PEERS ALLEY MEDIA

NANO Intellects 2022

VIRTUAL EVENT

2nd Global Conference on

Advanced Nanotechnology & Nanomaterials

June 22-23

2022

Peers Alley Media

1126 59 Ave East, V5X 1Y9

Vancouver BC, Canada

WhatsApp No: +1 873-889-8976

https://nanointellects.peersalleyconferences.com/

PEERS ALLEY MEDIA

YOUR FIRST CHOICE FOR RESEARCH INGENUITY

PROGRAM-AT-A-GLANCE

NANO INTELLECTS 2022

DAY 1

JUNE 22, 2022

Scientific Program

BST- British Summer Time

08:15-08:30 **Opening Ceremony**

Distinguished Speaker Talks

Sessions: Nanotechnology | Nano Biotechnology | Nano Pharmaceuticals | Nano Polymers | Robotics | Commercialization of Nanotechnology | Nano Chemistry | Molecular Nanotechnology | Nanotechnology in Cancer Treatment | Advancing Cellulose-Based Nanotechnology | Forensic Nanotechnology | Nanotechnology and Energy | Nanostructures and Nanofilms | Nano Medicine | 3D Printing | Carbon Nanotubes | Fuel Cells

08:30-08:55

Title: Performance analysis of Terahertz unmanned aerial vehicular networks

Zihuai lin, *The University of Sydney, Australia*

08:55-09:20

Title: 2D active nanobots powered by an ultralow fuel concentration

Motilal Mathesh, *Deakin University, Australia*

09:20-09:45

Title: A theoretical discussion of the theory of negative pressure within wood Hierarchical nano-structure in the light of CT-scanner images of wood during drying

Diego Elustondo, *Chemical and Bioprocess Engineering Scion, Newzealand*

09:45-10:10

Title: The magnetic enhancement effect in methanol oxidation reaction with CoPt truncated octahedral nanoparticles

Jialong Liu, *Beijing University of Chemical Technology, China*

10:10-10:35

Title: Nanomaterial design *via* joint first principles and machine learning exploration

Huashan Li, *Sun Yat-sen University, China*

Refreshment Break 10:35-10:50

10:50-11:15

Title: Synthetic *poly(lactic-co-glycolic acid)* microvesicles as a feasible Carbon Monoxide-releasing platform for Cancer treatment

Wei-Peng Li, *Kaohsiung Medical University, Taiwan*

11:15-11:40	**Title: Obtaining 3D structured diatomaceous biosilica doped with transition metal ions (Ti, V) and semi-metal ions (Ge, Te) by *in vivo* method** **Weronika Brzozowska,** *University of Szczecin, Poland*
11:40-12:05	**Title: A critical assessment of the current process of scientific and technological development: Search for an alternative perspective** **Badrudin Amershi,** *Cpo-Im, Germany*
12:05-12:30	**Title: Artificial Intelligence: Ecosystem of threats Vs. Ecosystem of trust** **Michal Boni,** *SWPS University of Social Sciences and Humanities, Poland*
12:30-12:55	**Title: Development of modified Phytosomes loaded with an enriched extract of coffee silverskin** **Faezeh Fathi,** *University of Portugal, Portugal*
Lunch Break 12:55-13:20	
13:20-13:45	**Title: Novel carbazole host materials for solution processed TADF/ Phosphorescent organic light emitting diodes** **Saulius Grigalevicius,** *Kaunas University of Technology, Lithuania*
13:45-14:10	**Title: Bioceramic nano and microparticles as component of bone regeneration system** **Bogdan Parakhonskiy,** *Ghent University, Belgium*
14:10-14:35	**Title: Prospects for the use of Electrooxidation and Electrocoagulation techniques for membrane filtration of irrigation water** **Estefania Espinoza Márquez,** *University Bookstore UAQ, Mexico*
14:35-15:00	**Title: Synthesizing heat transfer factors on thermal bonding structure of mineral added Polypropylene spun** **Wei Yu Wei,** *North Carolina State University, USA*
15:00-15:25	**Title: Autonomous Human machine systems** **William F. Lawless,** *Paine College, USA*
15:25-15:50	**Title: ERMO enterprise risk management optimization for emerging technology** **Howard A. Miller,** *LBW Insurances and Financial Services, USA*

Refreshment Break 15:50-16:05

16:05-16:30	**Title: Explore two-dimensional energy-efficient nanoelectronics** **Huamin Li,** *University at Buffalo, USA*
16:30-16:55	**Title: A second generation Nanoluc-IL27 fusion cytokine for Targeted-Gene-Therapy Applications** **Marxa Leao Figueiredo,** *Purdue University, USA*
16:55-17:20	**Title: AI Ethics: From substantialists to instrumentalists, towards a reasonable deflationism** **Frederick Bruneault,** *UQAM, Canada*
17:20-17:45	**Title: Advanced manufacturing of multifunctional nanocomposite materials for biomedical applications** **Haniyeh Fayazfar,** *University of Ontario Tech, Canada*
17:45-18:10	**Title: A Context-Aware Artificial Intelligence-based system to support street crossings for pedestrians with visual impairments** **Aleksandro Montanha,** *University of Seville, Brazil*
18:10-18:35	**Title: Using nanotechnology to combat Antidepressants discontinuation syndrome** **Adedapo Adesokan,** *PreciseMed, UK*

Panel Discussion

End of Day 1

DAY 2

JUNE 23, 2022

Scientific Program

BST- British Summer Time

Distinguished Speaker Talks

Sessions: Artificial Intelligence | Nanoscience and Technology | Novel Drug Delivery Nano Physics | Nano Weapons | Nano-Surgery | Functional Nano Materials | Graphene and Fullerenes | Properties of Nanomaterials | Materials Science and Engineering | Nano Structures | Materials Science

08:30-08:55	**Title: Possible application of using nuclear magnetic resonance to create a quantum computer based on the top-to-bottom approach** **Vladimir Voronov,** *Scientific and Technical Library of the Irkutsk National Research Technical University, Russia*
08:55-09:20	**Title: Kelvin-Helmholtz instability in the nanometer wavelength range** **Vladimir Dmitrievich Sarychev,** *Siberia State Industrial University, Russia*
09:20-09:45	**Title: Obtaining of electroless Cu-Ni-P coating on a dielectric surface** **Mihaela Georgieva,** *Institute for Physical Chemistry, Bulgaria*
09:45-10:10	**Title: Evaluation of therapeutic potential of Nanoceria *via* surface functionalization strategies for colon and Lung Cancer** **Elif Tarakci,** *Natural and Applied Sciences, Turkey*
10:10-10:35	**Title: Current trends in multifunctional nanoplatforms for bioimaging and controlled drug delivery in Cancer** **Seda Demirel Topel,** *Antalya Bilim University, Turkey*

Refreshment Break 10:35-10:50

10:50-11:15	**Title: A survey of Density based clustering Algorithms** **Panthadeep Bhattacharjee,** *Kalinga Institute of Industrial Technology, India*
11:15-11:40	**Title: Experimental study of fracture plugging effectiveness for improving the fracture pressure of a low bearing capacity formation** **James C Rwechungula,** *The University of Dodoma, Tanzania*

11:40-12:05	**Title: Green synthesis of selenium nanoparticles and evaluate their effect on the expression of *ERG3, ERG11* and *FKS1* antifungal resistance genes in *Candida albicans* and *Candida glabrata*** **Mahdi Hosseini Bafghi,** *Mashhad University of Medical Sciences, Iran*
12:05-12:30	**Title: A new multi-switch circuit with adaptive capacitance for vibration energy harvesting using smart materials** **Saber Mohammadi,** *Razi University, Iran*
12:30-12:55	**Title: Using a nano-glass powder in concrete- A Review** **Sief Aldeen Odaa,** *University of Anbar, Iraq*
Lunch Break 12:55-13:20	
13:20-13:45	**Title: Nanostructures of *Tris[(5,7-diphenyl)-8-quinolinolato]* Gallium(III) complex fabricated by surfactant- assisted microemulsion method** **Usama Abdullah Al-Zaabi,** *Sultan Qaboos University, Oman*
13:45-14:10	**Title: Chloroform-Injection (CI) and Spontaneous-Phase-Transition (SPT) are novel methods, simplifying the fabrication of liposomes with versatile solution to cholesterol content and size distribution** **Muhammad Ijaz Khan Khattak,** *University of Swabi, Pakistan*
14:10-14:35	**Title: Synthesis and characterization of Zinc Oxide (*ZnO*) nanostructures for sensing and dye degredation** **Shazrah Shahzad,** *Health Services Academy, Pakistan*
End of Day 2	
Closing Remarks	

BOOKMARK YOUR DATES

3RD GLOBAL CONFERENCE ON

ADVANCED NANOTECHNOLOGY & NANOMATERIALS

MARCH 2023 | LONDON, UK

https://nanointellects.peersalleyconferences.com/

SCIENTIFIC ABSTRACTS

DAY 1

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on Advanced Nanotechnology & Nanomaterials

June 22-23, 2022

NANO INTELLECTS 2022

Performance analysis of Terahertz unmanned aerial vehicular networks

Zihuai Lin[2] and **Xufang Wang**[1]

[1]*The Key Laboratory of Optoelectronic Science and Technology for Medicine of Ministry of Education, Fujian Normal University, China*
[2]*The School of Electrical and Information Engineering, University of Sydney, Australia*

Terahertz (THz) transmission technologies constitute a promising candidate for supporting ultra-broadband short-range next generation communications. Hence, we analyse the performance of unmanned aerial vehicle (UAV) in the THz networks. The coverage probability is derived as well as the area spectral efficiency (ASE) and a pair of Line-of-sight (LoS)/non-line-of-sight (NLoS) probability models, namely the microcell LoS/NLoS probability model and picocell LoS/NLoS probability model are adopted. Furthermore, the lower-bound of the network performance are derived via homogeneous Poisson point process (HPPP) analysis, as well as the upper-bound. The simulation results match the analytical results well, which show that the coverage probability of the network first increases upon increasing the THz UAV BS density, and then decreases beyond the maximum. Given the severe path loss experienced by THz signals, a higher UAV density is required for a certain coverage probability than at lower carrier frequencies.

Biography

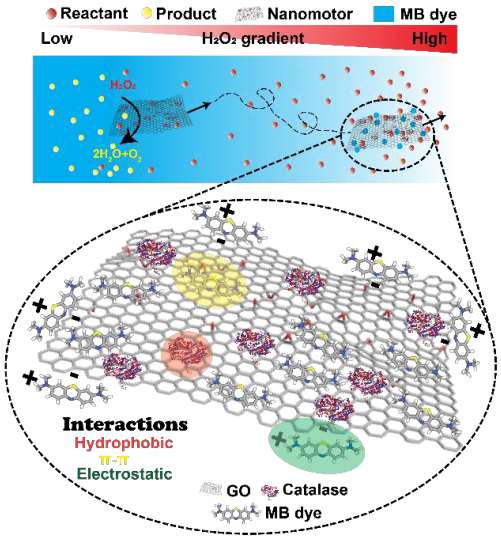
Zihuai Lin (M'06-SM'10) received the Ph.D. degree in Electrical Engineering from Chalmers University of Technology, Sweden, in 2006. Prior to this he has held positions at Ericsson Research, Stockholm, Sweden. Following Ph.D. graduation, he worked as a Research Associate Professor at Aalborg University, Denmark and currently a senior lecturer at the School of Electrical and Information Engineering, the University of Sydney, Australia. He is an associate editor for IEEE access. His research interests include source/channel/network coding, coded modulation, MIMO, radio resource management, cooperative communications, small-cell networks, 5G/6G, IoT, ECG and EEG signal analysis, Radar imaging, etc.

2D active nanobots powered by an ultralow fuel concentration

Motilal Mathesh and **W. Yang**
School of LES, Deakin University, Australia

Active motion-based micro/nanosystems of different shapes and sizes has stimulated tremendous interest in the last decade for biomedical applications and addressing envi-ronmental issues. The geometry and architecture of these artificial systems plays a crucial role to achieve a sustained motion by overcoming the strong viscous forces at low Reynolds number and strong thermal fluctuations at the micro/nanoscale. Currently, their design is mainly based on a complex three-dimensional (3D) architecture, with limited accessible surface areas for the catalytic sites, and thus requires a higher fuel concentration to achieve active motion.

Herein, we report for the first time an enzyme-powered 2D nanobot, which was designed by a facile strategy based on soft nanoarchitectonics for active motion at an ultralow fuel concentration. The 2D nanobots was characterized by spectroscopic, microscopy techniques and their active motion was observed by nanosight measurements. The 2D nanobots exhibited efficient positive chemotactic behavior and the ability to swim against gravity by virtue of solutal buoyancy. As a proof-of-concept, the 2D nanobots showed an excellent capability for "on-the-fly" removal of methylene blue (MB) dye with an efficiency of 85%. We expect, such 2D nanobots with chemotactic behavior will create considerable potential for designing structures with a wide range of applications ranging from biomedical to plant nanobiotechnology for active motion-based delivery to tumor microenvironment and site-specific delivery of cargo molecules to cellular organelles, respectively.



Biography

Motilal Mathesh received his PhD degree (2016) from Deakin University (Australia), in the field of bio-nanotechnology. In 2017, he joined Prof. Daniela Wilson's group at Radboud University (The Netherlands) and was awarded the prestigious Marie Curie Individual fellowship. Recently, he was awarded the Alfred Deakin Postdoctoral Fellowship and joined Deakin University (Australia) as a research fellow. His current research interest focuses on the design and fabrication of 2D nanomotors for environmental, plant nanobiotechnology and biomedical applications.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

A theoretical discussion of the theory of negative pressure within wood Hierarchical nano-structure in the light of CT-scanner images of wood during drying

Diego Elustondo

Chemical and Bioprocess Engineering Scion, New Zealand

Wood hierarchical nano-structure has evolved to provide both mechanical support and water transport in living trees. Cells that are already dead inside the tree create an anisotropic network of micro-channels and nano-pores that raise water in metastable state of negative pressure many times below absolute zero. Wood as a material inherit this intrinsic functionality of cells, but the use of wood products for water transport has not been traditionally a main area of research. On the contrary, traditional wood-water relationships theory tends to interpret wood cellular structure as mere network of interconnected channels, while the inherited functionalities of cell walls in the development and control of negative pressure is usually overlooked. This presentation discusses the theory of negative pressure in the light of CT-scanner images of wood during drying. A CT-scanner was used to scan 25 mm thick radiata pine boards during drying at 90°C dry-bulb and 60°C wet-bulb temperatures. Twenty transverse sections spaced by 10 mm along the

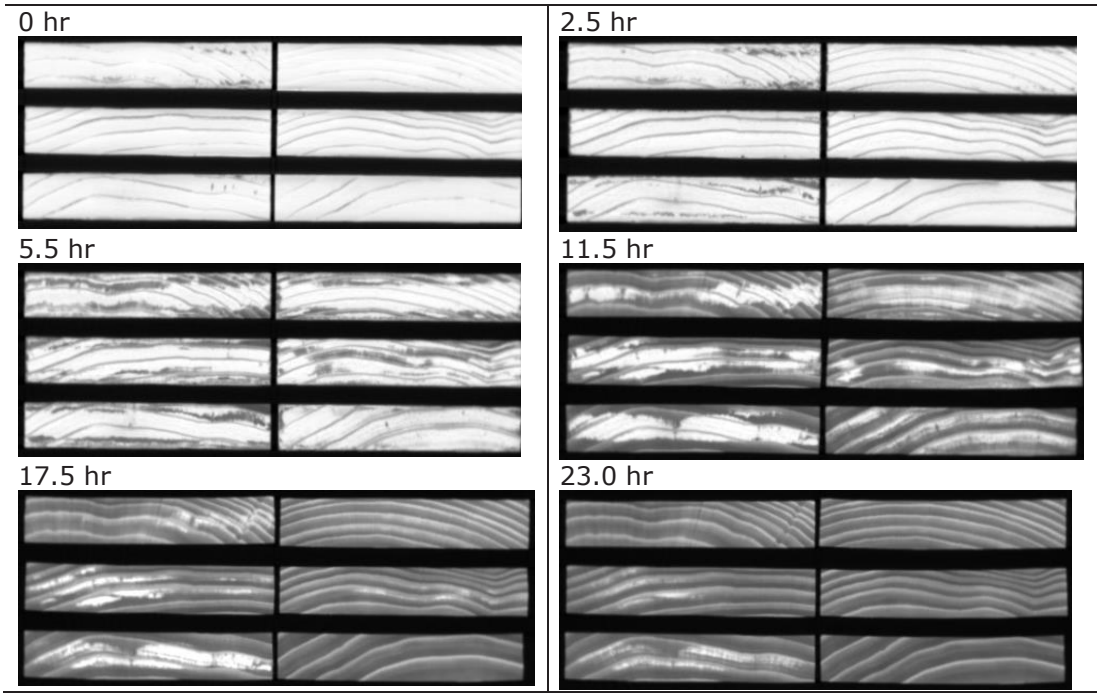


Fig 1: *CT-scanned images at the center of the boards during drying*

length of the boards were CT-scanned six times during drying (Fig.1 shows CT-scanned images at the center of the boards). Although the study did not attempt to measure negative pressure inside wood cells, it provided clear evidence that moisture content distributions inside the wood do not always resemble moisture transfer mechanism that are commonly assumed in wood drying. In fact, it showed that water can theoretically move from dry to wet zones, which is counterintuitive if the classical Darcy's and Fick's laws are invoked. This presentation explains the CT-scanner data by using the theory of water potential, which it is argued provides a more complete description of the driving forces for water transport inside the wood hierarchical nano-structure.

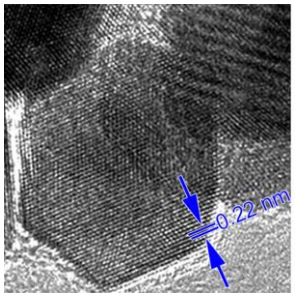
The magnetic enhancement effect in methanol oxidation reaction with CoPt truncated octahedral nanoparticles

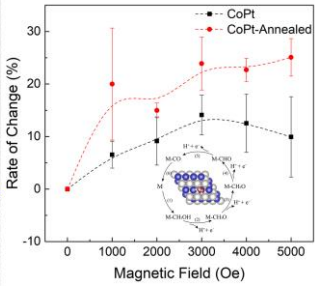
Jialong Liu[1], Wei Wang[1] and **Shouguo Wang[2]**

[1]School of Mathematics and Physics, Beijing University of Chemical Technology, China
[2]School of Materials Science and Engineering, University of Science and Technology Beijing, China

The electrocatalysis can be tuned by external multi-fields, such as magnetic field, thermal field, and electric field, which is the most promising approach to expand the theory, design and synthesis of state-of-the-art catalysts in the near future. However, the process and mechanism of physicochemical reactions are complex under multi-fields and need in-depth study. Here, the effect of external magnetic field and thermal field on methanol oxidation reactions (MOR) in magnetic CoPt nanoparticles is systematically investigated. Firstly, for Co42Pt58 truncated octahedral nanoparticles (TONPs), the catalytic performance in MOR is greatly increased to the maximum of 14.1% by applying a magnetic field up to 3000 Oe, the saturation field. The catalytic performance is monotonically enhanced with increasing working temperature. Meanwhile, the magnetic enhancement effect is closely related to the Co content of CoxPt100-x TONPs. Furthermore, the enhancement effect under magnetic field is more pronounced for Co42Pt58 TONPs annealed at 650 °C. First-principles calculation successfully reveals the change of energy with the presence of magnetic fields. It points out that the magnetic fields are beneficial for the dehydrogenation of both methanol and water by suppression of entropy of the electron spin and lowering of the activation barrier, where OHad intermediates on Co sites plays a more important role. The effect of magnetic fields together with thermal fields provides a new prospect to accelerate the applications of direct methanol fuel cells.

The enhancement effect of external magnetic field on methanol oxidation reactions in CoPt truncated octahedral nanoparticles and the annealed samples has been studied by experimental and theoretical analysis as shown above[1].





Biography

Jialong Liu is a lecturer in Beijing University of Chemical Technology. In 2016, he received the PhD degree in condensed matter physics from Beihang University. After graduation, he became an engineer at the Institute of Geology and Geophysics, Chinese Academy of Sciences. In 2021, he joined the School of Mathematics and Physics in Beijing University of Chemical Technology. His research interest is the synthesis and nanoscale characterization of metallic transition nanomaterials and the research for tuning spin and property in physicochemical reactions.

Nanomaterial design *via* joint first principles and machine learning exploration

Huashan Li
Sun Yat-sen University, China

Joint theoretical and statistical models can be developed based on the combination of analytical derivation, first principles calculation, and machine learning analyses. Such models pave an attractive avenue to elucidate the fundamental structure-property relationship, and ultimately to achieve the inverse design of complex nanomaterials. In this talk, we will present our latest accomplishments in two-dimensional piezoelectric materials as well as the new machine learning model built to interpret physical systems.

Two-dimensional piezoelectric materials have been regarded as ideal candidates for flexible and versatile nanoelectromechanical systems, yet their fundamental piezoelectric mechanisms remain to be fully understood. We develop universal models for quantifying the piezoelectricity of three-coordinated honeycomb-like monolayers at the atomistic level. The theoretical model within the framework of modern polarization theory suggests that the distribution of effective Berry curvature is essential for interpreting the relation between microscopic/electronic structures and piezoelectric properties. The statistical model based on DFT high-throughput calculation reveals that 2D piezoelectricity crucially depends on the effective mass, bandgap, and atomic distance along the rotation axis. Implementing stress and doping is demonstrated to be effective for optimizing piezoelectricity.

Intelligent generation of time-variant control series remains the critical challenge for acquiring the desired system evolution. A machine learning (ML) algorithm named time-series generative adversarial network (TSGAN) is developed to overcome the difficulties, by incorporating a long short-term memory (LSTM) kernel for recognizing multirange temporal patterns beyond the Markovian approximation and an adversarial training mechanism for efficient optimization. A variety of time series are examined by temperature-control experiments, and the results demonstrate an exceptional accuracy (>95%, 35% higher than prevalent ML methods) as well as strong transferability and stability of the TSGAN algorithm. The capability of generating arbitrarily complex response series opens an opportunity for the inverse design of time-variant functionals.

Biography

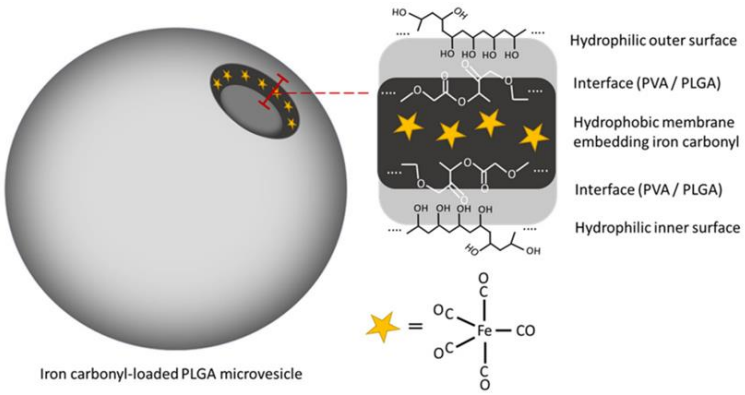
Huashan Li received her PhD degree in Colorado School of Mines in 2014, and has been working as associate professor in Physics Department of Sun Yat-sen University since 2017. She strives to pursue fundamental understanding of the relationship between optical response, charge/exciton dynamics, and atomic-scale structure in complicated systems, and to employ the derived guidelines to accelerate the design of novel materials for applications that crucially rely on efficient energy-conversion and fast state-transition.

Synthetic *poly(lactic-co-glycolic acid)* microvesicles as a feasible Carbon Monoxide-releasing platform for Cancer treatment

Wei-Peng Li

Department of Medicinal and Applied Chemistry, Kaohsiung Medical University, Taiwan

Biogenic microvesicles (MVs) play a pivotal role in intercellular signal communication, thus initiating critical biological responses such as the proliferation of cancer cells, gene and protein transport, and chemo-drug resistance. In addition, they have been recognized as having great potential in drug delivery applications. However, the productivity of biologically produced MVs is not sufficient for clinical applications. In this study, synthetic poly(lactic-co-glycolic acid) (PLGA) MVs were prepared via a double emulsion method. The PLGA MVs had a biogenic MV-mimic vesicular structure with a hydrophilic core/surface and hydrophobic interior of the shell, showing great potential for drug delivery. We successfully embedded hydrophobic iron carbonyl (IC), a carbon monoxide (CO) donor, in the PLGA shell region, enabling the delivery of IC in an aqueous solution. Because of the intrinsic properties of PLGA, it was susceptible to temperature, and the MVs could easily collapse in a warm environment, leading to the decomposition of IC into CO. The *in vitro* result indicated that the cell viability of A549 lung carcinoma cells significantly decreased to 14% after treatment with IC-loaded PLGA MVs for 24 h, suggesting that these synthetic PLGA MVs constitute an excellent drug delivery platform.



Iron carbonyl-loaded PLGA microvesicle

Biography

Wei-Peng Li is a Yushan Young Scholar and Assistant Professor at the Department of Medicinal and Applied Chemistry in Kaohsiung Medical University (KMU). His research expertise is developing novel nanomaterials and microbial electrochemistry to overcome clinical challenges. After receiving his Ph.D. degree in Chemistry under the supervision of Professor Chen-Sheng Yeh at National Cheng Kung University (NCKU) in 2015, he continued his studies in the same lab as a postdoctoral researcher until 2018, focusing on developing novel nanotechnology and its application in oncology, photochemical therapy, gas therapy and wound healing. From 2019-2020, he joined Professor Akihiro Okamoto's group at the National Institute for Materials Science (NIMS) in Japan, where he eventually branched his studies towards microbial electrochemistry. His Innovative Nanomedicine Lab (INL) is the first research group globally that attempts to combine various techniques from two independent fields; microbial electrochemistry and nanomedicine.

Obtaining 3D structured diatomaceous biosilica doped with transition metal ions (Ti, V) and semi-metal ions (Ge, Te) by *in vivo* method

Weronika Brzozowska[1], Myroslav Sprynskyy[2], Izabela Wojtczak[2], Przemysław Dąbek[1], Andrzej Witkowski[1] and Bogusław Buszewski[2,3]

[1]Institute of Marine and Environmental Sciences, University of Szczecin, Poland
[2]Department of Environmental Chemistry and Bioanalytics, Faculty of Chemistry, Nicolas Copernicus University, Poland
[3]Centre for Modern Interdisciplinary Technologies, Nicolaus Copernicus University, Poland

Diatoms are single-celled algae of microscopic size (from 5 µm to 500 µm). They can live singly or form colonies where each cell is a separate entity [1]. Diatom frustules are perforated with periodical nanopore systems, thus creating unique openwork and three-dimensional structures [2]. Opportunities of biosynthesis of 3D structured silica by growing diatoms can also significantly extend to the chemical modification of diatoms in the growing process (metabolic insertion) [3]. The synthesis and the possibility of adding other elements to their structure carried out by these „microtechnologists" and the possibility of adding, permit to obtain a modern material [4,5]. The unique natural structure of diatom frustules can be also used as a template, either to coat it with other substances, or to replace the silica of other materials.

The aim of the research work is the production of diatom biosilica with openwork three-dimensional structure doped with transition metal ions (Ti, V) and semimetal ions (Ge, Te) by cultivation of the selected species of diatoms (Pseudostaurosira trainorii) under laboratory conditions by manipulating the culture conditions. The cultivation is carried out in 3-liter glass flasks, for a period of 12 days, with the Guillard F/2 culture medium and a pH value of 8.2, lighting with 2 fluorescent lamps (1500 lux) at 19-20°C. The concentration of the doped element was about 0.35 mmol/L while the concentration of soluble silicon was about 0.045 mmol/L. The possibility to obtain the naturally organic functionalized 3D biosilica without complete the removal of strongly bonded organic residuals (biosilica-associated organic residuals) from diatom frustules and doped by elements with unique properties is a new interesting aspect providing our work novelty.

The investigation of morphological and structural features, elemental composition, photoluminescence properties and the specifics of the distribution of the doped elements in the silica exoskeletons structure using FTIR, XRD, TGA, SEM, TEM, ICP/MS and spectrofluorometry.

Biography

Weronika Brzozowska obtained MA degrees in Quantum Chemistry and Forensic Chemistry at the Faculty of Chemistry at the Nicolaus Copernicus University in Toruń in 2016 and 2019. During her research for the second master's thesis, she implemented the Ministry of National Defense project entitled "Study of the physicochemical properties of intelligent composites with the use of electroactive materials" in cooperation with the Polish Naval Academy based in Gdynia. Currently, she works on the modification of algae - diatoms - with metal ions in order to obtain innovative nanosilica materials with unique optoelectronic properties and semiconductor. These activities are directly related to the doctoral studies that she carries out as part of the Doctoral School of the University of Szczecin (US), in the discipline of Earth and Environmental Sciences. She is also a member of the US research team implementing the project "Advanced biocomposites for the economy of tomorrow BIO-GNET".

A critical assessment of the current process of scientific and technological development: Search for an alternative perspective

Badrudin Amershi
Cpo-Im, Germany

The objective is to make a critical assessment of the general process of scientific & technological development to date and the role played by AI and related technologies.

The scope of the paper includes a historical review of this process and its origins in the epochal scientific cultural revolution in Europe (the West) initiated by the Age of Enlightenment and its vehement pursuit of "rationality"- in contrast, to trust in "religious beliefs." We can depict this as the mindset of the West. Later this mutated into an overt "belief" in the power of "computational processes" as a 'safer' way to acquire knowledge, unfettered by blind faith or "irrational" factors.

This appears to be the driving force behind the emergence of AI. It is now globally the dominant "mindset", investing formidable trust in the power of computational processes and devices, which lead to scientific discoveries - bar any human-social interference. Rationality and the power of computational processes to achieve scientific progress are the hallmarks of this development.

Human "artefacts" are more or less left alone to plot their own course - without ethical and social correctives. Questions like "for what, for whom, and why" are regarded as hindrances. In retrospect, three hundred years after the dawn of the culture of "enlightenment" (in the West), humans seem to be abandoning their guiding role in this process.

To conclude: How can we regain control of this process? Can a change of "perspective" and viewing this process from an alternative "mindset" provide us with new insights and enable us to regain control?

Biography

Badrudin Amershi completed his higher education at the Universities of Heidelberg (Natural and Social Sciences) and Bielefeld with a Master's Degree (M.A – 1973) and a Ph.D. (1983) in Social Sciences and Economics. From 1979 to 1989 as Head of the South Asia Department (of Terre des Hommes, Germany), he was charged with overseeing operations in South Asia and Eritrea/Ethiopia. 1989-1995 he worked in leading positions for the official German Agency for international technical development (Aiz/GiZ), the EU in Brussels, and for IOM in Geneva. Since 1996 he has been active as a technical consultant (for the EU) and as an international business consultant for several European firms for their operations in Asia and Africa. Besides obtaining various post-graduate certificates and diplomas he has also authored various technical papers – e.g., the "EU Training Manual: Managing Diversity in international Cooperation" (2007). Other publications include e.g., for the Cambridge Journal: "AI and Society" and for "Asia Bridge", Germany.

Artificial Intelligence: Ecosystem of threats Vs. Ecosystem of trust

Michal Boni

SWPS University of Social Sciences and Humanities, Poland

The reasons of threats:

1. Experience of the popular culture (movies, tv series, books, comics, games. - the hidden dystopy)
2. Practical, everyday experiences:

- Tracking models of advertising (surveillance advertisements)
- Various types of uncontrolled facial recognition use
- Algorithmic management in many areas: from public services to the management of the platforms' workers
- scoring solutions

How to built the trust:

- How to translate explainability and transparency principles into AI systems (not only regulation, but social oversight are needed)
- How to avoid unintended consequences of AI systems / the significance of the risk based approach and ex-ante impact assessment (ethical Technology Assessment)
- How to ensure and keep human control over technology / AI development
- how to adapt people to collaborate with AI systems (the meaning of the AI digital literacy)

All those aspects are important to start the way from threats to the trust, as a pillar of the future AI development.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Development of modified Phytosomes loaded with an enriched extract of coffee silverskin

Faezeh Fathi[1], Samad N. Ebrahimi[2], João A. V. Prior[3], Susana M. L. Machado[1], Reza Mohsenian Kouchaksaraee[1], M. Beatriz P. P. Oliveira[1] and **Rita C. Alves[1]**

[1]REQUIMTE/LAQV, Department of Chemical Sciences, Faculty of Pharmacy, University of Porto, Portugal
[2]Department of Phytochemistry, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Iran
[3]REQUIMTE/LAQV, Laboratory of Applied Chemistry, Department of Chemical Sciences, Faculty of Pharmacy, University of Porto, Portugal

Designing strategies for an effective valorization of food by-products into high-value ingredients is a priority to address environmental sustainability concerns. Coffee silverskin is the major by-product of the coffee roasting industry, being rich in compounds with health benefits. In this study, coffee silverskin extracts were enriched by adsorbent resin column chromatography regarding caffeine and chlorogenic acid contents. The compounds content increased 3.08- and 2.75-fold, respectively, compared to the original extract. The enriched fractions were loaded into cholesterol-incorporated nano-phytosomes (modified phytosomes) to improve physicochemical properties and permeation rates of the compounds under study. The modified nano-phytosomes were also subjected to a secondary layer with different natural polymers (gum arabic, maltodextrin, pectin, starch) to improve protection and stability against degradation in digestive media, as well as storage and handling. In parallel, and for comparison, natural polymers were also loaded directly with the enriched extract. The produced particles were evaluated regarding product yield (42.38 - 65.51%), encapsulation efficiency (91.22 - 95.11%), loading capacity (5.21 - 7.02%), particle size (114.1-604.5 nm), and surface charge (−24.43 to −59.86). FTIR and molecular docking confirmed interactions between the phytoconstituents and the lipid bilayer. For the first time, this work allowed to conclude that chlorogenic acid and caffeine showed lower and higher docking scores exhibiting stronger and weaker hydrogen bonding to the lipid bilayer, respectively. *In vitro* release monitoring was done simulating gastrointestinal conditions and evaluated in terms of stabilization time and kinetic models. Many of the particles followed a super slow-release time confirmed by different kinetic models. Korsmeyer–Peppas, first order, and Higuchi fitted well to the experimental data. Therefore, most of the formulated particles followed the case-I and anomalous transport mechanism.

Biography

Faezeh Fathi is a researcher of REQUIMTE/LAQV, Faculty of Pharmacy of University of Porto. She completed her PhD in Phytochemistry, at MPDRI, Beheshti University, Iran, and in Pharmaceutical Sciences - Nutrition and Food Chemistry, at the Faculty of Pharmacy of University of Porto in 2021. Besides her academic expertise, she worked in R&D section of P.T.S Group as researcher, leader of R&D and technical manager for 3 years (2015-2018). Her specialization domains are extraction, enrichment, and standardization of natural plant-based structures as well as different encapsulation techniques (lipid-based carriers, nanoemulsion, suspension and cream).

Novel carbazole host materials for solution processed TADF/ Phosphorescent organic light emitting diodes

Saulius Grigalevicius

Department of Polymer Chemistry and Technology, Kaunas University of Technology, Lithuania

Several functional and internal layers have been used to improve the performance of solution-processed OLED devices. In the case of thermally activated delayed fluorescence (TADF) OLEDs, a large number of emitter materials have already reported, but the design and development of potential host materials are overlooked. Efficient solution process-able host materials for TADF OLEDs can reduce the complexity in the device architecture and production cost. We utilized a series of carbazole based solution-processable host materials to fabricate the 2,4,5,6-tetra(9H-carbazol-9-yl)isophthalonitrile (4CzIPN) based green TADF OLEDs. Among them, the bicarbazole composing device showed the best performance. The resultant device exhibits a maximum power efficiency of 40.0 lm/W, current efficiency of 44.7 cd/A, and external quantum efficiency of 14.1% with a maximum luminance of 16,220 cd/m2. The host derivative, we further tested as a host for Ir(ppy)3 based phosphorescent OLEDs also. The excellent performance of the devices may be attributed to the low singlet-triplet energy gap (ΔEST), high photoluminescence quantum yield (PLQY), high thermal stability, and unique porous morphology of the host material.

Biography

He was born in 1972 in Lithuania. He received his B.S. degree in Chemical engineering, M.S. degree in Polymer chemistry, Ph.D. degree in Chemistry, and a Habilitation in chemistry from Kaunas University of Technology, Kaunas, Lithuania, in June 1994, June 1996, December 2000, and October 2007, respectively. From 2007 to 2008, he served as a Senior Researcher and an Associate Professor at Kaunas University of Technology. From 2008 to 2010, he worked as a Leading Researcher and an Associate Professor at Kaunas University of Technology. Since 2010, he has been working as a Professor and a Leading Researcher at the Faculty of Chemical Technology, Kaunas University of Technology.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Bioceramic nano and microparticles as component of bone regeneration system

Bogdan Parakhonskiy, Anatolii Abalymov, Nooshin Asadi, Louis Van der Meeren and **Andre Skirtach**
Ghent University, Belgium

Hydrogels, which are versatile three-dimensional structures containing polymers and water, are very attractive for use in biomedical fields, but they suffer from rather weak mechanical properties. In this regard, design a hydrogel based biomaterials with cell-binding sites, tunable mechanical properties and complex architectures have emerged as a powerful tool to control cell adhesion and proliferation for tissue engineering.

In our study, we use the bioceramic colloidal micro/ nanoparticles as key component of such system. Particles containing various ratios of Ca2+/Mg2+ with sizes ranging from 1 to 8 μm were prepared and mixed with gellan gum (GG) solution to study the in-situ formation of hydrogel-particle composites. The particles provide multiple functionalities: 1) they efficiently crosslink GG to induce hydrogel formation through the release of the divalent cations (Ca2+/Mg2+) known to bind to GG polymer chains; 2) they enhance mechanical properties of the hydrogel from 2 up to 100 kPa; 3)particles provide a delivery function, where loading efficiency and loading capacity are depending on particle size, time of enzyme loading, and various container compositions and enzyme concentrations 4) the samples most efficiently promoting cell growth were found to contain two types of minerals: calcium carbonate and hydroxymagnesite, which enhanced cells proliferation and hydroxyapatite formation.

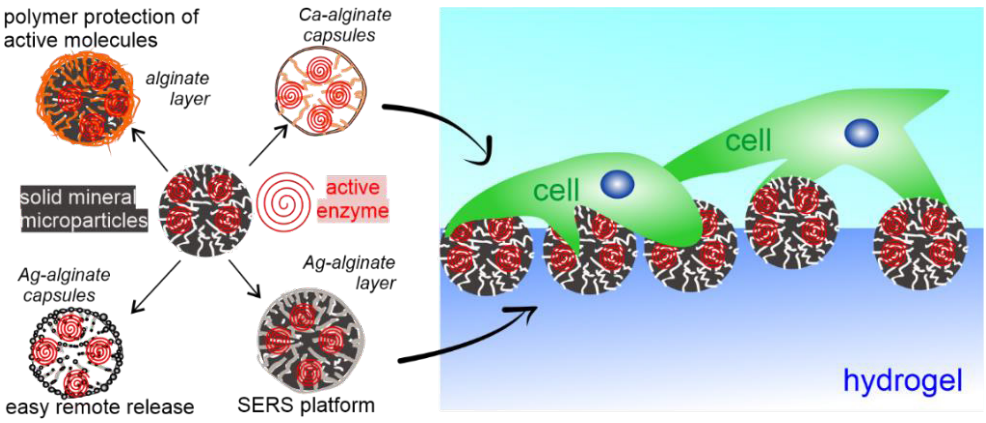


Figure 1. *Schematic of the functional colloids preparation and their application*

A refined way of synthesis and particles modification (Fig 1) allows preparing the enzyme delivery system with functionalized protection layers as well as diagnostic platform which can provide surface enhanced raman scattering effect(SERS). Our results reveal that the size of particles influences their morphology and this, in turn, affects the activity of the encapsulated enzymes. The presence of therapeutic effect on osteoblastic cells coupled with a relatively high loading capacity, biocompatibility, and ease of fabrication suggests that the developed carriers are promising candidates for efficient drug delivery, especially in the field of bone reconstruction.

