

5<sup>th</sup> Edition

# 3RINCs 2019

The 3R International Scientific Conference  
on Material Cycles and Waste Management

27 Feb - 1 Mar 2019

Bangkok, Thailand



Venue: Pullman Bangkok King Power

## PROGRAM SCHEDULE

27 February 2019, Wednesday				
09.00-09.30	<i>Opening &amp; Plenary Session (Infinity Ball Room)</i>			
09.30-10.00	<ul style="list-style-type: none"> <li>Opening remarks: Prof. Toshiaki Yoshioka (President of JSMCWM) and Prof. Seung Whee Rhee (President of KSWM)</li> </ul>			
10.00-10.30	<ul style="list-style-type: none"> <li>Opening ceremony and Introductory Speech on Thailand's 3R policy (DG, PCD)</li> <li>Keynote-Thailand: 3Rs Implementation in Thailand: from policy to practice (President, SWAT)</li> <li>Keynote-International: Waste Resources and Waste to Energy in Korea (Prof. Jinwon Park, Yonsei University)</li> </ul>			
10.30-10.50	COFFEE/TEA BREAK			
10.50-12.10	<i>Special Session 1: WtE Experience in Thailand (Infinity Ball Room)</i>	<i>Session 1: 3R and SDG Policies (Alfa Room)</i>	<i>Session 2: Characterization of Industrial and Hazardous Waste (Beta Room)</i>	<i>Session 3: Characterization and Valorisation of Organic Waste (Delta Room)</i>
12.10-13.10	LUNCH BREAK			
13.10-14.30	<i>Special Session 2: Disaster Waste Management (Infinity Ball Room)</i>	<i>Session 4: Case studies of Promotion of 3R and SDGs (Alfa Room)</i>	<i>Session 5: Practices of Industrial and Hazardous Waste Management (Beta Room)</i>	<i>Session 6: Biological Treatment of MSW (Delta Room)</i>
14.30-15.30	BUSINESS SESSION & COFFEE/TEA BREAK			
15.30-17.10	<i>Special Session 3: 3R Policy Indicator and Its Future (Infinity Ball Room)</i>	<i>Session 7: Challenges for Appropriate Waste Management (Alfa Room)</i>	<i>Session 8: Recovery Process on Industrial and Hazardous Waste (Beta Room)</i>	<i>Session 9: Waste Landfill &amp; Disposal (Delta Room)</i>
17.10-18.00	POSTER SESSION			
18.00-20.00	Cocktail Reception (Déjà Vu Room, 2 <sup>nd</sup> Floor)			
28 February 2019, Thursday				
09.00-09.30	Keynote: History and Lessons Learned on the Management of Waste Contaminated by Radioactive Substances released by Nuclear Power Plant Accident in Fukushima (Dr. Masahiro Osako) ( <i>Infinity Ball Room</i> )			
09.30-10.50	<i>Special Session 4: CCTs Waste Management Guideline Development (Infinity Ball Room)</i>	<i>Session 10: Environmental Safety of Thermal Treatment and Waste to Energy Facilities (Alfa Room)</i>	<i>Session 11: E-waste Recycling &amp; Management (Beta Room)</i>	
10.50-11.10	COFFEE/TEA BREAK			
11.10-12.00	POSTER SESSION			
12.00-13.00	LUNCH BREAK			
13.00-14.40	<i>Session 14: Trade Restriction on Recyclable Waste and Recycling in Asia (Infinity Ball Room)</i>	<i>Session 12: Development of Thermal Treatment and Waste to Energy Technologies (Alfa Room)</i>	<i>Session 13: Life Cycle Assessment and Other Assessment Tools (Beta Room)</i>	
14.40-15.40	BUSINESS SESSION & COFFEE/TEA BREAK			
15.40-17.10	<i>Special Session 5: Plastic Materials Cycles &amp; their Management (Infinity Ball Room)</i>			
17.10-17.30	<i>Closing Session (Infinity Ball Room)</i>			
17.30-20.00	<i>Move to Chao Phraya River by Bus &amp; River Cruise Dinner in Chao Phraya River</i>			
1 March 2019, Friday				
09.00-17.00	Technical Tour			

Remark: The organizer reserves the right to change the speaker schedule without prior notification due to unavoidable circumstances. All presentations will be in ENGLISH only.

