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Scientific Meetings

World Congress on

NANOTECHNOLOGY & NANOSCIENCE

June 04-05, 2025 | Paris, France

Venue: Hotel Mercure Paris Porte de Pantin,
22 Av. Jean Lolive, 93500 Pantin, France

Scientific Program

Day 1

June 04, 2025 | *Paris*

Scientific Program

09:00 -09:15: Registrations

09:15-09:30: Opening Ceremony

Keynote Forum

09:30-10:10	**Title: Potent and Sustainable Antimicrobial Upcycled from Food Waste** **Didi Gan,** N&E Innovations Pte Ltd, Singapore

Oral presentations

10:10-10:40	**Title: Development of Nanostructured Magnetic Core-Shell Systems for Controlled Drug Release** **Jean Jacques Bonvent,** Federal University of ABC, Brazil

Group Photo | Coffee Break 10:40-11:00 @ Foyer

11:00-11:30	**Title: Synthesis and Characterization of Various Silver Nanoparticles Encapsulated in Silica Shell** **Edi Kachal,** University of Szeged, Hungary

Session Introduction

Tracks

Nanomedicine | Nanoparticles | Nanocomposites | Biochemical | Nanomaterials | Nanoscale | Polymers

Session Chair: Didi Gan, N&E Innovations Pte Ltd, Singapore

11:30-12:00	**(Poster) Title: Modification of Polyester Gelcoat with Functionalized Organosilicon Compounds to Obtain Anti-icing Performance**
	Katarzyna Zietkowska, Warsaw University of Technology, Poland
12:00-12:30	**Title: Synthesis of Nanostructured Polymer Systems for Quantification of Circulating Biomarkers**
	Pasquale Mastella, Fondazione Pisana per la Scienza, Italy
Lunch Break 12:30-13:30	
13:30-14:00	**Title: Novel Eco-Friendly Alg@Na-ZW Nanocomposite with Alginate Modified zeolite NaX from Fly ash for Highly Efficient Removal of Methyl Orange from Aqueous Environment**
	Rkia Zari, Cadi Ayyad University, Morocco
14:00-14:30	**Title: Nanomagnetism in Human Cells: Emergence and use for Magnetic Bioprinting**
	Aurore Van de Walle, Universite PSL, France
14:30-15:00	**(Poster) Title: « Not smallness but complexity of biological systems ». The emergence of supramolecular chemistry at the University of Strasbourg (1961-2011).**
	Marianne Noel, Universite Gustave Eiffel, France

Panel Discussion & Certificate Falicitation

Day –1 Ends

Day 2

June 05, 2025 | *Virtual*

Scientific Program

Virtual Mode Zoom Meeting (GMT+2), Time in France

12:30-12:50	**Title: Azodye Photoaligned Nanolayers for Liquid Crystal Devices: Physics and Applications** **Vladimir Chigrinov,** Hong Kong University of Science and Technology, Hong Kong
12:50-13:10	**Title: Shape Memory Phenomena and Functional Characterization of Shape Memory Alloys** **Osman Adiguzel,** Firat University, Department of Physics, Elazig, Turkey
13:10-13:30	**Title: Powering Internet of Nano-Things (IoNT) Using Sustainable Nanoantenna Harvesting System** **Chayanika Baishya,** Indian Institute of Technology, India
13:30-13:50	**Title: Development and Characterization of $MoSe_2$ Quantum Dots for Sensing Applications** **Aneesha,** Delhi Technological University, India
13:50-14:10	**Title: 30,000 Nanotextured Implants with No Failures…And Still Counting** **Thomas J. Webster,** Hebei University of Technology, USA
14:10-14:30	**Title: Synthesis and Characterization of Green Calcium Oxide Nanoparticles from Ginger Extract** **Mary Samaan,** Electronic and Nano Devises Lab, Faculty of Science, South Valley University, Qena, Egypt
14:30-14:50	**Title: Long-Acting Injectable (LAI) Nanoparticulate Drug Delivery Systems for CNS Molecules** **Devendra Ridhurkar,** RidNova Pharmaceuticals, Spain
14:50-15:10	**Title: Impact of Magnetite Nanoparticles (ICNB) on Protein and Lipid Bond Stability in Preserved Erythrocyte Membranes** **Andrey Belousov,** Kharkiv National Medical University, Ukraine
15:10-15:30	**Title: Carbon Dot-polymer Nanocomposite: The Way for Room-Temperature Magnetic Ordering** **Paulo De Morais,** University of Brasilia, Brazil
15:30-15:50	**Title: Lipid-Based Nanocarriers Loaded with Combination Drugs: A Promising Therapeutic Approach for the Treatment of Glioblastoma Multiforme** **Franciely Rufino de Almeida Lima,** University of Sao Paulo, Brazil

15:50-16:10	**Title: Carbon Nanotubes (CNTs) Chirality Effect on Semiconductor Device Modeling**
	Muhammad Sana Ullah, Florida Polytechnic University, United States
16:10-16:50	**Title: Creating Materials with a Desired Refraction Coefficient and Other Applications**
	Alexander G. Ramm, Kansas State University, United States
16:50-17:10	**Title: Ecotoxicity of Bare and Algal Polysaccharide-Coated Metal Nanoparticles: A Comparative Study Using Aliivibrio fischeri as a Model Organism to predict Marine Environmental Safety**
	Liz M. Diaz-Vazquez, University of Puerto Rico, Puerto Rico
17:10-17:30	**Title: Acyclovir-loaded Solid Lipid Nanoparticles: A Permeation and Penetrability Study**
	Anyoli Taly, Grupo Leti, Venezuela

Panel Discussion

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KEYNOTE PRESENTATION

DAY 1

Didi Gan
N&E Innovations Pte Ltd, 9 Chin Bee Dr, Singapore

Vikang99: Potent and Sustainable Antimicrobial Upcycled from Food Waste

N&E Innovations has developed a pioneering circular economy solution that transforms food waste into Vikang99, a plant-based antimicrobial agent created through a green-synthesis upcycling process. As a sustainable alternative to conventional antimicrobials like titanium dioxide, Vikang99 is non-toxic, does not induce antimicrobial resistance, and has been globally tested and certified for safety and efficacy. The technology is already integrated into multiple applications, including the Vi-Mask,a reusable, CE-certified medical-grade bamboo fiber mask and C2Plus, a low-carbon line of disinfectants and antimicrobial coatings. Vikang99 also powers biodegradable food packaging and food coatings that extends shelf life by up to 4X, directly addressing food spoilage and waste. Key features include 99.9% antibacterial efficacy, eco-friendliness with a low carbon footprint, and food-contact safety. The coatings are colourless, odourless, and non-toxic, providing a safer alternative to traditional carcinogenic materials often used in food packaging. Vikang99's versatility allows seamless incorporation into medical textiles, wastewater treatment, agriculture, and public health applications, empowering businesses to enhance product performance while advancing sustainability. To date, the company has valorized 2 tons of food waste, resulting in a reduction of 5 tons of CO_2-equivalent emissions. With a target of 10,000 tons valorized by 2030, N&E Innovations aims to drive a 25,000-ton CO_2-equivalent reduction, supporting climate action and sustainable innovation through bio-based, circular technologies.

