International Exhibition

INVENTCOR

POSTER CATALOGUE 4th edition

Editor: Corneliu BIRTOK BĂNEASĂ

14-16 September 2023
Deva, Romania



SCAN ME

www.corneliugroup.ro

inventcordeva@gmail.com

ISSN 2971– 8392
ISSN – L 2971 – 8392

Editura **POLITEHNICA**

Catalogue 4th International Exhibition InventCor

14-16.09.2023 – Deva, Romania

International Exhibition InventCor 4rd edition

CORNELIUGROUP research-innovation Association in collaboration with **Faculty of Engineering Hunedoara - Politehnica University of Timisoara** organizes in a hybrid format, the **International Exhibition INVENTCOR**, 4th edition, 14-16.09.2023, at the **Cultural Center „Drăgan Muntean”** from Deva city.

Description: The event is dedicated to non-formal education for all ages. **INVENTCOR** presents inventions, research projects, products, educational programs, experimental teaching stands of universities, research institutes, multinational companies and private inventors.

Objective: The main objective of **INVENTCOR 2023** is the importance of developing the creative-innovative spirit, through the involvement of young people and the promotion of Hunedoara County.

Site: CORNELIUGROUP association https://www.corneliugroup.ro/inventcor.html

FB event page: INVENTCOR 2023 https://fb.me/e/HsV4uQj4

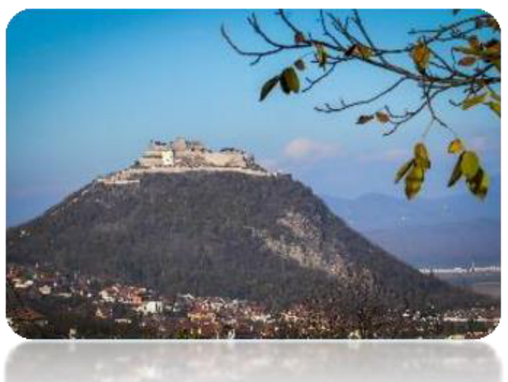
Period & Location: 14-16.09.2023 - **Cultural Center „Drăgan Muntean”**

Motto: Creation **O**pportunity **R**ealization

Promo: https://youtu.be/d9kepE5K6yA

Hashtag: #InventCOR2023 #CorneliuGroup #PutereaMintiiCreative

Origin: Deva City





INVENTCOR President: Corneliu Birtok Baneasa
https://www.facebook.com/corneliu.birtokbaneasa
https://www.linkedin.com/in/corneliu-birtok-baneasa-547765240

Catalogue 4th International Exhibition InventCor

14-16.09.2023 – Deva, Romania

The **International Exhibition INVENTCOR** covers the following fields: environmental protection, materials, bio & nanotechnology, food industry, architecture, IT, electronics, computer science, automotive, aeronautics, publications, history, medicine, agriculture, textiles, includes **KidsCorner** and **InnovativeART**.

The **Power of Creative Mind Symposium** will be held within **INVENTCOR** with presentations on various topics: science, innovation, ecology, security, health, community, intellectual property, teaching methods, entrepreneurship and others.
The interest shown for the 4th edition of **INVENTCOR 2023** is quantified in more than 300 registrations from 29 countries.

Participating Countries: Australia, Brazil, Canada, Cambodia, Cameroon, Egypt, England, Germany, Greece, Hungary, India, Indonesia, Iraq, Israel, Italy, Lebanon, Malaysia, Moldova, Philippines, Portugal, Romania, Saudi Arabia, Serbia, Spain, Sweden, Thailand, Turkey, Vietnam and Zanzibar.

Co-organizer

Politehnica University of Timișoara
https://www.upt.ro/Universitatea-Politehnica-Timisoara_en.html

Faculty of Engineering Hunedoara
http://www.fih.upt.ro/v4/#

Educational partners

County Library "Ovid Densusianu" Hunedoara-Deva
https://www.bibliotecadeva.ro/desprenoi.html

General Directorate of Monuments Administration and Tourist Promotion of Hunedoara County – DGAMPT
https://www.dgampt.ro/?page_id=5592

MUSEUM OF DACIAN AND ROMAN CIVILIZATION
https://mcdr.ro/index.php/en/home-5

Catalogue 4th International Exhibition InventCor

14-16.09.2023 – Deva, Romania

Research and innovation partners

The House of Science Deva
https://www.facebook.com/Casa-Stiintei-112843810370259/?ref=page_internal

Hunedoara County Center of Excellence
https://cexhd.ro/despre/

State Office for Inventions and Trademarks
https://www.osim.ro/en/

World Invention Intellectual Property associations
https://wiipa.org/about-us/

UPT Center for Innovation and Technology Transfer
https://citt.upt.ro/en/

The General Association of the Engineers in Romania Hunedoara Branch https://www.hunedoara.agir.ro/

Romanian Association for Alternative Technologies Sibiu - A.R.T.A. Sibiu
http://artasibiu.ro
https://www.facebook.com/mihail.titu/
mihail.titu@yahoo.com

The Patent - International Magazine of World Inventions
https://www.thepatent.news/

Research Center for Engineering and Management
http://www.mpt.upt.ro/eng/research/research-center.html

Romanian Inventors Forum
http://www.afir.org.ro/

Catalogue 4th International Exhibition InventCor

14-16.09.2023 – Deva, Romania

Toronto International Society of Innovation & Advanced Skills
https://www.tisias.org/

Satit Chula Innovation Society
Chulalongkorn University in Bangkok, Thailand
https://www.chula.ac.th/en/

Al Amaan Al Mutahida Company - Bagdad, Iraq
www.alamaan-iq.com

Indonesian Young Scientist Association (IYSA)
https://iysa.or.id/

Media partners

Other partners

INVENTCOR Jury

President of the Jury



*Prof. Eng.& Ec. **Aurel Mihail ȚÎȚU**, Sc.D. & Ph.D., Dr. Habil., Dr.h.c.*
"Lucian Blaga" University of Sibiu,
Romanian Association for Alternative Technologies Sibiu – A.R.T.A. Sibiu
mihail.titu@ulbsibiu.ro

Members of the Jury



*Prof. Eng. **Liviu MARȘAVINA**, Sc.D.*
Vice- rector of Scientific research, innovation, and technology transfer
Politehnica University of Timisoara
liviu.marsavina@upt.ro



*A/Prof. **Teodora MOCAN**, Ph.D., Dr. Habil.,*
"Iuliu Haţieganu" University of Medicine and Pharmacy Cluj Napoca
"Prof. Dr. Octavian Fodor" Regional Institute of Gastroenterology and Hepatology Cluj Napoca
teodora_mocan@yahoo.com



*Prof. Emeritus Eng. **Constantin OPREAN**, Sc.D., Dr.h.c.*
"Lucian Blaga" University of Sibiu
constantin.oprean@ulbsibiu.ro



*Prof. **Phan Quoc NGUYEN**, Ph.D.*
Technical Vietnam National University, Hanoi, Vietnam
pqnguyen77@yahoo.com

JURY

Catalogue 4th International Exhibition InventCor

14-16.09.2023 – Deva, Romania

Opportunity
CORNELIUGROUP Research-Innovation Association
INVENTCOR
Power of Creative Mind
Creation
Realization
Deva ROMANIA



A/Prof. Eng. Andrei Victor SANDU, Sc.D.
"Gheorghe Asachi" Technical University of Iasi
Romanian Inventors Forum
sav@tuiasi.ro



Prof. Eng. Niculae Eugen SEGHEDIN, Sc.D.
Gheorghe Asachi Technical University of Iasi
National Intitute of Inventions Iasi
neculai.seghedin@tuiasi.ro



Mr. Jeerasak JITROTJANARAK
Director of Satit Chula Innovation Society
Chulalongkorn University in Bangkok, Thailand



Mr. Robert ARMSTRONG
Deputy Director of Satit Chula Innovation Society
Chulalongkorn University in Bangkok, Thailand



Augustin SEMENESCU
Professor Habilitated Doctor M.Sc., B.Sc.
Politehnica University of Bucharest
augustin.semenescu@upb.ro



Prof. Eng. Alexandru MARIN, Sc.D., Dr. Habil.
Mentor at UPBizz Entrepreneurship Center
Politehnica University of Bucharest
alexandru.marin@upb.ro



Prof. Eng. Viorel NICOLAE, Sc.D.
Vice-rector of Education Quality
University of Pitesti
viorel.nicolae@upit.ro



Prof. Eng. Cătălin FETECĂU, Sc.D., Dr.h.c.
"Dunarea de Jos" University of Galați
catalin.fetecau@ugal.ro

JURY

Catalogue 4th International Exhibition InventCor

14-16.09.2023 – Deva, Romania

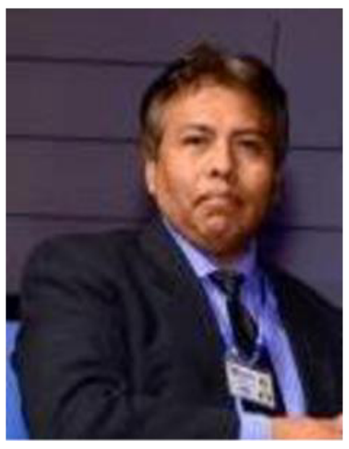
Opportunity
CORNELIUGROUP
Research-Innovation Association
Creation
INVENTCOR
Realization
Power of Creative Mind
Deva ROMANIA



Prof. Eng. Cornel CIUPAN, Sc.D.
Technical University of Cluj Napoca
cornel.ciupan@muri.utcluj.ro



Prof. Dr. Nataša TRIŠOVIĆ
University of Belgrade, Faculty of Mechanical Engineering, Serbia



Prof. Eng. Camilo Freddy Mendoza Morejon, Sc.D.
Universidade Estadual do Oeste do Paraná Brazil
camilo_freddy@hotmail.com



Prof. MD. Daniel COCHIOR, Ph.D., Dr. Habil.,
Rector of Titu Maiorescu University, Bucharest
rector@univ.utm.ro



Prof. Dr. Tatjana LAZOVIĆ
University of Belgrade, Faculty of Mechanical Engineering, Serbia
tlazovic@mas.bg.ac.rs



Prof. Eng. Radu Adrian MUNTEANU, Sc.D., Dr. Habil.
Technical University of Cluj Napoca
Radu.A.Munteanu@ethm.utcluj.ro



A/Prof. MD Gabriel Petre GORECKI, Ph.D.
Titu Maiorescu University, Bucharest
gabygo2006@yahoo.com



MD Ștefan ȚÎȚU
"Iuliu Haţieganu" University of Medicine and Pharmacy Cluj Napoca,
The Oncology Institute "Prof. Dr. Ion Chiricuță" Cluj-Napoca
stefan.titu@ymail.com

JURY

Catalogue 4th International Exhibition InventCor

14-16.09.2023 – Deva, Romania

Opportunity
CORNELIUGROUP Research-Innovation Association
Creation
INVENTCOR
Realization
Power of Creative Mind
Deva ROMANIA



Prof. Eng. Dumitru MNERIE, Sc.D.
Politehnica University of Timisoara
dumitru_mnerie@yahoo.com



Prof. MD. Dan TARNIȚĂ, Ph.D.
Faculty of Medicine and Pharmacy of Craiova
dan_tarnita@yahoo.com



Prof. Eng. Ovidiu NEMEȘ, Sc.D., Dr. Habil.
Technical Universiy of Cluj Napoca
ovidiu.nemes@imadd.utcluj.ro



Dipl. Eng. Adrian BOGORIN-PREDESCU
Continental Automotive Systems Sibiu
Lucian Blaga University of Sibiu
adrian_bogorin@yahoo.com



PROF. DR. MOHD MUSTAFA AL BAKRI ABDULLAH
Dean
Faculty of Chemical Engineering Technology
Universiti Malaysia Perlis (UniMAP)
Perlis, Malaysia
mustafa_albakri@unimap.edu.my



DR. Neyara RADWAN

Associate Professor
Mechanical Dept., Faculty of Engineering,
Suez Canal University, Egypt
Associate Professor
& the Quality Assurance Officer, PhD Program,
King Abdulaziz University, Jeddah , Saudi Arabia



A/Prof. Eng. Adrian SACHELARIE, Sc.D.
"Gheorghe Asachi" Technical University of Iasi
asachelarie@yahoo.com



A/Prof. Eng. Adina BUDIUL-BERGHIAN, Sc.D.
Politehnica University of Timișoara
adina.budiul@fih.upt.ro

Catalogue 4th International Exhibition InventCor

14-16.09.2023 – Deva, Romania

JURY



Dr. Habil. ***Irina FIERASCU***
Scientific Reasearcher I
National Institute for Research & Development in Chemistry and Petrochemistry ICECHIM Bucharest



Deni IRAWAN
President of Indonesian Young Scientist Association (IYSA)
youngscientist.iysa@gmail.com



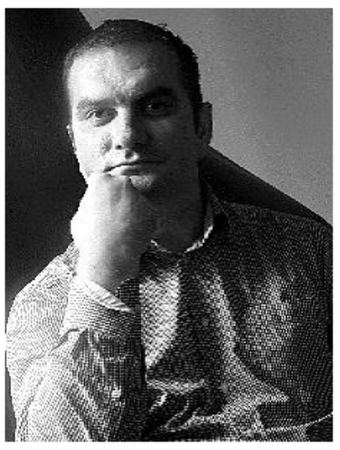
Edwina KASLER
Photography specialist
Founder of Kasler Studio
edwinakasler@yahoo.com



Dr. eng. ***Alina VLADESCU (Dragomir)***
National Institute of R&D for Optoelectronics-INOE2000
alinava@inoe.ro



Gherghina BODA*, Dr. Habil.*
Scientific researcher I
Museum of Dacian and Roman Civilization Deva
ginaboda15@gmail.com



Scientific researcher III
Dumitru-Cătălin ROGOJANU*, Dr. Habil.*
Museum of Dacian and Roman Civilization Deva
rogojanucatalindumitru@yahoo.com



Assist. Prof. ***Mohd Helmy Abd WAHAB****, Sc.D.*
University Tun Hussein Onn, Malaysia
helmy.uthm@gmail.com



Prof. Eng. ***Daniel GHICULESCU****, Sc.D., Dr. Habil.*
National University of Science and Technology POLITEHNICA Bucharest
daniel.ghiculescu@upb.ro

JURY

Catalogue 4th International Exhibition InventCor

14-16.09.2023 – Deva, Romania



Prof. Eng. Dan MILICI, Sc.D.
"Stefan cel Mare" University of Suceava
dam@usm.ro



Prof. Eng. Tihomir LATINOVIC Sc.D.
Member of BHAAAS Bosnia and Herzegovina American Academi Arts and Science
University Vitez, Faculty of Information technology



Anda VLAD, trademark attorney
Intellectual Property Office
consilier.marca@gmail.com



Prof. Eng. Anton FICAI, Ph.D., Dr. Habil.
Politehnica University of Bucharest
anton.ficai@upb.ro



Prof. Eng. Daniela TARNIȚĂ, Sc.D.
Craiova University
tarnita.daniela@gmail.com



Prof. Habil. Dr. Narcisa MEDERLE
Vice Dean, Faculty of Veterinary Medicine, Timișoara
"KING MIHAI I" UNIVERSITY OF LIFE SCIENCES FROM TIMISOARA
Member of the Academy
Academy of Agricultural and Forestry Sciences Gheorghe Ionescu-Sisești



Arlan Escal BOLASCO, LPT, MAEd
Oriental Mindoro National High School,
Calapan City, Philippines

Awards

Catalogue 4th International Exhibition InventCor

14-16.09.2023 – Deva, Romania

Opportunity
CORNELIUGROUP
Research-Innovation Association
Creation
INVENTCOR
Realization
Power of Creative Mind
Deva ROMANIA

InventCor Awards

The following awards are presented at the **InventCor International Exhibition**



- **INVENTCOR GRAND AWARD**
- **JURY AWARD**
- **MEDICINE AWARD**
- **CORNELIUGROUP AWARD**
- **A.R.T.A. Sibiu AWARD**
- **EDUCATION AWARD**
- **A.G.I.R. AWARD**
- **BEST INNOVATION AWARD**
- **MEDIA AWARD**
- **BUSINESS AWARD**
- **CREATIVE AWARD**
- **POPULARITY AWARD**
- **Categories Awards**
- **Special Awards of the participating institutions**

Following the international judging, gold, silver and bronze medals will be awarded.



Organizing committee

Corneliu BIRTOK BĂNEASĂ - Politehnica University of Timisoara

Aurel Mihail ȚÎȚU - "Lucian Blaga" University of Sibiu

Erika KOLLMANN - CorneliuGroup Association

Ana Virginia SOCALICI - Politehnica University of Timisoara

Diana STOICA - Politehnica University of Timisoara

Adina BUDIUL-BERGHIAN - Politehnica University of Timisoara

Oana GĂIANU - Politehnica University of Timisoara

Leonard-Nicolas MARARU - Politehnica University of Timisoara

Ștefan ȚÎȚU -"Iuliu Haţieganu" University of Medicine and Pharmacy Cluj-Napoca

Dimitrie-Cristian FODOR - "Gheorghe Asachi" Technical University of Iasi

Marius-Alexandru IȘTOC - Politehnica University of Timisoara

Sorin-Mihai BOBARU - Politehnica University of Timisoara

Lucian HENȚIU - Politehnica University of Timisoara

Paul Andrei Constantin MACARIE - CorneliuGroup Association

Miruna ARMIONI - Politehnica University of Timisoara

Aniela Iulia CRIȘAN - CorneliuGroup Association

Răzvan Dorian MĂGDUȚ - Politehnica University of Timisoara

Paul Sorin MUNTEAN - CorneliuGroup Association

Eugen BIRTOK - Politehnica University of Timisoara

Cristian ABRUDEAN - Politehnica University of Timisoara

Catalogue 4th International Exhibition InventCor

14-16.09.2023 – Deva, Romania

InventCor Categories

A - Energy, Protection of the environment, Biotechnology

B - Nanotechnology, Advanced materials, Metallurgy, Civil engineering

C - Computer sciences, Electronics and Electrical engineering

D - Automotive, Space science, Aviation, Ships, Mechanics

E - Teaching methods, Books, History and Cultural studies

F - Medicine, Paramedical, Pharmacy, Cosmetics, Hygiene

G - Agriculture, Veterinary medicine

H - Foods, Drinks, Restaurants, Hotels & Spa

I - Textiles, Clothing, Fashion, Handmade

J - Kids Corner, Games, Toys, Outdoor activities

K - Innovative ART, Music, Video, Photography, Publicity

Posters Catalogue

4th International Exhibition InventCor

14-16.09.2023 – Deva, Romania

Opportunity
CORNELIUGROUP Research-Innovation Association
Creation
INVENTCOR
Realization
Power of Creative Mind
Deva ROMANIA

A

Energy

Protection of the environment

Biotechnology

Reducing the impact on the environment by neutralizing expired drugs

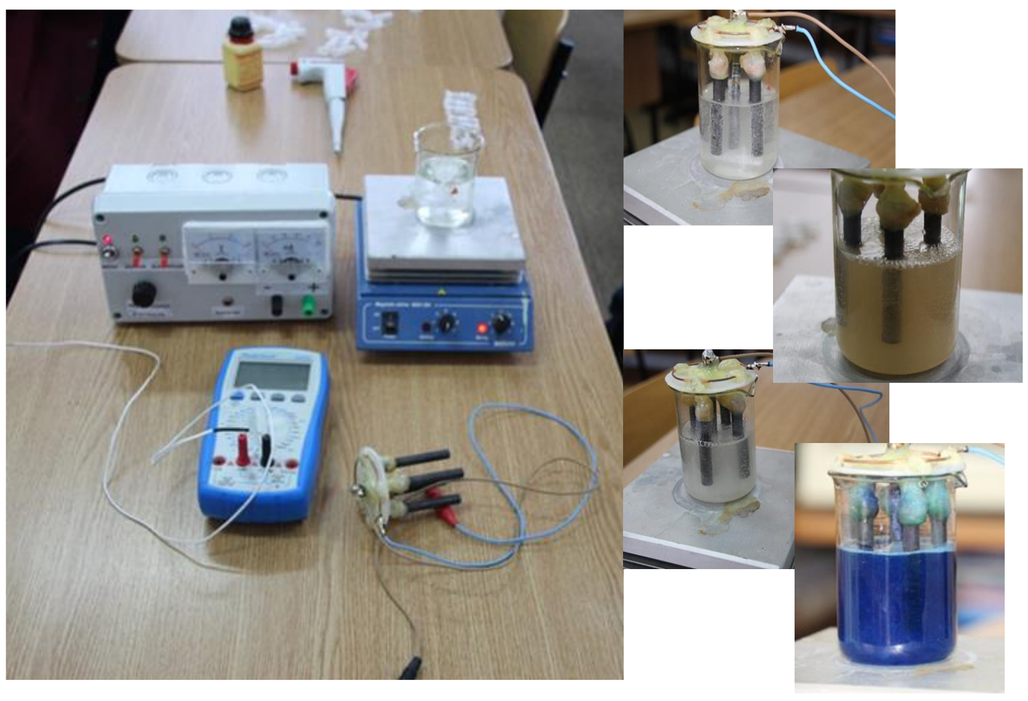
A

Research project

Authors: Erika Ardelean, Valentin Ordodi, Marius Ardelean, Ana Socalici

Used medicines can have a significant impact on the environment when disposed of improperly, as they may contain chemicals and active substances that can be harmful to living organisms and ecosystems. In general, used drugs enter the environment in two main ways: through direct disposal into wastewater and through storage in mixed waste and landfills/landfills, where they can reach groundwater or surface volatilization.

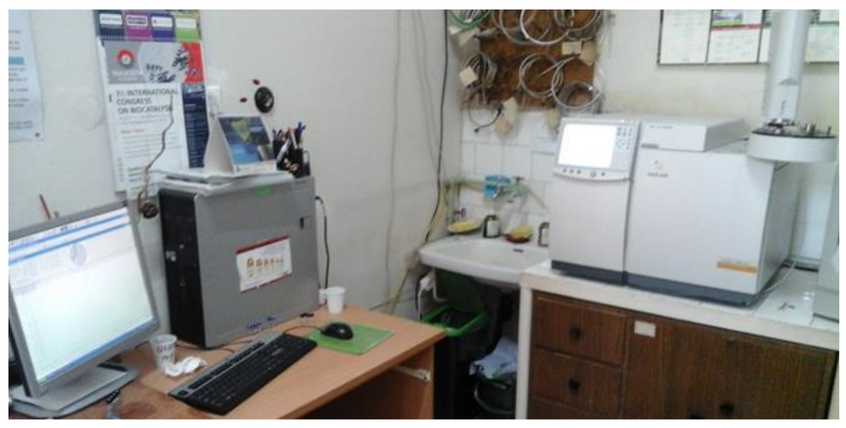
The substances selected for the experiments were ephedrine, acetaminophen, caffeine and methylene blue. These substances are active in the composition of many commercial pharmaceutical preparations, used in the treatment of a wide range of conditions. Our method is based on two processes: oxidation of hazardous waste considered in the study by reactive species of chlorine (sodium hypochlorite, hypo-chloric acid and physically dissolved chlorine); direct anode electro-oxidation of these wastes.





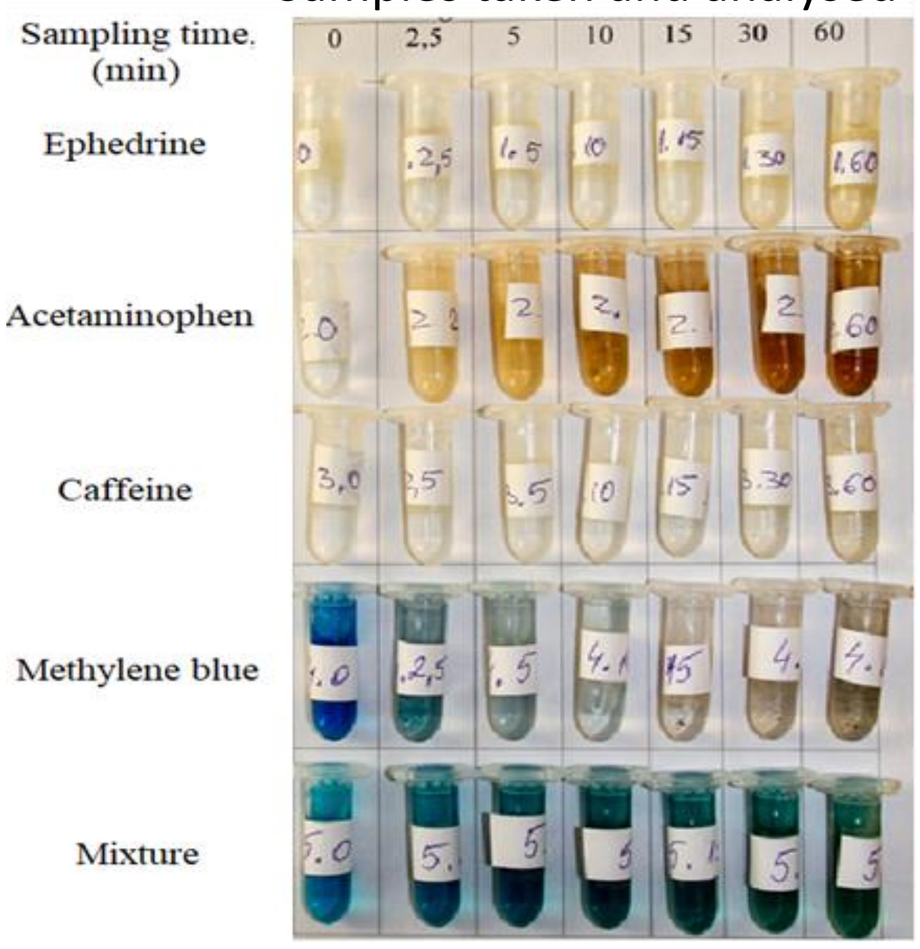
A combined solution resulted from mixing in 100ml sodium chloride solution 3%, 500mg ephedrine, 500mg acetaminophen, 500mg caffeine and 5mg methylene blue for pharmaceutical use.

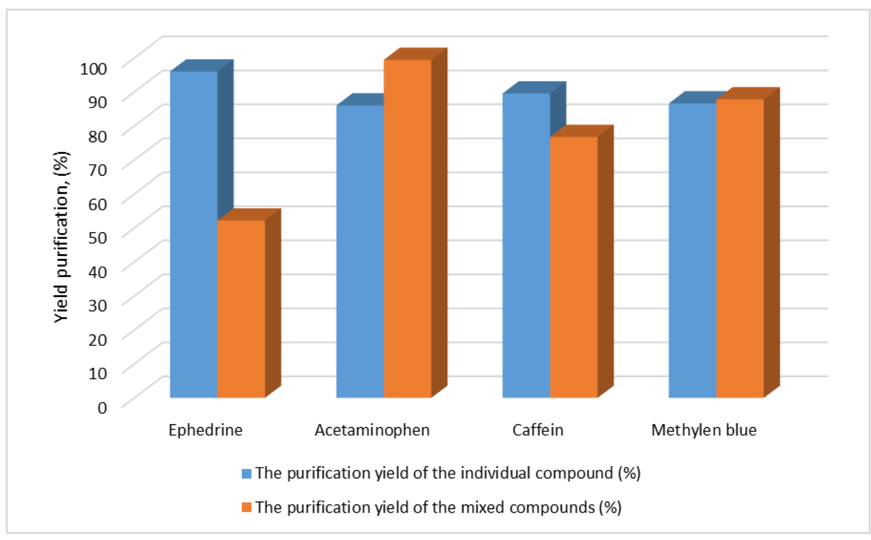




Sample vortexing system and Gas-chromatograph used

Samples taken and analysed





Comparative analysis between individual compound treatment and mixture compounds

At the end of the experiments it was concluded that:

- The need to implemented adequate waste management, in particular for hazardous waste, in order to improve and make more efficient collection, transport and neutralization of this wastes.
- The proposed electrochemical method can be applied to water-soluble substances or if is forming stable emulsions with water.
- It was concluded that: the combination of the 4 compounds has a favorable effect with regard to the purification of acetaminophen and methylene, but it is significantly unfavorable in the case of ephedrine and to a lesser extent in the case of caffeine.

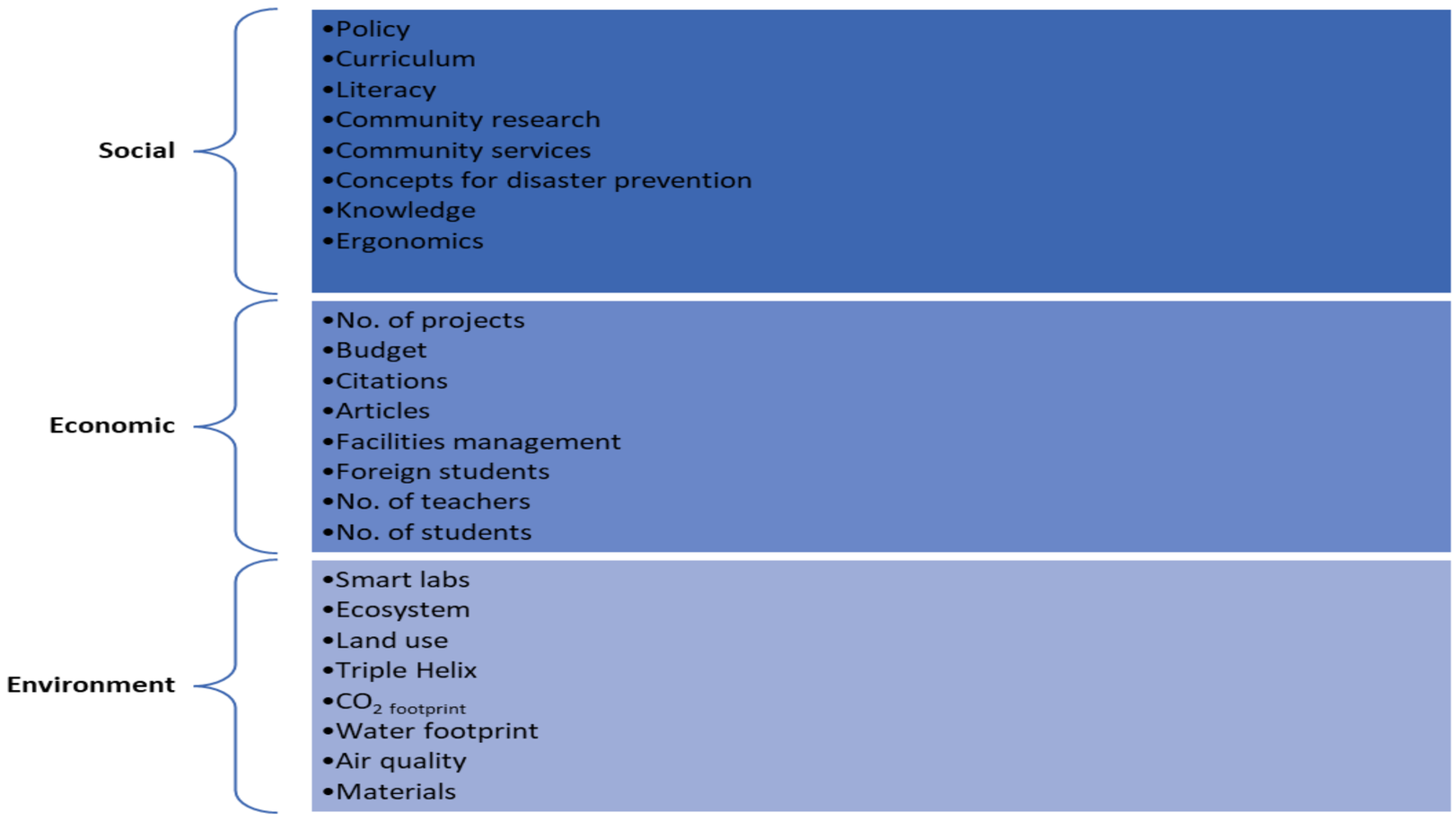
Contact: erika.ardelean@fih.upt.ro

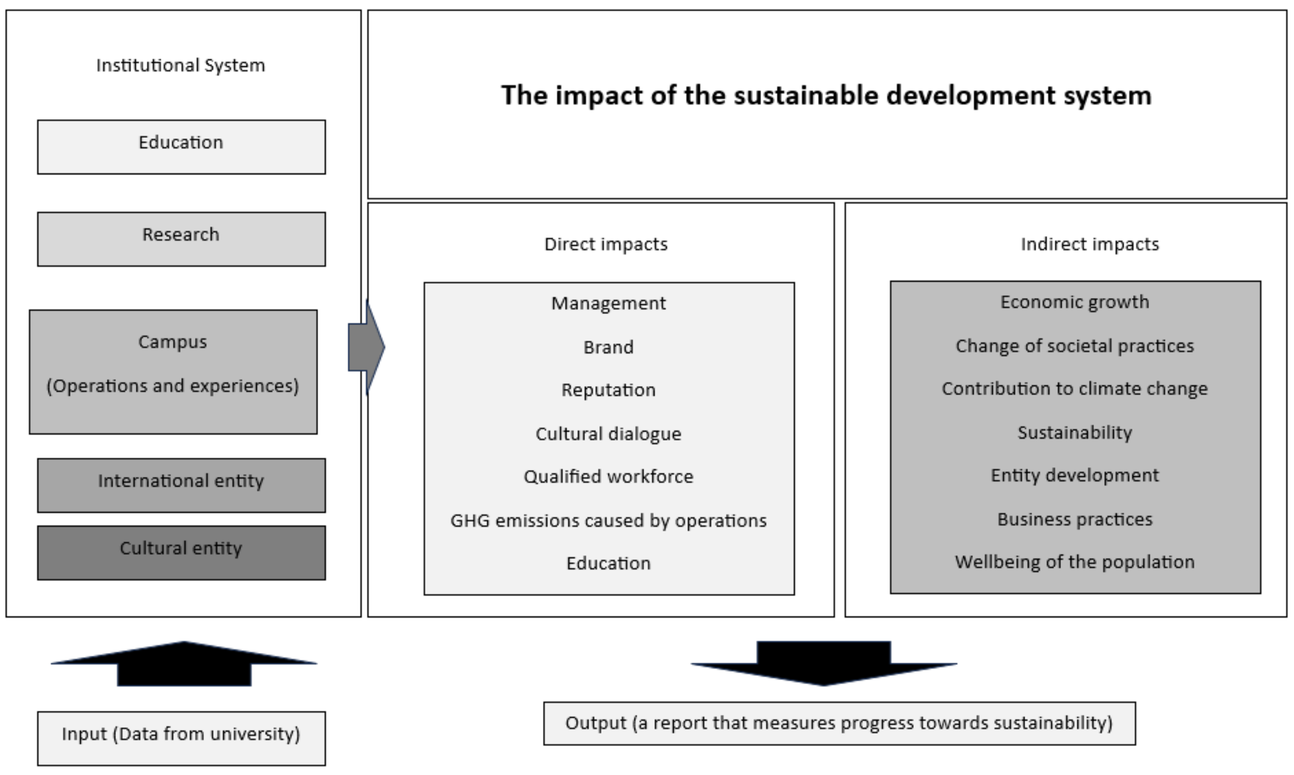
Innovative system for evaluating the sustainability of the university (SUny)

Authors: Delia ROZOVLEAN, Laura-Crina COCA, Larisa IVAȘCU

A

This innovative system is considered to be unique for evaluating the sustainability of universities. It is based on 150 indicators covering a wide range of issues, including policy, campus, financial resources, facilities management, curriculum, sustainability literacy, smart labs, community research, ecosystem, land use, energy, water, community services, concepts for disaster prevention and others. The established indicators fall under the three responsibilities of sustainability (economic, social, and environmental). The indicators are applied to the institutional system which is designed on 5 entities: education, research, campus (operations and experiences), international entity, and cultural entity. The purpose of the platform is to improve social responsibility and environmental performance through a whole institution approach.





This system will help with the design, planning, delivery, and control of your strategic sustainability activities.

The output of the system will be a report that measures progress towards sustainability and be recognized for sustainability leadership. The system will have direct impacts (management, brand, reputation, cultural dialogue, qualified workforce, GHG emissions caused by operations, and education) and indirect impacts (economic growth, change of societal practices, contribution to climate change, sustainability, entity development, business practices, and well-being of the population).

Contact: delia.rozovlean@upt.ro

Method of platinum recovery and capitalization from residual aqueous solutions

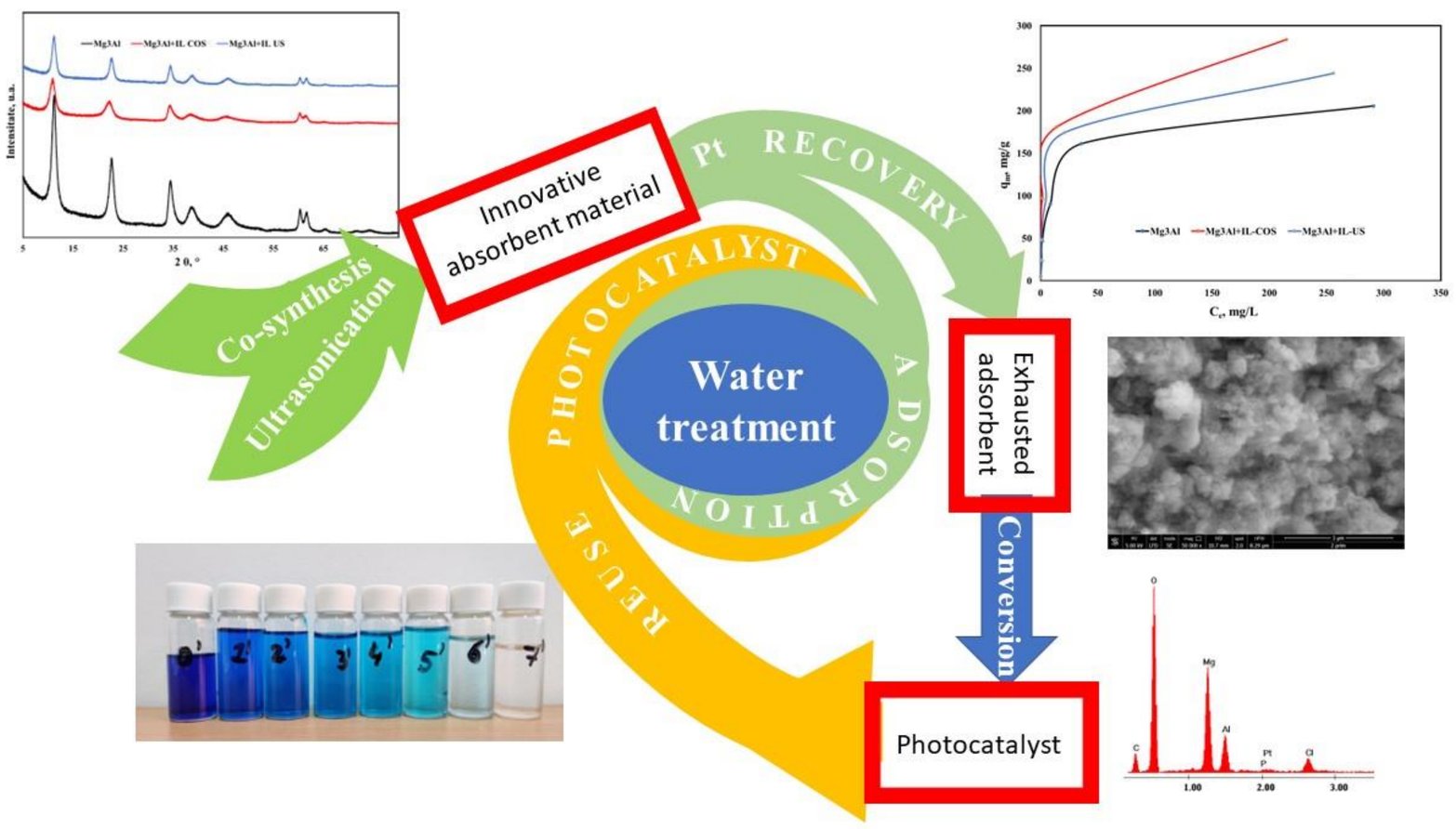
A

Patent number: OSIM - A/00056/ 08.02.2023

Authors: Lupa Lavinia, Cocheci Laura, Țolea Nick Samuel, Lazău Radu

Description

The invention relates to a method of platinum recovering from residual aqueous solutions by adsorption on new and efficient adsorbent materials, followed by their reutilization in the form of photocatalysts in the treatment process of waters containing undesirable organic compounds. The layered double hydroxides (LDH) of Mg_3Al, respectively Zn_3Al functionalized with ionic liquid, trihexyl tetradecyl phosphonium chloride (IL) are used as adsorbent materials.



ADVANTAGES

- Allows obtaining materials with significantly improved adsorbent properties by combining the advantages of ionic liquids with the properties of layered double hydroxides.
- Total production costs are minimized due to the use of a reduced amount of IL and avoiding their loss in the aqueous phase.
- An efficient recovery of Pt from aqueous solutions is achieved, obtaining materials with a content of up to 250 mg Pt/g adsorbent.
- Was developed a solution to recycle the adsorbed platinum on synthesized materials by reusing the spent adsorbents as photocatalysts in the degradation process of undesirable compounds from water.

Functionalization of LDH with IL is done by ultrasonication or co-synthesis. The recovery of platinum from aqueous solutions is carried out by adsorption on the newly synthesized materials. The adsorption process proceeds in dynamic mode at a solid:liquid=1:1 ratio, stirring time 60 min, ambient temperature, using aqueous solutions with an initial concentration of platinum ions up to 500 mg/L. The recovery of platinum ions is carried out by using exhausted adsorbent materials with a content of up to 250 mg Pt/g in the form of photocatalysts in the treatment process of waters containing emergent compounds (Ci, dyes ≤ 50 mg/L, Ci, drugs ≤ 250 mg/L and Ci, phenolic compounds≤ 200 mg/L). The photocatalysis processes take place at a ratio of aqueous solution: photocatalyst = 1 g/L, irradiation time 180 minutes, and ambient temperature. The proposed method is in accordance with the European "green" agreement (European Green Deal: "Clean environment and zero pollution"), proposing a solution that falls within the closed cycle technologies of platinum recovery and revalorization.

Acknowledgement

This work was supported by a grant of the Romanian Ministry of Education and Research, CNCS - UEFISCDI, project number PN-III-P1-1.1-TE-2019-1555, within PNCDI III

Contact: Lavinia Lupa, email: lavinia.lupa@upt.ro

ASSESSMENT OF WATER RESOURCES USING LANDSAT SATELLITE IMAGERY

A

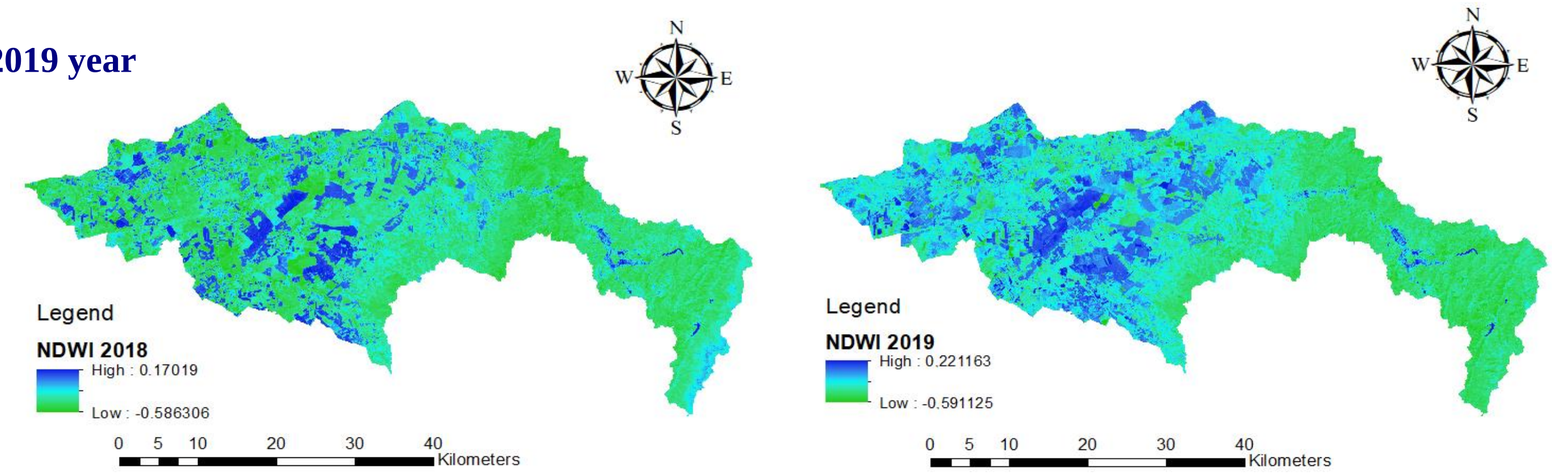
Research project

Author: Codruta Badaluta-Minda, Mihai Valentin Herbei

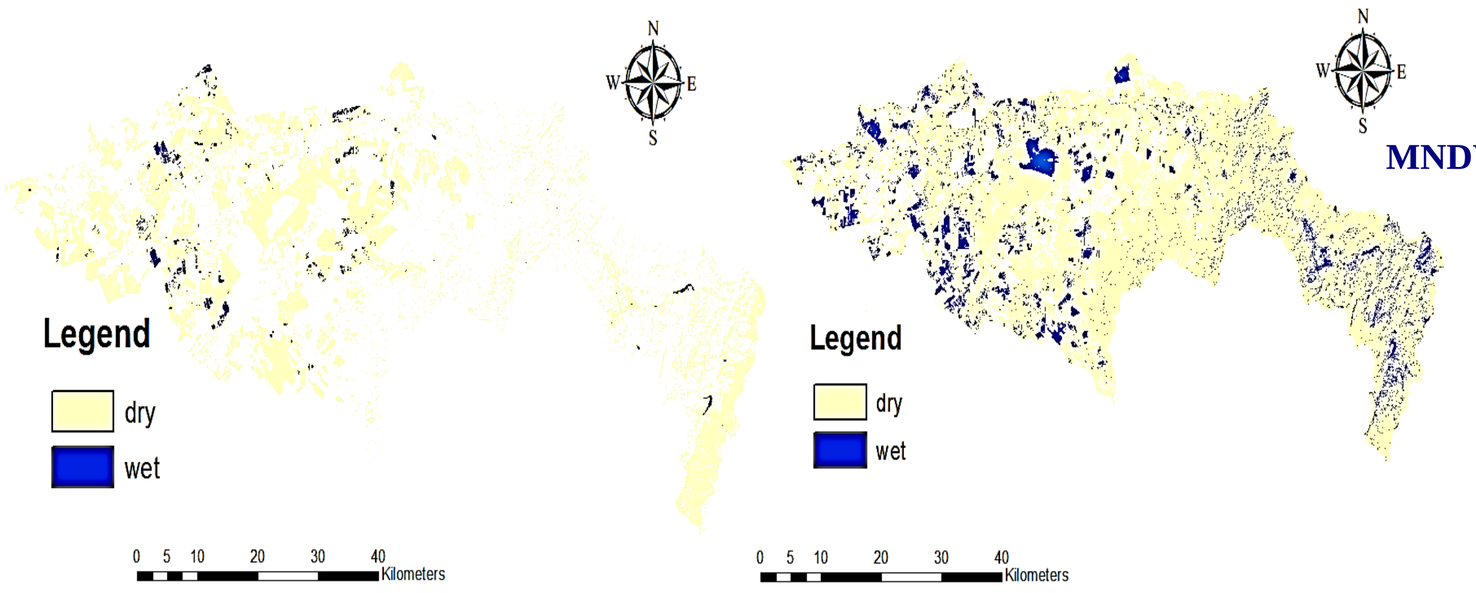
Observation of surface water is very important for studying hydrological processes and last advances in satellite-based optical remote sensors have promoted the field of sensing surface water of a certain area or from a catchment area. GIS techniques were used to extract data NDWI, MNDWI, and AWEI indices from Landsat-8 satellite in images to evaluate their performances for the extraction of surface water.

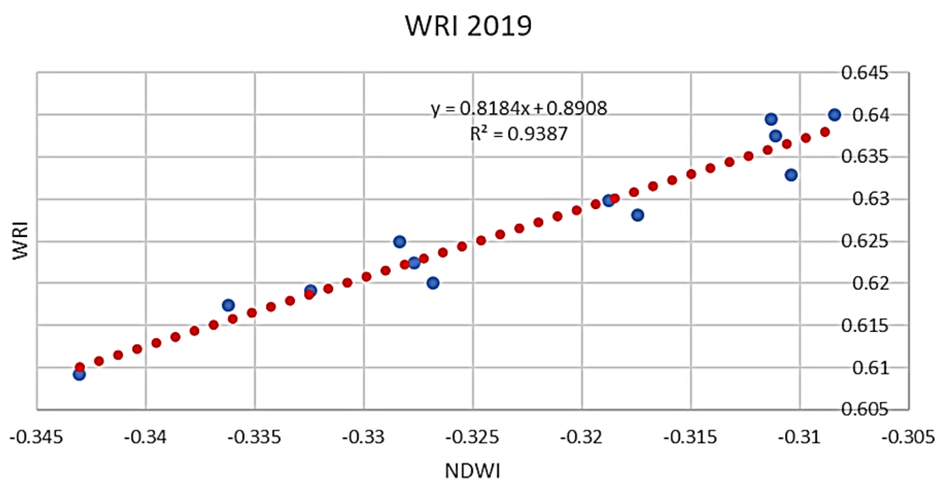
The objective of this research was to extract these surface water bodies from the hydrographic basin of river Barzava based on the indices resulting from the processing of satellite images after that, the obtained data are used for the purpose of finding correlation and regression equations between the reflectance of satellite image and the measured parameters of the water. Automatic water extraction index, introduced by addition and subtraction of bands with the coefficients. AWEInsh and AWEIsh can visually extract a large portion of the water pixels, eliminating most of the classification errors for shadows and other non-water surfaces, whereas AWEIsh is for removing shaded pixels and AWEInsh for the urban areas.

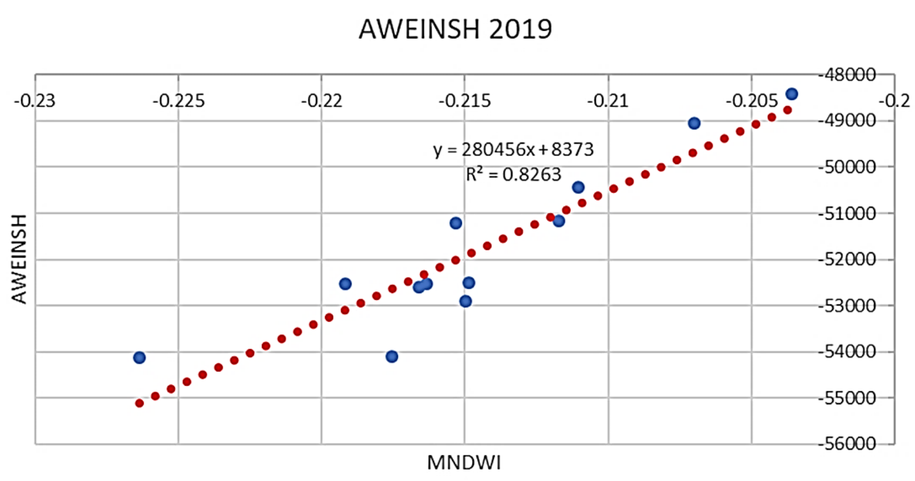
NDWI index for 2018 year, NDWI index for 2019 year



MNDWI index for 2018 year, MNDWI index for 2019 year







The study highlights the coverage of areas with surface water bodies in the river basin, using high-resolution images, and the coefficient of correlation between NDWI, MNDWI, AWIR, and WIR was used as a statistical measure of successful the regression model to explain the variation of the observed data.

Contact: Badaluta Minda Codruta , Email : codruta.badaluta-minda@upt.ro

Silver recovery from radiographic films

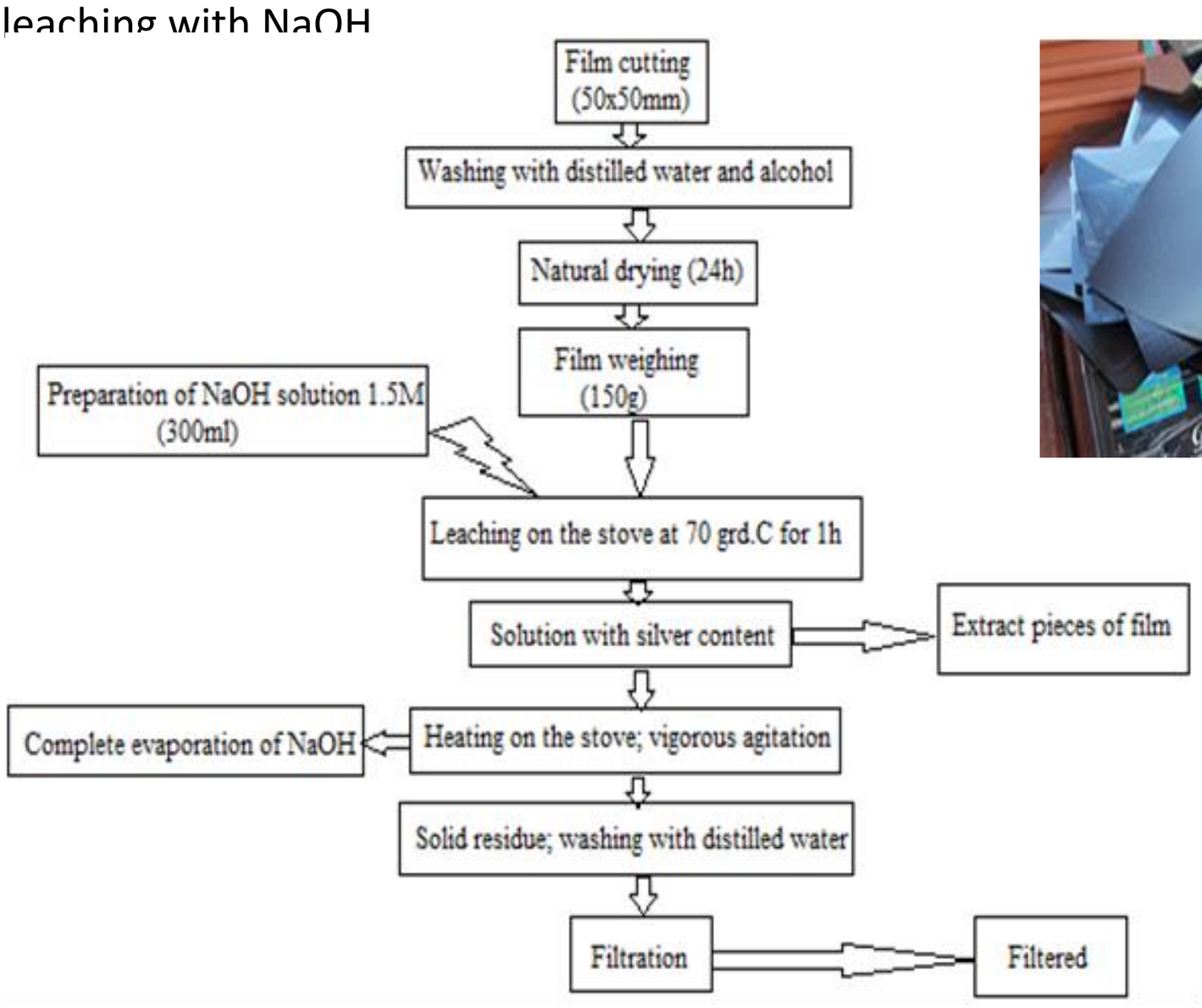
Research project

Authors: Marius Ardelean, Erika Ardelean, Corina Galfi, Ana Socalici, Ana Josan

A

Radiographic films used in the medical field consist of a polyester film covered on both sides with photosensitive radioactive material. The radiological image is produced on the radioscopic screen or on the radiographic film, and is formed due to the uneven absorption and uneven impression of the film and the screen when passing an X-ray beam through a body. On both sides of polyester layer we find an adhesive layer, photosensitive emulsion (made up of silver bromide embedded in gelatin), a protective layer.

For our own experiments, it was tried to identify a technological solution as simple as possible, reliable and efficient, in the context in which the solution generated must be also slightly polluting. For these reasons, it was chosen to experiment with the solution of recovering silver from radiographic films by leaching with NaOH











The experimental lot weighed 7.68kg of radiographic films, leached in 4M NaOH solution – initially 17 l solution, at a temperature that varied between 80-100°C, the leaching lasting about 4 hours. Subsequently the resulting solution – about 12 l solution was left to cool for 12h and then filtered on quantitative filter paper. The melting of the residue filtrates was carried out in a small capacity silica bar furnace in the presence of borax, at temperatures of maximum 1050°C, obtaining after melting a quantity of 55.7g Ag.

Using the proposed method is recovered an amount of Ag of 7.25g Ag / kg radiographic film. However, the problems that occurred during the experiments must be taken into account: gluing the films to each other, which requires introduction them one at a time for leaching or increasing the stirring speed (using mechanical equipment); the possibility of filtering the resulting solution at a much higher speed and with a higher yield (qualitative filtering using Buchner funnels); reducing the amount of solution by evaporation.

Currently, much more advanced investigation methods such as computed tomography (CT), nuclear magnetic resonance (MRI) or even computerized radiographs have appeared, all these methods involving to obtain the result in electronic format, on magnetic or optical media. But the replacement of old devices with modern equipment will be done in time, requiring large budgets for investments – which is why, for another period of time, the classical method will be used in many medical units.

Contact: marius.ardelean@fih.upt.ro

Opportunity — CORNELIUGROUP Research-Innovation Association — INVENTCOR — Creation — Realization — Power of Creative Mind — Deva ROMANIA

unioeste — Western Paraná State University

BRAZIL

SOLID WASTE MANAGEMENT MODEL WITH TECHNOLOGICAL INNOVATIONS

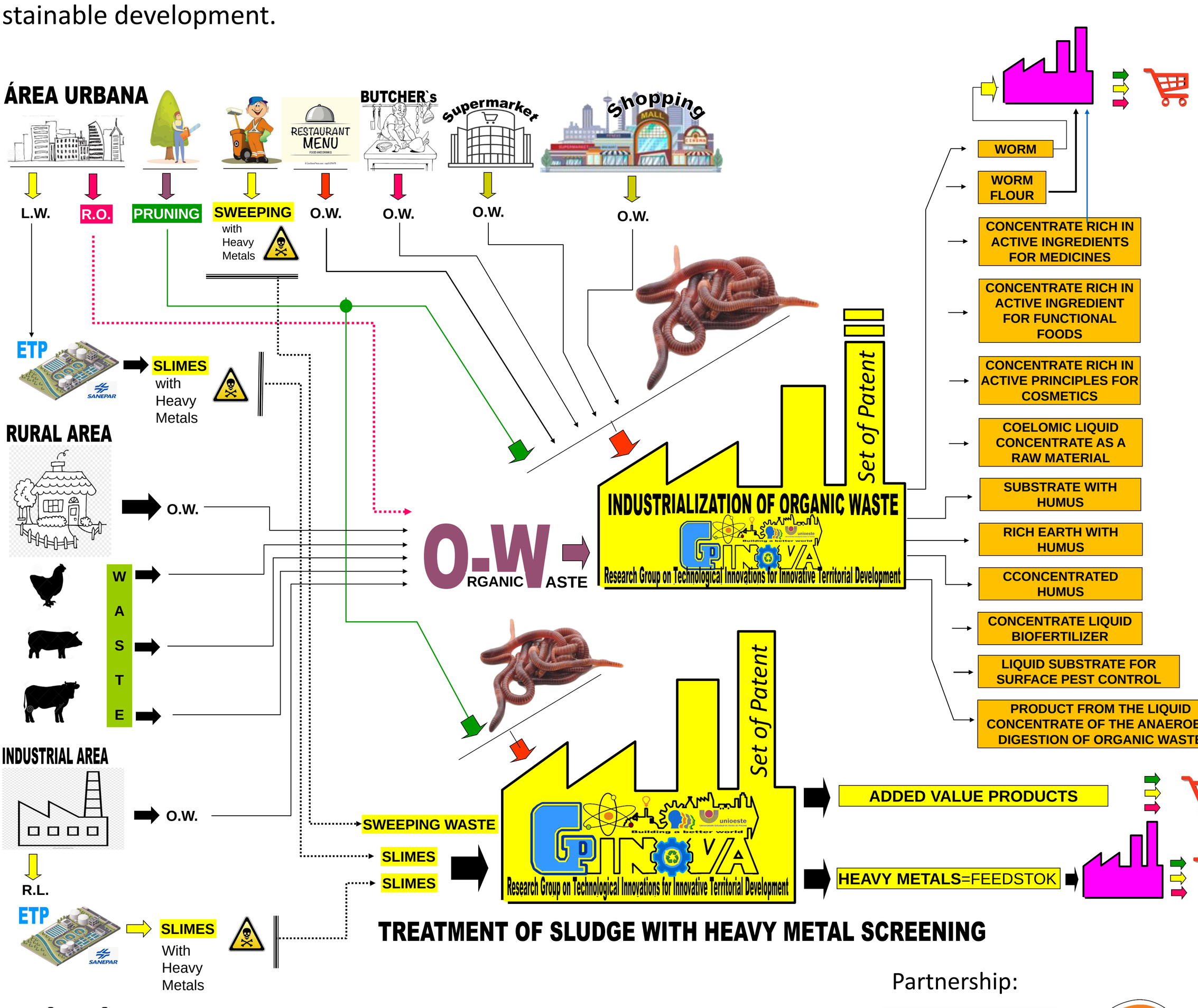
A

Set of Patent

Camilo Freddy Mendoza Morejon

Andy Avimael Saavedra Mendoza *and* ***Jeferson Alexandre dos Santos Bosa***

With the technological innovations developed at universities, organic waste from different sources ceases to be a problem and becomes raw material for industrialization processes of this waste. Even though these wastes contain heavy metal contaminants, they can be transformed into various value-added products. For this purpose, a management model for organic solid waste was developed, based on the use of innovative technologies with intellectual protection, which, after implementation, eliminate the need for landfills and other forms of improper disposal of this waste. This model is in line with the 17 goals of sustainable development.



Contact:

Camilo Freddy Mendoza Morejon

camilo.morejon@unioeste.br

0055 45 999341190

www.Unioeste.br

Project funded by:

CNPq — Conselho Nacional de Desenvolvimento Científico e Tecnológico

Partnership:

unioeste — Western Paraná State University X Minhocal® AGROINDUSTRIAL COMPANY

Research Group on Technological Innovations for Innovative Territorial Development

Opportunity
CORNELIUGROUP
Research-Innovation Association
Creation
Realization
INVENTCOR
Power of Creative Mind
Deva ROMANIA

NATIONAL INSTITUTE OF RESEARCH AND DEVELOPMENT FOR OPTOELECTRONICS

Method for determination of the Cherenkov cone in saline environment outside the Cherenkov detector volume.

Authors: Madalin Ion RUSU, Valeriu SAVU, Dan SAVASTRU

Patent application no. A/00354/2019

A

DESCRIPTION: The method for determination of the Cherenkov Cone of electromagnetic radiation in saline environment outside the Cherenkov detector volume is used to determine the positions of the optimal points for placing the detection elements outside the detector volume on flat surfaces determined by the next iteration, determining energy levels measured by external detection elements provided that they are higher than the energy levels measured by the detection elements inside the Cherenkov detector. This method is a novelty in the field of Cherenkov detectors and minimizes as much as possible the number of detection elements thus reducing costs.

NOVELTY: The invention relates to a method for determining the Cherenkov Cone of electromagnetic radiation in the saline environment outside the volume of the Cherenkov detector by placing in optimal points detection elements outside its volume in all x, y, z positive and negative directions.

The invention has the following advantages:

-determination of the Cherenkov Cone generated outside the Cherenkov detector;
-determining the placement surfaces of the detection elements outside the volume of the Cherenkov detector obtained by an iteration superior to the determination of the detector volume;
-minimizing the number of external detection elements;
-minimizing the measuring chain;
-minimizing the data processing time with the help of the dedicated software;
-determination of the Cherenkov Cone generated outside the detector in real conditions;
-increases the probability of detecting the events in which Con Cherenkov is generated outside the detector;
-involves minimizing the number of wells required outside the detector;
-this method can be used for any type of environment as long as the environmental attenuation footprint in the field in which the Cherenkov detector works in that environment does not change during the determination period;
-increases the detection accuracy of the Cherenkov cone in drastic situations.

APPLICATIONS: Astrophysics, to enrich the knowledge of the very distant Universe. This method is applied to achieve and extend the detection range of a well-defined volume of a Cherenkov detector in saline and other environments.

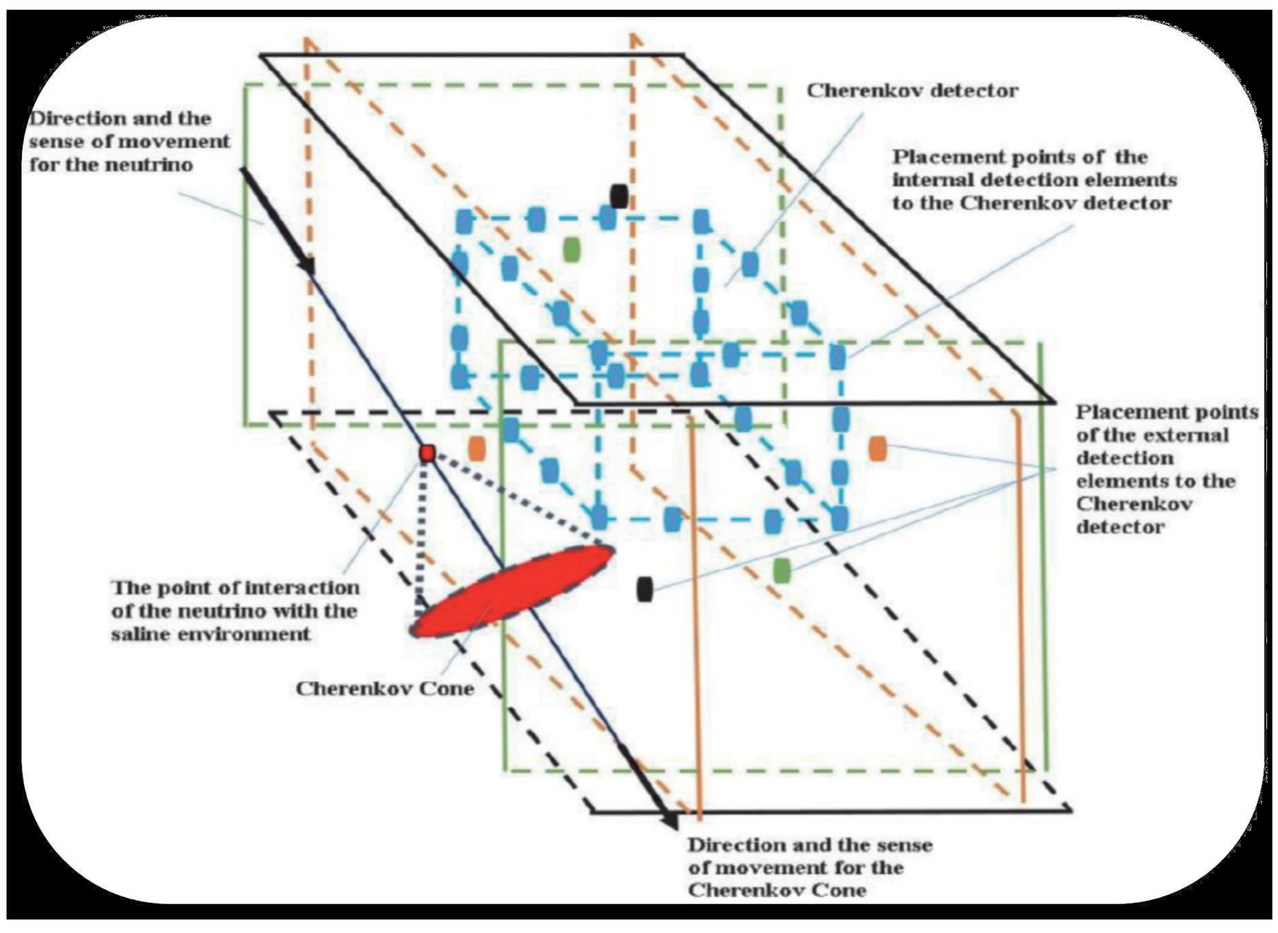


FIG. 1
An example of determination of the spatial positions of the placement plans of the detection elements external to the volume of the Cherenkov detector for a higher iteration of the determination of the volume of the Cherenkov detector in saline environment.

Contact: madalin@inoe.ro **+40726.216.353**

NATIONAL INSTITUTE OF RESEARCH AND DEVELOPMENT FOR OPTOELECTRONICS

A

Method of optimizing the Cherenkov detector of electromagnetic radiation in the saline environment.

Authors: Valeriu SAVU, Madalin Ion RUSU, Roxana SAVASTRU, Dan SAVASTRU

Patent application no. A00404/07.06.2018; RO133796-A2

DESCRIPTION: The method of optimizing the Cherenkov detector of electromagnetic radiation in the saline environment is used to determine the positions of the optimal placement points of the detection elements for measuring the electromagnetic radiation generated by the Cherenkov cone and also to determine the optimal position of the future Cherenkov detector in saline environment. This method minimizes the number of detection elements, simplifies the measurement chain and reduces costs, using dedicated software and thus leading to the enrichment of knowledge about the distant universe, being a quick method by using a footprint of the saline environment.

NOVELTY: The invention relates to a method for optimization the Cherenkov detector of electromagnetic radiations in saline environment by determination the optimal points for detection elements placement and minimized this points. Reduces costs and simplifies the measurement chain.

The invention has the following advantages:

-determine the optimal position of the Cherenkov detector in the total volume of saline environment;
-determine the optimal points of placement of the detection elements for the volume determined by each iteration, obtaining a Cherenkov detector forming by minimum 2 or more cube-in-cube detectors;
-minimizing the number of detection elements and the chain of measurement;
-the length of data processing by the software is low compared to other methods;
-Determination of the Cherenkov Cone in real conditions;
-Involves very low workmanship and material prices compared to known methods;
-involves minimizing the number of wells required to achieve the detector.

APPLICATIONS: Astrophysics, to enrich the knowledge about the very distant Universe. This method is applied to achievement a Cherenkov detector in saline environment.

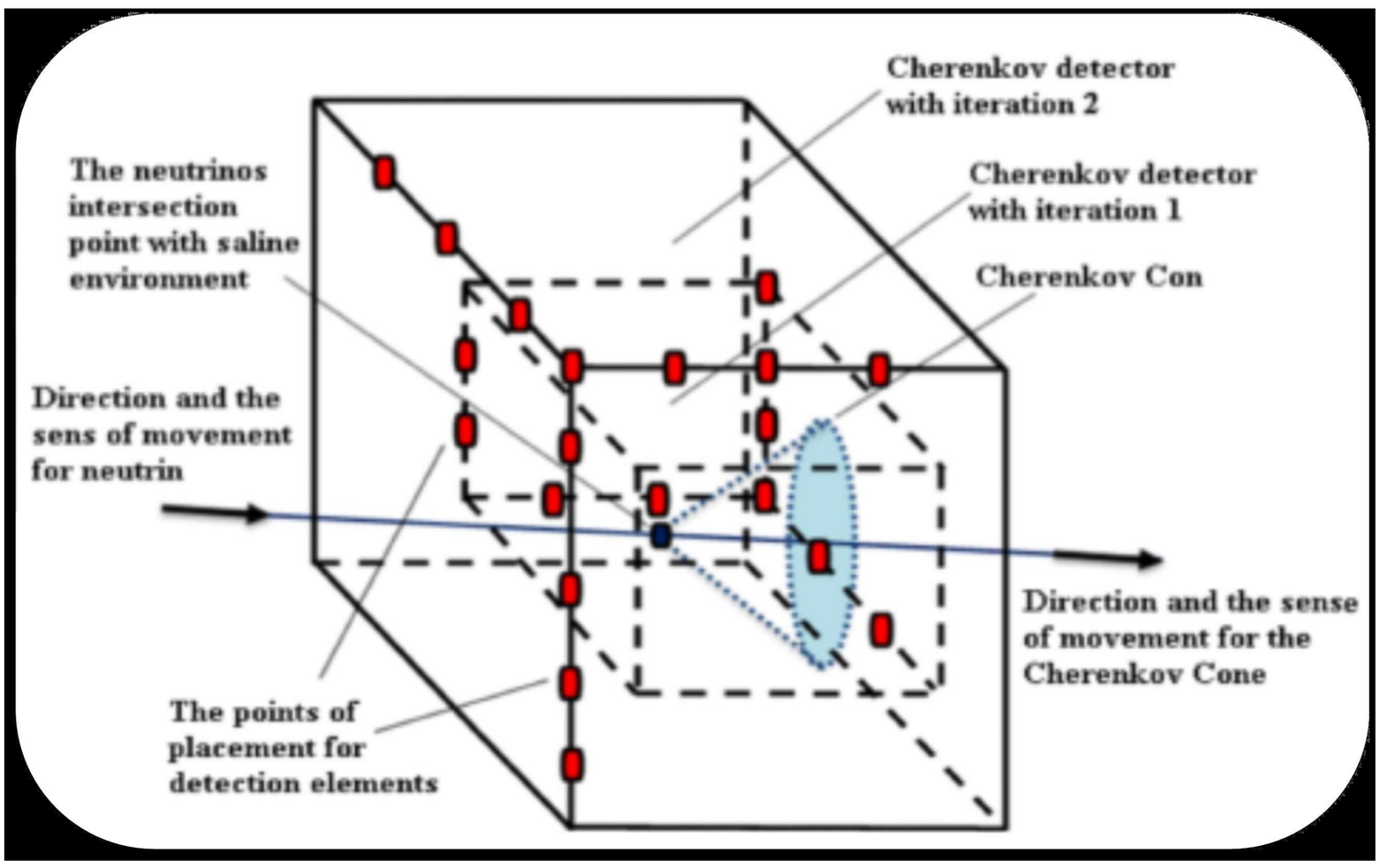


FIG. 1
Cherenkov detector of electromagnetic radiation in saline environment (by iterations), for two iterations and example of placement of the detection elements.

Contact: madalin@inoe.ro **+40726.216.353**

ECO FRIENDLY HELMET

Author: VENKATESH PENUMARTHI

A





INSTITUTION
Andhra University, India

Our project is an Eco Friendly Helmet. We use solar energy (Renewable Resources) to power the helmet. This solar energy can be stored and used to recharge mobile phones, torch lights, etc. It is helpful for traffic police, students, and people who travel, especially at night.

PROBLEM

ECO-FRIENDLY HELMETS SHOULD MEET THE SAME SAFETY STANDARDS AS TRADITIONAL HELMETS. EXTENSIVE RESEARCH AND TESTING SHOULD BE CONDUCTED TO ENSURE THAT THEY OFFER ADEQUATE PROTECTION.



DESCRIPTION

OUR ECO FRIENDLY HELMET IS ENVIRONMENTALLY FRIENDLY AND ENERGY-SAVING, SIGNIFICANTLY REDUCING ELECTRICITY BILLS. IT IS PERFECT FOR CONSTRUCTION WORKERS, SANITATION WORKERS, AND ANYONE LOOKING TO CONTRIBUTE TO A GREENER ENVIRONMENT. THE HELMET IS MADE UP OF WASTE MATERIALS FROM THE INDUSTRY, MAKING IT LOW COST AND COMPLETELY FREE FROM POLLUTION. WITH A BATTERY BACKUP OF UP TO 3 HOURS, IT ENSURES PROLONGED USAGE.



USIES IN SOCITY AND PROBLAM BASE SOLUCATION

An eco-friendly helmet is a helmet designed to have a minimal negative impact on the environment throughout its lifecycle.

It can be made from sustainable materials, be recyclable or biodegradable, and employ energy-efficient manufacturing processes. These helmets are increasingly gaining popularity as people become more conscious of the environmental impact of their choices.

Contact: Cofounder&CEO OF VENKAY-SCIENCE-PROJECTS
+917386185111 penumarthivenkatesh05@gmail.com

4th International Exhibition
InventCor
14-16.09.2023 – Deva, Romania

DEVELOPMENT OF NEW MATERIALS FOR THE INTEGRATED APPROACH OF WATER RESOURCES PROTECTION: FROM DETECTION TO DEPOLLUTION
AquaMat

A

Research Project PN 23.06.01.01

Radu Claudiu Fierascu, Ana Maria Gurban, Irina Fierascu, Teodor Sandu, Valentin Raditoiu, Cristina Enascuta, Irina Elena Chican, Mihaela Doni

GENERAL INFORMATION

Financing source: State budget
ICECHIM Core Programme: Sustainable Development through Advanced Chemistry for a Circular Economy - *ChemNewDeal* (PN 23.06)
Total value of the contract: 30.718.973,32 lei
Implementing period: 48 months
Contracting authority: Ministry of Research, Innovation and Digitization

PROJECT MAIN GOAL

The aim of the project is to develop monitoring systems, innovative nanomaterials and depollution technologies, through multi- and trans-disciplinary research, at the border between chemistry and other fields, such as environmental protection, chemical engineering, materials science, etc., with applications in the integrated management of the environment and its monitoring, respecting the concept of eco-innovation.

Specific Objective 1
PhD Chem Ana Maria Gurban

Development of miniaturized electrochemical (bio)sensors based on hybrid nanomaterials with performing electrocatalytic properties for the determination of pollutants.

Specific Objective 2
PhD Habil Irina Fierascu

The development of organic-inorganic composite materials intended for the depollution of waters loaded with emergent inorganic and organic contaminants through adsorption. The full exploitation, in cascade, of renewable resources

Specific Objective 3
PhD Chem Teodor Sandu

The development of innovative sol-gel materials containing silver ions, deposited on chitosan-based membranes, as well as their related biocomposites, with wastewater decontamination activity

Specific Objective 4
PhD Chem Valentin Raditoiu

The development of composite photocatalytic systems with semiconductor heterojunctions optimized for operation under artificial/natural lighting, in order to accelerate the pollutants photochemical decomposition

Specific Objective 5
PhD Chem Cristina Enascuta

Development of new catalyst systems required for wastewater treatment and their integration into a depollution process using catalytic ozonization

Specific Objective 6
PhD Habil Radu Claudiu Fierascu

Selection and integration of developed modules into a modular water resource treatment technology adapted to various types of water sources

ESTIMATED RESULTS

- 60 ISI papers
- 105 scientific conferences
- 17 patent applications
- Web page & online campaign
- 15 Studies
- 61 Technologies
- 28 Products
- 4 Workshop
- 10 PhD thesis
- 10 Inthernship
- 30 submitted projects
- 12 meetings with stakeholders

https://icechim.ro/ro/institut/chemnewdeal/chemnewdeal-pc1/

ACKNOWLEDGEMENTS
This work was carried out through the PN 23.06 Core Program - ChemNewDeal within the National Plan for Research, Development and Innovation 2022-2027, developed with the support of Ministry of Research, Innovation, and Digitization, project no. PN 23.06.01.01, AQUAMAT. The support provided by the Ministry of Research, Innovation and Digitization through Program 1-Development of the national research and development system, Subprogram 1.2-Institutional performance-Projects to finance excellence in RDI, Contract no. 15PFE/2021 is also gratefully acknowledged.

CONTACT:
Technical manager: PhD Habil Radu Claudiu Fierascu
fierascu.radu@icechim.ro

Opportunity — CORNELIUGROUP Research-Innovation Association — Creation — Realization — INVENTCOR — Power of Creative Mind — Deva ROMANIA

4th International Exhibition InventCor 14-16.09.2023 – Deva, Romania

ICECHIM

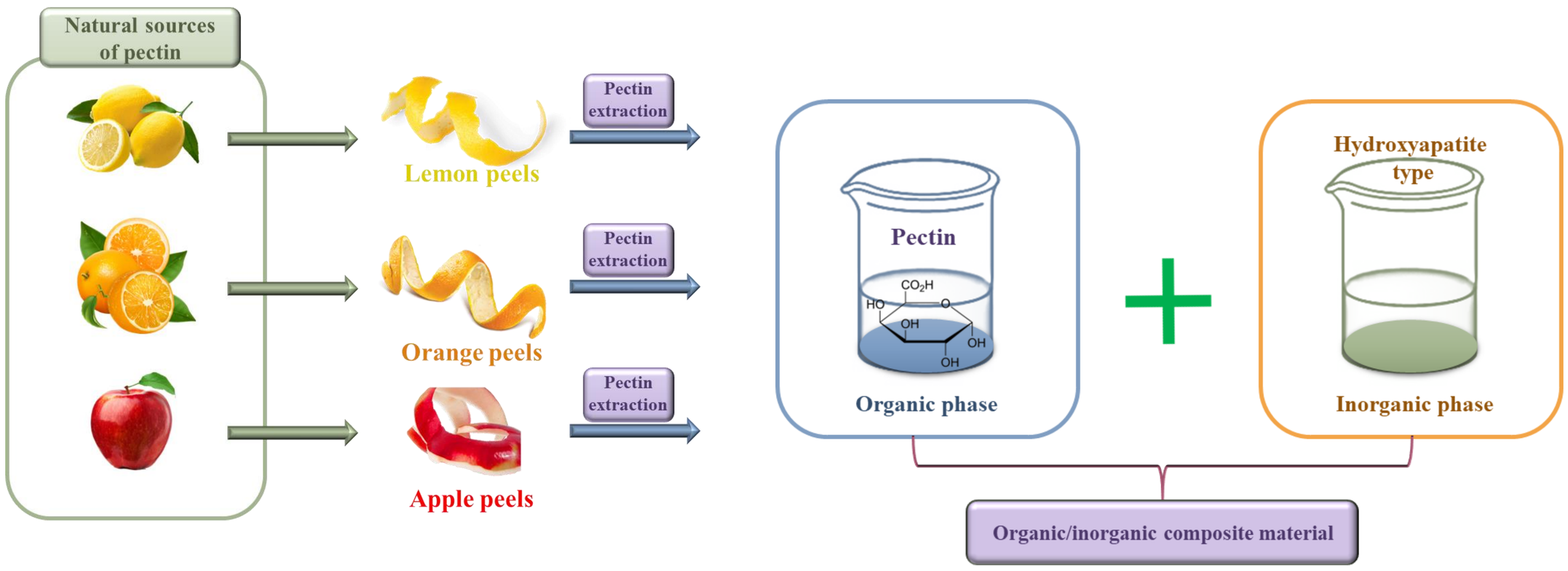
ORGANIC/INORGANIC COMPOSITE MATERIAL FOR THE ADSORPTION OF HEAVY METALS FROM AQUEOUS SOLUTIONS AND PROCEDURE FOR OBTAINING IT

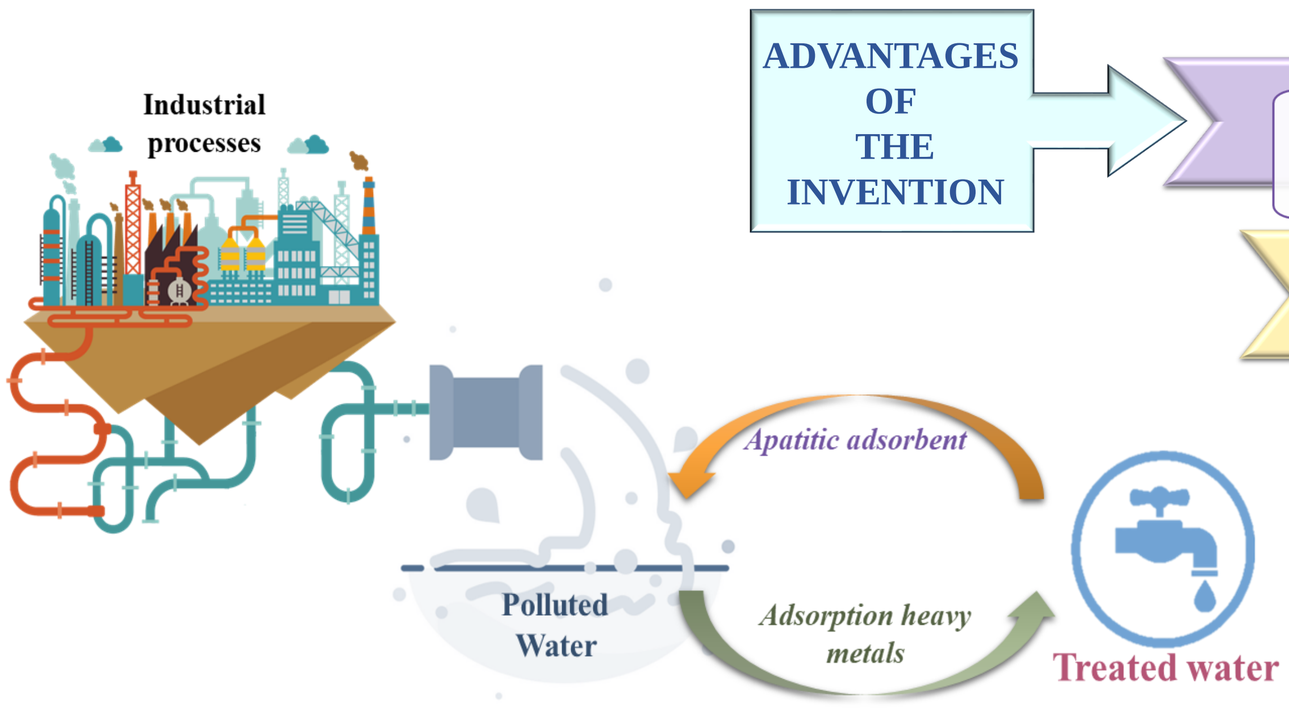
A

Patent application No. 00444/2023

Roxana Ioana Brazdis (Matei), Radu Claudiu Fierascu, Anda Maria Baroi, Toma Fistos, Irina Fierascu, Irina Elena Chican, Ioana Silvia Hosu

The present invention refers to a composite material formed from an organic phase, namely pectin obtained from vegetable waste (apple peels, citrus peels) and an inorganic phase formed from apatitic material of the hydroxyapatite type, in which calcium is partially displaced by magnesium, the composite material being used for the adsorption of heavy metals from aqueous solutions. The obtaining process consists of two stages, in the first stage pectin is obtained from vegetable waste, and in the second stage the apatitic material is obtained in the presence of pectin.





ADVANTAGES OF THE INVENTION

- Capitalization of vegetable waste (apple peels, citrus peels)
- It is stable and allows the adsorption of heavy metals at ambient temperature, atmospheric pressure and in the pH range found in aqueous effluents
- Adsorption capacity of heavy metals from aqueous matrices
- It is reproducible from the point of view of the physical-structural properties
- It uses compounds whose synthesis is fast, economical, and without negative action on the environment and human health
- Does not present secondary pollution
- It is obtained by known processes, without requiring high production costs
- It can also be used in case of accidental pollution, with high pollutant concentrations

ACKNOWLEDGEMENTS

This work was carried out through the PN 23.06 Core Program - ChemNewDeal within the National Plan for Research, Development and Innovation 2022-2027, developed with the support of Ministry of Research, Innovation, and Digitization, project no. PN 23.06.01.01 AquaMat. It is also acknowledged the support of Ministry of Research, Innovation and Digitization through Program 1 - Development of the national research-development system, Subprogram 1.2-Institutional performance- Projects to finance excellence in RDI, Contract no. 15PFE/2021.

CONTACT:

Technical manager: PhD Habil Radu Claudiu Fierascu

fierascu.radu@icechim.ro

Biomaterials with silver nanoparticles and *Ganoderma lucidum* metabolites and procedure for their obtaining

Patent application A/00123/2023

Mariana Constantin, Iuliana Răut, Raluca Suica-Bunghez, Ana-Maria Gurban, Cristina Firincă, Lucian-Gabriel Zamfir, Gelu Vasilescu, Nicoleta Radu, Maria-Luiza Jecu

National Institute for Research & Development in Chemistry and Petrochemistry- ICECHIM, 202 Independentei Spl., 060021, Bucharest, Romania

A

Background

The invention is related to the obtainment of metallic nanoparticles through **green synthesis**, a safe and nontoxic for environment as compared to conventional chemical and physical methods. The biosynthesis occurs using *Ganoderma lucidum,* a commonly used medicinal *Basidiomycete* with distinctive biological properties. The patent application claims the cultivation of *Ganoderma lucidum* on suitable culture medium, preparation of aqueous mycelium extract, and biosynthesis of AgNPs in presence of silver precursor (Fig. 1). The potential impact of AgNPs on health safety and control was proved by the antimicrobial activity expressed against representative pathogenic microorganisms, such as *Escherichia coli, Pseudomonas aeruginosa, Staphylococcus aureus, Candida albicans,* and *Candida parapsilosis.*

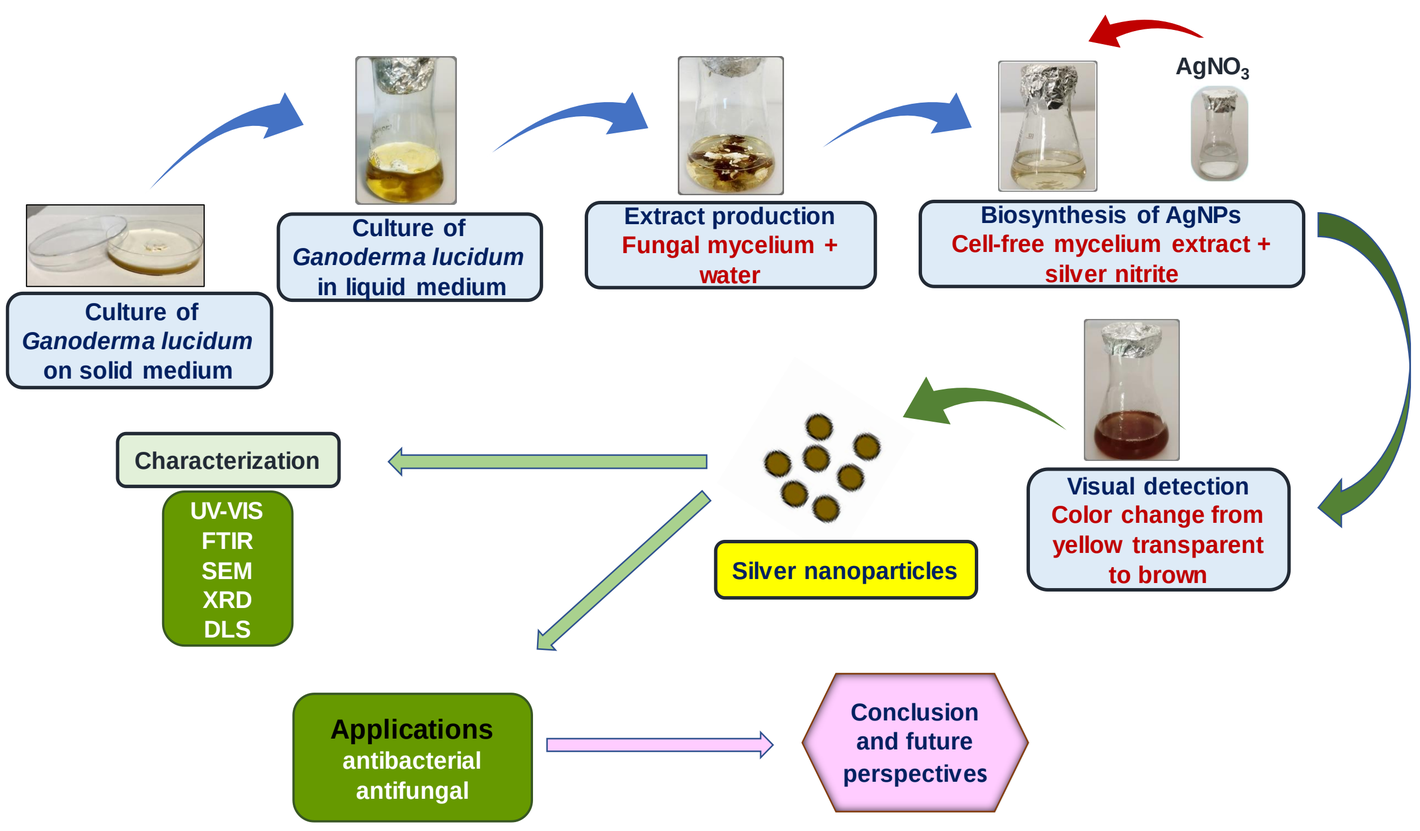


Fig. 1. Schematic representation of green synthesis for AgNPs

The maximum UV absorption was obtained at 420 nm, which is the specific surface plasmon resonance band for biosynthesized AgNPs (Fig. 3a). FTIR spectra illustrated the presence of functional groups that can support the reducing of ion Ag^+ to Ag(0) (Fig. 3b). SEM images showed particles predominantly spherical (Fig 4).

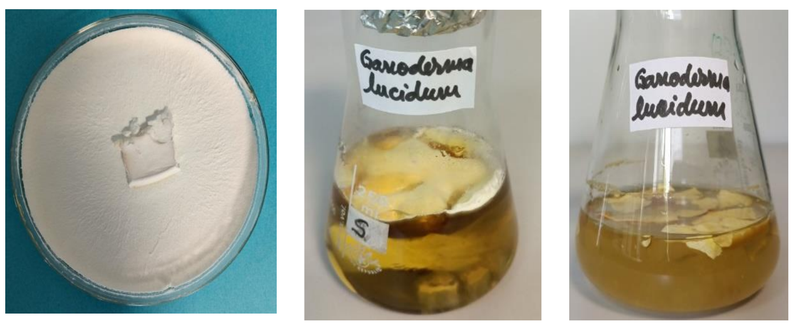
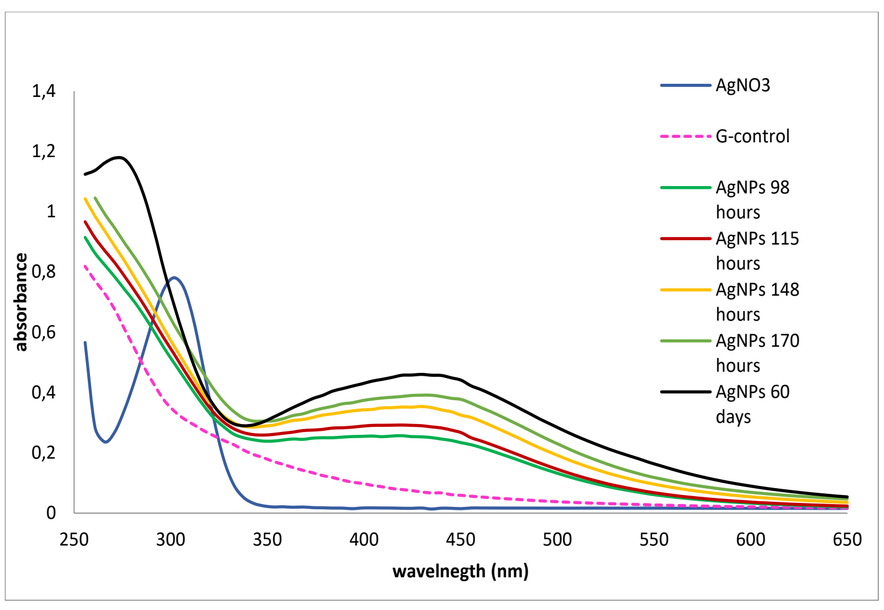


Fig. 2. Obtainment of aqueous fungal extract from *Ganoderma lucidum* culture



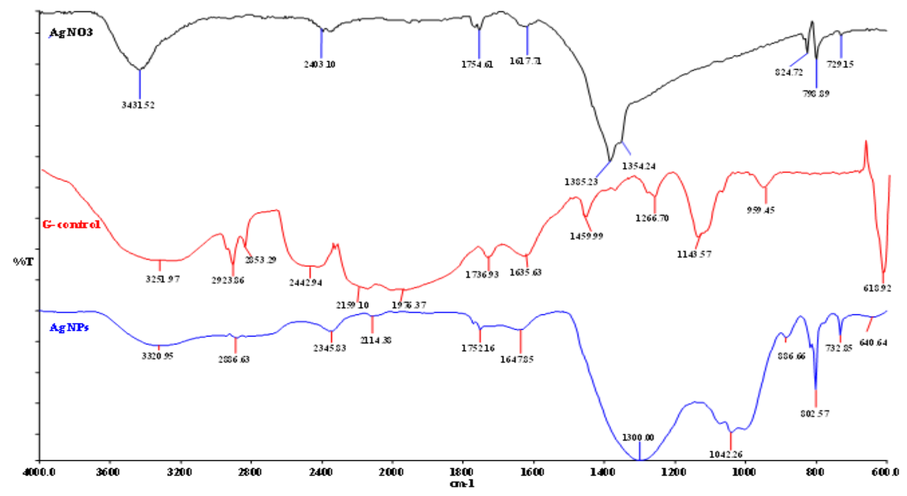
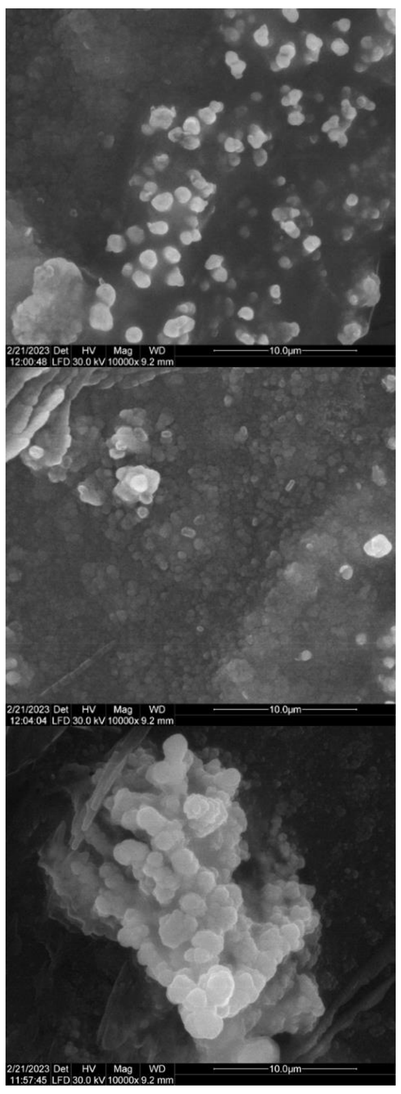


Fig. 3. UV-VIS (a) and FTIR (b) spectra of biosynthesized AgNPs



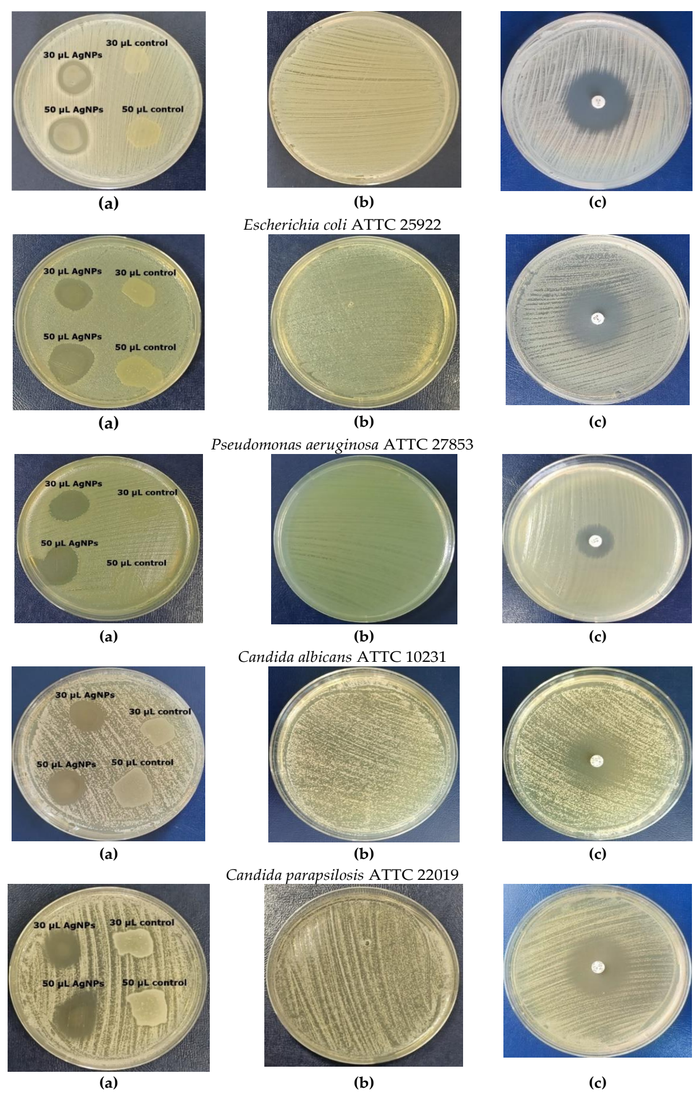


Fig. 4. SEM images (left), and antimicrobial activity (right) of biosynthesized AgNPs. Diffusion method in Petri plates: (a) Zones of pathogen inhibition; (b) Pure culture of pathogen; (c) Positive test - inhibition of pathogen by specific antibiotic impregnated in paper disk.

Contact: jecu.luiza@icechim.ro

Catalytic system with the structure of metal oxides for the treatment of traces of waste water residues

A0339/29.06.2023

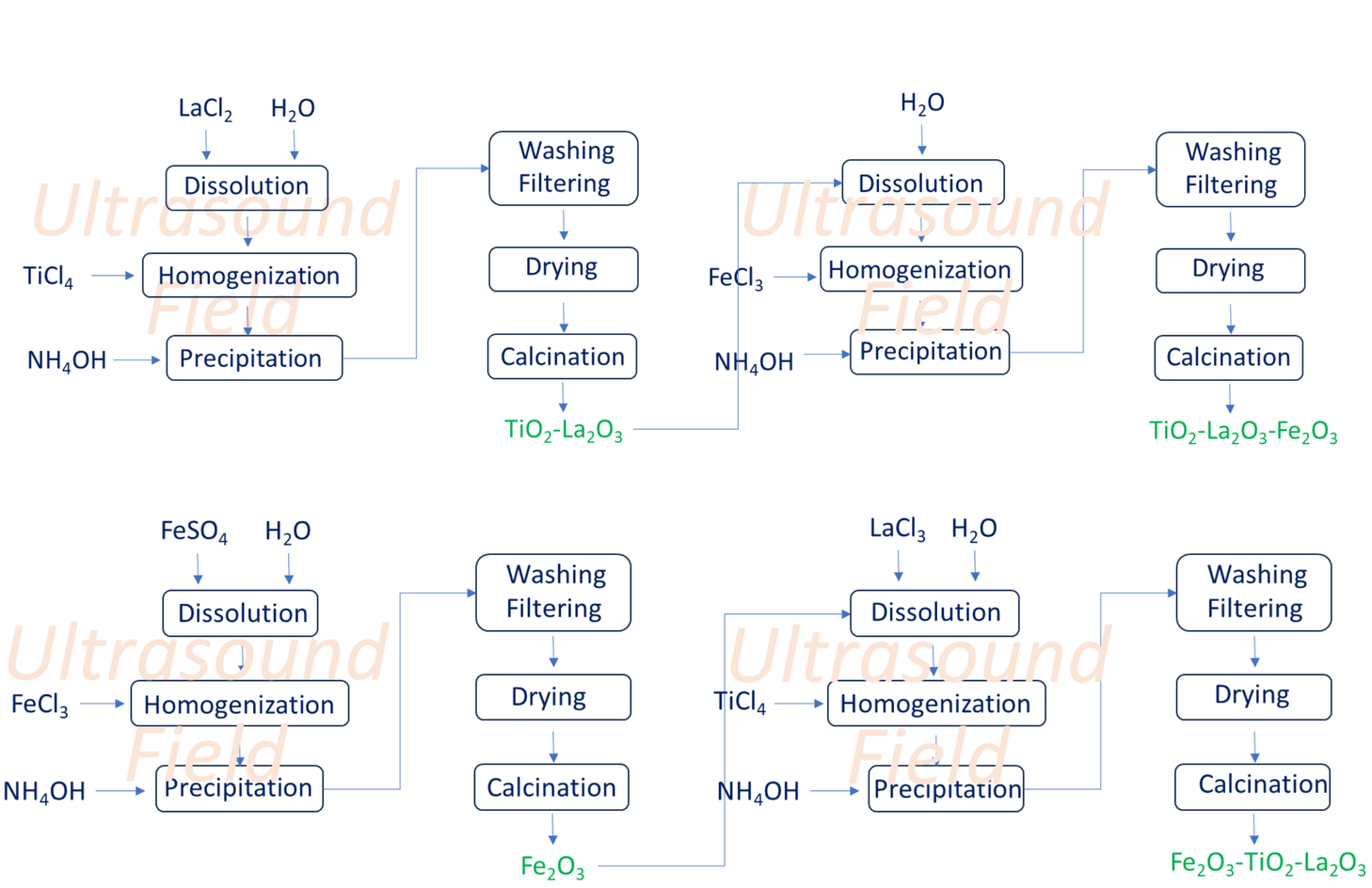
Enăşcuţă C.-E., Sîrbu E.-E., Fierăscu R. C., Ganciarov M., Pşenovschi G., Vlaicu A.

Category:

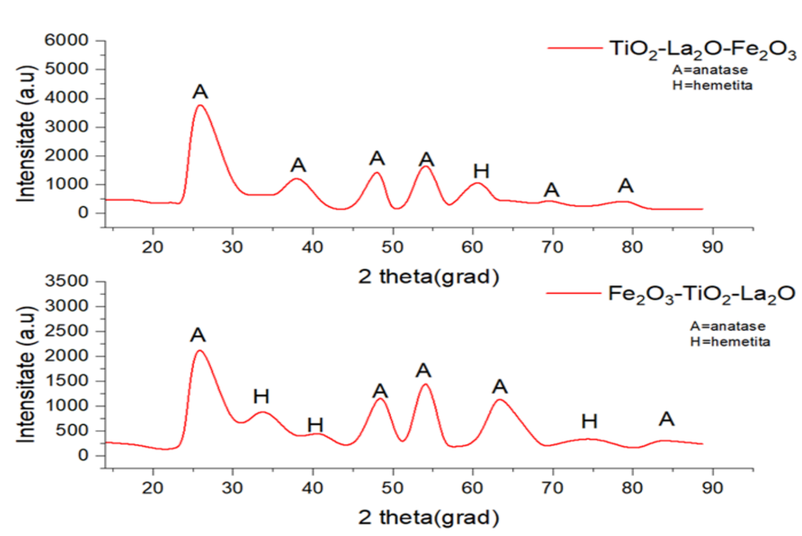
A

Description

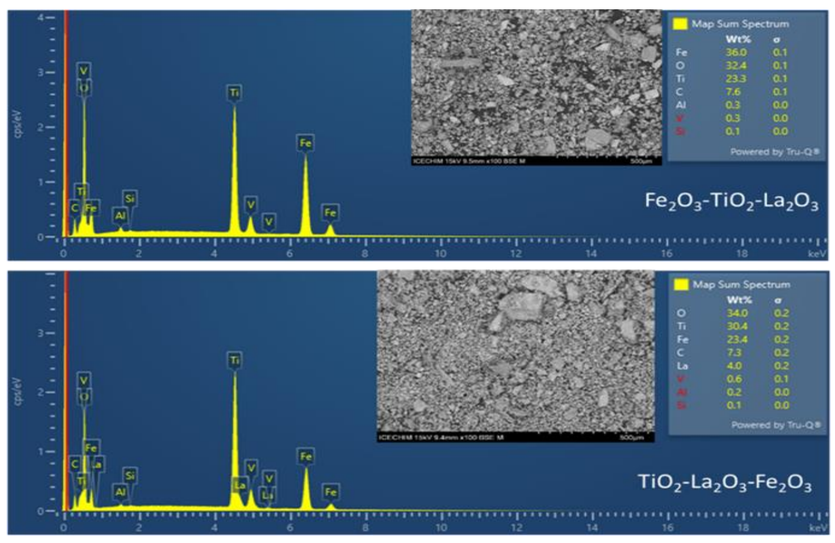
The invention refers to a process for obtaining in the ultrasound field a catalytic system with the structure of metal oxides used in the advanced treatment of waste water resulting from the pharmaceutical and agriculture industry. The invention belongs to the technical field of wastewater treatment by photocatalytic oxidation. The magnetic photocatalyst containing oxide components of Fe_2O, TiO_2 and La_2O_3 is obtained by the co-precipitation-calcination method. Mixed titanium and lanthanum dioxide is used as an intermediate coating, over which a layer of Fe_2O_3 is deposited. The magnetic photocatalyst can be activated in the presence of sunlight, being used to treat water impure with organic compounds from the pharmaceutical industry or agricultural water.



Technological scheme for obtaining of the catalytic system with the structure of metal oxides



XRD characterization of the catalytic system



SEM characterization of the catalytic system

ADVANTAGES:

- ✓ relatively cheap photocatalytic support with high photocatalytic activity used in the treatment of waste water
- ✓ optimal preparation method of TiO_2-La_2O_3-Fe_2O_3
- ✓ realization of the process of obtaining in the ultrasound field that favors the homogenous dispersion of iron oxide on the TiO_2-La_2O_3 mixed oxide support
- ✓ a photocatalyst that allows the treatment of waste water in a relatively short time
- ✓ the photocatalyst can be quickly recovered and reused repeatedly.

Acknowledgements: *This work was supported by a grant from the Ministry of Research, Innovation and Digitization, CNCS/CCCDI-UEFISCDI, project number PN-III-P3-3.5-EUK-2019-0169, within PNCDI III; this work was carried out through the PN 23.06 Core Program—ChemNewDeal within the National Plan for Research, Development and Innovation 2022-2027, developed with the support from Ministry of Research, Innovation, and Digitization, project no. PN 23.06.01.01.*

Contact: *cristina.enascuta@gmail.com; +40722742047*

Opportunity
CORNELIUGROUP
Research-Innovation Association
Creation
Realization
INVENTCOR
Power of Creative Mind
Deva ROMANIA

INFLPR
INSTITUTUL NAȚIONAL DE CERCETARE-DEZVOLTARE
PENTRU FIZICA LASERILOR, PLASMEI ȘI RADIAȚIEI

SOCIETATEA ROMANA PENTRU CERTIFICARE ROCERT
SR EN ISO 9001:2015
SR EN ISO 14001:2015
SR ISO 45001:2018
SR EN ISO/IEC 27001:2018
SR 13572:2016

Fabrication of WO_3 thin films with enhanced photoelectrochemical efficiencies in alkaline solution

Patent A/00583/27.09.2021

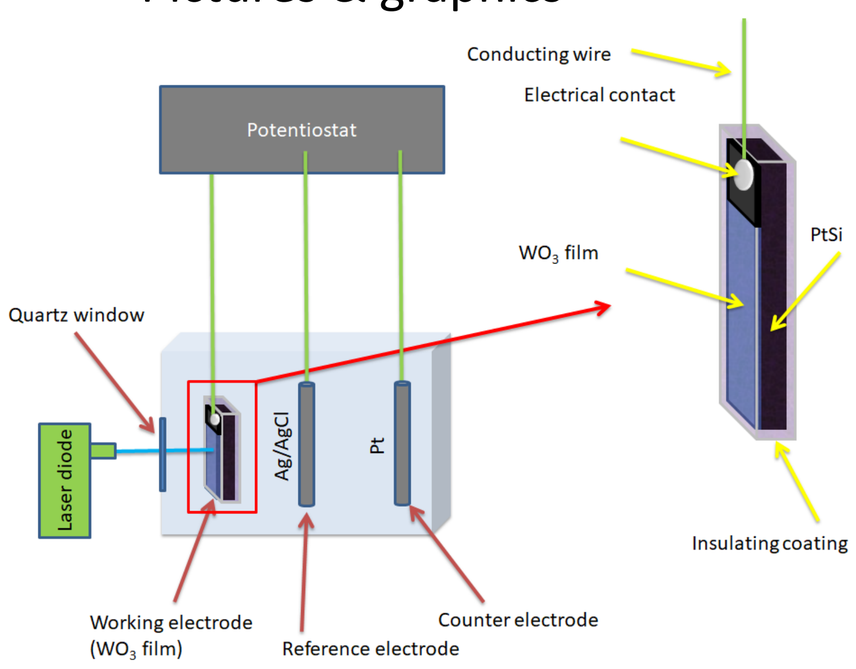
Author/s: NICU DOINEL SCARISOREANU, FLORIN ANDREI, ANDREEA ANDREI, NICOLETA ENEA, VALENTIN ION

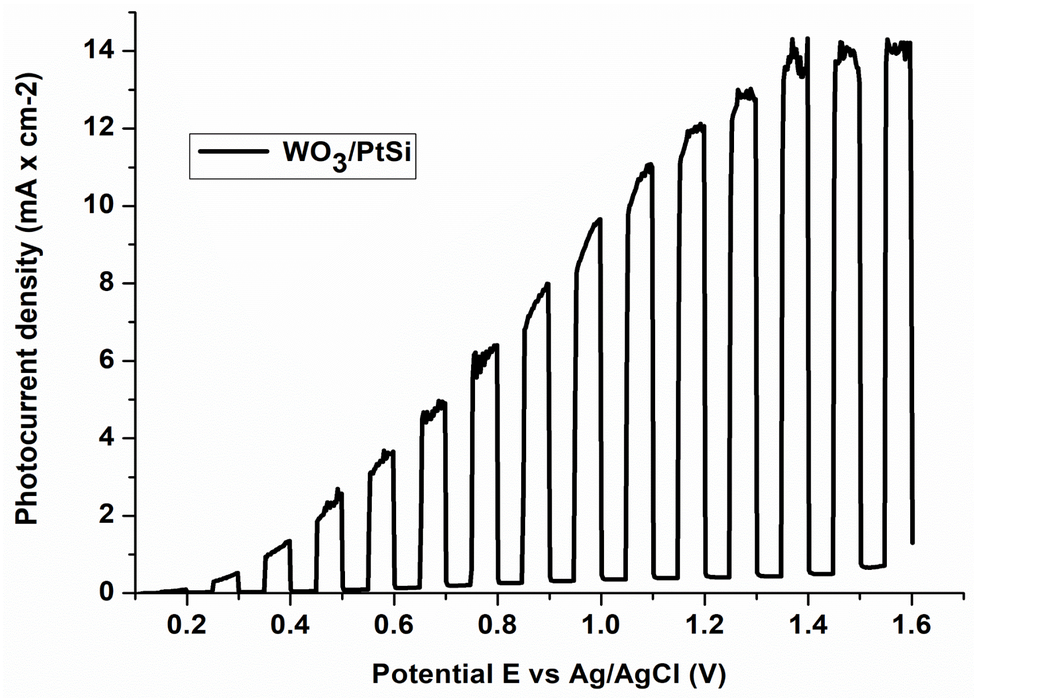
A

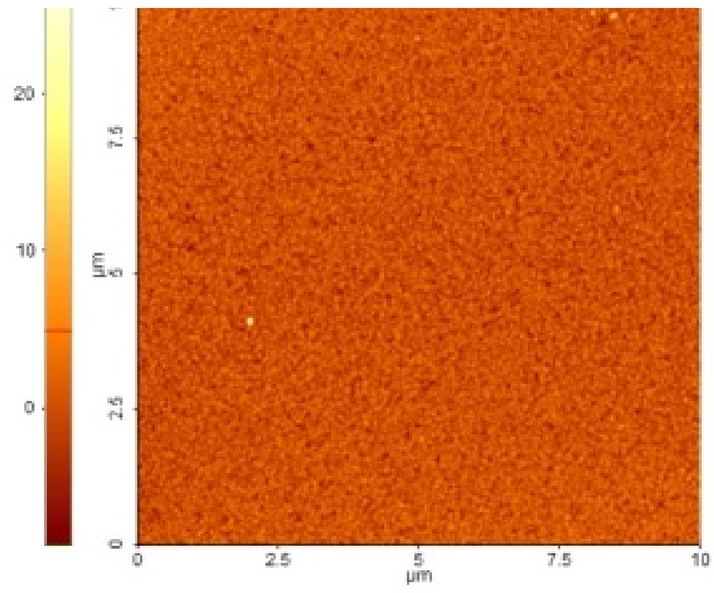
Description

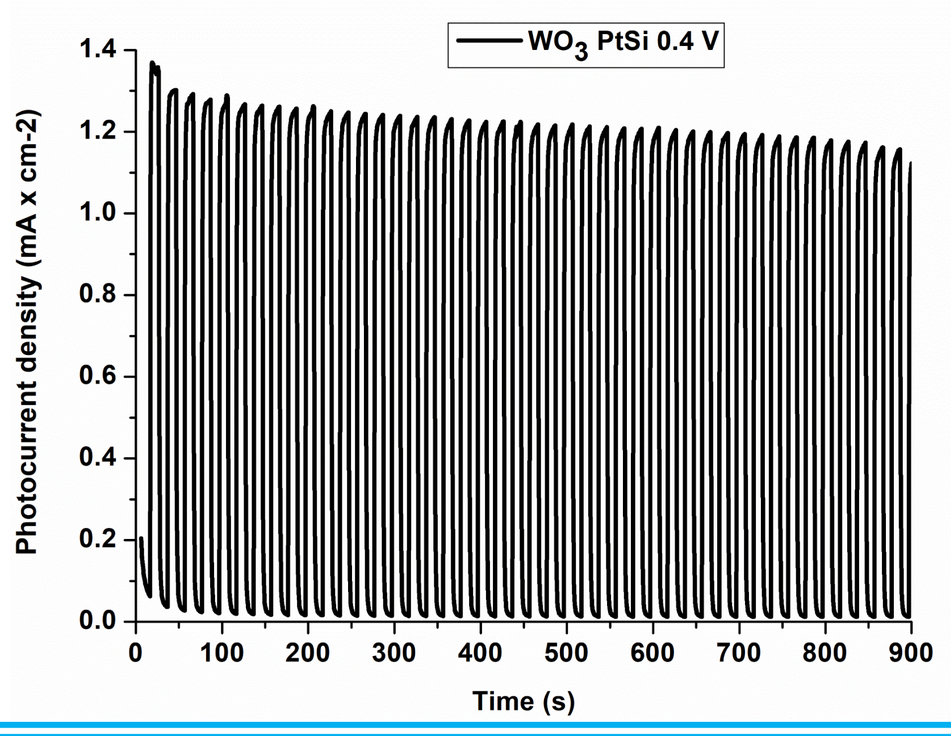
Having in mind the concept of the global energy crisis, a new alternative for energy production must be urgently and efficiently implemented. Hydrogen is considered to be one of the most suitable options to support zero-carbon energy strategies being a clean and flexible energy source. High-purity hydrogen can be photoelectrochemically obtained from inexhaustible resources: solar light and water. The invention is related to a new original procedure for the obtaining of inexpensive WO_3 thin films with excellent photoelectrochemical activity and enhanced stability. For the manufacturing of thin films, WO_3 was successfully grown on polycrystalline PtSi substrates via pulsed laser deposition (PLD) technique. This laser-based technique permits the fabrication of continuous WO_3 films having only several hundreds of nanometers. Therefore, the preparation of the device, designed as a thin film, requires a low consumption of the active material, leading to a low cost of the final product. The photoelectrochemical activity of prepared devices was evaluated in a three-electrode configuration coupled to a photoelectrochemical cell. The electrolyte in which the samples were tested is a strongly alkaline NaOH solution (pH = 13.7). The results confirm the great photoelectrochemical activty and stability in alkaline solution of WO_3 thin films. A maximum J_{ph} of 14 mA/cm^2 was obtained at an applied potential of 1.6 V vs Ag/AgCl as potentiodynamic measurements have revealed. Potentiostatic measurements were performed for 900s and the activity of WO_3 films was entirely preserved. All samples were irradiated using a low-energy consumption laser diode emitting at 404 nm. The fabrication of WO_3 photoelectrodes in the form of thin films, as well as their excellent stability in time, ensure an excellent reusability and an easy handling of devices.

Pictures & graphics









Contact: florin.andrei@inflpr.ro

Opportunity
CORNELIUGROUP
Research-Innovation Association
Creation
Realization
INVENTCOR
Power of Creative Mind
Deva ROMANIA

INFLPR
INSTITUTUL NAȚIONAL DE CERCETARE-DEZVOLTARE
PENTRU FIZICA LASERILOR, PLASMEI ȘI RADIAȚIEI

SOCIETATEA ROMANA PENTRU CERTIFICARE ROCERT
SR EN ISO 9001:2015
SR EN ISO 14001:2015
SR ISO 45001:2018
SR EN ISO/IEC 27001:2018
SR 13572:2016

HETEROSTRUCTURES BASED ON INORGANIC PEROVSKITES FOR PHOTOELECTROCHEMICAL Applications

Patent

Author/s: FLORIN ANDREI , VALENTIN ION , MARIA DINESCU , NICU SCARISOREANU

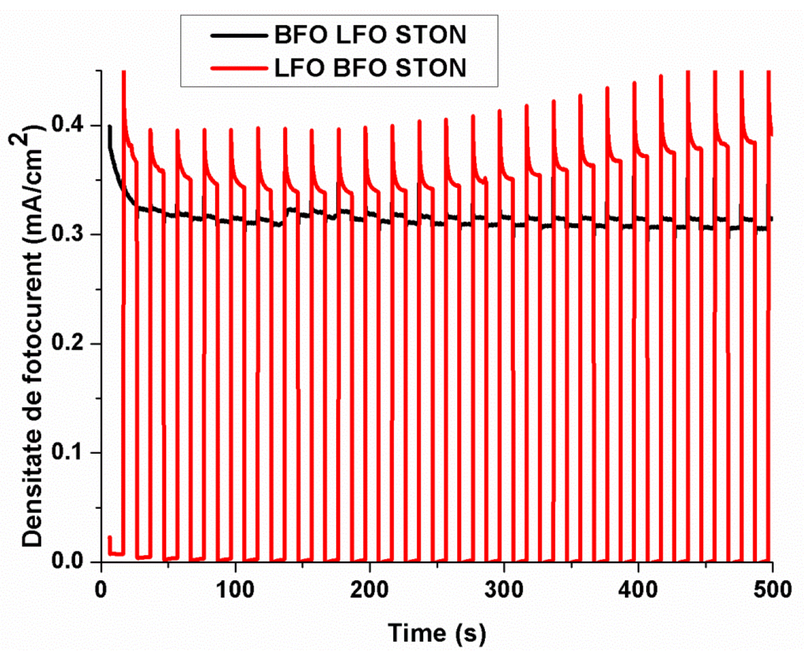
A

Description

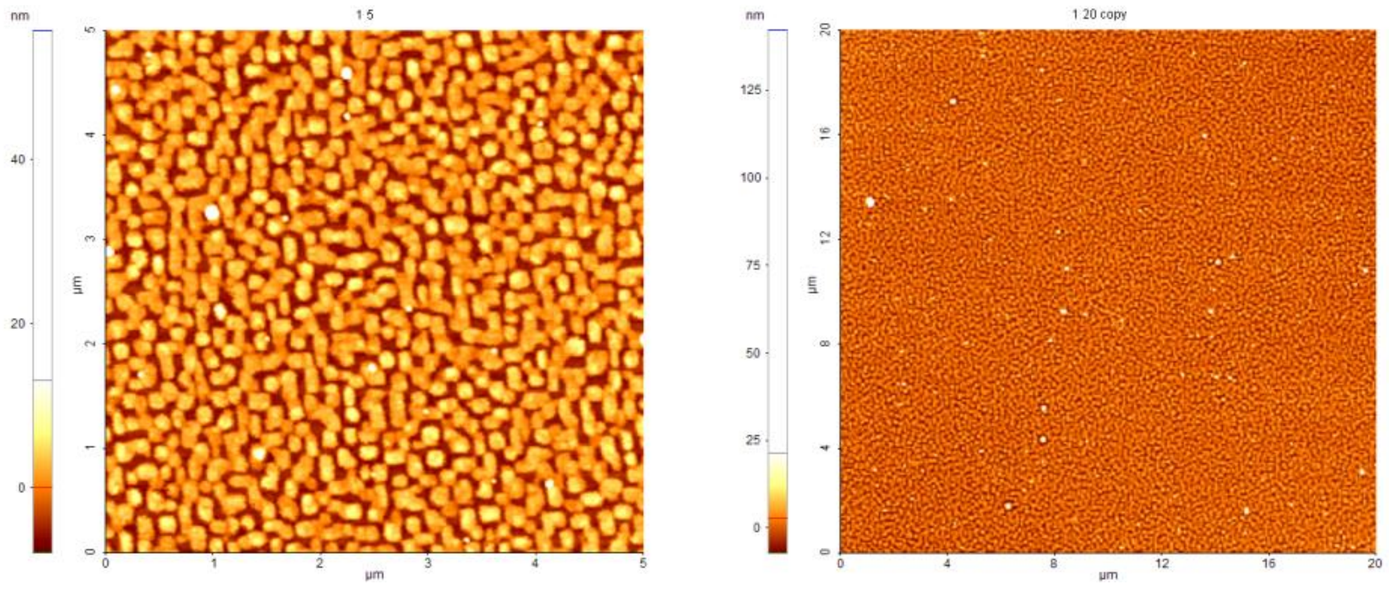
The invention is related to an original procedure for the obtaining of heterostructures based on LaFeO3 (LFO) and BiFeO3 (BFO) perovskites with enhanced photoelectrochemical stability. The heterostructures were manufactured via pulsed laser deposition (PLD) technique on Nb doped SrTiO3 (STON) conductive substrates. The functionality of these devices was tested in a three-electrode system coupled to a photoelectrochemical cell. The electrolyte in which the samples were tested is a strongly alkaline NaOH solution (pH = 13.7). The irradiation was performed using a laser diode emitting at 405 nm. The results confirm the great photoelectrochemical stability of heterostructures based on $LaFeO_3$/$BiFeO_3$ in strong alkaline experimental conditions. Potentiostatic measurements show excellent stability for the heterostructure having $LaFeO_3$ as top material, with a maximum of the photocurrent density of ca. 0.45 mA/cm^2 at 0.4 V vs Ag/AgCl. A huge value of the photocurrent density was obtained during the potentiodynamic measurements for the heterostructure with $LaFeO_3$ as material surface.

Pictures & graphics

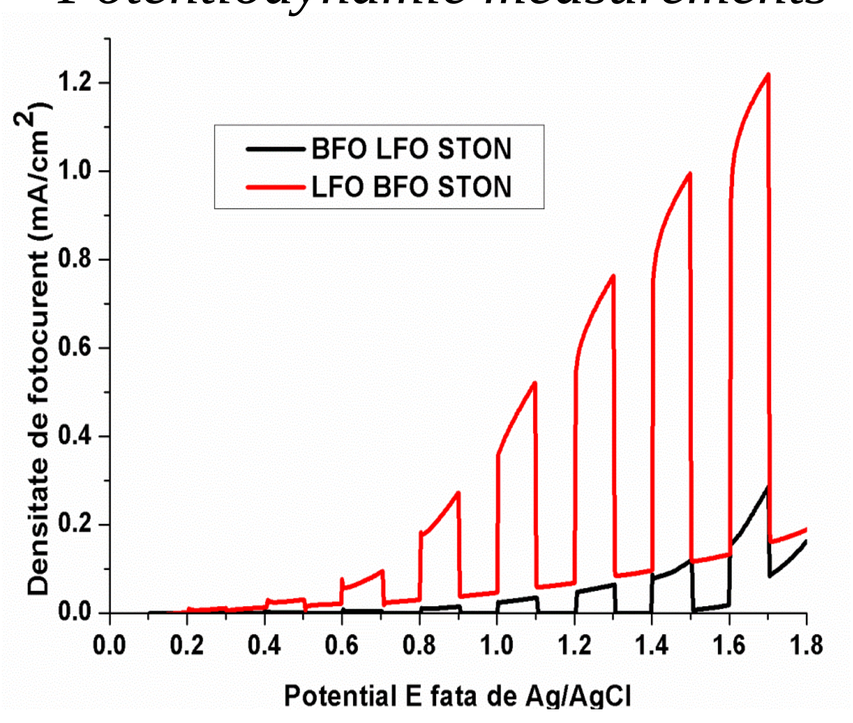
Potentiostatic measurements



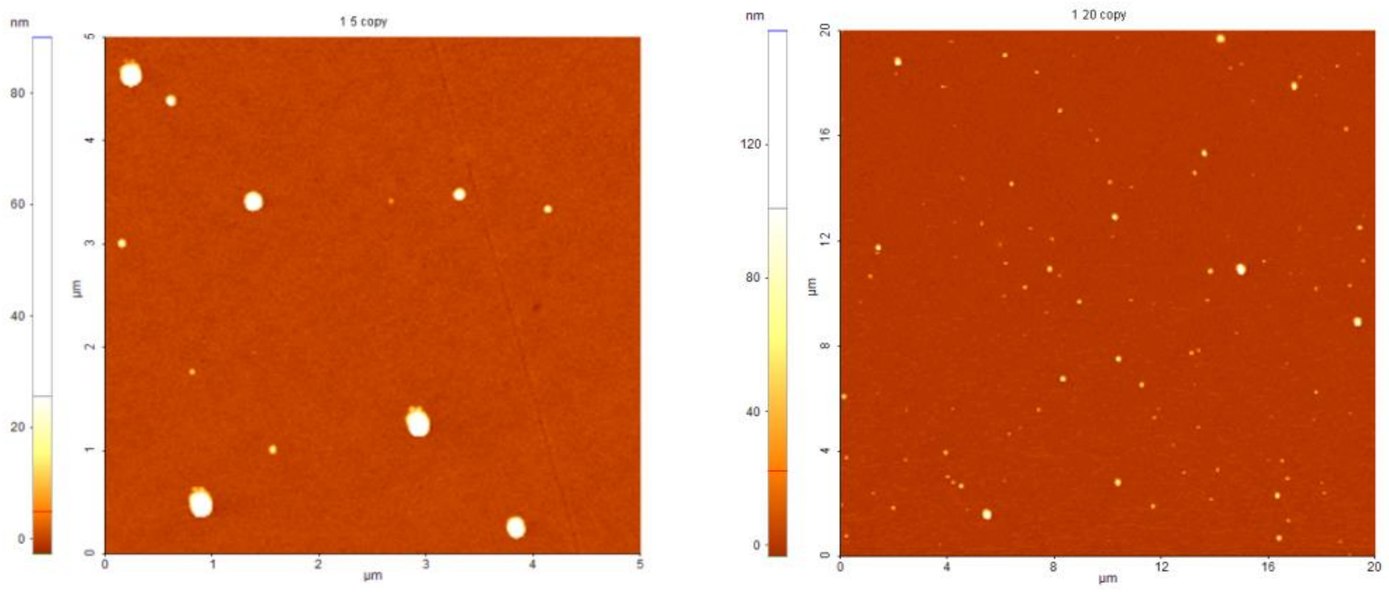
AFM images for heterostuctures with $LaFeO_3$ as final layer



Potentiodynamic measurements



AFM images for heterostuctures with $BiFeO_3$ as final layer



Contact: florin.andrei@inflpr.ro

Opportunity CORNELIUGROUP Research-Innovation Association INVENTCOR Power of Creative Mind Deva ROMANIA Creation Realization

INFLPR

INSTITUTUL NAȚIONAL DE CERCETARE-DEZVOLTARE PENTRU FIZICA LASERILOR, PLASMEI ȘI RADIAȚIEI

SOCIETATEA ROMANA PENTRU CERTIFICARE ROCERT

SR EN ISO 9001:2015
SR EN ISO 14001:2015
SR ISO 45001:2018
SR EN ISO/IEC 27001:2018
SR 13572:2016

Electrochemical sensors based on micro and nanostructured ceria layers obtained by laser methods for NADH detection and biosensors

A

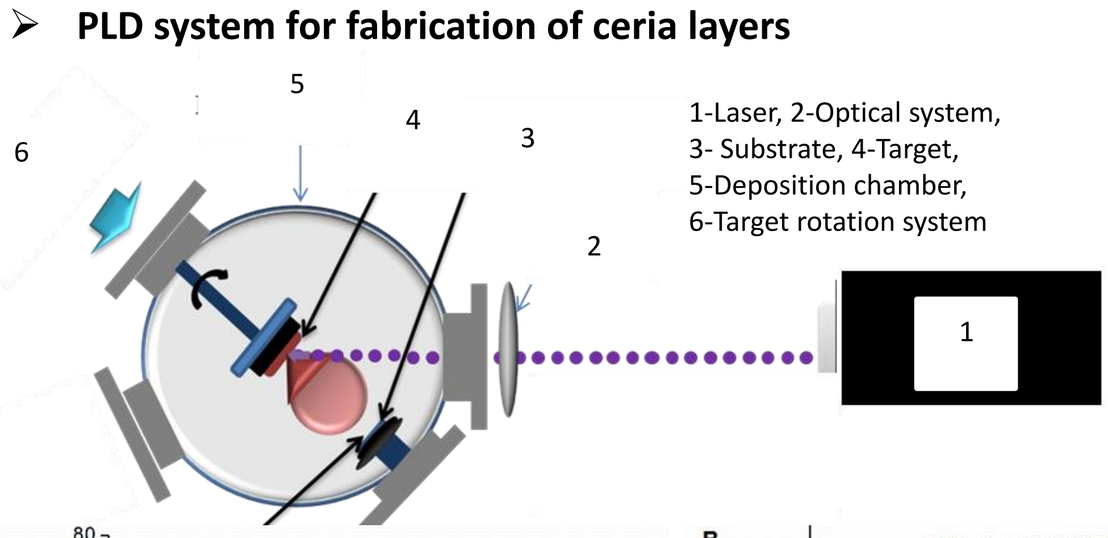
Patent: A/00717/26.11.2021

Authors: V. Dinca, A. Bonciu, M. Filipescu, A. Vasilescu

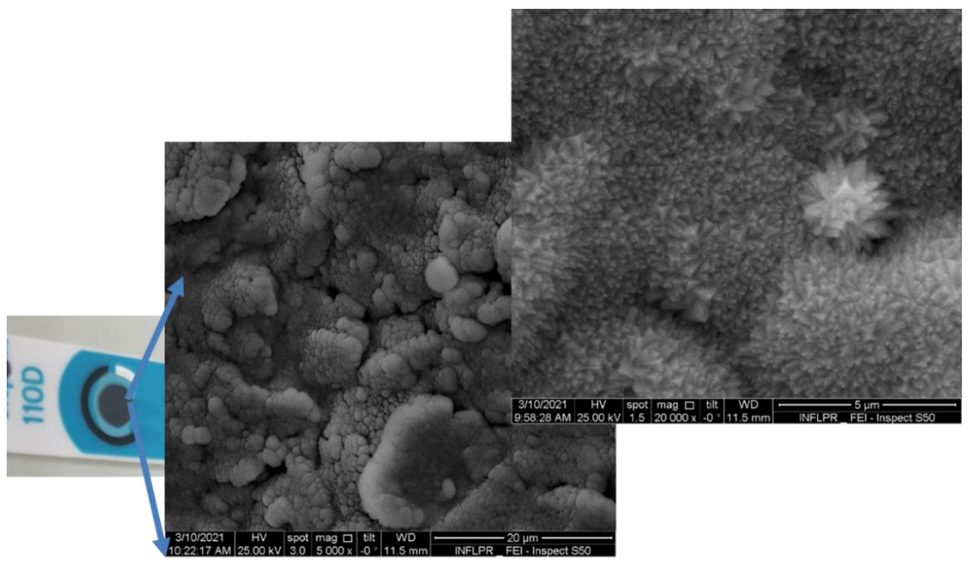
The invention refers to obtaining **new electrochemical sensors** based on modified carbon electrodes with micro and nanostructured active layers of cerium oxide (ceria) used for the detection of NADH, with direct applications in biosensors based on NAD+ dehydrogenases - addictions. The new sensors are obtained by deposition of **ceria pyramidal structures** (base side of about 150-350 nm and a height of over 150 nm) at a temperature Ts=500 ºC on carbon electrodes, using pulsed laser deposition (PLD) method.

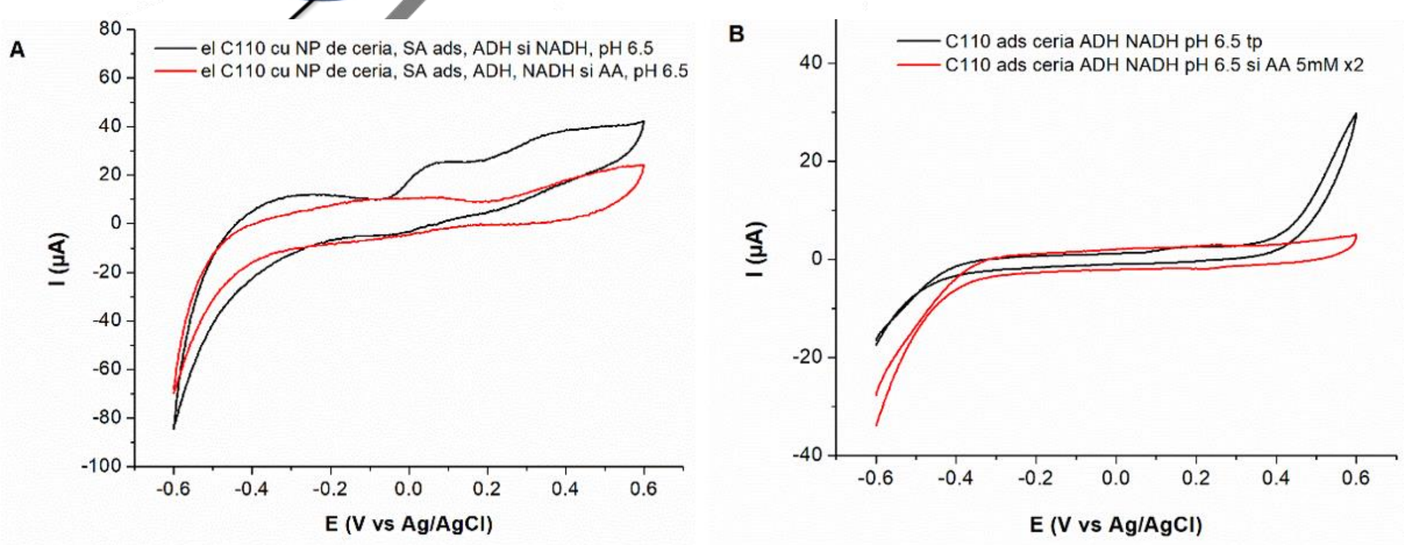
Films obtained on carbon electrodes are active as such or after modification with an electrochemical mediator, syringaldazine, for the electrochemical determination of NADH and various compounds representing substrates for enzymes in the class of NAD + -dependent dehydrogenases.

➢ **PLD system for fabrication of ceria layers**

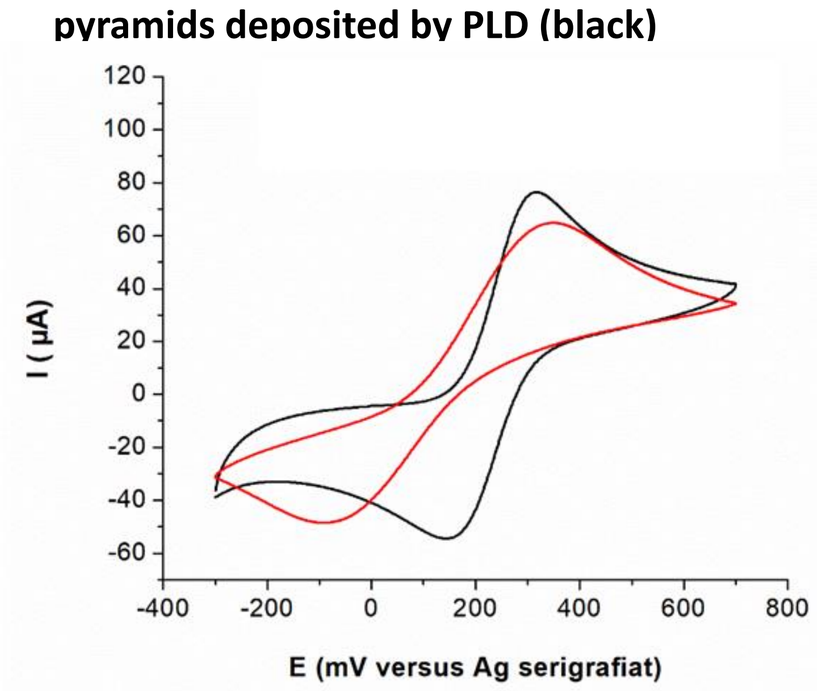


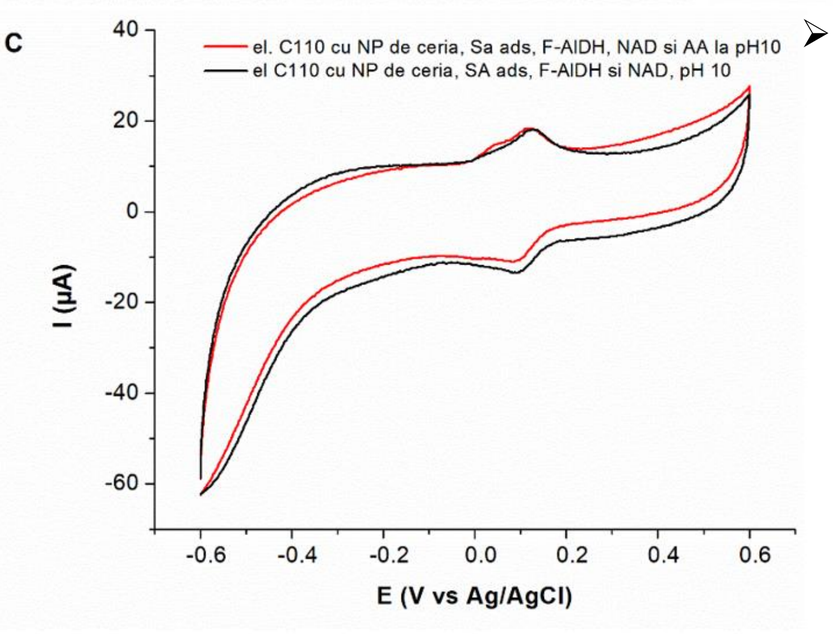
➢ **Optical image of the sensor with electrodes covered with CeO_2 and SEM image of CeO_2 deposited on C electrodes**





➢ **Cyclic voltammograms recorded in 5 mM potassium ferrocyanide in 0.1 M KCl, with C electrodes (e.g. C110 from Metrohm Dropsens, red) modified with CeO_2 pyramids deposited by PLD (black)**





➢ **Cyclic voltammograms recorded in the absence (black) and in the presence of acetaldehyde (concentration 5 mM, red), respectively, with working electrodes with adsorbed SA, in system of 3 screen-printed electrodes (C110, Dropsens) with C auxiliary electrode and Ag reference electrode. A, C: working electrodes with cerium nanopyramides deposited by PLD and adsorbed SA. B: electrode with dripped spherical cerium nanoparticles (5 µL of a 2% solution of cerium nanoparticles).**

The CeO_2 sensor **significant advantages**:

- **Improving the reproducibility of the active layer on the sensor surface**, improving the processability of the sensitive layer for the electrochemical detection of NADH and various compounds;
- **Increasing the specific surface of the sensitive layer by obtaining nano-micropyramidal structures with dimensions per the structure of 150-350 nm**;
- **Better conductivity and larger electroactive surface** for CeO2 electrodes compared to simple carbon electrodes;
- **Reduction of the potential for direct oxidation of NADH on CeO2 electrodes** compared to carbon electrodes and modified electrodes with spherical cerium nanoparticles deposited by adsorption;
- Higher current intensity at NADH oxidation mediated by syringaldazine on CeO2 electrodes compared to carbon electrodes;
- **Adequate sensitivity and stability** after modification with syringaldazine when applying sensors for electrochemical tests in combination with NAD + -dependent dehydrogenases at both low acidic and alkaline pH.

Contact: mihaela.filipescu@inflpr.ro

Vitreous potassium-phosphate fertilizers and method for preparing the same

A

Patent: RO 128736 B1/28.09.2018

Authors: Bogdan Alexandru Sava, Lucica Boroica, Mihai Sava, Mihai Elisa

The invention relates to vitrified phosphorus-type fertilizers for agriculture and to the process for their preparation, characterized in that they are used oxides, salts or complex combinations thereof which introduce phosphorus oxide as a glass network formers, potassium oxide as a glass network modifier, magnesium and calcium oxides as stabilizers, as well as small additions of boron, iron, zinc, molybdenum, manganese oxides and very small amounts of vanadium, copper and /or cobalt, for plant-friendly properties. These raw materials are granulated, milled, sieved by conventional operations of this type, then homogenized by conventional operation in the ball mill, heat treated to temperatures above the melting temperature of the mixture of raw materials, usually between 900 and 1200 °C, after which they are subjected to the rapid cooling in water or matrix plate, drying, grinding and size sorting to grains specific to the type of culture for which they will be used and to the desired time of solubility.



Figure 1. Grain crops fertilized with AG 2 glasses.



Figure 2. Corn crops fertilized with AG 2 glasses.



Figure 3. Sunflower crops fertilized with AG 2 glasses.

It is considered that the proposed fertilizers will be able to introduce the macro elements (K, P, Mg) and the microelements (Mo, B, Fe, V, Cu) through glass with corrected composition. The use of the vitreous fertilizer allows the release with a controllable speed of the elements and microelements useful to the plant. This has the effect of managing them over several years. The vitreous fertilizer does not produce water pollution due to the fact that it dissolves only controlled in quantities adjustable, which are necessary for the vegetal crops. The fertilizer can also adjust the pH of the soil.

Contact: savabogdanalexandru@yahoo.com +40728062160

PROCESS FOR THE PRODUCTION OF MEMBRANE-ELECTRODE-GAS DIFFUSION LAYER ASSEMBLIES BASED ON PLASMA-ASSISTED GRAPHENE NANOWALLS FOR HIGH PERFORMANCE FUEL CELLS

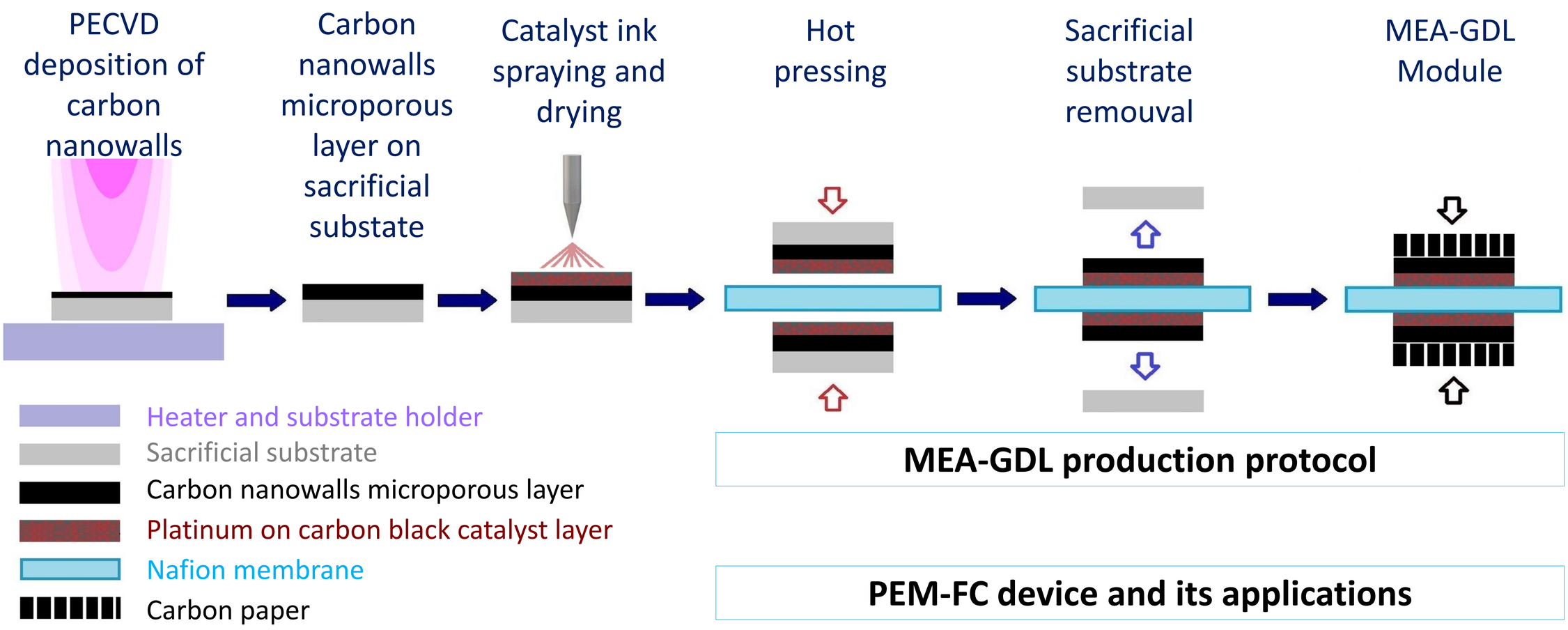
A

Patent application no. A / 00635 / 13.10.2020

This work was financially supported by grants of the Romanian National Authority for Scientific Research (UEFISCDI), framework PN-III-P1-1.2-PCCDI-2017-0387/2018 project 80PCCDI/2018

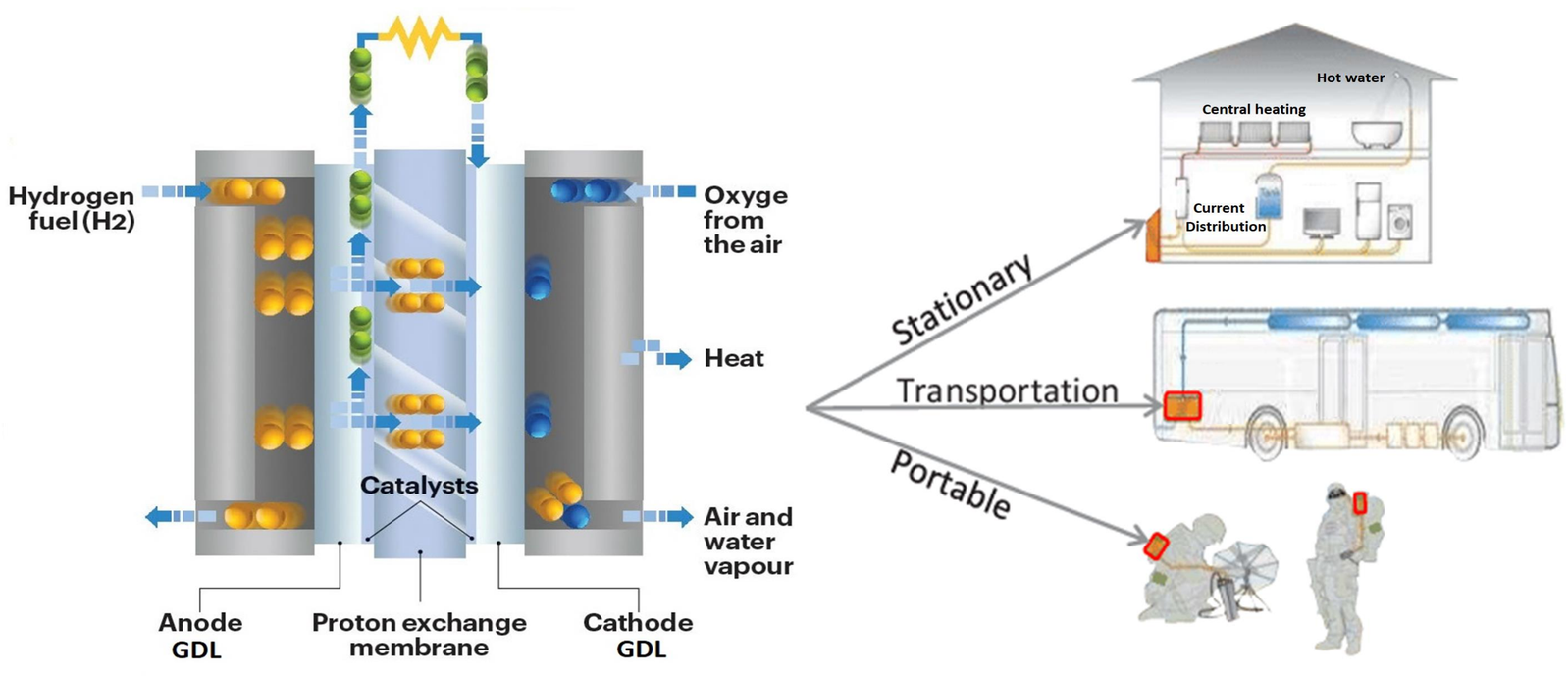
Authors: Trefilov Alexandra Maria Isabel, Vizireanu Sorin, Biţă Bogdan Ionuţ, Stamatin Ioan, Dinescu Gheorghe

The invention relates to a process for producing membrane-electrode-microporous layer (MEA) assemblies based on graphene nanowall films with optimized key properties: specific area, hydrophobicity, electrical conductivity, stability and gas permeability. The process proposed in this patent application aims to produce an MEA assembly that eliminates the drawbacks of current preparation methods and incorporates materials with favorable microporous layer properties. MEA Assemblies prepared by this process, using undeteriorated graphene nanowall films as components, exhibit more than 30% improved performance over conventional assemblies, with power densities of approx. 400 mW/cm^2 at 80°C and 80% relative humidity.



MEA-GDL production protocol

PEM-FC device and its applications



Contact: alexandra.trefilov@inflpr.ro

Developing high-efficiency, small-sized pumping units capable of generating high pressures at low flow rates

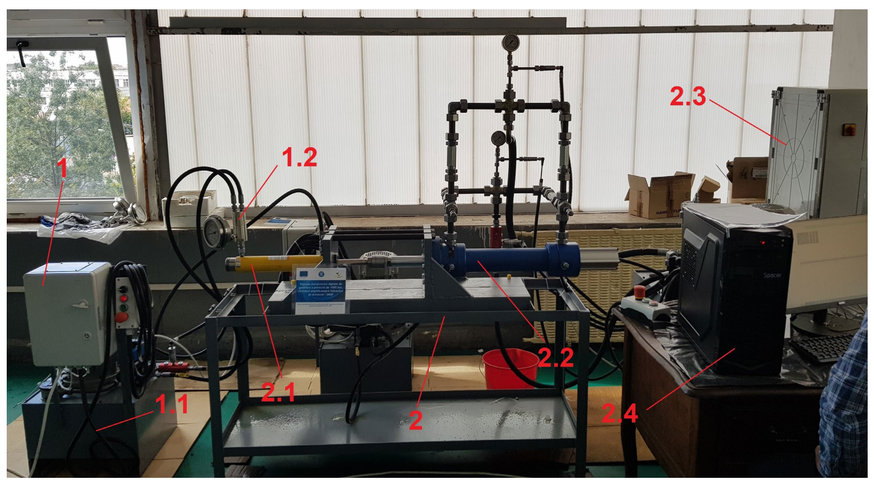
A

Project number: PN 23 05 - The Core Program within the National Research, Development and Innovation Plan 2022-2027, carried out with the support of MCID

Authors: Teodor Costinel POPESCU, Alexandru-Polifron CHIRIȚĂ, Ana-Maria Carla POPESCU, Alina Iolanda POPESCU

High-pressure pumping units consisting of **low-pressure pumping units** and **oscillating minibooster-type pressure intensifiers** are an efficient solution for generating high pressures in hydraulic drive systems. Such pumping units are typically used in **static applications** (burst tests for pipelines and tanks) and **mobile applications with high loads on small strokes** of hydraulic cylinders (hydraulic tools and presses).

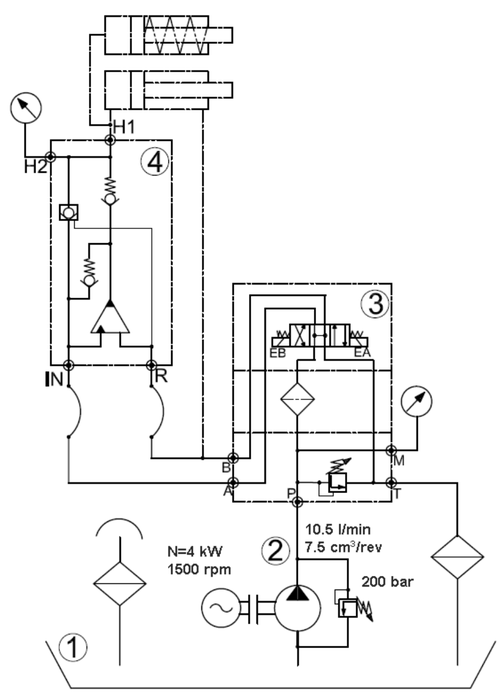
Through experimental research, carried out on a test stand that can load a high-pressure hydraulic cylinder with heavy, high-magnitude loads, the authors demonstrated the possibility of expanding the range of technical applications of these pumping units to ***mobile applications with high loads over the entire stroke*** *of the hydraulic cylinders*. A low-pressure pumping unit was used, 4 kW, 1500 rpm, 0...200 bar, which was successively equipped with three types of miniboosters with different gain factors (i) (i=5.0; i=6.6; i=7.6).



1= High-pressure pumping unit (HPPU); **1.1**= Low-pressure pumping unit; **1.2**=Minibooster; **2**=Test stand for HPPU; **2.1**= High-pressure test cylinder; **2.2**=Load cylinder (LC); **2.3**=LC loading unit; **3**=Stand control and experimental data acquisition system.

High-pressure pumping unit

hydraulic schematic diagram

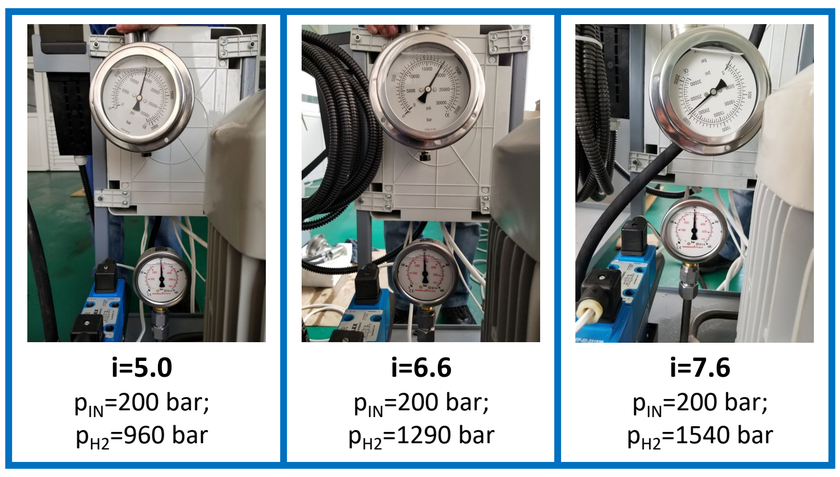


1= Hydraulic oil tank with return filter + loading and venting filter;

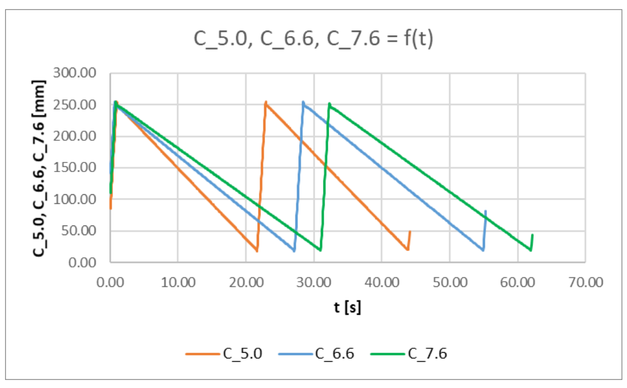
2= 4 kW low-pressure electric pump;

3= Block with hydraulic devices (pressure valve, pressure filter; hydraulic directional control valve); **P**, **T**, **M**, **A, B** = Hydraulic block connections (pressure, tank, low-pressure gauge, hydraulic test cylinder connections);

4= Minibooster (i=5, i=6.6, i=7.6); **IN**= low-pressure inlet connection (primary); **H1**= high-pressure outlet connection (secondary); **H2**= high-pressure gauge outlet connection (secondary); **R**= return connection.



Static tests on a pumping unit successively equipped with 3 types of miniboosters



Comparison of test cylinder displacements - the cylinder is connected to a pumping unit successively equipped with 3 miniboosters (i=5.0, i=6.6, i=7.6)

The experimental data acquisitions, processed in the adjacent graph, were determined over two full strokes of 250 mm for each direction of travel of the test cylinder, under the conditions of loading it with the same load on the advance stroke (the retract stroke is idle).

It turns out that: **the displacement** of the cylinder is **approximately linear**, for the three cases of equipping the pumping unit with a minibooster; ***advance speed under load*** of the cylinder (travel slope) decreases as the minibooster gain factor increases; ***idle retract speed*** (no load) does not depend on the gain factor of the minibooster; the cylinder moves slowly, but without restraint or stiffening on the advance stroke, and quickly on the retract stroke; the resistive force that the test cylinder can overcome is directly proportional to the gain factor of the minibooster.

Conclusions: the pumping unit can be equipped with any of the 3 miniboosters; if used in applications with hydraulic cylinders of lower loads and higher displacement speeds, the unit shall be equipped with minibooster with **i=5.0**, while for higher loads and lower displacement speeds, the unit shall be equipped with miniboosters with **i= 6.6** or **i=7.6**.

Contact: PhD. Eng. Teodor Costinel POPESCU
E-mail: popescu.ihp@fluidas.ro; Phone: +40721.626.543

THYMOL-BASED DEEP EUTECTIC SOLVENTS AS NEW EXTRACTANTS FOR TEXTILE DYES FROM AQUEOUS ENVIRONMENT

A

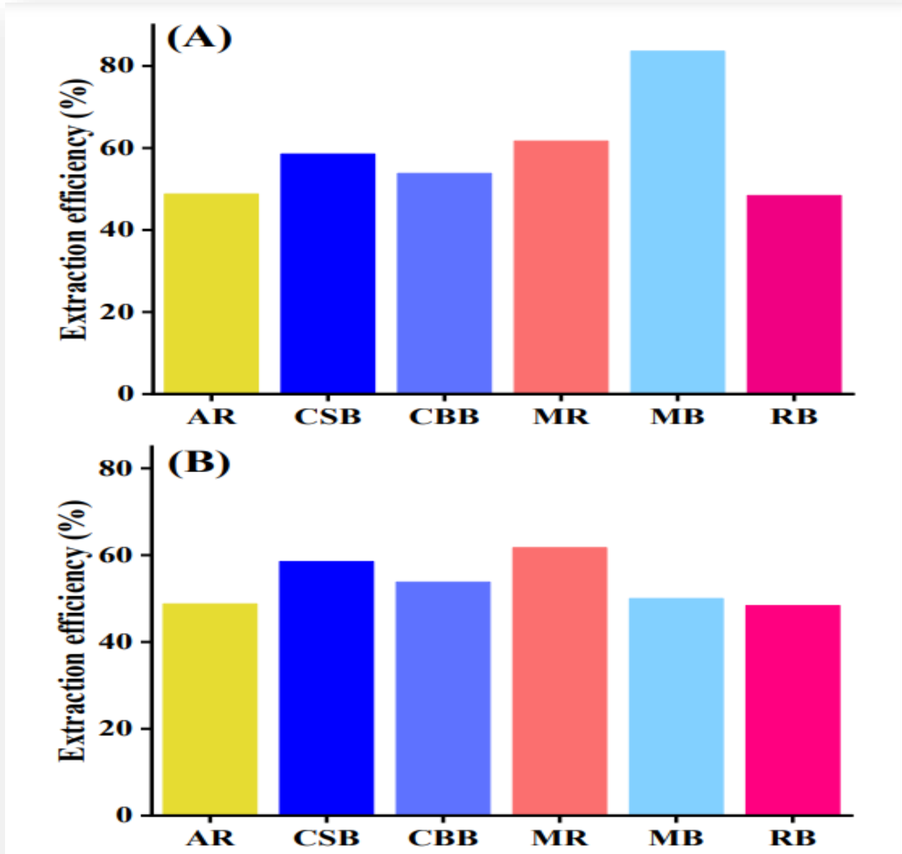
Author/s: MINOLII KARTHIGESAN , DR SITI KAHLIJAH MAHMAD ROZI, NAQIBAH BINTI SALIM

Organic solvents, had posed dangers to their users and environment as well because it emits harmful toxic chemicals such as benzene, carbon tetrachloride, trichloroethylene. methyl chloride, 2-ethoxyethanol, and 2- methoxyethanol. As a result, an alternate solvent was sought to replace the organic solvent.

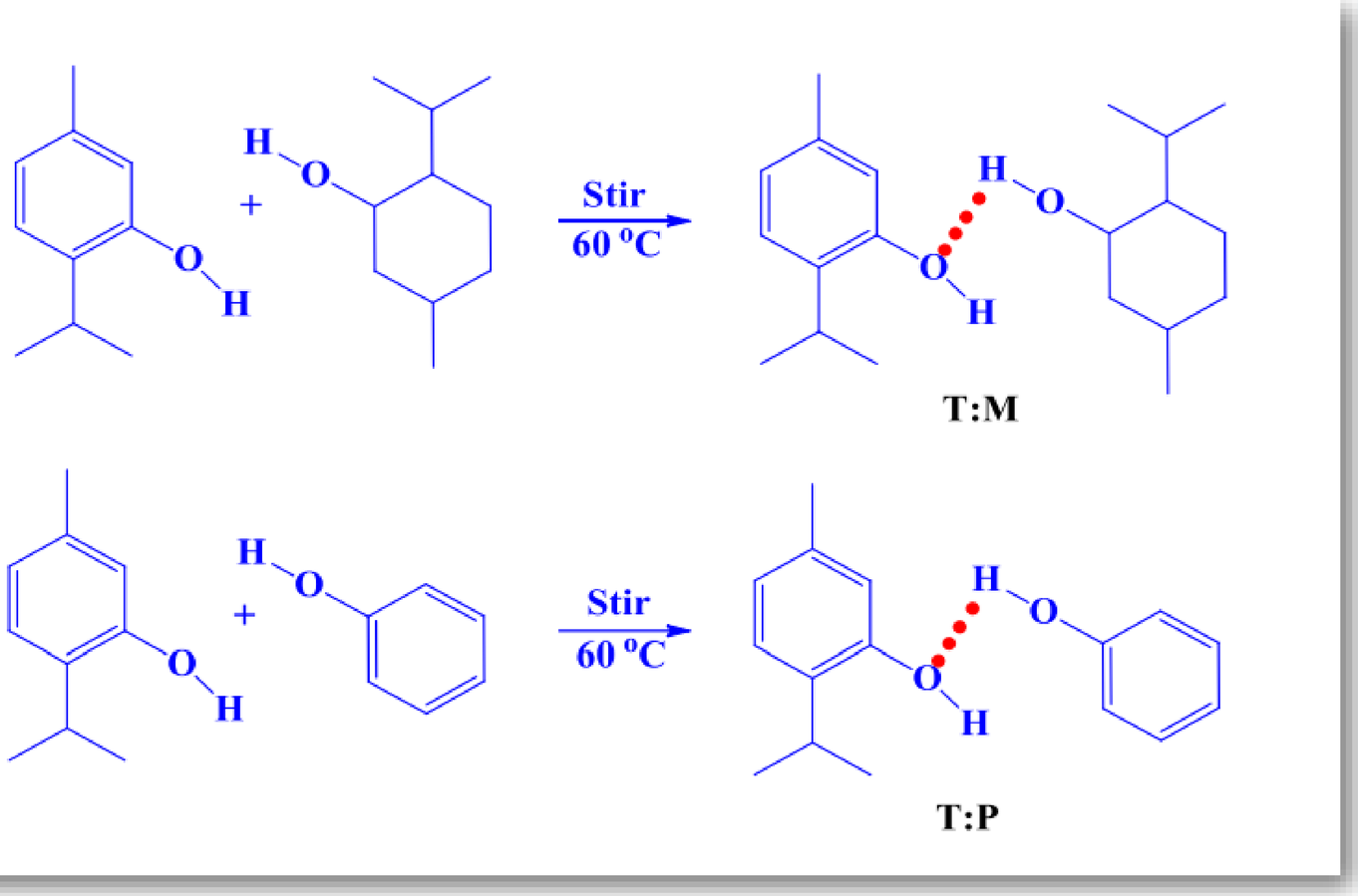
Due to their biodegradability, and low toxicity, deep eutectic solvents (DESs) have been discovered and demonstrated to be an excellent solvent for replacing these hazardous organic solvents. Traditional solvents are classified as organic solvents because they come from nature and are created by a wide variety of chemicals.

The discharge of organic solvents may cause harm to the environment such as air and water pollution, and land contamination. Their toxicity is another issue relating to the use of conventional organic solvents, particularly in hydrocarbons and chlorinated solvents. Therefore, an alternative solvent is being studied to replace the traditional solvents

Extraction efficiency of various organic dyes of (A) T:M 1:1 and (B) T:P



Synthesis of Thymol Based DES



Deep eutectic solvents (DESs) are one of the most sought after solvents to replace traditional solvents due to their remarkable properties such as non-flammability, recyclability, non-volatility, low vapour pressure, and high boiling point. Due to qualities including rapid preparation time, low costs, possible good biodegradability, and low toxicity, DESs are considered an appealing alternative for green solvents.

Contact: minolii44@gmail.com

ROMANIA AND GEOTHERMAL ENERGY:
An unconventional, clean and renewable energy source

A

Scientific paper

Author/s: Valentin-Paul TUDORACHE[1], Niculae-Napoleon ANTONESCU

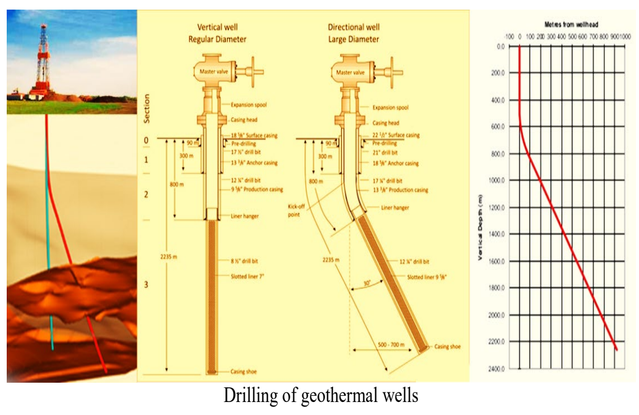
Geothermal resources lie in abundance beneath our feet, waiting to be exploited. At present, geothermal energy is a practically inexhaustible energy source and, until now, it has not been sufficiently studied and exploited. The paper aims to highlight the possibilities of harnessing the geothermal energy potential in the development of the country (geothermal projects offer all the benefits to contribute, without pollution, to the development of the country; facilities in remote locations can exceed quality standards of life, bringing distance electricity in people's homes). Drilling of geothermal wells is a complex of works for crossing, consolidating and isolating the rocks crossed.

The purpose of geothermal drilling works is to make boreholes in which ground geothermal wells can be placed, which can capture the energy of the earth, later distributing it further to the heating system. These works are performed with the help of special drilling rigs for geothermal wells.

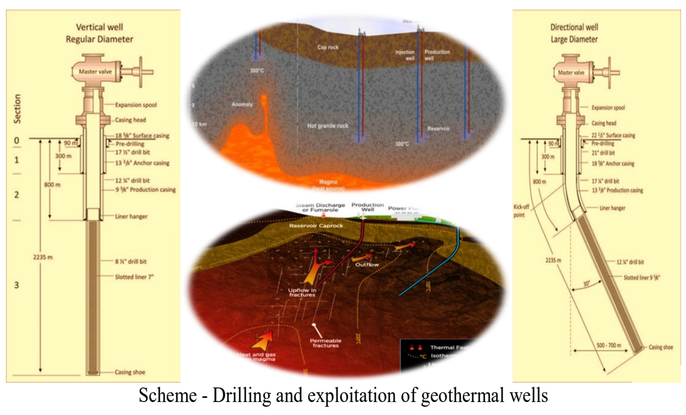
The directional drilling of the wells, *-in a direction other than the vertical one-*, is imposed by certain surface conditions or certain technical-economic conditions.

Illustrates the overview of drilling and operation of geothermal wells: vertically drilled well and directionally drilled well. A geothermal exploitation requires two wells: 1) *one of production,* which allows the extraction of hot water , and, 2) *one an injection*, which allows the reinjection of cold (used) water into the layer.

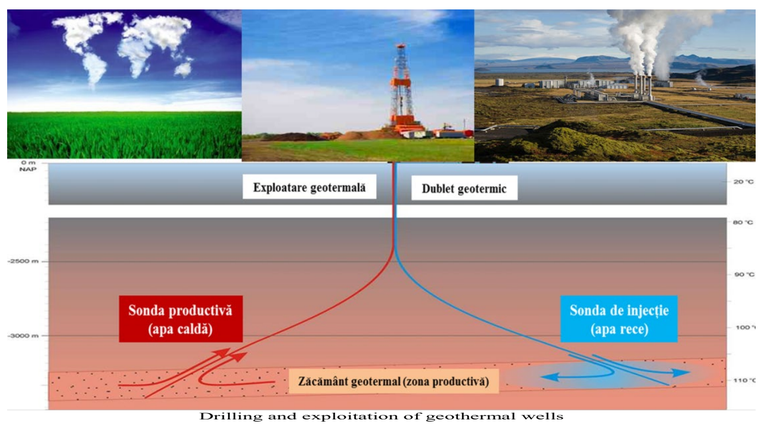
The second borehole must be drilled so that its extremity is placed at an optimal distance from the first borehole, in order to avoid a too rapid drop in the temperature of the exploited water. The practical realization of this system consists in drilling two boreholes. In principle, the geothermal energy from the earth is extracted with the help of the productive probe, from the established depth (depending on the heat demand and the existing geological conditions). The natural heat of the earth is extracted at the surface of the productive well, then taken over by a system of local pipes through which the thermal water or special thermal agent circulates (for example: water + antifreeze) and transported to the main pipe system for heating and/or air conditioning of production spaces, offices and private homes with the help of heat pumps.



Drilling of geothermal wells



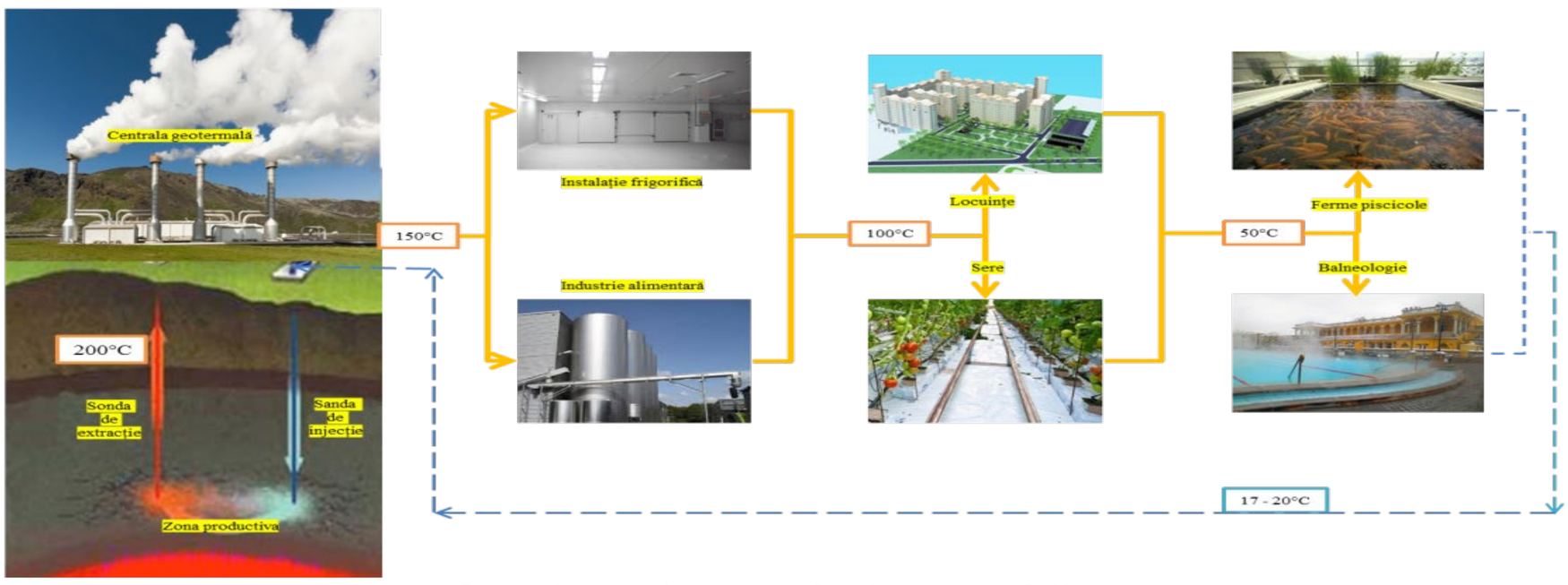
Scheme - Drilling and exploitation of geothermal wells



Drilling and exploitation of geothermal wells

The use of geothermal energy depends on the thermal parameters of the resource. For resources with geothermal fluids exceeding 150 ° C they can be used for electricity production, being fully technically and economically justified (the current minimum threshold for electricity production is 97 ° C).

Below this temperature, geothermal energy is used in direct processing technologies, most of which are built as cascade systems. A wide efficient use of geothermal energy, in cascade system, can be in *: a) Industry (heating, drying) at a temperature of 100 - 90° C; b) District heating (heating homes, hospitals, institutions etc.), at a temperature of 90 - 60° C; c)Agriculture (greenhouses, heating crops), at a temperature of 70 - 60° C; d)Hot water preparation (fish farms, balneology, housekeeping) temperatures below 60° C*.



Use of geothermal energy in the waterfall system

Overall, geothermal energy has a number of definite advantages:

1)Economic (geothermal water is located exactly where the geothermal power plant is located, and the economic benefits remain in the respective region;

2)Non-polluting (geothermal power plants do not require the combustion of fuels to obtain steam in starting turbines; electricity from the use of geothermal energy helps to conserve fuel and, of course, to reduce CO_2 emissions; there is no smoky air around the geothermal power plants to harm the atmosphere, they are built on forests, farms, etc.);

3)Flexible (geothermal power plants have a modular design, with additional units that can be installed when demand increases, to increase electricity production);

4)Resistant (geothermal power plants are designed to operate 24 hours a day, all year round; such a power plant is resistant to power outages during natural disasters, adverse weather conditions, political misunderstandings, which can affect the transport of fuel);

5)In the development of the country (geothermal projects offer all the benefits to contribute, without pollution, to the development of the country; installations in remote locations can exceed the standards of quality of life, bringing electricity from a long distance into people's homes).

As a general conclusion, Romania has a remarkable potential in terms of geothermal energy, being considered the third country in Europe. Unfortunately, the degree of capitalization of energy sources of geothermal origin is low, - *today, only a small part of the geothermal potential is used (greenhouses, balneology and leisure)* -, the main cause being determined by the lack of adequate financial support, which does not favors the development of this energy sector with superior economic and financial effects.

Contact: [1] ***Associate Prof. PhD. Eng. Dipl., Faculty of Petroleum and Gas Engineering, University PETROLEUM - GAS of Ploiesti, Romania:*** *valentin.tudorache@yahoo.com*

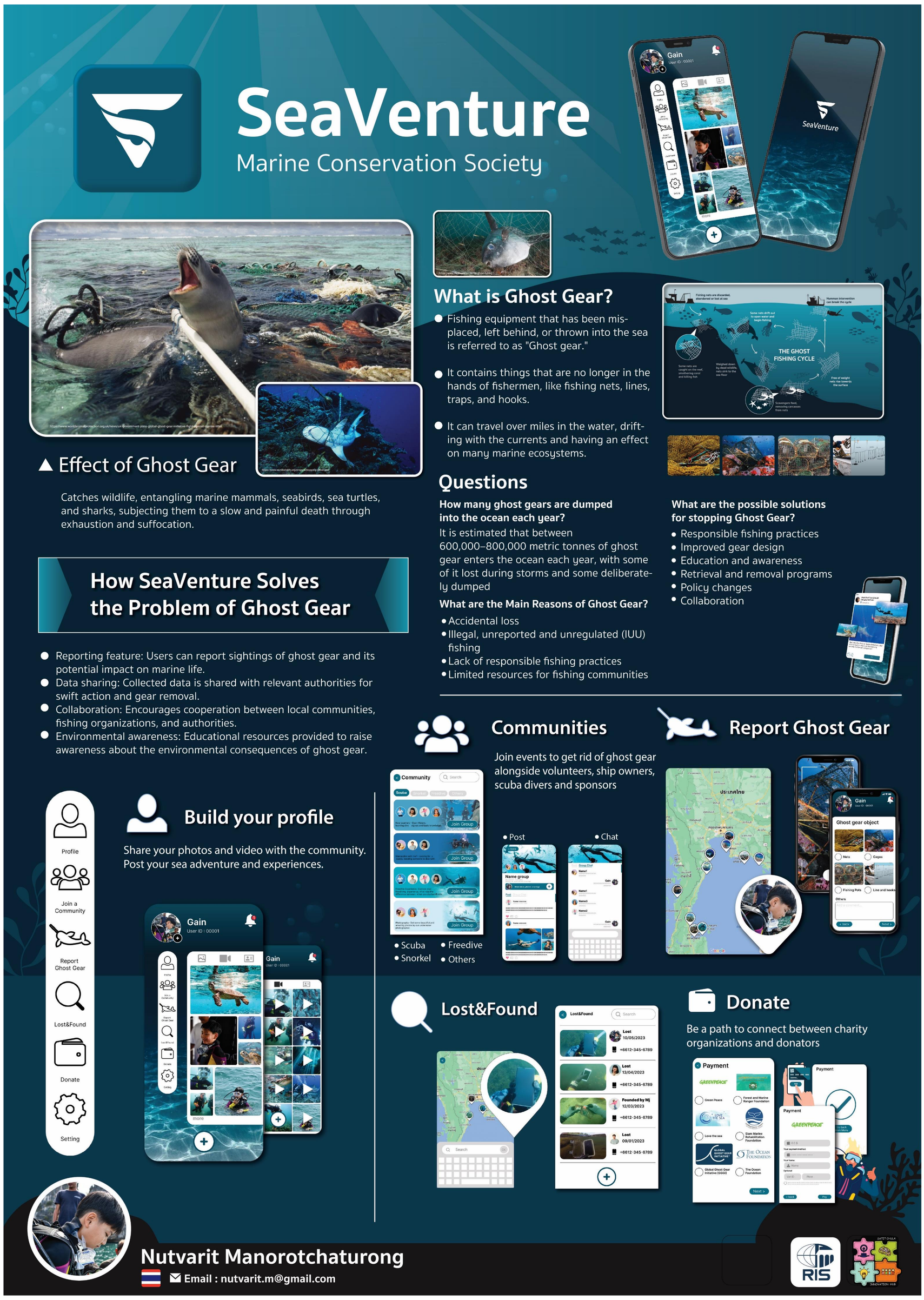
SeaVenture

Author: Nutvarit Manorotchaturong
Mentor : Mr. Jeerasak Jitrotjanarak

A

SeaVenture aims to solve the problem of ghost gear by functioning as a ghost gear reporting system where people can report and pinpoint the location of ghost gear, making it easier for professionals to properly deal with it later on.

The rest of the features include lost and found, communities, and donating.



The lost and found feature is extremely important to have due to the vastness of the ocean and if something is lost at sea it becomes more trash to the ocean.

Next is communities, this app aims to have the community feature to build up large groups of people to create projects on saving the ocean or marine life.

Lastly is donating, donators can donate their money to volunteers who are willing to go out on dives to collect ghost gear and make the ocean a cleaner place

Contact: scis.cud@gmail.com , j_jerasak@hotmail.com, +66 95 935 1062 , +66 84639 6363

Opportunity
CORNELIUGROUP
Research-Innovation Association
Creation
INVENTCOR
Realization
Power of Creative Mind
Deva ROMANIA

POLAND

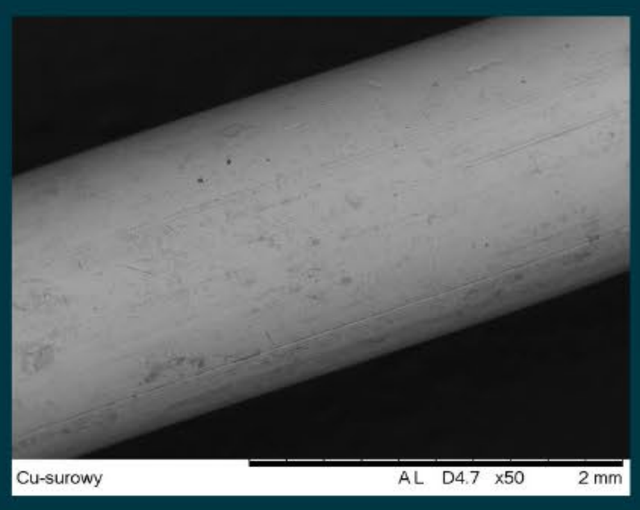
KINETICS RESEARCH OF THE REACTION OF COPPER WITH NITRIC ACID IN VARIOUS CONDITIONS OF ACID CONCENTRATION AND TEMPERATURE OF THE PROCESS

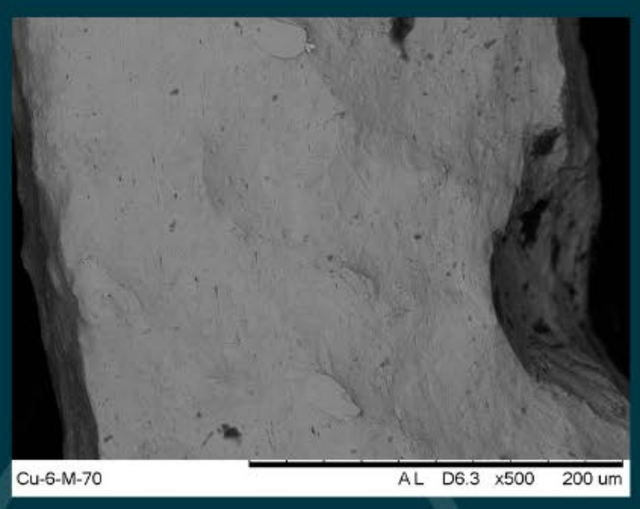
A

OBJECTIVE OF THE PROJECT

The aim of the project is to investigate the behaviour of copper in relation to nitric acid (V) in more detail, as the subject is not described exhaustively in secondary school textbooks. We research the effect of acid concentration, mixing or temperature increase on the rate of the reaction. To this end, we implement our project in cooperation with the Faculty of Inorganic, Analytical and Electrochemistry of the Silesian University of Technology in Gliwice, where we have the opportunity to use scientific laboratories or high-class equipment.







THE RESULTS OF OUR RESEARCH

At the beginning of the experiments, the first colorless bubbles of nitrogen oxide (II) were observed during the reaction between copper and 2,9-M nitric acid (V). As the concentration of the acid increased, the reaction proceeded faster, and the amount of gas bubbles released also increased. During the reaction with 5-M acid, the solution started changing color to blue, and during the reaction with 9-M nitric acid (V), a brown gas, namely nitrogen oxide (IV), began to precipitate. Regarding the studies on the effect of mixing, the first signs of the reaction were observed only at a concentration of 5.4 M, and the reaction with the release of nitrogen oxide (IV) began at an 8-M acid concentration. The research is still ongoing, and we are striving to expand it with new ideas. Currently, we are delving into the topic of copper structure before and after the reaction using a scanning microscope. In the near future, we would like to apply our acquired knowledge to work on copper recovery from electronic waste, which would contribute to environmental protection

SCIENTIFIC SUPERVISORS

Jerzy Maduzia
Maciej Sowa
Barbara Halska

APPLICANT

The Complex of School No 6 in Jastrzebie-Zdroj,
Creative Teachers Association,
Edison Polish-English Primary School in Warsaw

AUTHORS

Patryk Olejniczak
Emilia Basiura
Anna Leśny
Stanisław Woźniak
Adam Kruczkowski

Opportunity
CORNELIUGROUP
Research-Innovation Association
INVENTCOR
Creation
Realization
Power of Creative Mind
Deva ROMANIA

INSEMEX

NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT
IN MINE SAFETY AND PROTECTION TO EXPLOSION

STAND FOR TESTING THE TEMPERATURE AND FLAMMABILITY PROOF OF SELF-CONTAINED BREATHING APPARATUS, BASED ON COMPRESSED AIR

patent no A 2018 00892

Author/s: Irimia Alin, Găman George Artur, Ghicioi Emilian, Pupăzan Daniel, Darie Marius, Moldovan Iosif Lucian, Gabor Dan Sorin, Vătavu Niculina, Părăian Mihaela, Magyari Mihai, Grecea Dănuț Nicolae, Csaszar Tiberiu Attila, Jurca Adrian Marius, Păun Florin Adrian, Colda Ioan Cosmin.

A

The invention relates to the construction of a stand for testing the resistance of open circuit insulating devices upon exposure to high temperature. According to the invention, is ensured a stable operation of the elements involved in producing the required temperatures during the tests. The displacement is made on a track with chain. The carriage starts from an adjustable thermostatic enclosure, then passes through the battery of high-temperature burners and flames, and at the end of the 3000 mm stroke, it provides a free fall from a height of 150 mm.

To achieve the functional purpose, the temperature will be monitored at two points inside the oven, located at the bottom and at the shoulders of the dummy and using a pyrometer for the burner battery. Throughout the test, the respirator apparatus is connected to the breathing machine that has been set at a rate of 25 breath cycles/minute with 2 liters of air/cycle and breathing resistance is monitored.





Contact: Alin Irimia, email: alin.irimia@insemex.ro

INSEMEX
NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT
IN MINE SAFETY AND PROTECTION TO EXPLOSION

STAND FOR DETERMINING THE SELF-IGNITION TEMPERATURE Ti OF FLAMMABLE LIQUIDS WITH HIGH VISCOSITY

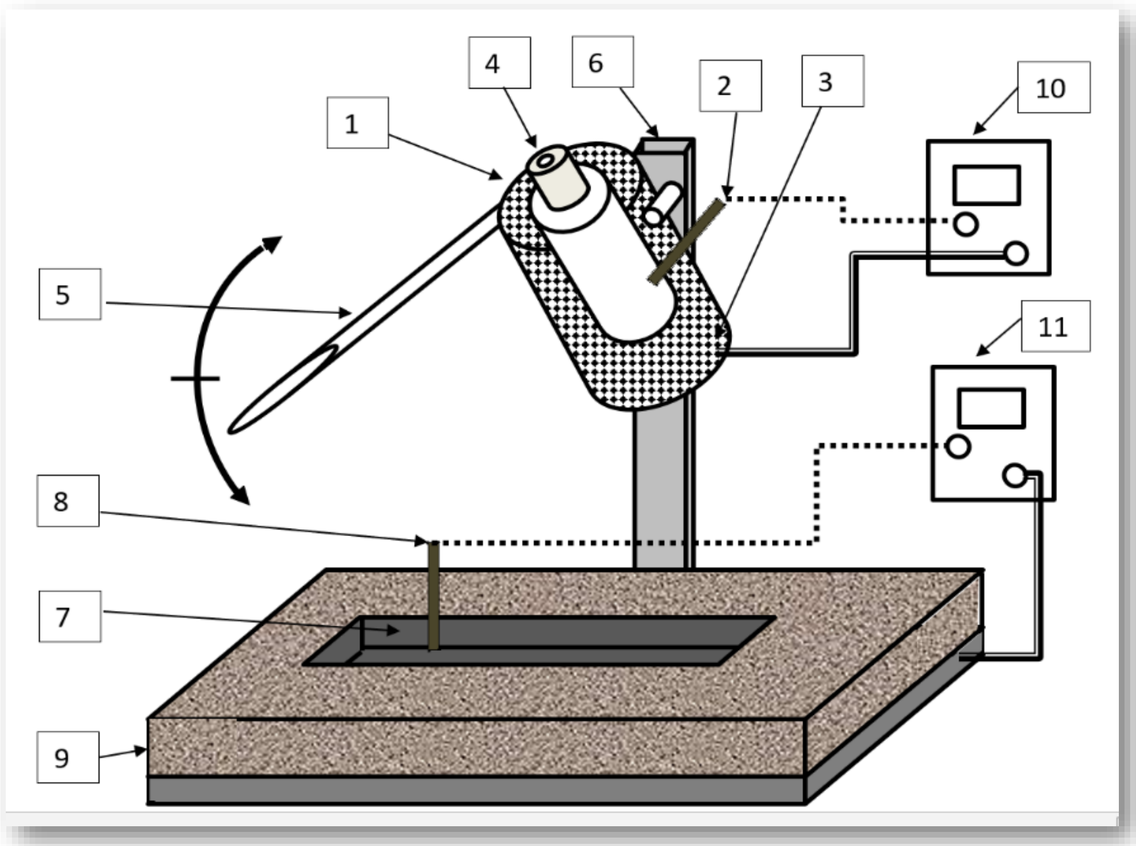
patent no A 2018 00910

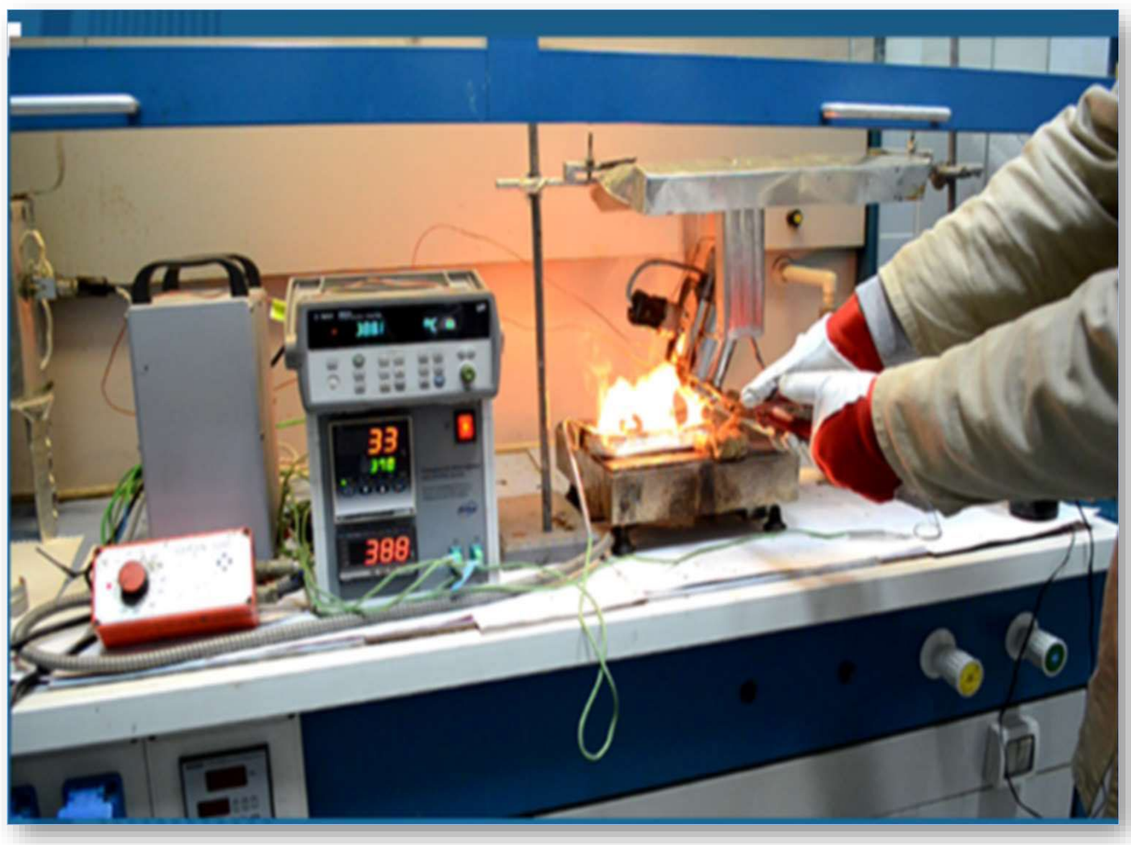
Author/s: Emilian Ghicioi, George Artur Găman, Gheorghe Daniel Pupăzan, Angelica-Nicoleta Găman, Nicolae Ioan Vlasin, Vlad Mihai Păsculescu, Cristian Nicolescu, Robert Laszlo, Constantin Sorin Burian, Florin Manea, Gheorghe-Daniel Florea, Vasilica Irina Nălboc, Andrei Szollosi-Moța, Marius Cornel Șuvar, Edward-Jan Gheorghiosu, Attila Kovacs, Alexandru Florin Simion, Marius Simion Morar.

A

The stand for determining the autoignition temperature Ti of flammable liquids with high viscosity, which at ambient temperature are in solid phase (have a freezing point above +60 degrees Celsius), according to the invention, consists of an assembly composed of a thermostated melting vessel [1] provided with a temperature probe [2], with a thermal chamber [3] adjustable in the range from +60 to +500 degrees Celsius, a lid with a central nozzle [4] with a diameter of 1 mm, a tilting device [5], mounted on the lifting device [6] at a height of 200 mm above the metal collecting trough [7], with a homogeneous temperature, provided with a measuring probe [8], immersed in a sand bath [9] with a temperature settable between +150 and +800 degrees Celsius.

The stand allows the liquid phase to gravitationally reach the metal collector after the melting stage by controlled tilting of the container, monitoring the ignition or not of the mixture of air and pre-heated liquid vapors in direct contact with the hot surface of the trough, and setting the auto-ignition temperature Ti (the lowest temperature at which auto-ignition occurs) for a wide range between +150 and +800 degrees Celsius.





The invention provides the material basis for knowing the self-ignition temperature Ti of highly flammable liquids, which are in solid form at ambient temperatures, allowing the establishment of maximum safe process temperatures, which provide explosion/fire protection for industrial activities where flammable liquids are processed, either as primary or intermediate products, obtained in the distillation processes of residues resulting from the refining of crude oil.

Contact: Emilian Ghicioi, email: emilian.ghicioi@insemex.ro

Opportunity
CORNELIUGROUP
Research-Innovation Association
Creation
Realization
INVENTCOR
Power of Creative Mind
Deva ROMANIA

INSEMEX

NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT
IN MINE SAFETY AND PROTECTION TO EXPLOSION

METHOD FOR PREVENTING SPONTANEOUS COMBUSTIONS IN COAL MINES AND SURFACE STORAGES, BY THERMOGRAPHY APPLIED IN THE EXTRACTIVE INDUSTRY

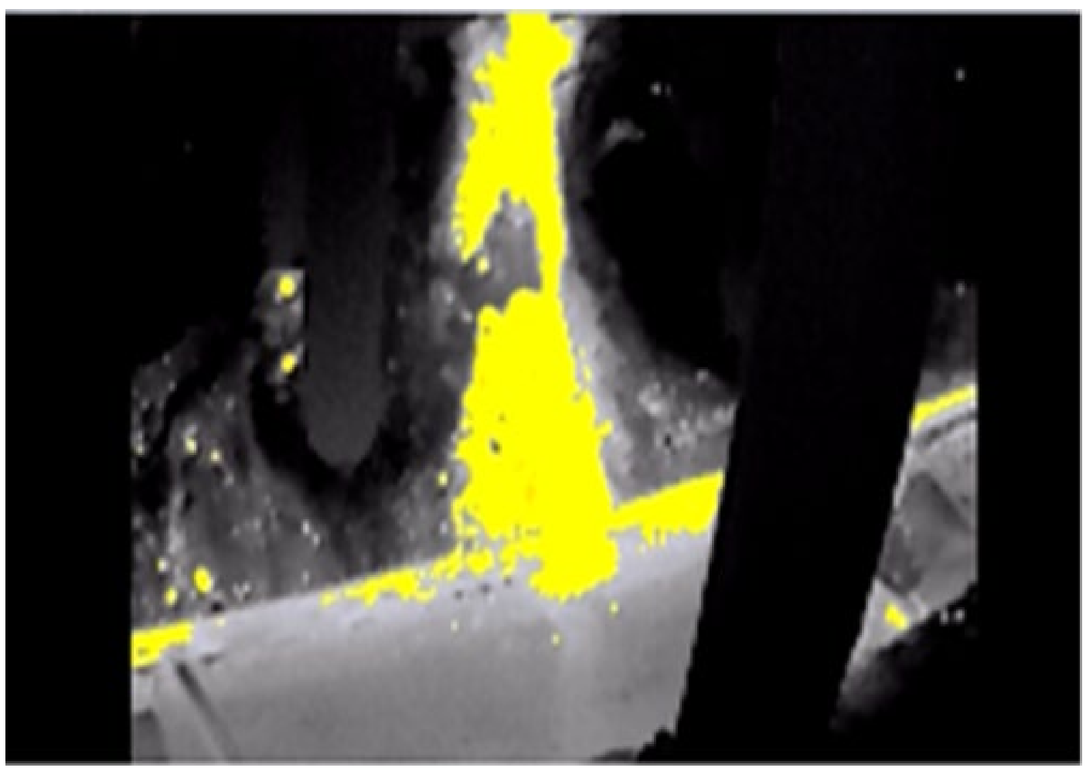
A

Patent: *patent no A 2018 00932*

Author/s: Tomescu Ion-Cristian, Cioclea Doru, Găman George Artur, Ghicioi Emilian, Gherghe Ion, Emeric Chiuzan, Toth Lorand, Szollosi-Moța Andrei, Rădoi Gheorghe Florin, Boantă Corneliu Dănuț, Morar Marius Simion, Ianc Nicolae, Matei Adrian, Drăgoescu Răzvan

The invention relates to a method for preventing spontaneous combustions which occur in open underground coal deposits, in exploitation or in surface storages. In accordance with the invention, it is ensured: the development of a smart method for preventing spontaneous combustions by thermographic monitoring of temperature fields and reducing risks generated by the occurrence of special situations in coal beds or within a surface storage, in order to ensure the safety of workers. The invention is a result of industrial research in the field of endogenous fires or of coal self-ignition risks or of surface coal storages.

The technical problem that the invention solves consists in the development of a method of preventing spontaneous combustion in coal mines and surface deposits, by applied thermography in the extractive industry, respectively, in removing the disadvantage that the self-heating nuclei of the useful mineral substance (coal) appeared in mining areas that are difficult for the operator to access, with a high risk of accidents and can be detected and controlled.



Stope - Coal discharged heated thermogram



Stope - thermal footprint from the coal massive

Classical thermometry applied to underground measurements does not always reflect the real situation of the temperature of the coal bed, in the exploited space, or of the surrounding rocks, due to objective or subjective causes the work procedure application. Non-contact thermometry eliminates these shortcomings, allows automatic measurement of hot or cold temperature cores, thermal scanning, generates the possibility of drawing up a thermal map in the shortest possible time.

Contact: Ion-Cristian Tomescu, e-mail: cristian.tomescu@insemex.ro

Opportunity
CORNELIUGROUP
Research-Innovation Association
Creation
Realization
INVENTCOR
Power of Creative Mind
Deva ROMANIA

INSEMEX

NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT
IN MINE SAFETY AND PROTECTION TO EXPLOSION

CONTINUOUS MONITORING AND RECORDING SYSTEM OF GAS EXPLOSION PARAMETERS

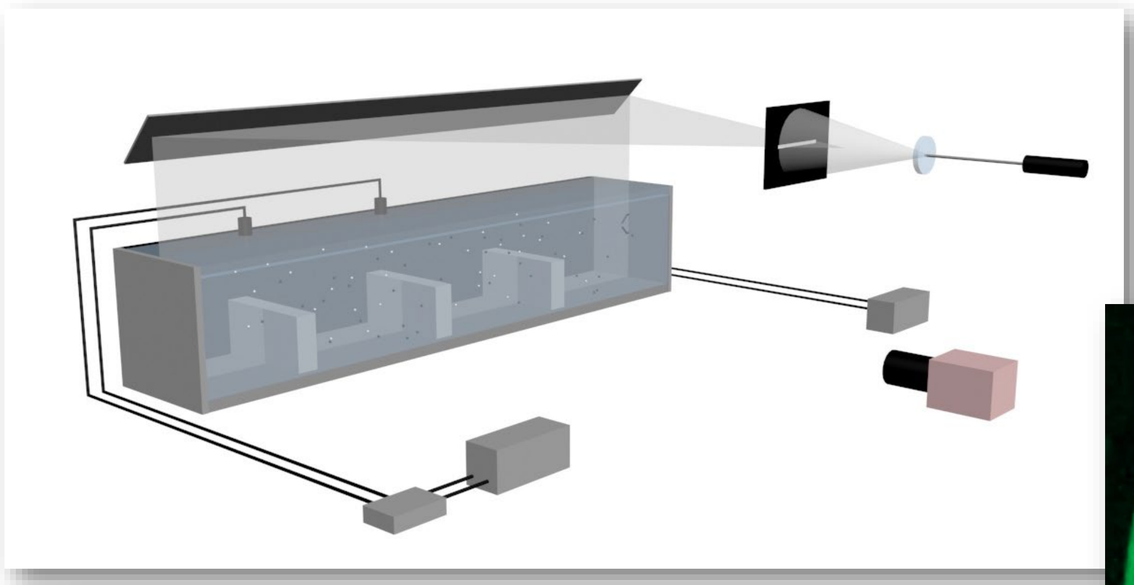
patent no A 2018 00933

Author/s: Vlasin Nicolae-Ioan, Găman George Artur, Ghicioi Emilian, Pupăzan Gheorghe Daniel, Găman Angelica-Nicoleta, Păsculescu Vlad Mihai, Nicolescu Cristian, Laszlo Robert, Burian Constantin Sorin, Manea Florin, Florea Gheorghe-Daniel, Nălboc Vasilica Irina, Szollosi-Moța Andrei, Șuvar Marius Cornel, Vass Zoltan, Tuhuț Ligia – Ioana, Simion Alexandru Florin, Morar Marius Simion

A

The invention relates to a system for monitoring and continuously recording the parameters of gas explosions. The system is capable of analyzing the explosion phenomena of air-combustible gas mixtures at higher recording speeds of the parameters.

Videos are recorded using a high-speed camera, on a vertical longitudinal section through the explosion chamber. This section is highlighted by a laser light beam, elongated along the entire length of the transparent tube by using a divergent lens to diffuse the beam into a cone shape. To obtain the vertical plane of the laser beam, the beam is reflected, with the help of a flat mirror, at an angle of 90 degree and is passed through a slit located on the upper and transparent wall of the rectangular tube.





The fluid movement is highlighted by the introduction of inert particles of very small mass inside the tube, particles that become more visible in the vertical plane generated by the laser source.

Explosion pressures data are recorded using pressure sensors, amplifier and oscilloscope, the data on the velocities and accelerations of the flame front and inert dust particles are calculated directly in the video files recorded by the high-speed camera through its dedicated software

Contact: Nicolae Ioan Vlasin, email: nicolae.vlasin@insemex.ro

Opportunity
CORNELIUGROUP Research-Innovation Association
Creation
Realization
INVENTCOR
Power of Creative Mind
Deva ROMANIA

INSEMEX

NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT
IN MINE SAFETY AND PROTECTION TO EXPLOSION

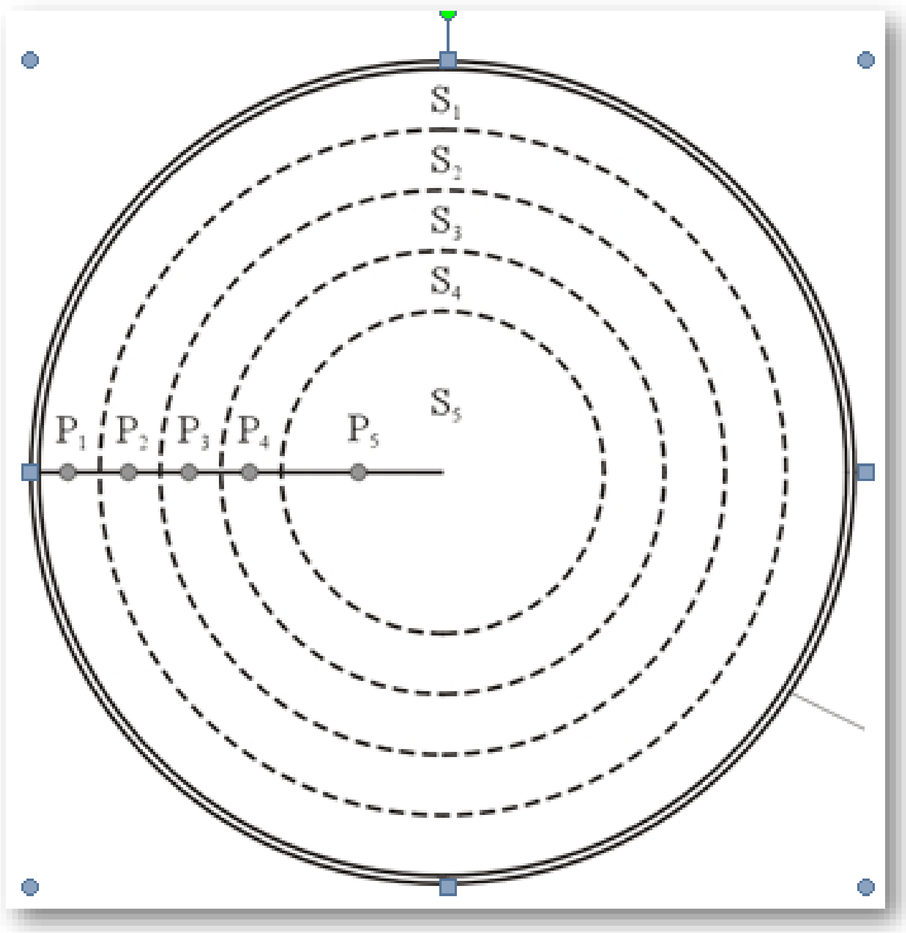
CONTINUOUS INVASIVE DETERMINATION METHOD OF AIR VELOCITY

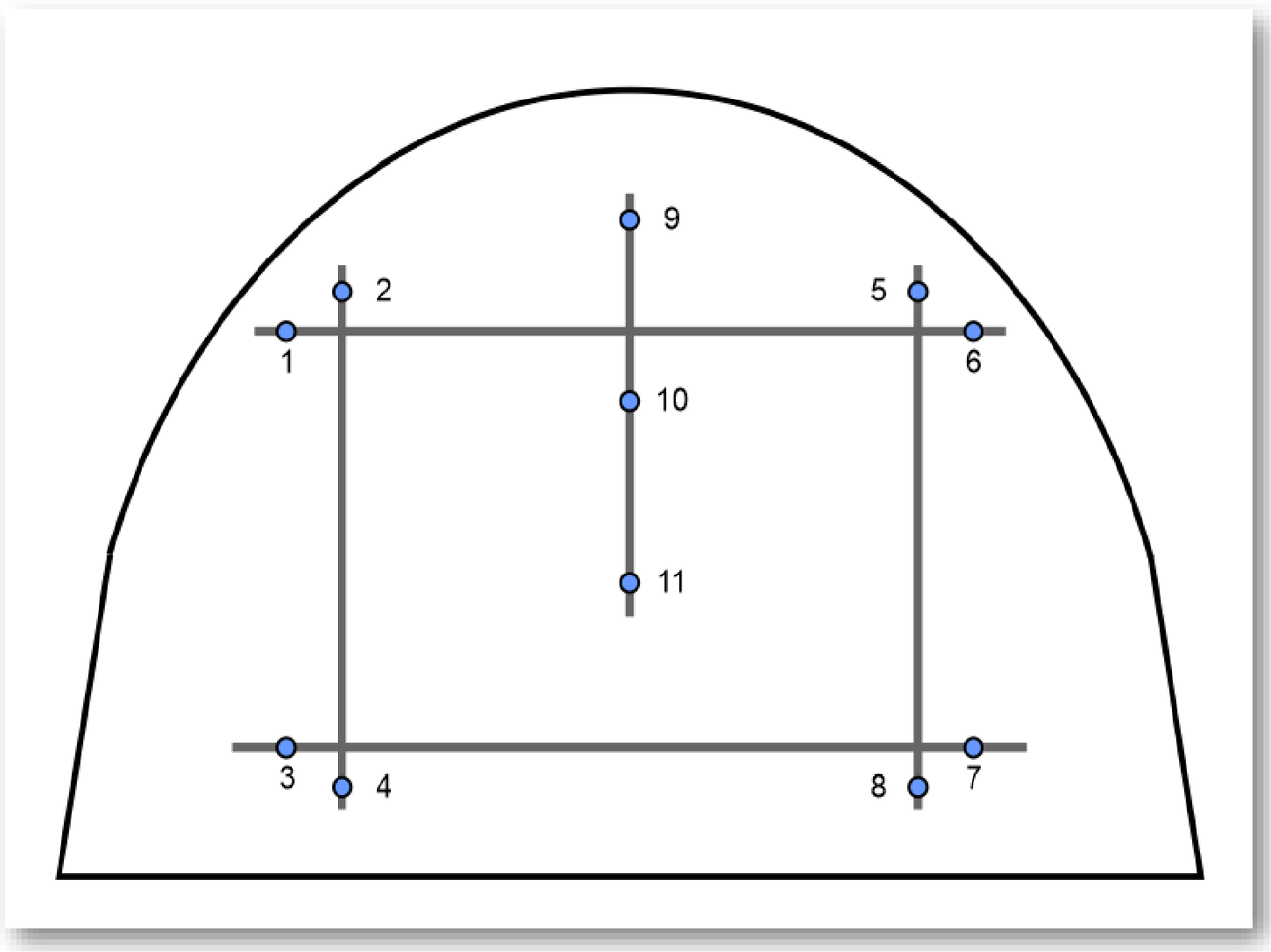
patent no A 2020 00338

Author/s: Doru Cioclea, Emeric Chiuzan, Artur George Găman, Emilian Ghicioi, Ion Gherghe, Florin Rădoi, Corneliu Boantă, Nicolae Ianc, Cristian Tomescu, Marius Morar, Adrian Matei, Răzvan Drăgoescu, Nicolae Vlasin

A

The continuous invasive determination method of air velocity shall take into account the entire measuring section, the location and the measuring surface are chosen and the air parameters, the equivalent surfaces and centers of gravity within the measuring surface are determined, the system for the continuous determination of the static, dynamic, and total average air pressure is set up and installed at the measuring point, and the system for continuous determination of the mean pressure is connected, the data resulting from the continuous measurements are collected, finally the average speed at the level of the measuring surface is established indirectly.





Contact: Doru Cioclea, email: doru.cioclea@insemex.ro

Opportunity
CORNELIUGROUP Research-Innovation Association
Creation
Realization
INVENTCOR
Power of Creative Mind
Deva ROMANIA

INSEMEX

NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT
IN MINE SAFETY AND PROTECTION TO EXPLOSION

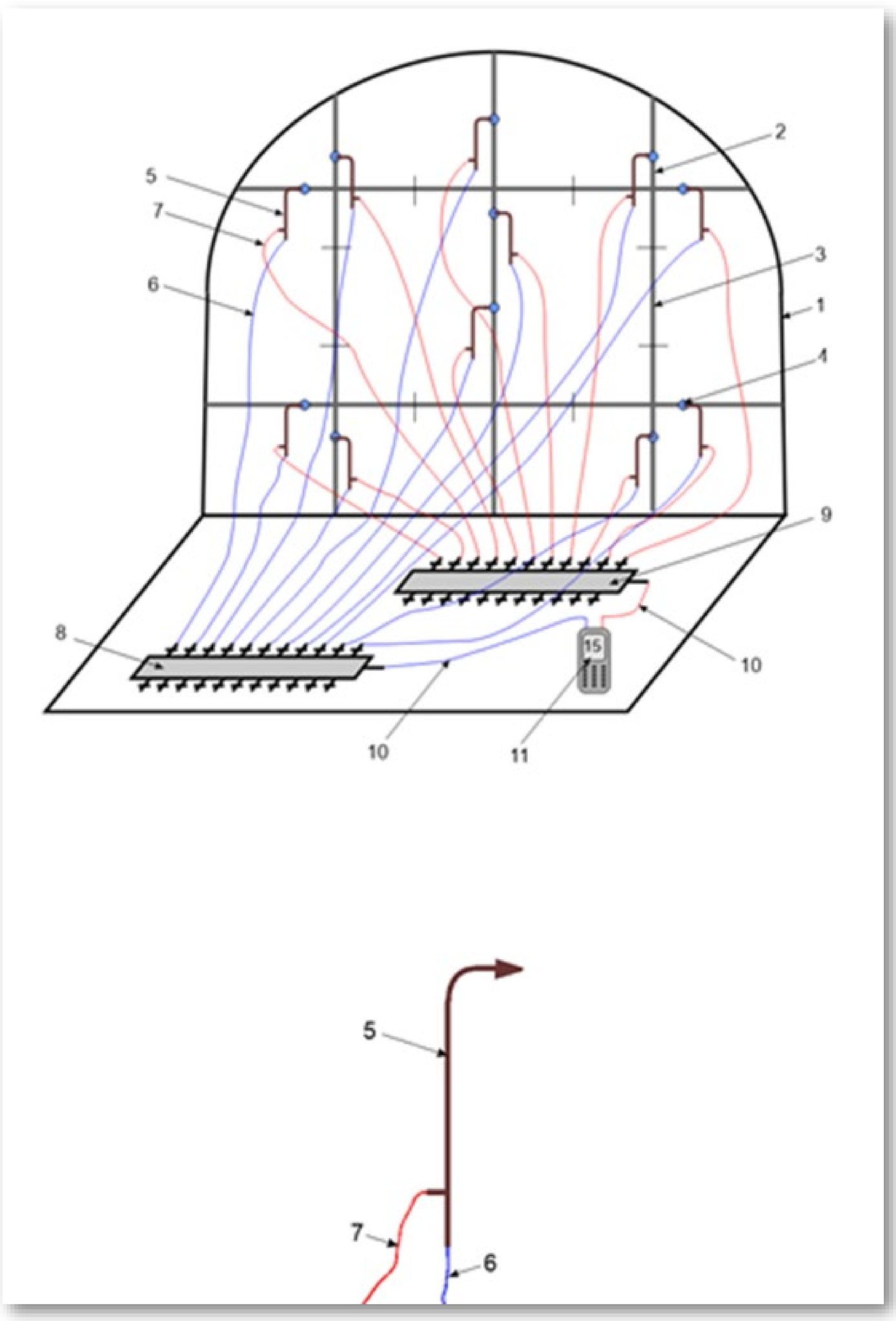
CONTINUOUS AIR SPEED DETERMINATION SYSTEM

patent no A 2020 00369

Author/s: Doru Cioclea, Emeric Chiuzan, Artur George Găman, Emilian Ghicioi, Ion Gherghe, Florin Rădoi, Corneliu Boantă, Nicolae Ianc, Cristian Tomescu, Marius Morar, Adrian Matei, Răzvan Drăgoescu, Nicolae Vlasin.

A

The system for the continuous determination of the air speed, uses rectangular profiles that can be structured from cross type components, with connecting elements made of linear rectangular profiles, screw-type stiffening elements, Pitot-Prandtl tubes, primary connecting hoses connected to the pressure sockets, two barrels equipped with several connecting elements, each connecting element is provided with a shut-off valve / opening, secondary connecting hoses connected to the barrels, respectively a pressure measuring device, the data resulting from the continuous measurements are collected, finally the average speed at the level of the measuring surface is established indirectly.



Contact: Doru Cioclea, email: doru.cioclea@insemex.ro

Opportunity
CORNELIUGROUP
Research-Innovation Association
Creation
Realization
INVENTCOR
Power of Creative Mind
Deva ROMANIA

INSEMEX

NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT
IN MINE SAFETY AND PROTECTION TO EXPLOSION

SPECIALIZED SCALABLE SYSTEM FOR CHECKING THE OPERATING PARAMETERS FOR PYROTECHNIC ARTICLES FOR PROFESSIONAL USE - CATEGORY F4

patent no A 2020 00687

Author/s: Vasilescu Gabriel-Dragoș, Ghicioi Emilian, Găman George-Artur, Laszlo Robert, Kovacs Attila, Gheorghiosu Edward-Jan, Rus Daniela-Carmen, Rădeanu Cristian, Garaliu Bușoi Bogdan, Ilici Ștefan, Miron Claudia

A

Summary of invention

The invention relates to a specialized scalable system, intended for determining the operating parameters for pyrotechnic articles for professional use - category F4, which allows the processing of images for the purpose of scalable determination, based on the assignment of a known size, expressed in the unit of measurement - the meter, a reference mark with a certain number of pixels, as well as by using a calculation algorithm, for determining and monitoring the main specific functional parameters, such as: trajectory - ascending height, deviation from the vertical in two perpendicular planes, the dimensions of the main and side effects.

Prototype design

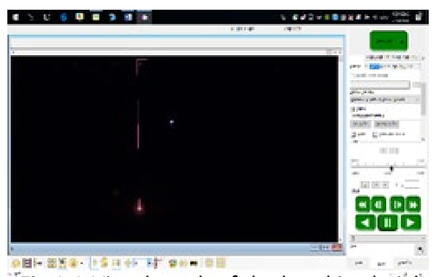


Fig.1.1-Visual result of the breaking height of the effect (A) recorded by the ultra-fast camera no.1

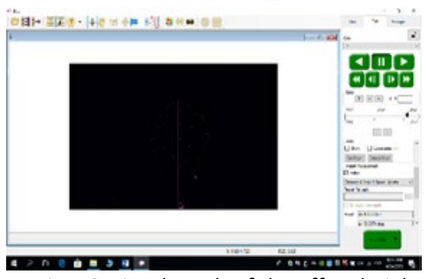


Fig.1.2-Visual result of the effect height (B) recorded by the ultra-fast camera no.1

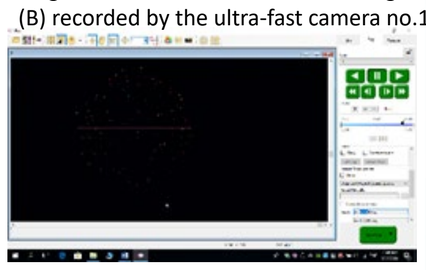


Fig.1.3-Visual result of the effect height (C) recorded by the ultra-fast camera no.1

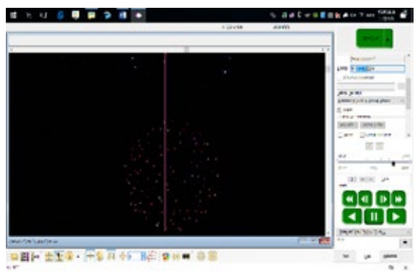


Fig.1.3-Visual result of the effect height (C) recorded by the ultra-fast camera no.1

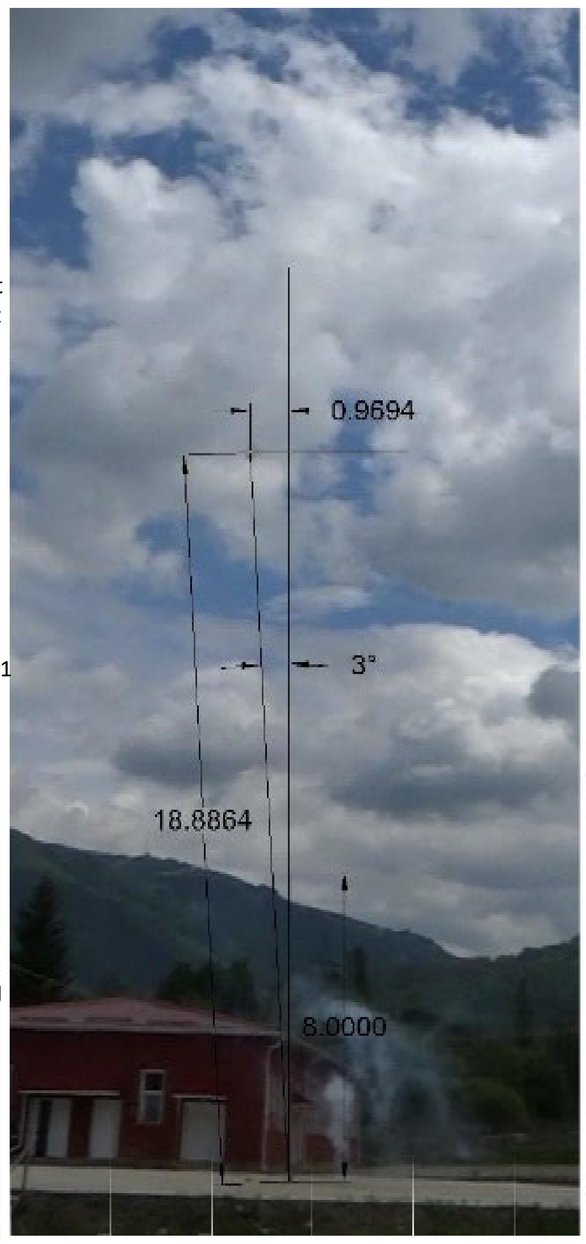


Fig.1 Operation of the pyrotechnic article (F4) captured by the ultra-fast video camera no.1



Fig.2 Operation of the pyrotechnic article (F4) captured by the ultra-fast video camera no.2

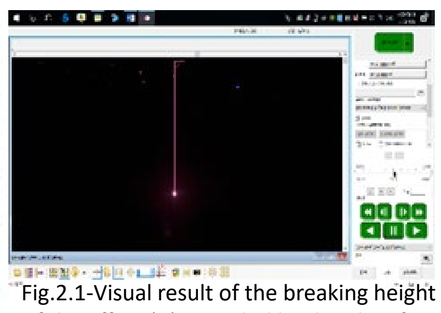


Fig.2.1-Visual result of the breaking height of the effect (A) recorded by the ultra-fast camera no.2

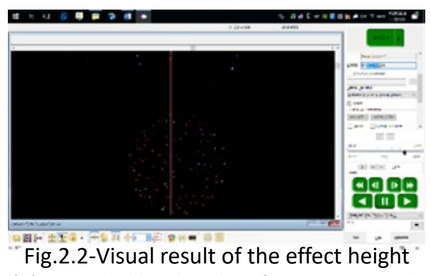


Fig.2.2-Visual result of the effect height (B) recorded by the ultra-fast camera no.2

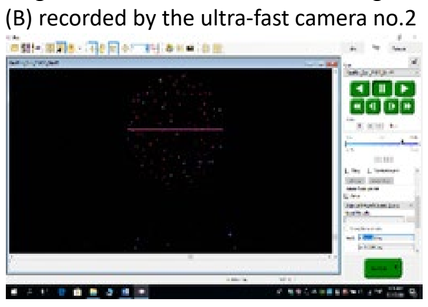


Fig.2.3-Visual result of the effect height (C) recorded by the ultra-fast camera no.2

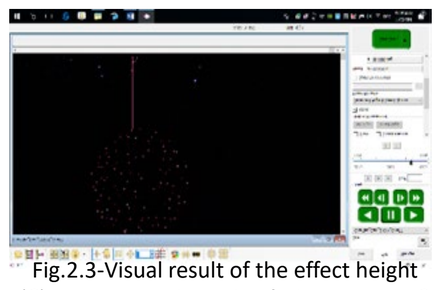


Fig.2.3-Visual result of the effect height (C) recorded by the ultra-fast camera no.2

Hardware controllers

The specialized scalable system is realized as a complex assembly, equipped with dual optical system with high frequency frame recording, which allows image processing for scalable determination, based on the assignment of a known size, expressed in the unit of measurement – the meter, to a reference landmark with a certain number of pixels, as well as by using a calculation algorithm, for determining and monitoring the main spatial functional parameters, specific to pyrotechnic articles for professional use - category F4, such as: trajectory- ascending height, deviation from the vertical in two perpendicular planes, the dimensions of the main and side effects, the height of fall, the safety distance. Thus, the system allows the determination of the explosion height and the ascending angle, the determination of the dimensions of the light effects: burst height, effect height, effect width, fall height, deviation angle from the vertical, based on them can be established, both compliance of these products with the security quality requirements that they must meet, as well as their classification in the related category -F4.

Contact: Dragoș-Gabriel Vasilescu, email: dragos.vasilescu@insemex.ro

Opportunity
CORNELIUGROUP Research-Innovation Association
Creation
Realization
INVENTCOR
Power of Creative Mind
Deva ROMANIA

INSEMEX

NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT IN MINE SAFETY AND PROTECTION TO EXPLOSION

VENTILATION CRITICAL CONSTRUCTIONS RECOGNITION METHOD

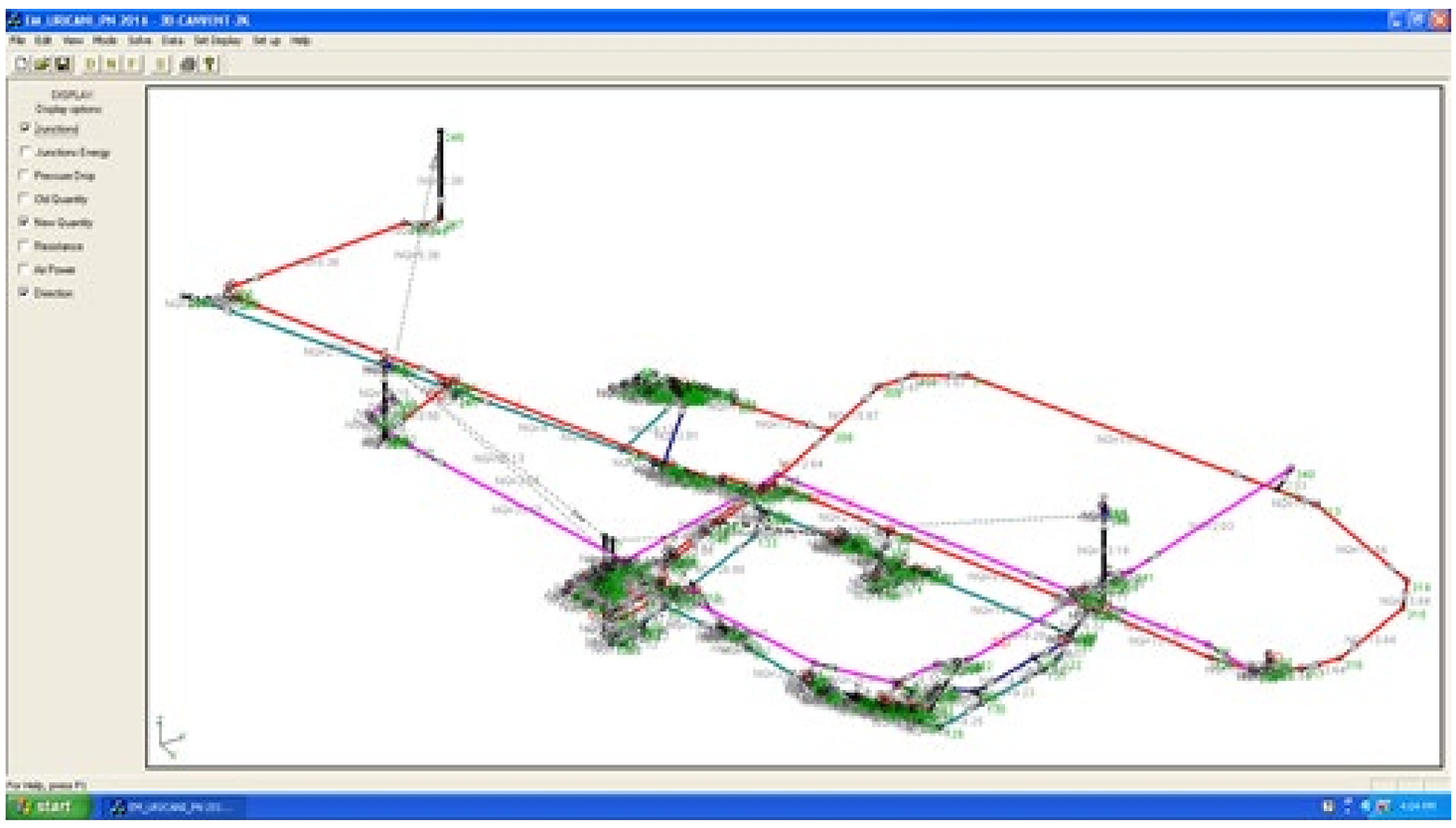
patent no A 2021 00358

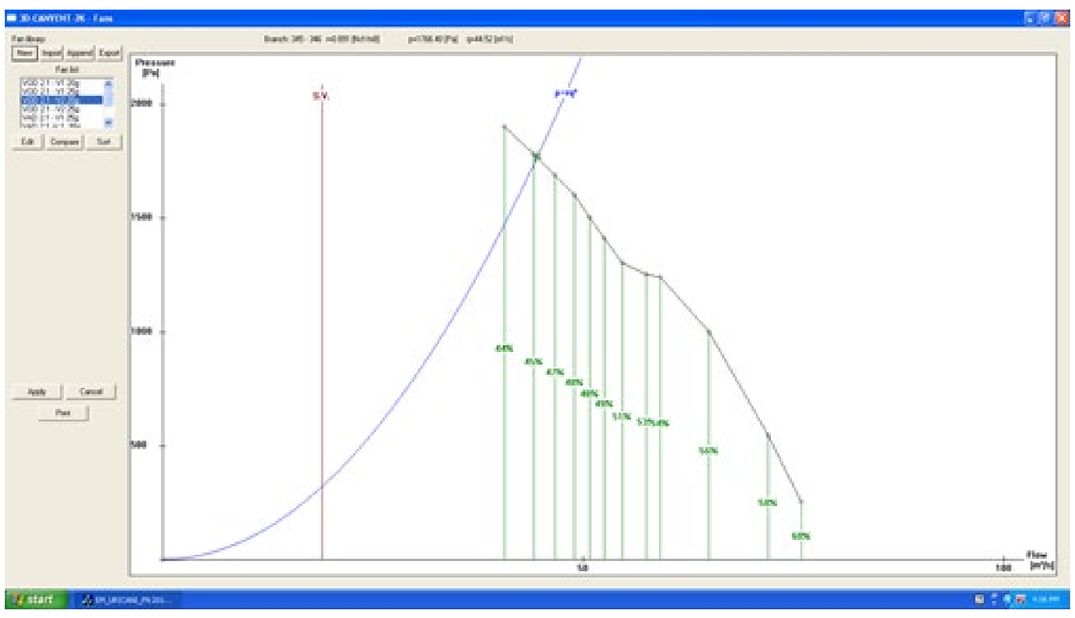
Author/s: Doru Cioclea, Artur George Găman, Emilian Ghicioi, Ion Gherghe, Florin Rădoi, Corneliu Boantă, Nicolae Ianc, Emeric Chiuzan, Cristian Tomescu, Adrian Matei, Răzvan Drăgoescu, Alexandru Cămărășescu.

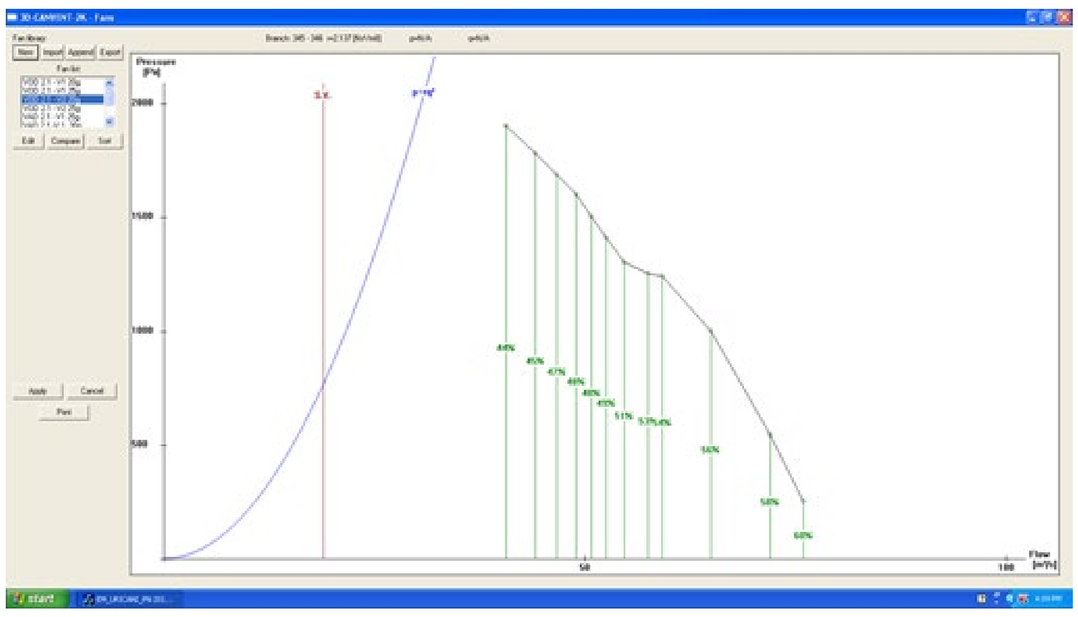
A

The method of recognition of critical ventilation constructions is based on the identification of critical ventilation constructions at the level of a complex ventilation network, by establishing the degree of instability induced at the level of active fans. For this, first, the complex ventilation network is solved and the functional parameters related to the active fans are established, under normal working conditions, the influence zones specific to each main ventilation station are established. After this stage, the type and position of the ventilation constructions is determined. The influence of ventilation constructions on the operating stability of active fans is established. At the level of the complex ventilation network, the ventilation constructions that do not produce effects on the operation mode of the active fans are identified. At the level of the complex ventilation network, the ventilation constructions that produce minor effects on the functioning of the active fans are identified.

Through successive simulations, the ventilation constructions that produce significant but harmless effects on the operation mode of the active fans are identified. It is identified at the level of the complex ventilation network, those ventilation constructions that produce major effects on the operation mode of the active fans and therefore determine the instability of the ventilation network. Thus these identified ventilation constructions are considered critical.







Contact: Doru Cioclea, email: doru.cioclea@insemex.ro

INSEMEX

NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT IN MINE SAFETY AND PROTECTION TO EXPLOSION

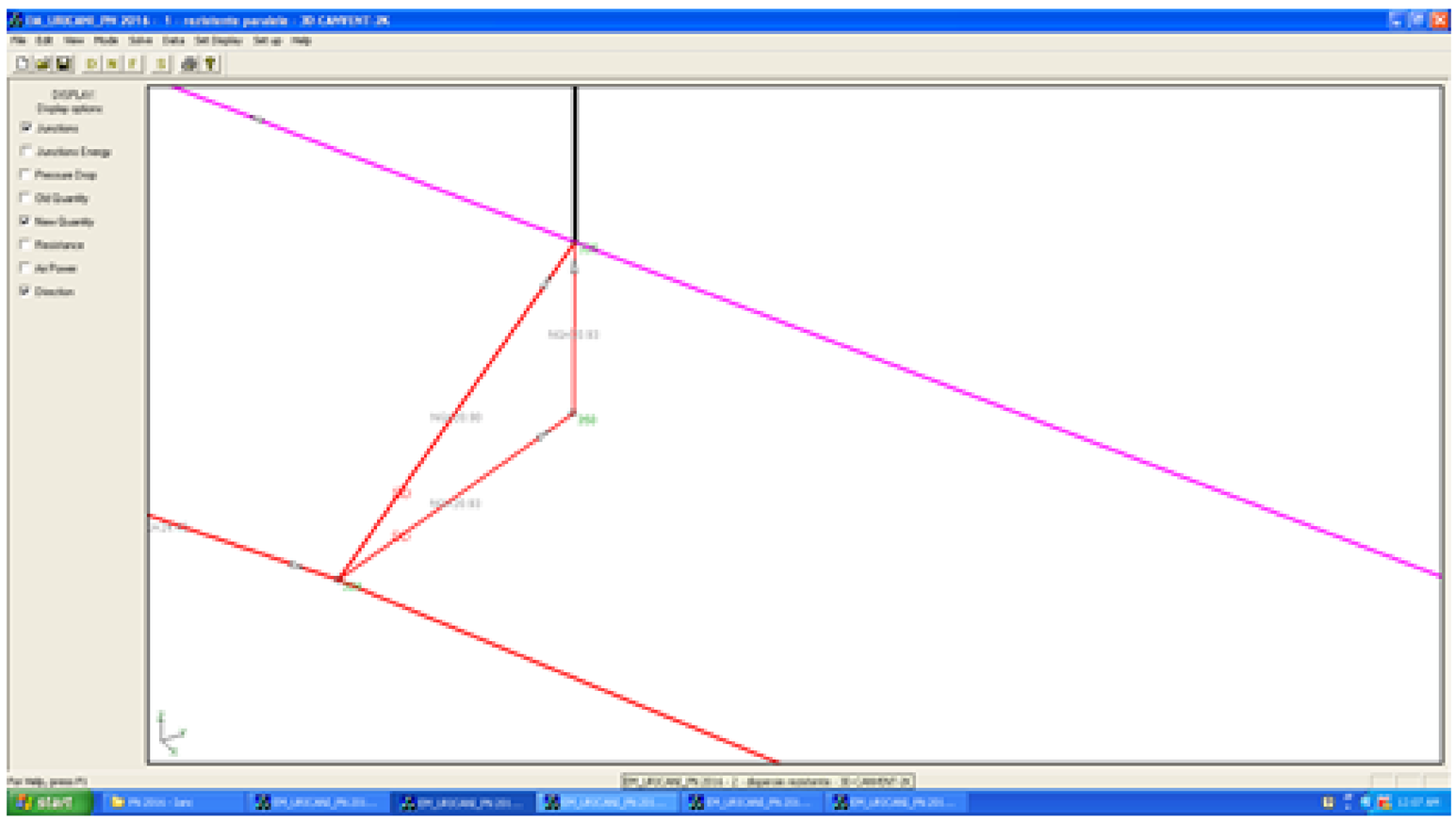
REPLACEMENT OF CRITICAL VENTILATION STRUCTURES METHOD

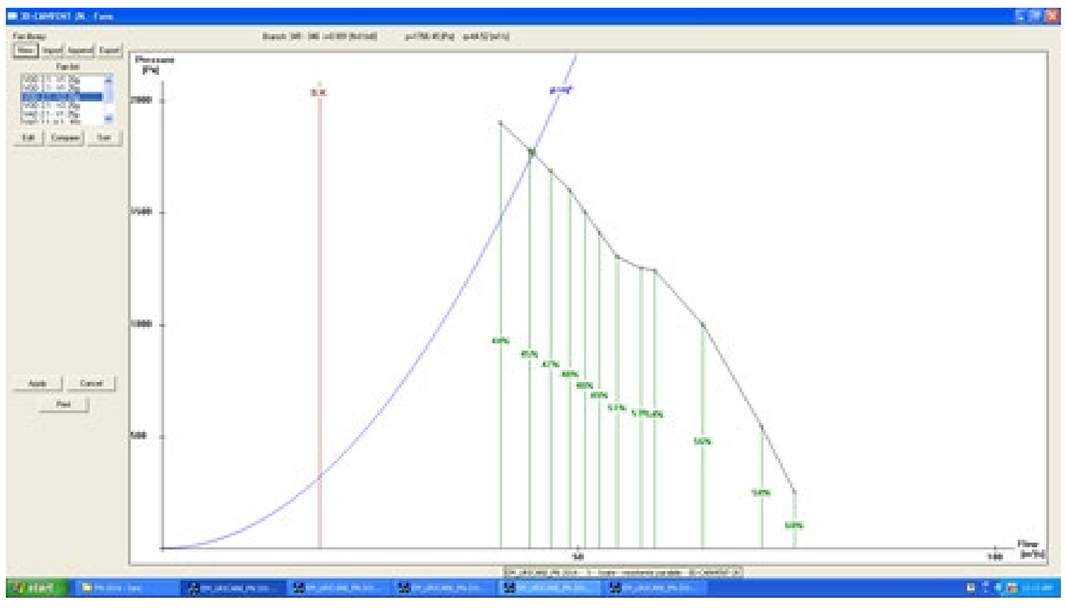
patent no A 2021 00359

Author/s: Doru Cioclea, Artur George Găman, Emilian Ghicioi, Ion Gherghe, Florin Rădoi, Corneliu Boantă, Nicolae Ianc, Emeric Chiuzan, Cristian Tomescu, Adrian Matei, Răzvan Drăgoescu, Alexandru Cămărășescu.

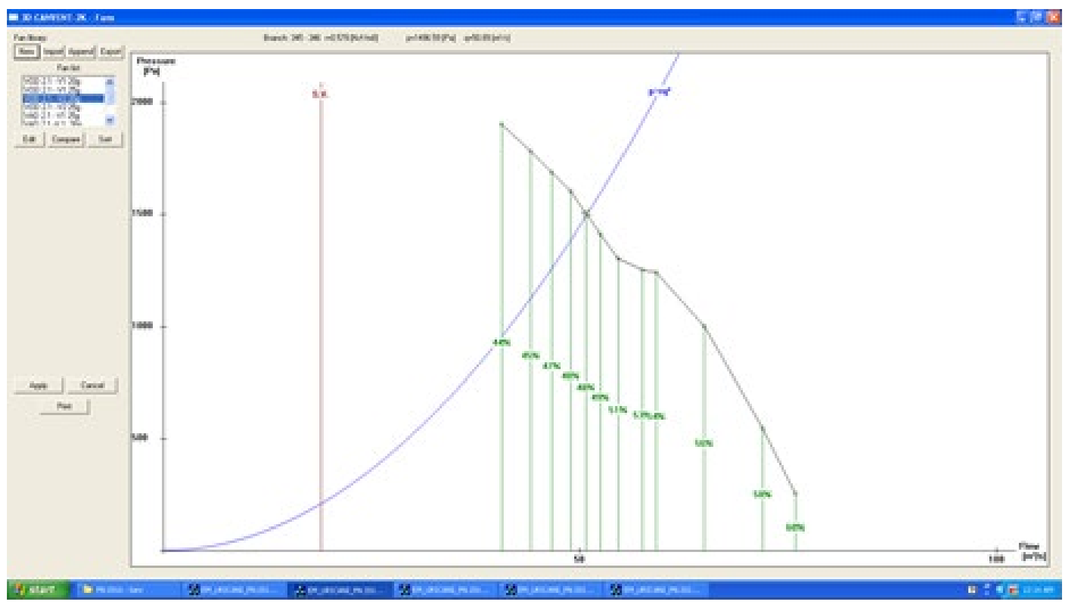
A

The method of replacing the critical ventilation constructions is based on the identification of the way to replace the critical ventilation constructions, by eliminating the degree of instability induced at the level of the active fans. For this, first, with the help of specialized programs, the complex ventilation network is solved and the functional parameters related to the active fans are established, under normal working conditions, the specific influence areas of each main ventilation station are established. After this stage, the type and position of the ventilation constructions is established. The influence of ventilation constructions on the operating stability of active fans is established. Critical ventilation constructions are identified at the network level. The critical ventilation construction replacement method is applied to critical ventilation constructions. A parallel connection is made to the branch on which the critical ventilation construction is located, on which a ventilation construction with equivalent resistance is located. The functional parameters specific to the active main fan are obtained in the new configuration of the ventilation network.





