2018 SHANGHAI CONFERENCE ABSTRACT

October 27-29, 2018

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2018 Shanghai Conference Introductions

Welcome to CMS-CBEES 2018 conference in Shanghai. The conference is held annually with high quality. The objective of the Shanghai conference is to provide a platform for researchers, engineers, academicians as well as industrial professionals from all over the world to present their research results and development activities in Advanced Nanomaterial and Nanodecices.

2018 International Conference on Advanced Nanomaterials and Nanodevices (ICANN 2018)

Accepted papers will be published in the following journal:

International Journal of Materials, Mechanics and Manufacturing (IJMMM, ISSN: 1793-8198), which is indexed by EI (INSPEC, IET), Chemical Abstracts Services (CAS), ProQuest, Crossref, etc.

Conference website and email: http://www.icannd.org/; icann@cbees.net

CMS Mission

The mission of HKCBEES Chemistry and Materials Society (CMS) is to meet the engineers and the scholars in the Chemistry and Materials discipline. CMS offers a platform for them to communicate and exchange idea. HKCBEES Chemistry and Materials Society hold annually scheduled conferences and workshops on the Chemistry and Materials related topics, it serves as a forum for idea exchange, networking, information sharing and problem solving for the Chemistry and Materials community. HKCBEES Chemistry and Materials Society play an important role in the academic community.

About HKCBEES

The Hong Kong Chemical, Biological & Environmental Engineering Society (HKCBEES) was founded in 2007. It is an independent and scientific research and development organization. The Service can be traced back to the first work in 1999.

HKCBEES plays an influential role in promoting developments in Chemical, Biological & Environmental Theory and Applications in a wide range of ways. The mission of HKCBEES is to foster and conduct collaborative interdisciplinary research in state-of-the-art methodologies and technologies within its areas of expertise.

Good news! To join in HKCBEES member is free now. Please check the information on the website: http://www.cbees.org/list-33-1.html if you are interested in. Any question regarding to membership, please feel free to contact membership@cbees.org.

Presentation Instructions

Instructions for Oral Presentations

Devices Provided by the Conference Organizer:

Laptop Computer (MS Windows Operating System with MS PowerPoint and Adobe Acrobat Reader)
Digital Projectors and Screen
Laser Sticks

Materials Provided by the Presenters:

PowerPoint or PDF Files (Files should be copied to the Conference laptop at the beginning of each Session.)
Duration of each Presentation (Tentatively):
Regular Oral Presentation: about **12** Minutes of Presentation and **3** Minutes of Question and Answer
Keynote Speech: about **35** Minutes of Presentation and **5** Minutes of Question and Answer
We would appreciate if all presenters can adhere strictly to this time limit.

Instructions for Poster Presentations

Materials Provided by the Conference Organizer:

The place to put poster

Materials Provided by the Presenters:

Home-made Posters
Maximum poster size is A1
Load Capacity: Holds up to 0.5 kg

Best Presentation Award

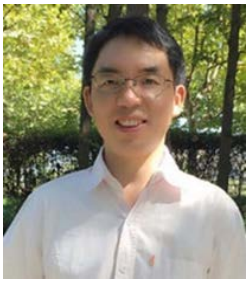
One Best Oral Presentation will be selected from each presentation session, and the Certificate for Best Oral Presentation will be awarded at the end of each session on October 29.

Dress Code

Please wear formal clothes or national representative of clothing.

Keynote Speaker Introductions

Keynote Speaker I



Prof. Yonghui Deng

Fudan University, China

Dr. Yonghui Deng received his B.S. in chemistry from Nanchang University (2000) and Ph.D in polymer chemistry and physics from Fudan University (2005). He worked as a postdoctoral researcher with Prof. Dongyuan Zhao (2005–2007), and was promoted as associate professor (2007) and full professor (2011) in Department of Chemistry at Fudan University. He worked in University of California at Berkeley (2009–2010) as visiting scholar. He has coauthored over 120 papers in refereed journals with total citation over 8000 times and h-index of 46. He received the second prize of Natural Science Award of Ministry of Education (the first awardee), the National Science Fund for Excellent Young Scholars by NSFC, the National "Youth Top-notch Talent Support Program, and Youth Cheung Kong Professor" by Ministry of Education. He is currently the acting associate editor of Chinese Chemical Letters (SCI indexed) and the assessor of Australian Research Council (ARC). His research interests include functional porous materials, core–shell nanomaterials, and their applications in catalysis, chemical sensor, biomedicine, etc.

Topic: "*Interface Nanoengineering Fabrication of Functional Porous Materials*"

Yonghui Deng

Fudan University, China

***Abstract*—**Core-shell or yolk-shell structured microspheres have been subject to extensive research, because they possess functionalities of both cores, shells and voids which endow them with great application potentials in various fields. In particular, core-shell magnetic porous spheres with magnetic core and porous shell with highly accessible pores have been considered as a kind of advanced colloidal materials for their application in separation, catalyst support, colloidal crystal, and drug carrier, etc. Much effort has been devoted to fabricating magnetic porous microspheres; however, little work has succeeded in synthesizing uniform and high-magnetization magnetic porous materials with well-defined pore structure and tunable pore sizes.

Recently, we developed versatile interface nanoengineering method to induce the co-assembly of structure directing agent with silica source on the surface of magnetic core. It has resulted in magnetic porous materials with diverse composition, morphology, structure and pore sizes which are highly desired for various applications including catalysis, bioseparation, enzyme immobilization, and so on. These microspheres include magnetic microporous zeolite spheres, magnetic mesoporous silica spheres, and magnetic mesoporous carbon spheres and metal-incorporated magnetic mesoporous spheres (Figure 1). Several synthetic strategies and methodologies have been developed and will be shown in this report. Additionally, their application for catalysis, selective adsorption, and separation will be highlighted.

Keynote Speaker II

Prof. Chengzhong Yu

The University of Queensland, Australia

Dr. Chengzhong Yu received his bachelor and Master's degrees (1990, 1993) from East China Normal University, and his PhD from Fudan University in 2002. He was a Professor at the Department of Chemistry, Fudan University till 2010. Currently he is a professor and group leader at the Australian Institute for Bioengineering and Nanotechnology, the University of Queensland, Australia.

Prof. Yu is a chemist and materials scientist in functional nanostructured composites and their applications. Since 2000, he has published over 260 peer-reviewed journal articles, which have been cited over 16,900 times and resulted in an H-index of 64. He has developed broad industrial collaborations to extend the applications of functional materials in a real world. He has received several awards including the Le Févre Memorial Prize from the Australian Academy of Science, the ARC Future Fellowship, and the Second prize of the National Science Award of China (3/5)

Topic: "*Silica-based Nanoparticles for Drug Delivery*"

Chengzhong Yu

The University of Queensland, Australia

***Abstract*—**Recent advance in nanotechnology has boosted the development of drug delivery systems, among which silica-based nanoparticles have attracted much attention in gene therapy, vaccine formulations and cancer immunotherapy. Innovative synthesis strategies of novel nanostructures and new understandings of the roles of nanostructure and composition on functionalities are the key towards their practical applications. We have developed several families of silica-based nanoparticles and applied them in various drug delivery applications. In this presentation we will highlight our knowledge of fundamental structure-function relationship, specifically on nanoparticle surface roughness and delivery performance; nanoparticle composition and adjuvanticity; and nanoparticle asymmetry and adjuvanticity.

