2017 HKCBEEs PHILADELPHIA CONFERENCE ABSTRACT

October 21-23, 2017

Four Points by Sheraton Philadelphia Airport

Philadelphia, USA

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Welcome to CBEES 2017 conference in Philadelphia, USA. The objective of the Philadelphia 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 Innovative Engineering Materials, Chemical Science and Engineering.

Papers will be published in:


**IOP Conference Series: Materials Science and Engineering** (ISSN: 1757-899X), which is indexed by **EI Compendex, Scopus, Thomson Reuters (WoS), Inspec,** et al.

Conference website and email: [http://www.iciem.org/](http://www.iciem.org/); [iciem@cbees.net](mailto:iciem@cbees.net)

**2017 6th International Conference on Chemical Science and Engineering (ICCSE 2017)**

**International Journal of Chemical Engineering and Applications** (IJCEA, ISSN: 2010-0221) which will be indexed by **Chemical Abstracts Services (CAS), Ulrich’s Periodicals Directory, CABI, DOAJ, Electronic Journals Library, Google Scholar, Engineering & Technology Digital Library, ProQuest, and Crossref.**

Conference website and email: [http://www.iccse.org/](http://www.iccse.org/); [iccse@cbees.org](mailto:iccse@cbees.org)

**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](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 17 Minutes of Presentation and 3 Minutes of Question and Answer
Keynote Speech: about 35 Minutes of Presentation and 5 Minutes of Question and Answer
Plenary Speech: about 25 Minutes of Presentation and 5 Minutes of Question and Answer

Instructions for Poster Presentation

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 the session on October 22, 2017.

Dress code
Please wear formal clothes or national representative of clothing.
Keynote Speaker Introductions

Keynote Speaker I

Prof. Yuegang Zuo
University of Massachusetts Dartmouth, USA

Prof. Yuegang Zuo is currently a Full Professor in analytical and environmental chemistry and Director of Graduate Programs at Department of Chemistry and Biochemistry, University of Massachusetts Dartmouth. He is also a Full Professor in marine chemistry at the School of Marine Science and Technology, University of Massachusetts. He received his B.S. degree in chemistry from Wuhan University in 1982, his M.S. degree in environmental chemistry from the Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences, in 1984, and his Ph.D. in environmental science from Swiss Federal Institute of Technology Zurich in 1992. Most of his recent research has focused on separation, identification and quantification of endocrine disrupting pollutants and phenolic antioxidants in plants and seafood as well as in the related environments and examine their occurrence, sources, distribution, transportation and fate in the biogeochemical realm. He has published over 70 scientific papers in prestige journals such as Science, and Environmental Science and Technology.
Topic: “Hydrophilic Interaction Liquid Chromatography (HILIC) and Its Application in Food, Pharmaceutical, Clinical and Environmental Industries”

Prof. Yuegang Zuo

Department of Chemistry and Biochemistry, University of Massachusetts Dartmouth and University of Massachusetts Graduate School of Marine Sciences and Technology
North Dartmouth, (USA)

Abstract—Hydrophilic interaction liquid chromatography (HILIC) is an effective alternative to conventional HPLC techniques for the separation and determination of polar and hydrophilic compounds. Since it was first described in the early 1990s, the popularity of HILIC has been growing exponentially as measured by the number of publications due to an increasing demand for the analysis of polar components in complex matrices. HILIC is a chromatographic technique that uses aqueous-organic solvent mobile phases with a high percentage of organic solvent, and a polar stationary phase. So far, silica gels, amino, amide, cyano, carbamate-, diol- and zwitterionic-based stationary phases have been utilized in HILIC separation. Like other HPLC techniques, the understanding of HILIC retention mechanisms and theories has been behind the practice. In this presentation, we will discuss the development, basic separation mechanisms, stationary and mobile phases of HILIC first, and main emphasis will be then put on the applications of HILIC in food, pharmaceutical, clinical and environmental industries due to the increasing demands in separation and determination of hydrophilic and polar chemicals in these industries. The issue for the method development, validation, as well as the advantages and drawbacks of HILIC will be also discussed.
Keynote Speaker II

Prof. Frank Yang

East Carolina University, Greenville, North Carolina, USA

Dr. Yu “Frank” Yang is a Professor and Director of Chemistry Graduate Studies at East Carolina University, located in Greenville, North Carolina, USA. Dr. Yang received his Ph.D. in Chemistry from University of Mainz, Germany in 1993. He joined the Department of Chemistry at East Carolina University as an assistant professor in 1997, tenured in 2003, and promoted to full professor in 2007.

Dr. Yang's principal areas of interest and expertise include green chemical processes, environmental chemistry, subcritical water chromatography and extraction. The main goal of Dr. Yang’s research programs is to eliminate or minimize the use of toxic organic solvents in extraction, chromatography, environmental remediation, and other chemical processes. Honors include the University Five-Year Achievement for Excellence in Research Award, the Sigma Xi Helms Research Award, University of North Carolina Board of Governors Distinguished Professor for Teaching Award, Cottrell College Science Awards from Research Corporation, and the Starter Grant Award from the Society for Analytical Chemists of Pittsburgh.
Abstract—Due to its green nature and low side effects, herbal medicine has gained much greater attention in the western world. Both raw and pre-prepared herbal medicines and dietary supplements are sold in many developed countries, especially in the United States. The traditional way for patients to take the herbal medicine prescribed by doctors has been to cook the herbs in boiling water for 60 to 90 min and then drink the “medicinal soup.” This herbal medicine preparation method is called traditional herbal decoction (THD). Although this herbal decoction method has been used since ancient times, there are several major problems associated with the THD method. Therefore, a scientifically rigorous path for modernization of herbal preparation techniques is of great interest.