Branch: 345 - 346 r=0.891 [Ns²/m8] p=1766.45 [Pa] q=44.52 [m³/s]



Branch: 345 - 346 r=0.578 [Ns²/m8] p=1496.59 [Pa] q=50.89 [m³/s]

Contact: Doru Cioclea, email: doru.cioclea@insemex.ro

Opportunity
CORNELIUGROUP Research-Innovation Association
Creation
Realization
INVENTCOR
Power of Creative Mind
Deva ROMANIA

INSEMEX

NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT
IN MINE SAFETY AND PROTECTION TO EXPLOSION

VENTILATION MANAGEMENT METHOD

patent no A 2021 00641

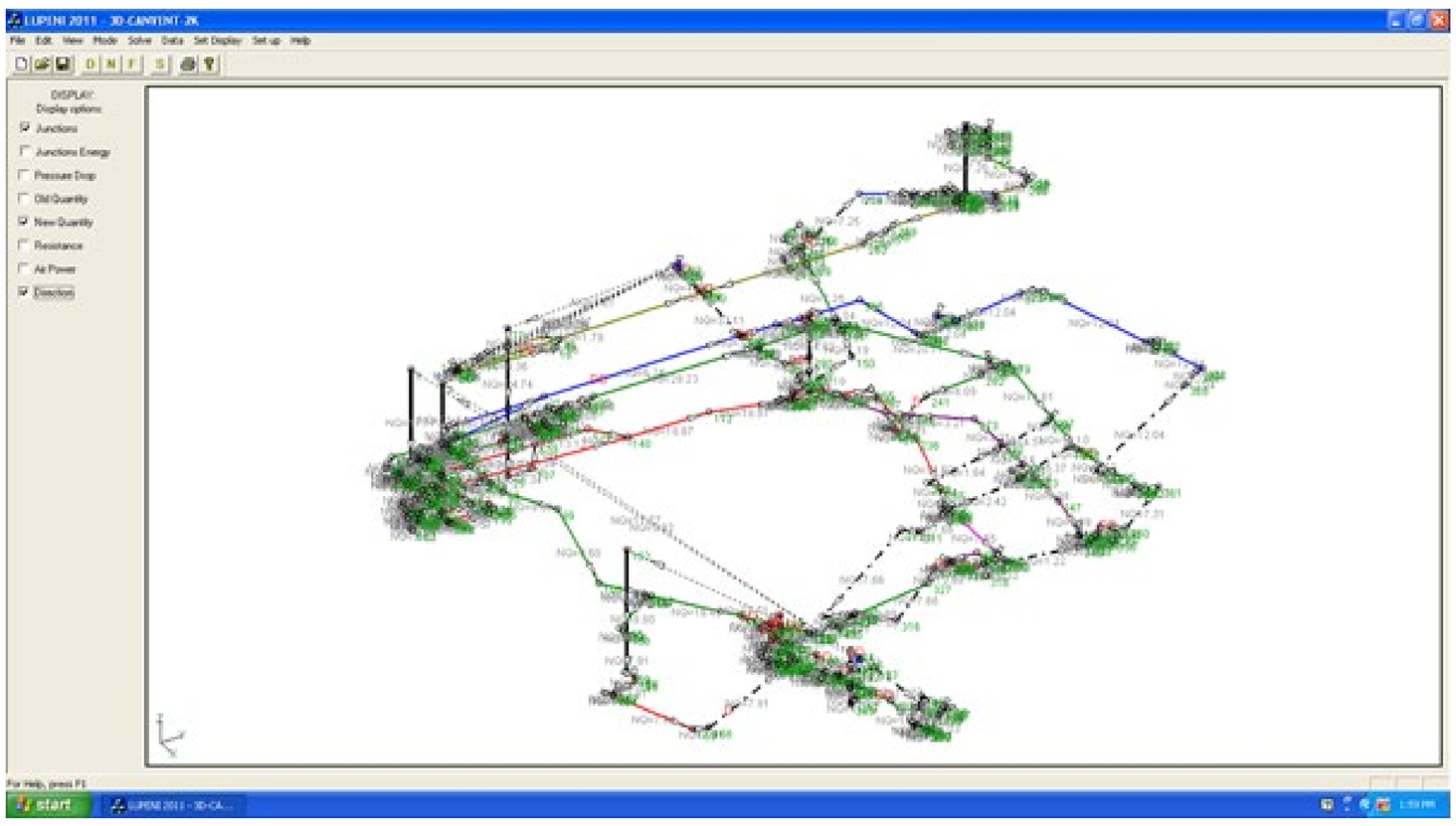
Author/s: Doru Cioclea, Artur George Găman, Emilian Ghicioi, Ion Gherghe, Nicolae Ianc, Florin Rădoi, Corneliu Boantă, Emeric Chiuzan, Cristian Tomescu, Adrian Matei, Răzvan Drăgoescu, Alexandru Cămărășescu.

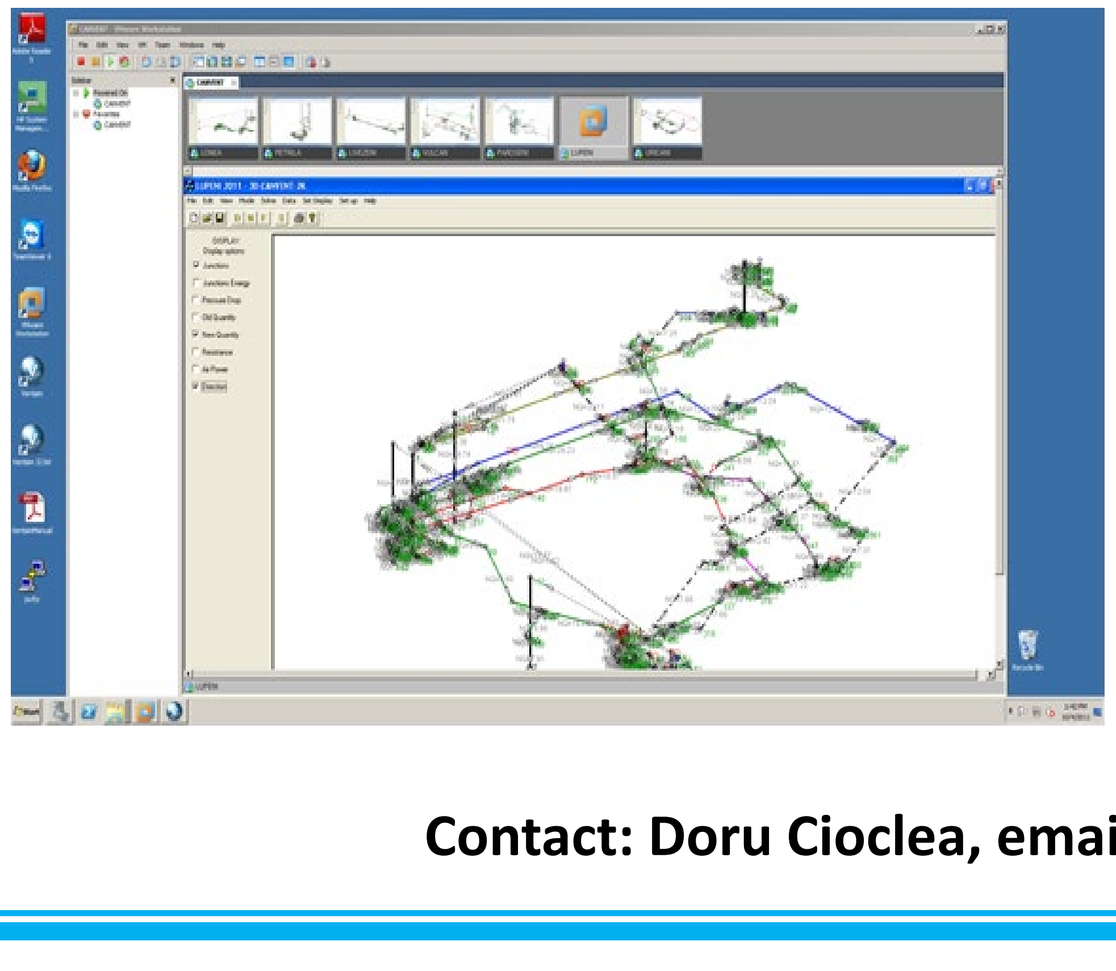
A

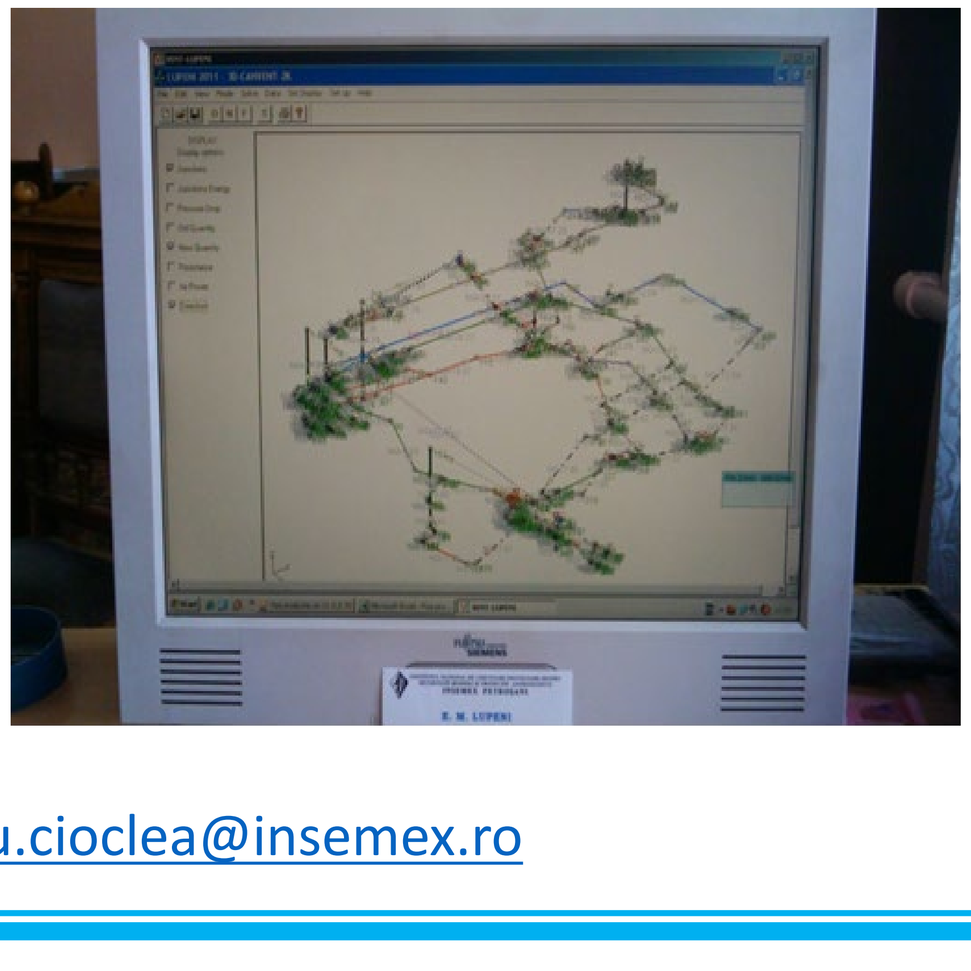
The ventilation management method is based on the use of a modeling, solving and simulation program for several complex ventilation networks and the creation of an interactive ventilation management system that allows the operative solution, from an expert center, of technical problems arising in the networks of ventilation related to mining units. For this, first, the modeling and successive solving of the complex ventilation networks is done with the help of the specialized program 3D CANVENT. After this, the successive optimization of the complex ventilation networks is carried out. An expert management center of ventilation networks is achieved by mounting an administrator server in a specially designated location. After this, virtual machines are created for each complex ventilation network and installed on the administrator server using VMware workstation 7 Software.

Correspondence between the virtual machine and the served air network is ensured by using the Real VNC Enterprise Edition program that is installed on the administrator server.

The mining unit is then granted access to the distributed virtual machine by using the Real VNC Enterprise Edition program that is installed on designated computers within the mining units. The connection between the expert center and the mining unit is secured by using authentication data and access passwords. Finally, the technical problems that arise at the level of any calling ventilation network that has been modeled, solved, optimized and installed on the dedicated virtual machine on the administrator server are solved operatively and in real time.







Contact: Doru Cioclea, email: doru.cioclea@insemex.ro

INSEMEX
NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT
IN MINE SAFETY AND PROTECTION TO EXPLOSION

REPLACEMENT OF CRITICAL VENTILATION STRUCTURES METHOD

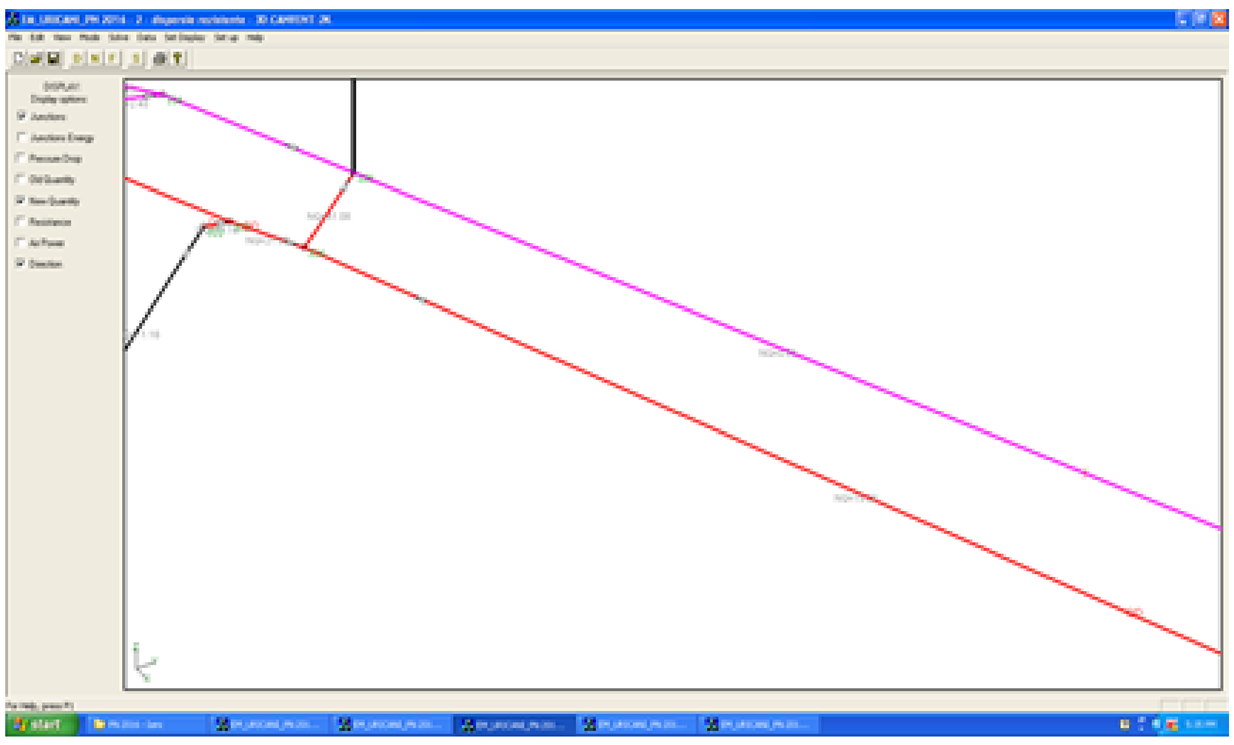
patent no A 2021 00642

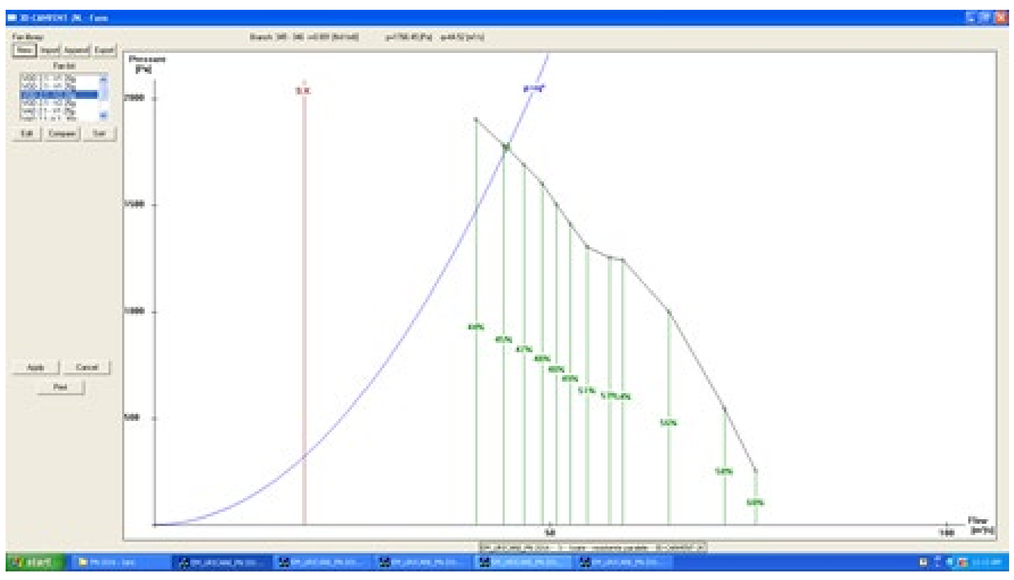
Author/s: Doru Cioclea, Nicolae Ianc, Artur George Găman, Emilian Ghicioi, Ion Gherghe, Florin Rădoi, Corneliu Boantă, Emeric Chiuzan, Cristian Tomescu, Adrian Matei, Răzvan Drăgoescu, Alexandru Cămărășescu.

A

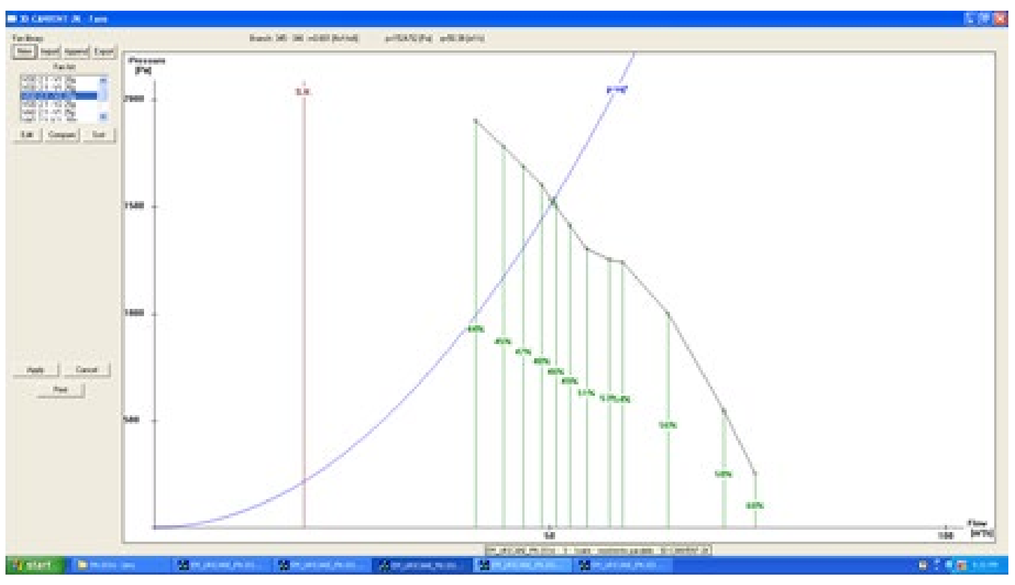
The method of replacing the critical ventilation constructions is based on the solution of the ventilation network and the establishment of the functional parameters, under normal working conditions, the establishment of the degree of instability induced at the level of the active fans by the critical ventilation constructions and the elimination of the critical character associated with the ventilation constructions at the level of a complex ventilation network. For this, the functional parameters related to the active fan are established. The specific influence zones of each main ventilation station are established.

After this stage, the influence of the ventilation constructions on the operating stability of the active fans is established and the critical ventilation constructions are identified. The critical nature of the ventilation structure is eliminated by eliminating the critical ventilation structure and the dispersion of the total resistance related to the critical ventilation structure, on parallel links, located downstream or upstream of the branch on which the critical ventilation structure is located, links parallels on which ventilation constructions are located with resistances equivalent to that of the critical ventilation construction. The functional parameters specific to the active main fan are obtained in the new configuration of the ventilation network. The method of replacing critical ventilation constructions is suitable for any underground mining of useful mineral substances.





Branch: 345 - 346 r=0.891 [Ns²/m8] p=1766.45 [Pa] q=44.52 [m³/s]



Branch: 345 - 346 r=0.601 [Ns²/m8] p=1524.52 [Pa] q=50.38 [m³/s]

Contact: Doru Cioclea, email: doru.cioclea@insemex.ro

Opportunity
CORNELIUGROUP
Research-Innovation Association
Creation
INVENTCOR
Realization
Power of Creative Mind
Deva ROMANIA

INSEMEX

NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT
IN MINE SAFETY AND PROTECTION TO EXPLOSION

STAND FOR IMAGING RECORDING OF THE FORMATION OF EXPLOSIVE ATMOSPHERES AND OF THE INITIATION AND DEVELOPMENT OF RAPID COMBUSTION PROCESSES

patent no A 2021 00692

Author/s: Vlasin Nicolae-Ioan, Găman George Artur, Ghicioi Emilian, Pupăzan Gheorghe Daniel, Morar Marius Simion, Păsculescu Vlad Mihai, Șimon Marinică Adrian Bogdan, Tuhuț Ioana Ligia, Florea Gheorghe Daniel, Șuvar Marius Cornel, Vass Zoltan, Muntean Laurențiu, Gherghe Ion

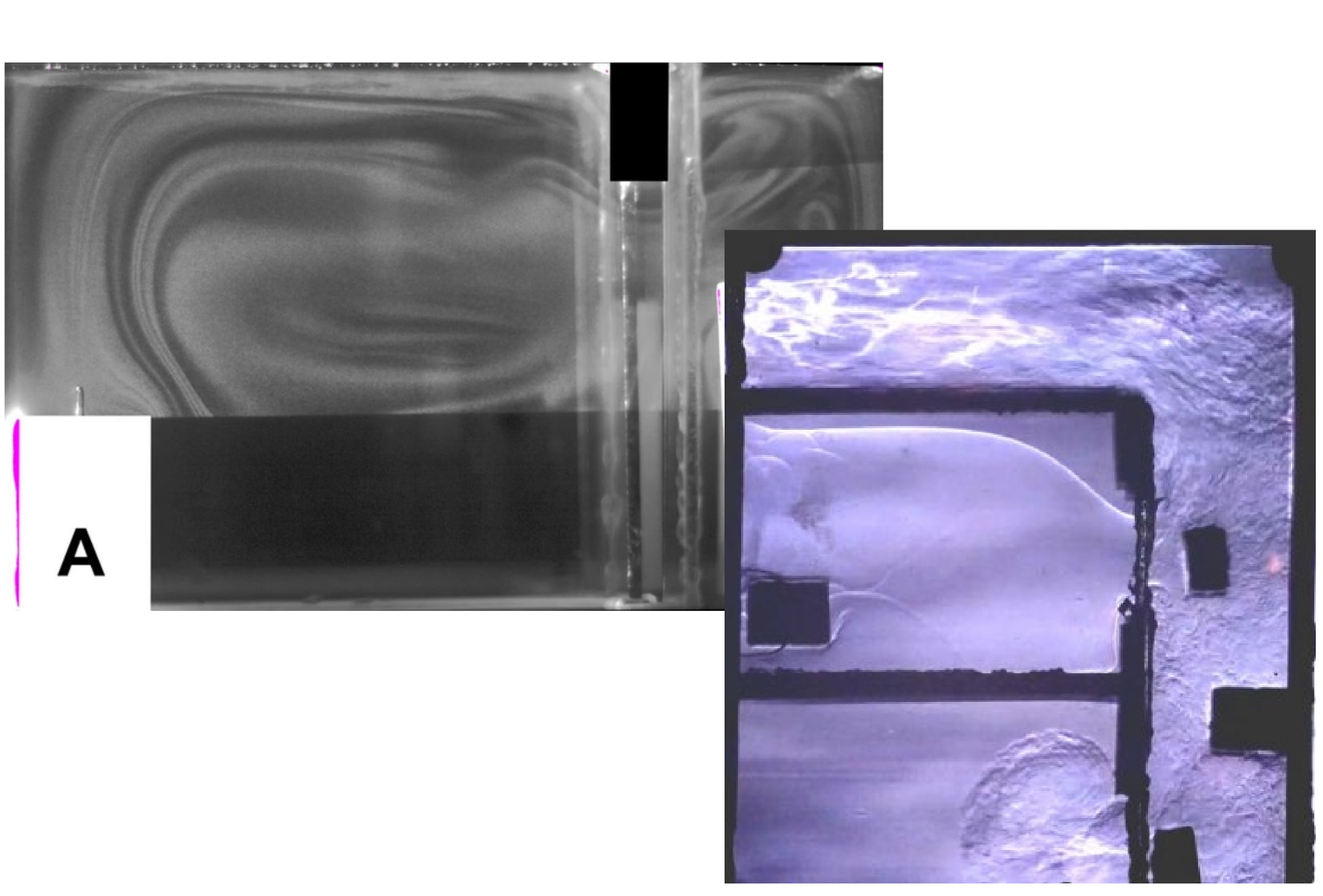
A

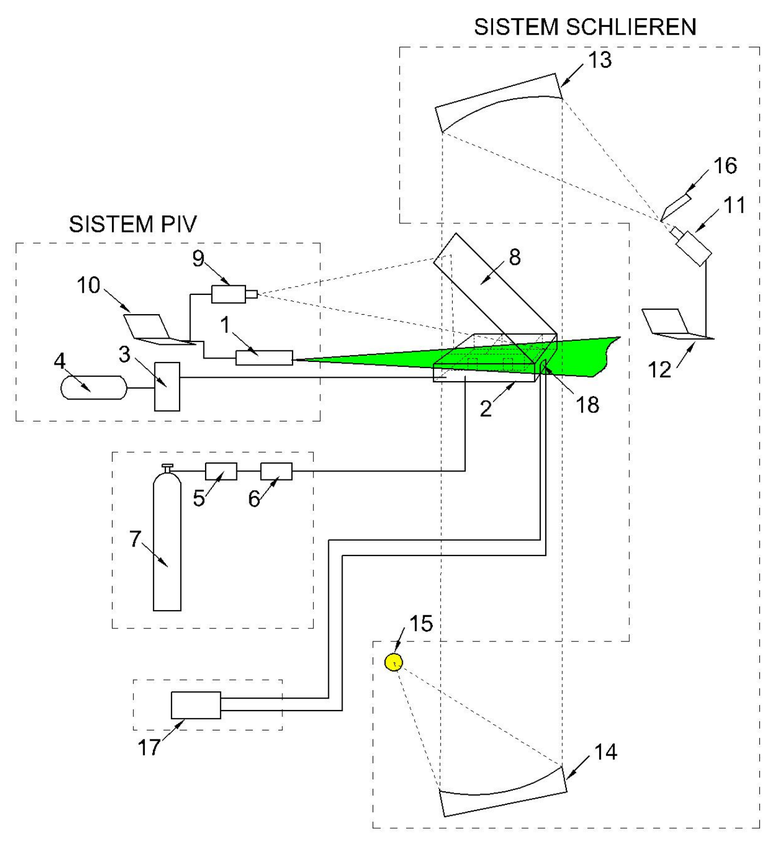
The stand simultaneously uses two modes of visualizing fluid movements in the transparent medium under analysis:

- the first mode is intended for recording, by highlighting some particles in suspension with the help of a laser source, of the regime of low speeds under which the diffusion of combustible gases takes place, and the formation of explosive atmospheres mixed with air;
- the second mode offers the recording capabilities at higher speeds, of the moment of initiation and, subsequently, of the density gradients generated by the flame front at the boundary between the burned and unburned gases during the explosion process.

The first recording system – arranged horizontally – based on the PIV (Particle Image Velocimetry) technique, consists of a pulsed laser source correlated in frequency with a CMOS video camera, a particle generator and a computer. This system highlights the formation of the explosive atmosphere, through the movement of suspended particles.

The second recording system – arranged vertically – uses Schlieren techniques and consists of a point light source, two parabolic mirrors, a shutter, a high-speed video camera and a computer. The role of this system is to highlight the initiation of the explosive atmosphere inside the transparent construction and the development and behavior of the flame front during the explosion process.





Through the computerized combination of the recordings made by the two techniques, the continuity of the combustion analysis is ensured, from the laminar to the turbulent regime.

Contact: Nicolae Ioan Vlasin, email: nicolae.vlasin@insemex.ro

Opportunity
CORNELIUGROUP Research-Innovation Association
Creation
Realization
INVENTCOR
Power of Creative Mind
Deva ROMANIA

INSEMEX

NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT
IN MINE SAFETY AND PROTECTION TO EXPLOSION

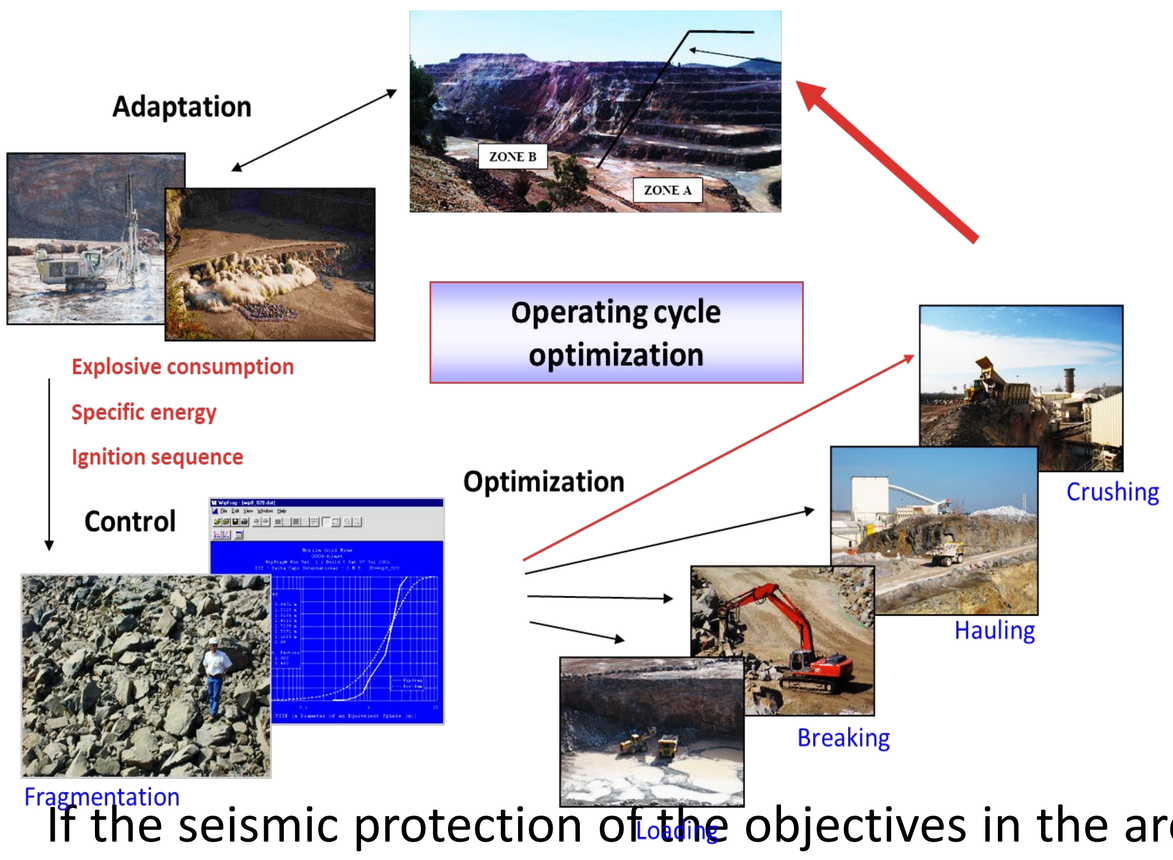
SCALABLE APPLICABLE SYSTEM TO OPTIMIZE BLASTING PARAMETERS SPECIFIC TO SAFE ECPLOITATION TECHNOLOGIES IN SURFACE MINING OPERATIONS

patent no. A 2021 00702

Authors: Laszlo Robert, Găman George-Artur, Ghicioi Emilian, Pupăzan Gheorghe Daniel, Vasilescu Gabriel-Dragoș, Gheorghiosu Edward-Jan, Kovacs Attila, Rus Daniela-Carmen, Rădeanu Cristian, Jitea Ilie Ciprian, Ilici Ștefan, Manea Florin, Garaliu Bușoi Bogdan

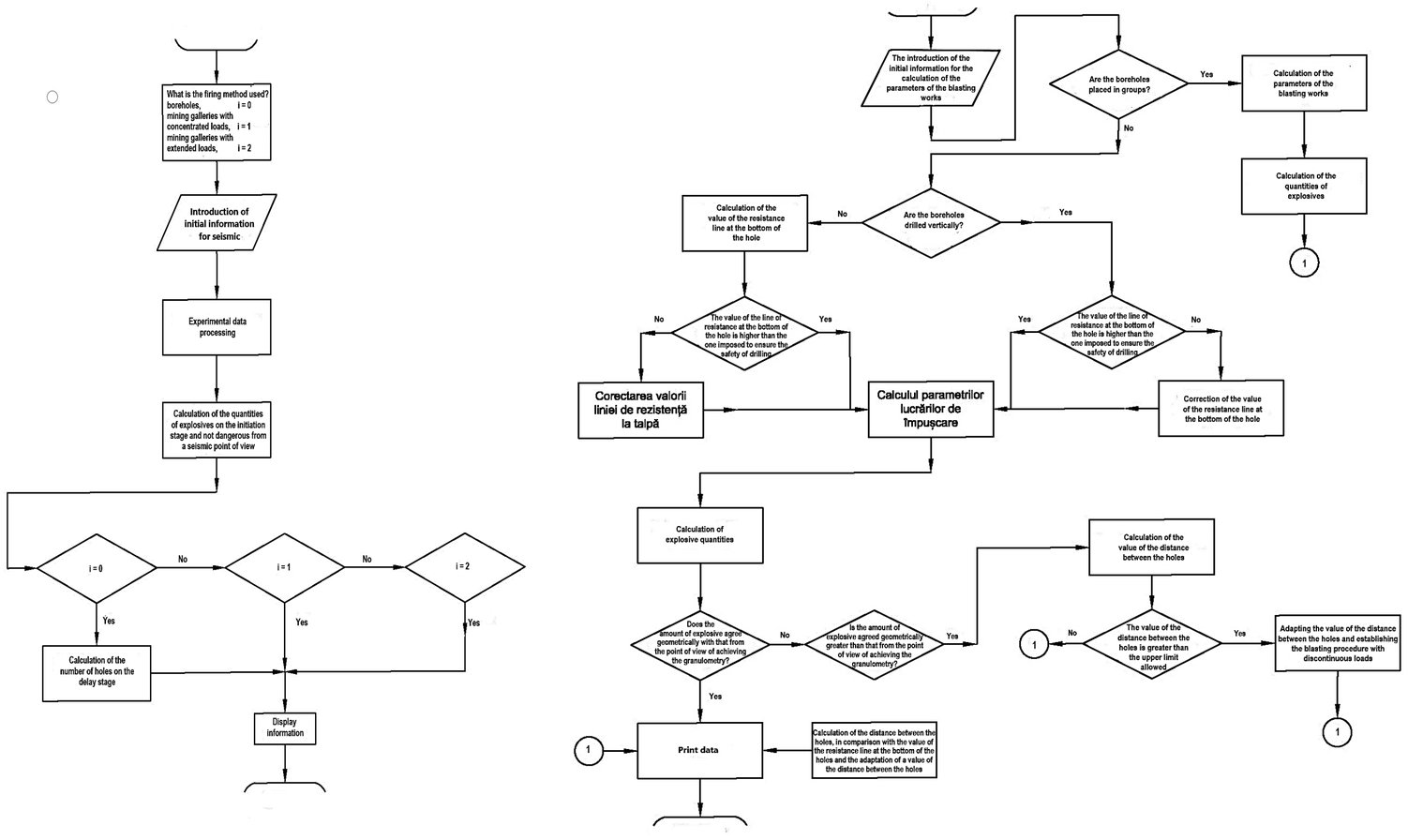
A

The invention deal with the development of a scalable applicable system that allows the determination and choice in real time of the optimal parameters of the blasting activities in correlation with the specificity of each rock deposit, of the types of explosives used and in close dependence with the established seismic restrictions regarding the quantities of explosives that can be used in such a way as to ensure the performance of the blasting activity in conditions of efficiency, security and a low carbon footprint.



In order to be able to include all the blasting procedures used in surface operations, the application system deals with the problem of establishing the blasting parameters according to the position of the holes - vertical or inclined, allowing to establish the real value of the burden, the length of the borehole and the explosive column structure. Depending on the amount of explosive required to detonate the volume of rock related to a hole, the possibility of maintaining the geometry of the explosive charge in the hole is analyzed and the spacing between the holes placed in a row is determined.

If the seismic protection of the objectives in the area is necessary, the application system also ensures the processing of seismic measurement data and allows the calculation of the quantities of explosives that are not dangerous from a seismic point of view. Depending on this amount of explosive determines the number of holes that can be blasted instantaneously or on per delay.



Presentation of the way to establish the parameters of the blasting works

Achieving the desired results of the mining activity is conditioned by establishing the blasting parameters in such a way as to ensure the detachment of the rock from the massif, reduce the degree of back cracking, a reduced scattering of the blasted mining mass, obtaining the desired granulometry, respectively a reduced seismic effect and carbon footprint.

Contact: Robert Laszlo, email: robert.laszlo@insemex.ro

Study concerning methods for managing used engine oil. Analysis of a questionnaire-based survey

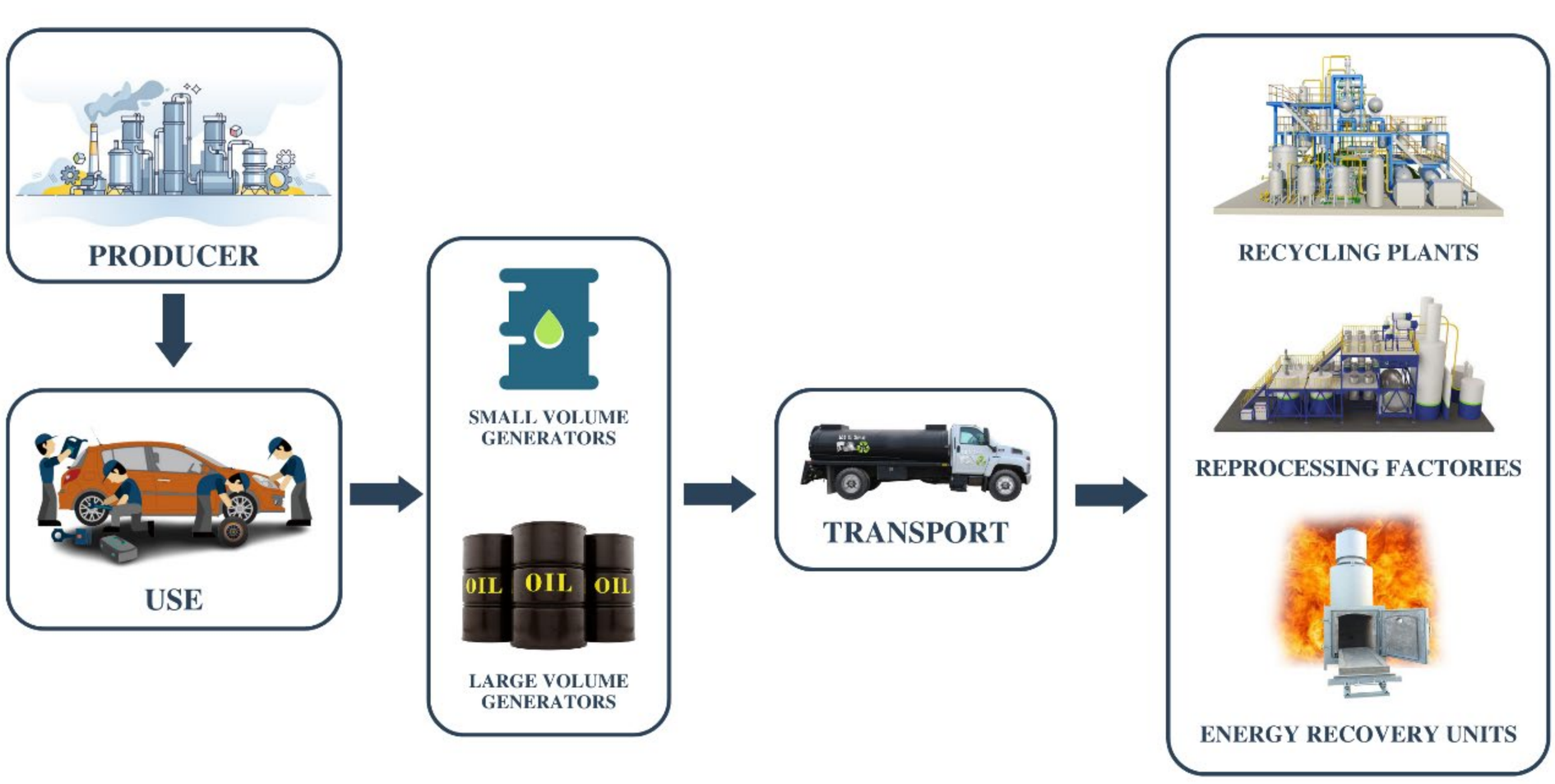
A

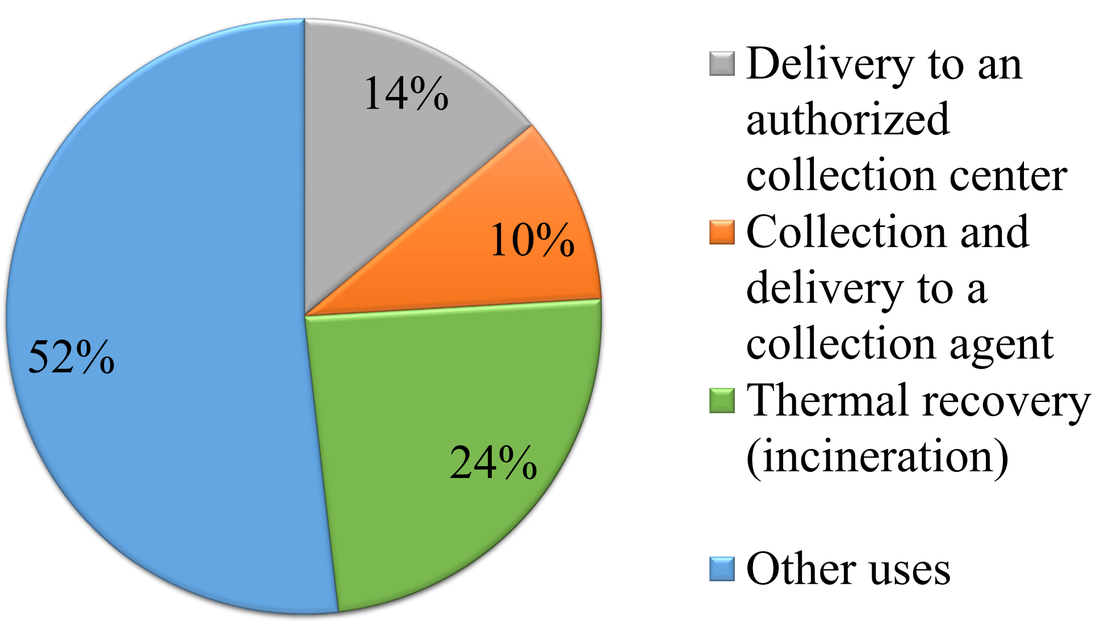
Scientific paper/PHD

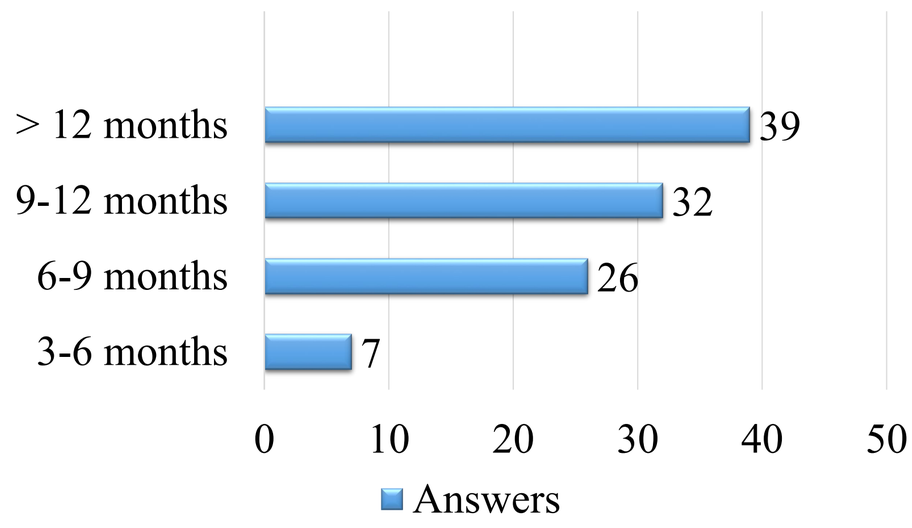
Authors: Diana Miruna Armioni, Ioana Ionel, Sorin Aurel Rațiu

This paper focuses on methods of managing used engine oil by presenting an analysis of the results of a survey based on a questionnaire designed by the authors, which aims to illustrate the real, objective situation of the management of used engine oil generated by vehicles powered by internal combustion engines.

The answers are analyzed for each question separately and both conclusions and implementable objectives that could improve the current situation are highlighted. In order to facilitate the understanding of the current framework, general aspects regarding the management of used engine oil are also presented, with an emphasis on the legislative perspective.







Contact: armionimiruna@yahoo.com

SOLAR HEATING SYSTEM TO MAINTAIN BATTERIES CHARGED

Patent Application

Author/s:

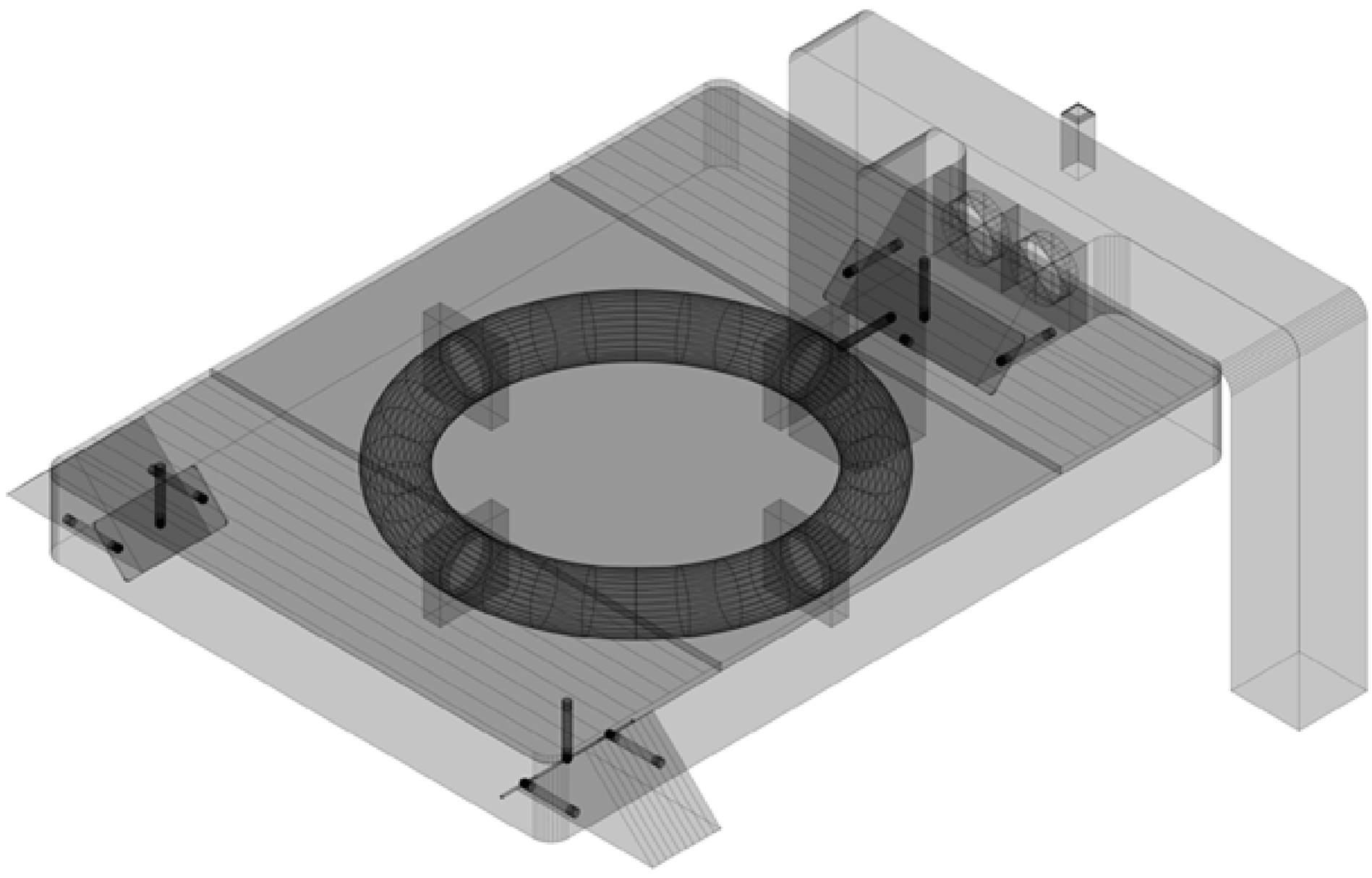
Laurențiu-Dan MILICI, Ciprian BEJENAR, Ilie NIȚAN, Mihai DIMIAN, Mahmoud ABU-BANDORA, Irina ALISAVETEI, Visarion-Cătălin IFRIM, Constantin UNGUREANU

A

The invention relates to a solar heating system, integrable in the constructive structure of a vehicle, intended to maintain the temperature and/or charge level of the batteries. It disposes of, so that the phenomenon is controlled through the specific constructive form that facilitates the conversion of solar energy, both in thermal energy as well as in electrical energy and because the system involves thermomechanical actuators with autonomous operation, suitable in the automatic regulation of this process.

ADVANTAGES

- it introduces new possibilities for hot air heating and/or electrical power supply, respectively for the adaptive maintaining of the temperature and/or charge level of the electrical energy storage elements of a vehicle, vulnerable to low temperatures;
- it reduces the number of charge/discharge cycles of the electrical energy storage elements and at the same time it reduces and/or covers the electrical energy losses, increases the lifetime and lowers their maintenance costs;
-it's actuated autonomously and the control process is regulated automatically, without requiring additional input of energy or special maintenance.



Contact: dam@usm.ro

MOLDOVA STATE UNIVERSITY
Faculty of Chemistry and Chemical Technology
Scientific Research Laboratory
Ecological Chemistry and Modern Chemical Technologies
60, Alexei Mateevici str., MD 2009, Chisinau, Republic of Moldova
Tel.: +373 67557620; E-mail: cisteacov.maxim.@usm.md

HR EXCELLENCE IN RESEARCH

ESTIMATION OF THE ECOLOGICAL STATUS OF SOME NATURAL LENTIC WATERS BY THIOL CONTENT

AUTHORS: Maxim CISTEACOV, Vladislav BLONSCHI, Viorica GLADCHI

APPLICATION FIELDS: Ecological and Environmental chemistry, protection of surface water, ecology. | A

AIM: Assessment of the ecological state of natural waters by determining the content of thiol compounds (R-SH).

SOLUTION: The biological value of waters is ensured by the predominance of oxidizing agents in the aquatic environment. Thiols, being reducing agents, consume oxidizing equivalents, which negatively affects the chemical self-purification of waters. Thus, monitoring the content of thiols in natural waters can indirectly indicate their ecological state. The concentration of thiols was determined by the Ellman spectrophotometric method. Using the example of lakes Ghidighici and Danceni, during 2020-2022, the relationship between seasonal concentrations of thiols and such parameters as biochemical oxygen demand (BOD) and stationary concentration of hydroxyl radicals was analyzed. From the graphs below, there is a direct relationship between the content of thiols and BOD, indicating the natural origin of thiols, as well as an inverse relationship between the content of thiols and the concentration of hydroxyl radicals, indicating the consumption of oxidative equivalents by thiols.

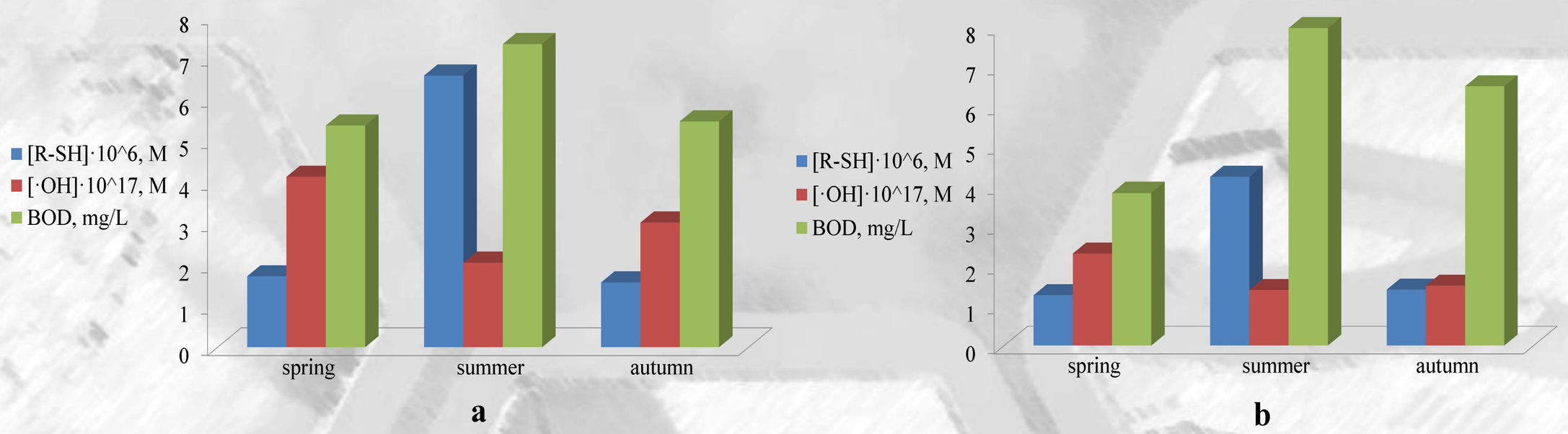


Fig.1. Average values of seasonal concentrations of thiols, stationary concentrations of hydroxyl radicals and BOD during 2020-2022 in (a) Ghidighici and (b) Danceni lakes.

ADVANTAGES: Rapid assessment of the ecological state of natural waters indirectly by monitoring the content of thiols in natural waters. The content of thiols is determined by the spectrophotometric method, does not require sophisticated equipment and does not take much time. It is also possible to identify sources of pollution by substances of protein origin.

IMPLEMENTATION STAGE: Application of the method in assessing the ecological state of waters in the Ghidighici and Danceni lakes.

ACKNOWLEDGMENTS: This research was supported by the research project #20.80009.5007.27

MOLDOVA STATE UNIVERSITY
Faculty of Economic Sciences
Center for Scientific Research
Sustainable Development in Economic Performance
60, Alexei Mateevici str., MD 2009, Chisinau, Republic of Moldova
Tel.: +373 60287573; E-mail: irina.golocialova@usm.md

HR EXCELLENCE IN RESEARCH

CONVERGENCE MATRIX OF IFRS METHODOLOGY AND SEEA CONCEPT AND ITS EFFECTIVENESS FOR RECOGNIZING MINERAL RESERVES IN THE CONTEXT OF THE TRANSITION TO A SOCIO-ECONOMIC REPORTING MODEL

RESEARCH PROJECT NUMBER: # 22.00208.0807.08/PD

AUTHOR: Irina GOLOCHALOVA

APPLICATION FIELDS: Energy, Protection of the environment, Biotechnology. | A

AIM: Development of a Matrix of indicators of convergence of the IFRS methodology and the SEEA concept and demonstration of its effectiveness in reflecting mineral reserves in the Balance Sheet, the format of which meets the socio-economic model of financial reporting.

SOLUTION: The composition of indicators characterizing the degree of convergence between IFRS and SEEA was established and their Matrix was developed, which is a conceptual basis for presenting information in the Balance Sheet.

Table 1: Matrix of convergence indicators of IFRS methodology and SEEA concept for reporting the state of MRs.

Criterion	Methodology IFRS	Concept of SEEA (CF, EA)
Role in sustainability	Responds flexibly to the requirements of the SDC and provides for the transition to the socio-economic model of financial reporting	Is part of the Sustainable Development Concept (SDC) and contributes to the transition to a socio-economic model of financial reporting
Stakeholders in information	Existing and potential investors, lenders and other creditors expecting a return on investment that depends on the responsible management of all resources	Owners (investors and shareholders), business policy makers, government, environmental economists, general public and others
Methodological approach	Based on the theory of accounting and financial reporting, the concept of 21st century capital, and the concept of economic valuation	It is interdisciplinary in character and is based on the methodological tools of the following concepts: ecological economics, statistics, economic valuation, management accounting
Classifications for the accounting of mineral reserves (MRs):	assets by type of work by phase of the extractive industry: 1 - exploration and production (IFRS 6); 2 - refining and marketing (IAS 2)	1) accounts; 2) types of ecosystem assets; 3) types of ecosystem services
Methods of quantitative measurement MRs	Not provided for. Prerogative of management accounting	Describes a framework for accounting for the supply and utilization of MRs
Method of measurement of MRs and their changes	Method of standardized measure of discounted future net cash flows (SMOG)	Net present value method (NPV)
Change in the quantitative state of MRs:	is taken into account as part of the MRs depletion calculation	is an important element for integrating data on the state of MRs
Change in the value status of the MRs	Due to depletion (extraction) and depreciation	Caused by degradation (including extraction), transformation, revaluation
Recognition of natural (En) capital	Provision is made for the application of the equity method for the contribution of non-financial participants in the business (IAS 20)	Not considered separately, but SEEA tool for implementation of the SDC, which requires the recognition of En-capital as a driver of environmental business activities
Disclosure of information	Defined by reporting requirements focused on assessing the value of the business and its economic impact on society	Aims to provide a structured link between the environment, business economic activity and human well-being

Table 2: Fragment of the socio-economic model of the Balance Sheet.

Assets and liabilities		
Non-current assets, including:		
Mineral assets	(+)	
Depletion of mineral assets		(-)
Non-current deferred environmental recovery expenditures	(+)	(-)
Long-term liabilities for environmental recovery	(+)	
Total net assets	(+)	(-,-)
Associated capital		
A. Financial contributions, including:		
A.III. Reserves, representing the redistribution of retained profits, including:		(+)
A.III.3. For the development and maintenance of En-capital		(+)
A.IV. Reserves, which are adjustments that ensure the maintenance of equity, including:		
A.IV.3. for the degradation of En-capital		
A.V. Retained profit		(-,-,-)
B.I. Contributions of non-financial business participants, including:	(+)	
B.I.1. En-capital	(+)	(-)
Total net assets	(+)	(-,-)

Originality

1	The composition of IFRS and SEEA convergence indicators was developed
2	The Balance Sheet model is adapted to the concept of associated capital and translates information on the status of MRs and changes in the value of En-capital
3	Based on the Balance model, a formula for calculating the indicator of En-obligation fulfillment is proposed: ■ Internal expenses + ■ Contribution to maintaining the size of En-capital

ADVANTAGES: Conceptually interprets the convergence criteria of IFRS methodology and SEEA concept. Demonstrates a high degree of convergence of IFRS and SEEA concepts in the context of transition to a socio-economic reporting model. Contributes to the development of a Balance Sheet model that meets the requirements of IFRS, SEEA and the SDC. Justifies the formula for calculating the En-contribution of business to the realization of sustainable development goals. Allows investors to assess the risks and prospects associated with the development of mineral reserve deposits.

IMPLEMENTATION STAGE: At the level of research by a functioning enterprise in the Republic of Moldova and drawing up an act of implementation.

ACKNOWLEDGMENTS: This research is supported by the scientific project "The methodology of accounting and financial reporting in the conditions of the innovation vector of the economy", registered under number _22.00208.0807.09/PD in the State Register of Projects in Science and Innovation of the Republic of Moldova.

Executive Agency for Higher Education, Research, Development and Innovation Funding

Advanced Methodology for Extracting Functional Fractions from Brewer Spent Grains

A

This study was supported by a grant of the Romanian Ministry of Education and Research, CNCSIS-UEFISCDI, project number PN-III-P4-ID-PCE-2020-2306, contract no. PCE 210, within PNCDI III.

Authors: Anca Corina Farcas, Silvia Amalia Nemes, Dan Vodnar, Loredana Leopold, Sonia Socaci

University of Agricultural Sciences and Veterinary Medicine, Cluj-Napoca, Romania

The project was designed to investigate the application and optimization of eco-friendly innovative technologies for the efficient recovery of bioactive fractions from combined spent grains resulting from beer production. Additionally, the project aimed to convert these fractions into microencapsulated formulations with broad applicability in the food, pharmaceutical, and cosmetic industries.

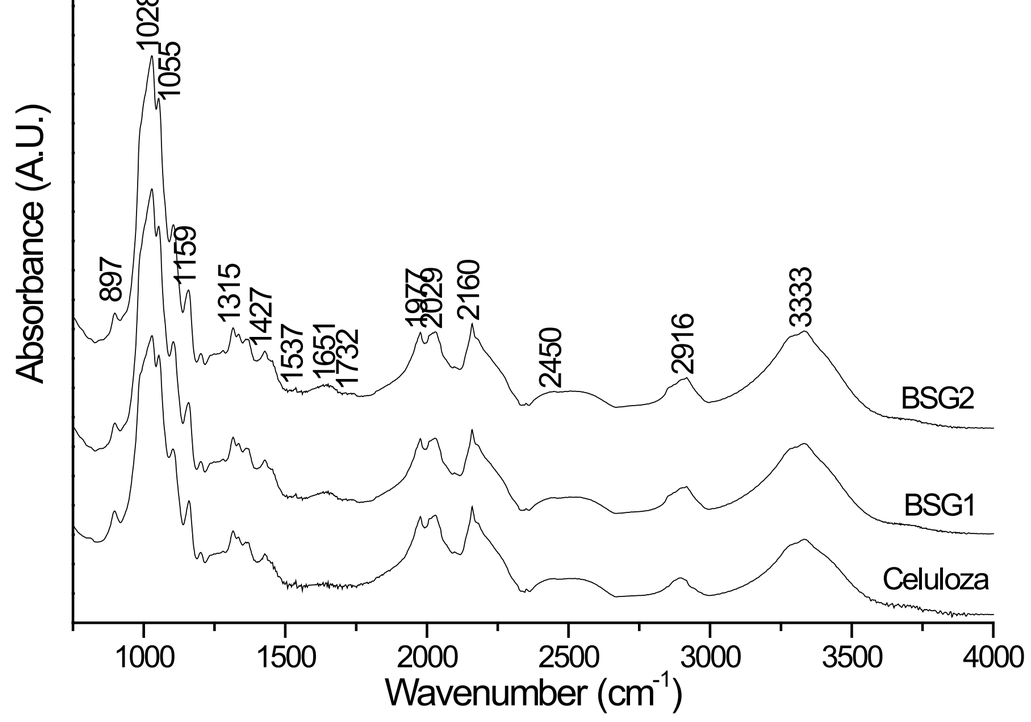
The primary activities were centered on obtaining antioxidant concentrates through advanced extraction, followed by spray drying using different compatible substrates. Furthermore, the project involved conducting bioactivity and structural characterization studies on the resulting products.



Images from treatments and extraction procedures



Images from spray drying process



The comparative FTIR spectra of the atomized microencapsulated phenolic concentrates derived from two BSG types (1 - with corn, 2 - with wheat) on a cellulose substrate

Reference: Fărcaș A.C. et al. Cereal Waste Valorization through Conventional and Current Extraction Techniques—An Up-to-Date Overview. *Foods* 2022, *11*, 2454. https://doi.org/10.3390/foods11162454

Contact: anca.farcas@usamvcluj.ro / www.usamvcluj.ro

An integrated model of bioactive compounds production from cereal bran

A

This study was supported by a grant of the Romanian Ministry of Education and Research, CNCSIS-UEFISCDI, project number PN-III-P4-ID-PCE-2020-2306, contract no. PCE 210, within PNCDI III.

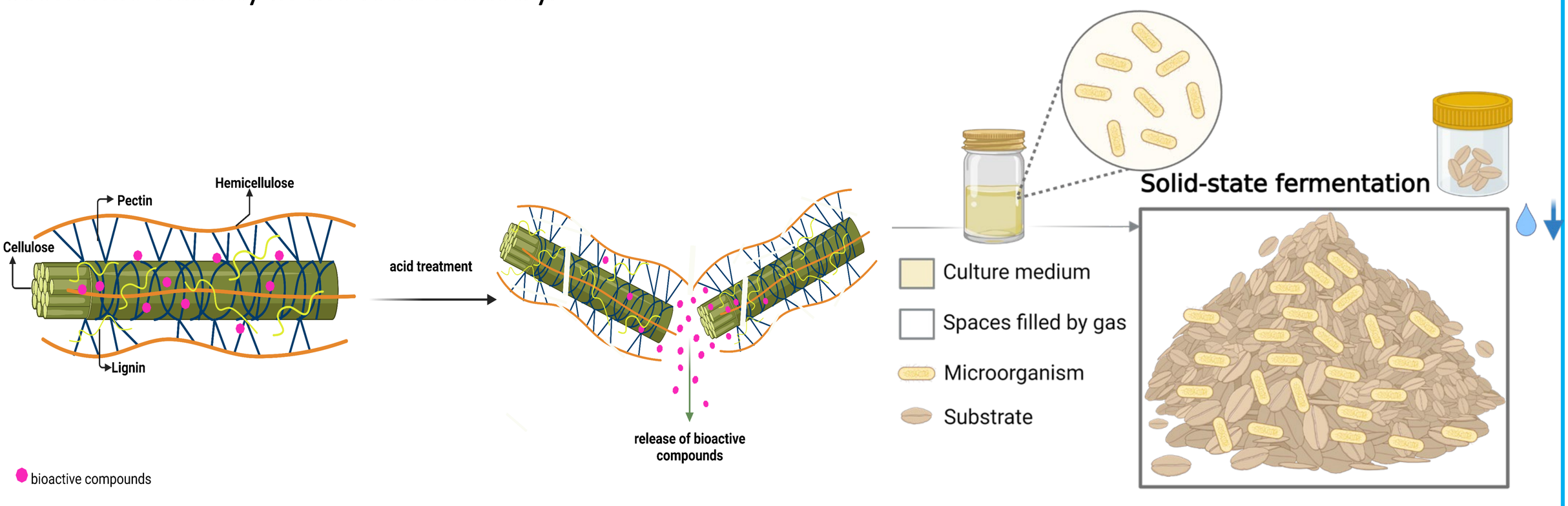
Authors: Silvia Amalia Nemes, Anca Corina Farcas, Dan Cristian Vodnar

University of Agricultural Sciences and Veterinary Medicine, Cluj-Napoca, Romania

An integrated model of bioactive compounds production from cereal bran, incorporating acid pretreatments followed by solid-state fermentation, represents a comprehensive approach to harnessing the hidden potential of this abundant agricultural by-product. Cereal bran, comprising the outer layers of grains such as rice, wheat, and corn, is typically discarded during processing but harbors a plethora of valuable bioactive compounds. The integrated model begins with acid pretreatment, wherein bran is subjected to controlled acidic conditions. This step serves multiple purposes: it disrupts the complex structure of bran, making it more accessible for subsequent microbial fermentation, and facilitates the release and activation of latent enzymes within the bran matrix. Acid pretreatment is carefully optimized to ensure optimal degradation of lignocellulosic components while preserving the integrity of bioactive compounds. Following acid pretreatment, the pretreated bran is subjected to solid-state fermentation. This step involves inoculating the bran with carefully selected microbial cultures or consortia known to possess the ability to transform and enrich bioactive compounds. Solid-state fermentation occurs under controlled conditions of moisture, temperature, and aeration, promoting the growth and metabolic activities of the microorganisms.

During the fermentation process, the microbial cultures metabolize various components of the bran, resulting in the synthesis and accumulation of diverse bioactive compounds. These compounds include but are not limited to antioxidants, dietary fibers, prebiotics, vitamins, and enzymes. The integration of acid pretreatment and solid-state fermentation allows for enhanced bioconversion efficiency and improved yield of bioactive compounds compared to individual processes. The integrated model of bioactive compounds production from cereal bran offers significant advantages, including sustainable utilization of agricultural waste, cost-effective production of value-added compounds, and the potential to develop novel functional food ingredients or nutraceuticals.

Moreover, this model contributes to the circular economy by transforming a discarded by-product into a valuable resource, thus promoting the principles of environmental management and economic viability in the food industry.



Contact: amalia.nemes@usamvcluj.ro

Opportunity
CORNELIUGROUP
Research-Innovation Association
Creation
INVENTCOR
Realization
Power of Creative Mind
Deva ROMANIA

URBAN INCD INCERC

Research and Development in Construction, Urban Planning and Sustainable Territorial Development National Institute "URBAN - INCERC„

R&DNI "URBAN - INCERC„

GREEN BUILDINGS: ECONOMIC ASPECTS AND EFFICIENCY

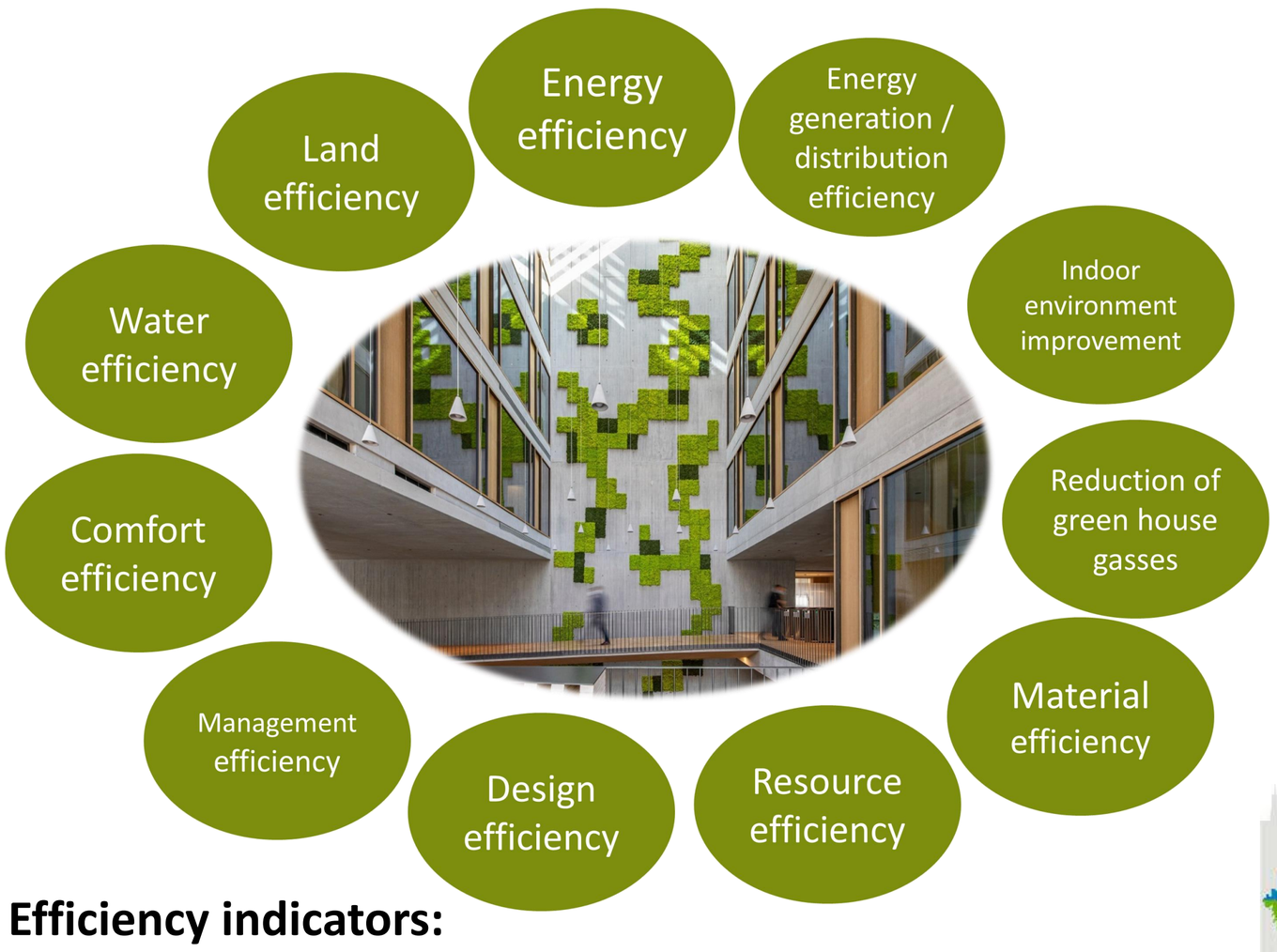
Research

Mircea-Iosif RUS

A

A green building is a building that is built and used in such a way as to protect the environment throughout its life cycle, starting with design, construction, use, maintenance, renovation and demolition.

The Green Building is an environmentally friendly building, and this means, first of all, that such a building has no or very low heat loss, which means very good insulation from this point of view. Secondly, all the materials used to construct this type of building are recyclable.









Efficiency indicators:

- **Cost per saved kWh:** $C(m) - (e \times \Delta E \times N) = 0$
- **Net present value:** $$VNA = C_0 + \{\sum_{k=1}^{3} C_{Ek} \times \sum_{t=1}^{N} [(1+f_k) / (1+i)]^t\} + \{C_M \times \sum_{t=1}^{N} [1/ (1+i)]^t\}$$
- **Payback Period** $$C_{(m)} - \{\Delta C_E \times \sum_{t=1}^{N_R} [(1+f) / (1+i)]^t\} = 0$$

Although the costs of this type of building are higher than a normal building, any investment can be recouped by substantially reducing energy costs. Another thing to bear in mind about green buildings is that they have an extremely low heat transfer with the environment.

The number of green buildings is increasing, especially as, at European level, it is desired that in the future each building should "consume" only the energy it "produces". The main indicators of the economic efficiency of a green building are the payback period of an additional investment and the cost per unit of energy saved (RON/kwh).

THE SHORTER THE PAYBACK PERIOD AND THE HIGHER THE CONSUMPTION SAVED, THE MORE COST-EFFECTIVE A GREEN BUILDING IS

Contact: mircea.rus@incerc-cluj.ro +40744478270

SILICOSIO BIN: An Environmental Fused Silica Granulator

Student project

Ashley May L. Macarandang

Ysabelle Mignonette D. Lopez

Ark Angel D. Alfante

A

The SilicoSio bin was created with the vision of addressing environmental problems as a revolutionary glass-crushing machine that is specifically built to granulate glass bottles. With a startling 75% of glass bottles ending up in landfills, improper glass bottle disposal creates a serious environmental issue that requires immediate attention. It utilizes a unique process of breaking down glass bottles and creating artificial sand from the glass.

This artificial sand can be utilized in a variety of building and manufacturing processes, lessening the impact of glass waste on the environment and the demand for virgin sand while also promoting resource conservation.

This study is aimed to assess SilicoSio Bin's effectiveness in the granulation of glass bottles, with a focus on factors such as time taken, weight maintenance, and the amount of weight of the resulting artificial sand produced within. An hour. The experiment was divided into three parts, each testing the device with three different types of bottles - 1L Glass Bottle A, 350 ml Glass Bottle B, and 330 Glass Bottle C - and using trials A, B, and C.

The results showed that the average time taken by SilicoSio Bin to granulate a bottle was 5.77 seconds, with the device able to granulate Glass Bottle B within an average of 5.12 seconds, Glass Bottle C in 5.48 seconds, and Glass Bottle A in 6.71 seconds. Furthermore, the weight of all bottles as maintained post-granulation, indicating that SilicoSio Bincan effectively granulate glass bottles without any significant loss of mass.



SilicoSio Bin



lessen land pollution



mangrove rehabilitation



artificial sand



coastal areas









Contact: +63 919 379 1485

INCANDESCENT LAMP REPELLENT: COMPARATIVE STUDY BETWEEN PROCESSED OCIMUM BASILICUM AND PROCESSED THYMUS VULGARIS

Student project

Author/s: Rawls Roche Hadraniel Villaruel

A

A tropical illness spread by mosquitoes called dengue fever is brought on by the dengue virus. Thyme is the dried aerial portions of a particular herbaceous plant. Leafy plants of the Lamiaceae family of mints. Laboratory testing reveal that topical applications of the components included in thyme essential oil will deliver 89.0-97.3% protection for up to 82 minutes against the common house mosquito. Basil, commonly known as (Ocimum basilicum), appears to be a nourishing herb.

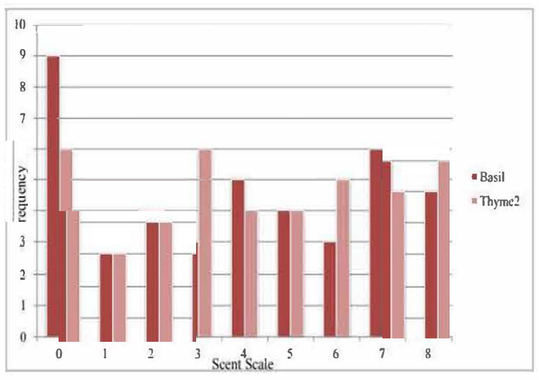
All members of the mint family, Lamiaceae. This investigation mainly focuses on creating and comparing insect repellents to protect people from mosquitoes Malaria-carrying mosquitoes are repelled by bites that might spread infections, and Identify the duration of the extract. Researcher have established that the Thymus vulgaris and Ocimum basilicum, two processed herbs, contain an ingredient.

Which is aedes aegypti-repellent. The lifespan of thymus vulgaris's fragrance was about two weeks longer than Ocimum basilicum. With reference to death, The percentage rate for both of the processed herbs is 50%.









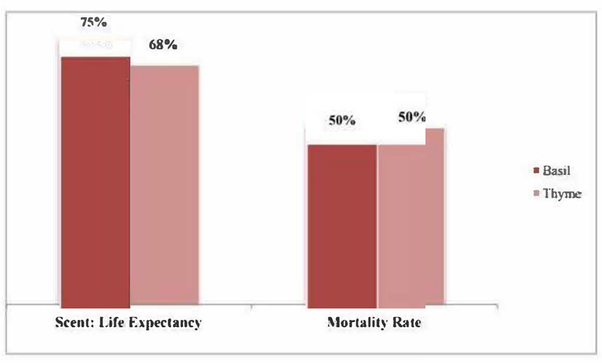
Thyme Extract Scent Scale	Frequency	Percentage Frequency
8	6	13.95%
7	5	11.62%
6	5	11.62%
5	4	9.30%
Basil Extract Scent Scale	**Frequency**	**Percentage Frequency**
8	5	11.90%
7	6	14.28%
6	3	7.14%
5	4	9.52%
4	5	11.90%
3	3	7.14%
2	4	9.52%
1	3	7.14%
0	9	21.42%
4	4	9.30%
3	6	13.95
2	4	9.30%
1	3	6.97%
0	6	13.95%

Extract	Mean total	Rate
Basil	10.49	75%
Thyme	9.49	68%

Basil	First 10 mins	Second 10 mins	Last 10 mins	Remarks
1st Trial	Flying around the cone	Attached to the excess liquid	Mosquito died	Mosquito died
2nd Trial	Flying around the cone	Stocked in the moist	Mosquito died	Mosquito died
3rd Trial	Flying around	Rested on the cone surface	Rested on the cone surface	Alive
Final Trial	Flying around	Landed on the glass surface	Rested on the cone surface	Alive
Thyme	First 10 mins	Second 10 mins	Last 10 mins	Remarks
1st Trial	Got stocked in the moist	Rested at the glass	Still at place	Tilted at 20-40 degrees
2nd Trial	Flying around the cone	Rested at the treated sponge	Got stocked at the treated sponge	Mosquito died
3rd Trial	Rested at the surface	Rested at the surface	Rested at the moist	Alive
Final Trial	Rested on the cone	Flying around	Rested on the cone	Alive

Trials	Frequency	Percentage Frequency
Rested on the cone surface for the first 10 mins	1	20%
Rested on the cone surface for the second 10 mins	2	40%
Rested on the cone surface for the last 10 mins	2	40%
5		

Extract	Mortality Rate
Thyme	50%
Basil	50%



SAMPLES	first 6 hours(percentage)		second 6 hours(percentage)		third 6 hours(percentage)		Fourth 6 hours(percentage)
No extract	40%active	60%resting	60%active	40%resting	30% KD	70%dead	100% Dead
Thyme	70%active	30%resting	40%active	60%resting	16.7% KD	83.3%dead	100% Dead
Basil	50%active	50%resting	10% KD	90%resting	100% Dead		100% Dead

Contact: +63 960 899 4231

ZEA MAYS HUSK
AN ECO-FRIENDLY PAPER BAG

Student Project
Author: ***Sophia Katherine C. Onofre***

A

INTRODUCTION

PLASTIC BAG

- Thin, waterproof, and strong
- Harms the environment
- Takes 10 years to decompose





INTRODUCTION

PAPER BAG



- More environmentally friendly than other materials
- Much safer for animals
- Can be repulped without any chemicals
- Takes about 1 month to decompose



INTRODUCTION

CORN HUSK

- Outer green leaves on corn cob
- Fibrous
- Considered as agricultural waste by some







STATEMENT OF THE PROBLEM

- **What is the effectiveness of zea mays husk paper bag and commercial paper bag in terms of tensile index?**
- **What is the effectiveness of zea mays husk paper bag and commercial paper bag in terms of burst index?**
- **What is the effectiveness of zea mays husk paper bag and commercial paper bag in terms of how long the paper bag can hold something wet before breaking?**

METHODS



STEP 1
CUT the corn husk



STEP 2
BOIL the corn husk



STEP 3
BLEND the corn husk



STEP 4
MOLD the fibers

DATA AND RESULT

TENSILE INDEX



TABLE 1

MEASUREMENT	ZEA MAYS HUSK PAPER BAG		COMMERCIAL PAPER BAG	
	TRIAL 1	TRIAL 2	TRIAL 1	TRIAL 2
600 grams	DID NOT TEAR	DID NOT TEAR	TEARED	TEARED
1800 grams	DID NOT TEAR	DID NOT TEAR	...	...
2100 grams	TEARED	DID NOT TEAR	...	...
2400 grams	...	TEARED	...	...
TOTAL	2100 grams	2400 grams	600 grams	600 grams
AVERAGE	2250 grams		600 grams	

DATA AND RESULTS

BURST INDEX



TABLE 2

MEASUREMENT	ZEA MAYS HUSK PAPER BAG		COMMERCIAL PAPER BAG	
	TRIAL 1	TRIAL 2	TRIAL 1	TRIAL 2
2400 grams	DID NOT BURST	DID NOT BURST	DID NOT BURST	DID NOT BURST
2600 grams	DID NOT BURST	DID NOT BURST	BURST	BURST
2800 grams	BURST	DID NOT BURST	...	...
2900 grams	...	BURST	...	...
TOTAL	2800 grams	2900 grams	2600 grams	2600 grams
AVERAGE	2850 grams		2600 grams	

DATA AND RESULTS

ICE TEST



TABLE 3

ZEA MAYS HUSK PAPER BAG	TRIAL 1	TRIAL 2	AVERAGE
	2 hours and 27 minutes	3 hours and 4 minutes	2 hours, 45 minutes and 5 seconds
COMMERCIAL PAPER BAG	TRIAL 1	TRIAL 2	AVERAGE
	55 minutes and 45 seconds	57 minutes and 38 seconds	56 minutes and 28 seconds

CONCLUSION

Zea mays husk paper bags have a tensile index of 2250 g on average, while commercial paper bags have a tensile index of 600 g. Zea mays husk paper bags have a burst index of 2850 g on average, while commercial paper bags have a burst index of 2600 g. The Zea mays husk paper bag can hold ice or something wet for 2 hours, 45 minutes, and 5 seconds on average, compared to 56 minutes and 28 seconds of the commercial paper bag.

Contact: 09517399424

PROCESS FOR SUBMERGED CULTIVATION OF STRAIN *LENTINUS EDODES* (BERK.) SING. CNMN-FB-01

Patent no. MD 4843, 2023.01.31

A

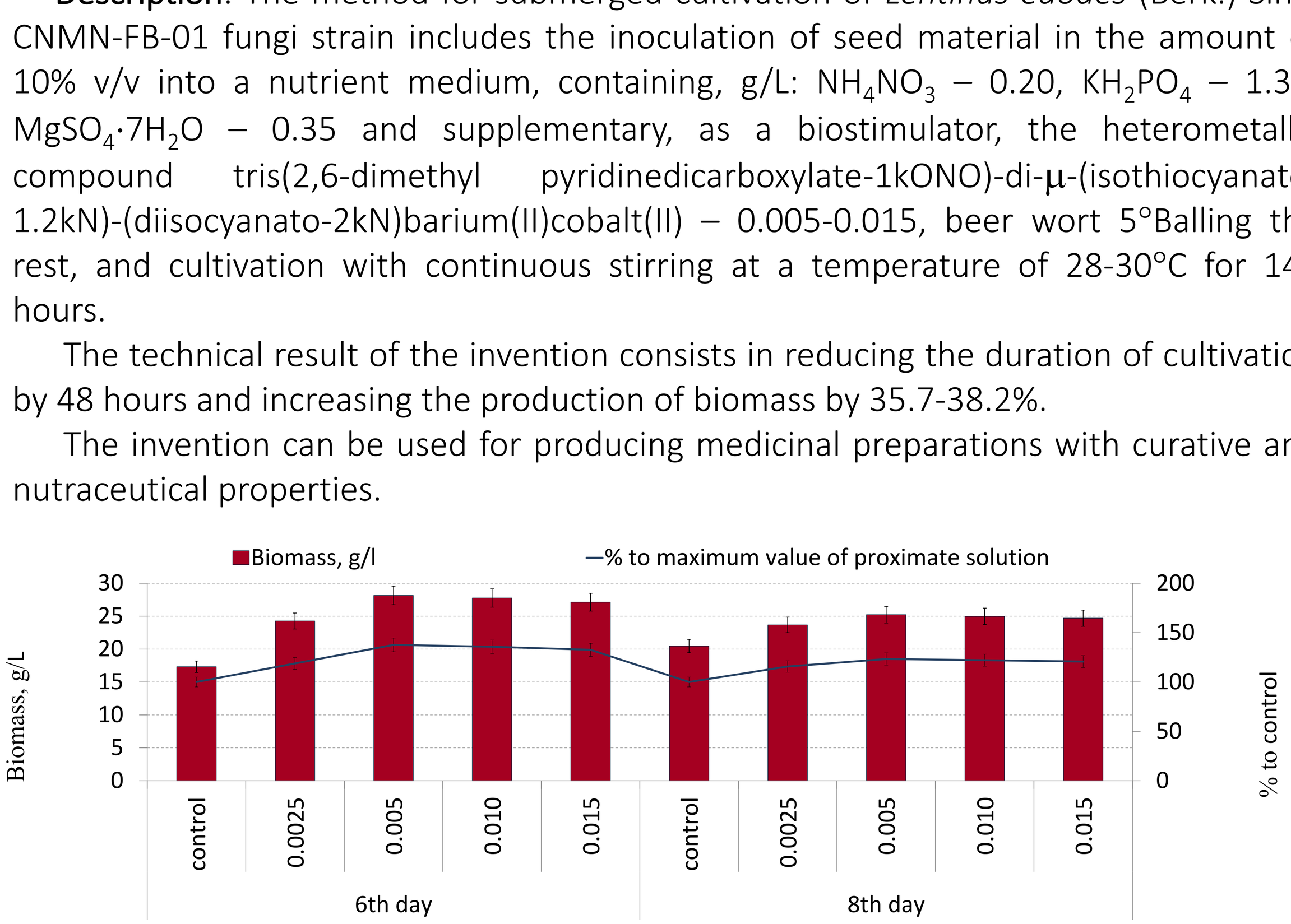
CILOCI Alexandra[1], DVORNINA Elena[1], RUDIC Valeriu[1], BULHAC Ion[2], URECHE Dumitru[2], COCU Maria[2]

[1]Institute of Microbiology and Biotechnology of Technical University of Moldova
[2]Institute of Chemistry of Moldova State University

Description: The method for submerged cultivation of *Lentinus edodes* (Berk.) Sing. CNMN-FB-01 fungi strain includes the inoculation of seed material in the amount of 10% v/v into a nutrient medium, containing, g/L: NH_4NO_3 – 0.20, KH_2PO_4 – 1.30, $MgSO_4 \cdot 7H_2O$ – 0.35 and supplementary, as a biostimulator, the heterometallic compound tris(2,6-dimethyl pyridinedicarboxylate-1kONO)-di-μ-(isothiocyanato-1.2kN)-(diisocyanato-2kN)barium(II)cobalt(II) – 0.005-0.015, beer wort 5°Balling the rest, and cultivation with continuous stirring at a temperature of 28-30°C for 144 hours.

The technical result of the invention consists in reducing the duration of cultivation by 48 hours and increasing the production of biomass by 35.7-38.2%.

The invention can be used for producing medicinal preparations with curative and nutraceutical properties.



Coordination compound concentration, g/L

The influence of different concentrations of [metalocomplex tris(2,6-dimethyl pyridinedicarboxylate-1kONO)-di-μ-(isothiocyanato-1.2kN)-(diisocyanato-2kN)barium(II)cobalt(II), on biomass production in *Lentinus edodes* (Berk.) Sing. CNMNFB-01

The inventions were created based on scientific results obtained within the project 20.80009.5007.28 "Development of new multifunctional materials and effective technologies for agriculture, medicine, technique and the educational system based on "s" and "d" metal complexes with polydentate ligands" funded by NARD, Republic of Moldova.

Contact: Ciloci Alexandra, Tel.: (+373022) 739824; E-mail: alexandra.ciloci@imb.utm.md

PROCESS FOR SUBMERGED CULTIVATION OF FUNGAL STRAIN *RHIZOPUS ARRHIZUS* CNMN FD 03, PRODUCER OF LIPASES

Patent no. MD 4828, 2022.10.31

CILOCI Alexandra[1], BULHAC Ion[2], CLAPCO Steliana[1], DANILESCU Olga[2], DVORNINA Elena[1], LABLIUC Svetlana[1], MATROI Alexandra[1], URECHE Dumitru[2]

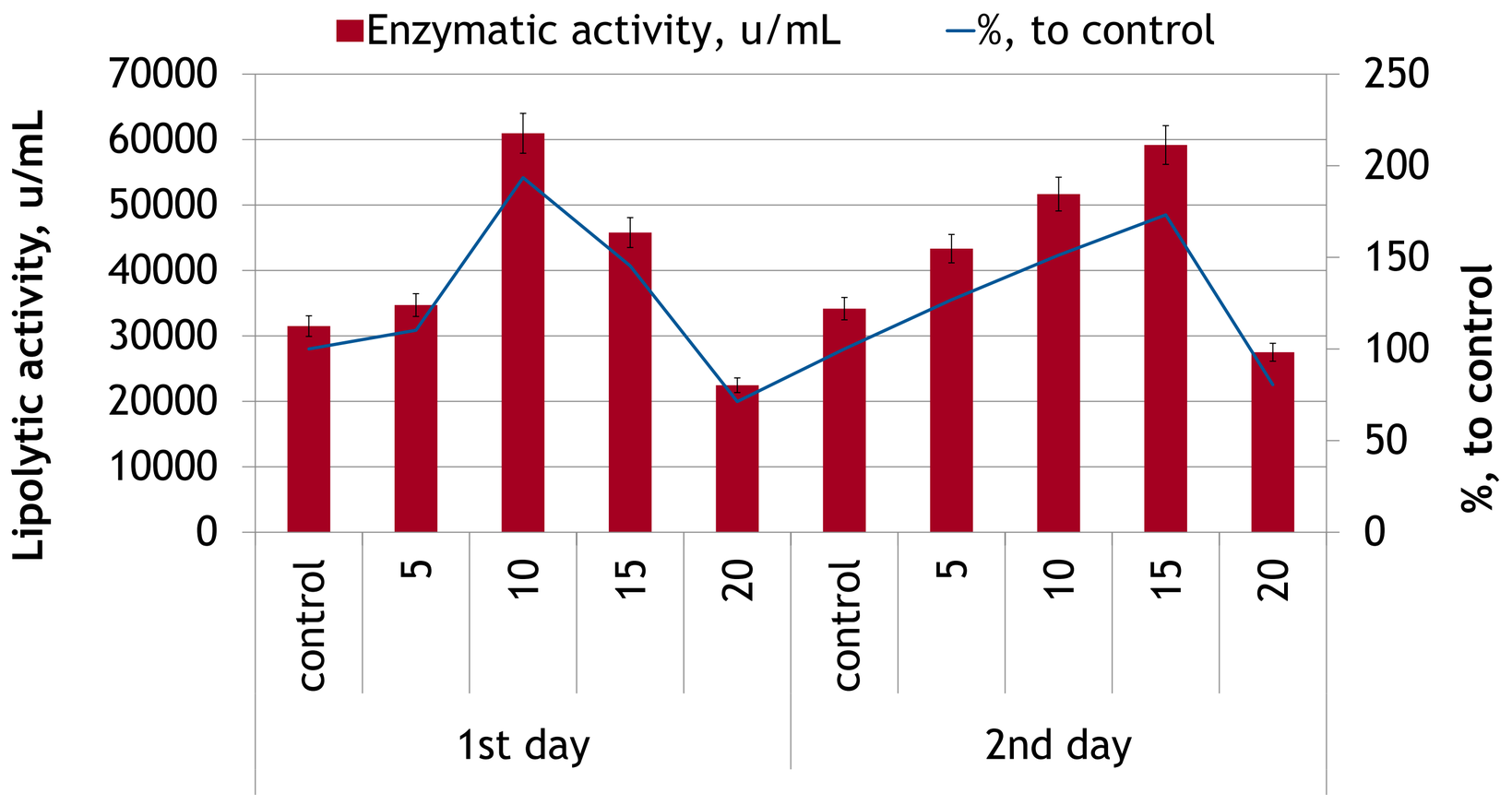
[1]Institute of Microbiology and Biotechnology of Technical University of Moldova,
[2]Institute of Chemistry of Moldova State University

A

Description: The process includes the preparation of a spore suspension of the strain grown for 30 days on a malt-agar medium, inoculation of the suspension in an amount of 5 vol.% in a nutrient aqueous medium containing, g/L: soy flour – 35.0, $(NH_4)_2SO_4$ – 1.0, KH_2PO_4 – 5.0, with the simultaneous addition, as a biostimulator, of 0.005-0.015 g/L of heterometallic compound $[Ca(L)_3][Co(NCS)_4]$, where L – dimethylpyridine-2,6-dicarboxylate, and cultivation with continuous stirring at 180-200 rpm at the temperature of 28-30°C for 24 hours.

The result of the invention consists in increasing the biosynthesis of lipolytic enzymes by 34.0…78.4% compared to the control, and reducing the duration of cultivation of the strain by 24 hours.

The invention can be used in the microbiological industry for obtaining lipolytic enzymes with wide application in the food industry, production and processing of fats and vegetable oils, in medicine as a therapeutic and diagnostic agent.



The influence of different concentrations of $[Ca(L)_3][Co(NCS)_4]$ on the lipolytic activity of the micromycete *Rhizopus arrhizus* CNMN FD 03



***Rhizopus arrhizus* CNMN FD 03**

The inventions were created based on scientific results obtained within the project 20.80009.5007.28 "Development of new multifunctional materials and effective technologies for agriculture, medicine, technique and the educational system based on "s" and "d" metal complexes with polydentate ligands" funded by NARD, Republic of Moldova.

Contact: Ciloci Alexandra, Tel.: (+373022) 739824; E-mail: alexandra.ciloci@imb.utm.md

The Institute of Microbiology and Biotechnology
of Technical University of Moldova

PROCESS FOR OBTAINING OF THE ANTIOXIDANT EXTRACTS BASED ON NATURAL PIGMENTS

Patent application a20220058 from 29.12.2022

Authors: Beşliu Alina; Chiselița Natalia; Chiselița Oleg; Efremova Nadejda; Tofan Elena; Rudic Valeriu

A

AIM. The elaboration of the new antioxidant extracts based on pigments from *Arthrospira platensis* biomass, remaining from the production of the BioR remedy.

SOLUTION. The development of a new process for obtaining antioxidant extracts based on natural pigments from the *Arthrospira platensis* cyanobacteria biomass, with an increased content of β-carotene, lutein, chlorophyll a, antioxidant and enzymatic activities.

TECHNICAL RESULT consists in the obtaining of the extracts with a content of β-carotene of 0.645±0.001-0.6875±0.010 mg/100g. The extracts have catalase activity of 659.02±13.20-720.14±7.10 mmol/min/mg protein, superoxide dismutase activity of 107.52±20-545.95±1.16 U/mg protein and the concentrated extract contains 14.21±0.020 mg/100g of β-carotene, 0.569±0.001 mg/100g of lutein, 14.243±0.066 mg/l of chlorophyll a, 442.5±0.58 mg/l of sulfated polysaccharides, total antioxidant activity of 195.93±9.15% inhibition, catalase activity of 1235±30.59 mmol/min./mg protein, superoxide dismutase activity of 618±2.6 U/mg protein.

THE ESSENCE The dried at the temperature of +50±5°C remaining biomass was subjected to grinding and then mixed with 96% ethyl alcohol in the 1:10 v/v ratio. The suspension is supposed to sonication (50 W) for 5 minutes or placed in a water bath at the temperature of +45°C for 30 minutes with periodic stirring. At the end of the process, the pigment preparation is separated from the biomass by centrifugation.

Cyanobacterial biomass (powder with 7-8% moisture)



Grinding of cyanobacterial biomass



Biomass treatment with 96% ethyl alcohol, biomass:extractant ratio 1:10 v/v, at a temperature of +45˚C, for 30 minutes, with periodic stirring. The suspension is centrifuged at 3500 rpm. for 15 minutes for separating the supernatant from the sediment.

Pigmented preparation



The results were obtained in the framework of project 20.80009.5107.16. “New biologically active microbial preparations for increasing the reproductive and productive potential of animals of zootechnical interest ”, financed by NARD

Contact: Chiselița Oleg, PhD in biology, associate professor; oleg.chiselita@imb.utm.md

Studies and determinations quantitative and qualitative of air pollution in Hunedoara

Research study

Authors: Pricopi Anamaria-Alina

Coordinators: Erika Ardelean, Marius Ardelean

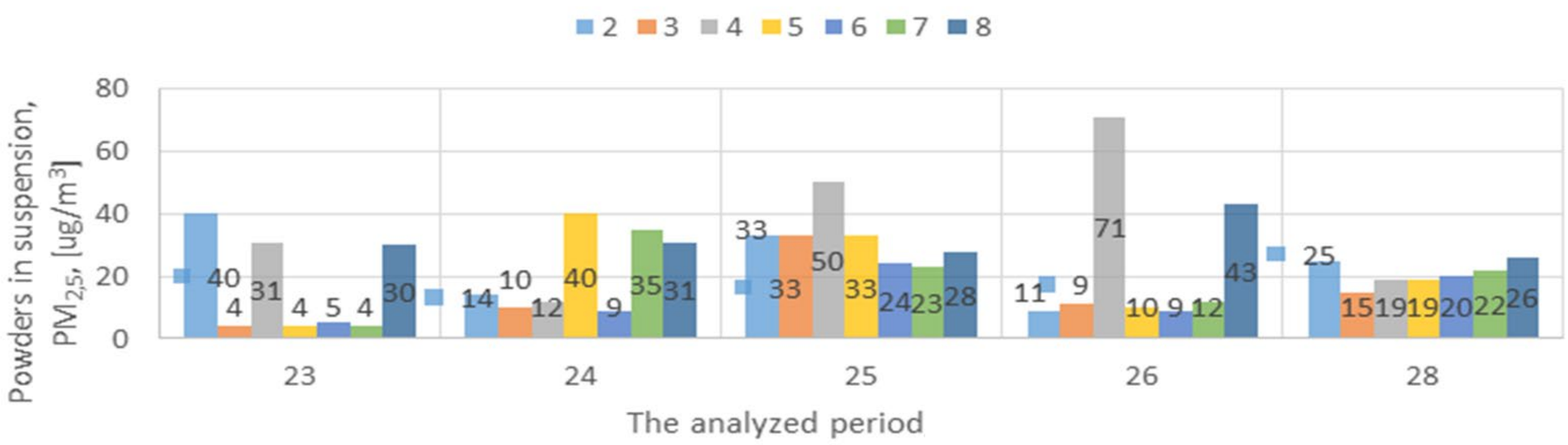
A

Air quality measurements were carried out in Hunedoara, over a period of 5 days, in 9 points marked on the map in the image. Dust content, $PM_{2.5}$ and PM_{10} were measured.

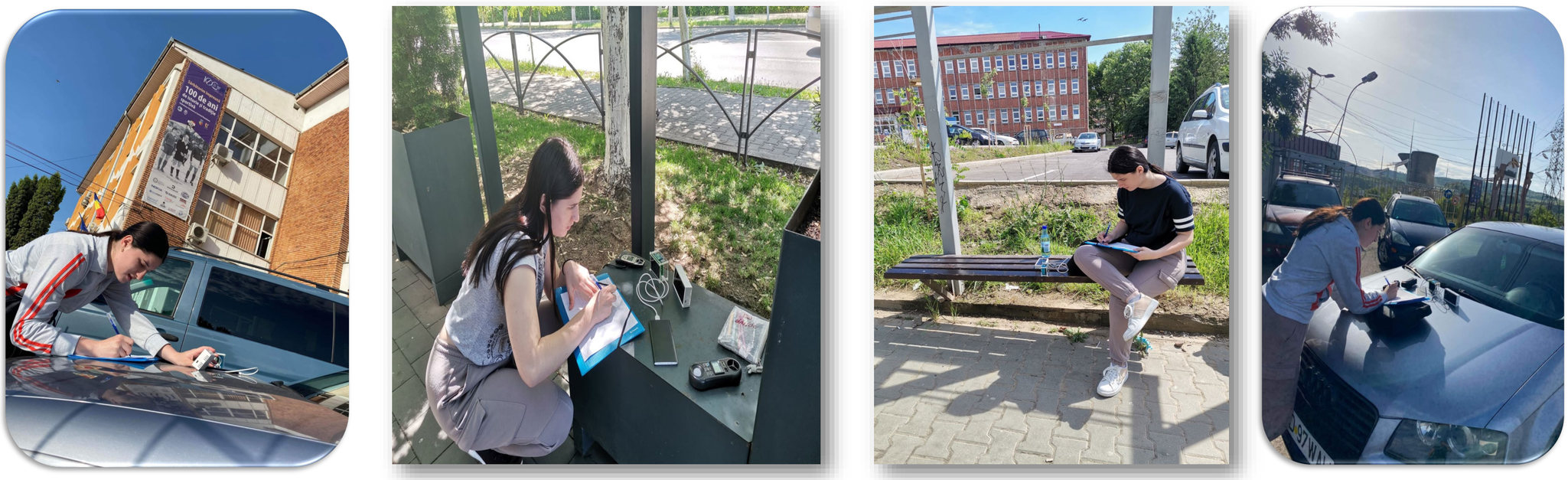
The measurements were carried out with the equipment of the Integrated Environmental Protection Laboratory of the Faculty of Engineering in Hunedoara, and the data are presented in the form of comparative histograms.







Distribution of $PM_{2.5}$ in the considered measurement points



From the analysis of the collected data, relative to $PM_{2.5}$ and PM_{10} powders in suspension, a high level of them can be found in areas with heavy traffic: in the intersection of a large shopping center, Kaufland and the street that connects Hunedoara with Călan, Hațeg.

Contact: alinapricopi507@gmail.com

Possibilities of valorization of the tailings resulting from the technological processes of ore preparation

PhD Thesis

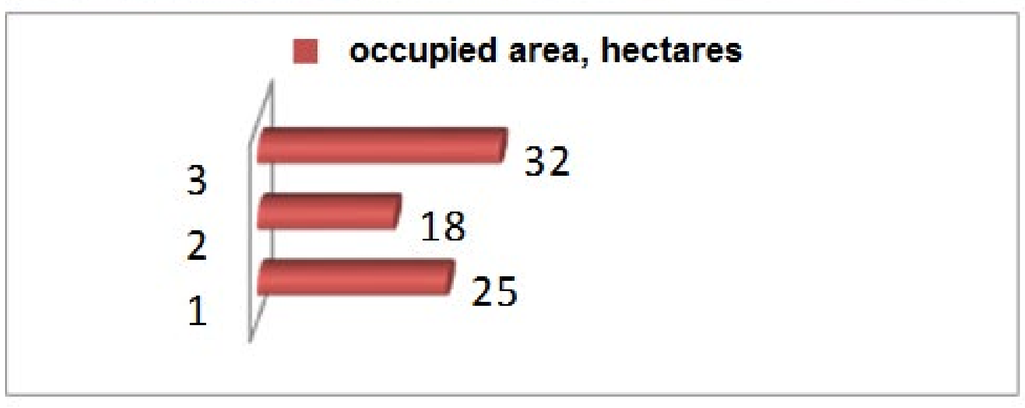
Authors: ***Adriana BOBORA, Ana SOCALICI, Erika ARDELEAN, Corneliu BIRTOK-BANEASA, Adina BUDIUL BERGHIAN***

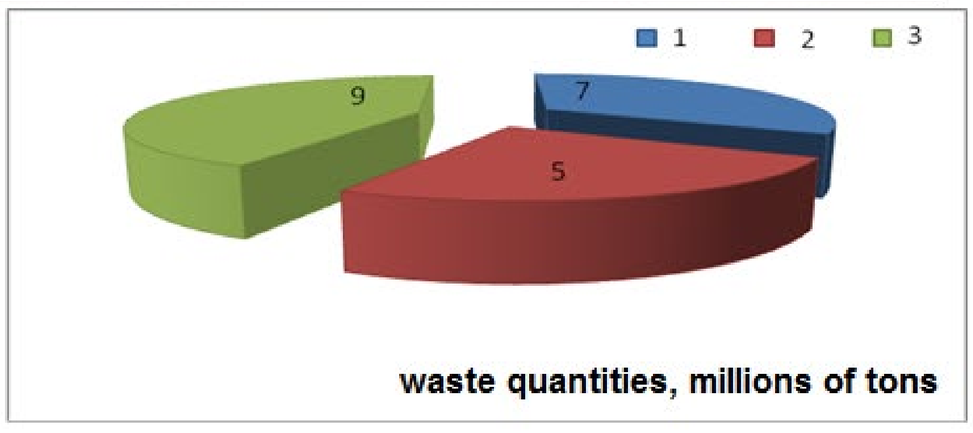
A

The elimination of "historical" waste still remains a problem that will be solved in a longer period depending on the financial resources and technical solutions that will be available. Considering the high potential given by extensive industrially polluted surfaces as a result of the mining and steel industry in the western area of Romania, and not only, a series of measures must be taken for a modern industrial waste management. The small and pulverulent waste, mainly from the steel industry but also from the mining and energy industries, due to the high content of metals and various oxides, are called by-products and are considered components of natural capital because they can be exploited in the metallurgical industry or in other industrial branches.









The sideritic waste ponds (1, 2, 3) from Teliuc

In the Hunedoara area, following the preparation of the sideritic ore used in the agglomerate processing, there are three sideritic waste settling ponds at Teliuc. The sterile can be subjected to preparation operations and the resulting product can be used to obtain by-products that can be used in industry (example - used in the technological process in steelmaking by briquetting or agglomeration together with other waste with a high iron content).

Contact: gulasadriana@gmail.com

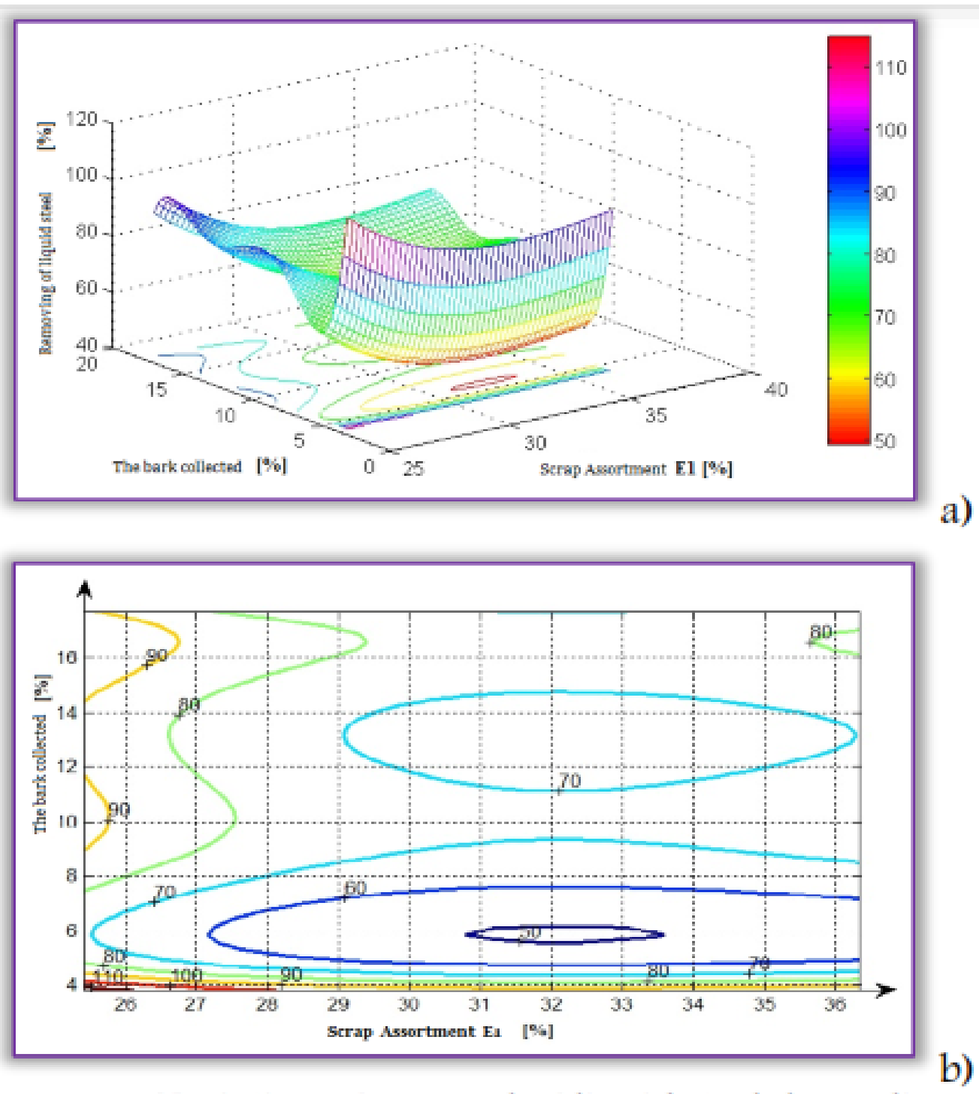
Research regarding the influence of the metallic charge upon reducing the specific consumption and the degree of pollution at electric mills

A

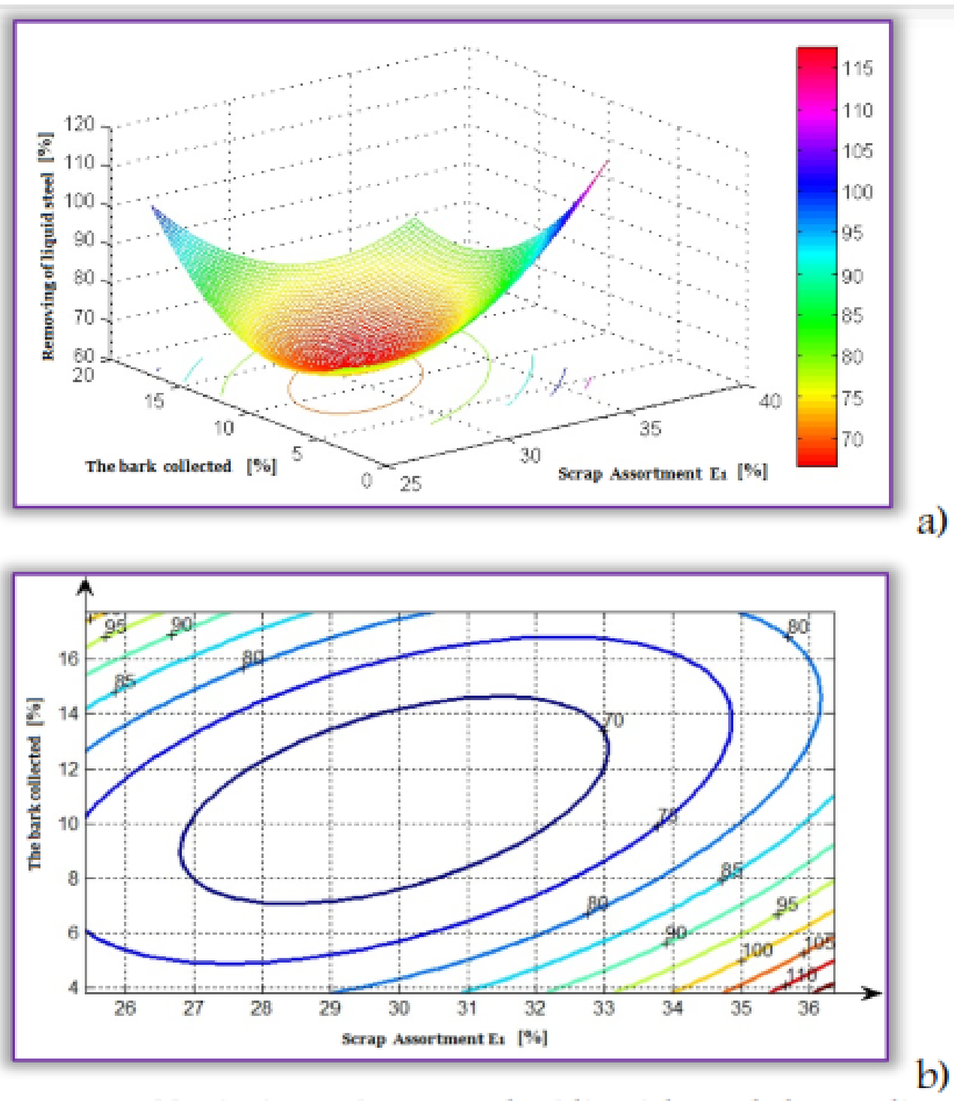
PhD Thesis

Authors: Cristina PACURAR (DIMPU), Ana SOCALICI

The European steel industry is faced with the simultaneous effects of reduced demand and overcapacity in a globalized steel market, as well as high electricity prices and the need to transition to energy from renewable sources, which means that the steel industry must invest in new technologies to adapt to the green economy and to manufacture innovative products at competitive costs. Taking into account the current data that show us that the steel industry has a major impact on the environment producing approximately 4% of carbon dioxide emissions in Europe and approximately 9% worldwide, research has been carried out to optimize specific consumptions, the quality of steel developed in the electric arc furnace as well as the possibility of reducing the impact on environmental factors and the health of the population by reducing carbon emissions, dust propagating in the atmosphere as well as noise produced during technological processes, due to the complexity of the installations and raw materials used on the technological flow. Industrial research has focused on the analysis of the EBT type electric arc furnace charge structure, from the point of view of the ferrous types, the ferroalloys used, the fuel and the oxygen used. Following the analysis carried out, based on the processing of industrial data in the MATLAB program, the optimal structure of the metal load (depending on the supply conditions) was established in order to increase the metal removal. International organizations predict a decrease in the price of electricity obtained from renewable sources until 2030, and the transition to green energy of the steel industry would allow the impact on the environment to decrease considerably and improve the quality of the steel obtained due to the use of hydrogen in the chemical composition of the metal load used by the new high-performance technologies.



Variation of removal of liquid steel depending on scrap iron assortment E1 and the bark collected
a) spatial representation; b) Curved level, projection in the horizontal plane



Variation of removal of liquid steel depending on scrap iron assortment E1 and the bark collected.
a) spatial representation; b) Curved level, projection in the horizontal plane

The assortment structure of the optimal load: assortment E100 -4-6%; commercial ferrous barks 10-20%; inner barks 10-20%; internal recycling 8-10%; scraps 4-6%.

Contact: daniellela2020@yahoo.com

THE ACADEMY
OF APPLIED TECHNICAL STUDIES
BELGRADE

Conceptual Design of a Plant for Anaerobic Biological Treatment of Sludge from the Process of Sanitary Wastewater Treatment

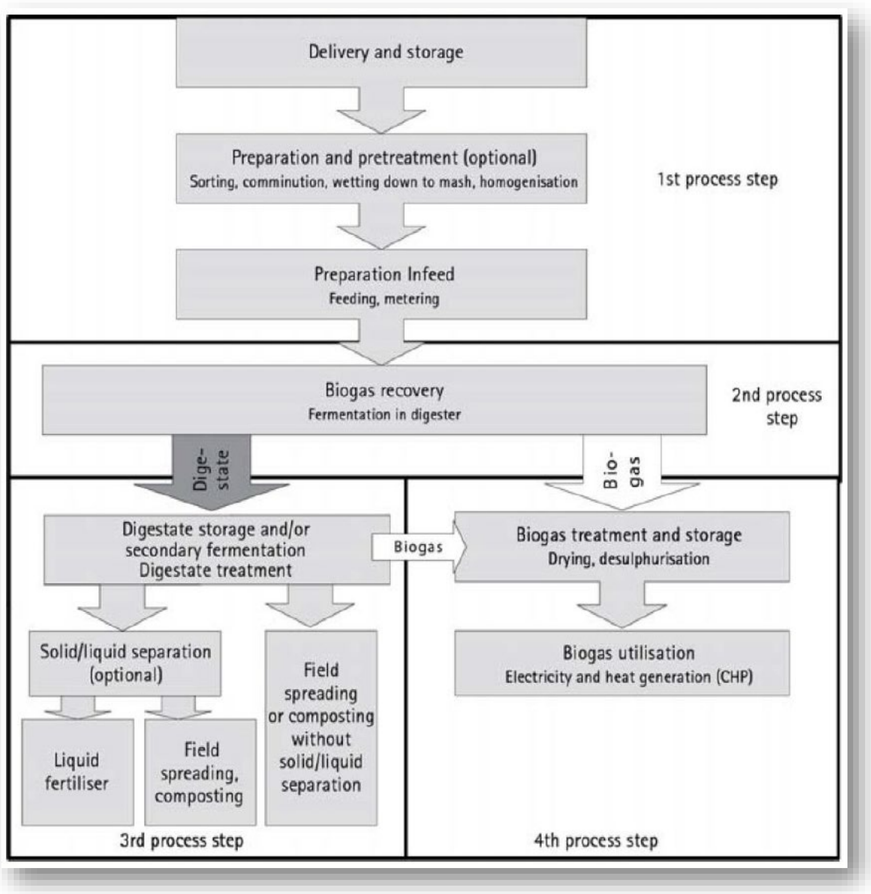
This project is based upon work from COST Action CA21112 - Offshore freshened groundwater: An unconventional water resource in coastal regions? (OFF-SOURCE), supported by COST (European Cooperation in Science and Technology).

A

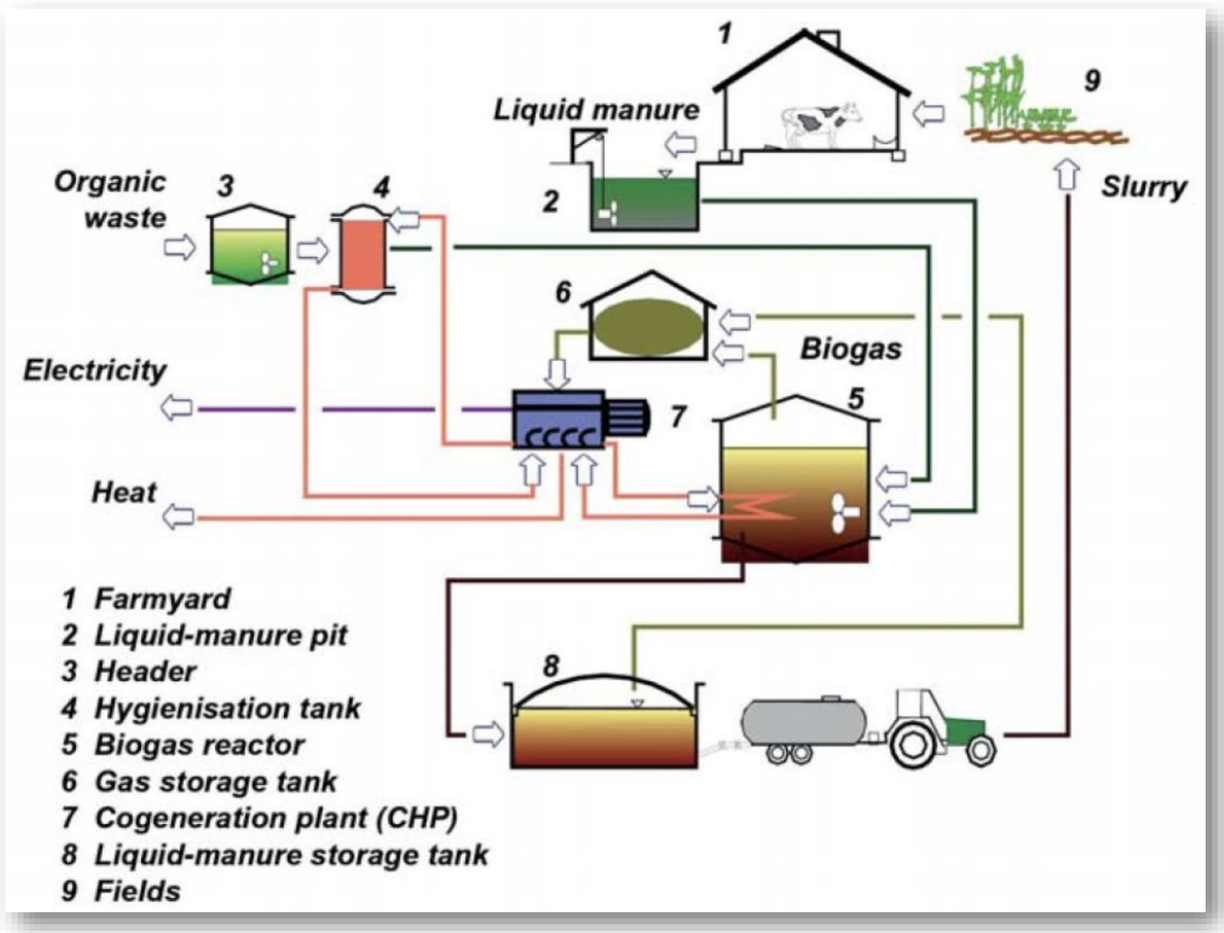
Author: Zaga TRIŠOVIĆ

Greenhouse gas emissions and climate change are global problems. Solution is to reduce fossil fuel use and increase the use of renewable energy. One of those renewable energy sources is biogas which is a flammable mixture of gases that consists mainly of methane (CH_4) and carbon dioxide (CO_2). Anaerobic digestion (AD) is an ecological, naturally occurring process where, in the absence of oxygen (anaerobic), organic matter decomposes to form a mixture of gases known as biogas. Energy (heat) and new biomass are generated from the process as well. The resulting gas mixture consists mainly of methane (50-75 vol.%) and carbon dioxide (25-50 vol.%).

Biogas also contains small amounts of hydrogen, hydrogen sulfide, ammonia and other trace gases. Important environmental conditions in process of anaerobic digestion: oxygen, temperature, pH value, nutrient supply, inhibitors, … The process of urban (sanitary) wastewater treatment consists of primary and secondary treatment and treatment of waste sludge by the process of anaerobic digestion. Biogas is used to produce heat and electricity by combustion in gas engines.



General process of biogas recovery

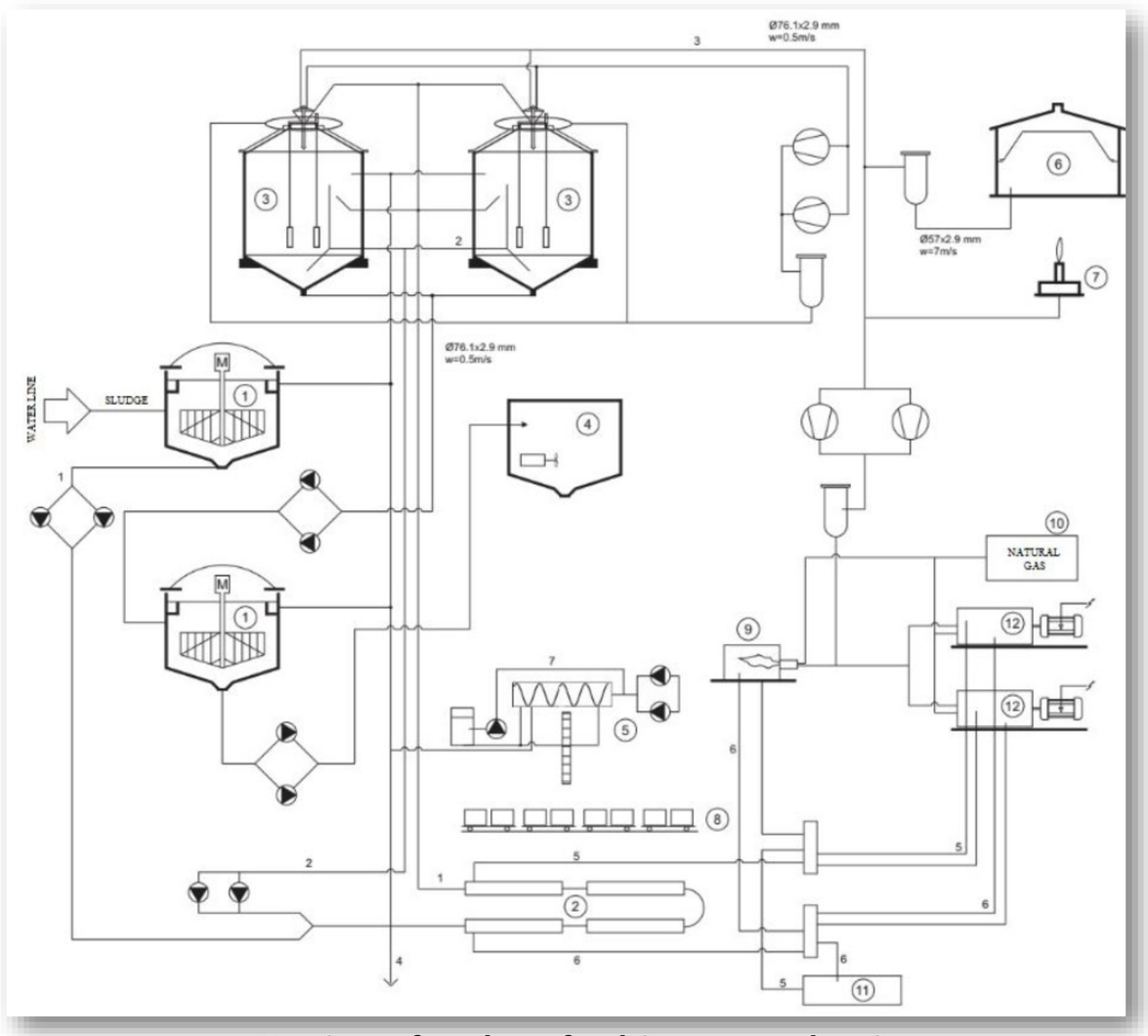


Schematic of an agricultural biogas recovery plant for co-substrates

In this project a conceptual design of a plant for biogas production using sludge separated from the primary and secondary sedimentation from the wastewater treatment for a city with 50,000 equivalent inhabitants (EI) is shown. Equivalent inhabitants (EI) is a water consumption of 150 liters per day.

The production and use of biogas has multiple positive effects, from the point of view of environmental protection, the use of renewable energy sources, and support for the national economy. Special emphasis should be placed on achieving the development of rural agricultural areas, less dependence on fossil fuels, a cleaner environment and the use of resources that would otherwise end up in landfills.

The use of renewable energy sources is supported, and it is expected that in the future the support will be even more significant, as well as the funds needed for further development of technology and a larger share of renewable energy use at the global and local level.



Design of a plant for biogas production

Contact: zaga.trisovic@gmail.com +38162295270

Department for Research, Development and Innovation Management
Knowledge and Technological Transfer Center

15 Constantin Daicoviciu street
400020, Cluj-Napoca, România

e-mail: liliana.pop@staff.utcluj.ro

www.utcluj.ro

A

Title

AIRBORNE WIND POWER SYSTEM

Inventor/s - Contact

Breban Ștefan, Drancă Marius Alexandru – Technical University of Cluj-Napoca,
Email: Stefan.Breban@emd.utcluj.ro
Mălăel Ion – COMOTI București, Email: ion.malael@comoti.ro

Patent/ Application number

Patent OSIM no.: RO133886- B1/29.04.2022

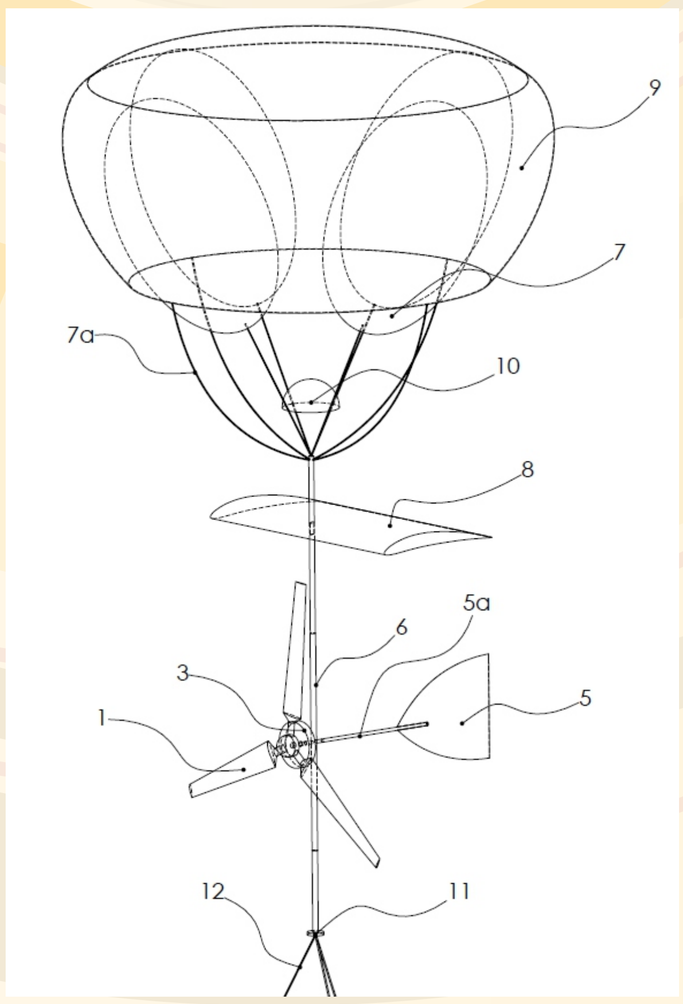
Short presentation

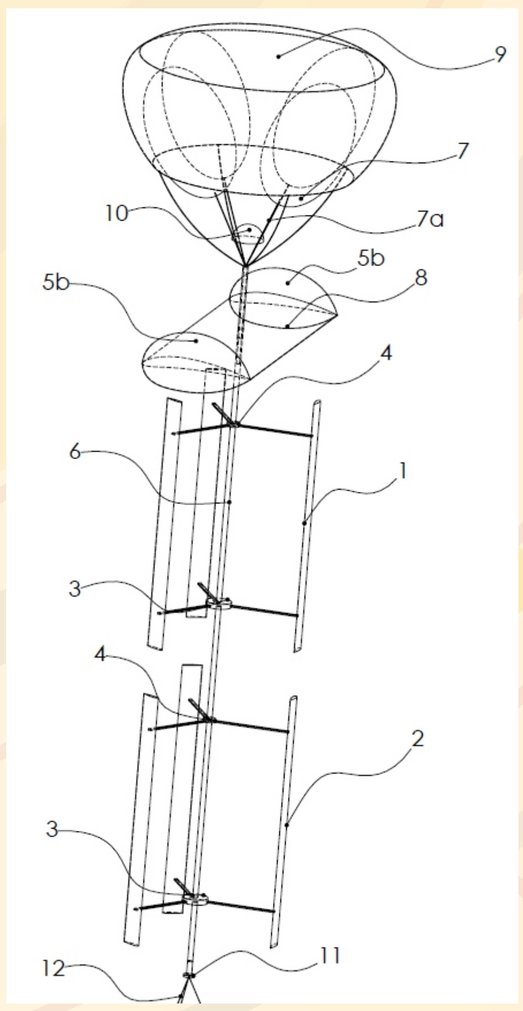
The airborne wind system is described in a first embodiment: it consists of a wind turbine **1**, with a horizontal axis, having one or more blades made of light material which drives an electric generator with outer rotor **3**, mounted on a pillar made of light material **6**, this pillar **6** being circular in section or having aerodynamic profile, a tail vane **5** made of a flat plate and fixed on one end of the strut **5a**, which strut is clamped at the end opposite the pillar **6**, balloons **7** filled with a gas lighter than air and attached to the upper end of the pillar **6** with connecting cables **7a**, an open main parachute **9**, which is placed on top of the balloons **7**, covering them at least in the upper part, an additional parachute **10** equipped with an actuator and pressure gauge, a wing **8**, asymmetric with respect to the pillar, which provides additional lift in the wind, a rotating equipment **11** consisting of an axial-radius bearing and an element with sliding contacts that allows rotation of the anchored assembly depending on the wind direction and at the same time ensures the electrical connection with the electrical conductors in the anchor cable(s) **12**. In the second and third embodiments two wind turbines are used, with horizontal axis and respectively, with vertical axis, that spin in opposite directions, thus the torque applied to the pillar **6** by each wind turbine will be cancelled.

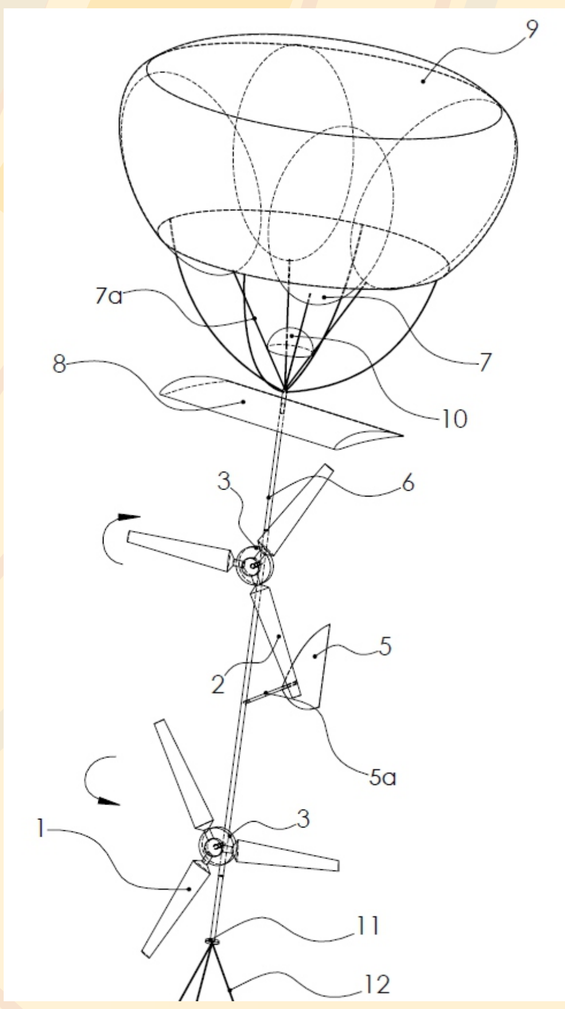
Applicability

Renewable energy production

Images







Department for Research, Development and Innovation Management
Knowledge and Technological Transfer Center

15 Constantin Daicoviciu street
400020, Cluj-Napoca, România

e-mail: liliana.pop@staff.utcluj.ro

www.utcluj.ro

Title

DESULFATIZATION, OPTIMIZATION AND APPLICATION TECHNIQUE OF THE SPENT PLATES PROVIDED FROM CAR BATTERY

A

Inventor/s - Contact

Simona Rada, Răzvan Opre, Andrei Pintea, Eugen Culea
simona.rada@phys.utcluj.ro; eugen.culea@phys.utcluj.ro

Patent/ Application number

Patent OSIM no.: RO134764- B1/30.12.2022

Short presentation

The invention relates to a recycling and desulphatization technique of the plates from spent car batteries by the melt quecching method and the incorporation of NiO or Co_3O_4 contents in order to improve the electrochemical performance of new materials for applications as electrodes on batteries. X-ray diffractograms of recycled and doped materials with 8 mole% NiO or 20 mole% Co_3O_4 show the disappearance of the sulphated phases of lead ions, respectively $4PbO{\cdot}PbSO_4$ and Pb_2SO_5 crystalline phases below the detection limit. The electrochemical performance of recycled and desulfatizated materials with metallic ions was demonstrated from cyclic voltammetry measurements. For the electrode material doped with 20 mol% Co_3O_4 the reversibility of the voltammogram after scanning of three cycles was increased comparatively with its analogue with 8 mol% NiO.

Applicability

This invention proposes two types of recycled and metal-doped materials for the applications as new electrodes at batteries. The invention relates to the recycling and regenerating processes of new electrode materials for batteries by the conversion of lead sulphates from spent plates into metal oxides. The electrode made of recycled material and optimized with metal oxide has electrochemical performance clearly superior comparative with the undoped electrode, the evolution processes of hydrogen are undetectable and the anodic passivation phenomena are much diminished.

Images

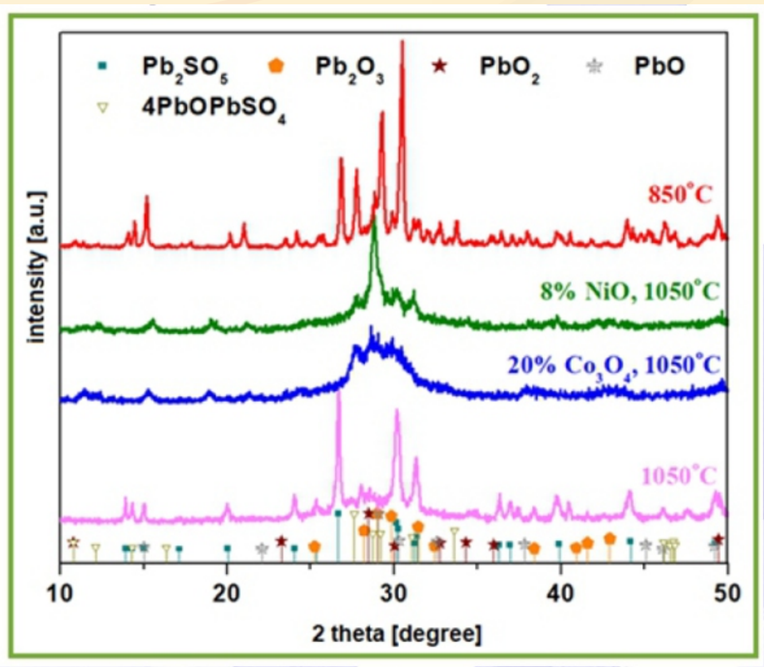


Figure 1: X – ray patterns of the recycled materials prepared at varied temperature and with different dopant contents.

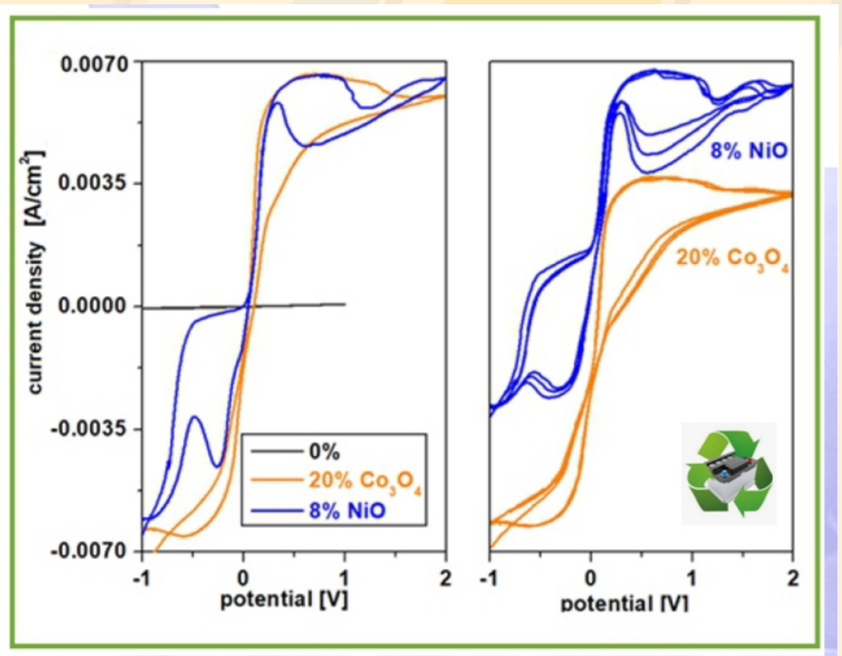


Figure 2: Cyclic voltammograms scanned for a) the first cycle and b) three cycles of the recycled and metal-doped electrode materials in electrolyte solution of 5M H_2SO_4.

Diode type multilayer organic device, transparent and flexible based on electrospun polymeric fibers and organometallic compounds, and its manufacturing process

A

I. C. Ciobotaru[1], , C. C. Ciobotaru [1], , A. Evanghelidis [1], , S. Poloșan[1], , I. Enculescu[1], , A. Casarica[2]

[1] National Institute of Materials Physics ; [2] National Institute for Chemical Pharmaceutical Research and Development

ABSTRACT

The present invention describes a multilayer organic device, together with the manufacturing process, consisting of a polymer fiber network covered with a metal layer acting as an anode, a hole injection layer based on conductive polymers, an emissive layer based on organometallic compounds, a buffer layer based on lithium fluoride and a metal layer acting as a cathode. All layers adjacent to the polymer fiber network have a well-defined geometric configuration to avoid short-circuiting in the final device. Integrating the structure into a transparent and flexible multilayer organic device and applying a voltage allows obtaining a diode characteristic, an aspect that is fundamental in a wide range of applications using electronic display technology.

INTRODUCTION

Foldable organic light-emitting diodes (FOLEDs) have unique features, including low power consumption, high efficiency and high response speed, which make them useful for the wearable technologies.These characteristics are based exclusively on the unique properties of their component materials. In organic electroluminescent diode technology, transparent and flexible metal electrodes obtained by electrospinning method, have a special impact due to their outstanding electrical and optical properties. The fabrication of electroluminescent diodes based on organometallic compounds, involves the optimization of the injection of electric charges, respectively the transport of these charges in the multilayer structures of these diodes.

Explanatory figures for the invention

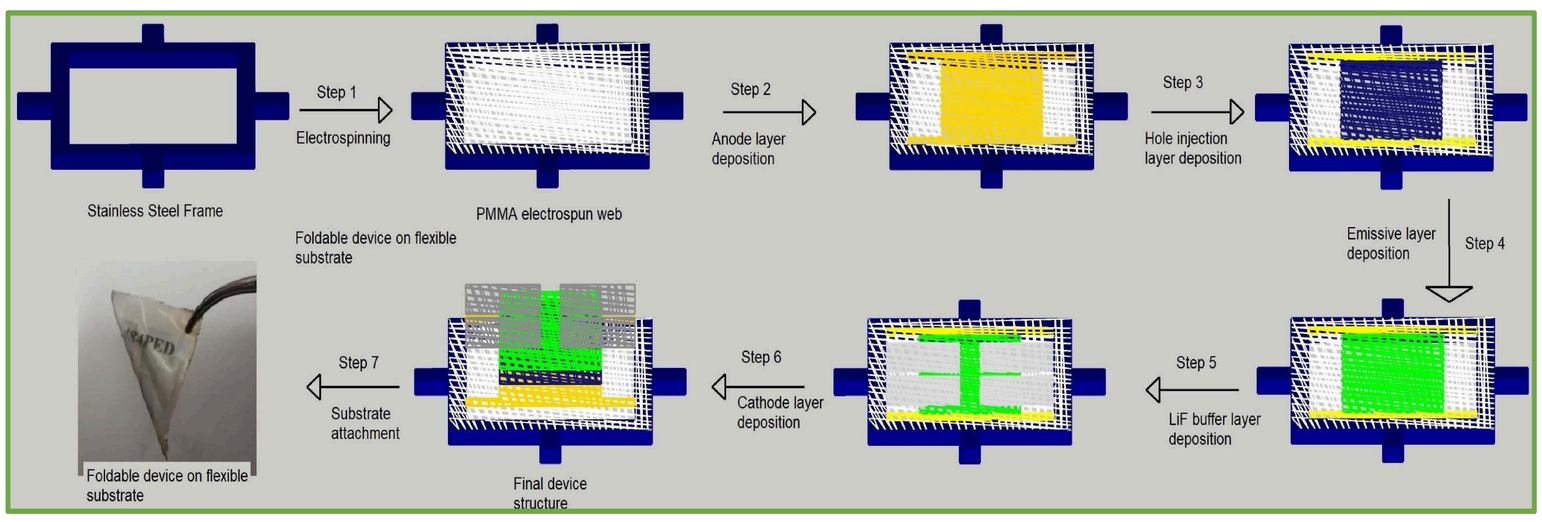


Figure 1. Fabrication process of foldable devices

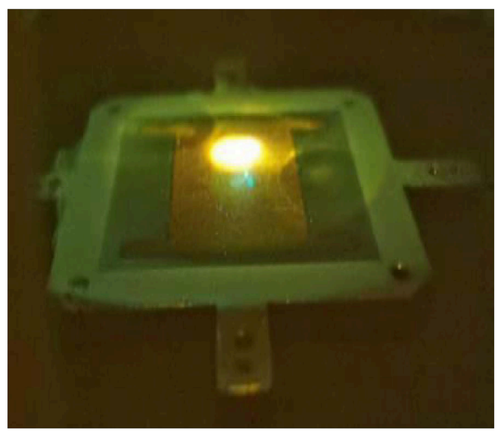


Figure 2. Emission image under 405 nm excitation (step 4)

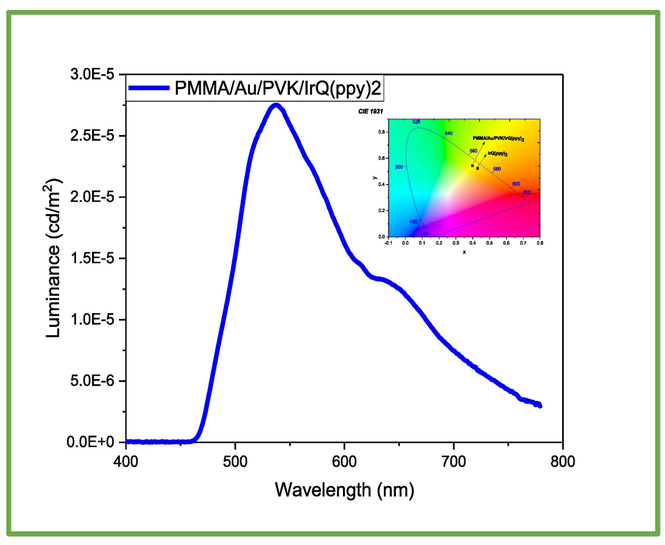


Figure 3. Luminance spectrum and CIE diagram of the structure obtained in step 4

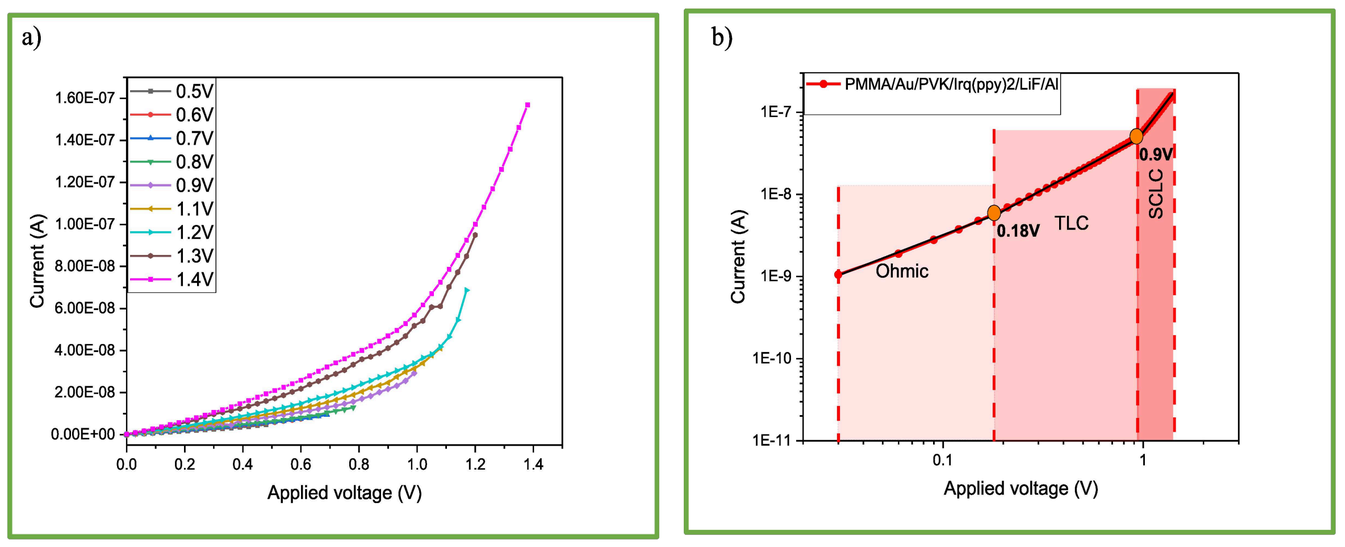


Figure 4. Current-voltage characteristics for the device obtained in step 7 a) at different applied voltages; b) logarithmic scale representation of the curve from 1.4V

This work was supported by a grant of the Romanian Ministry of Education and Research, CCDI – UEFISCDI project number PN-III-P2-2.1-PED2019-1459, within PNCDI III.

OSIM patent request no. A 2022 00626/ 12.10.2022

CONTACT: corina.ciobotaru@infim.ro

Implanturi endoosoase acoperite cu straturi de sticlă bioactivă pe bază fosfatică co-substituită cu cupru și galiu, cu activitate antimicrobiană extinsă, condiționată ca intensitate și durată de grosimea stratului de acoperire bioresorbabil – Procedeu de obținere

A

Copper and Gallium co-substituted phosphate-based bioactive glass coated endo-osseous implants with extended antimicrobial activity, conditioned in intensity and duration by the thickness of the bioresorbable coating layer – Obtaining procedure

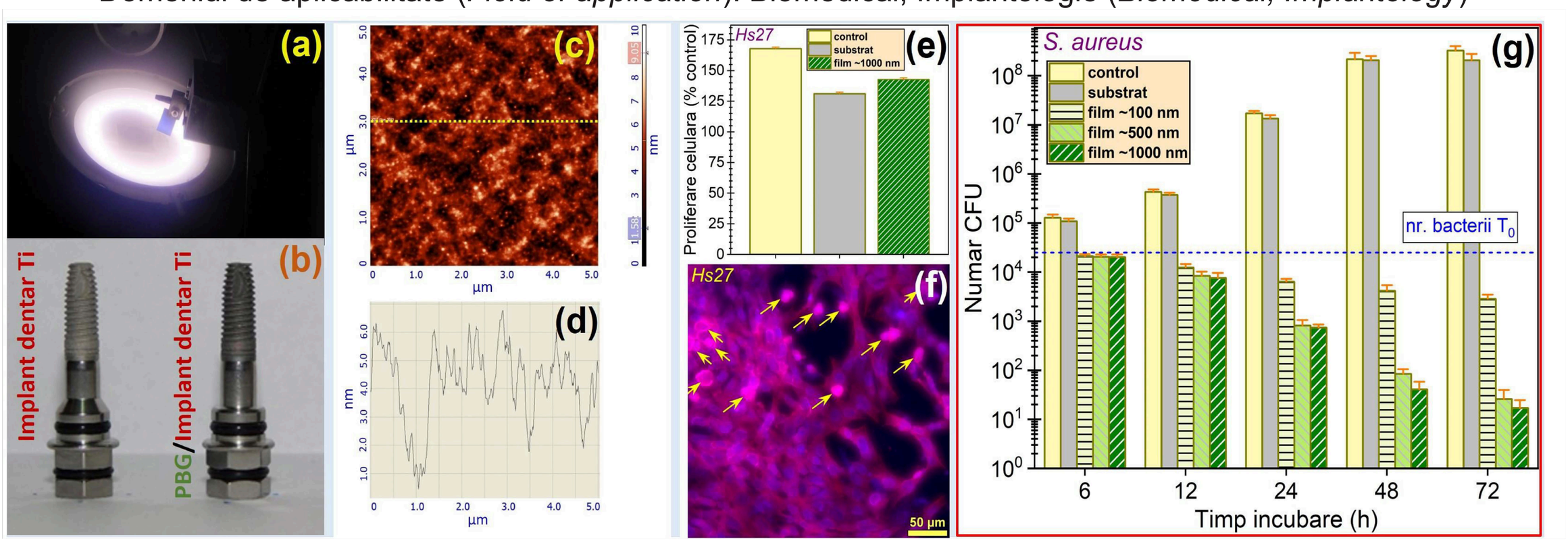
George E. Stan*, Adrian-Claudiu Popa, Cristina Beșleagă

Institutul National de Cercetare Dezvoltare pentru Fizica Materialelor (National Institute of Materials Physics)

Invenția se referă la un procedeu de bio-funcționalizare a unui implant endoosos metalic (ortopedic sau dentar) cu straturi subțiri de sticlă bio-activă fosfatică (PBG), depuse prin tehnologia pulverizării în câmp magnetron în regim de radiofrecvență (RF-MS), conferindu-le o activitate antimicrobiană a cărei intensitate și durată poate fi condiționată de grosimea stratului sacrificial bioresorbabil de PBG. Procedeul conform invenției constă în depunerea pe suprafața exterioară a implantului metalic a unui strat PBG prin RF-MS dintr-o țintă catod de pulbere presată de PBG cu o compoziție predefinită (i.e., P2O5–CaO–Na2O–Fe2O3, cu aditivi de CuO și/sau Ga2O3 cu concentrații situate în intervalul 2...4 mol%), la o presiune de lucru de Ar de 0,2...1,0 Pa (care permite controlul asupra compoziției filmelor PBG), o distanță țintă-substrat de 35 mm și o temperatură de depunere <100 °C); straturile subțiri de PBG rezultate sunt continue, poroase, uniforme și bine aderate la substratul metalic. Acoperirile implantologice PBG (cu grosimi în intervalul: min. 100 nm – max. 1500 nm) conduc la activitate antibacteriană (împotriva tulpinilor de Staphylococcus aureus și/sau Escherichia coli), a cărei intensitate și durată poate fi simplu adaptată prin modificarea convenabilă a grosimii de strat PBG, ceea ce favorizează calea către reducerea incidenței infecțiilor postoperatorii.

The invention refers to a bio-functionalisation protocol of a metallic, orthopaedic or dental endosseous, implants, with phosphate-based bioactive glass (PBG) thin-films, deposited by the radio-frequency magnetron sputtering (RF-MS) technique, possessing extensive antimicrobial activity, which can be conditioned as intensity and duration by the thickness of the sacrificial bioresorbable layer of PBG. The process according to the invention consists in the deposition on the outer surface of a metal endo-osseous implant of a PBG layer by RF-MS from a cathode target of mild-pressed glass powder with a predefined composition (i.e., P2O5–CaO–Na2O–Fe2O3 with additives of CuO and/or Ga2O3 in the range of 2...4 mol%), at a working argon gas pressures in the range 0.2...1.0 Pa (allowing for the control over the PBG films' composition), a target-to-substrate distance of 35 mm and a deposition temperature <100 °C; the resulting deposited thin PBG layers are continuous, porous, uniform, and well-adhered to the metallic substrate. The engineered thickness modification of the PBG implant-type coatings (in the range of min. 100 nm – max. 1500 nm) enables a strong antibacterial activity (against the Staphylococcus aureus and/or Escherichia coli strains) which can be tailored as intensity and duration, fostering the path towards a reduced incidence of post-surgery infections.

Domeniul de aplicabilitate (*Field of application*): Biomedical; Implantologie (*Biomedical; Implantology*)



(a) Secvență din procesul de funcționalizare prin RF-MS a unui implant dentar de Ti cu acoperire PBG; (b) Imagini comparative ale unui implant dentar de Ti simplu (stânga) și funcționalizat cu acoperire de PBG (dreapta). (c) Morfologia suprafeței acoperirii PBG evidențiată prin AFM; (d) Profilul topografic pe înălțime corespunzător liniei marcate în imaginea (c). (e) Diagrama viabilității/proliferării celulare (celule fibroblaste umane Hs27, ATCC® CRL-1634™). (f) Morfologia celulelor Hs27 cultivate pe stratul PBG evidențiată prin microscopie de fluorescență. (g) Diagrama activității antibacteriene a straturilor sacrificiale PBG (cu grosimi diferite, i.e., ~100, ~500 şi ~1000 nm) împotriva tulpinei bacteriene Gram-pozitive S. aureus, comparativ cu controlul (mediul nutritiv fără probă) şi substratul nefuncţionalizat.

Brevet nr. RO 134819 B1 (publicat in BOPI nr. 9/2022) / Patent no. RO 134819 B1 (published in BOPI no. 9/2022)
Cercetare finantata din proiectul PN-III-P1-1.1-TE-2016-1501 / Research financed by PN-III-P1-1.1-TE-2016-1501 project
Contact: *george_stan@infim.ro; adrian.popa@infim.ro; cristina.besleaga@infim.ro

Assessing the Impact of Adopting a Circular Economy Approach on Achieving Saudi Arabia's Vision 2030 Waste Management Goals

Research project

Dr. Neyara Radwan

Associate Professor

Industrial Engineering Dept., College of Applied Sciences,

ALMaarefa University, KSA

A

Circular Economy (CE)

Circular Economy (CE) is an economic model designed to promote resource efficiency by minimizing waste, preserving long-term value, reducing the consumption of primary resources, and establishing closed loops for products, their components, and materials, all while prioritizing environmental protection and socioeconomic advantages. Embracing a circular economy has the capacity to drive sustainable development by disconnecting economic growth from the adverse impacts of resource depletion and environmental degradation.



The Saudi Vision 'Vision 2030' and the Saudi National Transformation Program (NTP)2020

The Saudi population and actual Gross Domestic Product (GDP) over the last five years based on the World Bank data, *Table 1*. The Saudi oil reserves are the second largest in the world and the country is the world's leading oil exporter. Historically, the oil sector accounts for roughly 90% of Saudi budget revenues, 97% of export earnings, and 55% of GDP. Another 40% of GDP comes from the private sector. This situation calls for a new approach to diversify the country's economy, accordingly, the KSA's government announced a very comprehensive development vision "Vision 2030" in April 2016. The Vision is a strategic framework to reduce Saudi Arabia's dependence on oil, diversify its economy, and develop public service sectors such as health, education, infrastructure, recreation, and tourism.

Key Indicator	2015	2016	2017	2018	2019
Population (million)	31.72	32.44	33.10	33.70	34.30
Actual GDP (billion US $)	654.27	644.94	688.59	786.55	792.97

Table 1: KSA key economic indicator

At KSA most of the collected MSW is disposed to open or non-sanitary landfill sites that are causing greenhouse gas (GHG) emissions, and leachate production and soil contamination. The current practices in the waste disposal in the Kingdom does not reflect the state of economy in the country and very suboptimal in comparison to the world Status, *Figure 1*. To overcome these problems and to create economic opportunities, jobs, and environmental benefits, the waste-to-energy (WTE) and waste to recycling facilities are recommended as a way forward. KSA new policy of Vision 2030 is supporting the maximum diversion of MSW from landfills to material recovery facilities (MRF) with the production of renewable energy and recycling and value-added products.

Contact: Dr. Neyara Radwan

nradwan@um.edu.sa , hatsApp:+966560689751

Status of Municipal Waste Management at KSA

KSA witnesses a rapid population growth, industrialization, and urbanization in the last few decades, resulting in the production of a huge amount of solid waste. The average increase in population growth over the last four decades was recorded 3.4%, while the urbanization increases from 50 to 80% of the total population in 1970 to present. This scenario has raised the problem of enormous amount of unchecked solid waste generation where most of the waste is produced in some of eight main cities of KSA, *Table 2*. The rate of municipal solid waste (MSW) generation in KSA is 15.3 Mt/y with the average rate of 1.4 kg/capita/d. The produced MSW is generally regulated by the Ministry of Municipalities and Local Affairs (MOMRA), while the management is carried out by the local municipalities, which include the collection, transportation and disposal of waste to landfill or dump sites without material or energy recovery. The waste is usually disposed through landfill dumping and combustion. Some compost facilities have also established for conversion of organic waste into compost. However, the prevailing waste disposal practices are posing serious threats to the environment. The disposal of wastes without proper treatment can trigger problems like malodors and pollution of ground and surface waters.

Amount of Waste ($x10^3$ tons/year)	Population (millions)	Region /City	Amount of Waste ($x10^3$ tons/year)	Population (millions)	Region /City
Saudi Arabia	34.6	15,300	Makkah	1.675	915
Major cities of KSA	14.12	8633	Madina	1.180	64
Riyadh	5.328	2871	Al-Taif	0.987	540
Jeddah	3.456	1888	Dammam	0.903	1093

Table 2: Solid waste production in different cities of KSA

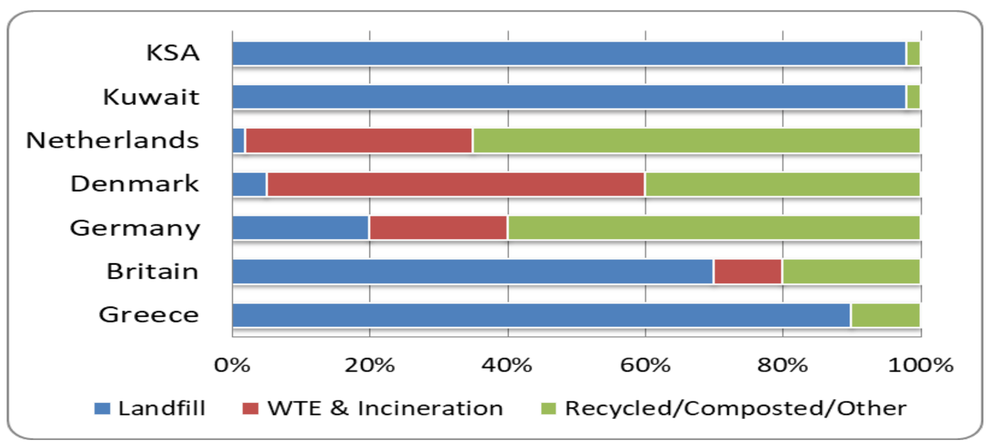


Figure 1. Benchmarking of Waste Treatment Options

B

Nanotechnology

Advanced materials

Metallurgy

Civil engineering

Method for obtaining a reinforced alveolar structure

A / 00078 / 20.02.2023

Authors: Emilia Dobrin, Sorin Mușuroi, G.-V. Mnerie, C.M. Matei

B

The process for producing reinforced alveolar structures according to the invention solves the technical problem presented and eliminates the disadvantages mentioned in that the structure obtained, with components produced by 3D printing, can be configured from the design phase according to the material used for printing, the intensity and orientation of the anticipated mechanical stresses and the mechanical strength imposed on the final product.

The structure is composed of a 3D-printed semi-finished product and metal fabric reinforcement, the joining of the structure components is done by ultrasonic welding equipment after the printing material, polymer or polymer with reinforcing agent (composite) is deposited layer by layer in a cellular volume structure with a configuration (cell size and orientation) determined by the mechanical strength requirements of the final product.

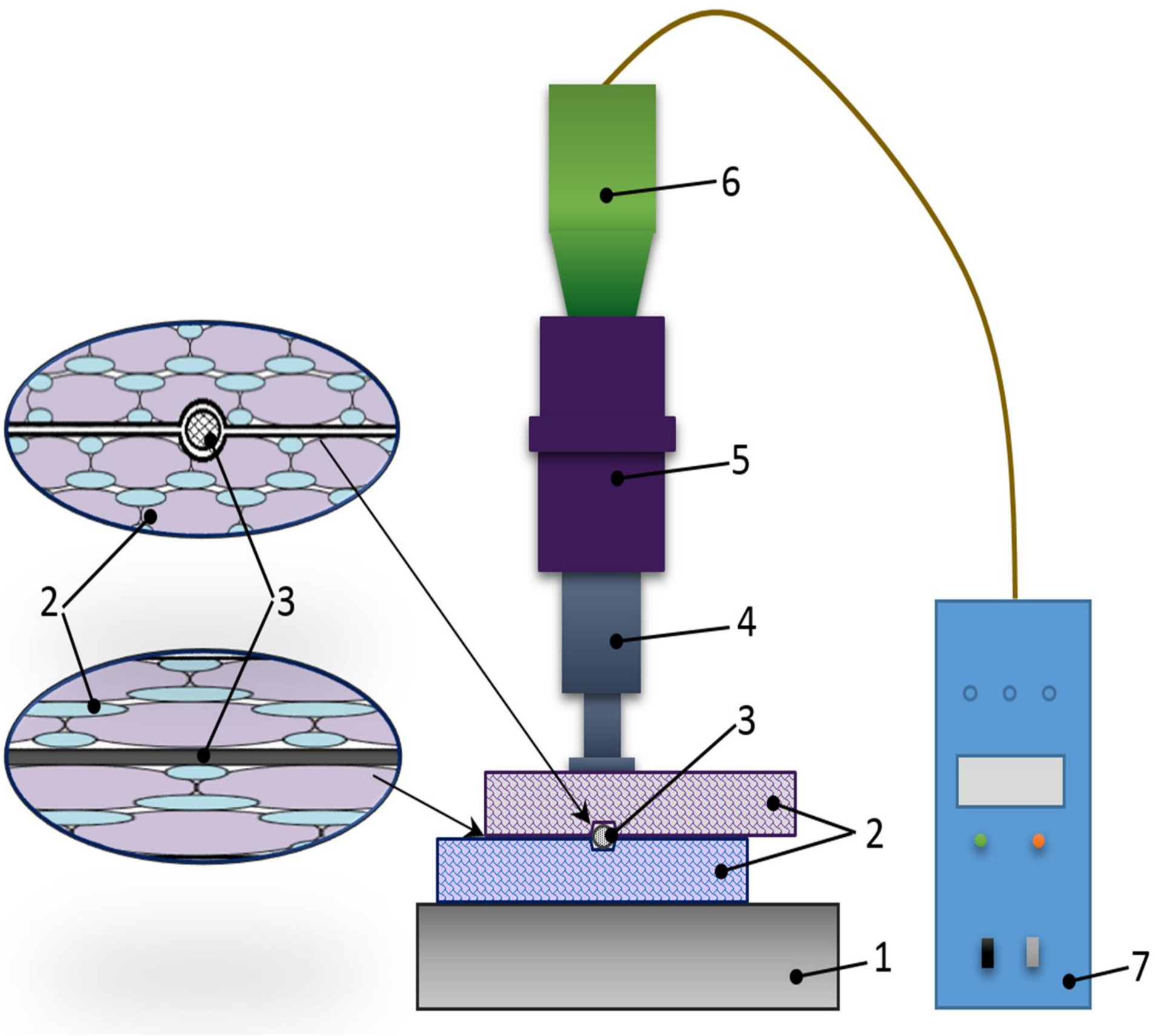


Figure - Reinforced alveolar structure and the equipment to obtain it: workbench (1), workpiece (2), metal reinforcement (3), sonotrode (4), booster (5), transducer (6), ultrasonic generator (7)

Contact: edobrin@isim.ro

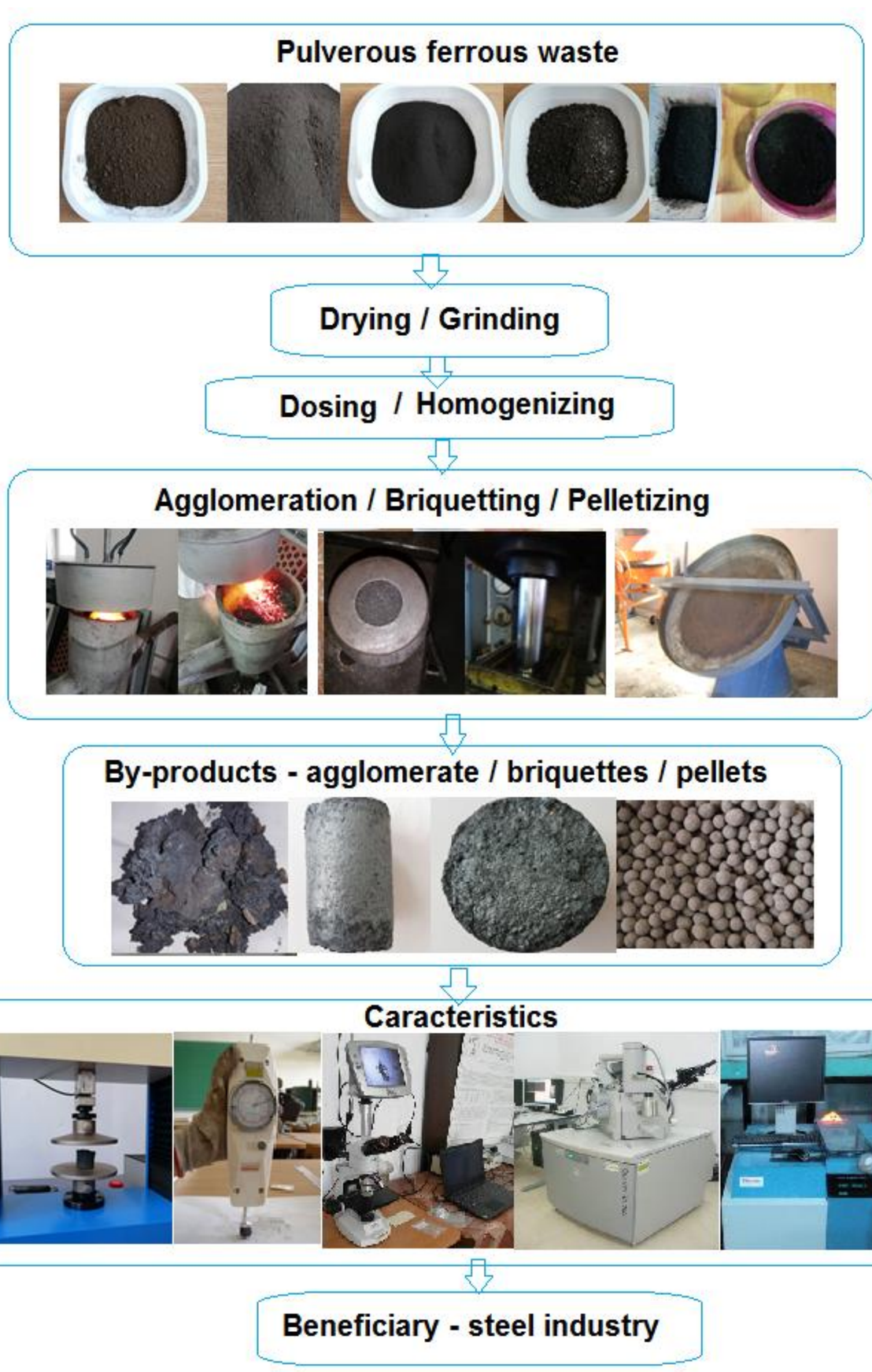
Recovery of iron-containing waste in the steel industry

Research project

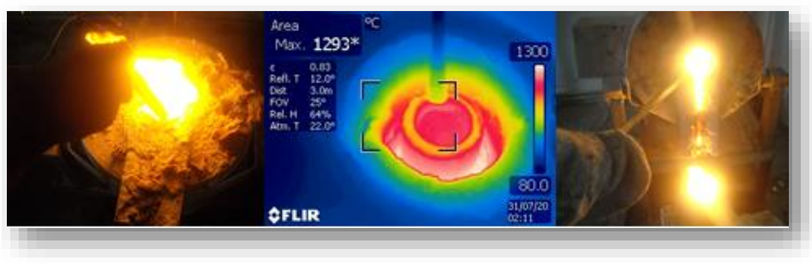
Authors: Ana Socalici, Erika Ardelean, Marius Ardelean, Vasile Puțan

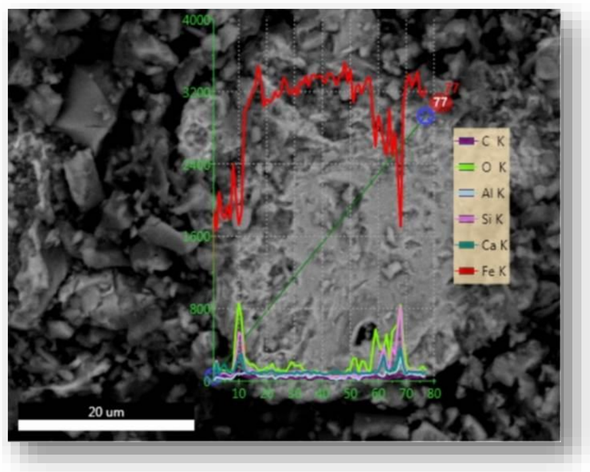
In the context of sustainable development, the resource efficiency, reuse and recycling of the steel in question of ferrous waste is very important for the steel industry. The efficiency and quality of raw materials and auxiliary materials is an integral part of the steelmaking process.

The research project presents the results obtained from the processing of sludge (sintering sludge, sludge mill scale and ferrous sludge) resulting from the steel industry. From the point of view of the chemical and particle composition, the waste can be recovered by recycling, the choice of technology having to take into account all its qualitative characteristics.









Experimental results lead to the conclusion that the waste analyzed can be processed by briquetting / pelletizing / agglomeration, which allows the recovery of waste with large particle size variation limits (desirable below 2 mm). The composition of the recipes is determined according to the availability of small and powdery waste and the destination of the resulting by-products - steel industry.

Contact: virginia.socalici@fih.upt.ro

COLLAGEN NANOFIBERS FROM FISH SCALES AND PROCEDURE FOR OBTAINING THEREOF

Patent application OSIM A/00782/29.11.2022
BOPI NO.3/2023, PG.23

Authors: Gaidau Carmen Cornelia, Rapa Maria, Stanca Maria, Predescu Cristian, Alexe Cosmin-Andrei

B

Description

The invention refers to obtaining collagen nanofibers with an average size diameter of 110-178 nm by using collagen from fish scales prepared following two innovative methods for extraction.

Advantages

The high surface area to volume ratio and porosity as compared to gelatin or collagen membranes as well as the origin of collagen make the fish scale collagen nanofibers an advanced biomaterial for manufacturing wound healing dressings.

Novelty

Extraction methods for collagen with spinnable properties from fish scales ►for collagen nanofibers electrospinning
Collagen from fish scales as alternative to mammalian collagen ►less immunogenic risks
Collagen from fish scales as alternative to native collagen ►cheaper
Collagen from fish scales as alternative to native collagen ►richer composition with bioactive components: Ca, P, chitin
Collagen nanofibers from fish scales collagen ►resistant to sterilization with gamma irradiation.

Washing

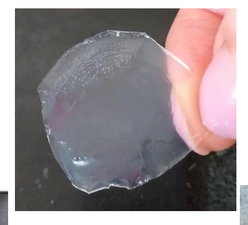
± Demineralisation

Extraction

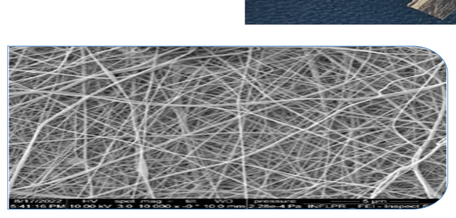
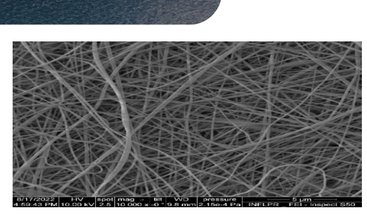
Drying

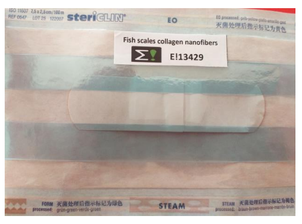
Electrospinning

Wound dressing





Acknowledgments: This research was funded by a grant from the Romanian Ministry for Research, Innovation, and Digitalization, CCCDI-UEFISCDI, project number PN-III-P3-3.5-EUK-2019-0237, Contract 219/2020 (NonActivPans), in the frame of Eureka project E!13429.

Presentation link: https://spdgroup.ro/non-active-pans-2-2/

Contact: Gaidau Carmen Cornelia, e-mail: carmen.gaidau@icpi.ro

BIODEGRADABLE POLYMERIC COMPOSITE BASED ON NATURAL RUBBER AND FUNCTIONALIZED WOOD WASTE

Patent application OSIM A 00539/27.08.2020

Authors: Laurenția Alexandrescu, Maria Sonmez, Mihai Georgescu, Daniela Stelescu, Mihaela Nituica

B

Description

Biodegradable polymer composite based on natural rubber and wood waste ground to nanometric dimensions and functionalized with potassium oleate, intended for obtaining products for the food, medical, consumer goods and footwear industries. The obtaining of composites has also been achieved through more efficient and easy to process technologies.



Procedure

Wood waste was collected from wood processing plants. Wood waste was grinded by a cryogenic mill with a speed of 12.000 rotations / min and separated through a sieve with meshes of 100 nm at dimensions of 50-100 nm.

After grinding, the wood fibers were mixed with 20% potassium oleate and stirred mechanically for 4 hours at 60°C.

The biodegradable polymer composite was obtained on a two-cylinder roller, having the following parameters: temperature on the roller cylinders - 35-45°C, speed - 27 rpm, distance between cylinders - 1.5… 2.5 mm, time - 20-25 min. Plasticize the natural rubber, in an amount of 1-100g for 3-5 minutes, afterwards gradually add 2 g of stearic acid, 5g of zinc oxide, 0-50 g of precipitated chalk, 0-50g of functionalized wood waste , 3 g mineral oil, 3 g antioxidant IPPD and 0.6 g PEG 4000. Mix the ingredients on a roller to homogenize for 5-10 min. After homogenization, vulcanizing agents, 1.2 g Cz accelerator, 0.15 g D accelerator and 1.5 g sulfur are added for 2 min. Refine the mixture for 3 min.

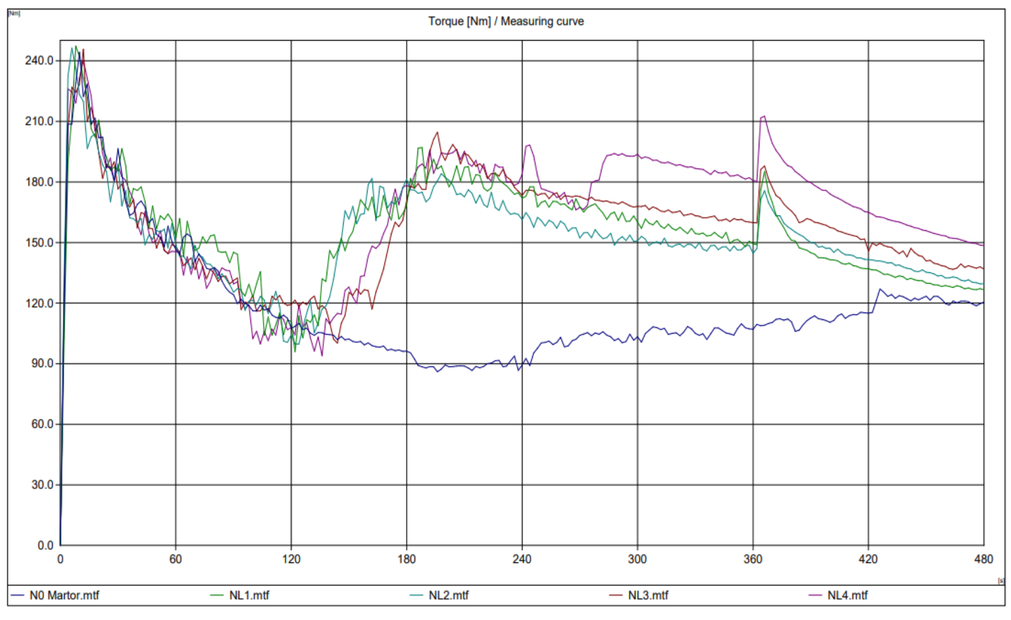
Formulation: a mixture of 1-100 parts by weight natural rubber, 1-2 parts stabilizer-stearin, 1-3 parts antioxidant-Irganox 1010 (pentaerythritol tetrakis (3- (3,5-di-tert-butyl-4-hydroxyphenyl) propionate), 1-5 parts active filler zinc oxide, 0-50 parts precipitated chalk, 0-50 parts functionalized wood waste, 1-3 parts mineral oil, 0.1- 0.6 parts PEG, 1-1, 2 parts Cz accelerator, 0.1-0.15 parts D accelerator and 1-1.5 parts sulfur, per 100 parts plasticized polymer.

Benefits

- Resistance to high temperatures ranges (-40 - +200°C);
- Hardnesses from 50-70° Sh;
- Long time thermo-oxidative aging resistance;
- Resistance to atmospheric weather, ozone and UV rays;
- Optimal processability of ingredients for mixing due to the functionalization of wood waste with potassium oleate;
- Abrasion resistance below 200 mm^3.

Physical-mechanical characteristics

Properties	Symbol			
	NL1	NL2	NL3	NL4
Hardness, °Sh A	51	57	61	63
Modulus 100%, N/mm^2	1,08	1,36	1,46	1,33
Modulus 300%, N/mm^2	2,19	2,14	2,00	1,83
Modulus 500%, N/mm^2	4,48	4,48	3,68	3,42
Tensile strength, N/mm^2	7,11	7,59	6,93	6,85
Elongation at break, %	580	600	600	660
Remanent elongation, %	28	32	32	36
Tear strength, N/mm	24,01	24,36	25,57	19,50
Specific weight, g/cm^3	1,17	1,15	1,11	1,06
Abrasion resistance, mm^3	209,73	201,89	232,33	208,45



Applications

For obtaining products for the food, medical, consumer goods and footwear industries. Products that could be manufactured: caps, gaskets and O-Rings, products for footwear, soles, soleplates, insoles etc. These product's properties will comply with specific product standards and will be biodegradable.

Acknowledgments: This patent application was supported within the PN 19- 17 01 03 Nucleu project - MCID

Contact: Laurenția Alexandrescu, e-mail: laurentia.alexandrescu@icpi.ro

NATIONAL INSTITUTE OF RESEARCH AND DEVELOPMENT FOR OPTOELECTRONICS

Process for preparing a polycrystalline material of the type $MnGe_xSb_y$ doped with Co or Fe.

B

Authors: Madalin Ion RUSU, Cristiana Eugenia Ana GRIGORESCU

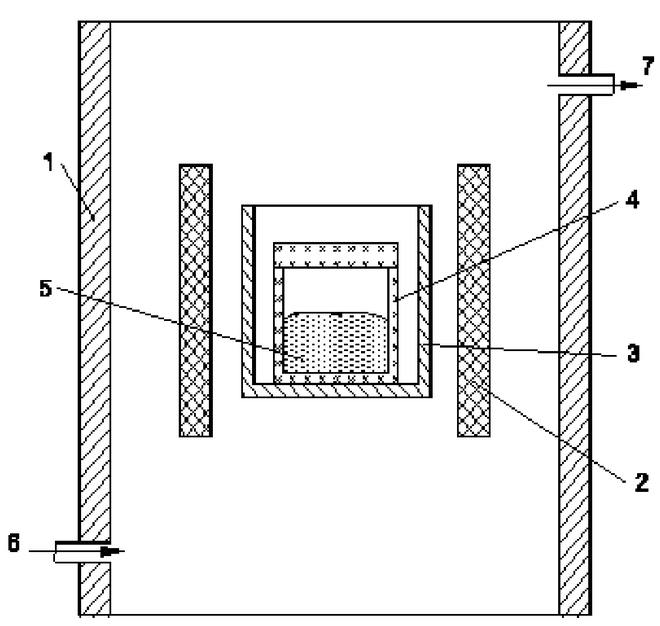
Patent no. RO130250-B1/2018

DESCRIPTION: According to the invention the process for producing polycrystalline $MnGe_xSb_y$ (x = 0.5-1.0; y = 1.5-2.2) doped with Co or Fe solves the technical problem of homogeneity in that it is achieved by the steps of: making a mixture of powders composed of: 5 ... 10 g of Mn powder, 10 ... 15 g of Ge powder, 30 ... 35 g of Sb powder, 0.1 ... 0.3 g of Co or Fe powder, mixing of powders in a ball mill for 100 ... 300 minutes at a speed of 400-500 rpm, the resulting mixture being then pressed into pellets of 10 ... 30 mm diameter and 2 ... 4 mm thickness at a pressure of 8 ... 10 tf, thermal treatment of pellets in argon gas at T1 = 1100-1200 ° C for up to 150 minutes, grounding the heat treated pellets in the ball mill, pressing the resulting powder into new pellets, melting the final pellets in a capped alumina crucible in argon flow at a temperature T2 = 1100-1350 ° C for up to 400 minutes and recrystallization of the melt.

NOVELTY: The invention relates to a process for the preparation of (Cu, Fe) doped $MnGe_xSb_y$ polycrystalline pellets, this material being meant for thin-film diluted magnetic semiconductor (DMS) technology, with applications in spintronics, optoelectronics, information technology.

The invention has the following advantages:

- the production process is simple and offers the advantage of producing bulk material starting from binary or ternary mixtures, depending on the desired final compositions
- allows obtaining materials with reproducible properties
- *allows the* ***production of a new material with a range of controllable compositions that extends the horizons of ferromagnetic materials*** *and which can be tested in the structures of current devices*
- requires low costs
- has high yield
- leads to applications of great interest that can significantly contribute to the state of the art in thin-film magnetic semiconductor (DMS) technology.



1. Stainless steel double wall water cooled vacuum chamber
2. Heating element
3. Support for crucible
4. Crucible of a refractory material
5. Melted / recrystallized material
6. Inert gas inlet
7. Inert gas outlet

FIG. 1 The installation scheme for the application of the process.

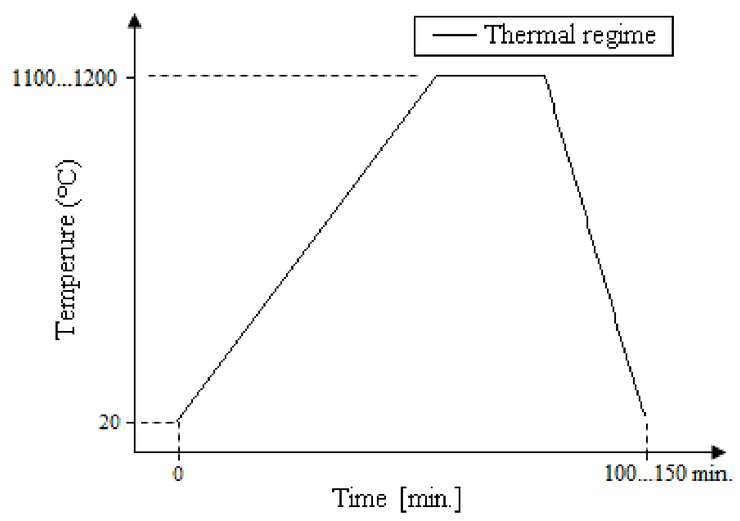


FIG. 2 The thermal regime for treating the pellets pressed by $MnGe_xSb_y$.

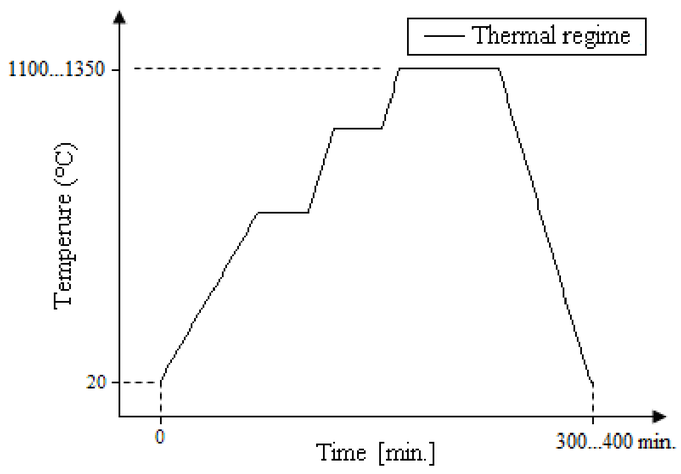


FIG. 3 The thermal regime for obtaining polyglycerol pellets of $MnGe_xSb_y$ by applying the process according to the invention.

APPLICATIONS: Sensors and magnetic memories, spin devices, optospintronics.

Contact: madalin@inoe.ro +40726.216.353

HARDCOAT

B

Multilayered coatings for protecting of cutting tools which work in server wear regimes used in woodworking tools

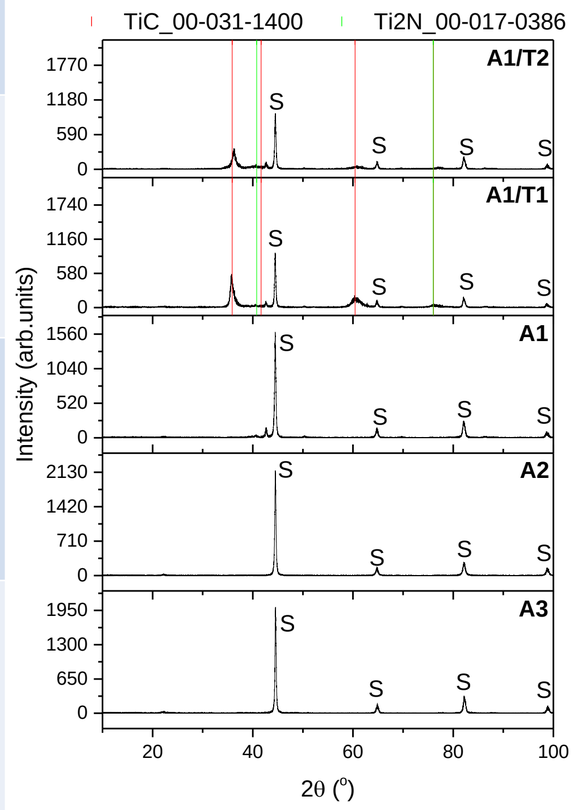
Patent application: A/00093/28,02,2023

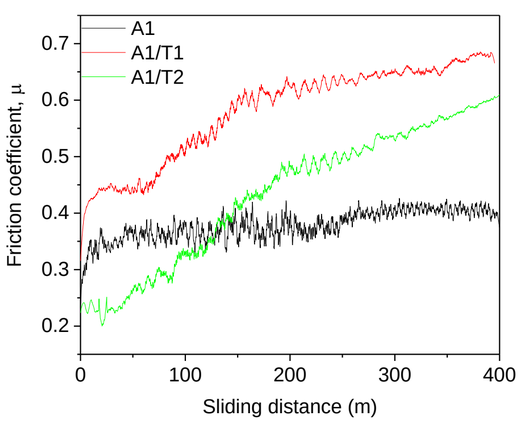
Alina Vladescu (Dragomir), Anca C. Parau, Mihaela Dinu, Lidia R.Constantin, Diana M. Vranceanu, Catalin Vitelaru

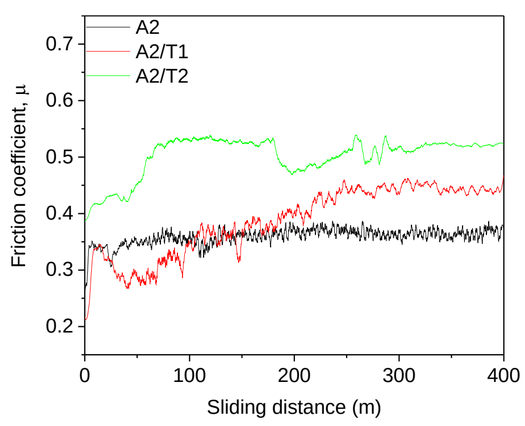
The patent application relates to a solution to obtain multilayered coatings consisting of alternate layers of metal, nitrides and binary or ternary carbonitrides of some transition metals (Ti, Cr, W, Fe), to be used as protective layers of cutting tools subjected to a severe regime abrasion, erosion and corrosion wear used in the woodworking industry. The multilayer coatings, according to the invention, are made of alternating thin individual layers, with total thicknesses between 1 and 4 µm, having high adhesion to the substrate, the critical normal forces in the "scratch test" being in the range of 24 ... 42 N, with hardness between 18 ... 55 GPa, a corrosion rate < 4 x10^{-4} mm/year, having friction coefficients in dry mode of 0.1...0.4 and in solution saline 3.5% NaCl of 0.10...0.22, and the wear rate in the dry ball-on-disc test of 0.6...2.6 × 10^{-6} $mm^3N^{-1}m^{-1}$.

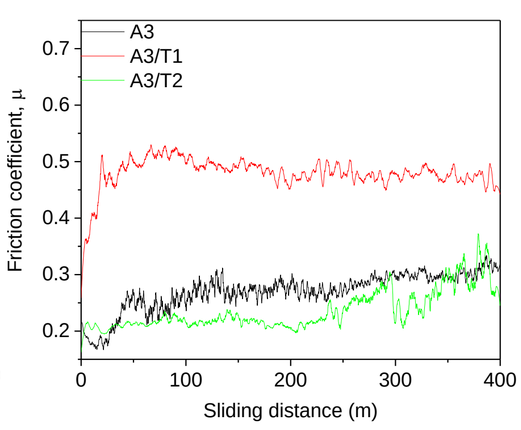
Results:

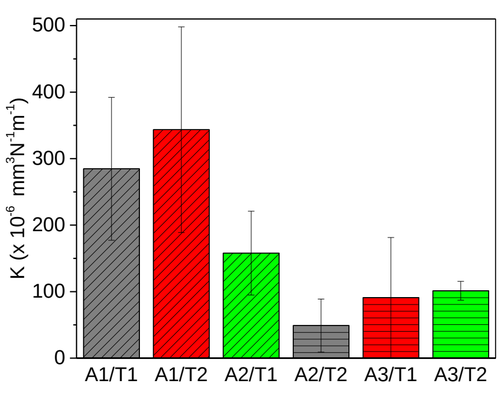
	T1	T2
Deposition condition	Ar 10sccm, C_2H_2 20sccm, N_2 80-110sccm	Ar 10sccm, C_2H_2 20sccm, N_2 110-20sccm
A1 (Alloy1)	Ti=51.71±2.35%at. Si=1.77±0.09%at. C=17.21±0.78%at. N=29.31±1.48%at.	Ti=40.69±2.16%at. Si=4.38±0.22%at. C=51.25±2.55%at. N=3.68±0.29%at.
A2 (Alloy2)	Ti=51.54±2.38%at. Si=1.69±0.09%at. C=17.48±0.80%at. N=29.29±1.50%at.	Ti=40.61±2.13%at. Si=4.38±0.22%at. C=52.25±2.55%at. N=2.76±0.22%at.
A3 (Alloy3)	Ti=50.92±2.42%at. Si=1.64±0.09%at. C=18.41±0.88%at. N=29.03±1.55%at.	Ti=40.98±2.20%at. Si=4.31±0.22%at. C=51.99±2.60%at. N=2.72±0.23%at.
Stress(MPa)	5505±16	4091±5

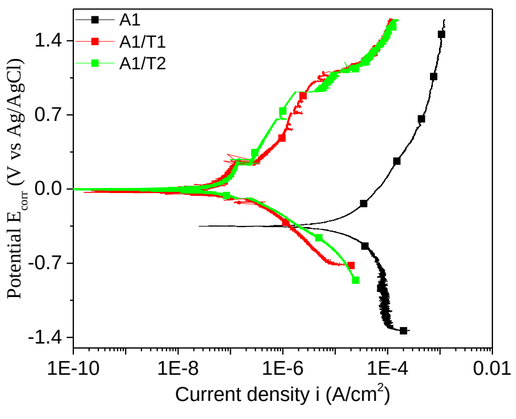


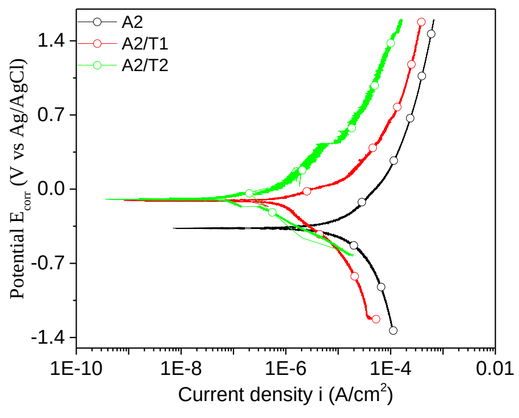


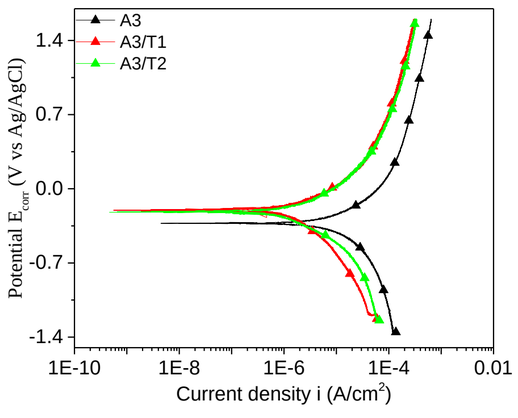


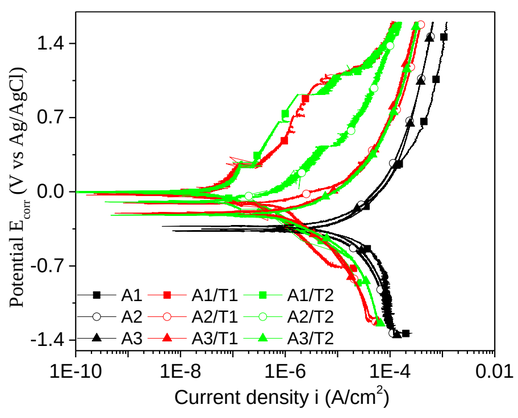












Conclusions:

- All coatings improved the wear and corrosion resistance of uncoated alloys, whatever was.
- T2 coating is better compared with T1, whatever was the substate.

Contact: alinava@inoe.ro

Acknowledgement: *This work was supported by the Romanian Ministry of Education and Research, CNCS - UEFISCDI, project number COFUND-M-ERANET-3-HardCoat-1 (311/2022) and COFUND-M-ERANET-3-HardCoat-2 (312/2022), within PNCDI III, within PNCDI III, as well as Core Program, Project no: PN11N-03-01-2023.*

New generation of Biocompatible Thin Film Metallic Glasses

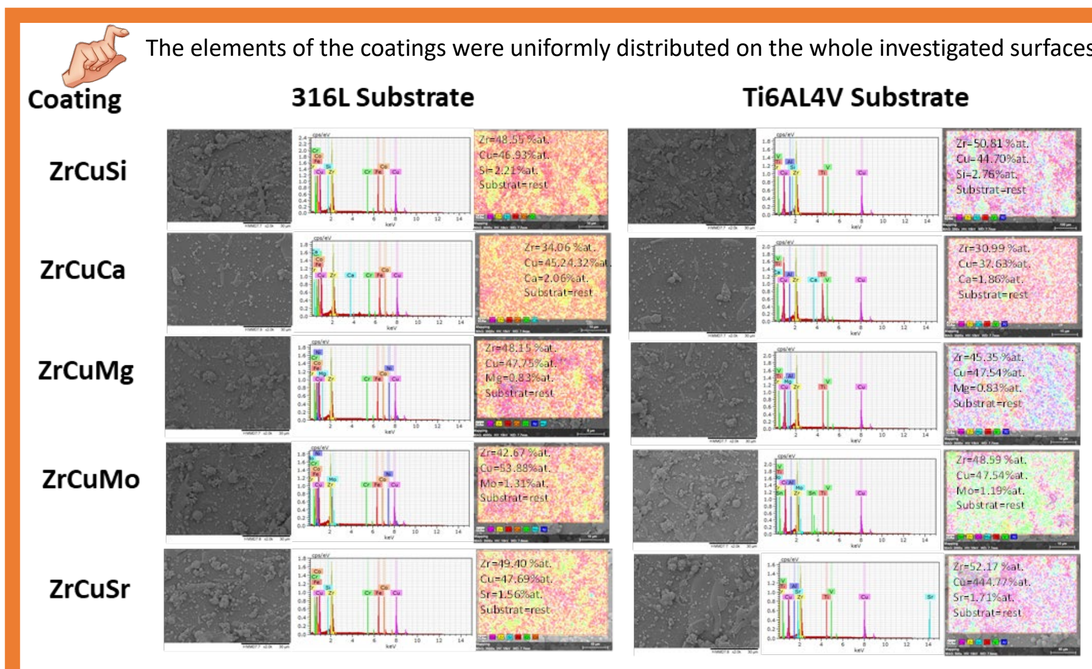
B

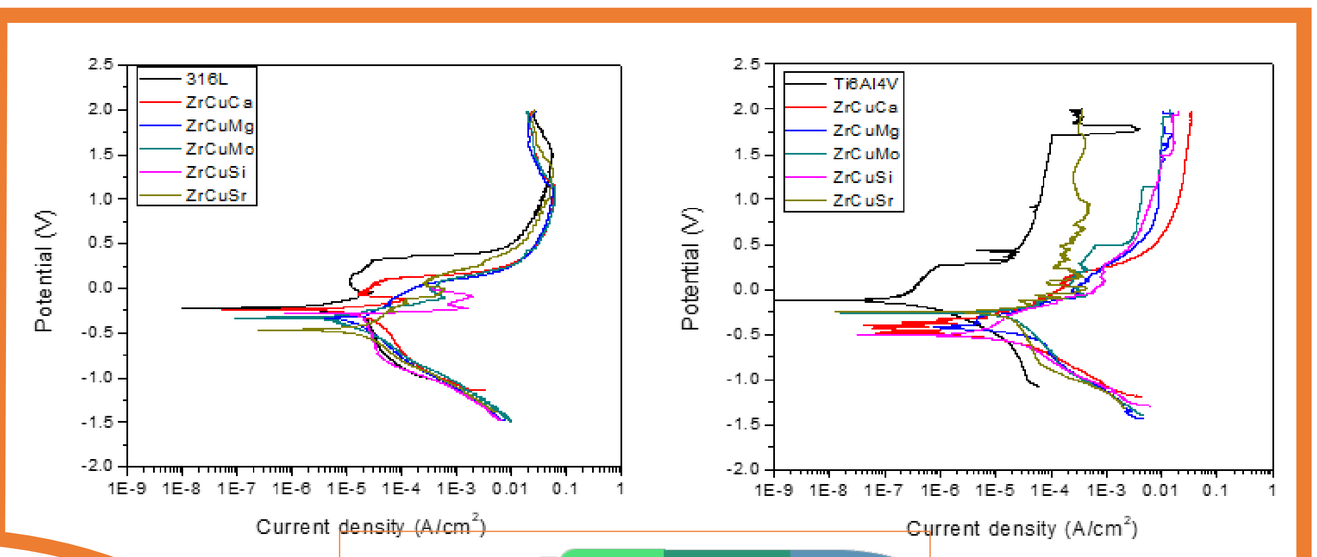
Research project: PCE 95/2021 (PN-III-P4-ID-PCE-2020-1264)

Author: Alina Vladescu (Dragomir)

The project relates to preparation of ternary biocompatible thin films metallic glasses based on ZrCu-X, where C can be one of the elements Ca, Mg, Mo, Si, Sr, by cathodic arc evaporation method used for coating of orthopaedic implants. Thin films are amorphous with 2 µm thickness, adherent to substrates and hard (10 -20GPa), with contact angle ranged from 115º to 134º. Thin films are resistant to corrosion in SBF at 37 °C, with a high protection efficiency (>58%) and good biomineralization abilities in SBF and DMEM solutions, having the adsorption of bovine serum albumin (BSA) higher than the uncoated surfaces.

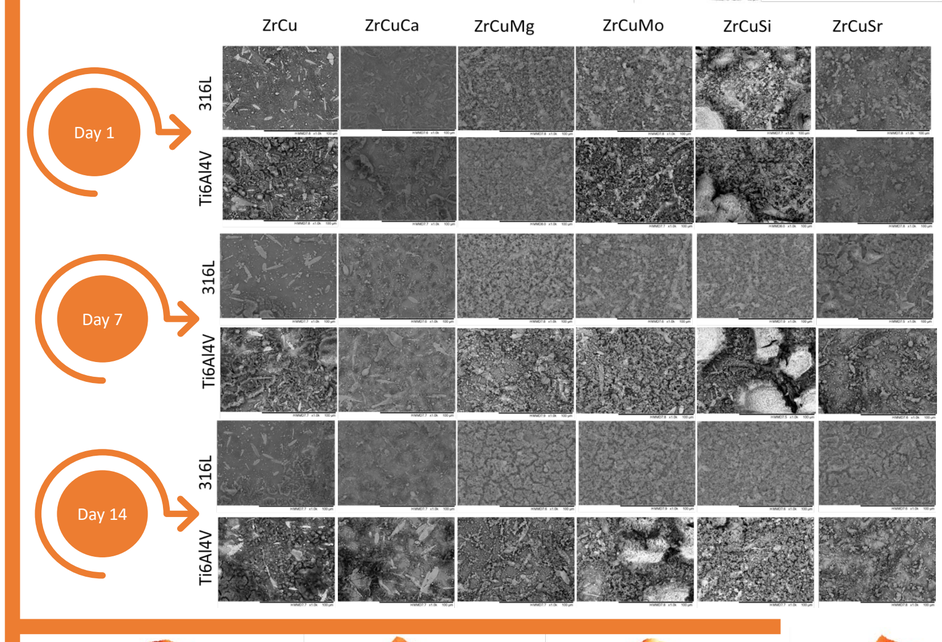
The elements of the coatings were uniformly distributed on the whole investigated surfaces.





Coating	Substrate	E_{corr} (mV)	i_{corr} (nA/cm²)	R_p (Ωx cm²)
	316L	-216	242.1	122.008
	Ti6Al4V	-119	284.465	204.82
ZrCuCa	316L	-235	36.35	3690.82
	Ti6Al4V	-468	18.304	2425.75
ZrCuMg	316L	-286	74.34	94.197
	Ti6Al4V	-476	90.042	492.24
ZrCuMo	316L	-326	7.685	5234.34
	Ti6Al4V	-264	31.523	2057.92
ZrCuSi	316L	-357	3.184	30459.6
	Ti6Al4V	-510	7.051	8982.28
ZrCuSr	316L	-462	99.642	3550.22
	Ti6Al4V	-246	10.208	3175.88

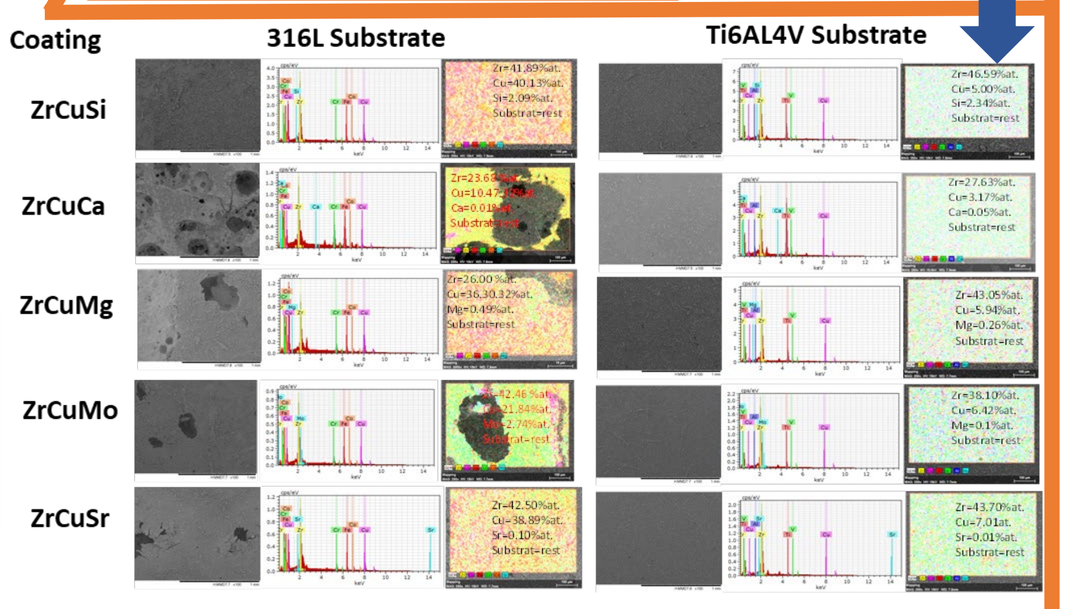
The electrochemical behavior analysis of the coatings have indicated that the coatings deposited on Ti6Al4V substrate present lower values of the corrosion current density as well as a higher polarization resistance.

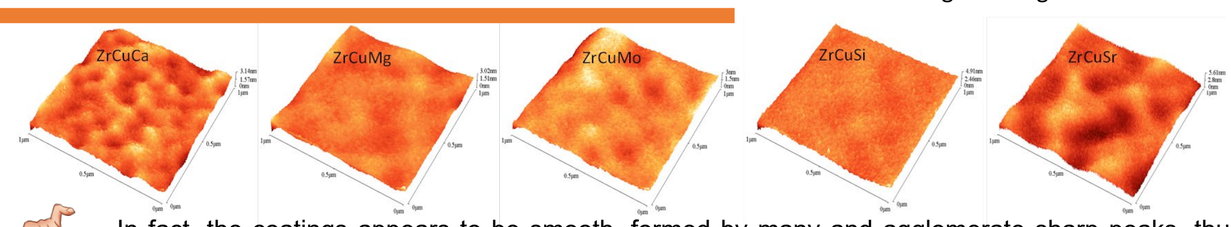


After corrosion tests

According to the SEM data, the cracks can be seen on the surface both coatings, being more evident in the case of those on 316L substrate. EDS mapping also showed that there is more amount of elements of coatings on the surface with Ti6Al4V.

All samples present newly apatite structures formed on their surfaces. For the coatings deposited on 316L, it can be observed that there are significant signs of degradation of the coating.





In fact, the coatings appears to be smooth, formed by many and agglomerate sharp peaks, thus indicating an uniform growth. The presence of air-pockets on surface of ZrCuSr confirms the rougher surface.

Conclusions

The Zr-based metallic glass coatings are uniform and they are covering the entire surface, regardless of the substrate.

The coatings deposited on Ti6Al4V substrate showed a better corrosion behaviour than those on 316L substrate.

The cracks can be seen on the surface both coatings, being more evident in the case of those on 316L substrate.

The presence of air-pockets on surface of ZrCuSr shows the rougher surface.

Acknowledgement

This work was supported by grants of the Romanian Ministry of Education and Research, CNCS - UEFISCDI, project PN-III-P4-ID-PCE-2020-1264 (PCE95/2021), within PNCDI III, and Romanian National Core Program no. no. PN 23 05 (id: PN11N-03-01-2023) and contract no. 18PFE/30.12.2021.

Contact: alinava@inoe.ro

Opportunity
CORNELIUGROUP Research-Innovation Association
Creation
Realization
INVENTCOR
Power of Creative Mind
Deva ROMANIA

4th International Exhibition InventCor
14-16.09.2023 – Deva, Romania

ICECHIM

COMPOSITE MATERIAL BASED ON GLASS IONOMER CEMENT AND PHYTOSYNTHESIZED METALLIC NANOPARTICLES WITH IMPROVED ANTIMICROBIAL PROPERTIES AND OBTAINING PROCEDURE

B

Patent application No. A00104/2023

Radu Claudiu Fierascu, Roxana Ioana Brazdis (Matei), Anda Maria Baroi, Toma Fistos, Irina Fierascu, Lia Mara Ditu

The present invention relates to a composite material with improved antimicrobial properties, without negatively affecting the physical and mechanical properties, intended for use in dental applications. The material, according to the invention, consists of aluminofluorosilicate glass with a particle size below 45 μm, a liquid component of the glass ionomer cement and a solution of metal nanoparticles phytosynthesized in plant extracts from the *Lamiaceae* family with a crystallite size below 25 nm.



ADVANTAGES OF THE INVENTION

- Obtained by known processes, without requiring high production costs
- Does not use reagents hazardous for the environment or human health for synthesis
- Has the potential to increase the life span of dental treatments, through the presence of superior antimicrobial effect.
- Addition of metallic nanoparticles with an antimicrobial effect does not negatively affect the physical/ mechanical properties of the glass ionomer cement
- Has superior antimicrobial properties
- Reproducible – considering the physical-structural properties

ACKNOWLEDGEMENTS

This work was supported by the Ministry of Research, Innovation and Digitization, CCCDI—UEFISCDI, project number PN-III-P4-PCE-2021-0292, within PNCDI III. The support provided by the Ministry of Research, Innovation and Digitization through Program 1—Development of the national research and development system, Subprogram 1.2—Institutional performance—Projects to finance excellence in RDI, Contract no. 15PFE/2021 is also gratefully acknowledged

CONTACT:

PhD Habil Radu Claudiu Fierascu

fierascu.radu@icechim.ro

4th International Exhibition
InventCor
14-16.09.2023 – Deva, Romania

COMPOSITE MATERIAL FOR DENTAL RESTORATION WITH STRENGTH TO IMPROVED COMPRESSION AND ANTIMICROBIAL PROPERTIES AND METHOD OF PRODUCING IT

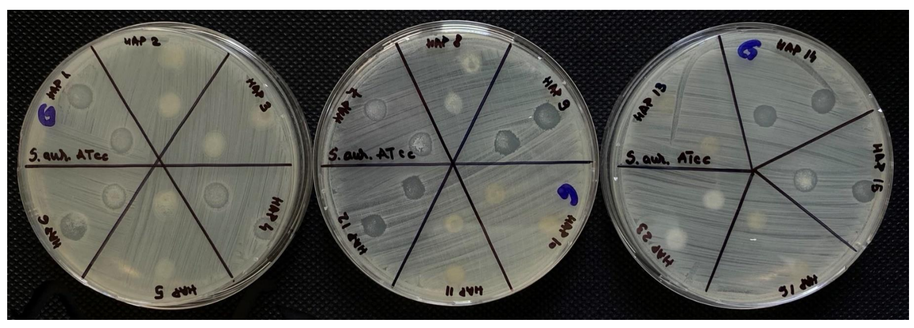
B

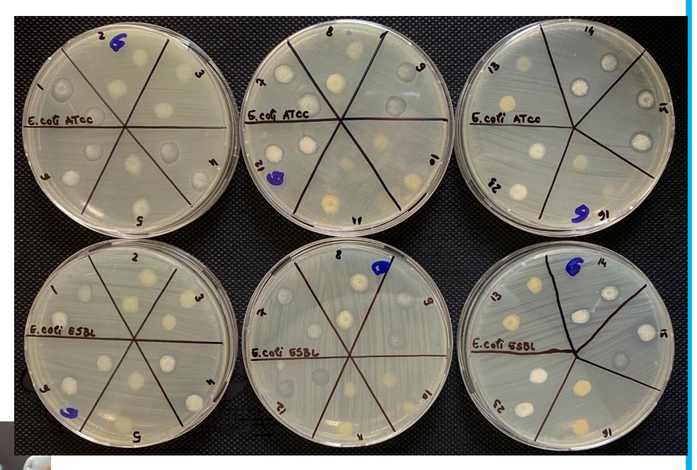
Patent application No. A0425/2023

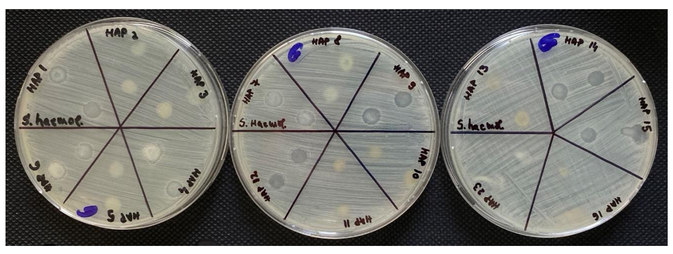
Radu Claudiu Fierascu, Roxana Ioana Brazdis (Matei), Anda Maria Baroi, Toma Fistos, Irina Fierascu, Irina Elena Chican, Lia Mara Ditu

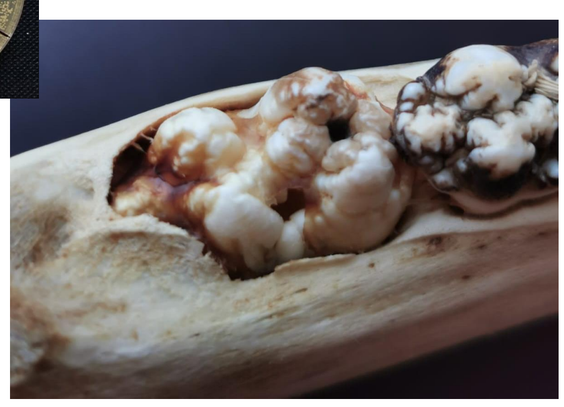
The present invention refers to a composite material with improved mechanical properties and antimicrobial effect, intended for use in dental applications, consisting of aluminofluorosilicate glass with a particle size below 45 μm, the liquid component of the glass ionomer cement and an antimicrobial component with a role in improving the properties mechanical, consisting of apatite material (of the hydroxyapatite type - Ca10(PO4)6(OH)2 in which the calcium:magnesium ratio is 10:0..1:1) decorated with silver nanoparticles having a crystallite size below 15 nm, phytosynthesized using extracts of plants from the Lamiaceae family, such as hyssop (Hyssopus officinalis L.), white horehound (*Marrubium vulgare* L.), oregano (*Origanum vulgare* L.) or white dead nettle (*Lamium album* L.) and phenolic compound (eugenol) in concentration 7..14% in alcoholic solution, the procedure for obtaining the composite material consisting of five stages, obtaining the apatite material (in which calcium may or may not be partially substituted with magnesium) by the sol-gel method, the phytosynthesis of silver nanoparticles, the decoration the apatite material with metallic nanoparticles and the phenolic compound (eugenol) followed by mixing with the aluminofluorosilicate glass until complete homogenization, and in the fifth stage the liquid component of the glass ionomer cement is added.



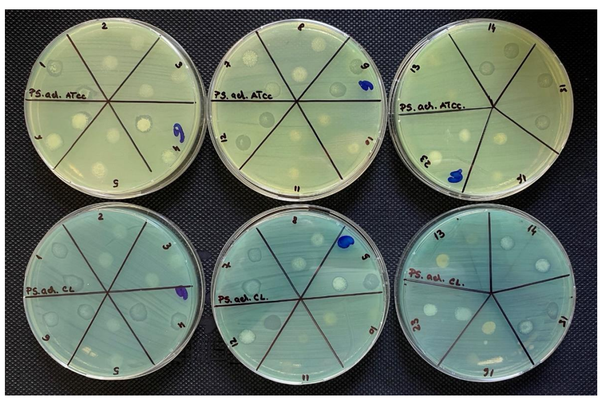












ADVANTAGES OF THE INVENTION

- Addition of metallic nanoparticles with an antimicrobial effect does not negatively affect the physical/ mechanical properties of the glass ionomer cement
- Has superior strength to improved compression
- Has superior antimicrobial properties
- Has the potential to increase the life span of dental treatments, through the presence of superior antimicrobial effect.

ACKNOWLEDGEMENTS
This work was supported by the Ministry of Research, Innovation and Digitization, CCCDI—UEFISCDI, project number PN-III-P4-PCE-2021-0292, within PNCDI III. The support provided by the Ministry of Research, Innovation and Digitization through Program 1—Development of the national research and development system, Subprogram 1.2—Institutional performance—Projects to finance excellence in RDI, Contract no. 15PFE/2021 is also gratefully acknowledged

CONTACT:
Dr. Habil. Radu Claudiu Fierascu
fierascu.radu@icechim.ro

Opportunity
CORNELIUGROUP Research-Innovation Association
Creation
Realization
INVENTCOR
Power of Creative Mind
Deva ROMANIA

4th International Exhibition InventCor 14-16.09.2023 – Deva, Romania

ICECHIM

Processes for preparing peroxynitrite electrosensitive depositions and methods of selective detection

Patent number: A00445/2023

B

Author: Ioana Silvia Hosu

Peroxynitrite is one of the most powerful anionic oxidants, that is associated to diseases such as Alzheimer, arthrosis, cancer etc. Selective, rapid, sensitive and direct methods for the detection of peroxynitrite are still scarce.

The present invention refers to **processes of preparing different peroxynitrite electrosensitive depositions** through electro-polymerization (**Fig.1**) and/or drop-casting, using metal phthalocyanines/tetra-amino phthalocyanines (with different transitional metals coordinated to pyrrole groups, metals such as Mn, Co, Zn, Fe or metal-free), as well as to the **methods for selective determination using these peroxynitrite electrosensitive depositions**.

The claimed selective peroxynitrite determination methods consists of different electrochemical techniques using the following steps: stabilization of the probe at pH 9, inserting the electrodeposited/drop-casted sensors into the analized probe (that may also include interfering species, beside peroxynitrite, **Fig. 2 and 3**) and quantification of peroxynitrite using the calibration curves from **Fig. 5 and 7**, depending on the nature and concentrations of peroxynitrite, using methods from **Fig. 4 and 6**. This work was supported by a grant of the Ministry of Research, Innovation and Digitization, CNCS - UEFISCDI, project number PN-III-P1-1.1-PD-2021-0798, within PNCDI III, contract number PD116/2022. It is also acknowledged the support of Ministry of Research, Innovation and Digitization through Program 1 - Development of the national research-development system, Subprogram 1.2-Institutional performance-Projects to finance excellence in RDI, Contract no. 15PFE/2021.

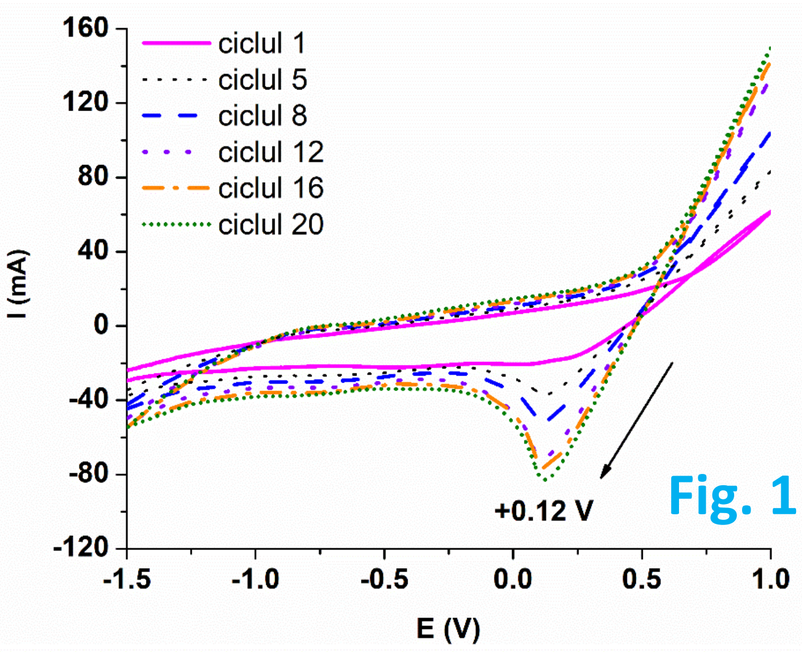


Fig. 1

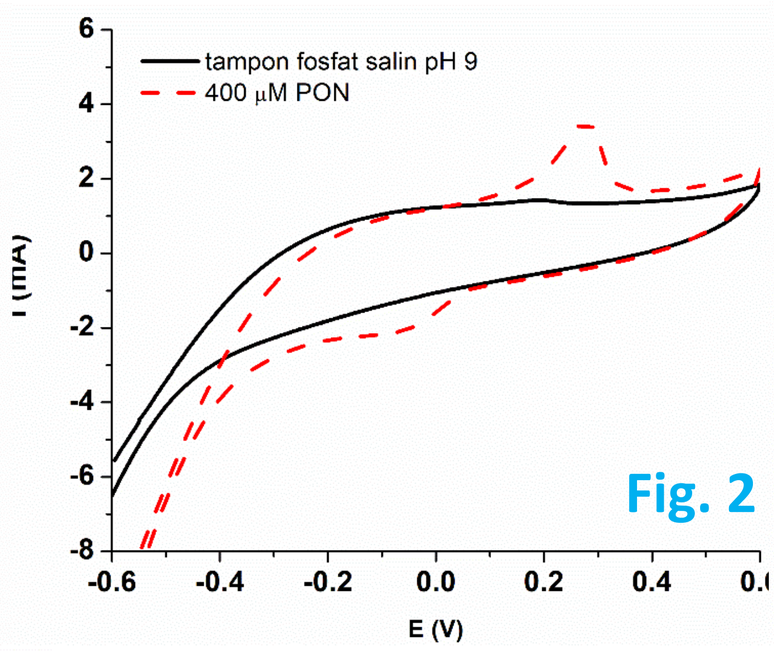


Fig. 2

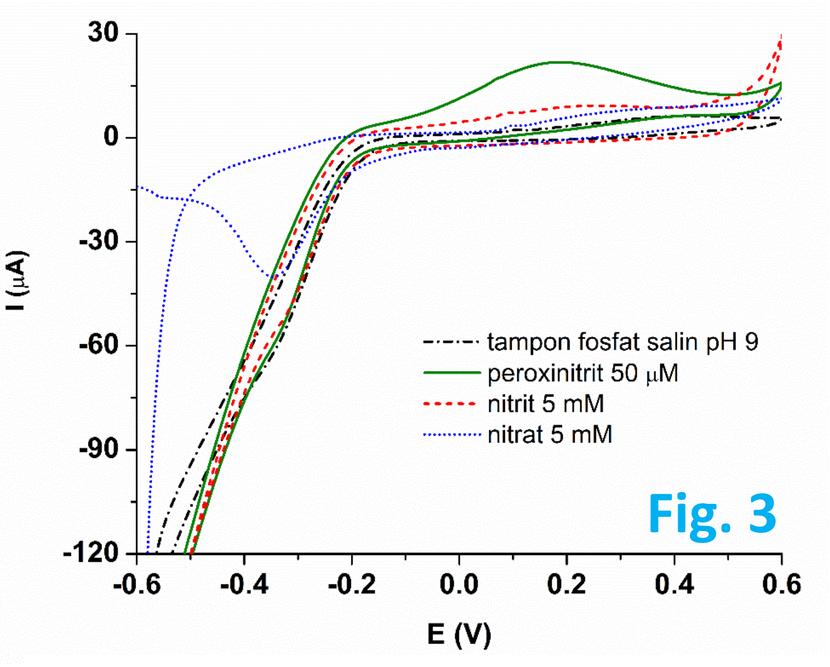


Fig. 3

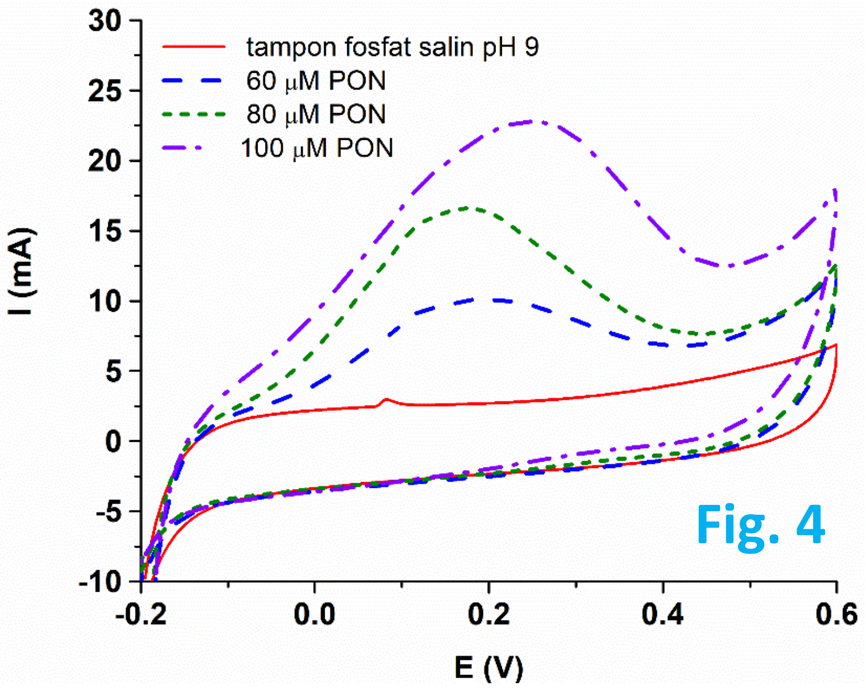


Fig. 4

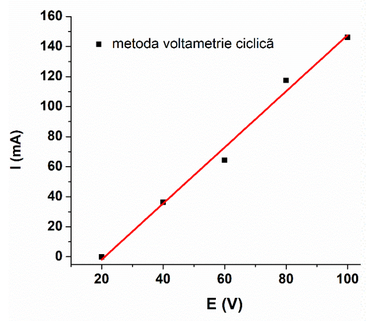


Fig. 5

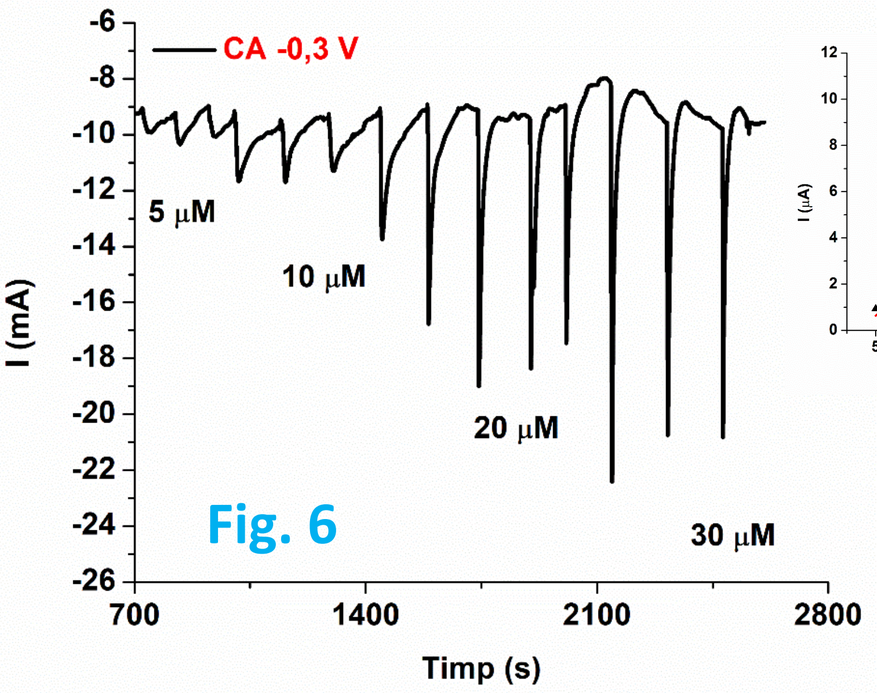


Fig. 6

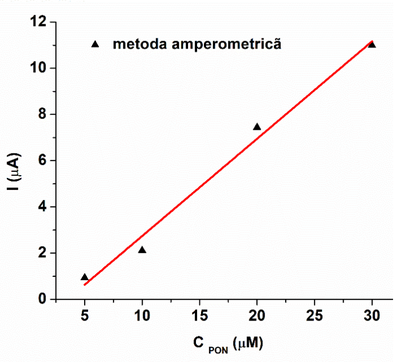


Fig. 7

$I_{CV} = 1.893\ (mA) \cdot C_{PON}\ (\mu M) - 0.041$

$I_{CA} = 0.4211\ (\mu A) \cdot C_{PON}(\mu M) - 1.469$

Contact: ioana.hosu@icechim.ro

4th International Exhibition InventCor
14-16.09.2023 – Deva, Romania

Process for functionalization of natural cellulosic fibers with antimicrobial compositions with selenium nanoparticles

B

Patent application No. A2022-00645/18.10.2022

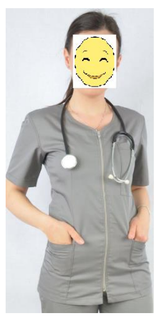
Authors: Florentina Monica Raduly, Valentin Rădiţoiu, Alina Rădiţoiu, Violeta Purcar, Andreea-Mălina Bivolaru, Iuliana Răut, Mariana Constantin

The invention refers to a process for functionalization of natural cellulosic fabrics with eco-friendly compositions having antimicrobial activity, consisting of subjecting natural textile materials to printing with a composition containing a polymeric binder of natural origin, an organic-inorganic hybrid made of - a natural extract of phytocomponents from plants of the *Ginger family* and selenium nanoparticles generated in situ, which can be used as antimicrobial textiles for common clothing or in the medical field.

The printed textile fabrics have a high antimicrobial activity as a result of the synergistic effect due to the simultaneous use of polymer binders of natural origin, organic-inorganic hybrids from natural extracts of phytocomponents obtained from plants of the *Ginger family* and selenium nanoparticles generated in situ.

ADVANTAGES

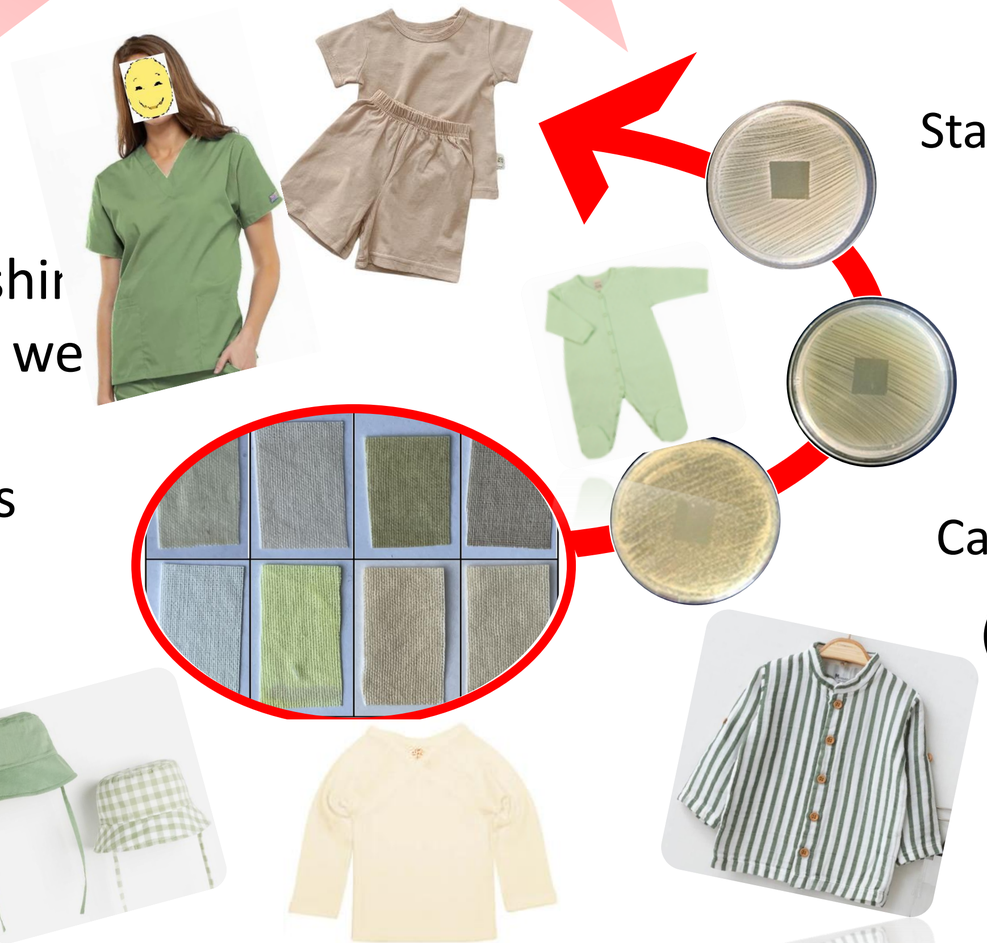
The printed fabrics are friendly to the human body, thanks to the natural materials used, and can be applied in the medical field and for clothing aimed at children and people with sensitive skin.



Antimicrobial textile materials are obtained using only natural, ecological materials, thus reducing the effect of pollution on the environment both in the production, use and recycling process, thus being sustainable.

- **PROBLEM SOLVED**

The technical problem, which the invention solves, consists of establishir the components and their ratios, as we as the association with the process stages and working conditions, so as to obtain by printing colored textile materials with antimicrobial properties.



Staphylococcus aureus (ATCC 25923)

Escherichia coli (ATCC 25922)

Candida albicans (ATCC 10231)

- This work was supported by a grant of the Ministry of Research, Innovation and Digitization, CCCDI - UEFISCDI, project number PN-III-P2-2.1-PED-2019-1471, within PNCDI III. It is also acknowledged the support of Ministry of Research, Innovation and Digitization through Program 1 - Development of the national research-development system, Subprogram 1.2-Institutional performance- Projects to finance excellence in RDI, Contract no. 15PFE/2021.

Contact: monica.raduly@icechim.ro

4th International Exhibition
InventCor
14-16.09.2023 – Deva, Romania

PROCEDURE FOR OBTAINING HOLOGRAPHIC MARKS USING EMBOSSING SUBSTRATE FROM BIOPOLYESTERS THAT CAN BE RECYCLED AND REUSED FOR THE SAME PURPOSE

B

Patent application No. A00271/2023

Denis Mihaela Panaitescu[1], Adriana Nicoleta Frone[1], Gabriela Madalina Oprica[1], Cristian Andi Nicolae[1], Augusta Raluca Gabor[1], Valentin Raditoiu[1], Dorian Radu[1], George Bostan[2], Melu Vlad[2], Mona Mihailescu[3]

[1] National Institute for Research & Development in Chemistry and Petrochemistry – ICECHIM, Romania
[2] OPTOELECTRONICA - 2001 S.A, Romania
[3] Politehnica University of Bucharest, Romania

The Patent Application A00271/29.05.2023 refers to an environmentally friendly process for manufacturing holographic marks using a biopolymer substrate for embossing a nanostructure in the form of an optical diffraction grating, for transferring it to various metal or polymer supports. The obtained holographic marks are useful for verifying authenticity and for securing against forgeries.

NOVELTY

The novelty brought by this patent consists in obtaining holographic marks with a high level of security through a process that uses recyclable and biodegradable biopolymers as embossing substrate. The biopolymeric substrate can be recycled of a minimum of six times using environmentally friendly melt processing processes and can be composted as a biodegradable and environmentally friendly material

ADVANTAGES

- Replacing in the process of fabrication of holographic marks non-biodegradable synthetic polymers with biodegradable biopolymers that can be recycled and allow composting;
- Recycling the biopolymer substrates a large number of times (verified up to 6 times) using environmentally friendly melt processing processes;
- The biopolyester used as a substrate is obtained from renewable resources through chemical or microbial synthesis;
- The new process allow reducing the carbon emissions and avoiding the formation of microplastics, thus contributing to the environment protection.

CONTACT: Panaitescu Denis Mihaela
Email: panaitescu@icechim.ro

Holographic mark obtained using a biopolyester substrate



ACKNOWLEDGEMENTS

This work was supported by a grant of the Ministry of Research, Innovation and Digitization, UEFISCDI, project number PN-III-P2-2.1-PTE-2021-0339 (HOLTERM), within PNCDI III. It is also acknowledged the support of Ministry of Research, Innovation and Digitization through Program 1 - Development of the national research-development system, Subprogram 1.2-Institutional performance- Projects to finance excellence in RDI, Contract no. 15PFE/2021.

Vanado-boron-phosphate glasses with electrical properties and process for obtaining them

B

Patent: A00484/ 2023

Authors: Ana Violeta Filip, Bogdan Alexandru Sava, Mihai Eftimie, Valentin Craciun

The invention relates to the production of vanado-boron-phosphate glasses, which have increased chemical homogeneity due to the method of manufacturing under conditions of improved mechanical, thermal, and chemical stability as well as electrical conduction properties beyond the range of insulators at room temperature and to the process for their production. The vanado-boro-phosphate glasses, according to the invention, contain only three vitreous network formers: 40 - 65 molar % V_2O_5, 30 molar % P_2O_5, and 5 - 30 molar % B_2O_3, and the method of obtaining these glasses, the wet melt-quenching technique is characterized in that the raw material mixture is prepared wet, followed by the stages of pre-melting, melting, refining, conditioning, molding, shaping, annealing and processing of the obtained glass for analysis.

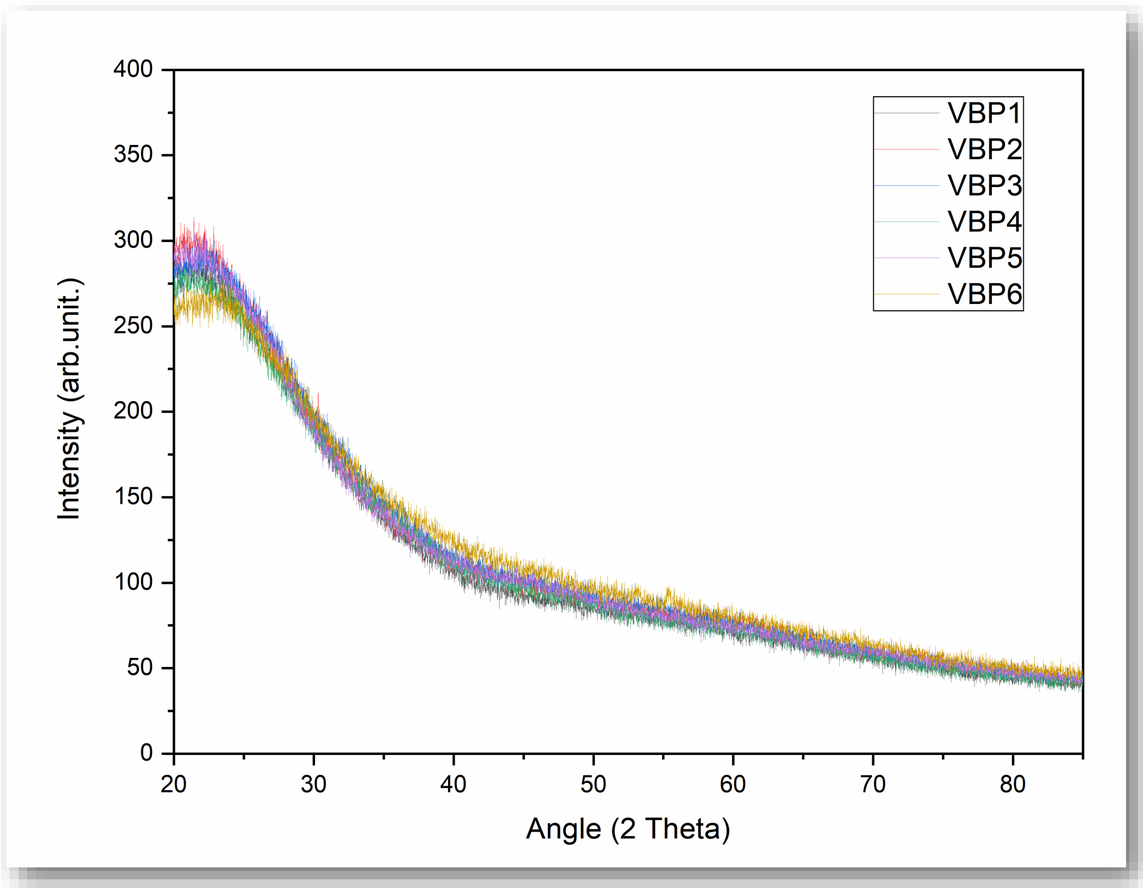


Figure 1. XRD diffractograms for vanado-boro-phosphate glasses.

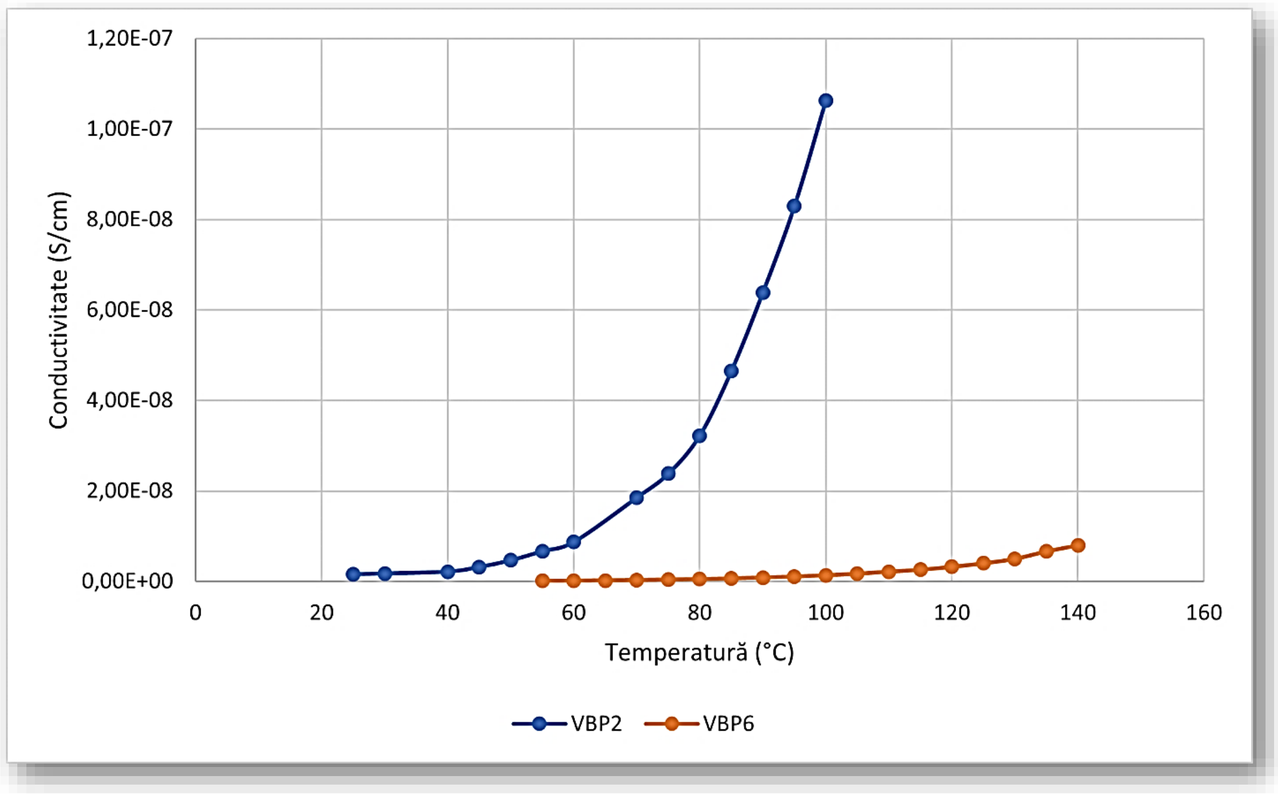


Figure 2. Electrical conductivity of VBP2 and VBP6 vanado-boro-phosphate glass as a function of temperature.

The invention can be industrially applied to the production of temperature sensor glasses, the product according to the invention being prepared with low energy consumption and low price from raw materials which are non-toxic and have improved mechanical, thermal, and chemical resistance compared to classical phosphate glasses, exhibiting a maximum transmission in the infrared range between 2 and 2.9 microns, as well as conductivity above 10^{-8} S/cm at room temperature.

Contact: ana_filip@ymail.com +40728062160

NATIONAL INSTITUTE FOR LASER, PLASMA AND RADIATION PHYSICS

SR EN ISO 9001:2015
SR EN ISO 14001:2015
SR ISO 45001:2018
SR EN ISO/IEC 27001:2018
SR 13572:2016

Laser Transfer of Graphene Sheets for the Fabrication of Sensors: Process Optimization via Time-Resolved Imaging

Research project

PN-III-P1-1.1-TE-2019-1093 / TE 116

B

Author/s: Alexandra Palla-Papavlu, Mihaela Filipescu, Cristian Viespe, Anca Bonciu

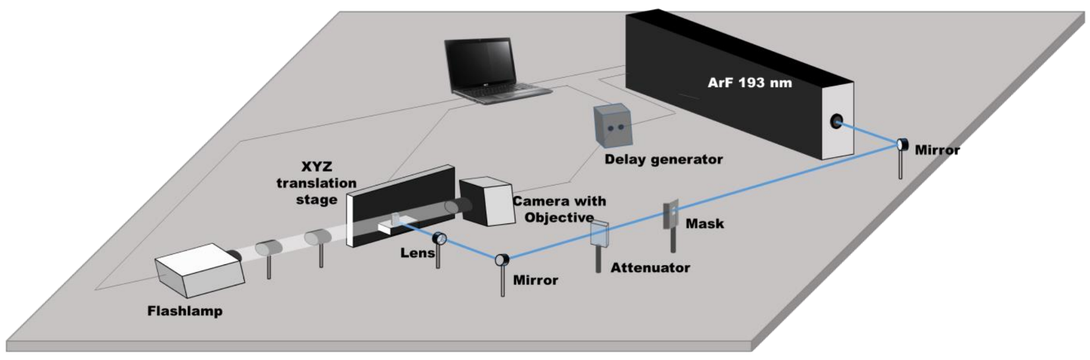
Description: In recent years there has been a growing interest for two-dimensional nanomaterials such as graphene, for applications in the electronic and optoelectronic industries. Graphene has many advantages; however, its main disadvantage for application in devices remains the need to use special growth / synthesis and handling conditions.

In the field of sensors, most of the research work is focused on reducing the size of the sensors and identifying and quantifying several species. Also, fast response, minimum hardware requirement, good reversibility, sensitivity and selectivity are also qualities of an excellent sensor. The main problem related to the new generation of miniaturized sensors is the complexity of the manufacturing processes, i.e., the integration of many functions on the same device through a single manufacturing process.