We have developed a new generation of silica-based nanoparticles with controllable nanoscale surface roughness. One example is silica nanopollens with an intrinsic spiky surface,[1] enabling strong adhesion toward various surfaces. Such nanoparticles have been applied in antimicrobial enzyme delivery. We further demonstrate that silica nanopollens are an excellent system for gene delivery.[2] Distinct from small drug or protein molecules, plasmid DNA possesses unique rope-like loop structures. The spiky nanotopography of nanopollens shows high binding towards the DNA loops and further protect the gene molecules sheltered in the spiky layer against nuclease degradation. Consequently, silica nanopollens show excellent gene transfection efficacy, especially under harsh enzymatic conditions. This novel delivery platform has shown potential in biomedical translations, such as antibiotic-free animal feed and DNA vaccines.

Cancer immunotherapy is a strategy that uses the innate force of immune system to fight against tumours, which is regarded as an effective methodology for safer cancer treatment than conventional cancer therapy using anticancer drug molecules. Development of potent and safe adjuvants for generating robust and long-lasting adaptive antitumor immunity remains one of the key challenges. We will introduce how the choice of various bridge groups in organosilica impacts on their functions and the final antitumor performance.[3] The applications of hybrid silica-based nanoparticles as multi-functional delivery platforms in cancer treatment and as intelligent nanoreactors in amplifying the immunogenic cell death and activating immune response in cancer immunotherapy [4] will also be introduced.

Keynote Speaker III

Prof. Jiaqiang Xu

Shanghai University, China

Dr. Jiaqiang Xu is currently a Professor and Vice Dean of Department of Chemistry at Shanghai University. He is internationally recognized as an expert in gas sensor and nanostructuredmaterials. His accomplishments include over 200 peer-reviewed journalpublications with 5700 cited times and 42 H-Index; 6 provincial science andtechnology achievement awards and tens of patents.

Prof.Jiaqiang Xu' group focuses on the design and synthesis of novel nanomaterialsfor a broad range of applications, including chemical sensing, biomedicalanalysis, catalysis, fuel cell and lithium battery technology. Their currentefforts on nanomaterials include the controllable synthesis of semiconductingnanomaterials, bimetallic nanocrystals, mesoporous silica, and organic/inorganichybrid materials. For the semiconductor nanomaterials research work, they aredeveloping different semiconductor nanomaterials with different morphology andstructure, and exploring the use of these nanomaterials as gas sensingmaterials for environmental and industrial monitoring, personal safety orpublic security. They have synthesized and assembled hierarchical semiconductornanomaterials from integrating low dimensional building blocks for gas sensingwith improved stability and sensitivity. They introduced monodispersed metalnanocrystal on the surface of semiconductor nanowires to construct diversefunctional nano-architectures for fabricating chemical sensors with tunableperformances.

They also synthesized different silica-based mesoporous organic-inorganic hybrid materials to construct QCM gassensors, and used for the detection of hazardous substances, including nerveagent simulant, organic vapor, and heavy metal ion. Other research interests inhis group are taken to the synthesis of functionalized bimetallic nanomaterialsand graphene to exploit their applications in chemical sensing, catalysis andenergy storage and conversion.

Topic: "*VOCs Gas Sensor: Design and Application of Sensing Materials*"

Jiaqiang Xu

Shanghai University, China

***Abstract*—**With rapid development of industrialization process, considerable VOCs pollutants emitted into atmosphere and indoor air caused by industrial emission, overcommitting of traffic tools and finishing materials. To protect the environment, It is necessary to detect effectively them intime. To develop smart sensors to sensing VOCs emission, we must understand the properties of detecting gas, sensing principle of a sensor, and the relationship between materials structure and properties. So two type gas sensors from metal oxide semiconductors and quartz crystal microbalance (QCM) were focused. Some enhancing strategies were introduced including modification of noble metals, assistance of catalysts, grafting molecular probes, tunning surface acidic and basic property and polarity. On the design strategy, formaldehyde, BTEX, ethanol, acetone, organophosphorus, organic amine and humidity sensors were achieved, resulting in a novel strategy for understanding of gas sensing mechanism and sensing material design.

Keynote Speaker IV

Prof. Jin Zou

University of Queensland, Australia

Dr. Jin Zou is currently the Chair of Nanoscience in the University of Queensland, he gained his PhD in 1993 from the University of Sydney. From then, Professor Zou has been engaged his research in understanding the advanced nanostructures using advanced electron microscopy. After received his PhD degree, he carried out his research in the University of Sydney for 10 years with various prestigious fellowships, including an Australian Research Council's Queen Elizabeth II Fellowship. In the second half of 2003, Professor Zou moved to the University of Queensland. In 2009, he was awarded an Australian Research Council's Future Fellowship. Over the years, he published over 630 SCI publications with most of them published in leading international journals, which have been cited for over 17,500 times and led to a H-index of 64

Topic: "*Advanced Transmission Electron Microscopy of Low-Dimensional Nanostructures*"

Jin Zou

University of Queensland, Australia

***Abstract*—**Low-dimensional nanostructures, such as nanowires, nanobelts and nanosheets, have attracted numerous research interests in recent years because of their exotic mechanical, optical, thermal, and electronic properties. Their properties are closely associated with their morphological, structural, and chemical characteristics. Therefore, understanding their detailed characteristics becomes critical for design and manufacturing nanodevices and nanosystems made of these low-dimensional nanostructures. On the other hand, with the development of aberration-corrected transmission electron microscopy and in-situ microscopy, advanced transmission electron microscopy has played a key role in understanding the advanced materials. In this presentation, I will summarize some of our achievements in understanding the structural characteristics of low-dimensional nanostructures by use of advanced transmission electron microscopy.

Keynote Speaker V

Prof. Pei Yuan

Fuzhou University, China

Dr. Pei Yuan received her Ph.D. degree from Fudan University in 2010 and worked as a visiting scholarship and postdoctoral researcher at the University of Queensland in Australia for three years. At present, she is a distinguished Professor in National Engineering Research Center of Chemical Fertilizer Catalyst, School of Chemical Engineering, Fuzhou University. She has long been engaged in the research of catalytic materials and catalysts, involving the design and synthesis of novel nanoporous materials, controllable preparation of supported catalysts, selective desulfurization and polymer hydrogenation. She was selected as Fujian Province's "Minjiang Scholars" distinguished professor, Fujian Province young innovative talents, Beijing "Science Star" and other talent programs. She has received Young Teacher Award of Huo Yingdong Education Fund from the Ministry of Education, the Outstanding Youth Fund of the Natural Science Foundation of Fujian Province, and the Shanghai Outstanding Doctoral Thesis Award. In the past five years, she has undertaken three national natural science funds and three provincial and ministerial funds. So far, she has published more than 60 SCI papers in international peer-reviewed journals, authorizing 3 Chinese invention patents.

