

出國報告（出國類別：其他）

## 赴日本參加「2016年核能科學與技術 國際研討會」出國報告

服務機關：核能研究所

姓名職稱：謝賢德 副研究員

派赴國家：日本

出國期間：105年5月25日~105年5月28日

報告日期：105年6月28日



## 摘要

核能研究所化工組謝賢德博士奉派於 2016 年 5 月 25 日至 5 月 28 日赴日本公差，目的為參加第十八屆核能科學與技術國際研討會(18th International Conference on Nuclear Science and Technology, ICNST 2016)，並發表口頭論文一篇，題目為「Preparation of Heterogeneous Ferrite Catalysts and Their Application for Fenton-Like Oxidation of Radioactive Organic Wastewater」。本次 ICNST 2016 國際會議之地點為成田東武機場國際飯店之一樓會議廳。

ICNST 2016 國際研討會主題包含放射性廢棄物處理技術、能源革新技術、環境科學技術等領域，與本所研究極具有關聯性。藉由參加會議，可以瞭解國際上核子科學與技術的發展現況、重要關心議題及未來趨勢挑戰，蒐集國際最新發展技術資訊，作為計畫執行參考。本次公差成果主要透過發表口頭論文，與與會專家學者進行放射性廢棄物之處理策略及經驗交流，以瞭解目前廢棄物處理技術之進度及最近研究計畫之發展，以及後續研究發展的主要方向。藉由參與本次會議對於促進國際學術交流與提升技術水準，展現研發成果，以及對於研究創新的啟發，均有極大之正面效益。

關鍵字：濕式氧化、放射性廢液、異相觸媒

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## 一、目的

為執行 105 年度「核設施除役產生放射性廢棄物處理與處置技術研發」計畫之子項計畫「二次廢棄物處理技術研究開發」，針對本所有關放射性有機廢液處理技術之研究成果，受邀於第十八屆核能科學與技術國際研討會(ICNST 2016) 並進行口頭發表，論文題目為「**Preparation of Heterogeneous Ferrite Catalysts and Their Application for Fenton-Like Oxidation of Radioactive Organic Wastewater**」，職奉派代表研究計畫赴日本成田參與此次國際會議發表研究成果，並與參加會議國際學者進行技術交流。

本次國際研討會共分成五個討論議題，包含能源革新科技、環境保護技術、生物科學技術、特殊功能材料開發及核能技術進展等領域。因大會安排之流程，選擇參加與本計畫有關之研討會，包含放射性廢棄物處理技術、環境科學及工程及能源技術發展等議題，瞭解各領域的研究發展現況及未來趨勢，將有助現行執行計畫或未來研究計畫之推展。

## 二、過 程

### (一) 出國會議行程

此次奉派出國公差時間為 2016 年 5 月 25 日至 5 月 28 日共計 4 天，會議期間行程如表一：

表一、參加 ICNST 2016 國際會議之行程安排

日期	行程	工作內容
5/25 (三)	台灣桃園機場 → 日本成田機場	去程及研討會資料準備
5/26 (四)	參加 ICNST 2016 國際會議 日本成田東武機場 國際飯店	辦理報到手續、領取會議文件、參加第一天議程
5/27 (五)	參加 ICNST 2016 國際會議 日本成田東武機場 國際飯店	參加第二天議程、 發表口頭論文一篇
5/28 (六)	日本成田機場 → 台灣桃園機場	回程

### (二) 第 18 屆 ICNST 2016 國際研討會

本次參加 ICNST 2016 國際研討會於 2016 年 5 月 25 日自桃園國際機場第二航廈出發，搭乘長榮航空 BR198 航班抵達日本成田機場第一航廈，飛行時間約 3 小時 25 分鐘。ICNST 2016 國際研討會於日本東京郊外之成田市舉辦，此研討會隸屬 WASET (World Academy of Science Engineering Technology) 國際研討會組織主辦，如圖一所示。參加本次研討會於會議排定之演講時程內，聆聽核能技術、放射性廢棄物處理、能源科技、環境工程、資源整合利用等主題，並與各國學者做技術交流。此國際研討會之主要目標為提供學者、研究生、工程師、研究人員及相關科技人員之意見交流與切磋介面，透過發表核能技術、放射性廢棄物處理、能源科技、環境工程、資源整合利用等相關領域研究成果，進行深度探討，以瞭解各國發展趨勢及現況。ICNST 2016 之發表領域相當豐富，研討會議程排定第一天(5/26)共計 7 個議程，

第二天(5/27)共計 4 個議程，並分別於東武飯店國際會議廳 A 廳及 B 廳進行，包含口頭發表簡報及 e-poster 短篇簡報 2 種形式。



**ICNST 2016 : 18th International Conference on Nuclear Science and Technology**



<b>Topic :</b>	Physical and Mathematical Sciences	
<b>Country :</b>	Japan	
<b>City :</b>	Tokyo	
<b>Important Dates :</b>	Abstracts/Full-Text Paper Submission Deadline	2016-03-26 00:00:00
	Notification of Acceptance	2016-04-10 00:00:00
	Final Paper (Camera Ready) Submission & Early Bird Registration Deadline	2016-04-26 00:00:00
	Conference Dates	May 26-27, 2016
<b>Aims and Objectives:</b>	The ICNST 2016: 18th International Conference on Nuclear Science and Technology aims to bring together leading academic scientists, researchers and research scholars to exchange and share their experiences and research results about all aspects of Nuclear Science and Technology. It also provides the premier interdisciplinary forum for researchers, practitioners and educators to present and discuss the most recent innovations, trends, and concerns, practical challenges encountered and the solutions adopted in the field of Nuclear Science and Technology.	
<b>Call for Papers :</b>	<p>Advanced small reactors without on-site refueling</p> <p>Advances in Nuclear Power Technology Development</p> <p>Basic Processes in Fully and Partially Ionized Plasmas</p> <p>Chambers, vacuum vessels, blankets, and shields</p> <p>Charged Particle Beams and Sources</p> <p>Condensed Matter Nuclear Science</p> <p>Diagnostics, data acquisition, and plasma control systems</p> <p>Diversors and plasma materials interactions</p> <p>Electromagnetics and electromechanics</p> <p>Energy policy</p> <p>Environmental Impacts of Nuclear Power Plant</p> <p>External Costs in Nuclear Power Plant</p> <p>Fusion Device Engineering</p> <p>Global Warming , Reduction of Carbon Dioxide a Climatic Challenge</p> <p>Heating and current drive</p> <p>High Energy Density Plasmas and their Interactions</p> <p>HSE Management in Nuclear Power Plant</p> <p>Operation</p>	<p>IFE drivers, targets and related technologies</p> <p>Industrial, Commercial and Medical Applications of Plasmas</p> <p>Innovative energy systems, Hydrogen energy system, cogeneration system, thermal energy utilization system</p> <p>Innovative nuclear energy systems, nuclear utilization systems based on fuel cycle, simultaneous solution for safety, radioactive wastes, and proliferation problems</p> <p>Innovative separation and fuel cycles/radioactive wastes</p> <p>Innovative transmutation systems</p> <p>International Commitment on Environmental Aspects of Nuclear Power Plants</p> <p>ITER and experimental devices</p> <p>Magnet engineering</p> <p>Material and process for innovative energy systems</p> <p>Materials assembly, fabrication, and maintenance</p> <p>Microwave Generation and Plasma Interaction</p> <p>Need for Nuclear Power; an Alternative Source of Energy</p>
<b>Abstracted and Indexed in :</b>	<a href="#">International Science Index</a>	
<b>Abstracts :</b>	<a href="http://waset.org/abstracts/physical-and-mathematical-sciences">waset.org/abstracts/physical-and-mathematical-sciences</a>	
<b>Periodicals :</b>	<a href="http://waset.org/Publications/Physical-and-Mathematical-Sciences">waset.org/Publications/Physical-and-Mathematical-Sciences</a>	
<b>Subjects :</b>	Nuclear Science, Technology	
<b>Keywords :</b>	Nuclear Science, Nuclear Engineering, Nuclear Physics, Condensed Matter, Charged Particle Beams, Nuclear Power Plant, High Energy Density Plasmas, Electromagnetics, electromechanics, Nuclear Power Technology	
<b>Conference Link :</b>	<a href="http://waset.org/conference/2016/05/tokyo/ICNST">waset.org/conference/2016/05/tokyo/ICNST</a>	
<b>Scientifically Sponsored by :</b>	International Physical and Mathematical Sciences Committee	

圖一、WASET (World Academy of Science, Engineering, and Technology)組織及 ICNST 2016 官網之核能科學與技術投稿領域

### (三) ICNST 2016 議程介紹

2016 年 5 月 26 日至 5 月 27 日為期二天的研討會議議程簡述如下：

#### 1. 議程 I(HALL A)

本議程由 Kasem Chunkao 博士主持，主要針對工業廢水、混凝土容器、水資源管理、污泥再利用、衝擊影響評估、廢水處理系統、環境教育等議題進行專題討論，其議程安排及發表情況如表二所示。

表二、Session I 議程安排及發表文章

May 26, 2016 HALL A  
Session I: 08:00-10:30  
Coffee Break: 10:30-10:45

#### Chair: Kasem Chunkao

Organic Substance Removal from Pla-Som Family Industrial Wastewater through APCW System	W. Wararam, K. Angchanpen, T. Pattamapitton, K. Chunkao, O. Phewnil, M. Srichomphu, T. Jinjaruk Kasetsart University, Thailand
Open Lids and Rainwater Falling into Concrete Box Technology Enhancing Aerobic Process for Digesting Organic Garbage in Producing High Content of Solid Compost	C. Chanthasoon, K. Chunkao, S. Thaipakdee, N. Semvimol Kasetsart University, Thailand
Urban Boundary Layer and Its Effects on Haze Episode in Thailand	S. Bualert, K. Duangmal Kasetsart University, Thailand
Applicable Eco-Engineering Techniques through Watershed Management over Phetchaburi Rain Shadow Zone in Providing Sustainable Water Yield to Downstream Community in Thailand	K. Chunkao, K. Duangmal, O. Phewnil, P. Wichittrakam, P. Rollap, S. Mokathip, J. Puemsin Kasetsart University, Thailand
Utilization of Beverage Sludge for Compensating Chemical Fertilizer for Growing Vegetables on Garden Nearby Beverage Production Plant at Bangkok Urban Fringe	N. Semvimol, O. Phewnil, K. Chunkao, S. Boonmang, T. Kannee, S. Thaipakdee, N. Chanwong, C. Nimpee Kasetsart University, Thailand
Impact Assessment in Developing Countries: Case Study of Thailand	K. Duangmal, K. Chunkao, S. Bualert Kasetsart University, Thailand
Effluent from Royal LERD Wastewater Treatment Systems to Furnish Nutrients for Phytoplankton to Generate the Abundance of Hard Clam ( <i>Meretrix</i> spp.) on Muddy Beach	O. Phewnil, S. Khowhit, W. Inkapatanakul, A. Boutson, K. Chunkao, O. Chueawong, T. Pattamapitton, N. Chanwong, C. Nimpee Kasetsart University, Thailand
Potential Impact of UV on Blooming Cyanobacteria toward Herbivore Fishes in Phetchaburi Municipal Wastewater Treatment System, Thailand	T. Pattamapitton, M. Srichomphu, K. Chunkao, O. Phewnil, T. Boonprakong, W. Wararam, N. Semvimol Kasetsart University, Thailand
Individually Environmental Training on Home Garbage Separation for Cleaning Small Fisheries Village Nearby Royal LERD International Learning Center in Phetchaburi, Thailand	T. Boonprakong, P. Sotong, S. Boonmang, S. Sawangjit, J. Phemsin Kasetsart University, Thailand
A Conceptual Framework of Integrated Evaluation Methodology for Aquaculture Lakes	Robby Y. Tallar, Nikodemus L., Yuri S., Jian P. Suen Maranatha Christian University, Indonesia



