NTA2022

2nd International conference on

Nanotechnology: Theory and Applications (NTA2022)

19 - 21 December 2022

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Jean-Marie Lehn

Jean-Pierre Sauvage

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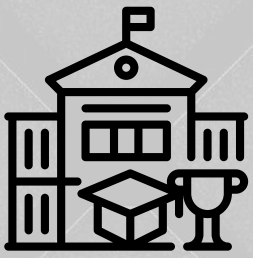
33 Egyptian universities &research centers



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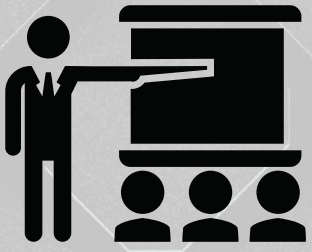
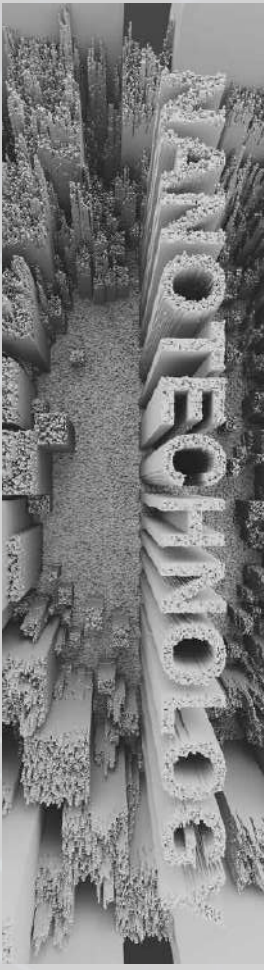
166 Professors from Egyptian universities & research centers



Objectives

Nanotechnology has emerged as one of the most promising new developments that is revolutionizing the way human challenges can be met , for sustainable development. Numerous groundbreaking new solutions have been proposed, based on nanotechnology, for health care, renewable energy sources, water treatment , environment preservation as well as new highly efficient materials and electronic and photonic systems, MEMS/NEMS, microfluidic devices, etc. to name just a few. Application domains have extended to cover biomedical applications such as biosensors and even lab or organ on chip. This compels us to create an international caliber periodic event, where researchers across all continents could meet, discuss and discover what other colleagues are developing. Exchanging ideas about nanotechnology potentials and challenges with industrials and decision makers is another objective. Conference also aims at creating solid and long lasting ties between researchers from both developed & developing countries, through exchange of visiting professors & PhD students.



Topics

NTA 2022

1

Nanomedicine

Lab-on-chip, Organ-on-chip, Drug delivery, Drug discovery, Molecular dynamics, Tissue engineering, BioMEMS, Genetics, Proteomics, ...

2

Nano for energy

Solar cells, Quantum based PV, Direct energy conversion, Energy storage, Biofuel, Fuel cells, Energy harvesting, Hydrogen energy, ...

3

Nano for Water, food & environment

Desalination, Water treatment, Pollution control, Nanotoxicity, Food packaging, Precision agricultural , Nanopesticides and Nanofertilizers, ...

4

Nano electronics

Nano electronics and Nanophotonic devices, MEMS/NEMS, optoelectronics and Quantum devices, Plasmonic and nano lasers (Spasers), Quantum based Photovoltaic, ...

5

Fundamentals of nanotech.

Physical, chemical and biological synthesis, Characterization, Nanoparticles, Nanowires, Nanofilms, Nanocomposites, Graphene, Fullerene, Metal organic framework, ...

6

Nano for Industry

Smart materials, Composite materials, Large scale production of nano materials, Applications in: Building industry, Petroleum industry, Restoration of monuments, ...

Invited Nobel Prize Laureate:

Towards adaptive nanoscience and nanotechnology

Jean-Marie LEHN
Director, Laboratory of Supramolecular Chemistry, University of Strasbourg, France, lehn@unistra.fr

Prof Jean-Marie Lehn was born in Rosheim, France in 1939. In 1970 he became Professor of Chemistry at the Université Louis Pasteur in Strasbourg and from 1979 to 2010 he was Professor at the Collège de France in Paris. He is presently Professor at the University of Strasbourg Institute for Advanced Study (USIAS). He shared the Nobel Prize in Chemistry in 1987 for his studies on the chemical basis of "molecular recognition" (i.e. the way in which a receptor molecule recognizes and selectively binds a substrate), which also plays a fundamental role in biological processes.
His work led him to the definition of a new field of chemistry, which he has proposed calling "supramolecular chemistry" as it deals with the complex entities formed by the association of two or more chemical species held together by non-covalent intermolecular forces, whereas molecular chemistry concerns entities linked by covalent bonds. Subsequently, the area developed into the chemistry of "self-organization" processes and more recently towards "adaptive chemistry", dynamic networks and complex systems. Author of more than 1000 scientific publications, Lehn is a member of many academies and institutions. He has received numerous international honors and awards. Lehn Home Page: https://isis.unistra.fr/laboratory-of-supramolecular-chemistry-jean-marie-lehn/

Abstract
Supramolecular chemistry is actively exploring systems undergoing *self-organization*, i.e. systems capable of spontaneously generating well-defined functional supramolecular architectures by *molecular information* controlled self-assembly from their components. Such programmed *engineering* and *processing* of *functional nanostructures* offers attractive perspectives to nanoscience and nanotechnology.

Supramolecular entities as well as molecules containing reversible bonds are able to undergo a continuous change in constitution by reorganization and exchange of their building blocks. This capability defines a *Constitutional Dynamic Chemistry* (CDC) on both the molecular and supramolecular levels. CDC takes advantage of dynamic constitutional diversity to enable variation and selection and thus allow for adaptation leading to the emergence of an *adaptive chemistry.*

These dynamic features introduce a paradigm shift in soft matter chemistry towards *Dynamic Nanoscience and Nanotechnology.*

General References

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[4] Lehn, J.-M., Perspectives in Chemistry – Steps towards Complex Matter, Angew. Chem. Int. Ed., **2013**, 52, 2836-2850.

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Invited Nobel Prize Laureate:

Topology and molecular machines: Two interlinked research Fields

Jean-Pierre Sauvage
Institut de Science et Ingénierie Moléculaire (ISIS). International Center for Frontier Research in Chemistry, University of Strasbourg, France, jpsauvage@unistra.fr

Prof. Jean-Pierre Sauvage Since the beginning of the 80s, Sauvage and his group have been interested in various fields including : (i) coordination photochemistry and solar energy conversion, (ii) CO_2 electrocatalytic reduction, (iii) chemical topology : catenanes, knots and rotaxanes, (iv) multifunctional ruthenium and iridium complexes for light-induced charge separation, (v) multifunctional porphyrins as models of the photosynthetic reaction centre as well as (vi) molecular switches and molecular machine prototypes such as a "swinging catenane", "muscles" or "compressors". Sauvage received many awards at the international level, including the **2016 Nobel Prize in Chemistry.** He has also been invited as a name lecturer in many universities all over the world. He worked with a group of wonderful professional and nonprofessional co-workers who were mostly responsible for the scientific success of the team. Their work has been cited numerous times. Sauvage Home Page https://isis.unistra.fr/laboratory-of-inorganic-chemistry-jean-pierre-sauvage/

Abstract

The area referred to as "Chemical Topology" is mostly concerned with molecules whose molecular graph is non-planar, i.e. which cannot be represented in a plane without crossing points. The most important family of such compounds is that of **catenanes**. The simplest catenane, a [2]catenane, consists of two interlocking rings. **Rotaxanes** consist of rings threaded by acyclic fragments (axes). These compounds have always been associated to catenanes although, strictly speaking, their molecular graphs are planar. **Knotted rings** are more challenging to prepare. Several spectacular knotted topologies at the molecular level have been created since the beginning of the 90s either by our group or by other highly creative research teams.

Since the mid-90s, the field of **artificial molecular machines** has experienced a spectacular development, in relation to molecular devices at the nanometric level or as mimics of biological motors. In biology, motor

proteins are of utmost importance in a large variety of processes essential to life (ATP synthase, a rotary motor, or the myosin-actin complex of striated muscles behaving as a linear motor responsible for contraction or elongation).

Many examples published by a large number of highly creative research groups are based on complex rotaxanes or catenanes acting as switchable systems or molecular machines. Particularly significant examples include a "pirouetting catenane", "molecular shuttles" (Stoddart and others) as well as multi-rotaxanes reminiscent of muscles. More recent examples are those of multi-rotaxanes able to behave as compressors and switchable receptors or as molecular pumps. The molecules are set in motion using electrochemical, photonic or chemical signals. Particularly impressive light-driven rotary motors have been created by the team of Feringa.

Finally, potential applications will be mentioned as well as possible future developments of this active area of research.

