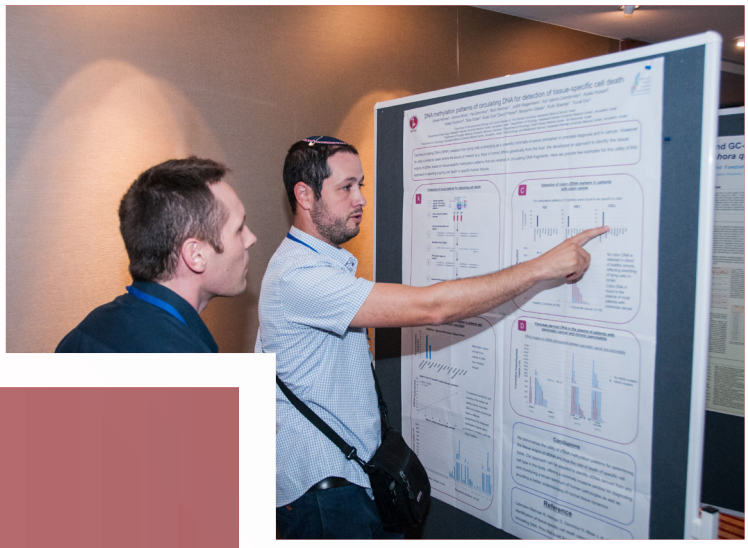
21st World

NANOTECHNOLOGY CONGRESS

October 15-17, 2018 Dubai, UAE



Scientific Tracks & Abstracts (Day 1)

Ahmed Abushomi, J Nanomed Nanotechnol 2018, Volume 9
DOI: 10.4172/2157-7439-C9-091

Engagement strategy to transform nanotechnology based product from theories to the factory floor in the Middle East

Ahmed Abushomi
University of Oxford, UK

This study is to present a case commonly seen across industries, where there are several innovative ideas represented that are never reached successfully to the market. There are key factors contributing to this case, a relevant analysis is conducted and then strategic recommendations are given based on the results observed. The aim is to enable investors, governments and decision makers in major companies to visualize the full potential of nanotechnology and understand the missing key in industries that inhibit such transformation. The challenges start by recruiting the right talents to work towards nanotechnology innovations, this begin from education at higher institutes, schools and organizations and touch on various factors beyond that. In the Middle East, there are multiple nanotechnology patents, few companies have established commercialization of nanotechnology products, the toxicity and regulations of nanomaterials is still uncertainty and R&D spending low. However, some examples are seen but are not yet to be successfully commercialized. Therefore, developing commercialization plan of products, monitoring of regulations and international standards, fostering R&D at academic and industrial level and developing the public engagement strategy are required. These steps are essential which will allow industries to engage in the development of nanotechnology product's life cycle and provide efficient solutions using this technology that will be presented to the market. In conclusion, there are real reasons for successful products that failed to reach the market. These will be encapsulated by giving recommendations which is adapted to demonstrate success in launching nanotechnology integrated products.

Biography

Ahmed Abushomi pursing his Postgraduate studies in Nanotechnology at the University of Oxford and is also the Postgraduate Student Representative of Nanotechnology at the University of Oxford. He has completed his Bachelor of Engineering from the Department of Electrical and Electronics Engineering at the University of Nottingham holding multiple professional certificates in innovation and leadership from the Massachusetts Institute of Technology and was awarded a professional certificate in Energy Innovation and Emerging Technologies from Stanford University.

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Junyuan Xu et al., J Nanomed Nanotechnol 2018, Volume 9
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Earth-abundant nano-catalysts for clean hydrogen fuel generation through water splitting

Junyuan Xu and Lifeng Liu
International Iberian Nanotechnology Laboratory, Portugal

Hydrogen (H_2) has been proposed to be a clean and carbon-neutral energy carrier that can be used as next-generation fuel to fulfill both stationary and transportation needs. Compared to steam reforming, electro-catalytic water splitting represents a greener and more sustainable way for H_2 generation and has been intensively investigated in recent years. The Oxygen Evolution Reaction (OER) has been a bottleneck to improve water splitting efficiency. It involves four concerted proton-coupled electron transfer steps and is both thermodynamically and kinetically demanding. Without a catalyst, the OER usually takes place at a high over-potential leading to a large energy loss. Compared to the OER, the H_2 Evolution Reaction (HER) can be accomplished comparatively easily, but efficient electro-catalysts are still needed to reduce the over-potential for HER and enable the reaction to take place at a practically high rate. Lately, earth-abundant transition metal based electro-catalysts have been demonstrated to be highly active for both HER and OER and are proposed to be promising alternatives to Platinum Group Metal (PGM) catalysts for use in water electrolysers. In this study, we showed our recent efforts to developing efficient and durable transition metal based electrocatalysts, including transition metal phosphides obtained by wet chemical reduction followed by post-phosphorization treatment and cobalt ultrafine clusters prepared by cluster beam deposition. We have demonstrated that all these catalysts show electro-catalytic performance favorably compared to PGM based electro-catalysts for HER or OER and therefore hold substantial promise for use as low-cost catalysts in water electrolysers.

Biography

Junyuan Xu has completed his PhD degree from University of Science and Technology Beijing (USTB) in January 2014 with a thesis entitled "High performance oxygen evolution reaction catalyst in acid for Proton Exchange Membrane (PEM) water electrolysis". During his PhD study, he has worked as a Scientific Visitor at Technical University of Denmark (DTU) for one year. In March 2014, he became a Post-doctorate Fellow at the Catalysis and Materials Division (CMD) of the Institute of Metal Research (IMR), Chinese Academy of Sciences, under the supervision of Professor Dangsheng Su, where his research focused on electro-catalytic mechanisms of carbon dioxide conversion using heteroatom doped nanocarbon electro-catalysts. He has joined Dr. Lifeng Liu's group at the International Iberian Nanotechnology Laboratory (INL) and is currently working as a Research Fellow on a Horizon 2020 project (CritCat) focusing on developing non-precious earth-abundant electro-catalysts for hydrogen/oxygen evolution reactions.