## 2. 議程 II (HALL A)

本議程由 Yang Shinhao 博士主持，主要針對生物多樣性、水資源經費、地下水、洪水風險評估、工業廢水管理、環境影響評估、凝膠電析技術、食品製程等議題進行專題討論，其議程安排及發表情況如表三所示。

表三、Session II 議程安排及發表文章

May 26, 2016 HALL A  
Session II: 10:45-12:45  
Lunch: 12:30-13:30

Group photo will be taken before lunch in the conference room.  
You can share the photos you have taken at <http://waset.org/conference/2016/05/tokyo/photos>

### Chair: Yang Shinhao

The Impact of Water Reservoirs on Biodiversity and Food Security and the Creation of Adaptation Mechanisms	Inom S. Normatov, Abulqosim Muminov, Parviz I. Normatov Tajik National University, Tajikistan	
Water Budget in High Drought-Borne Area in Jaffna District, Sri Lanka during Dry Season	R. Kandiah, K. Miyamoto University of Tsukuba, Japan	
Quantitative Analysis of Nutrient Inflow from River and Groundwater to Imazu Bay in Fukuoka, Japan	Keisuke Konishi, Yoshinari Hiroshiro, Kento Terashima, Atsushi Tsutsumi Kyushu University, Japan	
Flood Risk Assessment and Adapted to the Climate Change by a Trade-Off Process in Land Use Planning	Nien-Ming Hong, Kuei-Fang Huang Chinese Culture University, Taiwan	e-Poster
Industrial-Waste Management in Developing Countries: The Case of Algeria	L. Sefouhi, M. Djebabra University of Batna, Algeria	e-Poster
The Taiwan Environmental Impact Assessment Act Contributes to the Water Resources Saving	Feng-Ming Fan, Xiu-Hui Wen Environmental Protection Administration, Taiwan	e-Poster
Grading of Emulsified Agarwood Oil Using Gel Electrophoresis Technique	Y. T. Boon, M. N. Naim, R. Zakaria, N. F. Abu Bakar, N. Ahmad, I. W. Lenggoro University Putra Malaysia, Malaysia	
Utilization of Juncus acutus as Alternative Feed Resource in Ruminants	Nurcan Cetinkaya Ondokuz Mayıs University, Turkey	
Evaluation of Hazelnut Hulls as an Alternative Forage Resource for Ruminant Animals	N. Cetinkaya, Y. S. Kuleyin Ondokuz Mayıs University, Turkey	
Pale, Soft, Exudative (PSE) Turkey Meat in a Brazilian Commercial Processing Plant	Danielle C. B. Honorato, Rafael H. Carvalho, Adriana Soares, Ana Paula F. R. L. Bracarense, Paulo D. Guameri, Massami Shimokomaki, Elza I. Ida Londrina State University, Brazil	e-Poster
Pale, Firm and Non-Exudative (PFN): An Emerging Major Broiler Breast Meat Group	Cintia Midori Kaminishikawahara, Fernanda Jéssica Mendonça, Moisés Grespan, Elza Iouko Ida, Massami Shimokomaki, Adriana Lourenço Soares Universidade Estadual de Londrina, Brazil	e-Poster
Occurrence of Broiler Chicken Breast White Striping Meat in Brazilian Commercial Plant	Talita Kato, Moises Grespan, Elza I. Ida, Massami Shimokomaki, Adriana L. Soares Universidade Estadual de Londrina, Brazil	e-Poster
Meat Qualities and Death on Arrival (DOA) of Broiler Chickens Transported in a Brazilian Tropical Conditions	Arlan S. Freitas, Leila M. Carvalho, Adriana L. Soares, Amoud Neto, Marta S. Madruga, Elza I. Ida, Massami Shimokomaki Universidade Estadual de Londrina, Brazil	e-Poster

### 3. 議程 III (HALL A)

本議程由 Chair: K. K. Saju 及 Jianlin Cheng 博士主持，主要針對生物液態發酵、生物檢測、定量技術、醫療電子、金屬材料、基因表現、動物實驗、細胞試驗、生物化學、高分子電紡、生質薄膜、高分子聚合等議題進行專題討論，其議程安排及發表情況如表四所示。

表四、Session III 議程安排及發表文章

May 26, 2016 HALL A  
Session III: 13:30-16:00  
Coffee Break: 16:00-16:15

Group photo will be taken during coffee break in the conference room.

Chair: K. K. Saju, Jianlin Cheng

Bioproduction of Phytohormones by Liquid Fermentation Using a Mexican Strain of <i>Botryodiplodia theobromae</i>	Laredo Alcalá Elan Iñaky, Hernandez Castillo Daniel, Martinez Hernandez José Luis, Arredondo Valdes Roberto, Gonzalez Gallegos Esmeralda, Anguiano Cabello Julia Cecilia The Antonio Narro Agrarian Autonomous University, Mexico	Poster
Auxin and Siderophore Fast Detection by Microplate Technique	Anguiano Cabello Julia Cecilia, Flores Olivas Alberto, Aguilar González Cristóbal Noé, Arredondo Valdés Roberto, Laredo Alcalá Elan Iñaky The Antonio Narro Agrarian Autonomous University, Mexico	
Quantification of Enzymatic Activities of Proteins, Peroxidase and Phenylalanine Ammonia Lyase, in Growing <i>Phaseolus vulgaris</i> L, with Application Bacterial Consortium to Control <i>Fusarium</i> and <i>Rhizoctonia</i>	Arredondo Valdés Roberto, Hernández Castillo Francisco Daniel, Laredo Alcalá Elan Iñaky, Gonzalez Gallegos Esmeralda, Castro Del Angel Epifanio The Antonio Narro Agrarian Autonomous University, Mexico	Poster
Packaging Processes for the Implantable Medical Microelectronics	Chung-Yu Wu, Chia-Chi Chang, Wei-Ming Chen, Pu-Wei Wu, Shih-Fan Chen, Po-Chun Chen National Taipei University of Technology, Taiwan	Poster
Blood Volume Pulse Extraction for Non-Contact Photoplethysmography Measurement from Facial Images	Ki Moo Lim, Iman R. Tayibnapis Kumoh National Institute of Technology, Korea, Republic Of	e-Poster
Investigation into Black Oxide Coating of 410 Grade Surgical Stainless Steel Using Alkaline Bath Treatment	K. K. Saju, A. R. Reghuraj Cochin University of Science and Technology, India	
Gene Expression Signature-Based Chemical Genomic to Identify Potential Therapeutic Compounds for Colorectal Cancer	Yen-Hao Su, Wan-Chun Tang, Ya-Wen Cheng, Peik Siá, Chi-Chen Huang, Yi-Chao Lee, Hsin-Yi Jiang, Ming-Heng Wu, I-Lu Lai, Jun-Wei Lee, Kuen-Haur Lee Taipei Medical University, Taiwan	Poster
Hepatoprotective Effect of Oleuropein against Cisplatin-Induced Liver Damage in Rat	Salim Cerig, Fatime Geyikoglu, Murat Bakir, Suat Colak, Merve Sonmez, Kubra Koc Atatürk University, Turkey	
Carvacrol Attenuates Lung Injury in Rats with Severe Acute Pancreatitis	Salim Cerig, Fatime Geyikoglu, Pınar Akpulat, Suat Colak, Hasan Turkez, Murat Bakir, Mirkhalil Hosseinigouzdagani, Kubra Koc Atatürk University, Turkey	Poster

Defective Autophagy Leads to the Resistance to PP2 in ATG5 Knockout Cells Generated by CRISPR-Cas9 Endonuclease	Sung-Hee Hwang, Michael Lee Incheon National University, Korea, Republic Of	e-Poster
Role of Tyrosine-Phosphorylated STAT3 in Liver Regeneration: Survival, DNA Synthesis, Inflammatory Reaction and Liver Mass Recovery	JiYoung Park, SueGoo Rhee, HyunAe Woo Ewha Womans University, Korea, Republic Of	e-Poster
Protective Role of Peroxiredoxin V against Ischemia/Reperfusion-Induced Acute Kidney Injury in Mice	Eun Gyeong Lee, Ji Young Park, Hyun Ae Woo Ewha Womans University, Korea, Republic Of	e-Poster
DNpro: A Deep Learning Network Approach to Predicting Protein Stability Changes Induced by Single-Site Mutations	Xiao Zhou, Jianlin Cheng University of Missouri, United States	
Development of PCL/Chitosan Core-Shell Electrospun Structures	Hilal T. Sasmazel, Seda Surucu Atilim University, Turkey	
Cold Plasma Surface Modified Electrospun Microtube Array Membrane for Chitosan Immobilization and Their Properties	Ko-Shao Chen, Yun Tsao, Chia-Hsuan Tsen, Chien-Chung Chen Tatung University, Taiwan	Poster
Micro-Arc Oxidation Titanium and Post Treatment by Cold Plasma and Graft Polymerization of Acrylic Acid for Biomedical Application	Shu-Chuan Liao, Chia-Ti Chang, Ko-Shao Chen Da-Yeh University, Taiwan	e-Poster

#### 4. 議程 IV (HALL A)

本議程由 Titin Handayani 及 Shyang-Chwen Sheu 博士主持，主要針對醫學技術、基改產物、細胞傳遞、生物技術、疾病科學等議題進行專題討論，其議程安排及發表情況如表五所示。

表五、Session IV 議程安排及發表文章

May 26, 2016 HALL A  
Session IV: 16:15-18:20

#### Chair: Titin Handayani, Shyang-Chwen Sheu

Multiple Shoot Induction and Plant Regeneration of Kepuh ( <i>Sterculia foetida</i> L.) Tissue Culture	Titin Handayani, Endang Yuniastuti Agency for the Assessment and Application of Technology, Indonesia	
ESDN Expression in the Tumor Microenvironment Coordinates Melanoma Progression	Roberto Coppo, Francesca Orso, Daniela Dettori, Elena Quaglino, Lei Nie, Mehran M. Sadeghi, Daniela Taverna University of Torino, MBC, Italy	
Awareness of Genetically Modified Products Among Malaysian Consumers	Muhamad Afiq Faisal, Yahaya, Mohd Faizal, Hamzah Infrastructure University Kuala Lumpur, Malaysia	
Fluoride-Induced Stress and Its Association with Bone Developmental Pathway in Osteosarcoma Cells	Deepa Gandhi, Pravin K. Naoghare, Amit Bafana, Krishnamurthi Kannan, Saravanadevi Sivananesana CSIR-National Environmental Engineering Research Institute, India	Poster