Biography:

Didi Gan is the founder of N&E Innovations Pte Ltd, a sustainability-focused biotech company transforming food waste into Vikang99, a plant-based antimicrobial. A graduate of the University of Melbourne, she is also the Managing Director, overseeing R&D and business expansion. Under her leadership, the company has reduced carbon emissions by valorizing food waste and developed award-winning products like the C2Plus disinfectant and biodegradable food packaging. Her innovations earned the UNGC Sustainable Solutions Award in 2022 and Cartier Young Leader Award in 2024. Didi has successfully led multi-million-dollar projects and continues to drive eco-innovation across sectors such as agriculture, sanitation, and food safety.

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SPEAKER PRESENTATIONS

DAY 1

Jean Jacques Bonvent
Federal University of ABC, Santo André, SP- Brazil

Development of Nanostructured Magnetic Core-shell Systems for Controlled Drug Release

Drug Delivery Systems (DDS) can be engineered to specifically specific tissues, with release mechanisms triggered by physicochemical stimuli such as pH, temperature, or light irradiation, thereby minimizing undesirable side effects. To optimize the performance of DDS platforms, it is widely acknowledged that innovative strategies are essential for achieving precise control over parameters such as size, shape, porosity, and surface functionalization. In this study, we first describe the synthesis of mesoporous silica-coated magnetite nanoparticles (MNP@mSiO2) capped with polyelectrolytes (PE). The morphology and physical properties of the system's components were thoroughly characterized. Drug release experiments revealed that uncapped mesoporous silica nanoparticles loaded with TCH released over 90% of the drug within 48 hours, whereas the PE-capped nanoparticles released only 30%, attributed to the PE layer acting as a barrier to drug diffusion. In the second part of the study, we present preliminary findings on the microfluidic synthesis of functionalized mesoporous silica-coated magnetite nanoparticles, by a multistep approach that demonstrates enhanced control over tuning of these systems, highlighting its potential for advanced DDS applications.

Biography:

Jean Jacques Bonvent has completed his PhD from University of Bordeaux (CRPP) and postdoctoral studies from Philips NatLab, University of Calabria and University of São Paulo. He is associate professor at the federal university of ABC (Brazil) and has published more than 40 papers in peer-reviewed journals.

Edi Kachal*, Andrea Ronavari, Imre Szenti, Zoltan Konya
Department of Applied and Environmental Chemistry, IC, University of Szeged, Szeged, HU- 6720 Rerrich Béla tér 1, Hungary

Synthesis and Characterization of Various Silver Nanoparticles Encapsulated in Silica Shell

The silver core-silica shell nanoparticles synthesis and characterization are reported as a promising approach in biomedical filed such as targeted cancer therapy and imaging applications. While colloidal silver nanoparticles (AgNPs) hold promises their usage is limited by biocompatibility issues, toxicity, stability, and environmental concerns, to overcome these challenges, increase biocompatibility for biomedical applications, or even modify the optical properties of AgNps, the idea of creating a core-shell structure has been introduced. Based on this knowledge in this study, spherical shape various silver nanoparticles with an average diameter of 5–28 nm were synthesized via a chemical reduction and green reagents (tea and coffee extract), followed by the encapsulation of these AgNPs within a silica shell using the Stöber method widely-used sol-gel route. The silica shell was formed by hydrolysis-condensation polymerization of tetraethylorthosilicate (TEOS) on the surface of the Ag particles with average size 50 to 60 nm. The resulting Ag@SiO2 nanocomposites were characterized using various techniques, including transmission electron microscopy (TEM), dynamic light scattering (DLS), and UV-Vis spectroscopy, confirming the uniform size and morphology of the nanoparticles, as well as their optical properties and Fourier- transform infrared spectroscopy (FTIR) for structural stability of the silica shell was assessed.

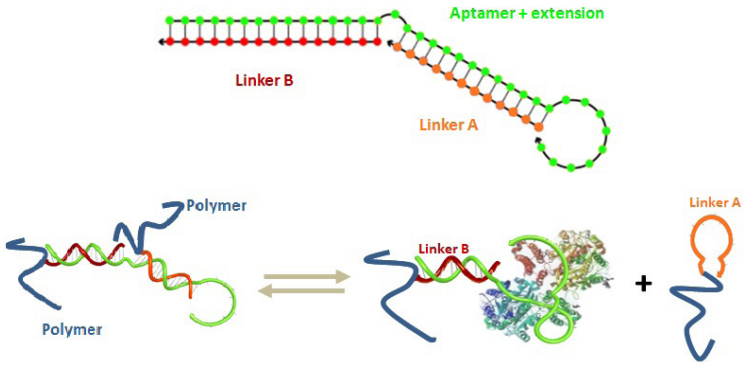
Biography:

Edi Kachal is a PhD student in the Doctoral School of Chemistry at University of Szeged. Hungary, where she is specializing in the development of silver-based nanoparticles and their potential biomedical applications. Her research explores the environmentally friendly methods of synthesizing AgNPs using plant extracts. Silver core-silica shell nanostructures, with an emphasis on enhancing their biocompatibility and targeting efficiency for cancer treatment specially has been center of her research interest. She has presented her findings in an international conference including 29th International Symposium on Analytical and Environmental Problems. Szegedi Tudományegyetem, Szeged. Edi completed her B.Sc. in Chemistry Science at the University of Duhok where she graduated with honors and MSc in Biomedical Science at the university of Chester, England UK. At this conference, she is excited to share her latest findings research work on the potential of Ag NPs and specially, silver core-silica shell (Ag@Sio2) nanostructure processing and their role in advancing precision medicine and engage with experts in the field.

P.Mastella [1,2,*], S.Iuin [2], F. Beltram [2]
[1] Fondazione Pisana per la Scienza, San Giuliano Terme, PI, Italy
[2] NEST Laboratories, Scuola Normale Superiore, Pisa, Italy

Synthesis of Nanostructured Polymer Systems for Quantification of Circulating Biomarkers

Cancer pathologies are closely linked to changes in cell metabolism and biochemical or morphological alterations in the body. These changes can be detected by measuring tumour biomarkers—hormones, proteins, or other biomolecules produced by cancerous tissue or in response to neoplasia. The appearance or variation of these markers in biological fluids such as blood, urine, and tissue may indicate tumour presence, recurrence, or serve as early treatment indicators. However, quantifying sub-pico-molar concentrations remains challenging for common bioanalytical techniques. Nanotechnology offers advantages over traditional methods, providing high biocompatibility, adaptability, and flexibility in functionalization and characterization. This study focuses on synthesizing a polymer/oligonucleotide-based nanostructure for in vivo protein recognition and quantification. The system uses PVA (polyvinyl alcohol) or polyglutamic acid nanoparticles, cross-linked by oligonucleotide sequences, and loaded with releasable reporters. The experimental work developed protocols for functionalizing the polymer with oligonucleotide sequences using maleimide linkers. Polymers were functionalized with two oligonucleotide sequences (linker A and B), designed to complement a third oligonucleotide (aptamer). These sequences were cross-linked through hybridization to form nanogels. The nanogels were characterized using analytical techniques to assess functionalization degree, size, polydispersity, and component concentration.