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Notes:

Yaw Opoku Damoah, J Nanomed Nanotechnol 2018, Volume 9
DOI: 10.4172/2157-7439-C9-091

Nano-theranostic lipoprotein-inspired zinc oxide-bound paclitaxel for enhanced anticancer photo-chemotherapy

Yaw Opoku Damoah
The University of Queensland, Australia

With the emergence of nanotechnology, there is a pressing need for novel bio-friendly drug delivery systems which are capable of eliminating all the constraints related to traditional treatment regimens. Driven by this need, this work encompasses drug targeting via reconstituted High-Density Lipoproteins (rHDL), chemotherapy, photodynamic therapy and *in vitro* nano-inspired theranostics. Herein, we successfully fabricated zinc oxide-bound paclitaxel (ZnO/PTX) and packaged the photo-chemotherapeutic formulation into rHDLs via one-pot synthesis. The final rHDL mediated ZnO/PTX nanomedicine (rHDL/ZnO/PTX) shared a characteristic near-spherical shape and FTIR analysis proved that ZnO was successfully bound to PTX via hydrogen bonding. The PTX and ZnO drug release pattern was analyzed by HPLC and ICP-OES analysis, respectively. The results suggested that ZnO could remain intact in neutral medium but could gradually dissolve in acidic media to trigger the collapse of the nanoparticle. The *in vitro* antitumor efficacy on A549 cells was evaluated by MTT assay and flow cytometry. The final nanoparticle irradiated with UV light proved to be the most efficient treatment group. This was further confirmed by the quantitative and qualitative detection of Reactive Oxygen Species (ROS) which indicates the apoptotic ability. Confocal laser scanning microscopy was used to detect the presence of ROS and the resulting images suggested that rHDL/ZnO/PTX could produce significant quantities of ROS. Flow cytometry analysis was employed to confirm that the fluorescence was more conspicuous in cells that were irradiated with UV light as compared to those without UV irradiation. We further employed flow cytometry to evaluate the existence of apoptotic and necrotic cells after a period of treatment. Moreover, ZnO fluorescence was adapted to track intracellular trafficking, suggesting that rHDL/ZnO/PTX could be harnessed for UV light-mediated photo-chemotherapy while apolipoprotein A-I (apoA-I) could help facilitate the shuttling of drugs into cancer cells via SR-BI receptors. In addition, we demonstrated that ZnO could be used as a potential *in vitro* theranostic moiety which could mediate photodynamic therapy and pH-responsive drug delivery.

Biography

Yaw Opoku Damoah has completed his BSc from the University of Cape Coast, Ghana. He is a Graduate of the China Pharmaceutical University where he has pursued Postgraduate studies in Pharmaceutics. As part of his national service, he has worked with the Import and Export Control Department of the Food and Drugs Authority, Ghana. His research is focused on nanotechnology, drug delivery and theranostics. He is specifically interested in the use of nano-theranostics for site-specific delivery and diagnosis. He is currently a PhD (Pharmaceutics) candidate at the Australian Institute for Bioengineering and Nanotechnology, The University of Queensland, Brisbance, Queensland, Australia.

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Yahia Fayiz Makableh, J Nanomed Nanotechnol 2018, Volume 9
DOI: 10.4172/2157-7439-C9-091

Substrate and annealing temperature effects on GaAs PN junction solar cells

Yahia Fayiz Makableh
Jordan University of Science and Technology, Jordan

High efficiency solar cells are of a wide interest worldwide due to the higher demand on renewable energy resources. Optimizing the design and fabrication of any type of solar cells is a vital process to minimize any loses due to fabrication limitations and errors. In this work the effect of the optimization of the annealing process was studied. Two scenarios were experimentally investigated in the first scenario the substrate temperature was help at elevated temperature than room temperature without post annealing. In the second scenario a post annealing process was performed by using RTA technique. As a result, the substrate heating during metal contact deposition by using E-beam evaporation enhanced single junction GaAs solar cells power conversion efficiency by up to 25% compared to the case of post annealing. This result is obtained by the J-V characterization of different single junction GaAs solar cells for both annealing processes.

Biography

Yahia Fayiz Makableh has completed his PhD degree in Electrical Engineering from the University of Arkansas in 2015. Currently he is an Assistant Professor and the Supervisor of the central labs in the Institute of Nanotechnology at Jordan University of Science and Technology. His research is focused on investigating nobel optical nanomaterials for high efficiency solar cells and energy harvesting. He also works on self-cleaning surfaces and light weight and high strength nanocomposites. He has published several papers in the field of solar cells and optical nanomaterials.

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Notes:

Shree Laxmi Prashant, J Nanomed Nanotechnol 2018, Volume 9
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Nanomaterials for densifying the concrete microstructure and improving strength and durability

Shree Laxmi Prashant
Manipal Institute of Technology, India

Microstructure plays a vital role in defining the strength and durability performance of concrete. The study of mechanism taking place at a nanoscale especially the hydrated cement paste helps to engineer the concrete in a well-defined and systematic way. This helps in improving the microstructural properties of concrete in the interfacial transitional zone. Nanoparticles also densify the concrete by occupying the spaces between the cement particles. This reduces the porosity of the cement paste. Nanoparticles are usually added in small amounts about 1-2% of the cement content in concrete. The shape and amount of nanoparticles can be tailored in order to optimize the performance of concrete to suit various projects. This paper reports the state of the art in use of nanoparticles in concrete.

