



3rd **CONCEPT** 2014

Conference on Emerging Energy & Process Technology

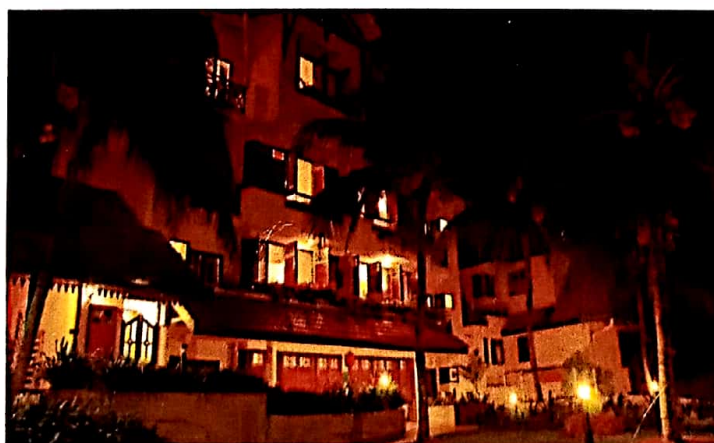
BOOK OF ABSTRACTS

17th–18th DEC 2014

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PNB ILHAM RESORT

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PORT DICKSON,
NEGERI SEMBILAN,
MALAYSIA



Organizer:



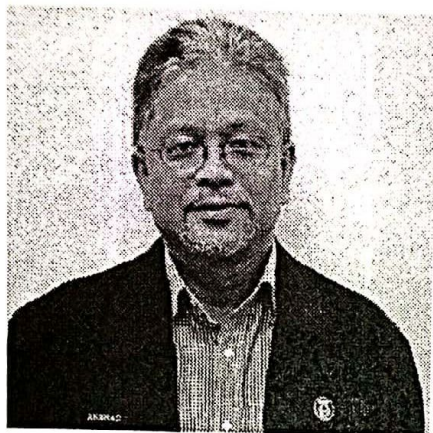
Institute of Hydrogen Economy
Universiti Teknologi Malaysia
81310 Johor Bahru
Malaysia

CONCEPT 2014

**3rd CONFERENCE ON EMERGING ENERGY
AND PROCESS TECHNOLOGY 2014**

**PNB Ilham Resort, Port Dickson, Negeri Sembilan
17 – 18 December 2014**

Foreword from Advisor of CONCEPT 2014



Assalamualaikum wrh. wbt., and good day to all. We did it again! For the third year CONCEPT has come again. Congratulations to the organizing committee, supervisors and students alike, for your undivided support to make this unique event a reality. Unlike other research events, CONCEPT is designed to inculcate supportive research culture towards establishing academic excellence in a socially warm environment. This is one of the important core values that made the Institute of Hydrogen Economy (IHE) one of the promising research groups in UTM.

As always, there are many research findings to be shared. These topics are organized into a few research themes, for needs to be understood, for concerns to be expressed, for new developments and trends to be made aware of, for best practices to be identified, for new products to be demonstrated, for standards to be discussed, and so on. It is our hope that the knowledge sharing at this conference will introduce new research development, as well as remediate the environment through multidisciplinary research and help to ensure full recognition of the potential of emerging energy and process technology in safe and responsible manner. I believe, each one of us would be proud if we as a group are able to contribute on something that matters to the livelihood of mankind. Finally, I would like to express my heartiest gratitude to the organizing team that has tirelessly gone through the journey in making this event a success. God Bless us all. Thank you.

Thank you.

Regards,
Prof. Dr. Arshad Ahmad
Advisor for CONCEPT 2014
Director, Institute of Hydrogen Economy
Universiti Teknologi Malaysia, Johor Bahru

Welcome Message by the Conference Chairman



Welcome to the third Conference on Emerging Energy and Process Technology 2014 or CONCEPT 2014. On behalf of organizing committee, I am delighted to extend a heartfelt welcome to our participants. This is an annual event organized by Institute of Hydrogen Economy (IHE). Once again, this year, the submission of papers was encouraging. We have received numerous papers from the students of IHE. More than 50 extended abstracts covering a breadth of exciting topics in the area of chemical process & development, environmental, materials and reactions were submitted for this conference. The topics are merged as a platform for sharing the great ideas with others.

This conference has been a long time in the planning and its success this week and it would not have been possible without the dedication and hard work of the team. Sincerely thanks to the well-known keynote speakers, invited speakers and presenters for the contribution in this conference. I wish you a very fruitful conference and please take time aside to enjoy the activities and facilities in the PNB Ilham Resort. Finally, I believe that you will gain as much and unite as a teamwork afterward through the connections you make over these two days.