Subcritical water refers to high-temperature and high-pressure water under conditions lower than water’s critical point, 374 °C and 218 atm. Water at elevated temperatures acts like an organic solvent due to its weakened hydrogen bonds and decreased polarity. The solubility of organic compounds such as active pharmaceutical ingredients in medicinal herbs is dramatically enhanced by simply increasing the water temperature. This unique characteristic of water makes high-temperature water an excellent extraction fluid for efficient removal of organics from various sample matrices, including medicinal herbs. Because different temperatures can be employed to carry out subcritical water extractions, there will be an optimized temperature that yields the highest concentration of active pharmaceutical gradients and in turn produces the most potent herbal medicine.

In this work, an important Chinese medicinal herb, Dan Shen, was extracted using subcritical water. The extractions were carried out at 75, 100, 125, and 150 °C. The temperature and kinetic effects on the extraction efficiency of active pharmaceutical gradients from Dan Shen will be presented and discussed. The toxicity of the herbal extracts at different temperatures will also be evaluated and presented.
Keynote Speaker III

Prof. Karen Winey
University of Pennsylvania, USA

Karen I. Winey is Professor and TowerBrook Foundation Faculty Fellow of Materials Science and Engineering at the University of Pennsylvania with a secondary appointment in Chemical and Biomolecular Engineering. Winey’s current interests include both polymer nanocomposites and ion-containing polymers. In nanocomposites, she designs and fabricates polymer nanocomposites containing carbon nanotubes and metal nanowires with the aim of understanding how to improve their mechanical, thermal, and especially electrical conductivity and resistive switching properties. Polymer dynamics in the presence of nanoparticles is also an area of interest. In ion-containing polymers, including block copolymers and polymers with ionic liquids, Winey combines imaging and scattering methods to provide unprecedented insights into their morphologies. Current efforts focus on correlating nanoscale structures with ion transport properties. In both areas, she couples experimental studies with simulation and theory, either within her group or with collaborators.

Winey received her B.S. from Cornell University in materials science and engineering and her Ph.D. in polymer science and engineering from the University of Massachusetts, Amherst. Following a postdoctoral position at AT&T Bell Laboratories, she joined the faculty of the University of Pennsylvania in 1992. Elected positions include chair of the Polymer Physics Gordon Research Conference (2010) and Chair of the Division of Polymer Physics within the American Physical Society (2013). She served as an Associate Editor for Macromolecules, the premier journal for polymer science, for four years (7/2010 - 6/2014). Her honors include Fellow of the American Physical Society (2003), a Special Creativity Award from the National Science Foundation (2009-2011), the George H. Heilmeier Faculty Award for Excellence in Research (2012), and Fellow of the Materials Research Society (2013).
Abstract—Acid- and ion-containing polymers have specific interactions that produce both acid- or ion-rich aggregates arranged in hierarchical nanoscale morphologies and remarkable bulk properties. Untangling the correlations between the primary structure of such associating polymers and their morphologies and properties has long been a challenge in polymer physics, because most acid- and ion-containing polymers have random sequences of polar and non-polar monomeric units. New synthetic methods increasingly produce polymers with greater molecular precision that provide greater uniformity of and control over the hierarchical morphologies and even yield new morphologies. Specifically, we have studied a series of precise polyethylenes synthesized by acyclic diene metathesis (ADMET) chemistry that have functional groups evenly spaced along linear polyethylenes. We have established design rules connecting these precise polymers to particular hierarchical morphologies and have discovered a variety of new morphologies. For example, when the alkyl spacers in a precise polyethylene are long enough, the polymers assemble into a layered morphology. Using a combination of experimental tools as well as atomistic molecular dynamics simulations, we determined that the polymers make tight conformational turns to produce acid-rich layers that are transverse to the lamellae. This new morphology could be advantageous for controlling transport. The mechanical properties of these precise polyethylenes have three distinct responses, including remarkable strain hardening that corresponds to the onset of an anisotropic layered morphology. Finally, we recently demonstrates that nearly precise polymers have similar morphologies, which suggests that an even wider range of synthetic strategies can be used to achieve these properties.
Keynote Speaker IV

Prof. Ramesh K. Agarwal
Washington University, USA

Professor Ramesh K. Agarwal is the William Palm Professor of Engineering in the department of Mechanical Engineering and Materials Science at Washington University in St. Louis. From 1994 to 2001, he was the Sam Bloomfield Distinguished Professor and Executive Director of the National Institute for Aviation Research at Wichita State University in Kansas. From 1978 to 1994, he was the Program Director and McDonnell Douglas Fellow at McDonnell Douglas Research Laboratories in St. Louis. Dr. Agarwal received Ph.D in Aeronautical Sciences from Stanford University in 1975, M.S. in Aeronautical Engineering from the University of Minnesota in 1969 and B.S. in Mechanical Engineering from Indian Institute of Technology, Kharagpur, India in 1968. Over a period of forty years, Professor Agarwal has worked in various areas of Computational Science and Engineering - Computational Fluid Dynamics (CFD), Computational Materials Science and Manufacturing, Computational Electromagnetics (CEM), Neuro-Computing, Control Theory and Systems, and Multidisciplinary Design and Optimization. He is the author and coauthor of over 500 journal and refereed conference publications. He has given many plenary, keynote and invited lectures at various national and international conferences worldwide in over fifty countries. Professor Agarwal continues to serve on many academic, government, and industrial advisory committees. Dr. Agarwal is a Fellow eighteen societies including the Institute of Electrical and Electronics Engineers (IEEE), American Association for Advancement of Science (AAAS), American Institute of Aeronautics and Astronautics (AIAA), American Physical Society (APS), American Society of Mechanical Engineers (ASME), Royal Aeronautical Society, Chinese Society of Aeronautics and Astronautics (CSAA), Society of Manufacturing Engineers (SME) and American Society for Engineering Education (ASEE). He has received many prestigious honors and national/international awards from various professional societies and organizations for his research contributions.

