

# International Symposium on Feedstock Recycling of Polymeric Materials (ISFR2023)

## Conference Program

\*General oral presentation consists of **15-minute presentation & discussion**.

\*\*Student oral presentation consists of **12-minute presentation & discussion**.

6, November 2023, Mon.

### Opening Ceremony (9:00-9:20, November 6th, Mon.)

Opening Remarks

*Shigeru Yao, Conference Chair /President of FSRJ, Japan*

Positioning of plastic recycling in the circular economy (as a circular industry)

*Toshiaki Yoshioka, Conference Committee/Tohoku University, Japan*

### Keynote Talk 1 (9:25-10:05, November 6th, Mon.)

Thermo-Chemical Recycling of Wastes

*Paul T. Williams, University of Leeds, United Kingdom*

### Oral Session 1 (10:05-10:50, November 6th, Mon.)

Chair:

O1-1 Development of Biomass Fractionation Technology to Support the Widespread Use of Bioplastics in Society

*Kiyohiko Igarashi, The University of Tokyo, Japan*

O1-2 Upcycling by Precise Thermal Degradation for Waste Polyolefins

*Daisuke Sasaki, San-ei Kogyo Corporation, Japan*

O1-3 Chemical Upcycling of Olefinic Plastics to Valuable Chemicals by Hydrogenolysis Over Heterogeneous Ru-based Catalysts

*Masazumi Tamura, Osaka Metropolitan University, Japan*

Break (10:50-11:05, November 6th, Mon.)

### Invited Talk 1 (11:05-11:30, November 6th, Mon.)

Co-pyrolysis of Wheat Straw and PET Plastic: Kinetics and Product Analysis

*Kaustubha Mohanty, Indian Institute of Technology Guwahati, India*

### Oral Session 2 (11:30-12:15, November 6th, Mon.)

Chair:

O2-1 The Current Dilemma of Promoting Chemical Recycling of Plastic Waste in China and the Importance of Dechlorination

*Jiaqi Lu, Shanghai University of Engineering Science, China*

O2-2 Fluorine Recovery from Used Small Lithium-Ion Batteries for Halogen Circulation

*Yuko Saito, Tohoku University, Japan*

O2-3 Energetic Utilization of Dewatered Sludge from the Food-processing Industry

*Awassada Phongphiphat, King Mongkut's University of Technology Thonburi, Thailand*

Lunch (12:15-13:15, November 6th, Mon.)

**Poster Session 1** (13:15-14:00, November 6th, Mon.)

**Poster Session 2** (14:00-14:45, November 6th, Mon.)

Break (14:45-14:55, November 6th, Mon.)

**Keynote Talk 2** (14:55-15:35, November 6th, Mon.)

Smart Films Derived from Regenerative Bioresources

*Hathaikarn Manuspiya, Center of Excellence on Petrochemical and Materials Technology, Thailand*

**Student Session 1** (15:35-17:23, November 6th, Mon.)

Chair:

- S1-1 Analyzing the Relationship between Mechanical Properties and Inner Structure of Compounded Polyethylene Virgin Film with Different Extrusion Condition  
*Maho Toshimitsu, Fukuoka University, Japan*
- S1-2 Recycling of E-waste Plastics by Using Supercritical Fluids  
*Amrita Preetam, Indian Institute of Technology, Delhi, India*
- S1-3 Pyrolysis Characteristics of Tire Rubber at Lower Temperatures  
*Emmanuel Ikechukwu Awosu, Tohoku University, Japan*
- S1-4 Chemical Recycling of PVC-containing Plastic Waste for Recycling of Metals from Composite Materials  
*Michael Peer, Fraunhofer Institute for Environmental, Safety and Energy Technology UMSICHT; Institute Branch Sulzbach-Rosenberg, Germany*
- S1-5 Production of Wax-rich Pyrolysis Oil from Polyethylene Using a New-type Fluidized Bed Reactor  
*Jaekyung Kim, University of Seoul, Republic of Korea*
- S1-6 Sequential Conversion of Fractionated Lignin from Bamboo Waste into Bio-graphitic Materials  
*Mohammed Abdillah Ahmad Farid, Kyushu Institute of Technology, Japan*
- S1-7 Assessing the Changes in Thermal and Catalytic Pyrolysis of Lignocellulose when Shifting from Batch to Continuous Systems  
*Maurizio Pagano, Imdea Energy Institute, Thermochemical processes unit; Rey Juan Carlos University, Spain*
- S1-8 Cellulose Luminescent Hydrogels Loaded with Stable Carbon Dots for Duplicable Information Encryption and Anti-counterfeiting  
*Juan Wang, Osaka University, Japan*
- S1-9 Exploring the Link between Environmental Education, Knowledge, Facilities, and the Intention of student to Engage in Plastic Waste Separation and Recycling: A Case Study in Indonesian Teacher Training Institutions  
*Ardyanto Tanjung, The University of Kitakyushu; Universitas Negeri Malang, Indonesia*