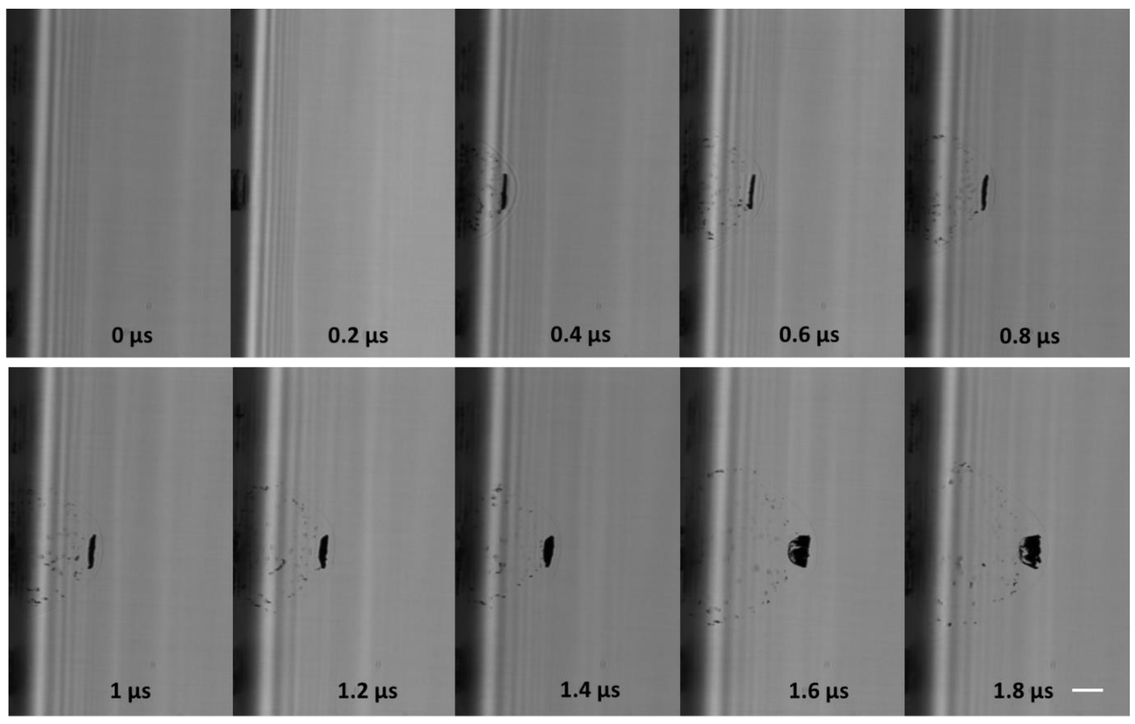
Thus, the “Laser transfer of graphene sheets for the fabrication of sensors: process optimization via time-resolved imaging” project has as main objective the optimization of the laser induced forward transfer process (LIFT) by imaging techniques (shadowgraphy) that allows the deposition of two-dimensional atomic layers of graphene with high spatial resolution for the subsequent realization of sensors.

Pictures & graphics

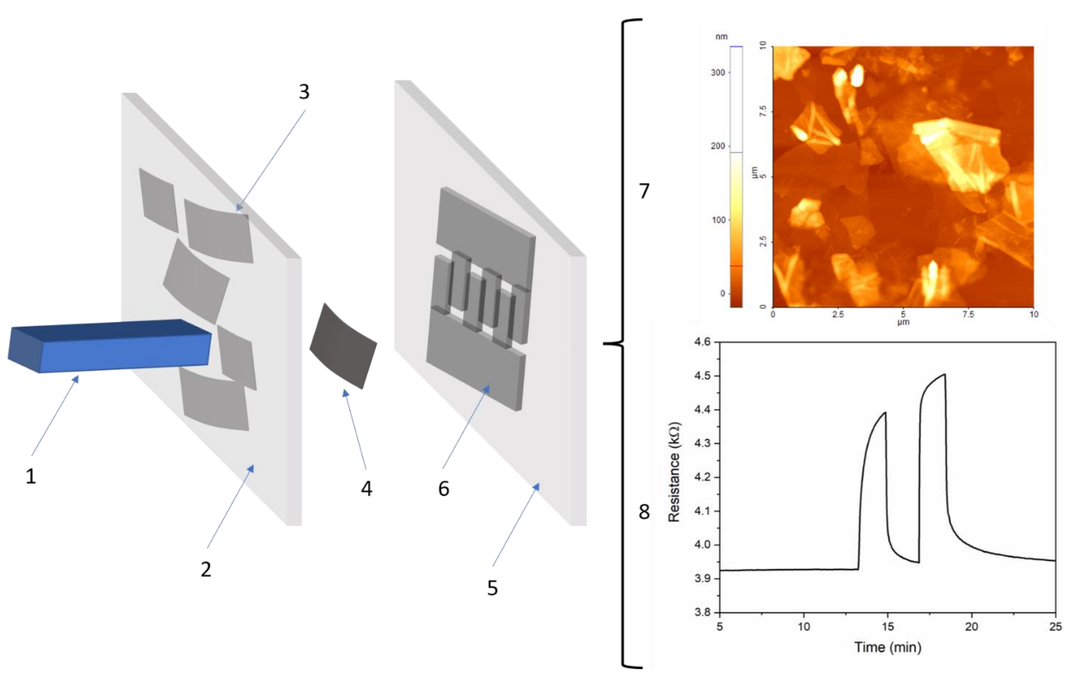
Scheme of the experimental setup



Pictures taken at different time intervals after the laser pulse



Sensor fabrication



1 – ArF laser beam, 193 nm, 20 ns pulse duration, 1 Hz repetition rate
2 – Donor substate, quartz plate
3 – Donor film, graphene sheets
4 – Grapene Flyer
5 – Receiver substrate, glass
6 – Pre-patterned interdigitated metal electrodes
7 – Atomic force microscopy image of graphene sheets transferred by laser-induced forward transfer
8 – real time sensor measurements to 20 and 30 ppm of NH_3

Contact: Alexandra.papavlu@inflpr.ro or alexandrapalla@yahoo.co.uk

INSTITUTUL NAȚIONAL DE CERCETARE-DEZVOLTARE
PENTRU FIZICA LASERILOR, PLASMEI ȘI RADIAȚIEI

SR EN ISO 9001:2015
SR EN ISO 14001:2015
SR ISO 45001:2018
SR EN ISO/IEC 27001:2018
SR 13572:2016

Tungsten oxide/polymer composites for sensor applications

CO-POLYSENS

Research project

B

Authors: Mihaela Filipescu, Adrian Bercea, Alexandra Palla Papavlu

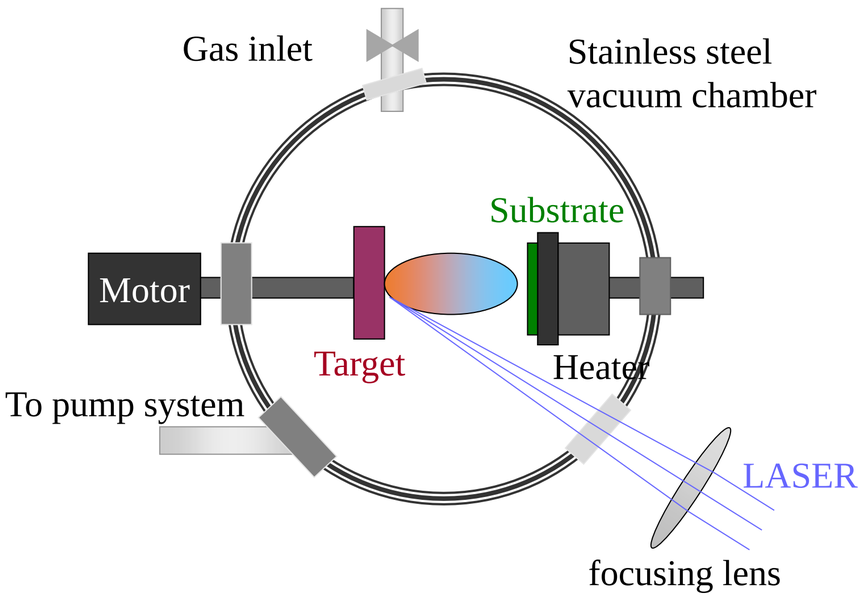
Permanent, rigorous and efficient monitoring of the environmental pollution involves the use of efficient devices, namely highly sensitive and reproducible sensors that work at room temperature.

The most important part of such a sensor is the **active membrane** that detects pollutants, based on chemical or physical phenomena. In the case of chemoresistive sensors, the use of new composite materials obtained by mixing organic and inorganic compounds appears to be a promising alternative. Materials used in this project are: **WO_3 and polypyrrole (Ppy)**.

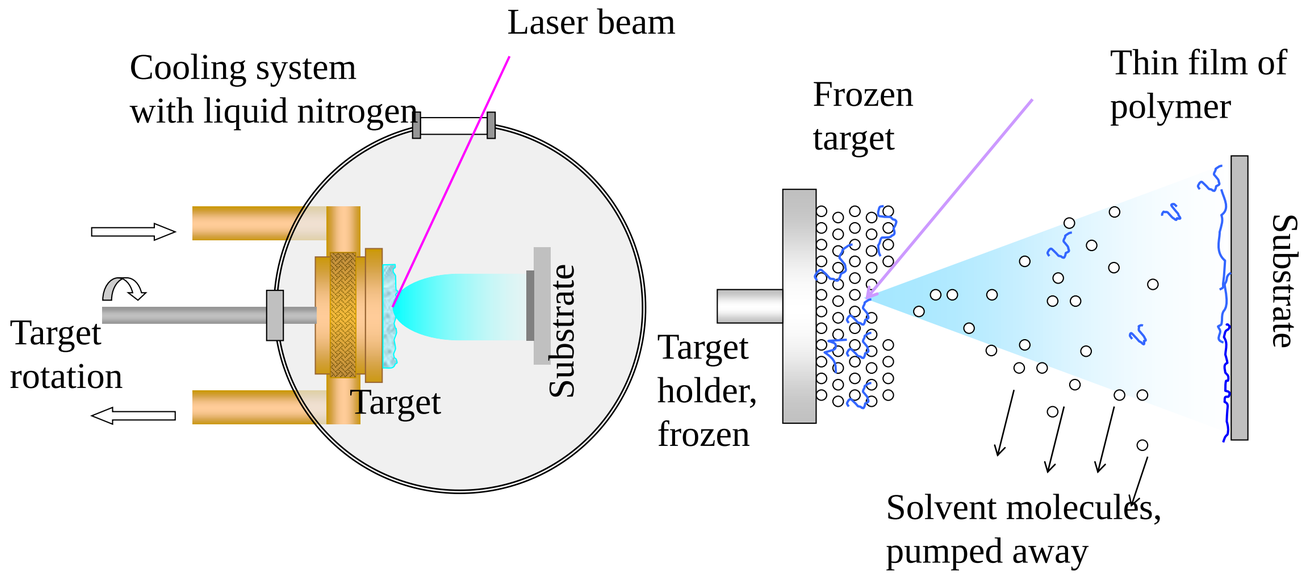
The objectives of this project are related to the development of WO_3/PPy nanostructures (as active membranes for sensors) using laser processing methods (pulsed laser deposition - PLD and matrix assisted pulse laser evaporation - MAPLE) and the membrane's integration in a sensor device in a single-step process using a mask during the composite layer deposition.

It is expected to obtain composite thin layers with: specific morphology (nano-pores or gains with regular sizes, or filaments embedding nano-grains or nano-pores), high conductivity and low working temperatures that will lead to an increased sensitivity of sensors (laboratory device).

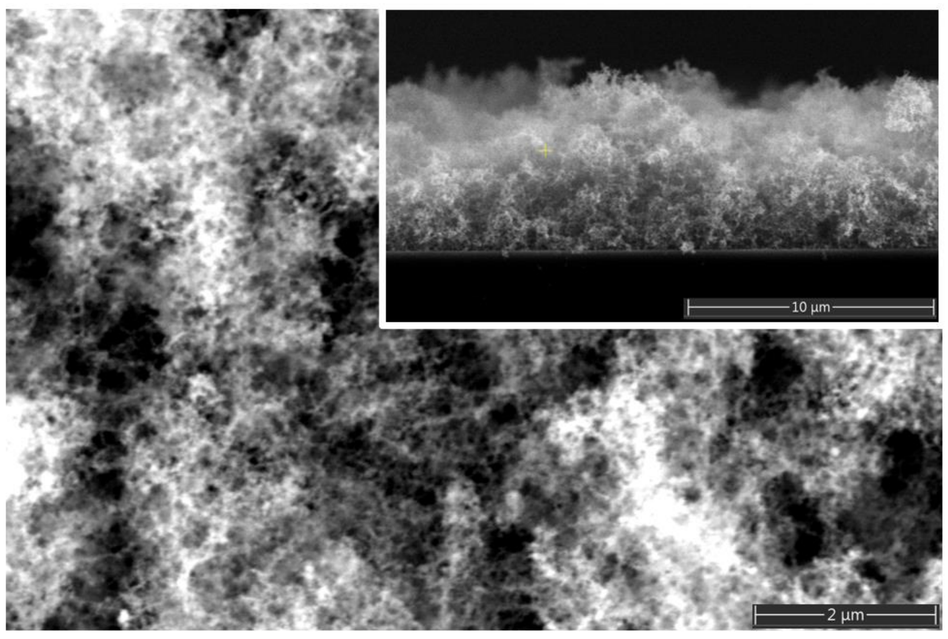
➢ PLD system for fabrication of WO_3 layers



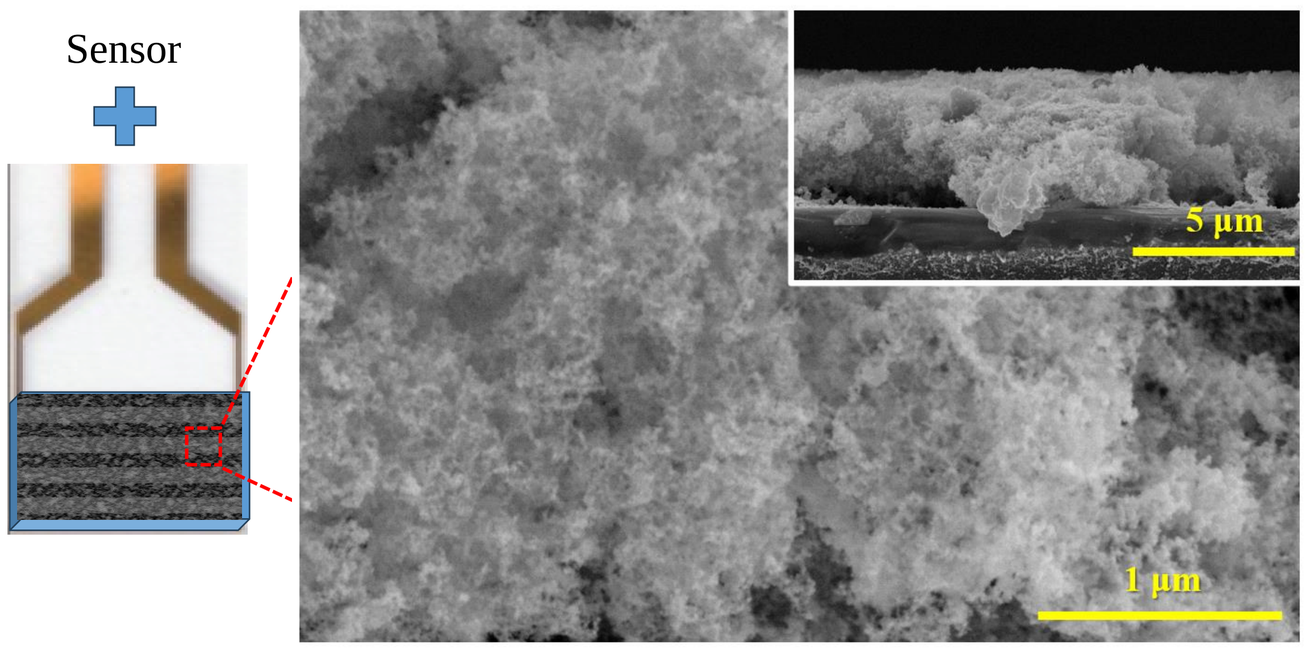
➢ MAPLE system for fabrication of WO_3-Ppy layers



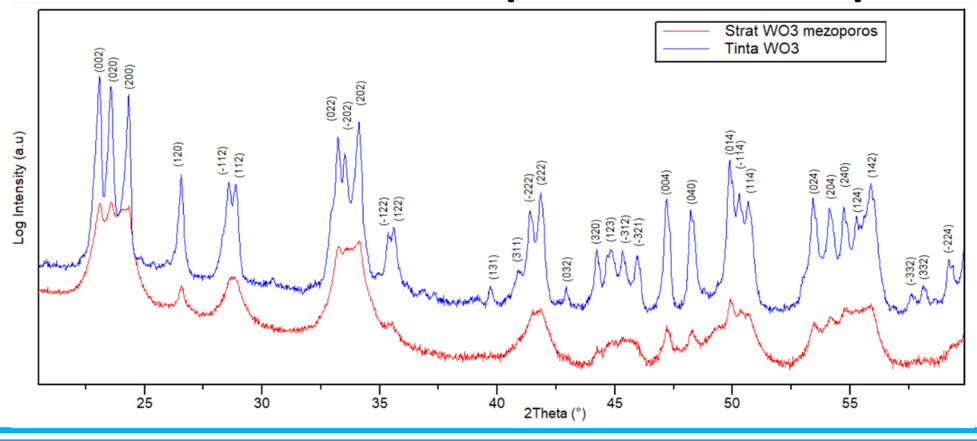
➢ SEM images of WO_3 porous layer obtained by PLD



➢ SEM images of a sensor (left) with WO_3-PPy porous layer (right) obtained by MAPLE



➢ XRD spectra of WO_3 target and WO_3 layer: monoclinic structure (JCPDS-43-1035)



Conclusions:

- ✓ Successful development of WO_3-Ppy composites through a coupling of PLD and MAPLE techniques.
- ✓ WO_3-Ppy composite is implemented in the sensor fabrication and can be used to detect ammonia at room temperature.

Contact: mihaela.filipescu@inflpr.ro

Phosphate-tellurite vitreous materials with magnetic and magneto-optical properties, for Faraday rotators and the process for obtaining them

B

Patent: A/00752/19.11.2020

Authors: Mihail Elisa, Stefan Marian Iordache, Bogdan Alexandru Sava, Lucica Boroica, Victor Kuncser, Aurelian Catalin Galca

Aluminum-phosphate-tellurite glasses containing lithium oxide and titanium dioxide and, respectively, zinc oxide, used as Faraday rotators were prepared by using as raw materials oxides and salts. The unconventional obtaining method used ensures a high chemical and optical homogeneity of the obtained materials and lower melting and annealing temperatures as compared to the conventional glass. Optical transmission was higher than 88%.

Unconventional wet method of reactant processing followed by melting (1100 °C-1225 °C, mechanical homogenization, refining, shaping by pouring the melt into pure spectral graphite mold, preheated, annealing (removal of residual stresses, 390 °C – 420 °C) and optical processing.

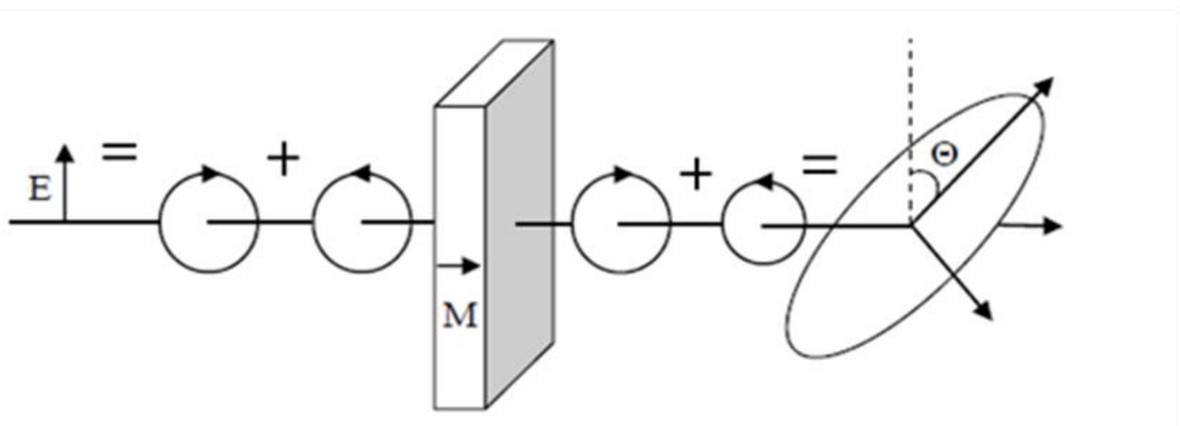
Te-1: $35ZnO\text{-}10Al_2O_3\text{-}40P_2O_5\text{-}15TeO_2$

Te-2: $30Li_2O\text{-}10Al_2O_3\text{-}5TiO_2\text{-}45P_2O_5\text{-}10TeO_2$

Te-3: $25Li_2O\text{-}10Al_2O_3\text{-}5TiO_2\text{-}45P_2O_5\text{-}15TeO_2$

Property/Glass	Te-1	Te-2	Te-3
Low annealing temperature, T_{IR}	394	394	393
Glass transition temperature, Tg	429	427	426
High annealing temperature, T_{SR}	440	436	436
Softening temperature, T_D	453	446	450
Thermal expansion coefficient, $\propto_{20}^{300}$ x10^{-6} (K^{-1})	7.68	11.95	11.19

Faraday magneto- optical effect



Glass/ Property	Diamagnetic susceptibility, χ (cm^3/g), at 300 K	Faraday rotation angle, θ_F (°), at 633 nm	Verdet constant, V (min/Oe/cm), at 633 nm
Te-1	-64(2) ·10^{-8}	0.134°	0.019
Te-2	-180·10^{-8}	0.098 °	0.015
Te-3	-370·10^{-8}	0.127 °	0.019

Contact: savabogdanalexandru@yahoo.com +40728062160

Borosilicate glasses doped with gadolinium oxide and/or dysprosium oxide for neutron guides and process for obtaining them

B

Patent: A/00797/21.12.2021

Authors: Bogdan Alexandru Sava, Marius-Catalin Dinca, Bogdan Ionut Bita, Lucica Boroica, Aurelian Catalin Galca

The invention relates to a novel product, boron-silicate glasses doped with gadolinium oxide and/or dysprosium oxide for neutron guides and a process for obtaining them.

The doped boron-silicate glass contain: glassy formers: 50… 80% molar boron oxide - B_2O_3; 10… 30% molar silicon dioxide - SiO_2; glassy modifiers: potassium oxide - K_2O, in a proportion of 0… 20% molar; sodium oxide - Na_2O, in a proportion of 0… 20% molar; chemical, thermal and mechanical stabilizers: aluminum oxide - Al_2O_3, 2… 10% molar; zinc oxide - ZnO, 0… 10% molar; magnesium oxide, MgO, 0… 10% molar; together with oxides which induce the properties of neutron transport and radiation resistance, in percentages of 0… 15% molar, of the following rare earth oxides, introduced alone or in pairs: Gd_2O_3 and / or Dy_2O_3.

The process for obtaining this new type of glass comprises the operations of weighing, mixing-homogenizing the raw materials, pre-melting, melting, refining, homogenizing, conditioning, pouring, annealing, and shaping the glass obtained, followed by its treatment in a flux of thermal neutrons (0.025 eV) of 102 nth cm^{-2} s^{-1}.

Unconventional wet method of reactant processing followed by melting (1100°C – 1225°C, mechanical homogenization, refining, shaping by pouring the melt into pure spectral graphite mold, preheated, annealing (removal of residual stresses, 390°C – 420°C) and optical processing.

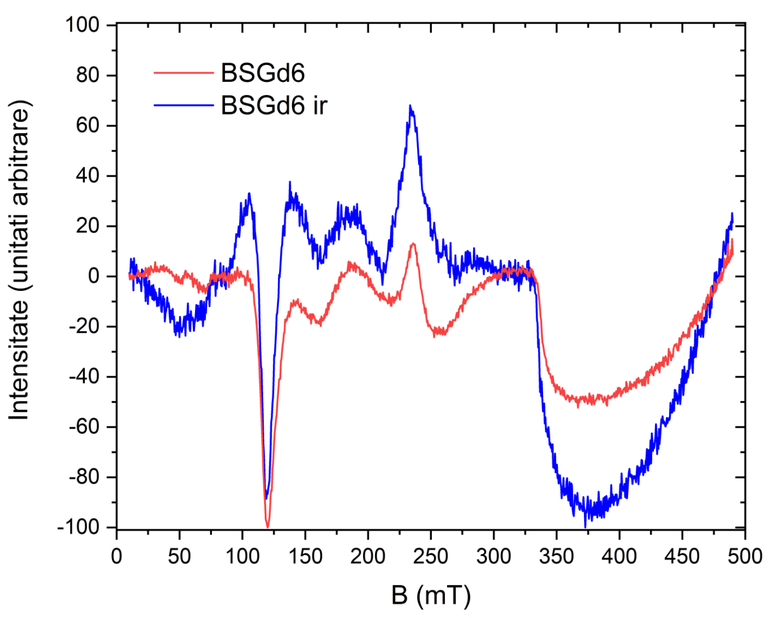


Figure 1. Electronic paramagnetic resonance for 6% Gd_2O_3 doped glass, before and after irradiation.

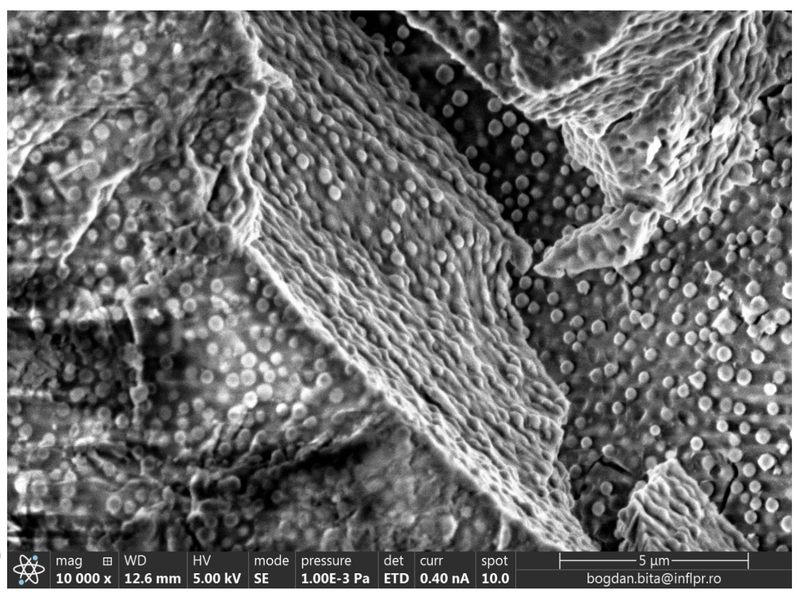


Figure 2. SEM image of 6% Gd_2O_3 doped glass.

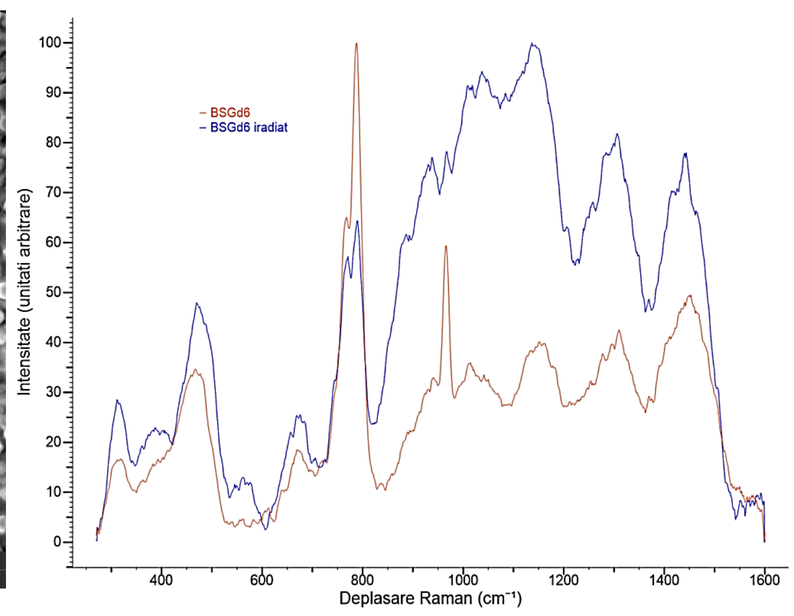


Figure 3. Raman spectrum of 6% Gd_2O_3 doped glass, before and after neutron irradiation.

The advantages of these glasses refer to their use as thermal and cold neutron guides, with superior performance to existing ones, in terms of resistance to the effect of prolonged radiation exposure. The applications of these glasses are their use for the manufacture of high-performance thermal and cold neutron guides in terms of resistance to neutron radiation.

Contact: savabogdanalexandru@yahoo.com +40728062160

Films based on titanium (TiO_2) and phosphorus (P_2O_5) oxides modified with reduced graphene oxide (rGO) with controllable photocatalytic properties and process to obtain them

B

Patent: A/00342/2021

Authors: Ileana Cristina Vasiliu, Ana Maria Iordache, Mihail Elisa, Iulian Pana, Bogdan Alexandru Sava, Lucica Boroica, Ana Violeta Filip

The invention refers to a technology using the sol-gel method to obtain with reduced costs, vitreous films with photocatalytic properties based on TiO_2-P_2O_5 modified with reduced graphene oxide (rGO) to be used as anodes in dye-sensitized solar cell (DSSC). The prepared composite films exhibit the photocatalytic properties of titanium dioxide, the phosphorus characteristics to form vitreous structures, transparent, homogenous, with large active surface and large pore volume and the attributes of graphene oxide that improves the photocatalytic properties of titanium oxide.

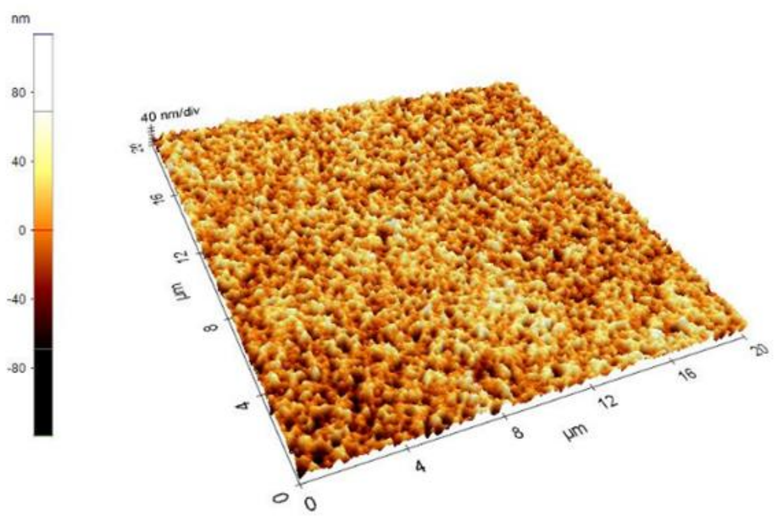


Figure 1. AFM image of the 1.5% rGO$TiO_2P_2O_5$ film.

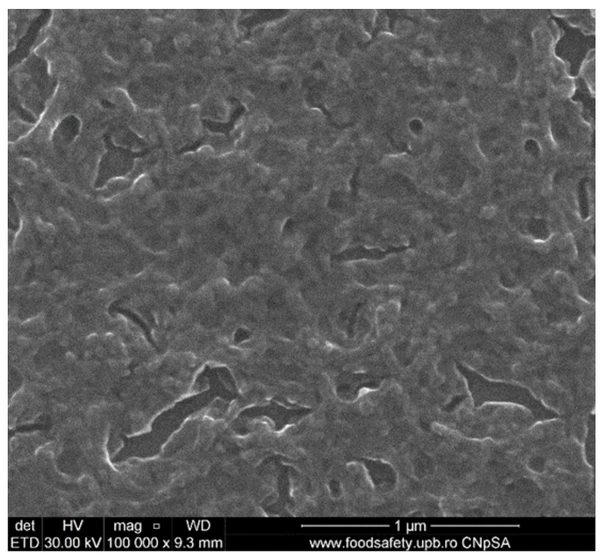


Figure 2. SEM image of the 1.5% rGO$TiO_2P_2O_5$ film

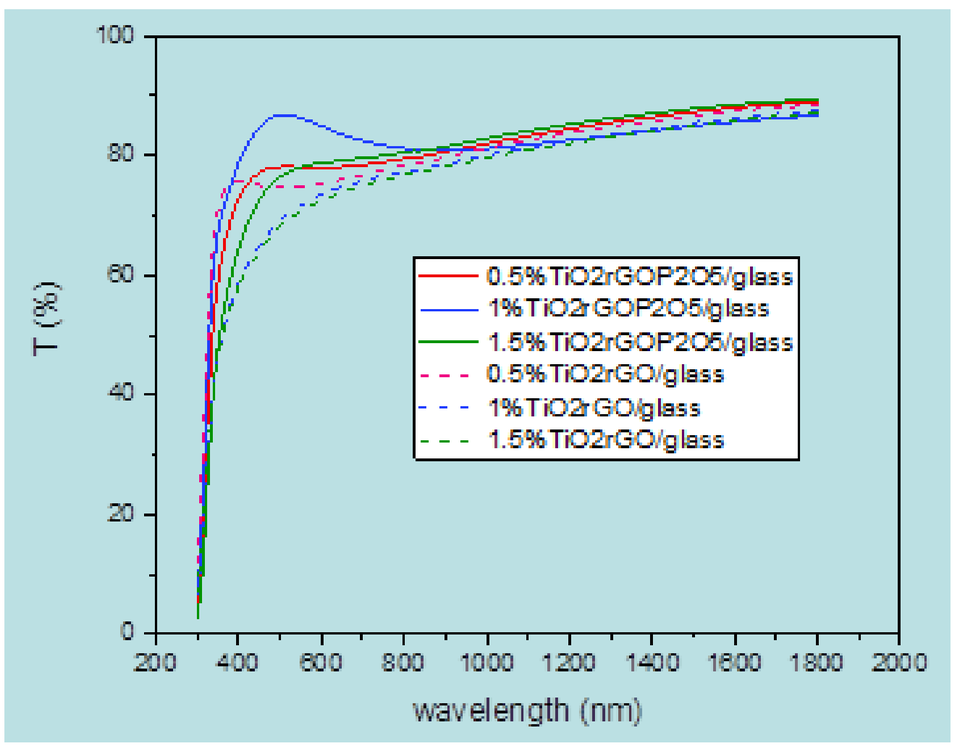


Figure 3. UV-Vis-NIR spectra of TiO_2rGO and TiO_2rGOP_2O_5 thin films on glass substrate at different concentrations of rGO in precursors mixture solutions.

The TiO_2-P_2O_5-rGO vitreous composite usable in DSSC cells as a photoanode offers outstanding transparency functions to allow maximum light absorption transfer along the photovoltaic cell.

Contact: savabogdanalexandru@yahoo.com +40728062160

Doped boro-lead-phosphate glass and nanocarbon composites and method for obtaining them

B

Patent: A/00379/2021

Authors: Bogdan Alexandru Sava, Lucica Boroica, Ana Violeta Filip, Ileana Cristina Vasiliu, Mihail Elisa, Ana Maria Iordache

The technical problem solved by the invention consists in obtaining doped boron-lead-phosphate glass composites - nanocarbon, which have increased chemical homogeneity, while maintaining the other nanocarbon-induced properties, namely electrical and mechanical properties, and dopants add optical properties and new magnetic, amplified by phosphorus oxide in the glass matrix.

The novelty of the invention consists in the fact that new composites with optical and laser uses have been obtained, combining the properties of lead-borate glasses with the advantages and novelty of introducing phosphorus oxide and nanocarbon directly into the melt.

Molar percentage	0-50 %	10-30 %	40-70 %	5-15 %	2-20 %	3-15 %	3-20 %
Oxides	B_2O_3	P_2O_5	PbO	Li_2O	ZnO	Tb_2O_3, Dy_2O_3, CeO_2, Eu_2O_3, Pr_2O_3, Nd_2O_3, Sm_2O_3, Gd_2O_3, Ho_2O_3, Er_2O_3, Tm_2O_3, Yb_2O_3	graphene, graphene oxide or nanographite

Improved characteristics: i) high homogeneity, in the whole volume of the composite; ii) lack of defects such as inclusions or stones; iii) small number of gaseous inclusions and their very small size; iv) lack of defects such as striations, threads, veins; v) lack of stresses due to thermal gradients; vi) high chemical and thermal resistance; vii) superior electrical and mechanical properties; viii) optical and magnetic properties comparable to the world level.

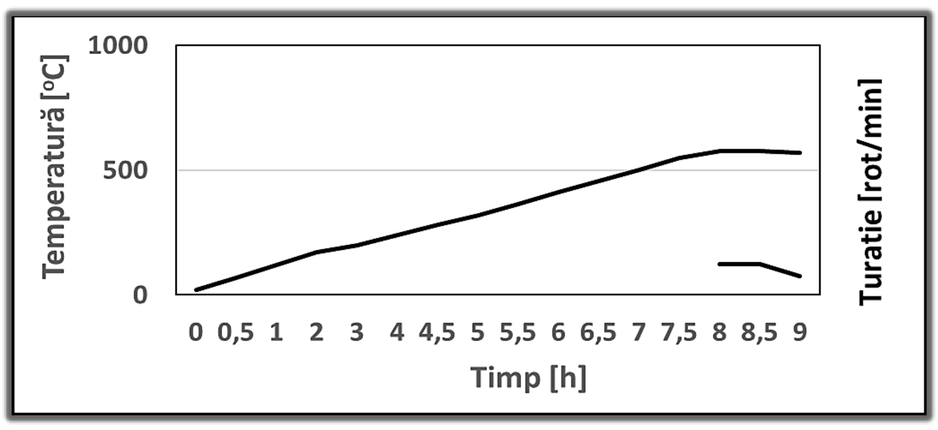


Figure 1. Pre-melting-melting-refining-homogenization program according to the invention, comprising temperatures, time frame, mixing regime, for BPPG3Ce composite.

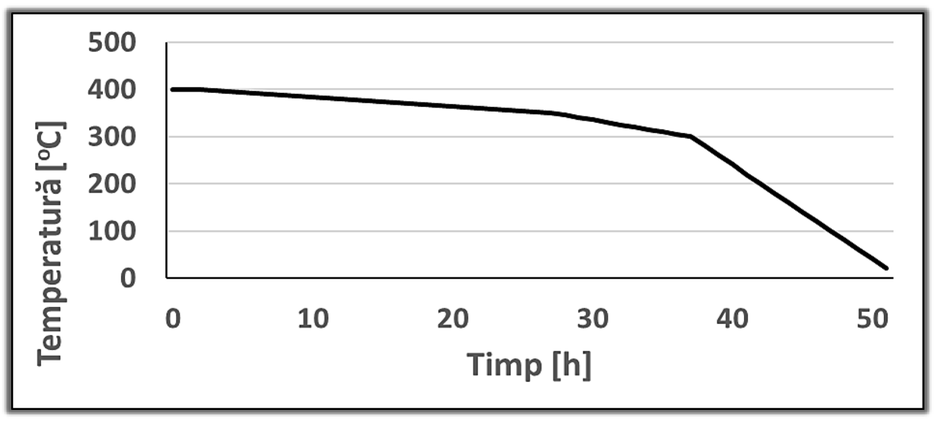


Figure 2. Annealing program for BPPG3Ce composite according to the process proposed in the invention, comprising the temperatures and time frame of the annealing process steps.

Doped boron-lead-phosphate and nanocarbon composites eliminate the disadvantages of previous work in that:

- ✓ contain: three glass network formers: B2O3, P2O5, PbO; vitreous network modifiers: Li2O, ZnO; oxides that induce optical and magnetic properties: Tb2O3, Dy2O3, CeO2, Eu2O3, Pr2O3, Nd2O3, Sm2O3, Gd2O3, Ho2O3, Er2O3, Tm2O3, Yb2O3; together with 3 ... 20% molar nanocarbon of graphene type, graphene oxide or nanographite
- ✓ the process of obtaining this type of composite is new.

Contact: savabogdanalexandru@yahoo.com +40728062160

Aluminophosphate glasses containing rare-earth ions, applied as optical sensors and the processing method

B

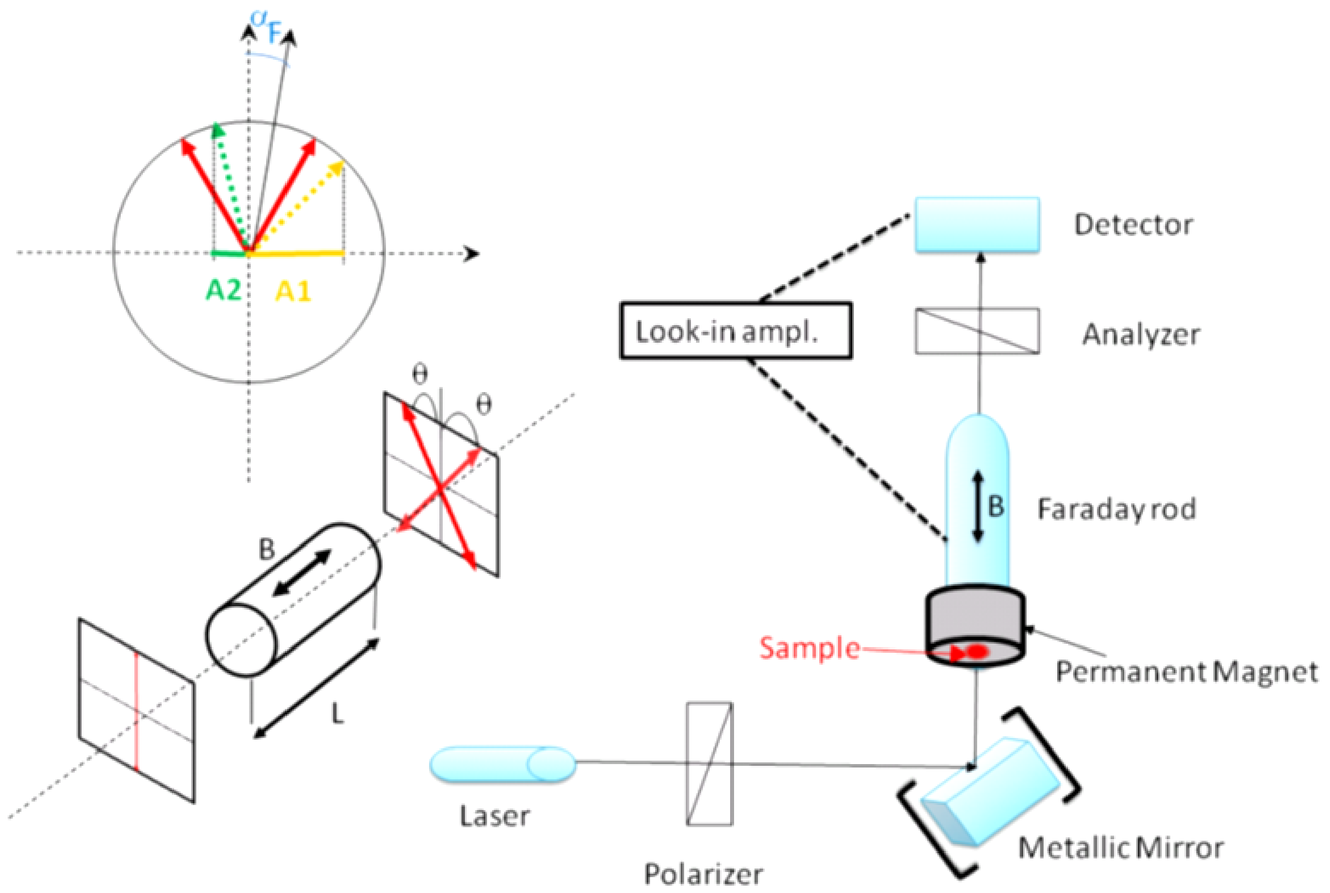
Patent: RO 130686 B1/30.07.2019

Authors: Mihail Elisa, Bogdan Alexandru Sava, Lucica Boroica, Raluca Iordanescu, Ionut Feraru, Mihai Eftimie, Anca Beldiceanu

The invention is related to aluminophosphate-type glassware products containing rare-earth (RE) ions (Eu^{3+}, Sm^{3+}, Tb^{3+}), used as optical sensors and to the technological process for the preparation of these vitreous materials. The wet process of doped aluminophosphate glasses preparation offers the advantage of a better homogenization of the raw materials from the first stages of the processing and also allows the formation of intermediate chemical compounds, precursors of the final chemical compounds in the glass. This process guarantees the achievement of a high chemical homogeneity of the initial batch glass, leading to the achievement of high optical homogeneity of doped aluminophosphate glasses, finally obtained.

Technical characteristics of the doped glass:

- thermal expansion coefficient: 90-100 x 10^{-7}/K;
- low annealing temperature: 435°C-450°C;
- vitreous transition temperature: 460°C-480°C;
- high annealing temperature: 460°C-490°C;
- softening temperature: 495°C-515°C;



- refractive index:
  - ✓ n_D (589, 29 nm) 1.54–1.55;
  - ✓ n_e (546 nm) 1.53-1.58;
  - ✓ n_F (656 nm) 1.54-1.59;
  - ✓ n_C (486 nm) 1.52-1.57;
- optical dispersion, $n_F - n_C$, 0.01-0.03 and Abbe number, υ_e, 61-68;
- striae in the bulk glass, according to class I (control on two directions), birefringence, $\Delta n<10$ nm/cm (class II), optical homogeneity, class I.

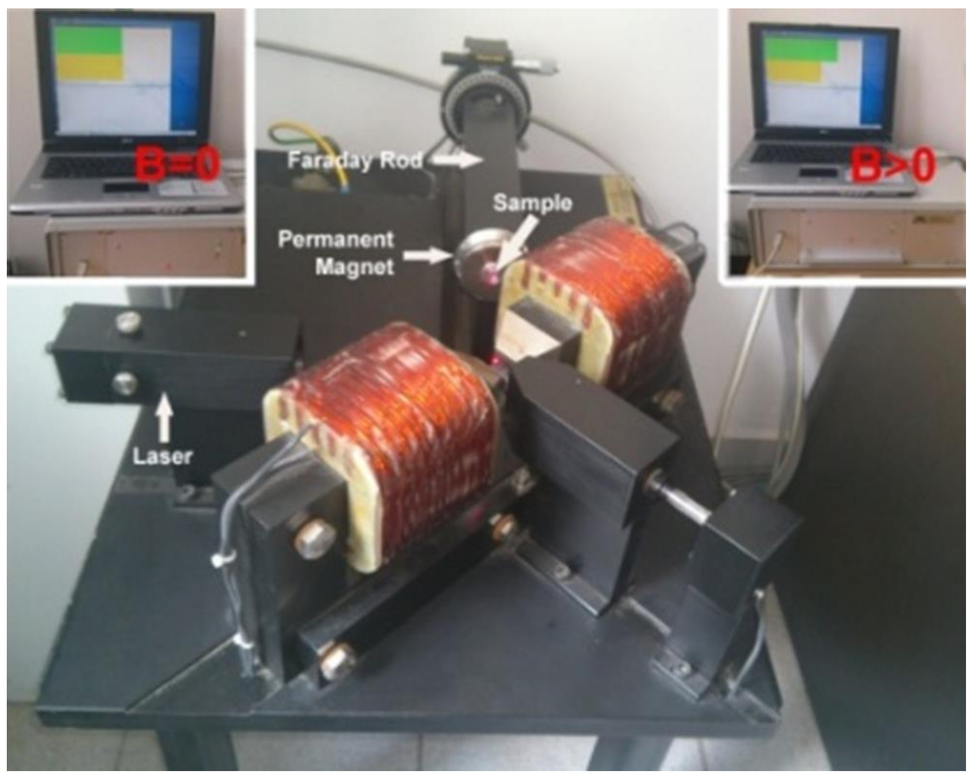


Figure 1. The magneto-optical Faraday effect.

Contact: savabogdanalexandru@yahoo.com +40728062160

NATIONAL INSTITUTE LASER,
PLASMA AND RADIATION PHYSICS

Boro-phosphate glasses with magneto-optical properties and process for preparing them

B

Patent: RO 132655 B1/30.08.2021

Authors: Bogdan Alexandru Sava, Lucica Boroica, Mihail Elisa, Dumitru Ulieru, Doina Craciun

The novelty of the invention is that new vitreous materials for magneto-optical uses have been obtained, combining the properties of phosphate glasses with the advantages and novelty of the introduction of B_2O_3 and ZnO. Stabilization of phosphate glasses was achieved with B_2O_3 combined with ZnO and /or PbO. The dopants, transition metal, post-transition metals and rare earths oxides provide high magneto-optic properties for these glasses, which have the advantages of combining these properties with high chemical and mechanical stability.

Methods

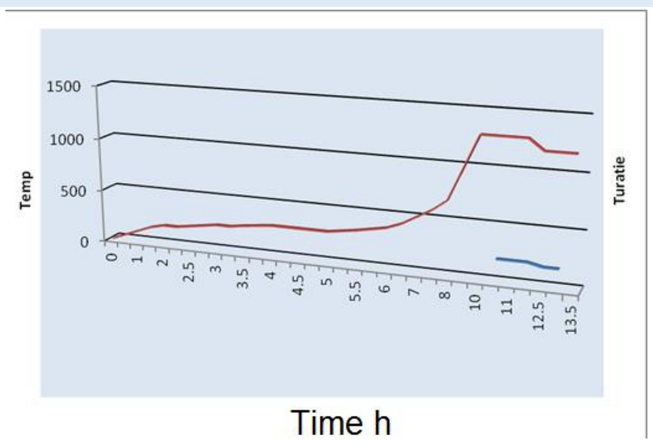


Figure 1. Pre-melting-melting-refining – homogenization -conditioning program comprising the temperatures, duration and mixing regime for BPM2 glass.

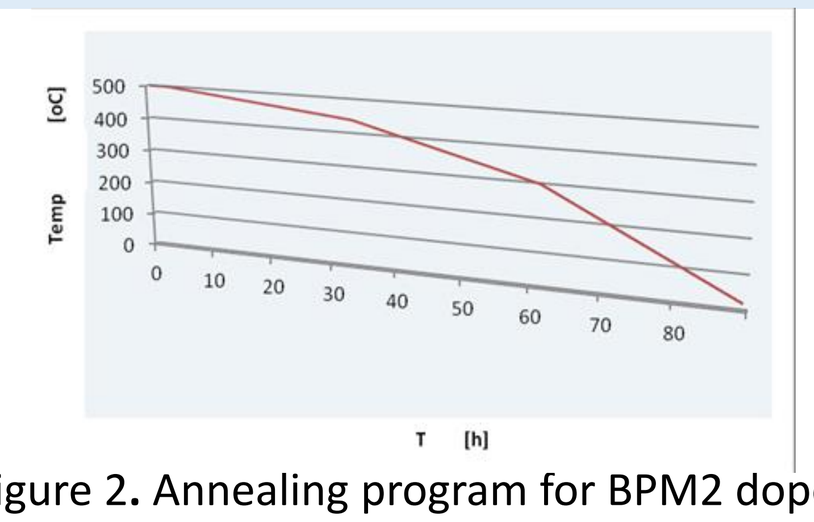


Figure 2**.** Annealing program for BPM2 doped glass according to the process of the invention, comprising the temperatures and the lengths of the annealing steps of the molded glass block.

Results

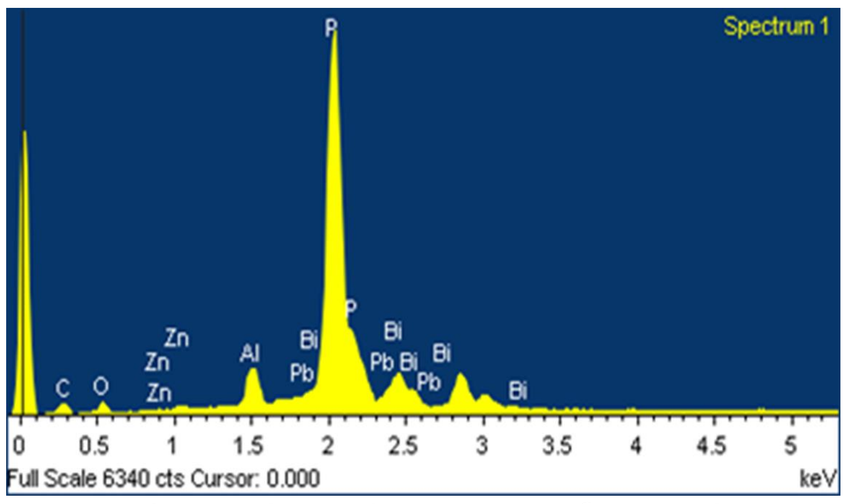


Figure 3**.** EDS spectra of BPM 2.

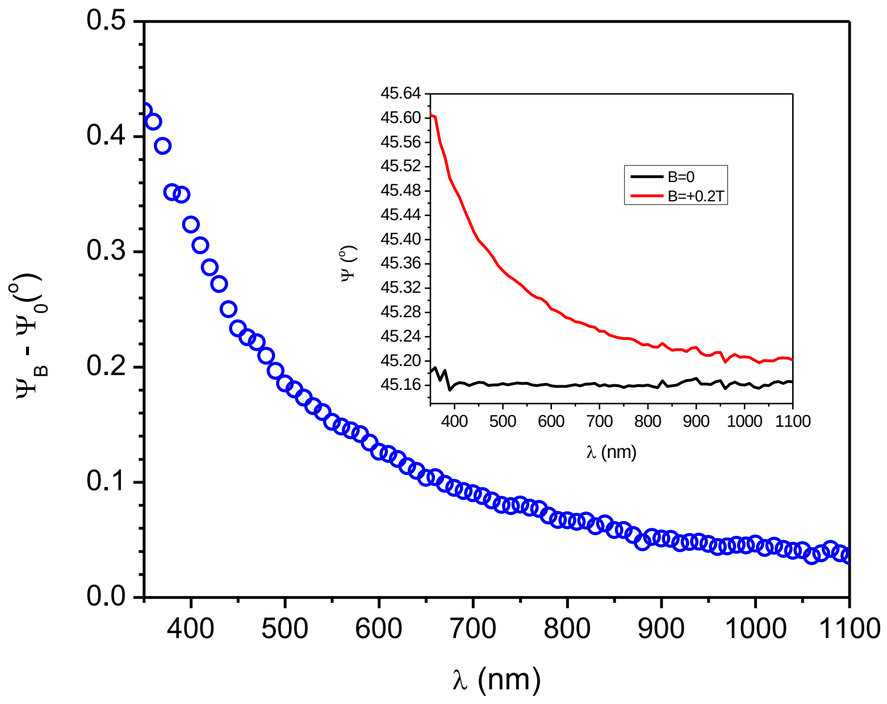


Figure 4**.** The Kerr angle vs. wavelength for BPM2 (in the insert is given the rotation of the polarization plane in the absence and in the presence of the applied 0.2 T field).

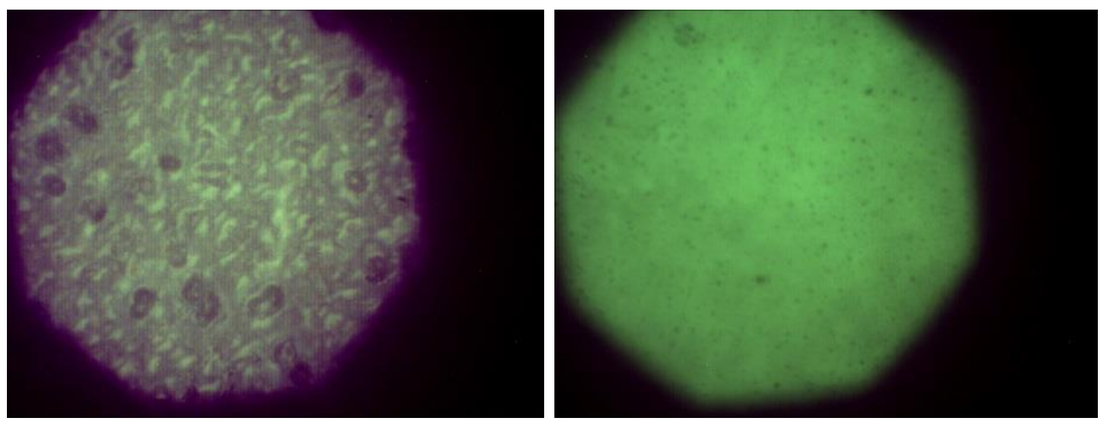


Figure 5**.** Optical Microscopy (Mx100) obtained on BPM2 samples.

Contact: savabogdanalexandru@yahoo.com +40728062160

COMPOSITE CARBON XEROGELS WITH GRAPHENE OXIDE AND THEIR MANUFACTURING PROCESS

Patent no. 130237/2018

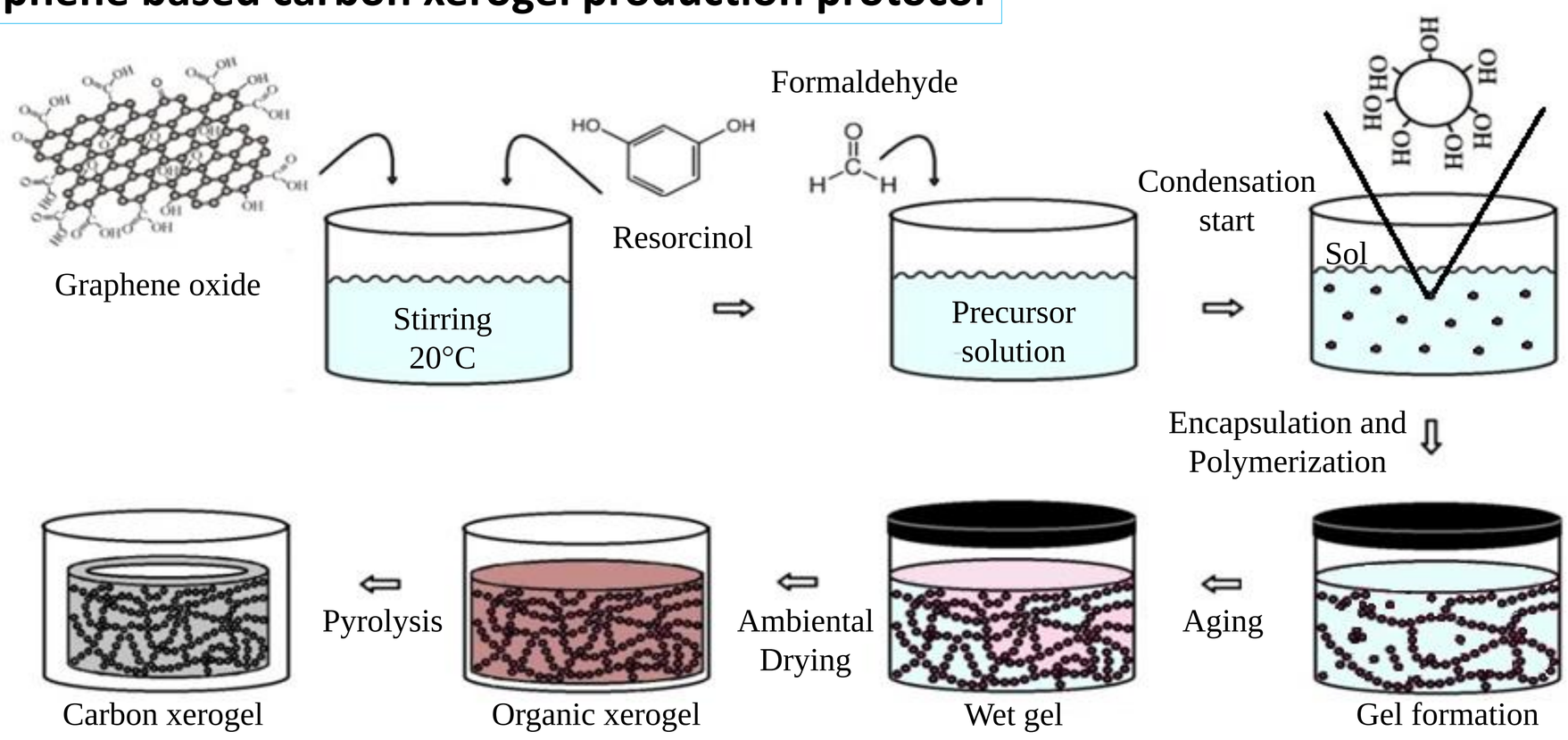
Authors: Stamatin Ioan, Trefilov Alexandra-Maria-Isabel, Balan Adriana-Elena, Nichita Cornelia, Iordache Stefan-Marian

B

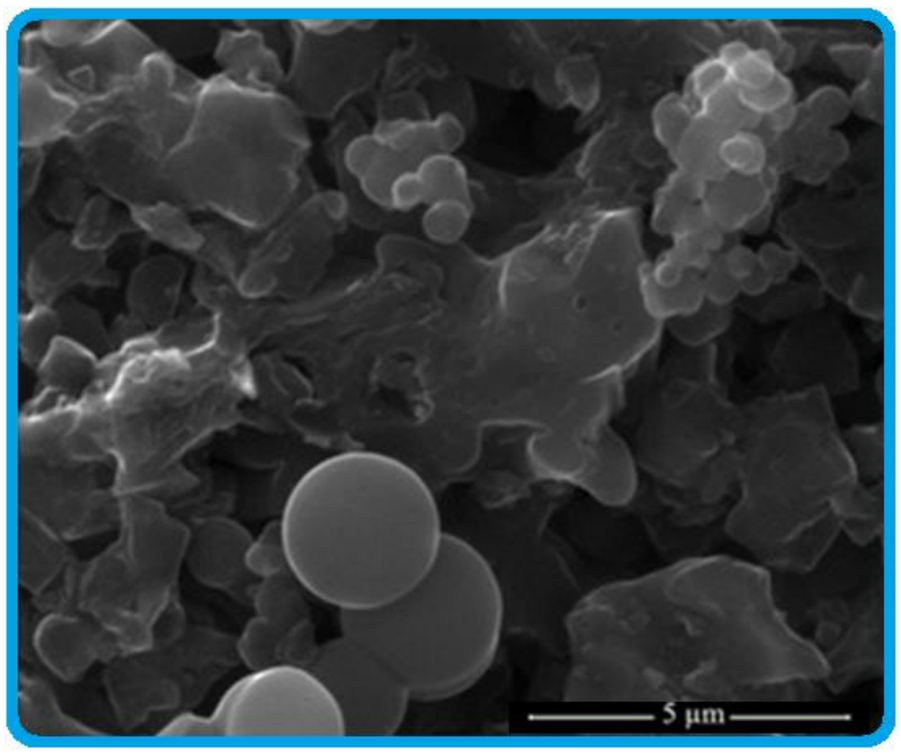
The invention relates to the production process of high-quality composite carbon xerogels based on reduced graphene with improved properties: increased carbon purity, low resistivity, low density and high retention capacity.

The process according to the invention consists in the sol-gel synthesis of resorcinol and formaldehyde solution in the presence of graphene oxide, which simultaneously plays the role of reaction catalyst and active component. After the pyrolysis step, the graphene-containing carbon xerogel obtained is studied by morphological, structural and electrical measurements, which highlights the possibility of application in energy related devices.

Graphene based carbon xerogel production protocol

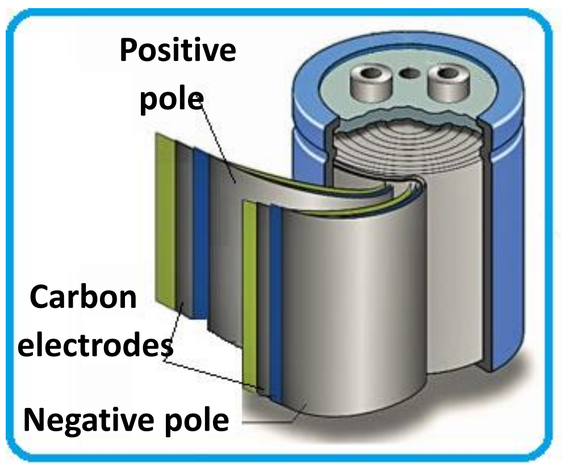


Carbon xerogel product and few applications

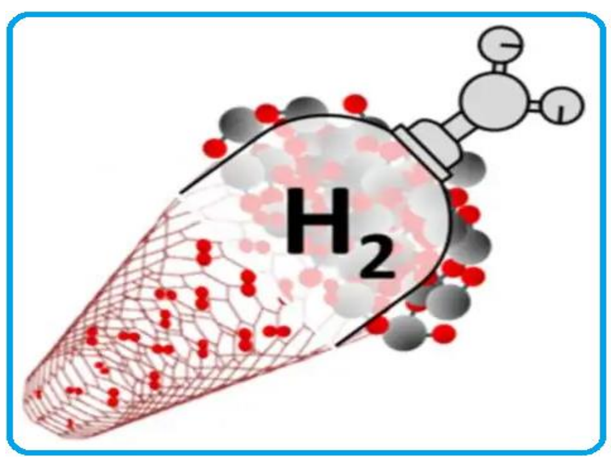




Batteries



Capacitors



Gas Storage

Contact: alexandra.trefilov@inflpr.ro

„Gheorghe Asachi” Technical University of Iasi

Phosphating process for titanium alloy with Zn-Zr phosphate solution

D. P. BURDUHOS-NERGIȘ[1], C. BEJINARIU [1], A.V. SANDU, P. VIZUREANU [1] , N. CIMPOESU [1], D. D. BURDUHOS-NERGIȘ[1]

Affiliation: 1. “Gheorghe Asachi” Technical University of Iasi

B

Introduction. Driven by the imminent clinical demands and the favorable commercial foreground, the improvement of the biological response of metallic implants has begun to be widely studied, especially by surface modification treatments. The technology of deposition by chemical conversion is important to be studied and introduced among the methods of treating the surfaces of biomaterials because it has multiple advantages. Therefore, the invention refers to a process of phosphating titanium alloys using solutions based on Zr and Zn, in order to obtain thin porous layers capable of improving the biological response of titanium implants, promoting osseointegration, by. increasing corrosion and wear resistance.

Advantages

Low impact on the mechanical properties of the substrate

Increases corrosion and wear resistance

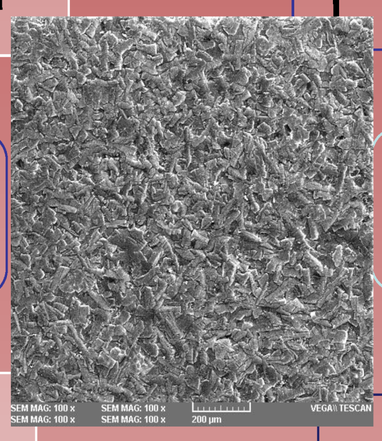
High adhesion to the substrate

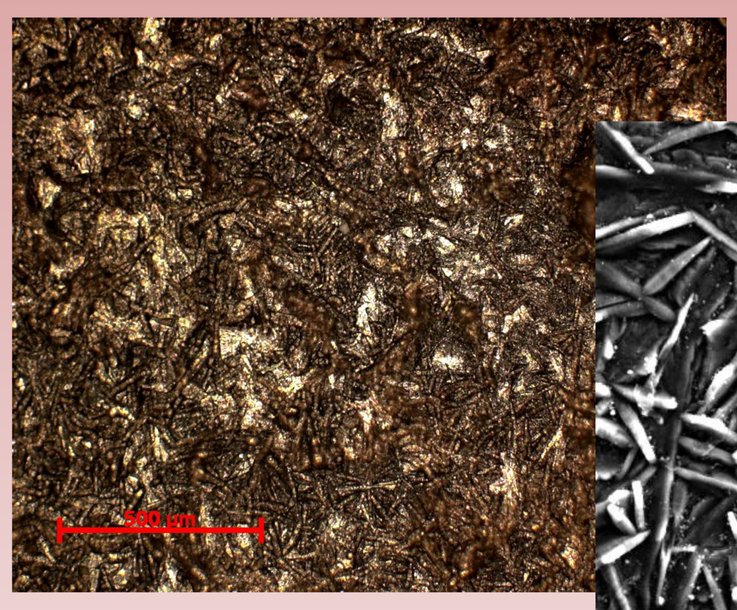
Excellent design and control ability

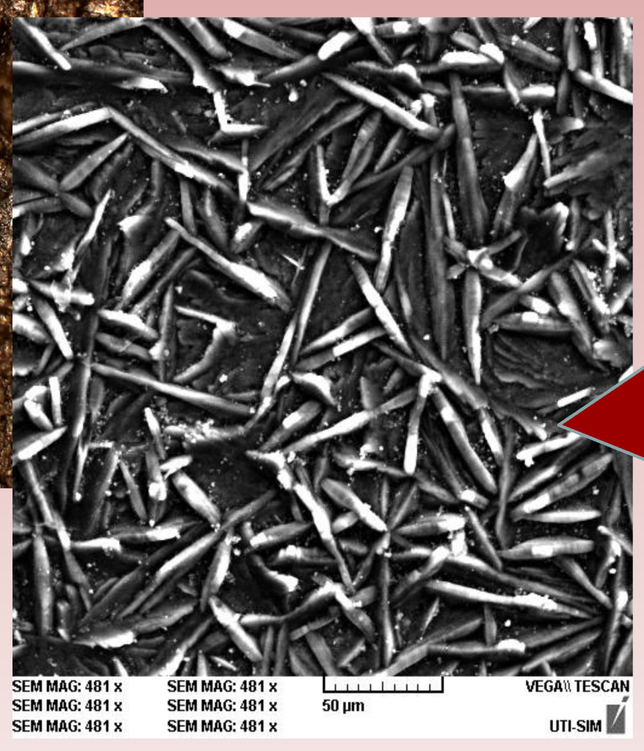
Introduction of metallic elements → to promote bone formation, antibacterial and immunoregulatory

Low price

Obtaining morphological characteristics favorable to cell adhesion similar to related biological functions







Phosphating stages

01 Sample preparation

Ti6Al4V
- 1200 grit

02 Degreasing

Ultrasonically cleaned in acetone, ethanol and deionised water

03 Pickling and surface activation

In 2% fluorhidric acid solution
In titanium colloid sollution

04 Phosphate layer deposition

Phosphating in Zr-Zn phosphate solution

Drying

05 Cold water washing

Conclusions

- As can be observed from the SEM and OM images, a phosphate layer, based on Zr-Zn, was deposited on the Ti6Al4V surface. This layer aims to improve the corrosion resistance and wear of the titanium alloy, in this way, helping to decrease the reject rate of the implant.

Contact information:
diana-petronela.burduhos-nergis@academic.tuiasi.ro

Aknowledgement: This research was realized with the support of COMPETE 2.0 project nr.27PFE/2021, financed by the Romanian Government, Minister of Research, Innovation and Digitization. This research was also supported by “Gheorghe Asachi” Technical University from Iaşi (TUIASI), through the Project “Performance and excellence in postdoctoral research 2022”.

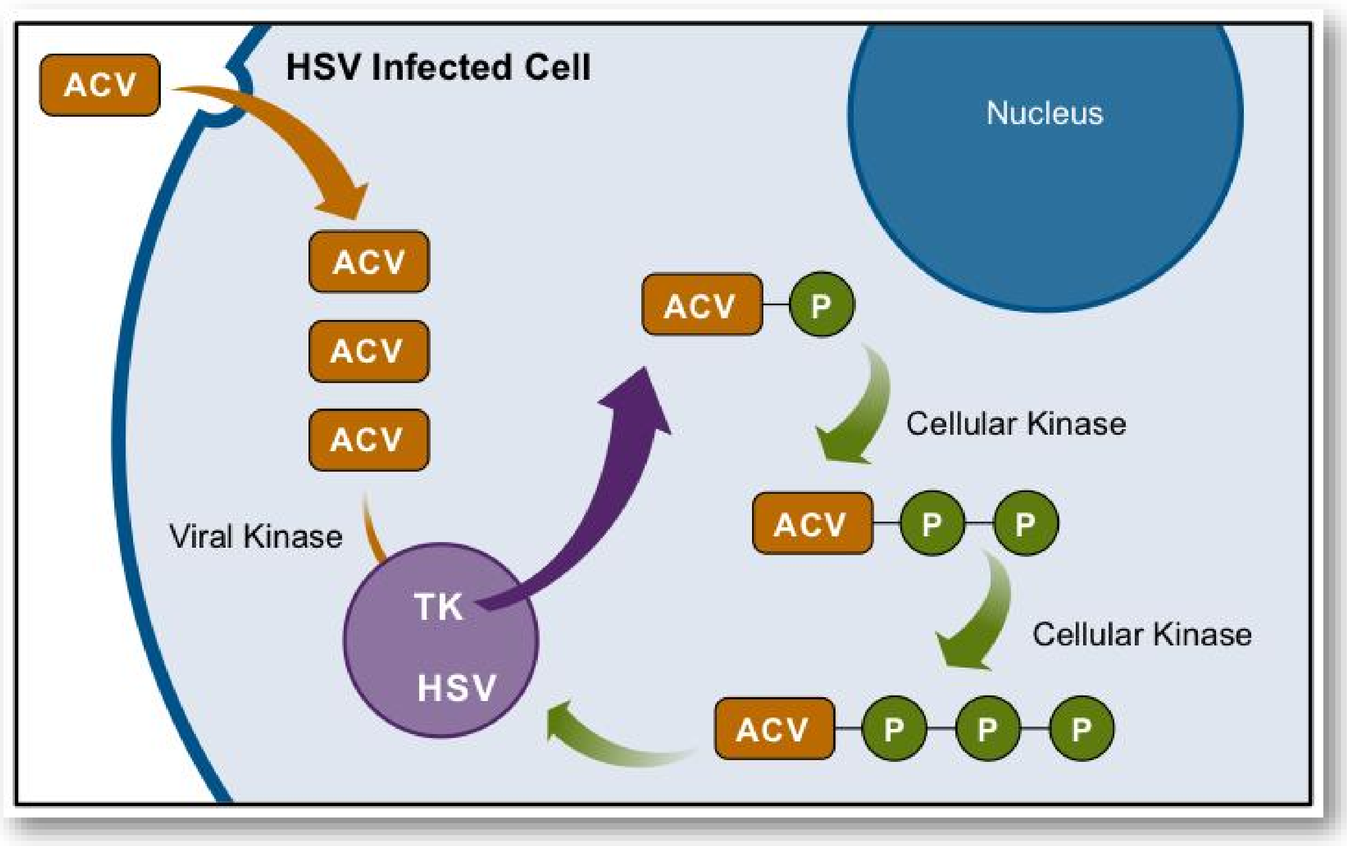
PROCESS FOR OBTAINING A TRANSDERMAL TRANSPORTER OF ACYCLOVIR

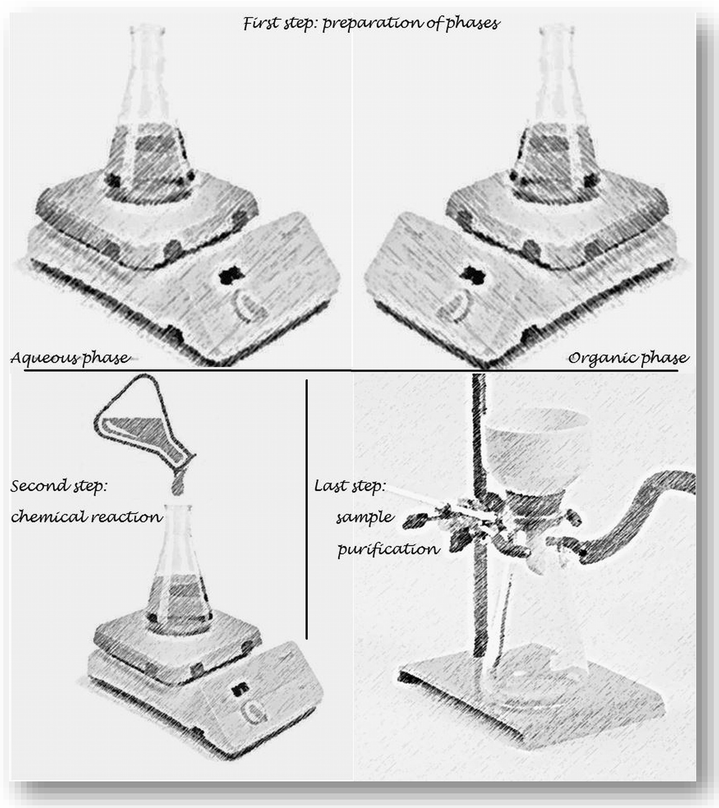
B

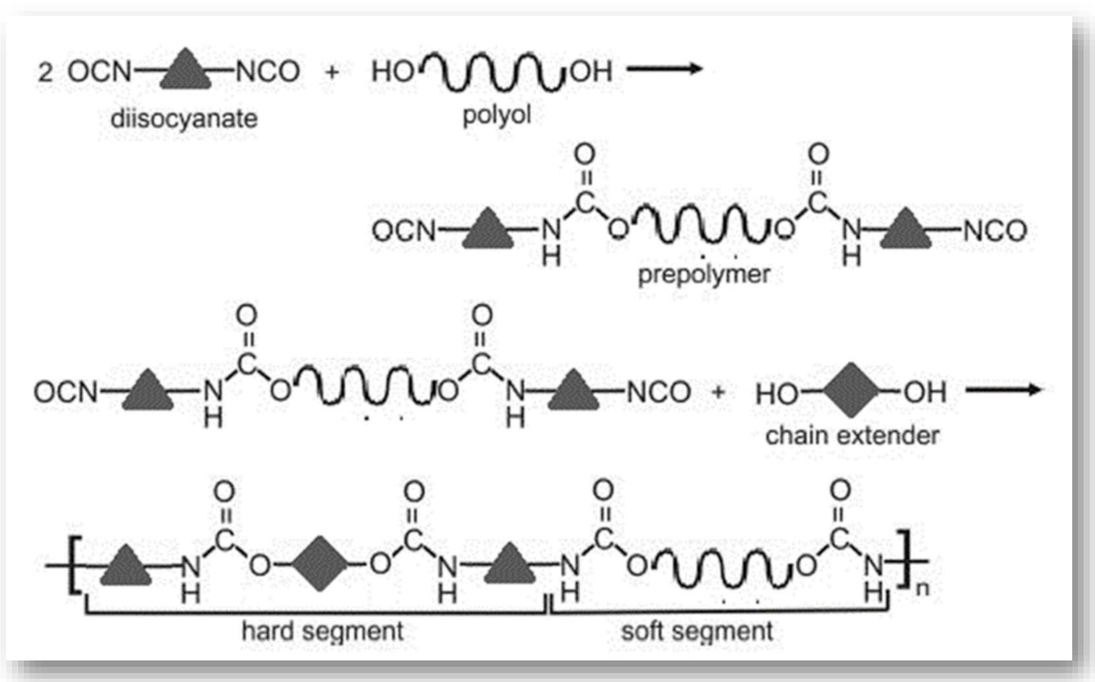
Patent no. RO 134816 / 2023

Borcan Florin, Dehelean Cristina Adriana, Soica Codruta Marinela

The invention refers to a process for obtaining a polyurethane composition with increased solubility used as a delivery system for Acyclovir. The process, according to the invention, consists in the interphase polyaddition reaction combined with a spontaneous emulsification using an aqueous solution of a mixture of polyethylene glycol, poly(ethylene oxide), monoethylene glycol, 1,4-butanediol, 1,6-hexanediol, eventually, agents as 1,2-propanol 2-acetate or glycerol 1,2-diacetate, to increase solubility, an organic solution as well as a usual emulsifier, in a discontinuous microreactor at a temperature of 30 ^{o}C, with homogenization of the final suspension for 6 hours at 300 rpm, resulting in a stabilized hydrogel composition with reduced skin irritation level, non-toxic, thermally stable in the range of 20... 280 ^{o}C, with polyurethane structures having dimensions of 144... 229 nm and increased solubility in water which facilitates the transmembrane transfer of the antiviral drug Acyclovir.








ROMÂNIA

OSIM

OFICIUL DE STAT PENTRU INVENȚII ȘI MĂRCI

Brevet de invenție

Nr. 134816

Acordat în temeiul Legii nr.64/1991 privind brevetele de invenție, republicată în Monitorul Oficial al României, Partea I, nr.613, din 19 august 2014.

Titular: UNIVERSITATEA DE MEDICINĂ ȘI FARMACIE "VICTOR BABEȘ" TIMIȘOARA, TIMIȘOARA, TM, RO

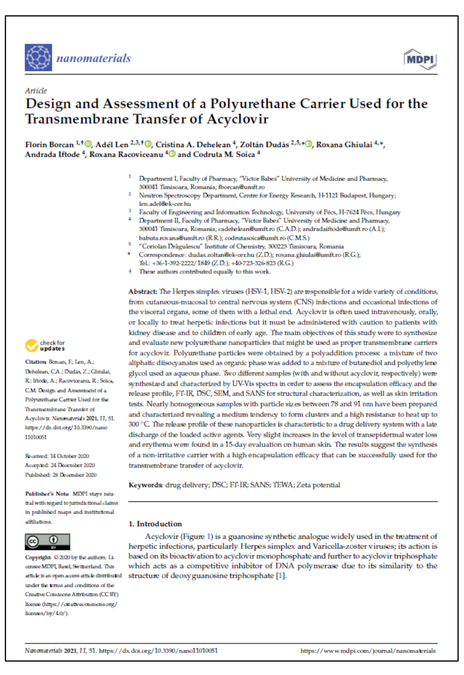
Titlul invenției: PROCEDEU DE OBȚINERE A UNUI TRANSPORTOR TRANSDERMIC AL ACICLOVIRULUI

Inventatori: BORCAN FLORIN, TIMIȘOARA, TM, RO; DEHELEAN CRISTINA ADRIANA, TIMIȘOARA, TM, RO; SOICA CODRUȚA MARINELA, TIMIȘOARA, TM, RO

Descrierea invenției, revendicările și desenele la care se face referință în acestea, fac parte integrantă din prezentul brevet de invenție.
Durata brevetului de invenție este de 20 ani, cu începere de la data de 23/10/2020, cu condiția plății taxelor anuale de menținere în vigoare a brevetului.

Director General

București, Data eliberării 30/06/2023


nanomaterials

MDPI

Article

Design and Assessment of a Polyurethane Carrier Used for the Transmembrane Transfer of Acyclovir

Florin Borcan [1,†], Adél Len [2,3,†], Cristina A. Dehelean [4], Zoltán Dudás [2,5,*], Roxana Ghiulai [4,*], Andrada Iftode [4], Roxana Racoviceanu [4] and Codruta M. Soica [4]

1 Department I, Faculty of Pharmacy, "Victor Babeș" University of Medicine and Pharmacy, 300041 Timișoara, Romania; florcan@umft.ro
2 Neutron Spectroscopy Department, Centre for Energy Research, H-1121 Budapest, Hungary; len.adel@ek-cer.hu
3 Faculty of Engineering and Information Technology, University of Pécs, H-7624 Pécs, Hungary
4 Department II, Faculty of Pharmacy, "Victor Babeș" University of Medicine and Pharmacy, 300041 Timișoara, Romania; cadehelean@umft.ro (C.A.D.); andradaiftode@umft.ro (A.I.); babuta.roxana@umft.ro (R.R.); codrutasoica@umft.ro (C.M.S.)
5 "Coriolan Dragulescu" Institute of Chemistry, 300223 Timișoara, Romania
* Correspondence: dudas.zoltan@ek-cer.hu (Z.D.); roxana.ghiulai@umft.ro (R.G.); Tel.: +36-1-392-2222/1849 (Z.D.); +40723-326-823 (R.G.)
† These authors contributed equally to this work.

Abstract: The Herpes simplex viruses (HSV-1, HSV-2) are responsible for a wide variety of conditions, from cutaneous-mucosal to central nervous system (CNS) infections and occasional infections of the visceral organs, some of them with a lethal end. Acyclovir is often used intravenously, orally, or locally to treat herpetic infections but it must be administered with caution to patients with kidney disease and to children of early age. The main objectives of this study were to synthesize and evaluate new polyurethane nanoparticles that might be used as proper transmembrane carriers for acyclovir. Polyurethane particles were obtained by a polyaddition process: a mixture of two aliphatic diisocyanates used as organic phase was added to a mixture of butanediol and polyethylene glycol used as aqueous phase. Two different samples (with and without acyclovir, respectively) were synthesized and characterized by UV-Vis spectra in order to assess the encapsulation efficacy and the release profile, FT-IR, DSC, SEM, and SANS for structural characterization, as well as skin irritation tests. Nearly homogeneous samples with particle sizes between 78 and 95 nm have been prepared and characterized revealing a medium tendency to form clusters and a high resistance to heat up to 300 °C. The release profile of these nanoparticles is characteristic to a drug delivery system with a late discharge of the loaded active agents. Very slight increases in the level of transepidermal water loss and erythema were found in a 15-day evaluation on human skin. The results suggest the synthesis of a non-irritative carrier with a high encapsulation efficacy that can be successfully used for the transmembrane transfer of acyclovir.

Keywords: drug delivery; DSC; FT-IR; SANS; TEWA; Zeta potential

1. Introduction

Acyclovir (Figure 1) is a guanosine synthetic analogue widely used in the treatment of herpetic infections, particularly Herpes simplex and Varicella-zoster viruses; its action is based on its bioactivation to acyclovir monophosphate and further to acyclovir triphosphate which acts as a competitive inhibitor of DNA polymerase due to its similarity to the structure of deoxyguanosine triphosphate [1].

check for updates

Citation: Borcan, F.; Len, A.; Dehelean, C.A.; Dudás, Z.; Ghiulai, R.; Iftode, A.; Racoviceanu, R.; Soica, C.M. Design and Assessment of a Polyurethane Carrier Used for the Transmembrane Transfer of Acyclovir. *Nanomaterials* **2021**, *11*, 51. https://dx.doi.org/10.3390/nano11010051

Received: 16 October 2020
Accepted: 24 December 2020
Published: 28 December 2020

Publisher's Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Copyright: © 2020 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/).

Contact: Borcan Florin (+40722371025, fborcan@umft.ro)

POLYURETHANE NANOGEL APPLICABLE IN GENE THERAPY OF RARE SKIN DISEASES

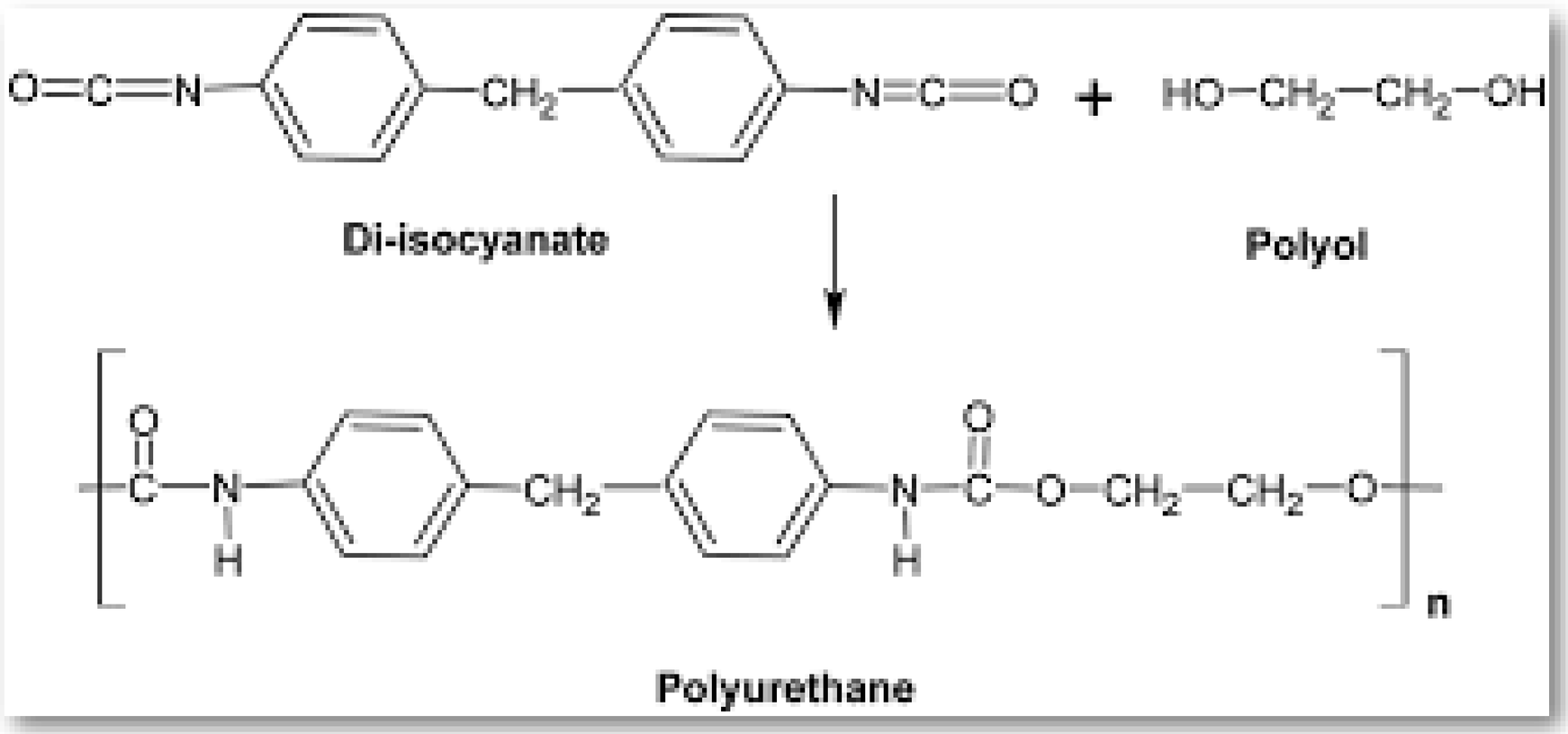
B

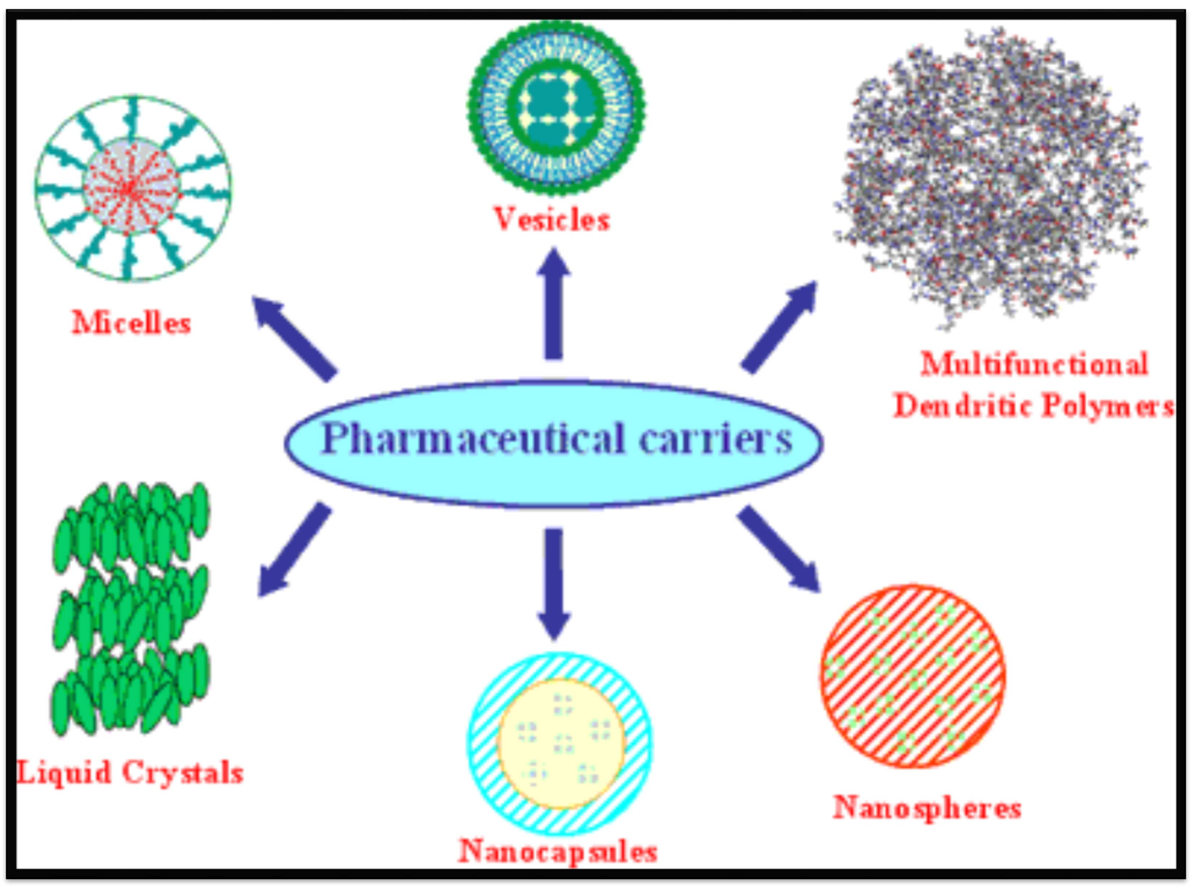
Patent appl. no. a 2022 00718

Borcan Florin, Popescu Roxana, Szuhanek Camelia Alexandrina, Soica Codruta Marinela, Dehelean Cristina Adriana

The invention refers to a pharmaceutical formulation product, with cutaneous administration, being used as a delivery system for a mixture of deoxyribonucleic acid (DNA), betamethasone dipropionate and vitamin E. The product according to the invention contains polyurethane nano-structures obtained in a complex synthesis process, in which an interphase polyaddition reaction takes place, using only aliphatic compounds, which do not present a potential carcinogenic risk. The evaluation of the product highlighted the obtaining of a gel with a neutral pH, with relatively homogeneous structures, showing a low tendency of self-agglomeration, thermally stable in a wide temperature range, respectively its non-irritating character in skin tests.









pharmaceutics

MDPI

Article

Synthesis and Assessment of a Polyurethane Carrier Used for the Transmembrane Transfer of 2'-Deoxycytidine-5'-monophosphate sodium salt

Florin Borcan [1,*], Titus Vlase [2], Gabriela Vlase [2], Roxana Popescu [3] and Codruta M Soica [4]

[1] Department I, Advanced Instrumental Screening Center, Faculty of Pharmacy, "Victor Babes" University of Medicine and Pharmacy, 2 E. Murgu Sq., Timisoara-300041, Romania; fborcan@umft.ro
[2] Research Center "Thermal analysis in environmental problems", Faculty of Chemistry, Biology, Geography, West University of Timisoara, 16 Pestalozzi Str., Timisoara-300115; titus.vlase@e-uvt.ro, gabriela.vlase@e-uvt.ro
[3] Department II, Faculty of Medicine, "Victor Babes" University of Medicine and Pharmacy, 14A T. Vladimirescu Str., Timisoara-300041, Romania; popescu.roxana@umft.ro
[4] Department II, Faculty of Pharmacy, "Victor Babes" University of Medicine and Pharmacy, 2 E. Murgu Sq., Timisoara-300041, Romania; codrutasoica@umft.ro
* Correspondence: fborcan@umft.ro; Tel.: 0040-722-371-025

Abstract: The drug delivery systems receive more and more attention for the control and treatment of many diseases due to their increased number in recent years. The main aims of this study were to develop and to characterize a polyurethane drug delivery system that it is intended to be used for the transmembrane transport of nucleosides. Three different samples have been synthesized based on aliphatic diisocyanates (hexamethylene diisocyanate, isophorone diisocyanate and lysine diisocyanate) as organic phase, respectively a mixture of polyethylene glycol, polycaprolactone diol and low molecular weight diols as aqueous phase. The samples were characterized by pH, refractivity index and solubility measurements, drug loading efficacy and release investigations, thermal behavior, Zetasizer, cells viability and irritation tests on mice skin. The results indicate the obtaining of different populations of neutral acido-basic particles with size between 132 and 190 nm; the Zeta potential values and SEM images show a medium tendency to form clusters, while UV-Vis evaluations indicate an almost 70% encapsulation efficacy, a prolonged release (45% of encapsulated substance is released in the first 5 days) and around 70% of particles have penetrated an artificial membrane in the first 24h. The synthesized products can be tested in further clinical trials, the currently tests on cells culture and mice skin revealing no side effects.

Keywords: cells culture; drug delivery; FT-IR; mice skin; thermal analysis; UV-Vis; Zetasizer

Citation: To be added by editorial staff during production.

Academic Editor: Firstname Last-name

Received: date
Revised: date
Accepted: date
Published: date

Copyright: © 2023 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/).

1. Introduction

Nucleosides represent a large group of biological molecules known as glycosylamines displaying similar structures with nucleotides but lacking phosphate functional groups. They exhibit very diverse structures containing a nucleobase or nitrogenous base (adenine, thymine, cytosine, guanine) that is covalently linked to a monosaccharide with five carbon atoms [1,2]. The nucleosides act as precursors in the synthesis of nucleic acids, and they are also involved in the control of the metabolism and growth of all living cells; additionally, they modulate certain activities of the muscular, cardiovascular, and nervous systems [3]. Various supplements based on exogenous nucleosides (and nucleotides) have been developed for the patients who lack the ability to synthesize these compounds *de novo* [4]. The challenges and advantages associated with the use of drug delivery systems for nucleosides can also be associated to various approaches for cancer treatment [5,6]. 2'-Deoxycytidine-5'-monophosphate (dCMP, **Figure 1**), often found as a substrate of

Contact: Borcan Florin (+40722371025, fborcan@umft.ro)

Germ Guard Goo
(G.G.G.)

This project was supported by Satit Chula Innovation Society and CU Smart Lens Co. Ltd.

Author/s: Pimbisa Bisalputra, Thantham Jittham, Warinsaya Sereepapong, Phichpanita Mathasuriyapong
Mentor : Mr. Jeerasak Jitrotjanarak

B

Maintaining a safe and clean environment is crucial for our health and well-being. With the increasing focus on environmentally friendly products, a revolutionary solution has emerged in the form of a dust-cleaning, germ-preventing, reusable slime called the G.G.G. This innovative product not only helps to eliminate dust particles but also provides a barrier against germs. This abstract highlights the five key advantages of using this unique slime; its cleaning properties, germ-prevention capabilities, reusability, eco-friendliness, and versatility.

One of the many features of G.G.G. is its exceptional dust-cleaning abilities. The slime's sticky texture attracts dust particles and debris, making it an effective tool for removing dirt or grime from various surfaces. A simple rolling or pressing of the product allows for effortless and thorough cleaning. Its moldable nature enables it to reach even the most intricate corners, ensuring no dust is left behind. This flexibility not only saves time and effort but also enhances the overall cleanliness of any surroundings. In addition to its outstanding cleaning properties, the G.G.G. acts as a germ-preventing agent. It contains antibacterial properties that inhibit the growth and prevent the spread of harmful microorganisms. The slime's composition creates an inhabitable environment for germs, simultaneously reducing the risk of infections and illnesses. Whether you're cleaning a keyboard, smartphone, or other high-touch surfaces, using this slime provides an extra layer of protection, maintaining a hygienic environment.

Unlike single-use cleaning products that contribute to waste accumulation, this slime is reusable, making it an eco-friendly alternative. After cleaning or collecting dust from surfaces with the product, it can be stored in a sealed container for future use. When the slime becomes visibly dirty or loses its stickiness, a simple cleaning process can restore its effectiveness. This factor not only saves money in the long run but also promotes the reduction of generated waste.



Fig. 1 Product's Logo & Packaging

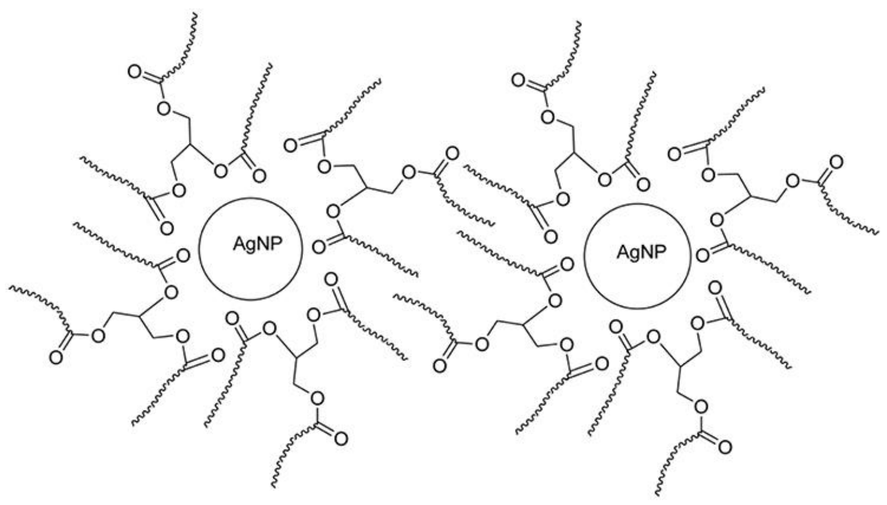


Fig. 2 Molecular Structure of Silver Nanoparticles



Fig. 3 Product's Flexibility Showcase

G.G.G.'s versatility as a cleaning tool also stands out as it can be used on almost limitless surfaces. From electronics and household appliances to furniture and car interiors, the slime adapts to different cleaning needs. Its malleable texture allows it to conform to different shapes, reaching tight spaces where traditional cleaning tools might miss. Additionally, it does not leave behind any residue or cause any damage to surfaces, making it also suitable for more delicate objects. This versatility makes the slime an indispensable addition to any cleaning arsenal.

Contact: scis.cud@gmail.com , j_jerasak@hotmail.com, +66 95 935 1062 , +66 84639 6363

OxyRock

Authors: Jeerasak Jitrotjanarak and Nattadanai Pinthanon

B

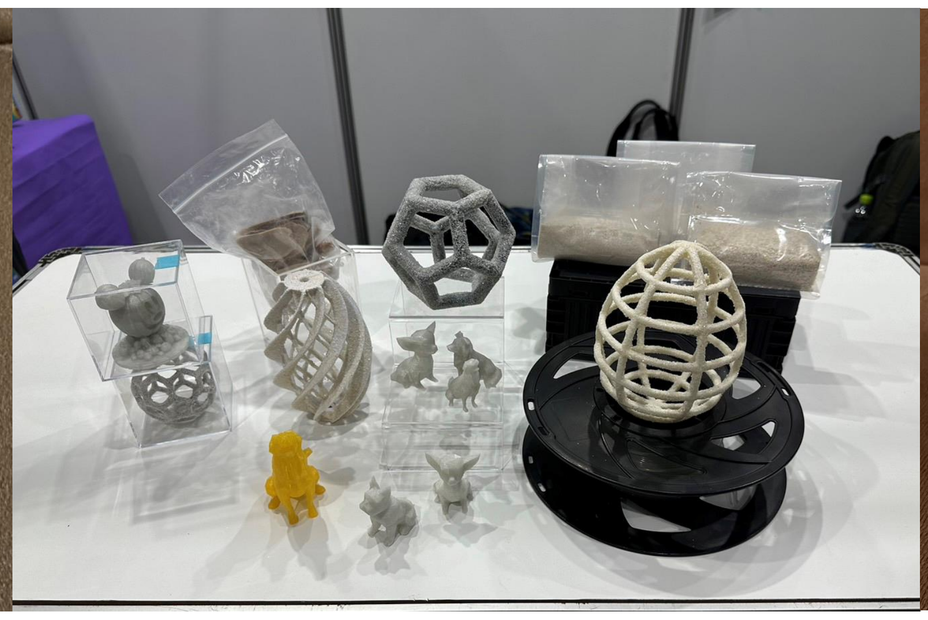
Innovatively repurposing waste green mussel shells, this project converts them into valuable high-value products, notably decorative stone made from calcium carbonate. These shells, typically discarded in landfills, contribute to environmental degradation.

Through a unique process, pure calcium carbonate is extracted from these shells, finding applications in industries like cosmetics and agriculture, reducing environmental burdens. Additionally, the project introduces a novel air-purifying function to the stone using titanium dioxide, enhancing both aesthetics and environmental impact.

The innovative use of 3D printing allows for custom designs, adding a new dimension to the decorative stone fabrication process.

By transforming waste into valuable resources and integrating cutting-edge techniques, the project aligns with circular economy principles, fostering sustainability and economic growth while addressing UN Sustainable Development Goals.











Contact: scis.cud@gmail.com , j_jerasak@hotmail.com, +66 95 935 1062 , +66 84639 6363

FROM SYMMETRIC GROUPS TO ROAD DESING

Research project

Author/s: Remzi AKTAY

Today, especially in metropolitan cities, there is a traffic problem caused by roads and the number of vehicles. Especially since the construction in the city is over, there are measures such as building bridges and opening roads from below are taken to solve this problem. This solution is only an artificial solution to reduce traffic for a certain period of time. Based on this problem, it is aimed to make road design at the beginning of urbanization and to analyze the situation of two-way one-way roads in the name of not to encounter such a problem in the new settlements to be established or to change the routes of the roads in certain cities if they can be arranged. In this study were used quantitative research method and experimental design.

Within the scope of the study, symmetric groups, permutation function and its combination were utilized. Let n be the length of a permutation function written as a circle. The symmetric group in which this function is located is S_n, and a method has been developed that can be written as the composite of functions of the same length and less than this length in this group. Thanks to this method, a permutation function was created for the roads to be determined according to the important centers in a settlement, the circular software and length of the permutation function were found, and the road routes between these centers could be written as a composite of permutation functions with less length in circular representation, and accordingly, road designs could be made. For each road design, cost calculation, accessibility to other centers, one-way and two-way road conditions were examined and alternatives were revealed. Based on this study, algorithms and software of the road designs developed can be developed and new urbanization and settlement planning can be made accordingly.

Keywords: Permutation, composition, graph theory, path design, number theory

B

Table-1: The resultant states of all binary functions of (14352)

(32)(35)(21)(14)	(25)(21)(14)(43)	(35)(51)(14)(52)	(23)(35)(24)(21)	(23)(21)(14)(35)
(25)(23)(21)(14)	(21)(15)(14)(43)	(13)(35)(14)(52)	(25)(23)(24)(21)	(21)(13)(14)(35)
(53)(25)(21)(14)	(15)(52)(14)(43)	(15)(13)(14)(52)	(53)(52)(24)(21)	(13)(32)(14)(35)
(23)(21)(35)(14)	(25)(24)(21)(43)	(35)(54)(51)(52)	(23)(24)(35)(21)	(23)(24)(21)(35)
(21)(13)(35)(14)	(24)(45)(21)(43)	(34)(35)(51)(52)	(42)(43)(35)(21)	(24)(43)(21)(35)
(13)(32)(35)(14)	(54)(52)(21)(43)	(45)(43)(51)(52)	(34)(32)(35)(21)	(12)(14)(43)(35)
(25)(21)(13)(14)	(12)(14)(45)(43)	(13)(14)(35)(52)	(25)(24)(43)(21)	(24)(21)(43)(35)
(21)(15)(13)(14)	(24)(21)(45)(43)	(43)(31)(35)(52)	(24)(45)(43)(21)	(14)(42)(43)(35)
(51)(52)(13)(14)	(41)(42)(45)(43)	(14)(43)(35)(52)	(54)(52)(43)(21)	(34)(32)(21)(35)
(35)(51)(52)(14)	(15)(14)(52)(43)	(15)(14)(43)(52)	(35)(54)(52)(21)	(13)(14)(32)(35)
(31)(35)(52)(14)	(54)(51)(52)(43)	(54)(15)(43)(52)	(43)(35)(52)(21)	(34)(31)(32)(35)
(51)(13)(25)(14)	(14)(45)(52)(43)	(14)(45)(43)(52)	(54)(43)(52)(21)	(14)(43)(32)(35)

Table-2: Compositions of some length-3 functions for the function (14352)

(352)(213)(143)	**(352)(215)(145)**	**(215)(143)**
(213)(153)(143)	(213)(153)(143)	(215)(531)(145)
(215)(143)	(152)(143)	(512)(532)(145)
(315)(523)(143)	(213)(351)(145)	(315)(123)(145)
(253)(213)(145)	(312)(352)(145)	(513)(125)(145)
(352)(342)(213)	(253)(345)(213)	(352)(214)
(312)(342)(351)	(145)(435)(523)	(145)(534)(524)
(541)(521)(432)	(145)(524)(432)	(245)(214)(431)

Table-3: Compositions of Functions with Length 4 for Function (14352)

(3152)(1423)	**(3152)(1423)**	**(3152)(1423)**
(3421)(3541)	(1423)(3542)	(5421)(4315)
(1453)(5234)	(5431)(5231)	(1425)(4325)
(3452)(2134)	(1453)(5234)	(5423)(2154)
(2415)(4312)	(2431)(3512)	(5413)(5241)

The reason for the development of such a method in path design is actually because the method is systematic and it is confirmed that the software of the algorithm can be done. The designs given in 5.2.5 are purely for illustrative purposes because when a settlement is designed, the number of roads will be very large. At the same time, there will be a lot of institutions in the settlement, central places, etc. In such a case, it would be beneficial for the architect or engineer doing the work to see all the alternatives. Thanks to this study, he will have seen all the alternatives and will be able to extract the alternatives according to the desired quality. For example, if the lengths of the roads are desired to be minimum, a design similar to figure-21 can be used, and if one-way roads are desired to be more, similar designs in figure-24, figure-25 and figure-26 can be used. For example, if there will be only one central place or bazaar in the settlement, a design similar to figure-25 can be used, if there will be more than one central place, a design similar to that in figure-26 can be used, or it can be used by combining these designs.

Table-4: An example of 5 locations in a settlement and their distances.

Two Selected Venues	Distance (km.)	Two Selected Venues	Distance (km.)
1-2	2	2-4	4
1-3	10	2-5	3
1-4	5	3-4	7
1-5	8	3-5	6
2-3	1	4-5	9

In testing this hypothesis, we will consider the example of the function (14352) and the distances between the 5 locations created based on this function. The locations are labeled as 1, 2, 3, 4, and 5. Figure-23 is constructed according to the composition (14352) = (25)(24)(43)(21), as obtained from Table-1 of Figure-23. Upon examining Figure-23, it can be observed that when considering compositions with a length of two, there is only one central location with the maximum number of granted paths in the settlement. In this way, a person leaving a location can traverse all other locations and return to their original place. There must be a round-trip path between each location. Based on the data in Table-4, the total length of the constructed path is 36 km.

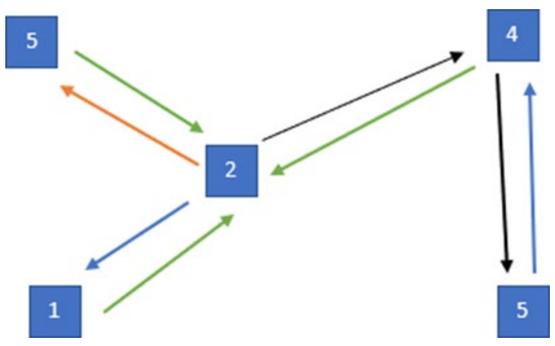


Figure-23: (14352) = (25)(24)(43)(21)

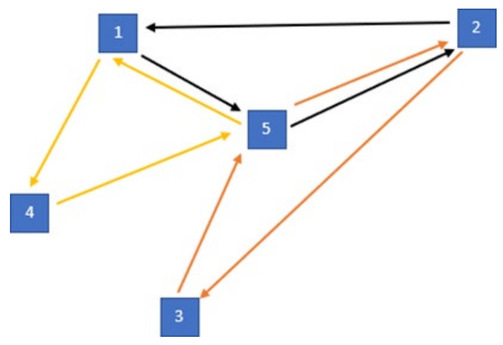


Figure-24: (14352) = (145)(152)(352)

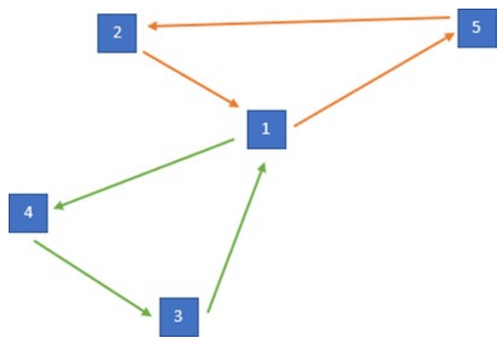


Figure-25: (14352) = (215)(143)

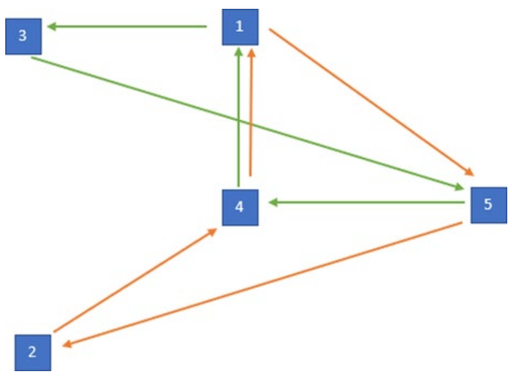


Figure-26: (14352) = (5413)(5241)

Figure-24 represents a road design selected from Table-2 and constructed based on Case 5.2.1. Upon analyzing the design, it can be observed that it does not have only one central location as described in 5.7.1. In this design, the central location is numbered as 5, while the nearby central locations are numbered as 1 and 2. In this design, there are bidirectional paths between central locations, but unidirectional paths between other locations. Based on the data in Table-4, the total length of the constructed path is 36 km. A person starting from any location can traverse all other locations and return to their original place.

In the given path design in Figure-25, there is only one central location, and all the roads are one-way. This scenario has the minimum total path length among the data in Table-1-2-3. According to the data in Table-4, the total path length is 21 km. Furthermore, a person starting from a location can visit all places and return to their original location.

In this design, there are three central locations, and all locations have one-way roads. If we do not consider the condition of not reusing a road as in graph theory, the path between 1 and 4 can be considered as the same, resulting in a single path. In this case, the total path length is 50 km according to the data in Table-4.

Based on this study, first of all, a study can be made for the case that the developed method cannot be written as the resultant of functions with length r when n is even and r is odd. As stated in the concluding discussion section, this is not a definitive judgment. It does not come out only according to the developed method. In addition, studies can be carried out to create general formulas for the number of compounds made with functions with a length of 3 or more. Since the developed method finds a systematic result, the algorithm related to this part can be defined and its software can be made. Road designs of very large settlements can be easily made by creating compounds for functions with very large lengths.

Contact: aktayremzi@outlook.com +90 5413033614

COLLAGEN AND COLLAGEN-KERATIN NANOFIBERS FROM DONKEY BY-PRODUCTS. PROCESS FOR THEIR OBTAINING

Patent Application no. **A 2022 00770**

B

Maria Râpă, Carmen Gaidau, Ecaterina Matei, Maria Stanca, Daniela Mariana Berechet

The invention refers to a composition for making nanofibers based on collagen and keratin obtained from hides and hair of donkey and to a method of obtaining them. The nanofibers obtained could be utilized for non-active medical dressings.

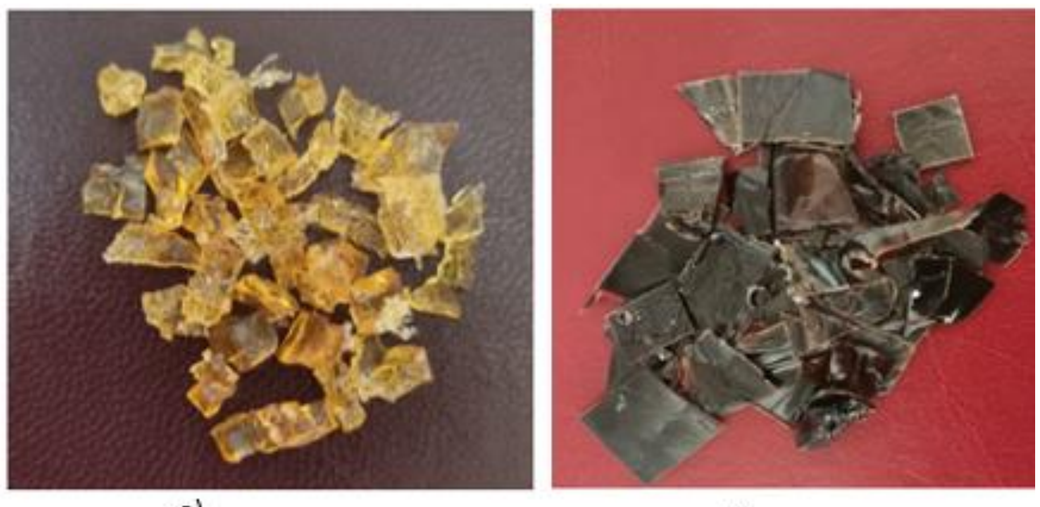
The composition according to the invention comprises the following elements expressed as a percentage by weight: 12% collagen or collagen-keratin mixture and 88% acetic acid solution in water, with a volume ratio of 9:1 for acetic acid and water. The process according to the invention involves obtaining a working solution from the above elements. This is achieved by stirring them for 6 hours at room temperature and a speed of 600 rpm. The resulting solution is then introduced into a syringe fixed in a pump and electrospun with a flow rate between 0.6 to 0.8 mL/h. The needle used for electrospinning has an inner diameter of 0.168 mm and is connected to a high voltage source ranging from 22.71 to 25.59 kV.

The distance between the end of the needle and the collector is set between 9 to 14 cm, resulting in nanofibers with a variable diameter between 73.15 to 133.33 nm.

The technical problem that the invention solves is the obtaining of nanofibers compositions based on collagen and keratin extracted from hides and hair donkey by-products, natural polymers, which show biocompatibility, biodegradability, nontoxicity and similarity to the extracellular matrix (ECM). The purpose of obtaining nanofibers with the smallest diameter and the finest pores is to enable rapid absorption of exudate and prevent bacteria penetration into the wound area.

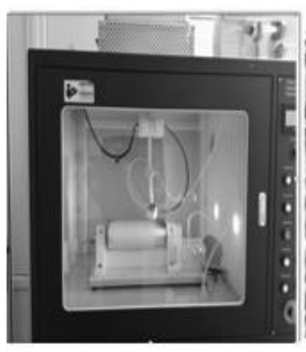
Advantages

- Ensuring environmental sustainability by capitalizing on existing protein resources
- Better waste management
- The process of obtaining nanofibers is simple, versatile, reproducible, takes place at room temperature, without high energy consumption and without potentially toxic solvents
- New wound healing products without the risk of cross-contamination will be brought to market

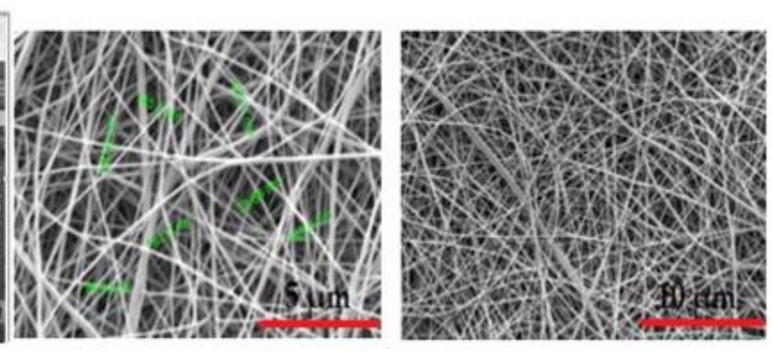


a) b)

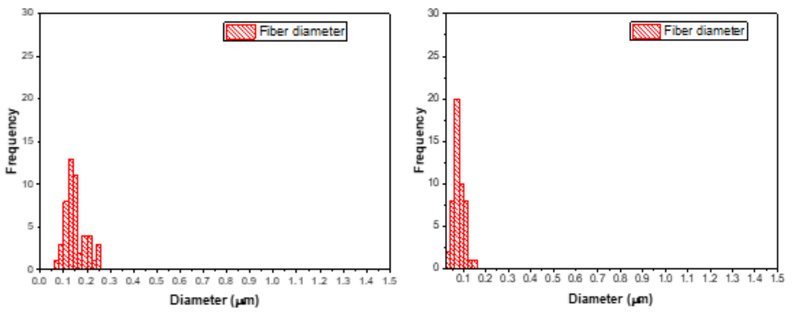
Proteins extracted from hides and hair donkey by-products: a) collagen; b) collagen-keratin



Electrospinning equipment



Nanofibers based on collagen and keratin extracted from donkey by-products



Funding: This research was funded by a grant of the Romanian Ministry of Research Innovation and Digitalization, project number PN-III-P3-3.5-EUK-2019-0237 within PNCDI III (NonActivPans), Contract 219/23.12.2020.

Contact: maria.rapa@upb.ro; carmen_gaidau@hotmail.com

MOLDOVA STATE UNIVERSITY
FACULTY OF FHYSICS AND ENGINEERING
Scientific Research Laboratory
Physics of Semiconductors and Devices
60, Alexei Mateevici str., MD 2009, Chisinau, Republic of Moldova
Tel.: +373 67560052; E-mail: *leonid.gorceac@usm.md*

HR EXCELLENCE IN RESEARCH

HETEROJUNCTIONS BASED ON InP AND GaN NANO/MICROMETRIC THIN FILMS FOR PHOTODETECTOR APPLICATIONS

B

PATENT: MD 4686 / 2020.12.31, MD 4772 / 2022.05.31; s 2023 0010 / 2023.02.02

AUTHORS: Vasile BOTNARIUC, Leonid GORCEAC, Simion RAEVSCHI, Sergiu VATAVU

APPLICATION FIELDS: Photonics. Optoelectronics.

AIM: Technology for InP and GaN based heterojunctions (HJ) preparation for wide spectral range photodetection use.

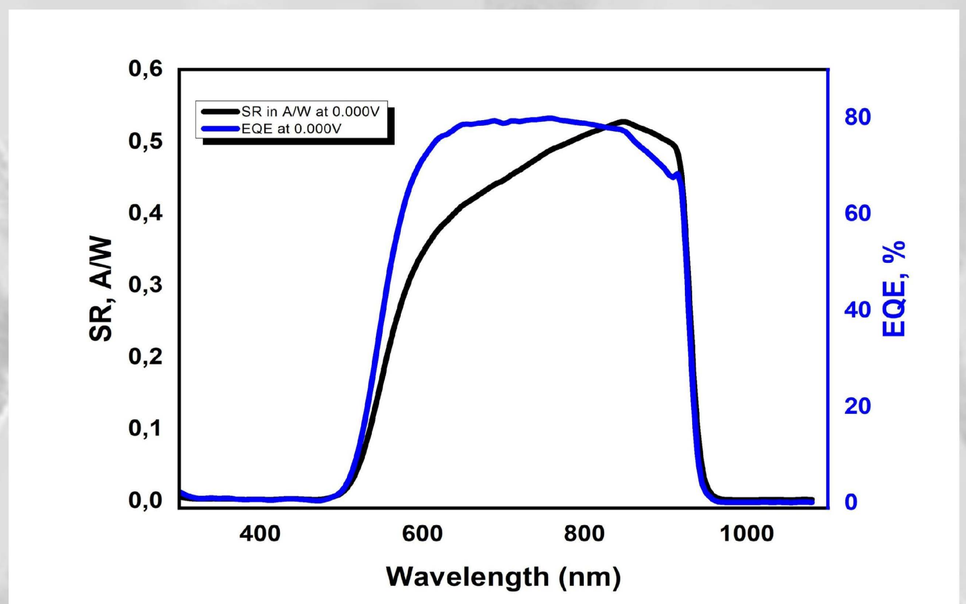
SOLUTION: The preparation of nCdS-pInP, nITO-TiO_2-pInP, nZnO-pInP, nGaN-pSi heterojunctions with SiO_2 antireflective layers by use of HVPE (n/pInP, n/pGaN), MOCVD, magnetron sputtering (nZnO, TiO_2), CSS (nCdS), spray pirolysis (ITO), e-beam evaporation (SiO_2) methods.

RESULTS: 1) Photodetectors based on nCdS-pInP heterojunctions with intermediate epitaxial p^oInP layer (and SiO_2 antireflective coating) for VIS spectral range applications (maximum spectral response 0,510 A/W; external quantum efficiency (EQE) of 75-80 %, 600-900 nm range) (Figure).

2) nZnO-pInP, nITO-TiO_2-pInP, nGaN-pSi heterojunctions with wide spectral range photosensitivity (Table).

Figure

Spectral response (black curve) and external quantum efficiency (blue curve) for nCdS-pInP heterojunctions with intermediate epitaxial layer



Table

Photosensitivity spectral distribution

Heterojunction	Photosensitivity spectral range (nm)
nCdS-pInP	512-925
nZnO-pInP	372-925
nITO-TiO_2-pInP	313-925
nGaN-pSi	364-1127

ADVANTAGES: HVPE, MOCVD, magnetron sputtering, spray pyrolysis technologies use for InP and GaN heterojunction based photodetectors preparation; Photodetectors with wide spectral range photosensitivity combined with increased resistance to corpuscular radiation.

IMPLEMENTATION STAGE: Laboratory scale.

ACKNOWLEDGMENTS: This research was supported by the *NARD project* # *20.80009.5007.12*

Research and Development in Construction, Urban Planning and Sustainable Territorial Development National Institute "URBAN - INCERC„
R&DNI "URBAN - INCERC„

Study on the Possibilities of Developing Cementitious or Geopolymer Composite Materials with Specific Performances by Exploiting the Photocatalytic Properties of TiO2 Nanoparticles

B

Research Project PN 23 35 05 01

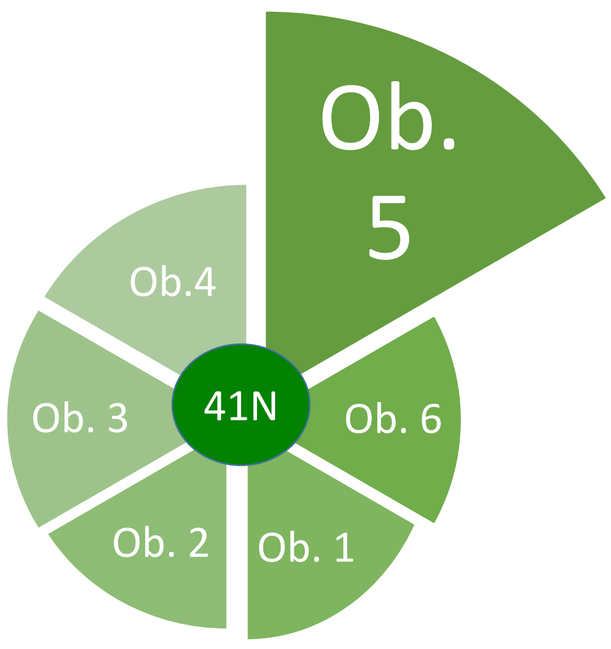
Adrian-Victor LĂZĂRESCU, Andreea HEGYI, Adrian Alexandru CIOBANU, Brăduţ Alexandru IONESCU, Mihail CHIRA, Carmen FLOREAN, Horaţiu VERMEȘAN, Vlad STOIAN



self-cleaning mortars
self-cleaning concrete
self-cleaning cementitious composite

alkali-activated geopolymer
self-cleaning geopolymer
geopolymer





OBJECTIVE

Contributions to the advancement of science through the development of multi- and trans-disciplinary research with an impact on the quality of life in the context of sustainable development of the built environment and increasing the possibilities for transfer of emerging technology through the development of advanced, eco-intelligent, self-cleaning materials that allow the reintegration into the economic circuit through recovery and recycling of waste and industrial by-products while exploiting the specific character of nanomaterials responsive to environmental factors.

ACKNOWLEDGEMENTS:

This work was carried out within Nucleu Programme of the National Research Development and Innovation Plan 2022-2027, supported by the Romanian Ministry of Research, Innovation and Digitalization - MCID, "ECODIGICONS" project no. PN 23 35 05 01: "Innovative sustainable solutions to implement emerging technologies with cross-cutting impact on local industries and the environment, and to facilitate technology transfer through the development of advanced, eco-smart composite materials in the context of sustainable development of the built environment"

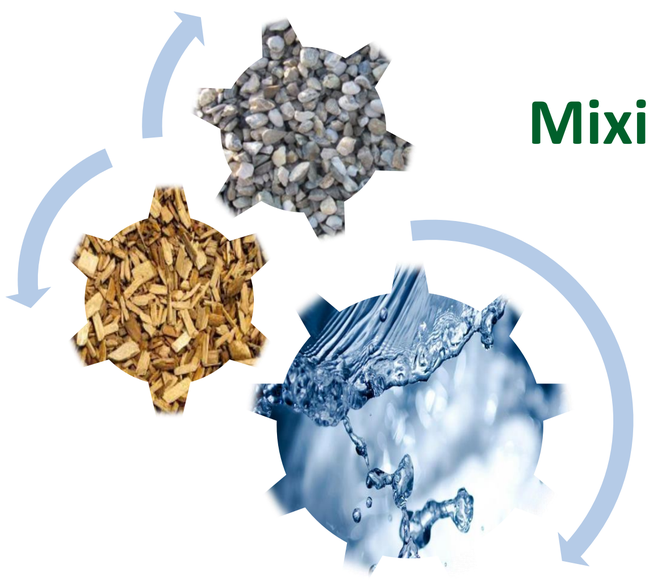
Contact: adrian.lazarescu@incerc-cluj.ro +40758327156

Capitalizing on sustainable material resources in the context of extreme environmental, seismic and climatic actions

Research Project PN 23 35 03 01

B

Adrian-Alexandru CIOBANU, Andreea Cristina Hegyi, Cristian PETCU, Ioana ALEXE, Marius MÂRȚ

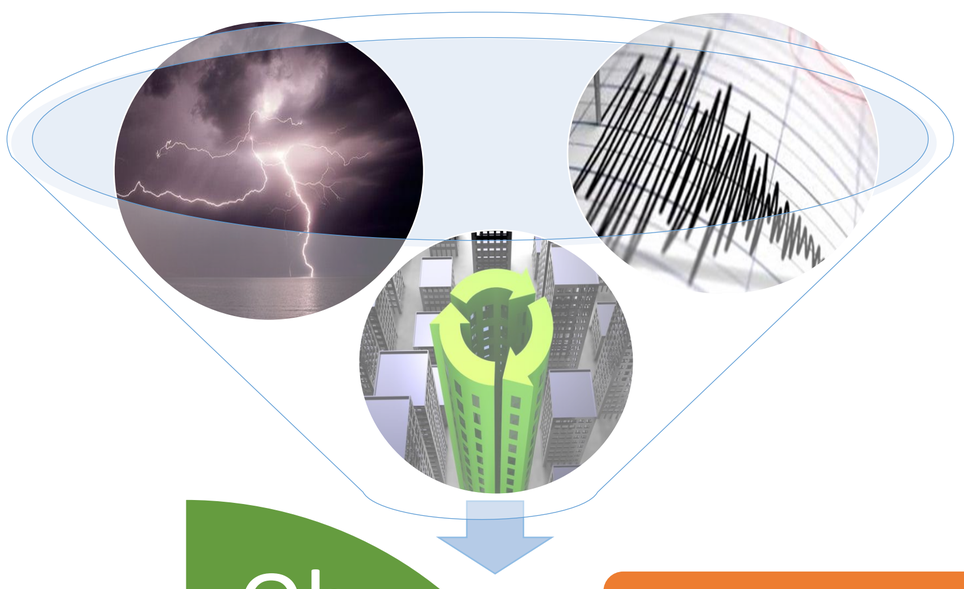






 # SUSTAINABILITY

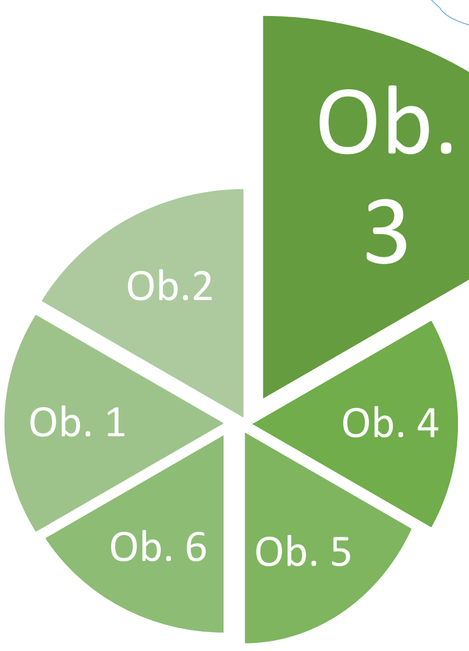
Conditions



Targets



 # RESILIENCE



PN 23 35 03 01 - Integrated system of development and scientific research of constructions and vital infrastructures exposed to extreme seismic and climatic environmental actions and the exploitation of sustainable resources of materials and energy

new directions of research and development of studies dedicated to achieving a goal of major interest for society, namely increasing community resilience to extreme environmental, seismic and climatic actions

research focuses on the design - execution - testing and validation of innovative and sustainable products, as well as the development of new experimental research methods regarding the evaluation of their sustainability through exposure to extreme environmental actions

ACKNOWLEDGEMENTS:

This work was carried out within Nucleu Programme of the National Research Development and Innovation Plan 2022-2027, supported by MCID, “ECODIGICONS” project no. PN 23 35 03 01: “Integrated system of development and scientific research of constructions and vital infrastructures exposed to extreme seismic and climatic environmental actions and the exploitation of sustainable resources of materials and energy”, financed by the Romanian Government.

Contact: ciobanuadrianalexandru@yahoo.com +40724052488

Research and Development in Construction, Urban Planning
and Sustainable Territorial Development National Institute "URBAN - INCERC„
R&DNI "URBAN - INCERC„

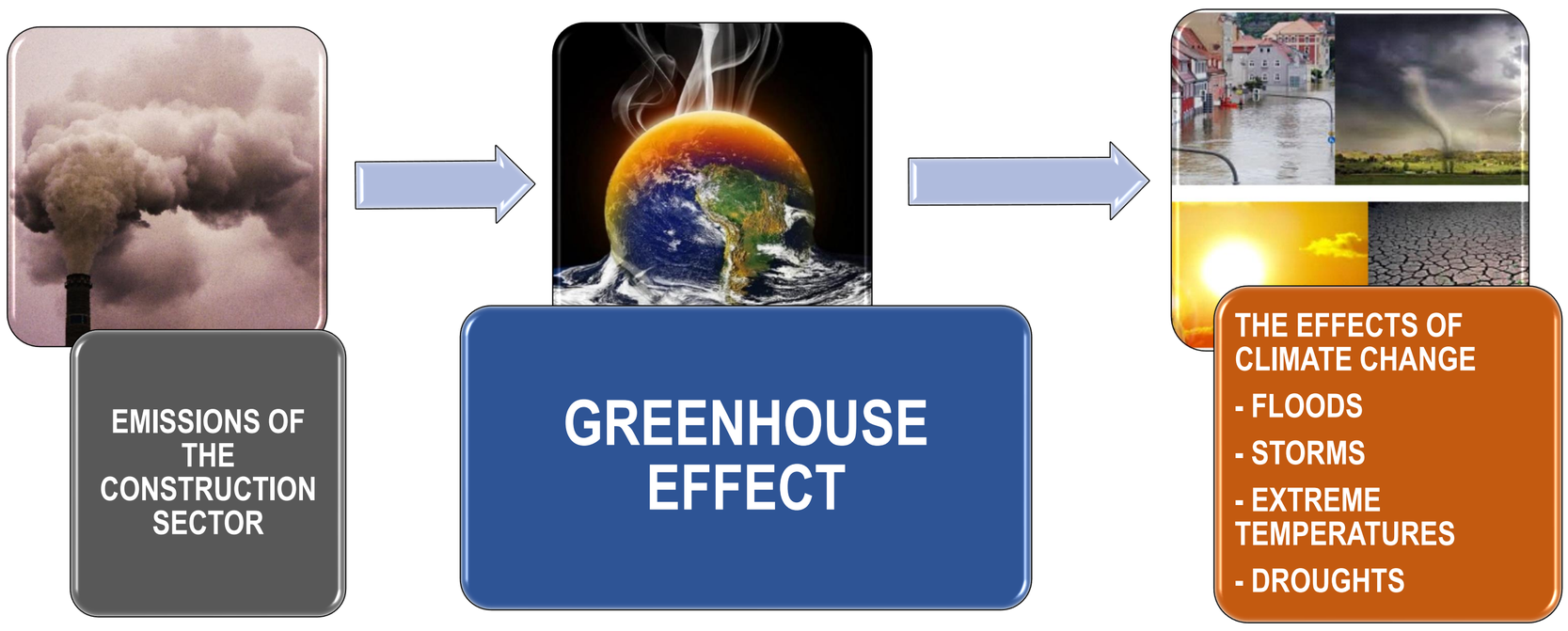
CLIMATE RESILIENT LOCALITIES

from classic materials to traditional sustainable building materials

Research Project PN 23 35 03 01

B

Ioana-Mihaela ALEXE, Adrian-Alexandru CIOBANU, Alexandrina-Maria MUREȘANU



The present project aims to bring Romania closer to the global requirements regarding adaptation to climate change, by creating new products, using local resources, sustainable traditional materials (wood, mud, clay, straw, seeds, etc.) to be used in constructions and which can successfully replace classic materials used today.
Climate mainly caused by human intervention. Human activities cause greenhouse gas emissions that result in long-term changes in weather phenomena.

Thus occur extreme temperatures, drought and forest fires, lack of availabilitychange is of fresh water, floods, landslides, etc. People, societies must adapt to these consequences of climate change, this means adapting housing, infrastructure and natural ecosystems. These changes entail significant costs, which, however, will reduce the future costs of repairing the consequences of disasters caused by climate change.

The development and adaptation of the built environment means the development of new techniques and markets for materials, products and constructive systems for sustainable constructions that are resistant and adapted to the effects of climate change.

ACKNOWLEDGEMENTS:
This work was carried out within Nucleu Programme of the National Research Development and Innovation Plan 2022-2027, supported by MCID, "ECODIGICONS" project no. PN 23 35 03 01: "Integrated system of development and scientific research of constructions and vital infrastructures exposed to extreme seismic and climatic environmental actions and the exploitation of sustainable resources of materials and energy", financed by the Romanian Government.

Contact: ciobanuadrianalexandru@yahoo.com +40724052488

Synthesis process under microwave-assisted hydrothermal conditions of an rGO/Zn-ZnO hybrid electrode

B

Request Patent Application: **OSIM A/00164/03.04.2023**

Cornelia Bandas, Mircea Nicolaescu, Carmen Lazau, Corina Orha, Cristian Casut

National Institute for Research and Development in Electrochemistry and Condensed Matter, no 144, A. Paunescu Podeanu Street, Timisoara 300569, Romania

Description: The invention refers to a synthesis procedure of a hybrid electrode type on rGO/Zn-ZnO under hydrothermal conditions, which supposes two main experimental stages: A) synthesis of an ZnO crystalline layer directly on zinc foil by thermal oxidation obtaining the structure Zn-ZnO; and B) graphene oxide reduction in hydrothermal conditions and "*in-situ*" deposition of rGO film on the Zn-ZnO structure by microwave-assisted hydrothermal method, obtaining the hybrid electrode type on rGO/Zn-ZnO. Based on structural and functional properties, the as-synthesized hybrid electrodes type on rGO/Zn-ZnO could be used in development of the electrochemical sensors, gas sensors, supercapacitors, etc.

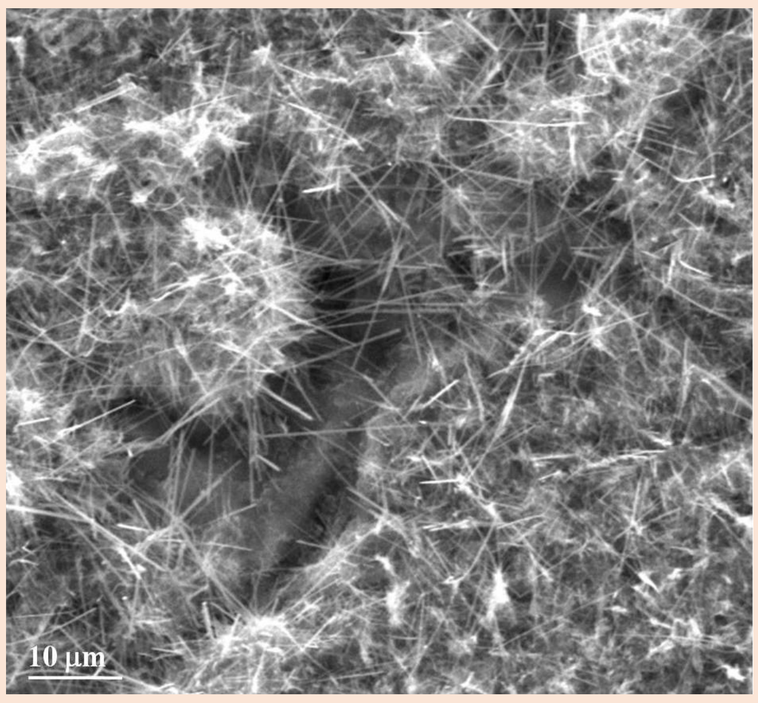


Figure 4. SEM morphologies of the Zn-ZnO

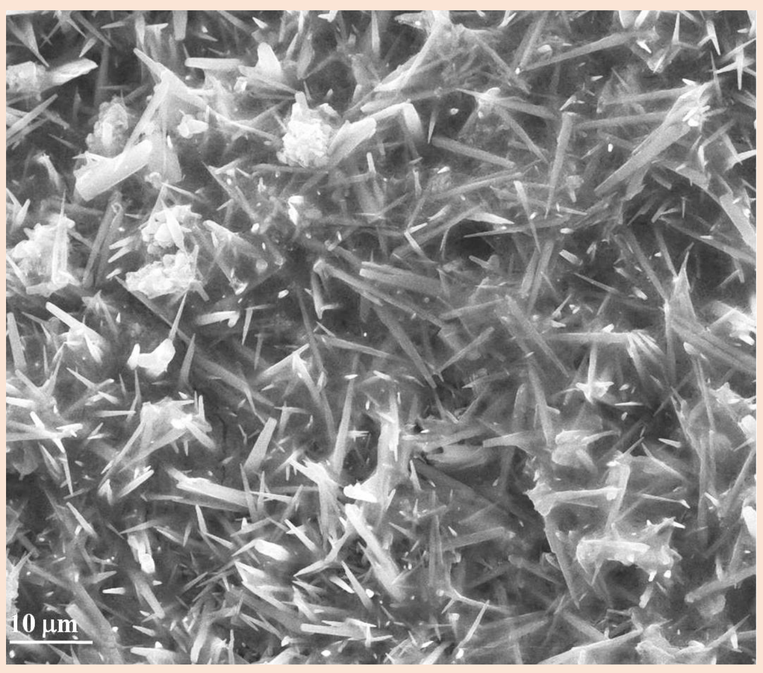


Figure 5. SEM morphologies of the rGO/Zn-ZnO

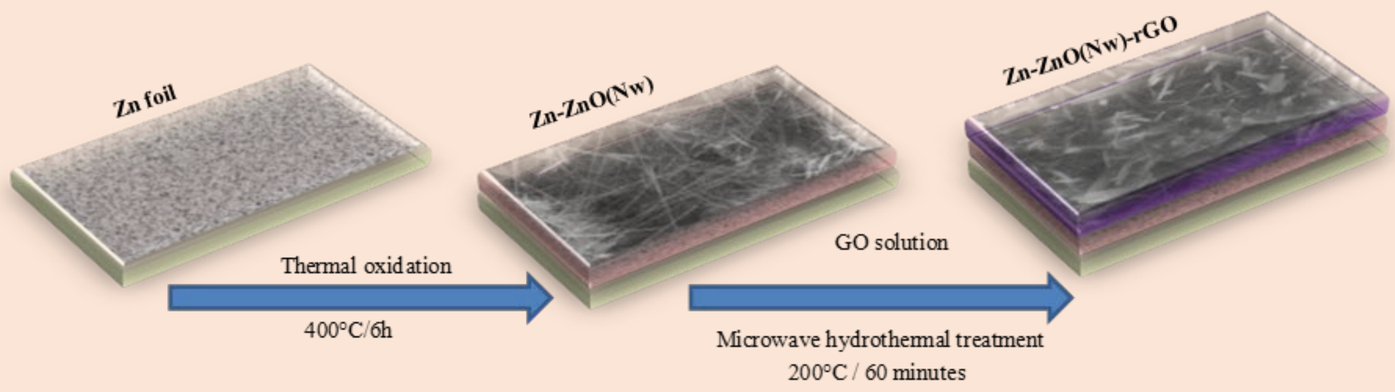


Figure 1. Schematic representation for the development of hybrid electrode

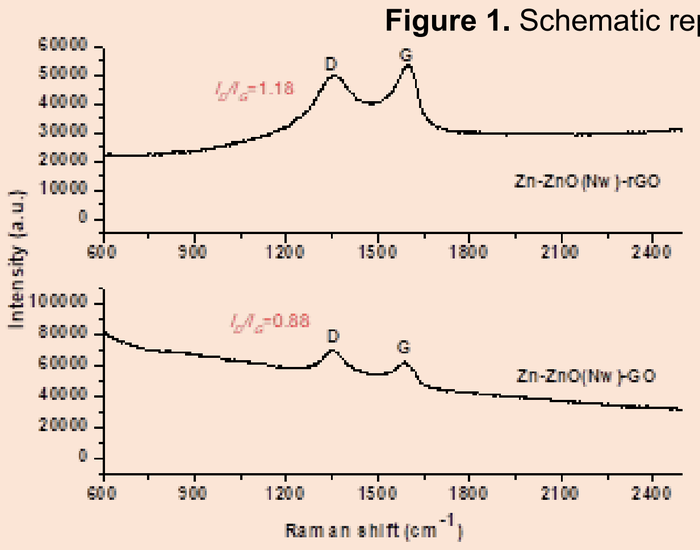


Figure 3. Raman spectra of the as-synthesized hybrid structure

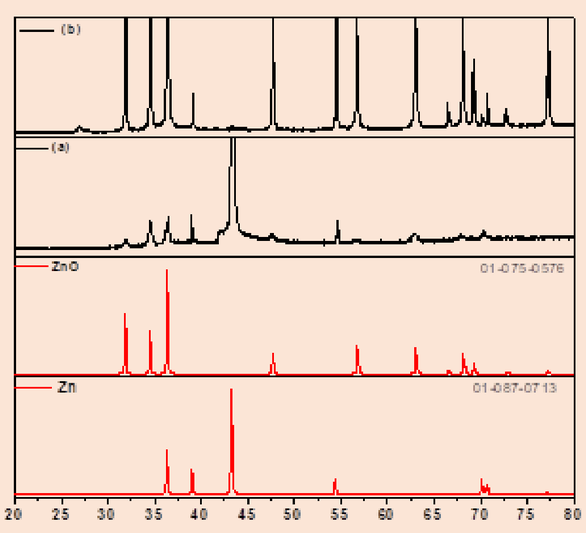


Figure 2. X-ray patterns for the **(a)** Zn-ZnO(Nw) supports and **(b)** Zn-ZnO(Nw)-rGO hybrid structures

Overview:

Due to their high surface area and good conductivity, porous carbonaceous materials (graphite, activated carbon, carbon nanotubes) are the most used as electrode materials for supercapacitors. Among these carbon materials, graphene with two-dimensional nanosheets has attracted a lot of attention because of its large specific area, good mechanical strength and thermal conductivity and exhibits potential applications in supercapacitors and other electrochemical energy storage devices. Metallic oxides, are being investigated as alternative materials for supercapacitor electrodes to improve specific capacitance and energy density. ZnO are a suitable choice as a potential candidate for supercapacitors because they are low cost, environmentally friendly, and possess a high exciton binding energy (60meV) at room temperature and a wide direct band gap (3.37 eV), that usually crystallizes in hexagonal structures that allow a variety of uses in electrochemical properties, magnetic compounds, solar cells, photocatalysts and gas sensing devices. The progress and novelty of this paper are related to the development of new hybrid electrodes based on metallic zinc decorated with nanowires crystalline zinc oxide functionalized with reduced graphene oxide, directly in-situ by microwave-assisted hydrothermal method.

Conclusions:

In summary, a new approach for the development of rGO/Zn-ZnO hybrid by a one-step microwave-assisted hydrothermal deposition method of rGO, directly *in-situ* on Zn-ZnO supports was successfully assessed. According to XRD and Raman analyses, graphene oxide was reduced under microwave hydrothermal treatment, which is accompanied by the increasing of the ZnO nanowires length to about 130 nm anchored on the rGO structure. The morphological result indicates a good adhesion of the reduced graphene oxide layer onto the Zn-ZnO support, and confirms the presence of ZnO nanowires on the Zn support.

Contact: Dr. ing. Cornelia Bandas, INCEMC Timisoara
e-mail: cornelia.bandas@gmail.com

Acknowledgment: This research was funded by a grant of the Ministry of Research, Innovation and Digitization, CNCS - UEFISCDI, project number PN-III-P1-1.1-TE-2021-0963, within PNCDI III, with contract number TE13/2022 (DD-CyT) and project code PN 23 27 01 02 INOMAT, 23-27 29N/2023.

MULTIFUNCTIONAL FURNACE

Opportunity
CORNELIUGROUP
Research-Innovation Association
Creation
INVENTCOR
Realization
Power of Creative Mind
Deva ROMANIA

ÖTLET CLUB EGYESÜLET
13
IDEA
HÓDMEZŐVÁSÁRHELY

Author:
Lajos Vásárhelyi





AESTHETIC
GREAT EFFICIENCY

3 IN 1
STOVE &
CENTRAL HEATING &
WATER HEATER

B

ECONOMICAL

STORE THE HEAT
UP TO 6 HOURS

FOR MASS PRODUCTION





VÁSÁRHELYI LAJOS
MÓRAHALOM, BÉKE U. 107.
06-30/529-1990
POVEDAK@YAHOO.COM

Exploration of Oobleck material for understanding its behaviour when subjected to compressive stress

Scientific Research Project

Authors: Mihail CORDASCO, Larisa PĂCURAR, Claudiu STRÎMBU

Coordinator: Robert-Marian BLEOTU

B

INTRODUCTION

Recently, there has been increasing pressure on all industrial fields to reduce environmental pollution. Thus, researchers and engineers were forced to develop new materials. They have the role of replacing the classic materials used to make different products. Also, these materials can be used in the production of various packaging for transporting products. The use of fluids as packaging material is not very common in industry. Depending on the type of fluid used to produce them, they could be easier to obtain, biodegradable and reduce the use of petroleum-derived plastic products. Costs can also be reduced. A Newtonian fluid has the property that the viscosity is realized as a function of parameters other than temperature. Starch particles in Oobleck can form structures similar to those of liquid glass when subjected to rapid crushing or shaking motions. These structures can lead to the phenomenon of dynamic blocking, which occurs when the particles in the mixture become stuck and can no longer be moved. These structures are formed by the organization of starch particles in a crystalline pattern, which can influence the rheological properties of the mixture. Oobleck, which is a mixture of cornstarch and water, can behave as a Newtonian or non-Newtonian fluid depending on the strain rate. At low strain rates, the mixture behaves like a Newtonian fluid, and at high strain rates, it behaves like a non-Newtonian fluid, that is, it becomes thicker and more resistant to compressive stress.



METHODS

The behaviour of the material under stress

This paper studies the behavior of Oobleck material under compressive stress. To carry out this experimental study it was necessary to use the Galdabini Quasar Q25 tensile and compression testing machine. To make this material, 4 containers were used in which the same amount of its ingredients was inserted. The Oobleck material was made from water and starch. The amounts of these ingredients are: 250 ml water, 300g cornstarch and 2ml food colorant. For easy identification of the samples, a food coloring was also added. In Figure 1, the four material samples can be identified.



Figure 1: Obleck samples used in the study

Due to the theoretical knowledge of this material, a varied range of speeds was used to obtain the results for the force due to displacement. Due to the properties of this material, multiple testing at different speeds on the same sample was possible. The placement of the samples in the test machine can be seen in Figure 2.

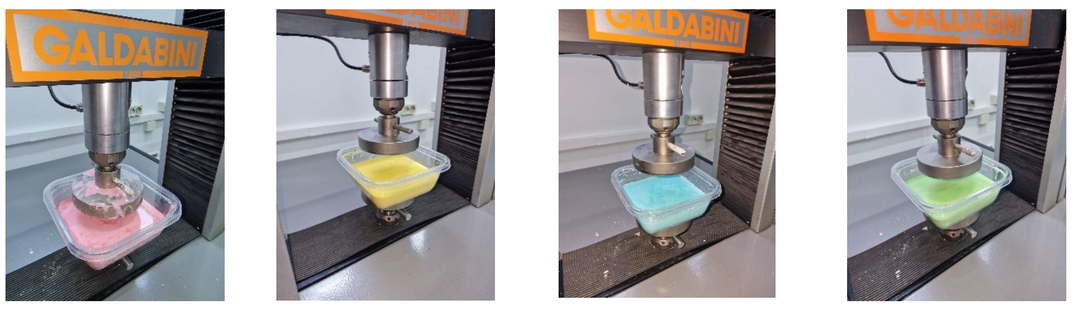


Figure 2: Exemplification of the experiment

Material	Cantitate
Amidon	300 g
Apă	250 ml
Colorant	2 ml

Table 1. Amount of material used for oobleck

Nr.	Speed 1 [mm/s]	Speed 2 [mm/s]
a)	350	450
b)	150	250
c)	750	850
d)	550	650

Table 2. Input data – compression test

RESULTS

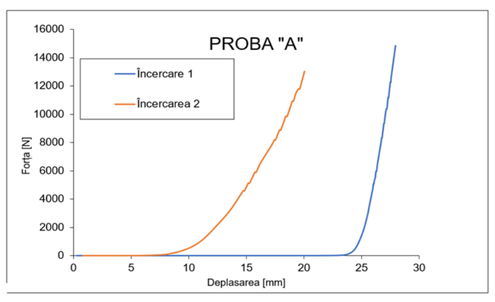


Figure 3 Graph: Force/Displacement: Trial 1 and Trial 2

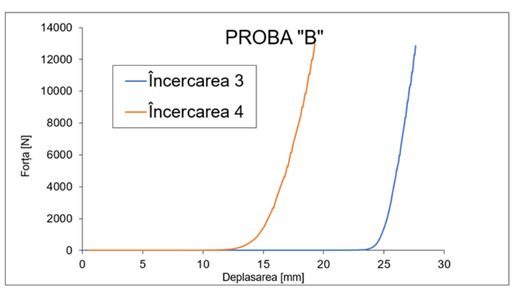


Figure 4 Graph: Force/Displacement: Trial 3 and Trial 4

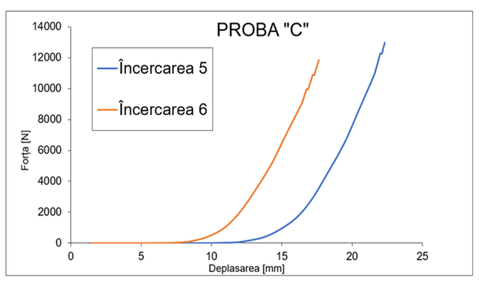


Figure 5 Graph: Force/Displacement: Trial 5 and Trial 6

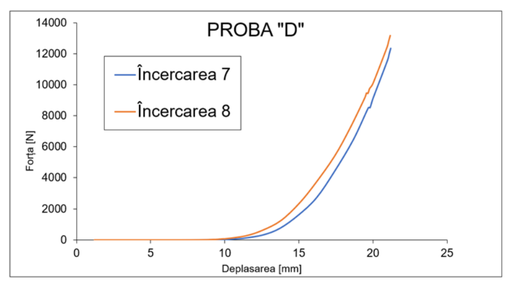


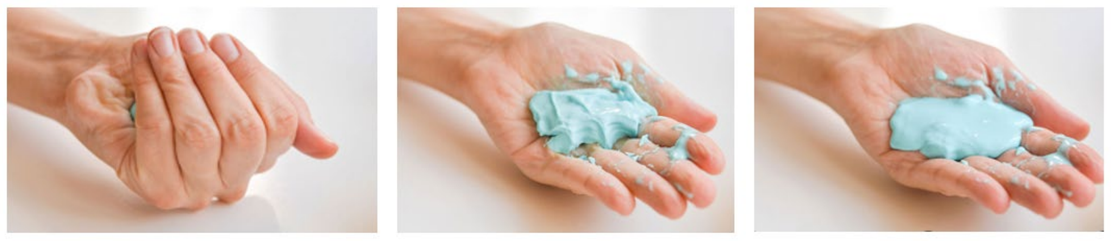
Figure 6 Graph: Force/Displacement: Trial 7 and Trial 8

Following the experiments carried out on the Oobleck material, the force resulting from the displacement of the compression punch on the vertical axis was obtained. In Figure 3 you can see the graph obtained for the first two tests. As can be seen, for a speed of 350 mm/s, the material is able to generate a resistance of 14857 N at a displacement of 28 mm. Also in this graph you can see the results for the second attempt. At a speed of 450 mm/s, a force of 12726 was obtained at a displacement of 20 mm.

In Figure 4 you can see the results obtained for the following tests. In trial 3, a speed of 150 mm/s was used. The resulting force over a distance of 28 mm is 12838.75 N. For test 4, a speed of 250 mm/s was used. The force obtained over a distance of 20 mm is 12979.75 N.

Figure 5 shows the graph for test 5 and 6. For test 5 a speed of 750 mm/s was used. The force obtained at a displacement of 22 mm was 13021 N. The sixth test was performed at a speed of 850 mm/s. For a displacement of 18 mm, a force of 11830.88 mm was obtained.

Finally, figure 6 shows the graph for test 7 and 8. It can be seen that in test 7 (550 mm/s) for a displacement of 22 mm a force of 12359.25 N was obtained. Test 8 was performed at a speed of 650 mm/s. The force obtained was 13155.63 N at a displacement of 21.5 mm.



CONCLUSIONS

The Oobleck material has very good abilities to absorb energy in the event of an impact. It has been proven that this material is advantageous for high speed demands. As the speed increases, it bears an increasing compression force depending on the displacement of the compression punch. Using oobleck as a packaging material has several advantages over traditional packaging materials such as plastic and polystyrene. It is biodegradable, cheap, easy to produce and has excellent insulating properties. In addition, using oobleck as a packaging material can help reduce the amount of plastic waste in the oceans and promote sustainability. As consumers become more aware of the environmental impact of packaging waste, using oobleck as a packaging material could become a more popular and viable option for businesses.

Contact: Robert-Marian Bleotu

„Lucian Blaga” University of Sibiu, Faculty of Engineering

robert.bleotu@ulbsibiu.ro

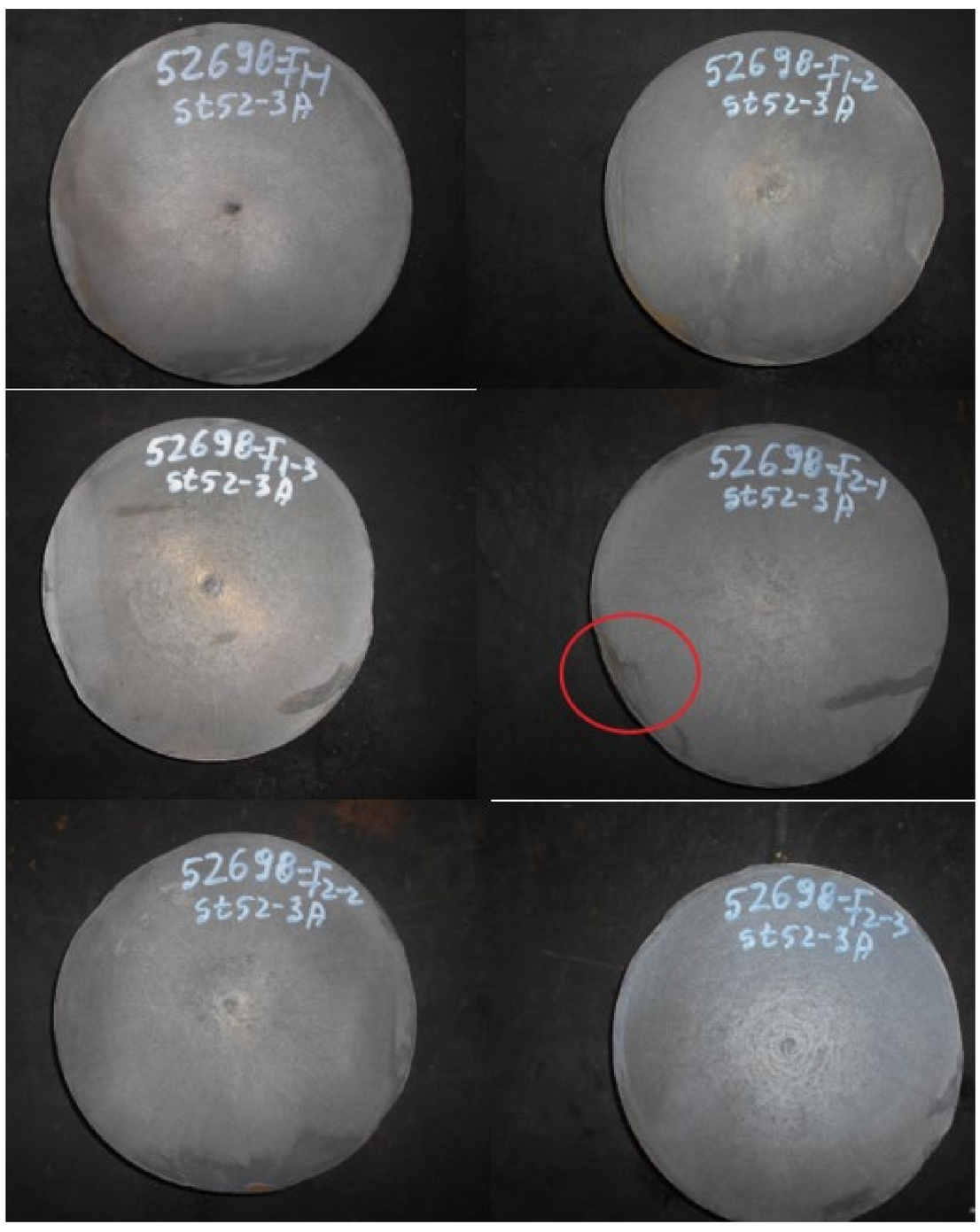
Morphology of non-metallic inclusions in continuously cast steel semi-finished products for the automotive industry

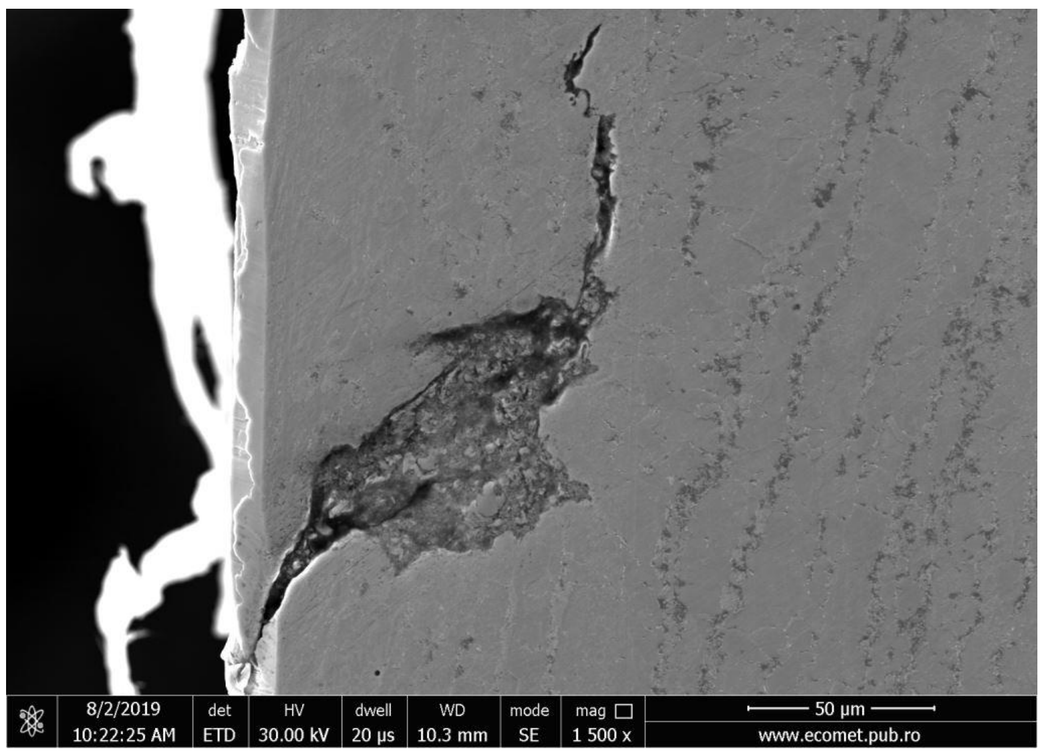
PhD Thesis

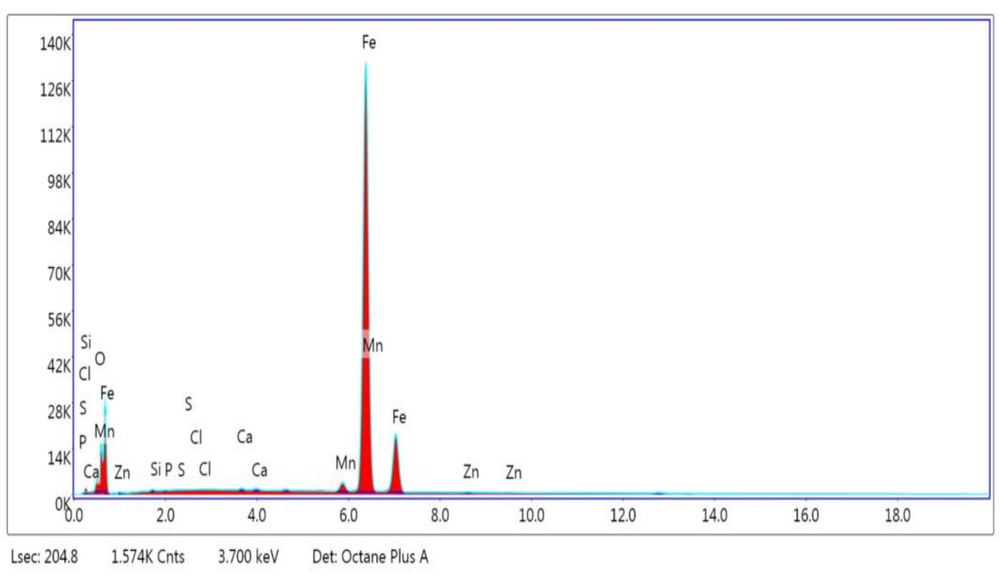
Authors: Iulia Poenaru, Ana Socalici, Adina Budiul Berghian, Corneliu Birtok Baneasa

B

Non-Metallic Inclusions are chemical compounds consisting of a combination of a metallic element (Fe, Mn, Si, Al, Ca, etc.) and a non-metallic one (O, S, N, C, etc.). The most common inclusions include oxides, sulphides, oxy-sulphides, phosphates, nitrides, carbides and carbo-nitrides. One of the essential points in steelmaking is the control of non-metallic inclusions from the morphological point of view, their composition, size, quantity and distribution. Reducing the occurrence of defects is a point of major importance as their correction or removal requires time and high costs. The purity of steel in non-metallic inclusions depends on the genesis (origin-source, formation, birth, therefore also the moment of appearance) and on the morphology of the inclusions (physico-chemical changes, structure and chemical composition). Industrial research focused on steel S 355 J2, according to EN 10025:2004. The developed steel is cast continuously in the form of billets with a diameter of 177 mm, semi-finished products intended for the manufacture of hydraulic cylinders in the automotive industry.







The macrostructure, depending on the requirements for the continuously cast semi-finished product, is thus highlighted by highlighting the segregation of sulfur. Samples were analyzed by scanning electron microscopy (SEM) and energy dispersive X-ray microanalysis (EDAX) on a Quanta Inspect scanning electron microscope. The purity of the metal charge is an important factor that influences the chemical composition and which affects the quality of the steel. Nonmetallic inclusions can be controlled during pot treatments by controlling their addition materials and techniques.

Contact: iulia.poenaru@student.upt.ro +40724336658

THE DEVELOPMENT OF ENVIRONMENTAL MONITORING SENSORS BASED ON n-TiO_2/p-$CuMnO_2$ OXIDE HETEROJUNCTIONS

PHD

Autor: Mircea Nicolaescu[1,2], Cornelia Bandaș [2], Corina Orha[2], Carmen Lazău[2], Viorel Aurel Șerban[1]

[1]*Politehnica University Timisoara*

[2]*National Institute for Research and Development in Electrochemistry and Condensed Matter*

B

Description: In this scientific research, we investigated the use of an n-TiO_2/p-$CuMnO_2$ semiconductor oxide heterojunction for the development of sensors aimed at environmental monitoring, specifically in the detection of UV radiation and CO_2 in the gas state. Various designs of sensitive modules were tested depending on the intended application. For UV detection, two distinct designs were employed. A simple and cost-effective device was developed by directly growing titanium oxide on a titanium support, followed by the deposition of a layer of $CuMnO_2$. Additionally, we utilized an FTO conductive glass substrate to create a transparent and self-powered sensor based on the oxide heterojunction, enabling the development of self-powered UV sensors. For gas sensing, we grew zinc oxide nanowires on a zinc substrate, and then deposited a layer of $CuMnO_2$ to achieve the behavior of the heterojunctions. Furthermore, the gas testing was conducted at 400 PPM CO_2 in an Ar carrier gas with varying testing temperatures.

Production of UV and gas heterojunction sensor

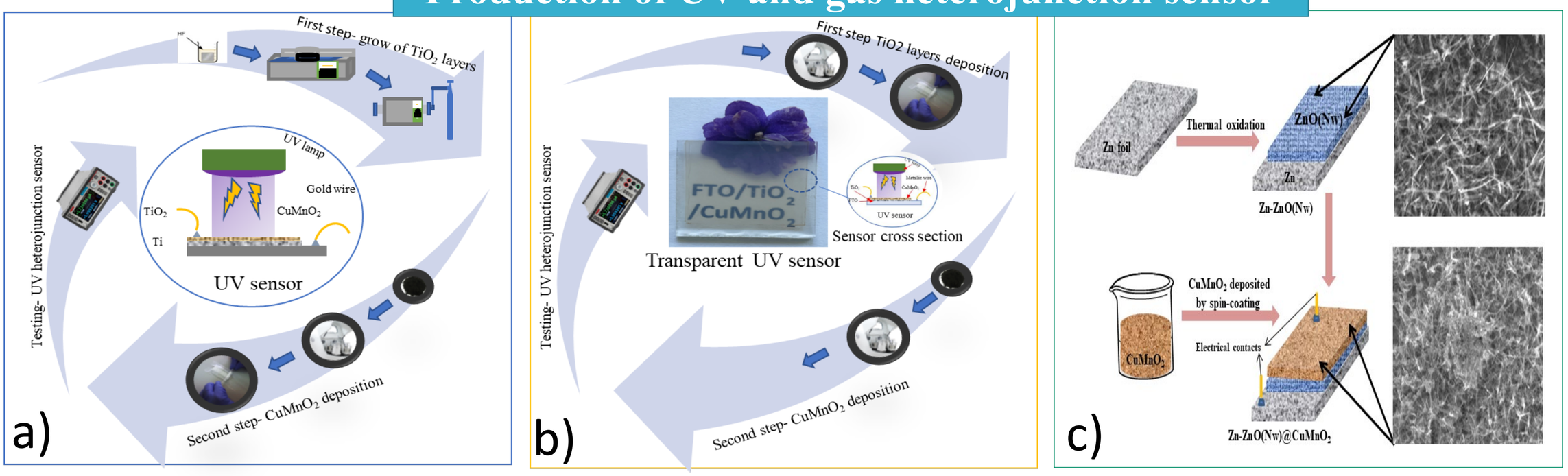


Figure 1. n-TiO2/p-CuMnO2 heterojunction sensor; a) UV sensor; b) Self-powered UV sensor; c) CO_2 sensor

Testing UV and heterojunction gas sensor

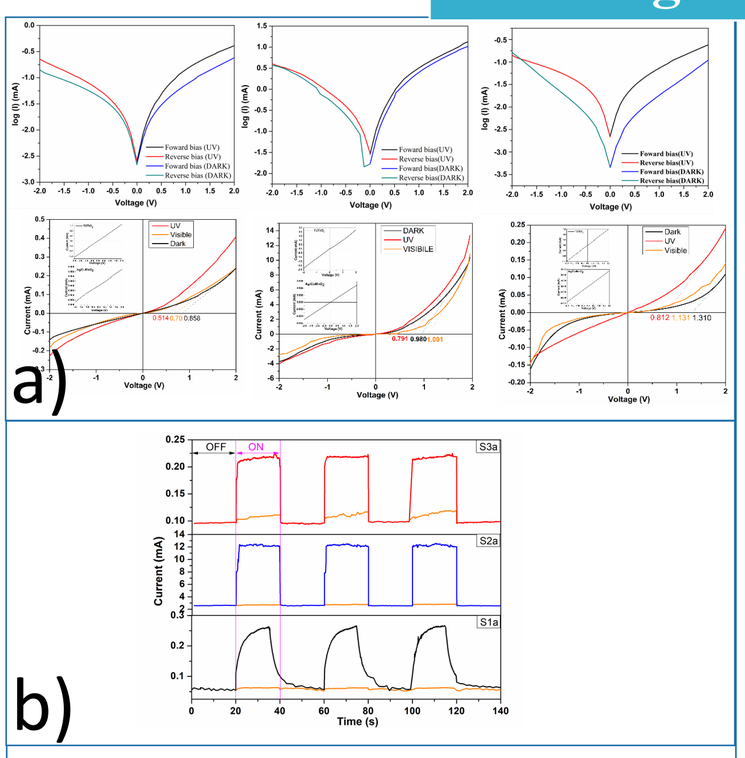


Figure 2. Electrical measurement of Ti/TiO_2/$CuMnO_2$ sensor; 2a) I-V heterojunction measurement; 2b) I-T sensibility measurement

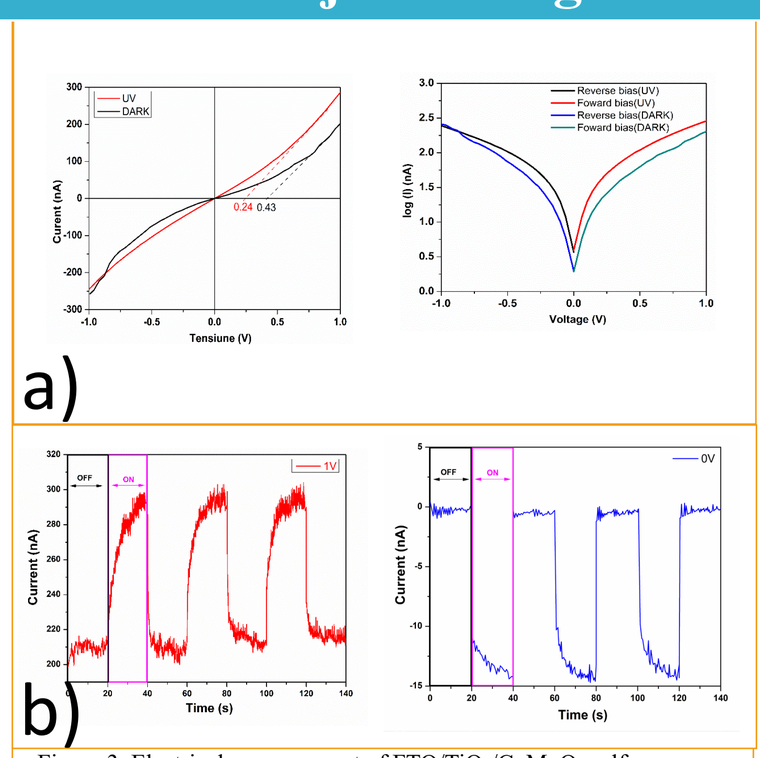


Figure 3. Electrical measurement of FTO/TiO_2/$CuMnO_2$ self power sensor; 3a) I-V heterojunction measurement; 3b) I-T photo-detective properties of the UV sensors at light exposure is self power mod

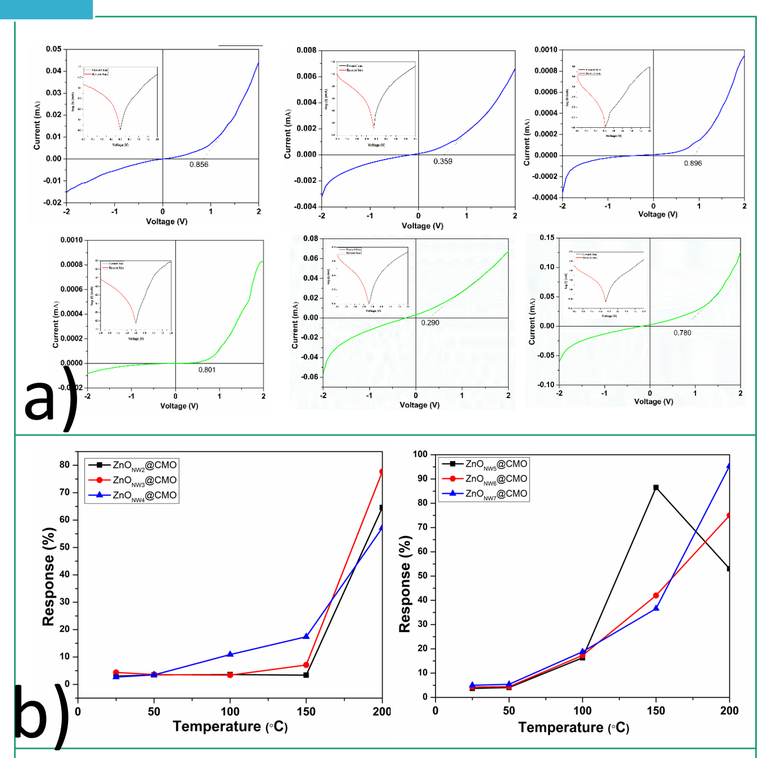


Figure 4. Electrical measurement of Zn/ZnO/$CuMnO_2$ gas sensor; 4a) I-V heterojunction measurement; 4b) Response measurement to temperature of testing sensor

Description: Figure 2 displays the electrical measurements of the UV sensors fabricated on a titanium support under dark, visible, and UV illumination. Sensor S2a demonstrates the highest sensitivity and responsivity values of 4.99 and 100.6 mA mW−1 cm2, respectively, along with a rapid response time of approximately 1.56 s. Figure 3 shows the electrical measurements of the self-powered UV sensor in dark and UV illumination. This device exhibits an outstanding ON/OFF ratio of about 48.3 at 0 bias, which is significantly higher than the value obtained at 1 V bias of about 1.4. In Figure 4, the electrical measurements of the ZnO/$CuMnO_2$ heterojunction gas sensor are presented. The sensors were tested in an experimental setup, and the results revealed that for the ZnONw7@CMO sensor, at a testing temperature of 200°C and a CO_2 concentration of 400 ppm, the maximum response was 95.4%. However, for the ZnONw5@CMO sensor, the maximum response value of 85.5% was obtained at an operating temperature of 150°C.

Contact:mircea.nicolaescu@student.upt.ro

Life cycle of steel

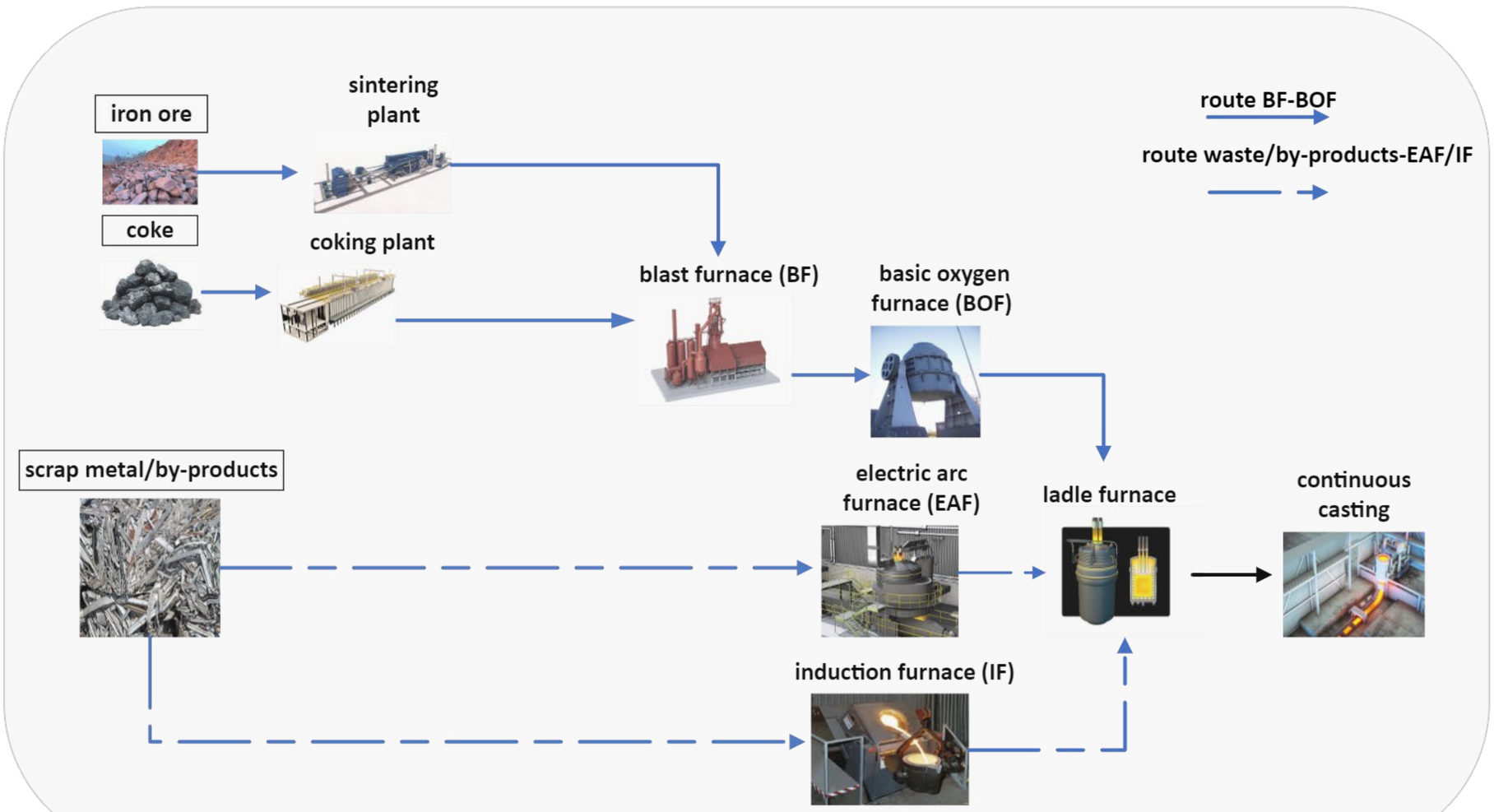
B

PhD Thesis

Authors: Ioana FĂRCEAN, Gabriela PROȘTEAN, Erika ARDELEAN, Ana SOCALICI

Steel is among the few materials that can be recycled without the new product obtained showing inferior quality characteristics, with a wide area of use from construction and infrastructure to general purpose goods, steel is a 100% recyclable material.

Annually, approximately 70% of the steel produced worldwide is manufactured via the blast furnace (BF) - basic oxygen furnace (BOF) route, similar to the electric arc furnace (EAF) route, where the load can be made up of 100% steel scrap, only about 30 % of the world's steel is produced.





Steel scrap has a significant economic value, which is why the demand for recycled materials in the aftermarket is well established. Steel is recycled in a closed loop so that the properties of the primary product made from primary resources (iron ore, limestone, coal) and the secondary product made from waste are equivalent. Essentially by using waste as secondary resources of raw materials, primary natural resources are replaced without generating changes in production flows or the quality of finished products.

Worldwide, the need for steel waste for the steel industry exceeds the availability of waste (aspect due to the long life of steel products), hence the smaller amount of steel produced in the electric arc furnace.

Contact: farceanioana@yahoo.com

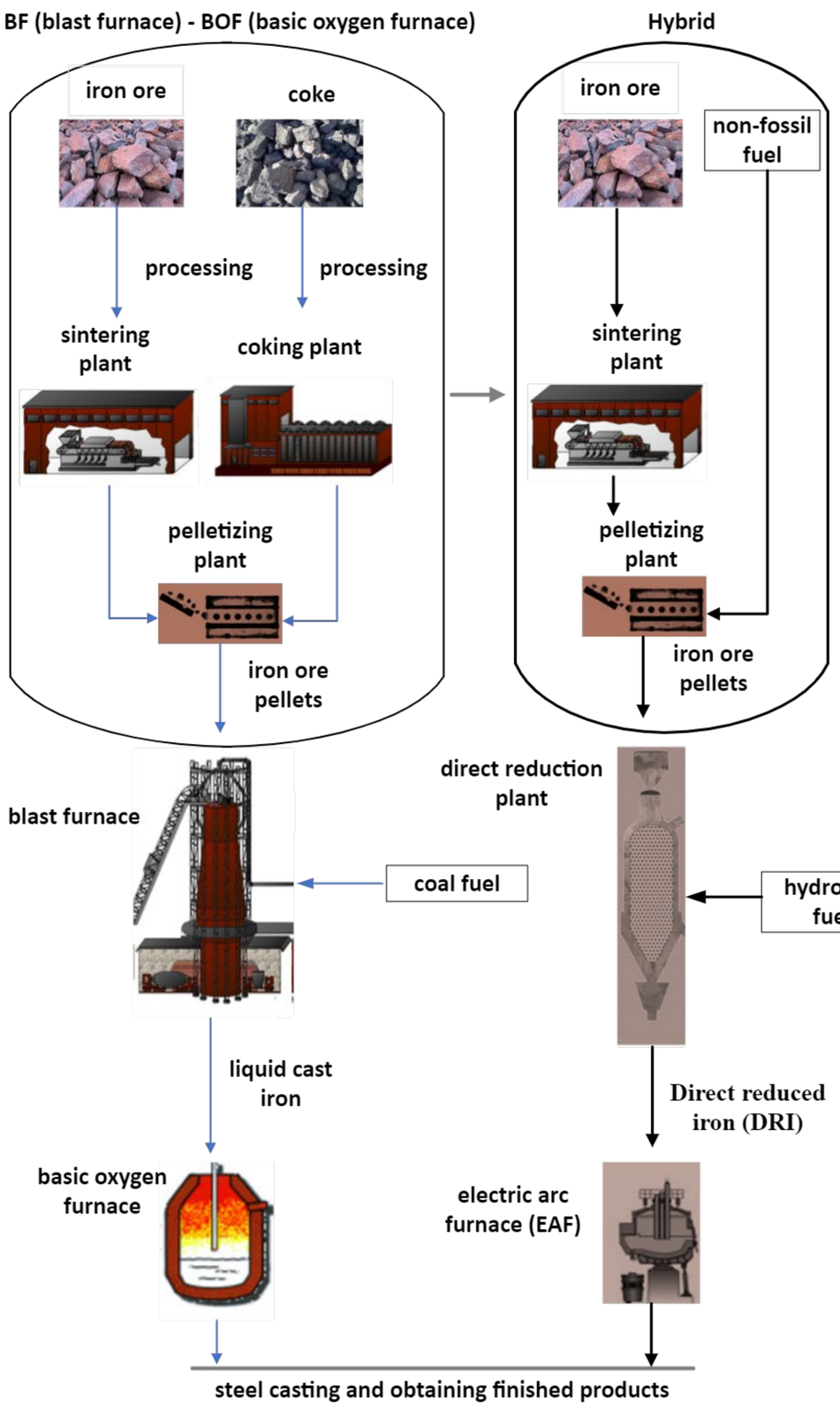
Possibilities to minimize emissions in steelmaking

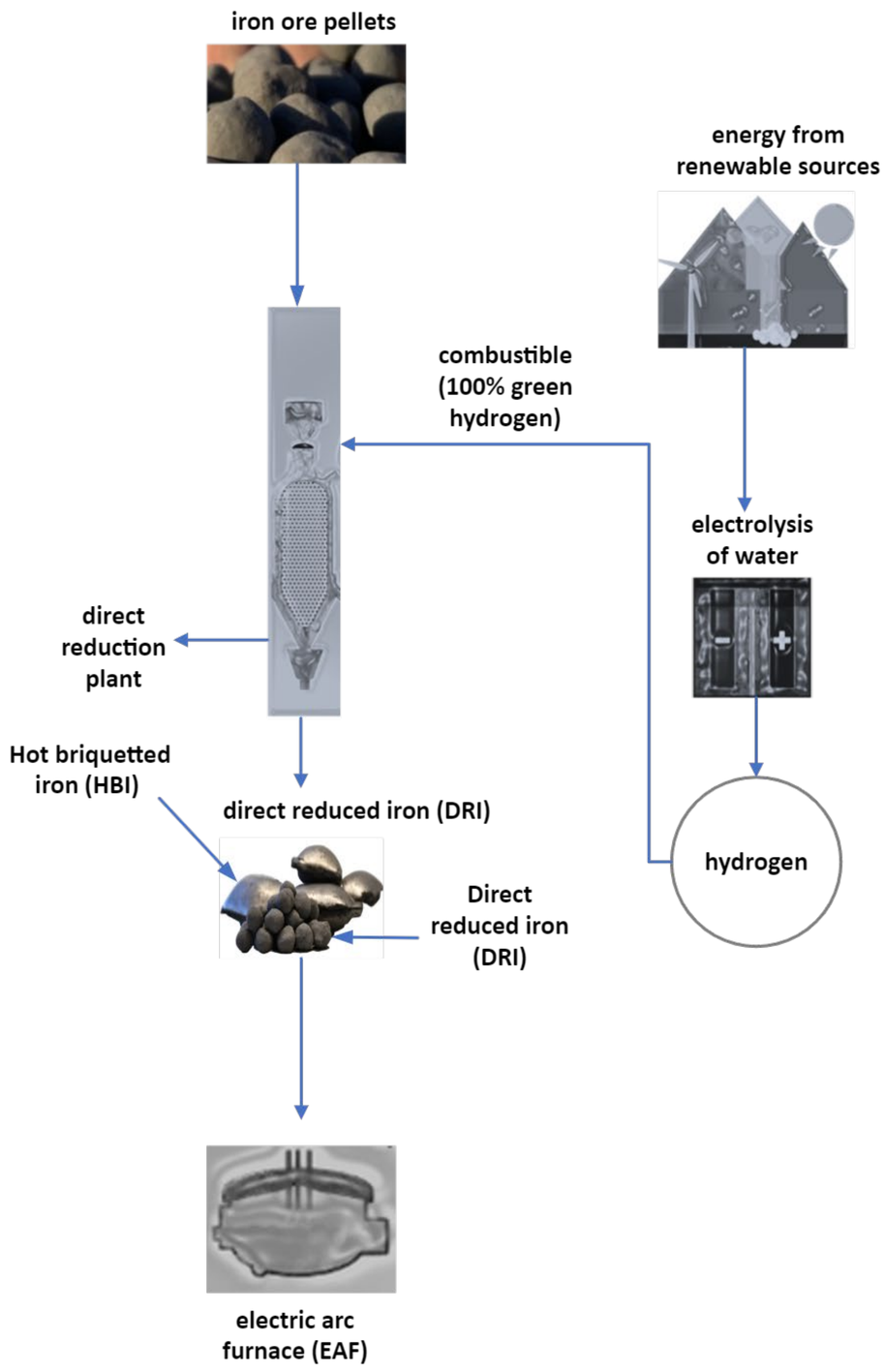
B

PhD Thesis

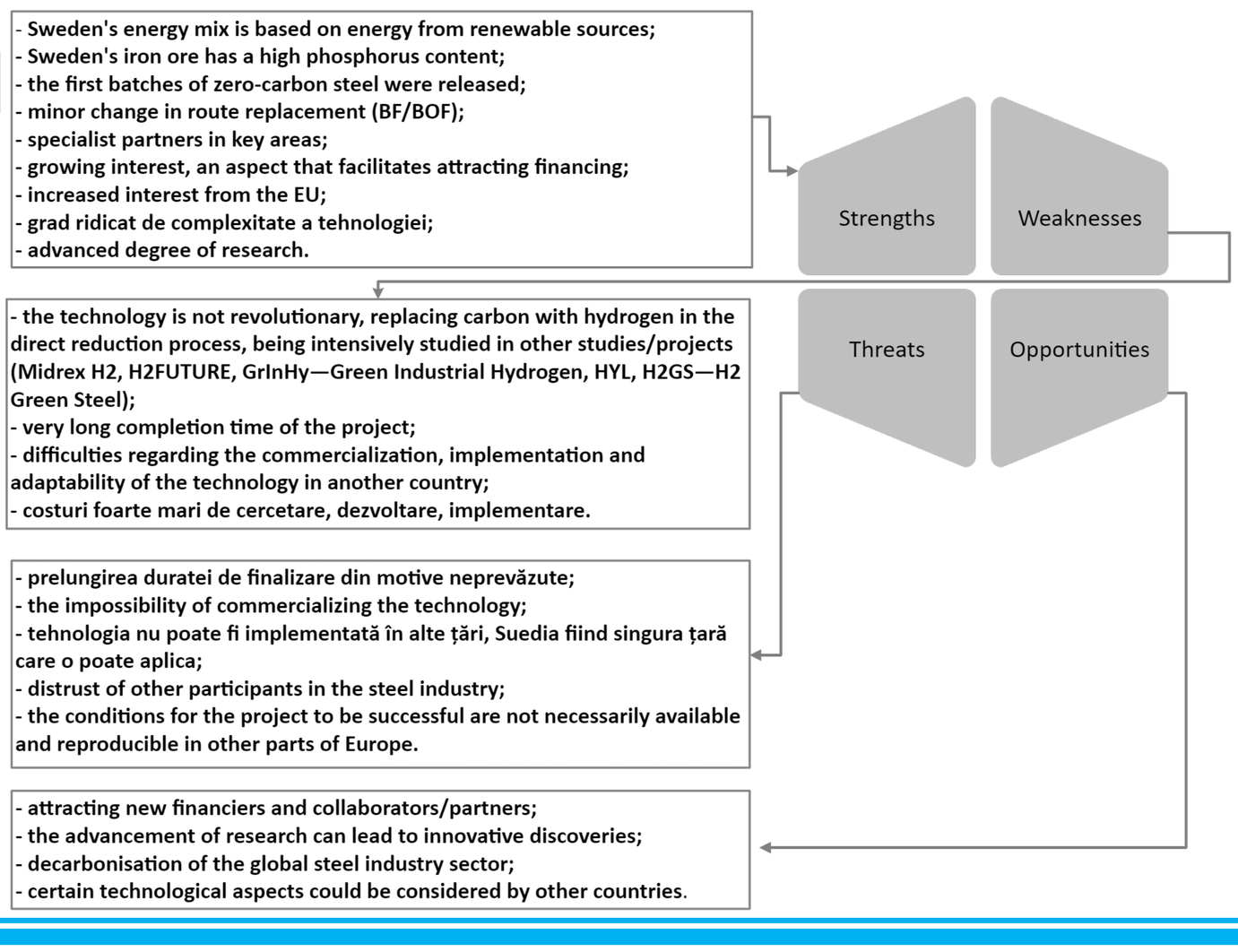
Authors: Ioana FĂRCEAN, Gabriela PROȘTEAN, Ana SOCALICI, Erika ARDELEAN

The steel industry is among the largest industries in the world that generate high amounts of CO_2 emissions. The most popular steelmaking route, which uses pig iron and steel scrap, accounts for almost 70% of crude steel production in the EU is the blast furnace – oxygen converter (BF/BOF) route. Currently, due to the needs to reduce CO_2 emissions, electric arc furnace (EAF) steelmaking is gaining more ground. The reasons for this change are due to the fact that the steelmaking process in EAFs from ferrous scrap/direct reduced iron (DRI) has lower CO_2 emissions. The great challenge for the steel industry is to find a replacement for fossil fuels or to capture and store the generated emissions, the research carried out in the field leading to the development of the Hybrid Project in Sweden.





The aim of the Hybrid project is to contribute to the decarbonization of the steel industry, by using hydrogen produced with electricity through the electrolysis of water. The progress made up to this point being a real success, but there are still many obstacles to be met and overcome, some of them have been identified in the SWOT analysis carried out.



Contact: farceanioana@yahoo.com

Department for Research, Development and Innovation Management
Knowledge and Technological Transfer Center

15 Constantin Daicoviciu street
400020, Cluj-Napoca, România

e-mail: liliana.pop@staff.utcluj.ro

www.utcluj.ro

B

Title

METHOD OF ELECTRODEPOSITION OF ZINC-NICKEL ALLOY ON STAINLESS STEEL SUBSTRATE

Inventor/s - Contact

Vermeşan Horaţiu (Horatiu.Vermesan@imadd.utcluj.ro), Chira Mihail (chmihai.27@gmail.com)

Patent/ Application number

Patent OSIM no.: RO134133- B1/29.04.2022

Short presentation

The invention relates to a method of zinc-nickel alloy electrodeposition on the stainless steel parts through several stages. Electrodeposition of zinc-nickel alloy on stainless steel is important in applications where stainless steel is in contact with a less noble metal. Electrodeposition of zinc-nickel alloy on stainless steel is used especially in the automotive industry. The method of electrodeposition of the zinc-nickel alloy on a stainless steel substrate according to the invention consists of: chemical degreasing (only if the parts are dirty, oily); washing in water; surface preparation in alkaline solution; washing in water and electrolytic zinc in alkaline Zn-Ni solution.

Applicability

Chemical industry, automotive industry, telecommunications industry, planes, boats and ships in harsh environmental corrosive conditions

Images



(a)
Electrodeposition of the zinc-nickel alloy without using the method claimed on stainless steel substrate

(b)
Electrodeposition of the zinc-nickel alloy by the claimed method, on stainless steel substrate

©
Stainless steel without electrodeposition

Images with parts obtained by electrodeposition of zinc-nickel alloy on stainless steel substrate

Department for Research, Development and Innovation Management
Knowledge and Technological Transfer Center

15 Constantin Daicoviciu street
400020, Cluj-Napoca, România

e-mail: liliana.pop@staff.utcluj.ro

www.utcluj.ro

B

Title

COMPOSITE PLATES OF NATURAL FIBERS AND PROCESS USED FOR OBTAINING IT

Inventor/s - Contact

1. Florea Iacob, PhD student at Faculty af Civil Engineering, Technical University of Cluj-Napoca, iacob.florea@ccm.utcn.ro
2. Manea Daniela Lucia, Professor at Faculty af Civil Engineering, Technical University of Cluj-Napoca, daniela.manea@ccm.utcluj.ro

Patent/ Application number

Patent OSIM no.: RO134330- B1/30.06.2022

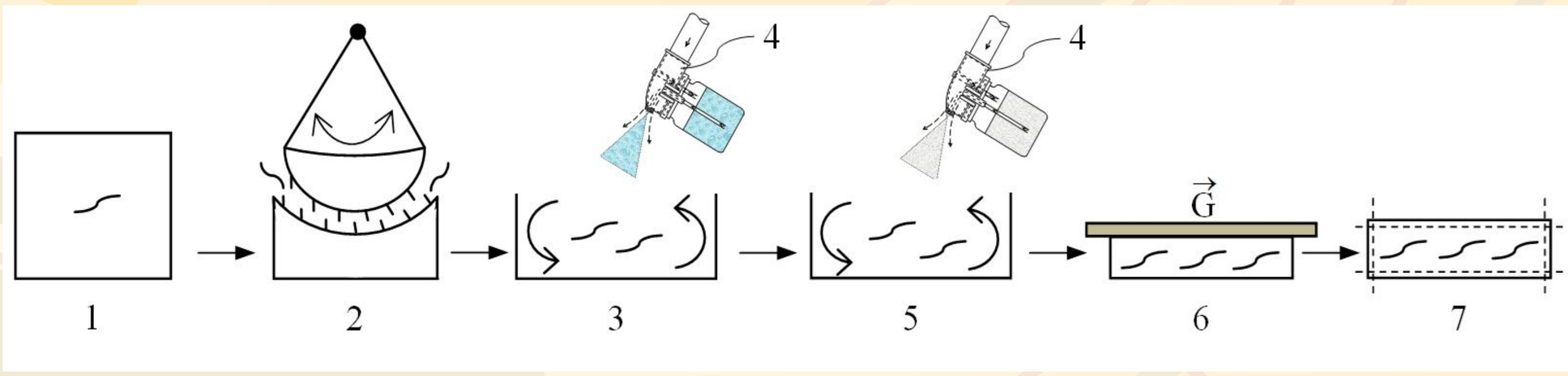
Short presentation

The invention relates to obtaining composite plates made from natural fibers of sheep's wool intended for the thermal insulation of constructions that meet the defining regulations for a thermal insulation material, and the process for obtaining them. Composite boards are made from a mixture of sheep wool fibers, mixed with glue (adhesive) and various binders (clay, Portland cement, plaster, hydrated lime, hydraulic lime NHL 3.5, lime lime, washable lime, starch , bone glue and rosin). By removing the disadvantages of the wool-based insulation products, which comes in different forms (mattresses or rollers), the innovative character of this invention consists in ensuring dimensional stability of the insulating material. The process of obtaining the plates consists of wool fiber loosening, wool dosing, hydrating it by spraying water into wool mass in an equal amount to wool mass, dosing the adhesive and binder, water, spraying the mixture into wool mass, pouring the mixture In printing, the compression of the composite plate for 24 hours, its decofraction and the compression interval of 48-72 h.

Applicability

The problem solved by the invention is the creation of wool-based composite plates with low thermal conductivity and density, using a process for obtaining low energy consumption. Natural wool fiber composite tiles are viable natural alternative to synthetic fibers, intended for thermal insulation of buildings and can be easily applied, thus helping to increase the energy efficiency of buildings.

Images





Department for Research, Development and Innovation Management
Knowledge and Technological Transfer Center

15 Constantin Daicoviciu street
400020, Cluj-Napoca, România

e-mail: liliana.pop@staff.utcluj.ro

www.utcluj.ro

B

Title

PROCEDEE DE OBTINERE A UNOR AMBALAJE ALIMENTARE INTELIGENTE

PROCESS FOR OBTAINING NANOCOMPOSITE FOOD PACKAGES

Inventor/s - Contact

PETER ANCA, BAIA MARE, RO - Anca.PETER@cb.utcluj.ro; NICULA CAMELIA, BAIA MARE, RO - Camelia.NICULA@cb.utcluj.ro
MIHALY COZMUTA ANCA, COMUNA RECEA, RO - Mihaela.MIHALY@cb.utcluj.ro; MIHALY COZMUTA LEONARD, COMUNA RECEA, RO - Leonard.MIHALY@cb.utcluj.ro; DANCIU VIRGINIA, CLUJ-NAPOCA, RO; BAIA GHEORGHE LUCIAN, CLUJ-NAPOCA, RO; KOVACS GABOR, PECICA, RO; CIRIC ALEXANDRU, COMUNA CHIAJNA, RO; BEGEA MIHAELA, BUCURE$TI, RO; CRACIUN LILIANA, DEJ, RO; CRACIUN GRIGORE, DEJ, RO; DUTUC GHEORGHE, DEJ, RO; FALUP ANCA, DEJ, RO; ZIEMKOWSKA WANDA, LEGIONOWO, PL; JASTRZEBSKA AGNIESZKA, NADARZYN, PL; KURTYCZ PATRYCJA, BIALYSTOK, PL; KARWOWSKA EWA, BLONIE, PL; MIASKIEWICZ-PESKA EWA, WARSAW, PL; ZALESKA RADZIWILL MONIKA, WARSAW, PL; OLSZYNA ANDRZEJ, WARSAW, PL; KUNICKI ANTONI, PRUSZKOW, PL; SITARZ KAROLINA, KLWOW, PL; ROSLON MAGDALENA, JASIENICA, PL

Patent/ Application number

Patent OSIM no.: RO130496- B1/30.08.2022

Short presentation

This invention relates to processes for obtaining intelligent food packaging based on polypropylene and paper respectively, which ensure the food preservation extend its shelf life. The technical problem that the claimed invention aims to solve is to carry out a process of obtaining active packaging that ensures the preservation of as many types of food as possible, for a longer duration, both at the ambient temperature of 10-30° C and at refrigeration (0-10° C), as well as ensuring the maintenance of the food characteristics during the conservation period. The used raw materials were paper and polypropylene, respectively modified with nano-structured materials, such as:

1. Mixed composite titanium dioxide - silicon dioxide modified with silver nanoparticles
2. Titanium dioxide modified with gold nanoparticles
3. Titanium dioxide modified with nitrogen and silver nanoparticles.

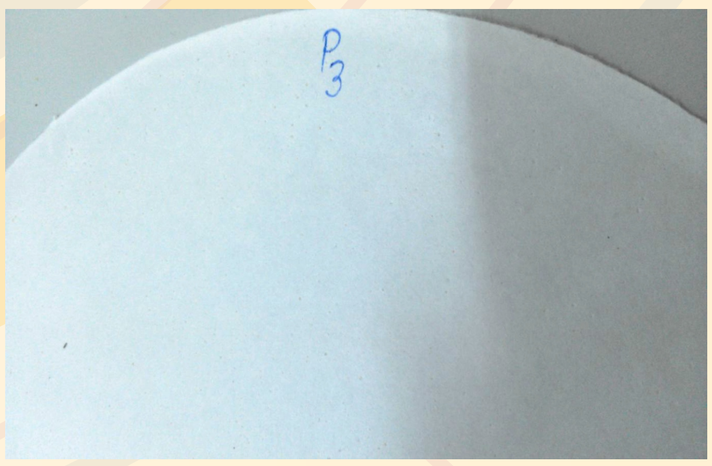
The process of obtaining smart food packaging has the following advantages: it prolongs the shelf life of food products; ensures the preservation of the properties of food throughout its storage in smart packaging; stimulates the growth of lactic acid bacteria in dairy products packaged in smart packaging

Applicability

The field of use of the invention is very wide, they can be used both at the individual level in the household, and especially on an industrial scale, in all operations aimed at food products: production, storage, transport, sale.

Images





UNIVERSITATEA TEHNICĂ DIN CLUJ-NAPOCA
MEMBER OF EUT+ EUROPEAN UNIVERSITY OF TECHNOLOGY

Department for Research, Development and Innovation Management
Knowledge and Technological Transfer Center

15 Constantin Daicoviciu street
400020, Cluj-Napoca, România

e-mail: liliana.pop@staff.utcluj.ro

www.utcluj.ro

B

Title

INNOVATIVE USE OF SHEEP WOOL AND POLYURETHANE FOAM FOR OBTAINING MATERIALS WITH SOUND-ABSORBING PROPERTIES

Inventor/s - Contact

OVIDIU NEMEŞ, SIMONA IOANA BORLEA (MUREŞAN), ANCUŢA-ELENA TIUC, GYORGY DEAK
Ovidiu.Nemes@imadd.utcluj.ro

Patent/ Application number

Patent application OSIM: A/000320/10.06.2022

Short presentation

The aim of this work was to obtain materials with sound-absorbing properties using sheep wool and rigid bicomponent polyurethane foam. Four materials with three layers were obtained. A layer of sheep wool previously processed by hot pressing at 80°C and 5 MPa, with final thicknesses of 2, 4, 6 and 12 mm; a layer of polyurethane foam, with a thickness of 8....37 mm and a transition layer, 1...20 mm thick, resulting from the migration of polyurethane foam during the multilayer panel manufacturing process into the wool layer and/or the migration of wool into the polyurethane foam layer. Wool and polyurethane foam are the combination of sound insulation and sound absorption - wool absorbs sound and reduces it, and due to the rigid structure of polyurethane foam (closed pore structure), it does not allow sound to travel further, resulting in sound insulation.
The obtained materials have very good sound absorption properties with acoustic absorption coefficient values over 0.7 for the frequency range 800 ÷ 3150 Hz; the results prove that the sheep wool has a comparable sound absorption performance to that of mineral wool.

Applicability

The study explores alternative usage of sheep wool as a construction material with improved sound absorbing properties beyond its traditional application as a sound absorber in textile industry or using of waste wool in the textile industry as a raw material. Sound absorbing materials can be used to reduce noise and to obtain an adequate acoustic for enclosed spaces. They can have many uses, both outdoors and indoors: in industry, commercial areas, relaxation and leisure areas, in areas used for education, in constructions, on building sites, highways, roads and streets, airports, ports, railways, etc. Materials studied in this research can be used to reduce noise impact, as decorative panels with sound absorbing role, to improve acoustic conditions, and to reduce or stop reverberations.

Images



A



B

Fig.1. Processing phases:
A: Phase I - Wool plate hot formed ;
B: Phase II - Finale structure of the plate

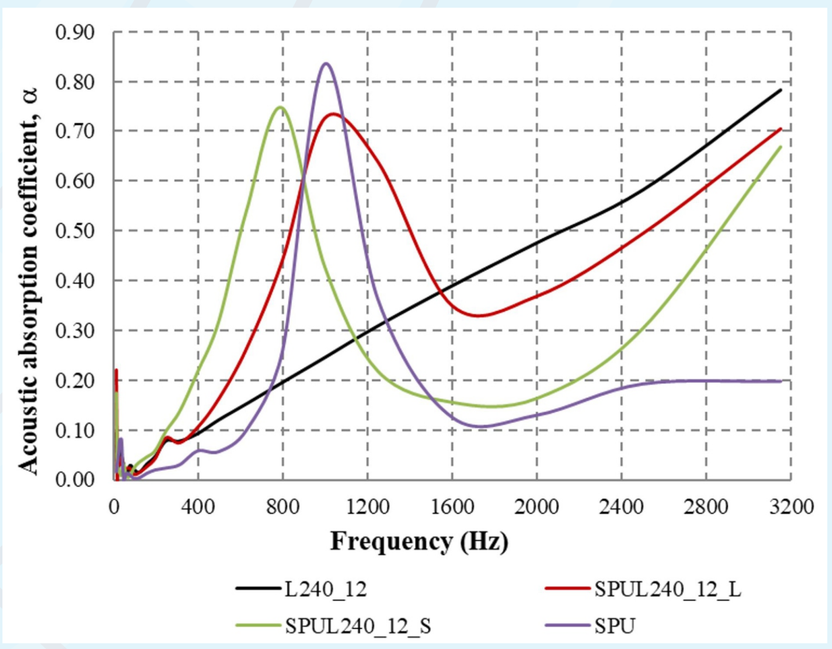


Fig. 2. Sound absorption coefficient variation function of…….

Department for Research, Development and Innovation Management
Knowledge and Technological Transfer Center

15 Constantin Daicoviciu street
400020, Cluj-Napoca, România

e-mail: liliana.pop@staff.utcluj.ro

www.utcluj.ro

B

Title

SHEEP WOOL BASED MODULAR PANEL AND THE METHOD USED FOR OBTAINING IT

Inventor/s - Contact

DÉNES Tünde-Orsolya, TĂMAȘ-GAVREA Daniela-Roxana, IŞTOAN Raluca, TIUC Ancuţa Elena, MANEA Daniela Lucia, VASILE Ovidiu

Patent/ Application number

Patent application OSIM no.: A/00176/05.04.2022

Short presentation

The invention relates to a modular panel based on sheep wool fibers, and the method of obtaining it, in order to meet the requirements of quality in construction regarding noise protection and the sustainable use of natural resources. Each module consists of a triple layered panel, having a composition similar to that of sandwich panels. The structure of the layered panel is made of two outer layers of hydrated lime-based plates, which delimit a mattress made of sheep wool fibers placed between them.

- The weighted sound reduction index of the modular panel is R_w ($C;C_{tr}$) = 38 (-2, -8) dB.
- The layered panels have high sound absorption coefficient values at low frequencies. The maximum value is 0.90 at the frequency of 524 Hz.
- The coefficient of thermal conductivity of the layered panels is 0.077 W/mK.

Applicability

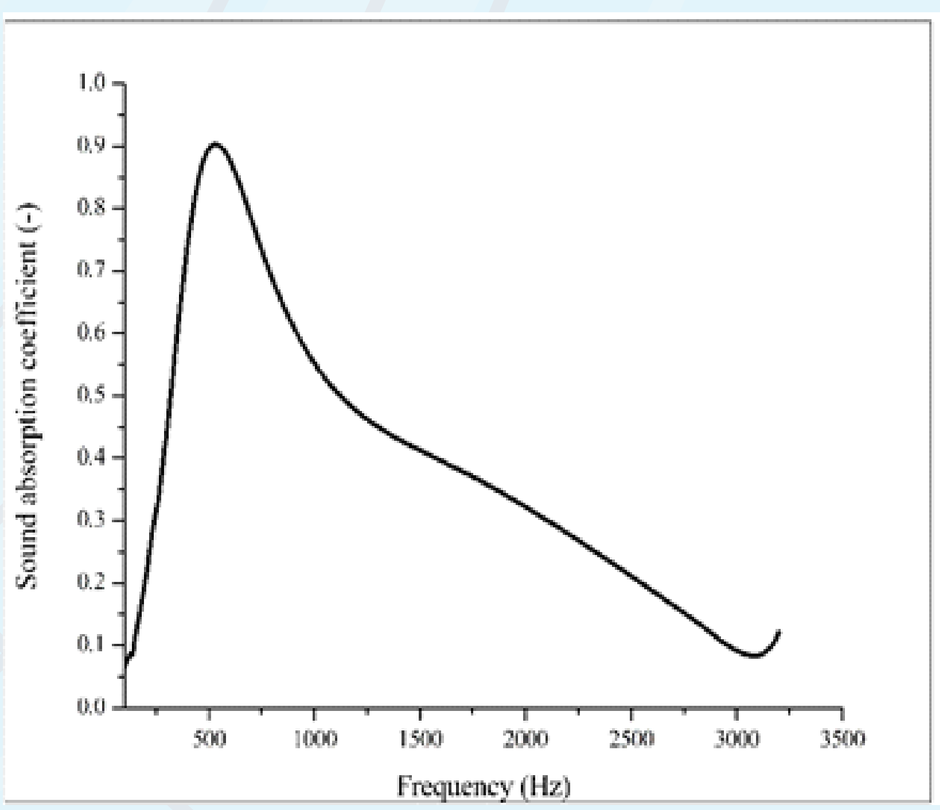
The invention consists in obtaining of a modular panel for vertical partition walls in buildings, having acoustic and thermal properties comparable to the existing sound insulating, sound absorbing and thermal insulating properties of other composites, by using sheep wool a viable natural alternative to synthetic fibers.

Images





Modular panel



Variation of sound absorption coefficient

Department for Research, Development and Innovation Management
Knowledge and Technological Transfer Center

15 Constantin Daicoviciu street
400020, Cluj-Napoca, România

e-mail: liliana.pop@staff.utcluj.ro

www.utcluj.ro

B

Title

PULBERI COMPOZITE COMPLEXE PE BAZĂ DE FE ȘI ALIAJ CU BAZA FE, COMPACTE SINTERIZATE COMPOZITE MAGNETIC MOI CU MATRICE OXIDICĂ PE BAZA ACESTORA ȘI PROCEDEU DE OBȚINERE
COMPLEX COMPOSITE POWDER COMPRISES IRON COATED WITH LAYER OF IRON OXIDE AND THEN COATED WITH FINE PARTICLES OF IRON-SILICON-ALUMINUM OR IRON-ALUMINUM OR IRON-SILICON ALLOY

Inventor/s - Contact

MARINCA TRAIAN - traian.marinca@stm.utcluj.ro, NEAMȚU BOGDAN VIOREL, POPA FLORIN, CHICINAȘ IONEL

Patent/ Application number

Patent application OSIM no.: A/00413/14.07.2022

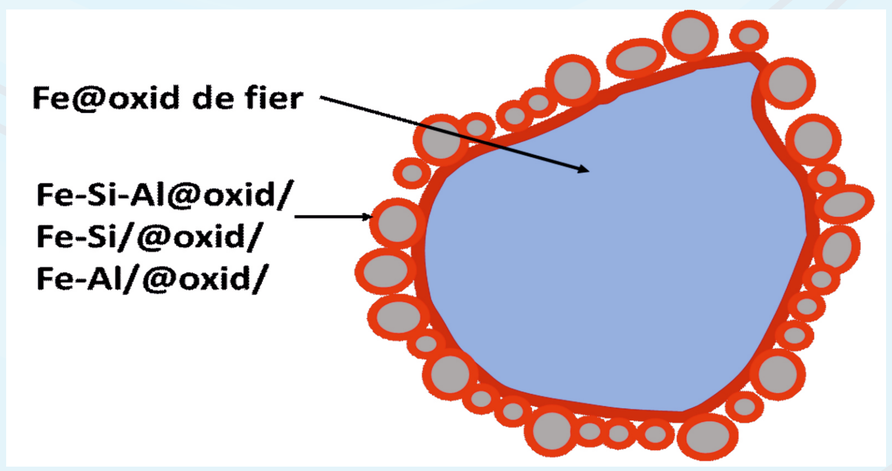
Short presentation

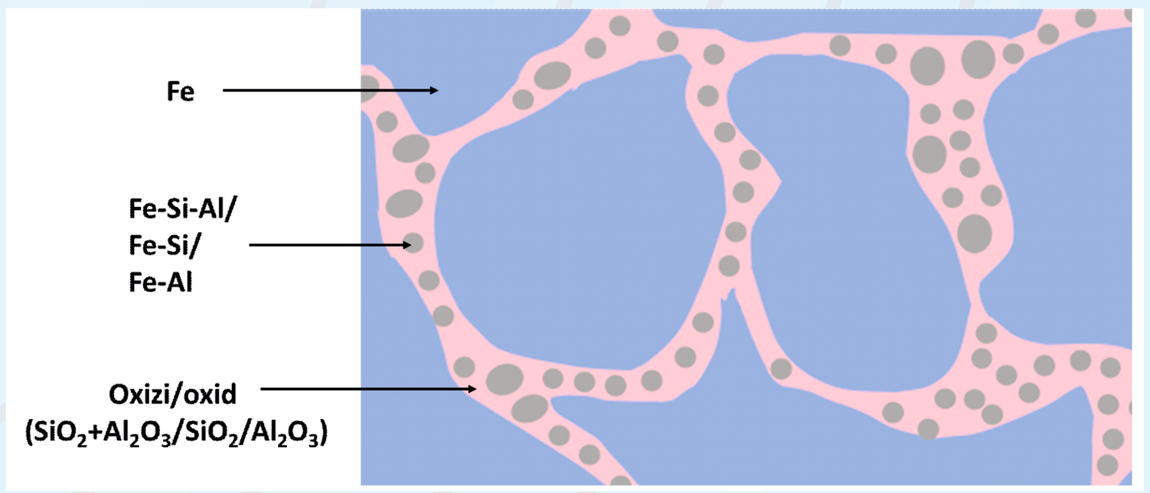
A complex composite powder comprises iron with particle size of 10-200 μ m, coated with a layer of iron oxide, and then coated with composite layer (L2) of fine particles of iron-silicon-aluminum or iron-aluminum or iron-silicon alloy. The ratio of iron and iron-silicon-aluminum alloy is 0.1-99.9%, and the amount of silicon and aluminum in the alloy is 0.1-30 wt.% and large areas of iron being embedded in a complex matrix based on aluminum oxide and silicon oxide which has areas/particles of iron-silicon-aluminum dispersed.

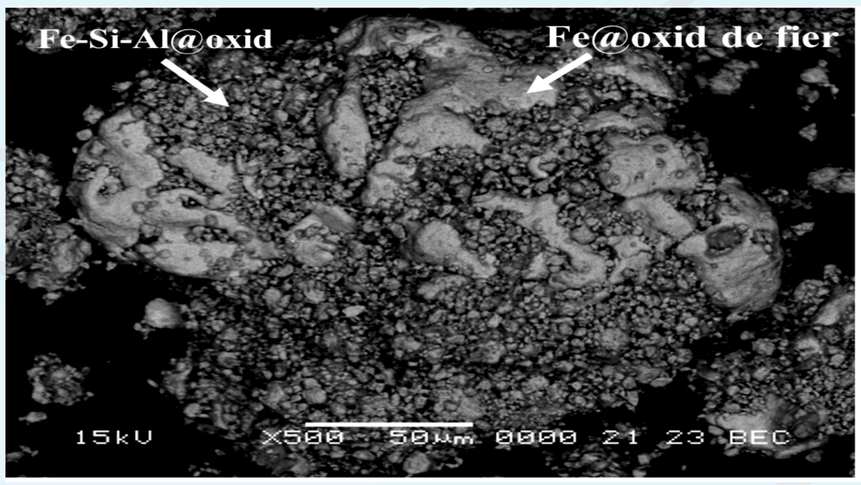
Applicability

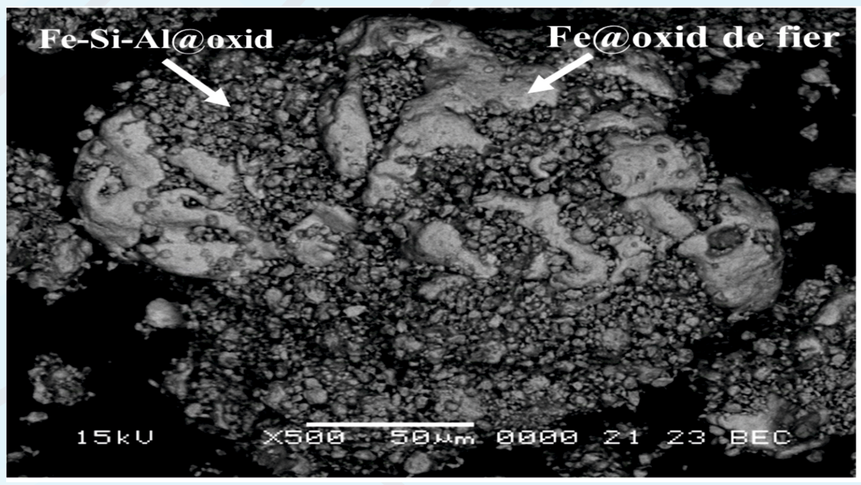
Magnetic cores, magnetic inductors, transformers, etc.

Images









Department for Research, Development and Innovation Management
Knowledge and Technological Transfer Center

15 Constantin Daicoviciu street
400020, Cluj-Napoca, România

e-mail: liliana.pop@staff.utcluj.ro

www.utcluj.ro

B

Title

ECO-INNOVATIVE ROAD CONCRETE BASED ON CEMENT, GLASS POWDER AND AGGREGATE FROM RECYCLED CONCRETE WASTE FOR CONSTRUCTION APPLICATIONS “BcRG”

Inventor/s - Contact

Ofelia-Cornelia CORBU, Attila PUSKAS

Patent/ Application number

Patent application OSIM no.: A/00618/10.10.2022

Short presentation

The invention refers to a new eco-innovative and sustainable "BcR_G" Road Concrete based on high quality Portland cement with recycled waste from: 1) uncontaminated concrete in the form of alternative aggregate successfully replacing non-renewable natural aggregates, derived from the recycling of concrete waste, collected, sorted, washed, ground/sorted into 4/8 mm particle size fractions and 2) glass in the form of under-100 μm powder, as a secondary raw material (1.39÷2.8)% of the cement quantity, solving an environmental pollution problem by reducing landfill waste and the exploitation of natural aggregate, with various applications in the field of construction, i.e. infrastructure, roads, platforms, pavements, etc. , becoming a composite material with high abbrasion resistance and high mechanical strength, for improving the quality of life through sustainable design.

Applicability

Application in the construction field with applicability for roads, sidewalks, alleys, urban furniture

Images

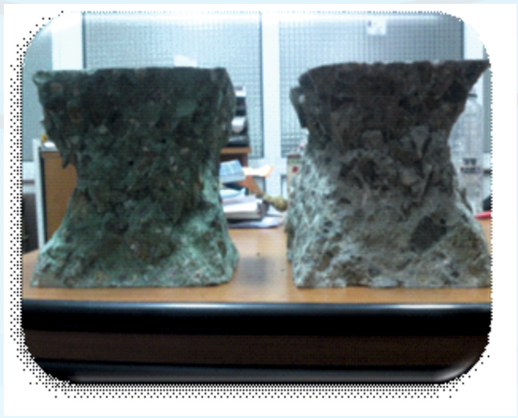


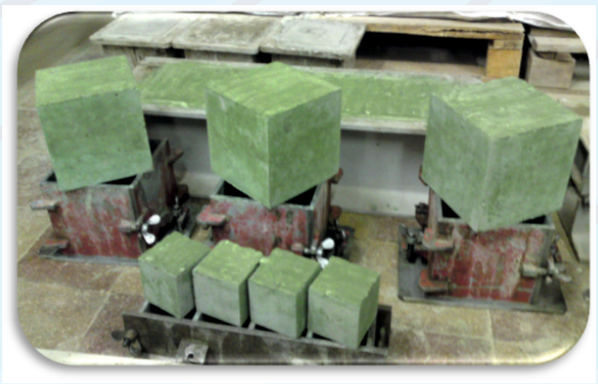
Glass waste transformed into PFS< 100 μm

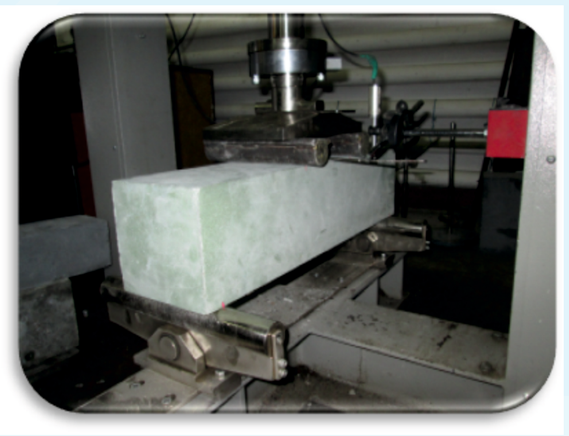




Concrete waste transformed into Recycled Aggregates







DIOXIMIC COORDINATION COMPOUNDS AS CORROSION INHIBITORS OF STEELS

B

Patents: MD 4330, MD 1257

Author: Eduard Coropceanu, Vladimir Parșutin

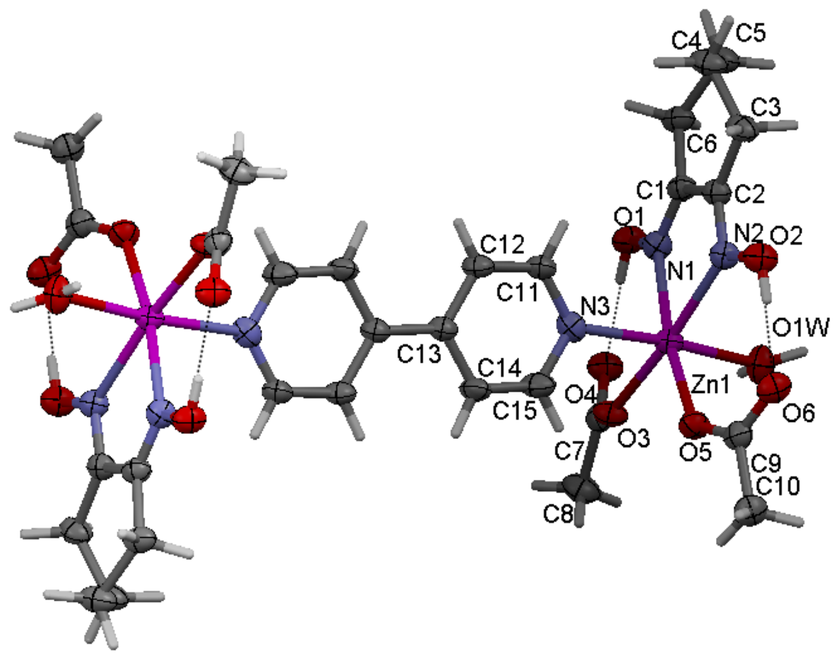
In the water from the Chisinau aqueduct, which contains, mg/L: Ca^{2+} - 42.5, Mg^{2+} - 19.5, HCO_3^- - 97.6, SO_4^{2-} - 203.7, Cl^- - 56.7, with a total salt content of 0.457 g/L, the speed of steel corrosion for 8 hours is high, reaching 21 g/m²·day. One of the ways to inhibit corrosion processes is the use of chemical compounds with the aim of increasing the stability of steels against corrosion.

The complex $[Zn_2(CH_3COO)_4(NioxH_2)_2(bpy)(H_2O)_2]$ ($NioxH_2$ – 1,2-cyclohexanedionedioxime; bpy – bipyridyl) was tested as a steel corrosion inhibitor in closed aqueduct systems. Testing under corrosion conditions of samples with dimensions 50x25x3 mm is performed by completely immersing them in the solution at the same depth as the air access.

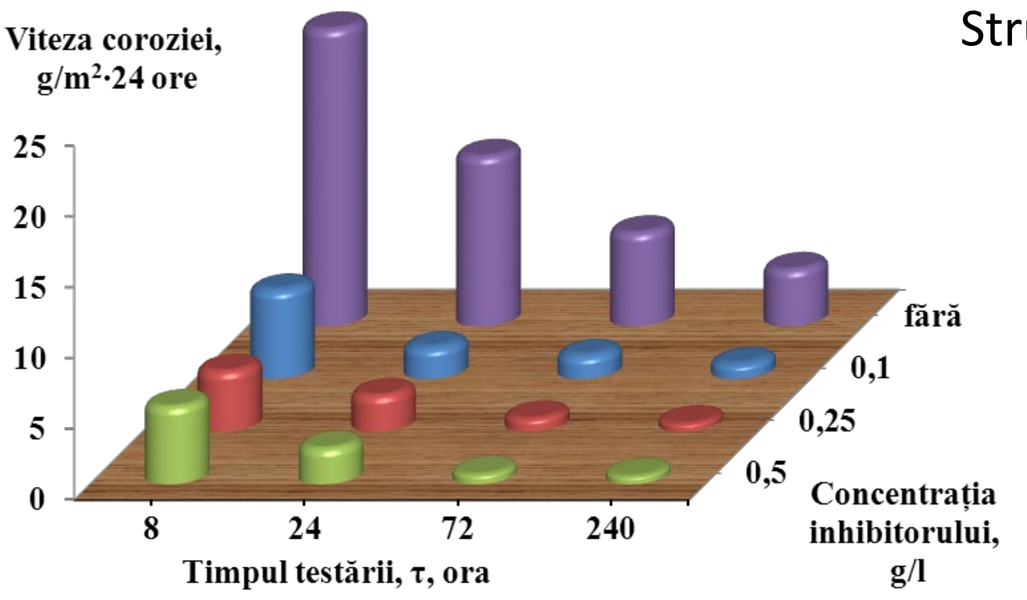
The effect of the action of the inhibitor is qualitatively evaluated according to the speed k, g/m²·day and the value of the braking coefficient $\gamma=k/k_1$, where k_1, k – the metal corrosion speeds with and without the use of the inhibitor. This coefficient shows how many times the corrosion speed is reduced as a result of the action of the inhibitor.

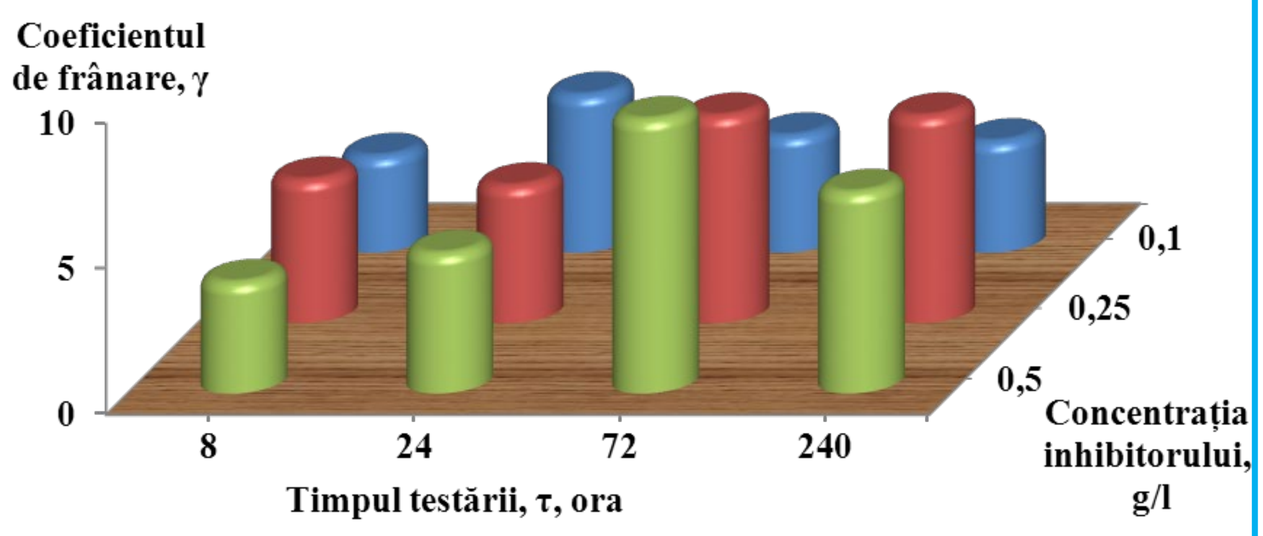
According to the recorded data, the greatest effect is obtained when using the inhibitor at a concentration of 0.05-1.0 g/L. Thus, at the inhibitor concentration of 0.25 g/L and the duration of the experiment of 72 hours, the losses caused by corrosion are reduced by 7.1 times. At the inhibitor concentration of 0.5 g/L and the same duration of the experiment, the losses caused by corrosion are reduced by 9.4 times.





Structure of the complex $[Zn_2(CH_3COO)_4(NioxH_2)_2(bpy)(H_2O)_2]$





The influence of the concentration of the inhibitor in the electrolyte on the degree of protection of the steel

coropceanu.eduard@upsc.md

Innovative solutions for the technical separation of measuring cold water consumption at apartment level

B

Authors: Darius ANCA, Ștefan ANCA

Innovative solutions refer to a technical separation at branch level for each apartment (individual metering for cold water).

Variant 1 refers to the individual metering of cold water consumption in apartments with cost distributors and their installation in a common space (staircase) and the appropriate modification of the internal installation, conditions in which the consumption registration for each apartment will be done through a metrologically registered class C branch meter.

Variant 2 refers to the individual metering of cold water consumption in apartments by installing the branch and the individual branch meters in a common home located in the public domain for which the owners have given their written agreement of servitude for interventions in favor of the operator. Modifying the internal installation involves making the connection between the output from the individual branch meter and the installation inside the apartment through the masking of the block.

The design and execution of the works are carried out in accordance with the provisions of Law 50 /1991; Law 241/2006 and ANRSC Order 88/2006.



Variant 1



Variant 2

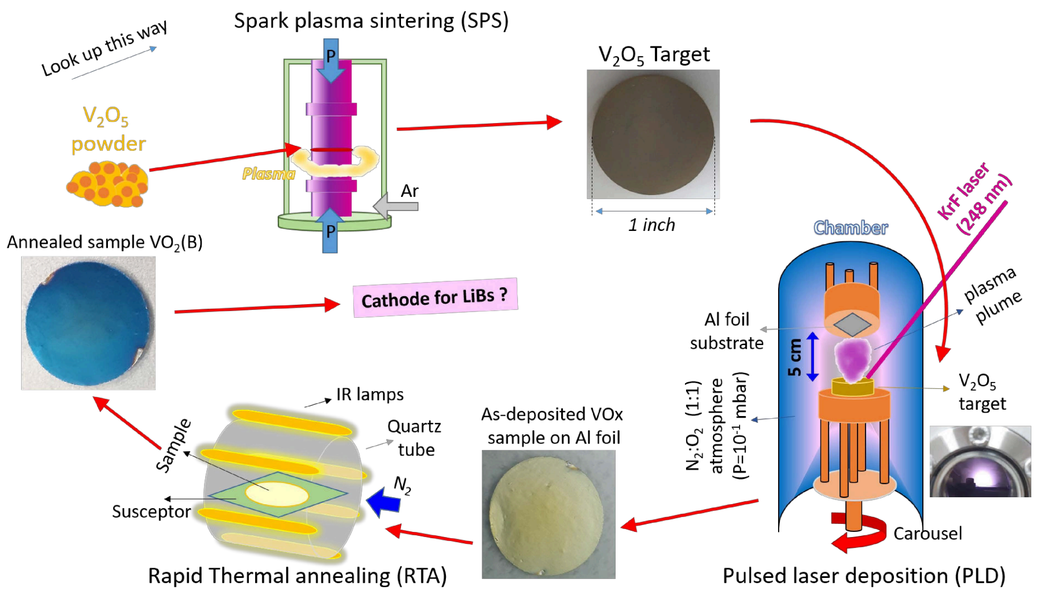
Although this process generates investment costs for both users and the operator, upon completion of this action a number of advantages are obtained: the service's objectives regarding the correlation of real consumption with the billed one, reduction of water losses and unbilled water, increase of user satisfaction and operator efficiency.

Contact: +40723513447 ***dariusanca@gmail.com***

Binder-free vanadium dioxide Vo2 (B) thin-films directly grown on aluminum foil by pulsed laser deposition as battery cathode and preparation method thereof

B

Teddy Tite*, Mihaela Buga, Ionel Stavarache, Cosmin Giorgian Ungureanu, Adnana Alina Spînu-Zăuleț, Elena Matei, Constantin Catalin Negrilă, Andrei Galatanu, Marian Lazar



FIELD OF THE INVENTION

The invention relates to interdisciplinary field for energy storage application as binder-free vanadium oxide (VOx) thin-films cathode for batteries.

BACKGROUND OF THE INVENTION

The cathode is one of the most crucial part of lithium-ion batteries (LiBs) since they determine the energy density of a cell through cell voltage, their capacity and voltage windows. In recent years, concerns regarding limited performance of current commercial cathodes and the sustainability of materials used in LiBs (e.g. cobalt) have been raised. In this context, transition metal oxides (TMO), such as VOx has been proposed as alternatives due to their sustainability, layered structures and better theoretical capacity than current LiBs cathodes. VOx thin-films with B polymorph phase (Vo2 (B)) is believed to be one of the most promising with a theoretical capacity for 1 li ions intercalation of ~322 mAhg-1, higher than known commercial Li-cathodes values (e.g. LiCoO2 ~140 mAhg-1)

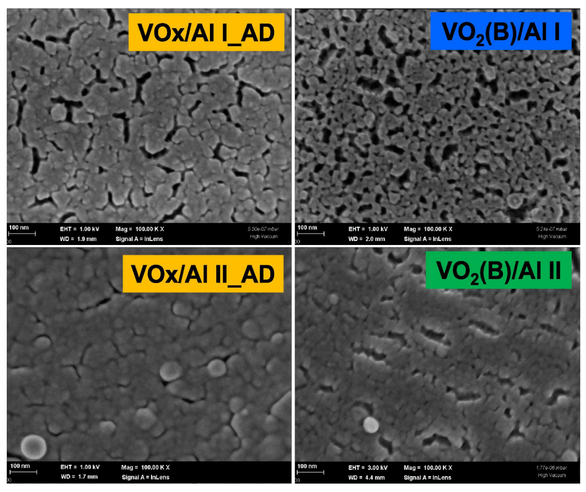
PROPOSAL

The first object of the invention is to provide a method for the preparation of binderfree Vo2 (B) thin-films cathode deposited on aluminum by using pulsed laser deposition (PLD) method.

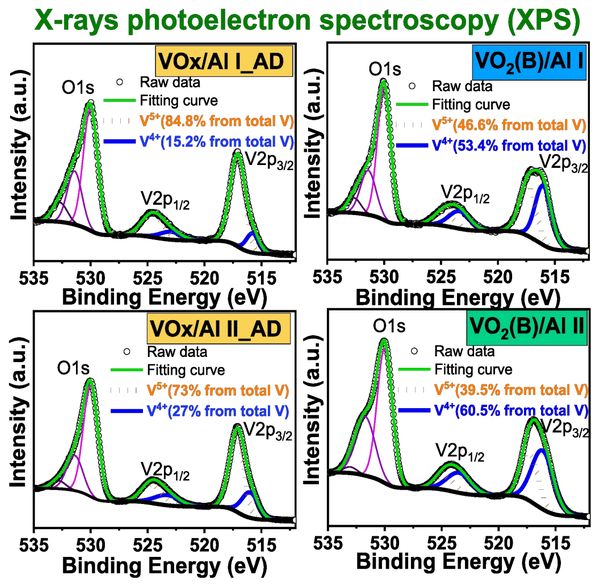
PLD is promising technique for the design of micro-batteries and could represent the masterpiece to develop binder-free thin-film electrodes.

Proof of concept on two grades Al foils

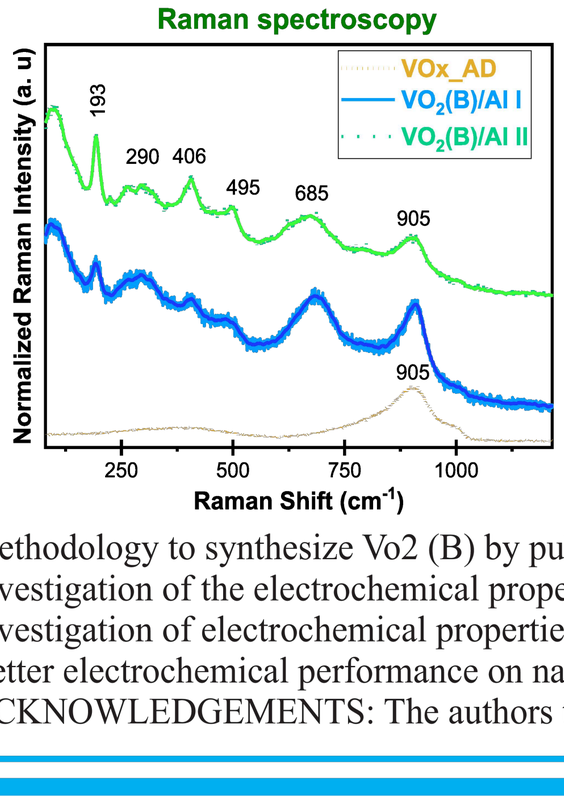
Scanning electrode microscopy (SEM)



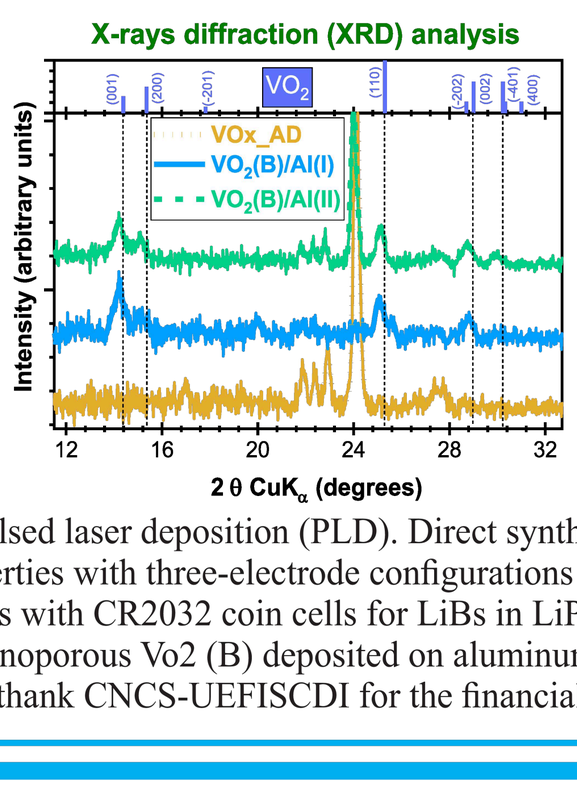
X-rays photoelectron spectroscopy (XPS)



Raman spectroscopy

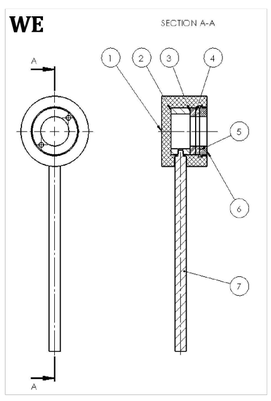


X-rays diffraction (XRD) analysis



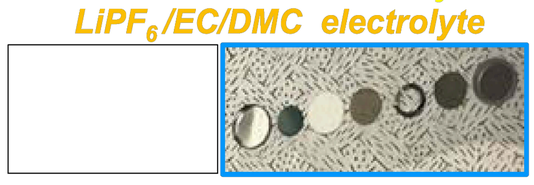
Electrochemical properties

Three-electrodes configuration Na_2SO_4 electrolyte

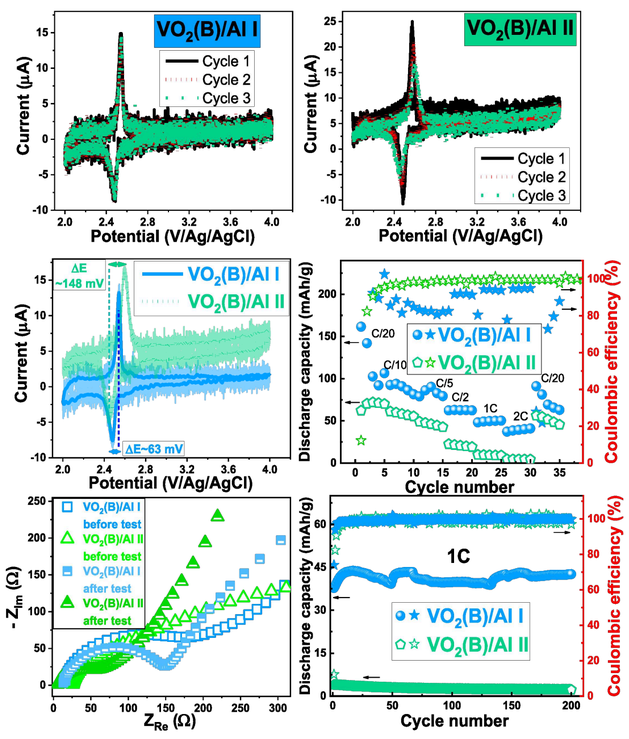


① isolant support of the metallic contact in polyamide;
② metallic contact of 20 cm;
③ sample;
④ gasket in caoutchouc;
⑤ polyamide gasket
⑥ Internal screw;
⑦ electrode support.

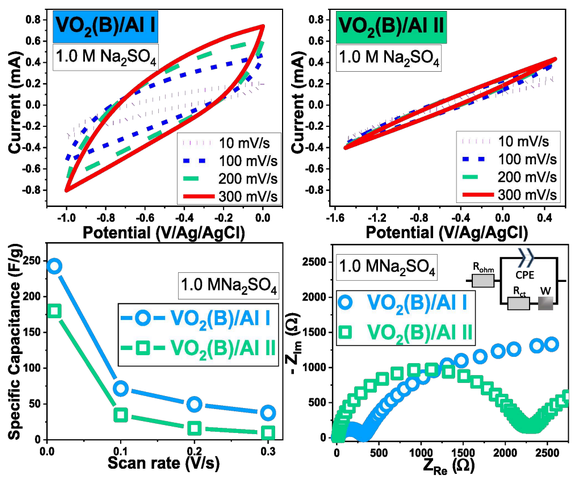
Coins cells for battery $LiPF_6$/EC/DMC electrolyte



Cyclic voltammetry (CV), EIS and galvanostatic charge discharge (GCD) tests



CV and impedance spectroscopy (EIS)



Corresponding author : teddy.tite@infim.ro

Methodology to synthesize Vo2 (B) by pulsed laser deposition (PLD). Direct synthesis on two grades Al foils without binder.
Investigation of the electrochemical properties with three-electrode configurations in Na2 So4 ; design of a working electrode for one-side coated metallic electrode.
Investigation of electrochemical properties with CR2032 coin cells for LiBs in LiPF6 /EC/DMC electrolyte. Observation of intercalation processes of Li in the CV curves.
Better electrochemical performance on nanoporous Vo2 (B) deposited on aluminum foils with grade I; for LiBs, the initial capacity can reach ~ 160 mAh/g.