Topic: "*Tailored Design and Controllable Synthesis of Chemically Modified Silica Hollow Microspheres with Penetrating Macroporous Shells as A Superior Support for NBR Hydrogenation*"

Pei Yuan

Fuzhou University, China

***Abstract*—**The selective hydrogenation of nitrile-butadiene rubber (NBR) is a significantly important process to produce high quality hydrogenated NBR (HNBR) with exceptional resistance against thermal-oxidative degradation and notably improved mechanical properties. The key factor for the macromolecular polymer reaction is the molecular diffusion and the adsorption. Hence the design of support with connected macropores is essential for intensifying mass transfer and enhancing the accessibility of the reactant molecules to active components. Herein, silica hollow microspheres (SHMs) with the penetrating macropores in the shells have been tailored designed and controllably synthesized by a simple one-step method with water/oil/water ternary phase emulsion system. This material with the chemical modification of ammonia can be served as a superior support to fabricate supported palladium catalysts via the coordination of -NH2- ligands with palladium. The Pd/N-SHMs catalyst shows a high activity and stability for NBR hydrogenation. The macropores are favorable for the macromolecules diffusion, and this reaction can be finished within 1h under 60 °C and 1 MPa H2, which is even better than the homogeneous hydrogenation process. The hydrogenation degree of HNBR could reach up to 95.0% without any gelation and the selectivity to C=C is 100%. The catalysts can be easily recycled by filtration and recovered by the solvent washing. The regenerated catalyst still exhibits a high activity and selectivity with the hydrogenation degree of 94.0% and the selectivity of 100%. Our contribution is to provide a novel hollow material with penetrating macroporous shells which can be used as superior support for macromolecular reaction and we also supply an efficient and recyclable supported Pd catalyst, which may promote the development of heterogeneous catalytic systems for unsaturated macromolecular hydrogenation.

Keynote Speaker VI

Assoc. Prof. Ahmed Abdelfattah Elzatahry

Dean of Graduate Studies, Qatar University, Qatar

Dr. Elzatahry's research interests include design of advanced materials and mesoporous materials and its applications in Biomedical, renewable energy, water treatment and environmental applications. He was the leader of Nanosurfaces Control and Design group at Dept. of Chemistry, King Saud University (2011-2014). Dr. Elzatahry has established strategic partnerships with many international scientific groups. Areas of collaboration include research, students exchange, joint publications and research projects with participants from several institutions. Dr. Elzatahry has published and coauthored more than 140 peer reviewed papers, reviews, and communications, including high impact ISI journals in Science Adv, J. Am. Chem. Soc ., Angew. Chem. Int. Ed., ACS NANO, Adv. Eng. Mater., Nano. Lett., Nano Today, Chem. Mat., J. mat. Chem., Sci. Adv. Mat., and Int. J. Nanomedicine. He also supervised over 15 postgraduate research students successfully for PhD (4), and MSc (11). In addition, Dr. Elzatahry has extensive experience in postgraduate (MSc and PhD) teaching and research. These include postgraduate management, supervision, training, courses development, training, tutoring, accreditation and examination. Currently, he is the dean of graduate studies at Qatar University.

Topic: "*Biological Assessment of Mxene Composite for Biomedical Applications*"

Ahmed Abdelfattah Elzatahry

Qatar University, Qatar

***Abstract*—**Recently, nanomedicine has gained a great deal of attention due to its superb characteristics. Two-dimensional (2D) nanomaterials have attracted a growing interest owing to their physicochemical and ultrathin structural properties. This study demonstrates the preparation of two nanocomposites based on a unique kind of 2D Ti3C2 nanosheets (MXenes), Au/MXene and Au/Fe3O4/MXene, for biomedical applications. Surface characterization of the prepared composites was investigated by SEM, TEM, and elemental mapping analysis, which confirmed the sucessful attchment of AuNPs and Fe3O4 NPs on MXene surface. In addition, XRD and DLS analysis were performed for MXene and the two nanocomposites. The magnetic properties of both Fe3O4 NPs and Au/Fe3O4/MXene composite were investigated using VSM. Here, we report for the first time the acute toxicity study for the two synthesized nanohybrids using the zebrafish embryo model. Toxicity results revealed that both nanocomposites are classified in the "practically harmless" group according to the Acute Toxicity Rating Scale by Fish and Wildlife Service (FWS), with no significant teratogenic or apoptotic effects. Photothermal-induced antitumor activity was evaluated using human breast cancer cells (MCF7). Our initial findings indicated that both composites have good tumor ablation effect after laser exposure for 5 min. Moreover, even high concentrations of both Au/MXene and Au/Fe3O4/MXene composites are considered less toxic than pure MXene.

Brief Schedule for Conference

Day 1	**October 27, 2018 (Saturday)** 10:00~17:00 **Venue: *Lobby*** Arrival Registration
Day 2	**October 28, 2018 (Sunday)** 9:00~18:50 **Venue: *Multi Functional Conference Hall B* (the Third Floor) & *Executive Meeting Room* (the Eighth Floor)** Arrival Registration, Keynote Speeches, and Conference Presentations
	Morning Conference
	Venue: *Multi Functional Conference Hall B* (the Third Floor) **Opening Remark** 9:00~9:05 Prof. Yonghui Deng, Fudan University, China **Keynote Speech I** 9:05~9:45 Prof. Yonghui Deng, Fudan University, China **Keynote Speech II** 9:45~10:25 Prof. Chengzhong Yu, The University of Queensland, Australia **Coffee Break & Group Photo Taking** 10:25~10:50 **Keynote Speech III** 10:50~11:30 Prof. Jiaqiang Xu, Shanghai University, China **Keynote Speech IV** 11:30~12:10 Prof. Jin Zou, University of Queensland, Australia
	Lunch: 12:10~13:30 **Venue: *Mingyu Hall* (the Second Floor)**
	Afternoon Conference
	Venue: *Executive Meeting Room* (the Eighth Floor) **Keynote Speech V** 13:30~14:10 Prof. Pei Yuan, Fuzhou University, China **Keynote Speech VI** 14:10~14:50 Assoc. Prof. Ahmed Abdelfattah Elzatahry, Qatar University, Qatar
	Session 1*(Part 1)*: 14:50~15:35 **Venue: *Executive Meeting Room* (the Eighth Floor)** 3 presentations-Topic: “Materials Science and Micro/Nano Device.”
	Coffee Break 15:35~15:50
	Session 1*(Part 2)*: 15:50~18:50 **Venue: *Executive Meeting Room* (the Eighth Floor)** 12 presentations-Topic: “Materials Science and Micro/Nano Device.”
	Poster Session 9:00~18:50 **Venue: *Multi Functional Conference Hall B* (the Third Floor) & *Executive Meeting Room* (the Eighth Floor)**
	Dinner: 18:50 **Venue: *Mingyu Hall* (the Second Floor)**

Tip: Please arrive at the Conference Room 10 minutes before the session begins, and upload PPT/ PDF file into the conference laptop.

