

28 Oct. (Day 2)

Plenary Lecture

9:15-9:55

Room A

Chair: Yukitaka KATO (Laboratory for Zero-Carbon Energy, Institute of Science Tokyo, Japan)

1A03

Materials-centered strategies for improving the thermodynamics of hydrogen production and carbon dioxide capture processes



Ian S METCALFE

School of Engineering, Newcastle University, United Kingdom

9:55-10:35

Room A

Chair: Naomi SHIBASAKI-KITAKAWA (Department of Chemical Engineering, Tohoku University, Japan)

1A05

Chemurgy Technology: Pioneering the Path to Green and Sustainable Chemistry



Tirto PRAKOSO

Department of Bioenergy and Chemurgical Engineering, Department of Chemical Engineering, Faculty of Industrial Technology, Bandung Institute of Technology, Indonesia

10:50-11:30

Room A

Chair: Takao NAKAGAKI (Waseda University, Japan)

1A07

Process Integration for Sustainable Energy Systems



Dominic C. Y. FOO

Department of Chemical and Environmental Engineering, University of Nottingham Malaysia, Malaysia

11:30-12:10

Room A

Chair: Yasuhiro FUKUSHIMA (Department of Frontier Sciences for Advanced Environment,
Tohoku University, Japan)

1A08

Waste to Wealth: Catalytic Conversion of PET Plastic to Valuable MOF Materials



Kevin C.-W. WU

Department of Chemical Engineering, National Taiwan University, Taipei, Taiwan

30 Oct. (Day 4)

Plenary Lecture

13:00-13:40

Room A

Chair: Akio KODAMA (Institute for Frontier Science Initiative, Kanazawa University, Japan)

3A11

Sorption Materials Innovation and Application: energy-water-air nexus approach



Ruzhu WANG

Institute of Refrigeration and Cryogenics, Shanghai Jiao Tong University, China

13:40-14:20

Room A

Chair: Gen INOUE (Department of Chemical Engineering, Kyushu University, Japan)

3A13

Pore-scale modeling of electrochemical devices



Jeff T GOSTICK

Department of Chemical Engineering, University of Waterloo, Canada

14:20-15:00

Room A

Chair: Keiko FUJIOKA (Functional Fluids Ltd., Japan)

3A15

Current status and future prospects of rock thermal energy storage demonstration tests



Chikako IWAKI

Chief Fellow, Corporation Laboratory, Toshiba Corporation, Japan

28 Oct. (Day 2)

Oral Session: Thermal energy conversion and storage (1)

13:00-15:00

Room B

Chairs: Henri SCHMIT (ZAE Bayern, Germany)

Ryo YOSHIIE (Gifu Renewable Energy System Research Center, Gifu University, Japan)

1B11

13:00-13:20

Development of sintered metal oxide pellets with enhanced heat storage kinetics and cycling stabilitySoomin CHOI¹, Gahyeon LEE¹, Hye Ri KIM¹, Jinsil LEE¹, Seong Eun KIM², Seoyoung JANG¹, Huijeong HWANG¹, Sungkook HONG², Jong Hoon JOO¹¹Department of Environment and Energy Engineering/Gwangju Institute of Science and Technology,²Korea Institute of Energy Research, Daejeon 34129, Republic of Korea**1B12**

13:20-13:40

Demonstration of Cu-Mn composite oxides honeycomb structure module for medium-high temperature thermochemical energy storageXiaoyu CHEN^{1,2}, Mitsuhiko KUBOTA², Shigehiko FUNAYAMA¹, Hiroki TAKASU¹, Yukitaka KATO¹, Hideki KITA²¹Laboratory for Zero-Carbon Energy, Institute of Integrated Research, Institute of Science Tokyo, Japan,²Department of Chemical Systems Engineering, Graduate School of Engineering, Nagoya University, Japan**1B13**

13:40-14:00

Thermochemical reaction system for industrial heat recovery and heat transformationAldo COSQUILLO MEJIA¹, Rakesh SHARMA², Jana STENGLER³, Marc LINDER³¹Institute of Engineering Thermodynamics, German Aerospace Center (DLR), Linder Höhe, 51147 Cologne, Germany,²Department of Mechanical and Industrial Engineering, Manipal Institute of Technology, Manipal Academy of Higher Education, Manipal 576104, India,³Institute of Engineering Thermodynamics, German Aerospace Center (DLR), Pfaffenwaldring 38-40, Stuttgart, 70569, Germany**1B14**

14:00-14:20

Constant power output of salt hydrate based thermochemical reactors: simple design rulesHenk HUIJINK¹, Stan DE JONG¹, Chris VAN HAM¹, Quinten PEETERS¹, Olaf ADAN^{1,2}¹Eindhoven University of Technology, ²TNO**1B15**

14:20-14:40

Entropy generation analysis of calcium oxide hydration in an indirect fixed-bed reactor for thermochemical energy storageShigehiko FUNAYAMA, Tsuyoshi IZAKI, Hana SAEKI, Satoshi TOSHIMA, Kanta SATO, Takashi KATO, Hiroki TAKASU, Yukitaka KATO

Institute of Science Tokyo

1B16

14:40-15:00

Evaluation of advanced electrochemical techniques for improved monitoring control in sorption materials for TES systemsAngel G. FERNANDEZ, Jalel LABIDI

Department of Chemical and Environmental Engineering, University of the Basque Country

Oral Session: Thermal energy conversion and storage (2)

15:30-17:50

Room B

Chairs: Shigehiko FUNAYAMA (Institute of Science Tokyo, Japan)

Aldo Cosquillo MEJIA (German Aerospace Center, Institute of Engineering Thermodynamics, Thermal Process Engineering, Germany)

1B17 A new general analytical model for microgroove-based absorbers in sorption heat transformers

15:30-15:50

Mahyar ASHOURI, Salman HASSANABADI, Callum CHHOKAR, Majid BAHRAMI

Laboratory for Alternative Energy Conversion (LAEC), School of Mechatronic Systems Engineering, Simon Fraser University