ACKNOWLEDGEMENTS: The authors thank CNCS-UEFISCDI for the financial support in the framework of grants PN-III-P2-2.1-PED-2019-4519.1

STICLE VITROCERAMICE FLUORESCENTE CU NANOCRISTALE DE CaF_2-Eu^{2+} DISPERSATE ŞI PROPRIETĂŢI REMARCABILE DE FLUORESCENŢĂ SI TRANSPARENŢĂ

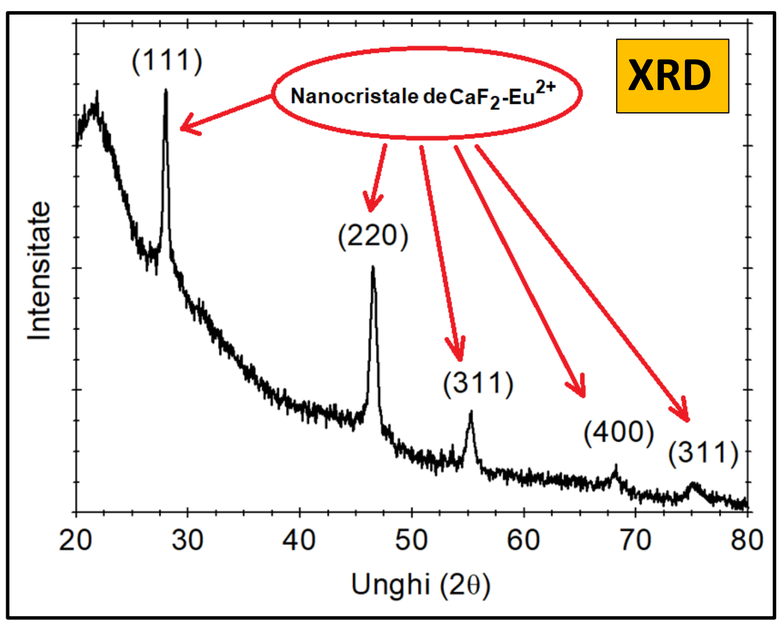
M. Secu, C.E. Secu

B

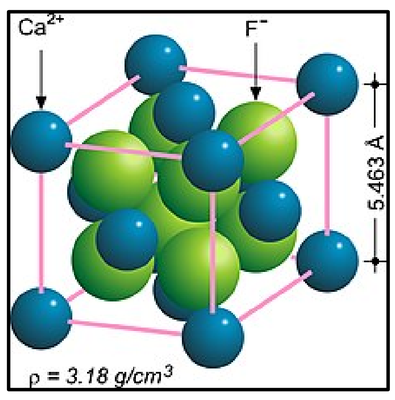
Domeniul de aplicabilitate: luminofori de radiaţii (X, gamma, UV, particule), dozimetrie de radiaţii

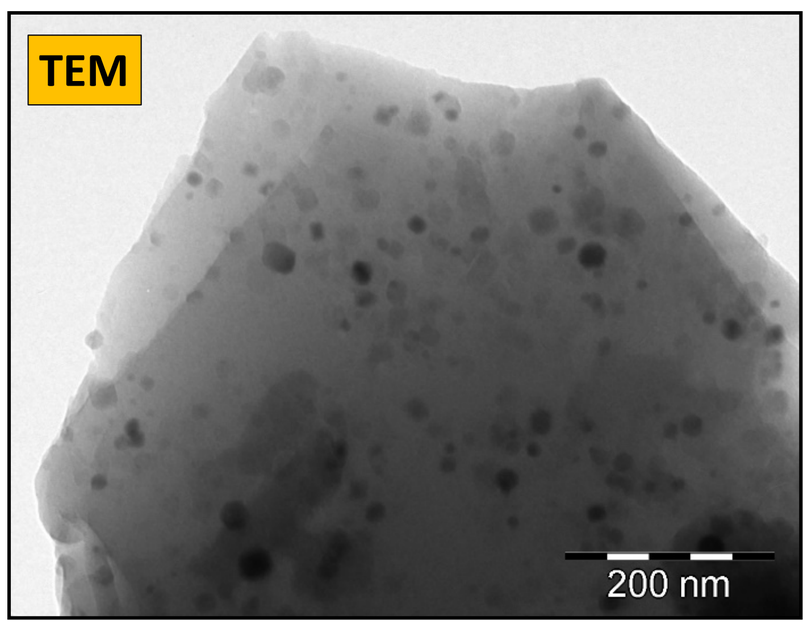
Dezavantajele metodelor de sinteză curente in cazul ceramicilor sau cristalelor**:** (a) dificultatea producerii şi prelucrării la dimensiuni mari; (b) transparenţa relativ scazută (c) aglomerarea nanoparticulelor la dispersare in diverse medii; (d) prezenţa ambelor specii luminescente Eu^{2+} şi Eu^{3+}.

Metoda de preparare: obţinerea xerogelului uscat (ca pulbere) $94SiO_2$-$5CaF_2$-1Eu prin metoda sol-gel urmată de calcinarea succesivă a acestuia în aer şi apoi în atmosferă reducatoare (Ar-H_2) la temperaturi relative ridicate (800°C).



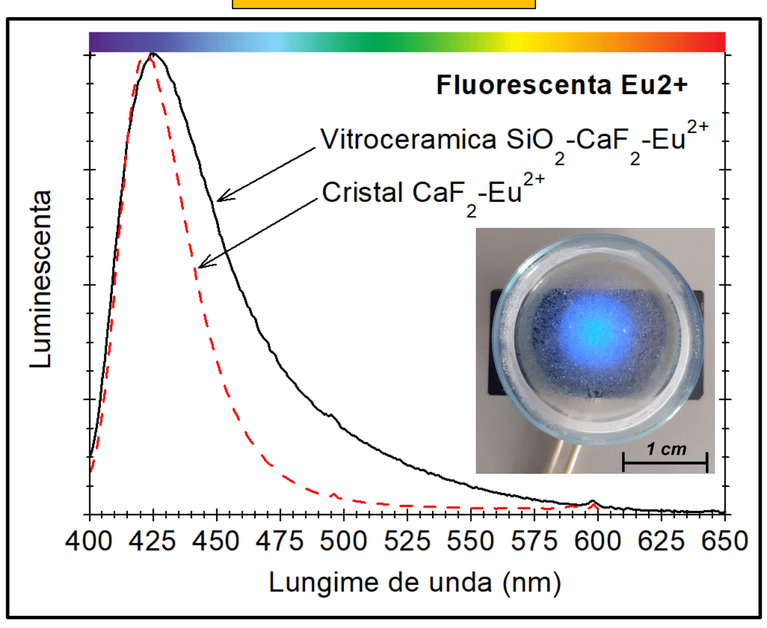
Structura CaF_2



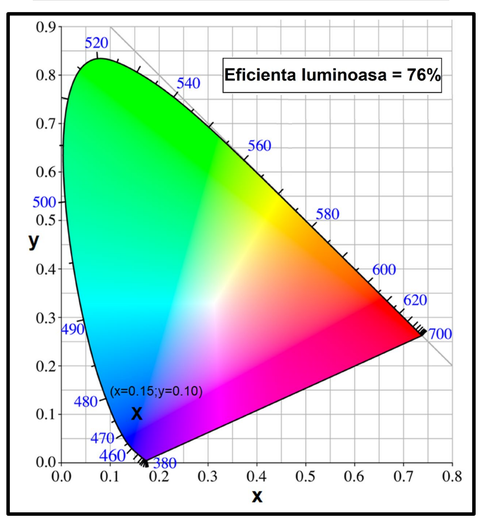


➡ **Difractograma de radiaţii X** a arătat formarea nanocristalelor de CaF_2, imaginile **microscopie electronică TEM** prezintă distribuţia omogenă a nanocristalelor cu dimensiuni de zeci de nm.

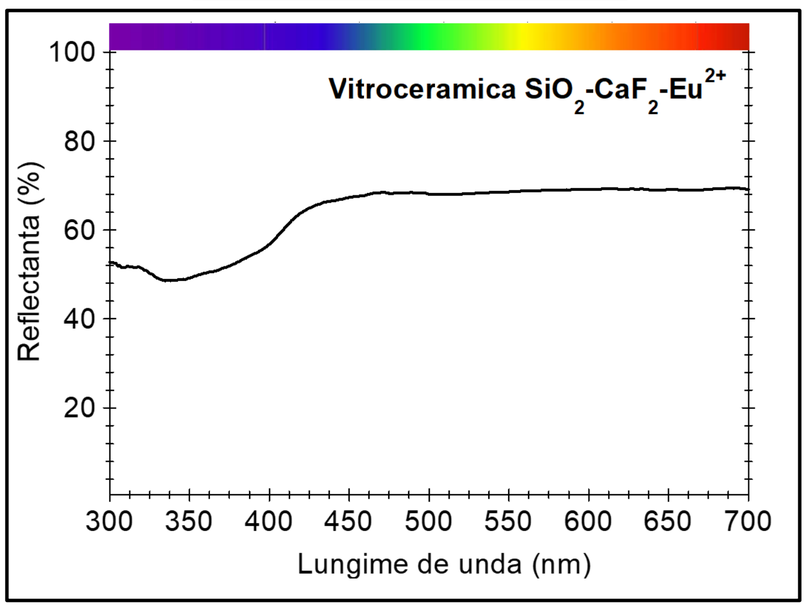
Fluorescenţă



Colorimetrie, QE



Transparenţă optică



➡ **Proprietaţile luminescente** sub acţiunea radiaţiilor UV sunt datorate Eu^{2+}. Eficienţa luminescentei: **QE=76%;** Parametri colorimetrici CIE (1931): **x=0.15, y=0.10**

Proprietăţile de transparenţă remarcabile in domeniul vizibil sunt datorate dimensionalităţii reduse a nanocristalelor

➡ **Concluzie:** S-au obţinut luminofori vitroceramici cu nanocristale de CaF_2-Eu^{2+} incorporate in sticla şi proprietăţi luminescente sub acţiunea radiaţiilor UV

CONTACT: msecu@infim.ro

Energy efficient memristor based on orthorhombic tin selenide flakes and method of making the same

*Angel-Theodor Buruiană, Amelia Elena Bocîrnea , Andrei Kuncser, Teddy Tite, Elena Matei, Claudia Mihai, Aurelian-Cătălin Gâlcă, Alin Velea**

B

ABSTRACT

The way we live, work and interact is constantly evolving due to the exponential growth of electronics and information processing power. Information processing efficiency is being considered as a new benchmark in addition to processing power, which is very important in domains with large volume of data such as IoT. Therefore, the new electronic devices must be scalable in terms of processing speed and efficiency and have a low energy cost. Here, we present an energy-efficient memristor formed from monocrystalline orthorhombic tin selenide flakes with a low threshold voltage of 3 V and an operating current of 10^{-4} A. The flake has a lateral size between 20 to 100 μm, a thickness of under 100 nm and it consists of 45% ~ 55% Sn and 45% ~ 55% Se. The device consists of 2 metallic electrodes contacting the nanoflake while the switching mechanism considered is the redistribution and migration of charged defects to grain boundaries.

The method for obtaining tin selenide memristors is simple, consisting of two steps, namely (i) obtaining micrometric orthorhombic flakes of tin selenide on substrates, which may be of $Si\SiO_2$, quartz or sapphire, by physical vapor transport at atmospheric pressure and (ii) transfering the flake between two metal contacts using a dry method involving the use of an adhesive material, which may be Polydimethylsiloxane (PDMS) or GelPak. Tin selenide flakes are obtained at a temperature between 600 and 800 °C from high purity SnSe powder in a horizontal furnace. During the synthesis, which lasts between 10 and 30 minutes, the gas flow, which can be N_2, Ar or a mixture of H_2 and Ar, transports the vapors to the substrate where they condensate in the form of orthorhombic plates after fine tuning de deposition parameters.

Explanatory figures for the invention

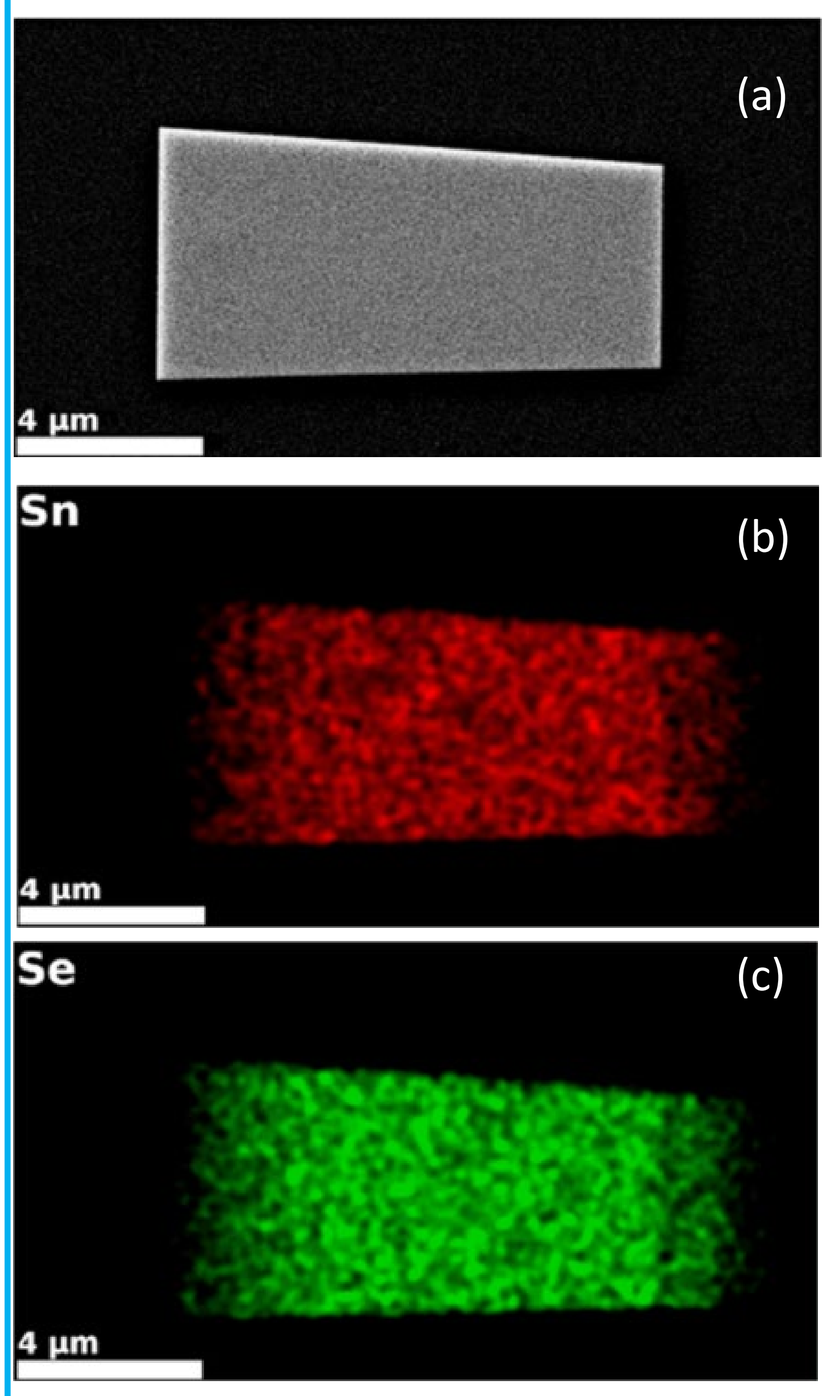


Figure 1. *a) Scanning electron microscopy of a SnSe flake. Energy dispersive X-ray spectroscopy elemental mapping for b) Sn and c) Se.*

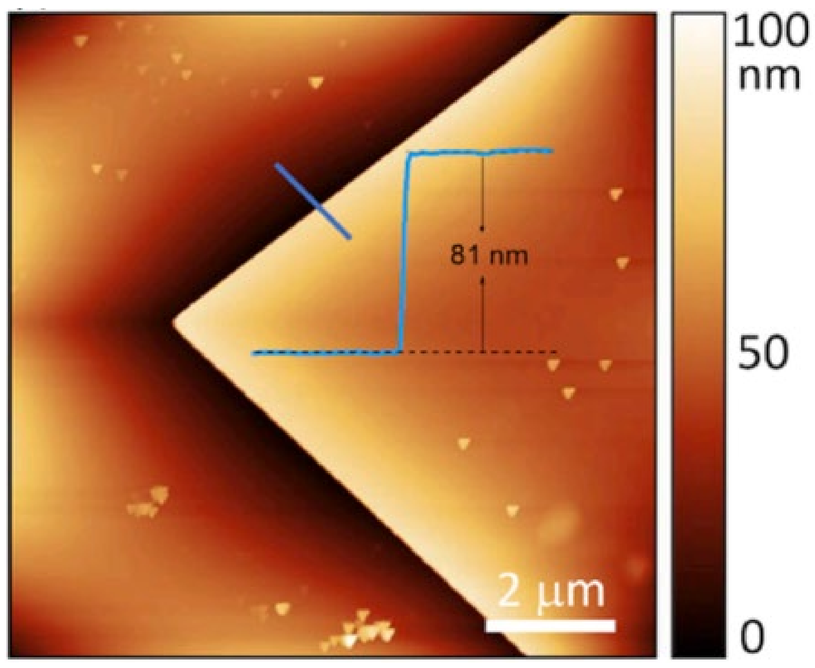


Figure 2. *AFM image of a typical SnSe nanoflake showing a thickness of under 100 nm.*

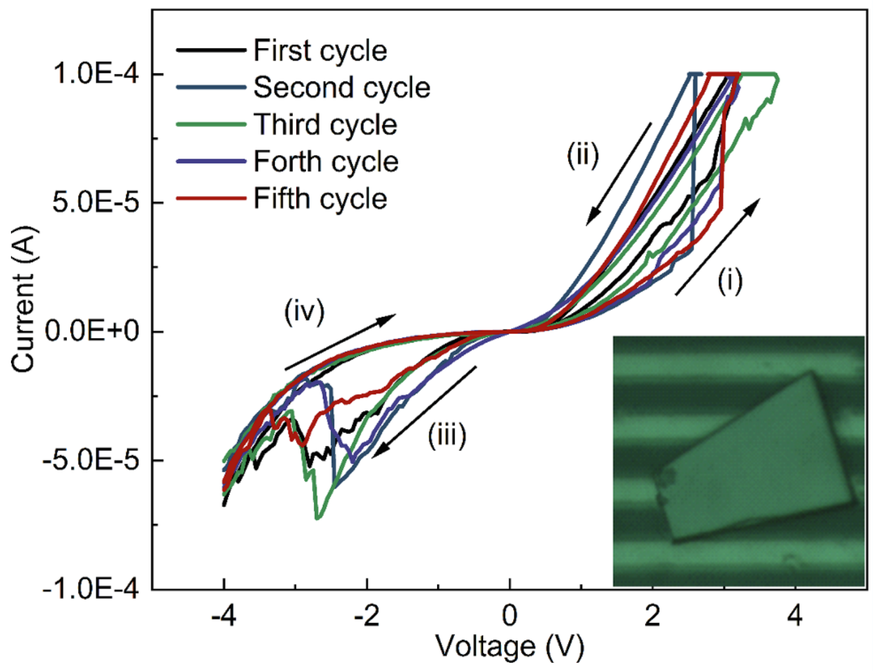


Figure 3. *Non-volatile memory switching of the SnSe memristor. The inset shows a SnSe nanoflake transferred on Ti/Au contacts.*

Table 1. *Comparison between the operating parameters of the SnSe memristor (this work) and the operating parameters based on other materials*

Memristor	Switching Mechanism	SET Voltage [V]	Operation Current [A]	Endurance [Cycles]	Retention [s]
Ti/Au-SnSe-Ti/Au	Defect migration	3	10^{-4}	>10	>30
Au–MoS_2–Au	Defect migration	80	10^{-4}	475	9×10^4
Ti/Au–MoS_2–Ti/Au	Defect migration	50	10^{-4}	N/A	N/A
Au–MoS_2–Au	Phase transition	3.0	10^{-5}	1000	7×10^3
Ti–TaS_2–Ti	Phase transition	3.0	10^{-3}	N/A	N/A
Ag–MoS_2–Pt	Filament formation	2.0	10^{-5}	N/A	N/A
Ag–SnO_x/SnSe–Ni/Au	Filament formationt	0.4	10^{-5}	4000	10
Cr/Au–NbO_x/$NbSe_2$–Cr/Au	Filament formation	1.0	10^{-4}	20	3000

CONTACT: alin.velea@infim.ro

Compozite stratificate pe bază de folii de plastic reciclate din ambalaje

Laminated composites based on recycled plastic films from packaging

B

Petre Bădică, Mihai Alexandru Grigoroșcută, Mihail Burdușel, Ruxandra Costescu

Prezenta invenţie se referă la reciclarea plasticului de tip PET prin metoda sinterizarii asistate de câmp electric SPS, pentru fabricarea materialelor compozite stratificate formate din folii de plastic tăiate/decupate din ambalaje, între care sunt introduse straturi intermediare de ranforsare ce pot fi folii, fibre sau pulberi din materiale organice sau anorganice.

Invenția rezolvă problema ’lipirii’ directe a unor polimeri din ambalaje (PET) cu formarea unor legături chimice pe diverse suprafețe de materiale, la interfața dintre straturi fără a folosi adezivi și fără topirea metarialelor componente. Brevetul oferă noi posibilități în realizarea unor compozite cu matrice din folii polimerice, multistratificate.

The present invention refers to the recycling of PET type plastic by the SPS electric field assisted sintering method, for the manufacture of layered composite materials formed from plastic films cut/cut from packaging, between which are inserted intermediate layers of reinforcement which can be films, fibers or powders from organic or inorganic materials.

The invention solves the problem of direct 'gluing' of some packaging polymers (PET) with the formation of chemical bonds on various material surfaces, at the interface between the layers and without using adhesives and without melting the component materials. The patent offers new possibilities in the realization of composites with matrixes of polymer foils, multilayered.

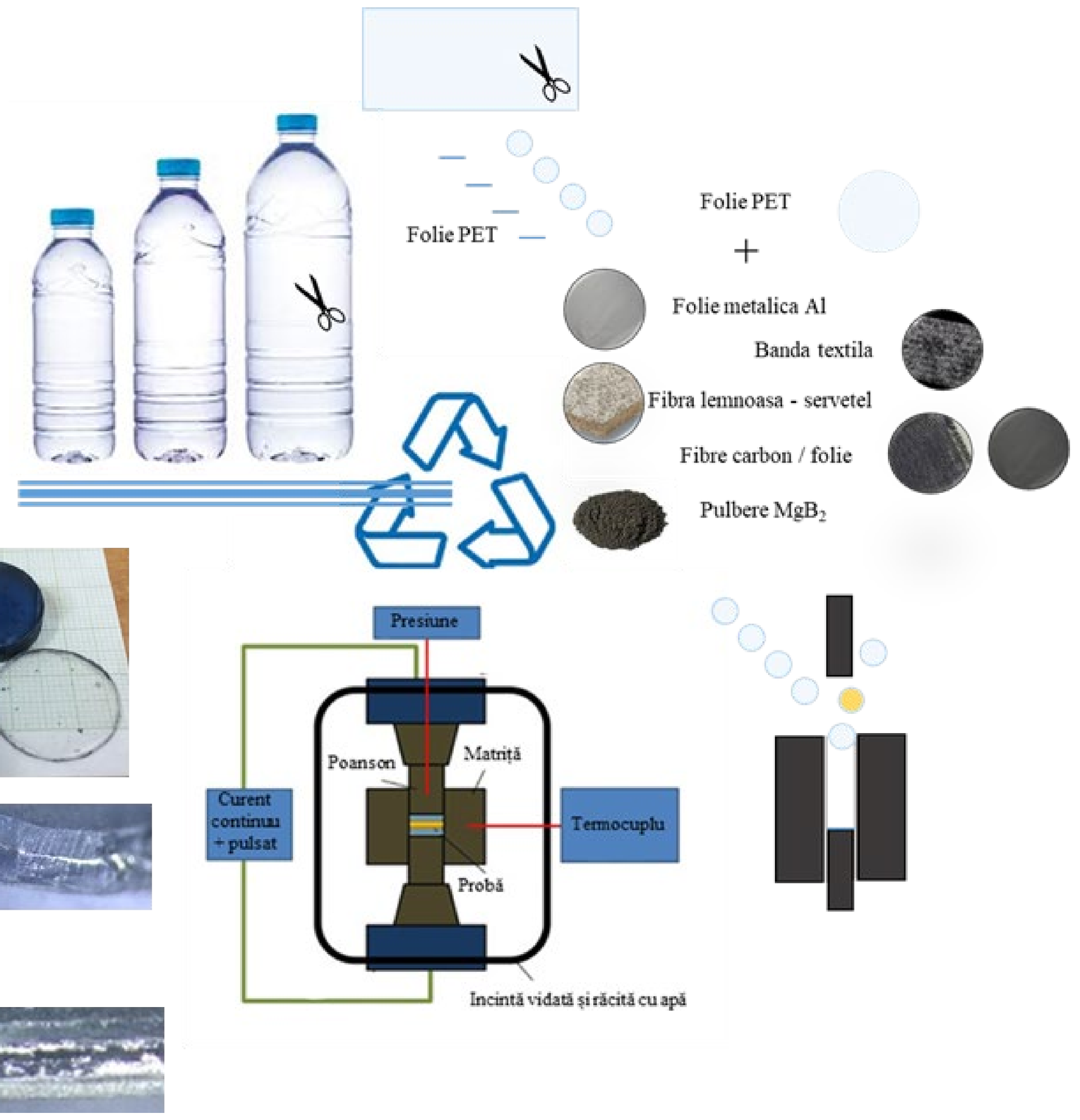


Fig. 1 Reciclarea plasticului de tip PET pentru fabricarea unor compozite stratificate formate din folii de plastic tăiate/decupate din ambalaje, și între care sunt introduse straturi intermediare ce pot fi folii, pulberi sau fibre din materiale organice sau anorganice. Aceste folii/materii prime sunt introduse în ordinea dorită într-o matriță de grafit și ansamblul este procesat prin metoda SPS. Conditiile de procesare sunt alese astfel încât să se genereze stari noi de suprafață care să formeze legături chimice ‘lipind’ straturile compozitului fără topire (și fără utilizarea adezivilor).

Domeniul de aplicabilitate: știința și ingineria materialelor, compozite

Cerere brevet nr. **A/00516** inregistrata la **OSIM** la data 25.08.2022

Contact: petre.badica@infim.ro, mihai.grigoroscuta@infim.ro, mihai.burdusel@infim.ro, ruxandra.costescu@infim.ro,

VIS-SWIR photosensitive nanocrystalline SiGeSn thin film and fabrication method

OSIM Patent RO134049-B1 / 2022

Derwent Primary Accession Number: 2020-36416Y

Magdalena Lidia Ciurea, Ionel Stavarache, Ana-Maria Lepadatu, Sorina Lazanu, Toma Stoica

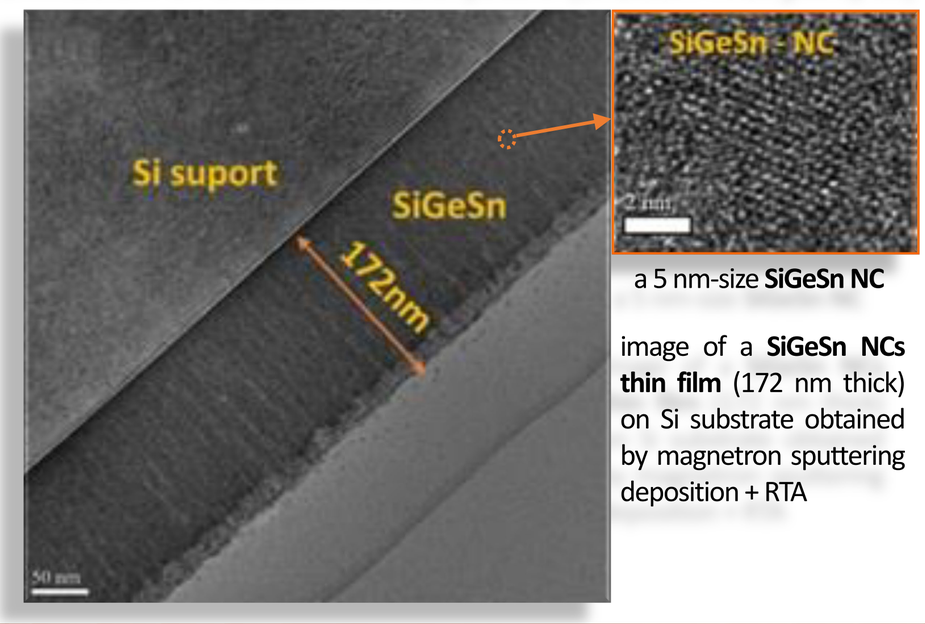
B

Thin films of semiconductor group IV alloy SiGeSn NCs with photosensitivity in the 0.6 – 1.35 µm range from VIS-SWIR are fabricated. These films play the role of **photoactive components in optoelectronic devices**, e.g. **VIS-SWIR optical sensors**. Films fabrication is **complementary metal oxide silicon (CMOS)- compatible**; magnetron sputtering **technology for films deposition** is **cost-effective**, **versatile** and **suitable for industry**, providing high quality and uniform films under much more relaxed growth/deposition conditions than CVD/MBE. **Fabrication steps** are: 1) standard processing of Si wafers in cleanroom for cleaning and removal of native SiO_2; 2) deposition of $Si_xGe_{1-x-y}Sn_y$ films (≈ 9% Sn in the alloy) by magnetron co-sputtering from separate targets of SiGe and Sn; 3) rapid thermal annealing for films nanostructuring, i.e. formation of SiGeSn NCs.

The **spectral photoresponsivity** measurements performed at **room temperature** on **photosensors based on SiGeSn NCs films** with top ITO transparent electrode and bottom Al contact evidenced their **high performance in a broad spectral range from 0.6 µm in visible (VIS) to 1.35 µm in short-wave infrared (SWIR)**. The proposed films have **applications** in **Si optoelectronics/photonics** to be used as **VIS-NIR-SWIR photoactive components** in **cheap market photosensor/photodetector devices** instead of the toxic and expensive InGaAs, HgCdTe, PbS and PbSe-based devices. **Multiple applications of optical sensors**: monitoring of slippery (wet, icy) road conditions for traffic safety (**project M-ERA.NET PhotoNanoP/2016-2018**), internet of things, biomedical applications.

Fabrication of VIS-SWIR photosensitive nanocrystalline SiGeSn thin film:

- ➔ cleanroom standard processing of **Si** wafers (substrates) for cleaning & removal of native SiO_2
- ➔ co-deposition by magnetron sputtering of SiGe and Sn on Si substrate (***SiGeSn film/Si***)
- ➔ rapid thermal annealing (RTA) in RTP processor for formation of SiGeSn nanocrystals (***SiGeSn NCs film/Si***)



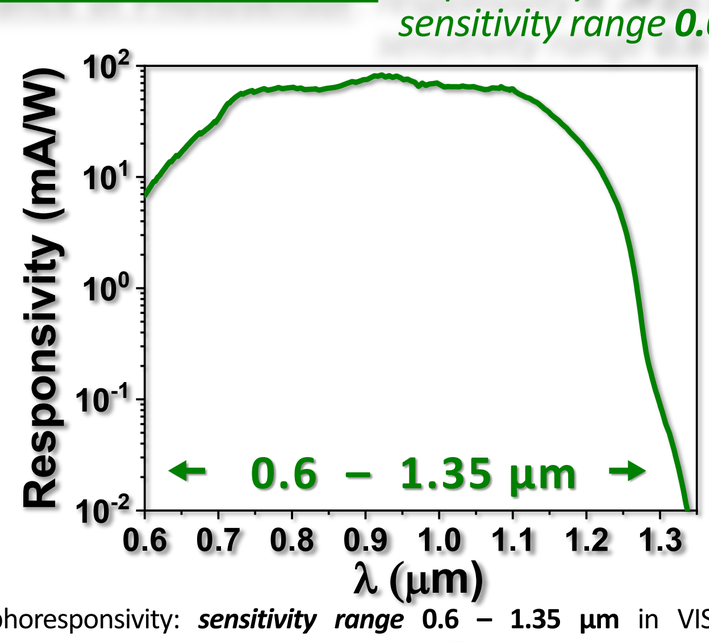
a 5 nm-size **SiGeSn NC**

image of a **SiGeSn NCs thin film** (172 nm thick) on Si substrate obtained by magnetron sputtering deposition + RTA

Fabrication of Photosensor *top ITO contact/photosensitive film of SiGeSn NCs/Si substrate/bottom Al contact*:

- ➔ vacuum evaporation of **bottom Al** contact on the back of Si substrate (sandwich ***SiGeSn NCs film/Si/Al***)
- ➔ magnetron sputtering of **top ITO** contact on top of SiGeSn NCs film (sandwich ***ITO/SiGeSn NCs film/Si/Al***)

Performance of Photosensor: *responsivity **R ↗ 85 mA/W**, sensitivity range **0.6 – 1.35 µm***



Spectral phoresponsivity: ***sensitivity range* 0.6 – 1.35 µm** in VIS-NIR-SWIR; **max. *responsivity R* = 85 mA/W**; ***responsivity* 10 ↗ 85 mA/W** in **0.6 – 1.2 µm** range

Optical sensors were obtained in the frame of
***PCE project** 122/2017-2019* (Director Dr. M.L. Ciurea)
Optoelectric devices based on SiGeSn nanocrystals in oxide matrix – NcSiGeSnOPELD.

☑ ***2 optical sensors** were fabricated with device parameters (room temperature functioning):*

***1)** responsivity **R = 65 mA/W**,*
*specific detectivity **D* = 10^{11} Jones***
for monochromatic illumination, VIS-NIR, 3 V polarization

***2)** responsivity **R up to 100 mA/W**,*
*specific detectivity **D* = 2x10^{10} Jones***
under integral light, 1 V polarization

Benefits:

- ☑ **Semiconductor CMOS technology compatibility**; ☑ Ecologic materials
- ☑ **Fabrication technology: suitable for industry** (cost-effective, versatile, eco-friendly) with controlled technological steps; magnetron sputtering deposition allows obtaining high-quality uniform films on large areas
- ☑ Benefit from varying composition of $Si_xGe_{1-x-y}Sn_y$ films and NCs: **tuning and extending the cut-off sensitivity limit in SWIR**
- ☑ SiGeSn NCs films are more sustainable than the toxic heavy metal Pb- and Cd-based materials used in the expensive market devices

Applications:

- ☑ **Cheap VIS-NIR-SWIR photodetectors / photosensors (Si optoelectronics)**

National Institute of Materials Physics

405A Atomistilor Str., Magurele, Ilfov, 077125, Romania

Preparation method of Ni thin films

B

Hușanu Marius-Adrian, Popescu Dana-Georgeta

Description

The invention refers to a process for preparing crystalline layers of nickel by evaporating the metal (Ni) onto a substrate maintained at a temperature of 250°C - 300°C. The strontium titanate or barium titanate substrates, previously cleaned by successive heating in a vacuum at a temperature of approximately 300°C, stabilize at the interface with the deposited metal a buffer layer of Ni in an oxidized state that initiates and directs the crystalline growth. The subsequent layers of Ni grow in an orderly manner with a structure similar to that of Ni single crystals obtained through conventional crystal growth methods.

Explanatory figures for the invention

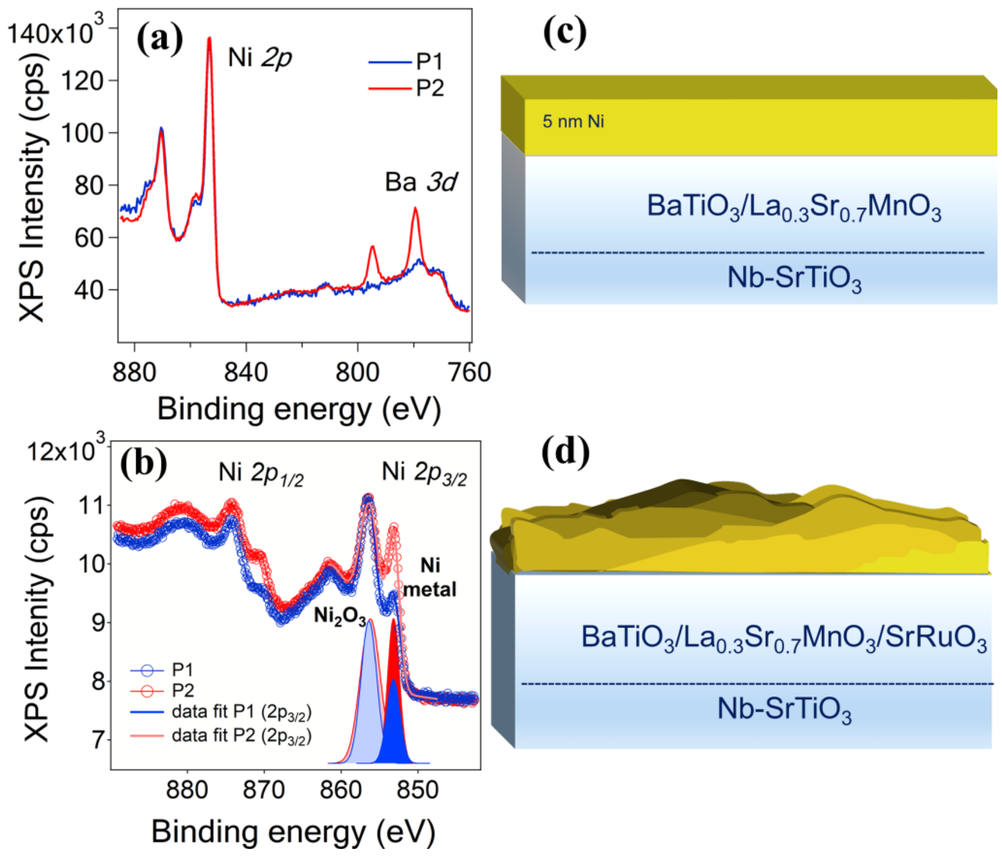


Figure 1. *XPS spectra on P1 and P2 samples immediately after deposition of 5 nm Ni (a) and post-MOKE measurements (b) along with the growth modes of Ni on both substrates (c and d).*

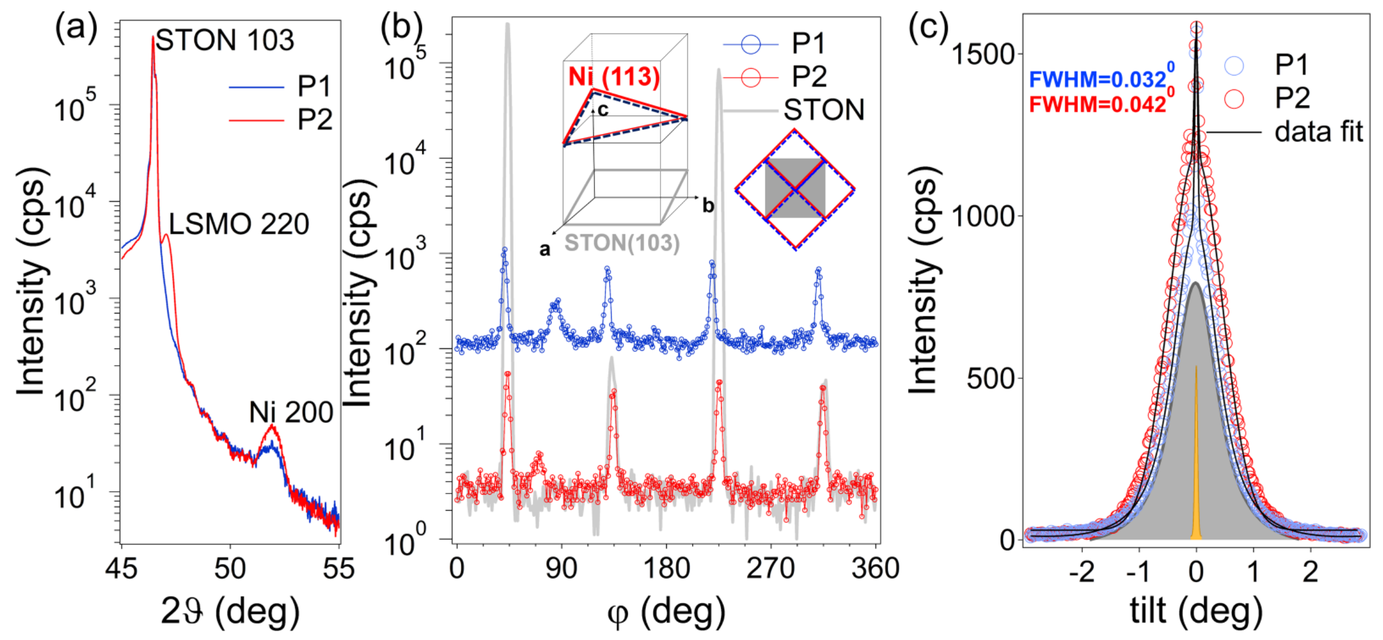


Figure 2. *(a) 2θ − ω XRD diagram of P1 and P2. (b) ϕ – scan on the STON (103) and Ni (113) planes. (c) Rocking curve around the 002 peak of Ni. Geometry of the (103) and (113) planes of STON and Ni, respectively, and the derived growth configuration of Ni on the oxide substrate are in the inset of (b).*

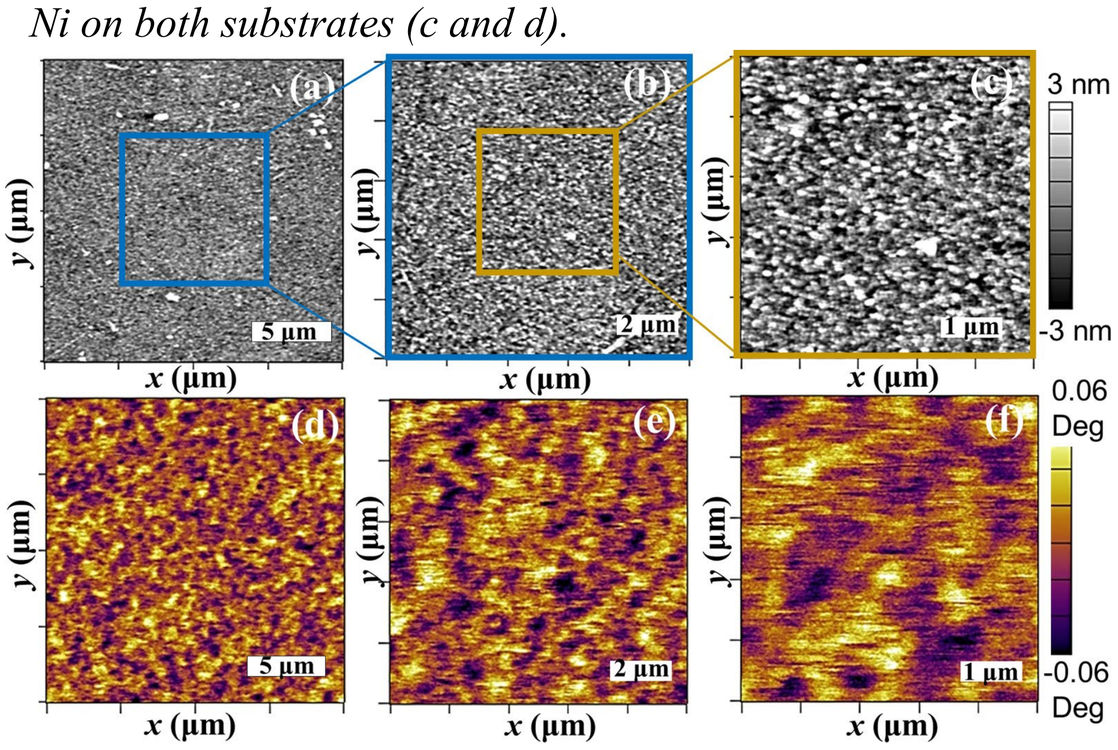


Figure 4. *Morphology and magnetic response derived from atomic force microscopy (a–c) and magnetic force microscopy (d–f) in representative regions of P2. Colored rectangles represent the corresponding zoomed-in areas, imaged by AFM and MFM.*

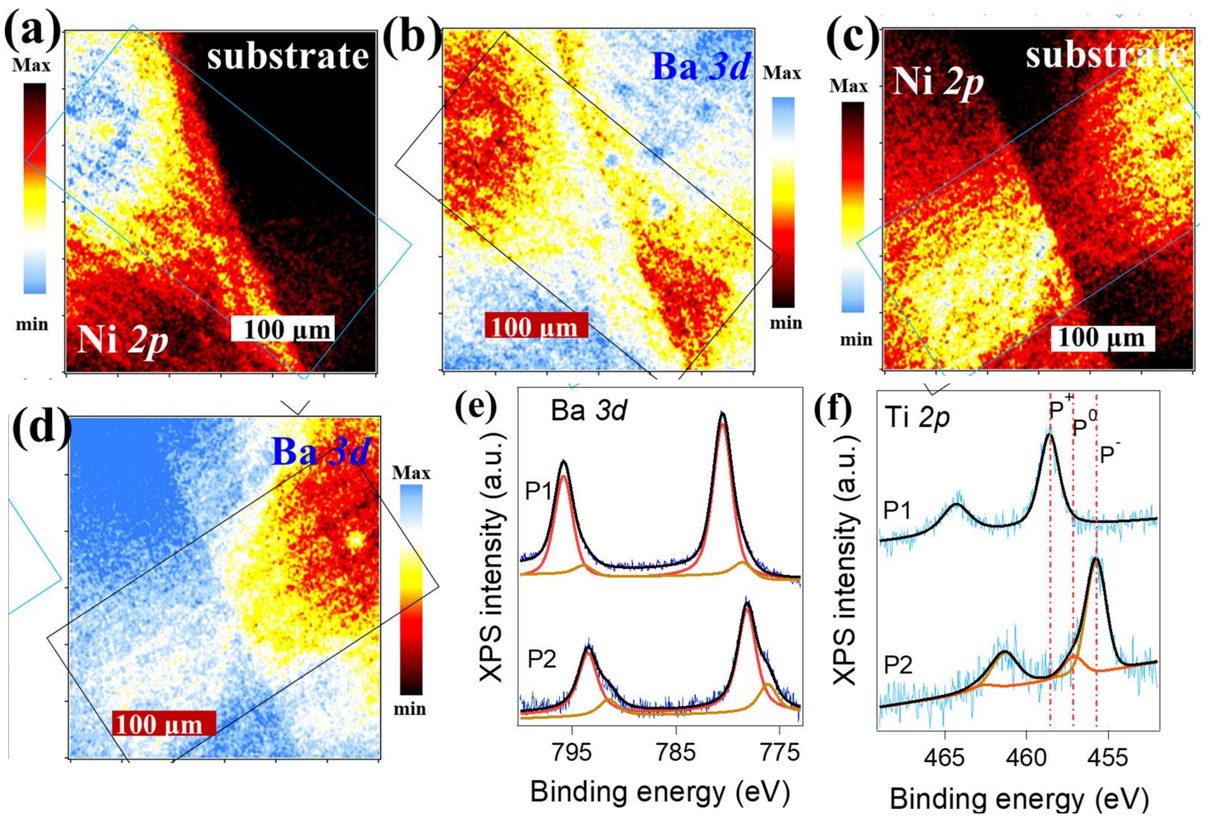


Figure 3. *Spectromicroscopic images of the metal-covered region obtained using Ni $2p_{3/2}$ peak for P1 (a) and P2 (c) and of the substrate using Ba $3d_{5/2}$ peak for P1 (b) and P2 (d). Ba 3d (e) and Ti 2p spectra recorded on P1 and P2 samples.*

Category B

OSIM patent request A/00715 2019

Contact: dana.popescu@infim.ro

Projects: TE50/2022 & PCE96/2021

C

Computer sciences

Electronics

Electrical engineering

Integrated intelligent system for environmental sustainability assessment - INTEL-GREEN

C

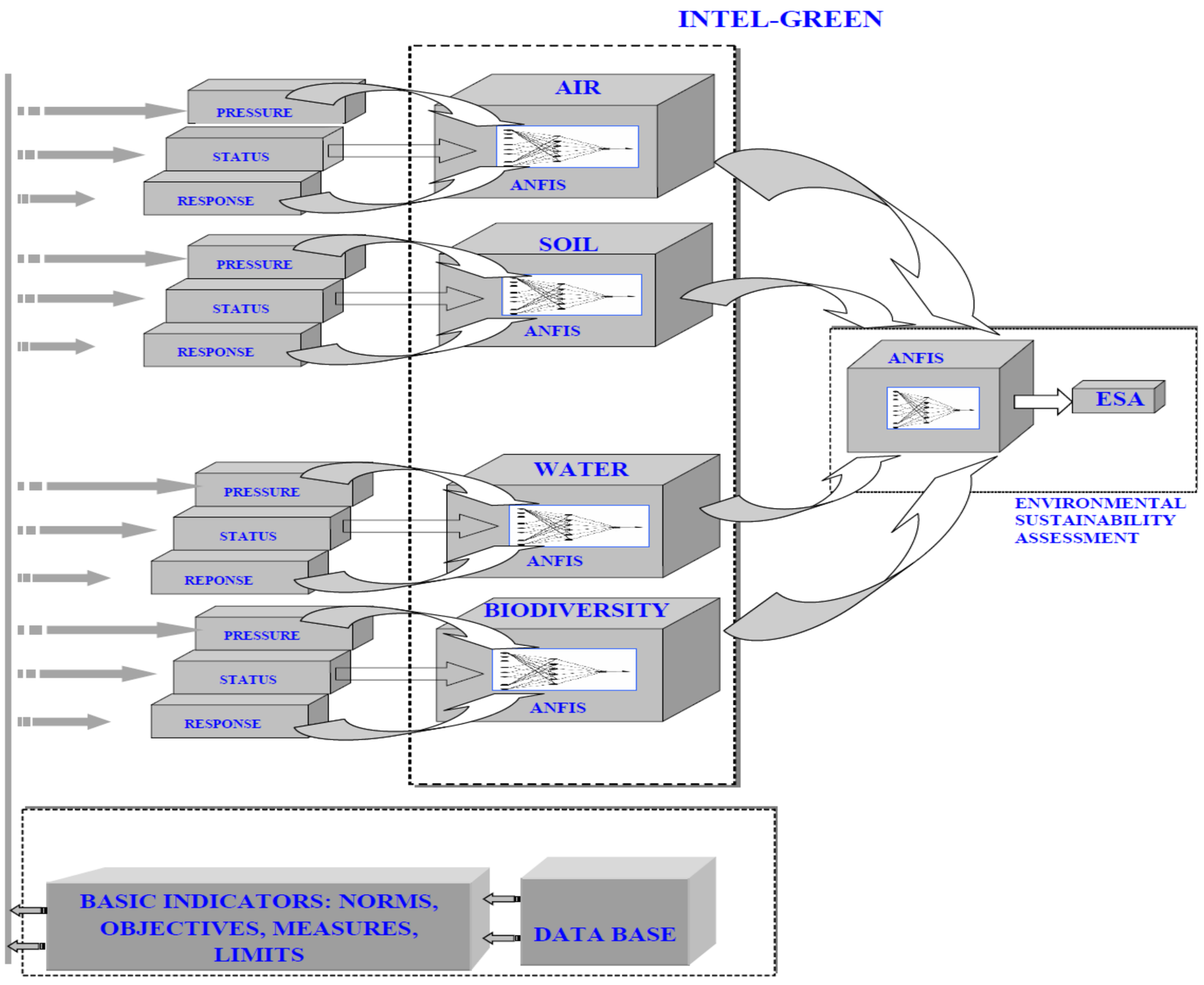
Authors: Florin DRĂGAN, Marius PÎSLARU, Larisa IVAȘCU

The research is focused to develop an *integrated neuro-fuzzy* based framework in order to generate and evaluate ecological scenarios based on data provided by environmental institutions, proposing concerted actions for improving ecological resilience at local, regional or national level and maximizing the benefits provided by the environmental policies to society and economy, respecting the ecological limits of the ecosystem.

As a consequence, the goal of this research is to develop an integrated framework for using fuzzy logic and neural networks with the purpose of determining the specific integrated system design parameters, and also of ensuring an increased adaptability of the environmental policies to the continuously changing environment.

In this field, the neuro-fuzzy modelling approach is very new and involves defining, delineating and analysing the system which will perform the pre-defined functions. These functions will result from the architecture of the proposed system of design support variant indicators.

The research originality consists in developing an integrated intelligent system that combines the advantages provided by different computational techniques (fuzzy techniques and neural networks) in order to develop specific solutions to support innovative policies for environmental sustainability assessment.



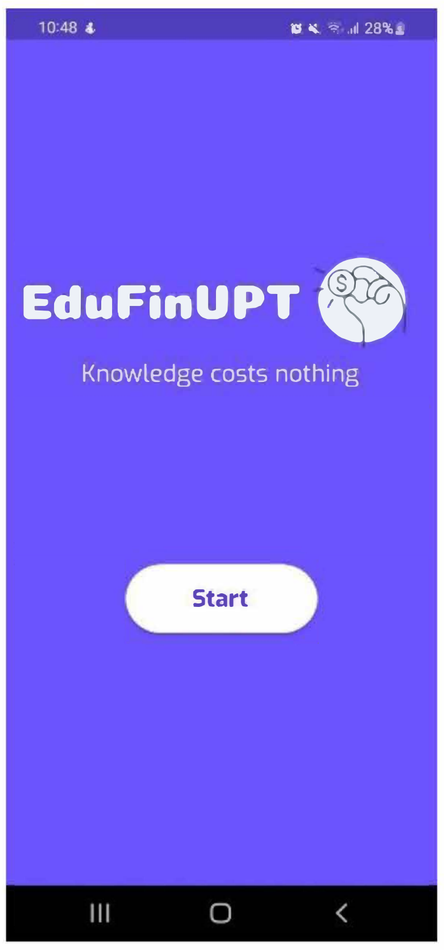
The proposed research theme represents a premiere at national level and it's addressing an up-to-date issue for the scientific community worldwide. The digital model (INTEL-GREEN) is the end result of a collective effort of multiple interdisciplinary research activities which will encompass the systematization, association, analysis and adaptation of existing knowledge applied in various scientific areas such as computational science, chemistry, engineering, environmental economics, and environmental management.

Contact: larisa.ivascu@upt.ro

EduFinUPT - Mobile Application for Acquiring Financial Skills

C

Authors: Daniela-Nicolia Pătruţ, Larisa Ivaşcu, Mădălin-Dorin Pop, Matei Tămăşilă, Alin Artene, Alexandra Coroian, Timea Cisma, Andrei Agache



This mobile application aims to provide the theoretical basis in the financial domain for engineering students and the appropriate mechanisms to keep them engaged throughout this learning process.

The EduFinUPT application represents a tool through which the transition to a digital educational regime will be made in favor of students by creating a dynamic context, which would stimulate their interest in accumulating new knowledge, regarding a field with a rather large impact on their further development, namely, the financial field.

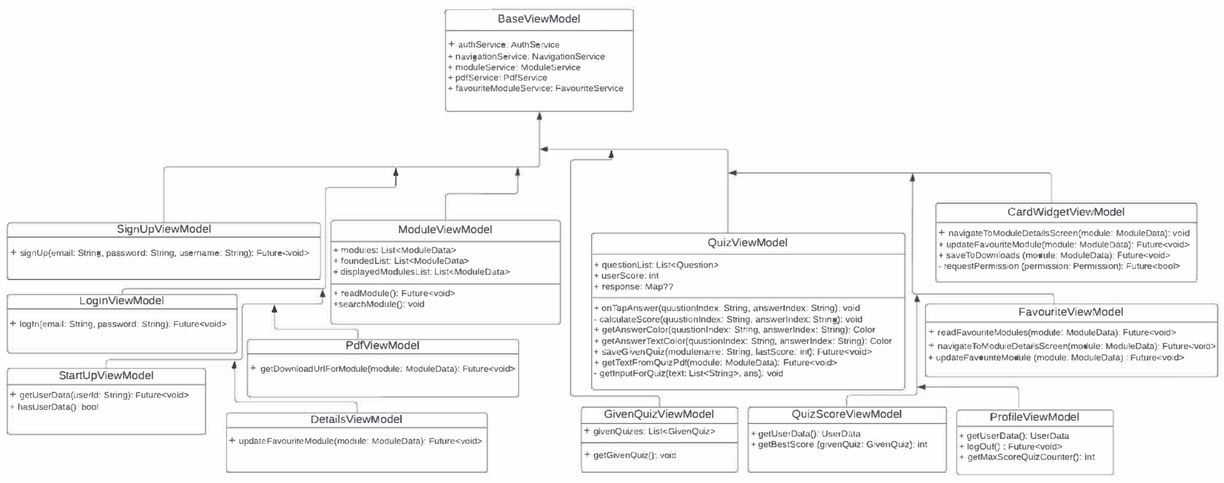
This application offers the possibility of learning beyond the contexts already existing in classical education, therefore, learning in a mobile environment, where users use mobile phones as a method of convenience.

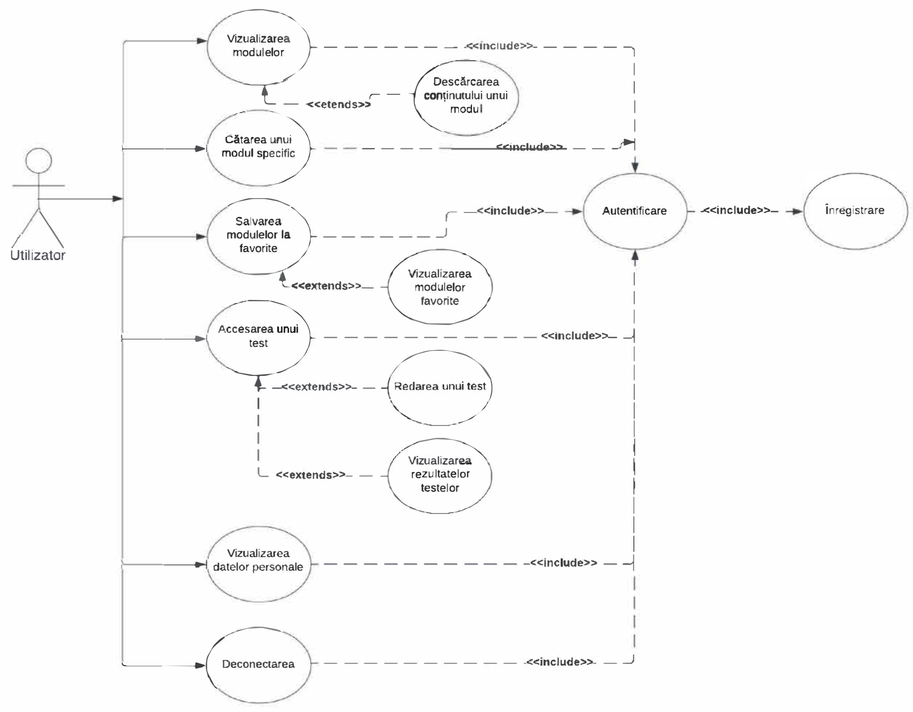
The possibility of individual management of their free time for cognitive development may be an advantage. Compared to other learning applications, it provides evaluation tests that can help students verify their knowledge status at any time.

This application includes a learning guide and a learning dynamic based on continuous assessment.

System architecture - Following the user's interaction with the graphic interface (View), methods from the related ViewModels will be called.







UML diagram for ViewModels. All view models extend the BaseModel class, inside which all the existing services of the application are located. Thus, functions in ViewModels can use any service, at any time.











Experimental stand with VAR regulator for low voltage installations

C

Research project

Authors: Gabriel Nicolae Popa, Corina Maria Diniș, Angela Iagăr

The receivers of reactive energy are three-phase induction motors, power transformers and under-excited three-phase synchronous motors. Generators of reactive energy in electrical installations are overexcited synchronous motors, capacitors and no-load electrical cables. The load power lines have an inductive character. The experimental stand can be used to study on the improvement of the power factor, during deforming regime, in low voltage electrical installations with the specialized VAR-metric regulator. The ESTAmat RPR 12 regulator, which uses three-phase low voltage capacitor batteries, is specially designed to improve the power factor in electrical installations. When conducting the experimental measurements, a power quality analyser type CA 8334 B was used. An ESTAmat RPR reactive power regulator with 12 steps from VISHAY is used in the experimental installation in the laboratory. In the realized application, the first six stages of the regulator were used.

The VAR regulator permanently measures the phase shift between the current on phase L1 and the voltage on phase L1 amd null. The scheme consists of six relays K1.....K6 - power relays, RI 13, and a TC - current transformer with a transformation ratio of 15/5 connected to phase L1 and null.

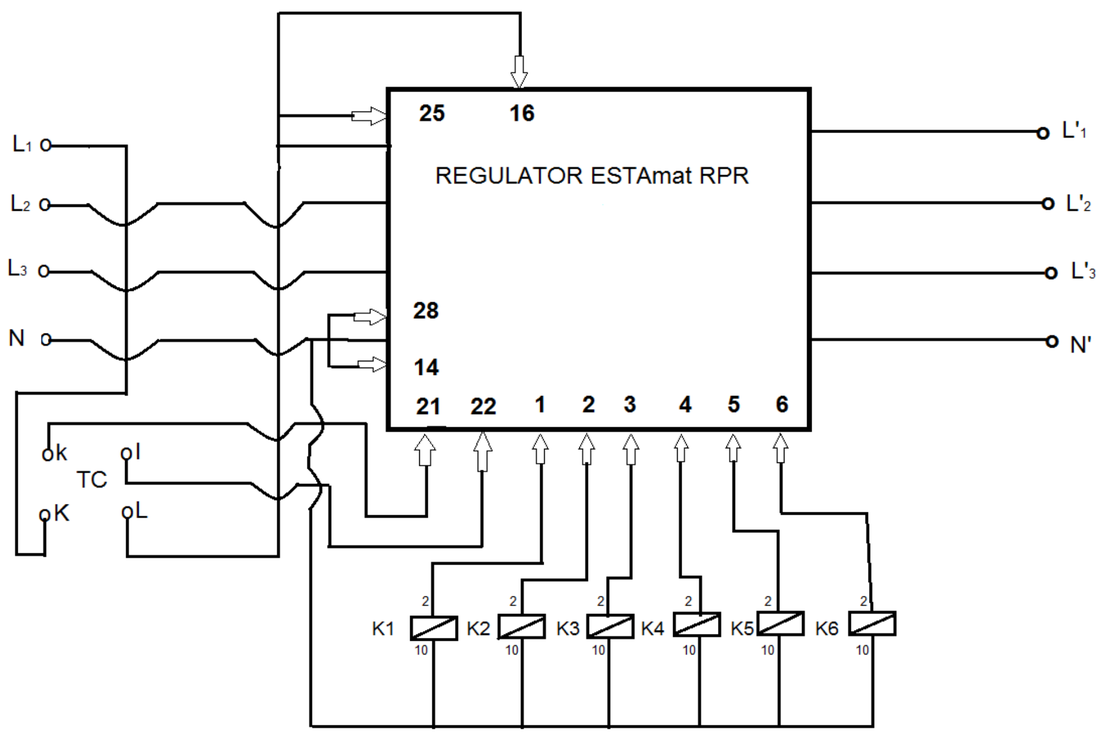


Fig.1. Experimental stand with ESTAmat RPR 12 VAR regulator – principial diagram

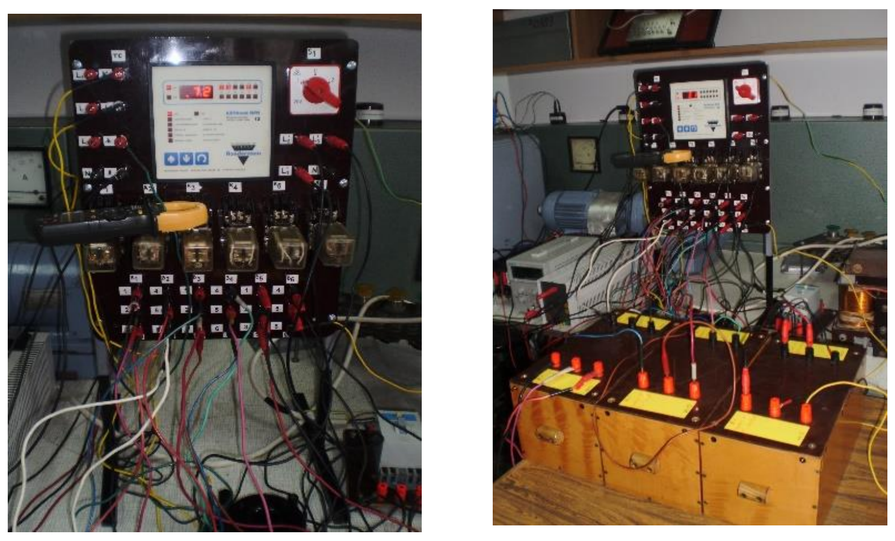


Fig.2. Experimental stand during experiments

Fig.3. Power quality analyser CA 8334B and laboratory capacitor banks

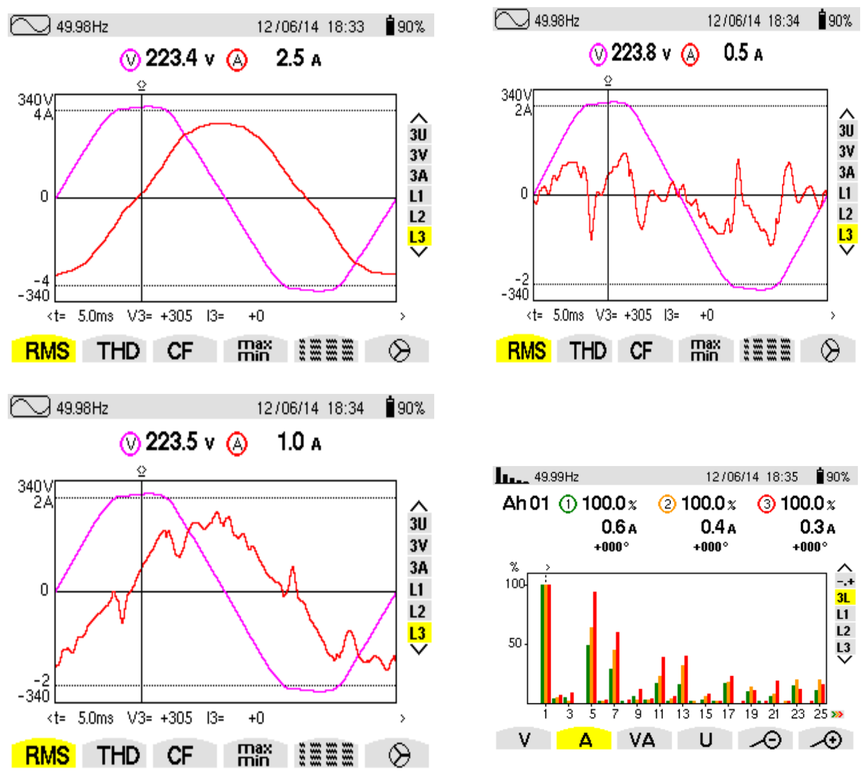


Fig.4. Electrical measurement in installations during operation of ESTAmat RPR 12 VAR regulator

Contact: Popa Gabriel Nicolae, e-mail: gabriel.popa@fih.upt.ro, tel. 0040254207541

Experimental stand with PLC, DC motor and incremental encoder

Research project

Authors: Gabriel Nicolae Popa, Corina Maria Diniș

The PLC (programmable logic controller) is an electronic equipment used to automation of industrial processes. With the help of this device, combinational and sequential control installations can be realized in programmed logic (usually, using LAD or FBD). Sensors and transducers provide the information from the process, necessary to manage the industrial process. Depending on the specifics of the industrial process, in addition to the PLCs, actuation elements such as: electric, pneumatic and hydraulic are used. Contactors are electrical devices used to supply electrical consumers.

The experimental stand the speed regulation of a direct current motor, using a Zelio SR2 A201FU PLC, an TS 5213 incremental encoder and AC/DC converters (230 V, 50 Hz / 5V, 1A) and DC/DC step-up converters MT 3608 (3 pcs., 5V / 7.5 V, 5V / 10 V, 5V / 12.5 V). At the experimental stand it is used the DC motor and switches. The PLC has 12 digital inputs and 8 outputs (contacts), the sources are connected to the first four outputs, and the outputs Q5, Q8 are connected to the motor for direct operation, and to Q6, Q7 for reverse operation of the motor. A mechanical coupling between the encoder and the motor shaft is used. The PLC is powered at a voltage of 230V, 50Hz.

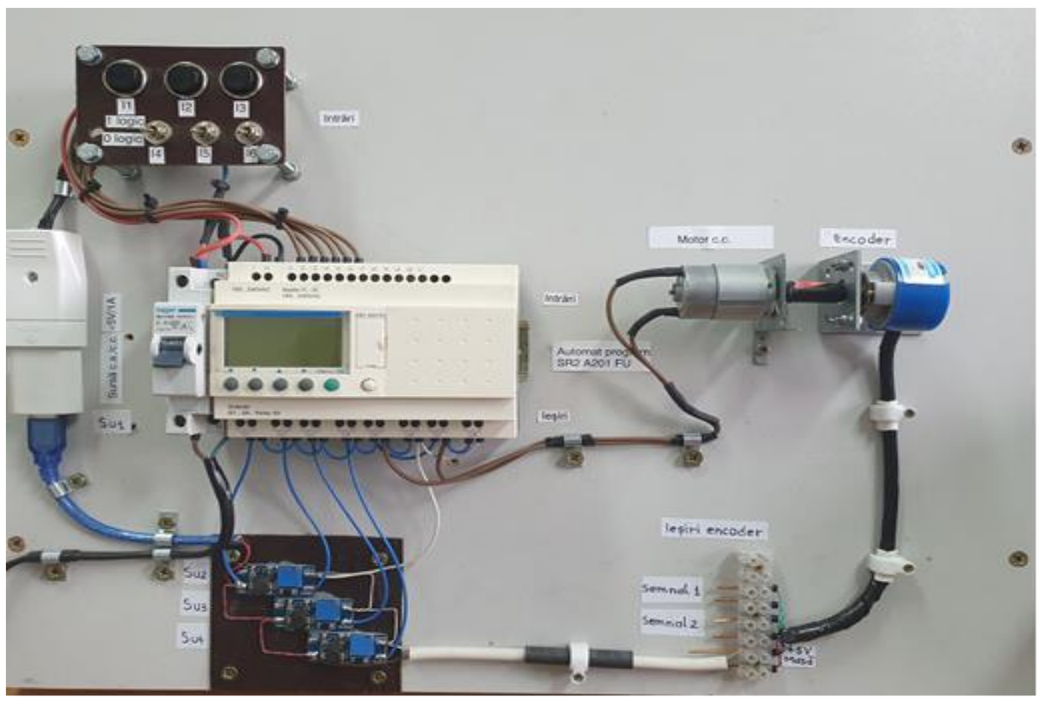


Fig.1. Experimental stand with PLC and a DC motor

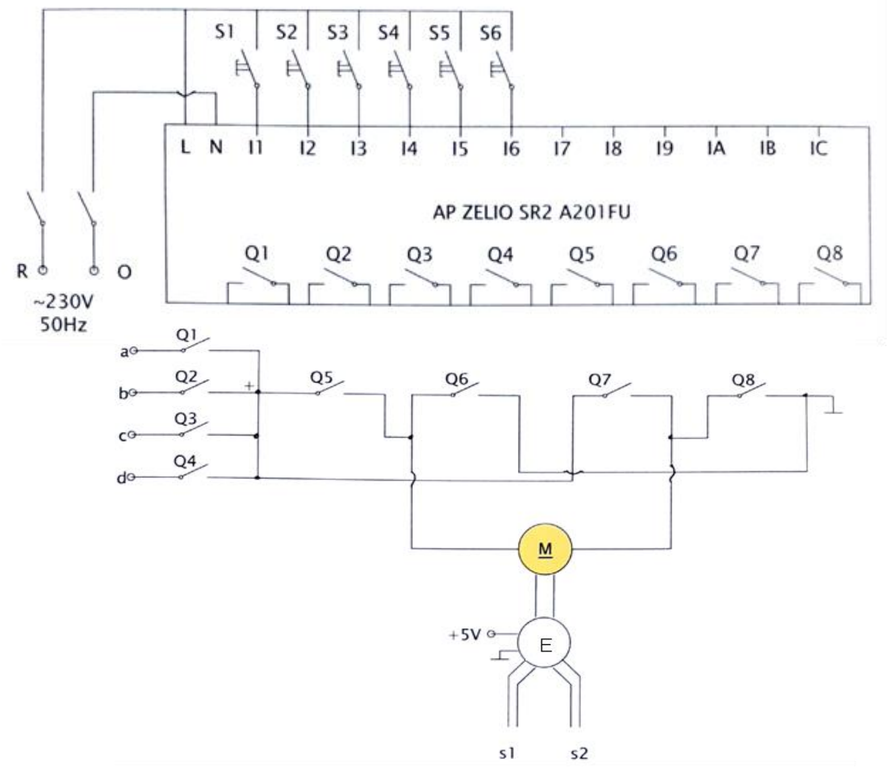


Fig.2. Inputs and outputs connections on PLC

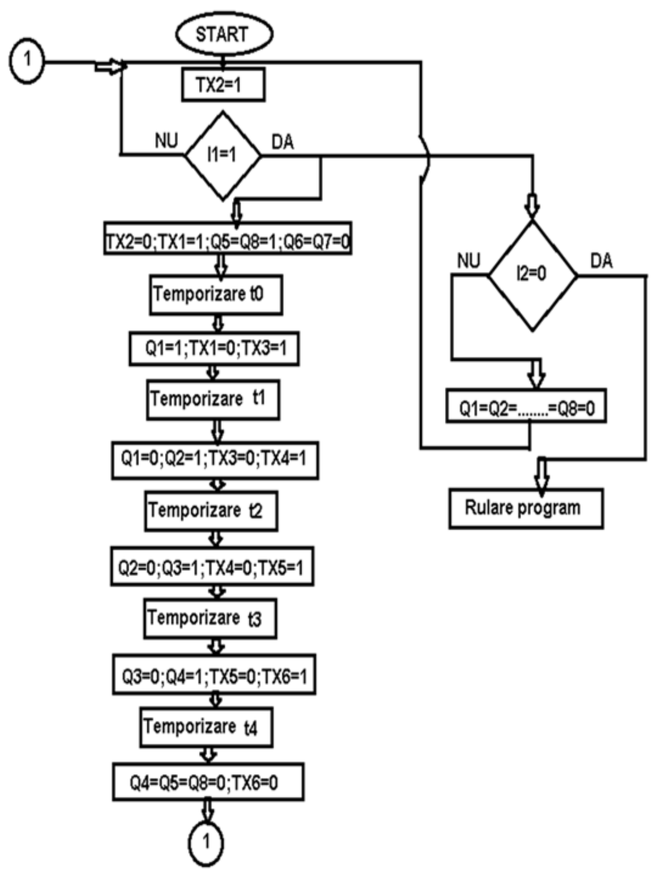


Fig.3. The flow chart for an application

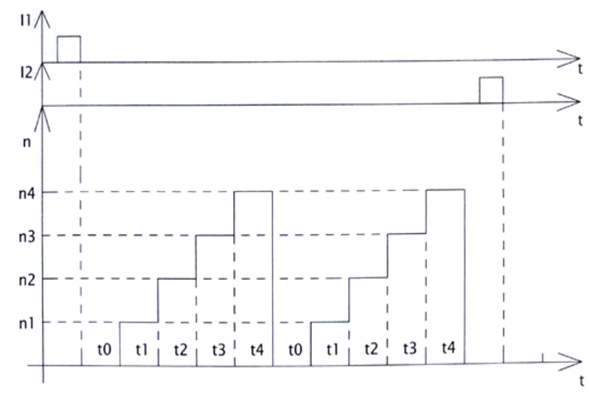


Fig.4. The timing diagram for an application

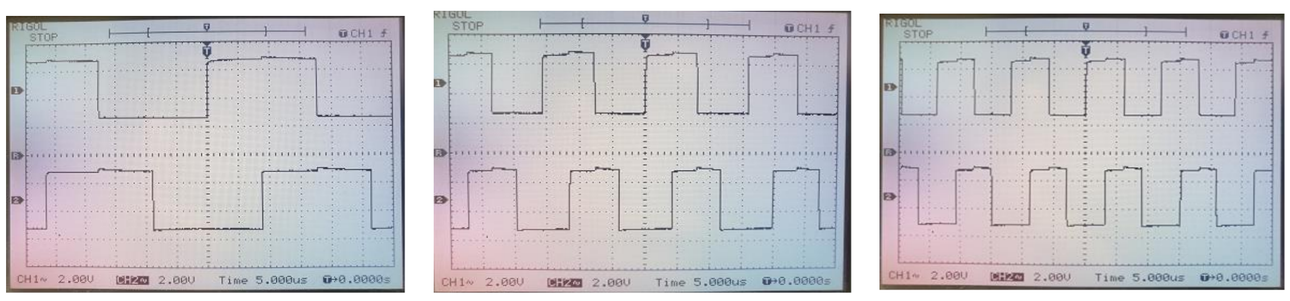


Fig.5. The encoder ouput signals at different speed of motor

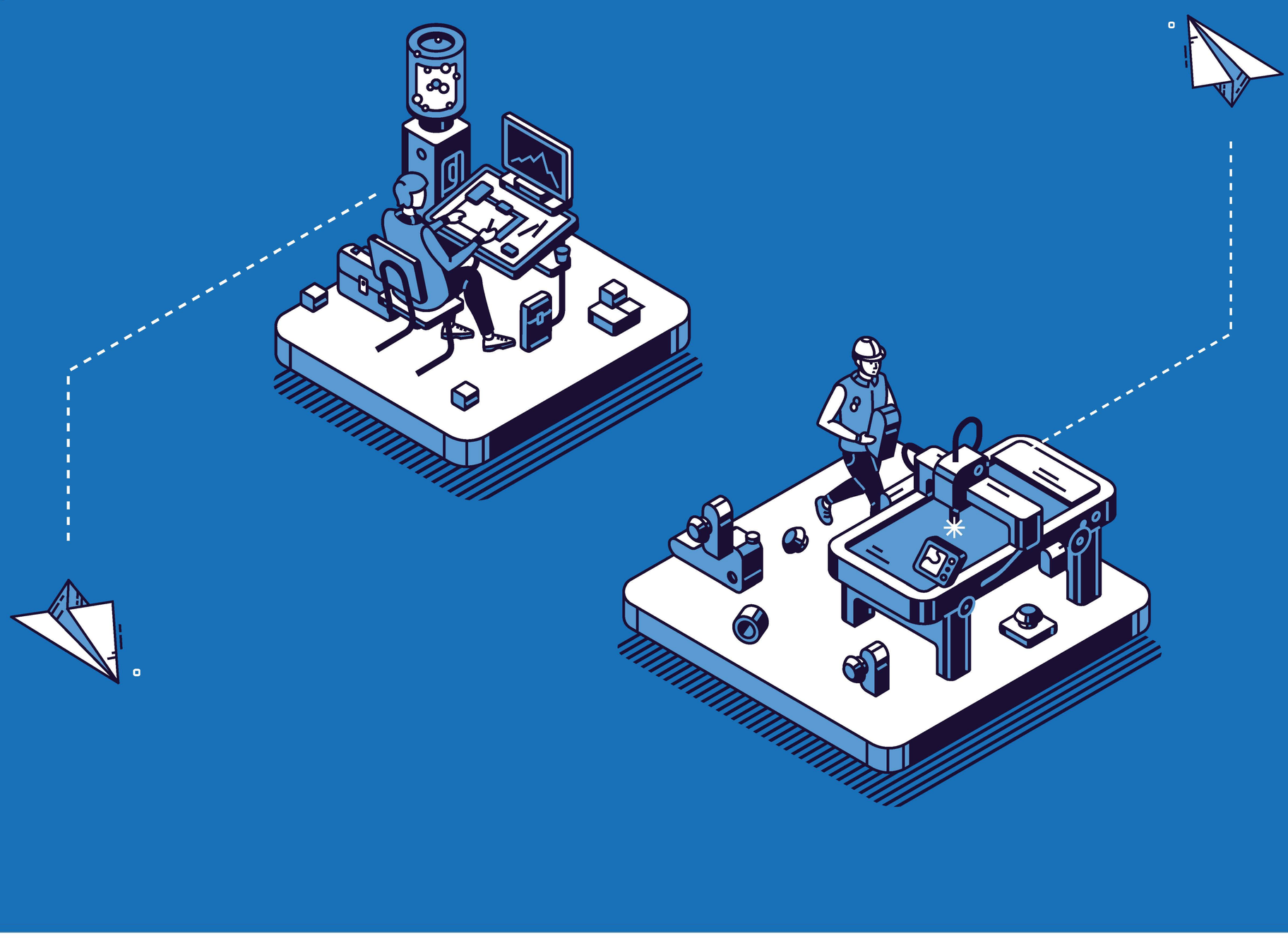
Contact: Popa Gabriel Nicolae, e-mail: gabriel.popa@fih.upt.ro, tel. 0040254207541

DISTRIBUTED SYSTEM AND METHOD FOR REMOTE TECHNICAL ASSISTANCE TO FLEXIBLE MANUFACTURING CELLS

Patent / PHD

A /2022 /00047

Ioan Silea, Romina Drută



The invention refers to a distributed collaboration system, which allows efficient communication between one or more experts remote technicians (usually in different locations of the manufacturer/supplier of a flexible manufacturing cell) and a operator located in the operating location of the flexible manufacturing cell.

In particular, flexible cells with machine tools, manipulators and robots are targeted.

The system is made up of intelligent devices that are the basis of the exchange of information between those who collaborate, video-indicator devices for guiding and visibly indicating, in real time to the assisted person, the various actions that must be performed, a device (similar to a joystick) through which the expert autonomously changes the position of the cameras remote video-indicators (ie located in the area of the flexible manufacturing cell).

Through the 4G/5G mobile network, the data package is transmitted from the specialist to the platform where it is found the operator who requires help (assistance, collaboration). This data package contains commands related to the real-time selection of any of the installed video-indicator assemblies, changing the video camera characteristics of the selected assembly (at/at in the area of the flexible cell for which assistance is provided), as well as commands related to the change the angle at which the video camera takes the flow of information.

Contact: ioan.silea@upt.ro / romina.druta@student.upt.ro

Device for measuring gas and air quality

Research project

C

Authors: Gabriel Nicolae Popa, Corina Maria Diniș

A device has been designed and built for measuring gases (LPG gas, methane, carbon monoxide, hydrogen, ammonia) concentration in the air, as well as measuring air temperature and humidity. The device uses four electrochemical gas sensors, an electrochemical sensor for measuring air quality, a sensor for measuring temperature and humidity that are connected to an Arduino development board that is connected to a 2x16 LCD display with six buttons and one electromagnetic relay. Each sensor (MQ types) usually measures more than two types of gas. The sensors also have a digital output that becomes 1 logic when a preset value has been exceeded, set from a potentiometer located on the sensor board. The analogue outputs from each sensor are connected to the analog inputs (A1, A2, A3, A4, A5) from an Arduino Uno development board. A 2x16 character LCD shield is connected to the Arduino Uno development board. Arduino Uno's A0 analogue port is connected to the the LCD screen with six buttons. In addition, the device also uses a digital temperature and humidity sensor (DHT 11) which is powered between +5V and ground which has a pin through which the information (regarding temperature and humidity) is digital transmitted (serially) to the digital port 7 of Arduino Uno.



Fig.1. Device for measuring gas and air quality

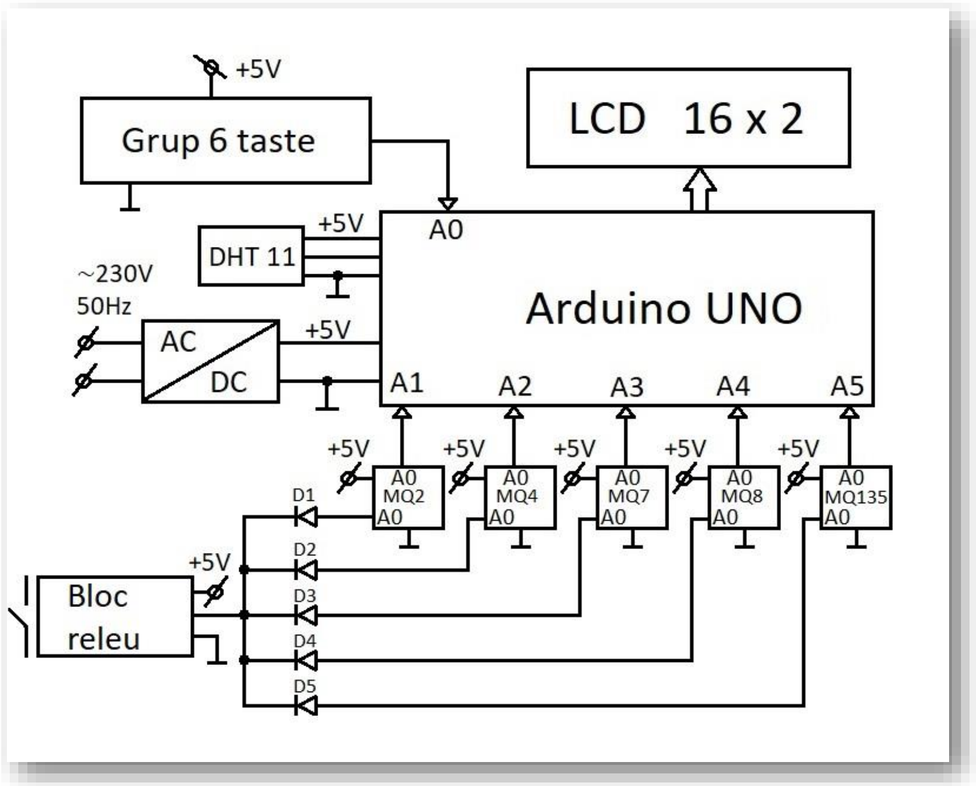


Fig.2. Electrical diagram of the device

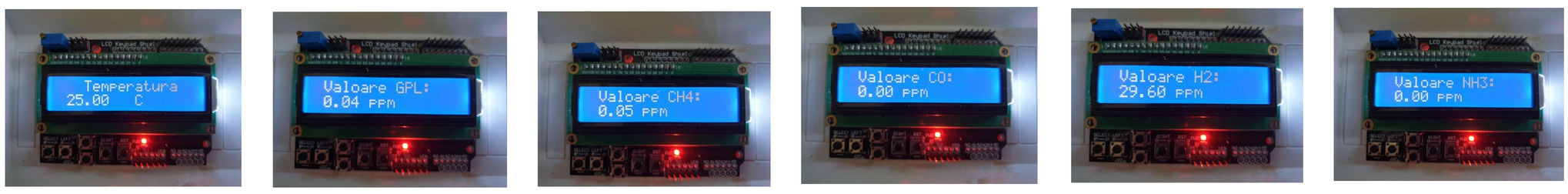


Fig.3. Aspects from displayed data on LCD

The digital outputs of the sensors together with the diodes D1, D5 form a logic gate OR with 5 inputs and one output, being connected to an electromagnetic relay that has the normally open contact (NO) connected to the outside of the device. If any of the sensors detect a value that is exceeded a certain value the output D0 will be 1 logic. If any of the outputs D0 will be 1 logic the electromagnetic relay, the relay will expand and the contact will close (to start a fan). The whole assembly is supplied from a switching voltage source 230V 50 Hz / 5V 2A DC voltage. The program was made to display the information from sensors, at a certain moment, on the LCD display, with the possibility to display information by using the buttons in the menu.

Contact: Popa Gabriel Nicolae, e-mail: gabriel.popa@fih.upt.ro, tel. 0040254207541

Innovation of Eliminate Toxic Gases in Industrial Factory by Applying High Intensity Ozonation Electrical System

Research project

Siseerot Ketkaew

C

This innovative research project presents Innovation of Eliminate Toxic Gases in Industrial Factory by Applying High Intensity Ozonation Electrical System consisting of 3 parts : Part 1, high-intensity electric field cell with corona discharge process for trapping small dust and eliminating odors by using a switching frequency modulation technique to control high voltage. Part 2 pre-filter and high-efficiency HEPA filter set, and Part 3 high-intensity plasma set for use in eliminating toxic gases in the air, which part 1 has introduced a high-voltage switching power supply circuit which has adopted the flyback converter principle, It consists of a high-frequency pulse generator using IC No. SG3525 for adjusting high-voltage voltages of 1.26 kV, 2.53 kV, 3.27 kV, 4.69 and 5.78 kV under the switching frequency of 10 kHz, 11 kHz, 15 kHz, 22 kHz and 32 kHz respectively, and using the IC as a signal amplifier for the power motor. Footer IRFP460 that controls the operation of the flyback transformer. to produce high voltage For supplying electrical energy to high-intensity electric field cell sets.

The test results in part 1, when measuring ozone gas, it was found that at a high voltage of 1.25 kV, it was able to produce 1.5 ppm of ozone gas; at a high voltage of 2.63 kV, it was able to produce ozone gas 1.8 ppm; at a high voltage of 3.27 kV can produce 2.6 ppm of ozone gas, at a high voltage of 4.39 kV can produce 3.5 ppm of ozone gas and at a high voltage of 5.78 kV can produce 3.9 ppm of ozone gas by testing with a room with an area of 200 square meters in 60 minutes, it will be found that when testing the amount of ozone gas 3.9 ppm will result in a reduction in the amount of odors. Part 2 : The HEPA high-efficiency air filter set can capture PM2.5 dust particles with an efficiency of about 98 percent as measured by the dust meter. Standardized and Part 3: high-intensity plasma series. For use in eliminating toxic gases in the air, the result is that it can reduce carbon monoxide gas, carbon dioxide and alcohol gas.







This innovation of Eliminate Toxic Gases has passed the analysis of total power consumption (Power Consumption), the leakage safety standard analysis test (IEC 60335-1), the preparation test for grounding and the electric strength test is completed. At the testing room of the Electrical and Electronic Products Testing Center (NSTDA), therefore, this research project received funding from the state budget: the Science Promotion Fund. Research and Innovation : Research plan for developing technology and innovation to reduce environmental problems from industry Fiscal Year 2023 Agency/PMU: National Research Council of Thailand (NRCT) and can be used to develop Thai innovation accounts and extend them into commercial innovations in the future.

Contact: Siseerot Ketkaew, E-mail : siseerot@hotmail.com

The Ultrasonic Sonar “AudioEye”

C

Research project

Author: Albert VLADESCU

Description

The Ultrasonic Sonar is designed for helping blind people, automation of working flux, in car manufacturing and in 3D objects scanning.

- It can help blind people avoid incoming trafic and stop them from hiting objects in their way, by sending mesages to a pair of headphones about how close they are to an object.
- It can help in working flux by receiving information and making sure that the manufacturing proces went smootly.
- It can be used in car production for small details and correct robotic arm movement.
- It can be used in self-driving cars and car collisation avoidment.

All of these can be done with the right code an machine skill.

My Ultrasonic Sonar is made with an usually platform, servo-motor, ultrasonic sensor (for the distance measuring) and an LCD screen, whitch I tied together and made the necessary code for the 150° of movement and the ouput side of the lcd.

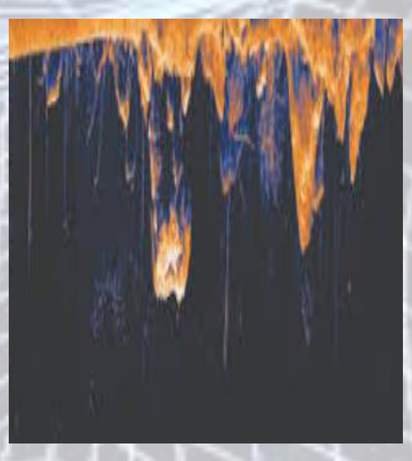
The device is dedicated to ultrasonic scanning, in real time, of the operating environment, being able to provide, in the form of an audio or video map, the footprint of obstacles at a predefined distance, determined by the applied presets.

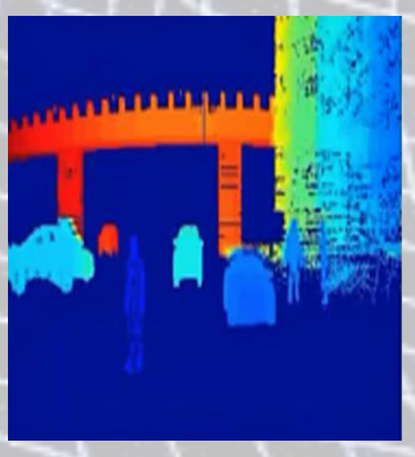
Concretely, it can constitute an audio visualization of the vicinity, of nearby obstacles, as well as the exposure, in the visible spectrum, of properly camouflaged objects (in conditions of fog, darkness, smoke, etc.). The digital signal extracted by the specific program can be converted into warning / avoidance / trajectory correction commands for a wide range of users.

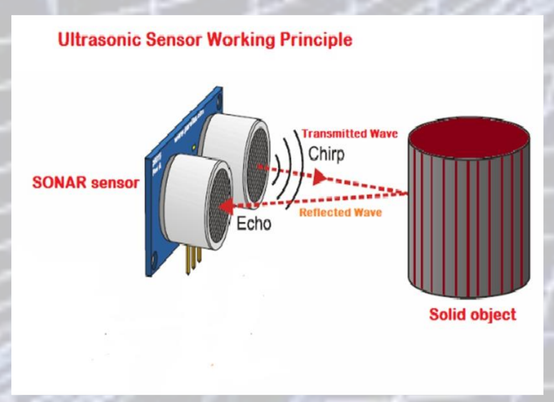
Pictures & graphics

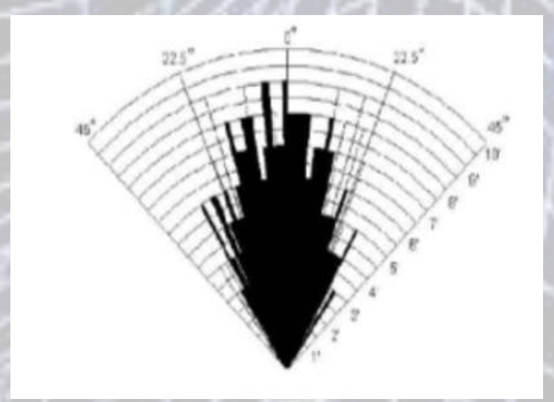


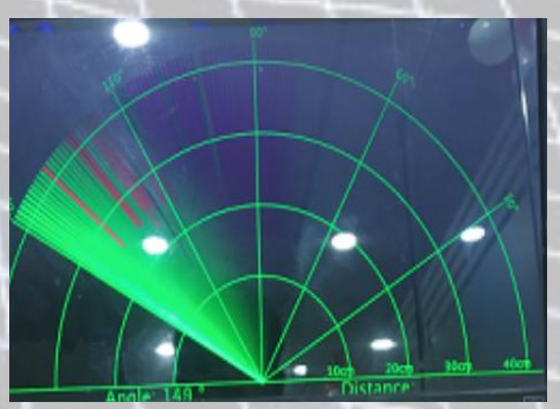


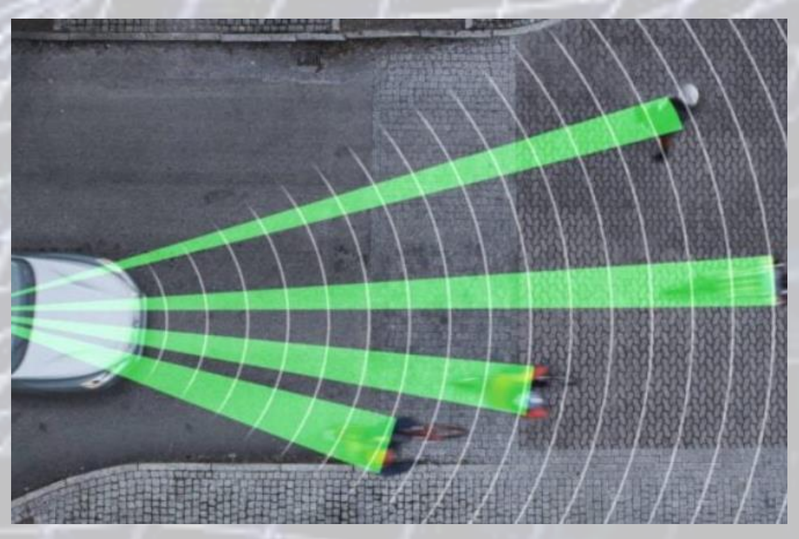


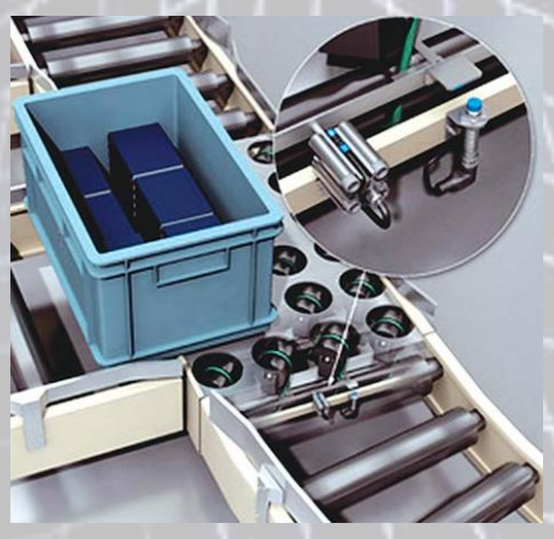














Contact: albertvladescu6@gmail.com +40729928575

NATIONAL INSTITUTE OF RESEARCH AND DEVELOPMENT FOR OPTOELECTRONICS

The switching power supply with regulation and total control of the outputs.

Authors: Valeriu SAVU, Madalin Ion RUSU, Dan SAVASTRU

Patent application no. A/00729/12.11.2019

C

DESCRIPTION: The switching power supply with the regulation and total control of the outputs, is used for the regulation and control of all the voltages from the outputs, eliminating the interdependence between them and the control of the current output limitation. The characteristics of the source lead to the improvement of the stability of the output voltages for any output at the level of the parameters of a switching source with a single output and feedback, by using a dedicated software, can be used to power computers, for systems requiring multiple voltages stabilized, for industrial and professional systems, etc..

NOVELTY: The invention relates to a switching power supply with the regulation and total control of the outputs which allows the regulation and control of the output voltages and currents for a switching power supply with several outputs. The power supply control element is controlled by a programmable microcontroller that has in the internal non-volatile memory a dedicated software with which the voltage and current error information is extracted. The microcontroller acts on the regulating element in order to maintain the voltage and current on each output, in identical minimum variations on each output obtaining output parameters as in the case of a switching power supply with the control of a safe output.

The invention has the following advantages:

❶ controls, maintains and regulates voltages and currents for all switching power supply outputs; ❷ the modification of an output voltage due to its adjustment or due to the annihilation of the voltage error for the controlled output does not affect the other outputs; ❸ eliminates the interdependence between the voltages from the switching power supply outputs; ❹ limits the current for any of the switching power supply outputs; ❺ the limitation of one current output does not affect the other outputs; ❻ adjusting the current for the desired output does not affect the other outputs; ❼ controls and maintains the voltages for all the outputs of the switching power supply at the performances obtained by a switching power supply with a single feedback output.

APPLICATIONS: It can be applied in a multitude of areas where rigorously stabilized voltage supply is required, both civilian and military. (Power supply of computers, systems that require several voltages stabilized at very rigorous parameters, industrial and professional systems, etc.).

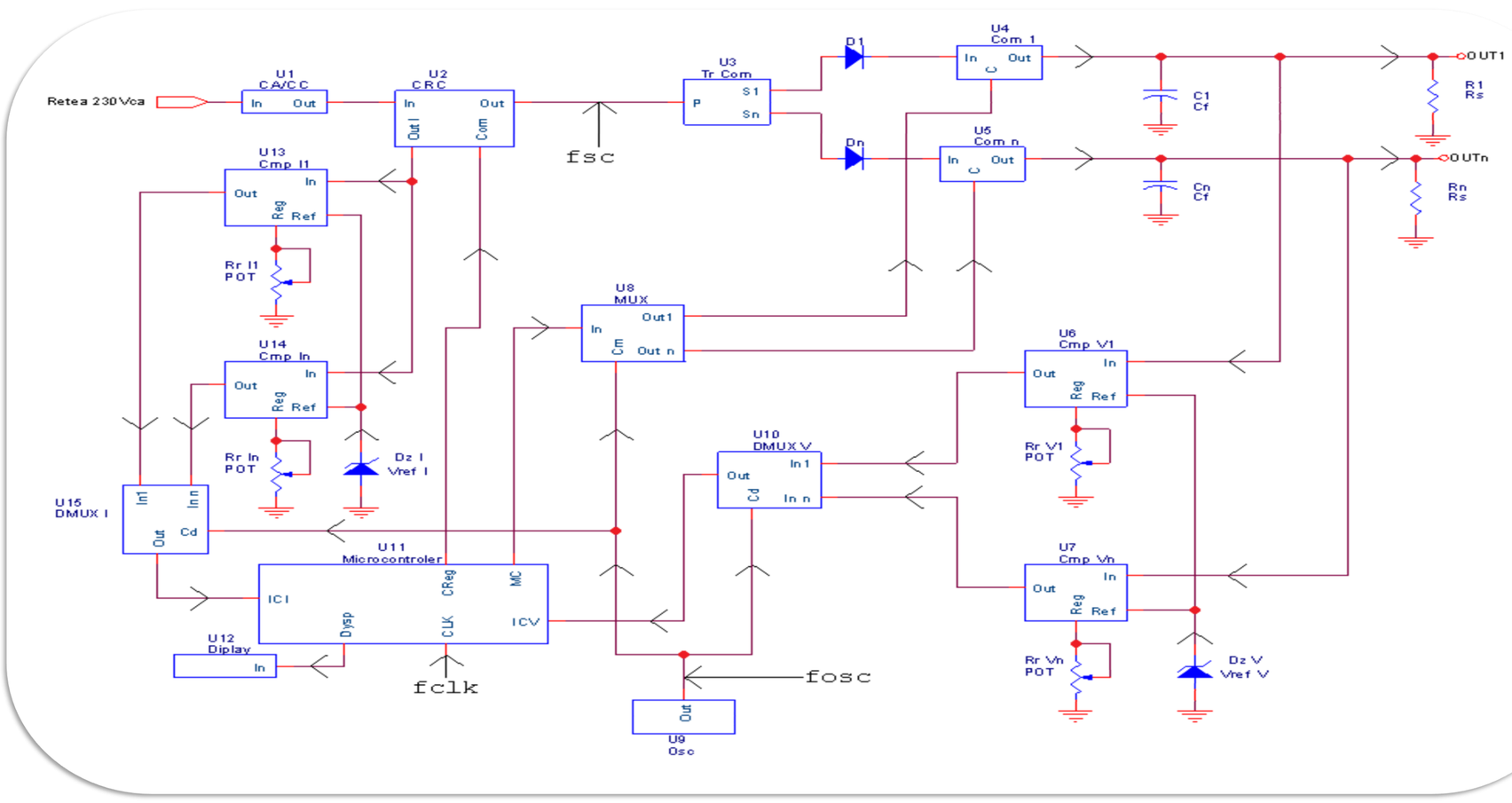


FIG. 1 Functional block diagram of a switching power supply with regulation and total control of outputs.

Contact: madalin@inoe.ro **+40726.216.353**

NATIONAL INSTITUTE OF RESEARCH AND DEVELOPMENT FOR OPTOELECTRONICS

Procedure for determining and measuring high and very high pulsating voltages

Authors: Madalin Ion RUSU, Valeriu SAVU, Dan SAVASTRU

Patent application no. A/00278/2020

C

DESCRIPTION: This invention is used to determine the amplitude and waveform of high voltages used in installations (particle accelerators, etc.), using external measuring devices and the electrical parameters of high voltage power cables, determining a delimited area, in accordance with the use of a fixed capacitor. It is very simple, no electric discharge, measurement errors are minimized by using a repeater inserted in the measuring chain, no parasitic inductors, allows working with non-hazardous voltages and completely eliminates temperature measurement errors, if the dielectric permittivity of the fixed capacitor is the same with the power cable.

NOVELTY: The procedure does not use extra elements, but only using the dielectric parameters of the cable and a fixed capacitor at low working voltage, with which the pulse shape and amplitude are read.

The invention has the following advantages:

❶ it is a simple procedure, it is not complicated; ❷ errors are minimized if the values of capacitors C and the fixed capacitor added are measured before determining the high voltage and are used in its calculation, so the errors for determining the high voltage are given by the errors of the external device; ❸ does not pierce capacitor C, because the high voltage cable used to supply the installation is designed to operate at voltages much higher than the working ones; ❹ increase the measurement accuracy by using a repeater inserted between the fixed capacitor and the external measuring device; ❺ allows work with low voltages (maximum 10V - depending on the division coefficient of the capacitive divider) in the area of measuring the amplitude and determining the high voltage waveform; ❻ does not show parasitic inductance because the connecting conductor between the screen or the rolled surface and the fixed capacitor is straight (not spiral) nor parasitic capacitance, because the distance between the delimited area and the other parts of the shielded cable is well determined; ❼ is a direct measurement, using a simple capacitive divider (does not use indirect measurement processes - mechanical tensioning); ❽ allows the use of feedback in the control of high voltages.

APPLICATIONS: Applicable to systems, installations, etc. which use very high voltages for their proper functioning and which require the determination of the values of these voltages and the waveform in order to obtain feedback, being a simple procedure to implement, which is based on design and manufacturing parameters of the cables that are used for their high voltage supply (particle accelerators, etc.).

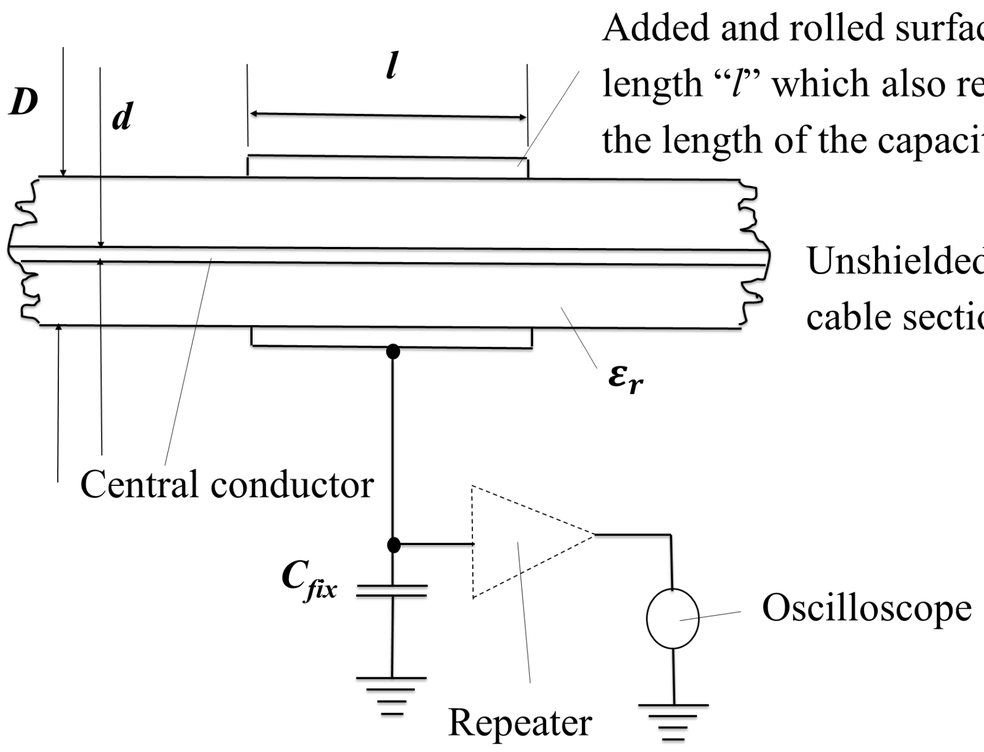


FIG. 1 Block diagram of the practical application of the procedure for determining and measuring very high pulsating voltages for unshielded cable.

Contact: madalin@inoe.ro **+40726.216.353**

C

A Unified Controller for Smart Healthcare Applications (DeltaHealth)

Authors: Souvik GANGULI, Larisa IVAȘCU, Lucian-Ionel CIOCA

Description: The delta domain is a framework for analysing and designing control systems that was developed by Middleton and Goodwin in the 1980s. The basic idea behind the delta domain is to unify the analysis of continuous-time and discrete-time systems at high sampling frequencies. The delta operator modelling is thus a powerful tool for system and control theory and has been widely used in a variety of applications, including robotics, aerospace, and process control. In this work, DeltaHealth is conceptualized as a unified controller in a combined framework, which is designed for medical devices and healthcare applications. The controller is designed to optimize the performance of medical devices and healthcare systems by balancing the input and output signals in real-time.

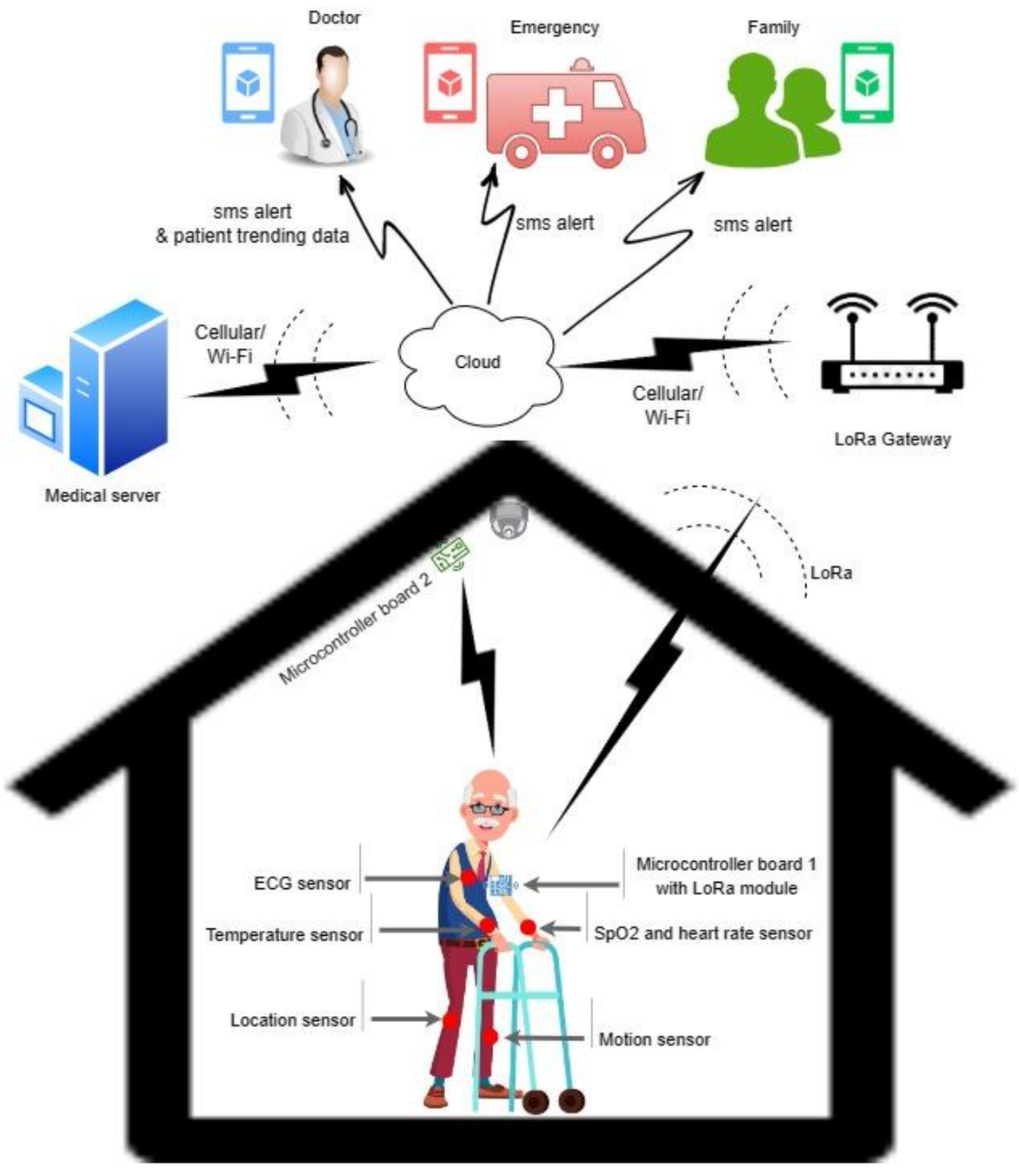
The working of DeltaHealth involves several key components, including sensors, a data acquisition system, a mathematical model of the medical device or healthcare system, and a control algorithm. The sensors are used to measure various factors such as vital signs, like blood pressure, and oxygen levels, which are then fed into the data acquisition system. The data acquisition system processes the data and sends it to the control algorithm, which uses the mathematical model of the medical device or healthcare system to predict its response to changes in the input signals. Based on these predictions, the control algorithm makes decisions about how to balance the input and output signals by adjusting the medical device or healthcare system. The control algorithm uses a combination of feedback and feed forward control to ensure the stability and reliability of the system.

The design of DeltaHealth is flexible and scalable, allowing it to be used in a wide range of applications, including medical devices, healthcare systems, and patient monitoring. It can also be used to manage different types of medical devices, such as ventilators, infusion pumps, and patient monitors as well. Overall, DeltaHealth represents a significant advance in medical devices and healthcare, allowing healthcare professionals to optimize the performance of medical devices, improve patient outcomes, and reduce the risk of medical errors and adverse events.

DeltaHealth is not designed to diagnose specific diseases or conditions. Instead, it is a unified controller designed to optimize the performance of medical devices and healthcare systems by balancing input and output signals in real-time.

DeltaHealth can be used in a variety of medical devices and healthcare systems, including those used in the diagnosis and treatment of various diseases and conditions.

For example, it can be used in devices such as ventilators, insulin pumps, and blood glucose monitors to optimize their performance and improve patient outcomes.



Contact: larisa.ivascu@upt.ro

Opportunity
CORNELIUGROUP
Research-Innovation Association
INVENTCOR
Creation
Realization
Power of Creative Mind
Deva ROMANIA

HCRPS
Cameroon

FOOD ELECTRONICPROCESSING DRYER

1201800384(18952)

Author: Wam Elvis Mbviugeh

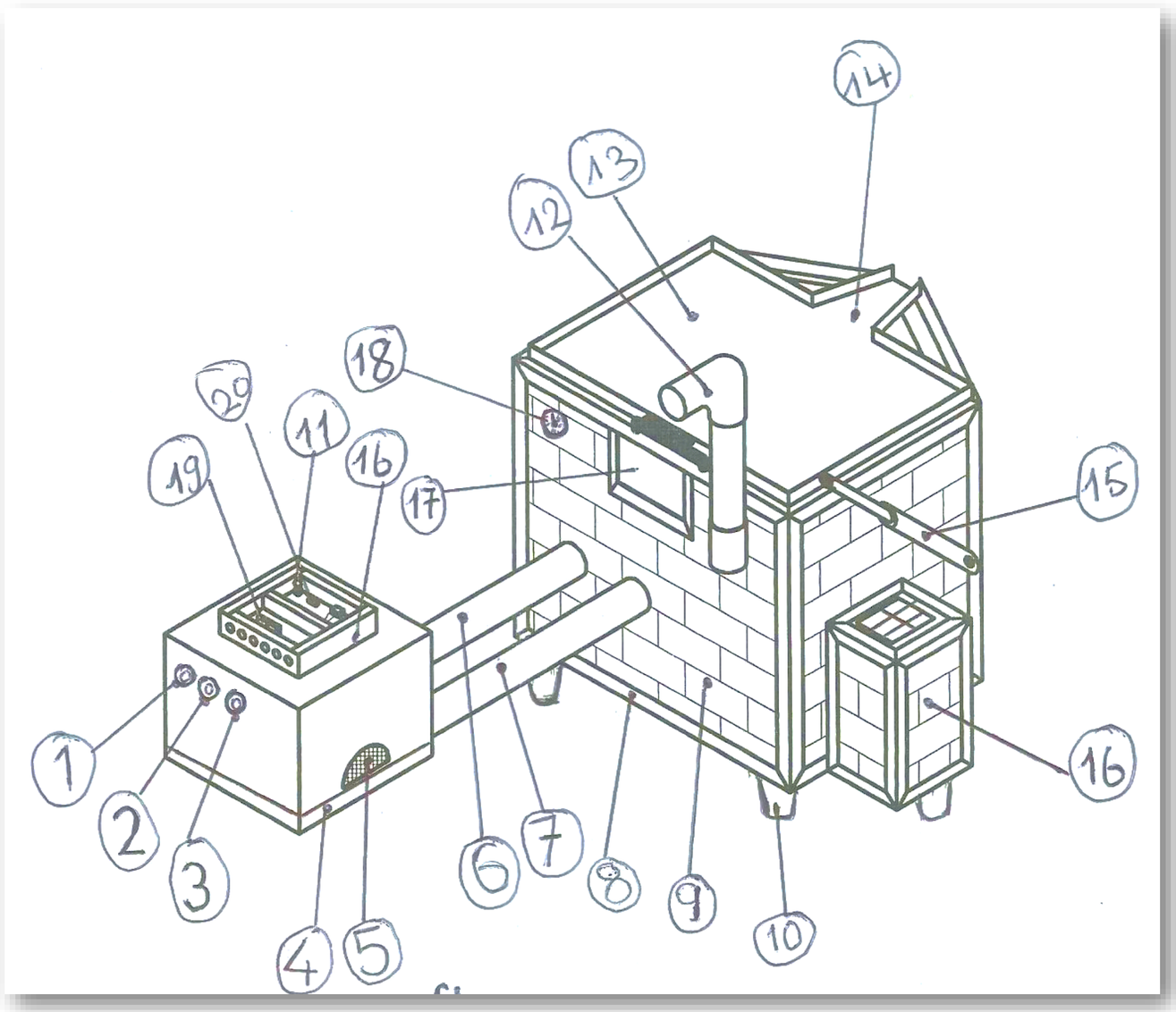
C

"The Food electronic processing dryer" unlike, other dryers is a scientific contribution which is purely African; in that it is made out of local materials such as: metal, bricks, wood, chemical composition of clay soil and electronic components.

It uses electrical energy which is transformed into thermal energy; in the presence of a catalyst (ecological coal), that helps to facilitate the process for work done.

This creation will help farmers in Cameroon, to better preserve cocoa in order to improve on their economic conditions and social lives.





What is premium to this concept is that, the cost of running this machine is cheaper; because the induction motor is connected through a rectification circuit which drops the consumption rate of the motor with the possibilities of mounting the engine with a D.C (Direct current) motor of 12V-24V.A careful study and research has been carried out by the Author through print journals (Cameroon business for today, the wood workers pocket book by Charles Hay-ward for the selection of good wood to build-up the engine of this invention.

The study of thermodynamics, Observation and experimental nature influence this creation in that; I grew up and meet my father as a cocoa producer.

Contact: +237 677 458 290 +237 656 267 364 wamelvis@gmail.com

Opportunity
CORNELIUGROUP
Research-Innovation Association
Creation
INVENTCOR
Realization
Power of Creative Mind
Deva ROMANIA

INSEMEX

NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT
IN MINE SAFETY AND PROTECTION TO EXPLOSION

TEST STAND FOR IGNITING THE EXPLOSIVE DUST/AIR ATMOSPHERE BY CAPACITIVE ELECTROSTATIC DISCHARGES

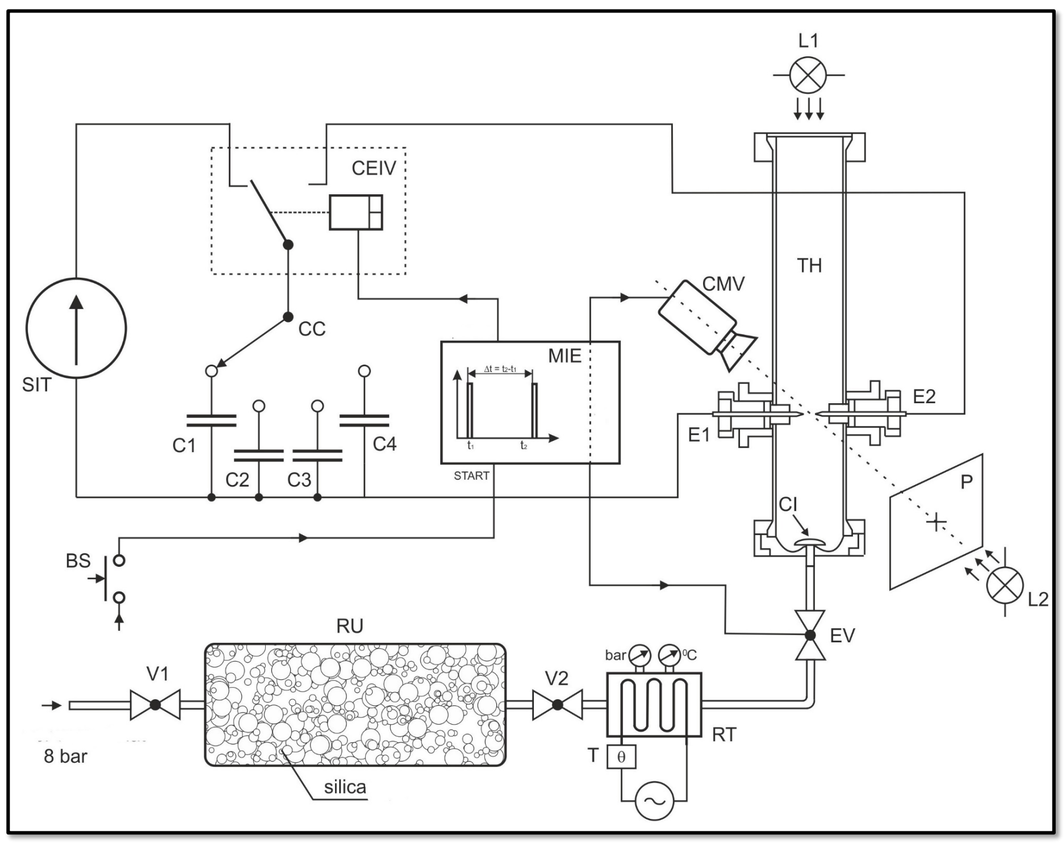
patent no A 2018 00934

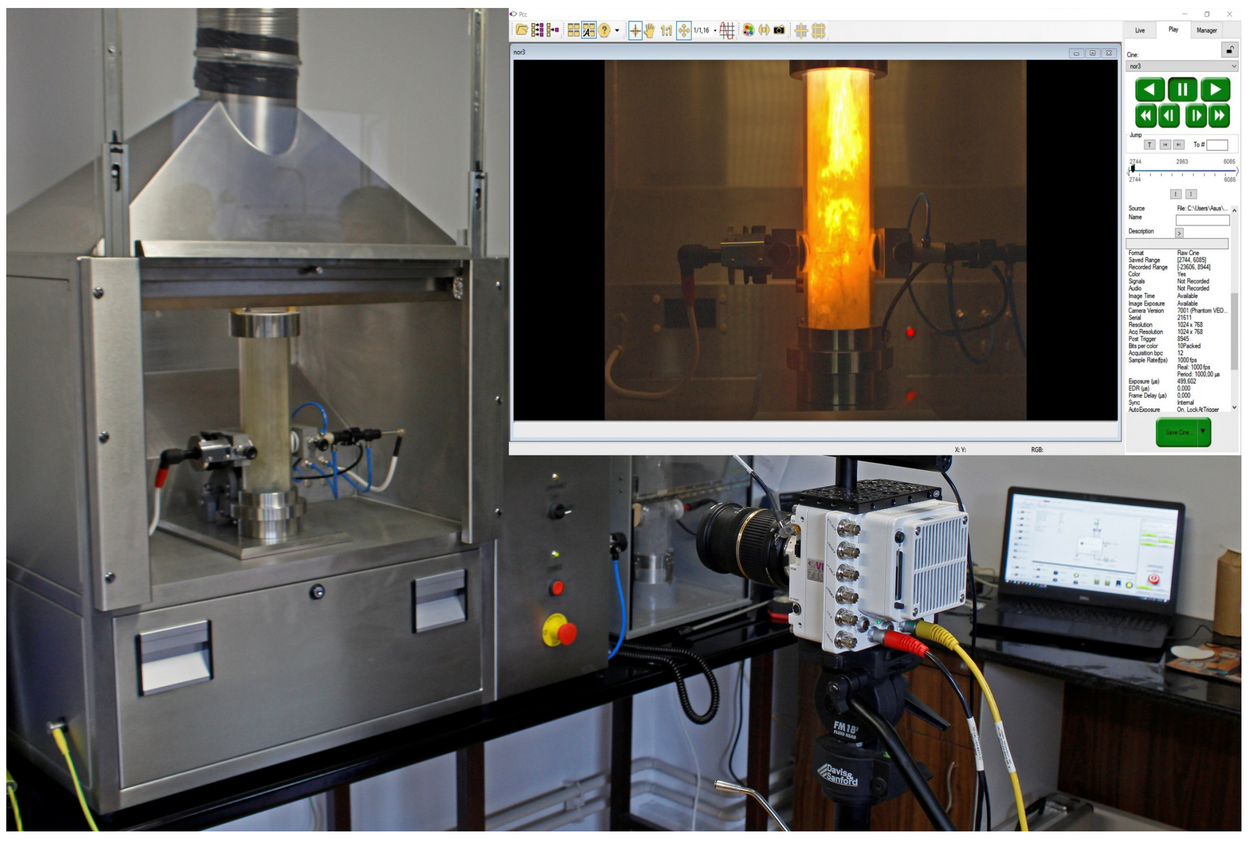
Author/s: Gabor Dan Sorin, Găman George Artur, Ghicioi Emilian, Pupăzan Daniel, Darie Marius, Lucian Moldovan, Irimia Alin, Vătavu Niculina, Părăian Mihaela, Magyari Mihai, Grecea Dănuț Nicolae, Csaszar Tiberiu Atila, Jurca Adrian Marius, Păun Florin Adrian, Colda Ioan Cosmin.

C

The test stand for ignition of the explosive dust/air atmosphere by capacitive electrostatic discharge uses an explosive test mixture of air and combustible dust. The mixture must have a concentration that is between the lower explosion limit and the upper explosion limit, which is ignitable by an electrostatic discharge. The stand optimises the initiation process of the dust/air explosive atmosphere by accurately determining the delay between the start of dust clouding and the moment of electrostatic discharge and by providing test conditions similar to those in industrial environments. The solution to optimise the dust/air explosive atmosphere initiation process is to mount a high-speed video camera capable of recording 1000 frames per second and transferring the images to a PC. The camera is mounted at the discharge electrodes on one side of the vertical glass tube. On the other side is positioned a screen, white or black depending on the colour of the powder used.

The camera is turned on with the opening of the electrovalve that releases air into the glass tube, air that wraps the dust from the base of the tube, and is turned off after 1000 frames, i.e. after a period of 1000 ms. The video recording is transferred to the PC and with a software that allows the viewing and counting of the video frames is read the number of frames at which the wrapped dust cloud is optimal for initiation.





The value obtained, i.e. the number of frames counted, will be the value in ms of the delay required from the opening of the electrovalve (the lighting of the red LED) and until the generation of the spark. The solution by which conditions are ensured in the ignition stand as close as possible to those in industrial environments, is the use of a first silicagel tank in which the compressed air is dehumidified and a secondary thermostatic tank for the control of the temperature of the air with which the dust will be wrapped.

Contact: Dan Gabor, email: dan.gabor@insemex.ro

Opportunity
CORNELIUGROUP Research-Innovation Association
Creation
Realization
INVENTCOR
Power of Creative Mind
Deva ROMANIA

INSEMEX

NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT IN MINE SAFETY AND PROTECTION TO EXPLOSION

COMPUTERIZED STAND FOR THE PREPARATION OF A MIXTURE OF FLAMMABLE/TOXIC/ASPHYXIATING GASES

C

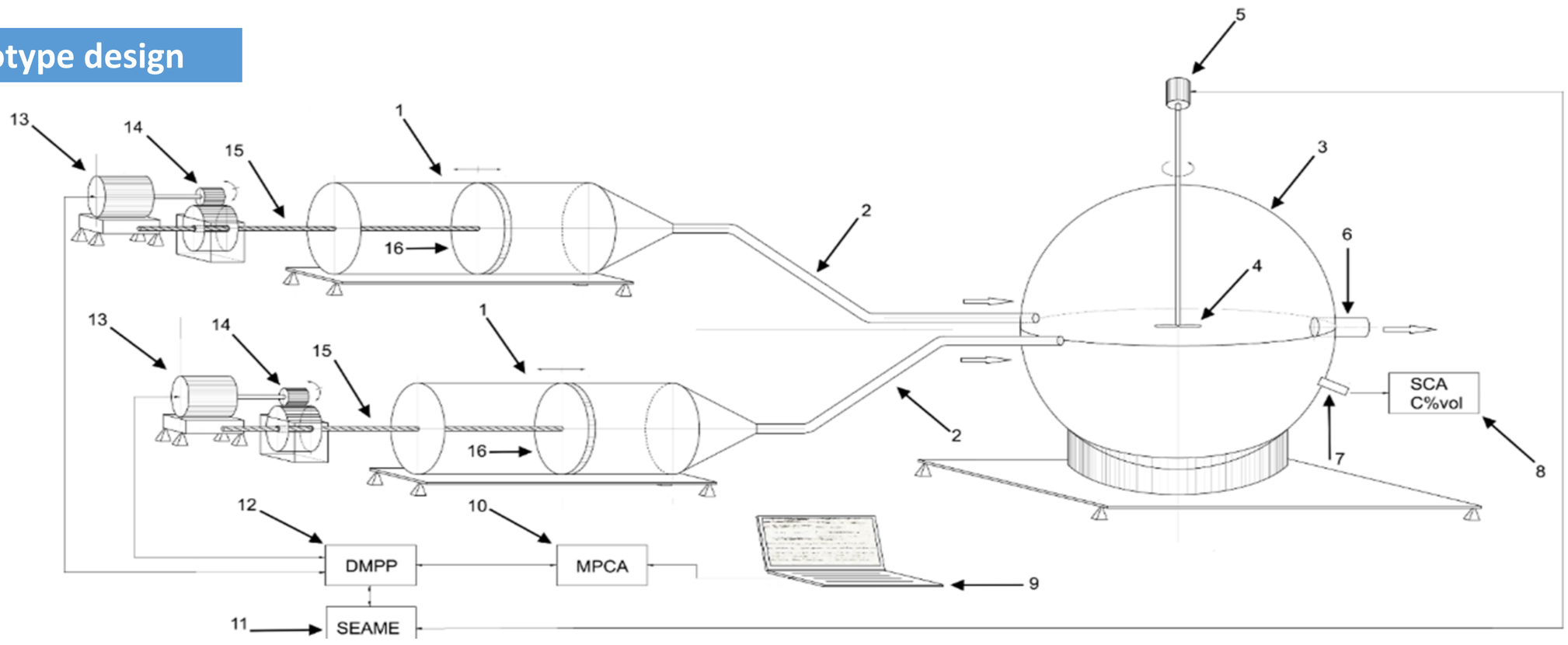
patent no A 2019 00807

Author/s: Șimon-Marinică Adrian Bogdan, Găman George Artur, Ghicioi Emilian, Pupăzan Gheorghe Daniel, Găman Angelica-Nicoleta, Păsculescu Vlad Mihai, Vlasin Nicolae-Ioan, Laszlo Robert, Burian Constantin Sorin, Florea Gheorghe-Daniel, Prodan Maria, Cioclea Doru, Șuvar Marius Cornel, Vass Zoltan, Moldovan Lucian, Simion Alexandru Florin

Summary of invention

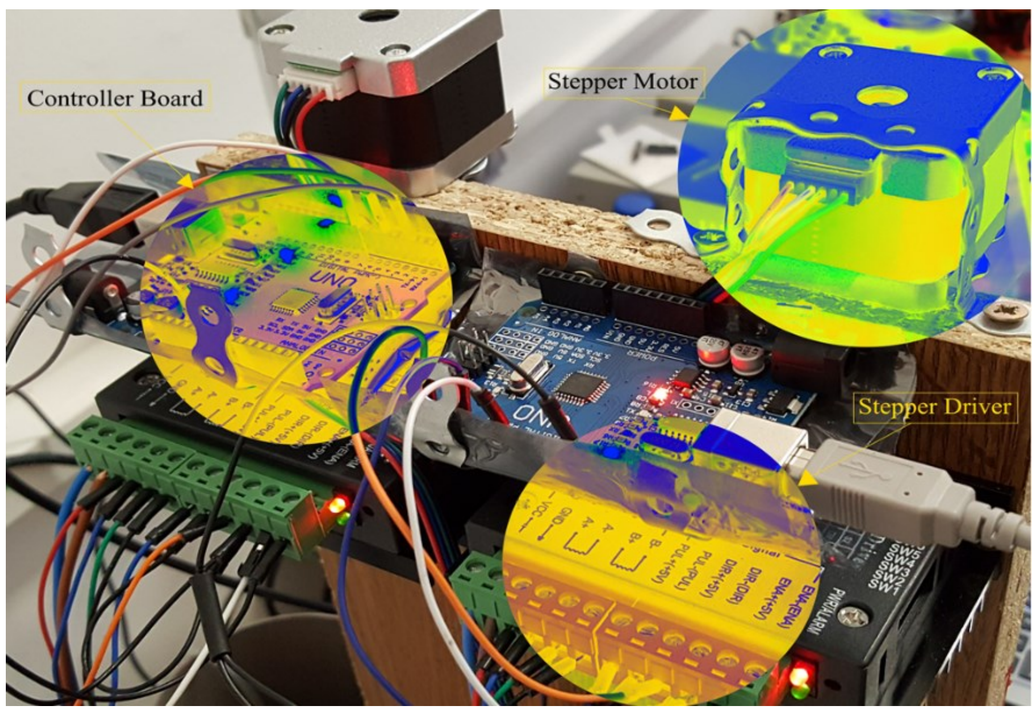
The invention relates to a computerized stand for the preparation of a mixture of flammable/ toxic/explosive gases, with the purpose of obtaining gas mixtures at concentrations in the explosive range. The operating principle of the stand is based on mixing two volumetric flows, controlled by programmable microprocessors, at which the gases are stored and circulated at atmospheric pressure with the aid of cylindrical injectors, driven by stepper motors so that the gas circuit does not require valves and at the outlet there is a homogenization chamber with agitator and dedicated flammable/toxic/explosive sensor to confirm the programmed concentration.

Prototype design



Hardware controllers

Inside the injector cylinders [1] we can find gases A and B at a known concentration. The initial volume of the cylinders being 10 cubic decimeters with an inside diameter of 1 decimeter, were the gases flow into the circuit without valves [2] and reach into the homogenization chamber [3], where the agitator propeller [4], driven by an electric motor [5], performs the homogenization. Then the mixture is discharged for use through the outlet nozzle [6], at the required concentration verified with the sensor [7], which transmits a signal to the mixture concentration display system [8].



This concentration value is first programmed by means of the computer [9] communicating unambiguously with the microprocessor [10] for the control of the mixer, respectively the control of the driver [12] and stepper electric motors [13], which are supplied with electricity from the multiple electric source [11]. With the help of mechanical couplings [14] and the mechanical assembly [15] the rotational motion is transformed into a translation motion so that the actuated injectors pistons [16] are actuated to obtain the discharged volumes, according to the predetermined calculation program, introduced into the mixing and homogenization chamber.

Contact: Adrian Bogdan Simon-Marinica, email: bogdan.simon@insemex.ro

DECİMAL SOFTWARE

Research project

Author/s: Muhammed Tunahan BOŞDURMAZ

C

In this study, it is aimed to develop a method that enables to find the digit in any digit after the comma in the decimal form of the number $\frac{1}{n}$ for a natural number n whose prime factors are not 2 and 5, and based on this method, the fraction $\frac{a}{n}$, a being a natural number greater than one, is followed by the decimal point. It is aimed to generalize the method to give the number in any of its digits. It started with a question of my advisor for the study asked, “What is the digit in the 2021th digit after the comma in the decimal form of the number $\frac{1}{2021}$?” As a method, modular arithmetic rules, Euler Function, Euler Theorem, Chinese Remainder Theorem were used. As a result of the studies, since finding the digit in k. digits from the beginning after the comma of the number $\frac{1}{n}$ actually means finding the digit in the first digit of the number 10k-1. $\frac{1}{n}$ after the comma, the form of the number 10^{k-1} as n.p +q , 0 < q < n has been found. When the number of n.p +q found is multiplied by the number $\frac{1}{n}$, the number p +$\frac{q}{n}$ will be formed, and the first digit after the comma in the decimal form of the number $\frac{q}{n}$ will be the result we are looking for. The coding of this study was done, and the program that gives the number in any digit after the comma was made. Thanks to this method, it was possible to generalize within the number $\frac{a}{n}$ (a natural number greater than one).

The following results were obtained in this study.

Provided that n is a positive integer, a method has been developed to find the k. digit after the decimal point in the decimal writing of the number. The reason why I multiplied the number by 10^{k-1} in the method found is the first element after the comma in the decimal form of the number $\frac{1}{n}$, it means the first digit of the number 10^{k-1}. $\frac{1}{n}$ after the comma in the decimal form. In this way, I found the remainder of the prime factors of n divided by 10k-1. Then, with the help of the Chinese Remainder Theorem, I wrote the number 10k-1 as m.p +q. Also the number 10^{k-1}. $\frac{1}{n}$ is written as (m.p +q). $\frac{1}{n}$. From there I reached the p + $\frac{q}{n}$ value. When I wrote the number $\frac{q}{n}$ as a decimal, the first digit after the comma was the number I was looking for. I was able to generalize the method I found and find the number in any digit after the comma in the decimal form among the numbers $\frac{a}{n}$, where a is a natural number greater than one.The method is the same, and when the p + $\frac{q}{n}$ value, which is the final version of 10^{k-1}. $\frac{1}{n}$, is found, it is necessary to multiply it by the number a. When it is multiplied by the number a , a.p + $\frac{q.a}{n}$ comes out. When the number $\frac{q.a}{n}$ is written as an integer fraction, the first digit after the comma in the decimal form of the simple fraction part becomes the searched result. Prime factors of n must not have prime factors of 2 and 5. In order to prove Euler's Theorem, if we express the prime factors of n with q, the factors between 10 and q must be prime.

The software of the study was made. For natural numbers with a maximum of three prime factors, the desired digit can be easily found with the help of the program. We can send you the program if you want. The program will be introduced at the time of the presentation.

Where n is a positive integer,

Let n = p. q. r be the prime factors excluding 2 and 5 . When the number in the k. digit after the comma is asked in the form of the number,

In the form of the number $10^{k-1}.\frac{1}{n}$, the first digit after the comma is the desired value. According to this,

$10^{k-1} \equiv x \pmod p$, $p \neq 2$, $p \neq 5$, $(p, 10) = 1$

$10^{k-1} \equiv y \pmod q$, $q \neq 2$, $q \neq 5$, $(q, 10) = 1$

$10^{k-1} \equiv z \pmod r$, $r \neq 2$, $r \neq 5$, $(r, 10) = 1$

These equations are solved by Euler's Theorem and Modular Arithmetic rules and x, y, z are found.

where $w = 10^{k-1}$ an integer,

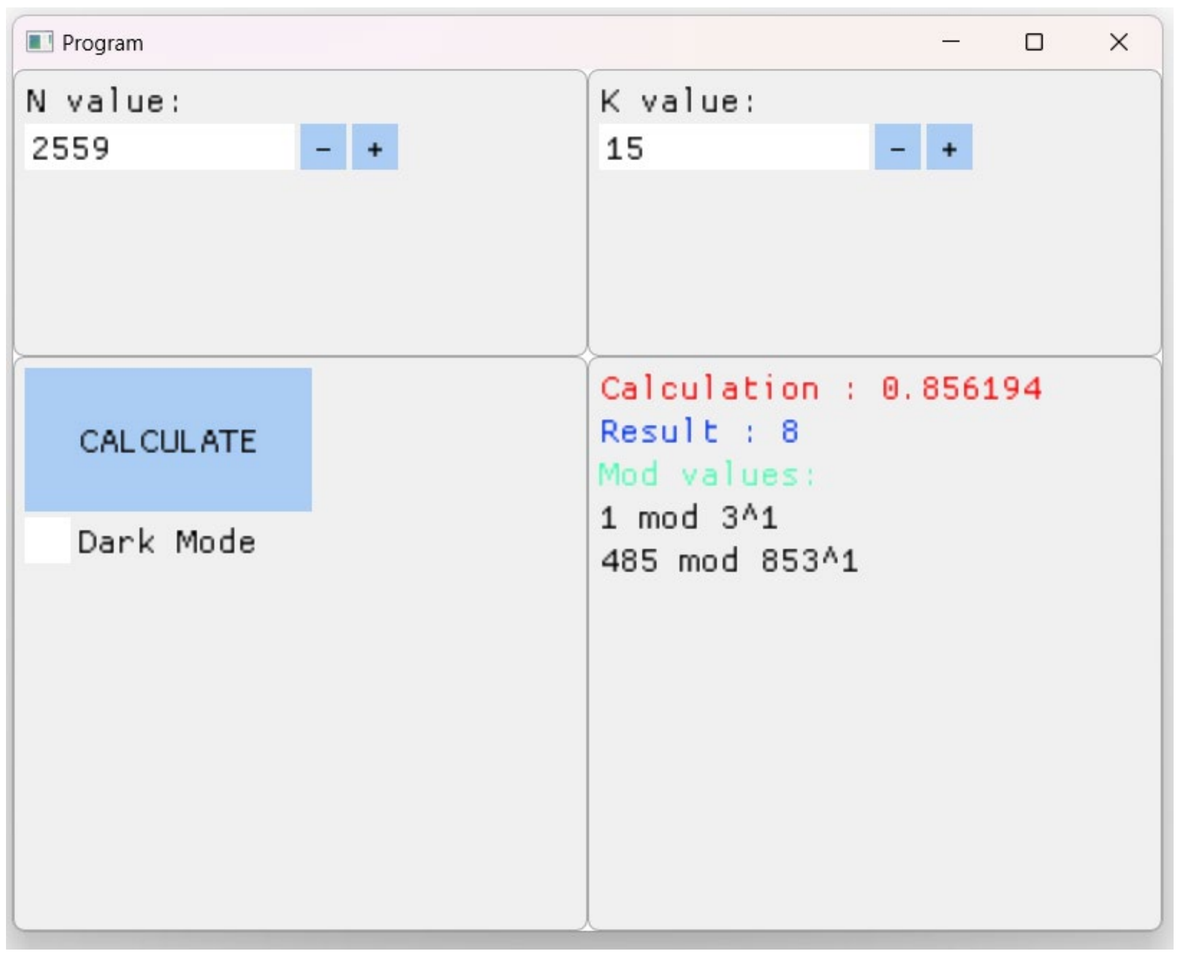
$w \equiv x \pmod p$

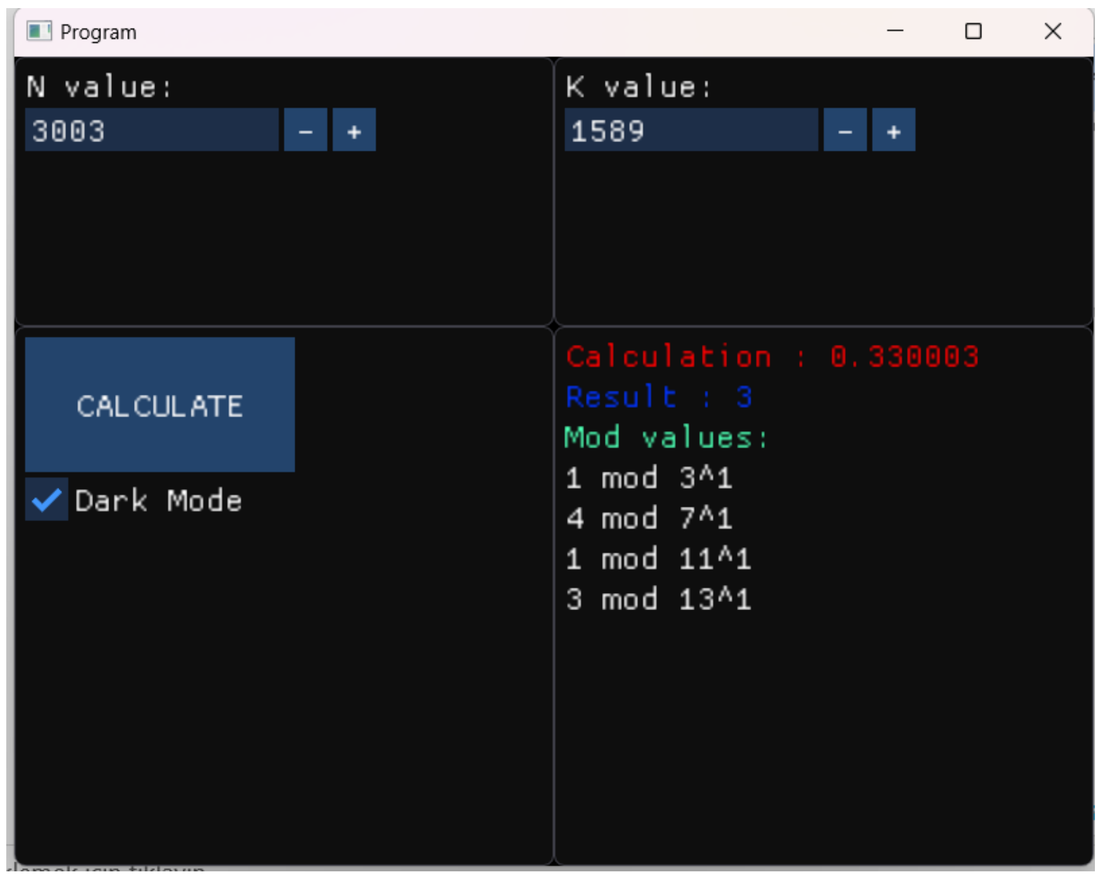
$w \equiv y \pmod q$

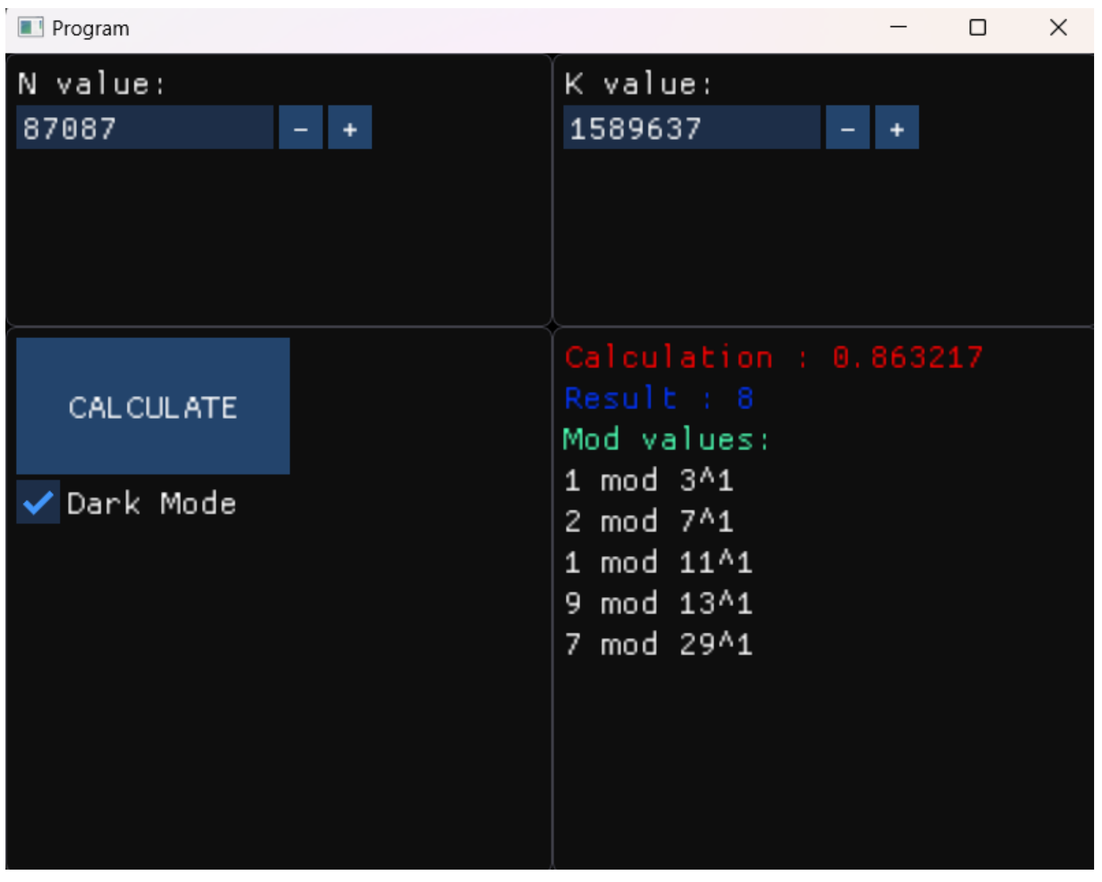
$w \equiv z \pmod r$ According to the Chinese Remainders Theorem, w = m. n + z when the number w is found.

So 10^{k-1} = m.n + z.

The value $10^{k-1}.\frac{1}{n}$ = (m.n + z) .$\frac{1}{n}$ = m + $\frac{z}{n}$ is found. First decimal digit of $\frac{z}{n}$ value, in decimal form, the number $\frac{1}{n}$ becomes the k. digit after the comma.







Contact: aktayremzi@outlook.com +90 5413033614



RESCUE LAUNCHER - "LIFE GUN"

AUTHORS: PATRYK GÓRSKI, GABRIELA RUTKIEWICZ, KAMIL LEONIK
SCIENTIFIC SUPERVISIOR: BARBARA HALSKA, KAZIEMIERZ OKRASZEWSKI

Leopold Staff LXXX High School in Warsaw

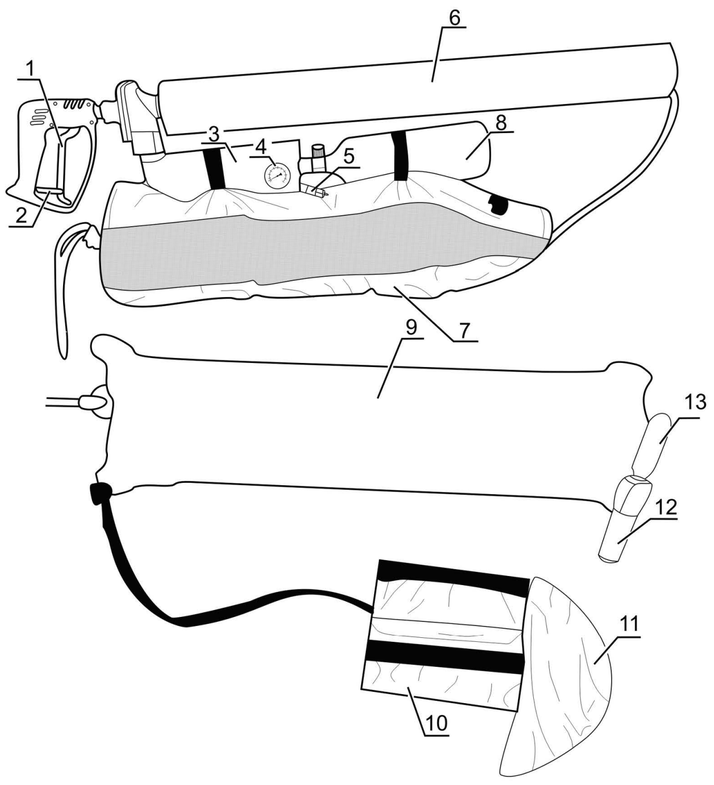
WHAT IS "LIFE GUN"?

„Life Gun ” is an invention designed to help over the water, allowing you to save a drowning person without risking your own life and health. It throws buoys inflated with CO2 cartridges attached to the gun with a rope. This enables the drowning person to easily and safely lift out of the water. The gun itself is very intuitive. Another advantage of this launcher is that it is equipped with replaceable modules.



HOW IT WORKS?

Life Gun throws rescue buoys (which are attached to the gun with a rope) using CO2. Buoys open automatically after being immersed in the water through a paper release. The buoy is also reusable - you just need to let the gas down, roll it up, and replace the cartridge. The gun is modular and you can replace used rope or another part of it



MOTIVATION

In Poland, the death rate from drowning accidents is over 95%. Surprisingly over 80% of people weren’t under the influence of alcohol. It leads us to the conclusion that more dangerous is a lack of rescue equipment on Polish beaches than alcohol.

Traditional rescue equipment is also unintuitive and dangerous. And there is no effective and safe substitute for our device on the market.

PATENT

Our invention has been registered with the Polish Patent Office



POLAND

Samonaprowadzający Bezzałogowiec Ratunkowy - SBR Helpinio
(Self-guiding unmanned rescue vehicle)

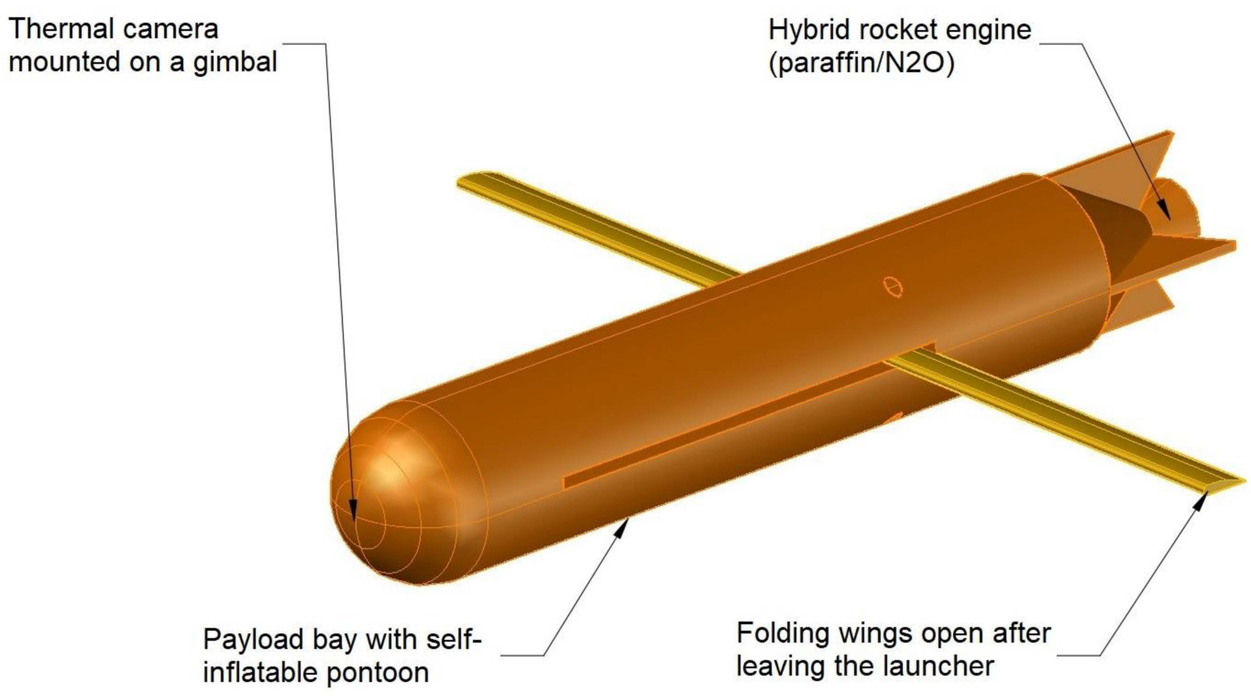
Authors:
Seweryn Komuda
Franciszek Jóźwiak

School:
Technikum Mechatroniczne Nr 1

Scientific supervisor:
Mgr. Inż. Kazimierz Okraszewski

Main goal of this project is the development of a flying unmanned aerial vehicle used to rescue drowning people, aimed at increasing safety on the oceans and seas. The solution will consist of a hand-held launcher and a homing unmanned aerial vehicle.
The unmanned aerial vehicle will be propelled by a solid fuel rocket engine (paraffin/N2O), and guided by a thermal imaging camera located in the front gimbal.
Using this camera, the device will find drowning people and then deliver to them a self-inflating life raft, inflated by a chemical gas generator providing warmth to protect against hypothermia.

Concept graphics







rocket engine test



searching view visualisation

MPS - Serial measurements meter

Authors: Paweł Orlik, Maciej Warloch, Jakub Warloch, Sebastian Kura
Mentors: Marcin Lasak, Krzysztof Smyczek

C

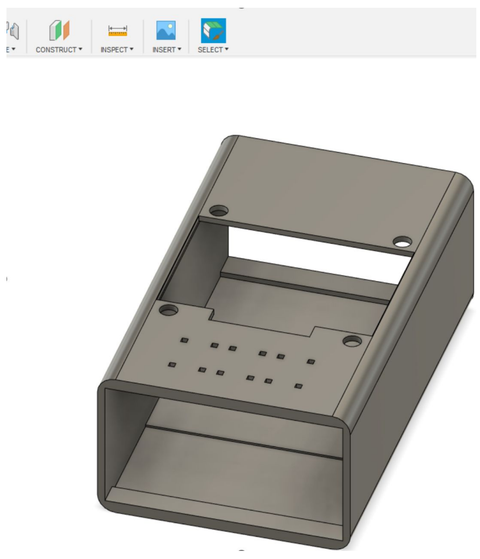
The serial measurements meter is an innovative device that facilitates work in many industries that require periodic measurements. Its simple design with an intuitive interface allows for use by untrained peoples. Measurements are saved to a database. An application has also been designed to generate reports from the measurements taken. Thanks to the use of NFC tags, the device assigns measurements to the correct module.

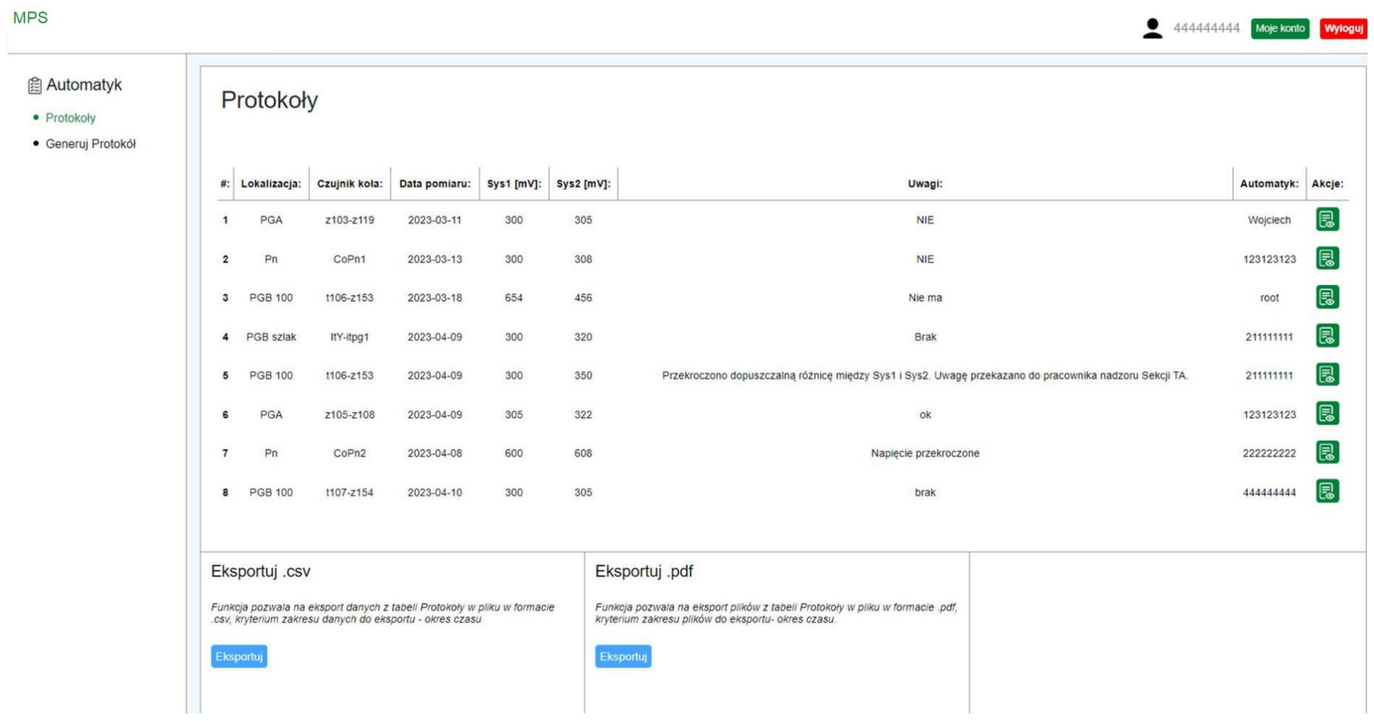
This solution is very simple and does not require the user to enter the module name. This shortens measurement time and reduces the risk of error when transcribing the identification number. The Li-ion battery along with the OLED display allows for long battery life, which is very important when taking a large number of measurements. Interchangeable tips allow the device to be adapted for performing various measurements.

Future plans: We are working on implementing a GSM module and data storage on an SD card, so that connection to a database is not necessary all the time.



MPS





Contact: tcs10.contact@gmail.com

MOLDOVA STATE UNIVERSITY
Faculty of Physics and Engineering
Scientific Research Laboratory
Environmental Physics and Modeling Complex Systems
Al. Mateevici str. 60, Chisinau MD-2009, Republic of Moldova
tel.: +373-22 244386, e-mail: veaceslav.sprincean@usm.md

HR EXCELLENCE IN RESEARCH

THE NATIONAL *eALERT* PLATFORM FOR INSTANT WARNING OF THE POPULATION IN CASE OF NATURAL HAZARDS BASED ON LORAWAN TECHNOLOGY

Research project no. 20.80009.7007.05: ***Advanced physical technologies with the UVS application in monitoring and modelling of environmental factors*** **/ Innovation and technology transfer project no. 22.80015.7007.262T:** ***Creation of the eALERT platform for real-time environmental monitoring and instant warning of the population of Chisinau in case of dangerous natural and anthropogenic hazards /***

AUTHORS: Veaceslav SPRINCEAN, Alexei LEU, Roman BUIMESTRU, Marianna SAVVA, Vasili ANDRUH, Marian JALENCU, Mihail CARAMAN, Alexandr A. BARSUK, Florentin PALADI

APPLICATION FIELD: C - Computer sciences, Electronics and Electrical engineering. **C**

AIM: The system contains energy autonomous stations for monitoring the environment in real time based on LoRaWAN technology.

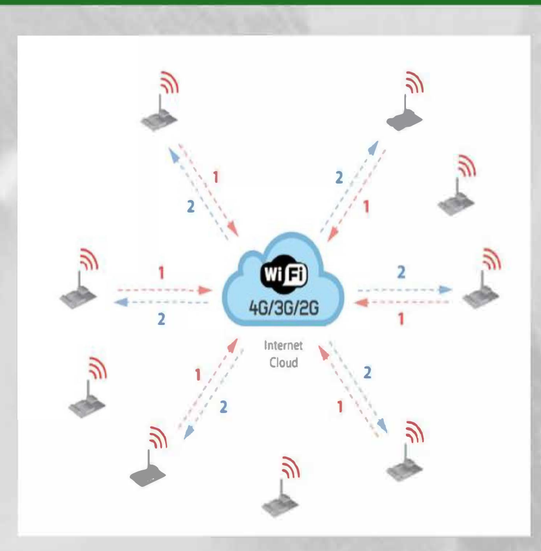
SOLUTION: Complex monitoring of the environment in real time, forecasting dangerous natural and anthropogenic hazards based on the obtained data.



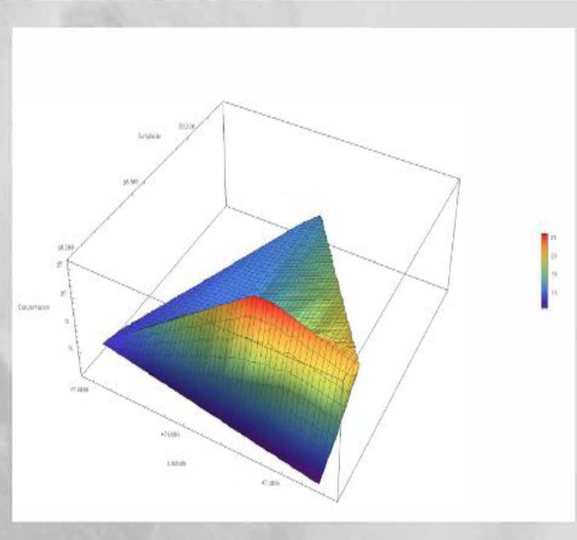
Waspmote Plug & Sense! accessories: 1 enclosure, 2 sensor probes, 3 external solar panel, 4 USB cable, 5 antenna, 6 cable ties, 7 mounting feet (screwed to the enclosure), 8 extension cord, 9 solar panel cable, 10 wall plugs & screws.



Waspmote Plug & Sense! powered by an external solar pane.



Over The Air Programming (OTAP) process.



Mathematical model for forecasting the concentration of air pollution with solid microparticles.

The Waspmote Plug & Sense! line allows you to easily deploy Internet of Things networks in an easy and scalable way, ensuring minimum maintenance costs. The platform consists of a robust waterproof enclosure with specific external sockets to connect the sensors, the solar panel, the antenna and even the USB cable in order to reprogram the node. It has been specially designed to be scalable, easy to deploy and maintain. The battery can be recharged using the waterproof USB cable but also the external solar panel option. The external solar panel is mounted on a 45º holder which ensures the maximum performance of each outdoor installation. The External Battery Module (EBM) is an accessory to extend the battery life of Plug & Sense!. The extension period may be from months to years depending on the sleep cycle and radio activity. The daily charging period is selectable among 5, 15 and 30 minutes with a selector switch and it can be combined with a solar panel to extend even more the node's battery lifetime.

For the modeling of natural hazards, in our case we use the data collected from our air quality monitoring stations. This model is based on knowledge of the characteristics and behavior of these phenomena, as well as available data on the affected areas and their intensity. Mathematical and statistical models are used to estimate the probability and severity of the hazard, as well as to identify the areas most at risk.

ADVANTAGE: ***eAlert*** **is the first platform in the municipality of Chisinau for real-time monitoring and instant warning of the population in case of dangerous natural and anthropogenic hazards. This application derives from an applied research project, which studies atmospheric pollutant emissions from various sources in the Republic of Moldova, their dynamics and impact, as well as the forecasting of natural hazards based on the collected data.**

IMPLEMENTATION STAGE: Actual system proven in operational environment, https://ealert.md

EXPERIMENTAL DEVICE FOR MONITORING CLIMATOGENIC PARAMETERS AND THE ELECTROMAGNETIC FIELD; OML MULTI-GAUSSIAN MODEL

Student: Bogdan Bora
Supervisor: prof. Gabriel Teodorescu
National College "George Coșbuc"
Cluj-Napoca, Romania
Research project
Category: C
Contact: bogdanboraalex@gmail.com; gabrielteodorescu48@gmail.com

INTRODUCTION

Air reacts quickly to harmful substances. Any change in air quality is felt by the body, which can lead to a change in the health status of the population.

Air pollution is caused by the presence of suspended particles and harmful gases in the air with a major effect on human health.

The most important pollutants are: carbon monoxide (CO), carbon dioxide (CO2), NO2, NH3, VOCs and suspended dust (PM 1, PM2.5, PM 10). The sources of these substances are different, and so is the impact on human health.

A climate data element is a measured parameter that helps specify the climate of a particular location or region, such as precipitation, temperature, wind speed, and humidity.

Long-term and peak exposures to these pollutants vary in severity and impact.

OBJECTIVES

Determination, monitoring and analysis of all data provided by the mounted sensors, the data being visualized on monitoring graphs.

Testing specific sensors, using Arduino, to be able to determine different parameters for example: pressure, temperature, humidity, radiative, to determine air quality.

The study of correlations using the t-test, to see the evolution trend of the analyzed parameters.

Gauss adapted model testing – DMA* - for studying atmospheric dispersion.

THE MOTIVATION

At the level of the local community, information related to weather and air quality are subjects of great interest from the perspective of everyday activities, but also as influencing factors of the health status of the population.

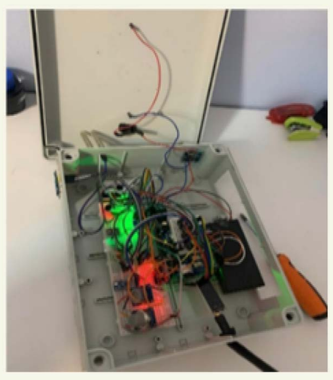
We want to develop a network of weather and air quality measurement stations as well as independent monitoring.

predicting imminent phenomena more precisely.

Many hazardous weather events are associated with thunderstorms. Under the right conditions, rainfall from storms causes flash floods, killing more people each year than hurricanes or tornadoes. Lightning is responsible for many fires around the world every year and causes deaths. Hail the size of softballs damages cars and windows and kills animals trapped outdoors. Strong straight-line winds associated with thunderstorms bring down trees, power lines and mobile homes.

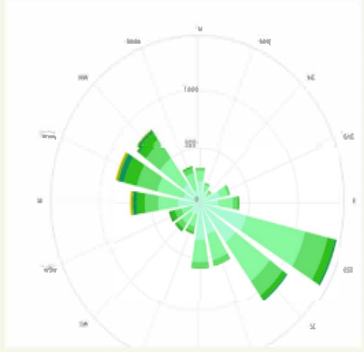
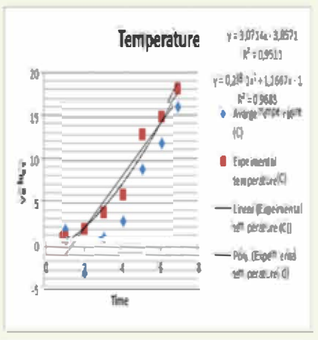
THE EXPERIMENTAL DEVICE

The devices have their own Case, Waterproof and resistant to other aspects of the environment. We have made several device designs. These use different motherboards, for example: Arduino UNO R3, ARDUINO NANO, ARDUINO UNO WI-FI REV2, ARDUINO MKR 1010, and Transmit data via radio or Wi-Fi to specialized receivers or digital database.The experimental device will contain sensors of: temperature and humidity (DHT22); pressure (BM180); wind speed (Anenometer); wind direction (Girueta) and a lightning/electromagnetic activity sensor (AS3935). The listed sensors will be connected to an Arduino Nano board that will process all the information read from the sensors. A 20x4 LCD module communicating through the I2C interface that will display all data and a SIM800L 2.0 module communicating through the UART interface will be connected to the Arduino board that will be able to send SMS and record data in databases such as IoT clouds with the help of a SIM card.

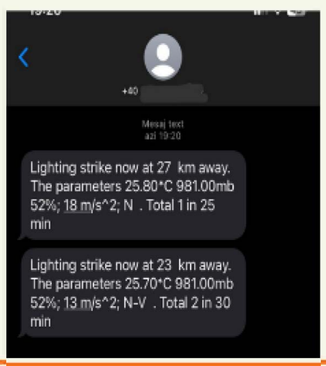


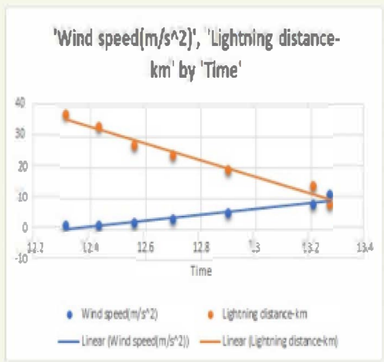


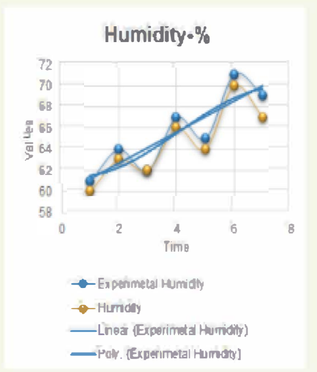



DATA VISUALIZATION AND PROCESSING

There are 4 different ways to view and store data. How we use the Arduino UNO Wi-Fi Rev 2 board we can create a web server on the local IP. All parameters are displayed on the web page. Any device connected to the same network will be able to access the page at this address. The access port is forwarded by the router, the page can be accessed at any time at this server address, within the local network. The Arduino MKR 1010 board is also wireless. It communicates via MQTT with an IoT Cloud where we can see the data in real time and graphed. This Cloud also saves data for a period of 90 days. Other devices with other motherboards transmit data via radio at a frequency of 2.4 GHz. We also store offline data on an SD card connected to the motherboard. Two data files are created on the SD card. The data is already processed by our software into graphics, we just add more features to it. We are also sending text with the help of a SIM800L 2.0 with lightning parameters.







MULTI-GAUSSIAN MODEL

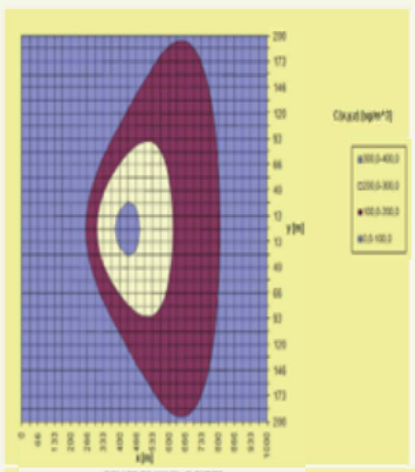
Atmospheric dispersion characterizes the evolution, in time and space, of a set of particles (aerosols, gases, dusts) emitted into the atmosphere. The phenomenon of atmospheric dispersion is influenced by atmospheric conditions, soil parameters and emission values. The Atmospheric Dispersion Model (MDA) represents the mathematical simulation of how pollutants are dispersed in the atmosphere. MDAs are used to estimate the concentration of atmospheric pollutants emitted as a result of industrial activity or car traffic in the direction of the wind.

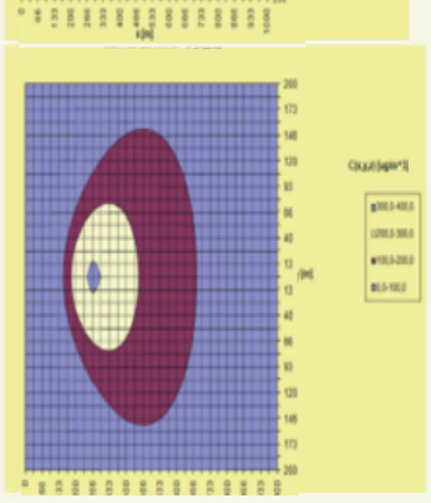
The dispersion equation according to the multi-Gaussian model underlying the OML model is according to the formula below:

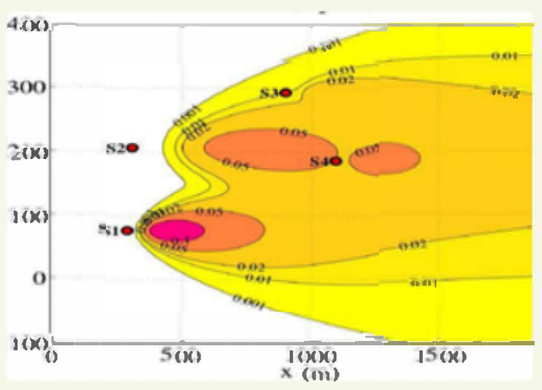
$$C = \frac{Q}{u\sigma_Z(2\pi)^{1/2}} \cdot e^{-\frac{y^2}{2\sigma_y^2}} \cdot \left[e^{-(H_r-H_e)^2/2\sigma_z^2} + e^{-(H_r+H_e)^2/2\sigma_z^2}\right]$$

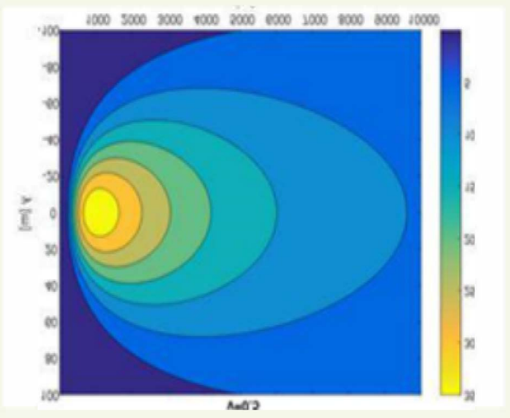
where: C is the emission concentration [g/m3] at any receiver located x meters down, y meters to the side and Hr meters above the ground; Q – emission rate of the source [g/s]; u – horizontal wind speed [m/s]; He – the height of the smoke cloud to the ground level [m]; Hr – receiver height [m]; σz – vertical standard deviation of the emission distribution [m]; σy – horizontal standard deviation of the emission distribution [m].

Only one parameter in the MDA is modified, more precisely the type of land where the dispersion is carried out, and the possibility of spreading the pollutant changes with the distance. In figures depending on the type of land that was taken into account obtaining level curves.[4]. The mathematical model is limited to a distance of 1000 m on the x-axis and 200 m on the y-axis, observing a dispersion of the pollution, the concentration is between 0-400 mg/m3. Changing the stability class and analyzing the case for the highest level of stability leads to the definite change in the evolution of the atmospheric dispersion.









CONCLUSIONS

Software implementation in the case of sensor-based air quality data measurement and analysis systems is very convenient, easy and useful.

The testing of some software (the data are at an international level) regarding the studied parameters, showed us that some variables are either overestimated or diminished, but they fit according to the existing data, the trends being either positive (for temperature, pressure, humidity, pollutants, dust particles) be negative for certain days of the month.

The warming of the atmosphere is due to anthropogenic causes that lead to climate changes and very large oscillations of the studied parameters compared to multi-year averages.

It is possible that we cannot detect the real causes of the oscillations of some climate parameters, these being due to both solar activity and pollution.

According to the atmospheric dispersion models, the input data must comply as accurately as possible with the meteorological conditions, the geographical location and the emission parameters at the pollution source. Atmospheric dispersion models - MDA, used for the analysis of pollutants, are decisively influenced by the emission of harmful smoke released into the atmosphere.

AI – PSS AI – POWERED SAFETY SYSTEM

Prototype

Authors: Mihail Cimpoiasu, David Luca Mosu, Denisa Maria Cristea, Andrei Bazavan

Mentor: Mariana-Oana Farcas

C

ISSUE STATEMENT

The prevalence of criminal activity, mainly in Romania and other countries, such as the US, has led to a **greater need for effective security measures in buildings**. One way to deter intruders and potential threats is to **detect weapons** and other **prohibited items** before they can be used to harm individuals. While manual checks for weapons and intruders can be effective, they can also be time-consuming, labor-intensive, and potentially dangerous for security personnel.

An **AI system** that is specifically designed to **detect weapons and intruders in public institutions**, such as schools, would be a **valuable asset to any security team**. It could continuously monitor the premises, alerting security personnel if any suspicious activity or prohibited items are detected. This would allow security personnel to respond quickly and effectively to any potential threats, improving the **overall safety and security of the buildings**.

KEY FEATURE

One of the key features of our system is its ability to anticipate and respond to potential threats in real-time, using **data** from **multiple sensors** and **decision-making algorithms**.This allows it to proactively safeguard against potential dangers, rather than simply reacting to incidents as they occur. In addition to its real-time threat detection capabilities, our system also incorporates **messaging alerts to communicate with building occupants and security personnel**.

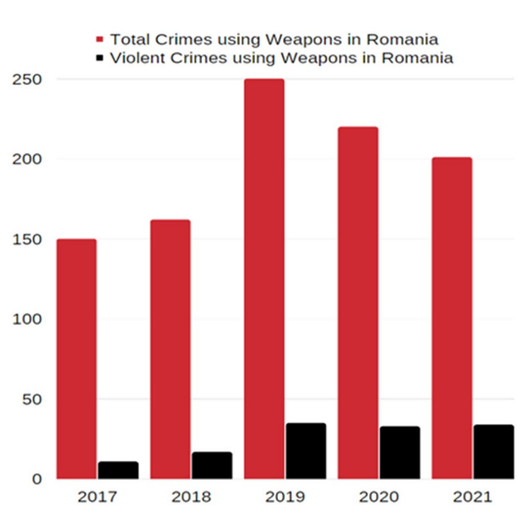
SOLUTION

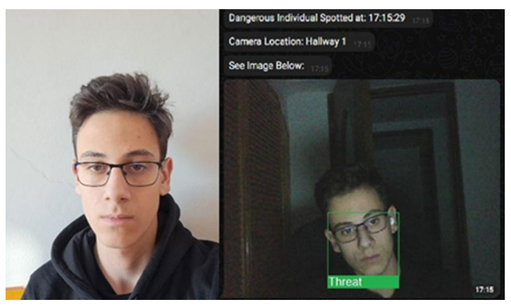
The system utilizes **machine learning algorithms to identify patterns and features associated with weapons and faces registered in the system's database , and is able to alert security personnel and local authorities in real-time of any potential threats**.

The AI system was trained on a large dataset of annotated images of various weapon classes, and its performance was evaluated using a separate dataset of real-world security footage.

The results of the evaluation demonstrate the **effectiveness** of using **AI** for **detecting weapons and intruders in buildings**. The system is able to accurately identify weapons and criminals in the footage with a high degree of precision and recall, and was able to do so in real-time with a **low latency (<1-3s)**.

Additionally, the system is able to adapt to different lighting conditions and camera angles, indicating its robustness and versatility.







FUTURE PLAN

I. Further improve the AI model
II. Incorporate the system into a single, embedded device
III. Create a feedback loop for the system to improve itself

SYSTEM WORKFLOW

01 The building's CCTV system forwards real-time footage to the AI system, and is then processed by our system to filter out any visual errors on each frame received.

02 The system uses facial recognition technology to detect any dangerous individual registered in the system's database, updated based on the national wanted list database.

03 The system checks every received frame for patterns associated with lethal and non-lethal weapons using a machine learning-trained AI model trained on ~3050 labeled images, then saves any evidence if a weapon is detected.

04 The system sends out alerts via messaging APIs to building personnel and local authorities, and activates all building automatic security measures (if applicable).

Contact: mihail.cimpoiasu@gmail.com, +40 720 251 122

NICHITA STANESCU NATIONAL COLLEGE PLOIESTI

With us, Countless Successes!

Think Alone! Be Creative! Be New! Be Yourself!

Security Using a Ghost Network

C

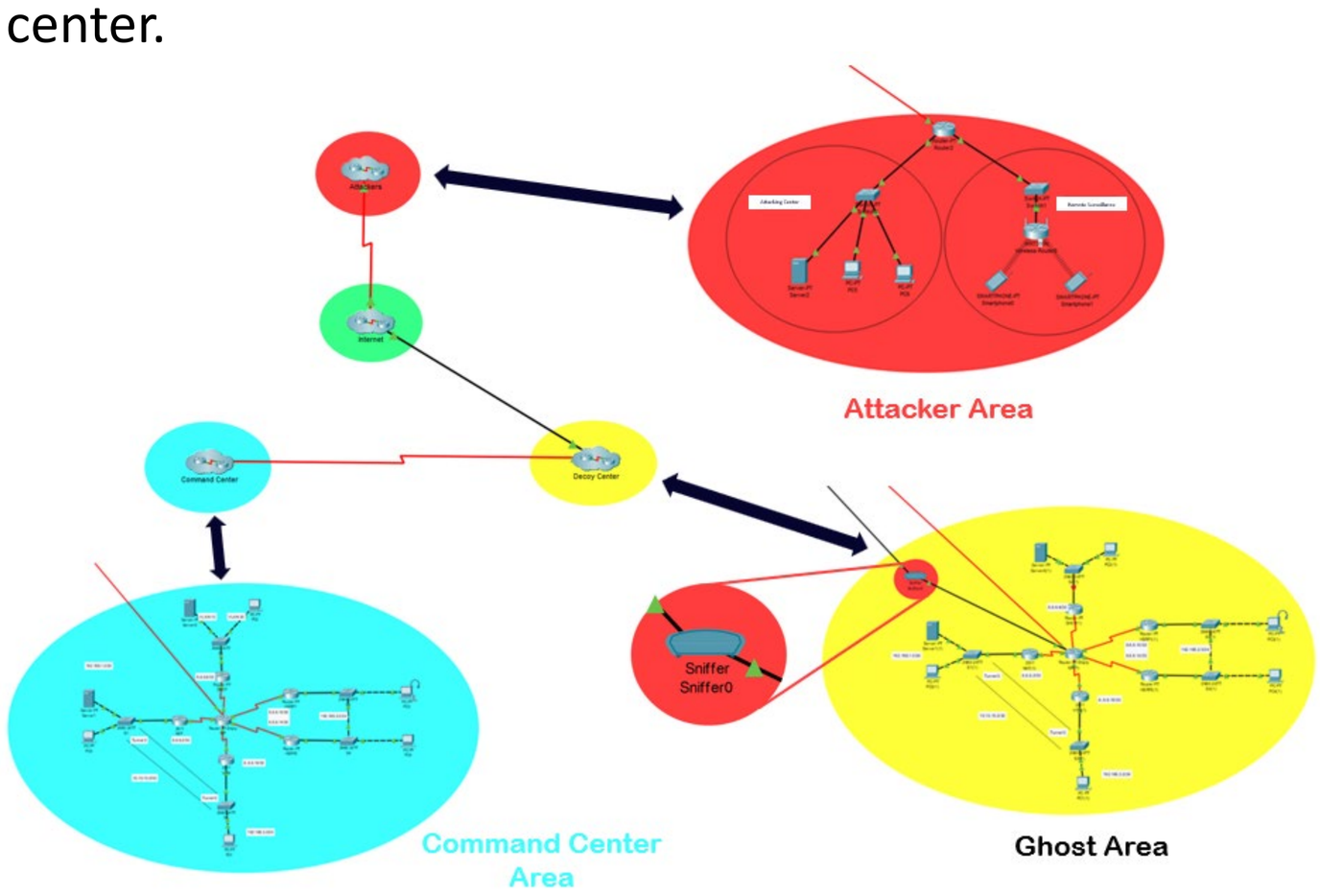
Patent/Research project/PHD

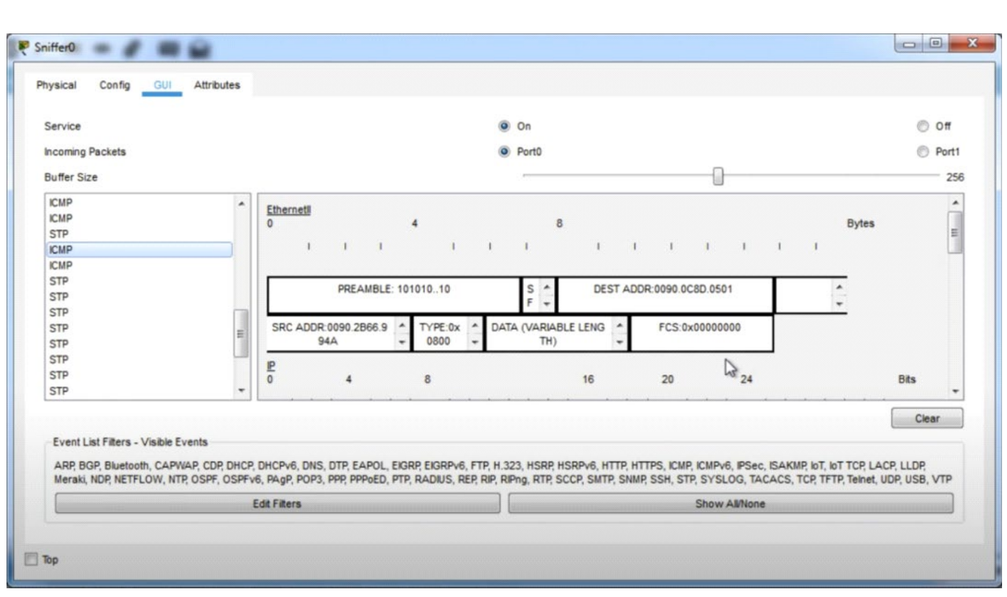
Authors: Gabriel-Alexandru Păduraru, Ioana-Adelina Duca, Theodor Ștefan Stoica

Mentors: Prof. Mariana-Oana Farcaș, Radu Boia

With the advancements made by society in the domain of technology, we tend to spend more and more time on the Internet. Given so, we have to assure our safety and privacy while navigating, through different types of security. Moreover, big companies and institutions require an extra step in the design of their networks, so that they don't lose private data in eventual cyberattacks.

The main concept focuses on a "ghost" network, which copies the main one in detail and sits in between the real network and the Internet. The reason of the similarity between the networks is that we are trying to convince the attackers that they breached the real command center.





At the gateway of the duplicate network, we have installed a device called "sniffer" that is connected to the main router. This device is designed to capture all the signals that flow through the router that it is connected to, in our case, the gateway router.

After the signal travels through the Internet, it is acknowledged by the Sniffer, which memorizes its source and destination physical addresses, as well as the type of message that is being sent.

Using various monitoring tools, not only we can protect the real network by adding a protection layer, but also keep a record of the methods used by the intruders, which helps with improving the security measures of the real base, for future attacks.

Contact: padurarualex70@gmail.com **+40733802448**

Python Automation for a Network Structure

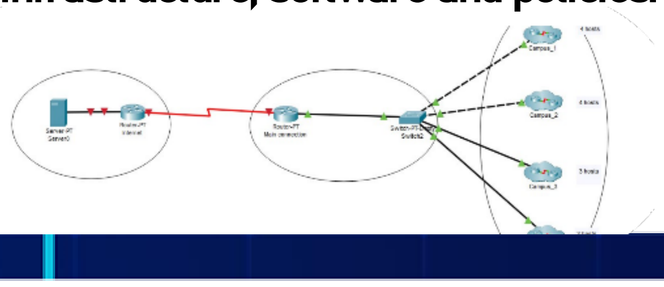
Research Project

Authors: David-Gabriel Păun, Luca-Albert Ceban, Yanni-Andrei Negrescu, Tiana-Maria Țiprigan
Mentors: Mariana-Oana Farcaș, Cosmin-Alexandru Florea

C

INTRODUCTION

Networking, also known as computer networking, is the practice of transporting and exchanging data between nodes over a shared medium in an information system. Networking comprises not only the design, construction and use of a network, but also the management, maintenance and operation of the network infrastructure, software and policies.



OBJECTIVE AND DISCUSSION

The main goal of our project is to make an easier way to subnet, assign and configure addresses for hosts and networking equipment.
Networking is a challenging task, primarily because professionals often struggle to keep up with their network maintenance due to time constraints. A recent survey found that around 49% of participants stated that they lacked sufficient time for networking.
This particular automation method ensures efficiency and cost-effectiveness by eliminating the need for manual configuration, as the robot takes care of it. This innovation saves valuable time, which is crucial even for small companies.

TECHNOLOGICAL INNOVATION

The main goal of our project is to make an easier way to subnet, assign and configure addresses for hosts and networking equipment.
Networking is a challenging task, primarily because professionals often struggle to keep up with their network maintenance due to time constraints. A recent survey found that around 49% of participants stated that they lacked sufficient time for networking.
This particular automation method ensures efficiency and cost-effectiveness by eliminating the need for manual configuration, as the robot takes care of it. This innovation saves valuable time, which is crucial even for small companies.

CONCLUSION

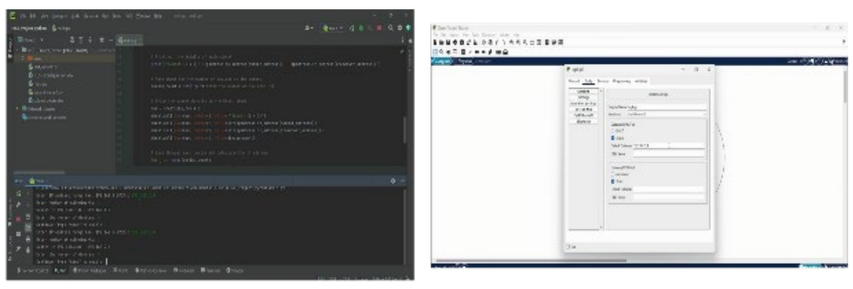
With the growing demand for continuous network development, sustainable alternatives for automating complex engineering tasks have become essential. Our idea aims to provide an efficient administration solution for all types of networks, from small to enterprise-level. By automating equipment configuration and assignment, our innovation can maintain the needs of every Internet user while also saving time and reducing costs. This way, we think that this will boost up the productivity in this specific domain and will offer a much easier time when configuring networks. The only variable is the cost for enterprise-level administration, which can have a personalized price considering the possibilities and scale of it. However, there are many trusted and cost-free alternatives, automatization of the repetitive task being a very important aspect in the modern days.
With these being said, modern society searches for new ways of solving daily problems and, despite the growing number of solutions found for some of our problems, many of them are still unsolved, leaving a door open for those who dare to think further and bring us a brilliant and revolutionizing concept.

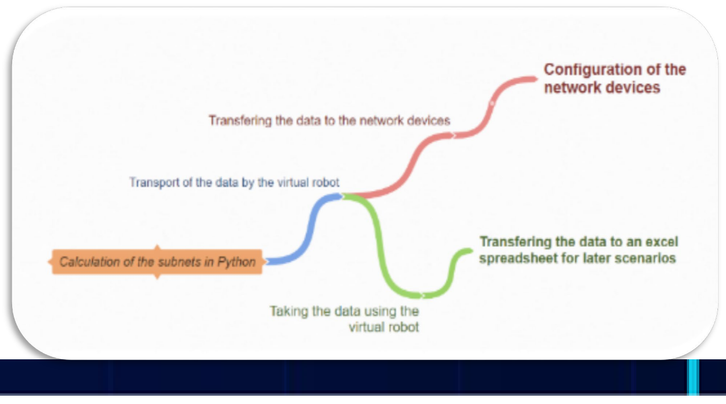
Contact

+40771279417 – Mariana Oana Farcaș
Mail: ofarcas76@yahoo.com
Our CVs and Video Presentation:
https://drive.google.com/drive/folders/1p_rlZepRDzorodhAcHbV2zliDjQm-rAw?usp=sharing

METHODS

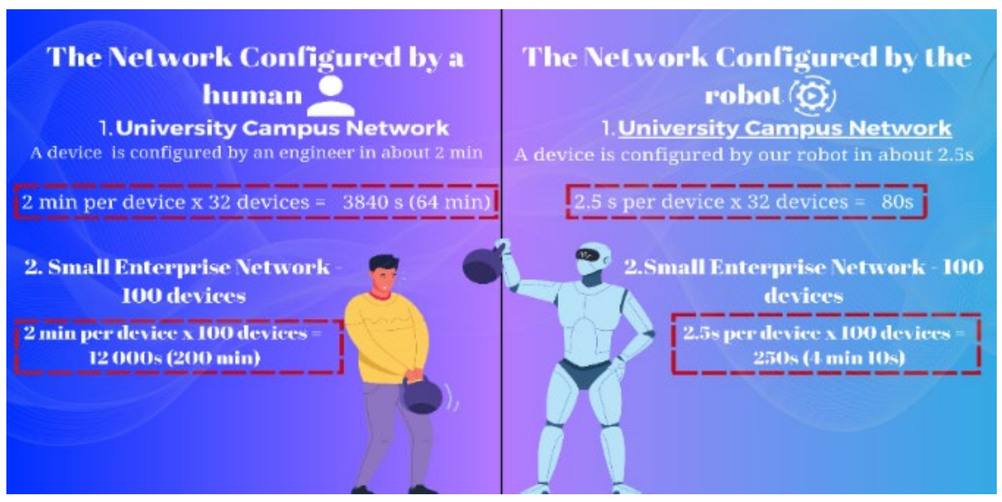
We want to maintain the reliability of the network by using modern technologies and coding languages, such as virtual robots and Python algorithms. The Python program represents the computing power behind our project. It analyzes the input which consists of the network address, subnetting it and specifying the addresses for every device, exporting it to an Excel Sheet. The virtual robot transfer the data from the Excel Sheet to the configuration panel of every Packet Tracer device, assigning the addresses and the LANs' router interfaces.





APLICABILLITY AND UTILITY IN REAL LIFE

This type of innovation is very easy to implement, mostly because we are not selling a physical product that needs to be produced in a factory, we are installing an automation system using the python program and the virtual robot. The commercialization method isn't a product, is a service that will require time and staff instead of primal materials and factories. We could have a very powerful marketing power given the fact that our concept aims to cater to a wide range of networks, ranging from small to enterprise-level, being an excellent administrator solution for all types of connections.
In order to demonstrate the applicability and usefulness of the project in real life, we made a case study in which we included 2 comparisons, one being the topology presented above with a number of 32 devices and the other being a small enterprise network with only 100 devices. On the left side of the image we can see the times in which a network engineer configures the two networks, considering that it takes about 2 minutes for a device, which means that the first network is configured in 3840 seconds or 64 minutes and the second one in 12000 seconds or 200 minutes.
Our robot, on the other hand, configured both networks in just 330 seconds or roughly 5 minutes. The significant difference in time between manual configuration and automated configuration indicates that our program can significantly reduce time and effort required for network configuration.



IPv6 Subnetting 3.0
New Mathematical Approach

Research Project

Authors: Mariana-Oana Farcaș, Cosmin-Alexandru Florea, Valentina-Roxana Soare, David-Gabriel Păun, Felicia-Cristina Dumitru, Maria-Alexandra Ivan, Samuel-Mihai Savu

C

INTRODUCTION

Computer networks are crucial in today's world because technology information is constantly increasing all over the planet. The network and data communication are important considerations in the growth of technology information throughout the world. Regardless of the evolution that occurs in the IT world, there will always be a variety of networks that must be interconnected in order to communicate with one another. Sometimes the network can become too large resulting in too much traffic and therefore poor performance. In such cases, one way to solve the problem is to divide the network into smaller parts by using subnets. IPv6 was created to replace IPv4. The only explanation is that the IPv4 address space has become insufficient, taking into account the rapid evolution of IT technology and the number of gadgets, the fact that any device needs an IP address to connect to a network or the Internet. If IPv4 subnetting is in binary-decimal, IPv6 subnetting is in hexadecimal-binary. The world has reached the point where there are not enough 32-bit addresses to link every device which wants to connect to the Internet. IPv6 uses 128 bits. IPv6 allows almost 8*10 times as many addresses as IPv4. Basically, a number too large for the human mind to grasp.

TECHNOLOGICAL INNOVATION

Since the address space is very large, IPv6 subnetting can be done in several practical ways.

The third method, our method, is basically the step-by-step explanation for the second method. The first step of subnetting our way is to write the base address ipv6 in 8 groups format, starting with subnet 0. Then you open the first group after the 64 prefix in binary code, in 4 nibbles. You need the closest power of 2 to the subnet requested. If that power doesn't exist in the nibble borrowed, then you move to the next one. Depending on the nibbles that you borrowed, the prefix changes, but here we speak about bits, not nibbles. For example, if you borrowed 5 nibbles and the initial prefix is 64, then the new one is 84, because 5 nibbles mean 20 bits, and at the new prefix is 84. After that, you write the nibbles into bits, and, starting from right to left, you write over the bits 2 at the power of 0, 2 at the power of 1 and so on until the last bit. Now you convert the network from base 10 to base 2 and use the bits that you prepared previously, tranforming the 0s into 1s where is the case. Then, we take each goup of 4 bits and convert it from binary to hexadecimal. You introduce the new nibbles back into the address. After that, you can optionally use the rule of emitting goups of 0, compressing the address.

CONTACT

+40771279417 – Mariana Oana Farcaș

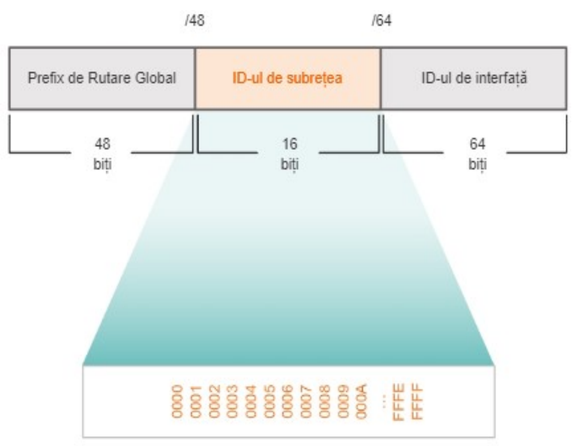
Mail: ofarcas76@yahoo.com

For more details:

https://drive.google.com/drive/folders/1p_rlZepRDzorodhAcHbV2zliDjQm-rAw

METHODS

Method 1.0
Basic IPv6 Subnetting

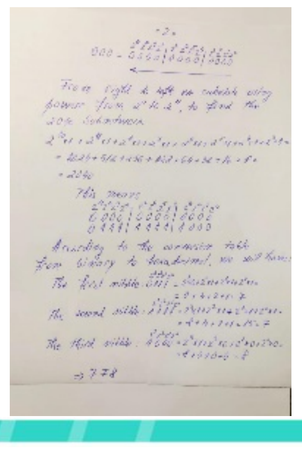


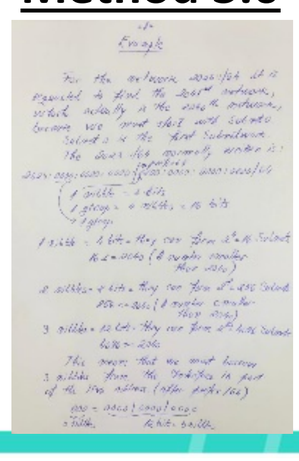
The IPv6 address block is a block with a /48 prefix that has 16 bits for the subnet ID, as shown in the figure above.

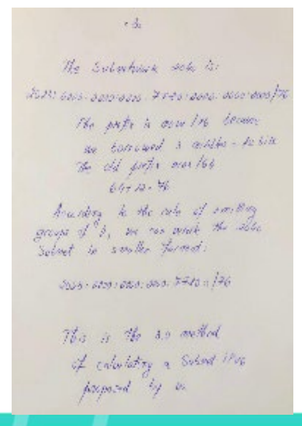
Method 2.0
IPv6 Subnetting on-a-nibble

Similar to borrowing bits from the host portion of an IPv4 address, IPv6 bits can be borrowed from the interface ID to create additional subnets. This is specifically for security reasons to create fewer hosts per subnet and not necessarily to create additional subnets. When increasing the subnet ID by borrowing bits from the interface ID, best practice is to subnet by borrowing 4 bits (nibble boundary). A "nibble" is 4 bits or a hexadecimal digit. As shown in the figure, the /64 subnet prefix is extended by 4 bits or 1 nibble to /68. This reduces the interface ID size by 4 bits from 64 to 60. This subnetting refers to the use of subnet masks aligned on a nibble. Starting at /64, the nibble-aligned subnet masks are /68, /72, /76, /80, etc.

Method 3.0







OBJECTIVES

This project can help everyone who is interested in finding more about subnetting. You can find a new and quick method on how to calculate the subnet of an IPv6, that is moreefficient on terms of efficiency regarding planning the network IPv6 domain.

CONCLUSION

In this project we propose an IPv6 subnetting method that is much more efficient and clearer than the current ones, we expose all the steps that must be followed, using a classical mathematical method. Our project takes advantage of the current state of subnetting standards and IPv6 development, delivering a much more performant, easy-to-use and structured method that has the same targeted output with fewer resources, more accessibility and an overall process understanding. This formula optimizes the resources of the network in a much better way than the current methods do with the added bonus of time and cost efficiency in the same structural environment.

Malware detection based on performance counters using deep learning classification models

Author: Omar MOHAMED,
Ciprian-Bogdan CHIRILA

C

Security exploits and subsequent malware is a challenge for computing systems.

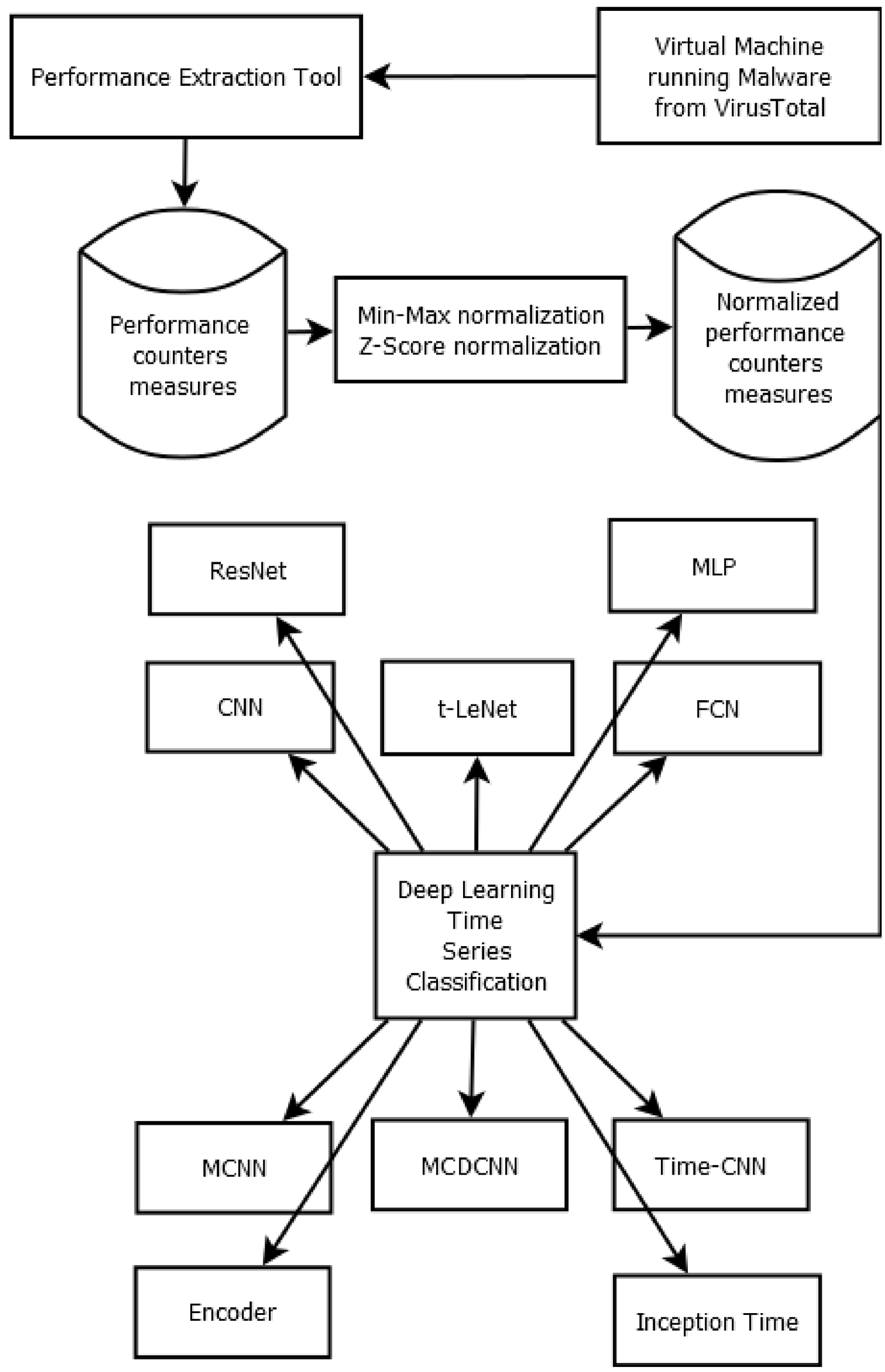
For detecting anomalies and discovering vulnerabilities in computing systems several methods are used: i) malware aware processors; ii) static program analysis; iii) dynamic program analysis.

Malware aware processors require online hardware which is not always a practical and scalable solution.

Static analysis methods imply automated static analysis tools that have a limited performance with a detection capability that not always meets the requirements of the project regarding the criticality of the application.

Dynamic analysis on the other hand overcame static analysis in latest trends. In this trend performance counters analysis are used in several approaches.

Operating system performance counters are collected and stored as time series in two contexts: i) in the presence and ii) in the absence of malware.



Ten deep learning models are used for time series classification.

From the experiments we learned that 2 models are able to detect accurately the presence of malware in an infested operating system, while the rest of the models tend to overfit the data.

Contact: chirila@cs.upt.ro

Department for Research, Development and Innovation Management
Knowledge and Technological Transfer Center

15 Constantin Daicoviciu street
400020, Cluj-Napoca, România

e-mail: liliana.pop@staff.utcluj.ro

www.utcluj.ro

Title

INTERLEAVED VOLTAGE STEP-UP/STEP-DOWN ELECTRONIC CONVERTER

Inventor/s - Contact

TEODOSESCU PETRE DOREL; SUCIU VASILE MIHAI; SZEKELY NORBERT CSABA;
PĂCURARU ALEXANDRU MĂDĂLIN; BOJAN MIRCEA; MATHE ZSOLT
petre.teodosescu@emd.utcluj,.ro

C

Patent/ Application number

Patent OSIM no.: RO134350- B1/ 28.01.2022

Short presentation

The invention relates to an electronic converter with an interleaved structure intended for applications with electrical energy storage, renewable sources, electronic consumers, and electric vehicles, in which:

- the voltage value from the power supply is too low for the intended application, with operation in the input voltage amplification mode - voltage raising converter (Boost);
- the voltage value from the power supply is too high for the intended application, with operation in the input voltage attenuation mode - voltage step-down converter (Buck);
- energy circulation is bidirectional – voltage raising/lowering converter (Boost/Buck).

Applicability

Electrical energy storage system; Renewable sources; Electronic consumers devices; Electric vehicles

Images

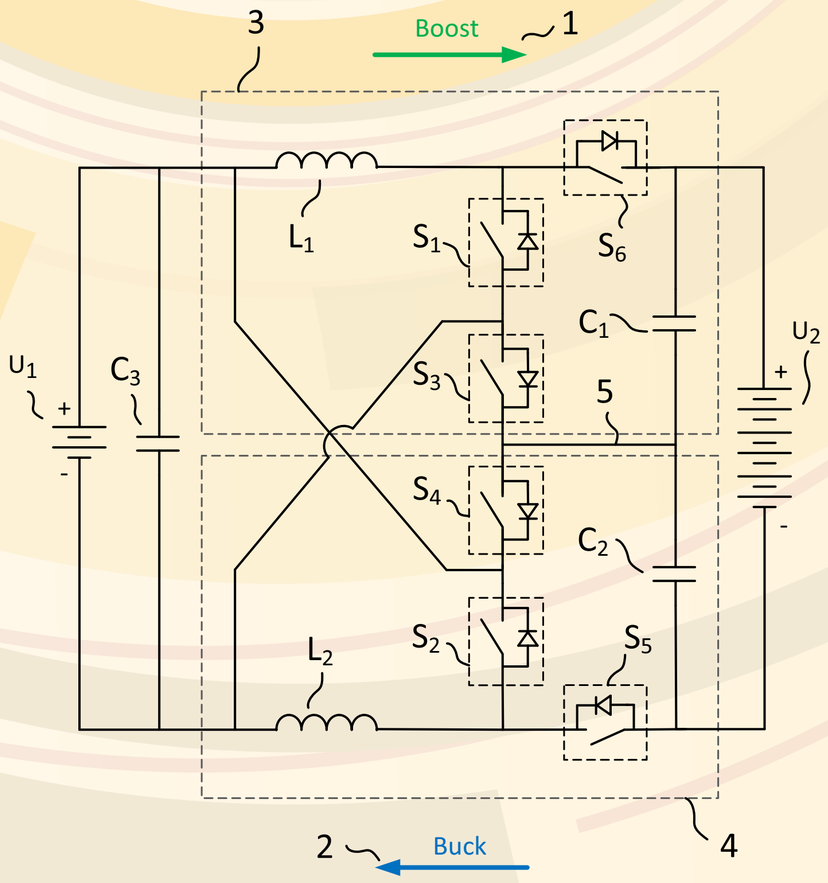


Fig. 1. Converter electronic schematics

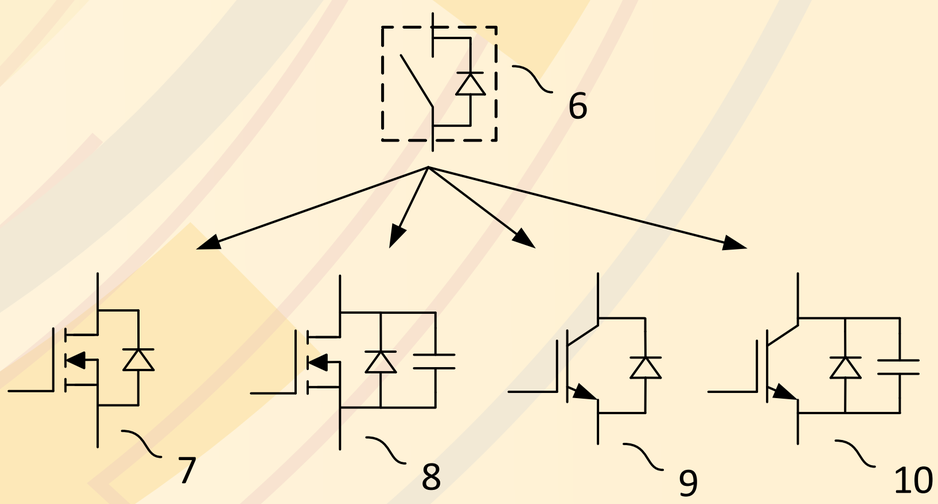


Fig. 2. Possible electronic components

Department for Research, Development and Innovation Management
Knowledge and Technological Transfer Center

15 Constantin Daicoviciu street
400020, Cluj-Napoca, România

e-mail: liliana.pop@staff.utcluj.ro

www.utcluj.ro

C

Title

METHOD AND SISTEM FOR ATTENUATING THE FAULTS THAT APPEAR IN DATA PROCESSING UNITS IMPLEMENTED USING DIGITAL CIRCUITS

Inventor/s - Contact

Lendek Zsofia, Cluj-Napoca, CJ, RO, zsofia.lendek@aut.utcluj.ro
Amăricăi-Boncalo Alexandru, Timisoara, TM, RO, alexandru.amaricai@cs.upt.ro
Amăricăi-Boncalo Oana, Timisoara, TM, RO, oana.amaricai-boncalo@upt.ro

Patent/ Application number

Patent OSIM no.: RO134587- B1/28.10.2022

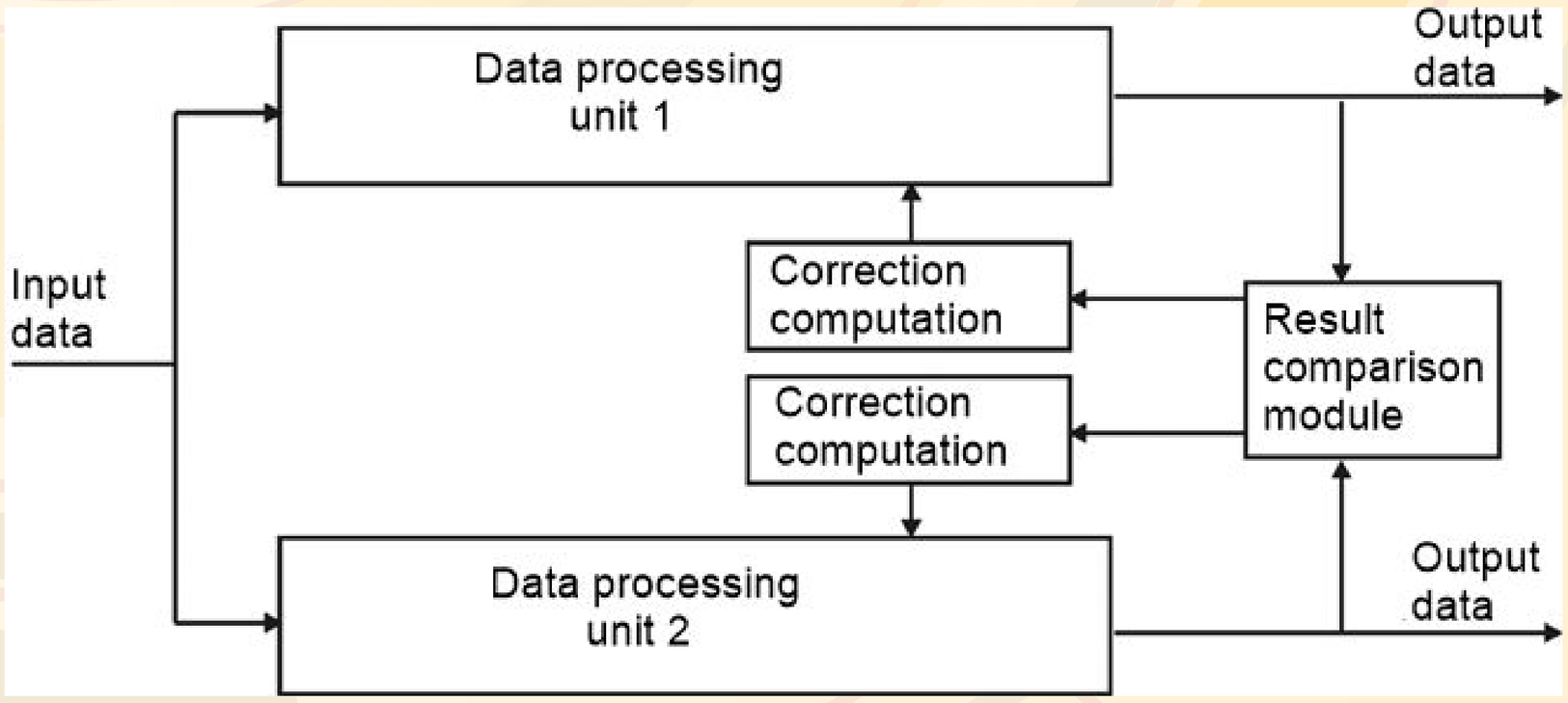
Short presentation

The patent refers to a method and system for mitigating probabilistic errors that occur in digital circuit implementations where the data processing is based on addition, multiplication, and accumulation operations or can be decomposed into such operations. The system consists of two instances of the data processor connected in parallel, each consisting of the one hand of the block that implements the procedure, usually a mathematical rule, and on the other hand of the block for calculating the correction input, each having access and using the results produced by the other circuit. The method, according to the invention, involves the creation of a dynamic model that describes the current state of the circuit and the calculation of correction factors based on this model.

Applicability

The method can be used to mitigate probabilistic errors that occur in implementations of digital integrated circuits in computing systems on data paths that use add, multiply, and accumulate operations. It can also be used only for the purpose of detecting defects, without mitigating them.

Images



Department for Research, Development and Innovation Management
Knowledge and Technological Transfer Center

15 Constantin Daicoviciu street
400020, Cluj-Napoca, România

e-mail: liliana.pop@staff.utcluj.ro

www.utcluj.ro

C

Title

INTELLIGENT AUTOMATION SYSTEM BASED ON A DISTRIBUTED, RECONFIGURABLE AND ADAPTIVE ARCHITECTURE

Inventor/s - Contact

S.L. Dr. Ing. Mircea MURAR / mircea.murar@muri.utcluj.ro
Prof. dr. ing. dr. ec. Stelian BRAD / Stelian.Brad@muri.utcluj.ro

Patent/ Application number

Patent OSIM no.: RO129401- B1/30.08.2022

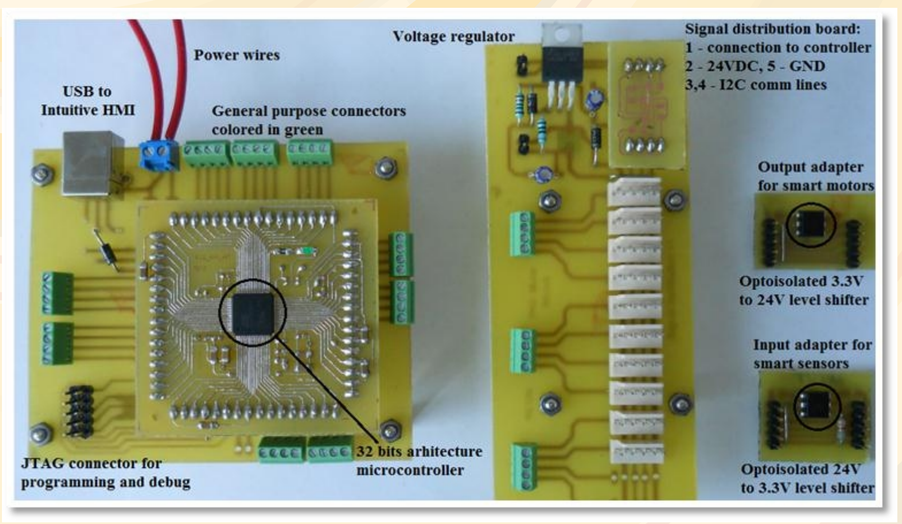
Short presentation

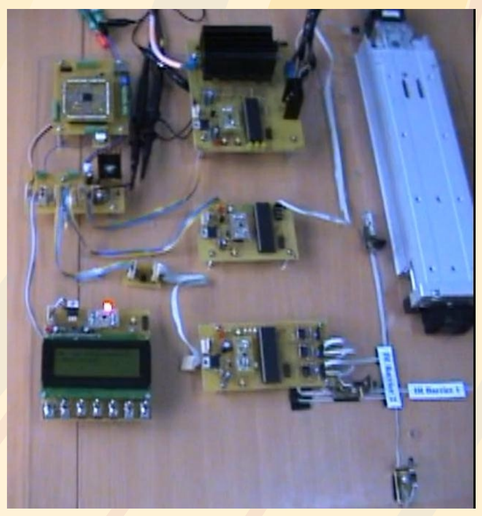
Invention describes an automation system for command, control, monitoring and configuration of industrial equipments andproducts, having a rapid reconfigurable, adaptive, dynamic architecture, where equipment/products are endowed with aminimum level of distributed intelligence. The architecture is constituted from a control unit, I/O equipments of high priority,I/O equipments of low priority, as well as adapters that are specific to the I/O equipments with high and low priority. When anintelligent equipment is connected, it configures its internal modules, then waits for the general interrogation, answers to it,and afterwards waits to be auto-integrated in the process, configured by the operator and programmed by means of the HMIand the control unit.

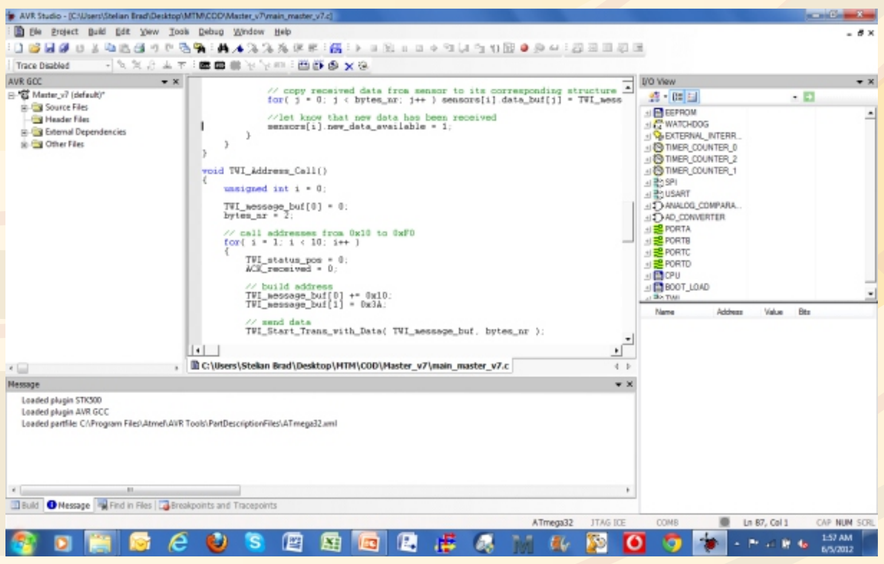
Applicability

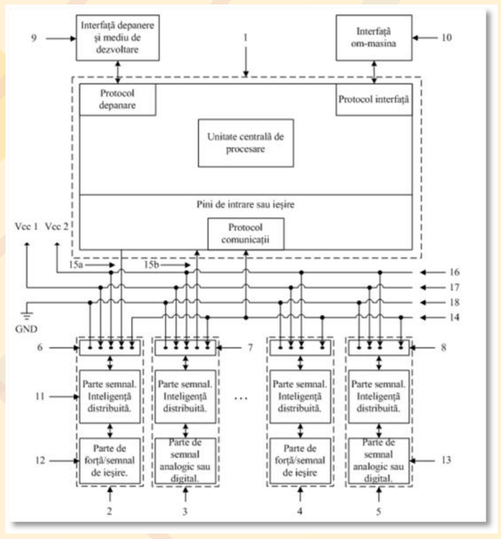
industry (automation), smart buildings, robotics, extensions to various industrial products to increase intelligence.

Images









UNIVERSITATEA TEHNICĂ DIN CLUJ-NAPOCA
MEMBER OF EUT+ EUROPEAN UNIVERSITY OF TECHNOLOGY

Department for Research, Development and Innovation Management
Knowledge and Technological Transfer Center

15 Constantin Daicoviciu street
400020, Cluj-Napoca, România

e-mail: liliana.pop@staff.utcluj.ro

www.utcluj.ro

C

Title

REACTIVE ENERGY COMPENSATION METHOD AS SECONDARY ELECTRONIC FUNCTION AT THE POINT OF COMMON COUPLING

Inventor/s - Contact

Salcu Sorin Ionut, Bojan Mircea, Iuoraș Mihai Adrian, Pintilie Lucian Nicolae, Teodosescu Petre Dorel
Sorin.Salcu@emd.utcluj.ro

Patent/ Application number

Patent application OSIM no.: A/00528/30.08.2022

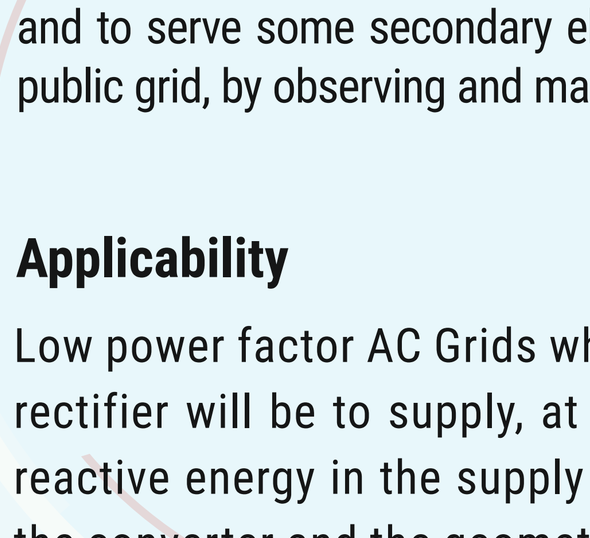
Short presentation

The invention is related to an alternating current supply grid, which serves electric consumers that may be with reactive behavior. The main objective of the invention concerns the algorithm and method of managing the reactive energy in the mentioned grid type and their use for the control of an electronic converter that can compensate reactive energy. More, the purpose of the invention is to increase the exploitation level of the total installed power of electronic AC-DC converters that mainly supply their own consumers, and to serve some secondary electronic functionalities for reactive energy compensation at the point of common coupling to the public grid, by observing and maximizing their load level.

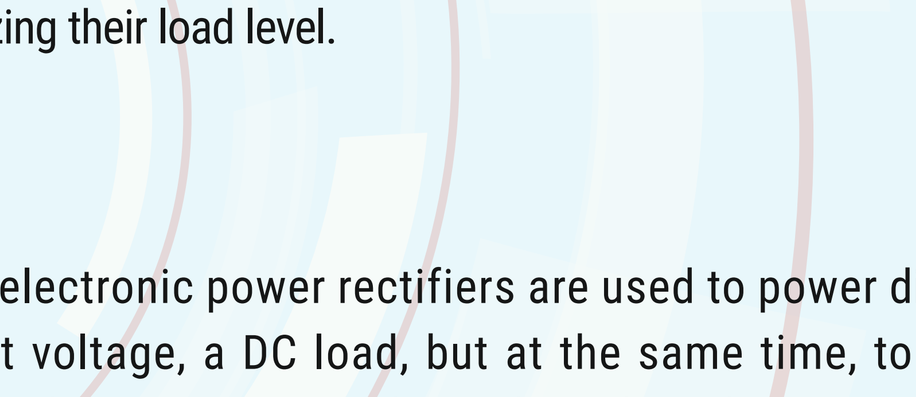
Applicability

Low power factor AC Grids where electronic power rectifiers are used to power different loads. The main purpose of the rectifier will be to supply, at a set voltage, a DC load, but at the same time, to participate in the management of the reactive energy in the supply grid. The control algorithm is based on the constraints established by the power level of the converter and the geometric relations resulting from the phasor diagrams correlated with its electrical quantities.

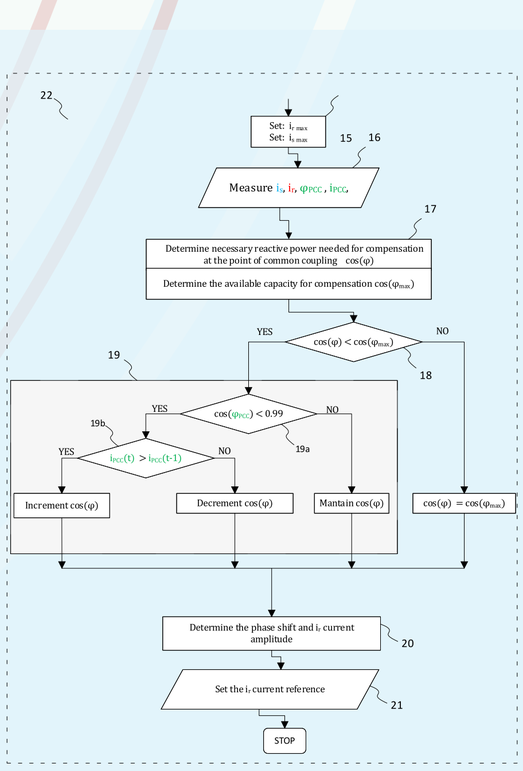
Images



AC Grid structure



Phasor diagram of the method



Control algorithm of the invetion

Department for Research, Development and Innovation Management
Knowledge and Technological Transfer Center

15 Constantin Daicoviciu street
400020, Cluj-Napoca, România

e-mail: liliana.pop@staff.utcluj.ro

www.utcluj.ro

C

Title

ELECTRONIC MICRO-INVERTER FOR ENERGY CONVERSION FROM PHOTOVOLTAIC PANELS

Inventor/s - Contact

Teodosescu Petre Dorel, Suciu Vasile Mihai, Szekely Norbert Csaba, Păcuraru Alexandru Madalin, Bojan Mircea
petre.teodosescu@emd.utcluj.ro

Patent/ Application number

Patent application OSIM no.: A/00527/30.08.2022

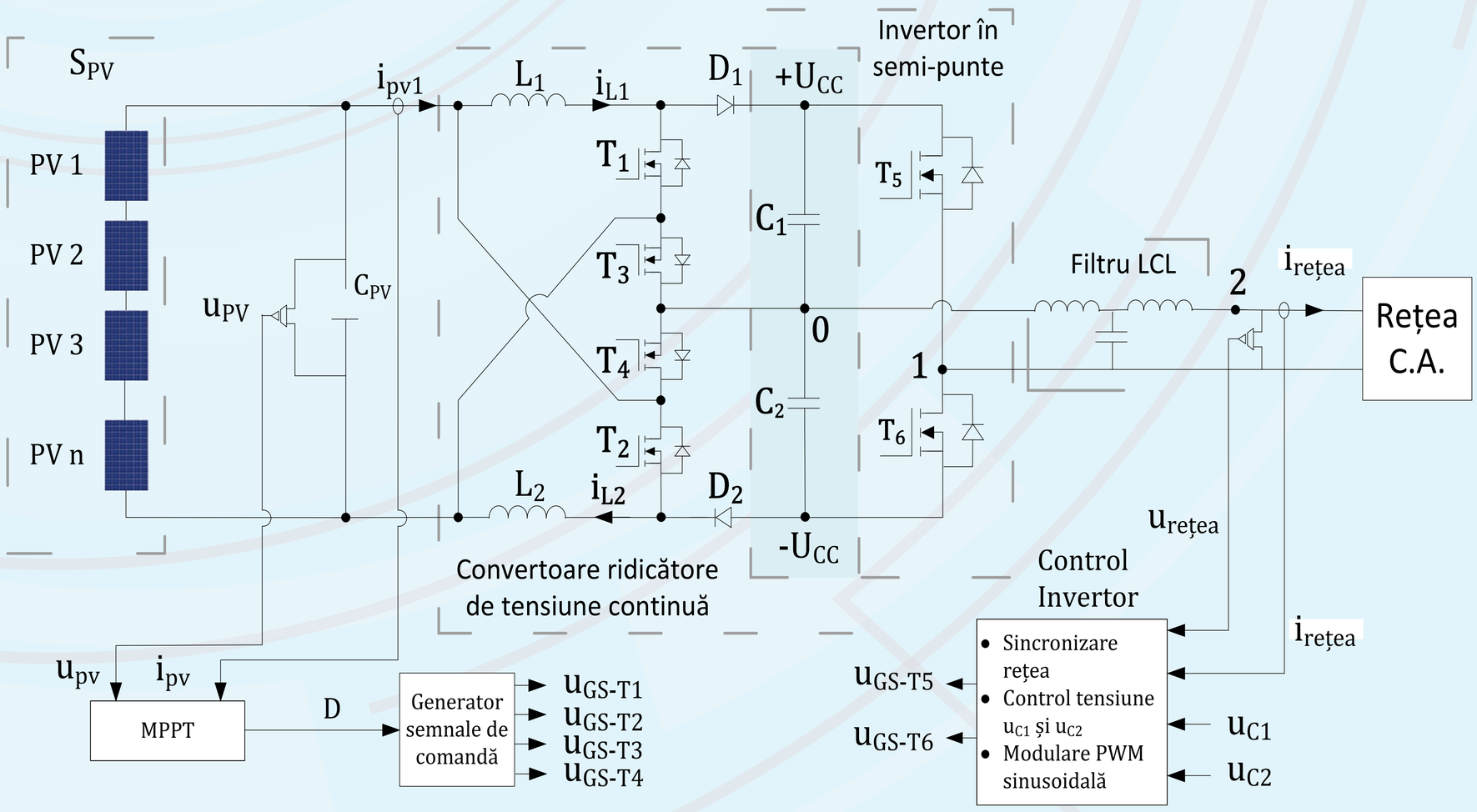
Short presentation

The invention relates to an electronic microinverter structure, composed of a boost converter and a conversion stage from DC to AC, intended for electrical energy harvesting from renewable energy sources, such as the photovoltaic panels and its injection into the local or public alternating voltage grids. The electronic microinverter according to the invention uses a reduced string of photovoltaic panels with a maximum power tracking system, thus reducing losses due to partial shading, respectively by increasing the conversion efficiency from direct voltage to alternating voltage by using a three-level voltage converter and a half-bridge inverter.

Applicability

Electrical energy harvesting from renewable energy sources by using photovoltaic panels and its injection into the local or public AC grids.

Images



Electronic schematic of the micro-inverter

Department for Research, Development and Innovation Management
Knowledge and Technological Transfer Center

15 Constantin Daicoviciu street
400020, Cluj-Napoca, România

e-mail: liliana.pop@staff.utcluj.ro

www.utcluj.ro

C

Title

ToF NORMAL ESTIMATION FOR PULSE BASED ToF CAMERA USING CNN FOR SPECTRAL DATA

Inventor/s - Contact

Szilard Molnar, Levente Tamas
Levente.Tamas@aut.utcluj.ro

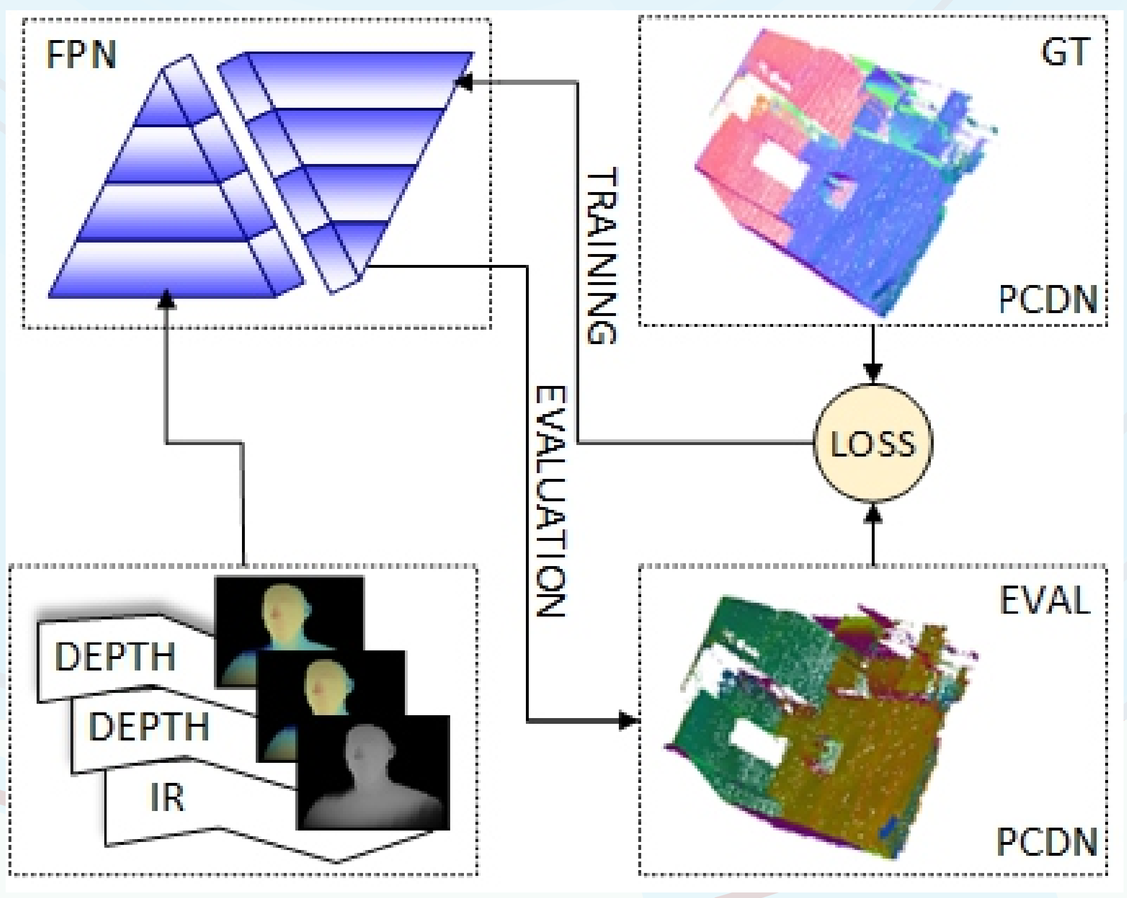
Patent/ Application number

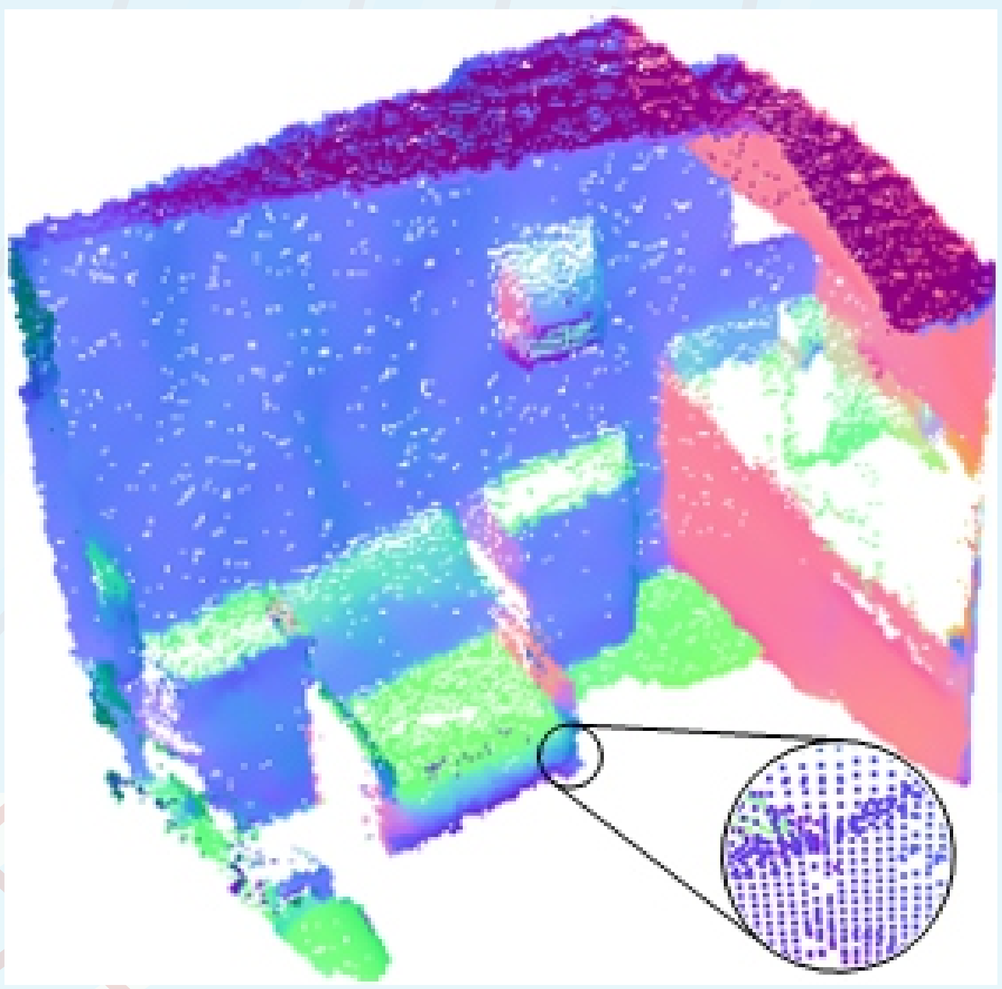
Patent application OSIM: A/00292/30.05.2022

Short presentation

A system and method for automatically computing spatial surface normals in 3D data from the pulse based Time-of-Flight(ToF) cameras is provided. Moreover, the system comprises a component which is using convolutional neural network (CNN) for computing the normals of a 3D pointcloud sensed and returned from the ToF camera depth images. The CNN is based on the 3 channel composition of information which is trained on a large real and synthetic dataset, for which an automatic 3D point processing chain is used to determine the normals. During the evaluation mode, the CNN is able to compute the normals of the pointcloud from the ToF camera, ensuring a fast and robust normal estimation for the pointclouds.

Images





LOV-E

Student project

Author: Dawid Kaczmarzyk

Promotors: Katarzyna Błaszczyk, Przemysław Błaszczyk

C

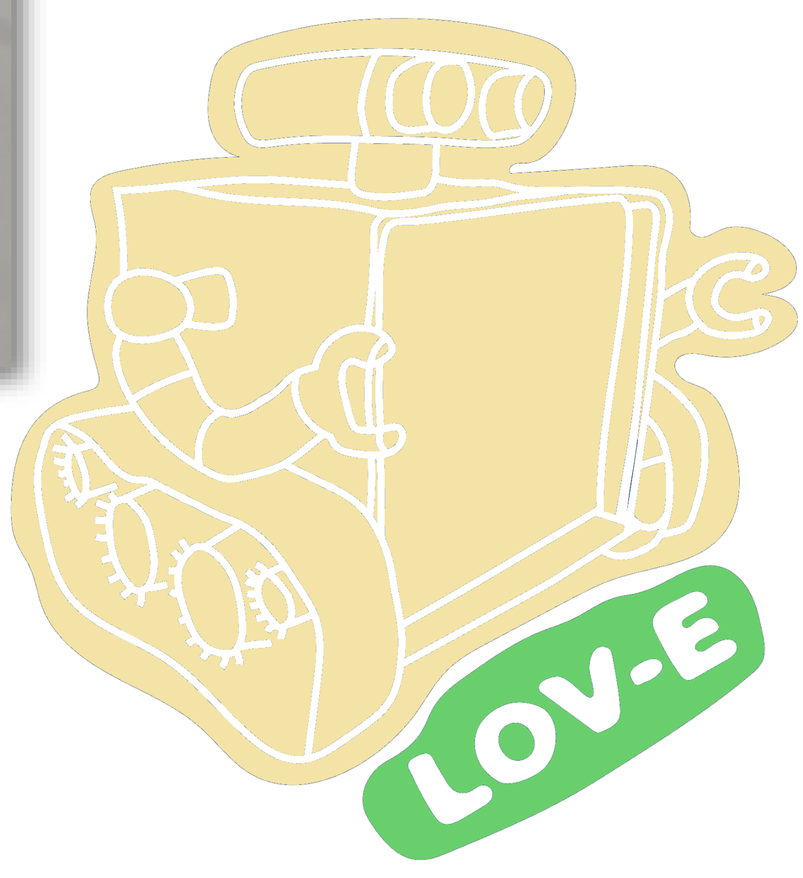
The presented solution is an innovative, educational mobile game designed for teaching programming in primary and secondary schools. The use of augmented reality technology allows to acquire knowledge in an engaging and interactive way.

The application contains various exercises that introduce fundamental programming concepts. The exercises are designed with different levels of difficulty to adapt to the needs and abilities of students across a wide scope of education. Additionally, it can be used by individuals seeking an accessible way to learn the basics of programming.
The educational aspect of this game undoubtedly contributes to increasing the interest in learning programming. It also facilitates and enhances the teaching of this field of knowledge. A field which is not easy but highly attractive among young people and on the labor market.

By participating in the gameplay, users strive to complete successive levels of the game by creating algorithms to control a virtual robot in the real world. Visual blocks representing textual instructions of programming languages are used to create programs. The application offers increasing levels of difficulty, encouraging players to come up with newer solutions to the presented problems and deepening their logical thinking abilities.
The game is available on various platforms, including mobile (Android and iOS) and desktop operating systems.



The project's development will involve:
- Adding new features and content for users.
- Enabling multiplayer gameplay.
- Creating additional teaching materials.



Contact: szkola@tzn.edu.pl +48 343244727

DOIT

Student project

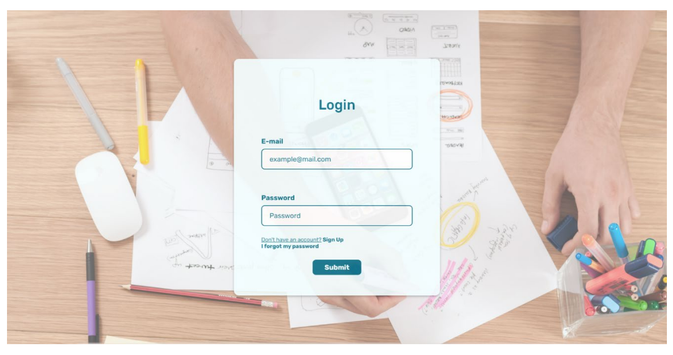
Authors: Piotr Orzechowski, Jacek Szczypior

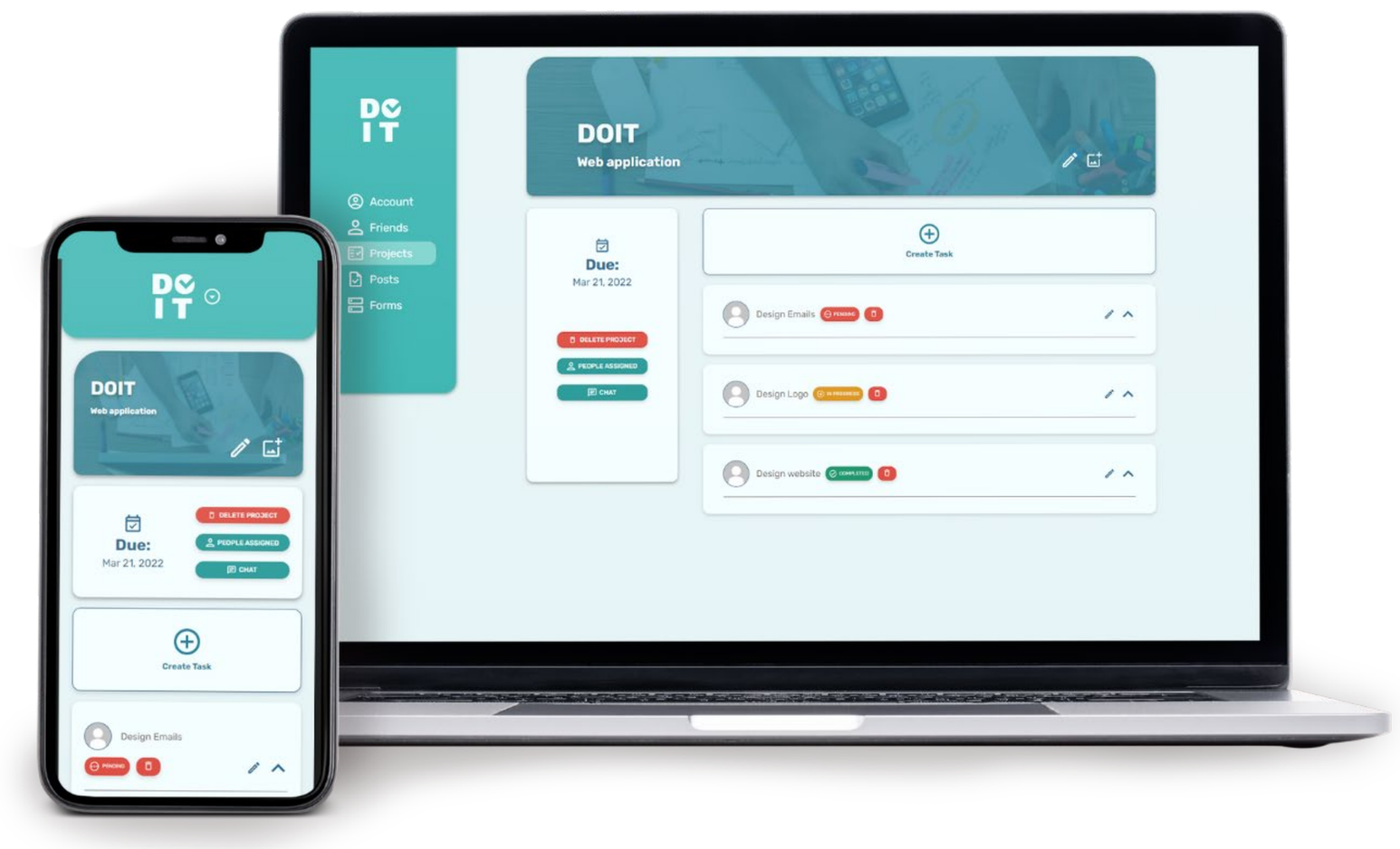
Promotors: Katarzyna Błaszczyk, Przemysław Błaszczyk

C

DOIT is a platform designed to improve the organization and communication when working in groups. A simple and modernistic interface of this application makes it easy to use. As a result, it can be quite easily operated by any person without any major problems. It provides support for the management of group work through a distribution of tasks between people involved, a possibility of having a common conversation between these people, as well as a collection of data from many people in a quick and easy way.

