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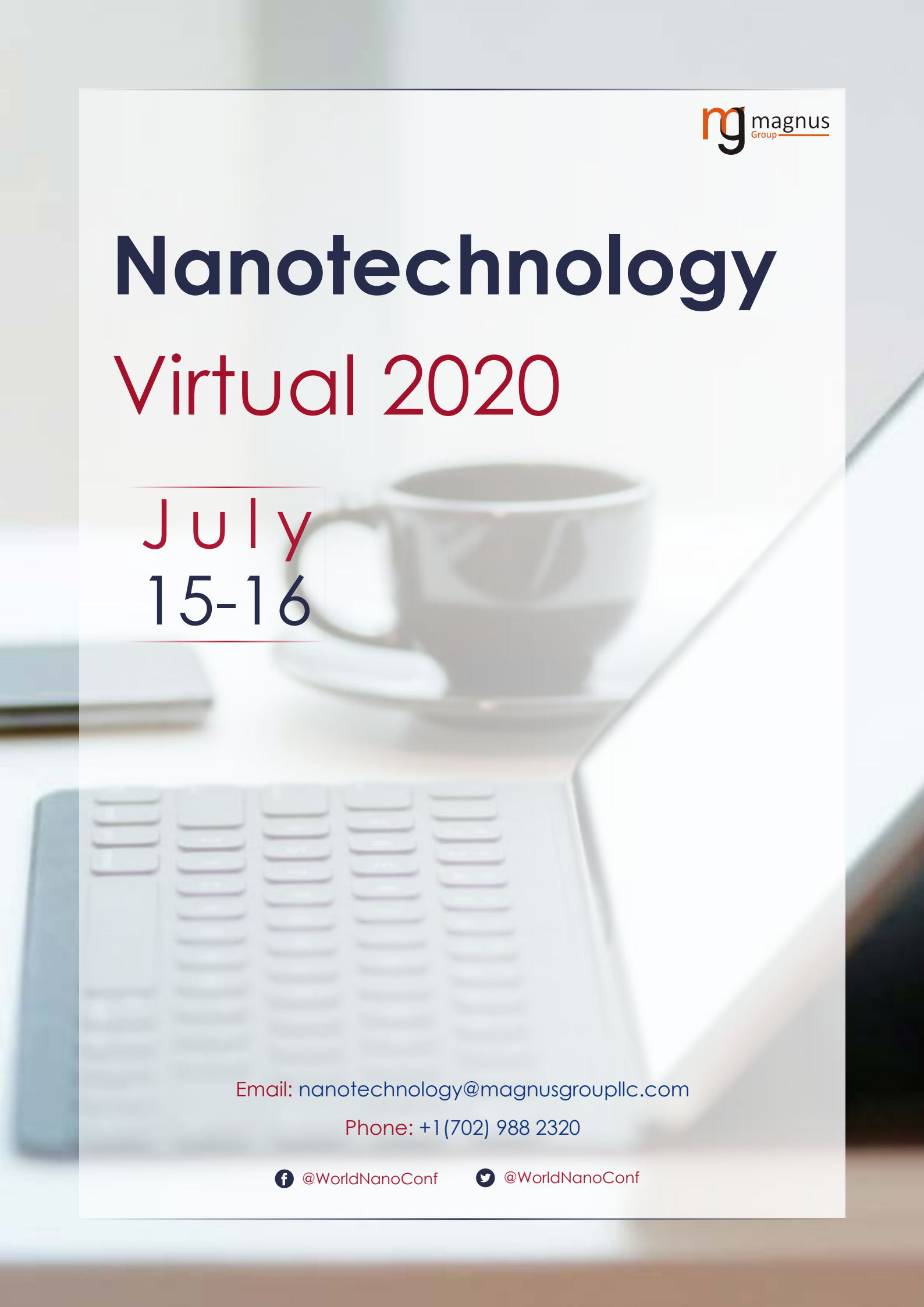
Virtual 2020

July
15-16



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NANOTECHNOLOGY VIRTUAL 2020
BOOK OF ABSTRACTS

NANOTECHNOLOGY VIRTUAL 2020

JULY 15-16, 2020

Theme:

Exchange questions, answers, and best practices in the field of Nanotechnology

INDEX

About MAGNUS GROUP

Magnus Group (MG) is initiated to meet a need and to pursue collective goals of the scientific community specifically focusing in the field of Sciences, Engineering and technology to endorse exchanging of the ideas & knowledge which facilitate the collaboration between the scientists, academicians and researchers of same field or interdisciplinary research. Magnus group is proficient in organizing conferences, meetings, seminars and workshops with the ingenious and peerless speakers throughout the world providing you and your organization with broad range of networking opportunities to globalize your research and create your own identity. Our conference and workshops can be well titled as 'ocean of knowledge' where you can sail your boat and pick the pearls, leading the way for innovative research and strategies empowering the strength by overwhelming the complications associated with in the respective fields.

Participation from 90 different countries and 1090 different Universities have contributed to the success of our conferences. Our first International Conference was organized on Oncology and Radiology (ICOR) in Dubai, UAE. Our conferences usually run for 2-3 days completely covering Keynote & Oral sessions along with workshops and poster presentations. Our organization runs promptly with dedicated and proficient employees' managing different conferences throughout the world, without compromising service and quality.

About Nanotechnology Virtual 2020

Nanotechnology Virtual 2020 will bring all the participants an opportunity to explore the recent advancements and developments in the field of Nanotechnology. Webinar consists of talks to ensure an intense interaction amongst the researchers present at the webinar. The purpose of the Nanotechnology Virtual 2020 is to promote interaction and discussion among academics, researchers and professionals in the field of Nanotechnology

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KEYNOTE FORUM

NANOTECHNOLOGY VIRTUAL 2020

July 15-16, 2020

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Antibodies (Abs) with functionality (Ab-Proteases) as a new generation of translational tools designed get healthcare model Re-Armed

Abs against myelin basic protein/MBP endowing with proteolytic activity (*Ab-proteases* with *functionality*) are of great value to monitor demyelination to illustrate the evolution of multiple sclerosis (MS). Anti-MBP autoAbs from MS patients and mice with EAE exhibited specific proteolytic cleavage of MBP which, in turn, markedly differed between: (i) MS patients and healthy controls; (ii) different clinical MS courses; (iii) EDSS scales of demyelination to correlate with the disability of MS patients to *predict* the transformation prior to changes of the clinical course.

Ab-mediated proteolysis of MBP was shown to be sequence-specific whilst demonstrating five sites of preferential proteolysis to be located within the *immunodominant* regions of MBP and to fall inside into 5 sequences fixed. Some of the latter (with the highest encephalitogenic properties) were proved to act as a specific inducer of EAE and to be attacked by the MBP-targeted Ab-proteases in MS patients with the most severe (progradient) clinical courses. The other ones whilst being less immunogenic happened to be EAE inducers very rare but were shown to be attacked by Ab-proteases in MS patients with moderate (remission-type) clinical courses.

