The 4th International Symposium on Fuels and Energy

ISFE2020

Venue: ON-LINE (Hiroshima University)
Dates: December 7 to 8, 2020

PROGRAM BOOK

Organizer

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

Co-organized by

Society of Automotive Engineers of Japan
The Japan Society of Mechanical Engineers
The Society of Chemical Engineers, Japan

Gold Supporter

HIROJIREN (ひろしま自動車産学官連携推進会議：ひろ自連)

PREFACE

December, 2020
ISFE2020 Chair: Prof. Keiya NISHIDA

“Advanced Core for Energetics of Hiroshima University (HU-ACE)” the research core authorized by Hiroshima University was established and started its activity in October, 2016, as Promising Research Initiatives. Now HU-ACE was re-authorized by Hiroshima University as the Center of Excellence in October 2019 based on the intensive research and education activities for the past 3 years. Please visit the HU-ACE web site to see the details. https://hu-ace.hiroshima-u.ac.jp/en/about_en/.

Japan set a high target for greenhouse gas reduction as a countermeasure against global warming: 26 % reduction compared to 2013 greenhouse gas emission rates by 2030, and 80 % reduction by 2050. Japan must develop interdisciplinary technology, such as CO_2 capture and storage, energy conservation, and the use of renewable energy sources, to achieve this target.

Setting these major tasks as our final goal, HU-ACE is undertaking the following projects;
(1) Development of advanced technology to improve the energy efficiency of each step of the energy flow, from energy supply, transportation, storage, to energy consumption,
(2) Designing a roadmap to integrate improved energy consumption technologies now and in the future to the year 2050,
(3) Developing personnel skills to contribute to major greenhouse gas reductions through interdisciplinary research and education, and
(4) Publication of research outcomes to share the results with researchers and industries worldwide.

International Symposium on Fuels and Energy (ISFE) is an annual event organized by HU-ACE as a part of the above project (4). ISFE 2020 is the 4th time and was planned, in the beginning of this year, to be hold on July 20 and 21 in Higashi-Hiroshima, Japan. However, because of the new coronavirus pandemic in the world, the organizing committee decided to hold the ISFE 2020 on-line on December 7 and 8. I hope we can make the fruitful discussion and exchange of the state of the art of fuels and energy regarding the above (1) and (2) topics through ISFE 2020.

PROGRAMME

[DAY 1] MONDAY, December 7th 2020

8:50 – 9:00 Welcome Remark (Prof. Keiya NISHIDA, Hiroshima University, Japan)

Session 1: Energy and Combustion (Chair: Dr. Akira Miyoshi)

9:00 – 9:20 O01 "Optical Study of Diesel Spray and Combustion Processes by Means of Rapid Compression and Expansion Machine - Observation from Lateral Side of 2-D Piston Cavity", Chengyuan Fan, Keiya Nishida, Youichi Ogata (Hiroshima University)

9:20 – 9:40 O02 "Effects of Ultra-High Injection Pressure and Micro-Hole Size on Evaporating and Combustion Spray Characteristics of Multi-Hole Injector", Chang Zhai, Keiya Nishida, Youichi Ogata (Hiroshima University)

9:40 – 10:00 O03 "Performance Simulation of a 2-stroke Opposed Piston Gasoline Engine Dedicated to Series Hybrid", Koichi Hatamura, Keiya Nishida (Hiroshima University)

10:00 – 10:40 **K01** "Study on Knock of Low-speed Two-stroke Marine Dual-fuel Engine with Low Injection Pressure of Natural Gas" Prof. Long Liu (Harbin Engineering University, China)

10:40 – 11:00 O04 "Flame Propagation Behavior of Aluminum Particle Cloud Suspended in Air", Rinrin Saeki, Ritsu Dobashi, Takuma Endo, Kazunori Kuwana, Toshio Mogi, Minhyeok Lee, Masato Mikami, Yuji Nakamura, Wookyung Kim (Hiroshima University, University of Tokyo)

11:00 – 11:20 O05 "Effects of Carbon Dioxide, Hydrogen Concentration on Laminar Burning Velocities of Methane-Air Mixtures", Akihiro Ueda, Keiya Nisida, Takayuki Ichikawa, Takuma Endo, Tomoyuki Johzaki, Yukihiko Matsumura, Yutaka Nakashimada, Wookyung Kim (Hiroshima University)