Detailed Schedule for Conference

October 27, 2018 (Saturday)

Venue: Lobby

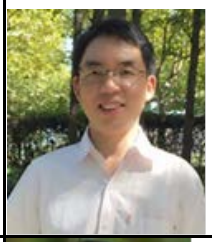
10:00~17:00	**Arrival Registration**

Note: (1) The registration can also be done at any time during the conference.
(2) The organizer doesn't provide accommodation, and we suggest you make an early reservation.
(3) One Best Oral Presentation will be selected from each oral presentation session. The Certificates for Best Oral Presentation will be awarded at the end of the session on October 28, 2018.

October 28, 2018 (Sunday)

Venue: *Multi Functional Conference Hall B* (the Third Floor)

& *Executive Meeting Room* (the Eighth Floor)

9:00~9:05		**Opening Remark** Prof. Yonghui Deng Fudan University, China
9:05~9:45		**Keynote Speech I** Prof. Yonghui Deng Fudan University, China Topic: *"Interface Nanoengineering Fabrication of Functional Porous Materials"*
9:45~10:25		**Keynote Speech II** Prof. Chengzhong Yu The University of Queensland, Australia Topic: *"Silica-based Nanoparticles for Drug Delivery"*
10:25~10:50		**Coffee Break & Group Photo Taking**
10:50~11:30		**Keynote Speech III** Prof. Jiaqiang Xu Shanghai University, China Topic: *"VOCs Gas Sensor: Design and Application of Sensing Materials"*

11:30~12:10		**Keynote Speech IV** Prof. Jin Zou University of Queensland, Australia Topic: "*Advanced Transmission Electron Microscopy of Low-Dimensional Nanostructures*"
12:10~13:30		**Lunch**
13:30~14:10		**Keynote Speech V** Prof. Pei Yuan Fuzhou University, China Topic: "*Tailored Design and Controllable Synthesis of Chemically Modified Silica Hollow Microspheres with Penetrating Macroporous Shells as A Superior Support for NBR Hydrogenation*"
14:10~14:50		**Keynote Speech VI** Assoc. Prof. Ahmed Abdelfattah Elzatahry Qatar University, Qatar Topic: "*Biological Assessment of Mxene Composite for Biomedical Applications*"
14:50~15:35	**Session 1*(Part 1)* :** 3 presentations-Topic: "Advanced Nanomaterial and Nanodecices"	
15:35~15:50	**Coffee Break**	
15:50~18:50	**Session 1*(Part 2)* :** 12 presentations-Topic: "Advanced Nanomaterial and Nanodecices"	
18:50	**Dinner**	

Session 1

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest you attend the whole session.

Afternoon, October 28, 2018 (Sunday)

Time: 14:50~15:35

Venue: *Executive Meeting Room* (the Eighth Floor)

Session 1*(Part 1)*: 3 presentations- Topic: " Materials Science and Micro/Nano Device"

Session Chair: Prof. Chengzhong Yu & Prof. Jin Zou

N0002 Presentation 1 (14:50~15:05)

Comparison of Cutting Performance of Router with Hard Coatings

Yi Huang, Jin-Shi Zhang, Xiao-Yin Chen, Wei-Yu Ho and Wei Li

Fujian University of Technology, China

Abstract—Milling printed circuit board (PCB) is a quite essential technology of removing areas of copper from a sheet material. The PVD hard coatings are expected to improve milling tools for PCB industry. In this study, the cutting performance of the CrAlSiN and diamond like carbon (DLC) double-layered coating deposited on the micro router was compared by machining the PCB. CrAlSiN coated tool as reference, two other coating systems including CrAlSiN and DLC double layers were deposited by cathodic arc evaporation (CAE) technology. Two different DLC layers were designed with Cr/C and CrN/C multilayer structure. The results shows that both double layered coated tools present the better hardness and cutting performance as compared to the single CrAlSiN coating. The highest improvement of the CrAlSiN + CrN/C double layered coating is nearly triple times higher than that of tool coated with single CrAlSiN layer.

Afternoon, October 28, 2018 (Sunday)

Time: 14:50~15:35

Venue: *Executive Meeting Room* (the Eighth Floor)

Session 1*(Part 1)*: 3 presentations- Topic: " Materials Science and Micro/Nano Device"

Session Chair: Prof. Chengzhong Yu & Prof. Jin Zou

N0003 Presentation 2 (15:05~15:20)

Cationic Nanofibrillated Cellulose (CNFC) Acts as A Versatile Additive for the Preparation of Reconstituted Tobacco Sheets

Haoyue Liu, Zhong Liu, Hongbin Liu, Langfeng Hui and Fangdong Zhang

Tianjin University of Science and Technology, China

Abstract—Reconstituted tobacco sheet (RTS) is a slice composite which was could be incorporated directly into cigarettes. It is well-known that filler addition, such as, precipitated calcium carbonate (PCC) in the reconstituted tobacco sheet is now a very common practice in the production of RTS. And it is attractive and worthwhile to add filler in reconstituted tobacco sheet, which is beneficial to improve the physical properties of reconstituted tobacco sheet, decrease the release of harmful substance, and reduce the cost and energy during the process as well. The current trend of tobacco industry is to increase filler content in reconstituted tobacco sheet, due to the aforementioned charming advantages and benefits in production.

However, there are some limitations towards the high filler content, for example, the strength of RTS decreased with increasing filler content, which would lead to a base sheet break during the machine running. In addition, poor strength of tobacco base sheet would lower liquid coating efficiency in later process stage. Furthermore, the undesired filler lost at the wet-end will be mixed into white water system, and then increase the treatment cost of white water.

Afternoon, October 28, 2018 (Sunday)

Time: 14:50~15:35

Venue: *Executive Meeting Room* (the Eighth Floor)

Session 1*(Part 1)*: 3 presentations- Topic: " Materials Science and Micro/Nano Device"

Session Chair: Prof. Chengzhong Yu & Prof. Jin Zou

N0004 Presentation 3 (15:20~15:35)

A Study on Hot Carrier Reliability of Radiation Hardened H-gate PD SOI NMOSFET after Gamma Radiation

Jinghao Zhao, Xuefeng Yu, Jiangwei Cui, Qiwen Zheng, Ying Wei, Hang Zhou and Qi Guo

Xinjiang Technical Institute of Physics and Chemistry, China

Abstract—Reliability of space applied micro/nanometer devices are simultaneously facing space radiation environment and own reliability issues such as HCI（hot carrier injection）effect. To clarify the effect of mature RH (radiation hardened) technology for deep submicron device on its hot carrier reliability, the author performed gamma irradiation and hot carrier stress on RH H-Gate PD (partially depleted) SOI NMOS and commercial strip-shaped gate PD SOI NMOS as control group. He makes a detailed analysis on hot carrier reliability and reaches a conclusion that compared to irradiated strip-shaped gate devices, HCI effect is partly improved in irradiated RH H-gate. On the other hand, in comparison with unirradiated RH H-gate devices, there's still enhanced HCI degradation in irradiated ones. Mechanism is explained as the coupling effect between front gate and back gate caused by TID (total ionizing dose effect) induced charge trapping in buried oxide.