When working in a group and when creating any project, it may happen that we forget about solutions we wanted to implement earlier, or problems may occur with the distribution of tasks between people involved in the job. The application enables the elimination of these problems. Moreover, it provides additional functions such as e.g. a chat or a possibility of a quick collection of data (a survey). It helps in finding the most suitable people for the particular project and further cooperation. The platform was originally designed to support the organization of work for school projects, the application tools, however, turned out to be very useful also at universities and in work environments.





Originally, the authors' proposition was to create a platform for students due to which they could easily manage school projects. We noticed a growing demand for this type of application among our peers and the lack of such a solution on the market. After creating the first version of the application, we decided to design a platform containing many integrated and cooperating functions. As a result, we introduced the option to create surveys due to which we can collect information e.g. about solutions in the project. Finally, we improved communication between users by adding an optional chat.

Contact: szkola@tzn.edu.pl +48 343244727

Scanning device in multiple spectra

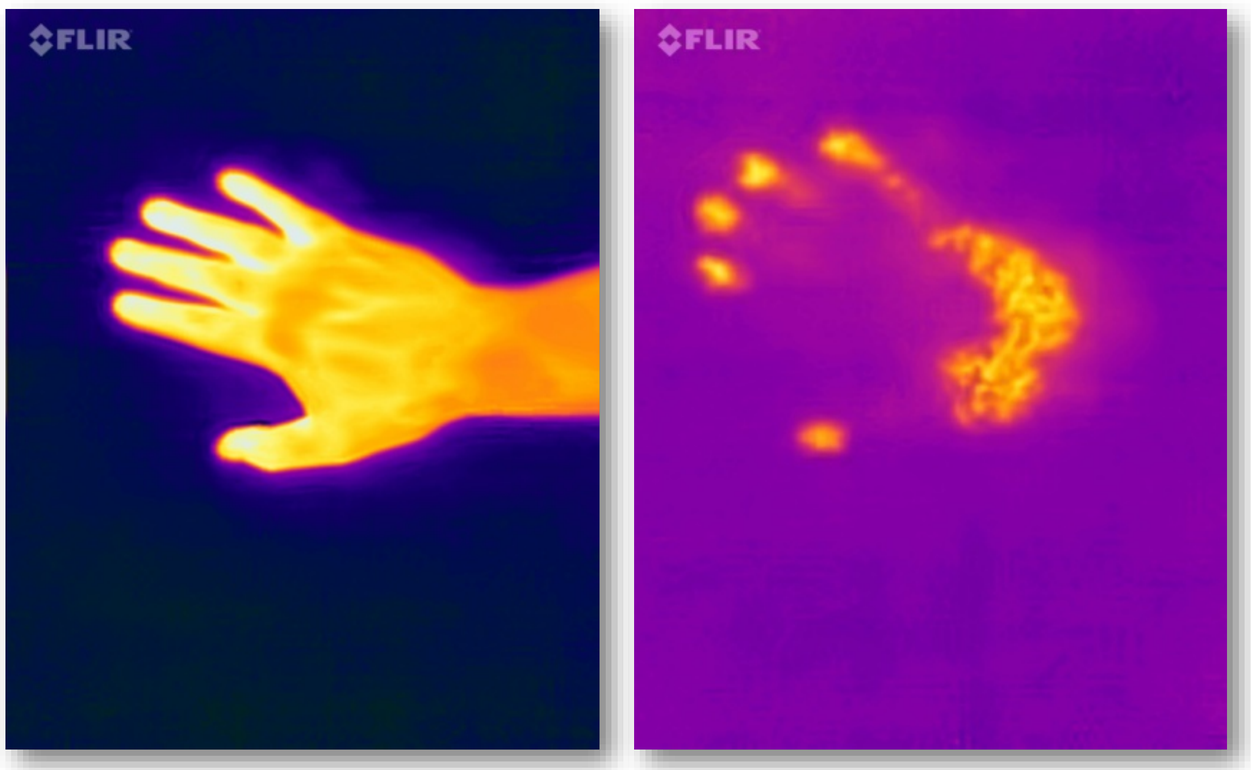
C

Patent/Research project

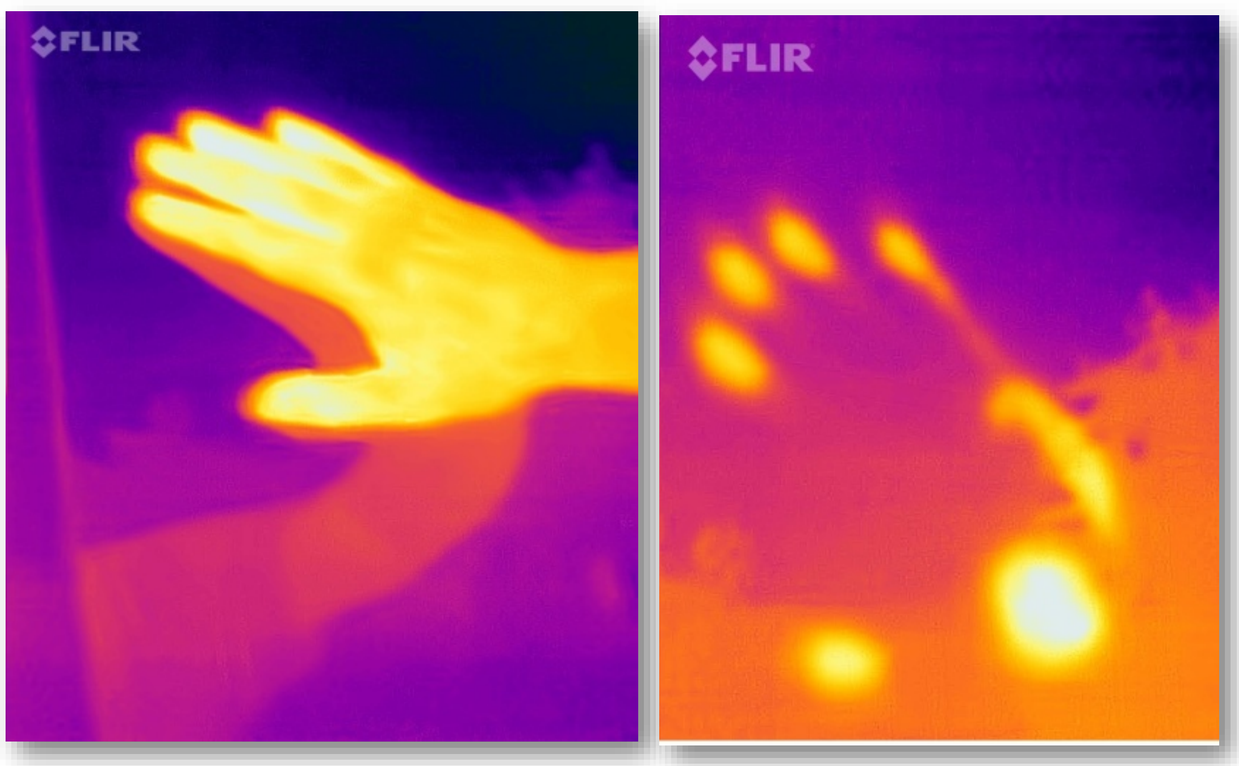
Authors: Șaptebani Neta-Ionelia, Luca Flavia, Jurcuțu Corina, Mocan Marian, Coroian Alexandra, Delia Rozovlean

It is a device designed for non-destructive physical customs control that can also be utilized in other areas of interest. Its major methods of operation include electromagnetic spectrum analyses in multiple bands and information gathering from other sensors. The module has the ability to interface with a special computer network, which enables it to carry out prompt comparison analyses to find any potential attempts to avoid customs clearance. This equipment's claimed goals are to enhance physical customs control, prevent human trafficking, economic crime, and other legal violations.

By transmitting the pertinent data on a specialized computer network, the device can be utilized both singly and in groups.

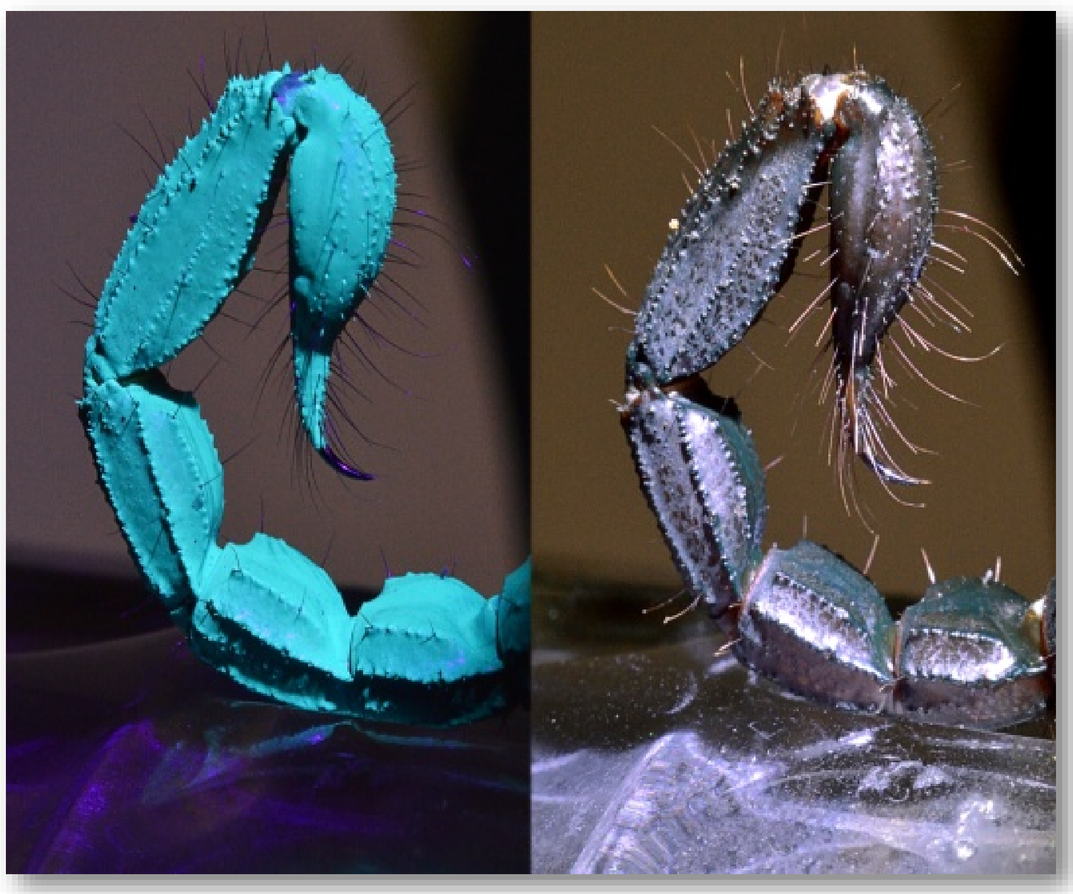


Amprentă termică pe zidărie



Amprentă termică pe sticlă

Exemple de fotografii în spectrul ultraviolet: adaptări naturale la mediu, camuflaj, diferențe contrastante de culoare în lumină ultraviolet



Metasomă de scorpion fotografiată în paralel în lumină vizibilă și în ultraviolet



Imagine compusă astfel încât să prezinte un scorpion în mediul său natural având jumătate din corp iluminat natural și jumătate iluminat în ultraviolet

Contact:

neta-ionelia.saptebani@student.upt.ro

WEARABLE SAUDI SIGN LANGUAGE RECOGNITION DEVICE BASED ON NEURAL NETWORK

Shouq Algahtani, Rana Zuhairy, Olla Almarghalani, Mawadda Aljohani
Supervisor: Dr. Rania Elmanfaloty

C

Problem Statement:

There are 750,000 deaf and mute individuals in Saudi Arabia which utilize sign language as a main form of communication. As most of the hearing community are unfamiliar with sign language, there is a huge communication barrier between deaf individuals and the hearing community in Saudi Arabia. This makes the communication difficult especially with the lack of sign language interpreters.

Objective and Motivation:

This is the senior design project for the Electrical Engineering faculty at King Abdulaziz University (KAU), which aims to develop a wearable device capable of recognizing Saudi Sign Language using neural networks. The primary goal of this project is to facilitate communication for individuals who use Saudi Sign Language as their primary means of communication.



Figure 1: The final product

Introduction:

The developed device utilizes both hands to recognize the signs, where the non-dominant hand data is sent to the dominant hand to be processed along with the dominant hand data. The implementation consists of three stages:

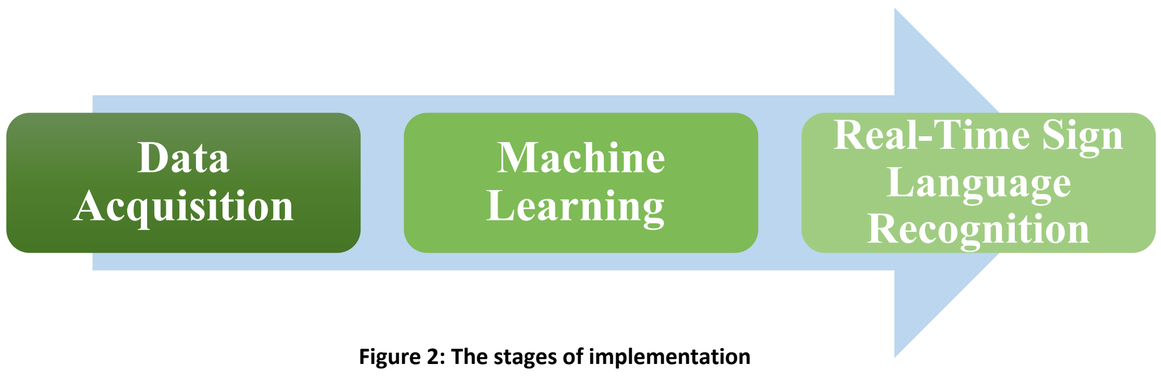


Figure 2: The stages of implementation

1- Data Acquisition:

To collect the data, electromyography (EMG) and inertial measurement unit (IMU) sensors were used, along with the Arduino IDE. Moreover, two Arduino Nano 33 BLE microcontrollers with headers were used to collect and transmit the data. The dataset includes 25 signs performed by four subjects, with 80 repetition for each sign.

2- Machine Learning:

The model was constructed using Python programming language. The model consists of two Convolutional Neural Networks (CNNs) to extract features from the readings of the two sensors, as well as dense neural networks for training.

3- Real-Time Sign Language Recognition

Sign recognition was achieved by converting the model into TensorFlowLite (TFL) and then uploading the TFL model into the Arduino.

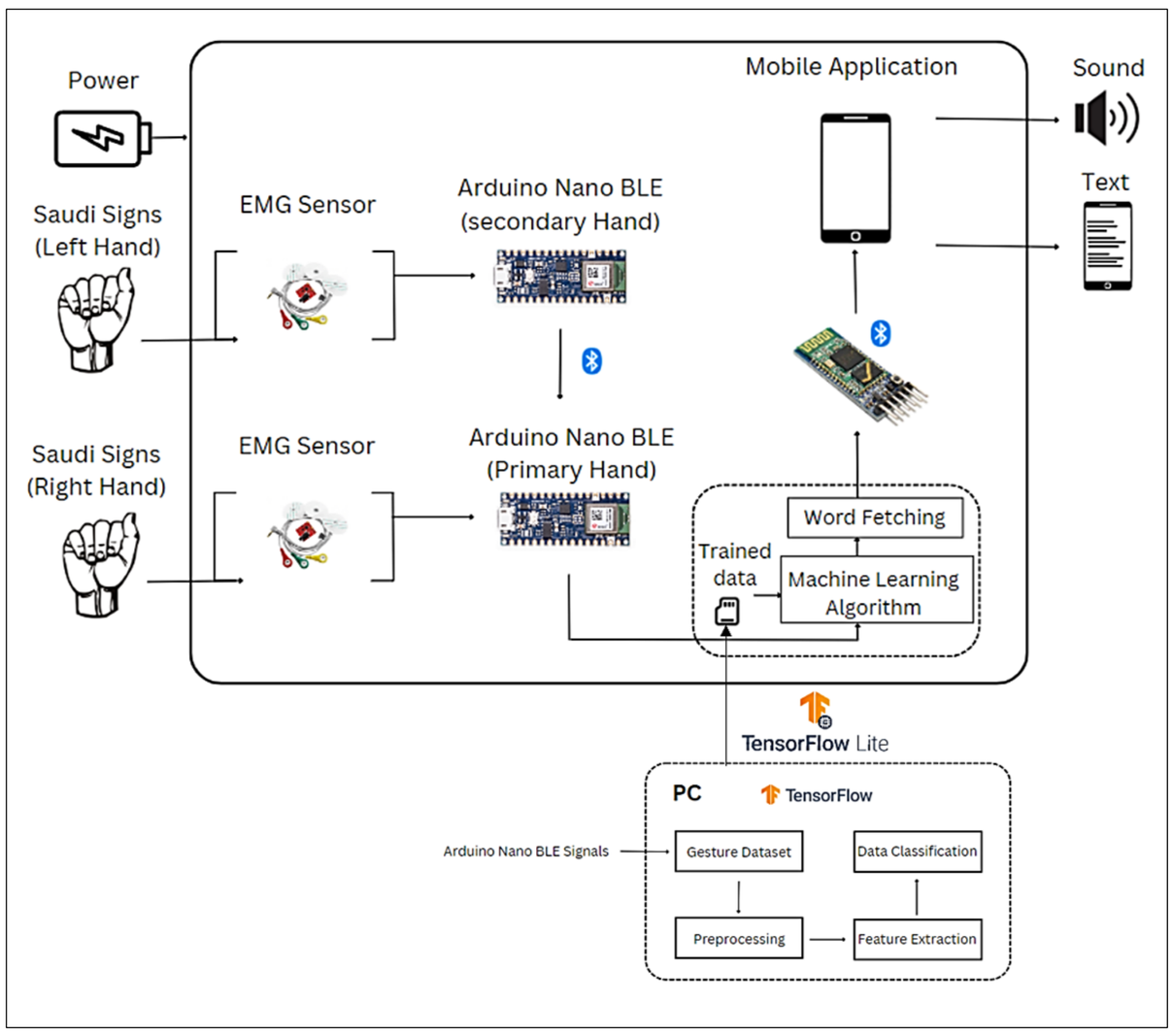


Figure 3: The block diagram

An application was created to display sign language words in both text and audio forms using MIT App Inventor, as shown in Figure 4. The device has the capability to recognize 20 signs, to form a minimum of ten sentences. The word recognition achieved an average accuracy of 91% with an average response time of 2.58 seconds.



Figure 4: The output in the application

Future Work:

Future improvements include designing a smaller, more comfortable device such as a band, utilizing reusable electrodes with a reliable EMG sensor to increase the efficiency, and training the model on a larger dataset involving a greater number of subjects to enhance data generalization and improve the accuracy of sign recognition.

Contact: **Dr. Rania Elmanfaloty**
Faculty of Engineering, King Abdulaziz University, Saudi Arabia
relmanfaloty@kau.edu.sa
Telephone No.: :+966598492399

Defending Against ARP Poisoning

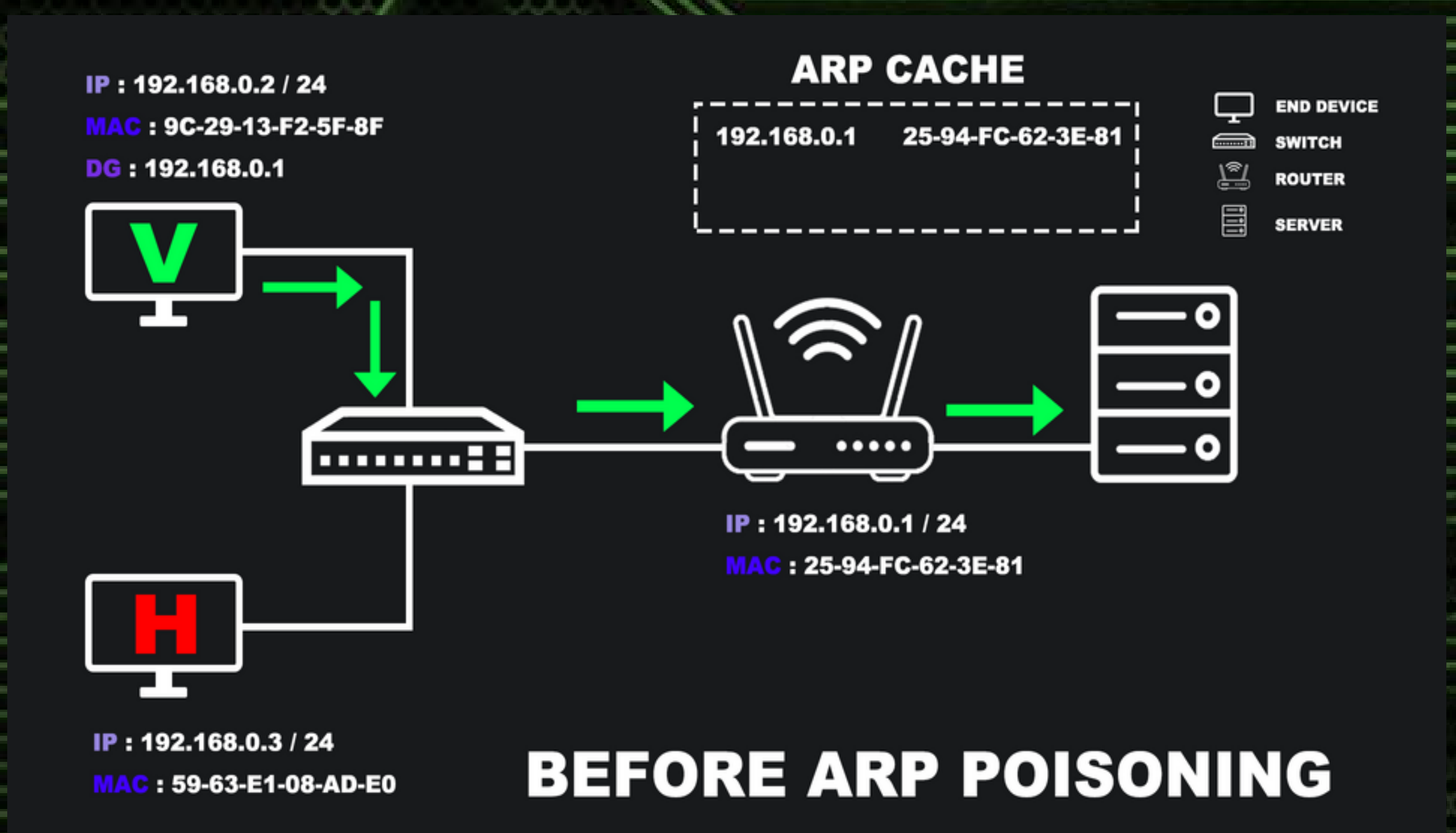
Authors: Lorena-Maria Constantin, Theodor-Iulian Badea, Andrei-Cosmin Mazilu, Gabriel-Alexandru Paduraru
Mentors: Mariana-Oana Farcas, Cosmin-Alexandru Florea

C

The selected subject is relevant and captivating in the realm of information technology, which provides protection against ARP Poisoning attacks for individuals seeking to connect to a public Wi-Fi network. ARP Poisoning occurs when an attacker successfully links their device's MAC address with the IP address of another device on a local area network. The concept we thought of is about creating a security layer as an algorithm which can verify the correspondence between a device and a switch so that no one could intervene in the communication of the ARP request and the ARP reply. Our algorithm has only 3 simple steps: First is the detection of the ARP Poisoning, is made by looking in the ARP Chace if two or more IP Addresses are associated with the same MAC Address.

In the second step, the switch blocks the communication between the end devices and itself. This interuption serves as a security measure to prevent any malicious activity.

After the communication was interupted, the security layer is proggramed to alert the victims of the potential security breach. The porpuse of the message is to explain to the victims why the communication was ended and to tell them to take imidiate action.



The Address Resolution Protocol (ARP) is a communication protocol used for discovering the link layer address, such as a MAC address, associated with a given internet layer address, typically an IPv4 address. This mapping is a critical function in the Internet protocol suite.

ARP REQUEST

ARP request is a broadcast packet sent to all the machines on the LAN which asks if any of the machines are using that particular IP address.

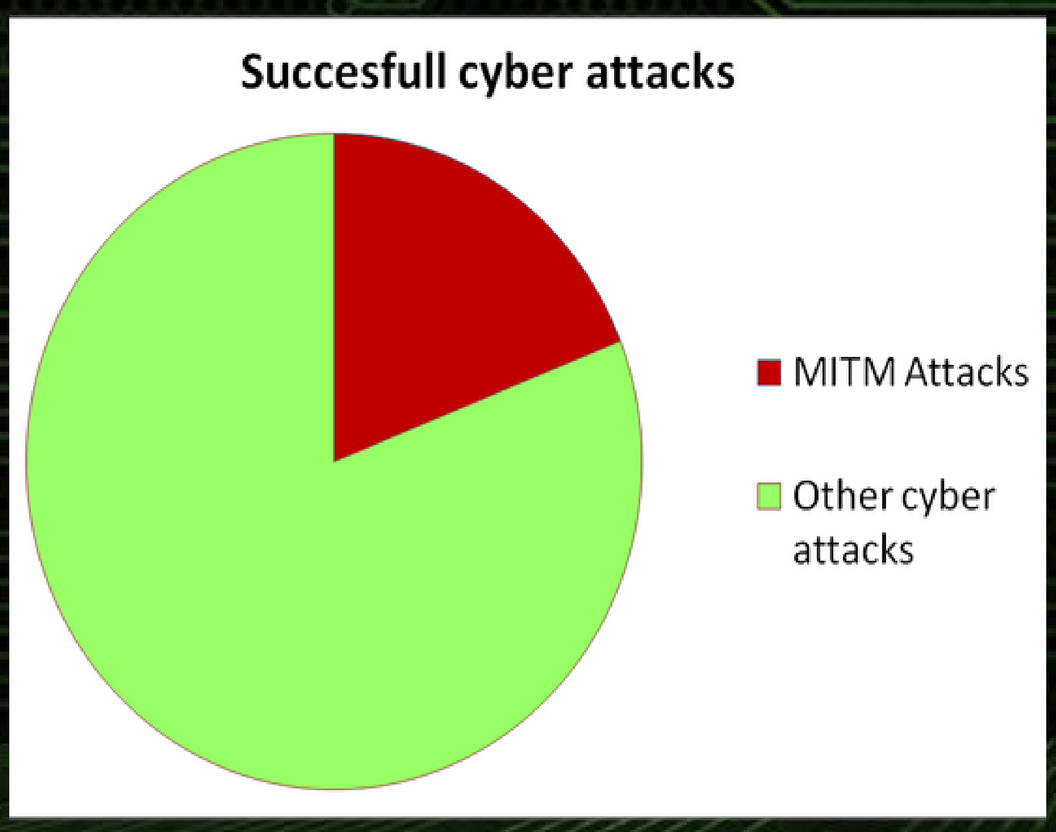
ARP REPLY

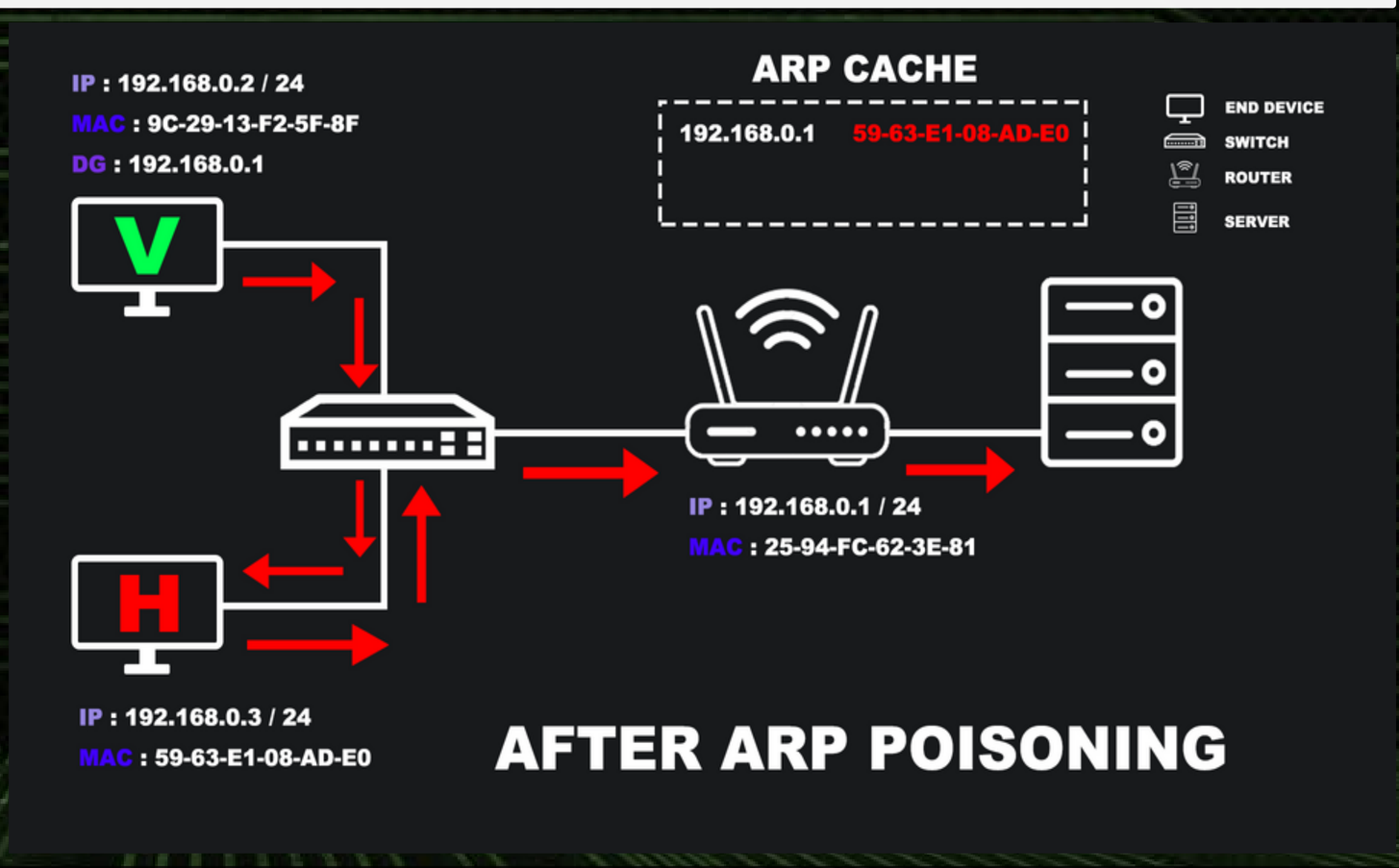
ARP reply is a unicast response, containing the desired information, sent to the requestor's link layer address.

ARP Poisoning (or ARP spoofing) is a type of attack in which an attacker sends fabricate ARP messages over a local area network in order to link attacker's MAC address with the IP address of any other device on a network to achieve a malicious task.

Man-in-the-middle attack

If an attacker ables to manage linking of the MAC address of his/her device with the IP address of any other device on a local area network, this linking leads to ARP Poisoning and allows an attacker to carry out several malicious tasks suchas intercepting network traffic and modify the data in-transit .The main goal of the MiTM attack is to steal important and cofidential data.





Compared to other existing programs, the security layer algorithm is a more efficient and cost-effective way to ensure the safety of individuals who connect to public Wi-Fi networks. Therefore, people can connect to Wi-Fi in public spaces with confidence due to our security method.

Contact: +40 787 433 840 constantinlorenamaria@gmail.com

D

Automotive

Space science

Aviation

Ships

Mechanics

EQUIPMENT FOR REDUCING OF HYDRAULIC INSTABILITIES GENERATED BY THE SWIRLING FLOW FROM THE CONICAL DIFFUSER OF HYDRAULIC TURBINES

D

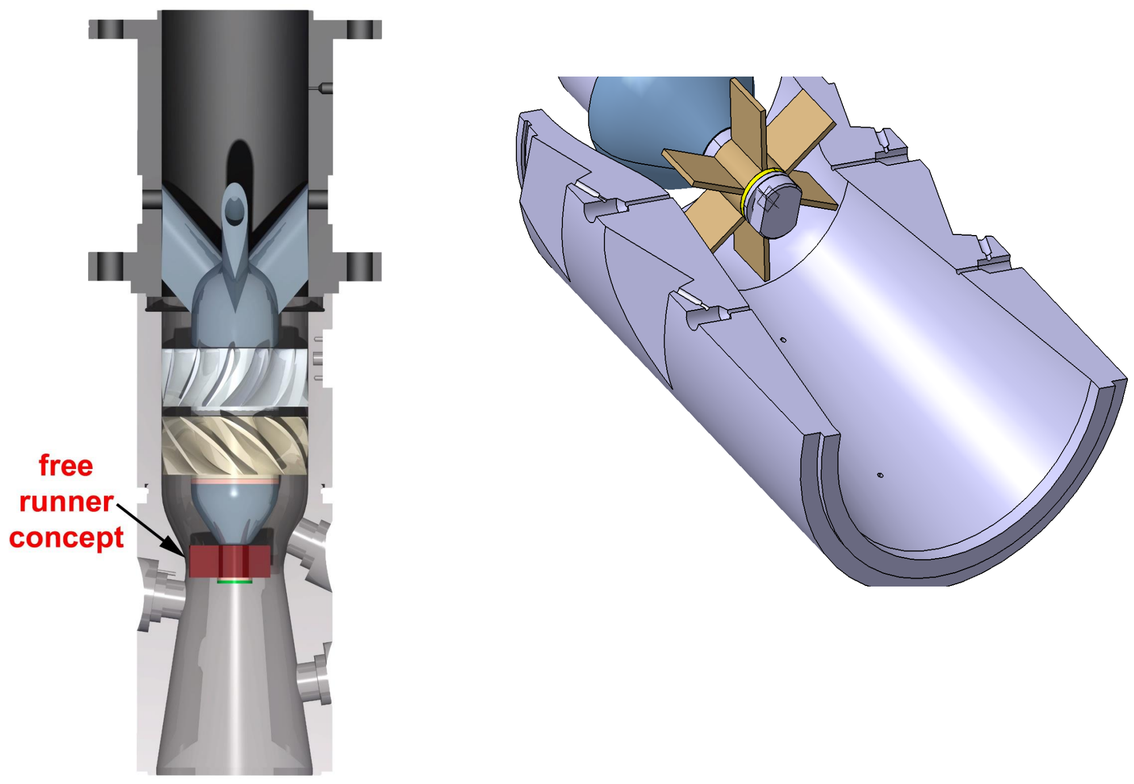
Patent: a 2022 00182

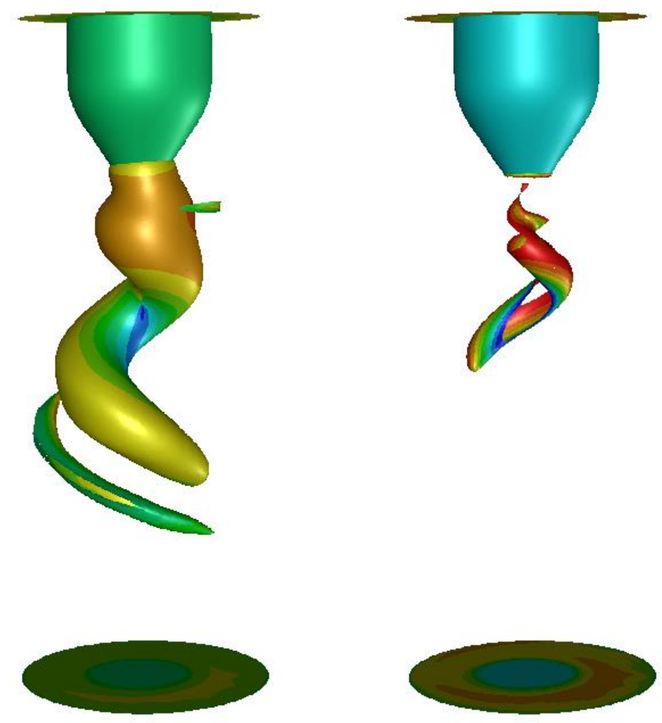
Research project: TE 179/2020: Free Runner for Swirling Flow Control at the Outlet of Hydraulic Turbines, PN-III-P1-1.1-TE-2019-1594

Authors: Susan-Resiga Romeo Florin, Bosioc Ilie Alin, Tanasa Constantin, Stuparu Adrian Ciprian, Szakal Raul Alexandru

The invention refers to a new equipment for eliminating/reducing the pressure fluctuations associated with the vortex rope, which appear at partial discharge in the conical diffuser of hydraulic turbines, especially those with fixed blades (ex: Francis turbines). The new equipment can be applied both in new hydropower plant constructions and in the case of existing ones. The main element of the invention is the so-called free runner, which connected to a shaft passing through the turbine rotor, eliminates the rope vortex and the pressure fluctuations associated with it, which are very harmful to the hydraulic turbines. The major advantages of the invention are: simple construction and implementation as well as low maintenance costs. Furthermore, it does not produce any other negative effects on the flow in the conical diffuser or on the turbine.

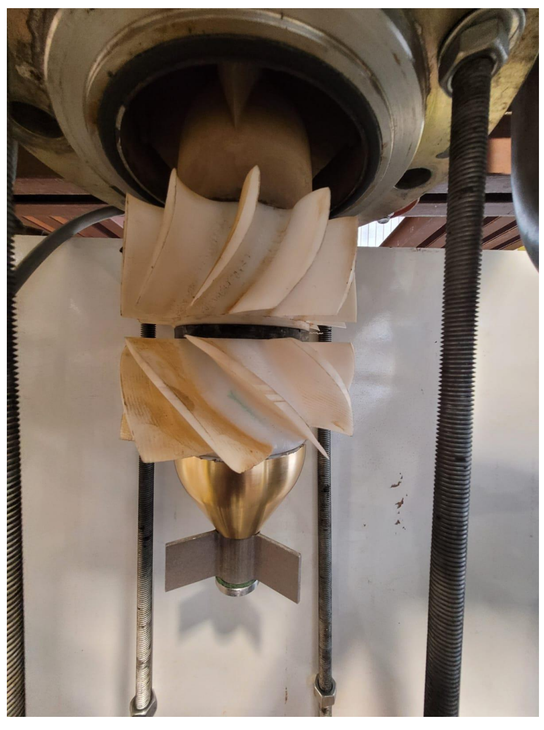
Results: Analysis Using Numerical Simulations





Flow in the conical diffuser of hydraulic turbines without and with the free runner concept

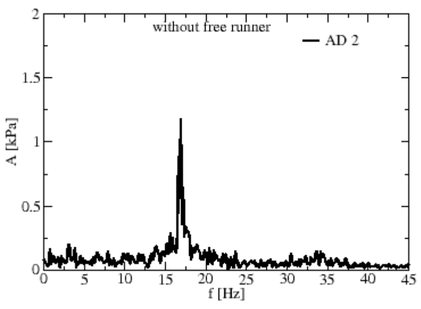
Results: Experimental Laboratory Analysis

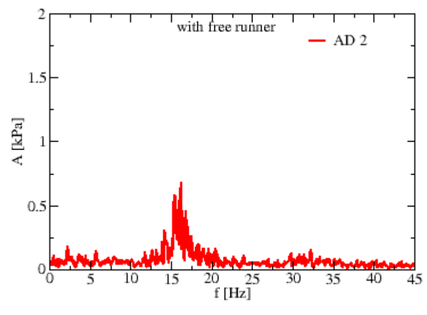






Fast Fourier analysis of unsteady pressure at the wall of the conical diffuser without and with the free runner concept





Contact: Lecturer Dr.Eng. Alin BOSIOC, alin.bosioc@upt.ro, tel: 0040727988895

Modeling an innovative infrastructural framework for autonomous cars

Ciprian-Sorin VLAD, PhD Student, Politehnica University of Timisoara, Prof. univ. dr. ing. Larisa IVAȘCU

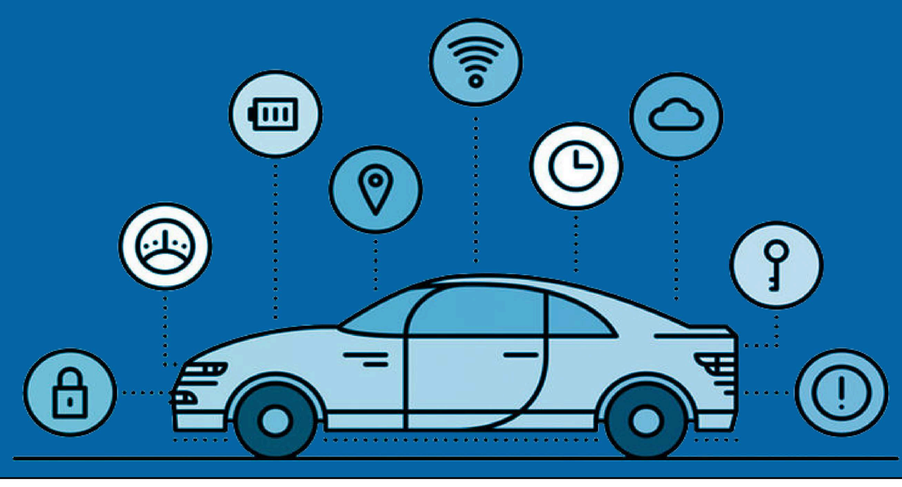
Iulia-Ioana MIRCEA, PhD Student, Politehnica University of Bucharest, Prof. ec. dr. ing Eugen ROȘCA

D

Doctoral research project

The opportunity for dynamic testing, research, and development of level 3, 4 and 5 technologies in the field of autonomous mobility, road safety and smart infrastructure by modeling an innovative infrastructure framework, which, by replicating real-scale traffic conditions, will facilitate the advance technologically, positioning Romania in the role of regional leader.

With 98% of road accidents linked to human error, the widespread use of autonomous cars with level 5 technology is expected to help meet the EU's target of approaching 0 deaths by 2050.



METHOD:

1

SIMULATION BUILD





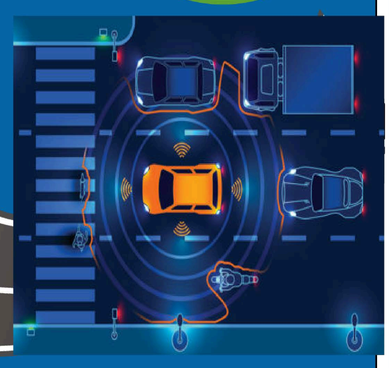
VIRTUAL DRIVING

2

VALIDATION ON TEST TRACK



3



READY TO DRIVE ON PUBLIC ROADS



RESULTS:

The development of 3,4 and 5 technologies for autonomous mobility

The identification of new smart infrastructure and connectivity solutions

The determination of road safety improvement parameters

REFERENCES:

Raja Ben Abdessalem, Annibale Panichella, Shiva Nejati, Lionel C. Briand, and Thomas Stifter. 2018. Testing autonomous cars for feature interaction failures using many-objective search. In Proceedings of the 33rd ACM/IEEE International Conference on Automated Software Engineering (ASE '18). Association for Computing Machinery, New York, NY, USA, 143–154. https://doi.org/10.1145/3238147.3238192

Szalay, Zsolt & Tettamanti, Tamas & Esztergár-Kiss, Domokos & Varga, István & Bartolini, Cesare. (2017). Development of a Test Track for Driverless Cars: Vehicle Design, Track Configuration, and Liability Considerations. Periodica Polytechnica Transportation Engineering. 46. 10.3311/PPtr.10753.

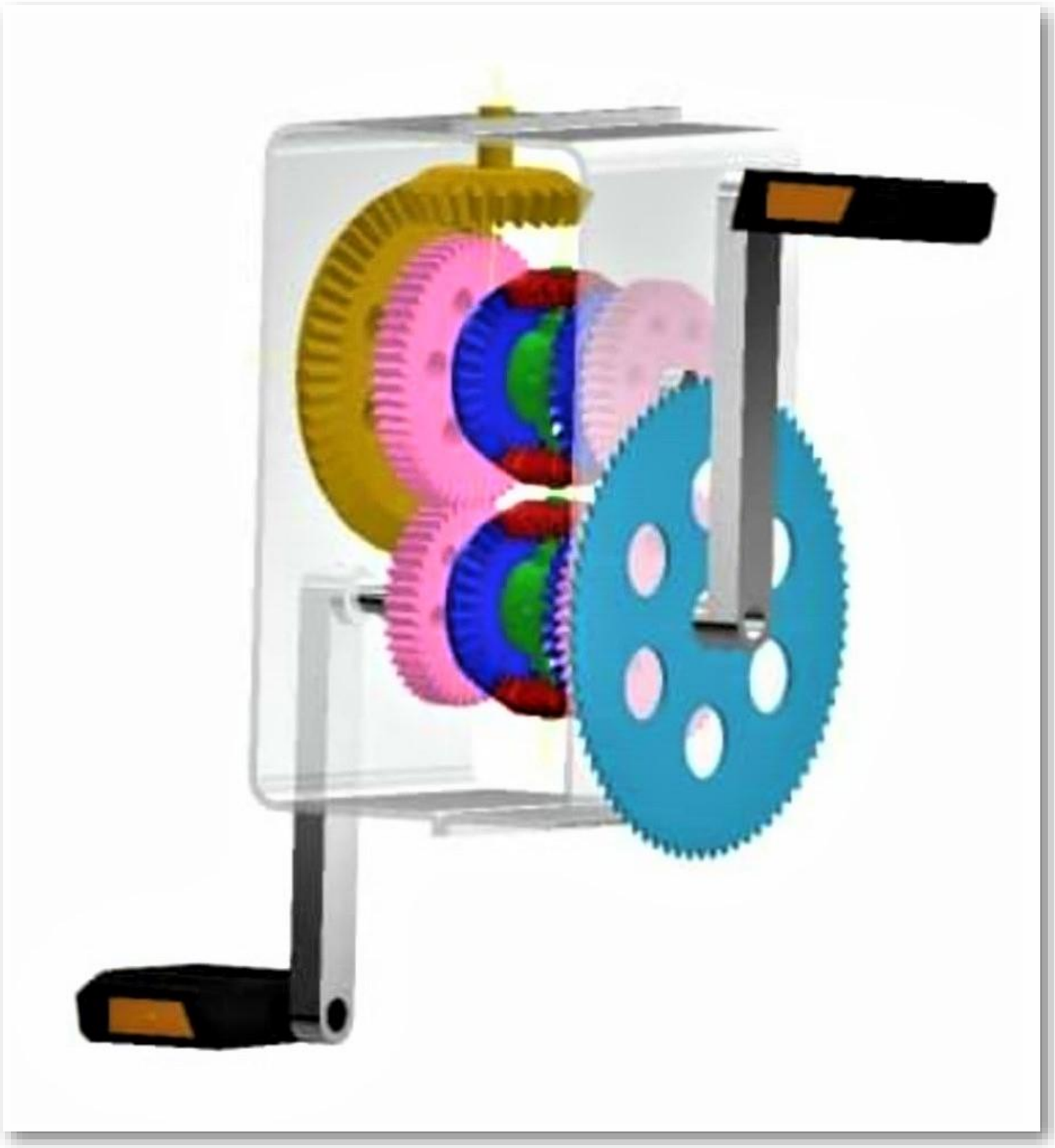
Electric assisted self-adaptive hybrid transmission

Patent 00889/12.12.2019

D

Authors: ROMEO CĂTĂLINOIU,
SORIN AUREL RAȚIU, IMRE ZSOLT MIKLOS

The proposed solution refers to an implementation of patent application no. 00889/12.12.2019 and consists of a gearbox intended to equip vehicles with pedals.



SCAN ME

The gearbox is a mechanical reducer characterized by the fact that it provides assistance when pedaling through an electric motor, assistance that can be achieved in three modes: low, medium and high, self-adaptive depending on the value of the load torque that must be overcome. The major advantage is that changing gears becomes unnecessary.

Contact: *catalinoiuromeo@gmail.com* *sorin.ratiu@fih.upt.ro*

Possibilities of recycling Lithium-ion electric vehicles batteries

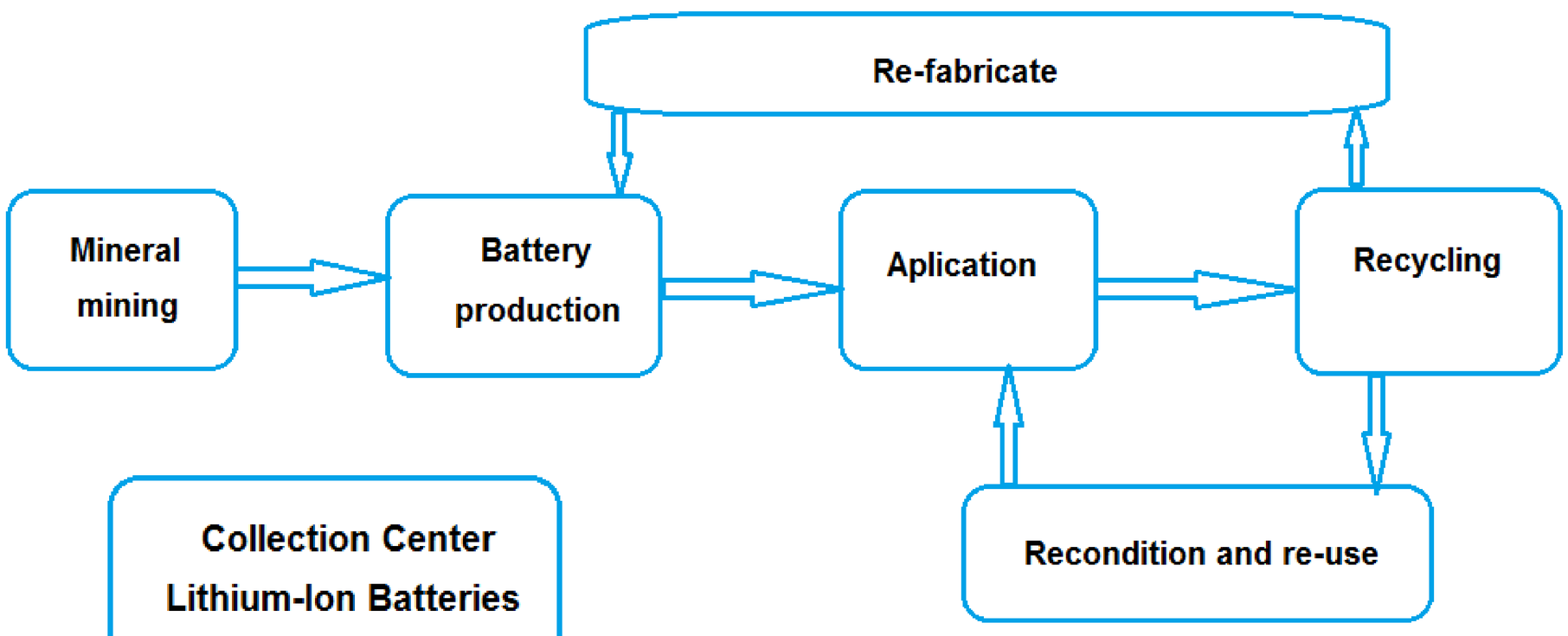
D

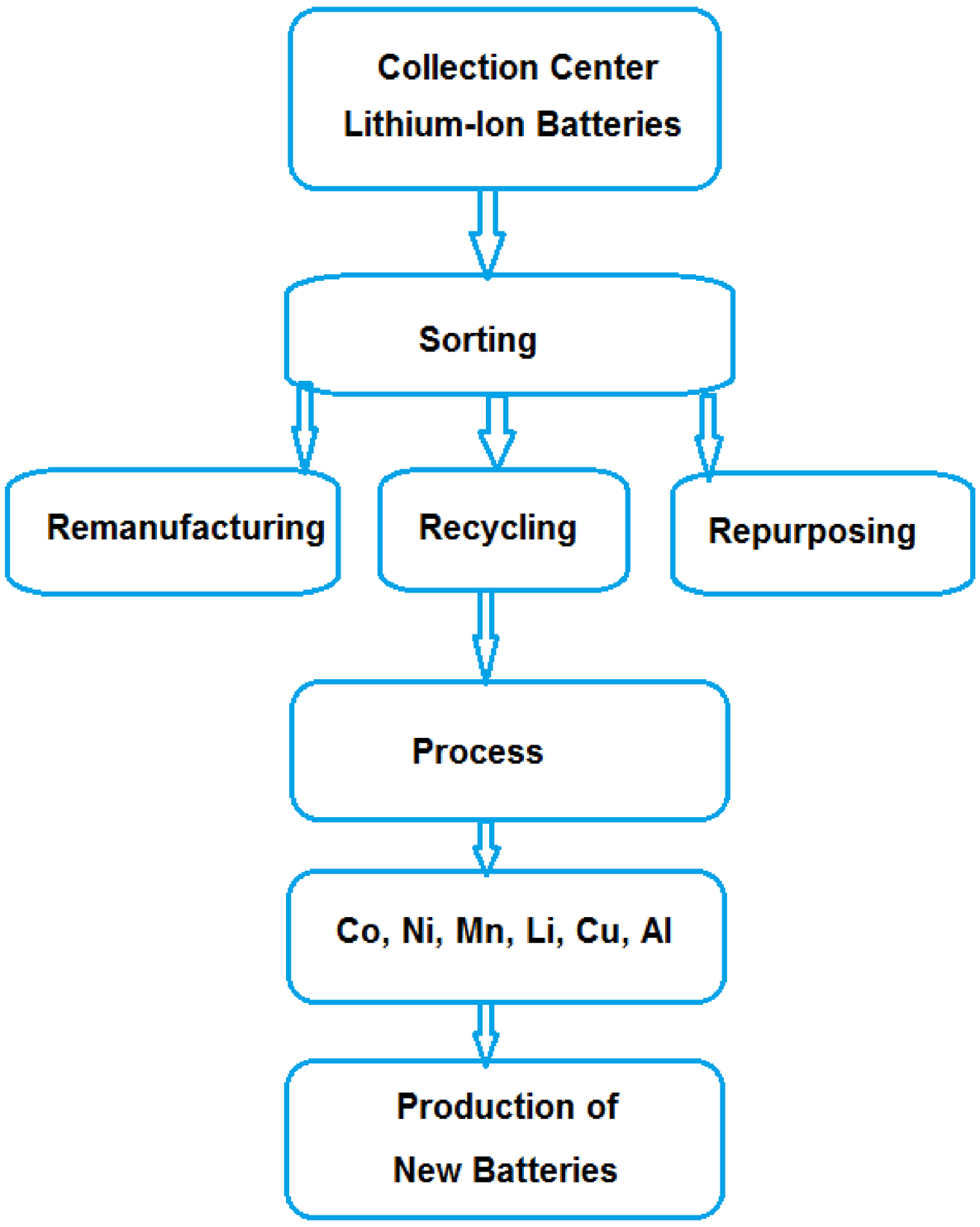
Doctoral research project

Author: RUS Ioan Alexandru

Coordinators: NICOLAE Eugen-Viorel, BIRTOK-BANEASA Corneliu

Energy storage systems, usually batteries, are essential for all-electric vehicles, plug-in hybrid electric vehicles (PHEVs), and hybrid electric vehicles (HEVs). Lithium-ion batteries are currently used in most portable consumer electronics such as cell phones and laptops because of their high energy per unit mass relative to other electrical energy storage systems.





Most components of lithium-ion batteries can be recycled, but the cost of material recovery remains a challenge for the industry.

The recycling of used Li-ion batteries from vehicles goes through a series of stages: collection, sorting, handling, processing, metal recovery and valorization.

Recycling of used batteries is an increasingly important step in alleviating both waste management and environmental concerns regarding the materials used in Li-ion batteries.

Recycling allows to reduce the costs of production by recovering valuable recovered raw materials such as cobalt, nickel and lithium from end-of-life batteries. The recovery of the raw materials used in the manufacture of batteries is essential if we consider their scarcity and high cost.

Contact: alecsandru.rus@yahoo.com

Analysis and development of the experimental manufacturing process of porous ceramic filters for automotive industry

PhD Thesis

D

Authors: Robert BUCEVSCHI, Ana SOCALICI, Adina BUDIUL-BERGHIAN, Corneliu BIRTOK-BĂNEASĂ

The study presents the results obtained from research activities in the field of material engineering, activities focused on obtaining methods for porous ceramic materials intended for air filtration.

The purpose of the experimental studies is the development and improvement of the manufacturing process for the filter element made by porous ceramic. The innovation presented by this concept of filter element is the exclusive use as a filtration medium of a porous ceramic mixture.

The disseminated results also show the influence of the obtaining process on the density and mechanical strength of the filter element.

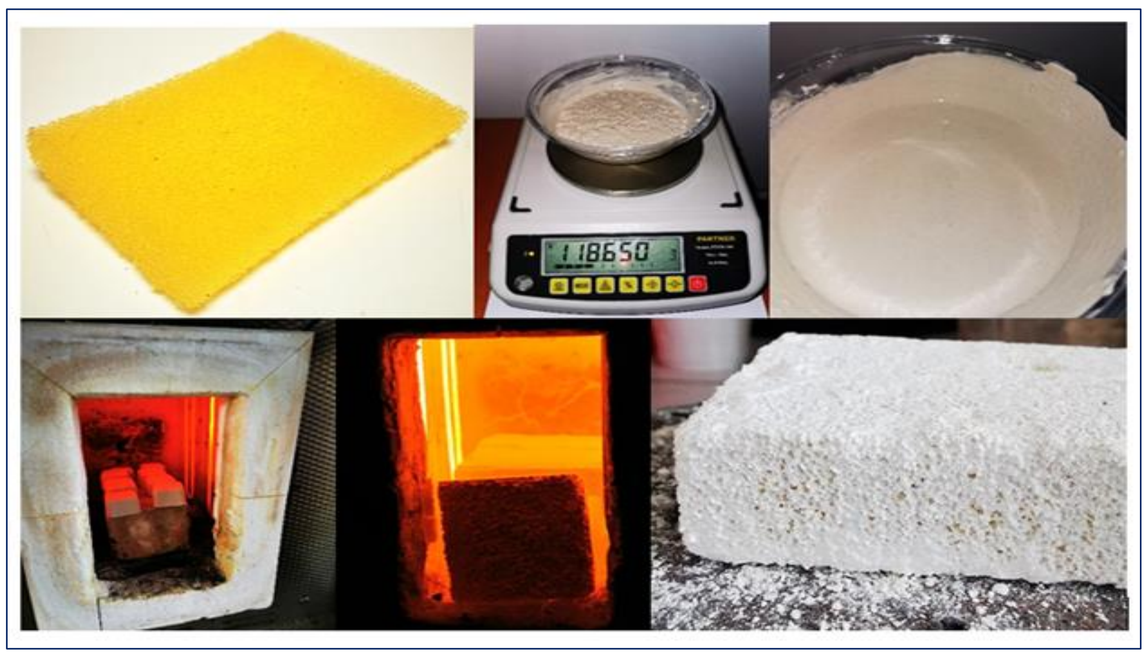


Figure 1. Aspects during laboratory experiments



Figure 2. The product obtained from experimental research

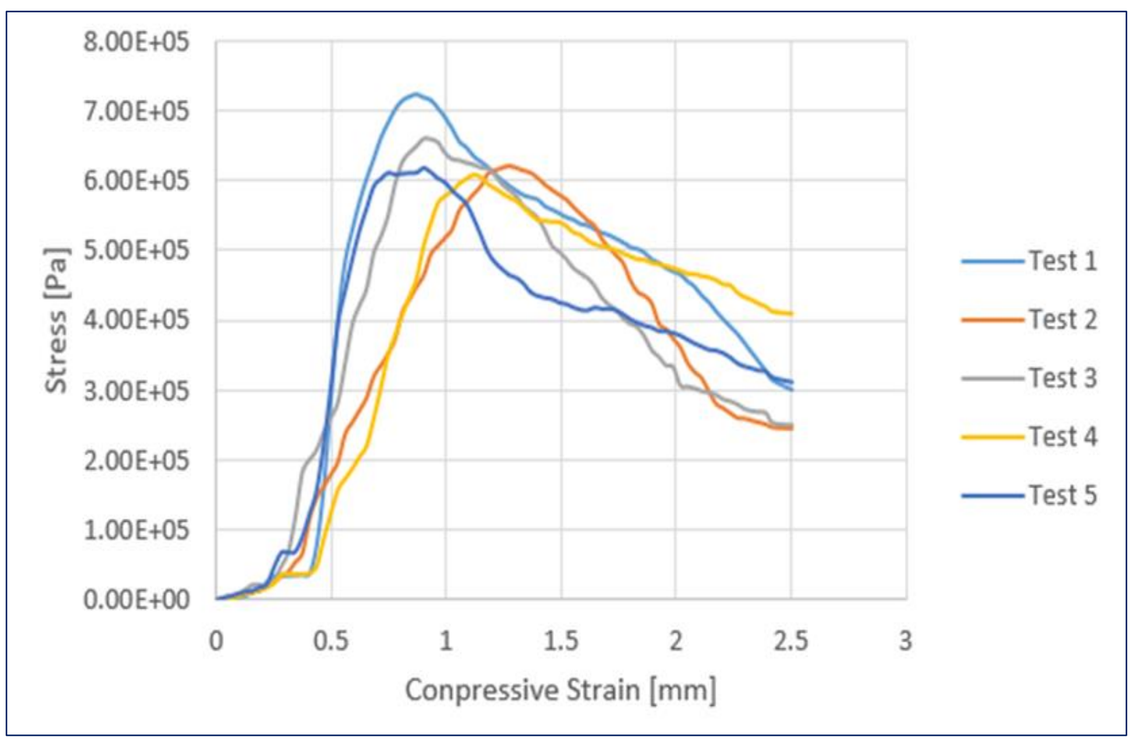


Figure 3. Uniaxial compression test results

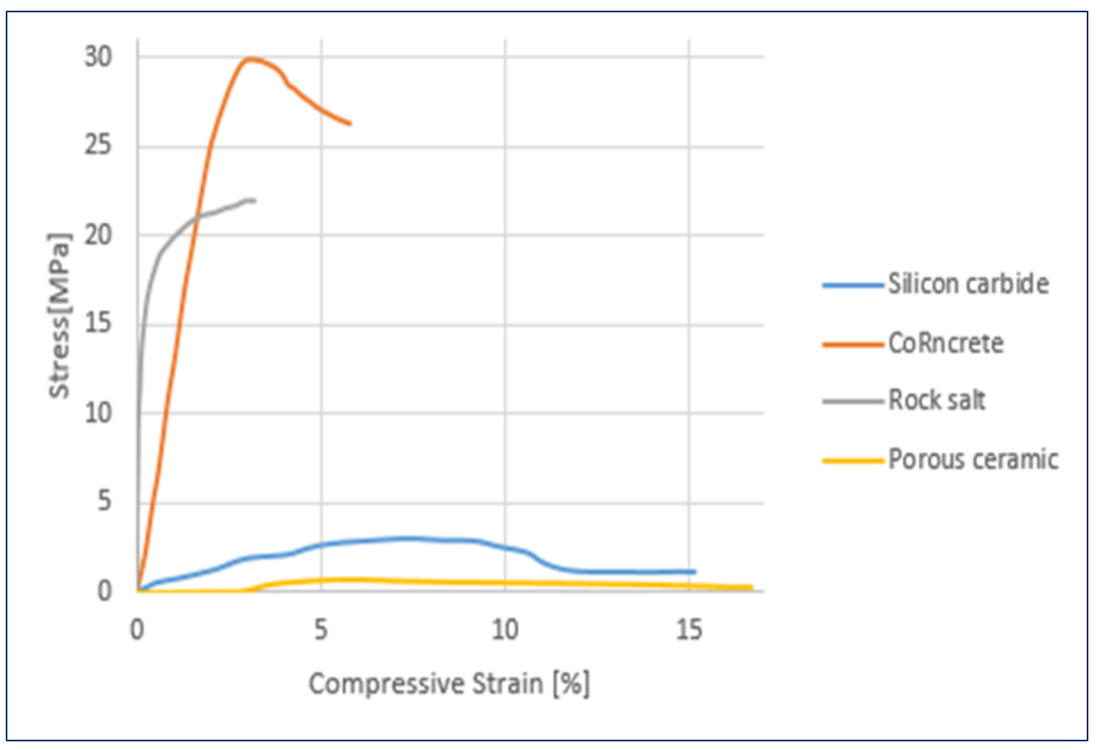


Figure 4. Comparison with different uniaxial compression test results

Among the advantages offered by the use of ceramic materials in gas filtration is their ability to retain gases at the molecular level. porous ceramic filter elements could be a viable environmentally friendly alternative to conventional microfiber filters. Following the analysis of the obtained results, we can conclude that the ceramic filtration material obtained through the process presented in this paper can be structurally an alternative to the classic paper filters. a number of critical steps in the production method were also identified, such as the need to improve the homogeneity at the immersion process of the aqueous ceramic solution in the volume of the polymeric sponge, as well as the need to carry out an analysis of the influence of granulometric classes properties for the materials used in the preparation of the aqueous ceramic solution.

Contact: robert.bucevschi@yahoo.ro +40757071093

4th International Exhibition

InventCor

14-16.09.2023 – Deva, Romania

COMOTI ROMANIAN RESEARCH & DEVELOPMENT INSTITUTE FOR GAS TURBINES

Aircraft engine with horizontally arranged cylinders

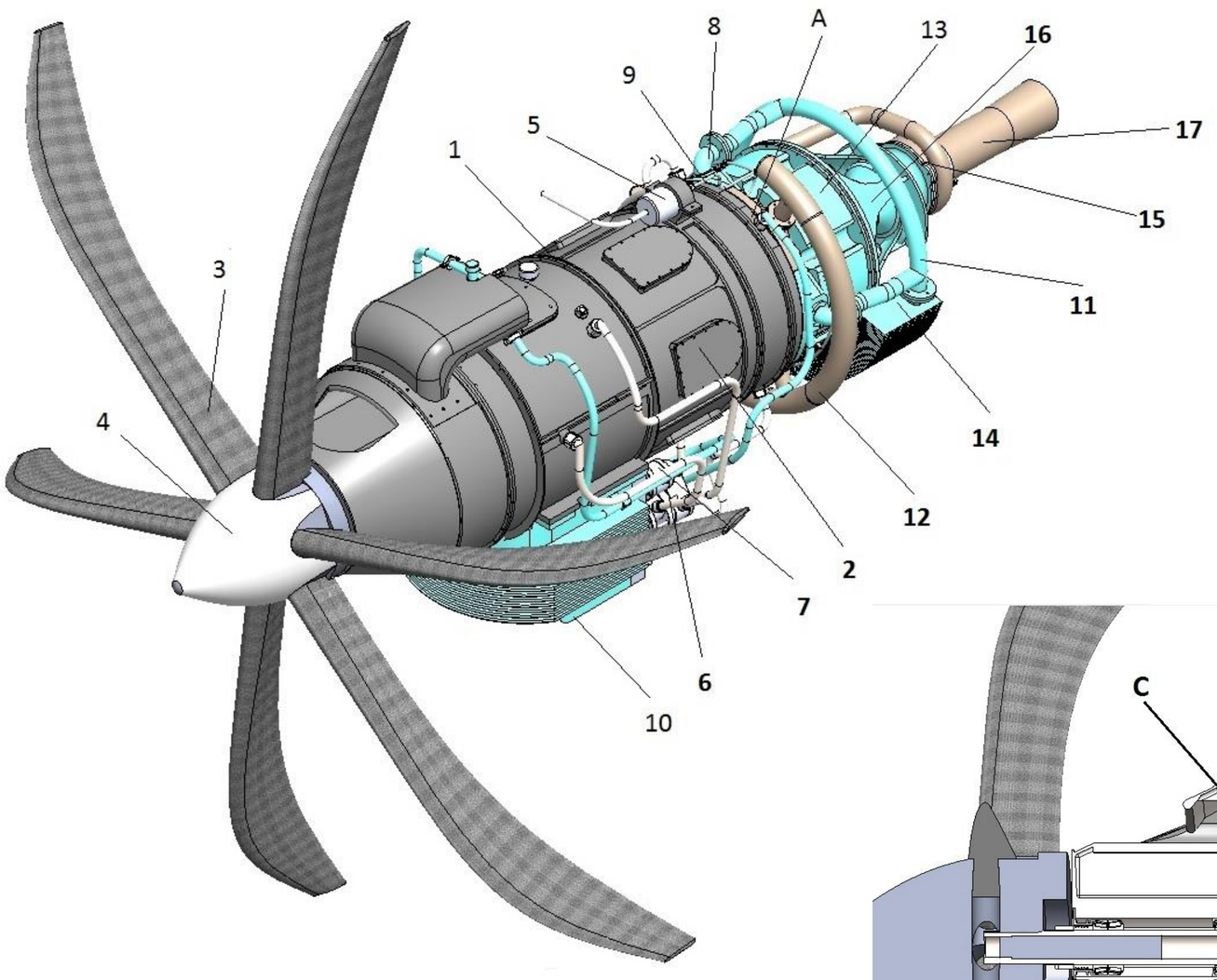
D

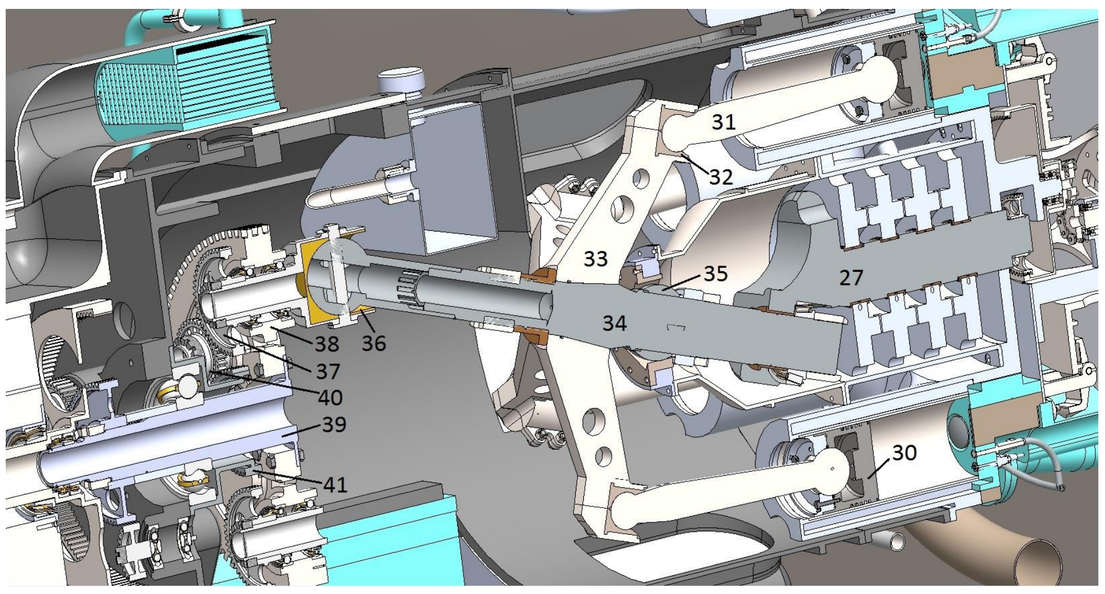
Patent Application: **RO 137511 A0**

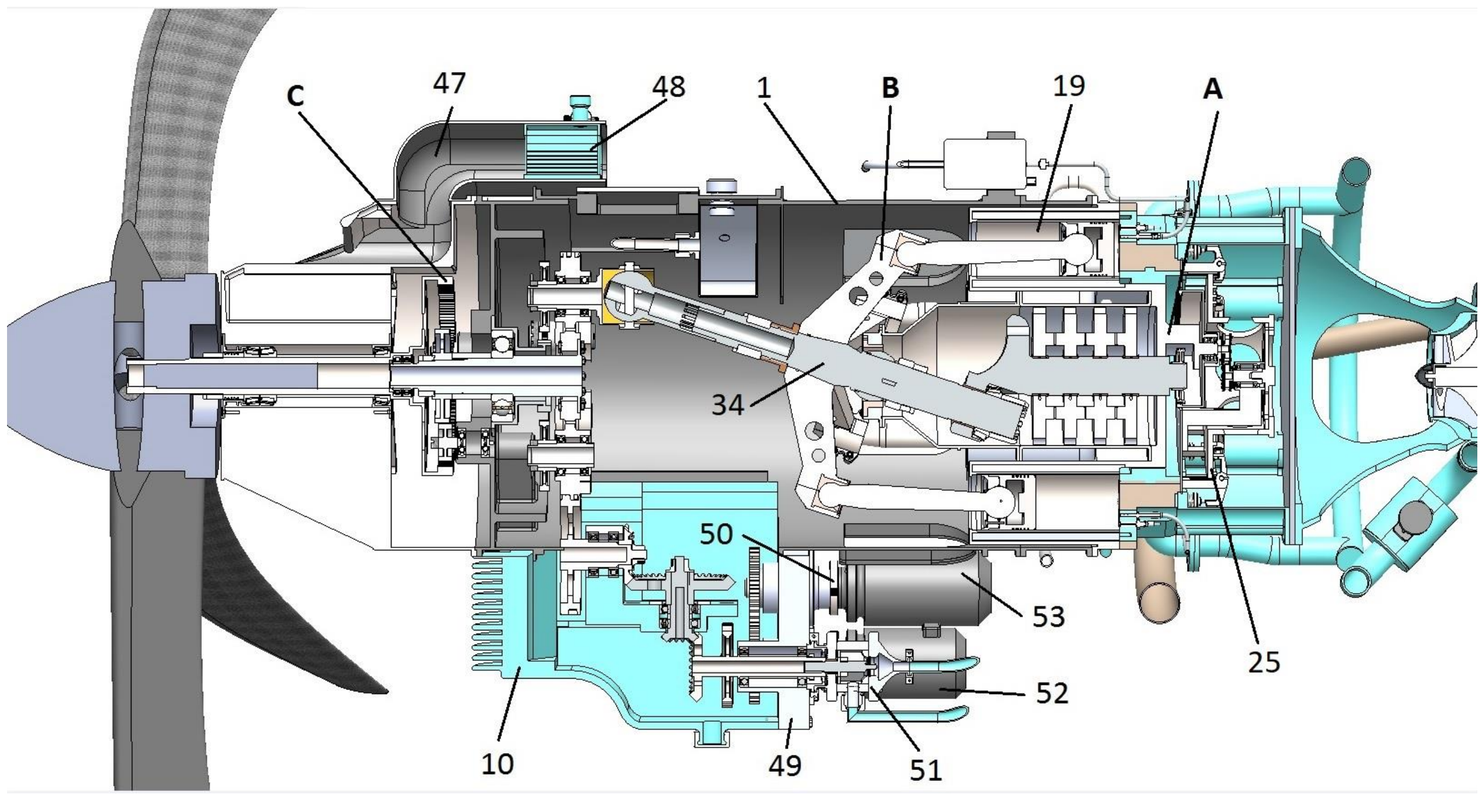
Author/s: Panaitescu Costin, Dediu Gabriel, Catana Razvan Marius

General description: The invention is referring to a new design of an internal combustion engine with horizontal arrangement of cylinders, an aeronautical piston engine type equipped with a propeller for aviation application, with six horizontal cylinders, a reduction gear and with a specific oscillating system to convert the translational movement of the pistons into the rotational movement of the propeller shaft.

Technical description: The invention proposal refers to a specific design of an aeronautical piston engine built with horizontally arranged cylinders, characterized by the fact that it is made of a sub-assembly (A) of the engine block containing the six horizontal cylinders (19), a cylinder head (13) with rotating disk (25) with cam, a sub-assembly (B) oscillating in three dimensions with a system to prevent the own rotation of the drive shaft (34) through two pinions (40) that move on a fixed pinion (41) to obtain a parallel plane rotation of the pinion (37) which moves in a rotational movement around the engine axis, and a subassembly (C) reduction gear to reduce the speed at the propeller shaft. The gear box (10) assure motion for the oil pump (6), hydraulic pump (7), cooling fluid drive pump (51), current generator (52) and starter (53). The engine holds the air intake manifold (11), intercooler (14), turbocharger (15), exhaust gas duct (12), and the cooling air duct (47) for water radiator (48) to assure the cooling of the engine cylinders.







Particularities:

1. Specific design and technical solution of horizontally arranged cylinders
2. Specific oscillating system for conversing the translational motion into rotation motion by removing the classical crankshaft
3. Specific rotary cam distribution system

Advantages: By design concept and technical solution of the invention it results certain main advantages such:

1. Reducing the frontal section of the engine by reducing the engine diameter
2. Engine lower drag force due the fact of reducing the frontal section
3. Higher working area of the propeller due the fact of reducing the engine frontal section
4. Increasing the propeller thrust due the fact of increasing the propeller working area
5. Possibility to use new propeller concept which provide a higher mass air flow for thrust

Contact: costin.pan@gmail.com, Phone: +40731207154; gabriel.dediu@comoti.ro; razvan.catana@comoti.ro;
220 Iuliu Maniu Ave, 061126 Bucharest 6, Romania PO 76, POB 174, Phone:+4 021/4340198, +4 021/4340240, Email: contact@comoti.ro, www.comoti.ro

NATIONAL INSTITUTE OF RESEARCH AND DEVELOPMENT FOR OPTOELECTRONICS

Accelerometric system for automatic triggering of control equipment mounted on vehicles at predetermined intervals of the distance traveled

Authors: M. Tautan, S. Miclos, A. Stoica, D. Savastru, R. Savastru

Patent no. RO130784/2022

D

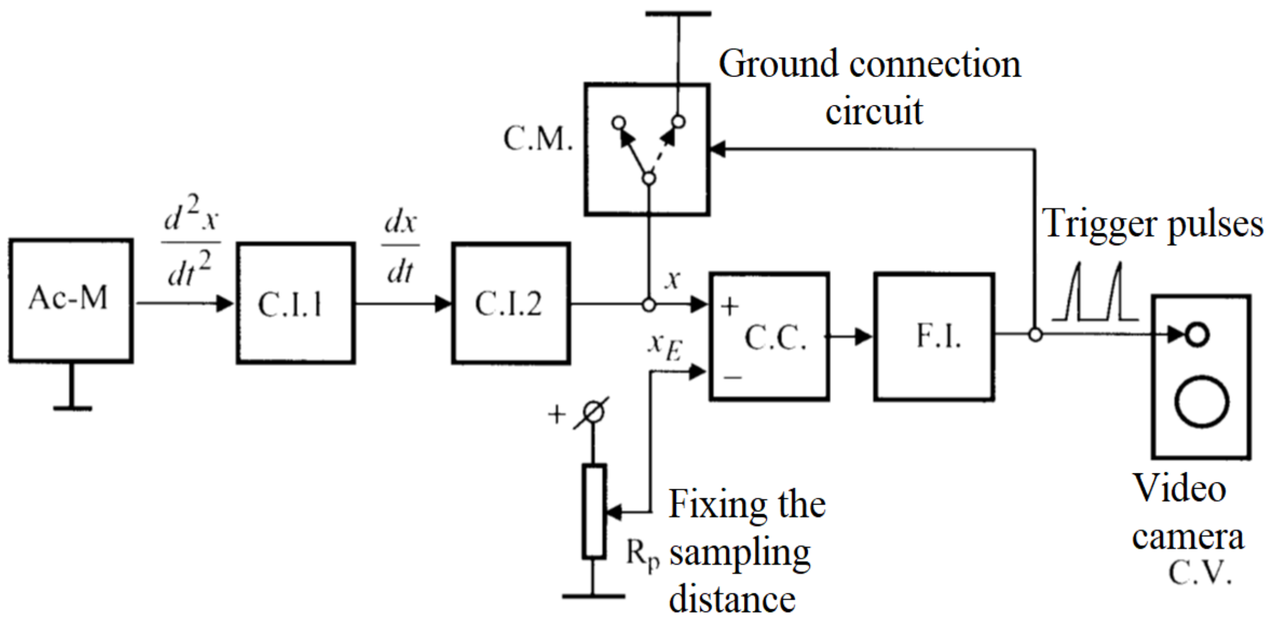
DESCRIPTION: The invention relates to an accelerometric system for automatic external triggering of control equipment, video cameras and radar scanners, mounted on vehicles that perform the testing of the asphalt layers of road arteries by automatically triggering this equipment at intervals of the distance predetermined by the operator in accordance with the regulations in force. To achieve this goal it is necessary for the odometrical transducer to consist of a rotary transducer capable of converting angular motion into digital pulses. Such a transducer, usually called an encoder, usually consists of a cylindrical body a flange, a shaft and an output connector.

NOVELTY: It transforms the acceleration of a vehicle, through successive integrations, in the distances that can be set by an operator in accordance with the standards in force, for the characterization of road arteries.

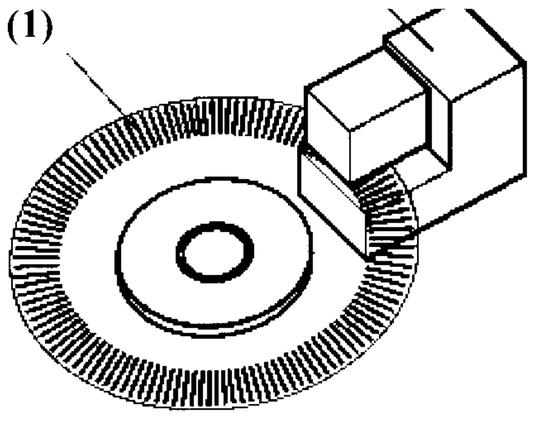
The invention has the following advantages:

❶ Elimination of errors due to tremors, oscillations, successive braking, etc. by double integration and by transmitting from the accelerometer only the accelerations on the X axis; ❷ The possibility of adjusting the trigger distances by the user in accordance with the standards in force; ❸ It uses operational amplifiers for integration processes - simplicity in operation; ❹ It presents very good stability with thermal variations - the use of professional electronic components; ❺ Wide flexibility in triggering trigger distances - from 8mm to 30cm; ❻ It can trigger directly or through processing systems (PC) control equipment, video cameras and radar scanners, mounted on vehicles that carry out testing of the quality of asphalt layers of road arteries.

APPLICATIONS: Testing the quality of the asphalt layers of the road arteries.



Principle: The system is based on the use in the configuration of:
-an accelerometric transducer (Ac M)
-two integrating circuits (CI1) and (CI2) which are configured to provide at the output of the second circuit a voltage proportional to the distance (traveled by the vehicle in current with respect to a previous reference
-input of a comparator block (CC) in opposition to a voltage adjustable by the operator
-a potentiometer (Rp) which thus fixes the prescribed sampling distance (xE)
-a pulse forming circuit (FI)
-video camera (CV)



(1) Disc with radial markings; (2) Scanning device

Contact: madalin@inoe.ro **+40726.216.353**

NATIONAL INSTITUTE OF
RESEARCH AND DEVELOPMENT
FOR OPTOELECTRONICS

Process and device for detecting ice on roads

Authors: D. Savastru, S. Miclos, A. Popescu, R. Savastru

Patent no. RO 130626

D

DESCRIPTION: The procedure is based on Raman spectroscopy of an area of the roadway in front of the vehicle. Water gives complex Raman spectra. Their analysis, together with changes caused by variations in temperature and / or pressure or the presence of solutions, is considered to be able to provide detailed information on the structure of liquid water. Raman spectroscopy is a promising method for remote sensing of ice, water and even its temperature.

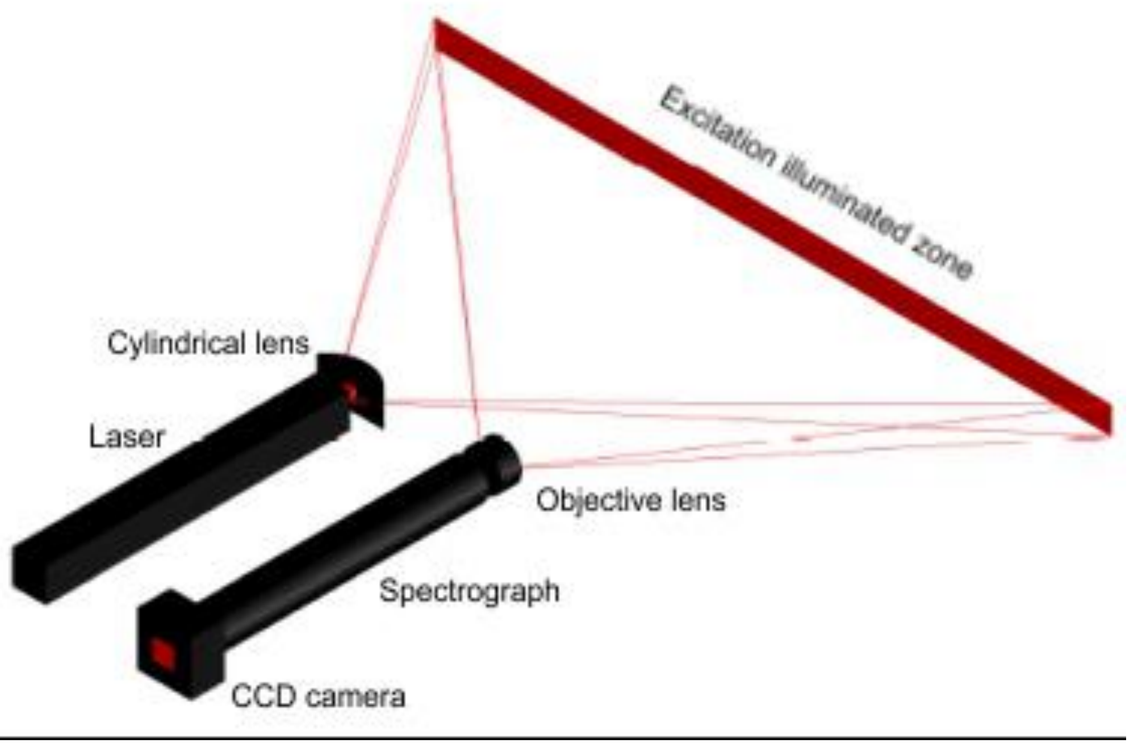
NOVELTY: Sensing the presence of ice on the road arteries on board a moving vehicle at a sufficient distance from it to ensure an adequate response time.

The invention has the following advantages:

1. Senses the presence of ice on the road artery;
2. The area where the presence of ice is sought is 100 m in front of the vehicle;
3. Can provide information on the temperature and thickness of the ice sheet;

The major drawback of the known method is that it does not detect the presence of ice or icing on the road artery but only signals the existence of a temperature low enough to allow the appearance of frost. However, the existence of favorable conditions for the appearance of ice or icing does not mean that the phenomenon actually occurred, much less its magnitude.

APPLICATIONS: Detection of the appearance of ice on road arteries or conditions favorable to ice.



Principle: Raman spectroscopy is based on the inelastic diffusion of monochrome light, usually from a laser that emits in the visible, near-infrared, or near ultraviolet field. Laser light interacts with molecular vibrations, phonons, or other excitations in the system, resulting in the energy of the laser photons being moved up or down. The movement of energy gives information about the vibrational modes in the system. Typically, the sample is illuminated with a laser beam. Light from the illuminated area is collected with a lens and sent through a monochromator. Wavelengths close to the laser line due to elastic Rayleigh scattering are filtered while the rest of the collected light is scattered on a detector. Modern instrumentation almost universally uses bandpass filters or high-pass filters for laser rejection and spectrographs and CCD detectors.

Contact: madalin@inoe.ro **+40726.216.353**

TOYOTA alternative propulsion systems

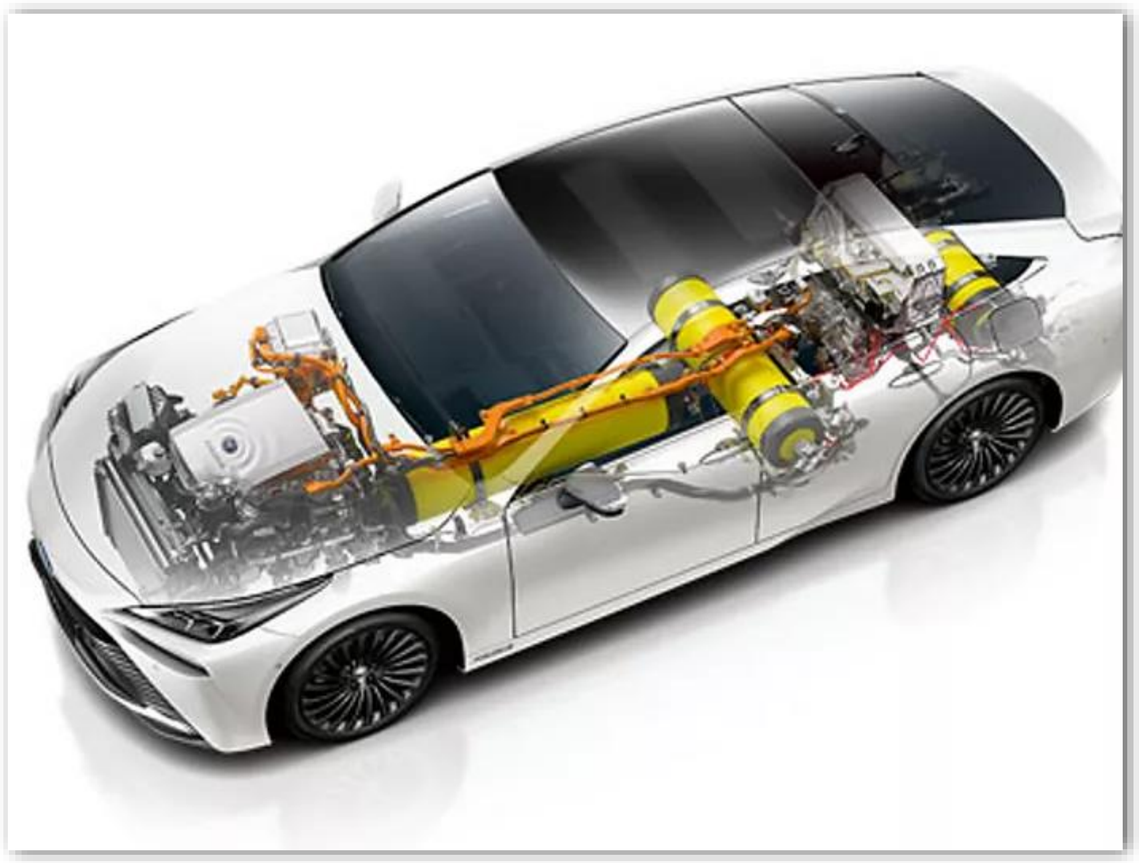
D

Student Project

Author: ***Leonard Nicolas MARARU; coordinator Prof. Corneliu BIRTOK BANEASA***

Hydrogen will not only change the future of transport, it will also change many other things. From the propulsion of cars, trains and ships to the heating of apartments - we are slowly migrating towards a hydrogen-based community. Because, unlike other energy sources, its only by-product is water.

Additionally, hydrogen is easy to store and transport in large quantities. Sustainable systems are needed to replace fossil fuels, whose extraction and burning have a negative impact on the environment. Hydrogen promises the greatest impact in the process of eliminating carbon emissions. It is an important alternative that brings us closer to the goal of a cleaner environment. Easy to refuel, offering an autonomy of over 500 km and without emitting anything but water.



TOYOTA electric vehicles with hydrogen fuel cells have the potential to revolutionize the way we drive. After launching the world's first hydrogen-powered car in 2014, it takes zero-emission fuel cell technology to new heights in the second-generation Mirai, with a new vision for clean mobility, which is on the road today. A fuel cell does not produce a large amount of electricity, so the Mirai combines several cells to power the electric propulsion motor.

The process is extremely efficient, over 80% of the hydrogen energy being converted into electricity, more than double the performance of a heat engine that wastes a good part of the fuel's energy in combustion.

As elementary as the working principle of hydrogen fuel cells is, as complex is the technology used to implement the solution in a vehicle, from the development and construction of the fuel cell unit to the design and realization of capable hydrogen tanks to withstand extremely high pressures (700 bars), having a high degree of impermeability. From the very beginning, Mirai was not an experimental vehicle, but a coherent proposal for alternative mobility, with a distinct design, with a high level of comfort and performance.



The maximum power of 154 HP and the torque of 335 Nm supported an acceleration from 0 to 100 km/h in 9.6 seconds, and the pleasant dynamic behavior benefits from the optimal distribution of the masses and the center of gravity close to the ground: the electric motor and the electronic unit control were placed on the front deck, fuel cells and a hydrogen tank under the seats, the second tank and the additional battery for storing renewable energy on the rear deck.

The dynamic and comfort characteristics, the specificity of the propulsion solution, the possibility of refueling with hydrogen in an interval close to a conventional car (3-5 minutes) and the autonomy of about 500 km have attracted the attention of public institutions and companies interested in "green" mobility.

Contact: leonard.mararu@gmail.com

Opportunity
CORNELIUGROUP Research-Innovation Association
Creation
Realization
INVENTCOR
Power of Creative Mind
Deva ROMANIA

COMOTI
ROMANIAN RESEARCH & DEVELOPMENT INSTITUTE FOR GAS TURBINES
220D Iuliu Maniu Ave., 061126 Bucharest 6, ROMANIA PO 76, POB 174
Phone: +4 021/4340198, +4 021/4340240; Fax: +4 021/4340241
E-mail: contact@comoti.ro, www.comoti.ro
Nr. Of. Com. Reg. J40/4880/1997, CIF: RO445238

FIXED-WING UAV WITH VERTICAL TAKEOFF/LANDING SYSTEM WITH TRI-ROTOR PROPULSION SYSTEM AND METHOD OF INTERCEPTING THE SPECIFIC SOUND OF A HEAT ENGINE CHAINSAW

Patent A/00305

D

Authors: Tiberius-Florian FRIGIOESCU, Gabriel-Petre BADEA, Victoras-Florentin ANGHEL, Grigore CICAN, Mihaela-Raluca CONDRUZ, Marius-Adrian DIMA

The present invention refers to a fixed-wing unmanned aerial vehicle featuring a vertical take-off/landing system (VTOL), a tri-rotor propulsion system, and a technique for detecting the distinctive auditory emissions produced by a thermal engine-powered chainsaw. These encompass a central fuselage region, three sections constituting the tri-rotor propulsion system's rotors, and two sectors, each housing a fixed wing equipped with control surfaces known as elevons. The tri-rotor propulsion setup comprises two front-mounted engines and an additional engine located within the dorsal region of the fuselage, replacing the conventional tail. Furthermore, the device incorporates an acoustic system encompassing four microphones, accompanied by a data processing computer housing an AI program meticulously trained to discern the precise acoustic signature emitted by chainsaws. This AI program enables the identification of the specific chainsaw noise profile and facilitates the determination of the source's directional orientation. Consequently, in collaboration with the autopilot system, the aircraft is autonomously guided toward the source of the detected acoustic emissions.



Technical details

- Hover flight time: over 3 hours
- Mass: 15 Kg
- Range of control: 15 km
- Cruise speed: 70 km/h
- Wing span: 4 meters
- 4 microphones on board
- Payload: Video Camera
- Capable of autonomous flight



Features

- Vertical take-off and landing capable
- Innovative tri-rotor system
- Autonomous flight over the airspace above the forests in order to intercept and locate the sound(using AI) produced by chainsaws to combat illegal tree cutting
- Capture meteorological data (pressure, temperature, humidity)

Contact: contact@comoti.ro
Mobile: 021-434 02 40

This invention was funded by Romanian Ministry of Research, Innovation and Digitization, within PTE program ENFORCING PN-II-P2-2.1-PTE-2021-0369

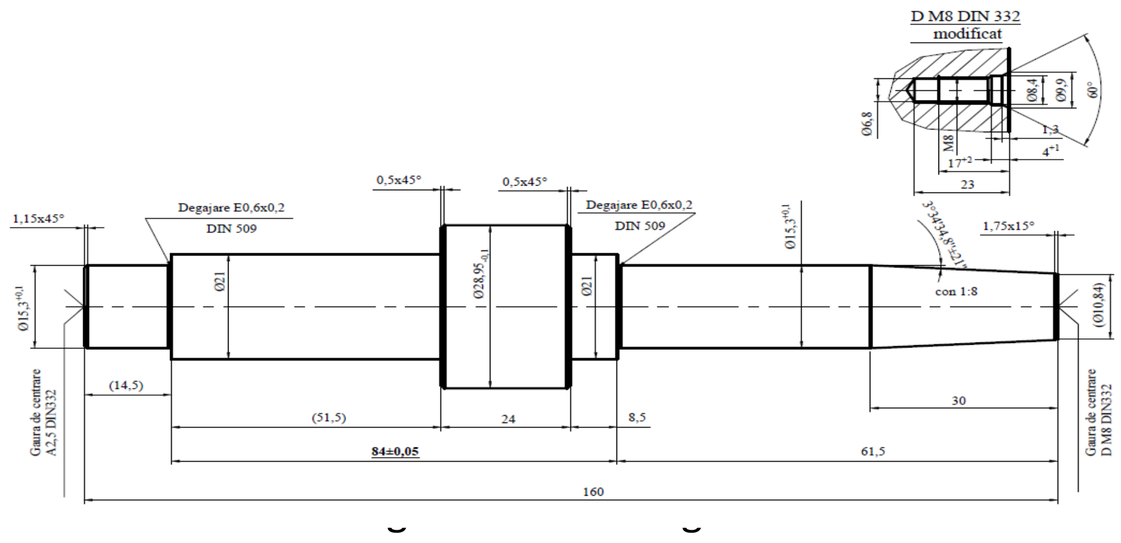
Shaft intended for the transmission of ATVs

Research project

Author: Ludvic Kasler

D

This study present aspects of the tree processing technological itinerary RITZELWELLE made of steel brand 17CrNiMo6. A lot of operations were performed: cutting, turning, milling, marking, heat treatment, rectification and final control.

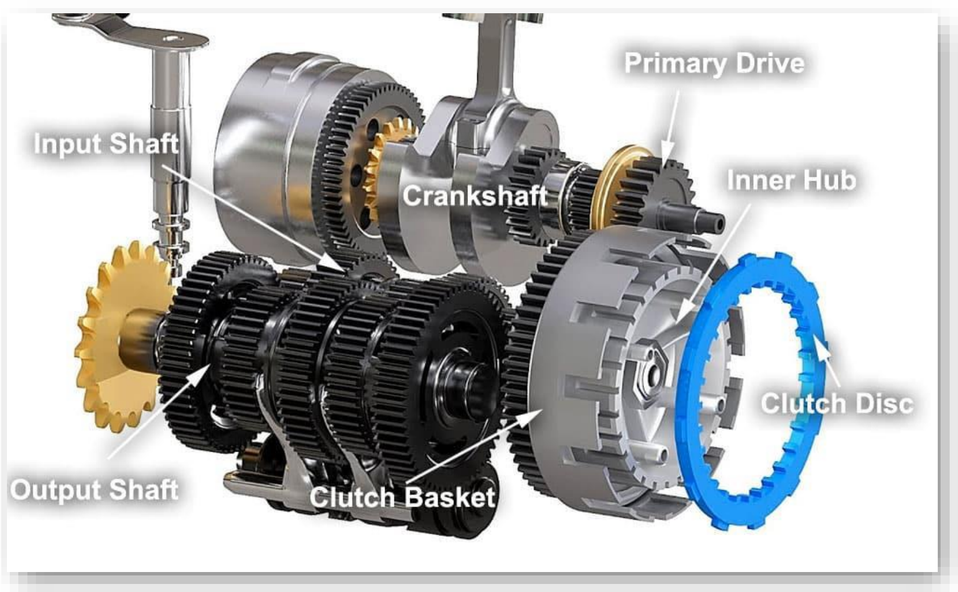


Consumer satisfaction depends on a multitude of factors: his personality and culture, his habits, his standard of living, his physical abilities and intellectual, health status and a multitude of other factors that depend on the individual individual. In other words, product quality is ensured in the production process, but manifested in the sphere of consumption. As such, there is a noticeable difference in quality production (manufacturing) and product quality.

Human resources constitute an active factor, unlike the other factors that acts passively, in the achievement of quality, with attributions in the fields of management, research and design, production, logistics, marketing and service provision.

Raw materials and materials must meet the specifications in point of qualitatively, to be ensured rhythmically and properly stored.

Equipment and installations must work within the limits of precision and to technically corresponds. In order not to negatively affect the quality of the benchmarks and products, these machines have fixed tolerances that cannot be exceeded. The quality of the machines is given by technical, economic and functional characteristics.



Img. 2 Manual transmission



Img. 3 Automatic transmission

Contact: albertelectronics@yahoo.com

Opportunity
CORNELIUGROUP Research-Innovation Association
Creation
Realization
INVENTCOR
Power of Creative Mind
Deva ROMANIA

ISIM TIMIȘOARA
National Research & Development Institute for Welding and Material Testing - ISIM Timișoara

Welding device for underwater friction stir welding method
Patent application No. A/00696/19.11.2021, RO137449 (A2)

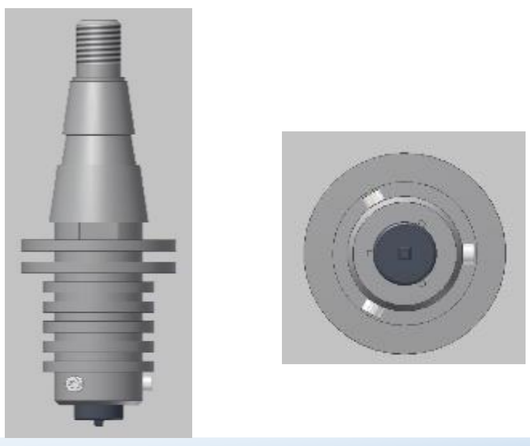
D

Author/s: Lia-Nicoleta Boțilă and Radu Cojocaru

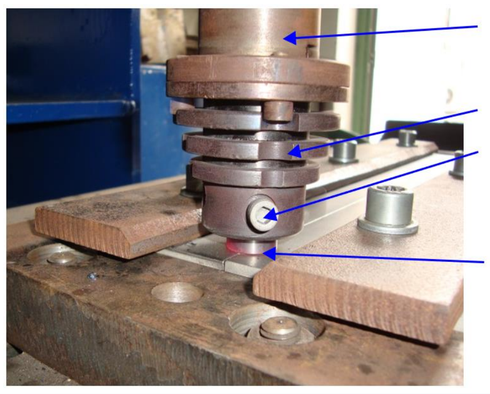
Friction stir welding performed in a liquid environment (Submerged Friction Stir Welding – SFSW) aims to reduce the amount of heat generated (sometimes in excess) in the case of classic FSW welding of some metallic materials and to reduce the formation of brittle intermetallic compounds.

Object of the invention:
Development of a welding device usable for the submerged friction stir welding (SFSW) method.

Current technical situation:
The geometry of the currently used welding device does not offer the possibility of adequate cooling of the welding tool, and depending on the welding application, excessive overheating of the tool may occur, which may lead to its damage.

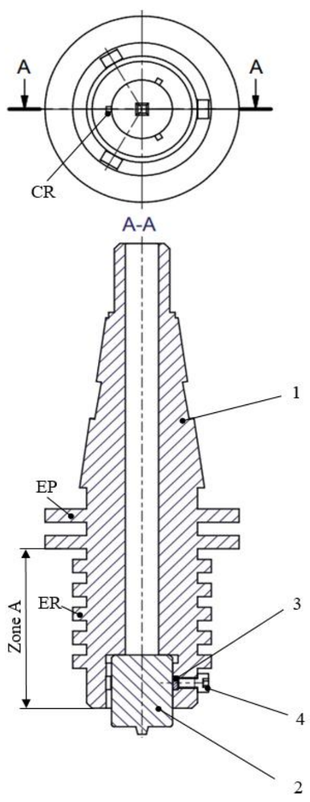


New welding device for SFSW welding



Current welding device integrated on the FSW machine

The technical problem solved by invention:
- welding device made of non-corrosion materials, that can be integrated on the FSW welding machine (by Morse taper clamping, on the main shaft of the welding machine) and allowing the welding tool to be fixed in the device body;
- ensuring the technical conditions necessary for underwater FSW welding of ferrous and non-ferrous metal alloys, regarding the device, which represents the interface between the welding machine and the FSW welding tool;
- the shape of the device and the liquid working environment allow limiting the overheating of the welding tool and the materials to be welded, compared to the classic FSW process carried out in the ambient environment (air).



Description of the new device :
During the welding process, a part of the body of the device (1), made of corrosion-resistant steels, is in water (zone A).
In this area, the constructive solution of the device body ensures a large contact surface with water, due to the geometry of the (ER) cooling elements.
The (EP) protection elements provide splash protection for the part of the device body that acts above water, as well as the main shaft of the FSW machine.
The body of the device is provided internally with 3 equidistant (CR) cooling channels that facilitate the access of water along the side surface of the tool to increase its cooling and that of the welding device.
The FSW welding tool (2), made of corrosion-resistant steels or sintered tungsten carbides, is fixed in the body of the welding device by means of three clamping pad type contact elements (3) and three screws (4).

Advantages:
- the possibility of easy integration on specialized welding machines;
- due to the working environment (water) and the constructive solution that ensures a large contact surface with water, the overheating effect of the welding tool is reduced, thus ensuring an increase in its service life and protecting the bearings of the main shaft of the FSW machine by reducing the temperature;
- allows underwater FSW welding of sheets made of light alloys having 2-10 mm thicknesses, of copper alloys and steels respectively, with 1.5 - 5.0 mm thicknesses.

Contact: ISIM Timişoara, 30 Mihai Viteazu Bv., 300222 Timişoara, România
• tel.: +40 256 491831 • www.isim.ro • isim@isim.ro, lbotila@isim.ro

Establishing a Mobile Car Wash Business at Onaizah in 2023

D

Research project

Ziyad Mohammed Al Mazyad, Bader Abdullah Alaqeel

Supervised by Dr. Maged Farouk



Mobile Car Wash Business

Mobile car wash business offers convenience by providing car washing and detailing services at the customer's chosen location. It is a flexible business model that requires mobile equipment and a comprehensive understanding of car care practices.

10 Steps to Start a Mobile Car Wash Business

1



Research your Business Market

Equip yourself with the knowledge of all the latest technology, service know-how, and equipment that you might need before entering the car washing industry.
Find out what types of customers are availing mobile car clean service and how often they do it.

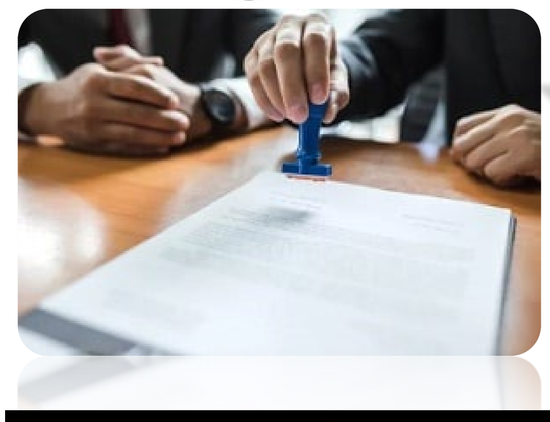
2



Write your Business Plan

Create a detailed mobile car wash business plan that outlines everything from business goals to what kind of customers you want to attract.

3



Get the required Legal Permissions

Register your business with the relevant authorities. **Get** your tax ID, Setting up your business. **Pay** taxes on time. **Secure** the necessary insurance policies to protect your business

4



Get the required Legal Permissions

Scout a place to be your office, especially if you will be bringing in a team for your business.

5



Buy or Lease Your Equipment

Create a shopping equipment list for your washing services equipment and detailing tools that you will be needing such as office supplies, cleaners' vacuum, pressure washer, and more.

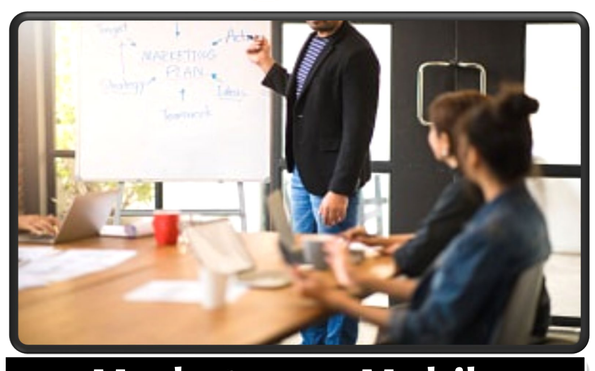
6



Build Your Team

For that type of business that requires a lot of managing, knowledge, and applying elbow grease, a team of professionals will be a huge help.

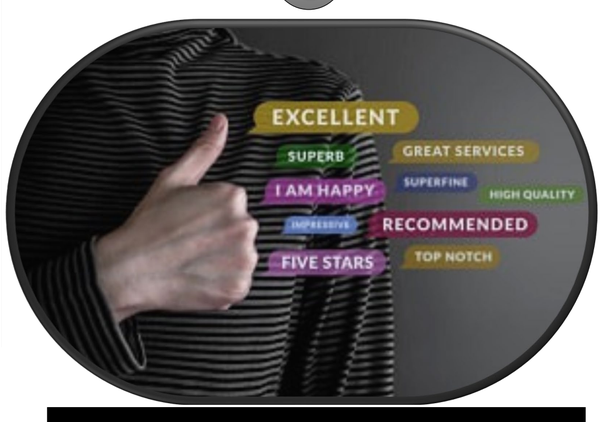
7



Market your Mobile Carwash Startup

Write blogs and posting content on social media sites. **Use** everything you can to spread the word.

8



Provide Exceptional Customer Service

Offer good customer service before, during, and after each service. **Provide** updates to the customer during the service. **Have** an honest policy on returns/refunds. **Make sure** that all staff members are knowledgeable about the job they do.

9



Plan for Equipment Maintenance

10



Count your Profits and Grow your Business

Contact: Dr. Maged Farouk
Onaizah Colleges, Saudi Arabia
& Workers University, Egypt
magedfarouk5@gmail.com
WhatsApp:+966560685792

TIMIȘOARA

National Research & Development Institute for Welding and Material Testing - ISIM Timișoara

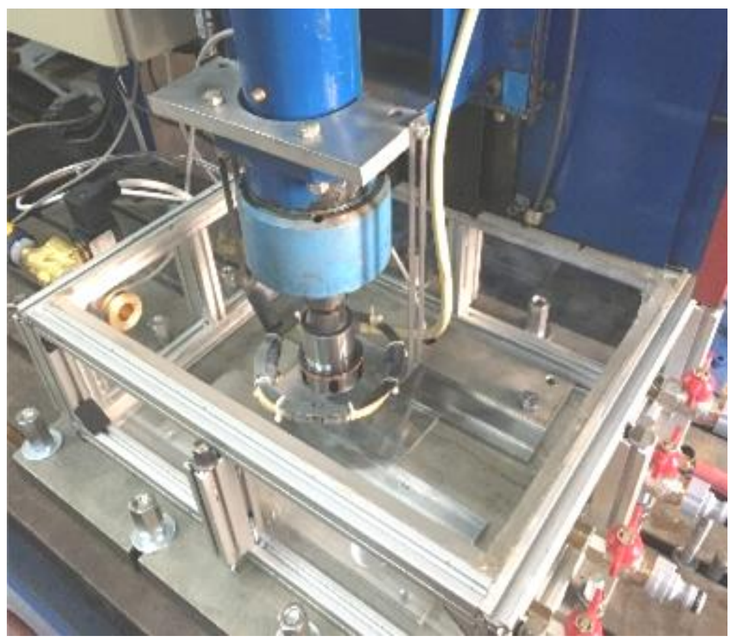
System for the application of the friction stir welding in liquid environment
Patent application No. A/00697/19.11.2021, RO137450 (A2)

D

Author/s: Radu Cojocaru and Lia-Nicoleta Boțilă

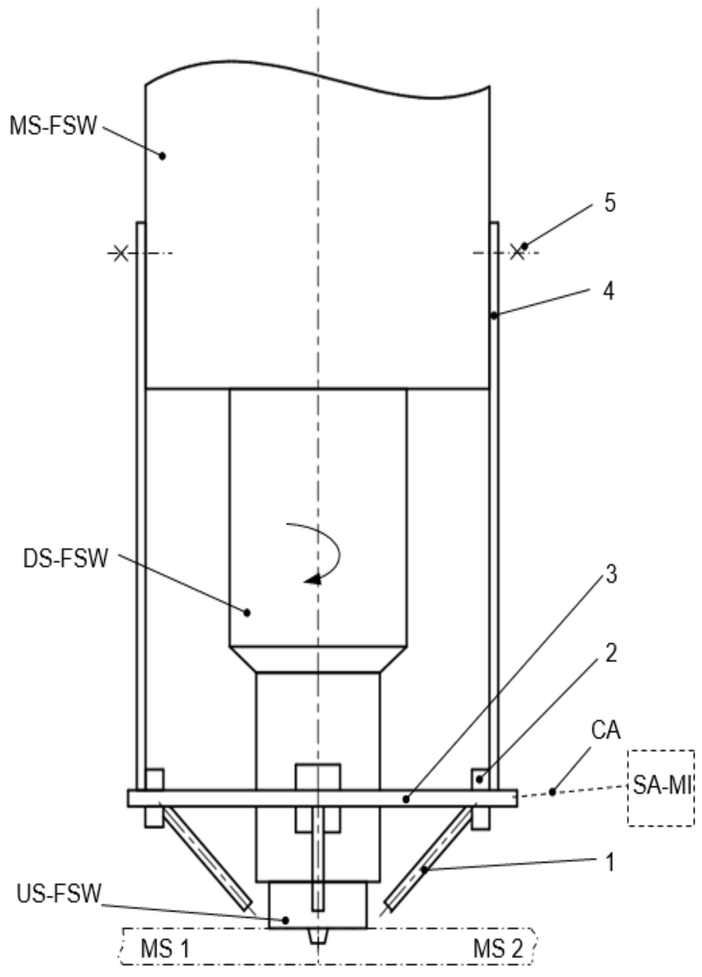
Friction stir welding applied in a liquid environment (Submerged Friction Stir Welding – SFSW) aims to reduce the overheating of the tool and of the welding device, with positive effects on extending their service life and improving the mechanical properties of the welded joints

Object of the invention:
Development of a system to ensure the cooling of the welding tool and welding device, usable for the SFSW (Submerged Friction Stir Welding) method of friction stir welding in a liquid environment.



Technical problem solved by invention:
- making a system of special construction that ensures the controlled cooling of the FSW tool, of the welding device and of the joining materials (in the area of the welding tool action) during the welding process;
- ensuring the technical conditions necessary to protect the SFSW welding tool and the materials to be joined (in the area of action of the welding tool) during the welding process from overheating by forcibly cooling them by spraying with water;
- the constructive form of the cooling system allows for easy integration on a FSW welding machine and can provide continuous or intermittent water spray in several directions oriented towards the welding tool.

Description of the water cooling system:
The cooling system for friction stir welding in liquid environment contains:
- (1) water spray nozzles, equidistantly arranged (4 pcs.) around the welding tool (US-FSW) mounted in the welding device (DS-FSW), integrated on the welding machine (MS-FSW). They are mounted at an angle $\alpha = 45^0$ relative to the axis of symmetry of the welding tool (US-FSW). Role*:* directing water (by spraying) on the welding tool and on the upper surfaces of the welding materials (MS1) and (MS2).
- (2) modules for positioning, fixing and adjusting spray nozzles (4 pcs.). Role: supporting the nozzles and allow the adjustment of their angular position in the vertical plane in relation to the reference angle (with $\pm 15^0$).
- (3) circular support. Role: supporting the modules (2) and for distributing water to the nozzles, fed from an water supply circuit (CA). Water is delivered at the prescribed temperature from a supply source equipped with a heating module (SA-MI).
- (4) mounting bracket on the FSW machine (MS-FSW). Role: integrating the cooling system into the assembly of the FSW welding machine.
- (5) mechanical assembly elements. Role: to attach the cooling system to the welding machine (MS-FSW).



Advantages:
- the possibility of easy integration on specialized welding machines;
- the constructive solution of the system and the working environment (water) ensure uniform cooling, contributing to:
  - reducing the overheating effect of the tool and of the welding device, respectively to an increase in its service life, also protecting the bearings of the FSW welding machine main shaft by reducing the temperature;
  - reducing the overheating effect of the welding materials, aiming at improving the mechanical properties of the welded joints;
- usable for FSW welding in liquid environment of a wide range of couples of similar and dissimilar metallic materials (lightweight alloys, steels, copper alloys, etc.).

Contact: **ISIM Timişoara, 30 Mihai Viteazu Bv., 300222 Timişoara, România**
• tel.: +40 256 491831 • www.isim.ro • isim@isim.ro, lbotila@isim.ro

TIMIȘOARA

National Research & Development Institute for Welding and Material Testing - ISIM Timișoara

REAL-TIME EVACUATION SYSTEM FOR ABRASIVE MATERIAL SLUDGE

Patent application No. A/00586/17.09.2020, RO135579 (A2)

D

Authors: Ion-Aurel PERIANU, Emilia BINCHICIU, Gabriela-Victoria MNERIE

The **technical field** in which the invention is used is the machine construction industry, for the production of various cut products under dimensional precision conditions, in accordance with the technical specifications of the respective products.

The product that is the subject of the invention refers to a real time evacuation system for abrasive material sludge for an abrasive waterjet cutting installation These installations are equipped with a collector tank in which the abrasive sludge material is deposited during the processing.

The invention proposes an abrasive sludge material evacuation system, as follows:

- A predetermined high pressure water pipe circuit with eductor nozzle is positioned in the tank of a n abrasive waterjet cutting installation, connected to the water network and additionally to a water buffer tank for high flow rate;
- The system is positioned inside the cutting tank and is equipped with a number of connection eductor nozzle outlets through which pressurized water is pumped having a powerful mixing effect for the collector tank contents;
- The suspension water sludge mixture is then pumped into a decanter sludge tank for storage and distribution

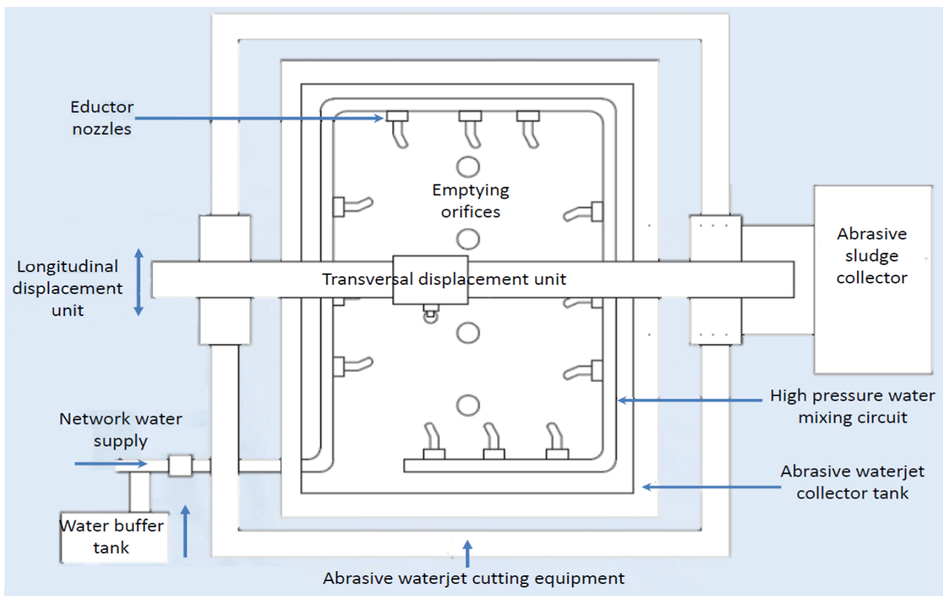


Figure 1. *Diagram of the proposed real-time evacuation system for abrasive material sludge*

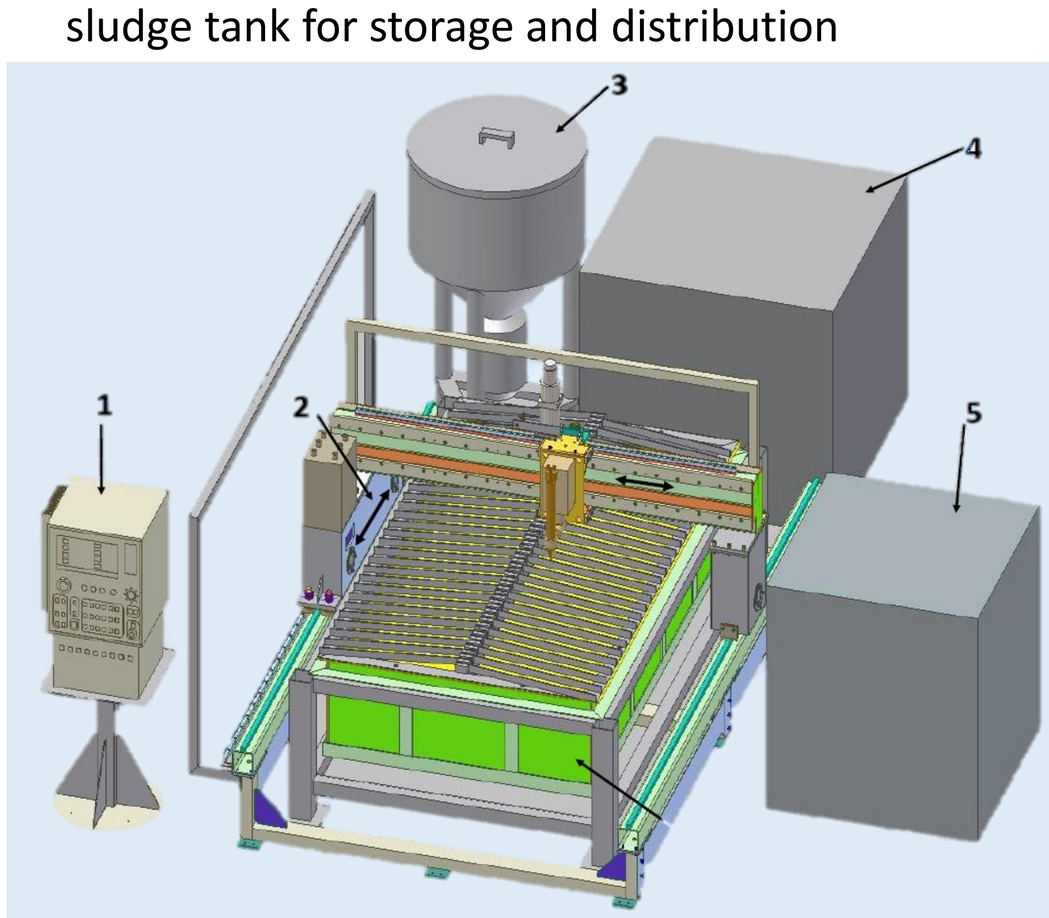


Figure 2. *Overview of water jet and abrasive cutting installation: 1 - CNC system, 2 - cutting gantry, 3 - abrasive hopper, 4 - pressure pump, 5 - water and abrasive sludge collector hopper, 6 - cutting tank – fitted with the new solution equipped with a system for agitation and evacuation of the abrasive sludge material through a pressurized water system*

By implementing this system, there will be a process of streamlining the abrasive waterjet cutting operations, by reducing the maintenance time of the processing installations through these procedures.

The technical problem solved consists of the need to obtain an efficient system for evacuating water and sludge abrasive material in a shorter period of time, in terms of value and under conditions of quality that correspond to the technical documentation regarding the technology for producing the processed products.

After a certain amount of processing time, the working collector tank of the equipment must be emptied of the abrasive sludge material, which accumulates, clogs, and solidifies The evacuation of the tank is done either manually or with a scraper system, in both cases being a time consuming operation stopping the use of the equipment.

By implementing the proposed solution the necessary agitation of the technological water together with the abrasive sludge from processing is obtained in a suspension form and this mixture of water sludge is eliminated through the drainage holes fitted in the lower part of the tank into an auxiliary collecting container through the means of dirty water pumps From there, the water is discharged, and the sludge abrasive material is stored for other uses.

The corresponding valves for the drainage holes are subsequently activated, thus closing the tank

After completing these steps, the tank is filled with clean water from the existing network, and the installation is thus prepared for the next processing activities After filling the tank with water, the connection pipes, also equipped with valves, are closed.

Advantages

- reducing maintenance times for the abrasive waterjet cutting equipment;
- increasing productivity operating times will be increased, creating the possibility of handling a greater number of pieces in the same time period;
- the system can be customizable to different types of abrasive cutting machines or implemented on existing ones.

Contact: ISIM Timişoara, 30 Mihai Viteazu Bv., 300222 Timişoara, România

• tel.: +40 256 491831 • www.isim.ro • isim@isim.ro, aperianu@isim.ro

Research concerning the development of 3D printed high entropy alloys for the construction of components subject to severe wear and vibration

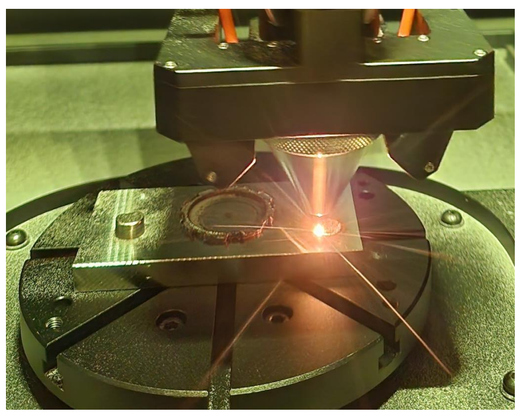
D

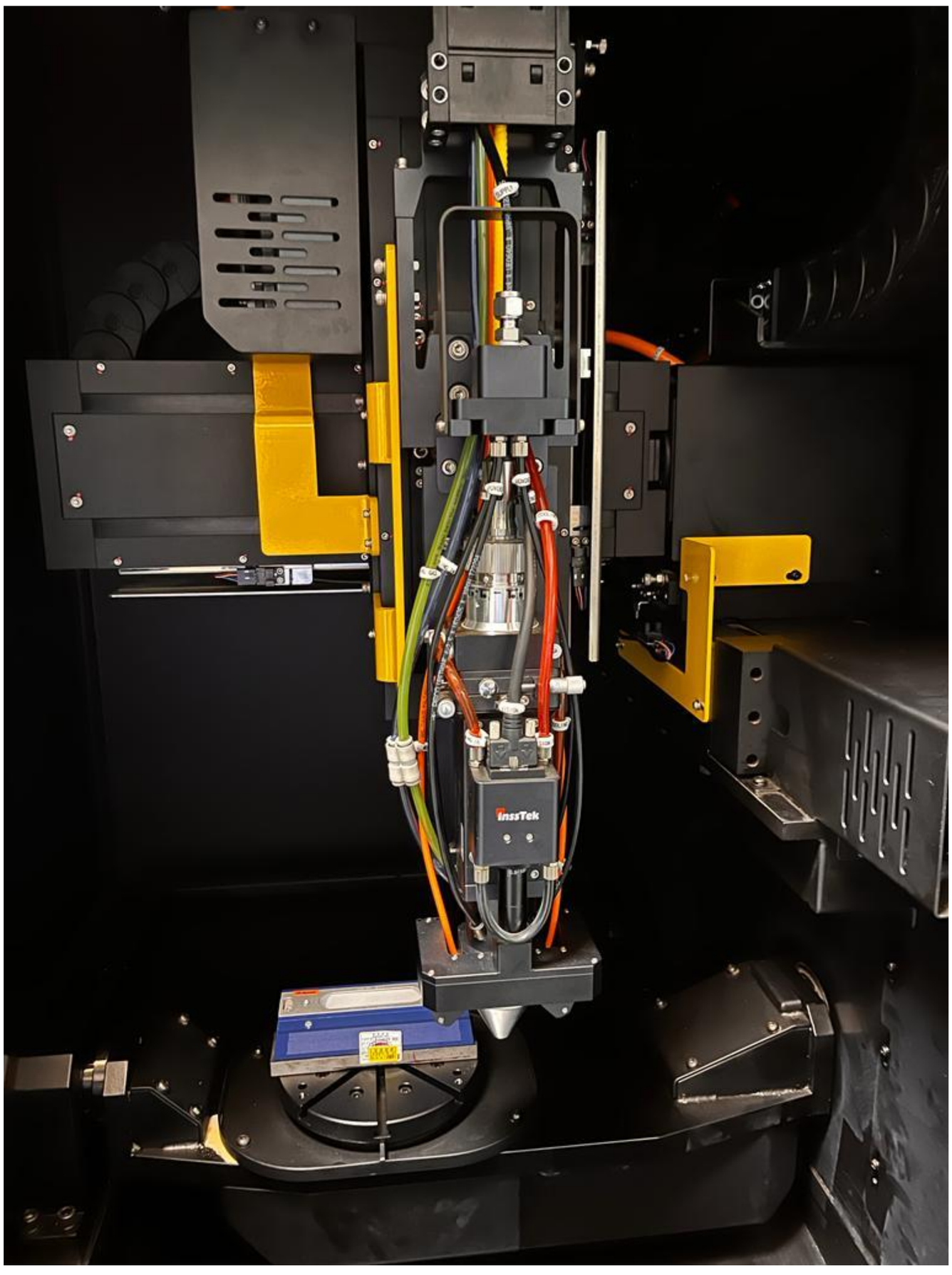
Project numer: PN 23 37 01 03

Project manager: Nicușor-Alin SÎRBU

Program objective:

- Development of innovative functional materials, advanced manufacturing and eco-technologies





Purpose / objectives:

- Development of 3D printed high entropy alloy for the construction of severely wear and vibration stressed components;
- Development of manufacturing technologies and innovative products through 3D printing.

Estimated results:

- 3D printed high-entropy alloys for the construction of components subjected to severe wear and vibration;
- 3D printing technologies for the construction of components subjected to severe wear and vibrations;
- Innovative products with similar or dissimilar structure (layer by layer).

Project manager: Dr. eng. Nicușor-Alin SÎRBU; e-mail: asirbu@isim.ro

Contact: ISIM Timişoara, 30 Mihai Viteazu Bv., 300222 Timişoara, România
• tel.: +40 256 491831 • www.isim.ro • isim@isim.ro

Acknowledgements: The paper was elaborated in the frame of the project PN PN 23 37 01 03 entitled " Research concerning the development of 3D printed high entropy alloys for the construction of components subject to severe wear and vibration" financed by the Ministry of Research and Innovation, in the frame of Nucleu Program of ISIM Timisoara (Advanced research on the industry of the future, Inno-SIM 2023-2026, contract 16 N/2023).

The study and optimization of the behavior and energy absorbed in the frontal impact by a rectangular metal workpiece with an Origami Core

Scientific Research Project

Authors: Robert-Marian BLEOTU, Cosmin PREDA

Coordinator: Professor Aurel Mihail TITU

D

INTRODUCTION

Due to the rapid development of technology and also the evolution of human beings, the number of cars purchased is continuously increasing. Together with this increase, the number of road accidents that lead to the injury or even death of passengers also increases. Thus, the safety offered by the vehicle has become the main challenge of engineers and researchers. For impact resistance verification, in the 1970s, car manufacturers introduced physical testing. As technology developed, finite element simulation replaced physical testing. This helps reduce production costs. Thus, there is no longer any need to destroy vehicles or their various components. Another goal of car manufacturers is to replace heavy materials (steel) with light materials (aluminum, magnesium and their alloys). This is due to the current world trend to produce lighter, greener, cheaper and safer vehicles. The challenges of improving safety and at the same time reducing greenhouse gas emissions have become a priority objective for vehicle manufacturers.

The paper aims to use origami techniques to optimize the constructive shape of the side member. The "Origami Engineering" technique intersects the art and the engineering in a new concept that greatly helps researchers to obtain complex shapes with very good capabilities such as: compaction, reduction of total mass or absorption of internal energy.

To fulfill the main purpose of this paper, the frontal impact behavior of thin-walled tubes having different design characteristics was studied. After analyzing them, the core of the designed spar was designed and analyzed using the Origami Engineering technique. At the end of this study, the design and finite element simulation of a new spar concept was carried out.

METHODS

The position of the side members in the resistance structure

The side members are metal bodies, usually made of aluminum or steel. They are located in the front of the vehicles and are mounted by removable or non-removable assembly following the chassis. Their role is to ensure the highest energy absorption in the event of frontal impact, but also to support the assembling of certain auxiliary components of the vehicle.

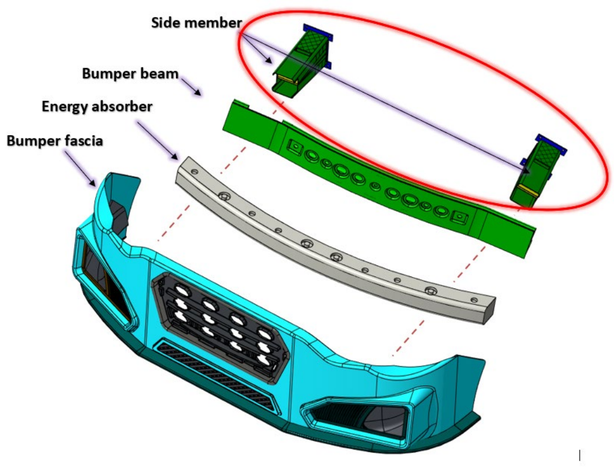


Figura 1. The position of the side members in the resistance structure

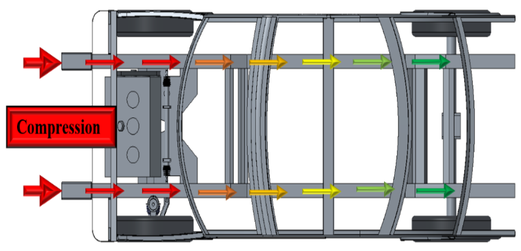


Figura 2. The side members position and stress.

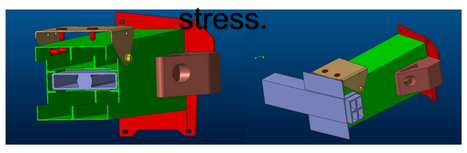


Figura 3. Side members

3D models

In order to fulfill the principles of sustainability, an attempt will be made to reduce the total mass of the side member. This will be achieved by replacing its additional bodies that have the role of stiffening the side member with lighter structures made by Origami Engineering technique. 3D models were made for: thin-walled tubes (square, circle, triangle, hexagon), origami structure, side member prototype. The material from which 3D models were made is aluminum alloy: Aluminium 6063.

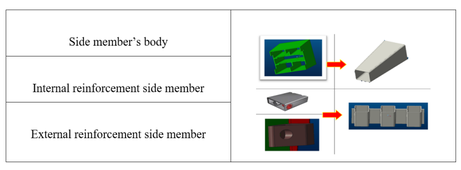


Figura 4. Application of the principles of sustainability.

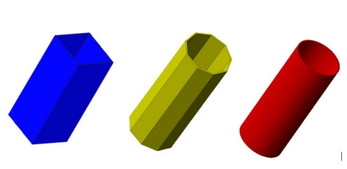


Figura 5. Thin-walled tubes

Mechanical properties	Value
Density [kg/m³]	2700
Young modulus (GPa)	70
Yield Strength (MPa)	214
Tensile Strength (MPa)	271
Poisson's Ratio	0.33

Figura 6. Mechanical properties – Aluminum 6063

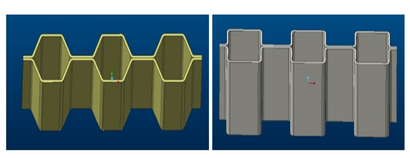


Figura 7. Form the cell

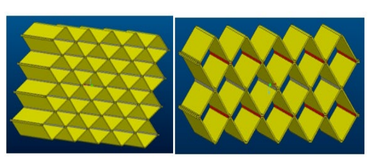


Figura 8. Origami Core

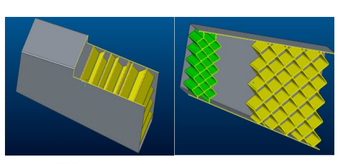


Figura 9. New prototype

RESULTS

Cross section of the tube ***Bending radius*** ***Bending angle***

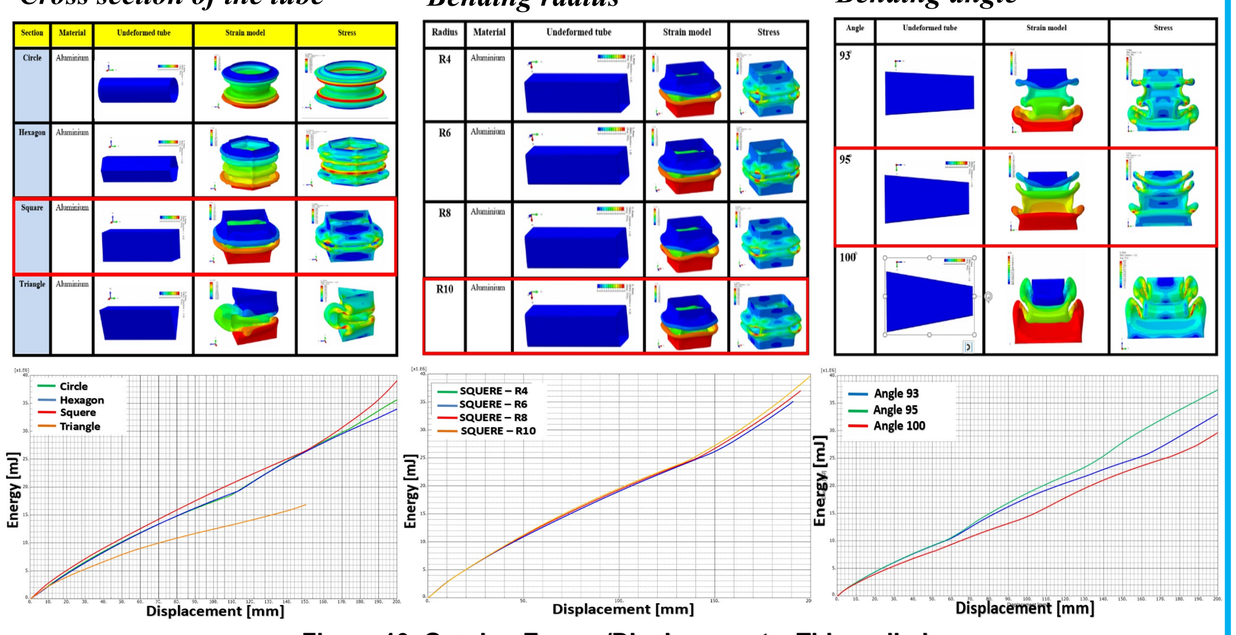


Figura 10. Graphs: Energy/Displacement – Thin walled tubes

Cell shape **Origami Core** ***Side member prototype***

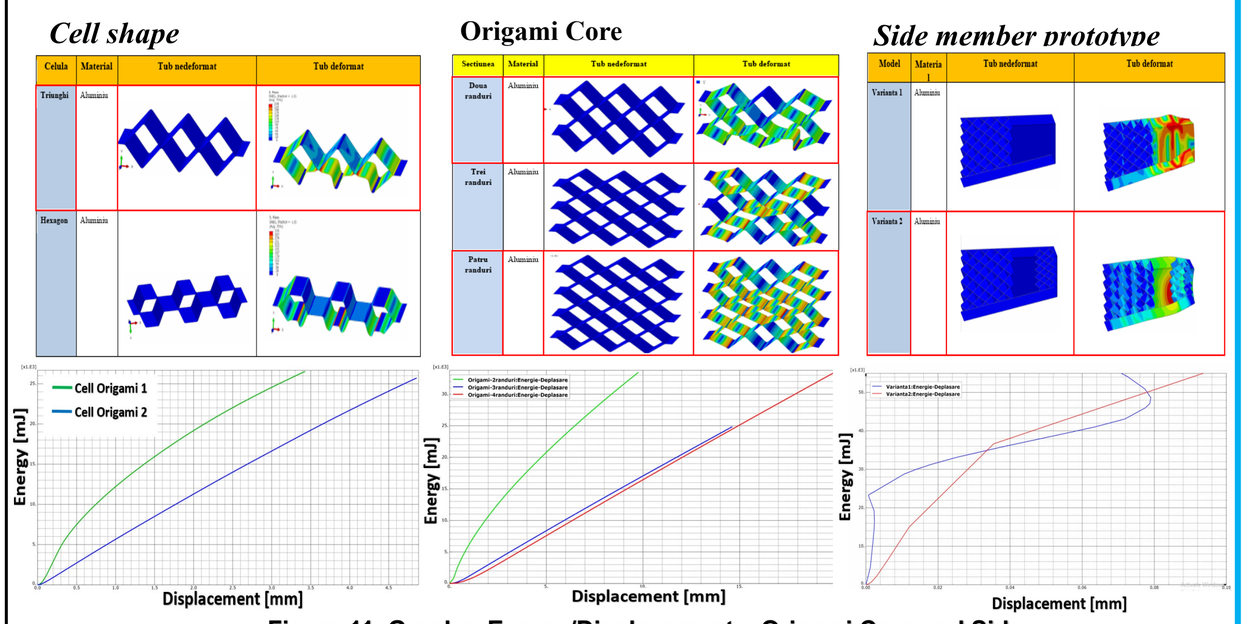


Figura 11. Graphs: Energy/Displacement – Origami Core and Side member

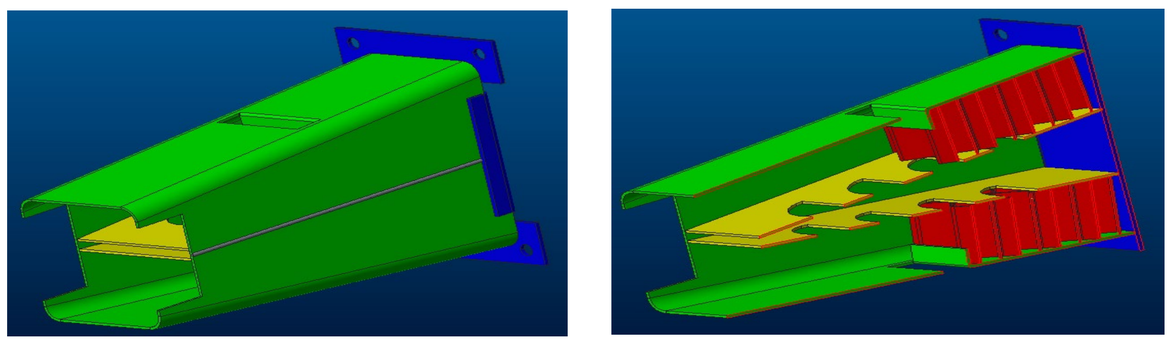


Figura 12. 3D model: New side member prototype

CONCLUSIONS

- the tube with a square cross-section absorbs the largest amount of energy was carried out: 39000 J;
- as the profile radius increases, the energy absorption capacity increases. The 10 mm radius tube achieved the best result: 40000 J;
- the tube with the 95 degree angle obtained the most favorable result: 37000 J;
- the square-shaped origami cell absorbed a larger amount of energy compared to the hexagon-shaped cell: 27 J;
- the higher the number of rows, the more energy the origami structure absorbs when moving the material: 35 J;
- side member in which two origami structures are used absorbs a greater amount of energy at the end of material displacement ;
- side member weight has been reduced by using origami engineering structures.

Contact: „Lucian Blaga" University of Sibiu, PATLIB Centre of Sibiu, 4 Emil Cioran Street, Room IM 100, Phone +40 744 390 290, mihail.titu@yahoo.com

Semi-Automatic Cleaning Device Unit

Scientific Research Project

Authors: Cisteian Silvana Denisa, Cornea Gabriela, Bitea Alexandu Paul
Coordinator: Professor Aurel Mihail TITU

D

Description: *The device is powered by two Li-ion batteries, with a maximum capacity of 20000mA mounted on the lower part of the support. It is equipped with a tank supplied with clean water and cleaning solution plus an electric pump that serves to create the necessary pressure and the water is sprayed through ten nozzles. The method of taking up the carpet is made by a system of rollers arranged all around, actuated by an electric motor, and the*
release of water is done through a process similar to rolling with the help of two cylinders positioned horizontally, the released water being taken over by a concave tray up to the gray water tank. To clean the press, there is a button built into the upper part of the device that can be easily operated.

APPLICATIONS:

To create this product, we started from the idea of the conventional process of cleaning the presses and arrived at a semi-automated cleaning process. Using the conventional process, the time for cleaning and drying the press is about an hour and a half, while choosing a semi-automatic cleaning process will reduce the time considerably and this process takes about 40 minutes



ADVANTAGES:

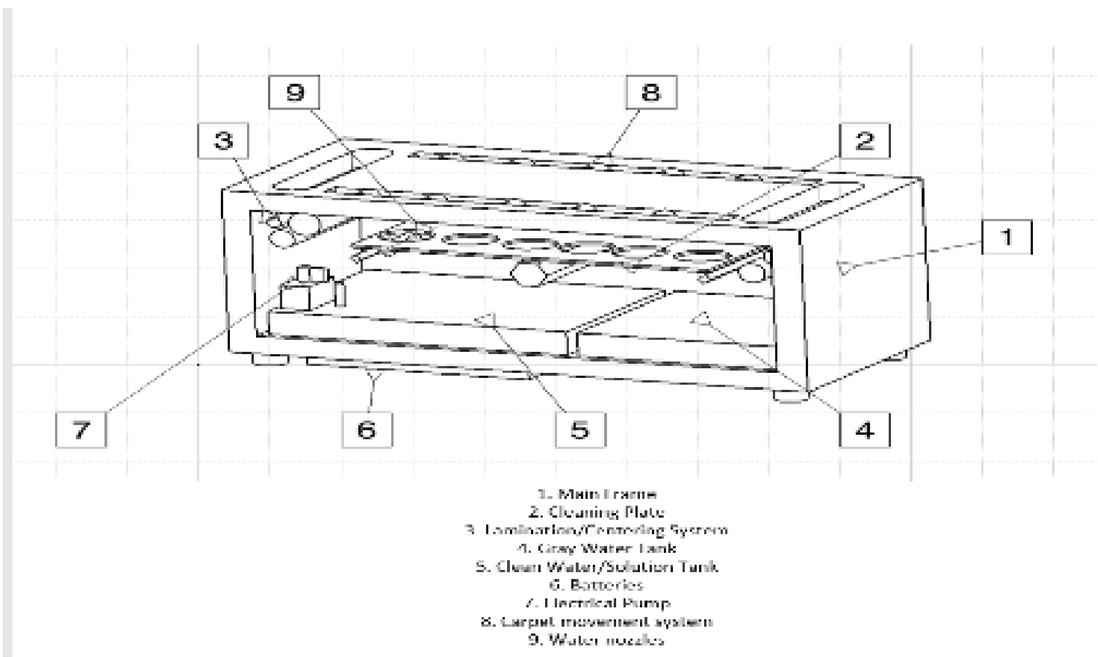
It is a robust device that can be positioned both in front of the house and
inside it It has a resistance of 120 kg.



The product has a functional role as a cleaning device, but it can also be
used as a support for the press.

This is a product designed to reduce the time in which the mat is cleaned
manually.

RESULTS AND DISCUSSIONS:



1. Main Frame
2. Cleaning Plate
3. Lamination/Removing System
4. Gray Water Tank
5. Clean Water/Solution Tank
6. Batteries
7. Electrical Pump
8. Carpet movement system
9. Water nozzles

Contact: „Lucian Blaga” University of Sibiu, PATLIB Centre of Sibiu, 4 Emil Cioran Street, Room IM 100, Phone +40 744 390 290, mihail.titu@yahoo.com

ELECTRIC ENGINE

Scientific Research Project

Authors: Ciuntu Sebastian

Coordinator: Professor Aurel Mihail TITU

D

Description: Our project is about an electric engine with coil, also known as an induction motor, is a common type of electric motor used for a wide range of applications.
Induction motors work on the principle of electromagnetic induction, where the current flowing through the stator coil generates a magnetic field that induces a current in the rotor coil. This creates a rotating magnetic field that drives the motor shaft.

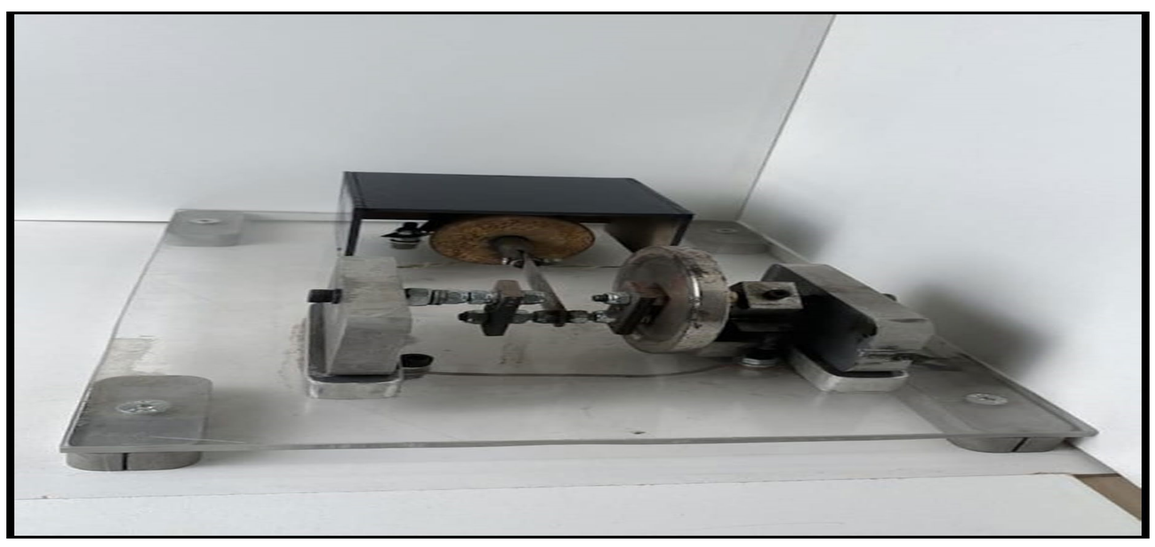
APPLICATIONS:

The electric engine operate through the interaction between the motor's magnetic field and electric current in a wire winding to generate force in the form of torque applied on the motor's shaft. The applications of electric engine primarily include fans, blowers, machine tools, turbines, pumps, power tools, compressors, alternators, rolling mills, movers, ships, and paper mills.

ADVANTAGES:

One of the most significant advantages of induction motors is their reliability, durability, and low maintenance requirements.
Is it also highly efficient, with low losses and high-power output. Moreover, it is easy to control and are widely used in various industrial and commercial applications. However, it does require an external power source to operate, and its speed is dependent on the frequency of the input power.





Contact: „Lucian Blaga” University of Sibiu, PATLIB Centre of Sibiu, 4 Emil Cioran Street, Room IM 100, Phone +40 744 390 290, mihail.titu@yahoo.com

NUMERICAL ANALYSIS OF THE EFFECT OF VENTILATION SLOTS ON THE BRAKING SYSTEM

Scientific Research Project

Authors: Cosmin PREDA, Robert-Marian BLEOTU

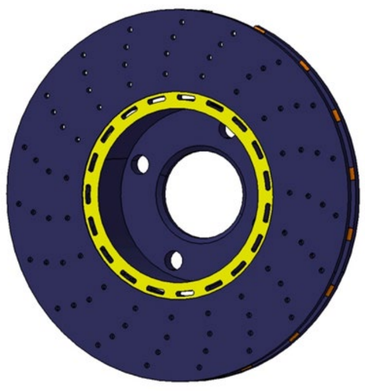
Coordinator: Professor Aurel Mihail TITU

D

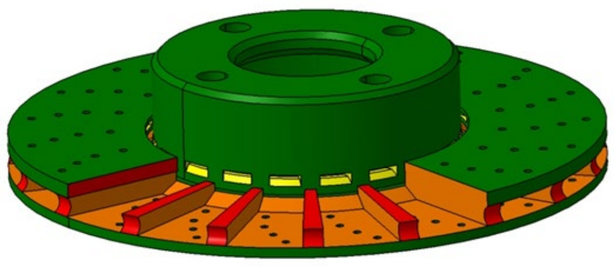
Description: *For any type of existing vehicle, one of the most important systems in its structure is the braking system. It is also the main safety element, which stops the vehicle by converting kinetic energy into heat. For constructive reasons and thermal efficiency, ventilated discs are the most widespread and used in industry, therefore. The purpose of this work is to create a thermally efficient design for ventilated brake discs by adopting three different designs from a constructive point of view. A special importance was also for the brake disc material, initially a semi-metallic material was chosen, being the most used for discs, later the ceramic material was also chosen. The design variant for the brake disc, to which the disc material and the thermal shield are added, lead to a significant improvement from a thermal point of view, which was also the main objective of this work.*

APPLICATIONS:

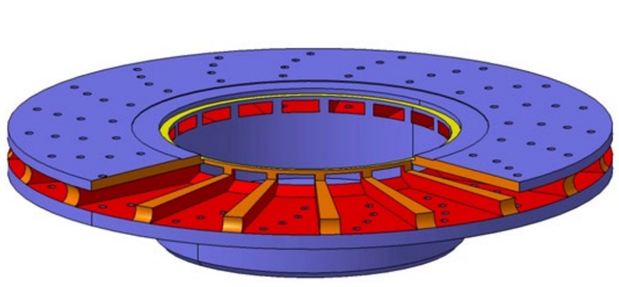
If we want to achieve reliability over time and have a medium-performance car, then regular ventilated discs are sufficient. In the case of a performance car, perforated and ventilated discs will be used, for extra cooling. If we want to achieve a supreme performance, where reliability does not matter but only optimal braking, then we will turn to ventilated and ribbed discs. Overheating of the brake disc-pad assembly can have serious consequences, reducing the safety of the braking system.



Variant A0



Variant A1



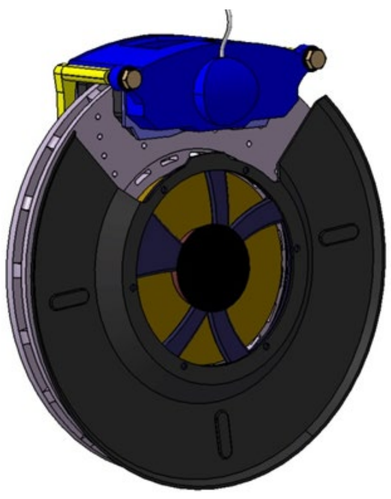
Variant A2

- Brake disc with bi-directional ventilation = ***A0***
- Brake disc with grooved channel-rear = ***A1***
- Front grooved brake disc = ***A2***

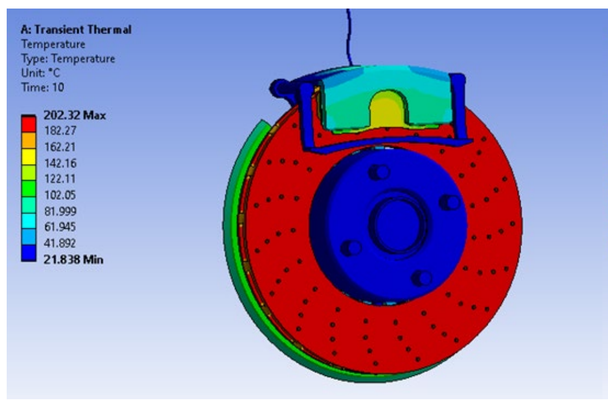
ADVANTAGES:

- Brake discs have additional ventilation slots compared to conventional discs;
- The size and position of the ventilation channels help to release the flow of heat from the surface of the discs;
- Constructive simplicity and thermal efficiency are advantages that bring a big plus for experimental testing;
- The thermal shield protects the braking system from foreign objects that appear during use and from the heat flow released by the braking assembly;

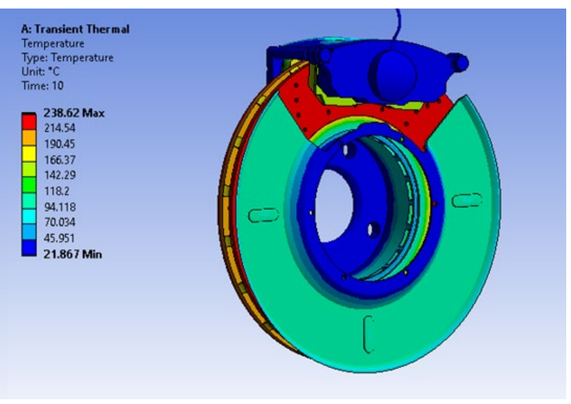




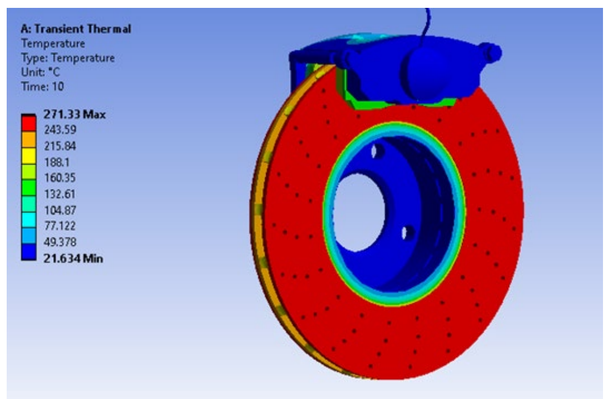
RESULTS AND DISCUSSIONS:



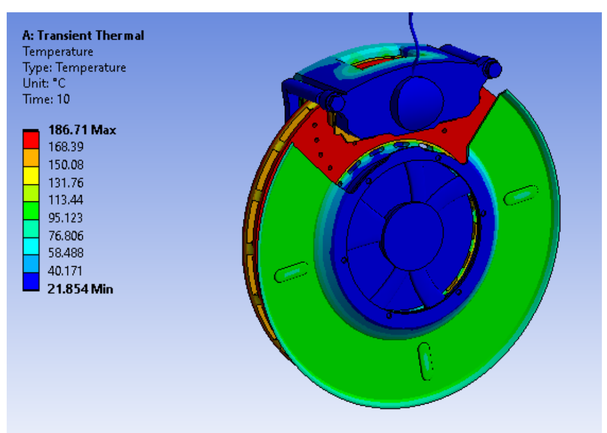
Variant A0



Variant A1



Variant A2



- The temperature increases linearly during the braking process;
- Of the three variants considered in the modeling for the brake discs, the disc variant with bi-directional ventilation vents made of ceramic material has the best behavior from the thermal point of view.

Contact: „Lucian Blaga" University of Sibiu, PATLIB Centre of Sibiu, 4 Emil Cioran Street, Room IM 100, Phone +40 744 390 290, mihail.titu@yahoo.com

HEIGHT-ADJUSTABLE ELECTRIC DESK

Scientific Research Project

Authors: Florea Toader Denisa Gabriela, Cernea Daniela Elena, Gliga Paul, Gresoiu Nicoale-Claudiu

Coordinator: Professor Aurel Mihail TITU

D

DESCRIPTION:

The desk has quality aluminum legs, electrically adjustable in height. To make the work easier, it includes 2 sliding rulers that can be used for sketching, painting, and many others activities.

There are also storage spaces and containers for used utensils, such as pens, sticky notes, paper clips, compass. USB ports are there to help you charge your phone and cable organizers will be of service with your cords.

Working with smart devices more and more nowadays, the desk has a scanner attached to it, that allows the user to convert the work documents into electronic files. At the base of the aluminum legs there are wheels, which allows the workplace to be moved quickly.

APPLICATIONS:

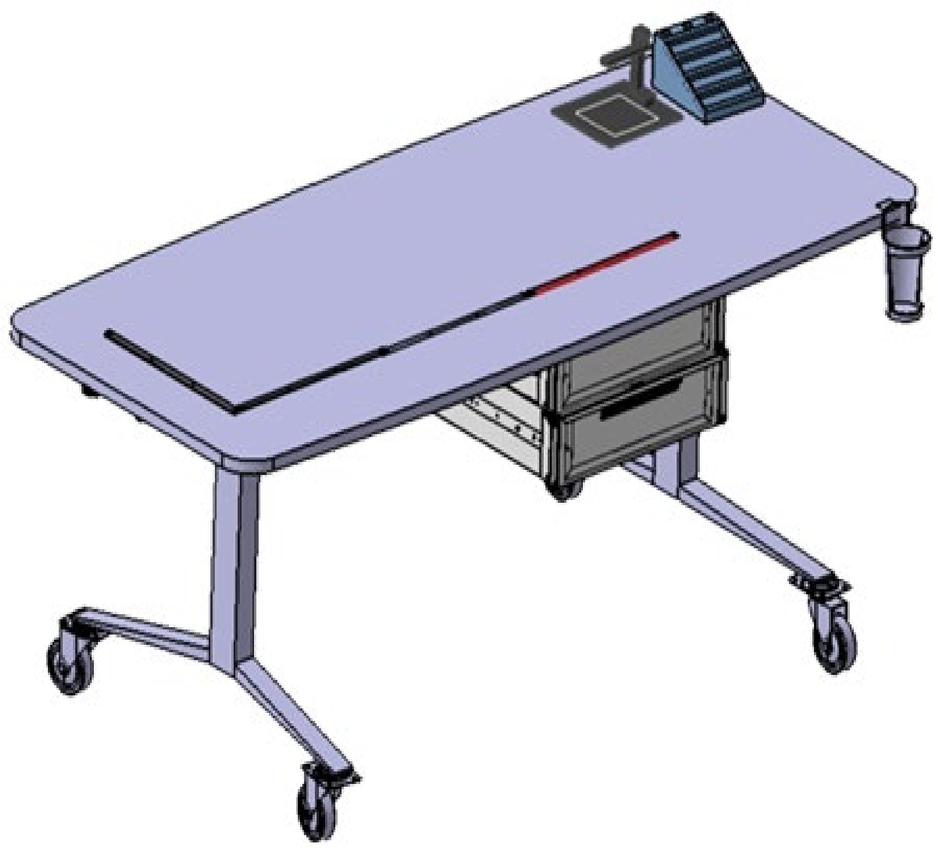
We can use it especially in spaces where we don't have much space. Suitable for several fields of activity.

On table is a scanner that can be connected via Bluetooth to the laptop in order to be able to scan documents quickly.

There are several usb ports in the table that facilitate the speed of receiving/sending documents

ADVANTAGES:

- Easy to handle;
- We can use it for several purposes;
- It doesn’t take up much space;
- Can be use by anyone.



Contact: „Lucian Blaga” University of Sibiu, PATLIB Centre of Sibiu, 4 Emil Cioran Street, Room IM 100, Phone +40 744 390 290, mihail.titu@yahoo.com

THE THERMAL STUDY FOR BRAKE DISCS AND THE INFLUENCE OF THE MATERIAL

Scientific Paper

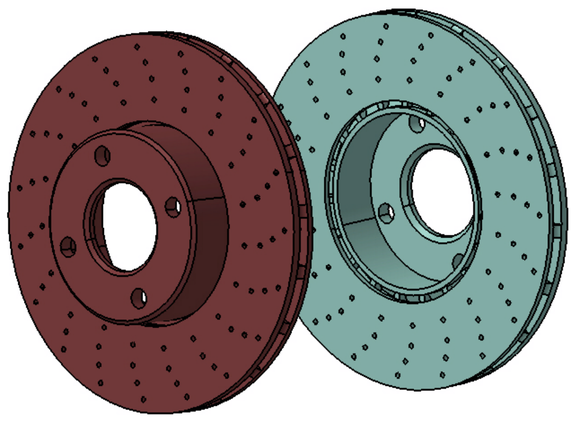
Authors: Lucian BUDUȘAN, Bogdan MATIEȘ, Marian-Cristian POPA, Ana-Maria MUNTEAN

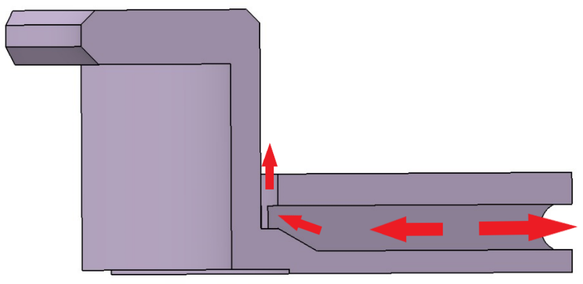
Coordinator: Cosmin PREDA

D

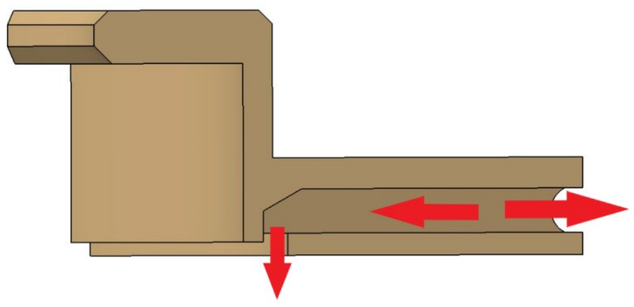
Summary: *The purpose of this work is to create a thermally efficient design for ventilated brake discs by adopting two different designs from a constructive point of view. A special importance was also for the brake disc material, initially a semi-metallic material was chosen, being the most used for discs, later the ceramic material was also chosen, which has improved thermal properties.*

BRAKE DISCS MODELS





Variant 1

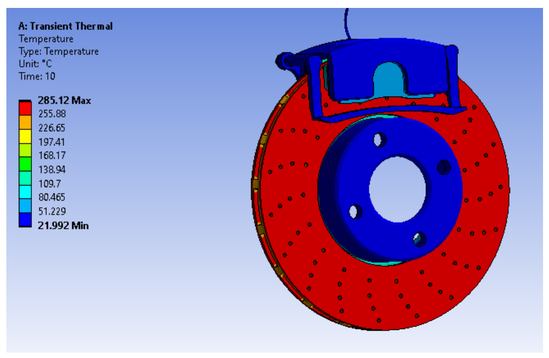


Variant 2

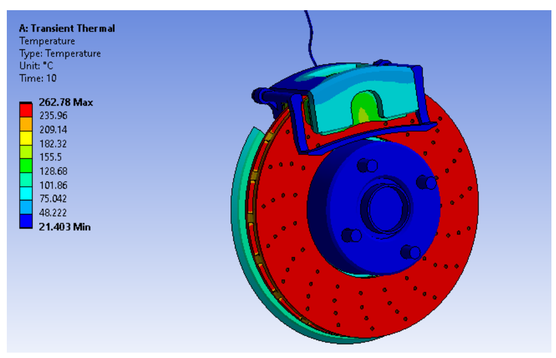
The study was based on the creation of an improved version of the brake disc, from a constructive point of view, which would offer the best possible heat dissipation.

Regarding the design of the ventilation channel, it was positioned on both surfaces of the disc, both on its front and on the back, in order to be able to make a comparison between the two positions used.

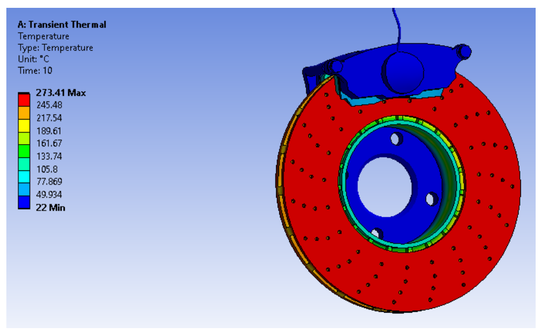
THERMAL ANALYSIS



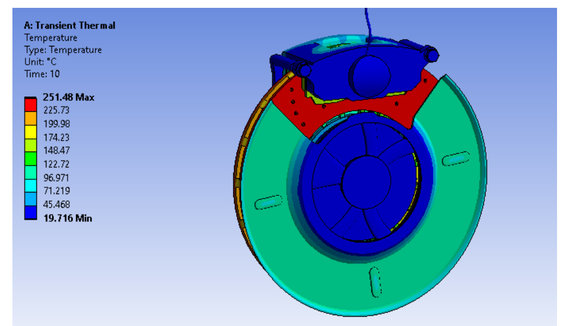
Front vent- *285.12℃*



Front vent + shield- *262.78℃*

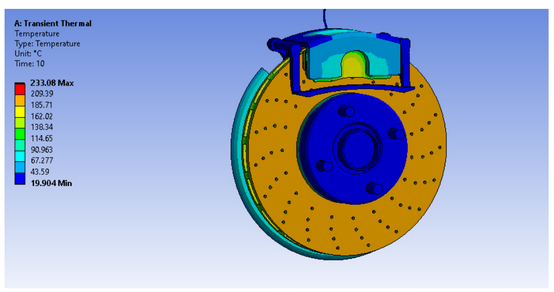


Back vent- *285.12℃*

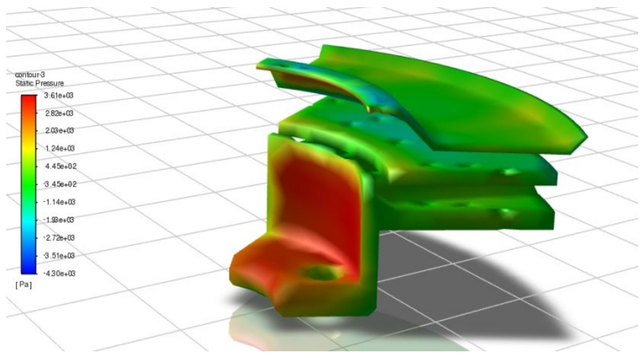


Back vent + shield- *262.78℃*

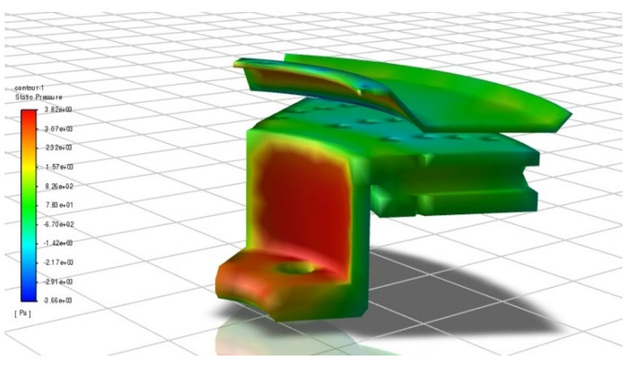
Back vent– *185-209℃*
Ceramic material

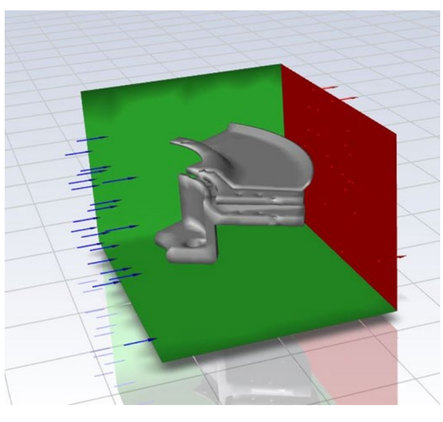


CFD FLUENT ANALYSIS



The results of the analysis indicate that the disc variant with rear ventilation is more efficient in terms of air circulation on the surface of the brake disc-shield assembly.





Contact: Cosmin PREDA
„Lucian Blaga” University of Sibiu, Faculty of Engineering
cosmin.preda@ulbsibiu.ro

MX-13 Engine of US Trucks

Student project

Author: Ștoc Marius Alexandru

Mentor: Corneliu BIRTOK-BĂNEASA

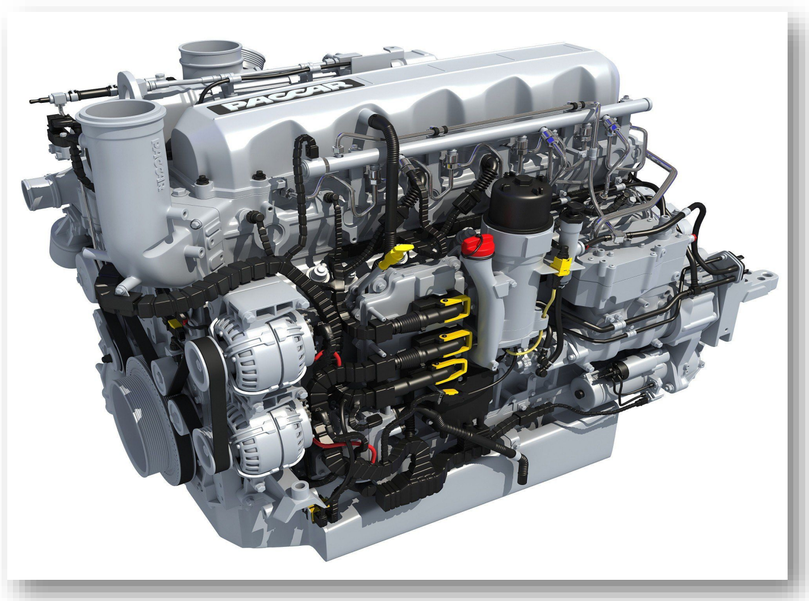
D

Seattle Car Mfg. Co. was established in 1905 by William Pigott, Sr., to manufacture logging and railroad equipment at its West Seattle facility. Later on, the Company combined with Twohy Brothers of Portland to become Pacific Car and Foundry Company, which it kept for the following 55 years. William Pigott transferred the company's ownership to the American Car and Foundry Company in 1924.

In 1945, the company made its first significant acquisition, Seattle's Kenworth Motor Truck Company, and entered the heavy-duty truck market. When Pacific Car and Foundry acquired Peterbilt Motors Company in 1958, it significantly increased its capacity for heavy-duty trucks. The acquisition of Dart Truck Company in the same year allowed it to enter the brand-new market for mining trucks. The steel for the 1962 Seattle World's Fair's Space Needle was manufactured by the company's structural steel division. Later, it was crucial to the building of the World Trade Centre in New York City as well as the third powerhouse of the Grand Coulee Dam.



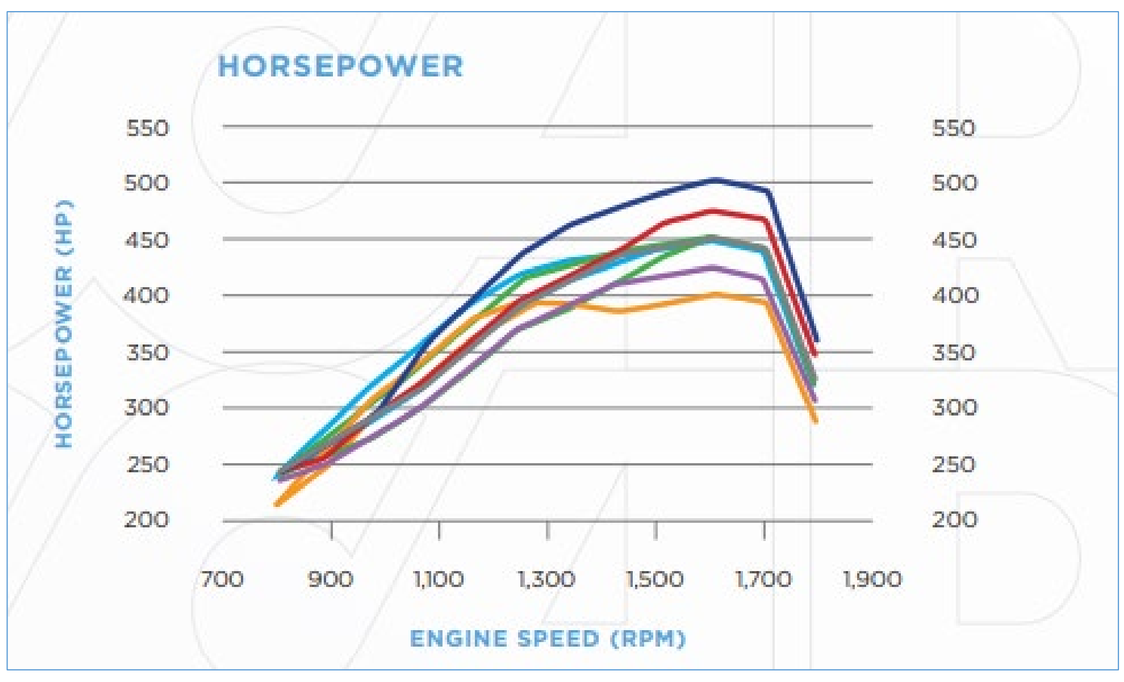
KENWORTH W900

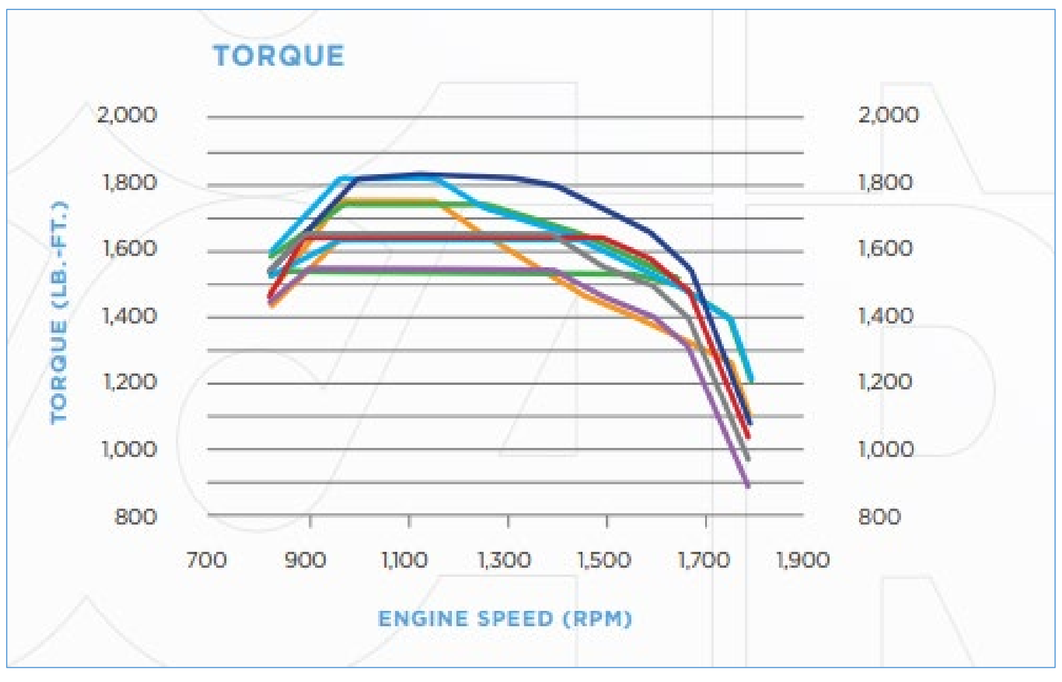


MX-13



Peterbilt 389





MX-13 engines are built for durability, with multi-million-mile endurance testing. Every MX-13 comes standard with remote diagnostics to deliver focused uptime support. Fuel savings is one reason the MX-13 continues to gain popularity in the heavy-duty market.

An MX-13 engine has broad torque curves, so it requires less shifting, and the quiet operation improves the driving experience.

Contact: mariusalexistoc@gmail.com

NUMERICAL ANALYSIS AND DYNAMIC STUDY FOR THE MACPHERSON TYPE SUSPENSION

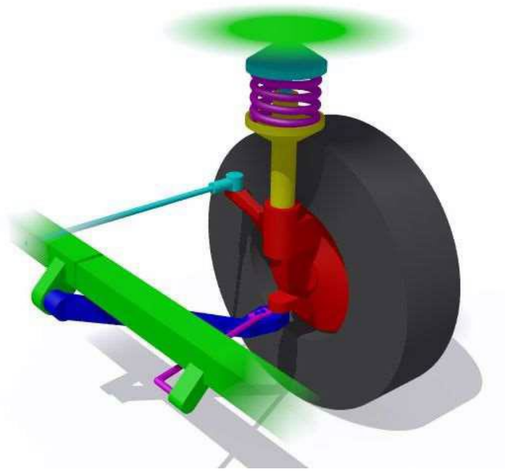
Scientific Paper

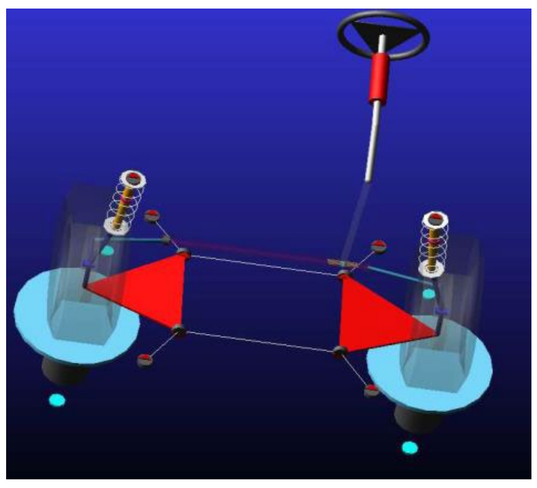
Authors: Alexandru-Ionel SPIRCU, Laurenţiu-Ilie SZŐKE, Flavia-Maria MIHĂILESCU

Coordinator: Cosmin PREDA

D

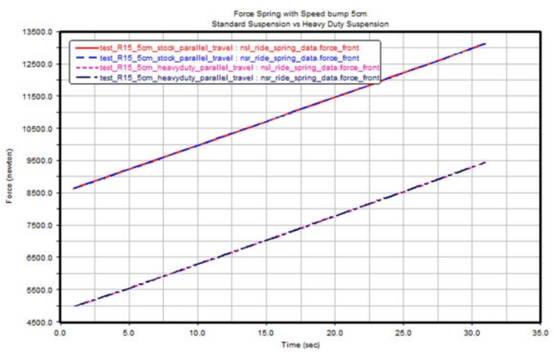
Summary: *The purpose of this dynamic study by numerical simulations of the MacPherson strut suspension is to highlight the dynamic differences between the stock and heavy MacPherson suspension duty for the Volkswagen Jetta.*
One of the specific objectives of the paper is to compare the two types of springs, the stock with which the car is equipped at the factory and the modified one, the heavy duty variant.
The second specific objective is to compare the two types of springs in relation to the two heights of the speed limiter (5 and 15 centimeters,) and the two types of tires (175/65 / R14, 195/65 / R15). The third objective of this paper is to perform a comparative analysis of the main components of a shock absorber assembly, statically through tests.



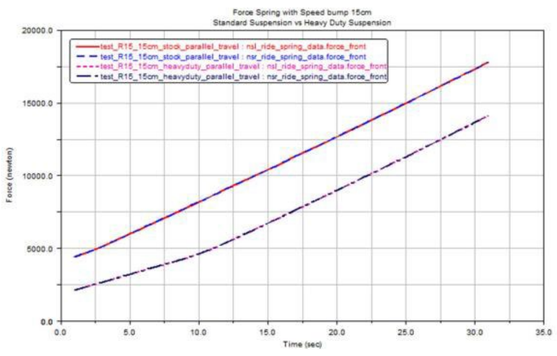


ANALYSIS METHOD AND RESULTS

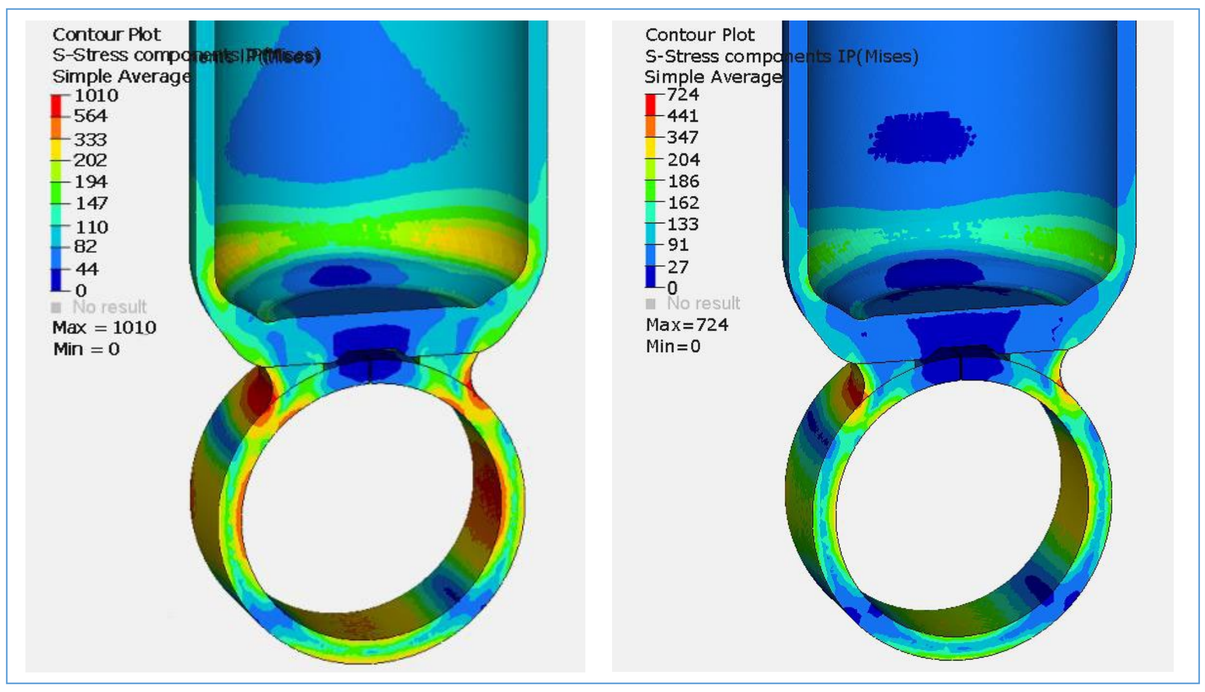
The analysis of the displacement of the wheels with parallel displacement will be performed.



The graphs related to the analysis of wheel displacement resulted from the analysis.



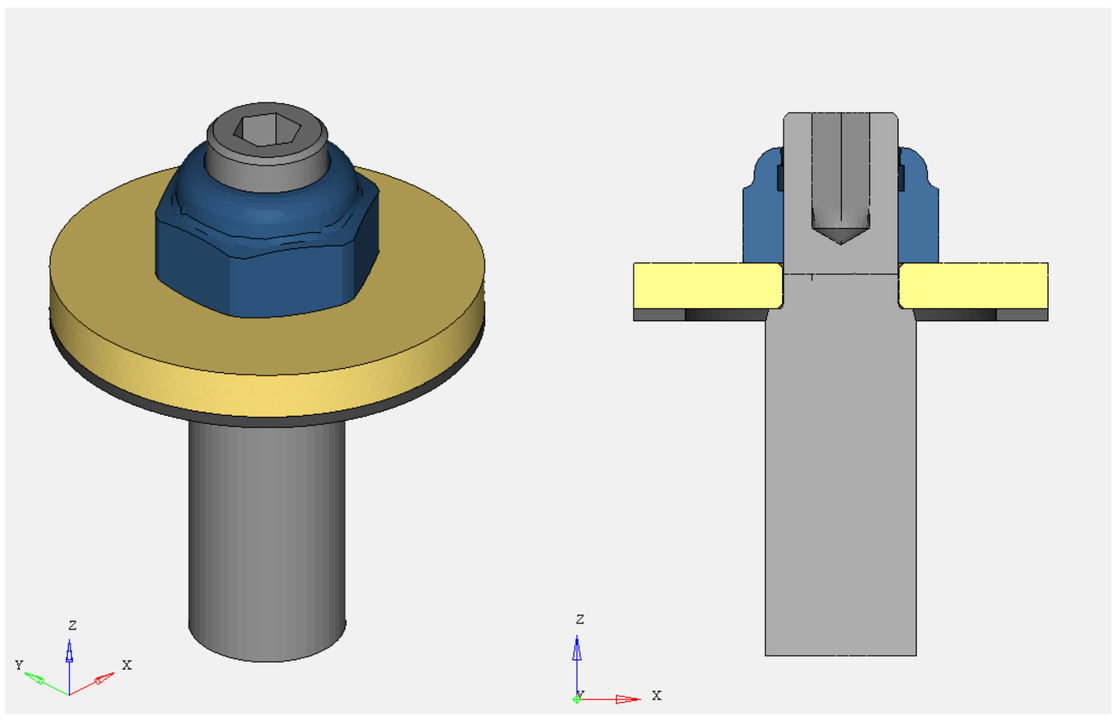
STATIC ANALYSIS OF THE COMPONENTS

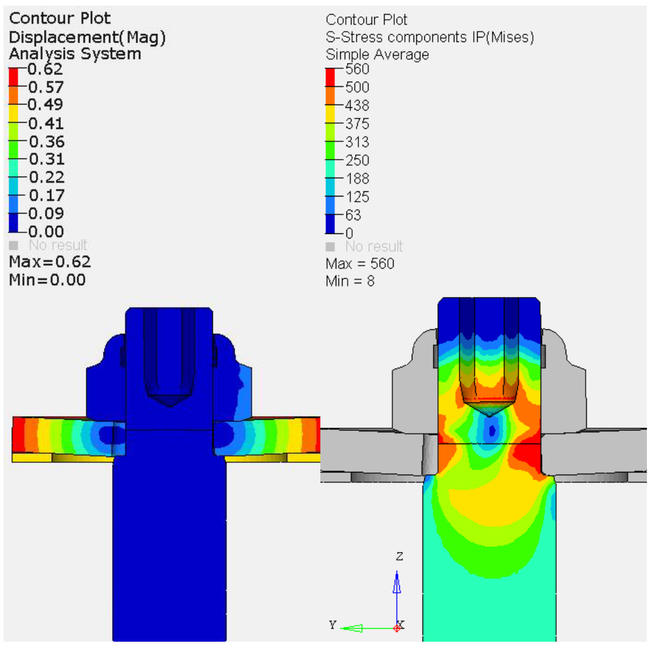


20 kN force

50 kN force

FEA: Finite element analyses will be performed for the main components that make up the shock absorber assembly. These analyses are of significant importance for the entire suspension assembly, as it is subjected to high forces during its operation, once mounted on the vehicle.





The displacement parameters and the equivalent von Mises values were followed for the case study in this paper. The results of the analysis for the displacements within the rod assembly, which indicate a maximum displacement of 0.55 mm.

Contact: Cosmin PREDA
„Lucian Blaga” University of Sibiu, Faculty of Engineering
cosmin.preda@ulbsibiu.ro

PROCEDURE FOR OBTAINING A COMPOSITE COATING WITH INCREASED DURABILITY ON A METAL SURFACE

Vili Pasare, Dan Florin Nitoi, Augustin Semenescu, Mihnea Cosmin Costoiu, Oana Roxana Chivu, Dragos-Florin Marcu, Radu Claudiu Fierascu, Irina Fierascu, Raluca Somoghi

D

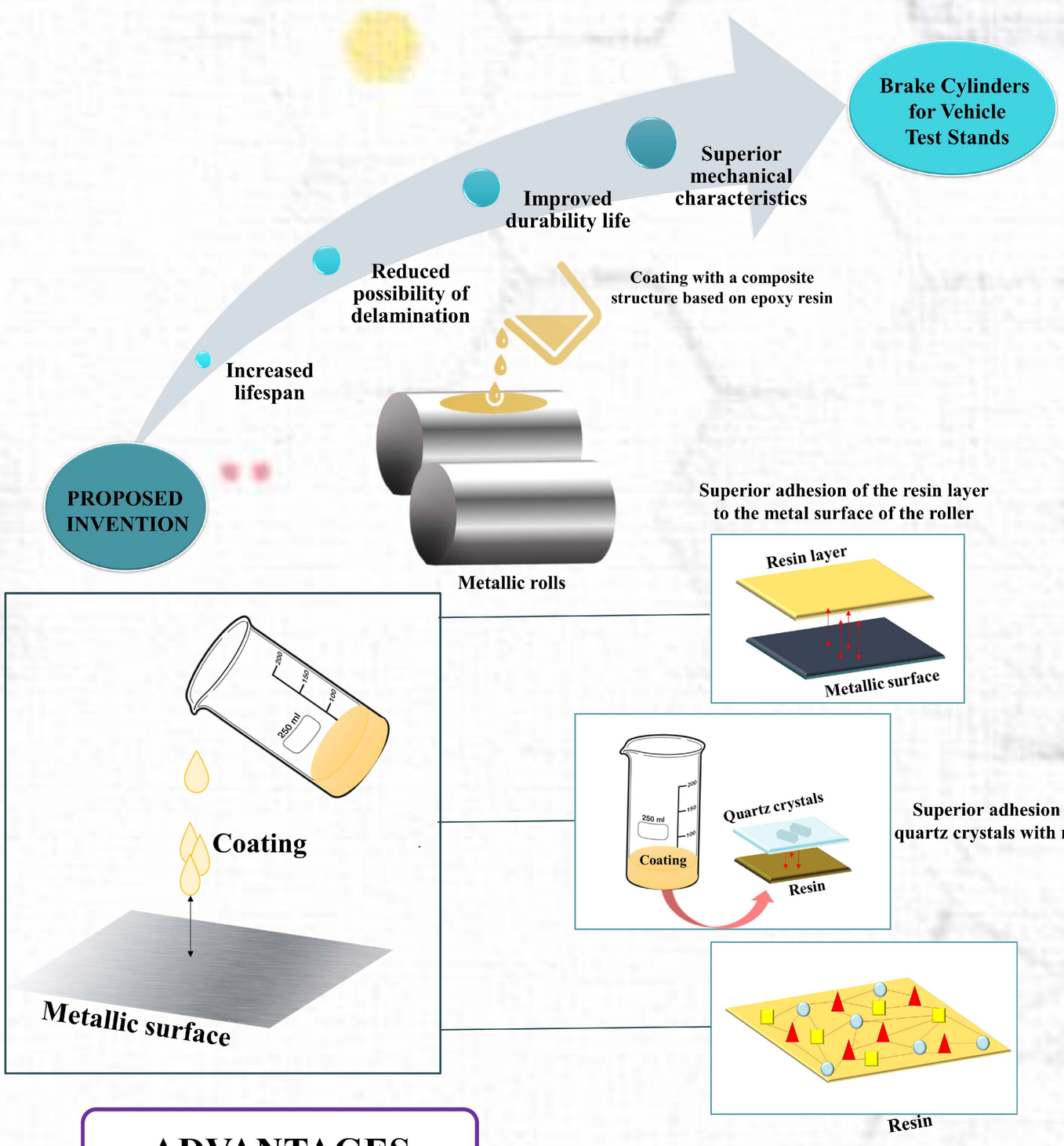
Patent application No. A-00150/2023

The invention refers to a procedure for obtaining a composite coating with increased durability on a metal surface, especially on a brake roller, by successively depositing of layers of liquid epoxy resin mixed with sand granules on a metal surface, supported and rotated by using some bearings assembled in a casing which in turn is mounted on a support plate.





ADVANTAGES OF THE PROPOSED INVENTION



ADVANTAGES

Increasing the polymerization processes that make the resin cross-linking process occur in a shorter time

CONTACT

CONTACT

National Institute for Research & Development in Chemistry and Petrochemistry – ICECHIM Bucharest

Dr. Habil. Radu Claudiu Fierăscu

fierascu.radu@icechim.ro

COMPOSITE COATING MATERIAL WITH ANTICORROSIVE AND ANTI SCRATCHING PROPERTIES

D

Radu Claudiu Fierascu, Vili Pasare, Augustin Semenescu, Mihnea Cosmin Costoiu, Dan Florin Nitoi, Oana Roxana Chivu, Dragos-Florin Marcu, Irina Fierascu, Raluca Somoghi

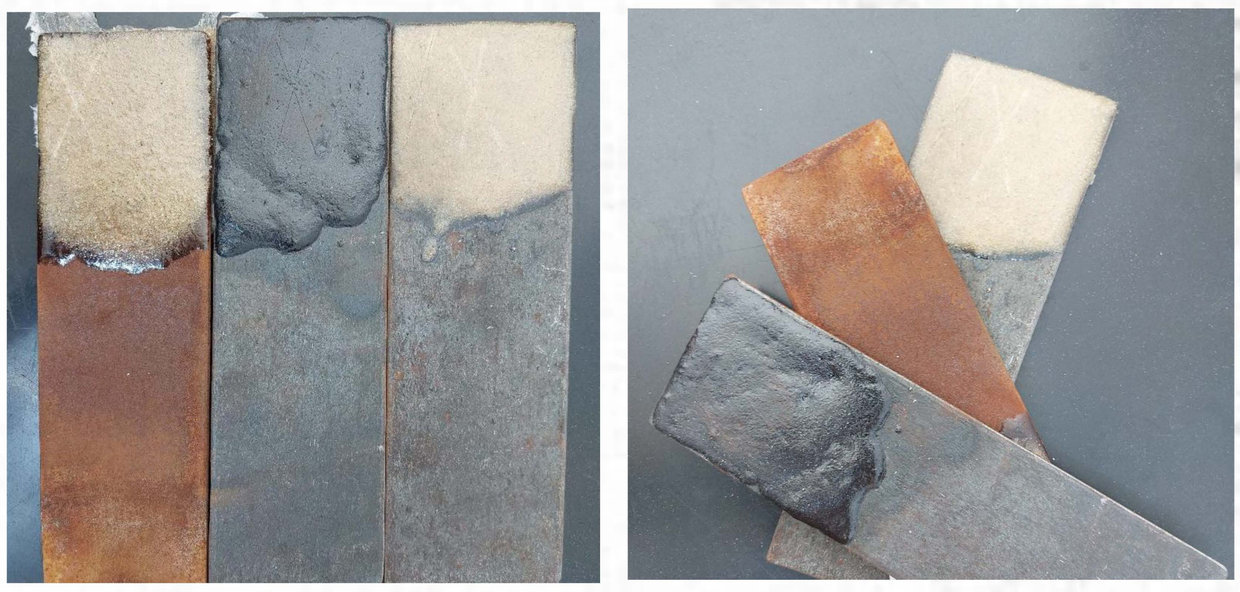
Patent application No. A-00151/2023

The present invention refers to a composite coating material, which simultaneously presents high cohesion and a high degree of scratch resistance, dedicated to the steel-carbon type support materials, offering at the same time anti-corrosion protection.



ADVANTAGES OF THE PROPOSED INVENTION

- filler materials with anti-corrosive effect (zinc oxide and magnetite)
- does not affect the structure of the treated material
- high cohesion and scratch resistance
- can be applied on different types of metal materials



Coating materials used for the tests

CONTACT

University POLITEHNICA Bucharest

Prof. Dr. Habil. Eng. Augustin Semenescu

augustin.semenescu@upb.ro

CONTACT

National Institute for Research & Development in Chemistry and Petrochemistry – ICECHIM Bucharest

Dr. Habil. Radu Claudiu Fierăscu

fierascu.radu@icechim.ro

Determining the internal forces within a truss beam using analytical calculation and finite element simulation method.

Scientific Research Project

Authors: Gabriel GHIȘOIU, Liviu BABOI, Andrei-Nicolae CHIRILĂ

Coordinator: Robert-Marian BLEOTU

D

INTRODUCTION

Truss beams represent one of the most efficient technologies for structures subjected to high loads. This technique has been successfully introduced in tunnel construction, providing the best solution for ensuring the safety of constructors during their realization. Additionally, truss beams are encountered in bridge construction; an example of such a bridge is the "King Carol Bridge," which was the largest in Europe at the time of its construction. Another significant domain is that of tall buildings with high seismic risk. The goal of engineers utilizing these structures is to select the most optimal and safest variant from a wide range of such structures. However, to employ these structures, a series of steps must be undertaken for their design. One of these steps involves vulnerability analysis. This stage involves identifying areas of maximum and minimum stress within the structure. Given this information, we observe the emphasis placed on this type of structure in the engineering field, particularly in bridge construction. This practice dates back to ancient times. Another example of the success of this technology is the "Lies Bridge" in Sibiu, constructed from cast iron as early as 1859. It features a truss-like structure in the form of an arch.





Figure 1: Utilization of Truss Beams

METHODS

This paper examines the forces that arise in the members of Figure 2. In the initial stage, the analytical method will be employed to determine the forces within the members, followed by the utilization of a validation method for the obtained results. Following these two approaches, three truss beam variants will be designed to be subjected to loading based on the input data of the problem.

Analytical method

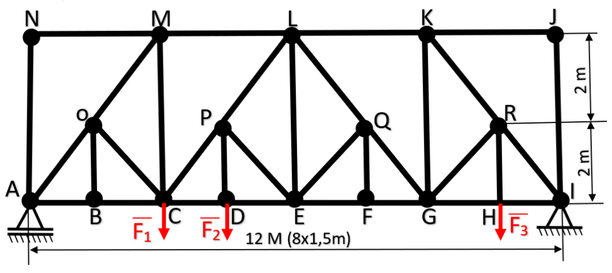


Figure 2: Input Data of the Problem - Analytical Calculation

To determine the forces in the truss beam shown in Figure 2, a first analytical method was employed. As can be observed, the truss beam consists of an expansive structure, hinged at point I and supported by a simple support at point A.

Validation of Analytical Calculation Results

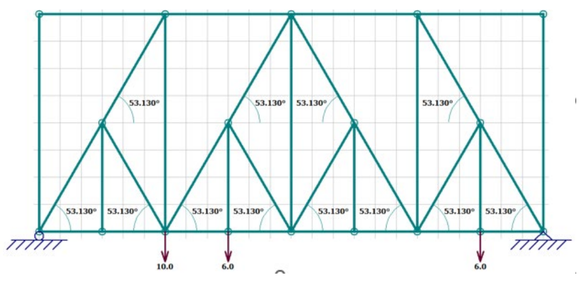


Figure 3: Input Data of the Problem - MDSolids 4.0 Validation

After performing the analytical calculation, the MDSolids 4.0 software was employed for result validation. In the Truss Analysis Module, input data for the truss beam were entered, as depicted in Figure3.

Static Analysis



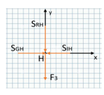
Figure 4: Cross-Sectional Views - Truss Beam

Three truss beam variants were analyzed. The differentiating factor among these three variants is the dimension of the cross-sectional area.

RESULTS

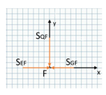
Analytical method

In order to determine the forces in the truss beam members using the analytical calculation method, the method of joints was employed.



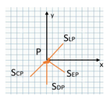
$Fx: -S_{IH} + S_{GH} = 0$

$Fy: -S_{RH} - F_3 = 0$



$Fx: -S_{GF} + S_{EF} = 0$

$Fy: -S_{QF} = 0$



$Fx: cos\alpha S_{CP} - cos\alpha S_{EP} - cos\alpha S_{LP} = 0$

$Fy: S_{DP} + sin\alpha S_{CP} + sin\alpha S_{EP} - sin\alpha S_{LP} = 0$

Nod	Efort	Rezultat	Nod	Efort	Rezultat	Nod	Efort	Rezultat	Nod	Efort	Rezultat
A	S_{NA}	0	E	S_{LE}	-3	I	V_2	10	O	S_{MO}	15
A	S_{OA}	15	E	S_{QE}	0	J	S_{KJ}	0	O	S_{CO}	0
A	S_{BA}	-9	E	S_{FE}	-8.25	J	S_{IJ}	0	O	S_{BO}	0
A	N_A	12	F	S_{EF}	-8.25	K	S_{LK}	5.25	P	S_{CP}	2.5
B	S_{OB}	0	F	S_{QF}	0	K	S_{JK}	0	P	S_{LP}	-1.25
B	S_{AB}	-9	F	S_{GF}	-8.25	K	S_{RK}	8.75	P	S_{EP}	3.75
B	S_{CB}	-9	G	S_{FG}	-8.25	K	S_{QK}	-7	P	S_{DP}	-6
C	S_{BC}	-9	G	S_{QG}	5	L	S_{ML}	9	Q	S_{LQ}	5
C	S_{OC}	0	G	S_{KG}	-7	L	S_{KL}	5.25	Q	S_{GQ}	5
C	S_{MC}	-12	G	S_{RG}	3.75	L	S_{QL}	5	Q	S_{PQ}	0
C	N_{PC}	2.5	G	S_{HG}	-7.5	L	S_{EL}	-3	Q	S_{EQ}	0
C	S_{DC}	-10.5	H	S_{OH}	-7.5	L	S_{PL}	-1.25	R	S_{KR}	8.75
C	F_1	10	H	S_{RH}	-6	M	S_{NM}	0	R	S_{IR}	12.5
D	S_{CD}	-10.5	H	S_{IH}	-7.5	M	S_{LM}	9	R	S_{HR}	-6
D	S_{PD}	-6	H	F_3	-6	M	S_{CM}	-12	R	S_{GR}	3.75
D	S_{ED}	-10.5	I	S_{HI}	-7.5	M	S_{OM}	15			
D	F_2	6	I	S_{RI}	12.5	N	S_{MN}	0			
E	S_{DE}	-10.5	I	S_{JI}	0	N	S_{AN}	0			
E	S_{PE}	3.75	I	H_1	0	O	S_{AO}	15			

Figure 5: Results: Analytical Calculation

Validation of Analytical Calculation Results

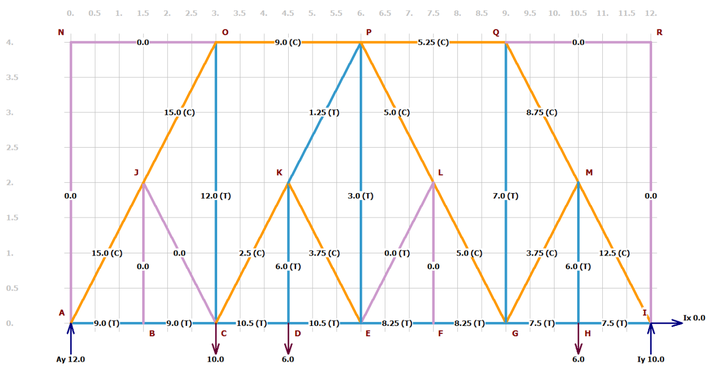


Figure 6: Validation of Analytical Calculation Results

Using the MDSolids 4.0 software, the validation of the results obtained from the analytical calculation was performed. It can be observed in Figure 6 that the members: AN, BJ, CJ, NO, EL, FL, QR, and IR are not subjected to any loads.

Static Analysis

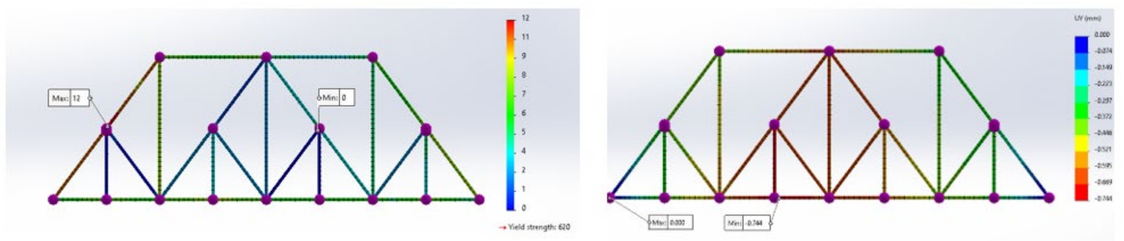
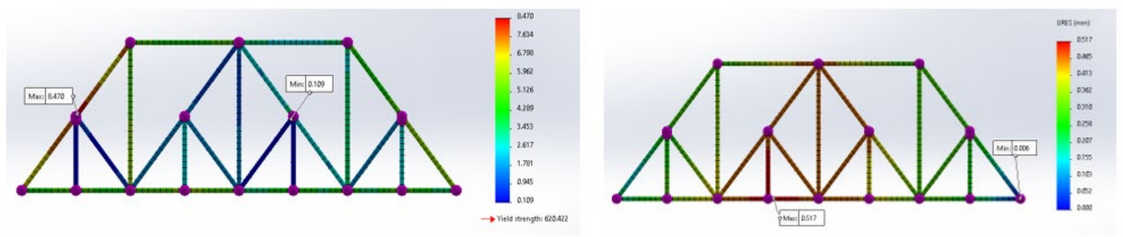
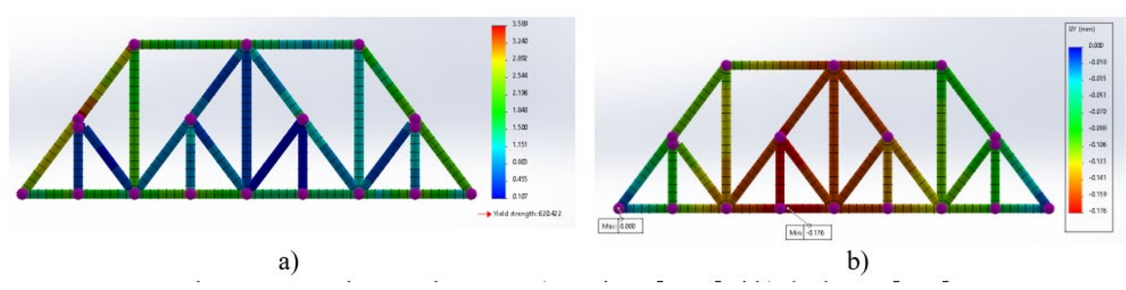


Figure 7: Variant I Results: a) Stress [MPa] and b) Displacement [mm]



a) b)

Figure 8: Variant II Results: a) Stress [MPa] and b) Displacement [mm]



a) b)

Figure 9: Variant III Results: a) Stress [MPa] and b) Displacement [mm]

CONCLUSIONS

Through this paper, I have reinforced the fact that truss beams are essential in everyday constructions. They have a significant impact on the efficiency of the load-bearing structure and, at the same time, offer easy technical feasibility. Furthermore, it has been demonstrated that members resulting in zero values through calculation can be eliminated. This can lead to a reduction in the weight of the truss beam, thereby reducing costs as well.

Contact: Robert-Marian Bleotu

,,Lucian Blaga" University of Sibiu, Faculty of Engineering

robert.bleotu@ulbsibiu.ro

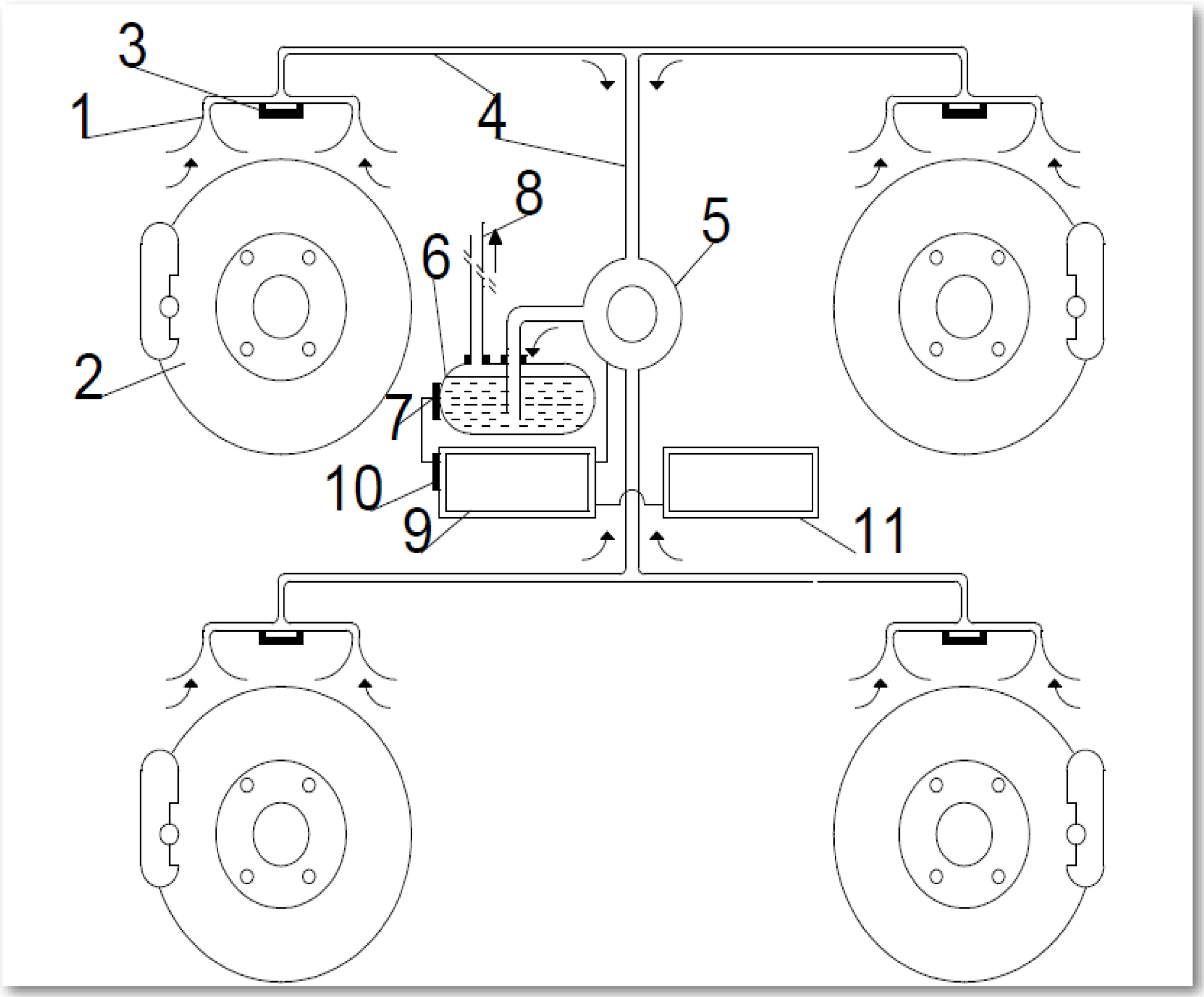
INSTALLATION USED FOR THE COLLECTION AND STORAGE OF THE MICROPARTICLES RESULTED FROM THE WEAR OF THE CAR BRAKES

Patent - A/000805/09.12.2022

D

Authors: Pavel Ştefan, Ungureanu Daniel-Viorel, Pascu Ioan-Bogdan

The invention refers to an installation intended for the collection and storage of the microparticles generated by the wear of the brake pads of autovehicles, in order to reduce the pollution and limit various respiratory ailmets for humans.



Advantages

- The installations does not use substances or chemical products that can affect the environment;
- The installation requires a simple maintenange, which is done by replacing the water container, when the vehicle computer signals it;

Contact: pavelstefanel@gmail.com

INSTALLATION FOR CLEANING LIGHTING FIXTURES WITH DIFFUSER, AND FLUORESCENT TUBES OR LEDs, MOUNTED ON THE CEILING

Patent - A/000806/09.12.2022

D

Authors: Pavel Ştefan, Ungureanu Daniel-Viorel

The invention refers to an installation intended for the cleaning operation of lighting fixtures equipped with a light diffuser and fluorescent tubes or LED ubes, fixed/mounted on the ceiling.

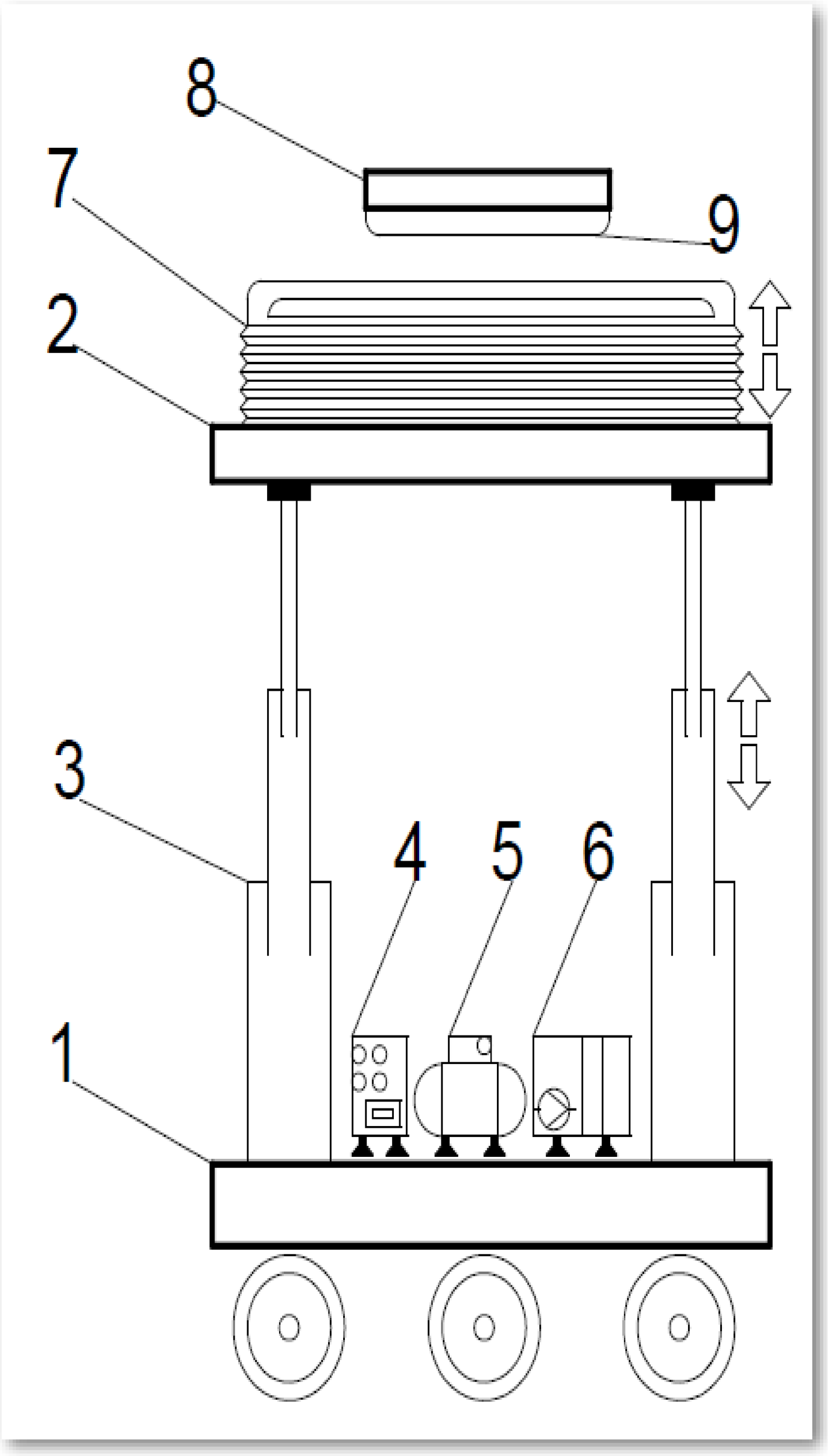
Advantages

-The presented installtion does not use substances or chemical products, which can affect the environment;

-Greater energy efficiency through reduced electricity consumption;

-Monitoring and archiving/storing the specific data of lighting parameters (lux) before and after the operation of cleaning the diffuser of the lighting fixtures and, if necessary, changing the lamps related to the lighting fixtures;

- Work accidents of the maintenance personnel of the lighting fixtures with diffuser mounted/fixed on the ceiling, are significantly reduced;



Contact: pavelstefanel@gmail.com

Autonomous car with Obstacle Avoidance and Parking Options with Arduino

D

Research project

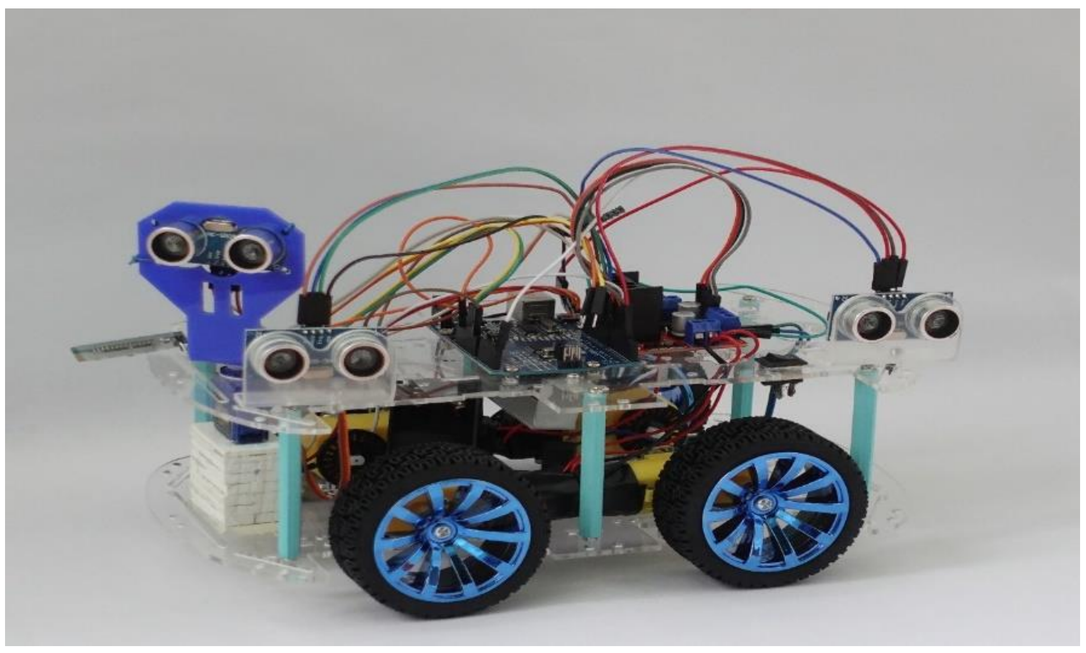
Author/s: Eugen BIRTOK, Raluca ROB

This project presents the construction of an autonomous car and its programming in order to accomplish various abilities. The car is constructed on a chassis with four dc motors. The car controller is an Arduino Uno development board which is programmed in order the car is able to manage itself, avoiding the encountered obstacles. The distance to the obstacles can be modified by the user.

An ultrasonic distance sensor is used for acquire the distance measurement. Like any autonomous car, the manual command options when required are mandatory. Therefore, an application on mobile phone is programmed. This application permits the motors controls on forward, backward, left and right turn,parking, using bluetooth transmission.

In the construction of this car were necesary the following parts:

Arduino Uno development board
Driver for L298N integrated circuit motors connects to Arduino digital pins.
HC-05 bluetooth module
Ultrasonic sensor HC-SR04 (to avoid obstacles and parking)
SG90 servomotor (for sensor movement at a certain angle)
DC 12V Battery Pack 3000mAh Rechargeable Lithium Battery Pack
65 mm Rubber Wheel RC Model Tires



Description of the Arduino program

A function has been programmed for each order. Thus, the *Forward () function* sends appropriate logic levels to the input pins in the driver, so that the wheels allow forward movement. To enable communication with the bluetooth module, the *#include <SoftwareSerial.h>* directive in the source code includes retrieving information about the bluetooth transmission in a *switch () structure*. The novelty consists in the implementation of two functions of modifying the engine speed. For parking I make a function Parking, and a function for Autonomy.



Android app description

MIT App Inventor is an open-source web application developed by Google that allows you to create programs for two types of operating systems: Android and iOS. The platform uses a graphical user interface similar to the Scratch programming language, in which the programmer can create objects by drag-and-drop. Following the compilation, an application is created that can be transferred to the mobile device.

Contact: eugene_birtok@yahoo.com

Customized Sprinter 311cdi Doka

Student project

D

Author: ***Călin Rareș TEODORESCU***
coordinator Corneliu BIRTOK-BANEASA

The project presents a method of increasing the performance of the Mercedes van, model Sprinter 311cdi Doka, by implementing solutions to optimize the main functional systems, respectively the stages of the RAR approval procedure. Mercedes is a successful German brand, the Sprinter model launched on the market in 1995 and which established itself through performance, reliability/cost in the automotive industry, being among the most used vans worldwide.













The Sprinter 311cdi Doka model was originally designed with a fixed integrated flatbed, without the possibility of tipping, the disadvantage of this feature is that it requires a relatively increased time to unload the load.

The main change consisted in the implementation of a tipping kit, respectively the installation of a mobile flatbed with the aim of facilitating the faster unloading operation of the transported load.

Contact: trarescalin@icloud.com

Department for Research, Development and Innovation Management
Knowledge and Technological Transfer Center

15 Constantin Daicoviciu street
400020, Cluj-Napoca, România

e-mail: liliana.pop@staff.utcluj.ro

www.utcluj.ro

D

Title

IN-WHEEL DIRECT DRIVE ELECTRIC MACHINE FOR RAILWAY TRANSPORTATION VEHICLES

Inventor/s - Contact

Breban Ștefan, Drancă Marius Alexandru – Technical University of Cluj-Napoca,
Email: Stefan.Breban@emd.utcluj.ro
Fărtan Marius – REMARUL „16 Februarie” S.A., Email: fartan.marius@remarul.eu

Patent/ Application number

Patent OSIM no.: RO134496- B1/30.06.2022

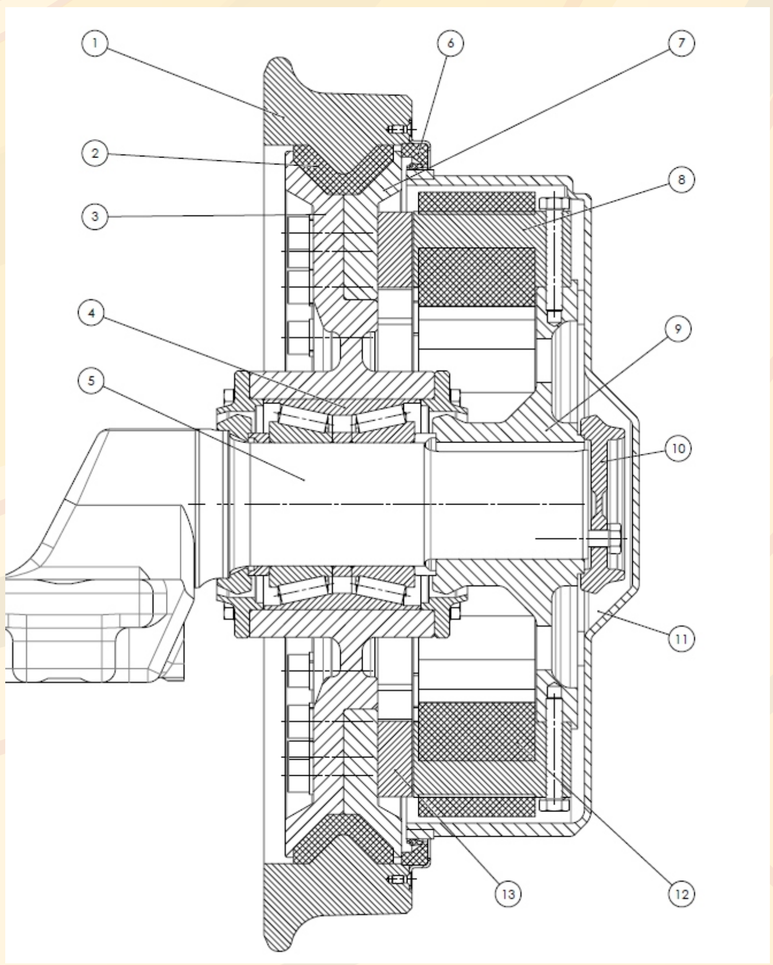
Short presentation

The invention presents an electric propulsion machine, with permanent magnets and axial flux, consisting of a stator mounted on a fixed shaft and a rotor consisting of permanent magnets mounted on a ferromagnetic part attached to the wheel of the vehicle. The ferromagnetic piece has a dual functional role: mechanical and rotor yoke. The wheel consists of a main steel piece **1**, elastic (rubber) element **2**, steel wheel rim **3** and a clamping ring **7**. The wheel is mounted on a fixed axle **5** by means of a radial-axial bearing **4**, intended for the railway sector, in classic construction, with spacer rings and covers mechanically fixed with screws, which allows the rotational movement and the radial and axial fixing of the metal wheel. The electric propulsion machine consists of a stator having a stator magnetic core **8**, made of circumferentially overlapping sheets in which grooves are milled, a winding **12**, mounted in the grooves of the stator magnetic core **8**, a stator mounting support **9**, an end flange on the axle **10**, a rotor consisting of permanent magnets **13** and the clamping ring **7**, which has ferromagnetic properties, an outer casing **11** made of aluminum, for better cooling, and rotation sleeve (semering) **6** with the role of eliminating the contamination of the electric machine with dust, water, etc.

Applicability

Propulsion of electric railway vehicles

Images



Department for Research, Development and Innovation Management
Knowledge and Technological Transfer Center

15 Constantin Daicoviciu street
400020, Cluj-Napoca, România

e-mail: liliana.pop@staff.utcluj.ro

www.utcluj.ro

D

Title

HIGH THROUGHPUT SPACEWIRE – IEEE 802.11 BRIDGE FOR ON-BOARD COMMUNICATIONS OF SPACE VECHICLES

Inventor/s - Contact

Pușchiță Emanuel Dumitru (Emanuel.Puschita@com.utcluj.ro), Kirei Sandor Botond (Botond.Kirei@bel.utcluj.ro), Palade Tudor (Tudor.Palade@com.utcluj.ro), Păstrăv Andra Elena Iulia (Andra.Pastrav@com.utcluj.ro), Buta Rareș Călin (Rares.Buta@com.utcluj.ro), Codău Cristian (Cristian.Codau@com.utcluj.ro), Fărcaș Adrian Călin (Calin.Farcas@bel.utcluj.ro)

Patent/ Application number

Patent application OSIM no.: A/00200/19.04.2022

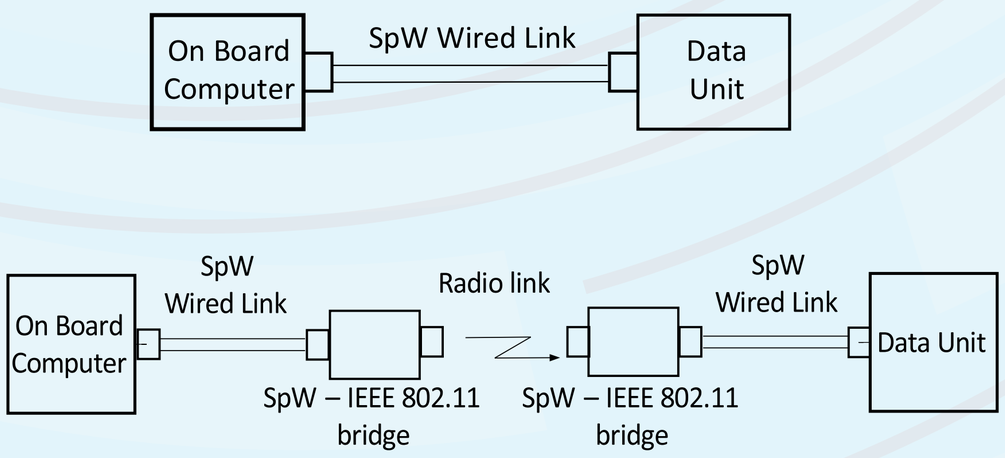
Short presentation

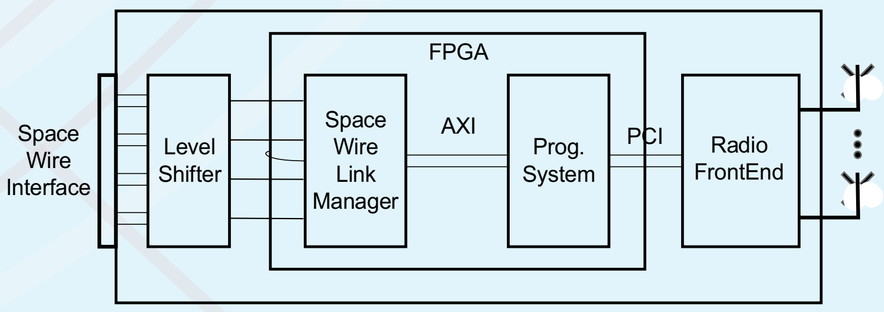
The invention refers to a spacecraft radio communication bridge that allows the replacement of SpaceWire cabled communication links between spacecraft equipment/systems with IEEE 802.11 radio communication links. The bridge is composed of the following major components: level translator, control unit, radio transceiver, antenna array, power source, circuits for power management and drivers for the configuration of the reconfigurable components. All the mentioned components are integrated on a PCB. The control unit is implemented on an FPGA and comprises a subsystem for managing the Space Wire wired link and a programmable system, respectively. The control unit has two interfaces: a Space Wire interface, and a AMBA AXI4 interface. The programmable system allows the subsystem to manage the Space Wire cabled link, control the radio transceiver, and coordinate two-way data transfer. It is equipped with interfaces according to the AMBA AXI4 and PCI Express protocols. The subsystem control for managing the SpaceWire wired link is performed through the AMBA AXI4 interface, which implements initialization, bidirectional data transfer and handling of errors occurring on the SpaceWire wired communication link. Furthermore, the programmable system performs the control of the radio transreceiver by means of the PCI Express interface implementing initialization functions for: a radio communication link according to IEEE802.11 standard, for bidirectional data transfer and error handling on the IEEE 802.11 radio communication link.

Applicability

The wired connections within spacecrafts are mission-specific, making the spacecraft assembly, integration, and testing process overly complex. The invention presented here aims to eliminate the disadvantages mentioned above. It is a compact two-way device that is able to receive from the equipment/systems on board the spacecraft the traffic specific to the cable communication protocols, convert it and transmit it using the radio channel. Reciprocally, it takes the traffic received on the radio interface, convert it and transmit it to the equipment/systems on board the spacecraft using the specific cable communication protocols. Thus, cabled links on-board the spaceraft are eliminated.

Images





Opportunity
CORNELIUGROUP Research-Innovation Association
Creation
Realization
INVENTCOR
Power of Creative Mind
Deva ROMANIA

UNIVERSITATEA TEHNICĂ DIN CLUJ-NAPOCA

MEMBER OF EUT+ EUROPEAN UNIVERSITY OF TECHNOLOGY

Department for Research, Development and Innovation Management
Knowledge and Technological Transfer Center

15 Constantin Daicoviciu street
400020, Cluj-Napoca, România

e-mail: liliana.pop@staff.utcluj.ro

www.utcluj.ro

D

Title

MODULAR AND RECONFIGURABLE STRUCTURE FOR A ROUTER GANTRY CNC MACHINE

Inventor/s - Contact

Cornel Ciupan, Claudiu-Ioan Rusan, Mihai Ciupan
Cornel.ciupan@muri.utcluj.ro

Patent/ Application number

Patent application OSIM no.: A/10073/02.12.2022

Short presentation

The invention relates to a mechanical structure for a router gantry machine. The structure of the machine, made of extruded aluminum profiles, consists of two upright beds (M) connected by connecting elements (5) and a table (B) that can be placed at different heights, the uprights (M) having the guides placed at the top on which the gantry (G) moves, in the shape of a straight beam, which provides increased rigidity compared to a "U" shaped gantry.

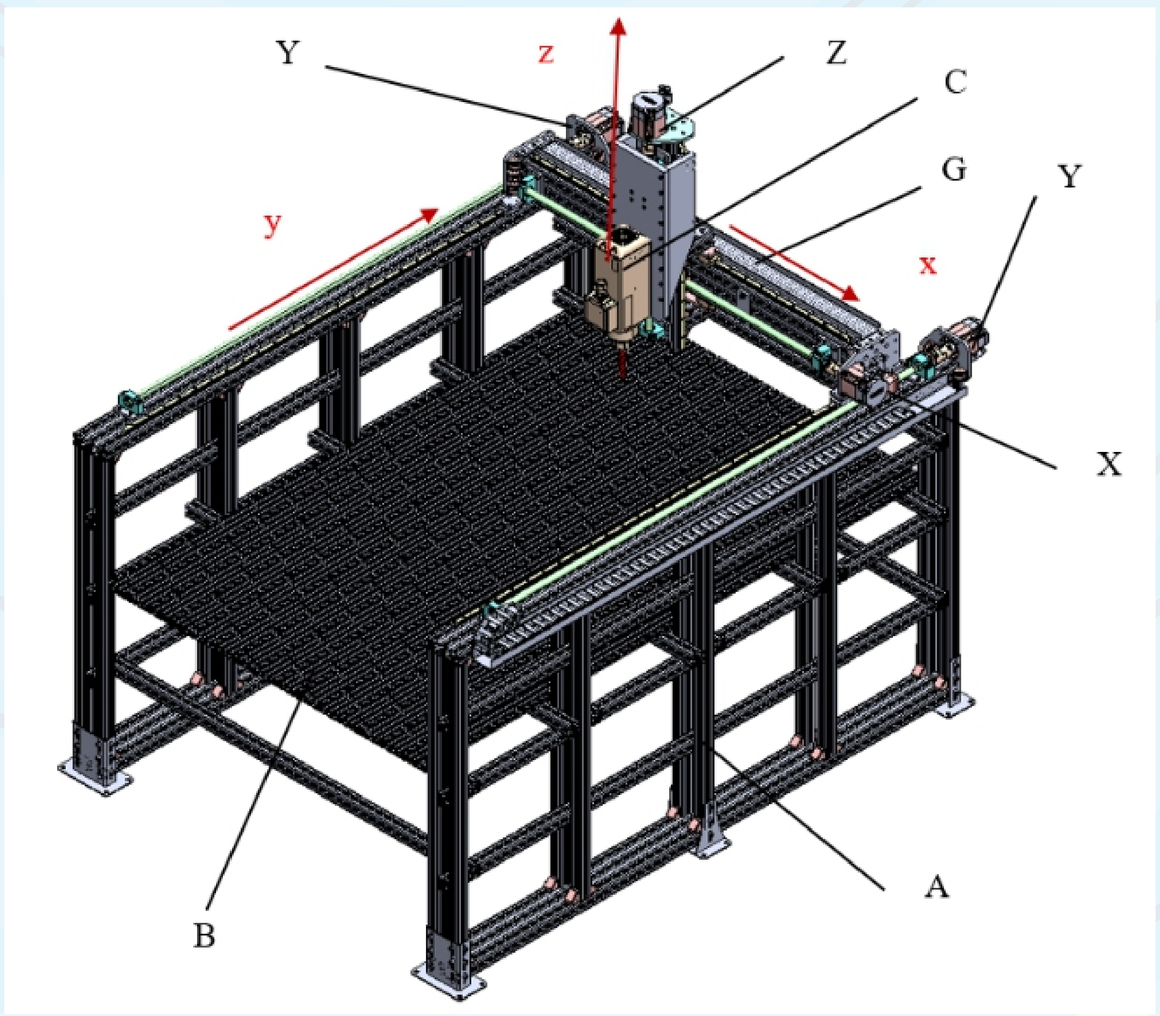
By applying the invention, the following advantages are obtained:

- modular mechanical structure, simple and reliable, at a low production cost
- increased rigidity in relation to the weight of the structure
- reconfigurable structure in relation to the dimensions of the parts and the type of operation (milling, laser or AWJ cutting).

Applicability

Machine tools

Images





APPLICATIONS OF ASSISTED PROGRAMMING ON MILLING MACHINING CENTERS

Research project

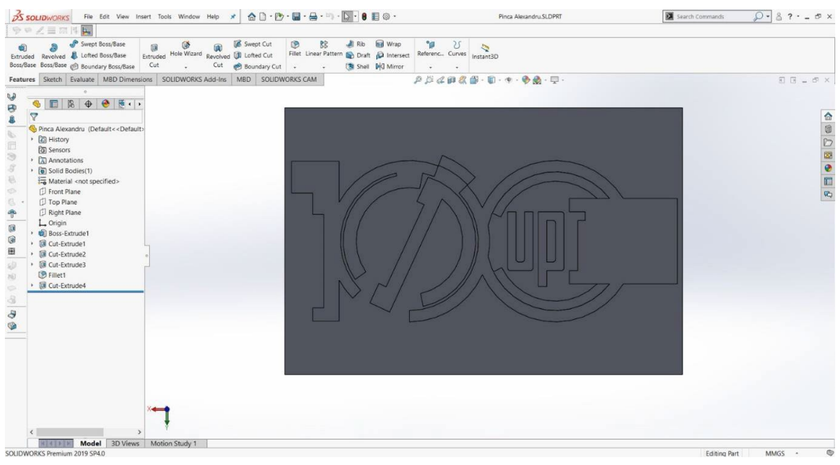
PINCA-BRETOTEAN ALEXANDRU MIHAI

D

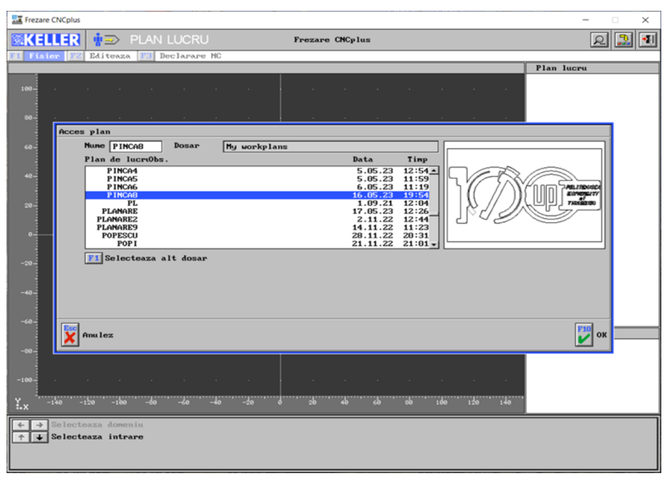
The main objective of the project is the study, programming, and computer-assisted manufacturing on milling machines for a prismatic component with an aesthetic role. The component within the project is an interpretation of the logo of Politehnica University of Timișoara, an idea that emerged on the occasion of its 100th anniversary in 2020 and has since remained an emblem of the technical university of Timisoara. In recent years, this emblem has undergone various aesthetic modifications.

The originality of this project lies both in terms of design and the technological manufacturing process. The prismatic component in the form of an anniversary plaque is made of aluminum, with starting semi-finished dimensions of 150 x 100 mm and a thickness of 10 mm. Computer-aided programming of prismatic parts was carried out using the CAD/CAM program, KELLER CNC Milling. The completed program will be implemented on a CNC with three-axis. The chosen machining strategy for generating tool paths had a significant influence on the machining time of the component. Thus, the project requirement of a machining time below 15 minutes was met, as the actual machining time of the component was 13 minutes and 44 seconds. Achieving this time was due to optimizing the cutting parameters, the sequence of tool path generation, and eliminating idle time. The actual machining time influences the manufacturing cost and, consequently, the final product price.

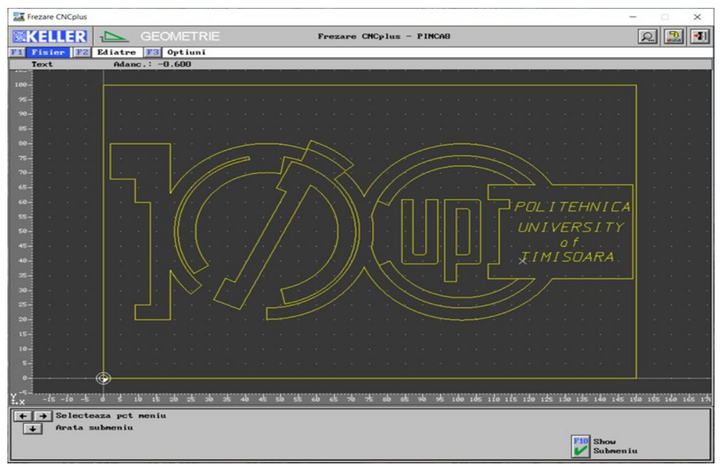
The original contributions of this project include interpretation of the logo of the Politehnica University of Timișoara in terms of design and the technological process of creation, designing the piece by determining dimensions, defining geometric details, necessary tolerances, and technical specifications of the logo, material selection, choosing the machining strategy and method for generating cutting tool trajectories, selecting milling tools and parameters, creating the CNC program, setting up the milling machine, correctly mounting and securing the work-piece, and ensuring proper system stability for machining, monitoring and controlling the machining process.



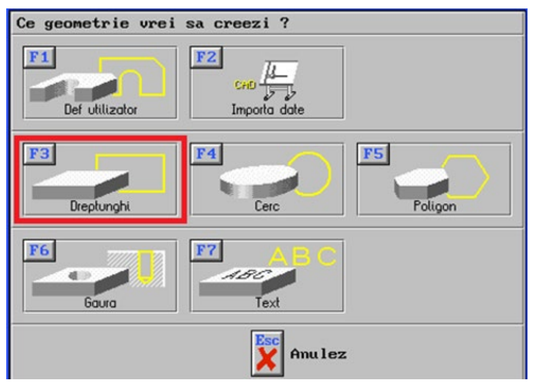
Modelul CAD al piesei



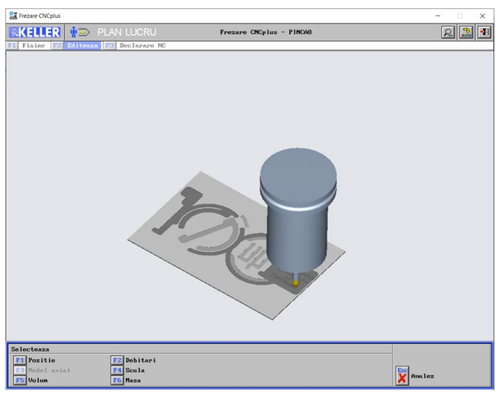
Alegerea piesei din baza de date CAD



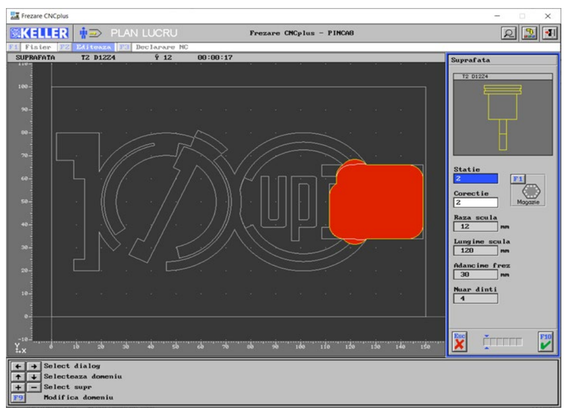
Desenul piesei importat în softul de CAM

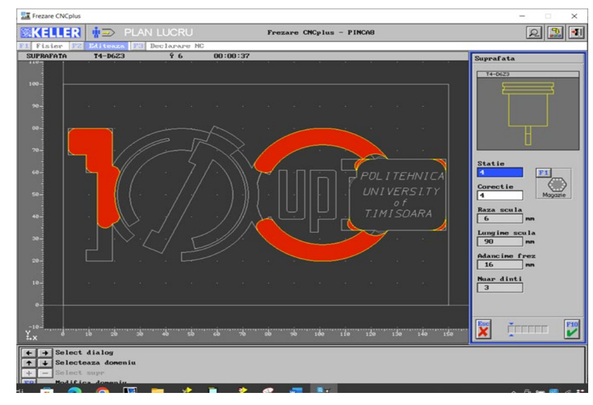


Definirea semifabricatului



Previzualizarea piesei

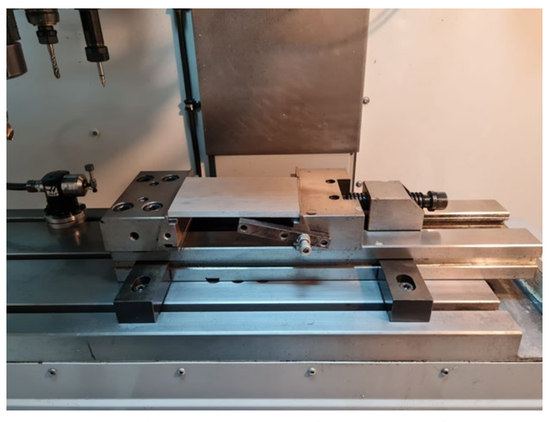




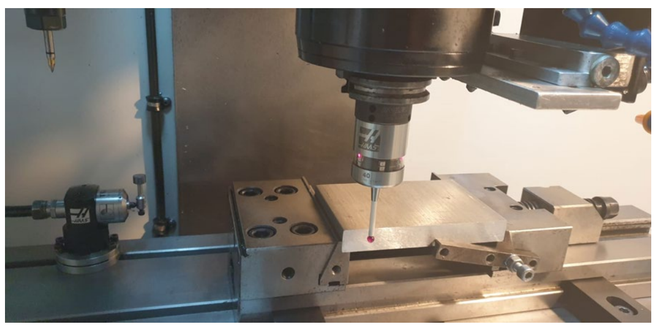
Etape în alegerea sculelor așchietoare și a parametrilor regimului de așchiere



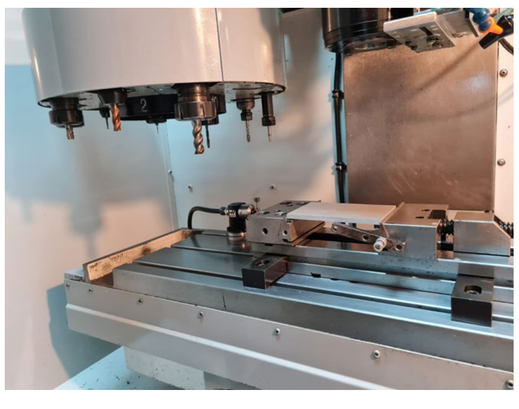
Centrul de prelucrare HAAS



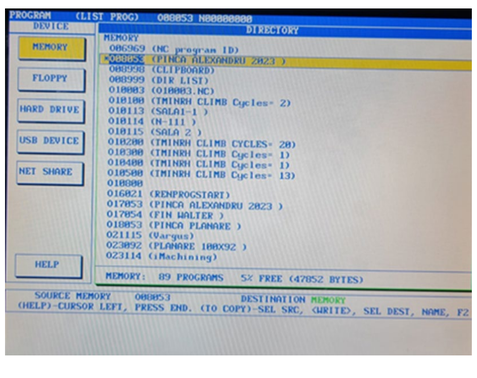
Semifabricatul poziționat în sistemul de prindere în vederea prelucrării



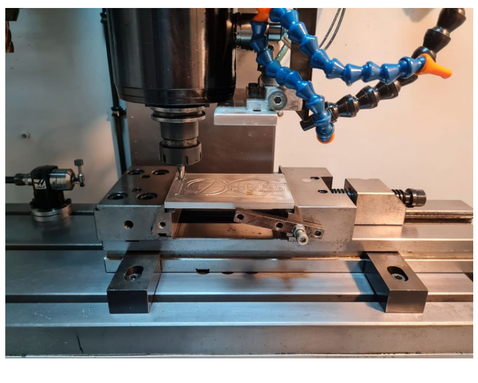
Determinarea originii piesei prin metoda palpatorului



Magazia de scule dotată cu frezele utilizate în prelucrare



Accesarea codului NC



Secvență de prelucrare



Plăcuța aniversară la finalul procesului de prelucrare

Contact: alexandru.pinca@yahoo.com

Solar Drone

*Patent/***RO132245 B1**

Author/s: Arghirescu Marius
Asoc. Iustin Capră

D

The invention relates to a solar drone having a skeletal frame (1) on which there are fixed thin photovoltaic batteries (**2**) made on plastic support, of the body part, (**3**), of the wings (**4**) and of the tail (**12**), some vertical propellers (**7, 8, 9**) with electric motor (**c**) and mini-turbine (**b**) , a charge (**15**) with a control system (**15 '**), a battery (**k**), some legs and two horizontal propellers (**10**) having a tubular body (**l**) and a funnel-shaped aperture in which a mini-turbine (**b**) is fastened to the shaft of an electric motor (**c**) fixed to the tubular body (**l**), at least one vertical thruster (9) having a mixed propeller (b'), of axial-radial suction, for generating also Coandă effect.