General References

[1] "Ruthenium(II) and Osmium(II) Bis(terpyridine) Complexes in Covalently-Linked Multicomponent Systems: Synthesis, Electrochemical Behavior, Absorption Spectra, and Photochemical and Photophysical Properties"; Jean Pierre Sauvage, Jean Paul Collin, Jean Claude Chambron, Stephane Guillerez, Christophe Coudret, Vincenzo Balzani, Francesco Barigelletti, Luisa De Cola, and Lucia Flamigni; *Chemical Reviews*, 1994, 94(4), pp. 993–1019

[2] "Transition Metal-Containing Rotaxanes and Catenanes in Motion: Toward Molecular Machines and Motors"; Sauvage, J.-P.; Accounts of Chemical Research, 1998, 31(10), pp. 611–619

[3] "Shuttles and muscles: Linear molecular machines based on transition metals"; Collin, J.-P., Dietrich-Buchecker, C., Gaviña, P., Jimenez-Molero, M.C., Sauvage, J.-P.; Accounts of Chemical Research, 2001, 34(6), pp. 477–487

[4] "Chemical topology: Complex molecular knots, links, and entanglements"; Forgan, R.S., Sauvage, J.-P., Stoddart, J.F.; Chemical Reviews, 2011, 111(9), pp. 5434–5464

Keynote: Impact of nanobiotechnology on the future of medicines: The road toward precision medicines –Case studies

Shaker Mousa
Albany College of Pharmacy, NY, USA

Prof. Mousa is the Executive VP and chair of PRI at Albany, NY. He is the founder of the Pharmaceutical Research Institute in 2002 and the founders of spin-off Pharmaceutical and biotechnology companies. He held a senior, principal research scientist and a research fellow at DuPont Pharmaceuticals and Imaging Co., DuPont Merck, and DuPont Pharmaceuticals Company for two decades. He held academic appointments of Adjunct Professor in the Department of Medicine, Sol Sherry Thrombosis Research Center, at Temple University, the State University of New York at Buffalo/Albany, Rensselaer Polytechnic Institute. Awarded the 2017 Kuwait Foundation for Advancement in Sciences (KFAS) Laureate for Applied Sciences in Medicine. Awarded in 2018 fellow of the National Academy of Inventors (FNAI), Awarded in 2020 the first Sheikh Zayed International Award in Traditional Complementary and Alternative Medicine (TCAM), in Prophetic Medicines for improved human health and quality of life. In 2020, he ranked by Stanford ranking to be among the top 1% of globally impactful scientist. His current googles scholar citation over 35,000; h-index 100. Among his professional accomplishments are his contributions to several patents and to the discovery and development of novel anti-platelet, anti-thrombotic therapies, noninvasive myocardial perfusion, and thrombus imaging agents. His work is reported in over 1,000 peer-reviewed publications and holds over 400 US Patents and International Patents. His early work in Neuropharmacology involved the biochemical and pharmacological interplay between hormonal and neuronal factors in pain modulation. He contributed to the discovery and development of FDA approved products / clinical candidates: **Cardiolite^{R}**, **Roxifiban** (Anti-platelet / Anti-thrombotic agent for the prevention and treatment of coronary, carotid, and peripheral artery thromboembolic disorders). Involved in the discovery of novel site directed anti-avb3 tumor radiotherapy and imaging. He is also involved in the discovery of novel pharmacological aspects of heparins and non-anticoagulant heparin derivatives. He contributed to the advancement of several key concepts including: the synergistic benefits of GPIIb/IIIa antagonists in combination with thrombolytic; the role of integrin alpha5/beta1 in angiogenesis and bacterial invasion of human host cells, the role of fibrinolytic components such as kininogen in angiogenesis.

Abstract

Over the past decade, evidence from the scientific and medical communities has demonstrated that nanobiotechnology and nanomedicine have tremendous potential to affect numerous aspects of

cancer and other disorders in term of early diagnosis and targeted therapy. The utilization of nanotechnology for the development of new Nano-carrier systems has the potential to offer improved targeted delivery through increased solubility and sustained retention and more importantly active targeting. One of the major advantages of this innovative technology is its unique multifunctional characteristics. Targeted delivery of drug incorporated nanoparticles, through conjugation of site-specific cell surface markers, such as tumor-specific antibodies or ligands, which can enhance the efficacy of the anticancer drug and reduce the side effects. Additionally, multifunctional characteristics of the Nano-carrier system would allow for simultaneous imaging of tumor mass, targeted drug delivery and monitoring **(Theranostics)**.

A summary of recent progress in nanotechnology as it relates to nanoparticles and drug delivery will be reviewed. Nano Nutraceuticals using combination of various natural products provide a great potential in diseases prevention. Additionally, various Nanomedicine approaches for the detection and treatment of various types of organ specific delivery, vascular targeting, and vaccine will be briefly discussed. Additionally, novel Ligand-Drug Conjugates and Ligand conjugated Nano loaded with active Pharmaceuticals versus Antibody-Drug Conjugates will be briefly highlighted.

Reference

[1] Mousa SA, Bawa R, and Audette GF (Editors): *The Road from Nanomedicine to Precision Medicine, Jenny Stanford Publishing (2020) – 1200+ pages, 36 chapters [ISBN 978-981-4800-59-4 (Hardcover), 978-0-429-29501-0 (eBook)].*

Keynote: III-V nanowires for silicon-integrated nanophotonics: opportunities and challenges

Vladimir G. Dubrovskii
Faculty of Physics, St. Petersburg State University, Universitetskaya Emb. 13B, 199034 St. Petersburg, Russia

Prof. V. G. Dubrovskii has authored and co-authored some 670 technical papers, including more than 300 journal papers indexed by WoS, 2 monographs and has a Hirsch-index of 45. His research interests are in synthesis and modeling of semiconductor nanowires and design of optoelectronic nanomaterials. He is a Professor and Head of the Laboratory of Physics of Nanostructures at Faculty of Physics, St. Petersburg State University. He has received a number of awards and honors including Chevalier of Ordre des Palmes académiques, France (2017), Doctor Honoris Causa of Université Clermont Auvergne, France, and Regular high-level visiting scientist in IGAT Base at Beijing University of Posts and Telecommunications, China (2007-2018)

Abstract

I will review the state-of-the art research on synthesis of III-V nanowires (NWs) on silicon substrates and photonic nano-heterostructures based on such NWs. Some recent advancements will be discussed, including coherent growth in regular arrays on silicon substrates and some growth features of the vapor-liquid-solid growth which enable controllable tuning of the NW morphology, composition, crystal phase and statistical properties of the size distributions within the ensembles of NWs. Opportunities and challenges for optoelectronic applications of III-V NW heterostructures monolithically integrated with silicon electronic platform will be discussed.

Keynote: Nanomaterials and membranes interfaces by Atomic Layer deposition: design, properties and applications

Mikhael Bechelany
Institut Europeen des Membranes, IEM, UMR 5635, Univ. Montpellier, ENSCM, CNRS, Montpellier, France

Prof. Mikhael Bechelany (born in March 1979) obtained his PhD in Materials Chemistry from the University of Lyon (France) in 2006. His PhD work was devoted to the synthesis and characterization of silicon and boron based 1D nanostructures (nanotubes, nanowires and nanocables). Then, he worked as a post-doc at EMPA (Switzerland). His research included the fabrication of nanomaterials (nanoparticles and nanowires), their organization and their nanomanipulation for applications in different field such as photovoltaic, robotic, chemical and bio-sensing. In 2010, he became a Scientist at CNRS. His current research interest in the European Institute of Membranes (UMR CNRS 5635) in Montpellier (France) focuses on novel synthesis methods for metals and ceramics nanomaterials like Atomic Layer Deposition (ALD), electrodeposition, electrospinning, 3D printing and/or on the nanostructuring using natural lithography (nanospheres and/or membranes). His research efforts include the design of nanostructured membranes for health, environment and renewable energy. Beginning of 2022, he is the author and co-author of more than 280 publications, 13 book chapters and 10 patents (h-index = 55). He is also the co-founder of 3 Startups

Abstract

Nanostructure science and technology are a broad and interdisciplinary area of research and development that has been exponentially growing in the past few years. Engineered nanomaterials are resources designed at the molecular (nanometer) scale to take advantage of their small size and novel properties which are generally not seen in their conventional bulk counterparts. The two main reasons why nanomaterials can have different properties are: (i) the increase of relative surface area and (ii) the quantum confinement effects leading to novel optical, electrical and magnetic behaviors. In order to apply these nanomaterials in different fields and to increase the throughput of nanostructured materials and membranes for energy, environmental and health applications, an efficient control of the interfaces is needed.

Here, we used different synthesis techniques such as atomic layer deposition (ALD) [1], as the main tools for the creation of controlled nanostructured materials and membranes in which the geometry can be tuned accurately and the dependence

of the physical-chemical properties on the geometric parameters can be studied systematically in order to investigate their performances in energy, environmental and health applications. We will show examples of how these methods can be used to create single nanopores for sensing, membrane for gas purification [2,3], osmotic energy harvesting [4] and water treatment as well as sensors and biosensors [5], in which the performance varies with the nanostructures/interfaces.

