



UNIVERSITATEA
CONSTANTIN
BRÂNCUȘI
din Târgu Jiu



OLTENIA TECHFEST

CATALOGUE



Editura ACADEMICA BRÂNCUȘI
Târgu Jiu, România
2026

1st edition

AUTORI:

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- CĂLINA DENIS LUCIAN
- BONCEA ADRIAN

ISBN 978-630-340-084-6

Oltenia TechFest Catalogue 1st edition

“Constantin Brâncuși” University of Târgu Jiu is organizing the **Oltenia TechFest Technology Forum**, an event dedicated to researchers, inventors and students from all faculties and study/master programs, as well as to the private sector. The event will take place from 6 to 7 November 2025, at the **Constantina Diță-Tomescu Municipal Stadium, Târgu Jiu**.

The main purpose of the forum is to stimulate innovation and economic development in the South-West Oltenia region, by creating a favorable framework for the exchange of ideas and best practices among academia, researchers, entrepreneurs and industry professionals, generating synergy between research, innovation and business.

General Objective:

Promoting innovation and technology transfer by creating a framework for collaboration between researchers, the economic environment and public administration, in order to disseminate scientific results, raise awareness of the importance of intellectual property and technology transfer, and facilitate access to funding sources for developing innovative solutions with regional (South-West Oltenia) and national economic impact.

Event Structure

Section A. Conference — topics:

1. Innovation and technology transfer in Romania: national strategic directions and regional implementation in South-West Oltenia
2. Intellectual property and technology transfer – pillars of added value in research and innovation
3. Innovative companies and technology transfer: from requirements to best practices and effective partnerships

Section B. Exhibition of patents, patent applications, research projects, product showcase, and B2B meetings / technology brokerage.

Parteneri:



Sponsor:

Oltenia TechFest Catalogue

Period & Location: 6–7 November 2025, Constantina Diță-Tomescu Municipal Stadium, Bulevardul Constantin Brâncuși St., no. 6, Târgu Jiu

Registration deadline: 15.10.2025

Website: icdi.utgjiu.ro/forum-tehnologic-oltenia-techfest-2025

Hashtag: #OlteniaTechFest2025 #UCBTarguJiu#TechnologyTransfer

Accommodation:

Hotel Goya Boutique — 15% discount for guests, 240 RON / double room with breakfast
Hotel Goya Collection — 15% discount for guests, 240 RON / double room with breakfast

Contact persons: Rădulescu Constanța, Călina Denis Lucian

E-mail: olteniatechfest@gmail.com

Phone: 0728 028 116 / 0761 186 722

Oltenia TechFest Technology Forum covers the following fields: technology transfer, intellectual property, information technology, research & innovation, patents and industrial innovation, entrepreneurship, and academia–industry collaboration.

Parteneri:



Sponsor:

PARTNERS:

IPA S.A., Sucursala CIFATT Craiova, Romania.

<https://www.ipacv.ro/index.php?cPath=h>



Primăria Municipiului Târgu Jiu

<https://www.targujiu.ro/>



Universitatea de Medicină și Farmacie din Craiova

<https://www.umfcv.ro/>



**Asociația Generală a Inginerilor din România,
Sucursala Gorj**

<https://www.gorj.agir.ro/>



**Institutul Național de Cercetare,
Dezvoltare pentru Chimie și Petrochimie**

<https://icechim.ro/>



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 - **Sustenabilitate, Transfer Tehnologic și Relația cu Diaspora**
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Aurel Mihail ȚÎȚU



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Constanța Rădulescu

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A. Industrial Technologies and Applied Engineering: Nanotechnology, Advanced Materials, Metallurgy, Civil Engineering; Mechanical, Automotive, Aviation, Space, Ships

B. Digital Technologies and Energy: Energy, Environmental Protection, Biotechnology; Computer Science, Electronics, Electrical Engineering

C. Human Health and Biotechnology: Medicine, Pharmacy, Cosmetics, Hygiene

D. Life Sciences and Food: Agriculture, Veterinary Medicine, Food Industry (Food, Beverages)

E. Education, Culture and Humanities: Education, Management, Pedagogy, History, Culture, Literature, Humanities

F. Art, Fashion and Creative Industries: Textiles, Fashion, Design, Crafts, Art, Music, Video, Photography, Advertising

G. Lifestyle, Leisure and Tourism: Children, Games, Sports, Outdoor, Tourism, Restaurants, Hotels, Spa

UNIVERSITATEA „CONSTANTIN BRÂNCUȘI” DIN TÂRGU JIU
FORUMUL TEHNOLOGIC OLTEA TECHFEST 2025
6-7NOIEMBRIE2025,Ediția I

Loc de desfășurare: Stadionul Municipal „Constantina Diță-Tomescu” din Târgu-Jiu

SECȚIUNEA A - CONFERINȚA
Ziua I - 6noiembrie2025

09⁰⁰-11⁰⁰

Primirea și înregistrarea participanților

11⁰⁰-11¹⁵

SESIUNEA DE DESCHIDERE

Cuvânt de deschidere

Reprezentantul Primăriei Municipiului Târgu-Jiu

*Prof.univ.dr.ing.LUMINIȚA GEORGETA POPESCU - Rector Universitatea
„Constantin Brâncuși” din Târgu-Jiu;*

Reprezentantul Consiliului Județean Gorj

1. INOVAREA ȘI TRANSFERUL TEHNOLOGIC ÎN ROMÂNIA: DIRECȚII STRATEGICE
NAȚIONALE ȘI IMPLEMENTARE LA NIVEL REGIONAL, NAȚIONAL ȘI INTERNAȚIONAL

KEYNOTE

1.1. CS I, dr.ing. **GABRIEL VLĂDUȚ** - Presedinte ARoTT Asociația Română de
Transfer Tehnologic și Inovare - Direcții strategice naționale și
implementare la nivel regional, național și internațional

1.2. **MAGDA LUNGU** - Apeluri proiecte- Prioritatea 1- Competitivitate
prin inovare și întreprinderi dinamice -ADR SV Oltenia

1.3. Proiecte de succes / exemple de bune practici- alte regiuni

JOI

11¹⁵-12¹⁵

Panel 1
(60 min)

Prof.univ. dr.ing. LUMINIȚA GEORGETA POPESCU

Prof.univ. dr. COSTIN TEODOR STREBA

Dr.Ing. IOAN IORDACHE

Dr.Ing. ADRIAN ENACHE

Prof. Univ. Habil.Dr. M.Ec.Ing.Mat.AUGUSTIN SEMENESCU

Prof.univ. dr. NARCISA JEANINA MEDERLE

Conf.univ. dr. OCTAVIAN MĂDĂLIN BUNOIU

Moderator: Prof.univ. dr. Ec. ANIELA BĂLĂCESCU

Parteneri:



Sponsor:

2. PROPRIETATE INTELECTUALĂ ȘI TRANSFER TEHNOLOGIC - PILONI AI VALORII ADĂUGATE ÎN CERCETARE ȘI INOVARE

JOI

12¹⁵ - 13¹⁵

KEYNOTE

2.1. Protecția unei invenții - **MARINA VOICULESCU**, expert
Compartiment Comunicare și Promovare P.I., OSIM

2.2. Proprietate intelectuală și transfer tehnologic - piloni ai valorii
adăugate în cercetare și inovare - **ALEXANDRA PETCU** - Directorul
Centrului de Transfer Tehnologic al UVT

2.3. Înțelegerea brevetelor - 7 termeni esențiali pentru înțelegerea
brevetelor- **ANA MARIA PETCULESCU** - consilier român și european în
proprietate industrială

Prof. univ. dr. ing. dr. ec. Dr. Habil. **MIHAI AUREL TITU**, Dr.h.c..

Lect.univ. **MARIAN NICOLAE VELCEA**

Panel 2

(60 min)

Dr.ing. **ILEANA MARIANA MATEȘ**

Prof.univ.dr. **CRISTINA ILEANA COVALIU MIERLĂ**

Prof.univ.dr. **ADINA TURCU ȘTIOLICĂ**

Moderator: Conf.univ.dr.ing.**RĂDULESCU CONSTANȚA**

JOI

13¹⁵ - 14³⁰

NETWORKING LUNCH

SECȚIUNEA B. EXPOZIȚIE DE PRODUSE ȘI ÎNTÂLNIRI B2B

JOI

14³⁰ - 18⁰⁰

Prezentare brevete de invenții/ cereri de brevete/ proiecte:

Prof.univ.dr **PETRE SĂVESCU**- Innovative food supplement based on plant products
obtained from organic farming

S.l.dr.ing. **IRINA MATRAN**- Potențialul antifungic al sericinei în produse de panificație și
patiserie

S.l.dr.ing. **IRINA MATRAN**- Premixes for appetizer or dessert muffins

Dr.ing. **FLORIN TEIȘANU** - Predictive method and system for determining the operating
condition in big-blaster air cannons and micro-cannons

Dr. habil. CS I **RADU CLAUDIU FIERĂȘCU** Composite based on raw materials of natural
origin for the adsorption of heavy metals and method of obtaining it

Dr. habil. CS I **RADU CLAUDIU FIERĂȘCU** - Composite material for organic pollutants
removal using materials based on food waste and procedure for obtaining it

S.l.dr.ing. **CĂTĂLIN ȘCHIOPU** - Laborator Practic de Tehnologii Inteligente, Eficiente și
Durabile în Horticultură (Acronim: LINTEL)

Vizitarea standurilor și jurizarea brevetelor, cererilor de brevete și proiectelor.
Vizitarea standurilor - Expoziția firmelor participante - permanent.

Parteneri:

Sponsor:



SECȚIUNEA A - CONFERINȚA

Ziua II - 7 noiembrie 2025

VINERI
10³⁰-10⁴⁵

ALINA DUMITRU
ALIANTBUSINESS SOLUTIONS SRL

3. FIRME INOVATIVE ȘI TRANSFERUL TEHNOLOGIC: DE LA CERINȚE LA BUNE PRACTICI ȘI PARTENERIATE EFICIENT

VINERI
10⁴⁵-12⁰⁰

KEYNOTE

3.1. CS I. dr.ing. GABRIEL VLĂDUȚ - Președinte ARoTT Asociația Română de Transfer Tehnologic și Inovare - Facilități fiscale pentru companiile care desfășoară activități de cercetare, dezvoltare și inovare (CDI)"

3.2. Consultant SORIN COSMULESCU - Apeluri EIC STEP Scale Up (Tehnologii strategice pentru Europa) ADR SV Oltenia

3.2. MIRCEA ȘCHEAU- PhD in Ordine Publică și Securitate Națională - Inteligența artificială versus profilare, dezinformare și manipulare cibernetică

Panel (75 min)

Conf.univ. dr. **OCTAVIAN MĂDĂLIN BUNOIU**

ROXANA PISTOL - Co-Founder and member Be Teen Association

CS. MARILENA CLAUDIA STANCU - INOE 2000

Dir. General **RĂZVAN -REBEDEA** Fivex SRL

Manager **MITRUȚ STĂNOIU** - Web Logistics

S.l.dr.ing. **CORNELIU BIRTOK-BĂNEASA**

Colonel Ing. **MIHAI ȘCHEAU**- Șeful Direcției Județene de Telecomunicații Speciale Gorj

Moderator:CS.dr. **COSTINASFİNTEȘ**

12⁰⁰-14⁰⁰

FESTIVITATEA DE PREMIERE

SECȚIUNEA B. EXPOZIȚIE DE PRODUSE ȘI ÎNTÂLNIRI B2B

Vizitarea standurilor - Expoziția firmelor participante - public larg

18⁰⁰

CINA FESTIVĂ

Restaurant GOYA

Pe parcursul celor două zile, standurile vor fi deschise publicului.

Parteneri:



Sponsor:





Oltenia TechFest Forum Tehnologic Ediția I, 6 - 7 Noiembrie 2025

Institutul de
Cercetare
Dezvoltare și
Inovare

PANEL 1:

**INOVAREA ȘI TRANSFERUL TEHNOLOGIC ÎN ROMÂNIA:
direcții strategice naționale și
implementare la nivel regional, național și internațional**



KEYNOTE SPEAKER:
CSI.dr. ing
Gabriel VLĂDUȚ



KEYNOTE SPEAKER:
Director DPG - ADRSUD VEST
Magda LUNGU

SPEAKER'S PANEL:



Prof. univ. dr. ing.
Luminița – Georgeta POPESCU



Conf. univ. dr.
Octavian Mădălin BUNOIU



Prof. univ. dr. habil.
Augustin SEMENSCU,
HC, M.Sc., B.Sc.



Prof. univ. dr.
Costin Teodor STREBA



Prof. univ. dr.
Narcisa Jeanina MEDERLE



Dr. ing.
Ioan IORDACHE



Dr. ing.
Adrian ENACHE



MODERATOR:
Prof. univ. dr.
Aniela BĂLĂCESCU



LOCAȚIA: Corp Administrativ, Etaj 1,
Stadionul Municipal Constantina Diță-Tomescu,
Bd. C-tin. Brâncuși , Nr. 6, Târgu Jiu, România
JOI, ORA: 11:15



Oltenia TechFest

Forum Tehnologic

Ediția I, 6 - 7 Noiembrie 2025

Institutul de
Cercetare
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Inovare

PANEL 2:

PROPRIETATE INTELECTUALĂ ȘI TRANSFER TEHNOLOGIC - PILONI AI VALORII ADĂUGATE ÎN CERCETARE ȘI INOVARE



KEYNOTE SPEAKER:
DirectorCTT - UVT
Alexandra PETCU



KEYNOTE SPEAKER:
Consilier proprietate industrială
Ana PETCULESCU

SPEAKER'S PANEL:



Prof. univ. dr. ing
Mihai Aurel ȚÎȚU



Consilier PI
Mariam VELCEA



Expert PI
Marina VOICULESCU



Dr. ing.
Ileana Mariana MATEȘ



Prof. univ. dr. habil.
Cristina Covaliu MIERLĂ



Prof. univ. dr
Adina TURCU-ȘTIOLICĂ



Moderator:
Conf. univ. dr. ing.
Constanța RĂDULESCU



LOCAȚIA: Corp Administrativ, Etaj 1,
Stadionul Municipal Constantina Diță-Tomescu,
Bd. C-tin. Brâncuși , Nr. 6, Târgu Jiu, România
JOI, ORA: 12:15



Oltenia TechFest

Forum Tehnologic

Ediția I, 6 - 7 Noiembrie 2025

Institutul de
Cercetare
Dezvoltare și
Inovare

PANEL 3:

FIRME INOVATIVE ȘI TRANSFERUL TEHNOLOGIC: DE LA CERINȚE LA BUNE PRACTICI ȘI PARTENERIATE EFICIENTE



KEYNOTE SPEAKER:
CSI.dr. ing
Gabriel VLĂDUȚ



KEYNOTE SPEAKER:
Specialist Securitate Cibernetică
Mircea ȘCHEAU

SPEAKER'S PANEL:



Conf. univ. dr.
Octavian Mădălin BUNOIU



Consultant ADR SV-OLTENIA
Sorin COSMULESCU



Manager Web Logistics
Mitruț STĂNOIU



Lector ing.
Corneliu BIRTOK-BĂNEASĂ



Manager FIVEX SRL
Răzvan REBEDEA



CS INOE 2000
Marinela Claudia STANCU



Co-Founder and member
Be Teen Association
Roxana PISTOL



Colonel ing.
Mihai ȘCHEAU



Moderator:
Cercetător Științific
Costina SFINTEȘ



LOCAȚIA: Corp Administrativ, Etaj 1,
Stadionul Municipal Constantina Diță-Tomescu,
Bd. C-tin. Brâncuși , Nr. 6, Târgu Jiu, România
VINERI ORA: 10:45

Table of Contents – Patents/Projects Presentation (sorted by category)

Total: 86 entries, numbered 23–113 (each number corresponds to one page of the source PDF; entries spanning multiple pages are shown as a range, e.g. 47-48). The entry at 65 is a duplicate of the one at 58, kept as its own entry.

Nr.	Title	Authors
23	Quaternary Hydrophilic Nanohybrid Composition for Resistive Humidity Sensors	Bogdan-Catalin Serban, Octavian Buiu, Cornel Cobianu, Viorel Avramescu, Nicolae Dumbravescu
24	Quaternary Oxidized Carbon Nanohorns-Based Nanohybrid for Resistive Humidity Sensor	Bogdan-Cătălin Serban, Octavian Buiu, Cornel Cobianu, Viorel Avramescu, Nicolae Dumbravescu
25	Laser Emission Stabilization Technique for Detection by High Spectral Resolution Lidar	Belegante Livio, Vasilescu Georgeta-Jeni, Nicolae Doina Nicoleta, Nemuc Anca Viorica, Dandocsi Alexandru Marius, Tilea Alexandru, Radu Cristian Marian
26	Composite Thermal Insulation Panels with Sheep Wool Core and Production Methods	Andreea Hegyi, Henriette Szilagyi, Carmen Dico, Vasile Meită
27	Wall Construction System Based on Unfired Clay	Gabriela Călătan, Andreea Hegyi, Henriette Szilagyi, Vasile Meită
28	Process for Obtaining Compaction Masses with Reinforcement Based on Hydraulic Binder	Popescu Georgeta Luminița, Marica Mădălina Mirabela, Abagiu Traian Alexandru, Predeanu Georgeta, Racocanu Cristinel, Cruceru Mihai, Popescu Cristinel, Diaconu Bogdan Marian, Ciofu Florin Cristian, Cazalbaşu Ramona, Anghelescu Lucica
29	Process for Obtaining Heat-Insulating Concrete Based on Heavy Ash of Power Plant	Popescu Georgeta Luminița, Marica Mădălina Mirabela, Abagiu Traian Alexandru, Predeanu Georgeta, Racocanu Cristinel, Cruceru Mihai, Popescu Cristinel, Diaconu Bogdan Marian, Ciofu Florin Cristian, Cazalbaşu Ramona, Anghelescu Lucica
30	Construction Brick Manufacturing Process Using Industrial Waste	Popescu Georgeta Luminița, Marica Mădălina Mirabela, Abagiu Traian Alexandru, Predeanu Georgeta, Racocanu Cristinel, Cruceru Mihai, Diaconu Bogdan Marian, Dițescu Corneliu Laviniu, Dondoe Valentin, Anghelescu Lucica
31	HCRPS Waste Plastic Recycling Plant	Wam Elvis Mbviugheh
32	Biocompatible Titanium-Based Alloy with the Addition of Molybdenum, Zirconium, and Tantalum	Bălțatu Mădălina Simona, Vizureanu Petrică, Geantă Victoraș, Ștefănoiu Radu, Voiculescu Ionelia, Sandu Andrei Victor
33	Self-Adaptive Differential Group	Romeo Cătălinoiu, Sorin Aurel Rațiu, Imre Zsolt Miklos
34	Preparation Process Nitrogen-Doped Graphene Materials in the Microwave Field	Teodora Adriana Marinoiu, Elena Carcadea, Mircea Răceanu, Ioan-Catalin Capriș, Mihai Varlam
35	Process for Preparing a Nanocomposite Material Based on Gold-Doped Graphene	Teodora Adriana Marinoiu, Mircea Răceanu, Ioan-Catalin Capriș, Elena Carcadea, Simona Filofteia Ion, Mihai Varlam
36	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
37	Chemiresistive Ethanol Sensor Based on Graphene and Metal Oxide Nanocomposites and Process for Obtaining It	Cornel Cobianu, Bogdan-Catalin Serban, Octavian Buiu, Nicolae Dumbrăvescu, Maria Roxana Marinescu, Narcis-Octavian Ionescu, Viorel Avramescu

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38	Resistive Humidity Sensor	Bogdan-Cătălin Serban, Octavian Buiu, Marius Bumbac, Cristina Mihaela Nicolescu
39	Surface Acoustic Wave Sensor for Relative Humidity Monitoring	Bogdan-Cătălin Serban, Octavian Buiu, Marius Bumbac, Cristina Mihaela Nicolescu
40	Propanol Resistive Sensor	Bogdan-Cătălin Serban, Octavian Buiu, Marius Bumbac, Cristina Mihaela Nicolescu
41	Chemiresistive Ethanol Sensor	Bogdan-Cătălin Serban, Octavian Buiu, Marius Bumbac, Cristina Mihaela Nicolescu
42	Trimethylamine Resistive Sensor	Bogdan-Cătălin Serban, Octavian Buiu, Marius Bumbac, Cristina Mihaela Nicolescu
43	Dynamically Adjustable Sunshade System for Vehicle Windshields	Ciprian Bejenar, Alexandru Leonte, Laurențiu Dan Milici, Andrei Emanuel Pascan, Mihai Dimian, Daniela Irimia, Constantin Ungureanu, Ciprian Afanasov
44	Modular Mecanum Wheel Assembly Optimized for Traction on Sandy and Unstable Surfaces	Aurel Mihail Titu, Daniel Balc, Emanuel Balc, Stefan Titu
45	Mecanum Wheel with Individual Flexring-Equipped Rollers for Vibration Damping and Enhanced Stability	Daniel Balc, Aurel Mihail Titu, Emanuel Balc, Stefan Titu
46	Hybrid-Architecture Mecanum Wheel with Independently Actuated Rollers	Emanuel Balc, Aurel Mihail Titu, Daniel Balc, Stefan Titu
47-48	Root Cause Analysis of a Heat Exchanger Failure	Lucas Jacoby, Jona Weiblen, Maximilian Hülsewede (Mentors: Gabriela Marginean, Klaus Mecking, Dino Woelk)
49	Occupational Health and Safety Study for the Work Environment of an Equipment Distribution Operator	Oana Roxana Chivu, Augustin Semenescu, Andrei Ștefan Iacob, Claudia Borda, Mădălina Giulia Boboceă, Marilena Gheorghe, Dan Florin Nițoi
50	Economic Aspects of Green Concrete	Mircea-Iosif Rus
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52	Wear Behavior of Single Point Cutting Tool	Alexandru Mihai Pinca-Bretotean (Mentor: Adrian But)
53	Biomedical Applications of Magnetite	Avrămoiu Gheorghe
54	Strategies for Increasing Productivity in CNC Machining	Coordinator: Adrian But; Master's student: Alexandru Mihai Pinca-Bretotean
55	Comparison of Wear Resistance of Thermally Sprayed WC-Co-Cr Coatings from Recycled Powders and Conventional WC-Co-Cr Coatings	Dino Woelk, Gabriela Marginean
56	TEA-BORGS – FIRST Tech Challenge Robotics Team #19121	Colegiul Național „Tudor Vladimirescu” Târgu Jiu (team)
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59-60	Predictive Method and System for Determining the Operating Condition in Big-Blaster Air Cannons and Micro-Cannons	Teisanu Florin, Chelan Constantin, Butoi Marinela, Patru Ion, Iordache Ioan, Nicola Claudiu, Nicola Marcel
61	From Elements to Wisdom – The Table that Inspires	Giñcu Eugenia, Bludaru Viorica, Coropceanu Eduard, Ciornăi Emiliana, Indoitu Irina

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62	High Frequency Rotary Transformer	Adrian Vintilă, Andrei Marinescu, Petre Pistol, Marcel Nicola, Claudiu Nicola
63-64	Compressed Air Cooling Device	Teişanu Florin, Chelan Constantin, Duţă Marian, Pătru Ion
65	Monitoring Method and System for the Sag of Overhead Power Transmission Lines Conductors (duplicate of the entry on p. 36 of the source PDF)	Sacerdoţianu Dumitru, Nicola Marcel, Vintila Adrian, Nicola Claudiu, Hurezeanu Iulian, Lazarescu Florica, Popescu Paul, Purcaru Ion, Albiţa Anca
66	The Smart Emergency Helmet	Gîncu Eudochia, Bludaru Viorica, Coropceanu Eduard, Bobeico Svetlana, Muntean Adelina
67	Composite Based on Raw Materials of Natural Origin for the Adsorption of Heavy Metals and Method of Obtaining It	Radu Claudiu Fierascu, Irina Fierascu, Toma Fistos, Anda Maria Baroi, Ioana Silvia Hosu, Roxana Ioana Matei, Irina-Elena Chican
68	Composite Material for Organic Pollutants Removal Using Materials Based on Food Waste and Procedure for Obtaining It	Roxana Ioana Brazdis (Matei), Irina Fierascu, Toma Fistos, Anda Maria Baroi, Ioana Silvia Hosu, Radu Claudiu Fierascu, Valentin Raditoiu, Monica Florentina Raduly, Maria Grapin
69	Hybrid Solar System with Automatic Adjustment	Visarion-Cătălin Ifrim, Ciprian Bejenar, Constantin Ungureanu, Laurenţiu-Dan Milici, Pavel Atănăsoae
70	System for Saving Low-Beam Light Sources and Method for Adjustment	Gheorghită-Stelian Mihăilescu, Ciprian Bejenar, Laurenţiu-Dan Milici, Ştefan-Bogdan Dulgheru, Radu-Dumitru Pentiu, Pavel Atănăsoae
71	Method and System for Increasing Heating Power	Ciprian Bejenar, Marian Bejenar, Andrei-Dumitru Naşcu, Daniel Hriţcan, Vasile-Eusebiu Toader, Laurenţiu-Dan Milici
72-74	Integrated System for Monitoring, Analyzing, and Diagnosing Overhead Power Lines (OPL) – SMLEA SEE TDEE	Partners: SC Simtech International SRL (Project Leader), ICMET Craiova (Partner)
75	Online Monitoring Module for OPL Cable	Not specified (Contact: market@icmet.ro)
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82	Viral Solution "SV"	Dr. Oana Codruta Bacean Miloicov
83	QVibe Frequency Generating Therapeutic Device – Used Against Parasitic Infections	Dr. Oana Codruta Bacean Miloicov
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87	Premixes for Appetizer or Dessert Muffins	Irina Matran, Claudia Bănescu, Ştefania Şerban

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88	Orthopedic Device for Correction of the Talipes Calcaneus / Talipes Calcaneovalgus Defect	Costoiu Mihnea Cosmin, Semenescu Augustin, Doicin Cristian, Ulmeanu Mihaela, Cîrstoiu Cătălin, Doicin Ioana, Mateș Ileana
89	Thermoresponsive Gel-Based Intranasal Delivery System Containing Vitamin F and Hyaluronic Acid for the Treatment of Nasal Inflammation and Epithelial Regeneration	Ciocîlteu Maria-Viorica, Oancea Carmen-Nicoleta, Turcu-Știolică Adina, Biță Andrei, Pîrvu Silvia-Andreea, Rău Gabriela, Văruț Marius-Ciprian
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92	DEXTER'S Laboratory – Educational Program	Corneliu Birtok Baneasa & Team
93	E-Tongue Like Sensor for Food Safety (FoodESense)	A.M. Iordache, V. Barna, S. Caramizoiu, A.M. Florea (Raduta), B. Bită, S.M. Iordache
94	Innovative Food Supplement Based on Plant Products Obtained from Organic Farming	Săvescu Petre, Iacobescu Fănel, Poenaru Maria Magdalena
95	Processing and Valorization of Natural Zeolites for Application as Clarifying Agents in Brewing	Oana Cadar, Marin Șenilă, Irina Wagner, Ion Miu
96	Ultrasensitive Gas Sensor Array for Greenhouse Environment Assessment (GreHSen)	S.M. Iordache, A.M. Iordache, S. Caramizoiu, A.M. Florea (Raduta), B. Bită
97	Brokerage Events for Technology Transfer and Partner Identification in the AgriFood Sector	Ancuța-Maria Ivan, Cristina-Maria Bălgărădean, Mădălina-Alexandra Coțiu
98	Practical Laboratory of Intelligent, Efficient, and Longevous Technologies in Horticulture (LINTEL)	Emil-Cătălin Șchiopu
99	Antifungal Potential of Sericin in Bakery and Pastry Products	Emanuela Chiper, Irina M. Matran, Monica Tarcea
100	Identification and Molecular Characterization of Giant Liver Fluke (Fascioloides magna) Infection and Gongylonema pulchrum	Popovici Dan-Cornel, Robu Mihai, Marin Ana-Maria, Moraru Maria Monica Florina, Morariu Sorin, Imre Mirela, Mederle Narcisa
101	Research Regarding the Epidemiological Study on the Evolution over 10 Years of Varroosis in Bees from Mehedinți and Vâlcea Counties	Dobrotă Radu-Sebastian, Marin Ana-Maria, Moraru Maria Monica Florina, Mederle Narcisa
102	Evaluating the Phytoremediation Efficiency of Iris pseudacorus for Lead Removal from Contaminated Water	Alexandru Becheru, Cristina Ileana Covaliu-Mierla, Gigel Paraschiv
103	Phytoremediation Potential of Helianthus annuus Seeds in Copper-Contaminated Waters	Alexandru Becheru, Letitia-Violeta Ghimiși, Sorin-Ștefan Biriș, Cristina Ileana Covaliu-Mierlă
104	Pilot Plant for Wastewater Treatment by Flotation	Cristina Ileana Covaliu-Mierlă, Laura Magdalena Toma, Sorin Ionescu, Corina Moga, Sorin-Ștefan Biriș
105	Multifunctional Products with Foliar Application Based on Diatomaceous Earth	Lupu Carmen, Lăzureanu Cătălin, Constantinescu-Aruxandei Diana, Badju Stere, Oancea Florin
106	Automated System in Agriculture	Association for Community Development Vladimir
107	Advanced Automotive Diagnostics Training	Gidali Adrian, Simon Florin
108	Discover Transylvania, Guided by a Medieval Knight	Harald-Alexandru Susanyi
109	The Importance of Education and Creativity for Young Students	Prof. Dr. Anuja Malik
110	EDUnet Space	Be Teen Association
111	Robot R.O.D.	Pipiași Matei, Ciucur Alexandru, Cola Emilian, Anuțoiu Andrei
112	CorneliuGroup Camp Learning in Nature	Corneliu Birtok Baneasa & Team
113	Pill Organizer with Warning Sensor, 3D Printed from Recycled Plastic	Vartolomei Nicoleta, Tănăsă Simina, Pîrvu Andrei

Quaternary Hydrophilic Nanohybrid Composition for Resistive Humidity Sensors

European Granted Patent EP3992622B1, 06/28/2023

Bogdan- Catalin Serban, Octavian Buiu, Cornel Cobianu, Viorel Avramescu, Niculae Dumbravescu

A

Description

Many principles and methods were described in literature for measuring relative humidity (RH) and several types of materials were employed as RH sensing layers. The present invention relates to the RH sensing response of a resistive sensor employing a sensing layer based on a quaternary nanohybrid composition comprising or consisting of CNHOX (FIG 1)/GO/SnO₂/PVP at 1/1/1/1 to 0.75/0.75/1/1 w/w ratio. The quaternary hydrophilic nanohybrid compositions exhibit several significant advantages, when employed as RH sensitive layers:

- both oxidized carbon nanohorns (CNHOX) and graphene oxide (GO) are nanocarbonic materials with high specific surface area (SSA)/volume ratio, affinity for water molecules, and exhibit rapid variation of the electrical resistance in contact with water molecules, when varying RH from 0% to 90%;
- nanometric tin (IV) oxide (SnO₂) powder exhibits good RH sensitivity;
- PVP is a hydrophilic polymer with excellent binding properties;
- detection at room temperature;
- low response time;
- low cost, small size, and simplicity in manufacturing

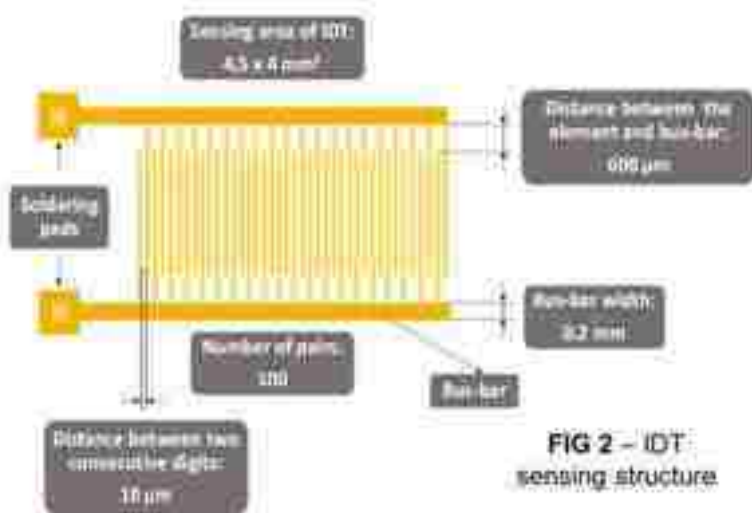


FIG 2 – IDT sensing structure

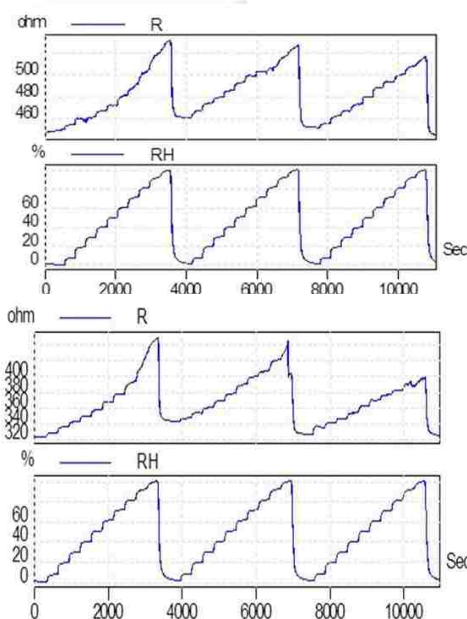


FIG 4 – R Curve: Response of the sensor employing GO/SnO₂/PVP at 0.75/0.75/1/1 as sensing layer, and RH Curve: Response of Sensirion RH sensor

FIG 5 – R Curve: Response of the sensor employing GO/SnO₂/PVP at 1/1/1/1 as sensing layer RH Curve: Response of Sensirion RH sensor

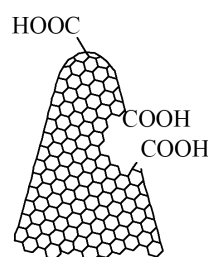


FIG 1 – Structure of oxidized carbon nanohorns (CNHOX)

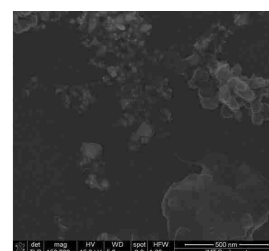


FIG 3 - SEM image for CNHOX/GO/SnO₂/PVP (0.75/0.75/1/1) nanohybrid composition

Sensing layer preparation

The interdigitated (IDT) sensing structure (FIG 2) was manufactured on a Si substrate (470 µm thickness), covered by a SiO₂ layer (1 µm thickness). The metal stripes of IDT comprised a Cr (10 nm thickness) and Au (100 nm thickness) stack, having 200 µm width. 6 mm was the distance between the electrodes. A dispersion formed in isopropyl alcohol of a quaternary nanohybrid composition described above, at different ratios, was deposited on the IDT structure using the drop casting method (FIG 3).

The RH monitoring capability of the sensitive layers was investigated by applying a current between the two electrodes and measuring the voltage at different RH values

Measurements were performed in humid nitrogen, at room temperature, and compared with the response of a commercial, industrial grade, capacitive RH Sensirion RH sensor, provided with signal-processing and signal-amplifying electronics (FIG 4 and FIG 5).

It was demonstrated that the resistance of the sensitive layer this patent proposes varies with RH.

Quaternary Oxidized Carbon Nanohorns - Based Nanohybrid for Resistive Humidity Sensor

European Granted Patent EP3992623B1, 07/05/2023

Bogdan-Cătălin Serban, Octavian Buiu, Cornel Cobianu, Viorel Avramescu, Niculae Dumbravescu

A

Description

The present invention relates to the RH sensing response of a resistive sensor employing a sensing layer based on quaternary nanohybrid composition comprising or consisting of CNHOX/SnO₂/ZnO/PVP at 1.5/1/1/1 w/w ratio to 3/1/1/1 w/w ratio. When employed as RH sensing layers, these quaternary nanohybrid compositions exhibit several significant advantages:

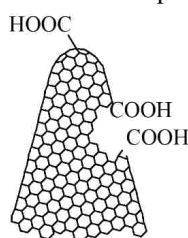
Oxidized carbon nanohorns (CNHOX) (Figure 1) have high specific surface area/volume ratio, water molecules affinity and show rapid electrical resistance variation when RH varies from 0% to 90%.

The nanometric tin (IV) oxide (SnO₂) nanopowder exhibits good RH sensitivity. CNHOX have p-type electrical conduction (through holes), while SnO₂ is a n-type metallic oxide semiconductor (through electrons). By adding SnO₂ to CNHOX, one will obtain islands of p-n semiconductor heterojunctions embedded in PVP (a dielectric material) that increase the sensitivity of the sensitive layer.