Biography

Shree Laxmi Prashant has her expertise in the fields of concrete technology. She has a passion in trying out new and innovative methods of designing the concrete to optimize the performance of concrete. She has been working on High Volume flyash concrete, Geopolymer concrete and use of industrial, plastic and C&D waste as filler materials for concrete. Presently guiding one Phd Student (under QIP scheme), one Mtech and 6 Btech students for their project on the theme of Sustainable development in concrete using various non biodegradable waste including ewaste. Developing geopolymer concrete in order to minimize the use of cement in concrete to reduce the carbon foot print. The paper entitled "Effect of partial replacement of coarse aggregates by E waste on strength properties of Concrete" has been awarded as Best Technical paper at International Conference on Sustainable construction and building materials at NITK Surathkal June 18-22 2018

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Video Presentations (Day 1)

Muzamil Khatri et al., J Nanomed Nanotechnol 2018, Volume 9
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Recent trends in nanofiber innovations and commercial perspective

Muzamil Khatri and Ick Soo Kim
Shinshu University, Japan

Nanomaterials have shown a great deal of interest in nanotechnology field. The nanofibers among such materials emerged with greater impact in recent technological cutting-edge research development because of ease of production, light weight, breathability, biodegradability and three-dimensional structure. In general, insight into the applications of nanofibers as a new entrant in to current era that include water filtration, hazardous dye removal, tissue engineering, drug delivery, nerve regenerations along with other functional applications. A broader perspective about nanofiber production of nanofibers by electrospinning machine challenges. Our recent journey to development of innovative product and transforming into viable commercial products. Recent projects include recyclability of nanofibers, nanofibers for food safety, nanofibers used as water filtration and nanofibers for drug release. Some basic instruments such as for nanofiber morphology analysis Scanning Electron Microscope (SEM) or Transmission Electron Microscope (TEM), for chemical structure analysis, Fourier Transform Infrared Spectroscopy or X-ray Photoelectron Spectroscopy or Raman Spectroscopy has been used for crystallinity analysis wide angle X-ray diffraction has been used and for other solution measurements UV-Vis spectrophotometer has been used. Conclusively, several types of nanofibers can be manufactured by using different polymer solution on electrospinning machine. Different types of fibers have different physical and chemical characteristics, like morphology, biodegradability, recyclability, crystallinity, solubility and other characteristics. According to end use applications nanofibers can be composited or incorporated with any functional materials.

Biography

Muzamil Khatri is PhD scholar at Shinshu University, Japan. He started his research in 2016 and has more than 10 publications and filed 1 patent. In the field of advanced nanomaterial research, his central focus has been the development of nanofibers for various applications. To accelerate research and innovation at the nanoscale, he has been contributing to work on biomedical, chemistry and reduction of health hazardous issue to get make environment greener.

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B. Münzing, J Nanomed Nanotechnol 2018, Volume 9
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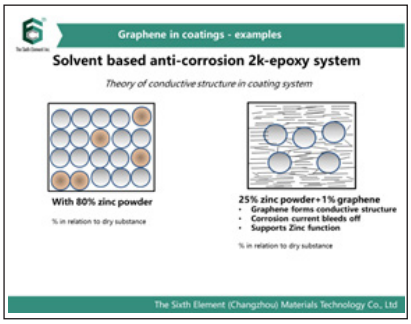
Corrosion protection with graphene

B. Münzing
The Sixth Element (Changzhou) Materials Technology Co, Ltd, China



Graphene, theoretically the atomic layer of graphite, can now be produced on large industrial scale. Most of these processes generate few layer graphene. The Sixth Element has established a proprietary process to manufacture different types of graphene with specific designed properties for different applications. Research on how to use graphene in coatings started already 2013 with the focus to reduce zinc in solvent based corrosion protection coating systems. In standard primers with high zinc content, zinc acts as cathodic sacrifice layer, as zinc is more ignoble metal, therefore protecting the underlaying metal substrate. When the zinc is more and more oxidized, the resulting zinc oxide is building up a barrier, which prevents the attack of the surrounding media (water, salt) to the metal substrate. The idea now was to design a graphene type, being electrical conductive enough to support any cathodic function of the system and being able to act as a barrier without producing a battery cell. A further requirement was that such a graphene can be processed with standard equipment used in the coating industry. Cooperating with an industrial partner in China, Toppen Co, the graphene type SE1132 was developed. It is a few layer graphene with medium conductivity. Addition of 1 % SE1132 to an epoxy primer system and reducing the zinc content to 25 % (based on dry substance) show significant improvements in salt spray testing and water condensation testing compared to a standard zinc rich epoxy primer. The results have been confirmed by measuring the corrosion current of such a system. Sixth Element had been granted a patent in China and US for this development. Based on independent tests of Chinese authorities the system) is approved for off-shore applications, first applied to protect the steel construction of an off-shore wind energy tower in 2015.

Biography

Bernhard Münzing started his career at BASF selling fibre reinforced prepregs mainly to the aerospace and sports industry. He then joined L. Brüggemann, a medium sized chemical company, responsible for materials management and market introduction of new products. After short period as Sales Manager for a small paint company, he worked for more than 17 years for GELITA, the leading gelatine manufacturer. Covering all potential applications areas for gelatine, he helped customers to adopt the product during the critical phase of the BSE disease, followed by a position in business development for more than 10 years, introducing a new product line to the food market, establishing a new production technology for a special gelatine and launching gelatine -based formulations into the metal processing industry. Since July 2016 he is with The Sixth Element, a leading supplier of graphene products responsible for all markets outside China with focus on EMEA region.