Decreased Autophagy Contributes to Senescence Induction in HS68 Cells	Byeal-I Han, Michael Lee Incheon National University, Korea, Republic Of	e-Poster
MicroRNA-1246 Expression Associated with Resistance to Oncogenic BRAF Inhibitors in Mutant BRAF Melanoma Cells	Jae-Hyeon Kim, Michael Lee Incheon National University, Korea, Republic Of	e-Poster
Immobilization and Characterization of Pectinase Using Florisil as a Support	Dilek Alagöz, Deniz Yildirim, S. Seyhan Tükel Çukurova University, Turkey	e-Poster
Protein-Coated Microcrystals of Rhizomucor miehei Lipase: Optimization of Immobilization Process	Deniz Yildirim, Dilek Alagöz, S. Seyhan Tükel Cukurova University, Turkey	e-Poster
Inhibitory Effects of PPAR $\gamma$ Ligand, KR-62980, on Collagen-Stimulated Platelet Activation	Su Bin Wang, Jin Hee Ahn, Tong-Shin Chang Ewha Womans University, Korea, Republic Of	e-Poster
Identification of miRNA-miRNA Interactions between Virus and Host in Human Cytomegalovirus Infection	Kai-Yao Huang, Tzong-Yi Lee, Pin-Hao Ho, Tzu-Hao Chang, Cheng-Wei Chang Taipei Medical University, Taiwan	e-Poster
A Pipeline for Detecting Copy Number Variation from Whole Exome Sequencing Using Comprehensive Tools	Cheng-Yang Lee, Petrus Tang, Tzu-Hao Chang Taipei Medical University, Taiwan	e-Poster
Effects of New Anthraquinone Derivatives on Resistance Ovarian Cancer Cells and The Mechanism Investigation	Hui-Hsin Huang, Sheng-Tung Huang, Chi-Ming Lee, Chia-Han Yen, Chun-Mao Lin Taipei Medical University, Taiwan	e-Poster
Nanoparticles Activated Inflammasome Lead to Airway Hyperresponsiveness and Inflammation in a Mouse Model of Asthma	Pureun-Haneul Lee, Byeong-Gon Kim, Sun-Hye Lee, An Soo Jang Soonchunhyang University , Korea, Republic Of	e-Poster
A Novel Method for Discovering Alternative Regulation Pathways of a Disease	Jeh-Ting Hsu, Chien-Hua Peng Hsing Wu University, Taiwan	e-Poster
Development of Loop-Mediated Isothermal Amplification for Detection of Garlic in Food	Ting-Ying Su, Meng-Shiou Lee, Shyang-Chwen Sheu National Pingtung University of Science and Technology, Taiwan	e-Poster
Induction of G1 Arrest and Apoptosis in Human Cancer Cells by Panaxydol	Dong-Gyu Leem, Ji-Sun Shin, Sang Yoon Choi, Kyung-Tae Lee Kyung Hee University, Korea, Republic Of	e-Poster
Anti-Colitic and Anti-Inflammatory Effects of Lactobacillus sakei K040706 in Mice with Ulcerative Colitis	Seunghwan Seo, Woo-Seok Lee, Ji-Sun Shin, Young Kyoung Rhee, Chang-Won Cho, Hee-Do Hong, Kyung-Tae Lee Kyung-Hee University, Korea, Republic Of	e-Poster
<a href="#">Ethanol Extract of <i>Potentilla pradoxa</i> Nutt Inhibits LPS-induced Inflammatory Responses via NF-<math>\kappa</math>B and AP-1 Inactivation</a>	Hae-Jun Lee, Ji-Sun Shin, Kyung-Tae Lee Kyung Hee University, Korea, Republic Of	e-Poster
Changes in Expression of Galanin in the CSMG Neurons Supplying the Prepyloric Area of the Porcine Stomach Induced by Intragastric Infusion of Hydrochloric Acid	Katarzyna Palus, Jarosław Całka University of Warmia and Mazury in Olsztyn, Poland	e-Poster
Analysis of Expression of SP and NOS in the Porcine Nodose Ganglion (NG) Sensory Neurons Supplying Prepyloric Stomach Region after Intragastric Hydrochloric Acid Infusion	Liliana Rytel, Jarosław Całka University of Warmia and Mazury in Olsztyn, Poland	e-Poster

## 5. 議程 V (HALL B)

本議程由 Grzegorz Mazurek 博士主持，主要針對農業合作、小型企業、計畫導向組織、網路服務分析、壓力管理、社群媒體、投資管理、客戶溝通及專案風險評估等議題進行專題討論，其議程安排及發表情況如表六所示。

表六、Session V 議程安排及發表文章

**May 26, 2016 HALL B**  
**Session V: 08:00-10:10**  
**Coffee Break: 10:10-10:15**

### Chair: Grzegorz Mazurek

The Productivity Comparison of Credit Departments of Farmers' Associations in Taiwan and Agriculture Cooperatives Bank in Japan	Meng-Hsuan Wu, Yung-Hsiang Lu National Chiayi University, Taiwan	
Efficiency and Scale Elasticity in Network Data Envelopment Analysis: An Application to International Tourist Hotels in Taiwan	Li-Hsueh Chen National Taiwan Ocean University, Taiwan	
The Specificity of Employee Development in Polish Small Enterprises	E. Rak Wroclaw University of Economics, Poland	
Dilemmas of HRM in a Project-Oriented Organisation	Katarzyna Piwowar-Sulej Wroclaw University of Economics, Poland	e-Poster
Corporate Philanthropy as a Source of Competitive Advantage	Mateusz Rak Wroclaw School of Banking, Poland	
Portfolio Optimization under a Hybrid Stochastic Volatility and Constant Elasticity of Variance Model	Jai Heui Kim, Sotheara Veng Pusan National University, Korea, Republic Of	
Analytical Study of Applying the Account Aggregation Approach in E-Banking Services	A. Al Drees, A. Alahmari, R. Almuwayshir King Saud University, Saudi Arabia	e-Poster
The Effect of Emotional Intelligence on Physiological Stress of Managers	Mikko Salminen, Simo Järvelä, Niklas Ravaja Aalto University, Finland	e-Poster
Social Media Marketing and Blog Usage in Business Schools: An Exploratory Study	Grzegorz Mazurek, Michal Kucia Kozminski University, Poland	
Use of Fuzzy Logic in the Corporate Reputation Assessment: Stock Market Investors' Perspective	Tomasz L. Nawrocki, Danuta Szwajca Silesian University of Technology, Poland	e-Poster
Multimodality of Brand Literacy in Acculturation Context —An Alternative Framework for Intercultural Brand-Consumer Communication	Han Han, Francesco Zurlo, Menglu Liao Politecnico di Milano, Italy	e-Poster
Influence of a Company's Dynamic Capabilities on Its Innovation Capabilities	Lovorka Galetic, Zeljko Vukelic Faculty of Economics & Business Zagreb, Marius Consulting, Croatia	
Effect of Internal Control on Fraud Detection in Public Universities in West Java Indonesia	Fury Khristianty Fitriyah Padjadjaran University, Indonesia	
Project Risk Assessment of the Mining Industry of Ghana	Charles Amoatey Ghana Institute of Management and Public Administration, Ghana	

## 6. 議程 VI (HALL B)

本議程由 Abdallah Sofiane Berrouk 及 Mohamed Ahmed 博士主持，主要針對氣體轉化、離子傳輸膜、鈮/鋰電池、礦業技術、合金技術、固態氧化電解電池、電極材料、等議題進行專題討論，其議程安排及發表情況如表七所示。

表七、Session VI 議程安排及發表文章

May 26, 2016 HALL B  
Session VI: 10:15-11:45

### Chair: Abdallah Sofiane Berrouk, Mohamed Ahmed

Split-Flow Method to Reduce Duty Required in Amine Gas Sweetening Units	Abdallah Sofiane Berrouk, Dara Satyadileep The Petroleum Institute, United Arab Emirates	
Chemical Stability and Characterization of Ion Exchange Membranes for Vanadium Redox Flow Batteries	Min-Hwa Lim, Mi-Jeong Park, Ho-Young Jung Chonnam National University, Korea, Republic Of	e-Poster
Preparation and Performance of Polyphenylene Oxide-Based Anion Exchange Membrane for Vanadium Redox Flow Battery	Mi-Jung Park, Min-Hwa Lim, Ho-Young Jung Chonnam National University, Korea, Republic Of	e-Poster
Influence of Iron Ore Mineralogy on Cluster Formation inside the Shaft Furnace	M. Bahgat, H. A. Hanafy, S. Lakdawala Saudi Basic Industries Corporation (SABIC), Saudi Arabia	
Submicron Size of Alumina/Titania Tubes for CO <sub>2</sub> -CH <sub>4</sub> Conversion	Chien-Wan Hun, Shao-Fu Chang, Jheng-En Yang, Chien-Chon Chen, Wern-Dare Jheng National United University, Taiwan	
Effect of Taper Pin Ratio on Microstructure and Mechanical Property of Friction Stir Welded AZ31 Magnesium Alloy	N. H. Othman, N. Udin, M. Ishak, L. H. Shah University of Malaysia Pahang, Malaysia	
The Effectiveness of Bismuth Addition to Retard the Intermetallic Compound Formation	I. Siti Rabiattul Aisha, A. Ourdjini, O. Saliza Azlina Universiti Malaysia Pahang, Malaysia	
Synthesis and Characterization of Pure and Doped Li <sub>7</sub> La <sub>3</sub> Zr <sub>2</sub> O <sub>12</sub> Li-Ion Conducting Solid Electrolyte for Lithium Batteries	Shari Ann S. Botin, Ruziel Larmae T. Gimpaya, Rembrant Rockwell Gamboa, Rinlee Butch M. Cervera University of the Philippines Diliman, Philippines	
Development of LSM/YSZ Composite Anode Materials for Solid Oxide Electrolysis Cells	Christian C. Vaso, Rinlee Butch M. Cervera University of the Philippines Diliman, Philippines	
Synthesis of Amorphous Nanosilica Anode Material from Philippine Waste Rice Hull for Lithium Battery Application	Emie A. Salamangkit-Mirasol, Rinlee Butch M. Cervera University of the Philippines Diliman, Philippines	e-Poster
Electrode Performance of Carbon Coated Nanograined LiFePO <sub>4</sub> in Lithium Batteries	Princess Stephanie P. Llanos, Rinlee Butch M. Cervera University of the Philippines Diliman, Philippines	
Novel Application of Nano-Gold Modified Artificial Kidney in Hemodialysis	Hsiao-Chien Chen, Fu-Der Mai, Chih-Ping Yang, Yu-Chuan Liu Taipei Medical University, Taiwan	e-Poster

## 7. 議程 VII (HALL B)

本議程由 Rajesh Kumar 及 Louis N. Y. Wong 博士主持，主要針對有限元素分析、動態結構、地震力學、混凝土技術、熱顯像技術、水油質傳分析、材料疲勞等議題進行專題討論，其議程安排及發表情況如表八所示。