### Session 1: 3R and SDG Policies

*Chairperson: Dr. Masahiro Osako  
Dr. Sirintornthep Towprayoon*

#### **Design for a circular economy - some comments about implementing a successful concept**

*Heinz-Georg Baum, Fulda University of Applied Sciences, Germany*

#### **Optimizing integrated solid waste management system for a tourism destination in Hoi An city, Vietnam: A sustainability approach**

*Song Toan Pham Phu, Okayama University, Japan*

#### **Effect measurement of waste separation at source program in Da Nang city, Vietnam**

*TRAN Vu Chi Mai, Okayama University, Japan*

#### **Time series change of municipal waste management flows in Austria**

*Rokuta Inaba, National Institute for Environmental Studies, Japan*

### Session 2 : Characterization of Industrial and Hazardous Waste

*Chairperson: Dr. Chart Chiemchaisri  
Dr. Suwanna Kitpati Boontanon*

#### **Estimation on hazardous characteristics of the components from spent linear LED lamps**

*Seung-Whee Rhee, Kyonggi University, Korea*

#### **Content and sources of metals in incinerated industrial waste**

*Masahiro Oguchi, National Institute for Environmental Studies, Japan*

#### **Emission of polychlorinated biphenyls (PCB) from PCB waste storage sites**

*Yasuhiro Hirai, Kyoto University, Japan*

#### **Global management of construction and demolition and disaster waste**

*Agamuthu Pariathamby, University of Malaya, Malaysia*

### Session 3: Characterization and Valorisation of Organic Waste

*Chairperson: Dr. Satoru Ochiai  
Dr. Achara Ussawarujikulchai*

#### **Characterization of oil palm waste products**

*Bence Babinszki, Hungarian Academy of Sciences, Hungary*

#### **Composition of the liquid phase products of rape straw formed during torrefaction**

*Zoltán Sebestyén, Hungarian Academy of Sciences, Hungary*

#### **The chemical effects of torrefaction of biomass and its impact on enzymatic hydrolysis**

*Zsuzsanna Czégény, Hungarian Academy of Sciences, Hungary*

#### **Utilization of organic municipal solid waste in the production of tiles**

*Vo Dinh Long, Industrial University of Ho Chi Minh City, Vietnam*

### Session 4: Case Studies of Promotion of 3R and SDGs

*Chairperson: Prof. Heinz-Georg Baum  
Dr. Chalor Jarusuthirak*

#### **International comparison on attitudes towards food wastage**

*Kohei Watanabe, Teikyo University, Japan*

#### **Review on current state of CDW management in Southeast Asian countries**

*Han Hoang, National Institute for Environmental Studies, Japan*

#### **The role of the MRF in Indonesia's waste management system (Case Study of the "Kartamantul" Territory, Special Province of Yogyakarta, Indonesia)**

*Hijrah Purnama Putra, Universitas Islam Indonesia, Indonesia*

#### **Present Status of marine litter management in Sri Lanka**

*A J M Gunasekara, Marine Environment Protection Authority, Sri Lanka*

### Session 5: Practices of Industrial and Hazardous Waste Management

*Chairperson: Prof. Jin Won Park  
Dr. Ranjana Jindal*

#### **Towards large-scale production of bio-succinic acid: Most promising second generation feedstocks and optimized fermentation and purification strategies**

*Manuel Pinelo, Technical University of Denmark, Denmark*

#### **Phosphate removal by using waste oyster shell**

*Thanh-Tham Tran, Taiwan Tech (NTUST), Taiwan*

#### **A waste composition survey of spray cans and cassette cylinder from households in Kyoto**

*Junya Yano, Kyoto University, Japan*

#### **Environmental impact of hazardous waste disposal at a cement plant in India – A case study of acid tar sludge trial**