11:20 – 11:40 O06 "Heat Generation from Zeolite under High Temperature and Pressure", Reo Yamane, Koichi Nakaso, Yukihiko Matsumura (Okayama University, Hiroshima University)

11:40 – 12:00 O07 "Study on the Realization for Carbon-Recycle Complex along Seto-Inland-Sea", Hirofumi Egusa, Takayuki Ichikawa (Hiroshima University)

12:00 – 13:00 lunch break

Session 2: Renewable Energy and Materials (Chair: Dr. Hiroki Miyaoka)

13:00 – 13:40 **K02** "Collaborative Research in Renewable Energy, Nanotechnology and Bio-Circular-Green Technology driven by COVID-19", Dr. Tawatchai Charinpanitkul (Chulalongkorn University, Thailand)

13:40 – 14:00 O08 "Development of a Hydrogen Sensor using Palladium and Carbon Nanotube Composite Materials", Eisuke Horie, Muxuan Zou, Shuhei Inoue, Yukihiko Matsumura (Hiroshima University)

14:00 – 14:20 O09 "Mechanism of Multi-Walled Carbon Nanotubes Paper for the Adsorption of Gas Molecule", Mengli Zhang, Shuhei Inoue, Yukihiko Matsumura (Hiroshima University)

14:20 – 14:40 O10 "Measurement of Electronic Structure of Photochromic Material using Photoelectron Yield Spectrometer", Yutaro Suzuki, Shuhei Inoue, Yukihiko Matsumura (Hiroshima University)

14:40 – 15:00 O11 "Investigation of Mg Ion Diffusion in Photochromic Materials", Yoshinori Aono, Shuhei Inoue, Yukihiko Matsumura (Hiroshima University)

15:00 – 15:20 O12 "CaH2 as Anode Material for All-Solid-State Li-ion Batteries", Yuchen Yao, Fernando Cano-Banda, Ankur Jain, Rini Singh, Takayuki Ichikawa (Hiroshima University)

15:20 – 15:30 break

15:30 – 15:50 O13 "Solid-Electrolyte Properties of LiB12H12 for All-Solid-State Lithium Ion Battery", Takumi Maeda, Junya Hashimoto, Keita Shinzato, Rini Singh, Ankur Jain, Hiroki Miyaoka, Takayuki Ichikawa (Hiroshima University)

15:50 – 16:10 O14 "Room Temperature All-Solid-State Li-Ion Batteries using MgH2 as Electrode Material", Fernando Cano-Banda, Ankur Jain, Abel Hernandez-Guerrero, Takayuki Ichikawa (Hiroshima University, University of Guanajuato)

16:10 – 16:30 O15 "Hydrogen Exchange Reaction in the MgH2-NaBH4 System", Daichi Sato, Keita Shinzato, Hiroki Miyaoka, Takayuki Ichikawa (Hiroshima University)

16:30 – 16:50 O16 "Synthesis of MgB12H12 by Optimized Conditions and its Mg Ionic Conductivity", Junya Hashimoto, Hai-Wen Li, Hiroyuki Gi, Hiroki Miyaoka, Takayuki Ichikawa (Hiroshima University, Hefei General Machinery Research Institute, China)

16:50 – 17:10 O17 "Investigation of Corrosion Process between Sodium Oxide and Ceramics for Na-Redox Cycle", Shohei Maruyama, Hikaru Oyama, Hiroyuki Gi, Keita Shinzato, Hiroki Miyaoka, Yoshitsugu Kojima, Takayuki Ichikawa (Hiroshima University)

17:10 – 17:30 O18 "Corrosion Suppression by Point Heating Reactor for Thermochemical Water-splitting via Na-redox Cycle", Masayuki Harada, Shohei Maruyama, Hiroyuki Gi, Keita Shinzato, Tomoyuki Ichikawa, Hiroki Miyaoka, Takayuki Ichikawa (Hiroshima University, Hydrolabo Inc.)