Zinc oxide (ZnO) nanopowder exhibits good RH sensitivity. Both ZnO and SnO₂ are n-type electrical conductors. The ZnO – SnO₂ nanocomposite has sensing properties superior to each of the single oxides, because each of the oxides interacts differently with the oxidized carbon nanohorn material, leading to alterations in the pore distribution, which increase the specific surface area;

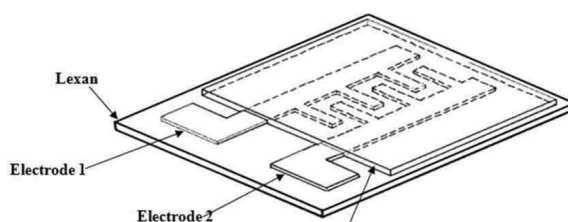
Polyvinylpyrrolidone (PVP) is a hydrophilic polymer with excellent binding properties, which enables its employment in sensing structures with either flexible or rigid substrates;

Detection at room temperature, low response time, low cost, small size, simplicity in manufacture.



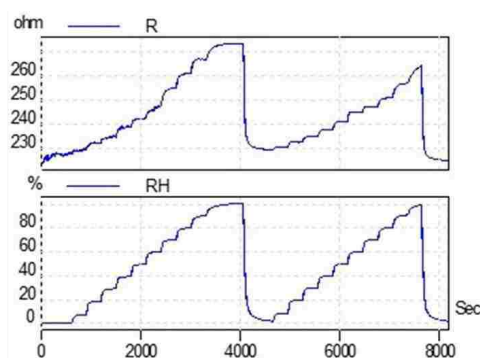
Oxidized carbon nanohorns (CNHOX)

Figure 1



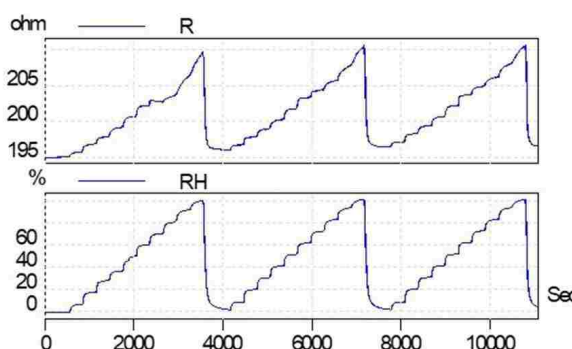
IDT sensing structure

Figure 2



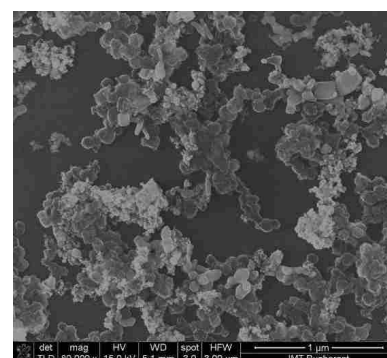
R Curve: Response of the sensor employing CNHOX/SnO₂/ZnO/PVP at 1.5/1/1/1 as sensing layer
RH Curve: Response of Sensirion RH sensor

Figure 4



R Curve: Response of the sensor employing CNHOX/SnO₂/ZnO/PVP at 3/1/1/1 as sensing layer
RH Curve: Response of Sensirion RH sensor

Figure 5



SEM image for CNHOX/SnO₂/ZnO/PVP at 1.5/1/1/1 nanohybrid composition

Figure 3

Measurements were performed in humid nitrogen at RT and compared with the response of a commercial capacitive RH humidity sensor, provided with signal-processing and signal-amplifying electronics (Figure 4 and Figure 5). From the detection principle point of view, the resistance of the sensitive layer varies with the RH level.

Conclusions

The IDT sensing structure presented in this work exhibits a linear response and good RH sensitivity when varying RH from 0% up to 90% in humid N₂ environment.

The sensor response time and stability are comparable to that of a commercially available RH sensor

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Laser emission stabilization technique for detection by high spectral resolution lidar

Submitted Patent number: A/00543 / 19.09.2024

Authors: BELEGANTE Livio; VASILESCU Georgeta-Jeni; NICOLAE Doina Nicoleta; NEMUC Anca Viorica; DANDOCSI Alexandru Marius; TILEA Alexandru; RADU Cristian Marian

A

Description

This patent proposal presents an innovative approach to laser emission stabilization designed for high spectral resolution lidar (Light Detection And Ranging) systems. The method involves a novel integration of optical and electronic components to ensure real-time frequency control of the laser source, thus enhancing measurement accuracy and system reliability. The proposed system relies on an acousto-optic modulator (AOM) to split the laser emission into multiple diffraction orders. This technique stands out for its simplicity, low cost, and ease of implementation. Using off-the-shelf hardware like Raspberry Pi modules enables automatic feedback control without the need for expensive or complex instrumentation. The device monitors the emission in real time and applies adjustments instantly, ensuring optimal performance of the lidar system used in atmospheric sensing, environmental monitoring, and remote detection.

Novelty

- Implementation of a technical solution for **emission control of a laser system** which is the core of a high spectral resolution lidar system.
- Solution is based on a Raspberry Pi module capable of monitor the emitted radiation and adjust the frequency of emitted radiation of the laser system in real time.
- The proposed system relies on an **acousto-optic modulator (AOM)** to split the laser emission into multiple diffraction orders.
- A Raspberry Pi 5 module, paired with two Raspberry cameras, monitors the laser's spectral stability by observing the behavior of these orders in relation to an iodine reference cell.
- The diffraction orders are compared to determine shifts in the primary emission wavelength, allowing for **real-time correction of the laser's frequency** based on intensity measurements.

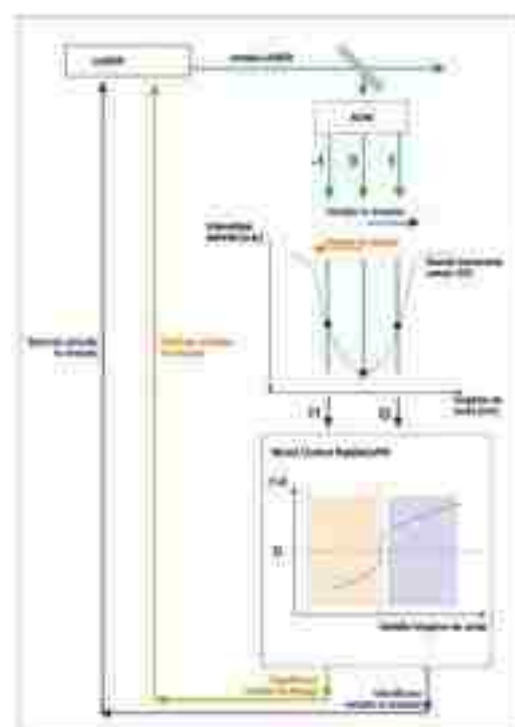
Prototype – opto-mechanical assembly



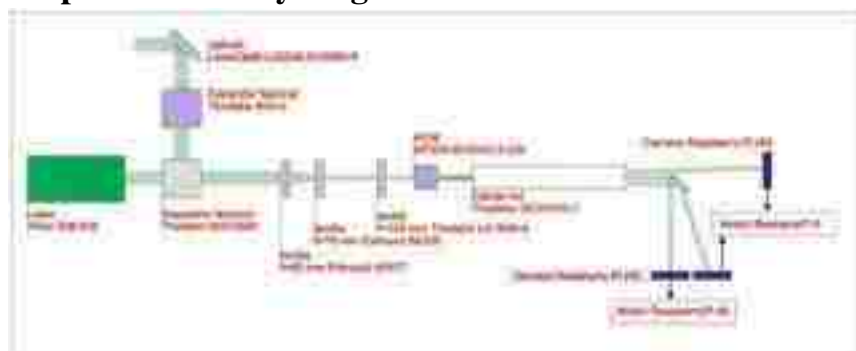
Advantages

- Low implementation cost due to use of affordable components
- High stability of laser emission through continuous monitoring
- Fast response time for real-time adjustments
- Easy deployment in existing lidar systems
- Fully automatic emission control, reducing the need for manual calibration

Operating principle of the Raspberry Pi 5-based module



Optical assembly diagram



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Acknowledgements

This work was supported by a grant of the Romanian Ministry of Education and Research, project number PN-III-P1-1.1-TE-2021-0714/Contract 103/LiCARS within PNCDI III and by Romanian National Core Program contract PN 23 05/3.01.2023

COMPOSITE THERMAL INSULATION PANELS WITH SHEEP WOOL CORE AND PRODUCTION METHODS

A

Patent number: RO 133842 B1

Authors: Andreea HEGYI, Henriette SZILAGYI, Carmen DICO, Vasile MEIȚĂ

The invention concerns composite heat-insulating panels with a core of sheep's wool, including the method of making.

AIM:

Exploiting a natural, renewable resource, which currently has a low exploitation, sheep wool. At the same time, the invention offers the possibility of reducing energy consumption while ensuring indoor thermal comfort.

THE INNOVATIVE NATURE:

Elimination of the disadvantages of non-woven mattress type products, through a principle of incorporating the core of the sheep wool mattress into an inorganic binder-based composite housing. In addition, following the execution process, which provides the arrangement of mineral wool strips between two adjacent panels, the re-use of mineral wool waste - a product that is not biodegradable, with a positive impact on the environment - is achieved.

METHOD OF USE :

Similar to conventional thermal insulation boards, without any particular difficulties.

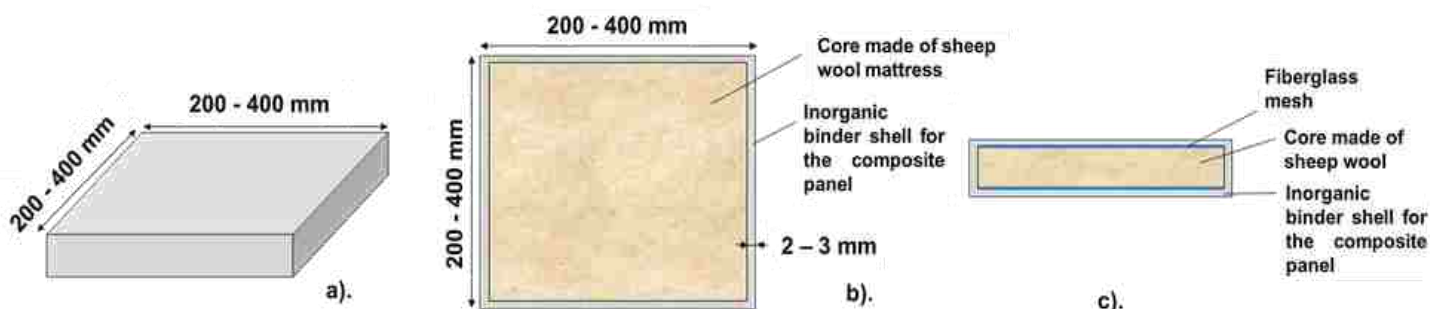
AREA OF USE:

The purpose of composite thermal insulation panels made of wool is to increase the thermal insulation properties and thermal comfort in buildings, enclosed spaces for industrial or agro-zootechnical activities. In addition, by the method of laying which indicates the placement of strips of mineral wool between two adjacent panels, the reuse of mineral wool waste is carried out, with a positive impact on the environment.

CLAIMS:

Claim no. 1: Composite thermal insulation panels with sheep wool core.

Claim no. 2: Production methods of the composite thermal insulation composite panels.



The invention is the result of an interdisciplinary program of experimental research that addresses specialists in the fields of construction, building materials, environmental engineering and even zootechnics..



WALL CONSTRUCTION SYSTEM BASED ON UNFIRED CLAY

A

Patent number: RO 134241 B1

Authors: Gabriela CĂLĂȚAN, Andreea HEGYI, Henriette SZILAGYI, Vasile MEIȚĂ

The building system for the walls based on unfired clay is composed of the following elements: bricks, masonry mortar and plaster, respectively finishing tiles, being realized of a mixture of clayey soil, sand and hydrated lime.

AIM:

COMPLETE AND ECO-FRIENDLY SOLUTION FOR BUILDING WALLS BASED ON UNFIRED CLAY.

THE INNOVATIVE NATURE:

REDUCING, UNTIL ELIMINATED, THE RISK OF POOR JOINTING BETWEEN BRICKS, MASONRY MORTARS, PLASTERING OR FINISHING, WHILE ALSO PROVIDING THE ADVANTAGE OF INCREASED DURABILITY AND REDUCING THE ENVIRONMENTAL IMPACT OF POLLUTANTS.

METHOD OF USE :

WITHOUT ANY PARTICULAR DIFFICULTIES.



AREA OF USE:

CONSTRUCTION OF VERNACULAR BUILDINGS WITH INCREASED DURABILITY AND REDUCED ENVIRONMENTAL IMPACT.

Claim no. 2

Mortar for masonry and plaster for unfired clay surfaces

Claim no. 1

Bricks based on unfired clay 200x100x50 mm

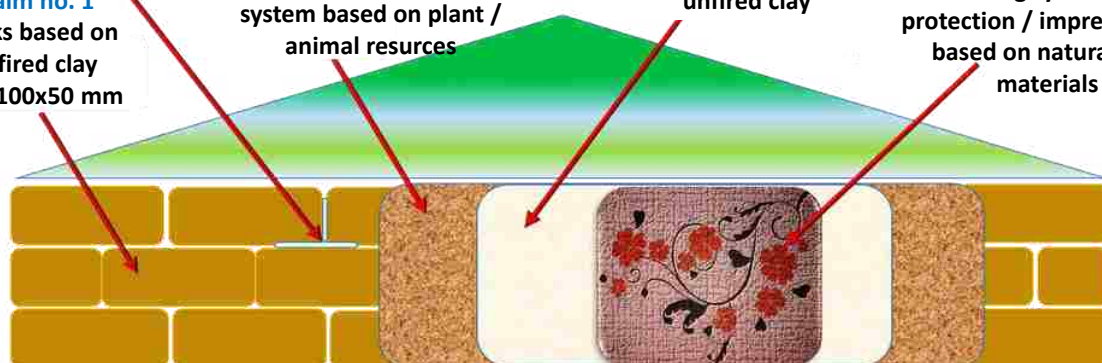
Claim no. 3

Finishing plaster based on unfired clay

Finishing system, film protection / impregnation, based on natural raw materials

Claim no. 4

Wall construction system based on unfired clay



PROCESS FOR OBTAINING COMPACTION MASSES WITH REINFORCEMENT BASED ON HYDRAULIC BINDER

A

Patent no. 129783/30.03.2018

Popescu Georgeta Luminița, Marica Mădălina Mirabela, Abagiu Traian Alexandru, Predeanu Georgeta, Racoceanu Cristinel, Cruceru Mihai, Popescu Cristinel, Diaconu Bogdan Marian, Ciofu Florin Cristian, Cazalbașu Ramona, Anghelescu Lucica

The invention refers to a process for obtaining quick-hardening masses, based on hydraulic binder, used in the execution of reinforced form, leveling or filling layers, in construction works. The process according to the invention capitalizes on the specificity of the oxidic and mineralogical chemical composition of the secondary steel treatment slag, in that, after grinding to an appropriate fineness for a rest of a maximum of 10% on the sieve with the meshes of 0.09mm, is used as a hydraulic binder in the composition of the compacting masses. The process according to the invention uses industrial waste with a relatively low degree of recovery as granular aggregates, to obtain the compaction masses with rapid hydraulic hardening: steel making slag in an electric furnace and ash of power plant.



NOVELTY / BENEFITS

- Reducing the amount of waste material that requires storage
- Reducing the impact of the energy and metallurgical industries on the environment
- Recovery and recycling of industrial waste from: the energy industry (ash collected at the base of the hearth) and from the metallurgical industry (electric furnaces, secondary treatment of slag); these are unique applications in Europe and even worldwide
- Capitalizing on the hydraulic binder potential of slag resulting from secondary treatment, potential given by the presence of free calcium oxide and calcium silicates
- Economy and long-term protection of natural resources:
 - (1) 60-80% natural aggregates – sand, crushed stone, resulting from replacement with ash and slag and
 - (2) lime and cement, resulting from replacement with metallurgical slag (secondary treatment)
- Energy saving compared to the conventional process
- Obtaining a product with low cost but with high added value
- Reduction of the carbon footprint associated with the production flow of rapid setting compaction compounds and reduction of energy consumption due to the economy of natural resources

AREAS OF APPLICATION

- Leveling layers, filling, construction preparation works (roads, pedestrian walkways, ground preparation for foundations, etc.)
- The process can be applied in construction without changing the current technology
- The interest for economic agents of the invention lies in the favorable economic effects resulting from its application.

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PROCESS FOR OBTAINING HEAT-INSULATING CONCRETE BASED ON HEAVY ASH OF POWER PLANT

Patent no . 129872/27.04.2018

Popescu Georgeta Luminița Georgeta, Marica Mădălina Mirabela, Abagiu Traian Alexandru, Predeanu Georgeta, Racoceanu Cristinel, Cruceru Mihai, Popescu Cristinel, Diaconu Bogdan Marian, Ciofu Florin Cristian, Cazalbaşu Ramona, Anghelescu Lucica

A

The invention refers to a process for the manufacture of heat-insulating concrete, with the use of hearth ash resulting from the burning of coal in thermoelectric power plants as a light granular aggregate.

It is known that for the manufacture of heat-insulating concrete with maximum usage temperatures of up to (1000-1100)°C, light aggregates are currently used, such as calcined diatomite and granulated blast furnace slag, raw materials that are currently in short supply in Romania. The technical problem that the invention solves consists in obtaining concrete with thermal power plant ash, through a cheap, economical and easy to apply process in production. The process of obtaining heat-insulating concretes, based on thermal power plant fly ash and cement, assumes that in the composition of these concretes, ash represents (25-80)%, either as a single granular aggregate or in combination with other types of heatresistant, lightweight granular aggregates, usual, such as, for example, expanded perlite. Heat-insulating concretes based on thermal power plant ash, obtained according to the invention patent, can be put into operation by known technical processes, of casting-vibration or shotcrete.



NOVELTY / BENEFITS

- Reducing the amount of waste material for which storage is required;
- Reducing the impact of the energy industry on the environment;
- Recovery and recycling of industrial waste from the energy industry (fly ash) currently produced or stored in closed historic repositories;
- Capitalizing on the aluminosilicate potential of ash from the hearth base
- Economy and long-term protection of natural resources: fly ash replaces between 70 and 100 % of lightweight natural aggregates (expanded perlite, calcined diatomaceous earth, expanded vermiculite) and/or synthetic aggregates (lightweight burnt bricks) depending on the type of concrete manufactured
- Energy saving compared to the conventional process
- Obtaining a product with low cost but with high added value
- Reduction of the carbon footprint associated with the production flow of heat-insulating concrete used for the thermal insulation of industrial aggregates, as well as the indirect reduction, by reducing energy consumption associated with the exploitation of natural resources

AREAS OF APPLICATION

- Thermal insulation of industrial aggregates (up to a maximum temperature of 1000 °C) in various industries (energy, metallurgy, machine building, chemical, petrochemical, etc.)
- The process can be applied in practice through conventional techniques: casting-vibration, shotcrete, without the need to modify the technological process and aggregates
- The interest for economic agents of the invention lies in the favorable economic effects resulting from its application.

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CONSTRUCTION BRICK MANUFACTURING PROCESS USING INDUSTRIAL WASTE

A

Patent no.13077/30.10.2020

*Popescu Georgeta Luminița, Marica Mădălina Mirabela, Abagiu Traian
Alexandru, Predeanu Georgeta, Racocanu Cristinel, Cruceru Mihai,
Diaconu Bogdan Marian, Dițescu Corneliu Laviniu, Dondoe Valentin,
Anghelescu Lucica*

The invention refers to a process for the manufacture of heat-insulating concrete, using as light granular The invention refers to a process for manufacturing construction bricks using industrial waste, in which raw materials are exclusively used materials considered waste in the energy and extractive industries: heavy ash from thermal power plants, clay from lignite mining quarries in the area Carboniferous Gorj, drilling mud. The advantages of this process are represented by the fact that power plant ash successfully replaces the sand used as an additive to correct the plasticity of the Rovinari clay, under conditions of reducing the density of the finished products by (8-12) %, increasing the thermal insulation capacity by (10-15)% and the reduction of the sintering temperature by (30-50)% in the final stage of heat treatment.



NOVELTY / BENEFITS

- Having a valuable oxide composition, such as: SiO_2 , Al_2O_3 , CaO , Fe_2O_3 , power plant/fly ash could replace up to 30-50% of the natural quartz sand used in the manufacturing process of ceramic products;
- Recovery and recycling of targeted waste up to 50%;
- Under the conditions in which the transport of these raw materials to the place of use will be ensured by the waste generators, the cost of waste is zero.
- Environmental benefits: prevention of air pollution with dust; preventing soil pollution by reducing the storage area of the three wastes; recycling waste/by-products and using them as raw materials (resources) for another industry and therefore developing a market for secondary raw materials (fly ash, drilling muds, metallurgical slag); long-term environmental protection by developing new solutions for the prevention, reduction, recycling and disposal of target wastes by increasing their availability.

AREAS OF APPLICATION

- Technologies for obtaining construction materials based on new raw materials,
- The development of new autochthonous ceramic composites at lower prices,
- The design and development of materials leading to the implementation of these efficient recycling technologies.

WASTE PLASTIC RECYCLING PLANT

Patent/project number: 19215(1201800492)

Author/s: WAM ELVIS MBVIUGEH

A

This invention is aimed at cleaning the environment and the ecosystem for sustainable agriculture and used for the production of construction materials like tar oils, (asphalt and Bitumen) roofing tiles, insulators for floors and walls, damp proof course materials, electric poles, culverts, gutters, road sign posts and steam with Improvements of using the steam to generate electrical energy and to recover bio fuel.

The main aim is transforming waste plastics and metals into useful products and used as an apparatus for fast cooking and to facilitate the cracking of stones for masonry works. This creation will greatly help Africans for the protection of the environment for other generations, substantial agriculture and improve on soil fertility against famine. The author laid down some principles which richly increased the performance of the invention. The study of the thermodynamics, observation and experiments with the ancient style forging apparatus which in my mother's tongue is called ALAM.

*The study of electronic components and tele-mechanique control systems helped the Author to deign a **rectifier circuit** on the **control panel**, which is the magical power to cut down the consumption of the machine during operation; that is from 220v to 12v-24v and permits the plant to be able to operate with solar plant and less consumption.*



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Biocompatible titanium-based alloy with the addition of molybdenum, zirconium, and tantalum

A

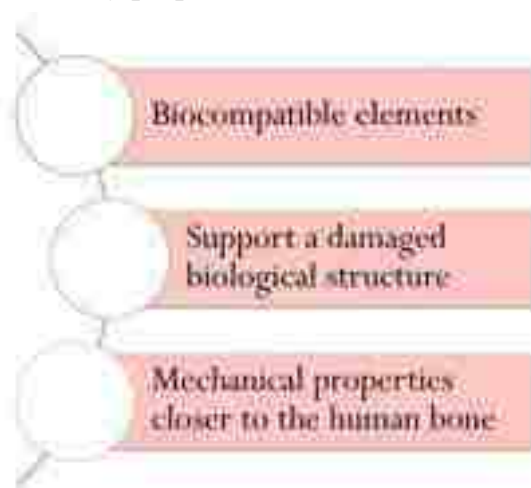
No. A/00132/ 11.04.2025

**BĂLȚATU Mădălina Simona, VIZUREANU Petrică, GEANTĂ Victoraș,
ȘTEFĂNOIU Radu, VOICULESCU Ionelia, SANDU Andrei Victor**

The invention is about making a new titanium-based alloy called TMZT, which comes from the Ti15Mo7ZrxTa system (where x can be 5, 10, or 15), designed for use in medicine, particularly for orthopedic implants. The controlled choice of alloying elements—molybdenum, zirconium, and tantalum—gives the material a set of excellent properties: excellent biocompatibility, high mechanical strength, and a modulus of elasticity close to that of human bone (51.93–76.88 GPa), thus reducing the risk of stress and bone resorption.

The alloy is made by melting materials with over 99% purity in a controlled argon environment, which helps keep the composition uniform and the structure strong. The resulting structure is of the solid solution type, thermodynamically stable, which contributes to increased corrosion resistance and excellent behavior in biological environments.

Cell viability tests have demonstrated superior compatibility compared to classic alloys such as 316L stainless steel or CP titanium, supporting the use of this material in regenerative medicine. TMZT alloy is suitable for the fabrication of a wide range of medical devices – dental implants, orthopedic rods, joints and stents – due to its advanced hemocompatibility and durability properties.



Stages of titanium alloying obtaining process: a) weighing of raw materials and gravimetric dosing; b) loading of the raw material; c) titanium semi-products obtained after solidification

Conclusion: □A ideal implant is very hard to find because of series of factors that can appear (chronic diseases, patient's age and health status). □Mechanical properties obtained are closer to the bone; The new Ti-Mo alloys demonstrates a potential medical applications with a small Young modulus and suitable hardness. □To improve the quality of life, it is our duty to improve the alloys that can be used as implants by all methods (addition of biocompatible elements, coatings, treatments etc.)

Contact: Conf. univ. dr.ing. Habil. Andrei Victor SANDU

SELF-ADAPTIVE DIFFERENTIAL GROUP

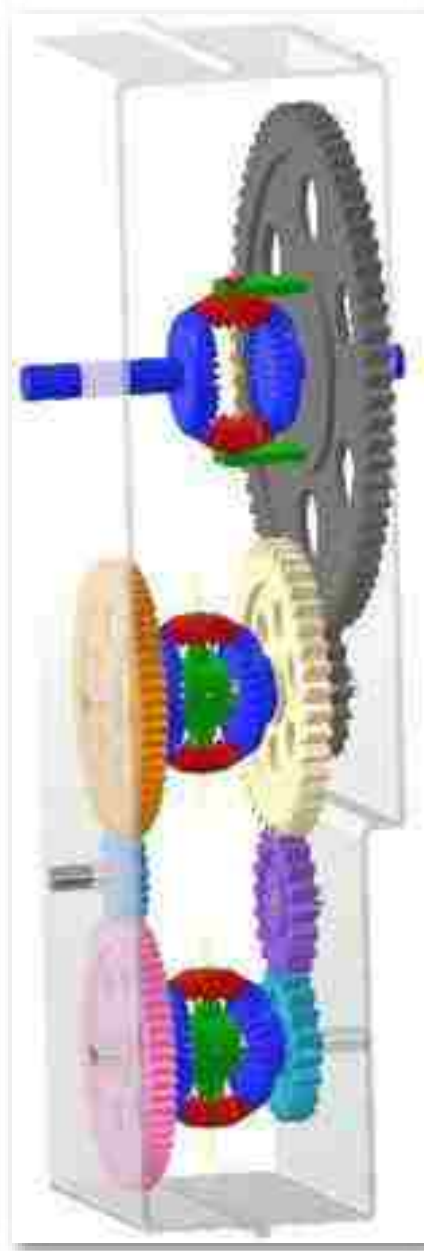
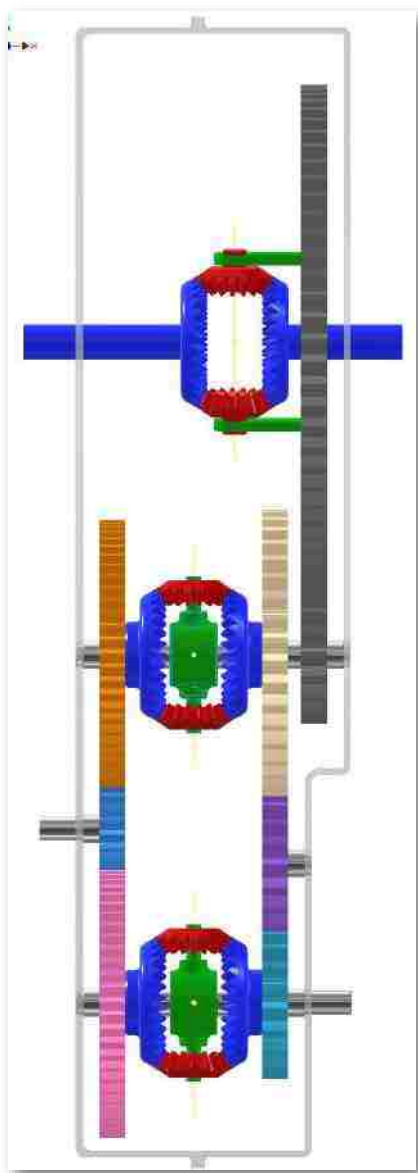
A

Patent RO134406 / 30.03.2023

Authors: ROMEO CĂTĂLINOIU, SORIN AUREL RAȚIU, IMRE ZSOLT MIKLOS

The invention is an application of Patent RO134406 dated 30.03.2023 and refers to a gearbox intended to ensure the transmission of electrically powered automobiles with the aim of reducing energy consumption and increasing energy autonomy.

The gearbox is characterized by the fact that it continuously varies the value of the transmission ratio, by varying the revolutions of the two electric motors, which can work individually or in tandem.



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.

Contact: catalinoiuromeo@gmail.com sorin.ratiu@fih.upt.ro

PREPARATION PROCESS NITRIGEN-DOPED GRAPHENE MATERIALS IN THE MICROWAVE FIELD

A

Patent No.134113/29.10.2021

Authors: Teodora Adriana Marinoiu, Elena Carcadea, Mircea Răceanu, Ioan-Catalin Capriș, Mihai Varlam

Description The invention relates to a fast, effective and inexpensive process for producing a nitrogen-doped graphene nanocomposite material in microwave field, material which is recognized for its electrochemical stability, being used for the production of electrodes, as components of various electrochemical devices. According to the invention, the process uses the synthesis of the material in a single reaction step, said material being prepared starting from commercial graphene oxide mixed with ethanol, as a reducing agent, and with a nitrogen precursor which can be ammonia or urea, the mixture being introduced into an 800W microwave field at a temperature between 60 ... 80°C, the nitrogen-doped graphene prepared starting from an ammonia solution, as a precursor of N, having the highest N doping concentration of 2.84% at and the nitrogen-doped graphene prepared starting from a solution of urea, as a precursor of N, having the highest N doping concentration of 1.3% at. The technical problem that the invention aims to solve is to obtain nitrogen-doped graphene materials, using a simple and rapid process that does not require high pressures or temperatures. The process, according to the invention, presents an original approach: a rapid and cost-effective way to prepare N-doped graphenes, starting from commercial graphene oxide, various nitrogen sources (ammonia, urea, various organic salts) and a reducing agent (ethanol)

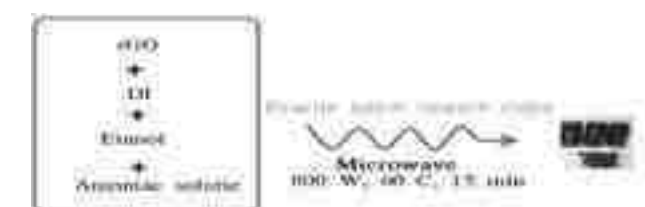


Figure.1 Nitrogen-doped graphene synthesis process

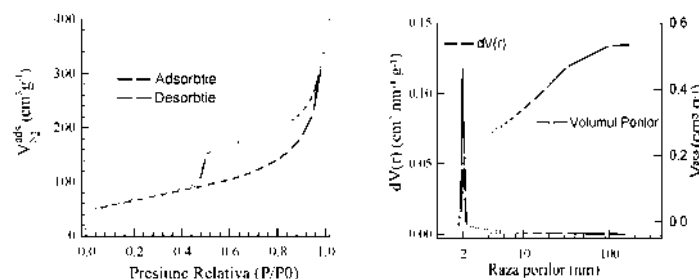


Figure.2 Nitrogen adsorption - desorption isotherms obtained by BET method, and pore size distribution by BJH method with reference to N-doped graphene material, starting from N precursor - ammonia solution

Sample	Chemical Composition (at%)			Chemical Composition (wt%)			Specific surface area (m² g⁻¹)	Pore radius (nm)	Pore volume (cm³ g⁻¹)
	C	O	N	C	O	N			
Sample A	83.34	13.82	2.84	79.31	17.53	3.15	83	1.96	1.068
Sample B	85.92	12.78	1.3	82.33	16.3	1.45	232	1.97	0.534

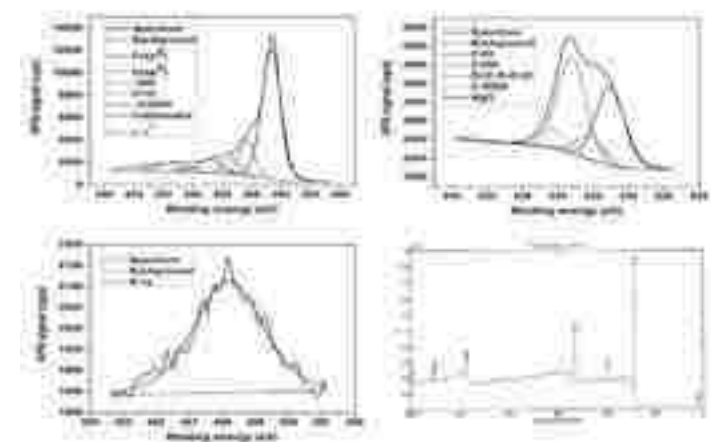


Figure.3 X-ray photoelectron spectroscopy measurements, with reference to the N-doped graphene material, starting from the N precursor - ammonia solution

Table 1. Physical and chemical properties of prepared samples

Contact: Teodora Adriana Marinoiu, adriana.maronoiu@icsi.ro

PROCESS FOR PREPARING A NANOCOMPOSITE MATERIAL BASED ON GOLD-DOPED GRAPHENE

A

Patent number: No. 133529/28.01.2022

Authors: Teodora Adriana Marinoiu, Mircea Răceanu, , Ioan-Catalin Capriș, Elena Carcadea, Simona Filofteia Ion, Mihai Varlam

Description The invention relates to a process for preparing a nanocomposite based on graphene and metal nanoparticles to be used in order to modify the electrode used in oxygen reduction reaction (ORR) in proton-exchange membrane fuel cells (PEMFC). According to the invention, the process consists of a 3-step synthesis, wherein, in the first step, the process of intercalating the oxygenated groups in the graphite layers takes place in the presence of sulfuric acid, potassium permanganate and hydrogen peroxide, in the second step, the ultrasound exfoliation of graphite oxide to graphene oxide takes place, followed by functionalization with polydimethyl-diallyl ammonium chloride, after which, in the third step, the in-situ co-reduction of graphene oxide and chloroaurous acid takes place, resulting in a graphene composite decorated with Au used as ORR electrocatalyst in PEMFC. The technical advantage of this invention is that, starting from a commercially accessible material - graphene oxide, through a specially designed process of chemical synthesis in the microwave field, gold-doped graphene materials with morphological and structural properties specific to use as catalysts and/or electrocatalysts can be obtained.