References:

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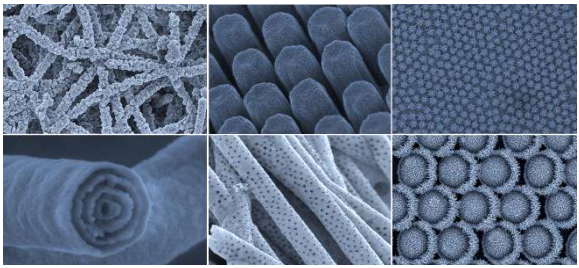

Figure 1: Design of nanomaterials for energy, environmental and health applications.

Keynote: High performance ceramic anode materials with structure decoration

Hailei Zhao[1,2]*

[1] School of Materials Science and Engineering, University of Science and Technology Beijing,
Beijing 100083, China

[2] Beijing Municipal Key Laboratory of New Energy Materials and Technologies, Beijing 100083, China

Prof. Hailei Zhao received her Ph.D. in Physical Chemistry from USTB in March 1993. She was a postdoctoral associate (STA Fellow) in Okayama Ceramic Centre of Japan during Dec. 1999 - Dec. 2001. As visiting scholar, she worked in Georgia Institute of Technology, Boston University and Chinese University of Hong Kong in 2015, 2004 and 2003, respectively. She is a panel member of Solid State Ionic Society of Chinese Ceramic Society, and vice-director of Beijing Ceramic Society, China. She is the recipient of Program for New Century Excellent Talents in University (2007), China. She is a co-holder of 57 Chinese patents and has authored more than 170 peer reviewed publications (SCI-indexed) (Google Scholar h-index = 52, citations = 9,357). Panel member of Solid State Ionic Society of Chinese Ceramic Society, and the vice-director of Beijing Ceramic Society, China

Abstract

A solid oxide fuel cell (SOFC) is an energy conversion device that produces electricity by electrochemically combining a fuel and an oxidant across an ionic conducting oxide electrolyte. It is one of the cleanest and most efficient energy technologies due to its modular, scalable, and efficient features. Significant efforts have been devoted to developing high-performance electrode materials with the aim of increasing the power density of SOFC stacks. Ceramic anode materials have many advantages over the traditional Ni/YSZ (yttrium stabilized zirconia) in terms of reaction active site, structural stability, carbon deposition and sulfur poisoning. To enhance the electrochemical activity of ceramic anode, in situ exolution of highly catalytic nanoparticles and lattice tailoring strategies are employed in this work to realize excellent performance of anode materials.

A series of double perovskites $Sr_2FeMo_{0.65}M_{0.35}O_6$ (SFM*M*, *M* = Co, Ni) with outstanding performance are developed. Through *in situ* exsolution, several metallic nanoparticle catalysts decorated ceramics were prepared. The maximum power densities (MPD) of electrolyte supported single cells with

SFMCo and SFMNi anodes reach 820, and 960 mW cm^{-2} in wet H_2 at 850 °C, respectively. The SFMNi anode also shows good coking resistance in wet CH_4. A novel double perovskite $Sr_2FeMo_{2/3}Mg_{1/3}O_{6-\delta}$ with anti-site defects was designed and prepared. The formation of anti-site defect promotes the generation of oxygen vacancy and facilitates the oxygen ion migration in the lattice, leading to an enhanced electrode reaction kinetics. In an electrolyte (300 μm) supported single cell, the $Sr_2FeMo_{2/3}Mg_{1/3}O_{6-\delta}$ anode demonstrates excellent cell performance with MPD of 1038 and 1316 mW cm^{-2} at 850 and 900 °C, respectively. The designed double perovskites are attractive anode materials for SOFCs.

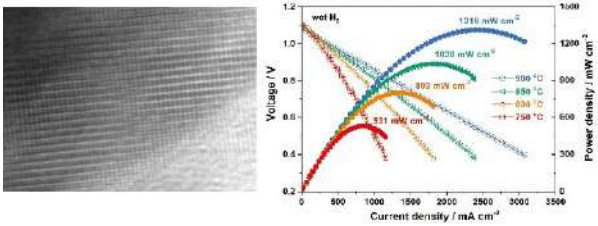

Figure 1. Anti-site defect and single cell performance of $Sr_2FeMo_{2/3}Mg_{1/3}O_{6-\delta}$ anode material.

Keynote: Novel electroactive hybrid fiber materials

Weihua Tang
Xiamen University, China

Prof. Weihua Tang is working at the Institute of Flexible Electronics at Xiamen University. He did his PhD study in chemistry from National University of Singapore. He had research experience at Institute of Materials Research and Engineering in Singapore, University of Melbourne and University of Washington. His recent research interest lies in on energy conversion and storage. He has published over 200 research papers in journals like EES, AM, ACIE, AFM, ACS Energy Letters, Nano Energy and Energy Storage Materials. He has over 11,000 citations on Google Scholar, with an h-index of 57. Click here for his Google scholar page

Abstract

In this talk, I will talk about our recent progress in the design of novel electroactive hybrid materials with fiber morphology for high-performance cycling-stable energy storages. The materials design, processing, theoretic modeling and charge/discharge mechanism will be elaborated.

Keynote: Nanofibers synthesis and applications in renewable energy, water desalination and wastewater treatment fields

Nasser A. M. Barakat
Minia University, Egypt

Prof. Nasser A. M. Barakat obtained his PhD in Chemical Engineering from Hunan University, China in 2004. From 2007 to 2009 he was a postdoctoral Research Fellow at the Bionanosyetm Engineering Department, Jeonbuk National University, Jeonju, South Korea. From 2010 to 2018, he was a faculty member in Organic Materials and Fiber Engineering Department, Jeonbuk National University, Jeonju, South Korea. Currently, he is working as a professor in Chemical Engineering Department, Minia University, Egypt. From 2013 to 2018, he was hired as a visiting professor in King Saud University, Riyadh, Saudi Arabia. He published more than 260 papers in SCI journals and owns H-index of 51 (Scopus). He was selected among the "World Ranking of Top 2% Scientists" created by experts at Stanford University, USA for three successive years. According to AD Scientific Index, in the field of chemical Engineering, Prof. Barakat' rank is 1, 1, 2 and 359 in Minia university, Egypt, Africa and world, respectively. His research interest is focusing on application of nanomaterials in renewable energy and wastewater treatment fields.

Abstract

Among the different classes of nanostructures, the large axial ration provides the nanofibers special consideration due to the corresponding distinct improvement in physicochemical characteristics. Consequently, this class of nanomaterials shows fantastic activities in different hot applications including medical, automobiles and industries, renewable energy, water technology… etc. However, in the field of renewable energy, the excellent performance drew high attention for this nanostructure. Besides, in water desalination and wastewater treatment, the nanofibrous materials are considered promised functional materials. This lecture summarizes the history of nanofibers manufacturing and introduces some hot topics applications of the nanofibers in renewable energy fields such as microbial fuel cells and hydrogen generation from water splitting. In the field of water technology, a brief discussion about application of nanofibers in oily water treatment and water desalination will be also introduced in the lecture.

Keynote: Water harvesting, desalination and quality control with silicon metasurfaces and microfluidic devices

Tarik Bourouina
Université Gustave Eiffel, Paris, France

Prof. Tarik Bourouina has obtained his Ph.D. in 1991 and his Habilitation (HDR) in 2000 from Université Paris-Saclay. He has been Professor of Physics at ESIEE Paris, Université Gustave Eiffel since 2002, where he took several executive positions as Dean for Research of ESIEE Paris (2012-2015 and since 2021) and Associate Vice-President for Research of Université Gustave Eiffel (2021-2022). He is affiliated to the French National Center for Scientific Research (CNRS) within the ESYCOM laboratory UMR9007. Before joining back ESIEE in 2002, Dr. Bourouina took several positions in France and in Japan; at Université Paris-Saclay (1995-1998) as Associate Professor in IEF Lab (CNRS UMR 8622), at the French National Center for Scientific Research (CNRS) and at The University of Tokyo (1998-2001) as Senior Researcher in LIMMS Lab (CNRS UMI 2820). He also used to serve as the Director of the ESIEE-NTU Singapore Dual-Degree Master of Engineering (2003-2006). In 2017, he was the recipient of the Chinese Academy of Sciences President's Fellowship. Dr. Bourouina has many contributions in the development of several companies launched by his former students and colleagues, which include Si-Ware Systems, Fluidion, Memscap, MEMS-Schlumberger and Izonics. Among his contributions to the international scientific community, Dr. Bourouina served in the Technical Program Committee of IEEE MEMS (2012-2013). He is now serving as an Editor in two journals of Nature Research: 'Light: Science and Applications' and 'Microsystems and Nanoengineering'. He also serves as Associate Editor in "Advanced Devices and Instrumentation" -a Science-Partner Journal and Associate Editor in "Optical Microsystems" -an SPIE Journal. His current interest includes micro-scale photonic and fluidic devices and the related physics as well as their applications to sustainable development

Abstract

In the context of the Anthropocene and its consequences on fresh water scarcity, we explore the potential of silicon-based devices for the purpose of sustaining the availability of fresh water resources. First, we will introduce meta-surfaces based on black-silicon, specifically designed for the collection of water from air thanks to their radiative and wetting properties. Another class of meta-surfaces are meta-foams, which were developed and specifically designed for optimal water desalination. A third class of meta-surfaces relate to functionalized silicon

for photocatalytic purification of water. Finally we will review solutions suitable monitoring various chemical and particulate pollutants of drinking water, including micro-plastic and biological contaminants.