Biography:

I am Pasquale Mastella, a final-year PhD student in the Nanoscience program at Scuola Normale Superiore, in collaboration with the laboratories of the Fondazione Pisana per la Scienza. My research focuses on methodological approaches in the design and application of polymeric nanoparticles, specifically for diagnostic and drug delivery systems. Throughout my doctoral studies, I have been dedicated to developing innovative strategies to enhance the efficacy and precision of nanoparticle-based therapies and diagnostics.

R. Zari[1]*, R.Kaim Billah[2] & Karima Abdelouahdi[3]

[1]Innovative Materials, Energy and Sustainable Development Laboratory, Faculty of Sciences and Technology, Cadi Ayyad University, Marrakech, Morocco,

[3]Science Engineer Laboratory for Energy, ENSAJ, Chouaïb Doukkali University, El Jadida, Morocco

Novel eco-friendly Alg@Na-ZW Nanocomposite with alginate modified zeolite NaX from fly ash for highly efficient removal of methyl orange from aqueous environment

In this study, nanocomposite Alginate impregnated zeolite NaX was synthesized, then their adsorptive performance for textile dye methyl orange was evaluated. The characterization of synthesized nanocomposite were performed using various techniques such as X-ray diffraction (XRD), scanning electron microscopy (SEM), FTIR and XPS,confirming successful incorporation of the zeolite and the presence of a porous, adsorption-friendly surface. Further, due to their high surface characteristics, the application of synthesized hydrogel on the adsorption of the anionic dye MO from aqueous solution in a batch process was investigated. Besides, the kinetics, isotherms, and thermodynamics of the MO adsorption onto the synthesized zeolite X and was studied under various conditions. The results indicate that adsorption of dye is more significant at pH 6. Further, the equilibrium data fitted well to Langmuir isotherm (Qmax= 226.16 mg/g), following pseudo First-order kinetics. The adsorption process was chemisorption, spontaneous and exothermic in nature. Additionally, regeneration studies indicated the material's ability to be reused over multiple cycles with minimal loss in performance. Finally, the nanocomposite Alg@Na-ZW from alginate and low cost zeolite is an efficient and recyclable adsorbent for the removal of MO dye.

Keywords: Biocomposite, Alginate, Microporous Zeolite NaX, MO removal, pollution reduction

Biography:

Rkia ZARI has her expertise in Sustainable Development and material innovation. She aims to create new pathways for valorization of solid waste. She has built this model after years of experience in research, evaluation, teaching and administration in university. Research is based on sustainable use of wastes in material elaboration and environmental applications.

Aurore Van de Walle
Laboratoire Physique des Cellules et Cancer, CNRS, Institut Curie, Université PSL, Paris, France

Nanomagnetism in Human Cells: Emergence and Use for Magnetic Bioprinting

The fascinating redox capacity of iron places it at the core of many essential biochemical processes. While the roles of non-magnetic iron in human physiology are well characterized, its magnetic form—iron oxides—has received surprisingly little attention, despite the known presence of natural magnetic crystals in human tissues, particularly in the brain.

In this context, we demonstrated in vitro that human stem cells are capable of synthesizing magnetic nanoparticles, providing the first in vitro model for studying biogenic magnetism in human cells. This opens to the possibility of exploring the underlying mechanisms of intracellular magnetic biomineralization. Our current work investigates these processes through two complementary strategies: (i) quantifying the biotransformations of chemically synthesized magnetic nanoparticles in diverse cellular environments, and (ii) inducing the de novo biosynthesis of magnetic nanoparticles from intracellular iron pools.

Beyond its fundamental interest, this biogenic nanomagnetism holds great promise for regenerative medicine. With the advent of nanotechnology, magnetic nanoparticles have emerged as powerful tools for magnetic bioprinting—allowing remote spatial control of magnetically labeled cells to build 3D tissue constructs. Traditionally, these nanoparticles are chemically synthesized and internalized by cells. However, our discovery that cells can produce their own magnetic nanoparticles could pave the way for fully biological, self-guided approaches to tissue engineering.

Biography:

Aurore Van de Walle, author of over 30 publications (h-index = 16), received her PhD in biomedical engineering from the University of Florida in 2015. She then joined the Matière et Systèmes Complexes (MSC) laboratory for a postdoctorate, before being recruited as permanent CNRS researcher in 2020. She moved to the Physics of Cells and Cancer (PCC) laboratory in 2023. Her work focuses on the use of magnetic nanoparticles for the spatial organization of cells, for anticancer applications, and on understanding the emergence of human biomagnetism.

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POSTER PRESENTATIONS
DAY 1

Katarzyna Ziętkowska[1]*, Rafał Kozera[1], Bartłomiej Przybyszewski[1], Anna Boczkowska[1], Bogna Sztorch[2], Robert Edward Przekop[2]

[1]Faculty of Materials Science and Engineering, Warsaw University of Technology, Warsaw, Poland,
[2]Center for Advanced Technologies, Adam Mickiewicz University in Poznan, Poznan, Poland

Modification of Polyester Gelcoat with Functionalized Organosilicon Compounds to Obtain Anti-icing Performance

Composite materials used across various industries, such as wind turbines, aircraft, watercraft, and lifeboats, often encounter the issue of ice accumulation during the winter seasons. Traditional mechanical, thermal, and chemical methods for removing ice are typically inefficient, costly, and environmentally damaging. However, a new approach has emerged recently - icephobic coatings which minimize or prevent ice build-up. One method to design such surfaces is chemical modification with compounds that enhance their hydrophobic properties. The solution is based on the idea that a highly hydrophobic material can maximally reduce the contact time of the cooled droplets with the surface at negative temperatures and, as a result, prevents the formation of ice (or frost) and reduces its adhesion.

In the present study, the polyester gelcoat surface was modified with functionalized organosilicon compounds with low surface energy. The novelty of the research is using modifiers containing two types of functional groups: reactive group that interact with the polymer matrix and non-polar group that impart hydro- and icephobic properties. The anti-icing performance of the modified polyester surfaces was determined by measuring the ice adhesion strength and icing tests conducted using an ice wind tunnel. The study also presents hydrophobicity, roughness and relationships between surface properties. The results show that the addition of organosilicon compounds significantly improved the icephobic properties of the surface, reducing ice adhesion and ice build-up compared to the unmodified polymer. Ice adhesion was about 90 kPa. It is considered that surfaces exhibit low ice adhesion when the detachment force for ice is lower than 100 kPa. From such surfaces, ice is detached under the influence of natural forces such as wind, gravity, or ambient vibration. Furthermore, it was found that all chemical modifications increased the water contact angle and reduced contact angle hysteresis of the polyester gelcoat surface. It was also observed that as hydrophobicity increases, ice adhesion decreases.

The surface designed in the present study can provide a potential solution to ice formation and accumulation on composite substrates.

Biography:

Katarzyna Ziętkowska is a PhD student at the Warsaw University of Technology (Poland) since 2020. She mainly focuses on developing hydrophobic and icephobic organic coatings that can be used in various industrial fields, mainly in the energy industry. In her PhD thesis titled “Modification of polymer gelcoats to obtain ice-phobic properties”, she uses chemical and physical methods to modify polyester and epoxy coatings and improve their hydrophobic and icephobic properties.

