2019 9th International Conference on Future Environment and Energy (ICFEE 2019)

January 9-11, 2019

Osaka, Japan

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Conference Venue

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Osaka Conference Introductions

Welcome to 2019 HKCBEES Osaka conference. This conference is organized by HKCBEES. The objective of the Osaka 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 Future Environment and Energy.

2019 9th International Conference on Future Environment and Energy (ICFEE 2019)

Papers will be published in the following conference proceeding:



IOP Conference Series: Earth and Environmental Science (EES) (ISSN: 1755–1315), and all papers will be indexed by EI Compendex, Scopus, Thomson Reuters (WoS), Inspec, et al.

Conference website and email: <u>http://www.icfee.org/; icfee@cbees.org</u>

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 10 Minutes of Presentation and 5 Minutes of Question and Answer

Keynote Speech: about **30** 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 Presentation will be selected from each presentation session, and the Certificate for Best Presentation will be awarded at the end of each session on January 9 and January 10, 2019.

Dress code

Please wear formal clothes or national representative of clothing.

Keynote Speaker Introductions

Keynote Speaker I



Prof. Orawan Siriratpiriya Chulalongkorn University (ARRIC), Thailand

RELATED EXPERIENCES

1.Working experience in environmental research as principal investigator, project director/ integrator/manager/coordinator, lecturer and thesis adviser at The Environmental Research Institute, Chulalongkorn University (1979-2014).

2.Expert in Environmental Impact Assessment (License) of Juristic Person 'Chulalongkorn University' (1991-present)

3.United Nations Environment Programme (UNEP) fellowship for International Leadership in Sustainable Environmental Management at Center for Environmental Management, Tufts University, Massachusetts, USA under "Intensive, International Post-Graduate Programme in Environmental Management" (1990).

4.Southeast Asia Programme Officer, The International START (HDP/IGBP/WCRP) Secretariat, Washington DC, USA (1994-1995). [START = Global Change System for Analysis, Research, and Trainning]

5. Thai National Expert for EIA/SEA (Environmental Impact Assessment/Strategic Environmental Assessment) guidelines development in the Mekong River Basin (2002-2003).

6.APRU Fellow, 5th APRU (Association of Pacific Rim Univ.).Fellow Program 2004 on Globalization and the Environment: Multidisciplinary Perspective" at Univ. of California Santa Barbara, Santa Barbara, USA. and Osaka University, Osaka, Japan. (2004)

7.Board member: Solid Waste Management Experts in Asia and Pacific Islands (SWAPI) (2005-present).

8.Board member (Environmental Expert): National Fertilizer Board of Thailand (2009-2014).

9. Editorial Board: Journal of Material Cycles and Waste Management (2010-present).

10.Member: Drafting Committee "State of the 3Rs in Asia and the Pacific", United Nations Centre for Regional Development (UNCRD) and Institute for Global Environmental Strategies (IGES) (2017).

Topic: 'Closed Materials Looped with Low Carbon Technologies to Sustainable Society'

Abstract— Achieving greenhouse gas emission targets of 80-95% below 1990 levels by 2050 requires a process of low carbon to be developed and deployed in the economy. Closed loop systems are conceptualization of integrated approach to manage entire life cycle of resources as a philosophy driven zero waste signified waste as a resource. Closed materials loops is at forefront of developing technologies about turning the materials recovered from any product into new products provided similar environmental quality and/or benefits. In addition, new and innovative low carbon technologies to reduce greenhouse gas emissions and create new employment and growth are involved. Besides, innovative technologies have to be deployed safely and managed their risks properly. The carbon capture and storage (CCS) which along with energy efficiency and renewable energy technologies, is expected to make an important contribution to meet global greenhouse gas emission targets. Moreover, the concept of using recycled materials to produce new products not only virtually eliminating the need for materials from natural resources but also need acceptance and interest of consumer to purchase. The direction to create a sustainable society utilized limited natural resources geared to bring up strategic industries development of waste minimization and utilization e.g. activate energy and material supply, nutrient elements for plant growth, carbon sequestration into the soil, capture CO_2 via photosynthesis and accumulation of CO_2 as carbon fixed in the plant biomass. Moreover, zero waste in the manner of materials can be used over and over again by returning organic waste to nature instead of being down cycled into lesser products, ultimately becoming waste. In addition, shifting in behavior, design, collaboration among stakeholders, logistic, and regulation are required significantly. It is necessary to study how to reorganizing living conditions, reappraising economic sectors, work practices, using science to develop new technologies, and adjustments in individual lifestyles underline people behavior is a heart of closed loop system that conserve natural resource lead to a sustainable society.

Keynote Speaker II



Prof. Ngai Weng Chan Universiti Sains Malaysia, Malaysia

Ngai Weng Chan is Professor of Water Resources Management at the Universiti Sains Malaysia in Penang, Malaysia. He is active in lecturing, research and publication, NGO work and consulting in the field of Hydrology, Climatology, Environment and Water Resources Studies. He has more than 40 years teaching experience, and has taught as a Visiting Professor at the Asian Institute of Technology (2006/2007), the University of Memphis, USA (2000/2001) and Yokohama City University (2014-2017). He was previously a Vice-President of the International Water Resources Association (2013-2015), and a Member of International Association of Hydrological Sciences, International Water Association and Association of American Geographers (2001-Present). He is active in civil society work related to water resources management, being President of Water Watch Penang (WWP) (1997-Present), Treasurer of Malaysian Environmental NGOs (2014-2016) and a member of Malaysian Water Partnership and Malaysian Water Association. He has completed more than 100 research/consultancy/community projects and published 29 Books, 98 Chapters in Books, and more than 100 professional papers in academic journals. He is often nicknamed "Malaysia's Waterman".

Topic: 'SUSTAINABLE URBAN DRAINAGE AS A VIABLE MEASURE OF COPING WITH HEAT AND FLOODS DUE TO CLIMATE CHANGE'

Abstract— Climate change is the most pervasive change currently affecting the human environment, especially in urban areas. Urban heat islands and urban flooding are the two most serious effects affecting cities worldwide. The 21st century is increasingly affected by both these hazards as global climate change caused by land use change and urbanisation intensify in cities. Cities are routinely affected by the impacts of heat and floods, but as climate change escalates, more severe heat and flood-related events are expected to occur. In order to reduce loss of lives and property damage, cities need to brace themselves by better coping and adaptation. More importantly, cities need to increase their resilience to face climate-related disasters from the perspectives of water, land, energy, food and environmental sustainability. As cities grow and encroach upon their hinterland, urban heat islands and flash floods are expected to intensify. For example, the larger the city, the larger is its heat island effect and the more devastating its floods. Almost every year, cities all over the world suffer from heat-related and flood-related disasters that account for a significant number of casualties, disease epidemics, property and crop damage and other intangible losses. This paper examines the incidence of heat islands and flood occurrence in urban areas, and looks at how cities (and its inhabitants) can adopt the best management methods and coping mechanisms to combat heat and floods and recover fast. The methodology is based on historical event analysis, literature review of heat and flood management and secondary data and reports from selected cities. The results indicate that heat and flood disaster preparedness and recovery in most cities are largely ineffective, disaster responses are largely reactive, and the roles of institutions weak. There is little legal and regulatory framework on combating heat and flood disasters. Consequently, results show that the incidence of heat islands and flood occurrence are both increasing in intensity in urban areas. However, results show that a viable method of heat and flood control in cities is via the adoption of sustainable urban drainage systems (SUDS). Cities using SUDS were found to cope very well with heat and floods. Overall, technical measures of flood management such as SUDS are found to be effective, affordable, aesthetically pleasing and socially acceptable. A holistic strategy combing technical SUDSs and non-technical human aspects of coping and resilience is the key towards effective management of floods in cities.



Coffee Break & Group Photo Taking	14.1014.25
(January 9)	14.10~14.25

Keynote Speaker III



Prof. Kondo Akira Osaka University, Japan

Prof. Kondo Akira was graduated from Faculty Engineering, Osaka University in 1982 and from Graduated School of Engineering, Osaka University in 1984. After that, he had worked in Matsushita Electric Industry (Panasonic) for 5 years. From 1989, he has been working in Osaka University as an assistant professor, associated professor and professor. He received PhD in 1999 and its thesis is "Study on development of numerical simulation model in order to mitigate urban atmospheric environment". He is researching on the environmental dynamics modeling in the wide ranges from global scale to indoor scale. Moreover he carried out the joint researches in South-East Asia; Nepal, Indonesia, Korea, China, Vietnam, and Thailand. Throughout these researches, he received the best paper award from The Society of Heating, Air Conditioning and Sanitary Engineering of Japan in 2010 and received the best paper award from the Society of Environmental Science of Japan in 2012. He is also the author of more than 90 peer-reviewed articles including articles written in Japanese, and 80 international conference papers with limited peer review.

Topic: 'Simulation in City Block Environment by CFD coupled with Meteorological and Air Quality Model'

Abstract— CFD (Computational Fluid Dynamic) is widely used for the simulation in the city block environment. As the lateral boundary conditions of the target domain of CFD simulation such as wind speed, wind direction, temperature, humidity and concentration of chemical substances continuously vary, it is relatively difficult to suitably determine them. Most CFD simulations are calculated by assuming the constant boundary conditions. The meteorological and air quality model can simulate the temporal and spatial distribution of wind speed, wind direction, temperature, humidity and concentration of chemical substances though the grid resolution is coarse and the geometry of the city block cannot be accurately represented. Setting the output from the meteorological and air quality model to the lateral boundary conditions of CFD, we can simulate the city block environment, which continuously varies, with the accurate geometry of the city block.

In this presentation, I introduce two applications of CFD coupled with meteorological and air quality model above mentioned. One application is the thermal environmental evaluation in city block with taking into account of evaporation from the water retained pavement. Also I introduce about vapor, water and heat transport model of the water retained pavement. Another application is the evaluation of air pollution due to air pollutant emission from vehicles in the street canyon with chemical reaction model.

Keynote Speaker IV



Prof. Jae K. Park University of Wisconsin-Madison, USA

Dr. Park is a professor of the Civil and Environmental Engineering Department at the University of Wisconsin-Madison since 1988. He received a B.S. in Civil Engineering at Yonsei University in 1977 and a M.S. in Environmental Engineering at Seoul National University in 1979. He worked as a consulting engineer in Korea and Australia for two years after serving two and a half years of military service. He received a Ph.D. in Public Health Engineering at the University of Newcastle upon Tyne, United Kingdom in 1985. He worked as a research associate at the Sanitary and Environmental Health Research Laboratory, University of California, Berkeley from 1985 to 1988.

Since he joined University of Wisconsin-Madison in 1988, he has taught various environmental engineering courses such as water treatment plant design, wastewater treatment plant design, biological treatment, physical/chemical treatment, hazardous waste management, solids and hazardous waste engineering, industrial water pollution control, etc. His research is in the areas of water quality management and river restoration; biological treatment; hazardous waste treatment; mass transport in the environment; fate of organic compounds in water and wastewater treatment processes; computer-aided design of water and wastewater treatment plants; and reuse of scrap vehicle tires as a contaminant sorbent. His research was supported by the National Science Foundation, the Department of Defense, municipalities, private industries, Wisconsin Department of Transportation, Wisconsin Department of Natural Resources, and various research institutes. He has served as the consultant of various governments, research institutes, utilities, universities, and industries all over the world.

Topic: 'Life Cycle Analysis of Photovoltaic Solar Panels'

Abstract— Solar photovoltaic (PV) panels is one technology that can reduce dependence on fossil fuels and the PV panel industry has grown dramatically over the past two decades. However, PV panel operating life is limited, about 30 years. With significant growth in the number of PV panel installations in the past decade and expected increase of PV panel installations into the future, the PV panel waste is expected to increase dramatically. In 2016, 250,000 metric tons of PV panel waste was produced worldwide. PV panel waste is expected to increase to 8 million tons by 2030 and 78 million tons by 2050, worldwide. In the United States (U.S.), PV panel waste is expected to increase to about 1 million tons by 2030 and 10 million tons by 2050. It is critical to take a proactive approach over a reactive one for the design, implementation and regulation for end-of-life PV panel processing to avoid unnecessary wastefulness and potential consequences. The objective of this study is to evaluate options for successful end-of-life PV panel management from a thorough understanding of both current and proposed PV technologies, manufacturing practices, installation practices, required maintenance, disposal methods, reuse options and hazardous waste risk assessments of PV panels. With this information, the study will recommend how to design robust and functional end-of-life PV panel standards and regulations.



Coffee Break & Group Photo Taking (January 10)

9:55~10:15

Brief Schedule for Conference

	January 9, 2019 (Wednesday) 10:00~18:00		
	Venue: Osaka International Convention Center (Add: 1101, 11 th Floor, 5-3-51 Nakanoshima, Kita-ku, Osaka City, 530-0005 Japan)		
	Arrival Registration, Keynote Speech, Conference Presentation		
	Lunch 12:00~12:50 Venue: Meeting room 1101, 11 th Floor, Osaka International Convention Center Afternoon Conference Venue: Meeting room 1102, 11 th Floor, Osaka International Convention Center		
	Opening Remarks	12:55~13:00	
	(Prof. Ngai Weng Chan, Unive	rsiti Sains Malaysia, Malaysia)	
	Keynote Speech I	13:00~13:35	
	Topic: 'Closed Materials Looped with Low Carbon Technologies to Sustainable Society' (Prof. Orawan Siriratpiriya, Chulalongkorn University (ARRIC), Thailand)		
D 1	Keynote Speech II 13:35~14:10		
Day 1	Topic: 'Sustainale Urban Drainage as a Viable Measure of Coping With Heat and Floods Due to Climate Change'		
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	January 10, 2019 (Thurs Arrival Registration, Keynote S	sday) 9:00~18:00 peech Conference Presentation	
	Antival Registration, Reynole Speech, Conference Presentation		
	Morning (Venue: Meeting room 1102. 11 th Floor. (Conference Dsaka International Convention Center	
	Opening Remarks	8:40~8:45	
	(Prof. Kondo Akira, Os	saka University, Japan)	
	Keynote Speech I	8:45~9:20	
	Topic: 'Simulation in City Block E	Environment by CFD coupled with	
	Meteorological and Air Quality Model'		
	(Prof. Kondo Akira, Os	saka University, Japan)	
	Keynote Speech II	9:20~9:55	
	Topic: 'Life Cycle Analysis o	of Photovoltaic Solar Panels'	
	(Prof. Jae K. Park, University	of Wisconsin-Madison, USA)	
	Coffee Break & Group Ph	noto Taking 9:55~10:15	
	Session 5: 10:15~12:00		
	Venue: Meeting room 1102, 11 th Floor		
	7 presentations-Topic:	"Renewable Energy"	
Day 2	Session Chair: Prof.	Orawan Siriratpiriya	
Duj 1	Lunch 12:00~13:00 Venue: Osaka International Convention Center Afternoon Conference		
	Venue: 11 th Floor, Osaka Inte	rnational Convention Center	
	Session 6: 13:00~15:00	Session 7: 13:00~15:00	
	venue: Meeting room 1101, 11th Floor 8 presentations Topic: "Combustion	venue: Meeting room 1102, 11th Floor	
	Science and Power Engineering"	Engineering and Transportation	
	Session Chair: Assoc. Prof.	Engineering"	
	Ratchaphon Suntivarakorn	Session Chair: Prof. Jae K. Park	
	Coffee Break	15:00~15:20	
	Session 8: 15:20~16:50	Session 9: 15:20~17:05	
	Venue: Meeting room 1101, 11th Floor	Venue: Meeting room 1102, 11th Floor	
	6 presentations-Topic: "Battery	7 presentations-Topic: "Geological and	
	Technology and Photovoltaic System	Civil Engineering" Session Chaim Access Brof War	
	Opunization" Session Chair: Prof. Kondo Akira	Session Chair: Assoc. Froi. wan Yaacob W Z	
	Dinner Bar	nquet 18:00	
	Venue: 5 th Floor, restaurant in Osaka International Convention Center		

2019 HKCBEES OSAKA CONFERENCE

Day 3

January 11, 2019 (Friday) 9:00~17:30 One Day Visit

Tips: Please arrive at the conference to upload or copy PPT into the laptop room 10 minutes before the session begins.

