

**OS2: The Seventh International Symposium on Innovative Energy Research II:
Combustion Technology and Fundamentals**

November 6, 2019

CON-SHIRAKASHI 1

- OS2-1 **CO₂ Free Ammonia as CO₂ Free Fuel and Hydrogen Carrier - Achievements of SIP**
14:00-14:50 **“Energy Carriers”¹ – (Invited keynote)**
Bunro Shiozawa (Sumitomo Chemical CO., Ltd., Japan)
- OS2-2 **Product Gas Characteristics of Strain and Swirl Stabilized Ammonia/air Flames**
14:50-15:10 *(Invited)*
Akihiro Hayakawa, Hideaki Kobayashi (Tohoku University, Japan)
- OS2-3 **Flame Propagation Characteristics of Ammonia and Coal Particle Cloud Mixture in**
15:10-15:30 **Turbulent Fields: Experimental Investigations Using a Fan Stirred Constant**
Volume Vessel (Invited)
Nozomu Hashimoto (Hokkaido University, Japan), Khalid Hadi (Hokkaido University, Japan / Politeknik Sultan Azlan Shah, Malaysia), Yu Xia, Ryo Ichimura, Genya Hashimoto, Osamu Fujita (Hokkaido University, Japan)
- OS2-4 **Recent Advances in Aluminium Particles Combustion for Propulsion and Heat**
15:40-16:05 **Generation (Invited topical)**
Fabien Halter (CNRS ICARE / Université d'Orléans, France), Christian Chauveau (CNRS ICARE, France)
- OS2-5 **CANCELED**
- OS2-6 **Experimental and Numerical Study of the Oxidation of NH₃/N₂O Mixtures in a**
16:05-16:25 **Micro-Flow Reactor with a Controlled Temperature Profile (Invited)**
Olivier Mathieu (Texas A&M University, USA), Mitsumasa Shindo (Tohoku University, Japan), Eric L. Petersen (Texas A&M University, USA), Takuya Tezuka, Hisashi Nakamura (Tohoku University, Japan)
- OS2-7 **Beyond the Selective Non-catalytic Reduction of NO by Ammonia: Mutual**
16:25-16:45 **Sensitization of NO and Ammonia Oxidation. (Invited)**
Philippe Dagaut (CNRS-INSIS, France)
- OS2-8 **Morphology Analysis of Hydrogen Produced from Sodium-Water Reaction over the**
16:45-17:05 **Transition Metal**
Ai Suzuki, Masayuki Miyano, Ryuji Miura (Tohoku University, Japan), Kuniaki Ara (Japan Atomic Energy Agency, Japan)
- OS2-9 **Experimental Study of Turbulent Burning Velocity of Ammonia/Oxygen/ Nitrogen**
17:20-17:40 **Mixture in a Fan-Stirred Closed Vessel**
Yu Xia, Genya Hashimoto, Khalid Hadi, Nozomu Hashimoto (Hokkaido University, Japan), Akihiro Hayakawa, Hideaki Kobayashi (Tohoku University, Japan), Osamu Fujita (Hokkaido University, Japan)

OS2-10 **Flow and Flame Structures of Non-premixed NH₃/N₂/O₂ Co-planar Jets: CFD Study with Detailed Chemistry**

Mahiro Ooe, Hiroshi Terashima (Hokkaido University, Japan), Jun Hayashi (Kyoto University, Japan), Fumiteru Akamatsu (Osaka University, Japan), Nobuyuki Oshima (Hokkaido University, Japan)

OS2-11 **Experimental Study of Flame Propagation Limits of Ammonia/methane/air Mixture in Turbulent Fields**

Genya Hashimoto, Khalid Hadi, Yu Xia, Aainaa Hamid, Nozomu Hashimoto (Hokkaido University, Japan), Akihiro Hayakawa, Hideaki Kobayashi (Tohoku University, Japan), Osamu Fujita (Hokkaido University, Japan)

