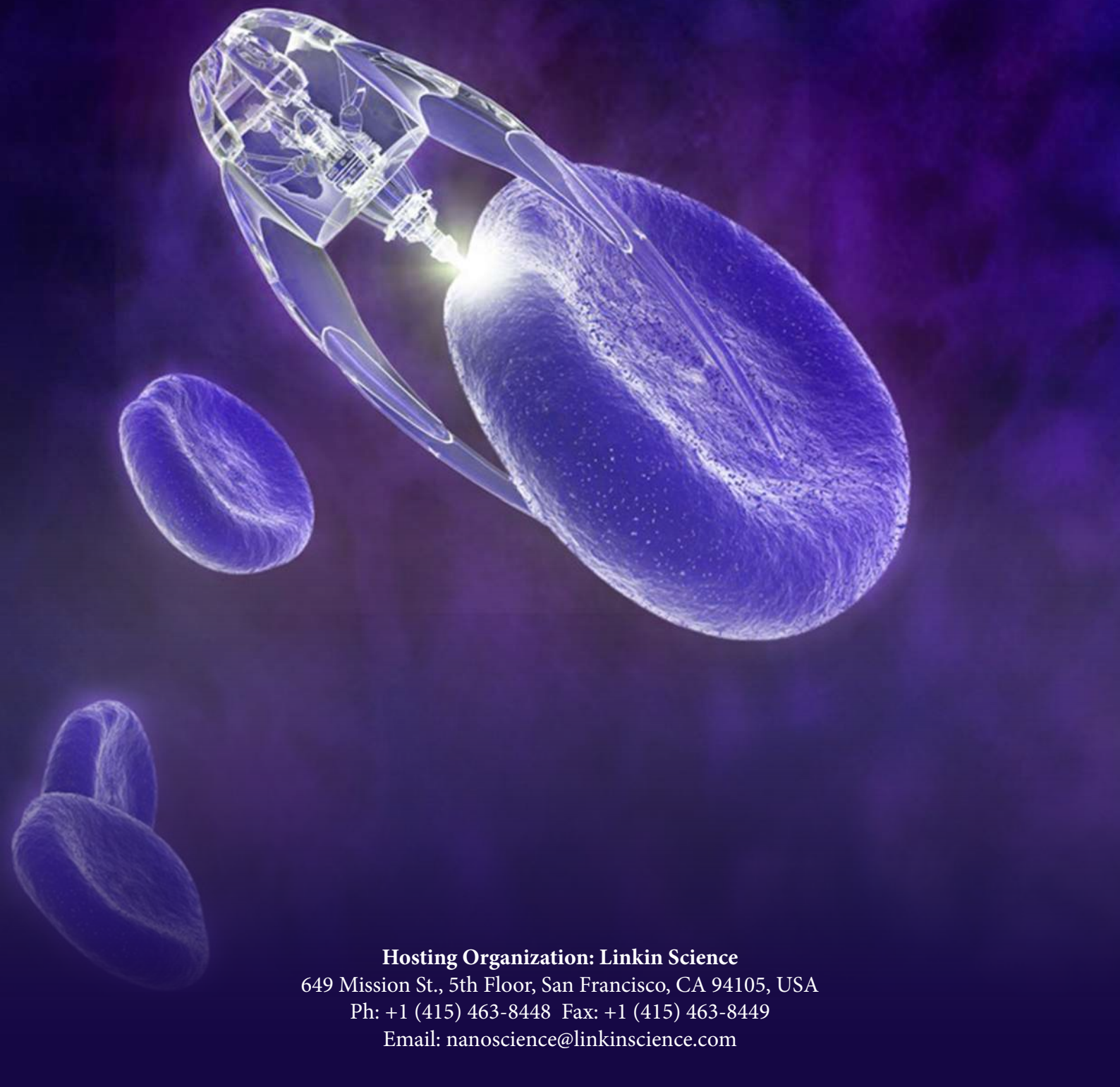
Linkin Science

Exploring & Connecting Science

Proceedings of

Global Summit on Nanotechnology and Material Science

December 04-06, 2017 | Dubai



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Welcome Message

Linkin Science welcomes all to Global Summit on Nanotechnology and Material Science to be held during December 04-06, 2017 in Dubai. We anticipate, your participation at Global Summit on Nanotechnology and Material Science 2017 will catalyze ideas and enhance new interdisciplinary collaborations.

By bringing two topics together under one roof, you get to choose the sessions which are the most applicable to help your business plan for the future of Nanotechnology & Material Science research, development and manufacture.

Nano Science and Material Science are rapidly expanding by playing a prominent role in many fields. The conference aims to showcase these scientific developments that are already resulting in measurable benefits, some of the highlights of the multi-disciplinary programme include world-leading experts speaking on Advanced Nano Materials, Nano Medicine, Nano Compuatational Modeling, Nanotechnology For Energy and Environment, Advancements in Materials Science.

Our exciting scientific program will be presented over the course of three days in various session types – Keynote Presentations, Oral sessions, Young research forum, symposia, Poster sessions and workshops.