The activity of Ab-proteases was first registered at the *subclinical* stages 1-2 years prior to the *clinical* illness. About 24% of the direct MS-related relatives were seropositive for low-active Ab-proteases from which 22% of the seropositive relatives established were being monitored for 2 years whilst demonstrating a stable growth of the Ab-associated proteolytic activity. Moreover, some of the low-active Ab-proteases in persons at MS-related risks (at subclinical stages of MS), and primary clinical and MRT manifestations observed were coincided with the activity to have its mid-level reached. Registration in the evolution of highly immunogenic Ab-proteases would illustrate either risks of transformation of subclinical stages into clinical ones, or risks of exacerbations to develop.

The activity of Ab-proteases in combination with the sequence-specificity would confirm a high *subclinical* and *predictive (translational)* value of the tools as applicable for *personalized* monitoring protocols. Ab-proteases can be programmed and re-programmed to suit the needs of the body metabolism or could be designed for the development of principally new

catalysts with no natural counterparts. Further studies on targeted Ab-mediated proteolysis may provide a translational tool for predicting demyelination and thus the disability of the MS patients.

Biography

Sergey Suchkov graduated from Astrakhan State Medical University and awarded with MD, then in 1985 maintained his PhD at the I.M. Sechenov Moscow Medical Academy and in 2001, maintained his Doctorship Degree at the Nat Inst of Immunology, Russia. From 1987 through 1989, he was a senior Researcher, Koltzov Inst of Developmental Biology. From 1989 through 1995, he was a Head of the Lab of Clinical Immunology, Helmholtz Eye Research Institute in Moscow. From 1995 through 2004, a Chair of the Dept for Clinical Immunology, Moscow Clinical Research Institute (MONIKI. Dr Suchkov has been trained at: NIH; Wills Eye Hospital, PA, USA; Univ of Florida in Gainesville; UCSF, S-F, CA, USA; Johns Hopkins University, Baltimore, MD, USA. He was an Exe Secretary-in-Chief of the Editorial Board, Biomedical Science, an international journal published jointly by the USSR Academy of Sciences and the Royal Society of Chemistry, UK. At present, Dr Sergey Suchkov is a Chair, Dept for Personalized and Translational Medicine, I.M.Sechenov First Moscow State Medical University. He is a member of the: New York Academy of Sciences, USA; American Chemical Society (ACS), USA; American Heart Association (AHA), USA; EPMA (European Association for Predictive, Preventive and Personalized Medicine), Brussels, EU; ARVO (American Association for Research in Vision and Ophthalmology); ISER (International Society for Eye Research); PMC (Personalized Medicine Coalition), Washington, USA.

Ali Ramazani

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Exciton-plasmon polariton coupling and hot carrier generation in two-dimensional semiconductors

Exciton (strong electron-hole interactions) and hot carriers (HC) assisted by surface plasmon polaritons shows promise to enhance the photoresponse of nano- electronic and optoelectronic devices. In the current research, we develop a quantum framework to study effect of coupled exciton and hot carriers on the photovoltaic energy distribution, scattering process, polarizability, and light emission of 2D-semiconductors. Using a stable 2D semiconductor (semi-hydrogenated SiB) as our example, we show that external strain and thermal effect on the SiB can lead to valley polarized plasmon quasiparticles (QP) and HC generation. Our results reveal that the electron-phonon (e-ph) and electron-electron (e-e) interactions characterize the correlation between the decay rate, scattering of excitons, and generation of HCs in 2D semiconductors. Moreover, phonon assisted luminescence spectra of SiB suggests that light emission can be enhanced by increasing strain and temperature. The polarized plasmon with strong coupling of electronic and photonics states in SiB, makes it as a promising candidate for light harvesting, plasmonic photocurrent devices, and quantum information.

Biography

Dr. Ali Ramazani is a Research scientist in the Department of Mechanical Engineering at the Massachusetts Institute of Technology (MIT). Prior to his current position, he was a research Fellow at the University of Michigan-Ann Arbor. He received his PhD degree in Materials Science & Engineering from RWTH-Aachen University in 2013. His research focuses on the development of a fundamental, integrated and quantitative multi-scale computational models to design new materials with exceptional properties for use in a wide variety of applications including energy, electronic, biomedical, automotive and aircraft structures. He has published more than 70 research articles in SCI(E) journals.)

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SPEAKERS

NANOTECHNOLOGY VIRTUAL 2020

July 15-16, 2020

Repolymerization and compatibilization of thermoplastics in post-consumer recycling processes by using titanate ester catalysts

Salvatore J Monte and Andreas Gegner

President, Kenrich Petrochemicals, Inc, Bayonne, NJ, US

How do you walk the walk after you've talked the talk? You pledged your company to sustainability goals such as increasing plastic recycle content and reducing carbon footprint – but, how do you get there? There's more to Plastics Technology Innovation than Industry 4.0. There's just so much you can do with software and hardware. Optimization cannot be achieved without first making more efficient use of the materials in the products you make.

My mission in life is to teach the more efficient use of raw materials and – as an entrepreneur who has been signing payroll checks for half-a-century – and an inventor with thousands of global patents by me and my customers – I will show how it can be done. We will look at how polymers are made – and how they are compounded – and provide solutions that will reduce cleaning and sorting and allow you to mix all the polymers and fillers in a melt compounder and make a better product faster.

- The extruder becomes a reactor for coupling and catalysis of all the materials in the recycle fed into the hopper. Here's how:
- If Ziegler, Natta & Kaminisky used Titanium and Aluminum catalysts to produce Addition Polymers;
- If Titanate catalysts are used to produce Condensation Polymers;
- If heteroatom Titanate coupling agents compatibilize Fillers with Polymers;

Monte claims: Why not use Titanate and Aluminum as a catalyst and coupling agent for compatibilizing the Fillers and Polymers (both Addition and Condensation) used in the Plastic to be Recycled.

Current plastic recycling and sustainability goals are limited by the intrinsic incompatibility of many polymers and the negative effect of fillers and impurities on end-product properties thus requiring a high degree of expensive sorting, separating and cleaning. Another barrier is the melt processing of polymers causes chain scissoring resulting in recycle and regrind materials having inferior properties compared to virgin. Current compatibilizers offered to recyclers are based on co-polymers or maleic anhydride modified polymers. Co-polymer compatibilizers require extensive sorting to match up the polarities of the recycled materials and maleic anhydride depolymerizes condensation polymers such as PET and Nylon obviating their use in post-consumer recycle. MAH technology claims to be a coupling agent, which is true for rebuilding molecular weight – but, misnomered when applied to coupling filler and organic interfaces.

Ziegler–Natta catalysts have been used in the commercial manufacture of various polyolefins since 1956. Ziegler showed a combination of TiCl4 and Al(C2H5)2Cl gave comparable activities for the production of polyethylene. Natta used crystalline α-TiCl3 in combination with Al(C2H5)3 to produce the first isotactic polypropylene. Kaminsky discovered that titanocene and related complexes emulated some aspects of these Ziegler-Natta catalysts but with low activity. He subsequently found that high activity could be achieved upon activation of these metallocenes with methylaluminoxane (MAO) –[O–Al(CH3)]n). Monte uses either a Monoalkoxy or Neoalkoxy Titanate in combination with Al2SIO5 mixed metal catalyst in Powder & Pellet forms for In Situ Macromolecular Repolymerization and Copolymerization in the melt – i.e. Polymer Compatibilization… AND … The Neoalkoxy Titanate proton coordinates with inorganic fillers and organic particulates to couple/compatibilize the dissimilar interfaces at the nano-atomic level thus reducing the need for expensive sorting of materials in Recycled Plastics.

