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Nanotek 2017

Day 1 : March 11th 2017

10.00 am -11.00 am - Registration

11.00 am -11.15 am - Inaugural session

11.15 am -11.30 am - Group photo

Keynote Forum

11.30 am -12.00 pm - Prof. Mineo Hiramatsu
Meijo University , Japan

12.00 pm - 12.15 pm - **Coffee Break**

12.15 pm -12.45 pm - Prof.Santiago Gomez Ruiz
Universidad Rey Juan Carlos, Spain

12.45 pm -01.15 pm - Prof. Paata Kervalishvili
Georgian Technical University, Georgia

01.15 pm - 02.15 pm - **Lunch Break**

Session Introduction

02.15 pm – 02.30 pm --- **Oral Presentation by *Renata Pasqualini***
Topic :- Ligand-Directed Targeting and Molecular Imaging Based on In Vivo Phage Display

02.30 pm - 02.45 pm --- **Oral Presentation by *Wei Chen***
Topic :- Copper Cysteamine – A New Multifunctional Nanomateril for Cancer Treatment and Optical Sensing

02.45 pm - 03.00 pm --- **Oral Presentation by *David Bozsaky***
Topic :- Heat transfer resistance experiments of thermal insulation coatings consisted of hollow nano-ceramic microspheres

Day 1 : March 11th 2017

03.00 pm - 03.15 pm	---	**Oral Presentation by *Zeeshan Ahmad*** **Topic :-** Electrohydrodynamic Methods As Emerging Tools For Drug and Bio-Therapies
03.15 pm - 03.30 pm	---	**Oral Presentation by *by Giuseppe Forte*** **Topic :-** pH sensitive functionalized graphene oxide for the release of drugs
03.30 pm - 03.45 pm	---	**Oral Presentation by *Junying Zhang*** **Topic :-** Graphitic- phase Carbon Nitride for photo-catalytically water-splitting and biological application
03.45 pm – 04.00 pm	---	**Coffee Break**
04.00 pm – 04.15 pm	---	**Feedback**

DAY 1 END

Day 2 : March 12th 2017

Keynote Forum

11.00 am -11.30 am	-	Prof.Akira Baba Niigata University, Japan
11.30 am -12.00 pm	-	Prof. Ibrahim El Sherbiny University of Science and Technology, Egypt
12.00 pm -12.30 pm	-	Prof. Andrey Klymchenko University of Strasbourg, France

12.30 pm – 12.45 pm - Coffee Break

Session Introduction

12.45 pm – 01.00 pm --- **Oral Presentation by *Paulina Laura PAjez***
Topic :- Oxidative stress generation by silver nanoparticles in bacteria and its relationship with the antimicrobial activity

01.00 pm – 01.15 pm --- **Oral Presentation by *Kun Luo***
Topic :- Batch Synthesis and Characterizations of Janus Noble Metal Nanoparticles by Toluene/Water Emulsion Reaction

01.15 pm – 01.30 pm --- **Oral Presentation by *Masih Darbandi***
Topic :- Facet orientated TiO2 nanoparticles: toward superior candidate for high performance photocatalysis and energy applications

01.30 pm – 02.30 pm --- Lunch Break

02.30 pm – 02.45 pm --- **Oral Presentation by *Yongiang Zhao***
Topic :- A Smart Detection System Based on Specific Magnetic and RCA Signal-amplified Dual-aptamers to Accurately Monitor MRD in Patients with T-ALL.

02.45 pm – 03.00 pm --- **Video presentation by *Peng-Sheng Wei***
Topic :- Surface Deformation Subject to a High-Pulsed Laser Beam

Day 2 : March 12th 2017

03.00 pm – 03.15 pm	---	**Oral Presentation by *Xiaoling Lu*** **Topic :-** Anti-tumor immune response of folate-conjugated chitosan nanoparticles containing the IP-10 gene in mice with hepatocellular carcinoma
03.15 pm – 03.30 pm	---	**Oral Presentation by *Josef Habdank*** **Topic :-** Synthesis, characterization and application of nanographene and metal oxide nanopowders in nanocomposite thermopiezo/tribological sensors
03.30 pm - 03.45 pm	---	**Poster Presentation by *Ali Reza Mahjoub*** **Topic :-** Characterization and evaluation of a functionalized metal organic framework for targeted anticancer therapy
03.45 pm - 04.00 pm	---	**E-Poster Presentation by *Dimitroula Papadopoulou*** **Topic :-** A case study of licensing: A company that provides top of the art technology for implants with PLGA NPs for drug delivery in cataracts, knee, hip arthritis and arteriosclerosis disease
04.00 pm - 04.15 pm	---	**Coffee Break**
04.15 pm – 04.30 pm	---	**Feedback**

DAY 2 END

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March 11th - 13th, 2017
Hamburg, Germany

KEYNOTE FORUM

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NANOTEK – 2017

March 11th-13th, 2017, Hamburg, Germany

Mineo Hiramatsu

Department of Electrical and Electronic Engineering,
Meijo University, Nagoya, Japan

Vertical Nanographene Network as Plat form for Electrochemical Applications

Carbon nanowalls (CNWs) are composed of few-layer graphenes standing almost vertically on the substrate forming 3-dimensional structure. CNW film has many graphene edges and CNW sheet itself is composed of nanographite domains of a few tens of nanometers in size. These graphene edges and domain boundaries are chemically reactive, and are modified or decorated easily with several types of surface termination including metal nanoparticles and biomolecules.The structure of CNW film depends on the source gases, pressure, process temperature as well as the type of plasma used for the growth of CNWs.From a practical point of view, structures of CNWs including spacing between adjacent nanowalls, crystallinity and alignment should be controlled according to the usage of CNWs. Moreover, post processes such as integration techniques including etching and coating of CNWs and surface functionalization should also be established. We report the current status of the control of the CNW structures during the growth processes as well as post treatment, together with examples of electrochemical applications using CNWs.Nanoplatform based

on vertical nanographene offers great promise for providing a new class of nanostructured electrodes for electrochemical sensing, biosensing and energy conversion applications.

Biography

Prof. Mineo Hiramatsu is a Full Professor of Department of Electrical and Electronic Engineering and the Director of Nanocarbon Research Center, Meijo University, Japan. His main fields of research are plasma diagnostics and plasma processing for the synthesis of thin films and nanostructured materials. Author of more than 100 scientific papers and patents on plasma processes for materials science.

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NANOTEK – 2017

March 11th-13th, 2017, Hamburg, Germany

Santiago Gómez Ruiz

Universidad Rey Juan Carlos

Nanostructured Materials Based on Porous Silica: Classical and Non-Classical Drug-Delivery Systems Against Cancer.

The therapeutic action of nanostructured drug-delivery systems (DDS) is divided in three different steps. First the loading of the nanosystem with the therapeutic molecule that needs a coherent design of the functionalization of the nanostructured scaffold to modulate the interaction with the therapeutic molecule. Second step is the targeting of the DDS to enter the cell, which is normally achieved by decoration of the nanosystems with fragments easily recognizable by a cancer cell receptor or similar which maximizes the selective action towards cancer cells. The last step is the release of the drug inside the cell as a response to external stimuli. In this context, our group designed a wide variety of nanosystems based on nanostructured silica and metallodrugs or nanostructured silica and natural products which are acting as non-classical or classical drug-delivery systems depending on the structure. In this communication, our last results in the topic will be presented and discussed.

Biography

Dr. Santiago Gómez-Ruiz (1978, Toledo, Spain) is Doctor in Chemistry by the Rey Juan Carlos University, Spain. He obtained a Postdoctoral Research Fellowship from the Alexander Von Humboldt Foundation to work at Leipzig University (2006-2007). In August 2009 he was awarded as Professor of Inorganic Chemistry at the Rey Juan Carlos University and since 2010 he is leading different research topics focused on the synthesis of nanostructured materials with anticancer or angiogenic applications and the preparation of novel advanced materials with catalytic and photocatalytic applications with important contributions in journals of high impact.

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NANOTEK – 2017

March 11th-13th, 2017, Hamburg, Germany

P.J. Kervalishvili

Georgian Technical University, Department of Enginering Physics,
Tbilisi 0175, Georgia

Optical Spectroscopy Study of Oscilation of Pathogenic Bionanoobjects.

The pathogenic bionanoobject - Virion, the extracellular infective form of a virus, is considered as a nanoparticle, consisting of an inner core of nucleic-acids (RNA or DNA) and outer protective protein coat called a capsid. Core-shell models of spherical and cylindrical geometries for virions of icosahedral, prolate or helical morphology are used as the first approximation of shape-structure. The shape, inner/outer diameters of capsid, nucleic acid- related and protein-related dielectric permittivities are proposed as the main parameters determining the set of oscillation frequencies, the prior-parameters defining the spectra signatures of VLPs, virions. The single-particle level preliminary study of electromagnetic (EM) wave and VLP interaction based on Maxwell EM theory, separation of variables method for solving Helmholtz equations is considered. Analysis of analytical and numerical results obtained by computer simulation show the possibility to appreciate the set of oscillation frequencies (eigenvalues) of VLP model using the system of algebraic equations, alongside of defining the quantitative graphs of scattering cross sections and radiation patterns of system. Investigation of VLP model for un-enveloped TMV, T7 viruses demonstrates the strong dependence of physical/spectroscopic characteristics of system on core-

shell related geometric, electric parameters and frequency modes/harmonics, which enable to consider the radiated field distribution as the possible spectral signature specific for shell or core as well as whole virion. Proposed theoretical basis for elaboration of frequency spectra model, investigation of spectroscopic properties of virions in complement with spectroscopic experimental study should be the best way for defining the fingerprints of viruses applicable for detection and identification sensory systems.

Biography

Professor, Doctor of Sciences and Dr.-Eng. Paata J. Kervalishvili is Professor at department of Engineering Physics within Georgian Technical University, as well as visiting Professor of faculty of exact and natural sciences of Tbilisi State University. Dr. Kervalishvili has served in several directions of physics and technology such as: condensed matter, molecular and quantum physics, nuclear and laser technologies, nanoscience and nanotechnologies, novel materials, energy and sensory systems, information science and technologies. He is author of more than 450 scientific publications, books, manuals, and inventions. P. Kervalishvili received his B.S. and M.S. in engineering physics from Georgian Technical University. The Research and technological Centre "Institute Giredmet" awarded him the title of Ph. D., and Dr.-Eng. in 1978, and Soviet atomic centre "Kurchatov Institute" – degree of Doctor of physics and mathematics (1985). He got USSR State Professor title in 1989.

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NANOTEK – 2017

March 11th-13th, 2017, Hamburg, Germany

Ibrahim M. El-Sherbiny

Zewail City of Science and Technology, 6th October City, 12588 Giza, Egypt

Smart Nano and Nano-in-microcarriers for Controlled Drug Delivery

Smart (stimuli-responsive) soft nanomaterials, a very promising class of nanomaterials, are three-dimensional networks that are able to dramatically alter their size and other characteristics in response to environmental stimuli such as temperature, pH, magnetic field, electricity, light and certain chemicals. More recently, the ability to control the size in the nanoscale, porosity, shape and surface morphology of soft matrices has created new opportunities to evade various challenges in different applications. Besides, the concurrent rapid and significant stimuli-response of these nano-structured smart soft nanomaterials may expand the scope of their applications, and offer enhanced performance in their uses especially in the biomedical fields.

A significant body of research has focused recently onto pulmonary drug delivery as a well-accepted treatment for many lung and other diseases. The talk describes the development, and in-vitro and in-vivo evaluation of new series of smart carriers for controlled drug delivery to and through the lung. The new smart delivery systems combine the benefits of nanoparticles (NPs) and respirable/swellable microparticles, and at the same time evading their shortcomings. The carriers are based on polyethylene glycol (PEG)-chitosan graft copolymers (PEG-g-CS) and crosslinked ionotropically with tripolyphosphate salt

or through polyelectrolyte compleation with sodium hyaluronate in form of hydrogel NPs. Drug-loaded NPs were then used to develop respirable/swellable 1-5 microns size microparticles (MPs) through controlled spray drying of an aqueous suspension of the NPs and lactose as excipient. Particle size was determined by laser diffraction and DLS. Surface morphology was investigated by AFM and SEM. In-vitro aerosolization was performed using a next generation impactor. Dynamic swelling, in-vitro biodegradation, particle density and moisture contents were also determined. In-vitro release profile of the loaded drug was investigated in simulated body fluids. In-vivo investigation of the drug was also performed using insufflation method. The average sizes of the PEG-g-CS NPs and MPs were found to be 83.2±2.4 nm and 4.1±0.03 µm, respectively. The NPs-MPs carriers showed high swelling within few minutes, low aerodynamic density (0.2±0.03 g/cc), moisture content of 4.1-9.0%, good in-vitro biodegradation, high drug loading capacity exceeding 93%, and a promising sustained drug release both in-vitro and in-vivo. In conclusion, the newly developed NPs-MPs systems are very promising and could be utilized as potential carriers for sustained delivery of various drugs to the lung.

Biography

Prof. El-Sherbiny has earned his PhD in Smart Drug Delivery in 2007 from Massey University, New Zealand. He joined the University of New Mexico as a post-doctoral fellow, then Texas University, USA as Research Assistant Professor. He is currently Professor of Nanomaterials, Director of Nano and Materials Science Programs, and Founding Director of the Center for Materials Science at Zewail City of Science and Technology. He has more than 67 papers in reputed journals, and almost same number in preceedings of international conferences. He is the author of three books plus contribution in other 14 books, and more than eight review articles. Besides, El-Sherbiny is a named inventor on more than fifteen international patents.

Dr. Ibrahim M. El-Sherbiny is currently a professor specializing in nano and materials sciences at the University of Science and Technology, and acts as director of nano and materials sciences programs, and the director of the Center for Materials Science (CMS) at Zewail City.

El-Sherbiny earned his Bachelor of Science degree, with honors, in chemistry (top scholar) and his Master of Science degree in polymer chemistry from Mansoura University in Egypt. He was awarded a graduate scholarship from the Egyptian government and a second from Massey University, New Zealand to study for his Doctor of Philosophy degree abroad. He earned his Doctor of Philosophy degree in drug delivery from Massey University in 2007.

El-Sherbiny started his professional career as a demonstrator followed by his appointment in 1999 as assistant lecturer at the Faculty of Science, Mansoura University. He also served as a chemistry tutor at the Institute of Fundamental Sciences, Massey University. From 2008 to 2009, he joined pharmaceuticals research groups as a post-doctoral fellow at the College of Pharmacy, University of New Mexico and Texas University in the United States. Then, El-Sherbiny worked as Research Assistant Professor in the division of pharmaceutics, College of Pharmacy, at the University of Texas starting from 2010.

El-Sherbiny's academic acumen was recognized by being offered a Fulbright Fellowship at the School of Biomedical Engineering, University of Michigan (U.S.) in 2009. He was also awarded several awards including the Prize of late Prof. Abdou Salam in the field of pharmaceuticals and bioproducts, the prestigious Egyptian State Incentive Award in Science, and the Venice Kamel Goda Award for Scientific Creativity for Young Researchers in the field of materials science and its applications. El-Sherbiny was selected among a group of top 40 European Union professors to form the new COST action committee, "Simm-Inhale", which focuses on the pulmonary drug delivery's research. He was also honored by some national and international universities and academies including the Academy of Scientific Research and Technology (ASRT), and Texas University, USA.

El-Sherbiny's research focuses on the design and development of new classes of intelligent nano- and nano-in-micro-polymeric matrices using advanced techniques, and evaluating these new structures as potential candidates in various environmental, biotechnological, and biomedical applications including

targeted and controlled drug delivery, tissue engineering, regenerative medicine, and biosensing. Dr. El-Sherbiny has more than 70 scientific papers published in high impact peer-reviewed journals over the last nine years in addition to many more papers in the pipeline. He also has more than 70 participations in international conferences in different countries including for instance, France, New Zealand, England, the United Arab Emirates, Jordan, Australia, Saudi Arabia, Germany, Singapore, Turkey, Malaysia, Spain, Canada, and the United States. Dr. El-Sherbiny is the author and co-author of three books plus contribution to other 14 books, and more than seven review articles. He is also a named inventor on 16 patents and patent applications in the U.S., U.K., Europe and Egypt. El-Sherbiny has contributed as a principal investigator and co-principal investigator for more than 15 funded applied research projects in Egypt and the U.S.

In addition to El-Sherbiny's professional experience, he cofounded the Egyptian Organization for Scientific Research and Technology in 2012. He is a member of different societies and associations including the American Association of Pharmaceutical Scientists, the Biomedical Engineering Society (U.S.), the American Chemical Society, the New Zealand Institute of Chemistry, the Egyptian Chemical Society, the Egyptian Society for Polymer Science & Technology, and the Materials Research Society (U.S.).

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NANOTEK – 2017

March 11th-13th, 2017, Hamburg, Germany

Akira Baba

Graduate School of Science and Technology and Center for Transdisciplinary Research, Niigata University, Niigata, Japan

Investigation of Gold Quantum Dots/Plasmonic Systems for Improvement of Organic Solar Cells

Plasmonic photoelectric conversion systems are a promising approach to create additional light trapping for the improvement of light absorption capability and efficiency of the solar cells without increase of the active layer thickness.1-3 When the gold particle size becomes smaller than 100 nm, localized plasmons are excited around the gold nanoparticles by an irradiation of visible light. When the size of gold nanoparticles further becomes smaller (< 2 nm), they are called gold clusters or gold quantum dots. As they have a diameter of less than 2 nm, they exhibit a quantum size effect; this effect means that the size of the AuQDs determines the wavelength of the fluorescence emission. Electrons in AuQDs are excited from the ground state to the excited state by absorbing mainly near-UV light. This implies that AuQDs can harvest light from the UV region and convert it into visible light. Because most organic photoelectric-converting materials harvest light mostly in the visible range, one important challenge is to apply AuQDs especially for organic light-harvesting systems. Here, we report enhanced properties of plasmonic organic thin-film solar cells (OSCs) by incorporating gold quantum dots (AuQDs).

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Andrey S. Klymchenko

Laboratoire de Biophotonique et Pharmacologie, UMR 7213 CNRS, Université de Strasbourg, Faculté de Pharmacie, 74, Route du Rhin, 67401 ILLKIRCH Cedex, France

Small and Ultrabright Fluorescent Polymer Nanoparticles for Bioimaging

Fluorescent organic nanoparticles (NPs) appear as an attractive alternative to inorganic NPs, such as quantum dots, because of their potential biodegradability, low toxicity and high capacity to encapsulate active molecules. For successful applications in biosensing and bioimaging, they should be small, ultra-bright and biocompatible, as well as they should undergo efficient Förster resonance energy transfer (FRET). The small size of NPs was achieved through an original methodology based on nanoprecipitation of polymers bearing 1-2 charged groups per polymer chain. This approach enabled preparation of NPs down to 10-15 nm size by nanoprecipitation. For dye encapsulation, we designed cationic dyes (rhodamines and cyanines) containing large fluorinated counterions that prevent dye pi-stacking and thus aggregation caused self-quenching. In case of neutral dyes, such as perylene diimides, we employed bulky side groups. As a result, PLGA and PMMA NPs of 15-50 nm size were obtained, where the size was tuned by the polymer structure. Our smallest NPs of 15 nm size encapsulating >100 rhodamine dyes were ~10-fold brighter than quantum dots-585 recorded at the same conditions. Dependent on the dye design and the polymer nature, our NPs showed either stable emission or complete ON/OFF switching. This switching behavior is an indication of strong coupling of the dyes by ultra-fast exciton diffusion, so that >100 dyes behave like a single emitter. This highly collective behavior enabled very efficient FRET from hundreds of encapsulated dyes to a single acceptor. Moreover, using different cyanine dyes with bulky counterions, we were able to tune the absorption/emission color from blue to near-infrared. Based on these multi-color NPs we developed a new methodology for long-term cell tracking of multiple color-coded cell populations in vitro and in vivo. In conclusion, small and ultrabright fluorescent polymer nanoparticles were obtained that could in the future replace quantum dots in many bioimaging applications.

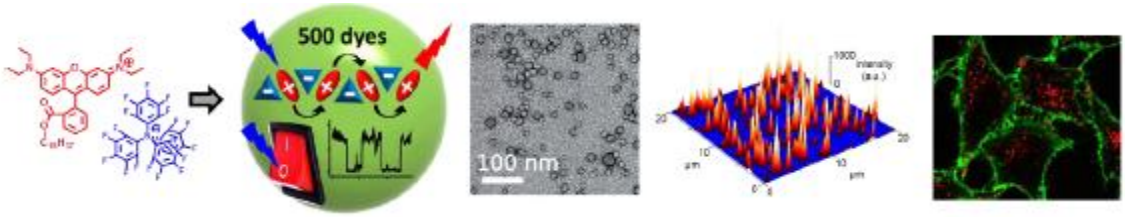

Figure: Dye-loaded polymer NPs using cationic dyes with hydrophobic counterions.

Acknowledgements: ERC consolidator grant BrightSens is acknowledged for financial support.

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ABSTRACTS

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NANOTEK – 2017

March 11th-13th, 2017, Hamburg, Germany

R. Pasqualini

University of New Mexico Comprehensive Cancer Center, Division of Internal Medicine, Department of Internal Medicine, University of New Mexico School of Medicine, Albuquerque, NM, USA

Ligand - Directed Targeting and Molecular Imaging Based on In Vivo Phage Display

Nanomedicines have significant potential for cancer treatment. Although the majority of nanomedicines currently tested in clinical trials utilize simple, biocompatible liposome-based nanocarriers, their widespread use is limited by non-specificity and low target site concentration and thus, do not provide a substantial clinical advantage over conventional, systemic chemotherapy.

In the past 20 years, we have screened combi-natorial peptide libraries displayed on bacterio-phage to identify receptors present on the sur-faces of tumor endothelial and perivascular cells, tumor cells, the extracellular matrix and stromal cells [1, 2, 3, 4]. These studies show that unique receptors such as IL-11Rα, GRP78, EphA5, among others, are differentially overex-pressed in tumors and present opportunities to deliver tumor-specific therapeutic drugs. By using peptides or antibodies that bind to accessible, tumor-specific cell-surface receptors, therapeutic agents such as apoptotic peptides, imaging dyes,siRNA or chemotherapeutics can be systemically delivered to non-invasively assess and/or reduce tumor growth in vivo, without harming healthy cells. Furthermore, different types of tumor-targeting moieties and/or therapeutic cargoscan be used in combination to create unique, theranostic agents.