1B18 AI-Assisted High-Throughput Screening of Cement-Based Composites for Sorption Thermal Energy Storage

15:50-16:10

Alessio MONDELLO¹, Giulio BARLETTA¹, Luca LAVAGNA², Matteo FASANO¹, Matteo PAVESE², Eliodoro CHIAVAZZO^{1,3}

¹Department of Energy, Politecnico di Torino,

²Department of Applied Science and Technology, Politecnico di Torino,

³Istituto Nazionale di Ricerca Metrologica

1B19 Experimental screening of zeolites for application in an industrial sorption tumble dryer

16:10-16:30

Henri SCHMIT, Tobias SCHUBERT, Lävemann EBERHARD, Stefan HIEBLER

ZAE Bayern

1B20 Performance of Coated vs. Loose Grain Composite for Chiller Application

16:30-16:50

Salman HASSANABADI, Ilya S GIRNIK, Majid BAHRAMI

Laboratory for Alternative Energy Conversion (LAEC), School of Mechatronic Systems Engineering, Simon Fraser University, Canada

1B21 Enhancement of the structural and thermal properties of Al-Cu-Si phase change materials for efficient thermal energy storage

16:50-17:10

Joshua Chidiebere MBA, Takahiro NOMURA

Hokkaido University

1B22 Experimental Study of a counterflow system bench scale packed-bed latent heat storage unit with Al-Si based PCM pellets

17:10-17:30

Tomokazu NAKAMURA¹, Yusuke SATO¹, Yuto SHIMIZU¹, Cholila TAMZYISI¹, Lianying SHAN², Justin Ningwei CHIU², Shoma FUJII³, Takahiro NOMURA¹

¹Faculty of Engineering, Hokkaido University,

²Department of Energy Technology, KTH Royal Institute of Technology,

³Institute for Future Initiatives, The University of Tokyo

1B23 Microencapsulation of high-temperature alloy-based phase change materials utilizing oxide ion conductors for robust shell formation

17:30-17:50

Koji TAKIZAWA¹, Noritoshi YAGIHASHI¹, Yuki NAKAMA¹, Yuto SHIMIZU², Tomokazu NAKAMURA², Melbert JEEM², Takahiro NOMURA²

¹Sekisui Chemical Co., Ltd.,

²Faculty of Engineering, Hokkaido University

Oral Session: Energy Storage and Transformation/Energy Carriers

13:00-14:40

Room C

Chairs: Takahiro NOMURA (Faculty of Engineering, Hokkaido University, Japan)

Koki YAGIHARA (Department of Frontier Sciences for Advanced Environment,
Tohoku University, Japan)**1C11**

13:00-13:20

A water-based lithium-ion solid-state battery with an easy direct-recycling systemShintaro YASUI, Yosuke SHIRATORI*Institute of Science Tokyo***1C12**

13:20-13:40

Experiments and calculations of Thermal Energy Storage (TES) with rock bed and evaluation of radiant heater effectivenessTakashi MAWATARI¹, Masayuki SATO¹, Koichi GOTO¹, Hiroshi SAEKI¹, Masato FUKUTA¹,
Chikako IWAKI¹, Hiromutsu MIKI¹, Naoya MATSUDA²¹Toshiba Energy Systems & Solutions Corporation,²Chubu Electric Power Co., Inc.**1C13**

13:40-14:00

Temperature-Programmed and *In Situ* Spectroscopic Approaches to Correlate Graphitization Degree and Kinetic Behavior of Cs-Promoted Ru Catalysts in Ammonia SynthesisLi Yu WANG¹, Shih Yuan CHEN², Takehisa MOCHIZUKI², Chia Min YANG¹¹Department of Chemistry, National Tsing Hua University,²Energy Catalyst Technology Group, National Institute of Advanced Industrial Science and Technology**1C14**

14:00-14:20

Kinetics and reactor design of chemical looping hydrogen production process using ilmenite-based oxygen carriersZhuang SUN, Junichiro OTOMO*Institute of Science Tokyo***1C15**

14:20-14:40

Investigating the role of defect transport in $\text{BaZr}_{0.1}\text{Ce}_{0.7}\text{Y}_{0.1}\text{Yb}_{0.1}\text{O}_{3-\delta}$ for electrochemical ammonia decompositionJulián Andres ORTIZ CORRALES, Moe OKAZAKI, Shiho OTOMO, Junichiro OTOMO*Department of Transdisciplinary Science and Engineering, School of Environment and Society, Institute of Science Tokyo*

Oral Session: LCA, Technoeconomic analysis, Energy system design and evaluations

15:30-16:50

Room C

Chairs: Shintaro YASUI (Institute of Science Tokyo, Japan)

Shih-Yuan CHEN (Energy Catalyst Technology Group Energy Process Research Institute (EPRI) National Institute of Advanced Industrial Science and Technology (AIST), Japan)

1C17

15:30-15:50

Carbon Independence Vision: Circular Transformation from Hard-to-Abate Industries

Yutaro NIIMI¹, Yoshiko TSUJI², Michihisa KOYAMA³, Yoshihiro MIZUGUCHI⁴

¹SUMITOMO MITSUI TRUST BANK,

²Environmental Science Center, The University of Tokyo,

³Institute for Aqua Regeneration, Shinshu University,

⁴JGC Holdings Corporation

1C18

15:30-16:10

Assessing greenhouse gas emissions reduction of amine-based post-combustion: impact of system boundary and energy production

Koki YAGIHARA, Tsai-Wei WU, Gakuto SO, Hajime OHNO, Yasuhiro FUKUSHIMA

Department of Frontier Sciences for Advanced Environment, Tohoku University

1C19

16:10-16:30

Withdrawal

1C20

16:30-16:50

Feasibility study of renewable hydrogen supply chain from India to Japan

Akira NISHIMURA, Hayato NARUSE, Masataka NORO, Sentaro TOMITA

Division of Mechanical Engineering, Graduate School of Engineering, Mie University