7, November 2023, Tue.

**Keynote Talk 3**

**(9:00-9:40, November 7th, Tue.)**

Precision Synthesis of Novel Degradable Polymers from Renewable Bio-based Resources  
*Kotaro Satoh, Tokyo Institute of Technology, Japan*

**Oral Session 3**

**(9:40-10:25, November 7th, Tue.)**

Chair:

- O3-1 Advanced Plastic Circulation System Constructed from Basic Polymer Physics  
*Shigeru Yao, Fukuoka University, Japan*
- O3-2 Effect of Novel Extrusion Process on Mechanical Properties of Low-density Polyethylene in Different Grades  
*Patchiya Phanthong, Fukuoka University, Japan*
- O3-3 Understanding Rheological Studies of Plastics in Mechanical Recycling Process: A Combined MD and NEMD Simulations Study  
*Mohammed Althaf Hussain, Fukuoka University, Japan*

Break

(10:25-10:40, November 7th, Tue.)

**Invited Talk 2**

**(10:40-11:05, November 7th, Tue.)**

Microplastics Analysis Using Customized Filtration Device and Py-GC/MS/MS  
*Young-Min Kim, Daegu University, Republic of Korea*

**Oral Session 4**

**(11:05-11:50, November 7th, Tue.)**

Chair:

- O4-1 Verification of the Existence of Metal Compounds in the Sea and their Implications for Marine Microplastic Degradation  
*Hisayuki Nakatani, Nagasaki University, Japan*
- O4-2 Assessing Plastic Marine Debris on Ainsoshima Remote-island Foreshore: Source, Distribution, and Socio-activity  
*Indriyani Rachman, The University of Kitakyushu, Japan*
- O4-3 Plastic Resin Composition Survey in the Chikugo Area of Fukuoka, Japan  
*Shinya Suzuki, Fukuoka University, Japan*

Lunch

(11:50-12:50, November 6th, Mon.)

**Keynote Talk 4**

**(12:50-13:30, November 7th, Tue.)**

Ionic Liquids in Feedstock Recycling  
*Akio Kamimura, Yamaguchi University, Japan*

**Oral Session 5**

**(13:30-14:15, November 7th, Tue.)**

Chair:

- O5-1 Recycling of Safety-Certified Consumer Product for Sustainability  
*Shigetaka Seki, Consumer Product Safety Association (CPSA), Japan*
- O5-2 Accelerating a Circular Economy of EV Battery in South Korea  
*Ji Hye Jo, Korea Environment Institute, Republic of Korea*
- O5-3 RDF Recovery from Final Disposal Sites: Challenges and Opportunities in Thailand  
*Komsilp Wangyao, King Mongkut's University of Technology Thonburi, Thailand*

Break (14:15-14:30, November 7th, Tue.)