表八、Session VII 議程安排及發表文章

**May 26, 2016 HALL B**  
**Session VII: 11:45-13:15**  
**Lunch: 13:15-13:45**

**Chair: Rajesh Kumar, Louis N. Y. Wong**

Concrete Cracking Simulation Using Vector Form Intrinsic Finite Element Method	R. Z. Wang, B. C. Lin, C. H. Huang National Center for Research on Earthquake Engineering, Taiwan	
Dynamic Soil Structure Interaction in Buildings	Shreya Thusoo, Karan Modi, Ankit Kumar Jha, Rajesh Kumar Indian Institute of Technology (Banaras Hindu University), Varanasi, India	
Experimental and Numerical Studies on Earthquake Shear Rupture Generation	Louis N. Y. Wong The University of Hong Kong, Hong Kong	
Optimal and Best Timing for Capturing Satellite Thermal Images of Concrete Object	Toufic Abd El-Latif Sadek Beirut Arab University, Lebanon	e-Poster
Best Timing for Capturing Satellite Thermal Images, Asphalt, and Concrete Objects	Toufic Abd El-Latif Sadek Beirut Arab University, Lebanon	e-Poster
Timing Equation for Capturing Satellite Thermal Images	Toufic Abd El-Latif Sadek Beirut Arab University, Lebanon	e-Poster
Laboratory Measurement of Relative Permeability of Heavy Oil and Water and Application to the Waterflooding in Petroleum Reservoir	Abdul Jamil Nazari, Shigeo Honma Tokai University, Japan	
Design of Single Point Mooring Buoy System by Parametric Analysis	Chul-Hee Jo, Do-Youb Kim, Seok-Jin Cho, Yu-Ho Rho Inha University, Korea, Republic Of	
Fatigue Analysis of Spread Mooring Line	Chanho Kang, Changhyun Lee, Seock-Hee Jun, Yeong-Tae Oh DSME Structure R&D, Korea, Republic Of	e-Poster
Simulation-Based Control Module for Offshore Single Point Mooring System	Daehyun Baek, Seungmin Lee, Minju Kim Jangik Park, Hyeong-Soon Moon Korea Institute of Industrial Technology, Korea, Republic Of	e-Poster
Mooring Analysis of Duct-Type Tidal Current Power System in Shallow Water	Chul H. Jo, Do Y. Kim, Bong K. Cho, Myeong J. Kim Inha University, Korea, Republic Of	

## 8. 議程 VIII (HALL A)

本議程由 Bernard Gangloff Gangloff 博士主持，主要針對教育環境、職場發展、語言教育、雇員分析、孩童照護、健康評估、癌症管理等議題進行專題討論，其議程安排及發表情況如表九所示。

表九、Session VIII 議程安排及發表文章

**May 27, 2016 HALL A**  
**Session VIII: 08:00-10:30**  
**Coffee Break: 10:30-10:45**

### Chair: Bernard Gangloff Gangloff

Ongoing Gender-Based Challenges in Post-2015 Development Agenda: A Comparative Study between Qatar and Arab States	Abdel-Samad M. Ali, Ali A. Hadi Al-Shawi Qatar University, Qatar
The Quality of Multi-Ethnic Preschool Environment and Human Resources: Teachers' Satisfaction on Their Career Development	Nordin Mamat, Abdul Rahim Razalli, Loy Chee Luen, Abdul Talib Hashim Universiti Pendidikan Sultan Idris, Malaysia
Bahasa Melayu Hand Coded and Malaysian Sign Language Acquisition of Hearing Impaired Students at Early Intervention	Abdul Rahim Razalli, Nordin Mamat, Lee Kean Low Sultan Idris Education University, Malaysia
Graphic Animation: Innovative Language Learning for Autistic Children	Norfishah Mat Rabi, Rosma Osman, Norziana Mat Rabi Sultan Idris Education University, Malaysia
Performance, Need and Discriminatory Allegiance of Employees as Awarding Criteria of Distributive Justice	B. Gangloff, L. Mayoral, A. Rezrazi University of Rouen, France
Child Sexual Abuse Prevention: Evaluation of the Program "Sharing Mouth to Mouth: My Body, Nobody Can Touch It"	Faride Peña, Teresita Castillo, Concepción Campo Autonomous University of Yucatan, Mexico
Assessment of Healthy Lifestyle Behavior Needs for Older Adults Living with Hypertension	P. Sutipan, U. Intarakamhang Srinakharinwirot University, Thailand
Stressors Faced by Border Security Officers: The Singapore Experience	Jansen Ang, Andrew Neo, Dawn Chia Immigration & Checkpoints Authority of Singapore, Singapore
Socio-Demographic and Clinical Features in Chilean Patients with Depression	Carla Crempien, Marcela Grez, Camila Valdés, María José López Pontificia Universidad Católica de Chile, Chile
Communication of Expected Survival Time to Cancer Patients: How It Is Done and How It Should Be Done	Geir Kirkebøen University of Oslo, Norway



## 9. 議程 IX (HALL A)

本議程由 Shyh-Nan Liou 及 Magdalena Escamilla 博士主持，主要針對新創產業發展、小型企業管理、醫療管理、校園管理、精神健康、溝通管理等議題進行專題討論，其議程安排及發表情況如表十所示。

表十、Session IX 議程安排及發表文章

May 27, 2016 HALL A  
Session IX: 10:45-13:00  
Lunch: 13:00

Group photo will be taken before lunch in the conference room.

**Chair: Shyh-Nan Liou, Magdalena Escamilla**

Innovation Mechanism in Developing Cultural and Creative Industries	Liou Shyhnan, Chia Han Yang National Cheng Kung University, Institute of Creative Industries, Taiwan
Psychosocial Risks and Occupational Health in a Mexican Small and Medium-Sized Enterprises	Magdalena Escamilla Quintal, Thelma Cetina Canto, Cecilia Aguilar Ortega Universidad Autónoma de Yucatán, Mexico
Self-Care and Risk Behaviors in Primary Caregiver of Cancer Patients	Ivonne N. Pérez-Sánchez, María L. Rascón- Gasca, Angélica Riveros-Rosas, Rebeca Robles García National Council for Science and Technology (CONACYT, Mexico
Gender Mainstreaming in Public Universities in Mexico	Carlos David Carrillo Trujillo, Rebelin Echeverría <sup>Poster</sup> Echeverría, Nancy Evia Alamilla, Rocío Quintal López Autonomous University of Yucatán, Mexico
Proposed Intervention to the Attention of Harassment at a Public University	R. Echeverría Echeverría, C. Carrillo Trujillo, N. Evia <sup>Poster</sup> Alamilla Autonomous University of Yucatán, Mexico
Mental Health in Young People Living Poverty in Southeastern Mexico	Teresita Castillo, Concepción Campo, Carlos Carrillo <sup>e-Poster</sup> Autonomous University of Yucatan, Mexico
Collaborative and Interdisciplinary Teams in Learning Communities through a University Program	Magdalena Escamilla Quintal, Melissa Aguilar Rivera <sup>Poster</sup> , Teresita Castillo León Universidad Autónoma de Yucatán, Mexico
Male Rivalry Seen through a Biopsychosocial Lens	John G. Vongas, Raghid Al Hajj <sup>e-Poster</sup> Concordia University and Dawson College, Canada
Development and Validation of the 'Short Form BASIC Scale' Psychotic Tendencies Subscale	Chia-Chun Wu, Ying-Yao Cheng <sup>e-Poster</sup> National Sun Yat-sen University , Taiwan
The Relations between Language Diversity and Similarity and Adults' Collaborative Creative Problem Solving	Z. M. T. Lim, W. Q. Yow <sup>e-Poster</sup> Singapore University of Technology and Design, Singapore
Theory of Planned Behavior Predicts Graduation Intentions of College and University Students with and without Learning Disabilities / Attention Deficit Hyperactivity Disorder in Canada and Israel	Catherine S. Fichten, Tali Heiman, Mary Jorgensen, Mai Nhu Nguyen, Rhonda Amsel, Dorit Olenik-Shemesh The Open University of Israel, Israel
An Evaluation of the Efficacy of School-Based Suicide Prevention Programs	S. Wietzychowski Nova Southeastern University, United States
Integrating Concepts in Positive Psychology with Suicide Prevention in Children and Adolescents	S. Wietzychowski Nova Southeastern University, United States
'Sit Down, Breathe, and Feel What?' Bringing a Contemplative Intervention into a Public Urban Middle School	Lunthita M. Duthely, John T. Avella, John Ganapati Coleman University of Miami, United States

## 10. 議程 X (HALL B)

本議程由 Noratiqah Mohd Ariff 及 Lina Wu 博士主持，主要針對競爭者整合機制、事件分析方法、模式分析、權重標準誤差法、邏輯系統、整數線性程式等議題進行專題討論，其議程安排及發表情況如表十一所示。

表十一、Session X 議程安排及發表文章

**May 27, 2016 HALL B**  
**Session X: 08:00-10:30**  
**Coffee Break: 10:30-10:45**

### Chair: Noratiqah Mohd Ariff, Lina Wu

Performance Comparison of ADTree and Naive Bayes Algorithms for Spam Filtering	Thanh Nguyen, Andrei Doncescu, Pierre Siegel Paul Sabatier University, France	
Competitor Integration with Voice of Customer Ratings in QFD Studies Using Geometric Mean Based on AHP	Zafar Iqbal, Nigel P. Grigg, K. Govindaraju, Nicola M. Campbell-Allen Massey University, New Zealand	
Regionalization of IDF Curves with L-Moments for Storm Events	Noratiqah Mohd Ariff, Abdul Aziz Jemain, Mohd Aftar Abu Bakar Universiti Kebangsaan Malaysia, Malaysia	
Daily Probability Model of Storm Events in Peninsular Malaysia	Mohd Aftar Abu Bakar, Noratiqah Mohd Ariff, Abdul Aziz Jemain Universiti Kebangsaan Malaysia, Malaysia	
A Prediction Method for Large-Size Event Occurrences in the Sandpile Model	S. Channgam, A. Sae-Tang, T. Termsaithong King Mongkut's University of Technology Thonburi, Thailand	
Quantile Coherence Analysis: Application to Precipitation Data	Yaeji Lim, Hee-Seok Oh Pukyong National University, Korea, Republic Of	
A Kolmogorov-Smirnov Type Goodness-Of-Fit Test of Multinomial Logistic Regression Model in Case-Control Studies	Chen Li-Ching Tamkang University, Taiwan	
$\bar{X}$ and S Control Charts based on Weighted Standard Deviation Method	Derya Karagöz Hacettepe University, Turkey	
Effects of Video Games and Online Chat on Mathematics Performance in High School: An Approach of Multivariate Data Analysis	Lina Wu, Wenyi Lu, Ye Li Borough of Manhattan Community College, The City University of New York, United States	e-Poster
Performance Measurement of Logistics Systems for Thailand's Wholesales and Retails Industries by Data Envelopment Analysis	Pornpimol Chaiwuttisak King Mongkut's Institute of Technology Ladkrabang, Thailand	e-Poster
Timetabling Communities' Demands for an Effective Examination Timetabling Using Integer Linear Programming	N. F. Jamaluddin, N. A. H. Aizam Universiti Malaysia Terengganu, Malaysia	
A Survey on the Requirements of University Course Timetabling	Nurul Liyana Abdul Aziz, Nur Aidya Hanum Aizam University Malaysia Terengganu, Malaysia	