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 Presentation will be selected from each presentation session, and the Certificate for Best

Presentation will be awarded at the end of each session on January 9 and January 10, 2019.

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, January 9, 2019 (Wednesday)

Time: 14:25~16:10

Venue: Meeting room 1101, 11th Floor

7 presentations-Topic: "Environmental Management and Sustainable

Development"

Session Chair: Prof. Orawan Siriratpiriya

W0101 Presentation 1 (14:25~14:40)

Integration of Aquaculture Aquatic plant and Plant Cultivation Systems Jirarat Pinthong, Jeeraluk Plengsakul, Vorapot Kanokkantapong and Prasert Pavasant Mahidol University, Thailand

Abstract- Integrated agricultural systems are very vital to the agriculture country. This study stimulated a natural system that is interdependent among a number of organism species. The ecosystem consisted of nutrient circulation in the integrated aquaculture systems (Cyprinus Carpio Linn. or fancy crap), cultivation of aquatic plants (Vallisneria asiatica or spiral tape grass) and plants in soil (Lactuca sativa var.crispa L. or green oak). The 14 fancy craps started with 50-500 g in a 5.6 m³ of pond volume. Used fancy craps waste excretion in the nutrient water was utilized in the circulation system by feeding 40 spiral tape grasses planted in 2.5 m^3 of pond volume and to green oaks in the pot size of 60 x 200 cm². The results indicated that water quality in fish pond showed dissolved oxygen (DO) ranging from 6.27 to 7.15 mg/L and pH ranging from 7.2 to 8.9. Nitrate, ammonia and phosphate were in the range of 5.52-8.09, 0.195-1.49 and 0.124-0.202 mg/L, respectively. All nutrients tended to continuously decrease from starting the experiment to the end of the experiment. Specific growth rate of fancy craps was 3.45 and survival rate was 100%. The shape of fancy craps was long, slender, cylinder and beautiful color, which did not change from the beginning of typically commercially available fancy craps. The length and weight of spiral tape grasses increased 2.5 times. On the 45^{th} day, green oak yielded was 2,750 g/m³, which was slightly higher than that of control set by hydroponic system. Therefore, this system can be used by farmers to reduce the use of water resources, fertilizers and cost savings.

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, January 9, 2019 (Wednesday)

Time: 14:25~16:10

Venue: Meeting room 1101, 11th Floor

7 presentations-Topic: "Environmental Management and Sustainable

Development"

Session Chair: Prof. Orawan Siriratpiriya

W0081 Presentation 2 (14:40~14:55) Quantitative analysis on the sustainable development of four municipality cities in China **Q R Shen**, H Tian, X Y Han, H Zhang and W Sun Beijing University of Chemical Technology, China

Abstract- Due to the geographical location, development history and many other social-economic factors, the economic development of each city displays significant difference from each other. It is hard to characterize the economic development of a city by only looking at one or two measurements, which is only one aspect of a city. A snap shot of a city with all of its data information could provide its holographic image. With its evolution along time, the image can be even more impressive, but is still hard to compare with its peer cities given its multivariate nature. From system point of view, no matter how complicate the appearance of a system is, it will be always associated to its intrinsic characteristics. In this work, data from four municipality cities in China are analysed quantitatively to discuss different development patterns by Pearson Correlation Coefficient and Hierarchical Clustering Analysis methods, correlation of factors and urban development patterns are clearly obtained and explained.

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, January 9, 2019 (Wednesday)

Time: 14:25~16:10

Venue: Meeting room 1101, 11th Floor

7 presentations-Topic: "Environmental Management and Sustainable

Development"

Session Chair: Prof. Orawan Siriratpiriya

W0067 Presentation 3 (14:55~15:10)

Study on Urban Ecological Sustainability Based on Emergy Theory-Taking Zhenjiang City as an Example

Junxue Zhang

Southeast University, China

Abstract- With the rapid development of the economy, the deterioration of the ecological environment problem has followed and the city's ecological assessment has become increasingly important. This article uses a quantitative ecological analysis method-emergy method to assess the ecological status of the city. The research object is Zhenjiang City. Through the calculation of a series of ecological sustainability parameters about Zhenjiang City, the city's ecological system is quantitatively evaluated. The results show that: 1. there is little change in renewable resources from 2012 to 2016 and a rapid increase according to the value of non-renewable resources; 2. the environmental load rate (ELR) has rapidly increased and the urban ecological sustainability has not improved; 3. Through Zhenjiang's GDP and GDP per capita grew rapidly from 2012 to 2016, it did not achieve satisfied results about industrial restructuring. In summary, the development in recent years has not achieved the expected effect and sustainable ecological development of Yangzhou City. The research significance of this article can provide a reference for the Zhenjiang municipal government to formulate better policies. Secondly, it has positive significance for the formulation of other urban policies.

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, January 9, 2019 (Wednesday)

Time: 14:25~16:10

Venue: Meeting room 1101, 11th Floor

7 presentations-Topic: "Environmental Management and Sustainable

Development"

Session Chair: Prof. Orawan Siriratpiriya

W0022 Presentation 4 (15:10~15:25) Treatment of Waste Emulsion using Coagulation Method **M. Najib Razali**, M. A. Fattah Ahmad, N. Adilah Md Salehan, Amira E. Anuar Universiti Malaysia Pahang, MALAYSIA

Abstract- Waste emulsion is one of the major toxic wastes that are generated from the metal processing industry. Emulsions are commonly used in the metal processing production as emulsified coolant and in power plant as lubricating oil. This paper presents a research to suggest the best coagulant in treating waste emulsion from manufacturing plant via coagulation method. Chitosan and bio-solvent will represent the natural coagulants, alum and polyaluminium chloride (PAC) will represent the industrial coagulant. Jar Test apparatus was used to treat the waste emulsion. It will be conducted in a batch test with a row of six beakers. One jar will be used as a control and the other five will be of different dosages of coagulant at 150 rpm of mixing rate, 30 minutes of mixing time and at room temperature. From the results, PAC showed to be the best coagulant with 82.29%, 95.45%, 99.95%, 96.4%, and 53% removal of COD, BOD O&G, TSS, and Turbidity, respectively, at a pH of 3.7 and minimum dosage of 2wt%. In conclusion, the PAC managed to break the oil and water bonding from the waste emulsion. Thus, it was suitable to treat the industrial waste emulsion.

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, January 9, 2019 (Wednesday)

Time: 14:25~16:10

Venue: Meeting room 1101, 11th Floor

7 presentations-Topic: "Environmental Management and Sustainable

Development"

Session Chair: Prof. Orawan Siriratpiriya

W0020 Presentation 5 (15:25~15:40) Analysis of Environmental Behaviour of Sulfa-drugs in the Lake Biwa and Yodo River Basin by Using Multimedia Models **S Li**, H Shimadera, T Matsuo, A Kondo Osaka University, Japan

Abstract- This study focuses on some sulfa-drugs that have been heavily used in livestock husbandry and emitted into the Lake Biwa and Yodo River Basin. Emissions of sulfa-drugs were estimated using the national statistical data on veterinary drug usage and livestock excrement in Japan. One-box and distributional type multimedia fate models were utilized with the estimated emissions in order to simulate the behaviour of sulfa-drugs in four environmental media (atmosphere, soil, water and sediment) in the study period from 2005 to 2015 in the basin. Based on the calculated results, sulfa-drugs emitted to the soil media were efficiently transported to water, which resulted in the largest amount in water among the environmental media and high concentrations in and around areas with large farmland proportion.

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, January 9, 2019 (Wednesday)

Time: 14:25~16:10

Venue: Meeting room 1101, 11th Floor

7 presentations-Topic: "Environmental Management and Sustainable

Development"

Session Chair: Prof. Orawan Siriratpiriya

W1011 Presentation 6 (15:40~15:55) Simulation Model of Biomass-based Cogeneration Plant Nur Azyan Athirah Abdul Razak and **Abdul Halim Abdul Razik** Universiti Malaysia Pahang, Malaysia

Abstract- Nowadays, one of the major problem faced by human populations around the world is unpleasant energy situation due to high energy demand and energy availability. It is exacerbated if the fossil fuels are the only energy source. From experiences, this situation causes energy shortages and instability of energy price. On the environmental perspective, fossil resources also can contribute to climate change and global warming. Thus, governments are focusing on efficient energy saving and also the usage of natural resources as fossil fuel substitution such as biomass. This study has focused on the modelling of biomass-based cogeneration plant. The objective was to model and simulate the cogeneration plant which uses torrefied biomass as fuel in the Aspen Plus simulator. The first step in conducting the study was by identifying suitable biomass resources in Malaysia to be used as fuel. A typical process flow diagram of cogeneration from the published literature would be referred. From the simulation, 1.764 MW of power was generated which exceeded the required power. Four parameters were ranged and analyzed to evaluate the response. It was observed that pellet flow rate, water flow rate, air flow rate and reactor temperature have all influenced the power generated. The findings conclude that biomass based cogeneration plant was technically feasible to be deployed. However, further refinements of the developed simulation model are necessary that include parametric optimization.

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, January 9, 2019 (Wednesday)

Time: 14:25~16:10

Venue: Meeting room 1101, 11th Floor

7 presentations-Topic: "Environmental Management and Sustainable

Development"

Session Chair: Prof. Orawan Siriratpiriya

W0090 Presentation 7 (15:55~16:10) Effective Computational Modeling for Early Arrhythmia Symptom Classification by using Decision Tree Approach **Mohamad Sabri bin Sinal,** Eiji Kamioka Shibaura Institute of Technology, Japan

Abstract- Heart disease has been the leading global cause of death for almost 15 years. One of the common causes lead to chronic heart disease and sudden death is Arrhythmia. However, the conventional or computational approach of Arrhythmia detection is not an easy task. It requires suitable method with a very specific timeline to detect the symptom. In addition, the symptom itself is very complex in behavior. Therefore, an automatic detection method with simple computational model to detect accurately Arrhythmia in ECG data is needed to deal with such critical issue. In this paper, a novel framework based on decision tree approach by utilizing five peaks taken from ECG segment is proposed to detect Arrhythmia from the first minute of the ECG data. The experimental results show that the proposed decision tree approach with the proposed five peaks is able to detect Arrhythmia with the accuracy of 98% outperforming the other data mining techniques. Moreover, the five proposed parameters to classify the disease show that these computational models have a strong level of sustainability in detecting Arrhythmia when it is compared to different numbers of parameters and methods.

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, January 9, 2019 (Wednesday)

Time: 14:25~16:10

Venue: Meeting room 1102, 11th Floor

7 presentations-Topic: "Atmospheric Monitoring and Water Quality

Analysis"

Session Chair: Prof. Jae K. Park

W0011 Presentation 1 (14:25~14:40)

Assessment of aerosol direct effects on PM_{2.5} and O₃ air quality in Continental Southeast Asia **Giang Tran Huong Nguyen**, Hikari Shimadera, Tomohito Matsuo and Akira Kondo Osaka University, Japan

Abstract- An online coupled modeling system composed of Weather Research and Forecasting (WRF) model and Community Multiscale Air Quality (CMAQ) model was applied to assess aerosol direct effects on air quality with the focus on fine particulate matter (PM_{2.5}) and ozone (O₃) in Continental Southeast Asia where has suffered significant air pollution recently due to rapid development. The results showed that, in four focused countries including Cambodia, Laos, Thailand, and Vietnam, the direct effects moderately decreased shortwave radiation, temperature, planetary boundary layer (PBL) height, and wind speed by -9.08%, -0.44 °C, -10.27%, and -2.21% in dry season, and -2.37%, -0.04 °C, -2.05%, and -0.57% in wet season, respectively. Consequently, PM2.5 concentration was found to increase by +10.51% in dry season and +1.44% in wet season. O3 concentration was decreased by -2.76% in dry season while slightly increased by +0.56% in wet season. The increasing effect of aerosols on PM2.5 concentration was caused by the more stable atmospheric condition. The increase or decrease in O3 concentration depended on the responses of atmospheric dynamics as well as photolysis rates of photochemical reactions to direct effects.

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, January 9, 2019 (Wednesday)

Time: 14:25~16:10

Venue: Meeting room 1102, 11th Floor

7 presentations-Topic: "Atmospheric Monitoring and Water Quality

Analysis"

Session Chair: Prof. Jae K. Park

W0016 Presentation 2 (14:40~14:55) Air pollution modeling over Shanghai and Guangzhou **TY Zhang**, Z Chen, Y Zhu, RH Zong Jiangxi University of Finance and Economics, China

Abstract- As one of the most prominent pollutants that threaten human health over big cities, fine particle matter (PM2.5) has largely attracted public and researches' attention. Critical challenges are unresolved regarding how to effectively predict atmospheric PM2.5 concentrations. Here, our team aimed to capture the PM2.5 high-frequency dynamics over Shanghai and Guangzhou using advanced machine learning technique. Our results showed that PM2.5 concentration could be forecasted with historical PM2.5 record and meteorology forcings including temperature, humidity, precipitation, pressure, wind speed, and due point temperature. Our sensitivity analyses further revealed that the perdition was robust against critical model parameters across cities. The underlying sink processes could be different despite of their similar temporal features.

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, January 9, 2019 (Wednesday)

Time: 14:25~16:10

Venue: Meeting room 1102, 11th Floor

7 presentations-Topic: "Atmospheric Monitoring and Water Quality

Analysis"

Session Chair: Prof. Jae K. Park

W0061 Presentation 3 (14:55~15:10)

Experimental Study of Membrane-based Electrostatic Precipitators with high Filtration Accuracy

Jing Chen, Fengjun Xie, Yijing Kang, Shunquan Chen, Zhaolin Feng

Guangzhou Institutes of Advanced Technology, Chinese Academy of Sciences, China

Abstract- Electrostatic precipitators (ESPs) with the membrane-based collecting electrode play an important role on the welding flue gas cleaning process. The research has been conducted on both bench and pilot scales with novel electrostatic precipitation using PTFE microporous membranes. Two types of membranes collector were used for testing—the charged and uncharged PTFE microporous membranes substrate. Tests were performed to measure the collection efficiency of the membranes. The result indicated that uncharged membrane is effective as charged membrane plates as a collection surface in a bench-scale ESP for the capture of PM2.5, but the charged membrane has a higher efficiency when particle size is lower than 0.3μ m, which is more suitable for collecting fine particulates. The preliminary data of the pilot-scale experimental also indicated that charged membranes exhibited excellent particulate capture efficiencies for welding flue gas, and the collection efficiency was reached 99.1%, which can achieve an ultra-low concentration emission of flue gas less than 1 mg/m³.

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, January 9, 2019 (Wednesday)

Time: 14:25~16:10

Venue: Meeting room 1102, 11th Floor

7 presentations-Topic: "Atmospheric Monitoring and Water Quality

Analysis"

Session Chair: Prof. Jae K. Park

W0096 Presentation 4 (15:10~15:25)

Prototype of Horizontal Bio-Trickling Air Scrubber (HBAS) for Ammonia Removal in Swine Farm

Jirarat Pinthong, Vorapot Kanokkantapong, Teerawit Poopa, Suphanut Jiebna Chulalongkorn University, Thailand,

Abstract- Modelling of Bio-Trickling Air Scrubber (HBAS) system is one of the methods to treat biological odor and gas emission in air treatment of manufacturing facility management. A cheaper way of efficient gas elimination is using sprinkling water in the direction of air flow in the media microbial adhesion. Samples of ammonia gas was continuously collected throughout swine production for 20 weeks. The experimental systems consisted of six different conditions by varying the amount of scrubbed water, the space between water spray and media, and the amount of media materials. Microorganism species in media, which affected to ammonia removal, were also classified. The results indicated that the highest efficiency of ammonia removal was 51.9% at the experimental condition as follows: 1) water spray rate of turn on: turn off - 60 : 30 seconds, 2) distance between water spray and media of 1 meter, and 3) a half of media microbial adhesion area. The treated ammonia concentration was lower than the standard value of the chemical in working atmosphere as determined by the American Conference of Governmental Industrial Hygienist (ACGIH TLV), giving ammonia not more than 25 ppm. Additionally, media bio-scrubber could classify five bacteria species (Brachybacterium sp., Micromonospora sp., Methylobacterium sp., Rhodococcus rubber and Cellulosimicrobium sp.), which ammonia was used as a natural resource. The main mechanism in gas removal was proposed by the liquid adsorption, whereas the microorganism adhering to the media did not affect in statistical signification. Improvement of removal efficiency could be achieved by an increase of gas retention time in the system and the space between water spray and media.