Topic: “Recent Developments in Composite Structures for ‘Green Aircraft’ Applications”

Prof. Ramesh K. Agarwal
Washington University in St. Louis

Abstract—In recent years, there has been emphasis on ‘Green Aviation’ with the dual aims of reducing the energy consumption as well as emissions. Several new concepts for the aircraft have been proposed to
reduce drag, improve engine efficiency, and reduce mass. Majority of the wing-tube transport aircraft in service today are very efficient high speed air vehicles equipped with high bypass jet engines. Since early 1960s most improvements in aircraft efficiency have come from advanced turbofan propulsion technology (40 %) and improved aerodynamics to increase the Lift/Drag (15%); however, the structural efficiency of the aluminum aircraft did not change much because of limited emphasis on considerations of novel materials, structures, and manufacturing processes. In recent years, reduction of aircraft mass has become one of the major drivers in developing new aircraft design concepts, novel materials and manufacturing processes without affecting the intrinsic qualities, namely the safety, reliability, durability and comfort. As a result, the metal composites based on textile-reinforced polymers that are locally blended with metal elements are being investigated for aircraft structures. Additionally, in the near future a tremendous leap in material morphologies is expected from intermediate components such as solid plates and slender beams that are assembled and joined mechanically to flexible bundles of fibers, which are then transformed into integral three-dimensional structures via both the traditional textile manufacturing and modern fiber placement machinery. These textile structures are impregnated (‘pre’, ‘in situ’ or ‘post’- before, during or after molding) and finally solidified into ultra-modern integral multipart and multifunctional solid lightweight composite structures. This review will describe these developments that will transform the ‘state of the art’ aircraft concepts into more efficient (more pay-load per unit weight and per dollar) transport, both by increasing the structural simplicity and efficiency, and by a more straightforward use of modern materials and processes.

In addition, to address many challenges of ‘Green Aviation,’ nearly a decade ago NASA launched an initiative called the ‘Environmentally Responsible Aviation (ERA).’ In this initiative, Blended-Wing-Body (BWB) aircraft is being seriously considered as a long-haul transport aircraft. BWB provides many aerodynamic advantages; however it presents structural challenges due to the noncircular cross section of the center part of its fuselage. Although significantly lighter than the conventional aluminum structures, even the most efficient composite primary structures used in today’s state-of-the-art aircraft are not adequate to overcome the weight and cost penalties introduced by the highly contoured airframe of the BWB. In the pressurized cabin regions where the design is primarily driven by the out-of-plane loading considerations and where secondary bending stresses are developed, a traditional layered material system would require thousands of mechanical attachments to suppress delaminations and to join structural elements, ultimately leading to fastener pull-through problems in the thin gauge skins. Furthermore, a conventional composite solution for BWB would entail high manufacturing costs due to its highly contoured airframe. Also, an effective BWB structure must operate in out-of-plane loading scenarios while simultaneously meeting the arduous producibility requirements inherent in building the highly contoured airframe. In addition to the secondary bending stresses experienced during pressurization, another key difference in the BWB shell is the unique biaxial loading pattern that occurs during maneuver loading conditions. It is important to capture such attributes to overcome the inherent weight penalties of the BWB noncircular pressure cabin. To address these issues, scientists at NASA and the Boeing Company are working together to develop a new structural concept called the pultruded rod stitched efficient unitized structure (PRSEUS). This concept is being analytically and experimentally evaluated using a building block approach that assesses the fundamental structural responses in representative loading environments. This presentation will also review the current status of PRSEUS.
Dr. Jing Wang is currently an Associate Professor in the Department of Electrical Engineering at University of South Florida. He received two M.S. degrees from the University of Michigan, one in electrical engineering (2000), the other in mechanical engineering (2002), and a Ph.D. degree from University of Michigan in 2006. His research interests include micro/nanofabrication technologies, functional nanomaterials, micromachined sensors and actuators, RF/Microwave/THz devices. He has published more than 90 peer-reviewed journal and conference papers, while serving as reviewer for more than a dozen journals. His work has been funded by research grants from federal agencies (NSF, DTRA, US Army, US Air force) and contracts from more than a dozen companies. He is the chairperson for IEEE MTT/AP/ED Florida West Coast Section and he is also the faculty advisor for Florida IMAPS, AVS and IMS student chapters. He was elected as a member the prestigious IEEE MTT Technical Committee on RF MEMS topics. He currently acts as the general co-chair for the IEEE Wireless and Microwave Technology Conference (WAMICON 2015).