Keynote: Multifunctional EMI shielding and sensor applications with 2D materials and their composites

Choon-Gi Choi[1,2]

[1] ICT Creative Research Lab.,
Electronics and Telecommunications Research Institute (ETRI), Daejeon, 34129, Korea,

[2] School of ETRI (Advanced Materials & Device Technology), Korea University of Science & Technology (K-UST), Daejeon, Korea, cgchoi@etri.re.kr

Prof. Choon-Gi CHOI is a head of the Graphene Research Team in Electronics and Telecommunications Research Institute (ETRI), South Korea and a full professor in School of ETRI (major: Advanced Materials & Device Technology) of University of Science and Technology (UST), South Korea. He received the doctorate in Physics from Université d'Orléans, France in 1996. Since 1996, he is working for ETRI, where he has developed micro- and nano-photonic and optoelectronic devices and graphene and 2D materials-based electronic and photonic devices. He was an associate editor of the Nano Convergence journal with Springer Nature publishing from 2013 to 2017. He is now an Editorial Board of Nano Convergence Journal and Sensors (MDPI). He was also a Review Board Member of National Research Foundation of South Korea from 2010 to 2012. He is author and co-author on over 120 international scientific publications and holds 30 U.S. patents as well as more than 80 Korea patents. His current research interests include 2D materials and nanocomposites fabrication with applications on pressure and strain sensors, humidity sensors, EMI shielding, heat spreading, transparent electrode, electrochromic device, etc.

Abstract

Two-dimensional (2D) materials and their composites have attracted widespread attention for many electronic applications. Combining 2D materials with other nanomaterials to form multifunctional composites is necessary to enhance the performances and add more functions to realize various applications. As electromagnetic (EM) wave pollution is becoming more and more severe due to the development of high-speed wireless communication devices and systems, researchers are trying to find suitable materials to prevent electronic devices from interrupting each other. 2D transition-metal dichalcogenides (TMDs) with their unique properties are also of great interest as sensing materials for the development of sensors

with exceptional sensing performance. Herein, I introduce recently developed multifunctional composites based on 2D materials for flexible pressure-temperature sensors with ultrahigh gamma radiation tolerance and an artificial electronic skin film with ultrahigh EMI shielding effectiveness (SE) and strain-pressure sensing performance. I also demonstrate resistive type 2D TMDs-based thin film humidity sensors with superior humidity sensitivity and fast response based on 2D molybdenum disulfides (MoS_2) and platinum diselenide ($PtSe_2$).

Acknowledgement

This work was supported by Korea Institute of Energy Technology Evaluation and Planning (KETEP) grant funded by the Korea government (MOTIE) (20181510102340), and Korea Evaluation Institute of Industrial Technology (KEIT) grant funded by the Korea government (MOTIE) (20013138).

Keynote: Electrical, mechanical, and medical applications of nanodiamond films prepared by physical vapor deposition

Tsuyoshi Yoshitake
Department of Advanced Energy Science and Engineering, Kyushu University
tsuyoshi_yoshitake@kyudai.jp

Prof. Tsuyoshi Yoshitake is with the Department of Advanced Energy Science and Engineering, Faculty of Engineering Sciences, Kyushu University, Japan. He received B., M., and Dr. Eng. degrees in electronic engineering from Kyushu Institute of Technology, Fukuoka, Japan, in 1991, 1993, and 1996, respectively. He became a research associate at the Faculty of Engineering, Kyushu University, Fukuoka, Japan, in 1996. After being promoted to an associate professor at the Interdisciplinary Graduate School of Engineering Science, Kyushu University, he is a professor from April, 2020. He has been involved in the research of electronic materials in thin film and their applications to electronic devices. Recently, he is interested in various applications of diamond, particularly to sensing and detections. Research interests include Sensors and photovoltaics at extreme conditions; 2) Formation of quantum centers in diamond and their application to sensing; Nanocarbon synthesis by physical vapor deposition and laser technologies.

Abstract

Nanocrystalline diamond (NCD), which is one of carbon nanomaterials, possesses physical properties similar to crystalline diamond and specific properties owing to the existence of a large number of grain boundaries in film. As shown in Fig. 1, NCD films comprise a number of diamond nano-sized grains and an amorphous carbon matrix.

NCD films have ever been prepared mainly by chemical vapor deposition (CVD) using hydrocarbon source gases. On the other hand, we have succeeded in the formation by employing physical vapor deposition, concretely pulsed laser deposition (PLD) [1] and coaxial arc plasma deposition (CAPD) [2]. From our previous studies, it was found that highly energetic carbon species such as ions and excited atoms realize quasi-high pressure and high temperature situations for forming diamond. As schematically shown in Fig. 2, resultant film structures are different from those of CVD NCD films. Table 1 shows comparisons in the film deposition process and condition between CVD and PVD. Significant specifics to PVD are no requirement of pretreatment of substrates with diamond powder and growth at low substrate-temperatures. In particular, hydrogen atmospheres are not necessarily

required for the growth of NCD films by CAPD

Concerning applications as semiconductors, B and N were doped during the deposition process, and the production of p and n-type conductions were confirmed. Based on the results, B-doped p-type NCD films were deposited on n-type Si substrate, and the resultant pn junction showed a typical rectifying action and photodetection for DUV light, as shown in Fig. 3 [3].

For the purpose of application to hard coating on cemented carbide (WC-Co), the process developments have been made. It was found that the low-temperature growth can suppress the graphitization induced by the catalytic effects of Co on the WC-Co substrates and the internal compressive stress of NCD films is extremely small, for example 4.5 GPa for 5-GPa-hardness film, which is smaller than that of comparably hard a-C films [4]. This might be because the huge number of GBs structurally specific to NCD films might have a role in the release of the internal stress. To enhanced the film hardness, negative biases was applied in quasi-direct current during the film deposition. By optimizing the negative bias condition, an enhancement in the hardness to 85 GPa has been realized thus far. The Raman spectra of the films are apparently changed due to enhanced diamond content, as shown in Fig. 4.

Acknowledgements

This research is supported by JST A-STEP Stage 2 Grant No AS2915051S, Osawa Scientific Studies Grants Foundation, JSPS KAKENHI Grant Nos. JP19H02436 and JP21K18830.

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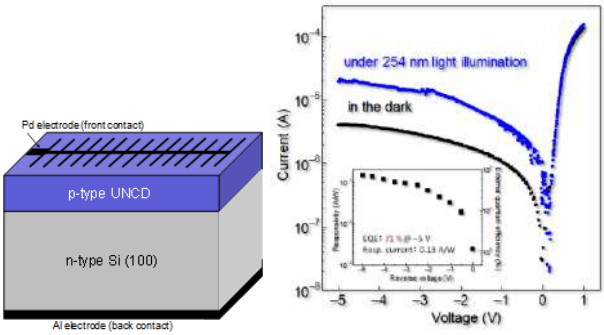
Table 1 Comparison in NCD preparation condition between CVD and PVD.

Chemical Vapor Deposition	This work: Physical Vapor Deposition	
	Pulsed Laser Deposition (PLD) / Coaxial Arc Plasma Deposition (CAPD)	
	CVD	PVD
		PLD / CAPD
energy of species	-	from tens to hundreds electron volts
depo. process	continuous	pulsed
seeding procedure	required	NOT required
depo. rate	generally low	80 nm/min / 400-6000 nm/min
substrate temp.	700 ~ 1000 °C	550 °C / RT ~ 550 °C
large area depo.	dependent on method	difficult / possible
others	generally high quality	amorphous carbon is cogenerated



(a) (b)

Figure 3 (a) Schematic of heterojunction comprising p-type NCD film and n-type Si substrate, and (b) its photodetection for 254 nm light. Inset of (b) shows photoresponsivity and eternal quantum efficiency.