Marianne Noel
Universite Gustave Eiffel, France

« Not smallness but complexity of biological systems ». The emergence of supramolecular chemistry at the University of Strasbourg (1961-2011).

The proposed communication describes the emergence of a research specialty (supramolecular chemistry or SMC) at the University of Strasbourg over a period of fifty years. The emergence of SMC was orchestrated to a large extent by Nobel laureate Jean-Marie Lehn (1987), but a network of scientists, as well as the University and the Alsace Region, were also key players in this regard. After demonstrating its relevance and formalizing its concept in 1978, Lehn proposed a term to designate a chemistry in which molecules assemble to form supramolecular structures. He argued that self-organisation goes from chemistry to nanotechnology, but from the interface with biology, with the complexity of biological systems, whereas the manufacturing approach defended in nanotechnology is more on the side of physics. Lehn's approach was to consider that it's not the smallness that counts, but rather the complexity of the object, and that it's better to build systems that set themselves up. He was also instrumental in the creation of a series of European chemistry journals in the late 1990s, whose genealogy I trace. My purpose is to examine the conditions of the success of a case of European integration that is not a major technological program but simply a "publication infrastructure". Based on an historical analysis completed with a fieldwork study, I first suggest that beyond the creation of a journal labelled as European, it is the combination of national publication infrastructures, and the processes of articulating and disarticulating them that contributed to the sense of Europeanness that emerged in our fieldwork study. I argue that the circulation and appropriation of numerous concepts, material artifacts and languages of the SMC were central in the development of this European "publication program", thus laying the foundations for the construction of a European chemical learned society created in 2018 under the name EuCheMS, the European Chemical Society.

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VIRTUAL PRESENTATIONS

DAY 2

Vladimir G. Chigrinov
Hong Kong University of Science and Technology, Clear Water Bay, Kowloon, Hong Kong

Azodye Photoaligned Nanolayers for Liquid Crystal Devices: Physics and Applications

Photoalignment and photopatterning has been proposed and studied for a long time [1]. Light is responsible for the delivery of energy as well as phase and polarization information to materials systems. It was shown that photoalignment liquid crystals by azodye nanolayers could provide high quality alignment of molecules in a liquid crystal (LC) cell. Over the past years, a lot of improvements and variations of the photoalignment and photopatterning technology has been made for photonics applications. In particular, the application of this technology to active optical elements in optical signal processing and communications is currently a hot topic in photonics research [2]. Sensors of external electric field, pressure and water and air velocity based on liquid crystal photonics devices can be very helpful for the indicators of the climate change.

We will demonstrate a physical model of photoalignment and photopatterning based on rotational diffusion in solid azodye nanolayers. We will also highlight the new applications of photoalignment and photopatterning in display and photonics such as: (i) fast high resolution LC display devices, such as field sequential color ferroelectric LCD; (ii) LC sensors; (iii) LC lenses; (iv) LC E-paper devices, including electrically and optically rewritable LC E-paper; (v) photo induced semiconductor quantum rods alignment for new LC display applications; (vi)100% polarizers based on photoalignment; (vii) LC smart windows based on photopatterned diffraction structures; (vii) LC antenna elements with a voltage controllable frequency.

Acknowledgements

[1] V.G. Chigrinov, V.M. Kozenkov and H.S. Kwok, Photoalignment of liquid crystalline materials, Wiley, 2008.

[2] V.G. Chigrinov, Liquid Crystal Photonics, Nova Science Publishers, 2015.

Biography:

Professor Vladimir G. Chigrinov is Professor of Hong Kong University of Science and Technology since 1999. He is an Expert in Flat Panel Technology in Russia, recognized by the World Technology Evaluation Centre, 1994, and SID Fellow since 2008. He is an author of 6 books, 31 reviews and book chapters, about 317 journal papers, more than 668 Conference presentations, and 121 patents and patent applications including 36 US patents in the field of liquid crystals since 1974. He got Excellent Research Award of HKUST School of Engineering in 2012. He obtained Gold Medal and The Best Award in the Invention & Innovation Awards 2014 held at the Malaysia Technology Expo (MTE) 2014, which was hosted in Kuala Lumpur, Malaysia, on 20-22 Feb 2014. He is a Member of EU Academy of Sciences (EUAS) since July 2017. He got A Slottow Owaki Prize of SID in 2018. He is 2019 Distinguished Fellow of IETI (International Engineering and Technology Institute).

Since 2018 he works as Professor in the School of Physics and Optoelectronics Engineering in Foshan University, Foshan, China. 2020-2024 Vice President of Fellow of Institute of Data Science and Artificial Intelligence (IDSAI) Since 2021 distinguished Fellow of Institute of Data Science and Artificial Intelligence.

Osman Adiguzel
Firat University, Elazig, Turkey

Shape Memory Phenomena and Functional Characterization of Shape Memory Alloys

Shape memory alloys are thermoresponsive materials and take place in a class of advanced smart materials by exhibiting a peculiar property, shape memory effect. This phenomenon is initiated with thermomechanical processes on cooling and deformation and performed thermally on heating and cooling, with which shape of the material cycles between original and deformed shapes in reversible way, and this behavior can be called thermoelasticity. Shape memory effect is governed by crystallographic transformations, thermal and stress induced martensitic transformations. Thermal induced martensitic transformation occurs on cooling with cooperative movement of atoms in <110 > -type directions on {110} - type plane of austenite matrix, along with lattice twinning and ordered parent phase structures turn into the twinned martensite structures, and twinned structures turn into detwinned martensite structures by means of stress induced martensitic transformations with deformation.

These alloys exhibit another property called superelasticity, which is performed with stressing and releasing the material in elasticity limit at a constant temperature in the parent austenite phase region, and shape recovery occurs immediately upon releasing, by exhibiting elastic material behavior. Superelasticity is performed in non-linear way, stressing, and releasing paths are different at the stress-strain diagram, and cycling loop refers to the energy dissipation. Superelasticity is also result of stress induced martensitic transformation, and the ordered parent phase structures turn into the detwinned martensite structures with stressing in parent phase region. These alloys are functional materials with these properties and used in many fields from biomedical application to the building industry.

Copper based alloys exhibit this property in metastable β-phase region, which has bcc-based structures. Lattice twinning is not uniform in these alloys, and the ordered parent phase structures undergo the non-conventional layered structures with martensitic transformation.

In the present contribution, x-ray and electron diffraction studies were carried out on ternary copper based CuZnAl and CuAlMn alloys. X-ray diffraction profiles and electron diffraction patterns exhibit super lattice reflections. Critical transformation temperatures of these alloys are over the room temperature. X-ray diffractograms taken in a long-time interval show that locations and intensities of diffraction peaks change with the aging time at room temperature, and this result refers to the redistribution of atoms in diffusive manner.