November 6, 2019

CON-SHIRAKASHI 2

OS2-12 **Flame Instability and Flame Structures Approaching to Limiting Conditions in a Thin Layer Geometry (*Invited*)**

Mike Kuznetsov (Karlsruhe Institute of Technology, Germany), Fernando Veiga-López, Mario Sánchez-Sanz (Universidad Carlos III de Madrid, Spain), Joachim Grune (Pro-Science GmbH, Germany)

OS2-13 **Propagation of Premixed Methane Flames in a Narrow-Gap-Disk-Burner (NGDB) of Constant-Volume**

Sang Min Lee, Hye Jin Jang, Nam Il Kim (KAIST, Korea)

OS2-14 **Flame Behavior in Spiral Microchannel**

14:45-15:05 Alina Ponomareva, Sergey Mokrin (Far Eastern Federal University / Institute of Applied Mathematics FEB RAS, Russia), Georgii Uriupin (Far Eastern Federal University, Russia), Sergey Minaev (Far Eastern Federal University / Institute of Applied Mathematics FEB RAS, Russia)

OS2-15 **Dynamics of the Burner Stabilized Hydrogen-Air Flames (*Invited*)**

15:05-15:30 Vladimir Gubernov (P.N.Lebedev Physical Institute, Russia), Viatcheslav Bykov, Ulrich Maas (Karlsruhe Institute of Technology, Germany)

OS2-16 **Variation of Edge Flame Speeds of Lifted Laminar Jet Flames under Elevated Pressures**

Gyu Jin Hwang, Nam Il Kim (KAIST, Korea)

OS2-17 **Novel Piston Engine and Electrochemical Hybrid System for Unmanned Aerial Systems**

Thomas S. Welles, Jeongmin Ahn (Syracuse University, USA)

OS2-18 **Development of an Anode Supported Tubular Solid Oxide Fuel Cell with Internal Cathode**

Alexander Hartwell, Thomas S. Welles, Jeongmin Ahn (Syracuse University, USA)

OS2-19 **Droplet Combustion under the Excitation of Ultrasonic Standing Wave (*Invited*)**

16:40-17:05 Xiangzhou Long, Xiaolong Gou (Chongqing University, China)

- OS2-20 **Dynamic Behaviors of Flame Ball in Flow**
 17:20-17:40 Takaki Akiba, Tomoya Okuno, Hisashi Nakamura, Youhi Morii, Takuya Tezuka (Tohoku University, Japan), Roman Fursenko, Sergey Minaev (Far Eastern Federal University, Russia), Masao Kikuchi (Japan Aerospace Exploration Agency, Japan), Kaoru Maruta (Tohoku University, Japan / Far Eastern Federal University, Russia)
- OS2-21 **Numerical Investigation on the Burning Characteristics of Wood Particle in Microgravity**
 17:40-18:00 Chia-Hsun Lin, Sheng-Yen Hsu (National Sun Yat-sen University, Taiwan)
- OS2-22 **Flame-assisted Fuel Cell Boiler for Combined Heating and Micro-power Generation**
 18:00-18:20 Mengyuan Chu, Alexander R. Hartwell, Thomas S. Welles, Jeongmin Ahn (Syracuse University, USA)
- OS2-23 **Numerical Study on CH₄/air Flame with Repetitive Extinction and Ignition in a Micro Flow Reactor with a Controlled Temperature Profile**
 18:20-18:40 Keisuke Akita, Youhi Morii, Hisashi Nakamura, Takuya Tezuka (Tohoku University, Japan), Kaoru Maruta (Tohoku University, Japan / Far Eastern Federal University, Russia)