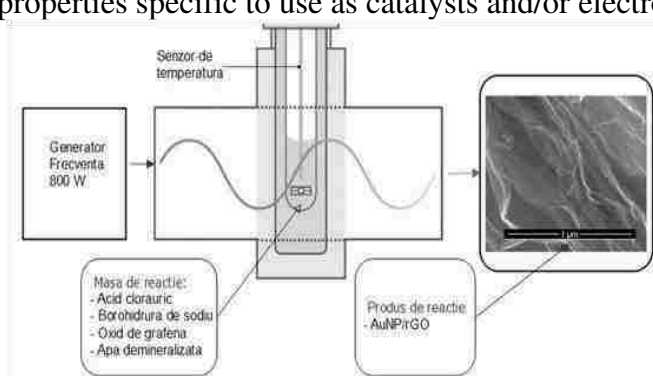


Figure 1. Process of obtaining graphene materials doped with gold nanoparticles, according to the invention

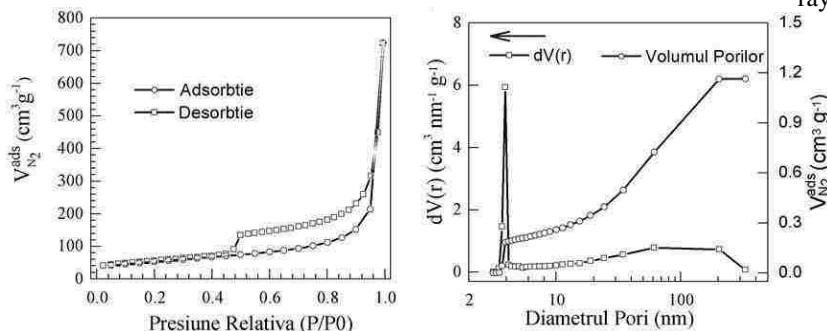


Figure 3. Adsorption isotherms - desorption of nitrogen obtained by the BET method and distribution of pore size obtained by BJH method

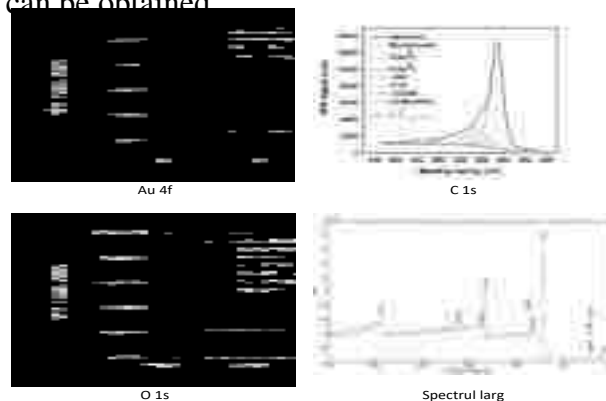


Figure 2. High resolution spectra by XPS analysis (X-ray photoelectronic spectroscopy)

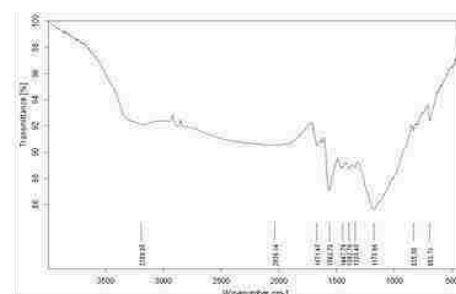


Figure 4. Fourier infrared spectroscopy (FTIR) measurements

PROCEDURE FOR OBTAINING A COMPOSITE COATING WITH INCREASED DURABILITY ON A METAL SURFACE

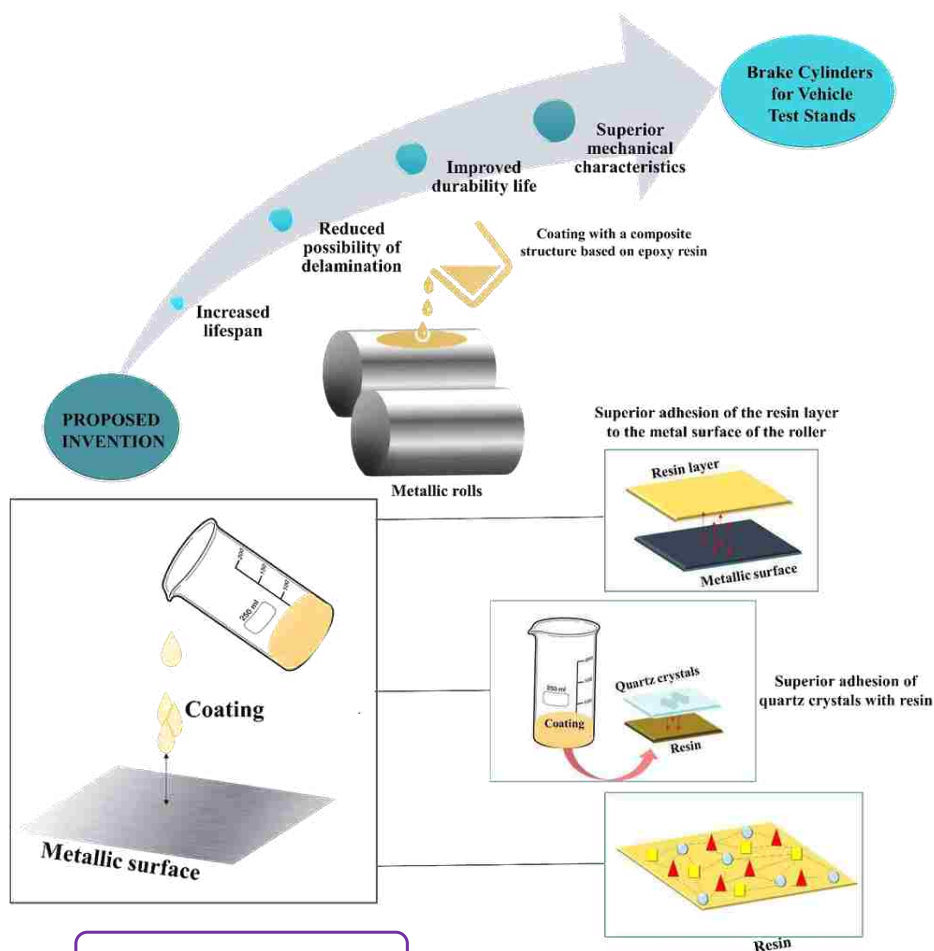
Patent application No. A-00150/2023

Vili Pasare, Dan Florin Nitoi, Augustin Semenescu, Mihnea Cosmin Costoiu,
Oana Roxana Chivu, Dragos-Florin Marcu, Radu Claudiu Fierascu, Irina
Fierascu, Raluca Somoghi

A

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

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CONTACT

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Dr. Habil. Radu Claudiu Fierăscu

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Chemiresistive ethanol sensor based on graphene and metal oxide nanocomposites and process for obtaining it

Romanian Patent Application 134143 RO OSIM din 30.01.2025

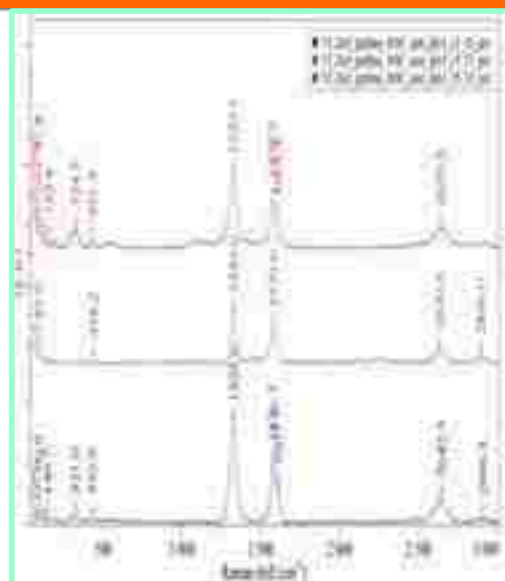
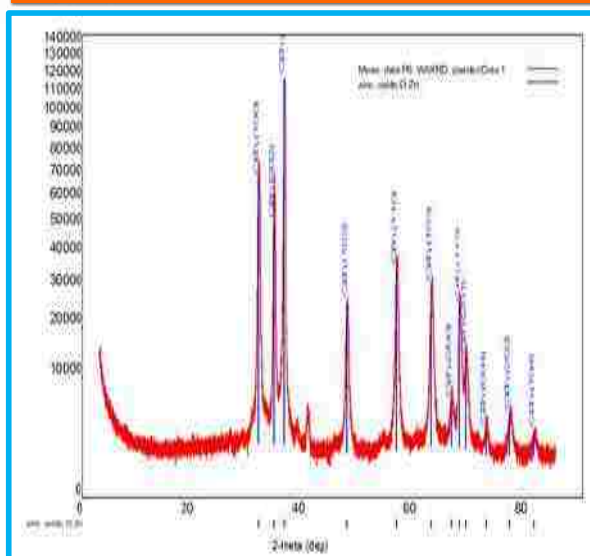
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**Authors: Cornel Cobianu, Bogdan- Catalin Serban,
Octavian Buiu, Nicolae Dumbrăvescu, Maria Roxana Marinescu,
Narcis- Octavian Ionescu, Viorel Avramescu**

Description

The invention presents a chemiresistive ethanol sensor and the new sonochemical process for its manufacturing based on sensitive layers synthesized from zinc oxide (ZnO) and graphene nanocomposite. The nanocomposite was prepared by aqueous sonochemical synthesis of high acoustic radiation density. An original element of the method is the use of sodium hydroxide (NaOH), both as a reducing agent in the formation of ZnO from zinc nitrate $\text{Zn}(\text{NO}_3)_2$ and as an initiator of nanostructuring, thus obtaining hierarchically organized ZnO-graphene powders of nano-flower type (high porosity powders) for pH values equal to 14. Functionalization of ZnO with graphene allows for increasing the sensitivity and reducing the electrical resistance of the sensitive layer and thus it makes easier measurability of the ethanol sensor.

SEM for ZnO/ graphene nanocomposite obtained from the synthesis carried out at pH=14 shows that under these synthesis conditions nanostructuring was obtained in the form of nano-flowers which thus ensure good porosity and a large specific area for the sensitive film.



The XRD spectra of X-ray diffraction on ZnO-graphene powders after drying showed the specific X-ray diffraction maxima, 15-26 of ZnO according to material standards and also demonstrated the obtaining of very well-defined ZnO crystallites, which demonstrates the capability of sonochemical synthesis to produce polycrystalline powders even after the drying step and before the calcination thermal treatment.

Resistive Humidity Sensor

Romanian Patent Application A00622, RO, OSIM, 21.10.2024

Bogdan-Cătălin Serban, Octavian Buiu, Marius Bumbac,

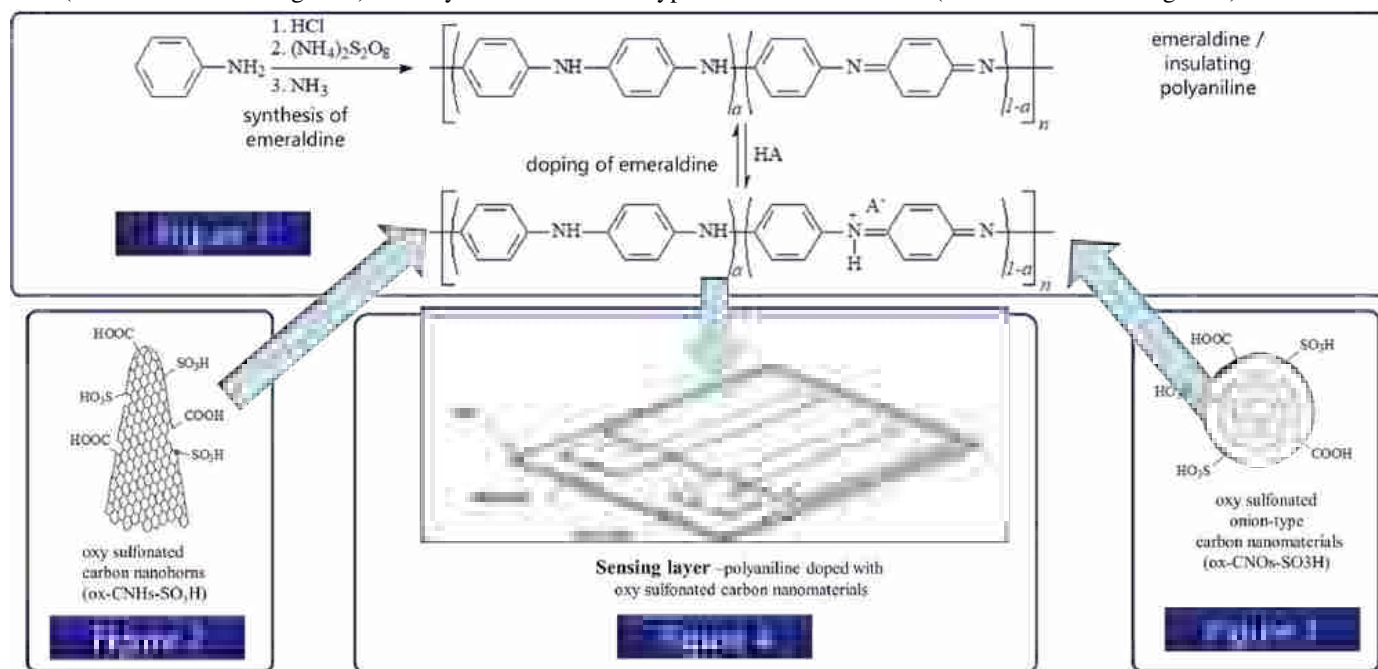
Cristina Mihaela Nicolescu

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Description

RH sensors have received increasing attention in the last years due to their importance in various fields of domestic and industrial activity, such as indoor air quality control, textile and paper industry, medical field (sterilization chambers, incubators), pharmaceutical industry (drug synthesis and quality control), woodworking industry, automotive industry (oil humidity control, engine assembly lines), paint room monitoring, agriculture (silos, soil humidity control), meteorology (radiosondes, weather balloons).

The technical problem solved by the invention consists in the synthesis of new conductive polyanilines, in the form of nanofibers, sensitive to the variation of the relative humidity value, by doping emeraldine / insulating polyaniline (Figure 1) with oxy sulfonated carbon nanohorns (ox-CNHs-SO₃H - Figure 2) and oxy sulfonated onion-type carbon nanomaterials (ox-CNOs-SO₃H - Figure 3).



Sensing layer manufacturing

Doping of emeraldine with ox-CNOs-SO₃H (the dopant is generically denoted as HA)

10 mg of ox-CNOs-SO₃H is added to 20 mL of dimethylformamide. To the newly formed solution is added 10 mg of emeraldine synthesized in the previous step and stirred with a magnetic stirrer for 20 hours. After this, the doped polyaniline is filtered and washed with water and diethyl ether to remove the remaining ox-CNOs-SO₃H.

10 mg of polyaniline doped with ox-CNOs-SO₃H. is added to 10 mL of water, then stirred magnetically for 8 hours.

Obtaining the sensitive layer based on conductive polyanilines

The appropriate solution is subjected to electrospinning, using as collectors the PET substrate with linear electrodes or the one with interdigitated electrodes. Previously, a protective layer (using, for example, photoresist) will be applied to the electrodes (on each of the linear electrodes or at each end of the interdigitated electrodes), on a region delimited by a mechanical mask, to keep an area free of the sensitive layer, which will later be used for electrical contacting. The photoresist layer will be removed after the deposition of the sensitive materials. The sensitive layer of conductive polyaniline nanofibers deposited on the substrate is dried in an oven at 90°C for 40 minutes.

Advantages of the proposed sensing layer

The use of the claimed conductive polyanilines as sensitive layers provides several significant advantages: the presence of oxygenated functions ensures the degree of hydrophilicity necessary for interaction with water; ox-CNHs-SO₃H and ox-CNOs-SO₃H contain carboxylic and sulfonic groups that can protonate the iminic nitrogen atoms in the emeraldine structure, with the formation of conductive and stable polyanilines, chemical and thermal stability, superior mechanical properties, detection at room temperature.

Due to the large counterion, conductive polyanilines synthesized by doping emeraldine with ox-CNHs-SO₃H and ox-CNOs-SO₃H are less susceptible to the dedoping phenomenon;

Contact: The National Institute for Research and Development in Microtechnologies –IMT Bucharest, 126A, Erou Iancu Nicolae Street, 077190, Voluntari, Ilfov, Romania

Surface Acoustic Wave Sensor for Relative Humidity Monitoring

Romanian Patent Application A00623, RO, OSIM, 21.10.2024

Bogdan-Cătălin Serban, Octavian Buiu, Marius Bumbac, Cristina Mihaela Nicolescu

A

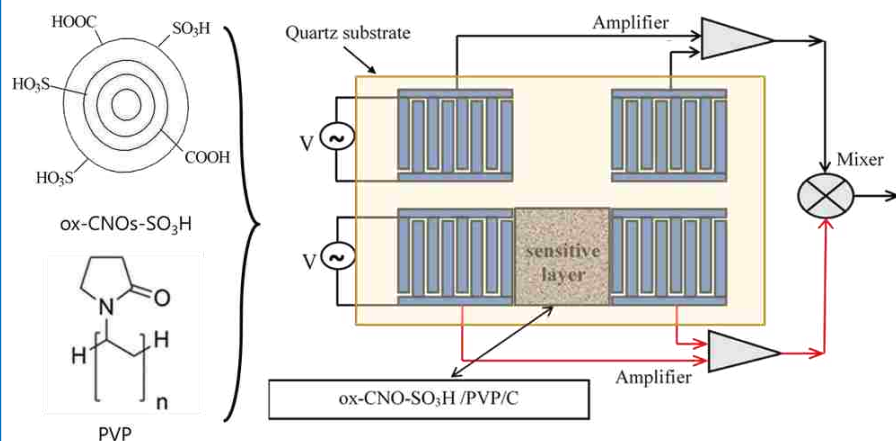
Description

Carbon nano-onions (CNOs) were first synthesized by Ugarte in 1992 by electron irradiation of carbon black. The standard procedure for the synthesis of CNOs is based on the annealing of diamond nanoparticles at high temperatures, in an inert atmosphere, under high vacuum conditions. Structurally, CNOs are zero-dimensional nanoparticles (with a diameter between 1.4 and 50 nm), characterized by closed multilayer shells (interlayer distance of approximately 3.4 Å and with a C60 or C80 fullerene included in their core). CNOs synthesized by traditional methods (vacuum heat treatments, electrical discharges between two carbon electrodes, etc.) are hydrophobic. Oxidations with dilute nitric acid or ozone lead to the formation of onion-type nanocarbon structures, functionalized with polar groups such as carboxyl, hydroxyl, carbonyl, which substantially increase the solubility of CNOs in polar solvents such as methanol, water, tetrahydrofuran, propanol, etc.

Original approach

The present invention relates to the RH sensing response of a surface acoustic wave sensor employing a sensing layer based on new ternary nanocomposite matrices of the polyvinylpyrrolidone type / oxy sulfonated onion-type nanocarbon materials (ox-CNOs-SO₃H)-carbon black. The oxy sulfonated onion-type nanocarbon materials used are found in the ternary nanocomposite in a mass percentage ranging between 60 - 70%, while carbon black is found in a mass percentage ranging between 5-10%.

The sensor used is of the "delay line" type, dual, made on a piezoelectric quartz substrate. The sensor has a double delay line to compensate for thermal drift. Thus, one delay line is covered with the ternary nanocomposite sensitive to RH variation, the second delay line being the piezoelectric substrate without a sensitive layer. The sensitive films are deposited on the piezoelectric quartz substrate by the "spin coating" method.



Sensing layer preparation

Sensitive layer preparation:

- 1) The quartz substrate is cleaned for 10 minutes in an ultrasonic bath using equal volumes of ethanol and demineralized water sequentially.
- 2) 3 mg of polyvinylpyrrolidone is added to 15 mL of deionized water, under magnetic stirring, for 20 minutes, at room temperature.
- 3) Subsequently, 6 mg of ox-CNOs-SO₃H is added to the previously prepared solution and magnetic stirring is continued for 90 minutes, at room temperature.
- 4) 1 mL of aqueous carbon black dispersion (10% concentration) is added to the dispersion prepared in item 3 and magnetic stirring is continued for 180 minutes, at room temperature.

- 5) The obtained dispersion is deposited by the "spin coating" method, using a quartz substrate (3000 rpm, for 40 s).
- 6) The obtained film is subjected to heating at 100°C for 60 minutes.
- 7) The obtained film is subjected to a final heat treatment at 200°C for 30 minutes.
- 8) The obtained sensitive layer, deposited on the substrate, is dried in an oven at 50°C, in vacuum, for 24 hours.

Advantages of the proposed sensing layer

The use of the previously described ternary nanocomposite presents several notable advantages:

- the presence of ox-CNOs-SO₃H confers a high specific surface area/volume ratio, affinity for water molecules ("mass loading"), as well as a variation in the resistance of the sensitive layer upon contact with them ("electric loading");
- excellent mechanical properties;
- detection over a wide temperature range;
- the hydrophilic character of PVP and ox-CNOs-SO₃H facilitates the interaction with water molecules;
- carbon black improves the dispersion of ox-CNOs-SO₃H in the polymer matrix and modulates the conductivity of the moisture-sensitive layer, being an excellent filler.
- rapid response of the sensor to variations in RH levels;
- reversibility;

Contact: The National Institute for Research and Development in Microtechnologies –IMT Bucharest, 126A, Erou Iancu Nicolae Street, 077190, Voluntari, Ilfov, Romania

Propanol Resistive Sensor

Romanian Patent Application A00624, RO, OSIM, 21.10.2024

Bogdan-Cătălin Serban, Octavian Buiu, Marius Bumbac,

Cristina Mihaela Nicolescu

A

Description

n-Propanol, a colorless and aromatic liquid, is one of the most commonly used chemical raw materials in various fields of industrial production, including the synthesis of preservatives, cosmetics, detergents, pharmaceuticals, fuels. N-propanol is volatile and flammable and can cause explosions when exposed to heat or flame. The threshold limit value (TLV) for n-propanol in the workplace is 200 ppm (500 mg·m⁻³). When the concentration of n-propanol vapor in the air reaches 400 ppm, it can become very harmful to the human body, causing irritation of the eyes, nose and throat. At the same time, n-propanol is also a volatile organic compound often used as a marker in the early detection of lung cancer. Recent studies reveal that patients with malignant lung pathology have slightly elevated levels of n-propanol in their breath compared to healthy individuals

Thus, interest in the design and manufacture of high-performance n-propanol sensors has increased substantially in recent years.

Original approach

The technical problem solved by the present invention consists in obtaining new layers sensitive to the variation of the n-propanol concentration, used in the design of resistive sensors. The sensitive film described in this invention, which is used to obtain resistive n-propanol sensors, is a binary nanohybrid of the fluorinated carbon nanohorns (Figure 1)/Cu₂O at 1/1 w/w ratio. From the point of view of the detection principle, the resistance of the sensitive film increases with the level of the n-propanol concentration. The decrease in conductivity is explained by the fact that n-propanol donates electrons to the sensitive layer, decreasing the concentration of holes.

The sensor substrate is made of Si/SiO₂ and has a size of 5 mm, the electrodes being made of gold. The width of the electrodes is approximately 200 microns, with a separation of 6 mm between them. They can be linear or have an interdigitated configuration (Figure 2). The n-propanol monitoring capacity is investigated by applying a constant current between the two electrodes and measuring the voltage at different values of the n-propanol vapor concentration to which the sensitive layer based on binary nanohybrid is exposed.

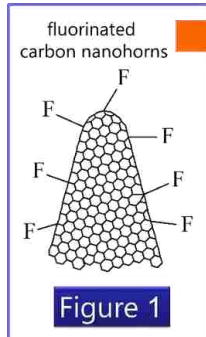


Figure 1

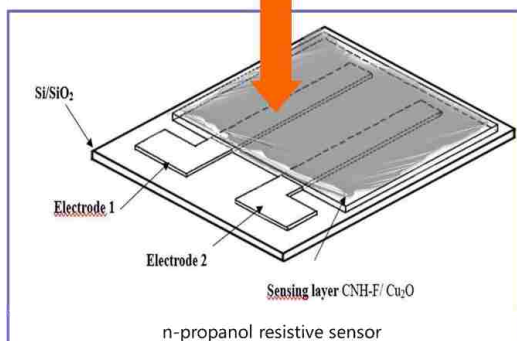


Figure 2

Sensing layer preparation

The steps required for the synthesis of the Cu₂O /fluorinated carbon nanohorns -based humidity sensing film are as follows:

Synthesis of fluorinated carbon nanohorns

- 1) The synthesis of fluorinated carbon nanohorns is carried out by treatment in plasma of F₂ and N₂ (volume mixture 1/8) at a pressure of 1 bar, in a nickel reactor, at room temperature. The injection time is 6 minutes, the exposure time varying between 3 and 5 minutes.
- 2) The dispersion of fluorinated carbon nanohorns is prepared by dissolving 1 mg of CNHs-F in 5 mL of ethanol, under magnetic stirring for five hours, at room temperature.

Synthesis of Cu₂O

- 1) Sodium citrate dihydrate is dissolved in distilled water at room temperature and stirred magnetically at a constant speed for 60 minutes.
- 2) A stoichiometric amount of CuSO₄ solution is added to the solution obtained in item a.

3) After ten minutes, a stoichiometric amount of NaOH solution is added to the solution obtained in item b.

4) An excess of ascorbic acid (30% of the required stoichiometric amount) is added to the suspension obtained in item c to precipitate Cu₂O.

5) The Cu₂O formed is washed with deionized water and dried in vacuum.

Sensing layer

1) 1 mg of Cu₂O nanocubes is added to the dispersion of fluorinated carbon nanohorns in ethanol (1mg to 5 mL ethanol).

9) the obtained dispersion is deposited by the "drop casting" method using a Si/SiO₂ substrate with linear electrodes or interdigitated electrodes (after previously masking the contact area).

9) Densification of the sensitive layer is carried out in a nitrogen atmosphere, for 60 minutes, at a temperature of 125°C.

Advantages of the proposed sensing layer

The use of the binary nanohybrid of the fluorinated carbon nanohorns/Cu₂O type as a sensitive layer presents advantages such as:

- fluorinated carbon nanohorns provide a high specific surface/volume ratio, affinity for n-propanol molecules as well as a significant percentage variation in the resistance of the sensitive layer upon contact with them;

- fluorine atoms, through the electron-attracting effect, increase the number of carriers both in carbon nanohorns. Conduction is achieved through holes (p-type carriers), so that the sensitivity of the material for water molecules increases.

Contact: The National Institute for Research and Development in Microtechnologies –IMT Bucharest, 126A, Erou Iancu Nicolae Street, 077190, Voluntari, Ilfov, Romania

Chemiresistive Ethanol Sensor

Romanian Patent Application A00644, RO, OSIM, 21.10.2024

Bogdan-Cătălin Serban, Octavian Buiu, Marius Bumbac,

Cristina Mihaela Nicolescu

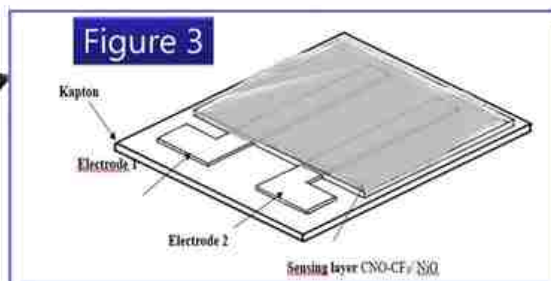
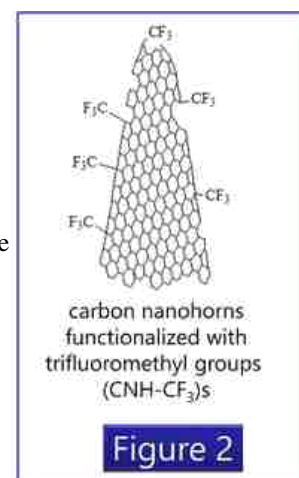
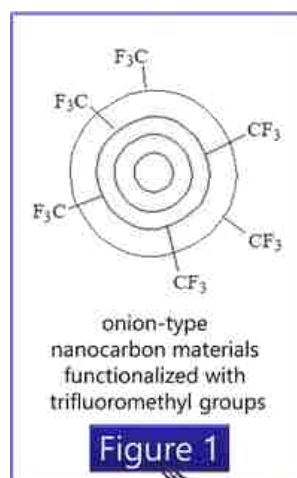
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Description

Monitoring ethanol concentration is an important process in various industrial fields such as the wine industry (e.g., monitoring fermentation processes), the biofuel industry, traffic management and safety (sensors for measuring alcohol levels, portable or even included in the dashboard of cars), the food industry, industrial monitoring (the sensor can be used in various industrial environments to monitor alcohol levels, thus ensuring worker safety), the medical field (breath monitoring). Highly concentrated ethanol is extremely flammable and has high toxicity, which can affect human health.

Original approach

The sensitive films described in this invention, which are used to obtain resistive ethanol sensors, are binary nanohybrids of the type of onion-type nanocarbon materials functionalized with trifluoromethyl groups (CNO-CF₃- Fig.1) - Ni oxide (NiO) and carbon nanohorns functionalized with trifluoromethyl groups (CNH-CF₃) - NiO. The increase in the resistance of the film sensitive to ethanol vapors can be explained taking into account the physicochemical properties of the two components and their mutual interaction. The sensor substrate is made of polyimide (Kapton) and has a size of 5 mm, the electrodes being made of gold. The width of the electrodes is approximately 200 microns, with a separation of 5 mm between them (Fig.3). The ethanol monitoring capacity is investigated by applying a constant current between the two electrodes and measuring the voltage at different values of the ethanol concentration to which the sensitive layer of the type CNO-CF₃ / NiO, CNH-CF₃ / NiO, CNO-CF₃ / CNH-CF₃ / NiO is exposed.



Sensor manufacturing

The steps required to obtain the CNO-CF₃/NiO sensitive film are presented below:

- 1) The synthesis of onion-type nanocarbon materials functionalized with trifluoromethyl groups (CNO-CF₃) is performed by treatment in CF₄ plasma at a pressure of 1 bar in a nickel reactor at room temperature. The injection time is 3 minutes, and the exposure time varying between 2 and 20 minutes.
- 3) The CNO-CF₃ dispersion is prepared by dissolving 1 mg of CNOs-CF₃ in 5 mL of isopropyl alcohol, under magnetic stirring for five hours, at room temperature. The synthesis of NiO nanopowder involves the following sequence of steps:
- 4) 0.237 g (1.0 mmol) of NiCl₂·6H₂O and 0.06 g of Na₂C₂O₄ are dissolved under magnetic stirring in 15 mL of H₂O and 2.0 mL of ethylene glycol. The obtained solution is transferred to a stainless steel autoclave and heated at 200 °C for 12 hours.
- 5) the solid product is separated by centrifugation, washed with deionized water, respectively ethanol, then dried in air.
- 6) the solid product is gradually heated to 300°C (3 degrees/min), maintained for one hour at this temperature, then gradually cooled to room temperature. To the dispersion prepared, 1 mg of NiO nanopowder prepared in item 9 is added.
- 7) The obtained dispersion is deposited by the "drop casting" method using a Kapton substrate with linear electrodes or interdigitated electrodes (after previously masking the contact area).
- 8) Densification of the sensitive layer is carried out in a nitrogen atmosphere, for 120 minutes, at a temperature of 100 °C.

Advantages of the proposed sensing layer

The use of binary and ternary nanohybrids as sensitive films presents several advantages:

- nanocarbon materials functionalized with trifluoromethyl groups present a high specific surface/volume ratio, affinity for ethanol molecules (by forming hydrogen bonds) as well as a variation in the resistance of the sensitive film upon contact with them;
- NiO nanopowder is a p-type semiconductor with a wide conduction band, a large specific surface area. It presents a synergistic effect with oxidized nanocarbon materials such as CNO-CF₃ and CNH-CF₃, also p-type semiconductors, upon contact with ethanol molecules.

Contact: The National Institute for Research and Development in Microtechnologies –IMT Bucharest, 126A, Erou Iancu Nicolae Street, 077190, Voluntari, Ilfov, Romania

Trimethylamine resistive sensor

Romanian Patent Application A00645, RO, OSIM, 21.10.2024

Bogdan-Cătălin Serban, Octavian Buiu, Marius Bumbac,

Cristina Mihaela Nicolescu

A

Description

Trimethylamine (TMA), an organic compound of primary importance in industrial organic synthesis, is a colorless, hygroscopic amine that is gaseous at room temperature. Trimethylamine has a fish-like odor at low concentrations and an ammonia-like odor at higher concentrations. Given that it is hazardous to human skin, eyes, and respiratory tract, the National Institute for Occupational Safety and Health (NIOSH) suggests that the upper limit of exposure to TMA be 10 ppm for 10 hours of exposure and 15 ppm for 15 minutes of exposure. Microbial degradation of trimethylamine N-oxide during spoilage of fish and marine organisms leads to the accumulation of trimethylamine. Consequently, the concentration of trimethylamine is widely used as one of the relevant indicators for assessing the freshness of fish and seafood intended for human consumption. Thus, there is increased interest in the design and manufacture of trimethylamine sensors with low detection limits.

Original approach

The sensitive film described in this invention, which is used to obtain resistive trimethylamine sensors, is a binary nanohybrid of the type of oxidized onion-type nanocarbon materials functionalized with trifluoromethyl groups (Figure1) / CuO.

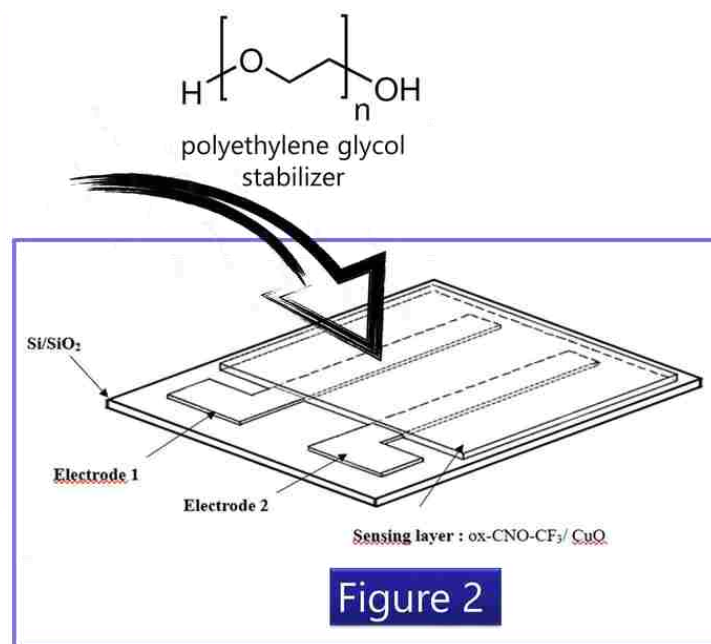
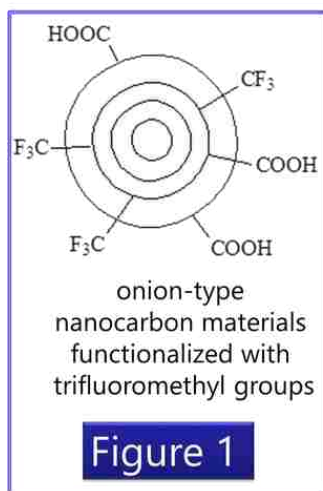
From the detection principle's point of view, the sensitivity film's resistance increases with the trimethylamine concentration level.

The increase in resistance is explained by the fact that trimethylamine donates electrons to the sensitive layer, decreasing the concentration of holes. The sensor substrate is made of Si/SiO₂ and has a size of 5 mm, the electrodes being made of gold. They can be linear (Figure 2) or have an interdigitated configuration. The monitoring capacity of trimethylamine is investigated by applying a constant current between the two electrodes and measuring the voltage at different values of the trimethylamine concentration to which the sensitive layer is exposed.

Sensor manufacturing

ox-CNOs-CF₃ synthesis:

- 1) Onion-type nanocarbon materials (CNOs) are synthesized from nanodiamond, by heat treatment at 1650°C, in a helium atmosphere.
- 2) The synthesis of nanocarbon materials functionalized with trifluoromethyl groups (CNO-CF₃) is performed by treatment in CF₄ plasma at a pressure of 1 bar, in a nickel reactor, at room temperature. The injection time is 5 minutes, the exposure time varies between 2 and 20 minutes.
- 3) The synthesis of ox-CNOs-CF₃ is performed by oxidation of CNO-CF₃ in Ar-O₂ plasma (volumetric mixture 3/1), in a quartz tube, at a pressure of 4 torr, at room temperature. The injection time is 10 minutes, and the exposure time varies between 2 and 10 minutes.



ox-CNO-CF₃/CuO sensitive layer preparation:

The raw materials required for the synthesis of the sol are: the precursor- Cu(CH₃COO)₂ · 2H₂O, the solvent (mixture of ethanol and ethanolamine), the stabilizer (polyethylene glycol with molecular weight M=5,000), ox-CNO-CF₃. The molar ratio of Cu(CH₃COO)₂ · 2H₂O - ethanol is 1: 4.

- 1) Magnetic stirring is performed sequentially, in two stages:

- at a temperature of 50°C, for 2h, and at a temperature of 70°C, for 2h.

- 2) In the second stage of magnetic stirring, ox-CNO-CF₃, synthesized in item 3, is added.

- 3) The solution is stabilized at room temperature for 12h. The deposition of the formed solution is carried out by the drop casting method, after previously masking the contact area. The densification of the sensitive layer is carried out sequentially, in two stages, by thermal treatment, as follows:

in air, for 10 minutes, at a temperature of 300°C, and in air, for 1 h, at a temperature of 400°C.