We proposed a modular design of a targeted or functionalized protocell in which a tumor-targeting moiety, such as a peptide or recombi-nant human antibody single chain variable fragment (scFv), is conjugated to a lipid bilayer surrounding a silica-based nanoparticle (NP) core containing a protected therapeutic cargo [5]. Unfortunately, functionalizing NPs loaded with therapeutic cargos or imaging agents is not trivial. Chemistries to link NPs to targeting moie-ties can alter their binding properties by inducing conformational changes, restrict steric freedom or distort its orientation. Contrary to these limitations, phage-based hydrogel nanoplatforms form spontaneously in the presence of colloidal gold NPs (AuNPs) and are biocompatible, non-pathogenic, and preserve the cell-targeting and internalization attributes mediated by phage displaying tumor-targeting peptide ligand[6, 7]. Targeting phage hydrogels can incorporateand release loaded NPs such as liposomes or mesoporous

silica NPsat the tumor site. These hydrogel networks offer convenient multifunctional integration within a single entity with potential for nanotechnology-based biomedical applicationsincluding tumor targeting, enhanced fluorescence and dark-field microscopy, near-infrared (NIR) photon-to-heat conversion, and surface-enhanced Raman scattering (SERS) detection [8].

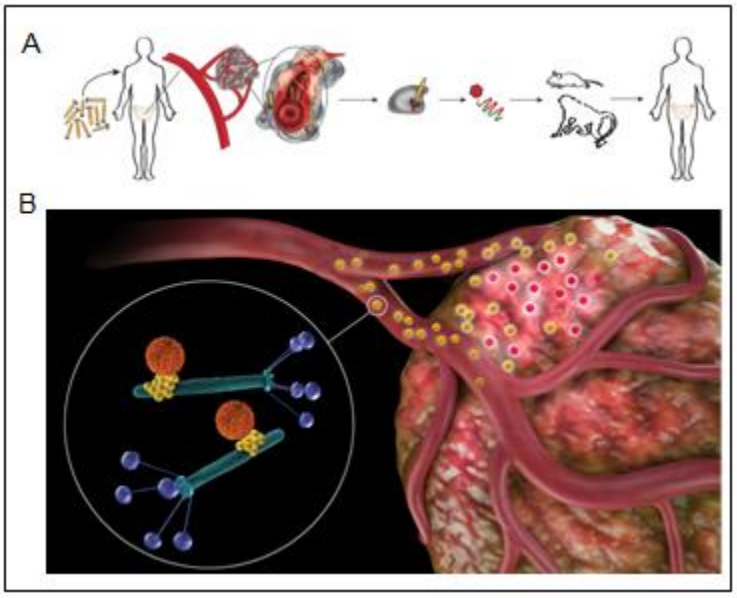

Figure 1: Development of targeted therapies. (A) Drug development pipeline starts with screeningcombinatorial peptide phage libraries by phage display to identify target receptors for developing drug candidates. (B) Hydrogels containing targeting phage andAuNPs (yellow spheres) systemically deliver therapeutic and/or imaging agents (encased in red spheres) di-rectly to tumors.

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NANOTEK – 2017

March 11th-13th, 2017, Hamburg, Germany

Peng - Sheng Wei

National Sun Yat-Sen University, Kaohsiung, Taiwan

Surface Deformation Subject to a High - Pulsed Laser Beam

This study numerically investigates transport processes during the melting of a surface subject to an electromagnetic wave or laser beam in a TM mode. The TM mode represents magnetic field to be perpendicular to the incident plane of electrical field. A systematical investigation of heating and melting of a surface is essentially required to understanding 3-D printing and different types of plasma processing and nanotechnology. The results show that electromagnetic wave propagating along the boundary between two media leads to a distributed heat input and magnetic force on the surface. Fluid flow and heat transfer associated with surface deformation result in complicated transport phenomena, especially for different frequencies and radii of incident electromagnetic wave.

Biography:-

Dr. Peng-Sheng Wei received Ph.D. in Mechanical Engineering Department at University of California, Davis, in 1984. He has been a professor in the Department of Mechanical and Electro-Mechanical Engineering of National Sun Yat-Sen University, Kaohsiung, Taiwan, since 1989. Dr. Wei has contributed to advancing the understanding of and to the applications of electron and laser beam, plasma, and resistance welding through theoretical analyses coupled with verification experiments. Investigations also include studies of their thermal and fluid flow processes, and formations of the defects such as humping, rippling, spiking and porosity. Dr. Wei has published more than 80 journal papers, given keynote or invited speeches in international conferences more than 70 times. He is a Fellow of AWS (2007), and a Fellow of ASME (2000). He also received the Outstanding Research Achievement Awards from both the National Science Council (2004), and NSYSU (1991, 2001, 2004), the Outstanding Scholar Research Project Winner Award from National Science Council (2008), the Adams Memorial Membership Award from AWS (2008), the Warren F. Savage Memorial Award from AWS (2012), and the William Irrgang Memorial Award from AWS (2014). He has been the Xi-Wan Chair Professor of NSYSU since 2009, and Invited Distinguished Professor in the Beijing University of Technology, China, during 2015-2017.

NANOTEK – 2017

March 11th-13th, 2017, Hamburg, Germany

Dr. Paulina L. Páez

Faculty of Chemical Sciences of the National University of Cordoba (UNC)

Oxidative stress generation by silver nanoparticles in bacteria and its relationship with the antimicrobial activity

Oxidative stress is a condition caused by the high intracellular concentrations of reactive oxygen species (ROS) that includes superoxide anion radicals, hydroxyl radicals and hydrogen peroxide. Nanoparticles could causerapid generation of free radicals by redox reactions. ROS can react directly with membrane lipids, proteins andDNA and are normally scavenged by antioxidants that are capable of neutralizing; however, elevated concentrationsof ROS in bacterial cells can result in oxidative stress. The aimof this workwas contribute to the knowledgeof action mechanism of silver nanoparticles (Ag-NPs) and their relation to the generation of oxidative stress inbacteria. We demonstrated that Ag-NPs generated oxidative stress in Staphylococcus aureus, Escherichia coliand Pseudomonas aeruginosa mediated by the increment of ROS and this increase correlatedwith a better antimicrobialactivity. On the other hand,we showed that the oxidative stress caused by the Ag-NPs biosynthesizedwasassociated to a variation in the level of reactive nitrogen intermediates (RNI). Oxidative stress in bacteria can resultfrom disruption of the electronic transport chain due to the high affinity of Ag-NPs for the cell membrane.This imbalance in the oxidative stress was evidentiated by a macromolecular oxidation at level of DNA, lipidsand proteins in E. coliexposed to Ag-NPs. The formation of ROS and RNI by Ag-NPs may also be considered to explainthe bacterial death.

Biography:-

Dr. Paulina L. Páez is a professor at Faculty of Chemical Sciences of the National University of Cordoba (UNC). She graduated from a degree in biochemistry Clinic in 2001 and a degree in Pharmaceutical Chemistry in 2003. She completed her doctorate in Chemistry in 2009 and her postdoc in antimicrobial photodynamic therapy in 2011. In 2012 he joined the scientific research career of CONICET. She currently runs her own research group and her research interests include the study of oxidative stress generated by compounds with antimicrobial activity and its relationship with the bacterial resistance. In this sense, the research group biosynthesized metallic nanoparticles with bactericidal effect that could generate alterations in oxidative metabolism of different bacterial species.

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March 11th-13th, 2017, Hamburg, Germany

Wei Chen

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Copper Cysteamine – A New Multifunctional Nanomateril for Cancer Treatment and Optical Sensing

Copper-cysteamine (Cu-Cy) is a new nanomaterial we have invented that has multifunctional properties and multifunctional applications. The two most striking characteristics of this new material is its strong red luminescence and its capability to produce singlet oxygen inducible with both regular light and X-rays. Cu-Cy not only have strong fluorescence but also strong scintillation under X-ray excitation, therefore, Cu-Cy nanoparticles not only can be used for solid state lighting, medical imaging, or cell labeling but also can be used for radiation detection and dosimetry. Interestingly, the fluorescence of Cu-Cy nanoparticles are very sensitive to ethylene, and this makes it a smart gas sensor for food safety. Most strikingly, Cu-Cy is a new photosensitizer that can be activated by light, X-ray and microwave to produce singlet-oxygen for cancer treatment. This functionality makes Cu-Cy nanoparticles very unique and superior over the conventional photosensitizers: (i) Cu-Cy nanoparticles can be activated directly by X-ray and microwave, thus eliminating the need for other sensitizing agents or nanoparticles; (ii) they emit luminescence, permitting their use as a diagnostic imaging agent; (iii) they can be fabricated at the nanoscale to increase water solubility and cellular uptake; (iv) they can also be tagged with functional groups for targeted delivery; (v) they have low toxicity; and (vi) they are easy and inexpensive to synthesize. Based on our observations, the X-ray induced singlet oxygen production from Cu-Cy particles is higher than any known photosensitizers. Therefore, Cu-Cy particles can be used for treating deeply seated cancer, surpassing the limits of traditional photodynamic therapy which is restricted to superficial tumors. Also, the combination of photodynamic therapy, radiation therapy and microwave ablation can largely reduce the radiation dose and related side-effects. In this presentation, the synthesis, structure, optical properties, observations for treating cancers in vitro and in vivo are described in details.

Biography:-

Wei Chen is a full professor in Nano-Bio Physics at the Physics Department of The University of Texas at Arlington (UTA) with a good record for research, teaching and publications. He received an Outstanding Young Scientist award and presidential award from the Chinese Academy of Sciences. Before joining UTA in 2006, he led the nanotechnology group at Nomadics, Inc. (now ICX Technologies Inc.) from 2000–2006. Since joining the

University of Texas at Arlington (UTA) in August 2006, he has received more than 10external grants. Hehas authored and coauthored more than 200 peer-reviewed journal publications, one edited book, 13 book chapters, seven awarded patents and six pending patents. His publications have been cited over7,000 times and my h-index of 43. Dr. Chen was promoted to an associate professor in 2011 and a full professor in 2013. Dr. Chen is currently the director for the SAVANT research center and the editor-in-chief for Reviews in Nanoscience and Nanotechnology.

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Batch Synthesis and Characterizations of Janus Noble Metal Nanoparticles by Toluene/Water Emulsion Reaction

The interface engineering has attracted much interest on the manipulation of nanoparticle's surface, to prepare nanoparticles with two distinct hydrophobic and hydrophilic hemispheres, or amphiphilic Janus nanoparticles. In this work, a facile emulsion reaction was employed with presence of triphenylphosphinein toluene and tetrakis(hydroxymethyl)phosphium chloride inalkaline water,

respectively, leading toa batch production ofJanus Auand Ag nanoparticlesby the reduction of HAuCl4 and AgNO3 atconversion rates of more than 95%. TEM images verified that the reactionproducts are consisted of noble metal nanocrystals, and the sizes can be adjusted by varying the pH value of aqueous solutions. The surface chemistry were characterized bycontact angle measurement, FT-IR, Raman, TG and XPS analyses, which indicate that the as-synthesized nanoparticles are modified with triphenylphosphineoxide and tri(hydroxymethyl)- phosphine oxide, and the NOESY analysis further suggested that the two ligands distribute separately on different hemispheresof the nanoparticles, or amphiphilic Janus nanoparticles. Moreover, the one-pot emulsion reaction results in self-assembled amphiphilic Janus nanoparticles, which kept stable in ambient atmosphere and was available to be dispersed in solvents as DMF or chloroform. The re-assembly of the as-dispersed Janus nanoparticleamphiphiles was investigated in a Langmuir trough monitored by X-ray Scattering analysis,wherespontaneousclustering was noticed as the nanoparticle coverage exceeds 10 % of the water surface before compression was applied, finally led topacking disorder to some extent in the Langmuir film, which again emphasizes the inherent amphiphilicity of the nanoparticles. The batch production of amphiphilic Janus noble metal nanoparticles allows the prospective applicationsonbiphasic catalysis, drug encapsulation, tumor imaging and thermal therapy at low cost.

The research was supported by the National Natural Science Foundation of China (Grant No. 21163004) and Guangxi Natural Science Foundation (Grant No. 2016GXNSFAA380017 and 2013GXNSFAA019029).

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March 11th-13th, 2017, Hamburg, Germany

David Bozsaky

Department of Architecture and Building Construction, SzechenyiIstvan University, H-9026 Györ, Hungary.

Heat Transfer Resistance Experiments of Thermal Insulation Coatings Consisted of Hollow Nano-Ceramic Microspheres

Since nanotechnology-based materials appeared on the market of building materials several options opened for architects and civil engineers using them for building insulation. Among nanotechnology-based thermal insulation materials thermodynamic performance of thermal insulation coatings consisted of hollow nano-ceramic microspheres generally generates intensive arguments in academic circles because of contradictory technical data that could be found in special literature. Complete agreement had not been already found about the mechanism of their insulating effect. In the Laboratory of Building Materials and Building Physics at SzechenyiIstvan University (Györ, Hungary) several heat transfer resistance experiments were performed to explore and describe the thermodynamic process inside this material. Several building structures with different order of layers were tested with a standard heat flow meter. Measurements showed significant difference between coated and uncoated samples. On basis of these results it could be concluded that in case of nano-structured materials convective heat transfer coefficient might be taken account in different way than in case of traditional macro-structured thermal insulation materials.

Biography:

Dr. David Bozsaky is an assistant professor at SzechenyiIstvan University(SZE) in Györ (Hungary) and the head of Department of Architecture and Building Construction. He received his MSc degree from SZE in architecture and graduated from SZE with Ph. D. majoring civil engineering in 2012. He started his research on thermal insulation materials in 2007 and since 2014 his research interest includes nanotechnology-basedthermal insulation materials, especially nano-ceramic coatings.

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March 11th-13th, 2017, Hamburg, Germany

Giuseppe Forte

pH Sensitive Functionalized Grapheneoxide for the Release of Drugs

A facile strategy of polyacrylate (PAA) grafting was used to develop a pH stimuli-responsive theranostic platform based on graphene oxide (GO) nanosheets of homogeneous size. Indeed, the GO lateral size was found to significantly affect its surface charge, optical properties as well as the cellular uptake. The actual surface termination of the GO/polymer hybrid, prepared at two different acrylate grafting ratios, was scrutinised by a multitechnique approach, including spectroscopic (UV-visible, fluorescence, Raman, ATR-FTIR, XPS), spectrometric (ToF-SIMS and –for the first time- ESI-MS) and microscopic (AFM, confocal microscopy) methods. AtomisticMolecular Dynamics (MD) simulations of both the physisorption process and the hydrationbehaviourof the aggregate consisting of gemcitabine (GEM) - (PAA) - (GO) are performed in explicitsolvent medium attwodifferentpHvalues. The differentionizationofpH sensitive groupscharacterizing the aggregate influences the energy of physisorption and the hydrationshellaround the complex. The decrease of negative chargedensity, occurringat acid pH, facilitates the physisorption processbetween PAA and GO. On the otherhand, at the samepHvalue, a weakerinteractionbetween GEM and PAA isobserved. MD simulations show a partial physisorption of the drug from the polymeratpH = 4.0. pHchangeaffectsalsomorphology of GO sheetwhichis more extendedatbasicpHvalue due to intrasheetelectrostaticinteractions. Radialdistributionfunction (RDF) indicatesthatcarboxylateoxygens of PAA and alkoxideoxygens of GO stronglyattractdipolar water molecules, thusaffecting the hydrationshellaround the complex in comparison with unionized GO and bulk water.Finally, an analysisbasedon H-bond correlationfunctionclearly shows that: a) hydrogen bond betweenbothcarboxylate and alkoxideoxygenatoms are longerlivedthanthoseobserved in unionized GO and bulk water; b) RDF decaysslower for PAA (f = 0.8) with respect to ionized GO, henceindicatingthat COO-groupsbind water moleculesstrongerthan R-O-.

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March 11th-13th, 2017, Hamburg, Germany

Prof Zeeshan Ahmad

Leicester School of Pharmacy De Montfort University, UK

Electrohydrodynamic Methods as Emerging Tools for Drug and Bio-Therapies

This talk focuses on a specific set of enabling technologies at the life and health science remit. Electrohydrodynamic(EHD) engineering platforms are rapidly emerging methods making use of electrical fields, simultaneous formulation flow and formulated design to engineer complex and tailored nanometre scaled systems. These are in particle, fibre, bubble or even printed formats. These structures have demonstrated great potential in several biological-biomaterial applications and there is scope to advance the science further in other healthcare fields. Specifically for this talk; aspects related to biosensors, diagnostics, imaging, nanoparticles and drug delivery will be discussed, giving the audience an indication of the underlying science, the current status and future direction of these methods. While the processes are very much at the maturing stages the talk will also discuss several initiatives in place between university and research companies indicting a real interest in the development of new technologies to address current global challenges. One such example is the EPSRC EHDA network and this will be discussed further.

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March 11th-13th, 2017, Hamburg, Germany

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Graphitic - Phase Carbon Nitrideforphoto - Catalytically Water - Splitting and Biological Application

Graphitic-phase Carbon Nitride (g-C3N4)has been widely used as visible light photocatalyst during the last several years. Recently, the strong size-dependentblue emission has attracted attention in the luminescencefields.

We prepared g-C3N4/NLTO (N-doped La2Ti2O7) 2D composite, which exhibited high photocatalytic activities for H2 production via water splitting and dye degradation under violet and visible light irradiation, due to the interfacial charge transfer between g-C3N4 and NLTO nanosheets. The g-C3N4 was treated with nitric acid to get the tripled luminescent intensity and 26 nm blue shift. The particles size of g-C3N4 was further reducedto about 5nm tomake it water-disperse well. The pH-sensitive emission of g-C3N4caused the generation of 1O2,inducing its potential to be utilized as a cancer-selective PDT agent.The g-C3N4quantum dots can produce singlet oxygen to induce tumor cells apoptosis under microwave irradiation.

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Synthesis, Characterization and Application of Nanographene and Metal Oxide Nanopowders in Nanocomposite Thermopiezo/Tribological Sensors

Graphene precursor and metal oxide (copper oxide, zinc oxide or iron oxide) nanopowders are co-milled creating Graphene precursor wrapped metal oxide hybrid. The resulting powder is used as an electrically active suspension in the electrolysis process, further changing the structure of the material and creating multilayer Graphene and metals chloride hydroxide. Then the material is subjected to secondary high power milling and oxidation creating nanographene metals chloride hydroxide, which is used as a filler in a thermoset resin based nanocomposite.

The final nanocomposite's impedance characteristics is evaluated from the perspective of a sensory application. It is shown that the nanocomposite's impedance is highly sensitive to temperature, pressure changes as well as wear. The material is then used in an innovative sensor which can simultaneously measure temperature and pressure. This is possible thanks to application of machine learning tools used to decompose the changing impedance spectrum of the material.

Keywords: semiconductive metal oxide nanographene nanocomposite, thermopiezoresistive sensor, friction pair sensor, machine learning based impedance decomposition

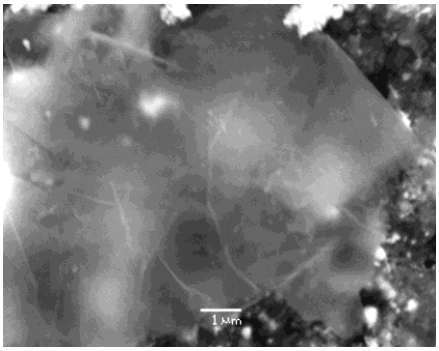

Fig. 1 multilayer graphene flake after first ball milling and electrolysis

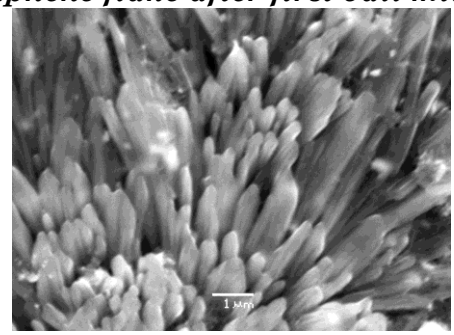

Fig. 2 Graphene/copper chloride hydroxide in a form of crystalline structures created during electrolysis

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March 11th-13th, 2017, Hamburg, Germany

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A Case Study of Licensing: A Company that Provides Top of the Art Technology for Implants with PLGA NPs for Drug Delivery in Cataracts, Knee, Hip Arthritis and Arteriosclerosis Disease

The objective of this study is to present the business plan of a Greek company that provides the technology of "know how" to companies, leaders in European market of medical implants. The technology of "know how" will provide the companies with the necessary procedure to produce and place polymeric PLGA nanoparticles with curcumin on medical implants, stents, knee, hip implants and IOLs. The objective of the nanoparticles will be to combat the inflammation with drug delivery.

The company will be a start-up established company in Thessaloniki. It will be consisted from four shareholders who will provide the initial capital investment required for the company to start. From the implementation of a 3 year business plan the company will determine the startup expenses, the monthly expenses and incomes, the selling price of licensing and the suitable purchasers.

Based on the business plan the company will be able to present a financial analysis, which will result a profit at the end of the second year of the company and a depreciation of the initial capital investment

Biography:
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Cardiac Implant Devices Market Analysis: By Devices (Pacemakers, ICDs, CRTs, Coronary Stents, Heart Valves, TAVI Valves); By Condition (Myocardial Ischemia, Arrhythmias, Acute Myocardial Infarction) – With Forecast (2015-2020) Coronary Stents-Global Trends, Estimates and Forecasts, 2012-2018 Overview, Size, Share, Analysis, Technology Developments, Development Status, Trends, Structure, Production Value and Forecast Research Report

Global Data: Hip and Knee Implants – Global Pipeline Analysis, Opportunity Assessment and Market Forecasts to 2016

NANOTEK – 2017

March 11th-13th, 2017, Hamburg, Germany

Ali Reza Mahjoub
Tarbiat Modares University

Reza Abazari
Tarbiat Modares University

Characterization and Evaluation of a Functionalized Metal Organic Framework for Targeted Anticancer Therapy

Metal organic frameworks (MOFs) comprises a group of artificially-made materials, which are potentially applicable in different applications such as biomedicine and drug development. In the present study, based on the folic acid functionalized metal organic frameworks, a delivery system for the anticancer drugs is developed and characterized. Using X–ray diffraction (XRD), energy dispersive analysis of X–ray (EDAX), field emission scanning electron microscope (FE–SEM), UV-Vis spectroscopy, Fourier transform infrared spectroscopy (FT-IR), thermo gravimetric analysis (TGA), and Brunauer–Emmet–Teller (BET), characterization of the structures and functionalization and modification of the surfaces have been performed. 5-fluorouracil (5-FU) has thus been regarded as the selected cancer-targeting drug, which has then been loaded into the functionalized metal organic framework. In this context, control of the release of the chosen drug in the simulated body fluid (SBF) can be achieved by pH adjustment. Results of the in vitro release are indicative of a typical sustained release behavior for the functionalized metal organic frameworks. Moreover, with respect to the cancer therapy, it is observed that the drug-loaded functionalized metal organic frameworks have a considerable potential for the targeted delivery of the anticancer drugs.