November 7, 2019

CON-SHIRAKASHI 1

- OS2-24 CANCELED
 9:00-9:20
- OS2-25 **Effects of Turbulence on Forced Ignition in a Premixture (*Invited*)**
 9:20-9:45 Xinyi Chen, Wang Han, Zheng Chen (Peking University, China)
- OS2-26 **Kinetic Study of Ignition Process of Methane/n-heptane Fuel Blends under High-pressure Direct-injection Engine-like Condition**
 9:45-10:05 Jingrui Li, Haifeng Liu, Ying Ye, Hu Wang, Mingfa Yao (Tianjin University, China)
- OS2-27 **A Numerical Investigation on the Effects of Prechamber Jet Flame Acceleration on a Constant Volume Combustion Bomb**
 10:05-10:25 Ye Ying, Liu Haifeng, Li Jingrui, Wang Hu, Yao Mingfa (Tianjin University, China)
- OS2-28 **Initial Stage Reactions of Methane Induced by Dimethyl Ether Using a Micro Flow Reactor with a Controlled Temperature Profile**
 10:40-11:00 Toru Sugita, Hisashi Nakamura, Takuya Tezuka (Tohoku University, Japan), Kaoru Maruta (Tohoku University, Japan / Far Eastern Federal University, Russia)
- OS2-29 **Time-resolved Quantitative Measurements of Intermediate Species in the Low-temperature Oxidation of Iso-octane using Mid-infrared Absorption Spectroscopy (*Invited*)**
 11:00-11:25 Kotaro Tanaka, Shinya Sugano, Satoshi Sakaida, Mitsuru Konno (Ibaraki University, Japan), Hisashi Nakamura, Takuya Tezuka (Tohoku University, Japan)

- OS2-30 **On Unique Three-stage Oxidations of C₂HF₅ (R125)/air Weak flame in a Micro Flow Reactor a Controlled Temperature Profile**
 11:25-11:45 Shintaro Takahashi, Hisashi Nakamura, Takuya Tezuka, Susumu Hasegawa (Tohoku University, Japan), Kaoru Maruta (Tohoku University, Japan / Far Eastern Federal University, Russia)
- OS2-31 **Further Investigations of the Formation of Highly Oxygenated Molecules through Low-temperature Oxidation of Ethers Using a Jet-stirred Reactor, APCI and Electrospray Ionization–high-resolution Mass Spectrometry. (Invited)**
 11:45-12:10 Philippe Dagaut, Nesrine Belhadj, Roland Benoit, Benoit Grosselin, Maxence Lailliau (CNRS-INSIS, France)
- OS2-32 **Plasma Technology for Fuel Conversion (Invited keynote)**
 14:50-15:40 Min Suk Cha (King Abdullah University of Science and Technology, Saudi Arabia)
- OS2-33 **Modeling of Low Mach Number Reactive Flows Coupled with Electric Fields (Invited)**
 15:40-16:00 Lucas Esclapez, John B. Bell, Marc S. Day (Lawrence Berkeley National Laboratory, USA)
- OS2-34 **Modeling of Electrically Assisted Combustion (Invited)**
 16:00-16:20 Memdouh Belhi (King Abdullah University of Science and Technology, Saudi Arabia), Bok Jik Lee (Gwangju Institute of Science and Technology, Korea), Min Suk Cha, Hong G. Im (King Abdullah University of Science and Technology, Saudi Arabia)
- OS2-35 **Electric Field Distribution Measurements in Plasma-Enhanced Flames (Invited topical)**
 16:30-17:00 M. Simeni Simeni (Ohio State University, USA), Y. Tang (Tsinghua University, China), K. Orr, I. V. Adamovich (Ohio State University, USA)
- OS2-36 **Complex flame dynamics coupling with plasmas and electric fields: diagnostics and control (Invited)**
 17:00-17:20 Shuiqing Li (Tsinghua University, China)
- OS2-37 **Reshaping Laser-Induced Plasmas for Non-Intrusive and Accurate Gas Property Measurements (Invited)**
 17:20-17:40 Sungkyun Oh, Sangeun Bae (Seoul National University, Korea), Campbell D. Carter (Air Force Research Laboratory, USA), Hyungrok Do (Seoul National University, Korea)
- OS2-38 **Computational Study on Ignition Process of CH₄/air Mixture Initiated by Nanosecond Repetitively Pulsed Discharges**
 17:40-18:00 Mayu Suzuki, Youhi Morii, Hisashi Nakamura (Tohoku University, Japan), Kaoru Maruta (Tohoku University, Japan / Far Eastern Federal University, Russia)