## 11. 議程 XI (HALL B)

本議程由 Joselito Medina 及 Kazuki Hiro 博士主持，主要針對物流分析、網路威脅、智能控制、負壓技術、法國核電發展、異相觸媒技術、電廠回復評估、核種吸附等議題進行專題討論，其議程安排及發表情況如表十二所示。

表十二、Session XI 議程安排及發表文章

May 27, 2016 HALL B  
Session XI: 10:45-13:00  
Lunch: 13:00

Chair: Joselito Medina, Kazuki Hiro

Modeling and Simulation of Flow Shop Scheduling Problem through Petri Net Tools	Joselito Medina Marin, Norberto Hernández Romero, Juan Carlos Seck Tuh Mora, Erick S. Martinez Gomez Autonomous University of Hidalgo State, Mexico	
A Reasoning Method of Cyber-Attack Attribution Based on Threat Intelligence	Li Qiang, Yang Ze-Ming, Liu Bao-Xu, Jiang Zheng-Wei Institute of Information Engineering, Chinese Academy of Sciences, China	
Using Classifiers to Predict Student Outcome at Higher Institute of Telecommunication	Fuad M. Alkoot The Public Authority for Applied Education and Training, Kuwait	
An Adaptive Opportunistic Transmission for Unlicensed Spectrum Sharing in Heterogeneous Networks	Daehyoung Kim, Pervez Khan, Hoon Kim Incheon National University, Korea, Republic Of	e-Poster
Quantitative Texture Analysis of Shoulder Sonography for Rotator Cuff Lesion Classification	Chung-Ming Lo, Chung-Chien Lee Taipei Medical University, Taiwan	
Active Islanding Detection Method Using Intelligent Controller	Kuang-Hsiung Tan, Chih-Chan Hu, Chien-Wu Lan, Shih-Sung Lin, Te-Jen Chang Chung Cheng Institute of Technology, National Defense University, Taiwan	e-Poster
Metal Berthelot Tubes with Windows for Observing Cavitation under Static Negative Pressure	K. Hiro, Y. Imai, T. Sasayama National Institute of Technology, Nara College, Japan	
Negative Pressures of Ca. -20 MPA for Water Enclosed into a Metal Berthelot Tube under a Vacuum Condition	K. Hiro, Y. Imai, M. Tanji, H. Deguchi, K. Hatari National Institute of Technology, Nara College, Japan	
Interactive Design Tool for an Airbag	Sangbaek Park, Sunghoon Yang, Soo-Won Chae Korea University, Korea, Republic Of	e-Poster
Stress Evaluation at Lower Extremity during Walking with Unstable Shoe	Sangbaek Park, Seungju Lee, Soo-Won Chae Korea University, Korea, Republic Of	e-Poster
'Saying' the Nuclear Power in France: Evolution of the Images and Perceptions of a Sensitive Theme	Jandot Aurélie Blaise Pascal University, France	
Preparation of Heterogeneous Ferrite Catalysts and Their Application for Fenton-Like Oxidation of Radioactive Organic Wastewater	Hsien T. Hsieh, Chao R. Chen, Li C. Chuang, Chin C. Shen Institute of Nuclear Energy Research, Taiwan	
An Information-Theoretic Approach to Assessing Resilience in Nuclear Power Plants	Jonathan A. Poli, Kazuyuki Demachi University of Tokyo, Japan	e-Poster
Sorption of Cesium Ions from Aqueous Solutions by Magnetic Multi-Walled Carbon Nanotubes Functionalized with Zinc Hexacyanoferrate	H. H. Lee, D. Y. Kim, S. W. Lee, J. H. Kim, J. H. Kim, W. Z. Oh, S. J. Choi Kyungpook National University, Korea, Republic Of	e-Poster
A Method for Solid-Liquid Separation of Cs+ from Radioactive Waste by Using Ionic Liquids and Extractants	J. W. Choi, S. Y. Cho, H. J. Lee, W. Z. Oh, S. J. Choi Kyungpook National University, Korea, Republic Of	e-Poster

#### (四) ICNST 2016 論文發表過程

第一天(5/26)提前抵達會場，依照會場指示牌指引方向，前往東武飯店之國際會議廳，領取大會手冊及文件，並發給識別證(如圖二、圖三、圖四、圖五)。

本次參加 ICNST 2016 國際研討會之投稿題目為「Preparation of Heterogeneous Ferrite Catalysts and Their Application for Fenton-Like Oxidation of Radioactive Organic Wastewater」，其投稿摘要如圖六所示。本摘要經大會審核後通過，並接獲邀請參加口頭報告，其會議接受函如圖七所示。本次口頭演說之時間係安排於第二天(5/27)上午之 Session XI 議程，演講時間約 15~20 分鐘，並由現場專家、學者及與會人員進行意見交流及發問。本次發表之內容著重於放射性廢液處理方法之建立及應用實例。透過核研所自行開發之磁性觸媒，本身具有磁性，可於批次反應後進行回收，且具有重複使用之能力，可做為放射性有機廢液之總有機碳(TOC)降解試驗。本次報告重點摘要如下：

1. 經由蒸餾及冷凝試驗，TOC 由原始濃度(21600 ppm)降至 9162 ppm，顯示低沸點之有機溶劑蒸氣化。
2. 添加 H<sub>2</sub>O<sub>2</sub> 後，TOC 進一步下降至 491 ppm。雖無添加觸媒，顯示 H<sub>2</sub>O<sub>2</sub> 初步有助於 TOC 降解。
3. 添加觸媒催化 TOC 降解試驗。H<sub>2</sub>O<sub>2</sub> 增加時，TOC 由 151 ppm 下降至 3 ppm (達液體場接收標準)。
4. 以 Fenton-like oxidation 能有效進行 TOC 降解反應，其效能與 CFCO catalysts 及 H<sub>2</sub>O<sub>2</sub> 添加量之有關。

本次發表論文過程順利，期間與多位學者針對演講內容進行討論，發表情況如圖八所示。大部分主要問題為此類型觸媒之效能、耐久性、製程、成本等問題，經討論後大致認為耐久性之測試應更需嚴謹，必須考慮多次濕式氧化後，觸媒之金屬成分是否有溶出現象，造成觸媒金屬比例改變，進而影響 TOC 降解效能。

透過本次參加 ICNST 2016 國際研討會，巧遇台灣各領域之專家，包含北科大陳教授、屏科大許教授及環保署同仁，如圖九所示。藉此機會，彼此可針對各自領域交流切磋，雖然彼此領域並非一致，但透過腦力激盪及討論亦可互相瞭解對方之研究領域，而提供建設性之建

議。此外，透過本次研討會發表機會，與韓國國立慶北大學環境工程系之教授 Won Zin Oh 博士進行放射性廢水處理之經驗交流，如圖十所示。Won Zin Oh 博士目前亦擔任韓國放射性廢棄物研究協會(Research Institute of Korea Radioactive Waste Society)之主管，針對核設施所產生之放射性廢棄物具有充分的實務經驗。本次 Won Zin Oh 博士團隊針對放射性廢水亦有發表短篇演講，其題目為「A Method for Solid-Liquid Separation of Cs<sup>+</sup> from Radioactive Waste by Using Ionic Liquids and Extractants」，其原理係利用離子液體(Ionic Liquids)作為綠色溶劑，針對污染水相進行液液萃取，透過離子液體與 Cs<sup>+</sup>進行離子交換，使 Cs<sup>+</sup>核種進入離子液體相中，達到廢液處理之目的，然而此方法之主要缺點為離子液體之化學結構較複雜，且其成本較高，若應用於廢水處理須考量其費用。此外，離子液體、水、溶解物之三相平衡關係複雜，各相成分濃度皆須進行分析，不利於現場作業之簡單化原則。此外，Won Zin Oh 博士團隊亦發表吸附劑相關研究結果，其題目為「Sorption of Cesium Ions from Aqueous Solutions by Magnetic Multi-Walled Carbon Nanotubes Functionalized with Zinc Hexacyanoferrate」，主要是利用多層奈米碳管作為吸附 Cs<sup>+</sup>核種之材料，其表面經過親水性改質，提高材料表面之極性及吸附性，以利處理放射性之廢水。首先他們透過鐵之有機前驅物(Fe(acac)<sub>3</sub>)將多層奈米碳管先進行磁化，並接上鋅赤血鹽(Zinhexacyanoferrate)。此類吸附材料可透過磁性進行分離，對於 Cs<sup>+</sup>核種吸附容量大。除此之外，亞鐵氰化鹽亦可做為多層奈米碳管改質劑，製備 Cs<sup>+</sup>核種之吸附劑，其合成機制如圖十一所示。首先須透過酸洗(硝酸/硫酸溶液)進行表面初步改質，使其於表面形成羧基(-OOH)，並添加 EDA(ethylenediamine)及 DCC(dicyclohexylcarbodiimide)，反應形成胺基(-NH<sub>2</sub>)。此類胺基(-NH<sub>2</sub>)扮演螯合劑(chelating ligand)角色，將與銅離子產生作用力，形成螯合物。將上述改質之奈米碳管螯合物再與亞鐵氰化鈉混合，即可完成改質，形成 MWCNT-CuFCs，如圖十一(5)所示。MWCNT-CuFCs 材料經 TEM 及元素分析結果如圖十二所示，可發現多層奈米碳管表面產生沉積物，透過進一步分析可發現含有 C、N、Fe、Cu 等元素，確認表面改質成功。表十三顯示改質後 MWCNT-CuFCs 材料之比表面積稍微減小，由 231.8m<sup>2</sup>/g 下降至 185.9m<sup>2</sup>/g。圖十三顯示改質後 MWCNT-CuFCs 材料之 FTIR 分析，確認亞鐵氰化鹽之官能基 C≡N 已接於表面，證實改質成功。圖十四顯示改質後 MWCNT-CuFCs 材料之熱重分析，結果顯示官能基於升溫程序下會逐漸裂解，其總重量於 700°C 時將減少至 80%

左右，證實胺基、鐵氰化鹽之官能基已脫離碳管表面。為了瞭解 MWCNT-CuFCs 材料之 Cs 吸附特性，於不同 pH 環境下測試期效果及影響，結果發現 pH 值增加時，有利於 Cs 之吸附，當 pH 達 11 時具有最佳效果，如圖十五所示。上述結果顯示，Cs<sup>+</sup>與 H<sup>+</sup>於溶液中會形成競爭關係，且與 ferrocyanide 於鹼性容易下呈現穩定狀態有關，而當 pH 大於 11 時，copper ferrocyanide 官能基開始瓦解，故吸附效能下降。為了瞭解 MWCNT-CuFCs 材料在其他離子存在時對 Cs 吸附效能之影響，嘗試使用鈉離子、鉀離子作為測試，如圖十六所示。在 0.001~5 mM 的鈉離子、鉀離子濃度下，MWCNT-CuFCs 材料吸附效能為 0.048 to 0.039 mmol/g，顯示仍具有 Cs 吸附之選擇性，且由於 binding strength 及 ionic radii 影響，可發現 Cs<sup>+</sup>與 K<sup>+</sup>之競爭關係大於 Cs<sup>+</sup>與 Na<sup>+</sup>。