Oral Session: Materials for Energy (1)

13:00-15:00

Room D

Chairs: Michihisa KOYAMA (Shinshu University, Japan)

Majid BAHRAMI (Simon Fraser University, Canada)

1D11

13:00-13:20

Advancing Thermochemical Energy Storage with Novel Salt Hydrates

Candida MILONE, Emanuela MASTRONARDO, Luigi CALABRESE, Emanuele PREVITI, Edoardo PROVERBIO

Engineering Department, University of Messina

1D12

13:20-13:40

Solid Sorbent-Filled Sulfonated Polymer Composites: A Coating Approach for Thermochemical Energy Storage

Davide PALAMARA¹, Mengistu GELAW^{1,2}, Emanuela MASTRONARDO¹, Andrea FRAZZICA³, Edoardo PROVERBIO¹, Candida MILONE¹, Luigi CALABRESE^{1,3}

¹Department of Engineering, University of Messina, Contrada di Dio Sant'Agata, 98166 Messina, Italy,

²Department of Mechanical Engineering, School of Mechanical, Chemical and Materials Engineering, Adama Science and Technology University, Adama, Ethiopia 1888,

³CNR ITAE "Nicola Giordano" - Institute of Advanced Technologies for Energy, Via Salita S. Lucia sopra Contesse 5, 98126 Messina, Italy

1D13

13:40-14:00

Comparative Analysis of Impregnation Techniques for CaCl₂/Silica Gel Composites in Thermal Energy Storage

Emanuela MASTRONARDO¹, Antonio FOTIA², Vincenza BRANCATO², Andrea FRAZZICA², Luigi CALABRESE^{1,2}

¹University of Messina, ²CNR ITAE

1D14

14:00-14:20

Synthesis of Highly Crystalline Graphitic Carbon via Hydrothermal Carbonization of Japanese Cedarwood with Ferric Ion Impregnation

Preethi PERIANAYAGAM¹, Yuta NAKAYASU^{1,2}, Futa IMAIZUMI¹, Takashi ITOH², Masaru WATANABE¹

¹Department of chemical engineering, Tohoku University,

²Frontier Research Institute for Interdisciplinary Sciences (FRIS), Tohoku University

1D15

14:20-14:40

Evaluating Molten-Salt Compatibility of Waste-Based Materials for Thermal Energy Storage Applications

Halime Omur PAKSOY¹, Burcu KOCAK¹, Alejandro CALDERÓN², Camila BARRENECHE², Gülfeza KARDAS¹, Ana Inés FERNÁNDEZ²

¹Cukurova University,

²Universitat de Barcelona

1D16

14:40-15:00

Scaling-up Composite Phase Change Materials Manufacturing for Thermal Energy Storage: from Lab to Industrial Production Scale

Maria Elena NAVARRO RIVERO, Abdalqader AHMAD, Yelaman MASKUM, Yulong DING

University of Birmingham

Oral Session: Low carbon technologies (1)

15:30-17:30

Room D

Chairs: Candida MILONE (Engineering Department, University of Messina, Italy)

Halime Omur PAKSOY (Cukurova University, Turkey)

1D17

15:30-15:50

Analyses on Costs and Potentials of Carbon Dioxide Removal (CDR) Technologies

Keigo AKIMOTO, Fuminori SANO, Hiroshi HARADA, Noritaka MOCHIZUKI, Takahiro NAGATA

Systems Analysis Group, Research Institute of Innovative Technology for the Earth (RITE)

1D18

15:50-16:10

Distributed energy systems based on ammonia and hydrogen utilization

Ryo YOSHIIE¹, Nobusuke KOBAYASHI¹, Shinji KAMBARA²

¹Gifu Renewable Energy System Research Center, Gifu University,

²Faculty of Engineering, Gifu University

1D19

16:10-16:30

CO₂ capture performance of calcium oxide-based composite over repeated carbonation and decarbonation cycles

Kenta TOMITA, Tsuyoshi IZAKI, Yue GUO, Shigehiko FUNAYAMA, Hiroki TAKASU, Yunitaka KATO

Institute of Science Tokyo

1D20

16:30-16:50

**Multi-stage structured catalyst system with powerfully converting GHG:
Innovative CO₂ recycling system for carbon neutralization**

Choji FUKUHARA, Yuki YAMADA, Yu NAKAZAWA, Hiroto NAIKI, Hiroshi AKAMA,
Ryo WATANABE

College of Engineering, Academic Institute, Shizuoka University

1D21

16:50-17:10

**Carbon-free hydrogen production test project with high temperature heat
from high temperature gas-cooled reactor**

Masato ONO¹, Katsunori ISHII¹, Hiroki NOGUCHI¹, Hiroyuki SATO², Nariaki SAKABA²

¹HTGR hydrogen utilization group, HTGR project management office, Japan Atomic Energy Agency,

²HTGR project management office, Japan Atomic Energy Agency

1D22

17:10-17:30

**Exploring the Potential of Molten Chloride Fast Reactor as a Versatile Zero-
Carbon Energy System**

Andika Putra DWIJAYANTO¹, Tomohiro OKAMURA^{1,2}, Kenji NISHIHARA³,
Masahiko NAKASE^{1,2}

¹Graduate Major in Nuclear Engineering, Department of Transdisciplinary Science and Engineering, School of
Environment and Society, Institute of Science Tokyo,

²Laboratory for Zero Carbon Energy, Institute of Integrated Research, Institute of Science Tokyo,

³Research Group for Nuclear Transmutation System, Japan Atomic Energy Agency

29 Oct. (Day 3)

Oral Session: Thermal energy conversion and storage (3)

9:00-10:00

Room B

Chairs: Angelo FRENI (CNR-ICCOM, Italy)