Contact: The National Institute for Research and Development in Microtechnologies –IMT Bucharest, 126A, Erou Iancu Nicolae Street, 077190, Voluntari, Ilfov, Romania

DYNAMICALLY ADJUSTABLE SUNSHADE SYSTEM FOR VEHICLE WINDSHIELDS

A

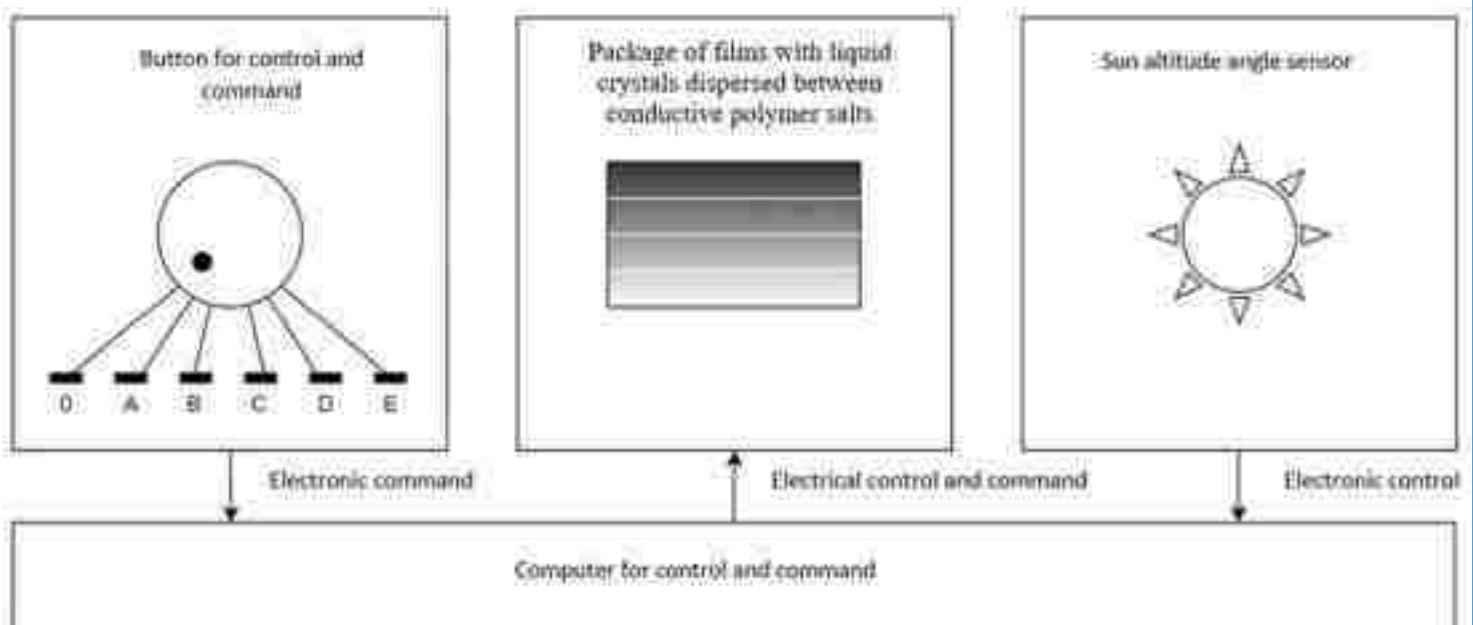
Patent Application Number: A 2024 00274

Ciprian BEJENAR, Alexandru LEONTE, Laurențiu Dan MILICI, Andrei Emanuel PASCAN, Mihai DIMIAN, Daniela IRIMIA, Constantin UNGUREANU, Ciprian AFANASOV

The sunshade system with dynamic adjustment for vehicle windshields involves gradually controlled shading, in the vertical plane of the windshield, by progressively powering the elements arranged in layers in a package of films, transparent when not powered and opaque when powered, both manually, depending on the user's wishes, and automatically, depending on the elevation angle of the sun and the vehicle relative to the horizontal plane, so as to provide a distinct alternative for creating sunshades next to the vehicle windshield.

Advantages:

- The system introduces new possibilities for the creation of sunshades with dynamic and progressive adjustment for vehicle windshields;
- The system preserves the chromatic range of colors perceived in the transparent state;
- The system produces a zonal shading effect in overlapping steps;
- The system can be adjusted effortlessly, depending on the elevation angle of the sun and the vehicle;
- The system increases road safety by being able to be applied to any windshield of a vehicle, train, flight system or watercraft with passengers;
- The system does not lose its properties due to wear and tear and does not require maintenance.



MODULAR MECANUM WHEEL ASSEMBLY OPTIMIZED FOR TRACTION ON SANDY AND UNSTABLE SURFACES

Patent request in progress

*Aurel Mihail TITU, Daniel BALC, Emanuel
BALC, Stefan TITU*

A

Description

In practice, we encounter the following problems:

Difficulties in moving on unstable surfaces

Vehicles equipped with Mecanum wheels face significant challenges on surfaces such as sand, gravel, or soft soil.

These terrains do not provide firm support, leading to traction loss and difficulties in maintaining the desired direction.

Omnidirectional mobility, a major advantage of Mecanum wheels on hard surfaces, becomes inefficient when ground contact is unstable.

THE PROPOSED SOLUTION

This modular Mecanum wheel is specifically designed to ensure advanced mobility on low-traction surfaces or terrains that are traditionally challenging for this type of wheels, such as sand, gravel, or soft surfaces.



CONCLUSIONS AND DISCUSSIONS

Improved Traction

Reduced Sinking

Energy Efficiency

Adaptability & Durability

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MECANUM WHEEL WITH INDIVIDUAL FLEXRING-EQUIPPED ROLLERS FOR VIBRATION DAMPING AND ENHANCED STABILITY

Patent request in progress
**Daniel BALC, Aurel Mihail TITU, Emanuel
BALC, Stefan TITU**

A

Description

In practice, we encounter the following problems:

Excessive Vibrations During Movement

On hard surfaces (such as concrete or metal) and uneven terrain, Mecanum wheels make intermittent contact with the ground, as each roller touches the surface one at a time. This discontinuous interaction generates constant vibrations that propagate throughout the entire mobile platform. In applications that require smooth motion.

Direct Transmission of Shocks to the Structure and Electronics

Without a damping system at the roller level, mechanical shocks and vibrations caused by ground contact are transmitted directly to the vehicle's supporting structure. This can negatively impact the lifespan of electronic components (such as motherboards, microcontrollers, or sensors) and may lead to malfunctions caused by high-frequency vibrations. In autonomous systems, these shocks

THE PROPOSED SOLUTION

This Mecanum wheel incorporates a damping component, based on the use of flexrings mounted on each individual roller. Flexrings are flexible structures that absorb vibrations generated by the rollers' contact with the rolling surface. This adaptation brings multiple benefits, especially for precision applications such as industrial robots or autonomous vehicles operating in vibration-prone environments or on uneven surfaces.

RESULTS AND DISCUSSIONS

- Significant Vibration Reduction
- Extended Lifespan of Wheels and Components
- Reduced Operational Noise



HYBRID-ARCHITECTURE MECANUM WHEEL WITH INDEPENDENTLY ACTUATED ROLLERS

Patent request in progress
Emanuel BALC, Aurel Mihail TITU,
Daniel BALC, Stefan TITU

A

DESCRIPTION

In practice, we encounter the following problems:

Lack of Active Traction Control at Roller Level

Conventional Mecanum wheels rely on passive rollers that rotate freely without any independent actuation. While this allows for omnidirectional movement, it also limits the ability to manage traction dynamically at each contact point with the ground. In environments with uneven grip — such as mixed surfaces (e.g., one wheel on asphalt, another on sand or wet tiles) — the inability to modulate traction per roller leads to inconsistent motion, slippage, or loss of directional control. Active control at the roller level would allow the system to respond more intelligently to such variations, improving overall traction and stability.

Limitations in Precision Maneuvers and Active Stabilization

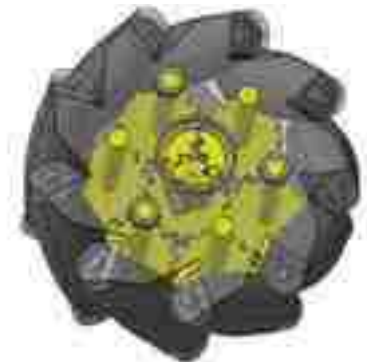
Without active roller control, Mecanum wheels cannot perform complex maneuvers such as automatic slip compensation, platform stabilization, or dynamic adaptation to local obstacles.

THE PROPOSED SOLUTION

This Mecanum wheel represents a significant technological advancement by integrating an independent actuation system for the peripheral rollers. In traditional configurations, Mecanum wheel rollers are passive, rotating freely as the main wheel spins. In this hybrid wheel, each roller is equipped with its own actuation system, powered by a dedicated DC micro-motor capable of independently controlling the roller's speed and direction of rotation.

RESULTS AND DISCUSSIONS

- Active Traction Control at Each Roller
- Advanced Maneuverability and Increased Precision
- Improved Energy Efficiency



Root Cause Analysis of a Heat Exchanger Failure

Authors: Lucas Jacoby, Jona Weiblen, Maximilian Hülsewede

Mentors: Dr. rer. nat. Gabriela Marginean, Prof. Dr.-Ing. Klaus Mecking, M. Eng. Dino Woelk

A

1. Problem & Investigation Methods:

A heat exchanger showed leakage at the fixed bearing shortly after commissioning. A transverse crack, propagating from the outside inward, was identified. To determine the root cause, we conducted dye penetrant inspection, laser scanning microscopy, microstructural analysis (SEM), hardness testing, and mechanical design evaluation on the sample shown in Figure 1.



Fig. 1: Sample from the broken pipe

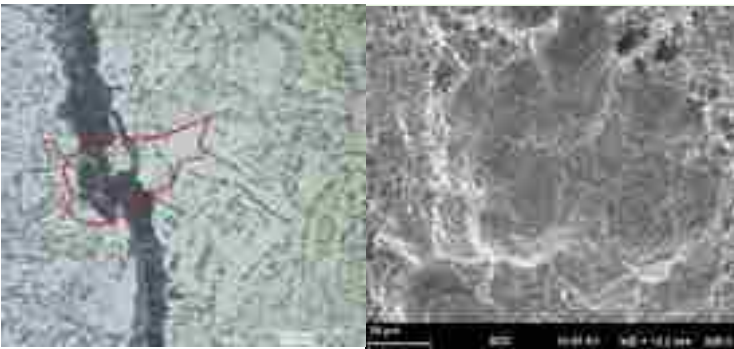


Fig. 2: CLSM image showing a transgranular fracture

Fig. 3: SEM image showing a brittle failure

2. Crack Characteristics & Material Analysis

The crack exhibited a transgranular fracture (Fig. 2) with intergranular components, indicating a brittle failure. SEM analysis confirmed these characteristics (Fig. 3). This is unusual for the pipe material, which suggested that increased hardness played a significant role in the crack formation.

3. Hardness & Welding Impact

Vickers hardness testing (Fig. 4) confirmed significantly higher hardness in the weld's heat-affected zone (HAZ). This excessive hardness increased brittleness, accelerating crack propagation despite not being the primary cause.

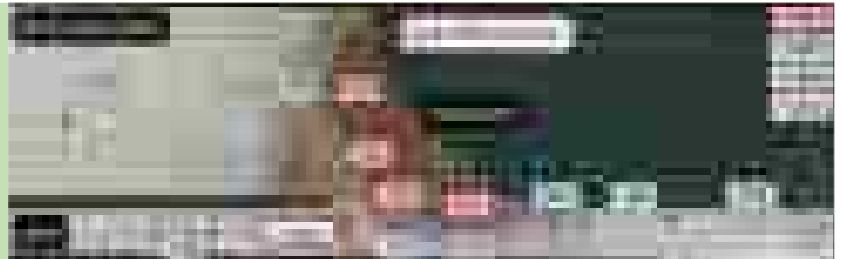


Fig. 4: Vickers hardness test HV10

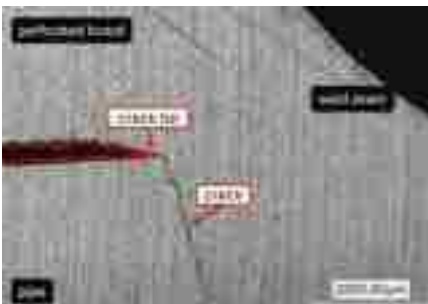


Fig. 5: Construction of the crack tip

4. Mechanical & Design Weaknesses

The investigation of the design revealed two major structural flaws. First, the pipe was welded off-center to the tube sheet, causing uneven stress distribution and localized overloads. Second, the crack originated at the sharpest point of the structure, where stress was highly concentrated (Fig. 5). This suggests that the extreme stress at this location was the primary factor in the crack initiation and subsequent failure.

5. Conclusion & Prevention

The crack likely originated from extreme stress concentration at the sharpest point of the structure, making it the most vulnerable to failure. While excessive weld hardness and misalignment may have contributed, they are not the primary cause. To reduce risks, minimizing sharp geometries and optimizing welding processes to lower hardness could improve structural integrity.



YXV super-aspirated air filter

AIR by CORNELIU



SCAN ME

This study 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

Author: Corneliu BIRTOK BANEASA

Mentor: Prof.Dr.Eng.Habil. Virginia Ana SOCALICI

A

YXV is a super-aspirated air filter dedicated for IC engine. YXV reduce the thermal, the gas and dynamic losses by contributing to the increase of the filling degree of the engine cylinders.

This study presents the influence of the air filter location on the intake system temperature in the case of engines for drifting. The heat flow dispersion map at the engine compartment was determined for four different cases. The measurements were performed with a thermographic camera in the area of the air filter and intake manifold. The results obtained after the test contribute to the efficiency of the thermal management of the engine by reducing the temperature of the intake air.

Four Drift engines with an engine displacement between 3.2l and 4.4l were considered for this study: I BMW E36; II Nissan Skyline r32; III BMW E30; IV BMW E36.



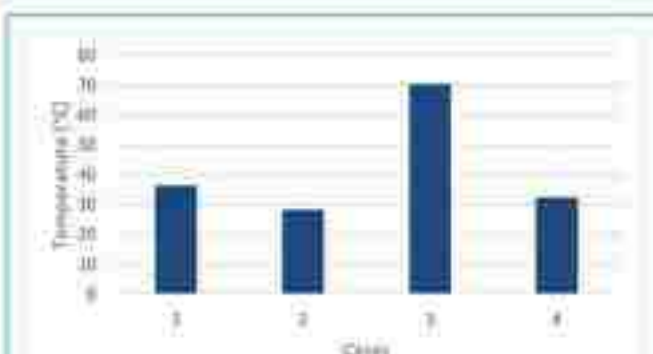
Air filter heat flow dispersion: a-air filter area; b-frontal surface of the air filter; c-lateral surface of the air filter



Sport Filter



YXV Filter



Cases variation of temperature fields on air filter

Contact:

corneliugroup@gmail.com +40729304129

The relatively high values of the temperature recorded on the intake path in the case of the 4 engines studied, mainly case 3 is due to the organization of the supercharging group, the air filter location and the lack of protection in the filter area.

A solution in order to reduce the temperature on the intake system consists in the implementation of an Air by Corneliu system composed of the super-aspiring air filter YXV, dynamic system of air transfer (STOA) and integrated thermal deflector.

The researches has shown that temperatures have been reduced by up to 50%.

OCCUPATIONAL HEALTH AND SAFETY STUDY FOR THE WORK ENVIRONMENT OF AN EQUIPMENT DISTRIBUTION OPERATOR

A

Authors: Oana Roxana CHIVU, Augustin SEMENESCU, Andrei Ștefan IACOB, Claudia BORDA, Mădălina Giulia BOBOCEA, Marilena GHEORGHE, Dan Florin NIȚOI

Description

The study presents the occupational risks within SC AC BONT TOOLS SRL, a company specialized in the distribution of industrial equipment.

The main hazards associated with the activity are identified, such as handling heavy equipment, ergonomic risks, exposure to chemicals and transport safety.

Solutions are proposed for the findings, creating work safety, highlighting the importance of periodic training, equipment modernization and optimization.

Pictures & graphics



ADVANTAGES OF THE PROPOSED STUDY

IDENTIFICATION AND REDUCTION OF
OCCUPATIONAL RISKS

OPTIMIZATION OF WORK PROCESSES

IMPROVEMENT OF LEGAL COMPLIANCE

INCREASE IN EMPLOYEE SATISFACTION AND
PRODUCTIVITY



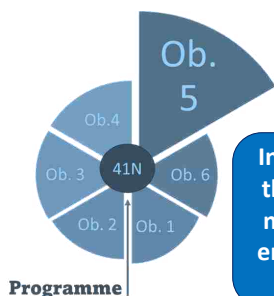
Contact: National University of Science and Technology POLITEHNICA Bucharest
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Economic Aspects of Green Concrete

Project number: PN 23 35 05 01

Author: Mircea-Iosif RUS

A



In recent decades, the construction sector has experienced rapid growth, leading to a significant increase in the consumption of building materials and, consequently, the environmental impact. Portland cement, the main component of conventional concrete, is responsible for approximately 7–8% of global carbon dioxide emissions. In this context, green concrete has emerged as an innovative solution designed to reduce carbon footprints, use alternative resources, and improve the economic efficiency of construction projects.

Green concrete is not only about lowering environmental impact but also about optimizing costs over the entire life cycle of a structure — from production and execution to operation and maintenance. This paper aims to highlight the main economic aspects of using green concrete compared to traditional concrete.

Production Costs and Alternative Materials

- Fly ash – a by-product of coal combustion in power plants;
- Ground granulated blast furnace slag – a by-product of the steel industry;
- Recycled glass powders, aggregates from construction waste, or other industrial by-products;
- Limestone filler, which can reduce cement content without affecting performance.

These materials are often locally available and less expensive than cement, which is produced through an energy-intensive and costly process. Studies show that using alternative materials can reduce the overall cost of concrete by 5–20%, depending on the region, material availability, and mixture proportions.

Initial Investment and Technological Adaptation

- More precise dosing equipment;
- Cleaning and sorting systems for recycled aggregates;
- Stricter quality control procedures.

These initial investments can temporarily increase production costs. However, they should be viewed as a strategic investment: the additional costs are offset over time through savings in materials, energy, and maintenance.

Long-Term Savings: Durability and Maintenance

Green concrete consumes less energy than conventional cement manufacturing, which lowers energy costs for producers.

Maintenance and repair costs for structures made with green concrete are lower over their life cycle. For example, a building or infrastructure built with green concrete may require fewer major interventions during the first 30–50 years, leading to considerable operational cost savings.

Economic Incentives and Public Policies

These measures help offset cost differences, making green concrete attractive from an economic as well as an environmental perspective.

- Tax reductions or VAT exemptions for sustainable projects;
- Subsidies or green loans for companies implementing eco-friendly technologies;
- Additional points in green building certification systems (LEED, BREEAM, DGNB), which can increase a building's market value.

Market Advantages and Competitiveness

Investors and clients are increasingly concerned about the carbon footprint of projects, which raises the demand for solutions such as green concrete

Companies adopting sustainable solutions:

- Can improve their public image;
- Can more easily participate in public or international projects where sustainability criteria are mandatory;
- Can gain a competitive advantage in a market with growing demand for eco-friendly materials.

This research was funded by the Romanian Government Ministry of Research, Innovation and Digitalization, 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".

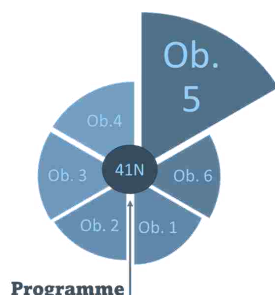


From waste to paving – the environmental performance of geopolymer concrete pavements through LCA analysis

A

Project number: PN 23 35 05 01

Authors: Adrian-Victor LĂZĂRESCU, Andreea HEGYI, Alexandra CSAPAI, Brăduț Alexandru IONESCU, Tudor TOADER, Mihail CHIRA, Carmen FLOREAN, Andra BĂRAȘ, Cosmin CHIRILIANU, Mircea-Iosif RUS

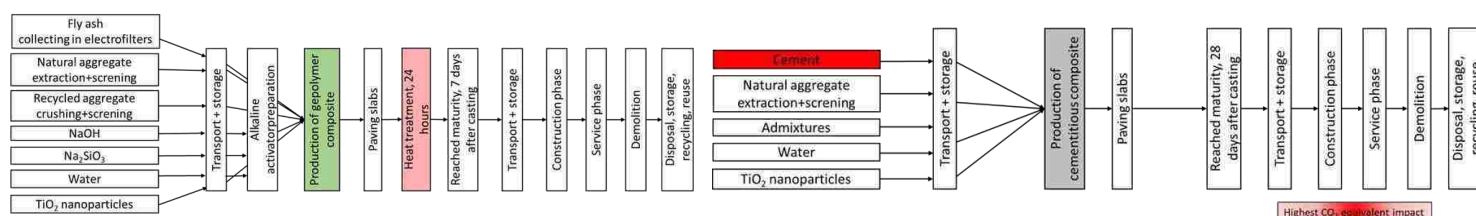


Programme

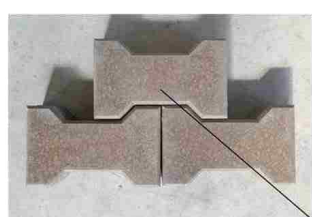
Design, implementation, and validation activities through prototype testing (full-scale system) in a relevant environment (operating conditions similar to real ones), in accordance with the proposed field of use, of small prefabricated elements (prototypes) made from optimized smart-eco-innovative geopolymer materials.

The aim of this paper is to present preliminary results on the production of paving block elements produced using the concept of alkaline activation of fly ash and to present results on specific physical and mechanical characteristics. At the same time, to maximize the potential of generating smart-eco-innovative character, different types of aggregates were used to produce these elements, as well as the use of TiO_2 nano-particles into the geopolymer matrix. Finally, the present work aims to highlight an LCA calculation of the resulting CO_2 equivalent emissions by comparison with similar elements produced using traditional materials (cement) and a cost-benefit analysis of the results obtained.

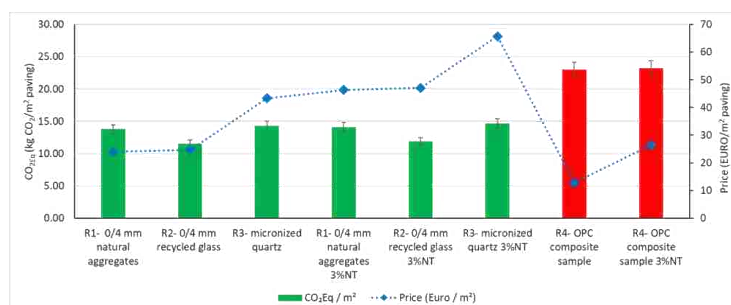
Materials and methods



Ordinary OPC Paving blocks



Geopolymer Paving blocks



Conclusions and opportunities

- Life Cycle Assessment of geopolymer paving blocks underscores their potential as a sustainable alternative in the construction industry. While they show positive environmental attributes, ongoing research, standardization, and collaboration within the industry are necessary to optimize their production processes and further enhance their overall sustainability. Additionally, collaboration between researchers, industry professionals, and policymakers is vital to promoting the widespread adoption of geopolymer paving blocks as a sustainable construction solution.

This research was funded by the Romanian Government Ministry of Research, Innovation and Digitalization, 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".

WEAR BEHAVIOR OF SINGLE POINT CUTTING TOOL

A

Author: Eng. Alexandru Mihai PINCA-BRETOTEAN

Mentor: Assoc. Prof. Ph.D. Adrian BUT

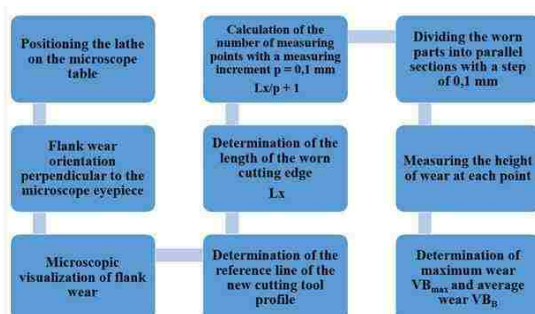
Description:

The objective of this project is to analyze, from an experimental perspective, the effects of cutting speed on the flank wear of cutting tools with one cutting edge. Three experiments were carried out with different spindle speeds and therefore different cutting speeds. In each experiment, the flank wear, thermal load in the cutting zone, and the resulting chips will be determined. The results obtained showed that the wear of the tools is a consequence of thermomechanical effects in the cutting zone. In each experiment, the damage of the flank was determined by off-line method using optical microscopes, measurements, and control instruments. The thermal regime in the cutting zone has also been monitored using a thermal imaging camera, and the resulting chips have been collected, photographed and stored for analysis. During the tests, the material of the work-piece and the tool, the cut conditions (dry state), the cut depth and the feed were maintained constant. The experiments were carried out on the SNB 400 x 2000 mm universal lathe with 7.5 KW power. Each turn was carried out on AISI 5140 hardened steel with the dimensions 50x300 mm. In the experiments, HSS tools are used, with 20x20mm dimensions. All new tools used for each experiment have the same initial geometric characteristics and the same tool adjustment parameters.

Cutting parameters

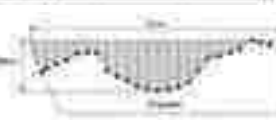
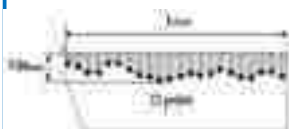
No.	Spindle speed n (rpm)	Cutting speed v (m/min)	Depth of cut a_p (mm)	Feed f (mm/rev)
Experiment 1	53	19.79	2	0.075
Experiment 2	125	39.26	2	0.075
Experiment 3	250	78.53	2	0.075

Steps followed in the project

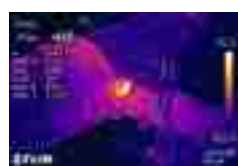


Flank wear and cutting zone temperatures at the end of the experiments

No.	Length of straight worn edge L_x (mm)	Number of measurements of points L_{meas}	Maximum wear VB_{max} (mm)	Admissible wear VB_{lim} (mm)	Temperature at the end of processing $T(°C)$
Experiment 1	2.1	22	0.26	0.6	372
Experiment 2	2.3	26	0.40	0.6	415
Experiment 3	2.4	26	0.83	0.6	482



Experiment 1



Experiment 2

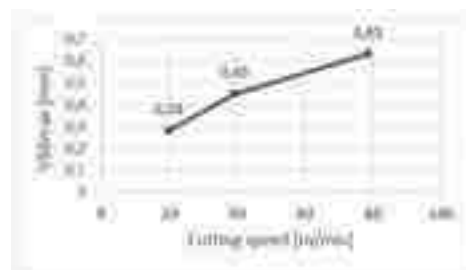


Experiment 3

Flank wear characteristics in experiment 3



Evolution of flank wear with the cutting speed



Chip shape at the end of experiments



Conclusions:

- Flank wear was present for all cutting speeds analyzed, even at low speeds, and increases as the cutting speed increases.
- Maximum flank wear values from Experiment 1 and 2 are lower than the admissible value.
- The highest wear value was obtained in Experiment 3. In this experiment, characterized by the highest cutting speed, the value obtained for maximum wear exceeds the admissible value. In this case, the tool has exceeded its service life.
- In Experiment 1, the chips are continuous, of different lengths, and are more easily fragmented.
- In Experiment 2, the chips are short, segmented, showing return colors, and were easily evacuated from the work area. The spindle speed of 125 rpm is double that of the previous one, so the cutting speed has also increased significantly. This is due to the presence of a greater amount of heat in the cutting area, allowing the material to deform plastically and shear more easily.
- In Experiment 3, the chips are short, segmented, brittle, and easily removable. The chips show recovery colours, due to the high thermal regime in the shear zone of the chip. This thermal regime is generated by the high cutting speed, which makes the processed material more plastic, and the chip breaks more easily.
- Increasing the spindle speed and, implicitly, the cutting speed leads to an increase in the thermal regime in the working area.

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Presentation Link:

<https://www.fih.upt.ro/ufts/t2ZKxhTU53sAcE6FO1ON/Wear%20behavior%20of%20single%20point%20cutting%20tool.pdf>

BIOMEDICAL APPLICATIONS OF MAGNETITE

Project:

Authors: Avrămoiu Gheorghe

Coordinator: Assos. Prof. PhD. Tătar Adina

University „Constantin Brâncuși,, din Târgu-Jiu

A

Description: The main subject of the work is the analysis of nanosystems with applications in the treatment of osteosarcoma cancer, using Fe_3O_4 nanoparticles as intracellular transport systems of substances with anti-tumor effect, intended for the treatment of osteosarcoma. Magnetite nanoparticles functionalized with doxorubicin were successfully obtained by the co-precipitation method. Identification of Fe_3O_4 samples was achieved by methods such as X-ray diffraction, selected area electron diffraction, the high degree of crystallinity of the samples being highlighted by the same methods and confirmation by high-resolution transmission electron microscopy analysis. Morphological investigations were carried out by scanning electron microscopy which demonstrated fine magnetite powders, sizes ranging between 5-7 nm.

The functionalization of magnetite with substances with anti-tumor effect was highlighted by thermogravimetric analysis, the obtained samples carrying an amount of Fe_3O_4 – 5.678%, respectively $\text{Fe}_3\text{O}_4@\text{DOX}$ -16.265. The anti-tumor effect of the obtained systems was evaluated by in vitro tests on tumor cell cultures, this confirms the cytotoxic action of the anti-tumor drug and proves the anti-proliferative efficiency of $\text{Fe}_3\text{O}_4@\text{DoX}$ as a new transport system for anti-tumor therapeutic agents. In order to determine the biocompatibility and distribution of magnetite-based nanostructures, in vivo tests were performed on BALB/c mice and on the chorioallantoic membrane of the chick embryo.

Pictures & graphics

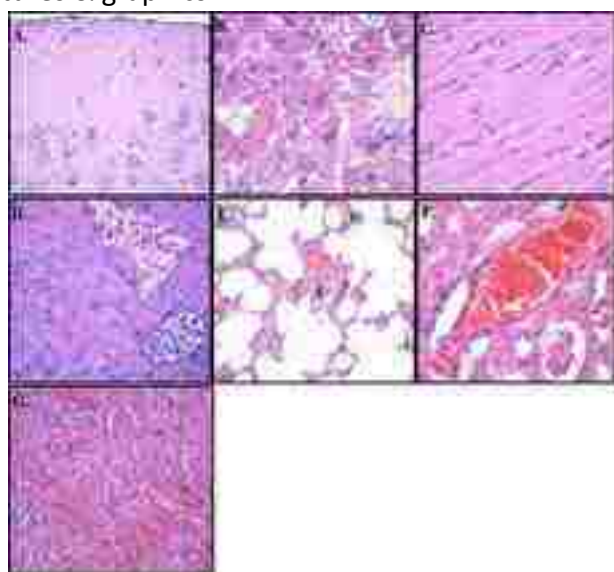


Fig. 1. Cross-sections through different organs of mice (A. Brain, B. Liver, C. Myocardium, D. Pancreas, E. Lungs, F. Kidneys, G. Spleen) 48h after injection at 400x magnification

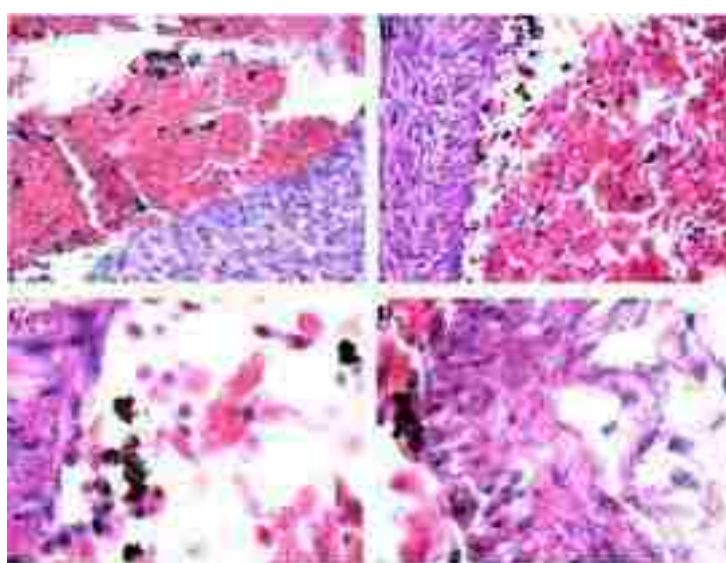


Fig. 2. Cross-section through the myocardium of the chick embryo treated with $\text{Fe}_3\text{O}_4@\text{DOX}$ nanoparticles

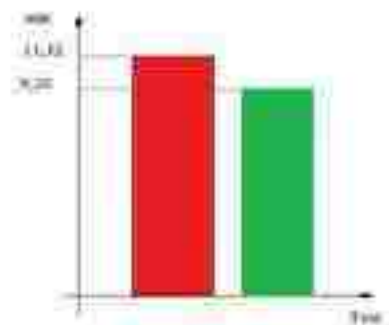
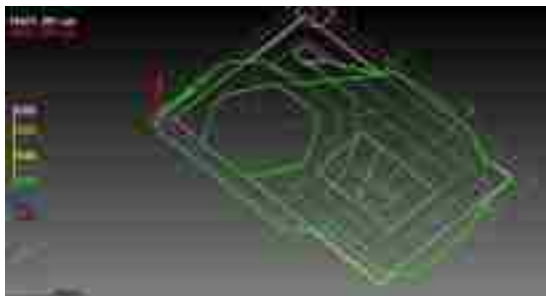
STRATEGIES FOR INCREASING PRODUCTIVITY IN CNC MACHINING

A

Coordinator: Assoc. Prof. Ph.D. Adrian BUT
Master's student: Eng. Alexandru Mihai PINCA-BRETOTEAN

Description:

The objective of this project is to present solutions to optimize the NC program. Using the original NC program, keep the technology with the same cutting tools, the results give us less time of manufacturing with more protection to collisions. A good solution to give a positive answer at all this requests is to use the advantage of NC BRAIN software. Using NC BRAIN we can reduce more than 10% of machining time and 90% of tool breakage, and helps to increase unmanned machining without worrying about any accident or collision, which will increase run rate after all. CAM software controls feed rate on load accordingly and save machining time. Besides, it will minimize the tool breakage and abrasion. The function mentioned above has been applied to 3 axis and is being applied to simultaneous 5 axis as well which is the first development in the world. Tool breakage is easily happening on excessive load. NC BRAIN has a function, called 'automatic tool path addition on overloaded area', which prevents tool breakage and deterioration. In particular, this function helps safe machining without any accident during unmanned operation. All this advantages was presented on real machining application without using the NC BRAIN, the original tool path with green colour and the time manufacturing was 11 minutes and 32 seconds. Using this software, was obtained 9 minutes and 20 seconds of manufacturing time. The results of the optimisation was with 19% less time of manufacturing.



Conclusions:

- The implementation of NC Brain software demonstrates a high potential for increasing productivity, safety, and tool durability, confirming the importance of integrating intelligent software solutions into modern machining industries.
- The use of NC Brain software leads to a significant increase in the efficiency of CNC machining processes.
- The software allows for a reduction of more than 90% in tool breakage cases, thanks to its intelligent function of automatically adding tool paths in overloaded areas, preventing tool damage and ensuring process stability.
- NC Brain contributes to increasing safety in unmanned machining by eliminating the risk of collisions and damage during operator-free operation.
- The software enables the optimization of tool paths for 3-axis and simultaneous 5-axis machining.

Comparison of Wear Resistance of Thermally Sprayed WC-Co-Cr Coatings from Recycled Powders and Conventional WC-Co-Cr Coatings

Patent/project number: Master's thesis

Author/s: Dino Woelk and Dr. Gabriela Marginean

A

In addition to the ever-increasing demands in the industry, environmental aspects and human health are coming to the forefront. Not only in Germany but also at the European level, regulations are being enacted that industrial companies must adhere to. For instance, primary energy consumption is expected to be reduced by 80–95% by 2050 to achieve the desired climate goals [1], [2].

Various strategies are being pursued in the field of thermal coating. Among them is the recycling of filter dust. By using these materials, less new raw material is required (conserving resources), and transport routes are eliminated, reducing overall energy consumption [3].

Figure 1 presents a comparison between a coating made from filtered cermet material (GC), which primarily consists of WC-Co-Cr, and a conventional WC-Co-Cr coating, which appears significantly more homogeneous. The high-velocity oxy-fuel (HVOF) spraying process was used for coating. The EDX mapping in Figure 2 shows that the chemical composition of the GC coating is diverse and, in addition to carbides, also contains oxides.

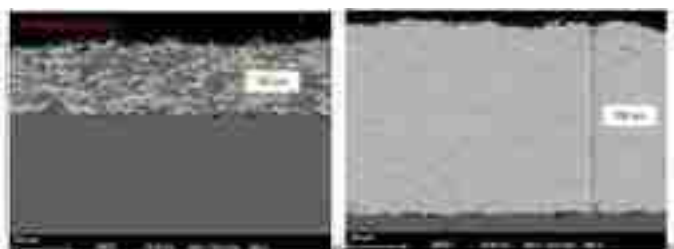


Figure 1: SEM cross-sectional images at 200x magnification in BSE mode: (a) GC coating and (b) WC-Co-Cr coating for overview purposes.