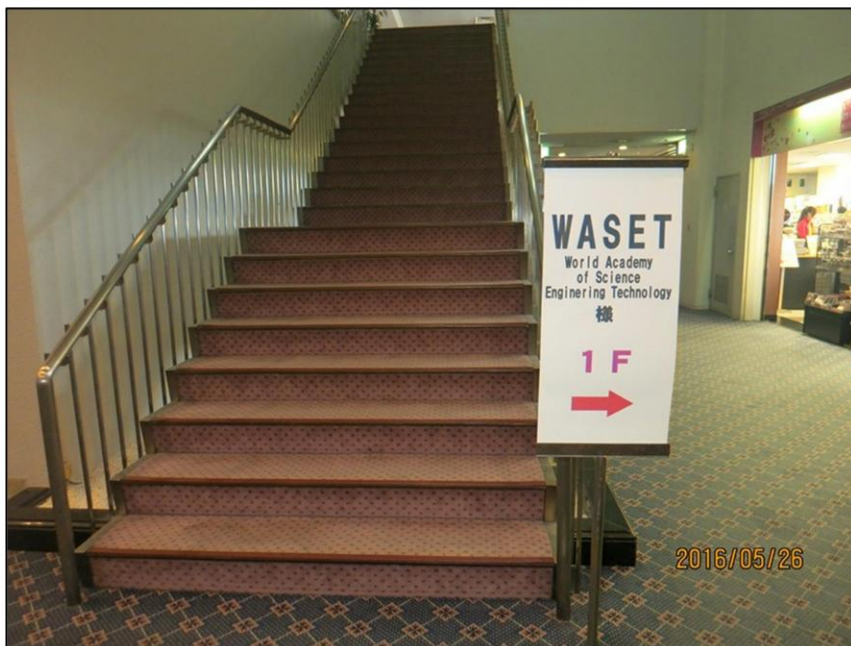
有關核能領域之社會議題發展於本次會議亦有著墨。法國 Blaise Pascal 大學 Aurélie Jandot 女士發表「Saying the Nuclear Power in France: Evolution of the Images and Perceptions of a Sensitive Theme」，說明核能產業之形象與認識如何受到敏感議題之影響，其發表過程如圖十七所示。本篇論文主要探討年份為 1965 至 1981 年，根據法國主流之新聞雜誌 L'Express 所發行之文章，研究主題著重於篩選大量文章、議題發生次數及所造成之印象作為論文主軸。新聞雜誌 L'Express 成立於 1953 年，為法國第一個新聞周刊，周發行量約 500,000~700,000 份。作者認為雜誌發行核能議題文章主要的目的是為了引導讀者的想法，因此也促成了社會大眾對於相關議題的認知及發展。作者亦指出 1965 至 1981 年針對核能領域，有兩股主流意見互相對抗，分別為對核能之逐漸的瞭解及不信任，透過雜誌文章用詞的變化可以窺見帶有神秘色彩的核能科技已逐漸變成社會議題而形成開放討論。

作者首先收集 1965 至 1981 年新聞雜誌 L'Express 之 884 份雜誌(共 154,700 頁)，再進行人工內容分析。未使用電腦關鍵字分析是因為使用核能產業之描述可能使用明顯用字，甚至是迂迴或暗示之說法表示，這些用詞之細微差異顯示了想法的複雜度。作者所篩選之重要文章數量及年代之關係如圖十八所示，並認為核能議題文章與國際主要事件、法國國家政策適應性、新政治運動的崛起及核能科學技術之進展有關。至於風險議題係包含意外事件及環境方面的考量，使得文章逐漸改變其所使用之用詞及敘述。作者歸納 1965 至 1967 年間，法國新聞雜誌 L'Express 對於核能議題所刊登之文章並無負面印象之報導，顯示核能議題被視為進

步的一種表現。當時能源問題為每周都被重新提出討論之主題，係肇因於燃燒石化燃料所產生的廢氣問題，為了解決上述問題，核能發電技術被視為最安全且為低成本供電之最佳解決方案。而當時法國正處於快速的經濟發展期間，對核能議題之疑慮很明顯地消失，取而代之的是對於核能發電廠的成長、法國科技技術的輸出及核反應器等議題。作者舉例 Louis Leprince-Ringuet 教授(如圖十九所示)撰文「The chances of the French nuclear science」，該文章說明了對核能正面看法的論述，許多此類核能電力之文章多與未來概念進行連結，儘管讀者已有機會了解離心及擴散等廢氣處理技術。當時認為推進發展的加速者是國際間的合作，而非互相競爭。唯一的考量是法國並無足夠的鈾原料供應核能電廠所需，因此當時對於核能發電之批評主要為鈾礦資源匱乏，可能是發展法國在核能科學及技術領域之弱點。1968 年隨著國際間及法國國內發生的事件，使得核能議題之評論逐漸轉向。當時法國與美國處於競爭階段，尤其法國人對美國人並未誠實支付法國學者 Frédéric Joliot-Curie (居禮夫婦之女婿)所屬智慧財產權之權利金費用十分在意，以及 Galley 先生(如圖二十)所面臨再選擇反應器技術的議題之文章，使得法國人回想起歐洲在面對美國主權逐漸失去獨立自主性的局面。此時法國對於核能研究仍具有熱誠的一面，法國政府仍持續關注核能發展領域並增加研究預算。1969 至 1973 年間環境關懷想法逐漸成長，關注污染議題數量逐漸增加，有關核能科技風險概念開始形成，而新聞雜誌 L'Express 仍主導核能議題之印象與爭論，對於原子似乎仍充滿各種可能性，寄望應用在各種領域。原子概念似乎代表著較便宜的成本，尤其是當時油價開始上漲，法國政府亦決定捨棄法國自行發展之氣冷石墨緩和式反應器(gas-cooled graphite moderated reactor)。然而，反對者指出國家花費太多成本及給予太大的佔地空間，損害了基本研究的資源，所以此類問題討論影響了法國爾後建置壓水式反應器的決定，但法國研究學者當時仍對原子能科技提出聲援及活動，如圖二十一所示。1974 至 1975 年初，雖然大部分核能議題文章仍為正面表述，但此期間爭議性文章之數量在此期間於法國雜誌穩定地增加，尤其是由 René Dumont 於總理大選之法國政策面所倡導，隨後 L'Express 雜誌意圖利用此核能議題重新獲取政治上的影響力。此時，雜誌文章已開始利用核能產業之圖片，強調核能科技之風險，並與神秘、死亡及恐懼進行形象之連結，如圖二十二所示。因此，上述情況開始出現新的聲音，包含減少能源使用及使用更多非核能之能源來源，而法國政府決定在考慮人口同時，使得興建新的核

能電廠已被限制。後來，隨著 1975 年 5 月法國議會討論能源政策，當時考量能源危機當時並無政治團體反對使用核能，且當時核能議題在全世界是受到支持的，因此核能議題文章顯示核能科技是安全而有保障的，如圖二十三所示。然而於 1978 年，法國議會選舉時由左翼政黨獲勝，因此重新引起環境考量之議題，而核能負面及風險觀念又重新回到輿論。1979 年 3 月發生三哩島核能意外事件，引發了許多討論文章，且為重大國際討論之議題，雖然引起核能威脅的印象，但因為面臨二次能源危機，因此核能仍視為有用的能源選項。因此，發展核能技術之議題文章捲土重來，並包含核能產業之宣傳廣告及提供工作機會之消息，如圖二十四所示。由於反對核能之倡議者雖然仍未被遺忘，其爭論及活動已減少，因其亦未能提出短期或中期內可靠的解決方案。上述研究顯示，1965 至 1981 年期間，新聞雜誌所倡導核能議題之文章大致上仍一定程度能影響民眾、社會之看法，但核能產業仍視國家政策及能源供需之趨勢所影響。





圖二、東武國際飯店之會議地點指示標示



圖三、ICNST 2016 國際研討會報到處



圖四、ICNST 2016 國際研討會識別證



圖五、ICNST 2016 國際研討會看板

## Preparation of Heterogeneous Ferrite Catalysts and Their Application for Fenton-Like Oxidation of Radioactive Organic Wastewater

**Authors :** Hsien T. Hsieh, Chao R. Chen, Li C. Chuang, Chin C. Shen

**Abstract :** Fenton oxidation technology is the general strategy for the treatment of organic compounds-contained wastewater. However, a considerable amount of ferric sludge was produced during the Fenton process as secondary wastes, which were needed to be further removed from the effluent and treated. In this study, heterogeneous catalysts based on ferrite oxide (Cu-Fe-Ce-O) were synthesized and characterized, and their application for Fenton-like oxidation of simulated and actual radioactive organic wastewater was investigated. The results of TOC decomposition efficiency around 54% ~ 99% were obtained when the catalyst loading, H<sub>2</sub>O<sub>2</sub> loading, pH, temperature, and reaction time were controlled. In this case, no secondary wastes formed and the given catalysts were able to be separated by magnetic devices and reused again.

**Keywords :** fenton, oxidation, heterogeneous catalyst, wastewater

**Conference Title :** ICNST 2016 : 18th International Conference on Nuclear Science and Technology

**Conference Location :** Tokyo, Japan

**Conference Dates :** May 26-27, 2016

圖六、ICNST 2016 主辦單位 WASET 之投稿摘要頁面



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## ACCEPTANCE LETTER

April 09, 2016

Dr. Hsien-Te Hsieh  
Institute of Nuclear Energy Research  
Taiwan

Herewith, the international scientific committee is happy to inform you that the peer-reviewed draft paper code 16JP05000958 entitled (Preparation of Heterogeneous Ferrite Catalysts and Their Application for Fenton-Like Oxidation of Radioactive Organic Wastewater by Hsien T. Hsieh, Chao R. Chen, Li C. Chuang) has been accepted for oral presentation as well as inclusion in the conference proceedings of the ICNST 2016 : 18th International Conference on Nuclear Science and Technology to be held in Tokyo, Japan during May, 26-27, 2016. The high-impact conference papers will also be considered for publication in the special journal issues at <http://waset.org/Publications>.