Biography:
Ali Reza Mahjoub received his MS in organic chemistry in 1988 and his PhD in inorganic chemistry in 1993 from university of Berlin, Germany. His research activity covers many aspects of the synthesis, characterization and chemical–physics of metal oxides and nano oxides with particular emphasis to catalytic and photo degradation properties.

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March 11th-13th, 2017, Hamburg, Germany

Masih Darbandi

Brown University, Providence, USA & Tabriz University,
Tabriz, Iran

Facet Orientated TiO2 Nanoparticles: Toward Superior Candidate for High Performance Photocatalysis and Energy Applications

Facet orientated TiO2 nanomaterials have received significant research attention because they usually exhibit fascinating surface dependent properties and may find promising range of potential applications for such materials, like photocatalysis, energy storage and conversion, electrochromic devices, and chemical sensing. In this work, we designed novel structures that possess high facet orientation that can be exploited for catalysis/energy applications. Nanocrystalline TiO2 structures of tunable morphology with high facet orientation have been synthesized by a surfactant-free, convenient, and low-cost solvothermal technique. The facet parameters of the nanostructures have been tuned by adjusting synthesis parameters. The crystalline phase of TiO2 nanoparticles and the facet orientation were confirmed by X-ray diffraction spectroscopy. The morphology of TiO2 nanostructures was observed by transmission electron microscopy. To prove the effect of facet orientation of final product on catalytic and energy application, the samples were investigated and compared favourably with commercially available P25 TiO2 materials. Our study proves that catalysis/ energy efficiency depend largely on the crystal facets that are exposed on the surface of the material. This new synthetic method may pave the way toward the preparation of other functional, transition metal oxide nanomaterials with tuned facet orientation. Most importantly, the simplicity of the method suggests that it is amenable to commercial scale-up.

Biography:

Masih Darbandi received his PhD in 2007 from Freiburg University, Germany, where he worked on semiconductor nanoparticles (QDs). Thereafter, he spent several years as a postdoctoral scientist in Bochum, Duisburg-Essen and Uppsala (Sweden) universities working on different topics from MOF to magnetic nanoparticles. In 2012 he moved to USA as senior scientist (staff) working at Vanderbilt and Brown Universities. His research area was ceramic nanoparticles, fabrication and the characterization of freestanding films of ceramic nanoparticles via electrophoretic deposition. Right now he held a position as visiting professor in Tabriz University, Iran.

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March 11th-13th, 2017, Hamburg, Germany

Yongxiang Zhao

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A Smart Detection System Based on Specific Magnetic and RCA Signal-amplified Dual-aptamers to Accurately Monitor MRD in Patients with T-ALL.

It is a major clinical challenge for clinicians how to early find out minimal residual diseases (MRD) of leukemia. Here, we developed a smart detection system for MRD involving magnetic aptamer sgc8 probe (M-sgc8 probe) to capture CEM cells and rolling cycle amplification probe（RCA-sgc8 probe）to initiate RCA, producing a single-stranded tandem repeated copy of the circular template. The DNA products were hybridized with molecular beacon to generate the amplified fluorescence signal. An in vitro model to mimic MRD was established to evaluate the sensitivity of the smart detection system. The smart detection system was used to detect MRD in patients with T-ALL peri-chemotherapy, which could not only specifically captured T-ALL cells, but also significantly amplified fluorescence signals on them. The sensitivity was 1/20,000. These results indicate that the smart detection system with high specificity and sensitivity could more efficiently monitor the progress of T-ALL peri-chemotherapy.

Keywords: magnetic aptamer sgc8 probe, rolling cycle amplification probe, minimal residual disease (MRD), T-cell acute lymphoblastic leukemia (T-ALL).

Biography:

Prof. Yongxiang Zhao is the innovative leading talent of National "Ten Thousand Talent Programme", the director of the National Center for International Research of Biological Targeting Diagnosis and Therapy, the moderator of the BIT's 5th World Gene Convention Keynote Forum---Nobel Laureate Forum, the national talented person of "New Centuary National Hundred, Thousand and Ten Thousand Talent Project". The reviewers and editorial board members of multiple SCI journals such as Nature. He has taken charge of 14 national science and technology major projects. Focus on biological targeting diagnosis and therapy for tumor, including: 1、The key targets and mechanism of malignant tumor's occurrence and progress. 2、Homologous antitumor vaccines. 3、Heterologous oncolytic biological drugs. 4、Tumor biotargeted diagnostic reagents. Based on these research results, 79 SCI papers have been published, such as Nature Biotechnology (IF=43.11). One International Academic Award, one ministerial and provincial first prize, thirty national patents and two authorized international PCT patents.

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Anti-Tumor Immune Response of Folate-Conjugated Chitosan Nanoparticles Containing the IP-10 Gene in Mice With Hepatocellular Carcinoma

Immunotherapy is one of the most promising new therapies for hepatocellular carcinoma (HCC). Herein, folate-conjugated chitosan nanoparticles (FA-CS-NPs) loaded with mouse interferon-γ-inducible protein-10 (IP-10) plasmid were used for the immunotherapy of HCC. H22 tumor-bearing mice were treated with FA-CS-NPs entrapped IP-10 plasmid and targeting efficiency was observed by optical imaging in vivo. The proportions of myeloid-derived suppressor cells (MDSCs) in the tumor and T-regulatory cells (Tregs) in the spleen were measured by flow cytometry. The number of interferon-γ producing cells was analyzed by the ELISPOT assay. IP-10 expression, tumor vessel density, cell proliferation and apoptosis were also evaluated by immunohistochemistry. Our data revealed that FA CS-NPs encapsulated with IP-10 plasmid significantly inhibited tumor growth and prolonged the survival time in H22 tumor-bearing mice. Treatment with FA-CS-NPs entrapped IP-10 plasmid suppressed angiogenesis and promoted IP-10 expression and induced apoptosis in the tumor. Furthermore, the proportions of Tregs cells decreased in the spleen, while the percentages of MDSCs in the tumor and the IFN-γ producing cells in the spleen increased in FA-CS-NPs entrapped IP-10 plasmid-treated mice compared with the control groups. These data suggested that the gene delivery system of folate-conjugated chitosan nanoparticles loaded with IP-10 plasmid holds promise for immunotherapy of HCC.

Biography:

Professor Xiaoling Lu was born in 1975, she received her PhD degree in Huazhong University of Science and Technology, China. She finished her postdoctoral work at Huazhong University of Science and Technology, China. She is the director of Guangxi Key Laboratory of Biological Targeting Diagnosis and Therapy Research, honored by Program for the National Key Talent and supported by Project for New Century Excellent Talents in University, and Candidate of the Second Level of Guangxi New Century "Tens-Hundreds-Thousands" Talent Project. She gained the Award for Youth in Science and Technology of Guangxi and the Award for Excellent College Young Teachers of the Huo Yingdong Educational Foundation. She has published 30 papers in SCI journal as first or corresponding author, and 23 patents.

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NANOTEK – 2017

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Multifunctional Nanosystems for Drug Delivery and Imaging

The author has reported the synthesis of multifunctional nanoplatform containing the drug Alisertib and lipophilic metallic nanostructures. In particular the author in this presentation will show:

Gold Nanorods:

Chlorotoxin is an active targeting 36-amino acid peptide that specifically binds to metalloproteinase-2 (MMP-2), a receptor overexpressed by brain cancer cells. Chlorotoxin-targeted polymeric nanoparticles containing entrapped gold nanorods as therapeutic agent for Glioblastoma Multiforme (GBM) will be shown. In first proof of concept experiments, in vitro specific uptake in cancer cells and selective laser-induced cell death will be reported. In vivo studies with optical imaging will demonstrate increased retention of targeted PNPs in the tumor.

Magnetic Nanoparticles:

Nanoplatforms containing iron oxide nanoparticles bearing in the outer shell and a monoclonal antibody selective for the human epithelial growth factor receptor will be also presented. The whole nanocarrier was also radiolabeled with 99mTc and tested as a theranostic nanomedicine. The biodistribution and therapeutic hyperthermic effects of the nanosystem were studied in tumor-bearing mice. A decrease in tumor size correlated with an increase in both nanoparticle concentration and local temperature was achieved, confirming the possibility of using this nanosystem as a therapeutic tool for epidermoid carcinoma.

Biography

1996: Ph.D in Chemical Science. 1997: CNR fellowship. 1998: Researcher, University of Bologna. 2014: Associate Professor. Dept. of industrial chemistry Toso Montanari, University of Bologna. Three months Department of Organic Chemistry of the University of Nijmegen. Six months period in the Dyson Perrins Laboratory, of the Oxford University. Associate Editor for the journal RSC Advances (Royal Society of Chemistry). Editorial board of International Journal of Nanomedicine. Research is in the field of organic chemistry, nanotechnologies and nanomedicine. Author of 99 articles. Two WTO patents and 5 contributions to book's chapter. Total Citations: 1500. H-Index= 23

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March 11th-13th, 2017, Hamburg, Germany

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Syntheses of Advanced Carbon-based Nanomaterials for Electrochemical Biosensors and Energy Storage Applications

The existing carbon materials can be classified into activated carbon (0-dimensional), carbon nanotubes (CNT) (1-dimensional), graphene (2-dimensional) and carbon foams (3-dimensional). Among these, graphene is well known to be the top candidate; However, preparation of graphene from graphite is an intricate procedure that can lead to an explosion during the oxidation of graphite. Similarly, the preparation of CNT also has some practical difficulties due to the complicated instrument setup. Fascinatingly, the preparation of ACs is simple, environmentally friendly and cost-effective. For the first time, Pongam seed shells-derived activated carbon and cobalt oxide (~2-6 nm) nanocomposite (PSAC/Co3O4) is prepared for the high performance non-enzymatic glucose sensor and supercapacitors. Remarkably, the fabricated glucose sensor is found to be exhibit an ultra-high sensitivity with a lower detection limit, and long-term durability. Moreover, the PSAC/Co3O4 electrode possess an appreciable specific capacitance and long-term cycle stability. The high surface area carbon porous materials (CPMs) synthesized by the direct template method via self-assemblyof polymerized phloroglucinol-formaldehyde resol around a triblock copolymer template were used as supports for nickel nanoparticles (NiNPs). Further electrochemical measurements by cyclic voltammetry (CV) and differential pulse voltammetry (DPV) also revealed that the Ni/CPM modified electrodes showed excellent sensitivity (59.6 μAμM□ 1 cm□ 2) andrelatively low detection limit (2.1 nM) toward the detectionof Hg(II) ion. The system is also been successfully applied for detection of mercuric ion in real sea fish samples. Furthermore, a facile method has been developed for fabricating selective and sensitive electrochemical sensor for the detection of toxic metal ions, which invokes incorporation of palladium nanoparticles(ca. 3□ 4 nm) on fruit peels-derived porous activated carbons (PACs). The Pd/PAC-modified GCEs were exploited as electrochemical sensors for the detection of toxic heavy metal ions, viz. Cd2+, Pb2+, Cu2+, and Hg2+, which showed superior performances for both individual as well as simultaneous detections. For simultaneous detection of Cd2+, Pb2+, Cu2+, and Hg2+, a linear response in ion concentration range of 0.5□ 5.5, 0.5□ 8.9, 0.5□ 5.0,and 0.24□ 7.5 μM, with sensitivity of 66.7, 53.8, 41.1, and 50.3 μA μM–1 cm–2, and detection limit of 41, 50, 66 and 54 nM, respectively,were observed. Moreover, the Pd/PAC-modified GCEs is also show perspective applications in detection of

metal ions in real sample, as illustrated in this study for a milk sample. In addition, the synthesis of highly dispersed and stable ruthenium nanoparticles (RuNPs; ca. 2–3 nm) on porous activated carbons derived from MoringaOleiferafruit shells (MOC) is reported. The as-prepared MOC carbonized at 900 oC was found to possess a high specific surface area (2522 m2 g−1) and co-existing micro- and mesoporosities. Upon incorporating RuNPs, the Ru/MOC nanocompositesloaded with modest amount of metallic Ru (1.0–1.5 wt%) exhibit remarkable electrochemical and capacitive properties, achiving a maximum capacitance of 291 Fg–1 at a current density of 1 A g–1 in 1.0 M H2SO4 electrolyte. These highly stable and durable biomass carbons modified electrodes, which can be facily fabricated by the eco-friendly and cost-effective route, should have great potentials for practical applications in energy storage, biosensing, and catalysis.

Keywords:– activated carbon, biowaste, environmental friendly, Pongam seed shells, high surface area, fruit peels, electrochemical sensor, biosensor, MoringaOleiferafruit shells,supercapacitor.

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Carbon-Based Nanostructures for Energy Conversion and Storage: Synthesis, Performance and Mechanism

Fuel cells, supercapacitors and lithium-sulphur batteries are the typical energy conversion and storage devices of great significance in which carbon-based nanostructures play irreplaceable role. The functionalized carbon-based nanostructures could be applied to fuel cells to lower Pt loading by highly dispersing and immobilizing Pt-based nanoparticles, or to totally get rid of Pt with the metal-free electrocatalytic ability themselves. The abundant nanostructures and morphologies, tunable compositions, high surface area, good conductivity, small volume expansion, as well as the low cost and environmental benignity make the carbon-based nanostructures have great potential as electrode materials of supercapacitors and lithium-sulphur batteries. In this talk I will give a brief introduction to the progressive advancements in our group about the synthesis, performance and mechanism of carbon-based nanostructures, especially the nanocages, for this kind of energy conversion and storage [1-10]. Special attention will be paid to the carbon-based nanomaterials doped with electron-rich N [2], electron-deficient B [3], and the both [4], as well as to the dopant-free carbon nanomaterials [5], to elucidate the correlation of performance with electronic configuration, which is a general interesting issue in developing the advanced carbon-based energy materials.

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Nanotubes Applications in Clean Energy Sources

One of the great technological challenges in 21st century is the development of renewable energy technologies due to serious problems related with the production and use of energy. A new promising area of research grows rapidly which is called Nanotechnologies are considered nowadays one of the most recommended choices to solve this problem. This review aims to introduce several significant application of nanotechnology in renewable energy systems. Paper reviewed including theoretical and experimental works related with nanotechnology applications in solar, hydrogen, wind biomass, geothermal works related with nanotechnology applications in solar, hydrogen, wind biomass, geothermal and tidal energies. A lot of literature are reviewed and summarized carefully in a useful tables to give a panoramic overview about the role of nanotechnology in improving the various sources of renewable energies. We think that this paper can be considered as an important bridge between nanotechnology and all available kinds of renewable energies. From the other side, Further researches are required to study the effect of nanotechnology to enhance the renewable energy industry especially in geothermal, wind and tidal energies, since the available papers in these fields are limited.

Biography

Ahmed Kadhim Hussein has completed his Ph.D from University of Al-Mustansiriya. He has published more than 70 papers in reputed journals and serving as an editorial board member and a reviewer of many international journals.

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Nature - Inspired Innovative Processes To Generate Smartmaterials for Nanomedicine

Nature is a great source of inspiration for the synthesis of new materials with unpreceded features. Indeed, natural"fabrication" processes are based on complex supramolecular phenomenagenerating nanocomposites exhibiting high adaptable functionalities. Bone tissue is a typical example of hybrid composite whose formation is governed by self-assembling and organization of collagen molecules in a complex 3-D structure, acting as a template for mineralization with nanocrystallineapatitic phase. This process was reproduced in laboratory, activating thesame physicochemical and ultrastructural constraints directing heterogeneous nucleation at specific sites and controlled crystal growth and orientation. Such process has been tailored to yield fibrous constructs with graded mineralization, thus functioning as scaffolds for regeneration of multifunctional tissues such as osteochondral and periodontalregions.The biomimetic composition and structure of such hybrid devices are the source of their outstanding regenerative ability, however they are characterized by limited mechanical performance that prevent their application in load-bearing sites.

In order to respond to such a critical clinical need, nature is again a golden source of inspiration: biomorphictransformation processes have been developed to translate theoutstanding performance of natural woods into new hierarchically organized bone scaffolds made of biomimetic hydroxyapatite. Such approach can be considered as a revolution in the development of smart scaffolds for theregeneration of long segments of load-bearing bones, since it allows the activation of the regenerative cascade and, simultaneously, ensuring the biomechanical performanceenablingthe complete regeneration and vascularization processes.

A further need in medicine isto improve the healing process by boosting the regenerative potential in aged or impaired patients. In this view a new superparamagnetic, bioactive and bioresorbable apatite nanophase (FeHA), developed through controlled substitution of Calciumwith Iron ions, proposes as an unique multifunctional platform enabling smart applications in nanomedicine, such as controlled drug delivery, cell and gene therapy and enhanced tissue engineering.

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Nanoalginate for Water Purification

Spherical, non-aggregatoryalginate nanoparticles were prepared by a green method. Nanoparticles synthesized were characterized by transmission electron microscopy (TEM), atomic force microscopy (AFM) scanning electron microscopy (SEM) and dynamic light scattering measurements (DLS). The potential of the synthesisednanoalginate for heavy metal removal was studied by batch adsorption technique. Heavy metals, lead and cadmium were selected for the biosorption study. The influence of various parameters on biosorption such as pH, initial concentration, contact time, biosorbent amount and temperature was also studied. More than 90% metal ions could be removed using nanoalginate. Efficiency of the synthesised alginate nanoparticles for dye removal was further investigated by the same technique. The study was carried out using cationic textile dyes, malachite green and methylene blue. Influence of selected parameters such as pH, initial concentration, contact time, biosorbent amount and temperature on biosorption was investigated. Residual concentration of dye molecules were determined by UV-Visible spectrophotometry at a wavelength of 617nm for malachite green and 663 nm for methylene blue. The maximum percentage removal was 96.81% and 99.02 % for malachite green and methylene blue respectively. The evaluation of various thermodynamic parameters confirmed the endothermic nature, spontaneity and irreversible nature of the biosorption process. The desorption studies using 0.2 M HCl showed the reusability of the nanosorbent. Since alginate is known for its antimicrobial activity, the possibility of using it for the removal of microbes from contaminated water was evaluated by taking both gram negative (E.coli) and gram positive bacteria (S.aureus) as indicator organisms. Effect of alginate nanoparticles on cell wall integrity was studied by death rate assay. More than 80% of E.coli cells were killed after an incubation time of 120 minutes whereas only 65 % of S.aureus cells were damaged showing the more sensitive nature of gram negative E.coli for alginate nanoparticles. SDS method showed the rapid reduction of cell wall integrity of gram negative E. coli strain after 30 minutes of incubation while only less than 40% and 70 % loss for S.aureus after 60 and 90 minutes respectively. The result showed that the S.aureus cell wall is more resistant towards nanoalginate. The SEM images of treated sample showed severe damage to the cell wall of E.coli while the effect was not so prominent in the case of gram positive S.aureus. This study demonstrates the potential of using calcium alginate nanoparticles for the effective removal of toxic heavy metals, dyes and microorganisms from contaminated water. Since alginate is a cheap and easily available material, it could be developed as a promising material for the detoxification of waste water.

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Enhanced Performance of Nanoparticles Embedded Phase Change Material for Thermal Energy Storage

Of late, evolution of nanotechnology has paved the path for improving a new method, called as nanofluids consisting of solid nanoparticles (NP) and liquid base material (as composite) for enhancing the thermal conductivity. As far as thermal conductivity enhancement is concerned metal NP, metal oxide nanoparticles, graphene, and carbon nanotubes (CNTs) are preferred. The present work aims to study the preparation and thermal energy storage behavior of CuO based composite PCM for low temperature heating applications. Composite PCM comprises palmitic acid as base material and CuO nanoparticles (NPs) as supporting materials. Different mass fractions of NPs have been dispersed in the base material so as to determine the maximum thermal conductivity enhancement. SDBS has been selected as the surfactant for ensuring the uniform dispersion of NPs in base material. With the help of DSC measurements, the newly prepared composite PCMs have been tested to determine their phase change temperatures as well as latent heats during melting and solidification. Thermal conductivities of the composite PCMs with all mass fractions of NPs have been measured. Likewise, viscosities of the composite PCMs with all mass fractions have been evaluated. Based on the test results, the newly prepared composite PCM could be considered to be a potential candidate for thermal energy storage.

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Changes in Intestinal Tight Junction Permeability Associated with Industrial Food Additives Explain the Rising Incidence of Autoimmune Disease

The incidence of autoimmune diseases is increasing alongwith the expansion of industrial food processing and food additive consumption. The intestinal epithelial barrier, with its intercellular tight junction, controls the equilibrium between tolerance and immunity to non-self-antigens. As a result, particular attention is being placed on the role of tight junction dysfunction in the pathogenesis of AD. Tight junction leakage is enhanced by many luminal components, commonly used industrial food additives being some of them. Glucose, salt, emulsifiers, organic solvents, gluten,microbial transglutaminase, and nanoparticles are extensively and increasingly used by the food industry, claimthe manufacturers, to improve the qualities of food. However, all of the aforementioned additives increase intestinal permeability by breaching the integrity of tight junction paracellular transfer. In fact, tight junction dysfunction is common in multiple autoimmune diseases and the central part played by the tight junction in autoimmune diseases pathogenesis is extensively described. It is hypothesized that commonly used industrial food additives abrogate human epithelial barrier function, thus, increasing intestinal permeability through the opened tight junction, resulting in entry of foreign immunogenic antigens and activation of the autoimmune cascade. Future research on food additives exposure-intestinal permeability–autoimmunity interplay will enhance our knowledge of the common mechanisms associated with autoimmune progression.

