The 9th International Symposium on Fuels and Energy

ISFE2025

June 30 – July 1, 2025

Venue: Higashi Hiroshima Arts & Culture Hall ‘KURARA’
(On-site and on-line hybrid)

PROGRAM BOOK

Organizer

ISFE2025 Organizing Committee
Advanced Core for Energetics, Hiroshima University (HU-ACE)

Co-organized by

Hiroshima University
Division of Energy Engineering, the Society of Chemical Engineers, Japan

Supported by

The Society of Chemical Engineers, Japan; The Japan Society of Mechanical Engineers;
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ISFE2025 Program

June 27, 2025

Day 1: June 30, 2025

9:30-9:40 Welcome Talk (ISFE2025 Chair: Yukihiko Matsumura)

9:40-11:00 [D1AM1] Energy Systems and Advanced Sensor Technologies (Chair: Prof. Sayaka Kindaichi)

9:40-10:20

K01 [Keynote] Theory of simulation models for ground source heat pump systems and their application to design methods and software

Takao Katsura (Hokkaido Univ.)

10:20-10:40

I01 [Invited] The Next Generation Hydrogen sensors based on Metal@Metal oxides (M@MOSs) Hierarchical Nanostructures and their Applications

Sonalika Agarwal (Hiroshima Univ.), Takayuki Ichikawa (Hiroshima Univ.), Yeon Tae Yu (Jeonbuk National Univ., Korea)

10:40-11:00 Break

11:00-12:00 [D1AM2] Energy and Environmental Materials (Chairs: Prof. Kazuhiro Mochidzuki)

11:00-11:20

O01 Discussion of reabsorption of $LaNi_5$ for H_2S Removal: A Study on Reversible Chemisorption

Shuto Kitayama (Tokyo Univ. of Science), Mayu Hamazaki (Tokyo Univ. of Science), Tetsuro Tokumoto (DOWA Holdings Co., Ltd.), Shoichi Kumon (DOWA Holdings Co., Ltd.), Kiyoshi Dowaki (Tokyo Univ. of Science)

11:20-11:40

O02 A simple measuring method for odor component formed from solidified fuels containing organic matter

Hajime Yasuda (National Institute of Advanced Industrial Science and Technology (AIST))

11:40-12:00

O03 Supercritical Water Gasification of Glucose using Ru/CNT Paper as a Catalyst

Mizuki KODAMA (Hiroshima Univ.), Mohammed Ahmed Mohammed ALI (Hiroshima Univ.), Takashi NOGUCHI (Toyo Koatsu Co., Ltd.), Shuhei INOUE (KINDAI Univ.), Mengli ZHANG (Hiroshima Univ.), Yukihiko MATSUMURA (Hiroshima Univ.)

12:00-13:00 Lunch

13:00-14:40 [D1PM1] Hydrogen and Sustainable Energy Materials (Chair: Dr. Mengli ZHANG)

13:00-13:20

I02 [Invited] Synthesis of Al–Ru alloy hydride under GPa-level pressure

Yuki Nakahira (Hiroshima Univ.), Toyoto Sato (Tohoku Univ.), Saya Ajito (Tohoku Univ.), Reina Utsumi (National Institutes for Quantum Science and Technology (QST)), Hiroyuki Saitoh (National Institutes for Quantum Science and Technology (QST)), Tetsu Watanuki (National Institutes for Quantum Science and Technology (QST)), Eiji Akiyama (Tohoku Univ.)

13:20-13:40

O04 Hydrogen adsorption characteristics on high specific surface area materials near the hydrogen critical point

Masato Nagasawa (Hiroshima Univ.), Hiroki Miyaoka (Hiroshima Univ.), Takayuki Ichikawa (Hiroshima Univ.)

13:40-14:00

O05 Nipa Sap Enables Nutrient Reduction in Acetic Acid Production by Moorella thermoacetica

Dung Van Nguyen (Vietnam National Univ.), Harifara Fenohasina Rabemanolontsoa (Kyoto Univ.)

14:00-14:20

O06 Study of Ni Electrodes Degradation for Alkaline Water Electrolysis under Frequent Power Switching Modes

Mingyang Chen (Hiroshima Univ.), Kazuhiro Mochidzuki (Hiroshima Univ.), Xin Zhao (Yaojing New Energy Co., Ltd. China), Hiroki Miyaoka (Hiroshima Univ.), Takayuki Ichikawa (Hiroshima Univ.), Fangqin Guo (Hiroshima Univ.)

14:20-14:40

O07 Ammonia Synthesis via Chemical-Looping Process by Sodium Hydride under Low Pressure and Temperature Conditions
Koki Tsunematsu (Hiroshima Univ.), Hiroki Miyaoka (Hiroshima Univ.), Takayuki Ichikawa (Hiroshima Univ.)