Also, many compounders are schooled in silane coupling agent art thus limiting filler and organic interface coupling to hydroxyl bearing materials such as silica and fiberglass – thus categorizing fillers such as CaCO3, BaSO4, carbon black and organics such as oils as contaminants. In addition, silane art requires knowledge of hydrolysis mechanisms and techniques usually outside the realm of melt recycling compounders. In summary, Monte claims: "Nano-Titanium Technology applied at the interface of dissimilar materials is the Holy Grail of Plastics Recycling".

Biography

Salvatore J. Monte, President of Kenrich Petrochemicals, Inc.; B.C.E. Manhattan College; M.S.-Polymeric Materials, NYU Tandon School of Engineering; Society Plastics Engineers Fellow & Honored Service Member; Licensed P.E.; Plastics Industry Association Recycle Subcommittee-Compatibilizers; Board of Governors, Plastics Pioneers Association-MTS Newsletter Chair; 31-U.S. Patents; Lectured Worldwide on Titanate & Zirconate Coupling agents; 450-American Chemical Society CAS Abstracts of published "Works by S.J. Monte"; Classified Top Secret for Solid Rocket Fuel and Energetic Composites Patents for the Insensitive Munitions Program; Lifetime member of the National Defense Industrial Association; Lifetime Member of the BOD-SPE ThermoPlastics Materials & Foams Division; External Advisory Committee-UCF NanoScience Technology Center; former Chairman of the NYRG-ACS Rubber Division; former President of the SPE P-NJ Section; Testified several times before Congress on Trade and IP Protection; Business Man of the Year 2015-Bayonne Chamber of Commerce; Federated Society Coatings Technology C. Homer Flynn Award for Technical Excellence; Recipient of the Albert Nelson Marquis Lifetime Achievement Award; Rotary Paul Harris Fellow; UA Million Miler; Member PIA, SPE, ACS, ASCE, AIChE, SAMPE, the GRAPHENE COUNCIL

Plant extracts based nanoparticles, a good perspective in nanomedicine

Jagessar RC

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Nanotechnology is the design, characterization, production/synthesis and application of structures, devices and systems by controlling the shape and size at the nanometer scale. Nanoparticles are usually synthesized by chemical methods that usually used toxic reactants/reagents as reducing agents that further produce toxic by-products, which in turn are hazardous to the environment. However, recently, there has been the used of plant extracts as an alternative, complementary source of reducing agents to reduce metal ions to the corresponding metal nanoparticles. Plants contain an abundance and diverse arrays of natural products such as alkaloids, flavonoids, saponins, steroids, tannins, coenzymes etc. that vary in concentration and type in different parts of the plants such as leaves, stems, roots, shoots, flowers, barks, fruits and seeds. These secondary metabolites can act as reducing and stabilizing agents for the bioreduction reaction to synthesize novel metallic nanoparticles. Plant based nanoparticles are less expensive to synthesise, ecofriendly and are thus less hazardous to the environment. These plant based nanoparticles, have now find increasing application as novel antimicrobial agents in light of the need to find new and alternative antimicrobial agents, as a result of antimicrobial resistance. Also, their efficacy as anticancer and antidiabetic agents are on the research agenda. This presentation on Green nanotechnology, surveys the use of plant extracts, in the synthesis of nanoparticles, incorporating silver, gold, platinum, metal oxides such as TiO2, ZnO and MgO etc, which has medicinal applications.

Keywords: Nanotechnology, nanoparticles, plant based nanoparticles, natural products, environmental friendly, medicinal.

A perspective approach in the production of innovative nanocomposite packaging for food conservation

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The development of sustainable products with innovative properties for food conservation is a demand for the food industry. In addition, the use of biodegradable polymers should be continuous investigate to substitute the petroleum based plastics, mainly in the food packaging system. The topic elucidated herein will focuses on the development of ecological nanoparticles and its application in biodegradable polymers, aiming to produce ecological nanocomposite packaging for food conservation. In sense of this, studies with natural nanomaterials incorporated in a polymeric matrix brings as a new perspective to the nanocomposite films formulation, and can be a solution to increase the food shelf life. Biodegradable polymers can be functionalized with a nanomaterial and then produce a nanocomposite with intrinsic properties, using many laboratorial tools. For instance, biosynthesized silver nanoparticles, zein nanoparticles entrapped bioactive compounds, poly-ε-caprolactone entrapped essential oils, and solid lipid nanoparticles loaded alpha-tocopherol are some practical examples related to nanomaterials production. These nanoparticles produced can be applied in a biodegradable polymer, and solving the industry problem through the production of a new nanocomposite. Beyond, in an environment and safety perspective, nanoparticles obtained through ecological production or green synthesis can be considered an innovative alternative for a practical application in food system. Notwithstanding, with the adoption of nanocomposite packaging, a controlled released of active compounds can be obtained, since the polymer used can acts as an agent to control de release. Moreover, with the presence of nanoparticles, a better antioxidant, antimicrobial and antifungal activity can be obtained, which is desirable to food conservation. This fact is obtained since the production technique elevated herein is necessary to use bioactive compounds, and after the synthesis, the bioactive compounds are encapsulated or remains in the nanoparticles colloidal solution. In a physicochemical perspective, studies demonstrate that nanocomposite packaging presents positive results regarding the mechanical, visual, wettability, morphological, and thermal properties. Based on the aforementioned, the ecological production of nanomaterials and application in a polymer can produce a nanocomposite packaging with innovative properties, being an effective alternative to promote the food conservation.

Biography

Bachelor in Chemical Engineering and Ph.D. student in Food Engineering at University of Campinas (UNICAMP). Worked (2016-2019) with the development of innovative packaging to food conservation, focusing on ecological nanomaterials. In this research area, bioactive, biodegradable and antimicrobial nanocomposite were produced with natural macromolecules and functionalized with antioxidant compounds, biosynthesized silver nanoparticles, nanocapsules, and nanospheres. In 2020, started to work with the research projects related to the valorization of agroindustrial waste to bioenergy production in a biorefinery concept, focusing on techno-economic evaluation and environmental impacts. Has published 20 papers in scientific journals and more than 50 studies in conferences proceedings.

Cacao mucilage exudate as growth medium for production of bacterial cellulose

Jessica Cabezas, Daniel Durán, Olga L. Saavedra-Sanabria, Inés Hernández, Marianny Yajaira Combariza Montañez, Cristian Blanco-Tirado*

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Currently, the global chocolate value chain is based exclusively on cacao beans. Most cacao beans traded worldwide are produced under a linear economy model where only 8 to 10 % of the biomass from the harvested cacao fruit ends up as chocolate. Increasing materials circularity in cacao crops, will undoubtedly benefit the chocolate value chain, particularly in producing countries like Colombia, and will also help the environment by reducing wastes. Cacao mucilage exudate or sweatings (CME), a sweet liquid that seeps from the white pulp surrounding the cacao bean, is typically lost during the fermentation of the beans. CME amounts up to 4 wt% of the biomass in the cacao fruit, and is mainly composed of carbohydrates (glucose, fructose, and saccharose), low molecular weight organic acids, minerals, and proteins.

