2018 International Conference on Environment and Ocean Engineering (ICEOE 2018)

August 6-8, 2018

National Taipei University of Technology
Taipei, Taiwan

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Conference Venue

1, Sec. 3, Zhong-Xiao (Chung-Hsiao) E. Rd., Da’an Dist., Chemical Engineering & Biotechnology Dept., National Taipei University of Technology, Taipei City 106, Taiwan (R.O.C.)

National Taiwan University of Technology, Chemical Engineering & Biotechnology Dept.,

Recommend Hotels (Close to the venue):

THE MIRAMAR GARDEN TAIPEI
Address: 104, Zhongshan District, 83 Civic Boulevard, No. 83, Civic Boulevard, Zhongshan District, 104 Taipei, Taiwan

Rido Hotel
Address: Taipei City 104, 11 Fuxing Road, 11, 104 Taipei, Taiwan

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August 6
Presentations
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August 7 Morning

Phone: 00886-2-27065600
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Feedback Information
2018 Taipei Conference Introductions

Welcome to CBEES 2018 conference in Taipei. The objective of the Taipei 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 Environment and Ocean Engineering.

Papers will be published in the following conference proceeding:

IOP Conference Series: Earth and Environmental Science (EES) (ISSN:1755-1315), which is indexed by EI Compendex, Scopus, Thomson Reuters (WoS), Inspec, et al.

Conference website and email: http://www.iceoe.org/; iceoe@cbees.net
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):
Keynote Speech: about 25 Minutes of Presentation and 5 Minutes of Question and Answer
Regular Oral Presentation: about 12 Minutes of Presentation and 3 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 each session on August 7, 2018.

Dress code
Please wear formal clothes or national representative of clothing.
Brief Schedule for Conference

Day 1
August 6, 2018 (Monday)
13:00~17:00
Venue: Chemical Engineering Hall (1st floor)
化学工程馆一楼
Arrival Registration and Conference Materials Collection

Day 2
August 7, 2018 (Tuesday)
Venue: Comprehensive Museum of Science and Technology
(the 2nd Lecture Hall)/Chemical Engineering Hall (1st floor)
综合科馆第二演讲厅/化学工程馆一楼
09:00~19:00
Arrival Registration, Keynote Speech, and Conference Presentation

Morning Conference
Venue: Comprehensive Museum of Science and Technology
(the 2nd Lecture Hall)
综合科馆第二演讲厅

Opening Remarks
09:00~09:05
Prof. Shen-Ming Chen
National Taipei University of Technology, Taiwan

Keynote Speech I
09:05~09:35
Prof. Xiaoheng Liu
Nanjing University of Science and Technology, China
Topic: “Development of photocatalyst in preparation, characterization and mechanism: from TiO$_2$ to AgVO$_3$”

Keynote Speech II
09:35~10:05
Assoc. Prof. Kuo-Yuan Hwa
National Taipei University of Technology, Taiwan
Topic: “Graphene Composites for Advanced Biomedical Applications”

Coffee Break and Group Photo Taking
10:05~10:30

Keynote Speech III
10:30~11:00
Prof. Kuo-Lin Huang
National Pingtung University of Science and Technology, Taiwan
Topic: “Regeneration of Ce(IV) in Real Spent Cr-etching Solutions: An Electrochemical Approach”
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<td>10:00~11:00</td>
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<td>Topic: “Neurotransmitters detection by nanomaterial modified bioelectrochemical analysis”</td>
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<td>11:30~12:00</td>
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<td>Session Chair: Prof. Xiaoheng Liu and Prof. Kuo-Lin Huang</td>
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Tips: Please arrive at the conference room 10 minutes before the session begins to upload PPT into the laptop.

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, and the Certificate for Best Oral Presentation will be awarded at the end of each session on August 7, 2018.
Keynote Speaker I

Prof. Xiaoheng Liu
Nanjing University of Science and Technology, China

Dr. Xiaoheng Liu completed his M.Sc degree in 1994 at University of Science and Technology of China (USTC) under the supervision of Professor Tiantang Yan. He obtained his Ph.D. in 2000 at Nanjing University of Science and Technology (NJUST) under the supervision of Professor Xin Wang. In 2004 he was a visiting fellow, in Professor John White’s group, Chemistry Research School, Australia National University, and in 2009 he was a senior visiting fellow in Professor Paul O’Brien’s group, Chemistry School, University of Manchester, UK. Since 2006, he has been as a full professor in the materials chemistry department at NJUST. His current research is focused on the synthesis of inorganic nanosized materials and their applications in energy and environmental areas, including specializing in the synthesis and characterization of sol-gel processes, and photocatalytic investigations. Since 2007, he has been a council member of Chinese Materials Society.

Topic: “Development of photocatalyst in preparation, characterization and mechanism: from TiO\textsubscript{2} to AgVO\textsubscript{3}”

Abstract—A series of AgVO\textsubscript{3}/palygorskite nanocomposites were synthesized by a facile one-pot precipitation route, wherein the AgVO\textsubscript{3} nanoparticles were uniformly anchored on the surface of palygorskite nanofibers. Systematic characterization by XRD, SEM, TEM, UV-vis DRS, XPS, PL and photoelectrochemical measurements were employed to analyze the phase structure, morphology, chemical composition and photocatalytic mechanism. The applications, including photodegradation of RhB and photocatalytic inactivation of E. coli under visible light, were used to evaluate the photocatalytic activity of the as-obtained AgVO\textsubscript{3}/Palygorskite nanocomposites. The results indicate that all the AgVO\textsubscript{3}/palygorskite nanocomposites exhibit superior photocatalytic performance than pure AgVO\textsubscript{3} both in the photodegradation and disinfection processes, of which the optimal content of AgVO\textsubscript{3} is about 40 wt.\%. The enhanced photocatalytic activity of AgVO\textsubscript{3}/palygorskite composites should be attributed to the enlarged specific surface area with the AgVO\textsubscript{3} nanoparticle size decreased and the effective transfer and separation of the photogenerated charge carriers. This work could provide a new clue for designing natural mineral based highly efficient visible-light responding photocatalyst for the organic pollutants degradation and bacteria inactivation.
Keynote Speaker II

Assoc. Prof. Kuo-Yuan Hwa
National Taipei University of Technology, Taiwan

Dr. Kuo-Yuan Hwa is an associate professor and the director of the Center for Biomedical Industries at the National Taipei University of Technology. Dr. Hwagraduated and received her PhD from the School of Medicine, the Johns Hopkins University. She is the president of the Medical Association for Indigenous Peoples of Taiwan (MAIPT). Dr. Hwa’s scientific interests are: 1) nanotechnology and biosensor, 2) new drug discovery for human diseases by proteomics and genomics approaches and 3) glyco-biology, especially on enzymes kinetics. She has published 85 conference and journal articles and 10 patents. She has served in many national and international committees. Dr. Hwa has been invited as a speaker for many academic research institutes and universities in China, Korea, Japan and USA. She has been invited as a reviewer, a judge and an editor for international meetings and journals. In addition, one of her currently works is on developing culturally inclusive health science educational program, with both indigenous and western science knowledge for indigenous children.

Topic: “Graphene Composites for Advanced Biomedical Applications”

Abstract—Graphene has been named as “a miracle material”, which is organized as a two-dimensional matrix of carbon atoms in a shape of honeycomb. It is applicable for many industrial usages, due to its excellent properties as light weighted, large surface area, high electron mobility, thermal conductivity and high mechanical strength. Although graphene has many applications in various fields, however graphene is inflexible and insoluble in water. Moreover, for biomedical usage and for e-textile usage, washable and flexible materials are required as the key performance indexes. One of the research areas at our biomedical industrial research center, is to develop advanced materials for the healthcare applications, particularly on e-textile. Recently we have successfully developed many graphene composite materials for biomedical applications. These studies are based on our previous work on advanced nano-sensors.