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The World Incidence and Prevalence of Autoimmune Diseases is Increasing

Epidemiological data provide evidence of a steady rise in autoimmune disease throughout Westernized societies over the last decades. Multiple publications exist, describing past or actual incidences/prevalence of individual autoimmune diseases, however, long term studies on selected populations are scarce. Aims: to calculate the % increases per year of autoimmune diseases frequencies worldwide, analyze the differential increases per country and disease, and identify geoepidemiological trends. Methods: A systematic review was performed to identify incidence and prevalence of autoimmune diseases. 30 Studies from the last 30 years were identified using Medline, Google, and Cochrane Library databases. Only long-term regional or national follow-ups are reported. Results: The means ± s.d. of the net % increased /year incidence and prevalence of autoimmune diseases worldwide were 19.1±43.1 and 12.5±7.9, respectively. Rheumatic, endocrinological, gastrointestinal and neurological autoimmune diseases revealed the following annual % increases per year: 7.1, 6.3, 6.2, and 3.7, respectively. In all of these, differences between old vs new frequencies were highly significant ($p < 0.0001$). Comparing various autoimmune diseases, celiac disease increased the most and the highest increase in incidence, comparing old to new surveys is allocated to myasthenia gravis. Despite considerable variations between the countries, celiac, type 1 diabetes and myasthenia gravis frequencies increased the most in Canada, Israel and Denmark, respectively. Frequencies of the autoimmune diseases increased significantly in the West and North when compared to East and South, respectively. Conclusions: Despite multiple reports on autoimmune diseases frequencies, long-term longitudinal follow-ups are scarce. Incidences and prevalences have increased significantly over the last 30 years. Rheumatic, endocrinological and gastrointestinal autoimmune diseases in Israel, Netherlands, USA and Sweden increased the most. These observations point to a stronger influence of environmental factors as opposed to genetic factors on autoimmune disease development.

Keywords: autoimmune disease, incidence, prevalence, surge, geoepidemiology.

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Dysbiosis May Trigger Auto immune Diseases via Inappropriate Post-Translational Modification of Host Proteins

The gut ecosystem with my riads of microorganisms and the high concentration of immune system cells can be considered as a separate organ on it sown. The balanced interaction between the host and microbial cells has been shaped during the long co-evolutionary process. In dysbiotic conditions, however, this balance is compromised and results in abnormal interaction between the host and microbiota. It is hypothesize here that the changed spectrum of microbial enzymes involved in post-translational modification of proteins (PTMP) may contribute to the aberrant modification of host proteins thus generating autoimmune responses by the host, resulting in autoimmune diseases.

Keywords: microbiome, dysbiosis, intestine, post-translational modification, autoimmune disease

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GUT-the Trojan Horse in Remote Organs' Autoimmunity

Human beings assemble and maintain a diverse but host-specific gut microbial community along the longitudinal axis of the intestines. Helped by a functional tight junction, the default response to commensal microbes is tolerance, whereas the default response to pathogens is an intricately orchestrated immune response, resulting in pathogen clearance. Nutrients and industrial food additives were suggested to impact the intestinal ecosystem and to breach tight junction integrity. Taken together, certain nutritional components, increased intestinal permeability, disease specific dysbiotic pathobionts and their capacity of post translation modification of proteins, are luminal events that impact autoimmunogenesis. The present review expands on the multi gut originated axes and their relationship to remote organ autoimmune diseases. Brain, joint, bone, endocrine, liver, kidney, heart, lung and skin autoimmune diseases are connected to the intestinal luminal compartmental deregulated events to form the gut-systemic organs axes.

Keywords: Gut; Intestine; Autoimmune disease; Microbiome; Nutrient; Intestinal permeability; Post translational modification of protein; Gut-axis

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Multiple Food Additives Enhance Human Chronic Diseases

In the current issue of SOJ Microbiology & Infectious Diseases a frequently used emulsifying food additive: Polysorbate-80 (P- 80) was shown to impact mouse microbiota, promote intestinal inflammation, obesity and liver dysfunction [1]. Epidemiological data provide strong evidence of a steady rise in autoimmune and allergic diseases throughout westernized societies over the last decades [2]. This trend parallels the recent pandemic of the metabolic syndrome and other lifestyle related human disorders [3,4]. The present editorial will expand on additional food additives, used heavily in the processed food industries, which join P-80 as environmental inducers of chronic diseases.

Keywords: Food additive; Chronic disease; P-80, Intestinal permeability; Microbiota; Mucus; Intestine

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Possible Association Between Celiac Disease and Bacterial Transglutaminase in Food Processing: A Hypothesis

The incidence of celiac disease is increasing worldwide, and human tissue transglutaminase has long been considered the autoantigen of celiac disease. Concomitantly, the food industry has introduced ingredients such as microbial transglutaminase, which acts as a food glue, thereby revolutionizing food qualities. Several observations have led to the hypothesis that microbial transglutaminase is a new environmental enhancer of celiac disease. First, microbial transglutaminase deamidates/transamidates glutens such as the endogenous human tissue transglutaminase. It is capable of crosslinking proteins and other macromolecules, thereby changing their antigenicity and resulting in an increased antigenic load presented to the immune system. Second, it increases the stability of protein against proteinases, thus diminishing foreign protein elimination. Infections and the crosslinked nutritional constituent gluten and microbial transglutaminase increase the permeability of the intestine, where microbial transglutaminases are necessary for bacterial survival. The resulting intestinal leakage allows more immunogenic foreign molecules to induce celiac disease. The increased use of microbial transglutaminase in food processing may promote celiac pathogenesis ex vivo, where deamidation/ transamidation starts, possibly explaining the surge in incidence of celiac disease. If future research substantiates this hypothesis, the findings will affect food product labeling, food additive policies of the food industry, and consumer health education.

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March 11th-13th, 2017, Hamburg, Germany

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Facile Bioinspired SERS Substrates for Real Life Applications

For the first time, fabrication of bioinspired,eco-friendly, low cost and reproducible surface enhanced Raman scattering (SERS) substrates based on plant leaf substrates has been done.The naturally occurring roughness (microstructures) on the surface of the plant leaves were replicated using the soft lithography technique. The replica of the leaf surfaces mimicked the surface roughness of the real leaves which influenced the deposition of Au NPs and leading to the formation of electromagnetic hot spots. The surface morphologies of different biomimetic surfaces tend to influence the SERS performance of the substrates which was demonstrated using MB as analyte molecule. Upon comparison of the enhancement factors obtained from the different substrates, one can correlate the effect of surface morphology of the leaf surface with SERS performance which is directly due to the different arrangement of the microstructures within the surfaces. Furthermore the fabricated biomimetic SERS substrate was found to be equally efficient in the real life application which was demonstrated by the sensing/detection of the common pesticides carbendazim and thiabendazoleupto 10 nanomolar concentrations.

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March 11th-13th, 2017, Hamburg, Germany

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Flow Boiling Characteristics using Various Nanofluids

Nanofluids have been gaining noteworthy consideration in the thermal research community in recent times. Nanofluids are engineered colloidal suspensions of ultrafine nanoparticles in base fluids such as water. There have been claims about both merits and demerits of using nanofluids to enhance heat transfer performance but researchers have still not reached a general consensus. Present investigation examines flow boiling characteristics using deionized (DI) water, Al2O3 water nanofluid and TiO2 water based nanofluid of 0.001% and 0.01% volume concentrations at mass flow rates of 7g/s and 9g/s. Tests have been performed on stainless steel pin of the exact dimensions as a real size nuclear pin. Till date, there is no reported study on flow boiling at such low mass flux values and Indian nuclear reactor specific geometry. This thesis reports comparison of DI water with different nanofluids through flow boiling curves, HTC curves and a visual study of different flow boiling regimes to aid in better comprehension of the boiling mechanism. The results evidently show an extended nucleate boiling regime and delay in the dry out phenomenon when using Al2O3 and TiO2 nanofluids compared to DI water. This work also points out higher enhancement in heat transfer attributes for relatively lower volume concentration of nanofluids (0.001%) compared to higher vol. concentration of nanofluids (0.01%). Results also show a higher bubble density and relatively smaller sized bubbles for nanofluids compared to DI water in the same heat flux range.

Keywords: nanofluids, flow boiling, nucleate boiling regime.

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March 11th-13th, 2017, Hamburg, Germany

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Hierarchical Assembly of Gold Nanoparticles with Amyloidogenic Protein of α-Synuclein

Fabrication of nanoparticles (NPs) into multi-dimensional structures is crucial for not only maximizing the physical and chemical properties of individual NPs, but also their applications in the development of high-performance nano-devices. Here, NPs have been assembled with an amyloidogenic protein of α-synuclein (αS), the major pathological component of Lewy bodies found in the degenerating neurons of Parkinson's disease. By taking advantage of the unit-assembly process of αS, gold-nanoparticles (AuNPs) coated with αS were assembled into either anisotropic 1-D chain or tightly packed single-layered 2-D array on a chemically diverse set of substrates. The resulting peapod-type AuNP chains embedded within the amyloid proteinnanofibrils were shown to be capable of exhibiting photoconductance with visible-light, essential for the development of subwavelength-size light guiding system. The αS-mediated single-layered AuNP adsorption was also employed in surface-enhanced Raman scattering (SERS)-based biosensor development, non-volatile memory development, fuel-cell performance improvement, plasmonic solar-cell enhancement, and photodynamic cell-culture platform fabrication, where the outlying αS has played versatile roles such as specific ligand interaction, dielectric layer for charge retention, sacrificial layer to expose AuNPs for chemical catalysis, reaction center for bio-silicification, and bio-interface for cell attachment, respectively. In addition, the tightly packed 2-D AuNP array was successfully unleashed from a substrate of polycarbonate in the form of free-floating monolayer film showing unlimited expandability, robustness for patterning, and flexibility leading to conformal contact. Not only these approaches, therefore, offer a facile and general way to fabricate NPs into hierarchical structures, but also the unique properties provided by the protein sheath make the resulting hybrid structures multi-functional photoelectric fusion materials suitable for applications in future nano-bio-technology.

Biography:

Dr.Seung R. Paik is a professor at Seoul National University (SNU) with appointment in School of Chemical and Biological Engineering. He received his BS from SNU with chemistry major. He was then graduated from University of Wyoming with Ph.D majoring biochemistry. After doing research at University of California, San Diego as Postdoc., he had started his own lab. atInha University before he joined SNU in 2004. His research interests include protein assembly in biological system, amyloidogenesis, and neurodegenerative disorders. With main specialty in protein chemistry, he has also been involved in fabricating protein-based multi-functional nano-hybrid materials and investigating their applications.

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Chemical Ensuring Subnanostructures Formation in Densely Crosslinked Organic-Inorganic Hybrid Polymer Networks

Cyanate Ester Resins are known to form polymer networks through reaction of polycyclotrimerization of cyanate groups. Cyanate groups are highly reactive towards active hydrogen containing organic groups as well. The high crosslink density organic-inorganic hybrid polymer networks have been synthesized from the mixture of tetraethoxysilane (TEOS), 3-aminopropyltrimethoxysilane (APTMS) and 1,1-Bis(4-cyanophenyl)ethane (DBCE). First, acid hydrolysis of the silanes followed by polycondensation reaction of the hydrolysis products was fulfilled in situ, and then reaction of DBCE cyanate groups with amino and hydroxyl groups of silica units formed was carried out under mild conditions. As a result, some DCBE molecules appeared to be chemically grafted to the silica network units. Then, polycyclotrimerization of DCBE free and grafted (by one side) molecules was performed at high temperatures. The composites with silica contents from 0.01 to 10 wt. % were prepared. The state of silica in the composites has been characterized by means of FTIR, high-angle annular dark-field STEM combined with EDXS. For the composites with ultralow silica contents (<< 1 wt. %), the structures without nano- or microclusters but with silica units distributed quasi-regularly within the amorphous polymer matrix have been formed. The data obtained imply the existence only in this case of subnanometer-sized silica nodes connected covalently with the matrix, i.e., the formation of the hybrid *subnanocomposites*. The Far-IR spectroscopy, DMA and DSC data showed that these subnanocomposites manifest the largest "constrained dynamics" effect and superiority in thermal and mechanical properties compared to those of the nanocomposites with higher silica contents containing nanoclusters and their aggregates.

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New Trends in Nanotechnology-Based Targeted Drug Delivery Systems

In recent years, theranostics are emerging as the next generation of multifunctional nanomedicine to improve the therapeutic outcome of cancer therapy. Polymeric nanoparticles with targeting moieties containing magnetic nanoparticles as theranostic agents have considerable potential for the treatment of cancer.

The use of directed enzyme prodrug therapy (DEPT) has been investigated as a means to improve the tumor selectivity of therapeutics. Magnetic DEPT involves coupling the bioactive prodrug-activating enzyme to magnetic nanoparticles that are then selectively delivered to the tumor by applying an external magnetic field.

Gene therapy is an attractive method for meeting the needs for curing brain disorders, such as Alzheimer's disease and Parkinson's disease. On the other hand, due to the fact that hepatocellular carcinoma (HCC) is resistant to standard chemotherapeutic agents, gene therapy appears to be a more effective cure for HCC patients.

Ultrasound-mediated drug delivery is a novel technique for enhancing the penetration of drugs into diseased tissue beds noninvasively. This technique is broadly appealing, given the potential of ultrasound to control drug delivery spatially and temporally in a noninvasive manner.

Biography

Holder of the First Class Golden Medal for Sciences and Arts and the recipient of the 2010 Appreciation State Prize in the realm of Advanced Technological Sciences. Professor Ammar is currently the Chairman, Pharmaceutical Technology Department, Faculty of Pharmaceutical Sciences and Pharmaceutical Industries, Future University in Egypt; formerly, Dean of the Pharmacy Division, National Research Centre, Cairo, Egypt. He has 114 research papers published in international scientific journals. These research papers cover most of the areas related to pharmaceutics, biopharmaceutics and pharmacokinetics. Design of new drug delivery systems is not beyond the scope of his interest.

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March 11th-13th, 2017, Hamburg, Germany

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Quantum Entangled Computational Studies of Origin of Prebiotic Life and Early Evolution and Quantum Entangled Spintronics Processes in Synapses of Neurons: towards a quantum spintronics processes in brain and nano medicine

During quantum entangled computational studies we have discovered that: Livings are self-assembled and self-replicating wet and warm stochastically moving supramolecular systems where quantum entanglement can be continuously generated and destroyed by non-equilibrium effects in an environment where no static entanglement exists; quantum entanglement involve the biomolecules inside one living or between other neighboring livings [1-7].

Our detailed quantum entangled computational studies that minimal prebiotic cells are self-assembling and self-replicating only in the case if we use preciously the fundamental physical constants in our quantum mechanical software programs [6]. Our first quantum spintronics entangled computational studies in synapses are promising and allow to state that most probably quantum spintronics entanglement exist in neural networks and in the entire brain structures. Basing of our quantum entanglement investigations in synapses, we will do the extension and extrapolation of possible quantum spintronics entanglement and neuron signal in the natural or synthetic molecular neural networks trying to connect our research with the theory, called "orchestrated objective reduction" ('Orch OR'), which was first put forward in the mid-1990s by mathematical physicist Roger Penrose, and anesthesiologist Stuart Hameroff [8-12]. They suggested that quantum vibrational computations in microtubules were "orchestrated" ("Orch") by synaptic inputs and memory stored in microtubules, and terminated by Penrose "objective reduction" ('OR'), hence "Orch OR." Microtubules are major components of the cell structural skeleton.

The next research task of A. Tamulis research group in these projects might be investigations of quantum spintronics entanglement between two brain neurons microtubules vibrations inside two brain neurons. The recent discovery by A. Bandyopadhyay research group of quantum vibrations in microtubules inside brain neurons [13, 14] corroborates the theory, according to review authors S. Hameroff and R. Penrose [12]. They suggest that EEG rhythms (brain waves) also derive from deeper level microtubule vibrations, and that from a practical standpoint, treating brain microtubule

vibrations could benefit a host of mental, neurological, and cognitive conditions. Quantum effects of natural neurons was already experimentally investigated in the natural neuron [13] by A. Bandyopadhyay research group. These authors demonstrated that a single natural brain-neuron-extracted microtubule is a memory-switching element, whose hysteresis loss is nearly zero. This study shows how a memory-state forms in the nanowire and how its protein arrangement symmetry is related to the conducting-state written in the device, thus, enabling it to store and process approximately 500 distinct bits, with 2 pA resolution between 1 nA and 1 pA.

Its random access memory is an analogue of flash memory switch used in a computer chip. Microtubule's vibrational peaks condense to a single mode that controls the emergence of size independent electronic/optical properties, and automated noise alleviation, which disappear when the atomic water core is released from the inner cylinder. A. Bandyopadhyay research group have carried out several tricky state-of-the-art experiments and identified the electromagnetic resonance peaks of single microtubule reliably. The resonant vibrations established that the condensation of energy levels and periodic oscillation of unique energy fringes on the microtubule surface, emerge as the atomic water core resonantly integrates all proteins around it such that the nanotube irrespective of its size functions like a single protein molecule. Thus, a monomolecular water channel residing inside the protein-cylinder displays an unprecedented control in governing the tantalizing electronic and optical properties of microtubule [14].

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NANOTEK – 2017

March 11th-13th, 2017, Hamburg, Germany

Arvydas Tamulis
Doctor of Natural Science, Independent expert of European Commission

Quantum Characteristics of Self-Assembled Neurotransmitter Acetylcholine Molecular Arrays Might Predict Quantum Effects in Neural Networks

The Los Alamos National Laboratory (LANL) research project has beensupported by the USA Department of Energy under Contract No. W-7405-ENG-36 andused neutral radical molecules for quantum information processing1-14.

The quantum mechanical self-assembly of four neurotransmitter acetylcholine (ACh) molecules arrays,i.e. supramolecular systems with different open electronic shells were investigated by means of density functional theory methods. These systems are surrounded by water molecules. The electron correlation interactions responsible for the weak hydrogen and Van der Waals chemical bonds increased due to the addition of polar water solvent molecules. The distances between the separated ACh and water molecules are comparable to Van der Waals and Calpha hydrogen bonding radii. As a result, the overall system becomes compressed, resulting in proton spin density tunneling from one C atom to far away located another C atom.

The main quantum mechanical research result of this paper is that the neurotransmitter ACh systems which were proposed include the use of quantum molecular spintronics logic gates to control the neurotransmission in neural networks.A two variable, quantum entangled AND logic gate was proposed. In the future, this process might be applied for the control of neural network cells or to yield building blocks in artificial quantum computing neural networks.

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Doctor of Natural Science, Independent expert of European Commission

Quantum Entanglement Communications in Photoactive Synthetic Bio-Systems and in Neuron Synapses and Neural Networks

Together with my collaborators I have been investigating the self-assembly of molecules that result in supramolecular bioorganic and minimal cellular systems, as well as the biochemistry of these assemblies. The self-assembly and biochemistry depend on quantum mechanics laws which induce hydrogen and Van der Waals bondings [1–10]. Therefore our work has been done through modelling based on quantum mechanical time dependent density functional theory, which also makes it possible to study quantum entanglement in such systems (TD-DFT).

In the work presented here, quantum entanglement takes the form of a quantum superposition of the active components in synthesized self-assembled and self-replicating living systems. When a quantum calculation of an entangled biosystem is made that causes one protocell photoactive biomolecule of such an entangled pair to take on a definite value (e.g., electron density redistribution tunnelling or electron spin density redistribution tunnelling), the other protocell photoactive biomolecule of this pair will be found to have taken the appropriately correlated value (e.g., electron density redistribution tunnelling or electron spin density redistribution tunnelling) in two quantum entangled excited states of this bicellular system (see Figure 1). In our simulations, the starting separation distance of the supramolecular bio systems changed during geometry optimization procedures, taking on final values that mimic those associated with real-world intermolecular interaction processes. Furthermore, the modelling indicates that quantum entanglement occurs between the prebiotic subsystems which enhances the photosynthesis of the combined systems. The enhancement occurs because two additional quantum entangled excited states are created through the simultaneous excitation of the combined system's two prebiotic kernels or. two protocells. The additional photosynthesis made possible by the quantum entanglement potentially provides a selective advantage through an enhancement of usable energy leading to faster growth and self-replication of minimal living cells [3-7], which in turn can lead to accelerated evolution.

Living systems that are self-assembled and self-replicating exist in wet and warm environments where stochastically moving supramolecular subsystems continuously generate and destroy quantum entangled states by non-equilibrium effects. While no static entanglement exists, quantum

entanglement nonetheless temporarily occurs amongst the biomolecules inside the combined system or between the living subsystems, i.e. between two protocells or two prebiotic kernels [3, 4].

This warm quantum coherence is proposed by others as a basis for DNA stability and for the understanding of brain magnetic orientation during migration in more than 50 species of birds, fishes and insects [4]. Experimental evidence also exists for quantum-coherence as a basis for more efficient light-harvesting in plant photosynthesis [4]. Furthermore, quantum entanglement exists between supramolecules used in the sense of smell and in the microtubules of brain neurons where it gives rise to critical quantum vibrations [6].

Using quantum mechanical investigations, we have now started to design quantum entanglement communication molecular logical devices which hold promise for use in nano-medicine biorobots to fight molecular diseases such a cancer tumors, and against the new kinds of synthesized microorganisms and nano guns [4, 5, 9]. Our current research concerns quantum entanglement communication phenomenon in neuron synapses and neural networks [10, 11].

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March 11th-13th, 2017, Hamburg, Germany

Alireza Rafieerad

University of Malaya /Department of Mechanical Engineering

Novel Fabrication, Corrosion Behavior and Biological Study of Anodic Titania – Niobia - Alumina/Graphene Oxide Nanocomposite Multilayered on Ti-6Al-7Nb for Orthopedic and Dental Applications

Highly oriented Titania-Niobia-Alumina mixed nanotubular arrays were developed on Ti-6Al-7Nb (Ti67) substrate via PVD magnetron sputtering and electrochemical anodization in fluoride-based electrolyte subsequently. Deposition parameters have been optimized to achieve the higher outputs property such adhesion strength and hardness of multi-layered Nb/crystalline-ceramics coating using nano-scratch and microhardness analysis. Besides, a thin film of functionalized graphene oxide (GO) nanosheets was transparently loaded on fabricated mixed oxide nanotubes to enhance corrosion and biological behavior as well mechanical properties. The microstructural features physically characterized to assess the morphology, mechanism reactions and attached bounding of synthesized structure. Furthermore, In-vitro bioactivity and hydrophilicity performance of designed nanocomposite confirmed the formation of bone-like apatite layer after immersion in SBF for higher osseointegration with long term stability after implantation. The measured low corrosion rate of modified Ti67 with ceramic/carbon-based biomaterials within body simulation media briefly contributed Ti/Nb/mixed-oxide/GO for smart artificial orthopedic and dental implants with drug delivery potential.

Biography:

Alireza Rafieerad, from Faculty Mechanical Engineering, University of Malaya in collaboration with dep. of Medical Mic, Faculty of Medicine. His research is in district of 'Nanostructure and biomaterial' entitled fabrication and design of smart drug-loaded artificial tissue for orthopedic and dental implant with enhanced mechano/biological properties. He has published several ISI papers, chapter book, patents and conference articles in reputed journals and has been serving as an official editorial and reviewer board of some academic journals and conference organizations. He is also a member of AMMP center, advanced manufacturing and material processing, Malaysia.