Keywords: Shape memory effect, martensitic transformation, thermoelasticity, superelasticity, twinning, detwinning

Biography:

Dr. Adiguzel graduated from Department of Physics, Ankara University, Turkey in 1974 and received PhD- degree from Dicle University, Diyarbakir-Turkey. He has studied at Surrey University, Guildford, UK, as a post-doctoral research scientist in 1986-1987, and studied were focused on shape memory effect in shape memory alloys. He worked as research assistant, in 1975-80, at Dicle University and shifted to Firat University, Elazig, Turkey in 1980. He became professor in 1996, and he retired on November 28, 2019, due to the age limit of 67, following academic life of 45 years. He supervised 5 PhD- theses and 3 M. Sc- theses and published over 80 papers in international and national journals; He joined over 120 conferences and symposia in international and national level as participant, invited speaker or keynote speaker with contributions of oral or poster. He served the program chair or conference chair/co-chair in some of these activities. In particular, he joined in last six years (2014 - 2019) over 60 conferences as Keynote Speaker and Conference Co-Chair organized by different companies. Also, he joined over 230 online conferences in the same way in pandemic period of 2020-2024. Dr. Adiguzel served his directorate of Graduate School of Natural and Applied Sciences, Firat University, in 1999-2004. He received a certificate awarded to him and his experimental group in recognition of significant contribution of 2 patterns to the Powder Diffraction File – Release 2000. The ICDD (International Centre for Diffraction Data) also appreciates cooperation of his group and interest in Powder Diffraction File.

Chayanika Baishya
Indian Institute of Technology, Guwahati, Assam, India

Powering Internet of Nano-Things (IoNT) Using Sustainable Nanoantenna Harvesting System

Advancements in nanotechnology, materials science, and engineering have enabled the miniaturization of electronic devices to the micro and nanoscale, facilitating the development of the Internet of Nano Things (IoNT), an extension of the Internet of Things (IoT). The integration of nanodevices has opened up a wide range of new opportunities across various domains, including biomedical applications, military technologies, and industrial product development. However, the continuous operation of these devices requires a reliable energy supply, which existing technology cannot provide due to size constraints. Nanoantennas have emerged as a promising solution for wirelessly powering IoNT devices. However, the charging of IoNT using nanoantenna has not been extensively studied yet. These structures, operating at nanometer scale wavelengths, are capable of capturing electromagnetic waves, inducing an alternating current (AC) that oscillates at the same frequency as the incident radiation. Metal-insulator-metal (MIM) diode coupled with nanoantennas, convert this AC into direct current (DC), enabling efficient power supply to IoNT sensors and electronic components. By combining a nanoantenna with a MIM diode, we can efficiently transform infrared radiation, which is present in the environment as different forms of thermal energy sources, into electrical energy. This will allow for the sustainable charging of IoNT devices and reduce our dependence on conventional energy sources. This study presents the design and simulation of a novel nanoantenna integrated with a MIM diode for efficient thermal energy harvesting. Further, the MIM diode's electrical characteristics are numerically analyzed to optimize energy conversion, offering a sustainable approach to powering autonomous IoNT systems.

Biography:

I am Chayanika Baishya, currently pursuing a Ph.D. at IIT Guwahati in the field of Nanoantenna research. I have contributed to the field through one journal publication and a conference paper. Actively engaged in research projects also, I am involved in the development of a Wireless Power Transmission System (WPTS) for insect-scale Micro Air Vehicles (MAVs) and the design of a Remote Ignition System with Pilot Burner Flame Detection for open-ground flares. I have completed my B.E. in Electrical Engineering from Bineswar Brahma Engineering College, Kokrajhar, and have completed internships at Namrup Thermal Power Station and Indian Oil Corporation Limited.

Aneesha
Delhi Technological University, Shahbad Daulatpur, Main Bawana Road, Delhi, India

Development and Characterization of $MoSe_2$ Quantum Dots for Sensing Applications

Molybdenum diselenide ($MoSe_2$) quantum dots (QDs) are emerging as promising materials for gas sensing, offering unique advantages over other Transition Metal Dichalcogenides (TMDs) like MoS_2 and WS_2 due to their superior electronic properties and enhanced sensitivity. In this study, $MoSe_2$ QDs were synthesized using a hydrothermal method and systematically characterized using techniques such as X-ray diffraction (XRD), Fourier Transform Infrared (FTIR) spectroscopy, High-Resolution Transmission Electron Microscopy (HRTEM), and Raman spectroscopy. XRD confirmed the crystalline structure, while HRTEM revealed uniform nanoscale morphology. Raman analysis validated the formation of $MoSe_2$, while FTIR indicated the presence of key functional groups. The optical properties of the QDs were explored using UV-Vis absorption and photoluminescence (PL) spectroscopy, which demonstrated strong absorption and significant PL, making them suitable for optoelectronic applications. Notably, $MoSe_2$ QDs exhibited enhanced sensitivity to ammonia (NH_2) compared to more commonly used TMDs, attributed to their unique band structure and higher charge carrier mobility. Preliminary gas sensing tests showed rapid response, high sensitivity, and good recovery, highlighting their potential for detecting hazardous gases.

The superior sensing capabilities of $MoSe_2$ QDs and their excellent optical characteristics position them as a viable alternative to conventional TMDs for applications in environmental monitoring and gas detection systems, offering improved performance in real-time air quality assessments.

Biography:

Ms. Aneesha, an accomplished M.Sc. Physics graduate from MDU Rohtak (2017), is a Research Scholar at the Laser Spectroscopy Lab, DTU. Joining in 2020, her research focuses on Quantum Dots and 2D nanostructures, particularly Transition Metal Dichalcogenides (TMDs). In 2023, she published two impactful research papers in reputed journals. Additionally, two more papers are currently being communicated and are under review. Her innovative work led to a patent for a probe detecting ferric ions in water, granted in December 2023. Her active participation in conferences reflects her dedication to advancing knowledge in applied physics, making her a valuable contributor to her field.

Thomas J. Webster
School of Health Sciences and Biomedical Engineering, Hebei University of Technology, Tianjin, China; School of Engineering, Saveetha University, Chennai, India

30,000 Nanotextured Implants with No Failures…And Still Counting

MNanomedicine is the use of nanomaterials to improve disease prevention, detection, and treatment which has resulted in hundreds of FDA approved medical products. While nanomedicine has been around for several decades, new technological advances are pushing its boundaries. For example, this presentation will present an over 25 year journey of commercializing nano orthopedic implants now in over 30,000 patients to date showing no signs of failure. Current orthopedic implants face a failure rate of 5 – 10% and sometimes as high as 60% for bone cancer patients. Further, Artificial Intelligence (AI) has revolutionized numerous industries to date. However, its use in nanomedicine has remained few and far between. One area that AI has significantly improved nanomedicine is through implantable sensors. This talk will present research in which implantable sensors, using AI, can learn from patient's response to implants and predict future outcomes. Such implantable sensors not only incorporate AI, but also communicate to a handheld device, and can reverse AI predicted adverse events. Examples will be given in which AI implantable sensors have been used in orthopedics to inhibit implant infection and promote prolonged bone growth. In vitro and in vivo experiments will be provided that demonstrate how AI can be used towards our advantage in nanomedicine, especially implantable sensors. Lastly, this talk will summarize recent advances in nanomedicine to both help human health and save the environment.