Our simple one-pot synthesis is easy to carried out and scale up for industrial usage. Synthesis of graphene oxide from graphite are based on Staudenmaier, Hofmann, Brodie or Hummers methods. The carbon oxygen ratio of the GO directly reflected the oxidation process effeteness. We currently used Hummers methods for generation GO. Most the graphene composites have been prepared with reduction of graphene oxide. With mixture of biocompatible polymers, we are able to make environmentally friendly conductive ink which can be readily used on traditional fabrics manufacture processes. Another biomedical application is using graphene composite for developing biosensors. And, we have successfully developed several biosensors. These sensors are different from traditional biosensors. Graphene-based biosensor commonly has higher sensitive than traditional non-graphene based biosensor.
Dr. Kuo-Lin Huang is a Professor at the Department of Environmental Science and Engineering at National Pingtung University of Science and Technology (NPUST). Previously, he worked as an Assistant Professor and then an Associate Professor at the same Department. He earned a Master degree in Environmental Engineering from National Cheng Kung University (Taiwan) in 1985 and a Ph.D. degree in Environmental Engineer from Clarkson University (USA) in 2001. His current research interests are broadly clustered in the areas of environmental and electrochemical technologies. He is particularly interested in developing electrochemical techniques for resource recovery, removal/degradation of (emerging) inorganic/organic pollutants, emission/monitoring of toxic air pollutants, fabrication of electrodes/sensors, and proton exchange membrane fuel cells. Prof. Huang has participated in the scientific committee of several conferences and associations and serves as a reviewer in a wide range of international renowned journals and for grant proposals of some institutes. He has published more than 85 papers in international journals with Science Citation Index (SCI) since 2002. He is on the editorial boards of several international journals. He also serves as a supervisor for Taiwan Association for Aerosol Research (TAAR) presently.

**Topic:** “Regeneration of Ce(IV) in Real Spent Cr-etching Solutions: An Electrochemical Approach”

**Abstract**—Nowadays, liquid crystal displays (LCDs) have been widely used in notebook computers, desktop computer monitors, and televisions. The thin film transistor (TFT)-LCD industry has developed rapidly, but the manufacture of TFT-LCD panels requires many complex procedures and suffers from enormous production of waste liquids such as spent chromium (Cr)-etching solutions. The spent Cr-etching solutions from TFT-LCD industry are regarded as acidic hazardous waste and traditionally treated by chemical precipitation which produces considerable amounts of hazardous sludge with liability. The concentrations of cerium (Ce(III) + Ce(IV)) in Cr-etching solutions are usually high (≥ 0.2 M) and cerium is one of the most reactive rare earth elements commonly used in modern industry, so it is greatly encouraged to recover or regenerate cerium from the spent Cr-etching solutions for recycling purposes. Electrochemical methods are simple, rapid, and economical and have attracted much attention for various applications including resource recovery/regeneration. This keynote speech will present the regeneration of Ce(IV) in real spent Cr-etching solutions using an electrochemical approach.
Keynote Speaker IV

Prof. Bih-Show Lou
Chang Gung University, Taiwan

Dr. Bih-Show Lou received her B.S. Degree in Chemistry in 1984 at the National Kaohsiung Normal University, Taiwan. She then went to University of New Mexico, USA where she received her Ph.D. with Prof. Mark R. Ondrias in Biophysical Chemistry in 1993, then was a postdoctoral fellow at University of Arizona with Victor J. Hruby, Regents Professor. She joined Division of Nature Science in Center for General Education, Chang Gung University, Taiwan in 1995. She has been a full professor since 2005 and the division coordinator since 2010. Her current research interests include LC/MS-based metabolomic approach for exercise physiology studies, spectroscopy for chemical and nanomaterial analysis, electrochemistry for biosensor applications, and surface modification by thin film metallic glasses and plasma electrolytic oxidation processes in biomaterial development for medical applications.

**Topic:** “Neurotransmitters detection by nanomaterial modified bioelectrochemical analysis”

**Abstract**—Recent studies suggest that physical activity plays an important role to mediate neuroplasticity. The mechanism of this is an area worth exploring to gain more precise insight into the process of remodeling of the nervous system. Improving the detection of neurotransmitters is the first priority of this study to better understand their physiological function. We utilize bioelectrochemical analysis as a key technology to establish a highly sensitive analysis platform for the investigation of neurotransmitters. We investigate the sensitivity of different nanocomposites as materials to modify the electrode as the electrode materials play a crucial role in the efficacy of sensing platforms. To this end, the core aspect of this study seeks to improve both sensitivity and selectivity for electrochemical sensors through modifying the working electrode.
Prof. Shen-Ming Chen (h-index > 60) received his PhD degrees in chemistry from National Taiwan University, Taipei, Taiwan. He was a visiting postdoctoral fellow with the Institute of Inorganic Chemistry, Friedrich-Alexander University Erlangen-Nuremberg, Germany in 1997. He joined Department of Chemical Engineering, National Taipei Institute of Technology, Taipei, Taiwan in 1985. He had been an associate professor of Department of Chemical Engineering, National Taipei Institute of Technology, Taipei, Taiwan from 1991 to 1997. Since August 1997, he has been a full professor of Department of Chemical Engineering and Biotechnology, National Taipei University of Technology. He has been the Dean (Curator) of library, National Taipei University of Technology, Taiwan from 2000 to 2006 and the Director of Extracurricular Activity, office of student affairs, National Taipei University of Technology, Taiwan from 1995 to 2000.

Prof. Shen-Ming Chen has published over 500 research and review papers in international SCI journals. Some of their papers have been selected as the most cited papers in the Journal of Electroanalytical Chemistry and Biosensor & Bioelectronics. He received three times Distinguish Professor awards. He also received three times Outstanding Research Award from National Taipei University of Technology, Taiwan. He have edited or attended two books for NOVA publications titled “Nanostructured Materials for Electrochemical Biosensors” and “Biosensors: Properties, Materials and Applications” and contributed four book chapters.

His research interest includes nanocomposites, bionanomaterials, bionanotechnology, electrochemical biosensor, biosensors, bioelectrochemistry, chemical materials, electroanalytical Chemistry, electrocatalysis and electroanalysis, photoelectrochemistry, metalloproteins, metalloporphyrins, nanotechnology, spectroscopic techniques, scanning probe techniques, quartz crystal microbalance, materials research, fuel cells, solar cell and photovoltaic cells.