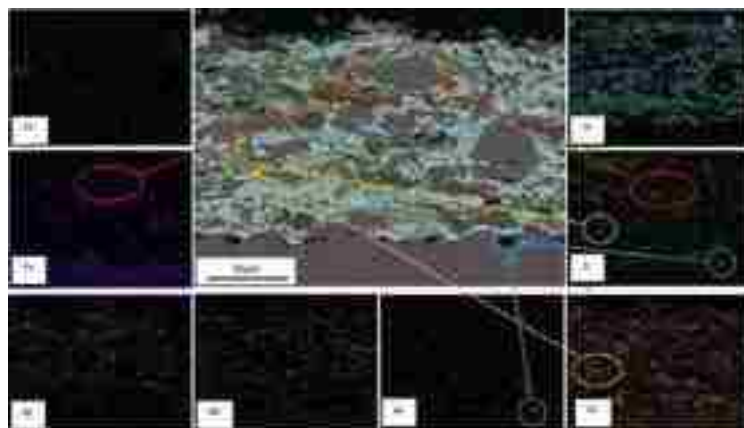


Figure 2: SEM cross-sectional image of a GC coating at 500x magnification; EDX mapping with individual electron images.

Hardness measurements were conducted using both nanoindentation (with loads in the mN range) and the Vickers method. The results are compared in Figure 3. Due to the higher applied load in the Vickers method, an average hardness value for the coatings is determined, leading to a lower standard deviation.

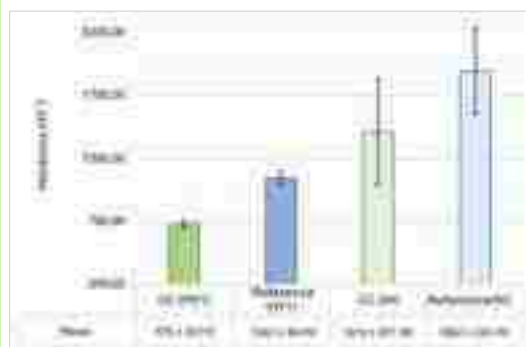


Figure 3: Bar chart of mean values and standard deviations for HV1 and NI converted to HV.

In addition, nanoindentation allowed for the determination of the elastic modulus, as shown in Figure 4. The elastic modulus of the GC coatings is significantly lower, which also indicates a higher tendency for crack formation. This tendency is markedly greater in the GC coatings compared to the reference coatings. However, the test did not result in the delamination of the GC coatings.

Figure 5 reveals that the friction coefficient of the GC coatings is significantly higher than that of the reference coatings and has a longer run-in phase. However, both coatings reached a steady-state condition within the measurement interval.

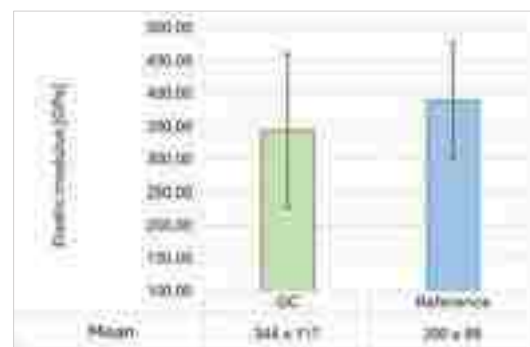


Figure 4: Bar chart of the averaged elastic modulus for the GC and reference coatings.

Conclusion:

The GC coatings exhibit significantly lower performance compared to the reference coatings in terms of mechanical and tribological properties. However, due to their hardness and stability against crack propagation, GC coatings provide sufficient wear protection for standard applications.

References:

- [1] Xi Tan, Jungui Zhang, Huichao Zhu, Zhongcheng Zhang, Xiagao Zhu, Weibang Ni, Tongyi Li, Tongchun Kuang, Hongliang Dai, Xiaofeng Zhang, "Double layer HVOF-sprayed WC-CoCr coatings for optimal properties," *Ceramics International*, 2022, doi: 10.1016/j.ceramint.2022.07.349.
- [2] Tobias Schmeja et al., "Klimaschutzplan 2050 - Klimaschutzpolitische Grundsätze und Ziele der Bundesregierung - Diskussionsbeitrag des Umweltbundesamtes," Umweltbundesamt, 2016.
- [3] European Commission, Directorate-General for Environment, "Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions," Document 52020DC0474, 2020.

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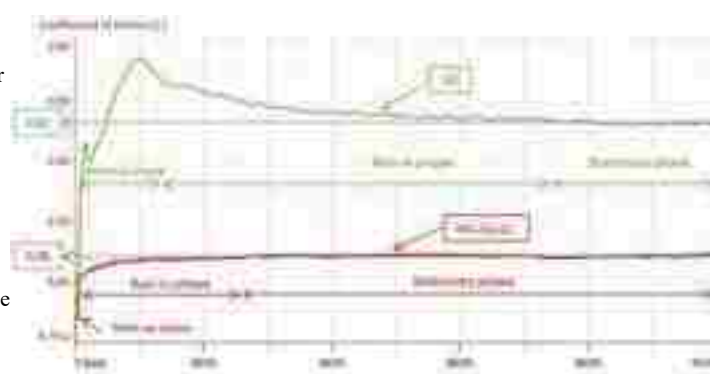


Figure 5: CLSM image at 50x magnification, crack tendency test of a GC coating (Brinell indenter Ø 2.5 mm; test load 31.625 kp).

TEA-BORGS

FIRST Tech Challenge Robotics Team #19121 *Colegiul Național „Tudor Vladimirescu” Târgu Jiu*

A

Echipa **TEA-BORGS – FTC #19121** a **Colegiului Național „Tudor Vladimirescu”**, activează de 8 ani în cadrul competiției internaționale de robotică **FIRST Tech Challenge (FTC)**, având ca obiective promovarea învățării integrate STEAM (Science, Technology, Engineering, Arts and Mathematics), dezvoltarea lucrului în echipă și cultivarea abilităților tehnice și non-tehnice în rândul tinerilor. **FIRST Tech Challenge** este o competiție internațională de robotică în care elevii din clasele VII–XII proiectează, construiesc și programează roboți pentru a concura în alianțe. România s-a remarcat la nivel global prin nivelul ridicat al competiției și rezultatele excepționale ale echipelor sale. De-a lungul anilor, **TEA-BORGS** s-a evidențiat prin performanțe notabile, obținând premii de prestigiu la competiții naționale și internaționale:

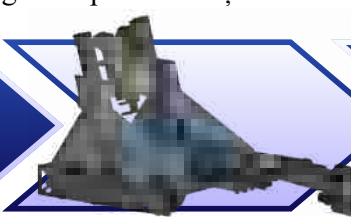
- **Inspire Award** – acordat echipei care excelează atât pe teren, cât și în afara lui, prin caietul tehnic, design și impact în comunitate;
- **Connect Award** – pentru construirea de conexiuni autentice și învățarea de la profesioniști;
- **Motivate Award** – pentru împărtășirea experiențelor tehnice și non-tehnice;
- **Think Award** – pentru documentarea riguroasă a procesului ingineresc;
- **Design Award** – pentru robustețea și performanța soluțiilor de design;
- **Winning Alliance Captain** – prin care a reușit să câștige Campionatul Național.



Iterația 1 Robot 2024-2025



Iterația 2 Robot 2024-2025



Iterația 3 Robot 2024-2025



Iterația Finală Robot 2024-2025

Grație acestei experiențe, echipa s-a calificat la trei Olimpiade Internaționale de Robotică:

- **FIRST World Championship din Houston (SUA)**, prin titlul de **Campion Național** și **Winning Alliance Captain**;
- **FIRST Global Challenge, din Geneva**, unde a primit recunoașterea „**New Technology Experience**”;
- **FIRST World Championship din Houston (SUA)**, prin titlul de **Dean’s List Finalist**.



Dincolo de competiții, TEA-BORGS se implică activ în proiecte educaționale și sociale cu impact major: **EDUPOWER** (premiat din 150 de proiecte la Gala Elevului Reprezentant, primind titlul „**Inițiativa anului pentru mediul rural**”), **Autism Understanding Through Outreach** (în parteneriat cu Freeland Foundation din Michigan, unde echipa este Ambasador și coordonator european), precum și inițiative precum Girl Up, FTC News sau GorjTechLab.

Astfel, **TEA-BORGS** nu este doar o echipă de robotică, ci o comunitate de tineri care construiesc viitorul prin tehnologie, educație și implicare socială, inspirând generațiile următoare să îmbrățișeze inovația și colaborarea.

Contact: teaborgs26@gmail.com

ADAPTIVE SYSTEM DESIGNED TO ENSURE ELECTRIC POWER QUALITY IN LOW VOLTAGE NETWORKS

B

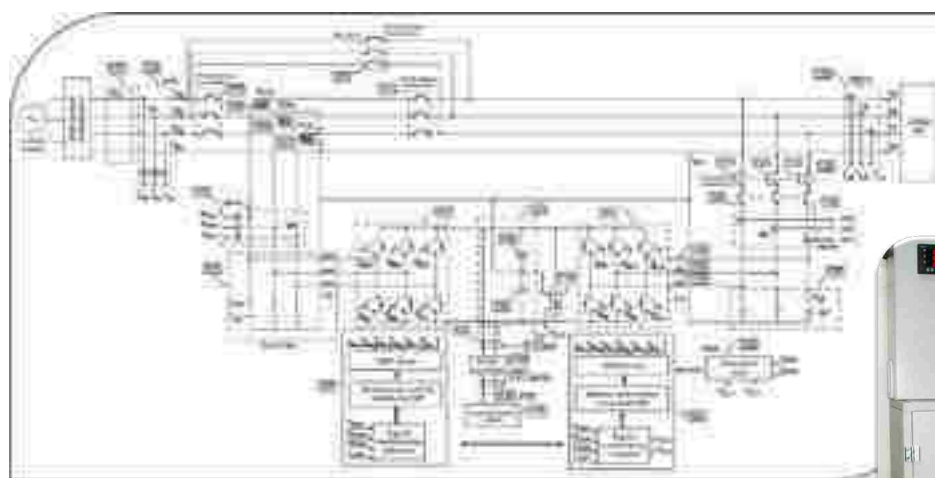
Patent/project number: RO 132402/28.08.2020 OSIM București

Author/s: Sacerdoțianu Dumitru, Nicola Marcel - ICMET Craiova; Ivanov Sergiu, Ciontu Marian - University of Craiova; Chindriș Mircea Dorin, Cziker Andrei Cristinel - Technical University of Cluj-Napoca; Radu Alexandru, Dumitrescu Camil-Sorin - S.C. INDAELTRAC S.A. Craiova

Description: The adaptive system for electric power quality in low voltage networks, according to the invention, consists of an active filter, connected in parallel with the electrical network and with the load and an active filter connected in series with the electrical network.

The following advantages are obtained by applying the invention:

- During the entire time of operation, and at any point of location of the adaptive system, the supply voltage values are in the range of $U_n \pm 10\%$, considering $U_n = 230V$ A.C.;
- It provides the compensation of the supply voltage unbalance so that during the entire time of operation, and at any point of location of the adaptive system, the values of the negative unbalance factor of the supply voltage system will be limited to 2%;
- It provides the limitation of the actual values of each individual voltage harmonic at the values stipulated by the regulatory documents and of the total supply voltage distortion value (including all the harmonics up to 40th order) at 8%;
- It provides the compensation of the single-phase dips with 70% amplitude and 180 ms duration and of the three-phase dips with 50% amplitude and the 90 ms duration;
- It provides the limitation of the actual values of each individual current harmonic at 5%.



Architecture of the adaptive system



Functional model

- a) Overview of the system; b) Overview of the measurement and control modules;
c) Overview of power circuits

MONITORING METHOD AND SYSTEM FOR THE SAG OF OVERHEAD POWER TRANSMISSION LINES CONDUCTORS

B

Patent/project number: RO 133444/30.12.2020 OSIM București

**Author/s: Sacerdoțianu Dumitru, Nicola Marcel, Vintila Adrian, Nicola Claudiu, Hurezeanu Iulian, Lazarescu Florica - ICMET Craiova;
Popescu Paul - University of Craiova - Faculty of Mathematics;
Purcaru Ion, Albița Anca - S.C. VIG S.A. Craiova**

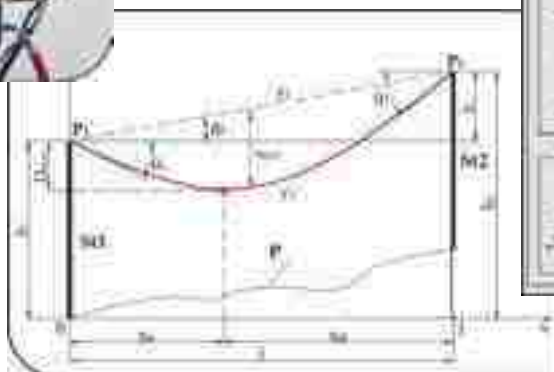
Description: The invention refers to a method and a system for the continuous, monitoring of the sag of high-voltage overhead power lines in the electric, power transmission and distribution systems. The method, according to the invention, consists in the acquisition of data from the acquisition modules located at the potential of the line conductor, by using the tilt sensors of the line conductor, and these data are used for the calculation of the conductor sag, according to a generally valid method for all types of conductors.

The system, according to the invention, consists of two acquisition modules located on a section of the high voltage overhead power line conductor, which include the tilt sensors of the line conductor, power supply sources, a WiFi module for communication with a local data acquisition and remote transmission unit, powered by an independent source, a communication module and a system for calculating the sag of the electric conductor.

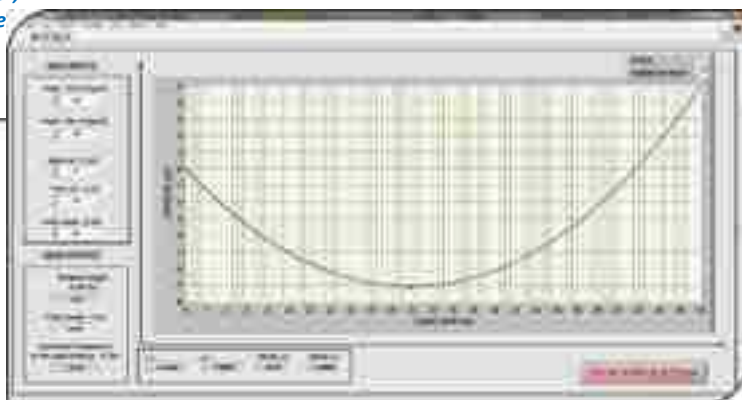
In terms of the sag calculation method, starting from the inclinometers output it can be accurately determined by using the catenary equation, the information from the inclinometers output and the distance between two successive poles. All this is the result of the understanding the fact that the shape of a conductor stretching a section between two points is approximated by using the catenary equation. For the general cases including uneven heights of suspension points and rugged ground as well as plane ground, the maximum sag is calculated according to the relationship.



Mini-test bench for the method
1 - Inclinometer; 2 - Support of inclinometer;
3 - Local display mode of the tilt with the output connected to a computer



Representation of the operands for a section of the power line for rugged ground



Software interface

PREDICTIVE METHOD AND SYSTEM FOR DETERMINING THE OPERATING CONDITION IN BIG-BLASTER AIR CANNONS AND MICRO-CANNONS

European patent application: No.23464004.3-1001/13.03.2023

National patent application: Nr.a/2022 00818/16.12.2022

Authors: Teisanu Florin, Chelan Constantin, Butoi Marinela, Patru Ion, Iordache Ioan, Nicola Claudiu, Nicola Marcel

Description

According to the invention, the diagnosis system (fig.1) is composed of a source (100) of compressed air, an electropneumatic module (200) specific to the application for preparing the compressed air and ensuring the command for loading-waiting-firing the pneumatic cannon, a system computer (300), which includes a dynamic pressure sensor (301) mounted in a threaded connection of the air gun reservoir, an analog-digital data acquisition board (303), an industrial PC computer (304) running a software with graphical interface for acquisitions and automatic pressure signal analysis, as well as a printer (305) for automatic generation of Word-type reports.

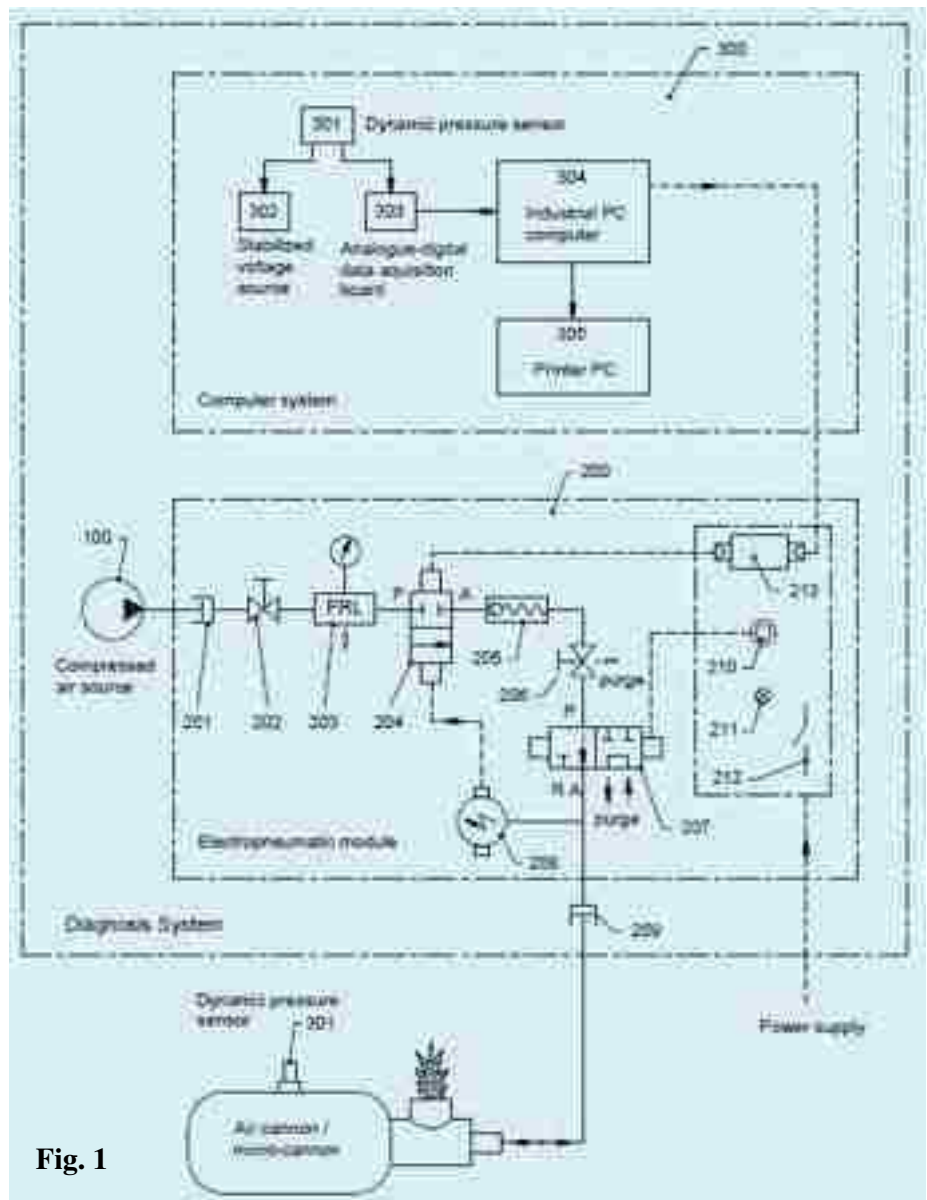


Fig. 1

From Elements to Wisdom – The Table that Inspires

B

Patent number: 8211

Authors: GÎNCU Eugenia, BLUDARU Viorica, COROPCEANU Eduard,
CIORNÎI Emiliana, INDOITU Irina

“Ion CREANGĂ” State Pedagogical University of Chisinau, Republic of Moldova
Public High School Institution of “Mihai Eminescu”

Description

The *Interactive Digital Periodic Table* is an innovative educational engineering project that reimagines the way chemistry is taught and learned. It transforms the traditional static periodic table into a dynamic, technology-driven platform that allows students to explore the world of chemical elements through light, motion, and interactivity.

Combining hardware engineering with digital design, the system integrates a microcontroller a synchronized online interface that visually represents chemical groups, periods, and reactions. Each interaction provides immediate access to verified chemical information, real-time simulations, and engaging visualizations, turning complex chemical concepts into accessible and enjoyable learning experiences.

The project seeks to make chemistry not only easier to comprehend but also deeply engaging and visually intuitive. By allowing students to “see” and “experience” the logic of the periodic table, it bridges the gap between abstract theory and real-world understanding. Teachers can use the system as a live demonstration tool, while students gain autonomy in exploring properties, bonding, and reactions through hands-on interaction.

By the end of 2025, the *Interactive Digital Periodic Table* aims to be implemented in at least ten model schools, serving as a foundation for national expansion. Within the first year, a fully functional prototype – featuring no fewer than five real-time simulations – will be developed, tested, and refined based on feedback from both students and educators. The system will be linked to a real-time database to ensure over 95% accuracy and reliability of chemical data.

Over the following two years, the project seeks to establish partnerships with educational institutions, investors, and government authorities to scale production and integrate the tool into science curricula nationwide. This initiative targets a 40% reduction in dependence on static learning materials and aims to ensure digital accessibility for 80% of students in participating schools. Furthermore, 100 teachers will be trained to effectively implement the system in classrooms, benefiting over 1,000 students directly and countless others indirectly.

Preliminary trials have already demonstrated the project’s effectiveness. Students using the *Interactive Digital Periodic Table* performed 25–30% better than those using traditional tables, showing increased motivation, improved understanding, and reduced stress during learning sessions. Teachers also reported a higher level of engagement and participation, confirming the project’s strong potential to transform educational practices in STEM fields.

Ultimately, the *Interactive Digital Periodic Table* represents a step forward in merging engineering innovation with education. It embodies the idea that learning science should not only be informative but also interactive, immersive, and inspiring – a true fusion of knowledge, creativity, and technology.

Pictures & graphics



Contact: Bludaru Viorica – 069962641 – vicarusul@gmail.com

Ciornîi Emiliana – 067351469 ciorniifelicia@gmail.com

High Frequency Rotary Transformer

Patent number: RO137480A0

**Authors: Adrian Vintilă; Andrei Marinescu;
Petre Pistol; Marcel Nicola; Claudiu Nicola**

B

Description

The invention relates to a high-frequency rotary transformer having a fixed primary winding and a rotating secondary winding mounted on a shaft and capable of concentric rotational movement with respect to the stationary primary winding. This system is used for the transmission of electrical power at high speeds through a rotary coupling without galvanic contact.

Due to the requirements regarding the small space, in the axial direction, for the installation of an inductive rotary coupler in the case of supplying the rotor winding of a synchronous motor and a efficient energy transmissions, it is necessary to develop a system that meets these requirements.

According to the invention, in order to reduce the installation space in the axial direction and to make transmitters and receivers of different sizes adapted to the power needed to be transmitted, the pieces that form the core of the transformer are designed as two superimposed parts with a U profile.

Figure 1 shows a rotary transformer, according to the invention. The rotary transformer consists of a fixed transmitter (A) and a rotating receiver (B).

Figure 2 shows a section through the magnetic circuit of the rotary transformer, according to the invention.

Figure 3 shows a fixed transmitter, according to the invention. The fixed emitter (A) consists of several U-shaped ferromagnetic unitary elements (1), mounted in a support (2), a primary winding (3) inserted in a support (4) of the primary winding, a cover (5) of axial locking of the ferromagnetic unitary elements (1).

Figure 4 shows a rotary receiver, according to the invention. The rotary receiver consists of several U-shaped ferromagnetic unitary elements (1) mounted in a support (6), a secondary winding (7) inserted in a support (8), an axial locking cover (9) and radial of the ferromagnetic elements (1).

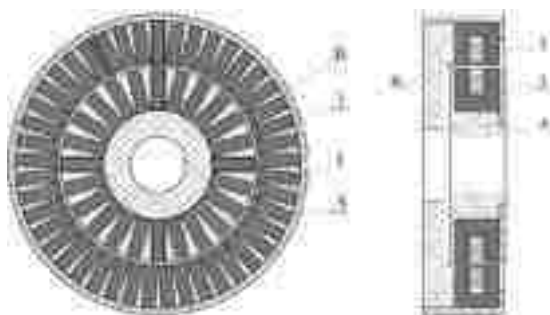


Figure 1

Figure 2

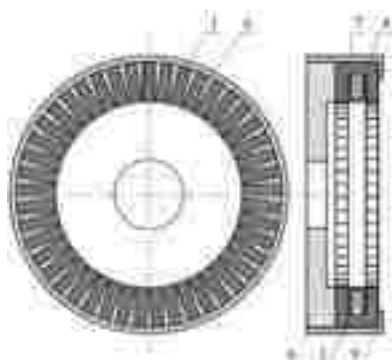


Figure 3

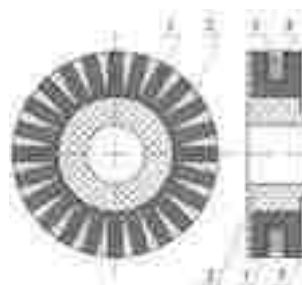


Figure 4

COMPRESSED AIR COOLING DEVICE

B

Patent number: RO Nr. 131145 / 29.11.2022

Authors: Teişanu Florin, Chelan Constantin, Duţă Marian, Pătru Ion

Description

The device is based on the thermodynamic principle of expanding compressed air, dividing it into a number of jets and generating a cold spray in the whirling chamber (Fig.1).

According to the invention, the compressed air cooling device (fig.1) consists of a body (9.1) which includes a multijet injector (9.2) inside, having an axial swirl chamber provided with holes arranged tangentially and equidistantly, nozzle type, on the front surface the injector (9.2) has a sealing gasket (9.4) pressed onto it, over which a cover (9.3) is threaded, provided with a conical central hole, characterized by the fact that: the respective body (9.1) has a non-perforated hole on the longitudinal axis, which presents a smooth portion and a threaded portion, and a second radial hole that communicates with the first, where the injector (9.2), gasket (9.4) and cover (9.3) are assembled.

The compressed air cooling system (Fig.2) consists of a filter (1) for purifying the air sucked from the atmosphere, a filter (2) for purifying the air sucked from inside the room, a 2/2 distributor (3), a source of compressed air (4), an air-to-air heat exchanger (5), a microfilter (6) for purifying the air contaminated in the compression process, a manometer (7), a pressure valve (8) that opens when the pressure in the circuit reaches a preset value in the range of 2.5-4 bar, a pneumatic cooling device (9) which by expansion in the centrifugal field produces cold air, a sound absorber (10), an air diffuser (11) for spreading cold air in the room, a pneumatic valve (12) for depressurizing the room, a microprocessor control module (13).

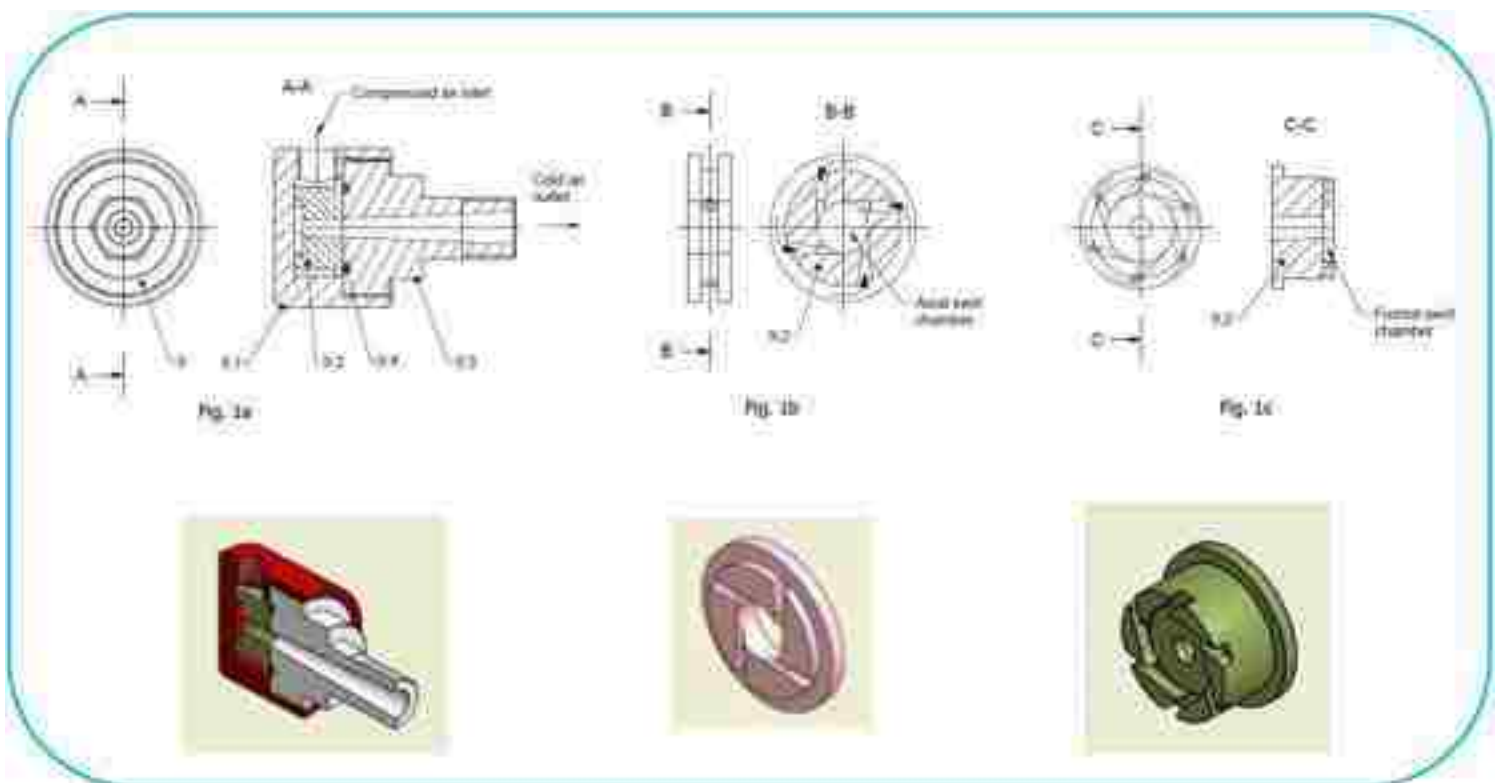
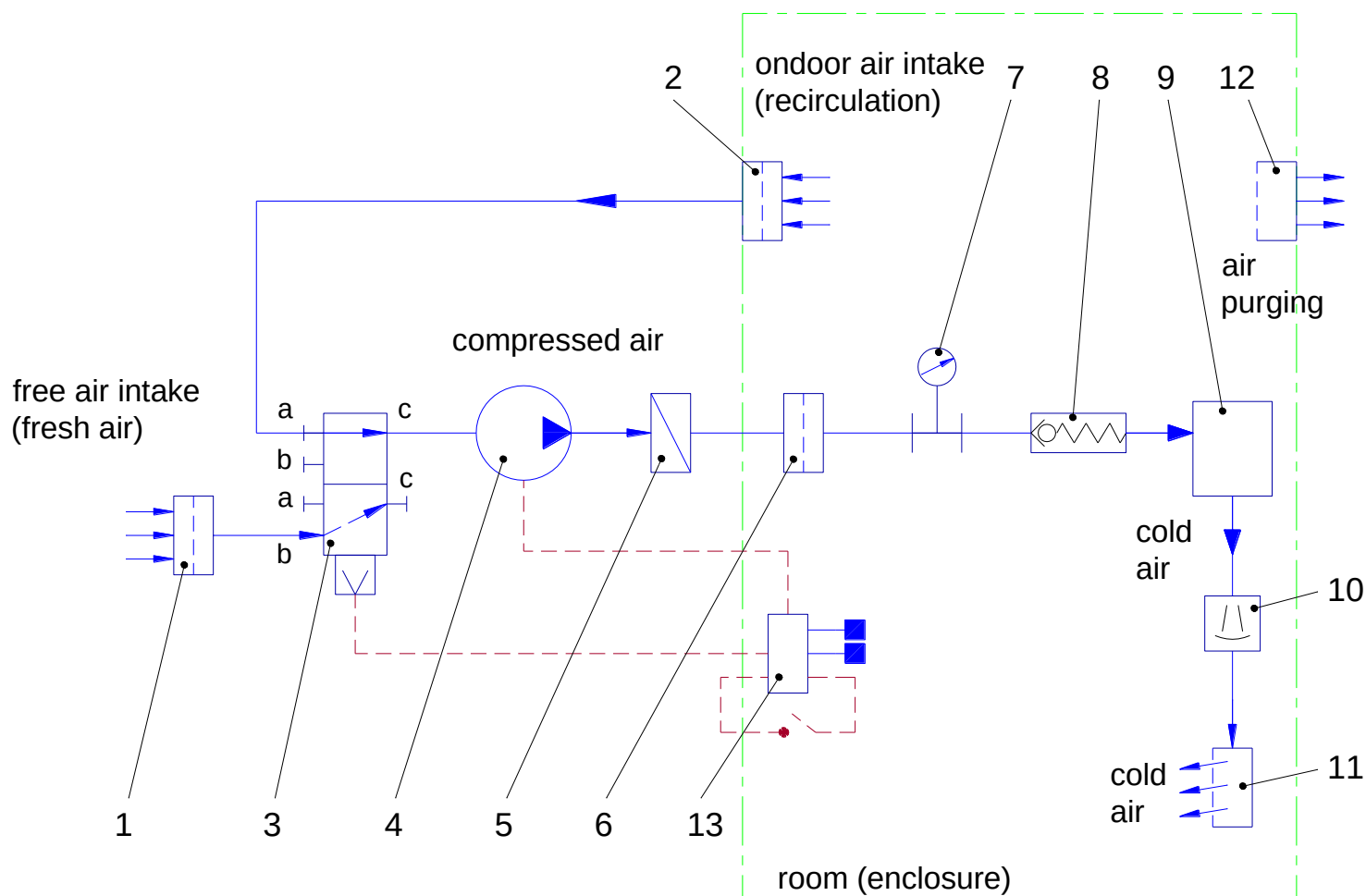


Fig. 1



FIELD OF APPLICABILITY / MARKET READINESS

- The device is intended for air conditioning, ventilation and ensuring thermal and physiological comfort conditions inside rooms such as: living space, work space, technological space, the passenger compartment of the vehicle or thermal conditioning in technological processes.
- TRL4 - Tehnology validated in laboratory .

ADVANTAGES OFFERED

The invention brings the following advantages:

- Transforms the entire amount of compressed air into cold air;
- It works without moving parts;
- Compared to the cooling installations by linear expansion in the Laval nozzle, the multiple expansion in the centrifugal field (swirling) generates a noise of reduced intensity;
- Recirculates the air in the passenger compartment to introduce fresh air into the passenger compartment and eliminate stale air;
- Promotes an ecological technology for the environment by the fact that it does not use freons
- It works in automatic cycles.



MONITORING METHOD AND SYSTEM FOR THE SAG OF OVERHEAD POWER TRANSMISSION LINES CONDUCTORS

B

Patent/project number: RO 133444/30.12.2020 OSIM București

**Author/s: Sacerdoțianu Dumitru, Nicola Marcel, Vintila Adrian, Nicola Claudiu, Hurezeanu Iulian, Lazarescu Florica - ICMET Craiova;
Popescu Paul - University of Craiova - Faculty of Mathematics;
Purcaru Ion, Albița Anca - S.C. VIG S.A. Craiova**

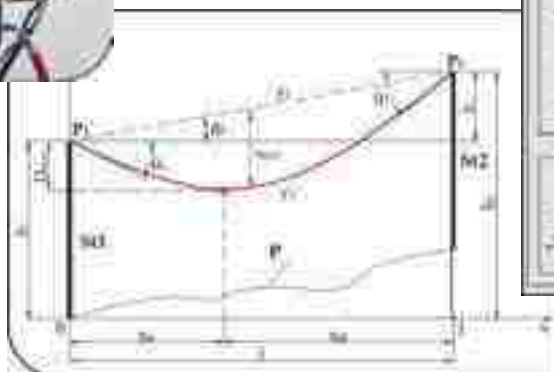
Description: The invention refers to a method and a system for the continuous, monitoring of the sag of high-voltage overhead power lines in the electric, power transmission and distribution systems. The method, according to the invention, consists in the acquisition of data from the acquisition modules located at the potential of the line conductor, by using the tilt sensors of the line conductor, and these data are used for the calculation of the conductor sag, according to a generally valid method for all types of conductors.

The system, according to the invention, consists of two acquisition modules located on a section of the high voltage overhead power line conductor, which include the tilt sensors of the line conductor, power supply sources, a WiFi module for communication with a local data acquisition and remote transmission unit, powered by an independent source, a communication module and a system for calculating the sag of the electric conductor.