14:40-15:00 Break

15:00-17:00 [D1PM2] Innovative Energy Technologies and Biomass Utilization (Chair: Prof. Takayuki Ichikawa)

15:00-15:40
K02 [Keynote] Biocoal: Powering the Future with Renewable Solid Biofuels
Kuboon Sanchai (National Nanotechnology Center, NSTDA, Thai), Wasawat Kraithong (National Nanotechnology Center, NSTDA, Thai), Anan Jiratanachotikul (National Nanotechnology Center, NSTDA, Thai), Channarith Be (National Nanotechnology Center, NSTDA, Thai)

15:40-16:00
O08 Evaluation of Inorganic Element Removal to Improve Combustion Efficiency of Elephant Grass for Biomass Thermal Energy
Johannes Lovisa Panduleni (Hiroshima Univ.), Tran Dang Xuan (Hiroshima Univ.), Akiko Nakano (Kyushu Univ.), Nguyen Van Thinh (Hiroshima Univ.)

16:00-16:20
O09 Hacking Fusion Reactors: Gyrotron Malware
Marcello Velasquez (Hiroshima Univ.)

16:20-16:40
O10 Rotating spiral reactor - a novel gas-solid contacting reactor
Tadaaki Shimizu (Niigata Univ.), Liuyun Li (Niigata Univ.), Heizo Kato (Niigata Univ.), Akimichi Hatta (CR-POWER LLC), Toshinori Kojima (Seikei Univ.)

16:40-17:00
O11 Utilization of oyster shell as catalyst for biodiesel production using supercritical methanol
Ken FURUTA (Hiroshima Univ.), Yukihiko MATSUMURA (Hiroshima Univ.)

18:00-20:00 Banquet

Day 2: July 1, 2025

9:40-12:00 [D2AM1] Electrode Materials and Performance for Water Electrolysis (Chair: Dr. Mengli Zhang)

9:40-10:20
K03 [Keynote] Electrode Development for Anion Exchange Membrane Water Electrolysis
Tseng Chung-Jen (National Central University, Taiwan) (Online) Ching-Hsien Lin (Academia Sinica), Jian-Yu Hsiao (National Central University, Taiwan)

10:20-10:40
O12 Evaluation of the electrolysis behavior of nickel electrodes for alkaline water electrolysis under fluctuated power supply conditions
Yixuan Yuan (Hiroshima Univ.), Yusuke Tama, Kazuhiro Mochidzuki (Hiroshima Univ.), Xin Zhao (Yaojing New Energy Co., Ltd. China), Fangqin Guo (Hiroshima Univ.), Hiroki Miyaoka (Hiroshima Univ.), Takayuki Ichikawa (Hiroshima Univ.)

10:40-11:00 Break

11:00-12:00 [D2AM2] Reaction and Combustion Safety (Chair: Dr. Fangqin Guo)

11:00-11:20
O13 Equation for randum hydrolysis of polymer
Zelong Xu (Hiroshima Univ.), Yukihiko MATSUMURA (Hiroshima Univ.)

11:20-11:40
O14 Flame acceleration in vented gases during thermal runaway of lithium-ion batteries
Tongyu Zhao (Hiroshima Univ.), Akihiro Ueda (Hiroshima Univ.), Yichen Gan (Hiroshima Univ.), Tomoyuki Johzaki (Hiroshima Univ.), Takuma Endo (Hiroshima Univ.), Byoungjik Park, Wookyung Kim (Hiroshima Univ.)

11:40-12:00
O15 Experimental Study on Flame Propagation Behaviors near the Low Flammability Limit of Hydrogen-Oxygen Mixtures
Weisheng Chu (Hiroshima Univ.), Akihiro Ueda (Hiroshima Univ.), Takuma Endo (Hiroshima Univ.), Tomoyuki Johzaki (Hiroshima Univ.), Wookyung Kim (Hiroshima

Univ.)

12:00-13:00 Lunch

13:00-14:30 [D2PM1] Poster Session (Chair: Prof. Takayuki Ichikawa)
* 13:00-13:45 core time for ODD number posters
* 13:45-14:30 core time for EVEN number posters

14:30-14:50 Break

14:50-17:05 [D2PM2] Sustainable Energy: Toward a Carbon-Neutral Society (Chair: Prof. Yukihiko Matsumura)

14:50-15:20
K04 [Keynote] From Fossil Dependence to Carbon Independence: Designing a Fossil-Free Future for Hard-to-Abate Industries
Yasuhiro Fukushima (Tohoku Univ.)