*Rahul Baidya, Jadavpur University, India*

## Session 6: Biological Treatment of MSW

Chairperson: *Dr. Rokuta Inaba*

*Dr. Wilai Chiemchaisri*

### **Oxygen profiles in waste pile by biological reaction during bio-drying process in tropical Asia**

*Satoru Ochiai*, Hokkaido University, Japan

### **Effect of air suction variation on pre-treated waste in bio-drying process**

*Panida Payomthip*, King Mongkut's University of Technology Thonburi, Thailand

### **Methane emission from windrow typed mechanical biological treatment in tropical climate**

*Noppharit Sutthasil*, National Institute for Environmental Studies, Japan

### **Assessment of municipal solid waste based biogas plants in India**

*Munish Kumar Chandel*, Indian Institute of Technology Bombay, India

## Session 7: Challenges for Appropriate Waste Management

Chairperson: *Prof. Seung Whee Rhee*

*Dr. Samunya Sanguanpak*

### **Rising the concern of marine plastic issues: How will an international regime deal with this global environmental issue?**

*Fusanori Iwasaki*, Economic Research Institute for ASEAN and East Asia, Indonesia

### **Comparison of characteristics of refuse collection vehicles (RCVs) in Japan, Singapore and Europe and its recent discussion for ISO standardization**

*Rieko Kubota*, National Institute for Environmental Studies, Japan

### **Fossil carbon fraction of diaper in Japan**

*Thet Ko Win*, Kyoto University, Japan

### **Estimation of fossil carbon fraction in paper waste and carbon fraction in plastic waste based on a household waste composition survey**

*Seiya Oyama*, Kyoto University, Japan

### **Marine plastic debris in selected islands in Malaysia: Anthropogenic activities and its impact to plastic waste abundance**

*Fauziah Shahul Hamid*, University of Malaya, Malaysia

## Session 8: Recovery Process on Industrial and Hazardous Waste

Chairperson: *Prof. Yifei Sun*

*Dr. Anucha Wannagon*

### **Regeneration of waste activated carbon disposed from mercury recovery process**

*Soo Jin Cho*, Yonsei University, Korea

### **Treatment of mine waste water containing As and Fe by Mg-Al layered double hydroxide aiming at sludge volume reduction**

*Xinyi Yang*, Tohoku University, Japan

### **Effect of anions on recovery of copper, nickel and water from electroplating wastewater in electro dialysis process**

*Eunjoo Oh*, Konkuk University, Korea

### **A study for two-step metal carbonation CCUS process based on seawater based industrial wastewater**

*Injun Kim*, Yonsei University, Republic of Korea

### **Utilization of resources in ferro alloy plant**

*Rajarshi Chakraborty*, Guru Nanak Institute of Technology, India

## Session 9: Waste Landfill & Disposal

Chairperson: *Dr. Tomonori Ishigaki*

*Dr. Komsilp Wangyao*

### **Environmental significance of heavy metal in leachate from different types of landfill in Malaysia**

*Kenichi Yoneda*, Kawasaki City & Tokyo University of Agriculture and Technology, Japan

### **Arsenite sorption capabilities of landfill soils from Malaysia**

*Munirah Hussein*, Universiti Teknologi Malaysia, Malaysia

### **Mitigation of methane emission from municipal solid waste landfill using biological filters with different media**

*Chart Chiemchaisri*, Kasetsart University, Thailand

### **Characterisation of the fine fraction obtained from municipal solid waste dumpsite and its reclamation potential evaluation**

*Munish Kumar Chandel*, Indian Institute of Technology, Bombay, India

### **Analysis of consumption and disposal of plastic products to discuss plastic waste management in Pacific Island countries**