Director of RF MEMS Transducers Lab  
Chair of IEEE Florida West Coast MTT/AP/ED Chapter  
Member of the IEEE Technical Committee MTT-21
**Topic:** “Remotely Controlled Microfluidic Micromanipulators by Fe$_3$O$_4$ NPs Embedded Hydrogels”

**Abstract**—The micromanipulation of biological samples is important for microbiology, pharmaceutical science, and related bioengineering fields. In this talk, we present the fabrication and characterization of surface-attached microbeam arrays of 20μm width and 25μm height that are made of poly(N-isopropylacrylamide), a thermoresponsive polymer, with embedded spherical or octopod Fe$_3$O$_4$ nanoparticles. Below 32 °C, the microbeams imbibe water and buckle with an amplitude of approximately 20 μm. Turning on an AC-magnetic field induces the microbeam array to expel water due to the heating effect of the nanoparticles (magnetic hyperthermia), leading to a reversible transition from a buckled to nonbuckled state. It is observed that the octopod nanoparticles have a heating rate 30% greater (specific absorption rate, SAR) than that of the spherical nanoparticles, which shortens the time scale of the transition from the buckled and nonbuckled state. The return of the microbeams to the buckled state is accomplished by turning off the AC magnetic field, the rate of which is dictated by dissipation of heat and is independent of the type of nanoparticle. It is further demonstrated that this transition can be used to propel 50 μm spherical objects along a surface. While the motion is random, this study shows the promise of harnessing shape-shifting patterns in microfluidics for object manipulation.
Plenary Speaker II

Assoc. Prof. Ouyang Jianyong
National University of Singapore, Singapore

Research Interests
1. Energy Materials and Devices
I am interested in the energy conversion and energy storage. The energy conversion includes low-cost solar cells, such as polymer solar cells and dye-sensitized solar cells, and electrocatalysis. I am also interested in developing high-performance materials for energy storage. My lab achieved the highest photovoltaic efficiencies for dye-sensitized solar cells with carbon nanotubes and graphene as the counter electrode.

2. Nanometer Materials and Devices
My interests in nanometer materials include the development, processing, and application of functional nanometer materials, such as carbon nanotubes, graphene, polymer/nanoparticle memory devices, and antibacterial nanocoatings. Recently, we developed methods to directly deposit nanostructured metals on substrates through the chemical reduction of metal precursors.

3. Organic Electronic Materials and Devices
Organic electronic devices, including light-emitting diodes, photovoltaic cells, and field-effect transistors, have many important applications as the next-generation electronic devices due to their low fabrication cost and high mechanical flexibility. I am interested in the development of high-performance organic electronic materials and devices, including conducting polymers, conjugated polymers, and organic molecules, photovoltaic cells, and light-emitting diodes. We recently developed approaches to develop highly transparent and highly conductive polymer films. The polymer films have transparency and conductivity like indium tin oxide (ITO), the traditional transparent electrode material for optoelectronic devices.

Ph.D. (Solid State Chemistry), Institute for Molecular Science, Graduate University for Advanced Studies, Japan, 1999
M.S. (Physical Chemistry), Institute of Chemistry, Chinese Academy of Sciences, China, 1996
B.Sc. (Chemistry), Tsinghua University, Beijing, China, 1993
Topic: “Intrinsically Conductive Polymers with High Conductivity and Their Applications”

Assoc. Prof. Jianyong Ouyang
Department of Materials Science and Engineering, National University of Singapore, Singapore

Abstract—Although intrinsically conductive polymers were discovered in 1970s, their application is quite limited mainly due to their poor processability and low conductivity. Most of conductive polymers are insoluble in any solvent and cannot melt. Poly(3,4-ethylenedioxythiophene): poly(styrenesulfonate) (PEDOT:PSS) has gained great attention and considered as the most successful conductive polymer, because it can be dispersed in water and some polar organic solvents. But it has a problem of low conductivity. The as-prepared PEDOT:PSS films from its aqueous solution usually has a conductivity of less than 1 S/cm. Here, I will present several novel methods to significantly enhance the conductivity of PEDOT:PSS. The conductivity can be enhanced to be more than 3000 S cm$^{-1}$. In addition, I will talk about the application of PEDOT:PSS in several areas. Highly conductive PEDOT:PSS can be used as the transparent electrode of optoelectronic devices because it can have high transparency in the visible range. It can be high-performance thermoelectric materials due to its low thermal conductivity as well. The high conductivity and high mechanical flexibility also enable its application in wearable/flexible electromagnetic shielding. Moreover, it can be modified as stretchable conductors and can be used in stretchable devices.
### Brief Schedule for Conference

**October 21, 2017 (Saturday)**  
**Venue: Montgomery Foyer**  
Arrival Registration 10:00~17:00  
Committee Meeting 15:00-17:00

**October 21, 2017 (Sunday)**  
**Venue: Montgomery**  
Arrival Registration, Keynote Speeches, and Conference Presentation

### Morning Conference

**Venue: Montgomery**

**Opening Remark**  
Prof. Karen Winey, University of Pennsylvania, USA  
09:00~09:05

**Keynote Speech I**  
Topic: “Hydrophilic interaction liquid chromatography (HILIC) and its Application in Food, Pharmaceutical, Clinical and Environmental Industries”  
(Prof. Yuegang Zuo, University of Massachusetts Dartmouth, USA)  
09:05~09:45

**Keynote Speech II**  
(Prof. Frank Yang, East Carolina University, Greenville, North Carolina, USA)  
09:45~10:25

**Coffee Break & Group Photo Taking**  
10:25~10:50

**Keynote Speech III**  
Topic: “Precise Polyethylenes that Control Nanoscale Morphologies & Properties”  
(Prof. Karen Winey, University of Pennsylvania, USA)  
10:50~11:30