Toshiaki FUKADA (Energy Transformation Research Laboratory, Central Research Institute of Electric Power Industry, Japan)

2B01 Synthesis of macro-mesoporous salt-silica composite tablets for salt heat batteries

9:00-9:20

Dasol CHO^{1,2}, Heiner FRIEDRICH², Olaf ADAN^{1,3}, Henk HUININK¹¹Department of Applied Physics and Science Education, Eindhoven University of Technology,²Department of Chemical Engineering & Chemistry, Eindhoven University of Technology, The Netherlands,³TNO Materials Solution, The Netherlands**2B02 EXPERIMENTAL PROOF OF A THERMAL SYSTEM FOR COOLING AND STORAGE APPLICATIONS EMPLOYING CaCl₂/SILICA GEL COMPOSITE ADSORBENT**

9:20-9:40

Valeria PALOMBA¹, Andrea FRAZZICA¹, Vincenza BRANCATO¹, Antonino BONANNO¹, Yannan ZHANG², Matteo CALÒ^{3,4}, Gabriele PENELLO⁴, Walter MITTELBAACH⁴, Gabriel YARCE⁴¹National Research Council of Italy – Institute for Advanced Energy Technologies (CNR-ITAE), Salita S.Lucia sopra Contesse 5, 98126 Messina, Italy,²School of Materials and Energy, Guangdong University of Technology, Guangzhou, 510006, China,³Politecnico di Torino, Department of Energy, Turin, 10129, Italy,⁴Sorption Technologies GmbH, Freiburg, 79098, Germany**2B03 Integration of ionic liquid in electrospon tissues for energy applications**

9:40-10:00

Angela MALARA, Paolo BRUZZANITI, Patrizia FRONTERA, Chiara NUNNARI, Lucio BONACCORSI

Mediterranea University of Reggio Calabria, Dept. DICEAM

2B04 Withdrawal

Oral Session: Thermal energy conversion and storage (4)

10:40-12:00

Room B

Chairs: Dasol CHOI (Department of Applied Physics and Science Education, Eindhoven University of Technology, Netherlands)

Angela MALARA (Mediterranea University of Reggio Calabria (Italy), Italy)

2B05

10:40-11:00

Stability and adsorption performance of adsorbent composites for low temperature cooling and air conditioning applications

Angelo FREN¹, Emanuela PITZALIS¹, Francesca NARDELLI², Roberto SPINIELLO¹, Giorgio TOMAINO³, Silvia PIZZANELLI¹, Davide PALAMARA⁴, Antonio FOTIA⁵, Luigi CALABRESE^{1,4}, Vincenza BRANCATO⁵, Matteo CALO⁶, Stefano DE ANTONELLIS^{1,3}, Claudio EVANGELISTI¹, Walter MITTELBACH⁶

¹CNR ICCOM – Institute of Chemistry of Organo Metallic Compounds, Pisa, Italy,

²Department of Chemistry and Industrial Chemistry, University of Pisa,

³Department of Energy, Politecnico di Milano, Italy,

⁴Department of Engineering, University of Messina, Italy,

⁵CNR ITAE– Institute of Advanced Technologies for Energy “Nicola Giordano”, Messina, Italy,

⁶Sorption Technologies GmbH, Freiburg, Germany

2B06

11:00-11:20

Numerical model of the sand-based thermal energy storage system for an industrial process

Toshiaki FUKADA

Energy Transformation Research Laboratory, Central Research Institute of Electric Power Industry

2B07

11:20-11:40

Demonstrations conducted at a waste treatment plant of an off-grid organic Rankine cycle power generation system contributing to a decarbonised society

Satoshi ENDO¹, Tadanobu AIZAWA¹, Toshimitsu ONO¹, Isao HAYASE², Toshihiko FUKUSHIMA², Hirokatsu KOSOKABE², Naoki SHIKAZONO², Hiroshi SONE³, Keisuke URA³, Tomoko HIRAYAMA⁴, Iwa OU⁵, Tomoya HASEGAWA⁵, Yuichiro TOKUNAGA⁵, Katsuhiko OYAMA⁶

¹Mabuchi Engineering Co.,Ltd.,

²Institute of Industrial Science, The University of Tokyo,

³Industrial Technology Institute, Miyagi Prefectural Government,

⁴Kyoto University,

⁵Eagle Industry Co., LTD.,

⁶Japan Sustainable Free Powered Energy System Exploit & Promotion Association

2B08

11:40-12:00

Performance Comparison of a Heat Exchanger with Various Composite Materials in Low-Grade Sorption Desalination

Antonio FOTIA, Valeria PALOMBA, Vincenza BRANCATO, Andrea FRAZZICA

National Research Council of Italy, Institute for Advanced Energy Technologies “N.Giordano” (CNR-ITAE)

Oral Session: Electric energy conversion and storage (1)

9:00-10:00

Room C

Chairs: Ian METCALFE (School of Engineering, Newcastle University, United Kingdom)
Takuya TSUJIGUCHI (Faculty of Mechanical Engineering, Institute of Science and Engineering, Kanazawa University, Japan)

2C01 Mitigating Mechanical Degradation in Silicon-Based Electrodes: A Discrete Element Method Study

9:00-9:20

Magnus SO, Takeru YANO, Shusaku ASANO, Koki SATO, Gen INOUE

Department of Chemical Engineering, Faculty of Engineering, Kyushu University

2C02 High-Performance Electrolyte Membrane Exhibiting Low Ohmic Resistance for Redox Flow Batteries

9:20-9:40

Hirokazu ISHITOBI¹, Ryusuke OBATA², Naruya SUGIURA³, Hidenori OHASHI⁴, Nobuyoshi NAKAGAWA⁵

¹*Department of Applied Chemistry, Meiji University,*

²*Department of Environmental Engineering Science, Gunma University,*

³*Department of Chemical Engineering, Tokyo University of Agriculture and Technology,*