Highlights of Conference

- Keynote Talks
- Best Poster Awards
- Young research Forum (YRF)

Regards,

Scientific Committee

Global Summit on

Nanotechnology and Material Science

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Abstracts - Day 01

Electro deposition of Li- doped ZnO nanowire arrays for solar cell

Ahmed El Hichou
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Undoped and lithium doped zinc oxide thin films were deposited by electro deposition technique from aqueous solution onto ITO substrates at optimum conditions. The variations of the structural, electrical and optical properties with the doping concentration were investigated. XRD analysis showed typical patterns of the hexagonal ZnO structure for both doped and undoped films. The films were polycrystalline with the (002) preferred orientation. No diffraction peaks of any other structure were found. The grain size and optical band gap were evaluated for different doping concentrations. The films with 5.10^{-6} M Lithium had a high crystallographic quality and a resistivity of $3,9.10^{-4}$ Ω. cm with an energy band gap of 3,3 eV.

It is very obvious that ZnO-Li films fabricated by sol-gel at optimum conditions are suitable for electronic applications, especially those requiring transparent electrodes.

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Notes:

Improved drug delivery and therapeutic efficacy of PEgylated liposomal doxorubicin by targeting anti-HER2 peptide in murine breast tumor model

Masoumeh Zahmatkeshan
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Statement of the Problem: The most common chemotherapy regimens for treating cancer are based on the application of nonspecific cytotoxic substances which can induce toxic side effects. Targeted cancer therapy is a powerful therapeutic strategy to management of cancer. HER2 as an anticancer target has long been studied. Its over expression plays an important role in the pathogenesis and progressiveness of breast and other cancers. Methodology & Theoretical Orientation to establish efficient and reliable drug delivery to HER2-overexpressing cells, the authors of this study have developed anti-HER2 (ErbB2) peptide-liposomal formulations of doxorubicin (DOX) by an engineered breast tumor targeting peptide ligand, AHNP, Anti-HER2/neu peptide, (FCDGFYACYADV) with three glycine amino acids as spacer before its original sequencing. Towards this goal, PEGylated liposome doxorubicin (PLD) bearing different ligand densities of AHNP was prepared and characterized for their size, zeta potential and peptide conjugation. The AHNP functionalization and density effects on breast tumor cell uptake, selective cytotoxicity, prevention of tumor growth and the tissue bio distribution of encapsulated DOX were studied in mice bearing TUBO breast cancer tumor model.

Findings: The findings demonstrated that increasing the ligand density of AHNP increases cytotoxicity and cell-uptake in SKBR3 and TUBO cells which over express HER2 but not in MDA-MB-231with low HER2 expression profile. The anticancer activity was also superior for targeted liposomal DOX with more AHNP densities. Conclusion & Significance: This experiment displayed the great potential of AHNP as a targeting moiety on the liposome surface and emphasized the significance of adjusting density of ligand to maximize the targeting capability of the nano drug delivery systems. Overall, the results showed that optimum AHNP density functionalization of PLD can significantly improve selectivity and the therapeutic index of liposomal DOX in the treatment of HER2 positive breast cancer and merits further investigation.

Biography

Masoumeh Zahmatkeshan has her expertise in drug delivery and nanotechnology. Her open and contextual evaluation model creates new combination and optimization pathways for treatment of breast cancer. She has built this model after years of experience in research, evaluation and teaching both in research and education institutions. The foundation is based on fourth generation evaluation (Guba & Lincoln, 1989) which is a methodology that utilizes the previous generations of evaluation: measurement, description and judgment. It allows for value-pluralism. This approach is responsive to all stakeholders and has a different way of focusing.

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Notes:

Metal organic framework for radioactive nuclides capture and storage

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We have screened a diverse set of 12 metal-organic frameworks (MOFs) for iodine capture using a molecular modelling. The simulation results provide insights into the influence of pore volume and surface area that influence the storage capacity. We have shown that MOFs with high pore volume and surface are preferred for iodine storage at ambient conditions of pressure and temperature, while at low pressure MOFs with smaller pore volume are more qualified for iodine capture. Moreover, some materials show very high adsorption capacity at normal conditions (13 g g^{-1}), which is higher than any material capacity reported to date. Simulations also show that adsorption sites formed by the metal clusters are the preferential adsorption sites for iodine molecules. In order to increase the iodine capacity of MOF type materials, structures with high density of metal sites must be designed.

One MOFs (Cr-MIL-101) was prepared and investigated in detail to demonstrate the iodine removal efficiency and capacity of MOFs. Detailed material characterization analysis is presented for the MIL-101 loaded with I_2. This includes powder X-ray diffraction (XRD), Infrared (IR), scanning electron microscopy coupled with energy-dispersive spectroscopy (SEM-EDS) and X-ray photoelectron spectroscopy (XPS). The typical sorption kinetics and uptake isotherms were measured using radioactive iodine (^{123}I) for the first time. The results showed that MIL-101 has the same efficacy for capture of radioiodine ^{123}I (96.61%) in comparing with active carbon (98%) but with much faster kinetics. Our results demonstrated that MOF scan be use as agent for radioiodine capture in hot cells and for nuclear accidents with radioiodine

Biography

Bassem join Highest Institute For Applied Science and Technology (HIAST) in the Department of physics. He received diploma from HIAST in the field of Nuclear Engineering in 2002. He received a Master's degree in Applied physics from Delft university of Technology in the Netherlands in 2006 and PhD. from Technical university of Dresden in Germany in 2011. In his thesis, he focused on Hydrogen storage in Nano-structured materials. His research focused on creating nanomaterials to pull radioactive ions from nuclear waste.