Regards,

Dr Tuan Amran Tuan Abdullah

Chairman

Conference on Emerging Energy and Process Technology 2014 (CONCEPT 2014)

Universiti Teknologi Malaysia, Johor Bahru

3rd Conference on Emerging Energy and Process Technology 2014 (CONCEPT 2014)
PNB Ilham Resort, Port Dickson, Negeri Sembilan, 17 – 18 December 2014

Conference Information

Conference Advisor
Prof. Dr. Arshad Ahmad

Conference Chairman
Dr. Tuan Amran Tuan Abdullah

Conference Secretariat
Nazlina Ya'aini
Salmah Mahmood
Syaidatul Liyana Razak
Mariatul Kaftiah Mohamadiah
Haszlee Mohd Safuan

Conference Publication Committee
Prof. Dr. Mohamed Mahmoud El-Sayed Nasef
Associate Prof. Dr. Aishah Abd Jalil
Associate Prof. Dr. Khairol Sozana Nor Kamarudin
Associate Prof. Dr. Mohamed Wijayanuddin Ali
Associate Prof. Adnan Ripin
Dr. Anwar Johari
Dr. Mimi Haryani Hassim
Dr. Rafiziana Md Kasmani
Dr. Kamarizan Kidan
Dr. Saharudin Haron
Dr. Umi Aisah Asli
Dr. Ebrahim Abouzari Loft

Conference Host
Institute of Hydrogen Economy (IHE)
Universiti Teknologi Malaysia
81310 Johor Bahru

Conference Venue
PNB Ilham Resort, Port Dickson, Negeri Sembilan, Malaysia

Conference Date
17th – 18th December 2014

Institute of Hydrogen Economy (IHE), Universiti Teknologi Malaysia

SCHEDULE

3rd Conference on Emerging Energy and Process Technology 2014 (CONCEPT 2014)

Date: 17th – 18th December 2014

Venue: PNB Ilham Resort, Port Dickson, Negeri Sembilan .

Wednesday, 17 th December 2014		
10.00 – 10.30 am	Registration (Hotel Lobby)	
10.30 – 11.00 am	Morning Coffee Break	
Parallel Oral Sessions (1 & 2) 11.00 am – 1.00 pm		
Session 1 : Material (M) Judge : Associate Prof. Dr. Aishah Abd. Jalil Venue : DKPI 2		
Time	Paper ID	Paper Title / Authors
11.00 – 11.15	M1	Optimization of Boron Adsorption Process Using Response Surface Methodology <i>Madana Leela Nallappan, Mohamed Mahmoud Nasef, Kamaruddin Hashim</i>
11.15 – 11.30	M2	Modification of Kenaf as Adsorptive Hydrogen Storage <i>Farahhin N. J., Kamarudin K.S.N.</i>
11.30 – 11.45	M3	Radiation Induced Grafted Boron Chelating Adsorbent Prepared by Emulsion and Solvent Mediated Reaction <i>T.M. Ting, Mohamed Mahmoud Nasef and Kamaruddin Hashim</i>
11.45 – 12.00	M4	Zirconium Loaded Banana Stem Fibers as Adsorbent for Recovery Of HG(II) <i>Salamun, N., Jalil, A.A., Triwahyono, S.</i>

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12.00 – 12.15	M5	Crosslinked Phosphoric Acid Composite Membrane By Radiation Grafting Of 4-Vinylpyridine/Triallyl Cyanurate Mixtures Onto Poly(Ethylene-Co-Tetrafluoroethylene) Followed by Phosphoric Acid Doping <i>Paveswari Sithambaranathan, Mohamed Mahmoud Nasef and Arshad bin Ahmad</i>
12.15 – 12.30	M6	Preparation of Crosslinked Proton Exchange Membranes by Radiation Induced Grafting Of 1-Vinylimidazole and Diisopropenylbenzene/Triallyl Cyanurate onto Pre-Irradiated ETFE Films <i>Hamdani Saidi, Habibu Uthman</i>
12.30 – 12.45	M7	Preparation of Kenaf Adsorbent Using Post-Irradiation Grafting Technique <i>Nor Azillah Fatimah Othman, Wan Nur Shahida Wan Jusoh, Tuan Anwan Tuan Abdullah</i>
12.45 – 1.00	M8	A Review on Development of Carbon Nanotubes Based Photocatalyst <i>Khusnun, N. F., Jalil, A.A., Triwahyono, S.</i>