Abstract—The existing carbon materials can be classified into activated carbon (0-dimensional), carbon nanotubes (CNT) (1-dimensional), graphene (2-dimensional) and carbon foams (3-dimensional). Among these, graphene is well known to be the top candidate; However, preparation of graphene from graphite is an intricate procedure that can lead to an explosion during the oxidation of graphite. Similarly, the preparation of CNT also has some practical difficulties due to the complicated instrument setup. Fascinatingly, the preparation of ACs is simple, environmentally friendly and cost-effective. For the first time, Pongam seed shells-derived activated carbon and cobalt oxide (~2-6 nm) nanocomposite (PSAC/Co3O4) is prepared for the high performance non-enzymatic glucose sensor and supercapacitors. Remarkably, the fabricated glucose sensor is found to exhibit an ultra-high sensitivity with a lower detection limit, and long-term durability. Moreover, the PSAC/Co3O4 electrode possess an appreciable specific capacitance and long-term cycle stability. The high surface area carbon porous materials (CPMs) synthesized by the direct template method via self-assembly of polymerized phloroglucinol-formaldehyde resol around a triblock copolymer template were used as supports for nickel nanoparticles (Ni NPs). The system is also been successfully applied for detection of mercuric ion in real sea fish samples. Furthermore, a facile method has been developed for fabricating selective and sensitive electrochemical sensor for the detection of toxic metal ions, which invokes incorporation of palladium nanoparticles (ca. 3-4 nm) on fruit peels-derived porous activated carbons (PACs). The Pd/PAC-modified GCEs were exploited as electrochemical sensors for the detection of toxic heavy metal ions, viz. Cd^{2+}, Pb^{2+}, Cu^{2+}, and Hg^{2+}, which showed superior performances for both individual as well as simultaneous detections. For simultaneous detection of Cd^{2+}, Pb^{2+}, Cu^{2+}, and Hg^{2+}, a linear response in ion concentration range of 0.5-5.5, 0.5-8.9, 0.5-5.0, and 0.24-7.5 µM, with sensitivity of 66.7, 53.8, 41.1, and 50.3 µA µM^{-1} cm^{-2}, and detection limit of 41, 50, 66 and 54 nM, respectively, were observed. These highly stable and durable biomass carbons modified electrodes, which can be facely fabricated by the eco-friendly and cost-effective route, should have great potentials for practical applications in energy storage, biosensing, and catalysis. We also investigated the direct electrochemistry of glucose oxidase (GOx) and cholesterol oxidase (ChOx) at multiwalled carbon nanotubes (MWCNTs) modified electrode. GOx was covalently immobilized onto MWCNT modified GCE through the well known glutaraldehyde (GAD) chemistry displayed. A cholesterol biosensor of ChOx/MWCNT containing MWCNTs and ChOx has been synthesized on electrode. The MWCNTs/GOx film modified GCE effectively exhibits the electro oxidation signals for the detection of glucose. MWCNTs provided large surface area for GOx base on modified electrode. The cyclic voltammetry (CVs) has been used for the measurement of electroanalytical properties of analytes by means of modified electrodes. The power densities of glucose biofuel cell based on the MWCNTs/GOx electrode was determined. We have also carried out for the fabrication of chemically modified electrodes on the use of micro and nanocomposites for different applications.
Session 1

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

Afternoon on August 7, 2018 (Tuesday)
Time: 13:00~16:00
Venue: Chemical Engineering Hall (1st floor)-化学工程馆一楼
12 presentations-Topic: “Photocatalysis and Electroanalytical Chemistry”
Session Chair: Prof. Xiaoheng Liu and Prof. Kuo-Lin Huang

J1001 Presentation 1 (13:00~13:15)
Fabrication of Bi$_2$MoO$_6$/CdS Heterostructures Nanocomposite: Enhanced Photocatalytic and Photoelectrochemical Performance under Visible-Light irradiation
Muhammad Arif, Tong Yu, Zhang Min, Qingyong Li and Xiaoheng Liu
Nanjing University of Science and Technology, Jiangsu, China

Abstract—We employed one dimensional (1D) CdS nanobelt as a synthetic template and developed Bi$_2$MoO$_6$/CdS heterostructures nanocomposite by simple 2 steps hydrothermal method. The as prepared Bi$_2$MoO$_6$/CdS heterostructures nanocomposite possess good disperisty and exhibits excellent photocatalytic activity towards rhodamine B (RhB) and phenol under visible light irradiation. Importantly, the large specific surface area of Bi$_2$MoO$_6$/CdS heterostructures nanocomposite (52.7 m$^2$ g$^{-1}$) and high electron mobility contributes to the enhanced photolytic activity. The as prepared heterostructures nanocomposite also exhibits significant photocatalytic oxygen evolution with rate of 0.773 mmol h$^{-1}$ g$^{-1}$. A series of experiments validate that the Bi$_2$MoO$_6$/CdS heterostructures nanocomposite contributes to improved photocatalytic activity and the electrons/holes separation are well promoted. Thus, the current research provides an efficient rout for the fabrication of photostable heterostructures nanocomposite with an effective utilization of solar light.
**Session 1**

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

**Afternoon on August 7, 2018 (Tuesday)**

**Time:** 13:00~16:00

**Venue:** Chemical Engineering Hall (1st floor)-化学工程馆一楼

12 presentations-Topic: “Photocatalysis and Electroanalytical Chemistry”

**Session Chair:** Prof. Xiaoheng Liu and Prof. Kuo-Lin Huang

**J4001 Presentation 2 (13:15~13:30)**

A Highly Conducting Flower like Au Nanoparticles Interconnected Functionalized CNFs and its Enhanced Electrocatalytic Activity towards Hydrazine through Direct Electron Transfer

Mani Sakthivel, Sukanya Ramaraj, Shen-Ming Chen, Bose Dinesh, Kuang-Hsiang Chen

National Taipei University of Technology, Taipei, Taiwan

**Abstract**—Recently, carbon nanofibers (CNFs) have attracted interest in variety of applications due to their high mechanical strength, chemical stability, superior laboriousness, excellent electrical and thermal conductivities, as well as substantial exhaustion, corrosion resistance and larger surface to volume ratio than CNT. Nevertheless, the electrode preparation using pristine CNF shows some difficulties due to its insolubility in water. In order to improve the solubility of CNF, which is treated in the acid solution (HNO\(_3\)/H\(_2\)SO\(_4\)) for functionalization process. To increase the electrical conductivity of F-CNFs, flower-like Au nanoparticles were electrodeposited onto the F-CNFs. Functionalization of CNF and the presence of spherical Au nanoparticles on the F-CNFs have been confirmed by FT-IR, Raman, XRD, and TEM techniques. Optimization study for electrodeposition of Au nanoparticles was performed with Au precursor’s concentration and deposition cycle number. The developed material was used as an electrode modifier for the detection of hydrazine. The amperometric hydrazine sensor shows a very low detection limit of 8 nM with a high sensitivity of 7.5 μA μM\(^{-1}\)cm\(^{-2}\). The excellent analytical parameters of the F-CNF@Au/GCE modified electrode over the various related modified electrodes suggest that the electrode can be useful for use in trace level detection of hydrazine in several industrial and pharmaceutical applications.
Session 1

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

Afternoon on August 7, 2018 (Tuesday)

Time: 13:00~16:00

Venue: Chemical Engineering Hall (1st floor)-化学工程馆一楼

12 presentations-Topic: “Photocatalysis and Electroanalytical Chemistry”

Session Chair: Prof. Xiaoheng Liu and Prof. Kuo-Lin Huang

J4003 Presentation 3 (13:30~13:45)

Detection of Pesticide Residues (Fenitrothion) in Fruit samples based on Niobium Carbide@Molybdenum Nanocomposite: An Electrocatalytic Approach
Mani Govindasamy, Umamaheswari Rajaji, Shen-Ming Chen, Tse-Wei Chen
National Taipei University of Technology, Taipei, Taiwan

Abstract—We have reported an effective electrochemical sensor for assorted pesticide (i.e., Fenitrothion). Exact tracking of these pesticides has become more important for protecting the environment and food resources owing to their high toxicity. Hence, the development of compatible sensors for the real-time detection of pesticides is imperative to overcome practical limitations encountered in conventional methodologies. In this regard, the role of the novel, advanced functional materials such as niobium carbide (NbC) supported on molybdenum nanoparticles (NbC@Mo) has drawn great consideration in conventional sensory systems because of their numerous advantages over other nanomaterials. The nanocomposite was characterized by XRD, XPS, HR-TEM, and EIS. Under optimized working conditions, the modified electrode NbC@Mo/SPCE responds linearly as 0.01–1889 μM concentration range and the detection limit is 0.15 nM. Most importantly, the method was successfully demonstrated in fruit samples.
Session 1

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

Afternoon on August 7, 2018 (Tuesday)

Time: 13:00~16:00

Venue: Chemical Engineering Hall (1st floor)-化学工程馆一楼

12 presentations-Topic: “Photocatalysis and Electroanalytical Chemistry”