⁴*Department of Applied Physics and Chemical Engineering, Tokyo University of Agriculture and Technology,*

⁵*Program of Chemical Engineering, Gunma University*

2C03 Utilizing magnetic materials and their magnetic entropy change for energy harvesting systems

9:40-10:00

Hikaru KIYOMOTO¹, Yuka SAKAI², Yasuki KANSHA²

¹*Department of Multidisciplinary Sciences, Graduate School of Arts and Sciences, The University of Tokyo,*

²*Organization for Programs on Environmental Sciences Graduate School of Arts and Sciences, The University of Tokyo*

2C04 Withdrawal

Oral Session: Electric energy conversion and storage (2)

10:40-12:00

Room C

Chairs: Hirokazu ISHITOBI (Department of Applied Chemistry, Meiji University, Japan)
Magnus SO (Department of Chemical Engineering, Faculty of Engineering, Kyushu University, Japan)

2C05 Support-Free Connected Nanoparticle Electrocatalysts with Enhanced Oxygen Reduction Performance in Polymer Electrolyte Fuel Cells

10:40-11:00

Hidenori KUROKI, Takeo YAMAGUCHI

Laboratory for Chemistry and Life Science, Institute of Science Tokyo

2C06

11:00-11:20

Controlling of the mass transport in the direct formic acid fuel cell using a catalyst ink with different particle distributions

Takuya TSUJIGUCHI¹, Madihah Binti MISKAN¹, Kakeru FUJIWARA², Yugo OSAKA¹, Akio KODAMA², Mototake FURUHASHI³

¹Faculty of Mechanical Engineering, Institute of Science and Engineering, Kanazawa University,

²Institute for Frontier Science Initiative, Kanazawa University,

³Sustainable System Research Dept. Environment & Energy lab., JTEKT

2C07

11:20-11:40

Ruthenium and Copper-Doped Advanced Binary Hydroxide OER Electrocatalysts for Efficient Alkaline Water Electrolysis

Gulfeza KARDAS¹, Goncagül AKSARAY¹, Yakubu Sawadogo ADAM¹, Ender FAKI¹, Murat FARSAK²

¹Cukurova University,

²Osmaniye Korkut Ata University

2C08

11:40-12:00

Suppression Technique of Sputtering Damage for High-Efficient Perovskite/CIGSe Tandem Solar Cells

Takahito NISHIMURA¹, Chihiro MIZUSHIMA², Ryousuke ISHIKAWA², Akira YAMADA¹

¹Department of Electrical and Electronic Engineering, Institute of Science Tokyo,

²Department of Electrical, Electronic and Communication Engineering, Tokyo City University

Oral Session: Low carbon technologies (2)

9:00-10:20

Room D

Chairs: Yuri I. ARISTOV (Boreskov Institute of Catalysis, Russian Federation)

Susan Menez ASPERA (Research Initiative for Supra-Material (RISM), Shinshu University, Japan)

2D01

9:00-9:20

Conversion of CO₂, water and power to CO and O₂ by the SPE electrolysis with Co-P4VPy/KB(673K) cathode

Ichiro YAMANAKA, Takahiro HASEGAWA, Jessica SAEKI, Shogo SASAKI, Ryuhei KOJIMA, Masanori YAMAMOTO

Department of Chemical Science and Technology, Institute of Science Tokyo

2D02

9:20-9:40

Urea Production by Pulsed-DBD Plasma

Muhammad Miftahur RAHMAN, Shinji KAMBARA, Ryou YOSHIE

Gifu University

2D03

9:40-10:00

Withdrawal**2D04**

10:00-10:20

Study on the introduction scenario of innovative fast chloride molten salt reactors for the realization of a zero-carbon society

Masahiko NAKASE, Andika Putra DWIJAYANTO, Tomohiro OKAMURA, Kenji NISHIHARA

Zero-carbon Energy Laboratory, Insitute of Science Tokyo

Oral Session: Low carbon technologies (3)

10:40-12:00

Room D

Chairs: Ichiro YAMANAKA (Department of Chemical Science and Technology, Institute of Science Tokyo, Japan)

Ruzhu WANG (Institute of Refrigeration and Cryogenics, Shanghai Jiao Tong University, China)

2D05

10:40-11:00

Co-generation of electricity and water: adsorptive water harvesting analyzed by a modified Mollier diagram

Yuri I. ARISTOV, Larisa G. GORDEEVA

Boriskov Institute of Catalysis

2D06

11:00-11:20

Machine Learning Aided Prediction of CO Adsorption on Multi-elemental Nanoparticle

Susan Meñez ASPERA, Gerardo VALADEZ HUERTA, Yusuke NANBA, Kaoru HISAMA, Michihisa KOYAMA

Research Initiative for Supra-Material (RISM), Shinshu University

2D07

11:20-11:40

Phase transition-induced CO₂ capture behavior in lithium-sodium borate melts

Shiyi ZANG, Takuya HARADA

Division of Chemical Science and Engineering, Department of Chemical Science and Engineering, Institute of Science Tokyo

2D08

11:40-12:00

Acceleration of Gas Absorption Rate by Continuously Formed Liquid Film on Spinning Cylindrical Column

Hiroshi NOGAMI¹, Naoya IZUCHI², XiangYu GAO², Kenji ISHIHARA², Akihisa ITO¹

¹*Institute of Multidisciplinary Research for Advanced Materials, Tohoku University,*

²*Graduate School of Engineering, Tohoku University*

30 Oct. (Day 4)

Oral Session: Energy processes and material properties (1)

9:00-10:20

Room B

Chairs: Kaiwen LI (Department of Finemechanics, Graduate School of Engineering, Tohoku University, Japan)

Massimiliano ZAMENGO (Department of Materials Science and Engineering, Institute of Science Tokyo, Japan)

3B01

9:00-9:20

Evaluation of high entropy alloys as structural material in Gen 3 of CSP plants using high-stability molten salt storage materials