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, January 9, 2019 (Wednesday)

Time: 14:25~16:10

Venue: Meeting room 1102, 11th Floor

7 presentations-Topic: "Atmospheric Monitoring and Water Quality

Analysis"

Session Chair: Prof. Jae K. Park

W0075-A Presentation 5 (15:25~15:40)

Radar Analysis on Convective-Scale Downdrafts of in the Convective Rainband during the interaction between Southwesterly monsoonal flow and Typhoon Morakot (2009) Nicolas

Yao-Chung Chuang

Air Force Institute of Technology, Taiwan

Abstract- The observational data collected by Doppler radar network in southern Taiwan area documents the downdrafts embedded within the rainband during the interaction between southwesterly monssonal flow and Typhoon Morakot (2009). The downdrafts was significant for maintaining the rainband. According to the finding by Didlark and Houze (2009), two kinds of downdraft may form accompanying with the pricinple rainband: the inner-edge downdraft (IED) and low-level downdraft (LLD). The IED originating at 6-8-km altitude created a sharp reflectivity gradient along the inner boundary of the rainband. Didlake and Houze (2009) concluded that the IED was drove by buoyancy-induced pressure gradient acceleration. However, since the convective cell and updraft tilted radially inward, and the existence and dissipation of IED correspond to the life time of the convective cell, it implied that the IED might be induced by precipitation drag rather than by buoyancy-induced pressure gradient acceleration. Besides, a downdraft penetrated from radially outer region of rainband and subsided into the base of the reflectivity core (Hence and Houze 2008). Although the downdraft associated with the convection almost corresponds to the LLD found by Didlark and Houze (2009), it seems that the downdraft originates from mid-level rather than from low-level. The downdraft was probably triggered by the radially downwind side updraft, which has yet to be further analyzed.

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, January 9, 2019 (Wednesday)

Time: 14:25~16:10

Venue: Meeting room 1102, 11th Floor

7 presentations-Topic: "Atmospheric Monitoring and Water Quality

Analysis"

Session Chair: Prof. Jae K. Park

W0072-A Presentation 6 (15:40~15:55) Application of the modified liquid crystal (LC) sensor to identify the hydroxy radical from Fenton reaction Shin-Hu CHAO, Hsien-Kuan LIAO, **Ruey-Fang YU** National United University, Taiwan

Abstract- Liquid Crystal (LC) was innovatively used as a sensor or bio-sensor (Liquid-Crystal-Based sensor) in some critical researches due to the specific optical and electrical characteristics of the LC, especially in the files of bio-chemical researches. The LC bio-sensor has been investigated to identify lipase activity, organophosphates, nitrogen dioxide, urea, l-tyrosine, glucose, cholesterol, acetylcholinesterase. In the environmental applications, some modified LC sensors were also investigated to detect the Volatile Organic Compounds (VOCs), ex. glutaraldehyde. However, the applications of LC sensor to identify the substances in aquatic environments are very rare and even can no find in the literatures. The LC sensor was regarded as an innovative, high potential and valuable sensor for many researches, and which was a high interesting and innovative study for many research areas. In our previous study, the LC sensor was investigated for quantitative identification of four different oxidants in aquatic environments, containing hydrogen peroxide (H2O2), sodium hypochlorite (NaClO), potassium dichromate (K2Cr2O7), and potassium permanganate (KMnO4). In this study, a modified LC sensor was used to quantitatively identified the hydroxyl radical from the Fenton oxidation. The measurement of hydroxyl radical is one of the most critical issues in the advanced oxidation processes (AOPs) relating researches, including the Fenton oxidation which was the most used AOP process. Several techniques

including Electron Spin Resonance (ESR), fluorescence, and High-performance Liquid Chromatography (HPLC) were investigated to identify the activity of hydroxyl radical in AOPs. However, these methods are expensive, complex, and difficult to be used for on-line application.

Therefore, the main objectives of this study is to develop a LC-based sensor to

identify the hydroxyl radical from the Fenton oxidation processes. Two basic type of nematic LCs (5CB and E7) were used to construct the LC sensor in this study. The DMOAP (N, N-dimethyl-N -octadecyl-3 -aminopropyl-trimethoxysilyl chloride) was used as the homeotropic alignment, and, the AEAPS (N-(2-aminoethyl)-3-(trimethoxysilyl)propylamine) was coated on the DMOAP layer as a reactive layer in the LC sensor. The color and brightness of the LC sensor surface were changed when the solutions of different Fenton reactions were dropped in the sensor. The concentrations of the hydroxyl radical of these Fenton solutions were also measured by the HPLC. Higher concentrations of the dropping hydroxyl radical revealed longer durations for the disturbances of the liquid crystal molecules inside the sensor. By analyzing the changes of brightness of LC sensor surface using image analysis technique, linear relationships were found between the concentrations of hydroxyl radical with the durations of the LC disturbance, therefore, the concentrations of hydroxyl radical can be identified. According to the experimental results, the concentrations of hydroxyl radical from $5.71 \times 10-6M$ to $1.23 \times 10-4M$ can be identified within the detection time from 28.8 to 82.0 seconds. As a result, this proposed LC sensor provides an innovative, rapid, economy application for the quantitative identifications of the oxidants aquatic environments.

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, January 9, 2019 (Wednesday)

Time: 14:25~16:10

Venue: Meeting room 1102, 11th Floor

7 presentations-Topic: "Atmospheric Monitoring and Water Quality

Analysis"

Session Chair: Prof. Jae K. Park

W0078 Presentation 7 (15:55~16:10)

Increased Electron Density and Dissolved Oxygen Level in Water through Magnetic Effect **Hwang Sheng Lee**, Augustine Chung Wei Yap, Cho Cheng Ng, Nuruol Syuhadaa Mohd and Joo Ling Loo

UNIVERSITI TUNKU ABDUL RAHMAN (UTAR), MALAYSIA

Abstract- Water is essential in nature for the survival of all life with significant environmental and economic contribution to the world. The gradual increases in water demand and consumption have led to the discharge of inadequately treated wastewater, thereby, deteriorating water quality and triggering worldwide water quality problem. Water quality is determined by different parameters. In particular, electron density and dissolved oxygen (DO) level in water are important in monitoring and controlling the water property and quality, since both of them are associated with various chemical, biological, and physical processes in water treatment. This project developed a method to increase electron density and dissolved oxygen level in water using principle of reversed electric motor. The essential requirements to achieve this principle are magnetic field, mechanical motion by force, and electron generation. The treated water's pH, conductivity, and dissolved oxygen level showed increment of 0.40, 0.05 µS/cm, and 2.7 % saturation (0.22 mg/L), respectively whereas its oxidation-reduction potential (ORP) showed a decrement of 94 mV, indicating the increment of electron density and dissolved oxygen level in the magnetic treated water. The enhancements of these parameters are highly desirable in the applications of medical treatment, wastewater treatment, agriculture, and aquaculture industries.

Break	16:10~16:15

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, January 9, 2019 (Wednesday)

Time: 16:15~17:45

Venue: Meeting room 1101, 11th Floor

6 presentations-Topic: "Environmental and Chemical Engineering"

Session Chair: Prof. Ngai Weng Chan

W0045 Presentation 1 (16:15~16:30) Sodium Grease Formulation from Waste Engine Oil N W Abdu Rahman, N S A Japar, **M A A Aziz** and M N Razali UNIVERSITI MALAYSIA PAHANG., MALAYSIA

Abstract- The present study was conducted to formulate sodium soap grease using waste engine oil (WEO). Greases were formulated by homogenizing sodium soap thickener in WEO for 2 hours at 150 °C Different grease composition of oil-to-thickener ratio was designed which are 90/10, 80/20, 70/30 and 60/40. The formulated greases were analysed by conducting the consistency, oil bleeding, oil separation and FTIR characterization tests. The present study found that grease can be formulated using WEO and the thickener percentage have significant effect on formulated greases properties. Grease formulated with 70 – 80% of base oil and 20 – 30% of thickener was the best grease formulated as it shows desirable grease properties.
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, January 9, 2019 (Wednesday)

Time: 16:15~17:45

Venue: Meeting room 1101, 11th Floor

6 presentations-Topic: "Environmental and Chemical Engineering"

Session Chair: Prof. Ngai Weng Chan

W0098 Presentation 2 (16:30~16:45)

Pharmaceuticals and personal care products removal from aqueous solution by nitrogen-functionalized carbon adsorbent derived from pomelo peel waste **P Prarat**, K Hadsakunnee, L Padejepan, P Inlee, S Wongpaisan and K Prasertboonyai Kamnoetvidya Science Academy, Thailand

Abstract- The aim of this work is to investigate the feasibility of the preparation of nitrogen-functionalized adsorbent material from waste pomelo peel by using diammonium hydrogen orthophosphate (DAP) activation for the removal of Pharmaceuticals and personal care products (PPCPs) such as carbamazepine (CBZ), clofibric acid (CFA) and oxytetracycline (OTC). Our results showed that the adsorbent prepared by chemical activation in the presence of DAP lead to mesoporous material. The adsorbent exhibits acid and basic groups at its porous surface. The kinetic data are found to follow a pseudo-second order kinetic model. The Langmuir model provided a good description of the experimental isotherms for CBZ, whereas CFA and OTC adsorption behavior rather follow the Freundlich model. Moreover, the PPCPs adsorption was found to be strongly dependent on the pH of solution as well as the pKa of both adsorbents and PPCPs. The strong adsorptive interaction between PPCPs and P-DAP was mainly attributed to the combination interactions of electrostatic interaction, hydrogen bonding and π - π interactions.

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, January 9, 2019 (Wednesday)

Time: 16:15~17:45

Venue: Meeting room 1101, 11th Floor

6 presentations-Topic: "Environmental and Chemical Engineering"

Session Chair: Prof. Ngai Weng Chan

W0100 Presentation 3 (16:45~17:00) Enhanced Photocatalytic Activity of Carbon Dots Grafted TiO2 Nanorods Shimin Cai Choate Rosemary Hall, USA

Abstract- TiO₂, one of the most promising photocatalysts, is widely used in air purification, sewage treatment, water splitting, carbon dioxide reduction, and solar cells. However, TiO₂ can only absorb ultraviolet light, which makes up only a small fraction (< 4%) of the total solar spectrum. Therefore, we successfully prepared carbon dots (CDs) by low-voltage electrolysis of ethanol/sodium hydroxide/water mixture. TEM image shows that the prepared CDs are monodispersed spherical particles with a diameter of 3-5 nm. CDs-grafted TiO₂ nanorods (CDs-TiO₂ nanorods) were prepared by hydrothermal treatment of CDs and TiO₂ nanorod solution at 200 °C. TGA shows that the content of CDs in CDs-TiO₂ nanorods was about 0.8%. UV-Dis shows that CDs could significantly improve the visible light absorption property of TiO₂ nanorods. With methyl orange as a model pollutant, the photocatalytic activity of CDs-TiO₂ nanorods was 2.17 times higher than that of TiO₂ nanorods under visible light irradiation.

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Afternoon, January 9, 2019 (Wednesday)

Time: 16:15~17:45

Venue: Meeting room 1101, 11th Floor

6 presentations-Topic: "Environmental and Chemical Engineering"

Session Chair: Prof. Ngai Weng Chan

W0030 Presentation 4 (17:00~17:15)

NaHCO₃-promoted olivine weathering with H_2 generation and CO_2 sequestration in alkaline hydrothermal system

J Wang, K Nakamura, N Watanabe, A Okamoto and T Komai

Tohoku University, Japan

Abstract- Hydration of Fe(II) bearing minerals, such as olivine ((Mg,Fe)SiO₄), potentially generate hydrogen (H₂). However, because of the low Fe(II) dissolution rate, the H₂ production rate is usually low. We have recently proposed a novel system to promote H₂ production and simultaneous CO₂ storage in hydrothermal conditions via NaHCO₃-enhanced olivine weathering. The present study reports the role of NaHCO₃ on both H₂ production from olivine hydration and on minerals generations on laboratory experiments in CO₂-rich (0.5 mol/L NaHCO₃) and CO₂-free hydrothermal conditions at pH range of 8-11. The highest H₂, HCOOH yields and carbonation rate reached at the CO₂-rich experiment with lower alkaline pH at 8.25. The addition of high concentration NaHCO₃ decreased pH from 10.92 to 8.25, whereas olivine and brucite dissolutions were accelerated. Thus, more Fe(II) was released from olivine and brucite, and H₂ production was suppressed in both CO₂-rich and CO₂-free conditions. This study suggests H₂ production was promoted with the presence of HCO₃⁻, but not the pH variation. The consumption of Fe(II)-bearing brucite was important in enhancing H₂ production during olivine hydration process

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Afternoon, January 9, 2019 (Wednesday)

Time: 16:15~17:45

Venue: Meeting room 1101, 11th Floor

6 presentations-Topic: "Environmental and Chemical Engineering"

Session Chair: Prof. Ngai Weng Chan

W1029-A Presentation 5 (17:15~17:30) Surface treatment for hydrophilic PTFE film using gliding arc plasma **Seung-Hyun Hong**, Tae-Hee Kim, Juyoung Ko and Sooseok choi Jeju National University, Korea

Abstract- Gliding arc plasma is a non-equilibrium plasma and able to generates at atmospheric pressure. Owing to the non-thermal characteristics of the gliding arc, it has been used for various surface treatment PTFE (Polytetrafluoroethylene) is a polymer compound, which consists of strong atomic bonding of carbon and fluorine and have high heat resistance and low temperature durability ranging from 270 to 300 °C. It is widely used as membrane for filtration of aqueous solution and organic solvent in semiconductor and pharmaceutical industries. PTFE film has originally a hydrophobic property due to low surface energy by stable covalent bonding with carbon. In this work, the surface of PTFE film was treated to obtain hydrophilicity by gliding arc plasma. It was carried out by various plasma forming gases as provide active radicals species, argon, oxygen, air, and nitrogen. The treated films surfaces were analyzed as measure contact angle for water. The contact angle of PTFE was 80 ° before treatment. It was estimated that OH radicals from ambient air were generates by gliding arc and they were bonded on the surface of PTFE.

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Afternoon, January 9, 2019 (Wednesday)

Time: 16:15~17:45

Venue: Meeting room 1101, 11th Floor

6 presentations-Topic: "Environmental and Chemical Engineering"

Session Chair: Prof. Ngai Weng Chan

W0094-A Presentation 6 (17:30~17:45) Multinary chalcogenide semiconductor nanostructures for thermoelectric applications **Mingyong Han** Institute of Materials Research and Engineering, 2 Fusionopolis Way, Singapore

Abstract- Multinary chalcogenide semiconductors have been gaining widespread attention in the past decade owing to their remarkable intrinsic properties that can be exploited in diverse areas of applications. Although their considerable utilities in photovoltaics and optoelectronics have been widely carried out, systematic research is still lacking when it comes to their use in thermoelectrics. During the past year, we have been developed an aqueous approach to colloidal large-scale and high-yield synthesis of multinary chalcogenide nanostructures without organic additives. This novel method have enabled us to prepare several important types of promising multinary metal chalcogenide nanomaterials for thermoelectric applications. The electrical conductivity of non-stoichiometric nanomaterials in thermally annealed pellets can surprisingly reach to the same order of indium tin oxide substrates, which have been widely used in photovoltaic, optoelectronic and light-emitting devices. Moreover, the power factors have been systematically controlled by altering synthetic concentration, annealing temperature and doping level among the few highest values as reported. In addition to systematic synthesis and composition control, we will also focus on fabrication and thermoelectric properties of hybrid nanomaterials.