[DAY 2] TUESDAY, December 8th 2020

Session 3 Hydrogen and Biofuel (Chair: Dr. Machi Kanna)

9:00 – 9:20 O19 "Nitrogen Dissociation Property and Chemical State of Li in Li-M(Si, Ge, Sn, Pb) Alloys", Kentaro Tagawa, Keita Shinzato, Hiroyuki Gi, Hiroki Miyaoka, Takayuki Ichikawa (Hiroshima University)

9:20 – 9:40 O20 "Synthesis and Characterization of Na-M(Si, Ge, Sn, Pb) Alloys as NH3 Synthesis Catalyst", Koki Tsunematsu, Kentaro Tagawa, Keita Shinzato, Hiroyuki Gi, Hiroki Miyaoka, Takayuki Ichikawa (Hiroshima University)

9:40 – 10:00 O21 "Thermodynamic and Spectroscopic Analysis of Li(NH3)xBH4", Takahiro Ide, Hiroki Miyaoka, Hiroyuki Gi, Seiki Sugino, Masakuni Yamaguchi, Norio Ogita, Takayuki Ichikawa (Hiroshima University)

10:00 – 10:40 **K03** "Novel Use of Biomass Power Generation System: Integration with Energy Storage for Non-Steady State Operation" Prof. Chihiro Fushimi (Tokyo University of Agriculture and Technology, Tokyo, Japan)

10:40 – 11:00 O22 "Volumetric Density of Ammonia in the Reaction between Ammonia and LiBH4-NaBH4", Hikaru Oyama, Machi Kanna, Masakuni Yamaguchi, Keita Yamamoto, Tomoyuki Ichikawa, Hiroki Miyaoka, Takayuki Ichikawa (Hiroshima University, KRI Inc.)

11:00 – 11:20 O23 "Cyclic Performance of TiFe Alloy for Hydrogen Compressor System", Fangqin Guo, Toshiaki Kisaki, Hiroki Miyaoka, Ankur Jain, Takayuki Ichikawa (Hiroshima University, Osaka University)

11:20 – 11:40 O24 "Hydrogen and Deuterium Adsorption Properties under Critical Point", Hiroyuki Gi, Hiroki Miyaoka, Norio Ogita, Takayuki Ichikawa (Hiroshima University)

11:40 – 12:00 O25 "Cyclic Properties of V40Ti21.5Cr38.5 Alloy for Thermochemical Hydrogen Compressor", Masaki Yanagi, Fangqin Guo, Hiroki Miyaoka, Takayuki Ichikawa (Hiroshima University)

12:00 – 13:00 lunch break

Session 4 Biomass and Treatment (Chair: Dr. Takayuki Ichikawa)

13:00 – 13:40 **K04** "Statistical Analysis of Microalgae Supercritical Water Gasification: Reaction Variables, Catalysis and Mechanisms" Prof. Masaharu Komiyama (Universiti Teknologi PETRONAS, Malaysia)

13:40 – 14:00 O26 "Algae Cultivation using Supercritical Water Gasification Effluent", Yukihiko Matsumura, Puji Rahmawati Nurcahyani (Hiroshima University)

14:00 – 14:20 O27 "Suppression of Char and Tar Formation in Supercritical Water Gasification of Guaiacol by Radical Scavenger Addition", Pattraporn Changsuwan, Shuhei Inoue, Yukihiko Matsumura (Hiroshima University)

14:20 – 14:40 O28 "Elution Characteristics of Potassium in Bamboo into Methanol", Fumika Kamagata, Kazuma Takata, Ken-ichiro Tanoue, Yukihiko Matsumura (Yamaguchi University, Hiroshima University)

14:40 – 15:00 O29 "Behavior of Organic Phosphorus in Hydrothermal Treatment", Shinnosuke Miyasako, Yukihiko Matsumura (Hiroshima University)

15:00 – 15:20 O30 "Nitrogen Behavior of Poultry Litter in Hydrothermal Treatment", Yuito Suganuma, Takayuki Ichikawa, Wookyung Kim, Yutaka Nakashimada, Keiya Nishida, Yukihiko Matsumura (Hiroshima University)

15:20 – 15:30 break

15:30 – 15:50 O31 "Dissolution of Biomass Particle into Supercritical Water Investigated using Fine Particles", Bailun Chen, Yuki Koshiishi, Yukihiko Matsumura (Hiroshima University, Nara Machinery Co., Ltd.)