*Megu Tsuchimura*, Kyoto University, Japan

### Session 10: Environmental Safety of Thermal Treatment and Waste to Energy Facilities

Chairperson: *Dr. Zsuzsanna Czégény*

*Dr. Chinnathan Areeprasert*

#### **Control of chlorine and elemental distribution in the municipal solid waste incineration process**

*Shigenori Iino*, Tokyo Metropolitan Research Institute for Environmental Protection, Japan

#### **Stabilization of mercury contaminated waste - fly ash from municipal solid waste/ hospital waste incinerators**

*Soo-Jin Cho*, Yonsei University, Korea

#### **Preliminary study on mineralogical immobilization of heavy metals in municipal solid waste incineration fly ash**

*Hiroki Kitamura*, National Institute for Environmental Studies, Japan

#### **Carbon dioxide capture with utilizing heavy metal ions in municipal solid waste fly ash**

*Juhee Son*, Yonsei University, Korea

#### **Study on location of solid waste incineration plant with new energy recover facility in Japan**

*Naohiro Goto*, Toyo University, Japan

### Session 11: E-Waste Recycling & Management

Chairperson: *Dr. Masahiro Oguchi*

*Dr. Nuttakan Nitayapat*

#### **Recovery of bisphenol A from discarded mobile phone**

*Trung Hai Huynh*, Hanoi University of Science and Technology, Vietnam

#### **Estimation of material volume from discarded large home appliances**

*Duc Quang Nguyen*, Hanoi University of Science and Technology, Vietnam

#### **Bioleaching for the recovery of Au and Ag from electronic waste facilitated by metal resistant heterotrophic bacteria**

*Minimol M.*, National Institute of Technology Karnataka, India

#### **Inhalation bioaccessible concentration and bioaccessibility of flame retardants in floor dust from E-waste processing workshop in northern Vietnam**

*Tatiya Wannomai*, Tokyo Institute of Technology, Japan

#### **Recovery of Indium from extractant solutions of waste Indium Tin Oxide (ITO) by aluminum cementation**

*Jenni Lie*, Taiwan Tech (NTUST), Taiwan

### Session 12: Development of Thermal Treatment and Waste to Energy

Chairperson: *Prof. Katsuya Kawamoto*

*Dr. Pruk Aggarangsi*

#### **Coupling of incineration waste bed modelling and freeboard computational fluid dynamics simulation – A bed model sensitivity study**

*Adrian C. H. Lai*, Nanyang Technological University, Singapore

#### **Pyrolysis characteristics of sewage sludge for efficient recycling and energy recovery**

*Gun-Ho Han*, Yonsei University, South Korea

#### **H<sub>2</sub>-rich syngas recovery and HCN removal via catalytic reforming of product gas from thermal degradation of polyurethanes over Ni/Mg/Al catalyst**

*Shogo Kumagai*, Tohoku University, Japan

#### **Nano-carbon fiber synthesized in waste plastic gasification process and application as composite material**

*Takashi Amemiya*, Nippon Institute of Technology, Japan

#### **Development and optimization of pilot-scale rotary kiln combustor for municipal solid waste incineration**

*Chelladurai Punithan*, Indian Institute of Technology Madras, India

### Session 13: Life Cycle Assessment and Other Assessment Tools

Chairperson: *Prof. Shabbir H. Gheewala*

*Dr. Trakam Prapapongsa*

#### **Waste input-output analysis of prefectures in Japan to promote sound material cycles by using data in official reports collected for waste management**