Advantage: For a particular square, rectangular or quasi-triangular shape of the drone, the mini-turbine (**b, b'**) of vertical propeller (**7, 8, 9**) with united cases **(a**) and one or two electric motors (**c**), has an optimized shape with thin radial (**p**) blades and a rectangular edge part with rectangular small blades (**f**) for air aspiration of both: superior and lateral parts, enhancing the sustentation force by Coanda effect.

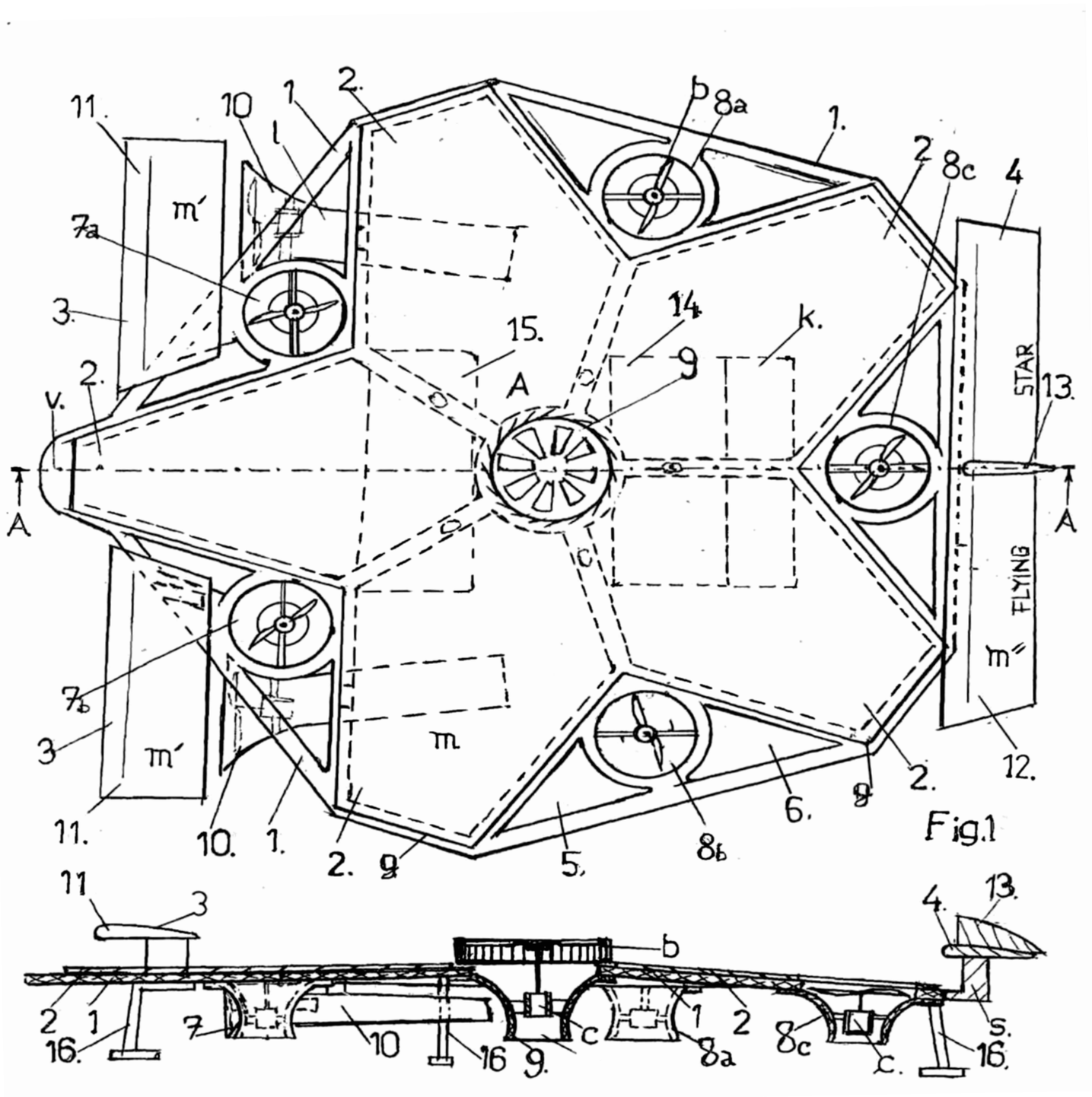
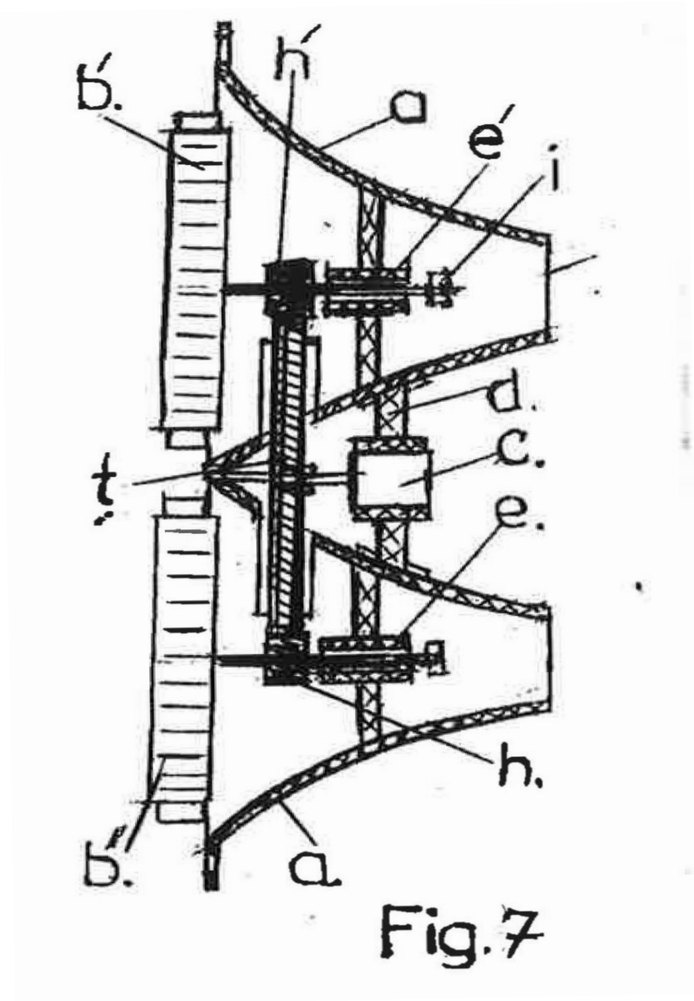
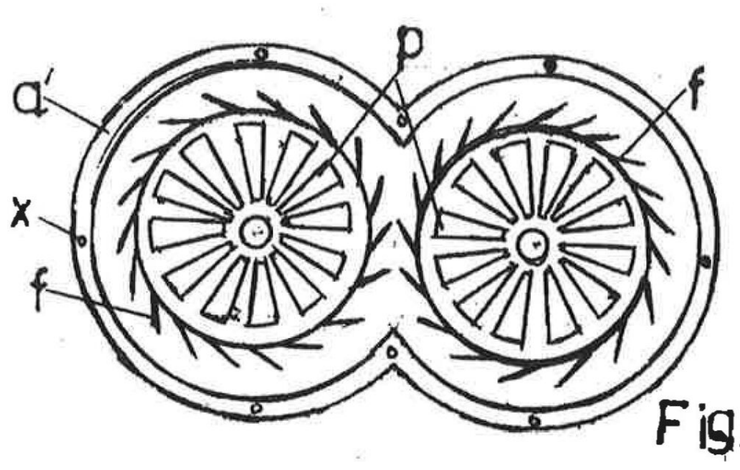


Fig.1


Fig.7


Fig.

Contact: maris3a@yahoo.com

Opportunity
CORNELIUGROUP Research-Innovation Association
Creation
Realization
INVENTCOR
Power of Creative Mind
Deva ROMANIA

ISIM
TIMIȘOARA
National Research & Development Institute for Welding and Material Testing - ISIM Timișoara

METHOD AND SYSTEM FOR ACCELERATED ARTIFICIAL AGEING OF THERMOPLASTIC OR COMPOSITE MATERIALS

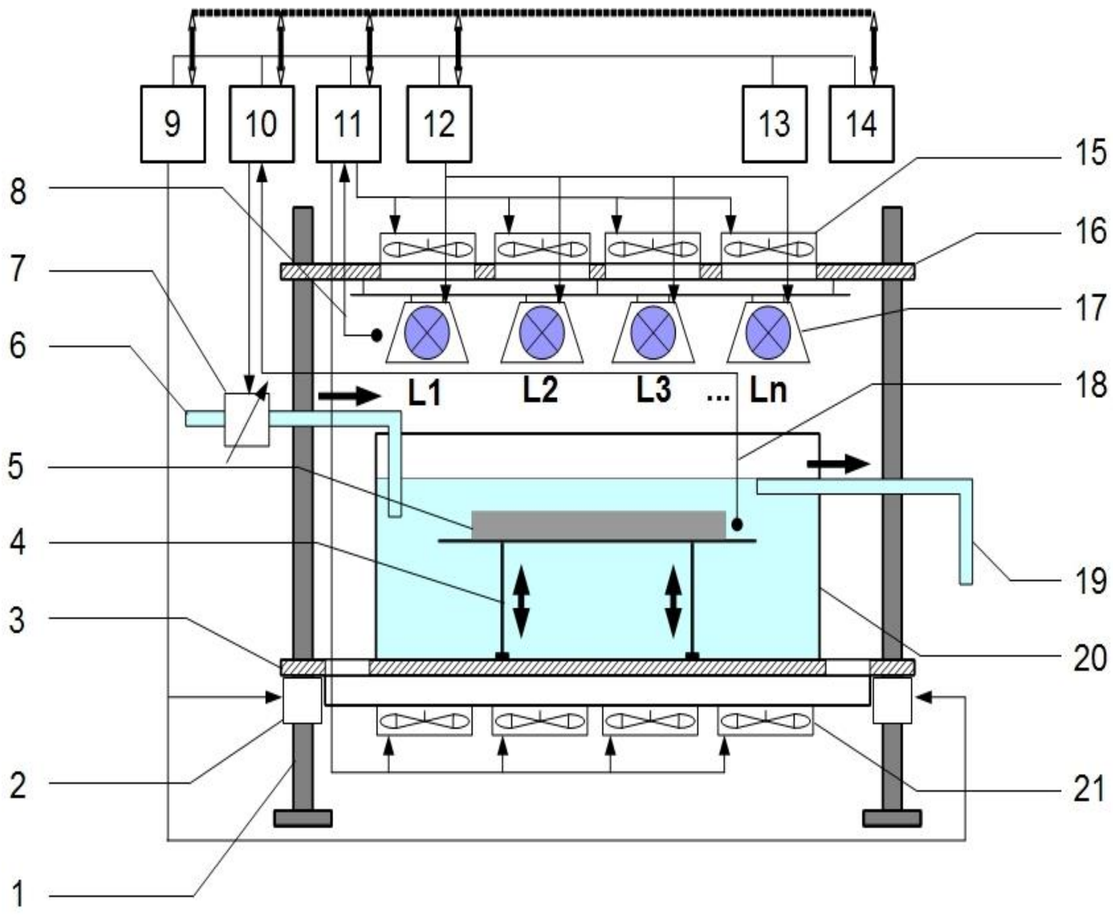
D

Patent No. RO 131897 A2 / 29.04.2022

Authors: Alin Constantin MURARIU, Lorand KUN

Object of the invention:

The method is based on the accelerated degradation of samples using ultraviolet (UV) lamps and comparing their physical-mechanical characteristics before and after the artificial ageing process. The accelerated artificial ageing system use UV radiation to age thermoplastic or composite materials. The system presented in figure 1 and 2 is designed to achieve accelerated materials degradation under controlled conditions, to estimate their behaviour over time in industrial working conditions.



(1) - fixing columns;
(2) - step motors;
(3) - lower mounting plate;
(4) - immersed height-adjustable support;
(5) - immersion samples;
(6) - water inlet;
(7) - electrovalve;
(8) - thermocouple;
(9) - control block;
(10) - control block for tank water supply;
(11) - control block for forced air cooling system;
(12) - control block for UV lamps;
(13) - uninterruptible power supply;
(14) - programmable microcontroller (PCL);
(15) - upper coolers;
(16) - upper support plate;
(17) - ultraviolet lamps;
(18) - thermocouple;
(19) - water overfill exhaust connection;
(20) - constant level water tank;
(21) - lower coolers

Figure 1. *Block diagram of the accelerated artificial ageing system*

Technical problem solved by the invention:

- the need to assess changes over time in the physical-mechanical characteristics of components made of thermoplastic or composite materials using qualitative determinations of resistance to artificial ageing;
- exposure to UV radiation and removal of infrared (IR) radiation generated by ultraviolet lamps by water cooling of samples, a process controlled by dedicated software implemented in an automated system.



Figure 2. *Monitoring and control system for UV artificial ageing of thermoplastics and composites*

Advantages:

- eliminates the effect of heat on samples, degradation being achieved exclusively by exposure to UV radiation and not by the cumulative effect of UV and IR radiations;
- provides high flexibility, as the method can be applied to different sizes of thermoplastic components, i.e. the system can be set to operate in different irradiation / temperature / time regimes, according to the requirements;
- the operating mode is simple and intuitive, the system being controlled by means of a PLC with dedicated software;
- it is a high-performance UV accelerated artificial ageing system.

Contact: ISIM Timişoara, 30 Mihai Viteazu Bv., 300222 Timişoara, România
• tel.: +40 256 491831 • www.isim.ro • isim@isim.ro, amurariu@isim.ro

Opportunity
CORNELIUGROUP Research-Innovation Association
Creation
Realization
INVENTCOR
Power of Creative Mind
Deva ROMANIA

ISIM
TIMIȘOARA
National Research & Development Institute for Welding and Material Testing - ISIM Timișoara

DEVICE FOR TRANSVERSE PROCESSING THROUGH THE WATER JET CUTTING PROCESS

Patent No. RO 131032 B2 / 30.03.2020

D

Authors: Nicușor-Alin SÎRBU, Ion Aurel PERIANU, Dan IONESCU

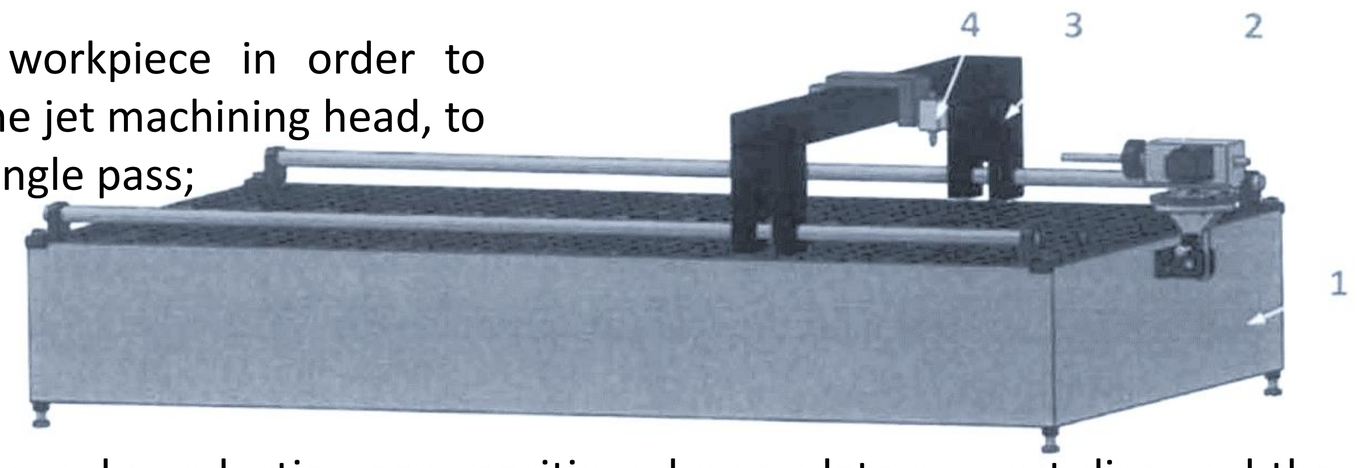
Novelty items:

The device for transverse machining by the water-jet cutting process, in which the workpiece is clamped, can be positioned in a horizontal plane or inclined to the horizontal plane of the work surface.

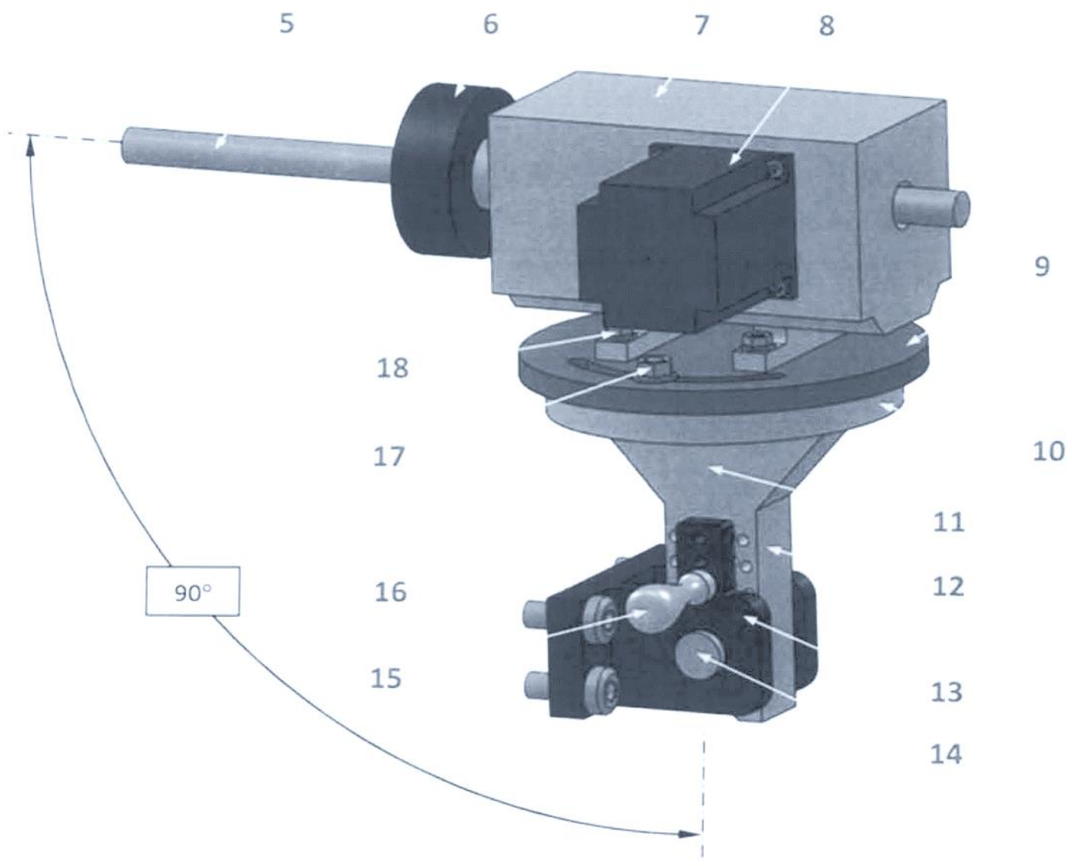
It is possible for the workpiece to be tilted mechanically by means of transmissions (stepping motor-reducer) which have the effect of providing the angles of tilt of the workpiece in the vertical and/or horizontal plane, so that this possibility can be used either in ordinary machining operations or to be included in the aforementioned programme, i.e. the automatic operation programme.

The technical problem solved by invention:

- controlling the positioning movements of the workpiece in order to position it as accurately as possible in relation to the jet machining head, to obtain the workpiece to the final dimensions in a single pass;



- the device for transverse machining by the water-jet cutting method is fixed by means of a support frame and fixing screws to a water-jet cutting machine provided with a portal and a water-jet cutting head, and is composed of an electric motor and a reduction gear positioned on a plate support disc, and the electric motor drives the reduction gear which rotates a chuck in which the workpiece is clamped, all fixed to the workpiece mounting disc by means of threaded pins and nuts, which positions the workpiece horizontally in the ±30° field and can be locked behind the axis Oy by means of screws, the workpiece mounting disc being attached to the support frame by means of a vertical plate which rotates vertically about a spindle, fixed to a support part by means of a fixture and thus able to be positioned in two perpendicular planes.



Claims:

Device for cross-cutting by the water-jet cutting method (2), fixed by means of a support frame and fixing screws (16) to a water-jet cutting machine (1) provided with a portal (3) and a water-jet cutting head (4), consisting of an electric motor and a reduction gear positioned on a plate support disc, characterized in that the electric motor (8) drives the reduction gear (7) which rotates a chuck (6) in which the workpiece (5) to be machined is clamped, all fixed to the workpiece mounting disc (9) by means of threaded pins and nuts (18), which position the workpiece in the horizontal plane 9 in the field ±30°, lockable behind the axis Oy by means of screws (17), the workpiece mounting disc (10) being attached to the support frame (11), by means of a vertical plate (12) which rotates in the vertical plane about an axis (14) fixed in a support part (13) and is locked by means of a fastener (15) and is thus able to be positioned in the vertical plane with inclinations of up to ±20°.

Advantages:

- possibility of transverse machining of workpieces of revolution (with axis of symmetry perpendicular to the plane of the cutting head of a waterjet cutting machine);
- the possibility of machining these workpieces at various angles of inclination of the workpiece relative to the plane of the water-jet cutting head;
- the possibility of machining workpieces made of different materials (metallic or non-metallic);
- the possibility of machining to final dimensions in a single pass, to the quality resulting from the relevant technical documentation.

Contact: ISIM Timişoara, 30 Mihai Viteazu Bv., 300222 Timişoara, România

• tel.: +40 256 491831 • www.isim.ro • isim@isim.ro, asirbu@isim.ro

Opportunity
CORNELIUGROUP Research-Innovation Association
Creation
Realization
INVENTCOR
Power of Creative Mind
Deva ROMANIA

ISIM
TIMIȘOARA
National Research & Development Institute for Welding and Material Testing - ISIM Timișoara

MEASURING SYSTEM AND METHOD OF ABRASIVE WATER JET DIAMETER, TO CONTROL THE CUTTING PROCESS

D

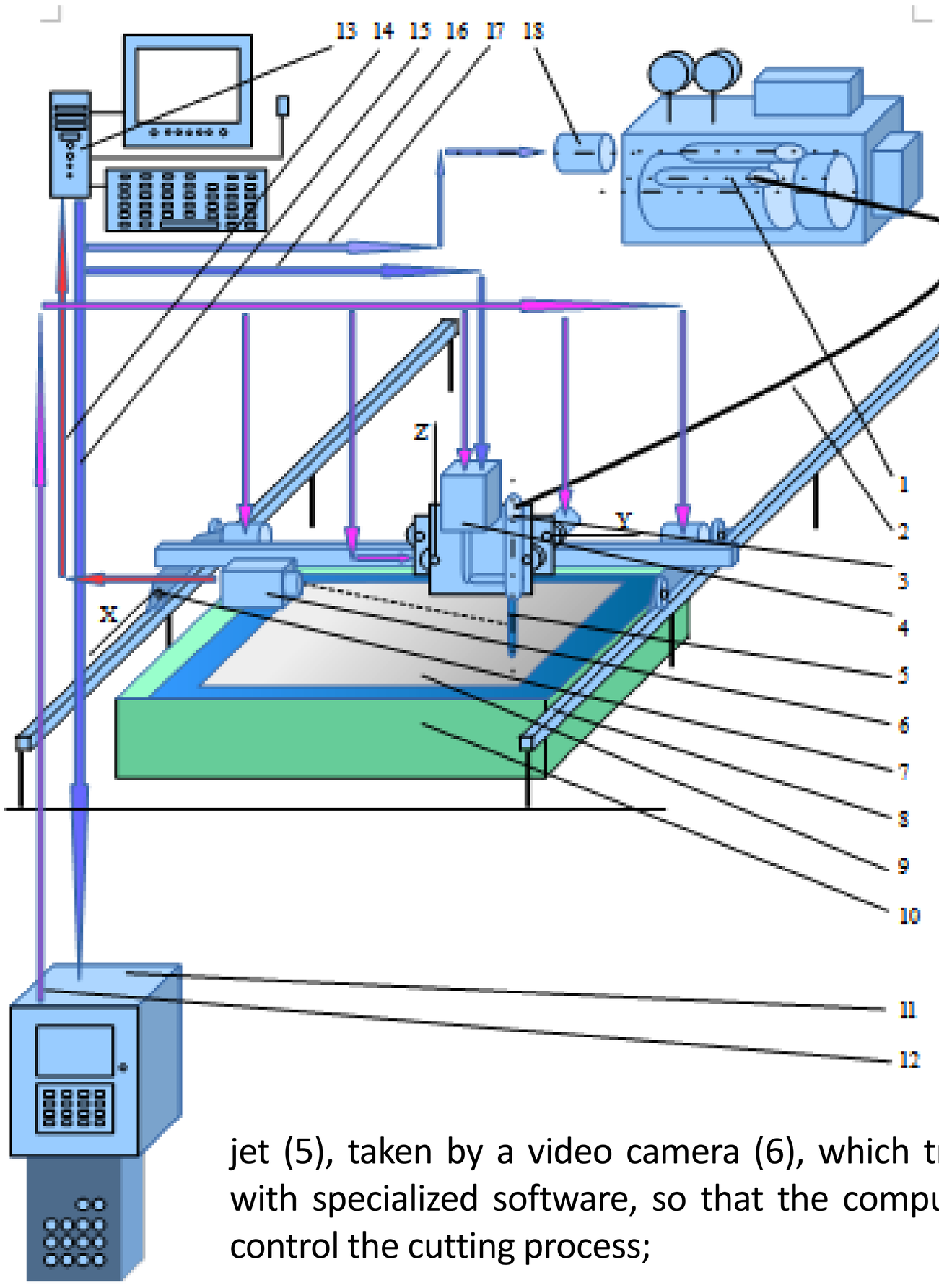
Patent No. RO 130944 A2 / 30.05.2022

Authors: Ion-Aurel PERIANU, Victor VERBIȚCHI, Dan IONESCU

Novelty items:

Measuring the diameter of the abrasive water jet on its image, because direct measurement is not possible, due to the very high kinetic energy of the jet.

Invention Class 5. Industrial and laboratory equipment's.



Components:

(1) high pressure pump;
(2) high pressure pipe;
(3) cutting head;
(4) abrasive dispenser;
(5) abrasive water jet;
(6) video camera;
(7) drive system;
(8) travel rail;
(9) cutting material;
(10) collecting tank;
(11) computer numerical control unit – CNC;
(12) data and supply bus;
(13) computer;
(14) camera - computer data bus;
(15) computer - CNC data bus;
(16) computer - dispenser data bus;
(17) computer - actuator data bus;
(18) pressure actuator.

Claims:

1. System of measuring the diameter of abrasive water jet, characterized in that it measures the diameter on an image of the abrasive water jet jet (5), taken by a video camera (6), which transmits the image to a computer (13), equipped with specialized software, so that the computer (13) transmits real-time correction signals, to control the cutting process;
2. Method of measuring the diameter of abrasive water jet, characterized in that it uses an image of the abrasive water jet (5) as an intermediate model for measuring, so that, according to the invention, the image is taken by a video camera (6) and is processed by a computer (13), which transmits correction signals, to control the cutting process.

Applications:

- Control of abrasive water jet of cutting machines, on rated pressure of 3000 - 4000 bar;
- Improving the turbulent flow in hydraulic turbines;
- Reducing the destructive effects of cavitation;
- Improvement of hydraulic equipment.

Contact: ISIM Timişoara, 30 Mihai Viteazu Bv., 300222 Timişoara, România
• tel.: +40 256 491831 • www.isim.ro • isim@isim.ro, aperianu@isim.ro

Opportunity
CORNELIUGROUP Research-Innovation Association
Creation
Realization
INVENTCOR
Power of Creative Mind
Deva ROMANIA

ISIM TIMIȘOARA
National Research & Development Institute for Welding and Material Testing - ISIM Timișoara

DEVICE FOR OPERATING A WATER JET CUTTING HEAD

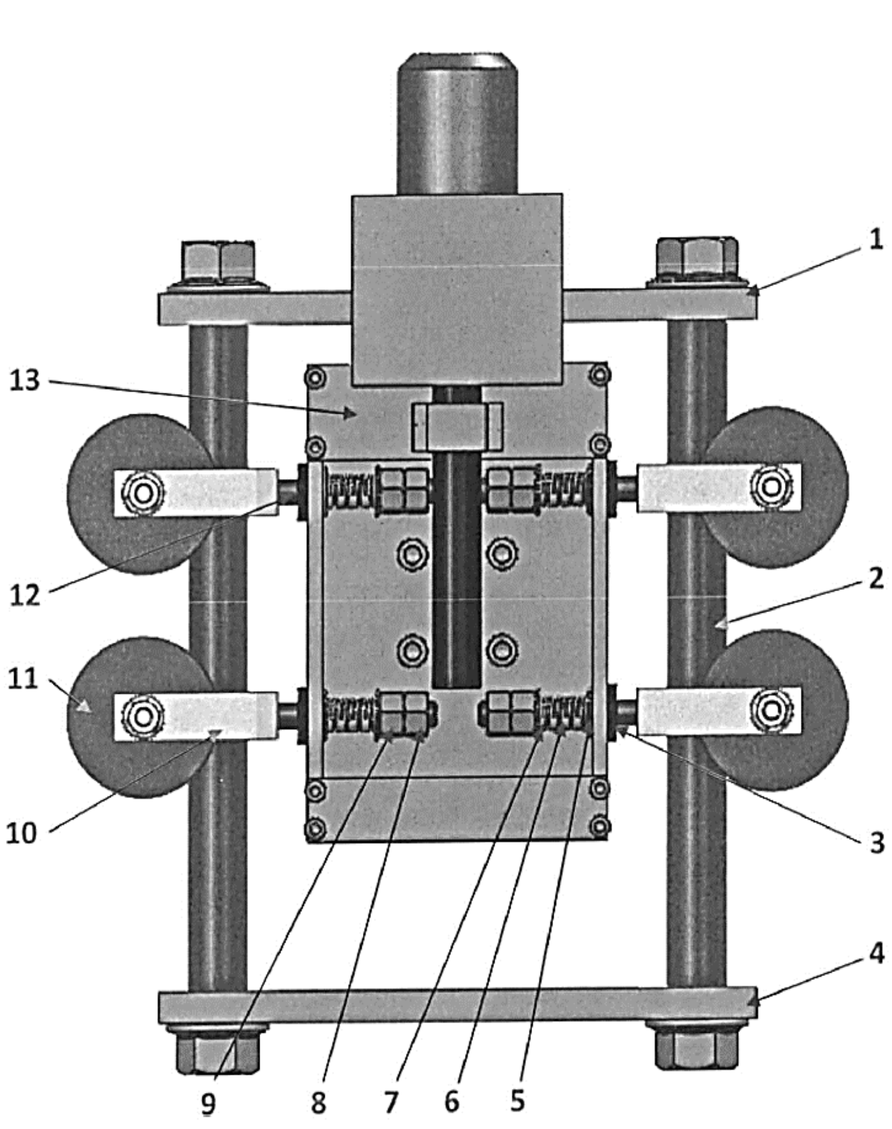
Patent No. RO 130835 B1 / 30.04.2019

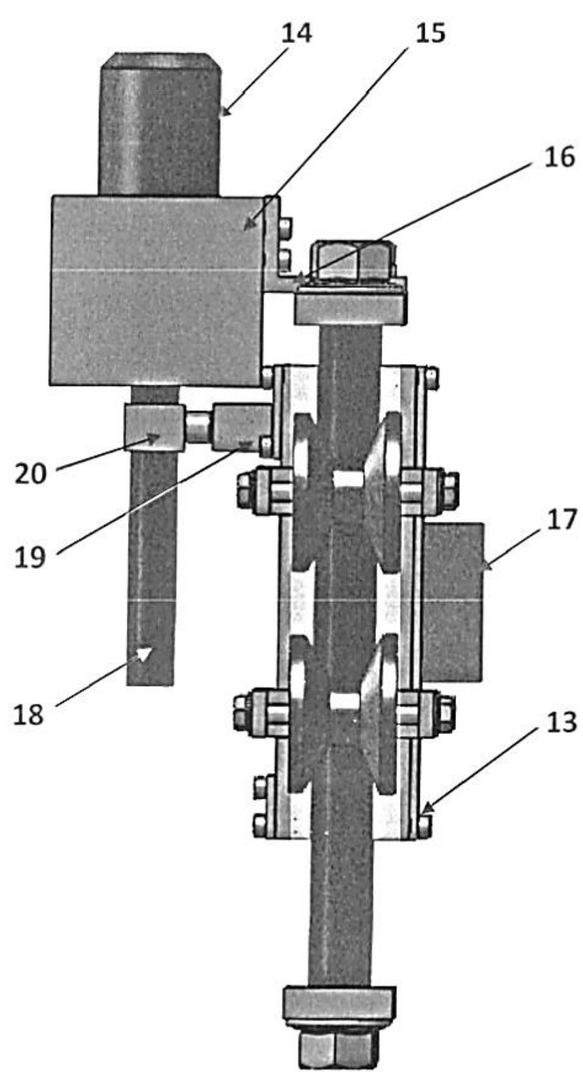
D

Authors: Nicușor-Alin SÎRBU, Dan IONESCU

The invention relates to a device for operating a water jet cutting head, with the purpose of correctly positioning it in relation to the working surface, or which is used in other industrial equipment, in situations where a linear movement of a working unit is required without deviations, such as in an oxy-fuel or plasma cutting facility, a submerged arc welding facility, etc. The technical field in which the invention can be used is the machinery construction industry.

A structural solution for the sled carrying the cutting head is suggested, aiming to achieve the displacement of the cutting head within the tolerance limits specified in the technical documentation for components processed using water jet cutting. The sled of the device is composed of a set of four rollers that move in pairs along two guide columns, thereby establishing the path for the device to travel. The movement of the cutting head sled is achieved through the rotation of the rollers on the two guide columns. This results in a frictionless movement, ultimately leading to a noticeable reduction in wear on the guide tracks.
Any potential inaccuracies in the alignment of the guide columns are absorbed by the four rollers, which, thanks to the proposed structural solution, can accommodate these possible errors arising from either faulty alignment of the two columns, machining inaccuracies, or as a consequence of their gradual wear over time.





Components:

(1) top plate of the frame;
(2) frame columns;
(3) guide bushings;
(4) bottom plate of the frame;
(5) washer of the roller assembly;
(6) spiral spring;
(7) washer of the roller assembly;
(8) nut of the roller assembly;
(9) locknut of the roller assembly;
(10) roller support for the damping assembly;
(11) rolling wheels;
(12) threaded rod of the roller assembly;
(13) sled;
(14) motor;
(15) reducer;
(16) clamping brackets;
(17) cutting head mounting bracket;
(18) guiding screw;
(19) ball joint;
(20) guide nut

Claims:

- This patented concept pertains to a device for operating a water jet cutting head, with the purpose of accurately positioning it relative to the work surface, used in the machinery construction industry.
- The patented device is comprised of a sled (13) driven by a drive unit consisting of an electric motor (14) and a speed reducer (15) to enable vertical movement. A water jet cutting head is mounted on the sled (13). The sled (13) is equipped with a group of four rollers (11) that facilitate vertical displacement along two guide columns (2). These four rollers (11) are mounted on the sled (13) through supports (10) equipped with rods (12) and spiral springs (6) and perform horizontal movements, allowing for the accommodation of potential inaccuracies in the manufacturing and/or assembly of the guide columns (2), the rollers (11), or wear and tear.

Contact: ISIM Timişoara, 30 Mihai Viteazu Bv., 300222 Timişoara, România
• tel.: +40 256 491831 • www.isim.ro • isim@isim.ro, asirbu@isim.ro

Opportunity
CORNELIUGROUP Research-Innovation Association
Creation
Realization
INVENTCOR
Power of Creative Mind
Deva ROMANIA

ISIM
TIMIȘOARA
National Research & Development Institute for Welding and Material Testing - ISIM Timișoara

DEVICE FOR WATER JET CUTTING PROCESSES

Patent No. RO 130329 B1 / 29.11.2018

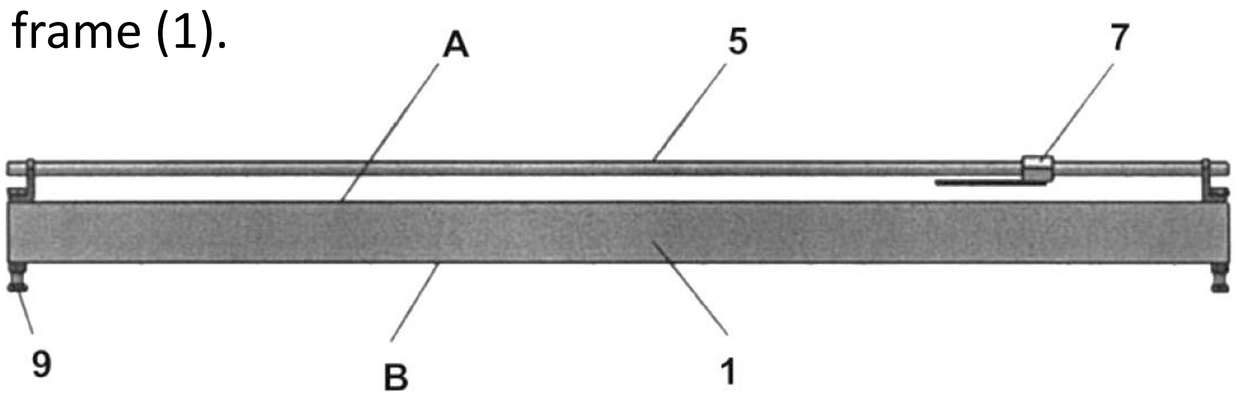
Authors: Ion Aurel PERIANU, Nicușor-Alin SÎRBU

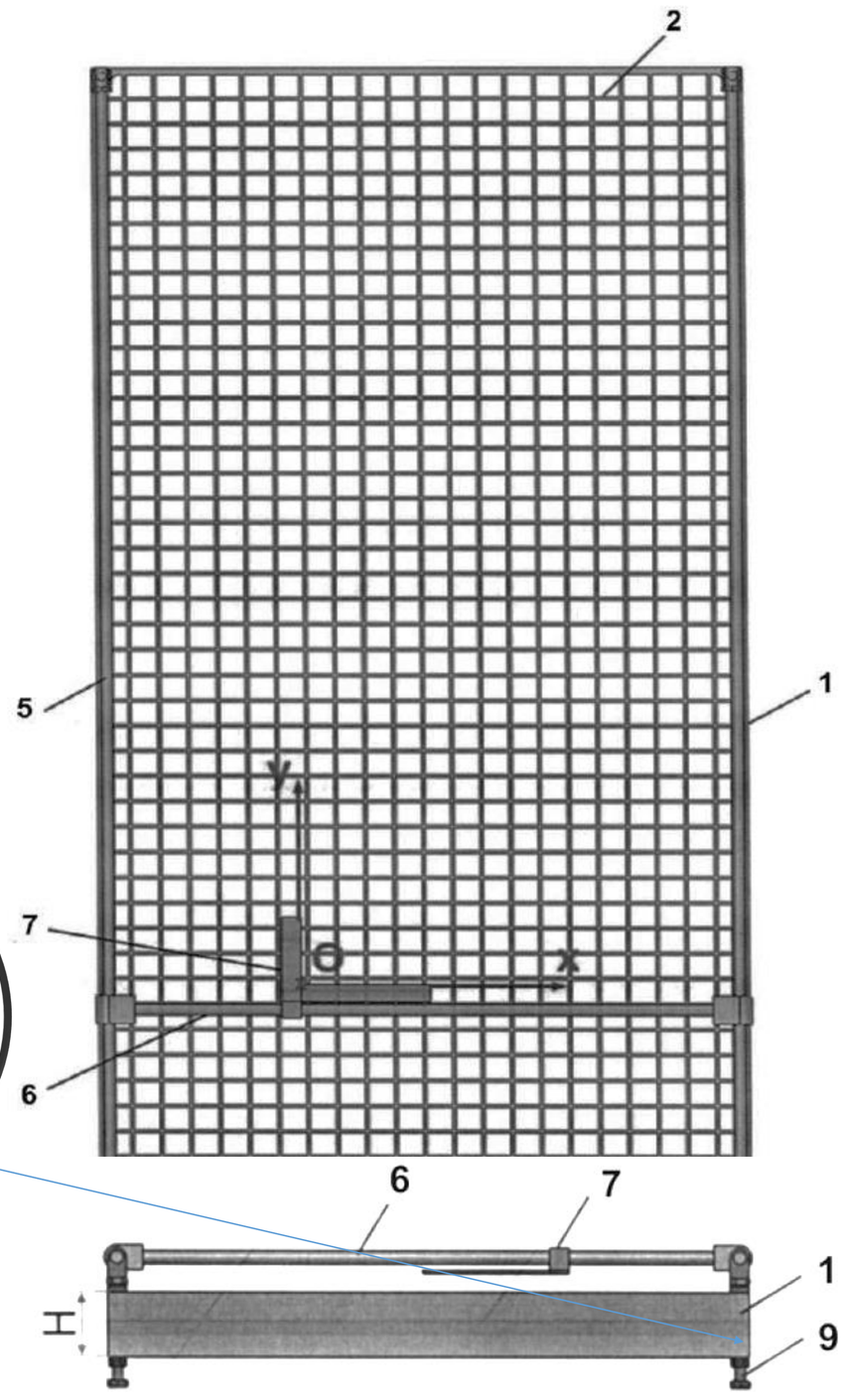
D

This invention relates to a device for waterjet/abrasive waterjet cutting used in the machine construction industry. The technical problem this device solves is extending the lifespan of the grates to which the pieces to be processed are attached.
This device, designed for waterjet cutting operations, eliminates the drawbacks of known devices in that the frame has two working surfaces and the possibility to change the working surface in relation to the adjustable legs and some guiding elements for the workpiece located at the top of the frame.

Claims:

- The patent pertains to a device for water jet or abrasive water jet machining, used in the machinery construction industry.
- The device according to the invention consists of a 100 mm high honeycomb-type metal frame (1) with two faces (A and B), support elements (2) at a height of 100 mm, constructed through welding, adjustable feet (9) to ensure the device's horizontal alignment, guide elements (5), a slide (6), and a slider (7), all of which are necessary for positioning the workpiece to be machined with a water jet on the surface of the metal frame (1).

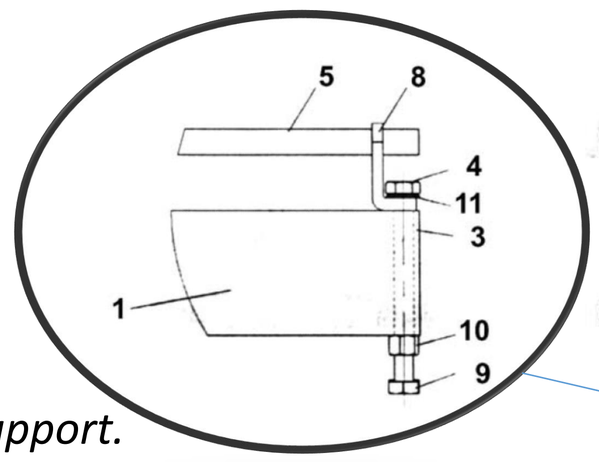




Components:

(1)frame;
(2) arrangement of workpiece placement elements for cutting;
(3) fixed feets support;
(4) clamping nut;
(5)guiding elements;
(6) slide;
(7) sliding rail;
(8) support for guiding elements;
(9) adjustable feets;
(10) nut for securing adjustable legs;
(11) washer;

(A), (B) working surfaces of the workpiece support.



Advantages:

- it is designed in such a way that the two working surfaces, A and B, can be used for arranging, positioning, and securing the workpieces;
- the proposed solution allows for easy leveling of the working surfaces by adjusting their positions;
- correct and easy positioning of the workpieces on the working surfaces can be achieved;
- it is easy to establish a zero point (origin) for the Ox and Oy axes within the working surface area.

Contact: ISIM Timişoara, 30 Mihai Viteazu Bv., 300222 Timişoara, România
• tel.: +40 256 491831 • www.isim.ro • isim@isim.ro, aperianu@isim.ro

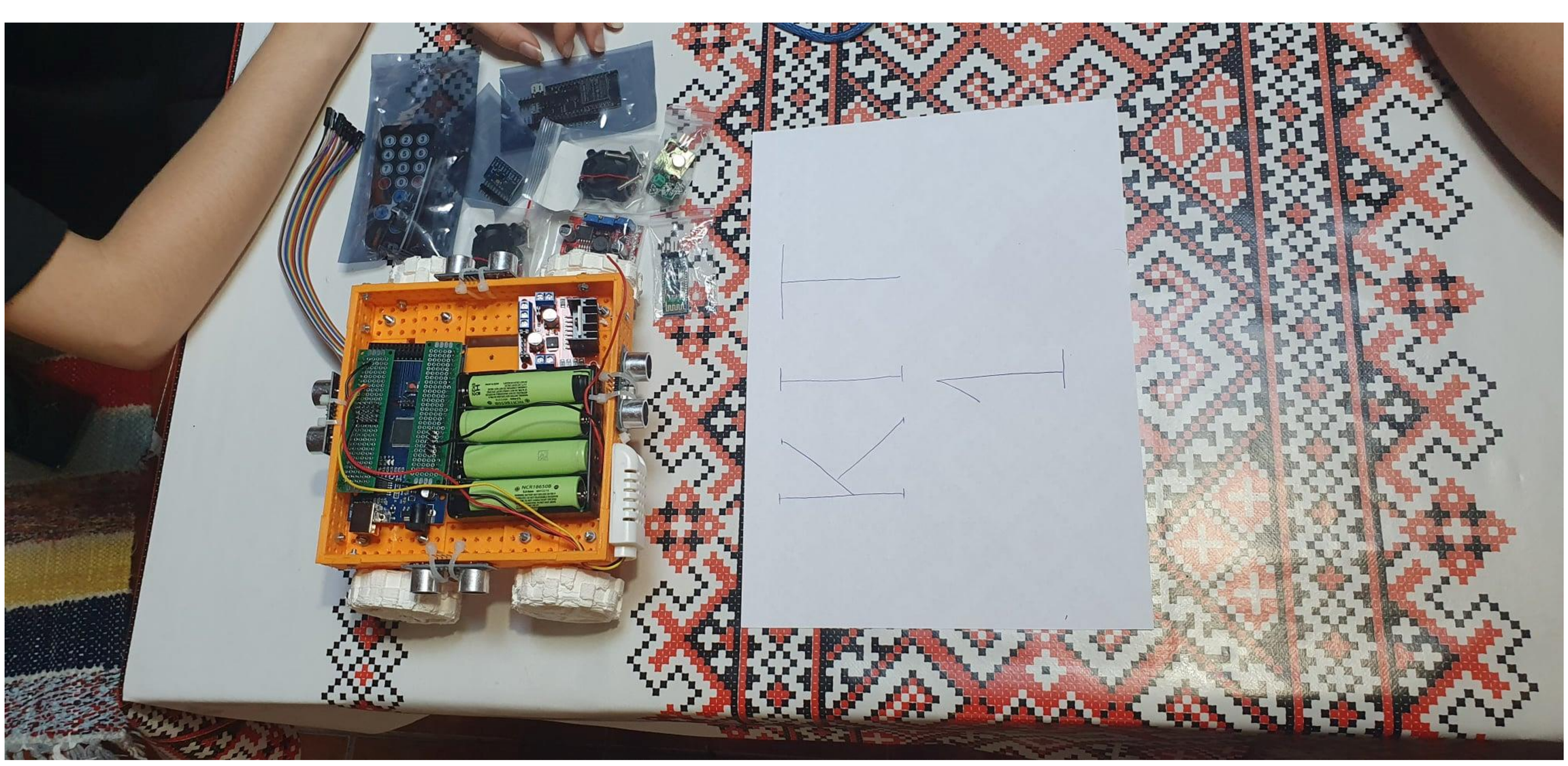
WATER QUALITY VERIFICATION SYSTEM ADAPTED TO TELEPRESENCE ROBOTICS

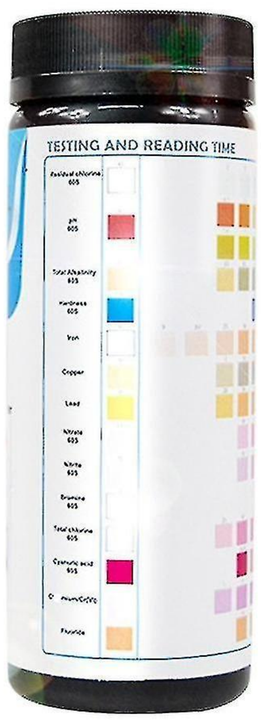
Research project

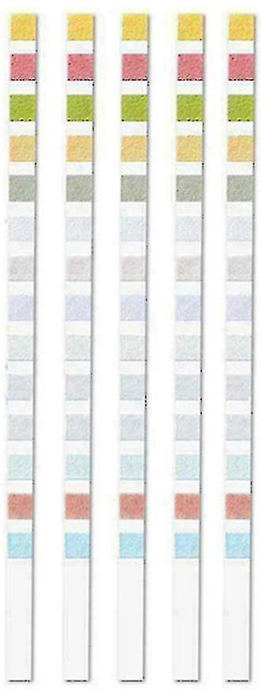
Author/s: Petrariu Sebastian Daniel (student - L.T.E. „Dragomir Hurmuzescu” Deva)
prof. ing. Paul Țoța (coordinator).

D

The project consists in adapting the method of water testing with the help of colored strips to be used with telepresence robots in the field or in laboratory conditions. Basically, the telepresence robot is attached to color sensors that make it possible to read the colors from the strips in commercial water analysis kits.







Contact: contact@cexhd.ro

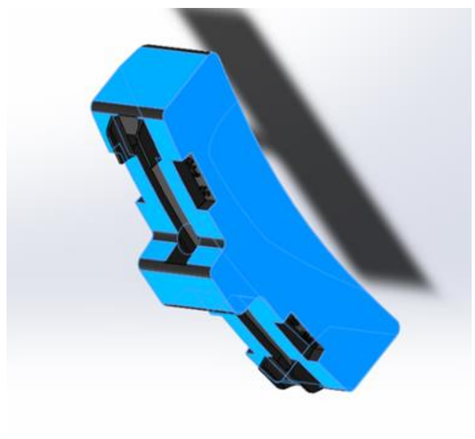
Simulation of casting and solidification of brake shoes from phosphorous cast iron

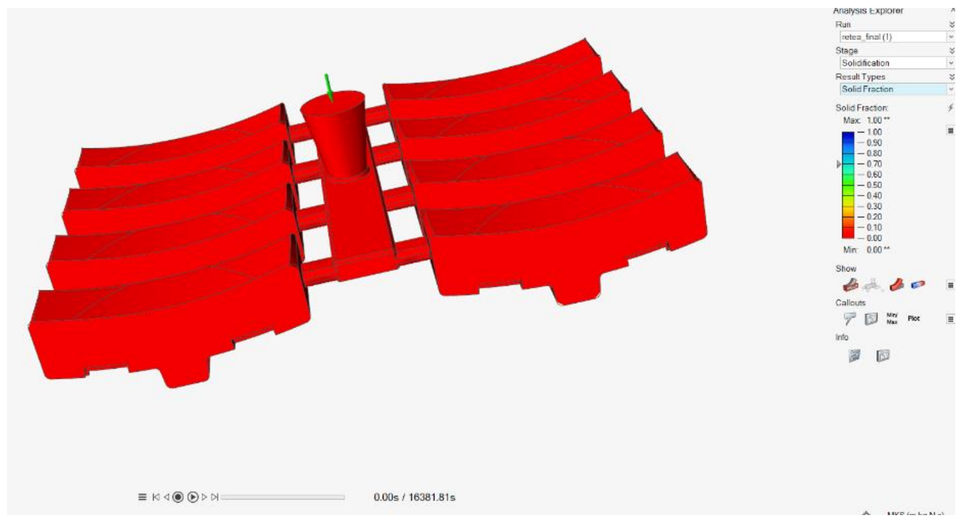
D

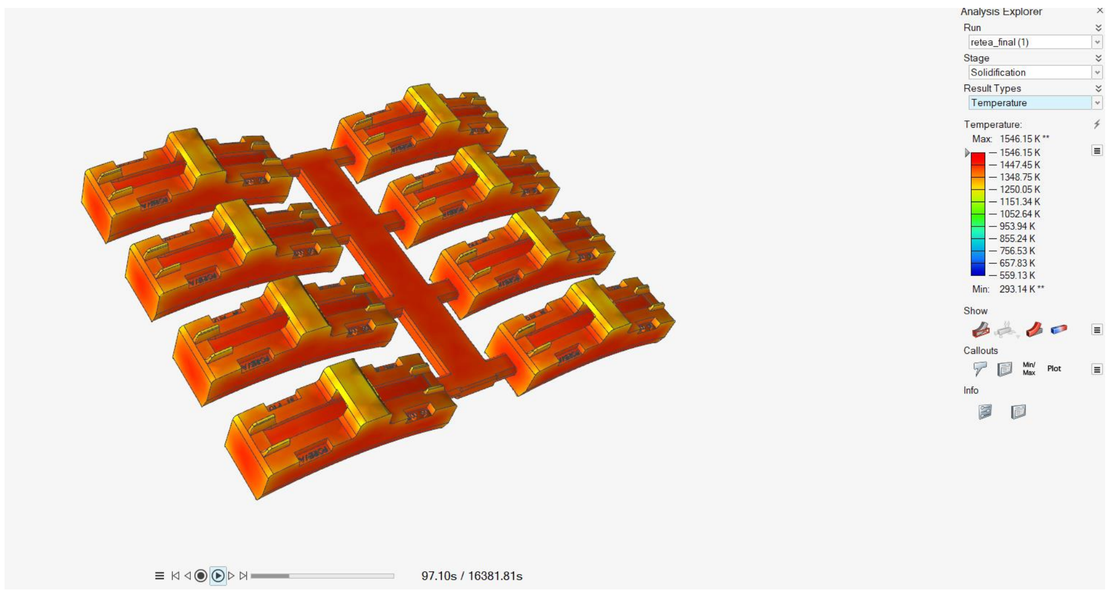
PhD Thesis

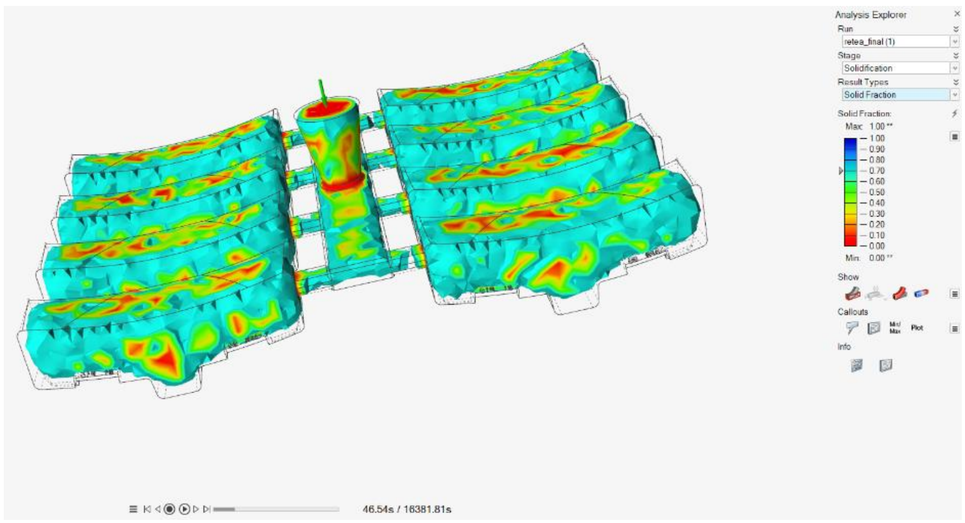
Authors: Flavius Bucur, Ana Socalici, Vasile Putan, Ana Josan, Marius Ardelean

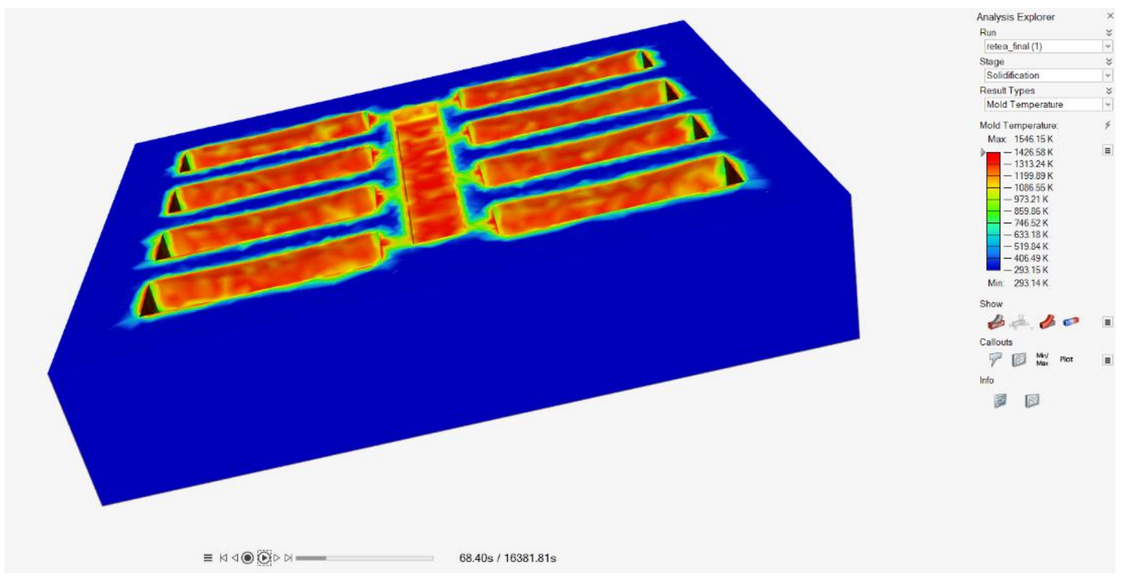
The solidification of cast metal alloys in parts greatly influences the quality of the cast parts. The solidification process influences the micro and macrostructure of the parts, their compactness, mechanical strength, dimensional accuracy and surface quality. When making brake shoes intended for rolling stock, P10 phosphorous cast iron is the most widely used. Solidification modeling and simulation was done using SolidWorks and Altair Inspire Cast. The solidification process of brake shoes is influenced by constructive and technological factors.

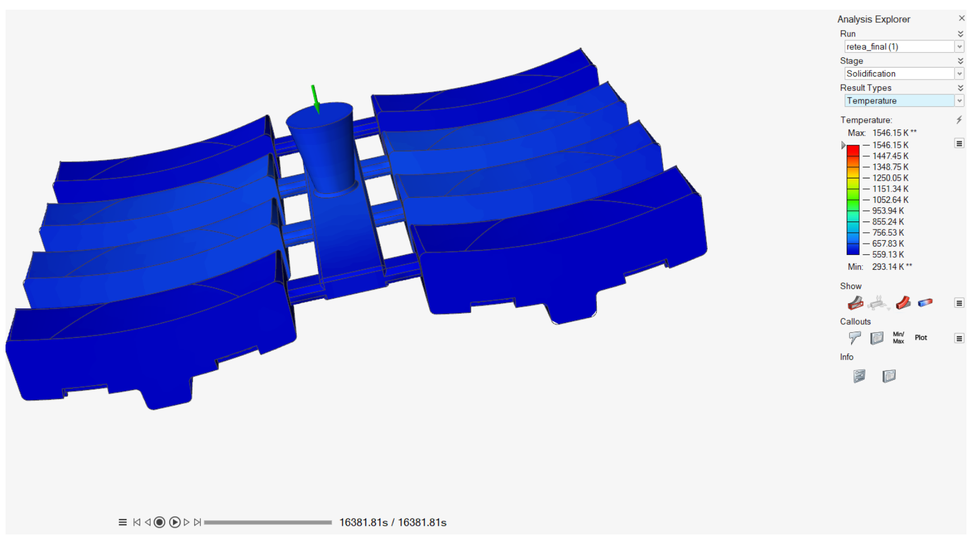












ACKNOWLEDGMENT: *This paper was financially supported by the Project "Network of excellence in applied research and innovation for doctoral and postdoctoral programs" / InoHubDoc, project co-funded by the European Social Fund financing agreement no. POCU/993/6/13/153437*

Contact: flavius_bucur@yahoo.com +40743011626

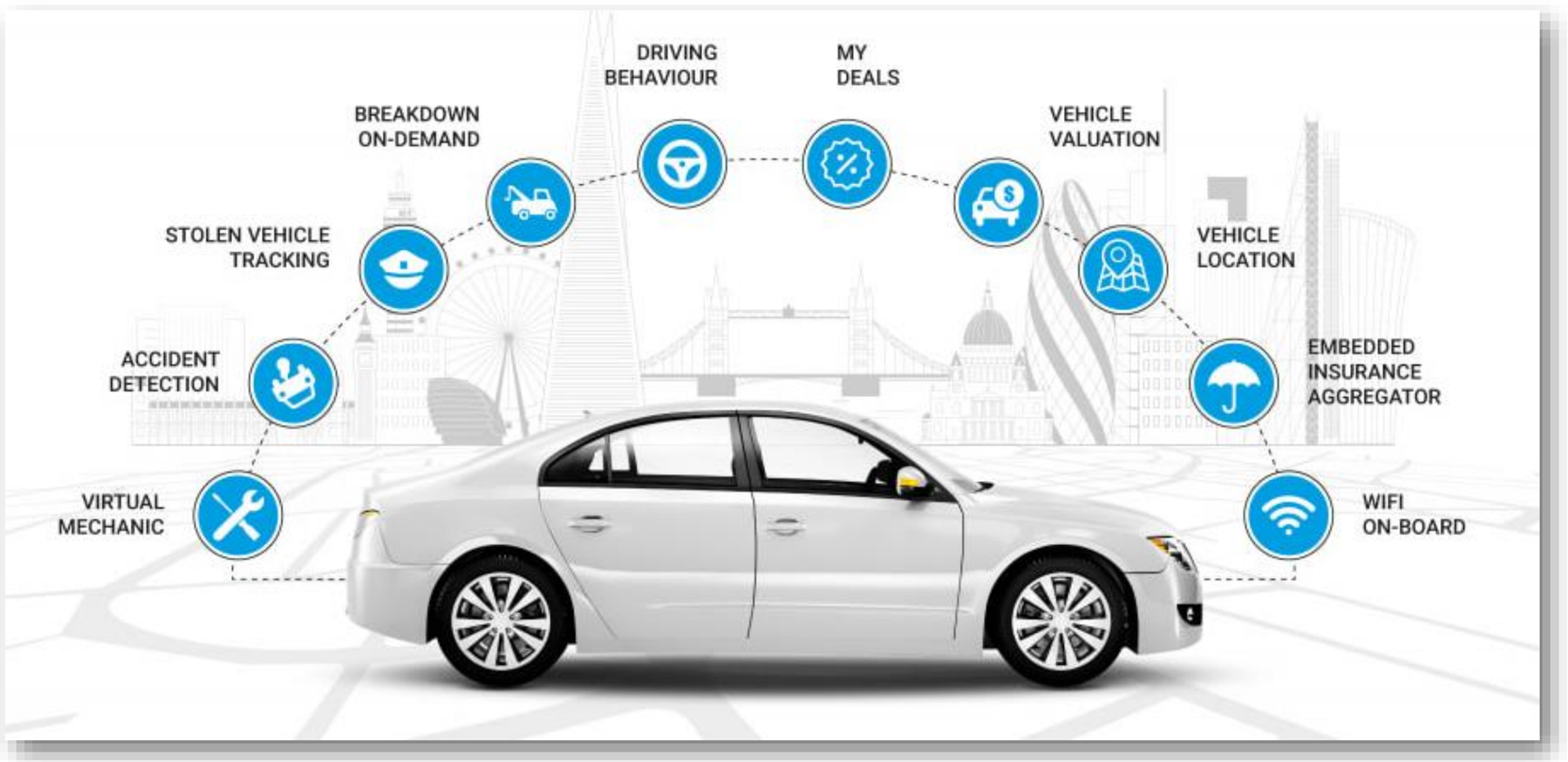
SOFTWARE FOR THE AUTOMOTIVE INDUSTRY

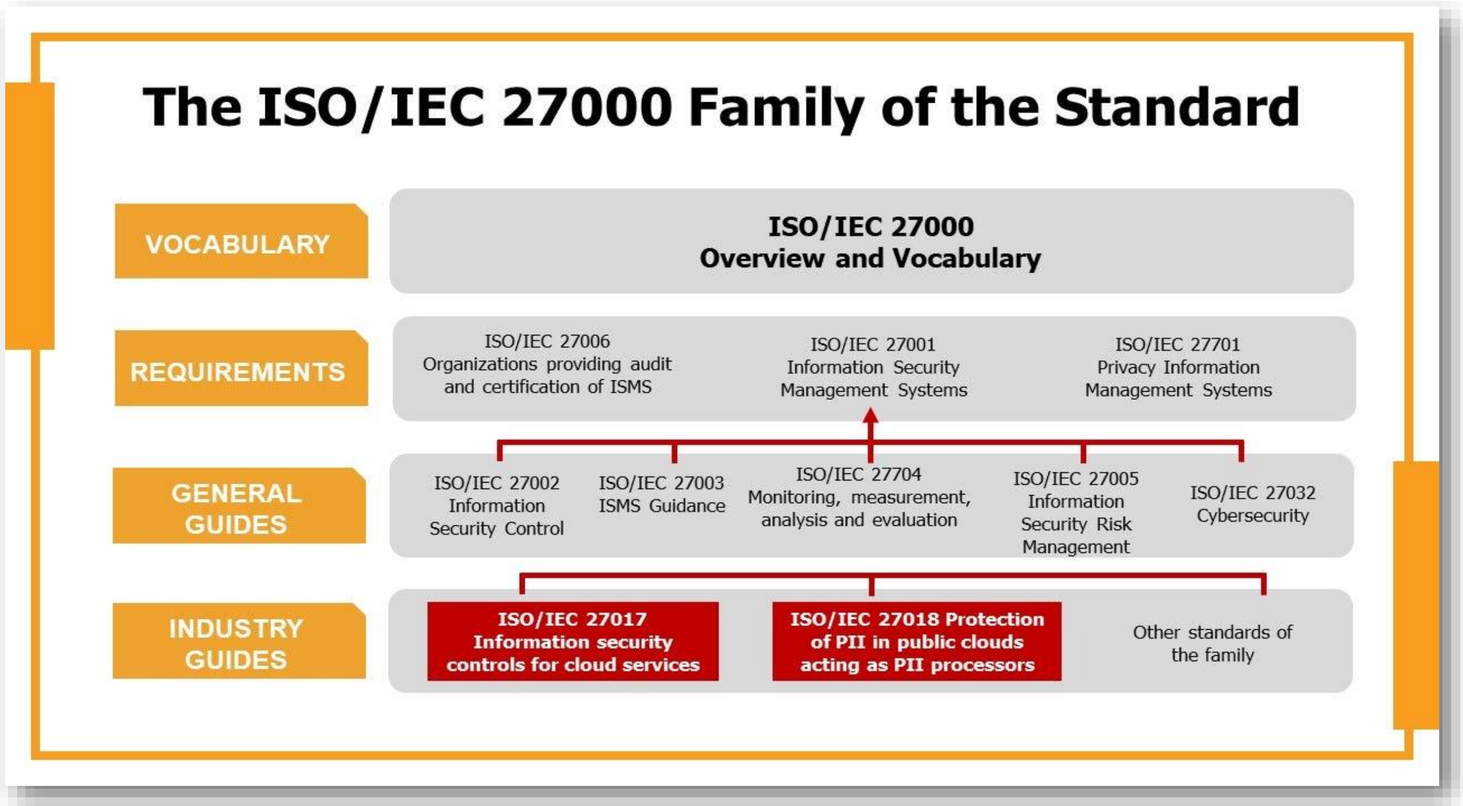
D

Student project

Author: Raluca DĂNILĂ; Coordinator: Corneliu BIRTOK-BĂNEASĂ

The study presents the standards in software development and the security requirements of the associated solutions for the automotive industry. Automakers have opted to outsource non-essential activities and prefer to purchase off-the-shelf components or services at low cost rather than produce them in-house. This consideration applies to software and hardware embedded in a motor vehicle.





The development of integrated technologies facilitates access to data and the management of remote things increases the level of complexity. The possibility of remote management creates the possibility of connection interception, fraudulent data collection and even manipulation of the "object". It is thus necessary to implement standards in software development for the automotive industry. The best-known examples of mandatory standards related to software development are those related to information security and, more recently, to the protection of personal data. Specific requirements for these purposes are covered by the ISO/IEC 27000 and GDPR family of standards.

Contact: corneliugroup@gmail.com

+40729304129

E

Teaching methods

Books

History and Cultural studies

PERSPECTIVE ÎN DIAGNOSTICUL PRECOCE AL SEPSISULUI ȘI ȘOCULUI Sseptic

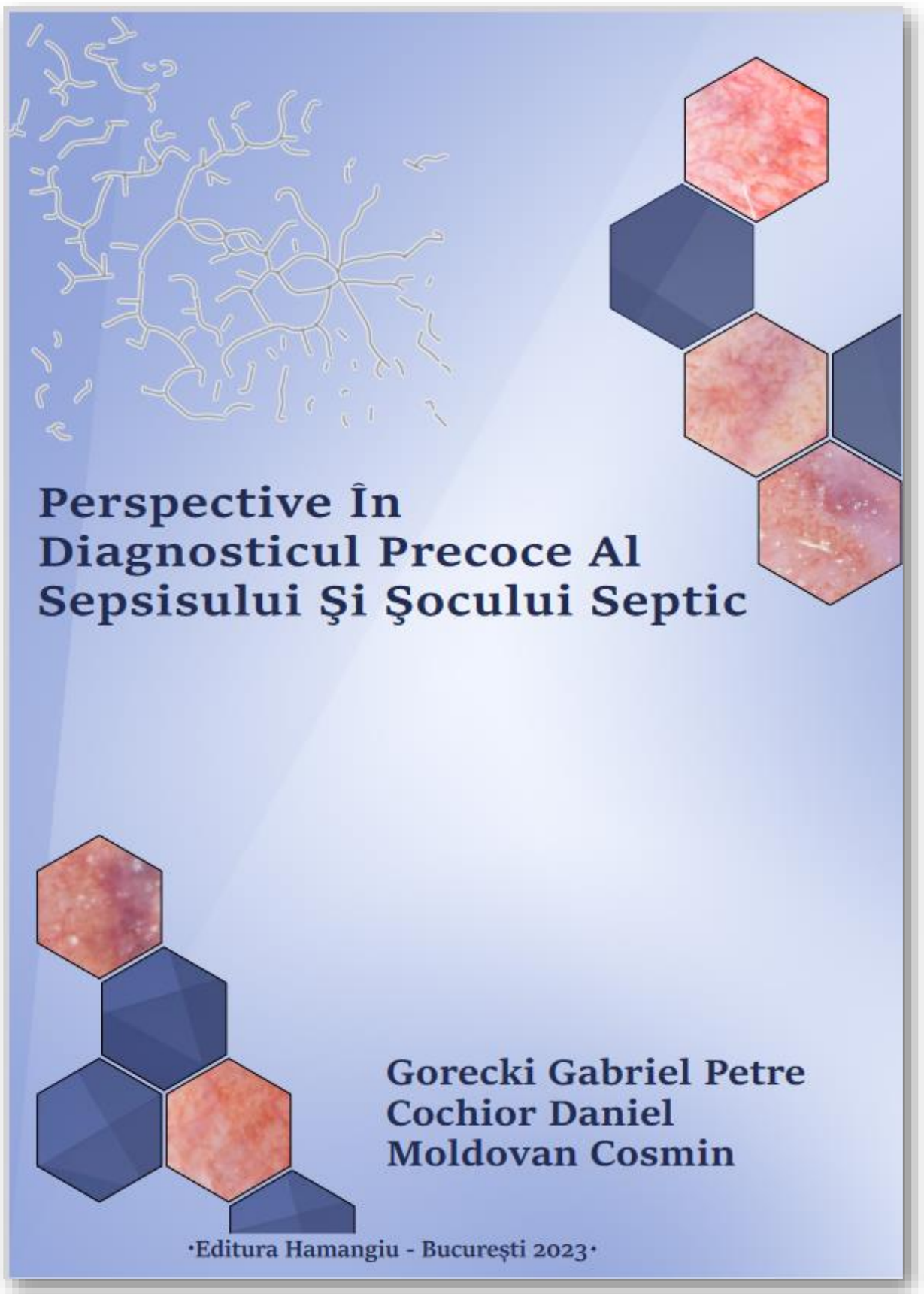
ISBN 978-606-27-2246-3

Autori: Gabriel-Petre GORECKI, Daniel COCHIOR, Cosmin MOLDOVAN

E

Sepsis and septic shock represents major health issues affecting millions people around the world, raising a high mortality and morbidity for patients. The morphologic study of microcirculation is of paramount importance due to microvascularization that is directly involved in the ethiopathology of the acute inflamatory states.

Oral videocapilaroscopy in our study was made with a prototype of device called „ Digital videocapilaroscope” (patent application A/00285/2018) which allow an early diagnosis of sepsis and septic shock.



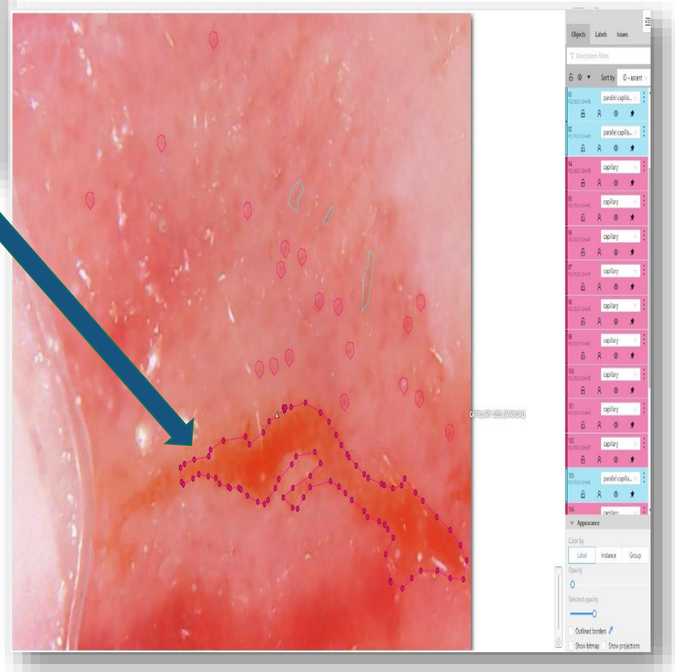








SCAN ME



Sepsisul și șocul septic sunt probleme majore de sănătate, care afectează milioane de oameni din întreaga lume, caracterizate printr-o morbiditate și mortalitate ridicată. Studiul morfologic al microcirculaţiei este de o importanţă fundamentală deoarece patul microvascular este direct implicat în etiopatogenia maladiilor autoimune şi a tulburărilor din stările inflamatorii acute.

Videocapilaroscopia orală, efectuată în studiul nostru cu prototipul de aparat „Videocapilaroscop digital” (cerere brevet invenție A00285/2018) permite vizualizarea alterărilor microcirculatorii. Astfel, putem diagnostica sepsisul în fazele precoce ale bolii, iar instituirea promptă a unui tratament adecvat va duce la rezultate favorabile, în beneficiul pacienților.

Book: https://www.hamangiu.ro/gabriel-petre-gorecki

Contact: gabygo2006@yahoo.com

Opportunity
CORNELIUGROUP
Research-Innovation Association
Creation
Realization
INVENTCOR
Power of Creative Mind
Deva ROMANIA

CORPUL TĂU ÎȚI VA MULȚUMI!

DOCTOR CIP -STIL DE VIAȚĂ SĂNĂTOS

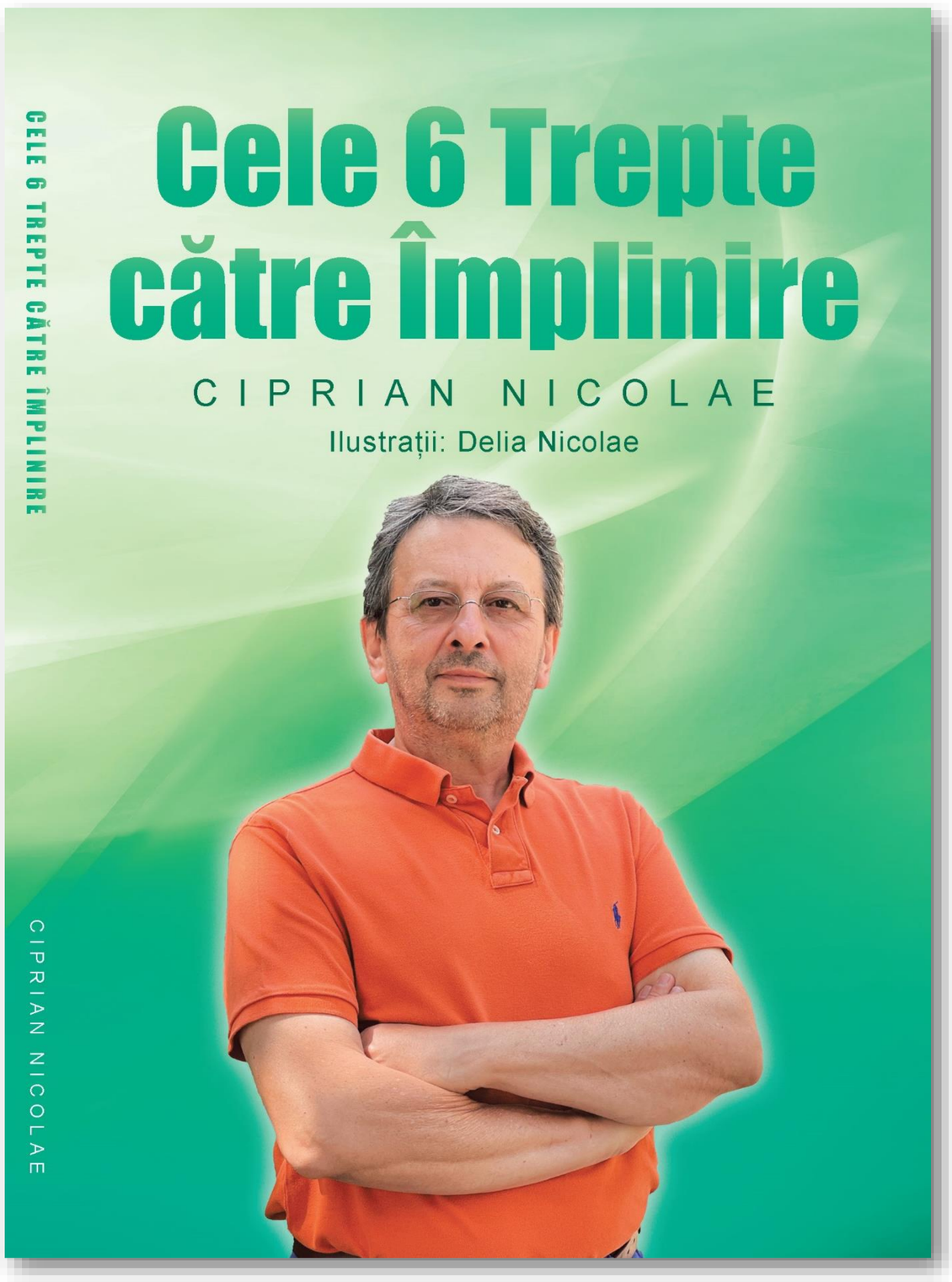
THE 6 STEPS TOWARD FULFILLMENT

E

Book

Author: Marius Ciprian Nicolae

I am a physician, I worked for several years as a manager in a multinational pharmaceutical company, then I became an entrepreneur, being a partner in several companies. For 25 years I have been reading self-help books, written by great authors, Napoleon Hill, Dale Carnegie, Bob Proctor, Jack Canfield, Joe Dispenza, Robin Sharma, Tony Robbins, etc. I am really passioned about this field and all this reading combined with my experience lead me to writing books.



The book represents the spiritualization of my experiences and lessons that I will be presenting in the six chapters of the book, which correspond to the six steps I believe we must climb in order to reach fulfillment: Vision, Visualization, Commitment, Perseverance, Balance, and Gratitude.

The way I see things, fulfillment is much more important than success, whether it is a financial, professional, scientific, or notoriety success.

Someone can have success and yet not feel fulfilled, and vice versa, can be unsuccessful by generally accepted standards and yet feel fulfilled. I tried to be direct and use plain speech, more specific to oral expression than written as if we were having a discussion among friends.



The book has many real examples, with notorious people, as well as ordinary people, whom I know personally, all of them being proofs that these things work in real life and are not just theories.

I wrote the book thinking it would be useful for young people as well as for mature because it is never too early or too late to apply these principles, as Colonel Sanders proved by founding KFC when he was over 60 years old.

Contact: ***doctorcip@doctorcip.eu***

A.D.O.R.

Human rights support project

E

Author: *Anca Maria Dorina & ADOR team*

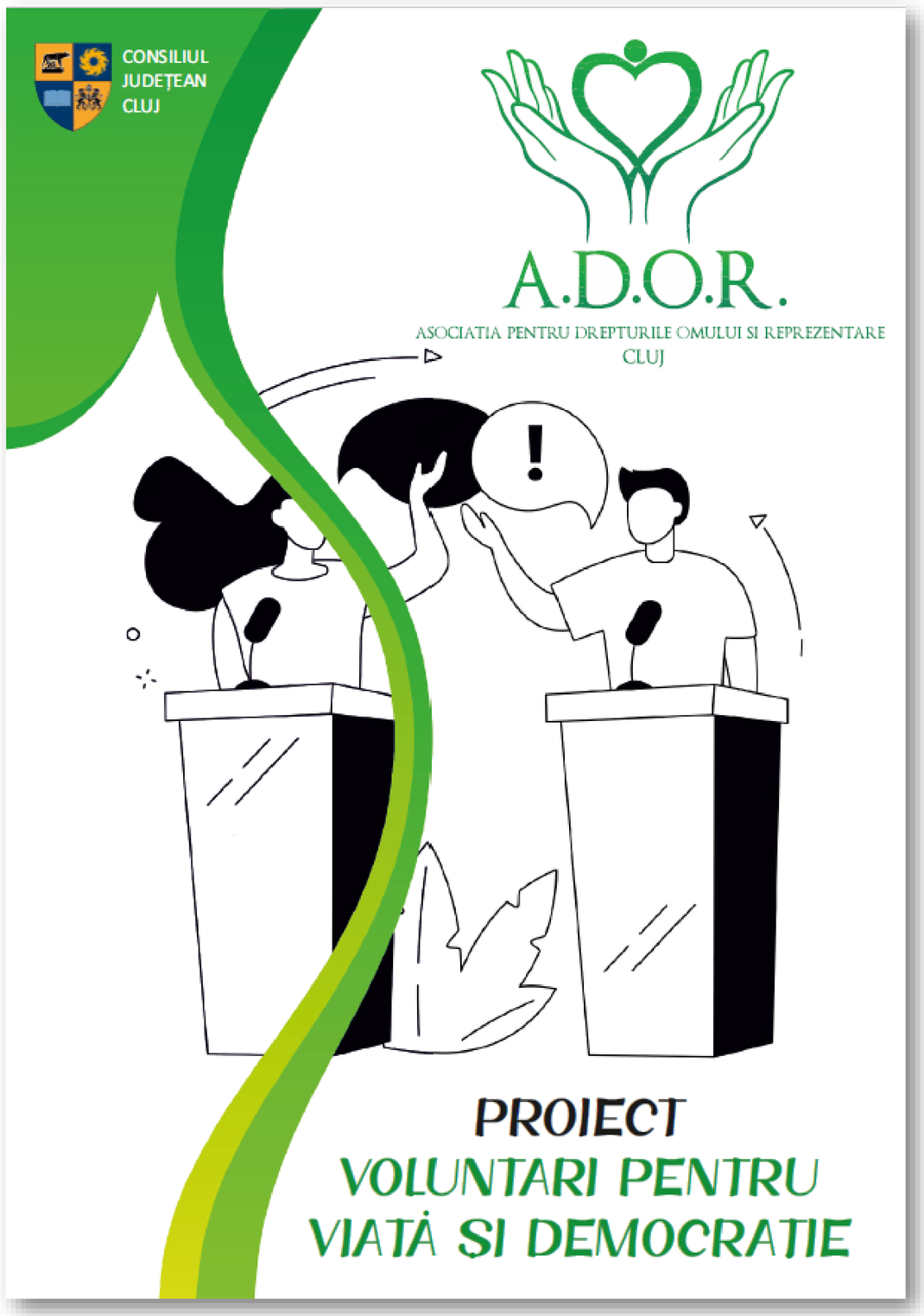
*The purpose of the **ASSOCIATION FOR HUMAN RIGHTS AND REPRESENTATION – ADOR** is in mainly, the support of human rights, and to increase it, it proposes a series of objectives, including:*

- monitoring local, parliamentary, European parliamentary, presidential elections and referenda local and national, through accredited observers and through any other legal means;

- creation of information centers and legal advice in the matter of human rights and social protection;

- carrying out studies, analyses, researches, opinion polls on different topics;

- promoting volunteerism, especially among young people.



*Through the **VOLUNTEERS FOR LIFE AND DEMOCRACY** project we propose to initiate and introduce the practice of dialogue with the all actors can contribute ideas, to promote structured dialogue between decision-makers at political level and civil society, in order to ensure the effective participation of employees in the electoral process. Also, through active involvement of our non-governmental organization in non-formal and informal education activities, we will lay the foundations the process of introduction into the formal curriculum of political education.*





SCAN ME

Contact: *asociatie.ador@gmail.com*

ISBN 978-606-011-136-8

COLPOSCOPIE SI CITODIAGNOSTIC

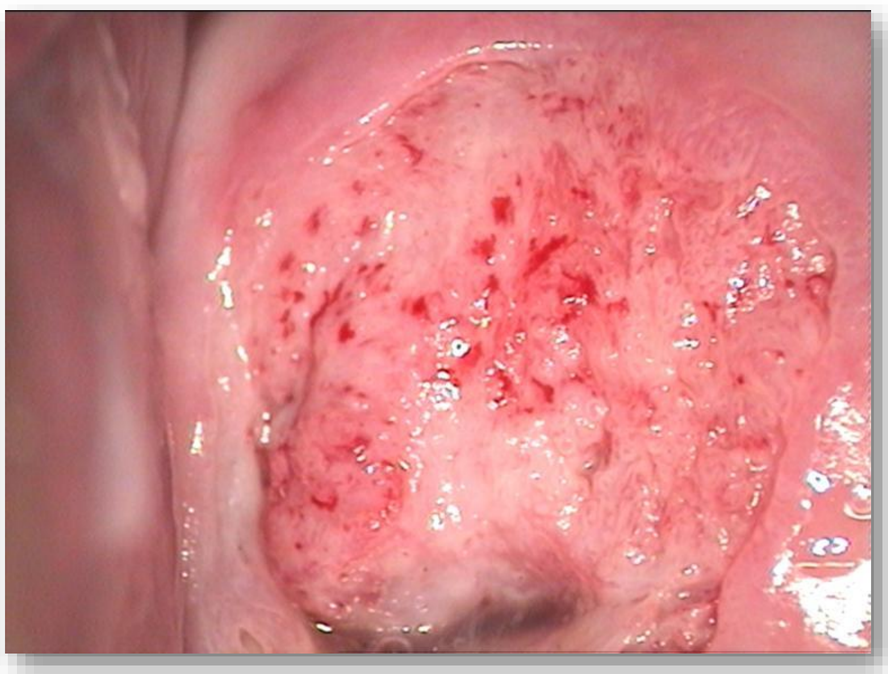
Autori: *LIANA PLEŞ, ANCA-DANIELA STĂNESCU*
OCTAVIAN-GABRIEL OLARU,
MIRCEA-OCTAVIAN POENARU
ROMINA-MARINA SIMA

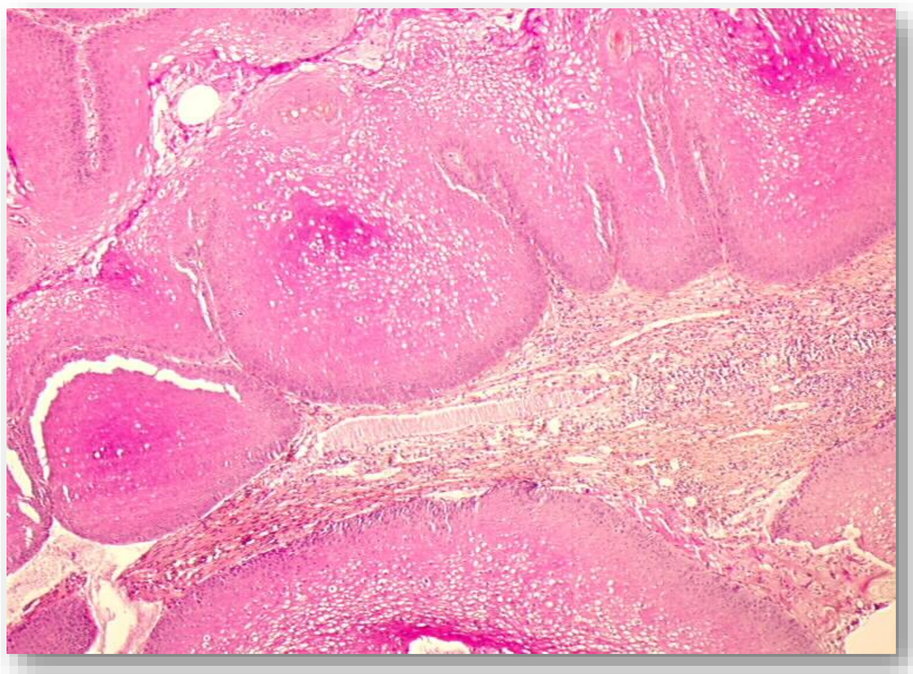
E

Colposcopia a fost introdusă pentru prima dată în arsenalul investigaţiilor ginecologice în secolul trecut de către Hinselman (Germania 1925). Deşi termenul de colposcopie desemnează examinarea vaginului, intenţia iniţială a inventatorului acestei investigaţii a fost de a depista cancerul de col uterin. Metoda de lucru descrisă iniţial avea ca punct de plecare ideea că leziunile epiteliale ale colului uterin sunt precursoare ale cancerului cervical şi pot fi evidenţiate prin mărirea sub lupă. Primele protocoalele de lucru au fost greoaie şi s-a renunţat la ele, mai ales că nu reprezintă o metodă acceptabilă de screening al cancerului de col uterin.

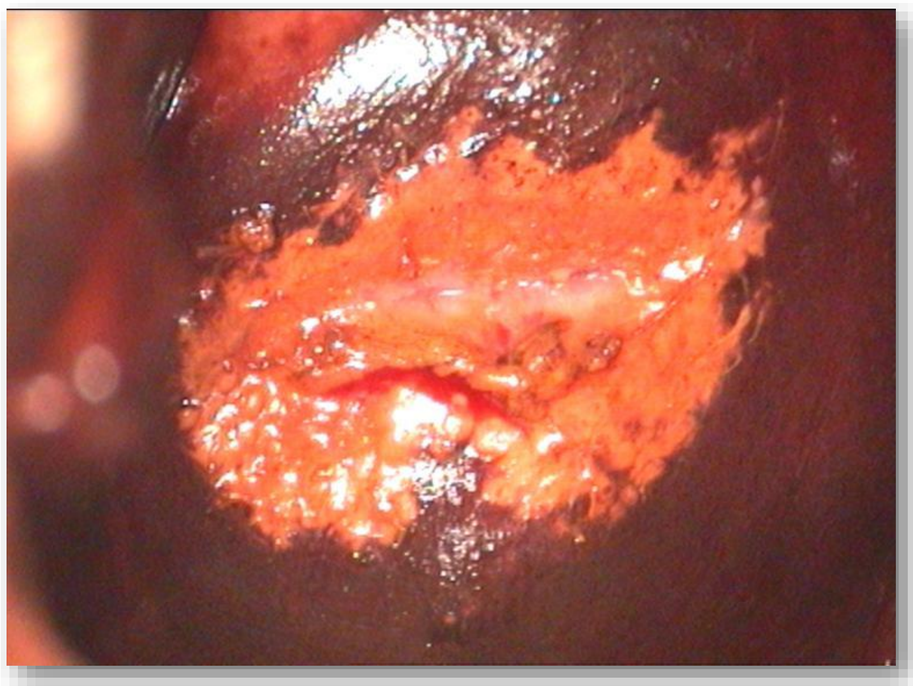
O altă etapă importantă în detecţia cancerului de col, deşi iniţial nu a fost corelată cu colposcopia, o reprezintă introducerea în 1927 de către Babeş iar în 1928 de către George Papanicolau a citologiei descuamative cervicovaginale. Această metodă a devenit rapid preferată de ginecologi în detecţia cancerului de col uterin în SUA unde colposcopia era o metodă cvasinecunoscută până în 1960. Din acest moment colposcopia a devenit şi aici o modalitate de supraveghere a rezultatelor anormale ale citologiei. Colposcopia a fost astfel validată ca o metodă intermediară de urmărire a citologiei anormale pentru a evita practicarea inutilă a biopsiei cervicale, metodă costisitoare, invazivă şi de multe ori nonnecesară.

Cancerul de col uterin rămâne încă pe primul loc între cauzele de deces de natură neoplazică în rândul populaţiei feminine. În tările dezvoltate datorită introducerii screeningului citologic coerent incidenţa cancerului a scăzut apreciabil. Acesta se datorează detectării şi tratării leziunilor precanceroase. În tările în curs de dezvoltare însă cancerul de col uterin rămâne o problemă de sănătate publică.









Colposcopy was first introduced into the arsenal of gynecological investigations in the last century by Hinselman (Germany 1925). Although the term colposcopy refers to the examination of the vagina, the original intention of the inventor of this investigation was to detect cervical cancer. The initially described work method had as its starting point the idea that epithelial lesions of the cervix are precursors of cervical cancer and can be highlighted by magnifying under a magnifying glass. The first working protocols were difficult and they were abandoned, especially since they do not represent an acceptable method of cervical cancer screening. Another important stage in the detection of cervical cancer, although initially it was not correlated with colposcopy, is the introduction in 1927 by Babeş and in 1928 by George Papanicolau of the cervical desquamative cytology. This method quickly became preferred by gynecologists in the detection of cervical cancer in the USA where colposcopy was an almost unknown method until 1960. From this moment colposcopy became a way of monitoring abnormal cytology results here as well. Colposcopy was thus validated as an intermediate method for following up abnormal cytology to avoid the unnecessary practice of cervical biopsy, an expensive, invasive and often unnecessary method.

Cervical cancer is the main cause of neoplastic death among the women. In developed countries, thanks to the introduction of cytological screening, the incidence of cancer has decreased appreciably. This is due to the detection and treatment of precancerous lesions. In developing countries, however, cervical cancer remains a public health problem.

Contact: romina.sima@umfcd.ro

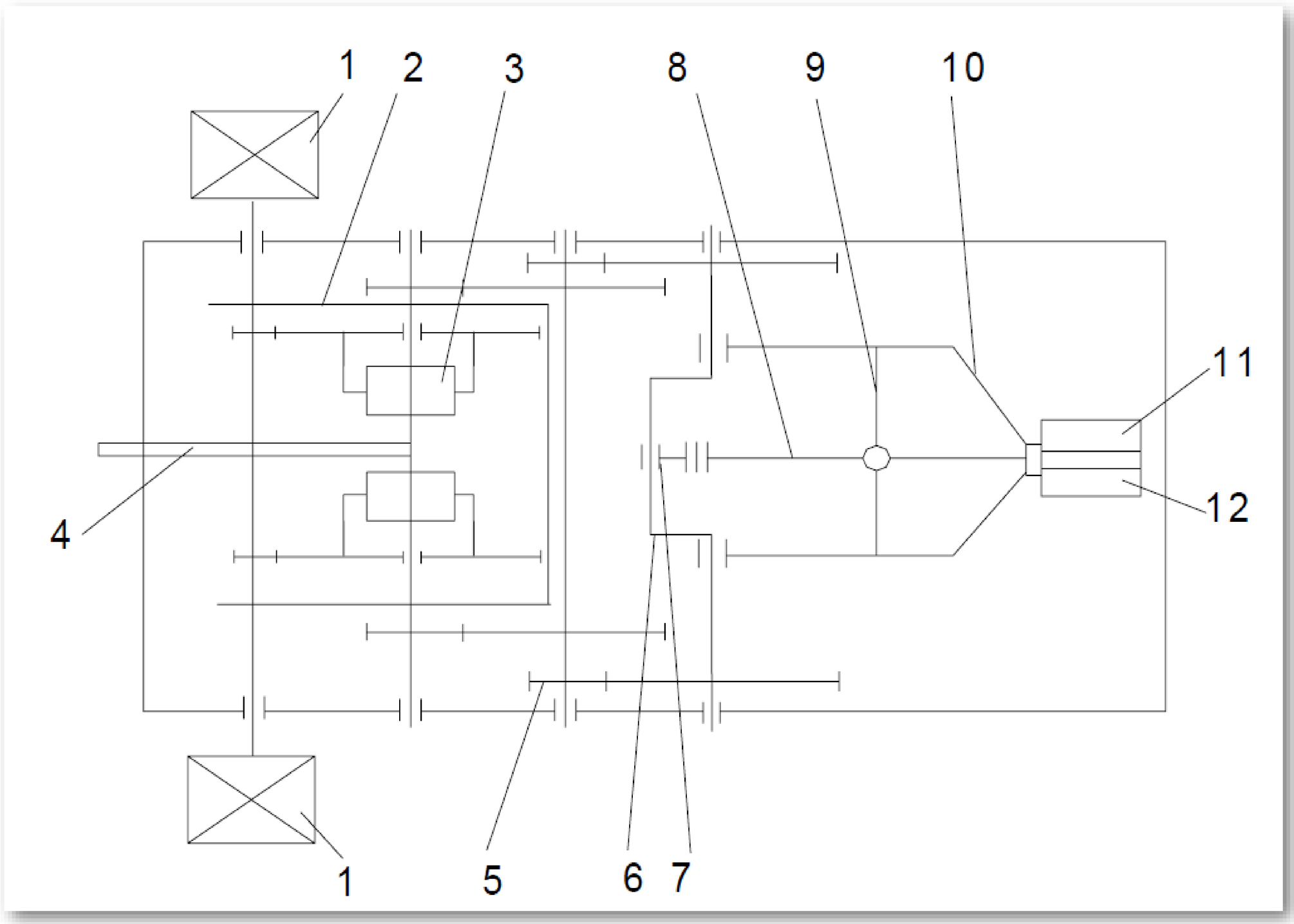
CUTTING MECHANISMS METALLURGY PRODUCTS KINEMATIC AND KINETOSTATIC ANALYSIS

ISBN 978-606-35-0533-1 Author:

Adina BUDIUL BERGHIAN

E

Scissors for cutting metal products play an important role in steel industry (figure 1.). Due to the specificity of their operation, these machines are relatively difficult to study in depth their structure because any stops non-technological means blocking the lamination process. Once put in function, the scissors acquire a "closed box" character that can be observed only the action mode of the knives. As a result, most studies on these machines are experimental. Such a study tries to be also developed in the present work that proposes the use of empirical models and phenomenological characteristics of a scissor with parallel blades of 8000 kN.



In the fifth chapter, the kinematic analysis for the model was carried out laboratory with the help of a specialized software, Turbo C++. Also within of this chapter, an experimental kinematic study was carried out by measuring accelerations with the help of a bi-axial accelerometer built on the basis of a miniaturized integrated circuit. The results obtained by analytical calculation a the kinematic parameters of the laboratory model of the 8000kN scissor, validates both the simulation with the specialized program and the one obtained by using the built-in accelerometer.

Contact: adina.budiul@fih.upt.ro, +40721217057

University of Belgrade
Faculty of Mechanical Engineering

EDUCATIONAL EQUIPMENT FOR SIMULATING INVOLUTE GEARING GENERATION

E

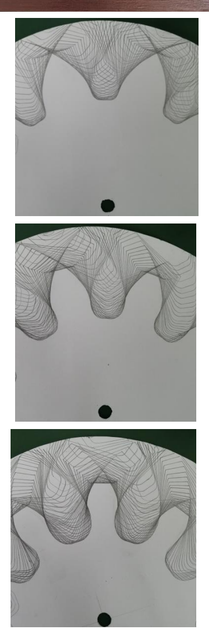
Authors: Milan Stojanović, Pavle Ljubojević, Tatjana Lazović
Faculty of Mechanical Engineering, University of Belgrade, Serbia

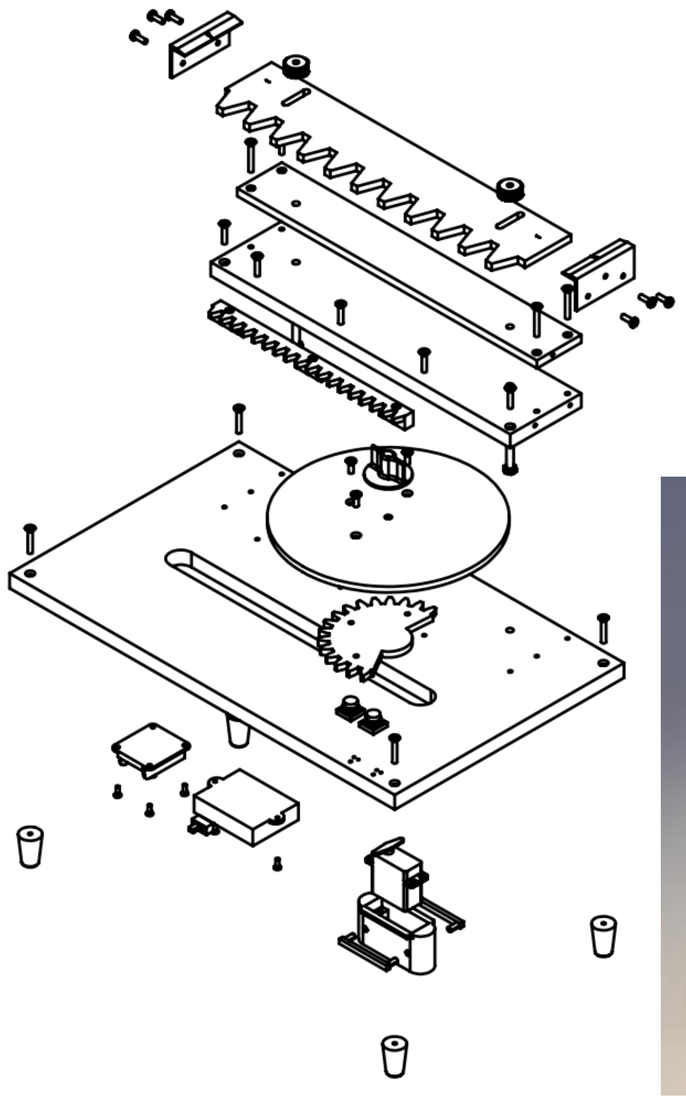
In engineering education within the field of machine design and machine elements, a detailed understanding of the theory of gear pairs remains crucial. Students learn about gear geometry, the kinematics of gear meshing, the strength, the calculation of load-carrying capacity, service life, and the reliability of gear pairs in various applications. Despite the presence of modern information technologies, modelling, and computer simulations, the classic traditional approach to learning (or potentially a hybrid approach combining conventional and modern methods) remains the most prevalent in teaching. In this process, laboratory exercises hold significant importance. The training system for simulating the shaping of involute gear tooth profiles is used for several decades in laboratory work within the course "Machine Elements" at the Faculty of Mechanical Engineering, University of Belgrade.

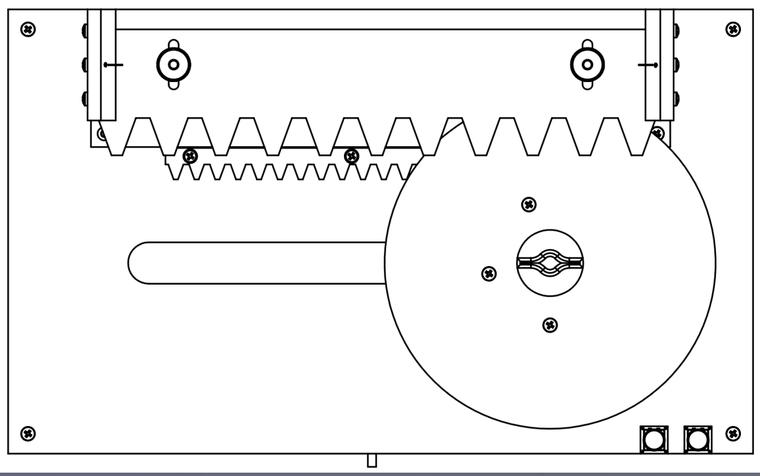
Actual design	Improved design
Tensioned wire wrapped around the turntable on the pitch circle and positioned to align with the pitch line	A pinion-rack mechanism which simplifies equipment maintenance (eliminating the need for periodic wire tensioning) and minimizes slipping, which can arise if the wire becomes loose.
Manual rotating the turntable by an arbitrary angular increment, resulting in either excessively prolonged simulation exercises or imprecise involute profiles.	A servo motor is incorporated, ensuring that the turntable consistently rotates by a predetermined angular increment
Only one gearing variant can be obtained, because of one fixed rack	Three options of interchangeable racks, each featuring distinct modules and numbers of teeth.

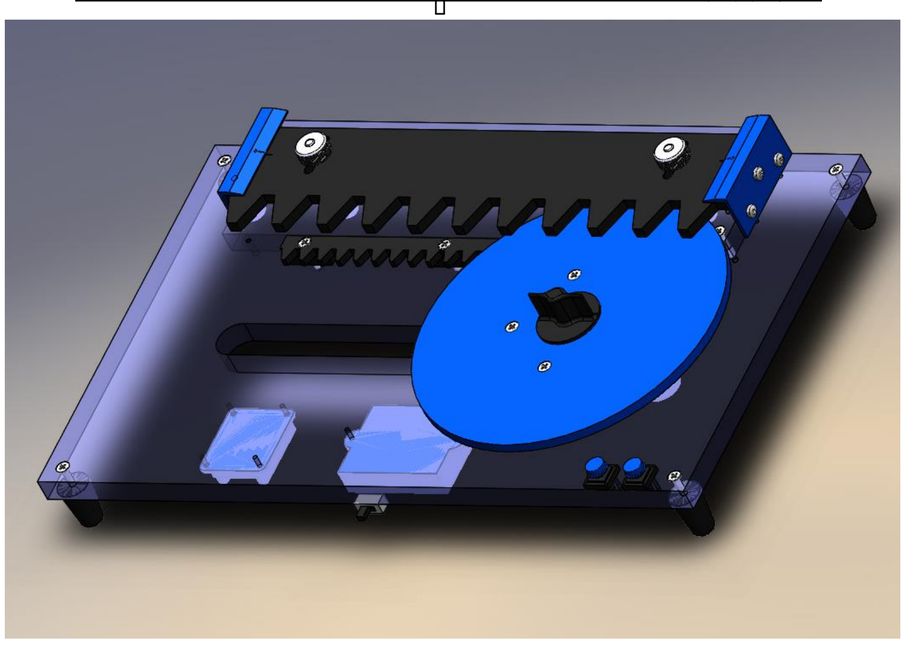












The presentation of gear generation simulation can be easily achieved by utilizing diverse software for 3D modelling and computer simulation. However, the pedagogical impact is more profound when students engage in hands-on simulation themselves, with traditional tools such as paper and pencil. Through this process, students transition from working with the geometrically simple shape of a rack (possessing a straight profile) to crafting teeth with a complex involute profile by outlining the tool's contour with a pencil. This innovation is an improved design variant of equipment for the simulation of involute gearing generation, enhancing technical reliability and enabling the simulation of diverse geometric tooth shapes.

Contact: pljubojevic@mas.bg.ac.rs

University of Belgrade
Faculty of Mechanical Engineering

MACHINE ELEMENTS 1 – Problems with Solution

E

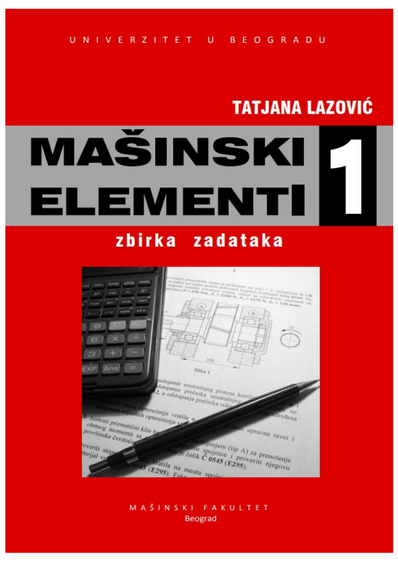
Book, Publisher: Faculty of Mechanical Engineering, University of Belgrade, Serbia

Author: prof. dr Tatjana Lazović

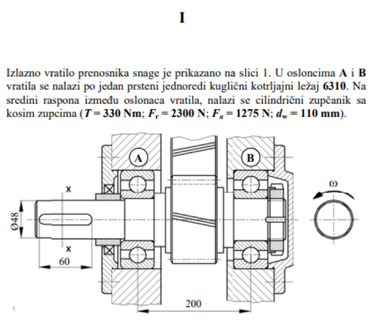
Mechanical Elements 1 is a mandatory subject in the curriculum of the Mechanical Engineering study program of Bachelor Academic Studies at the Faculty of Mechanical Engineering, University Belgrade. The subject is attended by all students of the second year of bachelor academic studies, in the third semester. The fields of machine elements theory covered by the course of Machine Elements 1 are: Tolerances and fits; Calculations of machine parts' strength; Shafts and axles; Keys; Rolling and sliding bearings; Bolted and screw joints.

Solving the tasks (examples of practical problems) is the dominant way to check the acquired theoretical knowledge in Machine elements. At the FME Belgrade, the final exam is solving tasks - original realistic problems. To successfully solve the task on the exam, students need to practice during the semester. They can solve tasks completely independently only if they use a collection of tasks for training. That is why it is necessary that, in addition to textbooks and manuals for project realization, students should also have a book of solved problems.

The book (212 pages) is methodologically organized into four parts:
I - "small" tasks (102 tasks on 52 pages), grouped in chapters: Standard numbers and standard dimensions - 1 task; Tolerances and fits - 11 tasks; Load, deformation, stress, safety factor - 20 tasks; Shafts, axles, keys - 21 tasks; Rolling and sliding bearings - 20 tasks; Bolted and screw joints - 29 tasks), tasks are arranged from simpler to more complex
II – Tasks solution (30 pages). In the case of simpler problems, only the final solutions are given. In the case of more complex tasks, the solution procedure, solutions of individual steps of the solution procedure are partially given, and the data took from the corresponding tables are also shown. Some solutions are illustrated in detail.
III - Combined complex problem. Each of them partially or fully covers the Mechanical Elements 1 course (15 solved problems on 100 pages). The solving procedures with the results are shown in detail, with reference to the tables from which the data were taken, with illustrations and the necessary explanations.
IV - Tables with the data needed to solve the tasks (25 tables on 17 pages)



VI



I

Izlazno vratilo prenosnika snage je prikazano na slici 1. U osloncima **A** i **B** vratila se nalazi po jedan prsteni jednoredi kuglični kotrljajni ležaj **6310**. Na sredini raspona između oslonaca vratila, nalazi se cilindrični zupčanik sa kosim zupcima (T = **330 Nm**; F_r = **2300 N**; F_a = **1275 N**; d_m = **110 mm**).

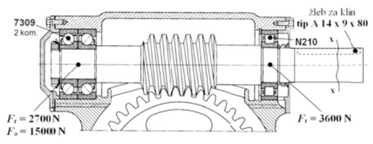
Slika 1.

1. Grafički prikazati naleganje unutrašnjeg prstena kotrljajnog ležaja **A** i rukavca vratila. Odstupanja prečnika unutrašnjeg prstena ležaja su: ES = **0** i EI = **-0,012**, a odstupanja prečnika rukavca vratila su određena poljem **k6**.
2. Prikazati šemu opterećenja vratila u dve međusobno upravne ravni i dijagrame napadnih opterećenja vratila: F_a i T.
3. Izabrati prizmatični klin bez nagiba sa zaobljenjem (tip A) za prenošenje obrtnog momenta sa vratila na glavčinu spojnice i proveriti njegovu površinsku čvrstoću. Materijal klina je čelik **Č 0545 (E295)**.
4. Proveriti stepen sigurnosti vratila na mestu spojnice (**u** preseku **x-x**). Materijal vratila je **Č0545 (E295)**. Faktor dinamičke čvrstoće vratila u

VIII

II

Ulazno vratilo pužnog prenosnika je prikazano na slici[1]. Ugaona brzina obrtanja vratila je konstantnog smera i intenziteta. Učestanost obrtanja vratila je **2850 ^{O}/min**. Obrtni moment na ulaznoj spojnici iznosi **900 Nm**.



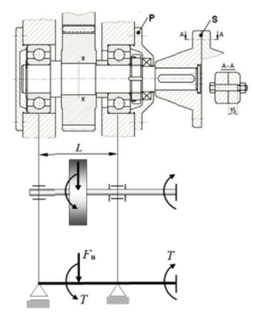
1. Grafički prikazati tolerancijska polja i dijagram naleganja kućišta (**Ø90H6**) i spoljašnjeg prstena (**Ø90$^{0}_{-0,015}$**) kotrljajnog ležaja u aksijalno pokretnom osloncu.
2. Proveriti stepen sigurnosti vratila na mestu spojnice u preseku **x-x** (prečnik podglavka **Ø45**). Materijal vratila je ugljenični čelik **Č 0645 (E335)**. Površina podglavka je **brušena** i nije dodatno termički i mehanički ojačana. Efektivni faktor koncentracije napona je **1,6**.
3. Proveriti zapreminsku i površinsku čvrstoću prizmatičnog klina bez nagiba, na mestu spojnice (prečnik podglavka **Ø45**). Materijal klina **Č 0645 (E335)**.
4. Na vratilo treba ugraditi krutu spojnicu, čiji su obodi spojeni sa **10 nepodešenih** zavrtnjeva **M8**, klase čvrstoće **8.8**, ravnomerno raspoređenih na krugu prečnika **200 mm**. Moment pritezanja zavrtnjeva je **19 Nm** po zavrtnju. Faktor pritezanja je **1,5**. Koeficijent trenja svih površina u kontaktu je **0,17**. Prečnik otvora u spojenim delovima je

[1] Bearing arrangements, Publ.4300, SKF Group, 1995

IX

III

Na slici je prikazano ulazno vratilo zupčastog prenosnika. Na vratilu se nalazi cilindrični zupčanik sa pravim zupcima (na sredini raspona između oslonaca, koji iznosi L = **160 mm**). Veza glavčine zupčanika i poglavka vratila ostvarena je presovanim spojem. Ugaona brzina obrtanja vratila je konstantnog smera i intenziteta.



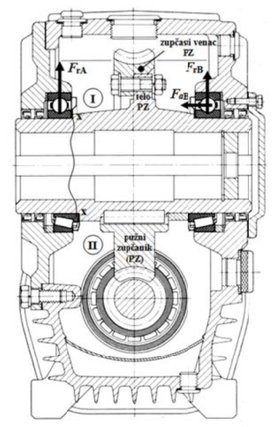
Učestanost obrtanja vratila je n =**850 ^{O}/min**. Moment na ulaznoj spojnici **S** iznosi T = **900Nm**. Sila kojom zupci pogonskog zupčanika deluju na zupce gonjenog zupčanika iznosi F_n=**10 kN**.

Prečnici vratila: na mestu spojnice d_S = **55 mm**, na mestu ležaja d_L = **60 mm**, na mestu zupčanika d_Z = **63 mm**. Materijal vratila **Č 0645 (E335)**. Materijal klina za vezu vratila i glavčine spojnice **Č 0545 (E295)**.

X

IV

Na slici[2] je prikazan poprečni presek pužnog reduktora sa **dva varijantna konstrukciona rešenja**(I i II) uležištenja vratila pužnog zupčanika.

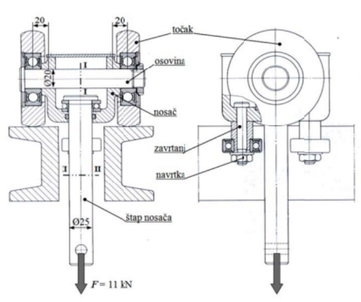


[2] Rolling bearings in industrial gearboxes, Publ.4560 E, SKF, 1997.

XII

V

1. Osovina točkova transportera i nosač sa slike[3] treba da formiraju labavo naleganje u sistemu zajedničke unutrašnje mere. Stepen tolerancije mera **oba dela** je **IT8**. Grafički prikazati položaj tolerancijskih polja, tako da je maksimalni zazor u naleganju **86 µm**. Odabrati odgovarajuće tolerancijsko polje spoljašnje mere, napisati oznaku naleganja i prikazati dijagram tolerancije naleganja.

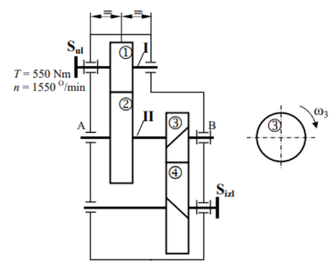


[3] Bearing arrangements, Publ.4300, SKF Group, 1995.

XV

VI

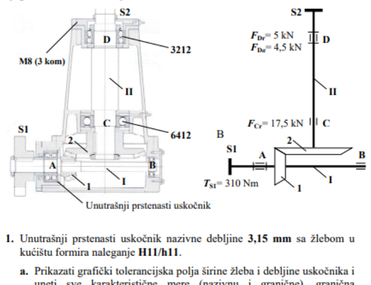
Dvostepeni zupčasti prenosnik, koji se sastoji od cilindričnog zupčastog para 1-2 sa pravim zupcima i cilindričnog zupčastog para 3-4 sa kosim zupcima, prikazan je na slici.



1. Grafički prikazati tolerancijska polja i dijagram naleganja žleba u vratilu i klina b = **12 N8/h8**.
2.
   a. Prikazati šemu opterećenja vratila **II** u dve međusobno normalne ravni i dijagrame napadnih opterećenja (F_a i T).
   b. Proveriti stepen sigurnosti vratila **I** na mestu ulazne spojnice S_{ul}, u poprečnom preseku prečnika d = **40 mm**, sa žlebom za klin b **x** h = **12 x 8**. Faktor dinamičke čvrstoće **1,9**. Materijal vratila je čelik **E335**.

VIII

Jednostepeni zupčasti prenosnik[4], koji čini par konusnih zupčanika **1-2**, i njegov mehanički model prikazani su na slici.

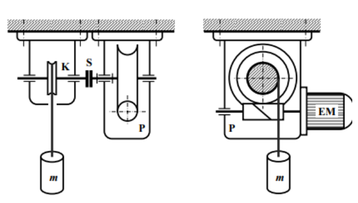


1. Unutrašnji prstenasti uskočnik nazivne debljine **3,15 mm** sa žlebom u kućištu formira naleganje **H11/h11**.
   a. Prikazati grafički tolerancijska polja širine žleba i debljine uskočnika i uneti sve karakteristične mere (nazivnu i granične), granična odstupanja i tolerancije. Prikazati dijagram tolerancije naleganja T_n.
   b. Odrediti klasu površinske hrapavosti koju treba ostvariti pri obradi žleba za uskočnik.
2. Veza vratila **I** i glavčine spojnice **S1** ostvarena je prizmatičnim klinom bez nagiba (**tip A**). Odrediti poprečne dimenzije klina (bxh; t; r), ako je prečnik vratila na mestu spojnice d_{S1} = **40 mm**. Na osnovu kriterijuma površinske čvrstoće (S_p = **2,5**) odrediti minimalnu potrebnu standardnu dužinu klina. Materijal klina je čelik **E335**.

[4] Bearing arrangements, Publ.4300, SKF Group, 1995.

IX

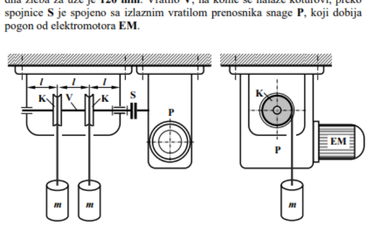
Uređaj za podizanje tereta mase m = **500 kg** brzinom v = **0,5 m/s**, prikazan je na slici. Sastoji se od kotura **K** (D_K = **120 mm**) sa užetom i pužnog prenosnika snage **P**, koji dobija pogon od elektromotora **EM**.



1. Prečnik otvora u čauri kliznog ležaja vratila kotura **K** je **Ø40H6**. Odabrati standardno tolerancijsko polje prečnika rukavca vratila u istom kvalitetu, tako da zazor u naleganju ne bude izvan granica Z = **(8…43) µm**. Prikazati dijagram tolerancije formiranog naleganja (T_n).
2. Prikazati šemu opterećenja vratila pužnog zupčanika u dve ortogonalne ravni i dijagrame opterećenja (F_a, T) za slučaj **podizanja** tereta.
3. Odrediti stepen sigurnosti vratila pužnog zupčanika na mestu spojnice **S**. Prečnik vratila je **30 mm**. Zanemariti uticaj žleba za klin. Materijal vratila je čelik **E335** (R_m = **570 N/mm^2**), površina podglavka je fino strugana.
4. Izabrati dimenzije poprečnog preseka standardnog prizmatičnog klina tipa A za vezu vratila pužnog zupčanika i oboda spojnice **S**. Prečnik vratila na mestu klina je **30 mm**. Odrediti minimalnu potrebnu dužinu

X

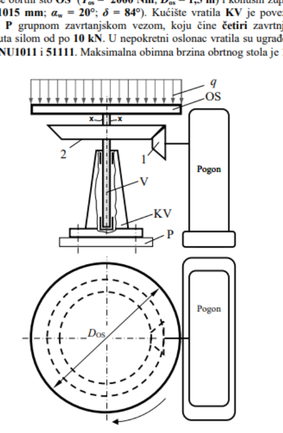
Uređaj za istovremeno podizanje dva tereta iste mase od po **500 kg**, brzinom **50 mm/s**, prikazan je na slici. Sastoji se od dva kotura **K** sa užetom. Prečnik dna žleba za uže je **120 mm**. Vratilo **V**, na kome se nalaze koturovi, preko spojnice **S** je spojeno sa izlaznim vratilom prenosnika snage **P**, koji dobija pogon od elektromotora **EM**.



1. Prikazati šemu opterećenja vratila **V** i dijagrame napadnog opterećenja (M_s, T) sa unetim vrednostima. Označiti kritični poprečni presek **x-x**, sa aspekta veličine napadnih opterećenja. Raspon vratila između oslonaca je **300 mm**.
2. Dimenzionisati vratilo **V** u kritičnom poprečnom preseku **x-x**. Posmatrani poprečni presek je pun, kružni, veza vratila i glavčine je ostvarna presovanim spojem, pretpostavljeni faktor dinamičke čvrstoće je **2,5**. Materijal vratila **V** je **E335** (**Č0645**), zatezne čvrstoće **570 N/mm^2**. Stepeni sigurnosti protiv svih oblika razaranja su **2**.
3. Obodi krute spojnice **S** su spojeni grupnom zavrtanjskom vezom, nepodešenim zavrtnjevima **M10** ravnomerno raspoređenim na krugu prečnika **220 mm**. Svaki zavrtanj je pritegnut momentom **10 Nm**.

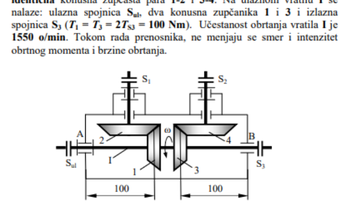
XII

Na slici je prikazan transportni uređaj – stoni rotacioni dodavač. Uređaj dobija pogon preko konusnog zupčastog para **1-2**. Na vertikalnom vratilu **V** nalazi se obrtni sto **OS** (T_{os} = **2000 Nm**; D_{os} = **1,5 m**) i konusni zupčanik **2** (d_m = **1015 mm**; α_n = **20°**; δ = **84°**). Kućište vratila **KV** je povezano sa pločom **P** grupnom zavrtanjskom vezom, koju čine **četiri** zavrtnja **M12** pritegnuta silom od po **10 kN**. U nepokretni oslonac vratila su ugrađena dva ležaja: **NU1011** i **51111**. Maksimalna obimna brzina obrtnog stola je **1 m/s**.



XV

. Zupčasti prenosnik sa jednom ulaznom spojnicom (S_{ul}) i tri izlazne spojnice (**S1**, **S2** i **S3**) prikazan je na slici. Prenosnik se sastoji od dva **identična** konusna zupčasta para **1-2** i **3-4**. Na ulaznom vratilu **I** se nalaze: ulazna spojnica S_{ul}, dva konusna zupčanika **1** i **3** i izlazna spojnica S_3 (T_1 = T_3 = 2T_{S3} = **100 Nm**). Učestanost obrtanja vratila **I** je **1550 o/min**. Tokom rada prenosnika, ne menjaju se smer i intenzitet obrtnog momenta i brzine obrtanja.



a. Odrediti intenzitete sila koje deluju na vratilo **I** (d_{m1} = d_{m3} = **75 mm**; δ_1 = δ_3 = **25°**; α_n = α_{nt} = **20°**).
b. Nacrtati **šemu opterećenja** vratila **I** u dve međusobno normalne ravni, odrediti **reakcije oslonaca A i B** i prikazati **dijagrame napadnih opterećenja**: aksijalne sile F_a, ukupnog momenta savijanja M_s i momenta uvijanja T, sa unetim vrednostima.
c. Proveriti stepen sigurnosti vratila **I** na sredini,između zupčanika **1 i 3**, gde ima pun kružni poprečni presek prečnika **35 mm**. Na razmatranom delu vratila, obrađenom grubim struganjem (vrednost odgovarajućeg uticajnog faktora je **0,82**) nema nikakvog oblika diskontinuiteta poprečnog preseka. Materijal vratila je ugljenični čelik sa mehaničkim karakteristikama datim u tablici:

			Savijanje		Uvijanje	
E335	R_e	R_m	$\sigma_{D(-1)}$	$\sigma_{D(0)}$	$\tau_{D(-1)}$	$\tau_{D(0)}$
	335	600	280	400	160	200

The Book of tasks has 175 illustrations and 21 references. The tasks can be used for exercises in classes, homework and projects, and exam preparation. In addition, some of the presented tasks can be used by engineers from the industry to solve real problems in their field of activity. The book Machine Elements 1 - Problems with Solution was published in four editions (2013, 2016, 2020 and 2022). More than 1000 copies have been sold so far.

Contact: tlazovic@mas.bg.ac.rs

MOLDOVA STATE UNIVERSITY
INSTITUTE OF PHYSIOLOGY AND SANOCREATOLOGY
Laboratory of Physiology and Reproductive Health
60, Alexei Mateevici str., MD 2009, Chisinau, Republic of Moldova
Tel.: +373 069124702 ; E-mail: balanion@rambler.ru

HR EXCELLENCE IN RESEARCH

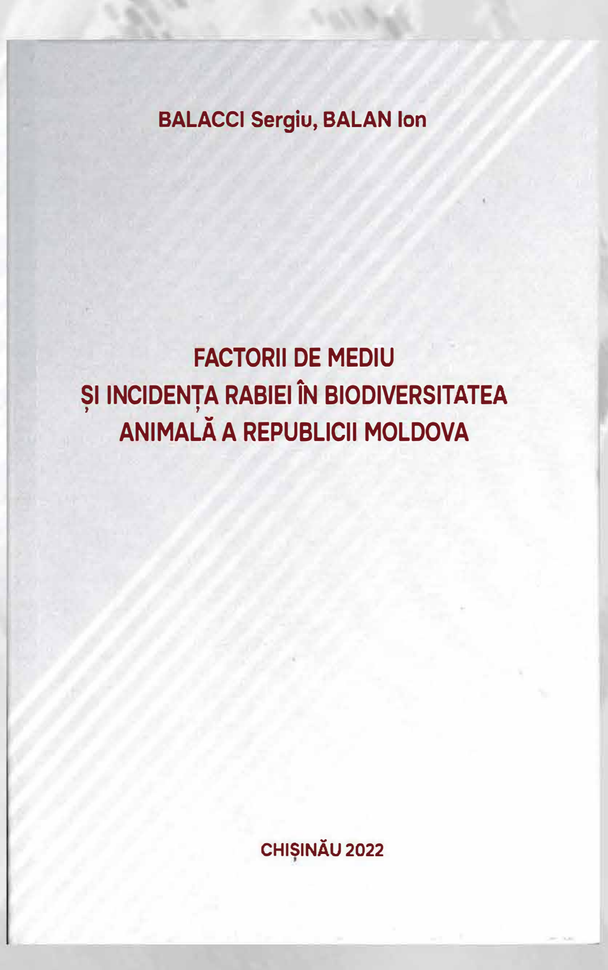
ENVIRONMENTAL FACTORS AND THE INCIDENCE OF RABIES IN THE ANIMAL BIODIVERSITY OF THE REPUBLIC OF MOLDOVA

Patent/project number: ISBN 978-9975-164-99-3

AUTHORS: Sergiu BALACCI, Ion BALAN

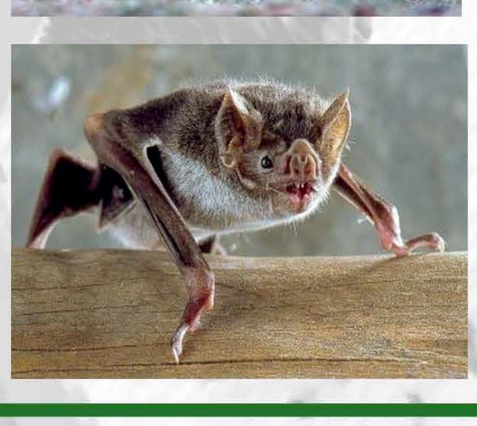
APPLICATION FIELDS: Teaching methods, Books, History and Cultural studies	E

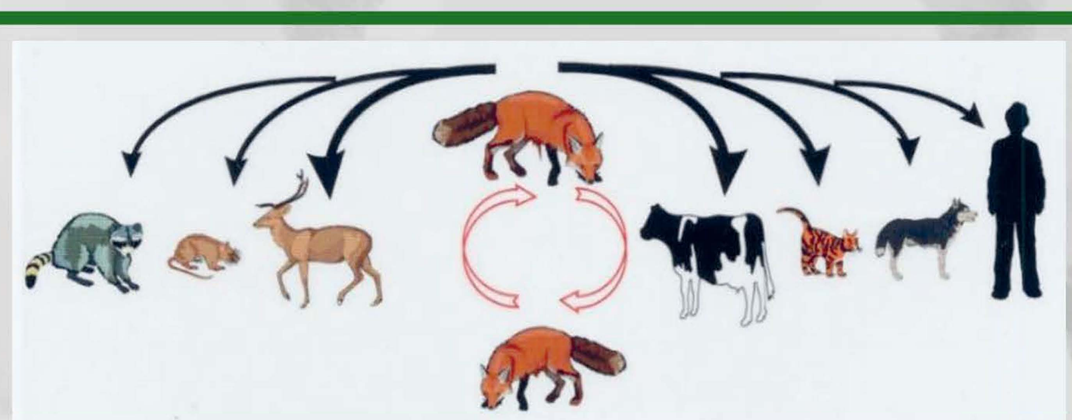
DESCRIPTION: In this monograph, a descriptive analysis of the data was carried out on the epidemiological situation and incidence of rabies in the world and on the territory of the Republic of Moldova according to the intensity of abiotic factors environmental. The geographic location database of the cases was created of rabies in all species of animals positively identified with the rabies virus, including persons registered on the national territory over the years 2021-2012. At the same time, the chronological distribution database was created monthly number of rabies cases in all infected animal species with the rabies virus during the reference years. The monograph includes a system of monitoring, combating, eradication and prophylaxis measures a rabies in the sylvatic and urban environment. Results and analytical review se addressed to a wide range of specialists in the field of veterinary medicine and human, scientific researchers, PhD students, students and the whole societies aware of the existence of the concept of "One health - man, animal, environment".

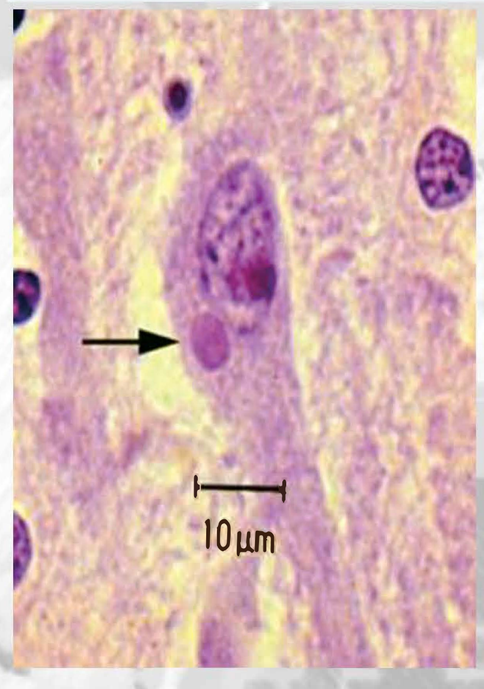


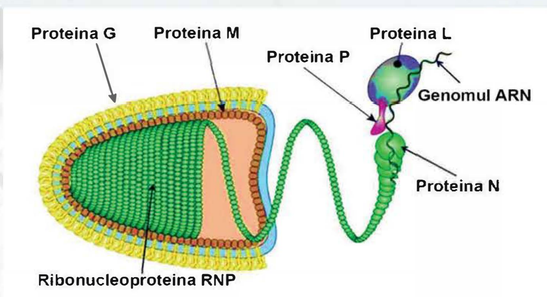


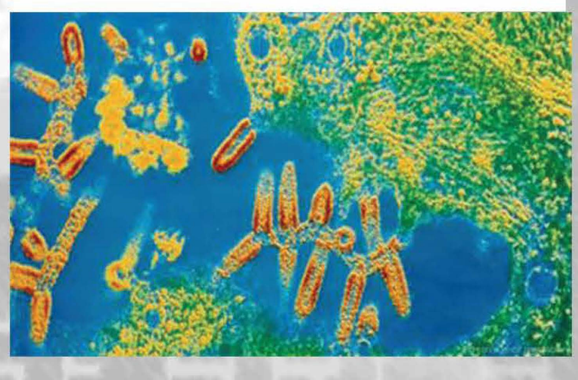












ACKNOWLEDGMENTS: This research was supported by the research project: 20.8000.7007.25

MOLDOVA STATE UNIVERSITY
„Ion NICULIȚĂ" Archaeology Center
Office Education for Drone
60, Alexei Mateevici str., MD 2009, Chisinau, Republic of Moldova
Tel.: +373-67320023 E-mail: fif@usm.md

HR EXCELLENCE IN RESEARCH

UAV CONTRIBUTION TO PALEOENVIRONMENTAL MODELING (LIPOVENI II ARCHAEOLOGICAL SITE, REPUBLIC OF MOLDOVA)

RESEARCH PROJECT NUMBER: 20.80009.1606.14

AUTHORS: Sergiu MATVEEV, Veaceslav SPRINCEAN, Vlad VORNIC

APPLICATION FIELDS: E-Teaching methods, Books, History and Cultural studies.

AIM: Capturing aerial photographs with the UAVs for researching the complexity of the landscape, site mapping, as well as the evidence of archaeological complexes.

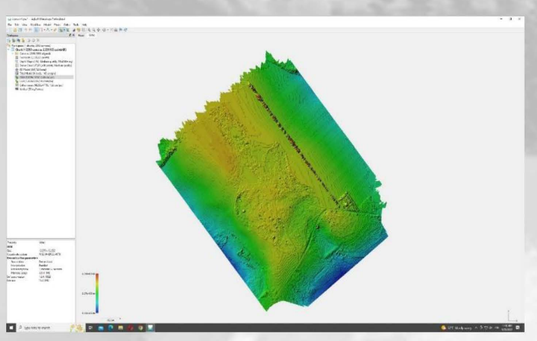
SOLUTION: The application of photogrammetry of aerial images in order to reconstruct them geometrically and their position in space in order to measure them and to represent them graphically and cartographically as accurately as possible based on the *Structure for Motion* technique offered new research possibilities, the images were processed with two softwares: Pix4D and AgiSoft, succeeding in locating archaeological complexes and water sources, developing the 3D terrain model, the digital terrain model, the digital elevation model, the digital surface model, as well as the reflectance, orthomosaic and thermal map.



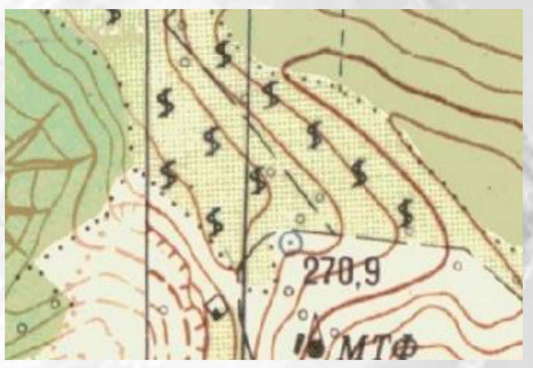
Microzone topographic map (1911)



View of Section X/2022, *Lipoveni II* site.

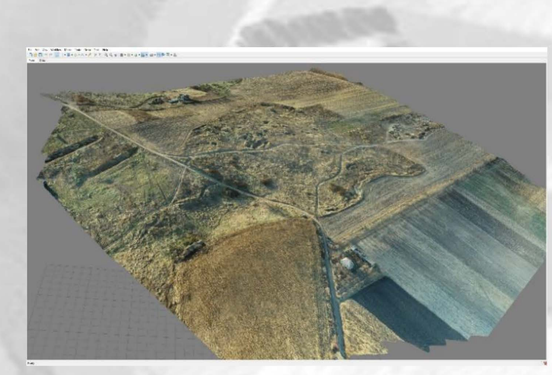


The DEM model of the *Lipoveni II* site.

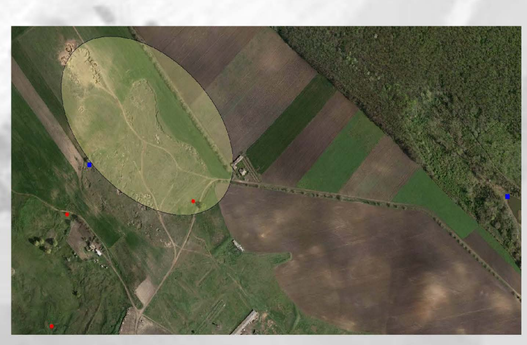


Microzone topographic map (1982)





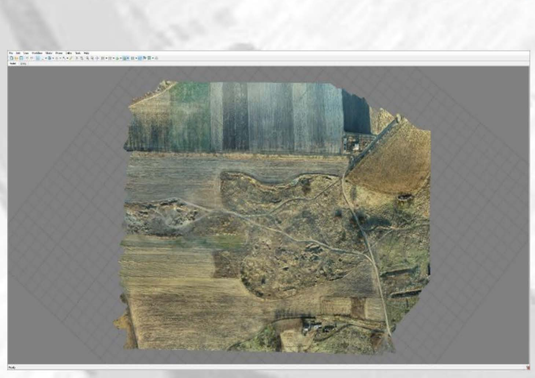
The 3D model of the land in the area of the *Lipoveni II* site.



View of the *Lipoveni II* site with location of water sources (2022).



View of the archaeological complexes in Section X/2022.



The orthomosaic of the *Lipoveni II* site.

ADVANTAGES: The methods are non-invasive and repeatable; they allow establishing the evolution of the impact of the anthropic factor on the environment.

IMPLEMENTATION STAGE: At the laboratory level and preparing the publication.

ACKNOWLEDGMENTS: This research was supported by the *research project: # 20.80009.1606.14*

MOLDOVA STATE UNIVERSITY
„Ion NICULIȚĂ" Center for Archaeology;
Laboratory Environmental Physics and Modeling Complex Systems
60, Alexei Mateevici str., MD 2009, Chisinau, Republic of Moldova
Tel.: +373-67320023 E-mail: fif@usm.md

HR EXCELLENCE IN RESEARCH

DRONE ARCHAEOLOGY AND IRON AGE LANDSCAPE OF THE MIDDLE DNIESTER BASIN

RESEARCH PROJECT NUMBER: 20.80009.1606.14

AUTHORS: Aurel ZANOCI, Veaceslav SPRINCEAN, Mihail BĂȚ

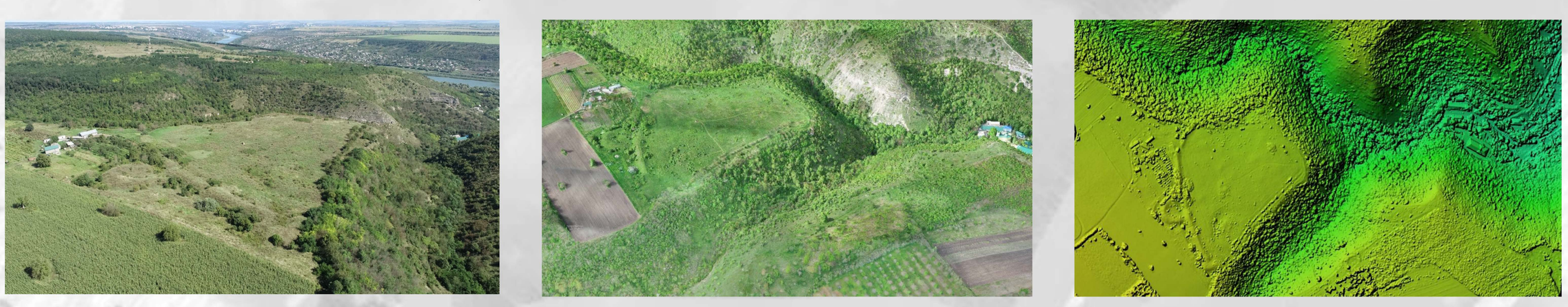
APPLICATION FIELDS: E - Teaching methods, Books, History and Cultural studies. | E

AIM: Aerial Survey and Photography with UAV to highlight the defensive features of Iron Age fortifications. UAV Photogrametry for mapping the archaeological landscape in the Middle Dniester Basin.

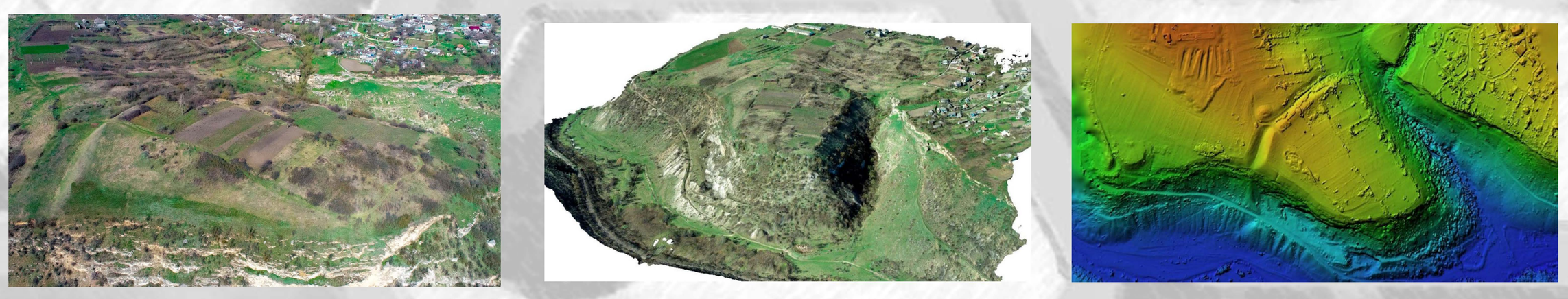
SOLUTION: Oblique aerial photos outlined the layout of the defensive features and how the inhabitants controlled their habitation area. Using Pix4Dmaper and Agisoft Metashape software, the workflow allowed to perform digital elevation models (DEMs), extracted from vertical imagery. These clearly show the topographic details of the areas where the iron ages fortifications were located, as well micro-relief features of potential underground archaeological structures.



Horodișteе site: aerial view, 3D Modelling and DEM Visualization



Saharna Mare site: aerial view, 3D Modelling and DEM Visualization



Glinjeni "La Șanț" site: aerial view, 3D Modelling and DEM Visualization

ADVANTAGES: Using a non-destructive and non-invasive approach, the repeatable documentation of landscape allow to establishing the evolution of the impact of the anthropic factors on the environment.

IMPLEMENTATION STAGE: Laboratory research and publishing process.

ACKNOWLEDGMENTS: This research was supported by the *research project: # 20.80009.1606.14*

SPIRITUALITY: HUMAN-NETWORK CORRESPONDENCE

Research project

Authors: Mihail-Alexandru Stanescu, Denisa Maria Cristea, Ioana-Adelina Duca

Mentors: Mariana-Oana Farcas, Carmen Argesanu

E

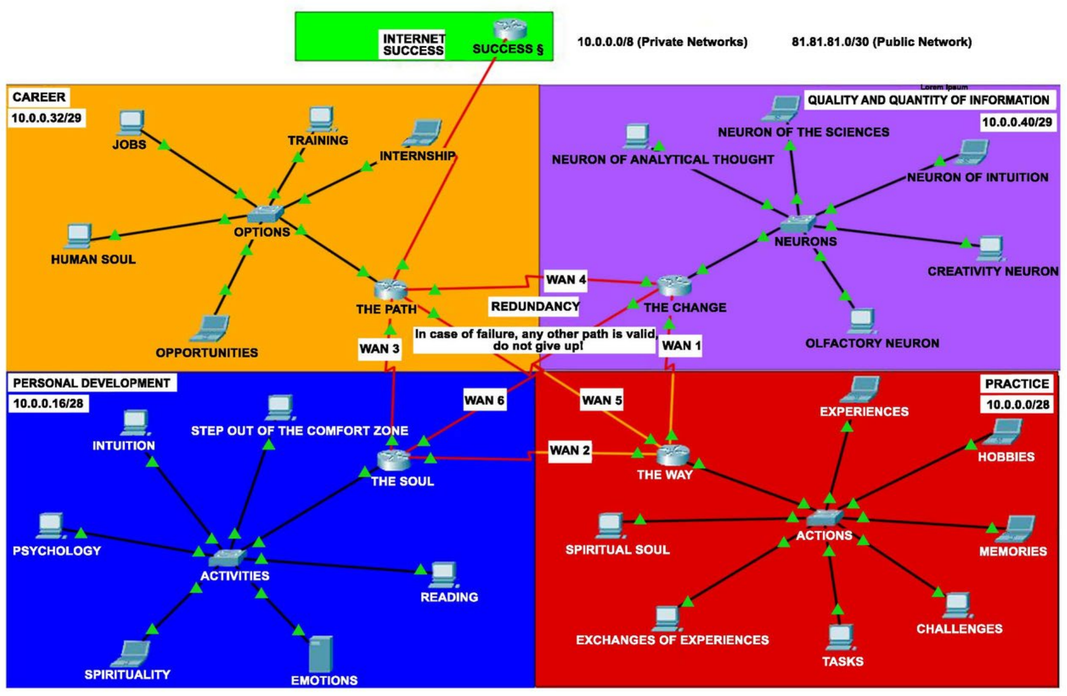
Over time, human studies have suggested that people are concerned with issues such as soul and social status. At the same time, in order to alleviate their needs, people have developed technologies, the most complex being the one in the IT field.

Starting from the neural activities of the human brain, this project proposes a correlation between a network topology and a person's spiritual and career path, pursuing the end result - success. Therefore, the steps were to be followed by the information - practice - personal development - career algorithm and to illustrate a way to find success, especially when somebody faces challenges, and a solution must be found using the redundancy method.

As a case study, we analyzed the people who participated in Erasmus projects. These are practical because the way information is transmitted can be transmitted differently from one center to another, especially when it comes to international projects. This paper will look at similar effects but for shorter projects - Youth Exchange and Training Courses. This type of project aims at the development of the individual on a certain topic, the realization is achieved by approaching non-formal education. Thus, the social and career impact of participating in such projects will be presented from a personal perspective.

Methods

- Implementation of an algorithm in a network topology depending on the properties of the devices.
- Finding correspondences between the spiritual domain, implicitly of the chakras that can be associated in the domain of networks.



Quality & Quantity of Information -> Practice -> Personal Development -> Career -> Success

The internet: Green, which means success.

Personal development: Indigo, which expresses principles and higher ideals.

Practice: Red, which indicates passion and hard-work.

Career: Orange, which suggests strategy and creativity.

Quality and Quantity of Information: Lavender, which suggests intelligence.

But as we have shown, it is also observed in the topology that if one path fails, there is always another path (network redundancy).

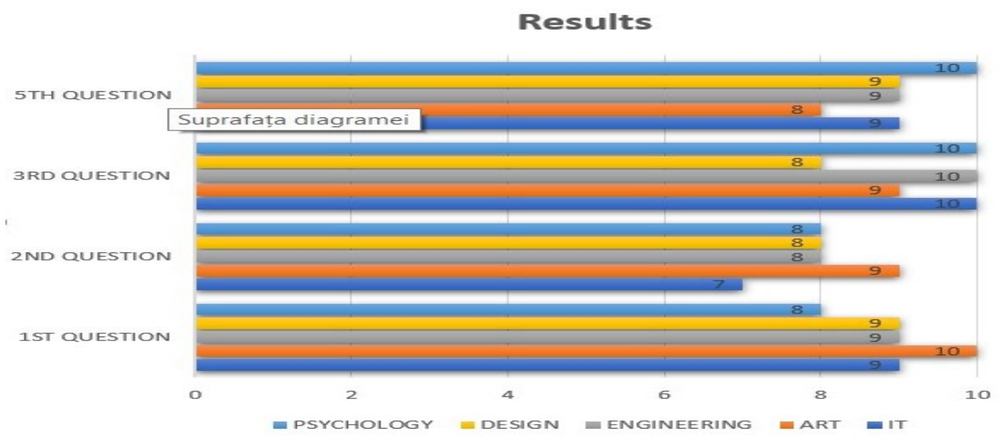
Fire	Last Status	Source	Destination	Type
	Successful	INTUITION	JOBS	ICMP
	Successful	CHALLENGES.	OUTSIDE OF THE COMFORT ZONE	ICMP
	Successful	NEURON OF THE SCIENCES	TASKS	ICMP

In the first phase, it is checked if there is connectivity between departments. As we can see in the next picture, the connection is successful. In the picture, it is observed that all the departments are in a good connectivity using redundancy propriety it can be a correlation to “SUCCESS”.

Fire	Last Status	Source	Destination	Type
	Successful	OPPORTUNITIES	EMOTIONS	ICMP
	Successful	TRAINING	HOBBIES	ICMP
	Successful	CREATIVITY NEURON	OPPORTUNITIES	ICMP

In the second phase, it is used social data from the interviews part (questions about: level of expectation, level of quality, level of benefits, chose between impact of career of life balance, and level of recommendation for another's to take part). The scale of level is between 0 and 10. We took interviews with people from different work areas (the majority from IT, arts, engineering, design and psychology). Based on their answers about their Erasmus experiences and career, we observed that they have improved their skills after the international experiences. In this study of aproximativ 50 people ha participated from the fields mentioned above.

NR.CRT.	1ST QUESTION	2ND QUESTION	3RD QUESTION	4TH QUESTION	5TH QUESTION
IT	9	7	10	BALANCE	9
ART	10	9	9	CAREER	8
ENGINEERING	9	8	10	CAREER	9
DESIGN	9	8	8	CAREER	9
PSYCHOLOGY	8	8	10	BALANCE	10



In conclusion, this project shows a way on how to develop your skills for a good career. If people participate in Erasmus projects, they can build the fundamentals of a successful career. In every good career, you should know how to express your message, how to be a good team player, and have good management. The purpose of this research is following the correspondence at the level of spirituality between the evolution of the human being and the evolution of a network topology. It is experienced whether or not there are correspondences between the course of a person, especially at the career level, with the quality of information traffic through protocols at the level of a software network.

Contact: mihailstanescu.24@gmail.com, +40 721 520 080

FLEXIBLE PRODUCTION LINE
- experimental teaching stand -

E

Author: Gelu-Ovidiu TIRIAN

One of the ways to achieve the goals of Industry 4.0 to produce products customized in one-piece batches is to have machines, equipment, and assembly cells designed so that the entire assembly system is flexible, which is also defined by the reference architecture. Production resources must therefore be modularized.

The entire assembly system is created in a decentralized manner, where the individual modules are designed as a separate cyber-physical system, a mechatronic system with its own control system and connectivity. The module should include a standardized interface so that the module can be connected to the assembly system and manufactured. Industry 4.0 defines this concept as "Plug & Produce".

Modularity is important not only at the level of local automated equipment, but also at the level of machines, stations, assembly cells, or lines.



The applicability of these new approaches in digital design was verified by creating a digital twin and performing a virtual commissioning of the automated assembly system MPS® system 203

Contact: ovidiu.tirian@gmail.com

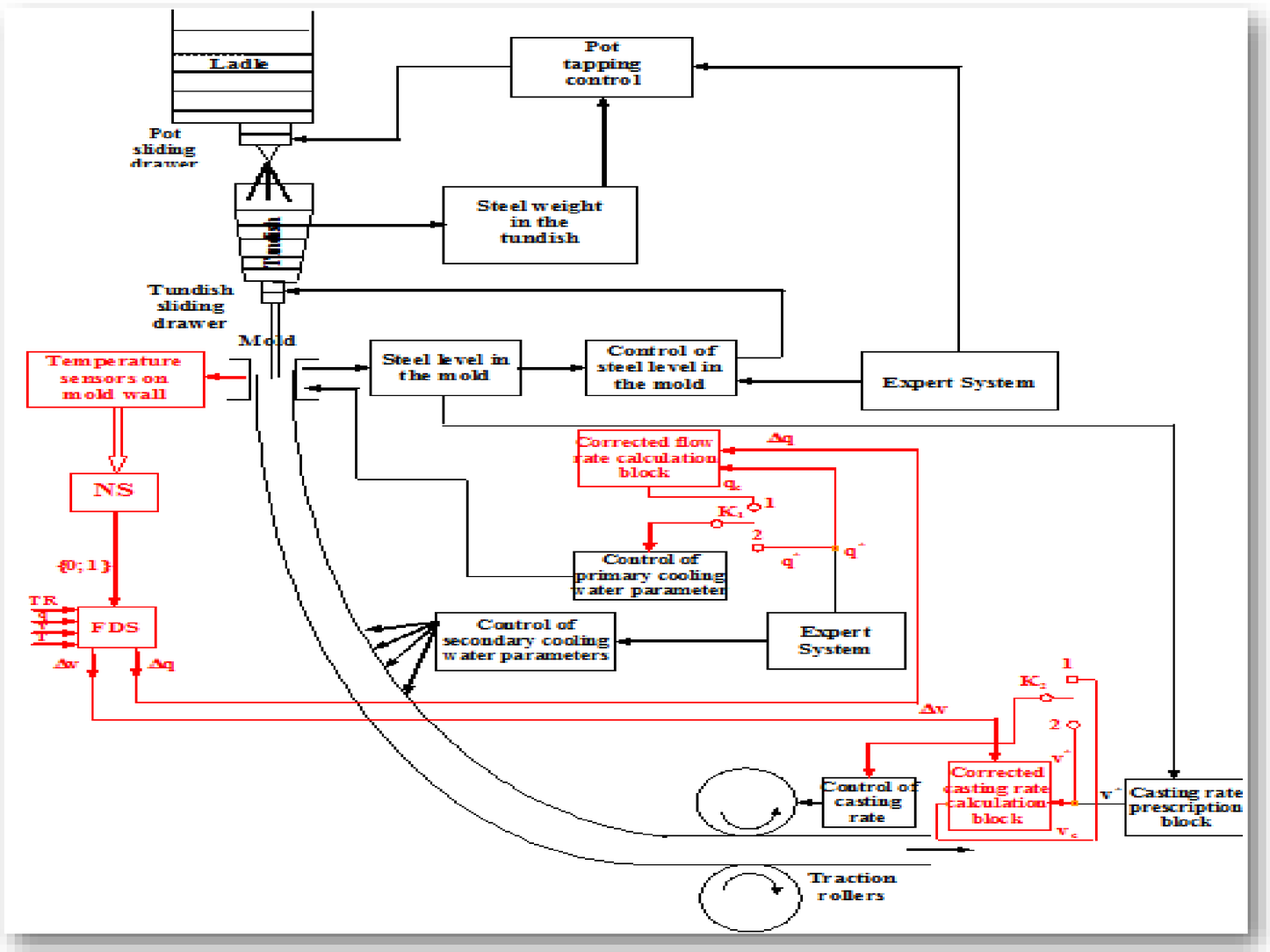
CONTINUOUS CASTING PROCESS OPTIMIZATION THROUGH THE INTELLIGENT WATER FLOW REGULATION SYSTEM FOR SECONDARY COOLING

- experimental teaching stand -

E

Author: Gelu-Ovidiu TIRIAN

It was realised developed and implemented, meant to control the casting process by an intelligent fuzzy-type system, allowing the control of the water flow rate in the secondary cooling, by appropriate distribution along the cooling area. This necessity is imposed by the fact that actual control systems do not correlate in real time the variations of the multiple variables related to the continuous casting process and stick to a rigid distribution of the water flow rate on each cooling area.





The intelligent system is capable of eliminating this shortcoming, by controlling in real time the distribution of the water flow rate according to the real situation in the installation, working as an adaptive system.

Contact: ovidiu.tirian@gmail.com

FORMATION OF THE CHEMISTRY RESEARCH COMPETENCE IN THE INTERDISCIPLINARY UNIVERSITY CONTEXT

Book: ISBN 978-606-11-8277-0

Authors: Eduard Coropceanu, Sergiu Codreanu

E

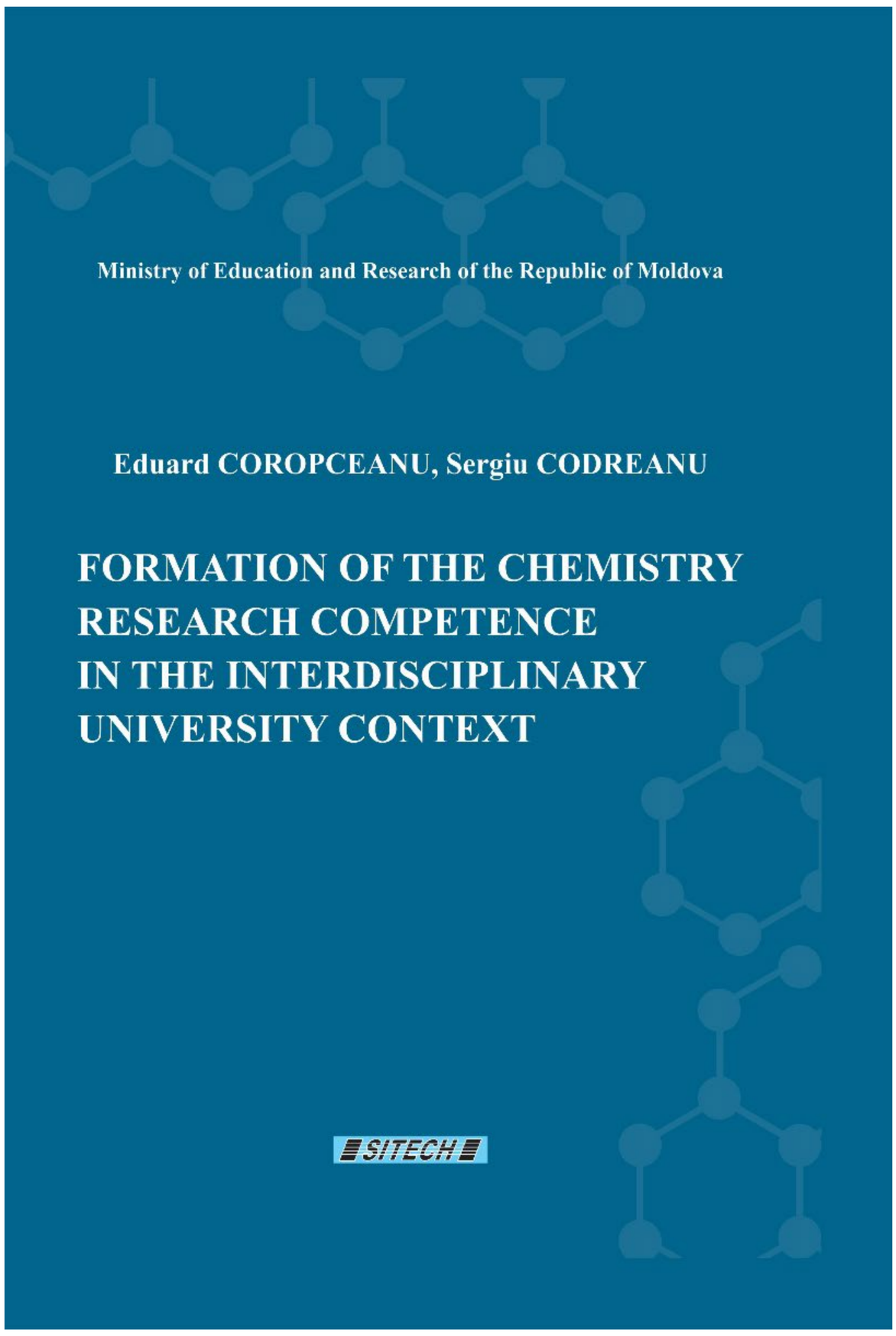
The monograph "Formation of the chemistry research competence in the interdisciplinary university context" (ISBN 978-606-11-8277-0, 232 pages) highlights a series of problems in the didactics of natural sciences and proposes solutions effective in the context of contemporary realities.

The didactic technology for training research competence in chemistry students is described. The research activities organized with the students of the faculty, including the optional course *Chemistry for life – integrated research* contributed significantly to the formation of the students' conception of research and the unity of the picture of the material world, the fundamental laws of nature of the transformation of matter and energy from a form in another, but also of research technologies based on specialized equipment for the study of various compound phenomena.

Concrete models for the synthesis of new coordination compounds are described, the analysis of their composition and structure based on physical methods of investigation, the deciphering of the molecular structure based on X-ray diffraction on a single crystal, in order to identify at the next stage the useful properties and potential fields of practical use.

Thus, the described algorithm focuses not only on carrying out research, but on a series of actions, which orient the process starting from the initial stages - the development of research objectives, the selection of research methods - towards the solution of practical problems (social, economic, etc.) would be the development of new biostimulators of physiological processes in plants, fungi and algae, the enhancement of enzymogenesis processes that would allow obtaining the increased amounts of enzymes needed for the pharmaceutical, food industry, etc.

The curriculum of the optional course aims to develop the skills necessary for professional training: investigative skills, communication skills, digital skills, environmental protection skills, continuous professional training skills, which are very necessary in the context of social integration, but also in the perspective of preparing chemical students for the configuration and development of their own career project.



coropceanu.eduard@upsc.md

THEORY AND METHODOLOGY OF THE FORMATION OF VALUE ORIENTATION OF ADOLESCENTS AND YOUNG PEOPLE

Book: ISBN 978-9975-56-811-1

Author: Diana Antoci

The monograph "**THEORY AND METHODOLOGY OF THE FORMATION OF VALUE ORIENTATION OF ADOLESCENTS AND YOUNG PEOPLE**" (ISBN 978-9975-56-811-1, 220 pages, "Print-Caro" Typography, Chisinau, Republic of Moldova) highlights the multiple scientific points of view from a theoretical and applied perspective and notes confusing, contradictory and synonymous interpretations. The content of the monograph represents various scientific positions from the philosophical, pedagogical, psychological perspectives with reference to the definition of the concepts of value, value orientation, value system; emphasizes the particularities of the manifestation of the contents of value orientations in adolescents and young people. An important aspect in the work is given to the tendencies to approach and promote values and value orientations in the education system from the perspective of educational policy documents.

The analysis of different scientific positions regarding the process of the formation of value orientations allowed the identification of the structural components of value orientations (behaviors, moods, attitudes, convictions, values) and the determination of the mechanism of value formation and the constitution of value orientation, which, therefore, was researched and verified within the experimental study organized by using 9 psychological instruments and with the involvement of adolescents and young people. The experimental results obtained highlighted the significant correlations between the structurally established components and constituted the basis for the development and validation of the Questionnaire for the evaluation of value orientations in adolescents and young people and the theoretical foundation and development of the Pedagogical Model for the formation of value orientation in adolescents and young people, through which new results of holding values, beliefs, attitudes and behaviors and maintaining the correlations between them in contemporary teenagers and young people are shown.



The monograph is intended for pedagogues and psychologists, with the intention of changing the interpretation of radically important and significant concepts for society and personality, it contributes to personal and professional training and self-training, focused on achieving and promoting axiological education in society as a whole.

The content of the work synthesizes and valorizes philosophical, pedagogical, psychological, sociological ideas, theories, concepts, principles and paradigms, converting them into significant and substantial contents for the field of Educational Sciences, valuable for the entire educational system and society.

antoci.diana@upsc.md

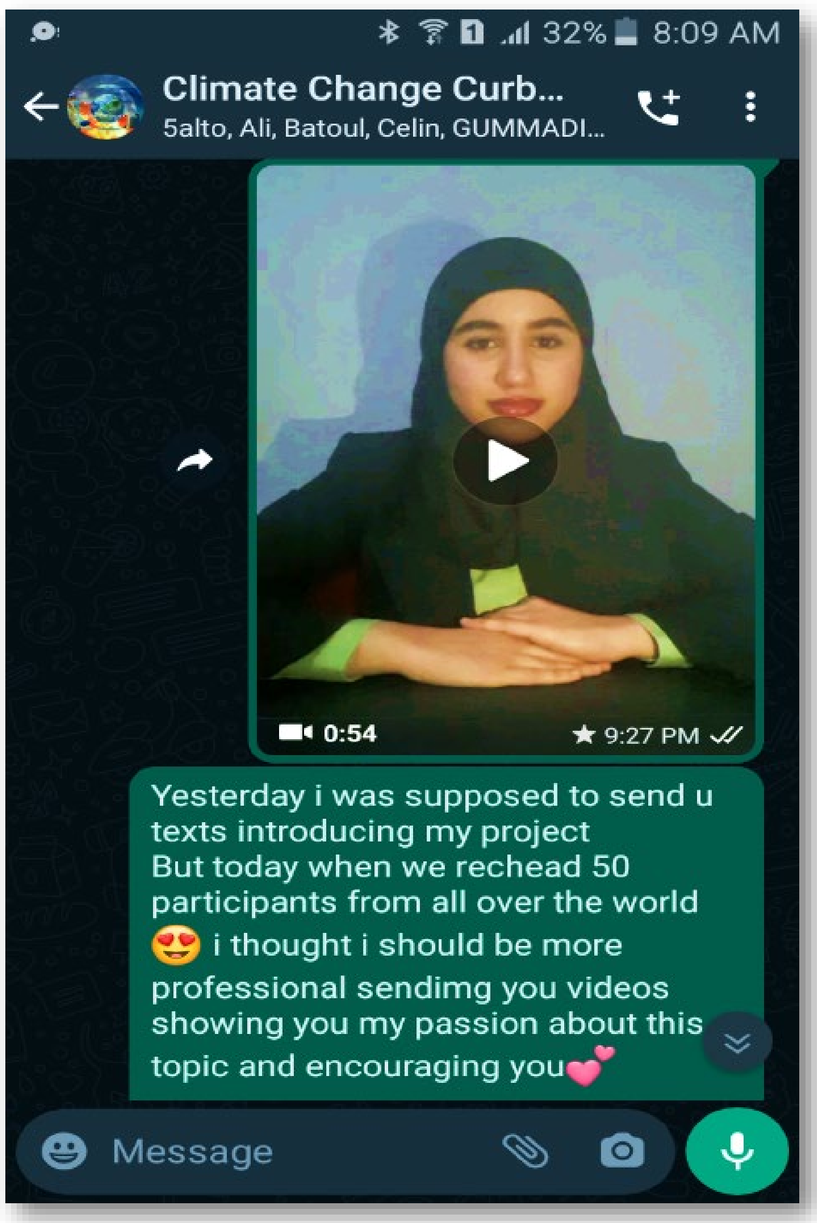
Climate Change Curb

Student Project

Author: Zainab Arzouni

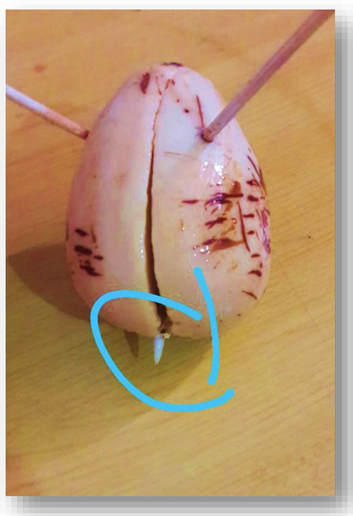
E

I'm a 18 years old Lebanese student joining Shohour Public High School. I was always passionate about protecting and saving nature, and when I joined some online webinars about Climate Change I was shocked with the threat our environment is exposed to. Then, I wanted to make a change, to make actions, not just to spread awareness by talking or writing. I knew that trees is the only cure for Climate Change as one tree can absorb 22KG of Carbon dioxide a year which is huge, since as we know that carbon dioxide is one of the poisonous gasses causing climate change. So, since I was a known international student, I took the advantage of making a whatsapp group and invited people from around the globe, when i had 70 people from more than 9 countries, I started sending them videos of me talking introducing them to Climate Change and spread awareness, then i planted lots of trees in my country and sent them the videos, this way they were encouraged and sent their contributions, so mision was accomplished.



Climate Change Curb VIDEO







Contact: zeinabarzouni94@gmail.com

Science Camps

E

Science workshops

Author: Tiberiu Stroia & Team

CASA STIINTEI (The House of Science) has been carrying out, for almost three years, a series of activities in which students passionate about natural sciences are invited to participate. Science camps, astronomical observation nights, zoom classes, science workshops held in the Association's laboratory and, starting this summer, scientific expeditions.

SCIENCE IS MAGIC THAT WORKS!



The study of gases

Children will obtain in the laboratory Oxygen, Hydrogen, Iodine, Acetylene, AMMONIA, HYDROGEN SULPHIDE, and Carbon Dioxide. They will learn the story of the discovery of each gas and will be able to observe, through experiment, the properties of these gases. Experiments carried out by the teacher: obtaining chlorine and ozone.







Contact: contact@casastiintiei.ro +40735 370 327

SCAN ME

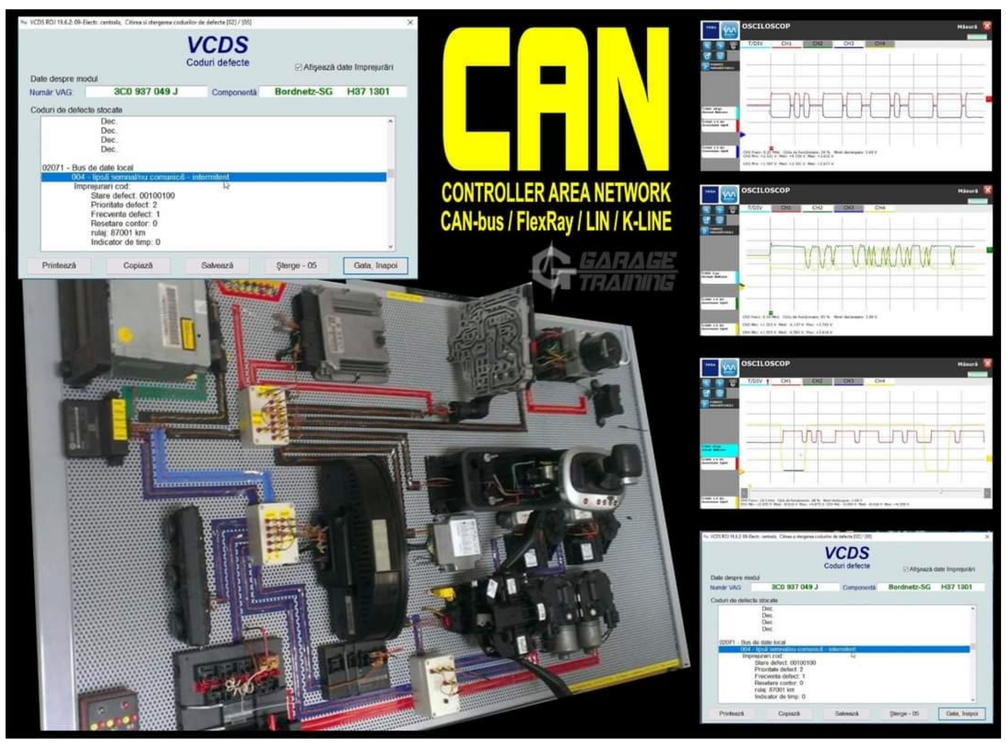
CONSTRUCTION AND DIAGNOSTICS OF MULTIPLEXED VEHICLE COMMUNICATION NETWORKS (CAN-bus)

Didactic simulator

Author: *Gidali Adrian, Simon Florin*

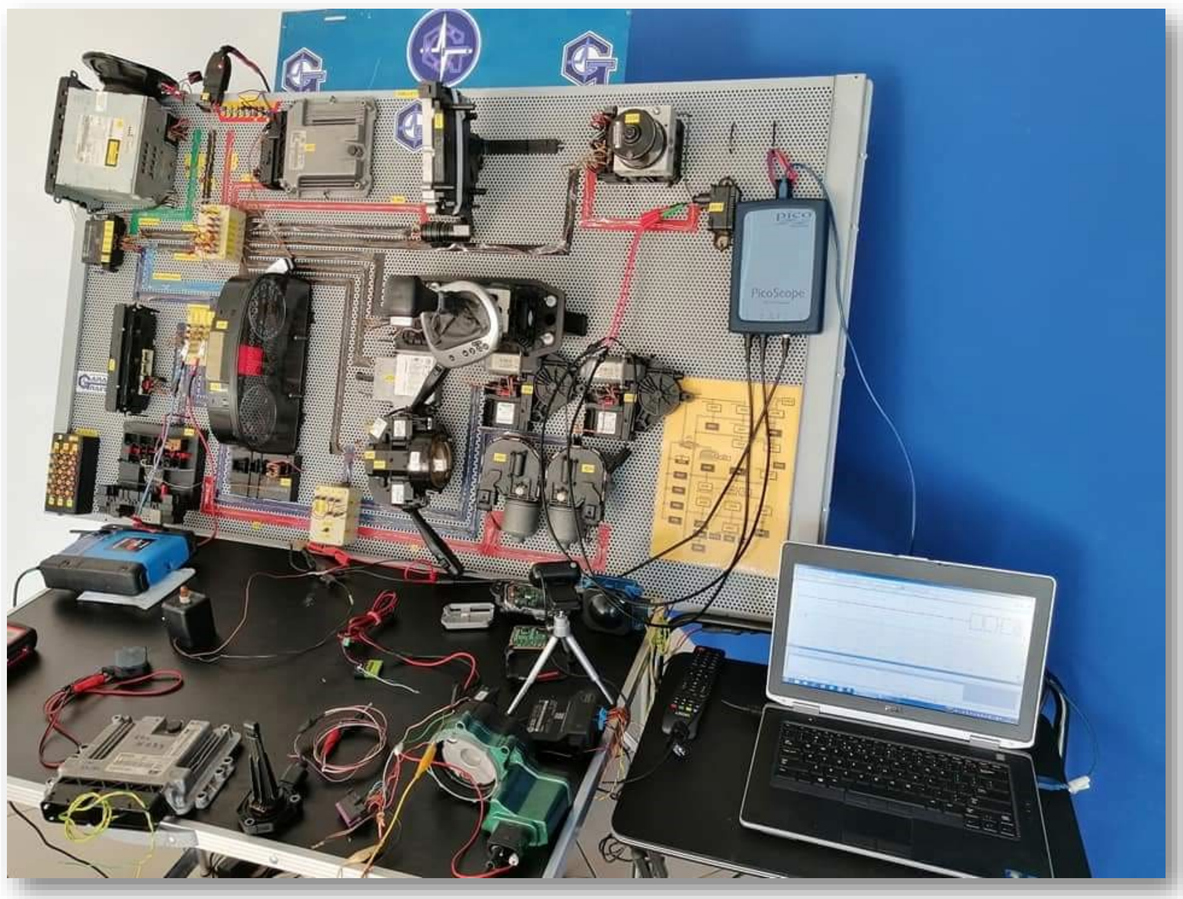
E

In order to study and verify functionality for different types of multiplexed networks or hardware analysis of frames (messages) related to different types of serial communication protocols, it is necessary to use specific measurement and control equipment (oscilloscope, voltmeter, ohmmeter, ammeter, frequency meter, dwell meter), as well as the use of serial diagnostic testers.





Since the use of these communication, measurement and control devices involves basic-medium level knowledge regarding the concepts of electricity, with an emphasis on car electricity, and since the complete CAN-bus course involves time, the support of this course is carried out in two stages, the first part is dedicated to the study and understanding of the introductory notions of automotive electricity and the way in which different sub-systems are mechatronic from the composition of modern vehicles, and the second part being exclusively dedicated to the study of the multiplexed communication networks of motor vehicles.





Contact: *cursuri.garagetraining@gmail.com*

EMPOWERING YOUNG MINDS

Author: Prof. Dr. Anuja Malik

E

THE IMPORTANCE OF EDUCATION AND CREATIVITY FOR YOUNG STUDENTS

Knowing and understanding the importance of education and creativity in young students has a profound effect on their adulthood. The benefits of instilling a love for learning and creative endeavors early in life are numerous, and the sooner we recognize this, the better our children's futures will be.



IMPORTANCE OF EDUCATION: OPENING NEW HORIZONS



- *Allows youngsters to gain knowledge, develop critical thinking skills, and become aware of the world around them.*
- *Alleviates socioeconomic barriers, offering a level playing field where anyone can learn and grow.*
- *Provides the flexibility to learn at one's own pace, irregardless of location or time constraints.*



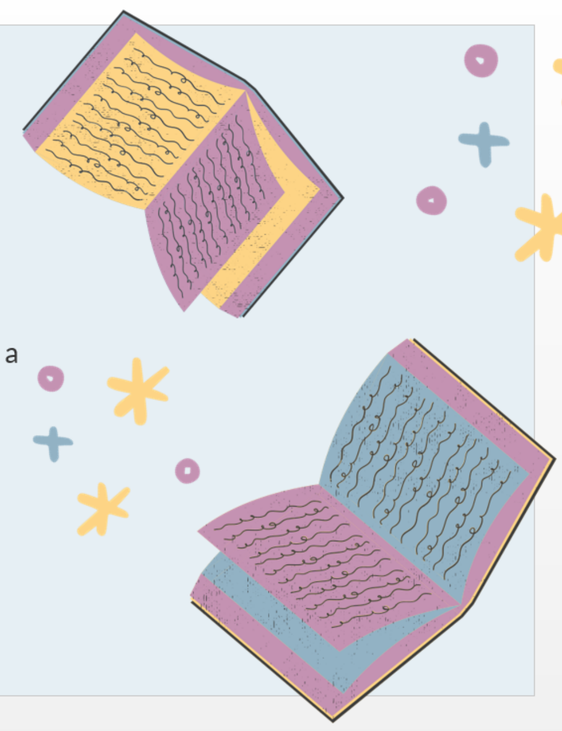
THE HARMONY OF EDUCATION AND CREATIVITY: UNLEASHING POTENTIALS

The education system should aim to foster creativity, elevating students' potential. Creativity empowers students to think out of the box, enabling them to approach problems from novel perspectives. It enhances their flexibility, adaptability, and resilience, thereby preparing them for the rapidly changing world.

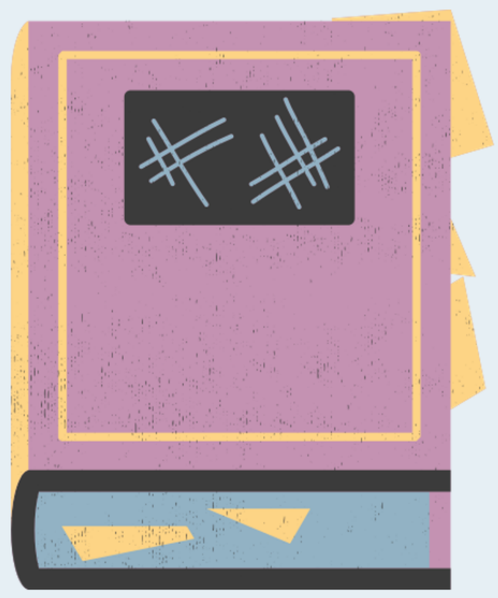
THE POWER DUO: EDUCATION AND CREATIVITY

What happens when education meets creativity? Here's the product - a versatile, resilient, and innovative young student. When creativity is combined with a quality education, students learn how to adapt, innovate, and tackle challenges strategically. They experience the joy of learning, are more driven to explore new areas, and develop a continuous thirst for knowledge and understanding, certainly the perfect recipe for success.

FOSTERING SELF-EXPRESSION AND CONFIDENCE



Creativity and education go hand-in-hand to build a child's self-expression. Teaching kids to articulate their thoughts, feelings, and ideas confidently is integral to their development.
A system that values creativity promotes risk-taking and curiosity, which leads to confidence in their abilities.



THE SOCIAL IMPACT

How can creativity in education influence the broader social fabric, you ask?
Well, it enhances cooperation, tolerance, and empathy among students. It paves the way for better interpersonal relationships and an inclusive society.
To sum up, the importance of education and creativity for young students cannot be overstated. It's crucial for their personal growth and helps prepare them to succeed in today's dynamic, interconnected world.

EDUCATION AND CREATIVITY - A STEP TOWARDS A BRIGHTER FUTURE

The significance of both education and creativity for young students cannot be overstated. Not only does it equip young minds with necessary life skills, but it also harnesses their unique potentials. The amalgamation of online or free education and creativity is a window for immeasurable opportunities that young students ought to embrace.
Meta-description: Discover the pivotal role of education and creativity in the lives of young students. Uncover how their intersection can shape a brighter future for our young generation.





Contact: anujamalik777@gmail.com

TehnoART

Author: Demeter Sorin & LTTD Team

E

Techno-ART is a national competition for high school students and more.
The aim of Techno-ART is technical creativity in this sense students are invited to present their ingenious projects.
The Techno-ART competition focuses on environmental protection so we encourage students to use recycled components from scrap yard.
The participating students transform these scrap into robots, cars, statues, lighting fixtures, figurines or various installations, which leads to the development of the practical skills so necessary for their future careers.



ROMÂNIA, Deva,
330162 B-dul 22 Decembrie, Nr. 116
Tel./Fax: 0254/ 230739
E-mail: deva_trans2003@yahoo.com
http://www.cttdeva.ro

The Guiding Light of SHARP Education

Authors: Lorena-Maria Constantin
Mentor: Mariana-Oana Farcas

E

The chosen topic contains complex methods of teaching, is curent and of interest in the field of education, the project being especially focused on modern and non-formal methods of teaching, which help pupils and students grow and develop new passions for different areas (Mathematics, IT, History, Biology etc.). In this project I focused on Networking, as the main subject because my mentor is Certified in Cisco and Computer Science and I am also learning CCNA R&S (Cisco Certified Network Associate Routing & Switching), but the methods can be used in any domain. The most effective way to put in practice our suggested procedures is by combining non-formal methods with modern methods for teaching : Games/Society games combined with The Star-bursting method, The Coffee Shop combined with Brainstorming, The Storytelling Method with The Cluster Method, The heuristic conversation combined with Debate. The basic requirement of progressive education is to ensure the union individual work with collaborative learning group study activities and interdependent .

Therefore, I have created an innovative technique : The Sharp Method. It is designed to maximize the potential of the preexistent methods, in order to help the students grow and develop through their own strength, in a way that fits their unique character and needs.

The purpose of the Sharp Method is to promote the interaction of the participants, of their personalities, the accomplishment being a more active learning and with obvious results.

This project shows a way to develop your networking skills as a teacher, as a student and as an employee .

Sharp cfb method

The Coffee Shop & Brainstorming

These two methods combined provide the most opportune atmosphere for new ideas to take shape.

Sharp gfv method

Graphic Facilitation & Visual

By combining these two students have access to information through colorful images instead of boring paragraphs.

sharp sgsb method

Society games & star-bursting

Helps the participant to find as many solutions and answers as possible by asking many questions, and this is perfect to be transformed into a board game, by putting competitive mind to the contribution of finding the most effective ideas.

Sharp Sc method

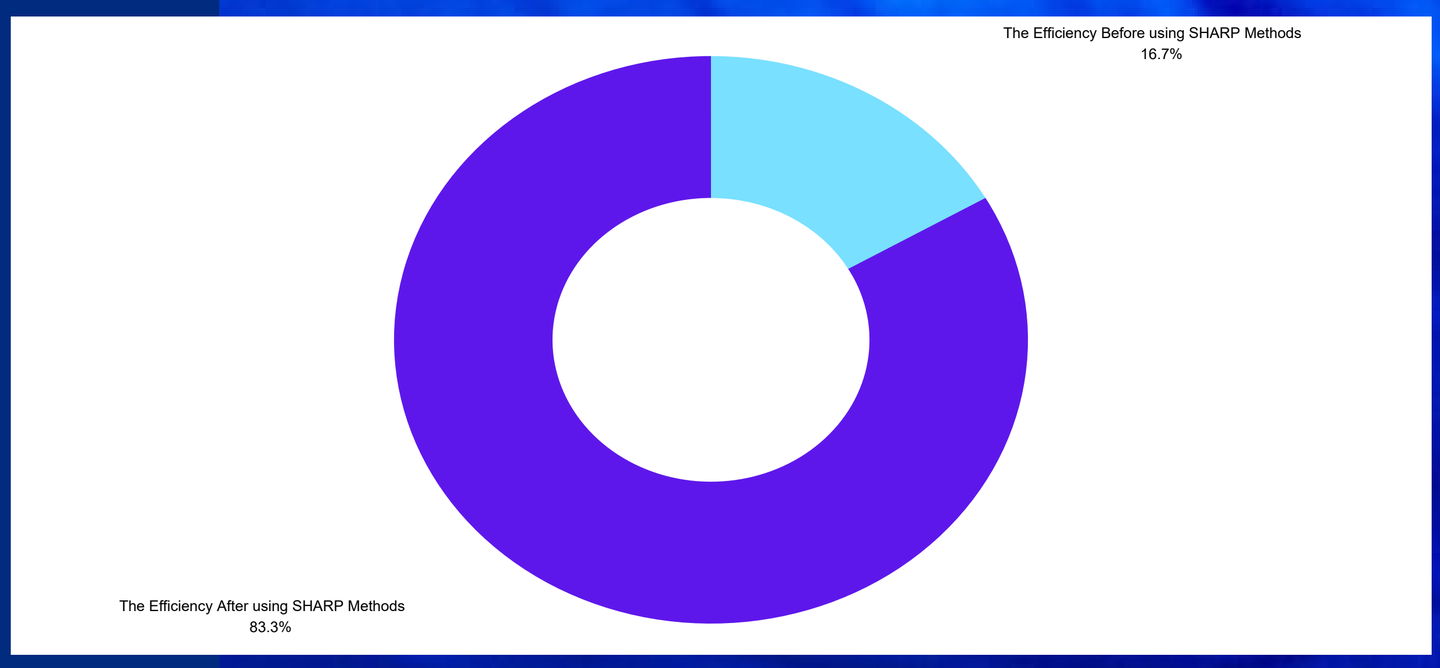
The Storytelling & The cluster

You can put a drawing in the form of clusters on the blackboard, and then, starting with the teacher and continuing with the students, you can create a story from anything.

Sharp hcds method

The heuristic conversation & Debating societies

The moment we combine heuristic conversation with classroom debate is the best time for students to develop their own ideas, their perspective on the debated topics and develop their social skills.



This concept helps children and teens into developing their minds and their emotional intelligence as well, by persuading them to speak freely in a safe environment. Questions stay at the base of our human beings and so our method encourage students to learn by smartly asking questions.

Constact : +40787433840 constantinlorenamaria@gmail.com

F

Medicine

Paramedical

Pharmacy

Cosmetics

Hygiene

EXPERIMENTAL MODEL FOR CANCER TREATMENT

PHD

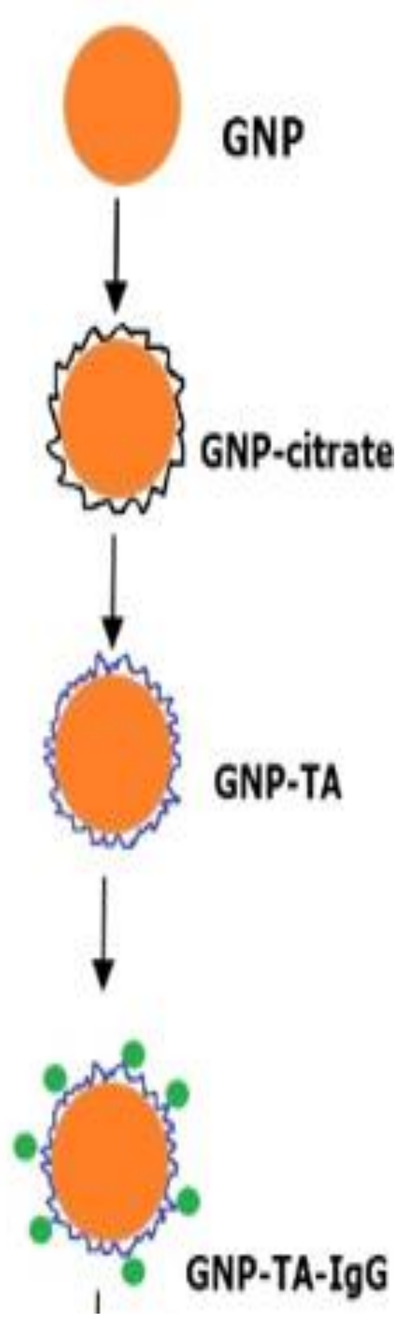
Authors: **Stefan TITU, Romelia POP, Teodora MOCAN, Flaviu-Alexandru TABARAN, Alexandru IRIMIE**

F

Matrix metalloproteinase -1 has been demonstrated to interfere with cell migration, invasivenes and colagen distruction in cancer patients. In particular, the hemopexin domain of MMP-1 regulates cell behaviour and the concentration upregulation has been known to increase rate of tumor local and metastatic growth.

Also, gold nanoparticles represent FDA-approved solutions for cancer imaging and treatment, due to their high level of biocompatibility. We hereby propose an experimental model that starts with the synthesis of gold nanoparticles (modified Turkewich method). The next step of our concept is represented by binding of the anti-MMP1 hemopexin domain antibody onto the surface of nanoparticles. The newly designed construct has a signifficant potential for targeting applications (photothermal treatment, tumor imaging) in cancer field.

Gold nanoparticles stabilized with citrate (GNP-cit.) are synthesized in aqueous medium, as follows: 29mg HAuCl4*3H2O are dissolved in 50mL H2O dist. under continuous stirring and the solution heated to 1000C. Add 5 mL of sodium citrate (20mg/mL) and the reaction is allowed to continue at 1000C under continuous stirring for 2h. In the next step, the citrate ions on the GNP surface are replaced with thioctic acid, as follows: the pH of a 9 mL volume of soil is adjusted. GNP-cit. 9.8nM at pH=11 with the help of a 0.1M NaOH solution. add 90µL of soil. ethanol TA 10mM and 40µL NaCl 2M under continuous stirring, and the reaction is completed for 90 minutes. The obtained GNP-TA solution is then subjected to a 15000RPM/10min centrifugation stage. followed by re-dispersion of the sediment in H2O dist. For the covalent coupling of immunoglobulin G (IgG): adjust the pH of a 3mL GNP 9.8nM solution to pH=8.5, using a 0.1M Na3PO4 solution, add 900 µL EDC (30mg/mL) and 900 µL NHS (30mg/mL), and then, after a 10-minute fermentation, add 4mL of soil. GNP-TA under continuous stirring. The bio-nanostructure obtained GNP-TA-IgG is subjected to an additional step of centrifugation (14000RPM/20min.) and re-dispersion in H2O dist. in order to remove secondary reaction products.



Contact: *dr.teodora.mocan@gmail.com*

TECHNOLOGY FOR OBTAINING AN INNOVATIVE ANTIMICROBIAL, NON-ACTIVE MEDICAL DRESSING THROUGH THE USE OF INDIGENOUS BIORESOURSES, NonActivPans

F

Research project

E!13429, PN-III-P3-3.5-EUK-2019-0237, contract 219/2020-2023

Authors: Carmen GAIDĂU, Maria RÂPĂ, Anamaria MOȘUȚIU, Ecaterina MATEI, Cristian PREDESCU, Daniela BERECHET, Maria STANCA, Cosmin ALEXE

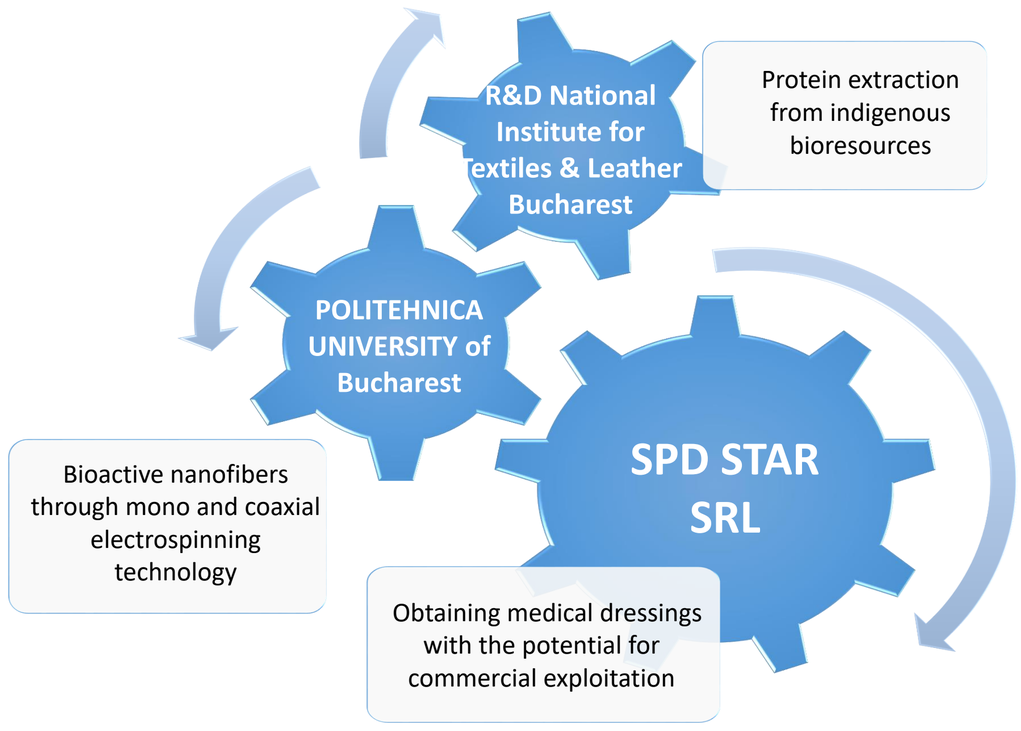
Description

The project aims to exploit proteins extracted from the by-products obtained from processing skins of mammals (rabbit, etc.) and sheep's wool keratin in order to make medical dressings additives with antibacterial and non-active antimicrobial agents (antibiotic-free), with advanced regenerative properties for the healing of acute and chronic wounds through electrospinning technology.

Novelty

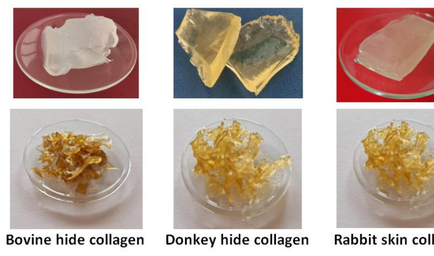
- Development of new protein nanofibers with natural or smart antimicrobials with efficiency in hard-to-heal wound healing.
- The use of new collagen sources extracted from donkey hides, rabbit skins, fish scales with improved bioactivity as compared to bovine/pork native collagen.
- The use of wool keratin as bioactive wound healing material.
- Encapsulation of efficient antimicrobials (essential oils, Zn/Ag nanoparticles) into protein nanofibers through co-axial electrospinning.

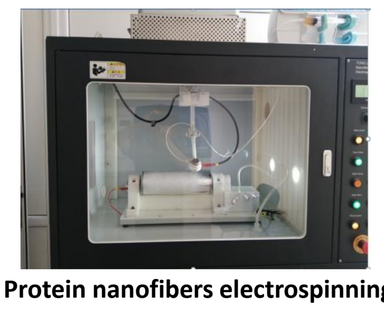
Partners Consortium



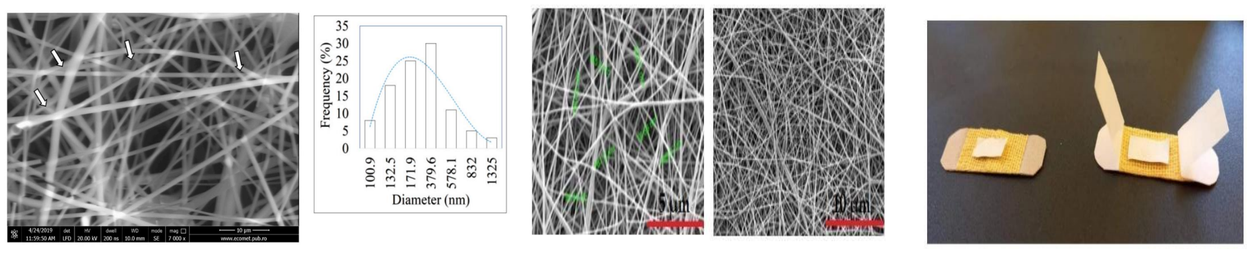
Work Plan

Technological and experimental concept for obtaining medical antimicrobial dressings → **Development of technologies for obtaining protein nanofibers using biopolymers/ antimicrobial compounds** → **Validation of antimicrobial, non-active (without antibiotics) medical dressings**





Protein nanofibers electrospinning



SEM images of protein nanofibers and wound dressing prototype

Project results

- Advanced biomaterials for hard-to-heal wounds, based on natural proteins (collagen, keratin) and antimicrobials (essential oils, chitosan, Zn or Ag nanoparticles)
- Collagen or keratin based nanofibers with average diameter below 250 nm, porous nanostructure, water soluble, without cytotoxicity up to 1000 µg/mL and biocompatible, according to in vivo tests.
- Collagen and keratin based nanofibers with antibacterial and antifungal properties for new wound dressings without antibiotics. An alternative to known risks of cross contamination or development of pathogen resistance.
- Advanced valorization of protein by-products with ecological impact.
- 2 Patent applications
  7 Articles with cumulated IF=26.74
  Technology transfer to SC SPD STARS SRL Romania and MB BIOFITA Lithuania

Contact: http://spgroup.ro/noutati/non-active-pans

Dr. Carmen Gaidau (carmen.gaidau@icpi.ro), Dr. Maria Rapa (maria.rapa@upb.ro), Farm. Anamaria Mosutiu (mosutiu.anamaria@gmail.com)

Acknowledgments: This research was funded by a grant from the Romanian Ministry for Research, Innovation, and Digitalization, CCCDI-UEFISCDI, project number PN-III-P3-3.5-EUK-2019-0237, Contract 219/2020 (NonActivPans), in the frame of Eureka project E!13429

Optimization of human mesenchymal stem cells interaction with innovative biomimetic structures for tissue engineering applications

Research project: 621PED/2022 (PN-III-P2-2.1-PED-2021-4275)

Authors: Alina Vladescu (Dragomir), Anca C. Parau, Irina Titorencu, Catalin Vitelaru, Vasile Pruna, Cosmin M. Cotrut, Diana M. Vranceanu

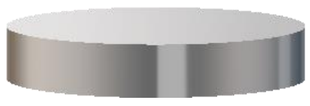
F

The project proposes the optimization of human mesenchymal stem cells (MSC) interaction with innovative biomimetic structures in order to create and provide a better environment for osteointegration. The proposed biomimetic HAp structures with different morphologies are obtained by electrochemical means on Ti substrate and are characterized by tailored in vitro behaviour, contact angles smaller than 20°, modified through adequate and optimized manufacturing strategies which provides superior osseointegration abilities.

Materials & Methods

Sample preparation

cp-Ti substrate

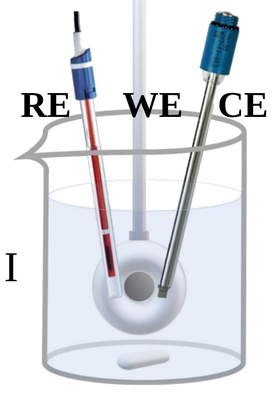


- discs Ø = 20 mm, h=2 mm
- SiC paper (230 ÷ 800 grit)
- Sonication in acetone

Coating deposition

Electrolyte

- 2,5 mM de $Ca(NO_3)_2 . 4\ H_2O$
- 1,5 mM de $NH_4H_2PO_4$
- dissolved in ultra-pure water ASTM I
- p*H* value of 6

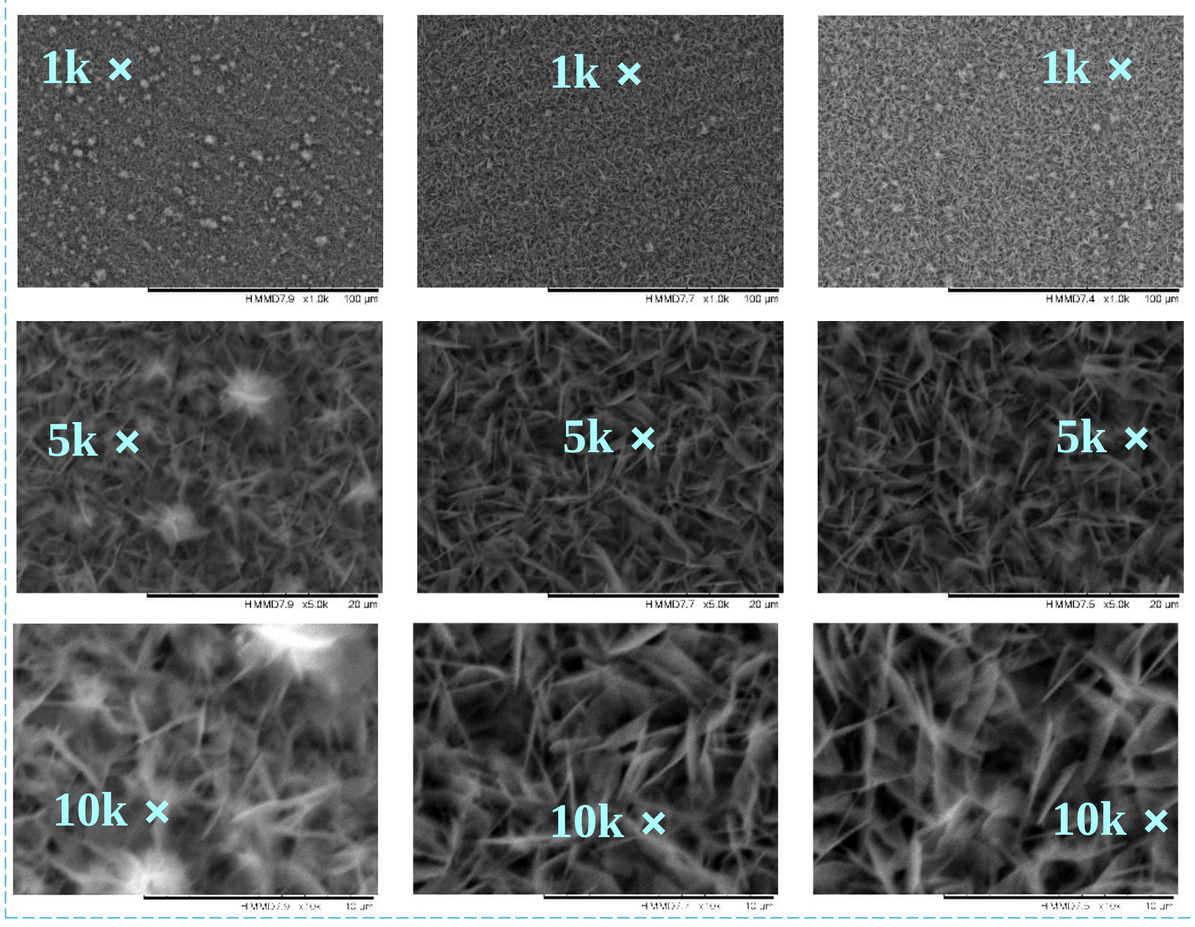


Pulsed electrochemical deposition

- 1 cycle
  - i_{ON} = − 3 mA/cm² for 1 s
  - i_{OFF} = 0 mA/cm² for 5 s
- 30 min / 300 cycles
- temperature: 60 °C

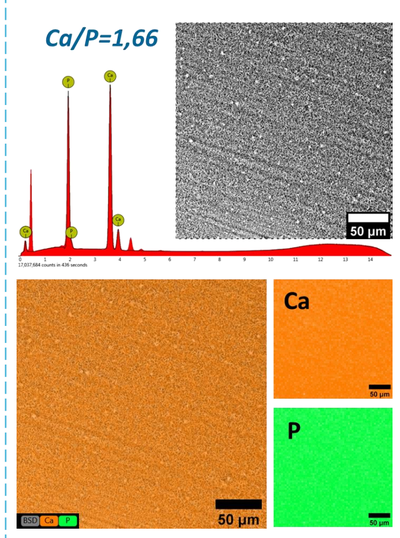
Morphology

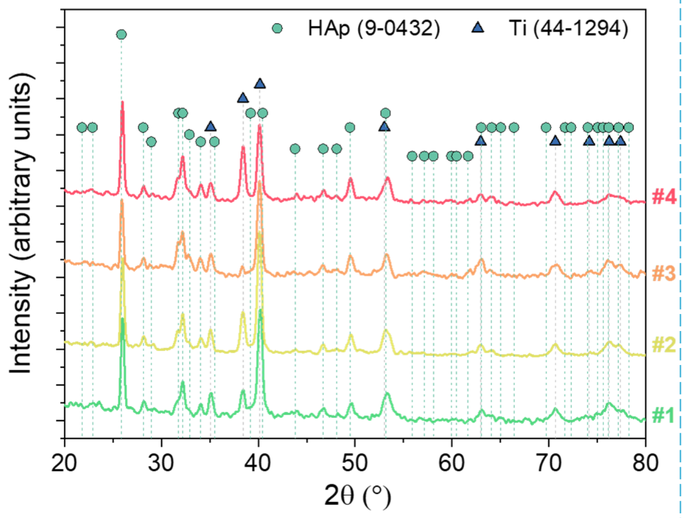
The morphology of the HAp coatings is made of plate-like crystals very thin and wide, grown perpendicular on the Ti substate



Chemical & phase composition

4 different samples were investigated

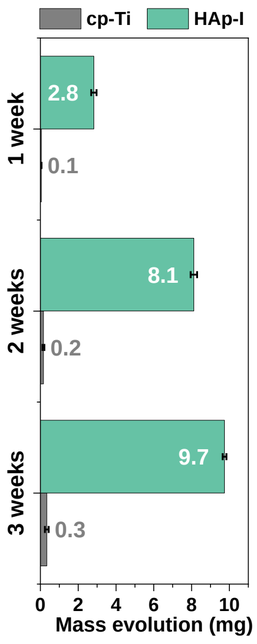


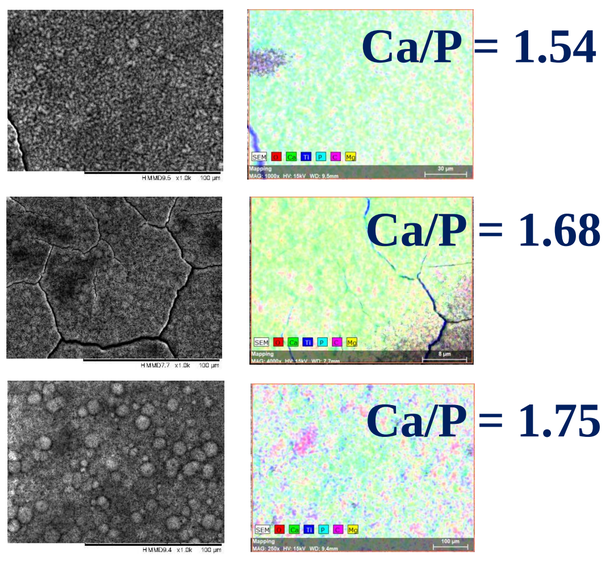


- The phasic composition and chemical bonds revealed that the coatings consists in hydroxyapatite as the main phase, with a crystallite dimension of ~ 21 nm and a crystallinity of ~ 25%

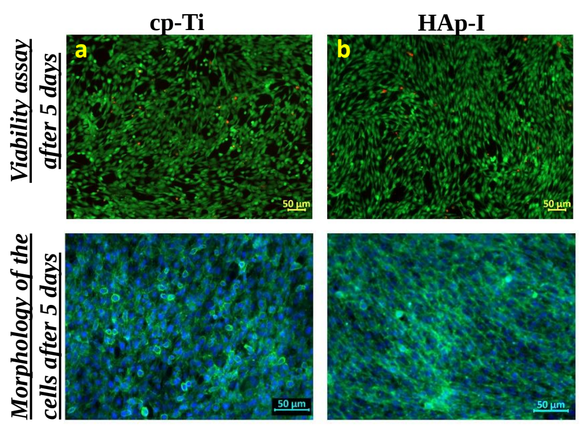
Crystallite dimension $L_{(002)}$ = 21.4 nm (±0.7)
Crystallinity χ_c = 24.8 % (±0.6)

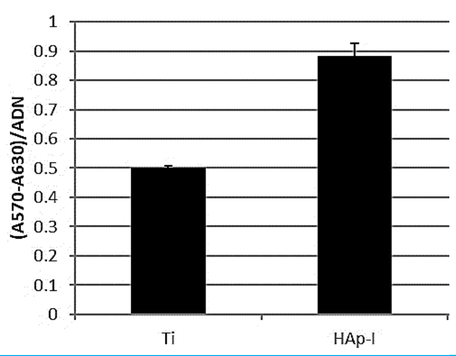
The bioactivity assays

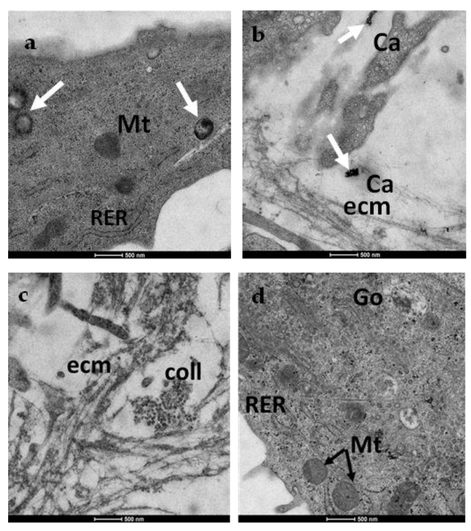




In vitro cell assay - MTT assay. MG 63 cells line







Contact: alinava@inoe.ro

Acknowledgement: *This work was supported by the Romanian Ministry of Education and Research, CNCS - UEFISCDI, project number PN-III-P2-2.1-PED-2021-4275 (BioMimCells), within PNCDI III (project No. 621PED/2022).*

Alexandru Ioan Cuza University

Attitudes of nurses in Israel towards welfare issues and job satisfaction

F

Research project

Author/s: 1. Milana Mazal Mazor, UAIC Doctoral School

2. Luca Florin-Alexandru, "Gheorghe Asachi" Technical University of Iasi

Research Problem

How can hospitals retain nursing staff and improve their satisfaction through the development of an optimal welfare system?

Purpose of the Study

Developing a model of an optimal welfare system for nursing staff in a hospital.

Research Method

Qualitative research - In the first part of the research, a quantitative research method was used (a method suitable for researching "quantity of data"). After the data was collected, statistical tools were used for their analysis. Using them, the research hypotheses were tested. At the same time, this method was used to check data from existing databases. All data were processed with statistical tools (Descriptive statistics, hypothesis testing, regression, analysis statistical variance, recommendation systems, data mining, etc.). As part of the quantitative research, a questionnaire was delivered to 240 nurses in 3 hospitals in Israel.

Research Tool

Several tools were used in this study. Some of the tools were developed for this study, and some are based on existing questionnaires developed in previous studies in the field.
Tool 1 - for group 1: A questionnaire for nurses consisting of 4 main parts:
Part A - Personal/demographic data
Part B - The existing welfare system in the hospital (according to the nurses' perception)
Part C - The nurses' satisfaction with their work today
Part D - What is the most important welfare component for nurses

The Study Population

The study population divided into three main groups:
Group 1: a team of 20 nurses from 3 hospitals. In each hospital, questionnaires will be distributed in 4 departments Number of participants: 80 nurses in each hospital, a total of 240 nurses.
Group 2: HR managers, employees of welfare departments from 3 hospitals. In every hospital there is one position in the human resources and welfare department that includes: Welfare manager, and a total of 3 participants in this group.
Group 3: department managers, nursing team managers from 3 hospitals. A total of 12 managers/nurses in charge.

Data Collection

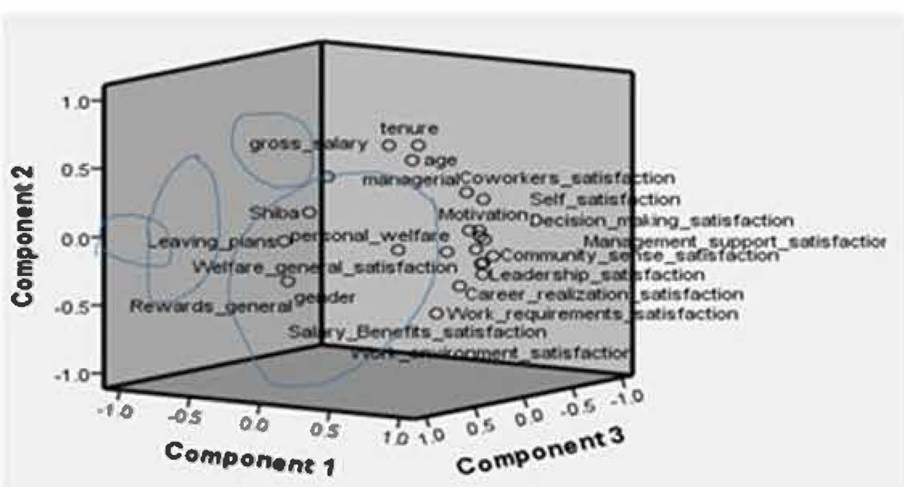
Satisfaction questionnaires (Qualitative research) were distributed among a team of 20 nurses from 4 departments of 3 hospitals (a total of 240 participants).

The Research Findings

1. **Contact with the organization's welfare department** Most of the participants knew about the existence of the welfare department in the organization where they work (only 30% did not know at all), but it is important to note that compared to men, women are more aware of the existence of the department and receive more information and help when they are recruited than men, however the differences between the sexes are not statistically significant. Women are more aware of workshops when they are held than men. Moreover, the welfare department initiated more contact with women than men. A little more than half of the participants agree that access to welfare workers is convenient and there are no differences between the genders.
2. **Satisfaction with the functioning of the welfare department in the organization** Sheba Hospital has a rather low level of satisfaction than the other hospitals in issues such as: "availability of the welfare department or workers", "dissatisfaction with the welfare department's concern among the employees", "dissatisfaction with the skill of the welfare department", "the welfare staff are working slowly", "the welfare staff do not always take care of the needs of the employees", "the welfare department does not handle problems thoroughly", "it is not always known about the availability of the welfare staff" and etc.
3. **Welfare issues** 43% stated there was a combination of burnout, workload, salary, and insurance. 13% mentioned the area of personal involvement. 10% indicated a lack of information about the existence of a welfare department. The most common welfare factor is work load, burnout, stressful working conditions and insurance. After that, health and a supportive environment, motivation and belonging.
4. **Suggestions for improving well-being** 34% of employees offered welfare programs to prevent burnout. 25% offered motivation programs, and 19.5% offered programs to belong to the workplace or the organization. To the question of which of the welfare programs the participants would choose, the most common answer was a combination of 25.15% less workload and assigning more workers to shifts, 17.96% vacations and better working conditions, 10.78% help for the needed. In other words, most of them choose less stress and more work, then vacations and better working conditions, and in the third most important place, help to those in distress.
5. **To the question of what needs to be changed in the welfare services organization** 36.5% change in organization, 32.5% change in work environment, 27% change in management.
6. **Nursing Retention** 38.5% are sure that nothing has been done, 17% agree that not much has been done and 10.5% do not know.
7. **General satisfaction with well-being** The employees of the Sheba Hospital were found to be generally less satisfied with well-being than the other hospitals. Also, in the other parameters such as: vacations, 13th salary, car expenses, gifts, concerts, discounted lunches, gifts after birth, management courses, support for higher education, etc. - usually in Sheba the employees get better welfare conditions than in other places, but the rating is still very low both in Sheba and in other places.
8. **Satisfaction with the work environment** Regarding personnel - most of the participants stated that there will be enough nurses, and skilled personnel. Regarding the treatment from the management - backup, support and sharing in daily work - teamwork and effective communication. Regarding personal development - professional training, personal empowerment and management development.
9. **Satisfaction with the rewards** The salary is the most important factor followed by different types of bonuses (activities for family members, discount in the marketing networks) and a fair and equitable reward system for performance based on contribution and personal skills.
10. **Work Satisfaction** In general, all the research participants from the hospitals (both men and women) are very satisfied in their workplace, the employees feel skilled, valued and have friends at work. According to an independent T-Tests for mean differences, it was found that Sheba hospital workers, more stressed at work than all other places, and were found to be more resentful because they are told what to do at work, they were less independence and less "consideration of their feelings". T-tests in the aspect of interpersonal relations reveal that women are more satisfied than men.
11. **Satisfaction with management** Most of the participants (regardless of gender) are satisfied with the management's performance (satisfaction is somewhat lower in Sheba). The management conducts itself in a decent and supportive manner.
12. **Satisfaction with job requirements** Satisfaction with job requirements is lower in Sheba where the participants experience more load and pressure and are less successful in balancing work and family. When the variables are examined in depth, significant differences are discovered (from the perspective of the research participants). Comparing men and women, independent samples t-tests reveal significant differences in favor of men. The motivational variables indicate high satisfaction both at Sheba and elsewhere. This finding indicates that the research participants are highly motivated, they are very satisfied at work, and there are no manifestations of burnout. When women have a little more motivation than men. The majority agree that they value their work and apply their knowledge in the workplace. There are high significant differences regarding the application of skills at work and evaluation of the workplace, the women rate the matter higher. work environment variables, the participants state that the feedback from the customers gives them a lot of motivation, and most of them are willing to continue working in the same place in the future.
13. **Personal well-being variables** Most of the participants (regardless of gender) are satisfied with their personal well-being, i.e., the variables of health, lifestyle, professional development, are ranked high both in Sheba and in other workplaces. The only significant mean difference according to independent T-test samples is found only in "I feel skilled worker" (higher in Sheba).
14. **Decision making variable** Most of the participants are satisfied with the decision making, but the findings are lower at Sheba Hospital. Regarding "I have the possibility to plan work more independently" besides Sheba the rating is higher (i.e., more satisfied) and also regarding "making decisions affects opportunities". There are no significant differences, not even when comparing women to men.
15. **Community variable/indicators** All the community indicators are a little higher outside Sheba. without gender differences.
16. **Wage** Regarding the salary conditions and benefits in general there is dissatisfaction, while in Sheba the satisfaction is lower. When comparing men and women, men are significantly more satisfied with all the parameters of salary, bonuses and the adjustment of salary to skills.
17. **Support from co-workers** Peer support- In general, everyone is satisfied with the colleagues they work with. In average values there are no significant differences between the genders. Among women, cooperation is higher than among men. Coworker support variables are lower in Sheba. Management support - There are no significant differences between men and women. Satisfaction with management support is lower at Sheba.
18. **A career building opportunity** The research participants, without difference between men and women, agree that they exhaust their skills, and their career goals are achieved. In Sheba the employees feel more stuck in the same position with lower opportunities for building a career.
19. **Intentions to leave** Although there is an intention to leave at some point in the future, the study participants do not express intentions to leave. Women are less likely to plan to leave their current job but want to leave in the future. In Sheba, employees are generally more pessimistic and less satisfied.
20. **Analysis of variables and relationships between variables** Age: Everyone's satisfaction increases with age. As the age increases, so there is improvement in all areas. Age is positively and significantly correlated with seniority, gross salary, managerial position, satisfaction with the performance of the research participant and his relationship with co-workers, satisfaction with management and working conditions, satisfaction with his well-being. This means that there are no signs of wear and tear and that as age increases, satisfaction increases. A Spearman correlation analysis between the variables found that age is negatively correlated with gender, meaning that the women who participated in the study are usually older than men (P_value<0.05).
Gender: Spearman's correlation analysis shows that gender is positively correlated with satisfaction with pay, but negatively correlated (P_value<0.05), with the assessment of personal skills, meaning that male respondents are less satisfied with their performance and their co-workers, and more satisfied with pay.

Bibliography

- Ablas, I., Selle, S., & Djanggih, H. (2019). Corporate Responsibility Towards Employees Welfare. Yuridika, 34(1), 37-53.
- Abel, M. (2013). The social and financial benefits of developing employee satisfaction. International Journal of Management & Information Systems (IJMIS), 17(2), 83-88.
- Acquavita, S. P., Pittman, J., Gibbons, M., & Castellanos-Brown, K. (2009). Personal and organizational diversity factors' impact on social workers' job satisfaction: Results from a national internet-based survey. Administration in Social Work, 33(2), 151-166.
- Burcea, M., Toma, S. G., & Popuc, R. M. (2014). Patients' satisfaction with the health care system in the age of globalization: The case of Romania. Transylvanian Review of Administrative Sciences, 10(SI), 5-20.
- Chachula, K. M., Myrick, F., & Yonge, O. (2015). Letting go: How newly graduated registered nurses in Western Canada decide to exit the nursing profession. Nurse education today, 35(7), 812-818.
- Desai, R., & Coleman, Y. A. (2019). The effects of a clinical ladder program on professional development and job satisfaction of acute care nurses. International Journal of Nursing and Health Care Research 2:1110.
- Herzberg, F. (1966). Work and the nature of man, Cleveland: World Publishing.
- Holmberg, C., Berg, J., & Sobis, I. (2018). Job satisfaction among Swedish mental health nursing personnel: Revisiting the two-factor theory. International journal of mental health nursing, 27(2), 581-592.
- Jackson, J. L., Chamberlin, J., & Kroenke, K. (2001). Predictors of patient satisfaction. Social science & medicine, 52(4), 609-620.
- Kumiawaty, K., Ramly, M., & Ramlawati, R. (2019). The effect of work environment, stress, and job satisfaction on employee turnover intention. Management Science Letters, 9(6), 877-886.
- Labrague, L. J., McEnroe-Petitte, D. M., Leocadio, M. C., Van Bogaert, P., & Tsaras, K. (2018, July). Perceptions of organizational support and its impact on nurses' job outcomes. In Nursing forum (Vol. 53, No. 3, pp. 339-347).
- Nissanholtz-Gannot, R., Rosen, B., Hirschfeld, M., & Community Nursing Study Group. (2017). The changing roles of community nurses: the case of health plan nurses in Israel. Israel Journal of Health Policy Research, 6(1), 69.
- Onuoha, P., Stephen, A., Bernard, P., Corban, A., Mahabir, M., & Israel-Richardson, D. (2017). Factors that contribute to work motivation and job satisfaction among hospital nurses in Trinidad and Tobago. Int J Health Sci Res, 7(1), 208-17.
- Patro, C. S. (2017). Employee welfare measures in public and private sectors: A comparative analysis. In Public health and welfare: Concepts, methodologies, tools, and applications (pp. 1026-1042). IGI Global.
- Yoshizawa, K., Sugawara, N., Yasui-Furukori, N., Danjo, K., Furukori, H., Sato, Y., Tomita, T., Fujii, A., Nakagami, T., Sasaki, M., & Nakamura, K. (2016). Relationship between occupational stress and depression among psychiatric nurses in Japan. Archives of environmental & occupational health, 71(1), 10-15.
- Zemach, M. (2012). Job satisfaction in organizations in general and police organizations: A literature review. Tel Aviv: Ministry of Public Security, Office of the Chief Scientist. [Hebrew]
- Zhang, L. F., You, L. M., Liu, K., Zheng, J., Fang, J. B., Lu, M. M., ... & Ma, W., Wang, J., Wang, S., & Wu, X. (2014). The association of Chinese hospital work environment with nurse burnout, job satisfaction, and intention to leave. Nursing outlook, 62(2), 128-137.



Contact: mazalr44@gmail.com

Desmo-761: A Novel Drug for Thrombosis Treatment

Author: Sara Sheikhlary

F

Desmo-761:

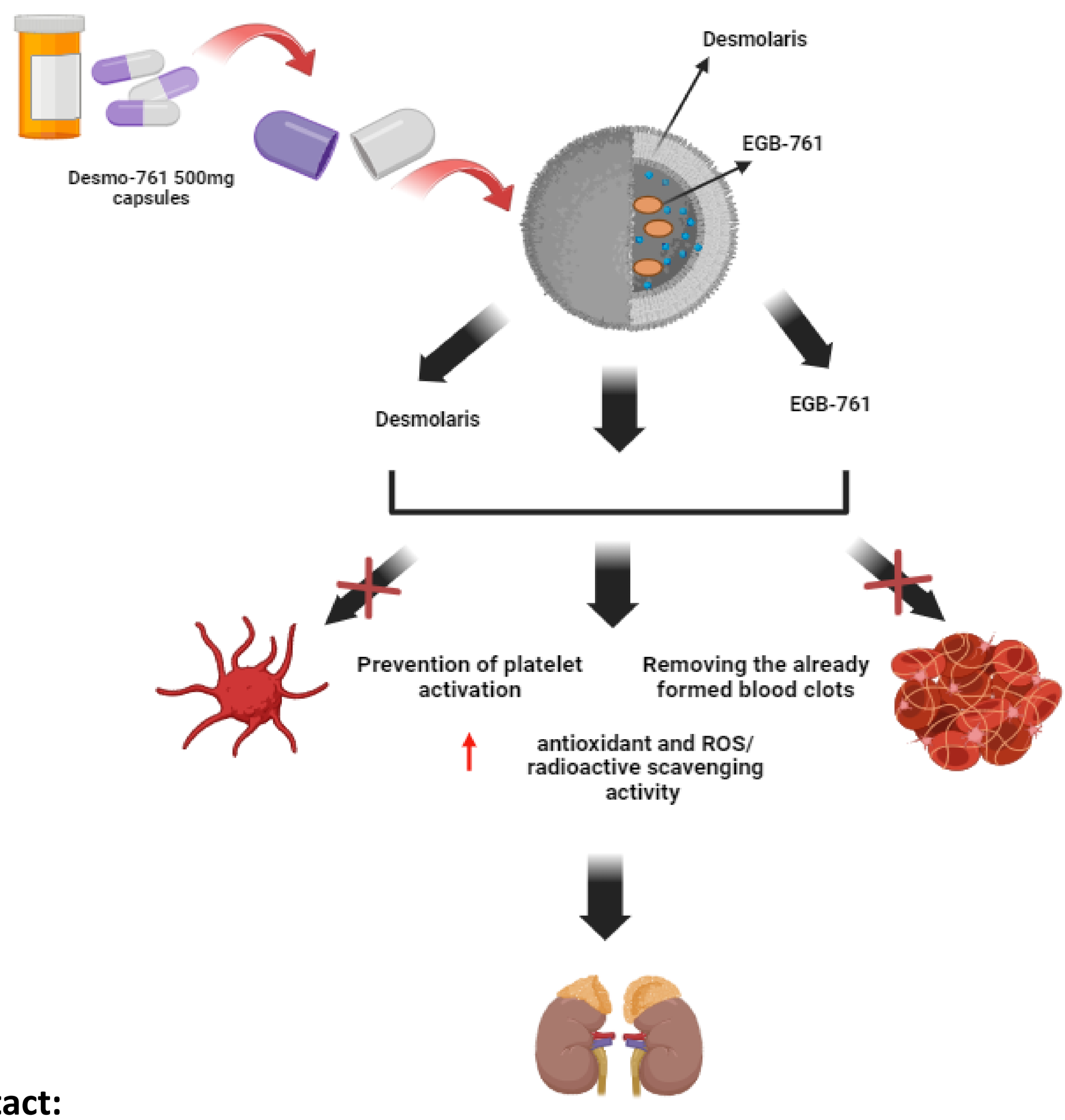
- An herbal-animal based extended-release niosome lipid nanoparticle-based drug delivery system.

Compositions:

- EGB 761 (Ginkgo Biloba leaf extract) in the inner layer + Desmolaris (the major anti-coagulant agent in vampire bat's saliva) in the outer layer. Niosome is made up of DPPC lipids which can reduce platelet activation by themselves.

Mechanism of action:

- Removing the already formed thrombus
- Preventing platelet activation and thus thrombus regeneration
- Maintaining the homeostasis by not inducing excessive bleeding.



Contact:
sheikhlary@arizona.edu

THE IMPORTANCE OF PREIMPLANTATION DIAGNOSIS IN GENODERMATOSES

Doctoral research project

PHD Author: Silvia POPESCU

Poster Authors: Silvia POPESCU, Zoltan Janos KÖVÉR, Călin GIURCĂNEANU, Gabriel GORECKI

F

Introduction and objectives. Genodermatoses represent relatively rare chronic conditions, but with major psychosocial impact. The incidence of these diseases varies between 1:6000 and 1:500.000 and is constantly increasing, possibly due to the development of more effective diagnostic methods. The severity of genodermatoses varies, in some cases presenting as severe diseases which significantly alter the quality of life, reduce life expectancy and have a major impact on the patients' families. Also, these afflictions are associated with an increased risk of malignant degeneration and disabling complications, which often lack concrete therapeutic solutions and require a complex multidisciplinary regimen, so that they constitute important public health problems in terms of consumed resources.

Materials and Methods. Prenatal screening and diagnostic techniques are of particular importance in the early detection of severe conditions associated with increased morbidity and mortality, thus allowing competent counseling and the possibility of making informed decisions that take into account the above mentioned implications of these diseases without omitting complex ethical considerations. Pre-implantation diagnosis is possible by means of PCR techniques and DNA haplotyping and can be carried out in various evolutionary stages (pre- or post-fertilization). Should the results of these test exclude genetic abnormalities, implantation is possible 2-3 days after the tests.









Results and Conclusions. Although these tests are not foolproof (2-11% risk of failure), are extremely expensive and are not yet widely available, they hold a great potential for the future approach of genodermatoses. The diagnostic and therapeutic approach to genodermatoses requires the coordination and collaboration between members of a multidisciplinary team that includes specialists with a wide range of complementary skills united in a common effort with the main goals including diagnostic accuracy, improvement of medical services offered to the patients and at the same time, improving the cost-benefit ratio, which brings unequivocal benefits to both the patient and the medical system.

Contact: eclarer_mon_ame@yahoo.com +40731623309

4th International Exhibition
InventCor
14-16.09.2023 – Deva, Romania

COSMETIC FORMULATION FOR SUN PROTECTION WITH ANTIMICROBIAL EFFECT BASED ON SILVER NANOPARTICLES AND NATURAL EXTRACTS AND PROCEDURE FOR OBTAINING IT

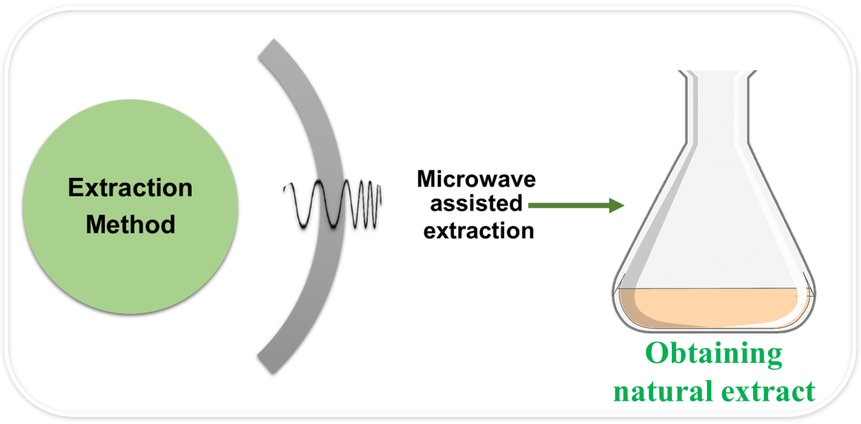
F

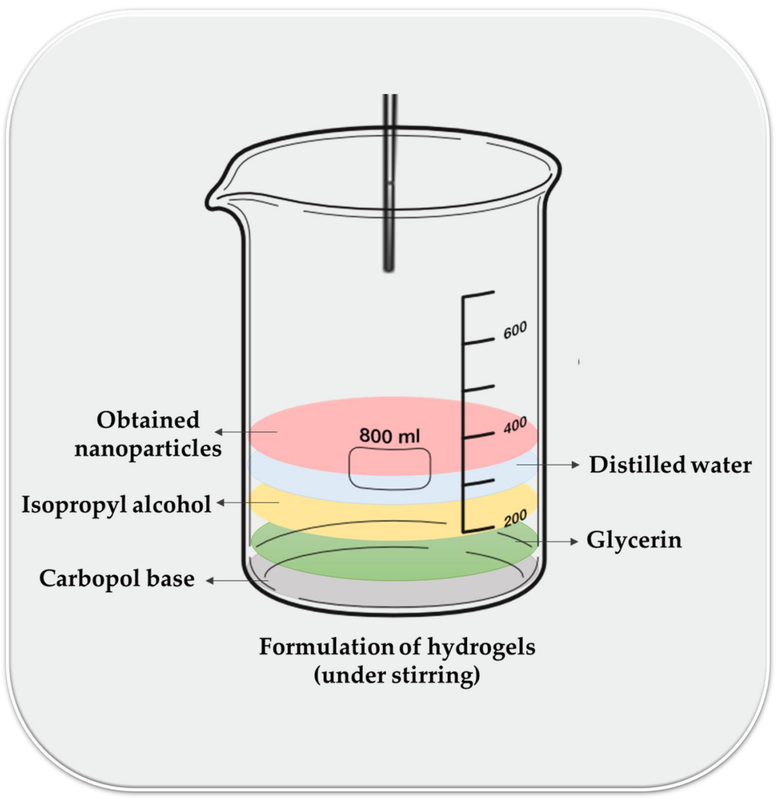
Patent application No. A-00375/2023

Anda Maria Baroi, Irina Fierascu, Roxana Ioana Brazdis (Matei), Toma Fistos, Radu Claudiu Fierascu, Irina Elena Chican, Ioana Silvia Hosu, Florentina Monica Raduly

The present invention relates to a cosmetic formulation for sun protection, based on silver nanoparticles and natural extracts from viticulture waste and to the method of obtaining it. The proposed material is obtained in the form of a hydrogel (with the composition: polymeric base, the active substance silver nanoparticles in dispersion, natural extract from vine shoots, obtained by microwave extraction, glycerin), for its emollient properties, non-greasy texture, ease of handling, compatibility with various excipients and miscibility in water, isopropyl alcohol and water. The method of obtaining the material consists in three stages: obtaining the extract, phytosynthesis of metallic nanoparticles and obtaining the final cosmetic formulation.

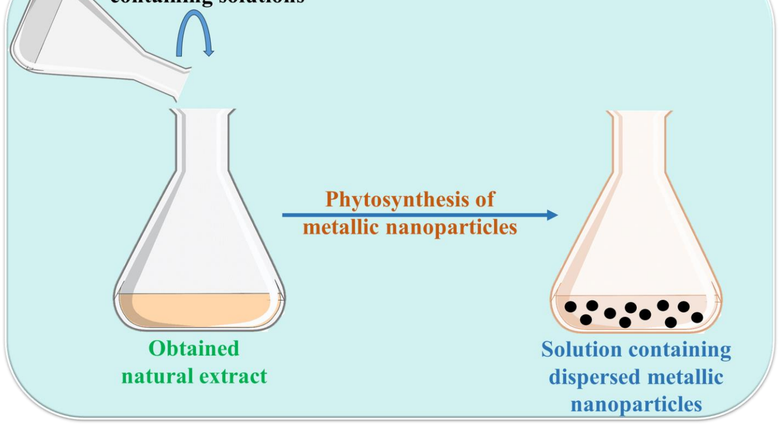






Final cosmetic formulation





ADVANTAGES OF THE INVENTION

- The obtaining proces does not require high production costs
- It has the potential to protect the skin, through the presence of superior antimicrobial effect and SPF level
- Addition of metallic nanoparticles with an antimicrobial effect does not affect the polymeric base of hydrogel

ACKNOWLEDGEMENTS

This work was supported by a grant of the Ministry of Research, Innovation, and Digitization, CCCDI-UEFISCDI, project number PN-III-P2-2.1-PED-2021-0273, contract 644PED/2022, within PNCDI III. It is also acknowledged the support of Ministry of Research, Innovation and Digitization through Program 1 - Development of the national research-development system, Subprogram 1.2-Institutional performance-Projects to finance excellence in RDI, Contract no. 15PFE/2021.

CONTACT:

Dr. Habil. Irina Fierascu

irina.fierascu@icechim.ro

INSTITUTUL NAȚIONAL DE CERCETARE-DEZVOLTARE PENTRU FIZICA LASERILOR, PLASMEI ȘI RADIAȚIEI

SR EN ISO 9001:2015
SR EN ISO 14001:2015
SR ISO 45001:2018
SR EN ISO/IEC 27001:2018
SR 13572:2016

Breast implants silicon outshell bioinstructive engineering for preventing microbial and fibrosis development

Research project

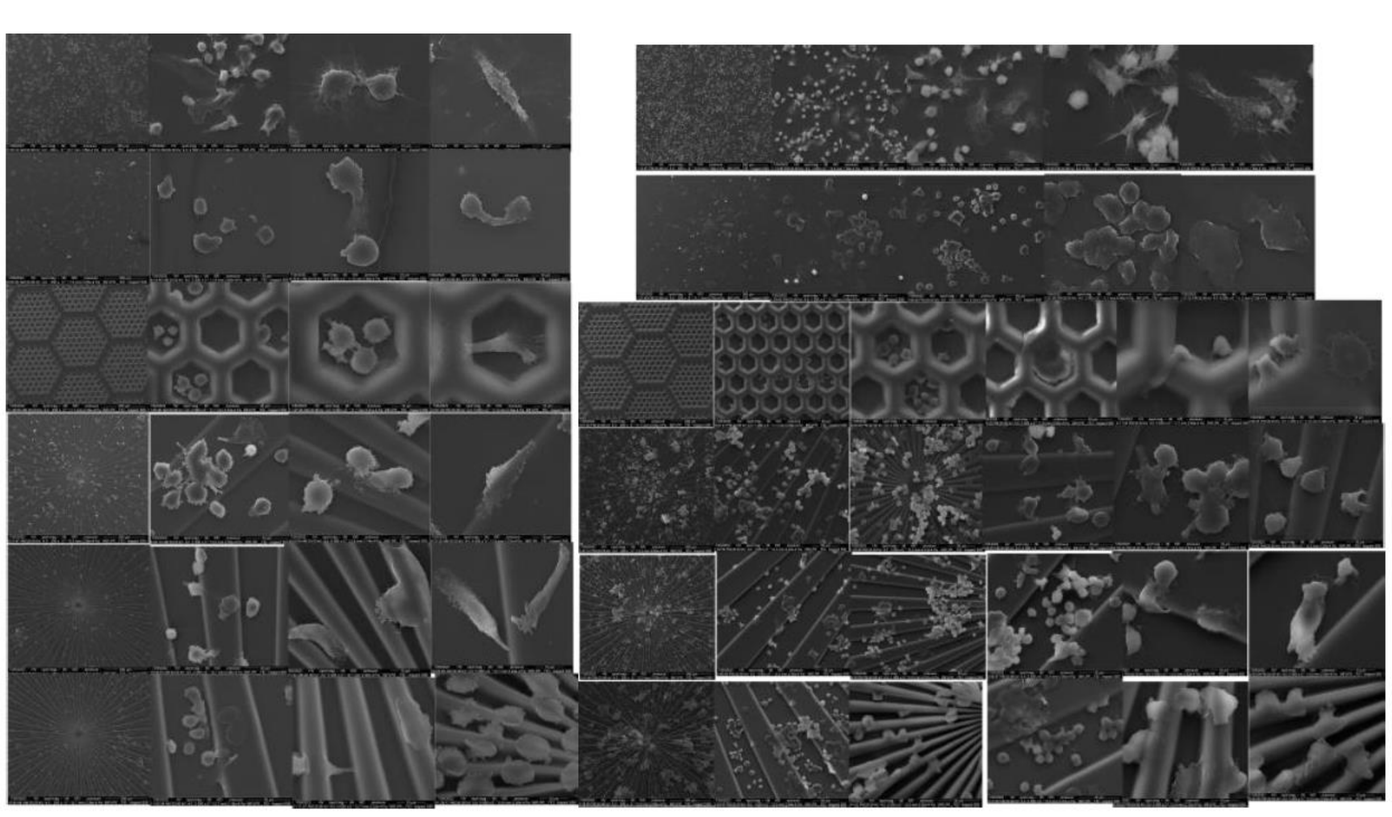
F

Author/s: Valentina Dinca, Nicoleta Dumitrescu, Anca Bonciu, Simona Nistorescu, Laurentiu Rusen

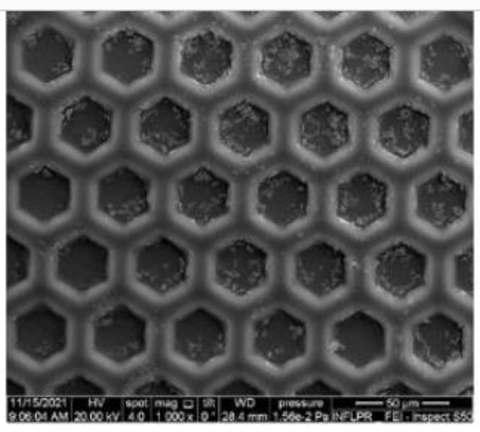
Description: Breast cancer is a significant public health issue for women and it is currently targeted by the national strategies for health outcomes. Considering both physical and psychological impacts on health-related quality of life, a large percentage of women with a mastectomy will choose breast reconstruction by implants. One inevitable consequence of silicone breast implantation and foreign body response is the capsular contracture, which often leads to health complications, need for revision surgery, etc.

Hence, the main objective of the project was to design, develop, and obtain new silicone out shell bioinstructive interfaces of breast implant with specific modulated characteristics (in terms of surface topography, chemistry, wear-resistant) for a final antibacterial and low inflammatory response that could lead to a reduced capsular contracture.

Pictures & graphics



The in vitro biological study was carried out on different textural surfaces using macrophage cells as an experimental model for inflammation and gram positive and gram negative bacteria.





Materials based on PDMS, favour the adhesion of macrophage cells in a different way. For all types of texturing, the morphological appearance of the macrophages is adapted to the type of topography of the surfaces of the PDMS-based materials.

The inflammatory response, namely the secretion of cytokines TNFα was quantified by ELISA tests, suggesting that linear and hexagonal structures are optimal.

The evaluation of the ability of the antibacterial capacity of the optimized substrates was carried out on 3 lines of microorganisms (E. Coli, S. Aureus and C. Albicans).

Contact:valentina.dinca@inflpr.ro

INSTITUTUL NAȚIONAL DE CERCETARE-DEZVOLTARE PENTRU FIZICA LASERILOR, PLASMEI ȘI RADIAȚIEI

SR EN ISO 9001:2015
SR EN ISO 14001:2015
SR ISO 45001:2018
SR EN ISO/IEC 27001:2018
SR 13572:2016

Polymer films with zwitterionic characteristics obtained by laser evaporation for applications in the biomedical field

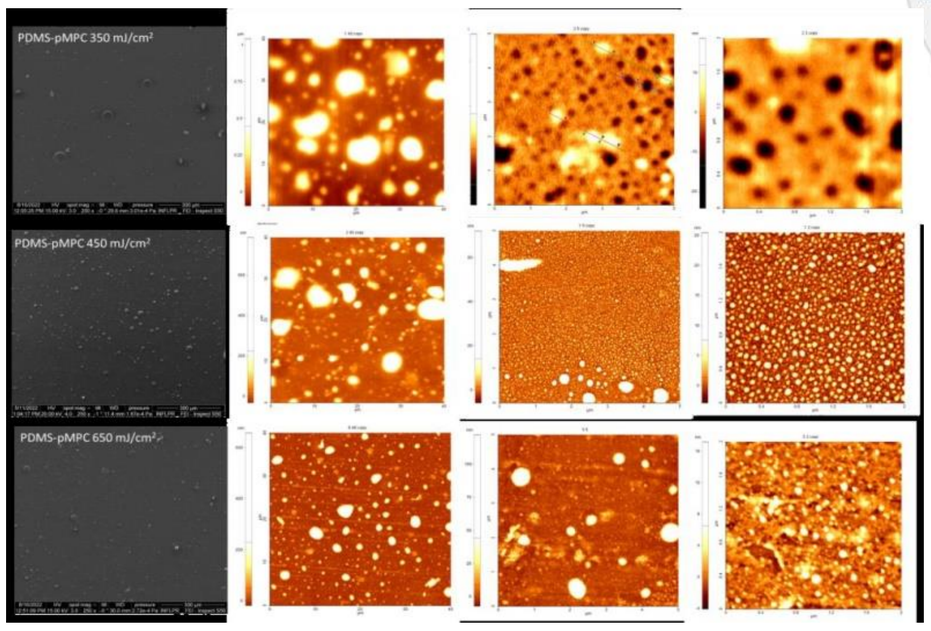
F

Patent: : A 16704, 25.11.2022

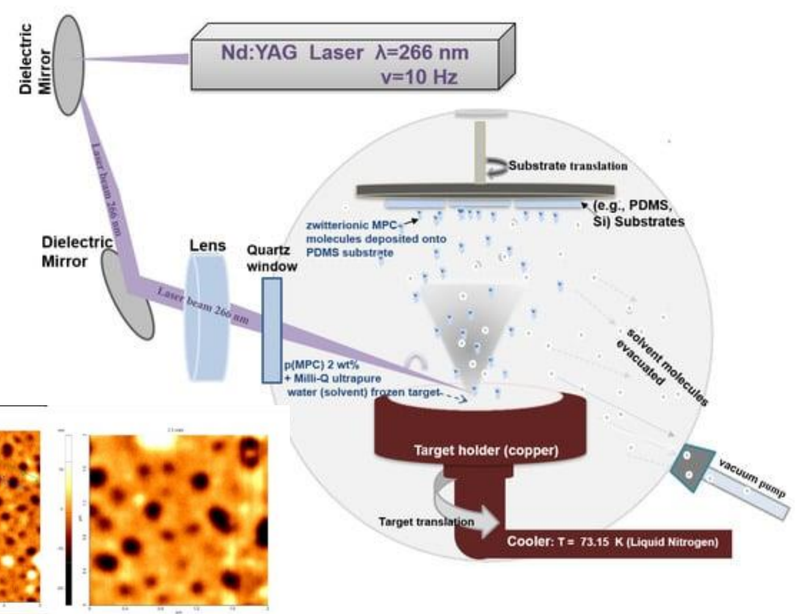
Author/s: : Valentina Dinca, Nicoleta Dumitrescu, Anca Bonciu, Simona Nistorescu, Laurentiu Rusen

New interfaces with hydrophilic profile to be used for improving the silicone elastomer shell of breast implants were obtained by Matrix assisted Pulsed Laser Evaporation.The physical-chemical characteristics of the newly proposed Poly(2-methacryloyloxyethyl phosphorylcholine) (pMPC) functionalized scaffold obtained by Matrix-Assisted Laser Evaporation (MAPLE) The assessment of adhesion, proliferation and morphology of cells grown on the functionalized Polydimethylsiloxane (PDMS) surfaces was performed *in vitro*, using human macrophages and fibroblasts, cells involved in foreign body reaction.