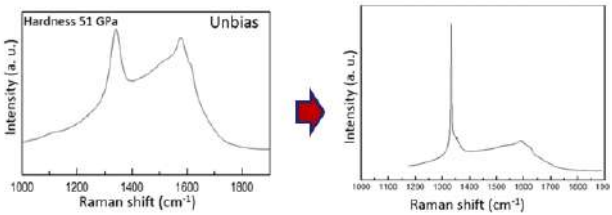


Figure 4 Change in Raman spectrum by applying negative bias.

Keynote: Nano-technology and nano-engineering for chemical engineers

Said Salaheldeen Elnashaie[1]*, Firoozeh Danafar[2], Hassan Hashemipour Rafsanjani[2]

[1]Chemical Engineering Department University of Waterloo, Ontario, Canada

sselnashaie@gmail.com

[2]Chemical Engineering Department , Shahid, Bahonar , University of Kerman , Kerman , Iran

Prof. **Said El-Nashaie** is a professor in the University of British Columbia, Vancouver, Canada. He has been holding this position since 2006. He has occupied academic and managerial positions in many universities worldwide including Pennsylvania State University, USA, Auburn University, USA, Putra University, Malaysia, King Saoud University, Saudi Arabia, as well as in Cairo University, Egypt. He was born in Cairo, Egypt, 1947. He is a Member of the mangement board of Egyptian Society for Chemical Engineers (ESCE). He is actually the chief editor for the Water, Energy, Food and Environmental Engineering Journal, he has been an associate Editor for the Journal ,Chaos, Solitons and Fractals. He has published 400 papers in international Journals and conferences + 6 books+ 5 chapters in books +2 Canadian patents and 2 USA patents.

Abstract

Nanotechnology/Nano-engineering for Chemical Engineers is a transformational educational lecture addressing basic principles of nanotechnology and translating them into nano-engineering with a particular focus on chemical engineering. This lecture aims to provide vital information about differences between descriptive technology and quantitative engineering for students as well as Professors and working professionals in various fields of technology/engineering. Besides chemical engineering principles, the fundamentals of nanotechnology are also covered along with detailed explanation of several specific Nano-scale processes from chemical engineering point of view. This information presented as practical examples and case studies that help the students, and researchers to integrate the processes which can meet the commercial production. It is worth mentioning here that the main challenge in production of nanostructure and Nano-devices are nowadays including from economic point of view to basic principles. The uniqueness of this lecture is a balance, between important insight into the synthetic methods of nanostructures and their integral relations with chemical engineering. Necessary rules that educate the audiences/ readers about process design, simulation, modeling, and optimization are described. Briefly, the

lecture takes the audiences/readers through a journey from fundamental fundamentals to frontiers of engineering of processes involved in production of nanostructures and those products comprising one or more nanostructures and informs them about industrial perspective research challenges, opportunities, and synergism in chemical engineering and nanotechnology. Utilizing this information, the audiences/readers can make informed decisions on their career and business. The above brief information makes chemical engineering among the most important engineering disciplines in the productive subsystem of nanoparticles.

One important application of that is the production of **C**arbon **N**ano **T**ubes (**CNT**s) in **F**luidized **B**ed Catalytic Reactors (**FBCR**s). **CNT**s are very important nanoparticles for the production of alloys and composites of very high strength and low density and have many applications. **CNT**s have many other applications and it is necessary to produce it in large quantities efficiently.

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Keynote: Si nano_photonics for data center applications

Diaa Khalil
Faculty of Engineering, Ain Shams University, 1 Elsarayat St. Abbassia, 11517, Cairo, Egypt.
E-mail: diaa_khalil@eng.asu.edu.eg

Prof. Diaa Khalil has over 37 years of experience in micro and nano photonic systems. He obtained his PhD from INPG France in 1993. He is Professor of photonics since 2004 in ASU where he was also the Chairman of the ECE Dept., the vice dean of research and the acting dean. He supervised more than 80 MSc and PhD. From 2007 to 2020, he was the CTO of the Optical MEMS Division in Si-Ware Systems where he is currently one of the company technical advisors. He is inventor of about 25 patents and patent applications, author and co-author of more than 370 publications, 4 book chapters and 1 ebook. He is a senior member in IEEE, OSA, SPIE, URSI, a member in the editorial board of the journal, Light: Science and Applications, produced by the **Nature** PG and associate editor of the journal of IEEE-PTL. He is a holder of the State incentive prize in 1998 and state appreciation prize in 2021.

Scopus ID: 7003898118; http://orcid.org/0000-0002-2067-2002

Abstract

With the huge demand of data transfer all over the world, optical communication becomes the default standard communication technique for long haul systems as well as access networks. Photons as carriers of information are penetrating in all the communication levels, they transfer data between continents, between countries, cities, buildings, boards and even between chips in the microprocessors. With this transformation, it becomes also a necessity to move photon manipulation from individual devices to complex circuits that can scale down in price and up in production. This created the technology of Si photonics in which Photonics devices are produced on a Si substrate using standard scalable IC technology. The increase of the photonic device density on the substrate led to the use of nano photonic components and the need of integration of these devices very close to the electronic devices led to the Co Packaged Optical CPO solutions in data centers.

In this work we present the recent development for building CPO solutions on Si technology for data center applications. The architecture of the solution, the main challenges facing its implementation and the solutions suggested to overcome these challenges will be briefly addressed. Examples of the solutions proposed in the literature and those in the market will be critically reviewed.

Review: Nano-biosensors: The future of health diagnostics

Rabeay Hassan
Nano-Science Program, Zewail City of Science and Technology

Dr. Rabeay Hassan is Associate Professor in the Nanoscience Program, Zewail City of Science and Technology (Cairo, Egypt). In 2011, he received the PhD in Bioanalytical Chemistry from Braunschweig University of Technology (Germany). In 2013, he joined the group of Biosensors and Bioelectronics, University of Technology Potsdam, Germany, as a Postdoctoral research fellow. In 2014, he joined the group of Proteomics and Microbiology, UMONS in Mons, Belgium. In 2015, he was a visiting scholar at University of California, USA. He has been granted several scientific fellowships such as the American National Academy of Sciences, Erasmus-Munds and DAAD. The major research interest of Dr. Hassan is microbial electrochemistry, electrochemical nanosensors and biosensors

Abstract

Nanomaterial-based sensing approaches that incorporate different types of nanoparticles (NPs) and nanostructures in conjunction with natural or synthetic bio-receptors as molecular recognition elements provide opportunities for the design of sensitive and selective assays for rapid detection of rapid detection and identification of infectious pathogens, cancer biomarkers and viral infections. This talk will summarize recent advancements over the past years in the development of nanotechnology-enabled biosensors and systems for capture and detection.

The most common types of nanostructures and NPs, their modification with bio-receptor molecules and integration to produce viable sensing systems with bio-recognition, amplification and signal readout will be discussed. Examples of all-in-one systems that combine multifunctional properties for capture, separation, inactivation and detection are also provided. Current trends in the development of low-cost instrumentation for rapid assessment of food contamination will be discussed as well as challenges for practical implementation and directions for future research.

Keynote: From basic sciences to applications: Towards sustainable societies

Amal Kasry
Chief of Section for Basic Science, Research Innovation and Engineering,
Natural Sciences Sector UNESCO HQ; Paris, France

Dr. Amal Kasry is an academic/scientist with a wide range of international experiences in Materials Science and nano-Biotechnology. She received a fellowship from the Max Planck Institute for Polymer Research (MPIP) in 2003, and obtained her PhD from the Johannes Gutenberg University, Mainz, Germany in 2006, in Biophysics, where her major work was in biosensing applications. She has worked as an academic and researcher in different areas around the world; including UConn Health Centre, USA; Cardiff University, UK; Austrian Inst of Technology, Austria; and industrial places like IBM, USA and Nitto Denko, Singapore. She joined the British University in Egypt on 2015 as an assistant professor in the faculty of Engineering for four years, before being appointed as the Director of the University Nanotechnology Research Centre (NTRC), where she developed strategies to manage the scientific and the administrative aspects of the Centre. Her major research is focusing on developing biosensing technologies and employing nanomaterials in the field of biosensing. Dr Amal Kasry is the author of more than 30 peer reviewed publications in prestigious journals, and holds three patents, she is also a reviewer for several scientific publishing houses and funding agencies. Since May 2021, she is the Chief of Section for Capacity Building in Basic Science and Engineering (CB) in Natural Sciences Sector at UNESCO

Abstract

Sustainable Development Goals (SDGs) are the means to achieving the United Nations Agenda 2030, adopted in September 2015, through focus on poverty reduction, infrastructure development, education, achieving gender equality and empowering all women and girls, etc., among other critical social, economic and environmental areas. Almost all 17 of these goals are anchored on science and technology.

It is extremely important to understand the link between physics, chemistry mathematics, and biology and applications such as energy and health, as well as new emerging technologies. It is even more important for scientists to recognize the link between these applications and technologies and the sustainable development. During the past two decades, an emerging field such as nanotechnology for example, has risen, not only as a hot research topic, but as the tool that can influence the future technologies and solutions.