15:35-15:50	**Coffee Break**

Afternoon, October 28, 2018 (Sunday)

Time: 15:50~18:50

Venue: *Executive Meeting Room* (the Eighth Floor)

Session 1*(Part 2)*: 12 presentations- Topic: "Materials Science and Micro/Nano Device"

Session Chair: Prof. Chengzhong Yu & Prof. Jin Zou

N0005 Presentation 1 (15:50~16:05)

Photonic Nanojets: Toward Three-Dimensional Manipulation and Detection Beyond the Diffraction Limit

Yao Zhang, Yuchao Li and Baojun Li

Jinan University, China

Abstract—With observation of small objects, a precisely manipulation is also highly desirable, especially for a three-dimensional manipulation of nanoparticles or biomolecules with a size of less than 100 nm [1,2]. Although optical tweezers have become powerful tools to manipulate microparticles and cells, they have limits when extended to the nanoscale because of the fundamental diffraction limit of light. The emergence of near-field methods, such as plasmonic tweezers and photonic crystal resonators, have enabled surpassing of the diffraction limit. However, these methods are usually used for two-dimensional manipulation and may lead to local heating effects that will damage the biological specimens. Therefore, we propose a near-field technique that uses a photonic nanojet to perform the three-dimensional optical manipulation of sub-100-nm objects. With the photonic nanojet generated by a dielectric microlens bound to an optical fiber probe, three-dimensional manipulations were achieved for fluorescent nanoparticles as well as for plasmid DNA molecules [3]. Backscattering and fluorescent signals from the trapped targets were detected in real time with a strong enhancement. The demonstrated approach provides a potentially powerful tool for nanostructure assembly, biosensing and single-biomolecule studies.

Afternoon, October 28, 2018 (Sunday)

Time: 15:50~18:50

Venue: *Executive Meeting Room* (the Eighth Floor)

Session 1*(Part 2)*: 12 presentations- Topic: "Materials Science and Micro/Nano Device"

Session Chair: Prof. Chengzhong Yu & Prof. Jin Zou

N1001 Presentation 2 (16:05~16:20)

Designing Metal Oxide Nanostructures for Enhanced Gas Sensing

Jun Zhang

Qingdao University, China

Abstract—Gas sensor plays a vital role in many aspects in our daily life. Current gas sensors based on metal oxide semiconductors are working at high temperature, which will shorten the sensor life and induce instability of the sensor performance. Nanostructured metal oxide (MO) materials with small size and dimension and tailored structures have demonstrated great potential for use as the sensing layers for a sensor. Advantages of using nanostructured materials for gas sensing stem from the large surface-to-volume ratio, high specific surface area, more surface active sites, as well as the exposed crystal facets. These features potentially endow metal oxide nanostructures with higher sensitivity, lower working temperature, and better selectivity. Current research efforts are directed toward developing high-performance gas sensors by designing thin films, porous, hollow, and hierarchical nanostructures, which includes various MO nanostructures (nanowires, nanotubes, and nanosheets), noble metal-functionalized MO nanohybrids, and inorganic-organic nanocomposites.

Afternoon, October 28, 2018 (Sunday)

Time: 15:50~18:50

Venue: *Executive Meeting Room* (the Eighth Floor)

Session 1*(Part 2)*: 12 presentations- Topic: "Materials Science and Micro/Nano Device"

Session Chair: Prof. Chengzhong Yu & Prof. Jin Zou

N1002 Presentation 3 (16:20~16:35)

Enhanced Performance of Ag-$LaFeO_3$/CNTs Nanocomposite Gas Sensors towards Acetone Vapor

Kejin Li, Chao Wang, Qian Rong, Yumin Zhang and Qingju Liu

Yunnan University, China

Abstract—Acetone in human exhaled breath is an important marker for convenient detection of diabetes, therefore, it is important to detect acetone gas at low concentration. In this regard, gas sensors based on semiconducting metal oxides have attracted a great deal of interest due to their small size, low in cost and rational design. Particularly, $LaFeO_3$ shows superior properties in gas detection. In this paper, Ag-$LaFeO_3$/carbon nanotubes (CNTs) nanocomposites were successfully prepared via a simple and cost-effective sol-gel method. X-ray diffraction, Fourier transform infrared spectroscopy, Raman spectroscopy, scanning electron microscopy and transmission electron microscopy were used to characterize the crystal structure, chemical bonding, and micromorphology of the as-prepared samples. The results show that crystalline orthorhombic perovskite $LaFeO_3$ nanoparticles were obtained, moreover, the composite material has the functional group and molecular structure of both Ag-$LaFeO_3$ and CNTs, indicating the effective combination of two materials. The gas-sensing properties of pure Ag-$LaFeO_3$ and Ag-$LaFeO_3$/CNTs nanocomposite were investigated. Ag-$LaFeO_3$/CNTs gas sensor exhibits higher response than the pure Ag-$LaFeO_3$. The response of Ag-$LaFeO_3$/CNTs (0.75wt%) composite exhibits the highest gas response (59) to 5 ppm acetone gas at the optimal operating temperature of 86°C, the response and recovery time are 58 s and 33 s, respectively. The enhanced gas-sensing properties can be ascribed to the formation of the heterojunction between the Ag-$LaFeO_3$ and CNTs. Relative movement of the Fermi level at the interface of Ag-$LaFeO_3$ and CNTs can be occurred due to the difference of Fermi energy, resulting in band bending and formation of the charge depletion layer. It suggests that the as-prepared Ag-$LaFeO_3$/CNTs is a promising candidate for excellent performance acetone gas sensor.

Afternoon, October 28, 2018 (Sunday)

Time: 15:50~18:50

Venue: *Executive Meeting Room* (the Eighth Floor)

Session 1*(Part 2)*: 12 presentations- Topic: "Materials Science and Micro/Nano Device"

Session Chair: Prof. Chengzhong Yu & Prof. Jin Zou

N1003 Presentation 4 (16:35~16:50)

Excellent Toluene Gas Sensing Properties of Molecular Imprinted Ag-$LaFeO_3$ Nanostructures Synthesized by Microwave-assisted Process