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NANOTEK – 2017

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Photocatalytic Degradation of Methylene Blue by Nitrogen Doped MoS2 under Visible Light Irradiation

Due to the development of industrialization, water pollution has become a global concern. The pollution of water resources by dyes from textile has become a serious environmental problem. Therefore it is very essential to remove the dyes from an aqueous environment. In this study, we have successfully synthesized Nitrogen doped MoS2 using an optimized sol gel method. Further this material was used for photocatalytic degradation of methylene blue. It's crystal structure was measured by X-ray diffractometry (XRD). A scanning electron microscope (SEM) and high resolution transmission electron microscope were used to observe the morphology and structure of the sample. Photocatalytic performance was evaluated by discoloring of Methylene Blue under visible light irradiation. It was observed that Nitrogen doped MoS2 prepared by sol gel method exhibited a strong capability to remove organic pollutants and durability on the elimination of organic pollutants under visible light irradiation. N-doped MoS2 has larger BET areas. Due to this fact the surface adsorption capacity of the reactants is improved. Also more active sites are exposed, guaranteeing higher activity in degrading the dye. This work provides potential applications in water pollution treatment, as well as other related fields.

Biography:
Jyoti Shakya has completed her master degree from Indian Institute of Technology (IIT) Delhi. She is currently doing her PhD at the age of 26 years from Jawaharlal Nehru University New Delhi. She has published 2 papers in reputed journals.

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Green Chemistry Approach vs. Traditional Chemical Approach for the Biosynthesis of Biocompatible Drug Delivery (DDS) Metal Nanoparticles: A Review

Metal nanoparticles (Nps) are widely used in number of applications, including electronics, catalysis, and sensors technology. Recently, the applications of metal NPs in nanomedicine have gained a lot of interest. They can be used for biological labeling, biosensors and as therapeutic agents. As a result, there is an urgent need to develop synthesize techniques that can result in more biocompatible metal Nps, suitable for biomedical applications . Chemical methods for the preparation of metal NPs are simple, easy to perform and very variable. However, their main disadvantages is the use of toxic chemicals [2, 3]. In the search of better pathway for synthesizing metal Nps that can overcome these limitations, researchers have turned to biological systems. Biosynthetic (biogenic) techniques employ proteins, microbes or plant extract for nanoparticles production. Green chemistry aims at implementing safer and biocompatabile synthetic methods that eliminate using harmful chemical reagents, thus has no/less harmful impact on human beings. Green synthesis of metallic nanoparticles (NPS) by using plant extracts have been extensively investigated. Plant extract contains intrinsic phytochemicals such as saponins, terpenoids, proteins, polyphenols and flavonoids, having the properties of stabilizers/ emulsifiers. It can be used for the synthesis of biocompatible, monodisperesd NPs of minimum particle size. This review provides an overview of recent trends in the biosyntheses of NPs via plant extract, expected mechanism for the biosynthesis process, and their potential advantage in the field of drug delivery.

Key words : Green Chemistry, nanoparticles, drug delivery, mono-dispersed

Biography

Salma Fouad is M.Sc. holder, nano-chemistry, American university in Cairo (AUC). She was first graduated from faculty of science, Ain shams University in 2010. In spring 2012, she joined the American university, as a chemistry master student, and got her degree in fall 2015.

Salma worked as teaching assistant in the chemistry department, AUC, from fall 2012-till spring 2015. In 2013, Salma joined Zewail city for science and technology where she worked as both teaching assistant in the chemistry department, and research assistant in the material science department, Nanotechnology center.

Salma was awarded the University fellowship and the thesis grant from the School of science and engineering, AUC. Also she was awarded the graduate student of honor for her academic achievement throughout her graduate study.

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NANOTEK – 2017

March 11th-13th, 2017, Hamburg, Germany

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Thermal Analysis of Automobile Radiator using Nanofluids

As the technology is emerging day by day, there is a need of some better methodology which will enhance the performance of radiator. Nanofluid is the one area which has promised the enhancement of the radiator performance. Currently, Nanofluid has got a well effective solution for enhancing the performance of the automobile radiators. Suspending the nano sized particle in the base fluid, which have got better thermal conductivity value when compared to base fluid, is preferably considered for nanofluid. In the current work, at first mathematical formulation has been carried out, which will govern the performance of the radiator. Current work is justified by plotting the graph for different parameters. Current work justifies the enhancement of radiator performance using nanofluid.

Key words : Nanofluid, Radiator performance, Graphene, Gamma Aluminium oxide (γ-Al2O3), Titanium dioxide (TiO2.)

Biography

Mr. Sumanth S is born on 18th September 1993. He graduated from Jawaharlal Nehru National College of Engineering (Under VTU, Karnataka), Shivamogga in Mechanical Engineering in the year 2015. He is perusing his Masters Degree in Machine Design Engineering in the year 2015-17, from PES University, Bangalore, Karnataka His areas of interest are Heat transfer, Fluid Mechanics, Nanofluids, and Nanotechnology applications to engineering problems.

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Green Synthesis of $BiVO_4$ using Plant Extracts

Nowadays, the development of efficient green chemistry methods for synthesis of metal oxides nanoparticles has become a major focus of researchers. These methods are being investigated in order to find an eco-friendly technique for production of well-characterized nanoparticles. In this contribution we report for the first time, the synthesis and structural characterization of n-type Bismuth vanadate ($BiVO_4$) nanoparticles using aqueous extracts of Callistemon viminalis as a chelating agent. To ascertain the formation of $BiVO_4$, XRD, SEM,HRTEM, SAED, EDS, TTIR, and Photoluminescence(PL) were carried out.

Biography

Hamza Mohamed, 26 years old is pursing MSc studies in Physics with the University South Africa. He is the recipient of the award from the African Institute for Mathematical Sciences – South Africa, (AIMS-SA). His current research is focused on investigating the use of natural plant extracts for the synthesis of nanoscaled multi functional metal oxides.

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March 11th-13th, 2017, Hamburg, Germany

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Synthesis and Characterization of the Novel Kidney-specific Drug Delivery System and Drug Efficacy Improvement

Chitosan is a natural copolymer of glucosamine and N-acetyl-glucosamine derived from chitin. Because of its excellent biocompatibility and biodegradability, chitosan has been widely used in drug delivery systems. In investigating a kidney-targeted conjugate with pre-dnisone, researchers used 50% acetylated LMWC with different molecular weights and found that the distribution to the kidney could be increased 13-fold compared to prednisolone alone with greatly reduced toxicity. LMWC is specifically taken up by renal tubular cells probably via megalin and, compared to lysozyme, is cleared from the kidneys more rapidly. These findings indicate that LMWCs with molecular weights of 19 and 31 kDa are useful drug carriers with a high degree of safety.We have been developed a new type of chitosan(CS) hydrogel using dextran sulfate(DS) as a polyanionic polymer to achieve complex coacervation for the incorporation and controlled release of drugs. In the our recent research works, CS-DS hydrogel have been used for preparing of an effective drug delivery sustem and now, we develop this polymeric system for Kidney drug delivery system. In this technology, Naproxen have been chosen as a model drug.

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Applications of Ga1-xMxP in Wide Band Gap Layers to Improve the Efficiency of a Gallium Phosphide N-P Photovoltaic Solar Cell (M=V, Mn, Fe, Co, Ni, Cu and x=0.25)

Gallium Phosphide semiconductors doped with transition metals shows variety of properties including optical properties; such as absorption and reflectivity. Much efforts have been performed in this paper to improve the efficiency of a gallium phosphide n-p photovoltaic solar cell. Different curves related to solar cells like Power vs. Voltage, Current Density vs. Voltage and Quantum Efficiency vs. Wavelength have been plotted to help us reach our desirable efficiency. We concluded that by varying atomic number of transition metals, the efficiency of solar cells increases. Under global AM 1.5 conditions, without an anti-reflective coating, the cell structure had an open-circuit voltage of 1.73 V, a short-circuit current density of 1.32 mA/cm2 and a fill factor of 91%, corresponding to a total area conversion efficiency of 2.13%.

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Laspas Ioannis

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Master's Thesis: Processing of Thin Films of Organic Semiconductors and Transparent Electrodes for Organic Electronic Devices using Laser Techniques

The processing of the surface of thin films of organic semiconductors and transparent electrodes by using laser techniques has attracted more and more interest in the last few years because of its advantages and multiple applications. These techniques include a great number of processes like ablation of material, deposit of material and surface scribing. This thesis is focused in the techniques of scribing thin films by using visible and infrared laser radiation for the production of organic electronic devices and mainly for the production of organic Photovoltaics (OPVs).

In the theoretical section of this research paper, we describe the physics of the laser radiation, the properties of its beams and the components of a device producing laser radiation. We refer to the manner by which this kind of radiation is produced as well as to the existing types of lasers. Then, we described the properties of materials of organic semiconductors, which are scribed by laser radiation during the construction of organic Photovoltaics (OPVs), both, OPVs with normal structure and OPVs with inverted structure. Particular emphasis was given to the study of laser interaction with matter, during the laser scribing process. Laser interaction with matter is influenced to a great extent by the mechanisms of propagation and absorption of the energy of the laser radiation in the interior of the material of the thin films that are scribed. We also described and analyzed in details the three basic types of scribes (P1, P2 and P3), which must be conducted by using visible and infrared pulse laser radiation, during the manufacture of organic electronic devices. We also referred to and analyzed to some extent the basic parameters that affect the scribes of thin films created by pulse laser radiation. These parameters are the radiation flux, the wavelength, the pulse duration and the pulse repetition rate, the focus position of the beams, the polarization state of the radiation, the properties of the materials of the scribed thin films, and the environmental conditions of the space in which the scribes are conducted.

In the experimental part of this research paper, we found the optimal experimental conditions (parameters), which lead to the formation of scribes of high quality in the surface of the thin films that form an organic Photovoltaic device (OPV). We studied and evaluated samples of scribed thin films of

semi conductive polymers developed on substrates of PET. These samples were scribed by laser radiation with pulse duration of the order of ns, ps and fs. The scribes that were studied are mainly P1 and P3 types and were examined by using optical microscope and scanning electron microscope (SEM). We conducted also the spectroscopic technique of energy dispersive X-ray (EDX) on some scribes in order to evaluate the extent of material removal in specific areas surrounding the scribes. This evaluation was based on the residual quantity (weight %) of the components of the materials that were detached during the conduct of the scribes. Finally, we made a short reference to the system that processes thin films of organic semiconductors and transparent electrodes, using the roll to roll technique for the production of flexible, organic, electronic devices. We also used a reference to the integrated laser engraving system, which scribes the surface of thin films, by using laser radiation with pulses of ps.

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NANOTEK – 2017

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Kishore Naik

Charging technologies and advances in Electric Vehicle battery charging

The increase of oil price and environmental issues cause the growing interest in clean vehicle technologies, such as electric vehicles (EVs) and fuel cell EVs, because they provide a good solution to reduce the environmental impacts of transportation and energy dependency thanks to their low energy consumption and zero emissions. EVs are powered by electric batteries, which need to be recharged drawing electric energy from the grid. This talk deals with the battery charging technologies for electric vehicles, giving an overview on their evolutionary process. At first, the wired technology is addressed and the main existing standards on it (charging modes, connection cases and plug types) are presented. Then the wireless power transfer technology is illustrated, showing the convenience of the resonant coupling topologies in increasing the power transfer efficiency. With elaborating the complete coil and power electronics systems addressed. At last, the in-moving technology is introduced and the preliminary studies on it are addressed.

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March 11th-13th, 2017, Hamburg, Germany

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Application of Response Surface Methodology Based on Central Composite Design For Selective Ultrasonic Removal of Reactive Red - 223 And Malachite Green By γ-Fe_2o_3 Loaded Activated Carbon

The present studies lay emphasis on the synthesis of γ-Fe2O3 –Activated Carbon nanocomposites (γ-Fe2O3-NP-AC) by sol-gel method. The surface morphology was scanned by FTIR, SEM and XRD techniques. Response surface methodology based on central composite design was employed to investigate the optimum parameters of ultrasonication. The optimum operating parameters (OOP) including sonication time, solution pH, amount of adsorbent, concentration of reactive red 223 dye (RR) and Malachite Green (MG) were obtained for the selective removal of RR from mixture of dyes by response surface methodology.

The optimum operating parameters (OOP) obtained for selective removal of RR from the mixture of dyes by response surface methodology (RSM) were observed to be 6.8min sonication time , pH of 11, 0.016g of (γ-Fe2O3-NP-AC) adsorbent, 25.0 mgL-1 and 11.0 mgL-1 concentrations of the RR-233 and MG dyes in the mixture respectively that correspond to a removal of 85.32%of RR dye and 92.12% of MG removal from the mixture was observed respectively.

Keywords: Nanocomposite; Response Surface Methodology; Central Composite Design; Ultrasonication; Adsorption; waste water treatment.

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NANOTEK – 2017

March 11th-13th, 2017, Hamburg, Germany

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Polymeric Micellar Nano System Modified with Breast Tumor Selective Peptide Ligand for siRNA Delivery

The long term objective of this study is to develop tumor targeted siRNA delivery systems. Here, we explored development of polymeric micellar systems forsiRNA delivery modifying their surface with an engineered peptide, P18-4, which has shown highstability in biological fluids and selectivity for breast cancer over normal cells in previous studies. Poly(ethylene oxide)-b-poly(α-carboxyl-ε-caprolactone) (PEO-PCCL) and acetal-PEO-PCCL were synthesized and used to conjugate (through their pendent carboxyl groups) spermine (SP) orN,N-dimethyldipropylenetriamine (DP) producing PEO-P(CL-SP), PEO-P(CL-DP) and acetal-PEO-P(CL-DP) block copolymers. A 2:1:1 (w/w) of the above polymers was used to prepare polymeric micelles forP18-4conjugation.siRNA bindingand serum stability in the presence of FBS was tested at different siRNA:polymer ratios for plain versus P18-4 micelles. siRNA release as a function of increasing heparin concentration was also checked. MDA-MB-435 cells were treated with 300 nMMCL-1 siRNA in a siRNA: polymer ratio of1:8and MCL-1 mRNA expression was measured byRT-PCR. The siRNA cell uptake was confirmed through flow cytometry. Complete siRNA binding was achieved at siRNA:polymer ratio of 1:8. At lower siRNA:polymer ratios siRNA binding was less, but still no significant difference in siRNA binding was observed between plain and p18-4 modified micelles. However, siRNA dissociation from P18-4 micelles demanded a smaller concentration of heparin.At siRNA:polymer ratio of ≥ 1:8, around 100% of siRNA was protected against degradation in serum. There was no significant difference between plain and peptide modified micelles in terms of siRNA stabilization either. Plain and P18-4 modified polymeric micellar complexes of MCL-1 siRNA down-regulated the expression of MCL-1mRNA by 75 and 82%, respectively, compared to their scrambled siRNA controls. The siRNA was significantly higher uptaken by the cells using the P18-4 micelles compared to the plain micelles. The results point to a potential for P18-4 nano-micelles in siRNA delivery.

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Synergistic Enhancement of Antimicrobial Effect by using Multi Walled Carbon Nanotube Conjugated with Ampicillin on Klebsiella Pneumonia

The development of antibiotic resistance in bacteria will be driven by an antibiotic use but several biological mechanisms contribute to this development. There is an ever increasing need to develop new antimicrobial agent with novel mechanism of action. The main objective of this study was to investigate the reducing rate of Ampicillin resistance in Klebsiella pneumonia with Multi-Wall Carbon Nanotube -Ampicillin conjugated.

Material and methods:

Ampicillin resistant Klebsiella pneumonia ATCC700603was used in this research . The samples were divided into two groups, the first groups were treated only with Ampicillin, and second group was treated with conjugated MWNT- ampicilin. At first time functionalized carboxylated multi-walled carbon nanotubes, then conjugated with Ampicillin (Jiang 2013) and characterized by XRD. Moreover, The antibacterial activity of the Ampicillin and MWNT-Ampicillin has been investigated against Klebsiella pneumoniae. Antimicrobial susceptibility testing was conducted on Muller-Hinton broth by MIC procedure.

Result and discussion:

The quantitative antimicrobial MIC test has shown that synergy effect of MWNT with Ampicillin. In some amount of drug and nano drug Amp haven no effect on growth of Klebsiella pneumonia strain (MIC >256µg/ml) but the conjugated of MWNT-Amp shoved high antibacterial activity (MIC<64µg/ml).

Conclusion:

These research results suggest that nano drug deliveries are able to solve Antibiotic resistance problem, although further work is needed to elucidate the safety and side effect of these compounds in human.

Key words: Klebsiella pneumoniae, Antibiotic resistance, MWNT, nano drug delivery

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Super Hydrophobic and Flexible Aerogels and Applications

As the name implies, aerogels consist of more than 95% air and less than 5% solid materials with a refractive index varying from 1.01 to 1.1. They are nanostructured materials having well controlled pore and particle sizes in the range of 1 to 100 nm. Because of their nanostructured nature, they have the combination of the unusual property of high porosity and high optical transmission to the visible light. Aerogels are produced by sol gel processing followed by supercritical drying or by silylation process using ambient pressure drying. For example, to produce silica aerogels, either organosilanes such as tetraethoxysilane (TEOS) or tetramethoxysilane (TMOS), are or a low cost inorganic precursor such as sodium silicate, are being used. Using TEOS or TMOS precursors, large size (up to 10 to 20 inches) aerogel sheets of high optical transmission (95%) at 600 nm, are being produced for Cerenkov radiation detectors. On the other hand, transparent grains of aerogels up to a few millimeters for superthermal insulating systems, are being produced commercially using the low cost sodium silicate precursor. In recent years, superhydrophobic and flexible silica aerogels with a contact angle as high as 175o have been produced by our group using alkyl alkoxy silanes such as methyl trimethoxysilane (MTMS) or methyl triethoxysilane (MTES). In this talk, the processing and manufacturing of aerogels using the organosilane compounds of the type Rn Si X4-n (where, R = alkyl, aryl or vinyl, X = alkoxy or chloro, and n = 0 to 3), will be described. The results on the Laplace pressure intrusion of water into the pores of the superhydrophobic aerogels indicating the storage of mechanical energy, are presented. The physico-chemical properties along with the applications of aerogels for Cerenkov radiation detectors in nuclear reactors and High Energy Physics, and thermal insulating systems, will be discussed. The applications of the aerogels for organic liquid absorption and desorption, will be demonstrated. The yet to be solved problems involved in the commercial production of silica aerogels using sodium silicate by ambient pressure drying, will also be briefly discussed.

NANOTEK – 2017

March 11th-13th, 2017, Hamburg, Germany

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"Small Meets Smaller: Nanomaterial - Mikrobe Crosstalk – Physico - Chemical Principles and (Patho) Biological Consequences"

Pathogenic microorganism can cause severe diseases. Also, scientific and medical interest in the human microbiome, defined as the sum of all microbial organisms residing inside the body, has increased dramatically. Notably, the infection paths ofpathogenic microorganism overlap with major entry routes for nanoparticles (NPs), occurring during environmental exposure or deliberate medical applications. For example, besides NPs, the air we breathe is also filled with a high number of fungal spores, originating from a variety of fungal species. Hence, it is surprising that the interaction of NPs with (pathogenic) microorganism and its (patho)biological consequences have not yet been investigated in detail.

As the physico-chemical characteristics of NPs (co)define their behaviors and (patho)biological activity in physiological systems, we studied a library of various model NPs widely varying in size, material, shape, and surface functionalization. The interaction of NPs with different microorganisms as well as the impact of NPs on microorganism-host cell responses wasinvestigated by comprehensive analytical approaches.

We report how different microorganisms interact with NPs, discuss the underlying physico-chemical principles, and demonstrate how these interactions can impact the (patho)biological outcome and fate of exposure of the human host to both, NPs and microorganisms.We expect that the identified mechanism will be of biomedical and toxicological relevance for the field.

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March 11th-13th, 2017, Hamburg, Germany

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Characterization and Anti-Proliferative Effect of Carboplatin Loaded Chitosan Nanoparticles for the Breast Cancer Treatment

Breast cancer is one of the major ongoing public health problems as the most common non-infectious malignancy among female worldwide. The chitosan nanoparticles have been formed by an ionic interaction procedure. Average particle size measurement, Transmission electron microscopy (TEM), Surface (zeta) potential analysis, Fourier transform infrared spectroscopy (FT-IR) and differential scanning calorimetry (DSC) were used for nanoparticles characterization. The maximum carboplatin loaded nanoparticles has a spherical shape with positive charge and mean diameter from 250 to 300 nm. The FT-IR and DSC studies showed that the drug was dispersed in amorphous form due to its potent interaction with nanoparticles polymer. The optimum encapsulation efficiency was found to be at 5mg/ml carboplatin. The carboplatin loaded chitosan nanoparticles has excellent blood compatibility. Lastly, the cytotoxic effects of the carboplatin loaded chitosan nanoparticles were diagnosed in-vitro against breast cancer (MCF-7) cell lines. The carboplatin loaded chitosan nanoparticles was more cytotoxic effect for cancer cells than normal cells. The chitosan nanopartcles was stable and nontoxic even at higher concentration. Our aim of the study demonstrated that the chitosan nanoparticles might be used as a better drug delivery system for the treatment of breast cancer.

Keywords - Chitosan, ionic interaction, nanoparticles, carboplatin, breast cancer.

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NANOTEK – 2017

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Recent Progress on Nanotechnology

Nanotechnology is a collective term referring to technological development on the nanometer scale, usually 0.1-100 nm. Nanotechnology is an enabling technology that has revolutionized many related disciplines such as food, pharmaceutical, cosmetics and nutraceuticals. Driven by increasing consumer demand for healthy food products and need for better drug delivery systems, researchers have been applying tools and knowledge in nanotechnology to address the specific relevant issues. Nanotechnology holds great promise to provide benefits for improving the understanding and designing better products. This review addresses the general applications of nanotechnology to food, nutraceutical and pharmaceuticals sectors.

Keywords:– Nanotechnology, pharmaceutical, cosmetics and nutraceuticals.

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March 11th-13th, 2017, Hamburg, Germany

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Operando-XPS for Device Characterization

A noncontact chemical and electrical measurement technique of XPS is performed to investigate a number of devices under operation. The main objective of the technique is to trace chemical and location specified surface potential variations as shifts of the XPS peak positions under operating conditions. To implement the technique we apply D.C. (Voltage-Contrast XPS) and/or A.C. (Dynamical XPS) voltage biases externally, and extract chemically resolved static and/or time-resolved electrical properties of materials and devices made from them. Details of the technique, and applications to a number of graphene- and ionic liquid-based devices configured in a transistor geometry with and without gating will be presented.