By definition, nanotechnology is the area of science and engineering where materials in the nanoscale (1-100 nm) are utilised in the design and the production of e.g. devices that can be implemented in several applications, such as Energy, Health, …etc, therefore these areas of research that are affecting our daily lives are being taken to a new perception and possibilities for great advancement, which will lead to even more sustainability.

In this talk, I will focus on some examples of basic science disciplines with their applications and show their importance for the sustainability of the societies. These examples will include the link between basic sciences and energy, nanotechnology, and health. I will also discuss some of the programmes and activities that we are currently performing at UNESCO to strengthen and promote basic sciences and the potential impact of this on the different societies.

Review: Recent progress in nanomedicine for gene delivery applications; An overview of the CERRMA Lab experience

Samar El Achy

Assistant Professor of Pathology and Executive Manager of the Nanomedicine Laboratory at Center of Excellence for Research in Regenerative Medicine and its Applications (CERRMA) at the Faculty of Medicine, Alexandria University, Egypt

Dr. Samar El Achy is an Assistant Professor of Anatomical Pathology, at the Faculty of Medicine, Alexandria University, also holds the position of the Executive Manager of the Nanomedicine laboratory at the Center of Excellence for Research in Regenerative Medicine and its Applications. Dr. EL Achy, earned her Bachelor Degree in Medicine and Surgery 2002, from the Faculty of Medicine, Alexandria University. She, commenced her career path in the field of Anatomical Pathology since 2004, handling all aspects of cancer diagnosis and management, experiencing, and acknowledging the gaps in this science which triggered her interest to explore new methods for cancer diagnosis and treatment, namely the field of nanomedicine. From thereon, she completed her PhD studies in the field of nanomedicine at Northwestern University, Chicago, USA. Upon returning to her home country, she played a key role with the Alexandria Faculty of Medicine team in building a comprehensive research center for regenerative medicine, cell culture, and nanomedicine.

Her main experience in research, for the past 10 years, focuses on the use of nanotheranostics for detection, and treatment of cancer, nanotoxicities, as well as a special recent focus on gene delivery nanotherapeutics. She has been involved in a number of funded projects from national and international funding agencies, and has been actively fostering "nanotechnology education" in her university through workshops, conferences and observorships run in her lab. Dr El Achy can be reached on her Linked In page as well as her email:

samarelachy@gmail.com, samar.elachy@alexmed.edu.eg

Abstract

Decoding of the human genome, has unraveled numerous canonical molecular pathways having great significance in cancer and chronic diseases. Recent advancements in the development of genomic high-throughput platforms have fueled genome-wide approach to mine novel biomarkers and paved the way for better diagnostics and the discovery of promising therapies.

The technology of using nucleic acid-based therapeutics is powerful, as it enables precise modulation of the expression of genes known to be

involved in disease progression and can thereby be used for precision medicine. DNA and mRNA are used to induce a specific genes of interest, whereas siRNA and miRNA are used for silencing and modulation of specific genes. The sequence of nucleic acids can further easily be modified to enable patient-specific treatments and can encode essentially any gene involved in specific molecular pathways, or oncogenes, to facilitate treatments of otherwise so-called "undruggable" tumors. Accordingly, nucleic acid therapeutics can be designed to target specific genes involved in cell proliferation, migration, invasion, apoptosis, as well as inflammation, including gene editing correction using CRISPR-Cas9.

Currently employed pharmaceutical nanocarriers, like micelles, liposomes, nanoemulsions, polymeric nano-particles, etc. amongst which few have already entered clinic, whilst others are ongoing preclinical development, exhibit a variety of advantageous characteristics. Herein, we discuss the mechanisms of nanoparticle-targeted drug delivery, recent advancement of therapeutic strategies of nanoparticles based carriers for siRNA, miRNA, and gene augmentation therapies. We also discuss the future prospects and challenges of nanoparticle gene therapeutics. Additionally, a brief overview of our research experience in nanoparticle gene therapeutics at the Center of Excellence for Research in Regenerative Medicine and its Applications (CERRMA) at the Faculty of Medicine, Alexandria University, Egypt

Keynote: Intellectual property issues in life sciences applications of nanotechnology

Ahmed Mousa
Pieris Pharmaceuticals, Inc. Boston USA, Gmbh Munich Germany

Ahmed Mousa is a biotechnology entrepreneur with experience in business and corporate development, licensing, intellectual property, corporate legal and governance. Ahmed currently serves as Senior Vice President, Chief Business Officer and General Counsel of Pieris Pharmaceuticals, acting as site head for the Company's Boston office, overseeing the business development, portfolio strategy, and quality assurance functions, and leading Pieris' intellectual property, corporate secretary, and legal activities, including licensing and corporate legal as well as the Company's global patent portfolio. Mr. Mousa also previously oversaw the Company's centralized project leadership function. Prior to joining Pieris, Mr. Mousa was an attorney with the law firm Covington & Burling LLP, where he represented pharmaceutical and biotechnology companies in a range of matters. He was also previously a law clerk at the U.S. Court of Appeals for the Third Circuit and an IP Associate at the law firm Kirkland & Ellis LLP. Mr. Mousa obtained undergraduate degrees in Molecular Biology and Government from Cornell University and a master's degree in Biotechnology from Johns Hopkins University. His research experience prior to his legal career focused on tumor biology and angiogenesis. Mr. Mousa graduated from Georgetown Law with honors, where he was the Editor-in-Chief of the Georgetown Journal of International Law

Abstract

The complexity of biomedical nanotechnologies yields correspondingly complex intellectual property issues. This talk will examine the challenges faced when seeking to patent these innovations. These challenges include use of known materials as part of these new products, interdisciplinary innovations that draw on multiple fields, and the presence of broad blocking patents in the field. The talk will also discuss strategies to effectively address these challenges to capture commercially significant intellectual property rights to nanomedicines and other nanotechnology innovations in the life sciences.

2nd International Conference on

Nanotechnology: Theory and Applications

NTA2022, Cairo, 19 – 21 December 2022

Program at a glance

Start	End	Monday, December 19, 2022	
8:00	9:30	**Registration**	
9:30	10:30	A11	**Inaugural session** – talks by: • Conference chair • EITESAL President • Mansoura University President • Ain Shams University President • French Ambassador • Minister of Electricity and Renewable Energy • Minister of Higher Education and Research
10:30	11:00	**Coffee Break**	
11:00	11:55	A12	**Nobel Prize talk 1**
11:55	12:05		Launching Egyptian Nanotechnology Association
12:05	13:00		**Nobel Prize talk 2**
13:00	14:30	**Lunch**	
14:30	15:10	A13	**Invited talk 1**
15:10	15:50		**Invited talk 2**
15:50	16:20	**Coffee Break**	
16:20	17:00	A14	**Invited talk 3**
17:00	17:40		**Invited talk 4**

Session name is composed of 3 Characters:

1st character	Hall: A or B
2nd character	Day: 1 - 3
3rd character	Period: 1 - 4

Example: A23 ⇒ Hall A, 2nd day, 3rd Period

-

Start	End	Tuesday, December 20, 2022			
9:00	10:40	A21	**Nanophotonics 1**	B21	**Chemical engineering 1**
10:40	11:10	Coffee Break			
11:10	12:50	A22	**Anti-cancer**	B22	**Chemical engineering 2**
12:50	14:20	**Lunch**			
14:20	15:40	A23	**Exhibitors & Poster session**		
15:40	16:10	**Coffee Break**			
16:10	18:15	A24	**Multidisciplinary**	B24	**Hydrogen/Fuel cell**
19:30	20:30	**Entertainment**			
20:30	22:00	**Gala Dinner and Awards**			

Start	End	Wednesday, December 21, 2022			
9:00	10:40	A31	**Biomedical applications**	B31	**Water treatment**
10:40	11:10	**Coffee Break**			
11:10	13:00	A32	**Future biomedical**	B32	**Electric applications**
13:00	14:30	**Lunch**			
14:30	16:20	A33	**Mechanical properties**	B33	**Nanophotonics 2**
16:20	17:00	A34	**Conference closing session**		