Biography

Bogdan Parakhonskiy obtained his PhD from Lomonosov Moscow State University, Department of Physics, in 2009. From 2010 until 2014 he held a Marie Curie Postdoc fellowship at the University of Trento, Italy. After this, he has had 4 years' experience as a group leader in the theranostic laboratory at Saratov State University, Saratov, Russia. Since 2015 he has been a holder of a prestigious Flanders research organization (FWO) fellowship at Ghent University, Belgium.

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Prospects for the use of Electrooxidation and Electrocoagulation techniques for membrane filtration of irrigation water

Estefania Espinoza Márquez[1], G.M. Soto Zarazúa[1] and **J. J. Pérez Bueno[2]**

[1]Faculty of Engineering, Research and Postgraduate Division, University Bookstore UAQ, Mexico
[2]Center for Research and Technological Development in Electrochemistry S. C., Mexico

The problem of water insufficiency within the agricultural sector creates the need to generate new strategies to optimize the use of this resource to the maximum. In the case of irrigation in greenhouses, ensuring the availability of water with adequate quality is a great challenge due to the strict quality standards that it manages, since the cost of water resources is very high. Conventional water treatment methods are not efficient or cost effective enough to meet the necessary standards. In this work, membrane filtration technology is presented as the base technology of this study, since it is widely used to generate drinking water and to treat wastewater. Natural organic matter (NOM) fouling of the membrane is identified as the main limitation of this technology. On this basis, the most effective technologies to solve this problem were searched and studied. We evaluated whether the use of membrane technology and the application of electrochemical techniques can be viable strategies to create a system that achieves a continuous reuse of irrigation water in closed agricultural production systems. The application of electrochemical techniques such as electrooxidation, electrocoagulation and the use of electroconductive membranes modified with nanomaterials turned out to be the most viable means. From the analysis of the mechanisms of action of these technologies, we deduce that the application of electrocoagulation techniques adapted to electroconductive membranes that can carry out electrooxidation processes could achieve a significant decrease in NOM. This would considerably reduce the fouling problem, optimizing irrigation water treatment systems to allow water reuse.

Synthesizing heat transfer factors on thermal bonding structure of mineral added Polypropylene spun

Wei Yu Wei[1], E. Shim, Y. Song and **B. Pourdeyhimi[2]**
[1]North Carolina State University, USA
[2]Donghua University, China

Spunbond nonwovens and functional additives, minerals, pigments, and fillers, for processing with these materials impact fabrics' specific performance. Three thermal energy forms of transfer, which on the one hand enhance fusion bond webs, on the other hand, through-air web bonding at embossing area. Fibre alignment as moving web collect fibres containing particulate fillers could skip calendaring gap. At the same time, as we start fibrous investigation geometry, it would allow us to insist on the initial hypothesis of temperature adjustment under 150°C. However, that hypothesis cannot be validated unless sufficient evidence to point to melting and cooling behaviour expediates as particles partially alter the micro heat transfer mechanism. The previous results have shown loading calcium carbonate fillers (CCF) in melt spinning fibres with dosage from 2.5 wt.% to 40 wt.% confirmed in the last research articles. When scaling up trials, it starts to utilize the calendar in which the temperature of rolls heated up from low to high above an average temperature level. It allows for an investigation of mechanical properties as in this practice; raw material uses technical specification contains several predetermined parameters. Other factors such as web basis weight, calendar speed, and a detailed geometrical features design could result in different outcomes. Filler adding polypropylene has lower heat capacity, which transfers heat efficiently to achieve optimum bonding effect. Modulated Differential Scanning Calorimeter characterizes heat capacity. The bonding structure described by using SEM will validate the circumjacent efficiency phase in modification of its geometric features. These papers have their research value of stating conducting lower bonding temperature structures of webs sustain an even better mechanical performance. Standing on the hypothesis that mingled phase have higherδ_k (H,ϕ_{Ca}) at a ΔT upper bottom temperature difference.

Biography

Wei Yu Wei is serves as research engineer in Kingfa Science and Technology as laboratory engineer. In doctorate study Wei has completed dissertation on topic of structure-property relationship of polypropylene spunbond containing inorganic particulate fillers. She is focusing on fiber-based product design for filtration and liquid acquisition purpose, additive manufacturing, and robotics.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Autonomous Human machine systems

William F. Lawless
Paine College, USA

Closed-system models are logical (e.g., game theory), and relatively easy to build and operate to generate desired results; the only uncertainty they can study is in the models themselves; their fatal flaw, however, is that their data consists of independent actions or observations that cannot aggregate to replicate social effects (viz., with i.i.d. data), precluding the derivation of autonomous teams or systems. In contrast, open-system models are not intuitive, difficult to manage, and cannot disentangle action and observation except, characteristically, when social effects are measured. Yet, interdependence theory has led generalizable results: that the best teams are highly interdependent; that the best teams of interdependent individuals outperform the best teams composed of the same individuals acting independently; that tradeoffs determine the entropy production of a team's structure (e.g., structural entropy production, or SEP) and its performance (e.g., maximum entropy production, or MEP). SEP-MEP Tradeoffs lead to these results; e.g., that the best teams are constituted of orthogonal roles (e.g., a small restaurant requires a cook, waiter, clerk); that the more dependent are the orthogonal members of a team on their team's performance, the greater the potential sum of the whole; that suppressing information in a system can deceive observers into believing that an organization is well-run, precluding innovation, but motivating the need to steal proprietary information; that competition between teams exposes vulnerabilities; that deception is a major factor across all aspects of social autonomy, even compromising machine learning algorithms; and that structures of the most successful, resilient and adaptive systems are able to be tuned in the search for minimum SEP and maximum MEP, autonomously motivating trial-and-error mergers, alliances, spin-offs, and divorces. We review these aspects of theory, results and future research, including value (bistable) information.

Biography

William F. Lawless blew the whistle on Department of Energy's mismanagement of military radioactive wastes. DOE invited him onto its Savannah River Site citizens advisory board where he sponsored closing the first two high-level radioactive waste tanks. He is the lead editor of seven books (Springer 2016; 2017; 2021; CRC 2018; Elsevier 2019; 2020 [*Elsevier nominated the latter to ASIS&T for Information Science book of the year in 2020*]; LNCS, 2021). His special issue on "human-machine teams and explainable AI" was published in *AI Magazine (2019*). He organized twelve AAAI symposia at Stanford. He is on Office of Naval Research's Boards for Science of AI and Command DM. He is lead editor: *Frontiers in Physics* Interdisciplinary Approaches to the Structure and Performance of Interdependent Autonomous Human Machine Teams; and *Entropy's* An Entropy Approach to the Structure and Performance of Interdependent Autonomous Human Machine Teams and Systems.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

ERMO enterprise risk management optimization for emerging technology

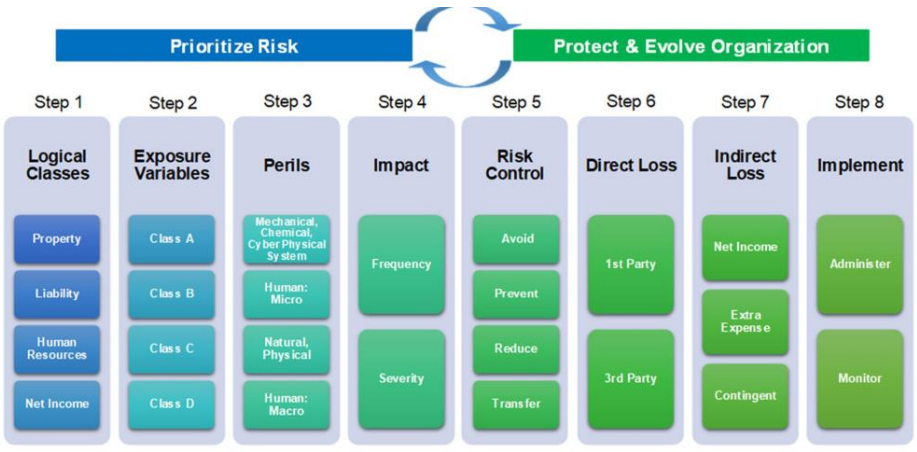
Howard A. Miller[1] and **Charla Griffy Brown**[2]

[1]*LBW Insurances and Financial Services, Inc., USA*
[2]*Pepperdine Graziadio School of Business, Pepperdine University, USA*

As a component of enterprise risk, risk management, in the past has primarily dealt with down-side risk or protecting the bottom-line. However, in the newly transformed, distributed digital workforce, business success requires a measured appetite for risk to achieve top-line growth. In other words, the real gap is the tools needed to evaluate both upside and downside risk when it comes to emerging technologies because the digital world in which all businesses must now operate for growth engenders inherent risk. This means that taking on risk is important for top-line growth as well as minimizing risk for protecting the bottom-line. Therefore, the real challenge is not in minimizing but optimizing risk and reward. To answer the question of how we can enhance topline growth and provide bottom line protection through optimizing risk a complementary risk/reward evaluation structure was created. The core components, key definitions and the connection with the previous foundation material will be explained. The risk optimization system was evaluated by business leaders that tested the framework by focusing on corporations across different industry verticals that utilized emerging technology impacted by both risk and reward.

Table 3 Results of optimized scoring for four companies/technologies

Group	Technology	Risk scenarios	Risk attributes	Reward scenarios	Reward attributes	Rating (0–100)
PredPol	Artificial Intelligence	2	62	2	82	50.63
Timberland	Blockchain	3	144	3	134	40.63
Alarm.com	IoT	3	79	3	30	52.08
Facebook	Facial Recognition	3	154	3	168	52.53
Totals/Average		11	439	11	414	48.96



Biography

Howard A. Miller, CRM, CIC, CyRP is currently SVP, Director Tech Secure® Division at LBW Insurance in Los Angeles CA. Over 20 years of experience advising clients on custom commercial insurance programs, with focus on cyber insurance, technology risk, and protecting long term success for clients through risk management and insurance. Member of MORS, National Security Risk Analysis Community. Co-lead SAE G-32 Risk Management Framework subcommittee for JA7496 Cyber Physical Systems Security Engineering Plan. Lead Risk Transfer and Insurance Subcommittee NDIA Trust and Assurance. Preferred referral partner for cybercrime insurance: City National Bank. Pepperdine Cyber Risk Professional Certificate Program (CYRP) Advisory Board, certificate holder and guest educator. Published author with multiple peer reviewed articles including Springer, Environment Systems and Decisions "Enterprise risk management optimization (ERMO)" 10.1007/s10669-021-09819-x

Explore two-dimensional energy-efficient nanoelectronics

Huamin Li

University at Buffalo, USA

With the rise of graphene in 2004, two-dimensional (2D) materials have received great attention in multiple disciplines and been considered one of the most promising materials for future energy-efficient nanoelectronics. In this talk, I will briefly review the novel and fascinating properties of 2D materials, ranging from semimetal graphene to semiconducting MoS2 and insulating h-BN. I will also talk about the state-of-the-art applications of 2D materials in low-power beyond-CMOS nanoelectronics, including some of our recent research results such as steep-slope transistors, Schottky diodes, and metal contact engineering.

Biography

Huamin Li has completed his PhD from Sungkyunkwan University, Korea, and postdoctoral research from University of Notre Dame, USA. His expertise is in the exploration of nanoscale two-dimensional materials and their application for next-generation nanoelectronics. He is an Associate Editor for IEEE Access and an Editorial Board Member for Nano Express.

A second generation Nanoluc-IL27 fusion cytokine for Targeted-Gene-Therapy Applications

Marxa Leao Figueiredo
Department of Basic Medical Sciences, Purdue University, USA

An emerging approach in treating skeletal malignancies utilizes osteoimmunology to investigate new multifunctional immune-stimulatory agents that can simultaneously combat tumor growth and promote bone repair. We have hypothesized that cytokine Interleukin-27 (IL-27) is an excellent candidate biologic to help rebalance the prostate tumor cells and bone cell environment. In this work, we examined the proof of principle for a short, secreted luciferase (Nanoluc) fusion with IL-27 to produce a novel cytokine-based biologic (Nanoluc-27), whereby we examined its efficacy *in vitro* in reducing prostate tumor growth and rebalancing bone cell proliferation and differentiation. This work demonstrates the targeting and anti-tumor efficacy of the Nanoluc-27 fusion cytokine in cancer and bone cell models. The fusion cytokine is detectable in conditioned media, and bioactive in different cell systems. This novel Nanoluc-27 cytokine will allow flexible incorporation of other targeting domains and may serve as flexible tool to augment IL-27's bioactivity and reengineer its efficacy against prostate tumor or bone cells, and may prove applicable to several other cell types for targeted gene therapy applications.

Biography

Marxa Leao Figueiredo has a BS in Biological Sciences (1994) from the Federal University of Goiás (Brazil) and a PhD from the University of Wisconsin-Madison (2002) in Madison, WI (USA). Her experiences as a Postdoctoral Fellow at the University of California Los Angeles in Los Angeles, CA (USA) have shaped her research interests in gene delivery utilizing viral and non-viral vectors and in molecular imaging technologies. Her lab at Purdue University examines the interactions between the skeletal and immune system to better develop novel therapeutic applications for diseases including bone-metastatic cancer.

AI Ethics: From substantialists to instrumentalists, towards a reasonable deflationism

Frederick Bruneault
Collège Andre-Laurendeau, Canada
School of Media – UQAM, Canada

Artificial intelligence (AI) plays an important role in current discussions on information and communication technologies (ICT) and new modes of algorithmic governance. It is an unavoidable dimension of what social mediations and modes of reproduction of our information societies will be in the future. While several works in artificial intelligence ethics (AIE) address ethical issues specific to certain areas of expertise, these ethical reflections often remain confined to narrow areas of application, without considering the global ethical issues in which they are embedded. We, therefore, propose to clarify the main approaches to AIE, from the substantialist position to the instrumentalist position, their philosophical assumptions and the specific characteristics of each one of them, to identify the most promising approach to develop an ethical reflection on the deployment of AI in our societies, which is the one we call reasonable deflationism and is based on information ethics as proposed by Luciano Floridi. We will identify the most important features of that approach to highlight areas that need further investigation.

Biography

Frederick Bruneault Ph.D. (philosophy) is professor of philosophy at Collège André-Laurendeau and associate professor at the École des médias, UQAM. He is a co-founding member of LEN.IA (AI & Digital Ethics Lab) and he is an associate researcher with the *Groupe de recherche sur la surveillance et l'information au quotidien* (GRISQ) and at the *Observatoire sur les impacts sociétaux de l'intelligence artificielle et du numérique* (OBVIA).

Advanced manufacturing of multifunctional nanocomposite materials for biomedical applications

Haniyeh Fayazfar
University of Ontario Tech, Canada

Development of advanced nanocomposite materials with multifunctional properties provides unique possibilities for creating next-generation high-performance products/ nanodevices. According to NASA "one promising nanocomposite material is multi-walled carbon nanotubes decorated with metal nanoparticles". Among others, Carbon nanotubes in a hybrid configuration with gold nanoparticles can provide very high electro-active surface areas, synergistic effect, and enhanced electrochemical performance, suggesting broad potential applications in electrochemical sensors, catalysis, and biomedicine. In this work, a scalable and simple chemical vapor deposition method was used to synthesize well-aligned MWCNTs which were then decorated with different morphologies of gold nanostructures by using eco-friendly and low-cost electrochemical methods in non-toxic solutions, which was the first of its kind. This research produced the required knowledge for architectural control and uniform distribution of nanomaterials in a nanocomposite layout by just simple controlling of process parameters, which is critical toward future nanodevices. The synergistic effect between CNTs and AuNPs led to the development of extra sensitive bi ological sensors with very low detection limit and fast response for sensitive label-free DNA detection of the cancer gene mutation as well as determination of doxorubicin hydrochloride, an efficient antitumor agent. On the other side, with integrating nanotechnology and additive manufacturing, unique possibilities for developing nanocomposite materials having additional functionality with the aid of 3Dprinting have come into scope to create multifunctional devices. In an effort to develop hybrid composite materials compatible with AM, we embedded zirconia bioceramic nanopowders in the polymer matrix to be printable by a customized AM system. Also, a conductive polymeric composite including silicone (matrix) and carbon fiber (filler) was developed for 3Dprinting of flexible wearable sensor for health monitoring applications. The outcomes of this research constitute important steps towards development of multifunctional hybrid nanocomposites harnessing unique properties and functionalities by using low-cost manufacturing approaches for emerging high-added-value applications.

Biography

Haniyeh Fayazfar is currently an assistant Professor in Mechanical and Manufacturing Engineering department at University of Ontario Tech, Canada. Her main research concentrates on Nanostructured Composites/Hybrid Materials, Advanced Manufacturing (NanoFabrication and Additive Manufacturing), Electrochemical Synthesis of Nanostructured Materials, Advanced Coatings and Surface Treatment, Biosensors for Point-of-Care Diagnostics and Health Monitoring. The outcomes of her research have been published in high prestigious journals/conferences and covered by various media outlets. Dr Fayazfar was awarded the 'Best Research Award' from "Intern. Research Awards on New Science Inventions ", 2021. Prior to joining Ontario Tech, she was a postdoctoral fellow in Multi-Scale Additive Manufacturing group at University of Waterloo. She received her Bachelor's, Master's, and PhD degrees in Materials Science and Engineering from Sharif University of Technology, Iran. She was awarded the University commemorative plaque and medal from the President of SUT for being ranked first among all graduated PhD and Master's.

A Context-Aware Artificial Intelligence-based system to support street crossings for pedestrians with visual impairments

Aleksandro Montanha, Andreea M. Oprescu and **MCarmen Romero-Ternero**
University of Seville, Spain

Artificial intelligence has the potential to support and improve the quality of life of people with disabilities. Mobility is a potentially dangerous activity for people with impaired ability. This work presents an assistive technology solution to assist visually impaired pedestrians in safely crossing the street. We use a signal trilateration technique and deep learning (DL) for image processing to segment visually impaired pedestrians from the rest of pedestrians. The system receives information about the presence of a potential user through WiFi signals from a mobile application installed on the user's phone. The software runs on an intelligent semaphore originally designed and installed to improve urban mobility in a smart city context. This solution can communicate with users, interpret the traffic situation, and make the necessary adjustments (with the semaphore's capabilities) to ensure a safe street crossing.

Biography

Aleksandro Montanha is an entrepreneur and researcher. Doctoral student in signal processing at the University of Sevilla, he developed a series of technologies applied to smart city environments and was a finalist in several international awards. Lecturer in several countries, he is currently chairman of the smart cities committee of the Brazilian Internet of Things Association and a member of Intel's Internet of Things Council. In 2020 he received an honorable mention from the Legislative Assembly of the State of Paraná, for a project related to combating the covid 19.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Using Nanotechnology to combat Antidepressants discontinuation syndrome

Adedapo Adesokan

PreciseMed, UK

Traumatic events such as date rape, drowning or death of loved ones in accidents often necessitate use of antidepressants for a short treatment course. Unfortunately many antidepressants use are plagued by antidepressant discontinuation syndrome (ADS). ADS is a common problem in patients following the interruption, dose reduction, or discontinuation of antidepressant drugs. Typical symptoms of antidepressant discontinuation syndrome include extreme insomnia, nausea, gait instability, sensory disturbances, dizziness, increased suicidal thoughts and hyperarousal. These symptoms can be disabling, long-lasting, limiting use of some antidepressants.

To reduce the incidence of ADS, we are experimenting the use of Nanotechnology-driven antidepressants in discontinuation syndrome animal models to see whether such use alleviates ADS in the animals and later humans subjects. From the various classes of antidepressants we selected examples and developed appropriate nanoparticles to encapsulate them on and tested these on ADS animal models to see if nanoparticles as a delivery system, which implies lesser bioequivalent dose compared to the free form of the drugs, and invariably reduces the incidence of ADS.

Among the different classes of antidepressants, SSRIs are the most widely prescribed type of antidepressants. For this study, ideally we would like to study Fluoxetine, Citalopram and Paroxetine as well as other classes choice antidepressants including Serotonin-noradrenaline reuptake inhibitors (SNRIs) duloxetine, Noradrenaline and specific serotonergic antidepressants (NASSAs) mirtazapine. Others are Tricyclic antidepressants (TCAs) amitriptyline, Serotonin antagonists and reuptake inhibitors (SARIs) trazodone and Monoamine oxidase inhibitors (MAOIs) phenelzine for analysis and ADS effect in animal model. So far, we have loaded the SSRIs into niosomes nanoparticles and the prepared formulations were characterised in terms of size, polydispersity index, surface charge, and drug encapsulation.

In the study we created three animal groups, each group would have 3 rats for each antidepressant being studied free drug form, their nanoparticles-loaded form and the normal saline group . The animals would be housed in 21o C on a 12 hours light/dark cycle in open top cages for 1 week prior to commencement of treatment to condition them to be depressed. Free drug form of the antidepressant would be utilized as comparator arm, normal saline as negative control, nanoparticle -loaded form of the antidepressant as treatment arm. Treatment would be daily for 28 days and

discontinuation period where the 3 groups of animals would be administered with normal saline only would be for 7 days. Anxiety was chosen as the focus discontinuation syndrome symptom for this study.

The primary endpoint is to observe if there is increased Anxiety in (Elevated Pulse Maze) EPM following discontinuation of treatments and to see if it's occurrence is worse in the comparator arm compared to treatment arm, should this be the case it would make case for clinical trial of nanoparticles-driven antidepressants in depressed patients in the future to see if loading such drugs in choice nanoparticles alleviate the disabling discontinuation syndrome symptoms patients experience in real life

SCIENTIFIC ABSTRACTS

DAY 2

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on Advanced Nanotechnology & Nanomaterials

June 22-23, 2022

NANO INTELLECTS 2022

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Possible application of using nuclear magnetic resonance to create a quantum computer based on the top-to-bottom approach

Vladimir Voronov
Irkutsk National Research Technical University, Russia

The paper deals with the possible application of NMR phenomenon to address the issues related to design of real quantum computers. In this regard, it should be noted that with the help of NMR, an elementary quantum algorithm has been implemented for the first time. According to this algorithm, nuclear spin of hydrogen (protons) or hydrogen and carbon atoms play the role of q-bits. Elementary version of Shor's algorithm has also been realized using a quantum NMR processor containing seven q-bits. Noteworthy, the scientific achievements of the last twenty years enable to revisit the idea of employment of the NMR phenomenon at a new level to solve the problem associated with creation of true quantum computer. It is proposed to do this using NMR signals transformed by the phenomenon of chemically induced dynamic polarization of nuclei. Such signals can be compared to the periodic remagnetization of the sample in which this phenomenon is realized, or the periodically changing magnetic susceptibility of the sample substance. The specified periodically changing parameter is proposed to be used as a control signal that ensures the operation of the nanotrigger. This nanotrigger is essentially an inverter capable of independently performing the logical operation of negating NOT. Adding new elements to it ensures the implementation of other logical operations necessary for the execution of the invoice. The device created in this way is an additional electronic unit embedded in a classic computer. Its purpose is, first of all, to expand the capabilities of existing computers in solving problems related to the analysis of a large volume of a data bank.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Kelvin-Helmholtz instability in the nanometer wavelength range

Vladimir Dmitrievich Sarychev[1] and **Dmitry Sarychev**[2]

[1]*Siberia State Industrial University, Russia*

[2]*Novosibirsk State Technical University, Russia*

The aim of the work is to theoretically substantiate the formation of nanoscale structures under shear flows in materials in a wide range of velocities. The paper [1] describes the formation of nanoscale cells in metals under the influence of heterogeneous plasma flows created by an electric explosion of conductors. Under the influence of these flows on metals, the surface layer melts and the shear flow of plasma and molten metal is realized. In this work, the idea was used that nanostructures in metal are formed as a result of Kelvin-Helmholtz instability. The plasma layer is modeled by an ideal liquid, and the molten layer by a viscous liquid. Linear analysis of the Navier-Stokes hydrodynamic equations with respect to small perturbations allowed us to obtain a dispersion equation, the numerical solution of which allowed us to obtain the dependence of the growth rate on the wavelength. The maximum in this dependence is reached at a certain value of the wavelength λm. It is found that for specific values of parameters (layer density, layer thickness, viscosity, tension coefficients and relative velocity), the wavelength λm is in the nanometer range. This means that waves of the order of this wavelength will develop and after solidification of the molten layer they can be observed. At the same time, the sliding speed is about 1 km / s and the role of viscosity is insignificant. This result was new, but it was expected: as the sliding speed increases, the length of λm decreases. In the same experiments, a second nanoslayer was found, located on the border of molten and non-molten metal. The model of its formation is also based on the occurrence of Kelvin-Helmholtz instability, where viscosity plays a fundamental role [2]. Under certain parameters, the dependence of the growth rate on the wavelength was found to have two maxima, one of which may lie in the nanometer range (viscosity-determined maximum). Studies [3, 4] allowed us to find the conditions for the formation of two maxima and to give approximate expressions for two values of λm. This makes it possible to carry out parametrization in order to identify the conditions for the formation of nanostructures in shear layers in a wide range of speeds, which is fundamentally new and requires experimental verification. In conclusion, experimental schemes are considered in which confirmations of the proposed model can be obtained.

Biography

Vladimir Dmitrievich Sarychev, born 1954, graduated from Novosibirsk State University in 1977, post-graduate student 1980-1983 ITPM SB RAS, from 1983 to the present teaches at the Siberian State Industrial University, Novokuznetsk.2003 - Candidate of Technical Sciences, 2010 - Associate professor.

Obtaining of electroless Cu-Ni-P coating on a dielectric surface

Mihaela Georgieva[1,2] and **D. Lazarova**[1]

[1]Department of Electrochemistry and Corrosion, Institute of Physical Chemistry, Bulgarian Academy of Sciences, Bulgaria
[2]Department of Chemistry, Faculty of Electronic Engineering and Technologies, Technical University of Sofia, Bulgaria

Electroless deposition of metal coatings expands the range of materials that can be metallized, as it does not require the substrate to be conductive. In this way the dielectric materials are wired and can be used for further electrochemical deposition of various metals. The obtained metal coatings by electroless deposition are homogeneous and with good adhesion. Electroless deposition of copper uses a catalytic redox reaction between metal ions and the reducing agent in solution (most often formaldehyde) at high temperatures in alkaline media (pH>12). In recent years, research has focused on replacing the toxic formaldehyde with other reducing agents (eg sodium hypophosphite) combined with an oxidation accelerator (nickel sulphate). Thus, the deposition process is due to the oxidation of H_2PO^{2-} ions and the reduction of Cu^{2+}, Ni^{2+} and H^+.

The inclusion of nickel (10-22 wt.%) and phosphorus (0.6-2.0 wt.%) suggests in the coating a good opportunity to create Cu-Ni-P alloy coatings with improved corrosion resistance in highly aggressive environments, especially in the marine environment.

The main aim of the present work is focused on the study the influence of the concentration of nickel sulfate in the electrolyte on the possibility of deposition of a Cu-Ni-P alloy coating by low alkali electrolyte (pH = 9.0). Especially important for obtaining alloy coatings is a precisely balanced composition of the electrolyte to ensure its stability and good quality of the coating.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Evaluation of therapeutic potential of Nanoceria *via* surface functionalization strategies for colon and Lung Cancer

Elif Tarakci[1,4], Feride Melisa Bilgin[3,4], Feride Sermin Utku[2] and Hilal Yazici[4]

[1]Biomedical Engineering, Natural and Applied Sciences, Turkey
[2]Biomedical Engineering, Engineering Faculty, Turkey
[3]Molecular and Translational Biomedicine, Natural and Applied Sciences, Turkey
[4]Genetic Engineering and Biotechnology Institute, Turkey

Nanotechnology applications has become a pioneer in the diagnosis, treatment, and monitoring of cancer. Hence, nanoparticles must be able to overcome biological barriers, accumulate preferentially in tumors, and specifically target cancer cells for detection and treatment. Cerium oxide nanoparticles (CNPs) or Nanoceria have emerged as a potential nanomedicine for treating several diseases, including cancer. The possibility of modifying physical and chemical features of CNPs, which are surface charge, particle size, surface composition, and shape, are considered significant factors that affect biocompatibility, bio inertness, uptake efficiency, and improvement of dispersibility in biological fluids through surface functionalization of the CNP surface. Dextran is one of the preferable polymers due to its excellent biocompatible, biodegradable, antithrombotic, and anti-inflammatory properties in terms of biological activity to functionalize CNPs. Due to such dextran features, we aimed to observe the cytotoxic behavior of two different Dextran-coated Nanocerias in cancer cell lines. In this study, two different Dextran-coated Nanocerias (SD1 and SD2) were synthesized and characterized in detail by utilizing UV-Vis Spectra, Dynamic Light Scattering (DLS), and Zeta Potential (ZP) measurements. Cytotoxicity assays were performed against two different colon and lung cancers for each cell line following its Reactive Oxygen Species (ROS) scavenger feature examination. As a result, SD2 has shown more cytotoxic effects than SD1. Deriving from different sources of dextran shows different responses on each cancer cell line, which represents the importance of surface functionalization with varying responses. This study was funded by the International Centre for Genetic Engineering and Biotechnology (ICGEB) under CRP/TUR 18-03 project number and TUBA-GEBIP Distinguished Young Scientist Award (Hilal Yazici, 2019).

Biography

My name is Elif Tarakci. I completed my undergraduate degree at Yeditepe University Biomedical Engineering program in 2020 with the thesis topic of "Electrochemical Detection of Glucose." I am currently working on the project entitled "Pharmacological Potential of Cerium Oxide Nanoparticles Through pH Dependency for Colon Cancer" as a master's thesis at Yeditepe University Biomedical Engineering Graduate Program, in collaboration with TUBITAK Marmara Research Center under the ICGEB funding since October 2020. Throughout the last 18 months, I have played an essential role in nanoparticle synthesis, partial characterization of nanoparticles, and cell culture experiments, ELISA. To present my work, I attended three international conferences to present her work via poster presentations.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Current trends in multifunctional nanoplatforms for bioimaging and controlled drug delivery in Cancer

Seda Demirel Topel

Antalya Bilim University, Department of Electrical & Electronics Engineering, Faculty of Engi-neering, Turkey

Multifunctional nano-sized materials have offered a significant solution in drug delivery and better diagnosis to different cancer types via imaging techniques, hence contribute to a targeted treatment method. In particular, inorganic nanomaterials have gained much attention in bioimaging and targeted drug delivery. Generally, quantum dots, iron oxide nanoparticles (IONPs), gold NPs, or upconversion nanoparticles (UCNPs) are utilized as bioimaging agents in multifunctional nanoplatforms. On the other hand, by tailoring bioimaging agents together with drugs into polymeric vesicles, numerous nanocarriers have been developed for theranostic applications via encapsulation, physical adsorption or entrapping, which affects the drug pharmacokinetics *in vivo*. Herein, we introduce our recent studies based on the development of multifunctional nanoplatforms for effective drug delivery and imaging studies.

One part of the studies comprised of (i) bioimaging in A549 and Ishikawa cells via polyethyleneimine (PEI) functionalized superparamagnetic iron oxide nanoparticles (SPIONPs) conjugated with Bodipy dyes1; (ii) SPIONPs-UCNP (Fe_3O_4-$NaGdF_4$,Yb^{3+},Er^{3+})

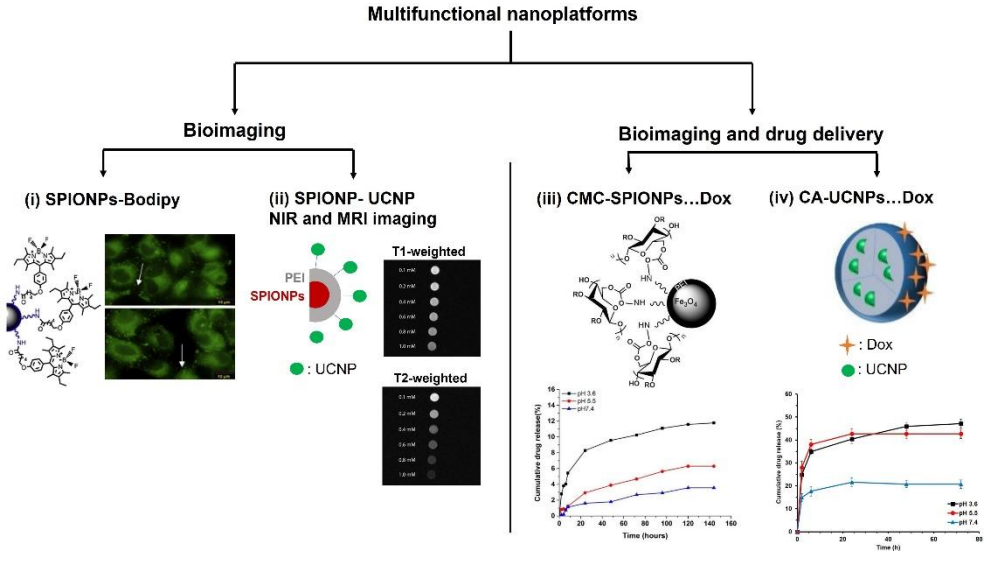


Figure 1. *Design and application of multifunctional nanoplatforms developed by our group*

nanocomposites as T1/T2 weighted dual-modal MRI contrast agents. The other part of the studies covers the development of polymeric nanocarriers which include both bioimaging agents and cancer therapeutics. In this part, (iii) carboxymethyl cellulose (CMC) decorated SPIONPs with 15 nm size in diameter, having 60 emu/g magnetic saturation was synthesized via co-precipitation method and studied adsorption and release kinetics of Doxorubicin (Dox) at various pH values (3.5; 5.5; and 7.4). In acidic media (pH= 3.5) showed the highest delivery of Dox from the magnetic nanocarrier2. (iv) luminescence UCNPs as bioimaging agent was encapsulated within cellulose acetate as a biocompatible polymer to produce UCNP-CA nanocarriers, to enabling simultaneous diagnosis and Dox delivery. Dox was loaded with up to 63 % efficiency and exhibited acid-induced release at pH=3.6 and 5.5. In a cellular assay, it was also confirmed that the toxicity of UCNPs has been significantly reduced via CA-encapsulation3 (Fig.1).

Biography

Seda Demirel Topel has received her PhD degree in Organic Chemistry (2013, Akdeniz University, Turkey). In first year of her PhD, she joined the Natural Products group as a researcher at Lund University, Sweden, then continued her PhD studies at National Nanotechnology Research Center (UNAM), Bilkent University, Turkey in the field of organic-hybrid nanoparticles for photodynamic therapy (2010-2013). She continued her studies as a post-Doc fellow at the Department of Molecular Sciences, SLU, Sweden in 2013-2014. Currently, she is working as an Assist. Prof. at the Department of Electrical &Electronics Engineering at Antalya Bilim University, since 2017. Her research interests include the synthesis and characterization of various types of nanoparticles such as silicon dioxide, titanium dioxide, superparamagnetic iron oxide and upconversion nanoparticles and their hybrid forms with organic ligands for biological applications such as theranostics, bio-imaging and controlled drug delivery.

A survey of Density based clustering Algorithms

Panthadeep Bhattacharjee[1] and **Pinaki Mitra**[2]

[1]*KIIT Deemed to be University, India*

[2]*Indian Institute of Technology Guwahati, India*

Density based clustering algorithms (DBCLAs) rely on the notion of density to identify clusters of arbitrary shapes, sizes with varying densities. Existing surveys on DBCLAs cover only a selected set of algorithms. These surveys fail to provide an extensive information about a variety of DBCLAs proposed till date including a taxonomy of the algorithms. In this work we present a comprehensive survey of various DBCLAs over last two decades along with their classification. We group the DBCLAs in each of the four categories: density definition, parameter sensitivity, execution mode and nature of data and further divide them into various classes under each of these categories. In addition, we compare the DBCLAs through their common features and variations in citation and conceptual dependencies. We identify various application areas of DBCLAs in domains such as astronomy, earth sciences, molecular biology, geography, multimedia. Our survey also identifies probable future directions of DBCLAs where involvement of density based methods may lead to favorable results.

Biography

Panthadeep Bhattacharjee is currently working as an Assistant Professor in the School of Computer Engineering, Kalinga Institute of Industrial Technology (KIIT) Deemed to be University, India. He obtained his PhD from the Department of Computer Science & Engineering, Indian Institute of Technology (IIT) Guwahati, India. He obtained his B.Tech in Information Technology from Assam University Silchar, India in 2010 and M.Tech in Computer Science & Engineering from National Institute of Technology Durgapur (NIT), India in 2012. He worked as Assistant Professor in the School of Computer Engineering, KIIT University, India from June 2012 to December 2013. He joined IIT Guwahati in January 2014. His research area includes pattern recognition, machine learning, incremental algorithms. He has also been a winner in the Artificial Intelligence-Design Challenge Championship held at International Institute of Information Technology (IIIT) -Bangalore in 2018. As an early researcher he has published his works in reputed journals and conferences.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Experimental study of fracture plugging effectiveness for improving the fracture pressure of a low bearing capacity formation

James C Rwechungula[1,2] and **Yuanfang Cheng[2]**

[1]The University of Dodoma, Tanzania
[2]China University of Petroleum, China

Wellbore strengthening by fracture plugging is an effective method for controlling fluid leakage in a fractured formation [1-3]. However, few experiments have documented the effectiveness of fracture plugging on formation leakage. The main objective of this study was to conduct the fracture plugging of fractured carbonate formation using a novel plugging dynamic core device. The methodology involved in this study includes processing core samples into standard cores suitable for experiments. In the present study, only the fracture porosity, confining pressure, and plugging agent content were studied against the fracture pressure bearing capacity. Fracture plugging was assessed using the fracture pressure bearing capacity, whose higher values indicate better plugging effectiveness (Figure 1).

A generalised linear model (GLM) has been proposed to correlate the effects of confining pressure, fracture porosity, and plugging agent

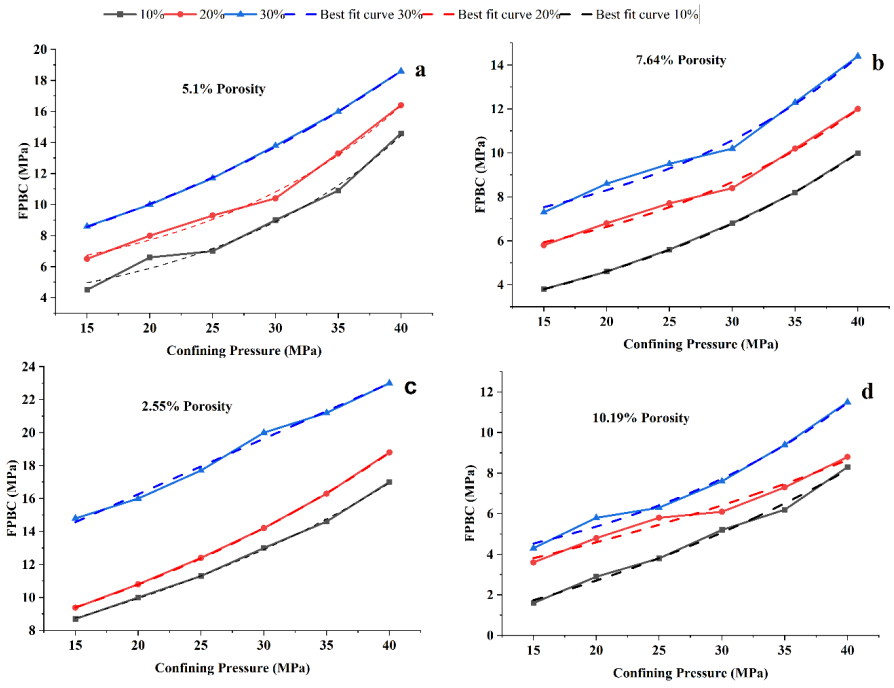


Figure 1. *Fracture Pressure Capacity - confining pressure curves at different values of porosity (a) 2.55%, (b) 5.10%, (c) 7.64%, and (d) 10.19% respectively [3]*

content (PAC) on the fracture pressure bearing capacity. According to this model, the fracture porosity has a greater effect on the fracture pressure than the confining pressure and plugging content. The model also revealed that as the fracture porosity increased by 10%, the fracture pressure bearing capacity decreased by 10.3%, while an increase in the confining pressure by the same magnitude resulted in a 5.3% increase in the fracture pressure (Table 1).