*Yasushi Kondo*, Waseda University, Japan

#### **Application of material flow analysis and water quality modelling to facilitate of leachate management system**

*Tengku Nilan Baizura*, University of Malaya, Malaysia

#### **Municipal solid waste material flow in Bali province, Indonesia**

*Elprida Agustina*, Bandung Institute of Technology, Indonesia

#### **Perceptive classification of combustible waste mixture: A Case survey in Japan**

*Nattapon Leeabai*, Tokyo Institute of Technology, Japan

**Flows, stocks, and generating factors of spray cans and cassette cylinders**

*Toshiyuki Tsunemitsu, Kyoto University, Japan*

**Session 14: Trade Restriction on Recyclable Waste and Recycling in Asia**

*Chairperson: Dr. Michikazu Kojima*

Presenters: *Aya Yoshida, Dian Lutfiana, So Sasaki, Amit Jain*

**Special Session 1: WtE Experience in Thailand**

*Chairperson: Prof. So Sasaki*

**Current status and issues of WtE projects in Thailand**

*So Sasaki, Chulalongkorn University, Thailand*

**Waste to energy in Phuket**

*Tavorn Jirapattanasopon, Phuket City Municipality, Thailand*

**Major challenges in development and implementation of WtE projects in Thailand**

*Patarapol Tularak, Solid Waste Management Association (Thailand), Thailand*

**Essence of waste management facility development & support by the consultant: from example of incineration facility in Japan**

*Taisuke Odera, Eight-Japan Engineering Consultants Inc., Japan*

**Special Session 2: Disaster Waste Management**

*Chairperson: Prof. Toshiaki Yoshioka  
Prof. Sdhan K. Ghosh*

**Introduction of the session and disaster waste management guideline**

*Misuzu Asari, Kyoto University, Japan*

**Development of regional disaster waste management guideline in the Pacific**

*Faafetai Sagapolutele, J-PRISM-II, JICA*

**Disaster Waste Management (tentative)**

*Nelson Anaia, MECMMM, Solomon Islands*

**Future prospective of “Disaster Waste Management in Indonesia”**

*Tunjung Puitika, Ministry of Environment and Forestry, Indonesia*

**Generation and characteristics of disaster waste in Indonesia**

*Maryono, Diponegoro University, Indonesia*

**Development of disaster waste management plan and policies in Nepal**

*Sumitra Amataya, LEAD, Nepal*

**International cooperation and dissemination of disaster waste management guidelines**

*Mahesh Pradhan, UNEP*

**Special Session 3: 3R Policy Indicator and Its Future**

*Chairperson: Prof. Shinichi Sakai  
Prof. Agamuthu Pariathamby*

**SDG 11 (city) and 12 (sustainable consumption and production) and regional 3R forum in Asia and the Pacific: How to accelerate implementation of SDGs in Asia and the Pacific region**

*Choudhury Rudra Charan Mohanty, UN Centre for Regional Development (UNCRD)*

**1<sup>st</sup> state of the 3Rs in Asia and the Pacific report**

*Yasuhiko Hotta, Institute for Global Environmental Strategies, Japan*

**Challenges and possible future priorities for science and database for 3R policy assessment at regional level**

*Chen Liu, Institute for Global Environmental Strategies, Japan*

**Implementing 3R indicators in Pacific Island countries**

*Ma Bella Buinto, SPREP*

**Recapping 1<sup>st</sup> round and priorities for 2<sup>nd</sup> round**

*Shinichi Sakai, Kyoto University, Japan  
Agamuthu Pariathamby, University of Malaya, Malaysia*