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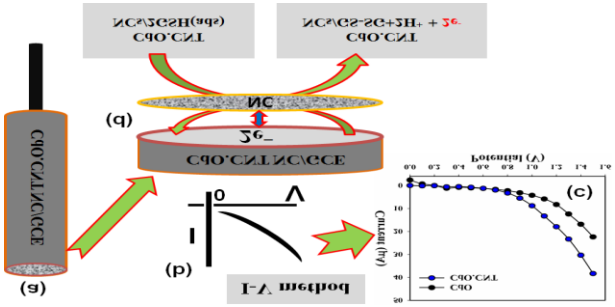
L-Glutathione biosensor development based on CdO nanoparticle-decorated CNT

Nanocomposite consisting of CdO decorated with CNT (CdO.CNT NC) was prepared by a wet-chemical technique, and it optical, morphological, and structural properties of were characterized by FTIR, UV/Vis., FESEM coupled to XEDS, XPS, and XRD methods. A flat glassy carbon electrode was modified with the nanocomposite to obtain a sensor for L-glutathione (GSH) that displays improved sensitivity, a large dynamic range and good long-term stability. The calibration plot (best acquired at a voltage of 0.5 V) is linear (r2 = 0.99) in the 0.1 nM to 0.1 M GSH concentration range. The detection limit is as low as 30.0 ± 0.1 pM, and the sensitivity is ~9.49 μAμM-1cm-2. To the best of our knowledge, this is the first report on the determination of GSH by using such a modified GCE and by the I-V method. The GCE was applied to the selective determination of GSH in spiked rabbit serum samples and gave acceptable results.

Keywords: Glutathione sensor; Electrochemical oxidation; Nanomaterials; Nanocomposite; Glassy carbon electrode; Sensitivity; Carbon nanotubes; Rabbit serum; I-V technique



NANOTEK – 2017

March 11th-13th, 2017, Hamburg, Germany

Dr Vijay Janyani

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Photonic Crystal based Solar Cells: Current Trends and Future Prospects

Photovoltaic technologies traditionally suffers from the problem of low efficiency-to-cost ratio, which is the main reason for its obstruction in wide spread acceptance for terrestrial applications. The most part of the cost in a solar cell is contributed by the thickness of the active absorption layer. Thus reducing the thickness of the active layer without compromising with the efficiency might provide the wide acceptance to the solar cell technologies. During past decades, thin film technologies have shown that they have the capability to provide the solution to this problem. Thin film solar cell technology has been attracted a lot of attention especially due to its ability to provide light weight flexible solar cells using small amount of active absorbing material. Reducing device thicknesses, not only reduces the cost of the device, but also helps in higher production throughput and better device stability. In this talk, recent developments in the area of thin film solar photovoltaics including light trapping schemes will be discussed, along with the future directions.

Biography

Dr Vijay Janyani obtained his Bachelor's and Master's degrees in engineering from MNIT Jaipur (erstwhile MREC Jaipur) in India and PhD Degree from United Kingdom under Commonwealth Scholarship Plan. He has received various honors such as AICTE Career Award for Young Teachers, Derrick Kirk Prize for excellence in Research. He has completed important collaborative projects, both at National and International levels. He has already guided seven PhDs, and four are underway. He is presently with the department of ECE at MNIT Jaipur. His areas of interest include optical communication, photonics and numerical modeling. He is a Senior Member of IEEE, OSA and SPIE, and a Life Fellow of IETE.

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SURMOFs and CCNCs as novel tuneable Materials for Optical, Photonic as well as for Green Energy Applications

Here I will present a particularly interesting class of surface-anchored (metal-organic frameworks and coordination network com-pounds) materials SURMOFs and CNCs for the fabrication e.g. of 1D (Photonic Band Gap) PBG materials [1] as optical sensors, low-k dielectric thin films [2], optoelectronic/ electrochromic switchable coatings/devices [3] PV devices [4] or as future artificial Light-Harnessing (LH) antenna array assemblies as well as monolithic up- and down conversion architectures. Since these materials are highly porous and the size of their pores are highly adjustable, they can be further functionalized (e.g. with different metal/oxo connectors or clusters linked with various organic linkers) e.g. in order to specifically bind target analytes (optical sensing), to electrically load and unload small ions (optoelectronic applications) as well as to act as photon traps, which are able to efficiently absorb, transport and harness light energy over an artificial LH antenna array.

In addition, the RI (Refractive Index) as well as the optical properties of SURMOF and CNC materials can be tailored – a fact which makes these materials ideally suited for photonic, optical, optoelectronic, light-harnessing as well as for future solar energy systems like photocatalytic and PV applications.

Keywords: SURMOFs, porous thin films, artificial light harnessing, optics and photonics, PV applications, photocatalysis.

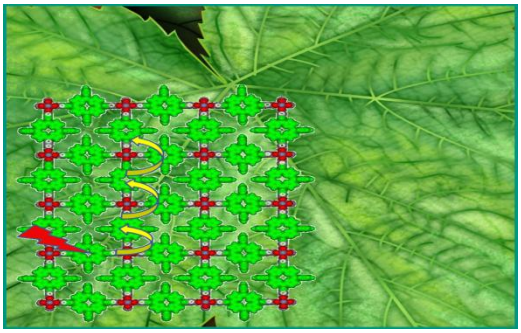

Figure 1. Schematic Drawing of an artificial su-pramolecular LH array for photocatalytic and/or PV applications

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March 11th-13th, 2017, Hamburg, Germany

Jiya Khan

Synthesis of Polyaniline Nanoparticles and Their Application for the Removal of Crystal Violet Dye by Ultrasonicated adsorption process based on Response Surface Methodology

The present study focuses the synthesis of polyaniline nanoparticles (PANP) by the rapid mixing polymerization method. They were recognized by FTIR and SEM techniques. Moreover, they were utilized for the removal of Crystal Violet (CV) dye by ultrasonicated adsorption process. It ensures a quick alternative method compared to other conventional processes, which led to enhancement of mass transfer by ultrasound waves. The effectiveness of the process was confirmed through the effect of certain conditions like sonication time, temperature, adsorbent dosage and CV concentrations. The validity of the process was estimated by various adsorption isotherms. Kinetics and thermodynamic studies were also conducted to authenticate the process. The optimum operating parameters (OOP) were evaluated by Response Surface Methodology (RSM) based on central composite design (CCD) for the removal of CV dye. Moreover analysis of variances (ANOVA) was employed to estimate the significance of experimental variables. The predicted removal efficiency was found to be 94.29% which proved to be the effectiveness of the process.

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March 11th-13th, 2017, Hamburg, Germany

Ahmed Nooh

Using Nanomaterials to Optimize Mud Rheology at HPHT Wells Throughout Experimental Work

Significant quantities of hydrocarbon reserves are contained in high pressure high temperature reservoirs (HTHP). Development of these reserves will require drilling fluids with high heat capacities to withstand those conditions. Nano-structured materials exhibit many distinctive properties due to their small grain size and large specific surface. Experimental measurements of heat capacity at constant pressure indicate that the heat capacity values of those materials are frequently higher than those of coarse-grained materials. Therefore, this paper proposes the use of Nanocomposites as an additive in the drilling fluid to optimize its yield point.

In this paper, the authors proposing a solution to one of the most important challenges of the drilling fluids in HPHT wells; carrying the drill cuttings back to the surface for continuous circulation. Multiwalled carbon nanotubes (MWCNTs) was functionalized and added to polymer (polystyrene-butadiene rubber copolymer matrix). The prepared MWCNTs were modified and characterized transmission electron microscopy (TEM) and X-ray diffraction (XRD). Furthermore, the prepared polymer/MWCNTs nanocomposites were used for HPHT (high pressure high temperature) drilling of oil base mud which also prepared and used in this method. The consequence of polymer and polymer/MWCNTs nanocomposites on the rheological properties of oil base mud which indicates using the polymer and polymer nanocomposites with different percentage from (0.5 to 3 gm.) in all percent the results it is very good, this means that the increase of polymer is reasonable for the increase of apparent viscosity, plastic viscosity and yield point at high temperature. Also, polymer/MWCNTs nanocomposites reveal increase of apparent viscosity, plastic viscosity and yield point at high temperature.

Keywords: MWCNTs, nanocomposites, TEM, HPHT, oil base mud, plastic viscosity, drilling..

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Biadglegne F
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Tuberculous Lymphadenitis in Ethiopia Predominantly Caused by Strains Belonging to the Delhi/CAS Lineage and Newly Identified Ethiopian Clades of the Mycobacterium tuberculosis Complex.

Recently, newly defined clades of Mycobacterium tuberculosis complex (MTBC) strains, namely Ethiopia 1-3 and Ethiopia H37Rv-like strains, and other clades associated with pulmonary TB (PTB) were identified in Ethiopia. In this study, we investigated whether these new strain types exhibit an increased ability to cause TB lymphadenitis (TBLN) and raised the question, if particular MTBC strains derived from TBLN patients in northern Ethiopia are genetically adapted to their local hosts and/or to the TBLN.

Methods:Genotyping of 196 MTBC strains isolated from TBLN patients was performed by spoligotyping and 24-loci mycobacterial interspersed repetitive unit-variable number of tandem repeats (MIRU-VNTR) typing. A statistical analysis was carried out to see possible associations between patient characteristics and phylogenetic MTBC strain classification.

Results:Among 196 isolates, the majority of strains belonged to the Delhi/CAS (38.8%) lineage, followed by Ethiopia 1 (9.7%), Ethiopia 3 (8.7%), Ethiopia H37RV-like (8.2%), Ethiopia 2 and Haarlem (7.7% each), URAL (3.6%), Uganda l and LAM (2% each), S-type (1.5%), X-type (1%), and 0.5% isolates of TUR, EAI, and Beijing genotype, respectively. Overall, 15 strains (7.7%) could not be allocated to a previously described phylogenetic lineage. The distribution of MTBC lineages is similar to that found in studies of PTB samples. The cluster rate (35%) in this study is significantly lower (P = 0.035) compared to 45% in the study of PTB in northwestern Ethiopia.

Conclusion:In the studied area, lymph node samples are dominated by Dehli/CAS genotype strains and strains of largely not yet defined clades based on MIRU-VNTR 24-loci nomenclature. We found no indication that strains of particular genotypes are specifically associated with TBLN. However, a detailed analysis of specific genetic variants of the locally contained Ethiopian clades by whole genome sequencing may reveal new insights into the host-pathogen co-evolution and specific features that are related to the local host immune system.

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Electrical Properties of Sulfonated Polyaniline (SPAN)/GaAs Hybrid Heterostructures Grown on (100) and High Index GaAs Planes

Recently organic semiconductors have attracted a great deal of attention due to their potential applications in electronic devices [1, 2]. Among the family of organic semiconductors, the semiconducting polymers such as Sulfonated polyaniline (SPAN) have attracted most attention for applications in electronic and optoelectronic devices, particularly due to their exceptional electrical properties and ease of preparation methods [1]. Additionally, this polymer can be grown over large area with low cost. It is therefore vital to have knowledge of electrical properties such as diode parameters of organic grown on inorganic substrates. In this work the electrical properties of sulfonated polyaniline (SPAN)/GaAs heterojunction devices is investigated in terms of barrier height $\overline{\Phi_b}$ and ideality factor by performing Current-Voltage (I-V) measurements at different temperatures (20-420K). The I-V results indicate that the value of the rectification ratio (IF/IR) at 0.5V is higher for SPAN/(311)A GaAs samples than for SPAN/(100) GaAs samples. SPAN grown on (100) and (311)A GaAs substrates are investigated for the first time by utilizing, I-V and C-V techniques. Moreover, the barrier height decreases and the ideality factor increases with decreasing temperature for both heterostructure devices. The high value of mean barrier of SPAN/(311)A (calculated from the plots of Φ_{b0} as a function of 1/2kT) confirms that the GaAs substrate orientation results in an increase of barrier homogeneities. Furthermore, the C-V characteristics were obtained at room temperature. The C-V measurements showed that the carrier distributions at the interface and away from the interface in high index (311)A GaAs orientations are more uniform and have better barrier homogeneity than those grown on the conventional (100) GaAs substrates.

Key words: Sulfonated Polyaniline (SPAN), GaAs, I-V, C-V, DLTS techniques

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March 11th-13th, 2017, Hamburg, Germany

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Rapid and Label-Free Bacterial Detection by Terahertz Metamaterials

Rapid and accurate detection of bacteriawith minimal operation stepsis critical for foodsafety controland infectious diseases diagnostics. In the present work, a rapid and label-free optical biosensor based on THz metamaterials was fabricated for bacterial detection.The developed metamaterials, i.e.split ring resonator (SRR)are artificially engineered structures composed of subwavelength metallic resonators. The changes in the dielectric constants caused by bacteria covered on the surface of SRRscan lead to thealterations ofthe capacitance, which give rise to the changes of the resonant frequencies. Giving the fact that different bacteria possess distinct dielectric response in the terahertz region, the differences in frequency shifts can be utilized for bacterial species identification.Moreover, due to the different dielectric response to THz wave for viable and non-viable bacteria, this metamaterial-based biosensor is capable of distinguishingbetween the viable and non-viable bacteria under test.By couplingthe increased sensing capability of the metamaterials with THztime-domain spectroscopy (THz-TDS), this newly developed biosensor can serve as a rapid alternative tool in the field of bacterial identification with minimal sample preparation.

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Optical Anisotropicity of Au@FeX (X= Ni, Co) Magnetoplasmonic Nanospheres of Solid, Core-Shell, and Hollow Types

The relationship between magneto-optics and plasmonics has been actively studied. But,localized surface plamonicresonance (LSPR)effect on magnetic phase, especially on motion of magnetic dipole moments, is not confirmed yet.In this article,solid, core-shell, andhollow-type of iron-based magnetoplasmonic (MagPlas) nanoparticles (NPs) are produced through thermolysis synthesis route. Different magnetic behaviors inside the magnetic NPs at the presence of plasmonic material are demonstrated based onLandau-Lifshitz-Gilbert (LLG) theory which represents ferromagnetic flux. It is experimentally proved, for the first time as we know,that adding electric field from plasmonic absorption and scattering of Au NPs to LLG equation adjusts magnetic anisotropic energy and thermal energy, which visualizes and explains by OOMMF and COMSOL micromagnetic simulation tool.

Keywords: Magnetoplasmonic (Mag Plas) nanoparticles, ferromagnetic nanocrystals, template-mediated synthesis, core-shell nanoparticles,thermolysis synthesis, micromagnetic simulation.

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March 11th-13th, 2017, Hamburg, Germany

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Applications of Nano Bio Technological Strategies in Phytopathology

Plant diseases are among the major factors, which limit crop productivity. The first step towards managing a plant disease under greenhouse and field conditions is to correctly identify the pathogen. Nanodiagnostic kit equipment can easily and quickly detect potential serious plant pathogens, allowing plant pathologist to help farmers in preventing epidemic diseases. The current subject deals with the application of nanotechnology for quicker, cheaper, and more precise diagnostic procedures of plant diseases. Also, nanotechnology can offer green and eco-friendly alternatives for plant disease management. Apart from being eco-friendly, fungi are used as bio-manufacturing units, which will provide an added benefit in being easy to use, as compared to other microbes. Nanotechnological application in plant pathology is still in the early stages. However, nanofungicides, nanopesticides and nanoherbicides are being used extensively in agriculture practices. Remote activation and monitoring of intelligent nano-delivery systems can assist agricultural growers in the future to minimize fungicides and pesticides use. Nanoparticle-mediated gene transfer would be useful for improvement of crops resistant to pathogens and pest. Such an accurate technology may also help to design a proper integrated disease management system which may modify crop environments to adversely affect plant pathogens.

Keywords: Diagnosis, Management, Nanobarcodes; Nanosensory, Plant Disease

Biography

Dr. Kamel A. Abd-Elsalam received his Ph.D. degree in Molecular Plant Pathology under the supervision of Professor Verreet JA. at Kiel University (2004) and joined postdoctoral training program in the laboratories of Professors Verreet and Professor Pierre J. G. M. de Wit. His current research interests include developing, improving and deploying plant biosecurity diagnostic tools and response tools, understanding and exploiting pathogen genomes and developing new nanotechnology-based technology and materials. Finally, he has published five book chapters, eight review articles, and more than 95 original scientific research articles in international peer reviewed journals such as Fungal Diversity, FEMS Review Microbiology, and PLOS Genetics.

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March 11th-13th, 2017, Hamburg, Germany

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Water Treatment Using Green Nanotechnology

This study is aimed at investigating the importance and feasibility of green nanotechnology in water treatment by using mordenite zeolites as matrices to Fe reagent. The article includes a brief introduction to nanotechnology and statistical facts about the growth of green nanomaterials applications worldwide, as well as the procedures undertaken related to the experiment. As a result of the experiment, possibility of using minerals like mordenite and clinoptilolite which are available at Azerbaijan in water treatment is proved.

We are currently living in a world, where energy demand is continuously growing, industries are constantly expanding and therefore pollution is making the environment worse and worse. Therefore, there is an on-going research about how to make the future of our planet more sustainable. This is where a relatively new branch of science, nanotechnology comes into play. Nanotechnology is an applied science of nanoparticles (which are about 1 to 100nm), and it evolves around doing manipulations to molecules in nano scale.

It started back in1959, with Richard Feynman, when he claimed that control of individual atoms were possible. After a decade, Norio Taniguchi used the term "nanotechnology" in his research papers. Finally, in 1981, scanning tunneling microscope was developed and as a result, individual atoms were observed for the first time ever.[1]Today nanotechnology is rapidly growing and governments are already heavily investing on this field. As a result, overall price of goods that are produced using nanotechnology has increased from 147$ billion in 2007, to 3.1 trillion $ in 2015 [2].

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March 11th-13th, 2017, Hamburg, Germany

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Adsorption of Cytosine on Single - Walled Carbon Nanotubes for Biosensor Applications: A Computational Approach

The adsorption of cytosine on metallic pristine single walled carbon nanotube (SWNT) energies increases to -0.56 and -2.20 eV in presence of Li and Co atoms. Using pristine SWNT, electric sensor based on Co- doped SWNT depicts more sensitivity. Reported work gives insight surface is investigated using density functional theory with local density approximation. On the SWNT, cytosine is physisorbed by taking the π-π interaction. Binding energy reported in this case is around -0.38 eV. By introducing metal atoms to the cytosine- SWNT, interaction can be strongly enhanced. The enhanced binding into SWNT-based bio- sensors enhanced by doping appropriate metal atoms.

Biography:

Prof/Dr.Baliram LONE has received his PhD in Physics from Dr.Babasaheb Ambedkar University Marathwada University, Aurangabad, during the period of 2002 to 2007. He received prestigious YOUNG SCIENTIST AWARD in 2009 from Department of Science & Technology, New Delhi,India .University Grants Commission, New Delhi awarded Raman Postdoctoral fellowship during 2013-14 to visit Utah State University ,Logan, Utah State U.S.A.,successfully he completed his postdoctoral studies.Currently, he is working as Head & Assistant professor in Physics,VinayakraoPatil Mahavidyalaya Vaijapur, affiliated to Dr.B.A.M.University Aurangabad, MS, India, He has successfully completed his Administrative responsibilities as Head & Principal investigator of major projects funded by UGC,DST and various funding agencies.

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Anti-biofouling performance of seaweed-mediated TiO_2/ZnO NPs by Sargassum wightii

In the present study, an attempt has been made to evaluate the anti-biofouling potentials of the TiO2/ZnO NPs synthesized using the seaweed Sargassum wightii collected from Mandapam coastal region, Southeast coast of India. FT-IR spectrum results showed occurrence of diverse functional groups in the seaweed extract, which could account for the reduction of metal ions to metallic NPs. Synthesized TiO2/ZnO NPs were characterized by UV-Vis spectrophotometer, XRD, HRTEM with EDX and SAED pattern. The synthesized bimetal NPs were found to have attractive shapes and it ranged between 12 and 50 nm. Crystalline nature of the TiO2/ZnO NPs was evidenced by SAED pattern with bright circular spots corresponding to (111), (200), (220) and (311) Bragg's reflection planes. The size of the TiO2/ZnO NPs was further determined by DLS analysis and it was found to be stable at 28 mV through ZP analysis. Screening results inferred that, TiO2/ZnO NPs exhibited wide spectral antagonistic activity (up to 22 mm) against marine biofilm bacterial strains with least MIC and MBC values. The CLSM images clearly showed the weak adherence and disintegrating biofilm formation of marine biofilm bacterial strains treated with TiO2/ZnO NPs. The synthesized TiO2/ZnO NPs showed promising antimicroalgal activity with MIC at 0.25 mg mL-1. Anticrustacean assay using Artemia salina larvae recorded LC50 value of 0.4 mg mL-1. The EC50 and LC50 values recorded against mussel Perna indica were found to be 0.8 and 1.25 mg mL-1, respectively. A therapeutic ratio (LC50/EC50) of 9 indicated the non-toxic nature of the TiO2/ZnO NPs. The mollusc foot adherence assay using the limpet Patella vulgata showed 8% fouling and 90% regaining at 0.125 mg mL-1 upon transfer to fresh seawater.

Keywords: Seaweed; Sargassum wightii; TiO2/ZnO NPs; Anti-biofouling activity.

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NANOTEK – 2017

March 11th-13th, 2017, Hamburg, Germany

Behrouz Arab

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Estimation of Anisotropic Elastic Properties of Biodegradable Polylactide/CNT Nanocomposites using Molecular Dynamics Method

Among the environmentally friendly polymers, polylactide (PLA) is one of the best choices because of its renewability, biodegradability and biocompatibility. In the spite of its primary applications in bio-based fields, PLA is now receiving considerable attention as an alternative to the traditional synthetic polymers for long-term applications such as automotive and electronics. However, PLA suffers from low thermal resistance and mechanical properties. Therefore, it is desirable to improve the properties of PLA through the addition of nano-sized reinforcements such as carbon nanotubes, graphene, ceramic nanoparticles and clay. In this paper, mechanical properties of PLA reinforced with single-walled armchair carbon nanotubes (SWCNT) were studied using the molecular dynamics method. The stiffness matrix and elastic properties such as Young's, shear and bulk moduli and Poisson's ratio of the pure PLA and PLA/CNT nanocomposites were estimated using the constant-strain method. The effects of different factors such as weight fraction and aspect ratio of CNTs on the elastic properties of nanocomposites were investigated. From computational results, it was observed that the elastic moduli of PLA can be enhanced in presence of CNTs, and further improvement can be achieved by increasing the weight fraction of nanotubes.