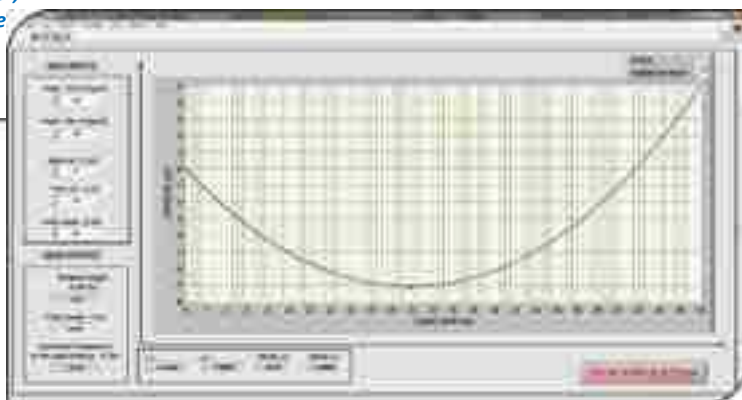
In terms of the sag calculation method, starting from the inclinometers output it can be accurately determined by using the catenary equation, the information from the inclinometers output and the distance between two successive poles. All this is the result of the understanding the fact that the shape of a conductor stretching a section between two points is approximated by using the catenary equation. For the general cases including uneven heights of suspension points and rugged ground as well as plane ground, the maximum sag is calculated according to the relationship.



Mini-test bench for the method
1 - Inclinometer; 2 - Support of inclinometer;
3 - Local display mode of the tilt with the output connected to a computer



Representation of the operands for a section of the power line for rugged ground



Software interface

The Smart Emergency Helmet

Patent Application – 3126 / 08.09.2025

Author/s: GÎNCU Eudochia, BLUDARU Viorica, COROPCEANU
Eduard, BOBEICO Svetlana, MUNTEAN Adelina

B

“Ion CREANGĂ” State Pedagogical University of Chisinau, Republic of Moldova
Public High School Institution of “Mihai Eminescu”

Description

The smart helmet represents an innovative solution, designed to combine the classical protective function with advanced detection and alert systems, thereby enhancing effectiveness in the prevention and management of critical situations. The project aims to develop a smart helmet that provides advanced protection and user comfort by integrating smart functionalities for trauma prevention and real-time monitoring of the user's condition.

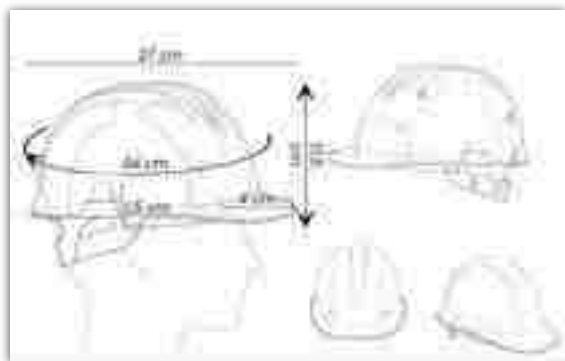
Additionally, the innovation seeks to be widely promoted and implemented by highlighting its benefits to investors and the public, thereby contributing to increased personal safety, work efficiency, and overall well-being.

The methods employed in the research and product development comprised a set of successive stages. The process began with the observation and identification of real safety issues, such as the risk of falls, accidents during cycling or riding electric scooters, as well as incidents occurring in hazardous work environments (construction sites, factories, and industrial plants).

Subsequently, documentation was conducted through the study of scientific literature and media sources, which provided relevant information on the increasing incidence of head injuries and the limitations of conventional protective equipment. Based on the analysis of existing solutions, a prototype was built. The smart system was integrated using electronic components and then tested. Final trials demonstrated its core functions: accident detection, visual signaling, and automatic SOS transmission with exact location.

The smart helmet demonstrates its efficiency through a rapid response time and a reliable detection mechanism. Its design emphasizes ease of use, ensuring accessibility for a wide range of users, from children to professionals in high-risk environments. Moreover, by integrating real-time monitoring and automated alert systems, the device provides an additional layer of protection and timely support in critical situations, contributing significantly to the enhancement of personal safety.

Pictures & graphics



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Student coordinator: Bobeico Svetlana – 062081488 – svetlana.bobeico27@gmail.com

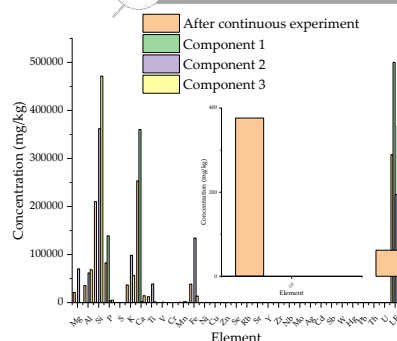
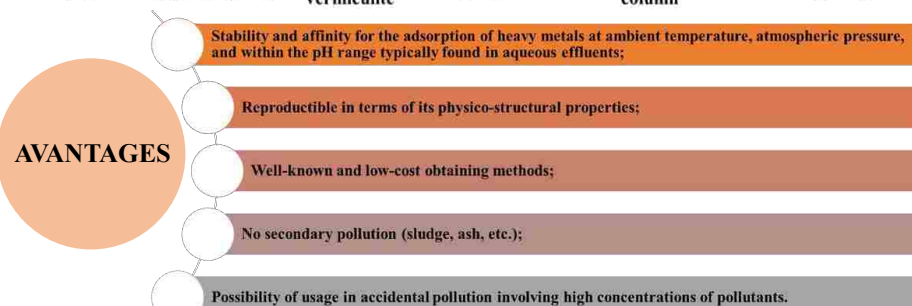
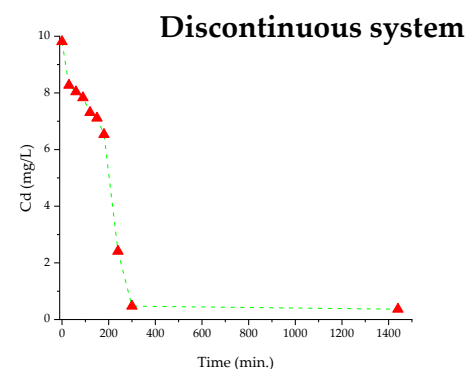
COMPOSITE BASED ON RAW MATERIALS OF NATURAL ORIGIN FOR THE ADSORPTION OF HEAVY METALS AND METHOD OF OBTAINING IT

Patent application No. 00334/2025

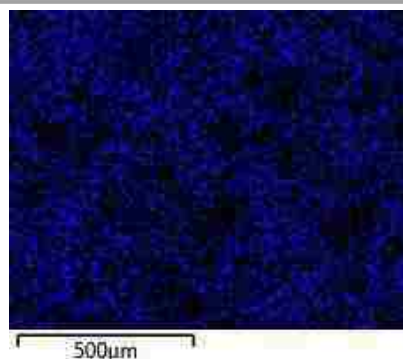
B

Radu Claudiu FIERASCU, Irina FIERASCU, Toma FISTOS, Anda Maria BAROI, Ioana Silvia HOSU, Roxana Ioana MATEI, Irina-Elena CHICAN

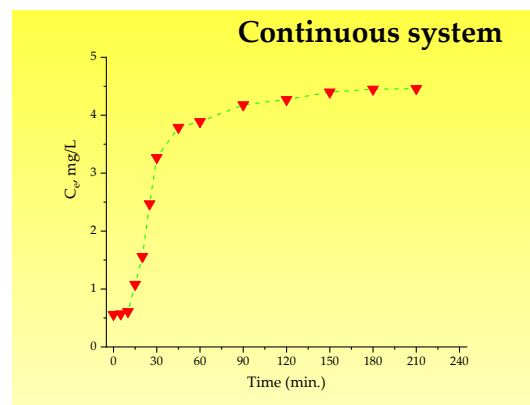
The present invention relates to a composite material and a method for obtaining it, intended for the removal of heavy metals from aqueous environments, particularly at low concentrations and under real usage conditions. The invention falls within the field of contaminated water treatment and environmental protection, addressing a pressing need for efficient, sustainable, and environmentally friendly solutions for water depollution. The proposed material consists of an active layer obtained by combining natural-origin materials – hydroxyapatite, vermiculite, and perlite – each contributing specific functional properties to the overall performance of the adsorption system. Through the synergy of these natural components, the resulting material exhibits superior efficiency in removing heavy metals under real contamination conditions (variable pH, presence of other competing ions, ambient temperature, etc.). The method of obtaining the material consists of four steps, is simple, scalable, and does not involve costly synthesis processes, making it suitable for industrial and/or municipal applications.



Elemental composition (XRF) of composite after continuous experiment vs. individual components.



Cd adsorption on the material – EDX data.



Cd adsorption studies on the composite material in discontinuous vs. continuous system.

ACKNOWLEDGEMENTS

The authors gratefully acknowledge the support of the Ministry of Research, Innovation and Digitization (Ministry of Education and Research, National Authority for Research) through the PN 23.06 Core Program – ChemNewDeal, project no. PN 23.06.01.01 – AquaMat, within PN IV.

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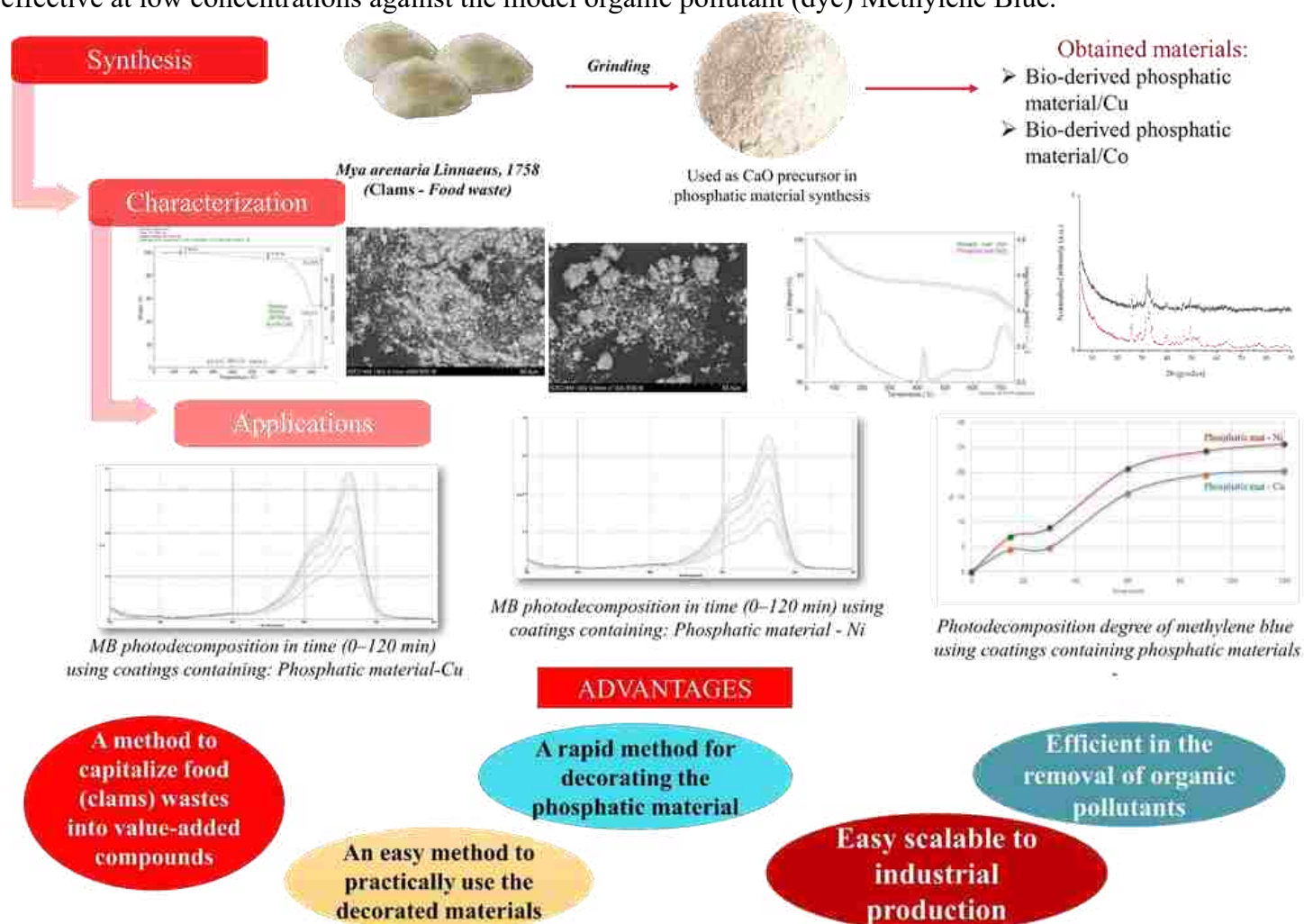
COMPOSITE MATERIAL FOR ORGANIC POLLUTANTS REMOVAL USING MATERIALS BASED ON FOOD WASTE AND PROCEDURE FOR OBTAINING IT

B

Patent application No. 00673/2024

Roxana Ioana BRAZDIS (MATEI), Irina FIERASCU, Toma FISTOS, Anda Maria BAROI, Ioana Silvia HOSU, Radu Claudiu FIERASCU, Valentin RADITOIU, Monica Florentina RADULY, Maria GRAPIN

The present invention refers to a material and procedure for the removal of organic pollutants. The procedure is based on the use of a phosphatic material (obtained from the valorization of food wastes-shells of *Mya arenaria* Linnaeus, 1758 - the most encountered edible clam on the Black Sea shore), decorated with metallic oxides (Cu or Ni) developed using a rapid approach, further formulated as an active coating. The material proved to be effective at low concentrations against the model organic pollutant (dye) Methylene Blue.



ACKNOWLEDGEMENTS

The authors gratefully acknowledge the support of the Ministry of Research, Innovation and Digitization 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.

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HYBRID SOLAR SYSTEM WITH AUTOMATIC ADJUSTMENT

B

Patent Application Number: A 2024 00274

*Visarion-Cătălin IFRIM, Ciprian BEJENAR, Constantin UNGUREANU, Laurențiu-Dan MILICI,
Pavel ATĂNĂSOAE*

Hybrid solar system with automatic adjustment, according to the invention, features an assembly consisting of solar panels intended for the production of electricity and heat, joined through thermo mechanical actuators and elastic parts, which is why, the system supports the adaptive modification of the shape and operating regime, without external intervention, so that, in summer the production of electrical energy is facilitated, in winter the production of thermal energy is facilitated, and in spring and autumn it allows the simultaneous production of electricity and heat.

Advantages:

- The system introduces new possibilities for the hybrid production of electricity and/or heat, respectively, for adjusting the operating regime of solar systems, due to the nature of its dynamic construction;
- The system covers the various needs of supplying electricity and/or heating, through its constructive form, because it alternately exploits the solar panels intended for the production of electrical energy;
- The system avoids overheating of solar panels intended for the production of thermal energy, because it is driven automatically, and the control process is autonomous, which does not require additional energy;
- The system features actuation elements that do not require special maintenance.



SYSTEM FOR SAVING LOW-BEAM LIGHT SOURCES AND METHOD FOR ADJUSTMENT

B

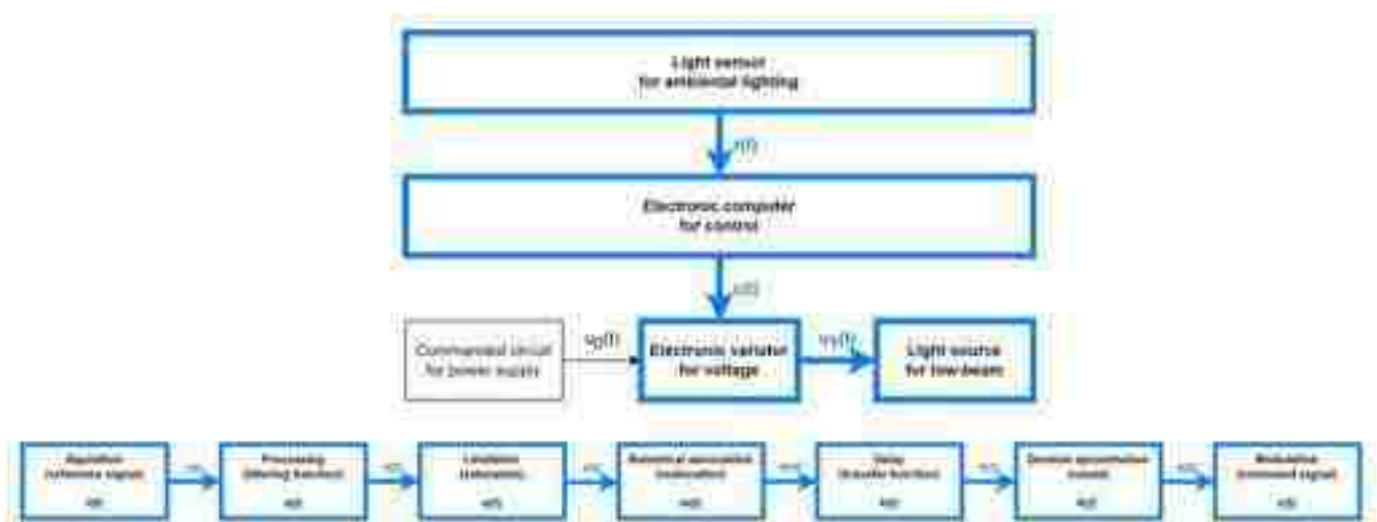
Patent Application Number: A 2024 00331

Gheorghiță-Stelian MIHĂILESCU, Ciprian BEJENAR, Laurențiu-Dan MILICI, Ștefan-Bogdan DULGHERU, Radu-Dumitru PENTIUC, Pavel ATĂNĂSOAE

System for saving low-beam light sources and method for adjustment, according to the invention, features the completion of the electrical circuit for powering adjustable low-beam lamps, so that it allows for fine and precise limitation of the electrical power supply depending on the external light, to extend the life of existing light sources and eliminate daytime running lights, while ensuring maximum visibility among traffic participants, in any driving condition that requires the use of the lowbeam of equipped vehicles.

Advantages:

- The system and method introduce new possibilities for increasing the lifespan of vehicle lamps dedicated to low-beam, in the presence of outdoor ambiental light;
- The system and method are adjacent to the electrical circuits and low-beam light sources already existing in the vehicle equipment, saving of electrical energy and/or fuel of vehicles, because it reduces the electrical power consumed by the powered light sources;
- The system and method ensure maximum visibility among traffic participants, because it does not perceptibly alter the luminous flux emitted by the affected light sources, ensuring a constant level of runway illumination, under variable external ambiental light conditions.



METHOD AND SYSTEM FOR INCREASING HEATING POWER

Patent Application Number: A 2025 00092

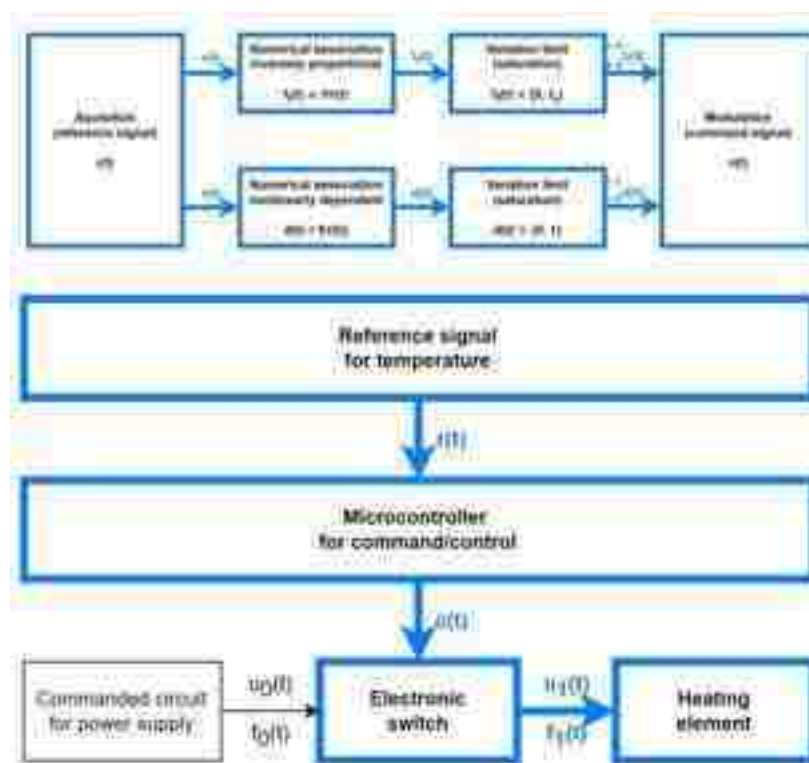
Ciprian BEJENAR, Marian BEJENAR, Andrei-Dumitru NAȘCU, Daniel HRIȚCAN, Vasile-Eusebiu TOADER, Laurențiu-Dan MILICI

B

Method and system for increasing heating power, according to the invention, features a strategy and a digital command/control path, of the direct current passed through non-ideal heating elements, of the resistive-inductive (RL) type, based on a pulse modulation technique, to modify the effective value of the electric current without varying the amplitude of the electric voltage, which improves the regulation linearity of the systems that implement it.

Advantages:

- The method and system introduce new digital command/control possibilities for increasing the heating power of non-ideal heating elements;
- The method and system do not require any additional electrical equipment/electronic conversion devices, or other electrical heaters and/or switching devices than those available;
- The method and system allow the modification of the effective value of the electric current without varying the amplitude of supply electric voltage;
- Method and system improve power regulation linearity of non-ideal direct current electric heaters.



Integrated system for monitoring, analyzing, and diagnosing overhead power lines (OPL) with a view to increasing energy efficiency in electricity transmission and distribution

B

Project number: SMLEA SEE TDEE acronym - 156460 SMIS code

PROJECT TITLE: Integrated system for monitoring, analyzing, and diagnosing overhead power lines (OPL) with a view to increasing energy efficiency in electricity transmission and distribution - SMLEA SEE TDEE acronym - 156460 SMIS code

Funded under the

COMPETITIVENESS OPERATIONAL PROGRAMME

Total Budget 1,325,370 EUR, of which:

ERDF	880,000 EUR
State Budget	155,293 EUR
Private Contribution	290,077 EUR

Project type: Innovative technology project

Partners: SC SIMTECH INTERNATIONAL SRL - Project Leader
ICMET CRAIOVA – Partner Project

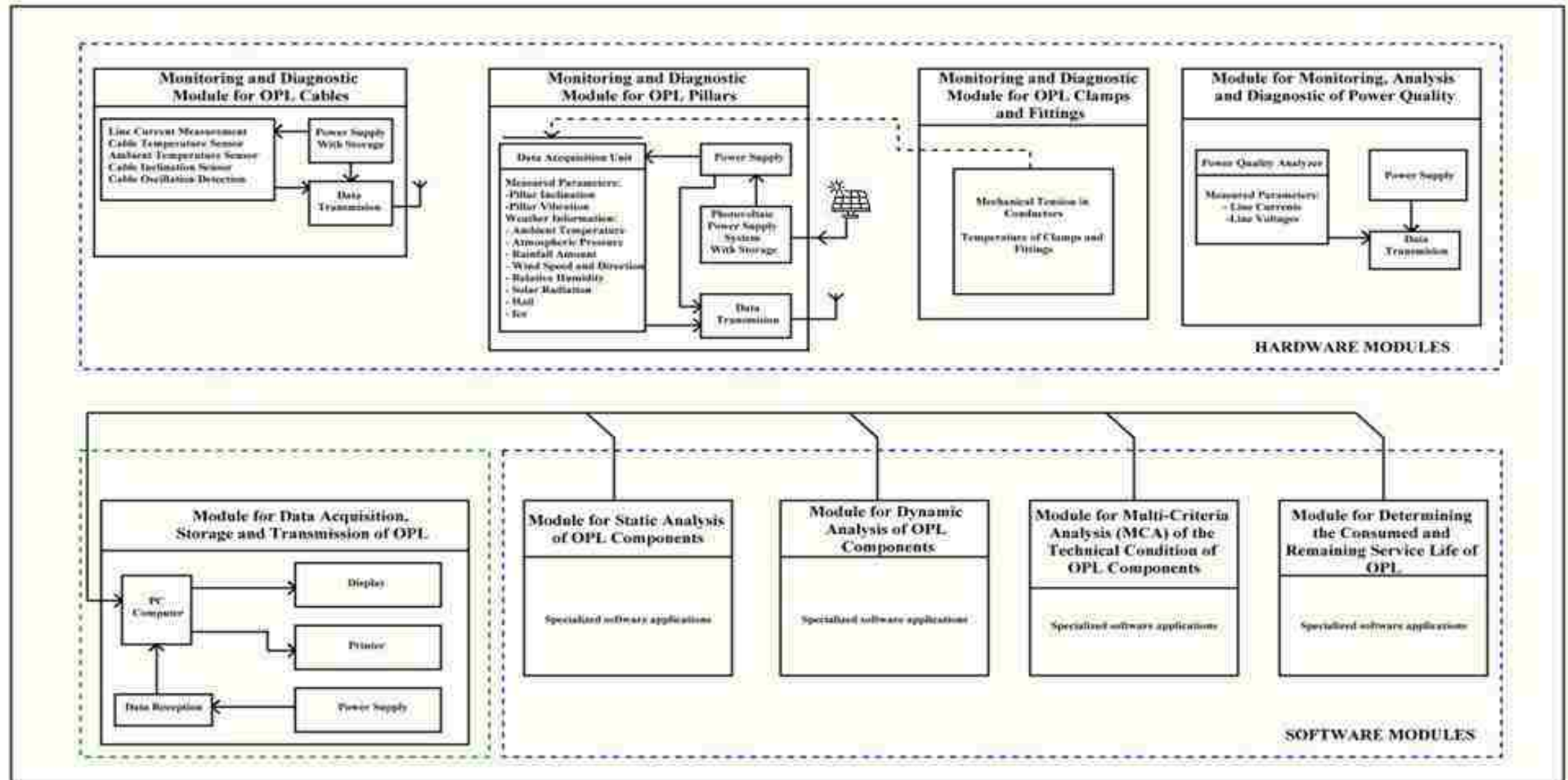
Project Result:

SMLEA SEE TDEE - An integrated system of hardware and software components that provides real-time monitoring of overhead power lines and electric energy quality, as well as multi-criteria diagnosis of OPL component status.

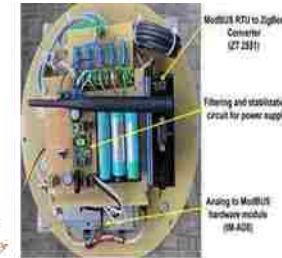
The integrated system configuration is modular and can be adapted to the needs and requirements of the beneficiary.

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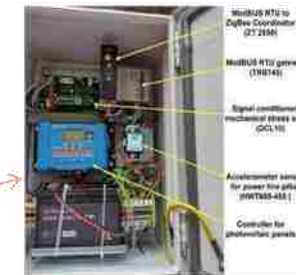
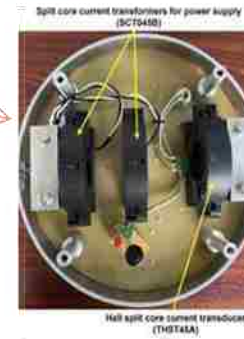
Hardware & Software Architecture of SMLEA SEE TDEE



ONLINE MONITORING
MODULE FOR
OPL CABLE



MECHANICAL STRESS
SENSOR DCL10



ONLINE MONITORING
MODULE FOR
FITTINGS AND CLAMPS



ONLINE MONITORING
MODULE FOR
OPL PILLAR



ONLINE MONITORING MODULE FOR OPL CABLE
-product assembly and cross-section-



Note: Overall dimensions: $\varnothing$ 324 mm; H=270 mm; Net weight approximately 13 kg

Contact: market@icmet.ro

RESEARCH OF DIFFERENT TYPES OF INDUSTRIAL WASTE APPLIED FOR COBALT AND CADMIUM IONS REMOVAL FROM WASTEWATER

B

Patent/project number: PTE 59/2025

Sorin Ionescu, Maria Râpă, Letiția Ghimiși, Cristina Ileana Covaliu-Mierlă

In this research, the removal of cadmium and cobalt ions from wastewater was investigated, through the adsorption process, using adsorbent materials industrial waste. The heavy metal ions, such as cobalt and cadmium ions, must be removed from water because they have various toxic effects on human health, for example cardiovascular toxicity, hepatotoxicity, carcinogenicity, nephrotoxicity, neurotoxicity and immunological toxicity. By comparison, cadmium ions have a negative impact on the nervous system, skin, reproductive system, kidneys, lungs, and cobalt ions affect the cardiovascular, immunological and hematological systems (Figure 1).

Blast furnace slag, walnut shells, hazelnut shells and sawdust (Figure 2) were used as adsorbent materials. The materials were used in different quantities, namely 10 mg, 25 mg and 50 mg.



Figure 2. (a) blast furnace slag, (b) walnut shells, (c) hazelnut shells, (d) sawdust

In the case of cobalt ions, the highest efficiency was 52.78% and 49.96% in the case of hazelnut shells, in quantities of 10 mg and 25 mg, and in the case of walnut shells, for the quantity of 25 mg, the efficiency was 48.48% (Figure 4).

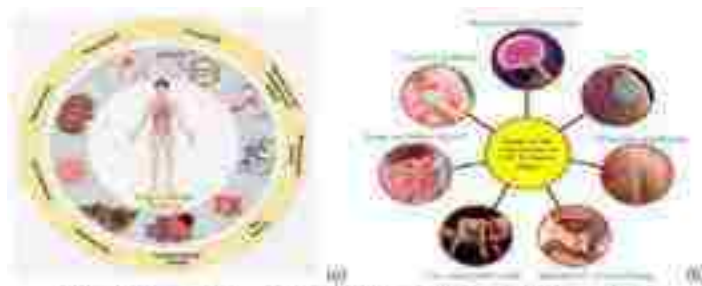


Figure 1. The impact of heavy metal ions (a) and cadmium ions (b) on human health

A high efficiency of cadmium ion removal was observed in the case of hazelnut shells, for the quantity of 10 mg being 90.88%, for 25 mg the removal efficiency was 90.18 % and in the case of walnut shells, the removal efficiency of cadmium ions was 80.50 % for the quantity of 25 mg (Figure 3).

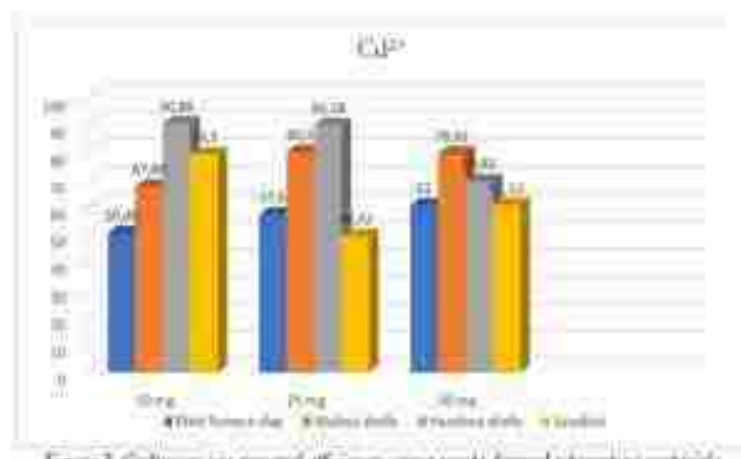


Figure 3. Cadmium ion removal efficiency using waste-derived adsorption materials

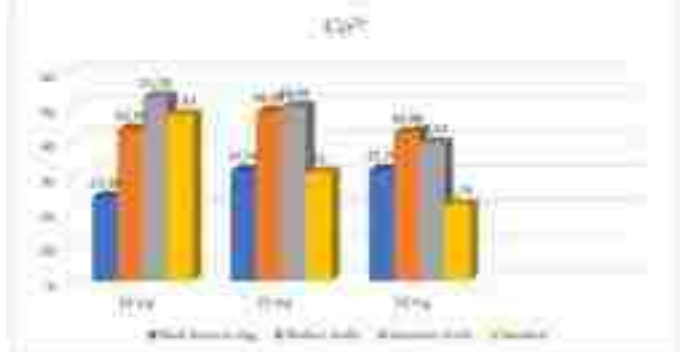


Figure 4. Cobalt ion removal efficiency using waste-derived adsorption materials

The purpose of this research was to discover new alternative adsorbent materials, derived from industrial waste, which can be found in large quantities, cheaply and which have a high potential for removing heavy metal ions, in this case cadmium and cobalt ions, offering a new perspective for waste removal and reuse.

The results confirm the efficiency of removing cadmium and cobalt ions, through the adsorption process, from materials originating from industrial waste (blast furnace slag, walnut shells, hazelnut shells and sawdust), highlighting the adsorption capacity of these adsorbent materials. The study shows the possibility of using waste derived adsorbents and provides the necessary framework for their application in wastewater treatment.

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APPLICATIONS OF THE SPIN COATING METHOD IN IMPLANTOLOGY

Project

Authors: *Mihuț Nicoleta-Maria, Tătar Adina-Milena, Podelean Alina-Larisa*

B

Description: The Spin Coating method is a simple and inexpensive method for depositing thin films on metal surfaces. Thus, using this method, thin films of pure zinc oxide and zinc oxide doped with different cobalt concentrations, consisting of 3 and 5 deposits and heat-treated at 500°C and 600°C, respectively, on a titanium metal substrate, were successfully deposited. Following the characterization of the obtained films, we can say that, regardless of the number of deposits that led to the formation of the thin film, doping ZnO with cobalt leads to a denser microstructure. With increasing dopant concentration, the microstructural density increases and the particle size decreases. Increasing the heat treatment temperature leads to an increase in particle size. It was observed that the particle size increases with the increase in the number of deposits that led to the formation of the thin film.

Also, from a microstructural point of view, the wurtzite structure of zinc oxide was highlighted, noting that the introduction of cobalt does not determine the formation of other mineralogical phases. Cobalt ions distort the structure of zinc oxide but do not destroy it.

Biological tests have shown that the deposition of zinc oxide films leads to increased antimicrobial activity against colonization and biofilm formation, cobalt doping not affecting the antimicrobial activity of ZnO. An increase in hydrophilicity was observed in relation to the increase in the concentration of dopant used. This was also supported by the MTT test which showed that cell proliferation increases visibly after 72 hours compared to the ethanol used.

Thus, we can say that the deposition of thin films of zinc oxide doped with cobalt can improve the antimicrobial properties of the substrate on which it is deposited. This makes this method a good alternative for increasing the antimicrobial activity of metallic materials used in implantology.

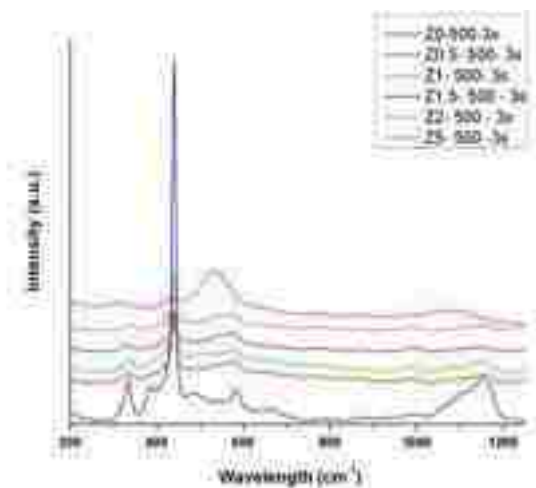


Fig.1. Raman spectra

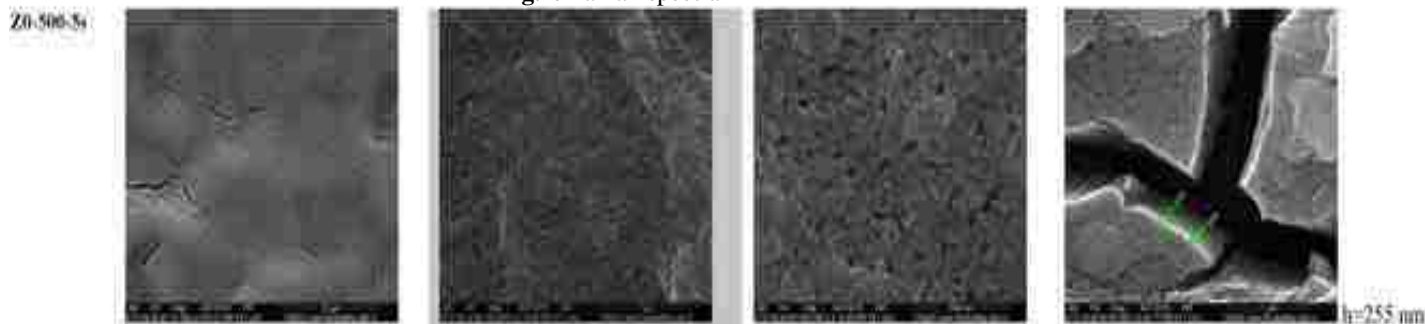


Fig. 2. Scanning electron microscopy images for thin films resulting from spin-coating deposition, namely five depositions, and heat treated at 500°C, 2-hour stage.