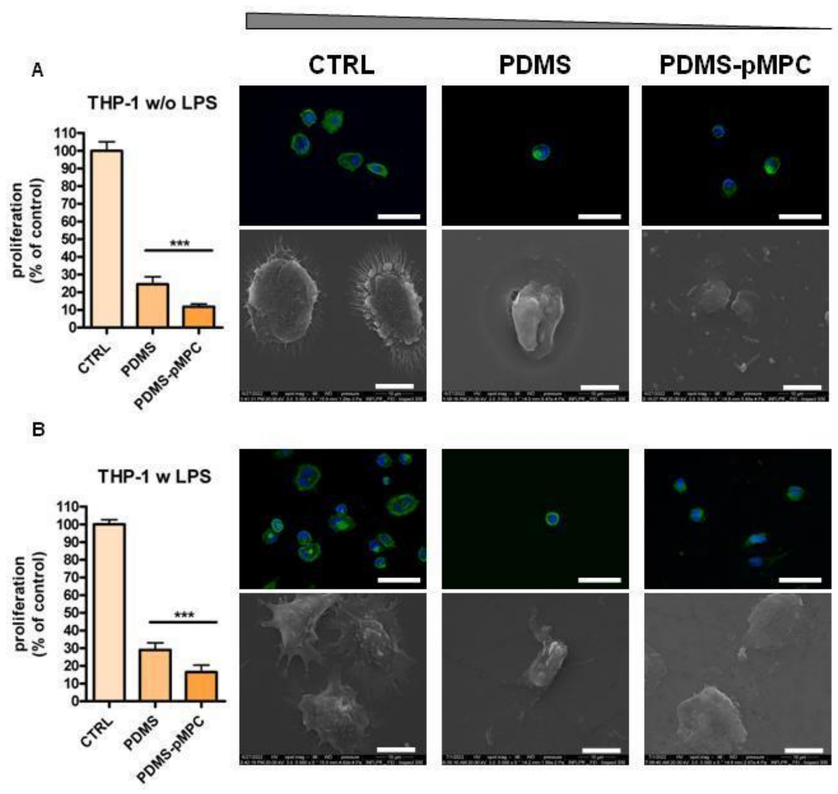
Pictures & graphics



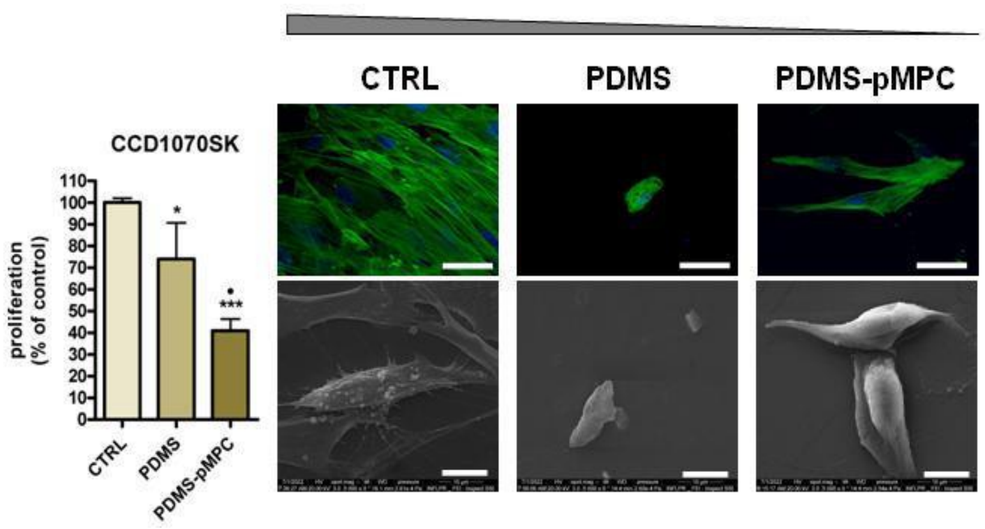
SEM and AFM images of pMPC coatings obtained by MAPLE on untreated PDMS, using fluences of 350 mJ/cm^2 (A–D), 450 mJ/cm^2 (E–H) and 650 mJ/cm^2 (I–L). SEM magnification 1000×, scale bar SEM images 300 μm. Scan areas for AFM: 40 × 40 μm^2, 5 × 5 μm^2 and 2 × 2 μm^2 for the pMPC coatings obtained at fluences of 350 mJ/cm^2 (B–D), 450 mJ/cm^2 (F–H) and 650 mJ/cm^2 (J–L).



MAPLE experimental set-up used for obtaining pMPC coatings



Proliferation, morphology and adhesion of THP-1 macrophages on PDMS scaffolds (without or with pMPC) in the absence (**A**) or presence of LPS (**B**).



Contact: valentina.dinca@inflpr.ro

represented by

ROMANIAN INVENTORS FORUM

organizers of EUROINVENT - European Exhibition of Creativity and Innovation, Iași - Romania

GHEORGHE ASACHI TECHNICAL UNIVERSITY OF IASI

DEVICE FOR CONTINUOUS GENERATION OF BIOACTIVE SOLIONS

F

Authors:

SANDU IG., SANDU I., VASILACHE V., SANDU A.V., VIZUREANU P., EARAR K., STIRBU C.M., CRISAN D.R.A., CHIRAZI M., STIRBU C., DROB A., BALAN G., HONCERIU C.

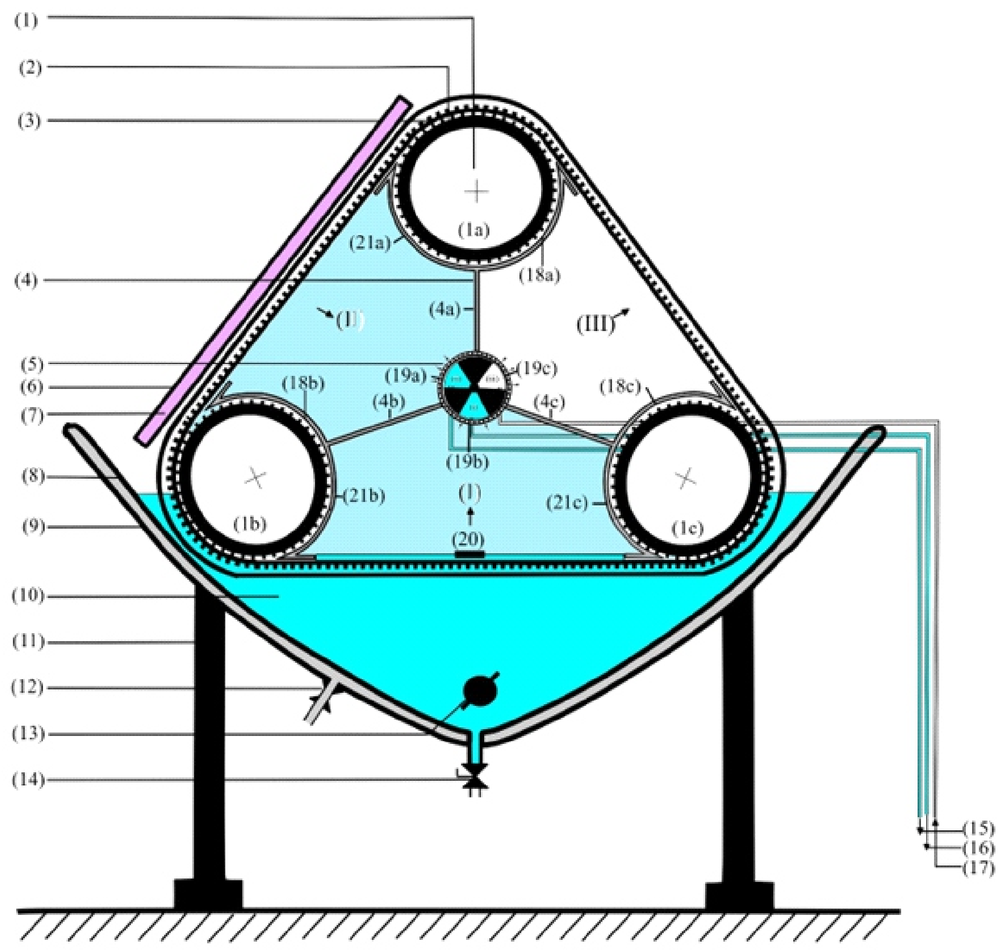
The invention refers to a device for the continuous generation of saline nanoaerosols of the Aitken type, which is based on the principle of operation of the filter with a wide conveyor belt in a closed circuit, framing three sectors in the form of an equilateral triangle, with sequentially differentiated distribution on three processes distinct: impregnation by light sorption from the supersaturated solution of halo-salts, extraction by vacuuming, with suction of dry air from the halochamber, dispersion by purging with hot and humid air in the halochamber. This device allows the achievement of optimal levels of bioactive solions (hydrated saline aerosols) for halocameras with multiple uses, such as: eliminating or stopping the formation of biofilms through microbiological contamination (virotic, bacterial, fungal, etc.) of prostheses during the manufacturing period, storage and implantation of bones and teeth, prevention and treatment of cardio-respiratory, osteo-muscular and psycho-motor conditions, as well as for improving the physical performance of children, the elderly and people who work under conditions of high effort or performance athletes. In order to achieve the optimal level of salt concentration in the halo chamber, the device's operating mode is automatically regulated by two sensors, one that determines the salinity and the other for vacuum regulation.



Used for artificial hallochambers - for respiratory and cardio- health related issues.

Patent Application RO135921(A2)

NOVELTY - The device has three horizontal cylinders, with different notation in the direction opposite to the sense of rotation, an upper cylinder and a lower cylinder driven into clockwise rotation. The three cylinders are placed in the apices of an equilateral triangle, delimiting the three cells, tightly sealed from one another by a partition wall with different notations, which exhibits in its central zone a circular distributing drum with three radial cells. The entire generating system is located in a tank which has a heating jacket and contains a halo-salt supersaturated solution. The jacket of the tank is coupled to a system for thermostat heating to 70-75°C. The tank also has a stirrer centrally positioned at the base of the tank and a tap for filling with or discharging the saturated halo-salt solution. The cylinder is differentially connected to a system located in the exterior, on one of the encapsulation caps.



Horizontal cylinders (1), gears (2), textile conveyor belt (3), partition wall (4), circular distributor drum (5), thin parallelepiped diaphragm with a rectangular section (6), filled with silica gel (7). The entire generating system is placed in the tank (8), which has a heating jacket (9) and which contains a supersaturated solution of halo-salts (10). The support system (11), has thermostats (12), a stirrer (13), and a cup or valve (14) for filling/evacuating the solution saturated with halo-salts.

CONTACT

Mailing address: Str. Pacurari 85, 700515, IASI - ROMANIA

Phone: +40-745-438604 Fax: +40-232-257012

E-mail: euroinvent@yahoo.com Web: www.afir.org.ro

www.euroinvent.org

Manager: Eng.PhD. Andrei Victor SANDU

"Dunărea de Jos" University of Galati, Romania
"Nicolae Testemițanu" State University of Medicine and Pharmacy, Republic of Moldova

with support of
ROMANIAN INVENTORS FORUM
organizers of EUROINVENT - European Exhibition of Creativity and Innovation, Iași - Romania

SYNERGIC ANTIDIABETIC COMPOSITION AND OPTIMUM PROCESSING PROCEDURE OF DRY MEDICINAL PLANTS

F

Authors:
Kamel EARAR, Ion SANDU, Ecaterina ANDRONESCU,,
Aurel NECHITA, Silvia FOTEA, Irina Cristina PASVANTU,
Ioan Gabriel SANDU, Diana Andreea CIORTEA,
Andrei Victor SANDU, Oleg SOLOMON, Simona PÂRVU

Patent Application 2023










The invention refers to a synergistic antidiabetic composition and optimal process for processing dry medicinal plants in the form of fine powders, in order to obtain by homogenization, agglomeration and monolithization in the form of micro-encapsulated granules, pills or thin films used as a food supplement under antidiabetic tea form.

The powders were mixed with a viscous leachable liquid in a powder gravimetric ratio: leachable liquid dispersion = 4:1, using as dispersion medium a semi-viscous mixture consisting of 5% enzymatically hydrolyzed collagen, 30% bitter cucumber juice and 65% juice of lemon. The process can be used to obtain other medicinal teas, which depending on the purpose (comforting drinks, those with a preventive and/or therapeutic effect), the raw materials subjected to processing are dosed through an experimental protocol for formulating combination reports and establishment of processing conditions in three working phases.

Fine powder blend contains: 24% blueberry leaves, 24% dry white bean pod sheath, 24% dandelion flower, leaf and rhizome blend, 12% nettle leaf and stem, 12% 1/1 leaf blend and young white mulberry bark and 4% fine cinnamon powder.

Car Air Purifier Bottle

Rajinibon School
885 Samsen Road, Dusit District, Bangkok, Thailand 10300
email: webmaster@rajinibon.ac.th

This project was created by the cooperation between
Miss Aunthara Saroth and Rajinibon School, Thailand.
Project No.: AUT:0012023

F

Author/s: Miss AUNTHARA SAROTH

Humans need clean air to breathe, but today the problem of PM2.5 and microbes in the air is affecting health and quality of life. Even sitting in the car during traffic in Bangkok, Thailand, PM2.5 and microbes can be inside exceeding safety standards. To solve this problem, car air purifier bottle have been developed for cars by using easily available and cheap materials. This could probably be developed into a health product in the future.

This study present the Car Air Purifier Bottle which is assembled from a 3-layers filter: 1. Pre-filters, 2.HEPA-Filters and 3. Carbon-Filters can reduce the amount of PM2.5 dust efficiently

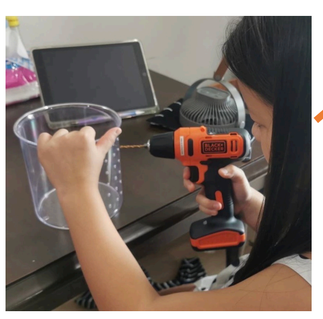
1. A pre-filter is a filtering device that removes large particles from the air including dust, hair, insects, pollen, and various fibers. Air purifying equipment outfitted with pre-filters are used in buildings, transports, public areas, and in various workplaces. Pre-filters are also used in respirators.

2. **HEPA** is a type of pleated mechanical air filter. It is an acronym for "**high efficiency particulate air**. This type of air filter can theoretically remove at least 99.97% of dust, pollen, mold, bacteria, and any airborne particles with a size of 0.3 μm. The diameter specification of 0.3 microns corresponds to the worst case; the most penetrating particle size (MPPS). Particles that are larger or smaller are trapped with even higher efficiency. Using the worst case particle size results in the worst case efficiency rating. All air cleaners require periodic cleaning and filter replacement to function properly.

3. Carbon-filters are the filters most commonly used to remove gases. They are designed to filter gases through a bed of activated carbon (also called activated charcoal) and are usually used to combat volatile organic compounds (VOCs) released from common household products. They are also often used to remove odors from the air, such as the smell of tobacco smoke.



3-filters



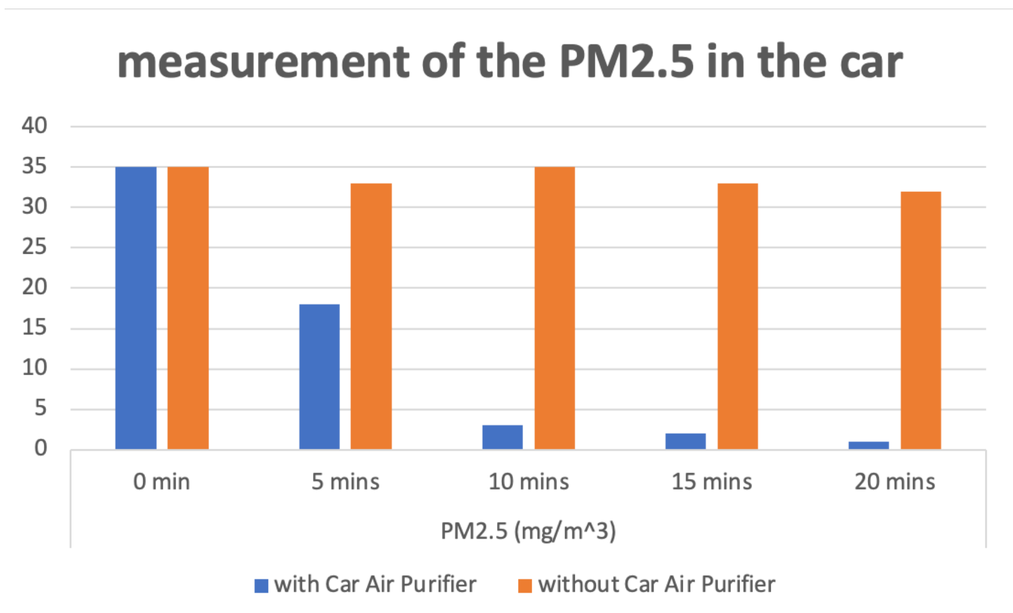
Piercing holes at the bottle



Before assembly



Car Air Purifier Bottle



The amount of PM2.5 that can be measured in the case of not turning on the air purifier, it remained constant throughout the experiment. But the amount of PM2.5 measured when the air purifier was turned on. has decreased in value over time.

Contact: Tossapn03@gmail.com +66969153525

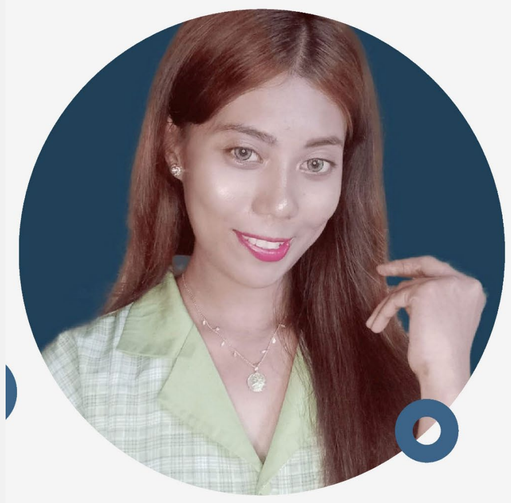
MindConnect - Empowering Mental Well-being Through AI-Powered Support

Mental Health

Author: Herdiana Dewi Nurfika

Bliss Education Center, Indonesia

F



Herdiana Dewi Nurfika is an Entrepreneur, she is Founder & CEO of Bliss Education Center, Brancy Firm and HDN STUFF. Besides that she is also Certified Entrepreneurship & Business Coach, Certified Employee Performance Coach, Certified NLP Master Practitioner, Certified Professional Workshop Facilitator, Emotional Intelligence Trainer, ACT Therapist, REBT Therapist, , Certified Group Life Coach, Mental Health Advocate,

As mental health advocate she become the best mental health advocate in 2023 by MHI Network and got media coverage over a hundred news in UK & US. she also has community called "Pull Empower" that she provides on social media to empower well-being.

Concept Overview

MindConnect is a comprehensive mental health platform that utilizes AI and data analytics to provide timely and personalized support to individuals struggling with mental health issues. This platform aims to bridge the gap between individuals, mental health professionals, and accessible resources.

by HERDIANA DEWI NURFIKA

Key Features



AI-Powered Personalized Insights

MindConnect uses AI algorithms to analyze user interactions, providing personalized insights into emotional well-being based on speech patterns, text conversations, and user behavior. It detects signs of distress, anxiety, or depression, alerting both users and caregivers.



Virtual Support Companions

Users can interact with AI-driven virtual companions designed to provide empathy, engage in conversations, and offer coping strategies. These companions learn and adapt to each individual's unique needs, providing a constant source of emotional support.



24/7 Crisis Intervention

MindConnect offers an emergency feature that recognizes crisis-level situations and immediately connects users to mental health professionals, crisis hotlines, or nearby support centers.



Progress Tracking and Goal Setting

Users can set mental health goals and track their progress over time. AI-driven insights help individuals recognize patterns and triggers, aiding in self-awareness and personal growth.

Key Features



Peer Support Communities

MindConnect facilitates secure, moderated online communities where users can connect with others facing similar challenges. These communities foster a sense of belonging and reduce the stigma surrounding mental health.



Teletherapy Integration

The platform allows users to schedule virtual therapy sessions with licensed mental health professionals, providing accessible and convenient support.



Education and Resources

MindConnect offers a library of educational resources, mindfulness exercises, and coping techniques to empower users with information and tools to manage their mental well-being.

Benefits

We provide high values to our users across the globe

Accessibility
MindConnect is accessible 24/7 from any device, removing geographical and time-related barriers to seeking support.

Early Intervention
The AI-driven system detects early signs of distress, enabling timely intervention and potentially preventing escalation.

Reduced Stigma
By normalizing conversations about mental health and providing a safe space, MindConnect contributes to reducing the stigma often associated with seeking help.

Customized Approach
Personalized insights and interactions cater to each individual's unique needs, enhancing engagement and effectiveness.

Scalability
The platform can scale to accommodate a large number of users, making mental health support widely available.



CONCLUSION

MindConnect stands as a groundbreaking innovation in the realm of mental health, harnessing the power of AI and technology to provide immediate, personalized, and compassionate support. By merging modern technological advancements with the essential human need for connection and understanding, MindConnect aims to transform the landscape of mental health support in the 21st century, promoting well-being and resilience for individuals worldwide.

by HERDIANA DEWI NURFIKA

SCAN ME

Presentation link:

https://youtu.be/wVpttSEmxzo/

Contact: *herdianadewinurfika@gmail.com*

NURSING DIAGNOSIS IN THE PATIENT WITH THE ACUTE PANCREATITIS TREATED SURGICALLY

Doctoral research project

F

Author: Magdalena Bianca TONE

Coordinator: Daniel COCHIOR

Introduction

Success in treating patients with pancreatic pathology is determined by effective management in their detection, diagnosis, and treatment. The evolution of pancreatitis and its prognosis, a few years ago, did not receive much attention because it was difficult to track the progression of the condition from the outset. Advances in imaging and biological investigations, therapeutic concepts correlated with cellular-level analyses, have led to a sustained interest with up-to-date information from specialized literature. A correct and comprehensive diagnosis of acute pancreatitis will lead to establishing therapeutic approaches. The natural course of the disease is characterized by 2 phases: the first, from the onset of acute pancreatitis, which is specific for releasing mediators and toxic substances that lead to Systemic Inflammatory Response Syndrome (SIRS), and the second, after 14 days, dominated by the infection of pancreatic necrosis and septic sequelae. Despite numerous ongoing research projects, pancreatitis remains a severe disease that requires continuous monitoring and significant clinical and therapeutic interventions over an extended period.

Material and Method

Our study consisted of evaluating patients with pancreatitis and establishing the nursing diagnosis.

Medical assessment of a patient with pancreatitis involves:

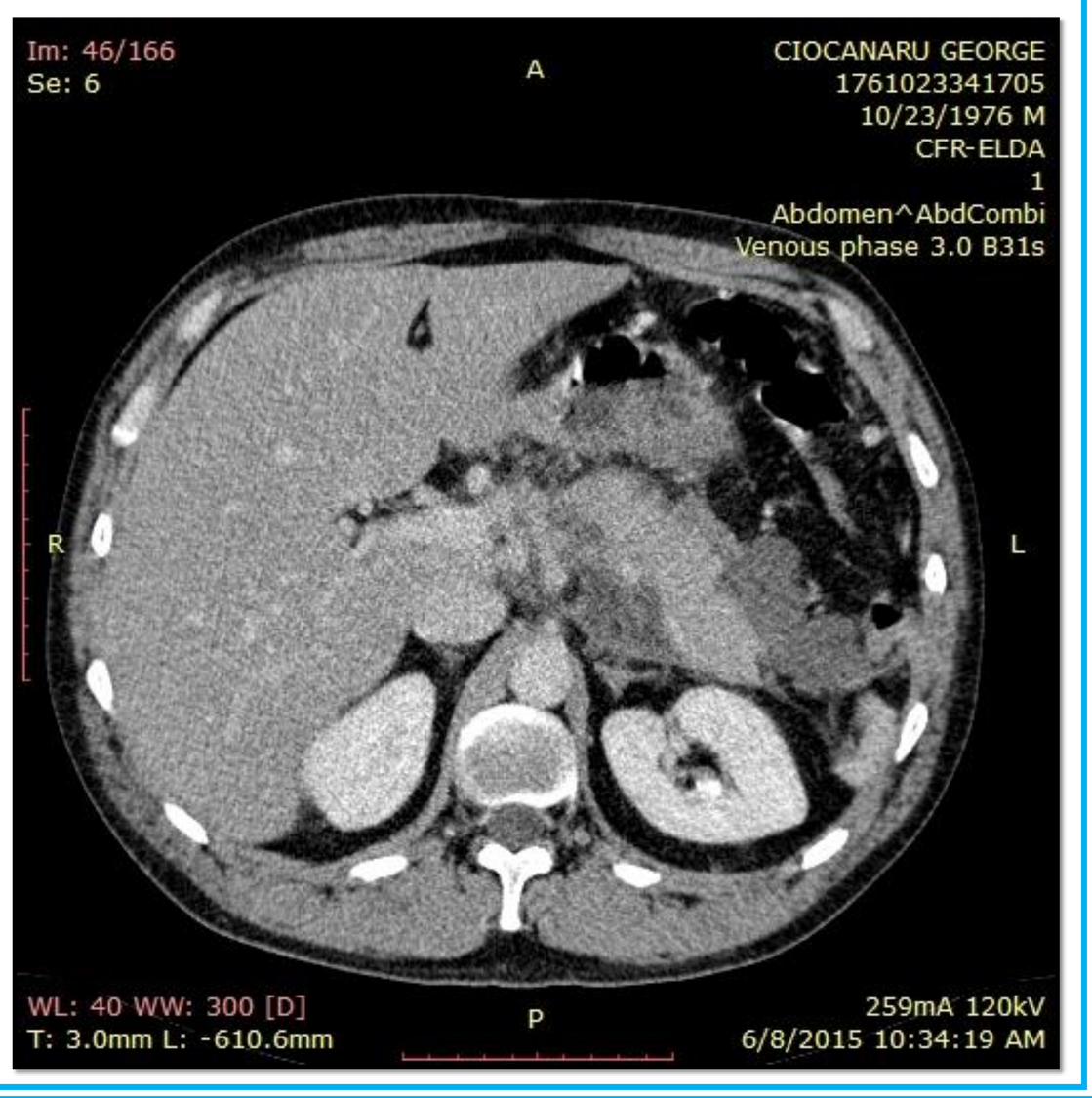
- Assessment of the current nutritional status and increased metabolic requirements.
- Assessment of respiratory status.
- Assessment of fluid and electrolyte status.
- Assessment of sources of fluid and electrolyte loss.
- Assessment of the abdomen for ascites.

Based on the assessment data, the nursing diagnosis for a patient with pancreatitis includes:

- Acute pain related to edema, pancreatic distension, and peritoneal irritation.
- Nutritional deficits: Less than body requirements related to inadequate dietary intake, diminished pancreatic secretions, and increased nutritional needs.
- Ineffective breathing pattern associated with severe pain synthesis, pulmonary infiltrates, pleural effusion, and atelectasis.

Objectives

1. Alleviation of pain and discomfort.
2. Improvement of nutritional status.
3. Enhancement of respiratory function.
4. Restoration of fluid and electrolyte balance.
5. Provision of appropriate medical assistance interventions.
6. Reduction of hospitalization duration and associated costs.



Contact: *magda.tone@spcf2.ro*

Happy Pill Dispenser

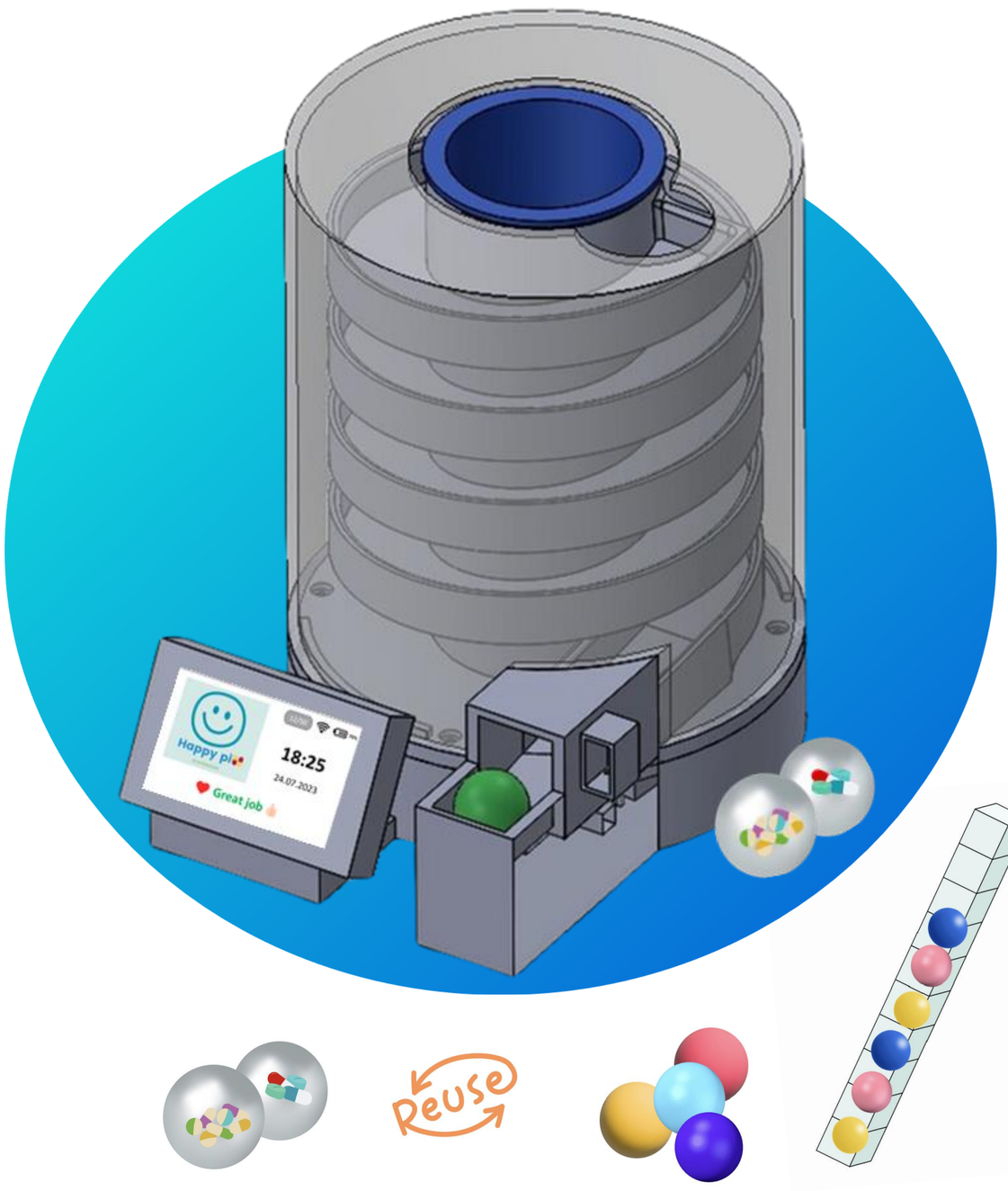
F

Authors : Master Nathan Chalokepunrat and Master Nagan Chalokepunrat
Mentor : Mr. Jeerasak Jitrotjanarak (Satit Chula Innovation Society)
Chulalongkorn Demonstration Elementary School, Bangkok Thailand

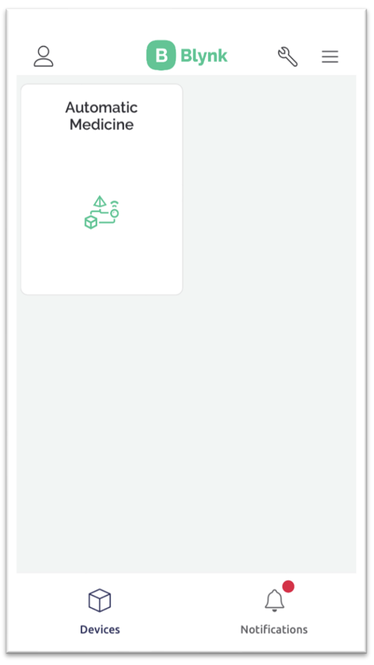
*"**Happy Pill Dispenser" is an Eco-Smart Medication System for Independent Elderly Living.*** This invention that aims to revolutionize the medication-taking process. Its purpose is to simplify and enhance patient compliance, making it ***Easy, Effortless, Enjoyable, Engaging, and Effective***, particularly for the elderly.

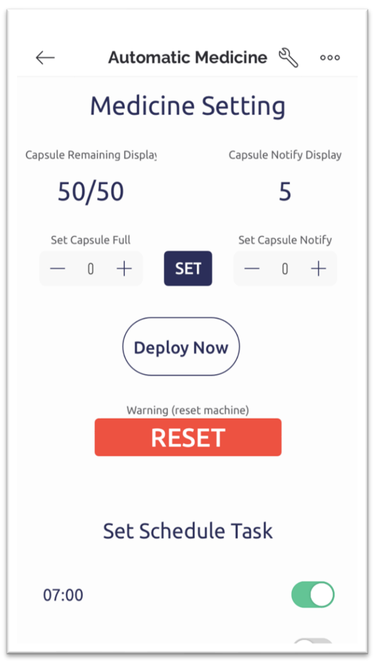
This automatic dispenser operates on a pre-set schedule, controlled through a mobile application. It includes an alarm and display function, providing visual and auditory notifications when capsules are dispensed. The accompanying mobile app allows users to set medication schedules and receive notifications for missed capsules and low supply. Moreover, the interactive feature shows uplifting messages upon capsule retrieval and patients can earn app badges by taking their medication on time, providing encouragement and motivation.

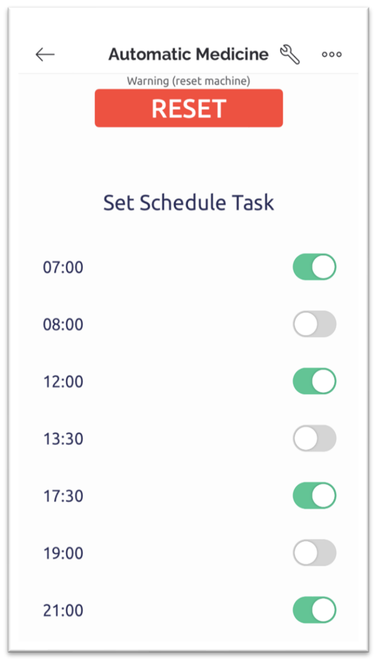
Additionally, doctors and caregivers can easily monitor how patients take their medicine through the app.



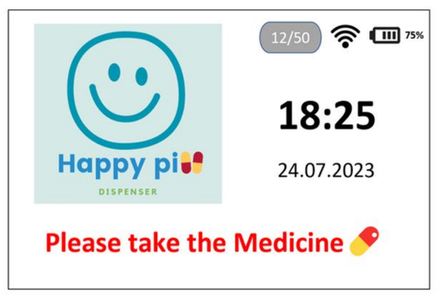
Mobile app.

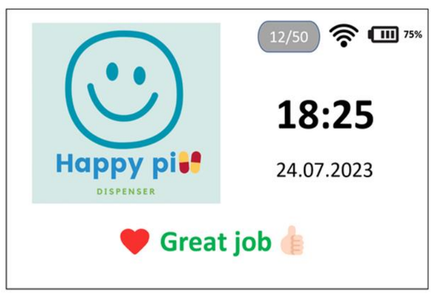






Monitor





Furthermore, with the rising aging population worldwide, many elderly individuals live alone. This invention provides a solution by efficiently managing and organizing a pack of medication capsules and delivering them directly from the hospital to the patient. And then the empty capsules will be returned for reuse/recycle, for the environmental sustainability.

By the implementation, our primary goal is enhancing patient's compliance. Ultimately, this will contribute to better health and overall well-being.

Contact: scis.cud@gmail.com , j_jerasak@hotmail.com,
+66 95 935 1062 , +66 84639 6363

For more information &VDO

SCAN ME

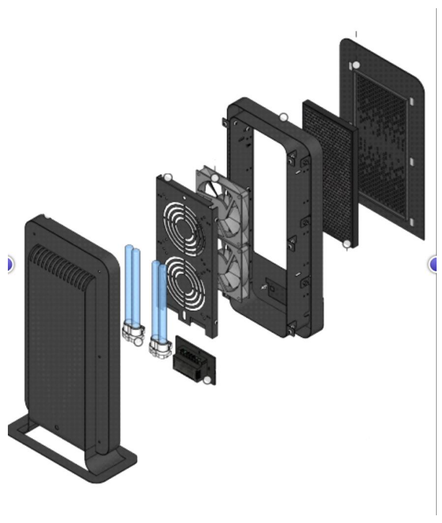
O-NE CASE AIR PURIFIER

Category
F

The project is supported by Retail Business Services Co.Ltd and Chulalongkorn Demonstration Elemental School innovation center. The patent serial is **SN=1100401535212, C=TH.**

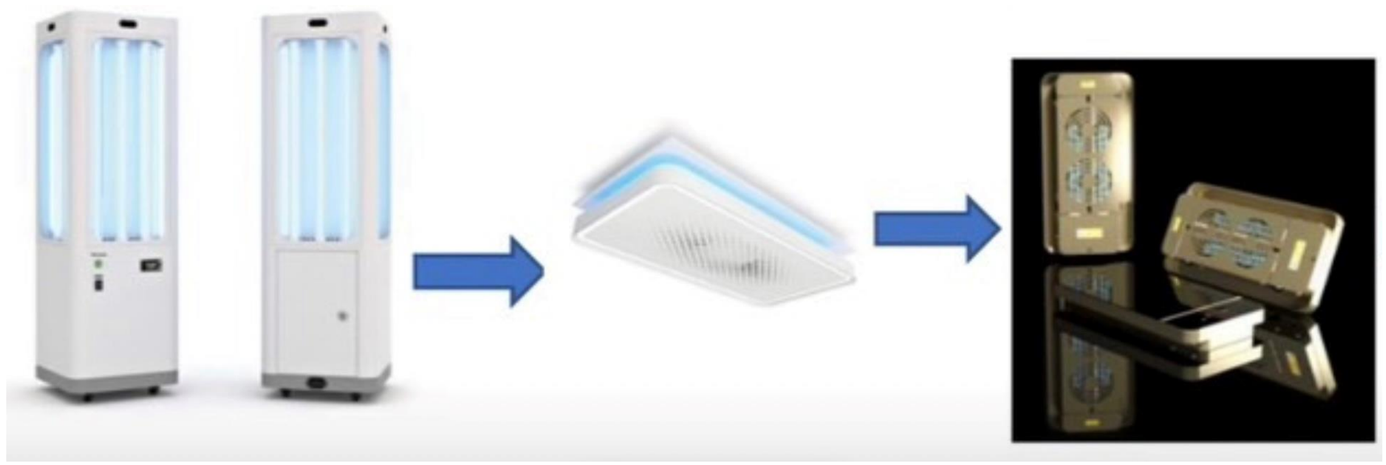
Author/s: Thaninkit Prasitdumrong, Pran Udomsawaengsup,
Sirarin Prasitdumrong, Jeerasak Jitrotjanarak

O-NE CASE air purifier is a dual function air purifier. In terms of its construction, it consists of eight parts. These include the back cover, plate support, two 12PWM Fans, frame cover, acrylic panel, two 18W UVC bulbs, main control compartment, HEPA and carbon filters.



The acrylic panel acts as a convenient cover for the filters and can be easily removed with the help of magnets for filter replacement. The HEPA and carbon filters are responsible for effectively filtering out unwanted particles from the air. The fans pull in the air and direct it through the filters and into the UVC chamber. Behind the fans, the two 18W UVC bulbs emit powerful ultraviolet light to disinfect the air from harmful bacteria and viruses. The metal case is designed to contain the UVC radiation due to the low penetration rate of UVC light. After the air is disinfected by the UVC lamps, it is released into the environment, providing clean and purified air.

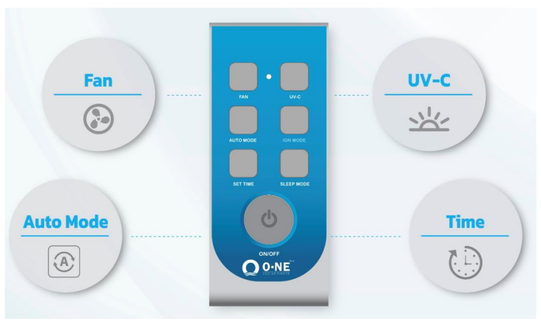
The machine was firstly designed as the standing type air purifier and the second version was changed to be the ceiling type to avoid UVC leakage which could damage human DNA. The later version became more luxurious; however, it has some disadvantages, for instance; inconvenient installation and immobilization. This current O-NE CASE air purifier is modified back to be a standing machine but add metal case to entrap and prevent UVC from harming people.
The machine is compact in size (50 cm. X 25 cm. X 6 cm.) and light weight which is easy to move. It can purify air with 16 minutes for 30 sq.m. sized room.







Current version



The machine is controlled by the display buttons and remote control. There are 4 modes; Automatic, Manual, Comfort and Sleep. The fan speed can be adjusted of the fans when the machine is in manual mode while the UVC button turns the UVC function on or off.



Apart from the controlling function, the display also has a air quality and PM2.5 reader in combination with filter function.











SCAN ME

**Contact: scis.cud@gmail.com , j_jerasak@hotmail.com,
+66 95 935 1062 , +66 84 639 6363**

Specialized Cleaning and Residue Cleaning Bot (S.C.R.U.B.)

This project was supported by Satit Chula Innovation Society and CU Smart Lens Co. Ltd.

F

Author/s: Phichpanita Mathasuriyapong, Thantham Jittham, Warinsaya Sereepapong, Pimbisa Bisalputra
Mentor : Mr. Jeerasak Jitrotjanarak

Keeping our surroundings clean by maintaining stain-free fabrics can be a time-consuming task. This has led to the development of an innovative invention: a vibration-powered, cleaning substance-loaded cloth stain cleaner that includes a drying vacuum, or S.C.R.U.B. This product combines the power of vibration technology with an all-in-one cleaning solution, providing simple and efficient stain removal. This abstract explores this remarkable cleaning tool's compact stain removal systems, ease of use, and time-saving features.

S.C.R.U.B. incorporates powerful vibration capabilities. By vibrating at ultrasonic frequencies, the device dislodges particles deeply embedded in clothes and other fabrics, ensuring a thorough cleaning process. Another feature of the cleaning tool is its ability to greatly accelerate the drying process. The strong suction power swiftly captures the dislodged debris, leaving surfaces clean and fresh, its drying function then utilizes airflow to expedite the evaporation of moisture. The rapid drying capability also prevents the growth of mold and enhances the longevity of fabrics, making it ideal for all kinds of carpets and clothing.

The cleaning substance is conveniently stored within the S.C.R.U.B., complementing the other mechanical components by providing an all-in-one stain removal solution. The cleaning substance is specially formulated to tackle a wide range of stains, including food spills, ink marks, and oil stains. With a touch of a button, the device automatically applies the cleaning substance to the affected area, activates the vibration function, and lets the vacuum's suction power lift the stain from the fabric. This versatile stain-removal capability offers significant time-saving advantages and allows users to achieve desired results in less time compared to traditional cleaning methods.



Fig. 1 Functional 3D-Printed Prototype

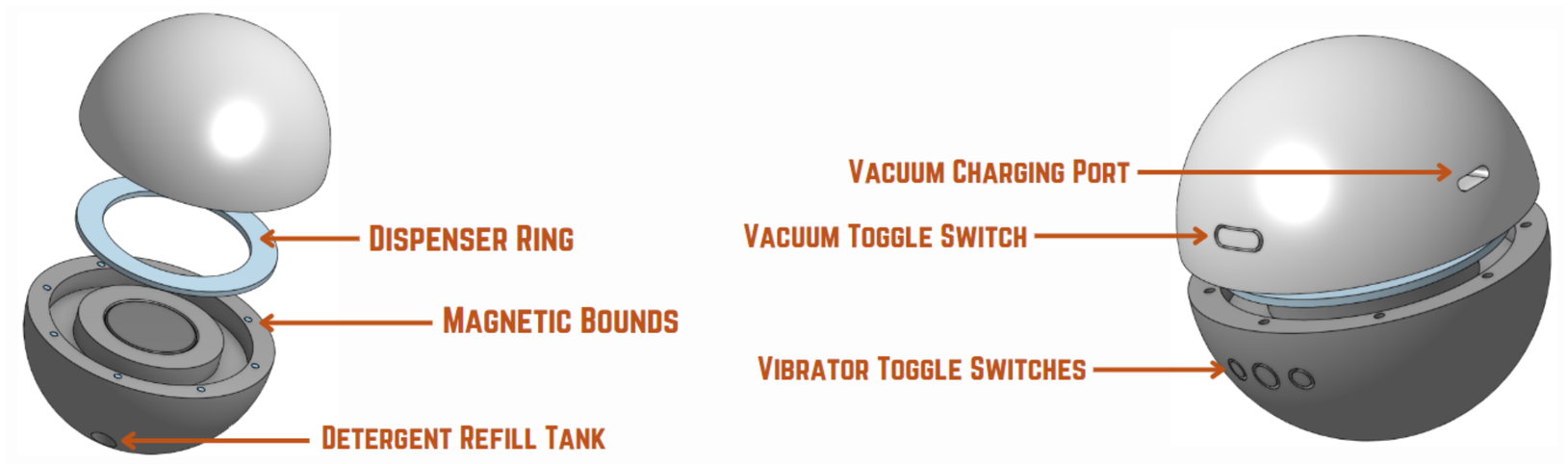


Fig. 2 Initial Conceptualization of the Product

This innovation is also designed with user convenience in mind. The device features intuitive controls and a lightweight design, allowing for comfortable handling and easy maneuverability. These user-friendly features make the cleaning process accessible to all. The all-in-one design eliminates the need for separate stain removers or dryers, stepping up the cleaning process by providing a hassle-free solution for busy individuals.

Contact: scis.cud@gmail.com , j_jerasak@hotmail.com, +66 95 935 1062 , +66 84639 6363

CareCamera

Collaboration project between Ministry of Public Health and a high school

Authors: Chavarat Wangweera, Gaewgan Yambangyang
Parinton Jangtawee and Jeerasak Jitrotjanarak

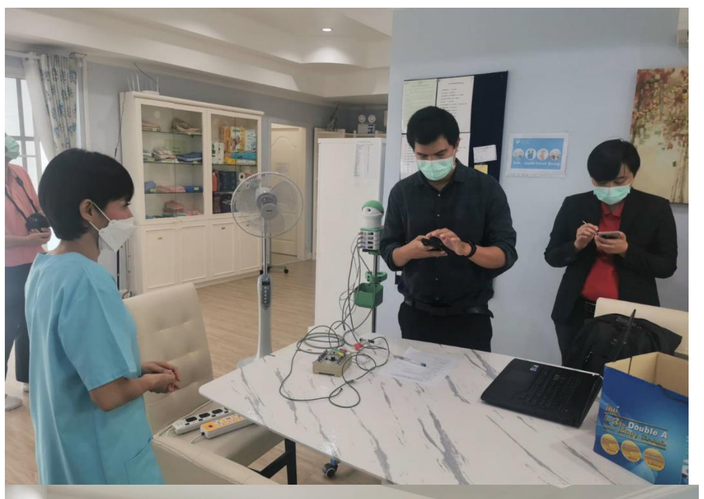
F

Accessing specialized medical care for bedridden patients can be a costly and challenging endeavor, often leaving them without the essential medical devices and staff they require. In response to this pressing issue, we present CareCamera, an innovative platform designed to connect bedridden patients with medical personnel through an array of cutting-edge medical devices. CareCamera incorporates state-of-the-art technology, including EKG sensors, temperature sensors, and SPO2 sensors, to continuously monitor vital signs in real-time.

This comprehensive suite of devices empowers medical personnel to closely observe patients' health conditions remotely, ensuring prompt and efficient care delivery. Through a cloud-based platform, medical personnel can securely access and monitor the collected data from any location. In emergency situations, CareCamera promptly triggers alerts, enabling swift responses and potentially life-saving interventions. Furthermore, the platform is equipped with a camera that facilitates real-time monitoring and video conferencing capabilities, enabling effective communication between patients and medical professionals.









The benefits of CareCamera extend beyond enhanced medical care. By leveraging this groundbreaking platform, patients experience improved quality of life, while reducing the burden of transportation costs associated with frequent hospital visits. Moreover, CareCamera optimizes the efficiency of medical personnel, empowering them to extend their care to a greater number of patients.

CareCamera is a game-changer in the realm of bedridden patient care. It revolutionizes access to specialized medical attention, enhances patient well-being, and amplifies the capabilities of healthcare providers. Join us in embracing this transformative innovation as we redefine the standards of care for bedridden patients worldwide.

Contact: scis.cud@gmail.com j_jerasak@hotmail.com **+66 95 935 1062 , +66 84639 6363**

Opportunity
CORNELIUGROUP
Research-Innovation Association
Creation
INVENTCOR
Realization
Power of Creative Mind
Deva ROMANIA

T U I A S I
"Gheorghe Asachi" Technical
University of Iasi

Iasi, Romania

GUIDANCE SYSTEM IN ECCs WITH CORRECTIVE FEEDBACK THROUGH FUNCTIONAL ELECTRICAL STIMULATION

Patent application no. A 2020 00529

Author: Bioeng. Dimitrie-Cristian FODOR, PhD Student

Doctoral School of the **Gheorghe Asachi** Technical University of Iasi
Dr. Iacob Czihac Military Emergency Clinical Hospital of Iasi

F

Description

The invention relates to a device for assistance in performing external chest compressions, to be applied in emergency medicine, meant to be used for teaching purposes or in real situations, in order to train a resuscitator for effectively performing required external chest compressions to a victim in cardiopulmonary arrest. Rescuers performing long-term external chest compressions (ECCs) have been shown not to produce the depth required for chest compression compared to the "elbow-locked" chest compressions (ELCCs) method. Fatigue causes the rescuer to bend his elbows and the force is no longer transmitted entirely to the victim's chest.

Novelty and originality

The problem solved by the invention is to make a device for assisting the execution of external chest compressions, which can be easily operated by a resuscitator or learner, presenting corrective feedback in the direction of the user, regarding the biomechanics of humero-cubito-radial joints, with a permanent digital monitoring of the degrees of movement of these joints, but also of the physiological parameters of the resuscitator, during CPR. The device also records all stored data, stores it, and has the ability to remotely transmit it over a wireless interface to a receiver (tablet, PC, smartphone, smartwatch, etc.).

Advantages

- Maintaining the maximum extension of the humero-cubito-radial joints;
- Automatic calibration of the user's joint anatomy;
- Corrective feedback by functional electrical stimulation (FES);
- Continuous monitoring of the user's physiological parameters;
- Remote measurement, storage and transmission of a biomechanical data.

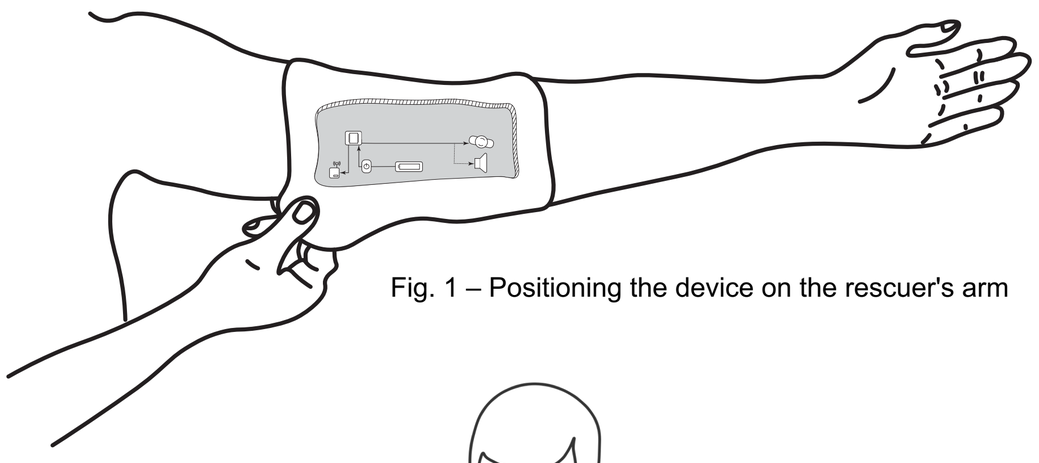


Fig. 1 – Positioning the device on the rescuer's arm

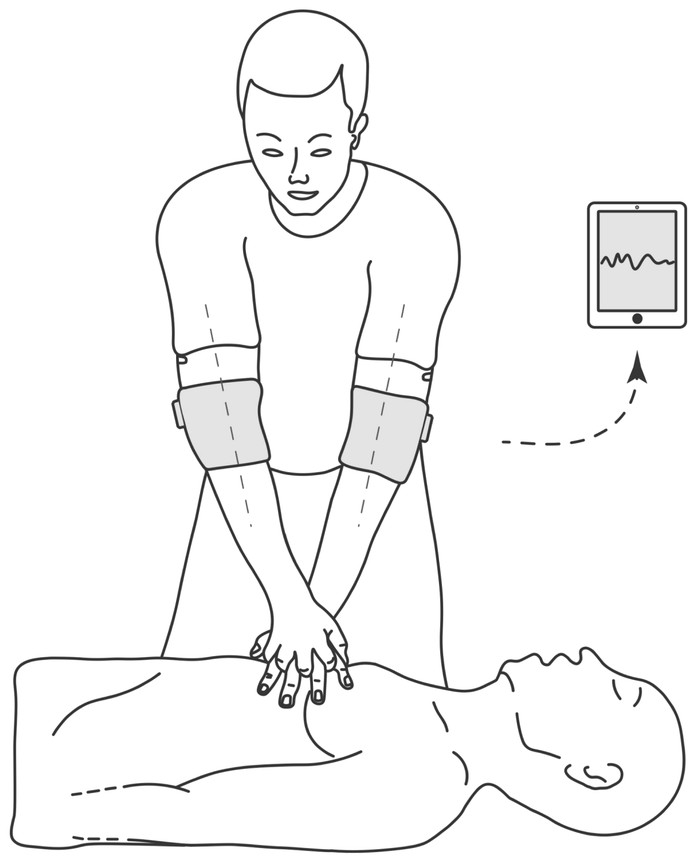


Fig. 2 – Resuscitator using the device during CPR

Conclusions

By implementing the presented concept and successfully completing the technology transfer, this device can bring great benefits to basic first aid instructors, medical staff, military in the defense medical network, paramedics, etc. Therefore, high results are expected because the device has a high degree of novelty, as there is no such device on the market.

Selective references

- Kang J.H., et al., "*Elbow-Lock" Chest Compression Method in the Setting of Single Rescuer Pediatric Cardiopulmonary Resuscitation, A Crossover Simulation Study*, Pediatric Emergency Care: February 2022 - Volume 38 - Issue 2 - p e583-e587;
- Bucki B., et al., *The assessment of the kinematics of the rescuer in continuous chest compression during a 10-min simulation of cardiopulmonary resuscitation,* Eur J Med Res. 2019; 24:9;
- Foo N.P., et al., *Rescuer fatigue and cardiopulmonary resuscitation positions: a randomized controlled crossover trial,* Resuscitation. 2010; 81:579–584.

Contact: cristifodorbim@gmail.com, Phone: +40 758 944223

"Alexandru Ioan Cuza" University of Iasi

Faculty of Biology

Determination of the presence *of Streptococcus Viridans* bacteria in pharyngeal exudate under different growth conditions

Student Project

Authors: Elena-Iuliana FODOR, Cristian CUCOLEA, Valentina CUCOLEA

F

Introduction

In this work, it was wanted to identify a species of bacteria present in the oral cavity, namely a bacterium belonging to the genus *Streptococcus*.

Materials and method

Streptococcus Viridans, the one that will be talked about, is a bacterium that most commonly causes tooth decay and heart valve infections. To determine the growth of this bacterium, pharyngeal exudate was taken from 3 different subjects and seeded on blood agar culture medium. The agar was melted at 37°C to which 5% ram blood was added. Then, the blood agar was placed in the 3 Petri dishes. Then, the 3 pharyngeal exudates were seeded on the culture medium and allowed to grow overnight. The 3 plates were placed in 3 different growth conditions, the petri dish in figure 1 was placed in normal conditions, at the thermostat at 37°C, the plate in figure 2 was left at laboratory temperature, approximately 26°C, and the third plate, from figure 3, was also placed in the thermostat, but in anaerobic conditions, the desiccator being used.

Results

Thus, the following differences were observed: the Petri plate in figure 1 was left in normal growth conditions (thermostat, 37°C) and the aerobic colonies grew normally, compared to the plate in figure 2 which was left at laboratory temperature where the colonies of *Streptococcus Viridans* grew poorly because they did not have a favorable temperature, also the colonies in the third plate present in figure 3, which was left in anaerobic conditions, grew normally, their growth being favored by the optimal temperature.

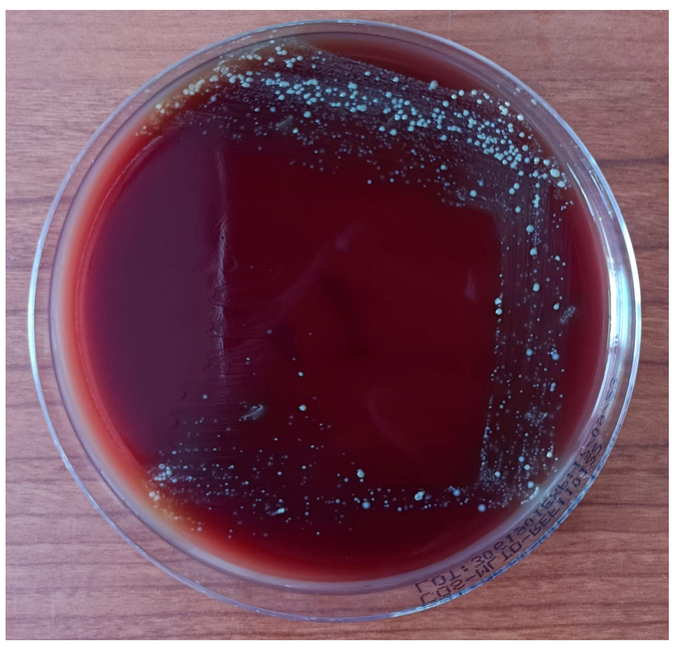


Fig. 1:
Growth of *Streptococcus Viridans* under normal conditions (thermostat, 37°C)

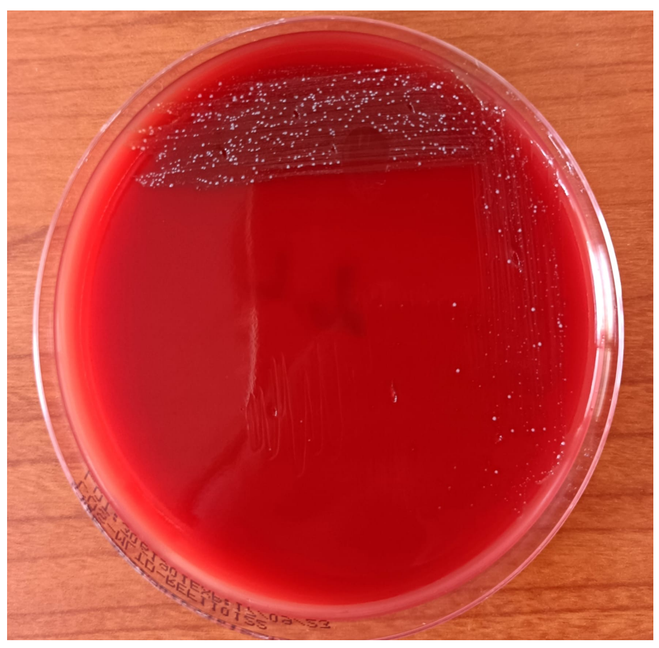


Fig. 2:
Growth of *Streptococcus Viridans* at laboratory temperature (approx. 26°C)

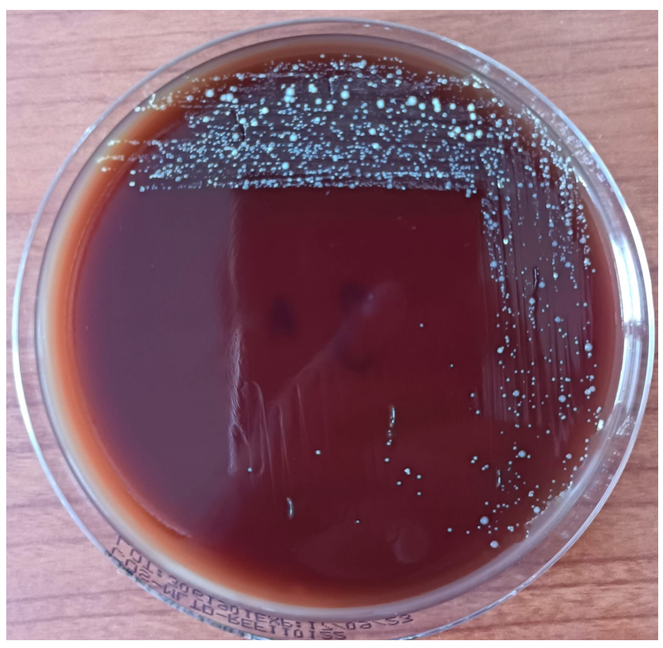


Fig. 3:
Growth of *Streptococcus Viridans* under anaerobic conditions

Conclusions

So, for results that attest to the presence or absence of a bacterium in certain areas of the body, it is necessary to respect their normal growth conditions. For most bacteria, leaving the thermostat overnight at a temperature of 37°C represents the optimal growth conditions.

References

1. Maria Jevitz Patterson, Medical Microbiology. 4th edition, Chapter 13, Streptococcus, 1996;
2. JL Shenep, Viridans-group streptococcal infections in immunocompromised hosts, 2000 Mar;14(2):129-35;
3. Szaldobagyi David, Mediile de cultură; https://www.academia.edu/41519560/3_MEDIILE_DE_CULTUR%C4%82 ,accessed at: 12.08.2023;
4. Medii de cultură, https://microbiologynote.com/ro/procedur%C4%83-practic%C4%83/medii-de-cultur%C4%83/ , accessed at: 13.08.2023.

Contact: bch2124.fodor.elena.iuliana@biologieuaic.onmicrosoft.com

Bubble - Pediatrician’s desk

Author: Eng. Izabela Kapuśniak
Mentor: Dr. Teija Gumilar

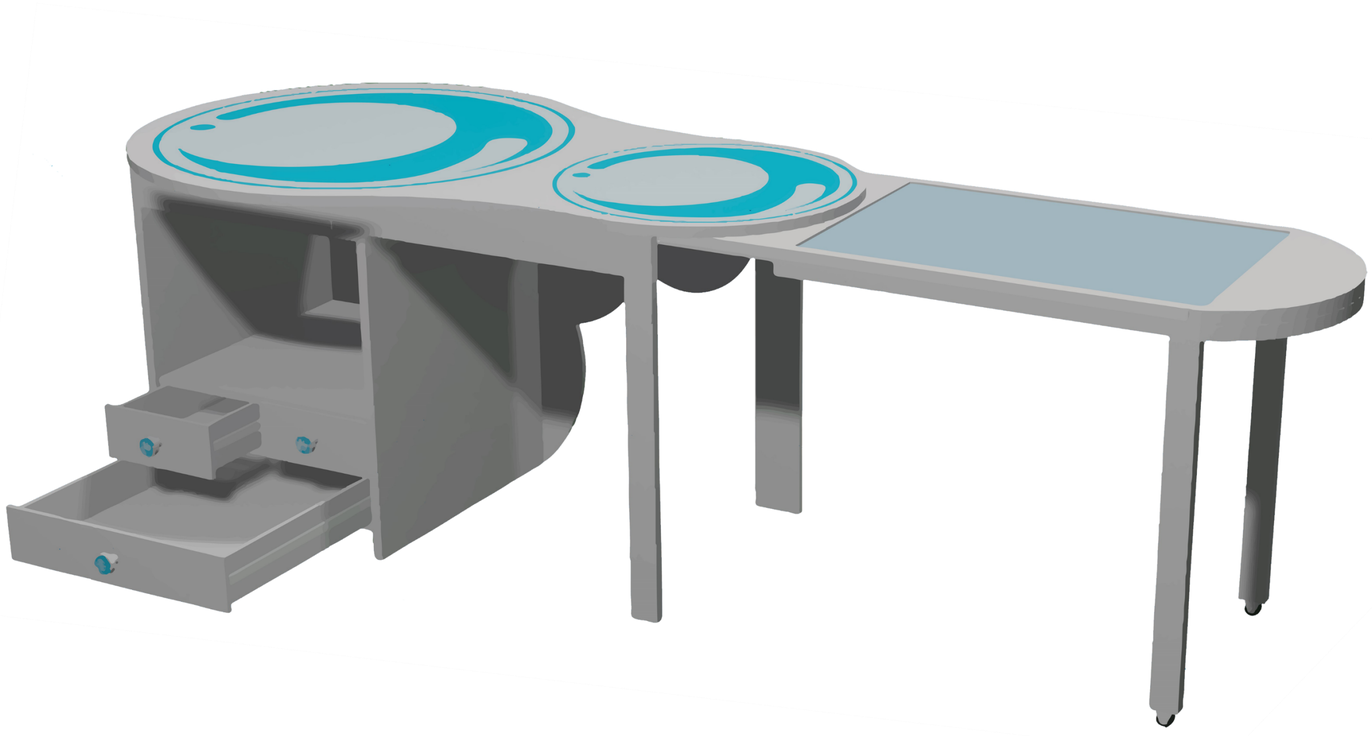
F

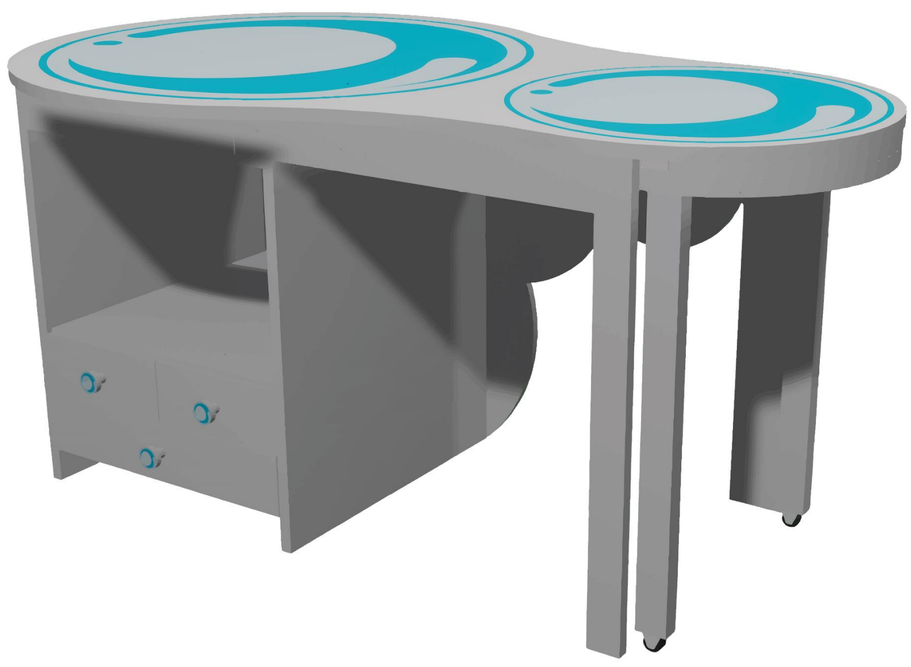
„Bubble” is a desk for a pediatrician with a pull-out couch for babies. In addition to the designer look, it has space for a printer and drawers for the most necessary items! Perfect for small doctor’s offices.

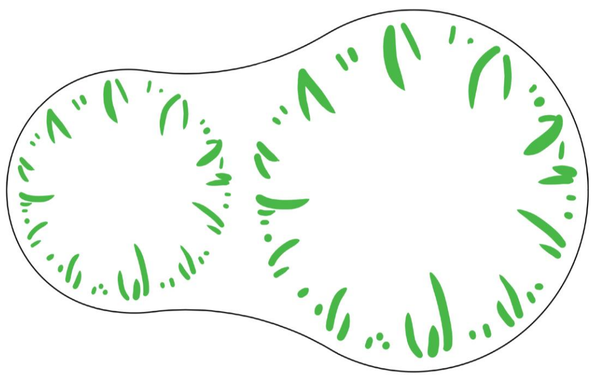
The project was created as part of an engineering thesis. It was created to improve the work of pediatricians. In the design process, the egronomic data of the child and the adult were analyzed.

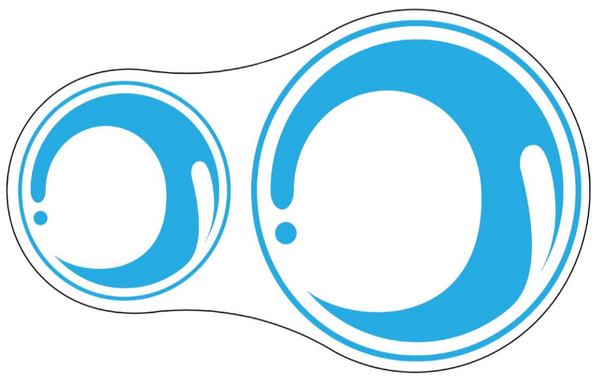
A pediatrician works in a small office with children up to the age of eighteen. Thanks to the possibility of hiding the couch for infants, there is more space in the doctor's office when treating older children. We will be able to sell a desk, a couch for babies and a scale for babies as one piece of furniture, which saves the buyer time and the need to select other items. Ability to change colors and graphics.

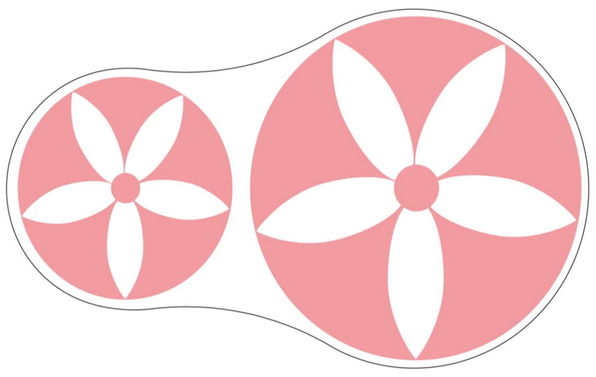
The project is being redesigned, but the current model shows the basic idea of the whole work.

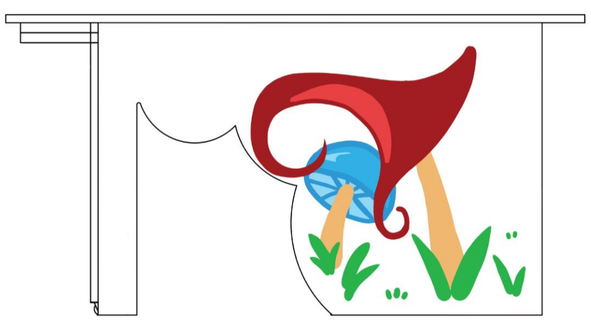


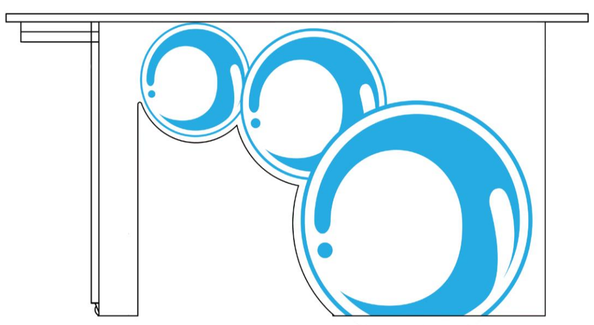


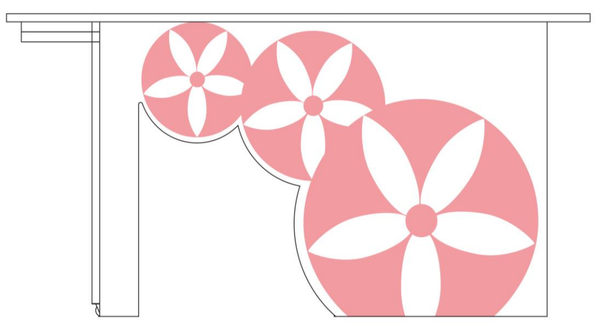












SCAN ME

Contact:

blue.lady.business@gmail.com +48 571 029 574 www.blueladyofficial.com

MECHANO-ELECTRIC LAUNDRY DRYER

RO131500(A0) — 2016-11-29 - Espacenet
International classification: D06F58/00; F26B11/14

MICULESCU FLORIN, MICULESCU MARIAN, COSTOIU MIHNEA COSMIN;
CHIVU OANA-ROXANA, BARBU CATALIN-ALEXANDRU, SEMENESCU AUGUSTIN

Contact person: augustin.semenescu@upb.ro

F

A. PREZENTARE

Invenția se refera la un uscător de rufe, care poate fi utilizat in locuințe sau hoteluri, pentru rufe sau prosoape mari sau mici, colorate sau albe. Uscătorul , conform invenției cuprinde o masa mobilă de translație de forma unei cutii paralelipipedice (1), realizata din mase plastice ignifugate, goala pe interior, prevăzuta cu o deschizătura dreptunghiulara, pe marginea căreia se montează niște glisiere metalice(2), pe care se sprijină cutia de protecție (3), in interiorul căreia se află fixat un moto-reductor cu turație variabila (4), legat la un transformator (5), la ieșirea motorului (4), se află montată o fulie (6), ce se continuă cu o articulație mobilă (7), pe care se fixează biela (8) ce se continuă cu o articulație mobilă (9) prinsă de un guseu de rigidizare orizontal (10), sudat de un guseele de rigidizare verticale (11), fixate pe ghidajele (12) si placa de ghidare (13), de masa mobila (1), pe care se afla suportul de rufe (14).Acționarea prin intermediul motorului (4), se face comandat prin intermediul unui modul de comanda (15). Prin mișcările de translație in plan orizontal, perpendicular pe planul de poziționare a rufelor, care prin deplasarea in lateral, creează curenți de aer care usucă rufele prinse pe orice tip de stativ (suport) de rufe.

B. PRESENTATION

The invention relates to a dryer for laundry, towels and bed linen, which can be used in households, hotels or other public lodging establishments. According to the invention, the dryer comprises a translation table (1) in the shape of a hollow parallelepipedal box made up of fireproof plastics, perforated on its whole surface for ensuring ventilation and avoiding overheating, provided with a rectangular opening, on whose edges there are some metal slides (2) placed longitudinally, by means of which it rests on a protective box (3) inside which the drive mechanism is located, the drive mechanism consisting of a variable speed gearmotor (4) connected to a transformer (6), at the output of the gearmotor (4) there being a gin (5) continued with a mobile joint (7) on which a connecting rod (8) is fixed with a mobile joint (9), attached to a horizontal reinforcing gusset (11), welded to the vertical reinforcing gussets (10) fixed to the guides (12) and the guiding plate (13), which, in their turn, are fixed to the mobile table (1) on which the laundry support (14) is located, the motor (4) being driven by means of a control module (15).

REFERENCES
[1] **PATENT RO 123119B1**
[2] PATENT **DE 10318486**.

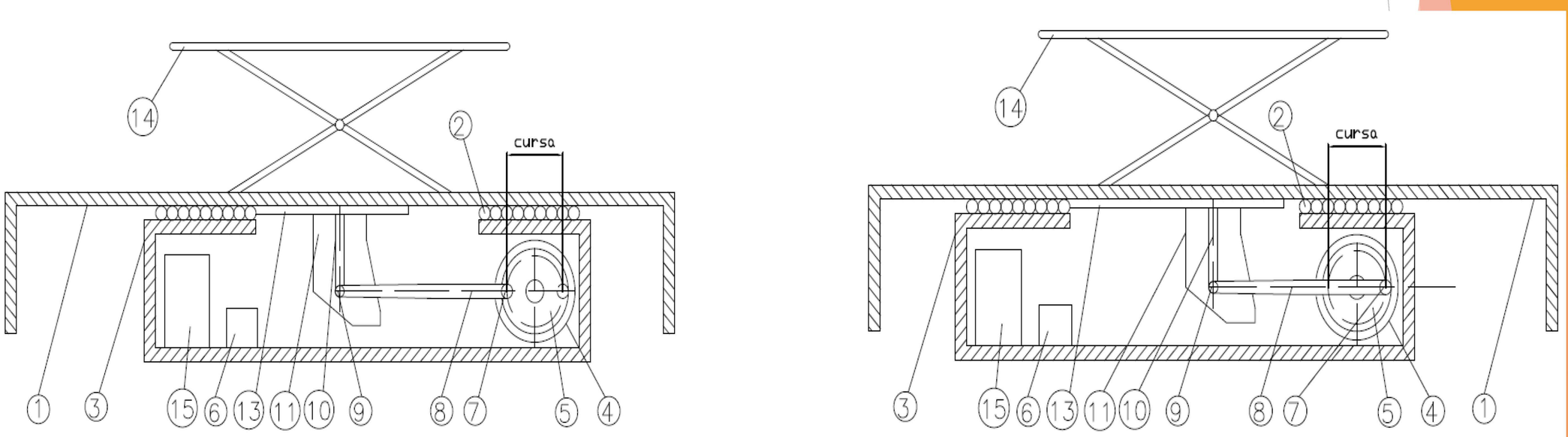


Fig. 1. MECHANO-ELECTRIC LAUNDRY DRYER (left extreme position and right extreme position).

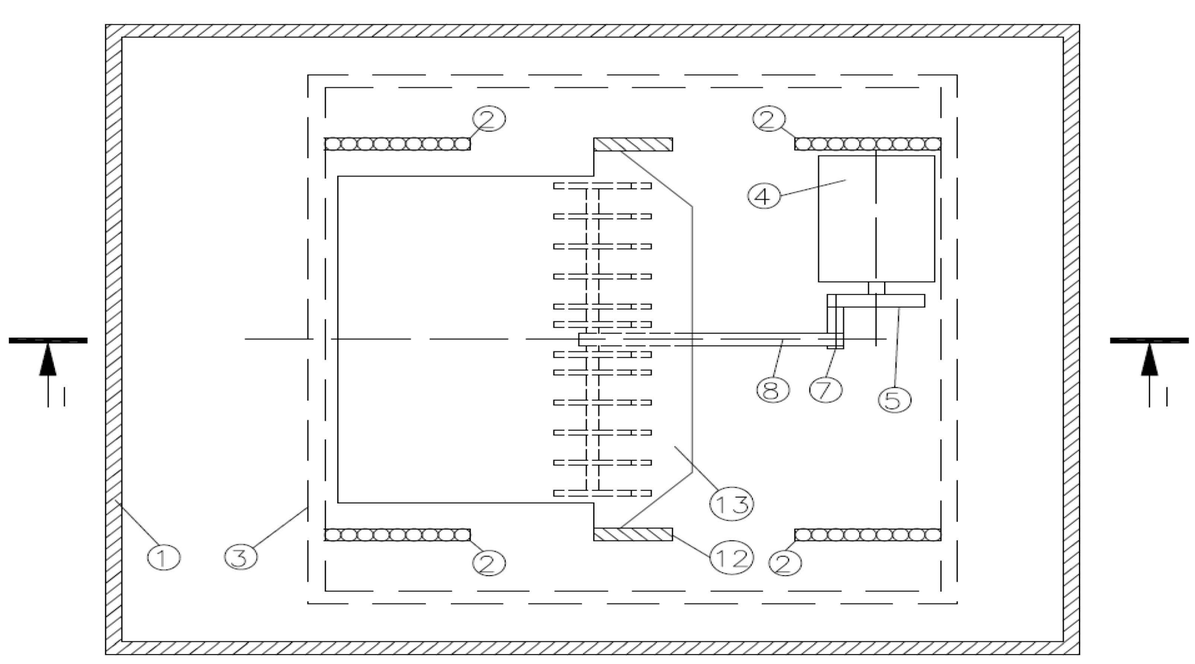


Fig. 2. Bird view of the MECHANO-ELECTRIC LAUNDRY DRYER.

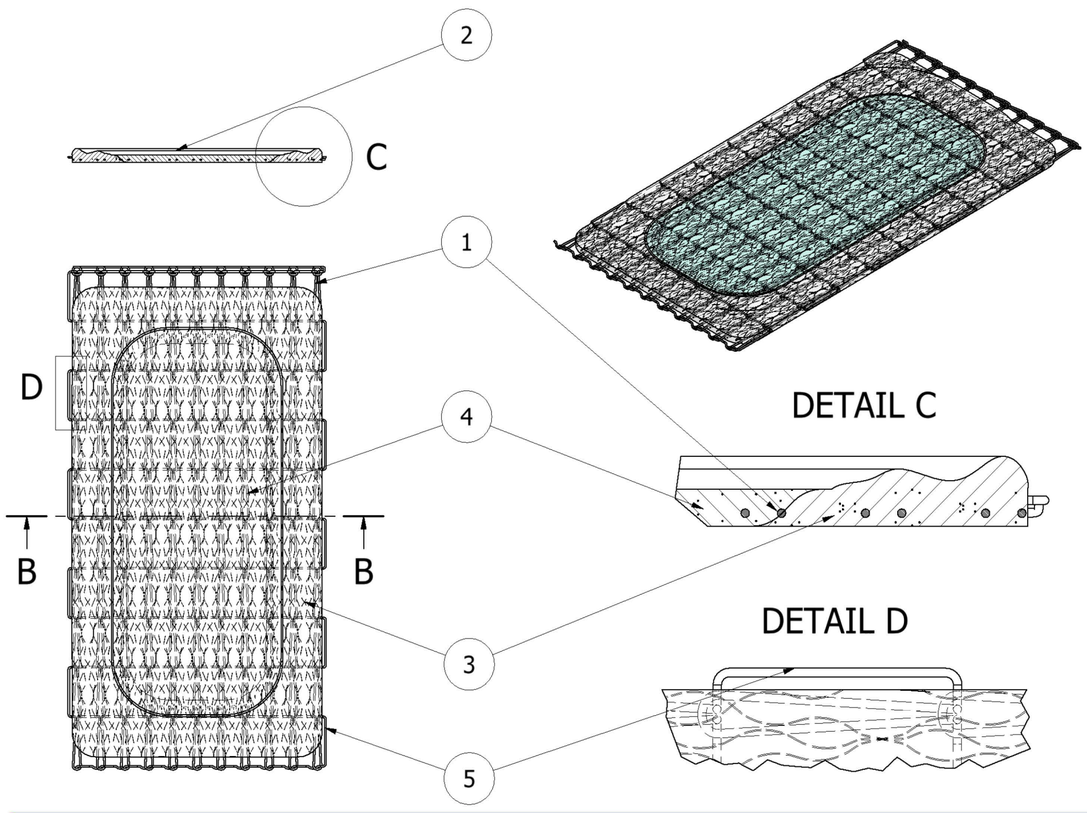
BIOCOMPOSITE MEDICAL DEVICE FOR EXTENSIVE RECONSTRUCTION OF SOFT TISSUE

ULMEANU Mihaela-Elena, DOICIN Cristian-Vasile, DAVIȚOIU Dragoș, TUNSOIU Daniela, Tunsoiu Nicolae, MURZAC Roman, PARASCHIV Alexandru, DOICIN Irina-Elena, SEMENESCU Augustin, COSTOIU Mihnea, MATEȘ Ileana Mariana

Contact person: augustin.semenescu@upb.ro

F

PRESENTATION



The invention refers to a biocomposite medical device used for extensive reconstruction of soft tissues in surgical procedures such as pelvic exenterations or hernias.

The biocomposite medical device consists of a silk fibre reinforcement layer and a composite material sheet made of a mixture between RTV silicone and silk and polyester ground fibres.

ADVANTAGES

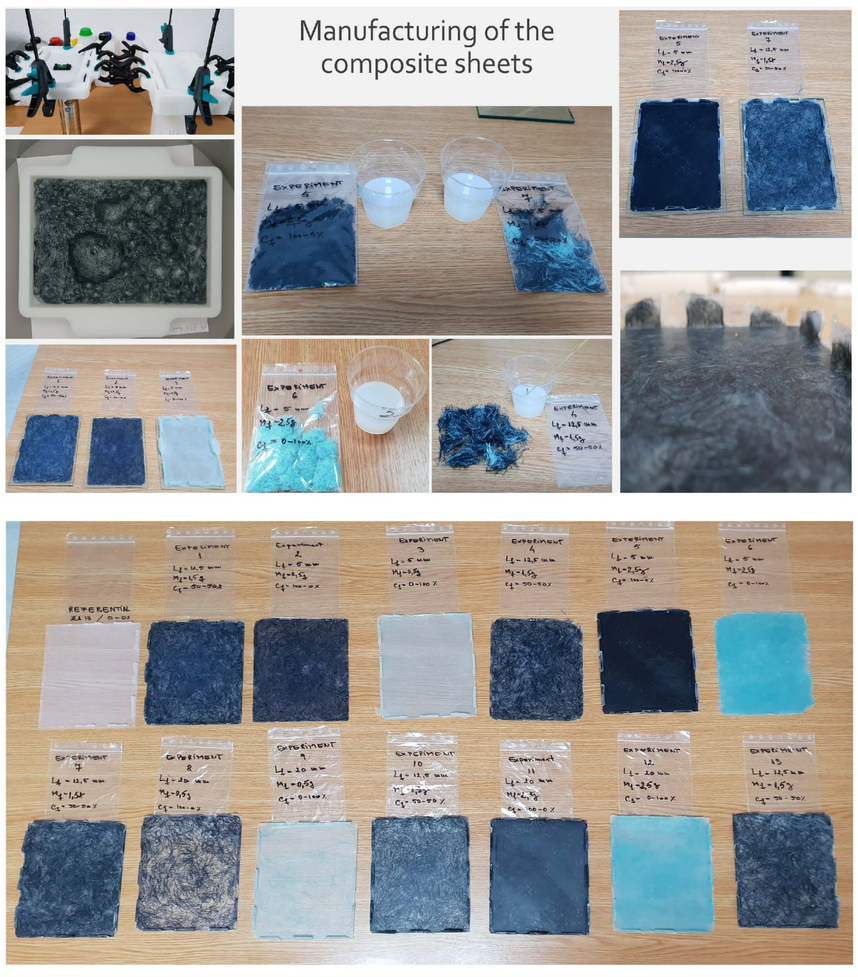
➢Allows the optimisation of the composite structure through differentiate functional impregnation with material fibre, in correlation with the surgical procedure that is being performed.

➢It is equipped with profiled anatomical structures to ensure perfect sealing of the affected areas and ensure anatomical compliance;

➢The biocomposite medical device features modular gripping elements throughout its perimeter.



PROBLEM SOLVED



❖ Prevents encapsulation, erosion and adhesion formation through its silicone membrane;

❖ Prevents prolapse of organs in the abdominal cavity and pelvic area through the functional fibre reinforcement layer and through the modular fixing system;

❖Ensures patient comfort and compliance in abdominal distension by providing variable elasticity along its surface;

❖Has a three step manufacturing procedure, which can be tailored in correlation with the patients' medical condition.

HANNOVER MESSE
The world's leading industrial show
HANNOVER MESSE 2018
23 - 27 April 2018

COMPOSITION FOR WHITENING AND REGENERATION OF DENTAL ENAMEL, WITH SPECIFIC PROPERTIES FOR ITS USE IN DENTAL COSMETICS

Authors: Moldovan Marioara, Prejmerean Cristina, Prodan Doina,, Saroși Codruța , Silaghi-Dumitrescu Laura , Dudea Diana, Gasparik Cristina, Popescu George, Agapescu Camelia

CERERE DE BREVET DEPUSA DE:
UNIVERSITATEA BABES BOLYAI – INSTITUTUL DE CERCETARI IN CHIMIE RALUCA RIPAN
UNIVERSITATEA DE MEDICINA SI FARMACIE IULIU HATIEGANU CLUJ-NAPOCA
Cerere de brevet de invenție
nr. A/00900/24.11.2016

F



Description: The objective of the current patent is the development of a composition intended for the whitening and regeneration of dental structures with optimal properties for their use in dental cosmetics.

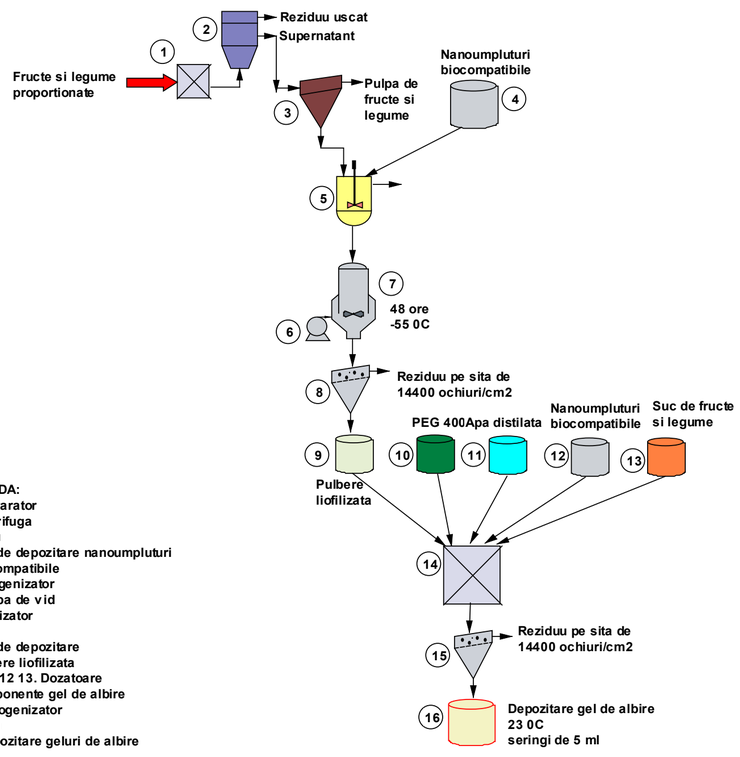
Areas of application - minimally invasive cosmetic dentistry, extrinsically caused dental dyschromia (determined by dyes from food, colored beverages, oral rinse solutions) or internalized in the dental structure, dyschromia caused by age.

The removal of pigment molecules from dental structures is based on oxidative mechanisms, and until now, it is carried out by substances based on peroxides. Substances that act through an oxidative mechanism are included in different concentrations in pharmaceutical forms of gel or solutions, which explains the varied treatment protocols associated with whitening treatments.

Improving the appearance of teeth by bleaching with whitening systems based on natural agents has the following advantages:
- efficiency, through detectable whitening effect, highlighted on extracted teeth and samples of composite materials
-biocompatibility
-does not alter the surface roughness

The whitening gel, according to the present invention, consists of a mixture consisting of active ingredients, namely:
- A combination of natural organic acids of plant origin
- Hydroxyapatite - with remineralizing effect
- Simvastatin - stimulation of dentine formation, anti-inflammatory effect - possible prevention of post-whitening sensitivity

Possibilities of use - gel in individual or by brushing



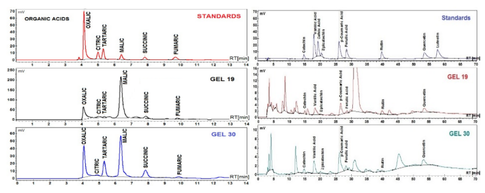
LEGENDA:
1. Triturarator
2. Centrifuga
3. Filtru
4. Vas de depozitare nanoumpluturi biocompatibile
5. Omogenizator
6. Pompa de vid
7. Liofilizator
8. Sita
9. Vas de depozitare pulbere liofilizata
10, 11, 12 13. Dozatoare componente gel de albire
14. Omogenizator
15. Sita
16. Depozitare geluri de albire

Technological flow diagram for obtaining the gel with natural extracts

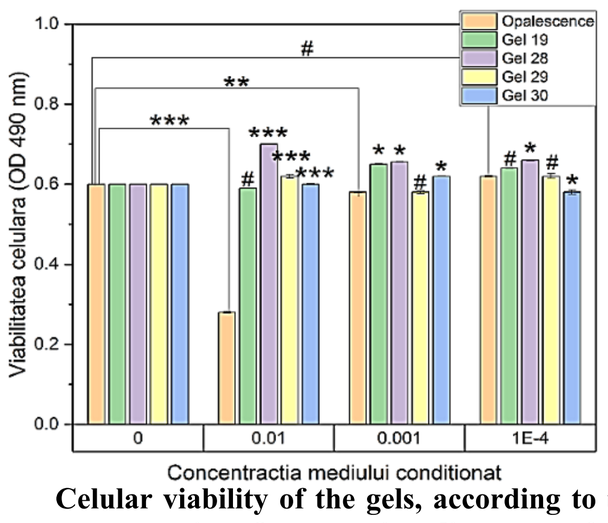
Cod	Acid oxalic	Acid citric	Acid tartric	Acid malic	Acid succinic	Acid fumaric	Aciditate totală
GEL 19	0,11	0,2605	0,0139	6,182	2,011	0,00043	8,7403
GEL 28	-	0,132	0,124	33,39	6,216	0,0009	39,8629
GEL 29	0,016	2,608	-	14,14	2,55	0,0089	19,3294
GEL 30	-	6,77	-	9,859	3,73	0,0066	20,3656

Flavonoide	GEL 19	GEL 28	GEL 29	GEL 30
Catechina	3,378	2,982	4,154	4,072
Epicatechina	1,906	2,063	5,548	6,685
Rutin	1,413	2,517	-	0,479
Quercetina	2,41	6,821	1,978	2,715
Total	9,107	14,383	11,681	13,951
Acizi fenolici	GEL 19	GEL 28	GEL 29	GEL 30
Acid Vanilic	1,392	3,086	2,537	2,674
Acid cafeic	-	-	-	-
Acid *p*-Cumaric	3,892	8,651	8,246	5,205
Acid Ferullic	1,086	5,479	8,521	0,367
Total	6,37	17,216	19,304	8,246

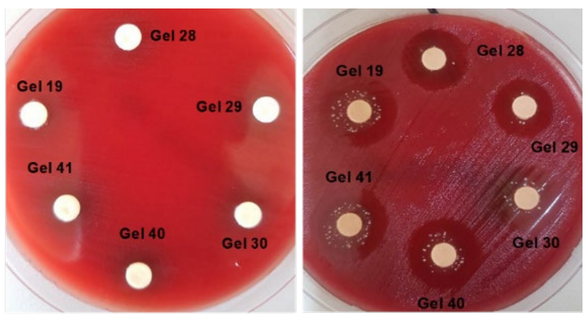
Determination of organic acids, flavonoids and phenolic acids from gel samples



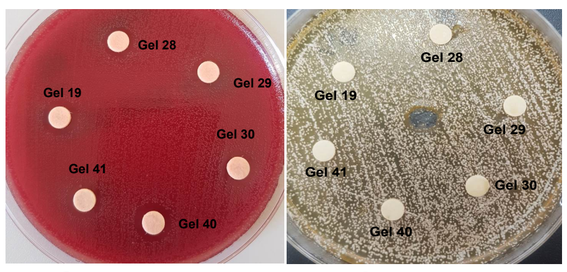
Chromatograms HPLC-UV for the organic acids from the bleaching gels



Celular viability of the gels, according to the concentration Comparative diagrams of the dental stem cells,
media ± standard deviation (n = 3); # - nonsignificant, * - p <0,05; ** p <0,01, *** p <0,001, in comparison with Opalescence



1 2



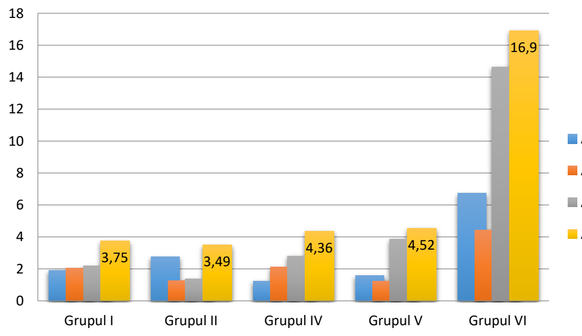
3 4

Antimicrobial effect analysis against:
1. Peptosteptococcus anerobius
2. Corynebacterium xerosis
3. Streptococcus mutans
4. Candida Albicans

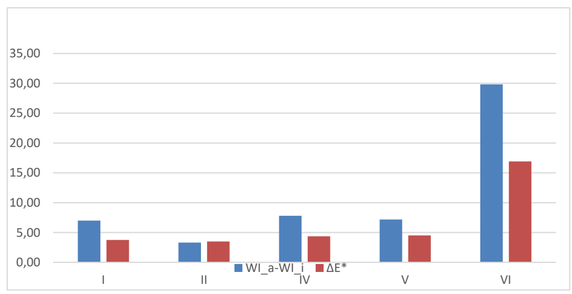




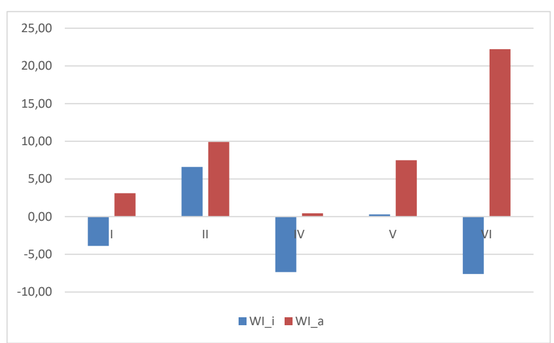
Experimental testing of the bleaching effect on extracted teeth (Spectrophotometric measurement- Vitaeasyshade) Group I – experimental gel 17, Group II – experimental gel 18, Group IV – experimental gel 19, Group V – experimental gel a, Group VI – Opalescence PF 16%



Variation in lightness L*, a* and b* chromatic parameters for the four experimental materials, and Opalescence 16%PF.



Variation of the whiteness index WI Blue) And of the color difference şi ΔE* (Red)



Variation of the whiteness index WI (blue: WI* average initial red: WI*average) In every case, WI has increased

Contact: Diana Dudea ddudea@umfcluj.ro,
Moldovan Marioara mmarioara2004@yahoo.com;

CREAM WITH PHOTOCHEMOPROTECTIVE EFFECT AND THE PROCEDURE FOR ITS OBTAINING

*Patent/***127719/2016 – Project PN – II 42--104/2008**

F

Authors:Gabriela Adriana Filip[1], Postescu Ion Dan[2], Maria Perde-Schrepler[2], Marcela Achim[1], Simona Clichici[1] , Şoimita Suciu[1], Piroska Virag[2], Eva Fischer Fodor[2,], Corina Tatomir[2], Gabriela Cherecheş[2], Olga Soriţău[2], Doina Daicoviciu[1], Ioana Brie[2], Otilia Barbos[2], Remus Moldovan[1], Tiberiu Dicu[2], Adriana Mureşan[1]

[1]UMF "Iuliu Haţieganu" Cluj Napoca; [2]Institutul Oncologic "Prof. Dr. I. Chiricuţă" Cluj Napoca

The invention refers to the content of a cream, oil-in water emulsion, for topical application with photochemoprotective property, with cosmetic use, designed to protect the skin against the noxious effects of ultraviolet radiation and also to two procedures of its obtaining.

The invention combines a natural extract obtained from *Vitis Vinifera* grape seeds, the Burgund Mare variety, and simple and cheap ingredients for the cream, which assures a good penetration of the extract in the skin and also improves the texture of dry and normal skin and maintains its moisturisation.





Contact: *Gabriela Adriana Filip, str. Antim Ivireanu nr 36, Cluj Napoca; 0745268704; adrianafilip33@yahoo.com; gabriela.filip@umfcluj.com,*

CHEWABLE TABLETS WITH POLLEN AND NATURAL VITAMIN C

Patent application No. RO 135449 A2 published in 28.01.2022

Authors: Ioan Tomuță, Dana Hales

F

Description

- The invention is characterized both by a ***new combination of natural products*** (pollen, honey, standardized vitamin C extracts from rosehips, sea buckthorn, acerola, cranberries or currants) and by a ***process*** for obtaining the chewable tablets, which uses honey as a binder in the technological process of wet granulation.

Claims

- Pharmaceutical form, presented as chewable tablets, characterized in that it includes in its composition pollen, honey, glucose and standardized extracts in the content of vitamin C and/or β-carotene.
- Pharmaceutical composition, as mentioned in claim 1, characterized in that it includes at least 900 mg of pollen.
- Pharmaceutical composition, as mentioned in claims 1 and 2, characterized in that it may include an essential oil with flavoring role.
- Process for manufacturing the chewable tablets, referred to in claim 1, characterized by the use of honey as a binder.
- Process for manufacturing the chewable tablets, referred to in claims 1-4, characterized in that it involves extraction, wet granulation and compression processes.
- Process for manufacturing the chewable tablets, referred to claims 1 to 4, characterized in that it involves the preparation of standardized extracts containing vitamin C and β-carotene, from rosehip, sea buckthorn, acerola, cranberries or currants.

Novelty of the invention

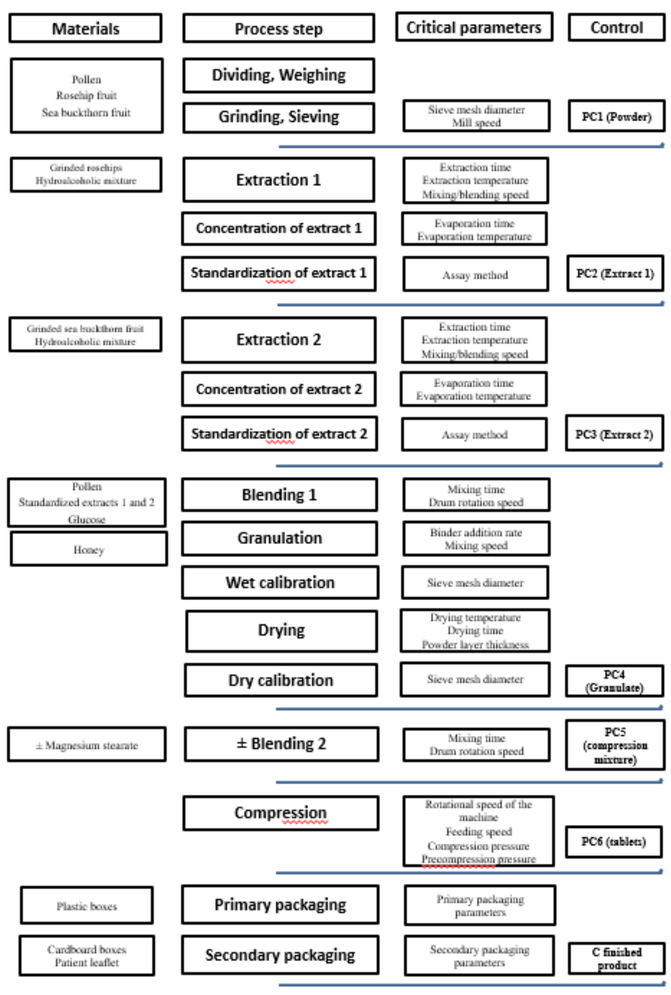
- Regarding ***product's composition*** - The chewable tablets contain only natural active ingredients, in the following combination: bee pollen, honey, vitamin C from standardized extracts of rosehip, sea buckthorn, acerola, cranberries or currants.
- Regarding the ***technological process*** - The association of pollen with honey, which fulfills a double role: it participates in the technological process of granulation as a binding excipient, and complements the benefits of pollen, leading to a valuable product in terms of energy and nutrition.

Pictures & graphics

Figure 1. Example of the manufacturing process for obtaining the chewable tablets containing pollen, honey and vitamin C standardized extracts



Figure 2. Appearance of the chewable tablets



Contact: dudas.dana@umfcluj.ro

MOLDOVA STATE UNIVERSITY
Faculty of Chemistry and Chemical Technology
Scientific Research Laboratory
Advanced Materials for Biopharmaceuticals and Technics
60, Alexei Mateevici str., MD 2009, Chisinau, Republic of Moldova
Tel.: +373 69127593; E-mail: *guleaaurelian@gmail.com*

HR EXCELLENCE IN RESEARCH

NEW ANTIBACTERIAL AGENT

PATENT: MD 4842/2023.01.31

AUTHORS: Aurelian GULEA, Vasilii GRAUR, Greta BĂLAN, Carolina LOZAN-TÎRȘU, Victor ŢAPCOV, Ion TODERAȘ, Vasile LOZAN

APPLICATION FIELDS: Medicine – pharmacy – cosmetics.

AIM: Chemical synthesis, characterization of copper coordination compound and its antibacterial evaluation against *Streptococcus pneumoniae*.

SOLUTION: New copper coordination compound with thiocarbamide ligand has been obtained using the directed synthesis method.

Antibacterial acitivity of the claimed substance against *Streptococcus pneumoniae* (µg/mL)

Compound	MIC, µg/mL	MBC, µg/mL
Ampicillin (Prototype)	0.5	0.5
Structural analog	0.03	0.06
Claimed substance	0.0038	0.0076

MIC - minimum inhibitory concentration; MBC - minimum bactericide concentration.

ADVANTAGES: The activity of the claimed compound against bacteria of the species *Streptococcus pneumoniae* exceeds by 66-132 times analogous characteristics of the Ampicillin and 7.9 times the characteristics of the structural analog. The discovered properties of this substance are of interest for medical practice in terms of expanding the arsenal of antibacterial remedies.

IMPLEMENTATION STAGE: At the laboratory level.

ACKNOWLEDGMENTS: This research was supported by the *research project: #20.80009.5007.10*

BIOTHERAPY MAGNET – BiTeM

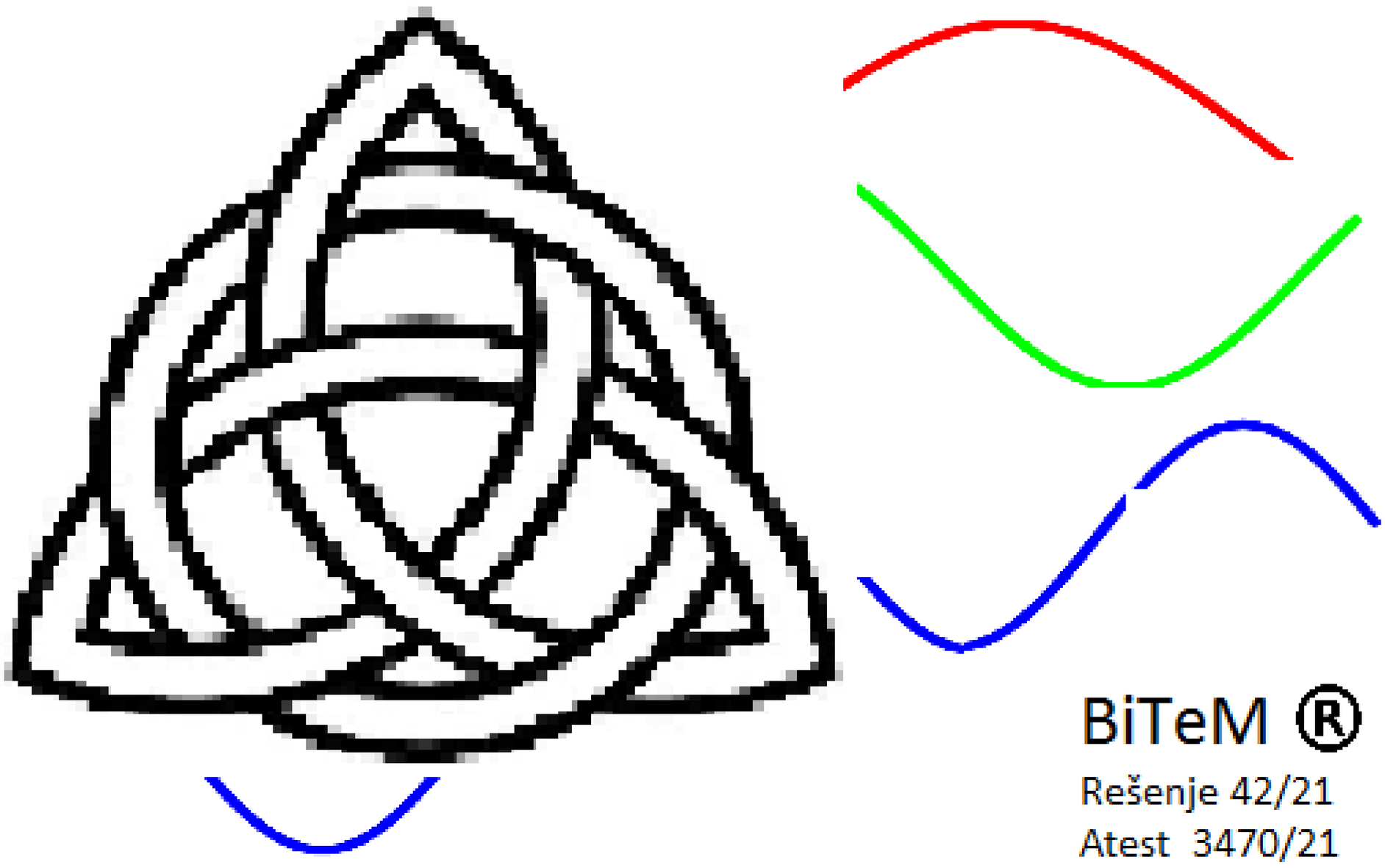
Patent

Author/s: ŠTANGL ĐORĐE - ŠTANGL ANKA

F

The latest technological solution for the treatment of diseases and injuries of muscles, ligaments and bones, as well as the peripheral nervous system.

BiTeM eliminates pain in a short time in various conditions, whether acute or chronic.



BiTeM is widely used to regulate blood and lymph circulation and accelerate the regeneration process.

BiTeM activates electrochemical processes in the tissue and improves the functioning of the cell and cell membrane.

Copyright and related law (in process).

Đorđe Štangl tel. +381(0)641276126 Email: upicib@gmail.com

NATURAL HERBAL PREPARATIONS

Patent

ANKA ŠTANGL - ĐORĐE ŠTANGL

F

Preparations made according to the original recipe and procedure from raw materials of plant and mineral origin, intended for the treatment of the consequences of mechanical and sports injuries.

In addition, they successfully relieve pain, not only in injuries, but also in rheumatic ailments.

Copyright and related law (in process).





Đorđe Štangl tel. +381(0)641276126 Email: upicib@gmail.com

QVibe frequency generating therapeutic device - used in a psoriasis case

Patent/project number: No 009015340-0001, 06/05/2022

F

Author/s: Senior Lecturer Dr. Oana Codruta Bacean Miloicov

Institution: SC Holistic Lounge SRL

Psoriasis is a chronic autoimmune skin condition characterized by the rapid overproduction of skin cells. This results in the formation of red, scaly patches on the skin's surface. The exact cause of psoriasis is unclear, but it is believed to involve a combination of genetic and environmental factors. Psoriasis can cause discomfort and itchiness, on face, neck, arms, in this case.

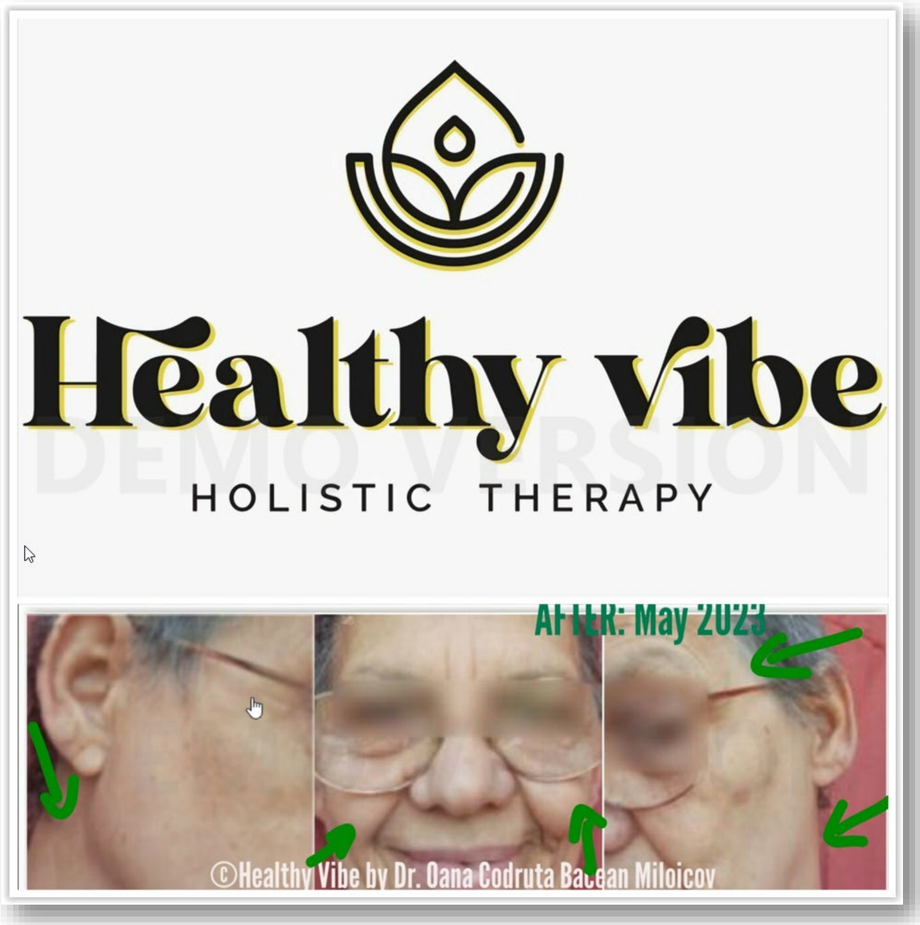
Q Vibe is a therapeutic frequency generating device, an inovative concept made out of requencies that are imprinted on it, the final result is a special, unique algorithm, modified according to the pathologies of the patients. We applied the device as a therapy(local external application) for this case. The subject used the QVibe deviece everyday, the frequency recipie is a unique registered algoritm imprinted on the device that generates the frequencies as therapy; we can clearly see the difference in the pictures(BEFORE- on 23rd of april 2023) and the result in the pictures named: (AFTER- on may 2023).

BEFORE- 23rd of april 2023





AFTER- may 2023



It is successfully used in balancing other pathologies as (allergies/digestive problems/renal diseases/melanoma/nervous system lessions/viral or bacteriological infections/parasitic infestations/bone diseases, etc.), it optimises the state of health, according to the improvement of the clinical and paraclinical paramethers.

Contact: baceano@gmail.com +40745170879 www.healthyvibe.ro

SCAN ME

Solutie Virala ”SV”

Viral solution ”SV”

Patent/project number: 1/20.03.2020

Author/s: Senior Lecturer Dr. Oana Codruta Bacean Miloicov

Institution: SC Holistic Lounge SRL

F

Substance composition - BASE: 5 ml Swedish Bitter, 25 ml ozonated pure water

The product is obtained by energetic imprinting with specific frequencies of known viruses; according to scientific studies, any energetically imprinted liquid generates those frequencies for a duration of approximately one month, after which the liquid no longer retains the energetic imprint. I used this aspect and reprinted another solution after the deadline.

I have used the product in hundreds of cases of viral infections, with spectacular results even from the first days; method of administration: the first two days: 7pic x 5/day, then: 7pic x 3/day, until the bottle is used up.

It is interesting that the base consists of a tincture of plants, natural and without adverse effects, but the therapy is actually made from the energetically imprinted frequencies on the solution. We started from the premise that digestion begins in the oral cavity, where absorption is very good (ex.: Nitroglycerin that is administered sublingually), as a result: statistics, kinesiological tests and the clinical evolution of the cases have shown us that the product is efficient reducing the occurrence of the symptoms, increasing immunity - much improved clinical condition after administration, significant reduction of inflammation and nasal congestion.

The remedy is energetically imprinted with the help of the only device of this type in RO, the recipie concept being registered with copyright.

Other benefits:

- adjuvant in upper respiratory infections (rhinitis, sinusitis, tonsillitis, laryngitis)
- adjuvant in lower respiratory infections
- anti-inflammatory
- antiviral
- can be anywhere administered
- does not require travel to get the solution, it can be send anywhere

SCAN ME

Contact: baceano@gmail.com

+40745170879

www.healthyvibe.ro



CO-TECH- test, measure, balance

(innovative concept of Automated Software Process for evaluation and therapy through biofeedback)

Patent/project number: 10/20.03.2020, copyright-protected concept
Author/s: Senior Lecturer Dr. Oana Codruta Bacean Miloicov
Institution: SC Holistic Lounge SRL

F

CO-TECH software process automation is an innovative and copyright-protected concept that brings a new perspective to patient evaluation and therapy. By using biofeedback, this system allows for the optimization of evaluation processes, improvement of therapies, and reduction of execution times, resulting in an optimized therapeutic approach with accelerated efficiency.

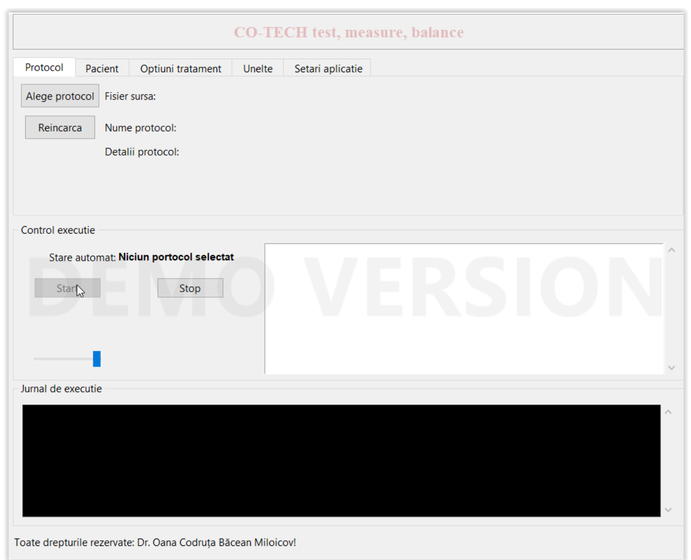
One of the core features of CO-TECH is its ability to obtain precise and detailed data about patients through biofeedback. This process involves measuring and monitoring the physiological responses of the patient in real-time. As a result, therapists can have access to essential information about the patient's health status and can adapt the treatment based on these data.

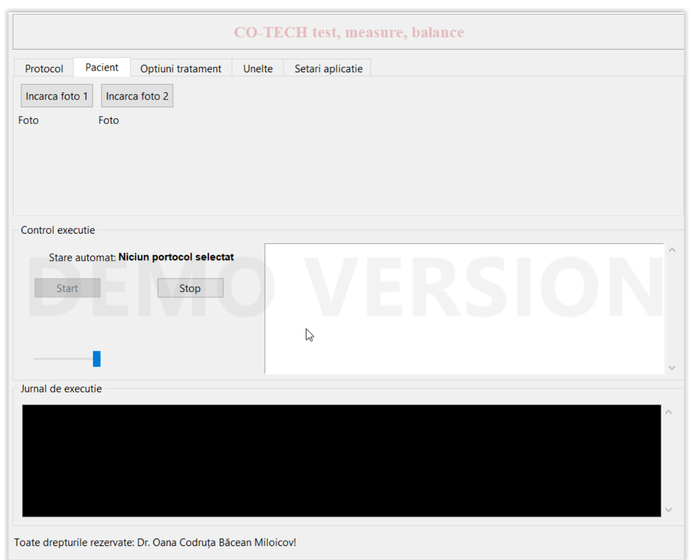
By applying CO-TECH software process automation in therapies, specialists can more accurately evaluate the patient's health condition and rapidly identify problems or difficulties they may face. Additionally, this system enables continuous monitoring of therapeutic progress, facilitating real-time adjustment and optimization of the therapy.

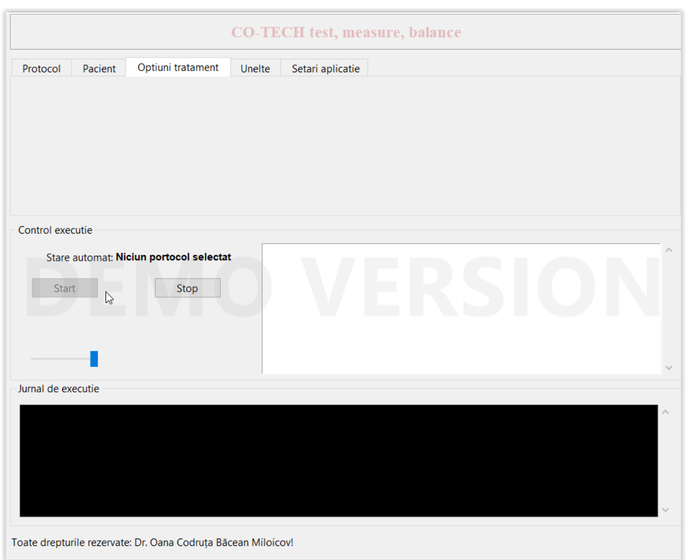
Moreover, CO-TECH software process automation brings a significant change in terms of the time required for therapies. By utilizing this innovation, therapists can considerably reduce the overall duration of therapies as they can quickly identify and eliminate inefficient or unnecessary methods. Consequently, patients will benefit from more time dedicated to other types of therapies without compromising the effectiveness of the main treatment.

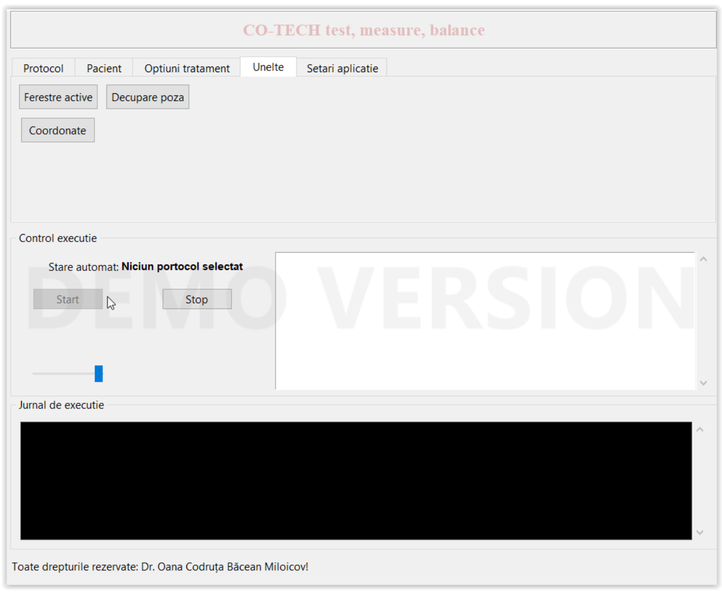
Another significant value brought by CO-TECH is its capacity to provide an optimized, personalized, and tailored therapeutic approach to each patient's needs. Through efficient resource utilization, therapists can develop specific strategies for each patient and track their evolution and health status in real-time. Through the use of CO-TECH software process automation, therapies become more efficient, faster, and personalized. This revolutionary concept offers the possibility to evaluate and treat patients more accurately, reducing therapy periods and maximizing therapeutic outcomes. CO-TECH brings benefits to the field of biofeedback evaluation, therapy improvement, and streamlining of therapeutic approaches, thus transforming the way patients are treated and cared for.

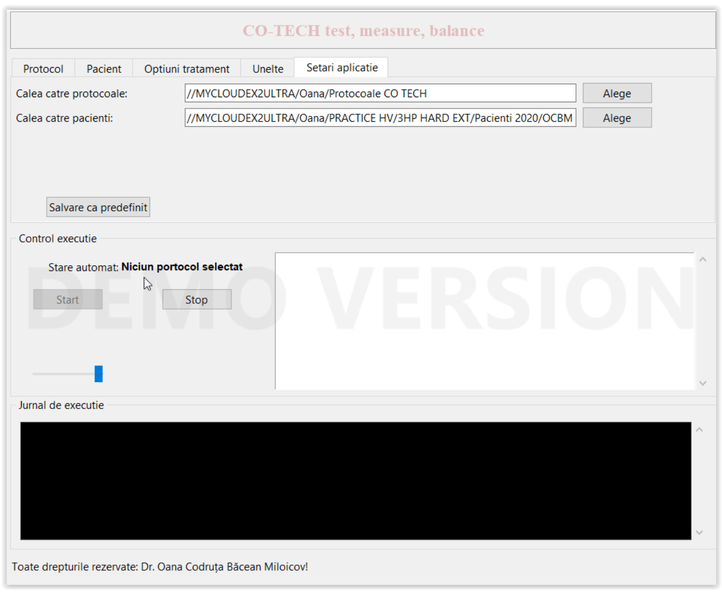
Affections that we have already used the CO-TECH- test, measure, balance concept for: depression, neoplasms, burnout, vitiligo, neurological diseases.











Contact: baceano@gmail.com +40745170879 www.healthyvibe.ro

SCAN ME

QVibe frequency generating therapeutic device-used against parasitic infections

Patent/project number: No 009015340-0001, 06/05/2022

Author/s: Senior Lecturer Dr. Oana Codruta Bacean Miloicov

Institution: SC Holistic Lounge SRL

F

Intestinal parasites in children are organisms that develop and live in their intestinal tract, causing various symptoms and health problems. The causes of parasitic infestation can be varied, including consuming contaminated food or water, contact with infected animals, or lack of proper hygiene.

The effects of intestinal parasites on children's health can be quite severe. These parasites can affect nutrient absorption, causing nutritional deficiencies and delays in growth and development. They can also cause abdominal pain, diarrhea, nausea, weight loss, fatigue, and irritability. Persistent parasite infestation can compromise the child's immune system and lead to the development of other serious conditions.

To combat intestinal parasite infestation in children, an effective and non-invasive device is the Q Vibe - a therapeutic anti-parasitic frequency generator. This device provides a natural and gentle solution, eliminating the need for aggressive or invasive chemical substances in treatment.

Q Vibe works by generating and transmitting specific frequencies that are highly unpleasant and harmful to parasites. These frequencies disrupt and destroy the parasitic organisms, eliminating them from the child's body. The use of the Q Vibe device is easy and convenient, so it can be used at home or in a clinic setting.

Another advantage of using Q Vibe is its immediate effectiveness. After applying the therapeutic frequencies, the child will experience rapid relief of symptoms and an improvement in overall health. Treatment with Q Vibe is completely non-invasive and does not cause any negative side effects.







In short, the Q Vibe device provides a non-invasive, natural, and effective solution for combating intestinal parasite infestation in children. By using therapeutic anti-parasitic frequencies, this technology offers immediate benefits and completely eliminates the harmful effects of chemical substances.

Q Vibe is a therapeutic frequency generating device, an inovative concept made out of frequencies that are imprinted on it, the final result is a special, unique algorithm, modified according to the pathologies of the patients. We applied the device as a therapy(local external application) for these cases on the right hand on the radial arthery, where we can feel the pulse.
It is recomanded to use QVibe deviece everyday, all the time, especially during the night, the frequency recipie is a unique registered algoritm imprinted on the device that generates the frequencies as therapy. In cases of abdominal discomfort caused by colics, inflammation, abdominal bloating, intestinal parasites or imbalance of intestinal flora.

SCAN ME

Contact: baceano@gmail.com +40745170879 www.healthyvibe.ro

ANTISTRESS PROTOCOL used in a vitiligo case

Patent/project number: 11/20.03.2020, copyright-protected concept

Author/s: Senior Lecturer Dr. Oana Codruta Bacean Miloicov

Institution: SC Holistic Lounge SRL

F

The results obtained, including physical outcomes, clinical appearance, and psycho-emotional levels, demonstrate the effectiveness of this innovative copyrighted protocol. Its non-invasive nature, combined with optimized clinical parameters, enhances skin appearance and mental equilibrium, as confirmed by the results.

The therapeutic ANTISTRESS PROTOCOL has shown significant benefits in the treatment of vitiligo. Beyond its impact on the physical manifestations of the condition, it also addresses the psycho-emotional aspects that can accompany the disease.

By promoting psycho-emotional balance, this protocol helps individuals cope with the psychological impact of vitiligo. It addresses the underlying traumas stored in the subconscious, aiding in their release and healing.

Furthermore, the therapeutic ANTISTRESS PROTOCOL protocol focuses on CHACKRA balancing, which plays a vital role in overall well-being. Through this process, the energy centers of the body are harmonized, resulting in improved physical and mental health.

The protocol also includes AURA correction, which helps restore the energetic field surrounding the body. By addressing imbalances and blockages within the aura, the therapy promotes healing on multiple levels.

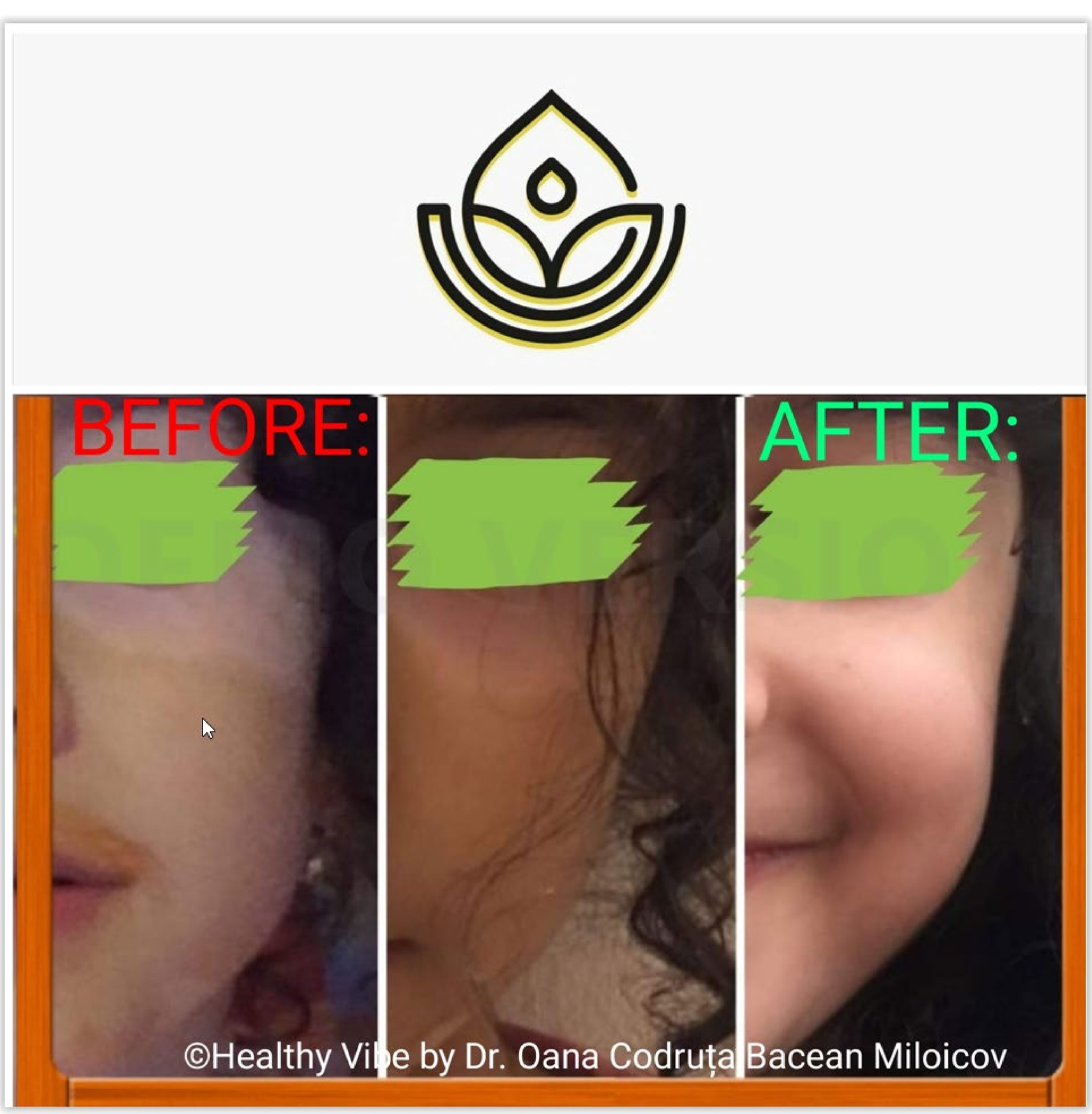
By targeting the imbalances caused by stress factors, this protocol aids in restoring the body's equilibrium. It addresses the impact of external stressors and supports the body's ability to withstand and recover from them.

The use of this innovative ANTISTRESS PROTOCOL has shown remarkable clinical and psycho-emotional improvements. It offers a non-invasive approach to treating vitiligo, enhancing both physical appearance and mental well-being. With the support of copyright protection, this protocol stands as a testament to its effectiveness and results.

The image on the LEFT- **BEFORE** represents the photo taken at the initiation of the therapy.

The image in the middle, intermediate stage.

The image on the right, the RESULT- **AFTER** obtained after three months from the initiation of the therapy.



SCAN ME

Contact: baceano@gmail.com

+40745170879

www.healthyvibe.ro

SEROTONIN - THE BINDING MESSENGER NEUROTRANSMITTER OF HAPPINESS

PROJECT: PROTOTYPE

Authors: Victor ILIE, Giulia MARTIN, Alexandru MEREUTA

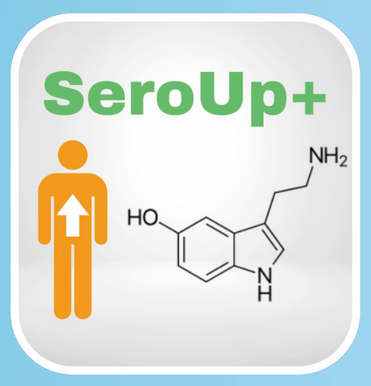
Mentors: Carmen ARGESANU, Mariana-Oana FARCAS, Andra ILIE

F

An innovative and revolutionary method to diagnose and solve the low levels of serotonin in the human body is, according to our team, the SeroUp+ (a combination between a medical in vitro device and a digital application).

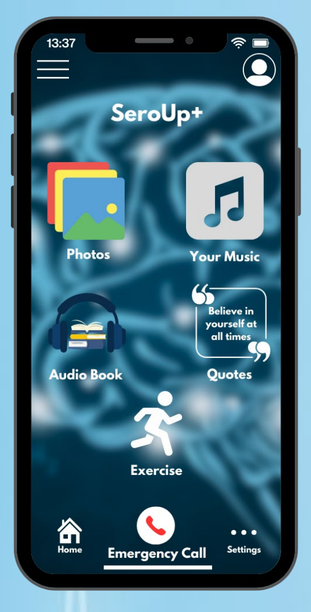
PROBLEM FORMULATION

There are difficulties with the diagnosis of low levels of serotonin as well as with the serotonin toxicity. Doctors don't usually perform blood tests to assess serotonin levels. Researchers still argue about whether to associate the low levels of serotonin with depression or not. Serotonin syndrome can have serious or even deadly side effects.

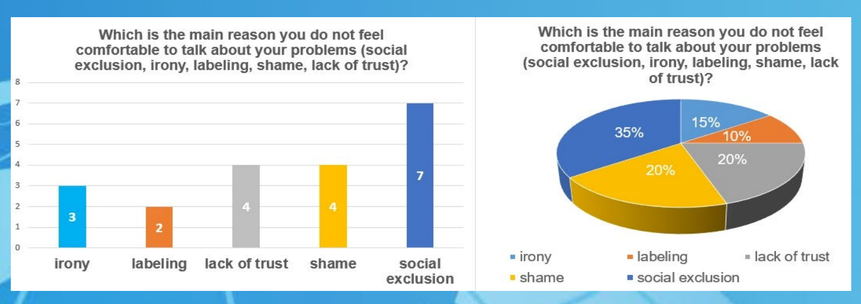


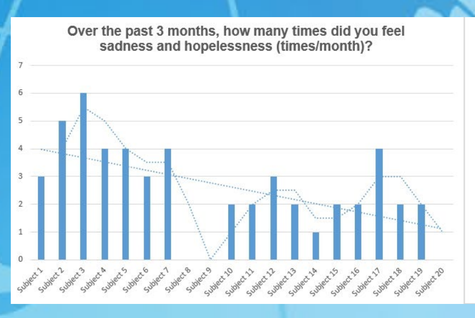


SCREENS OF SEROUP+ APP











RESEARCH OBJECTIVES

To compare the results of treating the hyposecretion of serotonin by pills with those of treating it through innovative, non-invasive methods and to analyse patients' reaction to a new app that they can use both when the level of serotonin is low and before that, in order to avoid the medical crises.

THE INNOVATIVE PRODUCT – MEDICAL DEVICE & SeroUp+ APP

The device we thought of is a partially or fully absorbed implantable type, intended to be inserted through a clinical intervention and intended to remain in the body after the procedure, as active. Since serotonin levels can be checked by simply collecting a drop of blood, in our vision the device we want to create is an in vitro diagnostic type – containing a reagent, a calibrator and software for sample examination, of blood in our case. In this way, whenever the level of serotonin in the blood drops below the alert level, a signal is sent in the form of a radio wave to a related electronic device connected to the base. It can be a smart watch, a digital photo frame that will start playing photos, previously chosen in the SeroUp+ app, with pleasant images from the person's life, in order to dictate the brain to increase the production of serotonin

Contact: *victorilie3015@gmail.com*, *+40 (771) 459 417*

Department for Research, Development and Innovation Management
Knowledge and Technological Transfer Center

15 Constantin Daicoviciu street
400020, Cluj-Napoca, România

e-mail: liliana.pop@staff.utcluj.ro

www.utcluj.ro

Title

PARALLEL ROBOTIC SYSTEM FOR BILATERAL SHOULDER MEDICAL REHABILITATION

F

Inventor/s - Contact

Tucan Paul-George-Mihai, Pîslă Doina Liana, Vaida Liviu-Călin, Pîslă Adrian,
Gherman Bogdan George, Bîrlescu Iosif
CESTER-TECHNICAL UNIVERSITY OF CLUJ-NAPOCA, ROMANIA

Patent/ Application number

Patent Application OSIM no.: A/00683/12.11.2021

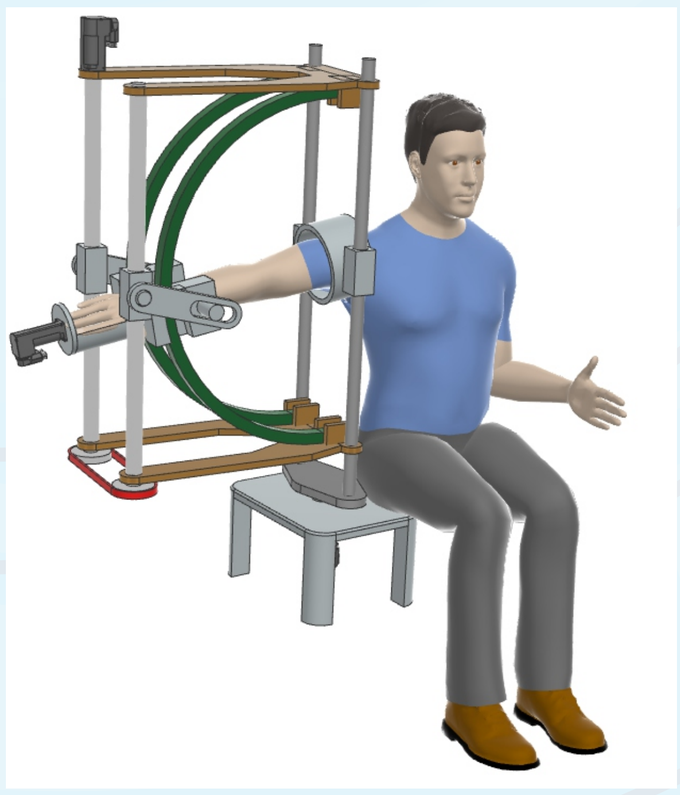
Short presentation

The invention describes a robotic system based on end-effector configuration for bilateral recovery of shoulder joint movements. The robot has 3 active joints needed to achieve flexion/extension, adduction/abduction of the shoulder and pronation/ supination movement of the forearm. The system is intended for patients with brachial monoparesis resulting from an injury to the central nervous system or peripheral nervous system. The robotic system is suitable for rehabilitation of both upper limbs. The robotic system works with the help of three degrees of mobility achieved with the help of three active rotation joints whose axes intersect at the same point, which is materialized in the form of the center of rotation of the patient's shoulder undergoing robotic assisted medical rehabilitation.

Applicability

The invention is applicable in the medical field, more specifically in the medical recovery of the upper limbs of patients suffering from brachial monoparesis. The robotic system is not limited only to this type of patients, its degree of use can also be extended to patients suffering from various neurological diseases whose recovery requires the remobilization of the shoulder joint.

Images





Department for Research, Development and Innovation Management
Knowledge and Technological Transfer Center

15 Constantin Daicoviciu street
400020, Cluj-Napoca, România

e-mail: liliana.pop@staff.utcluj.ro

www.utcluj.ro

Title

WORKBENCH FOR AUTOMATIC CONTROL OF ANESTHESIA

F

Inventor/s - Contact

Ionescu Clara Mihaela - Clara.Ionescu@aut.utcluj.ro, Muresan Cristina Ioana – Cristina.Muresan@aut.utcluj.ro,
Dulf Eva-Henrietta – Eva.Dulf@aut.utcluj.ro, Birs Isabela-Roxana – Isabela.Birs@aut.utcluj.ro,
Munteanu Radu Adrian - Radu.A.Munteanu@ethm.utcluj.ro

Patent/ Application number

Patent Application OSIM no.: A/00185/11.04.2022

Short presentation

The invention refers to a workbench that allows the testing of different automatic control strategies in anesthesia. Analysis of control systems and results can represent an important step in implementing such automatic control systems in practice. The primary objective of anesthesia is patient comfort, reduction of side effects and avoidance of overdose. Suboptimal and effective control of sedative/ analgesic/muscle relaxant doses has a negative impact on the patient, while implying an increase in costs. Anesthesia is intensively used in intensive care patients, especially in mechanically ventilated ones. There are a variety of approaches related to the drugs used, monitoring methods, protocols, especially to meet the different requirements of patients. A solution to unify these varied approaches, related to the intra- and inter-patient variety, consists in the use of automatic control systems that ensure a personalized approach. The workbench allows the testing of different automatic control strategies in anesthesia. It consists of two main components: a patient simulator, respectively a control system to monitor the patient's vital signs, respectively to adjust the dosage of drugs automatically based on a control algorithm. The patient simulator is an application that simulates the effects of drugs (analgesics, sedatives, muscle relaxants) on the state of hypnosis, analgesia and neuromuscular blockade of a patient under anesthesia. The measured variables are transmitted to the control system, represented by a microcontroller. The advantages of the workbench consist in providing the analysis, optimization, testing and validation of a closed-loop control system to assist the anesthesiologist in the phases of induction, maintenance and recovery from anesthesia.

Applicability

Anesthesia is intensively used in intensive care patients, especially in mechanically ventilated ones. The proposed workbench provides the analysis, optimization, testing and validation of a closed-loop control system to assist the anesthesiologist in the phases of induction, maintenance and recovery from anesthesia in any medical field.

Images

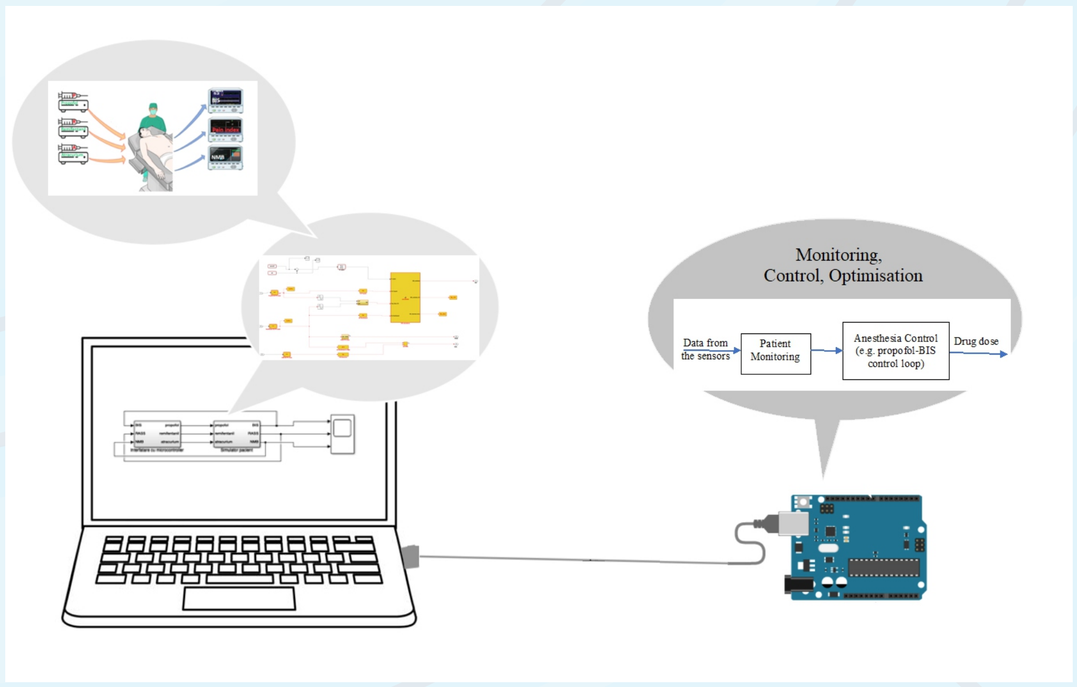
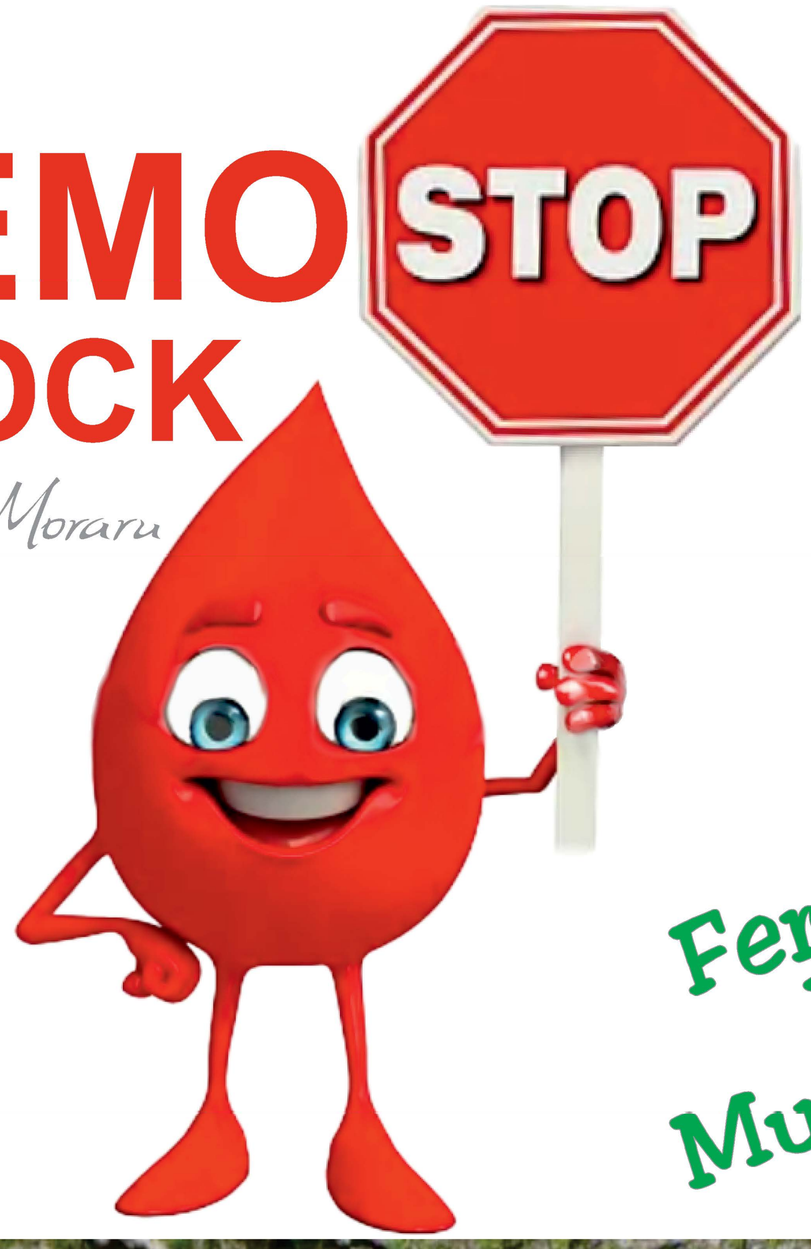


Figure 1. Benchmark design

Opportunity
CORNELIUGROUP
Research-Innovation Association
Creation
INVENTCOR
Realization
Power of Creative Mind
Deva ROMANIA

HEMO BLOCK

dr. Ionuț Moraru



PRO natura™

F

Stops bleeding

Fermented Herbs & Mushrooms



nasal spray





spray

Fomes Fomentarius



gel



The hemostatic effect can be increased taking oral **Fomes Fomentarius**.

The active ingredients found in the products: provide them with antiviral, antibacterial, cicatrizing (by stimulating fibroblasts), anti-inflammatory, antialgic and hemostatic effects. The products are useful in bleeding skin lesions, but also in dental-oral ones.

CERTIFICAT ISO 9001

CERTIFICAT ISO 22000

CERTIFICAT GMP

S.C. LABORATOARELE MEDICA® S.R.L.
Otopeni, str. Frasinului 11, tel.:021.351.4777
office@pro-natura.ro www.pro-natura.ro
facebook.com/Pro.Natura.RO
instagram.com/pronatura_medica
youtube.com/@medicapronatura

"Survival Therapy Kit" – Kit for the treatment of ailments, through therapies based on classical acupuncture (TCM – Traditional Chinese Therapy), applied with the help of passive resonant devices "EMCOPAD Doctor Tech"

F

Authors: VELCEA Marian, MOLDOVAN Ion-Corneliu,
PLOTOG Ioan, MIHĂILESCU Bogdan, HIDEG Cătălin
E-mail: marian.nicolae.velcea@gmail.com

The "Survival Therapy Kit" contains a "Practical Guide" for recommending therapeutic procedures (organized alphabetically for more than 100 common conditions), a set of 200 pieces of EMCOPAD devices (Doctor Tech passive resonant electromagnetic patches) and adhesive rolls for attaching the devices to the body of the treated person.

The devices are applied periodically on the acupuncture points recommended in the therapy of the diagnosed condition. The application period is 21 days and is followed by a 10-day break. The procedure is repeated, if necessary, twice more.

EMCOPAD Doctor Tech devices are used indefinitely. It is recommended to disinfect them with alcohol before each use.

The advice of a doctor or acupuncturist is recommended.

(TCM is officially approved by the WHO)





EMCOPAD devices
(Doctor Tech passive resonant electromagnetic patches)

CERVICAL BELT

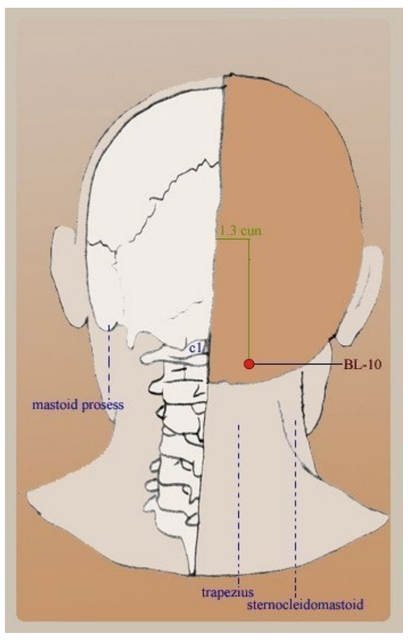
Project

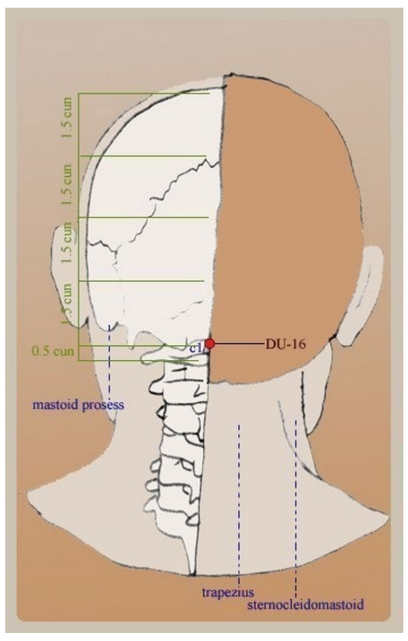
Authors:

Velcea Marian, Mândrea Lucian, Moldovan Ion Corneliu, Plotog Ioan, Hideg Cătălin, Curta Ioan, Mihăilescu Bogdan, Caracaș Eugen, Chețan Mihai, Ene Ciprian

F

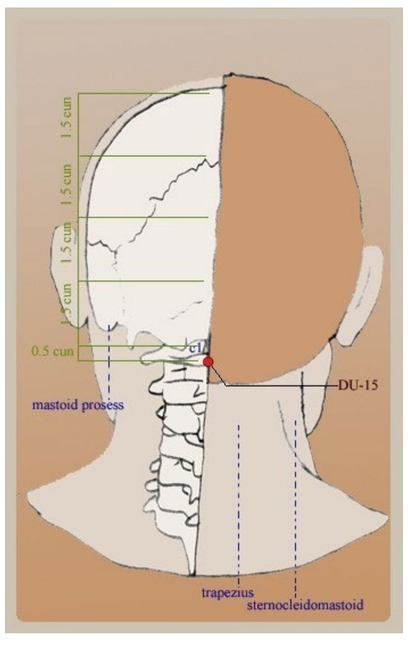
The device consists of a medical support dedicated to the cervical area on which Qi-Polino Doctor Tech passive resonant devices (EMCOPAD) have been assembled in the positions corresponding to the C7 vertebra and acupuncture points BL-10, VB-20, VG-15 and VG-16. These points are activated independently or simultaneously in groups formed by the therapist, depending on the patient's condition and his immediate needs. The interaction at the energy level takes place through the acupuncture points placed in electromagnetic contact with the Qi-Polino device, which transmits impulses with a harmonic frequency of the note LA, located in the radio band. This interaction is only possible during the period when paired acupuncture points are in relative imbalance (one to the other), characterized by the presence of a local electric potential, with an effect on the power supply of the electronic circuit; once the energetic balancing of the corresponding points is achieved, the electronic device cuts off its power supply for the entire balance period, resuming the operating cycle when a new imbalance between the corresponding acupuncture points occurs.

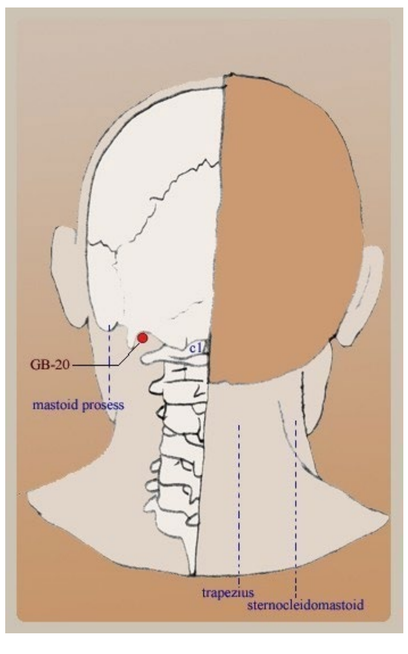












Contact: Marian VELCEA e-mail: marian.nicolae.velcea@gmail.com

SUPERFORTE SUPOZIN & SUPERFORTE APICOPLANT

Natural therapies

F

Author: ***Adriana Vlad***



Superforte Ovulin - Solid Cream *it is a 100% natural product that helps alleviate the manifestations of prostate, colon, and female genital dysfunction. It has a strong anti-inflammatory, cicatrizing, antirheumatic, antiseptic, antitumor, antihemorrhagic action. It prevents and acts beneficially on the early symptoms of colon and prostate damage, has positive effects in cases of tumors in the colon and the female genital area. The product is beneficial in prostate disorders, cystitis, nephritis, urethritis, internal and/or external hemorrhoids, inflammation, wounds, eczema and tumors on the colon, rheumatic diseases, but also in gynecological diseases, administered together with "Superforte Ovulin - Solid Cream". Ingredients: honey, propolis, pollen, royal jelly, mummy, clay, cocoa butter, sea buckthorn oil extract, chamomile, thyme, St. John's wort, marigold, marigold, juniper essential oil, sage, pine, fennel, geranium, lavender.*

SUPERFORTE APICOPLANT *it is a natural product that acts beneficially in conditions of the colon, rectum and intestine. Action: colon detoxifier, decongestant, alkalizing, antimicrobial, regulates digestion (diarrhea, constipation), antitumor, regenerates the digestive mucosa and intestine, antihemorrhoidal (in combination with Superforte Supozin), intestinal soothing (indigestion, gas, irritable colon, biliary colic etc.), slimming cures. In chronic conditions, a natural and homeopathic treatment is recommended - internally for a period of 3-6 months for greater treatment efficiency. Ingredients: Argilla (clay), Theobroma cacao (cocoa butter), Melem (honey), Cera (wax) Carbo (coal), Argentum colloidal (colloidal silver), Probiotic, Calamus aromaticus (obligean), Mentha essential oils), Feaniculi (fennel), Camelia sinensis (tea tree), Caryophyllis (clove), nipagin, nipasol.*



SCAN ME

Contact: ***elite.nutritia@yahoo.com***

Developing MED SHARE at Future Academy, Egypt

Rokia Darwish

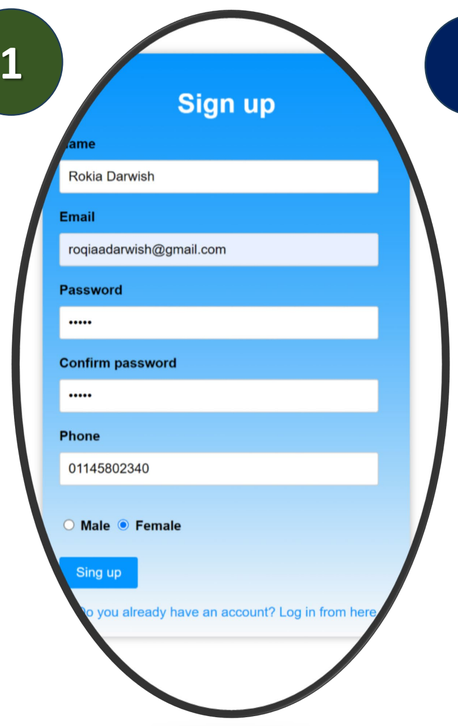
Supervised By: Dr. Radwa Radwan

F

MED SHARE

MED Share endeavors to tackle healthcare challenges by bridging the divide between surplus medical resources and those who require them. It offers a platform for individuals to contribute unused medications and repurpose medical equipment, thereby curbing waste. This initiative guarantees affordable healthcare by providing medications at reduced prices or free of charge and addresses scarcity issues by distributing surplus medications to regions with limited access. Through its commitment to responsible resource management, MED Share not only widens healthcare access but also contributes to a healthier global community.

1



Registration Page

Form for user registration before accessing buying or selling features

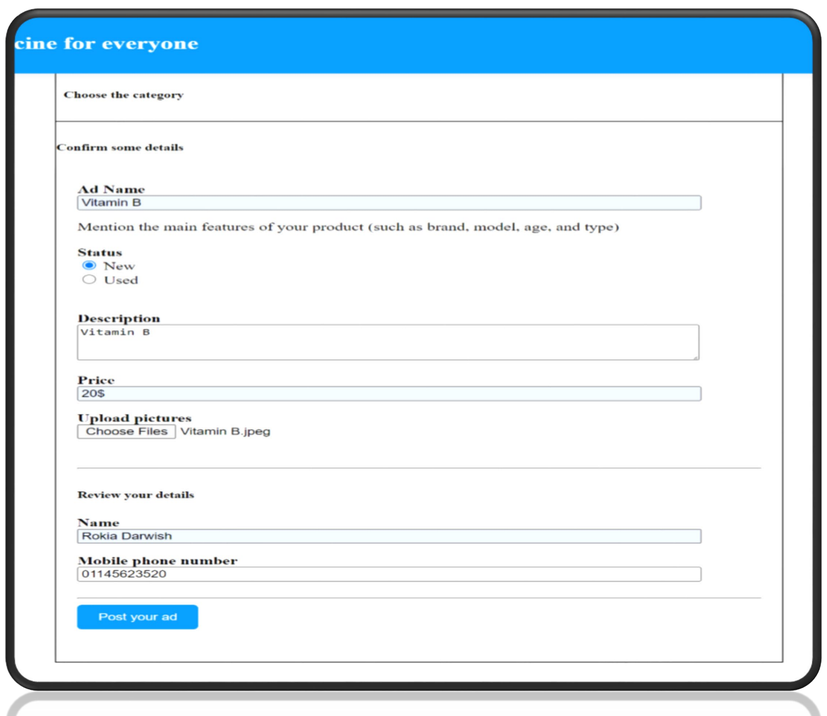
2



Home Page

Overview of website and options to buy or donate medications and supplies

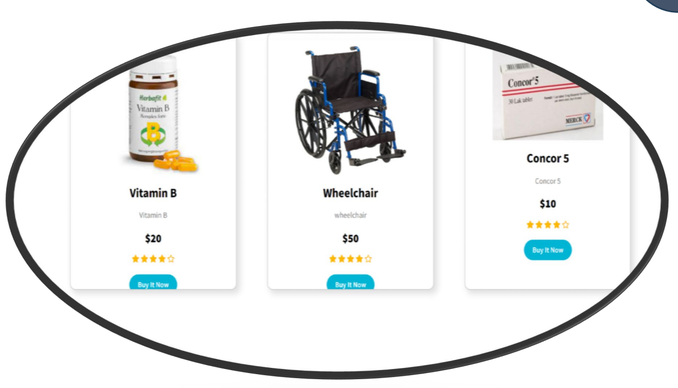
3



Selling Details Page

Seller provides information about the product for sale

4



Shopping Page

Display of available products for purchase

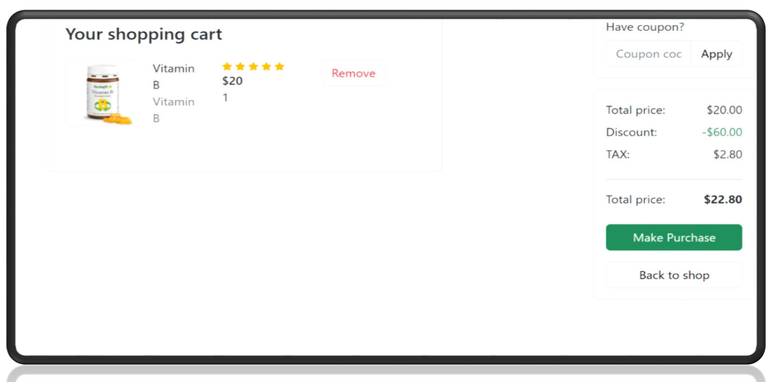
5



Product Details Page

Allows users to select quantity and examine product details before adding to cart

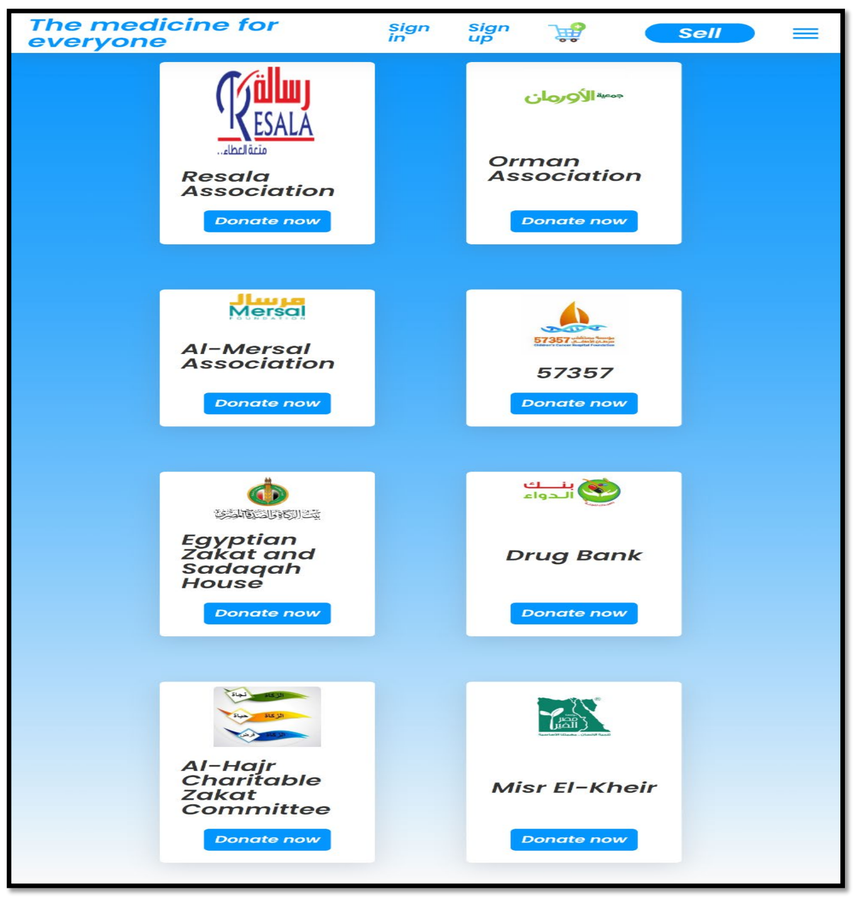
6



Shopping Page

View and manage items in the shopping cart before confirming the purchase

7



Donation Page

Connects donors with verified entities for medication and equipment donations

Contact: **Dr. Radwa Radwan**

Future Academy, Egypt

radwan.Mohamed@fa-hists.edu.eg

WhatsApp:+201157666770

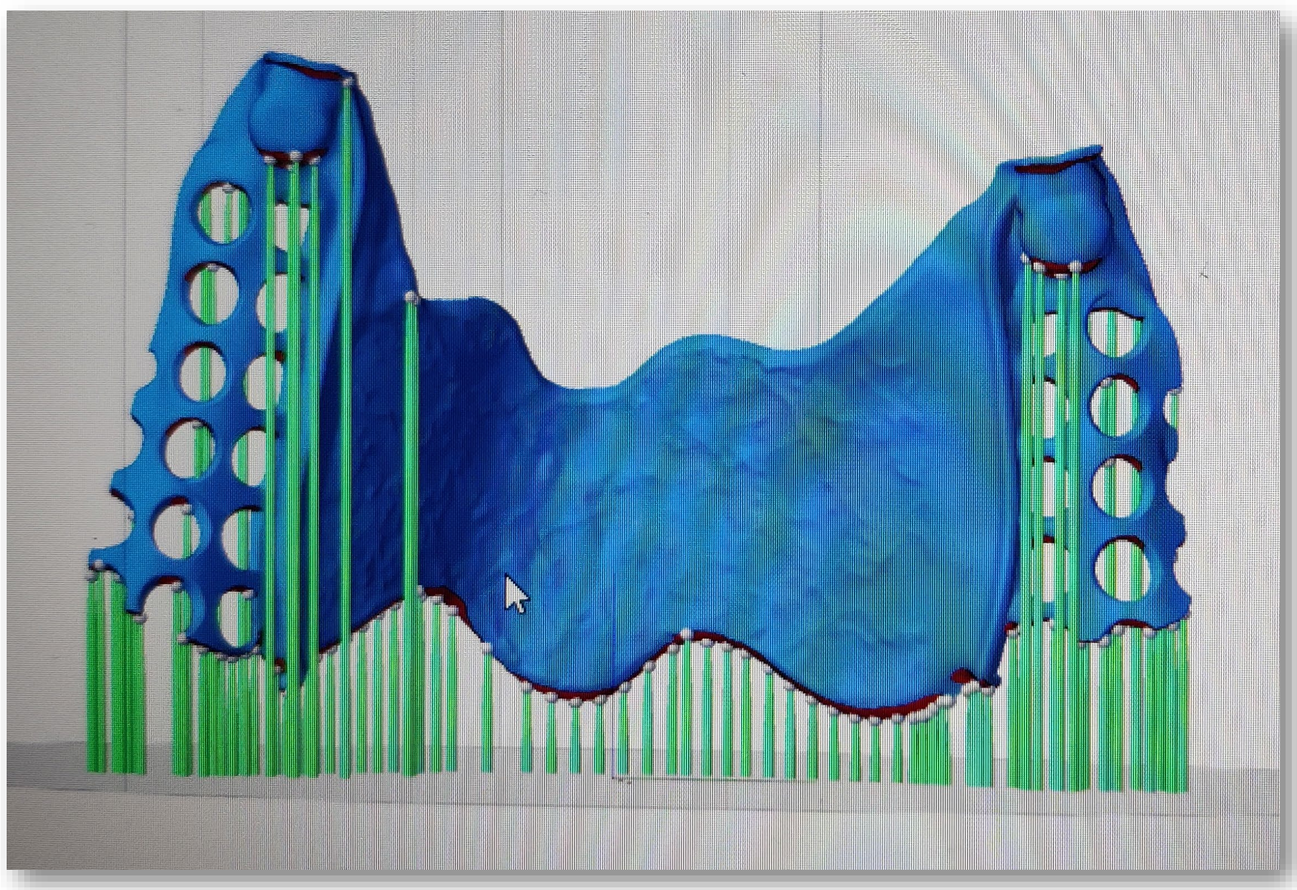
SINTER LASER MELTING

Dental medicine project

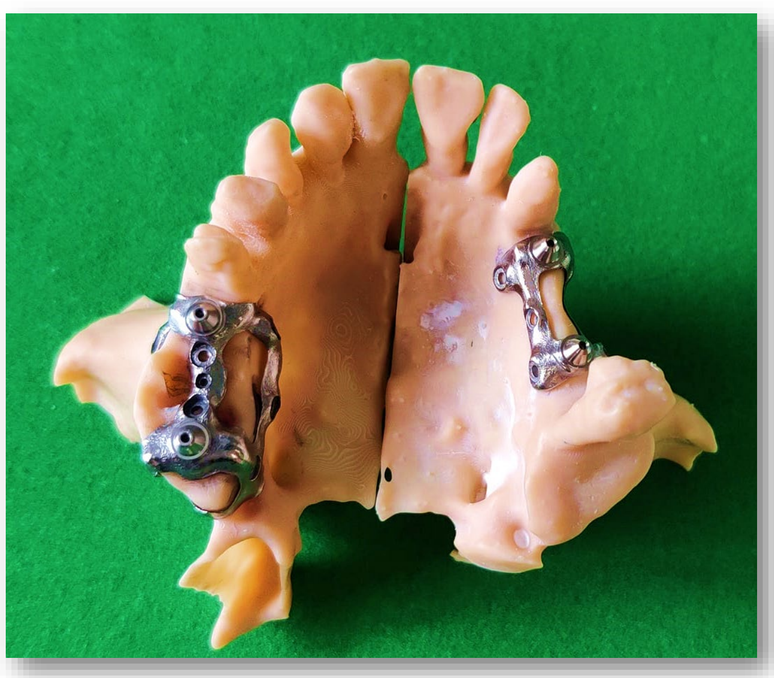
Author: Manolin Mita

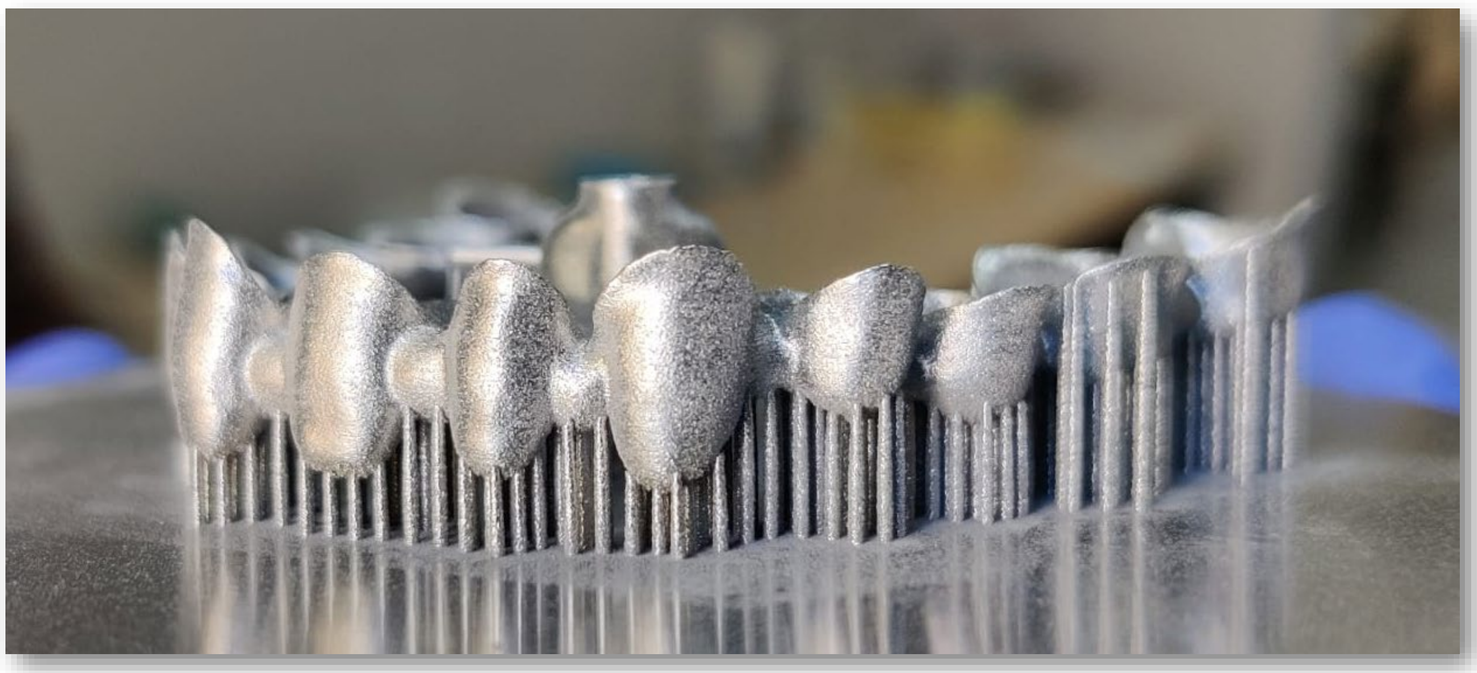
F

Being in the field related to dental medicine with vast experience and because there was no center specialized in laser printing using Sinter Laser Melting technology in Hunedoara county, I ecided to take this step. 3D printing or additive manufacturing is a manufacturing process of solid objects tri-dimensionally adding layer after layer. Physical objects are produced using data a digital model, a 3D model or others sources such as an AMF* file. By using 3D printing they can be created products of almost any shape. Selective laser melting (SLM) is the leading metal 3D printing technology revolutionizing the additive manufacturing of metal parts. This digitized technology gives dental laboratories the opportunity to benefit from creating work of an exceptional quality, far beyond what humans can achieve with classic melting and casting technologies.











SCAN ME

Contact: laserprintdeva@gmail.com

G

Agriculture

Veterinary medicine

METHOD FOR DETERMINING THE SEEDING ACCURACY OF GRASS PLANT SEEDERS

Dan CUJBESCU, Iulian VOICEA, Cătălin PERSU , Alexandru IONESCU, Ana-Maria TĂBĂRAȘU, Valentin VLĂDUȚ

INMA Bucharest – ROMANIA

G

Patent Application No. U-00029 / 2023

ABSTRACT:

The invention refers to a method for determining the quality indices of the distribution devices (seeding accuracy) of the precision seeders, which carry out the sowing of one or more seeds (grains) of grass plants in equally spaced nests on equidistant rows.

DESCRIPTION:

The technical problem that the invention solves consists in the simultaneous determination of the sowing accuracy of the seed distribution devices from the seeders of creeping plants, both for the distributors (seed distribution devices) with centralized transmission and for the distribution devices with transmission individual (where they are actuated by means of the seeding wheel) and outside the optimal agricultural periods.

The method for determining the sowing precision of the seeders of creeping plants, according to the invention, solves these technical problems and removes the mentioned disadvantages, allowing the determination of the quality indices of the sowing work (sowing precision), on a stand, simultaneously for distribution devices with centralized or individual actuation, not only of some types of seed distribution devices.

COMPONENTS:

The method of determining the seeding accuracy of grass plant seeders is characterized by the fact that it is designed as a sequence of the following operations:

1. determining the physical properties of the seeds;

2. automatic determination of sowing precision by:

a) feeding the tanks of the sections with seeds;

b) entering the input parameters on the stand's operating terminal;

c) calculation of the theoretical interval between seeds per row by means of a specialized software based on the input parameters;

d) actuation of the exhauster and actuation of the motor that actuates the tested section, until the number of tested seeds passes through the transducers;

3. display on the Operating Terminal (OT) of the quality indices of the tested section (seeding accuracy).

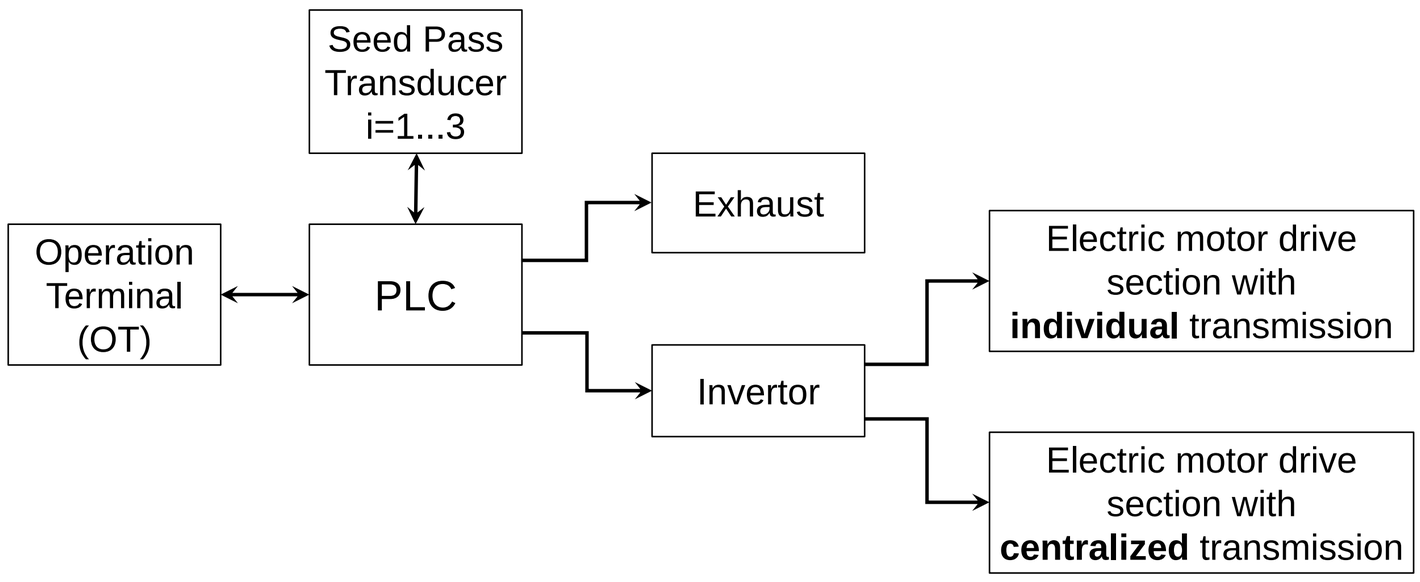


Fig.1 - The Principle of Operation Scheme

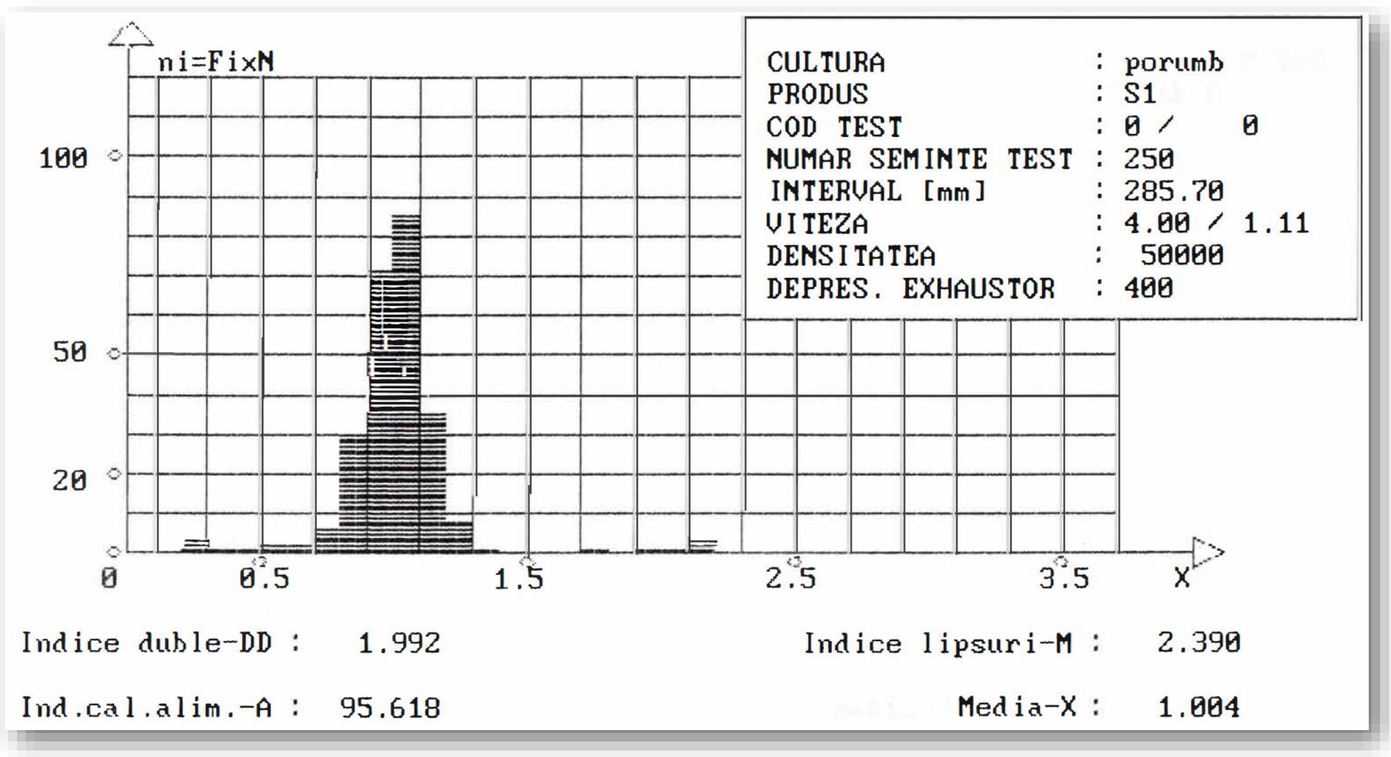


Fig.2 - Display of results on the Operating Terminal

ADVANTAGES:

The main advantages of the proposed solution are:

- ❑ - ensures the simultaneous determination of the sowing accuracy of the seed distribution devices from the seeders of grass plants, both for the distributors with centralized transmission and for the distribution devices with individual transmission;
- ❑ - ensures the simultaneous determination of the sowing precision of the seed distribution devices from the seeders of grass plants, outside of the optimal agricultural periods, too.
- ❑ - ensures the obtaining of high productions of grass plants.

NATIONAL INSTITUTE FOR RESEARCH - DEVELOPMENT OF MACHINES AND INSTALLATIONS DESIGNED FOR AGRICULTURE AND FOOD INDUSTRY - INMA

6, Ion Ionescu de la Brad Blv., Bucharest, 013813, ROMANIA

Tel.: +40-21-269.32.49 / 269.32 55, Fax: +40-21-269.32.73, E-mail: icsit@inma.ro / www.inma.ro

Programul Național pentru Dezvoltare Rurală 2014-2020

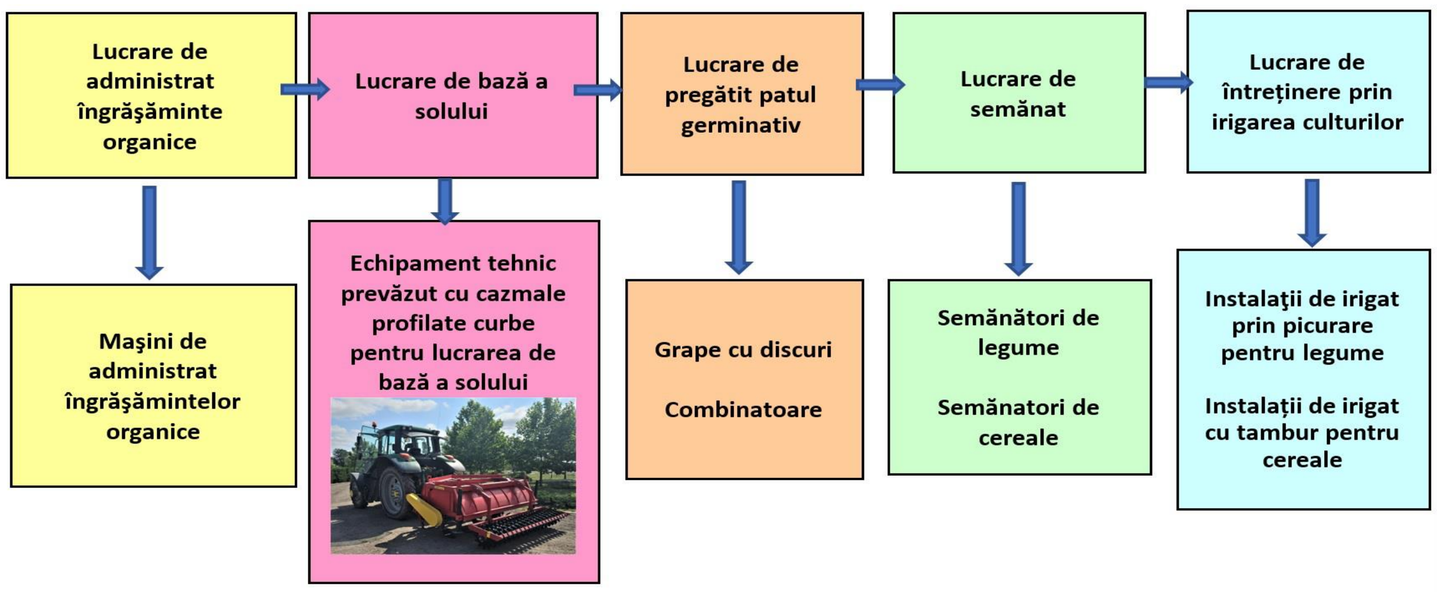
Măsura 16: Cooperare
Submăsura 16.1: „Sprijin pentru înființarea și funcționarea grupurilor operaționale (GO), pentru dezvoltarea de proiecte pilot, noi produse”
Proiect: „TEHNOLOGIE ECO-INOVATIVĂ CARE REALIZEAZĂ LUCRAREA DE BAZĂ A SOLULUI ÎN CULTURI LEGUMICOLE CU UN ECHIPAMENT TEHNIC PREVĂZUT CU CAZMALE PROFILATE CURBE”
Nr. contract de finanțare: C16100000011884200003 / 20.04.2021

Proiect finanțat cu fonduri europene nerambursabile prin Programul Național de Dezvoltare Rurală (PNDR)
Programul Național de Dezvoltare Rurală este implementat de Agenția pentru Finanțarea Investițiilor Rurale, din subordinea Ministerului Agriculturii și Dezvoltării Rurale
PNDR este finanțat de Uniunea Europeană și Guvernul României prin Fondul European Agricol pentru Dezvoltare Rurală

TEHNOLOGIE ECO-INOVATIVĂ CARE REALIZEAZĂ LUCRAREA DE BAZĂ A SOLULUI ÎN CULTURI LEGUMICOLE CU UN ECHIPAMENT TEHNIC PREVĂZUT CU CAZMALE PROFILATE CURBE

G

TEHNOLOGIE ECO-INOVATIVĂ - SCHEMA FLUXULUI TEHNOLOGIC AL LUCRĂRILOR MECANIZATE PENTRU LUCRĂRILE SOLULUI, ÎNFIINȚAREA ȘI ÎNTREȚINEREA CULTURILOR DE LEGUME / CEREALE

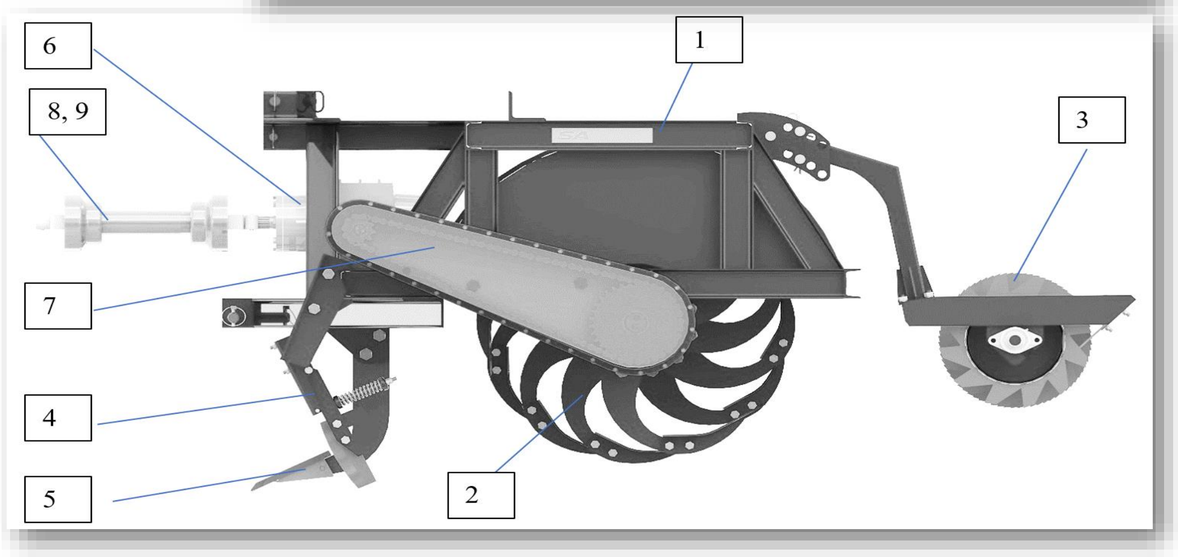


ECHIPAMENT TEHNIC PREVĂZUT CU CAZMALE PROFILATE CURBE



CARACTERISTICI TEHNICE PRINCIPALE:

- Tipul:	Purtat
- Tractorul necesar, CP	180 pe roți
- Tipul rotorului	cu cazmale profilate curbe
- Numărul de cazmale pe un disc, buc.	3, dispuse egal
- Numărul total de cazmale, buc.	21
- Distanța dintre discuri port cazmale, mm	350
- Turația la priza de putere, rot./min.	540
- Puterea reductorului, kW	132
- Raportul de transmitere al reductorului:	0,55
- Tipul transmisiei cu lanț:	16B-2
- raportul de transmitere:	0,33
- Lățimea de lucru, m	2,45
- Adâncimea maximă de lucru, mm	300
- Tipul tăvălugului	cu colți, tip Packer
- Diametru tăvălugului, mm	460
- Masa, kg	1600
- Dimensiunile de gabarit:	
- lungime, mm	2.727
- lățime, mm	2.789
- înălțime, mm	1.349



Componență:

1-cadru; 2-rotor cu cazmale asamblat; 3-tăvălug cu colți Packer;
4-ansamblu cuțite înclinate; 5-Scormonitori cu daltă;
6-Reductor conic 132KW, i=0,55; 7-Transmisie cu lanț 16B-2;
8, 9-Transmisie cardanică completă T6 071 A11 S19 A, T6 061 A11 S19 A

Operații:

- Decompactare și aerare;
- Încorporare mai mare a resturilor vegetale;
- Structurare mai bună a solului;
- Gestionare eficientă a apei;
- Intensificare a lucrării solului;
- Compactare mică;
- Omogenizare a solului;
- Posibilitatea de încorporare a fertilizanților ecologici.

Avantaje:

- Nu creează hardpan cum creează plugul și nu dăunează structurii solului;
- Decompactează și aerează pentru dezvoltarea maximă a rădăcinilor;
- Creează condiții omogene de sol prin întoarcerea continuă și amestecarea solului în timpul procesului de lucru;
- Foarte eficient pentru încorporarea composturilor, înlocuitori de sol și materialelor organice;
- Îmbunătățește drenajul, mișcarea apei și disponibilitatea nutrienților;
- Calitate ridicată a construcției și finisaj pentru a asigura durabilitate.

POTENȚIALI UTILIZATORI

Societăți legumicole mecanizate, asociații de producători legumicultori particulari, producători legumicultori individuali

Rezultatele prezentate în acest pliant au fost obținute cu sprijinul AFIR - Centrul Regional pentru Finanțarea Investițiilor Rurale 8 București – ILFOV, în cadrul unui proiect cu titlul „TEHNOLOGIE ECO-INOVATIVĂ CARE REALIZEAZĂ LUCRAREA DE BAZĂ A SOLULUI ÎN CULTURI LEGUMICOLE CU UN ECHIPAMENT TEHNIC PREVĂZUT CU CAZMALE PROFILATE CURBE”, susținut cu fonduri europene nerambursabile prin Programul Național de Dezvoltare Rurală (PNDR), Măsura 16-Cooperare, sM 16.1. Sprijin pentru înființarea și funcționarea grupurilor operaționale (GO), pentru dezvoltarea de proiecte pilot, noi produse, contract de finanțare nr. C16100000011884200003/20.04.2021.

Lider de proiect: INCD INMA, București, B-dul. Ion Ionescu de la Brad nr.6, sector 1, România CUI 2795310, reprezentat legal prin Dr. ing. VLĂDUȚ NICOLAE-VALENTIN
Partener de proiect P1: SIGMA PATENT STUDIO SRL, București, strada Bărbat Voievod nr.45A, CUI RO 21112317, J40/3260/16.02.2007, reprezentat legal prin POSTOLACHE LIVIU DAN
Partener de proiect P2: CEREALFLOR SRL, Călărași, strada București nr.139, CUI RO6787159, J51/890/1994, reprezentat legal prin LITU GEORGE
Partener de proiect P3: MORAR PAN COM SRL, com. Perișoru, jud. Călărași, CUI RO7914595, J51/719/1995, reprezentat legal prin MORARU ȘTEFAN

NATIONAL INSTITUTE FOR RESEARCH - DEVELOPMENT OF MACHINES AND INSTALLATIONS DESIGNED FOR AGRICULTURE AND FOOD INDUSTRY - INMA
6, Ion Ionescu de la Brad Blv., Bucharest, 013813, ROMANIA
Tel.: +40-21-269.32.49 / 269.32 55, Fax: +40-21-269.32.73, E-mail: icsit@inma.ro / www.inma.ro

MULTIFUNCTIONAL QUICK-FREEZING EQUIPMENT

Cristian SORICĂ, Adriana MUSCALU, Elena SORICĂ, Laurențiu VLĂDUȚOIU,
Andreea GRIGORE, Mihai CONSTANTINESCU
INMA Bucharest – ROMANIA

Patent Application No. A-00054 / 2023

G

ABSTRACT:

The invention refers to a quick-freezing equipment, of cabinet type, with discontinuous operation, using the method of freezing by contact with liquid nitrogen, in order to reduce the temperature of the products to the frozen state storage temperature.

DESCRIPTION:

The use of artificial cold in the two classic methods of refrigeration and freezing methods, offers the guarantee of preserving the taste as close to the original of perishable food, as opposed to other conservation procedures. The freezing, as a method of conservation, increases the permissible duration of food storage of more than 5...50 times compared to the preservation by refrigeration.

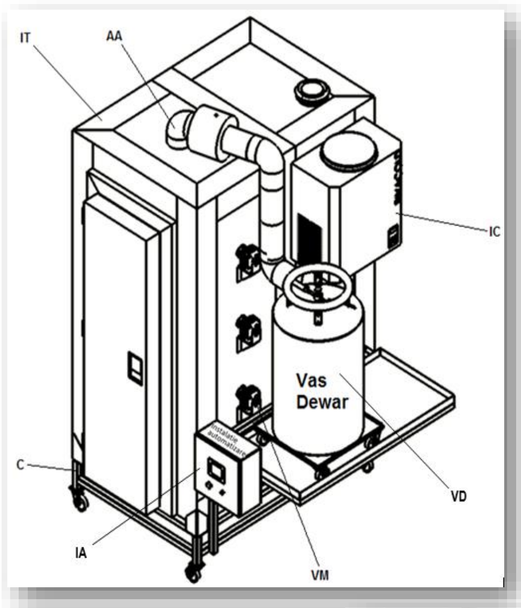
The technical problem, solved by this invention, consists in carrying out rapid freezing equipment, cabinet type, with discontinuous operation, using the method of freezing with liquid nitrogen, which ensures a low liquid nitrogen consumption, allows the optimal use of its refrigeration capacity, ensures a low energy consumption, improves the uniformity of the rapid freezing process and increases the quality of frozen products.

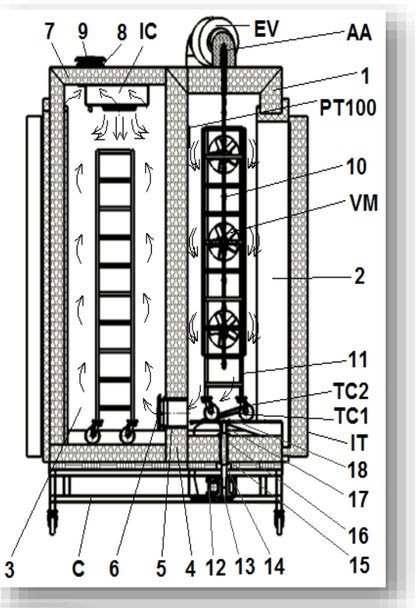
COMPONENTS:

The multifunctional equipment of rapid freezing, according to the invention, is composed of the support frame (**C**), the double -insulated (**IT**) enclosure, the mechanical ventilation (**VM**), the liquid nitrogen supply (**AA**), the freezing installation with mechanical vapor compression (**IC**), the Dewar vessel (**VD**) with purge head and automation installation (**IA**).

The double insulated enclosure (**IT**) is made by combining several thermal polyurethane insulation panels (**1**), in the form of a construction made up of two enclosures separated by a common thermal insulation wall, respectively the rapid freezing chamber (**2**) provided with an access door equipped with a defrost resistance accompanied by a temperature sensor and a proximity sensor, and the adjacent chamber (**3**), for pre-freezing / temporary storage in a freeze state, provided with an access door equipped with a defrost resistance, which communicates with each other through a pipe (**5**) that crosses the common wall (**4**), provided with an evacuation valve (**6**), having the role of favouring obtaining a slight overpressure in the fast-freezing chamber (**2**) in order to avoid a rapid evacuation to the adjacent chamber (**3**) of the nitrogen vapours that have not yet been used at maximum efficiency, which are still reused for the additional cooling of the adjacent chamber (**3**) and the reduction of the thermal load of the classic refrigeration installation (**IC**) that serves it. Subsequently, after "exhaustion", the nitrogen vapours are evacuated outside the enclosure (**IT**) through a pipe (**8**) crossing the ceiling (**7**) of the adjacent chamber (**3**), provided with an exhaust valve (**9**).

The liquid nitrogen supply (**AA**) is made of several stainless-steel pipes, interconnected through the appropriate, unmarked fittings, an electrovalve (**EV**), specially intended for cryogenic applications, several nozzles (**10**) with a flat distribution, mounted through some unmarked angle coupling elements, which allow the adjustment of the direction of purification of the cooling agent on the target surface, a thermal insulation on the outside, made by means of polyurethane foam shells, plated on the outside with aluminum foil (unmarked on the drawing), and a thermal insulation inside made using a thermal insulation material designed for the refrigeration installations (unmarked on the drawing).











The automation system has a temperature thermocouple sensor (**TC1**), to measure the temperature in the center of the product, a temperature thermocouple sensor (**TC2**), for measuring the temperature on the product surface, a temperature sensor of heat-resistance type (**PT100**), to measure the temperature inside the freezing enclosure, a power source of 24V DC, a touchscreen operating terminal, a Programmable Logical Controller (**PLC**) provided with special modules for adapting signals from thermocouple sensors, respectively the heat-resistance, two bipolar fuses, a START-STOP switch, a safety stop switch, several electromagnetic relays, a printed control box, several seal-type jacks and related, not-depicted, electrical cables.

ADVANTAGES:

- ❑ Optimally capitalizes the refrigeration capacity of the liquid nitrogen due to the use of both the latent heat of vaporization at atmospheric pressure of the liquid nitrogen and the sensitive heat of the vapors;
- ❑ Reduces the energy consumption as a result of reusing cold nitrogen vapors to reduce the thermal load of the classic refrigeration aggregate serving the adjacent room for temporary pre-retention / storage;
- ❑ Improves the uniformity of the fast-freezing process due to an homogeneous exposure to the liquid nitrogen jets and to an improved distribution;
- ❑ Reduces the consumption of liquid nitrogen due to the implementation of an automatic working process algorithm, which does not allow the purje of the liquid nitrogen and the mobilization of the atmosphere inside the fast- freezing chamber to take place simultaneously;
- ❑ Increases the quality of the fast-frozen products due to the implementation within the automatic management algorithm, of a procedure that allows it to pass as soon as possible over the maximum crystallization phase of the aqueous solution contained in the product.

ACKNOWLEDGEMENT:

This work was financed by the Ministry of Research and Innovation through Program 1 - Development of the National Research-Development System, sub-programme: 1.2 - Institutional Performance, the project "*Institutional development of INMA Bucharest in order to increase its performance in the field of bioeconomy*", contract No. 1PFE / 30.12.2021 - (PFE 1296 / 17.12.2021)

NATIONAL INSTITUTE FOR RESEARCH - DEVELOPMENT OF MACHINES AND INSTALLATIONS DESIGNED FOR AGRICULTURE AND FOOD INDUSTRY - INMA

6, Ion Ionescu de la Brad Blv., Bucharest, 013813, ROMANIA

Tel.: +40-21-269.32.49 / 269.32 55, Fax: +40-21-269.32.73, E-mail: icsit@inma.ro / www.inma.ro

AUTOMATED INSTALLATION FOR THE COLLECTION OF ATMOSFERIC HUMIDITY

Dragoș MANEA, Eugen MARIN, Marinela MATEESCU, Gabriel GHEORGHE,
Carmen VASILACHI, Florin DUMITRU
INMA Bucharest – ROMANIA

Patent Application No. A-00713 / 2022

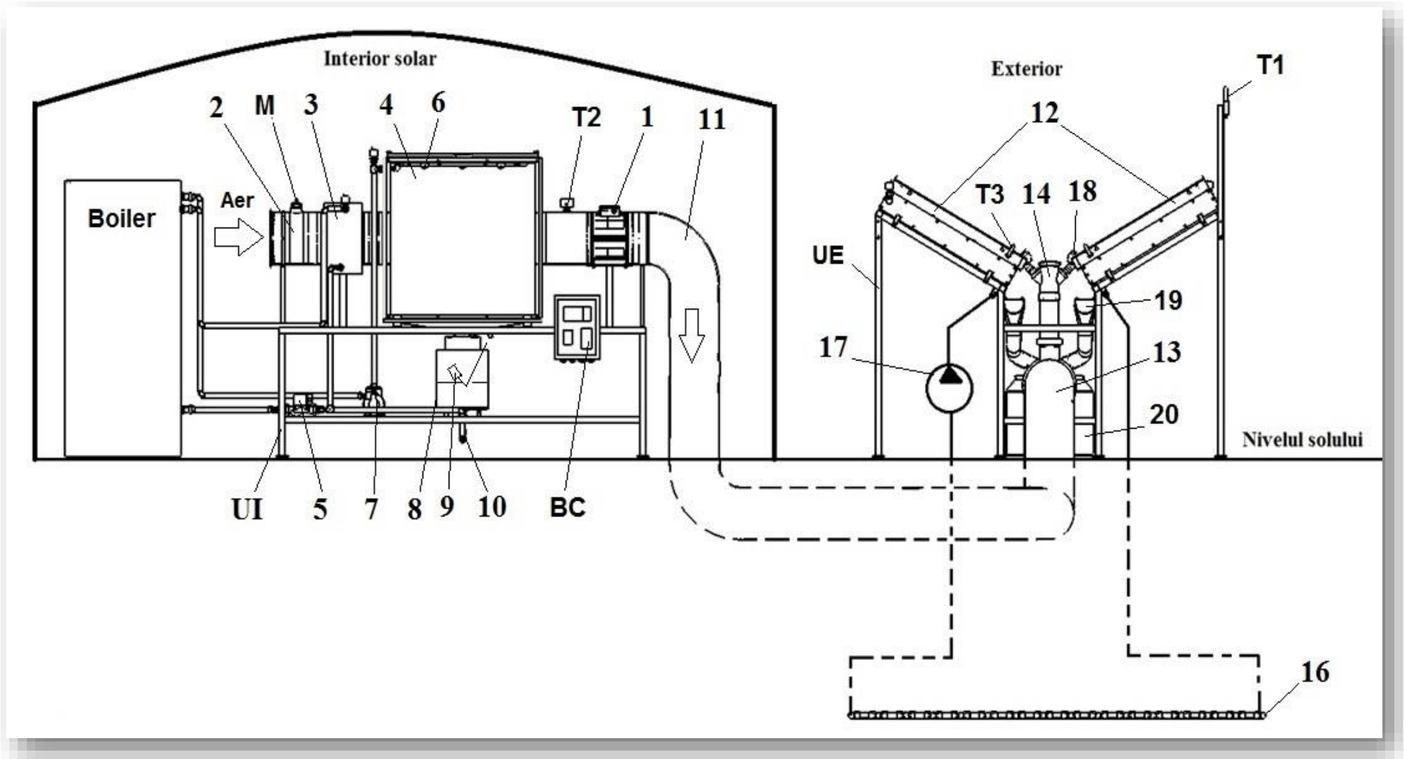
G

ABSTRACT:

The invention refers to an automated installation for the collection of atmospheric humidity, intended to obtain an additional amount of water for the irrigation of vegetable crops grown in greenhouses or solariums, monitoring and controlling the process of collecting atmospheric humidity in real time and with a low energy consumption.

COMPONENTS:

The automated installation for collecting atmospheric humidity, according to the invention, is made up of a unit (**UI**) that is located inside a vegetable greenhouse, composed of a pipe fan (**1**), with variable flow, a flap (**2**) for air-flow regulation, operated by a servo motor (**M**), a battery (**3**) for heating with hot water, a chamber (**4**) for humidification, a pump (**5**) for recirculation, some nozzles (**6**) for spraying hot water in the form of fog, a pressure pump (**7**), a tank (**8**), the unit (**UI**) being connected underground by means of a flexible tube (**11**) insulated with the unit (**UE**), which is located outside in the vicinity of the solar, composed of two collector walls (**12**) mounted in the shape of the letter "**V**" on a frame and placed symmetrically left-right with respect to a horizontal tube (**13**), provided with some vertical tubes (**14**), each vertical tube having at the top two branches oriented towards the collector walls (**12**), in each branch being mounted some bends (**18**) that can rotate around their own axes, to adjust the exit angle (**α**) of the air jets, in relation to the surface of the collector walls (**12**), at the side lower part of the collector walls (**12**) with gutters (**19**) that collect the water drained from the surface of the collector walls and direct it to the collection tank (**20**), a control block (**BC**) that acquires electrical signal type information from some humidity and temperature transducers (**T1**), (**T2**), (**T3**) and in which a work process monitoring and control software is running, in which combinations of air temperature and air humidity reference values are predefined, corresponding to the optimal conditions for moisture from the atmosphere to condense on the surface of the collector walls and which work according to a logical algorithm.





Automatic Control System



Indoor air heating and humidification unit



Outdoor unit or manifold

ADVANTAGES:

- ❑ - the installation ensures real-time monitoring and control of the atmospheric moisture collection process;
- ❑ - uses equipment with low electricity consumption (e.g. recirculation pumps, duct fan, servo motor);
- ❑ - uses chilled water in a coil of copper pipes located underground to cool the surface of the condensing elements (collector walls);
- ❑ - it is simple from a constructive point of view.

ACKNOWLEDGEMENT:

This work was financed by a subsidy of the Ministry of Research, Innovation and Digitization from Romania, through the *NUCLEU* Program, contract no. 5N/07.02.2019, project no. PN 19 10 02 01: "*Development of innovative technologies within smart farms*".

NATIONAL INSTITUTE FOR RESEARCH - DEVELOPMENT OF MACHINES AND INSTALLATIONS DESIGNED FOR AGRICULTURE AND FOOD INDUSTRY - INMA
6, Ion Ionescu de la Brad Blv., Bucharest, 013813, ROMANIA
Tel.: +40-21-269.32.49 / 269.32 55, Fax: +40-21-269.32.73, E-mail: icsit@inma.ro / www.inma.ro

METHOD FOR THE PRODUCTION STIMULATION IN ORGANIC FARMS THROUGH ORGANO-MINERAL FERTILIZATION OF THE AGRICULTURAL CROPS

Eugen MARIN, Marinela MATEESCU, Dragoș MANEA, Gabriel GHEORGHE, Carmen BĂLȚATU
INMA Bucharest – ROMANIA

Patent Application No. A-00707 / 2022

G

ABSTRACT:

The invention refers to a method for the production stimulation in organic farms through organo-mineral fertilization of agricultural crops, used in agriculture for the distribution and incorporation of diatomite microgranules in the soil at the level of the root system to provide a balanced and sufficient nutrition with substances based on silicon, through which production increases compared to the classic cultivation variant are obtained between 15...20% as well as a sustainable improvement of soil fertility.

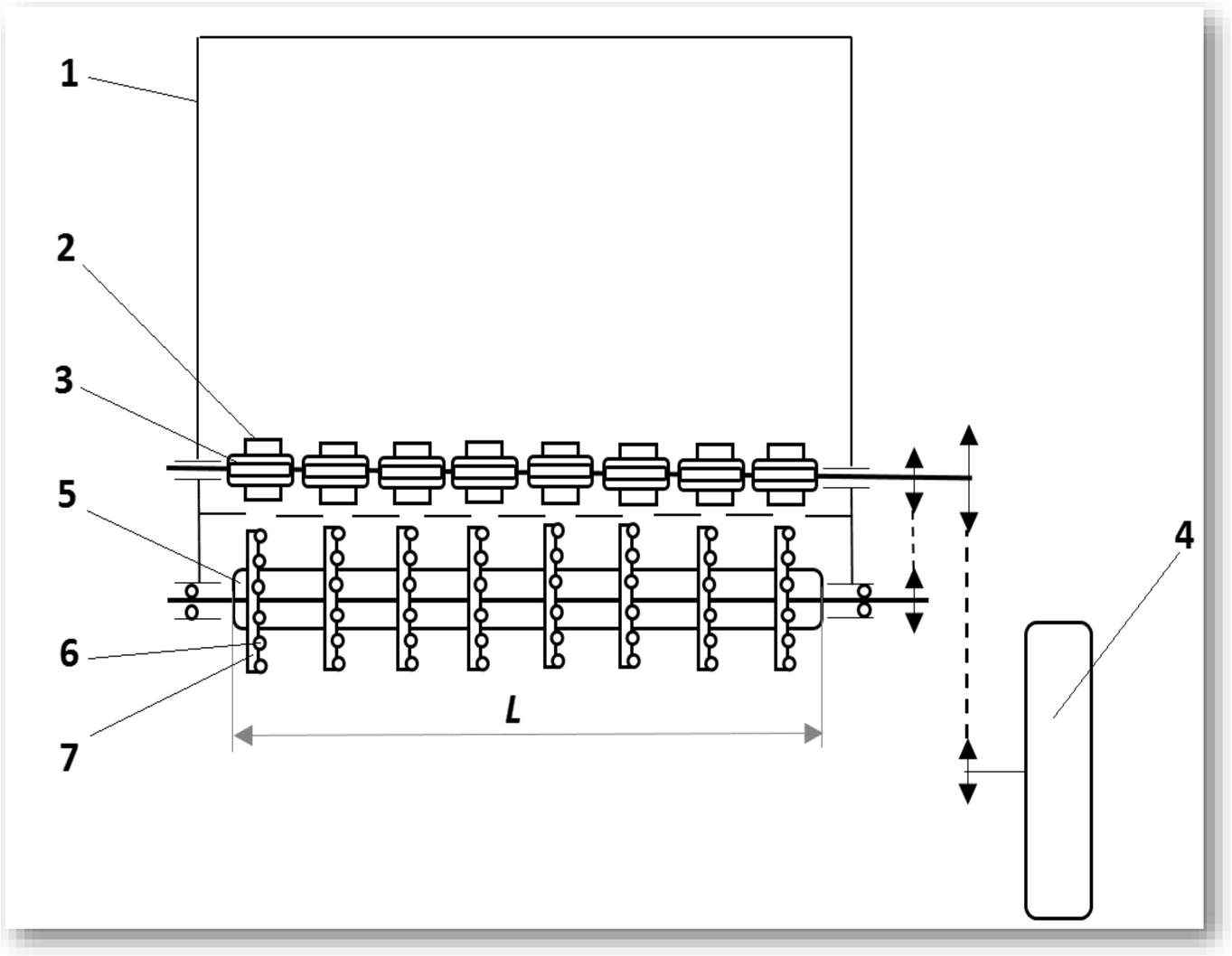
Thus, cereal plants will be supplied with nutrients from unpolluted materials, in order to obtain products of good nutritional quality adapted to the requirements of ecological agriculture.

DOSAGE → **Application through dustless spreading on the working width** → **Incorporation into soil** → **Mechanical soil aeration**

COMPONENTS:

The technical problem of applying diatomite microgranules that the invention solves consists in the development of a method which, in the technological itinerary, uses a technical equipment that performs in a single pass the application, the incorporation of diatomite microgranules into the soil and the mechanical aeration of the soil.

The method of stimulating production in ecological farms through organo-mineral fertilization of agricultural crops, according to the invention, consists in the fact that the diatomite microgranules in the box (**1**), having the length equal to the working width (**L**), are scattered in a quantity regulated with the help of the slats (**2**) of the dosing and distribution devices with grooved cylinders (**3**), which are operated from the support and drive wheel (**4**), on the special rotor (**5**), equipped with "spoon" teeth (**6**) mounted on rotating discs (**7**), which incorporate them evenly into the soil and at the same time perform mechanical aeration.



Schematic diagram of the technical equipment that performs the application by dustless spreading on the working width at the same time as the incorporation of diatomite microgranules into the soil and the mechanical aeration of the soil.

ADVANTAGES:

The main advantages of the proposed solution are:

- ❑ - determines the conservation of moisture in the plowing horizon;
- ❑ - favours the reduction of humidity and its flow on the production unit;
- ❑ - it causes yield increases between 15-20% compared to the classic cultivation option;
- ❑ - leads to sustainable improvement of soil fertility.

NATIONAL INSTITUTE FOR RESEARCH - DEVELOPMENT OF MACHINES AND INSTALLATIONS DESIGNED FOR AGRICULTURE AND FOOD INDUSTRY - INMA
6, Ion Ionescu de la Brad Blv., Bucharest, 013813, ROMANIA
Tel.: +40-21-269.32.49 / 269.32 55, Fax: +40-21-269.32.73, E-mail: icsit@inma.ro / www.inma.ro

METHOD FOR MONITORING AND COMBATING AGRICULTURAL LAND COMPACTNESS

Eugen MARIN, Dragoș MANEA, Marinela MATEESCU, Gabriel GHEORGHE, Carmen BĂLȚATU
INMA Bucharest - ROMANIA

Patent Application No. A-00691 / 2022

G

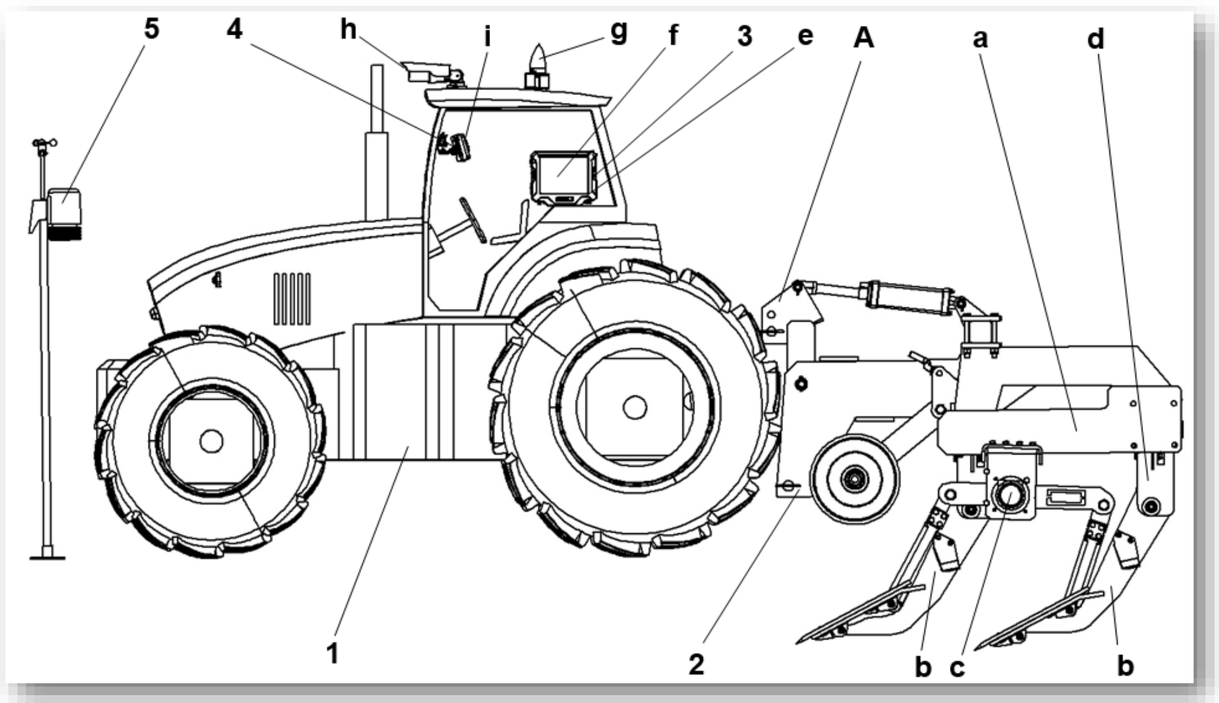
ABSTRACT:

The invention refers to a method for monitoring and combating the compaction state used in agriculture to improve the fertility and soil production capacity. The method leads to achieving rapid indications on the state of soil compaction, to establish the optimal variant regarding the measures taken in order to restore the structural architecture of the soil within the normal limits throughout its profile and to ensure a precise movement of the equipment on the ground for in-depth decompaction of the soil, thus eliminating overlapping errors.

COMPONENTS:

The method for monitoring and combating the state of compaction of agricultural land, according to the invention, is that it is composed of a decompaction subsystem (**A**) consisting of a towing vehicle (such as a tractor) in the aggregate with a machine for soil decompaction (**2**) consisting of a frame (**a**) with some active organs (**b**) of chisel type with vertical knife, driven by a vibrator system (**c**), and one of the active organs (**b**) of chisel type with vertical knife has, at the upper end, an element (**d**) for the direct measurement of the traction strength and a subsystem (**B**) for analysis and control of the direction of travel, composed of an electronic unit (**3**) for data procurement and processing, which runs a dedicated software (**e**) for the analysis, interpretation and display of the penetration force level, on a monitor (**f**), a GPS guiding system (**4**), consisting of an external antenna (**g**), a video camera (**h**) with night vision and a console receiver (**i**) and a portable weather station (**5**) for providing meteorological parameters.

As soon as the agrometeorological conditions and the state of soil compaction are met and displayed on the monitor (**f**), the human operator starts the vibrating system (**c**) of the working organ (**b**) of chisel type with vertical knife, from the soil decompaction equipment (**2**), in order to give the possibility of improving the decompaction of the soil and starts the work. In order to avoid overlaps and replacing the ground, the GPS guiding system (**4**) is also activated.



General location of the components



WiFi Meteo Station



Matrix Pro 570GS console for manual guidance

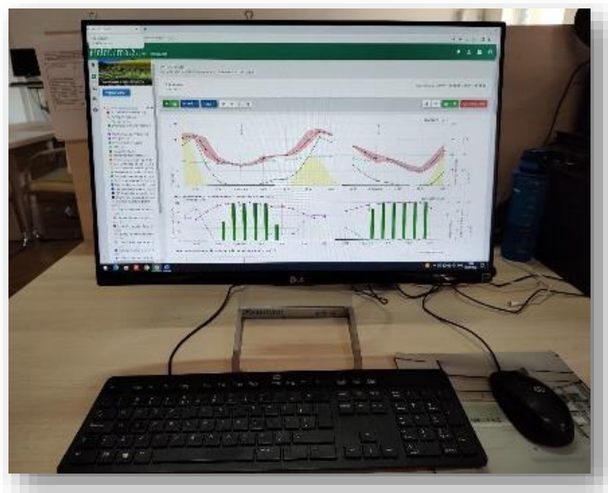
ADVANTAGES:

By applying the invention the following advantages are obtained:

- ❑ fast monitoring of soil compaction;
- ❑ reducing traction resistance and, implicitly, the fuel consumption;
- ❑ improve soil decompaction by:
  - increasing the ability to storage and keep water in the soil;
  - facilitating the roots of the plants to the nutrients needed in the soil, so that they can absorb them adequately;
  - increased organic matter and nutrients in the soil.



Antenna RXA-30 + RealView Camera



The alerting software for precipitation thresholds on the experimental field at INMA Bucharest.

NATIONAL INSTITUTE FOR RESEARCH - DEVELOPMENT OF MACHINES AND INSTALLATIONS DESIGNED FOR AGRICULTURE AND FOOD INDUSTRY - INMA
6, Ion Ionescu de la Brad Blv., Bucharest, 013813, ROMANIA
Tel.: +40-21-269.32.49 / 269.32 55, Fax: +40-21-269.32.73, E-mail: icsit@inma.ro / www.inma.ro

METHOD FOR COMPACTING BIOMASS IN A CLOSED CYLINDRICAL MOLD

Iuliana GĂGEANU, Cătălin PERSU, Dan CUJBESCU, Gabriel GHEORGHE, Dragoș DUMITRU, Dragoș ANGHELACHE, Ana-Maria TĂBĂRAȘU
INMA Bucharest – ROMANIA

Patent Application No. A-00511 / 2022

G

ABSTRACT:

The invention refers to a method for compacting the biomass in a closed cylindrical mold, with subsequent discharge of the compacted product at the bottom.

DESCRIPTION:

The existing methods have a major disadvantage, namely the need to pre-process the biomass before initiating the process (fine shredding, drying), the need to use binders, but also the high energy consumption needed to compact the biomass. Another major disadvantage of the current methods is that they are generally based on the need for a high temperature for the process and to maintain the integrity of the compacted products after the process is completed.

The technical problem solved by the invention consists in achieving a method for compacting the lignocellulosic and agricultural biomass, including biomass mixtures, thus producing solid biofuels, by compacting the minced biomass to predetermined values, having increased the control of the compaction mechanism, depending on the type of compacted material.

The method for compacting biomass in the closed cylindrical mold, according to the invention, solves these technical problems and removes the mentioned disadvantages, in that it allows the use not only of the materials from the lignocellulosic or agricultural biomass as such, but also of the mixtures of materials in biomass, without the need. The shredding to very small size of biomass, no biomass particles are required, no high temperatures are required to carry out the process, thus reducing the costs of obtaining compressed products.

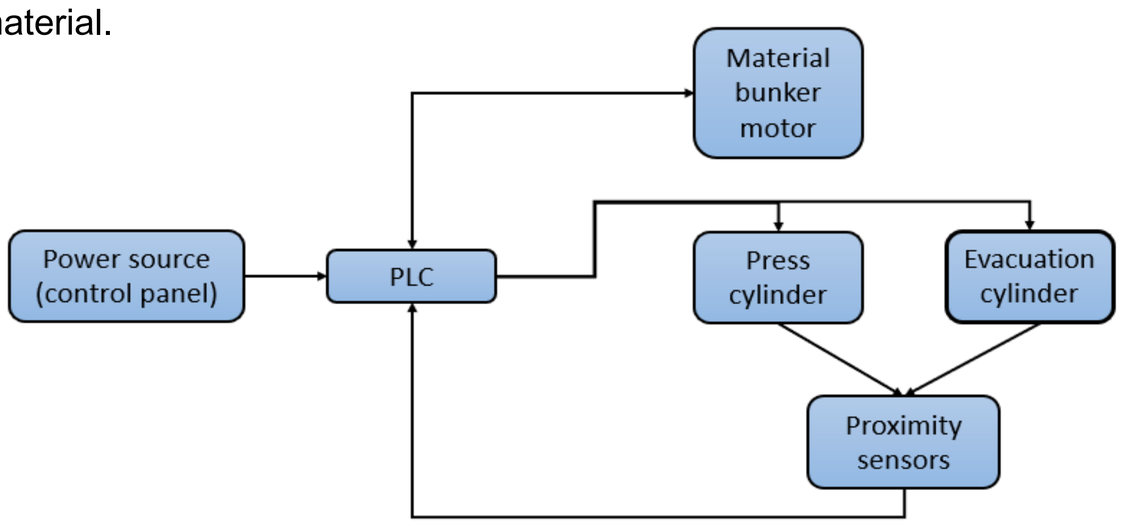


Fig.1 – Operating Principle – Process Diagram

COMPONENTS:

The method for compacting the biomass in the closed cylindrical mold involves the submission of biomass at high pressures inside a closed cylindrical mold and forcing it to considerably reduce its volume. The method is intended for compressing biomass inside the mold by using a pressing cylinder, hydraulically or pneumatic. Emptying the mold by the resulting compressed product is also provided to be done through an automatic actuating cylinder. The flow of material that enters the compaction mold is controlled differently depending on the type of material that enters the compaction process, but also on the desired thickness for the obtained product. The compression of biomass is achieved by the vertical pressing of the biomass in a closed cylindrical mold at the bottom until it reaches predefined values (pressing time, compacted product thickness). The evacuation of the product is done at the bottom of the mold, by opening the mold and pushing the product vertically until it falls off of the mold.

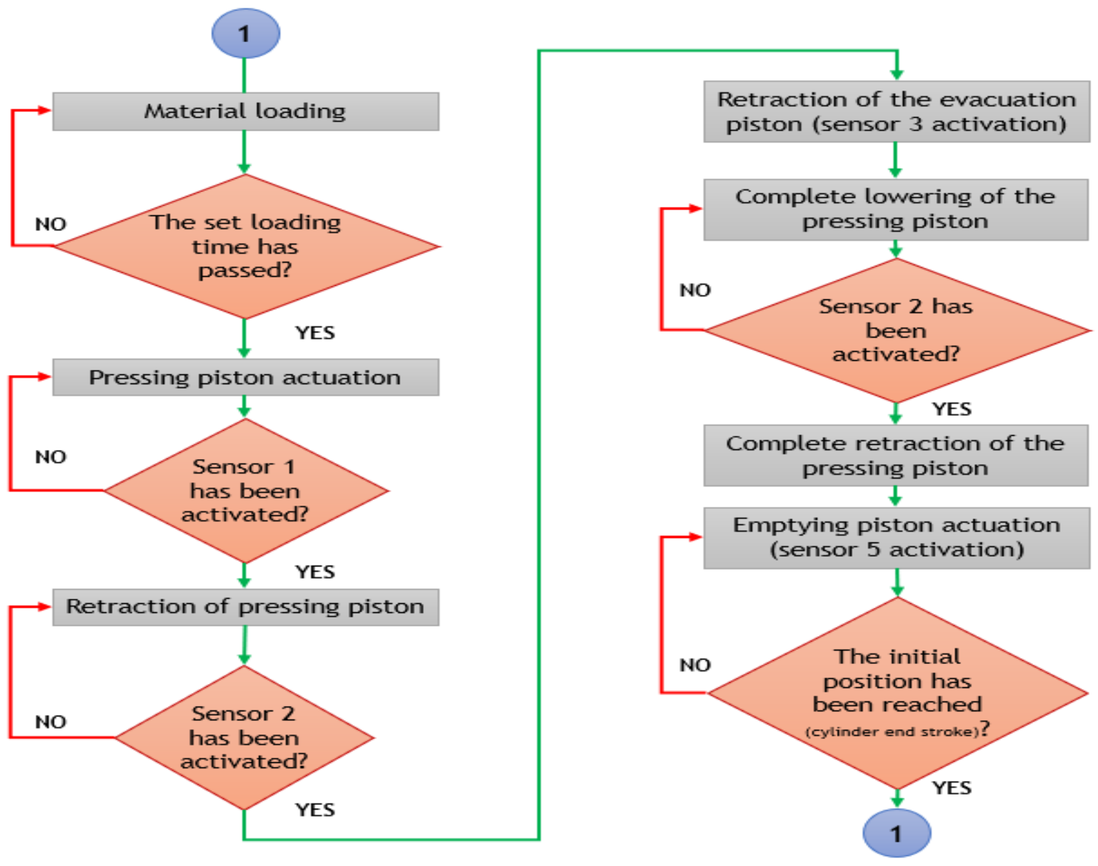


Fig. 2 - Logical diagram for biomass compaction process in a closed cylindrical mold

ADVANTAGES:

- ❑ -it has a low electricity consumption;
- ❑ -it offers the facility of modifying the control parameters according to the material used;
- ❑ -ensures a quick and easy compaction, without the need to use the binders or the application of high temperatures.

ACKNOWLEDGEMENT:

This work was supported by a grant of the Ministry of Agriculture and Rural Development in Romania, through the ADER program, project "*Technologies for the superior valorization of the lignocellulosic waste from horticulture*" Contract no. ADER 25.4.2/27.09.2019, A.A. 2 / 20.04.2021 and by the Ministry of Research, Innovation and Digitalization through Program 1 - Development of the national research -development system, subprogram 1.2 - institutional performance - projects for financing excellence in the CDI, contract no. 1PFE/30.12.2021.

NATIONAL INSTITUTE FOR RESEARCH - DEVELOPMENT OF MACHINES AND INSTALLATIONS DESIGNED FOR AGRICULTURE AND FOOD INDUSTRY - INMA
6, Ion Ionescu de la Brad Blv., Bucharest, 013813, ROMANIA
Tel.: +40-21-269.32.49 / 269.32 55, Fax: +40-21-269.32.73, E-mail: icsit@inma.ro / www.inma.ro

INTELLIGENT GREENHOUSE ENVIRONMENT MONITORING SYSTEM

Dan CUJBESCU, Iulian VOICEA, Cătălin PERSU, Iulia GĂGEANU,
Mihai MATACHE, Gabriel GHEORGHE, Dragoș DUMITRU
INMA Bucharest - ROMANIA

Patent Application No. A-00238 / 2022

G

ABSTRACT:

The invention refers to a system for monitoring environmental conditions in protected spaces of the smart greenhouse type, in order to make their management process more efficient, as well as to increase the quality of cultivated vegetables, through the strict control of the greenhouse microclimate.

DESCRIPTION:

Changes in temperature, humidity, light and other microclimate conditions can have a profound effect on the productivity and quality of plant production.

By monitoring environmental conditions, smart greenhouses are able to self-regulate their microclimate, being able to send information via mobile phone regarding the status of the monitored parameters, which can be stored long-term in databases.

The technical problem that the invention solves consists in creating a system for monitoring the environmental conditions in an intelligent greenhouse, without human intervention, and which can be used at any stage of plant development, by managing the microclimate factors in the greenhouses, being able to simultaneous maintain the main set of microclimate factors, i.e. temperature, relative humidity and carbon dioxide concentration, close to the preset reference values.

COMPONENTS:

The proposed system, according to the invention, has the following components:

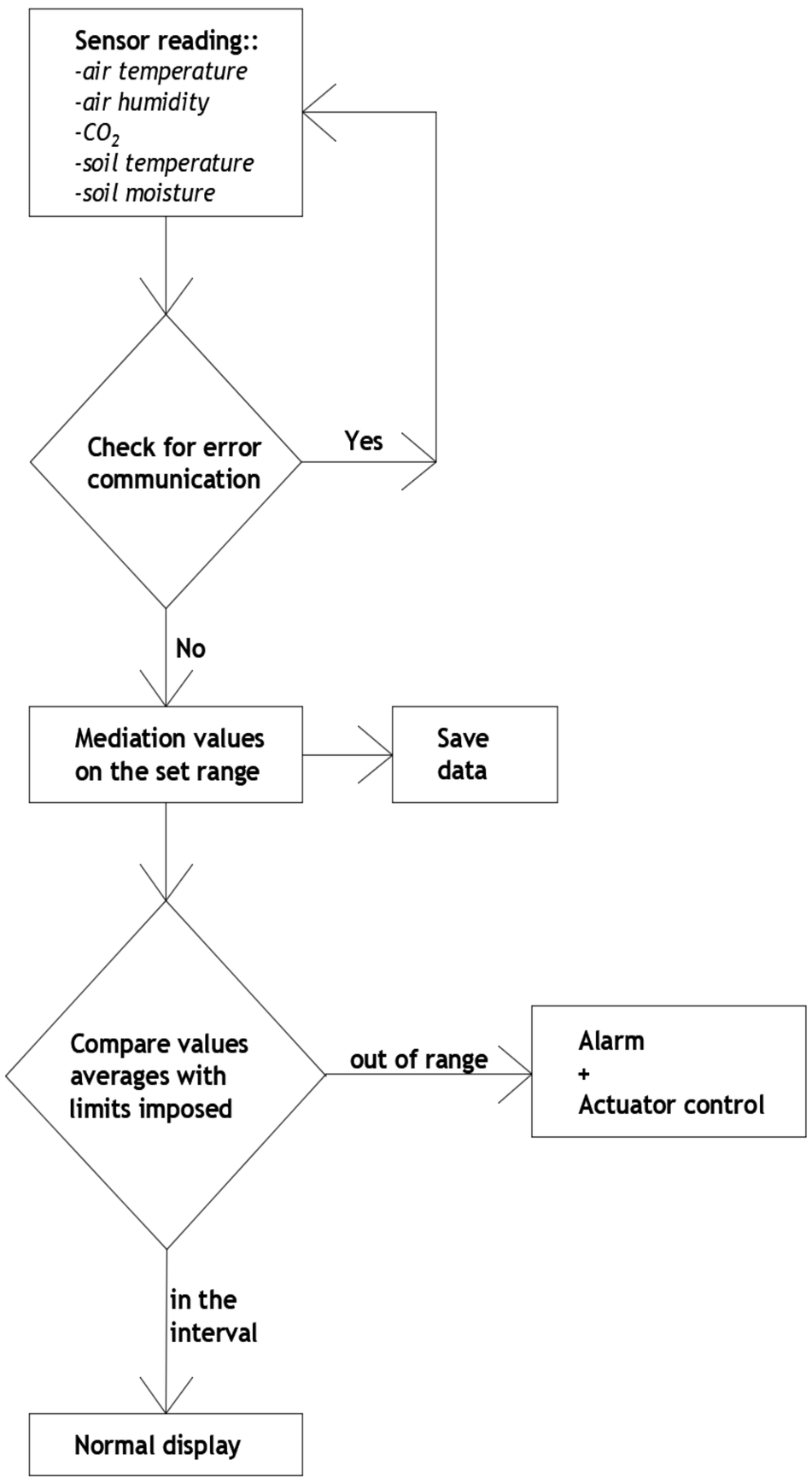
- 2 sensors for temperature monitoring;
- 1 sensor for monitoring relative humidity;
- 1 sensor for monitoring the concentration of carbon dioxide;
- 3 sensors for monitoring the soil temperature (at ground level, at 10 and 20 cm depth, respectively);
- 1 sensor for monitoring the humidity inside the smart greenhouse.

The real-time monitoring application allows the display of measured values in real time, directly on the screen of a touchscreen used as a graphic interface.

The application will be developed in the Melsoft GTDesigner3 (GOT2000) programming environment, after which it will be loaded into the operating terminal.

Each sensor will be allocated a Real data register, which allows displaying measurements with one decimal place. Also, these registers will be linked to the data saving function (logging) so that their evolution over time can be displayed. These registers correspond to the registers allocated in the PLC, for saving the data of each individual sensor being transmitted to the operating terminal on the dedicated communication bus.

Each page will have designated switch buttons that allow moving from one page to another as well as returning to the start page.



Logical diagram of the condition monitoring system in a smart greenhouse

CONCLUSIONS / ADVANTAGES:

The changes in temperature, humidity, light and other microclimate conditions can have a profound effect on the productivity and quality of plant production.

Therefore, the advantage of using this system is the continuous monitoring of many environmental variables simultaneously, the farmer being able to better understand how growing conditions fluctuate and react to those changes to maximize efficiency and minimize negative effects.

ACKNOWLEDGEMENT:

This work was supported by the Ministry of Agriculture and Rural Development, through the project entitled: "*Smart technologies and equipment to increase productivity in protected areas*" - ADER 25.2.1 - Contract no. 25.2.1 / 27.09.2019.

NATIONAL INSTITUTE FOR RESEARCH - DEVELOPMENT OF MACHINES AND INSTALLATIONS DESIGNED FOR AGRICULTURE AND FOOD INDUSTRY - INMA

6, Ion Ionescu de la Brad Blv., Bucharest, 013813, ROMANIA

Tel.: +40-21-269.32.49 / 269.32 55, Fax: +40-21-269.32.73, E-mail: icsit@inma.ro / www.inma.ro

INSTALLATION FOR TABLETING LIGNO-CELLULOSIC WASTE

Iuliana GĂGEANU[(1)], Mihai MATACHE[(1)], Cătălin PERSU[(1)], Dan CUJBESCU[(1)], Iulian VOICEA[(1)],
Valentin VLĂDUȚ[(1)], Lucian-Ionel CIOCA[(2)], Victoria-Larisa IVAȘCU[(3)]
[(1)]INMA Bucharest, [(2)]University "Lucian Blaga" Sibiu, [(3)]University "Politehnica" Timișoara

Patent Application No. A-00206 / 2022

G

ABSTRACT:

The invention relates to a plant for compacting and tableting ligno-cellulosic waste from horticulture, intended for their utilization as solid biofuel or as a raw material in the production of heat or smoke to protect vineyards and orchards against frosts or late spring frosts. The tableting process involves compacting the shredded biomass under high pressure inside a closed-end die and forcing it to greatly reduce its volume.

DESCRIPTION:

The installation for tableting lignocellulosic waste is intended for the production of high quality solid biofuels, by compacting the grinded biomass to predetermined values, under the conditions of a control of the compaction mechanism appropriate to the characteristics of the biomass material used.

The feed hopper (**3**) is filled with the grinded biomass material in the dry state and the process starts automatically by pressing the ON / OFF button in the automation box (**10**). The auger conveyor takes material from the hopper and fills the die (**2**). The compaction cylinder piston (**c**) descends inside the die and presses the material. When the preset parameters are reached, the piston of the compaction cylinder stops advancing, retracts to a predetermined position, and the emptying cylinder (**6**) acting on the counter-plate (**5**) pulls the latter until the die reaches the open position, a point where the compaction cylinder piston lowers again until the tablet is removed from the die. When the tablet falls out of the die, the piston of the compaction cylinder withdraws completely from the die, and the emptying cylinder, by actuating the counter-plate, pushes it into the closed position of the die, while also performing the complete evacuation of the tablet.

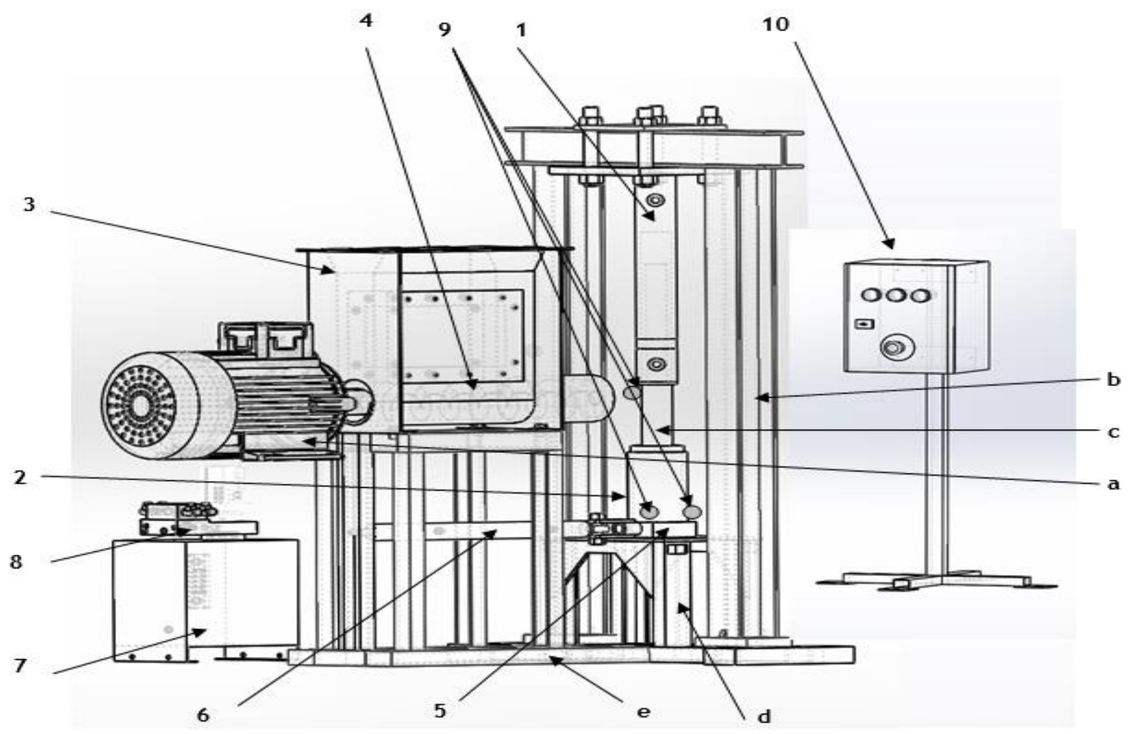
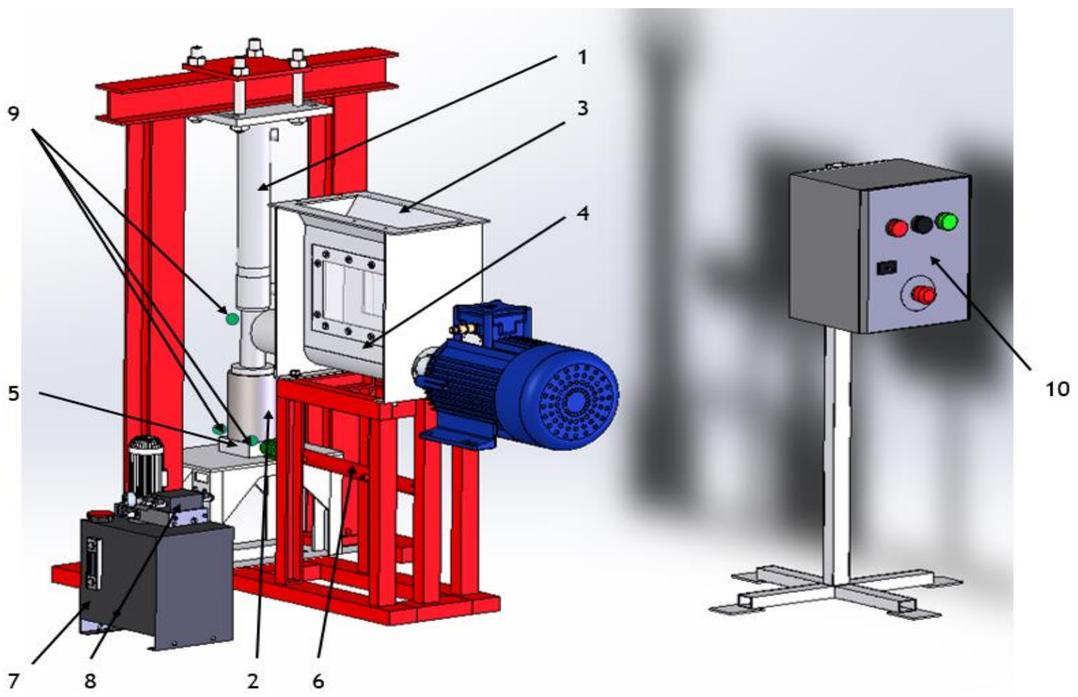


Fig. 1

(1) - Installation for the tableting of lignocellulosic waste – main view

COMPONENTS:

The installation for tableting lignocellulosic waste consists of the compaction die (**2**) mounted on frame (**d**), the compaction assembly (**1**) mounted on frame (**b**), with the hydraulic compaction cylinder (**c**) acting on the biomass forcing it reduce the volume, the feed hopper (**3**) with the motor (**a**) mounted on the frame (**e**) and the auger conveyor (**4**) which feeds the die with material, the die closing plate (**5**), the hydraulic cylinder (**6**) for discharging the table by actuating the counter-plate in the closed-open position, the hydraulic unit (**7**) which feeds and actuates the two cylinders, the hydraulic distributors (**8**), the proximity sensors (**9**) which allow monitoring and controlling the movement of the cylinders during the compaction process and the automation box (**10**).



(2) - Installation for the tableting of lignocellulosic waste - tridimensional view

ADVANTAGES:

- ❑ high quality compaction, without the use of binders or the application of high temperatures;
- ❑ reduced costs of transporting, storing and handling lignocellulosic waste;
- ❑ low electricity consumption;
- ❑ easy operation and maintenance.

ACKNOWLEDGEMENT:

This work was supported by a grant from the Romanian Ministry of Agriculture and Rural Development, through the ADER Program, project "Technologies for the superior valorization of lignocellulosic waste from horticulture" contract no. ADER 25.4.2/27.09.2019, A.A. 2 / 20.04.2021 and by the Ministry of Research, Innovation and Digitization through Program 1 - Development of the national research and development system, Subprogram 1.2 - Institutional performance - Projects for financing excellence in R&D, Contract no. 1PFE/30.12.2021.

NATIONAL INSTITUTE FOR RESEARCH - DEVELOPMENT OF MACHINES AND INSTALLATIONS DESIGNED FOR AGRICULTURE AND FOOD INDUSTRY - INMA

6, Ion Ionescu de la Brad Blv., Bucharest, 013813, ROMANIA

Tel.: +40-21-269.32.49 / 269.32 55, Fax: +40-21-269.32.73, E-mail: icsit@inma.ro / www.inma.ro

INDOOR POLYCULTURE FISH FARMING SYSTEM

Iulian VOICEA, Mihai MATACHE, Cătălin PERSU, Dan CUJBESCU, Iuliana GĂGEANU
INMA Bucharest - Romania

Patent Application No. A-00175 / 2022

G

ABSTRACT:

The invention relates to a system of indoor breeding of fish material in polyculture, in order to achieve the growth of fish for consumption in a controlled environment with a symbiosis between common carp and Asian carp such as bighead carp, silver carp, Grass carp, with higher growth yields compared to current growing systems made in tanks with permanent recirculation and a high technological water supply.

DESCRIPTION:

The system consists of a concrete basin with a width of 14.4 m, a length of 57 m and a depth of 4.6 m. The waterproofing of the reinforced concrete was ensured by applying a binder specific for fish basins that do not affect the good growth and development of the fish species and aquatic plants. The feeding system consists of 4 feeders with auger and feed disperser for pelletized feed with a diameter between 2-10 mm, these feeders being able to ensure automated feeding by sequential programming of food dispersion on the surface of the basin. The aeration - oxygenation system of the fish water in the basin consists of 3 aerators with submersible motor and directed water jet. Also, a system for air diffusion in the water was made by means of a HDPE type pipe for water, connected to 2 aerators. The 3 surface aerators are of the floating type moving the water in the form of a jet, thus producing a good water circulation and an increased oxygenation. The water jet is directed, forming currents and thus achieving optimal oxygenation.

The monitoring of the quality of the water in the basin with polyculture fish farming system is done through specific temperature and pH sensors - Sensorex 8000 series, compact and stationary monitoring system for oxygen determination and control - Aqua Control One with Dryden probe plus mobile multiparameter probe HI9829.