Biography:

Behrouz Arab is a Professor of Computational Nano-Mechanics in the Department of Mechanical Engineering– Islamic Azad University. He holds a Bachelor of Science in Mechanical Engineering from the University of Najafabad, a Master of Science in Mechanical Engineering from the K. N. ToosiUniversity of Technology, and a PhD in Materials Science from the K. N. ToosiUniversity of Technology. Arab was a researcher at Advanced Materials & Nanotechnology Research Lab,K. N.Toosi University of Technology, Tehran, until he joined the faculty at Islamic Azad University. He authored and co-authored many journal and conference papers and one book chapter, and contributed to many research activities in the field of nano-mechanics and materials. Also He has been involved in conducting workshops on modeling and simulation of materials in different time- and length-scales.

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NANOTEK – 2017

March 11th-13th, 2017, Hamburg, Germany

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Light Harvesting in Nanoscale Systems

Here, we will discuss the current status of challenging light harvesting nanomaterials such as semiconducting quantum dots (QDs), metal nanoparticles, semiconductor-metal heterostructures, π-conjugated semiconductor nanoparticles, organic-inorganic heterostructures, and porphyrin based nanostructures.1-7 The fundamental knowledge of these photophysical processes is crucial for the development of efficient light harvesting systems like, photocatalytic, and photovoltaic. We will highlight the impacts of size, shape and composition of QDs on exciton decay dynamics and the energy transfer process for developing light harvesting systems. Potential light harvesting systems based on hybrid π-conjugated semiconductor polymer nanoparticles, and self assembled structures of π-conjugated polymer will be discussed. We also discuss the significance of porphyrin based nanostructures for potential light harvesting systems.

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March 11th-13th, 2017, Hamburg, Germany

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Effect of Doping, Structural, Morphological, Physical and Dielectric Properties of Mn doped ZnO Nano-particles Synthesized by Sol-Gel Technique

The effect of Mn doping on the structural, morphological, physical and dielectric properties of Zn1-xMnxO nanoparticles were prepared using novel sol-gel technique and sintered at 400°C. Samples were systematically characterized using x-ray diffraction (XRD), transmission electron microscopy (TEM), fourier transform infrared (FT-IR) spectroscopy and LCR-Q meter. The peaks corresponding to broad were observed by x-ray diffraction (XRD) patterns, which indicate that the all samples were nanocrystalline with hexagonal phase. Although, according to x-ray diffraction (XRD) data, we have studied the lattice parameters and volume of unit cell of Zn1-xMnxO nanoparticles as a function of Mn content. The crystalline size, lattice strain, stress and strain energy density of Mn doped ZnO nanoparticles were determined from the first six most intensive reflection peaks of XRD using simple W-H models. The results obtained using three models yields strain, stress and strain energy density increases with increasing Mn content and crystalline size decrease. Among the developed models UEDM models was observed to be the best fit and realistic models for sol-gel route. The transmission electron microscopy (TEM) result confirms that mean particle size of Zn1-xMnxO nanoparticles were about 32 – 43 nm. The functional groups and chemical interactions of Mn substituted ZnO samples were also determined at various peaks using FTIR data and observed the presence of function groups in the samples. Dielectric constant and dielectric loss decreases with increasing Mn concentration and frequency. Thus Zn1-xMnxO nanoparticles observed structure, physical, morphological and dielectrical studies can be used in opto-electronics, spintronics and higher frequency applications.

Biography

V. D. Mote has completed his PhD at the age of 26 years from Dr. B. A. M. University, Aurangabad, India. He is the Assistantant professor, Department of Physics, Dayanand Science College, Latur, India. He has published more than 25 papers in reputed journals.

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NANOTEK – 2017

March 11th-13th, 2017, Hamburg, Germany

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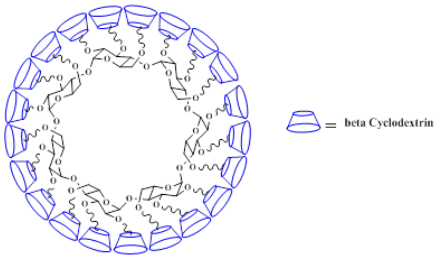
Fabrication of bio dendrimeric anti cancer nano carrier drug delivery agent based on chemically modified β-cyclodextrinusing click reaction

In this work a facile strategy for the fabrication of biodendrimeric ß-cyclodextrin (β -CD) in order to havehigher encapsulation efficacy, with β -CDs moiety to preserve the biocompatibility properties and particularly with higher loading capacity for drugs with certain size was developed.The desired dendrimer, having 21 β -CD residues attached to the primary and secondary faces of core β-CD was prepared through click reactionand its structure was determined using NMR, FTIR, DLS and other spectroscopy and analysis methods. The obtained dendrimer was employed as a host to fabricate supramolecularinclusion complex having methotrexate (MTX) as drug model. The formation of inclusion complex was confirmed through SEM, DLS, DSC and FTIR techniques. The resulted data showed higher encapsulation efficiency (due to presences of dendritic network and cavity of β - CD) and pH-sensing controlled release profile of MTX. The in vitro toxicity results confirmed that the system has very low toxicity on T47D cells. Therefore, thissystem potentially could be utilized as an appropriate nanocarrier for controlled release of DDS in cancer treatment.



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NANOTEK – 2017

March 11th-13th, 2017, Hamburg, Germany

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PLGA-Nanoparticles Mediated Delivery of Anti-Malarial Drugs for the Treatment of Malaria

Malaria is one of the most prevalent parasitic infectious diseases in the world. Treatment of malaria is becoming problematic due to development of resistance in Plasmodium falciparum to the commonly used drug, chloroquine (CQ). Thus there is an urgent need to find either new combined therapies using available drugs or develop new antimalarial drugs to replace failing ones or develop new way of antimalarial drug delivery. It has been reported that monensin is very effective in the treatment of CQ resistant malaria. But it's very short half-life in blood and hydrophobicity limits the antimalarial activity. Poly-lactic acid (PLA) and poly-glycolic acid (PGA) and their copolymers poly-lactic-co-glycolide (PLGA) have been extensively employed for formulating the nanoparticles carrier system because of their biocompatibility, biodegradability and versatile degradation kinetics. We have loaded monensin into PLGA nanoparticles of various compositions by using emulsification solvent evaporation technique to overcome the problem associated with application of monensin in the treatment of malaria. These nanoparticles were characterized by various biophysical techniques like Transmission Electron Microscopy (TEM), Atomic force Microscopy (AFM), Dynamic Light Scattering (DLS), Differential Scanning Calorimetry (DSC) and Fourier Transform Infra-Red Spectroscopy (FTIR). The monensin PLGA-nanoparticles were found to be in spherical shape with relatively monodisperse size. Monensin was found to be in the amorphous state in the nanoparticle matrix and there was no chemical interaction between monensin and PLGA.

We have evaluated the antimalarial activity of monensin in various PLGA nanoparticles in vitro against chloroquine resistant Plasmodium falciparum in culture and Plasmodium berghei infection in mouse model. It was observed that anti-malarial activity of monensin is significantly dependent on the hydrophilicity, chain length and composition of the polymer. Monensin exhibited maximum antimalarial activity both in vitro and in vivo when delivered through PEG-PLGA nanoparticles. Our results clearly showed that monensin in PEG-PLGA nanoparticles might have potential application in malaria chemotherapy.

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March 11th-13th, 2017, Hamburg, Germany

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Iodine Compound Coated Nanoparticles for the Measurement of MR Relaxivities and In Vitro Cytotoxicity

In this paper, we report the synthesis of Gd2O3 nanoparticles coated with iodine compound {3,5-Diiodo-L-tyrosine (DLT)}. The bonding status of DLT coated Gd2O3 nanoparticles (DLT-NPs) were confirmed by FT-IR and TGA. The surface coating amount was estimated to be 73% in weight percent from a TGA analysis. High voltage electron microscope (HR-TEM) shows that DLT-NPs were spherical in shape with an average diameter 2 nm. In addition, the bio-compatibility of the nanoparticles were measured by cytotoxicity test, which has demostatreted that the the cell viability reached upto 60% with Gd concentrations up to 50 mM for both DU145 and NCTC1469 cell lines, making them a promising candidate for biomedical applications. The DLT-NPs showed r1 and r2 of 9.24 and 38.27 s-1 mM-1 respectively.

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March 11th-13th, 2017, Hamburg, Germany

Seda Demirel Topel

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Production of Theranostic Bio-Platforms Based on Cellulose Capsules Containing up Conversion Nanoparticles for Potential Drug Delivery Applications

Recently it has been of great interest in the development of the theranostic platforms combining diagnosis and therapy in one formula, which may specifically target the cancer cells and image them simultaneously1. In this study, it has been developed a novel theranostic platform based on cellulose micro/nanocapsules containing luminescence upconversion nanoparticles (UCNP). UCNPs have the ability of converting of near infrared light (NIR) to UV/visible light. Therefore, this property of those UCNPs provide many advantages such as enhanced tissue penetration, low photodamage, minimal auto-fluorescence background and improved resistant to photobleaching and blinking[2]. Size and morphology of the designed cellulose based bio-platforms containing UCNPs have been characterized by scanning electron microscopy (SEM), transmission electron microscopy (TEM) and X-ray diffraction (XRD) techniques, while the encapsulation of UCNPs with cellulose acetate was confirmed by Fourier transform infrared spectroscopy (FTIR) and thermogravumetric analysis (TGA).Luminescence properties of the UCNPs and resultant bio-platform under NIR light were also investigated at room temperature. pH controlled drug release studieswith a well-known chemotherapy drug, doxorubicin (Dox) have been also studiedunder the different pH values.

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2. Tian et al. Adv. Mater. 2015, 27: 7692–7712.

Biography:

Dr. ÖnderTopel is an Assistant Professor in Department of Chemistry at Akdeniz University, Antalya-Turkey. He received his Ph.D in Chemistry in 2009. His research interests include design and synthesis of multifunctional nanoparticles (magnetic, fluorescent etc.) for biological applications and characterized them by physicochemically as well as characterization of structures in solution by EXAFS spectroscopy.

NANOTEK – 2017

March 11th-13th, 2017, Hamburg, Germany

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Construction of Serum-resistance Cationic Polymer α-CD-PAMAM and evaluation of its performances as Gene Delivery Vector

Polyamidoamine (PAMAM) dendrimers as synthetic gene vectors have been proved to be efficient gene delivery systems. In this study, a kind of α-Cyclodextrin-PAMAM conjugates polymer was synthesized as gene delivery vector. Based on 1H- NMR detectation, about 6.4 PAMAM-G1 molecules was grafted onto an α-CD core. Agarose gel electrophoresis results revealed that CyD-G1 could efficiently bind with DNA and condensed them into nano-scale particles which showed similar binding capacity of PEI-25K. Besides, it could protect DNA from DNase I degradation in a low N/P ratio. When N/P ratio in the CyD-G1/DNA polyplex was 40, the average particle size of CyD-G1/DNA polyplex was about 120nm, and zeta potential was +21mv. Also, this polyplex could maintain its particle size in serum-containing solution within 360min. In comparison with PEI-25K carrier, CyD-G1 showed low cytotoxicity in various cell lines. Cell transfection results showed that CyD-G1 could efficiently deliver DNA into cells at N/P=80 compared with Lipofectamine2000 and PEI-25K. Unlike Lipofectamine2000 and PEI-25K, in serum-containing test condition, CyD-G1/DNA polyplex could maintain the transgene activities. The results of confocal laser scanning microscopy indicated that most DNA entered into cell nuclei within 4h, and this phenomenon was consistent with the results calculated by flow cytometry. Above all, CyD-G1 showed good transgene activities and this gene delivery vector could be used not only for in vitro but also for in vivo testing.

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March 11th-13th, 2017, Hamburg, Germany

Salma Mirza

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A New MOF-Derived Carbon Porous Material (CPMs) for Electro-Catalysis

Nanotechnology, an interdisciplinary field of research, it would be described because of the unique design, characterization, synthesis and their applications in diverse devices and systems which are controlled by their small size to volume ratio in nano scale. The emerging demand of fuel for the power source throughout the world today urges wide exploration in this field. Metal-organic frameworks (MOFs) have appeared as a significant class of crystalline nanoporous materials, assembled from metal linked with organic ligands to support and stabilize metal NPs as they have shown numerous elite properties specifically, high surface area, diversity; tunable fine pores to hold metal NPs. Currently, Pd based carbon porous materials (CPMs) have been used to replaced the Pt loading to decrease the cost in fuel cell technology. In this regard, we have developed Pd based CPMs derive from MOF. The synthesized Pd/Cu-NPs were studied for improved small organic molecules (SOMs) electro-oxidation property for C1-C3 alcohols in alkaline medium. Moreover, cyclic voltammetry (CV), Chronoamperometry and electrochemical impedance spectroscopy (EIS) have illustrated the good electrochemical stability of these synthesized nanomaterials. Since Pd/Cu-NPs could serve as a promising nanomaterial for the electro-oxidation of (SOMs) and probably suitable in fuel cell applications.

Keywords: nanoparticles, fuel cell, electro-catalysis

Biography:

Miss Salma Mirza is pursuing PhD studies in Chemistry with the Fujian Institute of Research on the Structure of Matter, Chinese Academy of Sciences. She is awarded CAS-TWAS President's Fellowship 2015. She received Master of Philosophy degree in Organic Chemistry from International Centre for Chemical and Biological Sciences (ICCBS) 2014, master's and bachelor's degree in Chemistry from Department of Chemistry, University of Karachi Throughout her M. Phil studies she was awarded ICCBS Research Fellowship. In 2014, she was awarded first prize on Poster in International conference held in Lahore for her academic achievement. Her current research interest found in nanotechnology specifically nanomaterials designing and their applications and at this time she is working in this interdisciplinary field of science.

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March 11th-13th, 2017, Hamburg, Germany

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Effects of Hydrophobic Agent on Mechanical Properties of Dental Nano-Composites

Resin based nano-composites are used extensively as dental restorative materials. Composites are absorb water slightly depends on their chemical composition. Mechanical properties of composites are affected significantly by this phenomena.

The aim of this study is investigate changing in mechanical properties of nano-composites with water sorption and decrease amount of water sorption by incorporating hydrophobic agents into the organic network. For this purpose, diurethane dimethacrylate (DUDMA) bisphenol A glicidyl dimethacrylate (bisGMA) triethyleneglycol dimethacrylate (TEGDMA) as form polymeric network, silanated ceramic particles of various sizes as filler and Camphorquinone (CQ) as a photoinitiator were used. Butyl methacrylate, isobutyl methacrylate, t-butyl methacrylate, lauryl methacrylate and hexyl methacrylate were used as hydrophobic agents for decrease water sorption of dental nano-composite. The mechanical properties of composites such as flexural strength and compressive strength were measured by using universal test machine. The test samples were kept in water with different time before test performed. The results of flexural and compressive test were considered depend on soaking time in water, type and amount of hydrophobic agent.

Biography:
Nadir Kirazwas born in Germany on January9, 1980. He received his Ph.D in Chemistry in 2011. He is currentlyan Assistant Professor in Department of Chemistry at Akdeniz University, Antalya-Turkey. His current research is focused on design and synthesis of multifunctional nanoparticles, Sol-gel Chemistry and polymer based composite systems.

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March 11th-13th, 2017, Hamburg, Germany

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Synthesis of Polyamidoamine Dendrimer for Encapsulating Tetramethylscutellarein for Potential Bioactivity Enhancement

The biomedical potential of flavonoids is normally restricted by their low water solubility. However, little has been reported on their encapsulation into polyamidoamine (PAMAM) dendrimers to improve their biomedical applications. Generation four (G4) PAMAM dendrimer containing ethylenediaminetetraacetic acid core with acrylic acid and ethylenediamine as repeating units was synthesized by divergent approach and used to encapsulate a flavonoid tetramethylscutellarein (TMScu, 1) to study its solubility and in vitro release for potential bioactivity enhancement. The as-synthesized dendrimer and the dendrimer–TMScu complex were characterized by spectroscopic and spectrometric techniques. The encapsulation of 1 into dendrimer was achieved by a co-precipitation method with the encapsulation efficiency of 77.8% _ 0.69% and a loading capacity of 6.2% _ 0.06%. A phase solubility diagram indicated an increased water solubility of 1 as a function of dendrimer concentration at pH 4.0 and 7.2. In vitro release of 1 from its dendrimer complex indicated high percentage release at pH 4.0. The stability study of the TMScu-dendrimer at 0, 27 and 40 _C showed the formulations to be stable when stored in cool and dark conditions compared to those stored in light and warmer temperatures. Overall, PAMAM dendrimer-G4 is capable of encapsulating 1, increasing its solubility and thus could enhance its bioactivity.

Keywords: PAMAM G4 dendrimer; encapsulation; tetramethylscutellarein; solubilization; in vitro release; stability.

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NANOTEK – 2017

March 11th-13th, 2017, Hamburg, Germany

Iman Hejazi
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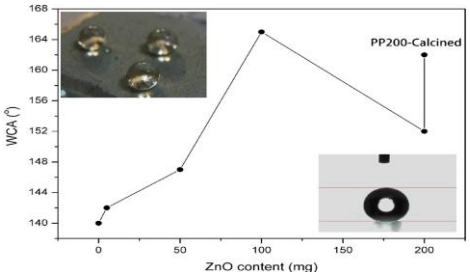
Surface Micro/Nano Structure Affects on in Cell Adhesion Behavior of Superhydrophobic Polypropylene/Nanosilica Surfaces

Current study was to investigate the effects of different topographical features on the biological performance of polypropylene (PP) / silica coatings. To this end, a novel method including combined use of nano particles and non-solvent was used for preparation of super hydrophobic PP coatings. The proposed method led to a much more homogeneous appearance with a better adhesion to the glass substrate. Moreover, a notable reduction was observed in the required contents of nanoparticles (100–20 wt% with respect to the polymer) and non-solvent (35.5–9 vol%) for achievingsuperhydrophobicity.

Surface composition and morphology of the coatings were also investigated via X-ray photoelectron spectroscopy and scanning electron microscopy. Based on both qualitative and quantitative evaluations, it was found that the superhydrophobic coatings with only nano-scale roughness strongly prevented adhesion and proliferation of 4T1 mouse mammary tumor cells as compared to the superhydrophobic surfaces with micro-scale structure. Such results demonstrate that the cell behavior could be controlled onto the polymer and nanocomposite-based surfaces via tuning the surface micro/nano structure.



Water contact angle values in terms of MEK content (non-solvent content in10 mL solvent)

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March 11th-13th, 2017, Hamburg, Germany

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Investigation of Photonic Interactions between Germanium Nanostructures and Fluorescent Dye Molecules via Fluorescence Lifetime Imaging Microscopy

Nanoscale photonic interactions between difluoro {2-[1-(3,5-dimethyl-2H-pyrrol-2-ylidene-N)ethyl]-3,5-dimethyl-1H-pyrrolato-N}boron (BODIPY) flouresent dye molecules and germanium nano surface are investigated by home-made fluorescence lifetime imaging microscopy system. Structures are obtained by electrochemical anodization of n-type Sb doped (100) oriented germanium (Ge) wafers with resistivity of 0.01 Ω-cm. Ge wafers are etched in an electrochemical double cell with a HF:C2H5OH (1:3) electrolyte solution at room temperature. After fabrication of Germanium nanostructures, samples are silanized by 3-aminopropyltriethoxylsilane (APTES) in order to attach commercial BODIPY dye molecules to germanium surface. Home-made fluorescence lifetime imaging microscopy system is prepared for fluorescence imaging and lifetime measurements. Free space fluorescent properties of dye molecules are compared with attached dyes to flat and nano structured Ge surface.

Keywords: Germanium, electrochemical anodization, pulsed laser, nanostructures, fluorescence lifetime, microscopy.

Acknowledgments: This work is supported through research grants from The Scientific and Technological Research Council of Turkey (TUBITAK) with a project number of 114F451.

Biography:
I am HasanYüngeviş, doctoral student at Selçukuniversity and teaching assistant at Karamanoğlu Mehmetbey Universty. I received my B.S. and MSc. from AnadoluUniversty Materials science and engineering department. I am working as teaching assistant at KaramanoğluMehmetbey University for 4 years.I studied on sytnhesis of CoFe2O4 during my MSc. studies. I am still working on forming Ge and GaAs nanostructures and their interactions with flouresent dye molecules.

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Inclusion of FeCl3 in Sol-Gel Ti02 Nanoparticles: Spectroscopic Studies

Utilizing a sol-gel process, Fe-TiO2 materials containing 0.1, 1, 5 and 10% weight of iron were prepared at pH 3 or pH 9 using HCI or NH4OH as hydrolysis catalyst respectively. Thenceforth, the samples were annealed at 200°C, 400°C, 600°C and 800°C under airflow during 4 hours and characterized by X-ray diffraction, N2 adsorption-desorption (BET), infrared spectroscopy (FTIR), X-ray photoelectron spectroscopy (XPS), Raman spectroscopy and Electron Paramagnetic Resonance (EPR). The catalytic activity of the materials was tested on a toluene combustion reaction. The results show that the cogelled iron with n-titanium butoxide slows down the anatase crystal growth. Samples of increasing iron content generate crystal size reduction. This effect is stronger passing from 0.1% to 5% Fe, but becomes weaker from 5% to 10% Fe.