In this research, we explore the use of CME as an alternative growth medium for the production of BC by static fermentation with the Gluconacetobacter xylinus (ATCC®23768) strain and compare its performance with the traditional HS medium. We monitored the fermentation process for 15 days in terms of pH, individual sugar consumption, and BC production. We observe that CME can be effectively used to produce BC. However, the high sugar content, low pH, and limited nitrogen sources of the raw CME hinder to some extent the microorganism development when compared with the HS medium. Thus, we found that dilution and addition of a nitrogen source effectively improve the performance of CME as medium for G. xylinus growth and BC production. Using diluted and supplemented CME, BC production increases up to 13.13 ± 1.09 g L-1 in contrast to 4.20 ± 1.34 g L-1 with the traditional Hestrim and Schram (HS) medium. BC production rate also increased with the CME-based medium to 0.0365 ± 0.0030 g L-1 h-1, while HS only amounted to 0.0093 ± 0.0037 g L-1 h-1. Physicochemical characteristics of the BC films, such as thermal stability, cellulose crystallinity index, crystallite size, nanofiber diameters and network structure, are also included in the report. The use of CME for biomaterials production, such as bacterial cellulose, could have a direct impact on the sustainability of cacao crops by transforming residual biomass into useful biopolymers.

Audience Take Away:

- How to increase circularity by using residual biomass from crops such as Cacao.
- By using cacao mucilage exudate we can obtain bacterial cellulose in high yield and quality.
- Cacao mucilage is a potential source of new biomaterials that could compete in new bio markets because its production is based on increasing circularity of cacao beans production.

Biography

Dr. Cristian Blanco-Tirado studied chemistry at Universidad Industrial de Santander in Colombia and graduated as Ph.D. in Chemistry at University of Massachusetts at Amherts, USA in 2004. After one year postdoctoral position at UMass he obtained his current tenure track position in the Chemistry Department at Universidad Industrial de Santander. He then returned back to Colombia to stablish his research group focused in developing nano materials from lignocellulosic sources. Currently, his group is working in adding value to residual biomaterials from traditional Colombian crops.

Influence of agglomerations and particle dimensions of metal powders on the characteristics of composite polymers/Iron metal powders

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[2]National Institute for Research and Development in Electrical Engineering INCDIE, ICPE-CA, Bucharest, Romania

One of the important problems in the preparation of nanocomposites of polymers with metal powders as fillers is the agglomeration of nanoparticles which causes an insufficient dispersion of them. Particle sizes are also important. These agglomerations can exist in the initial state of the powders but also after the preparation of composite materials with polymers as the volume of these fillers increases. The dispersion state of nanoparticles and the interface between the matrix and particles play very important roles. The paper analyzes composite materials with polypropylene and polyethylene matrix and Iron metal powders. Two sizes of Iron powders were used. From SEM analysis for powders it was found that the mean particles size was 82.2nm for the first powder of 50nm and the mean size of the particles of the second powder of 800nm was 2695 nm. Composites samples with the two polymers and Iron powders were prepared by extrusion. Samples were obtained in two stages. In the first step the components were blended for one hour in a Turbula cylindrical mixer with 1.3liters mixing bowl, rotation speed 40 rpm. By extrusion the composite granules were obtained. In the second step the composites granules were injected thus the samples disk shaped are obtained. Polymeric composite materials with content of powders (3, 5 and 8%) were prepared. From the mechanical measurements it could be concluded that the use of dispersing fillers would lead to a decrease in the composite resistance compared to the non-filler polymer. In all cases an increase in the modulus of elasticity, the energy of the reversible elastic deformation and the yield of the elastic zone have been observed. Thermal characteristics and thermal behavior were analyzed. The highest values of thermal conductivity are obtained for 8% concentration of Iron powders 82.2 nm. It is very important that this composite has the best thermal endurance. The decrease of the crystallinity with the amount of powders, if they are of the same type and are identical in size, was observed.

Biography

Doina Elena Gavrila is Emeritus Professor, physicist, researcher at the Physics Department of the University "Politehnica" of Bucharest.She holds Bachelor of Science with honors, Aurel Vlaicu College, Bucharest, 1959. She holds degrees in Physics (1965) from the University of Bucharest. PhD in Macromolecular Physics, Doctor of Philosophy, University Bucharest, (1975) with the thesis "Influence of nuclear radiation on the characteristics of some polymeric substances".

Teaching courses of General Physics at license and master level (Physical Fundamentals of Magnetism, Micro and nanostructures in Electrical Engineering, Physics of Advanced Materials). Author and co-author of more than 150 scientific papers, of 15 monographs and teaching courses, and more than 20 technical reports; about 20 invited articles and invited lessons. Chairman, member of the organizing committee and evaluator at 18 international and national conferences. Awards at national and international conferences. Participant at 6 guides of laboratory of Physics and applications in Physics. 14 graduate students: 6 students sustained doctoral thesis, 2 students prepare doctoral thesis. Director of 10 national research projects and participant at more than 30 projects. Director of MATELIZ Excellence Center. Head of the Laboratory "Physics of advanced Materials", Faculty of Applied Sciences, Physics Department. Member Professional Commission Universities of Bucharest 1985-1989, Member Acad. New-York(1996), Member IEEE (2011-2013), Member European Society of Physics and Member of Romanian Society of Physics..

Growth of centimeter scale carbon wires using in-liquid AC arc discharge

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A novel observation of the formation of carbon wire in a carbon-based liquid solvent, using in liquid high voltage AC arc discharge is described. The authors describe the observed phenomenon, technical equipment needed to achieve the effect and preliminary qualitative results of obtained material. The wire consisted of well packed layers of carbon elements. The arc-discharge method is a simple, low cost method for the production of three dimensional carbon structures. A further research is needed to get a thorough understanding of the phenomenon.

Keywords: Carbon Wires, High Voltage, AC Arc Discharge, Carbon structure, Graphite Electrodes, Graphite, Organic Chemistry, Canola oil

Synthesis and characterization of modified nano Iron – Bone composite as high efficiency adsorbent for the removal of dyes from aqueous solution

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Universiti Sains Malaysia, Penang, Malaysia

Synthetic dyes released by various industries pose a threat to environment and public health. During the past few years, nanoparticles have been proposed as a removal method for a wide range of dyes from aqueous solution. The contamination in wastewater due to the dyes can be recognized because a very small amount of synthetic dye in water are often visible. The discharge of these dyes into the receiving waters produce negative biological and ecological effects which inhibits the growth of aquatic species. Most dyes are non-biodegradable due to complex molecular structures. The Synthesis of modified Nano iron – Bone Composites for adsorption purposes have rarely been reported in the literature especially for the removal of dyes from wastewater. This work involves two phases, the preparation of sintered bone powered which has been achieved and was effective for the removal of organic pollutants. In the second phase, a Nano iron-Bone composite was prepared by an in-situ synthesis method to explore an efficient removal technology for dyes in aqueous solution. The bones from cow were washed dried at 105 °C for 24h. This was followed by crushing after which they were washed and oven dried for 24h to reduce inner moisture content. The dried bones were sintered for 5 h at 700 °C. The process was followed by crushing after which powdered samples were reduced to 75, 150, 200 and 300 μm and were stored in a desiccator. The synthesis of Nano iron/bone composite was achieved by adding 0.5g of the different particles sizes respectively to 9 mL of 0.45mol/ L iron and stirred vigorously for 15 min at 15 °C under nitrogen protection. 10 mL of NaBH4 was added dropwise with continuous stirring for 20 min. After the product was washed with deionized water. The Nano iron/ Bone composite was obtained by vacuum drying. Characterization studies was carried out on the composite using FT-IR, EDX, BET and SEM for the chemical composition, surface area and porosity and the morphology of the sample before the adsorption studies.