Session 2 : Environmental (E)
Judge : Associate Prof. Adnan Ripin
Venue : DKPI 3

Time	Paper ID	Paper Title / Authors
11.00 – 11.15	E1	Significant Effect of pH on Photocatalytic Degradation of Organic Pollutants Using Semiconductor Catalysts <i>Jaafar, N. F., Jalil, A. A., Triwahyono, S.</i>
11.15 – 11.30	E2	Effect of Preparation Temperature of Msn for Phenol Removal <i>Salleh, N.F.M., Jalil, A.A., Triwahyono S.</i>
11.30 – 11.45	E3	Natural Disasters Assessment and Management in Petrochemical Industries: A Review <i>Yousef A. Alhamdani, Mohd. N. Yacob, Mimi H. Hassim</i>
11.45 – 12.00	E4	Municipal solid waste planning for sustainable landfilling for Low Carbon Regions: A case study for Iskandar Malaysia <i>SI Ahmed, A Johari, H Hashim, JS Lim, H Alkali and SS Hafshar</i>
12.00 – 12.15	E5	Health Risk Assessment Due to Emissions From Medical Wastes Incinerator in Malaysia <i>Fariha L. M. Rahim, Mimi H. Hassim, Mutahharah M. Mokhtar</i>
12.15 – 12.30	E6	Emission Factor Establishment for Palm Oil Mill Boiler <i>Nur H. Hanafi, Mimi H. Hassim, and Mohd R. M. Yusuf</i>

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12.30- 12.45	E7	Compliance Audit of Permit to Work System in The Petrochemical Plant <i>Nizar Jusoh, Kamarizan Kidam and Onn Hassan</i>
12.45 – 1.00	E8	Health Risk Assessment for Powder Processing Facilities <i>Noor Azira Azuana Saliman, Kamarizan Kidam, Onn Hassan</i>
1.00 – 2.30 pm	Check-in & Lunch	
Parallel Oral Sessions (3 & 4) 2.30 pm – 5.00 pm		
Session 3 : Chemical Process Development (C) Judge : Prof. Dr. Mohamed Mahmoud El-Sayed Nasef Venue : DKPI 2		
Time	Paper ID	Paper Title / Authors
2.30 – 2.45	C1	The Estimation of Combined Failure Criteria using Bayesian Network <i>Ali Al-shanini, Arshad Ahmad, Ali Al-shatri, Mohamed Khalil</i>
2.45 – 3.00	C2	Corrosion Prevention in Carbon Dioxide Removal using Emulsion Liquid Membrane Method <i>Siti Balqis Mohd Najib, Khairul Sozana Nor Kamaruddin</i>
3.00 – 3.15	C3	Fault Analysis using MFM and Bayesian Network <i>Mohamed A. Khalil, Arshad Ahmad, Tuan Amran Tuan Abdullah and Ali H. Al-shanini</i>
3.15 – 3.30	C4	Numerical Estimation of Spray Dried Juice Powder Moisture Content <i>Aliyu Bello A., Arshad Ahmad, Adnan Ripin</i>
3.30 – 3.45	C5	Evaluating the Thermochemical Fuel Properties of Oil Palm Waste Using Elemental Analysis <i>Bengba Bevan Nyakuma, Anwar Johari, Arshad Ahmad, Tuan Amran Tuan Abdullah</i>
3.45 – 4.00	C6	Dynamic Simulation and Control of Multivariable Distillation Column of Aromatic Compounds <i>Ali. H. Al-Shatri, Arshad, Ahmad, Ali Al-shanini, Mohammed Khalil</i>
4.00 – 4.15	C7	Flame Propagation for Highly Reactive Combustible Mixture in Closed Pipe with L/D 51 <i>S.Z. Sulaiman, S.D. Emami, R.M. Kasmani, A. Mustafa</i>
4.15 – 4.30	C8	Model Free Kinetics Analysis of Imperata Cylindrica (Lalang) <i>Olagoke Oladokun, Bengba Bevan Nyakuma, Syle Luing Wong, Tuan Amran Tuan Abdullah, Arshad Ahmad</i>

reliable technologies for removing mercury from water. In this study, banana stem fibers, a natural biomass was immobilized with zirconium(IV) to investigate its feasibility for mercury removal from an aquatic environment. The XRD pattern for both BSF-HCl and Zr/BSF-HCl exhibited mainly the cellulose I structure which consists of two distinct crystal phases. The FESEM images illustrated the presence of relatively well organized, pronounced and uniform cavities distributed around the surface, indicated a good possibility for the metal ions to be adsorbed. The result shows that Hg(II) adsorption capacity increased from 45 to 72 mg/g after the immobilization of Zr due to increase in the active sites on the adsorbent.