The experimental results were successfully verified in the field by applying a 30% plugging agent in two wells. An improvement in the fracture pressure bearing capacity in two vulnerable sections of the wells was observed.

Table 1. *Output of GLM showing coefficients of the parameters*

P_{BC} MPa	Coefficients	OIM Std. err.	z	p>|z|	95% conf. interval	
F_P %	-1.34486	.105303	-12.77	0.000	-1.55125	-1.13847
P_C MPa	.3466667	.0267996	12.94	0.000	.2941404	.399193
PAC %	0.2244444	.0267996	8.37	0.000	.1719181	.2769708
constant	4.18023	1.126769	3.71	0.001	1.971803	6.388656

The experimental results were successfully verified in the field by applying a 3 plugging agent in two wells. An improvement in the fracture pressure bearing capa in two vulnerable sections of the wells was observed.

Green synthesis of selenium nanoparticles and evaluate their effect on the expression of *ERG3, ERG11* and *FKS1* antifungal resistance genes in *Candida albicans* and *Candida glabrata*

Mahdi Hosseini Bafghi[1] and **Razieh Nazari**[2]

[1]*Department of Laboratory Sciences, Faculty of Paramedical, Mashhad University of Medical Sciences, Iran*
[2]*Department of Microbiology, Faculty of Science, Qom Branch, Islamic Azad University, Iran*

Introduction: Drug resistance in Candida species has considerably increased in the last decades. Given the opposition to antifungal agents, toxicity, and interactions of the antimicrobial drugs, identifying new antifungal agents seems essential. This study assessed the antifungal effects of nanoparticles (NPs) on the standard strains of Candida albicans and Candida glabrata and determined the expression genes, including *ERG3, ERG11* and *FKS1.*

Methods: Selenium nanoparticles (Se-NPs) were biosynthesized with a standard strain of C. albicans and approved by several methods, including UV-Vis spectrophotometer, XRD technique, FTIR analysis, FESEM microscopy, and EDX diagram. The antifungal susceptibility testing performed the minimum inhibitory concentrations (MICs) using the CLSI M27-A3 and M27-S4 broth microdilution method. The expression of the desired genes was examined by the real-time PCR assay between untreated and treated with antifungal drugs and Se-NPs.

Result: The MICs of itraconazole, amphotericin B, and anidulafungin against C. albicans and C. glabrata were 64, 16, and 4 µg/ml. In comparison, reduced the MIC values for samples treated with Se-NPs to 1 and 0.5 µg/ml. The results obtained from real-time PCR and analysis of the $\Delta\Delta C_q$ values showed that the expression of ERG3, ERG11, and FKS1 genes was significantly down-regulated in Se-NPs concentrations ($P<0.05$).

Conclusion: This study's evidence implies biosafety Se-NPs have favorable effects on the reducing expression of *ERG3, ERG11* and *FKS1* antifungal resistance genes in *C. albicans* and *C. glabrata.*

Biography

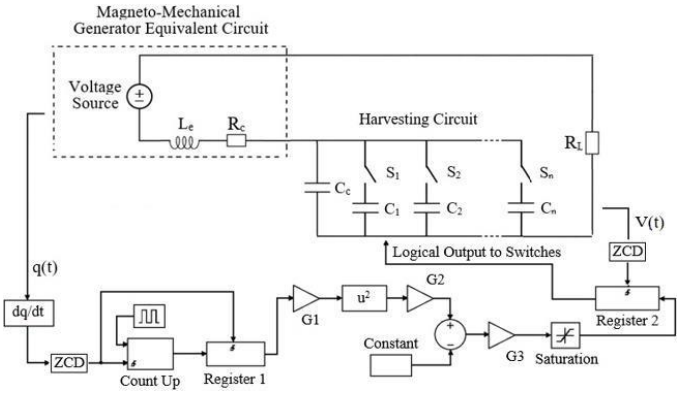
Mahdi Hosseini Bafghi, and I am 42 years old. I have a Ph.D. in microbiology, and I have been working in the Department of Laboratory Sciences, Mashhad University of Medical Sciences (MUMS), Mashhad, Iran. My research fields are biology, microbiology, biotechnology, and nanotechnology.

A new multi-switch circuit with adaptive capacitance for vibration energy harvesting using smart materials

Saber Mohammadi

Mechanical Engineering Department, Razi University, Iran

In this paper, a new harvesting technique using multi-switch circuit with adaptive capacitance has been presented based on impedance matching between electrical circuit and mechanical vibrating system in order to maximize the harvested energy. Considering an attached magnetostrictive layer to a vibrating structure that wound by a pick-up coil in parallel with a load resistance. The whole converted energy is not flowed into the load resistance and a remarkable portion of this energy is stored on the magnetostrictive coil. By connecting the vibrating magnetostrictive coil to a special interface circuit, approximately the whole stored energy portion flows into the circuit. The proposed interface circuit contains a set of capacitors in series with electronic switches that controlled by a microcontroller which always provides resonance condition for each excitation frequency. In the microcontroller, the excitation frequency measurement and relevant calculations to have desired capacitance in the circuit are managed. Indeed, this technique make a good impedance matching between harvesting circuit and magnetostrictive materials that maximize the flow of energy to the circuit. The proposed technique have been modeled experimentally and numerically. The results show a remarkable increase in the harvested energy rather than other methods. This technic also can be used to enhance the performance of some sensors like piezoelectric and magnetostrictive types.



Biography

Saber Mohammadi received the B.Sc. and M.Sc. degrees both in mechanical engineering and Ph.D. degree in the smart systems technology based on multiphysics coupling, from INSA-Lyon (Lyon, France, 2008). He is currently an associate professor in the department of mechanical engineering, Razi University, Kermanshah, Iran. His research interests focus on design of mechatronic systems (cognitive mechatronic systems), sensors and actuators technology, and smart material applications.

Using a nano-glass powder in concrete- A Review

Sief Aldeen Ahmed Odaa
University of Anbar, Iraq

Nanotechnology in concrete is the most interesting research field, with numerous applications that have grown in popularity over the previous three decades. In the civil engineering field, nanoparticles have emerged as prospective resources such as, utilizing Nano-glass powder that collected from wastes. Consequently, this paper extensively reviewed the application of nano glass powder in concrete mix as add or cement replacement. Amazing enhancement in terms of engineering characteristics a result from high surface area of nano-glass particles which it behaves as a high pozzolanic cementitious material as long as become more fineness.

Biography

Sief aldeen Ahmed Odaa was born in Al Anbar state, Iraq, in 1983. He received the B.E. degree in civil engineering from the University of Al Anbar, Ramadi, Iraq, in 2005, and the master degree in structural and constructions from university Putra Malaysia in 2016. His master thesis was under titled (COMPRESSIVE STRENGTH OF CONCRETE CONTAINING GLASS POWDER AND COCONUT SHELL ASH AS CEMENT REPLACEMENT).

Currently, he is PhD student in university of Al Anbar.

He is a good researcher and site engineer manager. Also, he has a good experience as a supervisor in building school, where he is working as civil engineering in the ministry of education /directorate of Al Anbar education since 2006. In addition, he already published some of research papers in same his field as shown below:

- Civil construction wastes and influence of recycling on their properties: a review
- Self-compacting concrete beams reinforced with steel fiber under flexural loads: A ductility index evaluation
- Properties evaluation of fiber reinforced polymers and their constituent materials used in structures – A review
- Land cover reflectance of Iraqi marshlands based on visible spectral multiband of satellite imagery

His academic motivation is trying to exploring a the various of nanomaterials and how far it will be affected on Concrete characteristics.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Nanostructures of *Tris[(5,7-diphenyl)-8-quinolinolato]* Gallium(III) complex fabricated by surfactant- assisted microemulsion method

Usama Abdullah Al-Zaabi, Saleh N. Al-Busafi and **FakhrEldin O. Suliman**

Department of Chemistry, Sultan Qaboos University, Sultanate of Oman

Since 1987, the 8-quinolinolate metal-chelate complexes have received research interest as one of the most powerful optoelectronic materials for the organic light-emitting diodes (OLEDs). Recently, the research efforts focused on constructing this class of materials on the nanometer scale and studying their photophysical properties. Nevertheless, a large number of studies are devoted to the Alq3-type complex; few studies exist so far to systematically investigating the gallium counterpart and its derivatives. Therefore, this contribution focuses on the nanofabrication of *tris(5,7-diphenyl-8-quinolinolato)* gallium(III) complex, Ga(5,7-Phq)3, and investigates its photophysical properties.

The SEM images of the as-prepared Ga(5,7-Phq)3 show that different types of micro-and nanostructures (microparticles and nanorods) in the same system were successfully fabricated on a large scale. It has been found that sonication time has a crucial effect on the structure of the product in addition to the concentration of the surfactant. The FTIR characteristic peaks of Ga(5,7-Phq)3 nanostructures are all in agreement with those of the bulk material indicating the compound has not undergone chemical reactions during the nanofabrication method.

The photoluminescence of the thin film of the nanostructures showed a slight red shift in the emission wavelength to 544 nm compared to that of the bulk material (540 nm). The results of the fluorescence decay of the thin film of Ga(5,7-Phq)3 nanostructures at 298 K show that the decay fits the biexponential model with two lifetimes of $\tau 1$ = 18.60 ns (longer) and $\tau 2$ = 6.14 ns (shorter). The fluorescence microscopy images reveal the product has excellent green light-emitting performance. In this study, Ga(5,7-Phq)3 complex was synthesized, constructed into nanostructures, and characterized optically. Based on photophysical properties, the Ga(5,7-Phq)3 nanostructures can potentially be used as a light-emitting material in optoelectronic devices.

Biography

Usama Abdullah Al-Zaabi is currently a Ph.D. student at the department of chemistry, Sultan Qaboos University under the supervision of Prof. F. O. Suliman and Dr. S. N. Al Busafi. He has been working at the Ministry of Education for more than fifteen years and now he is a Chemistry supervisor at the Governorate of North Al Batinah, Oman. His research interest include synthesis of OLEDmaterials and the fabrication of nanomaterials.

Virtual Event

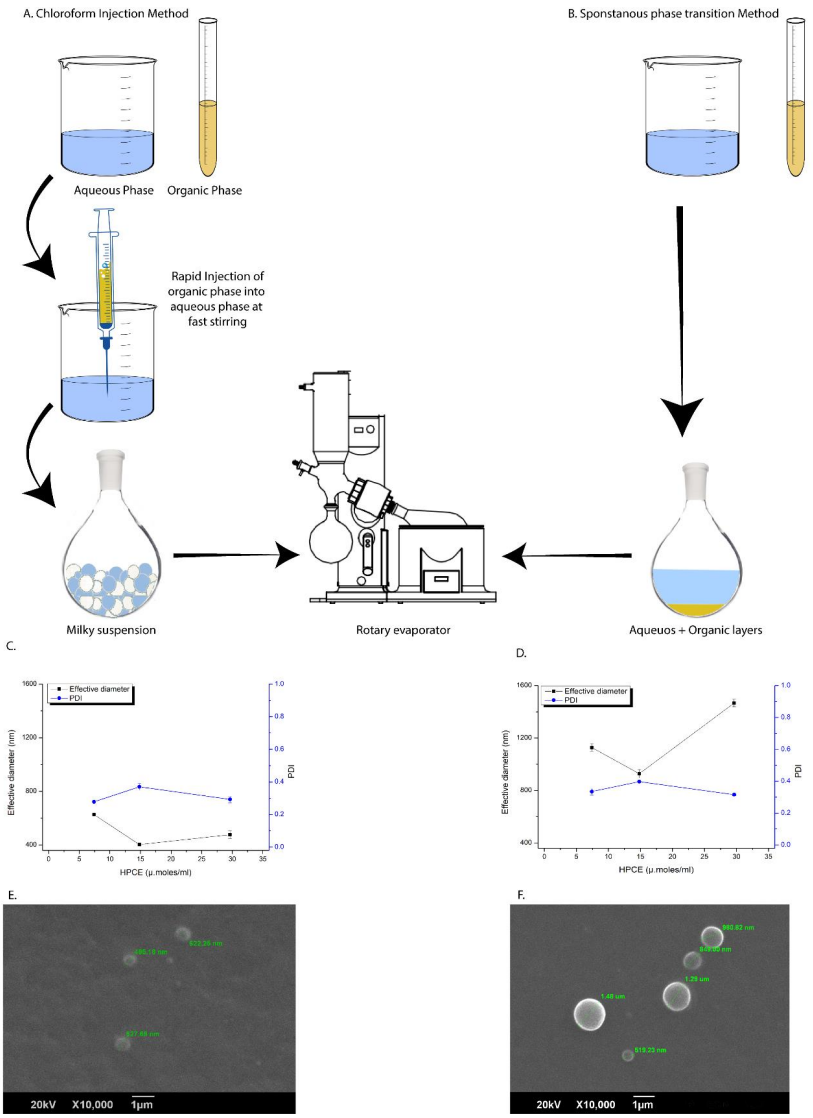
2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Chloroform-Injection (CI) and Spontaneous-Phase-Transition (SPT) are novel methods, simplifying the fabrication of liposomes with versatile solution to cholesterol content and size distribution

Muhammad Ijaz Khan Khattak[1,2], Naveed Ahmed[1], Muhammad Farooq Umer[1], Amina Riaz[1], Nasir Mehmood Ahmad[3] and Gul Majid Khan

[1]Department of Pharmacy, Quaid-i-Azam University, Pakistan
[2]Department of Pharmacy, University of Swabi, Pakistan
[3]SCME, National University of Sciences and Technology (NUST), Pakistan

Intricate formulation methods and/or the use of sophisticated equipment limit the prevalence of liposomal dosage-forms. Simple techniques are developed to assemble amphiphiles into globular lamellae while transiting from the immiscible organic to the aqueous phase. Various parameters are optimized by injecting chloroform solution of amphiphiles into the aqueous phase and subsequent removal of the organic phase. Further simplification is achieved by reorienting amphiphiles through a spontaneous phase transition in a swirling biphasic system during evaporation of the organic phase under vacuum. Although the chloroform injection yields smaller Z-average and poly-dispersity-index the spontaneous phase transition method overrides simplicity and productivity. The increasing solid/solvent ratios results in higher Z-average and broader poly-dispersity-index of liposomes under a given set of experimental conditions, and vice versa. Surface charge dependent large unilamellar vesicles with a narrow distribution have poly-dispersity-index < 0.4 in 10 μM saline. As small and monodisperse liposomes are prerequisites in targeted drug delivery strategies, hence the desired Z-average < 200 d.nm and poly-dispersity-index < 0.15 is obtained through the serial membrane-filtration method. Phosphatidylcholine/water 4 μmol/mL is achieved at a temperature of 10◦C below the phase-transition temperature of phospholipids, ensuring suitability for thermolabile entities and high entrapment efficiency. Both methods furnish the de-novo rearrangement of amphiphiles into globular lamellae, aiding in the larger entrapped volume. The immiscible organic phase benefits from its faster and complete removal from the final product. High cholesterol content (55.6 mol%) imparts stability in primary hydration medium at 5 ± 3 ◦C for 6 months in light-protected type-1 glass vials. Collectively, the reported methods are novel, scalable and time-efficient, yielding high productivity in simple equipment.



Comparison of CI and SPT liposomes produced with optimized parameters and without sizing a: CI method b: SPT method c: Z-av and PDI of unsized CI-liposomes d: Z-av, and PDI of unsized SPT-liposomes e: SEM image of unsized CI-liposomes f: SEM image of unsized SPT-liposomes.

Biography

Muhammad Ijaz Khan Khattak is Assistant Professor in the Department of Pharmacy University of Swabi, KPK, Pakistan. He served various Pharmaceutical industries for 14 years before joining the academia. His professional skills include formulation development of various dosage forms, their validation and scale-up to commercial batch production. He has vast production of research & development and management in pharmaceutical industries. During academic research, he continued the same field of research and designed nanocarriers as a targeted drug delivery strategy. He developed and reported two novel and simple methods for the fabrication of liposomes, titled as Chloroform Injection (CI) and Spontaneous Phase Transition (SPT) methods. His key interests include monocytes mediated drug cargo to the brain in the treatment of neurodegenerative diseases. Unconventionally, he believes in the simplification of complicated scientific approaches to make them available for entire global humanity.

Synthesis and characterization of Zinc Oxide (*ZnO*) nanostructures for sensing and dye degredation

Shazrah Shahzad and **D. Xie**
School of Integrated Circuits, Tsinghua University, China

In this research, growth of *ZnO* Nanostructures using Zinc Nitrate hexahydrate and Hexamethylene Tetramine (HMTA), by Chemical Bath Deposition on Silicon Wafer was investigated. The growth is conducted under influence amine-based enhancers including DiethylAmine and MonoEthanolamine. The effect of enhancer was studied and evaluated based on three different ratios (1:0.5, 1:1, 1:1.5) of enhancer to the precursor (Zinc Nitrate and HMTA). The effect different ratios of enhancers on morphology aspect ratio and crystallinity of the as grown Nanorods were studied under Scanning electron microscope (SEM), X-ray powder diffraction (XRD) and UV VIS Spectroscopy. Electrical Properties such as current–voltage characteristics were investigated, its correlation to the morphology and aspect ratio of the Nanorods in the presence of 100µL-500µL of Aromatic Compound Cyclohexane and at different applied voltages. The effect of morphologies on dye degradation (Methylene blue dye) was also investigated. The dye degradation was investigated in UV lamps in photo degradation chamber, and was monitored at 10 minutes' interval using the plots of UV Vis, and decrease in absorbance was observed.

Biography

Shazrah Shahzad is presently a Doctoral Candidate at Department of Micro and Nano Electronics at Tsinghua University, Beijing. She is working on Highly sensitive and ultra-fast responsive Gas Sensors using 2D materials (rGO, MoS2 and Tungsten Disulphide). Previously, she completed her Masters in Nanoscience and Engineering from National University of Sciences and Technology, Islamabad. Additionally, she served as a Research Associate on a Project Funded by U.S. Pakistan Center for Advanced Studies in Energy (USPCAS-E), Islamabad on "Development of self-cleaning and low emissivity thin films for glass". Her specialization and research interests revolve around gas sensors, thin film deposition and nano materials synthesis and characterization.

ACCEPTED ABSTRACTS

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on Advanced Nanotechnology & Nanomaterials

June 22-23, 2022

NANO INTELLECTS 2022

Hourly day ahead wind power forecasting with the EEMD-CSO-LSTM-EFG deep learning technique

A. ShobanaDevi[1], G Maragatham[1], K. Boopathi[2] and A. G. Rangaraj[2]

[1]SRM Institute of Science and Technology - SRM University, India

[2]National Institute of Wind ENERGY, India

Wind power forecasting has gained significant attention due to advances in wind energy generation in power frameworks and the uncertain nature of wind. In this manner, to maintain an affordable, reliable, economical, and dependable power supply, accurately predicting wind power is important. In recent years, several investigations and studies have been conducted in this field. Unfortunately, these examinations disregarded the significance of data preprocessing and the impact of various missing values, thereby resulting in poor performance in forecasting. However, long short-term memory (LSTM) network, a kind of recurrent neural network (RNN), can predict and process the time-series data at moderately long intervals and time delays, thereby producing good forecasting results using time-series data. This article recommends a hybrid forecasting model for forecasting wind power to improve the performance of the prediction. An improved long short-term memory network-enhanced forget-gate network (LSTM-EFG) model, whose appropriate parameters are optimized using cuckoo search optimization algorithm (CSO), is used to forecast the subseries data that is extracted using ensemble empirical mode decomposition (EEMD). The experimental results show that the proposed forecasting model overcomes the limitations of traditional forecasting models and efficiently improves forecasting accuracy. Furthermore, it serves as an operational tool for wind power plants management

Extremophilic Actinomycetes: A novel source of industrially important Extremozymes

Abd El-Rahman F. Gomaa, Mohamed Helal El-Sayed, Mohamed R. Khalil and **Osama M. Abd El-Raouf**

Botany and Microbiology Department, Faculty of Science, Al-Azhar University, Egypt

During the past few decades it has become clear that microbial communities can be found in the most diverse conditions, including extremes of temperature, pressure, salinity and pH. Enzymes such cellulases, pectinases and chitinases produced from actinomycetes play an important role in food, fermentation, textile and paper industries. Extremophilic actinomycetes have a remarkable enzymatic potential but till now natural resources due to the difficulties in isolation and maintenance of pure culture explored only up to a extend. For this purpose, 42 desert soil samples collected from different governorates; Minia, Assuit, sohag, Qena, and Luxor in Upper Egypt were investigated for the occurrence of alkalithermophilic actinomycetes. Isolation was done using actinomycetes isolation agar (AIA), starch nitrate agar and glycerol yeast extract agar at 550C. and pH 12. A total of 15 actinomycetes cultures were isolated, and purified at the same conditions then evaluated for their enzymatic activities of cellulase, pectinase and chitinase through primary screening on solid media. Among these, 13 isolates (86.6%) were found to be extracellular cellulase producers; 10 isolates (66.6%) were chitinase producers; 8 isolates (53.3%) were pectinase producers. Based on these results, we suggest that the extremophilic actinomycetes, which are a part of the biodiversity of the soils from different localities in Upper Egypt, are promising sources for novel enzymes and hence open exciting avenues in the field of biotechnology and biomedical research

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Estimation of total dissolved solids using intelligent models and PCA analysis a case study

Abdollah Taheri Tizro[1] and **A. Vanaei**[2]

[1]*Dept. of Water Science and Engineering, College of Agriculture, Bu-Ali Sina University, Iran*

[2]*Water Science and Engineering, Water Resources Engineering, Bu-Ali Sina University, Iran*

Artificial neural networks (ANN), adaptive neural fuzzy inference system (ANFIS-SC) and support vector machine models were used to determine total dissolved solids (TDS) of the Zayendehrood River in Iran. In total, nine parameters (Ca^{2+}, SO_4^{2-}, Na^{+}, Cl^{-}, EC, pH, HCO^{3-}, Mg^{2+} and SAR) were utilized to estimate the TDS of the river at a monthly time scale. Statistical data were categorized into low-flow and wet periods based on river discharge. Principal component analysis (PCA) was used in order to determine the input of the models. The results indicate that the PCA method, in both wet and low-flow periods, performed suitably based on the evaluation criteria for all models. The parameters of the first component included Ca^{2+}, SO_4^{2-}, Cl^{-}, EC, Mg^{2+} and SAR in both periods. In contrast, the parameters pH and HCO^{3-} of the second component provided unacceptable precision. The ANFIS-SC model was more precise than the other two models, with an RMSE value of 12.33 for the first component in the low-flow period. However, the ANN model was most precise in the wet period, with a calculated RMSE value of 13.87.

Comparison of three classifiers based on detection of benign tumor and malignant melanoma skin diseases

Abhyarthana Bisoyi, Rajesh Kumar Sahoo and **Aruna Tripathy**
Odisha University of Technology and Research, India

It is an unknown fact that many skin diseases have similar type of shape, size and symptoms. Hence, it is a cumbersome task to recognize and classify these diseases by the doctors. So, for the correct identification of skin disorders, doctors need to check the patient's history alongside certain laboratory testing and physical examinations. But all these processes are time consuming and also costlier for a common man. Hence, this paper discusses a MATLAB based software system introduced to reduce the complexity and thereby providing accurate results. This system includes image preprocessing, features extraction and classification for prediction of the type of skin disorders. Besides feature extraction, the paper mainly focusses on the classification based on three classifiers—SVM (Support vector machine), KNN (Knearest neighborhood) and NB (Naïve Bias classifier)—and provides a comparative result based on various parameters. It can be concluded from the comparison tables that among the three classifiers, SVM provides the highest accuracy of 98.73% while KNN with 93.67& and NB with 84.81%. This classification helps a doctor to achieve the exactness of the type of skin disorder. In this system the patient needs to provide the image of the infected portion as input and the proposed system shall detect the disease.

Predictive learning analytics using deep learning model in MOOCs' courses videos

Ahmed Ali Mubarak[1] and **Cao Han**[2]

[1]*Faculty of Education-Alnadra, Department of Computer, Ibb University, Yemen*

[2]*School of Computer Science, Shaanxi Normal University, China*

Analysis of learning behavior of MOOC enthusiasts has become a posed challenge in the Learning Analytics field, which is especially related to video lecture data, since most learners watch the same online lecture videos. It helps to conduct a comprehensive analysis of such behaviors and explore various learning patterns for learners and predict their performance by MOOC courses video. This paper exploits a temporal sequential classification problem by analyzing video clickstream data and predict learner performance, which is a vital decision-making problem, by addressing their issues and improving the educational process. This paper employs a deep neural network (LSTM) on a set of implicit features extracted from video clickstreams data to predict learners' weekly performance and enable instructors to set measures for timely intervention. Results show that accuracy rate of the proposed model is 82%–93% throughout course weeks. The proposed LSTM model outperforms baseline ANNs, Super Vector Machine (SVM) and Logistic Regression by an accuracy of 93% in real used courses' datasets.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Explainable artificial intelligence to evaluate industrial internal security using EEG signals in IoT framework

Ahmed Yaqoub Yousif Alkhayyat Alhammadi[1], Chan Yeob[1] and **Ernesto Damiani[1], Paul D. Yoo[2], Jiankun Hu[3], Hyun Ku Yeun[4]** and **Man-Sung Yim[5]**

[1]Center for Cyber-Physical Systems, EECS Department, Khalifa University of Science and Technology, UAE

[2]CSIS, Birkbeck College, University of London, United Kingdom

[3]School of Engineering and Information Technology, The University of New South Wales, Australian Defence Force Academy, Australia

[4]Department of Engineering, ETS, Higher Colleges of Technology, UAE

[5]Department of Nuclear and Quantum Engineering, Korea Advanced Institute of Science and Technology, Republic of Korea

Industrial insider threat detection has consistently been a popular field of research. To help detect potential insider threats, the emotional states of humans are identified through a wide range of physiological signals including the galvanic skin response, electrocardiogram, and electroencephalogram (EEG). This paper presents an insider risk assessment system as a fitness for duty security evaluation using EEG brainwave signals with explainable deep learning and machine learning algorithms to classify abnormal EEG signals indicating a potential insider threat and evaluating fitness for duty. The system is designed to be cost-effective by using an Emotiv Insight EEG device with five electrodes. In this study, the data from 17 people in different emotional states were collected. The different levels of emotions were mapped and classified into four risk levels, namely low, normal, medium, and high. The data were collected while the subjects were presented with different images from the scientific international affective picture system. The collected EEG signals were preprocessed to eliminate noise from physical movements and blinking. The data were then used to train self-feature learning of two- and one-dimensional convolutional neural networks, Adaptive Boosting, random forest, and K-nearest neighbor's models; the proposed method yielded classification accuracies of 96, 75, 97, 94 and 81%, respectively.

Nanostructuring influence of the reinforcing phase on the quality of powder Beryllium

Alexandr Revutskiy and **B.V. Syrnev**

Daulet Serikbayev East Kazakhstan Technical University, Kazakhstan

The paper presents the research results of reinforcing phase formation mechanism as noticed at the grain boundaries of sintered Beryllium during hot forming of powders. It is shown that when the powders are heated, the amorphous Beryllium oxide film covering the metallic Beryllium particles degrades by a devitrification and crystallization of into discrete strengthening particles. It has been established that depending on the content and ratio of low-melting impurities this mechanism can have both a homogeneous and a heterogeneous character, which determines the "dispersion-grain-boundary" hardening effect. The results are obtained in the graphical and analytical dependences form characterizing the range of possibilities for controlling the strength properties of sintered Beryllium of TIP-56 grade obtained by hot isostatic pressing.

Comparison of carbon fiber recycling methods and the effect of the poptube technique on the integrity of the recovered fibers

Alexis Salas[1,2,3], A. Diaz[3], D.A. Palacio[4], M.E. Berrio[2,3], C. Medina[1] and M.F. Melendrez[2,3]

[1]Department of Mechanical Engineering (DIM), Faculty of Engineering, University of Concepcion, Chile
[2]Department of Materials Engineering (DIMAT), Faculty of Engineering, University of Concepcion, Chile
[3]Research Group in Advanced Nanocomposites (GINA), Department of Materials Engineering (DIMAT), Faculty of Engineering, University of Concepcion, Chile
[4]Department of Analytical and Inorganic Chemistry, Faculty of Chemical Sciences, University of Concepcion, Chile

Over the years, the use of carbon fiber in the automotive, aerospace, and energy industries has generated an increase in the global demand for these materials, causing problems with the management of the waste produced. The objective of this work is to compare the recycling process by pyrolysis with a microwave thermolysis process, and then to nano-reinforce the recycled fibers with carbon nanotubes using the Poptube technique. To determine the effectiveness of these methods, thermogravimetric analysis (TGA), Raman spectroscopy, infrared spectroscopy (FT-IR), X-ray diffraction (XRD), atomic force microscopy (AFM), and scanning electron microscopy (SEM). The carbon fiber is successfully recovered using both methods, the results obtained indicate that excess temperature and power generate damage to the surface of the fibers, increase the ratio in the D and G Raman bands (12% for microwaves and 24% for pyrolysis), in addition to the fact that there is an increase in surface roughness as the processes become more aggressive (15% for microwaves and 3% for pyrolysis). Although at a morphological level microwave thermolysis generates a greater change in the fiber surface, it is a process 50% faster than pyrolysis and requires more research. Regarding the growth of nanotubes using the poptube technique, in both recycled fibers the growth of these is observed, being reflected in the Raman spectrum with the appearance of the G 'band, however, it is necessary to improve the homogeneity and dispersion on the surface of the fibers.

Experimental study on strength and endurance performance of burnt clay bricks incorporating marble waste

Ali Murtaza Rasool[1] and **Asif Hameed**[2]

[1]*National Engineering Services Pakistan (NESPAK), Pakistan*

[2]*University of Engineering and Technology, Pakistan*

Burnt clay brick is one of the oldest and widely used construction materials. Its production with various waste materials can reduce the environmental hazards and improve brick performance at low manufacturing costs, thereby leading towards more sustainable construction. This research aimed to evaluate the effect of using waste marble powder (WMP) in varying percentages, i.e., 0, 3, 6, 9, 12, and 15%, by weight of clay in an industrial brick kiln plant. This study performed a range of mechanical and durability tests on the raw material, i.e., clay, WMP, and bricks, to quantify their performance. The results indicate that incorporating WMP resulted in a reduced unit weight of the bricks, making the structure lighter in weight. Furthermore, compressive strength and freeze-thaw test results for all the brick specimens and sulfate tests for the brick specimens with 12% WMP addition were within the Building Code of Pakistan and ASTM prescribed limits. Moreover, sulfate test results of brick specimens having 12% WMP were also within specified code limits. Finally, it can be concluded that WMP up to 12%, by weight of clay, can be incorporated to prepare clay bricks, reducing the environmental waste to achieve sustainability and economy for the brick industry.

Mitigate the reverberation effect on the speaker verification performance using different methods

Khamis A. Al-Karawi
University of Diyala, Iraq

Speech signals recorded in far-field or with a far receiver typically comprise additive noise and reverberation, which cause degradation and distortion in the reliability and intelligibility of speech signal, and the recognition performance of speaker recognition systems, with severe consequences in a wide range of real applications. Channel equalization, i.e. the removal or reduction or other cleaning methods of the channel effects, to some extent, mitigates the mismatching problem at the cost of added distortions to the vulnerable speech signal themselves, and therefore, its effectiveness is limited. Recent research indicates that a new speaker feature, Gammatone frequency cepstral coefficients (GFCC), exhibits superior noise and reverberation robustness than other features. This paper proposed two methods to combat the effect of reverberation on speaker verification performance. The first method is using GFCC features as a robust feature to alleviate the effect of reverberation on system performance. While the second method is using multi training to combat the reverberation effect. Speaker verification experiments in the artificial and real reverberant conditions show the efficiency of the proposed methods in terms of decreased equal error rate EER and detection error trade-off DET.in terms of decreased equal error rate EER and detection error trade-off DET.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Synthesis and comparative evaluation of optical and electrochemical properties of *Ni+2* and *Pr+3* ions co doped mesoporous TiO_2 nanoparticles with un-doped Titania

Amna Bashir[1], U. Rafque[1], R. Bashir[3], S. Jamil[2], F. Bashir[2], M. Sultan[4], M. Mubeen[2], Z. Mehmood[5], A. Iqbal[2] and **Z. Akhter[2]**

[1]*Department of Chemistry, Fatima Jinnah Women University, Pakistan*

[2]*Department of Chemistry, Quaid-I-Azam University Islamabad, Pakistan*

[3]*School of Physics & Astronomy, Yunnan University, China*

[4]*Nanoscience and Technology Department, National Centre for Physics, Pakistan*

[5]*Pakistan Institute of Engineering and Applied Sciences, Pakistan*

In the present study TiO_2-based nanomaterial doped with nickel (Ni) and praseodymium (Pr) ions were prepared using a facile and cost-efective method. Diferent techniques were used to characterize the nanoparticles. The crystalline nature of nanoparticles was confrmed by X-Rays Difraction analysis (XRD). The results revealed that with the introduction of Pr and Ni ions in TiO_2 lattice the particle size decrease from 18.01 to 9.02 nm accomplished by the enhancement in surface area of the nanoparticles. The results obtained UV–Vis difused-refectance (DRS) spectroscopy of co-doped nanoparticles demonstrated a reduction in the bandgap compared with the pure TiO_2. The variation in surface defects and oxygen vacancies were evaluated using Photoluminescence (PL) studies, which exhibited a gradual reduction in PL intensity upon the addition of dopants in the TiO_2 Lattice. Furthermore, the exciton recombination was also investigated using electrochemical impedance spectroscopy (EIS), which showed the reduction in the recombination rate in doped nanoparticles. The photocatalytic activity of prepared nanoparticles was tested on three azo dyes (reactive blue-19 (RB-19), reactive orange-13 (RO-13), and reactive blue-13 (RB-13)). The experimental results showed that 99.0% of RB-19, 85.0% for RB-13, and 70.0% RO-13 were degraded after a small interval of irradiation. The adsorption of dye on the photo-catalytic support was checked by performing the experiments under diferent conditions by varying the pH values and temperature. Furthermore, the catalysts also exhibit remarkable activity for the overall water splitting in an alkaline solution with Ni-Pr-3 catalyst being the best, which recorded onset overpotential of 330 mV and a Tafel slope of 76 mV dec−1 for Oxygen evolution reaction (OER). It is also clear that Ni–Pr-3 (with 5% nickel and 3% Pr) content is more active in the OER process showing comparatively lower over-potential value at 10 mA/cm^2 than Ni-5 and TiO_2.

AI ethics: Beyond the hype and towards soft governance mechanism

Andréane Sabourin Laflamme
Cegep André-Laurendeau, Canada

Artificial intelligence systems (AIS) are increasingly penetrating the most intimate spheres of our lives. Although this technology is promising in many ways, the ethical and social issues associated with its use are numerous. Despite their ubiquity, AIS are in most jurisdictions only subject to a minimal normative framework. The many legislative reforms that have taken place and those that are underway, mainly oriented towards the protection of personal and biometric data, are nevertheless insufficient to provide an adequate framework for this disruptive technology. Over the last ten years, publications in AI ethics have also multiplied. Whether they come from the academic world, public bodies or industry, these statements and other guidelines, guides and codes of ethics aim to orient the design and use of AIS. These documents therefore aspire to play a normative role in AI-related practices, but as they lack binding mechanisms and enforceability, many consider them inadequate. For this reason, AI ethics initiatives are even sometimes greeted with suspicion. Indeed, faced with the increasing misuse of AI ethics for purposes of what is commonly characterised as ethics washing, i.e. a public relations strategy designed to discourage more restrictive legislative initiatives, many believe that ethics has no place in the normative framework of AI and that it should once and for all give way to state law. While it is impossible to deny the existence of this instrumentalisation of AI ethics, it would certainly be wrong to reduce AI ethics to these misuses. Moreover, the disqualification of ethics on the basis of its lack of binding force shows a misunderstanding of what ethics really is. In order to understand the particular function that ethics can play in the normative framework of AI, it is important to distinguish it from law and to situate it in relation to it. In this presentation, I will propose to reflect on these questions by using conceptual tools from the theoretical framework of information ethics developed by Luciano Floridi. I will argue that Floridi's distinction between what he calls hard ethics and soft ethics is particularly useful for distinguishing two functions of AI ethics and for thinking about their relationship to law. In the presentation, ethics and law will be analysed as distinct but complementary normative sources from the perspective of normative pluralism.

A rapid sensitive colorimetric method for estimation of dehydrogenase enzyme(s) activity in blood lymphocytes as primary indicator of cancer

Arpana Parihar and **Raju Khan**

CSIR-Advanced Materials & Processes Research Institute (AMPRI), India

Cancer remains leading cause of death worldwide. Several therapeutic modalities are available for the treatment of cancer however, these therapies are completely effective only when cancer is detected in its early stage. Early detection of ailment requires a noninvasive, easy to handle, fast, cost effective and reliable technology for which results are easy to interpret. A plethora of studies have confirmed the association of altered mitochondrial enzyme activities with cancer development and progression. Mutations and defective function of mitochondrial dehydrogenases i.e. succinate dehydrogenase (SDH), Isocitrate dehydrogenase (IDH), and alpha ketoglutarate dehydrogenase (KDH) are considered the cause of cancer progression and tumorigenesis. The activity of mitochondrial enzymes in patient's sample/bodily fluids such as in blood, urine, tissue and cells may act as biomarkers for the early detection and better prognosis of various oncological disorders. The aim of present research work is to develop a noninvasive, rapid, reliable, cost effective and less laborious and simple method based on biochemical criteria for assessment of defects in mitochondrial enzyme systems for the early diagnosis of cancer.

Methods: The blood samples of 50 cancer patients and 50 healthy individuals were collected for the study. The mitochondrial dehydrogenase enzyme activityof leucocytes, was estimated using an optimized colorimetric assay. The optimized protocol included the RBC lysis of blood sample and digitonin detergent mediated leucocyte permeabilization to release cellular enzymes in to buffer. The nitro blue tetrezolium dye was oxidized by mitochondrial dehydrogenases in to farmazan crystals. The dehydrogenase activity was measured by taking optical density of DMSO dissolved farmazan crystals using spectrophotometer. Enzymatic activity was estimated in pmol/mg of protein present in sample.

Results: The dehydrogenase activity in cancer patients was found to be significantly higher ($p<0.0001$) than healthy control subjects. Statistical significance was measured by student's 't' test. Our results revealed that cancer patients have two folds (1.31±0.52) of enzymatic activity than healthy individuals (0.58±0.24).

Conclusion: We have developed dehydrogenase enzyme activity based colorimetric assay, which is a noninvasive, reliable, fast and inexpensive approach for preliminary diagnosis of oncological disorders.

Numerical simulation of the heat exchange of electronic components using the nanofluid technique

Belghar Nourredine[1], K.Chadi[1], B. Guerira[1], M Lachi[2] and **M. Chikhi[3]**

[1]*Laboratory of Materials and Energy Engineering, University of Mohamed Khider Biskra, Algeria*

[2]*Laboratoire MATIM, Materials and Mechanical Engineering Faculty of Sciences, France*

[3]*Department of Development, Promotion and Valuation of Renewable Energies, Ministry of the Environment and Renewable Energies, Algeria*

In this work, we have done a numerical simulation for convective flows laminar and stationary for (cooling the electronic components) by using water (base fluid) and Cu, Ag, and Diamond Nanoparticles with a volume fraction of 0.02 to improve heat exchanges. For this reason, we have carried out three studies in the form of geometry.

The first study was divided into small channels of 10 channels and 11 fins.

The second study concerns the effect of the addition of the pie shape ribs and parallelogram ribs in micro channels on thermal performance.

The third study concerns the effect of three different types of Nanoparticles, Nanoparticles volume concentration and types of cooler metals on heat transfer in a mini-channel.

Through these studies, we can conclude:

- The micro-channels with parallel ribs were more efficient at transferring heat compared to micro-channels with pie-shaped ribs
- The increase of the fraction volumetric of Nano-particles in basic fluid (water) allows ameliorating the heat transfer coefficient in a mini channels cooler, especially with the decrease of the Nanoparticles diameter.
- For the two cooler metal types, the copper cooler is better in the reduction of the temperature.