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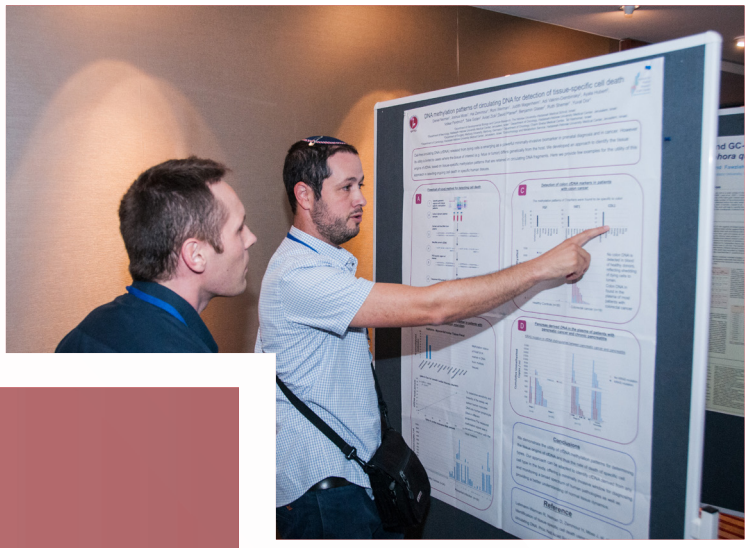

Workshop (Day 2)

Reshmi S Nair, J Nanomed Nanotechnol 2018, Volume 9
DOI: 10.4172/2157-7439-C9-091

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Reshmi S Nair

Amity University Dubai, UAE

Therapeutic aid for cancer treatment through phytochemical study: Novel composition and its characterization

Cancer is a genetic disease indicating the sudden alteration within cellular system leading uncontrolled cell proliferation. They grow exponentially even with the enhancement of cellular resistance. Over the decades, the world has witnessed a dramatic cancerous death and at the same time innumerous research milestones for the therapeutic sustenance. This research concentrates on the phytochemical study in order to enhance the potential of cellular system to fight against the deadly disease. In general, it is observed that the bioavailability of the therapeutic drugs for cancer therapy are not site specific thus resulting in damaging the healthy cells. There are several treatment modalities such as chemotherapy and radiation which depict adverse side effects resulting in secondary cancers. An abundance of herbal plants have been widely used as therapeutic agents for numerous diseases and disorders all over the world for centuries. Natural products derived from plants specifically are bring looked into for alternative methods for cancer treatment. Black cumin seeds and its essential oil have been used globally in cooking and also for treatment of several diseases and disorders including fever, paralysis, skin diseases, jaundice and dyspepsia among many others. Researches have also proven its potential benefit as an anti-cancer agent and attribute its therapeutic potential to its constituent Thymoquinone (TQ). Owning to enhanced properties of materials in the nanometer range, the chemical route nanoformulations of several plant extracts have proven to offer a higher cytotoxic potential than their bulk counterparts. This research aims to summarize how nanotechnology can help in providing more efficient cancer treatment and diagnosis possibilities and the anti-tumor potential of black seeds. The role of TQ in cancer prevention through different mechanisms is also analyzed. 70 nm size of particles were obtained by the synthesis mechanism of the plant extract. Significant SEM and AFM results were published with good stability.

Biography

Reshmi S Nair is a Faculty in the Department of Engineering at Amity University Dubai since 2015 specialized in the field of Nanotechnology. Her credential as an Academician has played a significant role in developing the interest, involvement and creativity of students on a widespread platform. Besides academics, she is keen into cancer research as she is an active Member of Research Wing at International Association of Nanotechnology. Prior to Amity, she was working as Research Scientist at BIOCON, leading pharmaceutical industry in India and also as Faculty in Nanoscience Department of Amrita University. Currently, she is pursuing her Doctoral research in "Receptor mediated anti-cancer drug delivery through therapeutic aid" at Indian Institute of Technology Madras. She has authored many research papers both in international and national journals and has presented papers in various conferences.

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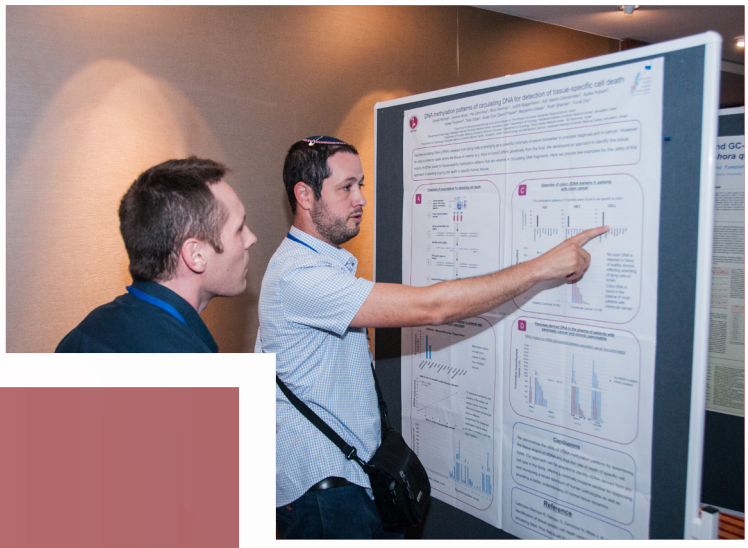

Scientific Tracks & Abstracts (Day 2)

E. Barborini et al., J Nanomed Nanotechnol 2018, Volume 9
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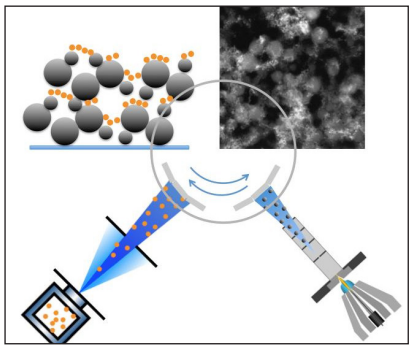
Transition metal – spinel nanoporous multi--layers by double--beam cluster beam deposition