Detailed conference program

Start	End	Monday, December 19, 2011	
8:00	**9:30**	**A10**	**Registration**
9:30	**10:30**	**A11**	**Inauguration**
10:30	**11:00**		**Cofee Break**
11:00	**13:00**	**A12**	**Nobel Prize Talks** **chairs: Saad Hassan & Mohamed Rashad**
11:00	11:55	**001**	Towards Adaptive Nanoscience and Nanotechnology; Jean-Marie Lehn
11:55	12:05		*Announcing Egyptian Nanotechnology Association*
12:05	13:00	**002**	Topology and Molecular Machines: Two Interlinked Research Fields; Jean-Pierre Sauvage
13:00	**14:30**	**Lunch**	
14:30	**15:50**	**A13**	**Frontiers of Nanotechnology 1** **chairs: Mohey Elmazar & Diaa Khalil**
14:30	15:10	**003**	Impact of Nanobiotechnology on the future of Medicines: The Road toward precision Medicines – Case Studies; Shaker Moussa
15:10	15:50	**013**	Multifunctional EMI shielding and sensor applications with 2D materials and their composites; Choon-Gi Choi
15:50	**16:20**	**Cofee Break**	
16:20	**17:40**	**A14**	**Frontiers of Nanotechnology 2** **chairs: Amal Kasry & Yasser Sabry**
16:20	17:00	**008**	Nanomaterials and membranes interfaces by Atomic Layer deposition: design, properties and applications; Mikhael Bechelany
17:00	17:40	**005**	Water harvesting, desalination and quality control with silicon metasurfaces and microfluidic devices; Tarik Bourouina

Start	End		Tuesday, December 20, 2011
9:00	**10:40**	**A21**	**Nanophotonics 1 chairs: Sherif Kotb & Diaa Khalil**
9:00	9:40	**004**	III-V nanowires for silicon-integrated nanophotonics: opportunities and challenges; Vladimir Dubrovskii
9:40	10:00	**035**	Dispersion engineering in silicon nitride waveguides; Abdelrahman Mohamed, Salsabil Elsibaie, Hussein E. Kotb, Diaa Khalil
10:00	10:20	**057**	Silicon photonics fabrication tolerance sensitivity study; Rabab A. Shalaby, Yasser M. Sabry, Diaa Khalil
10:20	10:40	**058**	Silicon photonics directional coupler measurements; Rabab A. Shalaby, Yasser M. Sabry, Diaa Khalil
9:00	**10:40**	**B21**	**Chemical engineering aspects of nanotechnology 1 chairs: Saad Hassan & Said ElNashaie**
9:00	9:40	**010**	Nanofibers synthesis and applications in renewable energy, water desalination and wastewater treatment fields; Nasser Barakat
9:40	10:00	**026**	Chitosan-bentonite biocomposite as an environmentally-benign adsorbent for Ciprofloxacin from aqueous solutions; Hanaa Essa, Hebatullah H. Farghal, Tarek M. Madkour, Mayyada M. H. El-Sayed
10:00	10:20	**043**	Hierarchical CoFe2O4/ NiMoO4-doped carbon electrodes for high bioanode performance in microbial fuel cells; Yasmin Ahmed, Fatma El-Gohary, Magdy Zahran, Mohamed Mahmoud
10:20	10:40	**060**	Fabrication and Characterization of a miniaturized pH potentiometric sensor based on a nano Bismuth Oxide film deposited on a Fluorine doped nano Tin Oxide glass substrate (FTO) using spray pyrolysis technique; Mahmoud A. Fathy, Ibrahim Moussa, Ayman H. Kamel, Saad S. M. Hassan
10:40	**11:10**		**Cofee Break**
11:10	**12:50**	**A22**	**Anti-cancer applications of Nanotechnology chairs: Mohey Elmazar & Maged Elkemary**
11:10	11:40	**012**	Recent progress in nanomedicine for gene delivery applications; An overview of the CERRMA Lab experience; Samar El Ashy

11:40	12:10	**014**	Intellectual property issues in life sciences applications of nanotechnology; Ahmed Mousa
12:10	12:30	**024**	MicroRNA-199a loaded gold nanoparticles; A promising tool to combat hepatocellular carcinoma; Mohamed El-Kady, Samar El Ashy, Mona Shehata, Thanaa Shalaby
12:30	12:50	**025**	Overcoming multidrug resistance of triple negative breast cancer cell lines using miRNA 374c-5p and its Inhibitor-Chitosan nanoparticle conjugates; Noor N. Fadhloon, Nefertiti El-Nikhely, Marwa M. Essawy, Yousri A. Rostom, Salah El-Din Abdelmoneim, Mohamed F. Mostafa, Samar El Ashy
11:10	**12:50**	**B22**	**Chemical engineering aspects of nanotechnology 2 chairs: Ahmed Elshazly & Ahmed Abu Kandil**
11:10	11:50	**045**	Nano-technology and Nano-engineering for chemical cngineers ;Said S. Elnashaie, Firoozeh Danafar, Hassan H. Rafsanjani
11:50	12:10	**044**	Response surface methodology for carbon dioxide reforming of methane over Ni/5La-ZrO2 catalyst; Tahani Gendy, Radwa El-Salamony, Seham El-Temtamy, Salwa Ghoneim, Dalia Abdel-Hafiza, Mohamed Ebiad, Ahmed El Naggar
12:10	12:30	**046**	Modeling, simulation and optimization of a bubbling fluidized bed reactor using Chemical Vapor Deposition (CVD) catalyst for the production of Carbon Nano Tubes (CNTs); Said S. Elnashaie, Firoozeh Danafar, Hassan H. Rafsanjani
12:30	12:50	**023**	Mythelene blue removal on biodegradable adsorption membranes fabricated from sugarcane bagasse pulp; Salma O. M. Elshabrawy, Amal Elhussieny, Mahmoud M. Taha, Abdelaziz H. Konsowa, Irene S. Fahim
12:50	**14:20**		**Lunch**
14:20	**15:40**	**A23**	**Exhibitors' session**
			Exhibitors
14:20	**15:40**	**B23**	**Poster session Chairs: Mervat Khalil & Hassan Nageh**
		031	The effect of radiation and cement dust on the DNA of female and male samples; M. M. El-Zaidia, Sobhy E. Hassab El-Nabi, Huda Salman, Sameh Hassan

		032	The effect of tobacco concentration on the DNA bloodsamples using the AC electrical impedance spectroscopy; M. M. El-Zaidia, Sobhy E. Hassab El-Nabi, Huda Salman, Sameh Hassan
		070	Silver nanoparticle probe for fast colorimetric determination of Tobramycin in pharmaceuticals with greenness assessment; Passant M.Medhat, Christine M.ELMaraghy, NermineV.Fares, Miriam F.Ayad
		072	Strong-base free synthesis enhancing the structural, magnetic and optical properties of Mn/Co and Zn/Co substituted cobalt ferrites; Hala G. Abd-Elbaky, M. Rasly, Reem G. Deghadi, Gehad G. Mohamed, M. M. Rashad
		054	Development of Cefoperazone loaded glycerosomes: Fabrication, optimization, and in vitro evaluation of the antimicrobial and wound healing activities; Noha Badawi, Yomna Moussa, Merna Ahmed, Mariam Ahmed, Haidy Mohamed, Madeline Adel, Mostafa Hamed, Marwa Mahmoud, Khaled Zeed, Yasmin Mostafa, Radwa Saeed
		055	Green coffee bean extract loaded solid lipid nanoparticles for management of cellulite: optimization and clinical study; Yomna A. Moussa, Mahmoud H. Teaima, Maha H. Ragaie, Dalia A. Attia, Mohamed M. Elmazar, Mohamed A. El-Nabarawi
		059	Combating type II diabetes employing biodegradable transdermal microneedles; AbdElrahman E. Abu ElKheir, Dalia H. Mady, Mahmoud Khalid, Mahmoud Magdy, Mennatollah S. Abul-Fetoh, Omar H. Selim, Salam H. Talib, Sara A. Shokr, Rania M. Yehia, Muhammed Ossama, Ahmed M. Fayez, Dalia A. Attia
		056	Revelation of the microsponges' predominant fabrication parameters and influence on in vitro biological activities of Adapalene; Rania M. Yehia, Mahmoud H. Teaima, Dalia A. Attia, Mohamed M. Elmazar and Mohamed A. El-Nabarawi

		077	Enhanced visible-light photocatalytic decontamination of methylene blue from wastewater using a biodegradable nano-composite hydrogel; Eman A. Motawea, Hend Al-aidy El-saied
		078	Conductive polypyrrole nanotubes decorated metal free P-g-C_3N_4 as efficient sorbent for Hg^{2+} capture from wastewater; Heba A.El-Sabban**,** M. A. Diab**,** Yasser Moustafa
15:40	**16:10**		**Cofee Break**
16:10	**18:15**	**A24**	**Multidisciplinary applications of nanotechnology chairs: Ahmed Abu Kandil & Hassan Nageh**
16:10	16:30	**073**	Controlling Toluene pollution using synthesized polyaniline/clay nanocomposite ; Amira Abdelraheem, Marwa Elkady, Ahmed H. El-Shazly
16:30	16:50	**061**	Recent trends in magnetic nanomaterials: Synthesis, properties, and their environmental and bio-applications; Mona Sayed, Mohamed Abbas, Salma Naga
16:50	17:10	**075**	Enhanced photocatalytic activity in Zn/Mn substituted BiFeO3 nanoparticles; Wael Ben Taazayet, Ikbel Mallek-Zouari, Jean-Marc Grenèche, Lotfi Bessais, Brahim Dkhil, Najeh T. Mliki
17:10	17:30	**074**	In-Situ determination of anticancer potential induced by Nickel Ferrite nanoparticles, against MCF-7 cancerous cells, using Atomic Force Microscopy under physiological conditions; Samia Dhahri, Marta M. Fernandez, Elias Estephan, Farah Nasraoui, Manel Othman, Csilla Gergely, Najeh T. Mliki
17:30	17:50	**028**	Sorption dynamics of some selected metal ions from aqueous solution using chitosan magnetized by Fe2O3 nanoparticles; Hussein M. Ahmed, Mohamed A. El-Khateeb, Neama A. Sobhy, Nouran Y. Mohamed
17:50	18:05	**038**	Review: Nanofluids derived from nanotechnology: industrial applications; Mahmoud S. Ahmed, Ashraf M. Elsaid
18:05	18:15	**039**	Solar desalination by nanofluids; Ashraf M. Elsaid, Mahmoud S. Ahmed