AI-Driven Supply Chain Optimization: Revolutionizing Sustainable Logistics and Operations in the UAE

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SUPERVISOR NAME: Dr. Neyara Radwan

Industrial Management Dept., Liwa College, Abu Dhabi, UAE
& Mechanical Dept., Faculty of Engineering, SCU, Egypt

B

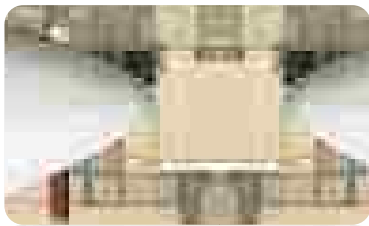
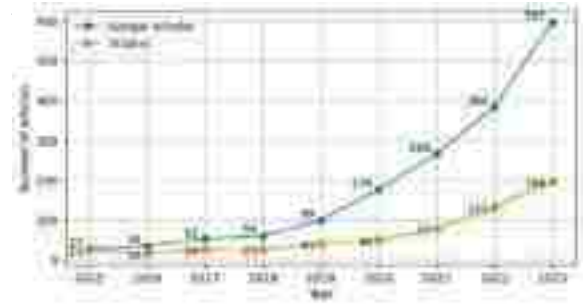
The Integration of AI and Supply Chain Management

The integration of artificial intelligence (AI) into supply chain management (SCM) is revolutionizing how businesses operate, enhancing efficiency, and reducing costs. Companies like Amazon are heavily investing in AI-driven automation to optimize their logistics networks, with plans to allocate up to \$25 billion towards robotics-led warehouses, anticipating annual savings of about \$10 billion over the next decade [1]. Similarly, FedEx has partnered with AI robotics firm Nimble to automate order fulfillment and inventory management, aiming to bolster its supply chain capabilities across North America [2]. In the fashion industry, AI-powered demand forecasting tools are addressing inventory challenges by analyzing complex data to predict consumer behavior more accurately, thereby reducing waste and enhancing profitability [3]. These developments underscore AI's pivotal role in transforming SCM, enabling companies to navigate complexities with greater agility and precision.



The Intersection of AI, Logistics, and Sustainability

Optimizing supply chains is essential for business success, allowing companies to meet customer demands and remain competitive. Logistics networks also play a key role in economic and social development. The World Bank's Logistics Performance Index (LPI) assesses logistics efficiency, reflecting the impact of policies on trade and growth. Given the importance of logistics in sustainability, integrating sustainable practices is crucial. AI in logistics can enhance efficiency, reduce emissions, and support sustainability goals, as demonstrated by the increasing research in AI and



Emirates SkyCargo

the air freight division of Emirates Airlines, has adopted AI solutions to streamline its operations. They use AI to optimize flight and cargo capacity, predicting demand for air freight services. Additionally, AI-powered systems monitor environmental conditions during transportation to ensure that sensitive cargo, like pharmaceuticals and perishables, is handled properly, thereby improving reliability and reducing waste.



Etisalat

a major telecommunications provider in the UAE, uses AI to enhance its supply chain management. The company employs predictive analytics to manage its inventory and streamline the procurement process for network equipment. By analyzing data from various sources, Etisalat can optimize its supply chain operations, reduce costs, and improve service delivery.



Al-Futtaim Group

has integrated AI in its supply chain processes to improve operational efficiency. By utilizing AI algorithms to analyze customer purchasing patterns, the group can better forecast demand and optimize its supply chain operations across various sectors, including automotive, retail, and electronics.



Noon

an e-commerce platform in the UAE, employs AI to enhance its logistics and warehousing operations. The platform uses AI algorithms to predict demand for products, allowing for better inventory management and distribution. Additionally, Noon has implemented AI-driven automated warehouses that use robotics for sorting and packing orders, increasing efficiency and reducing fulfillment times.

Majid Al Futtaim,

a leading retail and leisure conglomerate in the UAE, has implemented AI-driven inventory management systems. The company uses machine learning algorithms to analyze sales data and predict customer demand. This enables Majid Al Futtaim to optimize stock levels in its Carrefour supermarkets, reducing excess inventory and ensuring product availability while minimizing costs.



DP World,

a leading global logistics company based in Dubai, is leveraging AI and machine learning to optimize its operations. The company uses predictive analytics to forecast container traffic, improving resource allocation and reducing congestion at ports. By analyzing historical data and trends, DP World enhances its supply chain efficiency and minimizes delays in shipping and logistics.[5]



Dubai Customs

has implemented AI-driven solutions to enhance its supply chain security and efficiency. The department uses AI algorithms to analyze customs data and identify potential risks, improving inspection processes and reducing clearance times for goods. This integration of AI contributes to a smoother flow of goods through the UAE's ports and borders.

References



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CARIE the Marine Patroller

A Solar-Powered, Autonomous Marine Tracker

Student Project

Authors: St. Patrick School of Quezon City Robotics Elite Team
Cristina Gabrielle R. Cacho, Maridette Drannel M. Baylon,
Kyoshiro B. Mata, Jin Kyle B. Ventura

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The ocean is one of the most prominent sources of transport, trade, food, and energy, but fast growth in human activities has caused massive stress in the marine ecosystems, resulting in overexploitation of biodiversity. In order to face up to this challenge, the Solar Powered Submarine Championing Advocacies to Reinvent the Seas (SPS - CARES), named Carie, offers a sustainable solution to several oceanic issues. Carie uses LEGO Spike Prime parts to portray how she will detect and respond to marine pollution, coral degradation, and even discover endangered and new species.

Carie the Patroller is a multi-purpose submarine that aims to help the ocean bounce-back by reducing its stressors through advanced technology. Carie is equipped with LEGO Spike Prime color sensors that help show how she can adapt and respond to her environment with actual Artificial Intelligence.

The study highlighted that CARIE the Patroller has great potential to improve marine conservation through sustainability, stewardship, resilience and innovation. By using CARIE in environmental education, students become more engaged and develop a sense of sustainability.

Oil Vacuum is a vac that sucks in oil spills. Carie's Oil Vacuum operates without releasing any absorbent material externally. Instead, it internally uses hair nets to absorb the oil spill as it is suctioned in.

Coral Frames Carie has the ability to release coral frames; artificial structures in marine environments to support coral fragments for growth. They should be constructed from materials like metal or PVC, to ensure these frames provide a stable platform for the corals.

The **Sea Net** is made of beams attached to one another. Four beams were used to hold the *Nylon net* in place. The Sea Net functions as a waste collector; especially plastic waste. After the utilization of the Sea Net, the waste will go to the sorting facility. The waste will be sorted and delivered to organizations that will put them into better use.

In demonstration for the **sorting facility**, we used LEGO parts and color sensors to present the detection and segregation of various types of waste. Each category of waste is associated with a specific color, and the robot is programmed to recognize these colors and sort the waste accordingly.

Our CARIE
video presentation



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CO-TECH- test, measure, balance

(innovative concept of Automated Software Process for evaluation and therapy through biofeedback)



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.

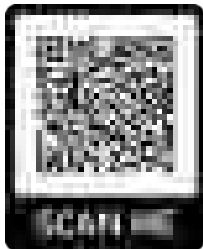
One of the core features of CO-TECH is its ability to obtain precise and detailed data about patients through biofeedback. This process involves measuring and monitoring the physiological responses of the patient in real-time. As a result, therapists can have access to essential information about the 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.



VIRAL SOLUTION "SV"

Patent/project number: OSIM 301242/29.12.2023

Author/s: Senior Lecturer Dr. Oana Codruta Baceanu Miloicov

Institution: SC Holistic Lounge SRL

C

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.

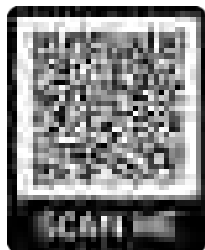
I have used the product in hundreds of cases of viral infections, with spectacular results even from the first days; method of administration: the first two days: 7pic x 5/day, then: 7pic x 3/day, until the bottle is used up.

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 recipe 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



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www.healthyvibe.ro

QVibe frequency generating therapeutic device-used against parasitic infections

Patent/project number: OSIM 301243/29.12.2023

Author/s: Senior Lecturer Dr. Oana Codruta Bacean Miloicov

Institution: SC Holistic Lounge SRL

C

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 innovative 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 artery, where we can feel the pulse.

It is recommended to use QVibe device everyday, all the time, especially during the night, the frequency recipe is a unique registered algorithm 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.



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Artificial multi-use self-controlled halochamber in dynamic regime

PATENT OSIM: RO134028B1

Sandu I.G., Sandu A.V., Sandu I., Earar K., Vasilache V., Știrbu C.M., Balan G., Crișan Dabija R.A., Chirazi M., Vladescu A., Cotrut M.C.

C

NOVELTY - The halochamber has a boiler that is provided with a blower and an closing/opening channel system produces water vapour. The optimal concentration of solions is reached in the halochamber controlled by a sensor that is connected to a microcomputer which allows modification of flow-rate of water vapours for bubbling and the other working parameters of the chamber. The volume of saturated solution in the bubbling device is higher than 1/10000 of the chamber volume. A bubbling device vessel is provided at top of a limewood grate with a mesh size to retain the bubbling splashes. The salt solutions are provided at the limit of the saturation level with a temperature ranging between 60 and 80 degrees C and the bubbling flow-rate is controlled to form fine drops which partially touch the grate.



You can create a room with the conditions of a salt mine.
The effect of salt aerosols is well known to be benefic to the body.



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Manager: Eng. PhD. Andrei Victor SANDU

Advantages:

- low cost;
- rechangeable pannels;
- can be addapted to any size;
- short time till optimal aerosol concentration;
- high fiability;
- no side effects

Phytherapeutic Formulations for Preserving Prostate Health and Balancing Urinary and Salivary pH

C

PATENT NUMBER: MD20251

***Kamel Earar, Emil CEBAN, Viorel JINGA, Mariana JIAN, Solomon OLEG,
Simona PÂRVU, Andrei Victor SANDU, Mariana LUPOAE***

The invention relates to a phytherapeutic formulation designed to support long-term prostate vitality and promote a balanced internal environment. It consists of extracts or dried parts of carefully selected medicinal plants known for their synergistic effects: *Urtica dioica* (nettle) – recognized for its diuretic, anti-inflammatory, and detoxifying properties; *Epilobium parviflorum* (small-flowered willowherb) – known for its targeted anti-inflammatory action on prostate tissue; *Equisetum arvense* (horsetail) – valued for its remineralizing and pH-regulating effects on the urinary tract; *Taraxacum officinale* (dandelion) – a powerful liver and kidney detoxifier that contributes to creating an alkaline systemic environment; and *Betula pendula* (birch) – offering mild diuretic and anti-inflammatory support. The composition is intended to maintain prostate health and function over time, while also aiding in the regulation of urinary and salivary pH.

Advantages

- Synergistic therapeutic effect by combining herbs with complementary actions
- Multiple mechanisms of action:
- Prostate-protective
- Anti-inflammatory
- Detoxifying
- Mildly alkalinizing
- Flexible formulation options (tea, capsules, tincture)
- Safe phytherapeutic profile, with no significant adverse effects



Forms of Administration

- The herbal preparation can be delivered in several forms:
- Herbal tea (infusion)
- Capsules with powdered plant material
- Hydroalcoholic tincture

Applications

- Prevention and adjuvant treatment of benign prostatic hyperplasia (BPH) and chronic prostatitis
- Regulation of urinary and salivary pH by supporting detoxification and the elimination of acidic metabolites
- Support for liver and kidney function, contributing to systemic homeostasis

Effect of Regular Use

- Reduction of prostate inflammation
- Normalization of urinary flow
- Mild alkalinization of urine
- Improved salivary pH (as a marker of metabolic balance)
- Enhanced liver and kidney detoxification



Contact: Conf. univ. dr.ing. Habil. Andrei Victor SANDU

Phytherapeutic Support for Prostate Health Using *Xanthium spinosum*

PATENT NUMBER: MD20252

BĂLȚATU Mădălina Simona, VIZUREANU Petrică, GEANTĂ Victoraș, ȘTEFĂNOIU Radu, VOICULESCU Ionelia, SANDU Andrei Victor

C

Prostate health is a key factor in maintaining male reproductive function. Epidemiological studies show that most men develop various prostate conditions during their lifetime, primarily due to hormonal imbalances. Therefore, maintaining optimal prostate health is a fundamental goal in preventive medicine. A balanced lifestyle and the use of phytherapeutic preparations with anti-inflammatory and diuretic properties can contribute significantly to prevention. Among these, *Xanthium spinosum* (spiny cocklebur) stands out as a valuable medicinal plant with documented therapeutic potential.

This invention explores the application of *Xanthium spinosum* in supporting prostate health through its phytherapeutic properties. The plant, naturally occurring in Europe including Romania, contains a unique mix of bioactive compounds such as essential oils, fatty acid salts, flavones, phytosterols (including beta-sitosterol), saponins, tannins, caffeic and chlorogenic acids, and xanthanin lactones.

These compounds give the plant significant therapeutic qualities relevant for prostate and urinary tract conditions.

Advantages

- Prostate Decongestant: Helps reduce inflammation in benign prostatic hyperplasia (BPH) and alleviates associated symptoms.
- Diuretic and Urinary Antiseptic: Promotes toxin elimination and prevents urinary tract infections.
- Anti-inflammatory and Anticongestive: Reduces inflammation and congestion in the prostate and urinary system.
- Natural, Accessible Source: The plant grows spontaneously and can be easily harvested for medicinal use.

Forms of Administration

- Herbal Infusion: Made by steeping the aerial parts of the plant; dosage should follow guidance from a phytherapy specialist.
 - Tincture: Used as an adjuvant in the treatment of prostate conditions, helping to alleviate specific symptoms.
- During use, it is recommended to avoid Spices, fermented dairy products, citrus fruits, acidic foods, pickles, and alcohol.

Applications

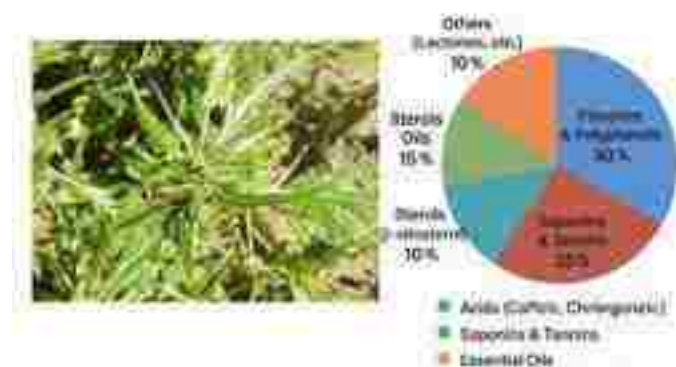
- Preventive and complementary therapy for prostate enlargement (BPH)
- Support in managing chronic prostatitis
- General urinary health and detoxification

Lifestyle Recommendations

For maximum benefit, phytherapeutic treatment should be paired with:

- Abalanced diet
- Regular physical activity
- Healthy body weight maintenance
- Increased intake of teas, fruits, and vegetables
- Reduced consumption of animal fats

The combined approach of herbal remedies based on *Xanthium spinosum* and a healthy lifestyle represents an effective strategy to preserve prostate function and prevent age-related disorders.



Premixes for appetizer or dessert muffins

Patent application: a 2025 00341

Author/s: Irina Matran, Claudia Bănescu, Ștefania Șerban

C

Objectives: • Development of three premixes for muffins: • free of gluten, lactose and synthetic additives, • sustainable agricultural raw materials, to stimulate the circular economy, • to be of the appetizer or dessert type, • to be added by end consumers to a small number of other ingredients (e.g. drinking water, coconut oil). • CCP verification – gluten in ingredients labeled as gluten-free, • education/informing the general population regarding food nutravigilance, • Patenting, • CBI Licensing.

Materials and Methods: • **Materials** (1): sustainable agricultural ingredients



- Can be cultivated, milled and processed in Romania



- manufacturing of premixes;
- manufacturing of muffins;
- marketing of premixes/ muffins.

• **Methods:** CTC ingredients, PCC verification (gluten), preparation, baking (120°C), CTC finished products

Results: • Establishing formulas (recipes), carrying out technological tests and CTC of finished products



Red color premix:

- sorghum flour
- millet flour
- beetroot powder
- trehalose
- sunflower lecithin
- sodium bicarbonate
- lemon juice powder



Green color premix:

- sorghum flour
- millet flour
- spinach powder
- trehalose
- sunflower lecithin
- sodium bicarbonate
- lemon juice powder



Brown color premix:

- sorghum flour millet
- millet flour
- carob flour
- trehalose
- sunflower lecithin
- sodium bicarbonate
- lemon juice powder



• **PCC verification** – gluten in ingredients labeled as gluten-free.

- Millet flour contains 10 ppm (parts per million) of gluten.

- 10 ppm (parts per million) of gluten is a threshold for "gluten-free" certification that is stricter than the standard US FDA limit of 20 ppm.

• **Advantages of premixes:** 100% natural, vegan, can be certified organic, HALAL, Kosher; do not contain gluten, lactose, ammonium bicarbonate; do not contain synthetic additives.

• **Patenting:** OSIM: a 2025 00341

• **CBI Licensing:** Currently, the three premixes are in the process of licensing in three counties in Romania: Cluj, Alba and Hunedoara.

Contact: Irina Matran, irina.matran@umfst.ro

ORTHOPEDIC DEVICE FOR CORRECTION OF THE TALIPES CALCANEUS / TALIPES CALCANEVALGUS DEFECT

Patent RO 133750 B1

*COSTOIU Mihnea Cosmin, SEMENESCU Augustin, DOICIN Cristian,
ULMEANU Mihaela, CÎRSTOIU Cătălin, DOICIN Ioana, MATEȘ Ileana*

C

Description

The invention relates to an orthopedic device for the correction of a malposition of the foot expressed by the defects talipes calcaneus and talipes calcaneovalgus, particular variants of Talus valgus, and to the process for obtaining it.

The orthopedic device for Talipes calcaneus / Talipes calcaneovalgus defect correction, is composed of a fixed subassembly, which is fixed to the leg of the foot, a movable subassembly, which is attached to the foot of the defective foot, a snail-snail gear and a graduated cap, which is fixed with the help of screws with clogged head.

Advantages

Shorter time to correct the talus Valgus defect for the babies.

The fixed and mobile subassemblies are custom made with additive technologies such as SLS, using anatomical data taken from DICOM images, which are then transformed into STL and GCODE files, and then sent to a 3D printing equipment.

The device is equipped with profiled anatomical structures to ensure perfect sealing of the affected areas and ensure anatomical compliance

Problem solved

By using the device the patients avoid to immobilize the foot for a long time and the repeated visits to the orthopedic doctor.

Prevents immobilization of the foot in gypsum and frequent visits to the orthopedic doctor.

Ensures patient comfort and compliance by providing variable angle along its mobile assembly;

Has a three step manufacturing procedure, which can be tailored in correlation with the patients' medical condition.



Thermoresponsive Gel-Based Intranasal Delivery System Containing Vitamin F and Hyaluronic Acid for the Treatment of Nasal Inflammation and Epithelial Regeneration

Patent Registration Number: A/00452/15.10.2025

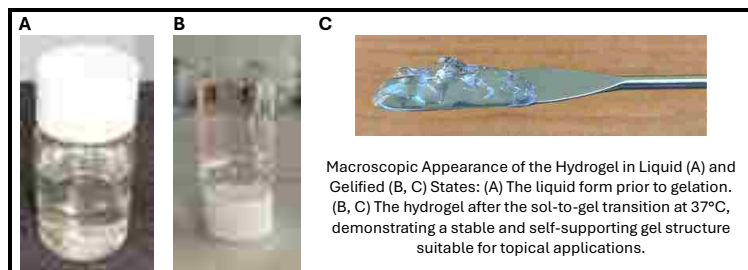
Ciocîlteu Maria-Viorica, Oancea Carmen-Nicoleta, Turcu-Știolică Adina, Biță Andrei, Pîrvu Silvia-Andreea, Rău Gabriela, Văruț Marius-Ciprian
University of Medicine and Pharmacy of Craiova

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Thermoresponsive gels, which transition from a liquid state at low temperatures to a gel upon reaching nasal mucosa temperature, represent a promising approach for prolonging contact time and enhancing intranasal absorption.

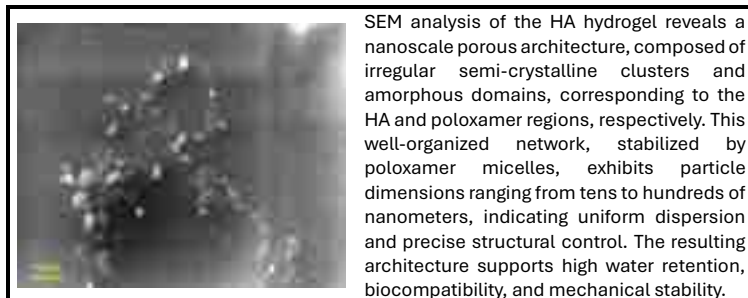
The technical problem addressed by this invention is to provide a pharmaceutical formulation that ensures efficient and sustained release of vitamins within the nasal mucosa, thereby overcoming the limitations of traditional formulations.

The thermoresponsive gel formulated with vitamins F, D, and C, hyaluronic acid, and oregano essential oil offers intense hydration, reduces local inflammation, and stimulates tissue regeneration through the prolonged and controlled release of active ingredients.

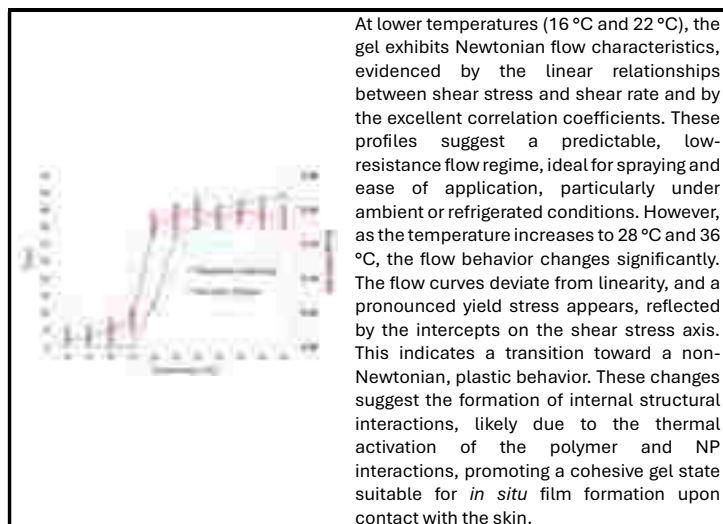


- ADVANTAGES**
- **Enhanced Bioavailability:** The thermoresponsive gel prolongs the contact time of the active ingredients with the nasal mucosa, thereby augmenting absorption and bioavailability.
 - **Ease of Administration:** The liquid formulation at low temperatures (4°C) allows for convenient intranasal administration via spraying or dropping.
 - **Formulation Stability:** The utilized poloxamers contribute to the stability of the formulation and protect the active ingredients from degradation.
 - **Antimicrobial Effect:** The oregano essential oil provides localized antimicrobial action, assisting in the prevention of nasal infections.
 - **Hydration and Protection:** The hyaluronic acid contributes to the hydration and protection of the nasal mucosa.

SEM Micrographs



Rheological Behavior



Contact: Professor PhD. Turcu-Știolică Adina,
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Contact: herdianadewinurfika@gmail.com

Weekend Inventions

Air by Corneliu

Author: Corneliu BIRTOK BANEASA & Team

C

Weekend inventions - Air by Corneliu, are creative-innovative concepts intended for a wide range of consumers and aim to increase the quality of life through the use of environmentally friendly products.

Soap AIR by CORNELIU

An explosion of imagination, originality, inventiveness, colors, harmony, scents and shapes. It includes a wide range of essential oils, antioxidants, vitamins, bee products, natural dyes, without NaOH.



MicroU

Multifunctional and ecological alternative to the glasses case, with the role of protection and, at the same time, of cleaning them, without resorting to wet wipes, which are difficult to recycle.



BircoR

Soap holder made of natural materials (rock) of different shapes and sizes. BircoR: reduces stress, improves dexterity, and brings us closer to nature.



SeptoBirCor hand sanitizer

The hands are disinfected and, at the same time, hydrated, eliminating side effects such as dehydration, irritation and the appearance of skin cracks.



DEXTER'S Laboratory

Educational program

Author: Corneliu BIRTOK BANEASA & Team

C

DEXTER's laboratory is an educational program of the CORNELIUGROUP research-innovation Association that supports students who want to carry out diploma projects with practical realization.

CORNELIUGROUP provides students with the material base as well as specialized staff with extensive experience in the field of engineering. Creative projects, teaching materials, experimental stands for the construction of road vehicles designed and made by students for the laboratory study.



Puma AIR by CORNELIU is a project realized by the students from Faculty of Engineering Hunedoara-Politehnica University of Timisoara through the educational program Dexter's Laboratory supported by Corneliugroup Research and Innovation Association.

The goal is to transform a street car into a sports car in order to participate at specific competitions.

The materialization of the project involves the design within the student diploma works by approaching the various necessary modifications: reducing weight, increasing body strength, implementing a roll cage, improving braking efficiency, increasing engine power etc.



AIR by CORNELIU®

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SCAN ME

"Be stubborn and follow your dream!"

E-tongue like sensor for food safety (FoodESense) – PD87/2020

A.M. Iordache*, V. Barna, S. Caramizoiu, A.M. Florea (Raduta), B. Bitu, S.M. Iordache*

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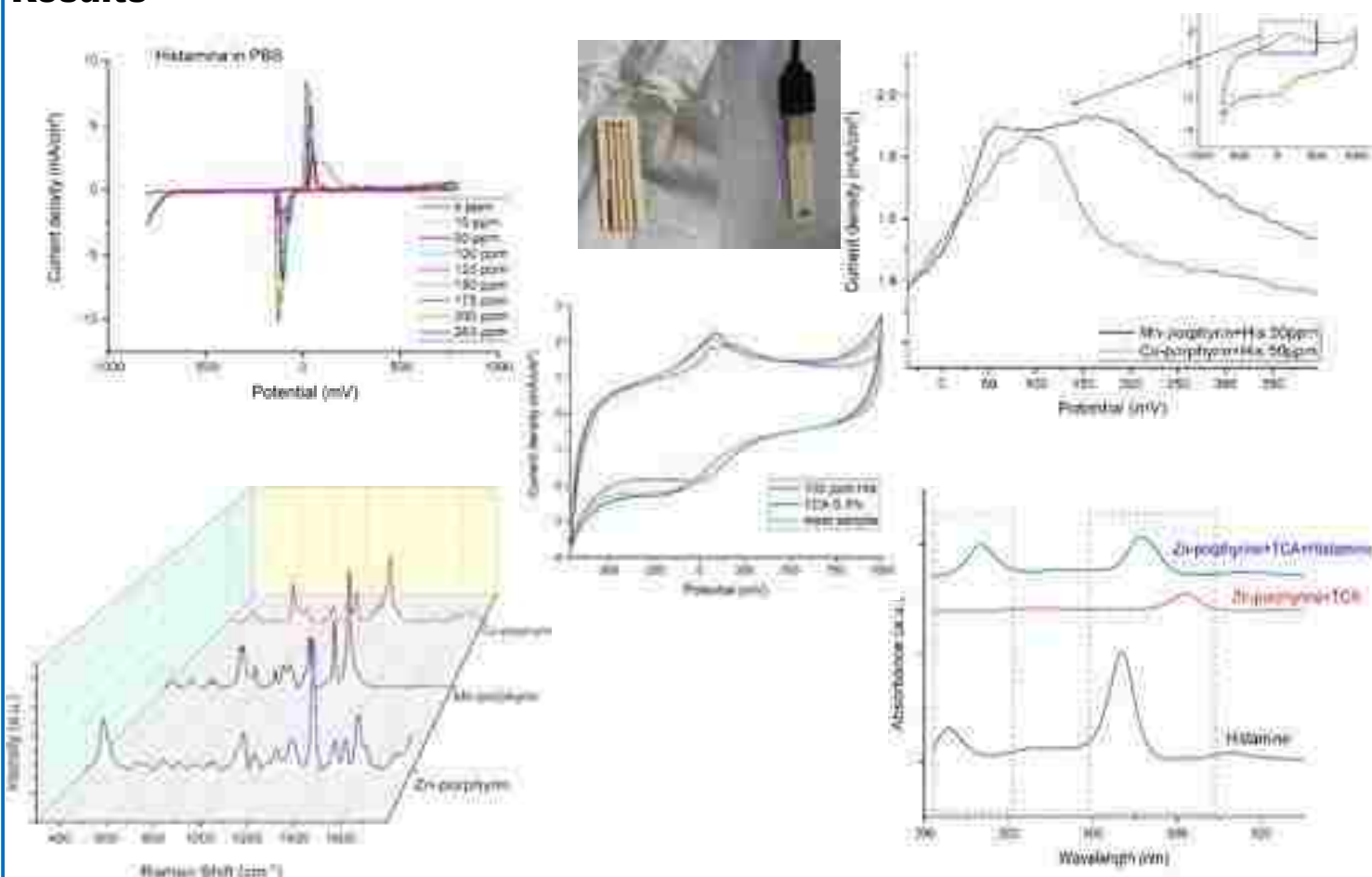
*Corresponding author e-mail: ana.iordache@inoe.ro ; stefan.iordache@inoe.ro

D

Abstract

The proposal is based on the development of an electronic tongue-like sensor for the evaluation of histamine in food products (the focus is on meat products, as they are most often subject to poor hygiene during production, processing and transport). Using a single ultra-sensitive electrochemical sensor, it is possible to measure the concentration of histamine, a representative compound for assessing the level of freshness (the caution level for histamine is 50 ppm, while the maximum allowed levels vary from 200 ppm to 500 ppm). This electronic language will ensure on-site quality control of food products, from producer to seller and to consumer, providing information on the condition of food along the distribution chain. To validate the sensor, tests were undertaken on real samples, purchased from commercial stores. 7 samples of different types of meat were tested: 1 fresh chicken sample, 1 fresh pork sample, 1 fresh beef sample, 1 pork and beef minced meat sample, 1 fresh pork sausage sample, 1 fresh pork sample smoked chicken and 1 sample of altered pork. The most important result obtained is the development of the sensor based on non-specific molecular imprinting, with graphene and thiophene electropolymerized onto Au support. This sensor represents an extension of the research project towards the “lab-on-a-chip” field. Even if the detection limit for histamine is relatively high (around 80 ppm), the manufacturing technique allows the immobilization of several distinct molecules on a small area of sensorial support.

Results



Acknowledgments: A.M. Iordache, S. Caramizoiu, A.M. Florea (Raduta), B. Bitu, S.M. Iordache were supported by the CORE Program with the National Research Development and Innovation Plan 2023-2027, carried out with the support of MCID, program PN-23-05. A.M. Iordache & V. Barna were supported by grant of the Romanian Ministry of Education and Research, CNCS - UEFISCDI, project number PN-III-P1-1-1-PD-2019-1134 (CNCS No. PD87/2020).
Project URL: <https://doi.org/10.1007/978-94-007-5000-0>

INNOVATIVE FOOD SUPPLEMENT BASED ON PLANT PRODUCTS OBTAINED FROM ORGANIC FARMING

D

Patent/project number: OSIM A00745, published in BOPI, May 2022

Authors: SĂVESCU, Petre; IACOBESCU, Fănel; POENARU, Maria Magdalena; University of Craiova, Romania

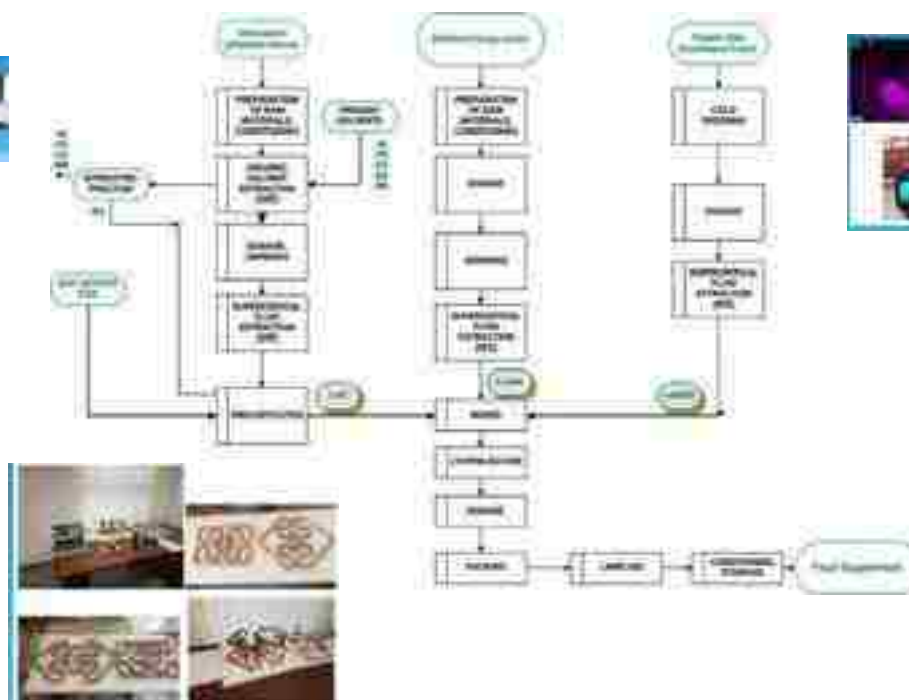
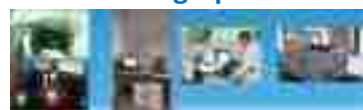
Description

© The invention relates to a food supplement made from defatted hemp seeds, Jerusalem artichoke leaf extract, sea buckthorn fruit extract and natural emulsifier, which can constitute a dessert that can be consumed by people with a deficient immune system, people with nutritional deficiencies, but also by all categories of consumers.

© The product type "Food supplement from partially defatted hemp seeds and healthy Jerusalem artichoke leaves" is made from (average values): 55% extract from ground healthy Jerusalem artichoke leaves of the local Dăbuleni variety; 30% extract from partially defatted hemp seeds Cannabis Sativa - Jubilee variety - from SCDA Secuieni, Neamț County; 14.1% extract from Romanian sea buckthorn fruits; 0.9% natural emulsifier non-genetically modified soy lecithin from the mass of the finished product, the percentages being expressed by weight.

© In the last 2 years, the final product and technology have been greatly improved by introducing smart technologies (use of activated bio-membranes in extraction processes, use of innovative technologies in mixed fields: plasma + electromagnetic + gravitational, advanced separations in combined fields, improvement of the management of redox processes by activating the enzymatic cofactors of oxidoreductases involved in the reaction mechanisms).

Pictures & graphics



PROCESSING AND VALORIZATION OF NATURAL ZEOLITES FOR APPLICATION AS CLARIFYING AGENTS IN BREWING

Patent proposal nr. A/00602 din 24.09.2020 (OSIM)

Oana Cadar¹, Marin Șenilă¹, Irina Wagner², Ion Miu²

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Introduction

- ✓ Beer turbidity and deposit formation are primarily caused by the spontaneous denaturation and flocculation of thermosensitive proteins present as colloidal suspensions. Diatomaceous earth is commonly used in beer filtration to remove suspended yeast and other particles that contribute to cloudiness or haze in the final product. The particle size of the used diatomaceous earth typically ranges from 60 to 100 μm . However, health and safety concerns emerged when the International Agency for Research on Cancer (IARC) reclassified diatomaceous earth in 1997 from Category 2 (Probable Human Carcinogen) to Category 1 (Human Carcinogen).
- ✓ Due to their unique physicochemical properties, natural zeolites have found broad applications across various industries, including the food sector. They are hydrated aluminosilicate materials that can reversibly lose and gain water, adsorb molecules, and undergo ion exchange without structural degradation, acting as molecular sieves. They are non-toxic via oral, dermal, ocular, and respiratory exposure routes, and they are environmentally safe upon disposal.
- ✓ The distinctive three-dimensional porous structure of natural zeolites confers diverse potential applications. Compared to other cation exchange materials, natural zeolites are cost-effective and exhibit excellent selectivity for different cations. They also release non-toxic exchangeable cations, such as K^+ , Na^+ , Ca^{2+} , and Mg^{2+} , into the environment.
- ✓ Romanian natural zeolites demonstrate promising filtration capabilities for removing haze from alcoholic beverages, such as wine and beer.