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, January 9, 2019 (Wednesday)

Time: 16:15~18:00

Venue: Meeting room 1101, 11th Floor

7 presentations-Topic: "Building Energy Efficiency and Energy

Management"

Session Chair: Associate Prof. Mathias Cehlin

W0058 Presentation 1 (16:15~16:30) Feasibility Analysis on Building Air-Condition System Renovation: Thailand Case Study Bancha Sreewirote, **Atthapol Ngaopitakkul** King Mongkut's Institute of Technology Ladkrabang, Thailand

Abstract- Energy efficiency improvement in existing buildings has been an interesting issue for researcher especially in heating, ventilation, and air conditioning (HVAC) system that appear to take up the large proportion of energy consumption. So, this paper aims to present an analysis on renovation measure to improve energy efficiency in building air-condition system. The study has been done using multi-purpose building in Thailand as a case study. The analysis of proposed renovation measurement will be done in both energy performance and economic perspective. Standard from Thailand building energy code is also taken into consideration when selecting equipment for replacement. The obtained result has indicated the suitability of proposed measure application in building with significant energy efficiency improvement and attractive economic parameter.

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, January 9, 2019 (Wednesday)

Time: 16:15~18:00

Venue: Meeting room 1101, 11th Floor

7 presentations-Topic: "Building Energy Efficiency and Energy

Management"

Session Chair: Associate Prof. Mathias Cehlin

W0052 Presentation 2 (16:30~16:45)

Evaluating the environmental and economic sustainability of energy efficiency measures in buildings

Yemane W. Weldu and Sami G. Al-Ghamdi

Hamad Bin Khalifa University, Qatar

Abstract- It is estimated that buildings in extreme weather regions waste large amounts of money each year in thermal comfort costs, and that if addressed, significant amounts of environmental impacts would be averted. Retrofitting is considered the most immediate, pressing, and effective mechanism for reducing energy consumption and greenhouse gas emissions in the building sector. An environmental life cycle costing was applied to evaluate the sustainability of retrofitting existing buildings. A portfolio of environmental and economic impact results was developed for a baseline building and five alternative retrofitted building scenarios based on insulating the building wall. The results demonstrated a reduction in the environmental impacts and economic impacts by retrofitting the building. Improving the thermal performance of the building resulted in a reduction of environmental life cycle cost of 5%. Externality, which is primarily caused by energy usage, was the key source of the environmental life cycle cost. People in hot climate zones spend much of their time indoors, therefore, it is critical to keep comfortable thermal environment in buildings. This study provides strategically important evaluations for transforming existing buildings into more cost-effective and environmentally friendly sustainable buildings.

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Afternoon, January 9, 2019 (Wednesday)

Time: 16:15~18:00

Venue: Meeting room 1101, 11th Floor

7 presentations-Topic: "Building Energy Efficiency and Energy

Management"

Session Chair: Associate Prof. Mathias Cehlin

W0065 Presentation 3 (16:45~17:00) Building Envelope Renovation for Net Zero Energy Building in Hot Humid Climate **C Boonyaputthipong** Khon Kaen University, Thailand

Abstract- Net Zero Energy building has become a topic that has drawn much attention from architects worldwide. Its concept is that buildings can meet all of their energy requirements from renewable sources. In Thailand, the renewable energy that is most suitable for integration into the idea of net zero energy building is photovoltiacs. With government funding, the communication affairs division building, Khon Kaen University, is selected for the renovation existing building to be net zero energy building. It is successfully proved that, after one year record, the energy produces by the PVs, 22,944 kWh is more than energy consumption, 20,932 kWh. This paper focuses on envelope renovation because it is an important part of the building that can apply to other renovation project in the future. It found that the envelope renovation for Net Zero Energy Building can be separated to be two part, for energy saving and for renewable energy installation. For photovoltaic installation, it can simply install on the metal sheet roof by using metal frame with special clip. The research and renovation on the envelope from this project can apply for the future net zero energy building in Thailand.

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, January 9, 2019 (Wednesday)

Time: 16:15~18:00

Venue: Meeting room 1101, 11th Floor

7 presentations-Topic: "Building Energy Efficiency and Energy

Management"

Session Chair: Associate Prof. Mathias Cehlin

W0023 Presentation 4 (17:00~17:15)

Environmental Impacts and Demand-Supply Balance of Minerals for the Transition to a Low-Carbon Energy System

Takuma Watari, Benjamin McLellan, Damien Giurco, Elsa Dominish and Tetsuo Tezuka Kyoto University, Japan

Abstract- Comprehensive perspectives are essential to address environmental problems that have become more challenging in recent years. Energy problems are one of the most fundamental challenges that humankind faces. Therefore, it is necessary to examine whether long-term energy scenarios are sustainable from a wide range of viewpoints, including their use of mineral resources. This paper focused on the energy-mineral nexus as a one of the examples of complex interconnection and investigated the availability of minerals in the transition to a low-carbon energy system. Moreover, in order to give more comprehensive perspectives to policy makers and industries, the environmental impacts associated with mining under low-carbon energy scenarios were evaluated. Results indicate that the introduction of low-carbon technologies affects future mineral demand significantly and supply may not keep up with increased demand without recycling. Furthermore, the environmental impacts (for example, CO2 emissions, water pollution and land uses) caused by increase in mineral production could be concentrated in specific countries such as China, Australia and South Africa, and the energy demand for mining could be also increased massively in Congo and Chile. A circular economy promoting recycling, remanufacturing plus strategies which reduce and reuse should be considered in parallel to introducing low-carbon technologies to boost mineral supply and reduce the environmental impacts.

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Afternoon, January 9, 2019 (Wednesday)

Time: 16:15~18:00

Venue: Meeting room 1101, 11th Floor

7 presentations-Topic: "Building Energy Efficiency and Energy

Management"

Session Chair: Associate Prof. Mathias Cehlin

W1016 Presentation 5 (17:15~17:30)

Energy Management Methodology for Energy Sustainable Actions in University of Campinas - Brazil

J G I Cypriano, L F Pinto, L C Machado, L C P da Silva and L S Ferreira University of Campinas, Brazil

Abstract- Universities need to be open to changes in socioeconomic and environmental that are occurring in the world, to transform society around them. For this, one of the natural movements has been in sustainability, focusing on 2030 Agenda. In this context, this article shows the path that University of Campinas has been adopting in order to become a sustainable benchmark. In the past, there was an environmental movement that culminated in the sustainable policies creation and, earlier, an international commitment to other institutions. Currently, the Sustainable Campus Project is in implementation to develop energy sustainability and change the organizational culture. For the future, the transformations needed to promote a sustainable energy management system and continuous improvement of its actions are indicated. In the end, all those processes will allow a living laboratory in energy sustainability and a regional benchmark.

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, January 9, 2019 (Wednesday)

Time: 16:15~18:00

Venue: Meeting room 1101, 11th Floor

7 presentations-Topic: "Building Energy Efficiency and Energy

Management"

Session Chair: Associate Prof. Mathias Cehlin

W0017 Presentation 6 (17:30~17:45)
Numerical Simulation of Heavy Rainfall in August 2014 over Japan under Pseudo Global Warming Conditions
Y Minamiguchi, H Shimadera, T Matsuo and A Kondo
Osaka University, Japan

Abstract- Climate change as a consequence of global warming may enhance severe precipitation events. This study investigated the impact of global warming on summertime heavy rainfall using the Weather Research and Forecasting model with the pseudo global warming (PGW) method. WRF simulations were conducted for August 2014 over a domain covering Japan, in which two big typhoons attacked Japan and rain fronts frequently passed over, in a baseline and two PGW (RCP4.5 and RCP8.5) conditions. The analysis showed that the future climate led to a larger amount of precipitation than the past climate during the study period in Japan. The mean increase rate of upward moisture supply from the surface of the entire modelling domain was 2.8% K-1 in RCP4.5 condition and 3.3% K-1 RCP8.5 condition. The mean increase rate of 2-m specific humidity was 6.7% K-1 in both RCP4.5 and RCP8.5 conditions, which is comparable to the Clausius-Clapeyron relationship. Therefore, the water supply from the lateral boundaries contributed to the increase in humidity largely and precipitation subsequently. The increases in precipitation related to typhoons were larger than rain fronts, in particular, the changes were remarkable over the paths of typhoons. These results show global warming will significantly increase the summertime heavy precipitation over Japan in the future.

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, January 9, 2019 (Wednesday)

Time: 16:15~18:00

Venue: Meeting room 1101, 11th Floor

7 presentations-Topic: "Building Energy Efficiency and Energy

Management"

Session Chair: Associate Prof. Mathias Cehlin

W0015 Presentation 7 (17:45~18:00) Heating energy use in China: the Current Situation, Challenges, and Possibilities **Qiaoran Wang**, Xianming Yang and Na Ma Yunnan University, China

Abstract- Heating energy consumption in China is continually increasing because of the rapid urbanization and accompanied rising living standards. A panoptic description of China's current heating status is still in need of developing effective heating policies. In this paper, heating policy in China was introduced and a brief summary of the status of heating in different parts of China was described, the key features were characterized. Then, current and foreseen challenges for China's heating energy use were analyzed. Finally, related policy suggestions were proposed and the future possibilities of heating energy-conservation in China were discussed.

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.

Morning, January 10, 2019 (Thursday)

Time: 10:15~12:00

Venue: Meeting room 1102, 11th Floor

7 presentations-Topic: "Renewable Energy"

Session Chair: Prof. Orawan Siriratpiriya

W0060 Presentation 1 (10:15~10:30) Solar Energy Potential in Bangka Belitung Islands, Indonesia Yuant Tiandho, Irwan Dinata, **Wahri Sunanda**, Rika Favoria Gusa and Dwi Novitasari Universitas Bangka Belitung, Indonesia

Abstract- Bangka Belitung Islands is one of the provinces in Indonesia which has hundreds of small islands. Because the islands are separated from each other it is almost impossible to distribute electricity from the main electricity source in the Bangka Island to all the islands. Because it is located in the tropic country, solar cells can provide an alternative solution to the fulfillment of electricity rather than create a distribution cable across the sea. The solar energy potential in Bangka Belitung Islands can be calculated based on climatological, meteorological, and geographical data. Various solar radiation transmittance coefficients have a higher value in the dry season. This condition indicates that in the dry season the total solar radiation is higher than in the rainy season. Due to the high value of total solar irradiance in the Bangka Belitung Islands, it reaches 4.95 kWh/m² day, it is interesting to utilize this potential to provide electrical energy in the Bangka Belitung Islands.

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.

Morning, January 10, 2019 (Thursday)

Time: 10:15~12:00

Venue: Meeting room 1102, 11th Floor

7 presentations-Topic: "Renewable Energy"

Session Chair: Prof. Orawan Siriratpiriya

W1018 Presentation 2 (10:30~10:45)

The Effect of Electric field on Glycerine Sedimentation and Reaction Acceleration using Multiple High Voltage Electrodes Designed for Biodiesel Production Tharin Ratanabuntha, Tanakorn Wongwuttanasatian and **Amnart Suksri** Khon Kaen University, Thailand

Abstract- Biodiesel is produced from fatty acids, using palm oil that is widely used in food industry as a raw material. This research aims to introduce an innovative method of acceleration in biodiesel production process. The biodiesel production was prepared by 1 liter substrate and conducted in the reactor chamber. The chamber was designed and built with coaxial cylindrical electrode consisted of multiple inner rod electrode and outer electrode. Supply high voltage level was at 10 kV and exposure time was 30 minutes. It is found that strong electric field can accelerate the rate of reaction on biodiesel production. The rate of glycerine sedimentation resulting from electric field process using single rod, double rod, triple rod and quadruple rod calculated from the results are 3.6, 4.2, 5.9 and 9.1 mL/min respectively. Electric field enhancement can be obtained by utilizing multiple rod electrodes so that the biodiesel reaction is confined within controlled environment. The fastest reaction process is by utilizing quadruple rod inner electrode. Glycerine yield separation was obtained at 100 milliliter within 11 minutes. This is 2.5 times faster than single rod configuration

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.

Morning, January 10, 2019 (Thursday)

Time: 10:15~12:00

Venue: Meeting room 1102, 11th Floor

7 presentations-Topic: "Renewable Energy"

Session Chair: Prof. Orawan Siriratpiriya

W1002-A Presentation 3 (10:45~11:00) Thermochemical advancement in technologies for the depolymerization of lignin **A Agarwal**, M Rana and J H Park Chonnam National University, Korea

Abstract- Lignin is one of the largest source of naturally occurring aromatic building blocks that possess immense potential to be employed as starting material for the production of value-added chemicals involving biofuels. Despite various challenges associated with lignin valorization, several strategies have emerged that could deliver value-added products in good yields. The present contribution aims to critically review recent advancements in thermochemical strategies for lignin depolymerization mainly focusing on acid/base/metal-catalyzed, and microwave-assisted degradation approaches. All lignin degradation strategies result in the production of an arsenal of several monomeric, oligomeric and polymeric compounds, with no single molecule being produced in significant amount. For large-scale production of biofuels and other value-added chemicals via lignin depolymerization, low cost and recyclable catalysts operating at mild reaction conditions needs to be explored.

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.

Morning, January 10, 2019 (Thursday)

Time: 10:15~12:00

Venue: Meeting room 1102, 11th Floor

7 presentations-Topic: "Renewable Energy"

Session Chair: Prof. Orawan Siriratpiriya

W0064 Presentation 4 (11:00~11:15)

The gasification Efficiency Improving by Self-Steam gasifier using RDF from municipal solid waste

T Khosasaeng and R Suntivarakorn Khon Kean University, Thailand

Abstract- This research aims to improve the efficiency of the gasification by self-steam gasifier stove (SSG) which has been designed to produce steam for using gasification system. The waste heat is generated around the heat exchanger with water for steam production. Then the experiment was conducted to produce syngas from an air gasification and self-steam gasification using Refuse-derived fuels (RDF) from municipal solid waste. The RDF with density of 930 kg/m³ and feed rate of 10 kg/hr was used as a fuel for gasification. The ER was varied from 0.15-0.50 in order to study the production of the producer gas and evaluate optimum point of heating value and cold gas efficiency for Comparison between air gasification had optimum ER of 0.35, with maximum syngas heating value of 5.87 MJ/Nm³ and The Self-steam gasification had optimum ER of 0.30 and steam feed rate of 0.96 kg/hr, with maximum syngas heating value of 6.56 MJ/Nm³. The self-steam gasifier shows higher cold-gas efficiency than the conventional gasifier of 13. 87%

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.

Morning, January 10, 2019 (Thursday)

Time: 10:15~12:00

Venue: Meeting room 1102, 11th Floor

7 presentations-Topic: "Renewable Energy"

Session Chair: Prof. Orawan Siriratpiriya

W0009 Presentation 5 (11:15~11:30) Estimation of the Monthly Global, Direct, and Diffuse Solar Radiation in Japan Using Artificial Neural Network Adi Kurniawan and Eiji Shintaku Hiroshima University, Japan

Abstract- In order to obtain the optimal design of solar energy system, the data of solar radiation should be provided. In this study, an estimation model of monthly solar radiation in Japan is developed using artificial neural network (ANN). The purpose of this study is to provide an accurate model to estimate the solar radiation, especially for the location where measured data is not available. The structure of ANN is constructed using geographical and 6 years-meteorological data between 2011-2016. The model has been validated by comparing the estimation results with measured solar radiation data on five different stations in 2017. Considering relatively small mean absolute percentage error (MAPE) and root mean square error (RMSE), it is believed that the proposed model could accurately predict the monthly solar radiation, which further could be used to obtain optimal design of solar energy system in Japan.

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.