Sustainable advanced materials from Leather industry wastes for energy and environmental applications

Thanikaivelan Palanisamy

Advanced Materials Laboratory, CSIR-Central Leather Research Institute, India

Grand challenges facing humanity today are intimately linked to the rapid exhaustion of natural resources in conjunction with massive growth of industrial production to support the booming world population. One such challenge is environmental sustainability and pollution mitigation, which have received considerable attention in several industries including leather. Collagen, the most abundant protein on earth, is a fibrous structural protein with intriguing mechanical properties namely high viscoelasticity and large fracture strength. It plays a crucial role in making Nature's structural materials tough. It is being processed in a variety of industries such as slaughterhouse, meatpacking, leather and related. Nevertheless, these industries generate significant amount of collagen containing co-products (bio-wastes), which can be used as a precursor for the bulk synthesis of nanomaterials and nanocomposites for high-value applications. The talk will feature novel ways of converting these collagen co-products into a range of advanced multifunctional materials such as self-doped carbon nanomaterials, Cr@C / Fe@C core-shell nanomaterials, N-rich carbon nanoonions, magnetic and conducting nanobiocomposites for energy and environmental remediation applications. The proposed new avenues for converting industrial bio-wastes into useful multifunctional advanced materials based on nanoscience approach are scalable and inexpensive thereby minimizing pollution and maximizing environmental sustainability.

Biography

Dr. Thanikaivelan Palanisamy is a Senior Principal Scientist at CSIR-Central Leather Research Institute, Chennai since 2002. He has founded the Advanced Materials Laboratory and currently heading. He received PhD in leather technology from Anna University in 2003. He had two post-doctoral stints at Texas Tech University and Rice University, USA under BOYSCAST and Fulbright-Nehru fellowships in 2005-06 and 2010-11, respectively. He specialized in cleaner leather processing and zero discharge technologies. He currently works on the development of new and advanced materials including nano, bio and composite materials, especially from wastes generated from leather industry for high-value applications in Healthcare, Environment, Lifestyle and Energy sectors. He has over 120 publications in peer reviewed international journals, 50 articles in conference proceedings and holds a h-index of 31 and 24 patents to his credit. His recent innovation on "Waterless Chrome Tanning" has been commercialized over 75 tanneries in India. He is a recipient of several National awards and academic honors from CSIR, INAE, IASc, DST, DBT, NRDC, WIPO, USIEF, IEI, IIT-Roorkee, TNASc and FICCI for his engineering innovations in cleaner leather processing, management of solid wastes and developing advanced materials.

Development of ethosomal gel for *Tinospora cardifolia*

Abbaraju Krishna Sailaja
Faculty Member, Osmania University, India

Natural products with medicinal value are gradually gaining importance in clinical research due to their well-known property of no side effects as compared to drugs. *Tinosporacordifolia* commonly named as "Guduchi" is known for its immense application in the treatment of various diseases in the traditional ayurvedic literature. Recently the discovery of active components from the plant and their biological function in disease control has led to active interest in the plant across the globe. Our present study is to develop ethosomal gel to enhance its permeation through skin and to treat allergies as well as inflammations. The stem extract was obtained by extracting with ethanol using soxhlet apparatus. Qualitative tests were used to analyse the phytochemical compounds in the solvent free extract of *Tinosporacordifolia*. Activities of the extract against 4 clinical pathogens were observed using Kirby Bauer's well diffusion method. The extract was exhibiting good antimicrobial property. For TLC determination of the extract, silica gel plated glass slides were used with different solvent systems like hexane: ethyl acetate in a different ratio (9:1),(8:2),(7:3),(6:4) and (5:5). TLC confirmed the presence of tannins as a major component of the extract. Now ethosomal formulation was developed for the extract of *Tinosporacordifolia* using cold and hot method. It has been evaluated for mean vesicle diameter, zeta potential, drug content, entrapment efficiency and drug release studies. The optimized formulation was developed as ethosomalgel. The formulation was showing better permeation property. Invivo studies were performed on albino rats to study the anti-inflammatory property of the ethosomal gel of *Tinosporacordifolia*. From the results it was concluded that ethosomal gel of *Tinosporacordifolia* was showing better anti-inflammatory property.

Keywords: Entrapment Efficiency, Drug Content, Mean Vesicle Diameter, Invivo Study, Drug Release Studies

Characterization of the Titanium Dioxide nanoparticles

Weam Sidahmed Awadalla Sidahmed
University of Khartoum, Khartoum, Sudan

This research aims to study an effect of annealing nanosize titanium dioxide (TiO_2), Titanium dioxide (TiO_2) is a wide gap oxide semiconductor is an n-type due to oxygen deficiency. It has three phases of the crystal structures including anatase, brookite, and rutile, where the band gap is 3.2 eV for brookite, 3.2 eV for anatase, and 3.0 eV for rutile. The most stable form and the principal source of (TiO_2) are rutile. The metastable anatase and brookite will transform to the thermodynamically stable rutile upon calcination at temperatures exceeding 600°C.

In all three forms, titanium (TiO_4) atoms are coordinated to six oxygen (O_2) atoms, forming (TiO_6) octahedra.

Utilize six grams of (TiO_2) material beige color was tope down divided for two parts one was annealed to 600°C for 4 hours and another let without annealing.

The as-prepared samples were further characterized using devices studying (TiO_2) properties, X-Ray Diffraction (XRD), Fourier Transformation Infrared Red (FTIR) and USB Spectrometer.

As 0.25g from both samples was taken and put in (FTIR) to reading transmission and absorption properties, 0.5g was taken for two samples put in (XRD), and 0.25g from both samples was taken and used UV-Visible Spectroscopy (USB) to take the readings.

After the properties of the annealed sample were studied and compared to the raw (control powder), this properties were found that the color of the Titanium Dioxide has changed from beige into white as the last one showed fewer impurities and formed Ti-O-Ti vibrational mood which was absent in the control sample.

The band gap was recorded and found to be 2.567 eV and 2.568 eV for control and annealed samples respectively.