Session Chair: Prof. Xiaoheng Liu and Prof. Kuo-Lin Huang

J4004 Presentation 4 (13:45~14:00)

Ultra-sensitive electrochemical sensors for simultaneous determination of hydrazine and hydroxylamine based on Au@QCR-carbon aerogels nanocomposites

Rajkumar Chellakannu, Shen-Ming Chen
National Taipei University of Technology, Taipei, Taiwan

Abstract—Ultra-Sensitive electrochemical sensors were fabricated with carbon aerogels-supported Au@QCR (Au@QCR-CAs) nanocomposites by sol–gel like processes and hydrothermal synthesis for simultaneous determination of hydrazine (HZ) and hydroxylamine (HA) with low detection limits and wide concentration ranges. From the Au@QCR-CAs modified SPC electrodes, well-separated oxidation peaks and enhanced peak currents of HZ and HA were observed owing to the superior conductivity of CAs and the excellent catalytic activity of Au@QCR nanoparticles. Various kinetic parameters such as transfer electron number, transfer proton number and standard heterogeneous rate constant were calculated, and various experimental parameters were also optimized. Furthermore, the fabricated sensors were applied to the detection of HZ and HA in real samples analysis. The Au@QCR-CAs nanocomposites have promising applications in highly sensitive and selective electrochemical sensing.
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**Afternoon on August 7, 2018 (Tuesday)**

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**12 presentations-Topic:** “Photocatalysis and Electroanalytical Chemistry”

**Session Chair:** Prof. Xiaoheng Liu and Prof. Kuo-Lin Huang

**J4005 Presentation 5 (14:00~14:15)**

One-step green synthesis of colloidal gold nano particles: a potential electrocatalyst towards high sensitive electrochemical detection of methyl parathion in food samples.

**Paramasivam Balasubramanian,** T.S.T. Balamurugan, Shen-Ming Chen
National Taipei University of Technology, Taipei, Taiwan

**Abstract**—A straightforward green fabrication of electrochemical assay for high sensitive quantitative detection of methyl parathion (organophosphate pesticide) via colloidal gold nanoparticles (AuNPs) modified glassy carbon electrode. Methyl parathion is widely known for its unpleasant functions in bio and ecological system. The synthesis utilizes tannic acid as a bi-functional reducing cum stabilizing agent under ambient temperature (25 °C). The colloidal TA@AuNPs were characterized through TEM, UV-vis, X-ray diffraction, and FT-IR spectroscopy. Fabricated TA@AuNPs/GCE assay has superior electrocatalytic activity toward MP in terms of a wide dynamic range (0.033 – 167.7 µM), and lower limit of detection (10.5 nM). In addition, the sensor displayed high selectivity, good reproducibility and stability. The practicality of fabricated electrode was verified through the determination of MP in various food and water samples.
**Session 1**

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**Afternoon on August 7, 2018 (Tuesday)**

Time: 13:00~16:00

Venue: Chemical Engineering Hall (1st floor)-化学工程馆一楼

12 presentations-Topic: “Photocatalysis and Electroanalytical Chemistry”

Session Chair: Prof. Xiaoheng Liu and Prof. Kuo-Lin Huang

J4007 Presentation 6 (14:15~14:30)

A new type of terbium diselenide nano octagon integrated oxidized carbon nanofiber: An efficient electrode material for electrochemical detection of morin in food sample

Ramaraj Sukanya, Mani Sakthivel, Shen-Ming Chen
National Taipei University of Technology, Taipei, Taiwan

**Abstract**—A new type of terbium diselenide (Tb2Se2) was prepared in nano octagon structure and integrated with oxidized carbon nanofiber (f-CNf) by using a simple hydrothermal technique. The oxidation of CNf and the formation of f-CNf/Tb2Se2 nanocomposite were studied by using various analytical techniques such as TEM, FT-IR, Raman, XRD and XPS analysis. In addition, the electrochemical properties of f-CNf/Tb2Se2 nanocomposite modified glassy carbon electrode (GCE) were studied by using the electrochemical techniques such as CV and DPV techniques, which showed low charge transfer resistance ($R_{ct} = 7.26 \Omega$) and high active surface area ($A = 0.113 \text{ cm}^2$). Meanwhile, the CV of ferrocyanide at this electrode showed a low peak potential separation ($\Delta E_p = 0.060 \text{ V}$). Furthermore, the reported f-CNf/Tb2Se2/GCE exhibits excellent electrochemical activity towards the detection of morin. As expected, f-CNf/Tb2Se2/GCE exhibited high sensitivity ($1.07 \mu \text{A \mu M}^{-1} \text{ cm}^{-2}$) and acceptable detection limit ($0.6 \mu \text{M}$) of morin. In addition, f-CNf/Tb2Se2/GCE was found with feasible selectivity, stability, and reproducibility. Finally, the real sample analysis also stated the exclusive performance of f-CNf/Tb2Se2/GCE electrode towards the detection of morin in guava leaves extract.
Session 1

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Venue: Chemical Engineering Hall (1st floor)-化学工程馆一楼

12 presentations-Topic: “Photocatalysis and Electroanalytical Chemistry”

Session Chair: Prof. Xiaoheng Liu and Prof. Kuo-Lin Huang

J4008 Presentation 7 (14:30~14:45)

An Innovative Strategy for the Simultaneous Determination of Anti-cancer Drug Flutamide and Environmental Pollutant 4-Nitrophenol Based on Novel Carbon black and β-Cyclodextrin Nanocomposite

Rajalakshmi Sakthivel, Shen-Ming Chen
National Taipei University of Technology, Taipei, Taiwan

Abstract—The similar nitroaromatic compounds are interfering with each other that affect the selectivity of the sensor. On the other hand, the electrochemical detection of the nitroaromatic compounds mainly depends on the reduction of nitro group. Hence, the researchers are interested to develop a simple and high performance electrochemical sensor for the determination of nitroaromatic compounds. In this present work, the simultaneous determination of nitroaromatic compounds in aqueous solution was demonstrated at CB/β-CD modified screen-printed carbon electrodes. The poor solubility of CB in water and other common solvents affects the electrochemical performance of the sensor, biosensor and energy storage applications. The conventional covalent approach such as acid treatment and other chemical methods are using the hazardous chemicals, which causes the problems of corrosion and environmental pollution. Hence, the non-covalent approach was used in this work using environmental friendly β-CD as a dispersing agent. The β-CD improves the solubility of CB and forms a new material without affecting the unique properties of CB and β-CD. The electrochemical performance of the proposed sensor was relies the conductivity of the CB, different binding strengths of the guests (Flut & 4-NP) to the β-CD host and different reduction potentials of the nitroaromatic compounds. These synergistic effects of the CB/β-CD nanocomposites successfully applied for the simultaneous determination of anti-cancer drug Flut and environmental pollutant 4-NP. Fascinatingly, the proposed sensor exhibits the excellent electrochemical performance with the high selectivity and reproducibility. The wide linear ranges about 0.05 to 158.3 µM for Flut and 0.125 to 225.8µM for 4-NP was obtained. On the other hand, the low detection limit of 0.016 and 0.040µM was achieved for the determination of Flut and 4-NP, respectively. Moreover, the practical feasibility of the proposed sensor was studied in tap water and human serum samples.
Session 1

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Afternoon on August 7, 2018 (Tuesday)

Time: 13:00~16:00

Venue: Chemical Engineering Hall (1st floor)-化学工程馆一楼

12 presentations-Topic: “Photocatalysis and Electroanalytical Chemistry”

Session Chair: Prof. Xiaoheng Liu and Prof. Kuo-Lin Huang

J4018 Presentation 8 (14:45~15:00)