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圖七、ICNST 2016 主辦單位 WASET 核發之論文接受函



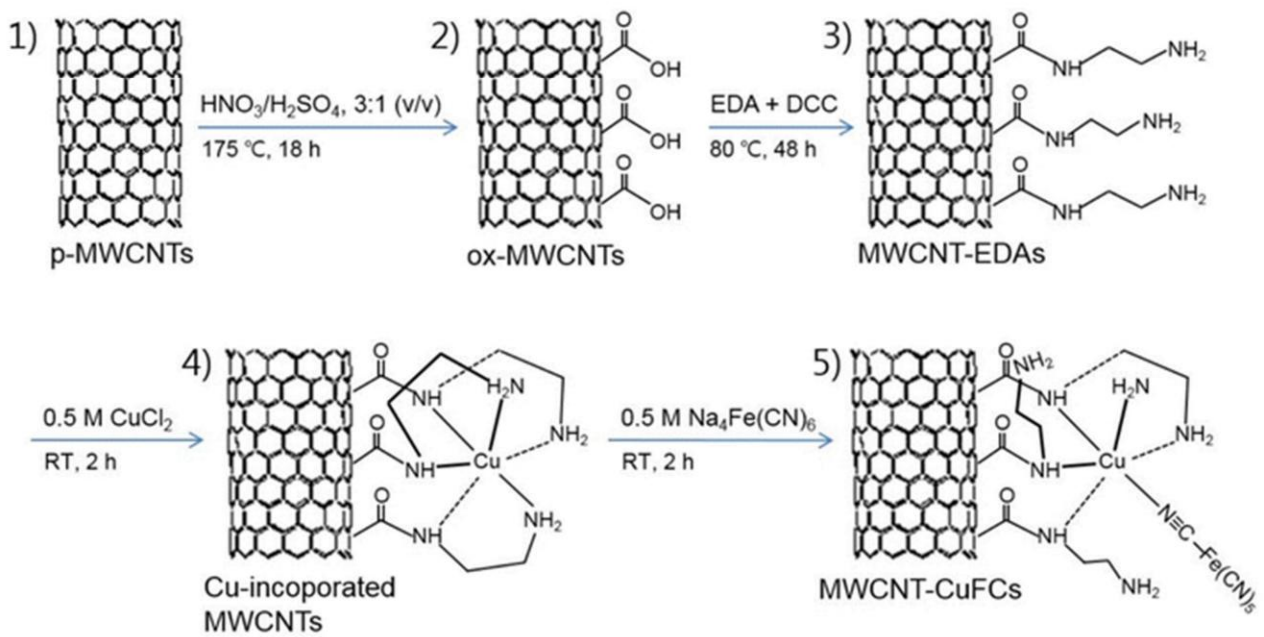
圖八、作者於 ICNST 2016 國際會議口頭發表情形



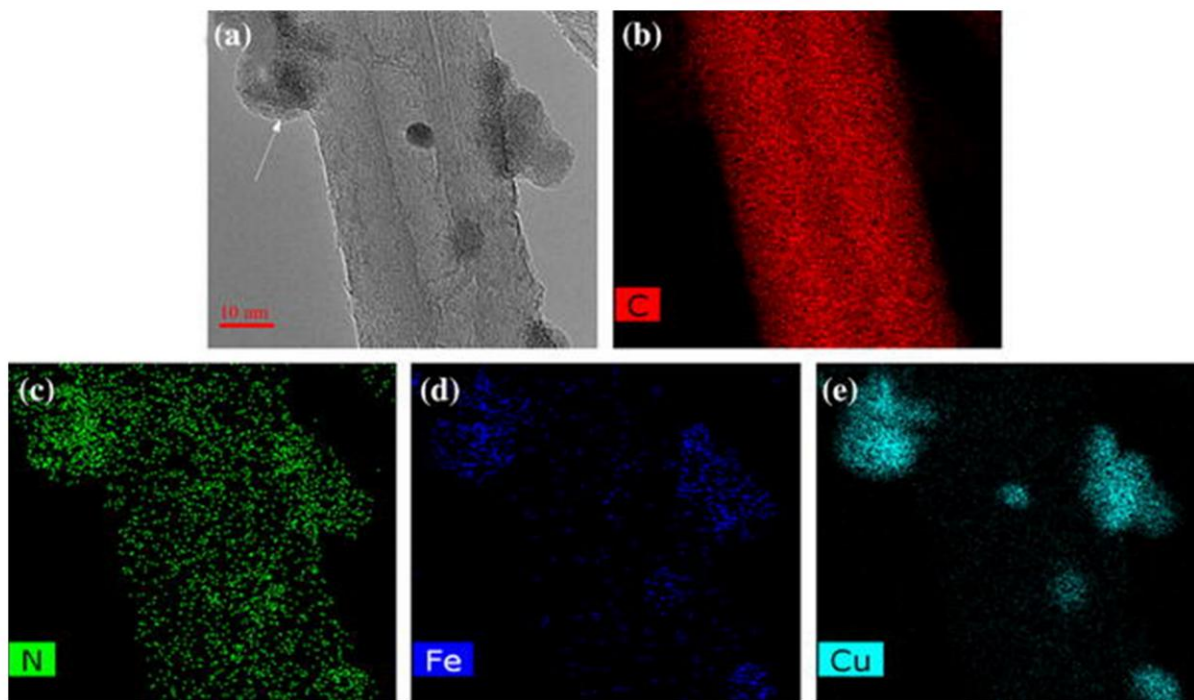
圖九、作者(右)與來自台灣之學者及環保署同仁之合照



圖十、作者(右)與韓國國立慶北大學教授合影



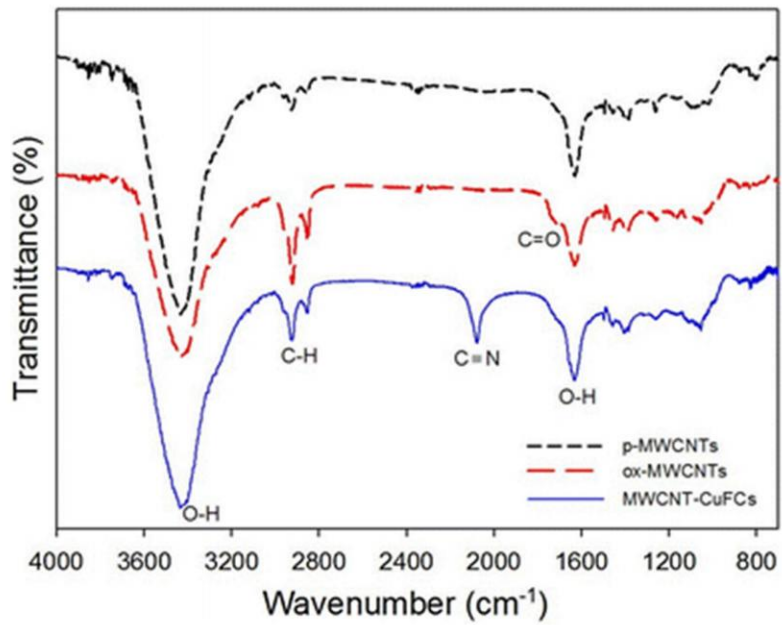
圖十一、多層奈米碳管表面改質程序與機制



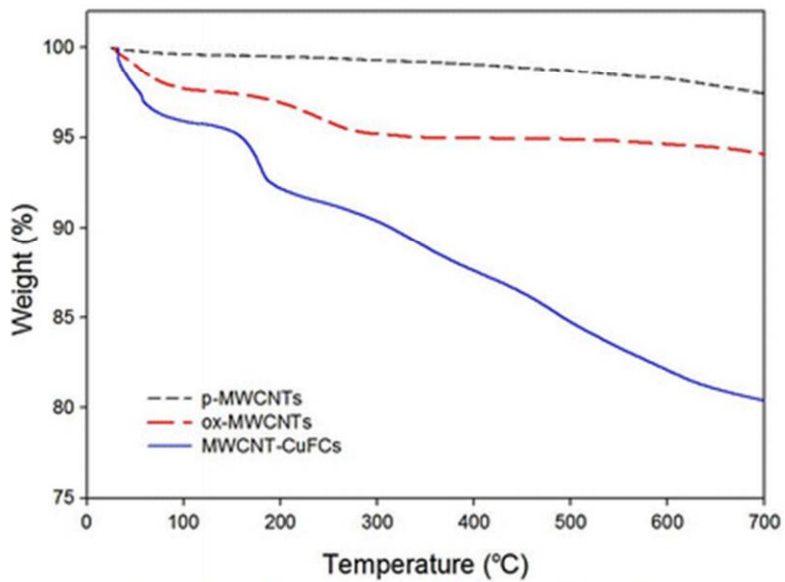
圖十二、多層奈米碳管改質後之(a)HRTEM 影像，  
及元素分析影像(b)碳、(c)氮、(d)鐵及(e)銅。

表十三、三種多層奈米改質後之 BET 分析結果

Sorbent	BET surface area (m <sup>2</sup> /g)	Pore size (nm)	Pore volume (cm <sup>3</sup> /g)
p-MWCNTs	163.3	18.6	0.85
ox-MWCNTs	231.8	10.8	1.20
MWCNT-CuFCs	185.9	15.2	0.95