Mingpeng Chen,Yumin Zhang,Kejin Li,Jin Zhang and Qingju Liu

Yunnan University, China

Abstract—Toluene, a kind of hazardous volatile organic compound, should be measured precisely even at low concentration. Nowadays, however, highly sensitive and selective detection against toluene gas remains a tremendous challenge in gas sensor applications. In this work, a series of molecular imprinted Ag-$LaFeO_3$ nanoparticles (IAL NPs) were synthesized in a microwave-assisted colloidal route. The structure and morphology of IAL NPs were investigated by X-ray diffraction (XRD), scanning electron microscopy (SEM), transmission electron microscopy (TEM), X-ray photoelectron spectroscopy (XPS) and energy dispersive X-ray spectroscopy (EDX). Their toluene sensing properties were examined over the temperature range of 55-295°C. Especially, the one prepared with optimal amount of imprint molecules (IAL-2 NPs) exhibited enhanced gas sensing properties for toluene gas at a relatively low working temperature. IAL-2 NPs have a response (R_g/R_a, R_g and R_a denote the sensor resistance in target gas and in air, respectively) of 24.0 to 5 ppm toluene at the optimum working temperature of 215°C with negligible responses to other interfering gases, such as xylene, benzene, ethanol, methanol, acetone, formaldehyde and ammonia. The improved performance can be attributed to the favorable effect of microwave radiation, the molecular imprinting structure and the sensitization of Ag. Microwave irradiation provides efficient internal heating which facilitates the formation of Ag-$LaFeO_3$; the novel molecular imprinting structure owns a porous functionalized surface, promoting toluene gas adsorption and diffusion into the sensitive layer; the "spillover effect" provided by Ag enriches the quantities of active oxygen species on the surface of sensing materials. The humidity stability and the long-term stability of were also measured for one month, which illuminates that IAL-2 NPs is a potential candidate for toluene detection.

Afternoon, October 28, 2018 (Sunday)

Time: 15:50~18:50

Venue: *Executive Meeting Room* (the Eighth Floor)

Session 1*(Part 2)*: 12 presentations- Topic: "Materials Science and Micro/Nano Device"

Session Chair: Prof. Chengzhong Yu & Prof. Jin Zou

N1004 Presentation 5 (16:50~17:05)

The Preparation and Methanol Gas-sensing Properties of ZnO-$SmFeO_3$ Composites

Kun Li, Zhongqi Zhu, Qingju Liu and Jin Zhang

Yunnan University, China

Abstract—Methanol, a kind of common organic solvents, is widely used in the industries. However, inhaling methanol gas is harmful to human health. Therefore, it is necessary to monitor the concentration of indoor methanol gas in real time. In this paper, $SmFeO_3$ (SFO), ZnO/$SmFeO_3$ (ZSFO) and molecular imprinted ZnO/$SmFeO_3$ (HZSFO) with hydroxyethyl methylacrylate were prepared by sol-gel method and characterized by XRD (X-ray diffraction), TEM (Transmission electron microscopy) and XPS (X-ray photoelectron spectroscopy) and energy dispersive X-ray spectroscopy (EDX). The sensing properties of samples were also investigated to 5 ppm methanol gas ranging from 155 to 295°C. The results reveal that the doping of ZnO into $SmFeO_3$ and application of molecular imprinting technology can improve the response and selectivity of the methanol gas sensor, and the response based on HZSFO reached 22.0 to 5 ppm methanol at optimal temperature of 240°C while that lower than 3 to other test gases such as ethanol, acetone, xylene, benzene, formaldehyde and ammonia. The response and selectivity of the three sensors to methanol gas meet the following order: HCSFO >CSFO >SFO. Meanwhile, HZSFO shows good repeatability and long-term stability which could determine methanol concentration in real-time. The enhanced performance can be attributed to the formation of p-n heterojunction which leads to accelerating transmission of electron, enhancing the response; the specific recognition sites complementary in shape, size and chemical functionality with methanol which is formed by molecular imprinting technology (MIT) can selectively adsorb methanol on the material surface. These interesting findings indicate that HZSFO could be a wonderful candidate of methanol gas sensor.

Afternoon, October 28, 2018 (Sunday)

Time: 15:50~18:50

Venue: *Executive Meeting Room* (the Eighth Floor)

Session 1*(Part 2)*: 12 presentations- Topic: "Materials Science and Micro/Nano Device"

Session Chair: Prof. Chengzhong Yu & Prof. Jin Zou

N3003 Presentation 6 (17:05~17:20)

A 2-D Photonic Crystal Hydrogel Tear Glucose Sensor

Cheng Chen, Zhiqiang Dong and Zhigang Zhu

Shanghai Polytechnic University, China

Abstract—Photonic crystal (PC) materials have huge potentials as sensors for noninvasive and real-time monitoring glucose in tears. We developed a glucose-sensitive PC material based on monolayered colloidal crystals (MCCs). Polystyrene nanoparticles were first self-assembled into a highly ordered MCC, and this two-dimensional (2-D) template was then coated by a 4-boronobenzaldehyde-functionalized poly(vinyl alcohol) hydrogel. Such a sensor efficiently diffracts visible light, whose structural color could change from red through yellow to green, as the glucose concentration altered from 0 to 20 mM. This intelligent sensing material presents certain possibility for the frontier point-of-care glucose monitoring.

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Venue: *Executive Meeting Room* (the Eighth Floor)

Session 1*(Part 2)*: 12 presentations- Topic: "Materials Science and Micro/Nano Device"

Session Chair: Prof. Chengzhong Yu & Prof. Jin Zou

N3006 Presentation 7 (17:20~17:35)

Hollow Carbon Nanoarchitectures: Interface Assembly and Structural Regulation

Chao Liu, JingJing Wan and Chengzhong Yu

East China Normal University, China

Abstract—Hollow carbon nanostructures (HCNs) have received extensive attention due to unique structure and functional behavior, which make them promising candidates for both fundamental studies and practical applications. However, the tedious procedures, monotonous precursors and uncontrollable process have restricted the structure variety and surface functionalization (i.e. heteroatoms doping) of HCNs. Except that, existing HCNS are always amorphous and granular, and have a low intrinsic electronic conductivity, hindering their electrochemical applications. Herein, to simplify the fabrication process, enrich the synthetic system and improve the structure and surface property of HCNs, a series of assembly pathways such as amine induced silica/carbon assembly, surfactant-free self-assembly and rigid interface induced outward contraction have been developed. On this basis, a variety of HCNs with tunable morphologies and structures including single-shell hollow carbon spheres (HCSs), yolk-shell HCSs, double-shell HCSs, hollow mesoporous carbon nanocubes have been prepared, which possess good dispersibility, uniform morphology, large surface area and pore volume and high nitrogen content. To further enhance the electronic conductivity and flexibility in electrochemical applications, we demonstrate the one-dimensional (1D) modularization of HCNs by introducing HCNs into electrospinning technique. Meanwhile, mulberry-like hollow mesoporous carbon sphere fibers and Co/N co-doped hierarchical carbon fibers were fabricated, which successfully integrate the merits of HCNs (i.e. high surface area and micro-meso-macropores) and 1D carbon fibers (i.e. large aspect ratio, high conductivity, and favorable flexibility). When used as electrode materials, the resultant carbon fibers show superior performances in the applications of supercapacitor, oxygen reduction reaction and Li-ions batteries. The findings may pave the way for the construction of distinctive hollow-structured carbon materials for various applications.