Cumulative effects of laser and spin orbit interaction (SOI) on the thermal properties of quantum pseudodot

Bernard Donfack
University of Dschang, Cameroon

In this work, we investigate the cumulative effects of laser and spin orbit interaction (SOI) on the thermodynamic properties of a quantum pseudodot using the Tsallis formalism. Through the evaluation of the energy we derive some thermodynamic properties at the accessible states. From the results obtained, we found that contrary to the SOI, laser field is a suitable external field to reduce the rate of entropy (disorder) in quantum system, this allows to have a control upon the spin alignment, increase the number of accessible states but stabilizing our system at the same time (reduce the rate of entropy) due to the great effect of laser field. Therefore, the combined effects of laser field and SOI are an important parameter to enhance the thermodynamic quantities and more define the spin alignment of quantum system.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Growth of pyrite-FeX2 (X=S, Se) thin films having desired properties for several applications, by the simple spray pyrolysis technique

Beya Ouertani[1,2]

[1]*University of Carthage, Higher Institute of Environmental Science and Technology of Borj Cedria, Borj-Cedria Science and Technology Park, Tunisia*

[2]*Photovoltaic laboratory, Research and Technology Center of Energy, Borj-Cedria Science and Technology Park, Hammam-Lif, Tunisia*

Nowadays, researchers are of great interest to innovate new low cost materials for solar cells. Several research works focused on the Pyrite (FeS_2, $FeSe_2$,..etc) films fabrication because of their low cost. The used synthesis technique was the simple spray pyrolysis followed by a heat treatment. Indeed, this technique is efficient for obtaining pyrite thin films having good properties for several applications. In a first step, the simple and non-toxic technique: spray pyrolysis, was used for growing amorphous iron oxide thin films; which were heat treated under sulfur or selenium at several temperatures, in a second step. But, unconvincing results were obtained. FeS_2-Pyrite, for example, is a promising candidate for absorption and photocatalysis. Furthermore, it is of great interest in applications of renewable energy conversion due to its high optical absorption coefficient, but to use it in this area, improving its optical and electrical properties is greatly necessary. However, researchers thought about its alloying/doping in the aim to improve its optical and electrical properties to make it more effective as a photovoltaic material. Different alloying elements/dopants were chosen. In this work, the ruthenium has been treated as a good candidate for alloying the FeS_2 and $FeSe_2$ thin films, in the aim to improve their properties since they were chosen among the low cost materials for solar cells. Hence, an aqueous solution of $FeCl_3.6H_2O$ (0.03 M) was sprayed for 5 min onto glass substrats, pre-heated at 350°C. On which, was srayed, immeadiatly, for 1 min, an aqueous solution of $RuCl_3.3H_2O$ (0.03M). Blackish amorphous layers were obtained, that were heat treated under sulfur or selenium atmosphere (~10-4Pa) at various temperatures. The obtained thin films presented a high absorption coefficient and direct band gaps corresponding to desired photon energies values for the estimated applications. The obtained results are an interesting plus in this domain.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Formation and chemical transformations of steel corrosion products in the primary systems of nuclear power plants

Boris Gusev[1], A. Efimov[2] and **L. Moskvin[2]**

[1]FSUE "Alexandrov Research Institute of Technology", Russia

[2]St. Petersburg University, Institute of Chemistry, Russia

Based on a look-back analysis of the obtained research results and a comparison of these results with those in available publications the following conclusions were made:

1. The morphology of corrosion products formed on the inside surfaces of NPP systems has a four-layer structure.

a. A layer of solid corrosion deposits tightly bonded with the surface is formed above the oxide film.

b. Tightly bonded deposits are under loosely bonded («loose» or dissipative) corrosive deposits layers that are dynamically balanced with the corrosion products particles dispersed in the water coolant.

2. Phase composition of solid corrosion products depends on the presence of ferrous (II) and ferric (III) iron oxide-hydroxide compounds whose ratio depends on water chemistry conditions:

Under reducing water chemistry conditions, the phase composition of all corrosion products is determined by a spinel structure of magnetite (Fe3O4).

Under oxidizing water chemistry conditions, the partial oxidation of ferrous (II) iron ions results in a defect structure of nonstoichiometric magnetite FeA3+ [Fe2+1-xFe3+]BO4-x, where A and B are two non-equivalent positions in magnetite structure. At x = 1 a nonstoichiometric magnetite structure changes into hematite α-Fe_2O_3 or maghemite γ-Fe_2O_3 structure.

It is noted that the mathematical models nowadays used for description of mass exchange and mass transfer of corrosion products in NPP primary systems do not consider physico-chemical processes leading to the formation of such complex (phase, disperse, chemical, radionuclide) composition of corrosion products.

The paper presents a diffusion model for corrosion products mass exchange and mass-transfer in the "steel/water coolant" system as an alternative to the electrochemical model for general corrosion. The diffusion model provided better insight into understanding how the phase, disperse, chemical, and radionuclide composition of steel corrosion products is formed in the coolant of NPP primary system.

Mixed-Metal MOF-Derived carbon sponges for oil absorption

Boris Ildusovich Kharissov[1], Cesar M. Oliva González[1], Thelma E. Serrano Quezada[1], Lucy T. González[2], Idalia Gómez de la Fuente[1] and **Oxana V. Kharissova[1]**

[1]*Autonomous University of Nuevo Leon, México*

[2]*Tecnologico de Monterrey, Mexico*

In this work, we propose the implementation of three carbon sponges, generated from the carbonization of melamine-formaldehyde sponges coated with different HKUST-type metal-organic frameworks (MOFs) in different thermal conditions. The employed MOF precursors were trimesic acid (BTC), nickel and cobalt salts. The monometallic HKUST type MOFs were synthesized using a simple method of controlled precipitation, which starts from two precursor solutions. It was revealed that the carbon sponges can selectively absorb oil in the water/oil mixture, possessing magnetic and enhanced hydrophobic and superhydrophobic properties. All the pyrolyzed carbon sponges, obtained at 500 and 700°C, were not the most optimal since they had absorption capacities of around 25 g/g and only supported up to 4 absorption cycles. On the other hand, the carbon sponges, obtained at 300°C, had absorption capacities greater than 40 g/g.

Precise tooth preparation technical guided by 3D printing guide plate with quantitative hole

Chunxu Liu

State Key Laboratory of Oral Diseases & National Clinical Research Center for Oral Diseases & Dept. of Prothodontics, West China Hospital of Stomatology, China

The minimum amount of tooth preparation that can be fully controlled is crucial in achieving long-term, stable, and effective aesthetic restoration, which is also a major difficulty in aesthetic restoration. The tooth preparation can be imple- mented efficiently and accurately through digital technology based on the fixed-deep hole guiding technology. Prior the actual tooth preparation, the technology first designs the virtual contour, layering, and virtual occlusion of the prosthesis on the computer. Then, virtual tooth preparation is carried out by cutting back according to the virtual prosthesis. Next, the virtual drilling operation plan is designed according to the shape of the virtual tooth preparation and the contour of the abutment tooth. Finally, the tooth preparation guide plate is designed and printed in 3D. It realizes the whole process of quantitative and precise guidance of dental preparation, visualizes the restoration space, reduces the clinical operation time, and guarantees the quality of dental preparation. It also promotes the improvement of the teaching quality of digital practical exercises.

Thermoplasmonics of gold nanord stable aggregates

Dheeraj Pratap and **Sanjeev Soni**

Biomedical Applications Group, CSIR-Central Scientific Instruments Organisation, India

The aggregation of nanoparticles is a natural phenomenon caused by a variety of biological and physical conditions, yet these aggregates are extremely unstable. If the aggregates had been stable, they may have been valuable for various biological applications. For the optical characteristics and photothermal heat generation of stable aggregates of metal nanoparticles, a forced synthesis of aggregates of tiny gold nanorods was carried in a mixture of Dulbecco's Modified Eagle's medium (DMEM) and Bovine Serum Albumin (BSA). To investigate the photothermal characteristics of hexadecyltrimethylammonium bromide (CTAB) coated gold nanorods, they were transformed into stable aggregates. The absorption spectra of aggregates revealed a redshift when compared to monodispersive gold nanorods, confirming that the form and size of the aggregate rely on the quantity of BSA in DMEM as well as the concentration of CTAB in the stock solution of the gold nanorods suspension. Greater redshift is caused by a higher concentration of BSA in DMEM and a lower concentration of CTAB in monodispersive gold nanorod solution. The well-defined plasmonic absorption resonance peaks of gold nanorod aggregates were therefore tailored up to the second biological therapeutic window. Gold nanorod aggregates were shown to be stable for at least one week after being synthesised. These aggregates were also photothermally studied utilizing a high power broadband near-infrared light source. Aggregates were also photothermally stable, implying that they can be used in similar applications repeatedly. The photothermal conversion efficiency of these stable gold nanorod aggregates was better than that of the nanorods in their monodispersive state. Stable aggregates' optical and photothermal capabilities might be beneficial for biological therapeutic applications, sensing, deep tissue light penetration for imaging, and other scientific applications by redshifting the plasmonic absorption resonance peak and enhancing the photothermal effect.

Pro-antioxidant and biological activity of nanocomposites of reduced Graphene oxide, silver, copper and their combinations

Elitsa L. Pavlova[1], Iliana A. Ivanova[2], Anna D. Staneva[3], Aneliya S. Kostadinova[4], Diana G. Kichukova[5] and **Lyubomira D. Yocheva[6]**

[1]Faculty of Physics, Sofia University "St. Kliment Ohridski", Bulgaria

[2]Faculty of Biology, Sofia University "St. Kliment Ohridski", Bulgaria

[3]Department of Silicates, University of Chemical Technology and Metallurgy, Bulgaria

[4]Istitute of Biophysics and Biomedicine Engendering, Bulgarian Academy of Sciences, Bulgaria

[5]Institute of General and Inorganic Chemistry, Bulgarian Academy of Sciences, Bulgaria

[6]Faculty of Medicine, Sofia University "St. Kliment Ohridski", Bulgaria

The study aimed to evaluate the pro-, antioxidant and biological activities of newly synthesized nanocomposites of RGO and its combinations with silver and copper by luminescent and microbiological assays. The antimicrobial activity was tested during 24h against E.coli and St.aureus. The Gram-positive bacteria were more resistant than the Gram-negative. Strongest antibacterial effect was demonstrated by the graphene nanocomposite decorated with silver and copper. The cubic silver nanoclusters size 30nm showed better bacteriostatic effect than the spherical nanoparticles on reduced graphene sheets with 43nm diameter.

The eukaryotic cell cytotoxicity effect was evaluated with two cell lines - MDCK-kidney-epithelium-noncancerous-cells and A549-lung-cancerous-epithelium-cells, tested for 24h. Our results showed that RGO Ag:Cu had stronger cytotoxic effect on eukaryotic cells. We have discovered that the cancerous A549 cells show stronger sensitivity to the nanomaterials than the noncancerous MDCK-cells.

The pro- and antioxidant activity of all nanomaterials were studied according to the free-radical oxidation reactions (pH 7.4 and pH 8.5) in the following chemiluminescent model systems:

1) Chemical, with Fenton`s reagent (H2O2-FeSO4) - for the generation of hydroxyl radicals (.OH)

2) Chemical, with oxidant hydrogen peroxide (H2O2)

3) Chemical (NAD.H-PhMS), for the generation of superoxide radicals (O2.-).

All tested nanomaterials presented definitive antioxidant activity in both tested media at neutral and alkaline pH. The only exception was RGO Ag nanoparticles, sized 30nm, that exhibited less than 10% prooxidant activity in the Fenton`s system, at pH 8.5. Those results support the idea to use such nanomaterials in body implants.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Robust medical image encryption based on DNA chaos cryptosystem for secure telemedicine and healthcare applications

Fatma Mohammed Ali Khallaf[2,3], Walid El Shafai[1,2,3], El Sayed M. El Rabaie[2] and **Fathi E. Abd El Samie[2,4]**

[1]Security Engineering Lab, Computer Science Department, Prince Sultan University, Saudi Arabia

[2]Department of Electronics and Electrical Communications Engineering, Faculty of Electronic Engineering, Menoufa University, Egypt

[3]Department of Electrical Engineering, Faculty of Engineering, Ahram Canadian University, Egypt

[4]Department of Information Technology, College of Computer and Information Sciences, Princess Nourah Bint Abdulrahman University, Saudi Arabia

The security of healthcare and telemedicine systems is a critical issue that must be significantly investigated. Several smart telemedicine applications are expected to be adopted in the medical sector in the incoming years. Healthcare smart products that are connected through Internet to be accessible anytime and anywhere are expected to deal with critical and confidential information such as personal medical images. Therefore, medical image encryption is an important task in telemedicine and healthcare applications. This paper presents an efficient cryptosystem for medical image security based on exploiting the advantages of the de-oxyribo nucleic acid (DNA) rules and chaos maps. In the proposed medical image cryptosystem, logistic chaos map, piecewise linear chaotic map (PWLCM), and DNA encoding are employed. The PWLCM is employed to generate a secret key image. Then, the DNA rules are utilized for encoding the secret key image and the input plain image by rows that are encoded with the logistic chaos map. After that, the proposed logistic map is employed to obtain an intermediate image as another secret key image to set DNA functions row-by-row on the coded original image. Moreover, the intermediate image is decoded in the following stage. Finally, the previous actions are iterated through image columns once again to obtain the best ciphered image. The experimental results reveal that the suggested cryptosystem has a high security with an acceptable processing time. In addition, it can resist various kinds of attacks, such as known-plaintext and chosen-plaintext attacks.

FHOSM tolerant control for networked control systems with disturbances and faults

Gafary Mahmoud, Yong Chen, Longjie Zhang and **Meng Li**

School of Automation Engineering, The Institute of Electric Vehicle Driving System and Safety Technology, University of Electronic Science and Technology of China, China

This paper investigates the networked control system (NCS) with faults and disturbances which affect both actuator and sensor. A fast high-order sliding mode (FHOSM) controller is proposed to compensate for actuator faults and sensor disturbances, which is constructed based on the estimated information of the NCS. Accordingly, an adaptive observer with multi-stage is designed to estimate the states and sensor disturbances and protect the NCS from actuator faults. Furthermore, a new sliding function is assembled to realize the finite-time convergence of system states. The stability of the system with the suggested procedure is illustrated by the stability analysis underneath the designed control law. Finally, the simulation results are implemented and confirm the effectiveness of the proposed method in defending the system against both issues and inhibiting system failures.

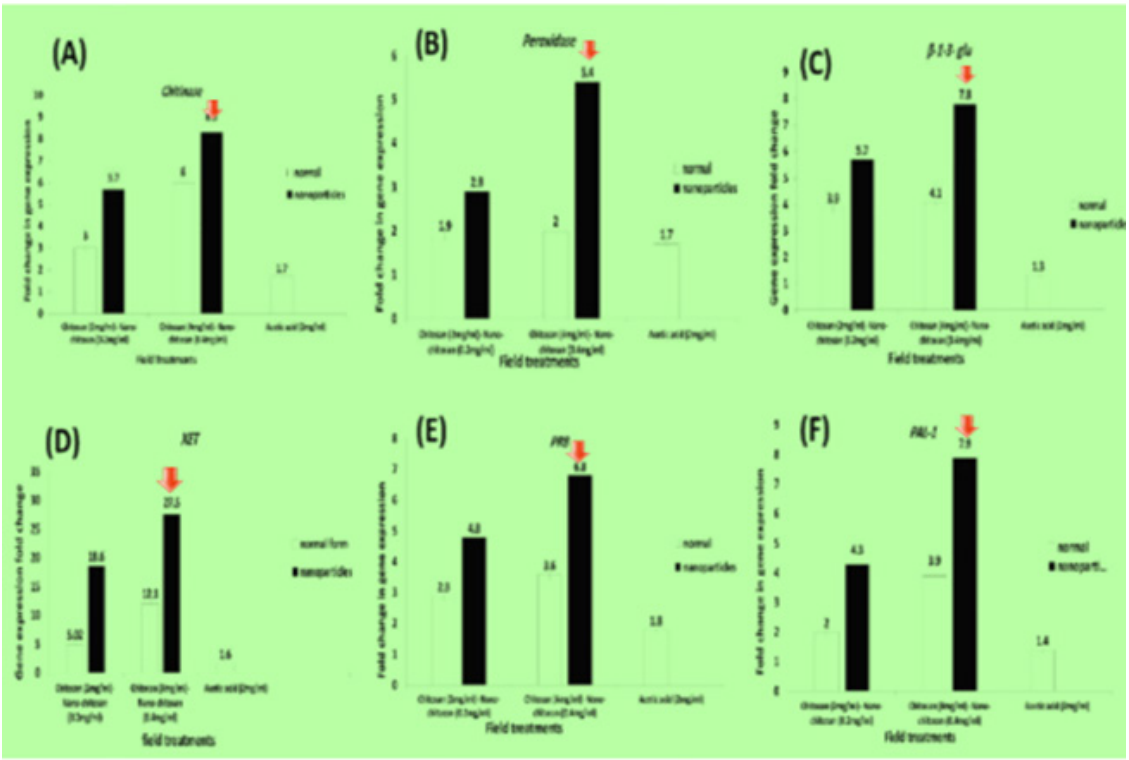
Exogenously applied chitosan and chitosan nanoparticles improved apple fruit resistance to blue mold, upregulated defense-related genes expression and maintained fruit quality

Gehan A. Monir[1], Fayz A. Abdel-Rahman[1], Mabrouk S. S. Hassan[1], Yosra Ahmed[1], Mohamed H. Refaat[2,3], Ismail A. Ismail[4] and **Hoda A. S. El-Garhy[2]**

[1]Agricultural Research Centre, Plant Pathology Research Institute, Egypt
[2]Genetics and Genetic Engineering Department, Faculty of Agriculture, Benha University, Egypt
[3]Moshtohor Research Park, Molecular Biotechnology Lab., Benha University, Egypt
[4]Department of Biology, College of Science, Taif University, Saudi Arabia

This work was to verify the effect of chitosan (2 and 4 g/L) and its nano-form (0.2 and 0.4 g/L) against blue rot disease on apples and their effect on the expression of six defense-related genes as well as fruit quality parameters Acetic acid was the best effective treatment where it completely inhibited the growth of tested P. expansum. Nano-chitosan was more effective at reducing the growth of P. expansum than their natural forms. Chitosan at 2 g/L was the least effective at reducing P. expansum growth. The highest percentage of decay incidence was recorded for water check treatment. Chitosan nanoform performed better as compared to its raw material for both artificial and natural infections. The highest efficacy was obtained for nanochitosan at 0.4 g/L. *In vivo* test, the most effective treatment was combined treatment between acetic acid vapor followed by chitosan solutions, which reduced the disease and rotted part tissues by more than 87.0%. The highest firmness value was recorded for nano-chitosan at 0.2 g/mL. Additionally, control fruit show the lowest firmness values in all cases. In most cases, chitosan in raw material at 2 g/L gave the highest TSS values. The studied genes were chitinase, peroxidase, b-1, 3-glu, XET, PR8, and PAL1. In general, both chitosan NPs and bulk material at both concentrations upregulated the six defense-related genes' expression with different patterns higher than the other treatments. The most pronounced increase of the studied genes' accumulation was observed in leaves of apple trees treated in the field with chitosan NPs compared to the

treatment with chitosan bulk and acetic acid after 48 h from the treatments. The mRNA quantity of chitinase, peroxidase, b-1,3-glu, XET, PR8, and PAL1 genes were much higher in apple tissues treated with chitosan NPs at 0.4 mg/mL (8.3, 5.4, 7.8, 27.5, 6.8, 7.9-fold increase, respectively) than other treatments. The expression of XET defense-related gene recorded the highest mRNA quantity in response to chitosan NPs at both concentrations 0.2 and 0.4 mg/mL, as well as chitosan bulk at 4 mg/mL (18.6, 27.5, 12.1-fold increase, respectively). All studied genes recorded the lowest mRNA quantity in response to acetic acid, which confirmed the chitosan efficiency at SAR induction against the investigated pathogen. Noteworthy, there was a great difference between the levels of expression in response to chitosan NPs and chitosan bulk materials at 0.4 and 4 mg/mL, respectively.



Microstructure, mechanical properties and thermal stability of (TiTaZrNb) Nx high entropy nitride coatings: Influence of nitrogen content and Bias voltage

Gilberto Bejarano Gaitan, M. A. Grisales and **F. Bolivar**
Department of Materials Engineering, Antioquia University, Colombia

High entropy alloys (HEA) and nitride (HEN) are currently very attractive to the automotive, aerospace, metalworking and materials forming manufacturing industry, among others, for exhibiting higher mechanical properties, wear resistance, and thermal stability than binary and ternary alloys. In this work, the effect of nitrogen content and bias voltage on the microstructure, chemical composition, mechanical and tribological properties as well as on the thermal stability of the high entropy (TiTaZrNb)Nx coatings deposited by direct current reactive magnetron sputtering was studied. H13 hot-work steel samples were used as substrates. The chemical composition and microstructure of the coatings were analyzed by scanning and transmission electron microscopy SEM, TEM, atom force microscopy AFM and X-ray diffraction. The mechanical and tribological properties were determined by nanoindentation and using a ball on disk tribometer, while the thermal stability was evaluated by thermogravimetry and differential scanning calorimetry TGA and DSC. All the deposited coatings exhibited a columnar structure of cubic phase fcc. The grain size and surface roughness decreased with increasing nitrogen content and bias voltage, while hardness and wear resistance increased reaching a hardness of 32 GPa. All coatings showed thermal stability up to 800˚C and began to oxidize above this temperature until complete oxidation at approximately 1000˚C.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Surface functionalization of natural Hydroxyapatite by polymerization of *β-cyclodextrin:* Application as electrode material for the electrochemical detection of Pb(II)

Guy Bertrand Ngassa Piegang[1,2], Rodrigue Tchoffo[1], Giscard Doungmo[3], Arnaud T. Kamdem[4], Ignas K. Tonlé[1,5] and **Emmanuel Ngameni[1]**

[1]*Laboratory of Analytical Chemistry, Faculty of Science, The University of Yaounde, Cameroon*

[2]*Department of Chemistry, University of Douala, Cameroon*

[3]*Institute of Inorganic Chemistry, Christian Albrechts University keel, Germany*

[4]*Freiburg Materials Research Center (FMF), University of Freiburg, Germany*

[5]*Chemistry of Materials and Electrochemistry, Faculty of Science, University of Dschang, Cameroon*

A composite material prepared by polymerization of β-cyclodextrin (β-CD) on the surface of natural hydroxyapatite using citric acid as cross linker, was employed as electrode material for the detection of Pb(II). Hydroxyapatite was obtained from bovine bones, following a three-step procedure including pre-calcination, chemical treatment with(NH4)2HPO4,andcalcination.Thestructure and morphology of the pristine hydroxyapatite (NHAPP0.5) and its functionalized counterpart (NHAPp0.5-CA-β-CD) were examined using XRD, FTIR, and SEM. Upon deposition as thin film on a glassy carbon electrode (GCE), the ion exchange ability of NHAPp0.5-CA-β-CD was exploited to elaborate a sensitive sensor for the detection of lead. The electroanalytical procedure was based on the chemical accumulation of Pb(II) ions under open-circuit conditions, followed by the detection of the preconcentrated species using differential pulse anodic stripping voltammetry. The reproducibility of the proposed method, based on a series of 8 measurements in a solution containing 2 µM Pb(II) gave a coefficient of variation of 1.27%. Significant parameters that can affect the stripping response of Pb(II) were optimized, leading to a linear calibration curve for lead in the concentration range of 2×10−8 mol L−1 – 20 × 10−8 mol L−1 (R2 = 0.998). The detection limit (3S/M) and the sensitivity of the proposed sensor were 5.06×10−10 mol L−1 and 100.80 µA.µM−1, respectively. The interfering effect of several ions expected to affect the determination of lead was evaluated, and the proposed sensor was successfully applied in the determination of Pb(II) ions in spring water, well water, river water and tap water samples.

Multifunctional nanosystems for Tumor therapy

Han Heyou[1], Mohamed Frahat Foda[1,3] and **Zhaoyu Ma[1,2]**

[1]State Key Laboratory of Agricultural Microbiology, College of Life Science and Technology, Huazhong Agricultural University, People's Republic of China

[2]Division of Chemistry and Biological Chemistry, School of Physical and Mathematical Sciences, Nanyang Technological University, Singapore

[3]Department of Biochemistry, Faculty of Agriculture, Benha University, Egypt

The fast growth of nanotechnology opens up new opportunities in biomedicine, notably tumor therapy. The cellular absorption of nanosystems is not only a key assumption for realizing a wide range of biomedical applications, but it is also an important factor in determining the eventual therapeutic impact. It is necessary to provide a comprehensive and detailed overview of recent research breakthroughs on the increase of nanosystem cellular absorption for cancer therapy. Based on how they enter the body, nanosystems may be classified into three groups. The first portion tries to stimulate the extracellular microenvironment in order to promote nanosystem accumulation and penetration into tumor cells. The second segment requires active targeting to enhance extracellular to intracellular cellular incorporation. The third component seeks to enhance therapeutic intracellular retention by subcellular localization. The essential components of delivery can be employed to construct multifunctional nanosystems for improving tumor therapy. Finally, the key challenges and opportunities of the growing research frontier are thoroughly examined. Herein, we present novel ideas, intriguing methodologies, and prospective approaches for building enhanced anticancer nanosystems for therapeutic use.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Physical and morphological properties of snail *(Achatina fulica)* shells for beneficiation into biocomposite materials

Iuwatoyin Joseph Gbadeyan[1], Adali[1], Bright G[1] and **B. Sithole[2,3]**

[1]School of Engineering, Discipline of Mechanical Engineering, University of Kwazulu-Natal, South Africa

[2]School of Engineering, Discipline of Chemical Engineering, University of Kwazulu-Natal, South Africa

[3]Biorefinery Industry Development Facility, Council for Scientific and Industrial Research, South Africa

In this paper, a study on the microhardness and flow strength (tensile) of a shell of an African Giant snail (Achatina Fulica) was studied as a function of indentation load. This study aimed to investigate the resistance of the shell to indention and external pulling force to determine its suitability for biofillers to be used as polymer reinforcement. In this regard, the influence of loading direction on the hardness of the nacreous (inner layer) and prismatic (outer layer) structure of the shell material was analyzed to determine the hardness variance on both layers. The results revealed that microhardness measured on the shell was dependent on the load on the nacreous and prismatic structures. Indentation loading between 50-500 kN induced tensile strengths that ranged between 675-1050 and 390 -810 MPa on the prismatic and nacreous layers, respectively. Also, the morphology of the shell surface exhibited an interlocking structure with a large surface for binding to the organic matrix. The observed reinforcement of the shell explained the hardness property of the shell. The improved hardness of the shell suggests that it can be beneficiated into filler that may be used to improve the mechanical properties of polymeric composite materials.

Dynamic hand gesture recognition under various practical scenarios

Joyeeta Singha
LNMIIT, India

Traditional human–computer interaction devices such as the mouse and keyboard have now become ineffective for the recent virtual environment applications. Gestures provide more natural and user friendly substitute to such external devices for interaction between computer and human. Hand gesture recognition systems are built so as to make the interaction between human and computer easier. This is done by making them learn the gestures being provided to them so that the next time a person gesticulates, the gesture class is being identified by the machine. The primary objective of any gesture recognition system is to build a model that has the ability to recognize human gestures and use them to control an application. In this thesis, hand gesture recognition system has been proposed which works under different scenarios such as presence or absence of variation in gesticulation speed and pattern.

The first system is developed in the absence of any variation in gesticulation speed or pattern. It has been observed that some of the gestures consist of unwanted movements during gesticulation. This is termed as 'self co-articulation'. The self co-articulated strokes were detected using speed information during pre-processing stage of the system. The major contribution in this system is the introduction of four new features such as position of the hand, self co-articulated features, ratio feature and first half trajectory features. Moreover, a hybrid classifier is designed which performs better than the individual classifiers.

The second system is developed to handle the variations in the gesticulation pattern while making a gesture by different users. The gesticulation pattern of a gesture may vary from person to person. In many of the earlier researches, the users were allowed to gesticulate according to the reference template pattern provided to them. This restricted the naturalness of the system. To make the system independent of the gesticulation pattern, two new features such as left sector trajectory features and right sector trajectory features were added along with the features developed in the first system. Thus, the combination of these features provides satisfactory results under varying gesticulation pattern.

In the third system, the users were allowed to

gesticulate at natural speed with the provided gesture pattern. Different users gesticulate at different speed for the same gesture. Variation in speed and time of gesticulation of a particular gesture results in variation in length of the extracted trajectory. In the proposed system, the variations in the gesticulation speed were addressed using two level normalization processes. In the first level, the trajectory points were aligned based on dynamic time warping (DTW) technique and 10 best gestures were selected based on minimum distortion. The final gesture is selected from the pre-selected gestures using Euclidean distance in the second level.

In order to make a hand gesture recognition system more natural and user friendly, the fourth system was developed where the users were allowed to gesticulate with bare hands. But, it has been observed that in any vision based approach, hand detection and hand tracking is a challenging task due to difficulties like variations in its appearance, complex and dynamic background, occlusion problem and illumination changes. Thus, a hand gesture recognition system is developed using bare hand which is independent of the above problems occurring during gesticulation. A combination of three frame differencing for colored frames, three frame differencing of grayscale frames and skin filtering were used to detect the hand from the background. For tracking the hand, Kanade-Lucas-Tomasi (KLT) algorithm has been modified and some additional features like compact criterion, orientation information and velocity information were added to the existing KLT algorithm. It has been observed that this modified KLT performed better than the KLT and CamShift algorithms.

A hand gesture recognition system was developed which could identify meaningful gestures within the continuous stream of hand motions. A continuous sequence may comprise of three types of strokes such as gesture strokes, self co-articulated strokes and movement epenthesis. Each meaningful gestures needs to be identified which is done in gesture spotting phase. Gesture spotting is essential for a recognition system to work continuously without need of human intervention. By spotting gestures in a continuous video stream, the unintentional movements arising between the gestures (movement epenthesis) or within the gestures (self co-articulation) can automatically be removed. Two basic problems in continuous gesture recognition is addressed in this system. Firstly, identifying self co-articulation and movement epenthesis from the normal gesture strokes in a continuous gesture sequence and secondly, differentiating movement epenthesis from the self co-articulation for gesture spotting. The combination of speed and pause information were used to obtain the movement epenthesis and self co-articulated strokes separately. Thus, the meaningful gestures are separated from the continuous sequence. The proposed system for unintentional movements detection and subsequent recognition of individual gestures in a continuous stream of gestures promises to perform well on different types of gesture sequences having different spatiotemporal characteristics and motion behaviour.

Categorization and eccentricity of the risks of AI: A comparative study of the global AI guidelines

Kai Jia[1] and **Nan Zhang**[2]

[1]*School of Public Affairs and Administration, University of Electronic Science and Technology of China, China*

[2]*School of Public Policy and Management, Tsinghua University, China*

Governments, enterprises, civil organizations, academics, are all engaged to promote normative guidelines aiming to regulate the development and application of AI in different fields. Although there have been more than 160 guidelines proposed globally, it is still uncertain whether or not they are sufficient to meet the governance challenges of AI. Given the absence of a holistic theoretical framework to analyze the potential risk AI, it is difficult to see what is overestimated and what is missing in the extant guidelines. Based on the classic theoretical model in the field of risk management, the research developed a four-dimension structure as a benchmark to analyze the risk of AI and its corresponding governance measures. The structure is consisted of four pairs of risks including specific-general, legal-ethical, individual-collective and generational-transgenerational. Using the framework, a comparative study of the extant guidelines is conducted by coding the 123 guidelines with 1016 articles. We show that the extant guidelines are indeed eccentric while collective risk and generational risk are largely underestimated by stakeholders. Based on the analysis, three gaps and conflicts are proposed for future improvements.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Silver and cupric oxide Phytonanoparticles prepared using *Simarouba glauca* and *Celastrus paniculatus* extracts and their enhanced apoptotic inducing activity

Kanchugarakoppal S. Rangappa[2], Amulya G[1] and **Prasanna D. Shivaramu[1]**

[1]*Department of Applied Sciences, Visvesvaraya Technological University, Center for Postgraduate Studies, India*

[2]*Institution of Excellence, Vijnana Bhavan, University of Mysore, India*

Objectives and scope : Silver (AgNPs) and Cupric oxide nanoparticles (CuONPs) were phytofabricated utilizing leaf extract of Simarouba glauca (SG) and aerial extract of Celastrus paniculatus (CP) to evaluate anticancer effect and to verify the apoptosis, cell cycle analysis.

Methods used: Free radical scavenging assays like DPPH, ABTS and NO; MTT assay, flow cytometry and caspase-3; EAC model with biochemical and haematological parameters.

Results and discussions: Characterization was validated using FTIR, SEM-EDX, TEM, XRD and UV-Vis analysis. The green synthesized AgNPs and CuONPs showed potent antioxidant potential with IC50 value of about 34.01+0.64 µg/mL correlated to ascorbic acid. The anticancer activities on cancerous cell lines like MCF-7 and HT-29 cell lines revealed that AgNPs and CuONPs synthesized using S. glauca and C. paniculatus indicated IC50 values ranging from 70.85+0.67 to 240.6+0.57 µg/mL. They could not effectively prohibit the growth of immortalized normal human breast epithelial cell lines (MCF-10A). To be more precise for anticancerous effect, molecular mechanism was examined in MCF-7 cell line treated with CuO-CP NPs by cell cycle analysis that depicted 75.28 % of cell arrest in Sub G0/G1 phase and 71.29 % of cells were gated in late apoptotic phase of Annexin V and propidium iodide (PI) compared to control cells. The synthesized nanoparticles also demonstrated less hemolysis efficiency and are evidenced by SEM images. We have also evaluated the *in vivo* antitumor efficacy of CuO-CP NPs treated against Ehrlich ascites carcinoma (EAC) bearing C57 mice for the first time and examined by variations in growth parameters, biochemical assays (like lactoperoxidase, reduced glutathione and myeloperoxidase), hematological profile, and histopathological analysis in comparison with control.

Conclusion: The green synthesized nanoparticles exhibited effective control of cancer cells for both *in vitro* and *in vivo* laboratory conditions and thus can be evaluated in preclinical cancer models.

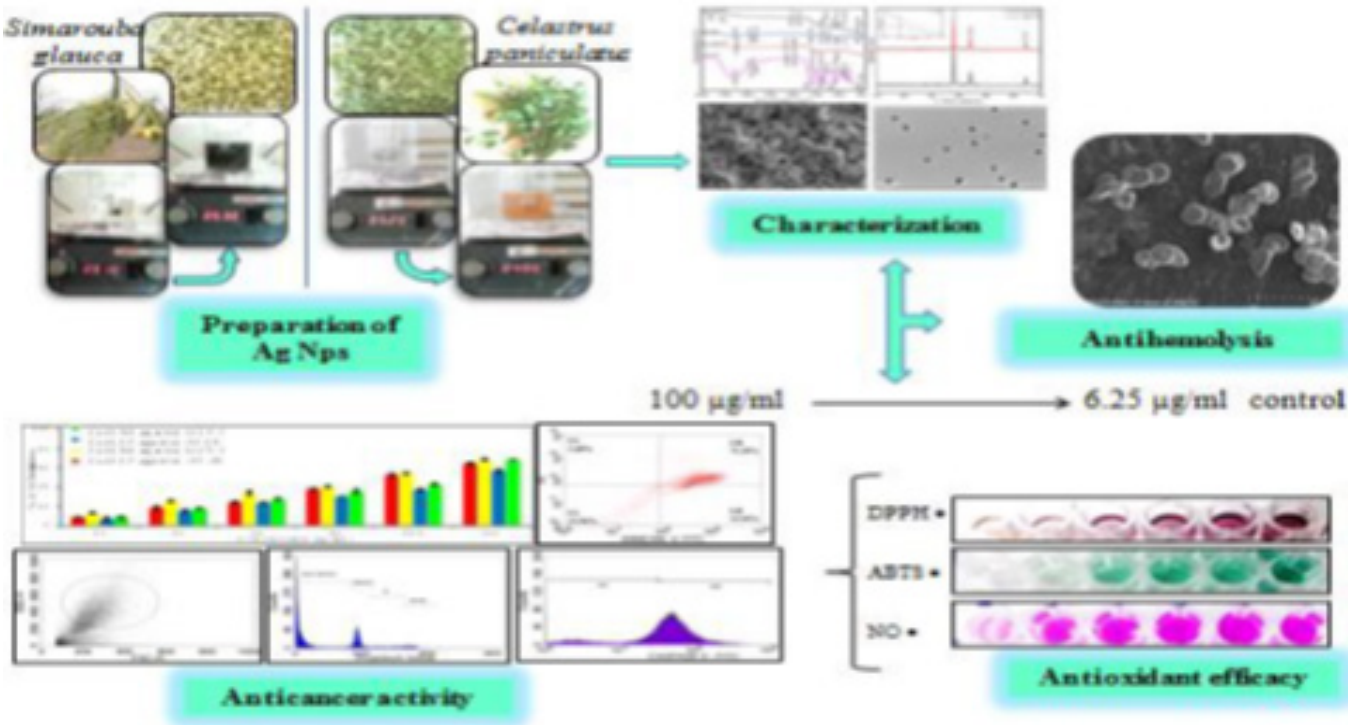


Figure: *Graphical representation of entire work*

Suppression limit cycles in 2x2 nonlinear systems with memory type nonlinearities

Kartik Chandra Patra and **Namrata Kar**
C. V. Raman Global University, India

In today's scenario, non-Linear self-sustaining oscillations otherwise called as limit cycles is one of the most important entity that limits the performance of most of the physical systems in the world. It is a formidable task to suppress the limit cycles for 2x2 systems with memory type nonlinearity in particular. Backlash is one of the nonlinearities commonly occurring in physical systems that limit the performance of speed and position control in robotics, automation industry and other occasions. The feasibility of suppression of such nonlinear self-oscillations has been explored by using pole placement technique. The novelty of the work lies with the investigation in case of the memory type non-linearity like backlash especially which is an inherent Characteristic of a Governor used for usual load frequency control of an inter-connected power system and elsewhere. Suppression of Limit Cycle using pole placement is adopted either arbitrary or optimal selection using Riccati Equation through State Feed Back. The analysis is based on harmonic linearization / harmonic balance method using graphical method which has been substantiated by digital simulation / use of SIMULINK Tool Box and the same have been illustrated through example.

The Poles / Eigen values are determined for Limit Cycling Systems with Memory type nonlinearities whose describing functions (harmonic linearization) are complex functions of X and ω. Hence, it is felt necessary to develop a graphical technique using harmonic balance method. The poles of such systems are shifted or placed suitably by state feedback so that the systems do not exhibit limit cycles. The optimal selection of feedback gain matrix K for suppression of Limit cycle has not been addressed elsewhere.

There is ample scope of extension of the present work for prediction of limit cycles and it's suppression in 3 X 3 or higher dimensional memory type nonlinear systems.

Example 1 - Consider a system as shown in Fig.1 where N1 and N2 are two nonlinear elements with backlash type input-output characteristics. G1, G2 are the transfer functions of the linear elements. Backlash nonlinearities contribute additional phase angle to the loop phase angles of G1 (j ω) and G2 (j ω) of the subsystems (s1) and (s2).