Biography:

Thomas J. Webster's (H index: 126; Google Scholar) degrees are in chemical engineering from the University of Pittsburgh (B.S., 1995; USA) and in biomedical engineering from RPI (Ph.D., 2000; USA). He has served as a professor at Purdue (2000-2005), Brown (2005-2012), and Northeastern (2012-2021; serving as Chemical Engineering Department Chair from 2012 - 2019) Universities and has formed over a dozen companies who have numerous FDA approved medical products currently improving human health in over 30,000 patients. His technology is also being used in commercial products to improve sustainability and renewable energy. He is currently helping those companies and serves as a professor at Brown University, Saveetha University, Hebei University of Technology, UFPI, and others. Dr. Webster has numerous awards including: 2020, World Top 2% Scientist by Citations (PLOS); 2020, SCOPUS Highly Cited Research (Top 1% Materials Science and Mixed Fields); 2021, Clarivate Top 0.1% Most Influential Researchers (Pharmacology and Toxicology); 2022, Best Materials Science Scientist by Citations (Research.com); and is a fellow of over 8 societies. Prof. Webster is a former President of the U.S. Society for Biomaterials and has over 1,350 publications to his credit with over 55,000 citations. He was recently nominated for the Nobel Prize in Chemistry. Prof. Webster also recently formed a fund to support Nigerian student research opportunities in the U.S.

Devendra Ridhurkar
Founder and CEO, RidNova Pharmaceuticals

Long-acting injectable (LAI) nanoparticulate drug delivery systems for CNS molecules

Long-acting injectable (LAI) nanoparticulate drug delivery systems are gaining prominence as an effective strategy for managing central nervous system (CNS) disorders, where traditional oral or systemic therapies often fall short due to limited blood brain barrier (BBB) permeability, rapid drug clearance, and poor patient adherence. By incorporating CNS-active compounds into biodegradable nanocarriers such as polymeric nanoparticles, liposomes, and lipid polymer hybrids these systems enable sustained drug release for 3-6 months, significant improvements in bioavailability, and targeted distribution to brain tissues.

Key nanoparticle attributes, including particle size (<100 nm), surface charge, zeta potential, and surface modifications, are critical in optimizing BBB transport and avoiding uptake by the reticuloendothelial system. Depot-forming formulations using polymers like PLGA or liposomes developed using phospholipids and cholesterol can extend the drug's release profile from days to several weeks or months following a single injection, thereby reducing dosing frequency and enhancing therapeutic outcomes in chronic neurological conditions such as postsurgical pain, epilepsy, Parkinson's disease, and neurodegenerative disorders.

This presentation will explore recent advances in LAI nanoparticulate systems for CNS delivery, discussing formulation strategies, release kinetics, and CNS distribution. Challenges such as nanoparticle and liposomes stability, sterilization, scale-up, and regulatory requirements will also be addressed. LAI nanotechnology holds strong potential to transform CNS pharmacotherapy by achieving steady therapeutic levels with fewer interventions and improved patient compliance.

Biography:

Dr Ridhurkar is a CEO of RidNova Pharmaceuticals, and a Biopharmaceutical Subject Matter Expert based in Barcelona, Spain. He boasts over 18 years of invaluable scientific leadership and management expertise in the complex formulation development and manufacturing of small and biological compounds. Renowned for his proficiency in steering projects encompassing Biosimilar, Protein and Peptides, Proprietary and Generic drugs, including 505b2, Hybrid, Complex, Specialty, and Branded formulations, he has significantly impacted Pharma-Biotech companies worldwide.

Andrey Belousov[1,2*], Elena Malygon[2], Ekateryna Belousova[1]
[1]Laboratory of Applied Nanotechnology of Belousov,
[2]Kharkiv National Medical University, Ukraine

Impact of Magnetite Nanoparticles (ICNB) on Protein and Lipid Bond Stability in Preserved Erythrocyte Membranes

This study was devoted to the learning changes in the structure of erythrocyte membranes at the level of molecular bonds during their storage at a positive temperature by means method of infrared spectroscopy (IR). Objects of research were red blood cells (RBCs) into bags containing preservative CPD and RBCs into bags containing preservative CPDA-1. As membrane protective used saline which had previously been treated with magnetite nanoparticles (ICNB) by the Belousov's method. The physiological solution that was treated with nanoparticles was added to the preserved RBCs according to the developed method. Sample of control was the addition of intact saline. Analysis of changes occurring in the IR spectra of samples of control and test in the CPD medium was showed that during the first 28 days storage of: 1. In the suspension of control of the RBCs, noticeable destructive changes in the molecular structure membrane of erythrocytes at the 14th day storage begins. After three weeks, the molecular structure membrane of erythrocytes is completely destroyed; 2. In the sample of test there was a weakening and rupture of molecular bonds only at the 28th day storage of RBCs. Complete destruction of the structure of membrane of erythrocytes occurs at the 35th day storage. Analysis of changes occurring in the IR spectra of samples of control and test in the CPDA-1 medium was showed that during 49 days storage of: 1. In the suspension of control of RBCs noticeable destructive changes in the molecular structure begins in four weeks, and after six weeks storage the molecular structure of erythrocytes membrane are completely destroyed; 2. In the sample of test, a significant weakening of intra-and intermolecular bonds in the structure of erythrocytes membrane occurs after six weeks. However, the complete destruction of the structure is not observed. After seven weeks storage of erythrocytes obvious violations of the molecular structure of lipids and proteins that make up the RBCs are visible but some of the strongest compounds still remain. In general, the results clearly showed that the presented method of application of nanotechnology significantly increases the storage time of RBCs in different versions of preservatives due to mechanisms to reduce violations of the molecular structure of proteins and lipids in the erythrocyte membranes. Presented method of application of nanotechnology is not only safe for use in practice in the Blood Service, Transfusiology and Hematology, but also is the most promising innovation project.

What will audience learn from your presentation?

- The results of the study expanded the spectrum of clinical efficacy of biocompatible magnetic nanoparticles.
- It was proved that the mechanism of membrane-protective action of the presented magnetite nanoparticles is due to the process of inhibition of destruction of the molecular structure of proteins and lipids in the membranes of donor erythrocytes.

- A promising direction is the use of biocompatible nanodevices to stabilize the structure of erythrocyte membranes at the level of molecular bonds during their storage at positive temperature.
- The presented method of nanotechnology application is not only safe for use in the practice of Blood Service, transfusiology and hematology, but is also the most promising innovative project.

Biography:

Prof. Andrey Belousov is Doctor of Medicine. Author a new medecine products – nanotechnology preparations based on magnetite nanoparticles (Fe3O4) of the size 6-12 nm: the peroral form - Micromage-B (the biologically active additive officially registration in Ukraine); Magnet-controlled sorbent brand of MCS-B for extracorporal detoxication of biological liquids (officially registration in Ukraine and was allowed for medical practice); Nanobiocorrector for intravenous application – ICNB (intracorporal nanosorbent). The published more 340 scientific works on results application of nanotechnology preparation in experimental and practical medicine. A. Belousov - the Head of Laboratory Applied Nanotechnologies of Belousov, DM, Professor of Department Anesthesiology, Intensive Care Kharkiv National Medical University, Ukraine.