Angel G. FERNANDEZ, Teresa GURAYA

Department of Chemical and Environmental Engineering, University of the Basque Country

3B02

9:20-9:40

Microstructural change in Fe-Cr-Ni alloys by high-temperature hydrogen exposure

Satoru KOBAYASHI, Yuki TSUDA

School of Materials and Chemical Technology, Institute of Science Tokyo

3B03

9:40-10:00

Kinetics of smelting reduction process of iron oxide by CO gas

Yoshinao KOBAYASHI, Kentaro URATA

Laboratory for Zero Carbon Energy, Institute of Integrated Research, Institute of Science Tokyo

3B04

10:00-10:20

Experimental and numerical analysis of calcium hydroxide dehydration under microwave heating in a single-mode resonant cavity

Massimiliano ZAMENGO, Junko MORIKAWA

Department of Materials Science and Engineering, Institute of Science Tokyo

Oral Session: Energy processes and material properties (2)

10:40-12:20

Room B

Chairs: Angel G. FERNANDEZ (Department of Chemical and Environmental Engineering, University of the Basque Country, Spain)

Adela SVOBODOVA (Department of Material Science and Physical Chemistry, Chemistry Faculty, Barcelona University, Spain)

3B05

10:40-11:00

Experimental determination of melting enthalpies of semicongruent salt hydrates for latent heat thermal energy storage

Henri SCHMIT, Stefanie TAFELMEIER, Christoph RATHGEBER, Stefan HIEBLER

ZAE Bayern

3B06

11:00-11:20

Effect of liquid subcooling on bubble formation in low-pressure pool boiling of water on a single tube

Dominika KACZMAREK, Tomasz HALON, Bartosz ZAJACZKOWSKI

Wroclaw University of Science and Technology, Department of Thermal Sciences

3B07

11:20-11:40

Insight into selective permeability of polymeric hollow fibres for lightweight heat exchangers

Frantisek MIKSIK¹, Yoshiaki KAWAJIRI¹, Kyaw THU², Takahiko MIYAZAKI², Erik BARTULI³,
Katerina MAYEROVA³, Jaroslav LONGAUER⁴

¹Institute of Innovation for Future Society, Nagoya University,

²Interdisciplinary Graduate School of Engineering Sciences, Kyushu University,

³Faculty of Mechanical Engineering, Brno University of Technology,

⁴Institute of Materials and Machine Mechanics, Slovak Academy of Sciences

3B08

11:40-12:00

Numerical Analysis of the Denitration Reaction under Microwave Heating in a Single Mode Resonant Cavity

Junko MORIKAWA¹, Massimiliano ZAMENGO¹, Hidetoshi KAWABATA², Makoto DOI²,
Takashi NAKAYAMA², Yuji WADA³

¹School of Materials and Chemical Technology, Institute of Science Tokyo,

²JFE Engineering,

³General Incorporated Association ZeroC

3B09

12:00-12:00

A Combined GRRM/MC/MD Simulation Study on Bond Exchange in Epoxy Vitrimers

Kaiwen LI¹, Yingxiao XI³, Naoki KISHIMOTO³, Gota KIKUGAWA²

¹Department of Finemechanics, Graduate School of Engineering, Tohoku University,

²Institute of Fluid Science, Tohoku University,

³Department of Chemistry, Tohoku University

Oral Session: Materials DX (digital transformation), Data-driven approach, Materials informatics (1)

9:00-10:20

Room C

Chairs: Kousuke HIROMORI (Department of Chemical Engineering, Tohoku University, Japan)

Tien Quang NGUYEN (Institute for Aqua Regeneration, Shinshu University, Japan)

3C01

9:00-9:20

Mapping Thermoelectric Materials Using Machine Learning on Integrated Computational and Experimental Datasets

Yusuke HASHIMOTO, Xue JIA, Hao LI, Takaaki TOMAI

Tohoku University

3C02

9:20-9:40

Theoretical study of amine-CO₂ system with kinetics simulations utilizing DFT calculations

Toru YAMAGUCHI¹, Hidetaka YAMADA², Syohei SANADA¹, Kenji HORI^{1,3,4}

¹Division of Computational Chemistry, Transition State Technology Co. Ltd.,

²Frontier Science and Social Co-creation Initiative, Kanazawa University,

³Interdisciplinary Research Center for Catalytic Chemistry, National Institute of Advanced Industrial Science and Technology,

⁴Faculty of Engineering, Yamaguchi University

3C03

9:40-10:00

CO Adsorption on Supported Monometallic Nanoparticles: Influence of the Support Effect

Gerardo VALADEZ HUERTA, Susan Meñez ASPERA, Yusuke NANBA, Kaoru HISAMA,
Michihisa KOYAMA

Shinshu University

3C04

10:00-10:20

Estimation of Kinematic Viscosity for Multicomponent Mixtures using Neural Network with Gradient Constraints

Yuya MURAKAMI, Atsushi HATOYAMA

Department of Applied Chemistry and Biochemical Engineering, Faculty of Engineering, Shizuoka University

Oral Session: Materials DX (digital transformation), Data-driven approach, Materials informatics (2)/Environment and Biomass energy technologies

10:40-12:20

Room C

Chairs: Yusuke HASHIMOTO (Tohoku University, Japan)

Gerardo Valadez HUERTA (Shinshu University, Japan)

3C05

10:40-11:00

A Data-Driven Model for Forecasting Thermal Load in District Energy Networks

Naghme KHEYRIKOOCHAKSARAYEE¹, Mina ROUHANI², Majid BAHRAMI¹

¹*School of Mechatronic Systems Engineering, Simon Fraser University, Surrey, BC, Canada,*

²*City of Surrey, Surrey, BC, Canada*

3C06

11:00-11:20

High-Throughput Computational Discovery of Stable Multi-Component Ni-Rich Cathodes Enabled by Universal Neural Network Potentials