**Keynote Speech IV**  
Topic: “Recent Developments in Composite Structures for ‘Green Aircraft’ Applications”  
(Prof. Ramesh K. Agarwal, Washington University, USA)  
11:30~12:10

**Lunch**  
12:10~13:30  
**Venue: Delaware**
Afternoon Conference

Venue: Montgomery

Plenary Speech I 13:30~14:00
Topic: “Remotely Controlled Microfluidic Micromanipulators by Fe₃O₄ NPs Embedded Hydrogels”
(Assoc. Prof. Jing Wang, University of South Florida, USA)

Plenary Speech II 14:00~14:30
Topic: “Intrinsically Conductive Polymers with High Conductivity and Their Applications”
(Assoc. Prof. Ouyang Jianyong, National University of Singapore, Singapore)

Presentations

Session (Part. 1): 14:30~15:50
Venue: Montgomery
4 presentations-Topic: “Materials Science and Chemical Engineering”

Coffee Break 15:50~16:10

Session (Part. 2): 16:10~17:50
Venue: Montgomery
5 presentations-Topic: “Materials Science and Chemical Engineering”

Dinner 18:00
Venue: Delaware

Day 3

October 23, 2017 (Monday) 9:00~17:00 One Day Visit

Tips: Please arrive at the conference room 10 minutes before the session begins to upload PPT into the laptop.
## Detailed Schedule for Conference

### October 22, 2017 (Sunday)

**Venue:**

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<td>09:00~09:05</td>
<td>Opening Remark</td>
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<td>Prof. Karen Winey</td>
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<td>University of Pennsylvania, USA</td>
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<td>Topic: “A New Process of Making Efficacious Herbal Medicine -</td>
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<td>Subcritical Water Extraction of Medicinal Herbs”</td>
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<td>10:25~10:50</td>
<td>Coffee Break &amp; Group Photo Taking</td>
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<td>10:50~11:30</td>
<td>Keynote Speech III</td>
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<td>Topic: “Recent Developments in Composite Structures for “Green</td>
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<td>Aircraft” Applications”</td>
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<td>12:10~13:30</td>
<td>Lunch</td>
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Plenary Speech I
Assoc. Prof. Jing Wang
University of South Florida, USA
Topic: “Remotely Controlled Microfluidic Micromanipulators by Fe₃O₄ NPs Embedded Hydrogels”

Plenary Speech II
Assoc. Prof. Ouyang Jianyong
National University of Singapore, Singapore
Topic: “Intrinsically Conductive Polymers with High Conductivity and Their Applications”

Session (Part. 1): 4 presentations-Topic: “Materials Science and Chemical Engineering”

Coffee Break

Session (Part. 2): 5 presentations-Topic: “Materials Science and Chemical Engineering”

Dinner

Note: (1) Please register on October 21 unless unavoidable reason.
(2) The organizer doesn’t provide accommodation, and we suggest you make an early reservation.
(3) One Best Oral Presentation will be selected from the oral presentation session, and the Certificate for Best Oral Presentation will be awarded at the end of the session on October 22, 2017.
**Session 1**

**Tips:** The schedule for each presentation is for reference only. We strongly suggest you attend the whole session in order not to miss your presentation.

**Afternoon, October 22, 2017 (Sunday)**

**Time:** 14:30~15:30

**Venue:** Montgomery

**Session (Part. 1):** 4 presentations- Topic: “Materials Science and Chemical Engineering”

**Session Chair:** Prof. Karen Winey & Prof. Yuegang Zuo

M0001 Presentation 1 (14:30~14:50)

**Swelling Characteristics of Poly(2-Hydroxyethyl methacrylate)/Poly (ethylene glycol) methacrylate Hybrid Hydrogels**

**Guan-Sian Guo, Che-Hao Wu, Tsung-Sheng Chen and Shu-Ling Huang**

National United University, Taiwan, R.O.C.

**Abstract**—In this study, the Poly(ethylene glycol) methacrylate (PEGMA)/2-Hydroxyethyl methacrylate (HEMA) hybrid hydrogels were synthesized by the photo-polymerization. PEGMA was introduced to influence water absorption, swelling ratio, mechanical property, swelling thermodynamics and kinetics expansion mechanisms in the hydrogels. In a hydrogel–water matrix, freezable water is depressed because of the porosity confinement or interaction. The freezable water includes freezing bound water and free water. The functional groups of PEGMA/HEMA hybrid hydrogels were verified by a FT-IR spectrometer. Using the differential scanning calorimetry (DSC) analyzed the thermal behavior of water molecules, the expansion of thermodynamics, as well as the content of water molecules in the hydrogel. The results show that the swelling ratio was increased with the amount of PEGMA, however, the mechanical property was reduced. In addition, The Flory’s interaction parameters ($\chi$) was obtained through the DSC diagram and water uptake experiment. The volume fraction-melting temperature values were derived from DSC endotherms, and fitted to Flory’s model of hydrogel solution with very high correlations. The smaller the value of $\chi$, shows that the hydrogel was hydrophilic.
Afternoon, October 22, 2017 (Sunday)
Time: 14:30~15:30
Venue: Montgomery

Session (Part. 1): 4 presentations- Topic: “Materials Science and Chemical Engineering”