Paulo C. De Morais
Catholic University of Brasília, Brazil
University of Brasília, Campus Darcy Ribeiro, Brazil

Carbon Dot-polymer Nanocomposite: The Way for Room-temperature Magnetic Ordering

This keynote talk will focus on discussing room temperature magnetic ordering of very small carbon dots (CDs), mat-like polyaniline nanofibers (Mat-PANI) and a composite comprising CDs and Mat-PANI (CDs@Mat-PANI), the latter containing a small fraction (less than 1 wt%) of CDs. It will be explored the saturation magnetization (MS) of CDs, Mat-PANI and CDs@Mat-PANI at increasing temperature, from 5 K to 300 K, revealing a systematic decreasing trend, with a huge synergic effect demonstrated in the CDs@Mat-PANI system. The impressive MS enhancement in the CDs@Mat-PANI system (about 200% at 5 K and 40% at 300 K) will be discussed in terms of an electron transfer mechanism from Mat-PANI imine nitrogen-atoms to the encapsulated CDs. Changes in MS values revealed that a substantial electron density is transferred to the CDs at low (5 K) as well as at high (300 K) temperatures, which is supported by observation of CDs photoluminescence (PL) redshift while within the CDs@Mat-PANI system. Band-bending and bandgap-renormalization calculations are claimed suitable to predict the observed redshift at higher (300 K) temperature as a result of the electron transfer mechanism, which is in excellent agreement with the PL data. Raman, x-ray diffraction and x-ray photoelectron spectroscopy data are used to support the electron transfer mechanism as well as the strong interaction of CDs with PANI within the CDs@Mat-PANI system, which double the crystalline domain size of Mat-PANI while reducing the tensile strain from about one third.

Biography:

Professor Paulo César De Morais, PhD, was full Professor of Physics at the University of Brasilia (UnB) – Brazil up to 2013. Appointed as UnB's (Brazil) Emeritus Professor (2014); Visiting Professor at HUST – China (2012-2015); Distinguished Professor at AHU – China (2016-2019); Full Professor at the Catholic University of Brasília (UCB) – Brazil (2018); CNPq-1A Research Fellow since 2010; 2007 Master Research Prize from UnB. He held two-years (1987-1988) post-doc position with Bell Communications Research, New Jersey – USA and received his Doctoral degree in Solid State Physics (1986) from the Federal University of Minas Gerais (UFMG) – Brazil. With more than 13,000 citations, He has published over 500 papers and more than 15 patents.

Franciely Rufino de Almeida Lima*
Priscyla D. Marcato University of São Paulo, Brazil

Lipid-Based Nanocarriers Loaded with Combination Drugs: A Promising Therapeutic Approach for the Treatment of Glioblastoma Multiforme

Glioblastoma (GBM) is the most prevalent and aggressive glioma, known for its low survival rate. Current treatment with Temozolomide (TMZ) has limited efficacy due to resistance mediated by P-glycoprotein (P-gp), which restricts drug passage through the blood-brain barrier (BBB) and into tumor cells. This study focuses on the development, optimization, and characterization of lipid nanoparticles (NPs) for the co-delivery of chemotherapeutic agents and natural products, alongside evaluating their cytotoxic effects on U87MG glioblastoma cells. NPs were prepared through hot emulsification and sonication, optimized using the Box-Behnken design. Characterization included assessments of size, zeta potential, encapsulation efficiency, morphology, thermal profile, and stability. Treatment of U87MG cells with NPs, both with and without co-encapsulated compounds, involved evaluating cell viability via neutral red assay, cellular uptake through confocal fluorescence microscopy, and cell death mechanisms using flow cytometry. Results indicated that surfactants and the oil phase ratio significantly influenced NP size and polydispersity index (PDI). The optimized NPs exhibited a diameter of less than 150 nm, low PDI, and a negative zeta potential. Transmission electron microscopy revealed a spherical morphology, and high encapsulation efficiency was achieved due to careful selection of lipid components. Co-encapsulated NPs showed significant internalization in GBM cells, enhancing cytotoxic activity and reducing the IC50 of nanoparticles by 2.418 times, indicative of a chemosensitizing effect. The predominant cell death mechanism was apoptotic, underscoring the potential of co-encapsulated NPs for GBM treatment and laying a foundation for future research in nanomedicine.

Biography:

Franciely Rufino de Almeida Lima is a PhD student in Medicines and Cosmetics at the University of São Paulo-USP. She has a degree in Pharmacy and a specialization in Pharmacology from the University of Juiz de Fora-UFJF. Furthermore, she is a specialist in Biodiversity Drug Innovation from FIOCRUZ. She has scientific experience in the development of nanoformulations at treating cancer and bacterial diseases. Committed to advancing science, she actively participates in research that bridges traditional knowledge with modern drug development techniques.

Muhammad Ullah
Florida Polytechnic University, USA

Carbon Nanotubes (CNTs) Chirality Effect on Semiconductor Device Modeling

To meet the speed, complexity, circuit density, power consumption, and ultimately cost requirements of many advanced applications, scientists have spent decades shrinking device feature sizes for better performance of metal-oxide semiconductor (MOS) technology. However, there are several disadvantages to switching to these nano size MOS devices. Most of the functional failure in nano-scale devices is caused by aging related phenomena such as negative bias temperature instability (NBTI), hot carrier degradation (HCD), and time dependent dielectric breakdown (TDDB). In addition, Silicon devices' dimensions and material capabilities are beginning to hit their limitations. Scientists and researchers are constantly trying to figure out how to replace the current silicon material with an emerging novel material like carbon nano tube. The goal of this research was to develop a drain current and threshold voltage model for carbon nanotube field effect transistors (CNTFETs) that can be used in the analysis and design of reliable integrated circuits, focusing on the reliability issues of conventional metal oxide semiconductor field-effect transistors (MOSFETs) at the nanoscale. To develop this model, we investigated the atomic structure of carbon nanotubes and used the fundamentals of electrostatics to describe a field-effect transistor. By analysing and defining the electronic structure of carbon nanotubes, we first arrived at analytical formulas for the carrier concentration in carbon nanotubes for various chiral vectors (n, m). By combining several chiral vectors, it is possible to determine the threshold voltage expression that is obtained throughout the procedure as well as the I-V characteristics for CNTFETs. The diameter and chiral angle of carbon nanotubes were shown to be significant determinants of the I-V characteristics and threshold voltage. In terms of the threshold voltage change CNTFET shows better performance 24% less than the conventional MOSFET in 45nm technology node.

Biography:

Dr. Muhammad Ullah is currently working as an associate professor of electrical and computer engineering at Florida Polytechnic University. His research focuses are the modeling of RLC interconnects in high density integrated circuits and energy-efficient electronic devices (TFET) for logic applications based on emerging 2-D nanomaterials (MoS2, Graphene, and CNT). Before joining Florida Poly, Ullah worked as a full-time lecturer from 2008 to 2011 at the Chittagong University of Engineering & Technology (CUET), Bangladesh. He has taught undergraduate courses in electrical circuits, digital logic designs, signals and systems, and graduate courses in advanced digital signal processing, introduction to VLSI designs, advanced VLSI designs, and emerging nanotechnology, including hands-on experience in MATLAB, Cadence Virtuoso, and HSPICE. In addition, Dr. Ullah has served as a regular reviewer of many journals and conferences, including IEEE TVLSI, IEEE TMI, Microelectronics Journal-Elsevier and Circuits, Systems and Signal Processing-Springer, and ASP Journal of Low Power Electronics.