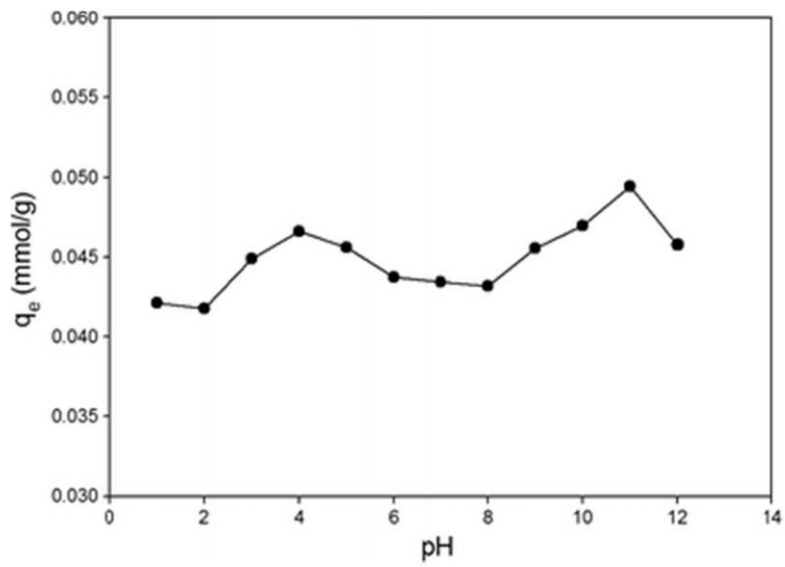


圖十三、三種多層奈米改質後之 FTIR 及官能基分析

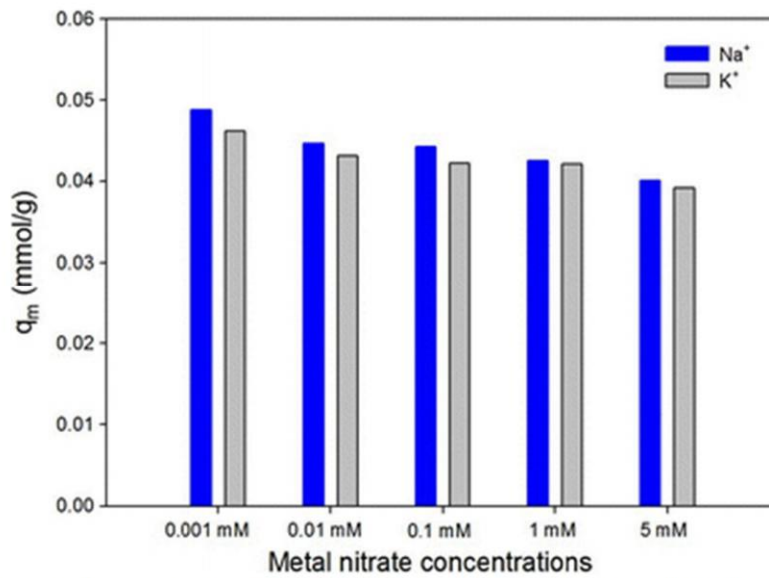


圖十四、三種多層奈米改質後之熱重分析





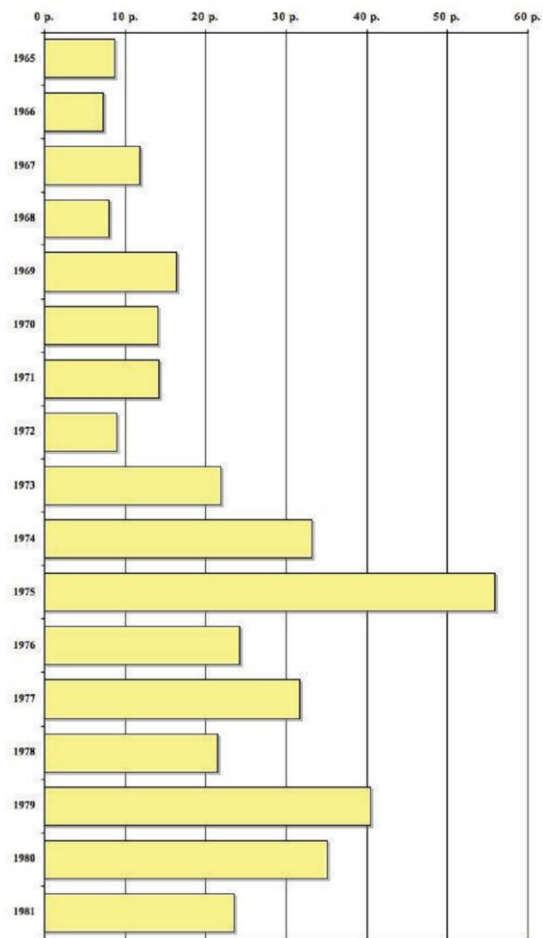
圖十五、不同 pH 值對 MWCNT-CuFCs 之吸附能力



圖十六、鈉離子、鉀離子共存時，MWCNT-CuFCs 之飽吸附能力比較



圖十七、法國 Blaise Pascal 大學 Aurélia Jandot 女士發表過程



圖十八、法國之核能議題文章數量與年代之關係



圖十九、法國 Louis Leprince-Ringuet 教授針對核能議題發表正面文章



圖二十、「Galley 先生於原子能面前之抉擇」封面照片



圖二十一、法國研究學者聲援原子能科學之活動情況



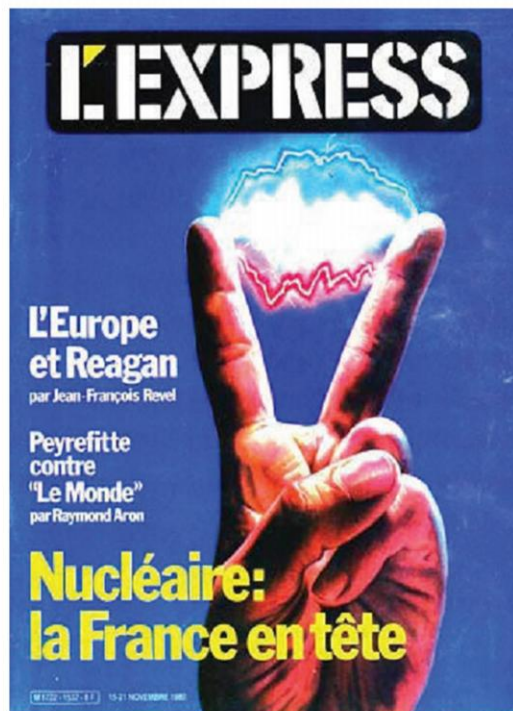
*Réparation d'un appareil de manipulation de l'uranium à la centrale de Saint-Laurent-des-Eaux.*

圖二十二、核設施維修設備之雜誌圖片



Mesures de sécurité à la centrale nucléaire de Chinon.

圖二十三、核能產業關於安全量測之雜誌圖片



圖二十四、核能產業之雜誌宣傳封面(Nuclear power: France ahead)

### 三、心得

此次代表核能研究所赴日本參加 ICNST 2016 國際研討會。發表的論文領域為放射性廢液之處理技術，本次研討會之討論議題廣泛，皆為目前工程、科技方面值得探討之議題，針對參加研討會之心得說明如下：

- (一) 參加十八屆 ICNST 2016 國際研討會共有美國、加拿大、法國、挪威、芬蘭、義大利、波蘭、日本、韓國、中國、香港、新加坡、菲律賓、泰國、馬來西亞、印度、黎巴嫩、土耳其、沙烏地阿拉伯、以色列、巴西、墨西哥、智利、紐西蘭等國之各界學者、政府及研究機構發表論文，論文發表領域除核能科學技術領域外，尚有許多工程技術領域專文發表，各項議題皆與基礎科學、民生工業及科技發展有關，可透過會議收集廣泛資料，並增加國際視野。
- (二) 本次會議議程主題包含能源革新科技、環境保護技術、生物科學技術、特殊功能材料開發及核能技術進展，研討會大致區分成五個討論議題。會議期間須事先挑選適當議題，做為執行計畫之參考依據。此外，會議期間亦抽空至其他主題場次聆聽簡報，以瞭解各項科技領域之發展現況，充實個人之最新資訊。
- (三) 能源革新科技方面，包含固態氧化燃料電池、電池電極、離子交換膜、鋰電池、鈎電池、礦業技術、合金技術、核能發展歷程等。此領域主要係探討取代化石燃料之可能性，已其他替代之發電技術結合相關材料進行開發，目的是取得成本低廉、環境友善、供電穩定之替代性方案。目前我國在此領域亦有積極作為，以綠色能源、再生能源、生質能源作為無碳家園之基礎，並維護我國核能發電之安全性。
- (四) 環境保護技術方面，包含工業廢水、混凝土容器、水資源管理、污泥再利用、衝擊影響評估、廢水處理系統、環境教育等、廢棄物回收、供排水工程、管理等領域。由於無論是已開發或未開發國家，其各項產業或製造業皆有可能產生廢棄物、廢水及廢氣。廢棄物需進一步進行處理、安定化之後，達到法規標準方可進行排放。由於環境保護之需求是全球一致的趨勢，並且針對水資源的充足利用亦是重要的課題之一。利用廢棄物資源再生、廢水利用、環保科技提升等措施，可有效增加企業對

於環境社會之貢獻，因此各國在此領域皆是投注大量人力，追求環境永續之目標。

- (五) 生物科學技術方面，包含生物液態發酵、生物檢測、定量技術、醫療電子、金屬材料、基因表現、動物實驗、細胞試驗、生物化學、生醫高分子電紡、生質薄膜、醫學技術、基改產物、細胞傳遞、生物技術等領域。近年來我國生技產業逐漸抬頭，無論是生質能源、生質酒精、細胞產油、藻類固碳、發酵工程、生物萃取等技術正迎頭追趕，期盼達到先進國家之水準。本次研討會對於生物技術亦有著墨，主要係考量生物科學於產業高質化的貢獻極大，其產值可跨足保健、醫療、食品、畜牧、產油等領域，因此各國無不盡全力投資大量人力及資金，加速研發計畫，以發展具有應用性之產品力。
- (六) 特殊功能材料開發方面，包含有限元素分析、動態結構、地震力學、混凝土技術、熱顯像技術、水油質傳分析、材料疲勞、礦業工程、冶金材料等領域。由於目前科技發展，往往需藉由特殊機具及具有特殊功能性材質所建構，透過材料科技領域的提升使其具有更廣的應用性成為全球發展的目標之一。例如，世界各國之放射性廢棄物貯存設施或處置設施，皆須對其材料之各種特性進行評估，以求其特性之穩定。因此本領域需同時跨足物理、化學、化工、機械及材料等背景，透過模擬、分析、實作及驗證方法已瞭解材料之各項特性。
- (七) 核能技術之進展方面，包含核能科技產業之演進、異相觸媒技術之應用、核種吸附及廢水處理技術等領域。以全球趨勢來說，核能發電仍占有一席之地，因此核能安全、廢棄物管理、公眾溝通等方面亦是我國必須著重的重要議題。此外，我國刻正針對核電廠除役進行評估，相關除役計畫已送至主管機關審查。核電廠除役是核設施生命週期的最後階段，包含廢棄物數量評估、時程規劃、除污作業、拆除工法、廢棄物管理等議題皆需投入大量人力資源，以進行妥善的設計及規劃。
- (八) 本次在日本成田所舉辦 ICNST 2016，其主辦會議為 WASET (World Academy of Science, Engineering, and Technology)組織，其主題著重於學術、科學、工程與科技領域。由於討論議題眾多，因此參加會議時須先行挑選，針對現在及未來計畫有關

之研討會進行瞭解。本次會議所進行的各項領域內容豐富，可作為執行計畫及規劃未來研究方向之參考。

- (九) 此國際研討會之主要目標為提供各國研究學者、工程師、博碩士研究生、相關研究機構研究員之交流平台，來發表其在能源科學及技術、環境科學及工程相關領域之傑出研究成果與開發活動，並透過詢問、討論而達到技術交流之目的。
- (十) 針對本次作者發表之論文「Preparation of Heterogeneous Ferrite Catalysts and Their Application for Fenton-Like Oxidation of Radioactive Organic Wastewater」，與會之學者及專家對於此類型觸媒深感興趣，提問內容包含效能、耐久性、製程、成本等。此部分之意見確實對於本研究有極大的助益，未來將作為研究調整之方向。
- (十一) 本次 ICNST 2016 國際會議之投稿部分並無安排海報展示，而是以 oral 或 e-poster 的方式擇一進行，其中 oral 為正式口頭報告，時間約 15~20 分鐘，足以進行互動與交流。較特別的是以 e-poster 的方式取代傳統海報展示，e-poster 仍須以 5 分鐘簡報方式進行報告，因此對於聽眾針對其內容可以快速的瞭解，而發表者亦有機會練習口說及在短時間內展示其技術發展之重點。



## 四、建議事項

- (一) 核研所本次參加 ICNST 2016 國際會議發表放射性有機廢液處理技術，係以共沉澱法製備磁性觸媒，進行高級氧化反應，以降解有機成分。會議中與專家討論後，一致認為應具可行性，足見本技術之應用價值。建議本所可繼續朝向放大化發展，並搭配合適之加熱單元、冷凝單元及排氣過濾裝置，據以提出具體方案，完善處理我國之小產源廢液。
- (二) 韓國國立慶北大學環境工程系之教授 Won Zin Oh 博士團隊針對核種吸附材料研究頗有進展，且 Won Zin Oh 博士目前亦擔任韓國放射性廢棄物研究協會(Research Institute of Korea Radioactive Waste Society)要職，該協會隸屬於韓國教育及科學技術部(Ministry of Education Science and Technology)，建議本所可善加利用國際研討會場合與該協會成員交流，若有適當機會或舉辦相關研討會(如 EA form)時，可邀請 Won Zin Oh 博士發表專題演講及論文發表，以促進我國在放射性廢棄物處理技術之國際交流。