Session Chair: Prof. Karen Winey & Prof. Yuegang Zuo

F0006 Presentation 2 (14:50~15:10)
Development of Corrosion Resistant Surfaces via Friction Stir Processing for Bio Implant Applications

Gurvinder Pal Singh Sodhi and Harpreet Singh
Indian Institute of Technology Ropar, India

Abstract—Current investigation presents the use of Friction Stir Processing (FSP) to improve the corrosion resistance of pure magnesium for biomedical applications. FSP has been used to incorporate hydroxyapatite (HAP) into Mg-surface so as to modify the chemical composition. FSP was done within a matrix of different parameters and conditions. Influence of various parameters on microstructure was also clearly observed. XRD analysis confirmed the presence of HAP, whereas SEM images revealed a uniform distribution of the imbedded phase. Micro-hardness and in-vitro corrosion studies were also performed. Influence of grain size on hardness was validated by Hall-Petch relationship. Corrosion behavior was explained on the basis of texture, which indicated better corrosion resistance in comparison to the pure Mg. Therefore, the study reveals that the proposed FSP methodology can be useful tool to improve mechanical and corrosion properties of pure Mg for biomedical applications.
Afternoon, October 22, 2017 (Sunday)

Time: 14:30~15:30

Venue: Montgomery

Session (Part. 1): 4 presentations- Topic: “Materials Science and Chemical Engineering”

Session Chair: Prof. Karen Winey & Prof. Yuegang Zuo

M0002 Presentation 3 (15:10~15:30)

The Preparation and Characteristics of Waterborne Polyurethane/Chitosan/Curcumin Blend Coating

Jui-Han Yang, An-Chong Chao and Jan-Yen Lee
National United University, Taiwan, R.O.C.

Abstract—In recent years, environmental issues have been paid more and more attention. As compare to solvent-based polyurethane, waterborne polyurethane (WPU) use less solvent. These solvents may cause a variety of hazards, such as the operator's health, environmental pollution, storage and transportation safety worries. Under the consideration of environmental protection and energy conservation, WPU gradually replace the solvent-based polyurethane. Chitosan (CS) has excellent biocompatibility, antibacterial property and biodegradability. Curcumin(CC) has many medical characteristics, such as antioxidant activity, inflammation and antitumor effects, Curcumin is low toxicity on the human body and side effects. In this study, we prepare WPU / CS/CC blend coating. The chemical structure of WPU/CS/CC blend were confirmed by FTIR, the UV resistance is tested by UV-VIS spectrophotometer, mechanical properties were determined by tensile testing machine, the thermal properties were checked by DSC and the hydrophilicity were examined by contact angle test. The effect of chitosan and curcumin dosage on UV resistance, thermal property, mechanical property, antibacterial property, hydrophilicity and formaldehyde removal rate were determined.
Afternoon, October 22, 2017 (Sunday)

Time: 14:30~15:30

Venue: Montgomery

Session (Part. 1): 4 presentations- Topic: “Materials Science and Chemical Engineering”

Session Chair: Prof. Karen Winey & Prof. Yuegang Zuo

M3001 Presentation 4 (15:30~15:50)

Photodegradation of 17α-Ethynylestradiol (EE2) in the Presence of Humic Acid and Carbonate Ions in Water Solutions

Faten Albalawi and Yuegang Zuo
University of Massachusetts Dartmouth, the United States

Abstract—The concerns over 17α-ethynylestradiol (EE2) have been growing in the recent years due to its increasing presence in the environment and its high estrogenic potency. However, there is a limited amount of research available on the photochemical behaviors of EE2 in the presence of various aquatic environmental matrix components even though photodegradation has been considered an effective pathway for the removal of organic pollutants from not only waste waters but also natural aquatic ecosystems. Herein, the direct photodegradation of EE2 and the effects of common natural water matrix components, humic acid and carbonate ions, on the photodegradation were studied. High-Performance Liquid Chromatography (HPLC) was utilized to determine the concentrations of EE2. The direct photodegradation of EE2 was found to increase with increasing water pH value in the range of 7.0 to 10.0 and the photodegradation rate constant increased with increasing concentration of EE2. Humic acid enhanced the photodegradation rate of EE2 under the simulated sunlight employed, while carbonate (CO$_3^{2-}$/HCO$_3^-$) had shown slight influences on EE2 photodegradation.

Coffee Break 15:50~16:10
Afternoon, October 22, 2017 (Sunday)

Time: 16:10~17:50

Venue: Montgomery

Session (Part. 2): 5 presentations- Topic: “Materials Science and Chemical Engineering”

Session Chair: Prof. Yuegang Zuo & Prof. Ramesh K. Agarwal

F0011 Presentation 5 (16:10~16:30)