Tien Quang NGUYEN¹, Nobuyuki ZETTSU^{1,2}, Michihisa KOYAMA¹

¹*Institute for Aqua Regeneration, Shinshu University,*

²*Department of Materials Chemistry, Faculty of Engineering, Shinshu University*

3C07

11:20-11:40

Practical Application of Gold Extraction Solvents with High Extractability and Low Water Solubility by Machine Learning

Takuto TSUNEMI¹, Tatsuya OSHIMA², Hiromasa KANEKO¹

¹*Department of Applied Chemistry, Graduate School of Science and Technology, Meiji University,*

²*Department of Applied Chemistry, Faculty of Engineering, University of Miyazaki*

3C08

11:40-12:00

Investigation of Descriptors for the Development of a High-Precision Cocrystal Prediction Model

Manato TAKEUCHI, Hiromasa KANEKO

Graduate School of Science and Technology, Meiji University

3C09

12:00-12:20

Development of an Energy-Positive Electrolysis System for Recycling Waste from Vegetable Oil Refining

Kousuke HIROMORI, Atsushi TAKAHASHI, Naomi SHIBASAKI-KITAKAWA

Department of Chemical Engineering, Tohoku University,

Oral Session: Materials for Energy (2)

9:00-10:20

Room D

Chairs: Henk HUIJINK (Eindhoven University of Technology, Netherlands)
 Shigeru UEDA (IMRAM, Tohoku University, Japan)

3D01

9:00-9:20

**Learnings and shortcomings of nano-enhanced PCM and solid-solid PCM.
 Case studies**

Ana Inés FERNÁNDEZ, Rebeca SALGADO-PIZARRO, Camila BARRENECHE,
 Adela SVOBODOVA-SEDLAKOVA

Department of Materials Science and Physical Chemistry, Universitat de Barcelona

3D02

9:20-9:40

**Material-Based Design of Thermal Energy Storage: A Database of Sustainable
 Solid Particles**

Adela SVOBODOVA, Marc MAJÓ, Alejandro CALDERÓN, Mercè SEGARRA,
 A. Inés FERNÁNDEZ, Camila BARRENECHE

Department of Material Science and Physical Chemistry, Chemistry Faculty, Barcelona University

3D03

9:40-10:00

Withdrawal

3D04

10:00-10:20

**Highly efficient atmospheric water harvesting enabled by hygroscopic
 zwitterionic hydrogel sponge**

Xinge YANG, He SHAN, Zhihui CHEN, Ruzhu WANG

*Institute of Refrigeration and Cryogenics, MOE Engineering Research Center of Solar Power and Refrigeration,
 Shanghai Jiao Tong University*

Oral Session: Materials for Energy (3)

10:40-12:00

Room D

Chairs: Ana Ines FERNANDEZ (Department of Materials Science and Physical Chemistry,
 Universitat de Barcelona, Spain)
 Yoshinao KOBAYASHI (Laboratory for Zero Carbon Energy, Institute of Integrated
 Research, Institute of Science Tokyo, Japan)

3D05

10:40-11:00

**The quest for power and stability – salt hydrates and thermochemical energy
 storage**

Henk HUIJINK¹, Hartmut FISCHER², Olaf ADAN^{1,2}

¹Eindhoven University of Technology,

²TNO

3D06

11:00-11:20

**Calculating the matrix flood point to avoid salt leakage in sorption
 composites**

Ilya S. GIRNIK, Claire MCCAGUE, Majid BAHRAMI

Simon Fraser University

3D08

11:20-11:40

Electrochemically prepared efficient and durable oxygen evolution reaction catalyst for anion exchange membrane water electrolysis

Sreekanth NARAYANARU¹, Hidenori KUROKI¹, Takanori TAMAKI¹,
Anilkumar M GOPINATHAN^{1,2}, Takeo YAMAGUCHI¹

¹*Institute of Science Tokyo,*

²*Noritake*

3D09

11:40-12:00

Production of LiFePO_4 from Steelmaking Slag

Takayuki IWAMA¹, Junyi DENG¹, Huafang YU², Yasushi SASAKI¹, Ryo INOUE¹,
Shigeru UEDA¹

¹*IMRAM, Tohoku University,*

²*State Key Laboratory of Advanced Metallurgy, University of Science and Technology Beijing*

Poster Session: [Odd Numbers] 12:10-13:20, 29 Oct. (Day 3)
[Even Numbers] 13:20-14:30, 29 Oct. (Day 3)