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Notes:

Copper oxide thin films grown by dc magnetron sputtering for solar cell applications

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Solar energy is a form of clean energy we received from the Sun, which can be harnessed using a range of technologies. It includes photovoltaics, solar thermal heating, artificial photo synthesis etc. An ideal photovoltaic material is the one which helps in absorbing most of the radiation incident on it. In the present work, we have utilized copper oxide thin films and they were grown by a direct current magnetron sputtering technique. A 2 inch copper target of 99.99% purity was used as the sputter target and the depositions were carried by using argon as sputter gas and oxygen as reactive gas. All the depositions were carried out room temperature. The ratio of sputter and reactive gas during deposition was tuned to get the desired physical properties. We have studied the structural details and absorption behavior of the grown films. It was observed that the deposition conditions play a major role in obtaining a desired crystalline phase. The deposition conditions were optimized for achieving the cupric oxide phase, since they offer high absorption coefficient and desired electrical properties. Optical energy gap of the grown films obtained from the spectrophotometric studies was found to be 1.6 eV. Carrier type and the resistivity values of the films were obtained with the help of Hall effect measurements. Based on our results, we found that the films are suitable for solar energy applications.

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Notes:

UV photodetector based on ZnO thin film nanostructure

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This paper presents a modified design of Area-Efficient Low power Carry Select Adder (CSLA) Circuit. In digital adders, the speed of addition is limited by the time required to transmit a carry through the adder. Carry select adder processors and systems. In digital adders, the speed of addition is limited by the time required to propagate a carry through the adder. The sum for each bit position in an elementary adder is generated sequentially only after the previous bit position has been summed and a carry propagated into the next position. The major speed limitation in any adder is in the production of carries.

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Investigating the effects of electrical stimulation via gold nanoparticles on in vitro neurite outgrowth: perspective to nerve regeneration

Moein Adel
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Statement of the Problem: Following the injury of nervous tissue, in particular, spinal cord injuries, axons do not regenerate appreciably in their native environment and current clinical approach to treating damaged nerves is inefficient; thus, medical treatment approaches are needed. Neural tissue engineering research field has been progressed by using different approaches especially for repairing of damaged neural cells. In addition, it is known that electrical stimulation can be used for neurite growth and nerve regeneration.

Methodology and Theoretical Orientation in these study conductive properties of gold nanoparticles (GNPs, 39 nm) and their contribution to the enhancement of electrical stimulation to nerve cells have been conducted. In experimental section, polyethyleneimine (PEI) polymer coated cover glasses was used to create a positively charged glass surface and adsorption of GNPs was used in conjugation with this polymer coated substrate. Subsequently, PC12 cells were cultured on the modified glass surface and pulsed electric field of 1.5 V, 20 Hz was applied as electrical stimulation for 55 min duration.

Findings: Images from FESEM showed a uniform distribution of GNPs on glasses surface. In addition, enhanced neurite outgrowth (120 μm) using electrical stimulation was determined by inverted phase contrast microscopy images.

Conclusion and Significance: Finally, our study showed that pulsed current stimulation induced neurite outgrowth of PC12 cells adhered to the GNPs coated surfaces. Altogether, synergist combination of GNPs together with pulsed electrical stimulation can be used for enhanced nerve regeneration. Our future works will direct towards optimizing properties of NPs and stimulation parameters for in vivo nerve regeneration and do a comparative study with other nanomaterial including silk, carbon materials and etc.

Biography

Moein Adel has his expertise in nerve regeneration and nanotechnology. His open and contextual evaluation model creates new combination and optimization pathways for treatment of CNS damages. He has built this model after years of experience in research, evaluation and teaching both in research and education institutions. The foundation is based on fourth generation evaluation (Guba and Lincoln, 1989) which is a methodology that utilizes the previous generations of evaluation: measurement, description and judgment. It allows for value-pluralism. This approach is responsive to all stakeholders and has a different way of focusing.

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Pharmacophore modeling, virtual screening and docking study of pyrimidinone inhibitors of dipeptidyl peptidase IV

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In the present study, Pharmacophore Modeling, virtual screening and docking studies have been performed on a series of pyrimidinone derivatives against dipeptidyl peptidase IV. Pharmacophore Modeling study was performed by creating hypotheses by identifying common pharmacophore hypotheses and analyzing hypotheses by enrichment factor. AHRR has been selected the final hypothesis with Phase Hypo Score 1.12 and ROC value of 0.98. ZINC database has been used for virtual screening of thousand of compounds based on validated pharmacophore against DPP-4. These screened compounds were further selected by Glide docking program via high throughput virtual screening (HTVS), standard precision (SP) and extra precision (XP) approaches against DPP-4 (PDB ID: 3GOG). Four top-ranked compounds ZINC34505198 (trelagliptin), ZINC14961096 (alogliptin), ZINC57344518 and ZINC57344513 were selected by virtual screening and docking studies. These compounds were showed better binding affinities towards DPP-4 by using amino acid residues such as TRY631, GLU206 and GLU285. The top-ranked compounds were showed their predicted binding energies with DPP-4 in the range of -9.646, -9.598, -9.18 and -8.915 kcal/mol, respectively. A comparative study of various DPP proteins such as DPP-8 and DPP-9 were also performed with ZINC derived compounds for detecting the binding pattern of active residues. DPP-8 showed binding energies -4.929, -4.627, -4.614, -.049 kcal/mol and DPP-9 showed binding energies -4.942, -3.019, -5.314, -5.598 kcal/mol with the four ZINC screened compounds. The results were concluded that compounds ZINC34505198, ZINC14961096, ZINC57344518 and ZINC57344513 identified as potential DPP-4 inhibitors that may be used as proposed compounds for further development of strong inhibitors.