Morning, January 10, 2019 (Thursday)

Time: 10:15~12:00

Venue: Meeting room 1102, 11th Floor

7 presentations-Topic: "Renewable Energy"

Session Chair: Prof. Orawan Siriratpiriya

W0077 Presentation 6 (11:30~11:45) Biomass pellets produced from filler cake as waste to energy in sugar industry K Pajampa, **T Wongwuttanasatian** Khon Kaen University, Thailand

Abstract- In the sugarcane and sugar industry, there is a waste produced from the manufacturing process called "Filter cake". It is a black solid sludge with the moisture content of 70-75%. In general, this waste is about 4% of the sugarcane mass input to the process. In every year, there are a large amount of filter cake resulting in high waste management costs. Therefore, the idea of conversion this waste to energy was proposed. The filter cake was dried off to the moisture contents of 40%, 45%, 50%, 55% and 60% and then fed into a pelletizer for the 5 different initial moistures. Then filter cake pellets were dried off by sun drying for 3 days. Dried pellets from different initial moistures were analyzed for physical properties. It was found that the pellet with initial moisture content of 40% has the best physical properties at the diameter of 4.0 mm and 68.4% of pellets felt into 30-40 mm of length. In addition, it has the highest bulk density, highest durability and lowest dust content of 222.03 kg/m³, 96.13% and 0.54% respectively. The proximate analysis and heating value were also determined for the dried pellets. The results showed that dried pellets contained 5.33% moisture, 35.67% ash, 51.33% volatile matter, 7.67% fixed carbon and the heating value of 11.71 MJ/kg. These properties were compared to other pellets and standard and it was suggested that the filter cake pellets can be used together with bagasse as fuel for a boiler in a sugarcane industry.

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.

Morning, January 10, 2019 (Thursday)

Time: 10:15~12:00

Venue: Meeting room 1102, 11th Floor

7 presentations-Topic: "Renewable Energy"

Session Chair: Prof. Orawan Siriratpiriya

W0034-A Presentation 7 (11:45~12:00)

Hydrogenase gene and Biohydrogen production by newly isolated *Bacillus* and *Clostridium* spp. from alternative carbon sources S Lertsriwong and C Glinwong

Chulalongkorn University, Thailand

Abstract- Biohydrogen is one of interested fuel for green trend of alternative energy. Biohydrogen production via fermentation has a key problems on yields of production. To overcome rate limited step, substrate, enzymes and culture condition can be varied. In parallel, novel efficient isolate of hydrogen producer is a critical parameter to determine production. In this study, new isolates of *Bacillus* and *Clostridium* species from industrial waste are focused in screening via biochemical and molecular identification process. Hydrogen production of each isolates were investigated by using molasses as a substrate for cultivation and fermentation. The isolate MO11 *Bacillus coagulans* is a choice in compare to benchmark *Clostridium butyricum* TISTR1032 which is previous published using DM medium supplemented with 15 g/L sucrose. After168 hr produce hydrogen gas 1.634 mol H₂/mol hexose detected by Drager tube. In comparison, the experiment performed by using *C. butyricum* feeding with 5 g/L glucose yields 1.4 mol H₂/mol glucose. Hydrogenase gene were detected by a set of primer for 4Fe-4S ferredoxin hydrogenase. ClustalW program is using for alignment and comparative analysis of hydrogenase detection.



Lunch (January 10) 12:00~13:00

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, January 10, 2019 (Thursday)

Time: 13:00~15:00

Venue: Meeting room 1101, 11th Floor

8 presentations-Topic: "Combustion Science and Power Engineering"

Session Chair: Assoc. Prof. Ratchaphon Suntivarakorn

W0001 Presentation 1 (13:00~13:15)Multi-objective optimization of SOFC systemsXiaojuan Wu, Ling He, Danhui Gao and Yuanyuan ZhuUniversity of Electronic Science and Technology of China, China

Abstract- For solid oxide fuel cell (SOFC) development, maximizing its electrical efficiency and minimizing its cost are two important optimization objects. A new optimization strategy is proposed in this work, which can maximize the SOFC electrical efficiency and minimize the cost in the case of an air leakage fault. The proposed optimization method involves a fault diagnosis module, a switching module and two backup optimizers. The fault diagnosis part is employed to identify the SOFC current fault type, and the switching module is used to select the appropriate backup optimizer. For the efficiency and cost are two conflicting objectives, the multi-objective optimization strategy based on a non-dominated sorting particle swarm optimization algorithm is applied to determine the trade-off solutions. The optimization results show the proposed method can achieve the maximum efficiency and the minimum cost in the case of SOFC normal, and even in the air leakage fault.

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, January 10, 2019 (Thursday)

Time: 13:00~15:00

Venue: Meeting room 1101, 11th Floor

8 presentations-Topic: "Combustion Science and Power Engineering"

Session Chair: Assoc. Prof. Ratchaphon Suntivarakorn

W0027 Presentation 2 (13:15~13:30)

Scaling of Heights and Widths of Laminar Jet Diffusion Flames under Subatmospheric Pressures

Pingchuan Ma, Haihang Li, jian Wang

University of Science and Technology of China, China

Abstract- The luminous shapes were presented to examine the scaling of flame heights and widths of laminar jet diffusion flames of burning methane, ethylene, and propane in a subatmospheric pressure chamber. All the flames examined were stable with no soot emitting.

The Reynolds scaling of $L/d \propto Re$ was generally suitable for the three hydrocarbon fuels although slopes were becoming steeper as soot formation elongated the flame height at high Re under high pressure. The regions of Froude number where buoyancy is dominant or buoyancy is unimportant were demonstrated by following Reynolds–Froude height scaling of

Altenkirch's model. In Froude scaling of width, the unchanged slopes between W/d and Fr with pressure increase indicated the good linearity of flame width changing on pressure. Finally, regression of the form $W/d \propto Fr^a \operatorname{Re}^b$ for flame width was also considered.

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, January 10, 2019 (Thursday)

Time: 13:00~15:00

Venue: Meeting room 1101, 11th Floor

8 presentations-Topic: "Combustion Science and Power Engineering"

Session Chair: Assoc. Prof. Ratchaphon Suntivarakorn

W0079 Presentation 3 (13:30~13:45)

Investigation of Intake Pressure and Fuel Injection Timing Effect on Performance Characteristics of Diesel Engine

Willyanto Anggono, Wataru Ikoma, Haoyu Chen, Zhiyuan Liu, Mitsuhisa Ichiyanagi, Takashi Suzuki and Gabriel J. Gotama

Petra Christian University, Indonesia

Abstract- The low fuel consumption and efficient power usage in diesel engine has made diesel engine more preferable in comparison with other type of engines. To raise the performance of DI (direct injection) diesel engine further, injection timing and intake pressure variation were studied under 2000 RPM (rotation per minute) engine rotation. This experiment used DI diesel engine with single cylinder. The length of stroke was set to 96.9 mm, the diameter of bore was set to 85 mm and the compression ratio of the engine was 16.3. The variations of injection timing were set for 1° after TDC (top dead centre) as advanced injection timing, while 3° after TDC as retarded injection timing. Boost pressures for intake pressure were varied with 20 KPa increments and started from 0 KPa to 60 KPa. In-cylinder pressure characteristics and heat release rate were used to evaluate the engine performance. The experiment indicated as the boost pressure raises, the heat release rate and in-cylinder pressure follow. The main injection timing advancement from 3° to 1° after TDC causes increase to the rise of in-cylinder pressure after TDC in DI diesel engine. This phenomenon is due to the slower combustion in retarded injection timing. For heat release rate, the advancement of injection timing causes the differences between various intake pressures to be more apparent.

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, January 10, 2019 (Thursday)

Time: 13:00~15:00

Venue: Meeting room 1101, 11th Floor

8 presentations-Topic: "Combustion Science and Power Engineering"

Session Chair: Assoc. Prof. Ratchaphon Suntivarakorn

W0018-A Presentation 4 (13:45~14:00)

Kinetic and thermal characteristics of co-combustion of oil shale and four agricultural wastes **Luyao Tang**

University of Nottingham Ningbo China, China

Abstract- The co-combustion characteristics of oil shale (OS) and four agricultural wastes (AW), including rice husk, wheat straw, sesame stalk and oil seed rape stalk, were investigated in this study. The thermogravimetric analysis (TGA) experiments were carried out within 30°C to 950°C by 20°C/min as heating rate. The characteristic index, combustion characteristics, co-combustion interactions, activation energy and blend ratio comparison were studied in this paper. Higher agricultural waste blend ratio was associated with easier ignition because of AW have higher volatile content (60.41% to 71.32%) than OS (18.79%). Activation energy reduction were observed by 10-30% after blend in AW in OS. Calculated data with different blend ratios also showed good consistence and recuperation with experimental data.

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, January 10, 2019 (Thursday)

Time: 13:00~15:00

Venue: Meeting room 1101, 11th Floor

8 presentations-Topic: "Combustion Science and Power Engineering"

Session Chair: Assoc. Prof. Ratchaphon Suntivarakorn

W0080 Presentation 5 (14:00~14:15)

Experimental investigation of the effect of *Nephelium lappaceum* seed biodiesel to the automotive diesel engine performance

Willyanto Anggono, Sutrisno, Fandi D. Suprianto, Muji Setiyo, Rendy Wibisono and Gabriel J. Gotama

Petra Christian University, Indonesia

Abstract- To decrease the reliance of fossil fuel and at the same time utilizing organic waste, an investigation regarding the viability of *Nephelium lappaceum* (rambutan fruit) seed oil as biodiesel has been conducted. The investigation was carried out by comparing the fuel characteristics of *Nephelium lappaceum* seed biodiesel with pure petro-diesel produced in Indonesia. The outcome of this investigation suggested that *Nephelium lappaceum* seed biodiesel has comparable fuel characteristics as that of commercial diesel fuel. Further comparison was also conducted by testing these fuels in diesel engine. The series of tests compared these fuels in terms of fuel consumption, brake mean effective pressure, thermal efficiency, torque, and power. The result indicates that *Nephelium lappaceum* seed biodiesel has better engine performance than pure petro-diesel. Overall, the output of this study proves the feasibility of *Nephelium lappaceum* seed biodiesel as environmentally friendly substitute for pure petro-diesel fuel in Indonesia.

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, January 10, 2019 (Thursday)

Time: 13:00~15:00

Venue: Meeting room 1101, 11th Floor

8 presentations-Topic: "Combustion Science and Power Engineering"

Session Chair: Assoc. Prof. Ratchaphon Suntivarakorn

W0069 Presentation 6 (14:15~14:30) Efficiency Improvement and Economic Analysis of Micro Hydro Power Plant by Using Twin Vertical Hydro Turbine **K. Tanutwutthigorn** and R. Suntivarakorn

Khon Kaen University, Thailand

Abstract- This research aimed at improving the efficiency of and comparing the production costs of micro hydropower plants by using twin vertical hydro turbines as low headwater sources. This micro hydropower plant was designed with the highest capacity of 3 kW and utilized a directly connected transmission system and induction generator by modifying two 3 HP induction motors. At the inlet area of the turbines, guide vanes were installed on the 25 turbines at 24 °. The ratio of turbine diameter was equal to 0.68. After the experiment was completed, it was found that the highest electrical power generated from the plant had been 1.38 kW with an efficiency of 49% at head 0.7 m. When compared to the plant without any installed guide vanes, the increase was 26.94%. Regarding the electrical production cost, the total cost was 5,844 USD or 1,948 USD/kW.

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, January 10, 2019 (Thursday)

Time: 13:00~15:00

Venue: Meeting room 1101, 11th Floor

8 presentations-Topic: "Combustion Science and Power Engineering"

Session Chair: Assoc. Prof. Ratchaphon Suntivarakorn

W0074 Presentation 7 (14:30~14:45) Study on the effect of ethanol content on the fire risk of nitrocellulose **R C Wei**, S S Huang, Z Wang, R Yuen, and J Wang City University of Hong Kong, China

Abstract- Obtaining the burning properties of nitrocellulose with different ethanol contents is necessary to reduce the possibility of nitrocellulose accidents in the process of handing, storage and usage. In this study, the effect of humectant content on the burning properties of NC was tested by the ISO 5660 Cone Calorimeter Test. It was noted that the amount of the ethanol content had little effect on the ignition time of nitrocellulose mixture. Both the maximum mass loss rate and the average mass loss rate of the sample decreased with an increasing ethanol content and gradually closed to fixed values. Also, it was concluded that the peak heat release rate of the sample was mainly contributed by the nitrocellulose component.

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, January 10, 2019 (Thursday)

Time: 13:00~15:00

Venue: Meeting room 1101, 11th Floor

8 presentations-Topic: "Combustion Science and Power Engineering"

Session Chair: Assoc. Prof. Ratchaphon Suntivarakorn

W0063 Presentation 8 (14:45~15:00)

The Effects of Blade Number and Turbine Baffle Plates on the Efficiency of Free-Vortex Water Turbines

P Sritram and R Suntivarakorn

Khon Kaen University, Thailand

Abstract- This article presents the results of the study on the effect of blade number and turbine baffle plates on the efficiency of a free-vortex water turbine. The laboratory experimentation performed to determine the power generation efficiency. The 2 to 7 blade water turbines were built and tested to find the most appropriate number of blades, and the result showed the 5 blade turbine being appropriate because it yields the highest torque from receiving impact from water flow. Next, the baffle plates were designed and attached to the top and bottom of the turbine blades. Four different sizes of space from 25% to 100% of the curve area around the blades were used. Experiments were carried out at the water flow rates of 0.04 to 0.06m3/s. The finding showed the 50% proportion of the curve area being most appropriate, and the blades installed with top and bottom baffle plates. It was also found that when the water flow rate increased, the system efficiency became higher.

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, January 10, 2019 (Thursday)

Time: 13:00~15:00

Venue: Meeting room 1102, 11th Floor

8 presentations-Topic: "Urban Engineering and Transportation

Engineering"

Session Chair: Prof. Jae K. Park

W3004 Presentation 1 (13:00~13:15)

How networks shape the spatial structure of less developed areas? -- a case study of south-central Yunnan, China

Jingxin Nie

Huazhong University of science and technology(HUST), China

Abstract- Since networking has become a recent trend of global regional development, scientifically measuring the characteristics of network association is the main task of studying regional structure. Most of the subjects in the existing research are concentrated on developed areas, but not enough attention is paid to the formation process of the urban system and networking characteristics in less developed areas. Taking the south-central Yunnan in China as an example, this paper analyzes the extent and characteristics of the association between cities and towns in this region with the social network analysis method, to construct the associated network through passenger flow, express logistics and capital flow data. It shows that the network characteristics of the spatial structure in south-central Yunnan are beginning to emergence but with a lesser degree. There are several important nodes for Kunming as the core, of which the gathering and interaction foster several town groups and north-south network corridors. The conclusion is that the network makes the regional structure more open and efficient, so that the resources can be well configured in the region. However, the backward geographical environment and infrastructure are still important factors restricting the evolution of the urban structure in underdeveloped areas. This paper suggests that the coordinated development of undeveloped areas should be promoted through infrastructure construction such as information and transportation, guiding the industrial cluster, creating regional dialogue organizations, and facilitating cross-border trade.

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, January 10, 2019 (Thursday)

Time: 13:00~15:00

Venue: Meeting room 1102, 11th Floor

8 presentations-Topic: "Urban Engineering and Transportation

Engineering"

Session Chair: Prof. Jae K. Park

W4018-A Presentation 2 (13:15~13:30) A Study on the Factors of One-Person Households Residential Choice in Small and Medium Cities in Korea Bae, Min-Cheu, Ahn, Jung-Geun, Jeong, **Won-Yeong, Jeong** Gyeongsang National University, South-Korea

Abstract- Recently, one-person households in korea are increased by changing educational environment, women's social activities, view point of wedding, and low birth rate. the government considering how to provide housing suitable for one-person households. This study aims to identify physical, social, environmental, and economic factors affecting the selection of residential housing for one-person households and provide basic materials for desirable housing supply. Based on the results of one-person household questionnaire, this study identified important factors to select residential housing of one-person household aspect. In the physical factors, ease access of facilities and convenience of transportation were found to be the most important factors to decide residential locations of one-person household. In the social factor, the rate of crime, the number of CCTVs, and the installation of unmanned home-delivery box were found to be the most important factors. In the environmental factor, maintenance costs and housing costs were found to be the most important factors.