15:20-15:50
K05 [Keynote] Frontier Domains and Emerging Technologies in Sustainable Energy: Geologic Hydrogen and Long Duration Energy Storage
Shigeki Hara (New Energy and Industrial Technology Development Organization (NEDO)), Akira Yabe (NEDO), Shigeru Niki (NEDO), Yoshiji Matsuda (NEDO), Tomoaki Iwai (NEDO), Hiroyuki Fukutomi (NEDO), Hiromitsu Kato (NEDO)

15:50-16:20
K06 [Keynote] Introduction of Idemitsu's project to produce sustainable aviation fuel (SAF) from biomass alcohol
Hirofumi Imai (Idemitsu Kosan Co., Ltd.)

16:20-17:05
*** Discussion ***, Yukihiko Matsumura (Hiroshima Univ.)

17:05-17:10 Closing Talk

Posters

P01 Research on enzyme leakage caused by heat treatment of psychrophile-based simple biocatalysts
Chie Son (Hiroshima Univ.), Kota Anda (Hiroshima Univ.), Akiko Hida(Hiroshima Univ.), Junichi Kato (Hiroshima Univ.), Takahisa Tajima (Hiroshima Univ.)

P02 Scale-up cultivation of the psychrophilic bacterium Shewanella livingstonensis
Taku Matsumoto (Hiroshima Univ.), Naofumi Yamada (Hiroshima Univ.), Akiko Hida (Hiroshima Univ.), Junichi Kato (Hiroshima Univ.), Takahisa Tajima (Hiroshima Univ.)

P03 Development of enzyme engineering for the efficient conversion of value-added compounds
Keisuke Takaki (Hiroshima Univ.), Hyuga Miyamoto (Hiroshima Univ.), Akiko Hida (Hiroshima Univ.), Junichi Kato (Hiroshima Univ.), Takahisa Tajima (Hiroshima Univ.)

P04 Development of electrodeless plasma thruster using solid-state microwave generator and its application to chemical processes
Natsuki Shimo (Hiroshima Univ.), Shota Nakano (Hiroshima Univ.), Tomoya Masukawa(Hiroshima Univ.), Naoya Shimomura (Hiroshima Univ.), Hayato Yamaki (Hiroshima Univ.), Yasuhiro Suzuki (Hiroshima Univ.)

P05 Studies of CO_2 decomposition using microwave plasma
Shota Nakano (Hiroshima Univ.), Natsuki Shimo (Hiroshima Univ.), Tomoya Masukawa (Hiroshima Univ.), Yasuhiro Suzuki (Hiroshima Univ.)

P06 Evaluation of High-Pressure CO_2 Adsorption and Desorption Characteristics on Porous Materials
YIMING ZHAO (Hiroshima Univ.), FANGQIN GUO (Hiroshima Univ.), Hirotsugu Matsuda (Mazda Motor Corporation), Sakima (Mazda Motor Corporation), Hiroyuki Koga (Mazda Motor Corporation), Yuji Harada (Mazda Motor Corporation), Hiroki Miyaoka (Hiroshima Univ.), Takayuki Ichikawa (Hiroshima Univ.)

P07 Renewable Energy Integration
Muhammad Tariq (Government Associate College, 41 JB, Faisalabad, Pakistan) , Muhammad Shahzad (Institute of Science & Technology Management, Karachi, Pakistan) , Muhammad Muneeb (Pioneer College of Advanced Studies, Faisalabad, Pakistan)

P08 The Effects of Support on Ammonia Methanation with Ni/Al_2O_3 Catalysts
Keitaro Nakamura (Hiroshima Univ.), Reiji Sunamoto (Hiroshima Univ.), Sohsuke Imamura (Hiroshima Univ.), Hiroki Miyaoka (Hiroshima Univ.), Takayuki Ichikawa (Hiroshima Univ.), Hitoshi Saima (Hiroshima Univ.)

P09 Activity and Characteristics of Ni-Based Hybrid Catalysts with Promoters for Ammonia Methanation
Reiji Sunamoto (Hiroshima Univ.), Hiroki Miyaoka (Hiroshima Univ.), Takayuki Ichikawa (Hiroshima Univ.), Hitoshi Saima (Hiroshima Univ.)

P10 In-situ X-ray diffraction under high pressure hydrogen for calcium hydride with group 14 element additive
Kanata Sugita (Hiroshima Univ.), Koki Tsunematsu (Hiroshima Univ.), Hiroyuki Saito (National Institutes for Quantum Science and Technology), Yuki Nakahira (Hiroshima Univ.), Reina Utsumi (National Institutes for Quantum Science and Technology), Takayuki Ichikawa (Hiroshima Univ.), Hiroki Miyaoka (Hiroshima Univ.)

P11 Application of a phase-change material heat exchanger to improve the efficiency of heat pumps at partial loads
Koharu Tani (Hiroshima Univ.), Sayaka Kindaichi (Hiroshima Univ.), Keita Kawasaki (National Institute of Technology (KOSEN), Kure College), Daisaku Nishina (Hiroshima Univ.)