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March 11th-13th, 2017, Hamburg, Germany

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Polymer Nanocomposites for Medical and Space Applications

Nanotechnology is an emerging technology with enormous potential in information and communication technology, biology and biotechnology, medicine and medical technology. It is an umbrella term that is used to describe a variety of techniques to fabricate materials and devices on the nanoscale. It t is a capable and promising forthcoming technology with its applications being unlimited, in almost every branch of the sciences. Nanotechnological techniques comprise of semiconductor fabrication such as deep ultraviolet lithography, electron beam lithography, focused ion beam machining, nanoimprint lithography, atomic layer deposition, molecular vapor deposition, and further sophisticated techniques including molecular self-assembly. Over the next five years we will see significant introduction of nanomaterials and novel production processes based on Nanotechnology which will address key issues of importance to the electronics industry. Displays for many new TVs, laptop computers, cell phones, digital cameras, and other devices incorporate nanostructured polymer films known as organic light-emitting diodes, or OLEDs. OLED screens offer brighter images in a flat format, as well as wider viewing angles, lighter weight, better picture density, lower power consumption, and longer lifetimes. Nano-engineered materials in the food industry include nanocomposites in food containers to minimize carbon dioxide leakage out of carbonated beverages, or reduce oxygen inflow, moisture outflow, or the growth of bacteria in order to keep food fresher and safer. Nanosensors built into plastic packaging can warn against spoiled food. Nanosensors are being developed to detect salmonella, pesticides, and other contaminates on food before packaging and distribution. Prototype solar panels incorporating nanotechnology are more efficient than standard designs in converting sunlight to electricity, promising inexpensive solar power in the future. Nanostructured solar cells already are cheaper to manufacture and easier to install, since they can use print-like manufacturing processes and can be made in flexible rolls rather than discrete panels. Nanotechnology-enabled sensors and solutions may one day be able to detect, identify, and filter out, and/or neutralize harmful chemical or biological agents in the air and soil with much higher sensitivity than is possible today. Researchers around the world are investigating carbon nanotube “scrubbers,” and membranes to separate carbon dioxide from power plant exhaust. And researchers are investigating particles such as self-assembled monolayers on mesoporous supports, dendrimers, carbon nanotubes, and metalloporphyrinogens to determine how to apply their unique chemical and physical properties for various kinds of toxic site remediation.

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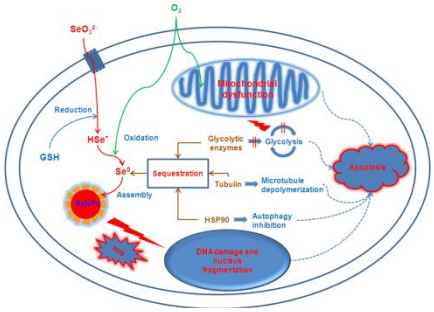
Peng Bao

Selenite-Induced Toxicity in Cancer Cells is Mediated by Metabolic Generation of Endogenous Selenium Nanoparticles

Selenite has been a touted cancer chemopreventative agent but has given conflicting outcomes. However, due to environmental depletion of this trace element, there's a need to understand its intracellular mechanisms of action towards facilitating supplementation. We observed that intracellular metabolism of selenite generates endogenous selenium nanoparticles (SeNPs) in cancer cells. Critical proteins that bind with high-affinity to elemental selenium during SeNPs self-assembly were identified through proteomics analysis; these include glycolytic enzymes, insoluble tubulin and heat shock proteins 90 (HSP90). Sequestration of glycolytic enzymes by SeNPs dramatically inhibits ATP generation, which leads to functional and structural disruption of mitochondria. Transcriptome sequencing showed tremendous down-regulation of mitochondrial respiratory NADH dehydrogenase (complex I), cytochrome c oxidase (complex IV) and ATP synthase (complex V) in response to glycolysis-dependent mitochondrial dysfunction. Sequestration of insoluble tubulin led to microtubule depolymerization, altering microtubule dynamics. HSP90 sequestration led to degradation of its downstream effectors via autophagy, ultimately resulting in a cell-signaling switch to apoptosis. Additionally, the surface effects of SeNPs generated oxidative stress, thus contributing to selenite cytotoxicity. Herein, we reveal that the multiple mechanisms of selenite-induced cytotoxicity are caused by endogenous protein-assisted self-assembly of SeNPs, and suggest that endogenous SeNPs could be potentially primary cause of selenite-induced cytotoxicity. Moreover, the assembly and disassembly of endogenous SeNPs proceeds simultaneously with the sequestration and release of SeNPs high-affinity proteins. This dynamic flux of endogenous SeNPs amplifies their cytotoxic potential in cancer cells, thus provide a starting point to design more efficient intracellular self-assembling systems for overcoming multidrug resistance.



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NANOTEK – 2017

March 11th-13th, 2017, Hamburg, Germany

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Active Nanotargeted Drug Delivery in Cancer Therapy

Conventional anticancer drugs exhibit a lack of specificity, poor solubility and distribution, unfavorable pharmacokinetics and high tissue damage or toxicity. Targeted nanotechnology such as passive and active targeting nanocarriers, have been developed to transform current treatment systems by providing more efficient cancer diagnostics and therapeutics. Today, Two therapeutic nanocarrier- liposomes and albumin nanoparticles have been approved by US FDA for clinical practices. In our researches, we customized nanoscale constructs as targeted drug delivery vehicles capable of delivering some chemotherapeutic agents into malignant cells, greatly increasing their cytotoxicity effects and reducing their side-effects that usually accompany many current cancer therapies (1-4).

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Multifunctional Nanoparticles for Cancer Diagnosis and Treatment

Cancer is the second leading cause of death worldwide, with about 7.6 million deaths reported in 2008 (13% of all deaths).This figure isestimated to reach13.1 million in 2030. Lung, stomach, liver, colon, prostate and breast cancer were reported to cause the highest death rates. 70% of all cancer deaths in 2008 were in low- and middle income countries. Even in the case of successful treatment, side effects of the current therapy cause significant damage to several vital organs, resulting in reduced efficiency of these organs and consequently lowering overall quality of life. Therefore, developing selective drug-delivery systems is highly warranted.

Recent investigations have shown that nanomaterials show great potential specifically in biosensing, drugdelivery, bioimaging, and biocomposites.Multifunctional nanoparticle systems are considered most promising candidates for in vivo diagnosis and treatment of cancers. They are a new typeof theranostics agents which, beside their capability to carry therapeutic payloads made to selectively target specific cells or organs, can also be constructed to contain diagnostic agents capable of detection and visualization.

Our recent applications using multifunctional nanoparticles based on biodegradable material, incorporating different visualization agents such as superparamagnetic iron oxide nanoparticles (SPION), Alexa680 and fluorescent Quantum Dots (QDs) and their use as contrast agents for Magnetic Resonance Imaging (MRI), in vivo imaging system (IVIS) and photo acoustics. Moreover, we were able to load the alkylating agent (busulfan) into biodegradable nanoparticles for slow release delivery. MRI studies showed an enhancement in T2 contrast superior to commercial contrast agents. We conclude that with these polymeric/inorganic multifunctional nanoparticles, MRI, photo acoustics and IVIS visualization investigations can be performed with high accuracy. Drug loading and releasing are of sufficient concentration to be utilized for treatment. Preclinical studies to evaluate the present theranostic agents in cancer diagnosis and treatment are ongoing.

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Carbon Nanotube Field Effect Transistor: An Opportunity for High Performance in Nano Device

In terms of electronics properties, carbon nanotube shows an excellent performance as a nano size material. A phenomenological performance is presented in this research for the field effect transistor using carbon nanotube (CNT) technology. CNTs have small band gap compare to other traditional semiconductor technologies. The modeling of a single wall nanotube with optimum bandgap for the designing of the carbon nanotube (CNTFET) is the aim of this work. Analysis of I-V characteristics of CNTFET with the drain current-voltage analytical relation enables the lower energy consumption from the proposed design. In this research, the optimum carbon nanotube (CNTs) is analyzed where the bandgap is 0.45eV as well as the diameter is 1.95nm. Modeling of CNTFET will be useful for semiconductor industries in order to manufacture the nano scale device.

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Curcumin - Loaded Nanoparticles Linked to Homing Peptides Used for Breast Cancer Treatment

Despite the numerous biological activities and modulation of multiple targets, curcumin has not yet been widely introduced in clinical use due to its low water solubility, limited bioavailabilities in different routes of administration, short half-life, and rather quick medium-dependent hydrolysis and degradation.

To contrive against the obstacles in physicochemical properties of curcumin, various carriers and delivery systems have been introduced in the past two decades. Among a multitude of potential vehicles, the prospective effects of the liposomes and lipid-structures in improving the pharmacokinetic and dynamic of turmeric compounds have numerously been reported in recent studies. Besides, peptides that modulate cancer cell specific molecular pathways have a great potential as anticancer therapeutics. Among them, peptides that induce cell death via apoptosis have attracted ever-increasing attention.

Tumor homing peptides and peptidomimetics containing RGD or NGR motifs have been exploited for targeting of therapeutics or diagnostics to cells with an overexpression of αυß integrin family of adhesion receptors. On the other hands, studies have demonstrated that KLA peptides with a sequence of (KLAKLAK)2 can induce apoptosis in cancer cells. However, cell internalization is perceived as a major obstacle for development of such pharmaceutically useful peptides. Many efforts have been done to optimize ACP properties through two approaches: computational design and delivery systems. Among the carriers, gold nanoparticles offer a safe delivery platforms for anticancer agent development.

Self-assembled structures were prepared from the oleyl-peptide at pH 3, 5.5, and 7. Curcumin was also dispersed in aqueous phase at neutral pH and was further separated from the colloidal particles and precipitates through filtration.

According to the results, the more cytotoxicity and cellular uptake by T47D and MCF-7 breast cancer cells were observed for the smaller NPs in size an aspect ratio (AR) in which T47D cells was more sensitive than MCF-7 cells. The MTT results were confirmed by the morphological changes for the cancer cells exposed to NPs. Our finding suggested that the biological and pro-apoptotic effects of the mitochondrial targeting peptide were tuned by P-AuNPs upon their size and shape.

Keywords: Curcumin delivery, nanoparticles, peptide, breast cancer cell, apoptosis.

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NANOTEK – 2017

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Hassan A Hemeg

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Nanomaterials for Antimicrobial Therapy

Despite an array of potent antibiotics, bacterial infections, particularly those caused by nocosomial pathogens that target the severely ill, hospitalized and immunocompromised patients, remain a major cause of morbidity and mortality around the globe. The antimicrobial therapy is mostly empirical and not bereft of toxicity, teratogenicity and mutagenicity. The emergence of multi-drug resistant (MDR) strains further aggravates the clinical problem because of the reduced potency of existing antibiotics. There is a growing concern regarding biofilm-associated infections that are refractory to the currently available antimicrobial armory. Thus, there is a pressing need to develop alternate bactericidal agents.

The past decade has witnessed a substantial surge in the global use of metal and metal oxide nanoparticlesfor combating antimicrobial resistance. The microbes are eradicated either by microbicidal effects of the nanoparticles such as release of free metal ions, cell membrane damage, DNA interaction, free radical generation, or by microbistatic effects followed by killing potentiated by the host's immune system. The mechanisms by which conventional and green nanomaterials annihilate MDR bacteria will be discussed. Combinatorial therapeutic approach with the metallic nanoparticles as adjunct to the existing antibiotics and may help to curb the mounting menace of bacterial resistance and nocosomial threat.

Biography:

Dr. Hassan A. Hemeg completed Masters in Pathological Science from Sheffield University, UK and Ph.D. from King Abdulaziz University, Jeddah, Saudi Arabia. He has earned several honors such as Fellow of Institute of Biomedical Science, UK and Certified Canadian Accreditation Specialist for Health Care Facilities. He acquired training in Microbiology from Sheffield and Bristol Universities, U.K.; and U.S. Department of Labor, Occupational Safety and Health Administration. He is a member, Secretary and Chairman of several Committees. His research interest is in the field of antimicrobial resistance. He has published several papers in Journals of International repute and is an Editor of InTech Book.

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NANOTEK – 2017

March 11th-13th, 2017, Hamburg, Germany

Farhat Afrin

Taibah University, Madinah, KSA

Vesicular Formulation of Artemisinin for Therapy of Murine Visceral Leishmaniasis

Visceral leishmaniasis (VL) is a fatal, vector borne tropical disease caused by intracellular protozoa of the genus Leishmania. In the absenceofvaccines, chemotherapyremains the mainarmament in controlof VL, a neglecteddiseaseofpoverty. Existing therapeutics are ineffective, expensive or have side effects coupled with emergenceofresistance, HIV co-infection and post kala-azardermalleish manias is after apparent cure.

Artemisinin is a sesquiterpenelactone with potent antileishmanial activity. However, its lipophilicity limits its accessibility to parasitized macrophages. To enhance its bioavailability and stability with targeted delivery to macrophages, we incorporated artemisinin in nanoliposomes. Nanoliposomalartemisinin (NLA) prepared by thin film hydration and optimized using Box-Behnkehn design, had particle size, polydispersity index, zeta potential and drug loading of 83 nm, 0.2, -27.4 mV and 33.2 %, respectively. NLA was free from concomitant signs of toxicity and significantly denigrated the intracellular Leishmaniaamastigotesex-vivo (IC506.0 μg/ml). Following treatment in murine model of VL, NLA conferred 82.1 and 77.6 % protection in the liver and spleen, respectively coinciding with modulation of cell mediated immunity towards Th1 type. Ours is the first report on the use of nanoliposomal delivery system of artemisinin as a promising alternative intervention against VL.

Biography:

Dr. Farhat Afrin received Ph.D. from Indian Institute of Chemical Biology, Kolkata, India. She served Department of Biotechnology, Hamdard University, New Delhi, India for 16 years. She also worked at National Institutes of Health, Bethesda, MD, USA and Centre for Immunology and Infection, University of York, UK. She is a recipient of several honors including American Association of Immunologists Young Faculty Travel Grant, Commonwealth Academic Staff fellowship. Her research interest is parasite immunology with emphasis on Leishmaniaimmunotherapeutics. She has published over 55 papers in Journals of International repute and is an Academic Editor, Editorial Board member and reviewer of several Journals.

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NANOTEK – 2017

March 11th-13th, 2017, Hamburg, Germany

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Advances in Nanomaterials Research for Waste Water Remediation

Nano size materials offer unique and sometimes unexpected material properties. This means that at the nano scale, materials can be 'tuned' to build faster, lighter, stronger, more efficient and stimuli responsive materials. Such properties of nanomaterials provide a platform for eco-toxicological based research investigations. Clean water is always essential which often calls for a cheap and efficient water purification system. Nanomaterials are being used to develop more cost-effective and high-performance water treatment systems. Nanomaterials in water research have been extensively utilized for the treatment, remediation, and pollution prevention. The focus of my talk will be to provide an overview of the nanomaterials for water remediation.

Biography

Ajay Kumar Mishra has completed his PhD from University of Delhi, India and postdoctoral studies from University of the Free State and University of Johannesburg, SA. He is currently working as Professor at NanoWS, University of South Africa, South Africa. He is also Adjunct Professor at Jiangsu University, China. He has published more than 10 papers in reputed journals and has been serving as an editorial board member of repute. Also he has edited many books thus far in reputed journals besides serving as associate editor to few journals of renowned publishers.

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Biosynthesis of Nanoparticle: A journey through different cohorts of Nature.

Mother Nature is occupied with preparing a plethora of nanomaterials having different types and dimensions towards their utilization with a zeal to nurture its constituent congeners.This has indeed led to an attractive adaptability and subsequently the amazing diversity which broadly ranges right from magnetotactic bacteria to mollusks and human beings and from cyanobacteria to giant tree ferns and pines all are ensuing the theories of thermodynamics and principles of supramolecular chemistry which are being operated at the nanometer scale.

On the other hand, biotechnology utilizes the biological principles and techniques that manage molecular, genetic and cellular procedures to develop various products and their uses in diverse fields from medicine, environment to agriculture. Furthermore, nanobiotechnology is considered as unique amalgamation of biotechnology and nanotechnology into which possibilities seem exponential.

We have taken use of benign microbes, plants, lower animalsand higher animal processing wastes to synthesize a variety of nanomaterials for bio-medical as well as technological applications which will be discussed during presentation.

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Debasis De

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Fabrication of Solar Cells Using Nanostructured ZnO Photo-Anode and Mixed Natural Dye Sensitizer

The dye-sensitized solar cell (DSSC), considered as third generation solar cell, is simple in construction and low cost promising photochemical electric cell. The DSSC is composed of photo anode, dye, electrolyte and counter electrode. The transparent conducting glass basically indium tin oxide (ITO) coated with wide band gap semiconducting metal oxide (SMO) acts as photo anode. The cost effective natural dye performs as an efficient solar cell sensitizer for absorbing photon from light energy.

In this work, the DSSC is fabricated using ZnO as a photo anode with two different natural dyes (purple cabbage and beet root extract) and their mixture as photo-sensitizer. Nanostructured ZnO is deposited on ITO using a simple and cost effective chemical bath deposition technique. The field emission scanning electron microscopic images show oriented hexagonal patterned ZnO nano-towers (tower height ~5 μm and 1 μm diameter) and each tower is further decorated throughout the top few nanometers with several nanosteps. At the top of the nano-tower, a perfectly hexagonal patterned ZnO surface with ~ 250 nm sides is observed. The natural dyes extracted from fresh purple cabbage and turmeric and their mixed (1:1) counterpart are used as a photo-sensitizer for the DSSC. The UV-vis absorption spectra are used to identify the characteristic absorption peaks of the extracted natural dyes and their mixed counterpart. The mixed dye shows wider absorption band-groups over 350-710 nm as compare to purple cabbage (455-690 nm) or turmeric (350-600 nm). The I-V& P-V curves of the fabricated DSSCs are measured under simulated light (100 mw/ cm2). The highest visible light to electric conversion efficiency of 0.7124% is observed in the mixed dye as compare to 0.1215% in purple cabbage and 0.23% in beet root. The highest efficiency is observed due to the absorption of wider range of solar spectrum.

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Nonlinear vibration of Hyper-elastic Micro-beam Based on First Shear Deformation

The present study investigates nonlinear vibration of dielectric elastomer–based micro-beam. The nonlinear terms in beam equation are geometric and material one. Geometric nonlinearity is considered by Von-Karmann strain displacement relationship and the material nonlinearity is modeled with Yeoh hyper-elastic model. The governing equation is solved by Lindstedt-Poincare method and is validated with numerical method. The results show an excellent agreement between analytical and numerical methods. In addition, influence of different parameters such as mode numbers, beam thickness, length and aspect ratio on normalized frequency is studied in this research. Also the stress-strain law is investigated for such materials.

Keywords:-Nonlinear vibration; Hyper elastic; Lindestedt; First shear deformation

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Mohamed Ahmed Aly
German University in Cairo

Graphene oxide and Silver Nanoparticle-based Photo-Nancomposites as Musca Domestica Larvicidal and Insecticidal

Musca Domestica (house fly) is a transmitter vector for several diseases such as typhoid, cholera and dysentery and thus resembles a serious health problem. Trying to avoid the major side effects of conventional house fly control approaches, photothermal and photodynamic therapy are combined in this study.

Objective: This study aims to control Musca Domestica through a lab-made and fully characterized nanocomposite composed of either graphene oxide or silver nanoparticles combined with the natural photosensitizer; chlorophyllin.

Methods: Citrate reduction method and grapheme oxidation reactions were carried out to synthesize silver nanoparticles and graphene oxide sheets, respectively. They were characterized using characterization techniques such as TEM imaging and UV spectrum analysis. The photo-nanocomposites were then synthesized and characterized before being used for PDT studies on either adults or larvae using the white light produced by a 500-watt mercury lamp as an irradiation source. Flies were bred to guarantee a pure colony. The number of viable flies and larvae after each treatment was counted and compared to the respective control after the irradiation.

Results: Spherical silver nanoparticles were successfully synthesized and they were 10-40 nm in diameter while graphene oxide nanosheets were produced with high integrity. None of the composites showed an intrinsic toxicity and only the graphene oxide nanocomposites showed a 100% larvicidal after 4 hours of incubation with 10-5 M followed by irradiation for 1 hour. As for the insecticidal activity, 24 hour of incubation was needed followed by 2 hours of sun light exposure.

Conclusions: The followed synthesis method was successful in producing the nanocomposites and the latter showed promising larvicidal and insecticidal activities.

Biography:

- A graduate from from German University in Cairo, faculty of Pharmacy and biotechnology.
- Pursuing the master's degree in the Pharmaceutical technology field at the German University in Cairo under supervision of Prof. Mahmoud H. Abdel-Kader and Dr. Sara Abdel-Gaber.

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Liqiu Wang

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Engineering Droplets with Microfluidics

Droplets of nanoliter and subnanoliter are useful in a wide range of applications, particularly when their size is uniform and controllable. Examples include biochemistry, biomedical engineering, food industry, pharmaceuticals, and material sciences. One example of their many fundamental medical applications is the therapeutic delivery system for delivering site-specific therapy to targeted organs in the body and as the carriers for newer therapeutic options. The size, the size distribution, the generation rate and the effective manipulation of droplets at a scale of nano, pico, femto and even atto liters are critical in all these applications. We make an overview of microfluidic droplet generation of either passive or active means and report a glass capillary microfluidic system for synthesizing precisely controlled monodisperse multiple emulsions and their applications in engineering materials, nanofluids, microfibers, embolic particles and colloidosome systems. Our review of passive approaches focuses on the characteristics and mechanisms of breakup modes of droplet generation occurring in microfluidic cross-flow, co-flow, flow-focusing, and step emulsification configurations. The review of active approaches covers the state-of-the-art techniques employing either external forces from electrical, magnetic and centrifugal fields or methods of modifying intrinsic properties of flows or fluids such as velocity, viscosity, interfacial tension, channel wettability, and fluid density, with a focus on their implementations and actuation mechanisms. Also included is the contrast among different approaches of either passive or active nature.

Biography:

Prof. L. Q. Wang received his PhD from University of Alberta (Canada) and is currently a full professor in the Department of Mechanical Engineering, the University of Hong Kong. He is also the Qianren Scholar (Zhejiang) and serves as the director and the chief scientist for the Laboratory for Nanofluids and Thermal Engineering, Zhejiang Institute of Research and Innovation (HKU-ZIRI), the University of Hong Kong. He has over 30 years of university experience in thermal & power engineering, energy & environment, transport phenomena, materials, nanotechnology, biotechnology, and applied mathematics in Canada, China/Hong Kong, Singapore and the USA. Prof. Wang has secured over 70 projects funded by diverse funding agencies and industries including the Research Grants Council of Hong Kong, the National Science Foundation of China and the Ministry of Science and Technology of China, and has published 10 books/monographs and over 340 book chapters and technical articles, many of which have been widely used by researchers all over the world. He is on

the list of the top 1% most cited scholars. He has also filed 22 patent applications and led an international team in developing a state-of-the-art thermal control system for the Alpha Magnetic Spectrometer (AMS) on the International Space Station. The AMS project is headed by Professor Samuel C. C. Ting (Nobel laureate in Physics, MIT, USA) and is to search for antimatter, dark matter and spectra of cosmic rays.

Prof. Wang was visiting professor of Harvard University (2008) and Duke University (2003). He has presented over 35 invited plenary/keynote lectures at international conferences, and serves/served as the editor-in-chief for the Advances in Transport Phenomena, the editor for the Scientific Reports, the associate editor for the Current Nanoscience, the guest editor for the Journal of Heat Transfer, the Nanoscale Research Letters and the Advances in Mechanical Engineering, and serves on the editorial boards of 19 international journals.