**Special Session 4: CCETs Waste Management Guidelines Development**

*Chairperson: Dr. Yasuhiko Hotta*

**Challenges and key factors in advancing environmentally sound management of waste in Asia and the Pacific**

*Shunichi Honda, UNEP*

**Introduction of the CCET and waste management guidelines activity**

*Kazunobu Onogawa, CCET*

**Development of the framework of CCET Guideline Series on MSWM**

*Chen Liu, IGES, Japan*

**Guideline Development on Mechanical Biological Treatment (MBT)**

*Tomonori Ishigaki, NIES, Japan*

**Guideline Development on Anaerobic Digestion for MSWM**



*Andante Hadi Pandyaswargo*, Waseda University, Japan

**Guideline Development on Waste-to-Energy from MSW incineration**

*Katsuya Kawamoto*, Okayama University, Japan

**Special Session 5: Plastic Materials Cycles & their Management**

*Chairperson: Prof. Toshiaki Yoshioka*

**Status of Marine Plastic Debris: Issues, Challenges and Global Initiatives**

*Agamuthu Pariatamby*, University of Malaya, Malaysia

**3Rs Policy and plastic waste management in Thailand**

*O. Chavalparit*, Chulalongkorn University, Thailand

**3R plus concept for plastic materials management**

*Shinichi Sakai*, Kyoto University & MOEJ, Japan

**3R challenges and experiences on plastic containers and packages**

*Yoshinori Suga*, Embassy of Japan, Thailand

**Marine Plastic Debris Status in Indonesia**

*Reza Cordova*, Indonesian Institute of Sciences, Indonesia

**Comparative Analysis of Plastic Waste Management and Circular Economy Policy in ASEAN Countries**

*Yasuhiko Hotta & Magnus Bengtsson*, IGES, Japan

**Poster Session**

**Selective separation of landfill gas using hydroquinone clathrates**

*Dongwon Lee*, Kongju National University, Korea

**Electrochemical behavior of tungsten carbide-cobalt alloy using molten hydroxide under low temperature condition**

*Phengxay Deevanhxay*, National University of Laos, Lao PDR

**A study on TiO<sub>2</sub>-coated cenospheres for photocatalytic performance**

*Jieun Jeong*, Kongju National University, Korea

**Effective capture of cesium iodide (CsI) by aluminosilicate sorbents for the treatment of radioactive gas from spent nuclear fuel**

*Jae Hwan Yang*, Chungnam National University, Korea

**Separation of syngas (CO and H<sub>2</sub>) using polyamide composite membrane**

*Jeeban Poudel*, Kongju National University, Korea

**Catalytic steam reforming of toluene in a DBD plasma reactor over SiO<sub>2</sub> and ZSM-5 supported Fe-based catalysts**

*Yifei Sun*, Beihang University, China

**Influence of temperature on syngas production from pyrolysis of anaerobically digested sludge**

*Gabin Kim*, Konkuk University, Korea

**Potentiality of in-house treatment for Khartoum state medical wastes**

*Nagwa Fadl Bashir*, Zamzam University College, Sudan

**Adsorption selectivity against zinc of amine modified mesoporous silica with different pore size**

*Tatsuo Nishihama*, Nagoya University, Japan

**Greenhouse gas emission from two-stage membrane bioreactor treating municipal solid waste leachate**

*Chart Chiemchaisri*, Kasetsart University, Thailand

**Preparation of magnetic BEA-type zeolite via dry-gel conversion method**

*Vanseng Chounlamany*, National University of Laos, Lao PDR

**Kofu-kyoto waste to energy plant stable operation record of fluidized-bed gasification and melting furnace**

*Koki Yamashita*, KOBELCO Eco-Solutions, Japan

**Investigation on formation of methane hydrate at moderate conditions for energy storage**

*Yuki Kamimoto*, Nagoya University, Japan

**Effect of pH in mercury re-emission**

*Doah Kim*, Chungbuk National University, Korea

**Flow characteristics in an electrostatic precipitator with fan operation time**

*Dong-uk Kim*, Chungbuk National University, Korea

**Flow Characteristics in an electrostatic precipitator at different environment**

*Dong-uk Kim*, Chungbuk National University, Korea

**Recovery of decane using vacuum swing adsorption**

*Jeongmin Park*, Chungbuk National University, Korea

**Mercury analysis for the adsorption of commercial activated carbon**  
Sinang Choi, Chungbuk National University, Korea

**Mercury analysis for the adsorption of prepared activated carbon**  
Sinang Choi, Chungbuk National University, Korea

**Evaluation of different sewage sludges as a potential of biodiesel source**  
Febrian Rizkianto, Kyoto University, Japan