Natural zeolite A
- sample thermally treated $\Rightarrow$ TNZ-A



Natural zeolite B
- sample thermally treated $\Rightarrow$ TNZ-B

- **Mineralogical composition**, as determined by X-ray diffraction (XRD) analysis, identifies clinoptilolite as the predominant crystalline phase, accompanied by muscovite, montmorillonite, quartz, cristobalite, and albite.

Chemical composition

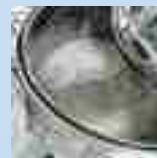
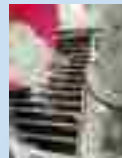
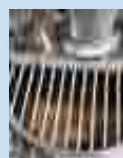


Parameter	TZ-1 (%)	TZ-2 (%)
SiO_2	65-75	70-75
Al_2O_3	10-15	10-15
Fe_2O_3	1.0-2.5	1.0-2.0
CaO	1.0-2.5	2.0-3.0
MgO	0.50-1.0	0.50-1.0
Na_2O	0.5-2.0	0.2-0.5
K_2O	1.5-2.5	2.0-3.0
TiO_2	0.01-0.05	0.01-0.05
MnO	0.01-0.05	0.01-0.05
CEC (mEq/100 g)	75-85	80-85



Description

- ✓ This invention refers to a process for producing a zeolitic tuff-based material intended for use as a beer clarification additive.
- ✓ These materials exhibit filtration properties that maintain beer quality, optimize filtration parameters, and reduce production costs compared to currently used materials.
- ✓ Thermally treated natural zeolites have been shown to be a suitable substitute for diatomaceous earth in removing haze-forming constituents from beer.
- ✓ Tailored zeolitic materials can replace diatomaceous earth without requiring significant modifications to existing brewery equipment or processing protocols.



Characteristics of filtered beer

Parameter	Measurement unit	Value
Alcohol content	% vol.	5.0-6.0
- standard value		min. 3.00
Original extract	%	10.0-12.0
- standard value		min. 3000
Total acidity	mL NaOH sol 1N/100mL	2.0-3.0
- standard value		max. 3
Culour	EBC unit	7.0-8.0
- standard value		max. 20
Bitterness	EBU	23.0-24.0
- standard value		min. 20

Microbiological analysis

Parameter	Unfiltered beer	Filtered beer
Total bacterial count (UFC/mL)	$400 \times 10^2 - 420 \times 10^2$	$6 \times 10^2 - 15 \times 10^2$
Yeasts and molds (UFC/mL)	$45 \times 10^2 - 50 \times 10^2$	$1 \times 10^2 - 4 \times 10^2$
Enterobacteriaceae	-	-

Advantages

- ✓ processing valorizing locally sourced zeolitic tuff using relatively simple technologies offers a sustainable way to produce effective filter adjuvants for brewing applications;
- ✓ tailored zeolitic materials demonstrate strong clarification performance, contributing to improved beer quality, particularly in terms of sensory attributes, while maintaining compatibility with established brewing standards;
- ✓ compared to conventional commercial filter media, these natural alternatives offer significant cost savings and reduce dependence on energy-intensive processes;
- ✓ their application supports product quality and advances economic and environmental sustainability within the brewing industry.

Application field

- ✓ purification of certain food products, such as filtering beer, improves its characteristics and potentially eliminates the need for pasteurization, which often reduces vitamin content.

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Acknowledgement. This research was carried out through the Competitiveness Operational Programme of the Ministry of European Funds, contract no. 7/01.09.2016, code MY SMIS 105654 and the Core Program within the National Research Development and Innovation Plan 2022–2027, carried out with the support of MCID, project no. PN 23 05.

Ultrasensitive gas sensor array for greenhouse environment assessment (GreHSen) – PED393/2020

S.M. Iordache*, A.M. Iordache, S. Caramizoiu, A.M. Florea (Raduta), B. Bită

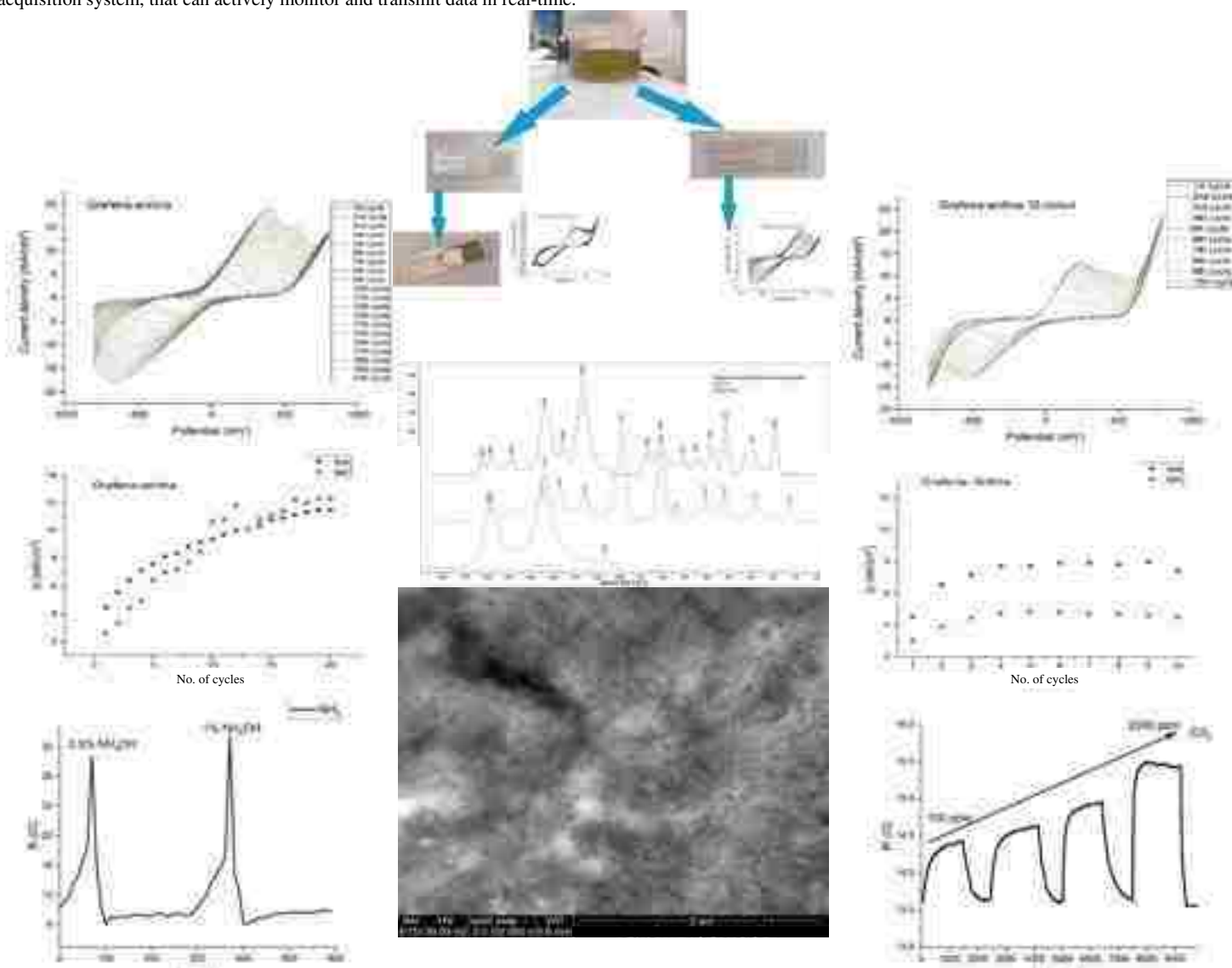
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Abstract

The efficient use of water and other resources as well as the development of an automated monitoring system are key issues in agriculture. The project – Ultrasensitive gas sensor array for greenhouse environment assessment (GreHSEN) – developed a monitoring sensor array which can specifically evaluate the level of dangerous gases produced inside of greenhouses (CO_2 , NH_3). The demonstration model is an experimental model consisting in an integrated gas sensors array and an appropriate data acquisition system. The integrated gas sensors array is based on functionalized graphene, which allows amplification of detected electrical signals. The detection mechanism is based on the variation of resistivity/conductivity and interfacial properties of the active semiconductor layer (in our case the semiconductive polymer-modified graphene layer) when exposed to different gases. The typical sensing mechanism is as follows: first, the target analyte comes into contact with the sensing layer; the analyte affects the semiconductor layer with various molecular interactions, changing the distribution of the charge carrier density; this change in the charge carrier density results in a change in the resistivity of the sensors. We synthesized by electro-polymerization and magnetron sputtering thin layers of graphene-polyaniline and graphene-polypyrrole and tested them to CO_2 and NH_3 . The sensor array showed a good response to the gases and fast recovery. The most important result obtained during the implementation of the project was the integration of the sensor array with the data acquisition system, that can actively monitor and transmit data in real-time.



Acknowledgments: A.M. Iordache, S. Caramizoiu, A.M. Florea (Raduta), B. Bită, S.M. Iordache were supported by the CORE Program with the National Research Development and Innovation Plan 2022–2027, carried out with the support of MCID, project no. PN 25-05. A.M. Iordache & V. Barna were supported by grant of the Romanian Ministry of Education and Research, CNCS – UEFISCDI, project number PN-III-P1-1.1-PD-2019-1134 (Gr. No. PD87/2020).

Project site: <https://ecodesense.inoe.ro/>

Brokerage Events for Technology Transfer and Partner Identification in the AgriFood sector

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BISNet Transylvania, ID 101216189

Ancuța-Maria Ivan, Cristina-Maria Bălgărădean, Mădălina-Alexandra Coțiu

Abstract

Technology Transfer plays a crucial role in transforming research outcomes into market-ready solutions. Yet, it is often difficult to identify suitable partners, which leaves universities and inventors struggling to find the right industrial or public partners interested in commercializing the results obtained.

A solution to meet this need is represented by Brokerage events which provide a structured matchmaking forum where representatives of various stakeholders in the Agrifood sector (e.g. academia, industry, public bodies etc.) come together to meet and explore potential collaborations. Still, the value of these events will depend on effective partner identification. To maximize results obtained following the participation to a Brokerage event, we compiled a list of useful tips and tricks.

-  **1.Prepare a Post-Event Engagement Plan** - Within a week of the event, follow up with personalized messages summarizing your discussion points and proposing clear next steps
-  **2.Assess Strategic Fit Before Deep Collaboration** - evaluate potential partners' **complementarity** in capabilities, market access, and IP interests.
-  **3.Engage Technology Transfer Offices (TTOs) or Innovation Brokers** - Involve your institution's **Technology Transfer Office** early to navigate legal, financial, and IP frameworks.
-  **4.Leverage Open Innovation Platforms** - Upload your technology offers or collaboration interests onto **open innovation databases** (e.g. **Enterprise Europe Network** - see below) immediately after the event.
-  **5.Track Impact and Iterate** - Measure the outcomes of your brokerage participation and adjust your future brokerage strategy accordingly.



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Practical Laboratory of Intelligent, Efficient, and Longevous Technologies in Horticulture (Acronym: LINTEL)

Patent/project number: CNFIS-FDI-2025-F-0328

Author/s: Emil – Cătălin Șchiopu

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Description

The "Constantin Brâncuși" University of Târgu Jiu, within the Study Program: Engineering and Management in Public Nutrition and Agritourism, is launching LINTEL – a revolutionary project that integrates smart agriculture into higher education. With a total budget of 166,250 RON, this practical laboratory aims to train future agricultural specialists using cutting-edge technologies.

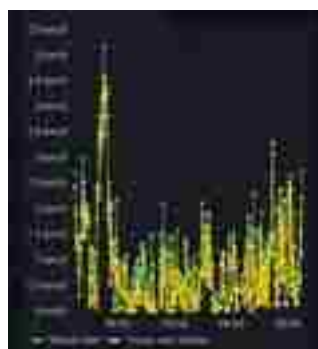
The project involves the implementation of advanced technological solutions, including:

- ❖ Two intelligent greenhouses (40 sqm each) equipped with:
 - Automated ventilation, irrigation, and fertilization systems
 - IoT sensors for monitoring temperature, humidity, wind, and rainfall
 - Wi-Fi cameras and mobile applications for online viewing
 - Phyto lamps and air stratification control systems
- ❖ An open-data web platform providing access to collected information

Long-term impacts of the project include:

- Reduced water consumption and increased efficiency in agricultural production through precise technologies
- Attraction of talented young students to university programs via practical demonstrations
- Strategic partnerships with local entrepreneurs for innovative projects

Pictures & graphics



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The stages of the project can be viewed by accessing the following link:

<https://drive.google.com/file/d/1xGxKGv6qLOQbA6nwoUsMeh5yuVeRWR2K/view?usp=sharing>

Antifungal potential of sericin in bakery and pastry products

Author/s: Emanuela Chiper, Irina M. Matran, Monica Tarcea*

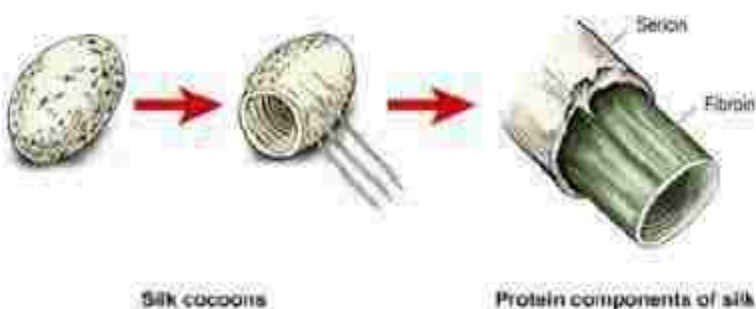
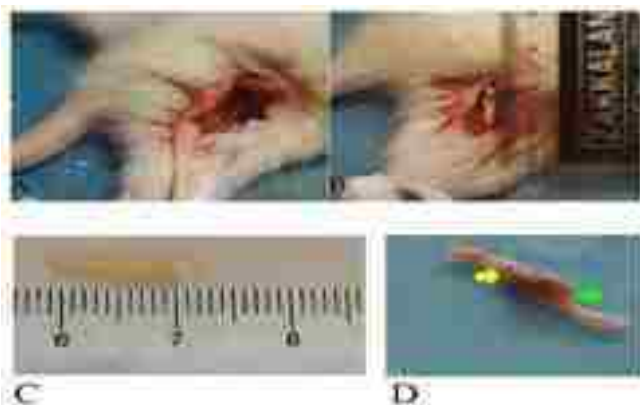
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Description: The project proposes the development of three innovative premixes for muffins (appetizer or dessert), made from sustainable agricultural ingredients cultivated in Romania: sorghum flour, millet flour, vegetable powders (beetroot, spinach, carob), trehalose, sunflower lecithin, sodium bicarbonate, and lemon juice powder. These premixes are 100% natural, vegan, gluten-free, lactose-free, and free from synthetic additives, with potential for organic, HALAL, and Kosher certification.

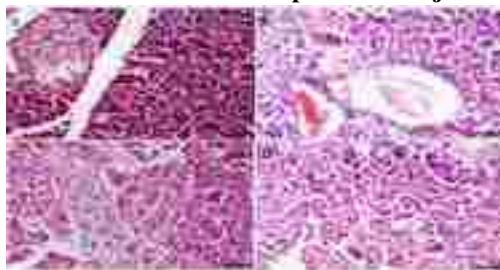
A major innovation is the integration of sericin – a protein extracted from silk – known for its antifungal properties. By including sericin, the premixes not only meet health and sustainability standards but also provide natural protection against fungal contamination, helping to extend the shelf life of bakery and pastry products.

Surgical repair of a 10 mm sciatic nerve injury in rats

Sericin from silk cocoons



Amelioration of type 2 diabetes through oral administration and intraperitoneal injection



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IDENTIFICATION AND MOLECULAR CHARACTERIZATION OF GIANT LIVER FLUKE (FASCILOIDES MAGNA) INFECTION AND GONGYLONEMA PULCHRUM

D

Author/s: POPOVICI DAN-CORNEL, ROBU MIHAI, MARIN ANA-MARIA, MORARU MARIA MONICA FLORINA, MORARIU SORIN, IMRE MIRELA, MEDERLE NARCISA

Description

This scientific project investigated the presence of two parasitic species — **Fascioloides magna** (giant liver fluke) and **Gongylonema pulchrum** — in fallow deer populations in Romania. The study was presented at the "Traian Vuia" International Exhibition of Inventions and Innovations in Timișoara.

Main Objective: To detect and molecularly characterize *F. magna* and *G. pulchrum* in 140 fallow deer specimens by analyzing liver and esophagus tissue samples.

Key Findings: *F. magna* was identified in 4 out of 140 liver samples (2.86%) *G. pulchrum* was found in 25 out of 140 esophagus samples (17.86%) Genetic sequencing confirmed 99% similarity with known GenBank sequences for both parasites

Conclusion: This is the first report of *F. magna* and *G. pulchrum* in fallow deer in Romania. The study highlights the need for ongoing parasitological monitoring and recommends further research to explore correlations between body weight, trophy quality, infestation level, and parasite species.



RESEARCH REGARDING THE EPIDEMIOLOGICAL STUDY ON THE EVOLUTION OVER 10 YEARS OF VARROOSIS IN BEES FROM MEHEDINTI AND VALCEA COUNTIES

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Author/s: DOBROTĂ RADU-SEBASTIAN, MARIN ANA-MARIA,
MORARU MARIA MONICA FLORINA, MEDERLE NARCISA

Description

This research project, presented at the "Traian Vuia" International Exhibition of Inventions and Innovations in Timișoara, investigates the ten-year epidemiological evolution of varroosis—a highly destructive parasitic disease caused by *Varroa destructor*—in bee populations from Mehedinți and Vâlcea counties in Romania. Varroosis is considered the most damaging disease affecting honey bees, leading to colony weakening, reduced productivity, and high mortality. The study highlights that *V. destructor* is an obligate parasite of social bees, with accidental presence on other insects, and cannot complete its life cycle outside the genus *Apis*. Data collected from the Veterinary and Food Safety Directorates (DSVFS) and local Beekeepers' Associations revealed that Vâlcea County recorded a maximum varroosis prevalence of 13.52% and a minimum of 3.72%, while Mehedinți County showed a peak of 4.76% and a low of 0.15%. The methodology included field sampling of live and dead bees, honeycombs, and laboratory analysis in parasitology labs, alongside the interpretation of epidemiological records spanning a decade. The findings emphasize the persistent threat posed by varroosis to bee health and the urgent need for implementing advanced and comprehensive parasitological control strategies to mitigate its impact and safeguard apicultural productivity.



Evaluating the Phytoremediation Efficiency of *Iris pseudacorus* for Lead Removal from Contaminated Water

PTE 59/2025

Alexandru Becheru, Cristina Ileana Covaliu-Mierla, Gigel Paraschiv

Description

The research investigates the ability of *Iris pseudacorus* to remove lead ions (Pb^{2+}) from water under laboratory conditions. The stems were immersed in samples with lead concentrations of 1, 2, and 3 mg/L, and the removal efficiency was monitored over a 72-hour period. The results showed that at a concentration of 1 mg/L Pb, the maximum removal efficiency exceeded 96%, while at 3 mg/L Pb, efficiency remained above 90%. During the experiment, the plants exhibited moderate signs of leaf stress but survived fully, with no significant reduction in biomass or root system development. The novelty of the study lies in demonstrating the high efficiency of *Iris pseudacorus* in the phytoremediation of water polluted with lead ions, even at elevated concentrations, and it highlighting the plant's tolerance to heavy metals without loss of vitality.

State of development: The research is at the pilot experimental stage. Laboratory tests using *Iris pseudacorus* were successfully conducted to evaluate its capacity to remove lead (Pb^{2+}) ions from contaminated water. The experiment demonstrated high removal efficiency (over 90%) and strong plant tolerance to heavy metal exposure. The study confirms feasibility under controlled conditions and provides a foundation for further validation at larger scales or in natural aquatic systems.



The plants were acclimatized for three days, then immersed in solutions with concentrations of 1, 2, and 3 mg/L Pb. The setups included one, two, and four stems per sample. Lead concentration was determined at 24, 48, and 72 hours, and removal efficiency was calculated based on the difference between the initial and final concentrations.

Stems of *Iris pseudacorus* collected from an unpolluted pond, distilled water, and standard lead solutions were used. The analyses were carried out with the photoLab S12 photometer, and the samples were kept in 500 mL glasses, exposed to natural light.



Iris pseudacorus demonstrates high efficiency in removing Pb^{2+} from water, even at concentrations of 3 mg/L, maintaining its viability throughout the treatment. These results support the use of the species in rhizofiltration systems and constructed wetlands, offering an environmentally friendly and cost-effective solution for purifying lead-contaminated water.

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Phytoremediation Potential of *Helianthus annuus* Seeds in Copper-Contaminated Waters

PTE 59/2025

*Alexandru Becheru, Letitia –Violeta Ghimiși,
Sorin-Ștefan Biriș, Cristina Ileana Covaliu-Mierlă*

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Description

This research investigates the efficiency of *Helianthus annuus* (sunflower) seedlings in the phytoremediation of copper-contaminated water using a hydroponic system. The seedlings were exposed for 72 hours to three precise Cu^{2+} concentrations: 0.63 mg/L, 1.02 mg/L, and 1.86 mg/L. During the experiment, copper removal from the solution and the plants' morphological response were monitored.

The results showed that at concentrations of 0.63 mg/L and 1.02 mg/L, the copper removal efficiency exceeded 96% after 72 hours. At 1.86 mg/L, efficiency decreased to approximately 35%, with significant phytotoxic effects observed. Morphological analysis revealed reduced stem length, discoloration, and decreased root mass, as well as the appearance of foliar chlorosis at the highest concentration.

Visual observations presented in Figure 1 illustrate the degree of copper-induced stress on the seedlings, ranging from vigorous control plants to specimens exhibiting pronounced phytotoxic symptoms (1.86 mg/L Cu^{2+}). Figure 2 compares root system development, highlighting discoloration and reduced root density at 1.86 mg/L.

The novelty of this study lies in its focus on the early developmental stage of *Helianthus annuus* seedlings in a hydroponic system for copper water phytoremediation. Unlike previous studies that targeted mature plants, this work demonstrates that seedlings can achieve efficient short-term remediation, offering a new perspective on the applicability of phytoremediation in copper-contaminated aquatic environments.



PILOT PLANT FOR WASTEWATER TREATMENT BY FLOTATION

Patent/project number: PTE 59/2025

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Cristina Ileana Covaliu-Mierlă, Laura Magdalena Toma, Sorin Ionescu, Corina Moga, Sorin-Ștefan Biriș

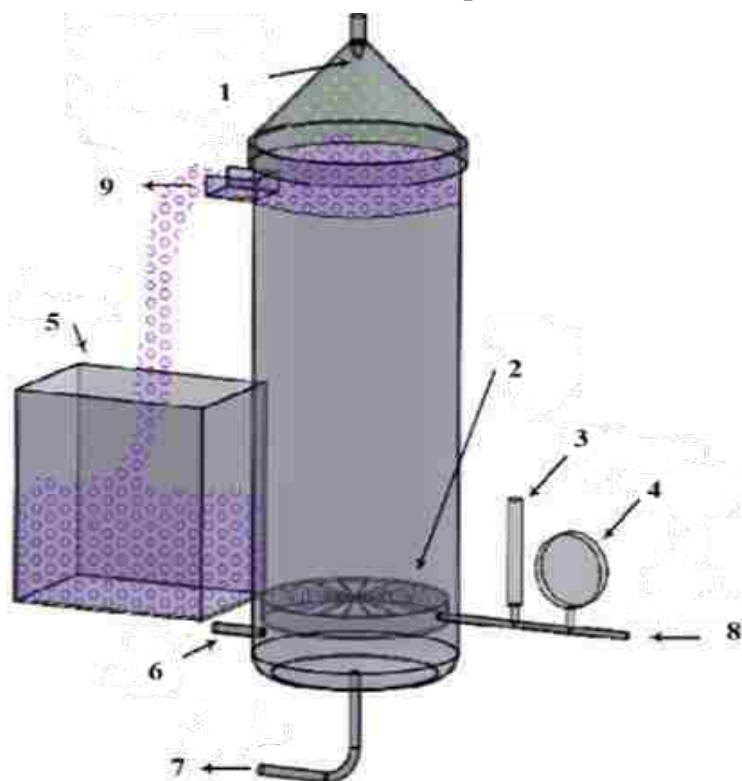
Description: The technical solution consists of an innovative nanotechnology based on the compressed air flotation process, enhanced by the addition of ecological nanomaterials. The flotation process will also be enhanced with the help of a fine bubble diffusion system that will achieve intimate contact between the pollutant in the water (fats and/or colloidal particles in suspension) and the air bubbles, so that the aeration process will result in a foam on the surface of the treated water, foam that will retain the pollutants.

The role of nanoparticles of ecological magnetic materials is to form a steric barrier, thus preventing the coalescence of bubbles in the foam composition and thus achieving an increase in its stability, which results in the following advantages:

- i) complete incorporation and over a long period of time of the pollutant retained in the wastewater until after the stage of its removal from the water surface,
- ii) favoring the achievement of a treatment efficiency close to/or 100% in the case of some categories of pollutants (fats), which once retained from the wastewater cannot return to it as a result of the breaking of the foam that incorporates them.

WaterFlo is to develop and validate at pilot level (TRL 6) the flotation installation with hybrid ecological nanomaterials used in water purification, by creating the following components:

- flotation equipment equipped at the bottom with a pressurized air diffusion system, and at the top with a formed foam evacuation ramp;
- hybrid oxide nanoparticles injection system at the top of the flotation equipment to increase the efficiency of the flotation process;
- foam collection and storage system, including nanomaterial recovery and regeneration.



- 1 - distribution system of nanoparticle through dispersion
- 2 - air system dispersion
- 3 - flow meter
- 4 - manometer
- 5 - foam collector
- 6 - wastewater input
- 7 - wastewater treated evacuation
- 8 - compressed air
- 9 - foam evacuation

Figure 1. Pilot plant installation for wastewater treatment

State of development: The research is at the pilot experimental stage. Laboratory-scale Results confirmed the nanomaterials give high efficiency of removing oil from wastewater by: stabilizing the froth phase because of preventing the bubble coalescence and decreasing time for waste water treatment.

Multifunctional products with foliar application based on diatomaceous earth

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Project number: PN-IV-P7-7.1-PTE-2024-0361 55PTE/05.052025

Authors: Lupu Carmen, Lăzureanu Cătălin, Constantinescu-Aruxandei Diana, Badju Stere, Oancea Florin

Description. Project aim to develop new multifunctional products for foliar application. The objectives are: (i) the development of a pilot plant for the manufacture of multifunctional foliar products based on diatomite; (ii) validation of the pilot technology for their production at industrial level; (iii) demonstrating the functionality of the technology at industrial level by characterizing and testing the products from the pilot; (iv) dissemination and valorization of results. The product novelty is the development of multifunctional products with foliar fertilizer action combined with that one of diatomite, forming films and releasing soluble silicon. The innovative process approach involves the addition of bioactive film conditioning agents, which facilitate film formation and increase the active surface area. The new marketing element is related to the testing of products in horticultural farms, through the establishment of 2 Living Labs that will facilitate the participation of those interested, the certification of the product for ecological horticulture and its adoption by farmers. In this way, the framework for the valorization of a valuable national mineral resource (Patârlagele diatomite having a low level of crystalline silica and a large specific surface), located in the Topominera exploitation, will be created, to obtain products that contribute to increasing the resilience of horticultural holdings to climate change.

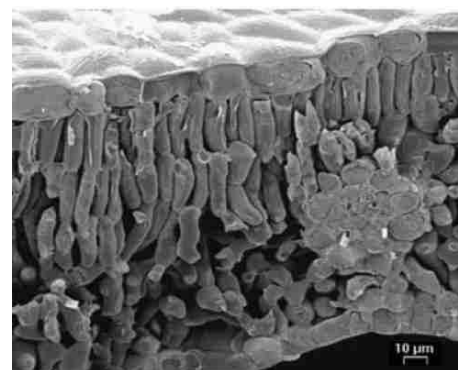
Pictures & graphics



Patârlagele DE quarry



DE frustules



DE foliar particle film



Treatment of apricot trees



Treatment of almond trees



Treatment of eggplants

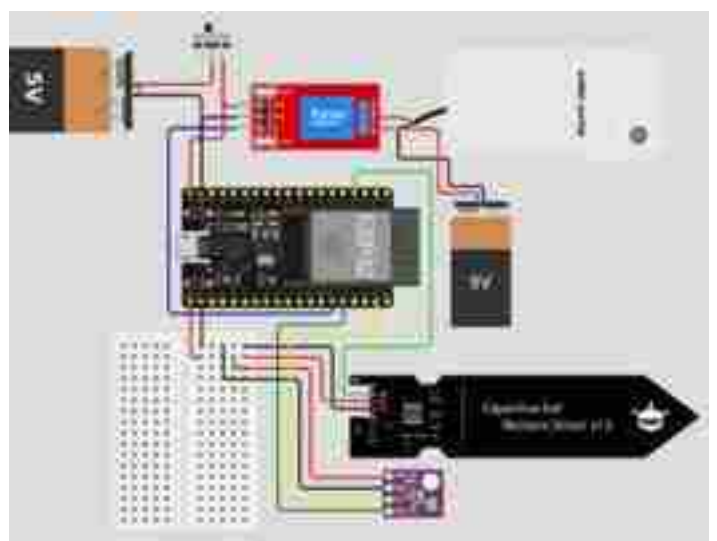
AUTOMATED SYSTEM IN AGRICULTURE

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Association for Community Development Vladimir

Description

This paper presents the development and implementation of an Internet of Things (IoT) system dedicated to monitoring and automating irrigation in an agricultural greenhouse. The project uses an ESP32 microcontroller, soil moisture sensors, and a BME280 sensor to collect relevant environmental data. The information is transmitted via Wi-Fi and can be accessed in real time through a web interface. The system automatically controls a water pump through a relay module, ensuring efficient plant watering. Real-world testing has demonstrated reduced water consumption and improved stability of microclimate parameters. The work includes an analysis of hardware components, software architecture, methods of expansion, and perspectives for integration into scalable agricultural solutions.



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ADVANCED AUTOMOTIVE DIAGNOSTICS TRAINING

advanced training courses

Authors: Gidali Adrian, Simon Florin

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GARAGE TRAINING's field of activity is the development and support of advanced training courses for automotive diagnosticians and qualified technical personnel in automotive repair workshops (mechatronics, electricians and car mechanics). The courses focus on the application of practical diagnostic methods, on detailed knowledge of the systems and components of the proposed topic, on the optimal use of specific measuring and testing equipment (diagnostic tester-oscilloscope-multimeter-specific equipment), as well as on compliance with the maintenance and repair standards imposed by automotive manufacturers. The initial segment of the course structure represents a series of introductory training sessions, developed specifically to understand the functioning of AUTOMOTIVE MECHATRONIC SYSTEMS. The course schedule is from 9:00 AM to 5:00 PM, with a lunch break from 1:00 PM to 2:00 PM and coffee breaks at 11:00 AM and 3:00 PM.



Contact: cursuri.garagetraining@gmail.com
<https://www.facebook.com/adrian.gidali>

DISCOVER TRANSYLVANIA GUIDED BY A MEDIEVAL KNIGHT

Author: Harald-Alexandru SUSANYI

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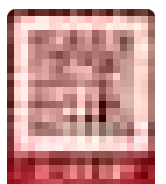
I'm Harald from Hunedoara and I guide in the beautiful province of Transylvania dressed in a knight templar suit. I'm studying history at the „1 December 1918” University of Alba Iulia and I'm fond of history of Transylvania and of the Corvin's family from Hunedoara.



Since 2019, I offer to my tourist groups some unique experiences, let's say „medieval experiences”, managing to make history interact with them. I will not mention them here, but I invite you to discover them together.

My tours are based on emotions, because information can be easily forgotten, but emotions remains alive in our hearts for years.

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THE IMPORTANCE OF EDUCATION AND CREATIVITY FOR YOUNG STUDENTS

Author: Prof. Dr. Anuja Malik

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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, irrespective 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 ideas, 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 learning, 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 spirit of 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 potential. The integration of culture in education and creativity is a window to unparalleled opportunities that young students ought to embrace.

Let's education. Discover the pivotal role of education and creativity in the lives of young students. Uncover how this integration can pave a brighter future for our young generation.



EMPOWERING YOUNG MINDS

DR. ANUJA MALIK



EDUnet SPACE

BE TEEN ASSOCIATION

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Description

EDUNET SPACE is an innovative educational center located in Târgu Jiu, Gorj County, dedicated to promoting modern learning and developing STEAM skills (Science, Technology, Engineering, Arts, and Mathematics) among children and young people. The 250 m² interactive space provides an inspiring environment for hands-on workshops, experiments, robotics, digital art, augmented reality, and collaborative projects.

The project aims to foster curiosity, creativity, and critical thinking through non-formal education methods that connect theory with real-world applications. Initiated by the **Be Teen Association** and supported by local partners, EDUNET SPACE seeks to make learning engaging, accessible, and relevant for the community in Gorj.

Pictures & graphics



Robot R.O.D.

Project

*Authors: Pipiași Matei, Ciucur Alexandru,
Cola Emilian, Anuțoiu Andrei*

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Description

The R.O.D. robot is a prototype based on an original idea, designed for the automatic organization of activities in industrial storage areas. It was built from the ground up as a device intended to eliminate the need for manual labor in hazardous zones that involve handling heavy loads. The robot consists of a four-motor platform on which a robotic arm with a 180-degree range of motion is mounted. The platform can move according to a preset program defined by the user or can be controlled via a web application developed for a mobile phone. The preset program specifies the location from which products must be collected and the new location where they must be moved. The robot was developed around an Arduino Uno R4 WiFi board. The control interface was built using web technologies (CSS, HTML, JavaScript), while the coordination logic was written in C++ and functions as a web server. As safety measures, proximity sensors were installed to detect potential obstacles and protect the robot from collisions. Additionally, an LED display is included to provide information about the progress of the assigned tasks.



CorneliuGroup Camp Learning in Nature

Educational program

Author: Corneliu BIRTOK BANEASA & Team

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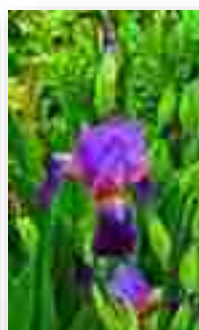
Starting from the concept of "outdoor education", **Corneliu Group Camp - Learning in Nature** aims to offer young people an optimal framework for the preparation of educational projects, in parallel with the development of the creative spirit and connection with nature.

We encourage #CreativeMindPower, #OutsideTheBox thinking and #SDGActions so if you want a balance between formal education and creativity, we welcome you to join our camp!



Another important part of **Corneliu Group Camp - Learning in Nature** project is environmental protection through implementation of **Sustainable Development Goals**.

Our main objective is for young people to spend as much time as possible in nature in the spirit of SDG. In this sense, we have developed programs to teach young people about the importance of communion between man and nature through practical actions as: Planting trees, Creating Vegetable Gardens, Plant careing, Planting Aromatic Plants, Cutting grass.



"Be stubborn and follow your dream!"

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SCAN ME

Corneliu Group Camp - Learning in Nature project started in 2020 respecting both the social distancing rules imposed by the pandemic context of that year, as well as the students' need to socialize and work in a team, the camp represents a unique space, where engineering sciences and the natural environment meet for create beneficial outcomes for both participants and society.

PILL ORGANIZER WITH WARNING SENSOR 3D PRINTED FROM RECYCLED PLASTIC

Authors: Vartolomei Nicoleta, Tănasă Simina, Pîrvu Andrei

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The overall objective of the project is to obtain a pill organizer for elderly people with a 3D printed warning sensor from recycled plastic, tracking the degree of involvement in environmental protection by recycling plastic materials in order to produce filament for 3D printing. Even though today they have their phones at their disposal and can set an alarm, there are some elderly people who have not adapted to mobile phones, and it would be much easier for them to remember to take their pills at the right time. The pill organizer for the elderly people can be printed on both sides without supports and is equipped with a small screen, a small speaker and a base plate with a buzzer, on which the time can be set to ring, reminding them to take their pills.



Conclusions

Plastic bottles have found a new use: raw material for 3D printers. Pill organizer for elderly people with a 3D printed warning sensor from recycled plastic, tracking the degree of involvement in environmental protection by recycling plastic materials.

Acknowledgements

This study was performed with the support material by *Technological High School of Targu Ocna*

Oltenia TechFest Catalogue 1st edition
6 - 7 November 2025
Târgu Jiu, Romania



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