Biography

Weam Sidahmed is an independent researcher who received her M.Sc. in Renewable Energy at the University of Khartoum, and studying M.Sc. in Business Administration in second semester at University of Khartoum, and B.Sc. Faculty of Science Department of Physics (Mathematical Section). Her work experience includes research and teaching posts in the Sudan since 2016, she teaches at several Sudanese higher education institutions and serves for NGOs in Sudan. She is a conferences organizer, presenter and proceedings editor, and is engaged in collaborative research with global and social perspectives. She is a committee member and from team founding of Next Einstein Forum in Sudan and organized conference the Sudanese Women in Science and organized (2018-219) Sudan Robotic Camp for kids (2018-219), team member of Sudan Youth Organization on Climate Change. I attended many local and global conference about nanotechnology

Space junk and its threat to satellites

Mubarak Ali M

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Impact events are classified into three: low velocity, high velocity or ballistic impact and hypervelocity impact. Hypervelocity impact damages occurs at the range of 5 to 20 km/s and it is a peculiar type of impact happening in space due to space debris (typical travel velocity 10 km/s) or meteorite/micrometeorite (typical velocity 20 km/s). Sandwich Composite panels and laminates are used in satellites for its specific strength and stiffness characteristics. Most dangerous characteristics of the hypervelocity impact event is the debris plume emanating from the rear face of the composite materials. The emanating particles will damage the neighbouring components and subsystems inside the satellite. If there are human beings in the space vessel as in International Space Station (ISS), then menace of hypervelocity impact will be substantial.

There are various sources of space debris in the space particularly in low earth orbits. The extend of the hypervelocity damage depends on size of the target material and size of the impactor. If the target material is thin and impactor is tiny object, the impactor will pierce the target and hole will be created in the target. If the target material is thick and impactor is tiny object, it will result in surface damages and degradation without punctured holes. If the impactor is large object, it will results in destruction of the target and orbital change. Destruction of the target will results in large numbers of space debris, which will magnify the risk of hypervelocity impact by acting as impactor. The ASAT (Anti Satellite Missile) launched by India during march 2019 have created 400 pieces of orbital debris and risk of orbital debris collision with ISS is estimated to be increased by 44% due to hypervelocity impact damage events.

The experimental simulation of hypervelocity impact damage events are highly challenging at earth. There have been experimental research in NASA and in ESA (European Space Research and Technology Centre, Netherlands). High velocity impact have been simulated using light gas gun in which particles of 1 cm size is propelled up to 8-9 km/s. To protect the Stardust probe from hypervelocity impact, NASA used a type of Whipple shield that consists of relatively thin outer shield, which is placed at a specific distance from the main spacecraft wall. Various shield configurations proposed to control the hypervelocity damage to space materials. International space station alone uses over 100 shield configurations with high-risk areas protected with better shielding.

This speech presents a review of growing risk of satellites due to space debris impact. The mechanism of mitigating the risk will also be discussed and challenges in future due to ever-increasing space debris/space junk will also be highlighted.

Biography

Dr. Mubarak Ali has pursued his Post-Doctoral Research in Satellite Research Centre, Nanyang Technological University, Singapore. His Post-Doctoral Research work was associated with Encapsulated Sandwich Composites for Thermal Coupling in Satellite Applications.
He has accomplished his Ph.D in School of Mechanical & Aerospace Engineering in Nanyang Technological University, Singapore with Nanyang Research Scholarship. His Ph.D research work dealt with Impact Damage and Scarf Repair of Laminated Composites with Dispersed Core/Shell Thermoplastic Particles. His Ph.D Supervisor was Associate Professor Sunil C Joshi.
He has completed his M.S. (by Research) in IIT Madras, in Department of Metallurgical and Materials Engineering. His M.S. Research dealt with Fretting Wear and Fretting Fatigue Analysis of Plasma Nitrided Ti-6Al-4V & AISI 304 Stainless Steel for Aerospace Application. His M.S. Research Supervisor was Professor Ganesh Sundara Raman, Department of Metallurgical and Materials Engineering, IIT Madras.

He holds a B.Tech Degree in Production Engineering from Madras Institute of Technology (MIT), Anna University Campus, Chennai. His Final Year Undergraduate Research Project involved Vibration Analysis of Microsatellite Satellite Structure, which forms a part of early stage analysis of ANUSAT Satellite program. ANUSAT was an Ambitious Indian Student Research Microsatellite, which was designed, developed & integrated at Department of Aerospace Engineering, Madras Institute of Technology (MIT), Chrompet, Anna University during 2002-2009. ANUSAT Satellite

His Biography has been listed in MARQUIS WHO'S WHO IN THE WORLD, 2014, 31st Edition, VIP Number: 36728040. He is currently working as Assistant Professor in Mechanical Engineering, in TKM College of Engineering, a prestigious institution in south India, affliated to Kerala Technological University.
TKM College of Engineering has signed a MoU with Universiti Teknologi Malaysia (UTM) during May 2019. Dr. Mubarak Ali is in close contact with Dr. Shukur Abu Hassan of CACM (Centre for Advanced Composite Materials) UTM, Johor Bahru, and Dr. Normah Binti Mohd Gazali, Professor in Dept. of Thermofluids, Faculty of Mechanical Engineering, Universiti Teknologi Malaysia (UTM), Johor Bahru.

Nanominerals from source to application

Maryam Kargar Razi
Islamic Azad University Tehran North Branch, Tehran-Iran

Nano-minerals based on natural and synthetic minerals form a wide range of nanomaterials. This class of nanomaterials is widely used in a variety of applications in modern technologies. Their main features are physically, chemically, optically and magnetically noteworthy. Their origin has been attributed to the onset of the earth and organisms and non-living organisms. Nano minerals have evolved over time in mineral species, relative abundance, range of percent composition and particle size variation. This article introduces the importance and application of nano minerals and overview study of chemical and physical overview identification methods.

Keywords: Nano-minerals, Methodology, Nano-crystals, Nano-particles, Nano-colloids.

Biography

Dr Maryam Kargar Razi studied applied chemistry at the Azad University North Branch of Tehran and graduated as MS in 1995. She received her PhD degree in inorganic chemistry 2001 at the Azad University Science and Research Branch of Tehran. She obtained the position of an assistant professor at the IAU-NBT and the same time, charge of industry management at the university and also as research consultant for the industrial mineral industries. In 2005, postdoctoral course supervised by prof. Christian Russell at the Otto schott institute, Germany. She is in the process of being promoted to Associate professor. She has published more than 40 research articles,46 News articles, 14 patents, 10 authors book ,3 translator book, more than 210 National standard edition committee and more than 50 workshops about the industrial minerals and industrial inorganic chemistry. She has won gold medals and honors for research in industries in Iran and also WIPO gold medal as the best inventor in 2007.

Application of nanominerals for cyanide removal from waste water in sodium cyanide production process

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In this research, nanominerals are used as an active and inert surface for photocatalitical process in the presence of hydrogen peroxide at alkaline pH and room temperature for removal and destruction of cyanide ions from wastewater in sodium cyanide plant production. Cyanide salt and complex derivatives are applied in many chemical processes. One of the most common usage is gold extraction from ores in CIL and CIP lines. There are some chemical methods for removal, destruction and even recovery from wastewater. The most usual method for treating of cyanide ion is oxidation by hydrogen peroxide or alkaline reaction. In such methods, cyanide oxidized to cyanate ions that is high toxic class 1000 times less toxic than cyanide free ions. Cyanate in many times allowable for discharge to wastewater or tailing dam. The benefits of nanominerals are residence time for complete reaction, reduction the intensity of reaction, less consumption of hydrogen peroxide and optimal control of reaction conditions in industrial plant scale.