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Determination of fluoride and some heavy metals in water, blood and urine samples among some inhabitants of gashua, bade local government area, yobe state, nigeria

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The research area was in Gashua, Bade Local Government Area, Yobe State, Nigeria. The levels of fluoride, cadmium, arsenic, lead, iron and nickel were determined in sachet and borehole water samples. The levels of fluoride, cadmium, arsenic, lead, iron and nickel were also determined in blood and urine samples with respect to age groups and gender. Sample collection and preparations were carried out using standard procedures. The concentrations of all the studied metals were determined using atomic absorption spectroscopy (A.A.S). The concentration of fluoride was observed to be higher in the male subjects when compared to the female subjects. It was also observed that the concentration of fluoride was significantly higher in the urine samples when compared to the blood samples. From the present study the concentration of iron ranged from 0.11 to 2.13 mg/L, 0.01 to 1.42 mg/L arsenic, 0.01 to 2.13 mg/L cadmium, 0.01 to 1.77 mg/L nickel and 0.02 to 2.13 mg/L lead. Results from the present study showed that the mean concentrations of arsenic in the borehole water samples from the different wards in Gashua ranged from 0.87 to 2.98 mg/L; 0.44 to 0.77 mg/L lead, 1.04 to 2.13 mg/L nickel, 0.12 to 0.35 mg/L cadmium and 2.56 to 5.56 mg/L iron. The values obtained from the borehole water samples were higher than the WHO standard value of 0.05 mg/L arsenic, 1.0 mg/L iron, 0.01 mg/L lead, 0.07 mg/L nickel and 0.005 mg/L cadmium for drinking water. Information from this research showed the possible factors that may result in gender metal accumulation. The concentrations of all the study metals in the urine and blood samples were significantly higher than the WHO limits. Data obtained from borehole water samples showed that, the borehole water might be a contributing factor to blood/urine metal accumulation. Information from this research also showed the possible factors that may result to higher concentrations of all the metals in urine (both recent and past exposure) when compared to blood (only recent exposure). Data obtained from the present research indicate that the concentrations of all the metals in the blood and urine samples increased with increase in age group. This fact could be explained by the tendency of heavy metals to accumulate in the human body (bioaccumulation of heavy metals) with time, indicating that metal accumulation is age dependent.

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MWCNT reinforced silica aerogel by ambient pressure drying: preparation, characterisation and applications

Isak Rajjak Shaikh
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Aerogels are nanostructured and open porous solids that are usually prepared in a first step by the traditional low-temperature sol-gel synthesis followed by the second step of drying at pressure and temperature higher than the critical point of the pore fluid. Though Kistler performed the first synthesis of silica aerogel in 1931, it is generally assumed as recent discovery due to its relative obscurity until lately. These fragile materials are well known for their low density, porosity and high surface area. Off late, silica aerogels and modified aerogels have been widely employed as catalyst support and catalysts. Carbon catalyzes reactions and the advanced materials like carbon nano tubes can substitute conventional catalyst supports and are also capable of catalyzing reactions. Uzma Bangi et al. reported the successful incorporation of multiwalled carbon nanotubes (MWCNTs) into silica aerogels for improving the mechanical strength. But the capability and potential applications of such materials were never explored. This abstract briefs on our research involving preparation of MWCNT incorporated sodium silicate based aerogel by ambient pressure drying. The MWCNT/Silica aerogel sample was appropriately characterized. The XRD pattern and the N_2-adsorption desorption experiments confirmed the characteristic porous aerogel; the SEM identified its morphology and the surface functional groups or modification are realized by FT-IR and Raman Spectroscopy which furthered our understanding of the surface and the organic compounds-solvent-solid interactions. The aerogel composite performs as a recyclable catalyst in multicomponent reaction and its another application demonstrates the decolourisation of Eriochrome Black T and Methylene Blue from their aqueous solutions. As far as highlighting the importance of the MWCNT/ Silica Aerogel is concerned, it should be stressed that this research not only reports the aerogel composite in significant catalytic and environmental applications but also bears further scope in using this versatile aerogel nanocomposite in some interesting and feasible geoengineering applications by way of its coating on fabric and also by way of developing aerogel as a sky-ceiling. In addition to this, the composite material is found to fluoresces well and also helps us identify adsorption of volatile organics that are prevalent in comet dust and also the inter-stellar medium. Hence there is a good scope for developing this aerogel composite for storing organics and their spectroscopic detection. Though the aerogel tends to have high colour stability, this e.g. with rutile titania, is worth developing for UV inhibition purpose. Such new possibilities provide new proving grounds for the scientific fraternity in developing these functional materials for their use in a broad spectrum of applications including catalysis, adsorption, space suit, aerogel tiles for comet dust collector and other space exploration activities, etc.

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Global Summit on

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Keynote - Day 02

Substrate effects on silicene and how to exploit them

Udo Schwingenschlögl
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Silicene is the Si analogue of graphene with the same honeycomb structure and linear dispersions of the π and π^* bands at the K point of the Brillouin zone. It is predicted to realize a buckled structure, due to sp^2-sp^3 hybridization, and is compatible with the current Si-based nano-electronics. Silicene yet has not been achieved by mechanical exfoliation but can be deposited on metallic substrates such as Ag(111), Ir(111), and ZrB_2(0001). Regrettably, strong interaction to these substrates destroys the Dirac physics. For this reason, semiconducting substrates, including Si(111) and SiC(0001), have been explored theoretically to evaluate whether they lead to a Dirac cone with reasonable band gap (which is essential for applications). However, surface passivation is inevitable for these and similar substrates, due to their dangling bonds. Layered materials such as $MgBr_2$(0001), MoX_2, and GaX_2 (X = S, Se, and Te), on the other hand, might preserve the characteristic electronic states of silicene and additionally simplify the preparation procedure as passivation is not required. The predicted effects of different substrates on silicene will be compared and evaluated with respect to technological requirements.