A new electrochemical sensor for highly sensitive and selective detection of nitrite in food samples based on sonochemical synthesized Calcium Ferrite (CaFe$_2$O$_4$) clusters modified screen printed carbon electrode

Ramki Settu, Paramasivam Balasubramanian, Shen-Ming Chen
National Taipei University of Technology, Taipei, Taiwan

Abstract—Herein, we report a novel, disposable electrochemical sensor for the detection of nitrite ions in food samples based on the sonochemical synthesized orthorhombic CaFe$_2$O$_4$ (CFO) clusters modified screen printed electrode. As synthesized CFO clusters were characterized by scanning electron microscopy (SEM), X-ray diffraction (XRD), Fourier transformer infrared spectroscopy (FT-IR), Thermogravimetric analysis (TGA), X-ray photoelectron spectroscopy (XPS), electrochemical impedance spectroscopy (EIS), cyclic voltammetry (CV) and amperometry (i-t). Under optimal condition, the CFO modified electrode displayed a rapid current response to nitrite, a linear response range from 0.016 – 1921 µM associated with a low detection limit 6.6 nM. The suggested sensor also showed the excellent sensitivity of 3.712 µA µM$^{-1}$ cm$^{-2}$. Furthermore, a good reproducibility, long-term stability and excellent selectivity were also attained on the proposed sensor. In addition, the practical applicability of the sensor was investigated via meat samples, tap water and drinking water, and showed desirable recovery rate, representing its possibilities for practical application.
Session 1

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12 presentations-Topic: “Photocatalysis and Electroanalytical Chemistry”

Session Chair: Prof. Xiaoheng Liu and Prof. Kuo-Lin Huang

J4019 Presentation 9 (15:00~15:15)

Synthesis and Fabrication of Novel Grass-like Vanadium Disulphide: An Efficient Non-Enzymatic Electrochemical Sensing Platform for Hydrogen Peroxide

R. Karthik, J. Vinoth Kumar, Shen-Ming Chen, P. Sundaresan
National Taipei University of Technology, Taipei, Taiwan

Abstract—Synthesis and fabrication of novel and resourceful nanostructured inorganic material for low level detection of food preservative chemicals is grown on major concern to the research. Herein, we developed a novel grass-like vanadium disulphide (VS₂) through simple refluxion environment without using any other surfactants or templates and utilized as an electrocatalyst for the detection of hydrogen peroxide (H₂O₂). The crystalline nature, surface morphology, elemental compositions and their valance states of the as-prepared VS₂ were meticulously investigated by X-ray diffraction (XRD), Raman, field-emission scanning electron microscopy (FE-SEM), energy-dispersive X-ray spectroscopy (EDX) and X-ray photoelectron (XPS) spectroscopy studies. Interestingly, the grass-like VS₂ modified glassy carbon electrode (GCE) portrays superior electrocatalytic activity in terms of higher cathodic peak current and lower cathodic peak potential when compared to the unmodified GCE. Furthermore, the grass-like VS₂/GCE displayed wide linear response ranges (0.1-260 μM), well sensitivity (0.23 μA μM⁻¹cm⁻²), lower detection limit (29 nM) and excellent selectivity even in the existence of potentially co-interfering substances for the H₂O₂ sensing. Most interestingly, the grass-like VS₂/GCE showed proficient sensing ability in milk and urine samples with appreciable recoveries, which manifests its real-time practical applicability in food contaminants.
Session 1

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Afternoon on August 7, 2018 (Tuesday)

Time: 13:00~16:00

Venue: Chemical Engineering Hall (1st floor)-化学工程馆一楼

12 presentations-Topic: “Photocatalysis and Electroanalytical Chemistry”

Session Chair: Prof. Xiaoheng Liu and Prof. Kuo-Lin Huang

J4013 Presentation 10 (15:15~15:30)

A Raspberry Shaped Strontium Tungstate Decorated on Reduced Graphene Oxide Sheets for the Effective Detection of Pyro-Catechol.

Shaktivel Manavalan and Sheng-Ming Chen  
National Taipei University of Technology, Taipei, Taiwan

Abstract—Modern approaches have been received great interest for the detection of environmental pollutant i.e. pyro-catechol (PCT). On this approaches, here a raspberry like strontium tungstate decorated on reduced graphene oxide nanosheets (SrWO$_4$@rGOSs) was prepared using a folic acid as reducing agent via hydrothermal method. The yield (SrWO$_4$@rGOSs) was well morphologized by X-ray diffraction (XRD), Raman spectroscopy, Field Emission Scanning Electron Microscopy (FESEM), Energy Dispersive X-Ray (EDX), and Electrochemical Impedance Spectroscopy (EIS). Further, the electrochemical signal of PCT was visualized by cyclic voltammetry (CV) and Amperometric (i-t) instruments using a screen printed multi carbon electrode (SPME). An excellent sensivity and selectivity of PCT was obtained from the electro-catalyst (rGOSs@SrWO$_4$) with linear range (0.025-105.4.01 $\mu$M) and detection of limit (5.26 nM). The practicality of the catalyst for the detection of PCT was analyzed in green tea and drinking water.
Session 1

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12 presentations-Topic: “Photocatalysis and Electroanalytical Chemistry”

Session Chair: Prof. Xiaoheng Liu and Prof. Kuo-Lin Huang

J2005 Presentation 11 (15:30~15:45)

An effect-analysis method for species-dependent coral health status in temperature and ammonia: a case study of Acropora sp., Turbinaria sp., and Porites sp.

U Bussapakorn, C Petchporn and R Sompop
Chulalongkorn University, Bangkok 10330, Thailand

Abstract—This research aimed to study the effects of temperature and ammonia on the health status of Acropora sp., Turbinaria sp., and Porites sp. by using acute toxicity testing (50% Lethal Concentration: LC50). The acute effects were monitored at temperatures of 30°C and 33°C at 24 and 48 hrs. The concentrations of ammonia varied at 0 0.05 0.07 and 0.1 mgN/L, respectively. The active polyp percentages of Acropora sp. was analyzed with comparison to the health status percentages. According to the findings at 30°C (24 and 48 hrs) and 33°C (24 hrs), the LC50 could not be investigated because the mortality percentages was not below 50%. On the other hand, at 33°C (48 hrs), the LC50 could be evaluated because the mortality percentages exceeded 50%. Therefore, the LC50 at 48 hrs of Acropora sp., Turbinaria sp., and Porites sp. were equal to 0.043, 0.075 and 0.054 mgN/L, respectively.
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12 presentations-Topic: “Photocatalysis and Electroanalytical Chemistry”

Session Chair: Prof. Xiaoheng Liu and Prof. Kuo-Lin Huang

J3001 Presentation 12 (15:45~16:00)

Increase in contaminants: Challenges to Arctic Ocean marine environment and governance
Kamrul Hossain
Northern Institute for Environmental and Minority Law / Arctic Centre, University of Lapland, Finland

Abstract—Spanning a total of approximately fourteen million square kilometers (about 5.4 million square miles), the Arctic Ocean is regarded as one of the most sensitive marine ecosystem on earth. The implication of climate change – the effect of which is two to three times higher in the Arctic than the global average – brings devastating consequences for the maintenance of sustainable Arctic marine eco-system services because of number of factors mainly driven by the increased melt of sea ice. The Arctic Ocean is today more open and increasingly accessible for varieties of human activities including resource extractions, commercial shipping, tourism etc. Once pristine, the Arctic Ocean is today growingly attracting contaminants both because of increased human activities and due to the natural flow of pollutants as open water facilitates such movements. Against this background, this presentation explores the challenges related to the presence and introduction of pollutants, including increase in marine litters in the Arctic Ocean, which result in disturbing effects on its unique marine biodiversity. In this context, the presentation also investigates how the aforementioned challenges are particularly addressed in the Arctic Ocean marine environmental governance regime – what gaps are there, if any?
**Session 2**