Keywords: Cyanide, nanomineral , removal, plant scale

A review of the traditional medicinal properties of licorice in Iran and its antiviral properties

Mansureh Ghavam

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Glycyrrhiza glabra L. native to Central and Southwest Asia, as well as the Mediterranean Sea It is cultivated in temperate and subtropical regions. In regions of the world including Europe and Asia. The root, dried and processed, is called licorice. In traditional Iranian medicine, it has also been used as a treatment for gastritis and antitussives . In today's study, have been seen the effects of licorice and its active ingredients on the respiratory system and cough relief, asthma and chest infections. In ethnobotanical studies in Iran in northeastern Khuzestan and Isfahan and Semirom, the roots and leaves of the plant are used for stomach ulcers. People in northern Iran use a concentrated decoction of licorice root to treat stomach ulcers and cough. Glycyrrhizin is an active component of licorice roots that has antiviral properties against Japanese encephalitis virus (JEV), Influenza virus, HBV, HCV, HAV, HIV, SARS-related coronavirus, Vesicular stomatitis virus (VSV). Studies in Iran have shown that aqueous extracts and methanolic of this plant have an antiviral effect on HSV-1.

Biography

Mansureh Ghavam graduated from Isfahan University of Technology in Iran in 2004 with a degree in Natural Resources Engineering. She completed a PhD in field of medicinal plants at University of Tehran in 2013. Her doctoral dissertation was in the field of genetics, cytogenetics and phytochemistry of medicinal plants, which was accepted with honors. She has been officially employed by University of Kashan since 2013 and is researching the antioxidant and antimicrobial properties of medicinal plants, nanotechnology of medicinal plants, and cultivation and propagation of medicinal plants. Her first research was accepted entitled "Effects of ecological factors on the antioxidant potential and total phenol content of Scrophularia striata Boiss." in Scientific Reports in November 2019. Due to his research skills, he now has a partnership agreement with the University of Cagliari, and is working with Maria Letizia Manca, Maria Manconi, and Gianluigi Bacchetta on a joint project on the antimicrobial properties of more than 20 plant species.

Synthesis, Myorelaxant activities and DFT study of some 5-Chloroisatin derivatives

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In this study a N-alkylation and copper-catalyzed 1,3-dipolar cycloaddition methods were applied for the synthesis of novel 5-Chloroisatin derivatives [1]. The structures of the compounds were confirmed by spectral methods. Myorelaxant effects [2] of the compounds were tested directly on spontaneous contractions. Computational investigations of the compounds on the muscle-relaxing effects performance are done by using the DFT method with B3LYP functional. The obtained results indicated that all compounds synthesized produced concentration-dependent relaxation on rabbit jejunum.

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Effect of pegylated Graphene Oxide nanoparticles on differentiation of myeloid suppressor cells (Mdsc)

SA Zamorina, VP Timganova, MS Bochkova, AI Nechaev, PV Khramtsov, KYu Shardina, MB Rayev

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Graphene oxide (GO) cytotoxicity and pro-inflammatory effects in relation to immune cells limit applying of GO-based preparations in biomedicine. Besides all, these are its properties they hinder scientific developments' putting into practice. Meanwhile, modifying of GO nanoparticles' surface with polymers favors the weakening of their toxicity and improving the biocompatibility. The most widely accepted compound for GO coating is polyethylene glycol (PEG), and we used just it to modify the nanoparticles. Myeloid-derived suppressor cells (MDSC) were the object of our research. It is an immature cell heterogeneous population of myeloid origin that acquires suppressor phenotype in pathologies and therefore suppresses the immune response. Human MDSCs are defined as LIN–HLA-DR–CD33+CD11b+ cells. They subdivide into polymorphonuclear MDSC (PMN-MDSC) and monocytic MDSC subsets (M-MDSC). The effect of graphene oxide (GO) nanoparticles on the differentiation of MDSC in vitro was studied. The isolated mononuclear cells of healthy donors were inducted into the MDSC phenotype, using cytokines (IL-6 (40 ng/ml) and GM-CSF (40 ng/ml); complete medium, 7 days, 370C, 5%CO2. In this work, we used GO nanoparticles (Ossilla Ltd., Great Britain) with a PEG-modified surface (GO-PEG). The average size of the GO-PEG plates was 569 ± 14 nm; the amount of the PEG covering was about 19-20%. Complete medium was changed on the fourth day, and concurrently GO-PEG at pharmacological concentrations of 2,5; 5 and 10 μg/ml was added into cultures; it was established that GO in these concentrations did not affect the cellular viability. As a result, it was found that GO-PEG at low concentrations (2.5 and 5 μg/ml) increased the percentage of MDSC in cultures, while a high concentration of GO-PEG (10 μg/ml) reduced the amount of MDSC. When analyzing the subsets' percentages, we found that M-MDSC frequency increased in cultures with 2.5 and 5 μg/ml of GO-PEG, while the level of PMN-MDSC did not change. The decrease in MDSC levels in cultures with a high GO-PEG concentration (10 μg/ml) was due to a reduction of PMN-MDSC percentage. Thus, we demonstrated for the first time that GO-PEG nanoparticles could regulate MDSC differentiation multi-directionally, depending on the concentration, both blocking and stimulating differentiation of these cells. This work is supported by the Russian Scientific Foundation under grant No. 19-15-00244.

Biography

Zamorina S.A., PhD, Dr.Sci.Biol. studied Biology at the Perm State University, Russia, and graduated in 1997. She received her PhD degree in 2000, and Dr.Sci.Biol. degree in 2013. She then joined the research group of Prof. M. Rayev at the Institute of Ecology and Genetics of Microorganisms (IEGM UB RAS), Perm, Russia. She is the Leading Researcher in the IEGM UB RAS and associated professor at Perm State National Research University, lectures course "Immunology". She has published more than 49 articles in high-ranked scientific journals (Scopus indexed, ID 6507973926). The scope of scientific interests concerns the cell and molecular mechanisms of the immune system regulation.

Polymer metamaterials in photonics as sensor systems

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Visible photonic crystals based on polymer microspheres were widely used in science and its various applications at the beginning of the 21st century as multifunctional materials. They are based on flat or spatial ordered structures of polymer (polystyrene, PMMA and others) submicron-sized microspheres.

Such structures are obtained by self-organization on the surface of various solid substrates. A feature of such structures is the presence of a selective spectrum of reflected radiation from their surface when they are irradiated with light with a wide band. Experiments show that changing the size of the microspheres changes the maximum of the spectrum of the reflected radiation according to the Bragg-Snell law. The use of polymer microspheres of 6-200 microns in size as elements for creating ordered structures allows us to expand the spectrum of selective reflected radiation up to the radio range.

We used monolayers of dense hexagonal packing of polystyrene microspheres with a diameter of 6-200 μm, deposited on a polycarbonate substrate. The sample was irradiated with terahertz radiation with a bandwidth of up to 3.5 THz. The reflected normalized emission spectrum in the figure is represented by a blue line. The graph shows that the width of the reflected signal is at least two times narrower compared to the reference irradiating effect.