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Venue: *Executive Meeting Room* (the Eighth Floor)

Session 1*(Part 2)*: 12 presentations- Topic: "Materials Science and Micro/Nano Device"

Session Chair: Prof. Chengzhong Yu & Prof. Jin Zou

N3007 Presentation 8 (17:35~17:50)

A Micelle Fusion-Aggregation Assembly Approach to Mesoporous Carbon Materials with Rich Active Sites for Ultra-Sensitive Ammonia Sensing

Wei Luo, Yonghui Deng and Dongyuan Zhao

Fudan University, China

Abstract—Nanostructured carbon materials have received considerable attention due to their special physicochemical properties[1]. Herein, ordered mesoporous carbons (OMCs) with two-dimension (2D) hexagonal mesostructure and unique buckled large mesopores have successfully been synthesized via a micelle fusion-aggregation assembly method by using poly(ethylene oxide)-*block*-polystyrene (PEO-*b*-PS) diblock copolymers as a template and resorcinol-based phenolic resin as a carbon precursor.

The obtained ordered mesoporous carbons possess unique fiber-like morphology, specific surface area of 571-880 m^2/g, pore volume of 0.54 cm^3/g and large mesopores (up to 36.3 nm) and high density of active sites (i.e. carboxylic groups) of 0.188/nm^2. We proposed a solvent evaporation induced micelle fusion-aggregation assembly process for formation of the 2D hexagonal mesoporous carbon materials.

The obtained large-pore mesoporous carbons can be employed to fabricate nanodevices as NH_3 sensors working at a low temperature and exhibit an excellent sensing performance with a fast response, ultralow limit of detection of 1 ppm, and excellent selectivity. Owing to their good merits of large pores, high surface area and large pore volumes, our OMCs hold a great promising for applications in portable miniaturized devices for ammonia sensing.

Afternoon, October 28, 2018 (Sunday)

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Venue: *Executive Meeting Room* (the Eighth Floor)

Session 1*(Part 2)*: 12 presentations- Topic: "Materials Science and Micro/Nano Device"

Session Chair: Prof. Chengzhong Yu & Prof. Jin Zou

N3008 Presentation 9 (17:50~18:05)

Ultrathin Nanosheets Assembled Bi_2WO_6 Hierarchical Architecture with Highly Sensitive Ethanol Gas-Sensing Performance

Tongwei Yuan, Wenshuang Zhang and Jiaqiang Xu

Shanghai University, China

Abstract—According to the World Health Organization accident survey, about 50-60% of traffic accidents are related to drink driving. Drunk driving has been listed as the main cause of death in traffic accident. Therefore, monitoring and punishing the drunk driving is an important solution to protect the safety of citizens' lives and properties. In the process of execution, quickly identifying the alcohol contained in the exhaled breath of the drunk driver is the key to investigating drunk driving. Gas sensor technology has been developed for several decades and has made tremendous contributions to areas such as national security, industrial production, and environmental monitoring. Using alcohol gas sensors to monitor drunk driving is a fast, convenient, low-cost and non-invasive solution. The test process only requires the driver to blow the breath into the instrument to determine whether he is drunk driving. The core technology of alcohol sensor is alcohol sensitive materials. Consequently, it is of great significance to develop alcohol sensitive materials with high sensitivity, fast response and stability. In this work, we describe a facile hydrothermal approach with assistance of CTAC to synthesize a unique hierarchical multilayered Bi_2WO_6 architecture, each layer has a thickness of 6.5 nm. Then, this sensing material was assembled into a gas sensor to validate its potential utility for ethanol gas sensing. The experimental results demonstrate its remarkable ethanol gas sensing performance, including rapid response recovery rate (7/14 s), high sensitivity (R_a/R_g = 60.8@50 ppm ethanol) and selectivity ($S_{ethanol}/S_{other}$ = 3.0-60.8). That is superior to any of the existing Bi_2WO_6-based sensing platforms. In the subsequent tests, it also showed excellent signal reproducibility and long-term stability. Together, this study demonstrates the feasibility of employing Bi_2WO_6-based materials in ethanol sensing, boosts the practical applications and opens up new opportunities in the field of drunk driving monitoring.

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Venue: *Executive Meeting Room* (the Eighth Floor)

Session 1*(Part 2)*: 12 presentations- Topic: "Materials Science and Micro/Nano Device"

Session Chair: Prof. Chengzhong Yu & Prof. Jin Zou

N3009 Presentation 10 (18:05~18:20)

Biosensors / Chemical Sensors Based on Functional Nanomaterials and Their Applications in Food Safety

Yongheng Zhu, Yong Zhao and Yonghui Deng

Fudan University, China

Abstract—Aiming to the requirements of rapid detection for food safety, biosensors / chemical sensors are used and combined with the nano-sensitive meso-material modification technologies. Herein, tailored design and facile synthesis concept was proposed for achieving exceptionally sensitive and selective detection of chemical hazards and biological hazards in food safety, the different functional ordered mesoporous materials were prepared. Detection technologies for biosensors consisted of microfluidics and chemi-resistive sensors based on the ordered mesoporous semiconductor oxide, have been developed respectively. In addition, it focues on the rapid trace detection for the freshness of seafood, pesticide residues, heavy metal ions, and pathogenic bacteria, etc.

Afternoon, October 28, 2018 (Sunday)

Time: 15:50~18:50

Venue: *Executive Meeting Room* (the Eighth Floor)

Session 1*(Part 2)*: 12 presentations- Topic: "Materials Science and Micro/Nano Device"

Session Chair: Prof. Chengzhong Yu & Prof. Jin Zou

N3010 Presentation 11 (18:20~18:35)

Highly Sensitive Pd and Pt-decorated α-Fe_2O_3 Nanorod Sensor for Detecting Triethylamine at Low Temperature

Gaojie Li, Zhixuan Cheng and Jiaqiang Xu

Shanghai University, China

Abstract—Triethylamine (TEA), one of the most important organic amines, is widely used in industrial applications as an organic solvent, preservative, catalyst, synthetic dye, and so on. In addition, TEA is highly toxic and harmful to human health, causing eye irritation, skin burns, headaches, and lung problems. Therefore, the development of an accurate and fast detection of TEA especially with high sensitivity and good selectivity is urgently needed. Recently, metal oxide semiconductor (MOS) gas sensors attract much attention for real-time environmental monitoring and hazardous gases detecting due to its merits of low cost, simple fabrication, fast response and good compatibility with microelectronic processes. Up to now, several MOSs have been studied to detect TEA, including SnO_2, ZnO, α-Fe_2O_3, MoO_3 and WO_3. However, some deficiencies still exist such as high working temperature and low response. Thus, in order to satisfy practical applications, it is interested and important to modify the MOSs for improving the gas sensing performance. In this study, α-Fe_2O_3 nanorod was prepared by a simple hydrolysis and then annealing in air. Pd-Pt nanoparticles (NPs) were decorated on the surface of α-Fe_2O_3 nanorod by an in situ reduction with ascorbic acid (AA). Their morphology and crystal structure were characterized by SEM, TEM and XRD. The obtained α-Fe_2O_3 nanorod was about 100-150 nm in diameter and 450-600 nm in length, and constructed by numerous NPs with the size about 13 nm. Their gas sensing properties were carefully studied. Compared with α-Fe_2O_3, the Pd-Pt/α-Fe_2O_3 sensor exhibited high response (40 to 10 ppm), low working temperature (190℃) and good selectivity. The enhanced sensing performance should be attributed to the chemical sensitization of Pt, the electronic sensitization of Pd and the synergistic effect of Pd-Pt NPs. The Pd-Pt/α-Fe_2O_3 sensor have a great potential application in detecting TEA.