**Student Session 2 (14:30-16:06, November 7th, Tue.)**

Chair:

- S2-1 Wax Production of Waste Polyethylene via Catalytic Pyrolysis  
*Joo-Hyeong Yoon, Korea Institute of Industrial Technology, Republic of Korea*
- S2-2 Slow and Rapid Co-pyrolysis Characteristic of Vacuum Residue and Bio-oil  
*Miranti Budi Kusumawati, Tohoku University, Japan*
- S2-3 Sustainable Utilization of Plastic Wastes using Non-catalytic and Catalytic Fast Pyrolysis from the Viewpoint of Circular Economy  
*Subhan Kumar Pal, Indian Institute of Technology, Madras, India*
- S2-4 Catalytic Co-pyrolysis of Biomass and Plastic Waste: A Study of the Thermal Degradation Using Rapid Analytical Pyrolysis (Py-GC/MS)  
*Viridi Chaerusani, Hirosaki University, Japan*
- S2-5 Simultaneous Removal of Brominated and Chlorinated Species During the Production of Oils by E-waste Plastics Catalytic Hydrolysis  
*Lidia Amodio, Imdea Energy Institute, Thermochemical processes unit; Rey Juan Carlos University, Spain*
- S2-6 A Legislative Review of Single-Use Plastic Consumption in Indonesia and Its Prospects for Digital Nudge Decoupling  
*Machmuddin Fitra Miftahadi, The University of Kitakyushu, Japan*
- S2-7 Analysis of Environmental Impact Reduction Effect of Mushroom-Based Packaging  
*Jonghyo Lee, Inha University, Republic of Korea*
- S2-8 Bio-Inspired Homogeneous Conductive Hydrogel with Flexibility and Adhesiveness for Information Transmission and Sign Language Recognition  
*Peng Du, Osaka University, Japan*

Break (16:06-16:20, November 7th, Tue.)

**Plenary Talk (16:20-17:20, November 7th, Tue.)**

Recent Advances in Ocean Plastic Studies: Current Status and Future View  
*Atsuhiko Isobe, Kyushu University, Japan*

**Gala Dinner (18:00-20:00, November 7th, Tue.)**

8, November 2023, Wed.

**Invited Talk 3**

**(9:00-9:25, November 8th, Wed.)**

Recovery of Chemicals and Building Blocks from Diverse Plastic Wastes Through Hydrothermal Liquefaction

*Ravikrishnan Vinu, Indian Institute of Technology, Madras, India*

**Oral Session 6**

**(9:25-10:10, November 8th, Wed.)**

Chair:

O6-1 Mechanistic Consideration for the Thermal Degradation of Polymers Based on a Continuous Flow Operation  
*Mihai Brebu, "Petru Poni" Institute of Macromolecular Chemistry, Romania*

O6-2 Maximizing Light Olefins Production via Circulating Fluidized Catalytic Cracking of Waste Plastic Pyrolysis Oil (WPPO)

*Do Kyoung Kim, Korea Research Institute of Chemical Technology, Republic of Korea*

O6-3 Highly Durable CeO<sub>2</sub> Oxygen Nanocarrier for Low-temperature Gasification of Waste Plastics

*Takaaki Tomai, Tohoku University, Japan*

Break

(10:10-10:25, November 8th, Wed.)

**Invited Talk 4**

**(10:25-10:50, November 8th, Wed.)**

Investigation Lignin Depolymerization for Chemical Feedstocks with Py-GCMS

*Chanatip Samart, Thammasat University, Thailand*

**Oral Session 7**

**(10:50-11:35, November 8th, Wed.)**

Chair:

O7-1 Optimizing Mixed Waste Plastic Sorting Scenarios for Enhanced Plastic Recycling  
*Hajime Ohno, Tohoku University, Japan*

O7-2 Environmental Benefits from Chemical Recycling of Plastic Waste and its Contribution to a Circular Economy: A Critical Review

*Chengyao Zhang, The University of Tokyo, Japan*

O7-3 Geographic and Technical Matching Approach Supporting the Low-carbon Style Recycling in Japan