**The relationship between businesses' handled amount and released/transferred amount of chemical substances according to the PRTR system**  
Satoshi Mizutani, Osaka City University, Japan

**Pyrolysis characteristics of biomass and marine waste buoys mixture by thermogravimetric analysis**  
Soyoung Han, Korea Institute Machinery & Materials, Korea

**Immobilization of toxic metals in MSWI fly ash by geopolymerization using incinerator bottom ash**  
Yuma Kawasaki, Kyoto University, Japan

**Characteristics of municipal solid waste as a source of SRF (Solid Refuse Fuel) generated From Daejeon metropolitan city, Korea**  
Hongkyoung Kim, Chungnam National University, Korea

**An efficient treatment of mixed plastic wastes by SRF and pyrolysis process**  
Hae Seung Lee, Gangwon State University, Korea

**Enhancement of FOG biodegradation using bio-augmentation of *Pseudomonas Putida* in co-digestion of grease trap waste and excess MBR sludge**  
Wilai Chiemchaisri, Kasetsart University, Thailand

**Mass balance of heavy metals in one closed landfill site for incinerator residues in Japan**  
Yiqun Xiong, Kyoto University, Japan

**CO<sub>2</sub> utilization using metal cation in seawater-based industrial wastewater**  
Dongwoo Kang, Yonsei University, Korea

**Thermal destruction of Br-based compounds by monitoring of CO and mineralized Br**  
Shodai Tagushi, Osaka Institute of Technology, Japan

**Lipid removal efficiency of bacteria isolated from wastewater in Khlong Hok area, Pathum Thani Province**  
Jantima Teeka, Rajamangala University of Technology Thanyaburi, Thailand

**Evaluation of the geotechnical characteristics of waste disposal site in Thailand by the surface wave exploration**  
Shuichi Nagaoka, Japan Environmental Sanitation Center, Japan

**Reduction in the amount of electricity generated by changes in breeding method of daily cows to free stalls on biogas production**  
Hitoshi Ogawa, Tamagawa University Research Institute, Japan

**Mechanical and structural properties for recycled thermoplastics**  
Tsukasa Sato, National Institute of Technology, Tsuruoka College, Japan

**Treatment of grease trap waste using bioaugmentation of yeast pure culture**  
Wilai Chiemchaisri, Kasetsart University, Thailand

**A study on the environmental assessment of the closure and postclosure landfill in Korea**  
Sangkeun Kim, Korea Institute of Construction Technology, Korea

**Separation of Cl from vaporized KCl during its condensation**  
Kohei Saito, Osaka Institute of Technology, Japan

**The catalyst properties for the high temperature water gas shift reaction depending on the concentration of precursor**  
Dae-Woon Jeong, Changwon National University, Korea

**A new method for the recovery of high purity copper from plating wastes**  
Han S. Kim, Konkuk University, Korea

**Identification of residual sludge due to high concentrations of Fe & Mn contained in bank filtrate**  
Daeyoung Kwon, Inje University, Korea

**A study of HBCD levels and flow of products and waste materials in Korea**  
Yeji Jang, Chungnam National University, Korea

**Recycling and greenhouse gas reduction of used glass bottles by EPR in Korea**  
Yuree Kwon, Chungnam National University, Korea

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**Organizer**

- Solid Waste Management Association -Thailand (SWAT)

**Co-Organizers**

- Pollution Control Department (PCD), Ministry of Natural Resources and Environment, Thailand
- Japan Society of Material Cycles and Waste Management (JSMCWM)
- Korean Society of Waste Management (KSWM)

**Supporters**

- UNCRD (United Nations Centre for Regional Development)
- UN Environment-IETC (United Nations Environment Programme – International Environmental Technology Centre)
- ISWA (International Solid Waste Association),
- IGES (Institute for Global Environmental Strategies),
- JESC (Japan Environment Sanitation Center),
- WMF (Japan Industrial Waste Management Foundation),
- JW (Japan Industrial Waste Information Center) and other organizations