Biography

Udo Schwingenschlögl is a Professor of Materials Science & Engineering at King Abdullah University of Science and Technology (KAUST), Saudi Arabia. He previously worked at the International Center of Condensed Matter Physics in Brasilia, Brazil, and the University of Augsburg, Germany. His research interests in condensed matter physics and first-principles materials modeling focus on 2D materials, interface and defect physics, correlated materials, thermoelectric materials, metal-ion batteries, nanoparticles, and quantum transport.

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Structure formation in high performance fibers with polymer blends and nanotubes for extreme loading events

Hassan Mahfuz
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Fibers like M5, PBO, Spectra, and Kevlar are used in high impact applications. Although these fibers have high strength and modulus, their fracture strain is low which leads to moderate energy absorption. Normalized velocity for M5, PBO, Spectra, and Kevlar are currently at 1000, 837, 887, and 680 m/sec, respectively. Normalized velocity is a combined measure of fiber's toughness and tensile wave speed, which is essentially the total energy absorption by the fiber. The question is – whether this energy absorption can be doubled or tripled for extreme loading events. Such high energy absorption is possible through a transformative change in the structure of the fiber. It has been shown that such structural change can be made through a hybridized polymer blend and infusion of carbon nanotubes.

A case in point is ultrahigh molecular weight polyethylene (UHMWPE) and nylon. Fracture strain of nylon is one order higher than that of UHMWPE while its strength and modulus are one order lower. Blending of the two increases fracture strain of UHMWPE to an intermediate level. On the other hand, dispersed nanotubes get aligned during the drawing process, co-continuously deform and carry the load resulting in higher strength and modulus. Net effect therefore leads to higher energy absorption. From a quantum energy concept, both polyethylene and polyamides have small cluster of atoms, allowing an opportunity to exchange molecular features if blended. Polymer (blended) crystallinity, strength, and modulus otherwise lost in the blending process, can be fully recovered and enhanced further with the inclusion of nanotubes.

The presentation will delve into scientific inquiries to understand interplay at the interface of major and minor phases, role of compatibilizer, deformation of the dispersed phase, formation of chemical bridges, interfacial tension, and role of nanotubes in sharing load and developing crystallinity.

Biography

Hassan Mahfuz is the Director of Nanocomposites Laboratory and Associate Dean for Research, College of Engineering and Computer Science. His research interests are Computational Methods in Solid Mechanics, Finite Element Method, Polymers, Polymer Composites, Polymeric Fibers, Composites Manufacturing, Mechanics of Composites, Nanomaterials, Nanocomposites, Experimental Stress Analysis, Machine Design, and Computer Aided Design.

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Fabrication of CIGS nanowires based on electro deposition for photovoltaic applications

Daniel S. Choi
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Nanomaterial-based solar cells attract people's attention for its clean and renewable properties. One-dimensional nanostructures can provide attractive architectures for solar energy applications, not only because of the unique physical properties that can be seen from the nanometer-scale structures but because of geometrical impacts that affect the performance of solar cells. Copper (Cu)-Indium (In)-Gallium (Ga)-Selenide (Se) CIGS nanowires are promising materials for solar cell applications due to the large light abortion coefficient (around ~10^5 cm^{-1}), and wide adjustable bandgap range (1.04 to 1.72 eV). We present a feasible approach for fabrication of $CuIn_{(1-x)}$ Ga_xSe_2 (CIGS) nanowire based solar cell by taking advantage of size-effect which increase the effective pn junction size per cell. This electrochemistry-based process includes one-step electro deposition technique to grow CIGS nanowires into the porous anodized aluminum oxide (AAO) template, which is a cost-effective alternative process to vacuum-based deposition process. Composition of CIGS nanowires, determined by energy dispersive spectroscopy (EDS), was achieved through a manipulation of the applied potential and composition of electrolytes. X-ray diffraction analysis showed that crystallinity of CIGS nanowires were improved by annealing. We fabricated the solar cell structure by etching AAO structure after growing highly ordered vertical array of CIGS nanowires as p-type. Chemical bath deposition was followed to deposit a smooth CdS layer as n-type, thin-film of PEDOT: PSS was deposited by spin coating as top layer to act as a transparent and conductive layer.

Biography

Daniel Choi received his B.S. in Metallurgical Engineering from Seoul National University (South Korea) and PhD in Electrical Engineering from UCLA. Dr. Choi was a staff member for three years at the Aerospace Corporation and a task manager Jet Propulsion Laboratory (JPL)/NASA for nine years, leading a number of space-related projects such as Phoenix and Mars Science Laboratory project. He was an associate professor and director of the Materials Science and Engineering (MSE) program at University of Idaho (USA). Currently, he is Founding Department Head of the Mechanical and Materials Engineering in the Masdar Institute of Science and Technology, Abu Dhabi, UAE. He is also a Science Team for UAE Emirates Mars Mission Program.