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, January 10, 2019 (Thursday)

Time: 13:00~15:00

Venue: Meeting room 1102, 11th Floor

8 presentations-Topic: "Urban Engineering and Transportation

Engineering"

Session Chair: Prof. Jae K. Park

W2012 Presentation 3 (13:30~13:45)

A Study on the Motive Mechanism of the urban integration of Wuhan and Ezhou under the background of aviation metropolitan area construction

Jiawei Zheng

Huazhong University of Science and Technology, CHINA

Abstract- In the central city working conference, it was proposed to speed up the construction of the central city group centered on Wuhan. The urban integration of Wuhan and Ezhou as a pilot area of Wuhan city circle has attracted much attention. In addition, Shunfeng Airport has recently been located in Ezhou, the goal is to make Ezhou into an international freight transit. This paper expounds the driving factors of the urban integration of Wuhan and Ezhou and the transformation direction of the same city in the three aspects of economy, society, policy and so on. It is considered that the three driving forces of economy, society and policy take the same role in the process of urbanization. Diffusion, one-way demand "into" two-wheel drive, mutual attraction, further accelerate the process of urbanization.

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, January 10, 2019 (Thursday)

Time: 13:00~15:00

Venue: Meeting room 1102, 11th Floor

8 presentations-Topic: "Urban Engineering and Transportation

Engineering"

Session Chair: Prof. Jae K. Park

W5003-A Presentation 4 (13:45~14:00)

A study on Revitalization of the Local Small and Medium Sized Cities Based 6th Industrialization inKorea

Jung, Oh-Rock, Ahn, Jung-Geun and Kim, Dong-Seong

Gyeongsang National University, Korea

Abstract- Small and Medium Size Cities(SMSC) located in rural areas have difficult to vitalize owing to fragmentary manufacturing business. However, the 6th industrialization can be one of ways to contribute to the activation of SMSC. This study aims to suggest activation plan of 6th industrialization to promote the development of local small and medium cities through the analysis of the 6th industrialization of Gyeongnam Province in Korea. A factor analysis in applied to evaluate 6th industrialization with 20 indicators derived from advances cases of Japan and Korea. This study found out the activation of the 6th industrialization in small and medium cities. First, It is necessary to identify local resources and establish a medium and long-term plan so that local resources can be utilized for the projects. It is also necessary to establish and cooperate among governments, support centers, local residents, business entity governance. Second, SMSC need detailed programs and policies to encourage the participation of citizens. The policy should also focus on the win-win policy between urban-rural. Third, SMSC should have regional experts related to 6th industrialization and create a system that enables them to contribute the interests of 6th industrialization enterprises for the local economy and community.

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, January 10, 2019 (Thursday)

Time: 13:00~15:00

Venue: Meeting room 1102, 11th Floor

8 presentations-Topic: "Urban Engineering and Transportation

Engineering"

Session Chair: Prof. Jae K. Park

W3002 Presentation 5 (14:00~14:15) Research on the Point-in-time and Spatial Structure of Urban Integration in China **Pei Chen**, Ya-ping Huang Huazhong University of Science and Technology, China

Abstract- Regional integration development reinforces the influence and communication among intraregional cities. Meanwhile, big cities gradually turned to metropolitanization. In the dual transition situation of regions and cities, urban integration, called as Tongchenghua in Chinese, has become a kind of urban functional area in the last decade. There are subtle differences from commonly known urban conurbation; urban integration is initiated in China, and its practices precede the theories. Therefore, lacking of advanced theoretical guidance of both developed western countries and native academia provides a huge boost in the study on urban integration. The research applies diachronic and synchronic analysis on 13 whole samples and 4 sub-samples, based on socioeconomy data and satellite imagery. Firstly, the research defines the point-in-time of urban integration, by analyzing historical data of socioeconomy and satellite imagery. Secondly, it identifies the special characteristics of urban integration, by comparing the satellite imagery of all the urban integration areas synchronously. Finally, the research proposes 2 results. It names three points-in-time during the process of urban integration: the germinate point, the start point, and the grow point. And, according to the characteristics of spatial pattern, it names 3 types: concentrated-spread, multi-group fragmentation, and halfway-point growth. The research can promote the development of urban-rural regional structure theories, and guide the development and construction of practices of urban integration. Furthermore, it's aimed at constructing the first theory of regional development initiated in China, and setting the benchmark on the regional coordinated development for developing countries.

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, January 10, 2019 (Thursday)

Time: 13:00~15:00

Venue: Meeting room 1102, 11th Floor

8 presentations-Topic: "Urban Engineering and Transportation

Engineering"

Session Chair: Prof. Jae K. Park

W2003 Presentation 6 (14:15~14:30)

Urban Flood Scaling using Hydrologic and Hydraulic Models with Inception for Early Warning

Romeji Ngangbam, Amaljit Bharali, and Sonamani Kangjam NATIONAL INSTITUTE OF TECHNOLOGY MANIPUR, INDIA

Abstract- Urban floods are generally characterized by surge in runoff volumes resulting in high flow peaks and water depths incurring huge socio- economic losses. Hydrologic and hydraulic simulation tools integrated with ground survey inputs can be effectively used to simulate the movement of flood waters in intricate urban environments. Integration of hydrological-hydraulic flood models supported by geospatial tools and hydro-meteorological analysis is one effective measure to comprehend urban flooding. Numerical Weather Prediction (NWP) models as WRF aided aided by Nowcasting DWR observations is one resourceful tool for urban flash flood forecasting. The NWP forecasted precipitation data is conglomerated to a distributed hydrological model to derive flood hydrographs. The theme of the study is to establish flood runoff thresholds in one of the most flood-prone urban region of India - Guwahati city, by simulating the spatial flooding extents, developing flood runoff thresholds and to scale the flood events. Database build up for actual flooding events, ground reconciliation using ETS-RTK survey, setting up of Base Flood Elevation (BFE) points for hydraulic model integration was done. The resulting hybrid DEM (1m resolution) was adopted for building the spatially-distributed hydrological model in HEC-HMS. Model runs were carried out to derive flood runoff hydrographs and peak discharges using time series NWP-WRF and AWS data. Drainage active areas, building footprints and blockages in storm drains were laid over the high resolution 1m bathymetric grid in hydraulic MIKE FLOOD model. Flood inundation simulation using runoff hydrographs were carried out under source/sink pairs. Schematization of the simulated flood inundation layers using threshold scales of flood discharges was used to develop a scaling of the urban flooding in Guwahati, with early warning inception.

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, January 10, 2019 (Thursday)

Time: 13:00~15:00

Venue: Meeting room 1102, 11th Floor

8 presentations-Topic: "Urban Engineering and Transportation

Engineering"

Session Chair: Prof. Jae K. Park

W2010 Presentation 7 (14:30~14:45)

The planning strategy of the "New town" around the metropolitan area from the perspective of urban-rural relationship change

Geng hong; **Pang kelong**

Huazhong University of Science and Technology, China

Abstract- With the transformation of township production mode, small towns have the economic function to integrate the resources of town-rural effectively. With the gradual emergence of the regional sharing of service facilities, the small towns around the metropolitan area have assumed the service function of realizing the urbanization of farmers. Under the trend of the change of township functions in small towns around the capital city, some central towns have been transformed into new towns and become an important space carrier for urban and rural integration. This paper takes Wangji street planning practice as an example to explore the planning strategy of the new town under the background of the function of the town in the surrounding towns. Break the administrative unit of the thinking mode of "town", establish a new mechanism of coordinated development, bridging with break phenomenon in the daily life and development of construction, combined with their own resources endowment of path planning is put forward, to provide the reference for the research of new town planning method.

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, January 10, 2019 (Thursday)

Time: 13:00~15:00

Venue: Meeting room 1102, 11th Floor

8 presentations-Topic: "Urban Engineering and Transportation

Engineering"

Session Chair: Prof. Jae K. Park

W0088 Presentation 8 (14:45~15:00) Experimental study on luggage-laden pedestrian movement in narrow seat aisle **Shenshi Huang**, Ruichao Wei, Siuming Lo, and Shouxiang Lu University of Science and Technology of China, China

Abstract- The experiment of one-dimensional luggage-laden pedestrian movement in narrow seat aisle were performed in this study, to investigate the hindrance effect of seat configuration on pedestrian flow. In a seat arrangement similar to a vehicle carriage, experiments of individual walking and single-file pedestrian flow were carried out respectively. The result shows that carrying luggage has little effect on pedestrian walking ability. However, Carrying large luggage such as trolley case can significantly increase the distance headway of pedestrians. It is also found that, although the pedestrian dynamic pattern in narrow seat aisle was similar to that in open environment, the randomness of narrow seat aisle environment shows obviously greater.



Coffee Break & Group Photo Taking

15:00~15:20

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, January 10, 2019 (Thursday)

Time: 15:20~16:50

Venue: Meeting room 1101, 11th Floor

6 presentations-Topic: "Battery Technology and Photovoltaic System

Optimization"

Session Chair: Prof. Kondo Akira

W0049 Presentation 1 (15:20~15:35) Experimental analysis on lithium iron phosphate battery over-discharged to failure **Dongxu Ouyang** and Jian Wang University of Science and Technology of China, China

Abstract- In this paper, a series of experiments were performed to investigate the thermal and electrical characteristics of a commercial lithium ion battery (LIB) over-discharged to failure. Specific information including voltage, current, capacity and battery surface temperature were measured and analyzed. According to the results, it is demonstrated that batteries behave obvious temperature rise during the over-discharge process and the temperature rise increase with the increasing charge rate. Besides, the LFP (lithium iron phosphate) exhibits gentler temperature rise than the NMC (nickel manganese cobalt oxide) battery in the over-discharge process. And the discharge rate is found there no huge effect on the lost capacity of battery when it is over-discharged to failure.
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, January 10, 2019 (Thursday)

Time: 15:20~16:50

Venue: Meeting room 1101, 11th Floor

6 presentations-Topic: "Battery Technology and Photovoltaic System

Optimization"

Session Chair: Prof. Kondo Akira

W0008-A Presentation 2 (15:35~15:50)

A random donor polymer based on an asymmetric building block to tune the morphology of non-fullerene organic solar cells

Jing Liu, **Lik-Kuen Ma**, Zhengke Li, Huawei Hu, Tingxuan Ma, Chenhui Zhu, Harald Ade, & He Yan

Hong Kong University of Science and Technology (HKUST), Hong Kong

Abstract- Non-fullerene organic solar cells (NF-OSCs) require donor polymers with different morphological properties from those used in fullerene devices to achieve optimal cell performance. In this paper, we report a random donor polymer (PTFB-M) constructed from an asymmetric donor unit (T- FB-T-M), which can effectively tune the morphology and thus enhance the performance of NF-OSCs. Compared with its analog polymer PTFB-P based on a C2 symmetric monomer, the asymmetric T-FB-T-M unit introduces some randomness in the PTFB-M polymer yielding several beneficial effects. Firstly, although the neat PTFB-M film exhibits slightly reduced crystallinity and hole mobility compared to PTFB-P, it can, to our surprise, better maintain its crystallinity when blended with non-fullerene acceptors, hence yielding NF-OSCs with higher hole mobility and fill factors (FF) compared to devices based on PTFB-P. In addition, PTFB-M also exhibits smaller and more favourable domain sizes in NF-OSCs, leading to higher external quantum efficiency (EQE) and short circuit current density (Jsc). As a result, when combined with a small molecule acceptor (SMA) ITIC-Th, PTFB-M yields a power conversion efficiency (PCE) of 10.4%, whereas the PCE is only 8.4% for PTFB-P:ITIC-Th-based cells. This provides a useful approach to tune the morphology of donor polymers and to enhance the performance of NF-OSCs.

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, January 10, 2019 (Thursday)

Time: 15:20~16:50

Venue: Meeting room 1101, 11th Floor

6 presentations-Topic: "Battery Technology and Photovoltaic System

Optimization"

Session Chair: Prof. Kondo Akira

W0013 Presentation 3 (15:50~16:05) Power Acquisition Effect for Appropriate Placement of MPPT Units in a PV Array **Yusuke Takeda,** and Kazutaka Itako Kanagawa Institute of Technology, Japan

Abstract- The PV generation system operates in maximum power point of PV array by MPPT control of power conditioning system (PCS). However, there is a problem that maximum power of the PV array configuration greatly decreases by partial shadow. For this problem, the authors previously proposed the method which connects MPPT unit to every PV panel between PCS and PV array. Moreover, the effect of this method was demonstrated by simulations and experiments. In the present day, this method is in practical use. However, the appropriate placement of MPPT units was still not clear. The authors previously investigated the appropriate placement of MPPT units from the viewpoint of acquisition of electric power and system stability, simulating P-V and I-V characteristics of some representative patterns connected MPPT unit to each PV panel in the PV array configuration. In this paper, power increase rate of the proposed PV array system is evaluated in experiment, compared to the conventional PV array system. It is clarified that maximum power of the proposed PV array system.

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, January 10, 2019 (Thursday)

Time: 15:20~16:50

Venue: Meeting room 1101, 11th Floor

6 presentations-Topic: "Battery Technology and Photovoltaic System

Optimization"

Session Chair: Prof. Kondo Akira

W1008 Presentation 4 (16:05~16:20)

Cooling enhancement of photovoltaic cell via the use of phase change materials in a different designed container shape

Tachakun Sarikarin, Tanakorn Wongwuttanasatian and Amnart Suksri Khon Kaen University, Thailand

Abstract- During the electricity generation of photovoltaic (PV) cells, large fraction of solar radiation gets converted into heat which raises the temperature and decreases the electrical efficiency. In order to reduce the heat accumulation, there are several methods that can be applied to cooling the solar panel. One of the simple and efficient approaches is to use the phase change materials (PCM) as a heat absorber. This research is the designed and constructed a housing container for filling up palm wax that is used as a PCM. The designed PCM containers are groove type, tube type, and fin type. Experiment was to compare the PV cell that installed the designed with PCM (test module) and with non-installed PCM containers (reference module). Exposure time for solar radiation is carried out from 9:00 AM to 5:00 PM at an atmospheric condition in Khon Kaen, Province of Thailand (latitude, $16 \circ 25' 50''$ N and longitude, $102 \circ 37' 0''$ E). Results showed that when the time is at 11:00 AM to 1:00 PM, solar radiation yield the most constant value. It was found that the designed fin type achieved the most outstanding heat reduction when compare with other designed prototype. The designed fin type has also reduced an average temperature by 6.167 °C and the average electrical efficiency is increased by 4.858 per cent.

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Afternoon, January 10, 2019 (Thursday)

Time: 15:20~16:50

Venue: Meeting room 1101, 11th Floor

6 presentations-Topic: "Battery Technology and Photovoltaic System

Optimization"

Session Chair: Prof. Kondo Akira

W0028 Presentation 5 (16:20~16:35) Discussion on Module-Based Hot-Spot Suppression in a PV Generation System **S Yang,** K Itako, T Kudoh, K Koh, and Q Ge Kanagawa Institute of Technology, Kanagawa, Japan. Yangzhou University, China.

Abstract- This paper presents a novel control system for the hot-spot detection and suppression in a photovoltaic (PV) generation system. In this novel system, a distributed structure of a PV string is employed by installing a buck-boost converter to each module. Following this structure, a systematic control strategy is proposed for the module-based hot-spot detection. Moreover, the safe operation is adopted to suppress the prolonged high temperature when the hot-spot is detected. On the other hand, the normal modules can work at their maximum power point tracking (MPPT), respectively. On this occasion, the PV string could be smart because every module could function in their optimal state which is determined to their respective conditions. In order to validate this novel control system, the experiments have been carried out in a laboratory prototype. The verified results show that the PV generation system can operate safely at module level by using this novel control system.