The graphical method developed in the present work has been illustrated through the Fig. 2 for the example 1. The results are shown partially in

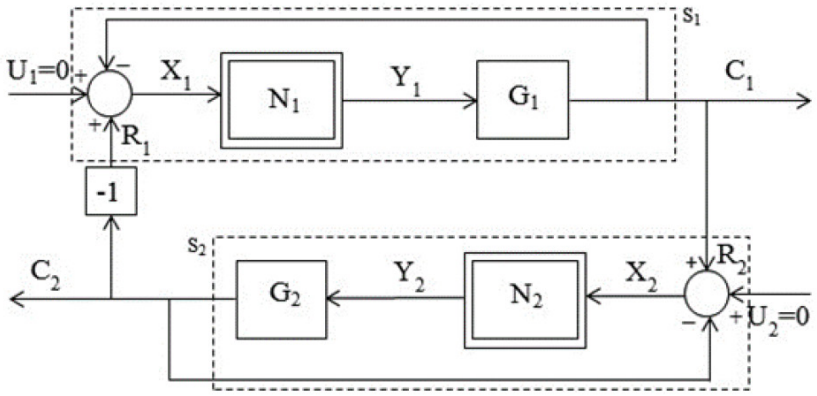
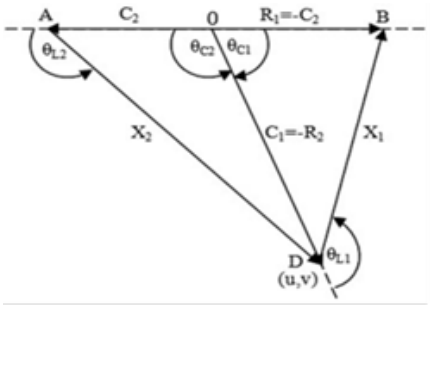
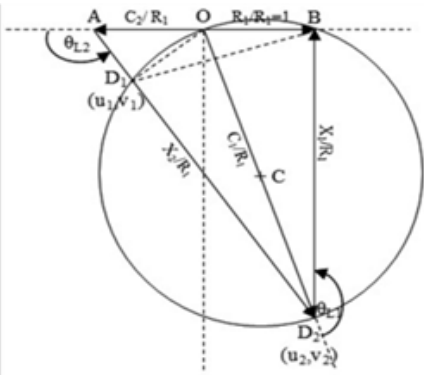


Figure 1- Sample System

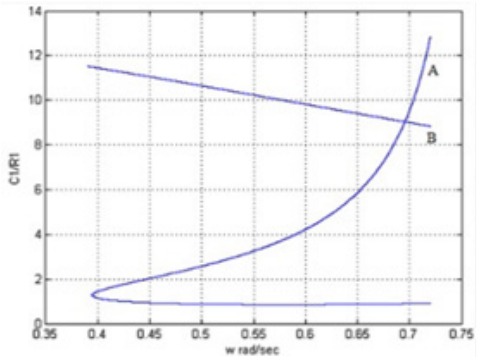
Table 1a. Under autonomous state, the system exhibits limit cycles (c.f. Table 1a). Suppression of Limit Cycle (LC) using pole placement is adopted either arbitrary or optimal selection using Riccati Equation through State Feed Back which has been depicted in Table 1b.



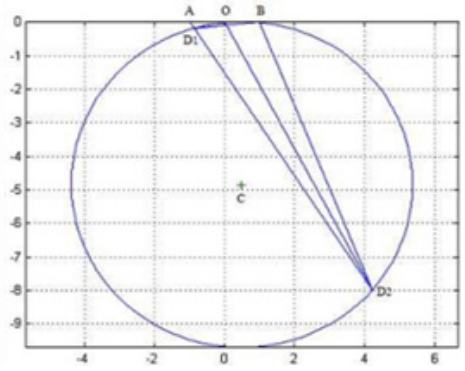
(A)



(B)



(C)



(D)

Figure 2-(a) Phase diagram for a 2 × 2 nonlinear system, (b) normalised phase diagram for a simplified generalised 2×2 nonlinear system,(c) solution of the system, (d) normalised phase diagram for Example 1 (backlash) with ω= 0.6955 radian/sec

Values of different quantities for example 1 for backlash: with D1 =2.16, D2 =1.26, b1=b2=1.0; Xm1=2.3 and Xm2=1.4

θ_{L1}	θ_{L2}	R (Radius)	$\frac{C_1}{R_1}$ Plot (c f Table 2)	$\frac{C_1}{R_1}$ Eq. (17)
-66.3730	-121.8119	0.508	0.8554,4.2227	9.8200
-68.6673	-122.1618	0.505	0.8616,4.9186	9.6127
-70.5142	-122.5110	0.503	0.8720,5.8676	9.4065
-72.5052	-122.8596	0.501	0.8869,7.2609	9.2017
-74.4505	123.2074	0.500	0.9064,9.5447	8.9988
-74.1500	123.1532	0.500	0.9031,9.0955	9.0303
-74.1037	*-123.1448*	*0.551*	*0.9025,9.0302*	*9.0351* ***(LC)***
-77.5066	-125.816	0.638	0.9084,11.500	11.87

Table 1b: Poles/Eigen values of the system in the presence and absence of limit cycles for example.1

System Condition	Roots	State feedback constants
Limit cycle exhibits	$\lambda = -1.917 \pm j0.2406$	$k_1 = 0, k_2 = 0$
Limit cycle does not exist (Optimal selection of gain K)	$\lambda = -1.201 \pm j0.2833$	$k_1 - 0.0192, k_2 = 0.0187$

Correlation between electrical, magnetic and galvanomagnetic properties in nanostructured composites obtained by implantation of transition metal ions into polymers

Lukashevich Mikhail Grigorievich

Belarusian State University, Belarus

The implantation of transition metal ions into insulators is an effective way to create nanostructured composite materials on both sides of the insulator-to-metal transition (IMT) with different mechanisms of electron transfer, both diamagnetic and magnetically ordered. The report provides a systematization and generalization of the results of studying the electrical, magnetic and galvanomagnetic properties of metal-polymer composite materials obtained by implanting magnetic (Fe^+, Co^+), and non-magnetic (Cu^+, Ag^+) metal ions with an energy of 40 keV in the dose range $D = 1 \times 10^{16}–1.5\times10^{17}$ cm^{-2} into thin polyimide (PI) and polyethyleneterephthalate (PET) films. The temperature dependences of resistance and magnetization, as well as magnetization hysteresis loops and magnetoresistive effect in the temperature range of 300-4.5 K and magnetic field up to 5 T have been studied. It has been established that the implantation of magnetic ions leads to the IMT, while the IMT is not observed at Cu+ and Ag+ ions implantation. The metal-polymer composite PET-Fe at low temperature shows metallic conductivity, while PI-Co - weak localization processes. In the PI-Co composites the size of the formed Co clusters was determined, which varies in the range of 4-11 nm depending on the dose. On the isulating side of the IMT in the PI-Cu and PET-Ag composites the magnetoresistance was not measured, while in PET-Fe and PI-Co, regardless of the side of the IMT and in the weak localization mode, it has a negative sign. The effects of the catalytic action of magnetic ions on the processes of graphitization in carbonized polymer layer and the π-electrons blocking are discussed.

Solar powered electric vehicle with health and energy monitoring

M.Padmapriya[1] and **D.T.A. Ragavendiran**[2]

[1]*SMK Fomra Institute of Technology, India*

[2]*Venkataeswara Women's Engineering College, India*

This paper discusses about the power source for e-vehicle obtained from solar panel. A buck boost converter is used to get a stable voltage / current output from the solar panel. The energy will be stored in battery. Then electric-vehicles utilizes the energy from the battery and charges to same level via solar panel. The e-vehicle driven by the DC geared motor via motor driver. Voltage sensor is used to find the charge of the battery. Current sensor is used to compare the charge from the converter to battery. The temperature sensing is done in order to find the health of the vehicle and monitor it. To detect obstacles and pot holes to avoid accidents ultrasonic sensors are used. Microcontroller receives all the values as input, and then ARM microcontroller monitors the values through IOT and display on the LCD. Thus, the E-vehicle's energy and health are monitored through IOT.

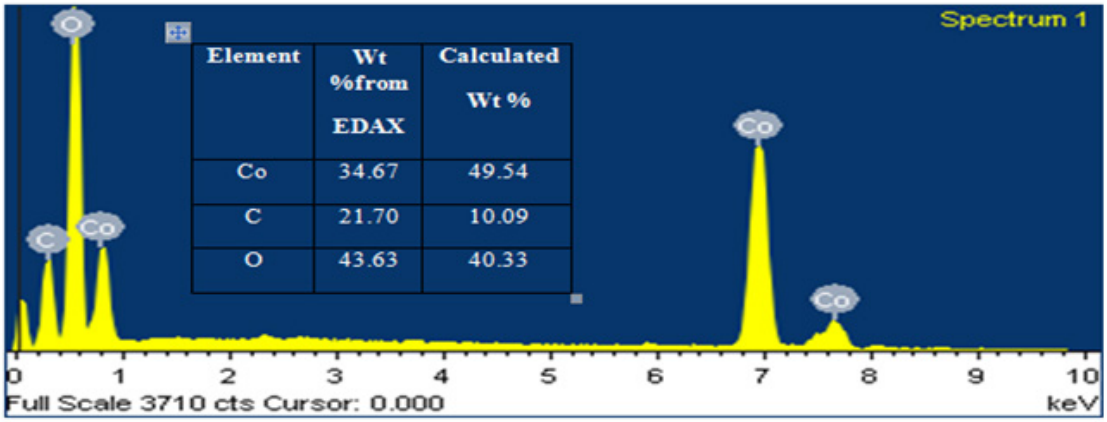
Hydrothermally synthesized Spherocobaltite nano-particles

Mahatta Oza[1], H.O.Jethwa[2], D.K.Kanchan[1] and **M.J.Joshi[2]**

[1]Department of Physics, Faculty of Science, The Maharaja Sayajirao University of Baroda, India

[2]Crystal Growth Lab, Department of Physics, Saurashtra University, India

Spherocobaltite, CoCO3, or cobalt carbonate is a mineral of calcite group. It finds applications in high-performance Li-ion batteries, as an animal feed trace element, and also used as a precursors to synthesize cobalt oxide. In this study, spherocobaltite nano-particles are synthesized by hydrothermal method using cobalt sulphate solution and ammonium carbonate solution in the ratio of 1:3. The mixture was then transferred into a 100 ml Teflon-lined autoclave and heated at 140 °C for 4 h. The final sample is recovered by centrifugation redispersion cycle. The hexagonal crystal structure is confirmed by powder XRD, and the average crystallite size is determined by Scherrer's formula and Williamson-Hall method, which is found to be within 14 nm. The presences of Carbon, Oxygen and Cobalt were confirmed by EDAX analysis. The TEM image suggests spherical morphology of the nano-particles. The FT-IR spectrum confirms the presence of functional groups such as O-H and C-O. The TGA curve suggests that the material starts dehydrating first and then decomposes in to cobalt oxide at 390o C temperature. The impedance and dielectric studies are carried out within 20 Hz to 2 MHz range at room temperature. The complex impedance and modulus plots are drawn and exhibiting the grain effect only. The VSM data taken at room temperature and low temperatures from 20 K to 300 K suggests a paramagnetic nature of the sample.



Super resolution of low fidelity flow solutions *via* generative adversarial networks

Mahdi Pourbagian
K. N. Toosi University of Technology, Iran

While computational fluid dynamics (CFD) can solve a wide variety of fluid flow problems, accurate CFD simulations require significant computational resources and time. We propose a general method for super-resolution of low-fidelity flow simulations using deep learning. The approach is based on a conditional generative adversarial network (GAN) with inexpensive, low-fidelity solutions as inputs and high-fidelity simulations as outputs. The details, including the flexible structure, unique loss functions, and handling strategies, are thoroughly discussed, and the methodology is demonstrated using numerical simulations of incompressible flows. The distinction between low- and high-fidelity solutions is made in terms of discretization and physical modeling errors. Numerical experiments demonstrate that the approach is capable of accurately forecasting high-fidelity simulations.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Effects of citral on serum inflammatory factors and Liver gene expression of il-6 and tnf *alpha* in exper imental diabetes

Mahsa Khosravibakhtiari[1], Maryam Hadadipour Zarandi[1], Hassan Sharifi-yazdi[1], Saeed Nazifi[1] and **Mehran Ghaemi[2]**

[1]*Department of Clinical Sciences, School of Veterinary Medicine, Shiraz University, Iran*

[2]*Department of Pathobiology, School of Veterinary Medicine, Shiraz University, Iran*

Background: Citral is the main ingredient of the lemongrass plant with anti-inflammatory properties.

Aim: In this study, the effects of citral on reducing inflammation in experimental diabetes in rats were investigated.

Methods: Forty rats were randomly divided into four groups. There were two control groups (healthy controls (H) and citral alone-treated control (HC)) and two diabetic groups (diabetes (D) and diabetes+citral treatment (DC)).

After diabetes confirmation on day 7, treatment with citral (300 mg/kg) was started for 2 weeks by gavage in the DC and HC groups.

Results: On days 0, 7, and 21 of the study, inflammatory elements of blood serum, IL-6, TNF-α, haptoglobin, and α2-macroglobulin were compared between the four groups. Also, on day 21 of the study, the expression level of IL-6 and TNF-α in the liver tissue was analyzed by quantitative real-time PCR. On day 21 of the study, following treatment with citral for 14 days, there was a significant difference in the DC group's inflammatory factors compared to the D group ($P < 0.005$). However, no significant difference was observed in DC and the two control groups' inflammatory factors. Regarding gene expression, the levels of IL-6 and TNF-α in the liver were significantly downregulated in the DC group compared to those in the D group ($P < 0.05$).

Conclusion: According to the results of this study, citral can be used as a suitable ingredient to reduce the inflammatory complications of diabetes.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

One-step microwave synthesis of gels based on PVA/copper and silver metallic nanoparticles: Effect antibacterial and cytotoxic

Maria Elizabeth Berrio Niño[1], J.A. Ramirez[1,2], C. Jerez[3], G. Sanchez[3,4], A. Salas[1,2], A. Diaz[1], D.A. Palacios[5] and **M.F. Meléndrez[2,6]**

[1]Department of Materials Engineering (DIMAT), Faculty of Engineering, University of Concepcion, Chile

[2]Research Group in Advanced Nanocomposites (GINA), Department of Materials Engineering (DIMAT), Faculty of Engineering, University of Concepcion, Chile

[3]Department of Restorative Dentistry, Discipline of Endodontics, Faculty of Dentistry, University of Concepcion, Chile

[4]Research Laboratory on Antibacterial Agents, Concepcion, Chile

[5]Department of Analytical and Inorganic Chemistry, Faculty of Chemical Sciences, University of Concepcion, Chile

[6]Technological Development Unit, Chile

Current dentistry requires the constant search for materials with potential antimicrobial properties that allows the eradication of bacterial biofilms in the oral cavity and enhance the durability of dental treatments. This is of great relevance in the prevention of oral infections due to the increasing bio-resistance of the microorganisms involved, mainly produced by the abuse of antimicrobial drugs. That is why the objective of this research was the development of nanostructured three-dimensional materials (gels), formed in one-step with silver and copper suspensions (NPs) and surfactant polymers as polyvinyl alcohol (PVA) and polyvinylpyrrolidone (PVP).

The compounds were prepared by mixing different molar ratios of PVA/NP/PVP (1:1:6, 1:3:6; 1:5:6) in ethylene glycol. Subsequently, the mixture was slowly stirred for 4 h by a magnetic stirrer and subjected to microwave-assisted heating for 20 min at maximum power. The gels were poured into a mold and thawed at room temperature for 24 h. In the process of preparation, the concentration of AgNPs and CuNPs into the gel was 10,787 ppm and 6,354 ppm respectively. The compounds were characterized by UV-vis, analyzing the surface plasmon signal of the AgNPs and CuNPs. FTIR-ATR to verify stability and quantification. In addition, with microscopic studies in SEM, TEM and AFM. The antibacterial and cytotoxic activity of nanocoposites was determined using E. faecalis and Fibroblast cell line (L-929).

It was evidenced that crosslinking with PVA influences the antibacterial activity of the particles, since the concentration in which cell death is generated is decreased, which translates into inhibition with lower concentrations of nanoparticles as they are not in the presence of PVA. These results are expected due to the coordination of the particles by the polymeric chains of PVA, which in turn represents an advantage in terms of the toxic properties of the nanoparticles, which decrease with increasing crosslinking.

Hybrid gradient simulated annealing algorithm for finding the global optimal of a nonlinear unconstrained optimization problem

Matsa Samath
Sana'a University, Yemen

A new hybrid gradient simulated annealing algorithm is introduced. The algorithm is designed to find the global minimizer of a nonlinear function of many variables. The function is assumed to be smooth. The algorithm uses the gradient method together with a line search to ensure convergence from a remote starting point. It is hybridized with a simulated annealing algorithm to ensure convergence to the global minimizer. The performance of the algorithm is demonstrated through extensive numerical experiments on some well-known test problems. Comparisons of the performance of the suggested algorithm and other meta-heuristics methods were reported. It validates the effectiveness of our approach and shows that the suggested algorithm is promising and merits to be implemented in practice.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Detection of AZF microdeletions and reproductive hormonal profile analysis of infertile Sudanese men pursuing assisted reproductive approaches

Mehad Azhary Abdelrhem Ali, Hassan Osman Alhassan Elsaid and **Hind Abushama**
University of Khartoum, Sudan

Background: Male factor is the major contributor in roughly half of infertility cases. Genetic factors account for 10–15% of male infertility. Microdeletions of azoospermia factors (AZF) on the Yq region are the second most frequent spermatogenesis disorder among infertile men after Klinefelter syndrome. We attempted in this study for the first time to evaluate the frequencies of all AZF sub-regions microdeletions and to analyze reproductive hormonal profiles in idiopathic cases of azoospermic and oligozoospermic men from Sudan.

Methods: A group of 51 medically fit infertile men were subjected to semen analysis. Four couples have participated in this study as a control group. Semen analysis was performed according to WHO criteria at Elsir Abu-Elhassan Fertility Centre where samples have been collected. We detected 12 STSs markers of Y chromosome AZF microdeletions using a multiplex polymerase chain reaction. Analysis of reproductive hormone levels including Follicle Stimulating, Luteinizing, and Prolactin hormones was performed using ELISA. Comparisons between outcome groups were performed using Student's t-test Chi-square test or Fisher's exact test.

Results: AZF microdeletion was identified in 16 out of 25 Azoospermic and 14 out of 26 of the Oligozoospermic. Microdeletion in the AZFa region was the most frequent among the 30 patients followed by AZFc, AZFd and AZFb. Among the Oligozoospermic participants, the most frequent deletions detected were in the AZFa region and was significantly associated with Oligozoospermic phenotype, Fisher's Exact Test (2-sided) p=0.009. Among the Azoospermic patients, the deletion of the AZFc region was the most frequent and was significantly associated with Azoospermia phenotype Fisher's Exact Test p=0.026. There was a significant difference in Y chromosome microdeletion frequency between the two groups. The hormonal analysis showed that the mean levels of PRL, LH, and FSH in Azoospermic patients were slightly higher than those in oligozoospermic. A weak negative correlation between prolactin higher level and Azoospermic patients was detected. (AZFa r=0.665 and 0.602, p=0.000 and 0.0004, AZFb r=0.636 and 0.409, p=0.000 and 0.025, and AZFd r=0.398 and 0.442, p=0.029 and 0.015). The correlation was positive for AZFa and negative for AZFb and AZFd.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Chitosan-based enzyme immobilization for Biotechnological applications: Glucose biofuel cells

Mireia Buaki Sogo[1], Laura García-Carmona[1], Marta Vegas-García[1], Mayte Gil-Agustí[1], Pedro Llovera-Segovia[2] and **Alfredo Quijano-López[1,2]**

[1]Technological Institute of Energy (ITE), Spain

[2]Institute of Electrical Technology-UPV, Spain

Glucose biofuel cells (BFCs) are devoted to harvest energy from body fluids. In particular, BFCs produce energy through the biocatalytic oxidation of glucose. This reaction is catalyzed for specific enzymes, such as Glucose Oxidase, that usually is immobilized on conductive supports through different techniques to perform the enzymatic transformation. BFCs are devoted to be employed as energy source for wearable devices mainly applied in medicine, sport and wellness. Therefore, the development of novel materials for enzymatic electrodes with conductive, biocompatible and flexible properties at the same time, able to withstand dairy routines of the wearer is of interest.

Chitosan, as natural polymer, has been widely used in the development of biodevices since it is a promising material for enzyme immobilization due to its biocompatibility, hydrophilicity, no toxicity and film forming ability, together with stable enzyme immobilization.

In this work, our findings regarding the use of chitosan as immobilization matrix or self-standing support is presented, using it together with conductive materials for the development of conductive, flexible and biocompatible membranes as supports for bioelectrodes development. The membranes based on the use of non-conductive materials (chitosan), is in a comparable range of conductivity with respect to the state of the art. However, the main advantages that are a key improvement compared with the state of the art are the features of biocompatibility, improved mechanical properties and capability of stable incorporation of enzymes. It is worth to highlight that this membrane include all this properties while prevents enzyme denaturation and bioelectrocatalytic activity thanks to chitosan presence. Moreover, it provides good power densities when using as BFCs, ranging between 15 and 150 μW/cm2 in the presence of glucose. Thus, it could be easily tailored to be integrated in real miniaturized systems, showing their great potential to be integrated in the new trend of wearable technologies.

A DNA nanodevice simultaneously activating the EGFR and integrin for enhancing cytoskeletal activity and cancer cell treatment

Mirza Muhammad Faran Ashraf Baig
The University of Hong Kong, Spain

Cell-surface receptors (e.g., EGFR and integ-rin) and their interactions play determining roles in signal transduction and cytoskeletal activation, which affect cell attachment/detachment, invasion, motility, metastasis (intra-cellular), and cell−cell signaling. For instance, the interactions between the EGFR and integrin (α6β4) may cause increased mechanical force and shear stress via enhanced cytoskeleton activation. Here, we design a DNA nanodevice (DNA-ND) that can simultaneously target the EGFR and integrin receptors on the caveolae. The piconewton (pN) forces in response to the EGFR−integrin coactivation can be sensed upon the unfolding of the DNA hairpin structure on the side arm of the device via changes of the fluorescence and plasmonic signals. We find that simultaneous activation of EGFR−integrin receptors causes enhanced signal transduction, contractions of the cells, and initiation of the biochemical pathways, thus resulting in a change of the cell division and endocytosis/exocytosis processes that affect the cell proliferation/apoptosis. The DNA-ND further enables us to visualize the cointernalization and degradation of the receptors by lysosomes, providing a novel approach toward bioimaging and mechano-pharmacology.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Tetracycline removal from aqueous solution by biochar derived from algae modified by MnMoO4: Effects of operating parameters, Isotherm, Kinetic and Thermodynamic study

Mohamad Ajam[1], Majid Ehteshami[1], Siamak Boudaghpour[1], Seyyed Ahmadmirbagheri[1] and **Mahbubeh Kafil[2]**

[1]Department of Civil and Environmental Engineering, K. N. Toosi University of Technology, Iran
[2]Department of Environmental and Biological Sciences, University of Eastern Finland, Finland

The aim of the present study is to improve the adsorption of tetracycline (TC) onto biochar of microalgae modified by nanocomposite of MnMoO4 (MM40BC60). The synthesized nanocomposite was characterized by Scanning electron microscopy (SEM), BrunauerEmmett-Teller (BET) surface area, Fourier transforms infrared (FTIR) spectroscopy to investigate the morphology, surface area, pores and the functional groups of MM40BC60, respectively. The effect of various parameters including initial pH, TC concentration, and temperature on the adsorption performance of TC to the adsorbent was evaluated with considering kinetics, isotherms, and thermodynamics models. The adsorption of TC on MM40BC60 shows good agreement with the pseudo-second-order kinetic and the Langmuir isotherm models. Results of the thermodynamic study showed that the adsorption process was a spontaneous and endothermic reaction in nature.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

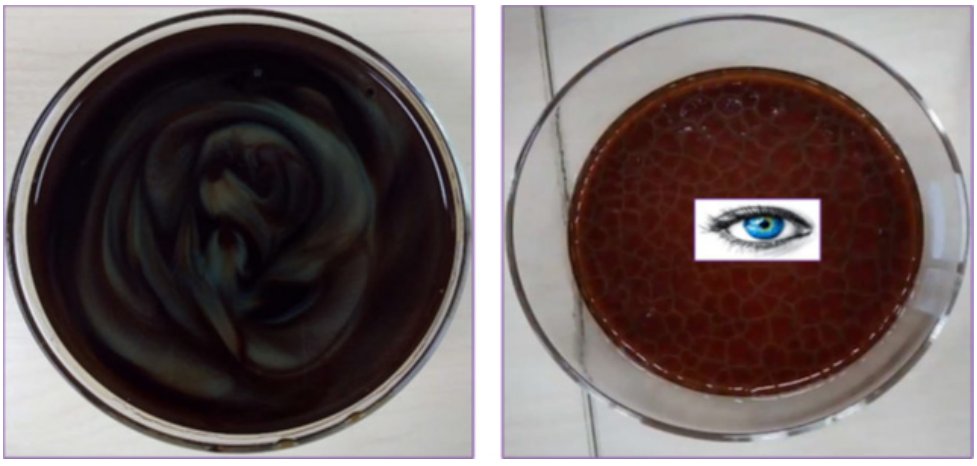
Synthesis, characterization and applications of NIVHCS LSC of GO from waste pencil leads (WPL)

Mohammad Al Mamuna[2], Yasmin Abdul Wahab[1], M. A. Motalib Hossain[1], Abu Hashem[1] and **Mohd Rafie Johan[1]**

[1]Nanotechnology and Catalysis Research Centre, Institute for Advanced Studies, University of Malaya, Malaysia

[2]Department of Chemistry, Jagannath University, Bangladesh

High quality, low cost, defect free, naked eye viewed honeycomb structured (NIVHCS) liquid single crystals (LSC) of GO (graphene oxide) is still now rare and a big challenge to synthesize, which has been successfully done using waste pencil leads as raw material. The prepared GO has been characterized by different physico-chemical, microscopic, spectroscopic and electrochemical methods. And it was used for the preparation of rGO (reduced GO) using an aqueous leaf extract of bryophyllum pinnatum as reducing agent. Moreover, the rGO was applied as nanocomposite with copper oxide (Cu2O) for the electrochemical conversion of CO2 into useful products.



Naked eye viewed honeycomb structured (NIVHCS) liquid single crystals (LSC) of GO

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Plasma-Assisted functionalization of 2D surface oxide films of liquid galinstan for electronic applications

Mohammad Karbalaei Akbari[1,2] and **S. Zhuiykov**[1,2]

[1]*University of Ghent, Department of Solid State Silences, Ghent, Belgium*

[2]*University of Ghent Global Campus, Faculty of Bioscience Engineering, South Korea*

The two-dimensional (2D) surface oxide films of liquid metals are among the main natural 2D semiconductor structures with atomically-thick dimensional characteristics. These fundamental layers of semiconductor films are formed in contact with low-concentration of oxygen in reactive atmosphere. Owning to the negligible vapor pressure, tunable surface properties, soft and dynamic interfaces, outstanding catalytic activities, and more importantly the formation of natural 2D films on their surface, the gallium based liquid metal alloys are promising platforms for development of novel 2D materials. The incorporation of trace impurities and introduction of doping elements into 2D semiconductor films are still challenging technological process for electronic applications. By taking the advantages of plasma, the selective incorporation of doping elements into surface oxide films of liquid alloys are facilitated. In the present research, the cold plasma environments of various gases (H2S, NH3 & CH4) were employed to incorporate reactive elements into the surface oxide films of liquid metal (LM) alloy. As the representative of room temperature LM, galinstan alloy (Ga 61 wt. %, Sn 25 wt. %, In 13 wt. %) was employed as the platform for the growth of 2D gallium oxide films. The combined effects of plasma electric field, presence of ionic charged particles and more importantly the catalytic activities of galinstan/Ga2O3 substrate facilitated the incorporation of reactive elements of decomposed gases into the 2D surface oxide Ga2O3 film.

Various material characterization techniques, including Fourier-transform infrared spectroscopy (FTIR), Raman, X-ray photoelectron spectroscopy (XPS), scanning electron microscopy and transition electron microscopy (TEM) were employed to investigate and confirm the level of elemental incorporation into 2D Ga2O3 films. The conductive atomic force microscope (c-AFM) was successfully employed to measure the resistive switching characteristics and electrical properties of functionalized 2D surface oxide films.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Green synthesis of copper oxide nanoparticles using *Justicia adhatoda* leaf extract and its application in cotton fibers as antibacterial coatings

Monjarul Alam[1], Md. Johurul Islam[1] and **Mist Toma Khatun[2]**
[1]*Dept. of Electrical and Electronic Engineering, Islamic University, Bangladesh*
[2]*Atomic Energy Centre Dhaka, Bangladesh Atomic Energy Commission, Bangladesh*

Nanotechnology is nanosciences have a vast subject to study and green chemistry principles is one of the main subjects. Green approach is one step process which is eco-friendly, cost effective, non-toxic and sustainable. The synthesis can be per-formed by bio-reduction process using the extracts of medicinal plants, microorgan-isms (bacteria, fungi etc.). In this research, the ability of the leaf extract of *Justicia Adhatoda* is observed as unique reducing agents for bioconversion of copper ions to copper oxide nanoparticles (CuONPs). Among various metal nanoparticles, CuONPs have chosen because of their efficient antibacterial activity and nontoxicity towards human. The formation of nanoparticles is confirmed by the color change of the solution from light blue to brown in color because of the trouble of surface plasmon resonance (SPR). The optical study showed SPR peak at 240 nm. FT-IR showed the reduction of CuNPs was due to the biomolecules present in the leaf extract which acted as reducing in addition to capping agents. FESEM has been applied to recognize the size, shape and morphology of nanoparticles. The synthesized CuONPs were tested for antibacterial activity to both gram positive and gram negative bacterial strains which are applicable for the fabrication of antibacterial textile cotton and alkali oxygen plasma treated pure cotton coated by CuONPs is used to application gram-negative (E. coli) bacteria found a promising result.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Polyolefin Catalysts: An unending research journey

M. Atiqullah[1] and **H. S. Al-Asiri**[2]

[1]*Senior Research Engineer and Professor Interdisciplinary Research Center for Refining & Ad-vanced Chemicals (IRCRAC) Research Institute, King Fahd University of Petroleum & Minerals, Saudi Arabia*

[2]*Director Interdisciplinary Research Center for Refining & Advanced Chemicals (IRCRAC) Re-search Institute, King Fahd University of Petroleum & Minerals, Saudi Arabia*

In materials research, catalyst plays critical role by decreasing chemical reaction activation energy, improving manufacture operating conditions, and increasing production volumes. Transition metal-catalyzed olefin polymerization particularly dominates the Chemistry literature and polyolefin education, science, engineering, and industry over 70 years. Saudi Arabia is listed as the 4th largest polyolefin producer in the world. This talk, therefore, highlights polyolefin catalyst research at the Interdisciplinary Research Center for Refining & Advanced Chemicals (IRCRAC), Research Institute, King Fahd University of Petroleum & Minerals, Saudi Arabia. We particularly address catalyst performance and kinetic evaluation, novelty in supported metallocene catalysts, the apparently absurd residual catalyst structure and solid-state electronic environment, illustration of supported metallocene catalyst active site distribution thru model and experiment, preparation of spheroidal MgCl2 support, and catalytic synthesis of energy-saving drag reducing UHMW polymers using local petrochemical feedstock. Each area has been assessed from the product development perspective. Our PO catalyst research aligns with Saudi Arab's Vision 2030 and National Strategic Plan (NSP). We also present a *circular research concept* which shows how product-driven research with a commercial driving force can significantly advance fundamental PO catalyst chemistry to valuable applications for Saudi Arabia. Finally, we focus on establishing spinoffs using local raw materials. In this context, we highlight the role, to be played by researchers, R&D management, and potential investors, to develop the appropriate *innovation diffusion* culture. We especially underscore the six relevant diffusion tools. The critical need is to understand why an innovation will fail to be marketed. We particularly stress the importance of conducive sociology (environment), psychology (mental state), and mindset (preparedness to make and accept changes) that precede innovation and technology and make research promote economy.

"Kerberized user authentication mechanism to prevent data leakage"

N. Jeyanthi, R. Thandeeswaran and **M. Hena**
VIT, India

Big data and data security are among the most widely discussed topics across the globe. Every organization adopts one or the other user identification and authentication methods to secure the data and avoid unauthorized access. Big data systems like Apache Hadoop heavily relied on the Kerberos Protocol to authenticate the user. Many improvements have already been proposed by various experts in dealing with the inherent security weakness of Kerberized systems. Password Guessing Attacks, Replay Attacks, Time Synchronization and Single Point of Failure problems are the few challenges of Kerberos to mention. Since Kerberos relies on a Trusted Third Party Server called Key Distribution Center (KDC), single point of Failure is considered as most critical among these. The Key Distribution Center required being online always and any failure can put the entire system to be down. For Big data systems, which demand a fast, reliable, and real-time data analytics and user access, this is not favourable.

Kerberos protocol uses symmetric key cryptography to provide mutual authentication and authorization for client-server applications. The Key Distribution Center is logically divided into two parts – the Authentication Server and the Ticket Granting Server. These servers issue the ticket and session keys for service access. All user information and credentials are stored in a local database at the KDC. Thus, the KDC is always the target of attackers and the entire system fails once this is compromised. This novel user authentication mechanism is an amalgam of modern technologies like Blockchain technology, Digital Signatures and Threshold ElGamal Cryptosystem to deal with the problem of single point of failure in Kerberized Hadoop Clusters.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Influence of *Zr* on structural and morphological properties of *ZnO* nanoparticles and their inverted organic solar cell

N.Nithya[1] and **G.Magesh**[2]

[1]*Assist Department of Physics, PSGR Krishnammal College for Women, India*

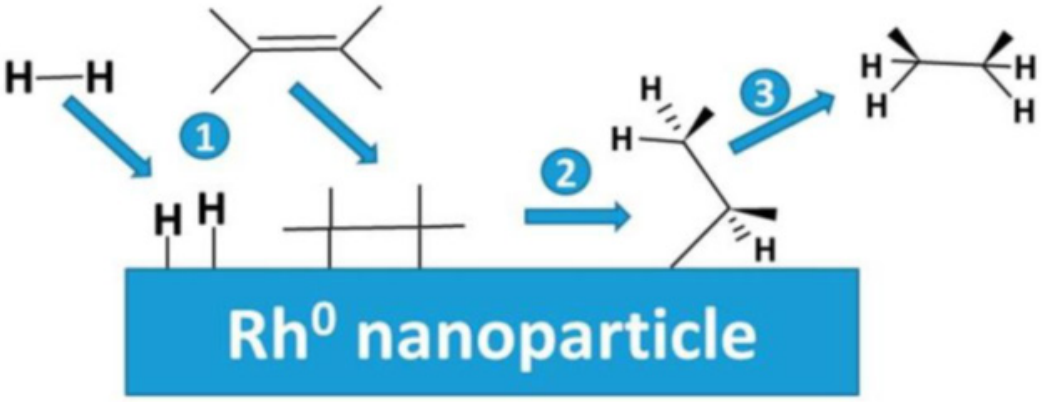
[2]*Department of Physics, PSGR Krishnammal College for Women, India*

In this study, Pure and Zr doped ZnO nanoparticles were effectively synthesized through easy Co-precipitation method. The synthesized Zr-ZnO NPs were characterized by XRD, FESEM, UV-Vis, FTIR and PL. X-ray diffraction analysis proved the creation of the hexagonal wurtzite structure. The average crystallite size was found to be 25- 30 nm. The FESEM and TEM analysis verified that the sphere-shaped morphology for both ZnO and Zr - ZnO NPs. UV – Visible Spectroscopy confirmed that an increase in the optical bandgap involving the concentration of dopant Zr increases. The bandgap values were found to be 3.57-3.54 eV. FTIR spectra showed that the existence of the characteristic stretching and bending vibrational band of Zn – O bonding at 400-600 cm-1 and shifts in vibrational bands were noticed for Zr - ZnO NPs. PL spectra of Zr - ZnO NPs at various concentrations show a strong UV and Green emission band. SAED pattern proves the crystalline nature of synthesized samples. EDAX spectra confirm the existence of Zr, O, and Zn and verify that Ti4+ ions are present in the ZnO lattices. ZnO nanoparticles are widely used as electron transport layer (ETL) in organic solar cell. (PEDOT: PSS) hole extraction layer. Power conversion efficiency (PCE) of fabricated organic solar cell is 8.10% Fill.

Rhodium nanoparticles incorporated mesoporous silica as an active catalyst for cyclohexene hydrogenation under ambient conditions

Nabil Al-Zaqri
Department of Chemistry, College of Science, King Saud University, Saudi Arabia

Rhodium (Rh) nanoparticles were embedded in the mesopores of TUD-1 siliceous material and denoted as Rh-TUD-1. Five samples of Rh-TUD-1 were prepared with different loadings of Rh that ranged from 0.1 to 2 wt% using the sol-gel technique. The prepared samples were characterized by means of several chemical and physical techniques. The obtained characterization results show the formation of highly distributed Rh0 nanoparticles with an average size ranging from 3 to 5 nm throughout the three-dimensional silica matrix of TUD-1. The catalytic activity of the prepared catalysts was evaluated in the solvent-free hydrogenation of cyclohexene to cyclohexane at room temperature using 1atm of hydrogen gas. The obtained catalytic results confirm the high activity of Rh-TUD-1, in which aturn over frequency(TOF)rangingfrom4.94to0.54s−1 was obtained. Moreover, the change in reaction temperature during the reaction was monitored, and it showed an obvious increase in the reaction temperature as an indication of the spontaneous and exothermic nature of the reactions. Other optimization parameters, such as the substrate/catalyst ratio, and performing the reaction under non-ambient conditions (temperature = 60◦C and hydrogen pressure = 5 atm) were also investigated. Rh-TUD-1 exhibited a high stability in a consecutive reaction of five runs under either ambient or non-ambient conditions.



Gold nanoflowers as effective labels for lateral flow immunosensors

Nadezhda Taranova and **A.A. Bulanaya**

A.N. Bach Institute of Biochemistry, Research Center of Biotechnology, Russian Academy of Sciences, Russia

The advantages of nanoparticles as bioanalytical markers are determined by increased total surface of their suspensions that accelerate formation of target products and increase their amount [1]. Currently gold nanoparticles are widely applied as a colorimetric marker in immunochromatographic analysis (ICA) due to their simple synthesis, conjugation with proteins and optical detection. However, variation of their size and shape provides additional facilities for more efficient and sensitive assays [2]. The presented study was focused on analytical application of gold nanoflowers (GNFs), which are flower-like nanoparticles with a developed surface in the form of wavy or sharp protrusions (tips) [3]. The integration of the GNFs with ICA of fatty acid-binding protein (FABP), an important biomarker of acute myocardial infarction, was considered.

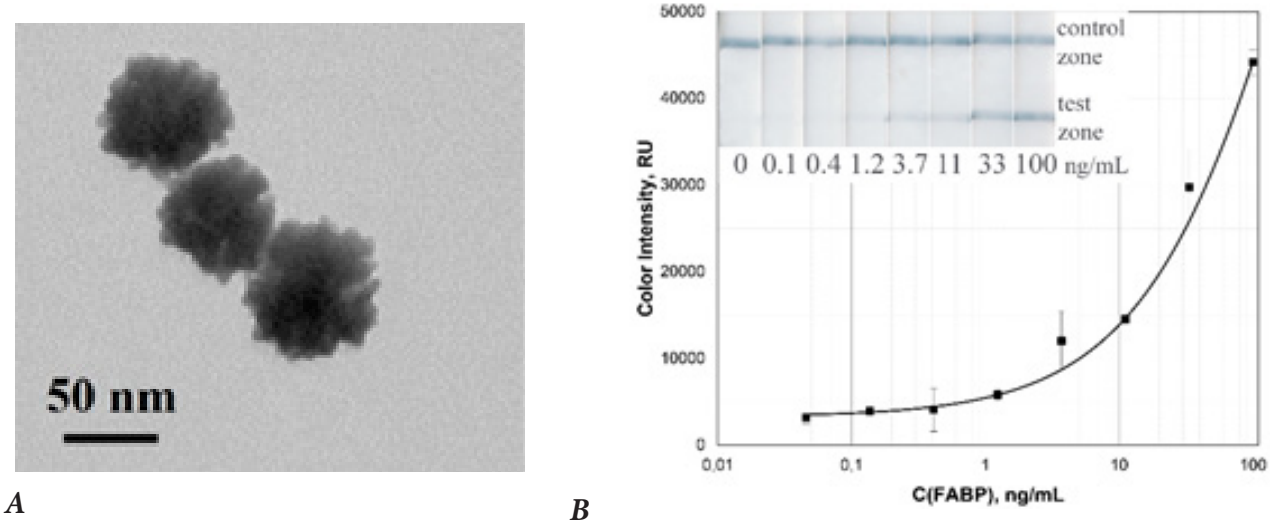


Fig. 1. *Transmission electron microscopy image ofr GNFs*
(A). *Calibration curve and appearance of test strips for FABP detection by the developed ICA.*
It was found that for the GNFs use the limit of visual detection of FABP was 0.4 ng/mL and the limit of instrumental detection was 0.1 ng/mL. The application of GNFs provided a 10-fold improvement of sensitivity compared with gold nanospheres, demonstrating facilities of the dstudied alternate bioanalytical label.