The data obtained allow us to conclude that ordered structures of polymer microspheres in the region of the terahertz range of wavelengths behave similarly to photonic crystals of the visible range

Nano application in sports

Amir Mohammadamini
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The Nanotechnology is a branch of research that has gained much momentum in recent years due to its wide application of its principles and products. The application of nanotechnology research ranges from fields such as disease prevention and treatment to advanced and improved electronic devices. Nanotechnology has even found applications in the wide field of sports. Within the niche of sports, nanotechnology has proven to very useful, and has the potential to improve a broad range of aspects of the sports world Ever picked up an old wooden tennis racquet or leather football and noticed how heavy they are, or how rough the material is? And then wondered how athletes weren't constantly injured as they used them?

Sporting equipment has changed dramatically in terms of the technology used to make them – golf clubs and racing bikes are lighter, tennis balls and footballs last longer, and swimmers and skaters can go faster thanks to the materials their gear is made from Nanotechnology is a branch of science dealing with the very small, smaller than the width of a human hair. But how can the very small be applied to the massive world of sports and can it really make the difference between winning and losing Small changes can make a big difference in the sporting arena and many types of sporting equipment now incorporate some kind of nanotechnology, from baseball bats to hockey sticks and from racing boats to archery arrows. Nanomaterials used include carbon nanotubes (CNTs), silica nanoparticles (SNPs), nanoclays and fullerenes – eachmaterial can confer an added advantage, such as high strength or stiffness, durability, reduced weight or friction, or wear resistance CNTs are the most prevalent nanomaterial used in sport equipment, accounting for 14% of the total annual consumption of CNTs. CNTs have a higher specific strength and stiffness – they are 100 times stronger but six times lighter than steel and as stiff as diamond making them ideal for low weight, high strength equipment such as ultra-lightweight bike frames and golf club shafts. Fullerenes are also used to lighten golf clubs by lowering the centre of gravity, thereby increasing the golfer's power and accuracy. Graphene oxide and buckypaper – sheets of CNTs – have also benefitted water sports such as canoeing and boat racing. By incorporating nanotechnology into this equipment, racers can help increase the glide and strength of boats in the water while also reducing their weight Scientists are always looking for new and innovative ways to improve existing products, and sports equipment is no exception. Already, scientists have found numerous applications of nanotechnology to improve current sports technology. These improvements range from creating stronger, yet lighter, golf clubs to taking away the odor normally associated with dirty sports clothing after it has been used.

Nanotechnology in sports equipment: The game changer Nanowerk Spotlight) Innovations bring a maze of complexities to a) sport, but elevate the performance level of an athlete and reduce the chances of injury, making sport more enjoyable for the spectators and the athletes. The world of competitive sport is highly influenced by even the minute changes in sports equipment, which could be a matter of winning or losing In recent times, the sports equipment industry has emerged as a sophisticated yet commercially viable hi-tech industry where advances have revolutionized sports. Additionally, various world-level championships like Olympics and World Cups have popularized the sports equipment industry up to a great extent, making it a lucrative business opportunity for public as well as private venture capitalists

Impact of Nanotechnology on Sporting Equipments

The degree of competitiveness in sports has been remarkably impacted by nanotechnology like any other innovative idea in materials science. Within the niche of sport equipments, nanotechnology offers a number

of advantages and immense potential to improve sporting.

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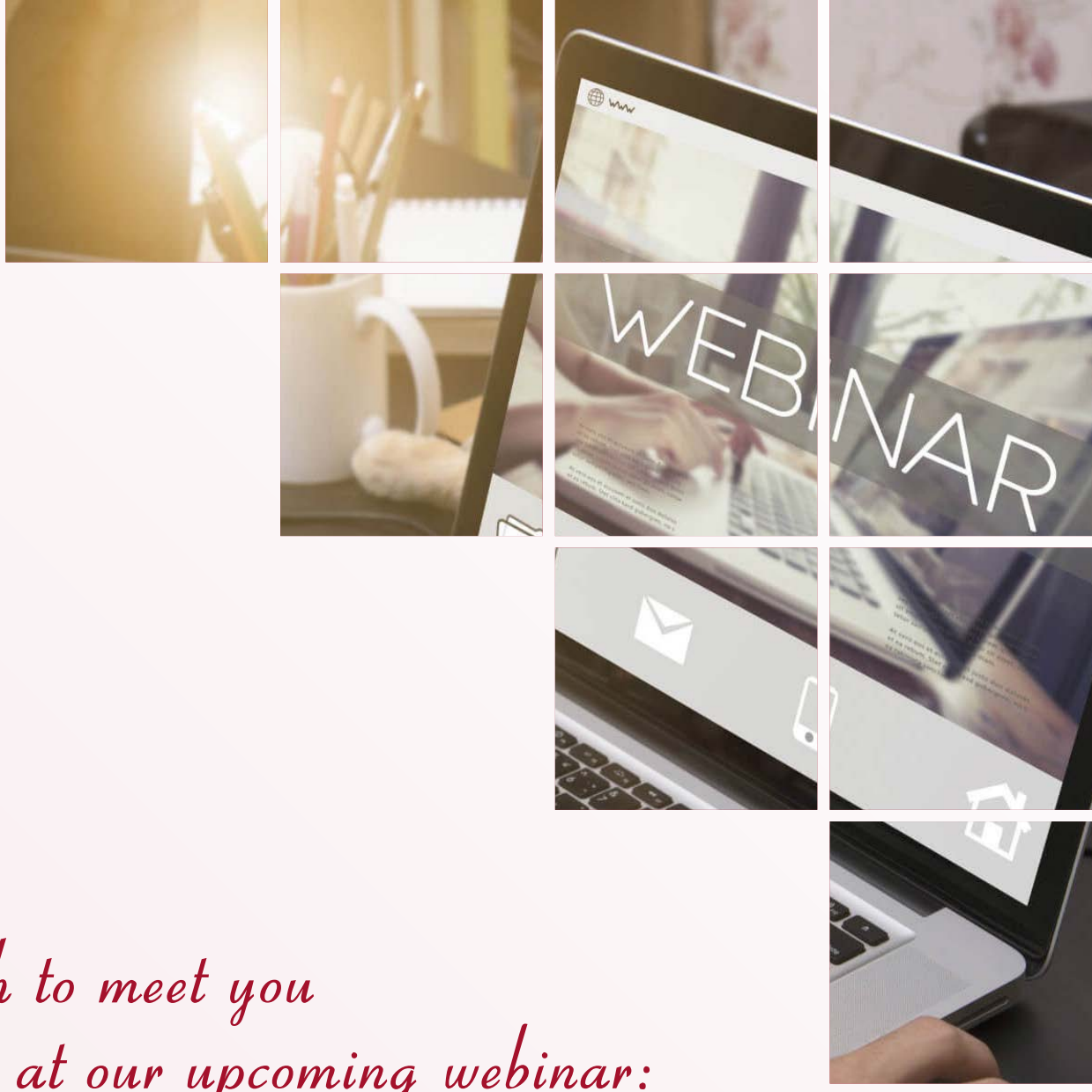

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