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Afternoon, January 10, 2019 (Thursday)

Time: 15:20~16:50

Venue: Meeting room 1101, 11th Floor

6 presentations-Topic: "Battery Technology and Photovoltaic System

Optimization"

Session Chair: Prof. Kondo Akira

W0010 Presentation 6 (16:35~16:50) Forecasting annual energy consumption using machine learnings: Case of Indonesia **Robi Kurniawan** and Shunsuke Managi Tohoku University, Japan

Abstract- To understand the future trajectory of energy consumption, we propose to utilize two different machine learning algorithm, artificial neural networks (ANN) and a model tree. Taking Indonesia as a case, the annual gross energy consumption was estimated by modelling a function of urbanization, real GDP per capita proxy for affluence (economic growth), and real capital use per capita. Utilizing the time period of 1971–2014, we train and test the model. Utilizing the root mean square error and the mean absolute error for model selection, we found the tree-based model has a better performance rather than the ANN. Having more superior performance, the tree-based model was then used to forecast the annual energy consumption for the future years. Using specific scenario, the energy consumption is predicted will increase from 883 kg per capita in 2014 to become 1243 kg per capita in 2040. Providing better accuracy, the approach applied in this study can easily be replicated for other countries. Furthermore, it also can be considered in simulating energy demand and environmental consequence in the future.

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Afternoon, January 10, 2019 (Thursday)

Time: 15:20~17:05

Venue: Meeting room 1102, 11th Floor

7 presentations-Topic: "Geological and Civil Engineering"

Session Chair: Assoc. Prof. Wan Yaacob W.Z

W4020 Presentation 1 (15:20~15:35) Slope Stability Analysis at Hilly Areas of Kuala Lumpur, Malaysia Ismail N.I., **Wan Yaacob W.Z.** and Md. Ali N.A Universiti Kebangsaan Malaysia, Malaysia.

Abstract- Landslides occur almost every year in Malaysia, especially during the rainy season. Landslide tragedies can cause extensive damage and fatalities. For this research, two case studies on landslide investigation were conducted on slope areas in Kuala Lumpur using geophysical, geotechnical and slope modelling methods. Accordingly, the purposes of the present study are to characterise the subsurface conditions based on the information obtained from borehole drillings, laboratory testings and geophysical measurements, to carry out slope stability analysis of the investigated soil slopes and to recommend suitable rectification works. A total of eight seismic refraction survey lines and 13 boreholes drilling were carried out in these study areas. A well-established computer program 'SLOPE/W' developed by GEO-SLOPE was deployed by adopting a limit equilibrium method (LEM) to determine the factor of safety (FOS) for the slopes. The findings of this study showed that the geophysical methods coupled with borehole drillings and slope stability analysis were useful tools for the characterisation of slope failure via subsurface profiles and engineering properties of soil and could be used as guidelines for the investigation of similar slope conditions. Results from the seismic refraction survey have provided information of weathering and rippability of the bedrock. Based on the analysis, the FOS were less than 1.5 which signify the inherently unstable slopes, thus, suitable remedial measures were proposed to improve the stability of the slope. The application of soil-nail will provide a reinforcing action to the soil mass, thereby increasing the stability of the slope.

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Afternoon, January 10, 2019 (Thursday)

Time: 15:20~17:05

Venue: Meeting room 1102, 11th Floor

7 presentations-Topic: "Geological and Civil Engineering"

Session Chair: Assoc. Prof. Wan Yaacob W.Z

W4015 Presentation 2 (15:35~15:50) DIGITAL MAPPING OF HARD SOIL DEPTH IN BANJARMASIN CITY **MA'RUF, M. A.**, RUSLIANSYAH, FITRIATI, U., RACHMAN, A. A. UNIVERSITY of LAMBUNG MANGKURAT, INDONESIA

Abstract- In the area of Banjarmasin City, a lot of data has been obtained well based on CPT data or SPT data. But for now, there is no information that summarizes the depth of hard soil in the city of Banjarmasin, especially in the form of digital maps. In in the field of civil engineering, the use of GIS has been widely applied to help map depth and type of soil. There has been a lot of research done using the CPT data and the GIS application. This kind of map holds important value for field work practice, especially in civil engineering. Therefore, it is necessary to make an initial concept of a digital map that can later be used as a starting point for foundation work in the city of Banjarmasin. The result of this study is a map of the depth of hard soil in the city of Banjarmasin with the help of GIS software. From the results of soil depth data based on CPT and SPT point test, the depth distribution of hard soil in the city of Banjarmasin varies from 28 m to 42.4 m. For areas that are not covered by the test location, a linear interpolation method is used. This depth varies in each region, between 30-40 m in Banjarmasin Utara, 36-42.4 m in Banjarmasin Barat, Banjarmasin Selatan, and Banjarmasin Tengah, and 28-40 m in Banjarmasin Timur.

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Afternoon, January 10, 2019 (Thursday)

Time: 15:20~17:05

Venue: Meeting room 1102, 11th Floor

7 presentations-Topic: "Geological and Civil Engineering"

Session Chair: Assoc. Prof. Wan Yaacob W.Z

W2011 Presentation 3 (15:50~16:05) Risk Analysis and Treatment on Seepage and Breaking of Tailings Dam **Guangming Yu**, Yingnian Yu, Irina V.Menshova, Daning Wang, Xiankun Zeng Qingdao University of Technology, China

Abstract- Online monitoring has been done in the Mengku tailings dam which stores iron ore. On September 14, 2016, the data of the monitoring points above 950m were obviously abnormal, then the field investigation was immediately carried out. The investigation showed that there were serious seepage problems on the dam slope and the swamping phenomenon occurred on the surface of dam. On the basis of the project research and practice, analyzing the seepage problems with the hydraulic method that deduced by Darcy's law, calculating the seepage line equation of this segment and verifying the results by numerical simulation. The hydraulic gradient of spill point, the hydraulic gradient of flowing soil damage and the hydraulic gradient of piping damage are calculating, it found that the hydraulic gradient of spill point is less than the hydraulic gradient of flowing soil damage and the hydraulic gradient of piping damage, so a conclusion is drawn that the cross section has water seepage phenomenon, but the phenomenon doesn't lead to flowing soil damage or the piping damage. In order to quickly eliminate the accidents, some effective measures of precipitation should be used to avoid the happening of the dam damage.

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Afternoon, January 10, 2019 (Thursday)

Time: 15:20~17:05

Venue: Meeting room 1102, 11th Floor

7 presentations-Topic: "Geological and Civil Engineering"

Session Chair: Assoc. Prof. Wan Yaacob W.Z

W3005 Presentation 4 (16:05~16:20) The Investigation and Discussion of Maintenance Situation of Old Residences in Shanghai **Fan Liu**, Jianwu Pan, Liang Xu Nanjing University of Aeronautics and Astronautics, China

Abstract- There are a huge amount of old residential buildings in Shanghai which involve a large number of residents. With the aging of the buildings, structural or architectural problems are exposed. Therefore, it is necessary to investigate the old residential buildings. This paper collects the data of 34 old residential clusters in three districts of Pudong New Area of Shanghai by means of questionnaire and field survey. It analyzes the causes of the differences in architectural problems of old houses in different regions, different ages and different types of structures. This paper also probes into the causes of structural problems of old residential buildings. And it accumulates important basic data for improving the comprehensive renovation level of old residential buildings and perfecting related laws and regulations in Shanghai.

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Afternoon, January 10, 2019 (Thursday)

Time: 15:20~17:05

Venue: Meeting room 1102, 11th Floor

7 presentations-Topic: "Geological and Civil Engineering"

Session Chair: Assoc. Prof. Wan Yaacob W.Z

W4019-A Presentation 5 (16:20~16:35)

Analytical Research on External Diaphragm Connections using Finite Element Model **Yoo, Jung-Han**

Seoul National University of Science and Technology, Republic of Korea

Abstract- This study is a basic study to develop an improved design formula for CFT moment connections with external diaphragms. The external diaphragm, which is used as a typical reinforcement method of concrete-filled circular steel pipe columns, is excellent in workability because it does not cut the steel pipe columns at the time of joining and has the advantage of minimizing the occurrence of pores in the steel pipe when filling concrete. However, there is no formal standard in Korea yet. Since the Korean building structure standard uses the modified design formula to the yield strength level, so there is a limit to evaluate capacity design and seismic performance. In this study, the design equation of AIJ2008, which can calculate the plastic stiffness reduction point, the maximum yield strength and the maximum deformation, of the outer diaphragm moment joint was introduced and an analytical model using the finite element analysis program was developed to calculate the simple tensile behavior of the actual diaphragm moment joint.

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Afternoon, January 10, 2019 (Thursday)

Time: 15:20~17:05

Venue: Meeting room 1102, 11th Floor

7 presentations-Topic: "Geological and Civil Engineering"

Session Chair: Assoc. Prof. Wan Yaacob W.Z

W2006 Presentation 6 (16:35~16:50) Parametric Finite Element Analysis for the Modular Expansion Device of Long-span Bridge **Fang Wu**, Minghua Zhou, Jianwu Pan Nanjing university of aeronautics and astronautics, China

Abstract- In order to research the cause of disease in modular expansion joints, in this paper, based on the secondary development, a general static analysis program has been compiled to facilitate the analysis of the integral finite element model of modular expansion joints. On this basis, the parameter analysis of modular expansion joints has been carried out using this program, mainly discuss the factor that affect the horizontal displacement of lamella. Moreover, the effect of the failure of sliding spring and control spring has been analyzed. The formula for the horizontal displacement of lamella is presented. The results show that the rigidity of control system and the condition of edge beam have a larger influence on horizontal displacement of lamella, then is friction coefficient of contact element, pre-tightening force and stiffness of sliding spring. Moreover, the failures of sliding spring and control spring are all close to the end of sliding. The research can provide scientific basis for the disease mechanism and the disease control of modular expansion joints.

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Afternoon, January 10, 2019 (Thursday)

Time: 15:20~17:05

Venue: Meeting room 1102, 11th Floor

7 presentations-Topic: "Geological and Civil Engineering"

Session Chair: Assoc. Prof. Wan Yaacob W.Z

W1028-A Presentation 7 (16:50~17:05) How to Measure Behaves of Bubble When Water Is Boiling along the Flow Channel **S.H. Kim**, I.W. Park, and Y.G. Lee Jeju National University, Korea

Abstract- How bubble behaves is an interesting phenomenon. It can be observed in nature and also various energy conversion systems. To explore the phenomenon, it could be important to measure the dynamics of bubbles. From this attempt, it could be possible to find a significant effect of bubble dynamics on general parameters of flow boiling. In this study, we considered the steam-water subcooled boiling flow system in a vertical channel since it has been applied in various systems. Experiences were performed by circulating water through the flow channel and heating the tube located at the middle of the flow channel to generate bubbles. The length, inner diameter and outer diameter of the channel are considered as 2.664 m, 10 mm and 30 mm. The optical fiber probes were used in 40 different positions (each 10 radial positions at 4 elevations) to measure the local void fraction, the velocity of the bubbles and the length of the bubbles. From this study, profiles of the void fraction along the radial and perpendicular directions were obtained. We expect that the obtained data can be applied for the assessment of boiling models which can be implemented in a computational fluid dynamics code.

January 10, 2019 (Thursday)

Time: 9:00~17:30

14 presentations

W2002-A Presentation 1 Evaluation of the Importance of CPTED Items in School Facility **Jongsik Lee** Songwon University, Republic of Korea

Abstract- Since 2005 the Korean government has also set CPTED(Crime Prevention through Environmental Design) guidelines and applied them to school facilities designs. According to the Korean National Police Agency, the total number of crimes decreased in 2005, when CPTED was applied to school facilities, however, the percentage of crimes incurred in school facilities for all crimes is not decreasing. Despite the fact that CPTED has been applied and built in school facilities in 2005, there are many reasons why the rate of crime in school facilities does not decrease. In this study, it was considered that the degree of design for CPTED should be different according to the environmental conditions when designing school facilities for crime prevention at school facilities, and the weight of each CPTED item was calculated and its Importance was evaluated. The CPTED guidelines for Korea, the United States, the United Kingdom and Japan were analyzed, and the evaluation items of two-tier school facilities (large classification and middle classification) suitable in Korea were composed. The Delphi technique was used to compose 24 detailed evaluations for each of the middle classification items. The AHP and the eigenvector method were used to analyze the possibility of crime in relation to the evaluation items of the large classification and middle classification of two-tier school facilities, and weights were calculated. The weight of 'D. Internal space of the building' had the highest weight among the evaluation items of the large classification. The weight was 0.32 and it is analyzed that the crime related to 'D. Internal space of the building' was most likely to occur. Among the evaluation items of middle classification, 'D. Internal space of the building', had the highest weight among the evaluation items of the large classification. The weight of the 'D4. Restroom' was the highest at 0.15 and it is analyzed that the crime related to the 'D4. Restroom' was most likely to occur.

January 10, 2019 (Thursday)

Time: 9:00~17:30

14 presentations

W5005 Presentation 2 Thailand's Floating House Project: safe and sustainable living with flooding **Panarat Saengpanya** Faculty of Engineering, Ramkhamhaeng University

Abstract- Thailand is suffering from the major floods in the recent years. Numbers of people were killed properties were damaged, and livelihoods were aggravated by flood water. Such destructions give a sign of adaptation to this natural disaster. In fact, flooding happens almost every year in Thailand during the monsoon season. Government sector has announced "Thailand's Water Resource Management Strategy" as a framework for all dimensions of water management. Apart from an implementation of 'Thailand's Water Resource Management Strategy', community has an option to counterpart flooding in the non-defensive way. Back in the past, Thais were conventional to living with water; majority of transportation took place in canal network, elevated houses tell a clear story of amphibious way of life. Houses in the former time were elevated against seasonal flood waters. Currently, cost effective amphibious houses are being developed as an alternative to conventional elevated house to fit more for future urbanization, sustainable living and help community enhance flood resilience in more convenient way.

January 10, 2019 (Thursday)

Time: 9:00~17:30

14 presentations

W5004-A Presentation 3 A Study on the Actual Utilization of Parking lots and Parking Countermeasures for Urban Regeneration District **Geun-Mo Park**, Jae-Rak Ahn Gyeongsang National University, South-Korea

Abstract- The old city center of Gwangyang is undergoing urban regeneration project. Local residents want to secure a parking lot as part of their urban regeneration project. In addition, Gwangyang City is also planning to increase parking lots continuously. However, the financial resources of the project are limited and there is a risk that too much cost will be incurred in securing the parking lot. The purpose of this study is to clarify the characteristics of utilization of parking lots in Gwangyang old city center, which is undergoing urban regeneration. Also we propose solutions to the situation where there is a conflicting opinion on the problem of securing the parking lot. In this study, we analyzed the land use status of target area and utilization of parking lots. First, we reviewed the parking policy and system of Gwangyang city. Next, the distribution and utilization of parking lot and empty land were investigated through field survey and drone shooting. We also conducted a questionnaire survey on the use of parking lots for residents. As a result of the study, the total capacity of the parking lot designated by the law of the area is 3,283, enough to accommodate 2,266 of the estimated number of cars in the old city center. The average number of parked vehicles during the survey period is 1,762, which does not exceed the total number of parking lots. The maximum daily parking lot usage level was only 40%. Despite the availability of parking space, approximately 47% of all parked vehicles were illegally parked. Thus, the size of the parking lot built in the center is sufficient to cover the total demand. However, due to the parking behaviors centered on the street parking, it is considered that the actual parking lot utilization rate is not high. This phenomenon is presumed to be caused by quantitative factors such as location of parking lot and awareness problem. In addition, there are problems in terms of operation such as parking habit of the driver who wants to park near the residence, parking interruption, and so on. Therefore, it is necessary to review the appropriateness of the location of the parking lot, to change the function of the parking lot with low utilization rate, and to have an efficient operation plan.