Polystyrene Paste as a Substitute for Portland Cement

Akinyemi Lanre Oluwafemi
Reynolds Construction Company Nigeria Limited, Nigeria

Abstract—The reduction of limestone to cement in Nigeria is expensive and requires huge amounts of energy. This significantly affects the cost of cement. Concrete is heavy! A cubic foot of it weighs about 150 lbs. and a cubic yard about 4000 lbs. Thus a ready-mix truck with 9 cubic yards is carrying 36,000 lbs excluding the weight of the truck itself, thereby accumulating cost for manufacturers also. Therein lies the need to find a substitute for Cement by using the Polystyrene Paste that benefits both the manufactures and the consumers. A patented material obtained by dissolving Waste in volatile organic solvent has recently been identified as a suitable binder/cement for Construction and building material Production. This paper illustrates the procedures of a test experiment undertaken to determine the splitting tensile strength of PPCC mortar compared to that of OPC (Ordinary Portland Cement). Expanded Polystyrene was dissolved in gasoline to form a paste referred to as Polystyrene Paste Constructional Cement (PPCC). Mortars of mix ratios 1:4, 1:5, 1:6, 1:7 (PPCC: fine aggregate) batched by volume were used to produce 50mm x 100mm cylindrical PPCC mortar splitting tensile strength specimens. The control experiment was done by creating another series of Cylindrical OPC mortar splitting tensile strength specimens following the same mix ratio used earlier. The PPCC cylindrical splitting tensile strength specimens were left to air-set, and the ones made with Ordinary Portland Cement (OPC) were demoded after 24 hours and cured in water. The cylindrical PPCC splitting tensile strength specimens were tested at 28 days and compared with those of the Ordinary Portland cement splitting tensile strength specimens. The result shows that Hence for this two mixes, PPCC exhibits a better binding Property than the OPC. I, thereby recommend the use of PPCC as a substitute for a Portland cement.
First-principles Investigation of Adsorption and Diffusion of Li, Na and Mg on Arsenene Monolayer: Prospective Materials for Li (Na or Mg)-ion Batteries
Hind Benzidi, Abdelilah Benyoussef, M. Garara, A. El kenz and Omar Mounkachi
Mohammed V-aggdal University, Morocco

Abstract—In view of the interest in new energy storage technologies, a novel architecture using two dimensional (2D) nanomaterials have been widely attracted researcher for designing a new electrode material with nanometer improving the performance of lithium-ion batteries, including Na-ion batteries, Mg-ion batteries. Arsenene likely to phosphorene are atomic thick material, it is possible to be manufactured in experiment by exfoliating from grey due to the weak interaction between layers of grey arsenic. In this work, the first-principles density functional theory (DFT) calculations are employed to investigate and compare the interaction of Na, Mg and Li ions with Arsenene monolayer. The most stable binding sites and their corresponding binding energies are identified for a single Na, Mg and Li adatom on arsenene monolayer. The binding energies results indicate that the Li, Na and Mg adatom preferably adsorbed on valley site, with values of -2.55, -1.91 and -1.10, respectively. Then the ions concentration increased until the full saturation of the surfaces is achieved. Accordingly, A semiconductor to conductor transition is observed, gives rise to a good electrical conductivity. The capacity is estimated to be 358 mA h g-1 which is close to graphite and phosphorene capacity. Furthermore, the diffusion barrier energies of Li, Na and Mg ions are calculated using utilized nudged elastic band method. the activation energy barriers of these ion shows isotropic behavior for different pathway (X, Y and diagonal direction) where the obtained values are 0.16, 0.05 and 0.016 eV, for Li ,Na and Mg ion, respectively. Our findings show that the high capacity, low open circuit voltage, ultrahigh barriere diffusion makethe arsenene a good candidate for application as an electrode material for Li(Na or Mg) batteries.
Afternoon, October 22, 2017 (Sunday)

Time: 16:10~17:50

Venue: Montgomery

Session (Part. 2): 5 presentations- Topic: “Materials Science and Chemical Engineering”

Session Chair: Prof. Yuegang Zuo & Prof. Ramesh K. Agarwal

M0003 Presentation 7 (16:50~17:10)

Evaluation of Tyrosinase Inhibition, Antioxidant and Moisture Retention Activities of the Pracparatum Mungo

Tzu-Chin Chang, Jan-Yen Lee, Min-Yun Chang, Chien-Min Weng and Shu-Ling Huang
National United University, Taiwan, R.O.C.

Abstract—In recent years, cosmetic products made from natural ingredients are a tendency, and these products not only need the requirements of skin care products efficacy, but also the safety and health on the skin. Pracparatum mungo (P. mungo) is a fermented mung bean product that can be obtained by the traditional or biotechnological fermentation. It is a traditional Chinese health food, used as folk medicine in anti-inflammatory of liver and other medications in East Asia countries. Previous studies showed that fermented mung bean has more active ingredients such as vitexin and isovitexin than unfermented one. In this study, we selected various P. mungos that were made by the biotechnological fermentation, and these P. mungos were added different species additives, containing curcumin, bromelain and trace elements. Using the different analysis methods evaluate and compare tyrosinase inhibition, antioxidant and moisture retention activities of P. mungo. The antioxidant properties were determined by total phenolic contents, DPPH and ABTS free-radical scavenging abilities, and Fe²⁺ chelating abilities. The whitening assay was determined by anti-tyrosinase activity. We can find the best species additives for P. mungo to further applications in antioxidation and whitening products.
Afternoon, October 22, 2017 (Sunday)

Time: 16:10~17:50

Venue: Montgomery

Session (Part. 2): 5 presentations- Topic: “Materials Science and Chemical Engineering”

Session Chair: Prof. Yuegang Zuo & Prof. Ramesh K. Agarwal

F0010 Presentation 8 (17:10~17:30)

Thermodynamic and Exergy Analysis of the Alternative Refrigerants for Automative AC System
Ahmet Tahir Kalkisim and Kadir Bilen
Gumushane University, Turkey