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Abstracts - Day 02

Biogenic synthesis of Fe_3O_4-conjugates using medicinal plant extracts of *Simarouba Glauca* and functionalized with essential oils for applications in Nanomedicine

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Biogenic synthesis of superparamagnetic Fe_3O_4 nanoparticles with specific sizes and shapes have been a challenge in biomaterial science. Synthesis using plant compounds has remarkable advantages in pharmacology to cure various diseases due to higher efficacy and less toxicity of the plant phytochemicals that attach to the NPs. The well developed surface chemistry of Fe_3O_4 makes it easy to load them with biopharmaceutics, promoting them as nanoplatforms for building up nanoparticle-based theranostics. These phytochemical-loaded magnetic nanosystems permit a slow, sustained & controlled release of the encapsulated plant compounds at the target site. This paper describes the fabrication of monodispersed superparamagnetic Fe_3O_4 conjugates by using phytochemical extracts of the medicinal plant *Simarouba Glauca* (Laxmi Taru) having anticancer properties. These Fe_3O_4-Lax nanocomposites are then functionalised with essential oils Eugenol & Ylang Ylang by surface coating methods. These essential oils are known to be powerful anticancer, anti-inflammatory, antioxidant agents. The nanoencapsulation of Eugenol & Ylang Ylang on polymeric Fe_3O_4 improves their solubility and bioavailability, prevents photo-oxidation, decreases volatility and enhances their antimicrobial and therapeutic efficiency. Various techniques used for confirming the formation of the Fe_3O_4 conjugates were XRD, FTIR, VSM, SEM, TEM and DLS methods. The amount of Essential Oils loaded on Fe_3O_4 nanoparticles was measured as Entrapment Efficiency values using UV-Vis spectroscopy. The antibacterial activity was tested on the bacteriums *S. Aureus* & *E. Coli*. The compounds showed synergistic antioxidant activity which was measured using DPPH assay. The study showed that Fe_3O_4-Lax- Eugenol/Ylang phytohybrids are efficient for stabilising and controlling the release of these essential oils thereby maximising their biological activity. All compounds used for synthesis are of natural plant origin with no side effects and thus these phytohybrid nanosystems can be used as a strategy for therapeutic approach in Nanomedicine such as cancer therapy, magneto aerosols, anti-biofilm and anti-Infection therapy.

Biography

Janesline P. D. Fernandes has an excellent academic record with O+ Grade in M.Sc (Inorganic Chemistry) and a M. Phil. Degree to her credits. She is currently an Associate Professor in Chemsitry, St. Xavier's College, Goa, India. Her research interests are in synthetic strategies and functionalization of nanomaterials for drug delivery and biomedicine. She has guided several projects in the field of Nanochemistry and has presented her research papers at conferences / seminars and earned appreciations in the State of Goa and outside. She has won several awards in the first place category for her oral and poster paper presentations at various events. In December 2016, she has received the International Best Oral Paper Presentation Award at the International Science Congress 2016, Pune-India. She has also earned great reviews for her teachings and student motivation and was honored with Best Educationist Award in June 2017. She is a friendly person, loves travelling and has a happy and a positive approach towards life.

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Notes:

Synthesis and characterization of gold-preyssler-Titanium dioxide nanocomposite: A new and recyclable catalyst for photodegradation of malachite green

Moghaddam Jafaria
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In recent years, investigations on the photocatalytic application of TiO_2 and its composite materials are intriguing interest, due to the small crystal size, high specific surface area and highly porous structure of mesoporous titanium dioxide. However, the most drawbacks of TiO_2 are its large band gap and massive recombination of photogenerated charge carriers, which make the catalytic efficiency low. Thus, modification of the electronic band structure of TiO_2 by noble metal deposition and co-doping with two or more foreign ions have been attracted much attention to overcome the large band gap of TiO_2.

In this research, we demonstrated a facile co-doping approach to synthesize of gold-preyssler-titanium dioxide nanocomposite, as a new and green photocatalyst. We synthesized this nanocomposite and characterized by UV-vis spectroscopy, X-ray diffraction (XRD), Scanning Electron Microscopy (SEM) and Transmission Electron Microscopy (TEM). In addition, the photo degradation of Malachite Green as a pollutant azo dye, in a designed photo reactor in our laboratory was performed as a test reaction to estimate the catalytic activity of this nanocomposite. The obtained results showed that malachite green solution can be degraded under UV light in the presence of the synthesized nanocomposite. For a systematic comparison, the photocatalytic activity was performed with classical catalyst: TiO_2. In all cases, maximum of photodegradation was observed by using gold-Preyssler-titanium dioxide nanocomposite as catalyst. The remarkable degradation of malachite green in the presence of this nano catalyst indicates that the treatments of other organic pollutants could be performed in the presence of this catalyst, in order to obtain a perfect photodegradation degree. This catalytic activity can also be extended to the other catalytic reactions.

Biography

Moghaddam Jafaria got bachelor of Applied chemistry from Ferdowsi University of Mashhad and my master degree of inorganic chemistry from Azad university of Mashhad. She could achieve the highest GPA (3.9/4) among 60 graduate students of Inorganic chemistry Program. She worked at the water and sewer company of Mashhad as a researcher in 2010 after that she worked as research assistant in department of chemistry in the Azad University of Mashhad during her masters from 2011 to 2013. Her primary research interests are in the field of inorganic chemistry and Nanotechnology. Specifically, she is interested in produce metal Nano particles and their application in drug delivery, Nano photo catalysis and semiconductors and their application in medicine and environment. In her free time, she does kickboxing and track and field and plays piano.