16:10	**17:50**	**B24**	**Nanotechnology for hydrogen and Fuel cells chairs: Nabil Sabry & Mohamed Rashad**
16:10	16:50	**006**	High performance ceramic anode materials with structure decoration; Hailei Zhao
16:50	17:10	**021**	Development of a microbial photoelectrosynthesis system for efficient hydrogen generation from organic waste streams; Mohamed Mahmoud
17:10	17:30	**040**	Simple and novel co-precipitation method of synthesis of 3D pyramidal hierarchical Ni@ ceo2-Al2O3 nanocatalyst for cyclohexane dehydrogenation; Rasha S. Mohamed, Wael A. Aboutaleb, Heba M. Gobara
17:30	17:50	**062**	Design and fabrication of nanostructured electrode materials for energy conversion; Ayat El-Shazly, Mohamed Rashad, Nageh Allam

19:30	20:30	Entertainment
20:30	22:00	Gala Dinner and Awards

Start	**End**		**Wednesday, December 21, 2011**
9:00	**10:40**	**A31**	**Biomedical applications of nanotechnology chairs: Shaker Mousa & Radwa Abou Saleh**
9:00	9:40	**049**	Electrical, mechanical, and medical applications of nanodiamond films prepared by physical vapor deposition; Tsuyoshi Yoshitake
9:40	10:00	**033**	Nanotechnology revolution in confronting the extreme-drug resistance (XDR) microorganisms; Dalia M. A. Elmasry, Samar Kassem, Walaa M. Elsherif, Dalia Elhosseny, Momtaz A. Shahein
10:00	10:20	**069**	Dermato-kit: a new dermatophytosis lab on chip immunochromatography based diagnostic era; Hassan Aboul-Ella, Rafik Soliman, Rafik Hamed, Heidy Abo-Elyazeed
10:20	10:40	**067**	Glucose optical sensor based on a ternary photonic crystal comprising a superconductor layer; Safaa Alqrinawy, Sofyan Taya

9:00	**10:30**	**B31**	**Water treatment applications of nanotechnology chairs: Mohamed Elhalawany & Mohamed Sameh**
9:00	9:30	**009**	From basic sciences to applications: Towards sustainable societies; Amal Kasry
9:30	9:50	**065**	Novel Solar simulated photocatalytic heterolysis of pharmaceutical wastewater via slag nanocomposite immobilization: Optimization using response surface methodology; Kingsley Safo, Hussien Noby, Masatoshi Mitsuhara, Hiroshi Naragino, Ahmed H El-Shazly
9:50	10:10	**066**	Synthesis of hybrid ultrasonicated eggshell biochar nanomaterial for decontamination of cationic and anionic dyes from aqueous solutions; Norbert O. Rubangakene, Ahmed Elwardany, Manabu Fujii, H Sekiguchi, Hassan Shokry
10:10	10:30	**041**	Enhancing performance of solar distillers using functional materials; Ammar El-Sheikh, Manabu Fujii
10:40	**11:10**		**Cofee Break**
11:10	**13:00**	**A32**	**Future biomedical applications of Nanotechnology chairs: Samar Elachy & Ibrahim Elsherbiny**
11:10	11:40	**011**	Nano-biosensors: The future of health diagnostics; Rabeay Hassan
11:40	12:00	**027**	Novel repurposed nano-facial sheet masks for dermatological disease; Nahla Elhesaisy, Shady Swidan, Mahmoud Teaima, Mohamed El-Nabarawi
12:00	12:20	**051**	Synthesis of nystatin-mediated bismuth oxide nano-drug by using gamma radiation and evaluation of its in vitro antimicrobial activity; Hanady G. Nada, Gharieb S. El-Sayyad, Reham R. El-Behery, Mohamed Gobara, Ahmed I. El-Batal
12:20	12:40	**042**	A novel biogenic formulation for osteoporosis reduction and promotion of bone tissue formation; E. M. Mahmoud, Sally A. El Awdan, M. Sayed, S. M. Naga
12:40	13:00	**071**	The miracle of Ag-NPs biosynthesis using lactobacilli; E. G. El Fadly, A. M. El Baz, O. F. Magooz, E. F. Kamis, N. S. Abdel Atty, H. K. Sakr, M. A. Salama, M. A. Nashaat, M. A. El Kemary

11:10	**13:00**	**B32**	**Electric applications of nanotechnology chairs: Emad Lashkar & Sherif Kotb**
11:10	11:40	**007**	Novel electroactive hybrid fiber materials; Weihau Tang
11:40	12:00	**022**	Synthesis- structure relationship in lead zirconate titanate PZT elaborated using sol-gel auto combustion approach; G. M. A. Elhefnawy, M. El-Gazery, M. M. Rashad, A. H. Khafagy
12:00	12:20	**034**	Parametric study of capacitively coupled Ar/CF4 plasma discharges; Mohamed G. Elsheikh, T. Al Ashram, W. M. Moslem, Mohamed Shihab
12:20	12:40	**068**	High performance supercapacitor electrodes based on eco-friendly glucose-derived nitrogen-doped graphene-like derivatives; Marwa Mohamed, Marwa Adel, Jehan El Nady
12:40	13:00	**076**	Identification of porphyrin-single walled carbon nanotube's supramolecular structure via scanning probe microscopy: towards SWNT absolute handedness chirality determination; Ahmed I. A. Abd El-Mageed, Takuji Ogawa
13:00	**14:30**		**Lunch**
14:30	**15:50**	**A33**	**Enhancing mechanical properties by nanotechnology chairs: Mervat Khalil & Mohamed Gepreel**
14:30	14:50	**048**	Bulk nanostructured Ti-alloys showed ultra-high strength; Mohamed A. Gepreel
14:50	15:10	**050**	Studying the microstructure, physical & mechanical properties of Al matrix reinforced with bi-modal particles coated with either Ni or Cu; Ghada Fadel, Shaimaa A. Abolkassem, Ghalia A. Gaber, Omayma A. ElKady, Aiea A. Elhabak, Mahmoud A. Adly, Lamiaa Z. Mohamed
15:10	15:30	**030**	Bi-modal particles effect on the microstructure, mechanical properties and corrosion behavior of Ti-nano composite for dental applications; Omayma El-Kady, Ahmed El-Tantawy, H. M. Yehia, I. M. Ghayad

15:30	15:50	**047**	Utilization of nano-hydroxyapatite in the fabrication of ceramic bodies with enhanced mechanical properties and translucency; S. M. Naga, N. El-Mehalawy, M. Awaad
14:30	**16:20**	**B33**	**Nanophotonics 2** **chairs: Ahmed Morshed & Emad Lashkar**
14:30	15:00	**020**	Si nano_photonics for data center applications; Diaa Khalil
15:00	15:20	**052**	Experimental characterization of spectral multi-mode double layer InP/AlGaInP quantum dot laser; Radwa A. Abbas, Yasser M. Sabry, Haitham Omran, Zhihua Huang, Michael Zimmer, Michael Jetter, Peter Michler, Diaa Khalil
15:20	15:40	**053**	Experimental characterization of single and double layer InP/AlGaInP quantum dot laser; Radwa A. Abbas, Yasser M. Sabry, Haitham Omran, Zhihua Huang, Michael Zimmer, Michael Jetter, Peter Michler, Diaa Khalil
15:40	16:00	**063**	Effects of structural disorder and Urbach's rule in borate glasses doped with Erbium oxide; Ahmed Henaish, Osama Hemeda, Taher Sharshar, Dmitriy Spiridonov, Ilya Weinstein, Aly Abouhaswa
16:00	16:20	**064**	Controlling the density of plasma species in Ar/CF4 radiofrequency capacitively coupled plasma discharges; Mohamed G. Elsheikh, Tarik El-Ashram, Waleed M. Moslem, Yasser Abdella, Mohammed Shihab
16:20	**17:00**	**A33**	**Closing session**