Abstract—R134a has been widely used as an Air Conditioning refrigerant in the automobile industry. Although R134a has a small effect on ozone depletion, it has a great influence on global warming potential. thus, the researchers are trying to find alternative refrigerants in replace with the R-134a. In these days, R152a has been considered as an alternative refrigerant because of it's having a zero ODP and low GWP. In this study, the possible usage of the R152a in replace with R134a in the AC system of an automobile and properties of the R152a will be investigated theoretically. The studies have been conducted in this field so far and the results of these studies will be presented and compared with the R134a still used. Also the effect of the R152a on the performance of the AC system of an automobile has been examined analytically and analysed in cool pack programme in constant compressor speed (1000 rpm). Exegy analysis has been made by means of the program developed using EES (Engineering Equation Solver) and NIST software programmes. In a automobile climate one stage vapor compression refrigeration cycle for refrigerants such as alternative refrigerant R152a and R134a refrigerants. It has been assumed that 5 °C superheating and 7 °C subcooling occur in the system and calculations. Irreversibilities occurring in the components of the cycle including compressor, evaporator, condenser and expansion valve have been examined for different evaporator (Te= -20 °C, -15 °C, -10 °C, -5 °C, 0 °C and condenser temperatures (40 °C, 60 °C, 70 °C). As a result of this study, it has been observed that R152a and R134a do not lead to any significant difference on the performance of the cooling system.
Afternoon, October 22, 2017 (Sunday)

Time: 16:10~17:50

Venue: Montgomery

Session (Part. 2): 5 presentations- Topic: “Materials Science and Chemical Engineering”

Session Chair: Prof. Yuegang Zuo & Prof. Ramesh K. Agarwal

F0013 Presentation 9 (17:30~17:50)

Numerical Simulation of Hull Curved Plate Forming by Electromagnetic Force Assisted Line Heating

Ji Wang, Shun Wang, Yujun Liu, Rui Li and Xiao Liu
Dalian University of Technology, China

Abstract—Line heating is a common method in shipyards for forming of hull curved plate. The aluminum alloy plate is widely used in shipbuilding. To solve the problem of thick aluminum alloy plate forming with complex curved surface, a new technology named electromagnetic force assisted line heating (EFALH) was proposed in this paper. The FEM model of EFALH was established and the effect of electromagnetic force assisted forming was verified by self development equipment. Firstly, the solving idea of numerical simulation for EFALH was illustrated. Then, the coupled numerical simulation model of multi physical fields were established. Lastly, the reliability of the numerical simulation model was verified by comparing the experimental data. This paper lays a foundation for solving the forming problems of thick aluminum alloy curved plate in shipbuilding.
One Day Tour

October 23, 2017 (Monday) 9:00~17:00

(Tip: Please arrive at the lobby of the hotel before 9 a.m. The following places are for references, and the final schedule should be adjusted to the actual notice.)

1. (9:00) Assemble at the lobby of the hotel

2. Independence National Park

Independence National Historical Park is a United States National Park in Philadelphia that preserves several sites associated with the American Revolution and the nation’s founding history. Administered by the National Park Service, the 55-acre (22 ha) park comprises much of Philadelphia’s most-visited historic district. The park has been nicknamed “America’s most historic square mile”[3][4][5] because of its abundance of historic landmarks, and the park sites are located within the Old City and

Society Hill neighborhoods of Philadelphia.

3. Liberty Bell

The Liberty Bell is an iconic symbol of American independence, located in Philadelphia, Pennsylvania. Formerly placed in the steeple of the Pennsylvania State House (now renamed Independence Hall), the bell today is located in the Liberty Bell Center in Independence National Historical Park. The bell was commissioned in 1752 by the Pennsylvania Provincial Assembly from the London firm of Lester and Pack (known subsequently as the Whitechapel Bell Foundry), and was cast with the lettering "Proclaim LIBERTY Throughout all the Land unto all the Inhabitants Thereof," a Biblical reference from the Book of Leviticus.
(25:10). The bell first cracked when rung after its arrival in Philadelphia, and was twice recast by local workmen John Pass and John Stow, whose last names appear on the bell. In its early years the bell was used to summon lawmakers to legislative sessions and to alert citizens about public meetings and proclamations.

4. (12:00-13:00) Have Lunch together.

5. Philadelphia City Hall

City Hall is the largest municipal building in the United States, containing over 14.5 acres of floor space. It is an architectural treasure inside and out. The public rooms are among the most lavish in the City. The City Council Chamber, the Mayor’s Reception Room, Conversation Hall and the Supreme Court Room are the most ornate.

The exterior is covered with sculpture representing the seasons and continents, as well as allegorical figures, heads and masks. All of the sculpture was designed by Alexander Milne Calder, including the 27-ton statue of William Penn atop the tower. The tower was the tallest building in Philadelphia until 1987. Its observation deck, accessible during guided-tours, provides a panoramic view of the city.

6. Philadelphia Museum of Art

The Philadelphia Museum of Art is an art museum originally chartered in 1876 for the Centennial Exposition in Philadelphia. The main museum building was completed in 1928 on Fairmount, a hill located at the northwest end of the Benjamin Franklin Parkway at Eakins Oval. The museum administers collections containing over 240,000 objects including major holdings of European, American and Asian origin. The various classes of artwork include sculpture, paintings, prints, drawings, photographs, armor, and decorative arts. The attendance figure for the museum was 751,797 in 2015, an increase of 17% from the prior year, ranking it among the top one hundred most-visited art museums in the world. The museum is also one of the largest art museums in the world based on gallery space.

7 (17:00) Back to the hotel
Conference Venue

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Thank you for taking time to participate in this conference evaluation. Your comments will enable us to execute future conferences better and tailor them to your needs!