GNFs were synthesized by growing gold nanospheres with diameter 10 nm (nuclei) with HAuCl4 with the use of sodium citrate and hydroquinone as reducing agents. The obtained product had an average diameter of 118±4 nm (Fig. 1A). The GNF-antibody conjugate was synthesized by physical adsorption of the specific monoclonal antibodies against FABP on the surface of the GNFs.It was shown that ~75% of the added anti-FABP antibodies were adsorbed on the GNFs surface, which is higher compared to the commonly used gold nanospheres (65% at the same conditions). The observed effects logically follow from the developed surface of the GNFs, which is inhomogeneous in curvature and due to this generate different sites of sorption.

This conjugate was used as detector agent in the ICA for FABP detection, where the formed nanopareticle-labeled immune complexes are detected as colored lines at a test zone of a membrane strip (Fig. 1B). For a correct comparative evaluation of GNFs and gold nanospheres as markers, the conditions for the both cases were optimized.

CFMT: A collaborative filtering approach based on the nonnegative matrix factorization technique and trust relationships

Navid Khaledian
Islamic Azad University, Iran

As a method of information filtering, the Recommender System (RS) has gained considerable popularity because of its efficiency and provision of the most superior numbers of useful items. A recommender system is a proposed solution to the information overload problem in social media and algorithms. Collaborative Filtering (CF) is a practical approach to the recommendation; however, it is characterized by cold start and data sparsity, the most severe barriers against providing accurate recommendations. Rating matrices are finely represented by Nonnegative Matrix Factorization (NMF) models, fundamental models in CF-based RSs. However, most NMF methods do not provide reasonable accuracy due to the dispersion of the rating matrix. As a result of the sparsity of data and problems concerning the cold start, information on the trust network among users is further utilized to elevate RS performance. Therefore, this study suggests a novel trust-based matrix factorization technique referred to as CFMT, which uses the social network data in the recommendation process by modelling users' roles as trustees and trusters, given the trust network's structural information. The proposed method seeks to lower the sparsity of the data and the cold start problem by integrating information sources including ratings and trust statements into the recommendation model, an attempt by which significant superiority over state-of-the-art approaches is demonstrated an empirical examination of real-world datasets.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

"Membranes composite materials of Titania/Graphene/Chitin and its application for the treatment antibiotics in water"

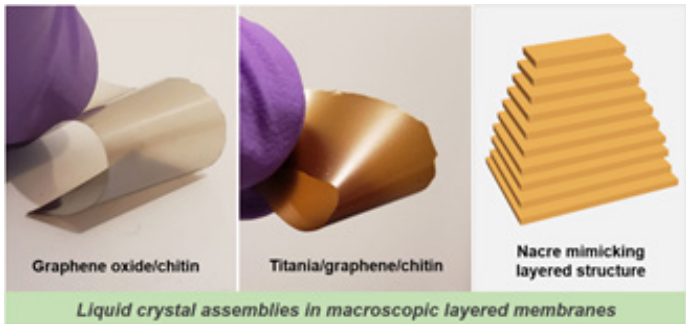
Nguyen Thanh Dinh[2] and **L.T. Phuong Anh**[1,2]

[1]*Ba Ria Vung Tau University, Vietnam*

[2]*Institute of Applied Material Science, Vietnam Academy of Science and Technology, Vietnam*

The fabrication of hierarchical layered TiO2/graphene/chitin composite membranes from the liquid crystal (LC) self-assembly of graphene oxide (GO) nanosheets, chitin nanospindles, and peroxotitanate is presented. The multilayer co-assembly evolves the lamellar arrangement to mimic a fascinating nacre's structure in the solidified graphene/chitin composites. The core of our routine is the self-assembly of both GO LCs and chitin LCs into a flexible nacre-mimicking membrane structured by graphene-wrapped chitin layers. The intrinsic electron mobility of graphene nanosheets and mechanical toughness of chitin nanocrystals endow these reinforced membranes with functions in catalyst supports and electronics. The nacre-mimicking composite homogeneously incorporates with TiO_2 nanoparticles by simultaneous LC coassembly of GO, chitin and peroxotitanate to afford layered TiO_2/-graphene/chitin composites that can function as a photocatalytic membrane for the mineralization of organic compounds. The LC integration creates hierarchical assemblies to increase the permeability of the TiO_2/-graphene/chitin nanohybrid membranes, offering its potential use for developing photocatalysis fo treatment antibotics in water. The sustainable materials as promising precursors for further investigation in energy storage and conversion and gas sensing.

Graphic abstract



Liquid crystal assemblies in macroscopic layered membranes

Some aspects of the synthesis of chitosan stabilized nanoparticles with bioactive properties

Noira R. Vokhidova and **S. Rashidova**

Institute of Polymer Chemistry and Physics of Uzbek Academy of Sciences, Uzbekistan

Research is devoted to the synthesis of chitosanstabilized mono- and bimetallic nanoparticles (NPs) of metals such as Ag, Cu, Co, Ag/Cu, Ag/Co. It was found, that in the absence of chitosan, occur agglomeration and oxidation of Cu and Co NPs, with formation oxides - CuO and Co_3O_4. Silver NPs were obtained in "*in situ*" in following conditions: $Na_3C_6H_5O_7/Ag^+$=0.736–4.416 and CS/Ag^+=20 mol. It was revealed that there is a correlation between synthesis conditions-size (shape) of the NPs. It is determined, that $Na_3C_6H_5O_7$ performs a dual function, both a reducing agent and a stabilizer of the particles. X-ray diffraction analysis established signals corresponding to Ag NPs at 2Θ = 38.40, 43, 64.0, 78 and 82°. The size and distribution of the silver NPs were studied by microscopic methods, and the spherical particles were 15–300 nm, and the needle-like particles were 1–8 nm.

The size and shape of chitosan stabilized bimetallic NPs can be controlled by varying pH, the concentration of the reducing agent and the molar ratios of metal ions. Established that an increase in the concentration of the reducing agent, as well as metal ions, promote the formation of fibrillar nanoparticles. On the based DLS-studies of chitosan and bimetallic NPs discovered that, 73-76% of the NPs had a size in the range of sizes from 25 to 250 nm. The results demonstrated, that for the ratio Cu^{2+}/Ag^+=2:3 mol, an increase in the concentration of Cu^{2+} led to the formation of fibrillar particles from d=180÷260 nm and l=25 micron.

In summary, found the optimal conditions for obtaining stabilized mono-, bimetallic NPs and "a protective effect" of chitosan. Computer modeling has proved that stabilization occurs due to "chemisorption". The results indicate that the synthesized samples have bactericidal and fungicidal properties.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Sustainable nano-sodium silicate and silver nitrate impregnated locally made ceramic filters for point-of-use water treatments in sub-sahara African households

Omeje Maxwell[1], Orere Faith Oghenerukevwe[1], Adewoyin Olusegun O.[1], Joel Emmanuel Sunday[1], Ozieme Arinze. Daniel[2], Ayanbisi Oluwasegun[1], Hassana O. Jonathan[2], Taiwo O. Samson[3], Ngozi Adeleye[4], OROSUN, Muyiwa Michael[5], Omeje Uchechukwu A.[6], Akinwumi Oluwasayo A.[1], Akinwumi Akinpelu[1], Akinyemi M. L[1] and **Olagoke Oladokun[7]**

[1]Department of Physics, College of Science and Technology, Covenant University, Nigeria

[2]Department of Chemistry, College of Science and Technology, Covenant University, Nigeria

[3]Department of Biological Sciences, College of Science and Technology, Covenant University, Nigeria

[4]Department of Economics and Development Studies, College of Business and Social Sciences, Covenant University, Nigeria

[5]Physics Department, University of Ilorin, Nigeria

[6]Department of Public Health, College of Medicine, University of Lagos, Nigeria

[7]Department of Chemical Engineering, College of Engineering, Covenant University, Nigeria

The inadequate public water supply by the Government to the general public has created several ways of sourcing water to sustain daily demand in Nigeria. Inadequate access to quality water for consumption craved the idea of the designing of new trend silver nitrate impregnated locally made Point-Of-Use (POU) ceramic filters to enhance water purification efficiency for household use. This study utilized silver nitrate-molded ceramic filters prepared with Kaolin from Owode, silt soil, sodium silicate, sawdust, and distilled water in three varying proportions to ascertain pollution removal efficiencies. Heating was carried out by firing the filters at 900oC and further preheating at 400oC after dipping in

silver nitrate solution. Silver nanoparticle and dissociated particle discharge from filter pot painted with 0.03 mg/g casein-covered nAg or AgNO3 were estimated as an element of pH (5-9), ionic strength (1-50mM), and cation species (Na^+, Ca^{2+}, Mg^{2+}). Silver delivery was constrained by disintegration as Ag+ and resulting cation exchange measures, paying little heed to silver structure applied. Water analysis for both heavy metals (Pb and Cd) and microbial load (E. coli) evaluated, corroborate the maximum removal efficiency. It was observed that kaolin-sawdust with the Silver nitrate filters showed a constant and effective removal of both heavy metals and disinfection of microbial load. The minimum flow rates observed were 4.97mL/min for batch filter used for Iju River water sample one (AF1) and 4.98 mL/min for batch filter used for Iju River water sample two (AF2) having porosity 49.05% and 50.00%, respectively, while the higher flow rate was 5 mL/min for batch filter used for borehole water sample one (BF1) and batch filter used for well water sample two (CF2) with porosity of 50.00%.

Artificial bee colony algorithm with directed scout

Radhwan Ali Abdulghani Saleh
University of Kocaeli, Turkey

As a relatively new model, the artificial bee colony algorithm (ABC) has shown impressive success in solving optimization problems. Nevertheless, its efficiency is still not satisfactory for some complex optimization problems. This paper has modified ABC and its other recent variants to improve its performance by modifying the scout phase. This modification enhances its exploitation ability by intensifying the regions in the search space, which probably includes reasonable solutions. The experiments were performed on CEC2014, and CEC2015 benchmark suites, real-life problems. And the proposed modification was applied to basic ABC, Gbest-Guided ABC, Depth First Search ABC, and Teaching–Learning Based ABC, and they were compared with their modified counterparts. The results have shown that our modification can successfully increase the performance of the original versions. Moreover, the proposed modified algorithm was compared with the state-of-the-art optimization algorithms, and it produced competitive results.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Experimental investigations on thermophysical properties of nano-enhanced phase change materials for thermal energy storage applications

Raja Elarem[1], Talal Alqahtani[2] and **Sofiene Mellouli[3]**

[1]Laboratory of Thermal and Energetic Systems Studies (LESTE) at the National School of Engi-neering of Monastir, University of Monastir, Tunisia

[2]College of Engineering, Mechanical Engineering Department, King Khalid University, Saudi Arabia

[3]College of Engineering, Mechanical Engineering Department, Jazan University, Saudi Arabia

Thermophysical properties such as latent heat, viscosity and melting temperature could be changed for different physical properties of dispersed nanoparticle such as size, shape, and concentration. In this study, Nanocomposites-Enhanced Phase Change Materials NePCM are formed by dispersing Aluminium (Al) and Copper (Cu) nanoparticles into paraffin wax in various mass fractions (0.1, 0.3, 0.6, 1, 2.5 and 5%). The impact on the thermophysical properties of paraffin wax by the nanoparti-cles is also investigated. Heat conduction and differential scanning calorimeter experiments are used to investigate the effects of different nanoparticle concentrations on the melting point, solidification point, and latent capacity of nanocomposites. Experimental results show that the dispersion of nanoparticles of Al and Cu can decrease the melting temperature and increase the solidification temperature of PCM. This dispersion could also be limited due to increase in dynamic viscosity of the NePCM. Furthermore, Al and Cu nanocomposites with mass fractions of 2% and 1%, respectively, show better enhancements in the thermal storage characteristics of the paraffin compared to the next higher mass fraction.

Deep learning in healthcare system for quality of service

Rajsekhar Boddu
Haramaya University, Ethiopia

Deep learning (DL) and machine learning (ML) have a pivotal role in logistic supply chain management and smart manufacturing with proven records. The ability to handle large complex data with minimal human intervention made DL and ML a success in the healthcare systems. In the present healthcare system, the implementation of ML and DL is extensive to achieve a higher quality of service and quality of health to patients, doctors, and healthcare professionals. ML and DL were found to be effective in disease diagnosis, acute disease detection, image analysis, drug discovery, drug delivery, and smart health monitoring. This work presents a state-of-the-art review on the recent advancements in ML and DL and their implementation in the healthcare systems for achieving multi-objective goals. A total of 10 papers have been thoroughly reviewed that presented novel works of ML and DL integration in the healthcare system for achieving various targets. This will help to create reference data that can be useful for future implementation of ML and DL in other sectors of healthcare system.

Oblique sputtered highly porous TiN thin films for on chip microsupercapacitors

Ramesh Chandra, Deepika Jhajhria and **Pranjala Tiwari**

Nanoscience Laboratory, Institute Instrumentation Centre, Indian Institute of Technology Roorkee, India

Microsupercapacitors are gaining increasing interest for energy storage in miniaturized electronics devices. However, the production of porous electrode material with standard microfabrication techniques is a big problem. Here, we report on the oblique angle deposition of highly porous and nanostructured columnar titanium nitride (TiN) films on silicon substrate using magnetron sputtering for high-performance microsupercapacitors. The intercolumnar porosity of the sputtered TiN films can be systematically controlled as a function of the oblique angle α achieved by tilting the substrate. The denser morphologies in TiN films deposited at α = 0° lead to moderate capacitive behavior in 1M Na_2SO_4 electrolyte solution. While a high areal capacitance of 17.5 mF•cm-2 is obtained for 60° oblique angle due to high intercolumnar porosity in films which increases the specific surface area and thus facilitates easy electrolyte permeation. The electrodes also retain 91.3% of the initial specific capacitance after 5000 charging/discharging cycles. An on-chip interdigitated microsupercapacitor has been subsequently fabricated based on optimized TiN thin film serving as both an efficient electrode and a current collector. The device was electrochemically tested using polyvinyl alcohol (PVA)-Na_2SO_4 hydrogel electrolyte and delivered energy densities of 0.46 μWh•cm-2 while maintaining a high-power density of 703.12 μW•cm^{-2}. This work gives insight into the use of oblique angle deposition for obtaining highly porous films of other electrode materials for microsupercapacitor applications and at the same time presents major technological advances toward the large-scale production of on-chip power sources.

Automatic recognitions of personality

Ramon Zatarain Cabada

National Technological Institute of Mexico, Technological Institute of Culiacán, México

In the field of automatic recognition of apparent personality, several studies have been carried out that reach different levels of certainty based on previously labeled video and voice data sets. On the other hand, there are standardized personality tests that allow, based on a model of personality factors, to determine the level of development of each factor in a person. However, there is no platform that allows the researcher to collect new video data sets (including voice) and, likewise, to apply a standardized personality test, and store that information to later evaluate the accuracy of the automatic recognizers applied to the collected data sets.

The present work describes the development of a data collection platform (PersonApp) with the objective of analyzing the effectiveness of automatic apparent personality recognizers with respect to the results of a standardized personality test of the same participant and in this way, have elements that allow the improvement of the evaluated models. Likewise, the results of the evaluation of an automatic apparent personality recognition model are presented, in order to test the platform.

Regarding the standardized test, the platform collected results from 32 different participants. For each of them, the values corresponding to each of the personality traits were obtained. Within the analyzed sample, it was observed that the traits of agreeableness and openness obtained the highest average value. On the other hand, neuroticism was the trait with the lowest mean value. An experiment was carried out where the participants were asked to record a video (including audio) with a duration of 1 minute. 84 videos corresponding to 20 participants were obtained. These videos were used to test an automatic apparent personality recognizer based on a convolutional neural network.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Performance assessment of artificial neural network model for the prediction of fouling resistance in cross flow heat exchanger

Rania Jradi[1], C. Marvillet[2] and **M.R. Jeday[1]**

[1]National Engineering School of Gabes, Tunisia

[2]National Conservatory of Arts and Crafts, France

The unwanted deposition of material on the surface is one of the vast majority issues that are occurred in industrial heat exchangers, which reduces their performance and thus constitute the biggest challenges in heat transfer. Despite their large economic losses and environmental damage, prediction and prevention of fouling remain unresolved issues in process engineering. To surmount these issues, artificial neural network (ANN) with back propagation method was used to predict the fouling resistance from some easily measurable variables of the phosphoric acid concentration loop. Indeed, fouling resistance is predicted according to the inlet and outlet temperature, density and flow rate of the phosphoric acid, the steam temperature and time. The accuracy analysis justified the existence of the highest interrelation between these independent variables and fouling resistance. The ANN model was developed and validated using the collection of the operating data of the concentration loop in cross-flow heat exchanger. The optimal number of hidden neurons was determined by maximizing a series of statistical accuracy measurements. The best topology was found with a network consisting of one hidden layer with 6 neurons using tangent sigmoid transfer function for the hidden and output layers. The reliable quality indices with overall AARD=0.048%, MSE=1.81 10-11, RMSE=4.25 10-6 and r2All=0.995 reflect the accurately performance of the developed model to predict fouling resistance.

Consequently, the developed model is used to predict fouling resistance of cross flow heat exchanger and can be applied to plan a cleaning schedule and control operation of the phosphoric acid concentration plant.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Immunotoxic effects of metal-based nanoparticles in fish and bivalves

Rashid Alijani Ardeshir[2], Sara Rastgar[1], Helmut Segner[3], Charles R. Tyler[4,5], Willie J. G. M. Peijnenburg[6,7], Youji Wang[8,9], Amir Parviz Salati[10] and Abdolali Movahedinia[11]

[1]Department of Marine Biology, Faculty of Marine Sciences, Khorramshahr University of Marine Science and Technology, Iran

[2]Faculty of Biotechnology, Amol University of Special Modern Technologies, Iran

[3]Centre for Fish and Wildlife Health, Department of Pathobiology and Infectious Diseases, Vetsuisse Faculty, University of Bern, Switzerland

[4]Biosciences, College of Life and Environmental Sciences, University of Exeter, UK

[5]Centre for Sustainable Aquaculture Futures, University of Exeter, UK

[6]Institute of Environmental Sciences (CML), Leiden University, the Netherlands

[7]Centre for Safety of Substances and Products, National Institute of Public Health and the Environment (RIVM), the Netherlands

[8]International Research Center for Marine Biosciences, Ministry of Science and Technology, Shanghai Ocean University, China

[9]Key Laboratory of Exploration and Utilization of Aquatic Genetic Resources, Ministry of Education, Shanghai Ocean University, Shanghai, China

[10]Department of Fisheries, Faculty of Marine Natural resources, Khorramshahr University of Marine Science and Technology, Iran

[11]Department of Marine Biology, Faculty of Marine Sciences, University of Mazandaran, Iran

There is a global research interest in metal nanoparticles (MNPs) due to their diverse applications, rapidly increasing use, and increased presence in the aquatic environment. Currently, most MNPs in the environment are at levels unlikely to cause overt toxicity. Sub-lethal effects that MNPs may induce, notable immunotoxicity, could however have significant health implications. Thus, deciphering the immunological interactions of MNPs with aquatic organisms constitutes a much-needed area of research. In this article, we critically assess the evidence for immunotoxic effects of MNPs in bivalves and fish, as key wildlife sentinels with widely differing ecological niches that are used as models in ecotoxicology. The first part of this review details the properties, fate, and fundamental physicochemical

behavior of MNPs in the aquatic ecosystem. We then consider the toxicokinetics of MNP uptake, accumulation, and deposition in fish and bivalves. The main body of the review then focuses on immune reactions in response to MNPs exposure in bivalves and fish illustrating their immunotoxic potential. Finally, we identify major knowledge gaps in our current understanding of the implications of MNPs exposure for immunological functions and the associated health consequences for bivalves and fish, as well as the general lessons learned on the immunotoxic properties of the emerging class of nanoparticulate contaminants in fish and bivalves.

Highly selective nanomolar level colorimetric sensing of *cr3+* through biosynthesized gold nanoparticles in the presence of *cr6+*

Roomia Memon
University of Sindh, Pakistan

Our work exhibits a green method of formation for gold nanoparticles (AuNPs) from its precursor salt, tetra-chloroaurate through the reducing and capping action of Ziziphus mauritiana leaves (ZmL) extract with the assistance of heat in aqueous medium. The formation of so called ZmL-AuNPs was confirmed via color change of solution mixture to ruby red which was further confirmed by surface plasmon resonance (SPR) band at 521 nm using ultraviolet-visible (UV–Vis) spectroscopy. Further characterization of ZmL-AuNPs includes Fourier transform infrared spectroscopy (FTIR), atomic force microscopy (AFM), X-ray diffraction (XRD) technique, and zeta-potential analysis (ZPA) respectively. The synthesized ZmL-AuNPs were probed and recognized to perform as a highly sensitive and selective colorimetric sensor for the detection of Cr3+ in the presence of other expected interfering cations including Cr6+. Importantly, the developed ZmL-AuNPs based colorimetric sensor functioned linearly in the range of 16–283 nM of Cr3+, based on aggregation induced decrease in absorption along with red shift in the resulting spectra exhibiting R2 value of 0.9977. The limit of detection and limit of quantification for Cr3+ were estimated as 0.48 nM and 1.6 nM respectively. The developed colorimetric sensor was effectively used for detecting Cr3+ in real water samples.

Development and characterization of functionalized Al-MCM-41 reinforced Polybenzoxazine nanocomposites

S. Ananda Kumar[1], M.R. Jayasree[1] and **M. Alagar[2]**

[1]Department of Chemistry, Anna University, India

[2]Polymer Composite Lab, Department of Chemical Engineering, Anna University, India

The present work relates to a development and fabrication of epoxy blended polybenzoxazine (PBZ) resinl and its subsequent characterization by advanced surface analytical techniques to find their suitability as advanced composite materials. DOPO based BZ matrix was synthesized from appropriate chemical reactants. The varying weight percentages of GPTMS functionalized Al-MCM-41 were incorporated into the DOPO-BZ matrix to fabricate PBZ nano-composites. The synthesized monomer was confirmed by 1H NMR and FT-IR. The BZ exhibits good compatibility with F-Al-MCM-41 filler and makes it possible to form cross-linking network of the cured products. The thermal stability and mechanical properties of the composites was also increased, due to the presence of alumina present in the nano-composites that produces an additional heat capacity to the polymer composites with a higher char yield as well. The value of dielectric constant of PBZ was found to be increased with the increasing weight percentages of F-Al-MCM-41. The important factors that influence the dielectric properties of the polymer nano-composites are highly aromatic structure and the long-conjugated delocalization of the polymer matrix that possess the bulk polarizability. Data obtained from dielectric and DMA studies infer that 5 wt% F-AL-MCM-41reinforced nano-composites possesses the maximum value of dielectric constant (7.5) and storage modulus than those of the neat PBZ matrix.

Experimental investigation and comparative machine learning prediction of compressive strength of recycled aggregate concrete

S. Reza Salimbahrami
Technical and Vocational University, Iran

In this study, the idea of recycling the concrete wastes and reuse of them for reproduction of green concrete has been presented. Thus, we have tried to study mechanical parameters using recycled aggregate concrete. For this purpose, three mix designs including natural, recycled and recycled fiber concrete were tested. Moreover, at the end of the paper, estimation of compressive strength using ANN methods, has been presented. Based on the results, the recycled concrete and recycled fiber concrete with the proposed mix design, has a high compressive strength and due to relatively high porosity of the recycled aggregate concrete, its density has decreased by 2.48% and its water absorption increased by 54% compared to the natural concrete. Two artificial intelligence method of ANN and SVM benefit from a quite equal coefficient of consistency and the results of 124 test specimens with the results obtained from SVM are in a better agreement. Finally, two artificial intelligence methods were compared with the MLR using K-fold cross validation, indicating superior performance of the artificial intelligence. In order to determine effectiveness of each one of the input parameters on the compressive strength, a sensitivity analysis using the Milne method with adjusted weights stemmed from the optimized neural network was conducted whose results indicated great impact of the content of natural gravel and low effect of water on target function of the neural network (NN). Hence, it is concluded that for attaining an efficient mix design, more care should be taken regarding selection of the coarse NAs and fine RAs.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Analytical solution for nonlinear forced vibration of the Piezoelectric carbon nanotube considering surface effects, located in the magnetic field and resting on nonlinear viscoelastic foundation

Saeed Shahsavari[1] and **Z. Rajabi Mashhadi**[2]

[1]*Department of Mechanical Engineering, Isfahan University of Technology, Iran*

[2]*School of Materials Science and Engineering, Iran University of Science and Technology, Iran*

In this study, the free and forced vibrations of piezoelectric carbon nanotubes with surface effects were placed in a magnetic field situated on a viscoelastic foundation with nonlinear damping and stiffness elements under the influence of external harmonic force were investigated. This structure would be formed when a piezoelectric layer material was attached to the outer surface of a carbon nanotube with a relatively uniform thickness. The nonlocal theory was used to illustrate the effects of the nanoscale in the theoretical model. The equations of motion of the system were also extracted using the dynamic equilibrium conditions of the element. The Galerkin method was used to reduce the order of the obtained dynamical equations. Considering the boundary conditions of the problem, which are both simple support (SS) or clamped (CC), the nonlinear time differential equations of the system and its coefficients were obtained. With the elimination of external forces and nonlinear terms, the eigenvalue problem of the system was solved to find the frequency of free vibration. Then, using the multiple time scales method, an analytical closed-form solution aimed at amplitude-frequency response curves for forced vibration of a nonlinear system is extracted. Moreover, the effect of different parameters such as nonlocal parameter, CNT surface effect, voltage magnitude and externally applied magnetic field, nonlinear viscoelastic foundation stiffness, and damping coefficients on eigenvalues and dynamic response results curves would be discovered. Finally, the obtained results were validated with the expected ones.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

"Allicin-mediated silver nanoparticles (AgNPs): Synthesis, profiling, *in vitro* and *in vivo* antioxidant properties"

Sarwar Allah Ditta[1], Atif Yaqub[1], Rehan Ullah[1], Fouzia Tanvir[2] and **Shaista Ali[3]**

[1]*Department of Zoology, Government College University, Pakistan*

[2]*Department of Zoology, University of Okara, Pakistan*

[3]*Department of Chemistry, Government College University, Pakistan*

Allicin is the main component in garlic extract, which gives garlic its characteristic taste and odor. In this study, allicin was extracted from the garlic and used for the preparation of the allicin-mediated silver nanoparticles. Allicin exhibited a broader surface plasmon resonance (SPR) peak at 240 nm, while high-performance liquid chromatography yielded one prominent peak corresponding to allicin. The allicin-mediated silver nanoparticles and chemically synthesized silver nanoparticles were characterized by UV-Visible spectroscopy, particle size analyzer (PSA), zeta potential, Fourier transform infrared spectroscopy (FTIR), and Transmission electron microscopy (TEM) analyses. The allicin-silver nanoparticles demonstrated good radical scavenging activity (*in vitro*) and antioxidant potential in albino mice (*in vivo*). Reduced glutathione and catalase were elevated ($p<0.05$), and superoxide dismutase (SOD) was depleted ($p<0.05$) in some groups. The histopathological analysis and all other findings revealed the safer biological nature of allicin-mediated silver nanoparticles than the chemically synthesized silver nanoparticles. It is concluded that allicin-mediated silver nanoparticles are less toxic and safer for biomedical applications.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Mathematical model to make previsions when information is represented by fractal sets

Serena Doria

Department of Engineering and Geology, D'Annunzio University of Chieti - Pescara, Italy

A new model of coherent conditional previsions, based on Hausdorff measures is proposed in a metric space and its nonlinear extensions to the class of all random variables, named coherent upper and lower conditional previsions, are investigated. The conditional expectation is defined by the Hausdorff measure of order s, or s-dimensional Hausdorff measure, if the conditioning event has positive and finite Hausdorff measure in its Hausdorff dimensions. Otherwise it is defined by a 0-1-valued finitely additive, but not countably additive probability. In this way the conditional expectation and its extensions depend on the complexity of the piece of information represented by a set, which can be also a fractal set.

It is proven that the coherent upper conditional previsions satisfy the monotone convergence theorem and the disintegration property if all the conditioning events are measurable sets.

The model can be applied to study fractal antenna in particular to investigate stochastic independence between random variables given the fractal set that represented the antenna.

The model can also be to represent the conscious and unconscious activities of the human brain in AI. By adopting this specific Bayesian approach to human behaviour and reasoning mathematical representation of fundamental functions of the human brain - usually considered as bias and detrimental to an account of normative rationality - are provided without incurring in the usual inconsistencies. In particular it is proven that the model solves classical problems connected to probability bias of human brain such as the solution to Linda's conjunction fallacy and the bias of selective attention describes in the so-called invisible gorilla experiment, often taken as a typical example of the limitations of human perception.

Fabrication and characterization of an active bionanocomposite film based on basil seed mucilage and *ZnO* nanoparticles

Shahin Zomorodi

West Azerbaijan Agricultural and Natural Resources Research and Education Center, Iran

In this study, active nanofilms were developed using basil seed mucilage (BSM) containing zinc oxide nanoparticles (ZnONPs), according to casting method. Different amount of ZnO-NPs at the range of 0% (control), 0.1, 0.25, and 0.5% were incorporated into BSM film, then the physical, permeability, mechanical, thermal, and antimicrobial properties, as well as color index of fabricated films were examined. The results showed that moisture content, water absorption, water solubility, water vapor permeability (WVP), melting temperature (Tm), glass transition temperature (Tg) decreased with increasing the amount of ZnO, while the melting enthalpy of films increased ($P < 0.05$). The addition of ZnO-NPs up to 0.25% resulted in significant increase in the ultimate tensile strength, light (L*) and white indexes. Additionally, the basil seed mucilage film did not show antibacterial performance, while added of ZnO-NPs to the film, caused an increased trend in the antibacterial activity of films. The fabricated nanofilms prevented the growth of *Listeria monocytogenes, Escherichia coli, Staphylococcus aureus,* and Salmonella typhimurium ($P<0.05$). All in all, the developed nanobiocomposite film using BSM containing 0.25% ZnO-NPs could be used as biodegradable and antibacterial film for food active packing to increase the shelf life of food.

Node redeployment Shrewd mechanism for wireless sensor network

Shahzad Ashraf
Hohai University, China

Despite numerous advantages, the challenges for wireless sensor communication always remains open due to which a continue effort is being applied to tackle the unavoidable conditions regarding wireless network coverage. Somehow, the uncouth deployment of the sensor nodes is making the tribulation queue longer day by day which eventually has great impact over sensor coverage range. In order to address the issues related with network coverage and uncouth energy wastage, a sensor node redeployment based shrewd mechanism (NRSM) has been proposed where new intended positions for sensor node are rummaged out in the coverage area. The proposed algorithm operates in two phases; in first phase it locates the intended node positions through Dissimilitude Enhancement Scheme (DES)☐ and moves the node to new position. While second phase is called a Depuration, when the moving distance between initial and intended node position is shrewdly reduced. Further, different variations factors of NRSM such as loudness, pulse emission rate, maximum frequency, and sensing radius has been explored and related optimized parameters are identified. The performance metric has been meticulously analyzed through simulation rounds in Matlab and compared with state of art algorithms like Fruit Fly Optimization Algorithm (FOA), Jenga-inspired optimization ☐algorithm ☐(JOA) and Bacterial Foraging Algorithm (BFA) in terms of mean coverage range, computation time, standard deviation and network energy diminution. The performance metrics vouches the effectiveness of the proposed algorithm as compared to the FOA, JOA and BFA.

Multifunctional synergy strategies for materials design, processing and applications

Shi Xue Dou

Institute for Superconducting & Electronic Materials, Australian Institute for Innovative Materials
University of Wollongong, Australia

Significant advances in development of strategies and approaches on novel materials design and processing have been made. Here we particularly highlight the advantages of combination of multi-functionalities to achieve synergetic effect on energy materials performance towards applications. These include combination of carbon coating with band engineering for alteration of electronic properties; universal general approach for morphology control; combination of physical confinement with catalytic effect to control polysulphide loss in metal sulphur battery; Multiple strain engineering for increase of reactive sites in catalysts; Additive & subtractive engineering for controlled growth of nanomaterials with designed size, shape and composition; Multiple dimension manipulation to achieve optimised electronic and ionic properties; Hybridisation at materials, structure & device level to achieve high reactivity in energy storage materials. Among these the interface/surface science and engineering is the most critical element for energy materials design and processing at both fundamental and applied level. Most of the research is limited within the block of research inputs to research outputs while there is a huge gap between research outputs and commercial benefits which need to be addressed. Scaling-up remains as a great challenge to facilitate industry transformation processes from laboratory to real world applications. The design and construction of battery pack driven minning veicles through development of advanced battery management system by UOW team sets unique example for transfering lab success to industry applications.

Thermal stress effects on nonlocal nonlinear axial free vibrations of nanorod exposed to magnetic field

Somaye Jamali Shakhlavi

School of Mechanical Engineering, Iran University of Science and Technology, Iran

Pickings the von Kármán geometric nonlinearity into tally, the current manuscript presents a nonlinear approach of nanorod, which is based on the nonlocal elasticity and axial beam theories. Imperfect nanorod is subjected to the axial compression or various fields in terms of thermal and transvers magnetic loads. Clamped-clamped and clamped-free nanorods are considered under axial compression in view of thermal and magnetic loads. The governing equations of the nanorod are derived by means of the Hamilton's Principle. The coupled nonlinear dimensionless differential equations are solved employing He's variational method. To evaluate the accuracy of the results, the results of this method are compared with the values obtained from the finite element method. Numerical results are provided to explore the influences of the low and high temperatures, nonlocal parameter, magnetic force of transvers field, and amplitude of vibrations for nanorods.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Dynamic study of Magnetostrictive (AM) actuators and protocol from their implementation to design a surgical robot

Zango Nkeutia Sylvain[1,2], Kamdoum Tamba Victor[3] and **Talla Pierre Kisito[1]**

[1]UR of Mechanics and Modeling of Physical Systems (UR-2MSP), UFR/DSST, University of Dschang, Cameroon

[2]Energy, Materials, Modeling and Methods Laboratory, National Polytechnic School of Douala University of Douala, Cameroon

[3]UR of Condensed Matter, Electronics and Signal Processing (UR-MACETS), UFR/DSST, University of Dschang, Cameroon

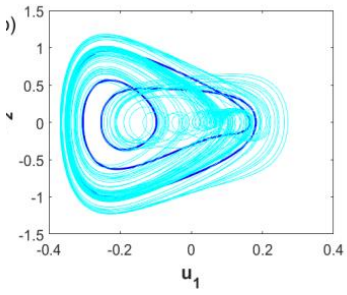
Development of technology have shown the importance of intelligent magnetostrictive actuators in fields such as robotics, medicine, security, nanotechnology and many more. The models made present in the literature have exhibited undesirable behaviors such as chaos and multistability, etc. Which is a problem because under these conditions the actuators are less stable. It is shown that if we increase the order of the nonlinearity, the more reliable the information obtained about the system.

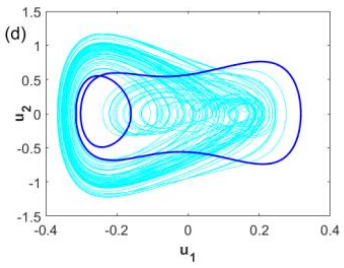
The main objective of this work is to propose on the one hand an improved model of a magnetostrictive actuator more stable than the existing models and on the other hand to develop a protocol for the implementation of the model for the design of a surgical assistance robot.

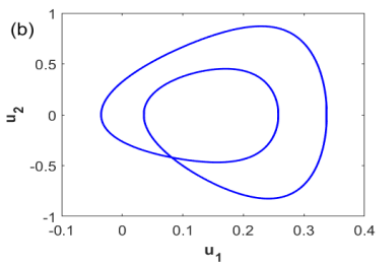
The Venkataraman cubic nonlinear magnetostrictive actuator model served as the basis for this study. Firstly, a quintic model is proposed which is richer than the cubic model. A study of the whole-order dynamics is made analytically by the multiple time scales method and numerically by plotting the phase portraits, the time series, the bifurcation diagrams, the maximal Lyapunov exponent and the diagrams of stability. Secondly, a feedback control law for chaos control and the linear augmentation method for controlling the multistability of the magnetostrictive actuator in a desired periodic state are designed, eliminating all possible chaotic behavior. The resulting magnetostrictive actuator is more stable than existing magnetostrictive actuators. Thirdly, a protocol is proposed for the design of a surgical robot for high precision cuts.

Controled model :	where δ is the coupling strength between the nonlinear oscillator and the linear control system, the vector $Y(t)$ describes the dynamics of the linear system with σ as a decay parameter. B is another control parameter of the augmented system and his value can be taken as one of the unstable fixed point of the system.

$$\begin{cases} \dot{u}_1 = u_2 \\ \dot{u}_2 = -2\xi\omega_0 u_2 - \omega_0{}^2 u_1 - \beta u_1^3 - \eta u_1^5 - \dfrac{Q_0}{2} + u_3 + \delta y \\ \dot{u}_3 = -2\omega u_4 \\ \dot{u}_4 = 2\omega u_3 \\ \dot{y} = -\sigma' y - \delta(u_2 - \mu_1) \end{cases}$$







Classification of rose flowers based on fourier Descriptors and color moments

Tesfahun T. Lejibo

College of Natural and Computational Sciences, Department of Physics (Computational Phys-ics), University of Hawassa, Ethiopia

In this paper, a rose-flower variety classification scheme, using color and shape fea-tures is presented. The first three statistical moments of the R, G, and B planes of the image were calculated to describe the color, while Fourier coefficients are used to describe the shape. For shape description, signatures (wave-forms) of the boundary contour of the binary images were extracted. Fourier coefficients that are used to describe the shape were estimated using the signatures generated. Depending on the Fourier coefficients, a representation of sums of angles formed along the boundaries of the flowers was defined. Using these sums and the color features as input to an artificial neural network (ANN), the flowers were classified into their respective target classes. The eighteen flower varieties considered in this study were classified with an accuracy of 95.6%, 98.9%, and 100% using their shape, color, and combination of both shape and color features, respectively. Comparing these results, it was found that the combination of the two features is an efficient criterion for rose flower variety discrimination and classification.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Application integrated of electrocoagulation reactor with magnetite nanoparticles for oily wastewater treatment

Thamer J.Mohammed[1] and **Hadeel A.Abdulkadhim**[2]

[1]*Chemical Engineering Department University of Technology, Iraq*

[2]*Ministry of Oil, Iraq*

In the area of water purification, nanomaterials offer the potential for the efficient eliminating very wide of variety of pollutants and biological contaminants. Oil is one of the most important hydrocarbon product in the modern world. Huge of cubic meters of oily wastewaters are produced daily, it can be discharged to the environment at various stages of production, transportation, refining and use.

The utilization of iron oxide nanomaterials or magnetic nanoparticles has received great attention due to their unique properties, such as biocompatibility, small size, high surface area to volume ratio besides magnetite can be regenerated. An electrocoagulation treatment process was developed for treatment of petroleum refinery effluent (wastewater), instead of the conventional methods, which can consume higher amounts of chemicals and produce larger amounts of sludge. Electrocoagulation process was integrated with magnetite nanoparticles for the treatment of oily wastewater, where these processes have been used individually in previous studies. Such combination and enhancement will reduce the requirements for time, power, and cost to reach the allowable limits of oil content. Experiments were conducted in a bench scales electrocoagulation reactor where voltage was applied across a perforated plate of aluminum as anode, and iron mesh as cathode. Commercial grade of magnetite (Fe3O4) with an average nanoparticle size of 50 nm was used. The effect of some factors on the efficiency of the process such as pH of the solution (5-9), current density (5-25 mA/cm2), time (10-30 min), and magnetite dosage (0.27-1.6 g/L) were studied.