*Richao Cong, University of Kitakyushu, Japan*

**Closing Ceremony**

**(11:40-12:00, November 8th, Wed.)**

**Excursion**

**(12:30-, November 8th, Wed.)**

## Poster Session 1

- P1-1 Defluorination Reaction of Fluoropolymers in Wet Process  
*Riku Oda, Tohoku University, Japan*
- P1-2 Mechanical Properties and Morphology of Polyethylene Films Processed by Extruder with Molten Resin Reservoir  
*Takumitsu Kida, The University of Shiga Prefecture, Japan*
- P1-3 Study on Enhancing Light Olefins Production via Catalytic Cracking from Waste Plastic Pyrolysis Oil  
*Dae Hun Mun, Korea research institute of chemical technology, Republic of Korea*
- P1-4 High-throughput evaluation of pyrolytic synergistic interactions during co-pyrolysis of polystyrene and cellulose by Py-GC/multi-detector system  
*Hayato Yamaguchi, Tohoku University, Japan*
- P1-5 Examination of Chemical/Material Recycling by Thermal Decomposition of Polylactic Acid/Polypropylene Polymer Alloy  
*Takuma Kasugai, Kanazawa Institute of technology, Japan*
- P1-6 Biomass Residue – Valuable Materials for Valorization by Thermal Methods  
*Elena Stoleru, "Petru Poni" Institute of Macromolecular Chemistry, Romania*
- P1-7 Depolymerization of Oxyphenylene-Based Super Engineering Plastics by Hydroxylation-Depolymerization  
*Yasunori Minami, National Institute of Advanced Industrial Science and Technology, Japan*
- P1-8 Thermal Degradation of Epoxy Resin with and without Copper Layer  
*Sylvia Oleszek, Kyoto University, Japan*
- P1-9 Technology to Reduce Environmental Load by Improving Interfacial Adhesion of New Compatibilizer in CNF/CF Hybrid Composites  
*Hikaru Terada, Kanazawa Institute of Technology, Japan*
- P1-10 Development of a Predictive Model for Treatment Status and Generation Amount of Marine Litter.  
*Yeong Hun Choe, Inha University, Republic of Korea*
- P1-11 Multifaceted Degradation Evaluation of PET Bottles Subjected to Outdoor Exposure Test  
*Takaya Satoh, JEOL Ltd., Japan*
- P1-12 Effective Recovery of High-Purity Copper and Poly (vinyl chloride) from End-of-Life Wire Harness Cables  
*Harendra Kumar, Tohoku University, Japan*

## Poster Session 2

- P2-1 Development of PET to Plasticizer Chemical Recycling  
*Shogo Miyazaki, Yamaguchi Prefectural Industrial Technology Institute, Japan*
- P2-2 Co-Pyrolysis Characteristics of Poly(lactic acid) and Petroleum Plastics  
*Wakana Adachi, Tohoku University, Japan*
- P2-3 Modeling Copper and Poly (Vinyl Chloride) Separation from Cable Waste Using an Asynchronous-Parallel Recurrent Neural Network  
*Jiaqi Lu, Shanghai University of Engineering Science, China*
- P2-4 RDF Utilization in Thai's Local Municipality by Mechanical Biological Treatment  
*Panida Payomthip, National Institute for Environmental Studies, Japan*
- P2-5 Effects of the Optional Equipment for Twin-Screw Extruder with Molten Resin Reservoir on the Mechanical Properties of Recycled Plastics  
*Yuuki Yamashita, Fukuoka University, Japan*
- P2-6 Kinetic Model for Catalytic Upcycling of Polyolefin Over Heterogeneous Supported Ru Catalyst  
*Atsushi Takahashi, Tohoku University, Japan*
- P2-7 Staged Steam Pyrolysis of Waste Tire; Behavior of Sulfur in Pyrolysis Products  
*Soon-Ho Kim, Korea Institute of Industrial Technology, Republic of Korea*
- P2-8 Effects of Pyrolysis Temperature on Isoprene Production from Tire Rubber  
*Kentaro Genda, Tohoku University, Japan*
- P2-9 Analysis of the Products of Catalytic Cracking by Using Tandem  $\mu$ -Reactor-Gas Chromatography/Mass Spectrometry: Catalyst Screening in the Recycle of Waste Plastics  
*Masayoshi Muraoka, Toray Research Center, Inc., Japan*
- P2-10 Effect of Iron Addition on Debromination of WPCBs Using Wet Ball Mill Process  
*Wataru Shimomura, Tohoku University, Japan*
- P2-11 Analysis of Environmental Impact of Engineering Plastic Resins using LCA and Carbon Footprint  
*Dong Uk Kim, Inha University, Republic of Korea*
- P2-12 Microplastic and Heavy Metals Interactions in Aqueous Solution: Batch Experiment  
*Sylvia Oleszek, Kyoto University, Japan*