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**Afternoon on August 7, 2018 (Tuesday)**

**Time:** 16:15~19:00

**Venue:** Chemical Engineering Hall (1st floor)-化学工程馆一楼

11 presentations-Topic: “Bioelectrochemical Analysis and Pathobiology”

**Session Chair:** Prof. Bih-Show Lou

**J4002 Presentation 1 (16:15~16:30)**

Facile synthesis of 3D urchin like cerium vanadate interconnected with carbon nanofiber scaffold for the electrochemical detection of prostate anti-cancer drug nilutamide

**Dr. T. Kokulnathan** and Dr. Shen-Ming Chen
National Taipei University of Technology, Taipei, Taiwan

*Abstract*—Highly sensitive and selective electrochemical sensors that can detect anti-cancer drug at ultra-low levels in early stages are urgently needed to reduce mortality risks. A facile and efficient sonochemical method has been used to prepare cerium vanadate/carbon nanofiber (CeVO$_4$/CNF) nanocomposites. The characterization techniques such as X-ray diffraction, Raman spectra, X-ray photoelectron spectroscopy, field emission scanning electron microscopy, energy dispersive X-ray spectroscopy, elemental mapping were used to analysis the as-synthesised nanocomposites. The as-synthesized CeVO$_4$/CNF was applied towards the electrochemical determination of nilutamide (Nil). The cyclic voltammetry and differential pulse voltammetry measurements were performed to monitor the electrochemical behavior. The electrochemical experimental results suggested that the CeVO$_4$/CNF modified GCE showed an excellent activity and a good linear range under optimal conditions. Additionally, the CeVO$_4$/CNF modified GCE was also showed excellent stability, favorable selectivity, reproducibility and satisfactory accuracy for Nil detection in real samples. The good analytical performance of the CeVO$_4$/CNF modified electrode makes it a promising tool for the efficient, cost-effective and convenient detection of Nil in clinical application.
Session 2

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Afternoon on August 7, 2018 (Tuesday)

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Venue: Chemical Engineering Hall (1st floor)-化学工程馆一楼

11 presentations-Topic: “Bioelectrochemical Analysis and Pathobiology”

Session Chair: Prof. Bih-Show Lou

J4006 Presentation 2 (16:30~16:45)

One-pot synthesis of three-dimensional Mn₃O₄ micro cubes for high-level sensitive detection of head and neck cancer drug

Rajaji Umamaheswari, Muthumariappan Akilarasan, Shen-Ming Chen, Yi-Hui Cheng, Veerappan Mani, Sakthivel Kogularasu
National Taipei University of Technology, Taipei, Taiwan

Abstract—We described a three-dimensional Mn₃O₄ microcubes (3D–Mn₃O₄MCs) synthesized via a facile hydrothermal route for the determination of nimorazole (NMZ), an important drug that used in the treatment of head and neck cancer. The 3D–Mn₃O₄ MCs possess large active area and high conductivity, and 3D–Mn₃O₄ MCs film modified screen-printed carbon electrode (3D–Mn₃O₄MCs/SPCE) was fabricated which displayed excellent electro catalytic ability towards NMZ. Under optimized working conditions, the modified electrode responded linearly to NMZ in the 0.025–8060 µM concentration range and the detection limit was 6 nM. A rapid, sensitive, selective, reproducible, and durable sensor was described. The practical feasibility of the sensor was demonstrated in human serum and NMZ tablet samples. The obtained results revealed the potential real-time applicability of the sensing device in biological analysis and pharmaceutical formulations.
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Afternoon on August 7, 2018 (Tuesday)
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Venue: Chemical Engineering Hall (1st floor)-化学工程馆一楼
11 presentations-Topic: “Bioelectrochemical Analysis and Pathobiology”
Session Chair: Prof. Bih-Show Lou

J4009 Presentation 3 (16:45~17:00)
Carbon supported Olivine type phosphate framework: a promising electrocatalyst for sensitive detection of dopamine
Raja Nehru and Sheng-Ming Chen
National Taipei University of Technology, Taipei, Taiwan

Abstract—In this study, layered Olivine-type LiMnPO4/functionalized-multiwall carbon nanotubes (f-MWCNTs) composite is used as an electrochemically active material for the real-time detection of dopamine. A wet-chemical ultrasonication process is used to combine LiMnPO4 with f-MWCNTs at room temperature. The composite was subjected to various structural, morphological and electrochemical study. The blending of olivine-type LiMnPO4 into the f-MWCNTs is revealed by TEM analysis. The electrochemical activities of LiMnPO4/f-MWCNTs composite are systematically investigated using cyclic voltammetry (CV) and differential pulse voltammetry (DPV) for the real-time detection of dopamine. Furthermore, the applicability of as prepared LiMnPO4/f-MWCNTs composite was extended for the detection of Human serum (E48) and Rat brain-serum (C7) samples with satisfactory recoveries for the real-time applications. All these studies revealed that the Layered Olivine-type LiMnPO4/f-MWCNTs composite is a potential candidate in the field of electrochemical sensing.
Session 2

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11 presentations-Topic: “Bioelectrochemical Analysis and Pathobiology”

Session Chair: Prof. Bih-Show Lou

J4012 Presentation 4 (17:00~17:15)

One-Pot Biosynthesis of Reduced Graphene Oxide/Prussian Blue Microcubes Composite and Its Sensitive Detection of Prophylactic Drug Dimetridazole

Murugan Keerthi, Shen-Ming Chen
National Taipei University of Technology, Taipei, Taiwan

Abstract—Herein, a robust novel electrochemical sensor for the detection of prophylactic drug Dimetridazole (DMZ) has been developed eco-friendly through the green synthesis of reduced graphene oxide/Prussian blue microcubes (rGO/PB MCs), and the fabrication was economically done by efficient screen-printed carbon electrode (SPCE) modification method. It is critical as DMZ excess level in poultry farm imposes carcinogenic threats. A responsive, reproducible and long-lasting DMZ sensor was established using the material composed of Prussian blue microcubes encapsulated by thin sheets of reduced graphene oxide (rGO/PB MCs). The rGO/PB MCs composite is prepared through a facile hydrothermal approach, and its elemental, structural, electrochemical and catalyzing abilities are examined. The composite is fabricated on the SPCE, and the resulting improved electrode showed outstanding electrocatalytic ability toward DMZ and the reduction peak current are correlated to the DMZ concentrations. It retains the more extensive working range between 0.02 μM and 1360.1μM and the detection limit reaches 3.2 nM. It also possesses appreciable sensitivity of 2.2935 μAμM⁻¹cm⁻².
Session 2

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Afternoon on August 7, 2018 (Tuesday)

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11 presentations-Topic: “Bioelectrochemical Analysis and Pathobiology”

Session Chair: Prof. Bih-Show Lou

J4014 Presentation 5 (17:15~17:30)

Facilely Sensitive Electrochemical Detection of Hydrogen Peroxide in Human Whole Blood samples on Cadmium-Based Metal–Organic nanosheets

Tse-Wei Chen, Dr. Shen-Ming Chen
National Taipei University of Technology, Taipei, Taiwan