The results verified that the current density required to obtain 90% oil removal efficiency for the 275-ppm initial oil concentration decreased from 25 to 15-mA/cm2 after the addition of 0.93-mg/L magnetite to the electrocoagulation process and time decreased from 30 min to 10 min, which is an indication of the enhancement of nanoparticles in the electrocoagulation process. In addition, the minimum oil content reached by electrocoagulation + magnetite process was 6.4 ppm, while the electrocoagulation process gave 19.4 ppm final oil content at the best operating conditions. The treated oily wastewater by the electrocoagulation + magnetite process found to be feasible for reusing in other processes or reinjection in the oil fields.

Sustainable green logistic in intuitionistic fuzzy Environment

Thiziri Sifaoui
Tamanrasset, Algeria

Green logistics is focused on producing and distributing goods in a sustainable way, considering environmental, ecological, and social effects. This area is receiving an increasing and close attention from governments, academic and business organizations. Their importance is motivated by the fact that current production and distribution logistics strategies are not sustainable in the long term. This research presents an innovative study of a sustainable green logistic which consists in a multistage multi-objective fixed-charge multi-item solid transport problem in intuitionistic fuzzy environment by considering recycling centers at the final stage which aims to reuse products and materials. In the proposed model, the parameters are assumed to be intuitionistic fuzzy numbers which are defined by membership and non membership functions. We use an expected value model to obtain a deterministic model and propose a solution methodology based on fuzzy goal programming approach to find Pareto-optimal solutions. Further, we incorporate an application example connected with a real-life industrial problem to display the feasibility and potentiality of the proposed model. Conclusions about the findings and future study directions are also offered.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Skin like optical sensor for healthcare and intelligent Human–Machine interface

Tianliang Li and **Yifei Su**

School of Mechanical and Electronic Engineering, Wuhan University of Technology, China

Skin-like sensors have huge potential in human-machine interaction, human health monitoring, and robotics. They can be worn flexibly to assess human vital signs or be extended toward enabling a machine to interact with its environment. However, many challenges hinder its further development, including stretchability, distribution measurement capability for multi-parameters and resilience to various complex conditions, which are still a challenging and interesting subject. Herein, we proposed a skin-like optical sensor (SSOF sensor) with excellent stretchability of up to 100%, distributed monitoring capability and multi-environment applicability. A unique hybrid coding approach based on the wavelength and the light intensity of two Fiber Bragg gratings (FBGs) was proposed and applied to the signal processing of SSOF sensor, achieving the resistance for environmental interference and the capability of distributed measurement. Meanwhile, the SSOF sensor shows outstanding durability (>10,000 tests), waterproofness, resistance for large temperature changes (0~55 □), and anti-impact. The SSOF sensor can instantly replicate the physiological activities of the human body in the form of digital signals, and convert them into virtual instructions and project them to the human-machine interface. These properties have been successfully used in the comprehensive assessment for multi-parameters induced by human breathing, muscle activity, and body movement. Furthermore, a SSOF sensor-based human-machine interaction system was created to monitor human physiological signals, track and reproduce human full-body movement. The proposed SSOF sensor puts forward a novel design idea of skin-like optical fiber sensors, and emerges huge potential in healthcare monitoring, virtual reality (VR), digital twin and intelligent human-machine interaction.

Edge detection of noisy digital image using optimization of threshold and self organized map neural network

Vahid Mehrdad

Department of Electrical and Electronics Engineering, Faculty of Engineering, Lorestan University, Iran

Today, every technical effort is due to the digital processing of the image. The X-rays are used in the imaging. Among the most well-known cases is the use of the beams in medical diagnosis and medical imaging. Computerized axial tomography (CAT) due to its detection and 3D capabilities has revolutionized medicine. Therefore it has been available since the 1970s by applying x-rays in medical imaging. Any CAT image is a cut that is perpendicular to the patient's body. Fig.1 shows a sample of a cat image cut from the human head. Similar techniques are used in the industrial processes but x-rays with higher energy are used. Fig.2 is an x-ray image of an electronic circuit board. These images show hundreds of industrial uses of the beams used in the testing of electronic boards to find possible defects, such as unassembled components or unclipped paths. If possible industrial cat scans are useful in recognizing components by the X-ray.

In this paper the image processing method is implemented in the spatial domain. The spatial domain is the page containing pixels of an image. Each pixel of an image with spatial coordinates x and y with a function f (x, y) has a certain numeric value that can be in the range of 0 to 255, this number represents the brightness or the gray level of the image. Each of these numbers represents a specific gray color with different concentrations. The main part of the noise is generated in digital images when shooting or transmitting. The light level and ambient temperature contribute to the noise level of the image obtained by the cameras and the images are contaminated during the transmission due to interference in the channel. Thus the presence of noise in digital images is common and often occurs, so different methods have been developed to eliminate this unwanted disorder.

Edge detection is the boundary between the two regions separated by the distinctive gray level properties. Many of the classical methods for edge detection are based on the derivation of the original image pixels. Classical edge detection operators such as Roberts, Sobel, and Prewitt detect the edges by calculating partial derivatives in a neighborhood. Edge detection based on the derivatives is sensitive to noise and to reduce the noise effect, first the image is smoothed and then the edge is detected. However this action reduces the contrast of

the edges and it is difficult to locate some of the poor edges. In this regard, research has been carried out for edge detection by the information theory. A study by Singh in this regard was carried out by Shannon entropy. This method results in the continuity in the resultant edges but only extracts the strong edges which is a disadvantage. This method is limited to the overall threshold of the mean brightness of the image and with these thresholds the image is made binary and then in this partitioned image the boundaries between the widths of these partitions are detected. Therefore some of the edges of the image will be lost due to the binary decision-making process. Tsallis attempted to improve this problem. In Tsallis method Tsallis entropy has been used to obtain all changes and edges of the image used by both Shannon and Tsallis but this high insistence on identifying all the changes creates thick edges and high noise. To solve this problem, Kiani et al has investigated the region around the threshold of different regions of the image and then using the Shannon algorithm, the entropy has detected the edges of the image. This method has been compared with standard Canny, Sobel, Roberts, Log, edge detection Ant Colony Optimization algorithms and Tsallis edge detection method which is more efficient than the mentioned methods. But its most important disadvantage is sensitivity to noisy digital images and it is extremely inefficient. To reveal the weakness of this method an example of the effect of noise is examined on a simple dummy image. In this case, the histogram is calculated and, as shown in Fig. 3, its histogram consists of two impulses. The mean of the brightness intensity of this image determines the range between the two impulses, thus it is not a good sample for the initial threshold. In the Kiani method for choosing the initial threshold, the mean brightness intensity in each region of the image is used. Therefore, edge detection in this method is very much affected by noise effects.In another researchaims to implement the Canny edge detection method, combining with Otsu thresholding to detect the edges. Otsu thresholding is used to gain threshold value for Canny Method. In result, some edges are well detected, but some others are missed.

The goal is detecting edge by using morphological operations. Unwanted edges (noise pixels) are eliminated by edge thinning and, ultimately, connecting the edges. A new combination of the mean and median filters leads to the creation of a new smoothing filter, which removes most of the image noises. The result is optimized edge detection. An image processing algorithm is created based on contour detection according to Mamdani. In addition, fuzzy rules are applied to detect blood veins in fundus images of the retina. Changing the contrast and application of a mean filter leads to a method that can carry out edge detection of retina's network of blood vessels properly. As a state of art, methods are based on gradient operator, but the accuracy level is poor. Therefore, computing based methods are proposed which are more accurate, still, these methods fail to detect some of the true edges. In this paper, the two-level approach is adopted for edge detection, firstly image edges are enhanced using guided image filtering and secondly on these enhanced images enhanced ant colony optimization method is applied for edge detection.

Fuzzy sets have prepared a framework to combine human knowledge as an efficient unsupervised machine-learning tool to solve problems. For instance, presents a public transfer learning plan using a rule-based fuzzy logic system to conduct edge detection in digital

images. A specific language value is selected in the input fuzzy set for optimal achievement in the fuzzy inference process. The second-order scope of difference separates edge pixels from non-edge pixels. Therefore, the method of brings out edge pixels from noise pixels by strengthening and presents optimal edge detection by decreasing impact noise.

In unsupervised learning, as its name suggests, no external supervisor has the right to dictate the process. Unlike the supervised learning methods such as the artificial neural networks, MLP, RBF and SVM where the external supervisors must provide a series of solved examples, based on training data. When the data is not tagged, it can be solved by the unsupervised mode. Different methods exist for unsupervised learning. All of these methods can be defined based on similarity. A similarity measurement parameter is a distance. As the distance is closer to zero, these two are more similar and distance more between means that they are more different.

The purpose of our research is to find a suitable method for detecting the edges of noisy digital images by eliminating the noise effects. The image will be partitioned into equal partitions and the initial threshold of that image partition will be calculated. By applying all these thresholds into the self-organized map (SOM) neural network input optimized for learning and training based optimization algorithm (TLBO), threshold clustering will be performed. The partitioned image will be edge detected by entropy method. Choosing the threshold for image segmentation is of great importance. The mean of the brightness of digital noise images is not a good representative of the initial threshold. Noise causes the mean intensity of the brightness to take distance from the main range of the intensity of the image so the resulting edge detected image will be severely noisy and truncated. By determining the highest frequency of brightness intensity instead of the mean brightness, the above-mentioned weaknesses will be eliminated. This method outperforms many current methods, such as Tsallis entropy, Singh and Kiani and even Canny Edge Detection which demonstrates the effectiveness of the proposed method.

The role of genetic and epigenetic factors in the incidence of type 2 diabetes and its complications

Vahideh Hassan-Zadeh

Department of Cell and Molecular Biology, Faculty of Biology, College of Science, University of Tehran, Iran

Type 2 diabetes, the most prevalent form of diabetes mellitus, is a complex autoinflammatory metabolic disease affecting more than 450 million individuals worldwide. Studies have shown that both genetic and environmental factors are involved in the pathogenesis of type 2 diabetes. Genetic studies have shown that type 2 diabetes is caused by hundreds of genetic variant. Interestingly, however, the genetic variants identified so far, can only explain 15% of type 2 diabetes heritability; a concept called "missing heritability". Epigenetic effects could account for the missing heritability of type 2 diabetes. The aim of this study was to investigate changes in epigenetic markers such as circulatory miRNAs and DNA methylation which are associated with high blood glucose levels in the plasma and blood cells of type 2 diabetic individuals. We focused on the expression and methylation status of several key inflammatory genes including *IL-1β* and IL-6 using qPCR and bisulfite sequencing, respectively. Healthy, pre-diabetic and type 2 diabetic individuals were enrolled and categorized based on their fasting plasma glucose and glycated hemoglobin levels. We found that in T2D patients with high blood glucose, *IL-1β* gene expression was increased by 2.69-fold whereas IL-6 gene expression was decreased by 3.45 fold. DNA methylation analysis revealed that both CpG sites in *IL-1β* gene are affected by hyperglycaemia and display decreased methylation while only one CpG site in *IL1R1* gene is affected by hyperglycaemia. Next, we examined the plasma levels of two type 2 diabetes specific miRNAs, miR-30d-5p and miR-126-3p. We found that the plasma levels of miR-30d and miR-126 increase by 3.1 and 11.16 times, respectively, in individuals with intermediate hyperglycemia compared to non-diabetic controls. We propose that epigenetic changes such as those investigated in this study could help understand the mechanism of metabolic memory and serve as markers of metabolic memory diagnosis.

SybilWatch: A novel approach to detect Sybil attack in IOT based smart health care

Vaishnavi S
RMKCET, India

Internet of things (IoT) in health care is gaining popularity in the field of research to improve quality in smart health care systems and applications. However, security and privacy of Smart Health (S-Health) data are the challenging issues due to Sybil attacks. Sybil attack is one of the most common attacks where a malicious node uses morphed identities to gener- ate Sybil nodes. Sybil nodes can acquire an authorized node identity and misbehaves by affecting its routing information, incurs interruption on communication line and storage. One of the IoT based smart health methodology is Privacy-Aware Smart Health (PASH), in which policy hiding is used to protect the privacy of users. The major issues in PASH is expensive to implement in S-Health applications, also it does not deal with attribute revocation and node traceability. To addresses these issues, a novel SybilWatch Enhanced Privacy-Aware Smart Health (E-PASH) approach is proposed in this paper. This approach has three major phases such as initialization phase, secure communication and Sybil node detection. A Lightweight Encryption Algorithm (LEA) is used to transmit SHRs (Smart Health Record) in encrypted form using prime order group- ing. A novel BlueTits Detection (BTD) algorithm is used in detection phase where cluster head gathers the recent activities of the suspicious user, and based on the gathered parameters (Master key and Last One-Time Authentication), the cluster head declares it as a Sybil node. As soon as Sybil node is detected, revised revocation list is shared with active users. The proposed approach is less expensive compared to the existing approach, it also supports attribute revocation and node trace- ability which are the major setbacks is PASH. Simulation results and comparison analysis shows that proposed SybilWatch is efficient and cost effective compared to the existing approach, the proposed approach yields high detection rate of 99.7% and also false positive rate is reduced to 1% in the smart health systems, which is better compared to the existing approaches.

Automatic text classification using machine learning and optimization algorithms

Vijayarani S
University Coimbatore, India

In the recent years, the volume of text documents in the form of digital way has grown up extremely in size. As significance, there is a need to be competent to automatically bring together and classify the documents based on their content. The main goal of text classification is to partition the unstructured set of documents into their respective categories based on its content. The main aim of this research work is to automatically classify the documents which are stored in the personal computer into their relevant categories. This work has two significant phases. In the first phase, the important features are selected for classification and the second phase is the classification of text documents. For selecting the optimal features, this research work proposes a new algorithm, optimization technique for feature selection (OTFS) algorithm. To estimate the proficiency of proposed feature selection algorithm, the OTFS algorithm was compared with the existing approaches artificial bee colony, firefly algorithm, ant colony optimization and particle swarm optimization. In the second phase, this research work proposed machine learning-based automatic text classification (MLearn-ATC) algorithm for text classification. In classification, the MLearn-ATC algorithm was compared with widely used classification techniques probabilistic neural network, support vector machine, K-nearest neighbor and Naïve Bayes. From this, the output of first phase is used as the input for classification phase. The decisive results establish that the proposed algorithms achieve the better accuracy for optimizing the features and classifying the text documents based on their content.

Ultrahigh reversible hydrogen storage in *K* and *Ca* decorated *4-6-8 biphenylene* sheet

Vikram Mahamiya

Indian Institute of Technology Bombay, India

By applying density functional theory (DFT) and ab-initio molecular dynamics (AIMD) simulations, we predict the ultrahigh hydrogen storage capacity of K and Ca decorated single-layer biphenylene sheet (BPS). It was found that 2*2*1 supercell of biphenylene sheet can adsorb eight K, or eight Ca atoms and each K or Ca atom can adsorb 5 H2, leading to 11.90 % or 11.63 % of hydrogen uptake, respectively, which is significantly higher than the DOE-US demands of 6.5 %. The average adsorption energy of H2 for K and Ca decorated BPS is -0.24 eV and -0.33 eV, respectively, lie in the suitable range for reversible H2 storage. Hydrogen molecules get polarized in the vicinity of ionized metal atoms hence get attached to the metal atoms through electrostatic and van der Waals interactions. We have estimated the desorption temperatures of H2 and found that the adsorbed H2 can be utilized for reversible use. We have found that a sufficient energy barrier of 2.52 eV exists for the movement of Ca atoms, calculated using the climbing-image nudged elastic band (CI-NEB) method. This energy barrier can prevent the clustering issue of Ca atoms. The solidity of K and Ca decorated BPS structures were investigated using AIMD simulations.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Concentration polarization control in stand alone and hybrid forward osmosis systems: Recent technological advancements and future directions

Wafa Suwaileh[1], M. Zargar[2], A. Abdala[1], F.A. Siddiqui[3], M. Khiadani[2] and **A. Abdel-Wahab[1]**

[1]*Chemical Engineering Program, Texas A&M University, Qatar*

[2]*School of Engineering, Edith Cowan University, Australia*

[3]*Department of Mechanical Engineering, Bahauddin Zakariya University Multan, Pakistana*

Forward osmosis (FO) has received significant attention recently. FO has high potentials for integration with other water treatment technologies. However, concentration polarization (CP) remains a significant challenge in FO membrane applications (see Figure.1). In particular, internal CP (ICP) reduces the permeability of FO membranes by nearly 80%. The development of FO processes and their applications can greatly benefit from strategies that detect and control CP in standalone and integrated FO systems. This requires consideration of FO membrane structures, materials, configurations, operating conditions, and modification and cleaning strategies. This review provides a state-of-the-art analysis of recent literature on CP detection and control with a specific focus on ICP as a major issue in FO processes. This helps to understand current CP mitigation strategies and their challenges and prospects. The first section reviews the structures of different FO membranes and related CP mechanisms. Research on CP and the impacts of various parameters on its magnitude are then discussed, followed by a review of CP phenomena in hybrid FO processes and applied ICP control strategies. Finally, recommendations for future research in CP detection and control are made. This review serves as a valuable reference for future research on FO processes and may contribute to developing more ICP-resistant FO membranes.

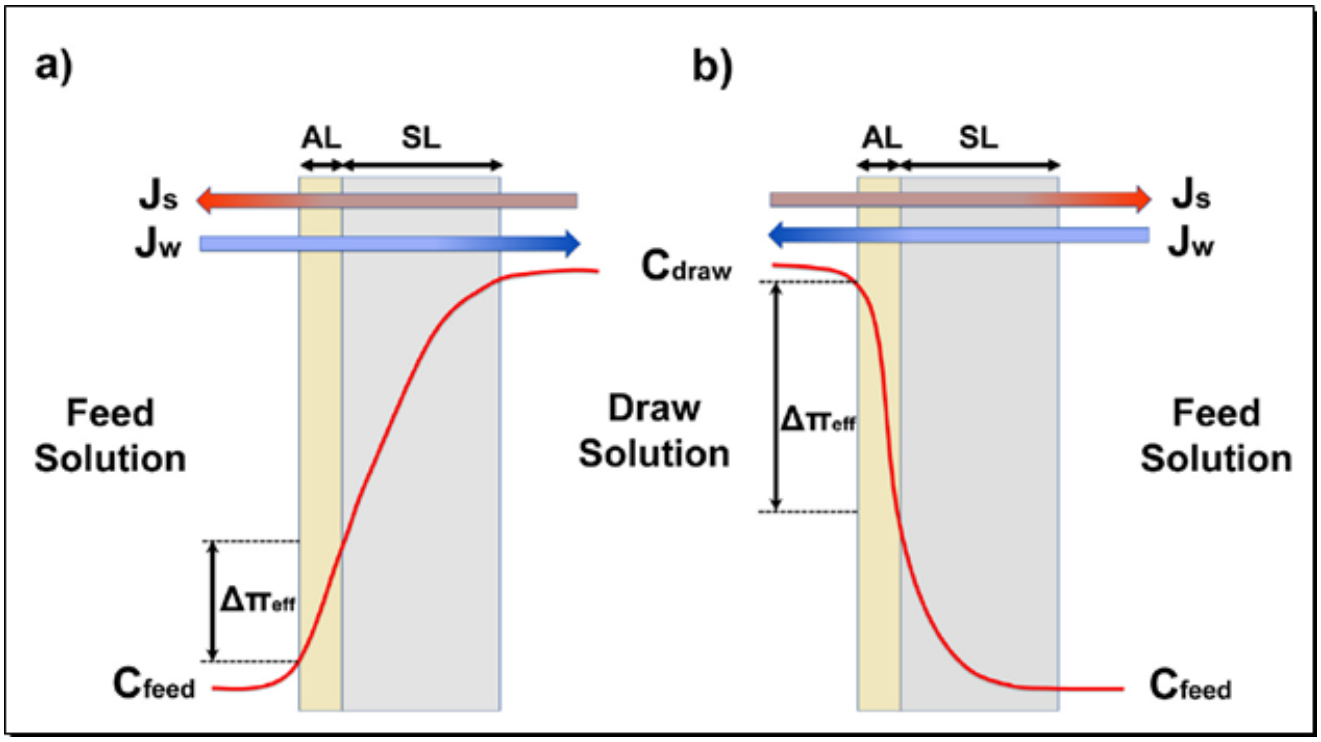


Fig. 1 – Schematic illustration of the CP mechanism occurring near a thin film composite (TFC) FO membrane and within its support layer at two membrane orientations: a) FO mode and b) PRO mode. AL = active layer, SL = support layer. Adapted from Zargar et al. (2020) with permission from Elsevier.

Recent progresses and remaining issues on the ultrathin catalyst layer design strategy for high performance proton exchange membrane fuel cell with further reduced Pt loadings

Xiang Deng

Sinosteel New Materials Co., Ltd., China

This presentation gives a detailed review on the ultrathin catalyst layer (UTCL) design strategy for high performance proton exchange membrane fuel cell (PEMFC). Specifically, the motivation towards the further reduced Pt loadings by applying the UTCL electrode design is firstly introduced from both the historical and mechanism deductions. Then, the recent developments on the UTCL designs belonging to different classifications are summarized with their respective merits. In particular, the critical issues remained on these ultra-thin, low Pt-loaded electrodes are proposed with alternative solutions. Finally, the whole presentation is concluded with the perspectives on the possible future directions settling the remaining challenges.

Bending and stress responses of the Hybrid Axisym-metric system via state space method and 3D elasticity theory

F. Yinan Zhao[1,2] and **Jinwu Zhuang**[1]

[1]*Naval University of Engineering, China*

[2]*WenZheng College of Soochow University, China*

This research presents bending responses of hybrid laminated nanocomposite reinforced axisymmetric circular/ annular plates (HLNRACP/ HLNRAAP) within the framework of non-polynomial under mechanical loading and various type of initially stresses via the three-dimensional elasticity theory. The current structure is on the Pasternak type of elastic foundation and torsional interaction. The state-space approach and differential quadrature method (SS-DQM) are studied to present the bending characteristics of the current structure by considering various boundary conditions. To predict the material proper- ties of the bulk, the role of mixture and Halpin–Tsai equations are studied. For modeling the circular plate, a singular point is studied. Finally, a parametric study investigates the impacts of various types of distribution of laminated layers, stacking sequence on the stress/strain information of the HLNRACP/ HLNRAAP. Results reveal that the system's static stability and bending behavior improve due to increasing the value of Winkler and Pasternak factors, and the stress distribution becomes more uniform.

Opportunities and risks offered by nano products for the grape industry

Zeki Kara[1] and **Basma Humam Ezzaldeen Ezzaldeen**[2]

[1]*Faculty of Agriculture Department of Horticulture, Selcuk University, Turkey*

[2]*Institute of Natural Science Department of Horticulture, Selcuk University, Turkey*

To meet the food demand in parallel with the global population growth and to achieve the goal of eradicating hunger, traditional plant production methods need to be renewed. Nano products (NP) offer important opportunities to meet the need for healthy food in a sustainable way. It is expected that the successes achieved in various production and processing processes with NP will be carried over to large food production sectors such as viticulture. In this literature review, developments in nanoscience and nanotechnology were examined from articles published for NP viticultural applications. The nono-technological approaches to the development of new grapevine genotypes, *in vitro* and *in vivo* propagation, NP seed priming, increasing growth and productivity in the production process, coping with biotic and abiotic stresses, and improving the biochemical content of grapes were evaluated. In addition, the mechanisms of action in various NP-plant interactions, the risks that may occur in terms of producers, the environment and consumers, products and risk creation methods were examined. Moreover, the use of the latest innovations in nanoscience and technology in the viticulture sector for a better future will be possible by developing practical usage recipes at the NP level and evaluating them together with risk analysis.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Damage analysis of chemically corroded sandstone undercyclic impacts and axial static pressure

Jinchun Xue[1], Zhuyu Zhao[1], Jiefang Jin[2], Li Tan[1] and **Ruoyan Cai[1]**

[1]*Jiangxi University of Science and Technology, China*

[2]*Jiangxi Provincial Key Laboratory of Environmental Geotechnology and Engineering Disaster Control, China*

To explore the influence of cyclic impact and axial static pressure on the damage of chemically corroded sandstone, a series of cyclic impact tests were conducted on white sandstone by using the Split Hopkinson Pressure Bar. Besides, the longitudinal sections and fractures of samples were observed with the scanning electron microscope for the purpose of investigating the damage characteristics and structural changes of sandstone subjected to the coupling of force and chemistry. The results show: (1) When pH of the solution is 7, the number of cyclic impacts and stress peaks of specimens increases, and the specimens respond with a significantly high resistant strength. (2) The stress wave transmission coefficient of sandstone decreases gradually with the increase of the number of cyclic impacts, while the reflection coefficient shows a tendency of ''decreasing firstly and then increasing''. (3) Cylindrical specimens with a certain axial static pressure present an ''X'' shaped conjugate failure under cyclic impact. When axial static pressure is too large or there is excessive impact, the ''X'' shaped conjugate undergoes shear to a state of broken cones. (4) The vertical section and fracture surface damage degree of white sandstone soaked in the sodium sulfate solution is more serious than that in the sodium sulfate solution.

Hippocampal inflammation and oxidative stress following exposure to Diesel exhaust nanoparticles in male and female mice

Mojtaba Ehsanifar

Anatomical Sciences Research Center, Kashan University of Medical Sciences, Kashan, Iran

Air pollution exposure is among the most prevalent reasons for environmentally-induced oxidative stress and inflammation, both of which are involved in the development and progression of central nervous system (CNS) diseases. Ultrafine particles (UFPs) plays an important role in global air pollution and the diesel exhaust particles (DEPs) are the most important component in this regard. There are more than 40 toxic air pollutants in diesel exhaust (DE), which is one of the main constituents of an environmental pollutant and including particulate matter (PM) especially UFPs. Thus, in this study, adult female and male NMRI mice were exposed to DEPs (350–400 µg/m3) for 14 weeks (6 h per day and 5 days per week). After 14 weeks of exposure, expression of pro-inflammatory cytokines (IL-1α, IL-1β, IL-6, TNF-α), nNOS, HO1, NR2A, and NR2B and malondialdehyde (MDA) level were analyzed in various brain regions such as the hippocampus (HI) and olfactory bulb (OB). Exposure to DEPs also caused neuroinflammation and oxidative stress in female and male mice. The effects observed in females were less pronounced than in male mice. The male mice emerged to be more susceptible significantly than the female mice to induced neuroinflammation following DEPs exposure. Also, our findings indicate that long term exposure to DEPs results in altered expression of hippocampal NMDA receptor subunits, and suggests that gender can play important role in the modulating susceptibility to neurotoxicity induced by DEPs exposure.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Effect of MWCNTS and natural Dye/ Polystyrene composite nano fibers for high sensitivity applications by Electrospinning techniques

Ahmed Amer Flayeh and **Hanaa Jawad Kadhim**
University of Babylon, Babylon, Iraq

Polymeric nanocomposites of polystyrene nanofibers and multiwall carbon nanotubes and natural pigment were synthesized using electrospinning technique the polystyrene concentration was 12 wt.% and multiwall carbon nanotube was added by (0, 100, 140, 200 ppm), and natural pigment added by two drops (0.063g) to the prepared solutions and many tests were carried out to the prepared solutions and the final samples. The solution tests included viscosity test by using cone-plate viscometer and surface tension test using du-nouy ring method. The nano textiles tests included the Fourier transform infrared spectroscope (FTIR) test, Field emission scanning electron microscopy (FESEM) test, contact angle test, and ultraviolet test to extract the energy bandgap using (tauc plot) method. The tests results showed that the viscosity increased by increasing the multiwall carbon nanotube and natural pigment and surface tension slightly increased at a high ratio of 200 ppm of multiwall carbon nanotube and natural pigment and physical type of reaction between the components were confirmed through FTIR, and the addition of multiwall carbon nanotube and natural pigment makes the fibers smoother and fewer beads formation and increase the multiwall carbon nanotube addition made the samples more hydrophobic and the charts of tauc plot show that increasing the MWCNT with natural pigment addition will increase the electrical sensitivity of the prepared samples in which the energy band gap dropped from 1.18 ev to 0.2 ev for the sample of Polystyrene/200 ppm MWCNT/natural pigment this is regarded as an indication of using it as a typical electrical sensor

Enhancement in the movement & motorization of nanobots by rhodopsin proteins and molecules

Ahmed Mateen Buttar and **Muhammad Majid**

Department of Computer Science, University of Agriculture, Pakistan

Nanobots are robots with a size of less than 200nm. A nanobot is more difficult to create than a microbot because of the multiple constraints and multifarious elements of the latter. (Scale in micrometers). Nanobots are made with a lot of care. Molecular nanotechnology and mechano-synthetic materials interaction. These are (Nano-electro Mechanical Systems) robots. Devices that are configured to perform one of two tasks one or more high-efficiency jobs with minimum work output and energy consumption. The size and range of programming options Nanobots' characteristics allow them to be used in a wide range of biomedical, pure medical, and pharmaceutical applications. There are some Nanobots can be manufactured in a variety of methods, including by hand Bio Hybrid nanobots are completely synthetic, biodegradable, or a combination of both. This research gives an outline of a few of the issues building strategies that might be utilized to construct nanobots for biomedical applications and current research Nanobots in Biomedical Applications rends and Future Scope.

Fuzzy logic controller for MR damping system implemented in both vehicle suspension and front end structure

Ahmed Rabie Fekry[1], Walid Abdel-Hady Oraby[2] and **Mahmoud Atef Ali[3]**

[1]Automotive Engineering Department, Faculty of Engineering at Mataria, Helwan University, Egypt

[2]Professor at Helwan University, currently visiting professor at Egyptian Academy For Engineering and Advanced Technology (EAEAT), Egypt

[3]Assistant Professor Department of Automotive & Tractors Engineering Faculty of Engineering at Mataria, Helwan University, Egypt

The represented work is driven by the well to improve vehicle crashworthiness. Herby, a crash-pitch controller integrated with Magneto-Rheological (MR) dampers is suggested. Hence, sets of MR dampers are implemented within both the vehicle suspension system and front-end structure. The methodology of the work is built on modeling the vehicle's dynamic behavior. a 3 degrees of freedom (DOF) half-car mathematical model is developed to represent the longitudinal, bounce, and pitch motions. Then, the model is used to study the vehicle's dynamic response in a full-frontal collision against a fixed barrier. Moreover, the integration of the suspension MR dampers with the vehicle's front-end structure MR dampers is suggested via a fuzzy logic controller. Four cases were simulated and compared according to the results. The mentioned cases can be expressed as:

1. Free-rolling in which a conventional suspension and front-end structure are assumed.
2. The vehicle's conventional suspension dampers are replaced with MR dampers
3. MR dampers are implemented within the vehicle's front-end structure. While the suspension system remains conventional.
4. A Fuzzy logic controller is used to integrate MR dampers implemented within both the front-end structure and suspension system.

The simulation results showed noticeable improvements as below:

- The front-end structure deformation is reduced.
- Angle had been reduced as well as its settling time.
- pitch acceleration had been reduced which benefits human body exposure.

Monitoring folds localization in Ultra-Thin transition metal Dichalcogenides using optical harmonic generation

Ahmed Raza Khan

Research School of Engineering, Australian National University, Australia

Folding is an effective technique to alter the optoelectronic properties of two-dimensional (2D) materials such as interlayer coupling, bandgap, etc. Optical techniques such as PL, Raman were used in the past to probe the folds localization. Here, we show that optical second harmonic generation (SHG), which is sensitive to the crystalline symmetry of 2D materials, is a powerful probe to monitor the fold localization in TMDCs. Two dimensional 2H Transition Metal Dichalcogenides (TMDC) are particularly well-suited for the study because their SHG investigation has already been done, in additional, they can be easily folded due to their high flexibility. Our study includes the fabrication of clean folds on ultra-thin layers of TMDCs, optical characterization of the folds using SHG imaging and theoretical calculations to prove our findings. We find that SHG from the folds is a coherent superposition of the SHG from the individual layers of the fold, with a very small phase difference depending on the folding angle. The SHG response is theoretically calculated as a function of the folding angle. Our results establish SHG as an effective tool to monitor folds localization in 2D TMDCs.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Effect of fiber set-up and density on mechanical behavior of robotic 3d printed composites

Ahmet Ipekci[1] and **B. Ekici**[2]

[1]*Düzce University, Department of Machine and Metal Technologies, Dr. Engin PAK Cumayeri Vocational High School, Turkey*

[2]*Marmara University, Faculty of Engineering, Department of Mechanical Engineering, Turkey*

The further development of composite manufacturing methods is characterized by the progress of their mechanical properties, which are widely used in many applications as automotive, aerospace, and marine industries. The automated composite production techniques are as follows: automatic tape layering, automatic fiber placement, and filament winding methods used in many industries. Photo polymerized composites and their additive manufacturing methods are promising with new advances in technology. This method for printing continuous fiber-reinforced plastic composite parts by a six-axis industrial robotic arm is based on fused deposition modeling technology. The objective of this work is to obtain a better understanding of the mechanical properties of robotic three-dimensional printed photopolymer resin continuous fiberglass–reinforced composites (CFGRCs) as a function of different printing speeds (10, 20 and 30 mm/s), fiber densities (45, 55 and 65%), and fiber orientations (0, 0/90 and ±45°). This work infers that mechanical properties are significantly affected by the fiber density and fiber orientation of CFGRC. With this method, approximately 300 MPa tensile strength can be obtained and structurally preferred instead of ferrous materials in many areas.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

"Finite elements analysis of a screw with cellular structure and bone thread for direct bone anchoring of the prosthesis"

Andrey Singegub, Suvorov V.A. and **Lopota A.V.**

Institute, Town, Country Higher School of Mechatronics and Robotics, Peter the Great St. Petersburg Polytechnic University, Russia

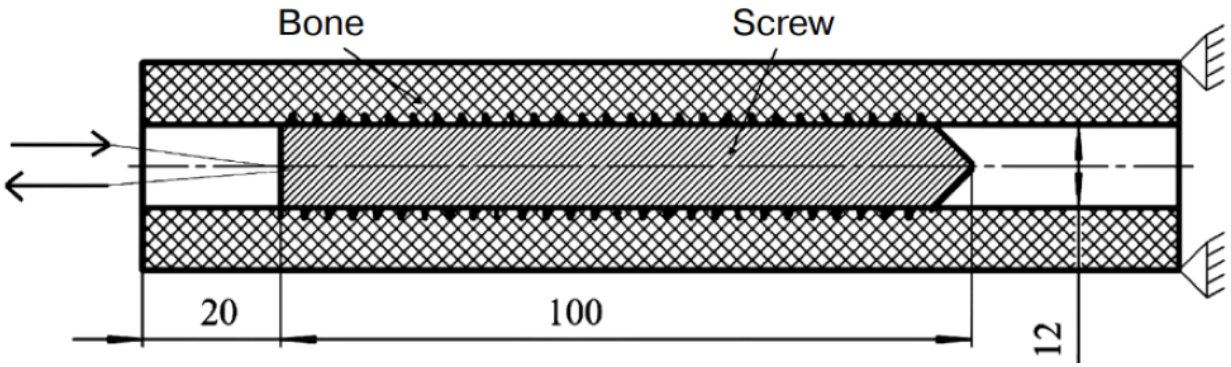
The purpose of the study: To determine the most optimal ratio of thread and honeycomb structure to ensure the primary and secondary stability of the screw.

The method of conducting the study is to calculate the maximum values of mechanical stresses and displacements for several types of screws under similar conditions, where the values of stress concentrators can indicate cyclic reliability (the lower the values, the higher the cyclic reliability), and displacements can indicate resistance to shock loads.

For this, three versions of an osseointegrable screw 100 mm long and 12 mm in diameter were developed, where the thread was made HB4 according to GOST R 50582-93, and the cellular structure consisted of a dodecahedron graph with an edge length 3.3 mm and 0.6 mm in diameter.

Screw analysis was performed under two conditions: primary stability and osseointegration. Each condition had two cases of study: axial normal load on the implant and axial shear load. The load on the implant Fa was

Рисунок



from 2000N to 4000N in steps of 500N. Under conditions of primary stability between the bone and the implant had a frictional contact with the coefficient of friction 0.4. Under osseointegration conditions: The honeycomb structure was "Bounded" with bone and the threads had a friction coefficient of 0.7. The prosthesis was made of an isotropic Ti6Al4V alloy (fig.1).

For the calculation, a solid finite element model was developed. Parts were decomposed into simple bodies: cylindrical, conical, and threads. Bonded linear contacts were used to connect simple bodies. The finite element mesh was modeled with octagonal hexahedral elements and 2 mm 4-gonal prismatic elements. The threaded surface was modeled with 0.75 mm hexahedral elements.

The result of the study: When designing bone intramedullary screws with a cellular structure and bone thread, it is necessary to evaluate the area of the cellular structure from the priority, since the thread performs its function even with a large pitch.

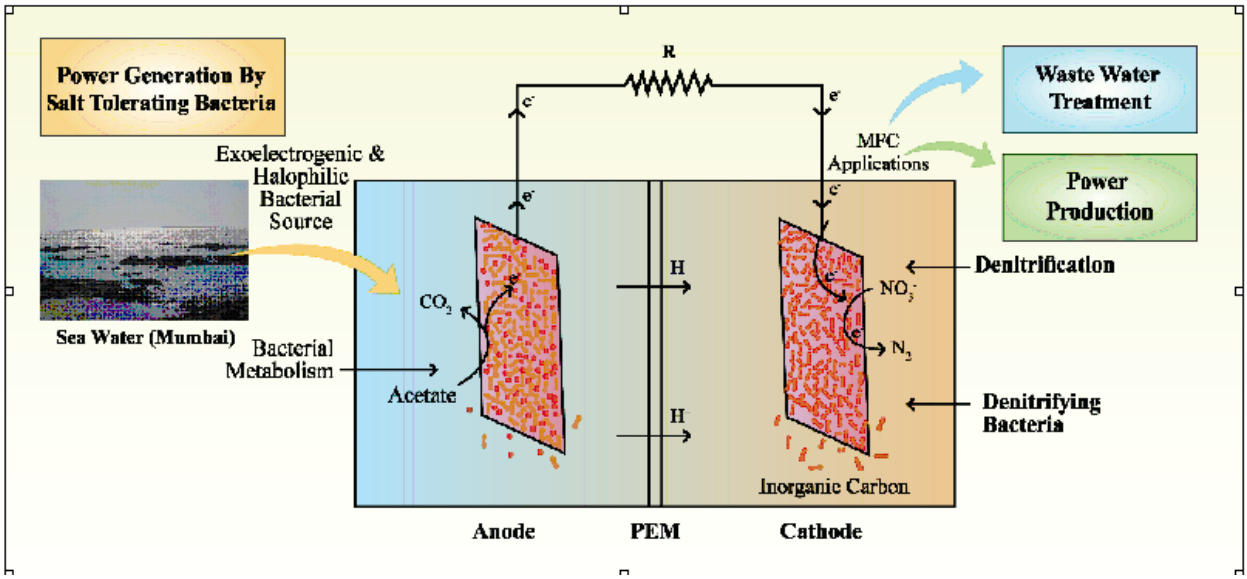
Power generation by Halophilic bacteria in saline microbial fuel cell and simultaneous nitrate removal

A. Vijay and **PC. Ghosh**

Department of Energy Science and Engineering, Indian Institute of Technology, India

Saline pollution of wastewater is one of the environmental concerns which needs to be addressed. Saline waste represents around 5% of the total generated influents worldwide. Different industries which generate saline wastewater include the fish, food processing, textile, and petroleum industries. To treat this saline wastewater many physico-chemical treatments are utilized which are expensive and have high energy requirements. The application of halophilic bacteria to treat saline wastewater is an effective and sustainable strategy. In a microbial fuel cell (MFC), chemical energy hidden in the waste can be converted into electrical energy with the bio-electrocatalytic activity of microorganisms. In the MFC system when the conductivity/ salinity is low there is a limitation in the ion transport and ohmic resistance is increased due to increased internal resistance of the system. So, increasing the salinity can increase the power performance of the system.