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Notes:

Controlled dimensions using Block copolymers for various applications

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Spatial arrangement and precise positoning of 1D nanomaterials and scaling is one of the key factor for advanced electronics and photonics over two decades. The various lithographic methods, optic lithography, electron beam lithography, interference lithography, zone-plate array lithography, focused ion beam lithography has been used for nanoarray formation. The applied lithographic methods are able to obtain nanoarray formation for the sub-100 nm features sizes, but these are not possible to produce large are dimension. Moreover morphological structures and chemical properties in the nanoscaled components may lead to complexity properties that are completely turned complex nanostructures. The controlled chemical segmentation of nanoarrays is required more controlled dimensions. To fabricate in small, desirable and scalable dimension on electronic industry, block copolymer lithography which present with a promising future in electronic industry due to their ability to self-organize at nanometer scales. Of particular importance is that BCP lithography is generally known to be capable of large-scale fabrication combined with hard mask techniques to create surfaces and selected area deposition.

In this perspective, block copolymer nanopatterning techniques for development and pre-development with graphene patterns were studied, the procedures for obtaining nanopatterns, the recent advances in the chemical and physical aspects of self-organized morphologies, nano-enabled surfaces or membranes and controlled self-assembled nanostructures will be presented.

Biography

Mustafa Ersoz is as Professor of Physical Chemistry in the department of chemistry, Faculty of Science, Selcuk University, Turkey. He is founder and served as director of Advanced Technology Research and Application Center of Selcuk University between 2005-2017. He is vice chair of European Cooperation of Science and Technology and principal member of the Turkish Academy of Sciences (TUBA). He coordinated the "Nanomaterials and Nanotechnologies" European cluster, is a member of the "Metals and Related Substances in Drinking Water" specialist group, IWA. He received the "Junior Scientists award" in natural sciences from TUBİTAK, The Scientific and Technical Research Council of Turkey. He received his Ph.D. scholarship in UK, NATO-ASI post doctorate fellowship and Leverhulme Trust visiting scientist fellowship in UK. He has been involved H2020 (MSCA-RISE) and FP7 projects (LAMAND, Chito Claen, EU-SOLARIS, Ligno Food) and core-STSM-MC member for COST CM1101, COSTMP1106, COST 637 and MC member COSTD43, COST D36, projects. Specifically, his research interests are nanochemistry, self-assembly, patterning-functionalisation, nanoparticles, electrochemistry at interfaces and membrane technology.

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Development and evaluation of mannose decorated bovine serum albumin coated superparamagnetic iron oxide nanoparticles (MnBSA-SPIONs) for liver imaging

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Liver diseases such as viral hepatitis, cirrhosis and hepatocellular carcinoma, are common in clinical practice with high morbidity and mortality worldwide. Hepatocyte selective imaging contrast agents can provide useful information for evaluating hepatic function non-invasively in vivo. Recently, superparamagnetic iron oxide nanocrystals (SPIONs) have been widely explored as magnetic resonance imaging (MRI) contrast agents in biomedical research. The mannose receptor is a transmembrane protein expressed on the surface of macrophages, including Kupffer cells and endothelial cells. We aimed to target these receptors for MRI imaging of liver. Oleic acid coated SPIONs were developed with high crystallinity and magnetization by modified thermal decomposition method. The SPIONs were further made water soluble by ligand exchange with (3-aminopropyl) triethoxysilane (APTS). The size of APTS coated SPIONs was fond to be 9.5 nm. These hydrophilic SPIONs were encapsulated in albumin nanoparticles and further mannosylated by schiff base formation in acetate buffer pH 4. The mannose conjugation was confirmed by decrease in free amino groups on nanoparticles with TNBS assay. The MnBSA-SPIONs were characterized by DLS, TEM, SEM, XRD, AAS etc. The uptake of MnBSA-SPIONs was monitored in J774 cell line by prussian blue staining at different time intervals. The biocompatibility of MnBSA-SPIONs was tested in J774 cell line by MTT assay and was found to be biocompatible. The T2 relaxivity of nanoparticles was determined in phan-tom agar gels and was found to be 394 mM-1S-1. The in vivo MRI for liver imaging is currently underway.

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Abstracts - Day 03

Influence of thermal processing rate on the structural and morphological properties of Cu_2SnS_3 (CTS) prepared using solid state reaction technique

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The copper tin sulfideCu_2SnS_3 (CTS) is a p-type direct band gap material; its elements are non-toxic and earth-abundant. It can be used in photo thermal conversion of solar energy and as selective radiation filters on architectural windows. The CTS compound was synthesized by solid state reaction method. The influence of soaking time on the structural and morphological properties of these films is investigated. X-Ray diffraction analysis of these compounds prepared with varying the soaking time at 900°C are found to exhibit tetragonal CTS phase with preferred orientation (1 1 2), (2 2 0) and (3 1 2). The XRD pattern showed that prepared samples do not contain any secondary phases. The grain size calculated using Debye-Scherer's formula was found to be in the range of 34 nm-46 nm. The chemical composition of the compound estimated using Energy dispersive spectroscopy showed Cu/Sn atomic ratio in the range 0.9 to 1.10.