15:50 – 16:10 O32 "Electrolysis of Ammonia Water as Livestock Waste Using Alternative Electrode Materials to Platinum", Yuki Nishimura, Takumi Katayama, Keita Shinzato, Tomoyuki Ichikawa, Machi Kanna, Hiroki Miyaoka, Wookyung Kim, Keiya Nishida, Yutaka Nakashimada, Yukihiko Matsumura, Takayuki Ichikawa (Hiroshima University, Hydrolabo Inc.)

16:10 – 16:30 O33 "Basic Analysis of Ammonia Removal Efficiency from Anaerobic Digester", Akira Waki, Setsu Kato, Yoshiteru Aoi, Yutaka Nakashimada (Hiroshima University)

16:30 – 16:50 O34 "Temperature Dependence of Ammonia Desorption in Calcium Chloride", Nobuatsu Omura, Masakuni Yamaguchi, Machi Kanna, Hiroki Miyaoka, Takayuki Ichikawa (Hiroshima University)

16:50 – 17:00 Closing Remark (Prof. Yukihiko MATSUMURA, Hiroshima University, Japan)

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ひろしま自動車産学官連携推進会議

HIROJIREN

目的

- 広島県の基幹産業である自動車産業の発展を通じた地域活性化を趣旨とする「２０３０年産学官連携ビジョン」を掲げ、その着実な実現を図る。

概要

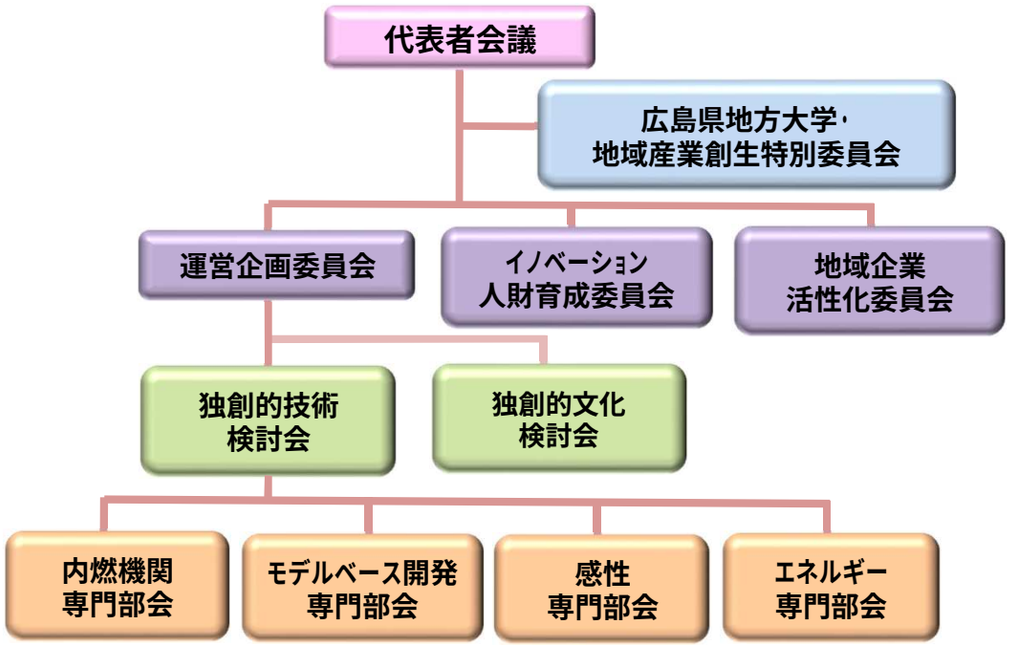
- 略称：　ひろ自連
- 設立：　平成27年6月11日

常任団体

ひろしま産業振興機構、マツダ、広島大学、
中国経済産業局、広島県、広島市

体制

内燃機関専門部会の成果を
反映したSKYACTIV-X



2030年　産学官連携ビジョン

広島を、自動車に関する独創的技術と文化を
追い求める人々が集まり、世界を驚かせる技術と
文化が持続的に生み出される聖地にする

産業・行政・教育が一体になり、イノベーションを
起こす人財をあらゆる世代で育成することにより、
ものづくりを通じて地域が幸せになる

広島ならではの産学官連携モデルが日本における
「地方創生」のリードモデルとなり、
世界のベンチマークとなる

https://www.hirojiren.org/

ひろ自連　検索

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PROGRAM BOOK

Organizer

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

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