In this study, a Microbial Fuel Cell (MFC)



capable of treating saline wastewater at anode and nitrate contaminated water at the cathode was developed (Figure-1). Sodium chloride (NaCl) concentrations of 20 g/L and 40 g/L were tested at the anode. Nitrate was used as an electron acceptor at the biocathode. The halophilic bacteria were isolated from the Arabian Sea, Mumbai India. Results indicated successful removal of nitrate (89%) and COD (83%) with a concomitant power output of 162.09 mW/m2 at 40 g/L NaCl concentration. An increase in power density from 96.77 mW/m2 to 162.09 mW/m2 (1.7 folds) was observed when NaCl concentration was increased. EIS (Electrochemical impedance spectroscopy) analysis revealed that charge transfer resistance at 40 g/L salinity was lower than 20 g/L. Cyclic voltammetry analysis also revealed high electrochemical activity in 40 g/L NaCl concentration. This is the first study of power production by halophilic bacteria in MFC isolated from the Mumbai Sea water.

The effects of nozzle rotation angles on spraying uniformity

Aojie Chen
Wuhan University, China

In order to obtain a symmetrical and stable circuit structure and improve the yield in the wet etching process, it is essential to control the uniformity of the etchant velocity and pressure on the surface of the FPCB.

In our work, a numerical method implemented with Euler multiphase flow model is proposed to simulate the interaction of etchant from the multi-nozzle array with three different nozzle rotation angles. The full model of the multi-nozzle array in the etching process of FPCB is established to study the interaction of etchant in a 3 × 8 spraying array, the inner channel structure of the nozzle, 24nozzles, the relative position between the nozzles, the rotation angle of the nozzle an the spraying domain.

The results of the simulations demonstrate that the optimal rotation angle is 1.3°with the smallest distribution of the low speed flow zone on the surface of the FPCB, reaching about 60mm along the X axis direction. Then we conducted experiments to validate the

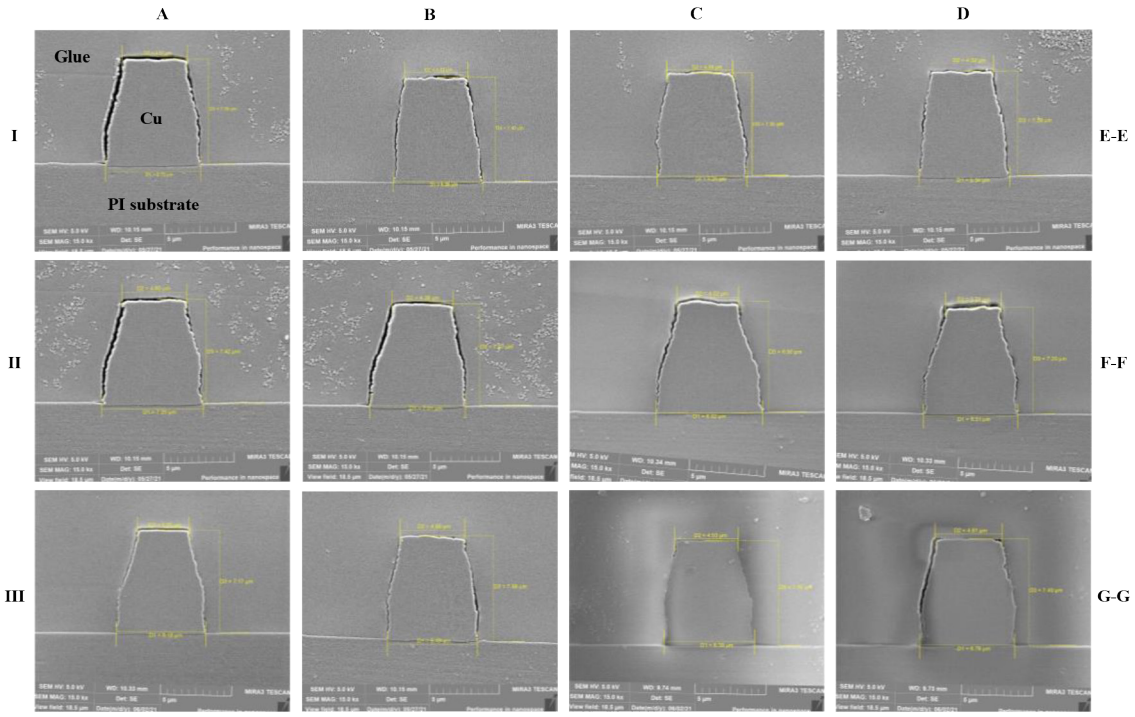


Figure 1. *Measured FPCB circuit cross-sections of 12 observed locations*

simulations with pressure sensors. When the rotation angle is 1.3°, the standard deviation of the pressure is the lowest, reduced by up to 67.6% compared to 0°. The cross-section of the FPCB circuit is close to an isosceles trapezoid, which is a relatively stable structure and benefits from the uniform etchant flow field. The experimental results are shown in the Figure 1 and Table 1.

TABLE II

ETCHANT PRESSURE OF THE OTHER 8 OBSERVED LOCATIONS

Locations		A-II	B-II	C-II	D-II
Pressure (Pa)	Simulation	298.4	296.4	295.9	297.5
	Experiment	307.6	309.0	307.4	301.8
Locations		A-III	B-III	C-III	D-III
Pressure (Pa)	Simulation	295.5	297.4	299.7	296.2
	Experiment	304.6	307.1	308.3	301.4

Development and joining of High-performance composite for space application by hybrid friction Stir welding Composit-4-Space2024

Ashwath Pazhani
University of Wales trinity Saint David, UK

There is an increasing demand in joining dissimilar material, and riveting is not always the best solution. Though conventional welding provides a good solution, certain materials like aluminum are difficult weld. Friction stir welding developed by The Welding Institute offers a greater potential in welding dissimilar materials e.g. copper/aluminium, aluminium/aluminium, with greater advantages in aerospace industry. In the space exploration and rocket propulsion, attention is paid to the payload capacity of the vehicle so that to reduce the weight of structural parts. Due to their lightweight and refractory properties at high temperatures, Aluminium alloys are used as main materials for the external tank on launch vehicles which are subjected to extreme temperatures at lift-off and re-entry into earth atmosphere. The welding aluminium alloys is a challenging task due the rapid oxidation of aluminium. However, NASA was the first to use welded aluminum-lithium alloy Al 2195 at cryogenic temperatures for their space vehicle external tank. New development in the technology of welding aluminium alloys allowed reducing the tank weighed 34.500 metric tons to 29.900 metric tons by the sixth mission. The AA 2050 aluminium lithium alloy was introduced and provide an increase of the payload by 3400 Kg and the majority of parts were friction stir welded. The idea proposed here is making leapfrog on current technology to harvest the advantaged of graphene nano-powder, and fusing it into aluminium-lithium alloys pushing to news boundaries the thermo-mechanical performance a newly engineered nano-composite Aluminium-lithium-graphene. The new super alloy and the technology to be developed here has direct application to fuel tanks in space propulsion vehicles and in other aerospace and automotive industry.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Green synthesis of silver nanoparticles using Berberine extract and comparison of their effect with antifungal drugs on the growth of standard strains of Aspergillus and candida

Elahe Saberi Teymourian and **Mahdi Hosseini**

Department of Laboratory Sciences, Faculty of Paramedical, Mashhad University of Medical Sciences, Iran

Introduction: The biosynthesis of nanoparticles stands as an uncomplicated, biocompatible, inexpensive, and secure approach for replacing the available chemical and physical methods. Nanoparticles with a size of 1 to 100 nm have unique chemical and biological quantum features. Recently, the induced difficulties of drug resistance are being constantly reported in different species of fungi. Candida and Aspergillus fungi function as opportunistic human pathogens in the immune system defect of individuals. Silver nanoparticles are known as substances that contain antifungal properties.

Methods: Silver nanoparticles (Ag-NPs) were biosynthesized using Berberine plant extract. Included UV-Vis spectroscopy, FT-IR analysis, XRD pattern, and FESEM/EDX images in the list of exerted methods for confirming the presence of nanoparticles. In addition, they utilized the Minimum Inhibitory Concentration (MIC) to perform a sensitivity test on fungal species' leachates through duplicate usage.

Result: The application of biosynthesized Ag-NPs at concentrations of 1 µg/mL and below caused no growth of fungal agents. However, antifungal drugs at concentrations higher than 1 µg/mL and even up to 64 µg/mL inhibited the growth of these drug-resistant fungi.

Conclusion: A comparison of the results showed that even these nanoparticles, in some cases, have a better effect than the group of antifungal drugs. Therefore, biosynthesized nanoparticles are more convenient and economical due to the increasing drug resistance of opportunistic and pathogenic microorganisms towards the exerted target drugs.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Reliability analysis for systems with self-healing mechanism under two different types of cumulative shocks

Fengming Kang[1] and **Lirong Cui**[2]

[1]*Beijing Institute of Technology, China*

[2]*Qingdao University, China*

System with self-healing mechanism has been successfully applied in many practical engineering fields. When we discuss the reliability performance of system subject to shocks, cumulative shocks have the greatest impact on most systems fields such as high-speed railway systems or civil structural components. In the present research, we deal with two different types of cumulative shock models in discrete time with self-healing effect, and consider the damage evolution effect of the system. We study a system with self-healing mechanism from a reliability point of view under these two shock models. The self-healing system will fail when the cumulative damage effect exceeds the given threshold. In the first model, there are shock events at instant of time , while in the second model at some time point there was no shock occurring event. Along with the work in this research, the system reliability formulas and the means and variances of their lifetimes are given under two different types shock models proposed, then simulation methods are adopted to analyze the reliability of the system for the second cumulative model. Finally, numerical examples and future researches are discussed

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Cascade chaotic neural network (CCNN): A New Model

Hamid Abbasi[1] and **M. Yaghoobi**[2]

[1]*Department of Computer Engineering, Damghan Branch, Islamic Azad University, Iran*

[2]*Department of Control Engineering, Mashhad Branch, Islamic Azad University, Iran*

In recent years, studies on chaotic neural networks have been increased to construct a robust and flexible intelligent network resembling the human brain. To increase the chaotic performance and to reduce the time-complexity of conventional chaotic neural networks, this paper presents an innovative chaotic architecture called cascade chaotic neural network (CCNN). Cascade chaotic system is inspired by cascade structures in electronic circuits. Cascade structure is based on a combination of two or more one-dimensional chaotic maps. This combination provides a new chaotic map that has more complicated behavior than its grain maps. The fusion of this structure into the network neurons makes the CCNN more capable of confronting nonlinear problems. In the proposed model, cascade chaotic activation function (CCAF) is introduced and applied. Using the CCAF with inherent chaotic features such as increasing variability, ergodicity, maximum entropy, and free saturation zones can be promising to solve or reduce learning problems in conventional AFs without increasing complexity. The complexity does not increase because no parameter is added to the system in use. The required chaos for neural network is generated by the Li oscillator, and then when using the neural network, parameters are considered as constants. Chaotic behavior of the CCNN is investigated through bifurcation diagram. Also, modelling capability of the proposed model is verified through popular benchmark problems. Simulation and analysis demonstrate that in comparison with outstanding chaotic models, the CCNN provides more accurate and robust results in various conditions.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

High frequency (100, 150 MHz) quartz crystal microbalance (QCM) piezoelectric genosensor for the determination of the Escherichia coli O157 rfbE gene

Kaory Barrientos[1], Maria Isabel Rocha[2], Marisol Jaramillo[1] and **Neil Aldrin Vásquez[3]**

[1]*GIBEC Research Group, Life Sciences Faculty, Universidad EIA, Colombia*

[2]*Advanced Wave Sensors S. L., Spain*

[3]*BioA Research Group, Biosciences Faculty, National university of Colombia, Colombia*

Escherichia coli O157 (E. coli O157) is responsible for outbreaks of high morbidity in food-borne infections. The development of sensitive, reliable, and selective detection systems is of great importance in food safety. In this work, it was designed and validated two high fundamental frequency (HFF) piezoelectric genosensor (100 and 150 MHz) for the rfbE gene detection, which encodes O-antigen in E. coli O157. HFF resonators offer improved sensitivity, small sample volumes, and the possibility of integration into lab-on-a-chip devices, but their sensing capabilities have not yet been fully explored. This HFF-QCM genosensor uses the method of physisorption based on the union between the streptavidin protein and the biotin molecule to immobilize the genetic bioreceptor on the surface and detect its hybridization with the target sequence. Parameters such as molecular coating, specificity, and variability have been tested to enhance its performance. Although, the genosensors evaluated can determine the target, the 100 MHz device has a higher response to the analyte than the 150 MHz platform. This is the first step in the development of an HFF-QCM genosensor that could be used as a trial test of E. coli O157 in large batch samples.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Enhancing the antifungal effect of biosynthesized selenium nanoparticles using *Aspergillus fumigatus*

Mohammad Hossein Ahmadi and **Mahdi Hosseini Bafghi**

Department of Laboratory Sciences, Faculty of Paramedical, Mashhad University of Medical Sciences, Iran

Background: Green synthesis as a new method of synthesis of nanoparticles with a simple, biocompatible, safe, and economical approach can be an alternative to chemical and physical processes. Fungi can convert some toxic ions into less harmful forms, including nanoparticles. Nanoparticles with a size of 1 to 100 nanometers have unique quantum properties. Today, the problems of drug resistance have been seen in different species of fungi. Selenium nanoparticles (SeNPs) are substances that have been reported to have antifungal properties. The present study aimed to investigate the antifungal effect of biosynthesized SeNPs using Aspergillus fumigatus.

Material and Methods: For this purpose, SeNPs were biosynthesized with a specific concentration using A. fumigatus. The presence of nanoparticles was confirmed by various methods, including UV-Vis, FT-IR, FE-SEM, EDX, XRD, DLS, and Zeta potential. Then, susceptibility determination based on the Minimum Inhibitory Concentration (MIC) test was performed on standard fungal strains treated with SeNPs.

Results: After confirming the results of nanoparticle biosynthesis, the MICs for itraconazole and amphotericin B against the standard fungal strains were 8 and 4 µg/mL. In comparison, MIC values for SeNPs-treated samples were reduced to 1 µg/mL and below.

Conclusion: Due to the increasing resistance of opportunistic fungi to target antifungal drugs, the use of biosafety SeNPs even at low concentrations can have favorable inhibitory effects on the growth of fungal pathogens.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Solubilization of diphenylcarbazide in the micellar system of tetra decyltri methylammonium bromide: The micellar effect on complex formation of the ligand

Mohammad Rezaur Rahman[1], Md. Manwarul Islam[2] and **Md. Nazrul Islam[3]**

Department of Chemistry, Bangladesh University of Engineering and Technology, Bangladesh

This work aims to investigate the interaction of diphenylcarbazide (DPC) with tetradecyltrimethyaammonium bromide (TTAB) over concentrations ranging from below and above the critical micelle concentration (CMC) of the surfactant and subsequent complexation of DPC with Zn(II) of the surfactant by visible and NMR spectrophotometry. For this purpose, we determined the CMC of the surfactant in pure water and in the presence of DPC conductometrically. Lower specific conductance values of the surfactant in the presence of DPC indicate the interaction between TTAB and DPC both below and above the CMC. The CMC of the surfactant was found to increase with increasing the concentration of DPC, indicating that hydrophobic interaction between the alkyl chains of the surfactant becomes unfavourable in the presence of DPC. The interaction of Zn(II) with DPC is strongly influenced by the concentration of the surfactant as well as the solubilisation site of DPC in the micelle. The absorbance of the Zn(II)-DPC complex increases initially, attains maximum near the CMC and then decreases with further increase in the concentration of the surfactant. Visible spectra together with NMR data of the Zn(II)-DPC complex in surfactant systems under different conditions provided information about the possible location of the DPC in the micelles.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Biosynthesis of selenium nanoparticles by *Aspergillus flavus* and *Candida albicans* for antifungal applications

Mohammadali Ghanbarinahzagh[1] and **Mahdi Hosseini Bafghi**[2]

[1]*Department of Medical Parasitology and Mycology, Ghaem hospital, Mashhad University of Medical Sciences, Iran*

[2]*Department of Laboratory Sciences, Faculty of Paramedical, Mashhad University of Medical Sciences, Iran*

Biosynthesis of nanoparticles can replace the available chemical and physical methods by offering new procedures as green syntheses that have proved to be simple, biocompatible, safe, and cost-effective. Recently, antifungal resistance has been reported against different species of Aspergillus and Candida opportunistic fungi. Selenium nanoparticles (Se-NPs) were biosynthesized using standard strains of Aspergillus flavus and Candida albicans. The presence of nanoparticles was confirmed by UV-Vis, FT-IR, FESEM, EDX, XRD, and Zeta potential. Common fungal strains were cultured in Sabouraud dextrose agar medium to perform the sensitivity test based on the minimum inhibitory concentration (MIC) method in duplicate. The utilization of Se-NPs at concentrations of 1, 0.5, and 0.25 µg/ml or in some strains even more minor than 0.125 µg/ ml resulted in zero growth of fungal agents. However, antifungal drugs inhibited their growth at concentrations of 2, 4, 8, 16, and 64 µg/ ml itraconazole (ITC). Also, MIC breakpoints for amphotericin B (AMB) and anidulafungin (AFG) were 2 µg/ ml for defining resistance in some isolates. Based on the obtained results, biological NPs produced by Aspergillus and Candida at different concentrations exhibited favorable inhibitory effects on the growth of fungal strains.

Advanced latent heat storage using hydrothermal carbonization NANO-Composite

Mostafa Esmaeili Shayan
Tarbiat Modares University, Iran

Solar energy's significant intermittency remains an issue that must be addressed. Thermal storage has been shown to be an effective method, with phase change material (PCM) being particularly promising. In this study, SEM/EDS microanalysis was used to examine the efficacy of infiltration into porous materials. Infiltrated samples were classified using thermal conductivity, infiltration efficacy, and power storage density. Infiltration, power, and the possibility of using stainless to ease the design of a single-chamber infiltration device are expected to reduce the overall expenses of composited preparation compared to other common approaches. an NANO-composite with a 70% porosity was employed for PCM infiltration. It is 90% effective to infiltrate PCM into nominal 100-200 µm foam pores using the study's infiltration device, vacuum, and pressurization. Based on PCM density at ambient temperature, infiltration used just 8.5% of the original PCM available in the setup. The thermal conductivity was found to be 1.8 W/mK at 23°C and 101 W/mK when infiltrated. Thermal conductivity increased by 56.1% at 150°C, from 1.7 W/mK for pure PCM to 78.2 W/mK for the infiltrated sample. Thermal conductivity increased by 46% at 300°C, whereas the infiltrated sample is 62.9 W/mK. The energy density loss estimated to be approximately 30% and more than 92% of pores were effectively infiltrated. They lost less than 18% of their weight after the infiltration cycles. For a large-scale, practical, and simple energy storage solution, infiltrating foam PCM encapsulations are required. They may now be employed for heat storage and other high-temperature applications.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Preventive measures and active response against COVID-19 taken by all four Provinces, two Independent Territories, and the Federal State of Islamic Republic of Pakistan, Islamabad

Muhammad Imran[1,2], Bashir Ahmad[1], Farhan Maqbool[1,3], Ashfaq Ahmad[1], Arshad Malik[1], Shahid Aziz[2,4], Faisal Rasheed[2] and **Tayyab Saeed Akhter[5]**

[1]Department of Biological Sciences International Islamic University, Pakistan

[2]BreathMAT Lab, IAD, Pakistan

[3]Department of Bioscience, Comsats University, Pakistan

[4]Department of Microbiology, Faculty of Biological Sciences, Quaid-i-Azam University, Pakistan

[5]Center for Liver & Digestive Diseases; Holy Family Hospital Rawalpindi, Pakistan

The novel coronavirus disease outbreak started in December 2019 in Wuhan, China. On March 11, 2020, WHO declared the COVID-19 outbreak as a pandemic due to an uncontrolled situation. Pakistani government management against COVID-19 was excellent having 204.65 million population, all four provinces, two independent territories, and the federal state took the different initiatives in the pandemic situation c. that's why the situation was under control in Pakistan due to state respond urgently to halt the spread of disease. With rapid response and full support of the government of Pakistan, the situation was under control in all aspects of life, June 17, 2019, each district of Pakistan recorded at least one confirmed case of COVID-19 due to remarkable effort against the pandemic. The state of Pakistan declare urgency and fastest action to control the situation, economic package, ventilator manufacturing, and diagnostic kits were manufactured locally. The DRAP Pakistan permitted to use of different drugs against COVID-19 and purchased vaccines from China. Due to the planning and management of the Pakistani Government, the situation was under control as compared with neighbourhoods countries (China and India), in both countries COVID-19 waves were lethal.

The Global need of Quantum dots in point of care testing

Pavi Dhiman
The Knowledge Society, Canada

With the COVID-19 pandemic, point of care and rapid testing have been on the rise. Their continuous use brought new advancements in point of care testing causing the demand to increase in developing countries due to the urgent need for more quick and efficient disease diagnosis for the large population. Current point of care tests require expensive and scarce materials causing difficulty when bringing them into both the developed and developing healthcare regions. However, with the use of an emerging field known as nanotechnology and quantum dots, point of care testing could become the new normal. This review will look at immediate testing and their applications within developing countries alongside using quantum dots to improve the analytical performance and to simplify the detection process. Overall, this paper focuses on the quantum mechanics of quantum dots and their use within biomarkers, their nanofabrication and understanding how they work by diving deep into the quantum confinement effect and Schrödinger's equation. It also looks at graphene quantum dots and their use in POCT, specifically in paper-embedded strips for testing within 5-10 minutes. As a whole, the combination of point of care testing and quantum dots could remodel the entire healthcare system and save millions of lives each year.

A study to improve adhesion between dissimilar materials through electrolytic plasma technology

Lucas, R.R.[1] , Marques, L.F.B.[1], Abrahão, A.B.R.M.[2], Botelho, E.C.[1] and **Mota, R.P.[1]**

[1]School of Engineering, São Paulo State University (UNESP), Brazil

[2]Technologycal College of Pindamonhangaba (FATEC), Brazil

Research involving welding of dissimilar materials has received large investments, starting from industries or research institutions. This type of research is essential for the development of new equipment and/or manufacturing methods for the aerospace industry. In this study, plasma electrolytic oxidation (PEO) technology was applied to an AA2024-T3 aluminum alloy, to create on this, an oxide coating with improved mechanical and chemical properties. To improve the surface adhesion with thermoplastic composite material, from oxy fuel welding (OFW). An alkaline solution based on sodium silicate was used, and the process had its time and voltage varied, to evaluate in which parameter it would be possible to obtain an ideal Lap Shear value. After the anodization, welding and mechanical testing processes based on ASTM D-1002:2010, it was observed that the hybrid samples presented mean values of 0.5 to 4.3 MPa. These low values can be associated with the Si content in the coating that decreased the shear strength of the hybrid junction, close to the aluminum, being observable the beginning of micro-cracks in the coating

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Green synthesis of silver nanoparticles (AGNPS), structural characterization, and their antibacterial potential

Rizwan Asif[3], Muhammad Asif[1] and **Riffat Yasmin[2]**

[1]*Centre of Excellence in Solid State Physics, University of the Punjab Lahore, Pakistan*

[2]*Riphah College of Rehabilitation and Allied Health Sciences (RCRAHS), Riphah International University Faisalabad, Pakistan*

[3]*Department of Eastern Medicine, Qarshi University Lahor, Pakistan*

Background: In the field of nanotechnology, the metallic nanoparticles are of remarkable interest because of their unique electronic, magnetic, chemical, and mechanical properties.

Purpose: In the present work, silver nanoparticles (AgNPs) were synthesized using bio-reduction method.

Research Design: Silver nitrate was used as metallic precursor and the extract of Moringa oleifera leaves with different concentrations was used as reducing as well capping agent. The extract exhibited strong potential in rapid reduction of silver ions for the synthesis of silver nanoparticles. The synthesized silver nanoparticles were characterized by UV-visible spectroscopy, X-ray diffraction (XRD), and scanning electron microscopy (SEM) techniques.

Results: The absorption SPR peaks appeared in the range of 415 to 439 nm. SEM analysis exhibited that particles were spherical in shape with size distribution range from 10 nm to 25 nm. The synthesized silver nanoparticles were pure crystalline in nature as confirmed by the XRD spectra with average crystallite size 7 nm. *In vitro* antibacterial activity of the prepared silver nanoparticles colloidal samples as well the extract was studied using different concentrations of AgNPs (C1 = 100 µg/ml, C2 = 50 µg/ml, C3 = 25 µg/ml) by well diffusion method against Gram negative Escherichia coli. The antibacterial performance was assessed by measuring the zone of inhibition (ZOI).

Conclusions: The results suggested that AgNPs prepared by green approach can be considered as an alternative antibacterial agent.

Smart Hybrid Nanocomposites for Structural Health Monitoring Application

Roopa AK[1] and **A. M. Hunashyal**[2]

[1]*Assistant Professor, School of Civil Engineering, KLE Technological University, India*

[2]*Professor, School of Civil Engineering, KLE Technological University, India*

Smart Hybrid Nano composite sensors are developed to diagnosing their own state of strain in which Nano-materials used as conducting filler. Nano-material like carbon fibre (CF), multiwall carbon nanotube (MWNCT), and graphene have a unique property that they can change applied strain into electric resistance. Hence, they can be used as conducting filler in the cement matrix. The present study mainly concerns with developing smart hybrid Nano composite cement based sensors and implementation of these sensors for structural health monitoring by embedding sensors into structural components. Two different combinations of sensors are developed by inserting Nano materials (0.25 and 0.5% weight of cement of MWCNT, CF, and Graphene) into cement mortar matrix. The insertion of carbon Nano filler into base material makes them into sensitivity to mechanical modification. This self-sensing property for material is achieved by adding piezoresistive materials into them. These piezo resistivity makes the materials self-sensing by indicating a detectable change in their electrical resistivity with applied stress or strain and make them useful for health monitoring of structures. Many studies shows that nano materials possess greater conductivity properties which can be used as smart materials. The size of specimen sensor was fixed to 80 mm 80 mm 50 mm with three 10 mm diameter tube was the filler is filled with copper electrode. From the electromechanical test it indicates that both combination sensors show good strain sensing with respect to applied load and also it is observed that is increased in flexural strength about 30.08% for 0.5% combination. A flexural and compression test was conducted by embedding Nano composite cement based sensors into structural components. The test results shows the variation in resistance for both compression and flexural loading which indicates into self-sensing property of structural element by embedding sensors into them, hence it will be helpful in monitoring the structure. Scanning electron microscope is carried to understand

the morphology of sample. A Finite elemental modeling is done to validate this experimental result. A FEA modelling is carried out using ANSYS software, subjected to steady steady static loading and electric analysis were done. Form the experimental is observed that addition carbon fiber induces conductivity property and the resistance decrease for failure load. The resistivity from experimental study observed is 9.2 kilo ohms and 11.2 kilo ohms for embedded carbon fibre sensor into beam and column respectively. The percentage error in electrical analysis of experimental tests compared with analytical modelling, found to be 15 %. A molecular dynamic simulation is carried to understand the atomic level interaction particles to evaluate the mechanical and electrical properties. Based on these results it can be concluded that carbon fiber cement composites have great potential and they can be used for structural health monitoring applications.

Integration of nanomaterials for wearable health technology

Shaghayegh Shajari

Hotchkiss Brain Institute, Cuming School of Medicine, University of Calgary, Canada
Mechanical and Manufacturing Engineering, University of Calgary, Canada
Biomedical Engineering, University of Calgary, Canada

Integration of nanomaterials for wearable health technology:

Wearable health technology based on flexible electronics has gained tremendous attention in recent years for monitoring the health of individuals to reduce time-consuming and high medical costs in the current clinical practices. This provides an opportunity for various disease prediagnosis and immediate therapy. In particular, wearable sensors based on polymer nanocomposites have opened up a new concept of personalized health monitoring by measuring physical states (e.g., wearable strain/pressure sensors) and chemical signals (wearable biosensors/microfluidics). In this regard, various conductive nanofillers including carbon-based fillers such as carbon nanotubes (CNTs), and graphene (Gr), and metal-based fillers such as gold nanoparticles (AuNPs), and silver nanowires (AgNWs) have been incorporated into the polymers as functional elements to induce sensing capabilities. They also provide stretchability, mechanical compliance, and durability. Despite the progress made so far, due to the limitation in nanomaterial synthesis, process, and structures, and design and fabrication of reliable devices, successful translation to the commercial market is challenging. Here, we developed various nanomaterials including flexible and stretchable polymers combined with conductive nanofillers such as CNTs, AgNWs, Gr, with unique structures and fabrication techniques that can be used for the fabrication and commercialization of wearable electronic devices such as wearable sensors with improved sensitivity and stretchability, and wearable biosensors/ microfluidics with improved flexibility, sensitivity and selectivity towards human health monitoring, and stretchable conductors as interconnectors in the electronic circuits.

Combined synthesis of carbon nanospheres and carbon nanotubes using chemical vapor deposition process

Sivamaran Venkatesan[1] and **V. Balasubramanian**[2]

[1]*Audisankara College of Engineering & Technology, India*

[2]*Annamalai University, India*

Carbon spheres (CNSs) and carbon nanotubes (CNTs) are attracting more attention from researchers due to their excellent potential applications as adsorbents, catalyst carriers, and drug delivery. The synthesizing of CNTs and CNSs is a challenging and tedious process. A researcher has to produce different catalyst materials and precursors to synthesize CNTs and CNSs. Hence, an attempt has been made to combined in-situ synthesize of CNSs and CNTs in a single experiment. NiO/CuO/Al2O3 catalyst was used as a substrate. The thermal chemical vapor deposition (CVD) process with acetylene as a precursor gas was used to synthesize the CNSs and CNTs. The influence of process parameters and the growth mechanism of carbon nanomaterials were investigated. The obtained carbon nanomaterials samples were characterized using FESEM, HRTEM with SAED pattern, XRD analysis, Raman spectroscopy, and FTIR analysis. Results indicated that the catalyst morphology has a greater influence on the growth of CNTs and CNSs. The CVD process parameters play a vital role in deciding the structure of carbon nanomaterials. A schematic representation was proposed to understand the formation of carbon nanomaterials on top of the catalyst particles.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Emerging *SARS-CoV-2* pandemic concerning cancer patients - A new direction to treat with immunotherapy and nanotherapy and involvement of Artificial Intelligence

Tanvi Gupta[1] and **Wen Pin Su**[1,2,3]

[1]*Institute of Clinical Medicine, College of Medicine,National Cheng Kung University, Taiwan*

[2]*Departments of Oncology and Internal Medicine, National Cheng Kung University Hospital, College of Medicine, National Cheng Kung University, Taiwan*

[3]*Center of Applied Nanomedicine, National Cheng Kung University, Taiwan*

The SARS- CoV-2 pandemic has created a huge impact across the world threatening the immuno-compromised individuals including the cancer patients; due to their weakened immune response it makes them more vulnerable and prone to the virus. The patients as well as oncologists are facing many issues for their treatment sessions as they need to reschedule or postpone their surgery, chemotherapy or radiotherapy. That's the concerning issue as they are avoiding hospital visits due to the high risk of virus infection. In our study, we aim to adopt a strategy especially concerning the cancer patients with the amalgamation of immunotherapy and nanotherapy to reduce the burden on the healthcare system with the rise of different variants of virus. As well as there is a high demand to predict or analyze the data of cancer patients prone to higher chance of getting exposed to contract a virus infection to reduce the mortality rate. Artificial Intelligence (AI) will step in to access and track the data in a real time basis which would be available to the physicians to understand their patient's clinical study and their past treatments. With this strategy, it would become much easier for them to modify or replace the treatment to achieve higher efficacy against the virus infection. The combination of immunotherapy and nanotherapy will be targeted for the treatment of the cancer patients diagnosed with SARS-CoV-2 and the AI will act as icing on the cake to monitor, predict and analyze the data of the patients in order to improve the treatment regime for the vulnerable cancer patients.

Wearables and their applications for the rehabilitation of elderly people

Valeria Paz Bravo Carrasco and **Javier Muñoz Vidal**
University of Talca, Faculty of Engineering, Talca, Region of Maule, Chile

Globally, there has been a change in the population pyramid with an accelerated aging process. This increase requires a greater challenge to maintain autonomy and independence. Currently, there are technologies developed with a focus on health. This is given by the development of wearables and their areas of applications. As a general context, this technology is characterized by the research field in energy generation, development of external devices for human control and monitoring, clothing, smart textiles, and electronics. The latter are classified into three areas of application: monitoring and safety; fabrics, perception, and physical activity; and rehabilitation. A literature review is conducted to identify the state-of-the-art in these fields within the last years. The progress in monitoring systems and intelligent textiles is evidenced, being able to highlight remote feedback, materials, and wearability both at a commercial and user level. A discussion is included to address the main challenges and future trends in the application of wearables in elderly people.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Recycling of municipal solid wastes for Road Embankment construction

Vasant G. Havanagi[1] and **A.K.Sinha**[2]

[1]*Chief Scientist, CSIR-Central Road Research Institute, India,*

[2]*Senior Principal Scientist, CSIR-Central Road Research Institute, India*

India is undertaking large scale Road infrastructure development in the country, through different National Highways and Rural Road development programs. Considering the magnitude of the projects under these programmes, there is a strain on natural resources like soil and aggregates, which are depleting at a fast rate. Restrictions on quarrying because of environmental considerations has resulted in increased lead distances, especially in urban areas, which in turn significantly increases the total cost of road construction. The effective utilization of locally available waste marginal/alternative materials, not only reduces the total cost of the project, but also protect our environment and results in sustainable road construction.

Municipal Solid Wastes (MSW) in the landfills have become a nuisance affecting significantly the health, hygiene, sanitation and aesthetics of surrounding area. If these wastes are not properly disposed off, they can prove perilous and an environmental hazard. It is very important for Engineers and Environmentalists to adopt sustainable waste management programs. As a part of sustainable road construction, CSIR-Central Road Research Institute, New Delhi, India carried out R&D studies to investigate the possibility of utilizing the Municipal Solid Wastes collected from Ghazipur, East Delhi and Ramana landfill, Varanasi, Uttar Pradesh, India. About 200 tons of Municipal Solid Waste from Ghazipur landfill, and 150 tons from Ramana dump site, were collected from different locations on the landfill site, based on its age. These materials were dried/ segregated into different sizes in the existing compost plant/ and were laboratory characterized to investigate for their suitability in road embankment construction. A segregation methodology was proposed in the study which can be adopted in the plant to arrive at a final material for use in road embankment construction. The segregated final MSW is then characterised for its Geotechnical characteristics. Stability and settlement analysis were carried out to arrive at suitable conclusions regarding its feasibility for embankment construction. It was concluded that about 62-75% of segregated Municipal Solid wastes can be effectively used for embankment construction.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

A distributed cooperative approach for dynamic target search using particle swarm optimization with limited intercommunication

Vikram Garg[1], Ritu Tiwari[2], Anupam Shukla[2] and **Joydip Dhar[1]**

[1]ABV Indian Institute of Information Technology and Management, India

[2]Indian Institute of Information Technology, India

Dynamic target searching is one of the most practical and realistic problems within a multi-agent system. It requires an effective and efficient cooperation strategy to address the challenges of real-world robotic applications. Mostly, centralized cooperation-based strategy proves to be less effective and inefficient in terms of search time, flexibility, scalability, and robustness. This paper discusses a distributed cooperation-based strategy that uses swarm intelligence based on a robotic particle swarm optimization (RPSO) algorithm to search dynamic targets to overcome these challenges. It uses evolutionary speed, aggregation degree, and inertia coefficient to enhance exploration and distributed cooperation for scalability and robustness. The simulation considers many practical constraints like limited communication, arbitrary initialization of swarms and targets, and decentralized cooperation among swarm robots. Existing cooperative algorithms were analyzed to compare the proposed algorithm regarding detection rate and the number of iterations needed to complete the search. The simulation experiment results show that the proposed algorithm maintains a detection rate of more than 80% for searching dynamic targets compared to the existing algorithms. It also shows that the proposed algorithm has a faster ability to search targets, higher detection rates, lower intercommunications, and better scalability.

PEERS ALLEY MEDIA

Virtual Event

2nd Global Conference on
Advanced Nanotechnology & Nanomaterials

Synthesis of Bio-based soft-packaging polyesters from *2,5 Thiophenedicarboxylic acid*

William Mawuko Kodzo Siegu[1] and **Lesly Dasilva Wandji Djouonkep**[2]

[1]*Institute of Fine Organic Chemistry and New Organic Materials, Wuhan University of Science and Technology, China*

[2]*Department of Petroleum Engineering, Applied Chemistry in Oil and Gas Fields, Yangtze University, China*

Demand for light-packaging materials for food and beverage is on the rise globally, especially in developing countries where several depend on packaged food. Furthermore, poly(ethylene terephthalate) (PET) a semi-crystalline thermally stable polyester, is widely used for carbonated soft drink, water and juice bottles, but shows a poor degradability properties after their lifespan. In this investigation, a series of novel random partially degradable poly(carbonate-co-esters) (PTB/PTBC$_n$) containing 2, 5-thiophenedicarboxylic acid (TDCA), and different amounts of bis(2-hydroxyethoxy)benzene (BHEB) and 1,4-cyclohexanedimethanol (CHDM) sub-units were successfully synthesized via a two-step melt polymerization as a facile and green semi-continuous process. The copolymers were thermally stable with tunable T_g values ranging from 47 to 71°C, while their 5% decomposition temperature (T_d, 5%) under N_2 varied from 463 to 432°C. Herein, focus was made on the synthesis of eco-friendly polyesters with satisfactory O_2- gas barrier properties (5.5 $cm^3mm/m^2 \times day \times atm$) at 25°C suitable for most packaging applications. The mechanical and thermal analysis of PTB and PTBCn polyesters revealed excellent properties comparable to commonly used packaging materials such as poly(vinyl chloride), poly(lactic acid) and PET, whereby the incorporation of cyclohexane (CHDM) and phenyl (BHEB) rings units greatly enhanced the thermal and mechanical properties, transparency, oxygen permeability, and biodegradability of these polyesters.

PEERS ALLEY MEDIA

About us

A confluence of Erudite and Knowledge-Seeker

Peers Alley Media

A global consortium of the scientific fraternity, scholars, educationists, industry leaders and entrepreneurs to collaborate, share ideas and knowledge to resolve challenges across medicine, science, technology and business

Our Vision

"We aim to bring the research and innovations happening across the parts of the globe to facilitate interaction, knowledge sharing and exchange. We also aim to inspire university professors, students, researchers, clinicians and entrepreneurs from across the disciplines including but not limited to clinical, medical, business, technology, healthcare and pharmaceutical fields. Our dream is to bring advancements in the Science and Technology to the mankind through our scientific gatherings and deliberations. We believe in introducing novel methods and innovative techniques in science, business and technology to provide understanding on the developments".

Our Mission

How do we serve our target groups in the scientific & business community?

- We bring the untold research accessible for many.
- Our events meet the research needs of the target groups across the academia, industry, corporates, the government, non-government agencies and public bodies.
- We Engage. Enlighten. Empower people deprived of information.
- We connect the international giants towards finding simple solutions to the complex medical and healthcare challenges of the globe.
- We unveil the unlimited research opportunities to the sections of population that is away from the developments in science and technology.
- We encourage Young and emerging researchers and scholars.
- We extend continuous education credits to boost the career and academic progress.
- We encourage start-ups in science, technology and business for the social and economic empowerment of the enthusiastic entrepreneurs.

Peers Alley Media
1126 59 Ave East, V5X 1Y9, Vancouver BC, Canada
Ph : +1-778-766-2134 / Contact us: contact@peersalley.com

INDEX

BOOKMARK YOUR DATES

3RD GLOBAL CONFERENCE ON

ADVANCED NANOTECHNOLOGY & NANOMATERIALS

MARCH 2023 | LONDON, UK

https://nanointellects.peersalleyconferences.com/