E. Barborini and S. Vinati
Tethis SpA, Italy



The integration of nanostructured layers into devices is the pivotal step to exploit peculiar properties of nanoscale systems. This particularly holds for atomic clusters and nanoparticles, whose manipulation is known to be a cumbersome process. For instance, wet-chemistry approach may leave contaminations affecting the final application, while high-temperature calcination step of sol-gel approach severely limits the choice of the platform hosting the nanomaterial. Cluster Beam Deposition (CBD) has been recognized as a method overcoming many of those drawbacks and carrying beneficial features such as room temperature deposition, huge porosity due to nanoparticles soft-assembling, hard-mask patterning. We report on a study where a double-beam deposition system has been developed to combine on the same substrate nanoparticles produced by Flame Spray Pyrolysis (FSP), through FlameBeam source, and atomic clusters produced by electrical discharges, through Pulsed Microplasma Cluster Source (PMCS). FlameBeam source exploits the combination of a FSP burner, operating at atmospheric pressure, with a "quenching nozzle" that captures the nanoparticles generated by FSP and concentrates them into a gas stream directed into a vacuum deposition chamber. PMCS exploits a pulsed plasma jet impinging on a metal target to vaporize atoms in Argon atmosphere. Atoms then re-aggregate in clusters that are carried by nozzle expansion towards the same vacuum deposition chamber to which FlameBeam is faced. FlameBeam materials library includes simple oxides, complex oxides, noble metals and their combinations. PMCS materials library includes transition metals, noble metals, alloys. As paradigmatic example of the capabilities of the double-beam deposition system described here, results on nanoporous Cu-$MgAl_2O_4$ multi-layer synthesis and characterization will be shown, where Cu clusters layer by PMCS is deposited on $MgAl_2O_4$ nanoparticles layer by FlameBeam. Remarkably, $MgAl_2O_4$ layer shows the spinel structure. This suggests possible interesting roles in catalysis field for the nanoporous metal-spinel systems by FlameBeam-PMCS combination.

Recent Publications

1. Xu J et al. (2018) Cluster Beam Deposition of Ultrafine Cobalt and Ruthenium Clusters for Efficient and Stable Oxygen Evolution Reaction. ACS Applied Energy Materials 1 (7), 3013--3018.
2. Barborini E (2013) Microhotplates and Integration with Metal Oxide Nanomaterials, in Metal Oxide Nanomaterials for Chemical Sensors, M.A. Carpenter S. Mathur A. Kolmakov (Eds.), Springer Series: Integrated Micro--analytical Systems, 503--537.
3. Wegner K et al. (2012) High--rate Production of Functional Nanostructured Films and Devices by Coupling Flame Spray Pyrolysis with Supersonic Expansion. Nanotechnology 23, 185603.

Biography

Emanuele Barborini received the PhD in Physics from the University of Milan in 2000. In 2004 he was co-founder of Tethis, a Nanotech-Biotech SME born as Spin-off of the University of Milan. Since 2007 he serves as Head of Applicative Research and R&D Special Projects Manager at Tethis, where he manages Applied Research and related Technology Transfer projects. His main achievements regard: atomic clusters and nanomaterials production methods, chemoresistive micro-sensing, nanomaterial-based devices for oncology and proteomics. In 2015 he was Visiting Scientist at the University of Helsinki, where he coordinated the research on the use of nanostructured surfaces in MALDI mass spectrometry. Dr. Barborini is author of 97 scientific publications and inventor of 10 national (Italy) and international (EU, USA) patents. He has h-index 26 and 2325 citations (Scopus, July 2018). In 2017 he has been awarded the “Abilitazione Scientifica Nazionale 02/B1 Prima Fascia”.

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N Manyala et al., J Nanomed Nanotechnol 2018, Volume 9
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Growth of graphene under layers: A wafer-scale Bernal-stacked bilayer graphene and graphene foam by atmospheric pressure chemical vapor deposition

N Manyala, M Fabiane and J Madito
University of Pretoria, South Africa

In this work, we present a simple approach to demonstrate that subsequent layers of graphene grown between the existing monolayer graphene and the copper catalyst in Chemical Vapor Deposition (CVD) by forming multilayer graphene islands with a structure of an inverted wedding cake. The topographic analyses of the as-grown CVD graphene on Cu foil revealed the under layer growth of subsequent layers, where the smaller graphene layers (or islands) lie above the larger layers stacked in a concentric manner. Consequently, the results of the as-grown CVD graphene support the formation of the inverted wedding cake stacking in multilayer graphene growth. Due to the major interest in the AB-stacked bilayer graphene film which stems from its unique band structure with a tunable band gap which determines transport and optical properties; the Atmospheric Pressure Chemical Vapor Deposition (AP-CVD) growth of monolayer and bilayer graphene on pure Cu foils and dilute Cu (Ni) foils were studied. This study clearly shows the capability of a dilute Cu (Ni) foil for growing a wafer (substrate)-scale high-quality bilayer graphene film compared to a pure Cu foil which is known to grow bilayer islands on a monolayer graphene background in chemical vapor deposition. This work contributed to the on-going research on the growth of large-area high-quality AB-stacked bilayer graphene films on metal substrates using CVD. Furthermore, this work also reports on the confocal Raman spectroscopy and imaging of graphene foam prepared on Ni and Ni (Cu) foam using AP-CVD. The confocal Raman spectroscopy imaging of graphene on Ni foam revealed variation in the number of layers, i.e. monolayer, bilayer and few-layer graphene. To reduce the number of layers in the as-grown graphene foam the Ni foam was doped with Cu foil. From a Ni foam doped with Cu (Ni (Cu) foam), a graphene foam showed only monolayer and bilayer with a large fraction of the bilayer (≈75% coverage). This graphene/Ni (Cu) foam sample may have a potential as a high-current response current collector for super capacitor applications.