January 10, 2019 (Thursday)

Time: 9:00~17:30

14 presentations

W0019-A Presentation 4 Effects of Solution-processed In-doped ZnO Thin Films for Bulk Heterojunction Organic Photovoltaics Guo-Sian Ciou, Jin-Bin Yang, Zong-Liang Tseng,Sheng-Yuan Chu,and **Chun-Cheng Lin** Taiwan Air Force Academy, Taiwan

Abstract- In-doped ZnO (IZO) thin films served as electron transport layer (ETLs) for P3HT:PCBM bulk heterojunction (BHJ) photovoltaic applications are investigated. It is found that the photovoltaic device exhibits improved electric and optical properties under IZO ETLs with different indium contents. The results show that the optimal conversion efficiency of the device at AM1.5G illumination was 4.18% for 5% IZO, which is due to an improved fill factor (FF) than the un-doped ZnO. In addition, the device maintains a good performance after 100-times bending test, which indicates a highly stable and efficiently flexible behavior.

January 10, 2019 (Thursday)

Time: 9:00~17:30

14 presentations

W0092-A Presentation 5 Mesoporous TiO2/ZnO interfacial layers templated by graft copolymer for quasi solid state dye-sensitized solar cells

Seung Man Lim, Jeong Min Lim, Juyoung Moon, Gyo Hun Choi, Jung Tae Park Konkuk University ,South Korea

Abstract- A graft copolymer based mesoporous TiO2/ZnO interfacial layers for quasi solid state dye-sensitized solar cells (QDSSCs) has been fabricated by the sol-gel method. The features of the mesoporous TiO2/ZnO interfacial layers were tested by SEM, EDS, and UV-vis spectroscopy. The cells were systemically tested by the photocurrent-voltage (J-V) curve, and EIS techniques. The mesoporous TiO2/ZnO interfacial layers was found to accelerate electron transfer, light harvesting and retard electron recombination, eventually leading to an efficient improve in energy conversion efficiency. The QDSSCs assembled with the interfacial layer consisting of mesoporous TiO2/ZnO exhibited short-circuit current density (JSC) of 9.8 mA cm-2, open-circuit voltage (VOC) of 0.76 V and conversion efficiency of 5.0%, which were higher than that without interfacial layer (4.2 %).

January 10, 2019 (Thursday)

Time: 9:00~17:30

14 presentations

W0043 Presentation 6 Influence of first-stage temperature on emissions and retention of heavy-metal in two-stage gasification **Chiou-Liang Lin** and Wang-Chang Weng

National University of Kaohsiung, Taiwan.

Abstract- The emissions and retention of Cu and Pb during the gasification process were investigated when different first-stage temperatures and equivalence ratios (ER) were employed. The experimental results showed that heavy-metal retention in the bed material was higher, as a decrease in temperature led to reduced heavy-metal evaporation and increased heavy-metal retention when the first-stage temperature was lower. Therefore, the second-stage retention was influenced by the decrease in the first-stage heavy-metal emissions. With lower ER ratios, a greater amount of fly ash was generated, and heavy metals evaporated and adhered to the fly ash more readily, which led to lower heavy-metal content in the bottom ash and increased heavy-metal content in the fly ash. Additionally, Pb content in the bottom ash was lower because of higher volatility. Most of Cu was stayed in the bottom ash owing to lower volatility.

January 10, 2019 (Thursday)

Time: 9:00~17:30

14 presentations

W0091-A Presentation 7

Ag nanoparticle decorated bi-functional TiO2 nanostructures templated by graft copolymers demonstrating high photoelectrochemical water splitting performance **Gyo Hun Choi**, Seung Man Lim, Jeong Min Lim, Juyoung Moon, Jung Tae Pak Konkuk University, South Korea

Abstract- Ag nanoparticle decorated bi-functional TiO2 nanostructures have been successfully prepared by a hydrothermal method relying on the redox reaction between Ti and Ag precursor with graft copolymer as structure direct agent for the first time. The as-designed Ag remarkable nanoparticle decorated bi-functional TiO2 nanostructures showed photoelectrochemical (PEC) water splitting performance under illumination with visible light because of surface plasmon resonance (SPR) of Ag NPs. The PEC water splitting performance of the Ag nanoparticle decorated bi-functional TiO2 nanostructures indicated that the structure direct agent-assisted hydrothermal synthesis strategy is effective in creating large surface area and visible light absorption of plasmonic metal nanoparticle based photoanode for efficient solar energy conversion.

January 10, 2019 (Thursday)

Time: 9:00~17:30

14 presentations

W0031 Presentation 8 Understanding and modeling climate impacts on ecosystem dynamics with FLUXNET data and artificial intelligence **NY Zhu,** XL Yu, SR Zhang, ZS Liu, YW Tong Columbia University, USA.

Abstract- Since preindustrial era, the radiative energy balance of the earth system has been largely perturbed by anthropogenic activities such as CO2 emissions from fossil fuel burning. As a net effect, global temperature increasingly warms up and will further increase in the future if CO2 concentration in the atmosphere keeps going up. Plants sequestrate a large amount of atmospheric CO2 via photosynthesis, thus greatly mediate the global warming. In this study, we aim to model the temporal dynamics of photosynthesis for various different vegetation types and further understand controlling factors of photosynthesis machinery. Our results showed that the photosynthesis and its interactions with climate drivers, such as temperature, precipitatin, radiation, and vapor pressure deficit, has an internal system memory about 14 days. Thus, the predictive model could be best trained with historical data of the past two weeks and could best predict future temporal evolution of photosynthesis in the following two weeks. Our leave-one-out experiment also showed that temperature and solar radiation dramatically control grassland and forest photosynthesis activity.

January 10, 2019 (Thursday)

Time: 9:00~17:30

14 presentations

W0093-A Presentation 9

Effective WO3 nanofiller based electrolytes for efficient quasi solid-state dye sensitized solar cells

Juyoung Moon, Gyo Hun Choi, Seung Man Lim, Jeong Min Lim, Jung Tae Park Konkuk University ,South Korea

Abstract- Effective composite electrolytes of different morphological types of WO3 nanofiller (D-WO3, NP-WO3) and polyethylene glycol (PEG) were prepared for the fabrication of quasi solid-state dye sensitized solar cells (QDSSCs). The morphological and structural studies revealed that the crystallinity of WO3 nanofiller based electrolyte was lower than PEG only. QDSSCs fabricated with XX-WO3 nanofiller based electrolyte presented the highest conversion efficiency of X.X % with high JSC of XX.X mA/cm2 and VOC of X.XX V as compared to other composite electrolytes. The introduction of WO3 nanofiller significantly enhanced the ionic conductivity of quasi solid-state electrolyte, resulting in the improved cell efficiency and stability of device.

January 10, 2019 (Thursday)

Time: 9:00~17:30

14 presentations

W0102-A Presentation 10

Metagenomics in monitoring marine dinoflagellates: new technologies for assessing marine ecological status

Jinik Hwang, Seung Joo Moon, Jun-Ho Hyung, Jae Yeon Park

Advanced Institutes of Convergence Technology, Republic of Korea

Abstract- The threat to human health and fisheries resources due to blooms of the toxic marine dinoflagellate has lead to widespread public concern and calls for continuous and accurate monitoring of coastal waters for these organisms. In this research, we suggest the potential of metagenomics technology to provide accurate, rapid, and cost efficient observations of the marine environment. The usage of such approaches in next generation sequencing will help to achieve the goals of future monitoring of marine plankton community with advanced technique. Metagenomics methods can provide faster results of monitoring, easier and more reliable taxonomic identification, as well as quicker and better assessment of the biological environments of marine waters. Data from metagenomics methods has high potential to intergrating or replacing into existing monitoring methods (qPCR, SNP based methods, DNA barcoding, microarrays). In this study, Metagenomics (NGS, Next generation sequencing) was used to obtain for snapshots of diversity and community structure of marine dinoflagellates in four stations of the Korean coastal water. In addition, the distribution of marine dinoflagellates which have toxin was shown and the risk of the coastal area is suggested. These results suggest that different geographical position of four sampling stations contribute to the dynamic structure of the plankton community in Korean coastal waters. The results presented here was useful for comparative analyses with other plankton communities also possible to detect a very small amount of marine dinoflagellates which hardly detected by a microscopic analysis. So when using metagenomic method for analysing marine dinoflagellates community, it enabling early detectiong of toxic of harmful species. Applying metagenomics method in monitoring marine plankton community is considered a new technology that goes beyond the limits of current monitoring methods.

January 10, 2019 (Thursday)

Time: 9:00~17:30

14 presentations

W1023 Presentation 11 Hydrometeorological Monitoring for Hydropower Reservoirs in Remote Areas **H Basri**, LM Sidek, L H C Chua, A Z Abdul Razad and M S Kamarulzaman Universiti Tenaga Nasional, Malaysia

Abstract- Operational hydrometric network is an essential element in hydropower reservoir operation. The data collected, to be used for reservoir management and decision making require high reliability with automatic data monitoring, processing and retrieval. However, the unique characteristic of every catchment and operational requirements raises the need to balance hydrometeorological monitoring objectives and site desirability. This paper describes the overall component of the Temengor Inflow Forecasting System developed as part of a decision support module for optimised hydropower dam operation for the Temengor Hydropower Dam system in Malaysia. The equipment used and challenges faced in deployment in a densely forested catchment in the Sungei Perak basin are discussed. The siting of the hydrometeorological network was made based on World Meterological Organisation guidelines and state of the art communication technology was utilized in overcoming accessibility to our monitoring sites. The real time data on power generation, river and reservoir level, rainfall that were collected are presented in this paper.

January 10, 2019 (Thursday)

Time: 9:00~17:30

14 presentations

W0103-A Presentation 12

A novel monitoring method of saxitoxin-producing dinoflagellates in marine environments using chip-based on digital PCR (dPCR)

Jun-Ho Hyung, Jinik Hwang, Kyeong Ah Seong, Jae Yeon Park Advanced Institutes of Convergence Technology, Republic of Koreaa

Abstract- Saxitoxin (STX) is a potent neurotoxin and the best-known paralytic shellfish toxin (PST). Ingestion of saxitoxin by humans, usually by consumption of shellfish contaminated by toxic algal blooms, is responsible for the illness known as paralytic shellfish poisoning (PSP). STX is usually produced by marine dinoflagellates such as Alexandrium sp., Gymnodinium sp., and Pyrodinium sp.. Early detection and monitoring of the toxin and the STX-producing dinoflagellates can prevent issues related to harmful algal blooms and human poisoning. However, conventional methods using qPCR have the limit for precise quantification which affected by PCR inhibitors in seawater samples. Here we developed a new analytical method using chip-based on digital PCR (dPCR), adding aspects of fluorescence-activated sorting for providing absolute quantification of STX-producing dinoflagellates. dPCR analysis detected the presence of domain sxtA4 that include putative STX biosynthetic gene clusters, and determined gene copy number of sxtA4 spiked with Alexandrium tamarense or Alexandrium minutum cells. STX measurements at the gene expression levels using dPCR will be useful for predicting and investigating the occurrence of increasing of toxicity in seawater samples, and it could pave the way toward ecological and environmental protection.

January 10, 2019 (Thursday)

Time: 9:00~17:30

14 presentations

W0085 Presentation 13 Reducing Energy Usage in Multi-family Housing **Arman Ameen, Mathias Cehlin** University of G ävle, Sweden

Abstract- The energy usage in residential sector have been around 22% of the total energy use in the world and increasing due to the population growth and higher living standards. The energy sources for this are made up primarily of non-renewable energy resources which generates a large amount of global greenhouse gases. A lot of countries have implemented various regulations and rules to reduce the energy usage in buildings and promoting the use of renewable energy technologies. This paper presents a parametric study of a typical multi-family building in its pre-design stage. The climate location used is Sweden (Gothenburg) and Japan (Osaka). The aim of the study is to compare various configurations and to examine how they affect the energy use. The most interesting configurations are the use of heat pump and solar cells. Other configurations that are examined are infiltration levels, pressure coefficients, wind impact, ventilation with heat recovery, ventilation scheduling, building orientation and finally changing U-values in the building material. Results of this study show that the energy saving, by utilizing a heat pump and solar panels, can reduce the total energy use by 34.9% for Gothenburg and 32% for Osaka. The results also show that the difference in total energy use between the two cities reduce substantially (3% difference) when utilizing a heat pump in combination with solar panels.

January 10, 2019 (Thursday)

Time: 9:00~17:30

14 presentations

W0099 Presentation 14 Enhanced efficiency of quasi-solid dye-sensitized solar cells by preparing Zeolite-X and A electrolytes from fly ash Jeong Min Lim, Juyoung Moon, Gyo Hun Choi, Seung Man Lim, Jung Tae Park

Konkuk University ,South Korea

Abstract- We synthesized Zeolite-X and A electrolytes from acetic acid-treated non-magnetic fly ash for quasi solid state dye-sensitized solar cells (QSDSSCs). The synthesized Zeolite-X and A electrolytes were characterized using XRF, BET, SEM, EDS, and XRD. The QSDSSC based on the Zeolite-XF12, Zeolite-XF7, and Zeolite-X&AF electrolyte shows an overall energy conversion efficiency of 6.0, 5.0 and 4.8 %, which is much higher than those of PEG based electrolyte system (3.8 %). This was mainly due to the enhanced the light harvesting and reduced interfacial resistance of the QSDSSCs.



Dinner

One Day Visit

January 11, 2019 (Friday) 9:00~17:30

(*Tip: Please arrive at "Osaka International Convention Center" at 8:50 a.m. The following places are for references, and the final schedule should be adjusted to the actual notice.*)

1. 9:30 Osaka Castle Park



Osaka Castle Park is a public urban park and historical site situated at Osaka-Jō inChūō-ku, Osaka, Japan. It lies on the south of the Ōkawa (Kyū-Yodo River) and occupies a large area in the center of the city of Osaka. This park is the second largest park in the city.

The park was constructed on a site with a long history. In the fifteenth century, a militant temple, Ishiyama Hongan-ji, was built here. In the park, there's Osaka Castle Hall, a large athletic field, baseball field, football field, open air music theatre, open-air concert hall, and Osaka Castle Keep Tower. From the top of keep tower, the vista includes Osaka Bay to Mount Ikoma, which surround the Osaka Plain. Many busking groups perform in the park. In spring, cherry blossom and plumblossom viewing is popular at this park.

2. 10:30 Osaka Museum of History

The Osaka Museum of History opened in 2003 in a tall building next to NHK Osaka and just across the street from Osaka Castle. The building offers excellent views of the castle from its top floors.

The museum exhibits are visually oriented with several large models. They chronicle the city's history, beginning in ancient times when Osaka served as Japan's first capital and site of the Naniwa Palace and ending with exhibits on the city's bustling shopping arcades of the early Showa Period.

The museum's collection is set up on the upper floors of the building while the lower floors are occupied by a restaurant, shop and spacious lobby. Museum visitors first take the elevator to the top floor and then follow the exhibition route down.

3. 12:00 Lunch

4. 13:30 Osaka Museum of Housing and Living



The Osaka Museum of Housing and Living is a remarkable facility located in the northeastern part of the Kita Area. The museum has re-created buildings and streets that show what life was like in Osaka in the past. A model of the entire city during the Edo Period, the only one of its kind in Japan, is housed in the building. Visitors can learn all about Osaka's development, experiencing via interactive exhibits the different ways of life in the city during different periods of its history.



5. 16:00 Visit the Shitennō-ji temple

Shitennō-ji (four heavenly Kings temple include Arahaka-ji, Nanba-ji, or Mitsu-ji) is a Buddhist temple in Ōsaka, Japan. It is sometimes regarded as the first Buddhist and oldest officially administered temple in Japan, although the temple buildings have been rebuilt over the centuries.

Prince Shōtoku invited three Korean Baekje carpenters, and they constructed this temple in 593. Prince Shōtoku was known for his profound Buddhist faith when Buddhism was not widespread in Japan. Most of the present structures are from when the temple was last completely rebuilt in 1963. One of the members involved in the initial construction of the temple in the 6th century later established a firm Kongō Gumi, specialized in temple and shrine buildings over centuries.

6. 17:30 Back to the Osaka International Convention Center

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