Abstract—Herein, the synthesis of novel cadmium-based metal–organic framework (CMOF) \([\text{Cd}_2(\text{Hpybim})_2(\text{ipa})_2(\text{H}_2\text{O})_2]_n\) nano-sheets and its application towards selective electro-catalytic reduction of hydrogen peroxide were described. Initially, CMOF nano-sheets was synthesized by one-step hydrothermal approach and the compound’s composition as well as the structure were deliberately explained by numerous characterizations. Finally, the CMOF nano-sheets underwent with direct non-enzymatic electrochemistry and succeeded. The significance of CMOF nano-sheets together with good electro-catalytic property leads to the versatile platform for electrochemical sensors. Moreover, CMOF nano-sheets was fabricated and validated as an enzyme-free biosensor for the sensitive detection of \(\text{H}_2\text{O}_2\). The demonstrated sensor revealed exceptional determination of \(\text{H}_2\text{O}_2\) with the lowest detection limit of 10.4 nM and also it offered moral analytical factors with wide linear range and excellent sensitivity and high sensitivity. Likewise, the non-enzymatic biosensor annexes good durability, reproducibility and selectivity towards the determination of \(\text{H}_2\text{O}_2\). Additionally, the nourishing capacity of the prepared CMOF nanosheets was exploited for the enzyme free detection of \(\text{H}_2\text{O}_2\) in human blood serum.
Session 2

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11 presentations-Topic: “Bioelectrochemical Analysis and Pathobiology”

Session Chair: Prof. Bih-Show Lou

J4010 Presentation 6 (17:30~17:45)

A Green Approach to the Synthesis of Well-Structured Prussian Blue Cubes for the Effective Electrocatalytic Reduction of Antiprotozoal Agent Coccidiostat Nicarbazin

Sakthivel Kogularasua, Muthumariappan Akilarasana and Shen-MingChen
National Taipei University of Technology, Taipei, Taiwan

Abstract—For the first time, a robust electrochemical sensor to detect the coccidiostat nicarbazin (NCZ) is developed through the green synthesis of Prussian blue cubes from Volvariella volvacea (paddy straw mushroom)extract. Recently, numerous articles were reported about the issue that the prophylactic drugs were injected excessively as a feed additive for fattening the chickens in short period. It is a significant concern that the level of coccidiostat NCZ exceeds the residue limits in the tissues of the meat; mainly, in chicken and eggs. Therefore, it is crucial to develop a sensitive, reproducible and long-lasting sensor for the real-time detection of NCZ. Thus, we have generated an electrochemical sensor through the economic screen-printed carbon electrode (SPCE) modification method. Eco-friendly Prussian blue cubes are fabricated on the carbon film of SPCE. As a result, the modified electrode showed exceptional electrocatalytic ability towards NCZ and the reduction peak currents are correlated to the concentrations of NCZ. It retains the more extensive working range between $1.253 \times 10^{-7}$ to $1.533 \times 10^{-3}$ molL$^{-1}$, and it possesses a very low limit of detection as well as the appreciable sensitivity. This method is successfully applied to the recognition of NCZ in the samples of chicken meat and eggs.
Session 2

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Afternoon on August 7, 2018 (Tuesday)

Time: 16:15~19:00

Venue: Chemical Engineering Hall (1st floor)-化学工程馆一楼

11 presentations-Topic: “Bioelectrochemical Analysis and Pathobiology”

Session Chair: Prof. Bih-Show Lou

J4011 Presentation 7 (17:45~18:00)

Effects of annealing temperature on crystal structure and glucose sensing properties of cuprous oxide

Muthumariappan Akilarasana, Sakthivel Kogularasua, Shen-MingChen
National Taipei University of Technology, Taipei, Taiwan

Abstract—The diabetes mellitus was reported as one of the leading reasons for death around the world. Consequently, most of the researches were ardent to the detection of blood sugar level. Therefore, the morphology, as well as the sensing properties of renowned materials, should have optimized and engineered for higher sensitivity towards glucose. For the first time, an extensively utilized active component of a glucose sensor, cuprous oxide (Cu2O) is synthesized and dealt with various annealing temperatures at 400, 600, and 800 °C. The impacts of annealing temperatures on morphology, electro-active surface area, and the glucose sensing properties of cuprous oxides are investigated and spotted that, 600 °C is an effective annealing temperature. Then, we developed an electrochemical biosensor through the economic SPCE modification method. As a result, the modified electrode showed exceptional electrocatalytic ability towards glucose and the anodic peak current is correlated with the concentrations of glucose. It obtained more extensive working range between 31 nM and 1423 μM and with very low detection limit and appreciable sensitivity. This method is successfully applied to the recognition of glucose level in the samples of human blood serum and whole blood.
Session 2

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Afternoon on August 7, 2018 (Tuesday)

Time: 16:15~19:00

Venue: Chemical Engineering Hall (1st floor) - 化学工程馆一楼

11 presentations - Topic: “Bioelectrochemical Analysis and Pathobiology”

Session Chair: Prof. Bih-Show Lou

J4015 Presentation 8 (18:00~18:15)

A novel synthesis of non-aggregated spinel nickel ferrite nanosheets for developing non-enzymatic reactive oxygen species sensor in biological samples

Shih-Hao Lin, Mani Govindasamy, Dr. Shen-Ming Chen
National Taipei University of Technology, Taipei, Taiwan

Abstract—Herein, the synthesis of novel non-aggregated spinel nickel ferrite, NiFe₂O₄ nanosheets (NiFe₂O₄ NSs) and its application towards the selective electrocatalytic reduction of hydrogen peroxide are described. Initially, NiFe₂O₄ NSs is synthesized by one-step hydrothermal approach, and numerous characterizations deliberately explain the compound's composition and structure. Finally, the NiFe₂O₄ NSs underwent direct non-enzymatic electrochemistry and succeeded, it as mimicking Horseradish Peroxidase properties. The significance of non-aggregated NiFe₂O₄ NSs together with good electrocatalytic properties leads the material to the platform for electrochemical sensors. Moreover, NiFe₂O₄ NSs is fabricated and validated as an enzyme-free biosensor for the sensitive detection of H₂O₂. The demonstrated sensor revealed excellent detection of H₂O₂ with the pico-molar detection limit (12.4 pM), and also it offered good analytical parameters with more extensive linear range and higher sensitivity. Likewise, the non-enzymatic biosensor annexes good durability, reproducibility, and selectivity towards the determination of H₂O₂. Due to the nourishing capacity of the prepared NiFe₂O₄ NSs, it is employed for the enzyme-free detection of H₂O₂ in human blood and rat brain serum samples.
Session 2

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Afternoon on August 7, 2018 (Tuesday)

Time: 16:15~19:00

Venue: Chemical Engineering Hall (1st floor)-化学工程馆一楼

11 presentations-Topic: “Bioelectrochemical Analysis and Pathobiology”

Session Chair: Prof. Bih-Show Lou

J4016 Presentation 9 (18:15~18:30)

Effect of Mediator on Self-Assembled Monolayer (SAM) Modified Biosensor for Glucose Monitoring

TATA Sanjay Kanna Sharma, Karuppaiah Palpandi, Murugan Velumurugan, Kuo-Yuan Hwa
National Taipei University of Technology, Taipei, Taiwan

Abstract—Functionalization of metal surface for designing biosensor has been a challenge for the past two decades. By developing ordered organic films, ranging from single nm to several hundred nm thickness using self-assembled monolayer (SAM)- techniques have been implemented. And, we had deployed successfully the glucose oxidase (GOx) enzyme with SAM technology, which was published previously. With this presentation, data on the concentration of selected molecule (i.e. glucose) and time-effect were tested. Both aliphatic and aromatic enactments of redox cation were tested on the SAM-modified AuEs. The response of our SAM system was evaluated in presence of mediators as that hydroquinone was added either within or with external addition to the SAM-system. The results confirmed that the mediator leached from electrode surface can affect the enzyme long time performance as the electrochemical activity was suppressed when hydroquinone was added. Cross-linking of mediator with the SAM-system is under tested.
Session 2

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

Afternoon on August 7, 2018 (Tuesday)

Time: 16:15~19:00

Venue: Chemical Engineering Hall (1st floor)-化学工程馆一楼

11 presentations-Topic: “Bioelectrochemical Analysis and Pathobiology”