Biography

Ncholu Manyala is Professor of Physics and Chair of South African research chair initiative (SARChI) in Carbon Technology and Materials at the University of Pretoria, South Africa. Prof. Manyala got his PhD from Louisiana State University working in low temperature transport and magnetic properties of strongly correlated materials where he published two papers in Nature and one in Nature Materials in this field. Prof. Manyala's recent research interest is on nano-carbon based materials and their applications in energy storage and sensing. Prof. Manyala has published more than 60 papers in this subject. Prof. Manyala is the member of International Society of Electrochemistry, South African Microscopy Society and South African Institute of Physics.

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Nanostructured surfaces for on-plate processing of biological samples in MALDI mass spectrometry

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Tethis SpA, Italy

Matrix-assisted laser desorption/ionization mass spectrometry (MALDIMS) is a powerful analytical tool endowed with the capability to analyze in short time several classes of biomolecules (e.g. peptides, proteins, nucleic acids) as well as micro-organisms (e.g. bacteria), up to whole histological sections. However, MALDI-MS effectiveness may be hampered by the complexity of the sample itself or by the presence of contaminants. This requires a many-steps pre-analysis processing of the samples, which is carried out in-vial. Nanostructured surfaces can be exploited to transfer sample processing (e.g. secondary cleaning, enzymatic cleavage) from vials directly to the MALDI plate. Here we show the use of Cluster Beam Deposition [1,2] to deposit patterned nanostructured films, made of ultrafine TiO_2 nanoparticles (top image), onto suitable substrates for MALDI-MS. Material nanoporosity (due to nanoparticle soft-assembling) and bio-affinity play a synergic role in sample capturing. Super-hydrophilicity induced in TiO_2 by UV irradiation [3] ensures uniform spreading in the case of liquid samples as well as optimal adhesion in the case of histological sections. Hydrophobic barrier at the border of the super-hydrophilic nanostructured areas acts as an effective confinement structure for droplets (bottom image), allowing reliable on-plate sample processing. In comparison with standard in-vial approach, on-plate processing avoids the loss of sample fractions due to cleaning or to the sticking on vials plastic surfaces, and improves the management of scanty samples in general. Regarding histological samples, the nanostructured film improves tissue adhesion and avoids detachment, tearing and shrinking, during processing (e.g. dehydration, delipidation, fixation). Improved adhesion can also benefit pharmaco-kinetic studies, where any tissue treatment is a-priori excluded [4]. The use of nanostructured films and surface-engineering concepts for the development of advanced plates in MALDI-MS may contribute to further fuel the spreading of this powerful analytical technique in clinical proteomic as well as biomedical and healthcare areas in general, with the ultimate benefit for patients.

Biography

Emanuele Barborini received the PhD in Physics from the University of Milan in 2000. In 2004 he was co-founder of Tethis, a Nanotech-Biotech SME born as Spin-off of the University of Milan. Since 2007 he serves as Head of Applicative Research and R&D Special Projects Manager at Tethis, where he manages Applied Research and related Technology Transfer projects. His main achievements regard: atomic clusters and nanomaterials production methods, chemoresistive micro-sensing, nanomaterial-based devices for oncology and proteomics. In 2015 he was Visiting Scientist at the University of Helsinki, where he coordinated the research on the use of nanostructured surfaces in MALDI mass spectrometry. Dr. Barborini is author of 97 scientific publications and inventor of 10 national (Italy) and international (EU, USA) patents. He has h-index 26 and 2325 citations (Scopus, July 2018). In 2017 he has been awarded the "Abilitazione Scientifica Nazionale 02/B1 Prima Fascia".

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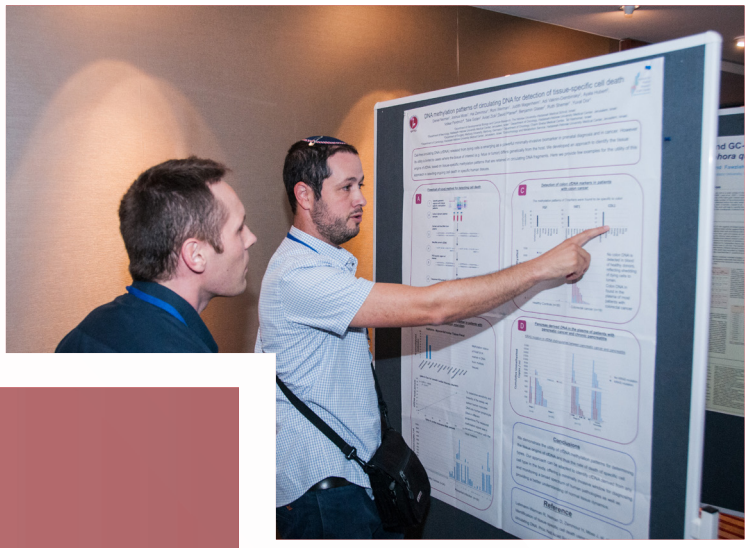

Workshop (Day 3)

Shree Laxmi Prashant, J Nanomed Nanotechnol 2018, Volume 9
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Shree Laxmi Prashant

Manipal Institute of Technology, India

Advancements in civil engineering using nanotechnology

Civil engineering is an oldest engineering and is an integral part of civilization. From the air we breathe, water we drink to high rise buildings we stay to the roads we travel. Civil engineering has been working wonders for mankind with the help of developments taking place in the field of science and technology. Nano is one such which has greatly influences the developments taking place in the field of construction technology, Geotechnical engineering, Nanotechnology involves the study of material and mechanisms at nanoscale. It enables structuring and restructuring of matter at an extremely small scale i.e., the nanoscale. The new material, engineered at nanoscale is associated with extremely high specific surface area which enables in achieving high purity. It has been observed various concrete structures undergo deterioration due to ingress deteriorating fluids when subjected to harsh environments. Use of nanomaterials in the concrete makes it extremely dense thereby strengthening the microstructure. This makes the concrete durable and the structures serviceable for longer duration. With nano modification of cementing materials it is possible to develop high strength sustainable concrete with the use various mineral admixtures. Nanomaterials have also been used for soil stabilization.