P12 Influence of Reduced Water Flow on the System Performance of Ground Source Heat Pump
Issei Hoshi (Hiroshima Univ.), Sayaka Kindaichi (Hiroshima Univ.), Keita Kawasaki (National Institute of Technology (KOSEN), Kure College), Daisaku Nishina (Hiroshima Univ.)

P13 A Study on the Stabilization Mechanism of “Hybrid Combustion” via the Extremely Lean Gas Mixture mixed with Biomass Powders
Yuyang Jiang (Toyohashi Univ. of Technology), Ryoki Okada (Toyohashi Univ. of Technology), Akito Tayama (Toyohashi Univ. of Technology), Daiki Matsugi (Toyohashi Univ. of Technology), Yuji Nakamura (Toyohashi Univ. of Technology)

P14 Fabrication of CNT Paper Using the Vacuum Filtration Method for Gas Sensor Applications

Haruki Matsumoto (Hiroshima Univ.), Mengli Zhang (Hiroshima Univ.),Yukihiko Matsumura (Hiroshima Univ.)

P15 Recovery of CaO from Calcined Oyster Shells for Use in Chemical Heat Pumps
Kazuyuki Osada (Hiroshima Univ.), Mengli Zhang (Hiroshima Univ.),Yukihiko Matsumura (Hiroshima Univ.)

P16 Hydrothermal carbonization of starch
Muhammad Haqqiyuddin ROBBANI (Hiroshima Univ.), Yukihiko MATSUMURA (Hiroshima Univ.)

P17 Effect of Ru/CNT catalyst on xylose decomposition
Raito ARAKAWA (Hiroshima Univ.), Yukihiko MATSUMURA (Hiroshima Univ.)

P18 Phosphorus recovery in supercritical water using reaction with calcium hydroxide
Zihao HE (Hiroshima Univ.), Yukihiko MATSUMURA (Hiroshima Univ.)

P19 Hydrothermal carbonization of xylose
Daolin HU (Hiroshima Univ.), Yukihiko MATSUMURA (Hiroshima Univ.)

P20 Hydrothermal carbonization of xylan
Koichi TAKEMOTO (Hiroshima Univ.), Yukihiko MATSUMURA (Hiroshima Univ.)

P21 Research on durability of Ti-RuO_2 electrodes in liquid ammonia electrolysis
Shuhei Osawa (Hiroshima Univ.), Tomoyuki Ichikawa (Hydrolabo Inc), Hiroki Miyaoka (Hiroshima Univ.), Takayuki Ichikawa (Hiroshima Univ.)

P22 Development of CO_2 carrier using sodium carbonate
Kenta Hisada (Hiroshima Univ.), Takayuki Ichikawa (Hiroshima Univ.), Hitoshi Saima (Hiroshima Univ.), Hiroki Miyaoka (Hiroshima Univ.)

P23 Effect of Transition Metal Addition on NaH Catalyst in NH_3 Synthesis
Akimori Sano (Hiroshima Univ.), Koki Tsunematsu(Hiroshima Univ.), Tomoyuki Ichikawa (Hydrolabo Inc), Hitoshi Saima (Hiroshima Univ.), Hiroki Miyaoka (Hiroshima Univ.), Takayuki Ichikawa (Hiroshima Univ.)

P24 Hydrogen Absorption Properties at Room Temperature of TiFe Alloys with Surface Modification by Additive

Chu Tiancheng (Hiroshima Univ.), Yin Chenghao (Hiroshima Univ.), Yamaguchi Shotaro (JTEKT), Ozaki Daisuke (JTEKT), Guo Fangqin (Hiroshima Univ.), Hiroki Miyaoka (Hiroshima Univ.), Takayuki Ichikawa (Hiroshima Univ.)

P25 Temperature dependence of anode degradation in alkaline water electrolysis
Sho Kodama (Hiroshima Univ.), Kazuhiro Mochizuki (Hiroshima Univ.), Guo Fangqin (Hiroshima Univ.), Hiroki Miyaoka (Hiroshima Univ.), Takayuki Ichikawa (Hiroshima Univ.)

P26 Research on Reaction Behaviors of $LiBH_4$ and $NaBH_4$ mixture with Liquid Ammonia
Hao Yiming (Hiroshima Univ.), Xu Zixin (Hiroshima Univ.), Ohyagi Shinsuke (KRI Inc), Wakabayashi Takashi (KRI Inc), Hamanaka Toru (Hiroshima Univ.), Guo Fangqin (Hiroshima Univ.), Hiroki Miyaoka (Hiroshima Univ.), Takayuki Ichikawa (Hiroshima Univ.)

P27 Effect of Ru/CNT catalyst on supercritical water gasification of acetic acid
Sho Inoue (Hiroshima Univ.), Ken Furuta (Hiroshima Univ.), Yukihiko Matsumura (Hiroshima Univ.)