November 7, 2019

CON-SHIRAKASHI 2

- OS2-39 **Predictions of PAH Profiles in a Counterflow Flame of Isobutene**
9:00-9:20 Jia-Syuan Lin, Kuang C. Lin (National Tsing Hua University, Taiwan)
- OS2-40 **Formation of C₂ Hydrocarbons from Extremely Fuel-rich Combustion of CH₄/air Mixtures in Pre-sooting Region using a Micro Flow Reactor with a Controlled Temperature Profile**
9:20-9:40 Keisuke Kanayama, Takuya Tezuka, Susumu Hasegawa, Hisashi Nakamura (Tohoku University, Japan), Kaoru Maruta (Tohoku University, Japan / Far Eastern Federal University, Russia)
- OS2-41 **Reduced Mechanism for Aromatics Formation from Butane Oxidation**
9:40-10:00 Yu-Hsuan Ma (National Tsing Hua University, Taiwan), Tzu-Wei Lee (National Sun Yat-Sen University, Taiwan), Kuang C. Lin (National Tsing Hua University, Taiwan)
- OS2-42 **Reduced Mechanism for Cyclohexane Oxidation and Lightweight PAH Formation**
10:00-10:20 Meng-Syun Han, Kuang C. Lin (National Tsing Hua University, Taiwan)
- OS2-43 **Reaction Pathway Analyses for the Formation of Aromatic Hydrocarbons from the Pyrolysis of Acetylene**
10:40-11:00 Yu-Hsien Chen, Kuang C. Lin (National Tsing Hua University, Taiwan)
- OS2-44 **Influence of Ethanol Blending on Soot in Spray Combustion of Kerosene** (*Invited*)
11:00-11:25 Taylor M. Rault, Ömer L. Gülder (University of Toronto Institute for Aerospace Studies, Canada)
- OS2-45 **Soot Formation in Toluene-doped Ethylene Laminar Diffusion Flames**
11:25-11:45 Junjun Guo (King Abdullah University of Science and Technology, Saudi Arabia), Yihao Tang (University of Michigan, USA), Prabhu Selvaraj, Can Shao, Anthony Bennett (King Abdullah University of Science and Technology, Saudi Arabia), Venkat Raman (University of Michigan, USA), William L. Roberts, S. Mani Sarathy, Hong G. Im (King Abdullah University of Science and Technology, Saudi Arabia)
- OS2-46 **Ignition Characteristics of Natural Gas under Low Oxygen Partial Pressure**
11:45-12:05 Xun Zou, Shuai Jin, Yichi Zhang, Qianhao Shen, Ming Zhai, Peng Dong (Harbin Institute of Technology, China)

November 8, 2019

CON-SHIRAKASHI 1

- OS2-47 **Combustion and NO_x Formation of Opposed-jet Syngas Diffusion Flames with CO₂ Dilution**
9:00-9:20 Shang-Ru Yao, Hsin-Yi Shih (Chang Gung University, Taiwan)