Biography

Shree Laxmi Prashant has her expertise in the fields of concrete technology. She has a passion in trying out new and innovative methods of designing the concrete to optimize the performance of concrete. She has been working on High Volume flyash concrete, Geopolymer concrete and use of industrial, plastic and C&D waste as filler materials for concrete. Presently guiding one Phd Student (under QIP scheme), one Mtech and 6 Btech students for their project on the theme of Sustainable development in concrete using various non biodegradable waste including ewaste. Developing geopolymer concrete in order to minimize the use of cement in concrete to reduce the carbon foot print. The paper entitled “Effect of partial replacement of coarse aggregates by E waste on strength properties of Concrete” has been awarded as Best Technical paper at International Conference on Sustainable construction and building materials at NITK Surathkal June 18-22 2018.

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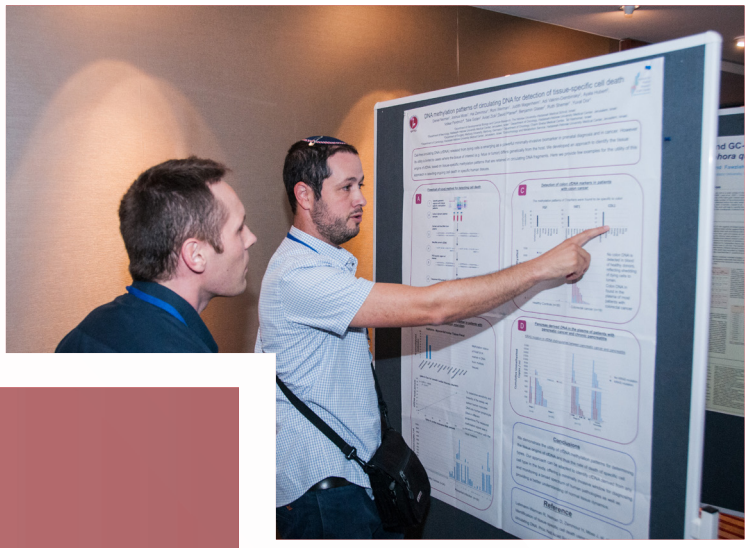
Notes:

21st World

NANOTECHNOLOGY CONGRESS

October 15-17, 2018 Dubai, UAE



Scientific Tracks & Abstracts (Day 3)

Niharika Kaushal et al., J Nanomed Nanotechnol 2018, Volume 9
DOI: 10.4172/2157-7439-C9-091

Bioflavonoids derived from Mandarin processing wastes as bioengineered antioxidants: A nanotechnological intervention

Niharika Kaushal, Simrandeep Kaur and Minni Singh
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Mandarins, upon processing generate significant agrowastes in the form of peels which are potential sources of bioflavonoids that possess significant anti-oxidative character. However, a constraint for use of these flavonoids is the low bioavailability which substantially masks their functionality. This work entails extraction and identification of key flavonoids from mandarin peels, followed by preparing flavonoid-nanoparticle conjugates in order to overcome the limitation and finally their impregnation into edible hydrogels. Total flavonoids estimated in the mandarin peel SC-CO_2 extract were 48.1±0.65 mg/ml rutin equivalents. Polymethoxyflavones (PMFs) were the key compounds identified in the extract through mass spectral analysis. Food grade Poly-Lactide-co-Glycolic Acid (PLGA) was used as a carrier to encapsulate flavonoids. The extract exhibited free radical scavenging activity with an IC50 of 0.55 µg/ml. The PLGA-PMF nanoconjugates, on the other hand, exhibit an improved antioxidant potential with an IC50 of 0.49 µg/ml. The PLGA-PMF nanoconjugates furnished a particle size of 252.2±1.04 and PdI 0.187±0.039. Also, the bioengineered nanoconjugates had a high entrapment efficiency of nearly 80.0% and stability of more than 1 year, which is favorable for their application in the food industry. FE-SEM and confocal microscopy images revealed the smooth and spherical shape of nanoconjugates. Further, the nanoconjugates were provided an additional layer of protection to achieve sustained and controlled release for which edible hydrogels were prepared using natural polymer alginate thereby enabling the release and retention of the flavonoids from the matrix. The two significant features of the gel were its low porosity of nearly 20.0% and the high crosslinking polymer network visualized by cryo-SEM. These nanoconjugate impregnated hydrogels were subjected to simulated gastrointestinal studies which revealed sustained release. This double layered carrier for bioflavonoids lays the foundation for developing PLGA-PMF-hydrogels as functional foods affording enhanced bioefficacy which was otherwise challenged owing to pre-mature metabolism of flavonoids in the gastrointestinal tract.

Biography

Niharika Kaushal is a Research Fellow at the Department of Biotechnology, Punjabi University, Patiala, Punjab, India. Main objective of her work intends to unlock the potential of agro-industrial residue to be converted into a portfolio of eco-efficient nutraceutical products using nanotechnological interventions.