Experimental model of the monitoring and control system related to the system of indoor growth of fish material

COMPONENTS:

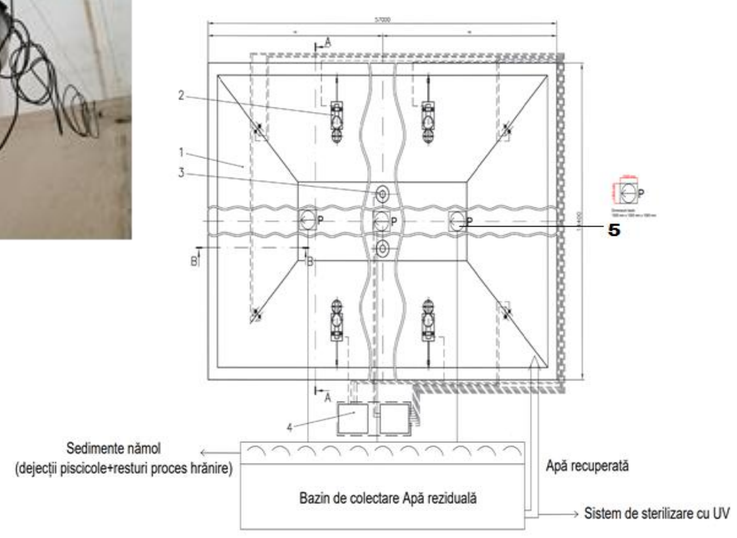
The system of indoor growth of fish material in polyculture consists of the main growth basin, which is composed of the concrete basin (**1**) which has integrated feeding system (**2**), aeration system (**3**), automation and process control system (**4**), pumps for sludge and other sediments (**5**), respectively the wastewater collection basin provided with the ultraviolet sterilization system, characterized in the fact that the process of growing the fish material consisting of common carp and Asian carp such as bighead carp, silver carp, Grass carp is carried out having the basin previously filled 2/3 with technological water, the aerators (**3**) of the system are started, after the accommodation period of 5-7 days the feeding system (**2**) is started and after another 5 days, the sludge-sediment pumping system (**5**) is started sequentially which will pump the dirty water into the wastewater collection basin where the separation takes place by gravity, sediment-sludge (fish droppings and feeding process residues) that can be used in agriculture as a nitrogen-rich fertilizer, and at the top part is the technological water that will also be passed under gravity force through a UV filtration and sterilization system in the initial basin, technological water loss and energy consumption of the system being minimal.

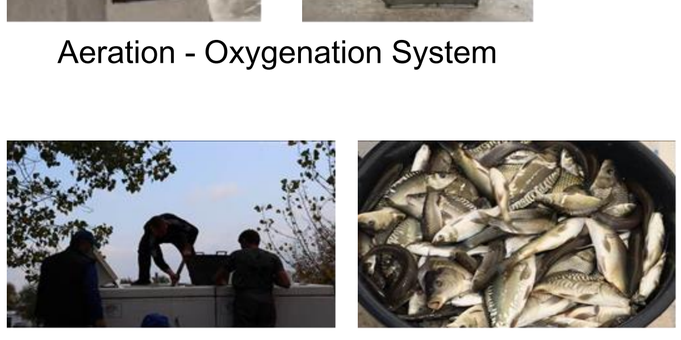


Pictures of the Feeding System



Aeration - Oxygenation System







The main growth basin, of fish material in polyculture

ADVANTAGES:

- ❑ optimal growth yields of fish material;
- ❑ use of sludge sediments as nitrogen-rich fertilizer for agriculture;
- ❑ operational safety, easy use and performance ;
- ❑ constructive simplicity;
- ❑ the use of gravitational systems determines a minimum energy consumption compared to the classic indoor systems used in fish farming.
- ❑ the possibility to increase the fish material with minimum technological water consumption, with a drastic reduction of the addition of medicines.

ACKNOWLEDGEMENT:

This work is financed by Project no. PN 19 10 02 03 Contract no.: 5N/07.02.2019-AA NO. 8/2022:
"*Research on intensive fish farming in a polyculture system and complex utilization of aquatic bioresources (plants)*".

NATIONAL INSTITUTE FOR RESEARCH - DEVELOPMENT OF MACHINES AND INSTALLATIONS DESIGNED FOR AGRICULTURE AND FOOD INDUSTRY - INMA
6, Ion Ionescu de la Brad Blv., Bucharest, 013813, ROMANIA
Tel.: +40-21-269.32.49 / 269.32 55, Fax: +40-21-269.32.73, E-mail: icsit@inma.ro / www.inma.ro

HIGH CAPACITY AGRICULTURAL DRONE FOR PHYTOSANITARY TREATMENTS IN FIELD CROPS

Mihai MATACHE[(1)], Iuliana GĂGEANU[(1)], Iulian VOICEA[(1)], Gabriel GHEORGHE[(1)], Cătălin PERSU[(1)], Dan CUJBESCU[(1)], Marian CHIRIȚESCU[(1)], Sorin-Ștefan BIRIȘ[(2)]
[(1)]INMA Bucharest – ROMANIA, [(2)]POLITEHNICA University of Bucharest - ROMANIA

Patent Application No. A-00687 / 2021

G

ABSTRACT:

The invention refers to a high-capacity agricultural drone for carrying out phytosanitary treatments in field crops, in order to precisely apply them and reduce the amount of phytosanitary substances applied.

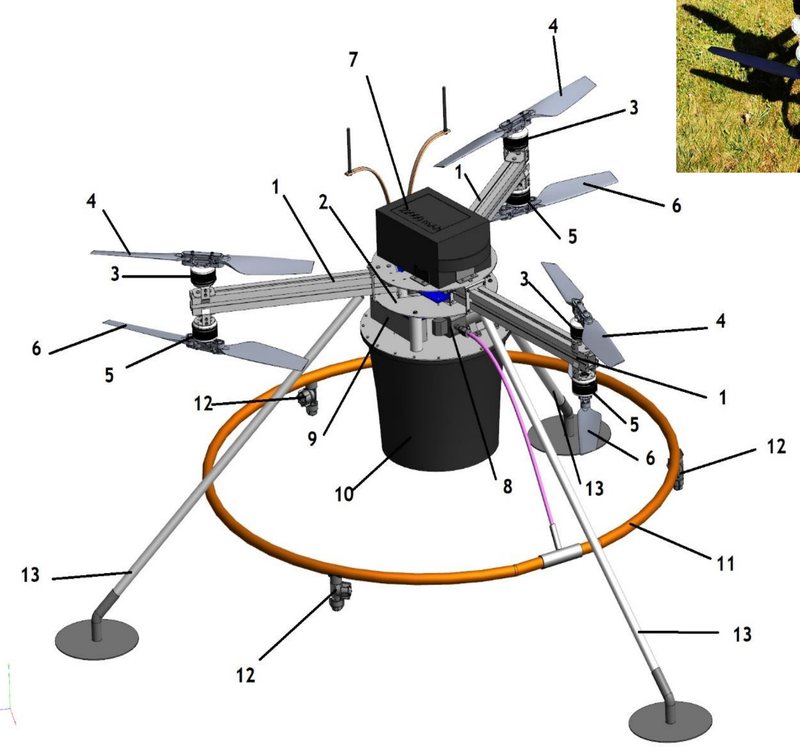


DESCRIPTION:

Currently, using classic spraying machines (self-propelled, trailed or carried) the application of phytosanitary treatments is done continuously, regardless of whether there are problems or not in the crop, thus dispersing large amounts of substances on the soil or on the crop plants.

The main disadvantage of the presented solutions lies in the fact that these installations have a reduced capacity of the pesticide tank, have a reduced number of motors, which reduces their lifting capacity and achieves an uneven spraying of the plants below them due to the conformation of their frame.

The technical problem that the proposed solution solves, according to the invention, consists in building a high-capacity agricultural drone for carrying out phytosanitary treatments in field crops, so as to allow the precise treatment of extensive areas of plants in the areas previously identified as needing phytosanitary treatment.



COMPONENTS:

The high-capacity agricultural drone for carrying out phytosanitary treatments in field crops, according to the proposed solution, solves the technical problem and removes the mentioned disadvantages, in that it is a Y-type hexarotor drone with a frame made up of three 0.5 m long arms from aluminium profile (**1**) that will be mounted on the central plate (**2**) having an angle of 120º between the arms, three brushless motors type KDE5215XF-220 (**3**) equipped with propellers type KDE-CF215-DP (CCW) (**4**), three KDE5215XF-220 brushless motors (**5**) equipped with KDE-CF215-DP (CW) propellers (**6**), Tattu Plus 1.0, 22000mAh, 44.4V, 25C 12S1P LiPo battery (**7**) powering electric both the drone's autopilot and the six ESC speed controllers of its KDE-UAS55HVC motors, the 12Vdc electric pump (**8**) which is powered by two 12Vdc batteries (**9**) and the pumps for the phytosanitary substances from the tank (**10**) of 20 litres, in the circular ramp (**11**) to the three port supports nozzle (**12**), the entire drone resting on the landing ramp (**13**).

With the tank of the drone (**10**) loaded with liquid phytosanitary substances, with the flight mission of the drone programmed into its autopilot, the drone will take off and, in automatic flight mode, move over the targeted agricultural land. There the electric spray pump (**8**) will be actuated and will spray via the nozzle holders with calibrated nozzles (**12**) only above the areas of interest, continuously comparing the actual coordinates from the autopilot GPS with the coordinates entered in the flight mission.

The drone's autopilot will constantly monitor the amount of plant protection substance in the tank (**10**) and will recall the drone to the original departure point for refuelling, if the level of plant protection liquid drops to zero. After refuelling with phytosanitary substances, the spraying operation will resume from the point where it was interrupted, until the completion of the originally set mission.

ADVANTAGES:

- ❑ -due to the use of CCW-type propellers above and CW-type propellers below, the Y-type hexarotor drone is much more stable and manoeuvrable;
- ❑ -due to the special arrangement of the drone supports in Y at 120º and the arrangement of the spray nozzles on the bisector of the 120º angle between the supports, the angle of the jet of the nozzles is directed directly downwards by the air currents related to the drone engines, so that a uniform spraying of the plants is achieved of culture;
- ❑ -the precise application of phytosanitary treatments by means of the drone leads to a reduced consumption of phytosanitary substances and implicitly reduced costs;
- ❑ -the possibility for farmers to treat agricultural crops with phytosanitary substances in a targeted manner only in the areas previously identified as needing phytosanitary treatment, without using machines on the ground, which compact the land and destroy part of the crop plants.
- ❑ -constructive simplicity;
- ❑ -safety in operation;
- ❑ -ease of use and performance.

ACKNOWLEDGEMENT:

This work was supported by a grant from the Ministry of Research, Development and Digitization, CCCDI-UEFISCDI, project no. PN-III-P2-2.1-PED-2029-4123, contract no. 380PED /2019.

NATIONAL INSTITUTE FOR RESEARCH - DEVELOPMENT OF MACHINES AND INSTALLATIONS DESIGNED FOR AGRICULTURE AND FOOD INDUSTRY - INMA

6, Ion Ionescu de la Brad Blv., Bucharest, 013813, ROMANIA

Tel.: +40-21-269.32.49 / 269.32 55, Fax: +40-21-269.32.73, E-mail: icsit@inma.ro / www.inma.ro

UNIVERSITATEA DE ȘTIINȚE AGRONOMICE ȘI MEDICINĂ VETERINARĂ – BUCUREȘTI

New variety of *Camelina sativa* (L.) Crantz - biomass for biokerosen production-

Authors: Sauca F., Jurcoane St., Dobre P., Matei F., Podgoreanu E., Moraru A, Cristea S, Cornea C.P.

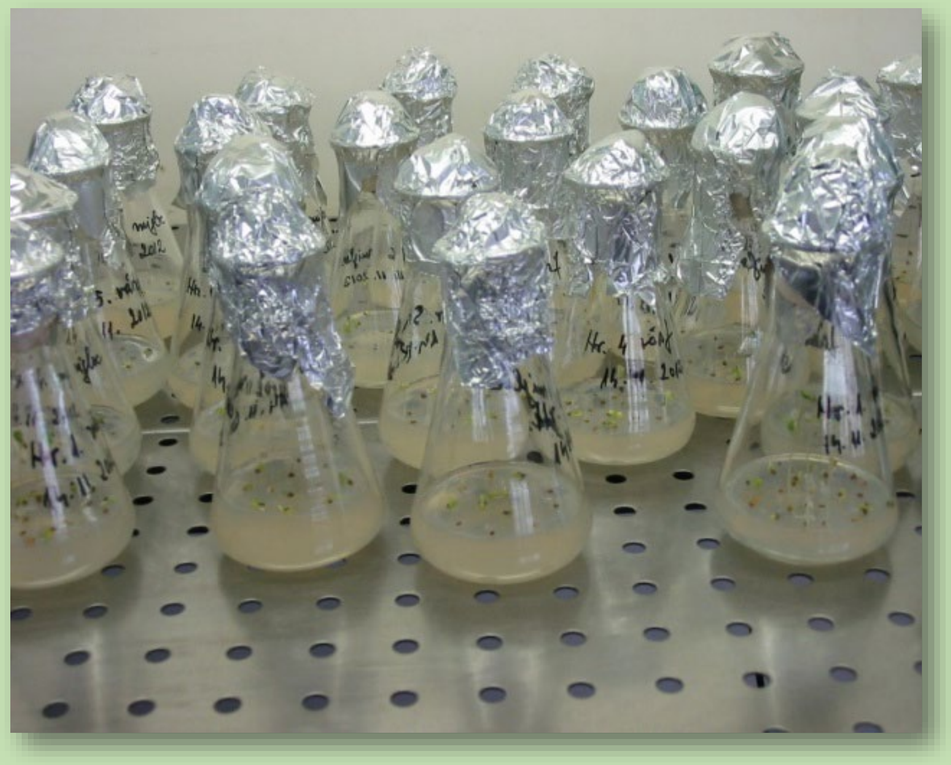
Methodology

- ✓ use of the immature embryo rescue technique
- ✓ hybridization, self-pollination, mass-selection and individual selection.
- ✓ starting material = Romanian camelina local variety
- ✓ open field for randomized hybridization with other camelina variety (GP202)

New variety description

Camelina sativa (L.) Linicola
ISTIS Certificate 3910/05.05.2017
Variety name: - in testing: FP-5-02
- for homologation: Mădălina
Characteristics:
- Leaf pilosity: absent
- Flowering moment: early (2 months after sowing)
- Average gross seeds production: 2600 kg/ha (+ 9.5% against GP202)
- Oil content : + 2.4 - 4% against parents
- **Resistance to frozen temperature:** moderate to high
(sensible to asphyxia under 50 cm of snow longer than 10 days)
- Resistance to mildew: moderate to high
- Resistance to fall: moderate to high

APPLICATIONS: biomass for second generation biofuel, residue.







Contact: Prof. Univ. Dr. JURCOANE Ștefana, 0745.034.392, stefana.jurcoane@biotehgen.eu

MOLDOVA STATE UNIVERSITY
INSTITUTE OF PHYSIOLOGY AND SANOCREATOLOGY
Laboratory of Physiology and Reproductive Health
60, Alexei Mateevici str., MD 2009, Chisinau, Republic of Moldova
Tel.: +373 069124702 ; E-mail: balanion@rambler.ru

HR EXCELLENCE IN RESEARCH

MAGNETIC PROBE FOR EXTRACTING FERROMAGNETIC OBJECTS FROM THE CATTLE NETWORK

PATENT NUMBER: 1644 (13) Y

MEREUŢĂ Ion, BALAN Ion, BUZAN Vladimir, CAZACOV Iulia, ROŞCA Nicolae, BUCARCIUC Melania, BORONCIUC Gheorghe

APPLICATION FIELDS: Agriculture, Veterinary Medicine. | G

AIM: The growth reliability, durability and simplification construction of the probe for extracting ferromagnetic objects from the cattle network .

DESCRIPTION: The invention relates to veterinary medicine, in particular to magnetic probes for extracting ferromagnetic objects from the cattle network, and can be used for the prevention and treatment of feed traumatism. The probe, according to the invention, comprises a magnet (1), having one end connected to a metal chain (2), on which is placed a rubber cover (3), the other end of the chain (2) being connected by means of a fitting (4) to one end of a silicone hose (7), in which, from its two ends, by means of a tubular nut with hidden bolts (5), is fixed a plastic-coated metal cable (6), and at the other end of the silicone hose (7) is fixed a fixing Ring (12) with a nut (11). The silicone hose (7) is placed in a tubular device (8), made with a conical extension and equipped with a Holder (10) with fixing straps with buckles (9). Fig. 1.

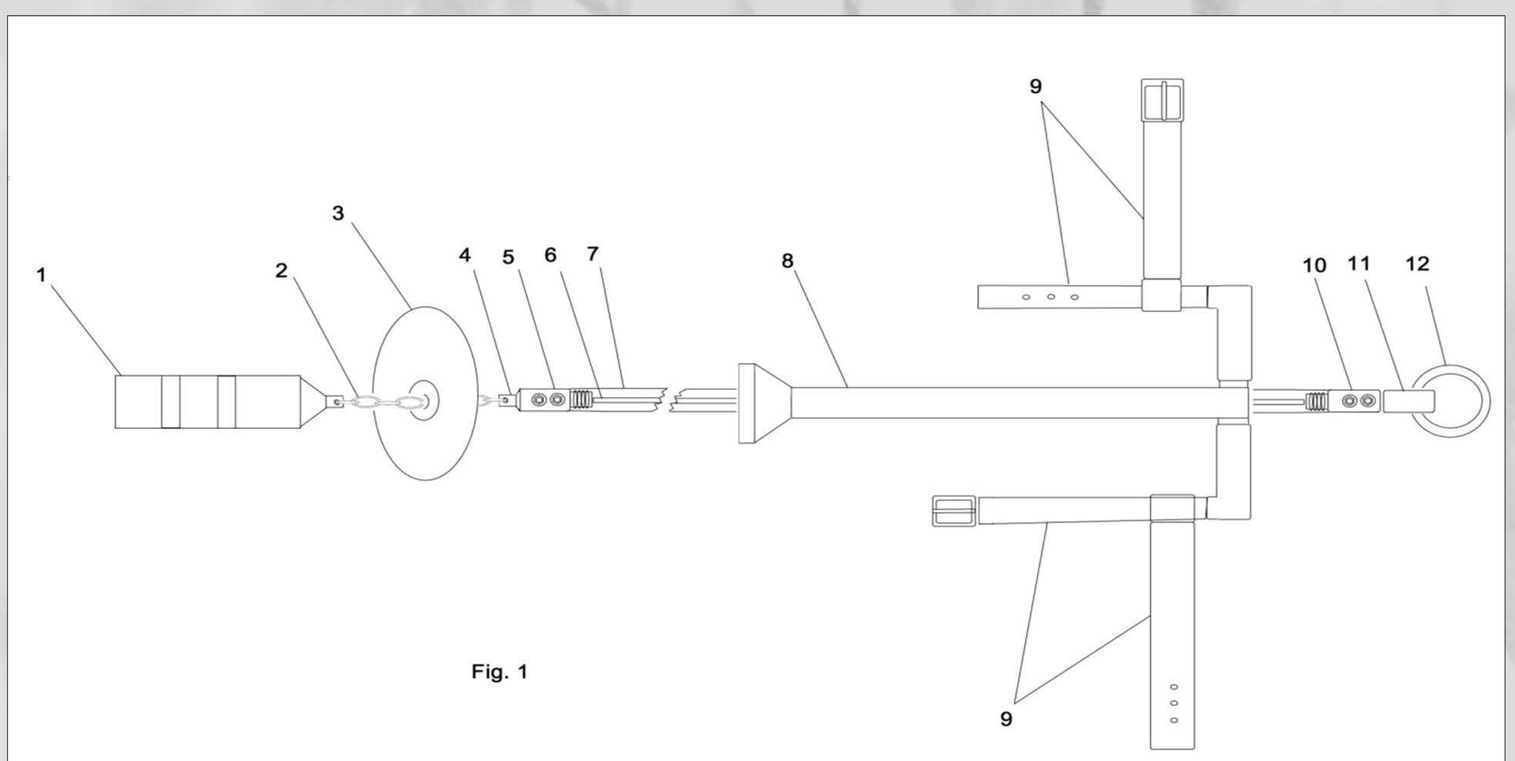


Fig. 1

ADVANTAGES: The advantage of the proposed invention lies in the fact that they have offered the flexible tube with the tube of silicone, in which, from both its ends, through hollow nuts with hidden bolts, the rope is fixed of metal covered with plastic, with the possibility of mounting-dismounting the metal rope, it can be visualized, and in case of damage easily replaced, which excludes incurring additional expenses for the procurement of a new probe. Metal rope is freely available, affordable and inexpensive. Concealed bolt tube nuts are made with rounded edges, which minimizes irritation cardiac and esophageal sphincter, as well as the esophageal mucosa.

IMPLEMENTATION STAGE: The magnetic probe for extracting ferromagnetic objects from the cattle network is implemented for use in the practice of prophylactic medicine and the treatment of food traumatisms.

ACKNOWLEDGMENTS: This research was supported by the research project: 20.8000.7007.25

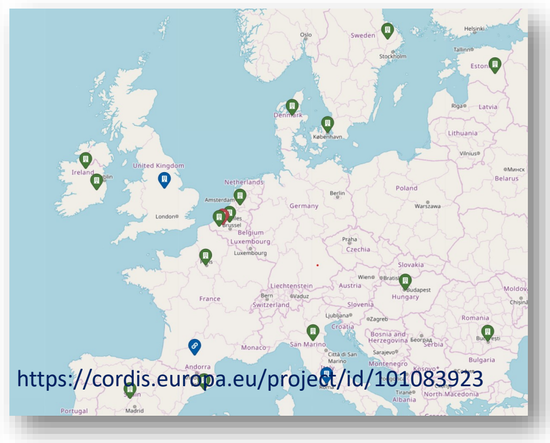
Development of a sustainable biosecurity management system in animal breeding in Romania / Enhanced and cost-effective biosecurity in livestock production

HORIZON.2.6 / Grant agreement ID: 101083923 / 2023-2026

BĂRĂITĂREANU Stelian, VIDU Livia, BĂRBUCEANU Florica, FURNARIS Florin Ciprian, GORAN Gheorghe, CIOCÎRLIE Nicoleta, GURĂU Maria Rodica, GHIMPEȚEANU Oana-Mărgărita, CONSTANTIN Nicolae Tiberiu, DUȚULESCU Valentin Alexandru, IONESCU Teodor, FÎNTÎNERU Gina

G

Starting with 1 January 2023, a team of 12 researchers from the University of Agronomic Sciences and Veterinary Medicine of Bucharest are involved in a four-year project supported by the European Union with a budget of 5 million euros and 19 participating partners, from 12 European countries, coordinated by Ghent University. The main objective is to enable decision-makers in livestock farming to understand, prioritise and implement evidence-based, cost-effective, and sustainable biosecurity management systems.





This will be carried out through various work packages and tasks that include:

- reviewing the current understanding of biosecurity throughout the livestock production chain;
- quantifying the impact of biosecurity practices on the prevention of infection and spread of disease;
- enhancing current biosecurity measures, as well as expanding on these by carrying out field studies and performing experiments.









Socio-economic impact of the BIOSECURE project in Romania will be assessed and stakeholder engagement will be facilitated to support knowledge transfer and implementation of key exploitable results in Romanian farms.

The new or enhanced biosecurity management systems developed in the BIOSECURE project will help Romanian farmers of various animal species (pigs, poultry, cattle, small ruminants) and of different production types (indoor-outdoor) to keep animals healthy in Romania.

BIOSECURE has received funding from the European Union's Horizon research and innovation programme under grant agreement No 101083923

Why do we do this?

Biosecurity is critical for the management of animal health and disease control however, implementation at the farm level remains often insufficient.

Contact: Bărăităreanu Stelian, stelian.baraitareanu@gmail.com

GLASS-CLINOPTILOLITE ZEOLITE COMPOSITE FILTERS AND METHOD FOR OBTAINING THEM

G

Patent deposition A/00267/29.05.2023

Authors: SURMELI (SAVA) Steluța Camelia, SAVA Bogdan Alexandru, NICOLAE Carmen Georgeta

Description

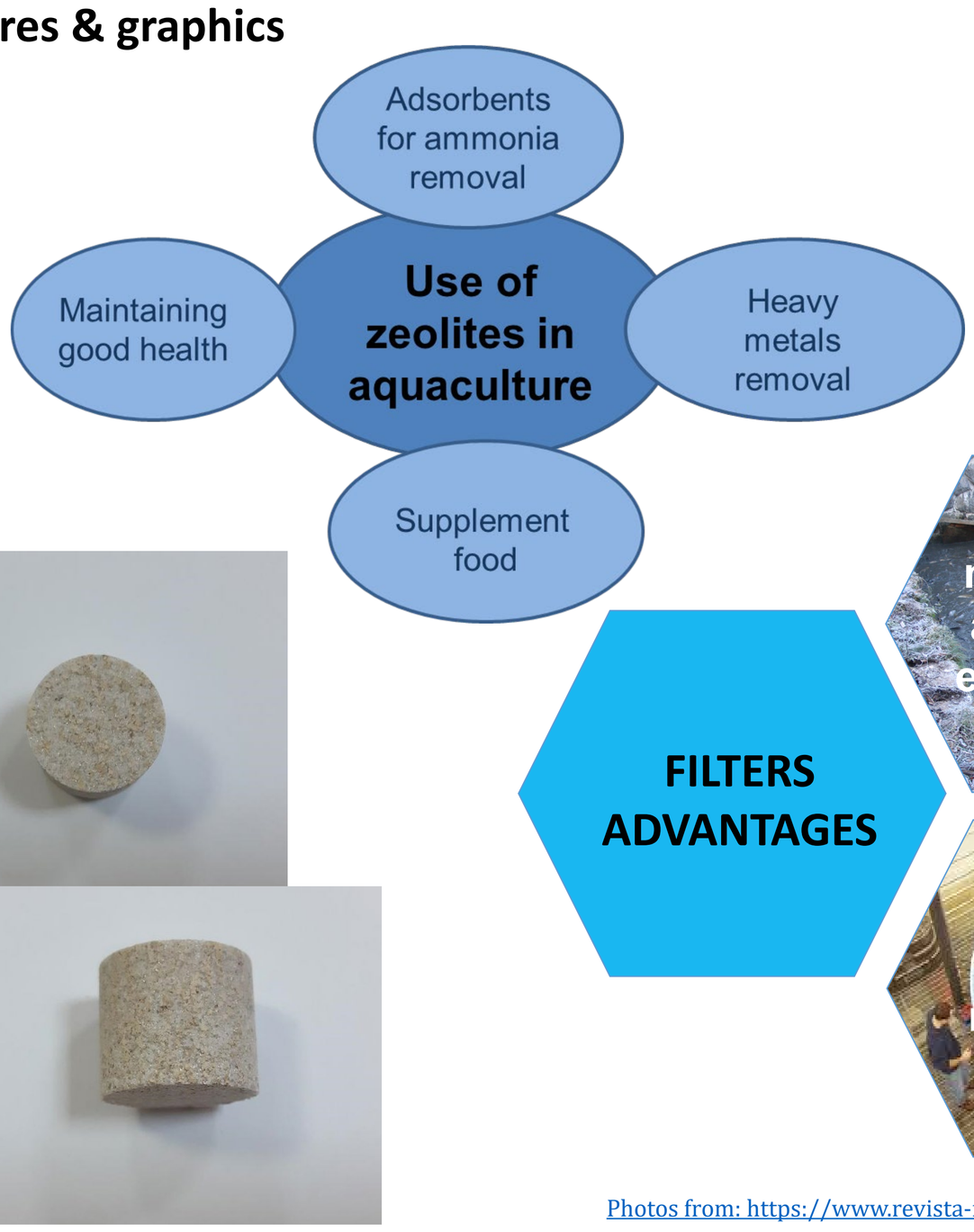
The sustainable development of aquaculture requires an adaptive approach that takes into account the appropriate use and conservation of biodiversity and ecosystems through responsible environmental management and wise use of natural resources.

Effluent water from recirculating aquaculture systems and fish farms has a negative impact on the environment due to the toxic contaminants it contains. Particular attention should be paid to ammonia concentration, as the carrying capacity of the systems is high but the possibility of filtering the water is limited.

The invention relates to glass-zeolite clinoptilolite composite filters used for the removal of ammoniacal nitrogen in controlled aquaculture systems and to a process for obtaining them. The glass-zeolite clinoptilolite composite filters according to the invention comprise a porous glassy matrix made of common cheap silicate or borosilicate glass containing glass network-forming oxides: silicon dioxide - SiO_2 and boron oxide - B_2O_3, glass lattice modifiers: calcium oxide - CaO, magnesium oxide - MgO and sodium oxide - Na_2O, and glass sintering temperature lowering oxides: lead oxide - PbO, together with clinoptilolite-type zeolite.

The technical problem which the invention solves consists in obtaining a composite which constitutes a filter for waste water from recirculating aquaculture systems for the retention and removal from the aquatic environment of nitrogen of various types, ammoniacal or nitrate-type compounds.

Pictures & graphics







Photos from: https://www.revista-ferma.ro/articole/acvacultura/ferma-piscicola-riscuri-si-oportunitati
https://www.lumeasatului.ro/stiri-agricultura/pescuit/6603
https://albuflorin.ro/tag/acvacultura-in-sisteme-recirculante/
https://ro.wikipedia.org/wiki/Piscicultur%C4%83
https://www.lumeasatului.ro/stiri-agricultura/pescuit/5213-crestere-reproductie-si-cercetare-la-ferma-piscicola-valea-morii.html

SURMELI (SAVA) Steluța Camelia, e-mail: savacamelia64@yahoo.com



University of Agronomic Sciences and Veterinary Medicine – București

Intensiv Fig Culture in Fruit Belt in Temperate Climate

G

Authors:

Stanica Florin, Asanica Adrian, Butcaru Ana C., Mihai Cosmin A., Moisescu Emilia, Velcea Marian

[1] Faculty of Horticulture, University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Mărăști Blvd., District 1, Bucharest, Romania

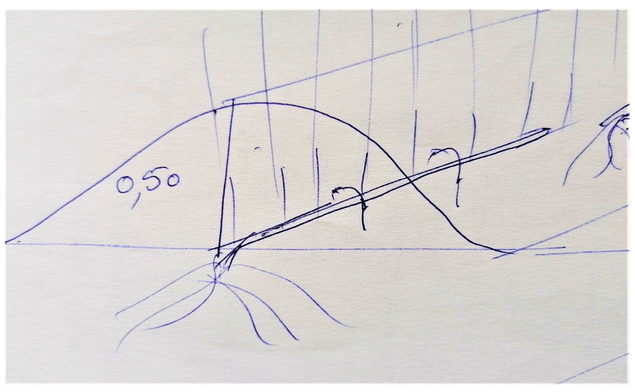
[2] Research Center for Studies of Food Quality and Agricultural Products - Integrated Pomiculture Laboratory, University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Mărăști Blvd., District 1, Bucharest, Romania

The present invention refers to an original and unitary method of fig culture (in an ecological system) in areas with a temperate climate. The method involves the preparation of the soil according to established agricultural technologies, followed by the cultivation of some medicinal and industrial plants on the entire surface that incorporate them at flowering, picketing the rows in the North-South direction at distances of 2.5-3.5 m between the axes of symmetry (b1), making planting trenches (a) 40-60 cm deep and 20-30 cm wide at the base and 40-50 cm at the top, filling these trenches with manure (c) and leveling them with soil at ground level, placing drip tubes (e) on the direction and position of the axes of symmetry (b1) of the planting trenches (a), watering and making planting pits (h) 20-30 cm deep at intervals of 0.7-1.0 m with the axis inclined at 30-45° from the horizontal, planting the figs (f) in pots with the tip towards the North, covering the planting pits (a), making the delimiting trenches (l) of the strips of culture 15-20 cm deep and 15-20 cm wide, which identify the ridges (m) between the fruit belts, 1.0-1.5 m wide.



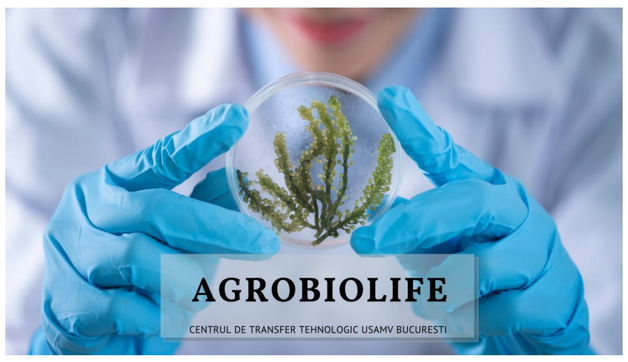


The maintenance of the crop in the first year is done by periodic irrigation, application of fertilizers and weeding as appropriate, harvesting the ripe fruits once every two days and storing them in refrigerated spaces at 1-2 degrees Celsius until delivery or utilization, covering the plants for a period of between the fall of the leaves and the arrival of spring with a heat-insulating layer (l) 40-50 cm thick having the shape of a drum with a height of 40-50 cm from the ground, consisting of a mixture (k) of soil with chopped dry grass, chopped straw, sawdust, textile scraps of cotton or wool. At the arrival of spring, the bin is opened and mechanized cuttings are carried out with the chopper adjusted to a height of 15-17 cm from the ground and/or manual cuttings in onions at 2-3 buds, simultaneously with the thinning of the vertical branches at a distance of 15-25 cm between them and maintaining the continuity of the vegetation by fixing some lateral branches to the ground with hooks (j), simultaneously with keeping the stems from the previous year at ground level with the help of fixing hooks; the crop cycle resumes similar to the previous year.



Contact: rectorat@usamv.ro
ctt-agrobiolife@usamv.ro

Pending Patent A/00457/2023
Ready for Licensing You &
With Biological Materials



University of Agronomic Sciences and Veterinary Medicine – Bucuresti

Tri Kule, Ada Kaleh and **Nectar** – the newest Romanian fig cultivars homologated at the Faculty of Horticulture in Bucharest

Stănică Florin, Curici Nicolaie, Peev Otiman Paula Diana, Dobrescu Vera, Butcaru Ana Cornelia, Ancuța (Moisescu) Emilia, Mihai Cosmin Alexandru, Velcea Nicolae Marian

Faculty of Horticulture, University of Agronomic Sciences and Veterinary Medicine of Bucharest

G

In Romania, fig trees are grown for hundreds of years but only in small areas or in people's yards. Due to the global warming effect and desertification process of many areas of Southern Romania, fig trees can become a new interesting fruit species for farmers. After years of research, the Faculty of Horticulture homologated three new Romanian fig cultivars.



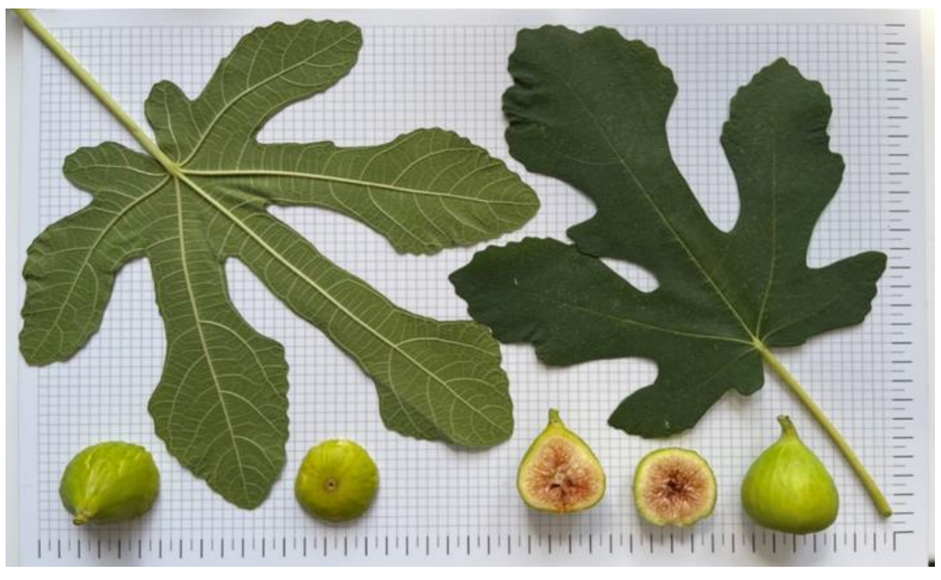
TRI KULE FIG

The plant forms erect bushes, and its vigor is average. If the winter is mild and low temperatures do not affect the flower buds, the first crop occurs in July (breba), with one-year-old branches bearing the fruits. The main crop starts at the end of July-beginning of August, the fruits (proper figs) grow at the leaf axil on the annual shoots. If the plant is vigorous, it can bear fruits from the first year after planting in the field. Yield increases steadily with bush development. Tri Kule fig has a brownish-green fruit skin and an amber/pink pulp. The fruit skin is quite thick. According to the location of the maximum width, the fruit has a long-pyriform shape, without a neck. The average weight of breba fruit is around 118 g and for proper figs around 47 g. In the case of the Romanian climate, Tri Kule fig is a middle cultivar. Fruits are very aromatic and can be consumed fresh or dried (entire or sliced). They are also suitable for processing sweets such as jam or distilled beverages.

ADA KALEH FIG

The plant forms erect bushes, and its vigor is average. If the winter is mild and low temperatures do not affect the flower buds, the first crop occurs in July (breba), with one-year-old branches bearing the fruits. The main crop starts at the end of July-beginning of August, the fruits (proper figs) grow at the leaf axil on the annual shoots. If the plant is vigorous, it can bear fruits from the first year after planting in the field. Yield increases steadily with bush development. Ada Kaleh fig has a dark brown fruit skin and a red pulp. The fruit skin is very thin. The fruit has a short-pyriform shape. The average weight of breba fruit is around 25 g and for proper figs around 20 g. Ada Kaleh fig is an early cultivar for the Romanian climate. Fruits are tasty and can be consumed fresh or dried (entire or sliced). They are also suitable for processing sweets such as confiture or alcoholic fermented beverages.





NECTAR FIG

The plant forms erect bushes, and its vigor is average. If the winter is mild and low temperatures do not affect the flower buds, the first crop occurs in July (breba), with one-year-old branches bearing the fruits. The main crop starts at the end of July-beginning of August. The plant can bear fruits from the first year after planting in the field. Yield increases steadily with bush development. Nectar fig has a light green fruit skin and a pink pulp. The fruit skin is of average thickness. The fruit has a pyriform shape. The average weight of breba fruit is around 37 g and for proper figs around 32 g. In the case of the Romanian climate Nectar fig is a middle cultivar. Fruits are very aromatic and can be consumed fresh or dried (entire or sliced). They are also suitable for processing sweets such as jam, confiture, or distillate beverages.

Culture technology – the figs are planted at distances of 1m between them on the row, so they form a green fruit strip. In late autumn the plants are cut to a 20 cm height and covered with leaves to protect them from the low winter temperature. If we want the plants to have also breba fruits, they will be cut in the spring, but only the shoots that do not bear fruits.

Plant Propagation is done by cuttings in greenhouses. Fig cultivation should be carried out in areas with mild winters. For Romania, these areas are Dobrogea, Southern zone, Danube Gorge, Banat, and Western Hills. Using green fruit strip culture technology, figs can be grown in other sunny areas with permeable soil. In greenhouses, figs can be grown in a larger area.



SILAGE STABILIZERS

Dr Aleksandra Ivetić

Institute for Science Application in Agriculture

G

Preparation healthy and safe silage

Problem

- **The basic objective of ensiling is to preserve the nutritional value of green plant**
- **Oxygen is the main cause of silage deterioration !!!**
- **Silage is prepared only once a year and used to feed domestic animals throughout the year**



PROVEN EFFECT OF SILAGE STABILIZER ON FARMS

Napredak, Delta Agrar



Horizontal silo

Kamendin doo



Round bale

PIK Bečej



Silo bag

SOLUTION

- **New components that increase milk and meat production**
- **Ensiling without losses**
- **Health safe for humans and animals**

PROVEN IN PRODUCTION

Filed national and international patent application 2020



Contact: **farmainova.aleksandra@gmail.com**

INFLUENCE OF STREPTOMYCETE BIOMASS ON THE PHYSIOLOGICAL INDICATORS OF HOMEOTHERMIC ANIMALS

G

Patent MD 1672 Y of 2022.09.08; Patent MD 1682 Y of 2022.09.08

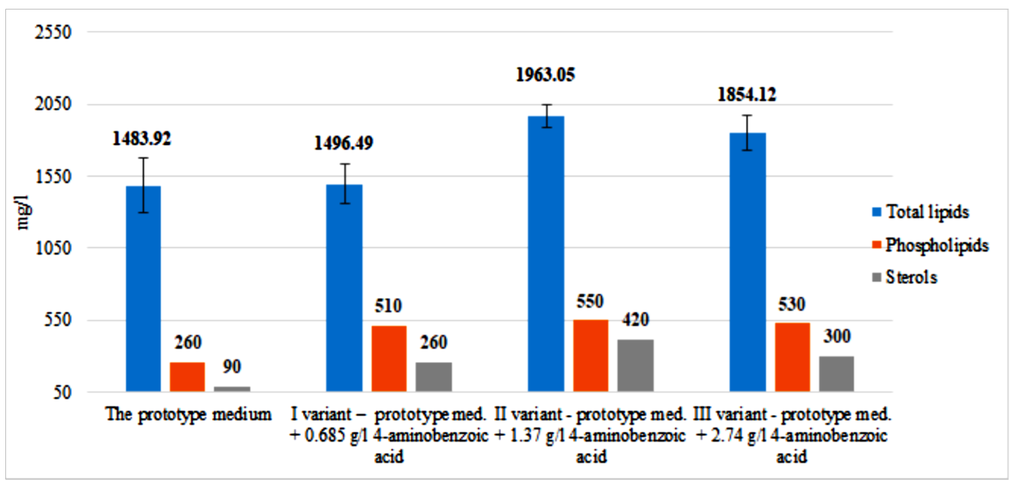
BÎRSA Maxim, PhD; BURȚEVA Svetlana, DS, prof.-researcher; SÎRBU Tamara, PhD, research lecturer; GARBUZNEAC Anastasia, PhD student; ȘEPTIȚCHI Vladimir, DS, research lecturer

- Purpose

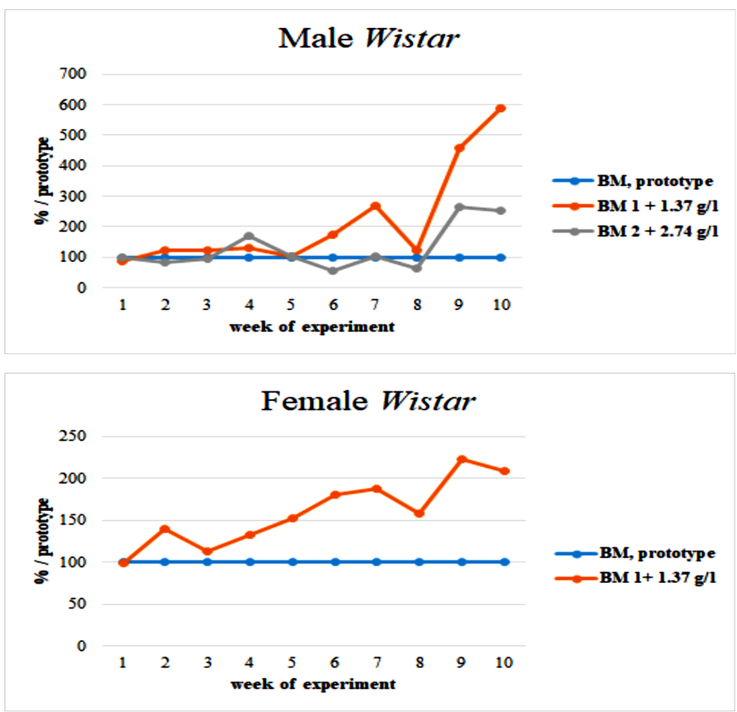
- **The invention relates to agriculture and experimental physiology, to obtaining biomass of streptomycetes during cultivation on nutrient media containing 4-aminobenzoic acid and using it as an additive in a standard diet to increase the body weight of homeothermic animals (laboratory rats *Wistar*).**

- Solution

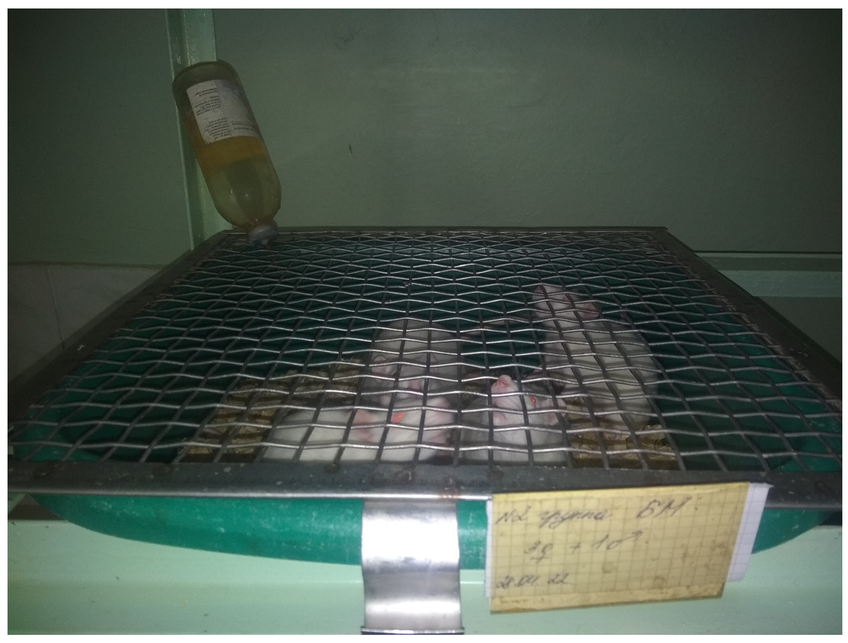
- **The essence of the invention consists in the fact that an optimized nutrient medium is proposed for the submerged cultivation of the strain *Streptomyces massasporeus* CNMN-Ac-06, which contains 4-aminobenzoic acid 1.37 g/l.**
- **In the following, a procedure for supplementing the diet of white rats *Wistar* with the biomass food additive of the strain *Streptomyces massasporeus* CNMN-Ac-06, cultivated on the same nutrient medium containing 4-aminobenzoic acid - 1.37 g/l, in a quantity of 250 mg/kg body weight per day for 5-10 weeks.**



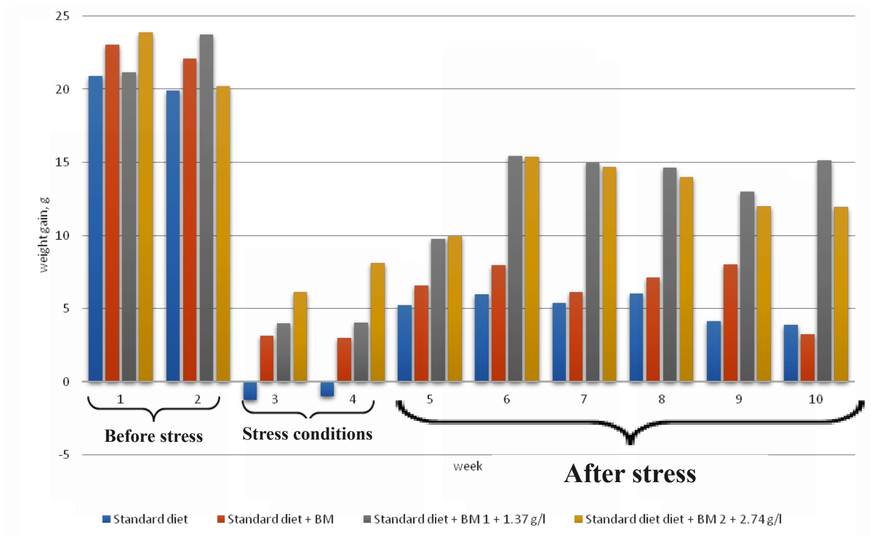
The dependence of the productivity of *S. massasporeus* CNMN-Ac-06 on the concentration of 4-aminobenzoic acid in the nutrient medium



Dynamics of weekly weight gain of male and female white rats *Wistar* following the consumption of the diet containing the biomass of *S. massasporeus* CNMN-Ac-06 strain cultivated on medium with 4-aminobenzoic acid in comparison with the prototype, g / %



Rats fed with diet fortified with streptomycete biomass



Dynamics of weight gain in male white rats *Wistar* with a standard diet supplemented with biomass of *Streptomyces massasporeus* CNMN-Ac-06 cultivated on a nutrient medium with 4-aminobenzoic acid under after stress conditions

- Advantages

- **The result of the invention is that the proposed medium increases the synthesis of lipids by 32.28%, phospholipids by 111.5% and sterols by 366.66% in comparison with the prototype medium. The amount of absolutely dry biomass in comparison with the prototype medium is increased by 212.76%, from 5th to 10th week in comparison with the prototype.**
- **An increase in body weight was also observed in experiments in the after stress condition (stressed with extremely high temperature 34 ... 36°C, without ventilation), weight gain was 127.56-466.67% in comparison with the control (standard diet + biomass of the strain).**
- **An increase in the weight gain of experimental animals occurs both under normal physiological conditions and under stress, especially in the after stress conditions, which indicates an increase in the resistance of the body of experimental animals to the effects of heat stress under the influence of the food additives used to the standard diet, as well as a more intensive restoration of physiological capabilities of the body after exposure to adverse environmental conditions.**

The research was funded out within the project 20.80009.7007.09 (ANCD).

Contact: Institute of Microbiology and Biotechnology of Technical University of Moldova, National Collection of Non-pathogenic Microorganisms, e-mail: maxim.birsa@imb.utm.md

APPLICATION OF BIOPESTICIDES OF MICROBIAL ORIGIN AGAINST PHYTOPATOGENES

G

Patent application nr. 7131 of 20.12.2022; nr. 7179 of 11.05.2023

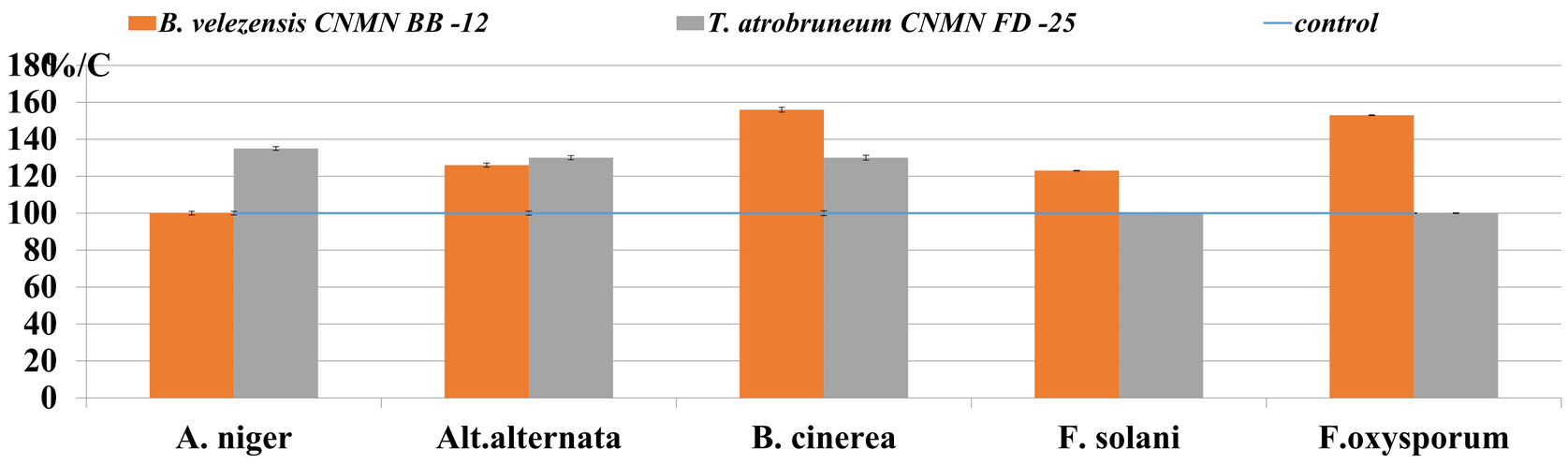
SIRBU Tamara, PhD, research lecturer; MOLDOVAN Cristina, PhD student; ȚURCAN Olga, researcher; BOGDAN-GOLUBI Nina, PhD; SLANINA Valerina, researcher

- Purpose

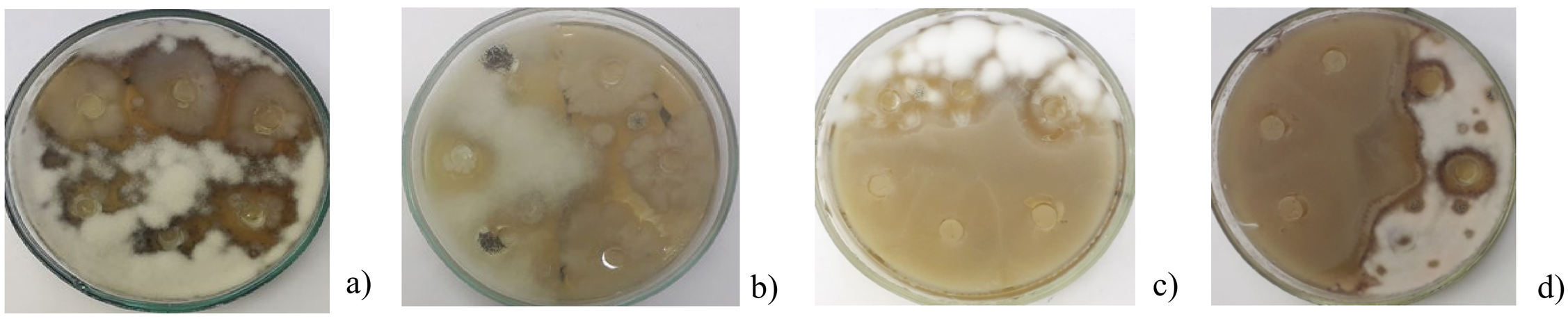
- **Use of *Bacillus velezensis* CNMN BB-12 and *Trichoderma atrobruneum* CNMN FD 25 strains as sources of bioactive substances with antimicrobial effect against phytopathogens.**

- Solution

- **The invention relates to agriculture; the use of *Bacillus velezensis* CNMN BB-12 and *Trichoderma atrobruneum* CNMN FD 25 strains as a source of bioactive substances for combat phytopathogens: *B. cinerea*, *Alt. alternata*, *A. niger*, *F. solani*, *F. oxysporum*, *C. michiganensis*, *E. carotovora*, *X. campestris*, *A. tumefaciens*. According to the invention, for combating phytopathogens, exometabolite solutions of the mentioned strains can be used for seeds treating before sowing, but also during the vegetative period of crop plants.**

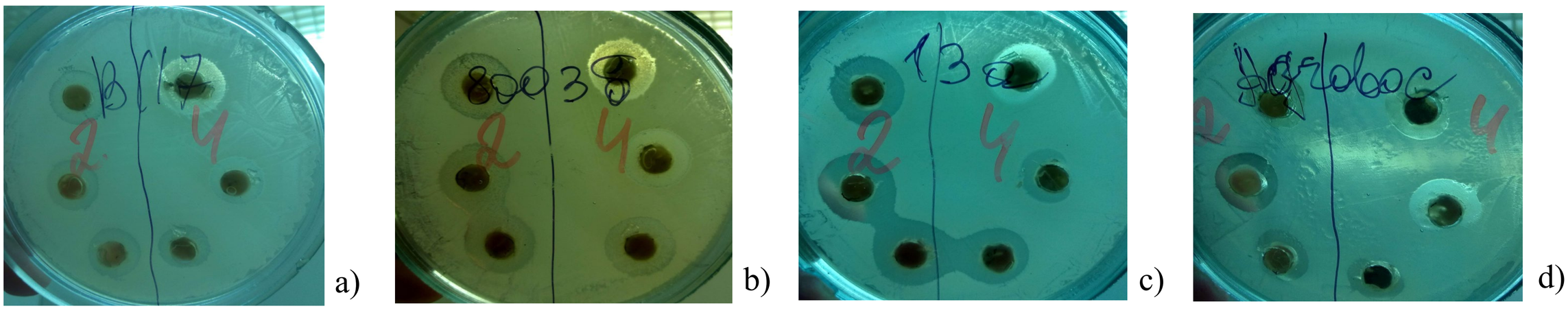


Antifungal activity of *B. velezensis* and *T. atrobruneum* in comparison with control



a) b) c) d)

Antagonistic activity of the strain *Bacillus velezensis* CNMN BB-12 against:
a) *Alternaria alternata*; b) *Botrytis cinerea*; c) *Fusarium solani*; d) *Fusarium oxysporum*



a) b) c) d)

Antagonistic activity of the strain *Trichoderma atrobruneum* CNMN FD 25 against:
a) Erwinia caratovora* ; b) *Xanthomonas campestris;* c) *Corynebacterium michiganense*; d) *Agrobacterium tumefaciens

- Advantages

- **The use of exometabolites of *Bacillus velezensis* CNMN BB-12 and *Trichoderma atrobruneum* CNMN FD 25 strains contributes to the fight against phytopathogens of fungal and bacterial origin, exceeding the control by 25-50%.**

The research was funded out within the project 20.80009.7007.09 (NARD).

Contact: Institute of Microbiology and Biotechnology of Technical University of Moldova, National Collection of Non-pathogenic Microorganisms, e-mail: tamara.sirbu@imb.utm.md

The Institute of Microbiology and Biotechnology
of Technical University of Moldova

PROCEDURE FOR OBTAINING THE PROTEOGLYCAN PREPARATION AND ITS TESTING IN THE ZOOTECHNICAL FIELD

Patent application a20220059 from 29.12.2022

Authors: Efremova Nadejda; Chiselița Natalia; Bețliu Alina; Chiselița Oleg; Tofan Elena; Rudic Valeriu.

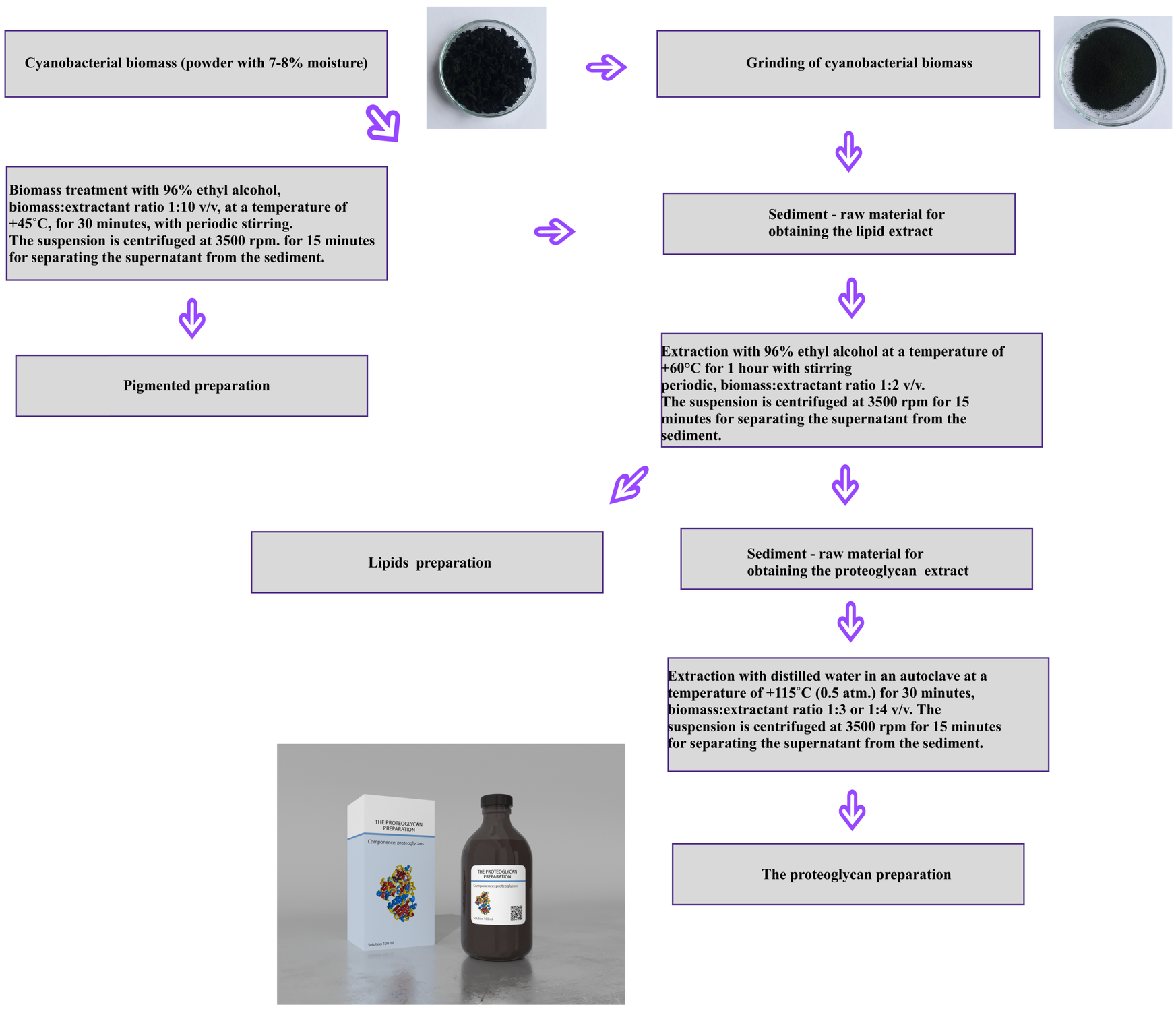
G

AIM. It consists in obtaining of proteoglycan preparation with high content of sulfated polysaccharides from the remaining from the production of bioremedy BioR biomass of *Arthrospira platensis*.

SOLUTION. Using biomass of cyanobacteria *Arthrospira platensis* as the source of proteoglycans which possess anti-inflamatory, antiviral activities for the application in zootechny and other fields.

TECHNICAL RESULT consists in obtaining the preparation with 661±2.30-733±1.55 mg/L sulfated polysaccharides, which is 28.96-32.12 times more than the closest solution. The extracts possess SOD activity of 54.68±2.82-38.41±0.42 U/mg protein and contain 20.66±0.12-26.50±0.06% S.U. proteins, 23.69±0.73-20.71±0.42%U.S. carbohydrates.

THE ESSENCE. A new procedure for obtaining the proteoglycan preparation from *Arthrospira platensis* cyanobacteria remaining biomass is proposed. The dried at the temperature of +50±5°C remaining biomass was subjected to grinding, in the next stage it was mixed with 96% ethyl alcohol in a volume of 1:10, the obtained suspension was placed in a water bath at a temperature of +45˚C, for 30 minutes, centrifugation at 3500 rpm., the biomass was mixed with distilled water at a ratio of 1:3 v/v and placed under 50 W ultrasound for 5 minutes and heated at a temperature of +45˚C for 30 minutes or subjected to autoclaving at a temperature of +115° C (0.5 atm.) for 30 minutes, centrifugation at 3500 rpm. and add EDTA to the final proteoglycan preparation.



The results were obtained in the framework of project 20.80009.5107.16. “New biologically active microbial preparations for increasing the reproductive and productive potential of animals of zootechnical interest ”, financed by NARD

Contact: Chiselița Oleg, PhD in biology, associate professor; oleg.chiselita@imb.utm.md

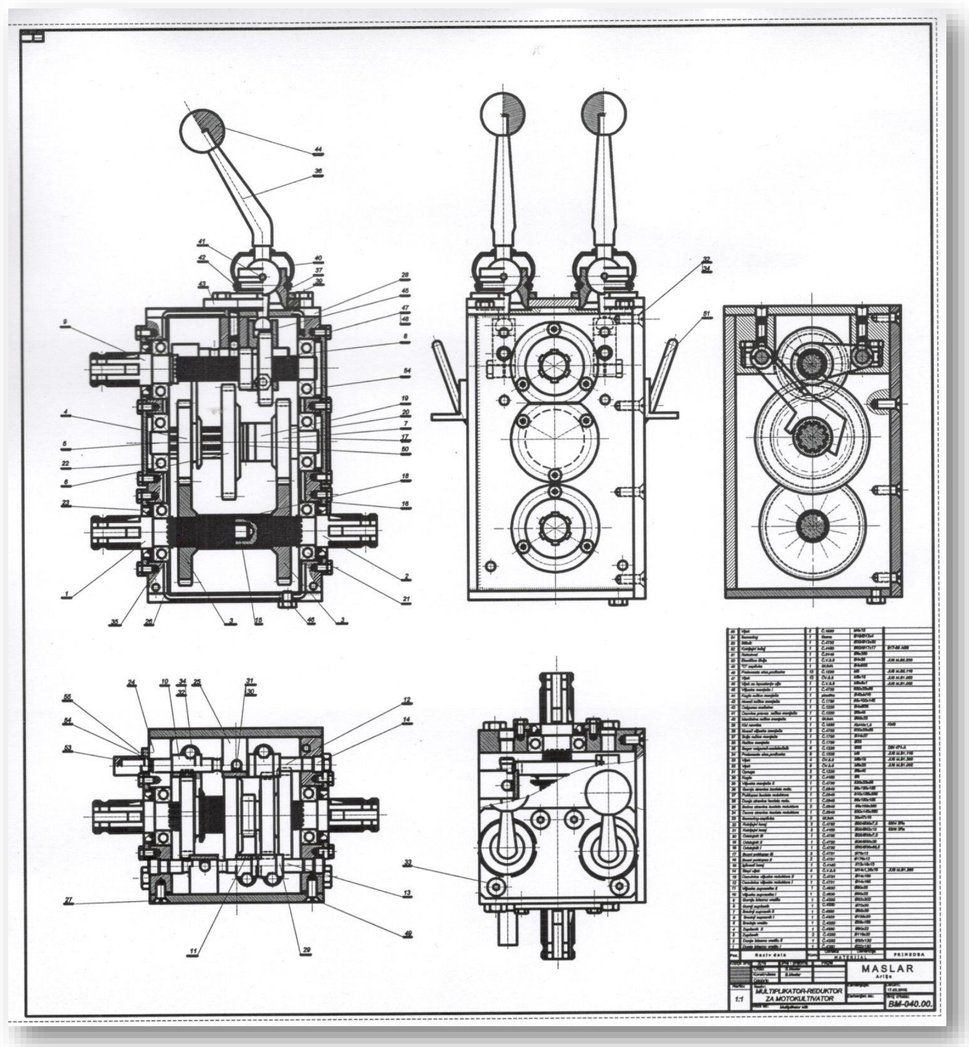
MULTIPLIER-GEARBOX (CHANGER)

G

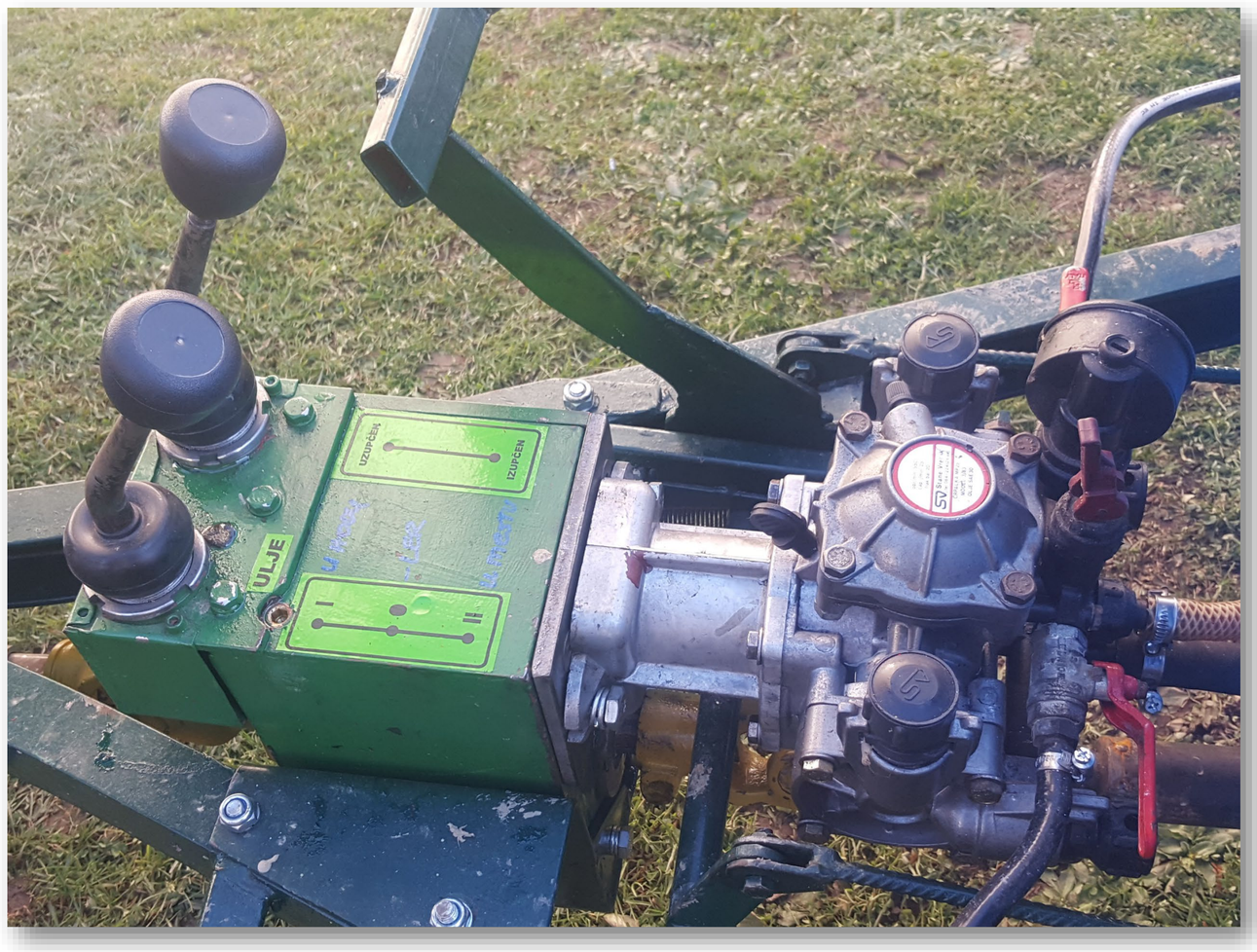
Author: Brane MASLAR

The multiplier (gearbox, reducer) is an additional device that can be installed on the existing platform of the motocultivator or a new platform (chassis) or can be used as a new platform for motocultivator. This device is intented to be installed in order to improve many performances where even modern machines cannot help people in agriculture due to the large slope of the land. It is primarily used for spraying fruits and vegetables, because the existing attachements are not adequately made. Thanks to this device farmers can mount a cyclone to disperse artificial fertilizer in a steep land slopes and successfully carry out fertilization.









Forest workers can by mounting a circular saw cut forest timber on inaccessible terrains. It is possible to extinguish the fire with water supply and in the absence of water in rural hoseholdes that have poor road infrastructure, 250 litres of water can be delivered in one fetching water. With an additional pulley (an additional shoulder com construction) workers where there is no electricity can mount a mixer for concrete and the desired facility do as well as many other possibilities. Briefly, this multiplier makes life much easier for all rural households living in difficult conditions.

Contact: branemaslar63@gmail.com

Cultivation procedures of crop higher plants based on coordinative compounds

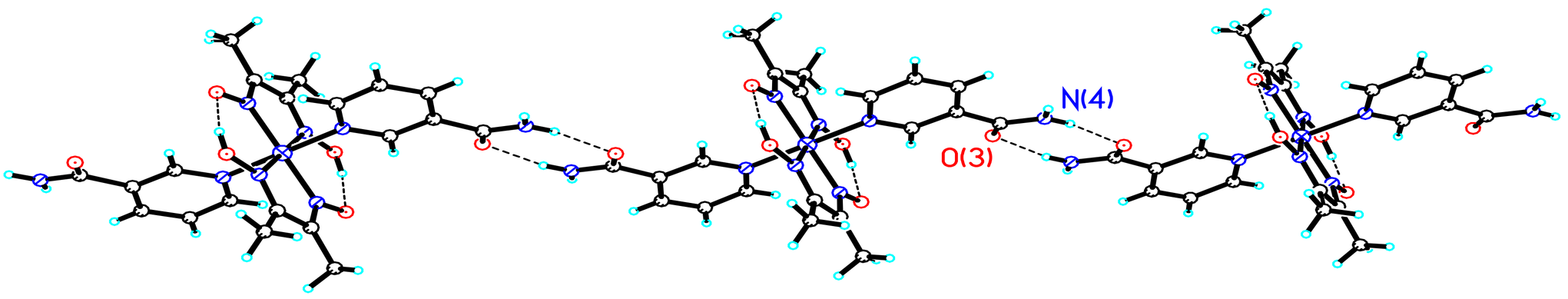
Patents: MD 510, MD 511, MD BSD 813

Authors: Eduard Coropceanu, Anastasia Ștefârță, Ion Bulhac

G

The coordination compounds of transition metals with oxime ligands possess properties of bioactive substances with a positive impact on plant growth, development, resistance and productivity. Treating the seeds for sowing and the leaf apparatus during the growing season, with aqueous solutions of Difecoden, Difemanden, Coditiaz, Conimid, Cobamid conditions the optimization of the functional state, growth and development of corn, soybean, sugar beet, cucumber, tomato, beetroot, peanut plants , both in favorable humidity conditions and in a moderate water deficit. The coordinative compounds used have the property of activating vital processes already at the initial stages of individual plant development, stimulate the growth of the root system, ensure the homeostasis of the water status in conditions of suboptimal water regime, increase plant productivity, strengthen the body's protective functions, increasing tolerance to suboptimal factors. In conditions of low humidity, Difecoden, Cobamid, Conimid and Coditiaz have an influence of reducing the effect of drought on the formation of the assimilative apparatus, the accumulation of biomass and the harvest of plants. The use of coordinative compounds in combination with water-soluble polymers (PVP, coVP) ensures the reduction of water consumption in the transpiration process without negative consequences on the accumulation of plant biomass.

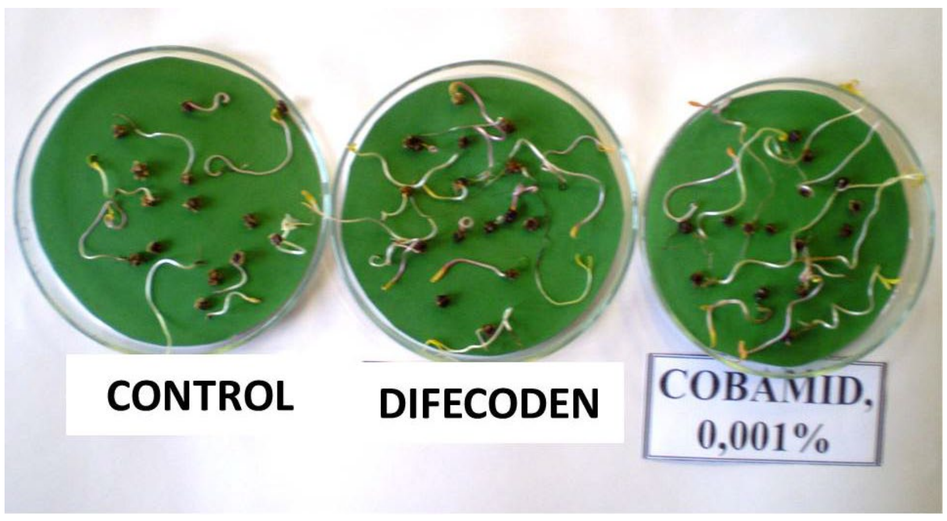
The coordinative compounds Difecoden, Conimid and Fludisec, possess antioxidant properties that areFormamnaitfieson teofd hinydrinogcreen asingbonds thaend aofnti tohexid uniandit mpreonst iectonaiol npsceapaudo cictyhaion fin [theCo(trDeHat)2e(dNiap)2la][nBtF4o].r2Hga2nsO. as a consequence of the intensification of antioxidant enzyme activity in them with a positive impact on plant productivity.



Formation of hydrogen bonds and of the unidimensional pseudo chain in $[Co(DH)_2(Nia)_2][BF_4]\cdot 2H_2O$



The influence of sowing seed and foliar apparatus treatment on the growth of cucumber plants



The effect of sugar beet treatment with physiologically active substances on seedlings growth and development at the initial stage of ontogenesis (9 days after treatment)

coropceanu.eduard@upsc.md

THE LOCAL CULTIVAR OF ELECAMPANE, *INULA HELENIUM* „ILEANA”

„Alexandru Ciubotaru” National Botanical Garden (Institute)
of Moldova State University, Republic of Moldova

Patent no. 401 / 2023.02.28

Author: Dr. Victor ŢÎŢEI

G

Description: **The local cultivar of elecampane, *Inula helenium* „ILEANA” registered in the Catalogue of Plant Varieties (no. 2594630 /2021) and patented by the State Agency on Intellectual Property, AGEPI, of the Republic of Moldova (no. 401 / 2023.02.28) is multi-purpose perennial crops with melliferous, ornamental, forage, medicinal, energy mass applications.**



6-10 kg/ha seeds incorporated at a depth of 2-3 cm are necessary, sowing period April or 40-50 thousand seedling plants/ha.







green mass substrates



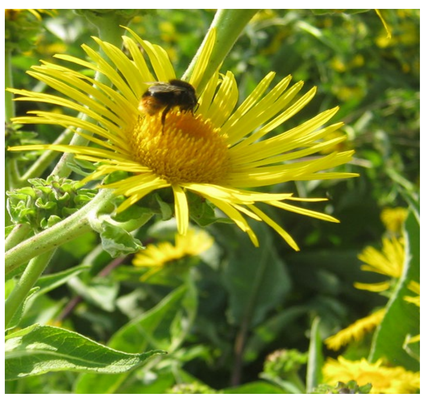
ensiled substrates





The stalks biomass had moderate gross calorific value of 18.5 MJ/kg and the amount of ash 2.6%, the specific density of the densified biofuel reached 800 kg/m3.

The forage values of the ensiled plants: 124.9 g/kg protein, 33.3 g/kg fats, 305 g/kg raw cellulose, 398 g/kg nitrogen-free extractive substances, 139 g/kg ash, 18.1 g/kg lactic acid, 3.9 g/kg acetic acid, 104 g digestible protein/ nutritive units.
The cv. „ILEANA” green and ensiled mass substrates for anaerobic digestion were characterized by optimal C/N ratio and hemicelluloses and moderate amount of lignin, the biochemical biomethane potential was 230-300 l/kg organic matter.



This cultivar is a source of pollen and nectar available for 30-42 days (July-August), and makes it possible to obtain 70-130 kg/ha of honey.



The elecampane rhizomes (Radix Inulae) contain 42% inulin and 9% other carbohydrates, as well as essential oils, which are used for the preparation of various pharmaceutical products, the aromatization of soft drinks, some wines and pastries

The local cultivar of elecampane *Inula helenium* „ILEANA” it suitable to be cultivated on marginal and wet lands.

Financially supported, National Agency for Research and Development of the Republic of Moldova, project no. 20.80009.5107.02

“Mobilization of plant genetic resources, plant breeding and use as forage, melliferous and energy crops in bioeconomy”

https://gbni.usm.md/; vic.titei@gmail.com ; victor.titei@ gb.usm.md

THE LOCAL CULTIVAR OF GIANT MISCANTHUS, MISCANTHUS × GIGANTEUS *„TITAN”*

„Alexandru Ciubotaru” National Botanical Garden (Institute)
of Moldova State University, Republic of Moldova

Patent no. 348 / 2020.04.30

Authors: Dr. Victor ŢÎŢEI Dr. Alexandru TELEUȚĂ

G

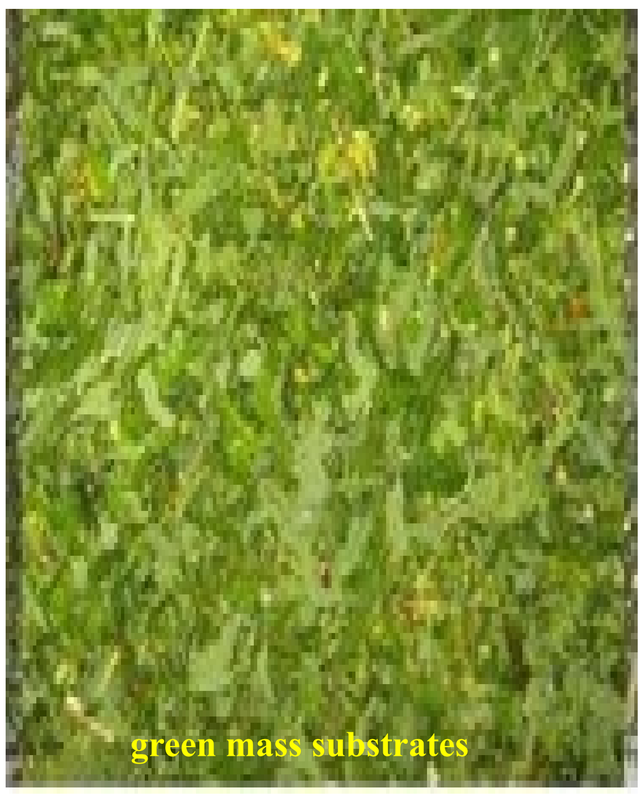
Description: **The local cultivar of giant miscanthus „TITAN” registered in the Catalogue of Plant Varieties (no. 0394505 /2021) and patented by the State Agency on Intellectual Property, AGEPI, of the Republic of Moldova (no. 348 / 2020.04.30) is perennial plant with numerous tillers 350-400 cm tall, annual productivity reached 60-100 t/ha of green mass or 16.2-28.0 t/ha dry matter.**

Multi-purpose crop: **ornamental plant, feedstock for renewable energy, biomaterials and chemicals production**













The biochemical methane yield of miscanthus green and ensiled substrates varied from 259 to 355 L/kg organic dry matter, the potential of biomethane production: 4100-7000 m3/ha/ year.

The specific density of miscanthus solid biofuel 882 kg/m3 of briquettes and 1262 kg/m3 of pellets, 1.73-2.51 % ash content, potential of energy production 325-500 GJ/ha/ year, equivalent to 11.1-20.1 t coal or 7.8- 12.2 t conventional oil. The miscanthus dry stalks mass was characterized by high content of cellulose (557 g/kg), hemicellulose (283 g/kg) with theoretical ethanol yield 610 l/t dry matter.

The miscanthus cultivar „TITAN” is useful in phyto-amelioration of eroded land and phytoremediation of contaminated land.

Financially supported, National Agency for Research and Development of the Republic of Moldova, project no. 20.80009.5107.02

“Mobilization of plant genetic resources, plant breeding and use as forage, melliferous and energy crops in bioeconomy”

https://gbni.usm.md/ vic.titei@gmail.com victor.titei@ gb.usm.md

THE LOCAL CULTIVAR OF PERENNIAL SORGHUM, *SORGHUM ALMUM „ ARGENTINA”*

„Alexandru Ciubotaru” National Botanical Garden (Institute)
of Moldova State University, Republic of Moldova

Patent no. 344 / 2020.04.30

Authors: Dr. Victor ŢÎŢEI Dr. Alexandru TELEUȚĂ

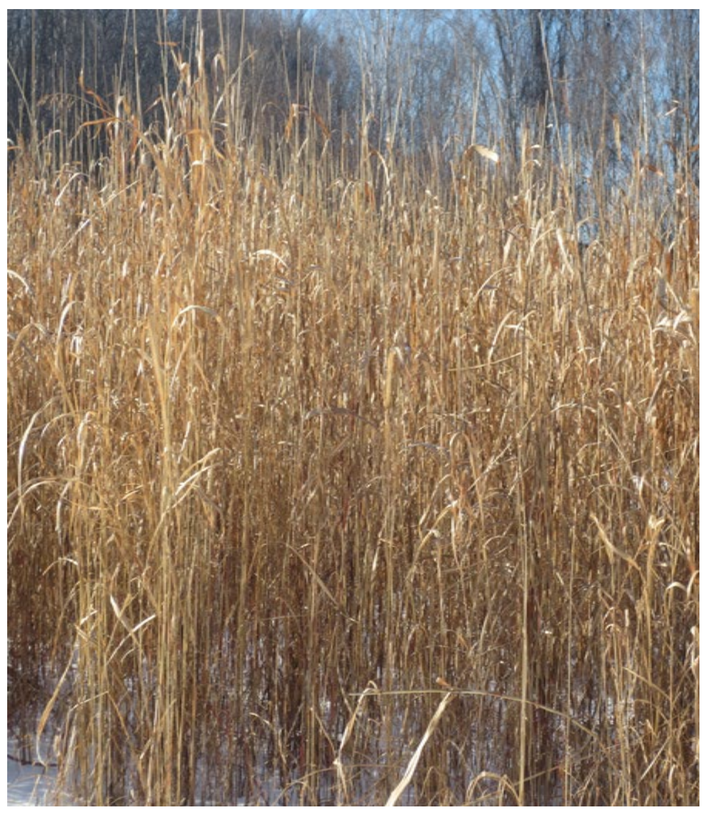
G

Description: **The local cultivar of „ARGENTINA” of perennial sorghum (columbus grass) registered in the Catalogue of Plant Varieties (no. 2584624/2021) and patented by the State Agency on Intellectual Property (AGEPI) of the Republic of Moldova is perennial plant with numerous tillers 250-270 cm tall, annual productivity from three cuts reached 61 t/ha green mass or 14 t/ha dry matter.**

Multi-purpose crop: **forage for animals (natural fodder, hay, haylage, silage, vitaminized flour, grains), biomass for renewable energy production, technical products.**

















The biochemical composition, nutritive and energy values of forage varied significantly in dependence of the cut: 186-267 g/kg DM, 51.0-141.9 g/kg CP, 19.6-34.5 g/kg EE, 76.7.0-138.2 g/kg ash, 670-781 g/kg NDF, 440-493g/kg ADF, 45-62 g/kg ADL, 376-447 g/kg Cel, 249-315 g/kg HC, 5.2-5.3 g/kg Ca and 1.8-3.2 g/kg P, 24.00-45.59 mg/kg carotene, 10.17-11.16 MJ/kg DE, 8.35-9.16 MJ/kg ME and 4.37-5.18 MJ/kg NEl. The ensiled mass was characterized by pH= 3.8-4.5, 24.7-45.5 g/kg lactic acid, 6.3-9.1 g/kg acetic acid, 0-0.2g/kg butyric acid, 7.58-9.52 % CP, 3.2-3.68 % EE, 7.72-10.76 % ash, 65.7-66.2 % NDF, 41.0-43.3 % ADF, 4.0-4.8 % ADL, 37.0-38.5% Cel, 22.9-24.7 % HC, 35.70-47.17 mg/kg caro-tene, 3.7-5.5 g/kg Ca and 1.8-2.7 g/kg P, 10.85-11.33 MJ/kg DE, 8.91-9.30 MJ/kg ME and 5.06-5.32 MJ/kg NEl.

The grains nutrients content of the cultivar „ARGENTINA” was: 10.1 % CP, 4.5 % EE, 10.5 % CF, 70.2 % NFE and 4.7 % minerals.

The gas forming potential of green and ensiled mass substrates was 546-680 l/kg; the methane yield was 279-350 l/kg; the annual methane productivity achieved 4198m3/ha.

The specific density of perennial sorghum biofuel 783 kg/m3 of briquettes and 1008 kg/m3 of pellets,2.73-3.71 % ash content, potential of energy production 190-270 GJ/ha, equivalent to 6.5-9.2 t coal or 4.6-6.4 t conventional oil. The dry stalks mass was characterized by optimal content of cellulose and hemicellulose with theoretical ethanol yield 560 l/t dry matter.

The perennial sorghum cultivar „ARGENTINA” is useful in phyto-amelioration of salt-affected land, eroded land and of contaminated land.

Financially supported, National Agency for Research and Development of the Republic of Moldova, project no. 20.80009.5107.02

“Mobilization of plant genetic resources, plant breeding and use as forage, melliferous and energy crops in bioeconomy”

https://gbni.usm.md/; vic.titei@gmail.com; victor.titei@ gb.usm.md

H

Foods

Drinks

Restaurants

Hotels & Spa

โรงเรียนสาธิตจุฬาลงกรณ์มหาวิทยาลัย ฝ่ายมัธยม
Chulalongkorn University Demonstration Secondary School

Boba-licious

This project was supported by Satit Chula Innovation Society

Author/s: Chomchan SITTIKIT
Mentor : Mr. Jeerasak Jitrotjanarak

H

"Have you ever encountered the challenge of eating boba tea and struggling to consume all the tapioca pearls at the bottom of the cup? I personally experienced this difficulty and didn't want to waste the pearls that I couldn't reach."

2nd

Ranking

Thailand's boba market 2nd Ranking in SE Asia

26

Billion Baht

Of the boba market sales value

6

cups per person/month

Thailand's average consumption of 6 cups per person/month

*I conduct research concerning the boba market in Thailand

Motivated by the problem, I devised a solution - a device to separate ice from pearls. This device would have small holes for the drink to flow through, reaching the pearls, and a hole for the boba straw. The materials used would be food-grade and sturdy to withstand the ice's pressure.





Contact: scis.cud@gmail.com , j_jerasak@hotmail.com, +66 95 935 1062 , +66 84639 6363

MOLDOVA STATE UNIVERSITY
FACULTY OF ECONOMIC SCIENCES
SUSTAINABLE DEVELOPMENT AND ECONOMIC PERFORMANCE RESEARCH CENTER
60, Alexei Mateevici str., MD 2009, Chisinau, Republic of Moldova
Tel.: +373-673 14 315 E-mail: fse@usm.md

HR EXCELLENCE IN RESEARCH

THE CHALLENGES OF THE COVID-19 PANDEMIC ON TOURISM DEVELOPMENT

RESEARCH PROJECT NUMBER: 20.80009.7007.15

AUTHORS: Maria HĂMURARU, Veronica BULAT

APPLICATION FIELDS: H - Foods, Drinks, Restaurants, Hotels & Spa.

AIM: Identifying opportunities for tourism development as a consequence of the COVID-19 pandemic.

SOLUTION: Tourism potential is one of the main motivators for travel in the Republic of Moldova. There are more than 15 thousand man-made tourist attractions and more than 300 important natural areas in the Republic of Moldova that provide tourist offer. The COVID-19 pandemic has significantly increased the perception of travel risks, joining excursions, traveling to unknown places and other general hospitality hazards. This has radically fueled both the development and demand for virtual forms of tourism. Whether it is during times of isolation or because of fear of traveling after the epidemic, there is certainly a demand for a tourism product that, just a few months before, was unknown to most of the population.

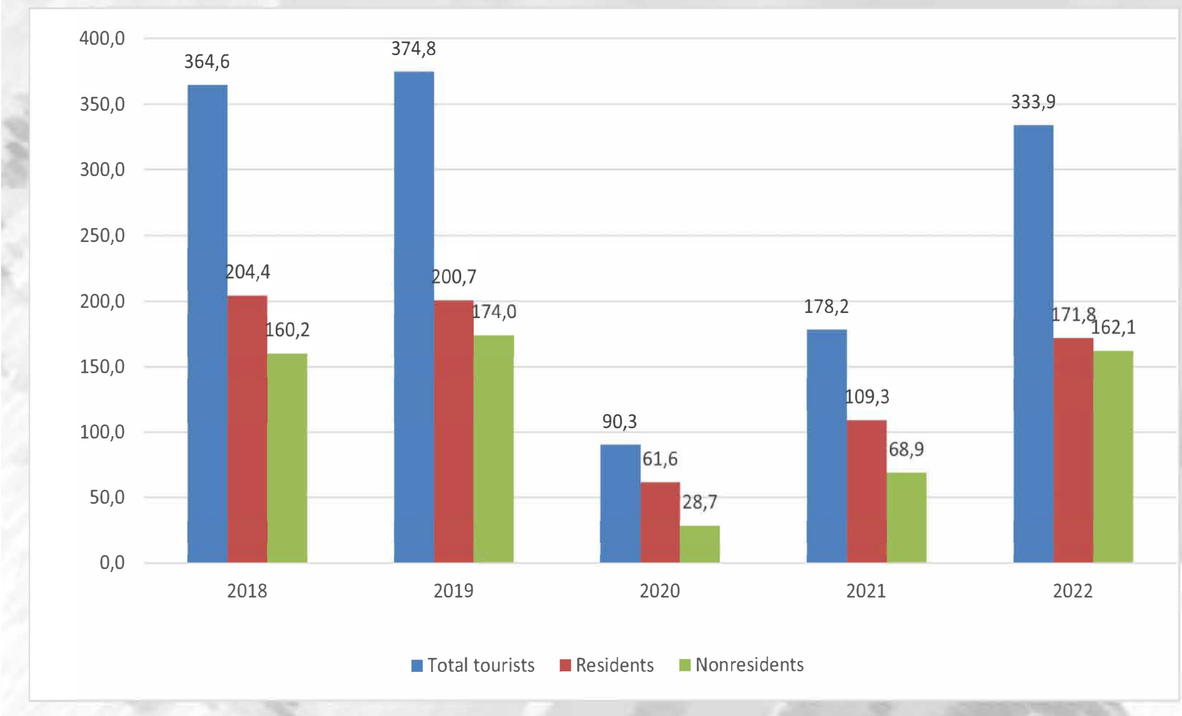


Figure 1. Tourists staying in collective tourist reception structures in Republic of Moldova (thousands of tourists)

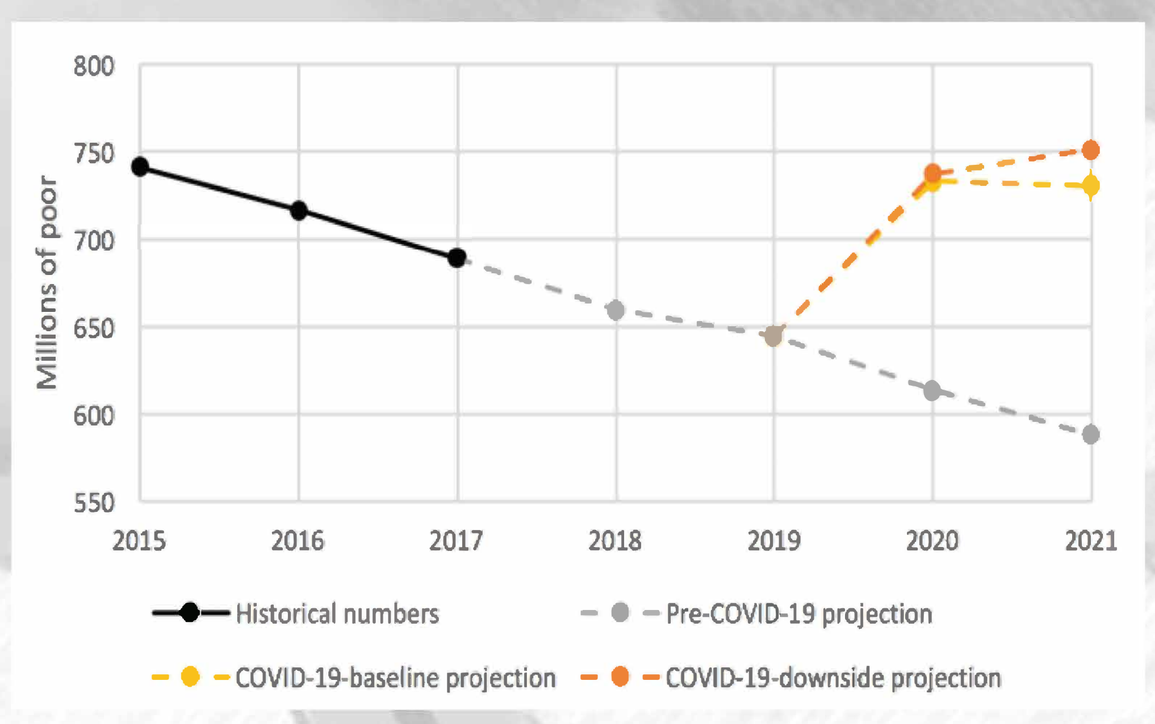
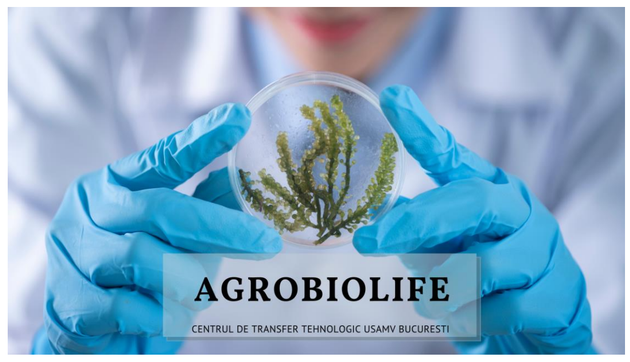


Figure 2. The impact of COVID-19 on global poverty

ADVANTAGES: The methods of virtual tourism research has the potential of becoming a good method of promoting our country at national and international level.

IMPLEMENTATION STAGE: At the research level and preparing the publication.

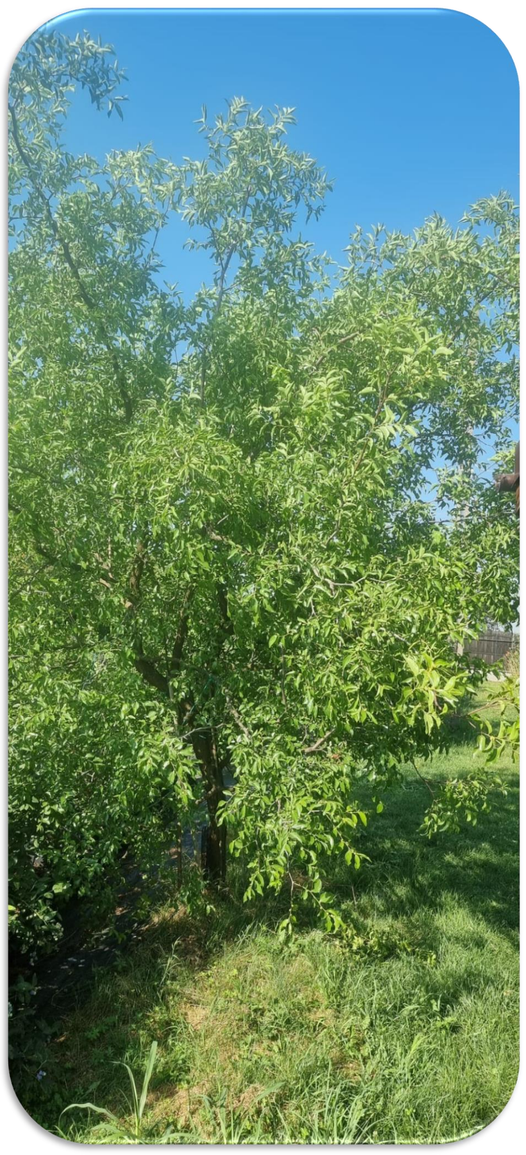
ACKNOWLEDGMENTS: This research was supported by the *research project: # 20.80009.7007.15*



University of Agronomic Sciences and Veterinary Medicine – București

Ziprim – an earlier cultivar for jujube (*Ziziphus jujuba* L.) homologated at the Faculty of Horticulture in Bucharest

Asănică Constantin Adrian, Stănică Florin, Mihai Cosmin Alexandru, Peticilă George Adrian
Faculty of Horticulture, University of Agronomic Sciences and Veterinary Medicine of Bucharest







- Jujube (*Ziziphus jujuba* L.) is a new fruit species for Romania with a high potential for valorizing areas exposed to desertification or salinization.
- At the same time, it is well known globally for its exceptional nutraceutical properties (for centuries, it has been used as a medicinal plant).
- The plants can be cultivated in the plum areas in Romania, with excellent results regarding yield and fruit qualities.

Cultivation technology:

- Planting system with Vertical Axis canopy, using specific pruning;
- By adopting planting distances of 4.0-4.5 m between rows, the use of mechanized means for orchard maintenance is possible;
- Soil maintenance can be done by using annual and perennial grasses and dicotyledonous plants, particularly Leguminosae from spontaneous flora; Through the repeated mowing of the grass carpet, these beneficial species for the ecosystem will thrive against the weeds;
- Fruits are changing the color starting from last week of August and are recommended to be picked for fresh consumption when they are brown on half of the surface. Harvest is done in 2-3 times over 2 weeks. For dehidratation is recomended to be harvested at a later ripen stage when fruits are complete brown.

Ziprim is the newest cultivar homologated by the Faculty of Horticulture in Bucharest, being one of the earliest in harvesting.

- The tree has a high vigor
- It presents resistance to diseases and pests
- It is drought resistant
- Low demands on the soil

- late flowering (mid-June)
- Early fruit ripening period, in the first decade of September

- Medium-large fruits with a sweet taste, and intense aroma
- High total soluble solids content
- High nutraceutical properties (super fruit!)





Composite food product and technology for manufacturing the composite food product consisting of microplants (sprouts/microgreens) and substrate for food use

H

This research was funded by the University of Agronomic Sciences and Veterinary Medicine of Bucharest through the Project no. 1067/15.06.2022, Production technology of aromatic microplants in an innovative cultivation system

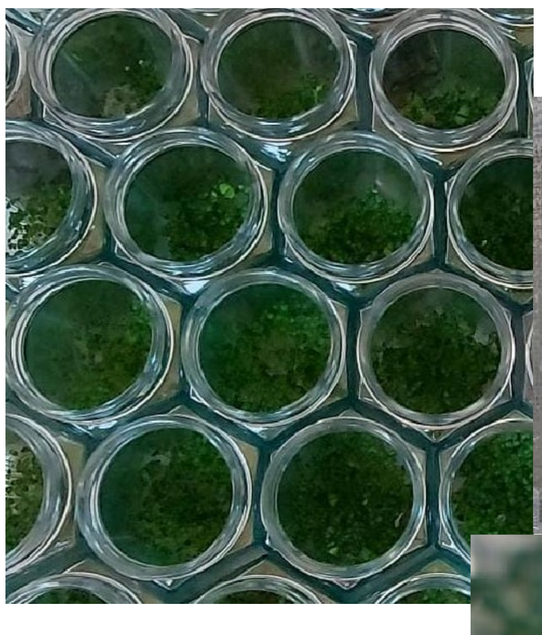
Authors: Livadariu Oana[1*], Băbeanu Narcisa Elena[1], Barbu Lavinia-Diana-Nicoleta[1], Boiu-Sicuia Oana-Alina[1], Peticilă Adrian George[2], Constantin Carmen Gabriela[2], Dobrin Aurora[2], Ion Violeta-Alexandra[2], Venat Cosmina Oana Arabela[2], Nicolae Ioana Cătălina[2], Lagunovschi-Luchian Viorica[3], Badea Monica Luminița[3]

[1] Faculty of Biotechnology, University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Mărăști Blvd., District 1, Bucharest, Romania
[2] Research Center for Studies of Food Quality and Agricultural Products, University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Mărăști Blvd., District 1, Bucharest, Romania
[3] Faculty of Horticulture, University of Agronomic Sciences and Veterinary Medicine of Bucharest of Bucharest, 59 Mărăști Blvd., District 1, Bucharest, Romania

This Patent application no. A / 00039 on 30.01.2023 registered at OSIM in Bucharest - Romania, inaugurates a new class of products for human use, both for ordinary consumers and for those in need of a personalized diet.

The major advantage is the complete consumption of the microplants (sprouts/microgreens), as the roots will be supplemented with edible particles contained at least in the substrate.

There is ongoing research on manufacturing products according to the patent.











As a result, this product and the subsequent technology come to support a greener Europe by conferring a higher quality level to the microplants (e.g. sprouts - microplants obtained by germinating seeds and consisting of radicle, hypocotyl and one or two cotyledons - and microgreens - microplants also obtained by seed germination, but consisting at least of radicle, hypocotyl, two true leaves that have the morphology specific to the species and epicotyl-), so that they contribute as functional foods with therapeutic potential:

- in nutrition intended for consumers in the general population having organoleptic preferences or food options, or in case of targeted needs and
- in precision nutrition with functional/immuno-modulatory foods intended for consumers who have specific needs (e.g., athletes), and cannot use synthesis nutrition supplements.

CONCLUSIONS

- ✓ **The possibility of exploiting the innovative result through CBI mainly derives from the potential for immediate use in activities for:**
  - **scientific research,**
  - **university education (Bachelor, Master and Doctoral Degrees),**
  - **the establishment of start-ups in Bucharest USAMV and concept development by franchising.**
- ✓ **Directions of applicability:**
  - **eco-innovative product in obtaining aromatic sorrel microplants,**
  - **eco-innovative product in obtaining aromatic basil microplants,**
  - **eco-innovative technology in plant cultivation,**
  - **biotechnology in the food industry and**
  - **technology for obtaining new basic materials-composites, intended for the production of nutritional supplements or superfoods (by turning them into powders with the help of lyophilization or dehydration and grinding in CO_2.**



Contact: rectorat@usamv.ro; ctt-agrobiolife@usamv.ro; oana.livadariu@biotehnologii.usamv.ro

DELICII RUSTICE

RUSTIC DELICIOUSNESS

Authors: Adrian CHIRCULESCU, Raluca BALOS

H

Welcome to our authentic culinary world, where tradition meets taste! At Delicii Rustice, we craft a range of exquisite products that capture the essence of Romanian heritage.

Our lineup includes homemade delights such as eggplant, bean, mushroom, and tuna spread, called “zacusca”, along with fiery chili pepper, onion, blueberry, and raspberry jams.

What sets us apart? Every creation is a tribute to nature's finest, sourced from local organic producers. We take pride in preserving time-honored Romanian recipes, passed down through generations, ensuring that every jar holds the spirit of our culture.

“Delicii Rustice”: Taste the tradition, savor the future!













With each “zacusca” and jar of jam, you're savoring a piece of history, where flavors tell stories of old. As we grow, we remain dedicated to the same principles, supporting our community and embracing innovation. Our commitment to sustainable sourcing and traditional craftsmanship will remain unwavering, even as we expand into larger production.

Contact: deliciirustice@gmail.com **+40767 111 660**

@DELICII.RUSTICE

NATURAL PRESERVATIVE WITH ANTIOXIDANT ACTIVITY FOR FOOD OILS, EXTRACTED FROM SEA BUCKTHORN FRUITS (*HIPPOPHAE RHAMNOIDES*)

Patent no. 127155

H

AUTHORS: Camelia Puia PAPUC[1], Gheorghe Valentin GORAN[1], Valentin Răzvan NICORESCU[1], Nicoleta Corina DURDUN[1]

[1] University of Agronomic Sciences and Veterinary Medicine of Bucharest, Romania
59 Marasti Blvd, District 1, 011464, Bucharest, Romania, corina.predescu@fmvb.usamv.ro

DESCRIPTION OF THE INVENTION

Main purposes of the invention. The invention relates to a natural product as a solution with strong antioxidant properties indicated primarily for the preservation of edible oils as an alternative to tert-butyl-4-hydroxy-anisole (BHA) and 2 6-di-tert-butyl-p-cresol (BHT) synthetic antioxidants. The antioxidant activity of the product was tested in the laboratories of U.A.S.V.M. of Bucharest. The results indicate the following antioxidant properties of the product: (1) it acts as a chelator of transition metal ions, especially Fe^{2+} ion, which is considered an initiator of lipid oxidation in the Fenton reaction; (2) it has the ability to neutralize reactive oxygen and nitrogen species (hydroxyl radical, superoxide anion, hydrogen peroxide, hypochlorite anion and nitric oxide); (3) it inhibits the lipid peroxidation of a linoleic acid emulsion; (4) it inhibits the peroxidation of phospholipids extracted from rat brain. It is well known that sea buckthorn fruit is rich in vitamins A, C, E, K, flavonoids, lycopene, organic acids, kaempferol, triglycerides, phytosterols, polyphenolic compounds and minerals. The high content of vitamins A, C, and E, flavonoids, polyphenols, carotenoids and selenium ensure the powerful antioxidant activity of sea buckthorn fruit. The natural product with antioxidant activity proposed by us has a beneficial effect on consumers because (1) the use of synthetic antioxidants can be avoided; (2) inhibits the formation of trans-trans peroxide stereoisomers; (3) the product has a beneficial effect on the health of consumers due to high content in flavonoids, carotenoids, liposoluble vitamins and minerals.

Technical problem solved. The technical problem solved by the invention is that the natural product with antioxidant activity proposed by us is superior to synthetic antioxidants for the following reasons: (1) the introduction of the natural product in oils in the concentration of 100 ppm has the same effect as BHA and BHT synthetic antioxidants added in double concentration (200 ppm); (2) the product is non-toxic; (3) the product contains, besides polyphenols, other compounds with beneficial effects on consumer health (carotenoids, vitamins A, E and K, phytosterols, etc.); (4) unlike BHT and BHA synthetic antioxidants, which favour the formation of trans-trans peroxide stereoisomers, our product favours the formation of cis-trans peroxide stereoisomers; (5) the product has a low price and it is ecological; (6) adding this product to oils will inhibit oxidation (rancidity), increasing their validity and will have a beneficial effect on consumers health.

Claims. Liquid natural preservative extracted from sea buckthorn fruits, which prevents the oxidation (rancidity) of food oils, consisting mainly of polyphenols in the concentration of 5…10 g gallic acid equivalent /100 ml.



Contact: Nicoleta Corina Predescu (Durdun) +04 0744867527

VORONSKAYA

Author/s: PRODALCOM team

H

SC PRODALCOM SA was born in the north of Moldova as a materialization and cementing of a lasting friendship between the company's shareholders. This friendship led further and contributed to the increase in the notoriety of Vorona, initially known for the monastery here and the secular woods that surround it.

The year 2017 was THE YEAR OF GROWTH for PRODALCOM:

- Refurbishment of the Vorona bottling section
- Refurbishment of the Botoșani Factory
- Opening of Suceava warehouse

The nature created it,
we just bottled it!







SCAN ME



OUR WORLD

From the company's founding in 1993, to celebrating the moments that matter to us and our community. Here you can see images and video from events that bring people together.

Contact: office@prodalcom.ro

LA LIBRĂRIE

Author/s: Sergiu STANESCU & LA LIBRĂRIA Team

H

La Librarie is a wine, liquor and coffee shop that's offering a wide range of imported or niche Romanian products. Either to serve on site, in a chill-out atmosphere, or to take away, we are here to offer some piece of advice in order to help you choose what mostly suits your gourmet appetite. You can have a cigar too, and if in a lucky day, you may enjoy an evening of wine tasting.







SCAN ME

Contact:

+40749 063 833

Adriana's Honey

Authors: Ignat-Matei Adriana
Ignat-Matei Adriana Daniela
Ignat-Matei Alexandra Roxana

H

Bee products intended for a healthy diet. In order to produce organic honey, bees are relocated to pollution-free areas as far away as possible from inhabited areas such as mountains, plains, and hills. **Types of honey: polyflora, cherries, lime, chestnut, fir, sunflower, scallops.**











In addition to honey, we also produce pollen, propolis, wax and a series of ENERGIN-like mixed products.

Capaceala is a beekeeping product that people don't really know, but it has great health benefits. As everyone understands, this is the cover of the honeycomb, with which the bees "seal" the honey deposited in each cell of the honeycombs.

In the mixture, honey with sea buckthorn fruits represents a complete cure with numerous healing properties for the body. In honey with sea buckthorn we find Vitamin A, the complex of B vitamins (B1, B2, B6, B9), Vitamins E, K, P and F, beta-carotene (more concentrated than in carrots) and other microelements such as calcium, magnesium, phosphorus, iron, potassium and volatile oils.

Contact: +40720575824 danielaign9@yahoo.com

RECORD DONER
BY
STAR DONER & PIZZA

Food Project

Authors: Irimia Marius Ionut & Team

H

We created the STAR Taste World just for you. STAR Doner&Pizza, a new, original concept based on quality and diversity adapted to any situation, with a portfolio of over 70 products. The service is provided directly from our location or based on the order with home delivery.

This year the Star Doner & Pizza team made the largest Doner in Romania with a diameter of 85 centimeters and over 50 kilograms.










Contact: ***+40731 588 801*** ***https://www.facebook.com/profile.php?id=100088256882595***

Opportunity
CORNELIUGROUP
Research-Innovation Association
Creation
Realization
INVENTCOR
Power of Creative Mind
Deva ROMANIA



VBUNG® Technology

H

No Added Additives and Preservatives

Maceration, Fermentation, Malolactic Fermentation and Aging under Continuous Pressure in Custom Wooden Barrels

WWW.VBUNGVDOOR.COM

Standard Patent AU 2018203047 from 4th of May 2017 / Application EP 3564354A1

The speed of oxidation during maceration, fermentation, malolactic fermentation and aging is much faster than the process of winemaking itself which is a huge disadvantage and requires control using manly Additives and Preservatives.

The invention refers to a Totally New ***VBUNG ® Technology*** by applying:

Isobaric Winemaking Process inside Custom Wooden Barrels Giving Control Over Oxidation, Contamination, and Evaporation.

1. Positive pressure can be created naturally by CO2 during fermentation or artificially using any food-grade gasses allowed
2. Negative pressure can be created using a vacuum system

No added Additives and Preservatives Winemaking
=
Grapes + Custom Wooden Barrel + VBUNG ® Equipment

Custom Wooden Barrel :

1. Food Grade Silicone Rod Between Staves / Barrelhead
2. Reinforced Hoops With Bolts
3. Acrylic Barrel Head for Sunlight / Visual / Sensors

VBUNG Patented Equipment :

1. Safety Relief Valve / Spunding Valve
2. Adjustable Racking Filter / Sparger / Liquid Inlet and Outlet Port
3. O2/N2/CO2/Ar…etc. Food Grade Gasses Inlet and Outlet Port
4. Temperature / Pressure / Dissolved Oxygen …etc. Sensors/ Wireless Sensors

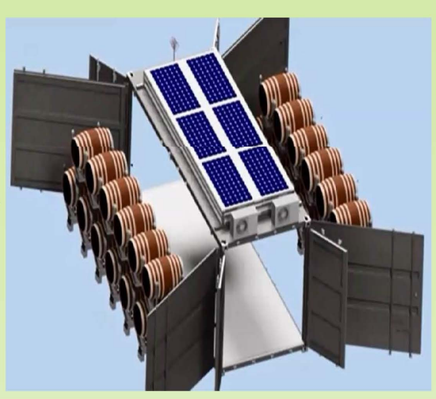
Advantages

1. Sustainable Technology and Equipment without the use of Additives and Preservatives
2. Sustainable Mobile Winery in the vineyard with solar panels, sensors, and mobile data
3. Accelerated Winemaking and Aging technological process
4. Equipment Control over Oxidation, Contamination, and Evaporation
5. New or Old Wooden barrels can be used once custom modifications are done
6. Whole bunch, Juice, or Berries can be used
7. No Juice clarification is needed (No flotation, cold settling, or centrifugation)
8. No temperature or humidity control is required (Fermentation at high temperatures for white winemaking is not a problem)
9. Direct Sunlight for the whole technological process
10. No need for topping the barrels
11. Taking out wine samples for laboratory or tasting without oxidation, contamination, evaporation
12. Barrel regeneration with compressed O2 or Air before vintage
13. Extended lifetime for wooden barrels due to custom construction
14. Can be applied to making and aging Wine, Beer, Cider, Vinegar, and aging Spirits.
15. Reduced labor, time, and cost.
16. Global potential













Establishing a Vegetable Freezing Project at Onaizah, Saudi Arabia for the year 2023

Research project

Muhammad Othman Al-Shtewi

Abdulaziz Mohammed Al-Badi

Supervised By: Dr. Majed Farouk

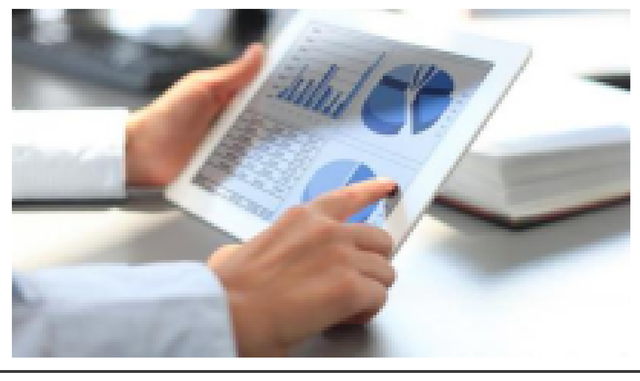
H

The Importance of the Vegetable freezing project

Vegetable freezing projects are of paramount importance in our efforts to build a more sustainable and resilient food system. They address issues related to food security, food waste, and nutritional value while supporting farmers and expanding global trade. As we face the challenges of a growing population and climate change, these projects will continue to be a crucial tool in ensuring that nutritious vegetables are available to all, regardless of season or location .

6 Steps to establish the store to freeze vegetables

1 Research your job market



Equip yourself with knowledge of the latest technology and equipment before venturing into the project and know the type of customers who benefit from the vegetable freezing service.

2 Write a business plan



Create a detailed business plan for freezing vegetables and define everything from business goals to the type of customers we want to attract.

3 Obtain the required legal permissions



Register your business with the competent authorities and obtain your tax ID to establish your business.
Pay taxes on time.
Secure the necessary insurance policies to protect your business.

4 Buy equipment



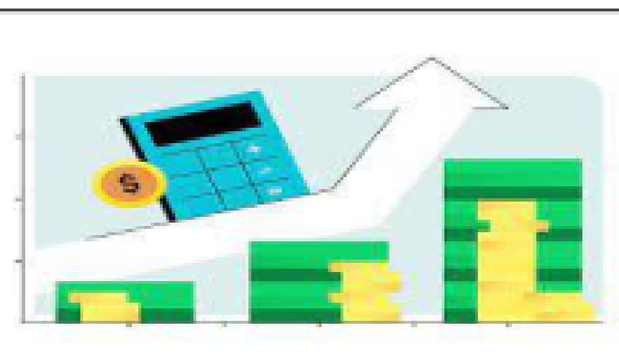
Create a shopping list of equipment for freezing vegetables and the freezing tools you will need, such as freezers, preservation and packaging tools.

5 Marketing startup for freezing



Writing blogs and publishing content on social media sites.

6 Calculate your profits and business



Calculate your profits and business growth.

Contact: Dr. Maged Farouk

Onaizah Colleges, Saudi Arabia & Workers University, Egypt

magedfarouk5@gmail.com

WhatsApp:+966560685792

Opportunity
CORNELIUGROUP Research-Innovation Association
Creation
Realization
INVENTCOR
Power of Creative Mind
Deva ROMANIA

Therefresh

THE REFRESH CONCEPT

PROJECT: HOSPITALITY CULTURE

Author: Florin Pirus & Team

H

Our company has been on the market for more than 12 years and we are continuously expanding.

Our activity is in the HoReCa field, we own 7 coffeeshops, a coffee roaster and a restaurant. In our cafes we offer our own brand of specialty coffee, hot chocolate, smoothie bar, catering and delivery services, in addition we are expanded with an online store where we offer our customers a varied range of products and accessories for serving and preparing tea and coffee.



Vision *TheRefresh is the place where you can really taste well-being!*

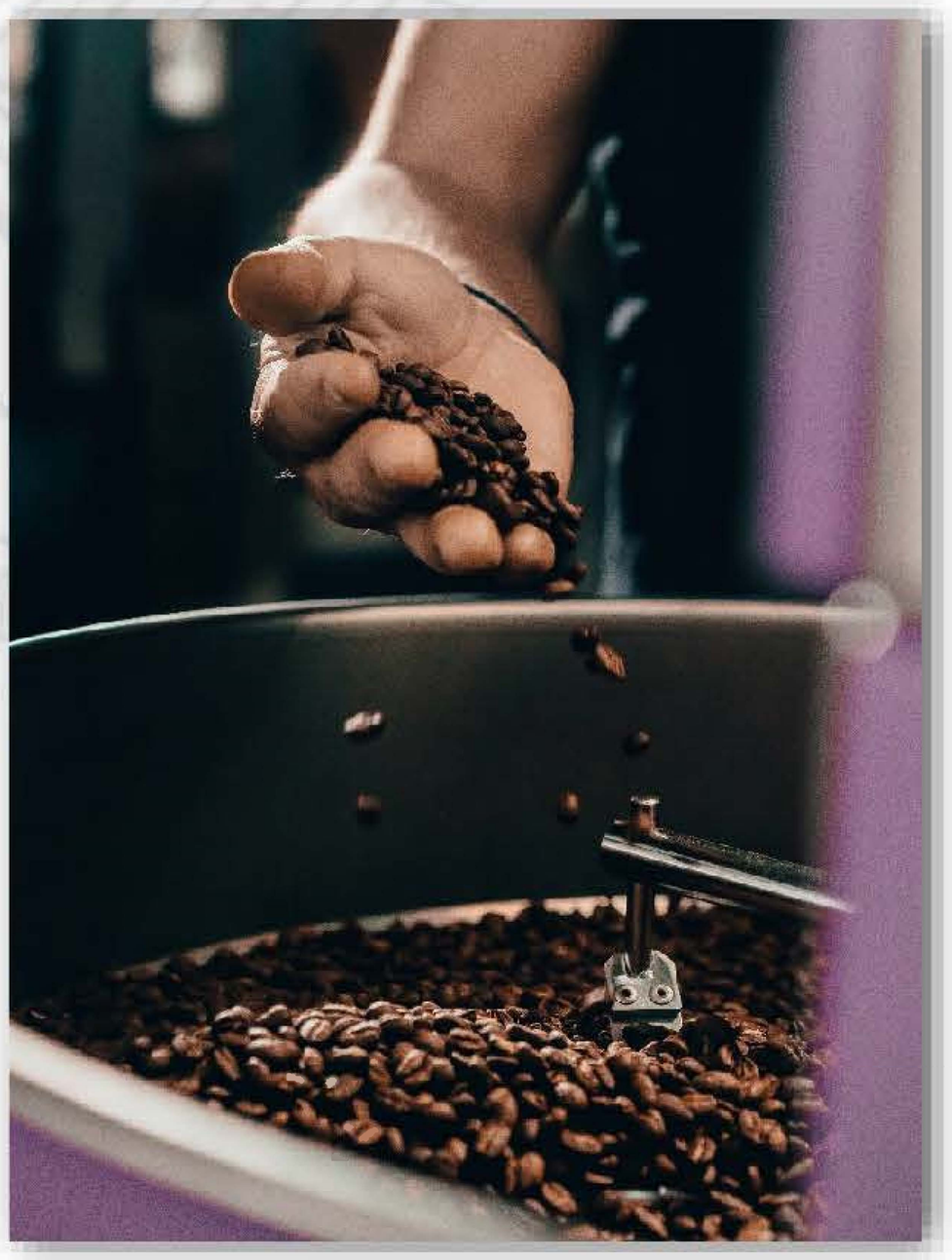
TheRefresh is more than a company or even a cafe. TheRefresh is a complex concept, which is based on the strong idea of refreshing, stimulating and educating the senses, to facilitate reaching the optimal level of energy and well-being.

TheRefresh is a concept aimed at offering customers a substitute for a healthy and balanced meal in the form of smoothies, teas and coffee.

TheRefresh is the place where the team is educated to serve all products in their finished form at the highest quality, honoring cultural factors and professional preparation methods. TheRefresh is more than a company or even a cafe. TheRefresh is a complex concept, which is based on the strong idea of refreshing, stimulating and educating the senses, to facilitate reaching the optimal level of energy and well-being.

TheRefresh is a concept aimed at offering customers a substitute for a healthy and balanced meal in the form of smoothies, teas and coffee.

TheRefresh is the place where the team is educated to serve all products in their finished form at the highest quality, honoring cultural factors and professional preparation methods.



Scan

Contact: S.C. COFFEE&BEVERAGE S.R.L
E-mail: florin@therefresh.ro Tel.: +40 721 726 116 www.therefresh.ro

I

Textiles

Clothing

Fashion

Handmade

HACKTEX - Innovative smart textiles & entrepreneurship

Research project

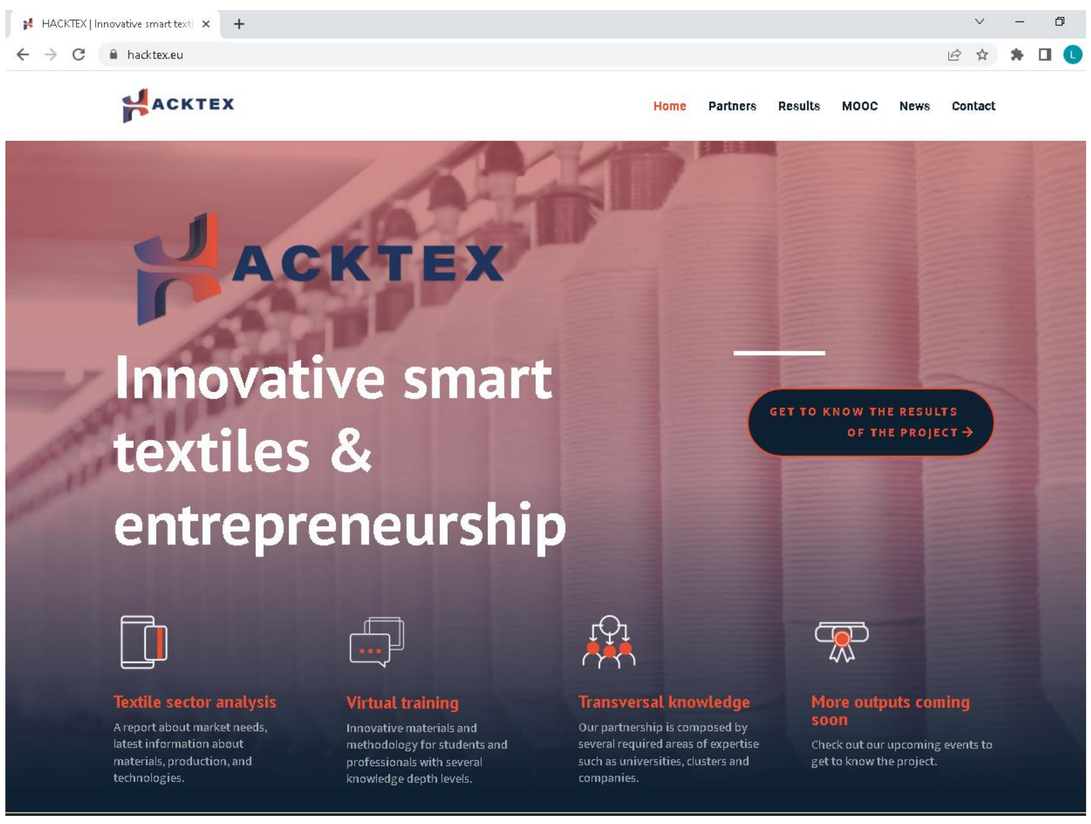
Authors: Luminița Ciobanu, Savin Dorin Ionesi, Lidia Alexa

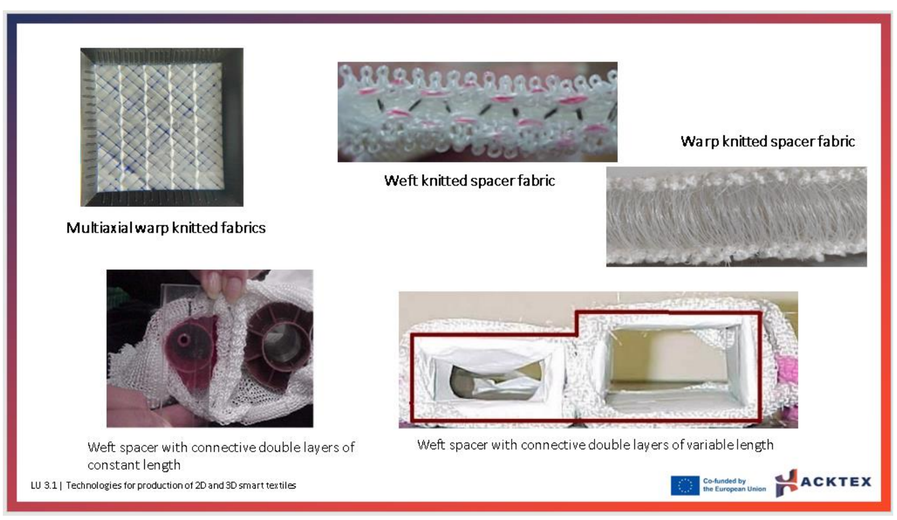
I

This is an EU-funded project, HACKTEX - Innovative smart textiles & entrepreneurship, no. 2021-1-RO01-KA220-HED-000027527. All information on the results of the project reflects the contributions of all partners – TUIASI - Romania, AEI Textils - Spain, CRE.THI.DEV. - Greece, CIAPE - Italy, Universitat Politecnica de Catalunya - Spain, University of West Attica - Greece, University of Borås - Sweden, TITERA - Germany.

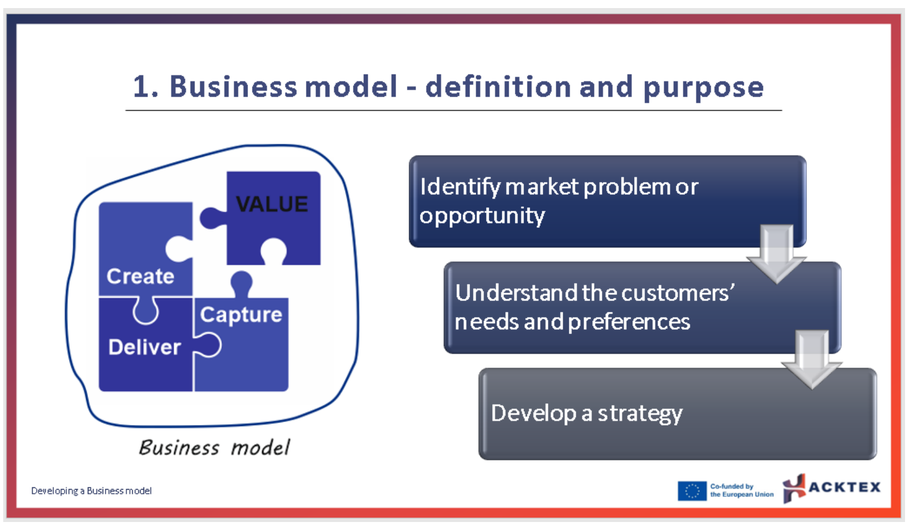
Smart textiles represent a large group of advanced textiles with new functions obtained using high-performance raw materials and specialized treatments. The HACKTEX project develops the tools necessary for skills enhancement targeted to higher education in relation to innovation in order to obtain its objectives: support higher education students to acquire skills in transdisciplinary innovation based on smart textiles; foster student cooperation multidisciplinary approach in hands-on projects; provide knowledge, skills, and competences using virtual learning methodologies and tools; promote the application of good practices for the enhancement of innovative skills; strengthen collaboration between universities with the advanced textiles industry.

Using videos and reading materials, the MOOC on smart textiles discusses the basics of this domain, specific raw materials, textile processes required to produce smart textiles, characteristics and specific standards, as well as issues related to sustainability.





SCAN ME



The guide on entrepreneurship covers the steps needed to develop a business model that will help research results transition toward the market. The virtual training materials are to be tested in a training session (Bootcamp), where 20 students from all 4 partner universities will participate in Boras, Sweden to classes, practical activities, visits to relevant companies, and a hackathon on developing business models adapted to smart textiles.

The MOOC on smart textiles and the virtual guide on entrepreneurship will be uploaded on a platform and are to be accessed for free by anyone interested in the field of smart textiles.

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Contact: luminita.ciobanu@academic.tuiasi.ro, https://hacktex.eu/index.php/contact/

Protective uniform for emergency medical responders

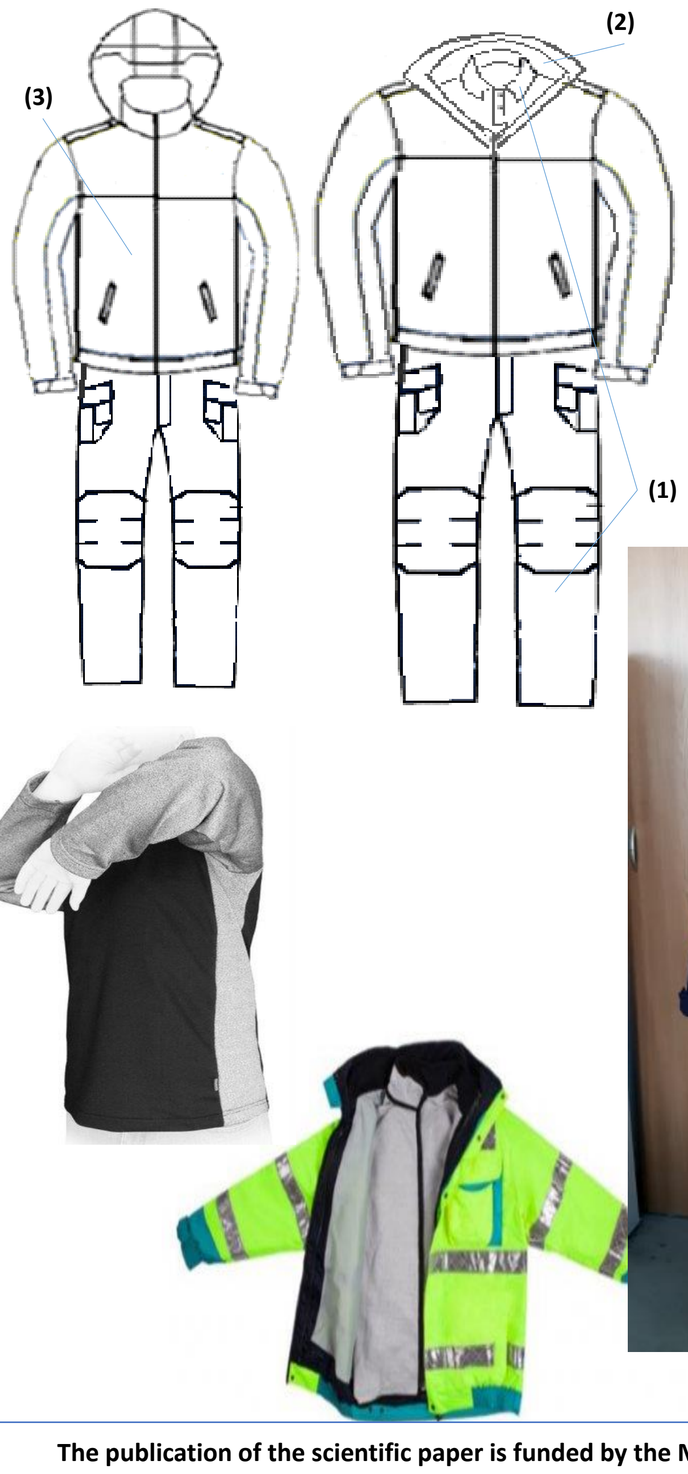
Patent application no. A 00772/09.12.2021

Authors: Toma Doina, Popescu Georgeta, Popescu Alina, Salistean Adrian, Badea Ionela, Popescu Adriana Iuliana

The invention refers to a system of protective clothing in the modular structure for protecting emergency medical responders against the multiple hazards, specific to the intervention missions.

The system according to the invention consists of three layers of different clothes, the first layer (1), worn in direct contact with the skin, is a costume made up of blouse, made of knitted fabric of 85% cotton fiber and 15% polypropylene yarns, with a mass of 200-230 g/m2 and pants made of woven fabric from a mixture of fibers including approximately 30-60% aramid fibers, 20-50% flame retardant cellulose fibers, 10-20% polyamide fibers, 2% antistatic fibers with a mass of 190-220 g/m2, the second layer (2), for protection against cutting /stinging, a jacket made of knitted fabric of high tenacity polyethylene fibers in combination with other technical fibers, with a mass of 440-450 g/m2, and the third layer (3) on the outside, the protection layer specific to the intervention mission, a jacket made of a layered textile support, laminated in 3 layers (outer layer: 100% PES fabric + intermediate layer: PTFE film + inner layer: 100% PA knit) breathable, with a mass of 180 - 200 g/m2.

The protective clothing thus made has performances according to the specifications of the standards: SR EN ISO 11612:2015 Protective clothing. Clothing to protect against heat and flame. Minimum performance requirements and SR EN 388+A1:2019 Protective gloves against mechanical risks; providing: resistance to limited flame spread: the mean value of after-flame time: 0s; the mean value of after-glow time: 0s; abrasion resistance, number of cycles>2000 (level 3); cut resistance: index >20 (level 5).















Protective uniform for emergency medical responders

a) costume made up of blouse and pants (first layer)

b) jacket for protection against cutting /stabbing (the second layer)

c) jacket (the outer layer)

d) a+b+c

The publication of the scientific paper is funded by the Ministry of Research, Innovation and Digitization within Program 1 - Development of the national R&D system, Subprogram 1.2 - Institutional Performance - RDI excellence funding projects, Contract no. 4 PFE/2021. The work was carried out through the Nucleu Program of the National Research Development and Innovation Plan 2019-2022, carried out with the support of MCID, project no. 4N/2019, PN 19 17 02 01, project title "Advanced multifunctional systems for logistics, communication and protection seeking to improve the safety, operability and effectiveness of emergency workers (SiMaLogPro)".

Contact: doina.toma@incdtp.ro - ***National R&D Institute for Textile and Leather - INCDTP***

Electroconductive composite based on nickel microparticles for electrodes, sensors and electromagnetic screens

Patent application No. A/00527/21.08.2020

Authors: Aileni Raluca Maria, Chiriac Laura, Toma Doina, Soare Vasile

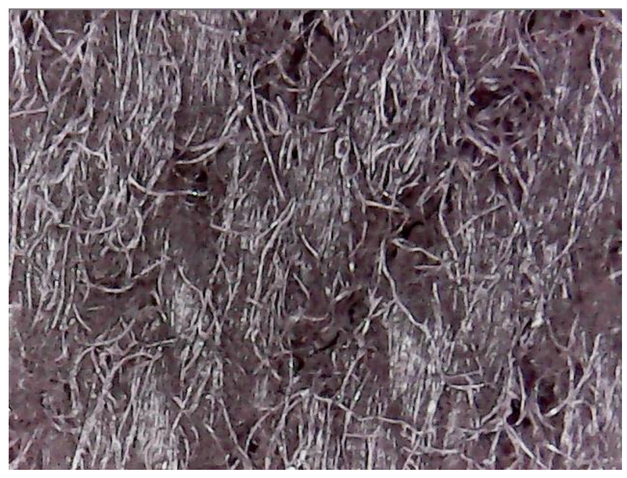
I

The invention refers to a process used for the functionalization of a fabric, the development of the electroconductive composite and the chemical composition of the electroconductive polymer paste based on Ni microparticles intended for the production of textile electrodes, sensors or screens for electromagnetic attenuation for technical applications, electronics, medicine or smart textiles.

The invention is characterized by the fact that the manufacturing of the composite material consists of the fabric functionalization in RF plasma oxygen and the deposition of the polymeric film-based Ni microparticles on the textile surface by lamination, scraping or direct printing process followed by crosslinking at 150 ... 170 ˚C.



a. Textile surface functionalized in RF O2 plasma



b. Textile Composite functionalized by coating with nickel paste

Surface analysis by optical microscopy

Advantages

- Due to the functionalization in oxygen plasma, the textile surface, initially hydrophobic, becomes hydrophilic and allows the polymer paste to adhere to the textile surface without the need for classic textile finishing procedures (e.g., alkaline boiling);
- Due to the thermal cross-linking, the electroconductive polymetric film is fixed on the fabric and allows obtaining textile electrodes with surface resistance having values between 10^1...10^3 Ω;
- Due to the doping with nickel microparticles with sizes < 150 µm, the composite material can be used to make surface electrodes for flexible sensors or screens for electromagnetic attenuation because nickel does not generate electromagnetic compatibility (EMC) problems.

Novelty

- the polymer film obtained mainly from polyvinyl alcohol, ethyl acetate, ethyl alcohol, acetone and Ni microparticles is uniform, hydrophilic, adheres to the surface of the fabric and cross-links at 150-170 ˚C for 2..5 minutes, showing low values of low electrical surface resistance (10^3 Ω), characteristic of electrical conductors;
- the initial functionalization of the textile support oxygen plasma, using the generator in MHz or kHz, increased the hydrophilicity and absorption capacity of polymeric substances in order to develop the electroconductive composite material by scraping, lamination, or direct printing on the textile surface.

Applications

The composite material can be used in technical applications (e.g., textile electrodes, sensors or screens for electromagnetic attenuation) for electronics and the medical domain.

Acknowledgment: The Ministry of Research, Innovation and Digitalization funded this research through the Program Nucleu, Contract PN 19 17 01 01 (3D ELECTROTEX), and the participation in the International Salon INVENTCOR 2023 within Program 1 - Development of the national R&D system, Subprogram 1.2 - Institutional Performance - RDI excellence funding projects, Contract no. 4 PFE/2021.

Contact: ***CS II Dr. Ing. Aileni Raluca Maria***

E-mail: raluca.aileni@incdtp.ro, www.incdtp.ro, INCDTP

Ultra-light textile structure used for the wing construction of a para-motor UAV platform for logistics-observation-monitoring-communication

Patent application No. A 00672/27.10.2020

Authors: Salistean Adrian, Carmen Mihai, Badea Ionela

I

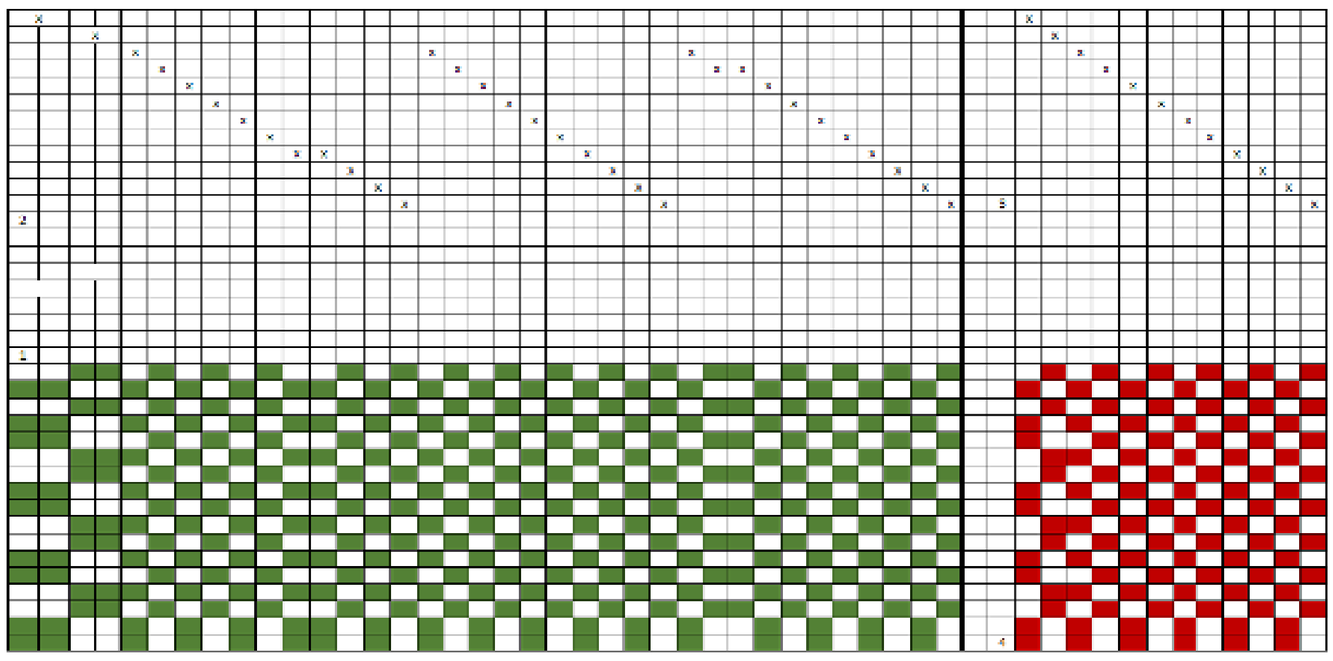
Description

The problem that this invention solves consists in the choice of raw material and the bonding of the structure, so that the whole assembly ensures the following operating requirements: weight max. 30 g/sqm, air permeability of max. 30l/sqm/s, breaking strength of min. 25 daN, tear strength of min. 1.5 daN, 2 years technical resource, easy maintenance and low costs.

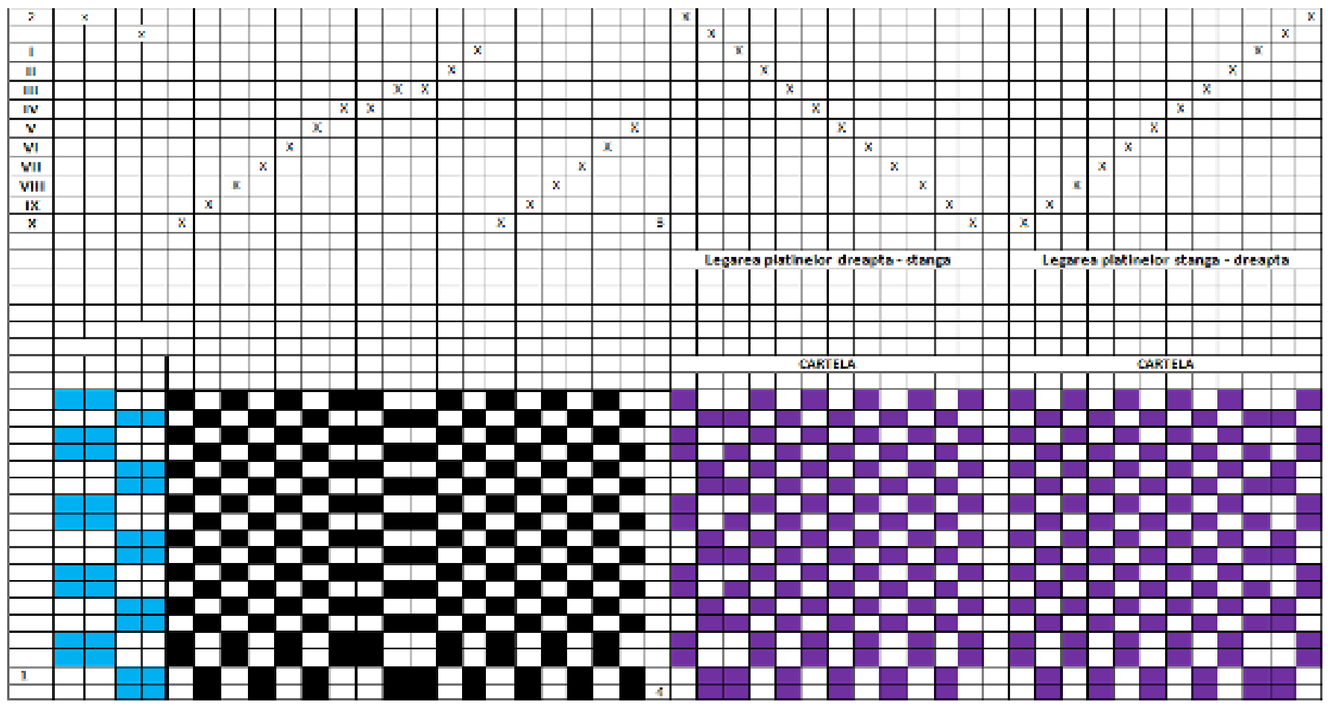
A textile structure made of polyamide yarns with density of length 30den/f24 x1/250Z, with 1/1 bond, used in the construction of textile wings of para-motor UAVs, is known, but it has the disadvantage of a low breaking strength (max. 15 daN) which does not ensure safe use on high load paraglider wing at high altitude.

Also known is a textile structure made of polyamide 6.6 yarns with a length density of 30den/f24 x1/250Z in both warp and weft, with R1/2 bonding, used in the construction of textile wings of para-motor UAV platforms, but which has the disadvantage of low tear strength (max. 1.0 daN) and high tear propagation speed and does not ensure safe use on high load paraglider wing.

The textile structure according to the invention overcomes the mentioned disadvantages in that the fabric is made of polyamide 6.6 yarns both in warp and in weft, with a length density of 30den/32fx1, ripstop binding made in 12 sts (10 for the ground yarns and 2 for the edge yarns), with 2 yarns each in the windings for the edge and warp yarns.



Programming card for ripstop variant



Programming card for double-ripstop variant



Several variants where iterated. Two of them are shown in the pictures above, one is a single riptop weave pattern the other is a double ripstop pattern. The double ripstop variant was the most performing.

The weaving process is well known and consists of: conditioning the yarns for 24 hours at a temperature of 22-25 °C and a relative humidity of 65%; the warping - waxing performed on a strip warping machine with a yarn tension of 0.10 cN/dtex; the weaving performed on an unconventional weaving - machine with flexible rod weights and 12 threads; the weave-control performed on the control ramp.

The publication of the scientific paper is funded by the Ministry of Research, Innovation and Digitization within Program 1 - Development of the national R&D system, Subprogram 1.2 - Institutional Performance - RDI excellence funding projects, Contract no. 4 PFE/2021. The work was carried out through the Nucleu Program of the National Research Development and Innovation Plan 2019-2022, carried out with the support of MCID, project no. 4N/2019, PN 19 17 02 01, project title "Advanced multifunctional systems for logistics, communication and protection seeking to improve the safety, operability and effectiveness of emergency workers (SiMaLogPro)".

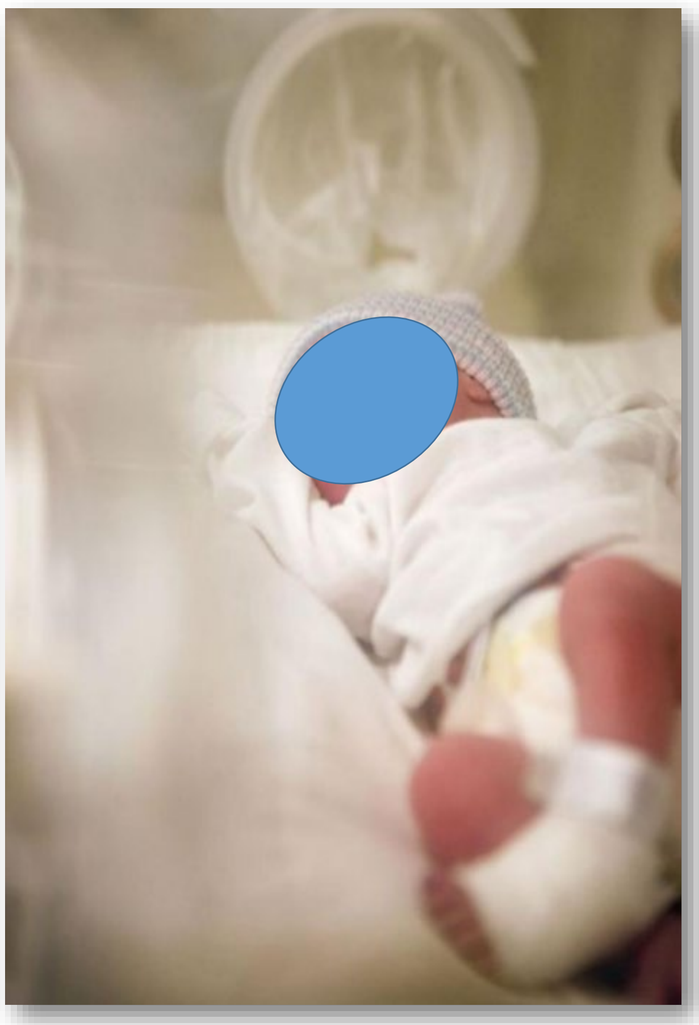
Contact: adrian.salistean@incdtp.ro - ***National R&D Institute for Textile and Leather - INCDTP***

System for monitoring vital signs in premature babies

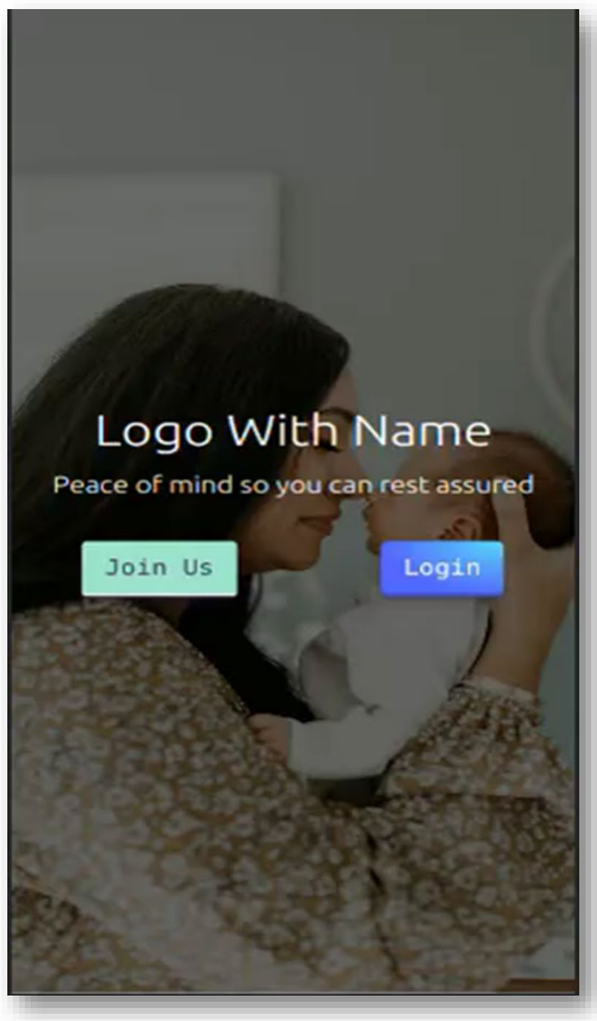
Author/s: Victoria Danila, Irina Pavel, Rareș Pogoreanu, Cristian Ciobanu

I

The vital signs monitoring system for premature babies is an innovative solution that allows real-time monitoring of heart rate, respiratory rate and body temperature. This system is designed to give parents and caregivers a safe and effective way to monitor their baby's health, especially in the first months of life when they are most vulnerable. The main components of the system include: (1) monitoring sensors (temperature sensor, pulse oximeter sensor): these sensors are strategically attached to the baby's clothing to provide accurate and continuous measurement of vital signs. (2) romper with integrated devices: the material of the romper is carefully chosen to be soft, non-allergenic and comfortable for baby's sensitive skin. (3) central processing unit: this unit takes the data received from the sensors and processes it to calculate and display vital parameters such as heart rate, respiratory rate and body temperature. It can also be equipped with connectivity features to transmit data to other devices, such as parents' smartphones or baby monitors. (4) software and mobile applications: parents monitor the baby's vital data in real time using an application. This application can provide notifications if vital signs are out of normal range or if significant variations occur.







The vital signs monitoring system for premature babies

Contact: victoriavasiledanila@gmail.com

SAVEOMATIC

I

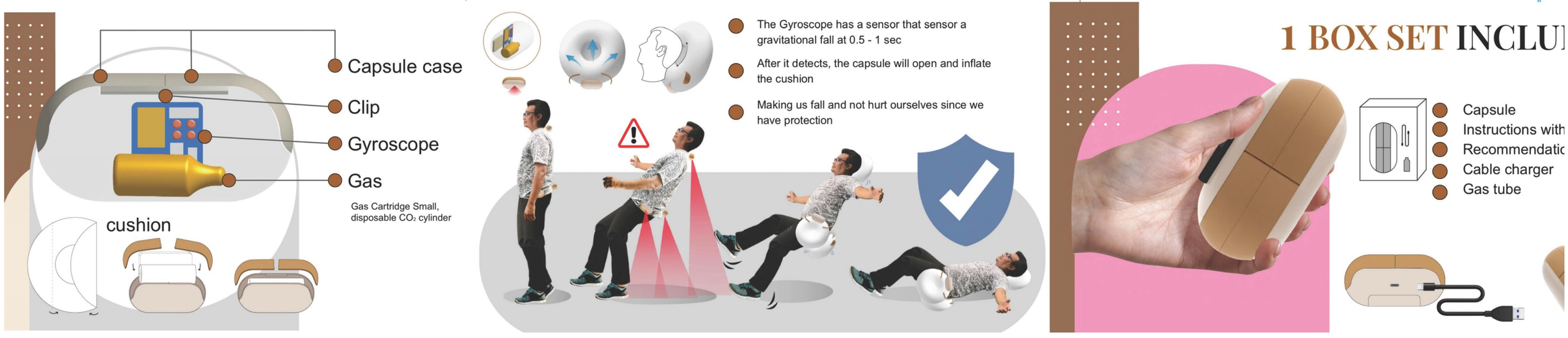
Author/s: Pornprapat Jirapojaporn

Mentor : Mr. Jeerasak Jitrotjanarak

Saveomatic is an innovative and stylish portable solution designed to reduce the impact force from hitting the ground while falling. It incorporates cutting-edge technology such as a gyroscope and accelerometer to detect the onset of gravitational fall within a timeframe of 0.5 to 1 second. By swiftly responding to the fall, Saveomatic deploys a cushioning mechanism that utilizes gas to inflate an airbag, effectively safeguarding the body from injury.

This revolutionary capsule ensures the safety of individuals, irrespective of age or physical ability. It caters to a wide range of users, including children, the elderly, and those with mobility challenges. Additionally, Saveomatic was designed to be portable, fashionable, and effortless to wear. The capsule can be conveniently attached to any desired location on the body with magnet mechanism, offering personalized protection based on individual preferences.





Furthermore, customization options are available for customers to personalize their Saveomatic experience. From a variety of vibrant colors and patterns to the option of adding names or personal touches, users can create a unique and tailored capsule that suits their individual style and preferences

Contact: scis.cud@gmail.com , j_jerasak@hotmail.com, +66 95 935 1062 , +66 84639 6363

Mihaela's Wonderful Beads

Bead Embroidery Project

Author: Mihaela MARARU

Bead embroidery has been my passion for more than 20 years, at first I embroidered simple things like bracelets, then I perfected my technique and made accessories for clothing items. Over time, I sewed icons, paintings, purses, bags, backpacks. The most spectacular creations of mine are the clothes sewn with embroidered beads, in some cases I used over 80,000 beads. The bead can be attached by a simple stitch of material, but a smaller bead can also be used to obtain a small column, for a more voluminous column, a column of two or more beads can be sewn.

The beads of different colours and sizes, sewn separately next to each other, look very nice, they can be placed inside a metallic outline, in the middle of an outline sewn with contrast beads or they can be scattered chaotically on the canvas, creating bright spots on the embroidery.







Contact: https://www.facebook.com/profile.php?id=100063499954796

EMLANIASHOP

Student Project

Author: *Emilia Cojocaru*

Mentor: Silvia Scortescu

Emlaniashop a rain hat that aims to treat head problems, also the hat is water resistant. It is intended for all ages. The hat is intended for all people, but especially for those with headaches and rheumatic problems and heart problems. There are people who often go to the doctor to take prescriptions, being acute in the headache department. This hat really treat hat and its original and unique one.



Contact: ***Silvia Scortescu + 373 798 97 247*** ***silvia.scortescu@yahoo.com***

FELIS PANDA

I

Student Project

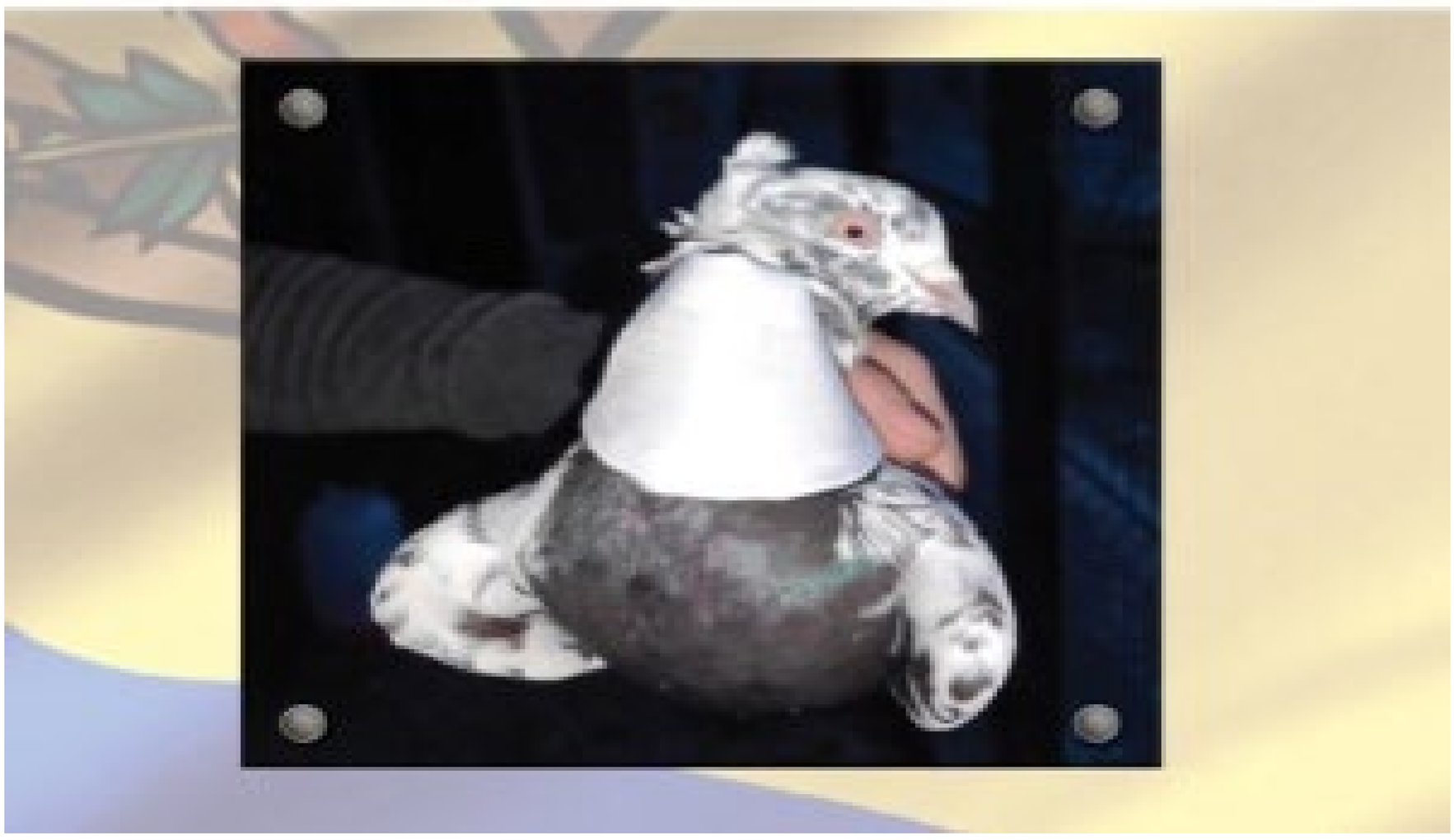
Author: *Buca Felicia*

Mentor: Silvia Scortescu

I work on a coat for a cat, dove, horse, rabbit, the project continues with magneto-therapy that will treat birds and animals for migraines, locomotor pain. Animals are saved and protected from the actions of nature. The universe acts on them and considerably affects their living environment. I love animals and birds very much, as we have a collection of pet breeds at home including domestic birds.



BUCA FELICIA - FELISPANDA, MOLDOVA



Contact: *Silvia Scortescu + 373 798 97 247* ***silvia.scortescu@yahoo.com***

BIFNY

Student Project

Author: *Lungu Alexandra*

Mentor: Silvia Scortescu

I

BIFNY-is a fridge bag that contains medical magnets in which you can keep products throughout the trip, or for going to the villa, camping or the beach. It is made of fluffy and ecological cloth. The purpose of the project is to heal the hands that hold weight and the back of the person who carries the heavy bag, including the food is always safe and fresh.



Contact: ***Silvia Scortescu + 373 798 97 247 silvia.scortescu@yahoo.com***

Dudu-Duda

Student Project

Author: *Scortescu Marius-Silviu*

Mentor: Silvia Scortescu

I made jacket- school bag with medical magnets, it is unisex for girls and boys, it has the role of treating the back and helps stable the nervous system, regulates the locomotor system.



Contact: ***Silvia Scortescu + 373 798 97 247 silvia.scortescu@yahoo.com***

Opportunity
CORNELIUGROUP Research-Innovation Association
Creation
INVENTCOR
Realization
Power of Creative Mind
Deva ROMANIA

MOFT STUDIO SRL

PATRICIA'S HANDMADE

Handmade creations

I

Author:Patricia Nelega

Patricia's Handmade is a concept based on creativity, sensitivity, passion for everything that art means. The products, unique, are designed for an avant-garde look. Diversity is the strong point of Patricia's Handmade creations from brooches, earrings, decorations to projects for special events: weddings, christenings, anniversaries etc.

All products are customized according to by the preferences of those for whom they are created.













Contact: ***+40721 603 933*** https://www.facebook.com/moftstudio/

APuN

Student Project

Author: *Griziuc Renata*

Mentor: Silvia Scortescu

I

I product sleeping glasses and purse-case for sunglasses with medicinal magnets that treat and help to treat the human body, head. Also I product water bottle cover that treats and keeps fresh water. They are maded of ecological cloth intended for girls and boys with APuN character design. The product is original and accessible to everyone.



Contact: *Silvia Scortescu + 373 798 97 247 silvia.scortescu@yahoo.com*

Handmade Concept

Author/s: Cherecheș Alexandra
Epure Oana-Roxana

"INSPIRED BY THE FEAR OF BEING AVERAGE"

Welcome to our world of creation, passion, and innovation! We are two energetic and creative girls who have turned our dream into reality - we have founded the Handmade Concept brand, where art and design come together in a symphony of color, textures, and unique ideas.

WHAT WE DO🎨

***1. Mural Paintings*: We transform the walls of your spaces into living works of art. From abstract landscapes to personalized illustrations, each wall becomes a story of its own.**






***2. Soulful Artwork*: Our canvas artworks tell stories and evoke emotions. You can choose from our collection or we can create personalized paintings tailored to your tastes and dreams.**







***3. Unique Fashion Pieces:* We provide personalized fashion options. From hand-painted jackets and sneakers to original print t-shirts and delicate embroideries, your wardrobe will become an authentic expression of your personality.**








WHAT SETS US APART✨

- Limitless Creativity- Meticulous Quality- Innovation in Every Project- Custom Creations

Join us on our artistic journey and discover the power of art and design to transform your world!

Contact:
Handmade concept
handmade.concept.artist
handmade.concept
+40767885187

RERAT HELVETIA
EUROPEAN MANUFACTURER
of
LASHING & LIFTING SLINGS

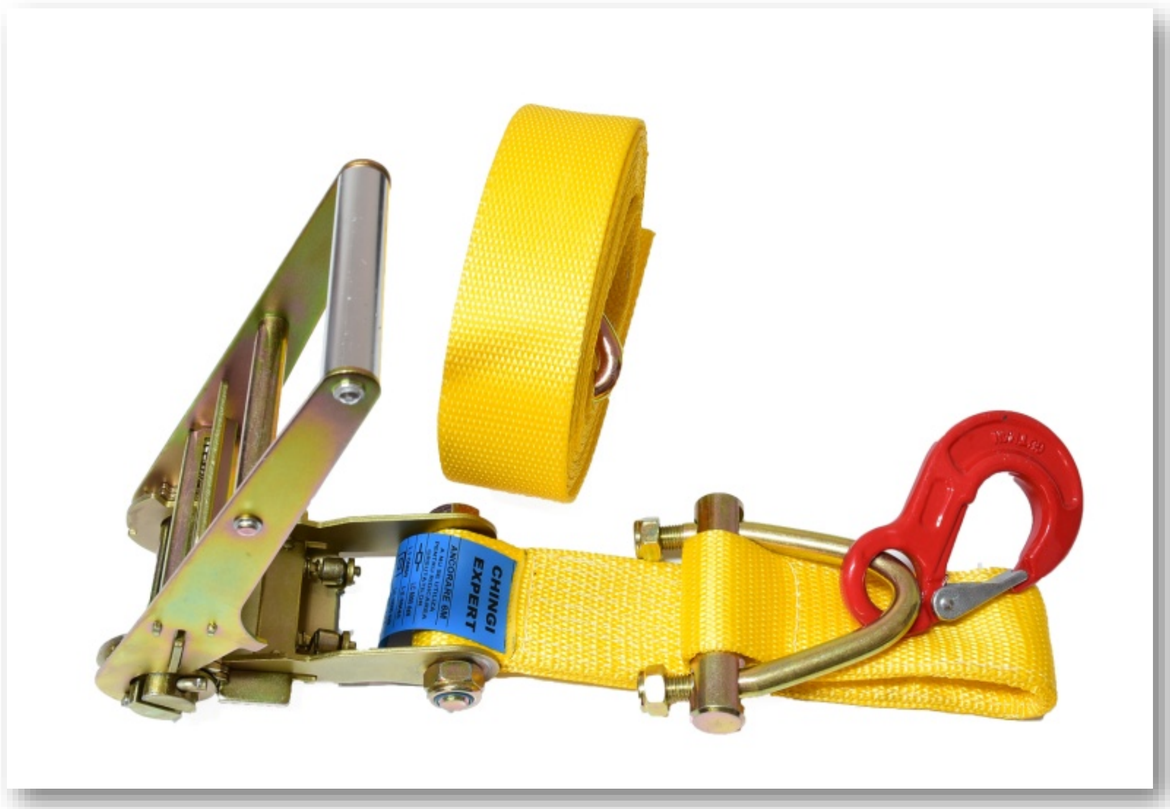
I

Author: Larisa Rerat & Team

Established in 2014, CHINGI EXPERT manufactures in Romania, customised solutions in cargo & lifting systems. We are continuously moving forward, innovating, and improving. Our lashings and webbing slings are products approved and certified in accordance with the European Standards and ISO 9001-2015

In our range you can find ratchet lifting slings, roundslings, eye webbing slings, lifting chaines, wire ropes and more!

Passion is at the heart of our company!

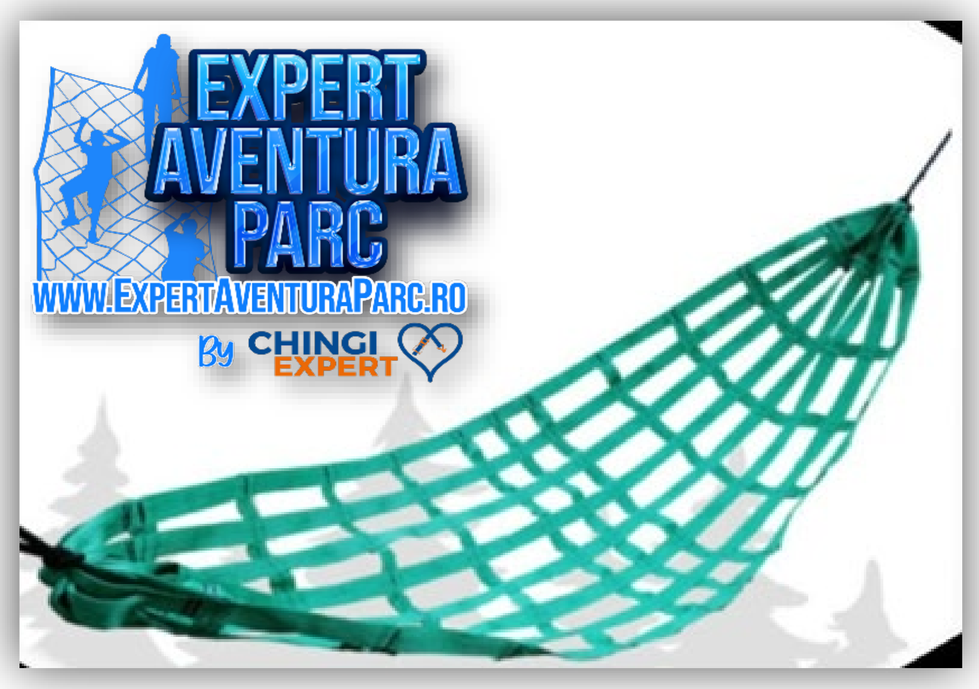






Our new line of products are designed to solve the lack of diversity whitin the playgroud field.

Swing Hammock & Friendship Net







The swing hammock offers both the fun of swinging and complet relaxation after a long day.
The benefits of climbing can be divided into five categories: physical, mental, sensory awareness, and health.

Safety represents our top priority!

Contact: www.chingiexpert.ro office@chingi-expert.ro **0040 749 090 725**

Lemnaria lui Radu

Unique wooden creations

Author: Radu Fachin

I am a passionate woodworker, a dedicated artisan with 8 years of experience in the field of woodworking, and eager to learn new techniques and skills. My work reflects a passion for craftsmanship and meticulous attention to detail.

The Art of Wood Personalization - Creations with Soul. One of my specialties and significant challenges in every project is crafting personalized items for clients. Over time, I've honed my skills to create miniature houses, faithful replicas of grandparents' homes, meticulously crafted based on photos. These mini houses bring a piece of history and emotion into our clients' living rooms.

Recycled Wood for a Sustainable Future. I am a staunch advocate for the use of recycled wood. In my workshop, wood becomes more than just raw material; it's a valuable resource we handle responsibly, contributing to environmental preservation.

Transforming Wood into Art and Utility. Wood is my favorite material for crafting captivating games, charming decorative items, and personalized toolkits for businesses and trades. Each piece of wood is carefully and passionately transformed, adding utility and turning it into a unique work of art.

I look forward to contributing my creativity and extensive experience in the art of woodworking to future projects. Handcrafted wooden items are more than mere objects; they bring stories and emotions into the homes and lives of our clients. Thank you.







Contact: +40.735.966.509
Website: https://www.lemnarialuiradu.ro/
Instagram: https://www.instagram.com/lemnarialuiradu/
Facebook: https://www.facebook.com/lemnarialuiradu/

J

Kids Corner

Games

Toys

Outdoor activities

Opportunity
CORNELIUGROUP
Research-Innovation Association
Creation
INVENTCOR
Realization
Power of Creative Mind
Deva ROMANIA

Magic Flexi

SCIS



Patent/Project number: Patent Pending
(Registered ref no. CUIP00861)

J

Magic Flexi: Enhancing Practicality & Hygiene in Portable Dining

Magic Flexi is a strengthen and expandable food tray for outdoor activities. With its firmly-secured structure, it could be used anywhere to minimize a food spillage and hygiene risk, especially while camping, eating in a car, and even a train. Moreover, it can snap with other tray to become a shared table for party. Thus, this portable food tray will boost individual, couple, family, and friends more enjoy eating and happy time together.

Have you ever experienced any of these Problems?





Food spillage and hygiene risk especially while camping, eating in a car, and even a train.

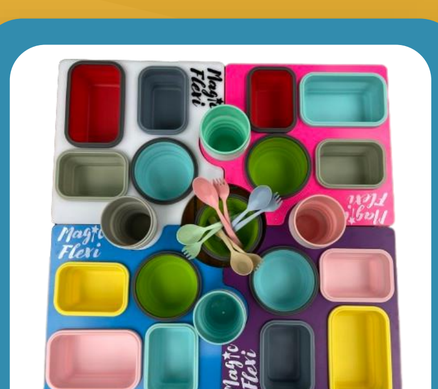
Solutions



Convenience and practicality specially designed holes that securely hold expandable containers



No more embarrassing spills or messy accidents



Improves cleanliness and hygiene
By eliminating the risk of spills, it reduces the chances of staining

Solution for group gatherings



Inventors



Scan Me

For More Information

Contact: scis.cud@gmail.com , j_jerasak@hotmail.com, +66 95 935 1062 , +66 84639 6363

HANDY DANDY MAT

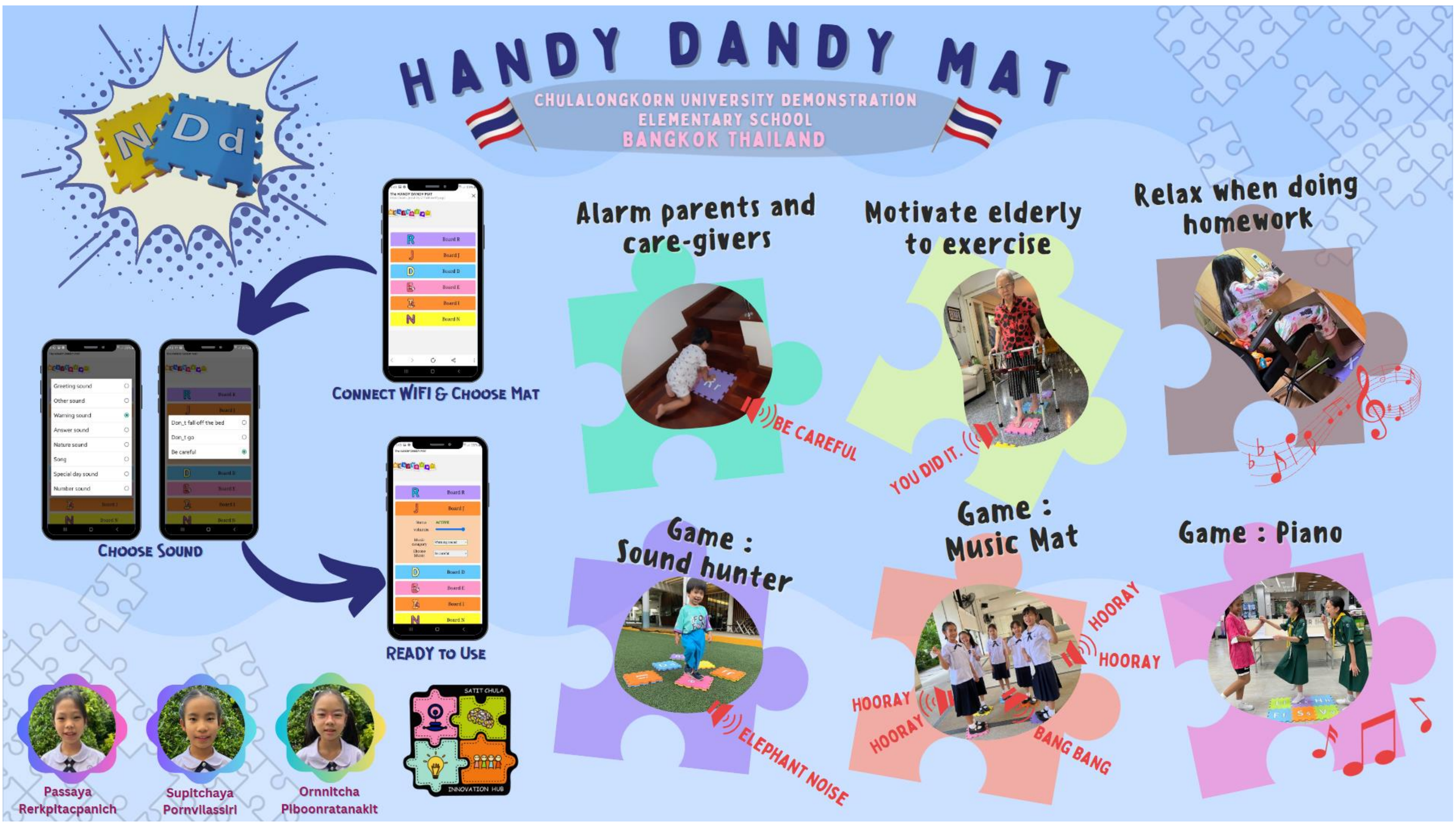
J

Authors: Passaya Rerkpitakpanich, Supitchaya Pornvilassiri,
Ornnitcha Piboonratanakit
Mentor: Mr. Jeerasak Jitrotjanarak (Satit Chula Innovation Society)
Chulalongkorn University Demonstration Elementary School

The problem of parents and care-givers is the baby climbing up the stairs. Babies will be in danger if they fall from the stairs. So, we will solve this problem by alerting parents when the baby gets in front of the stairs. Another problem is that most countries become aging society. Accidents may happen to the elderly such as falling down which can cause disability. We will solve this problem by encouraging them to exercise to strengthen their muscles and bones to reduce risk of injury.

Handy Dandy Mat was developed by installing speaker and force sensors on the strategic locations to detect the pressure on the crawling mat. The sound will be loud when sensors detect force or weight pressure. The website was created to control the category and volume of sound of the mat via WI-FI. There were various categories of sound such as alarming sound, cheer-up sound, natural sound, relaxing sound, music and sound effect. The mat can be used by connecting the mat to the website via Wi-Fi, then choosing the category of desired sound, adjusting the volume, and placing it following the purpose of use.

The main purpose of the Handy Dandy Mat is to prevent the baby go up the stairs by putting the mat in front of the stair and choosing the alarm sound such as “Don’t go!” or “Be careful!”. When the baby gets on the mat, the alarm will alert the parents. The mat can also be used for the elderly to encourage them to walk by placing the mats together and choosing the cheer-up sound such as “You did it” or “Good job”. Moreover, it can be modified to use for other purposes such as playing games, learning activities, and relaxing. The example of game called “Music Mat” is performed by putting the number of the mats equal to the players. One mat will be set as a losing mat with the ray gun sound and "Hooray" sound is set for other mats. Next, all mats are placed in a circle. When the music starts, all players will walk around the mats. When the music suddenly stops, the players have to stay on the mat near them. The player who gets the ray gun sound will lose and be out of the game.



Contact: scis.cud@gmail.com , j_jerasak@hotmail.com, +66 95 935 1062 , +66 84639 6363

3D Models

Student Project

Author: Pavle Trišović

J

3D Max and ZBrush are popular tools in the field of 3D modeling and digital art. 3D Max is a comprehensive 3D modeling, animation, and rendering software developed by Autodesk. It's often used for creating detailed 3D models, animations, visual effects, and architectural visualizations. It's widely used in industries like gaming, film, architecture, and design.

ZBrush, on the other hand, is a digital sculpting tool developed by Pixologic. It's particularly renowned for its ability to create highly detailed and intricate 3D sculptures. ZBrush uses a unique approach called "digital sculpting," where artists can manipulate a 3D model as if they were sculpting with real-world materials like clay.

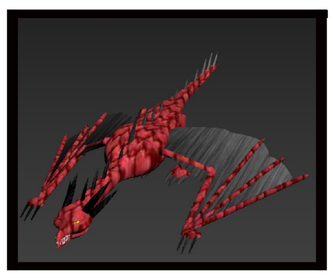
When used in combination, 3D Max and ZBrush can provide a powerful workflow for creating complex 3D models. For example, artists might create a base model in 3D Max and then import it into ZBrush to add finer details and textures through sculpting. The final model can then be exported back to 3ds Max for rendering or animation.

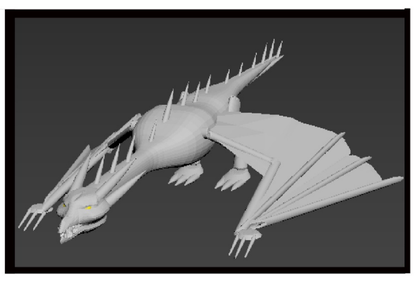


Grimizni Zmaj

Od početka vremena postojao je Stari mesec, koji je jednog dana doživeo veliki raspad kada ga je izneverio njegov prvorodjeni - grimizni zmaj. Zmaj je bio ljubomoran na Stari Mesec, zato što je on bio tvorac svega. Želeo je tu moć. Želeo je da proždere Stari mesec u potpunosti, ali kada je pokušao shvatio je da je mesec isuviše moćan da bi bio progutan u jednom komadu. I kako zmaj pokuša da zagrize zalogaj, Stari mesec ga progna na Zemlju. Tamo ostaje da bude večno lovljen i proganjan od strane ljudi zbog svojih greha, sve dok ga ne pobedi snažni ratnik. Ako ratnik ipak ne uspe u tome, zmaj će pojesti mesec, i time doneti kraj vremenu.



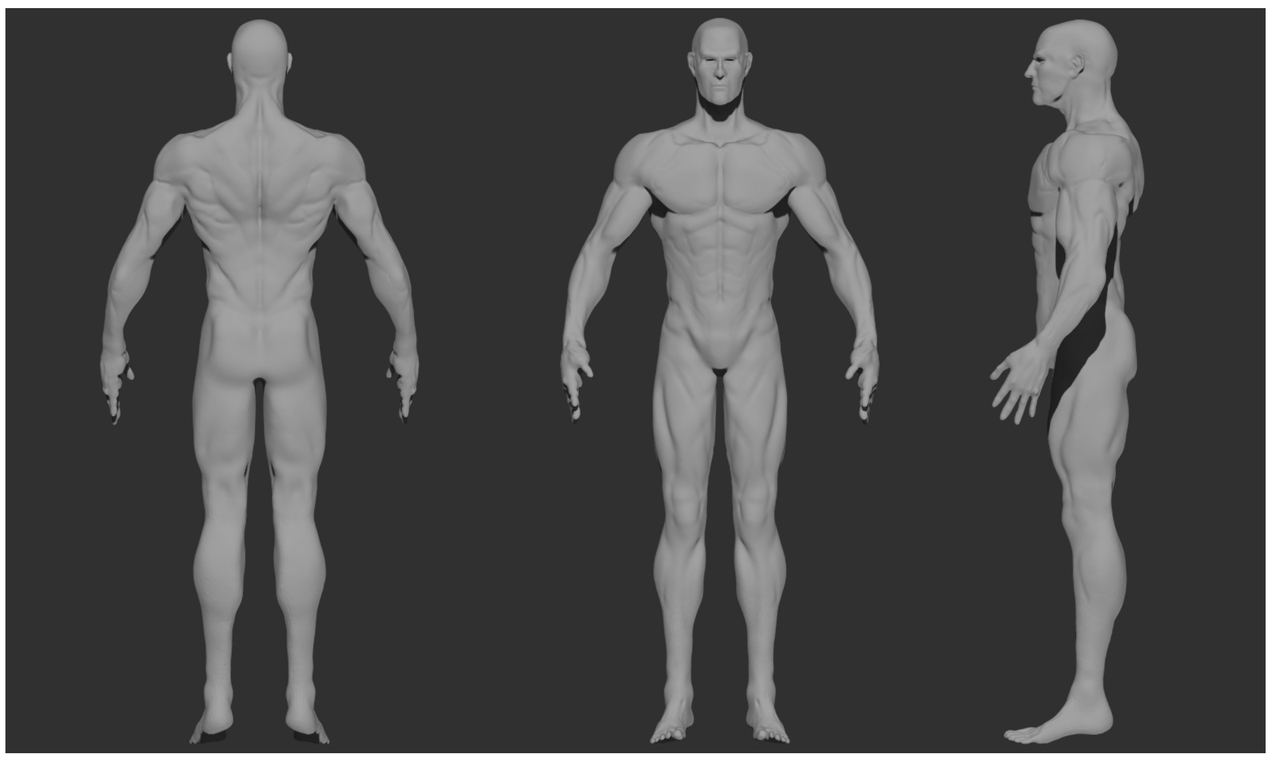






These programs were used for student projects, it means that the students were working on 3D modeling assignments, possibly related to fields like animation, game design, or digital art. Using such advanced software can provide students with valuable skills and experience that are highly relevant in the creative and entertainment industries.









SCAN ME

Contact: Pavle Trišović, Tel: +381631033990, Email: pavle.trisovic@fsu.edu.rs

Universitatea Ștefan cel Mare Suceava

INTELLIGENT SYSTEM FOR GRIP ENHANCEMENT

Patent Application

J

Author/s:

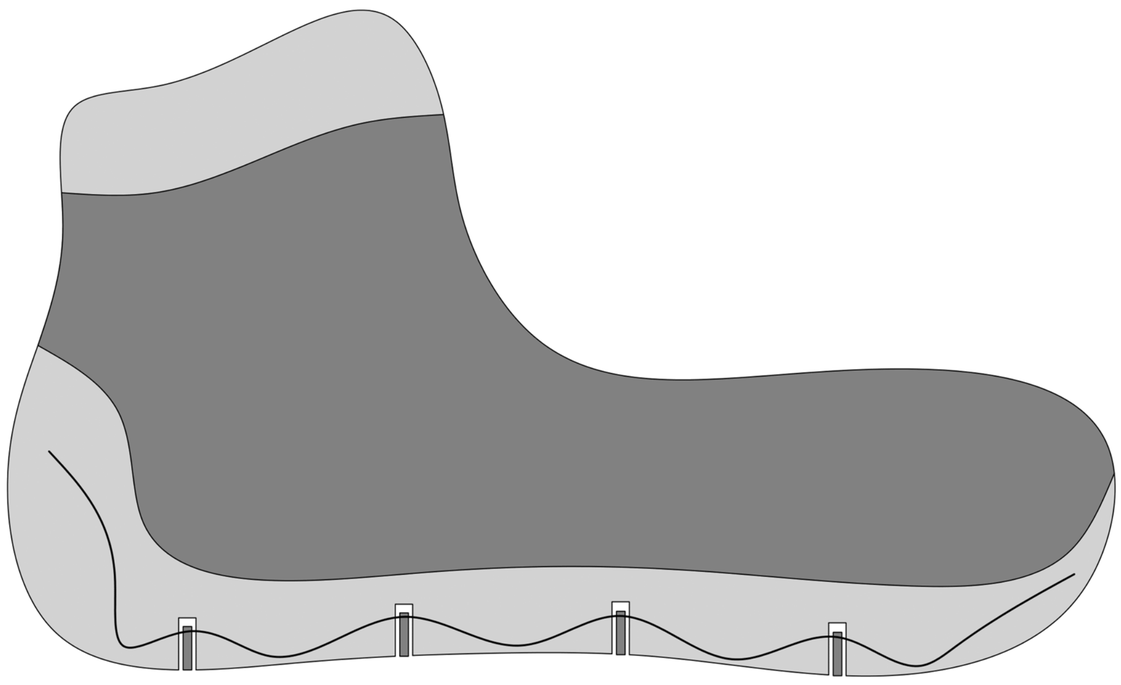
Laurențiu-Dan MILICI, Ciprian BEJENAR, Ilie NIȚAN, Oana-Vasilica GROSU, Dragoș-Ionuț VICOVEANU, Laura-Cătălina DOSPINESCU, Mariana-Rodica MILICI, Artiom MOLDOVAN

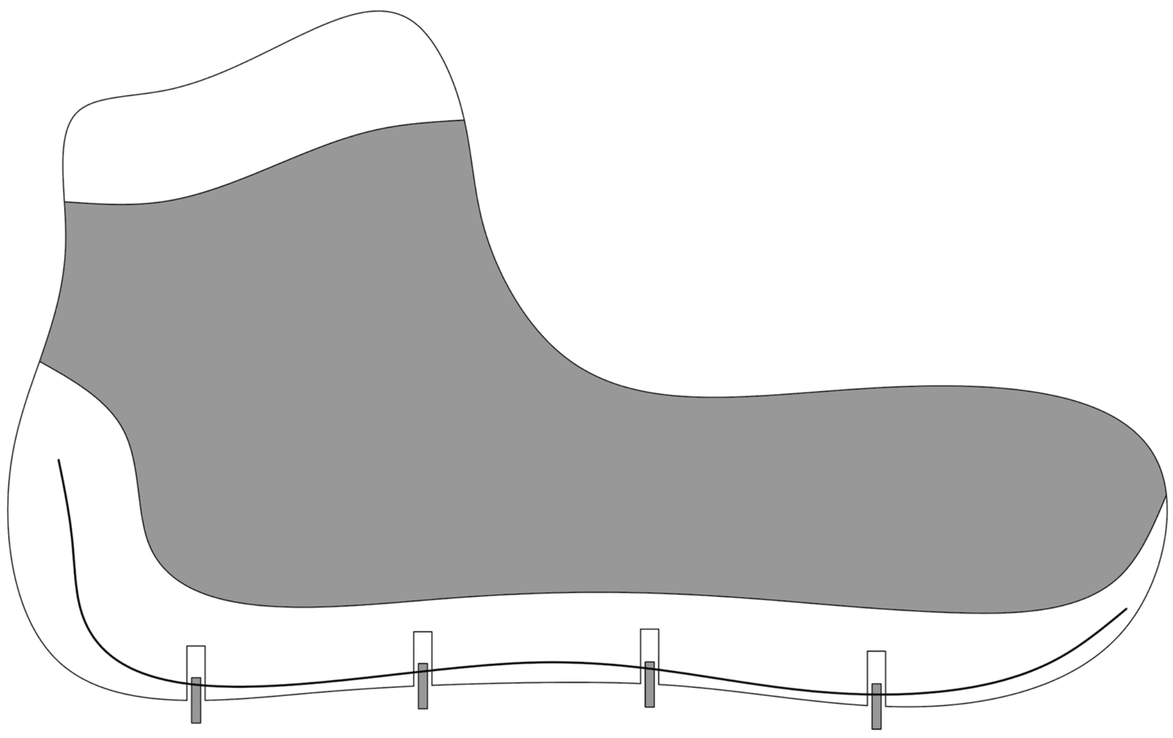
The invention relates to an intelligent system for grip enhancement of the footwear sole, depending on the temperature of the movement surface and in relation to the environmental conditions, based on the temperature difference, in that it is equipped with a thermo-mechanical conversion mechanism with a specific constructive form.

The invention consists of a solution that is actuated thermomechanically in an automatic manner and under different conditions of temperature, as a response to variable natural phenomena, which adapts the sole of the footwear in which it is embedded according to the external temperature, of environmental factors and/or of season, so that it facilitates the movement in conditions of high temperature (e.g., dry, firm and grippy environment) and it enhances the grip at low temperature (e.g., moist, soft and slippery environment).

ADVANTAGES

- it introduces new possibilities for grip enhancement;
- it presents constructive simplicity and flexibility, but at the same time advantageous dimension, mass and shape, without negatively affecting the movement or the sole of the footwear that incorporates it in the purpose of grip enhancement;
- it reduces the impact that other solutions introduce on the efficiency of moving with footwears whose sole incorporates them in the purpose of grip enhancement;
- it facilitates grip enhancement, both depending on the environmental factors and season





Contact: dam@usm.ro

PAINTED DECORATED AND CARVED EGGS

Author: Irén Szlávikné Buzás



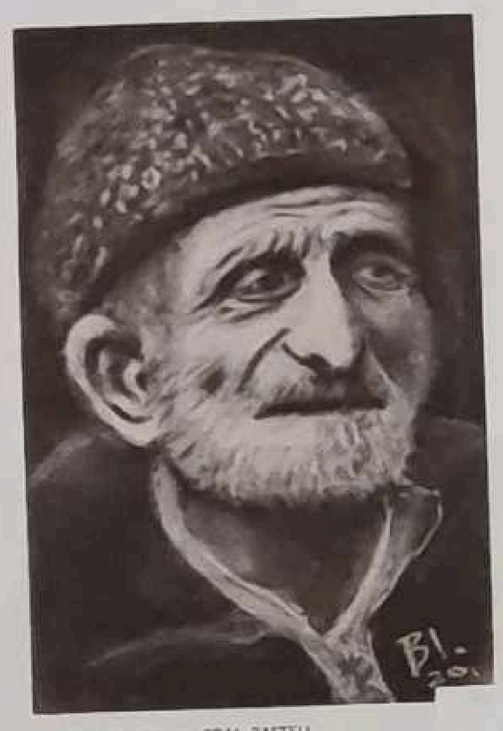
MY SON - PASTEL PORTRAIT 20X26CM





DECORATED EGGS

J



OLD MAN, 25X30 cm, COAL ,PASTELL

MRS IRENE BUZAS SZLAVIKNE

egg-decorator-carver and picture painter,
retired English teacher

I am from HÓDMEZŐVÁSÁRHELY, HUNGARY.
I have decorated, carved, painted hen-turkey-goose and ostrich eggs for many years, and I have about 300 own patterns and works. The other art is painting (all kinds of themes: sceneries, people, animals using oil, coal, acryllic , pastel paints), that I love and my works could be seen, or can be seen in many exhibitions here and abroad thanks to mainly Ötlet Club 13 Association and AMKA (Szeged, Hódmezővásárhely, Budapest, Barcs, Abony, Szolnok, valamint Serbia, Croatia and Romania.)

SZLÁVIKNÉ BUZÁS IRÉN

tojásfestő-faragó és képfestő, nyugd. angoltanár

HÓDMEZŐVÁSÁRHELYI nyugdíjas angol-rajztanár vagyok és sok éve díszítek tyúk-pulyka-liba és strucc tojásokat festve, karcolva, s több mint 300 féle saját mintám van.
A másik művészeti ág - a FESTÉSZET, amelyet szintén nagyon kedvelek (mindenféle témakör: tájak, ember- és állat portrék, épületek, növények és tárgyak.)

Többféle anyaggal és technikával dolgozom (olajfestek, akril, porpasztell, tempera, grafit és szén).

Munkáimat – főként az ÖTLET CLUB 13 EGYESÜLETNEK és az AMKA-nak köszönhetően 26 éve sok hazai és külföldi kiállításon mutathattam be. (Szeged, Hódmezővásárhely, Szolnok, Abony, Barcs, valamint Szerbia, Horvátország és Románia.)

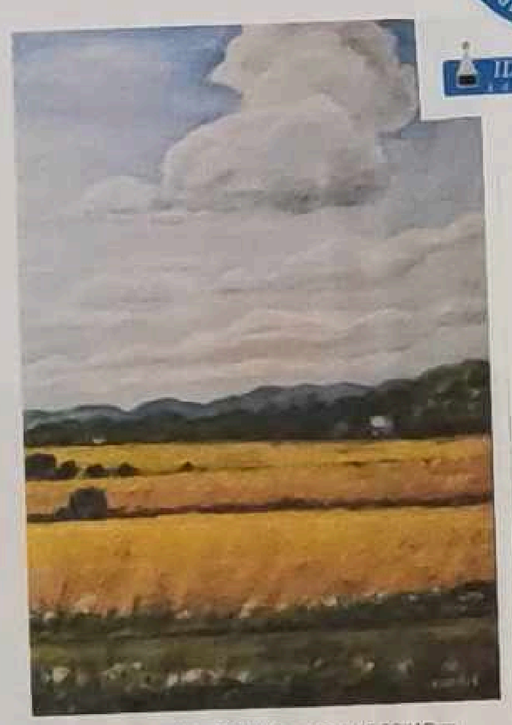
www.artmajeur.com /Művészek listáján:Buzás Szlávikné Irene/



MOTORBIKE TRIUMPH – 40X30 cm, PASTELL



BEGGAR WOMAN -40X30cm, OIL ON CANVAS



CORNFIELD WITH WILD FLOWERS – ACRYLLIC-30X40cm



Csibész - Our friends' dog who died - 28x20 cm pastell



HORSE, 30X 25 cm, ACRYLLIC



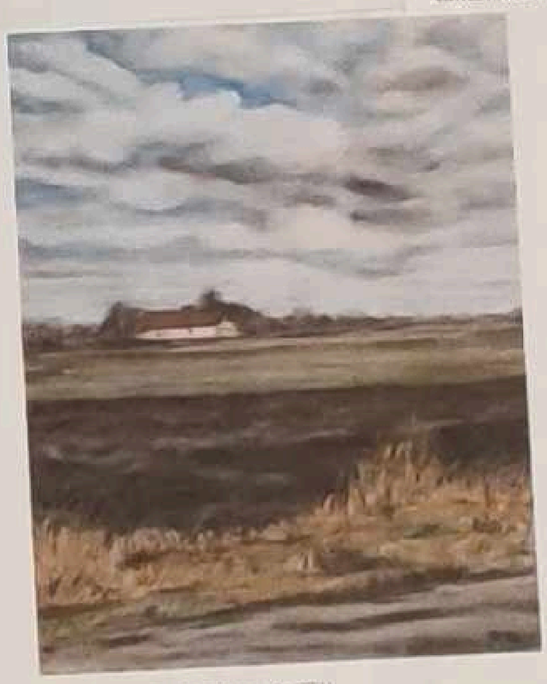
LONELY OLD HOUSE, 30X40cm, OIL ON CANVAS



SEA AND CLOUDS, 40X50 cm, OIL ON CANVAS



GATE-HANDLE -30X25 cm PASTELL



MY HOMELAND, 40X30 cm, PASTELL



SEA WAVES – 25X20cm, ACRYLLIC

HANDICRAFTS - TAPESTRY, NEEDLE PAINTING

Author:
id. Sándorné Zsiros

J

Gobelin: It is made with half cross stitches. Half and quarter meshes in order to develop the finest details. It is made with split embroidery thread. Needle-dyeing: It is done with split embroidery thread from 2 threads. Stitched closer to each other, we embroider "painted with a needle".





Contact: otletclub.idea@freemail.hu
Presentation link: https://otletclub.5mp.eu/web.php?a=otletclub

HAND-EMBROIDERED CREATIVE POSTCARDS WITH YARN GRAPHICS TECHNIQUE

J

Author: Dánielné Darázsi

The presented postcards were made using the String art technique. I work with cardboard (120-160g) and first choose a pattern. When I have the pattern, I place it on the cardstock and use a beading needle to poke holes in the paper every 1-2 mm (0.04-0.08 inches).

After that, I start sewing with different stitch distances. I use 1mm thick Mettler Poly Sheen String.





The seam should be tight, but make sure that the holes do not tear next to each other. After finishing the "sewing", I cover the back side of the stitches with another paper. Only the decoration remains with decorative stickers, beads and ribbons.

I also make pictures and bookmarks using this technique.

Contact: otletclub.idea@freemail.hu

Presentation link: https://otletclub.5mp.eu/web.php?a=otletclub

DISCOVER ZANZIBAR with MUDI

J

Travel Guide

Authors: Muhammed Suleiman Yussuf

I'm Mudi and I am a tour guide here in Zanzibar. I only learned Romanian on the internet and on youtube, and now I have a school where I also teach other friends of mine.
If you choose to spend your holiday here you will have the opportunity to discover Zanzibar and its beauty with me. This is my website and the place where I can be with you, my whole story in one place, along with information for tourists about Zanzibar.









Zanzibar is an archipelago located off the east coast of Africa and consists of the main island of the same name, Zanzibar or Unguja as the locals call it, and Pemba. The word Zanzibar comes from the Persian language and translates as "coast of black people" and Pemba translates as "green island".

Zanzibar is located approximately 6000 kilometers from Romania, the islands being sought after both for the wonderful beaches and reefs, and for the exotic destination.

Contact: https://www.facebook.com/ghidturisticdespre.zanzibar
tshabalalajunior17@gmail.com **+255 783 396 944**

SCAN ME

CLUB EVOLUŢII cu Alexandra Marcu

Outdoor project

Authors: Alexandra Marcu & Team

J

Club Evolutii *is an organisation from Romania, providing personal development activities based on mountain and traveling education.*

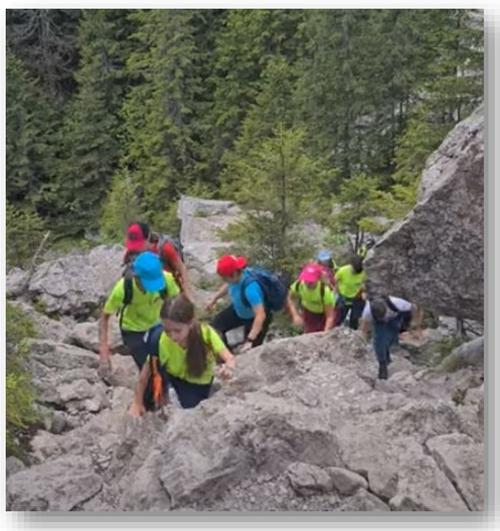
We organize mountain hikes, expeditions, camps and educational courses for children who want to become explorers and enjoy many experiences and adventures.













Why do we love the mountain?!

Because it's an escape between the blocks, an opportunity to socialize and although it often challenges us to get out of our comfort zone, it seems at the same time it gives us the feeling of well-being and safety!

Club Evolutions - Personal development through mountain education!

Contact: *alexandraflaviamarcu@gmail.com* ***+4 0723 219 655***

Kids Corner

Alex's Creative Painting

J

Kid Project

Author: Alexandru ROTEA

I chose this project because children love painting and are very creative when they start using the colors on the sheet. At the same time, the child develops his knowledge of colors, craftsmanship and why not, discovers his talent in painting.

Creative painting can be done using watercolors and acrylic colors.









Kids Corner

NATURE PHOTOS by ALEXIA

Kid Project

Author: Maria Alexia POENARIU

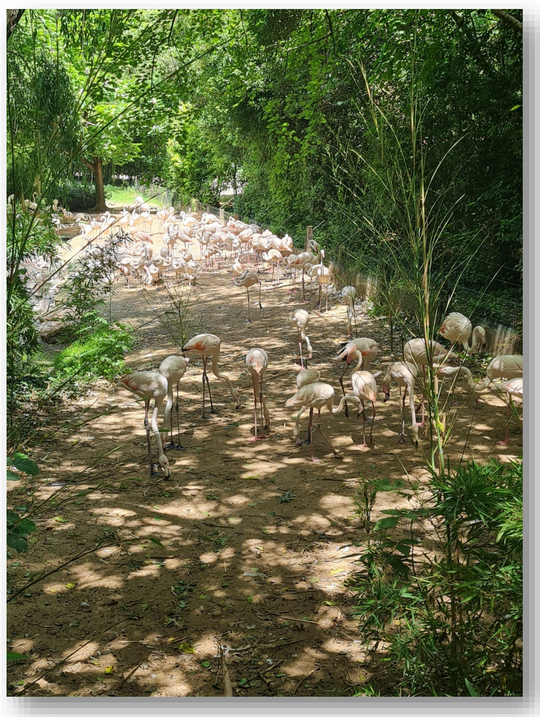
J

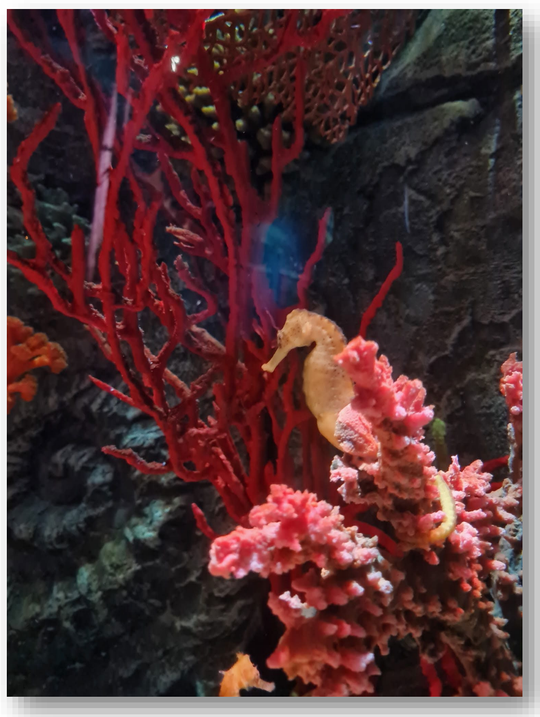
My name is Alexia and I am a 4th grade student at the Regina Maria National Pedagogical College, Deva, Romania. After finishing my daily activities and completing my homework, I like to spend time in nature.

Whenever I have the opportunity, I go for a walk admiring the wonders of nature, plants and animals. I am passionate about the fine arts, especially photography, of course, during my time outside I love to immortalize landscapes, plants and animals.

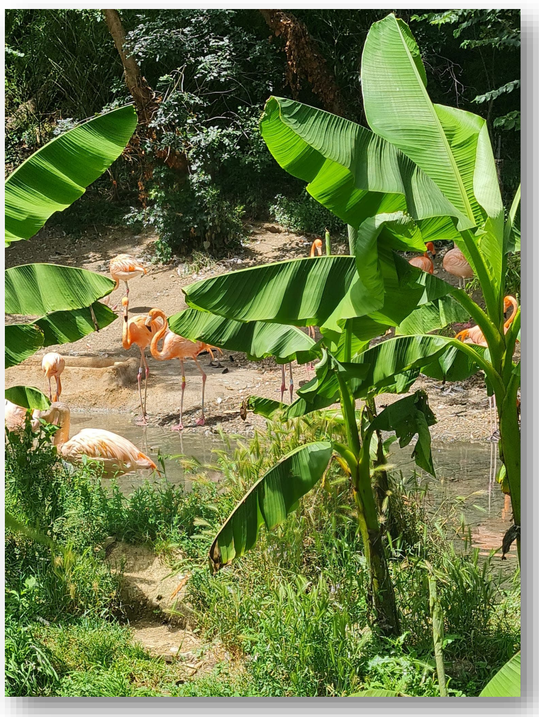












In this collage I present to you photos taken on the occasion of my summer vacation that I spent with my parents in Italy. These pictures reflect scenes from Safari Park Natura, Gardaland and Lago di Garda, being beautiful memories for me that I can share with my friends from Romania.

Kids Corner

J

Lego MOCs

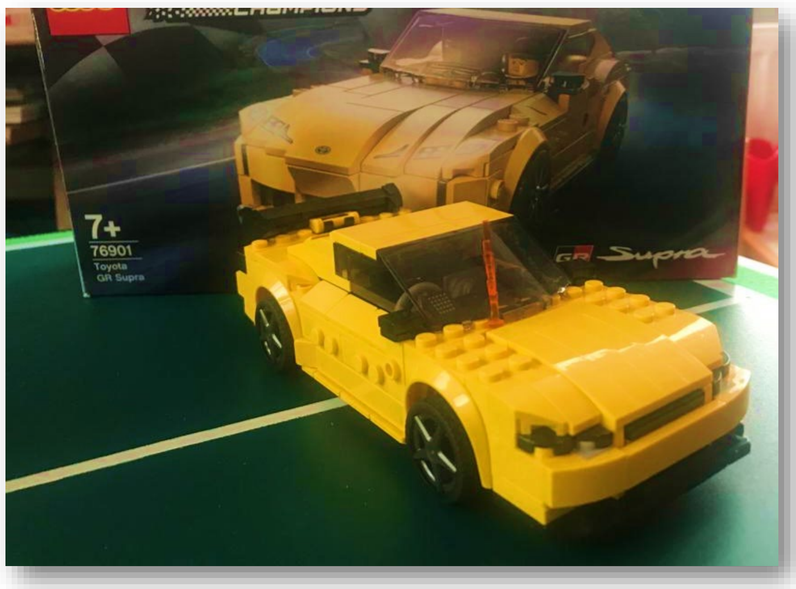
Kid Project

Author: *Sebastian ROTEA*

My project features Lego Mocs, this means creating a new car model from an existing Lego Auto set using the same parts.
Thus I have the pleasure to present you 3 Mocs:
The first is a police car that becomes a Mazda MX5 Miata.
The second Moc is a Toyota GR Supra that I converted into a Nissan Silvia S15.
The third Moc is a Dodge Charger R/T, Fast&Furious, which I modified into a Toyota Supra also from the movie Fast & Furious 5.
Practically from a Lego set I made 2 cars and not just one.











Posters Catalogue

4th International Exhibition InventCor

14-16.09.2023 – Deva, Romania

Opportunity
CORNELIUGROUP Research-Innovation Association
Creation
INVENTCOR
Realization
Power of Creative Mind
Deva ROMANIA

K

Innovative ART

Music

Video

Photography

Publicity



Artificial Renaissance

AI Generated Art

Author: Irina Fachin

K

Step into the world of the “Artificial Renaissance”, an innovative AI-generated art exhibition that pushes the boundaries of imagination and technology. Witness the fusion of Renaissance beauty and mystery with the technological advances of the future, as classic characters are reimagined in dystopian virtual landscapes.

This unique exhibition, brought to life through cutting-edge artificial intelligence artistry, showcases an era where humanity teeters on the brink of transformation. The unsettling shadow of technological wizardry and human-machine symbiosis lingers in every portrait, creating an enthralling experience that challenges our understanding of art, beauty, information, technology, and our very existence.







Don’t miss this once-in-a-lifetime opportunity to explore the future through the eyes of the past. Join us at the INVENTCOR 2023 International Exhibition and immerse yourself in a world where old and new collide.
Experience the future, ponder the past, and question the path we’re on.

Contact: +40.770.212.357
Instagram: https://www.instagram.com/virtualmedianet/
Facebook: https://www.facebook.com/virtualmedianet.eu/
X: https://twitter.com/v1rtualmed1anet

SCAN ME

Jam's Art

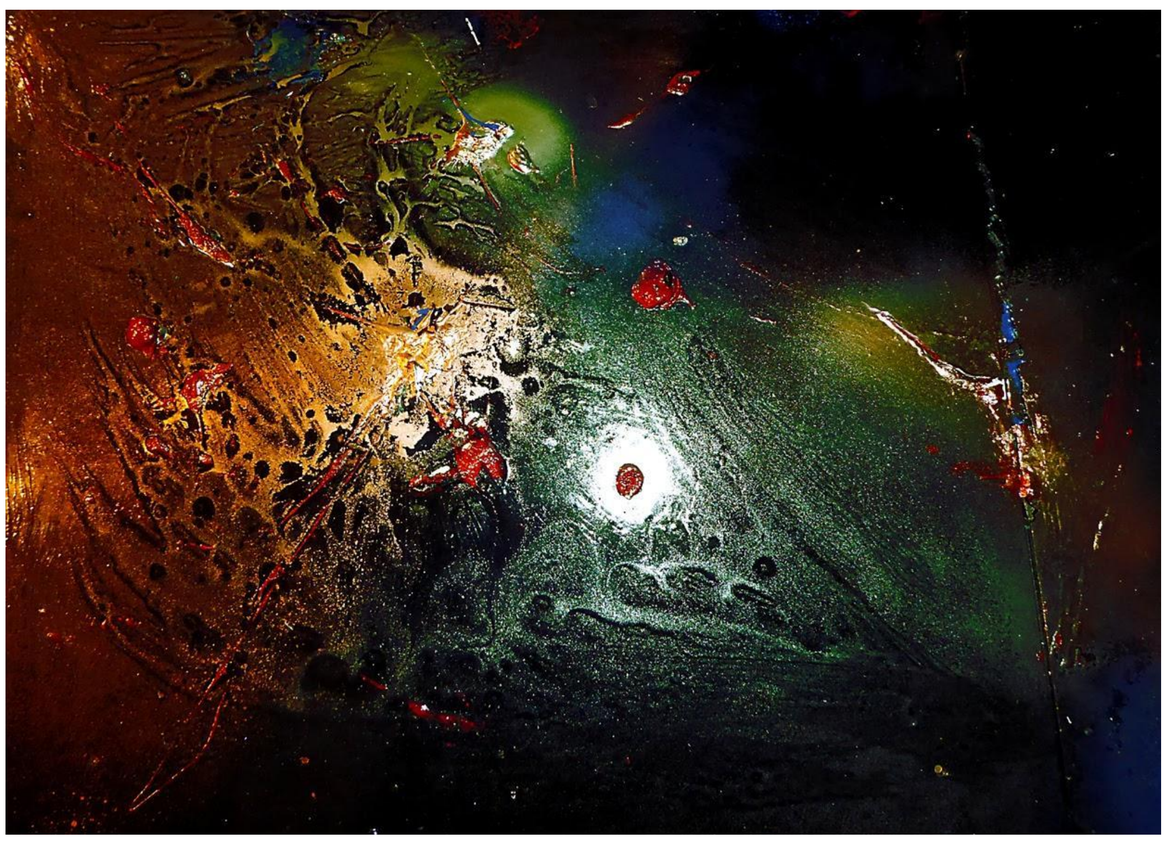
Universe I and II by Jamina Riedel

Innovative ART Project

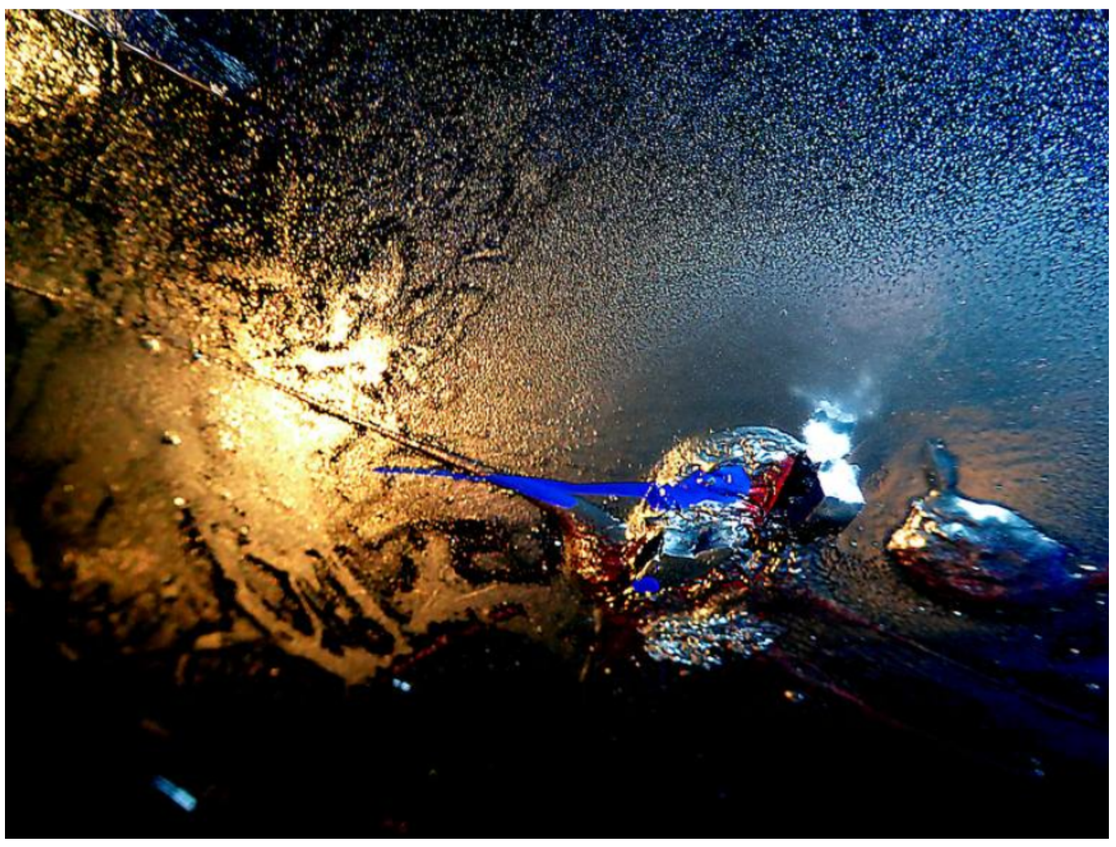
K

Author: Jamina Riedel

I love to make experiments with materials, colours, fluids, cristalls, wood and metal.
I love to make my hands dirty, with earth and grass, to feel the rezonance with the nature and animals, to play with air and fire. I feel and I am abstract. I love Johannes, the creator of my creativity.



Universe I



Universe II



Original One - of - a - kind Artwork

Jam's abstract painting - acryl on glass, fluide and spray.

Photographed by Johannes Riedel created in 2016, realized in 2021.

Size: 100w X 75h X 1,3d cm

Multi-paneled Photography from the original - acryl on Alu Dibond Fine Art, made in Germany.

SCAN ME

Contact: jaminaa12@gmail.com

Edwina Kasler
PHOTOGRAPHY

The Entropy of Image

Research project

Author: Edwina Kasler

K

The dependence on illusions and imagination generates the need to fix the image and the research project analyzes the connection between the structure of the human body, the Ph of water, the light and the transposition of the image in space.

Experiments done in the laboratory revealed the fact that obtaining images by other methods than with the help of the camera and using natural substances in random conditions of temperature and light allow obtaining unique and unrepeatable images but in close connection with the Ph of the water and the human body.

Each image obtained in this way is a proof that photography is an archive of the human existence.



SCAN ME

Presentation link:

https://www.facebook.com/edwina.kasler

Contact: edwinakasler@yahoo.com

Caretta's Art

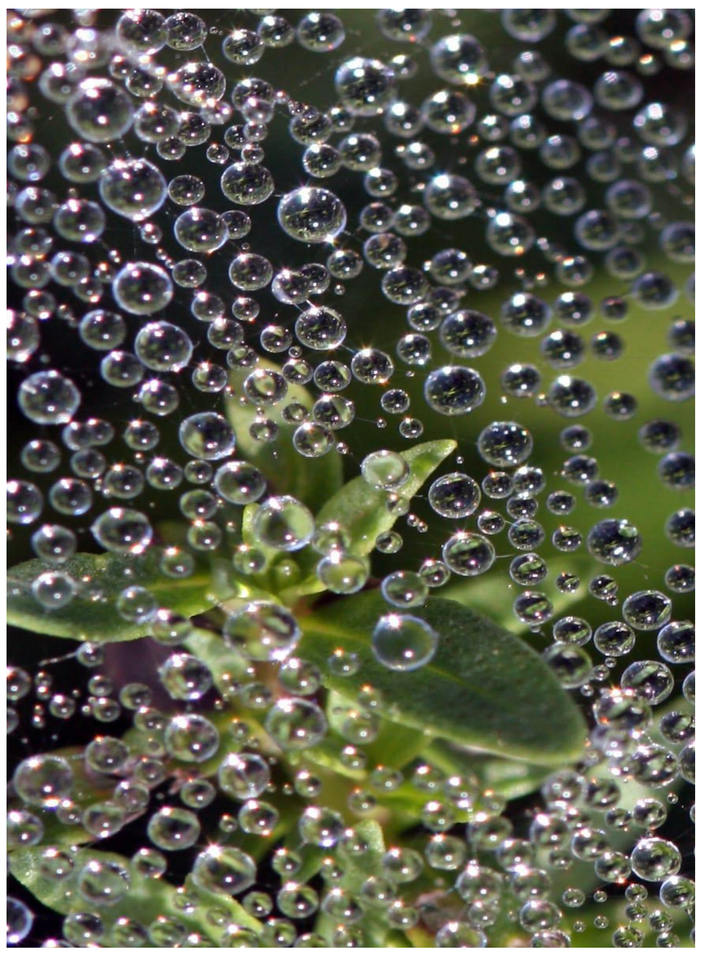
METAMORPHOSIS

Innovative ART Project

Author: Maria Liliana ZAGREAN

K

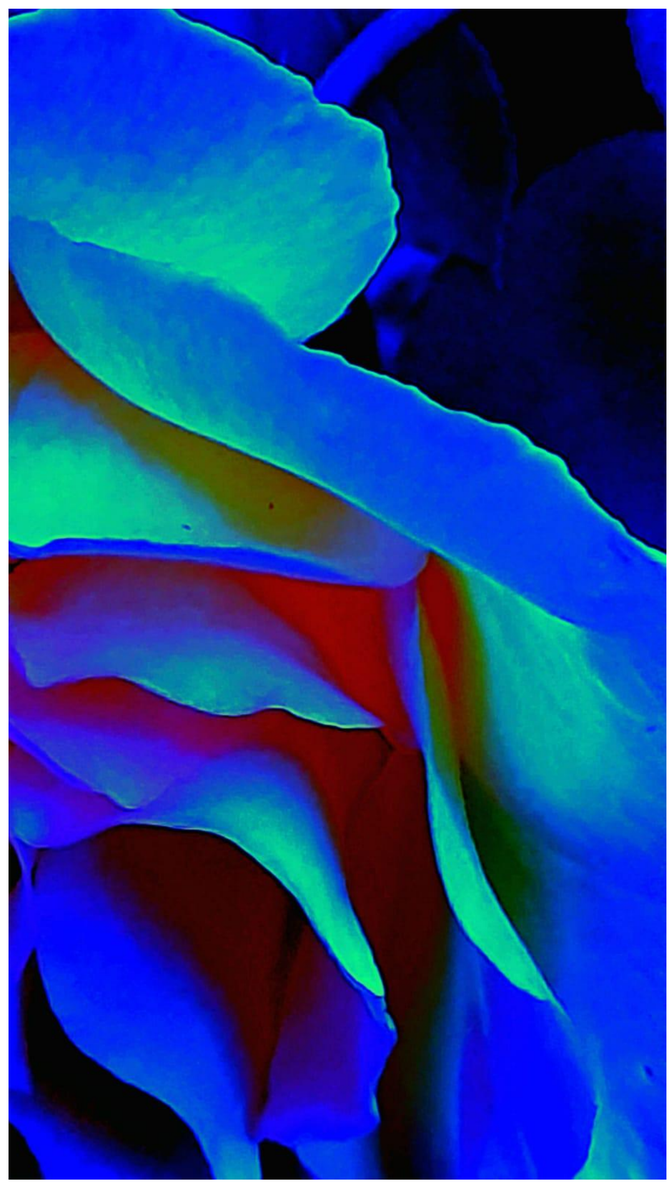
Since I was a child, I was fascinated about the wonder around us. The changing colors of the seasons, they make myself live a magic dream and as intensely live dreams become reality, 14 years ago, I had the opportunity to purchase a professional camera.



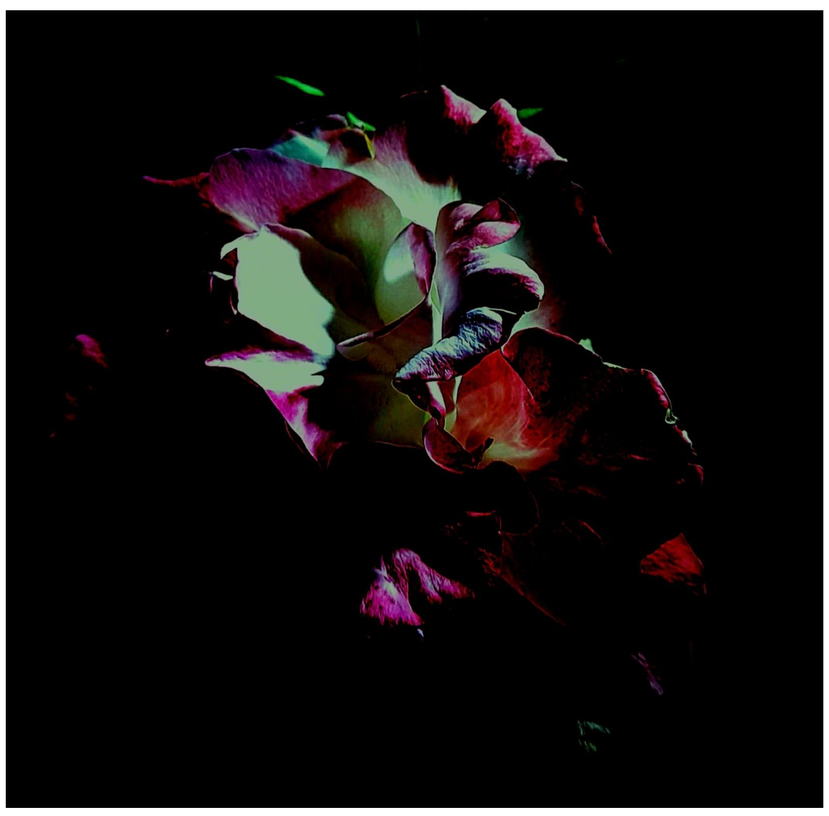
Morning drops



My body, my soul



Ice & fire



Mistery

SCAN ME



Time goes by

From that moment, through the eye of the lens, everything changed.
Looking to the raindrop, I realized that it also has its own lens.
I don’t create the abstract, nature creates it for me, and this is reflected in my works of art.

Contact: caretta.foita@ gmail.com

Jam's Art

Light sculpting “Remember me“ by Jamina Riedel

Innovative ART Project

Author: Jamina Riedel

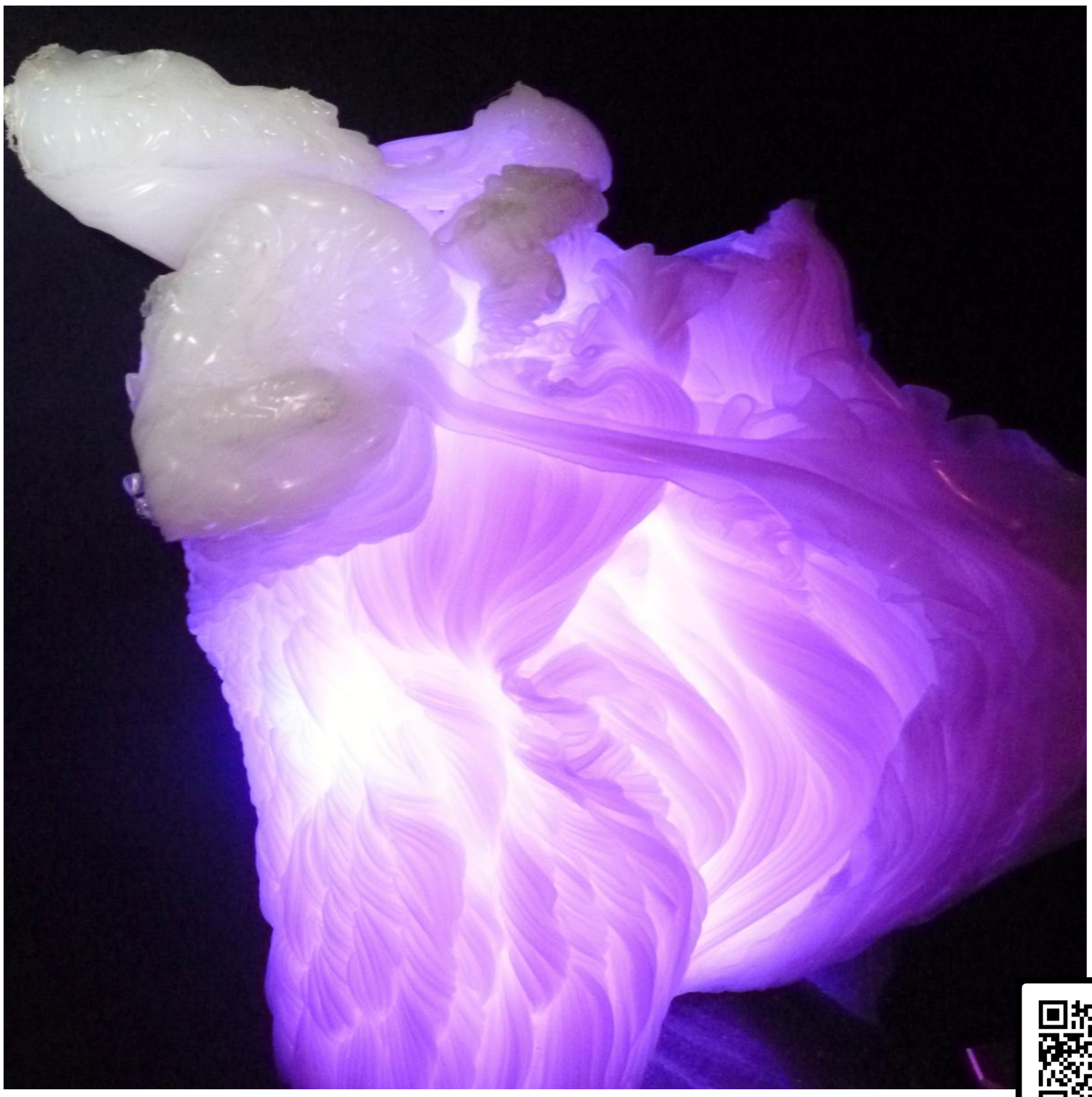
K

Me and my love, Hannes, started 10 years ago with an experiment, in folding plastic film and then, treat with pressure and heat. It takes nearly 4 years, to find the right way, to create a new art of sculpting of recycled plastic film.

We used waterproof LED- stripes for lightening.

Every sculpture is unique, it’s impossible, to create these form again.

It takes 3 month for one object, because every step has to cool down.



Original One - of - a - kind Artwork

Size : 47h x 40w x 30d cm weight : ca 7 kg.

SCAN ME

Plastic sculpture, lightening object, with LED, changing colours a wonderful night light, relax therapy with calming effect.

Contact: jaminaa12@gmail.com

Painting

Student Project

Author: Maksimović Milica

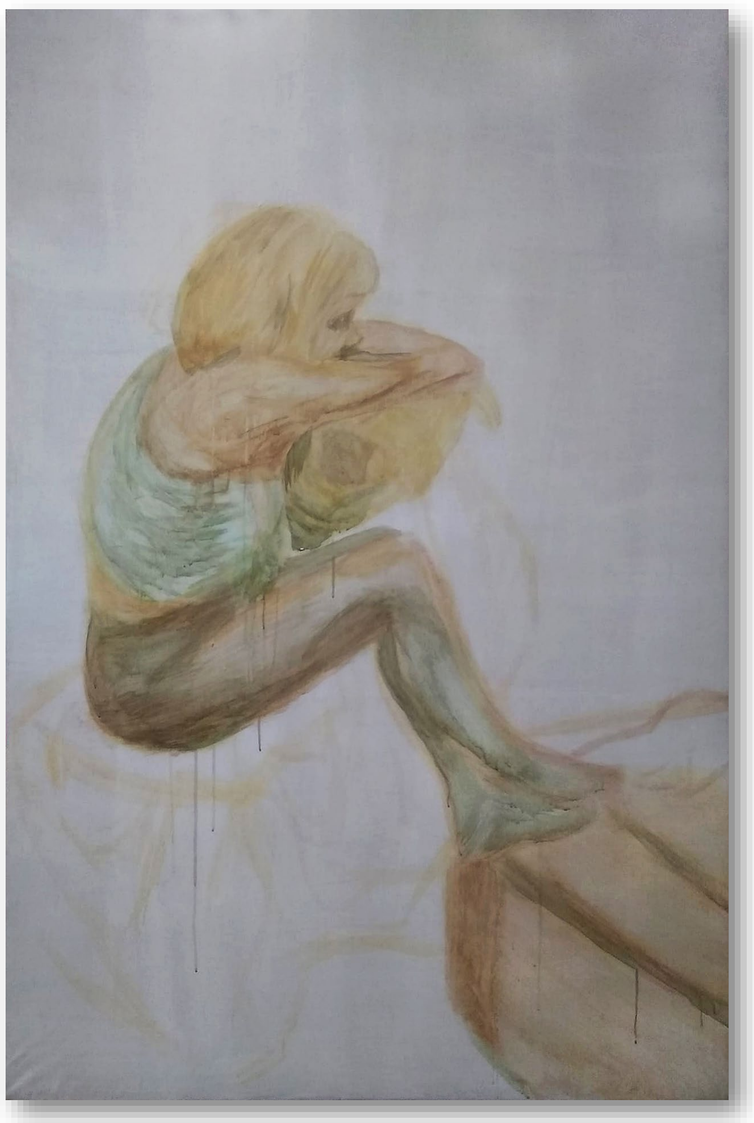
K

I painted a life - size model study over the course of two months and a half using acrylics and specially prepared paper.

At first, I made a simple sketch – deciding the composition and the colors I'm going to use, as well as taking notice of the way those colors complemented each other.

After that, I kept working on my painting, trying to capture the scene in front of me.

From that initial foundation, I continued to build on, developing some things further, while letting go of others.







Contact:

milica.maksimovic1@fsu.edu.rs
+38162295510

Remnants

Photography project/Innovative art

Author: Diana Miruna Armioni

K

„Remnants” is a photography project that delves into the eerie beauty and poignant history of an abandoned mine through a series of evocative black and white photographs.

This project aims to transport viewers into a world of forgotten industry, where the skeletal remains of once-thriving mining operations stand as silent witnesses to a bygone era. It means not just a collection of photographs; it's a journey into the past, a reflection on the present, and a meditation on the intricate relationship between humanity, nature, and the ruins of our industrial heritage.

Through the power of visual storytelling, this project ignites the imagination and invites viewers to connect with the stories hidden within the shadows of this abandoned mine.



Contact: armionimiruna@yahoo.com

Opportunity
CORNELIUGROUP Research-Innovation Association
Creation
Realization
INVENTCOR
Power of Creative Mind
Deva ROMANIA

Mircea IAN Art

Mircea JAN's caricatures

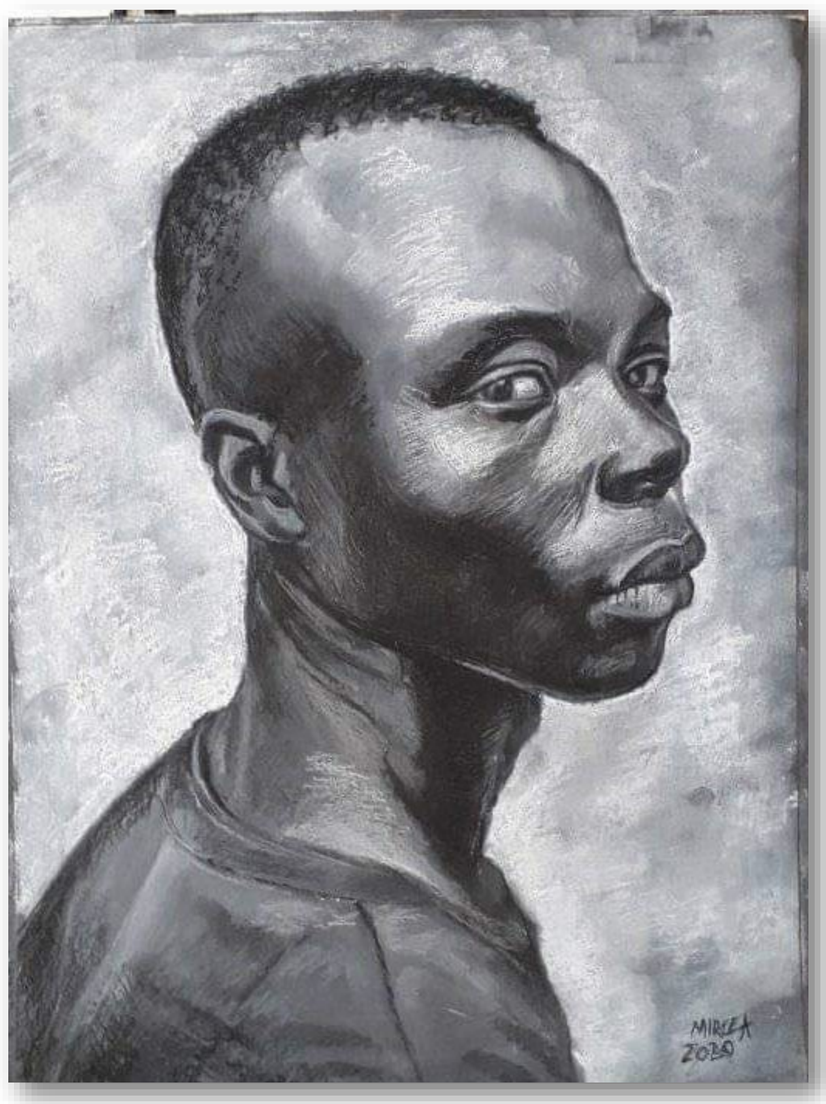
K

Author: *Mircea CRISTEA*

Since I know myself, I have been passionate about everything that means art, especially visual art. Slowly I transferred my passion to paper, so I started making street/urban drawings since 2002 in seaside leisure locations, festivals, events. Initially drawing portraits and currently I focus on the caricature that I intend to reproduce as best as possible: as expression and realization time.
My working technique: graphite charcoal and watercolor.













Contact: +40765659183 ***stelianmircescu@yahoo.com***

FaceBook: https://www.facebook.com/profile.php?id=100066986083424

SCAN ME

Opportunity
CORNELIUGROUP Research-Innovation Association
Creation
Realization
INVENTCOR
Power of Creative Mind
Deva ROMANIA

Gabriela's Art

NECKLACES & PAINTINGS by Gabriela

K

craft art

Author: Gabriela STRNAD

From NECKLACES to PAINTINGS the same technique on different works of art, both the necklaces and the paintings are made of strips of jeans. This idea is linked to „the art of rolling" – quilling, my first love, standing proof is the fact that for my paintings I mixed fabric and paper (for a splash of color) while the leaves are made of strips of paper. The play of colors depends on one's imagination and also preferences.

On my facebook page you can find photos and albums with almost all my work and creations from various fields – quilling, mediamixt (magnets, paintings, „mărțișoare"– the traditional romanian charms exchanged on 1st of March)











Contact: *gabriela.strnad@yahoo.com*

https://www.facebook.com/strnad.gabriela

SCAN ME

EM Art Gallery-Deva

Gallery

Author: Mircea POPITIU

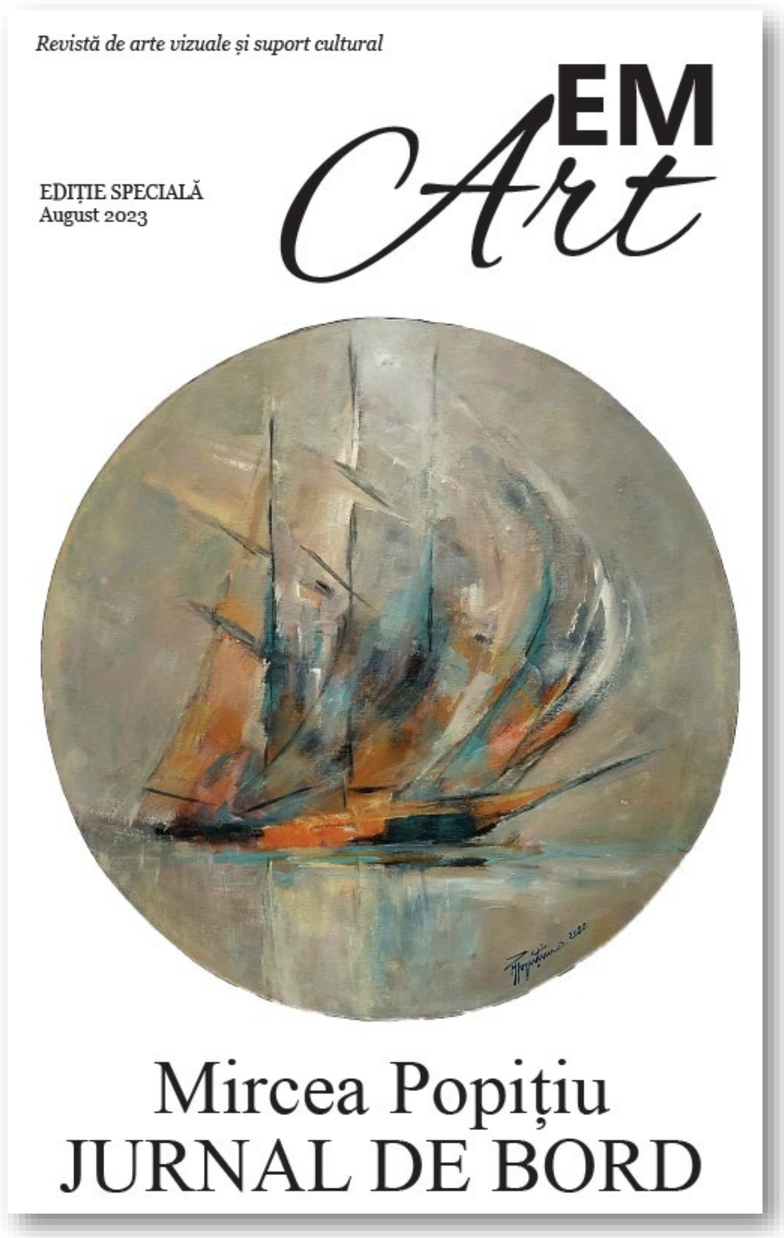
K

EM Art Gallery-Deva was born from the desire to promote contemporary visual artists, on December 5, 2018. From the beginning to the present, more than 50 contemporary professional artists have been exhibited, the gallery registering as the first private gallery in Hunedoara County!

Artists from the main cities in Romania and artists from France, the USA and the Republic of Moldova exhibited on the EM Art Gallery!

Out of the desire to do more, we have created a magazine of visual arts and cultural support entitled EM Art.









Contact: *+40723355939* *popitiuart@yahoo.com*

SCAN ME

Abstract experiences

Author: Irinel Daniela IACOB

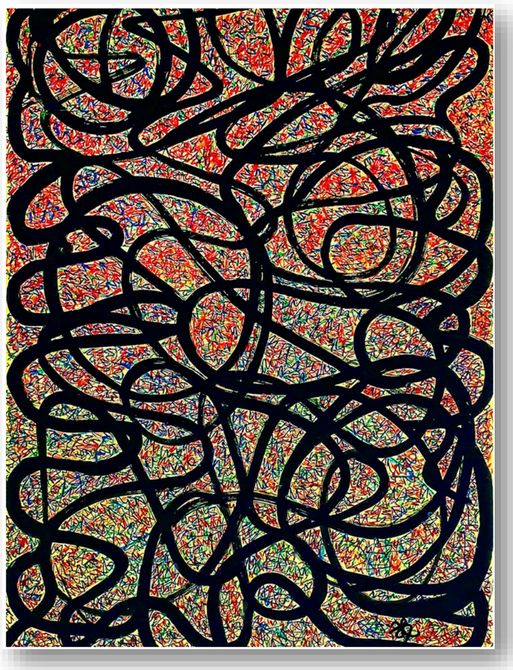
K

My works are mainly abstract and less figurative paintings, abundant in color, in a surprising chromatic circle with different shades outline a style of my own with remarkable creative force.

I am happy and honored to be an **Honored Member** of the prestigious **UNOTA** Organization **THE UNITED NATIONS ARTS & SCIENCES.**



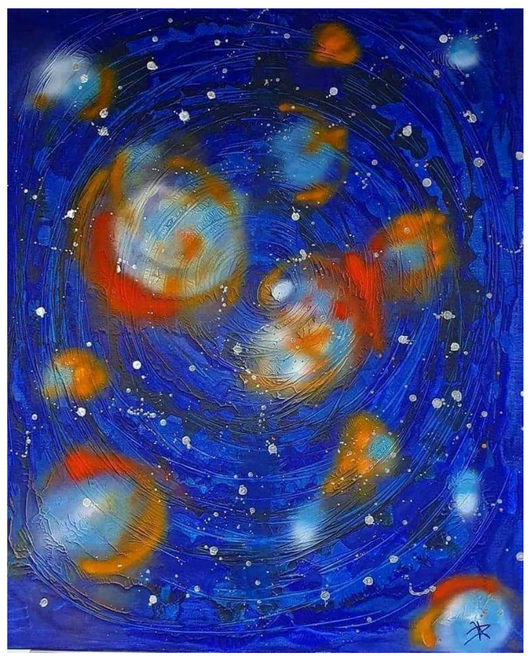
REMEMBERING COLORS
Mixed media on linen
(70 x 50) cm



CONTEMPORARY HISTORY
Mixed media on linen
(100 x 70) cm



SCUBA DIVER
Mixed media on linen
(100 x 70) cm



GALAXY 13041946
Mixed media on linen
(100 x 80) cm



SOARELE ROSU
Mixed media on linen
(100 x 80) cm



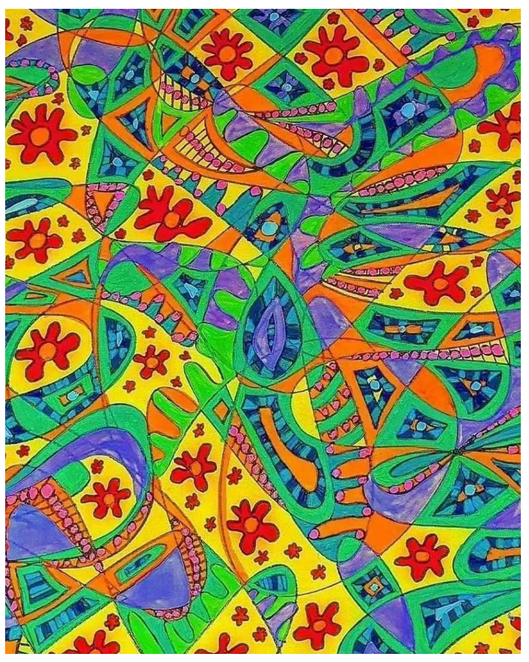
LIBERTATE
Mixed media on linen
(100 x 70) cm



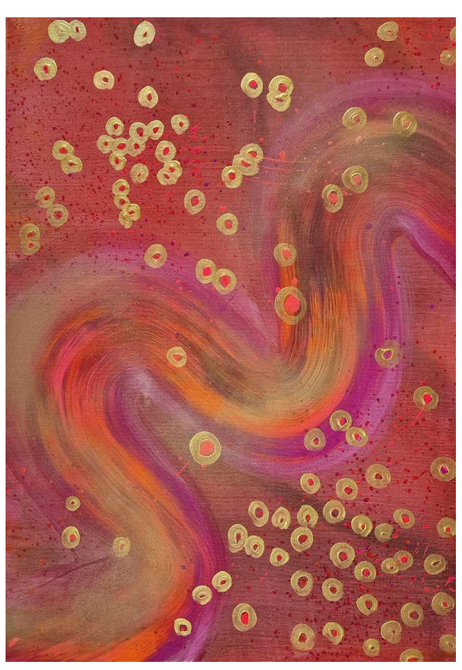
GRADINA CU LICURICI
Mixed media on linen
(70 x 50) cm



BLODY HISTORY
Acrilic pe canvas
(70 x 50) cm



GRADINA URBANA
Acrilic pe canvas
(70 x 50) cm



PARFUM DE FEMEIE
Mixed media on linen
(70 x 50) cm

SCAN ME

Contact: http://artbyirineldaniela.com/

MANEA's Art

PERPETUUM CLASSICUM

Artworks

Authors: Mugurel Emanuel MANEA

K

I'm a plastic artist, member of UAPR DEVA my works are part of a wider cycle of graphic wall installations. The first work entitled PERPETUUM CLASSICUM and the second AUDIO BOOK were exhibited in several galleries including EM ART GALLERY.





SCAN ME

Contact: ***https://www.facebook.com/mugurelemanuel.manea***

2024

Catalogue 4th International Exhibition InventCor

14-16.09.2023 – Deva, Romania



Opportunity
CORNELIUGROUP
Research-Innovation
Association
INVENTCOR
Power of Creative Mind
Deva ROMANIA
Creation
Realization

International Exhibition INVENTCOR
5th edition, 04-06 April 2024

See you next year!

Editor: Corneliu BIRTOK BĂNEASĂ

ISSN 2971- 8392
ISSN – L 2971 – 8392

Editura POLITEHNICA