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Gold Nanostructures/Graphene nanosheets modified ITO substrate for enhance Non-enzymatic Detection of Glucose in Serum based on Surface-Enhanced Raman Spectroscopy

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Diabetes mellitus is a worldwide public health problem, in 2000 WHO has been reported that at least 171 million people worldwide suffer from diabetes. The metabolic disorder could be reflected by the variations of the glucose concentration from the normal range (4.4–6.6 mM). Therefore, the determination of glucose concentration is a very important issue in clinic for diagnosing diabetics. Numerous studies have been performed towards developing a real-time, quantitative, and biocompatible glucose biosensor. Several electrochemical techniques based on glucose oxidase enzyme were used successfully for oxidation of glucose. However, these indirect detection methods are disadvantaged because this enzyme needs to be replenished limiting the lifetime of the sensor. Moreover, developed of non-invasive measurement of blood glucose by various methods including optical spectroscopy techniques have remained an elusive target for more than two decades. Here, we demonstrated a simple, rapid and inexpensive fabrication method to develop gold nanostructures/graphene nanosheets modified ITO substrate and its application as a glucose enzyme-free optical biosensor with high sensitivity and selectivity. This Au nano dots/graphene modified ITO substrate was developed based on electrochemical deposition of Au and graphene onto ITO substrate layer-by-layer. This modified transparent substrate was successfully used to measure glucose concentrations within range from 500 nM to 10 mM by surface enhanced Raman spectroscopy. Moreover, the need to achieve accurate non-invasive measurements of glucose under the presence of other possible blood analytes leads us to apply this substrate to monitoring the glucose level in the presence of human serum. Our results demonstrated an efficient direct measurement of near-physiological level of glucose. The optimization of such system will open the possibility of using this modified substrate as an optical biosensor for the *in-vivo*, non-invasive and on-line monitoring of glucose.

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Poster Abstracts

Catalyst-free synthesis of Novel 6-phenyl-6H-chromeno [4, 3-b] quinoline derivatives at RT: Their further structure evaluation leads to potential anti-cancer agents

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A variety of novel quinoline derivatives (6-phenyl-6H-chromeno [4,3-b] quinoline) have been prepared by using 4-chloro-2-phenyl-2H-chromene-3-carbaldehyde and various substitutes of aromatic anilines as starting materials. This is the first example on the preparation of quinolines through this novel method. And the resulting quinoline derivatives further structure evolution may leads to an anti cancer agents. Our preliminary data of model compound (7i) on three cancer cell lines (B16F10, MCF7 and A549) suggested decent anticancer activity on two cell lines (B16F10 and MCF7) with IC50 values of 14.8 and 21.32 μM, respectively. This method may require simple operation and works with a variety of substrates.

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A New Microemulsion Formulation for an Oil-Soluble Drug

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STGF-β. Microemulsions are transparent, thermodynamically stable and isotropicfluid mixtures of oil, water and surfactant, frequently in combination with a co-surfactant. In contrast to emulsions, microemulsions form upon simple mixing of the components and generally do not require high shear conditions used for emulsion formation. In this study, microemulsion systems were prepared using different surfactant, co-surfactant and oil ingredients. Among the ingredients tested were Tween® 20 and Tween® 80 as surfactants, PEG 400, glycerole, 2-propranol and isopropyl alcohol as co-surfactants and soybean and linseed oils. Microemulsions were prepared using pseudo-ternary phase diagrams. Optimum formulation was selected and characterized by droplet size, electrical conductivity, zeta potential and pH measurements.

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Improved permeability and selectivity in the cellulose acetate membranes by tosylated cellulose nanowhiskers

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The first material utilized for industrial fabrication of membranes is Cellulose acetate (CA). This polymer is a cheap material used in the membrane field, and has a good selectivity for the separation of CO_2 from N_2; but its low permeability is a weakness. On the other hand, cellulose nanowhisker (CNW) has characteristics such as high crystalinity and polar functional groups on its surface that can improve the useful features of the polymeric membranes. The precursor of CNW is cellulose, a cheap material widely found in nature. We used cotton (a cellulosic material) as the precursor of CNW in the research. Permeability and selectivity of CA nanocomposite membranes were investigated at a pressure of 2 bar and three different concentrations of the Tosylated-CNW (To-CNW) which were 0.25, 0.5 and 1 wt% of nanocomposite. Solution-casting method was used to prepare the membranes and the concentration of the solid material (CA together with To-CNW) in the solvent (THF) was 11.2 wt%. The cast films were allowed to be dried at ambient conditions then in a vacuum oven for two days. Afterward the dense nanocomposite membranes were cut in the circle shapes and placed in the cell of the "pure gas set-up". The results indicated useful features of the nanocomposite membranes have been improved using To-CNW derived from acidic hydrolysis and tosylation process. The effect of To-CNW content on permeability and selectivity of the prepared membranes is interpreted based on the influence of To-CNW on the CA chain packing because of good interaction between To-CNW and CA polymer matrix. The good interaction is related to existence of polar groups such as hydroxyls and tosyle esters on the surface of To-CNW and, hydroxyl and acetate groups on the CA polymer chains. Disrupting CA polymer chains leads to facilitate the diffusion of penetrants and consequently, increase in permeability. The most permeability and selectivity of penetrants were observed at 1wt% and 0.5wt% To-CNW. The polar groups on the surface of To-CNW, tosyle esters and hydroxyls, interact with the polar gas, CO_2, and as a result, CO_2 has more improved permeability thanN_2, especially at 0.5wt%. Therefore incorporation of To-CNW into the CA matrix leads to enhancement in CO_2/N_2 selectivity which is maximum at 1% of nanocomposite without a clear drop in selectivity. It should be mentioned that the plasticization effect of CO_2 on the membrane shouldn't be ignored, a phenomenon which is observed due toCO_2 permeability increment versus increased pressure in all prepared membranes.

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