Session Chair: Prof. Bih-Show Lou

J0005 Presentation 10 (18:30~18:45)

Effects of human cathelicidin LL-37 on SW982 cell line – an in vitro model to study the pathogenesis of rheumatoid arthritis

Chakkrapong Kuensan, Siriwadee Chomdej, Siriwan Ongchai, Korakot Nganvongpanit
Chiang Mai University, Muang, Chiang Mai, Thailand

Abstract—Rheumatoid arthritis (RA) is a complex autoimmune disorder with unknown exact causes and cure. The main characteristic of RA is the chronic inflammation of joints. Our goal is to understand the effects of LL-37, the only human cathelicidin-family anti-microbial peptide, on the pathogenesis of RA. LL-37 was reported to interact with invading pathogens and cause inflammation at various sites of body. SW982, a human synovial sarcoma cell line, was used as a model to study the pathobiology of RA. The cells were treated with LL-37 and, then, mechanisms related to RA – hyaluronan (HA) metabolism, inflammation, apoptosis resistance and migration, were examined. LL-37 was found to significantly increase HA levels in culture medium after 72-hr treatment. Alteration in gene expression was found at 6 hr in hyaluronan synthase 3 (HAS3), hyaluronidase 1 (HYAL1) and CD44 genes. Genes involved in inflammation, such as IL6 and IL17A, were also found to be upregulated at 3 hr. However, we found that LL-37 alone did not induce migration or apoptosis resistance in SW982 cells. To our knowledge, we are the first to address the regulation of HA by this anti-microbial peptide, LL-37.
Session 2

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

Afternoon on August 7, 2018 (Tuesday)

Time: 16:15~19:00

Venue: Chemical Engineering Hall (1st floor)-化学工程馆一楼

11 presentations-Topic: “Bioelectrochemical Analysis and Pathobiology”

Session Chair: Prof. Bih-Show Lou

J3002 Presentation 11 (18:45~19:00)

Biological Hydrogen Production from Amphora sp. Isolated from Eastern Coast of Thailand

Witawat Jangiam, P Tongtubtim and M Penjun
Burapha University, Thailand

Abstract—The world is finding ways of producing fuel from many sources to replace the fossil fuels. Hydrogen is considered one of the most promising fuels for the future. One biological way of producing hydrogen from solar energy is using photosynthetic microorganisms. The objective of this study is to search for marine algae which produce hydrogen and study the appropriate conditions to produce hydrogen from marine algae. Firstly, the 5 strains of algae were studied the total gas production. Amphora sp. was selected and studied the appropriate conditions to produce hydrogen gas. The first condition, we studied the important factors for marine algae which were present and absent sulfur. The second condition was to find the suitable pH for producing hydrogen which were pH 7, pH 8 and pH 9. The last condition, we studied the optimal light intensity which were 481, 1075 and 2085 lux. The result showed that Amphora sp. can produce hydrogen gas in present sulfur media, pH 8 and light intensity 2085 lux in volume 495.3 ml per 1 L of algae or the average rate of produce hydrogen is 0.798 ml per g of algae per hour.
Study on Characteristics of Leaching of Hazardous Substances Produced from Water Supply Pipes

Si-Young Kim, Dong-Choon Ryu, Gyeong-Sim Lee
Busan Water Quality Institute, Republic of Korea

Abstract—This study investigated the characteristics of changes in drinking water quality standards according to the leaching period lapse after filling with tap water in seven new water supply pipes without water flow for up to 90 days as an extreme condition and by completely sealing the pipes. Except for the pH after the maximum 90-day leaching period lapse, the seven types of new water supply pipes satisfied the drinking water quality standards. Bisphenol-F was detected from the epoxy-coated ductile cast iron pipe after three days (0.038 µg/L) and this leached up to 1.773 µg/L after 90 days. Bisphenol-A was detected in the three-layer polyethylene-coated steel pipe after three days (6.383 µg/L) and this leached up to 19.993 µg/L after 90 days. There are no drinking water standards for bisphenols in Korea, and the recommended standard for bisphenol-A in Japan is 100 µg/L or lower. The impact of bisphenols is regarded as minimal, as no bisphenol-A or F were detected quarterly in tap water from four purification plant systems and raw and treated water.
Assessment of Old Water Pipe Status in Actual Drinking Water Pipe Network

Soo Wan Im, In Soo Kim, Do Hwan Kim
Busan Water Authority, Republic of Korea

Abstract—The internal corrosion of water pipe has increased as time passed. Also, the cross-sectional areas in pipe are reduced by the rust, deposits and tubercles. It is the water supply ability decreases as the increase of hydraulic pump capacity is required to supply an amount of water, such as the initial condition. If problems occur, it should be able to respond rapidly and make an accurate estimate. In Korea, replacement and rehabilitation of aging drinking water pipes are carried out based on the circumstances of simply buried years. So, water distribution system management may not consider the entire water pipeline network.

In this study, the thickness of the old water pipes, corrosion levels of the inner and outer surface for water pipes, basic data research (i.e. pipe types, buried years, accident record, embedded environment, etc.), specific resistance of soil, ultimate tensile strength and elongation of metal pipes, samples characteristics, and chemical composition analysis were performed about aging drinking water pipes. Samples of water pipes used in this study were cement mortar lining ductile cast iron pipe (CML-DCIP, diameter 100mm) and epoxy lining steel pipe (diameter 65 and 50mm). Buried years of CML-DCIP and epoxy lining steel pipe were respectively 32 and 23 years. The area of embedded environment was marine reclamation zone since 1940’s. The result of this study was that CML-DCIP needed replacement and epoxy lining steel pipe was still useful.
Visit and Tour

August 8, 2018 (Wednesday) 8:30~18:00

(Tip: Please arrive at the National Taipei University of Technology before 8:30 a.m. The following places are for references, and the final schedule should be adjusted to the actual notice.)

Visit in National Taipei University of Technology

8:30-9:00—Library
9:00-9:30—University and red building
9:30-10:00—lab

Tour in Taipei

10:30-12:30

The total distance measured from the entrance of the Yehliu Geopark（野柳女王頭）to the end of the cape is about 1.7 km; the widest area in between is shorter than 300 m. The distance measured from Yehliu Stop at Jijin Highway to the end of the cape is about 2.4km. The rock landscape of Yehliu Geopark is one of most famous wonders in the world. The costal line is stretching in a direction vertical to the layer and the structure line; besides, the influences caused by wave attack, rock weathering, earth movement and crustal movement all contribute to the formation of such a rare and stunning geological landscape.

12:30-13:30 Lunch

14:00-15:30

The lighthouse at Fugui Cape（富貴角燈塔與富基漁港）was built by the Japanese in 1897, painted black and white to be more visible in fogs. It was also equipped with a fog horn for warnings in thick fogs. The lighthouse marks the northernmost point of land of the island of Taiwan, and has been an important landmark. It has
been renovated, but its function of guiding ships remains. Standing firmly on the cape, it lights up the northern coast.

16:30-18:00

Tamsui Fisherman's Wharf is a scenic spot at the western tip of Tamsui District, New Taipei City, Taiwan. Its predecessor was the "Tamsui Second Fishing Port" on the right bank of the Tamsui River estuary, an important fishing harbor in the early history of north Taiwan. The Tamsui Fisherman's Wharf is well known by its beautiful sunset and fresh seafood. While having sightseeing and leisure facilities, it still holds its functionality as a harbor for fish.

18:00

Back to University
## Note

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Feedback Information
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**Please indicate your overall satisfaction with this conference with “√”**

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Yes–Absolutely □ Yes-But not to my full extent □ No □
(If “No”, please tell us the main reason)
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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!