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Notes:

Smagulova Gaukhar et al., J Nanomed Nanotechnol 2018, Volume 9
DOI: 10.4172/2157-7439-C9-091

Synthesis of carbon nanotubes onto Al_2O_3-spheres with Ni-nanoparticles coating

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[2]Institute of Combustion Problems, Kazakhstan

The beginning of XXI century was marked by the revolutionary development of nanotechnologies and nanomaterials. In a practical sense carbon nanotubes are the most discussed and promising objects of the nanoworld. For practical, using it is essential to prepare high-quality CNTs with various constructions in large scale. Since 2006, worldwide CNT production capacity has increased tenfold. The annual number of scientific publications on CNT and issued patents continues to grow. Due to their unique physicochemical properties carbon nanotubes are believed to be materials of the future what caused an exceptional splash during investigation of the carbon nanomaterials. The most common approach of synthesis of carbon nanotubes is the chemical vapor deposition method. Number of parameters, such as choice of initial carbon containing raw materials (gas or liquid), transport gas, catalyst, temperature and processing time, plays a major role in the synthesis of carbon nanotubes. As a rule, catalyst is a matrix which surface is covered with a layer of active component. In our work, the synthesis was carried out in a vertical CVD reactor using acetylene and nitrogen as initial gases with a volume ratio of 1:9 respectively. Al_2O_3 spheres with a diameter of 0.5-1 mm and purity of 99.5% were used as the catalyst. Nickel coating was applied on the spheres surface by solution combustion method. Firstly, initial spheres were impregnated with an aqueous solution of nickel nitrate and fuel, followed by drying and heat treatment. Citric acid and ascorbic acid were used as fuels. After heat treatment, nickel nanoparticles coating was formed on the surface of the spheres. Obtained carbon nanotubes were studied by scanning electron microscopy and Raman spectroscopy.

Biography

Smagulova Gaukhar has completed her PhD in Nanotechnology and Nanomaterials, Head of the laboratory Functional Nanomaterials, Institute of Combustion Problems and Senior Lecturer of the School of Chemistry and Chemical Technology at Al-Farabi Kazakh National University, Kazakhstan. She is author of two patents and has 18 papers in the rating journals of Kazakhstan and foreign countries. She has completed scientific Internships in the University Texas at Dallas and Waseda University.

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Shifa Muneer et al., J Nanomed Nanotechnol 2018, Volume 9
DOI: 10.4172/2157-7439-C9-091

A comparison of nano-thiacloprid and its commercial formulation against green apple aphid (aphis pomi) on apple.

Shifa Muneer, F.A.Zaki and Malik Mukhtar
SKUAST-K, India

Chemical insecticides are the agents of controlling insects wherein the control may result from killing the insect or preventing it from engaging in behaviours deemed destructive. Different eras of insecticides brought a revolution and have been in use for more than 50 years. They have resulted in fast, economical and effective pest control. However, after all these years of utilizing chemical pesticides to control pests, some disadvantages came to surface as well, like resistance, resurgence, low solubility and led to shifting to modern methods of combating pests like nanotechnology. In this study we developed a nano-insecticide of thiacloprid by utilizing the purest form of this insecticide i.e. its technical grade. The nano-insecticide was developed by first synthesizing amphiphilic polymer and then encapsulating the active ingredient of this insecticide in the nanospheres of the developed amphiphilic polymer. Consequently, the nano-formulation synthesized viz. Nano-thiacloprid was then evaluated along with its respective commercial formulations viz. Thiacloprid (Alanto). These two insecticides were studied for mortality response using leaf dip method under graded response bioassay, against Green Apple Aphid (Aphis pomi). The mortality was recorded after 24 hours and these mortality counts were subjected to probit-regression analysis after percentage mortalities were corrected for calculating LC50 values by Abbott's formula. LC50 value of 1.02 ppm was recorded in case of nano-thiacloprid, while thiacloprid was found to be 6 times less efficient than its commercial formulation with LC50 value of 6.05 ppm. Nano-formulation of thiacloprid proved to be efficient in comparison to its commercial formulations as LC50 value was much lower as compared to commercial formulation. Owing to small surface area of nano-insecticides, better penetration occurs in insect body and longer persistence on leaf surface, as supported by the research findings. Nano-formulations of pesticides promise improved efficacy and can certainly replace the conventional pesticides in near future.

Recent Publications

1. Shifa, Asma Sherwani and Malik Mukhtar. Dose mortality response of European Red Mite (Panonychus ulmi Koch) to various acaricides. Indian Journal of Ecology. 2016, 43:489-493
2. Deelak Amin, M. A. Sofi, G. M. Mir, Shifa, Shahida Ibrahim and Asmat Ara. Indian Journal of Ecology. 2016, 43: 178-179
3. Asmat Ara, Z.A. Dar, Asif Iqbal, Shifa and Deelak Amin Crop Environment Interaction Assessment in Brassica rapa var. Brown Sarson. Vegetos- An International Journal of Plant Research. 2016. 30(1): 87-92
4. Shahzada Ramzan, M. A. Paray, S.H. Parrey, Munazah Yaqoob, Rizwana Khurshid, Shifa and Deelak Amin. Species richness and abundance of insect pollinators on pear blossoms in Kashmir Himalayans. Journal of Eco-friendly Agriculture. 2016. 12(1):54-57

Biography

Shifa Muneer is a young, enthusiastic and an innovative researcher working in the field of agriculture and horticulture with focus on nano-pesticides; intrinsic toxicity of pesticides and different toxicological parameters. Shifa has not only been a gold medallist in Bachelors in Agriculture, but also in Masters in Agriculture and has also been declared as the University topper amongst all the faculties of the university. Shifa is an awardee of the very prestigious INSPIRE fellowship, Department of Science and Technology (DST), India and has also been selected under the Nano-mission school sponsored by DST. Shifa has researched in collaboration with Indian Agricultural Research Institute, Pusa, New Delhi, India for synthesis of nano-formulations of pesticides. She strives to work towards synthesizing nano-pesticides and also testing and evaluating them. Her work is very imperative to the pesticide companies, different universities and is a breakthrough in the field of plant protection.

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