Alexander G. Ramm
Mathematics Department, Kansas State University, USA

Creating Materials with a Desired Refraction Coefficient and Other Applications

It is apriori not clear if it is possible to create materials with a desired refraction coefficient. Ifit is possible, there are many techno- logical problems that can be solved. In this talk the author proves that it is possible to create materials with a desired refraction coeffi- cient. Moreover, he gives a concrete practical method for doing this. This method is based on an asymptotic solution of the many-body scattering problem by many small particles.

The theory of wave scattering by many small impedance particles of arbitrary shapes is developed. The basic assumptions are: $a \ll d \ll \lambda$, where a is the characteristic size of particles, d is the smallest distance between the neighboring particles, λ is the wavelength.

This theory allows one to give *a recipe for creating materials with a desired refraction coefficient*.

One can create material with negative refraction: the group veloc- ity in this material is directed opposite to the phase velocity.

One can create a material with a desired wave *focusing property.*

Quantum-mechanical scattering by many potentials with small supports is considered.

Equation is derived for the EM field in the medium in which many small impedance particles are embedded.

Biography:

Alexander G. Ramm was born in Russia, emigrated to USA in 1979 and is a US citizen. He is Professor Emeritus of Mathematics with broad interests in analysis, scattering theory, inverse problems, theoretical physics, engineering, signal estimation, tomography, theoretical numerical analysis and applied mathematics. He is an author of 737 research papers, 25 research monographs and an editor of 3 books. He has lectured at many Universities throughout the world, gave more than 160 invited and plenary talks at various Conferences, and had supervised 11 Ph.D students. He was Fulbright Research Professor in Israel and Ukraine; distinguished visiting professor in Mexico and Egypt; Mercator Professor in Germany; Research Professor in France; invited plenary speaker at the 7-th PACOM; he won Khwarizmi international award in 2004 and received other honors.

Anyoli Taly
Department of R & D, Nanotechnology Laboratory, Industrias Biocontrolled, Grupo Leti, S.A.V., Guarenas, Venezuela

Acyclovir-loaded Solid Lipid Nanoparticles: A Permeation and Penetrability Study

Herpes simplex virus type I is a cutaneous infection treated with acyclovir (ACV). The topical treatment has therapeutic challenges due to the deficient delivery of the drug through epithelial barriers. This results in an inadequate drug-virus interaction in the basal epidermis (virus replication site). For this reason, it is essential to generate drug carrier systems that overcome these limitations. In this study, we evaluated the permeation (through in vitro test Franz cells) and penetration (by ex vivo test Tape Stripping) of a topical formulation of ACV loaded in solid lipid nanoparticles (SLN) and a conventional formulation (Aciclor®). The ACV SLN was prepared using hot homogenization and sonication methods. The results yielded a particle size of 85 ± 2 nm, a polydispersity index (PDI) of 0.24 ± 0.01, a zeta potential of -16 ± 2 mV, and 94 ± 3% of encapsulated drug. The in vitro test revealed that the permeability of the ACV-SLN formulation was superior compared to reference formulation, with values of 1473.74 ± 30.14 µg/cm² for the SLN and 893.36 ± 38.09 µg/cm² for the reference formulation. The ex vivo test demonstrated that ACV-SLN exhibited superior penetrability through the stratum corneum compared to the reference formulation, with total amounts of 3767 µg for the SLN and 2162 µg for the reference formulation. These findings seem promising in advancing new effective therapies against herpes generated by HSV-1.

Biography:

Ms. Anyoli holds a degree in Chemistry from the Central University of Venezuela and has seven years of experience in research and development. Currently, she has been working in the pharmaceutical industry for four years, specializing in nanotechnology. She is the head of a laboratory focused on developing innovative formulations using nanotechnology to improve their physicochemical and therapeutic properties. She has published and colaborated seven scientific papers in this field and clinical research area. The laboratory is the only one in the country dedicated to nanotechnology applications in pharmaceuticals, striving to make significant advancements in healthcare through cutting-edge scientific innovation.

Liz M. Díaz-Vázquez*; Marielys Torres Diaz
University of Puerto Rico, Rio Piedras Campus, Puerto Rico

Ecotoxicity of Bare and Algal Polysaccharide-Coated Metal Nanoparticles: A Comparative Study Using Aliivibrio fischeri as a Model Organism to predict Marine Environmental Safety

This study examines the ecotoxicity of bare and algal polysaccharide-coated metal nanoparticles, using Aliivibrio fischeri as a model organism to evaluate their effects on marine ecosystems. The primary objective is to assess whether surface modifications with algal polysaccharides can reduce the toxicity of metal nanoparticles, offering more environmentally friendly alternatives for marine applications. Ecotoxicity was evaluated through growth inhibition, bioluminescence assays, and metabolic profiling using gas chromatography-mass spectrometry (GC-MS). The results indicate that algal-coated nanoparticles, particularly those modified with ulvan, significantly lower toxicity. These findings emphasize the role of surface modifications in enhancing the safety of nanomaterials in marine environments.

Biography:

Dr. Liz M. Díaz Vázquez, originally from Barranquitas, Puerto Rico, earned her B.Sc. (2000) and Ph.D. (2005) in Chemistry from the University of Puerto Rico, Río Piedras. She has held prestigious fellowships, including from the Institute of Biotechnology and the Department of Homeland Security. Currently, she is a professor and Director of the Chemistry program at UPRRP. Dr. Díaz leads research in Environmental Analytical Chemistry, focusing on emerging contaminants and sustainable nanomaterials. She also directs the Center for Innovation Research and Education in Environmental Nanotechnology and advocates for women in science through multiple outreach initiatives.

A. A. Ebnalwaled[2] , Mary Samaan[2]* and Alaa Hassan Said[2]

[1]Physics Department, Faculty of Science, South Valley University, Qena, 83523, Egypt.

[2]Electronic and Nano Devises Lab, Faculty of Science, South Valley University, Qena, 83523, Egypt.

Synthesis and Characterization of Green calcium Oxide nanoparticles from Ginger Extract

Green nanotechnology is a newly developed branch in the bio nanotechnology field. It provides an alternative technique for synthesis of nanoparticles (NPs) with economic and environmental benefits compared with chemical and physical methods. Different microorganisms can be used for synthesis of NPs including bacteria, fungi, yeast, algae and plant extract. Biomolecules acts as a reducing and stabilizing agent for NPs production. The coating of biomolecules from microorganisms on the surface of NPs makes them biocompatible in comparison with the NPs prepared by chemical methods, which offers very interesting applications in biomedicine and related fields. In this work, we aim to apply the green nanotechnology to synthesis calcium oxide of NPs using ginger extract. Structural and optical properties of the synthesized NPs were examined to evaluate the effect of green synthesis on its physiochemical properties.

Keywords: Green synthesis, Ginger, Calcium Oxide, XRD, FTIR and UV spectroscopy

Biography:

Experienced Medical Laboratory Specialist with over 10 years of expertise in analytical chemistry and immunology, with a strong focus on quality control and infection prevention. Proven track record in implementing and maintaining high-quality standards, optimizing processes, and enhancing patient satisfaction. I am affiliated with the National Blood Transfusion Service, which has received ISO accreditation twice consecutively — reflecting the organization's commitment to the highest standards of quality. Passionate about continuous improvement and delivering outstanding results in the healthcare field.

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