Keyword: Banana stem fiber, cellulose, zirconium, adsorption, Hg(II)

ID M5

Crosslinked Phosphoric Acid Composite Membrane by Radiation Grafting Of 4-Vinylpyridine/Triallyl Cyanurate Mixtures onto Poly(Ethylene-Co-Tetrafluoroethylene) Followed by Phosphoric Acid Doping

Paveswari Sithambaranathan, Mohamed Mahmoud Nasef and Arshad bin Ahmad

ABSTRACT – Crosslinked phosphoric acid composite membranes were prepared by radiation-induced grafting of 4-vinylpyridine (4-VP) containing 2-10 vol% triallyl cyanurate (TAC) concentration onto poly(ethylene-co-tetrafluoroethylene) (ETFE) films followed by phosphoric acid (PA) doping. The degree of grafting (G%) was found to increase until 5 vol% TAC and beyond which tends to decrease. The obtained membranes were characterized by FTIR-ATR to confirm on the presence of 4-VP, TAC and also PA. The proton conductivity of the membranes was evaluated in correlation with crosslinker content and temperature. The prepared ETFE-g-P(4VP)/TAC membrane with 5 vol% TAC exhibits a conductivity of 0.039 S/cm under anhydrous condition at 120 °C. Therefore, the obtained membranes can be a potential candidate to be operated at high temperature proton exchange membrane fuel cell (PEM-FC).

Keywords: Radiation induced grafting, 4-vinylpyridine, triallyl cyanurate, phosphoric acid, fuel cell membrane

ID M6

Preparation of crosslinked proton exchange membranes by radiation induced grafting of 1-Vinylimidazole and diisopropenylbenzene/triallyl cyanurate onto Pre-Irradiated ETFE films

Hamdani Saidi, Habibu Uthman

ABSTRACT – Novel crosslinked radiation grafted ETFE based membranes has been obtained by RIG using DIPB and TAC crosslinkers. The investigated membranes were based on 125 µm thick ETFE films grafted with 1-VIm/DIPB and 1-VIm/TAC. Grafted films and proton exchange membranes with varying DIPB and TAC concentrations and different DG(%) were prepared. To provide evidence of grafting, to determine the composition of the 1-VIm/DIPB and 1-VIm/TAC in the bulk and in the near surface region and to determine DL, FTIR analysis were performed on the grafted ETFE films, PA doped ETFE films and compared with the original ETFE films. FTIR analysis revealed homogeneous crosslinker

distribution in the surface and bulk of the grafted films. Parameters for achieving the D.L (5.0 mmol repeat polymer unit⁻¹) were: DG(%) of 35%, PA concentration of 60%, doping temperature of 100°C and reaction time of 7 days. Furthermore, the effect of co-grafting 1-VIm with crosslinkers (DIPB/TAC) on the DG(%) and DL were studied.

Keywords: Crosslinkers, 1-vinylimidazole, proton exchange membrane, radiation induced grafting, doping level.

ID M7

Preparation of Kenaf Adsorbent Using Post-Irradiation Grafting Technique

Nor Azillah Fatimah Othman, Wan Nur Shahida Wan Jusoh, Tuan Amran Tuan Abdullah

ABSTRACT – Graft co-polymerization of emulsified glycidyl methacrylate (GMA) onto kenaf bast fiber has been carried out under post-irradiation technique using electron beam irradiation. In this work, kenaf fiber was treated with sodium chlorite (NaClO₂) to remove phenolic compounds particularly lignin. The GMA-grafted kenaf was modified using ethylenediamine (EDA) to introduce amine functional group. Radiation induced graft polymeric matrix followed by functionalization is widely accepted for the preparation of metal adsorbents. Degree of grafting (DG,%) and amine group density (AGD,%) was calculated gravimetrically and grafted polymer was observed with scanning electron microscopic (SEM) photographs.

Keywords: kenaf, delignification, radiation induced graft co-polymerization

ID M8

A Review on Development of Carbon Nanotubes Based Photocatalyst

Khusnun, N. F., Jalil, A.A., Triwahyono, S.

ABSTRACT – Carbon nanotubes (CNTs) are allotropes of carbon having novel properties that promising to modernize several fields in nanotechnology areas such as electrochemical sensor, supports for heterogeneous metal catalysts, fuel cells and adsorbents. They have high surface area, good conductivity and electronic properties that make them useful in chemical process such as photocatalytic reaction. In recent years, CNTs was used as a catalyst supports or adsorbent for enhancing photocatalytic activity. This review covers the types, physicochemical properties, modification, and application of CNTs based catalyst on photocatalytic activity.

Keywords: Carbon nanotubes, photocatalyst, catalytic activity, physicochemical properties