Afternoon, October 28, 2018 (Sunday)

Time: 15:50~18:50

Venue: *Executive Meeting Room* (the Eighth Floor)

Session 1*(Part 2)*: 12 presentations- Topic: "Materials Science and Micro/Nano Device"

Session Chair: Prof. Chengzhong Yu & Prof. Jin Zou

N3011 Presentation 12 (18:35~18:50)

Fabrication of Polyaniline/Graphene Sandwiched Films with a 3D Porous Network Aerogel for High-performance Supercapacitor Electrodes

Yiming Liu, Zhixin Li, Hongbin Zhao, Anbao Yuan and Jiaqiang Xu

Shanghai University, China

Abstract—As supercapacitor electrode materials, Polyaniline have been an powerful class of material for its high pseudocapacitance and low cost. However, rapid structural deformation along the charge/discharge process and low conductivity of PANI lead to poor cycling stability and rate performance. Using graphene as a matrix is a promising way to increase not only the conductivity but also the structural stability of the PANI as the supercapacitor electrode materials. In this work, we designed a superb (RGO-PANI-RGO) nanofilms assemble in 3D porous graphene aerogel. Due to its advantageous microstructure, the specific capacitance of the PANI/RGO composite attained 1187F/g at a current density of 1 A/g with excellent rate capability (remains 70% at 5A/g) in 1M H_2SO_4 aqueous solution. Notably, after 2000 continuously deep cycles the composite can maintain 90% of its initial capacitance, suggesting a guaranteed electrochemical cyclic stability.

Poster Session

October 28, 2018 Sunday

Time: 9:00~18:50

Venue: *Multi Functional Conference Hall B* (the Third Floor) & *Executive Meeting Room* (the Eighth Floor)

Poster Session: 3 presentations

N2003 Poster 1

Burkholderia Cepacia Lipase Immobilized in Different Nanomaterials: Useful Biocatalysts for Synthesis of 2-phenylpropyl Acetate

Kai Li, Yaohjia He, Jianhua Wang, Zhiming Hu, Xin He, Qinghua Zhou and Yunjun Yan

Huazhong University of Science and Technology, China

Abstract—2-phenyl-1-propanol, also called hydratropyl alcohol, has a rose scent and is often used in the blending of rose flavors or food flavors. It can be used to produce 2-phenylpropyl acetate, which is also a good fragrance ingredient and can also be used as an important intermediate for organic synthesis. The traditional catalyst for synthesis of these esters is sulfuric acid, which has problems in quality control of products, increased damage risk for equipment and serious environmental pollution. Whereas the biocatalysts can be used to solve the above problems. In this study, *Burkholderia cepacia* lipase (BCL) was immobilized in four kinds of nanomaterials, including a carbon nanotube enhanced hybrid phosphate-protein nanoflower, $Cu_3(PO_4)_2$/CNT/BCL, and three magnetic biocatalysts with different modifications which were named as BCL-GAMNP, BCL-GEAMNP, and BCL-GTAMNP, respectively. These immobilized lipases were used to replace the chemical catalysts in the reactions of fragrance synthesis. They performed well in the transesterification between hydratropyl alcohol and vinyl acetate. Under the same reaction conditions, the conversions of BCL-GTAMNP and $Cu_3(PO_4)_2$/CNT/BCL catalyzed reactions can reach 99.9% and 99.2% in only 20 min and 10 min, respectively. BCL-GAMNP and BCL-GEAMNP catalyzed reactions need 10 h and 2 h to reach the similar high conversions. What's more, these biocatalysts exhibited good tolerance to high temperature and organic solvents. These four kinds of immobilized lipases were also recycled for eight batches without obvious loss in activity. This study provides several strategies for preparation of efficient biocatalysts, showing great potential for fragrance synthesis.

October 28, 2018 Sunday

Time: 9:00~18:50

Venue: *Multi Functional Conference Hall B* (the Third Floor) & *Executive Meeting Room* (the Eighth Floor)

Poster Session: 3 presentations

N3004 Poster 2

Polymer-assisted Colloidal Crystal Layer as Transparent Photonic Films

Zhiqiang Dong, Cheng Chen and Zhu Zhigang

Shanghai Polytechnic University, China

Abstract—We provide a simple method to prepare large-area ordered photonic crystal (PC) films. The poly(methyl methacrylate) (PMMA) colloids are self-assembled in poly(vinyl alcohol) (PVA) solution and form a PC film via evaporation. These films can effectively diffract electromagnetic waves of specific wavelengths, and whose unique periodic structure can effectively reduce ultraviolet radiation without chemical reaction. The diffraction wavelengths of the PC films can cover the UV and visible region by changing the size of the PMMA colloids. These films have high transparency and sharp diffraction peaks, which might have great application prospects in UV shielding and color filter materials.

October 28, 2018 Sunday

Time: 9:00~18:50

Venue: *Multi Functional Conference Hall B* (the Third Floor) & *Executive Meeting Room* (the Eighth Floor)

Poster Session: 3 presentations

N3005 Poster 3

Preparation and Properties of Thermo-sensitive Photonic Paper

Xiaohui Wang, Cheng Chen, Zhiqiang Dong and Zhigang Zhu

Shanghai Polytechnic University, China

Abstract—A photonic paper with lower critical solution temperature (LCST) was prepared by the modification of poly(vinyl alcohol) (PVA) gelled colloidal crystal array (GCCA) with glycidyl trimethyl ammonium chloride (GTMAC). The affect grafting rate and acetyl degree on the temperature sensitivity of the product were investigated by NMR (^{1}H-NMR), FTIR and SEM. The diffraction properties upon thermo-response and the repeatability of thermo-sensing were characterized by optical fiber spectrometer, and such photonic paper may has potential applications in temperature switch and sensor.

Conference Venue

Golden Jade Sunshine Hotel, Shanghai, China

No. 1888, Zhou Jia Zui Road, Yangpu District, Shanghai

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The wall painting,"Golden Jade Sunshine Hotel" in the lounge is a large paining in gold foil picturing 18 famous scenic spots and literary allusions regarding the Silk Road, which represent a glorious and mysterious period in Chinese history.The commercial culture and prosperity in ancient years would be a precious reminder in correspondence to the legend of modern Silk Road during your tour in Shanghai...

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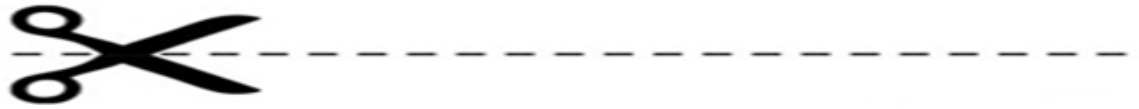

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