- OS2-48 **Laminar Flame Speed and Quenching of a Premixed Flame Front in Compressible Flow**
9:20-9:40 Keigo Wada, Yasuhide Fukumoto (Kyushu University, Japan)
- OS2-49 **Numerical Study of Opposed-flow Flame over Ultra-thin Solid Fuels**
9:40-10:00 Yu-Kun Yeh, Tai-Hsiang Fang, Abhishek Mehrotra, Sheng-Yen Hsu (National Sun Yat-sen University, Taiwan)
- OS2-50 **Experimental Investigation on Coherent Structures of Square Jet Flame**
10:00-10:20 Zheming Zhang, Yincheng Guo (Tsinghua University, China)
- OS2-51 **Off-design Characteristics about Ambient Air Temperature of Gas Turbine Pre-swirl System**
10:40-11:00 Hyunwoo Park, Jungsoo Lee, Hyungyu Lee (Hanyang University, Korea), GeonHwan Cho (Doosan Heavy Industries & Construction, Korea), Jinsoo Cho (Hanyang University, Korea)
- OS2-52 **Large-scale Interactions between Two Self-excited Partially-premixed Flames in a Model Gas Turbine Combustor**
11:00-11:20 Hyebin Kang, Ukhwa Jin, Taesong Lee, Kyu Tae Kim (Korea Advanced Institute of Science and Technology, Korea)
- OS2-53 **Performance Analysis for Radial On-Board Injection Type Pre-swirl System**
11:20-11:40 Jonggeon Lee, Hyungyu Lee, Jinsoo Cho (Hanyang University, Korea)
- OS2-54 **Fluctuating Phenomena in the Charge Flow of Un-Fueled Prechamber of Gasoline Engine**
11:40-12:00 Gombosuren Nyamsuren, Yoshifumi Ogami, Hiroyuki Asada (Ritsumeikan University, Japan)
- OS2-55 **Anatomy of a High-performance FR CFD Solver *(Invited topical)***
13:10-13:40 Freddie D. Witherden (Texas A&M University, USA)
- OS2-56 **Towards Exascale Direct Numerical Simulation Using Many-core/GPU Acceleration *(Invited topical)***
13:40-14:10 Francisco E. Hernández Pérez, Minh Bau Luong, Yu Jeong Kim, Wonsik Song (King Abdullah University of Science and Technology, Saudi Arabia), Swapnil Desai (University of Tennessee, USA), Ramanan Sankaran (Oak Ridge National Laboratory, USA), Hong G. Im (King Abdullah University of Science and Technology, Saudi Arabia)
- OS2-57 **Towards Turbulent Combustion using the High-Order Flux Reconstruction Approach *(Invited topical)***
14:10-14:40 Brian C. Vermeire, Charles B. Kiyanda, Hoi Dick Ng (Concordia University, Canada)
- OS2-58 **Platform of Combustion Simulation Software HINOCA *(Invited topical)***
14:50-15:20 Yasuhiro Mizobuchi, Taisuke Nambu (Japan Aerospace Exploration Agency, Japan), Hiroki Yao (Ryoyu Systems Co., Ltd., Japan)
- OS2-59 **High Fidelity Simulations of Supersonic Combustion *(Invited topical)***
15:20-15:50 Pascale Domingo, Guillaume Ribert, Jiangheng L. Ruan (INSA de Rouen, France)

- OS2-60 **Large-scale Multiphysics Simulation of a Multiphase Reacting Flow** (*Invited topical*)
15:50-16:20 Hiroaki Watanabe (Kyushu University, Japan), Ryoichi Kurose (Kyoto University, Japan), Shinobu Yoshimura, Tomonori Yamada (The University of Tokyo, Japan)
- OS2-61 **A High-Order Cross-Platform Incompressible Navier-Stokes Solver via Artificial Compressibility: Application to Submarine Hydrodynamics** (*Invited topical*)
16:30-17:00 Niki A. Loppi (Imperial College London, UK), Freddie D. Witherden (Texas A&M University, USA), Peter E. Vincent (Imperial College London, UK)
- OS2-62 **High Reynolds Number Aerodynamic Flow Simulation Using Split Form Flux Reconstruction Scheme** (*Invited topical*)
17:00-17:20 Takanori Haga, Kazuma Tago, Eiji Shima (Japan Aerospace Exploration Agency, Japan)
- OS2-63 **Towards Fluid-structure Interaction using Assumed Mode Deformation Approach**
17:20-17:40 Yoshiaki Abe, Iori Shoji (Tohoku University, Japan), Tomonaga Okabe (Tohoku University, Japan / University of Washington, USA)
- OS2-64 **Comparison of the Efficient ODE Solvers for Reactive CFD with Detailed Chemical Kinetics**
17:40-18:00 Youhi Morii, Hisashi Nakamura (Tohoku University, Japan), Kaoru Maruta (Tohoku University, Japan / Far Eastern Federal University, Russia)