- P-01** **Development of Module for Calcium Chloride-water Heat Storage and Its Performance**
Noriyuki KOBAYASHI, Natsuki CHIHARA, Kanato OMURA
Department of chemical systems engineering, Nagoya University
- P-02** **Evaluation of Electricity Storage Technologies Including Carnot Battery Using a Global Energy Systems Model**
Teruhisa ANDO, Fuminori SANO, Keigo AKIMOTO
Systems Analysis Group, Research Institute of Innovative Technology for the Earth (RITE)
- P-03** **Numerical analysis of a calcium oxide/water thermochemical energy storage reactor with multi reaction tubes**
Kanta SATO¹, Satoshi TOSHIMA¹, Tsuyoshi IZAKI², Hana SAEKI¹, Kenta TOMITA², Takashi KATO³, Shigehiko FUNAYAMA³, Hiroki TAKASU³, Yukitaka KATO³
¹Nuclear Engineering, Department of Chemical Science and Engineering, Institute of Science Tokyo,
²Nuclear Engineering, Department of Transdisciplinary Science and Engineering, Institute of Science Tokyo,
³Laboratory for Zero-Carbon Energy, Institute of Integrated Research, Institute of Science Tokyo
- P-04** **Evaluation of Output Performance and Reaction Rate Limiting for Microbial Fuel Cells**
Hiroya KOMBA¹, Kosei NAITO², Minoru DOHI¹, Tomohiro TOJO²
¹Department of Electrical and Electronic Engineering, Graduate School of Science and Technology, Shizuoka Institute of Science and Technology,
²Department of Electrical and Electronic Information Engineering, Graduate School of Engineering, Toyohashi University of Technology
- P-05** **Sustainable biodiesel production from byproduct oil derived from worm cultivation using food waste**
Calvin Tanito HARRINGTON, Kousuke HIROMORI, Atsushi TAKAHASHI, Naomi SHIBASAKI-KITAKAWA
Department of Chemical Engineering, Graduate School of Engineering, Tohoku University, Japan
- P-06** **Bio-diesel production with heterogenous CaO catalyst using minimal ultrasonic irradiation**
Toru TORII¹, Yuji AOYAMA¹, Rika SHINOHARA², Yusuke KOMAZAKI³, Fumiyuki KOBAYASHI¹, Sachiko ODAKE¹, Kiyomi FUCHIGAMI⁴
¹School of Food Science and Technology, Nippon Veterinary and Life Science University,
²GSFS, University of Tokyo,
³AIST,
⁴Shofu Inc.
- P-07** **Determination of Al₂O₃ and (Mg, Mn)Al₂O₄ co-saturated liquidus line of Al₂O₃-MgO-MnO-SiO₂ system for steelmaking**
Ryuya HABU¹, Motoya IWABUCHI¹, Hiroshi FUKAYA^{1,2}, Shigeru SUZUKI², Takahiro MIKI¹
¹Graduate school of Engineering, Tohoku University,
²Material Technology Laboratory, The Japan Steel Works, Ltd.
- P-08** **MOFs composites coatings for atmospheric water harvesting**
Roberto DI PIETRO¹, Vincenza BRANCATO², Andrea FRAZZICA², Elpida PIPEROPOULOS¹
¹Department of Engineering, University of Messina,
²CNR ITAE

P-09 **Formation of adsorbent layer on surface-modified aluminum plate and its water vapor adsorption properties**

Kenta OCHIMIZU¹, Yuma YAMAUCHI¹, Takuya TSUJIGUCHI², Akio KODAMA², Mikio KUMITA²

¹Graduate School of Natural Science and Technology, Kanazawa University,

²Institute of Science and Engineering, Kanazawa University

P-10 **Long term interface reaction between structural material and molten metal in large scale latent heat storage system**

Shun OINUMA, Reki TAKAKU, Shoko SUYAMA, Chikako IWAKI

Material Engineering R&D Department, Energy Systems R&D Center, Toshiba Energy Systems & Solutions Corporation

P-11 **Performance of Nickel Chloride Composite for Chemical Heat Storage Using Ammonia over Repeated Sorption/Desorption Cycles**

Ryo SUZUKI¹, Shigehiko FUNAYAMA², Yukitaka KATO², Hiroki TAKASU²

¹Graduate Major in Nuclear Engineering, Department of Transdisciplinary Science and Engineering, Institute of Science Tokyo,

²Laboratory for Zero-Carbon Energy, Institute of Integrated Research, Institute of Science Tokyo

P-12 **Development of a Novel Solid-Gas Chemical Thermal Storage System for Utilization of Low-Temperature Waste Heat - Experimental Investigation of Thermal Discharge Characteristics-**

Seito KOJIMA, Koichi NAKASO, Kuniaki GOTOH

Graduate School of Environmental, Life, Natural Science and Technology, Okayama University

P-13 **Study on supercooling relaxation of sugar alcohols**

Hayato SUZUMURA, Masaya SUGAWARA, Manabu TOKUSHIGE, Junichi RYU

Graduate School of Engineering, Chiba University

P-14 **Development of Thermo-Chemical Energy Storage Materials Using Redox Reaction of Cobalt Oxide**

Shunya OKAMURA, Manabu TOKUSHIGE, Junichi RYU

Graduate School of Engineering, Chiba University

P-15 **Performance Evaluation of Heat Storage System Using SiC Honeycomb Heat Exchanger**

Daisuke AMIKURA¹, Yuki MIZUNO¹, Niro NAGAI²

¹Graduate School of Engineering, University of Fukui, ²Department of Mechanical Engineering, University of Fukui

P-16 **Thermal storage stability of K₂CO₃ composites assisted by EG/OP-10 additives for low-temperature applications**

Asriadi SAKKA^{1,2}, Seo Been KO^{1,3}, Duckjae WEI¹, Seongeun KIM¹, Soo Hyun CHOI¹, Jihoo YOO¹, Woo Seok JEONG¹, Sung Kook HONG¹, Chan Young PARK¹

¹Korea Institute of Energy Research,

²University of Science and Technology,

³Korea University

P-17 **Reducing Leakage Current in Protonic Ceramic Fuel Cells Using Pyrochlore Bilayer Electrolyte**

Sarach TANGKASEMJIT, Julián A. ORTIZ-CORRALES, Junichiro OTOMO

Institute of Science Tokyo

P-18 **Formic acid production behavior by CO₂ electrolysis using electrodeposited electrode**

Zexu WU¹, Kakeru FUJIWARA², Yugo OSAKA³, Akio KODAMA², Takuya TSUJIGUCHI³

¹Division of Mechanical Science and Engineering, Graduate school of Natural Science & Technology, Kanazawa University,

²Institute for Frontier Science Initiative, Kanazawa University,

³Faculty of Mechanical Engineering, Institute of Science and Engineering, Kanazawa University

P-19 **Influence of Porous Structures on Gas-Liquid Transport Behavior within Water Electrolysis Cells**

Shinnosuke OMOTO, Takeru YANO, Shusaku ASANO, Gen INOUE

Department of Chemical Engineering, Faculty of Engineering, Kyushu University

P-20 **Development of phosphorus-doped silicon nanoparticle anode for high performance lithium-ion batteries**

Hidetaka NOMURA, Keisuke SATO

Department of Electrical and Electronic Engineering, Tokyo Denki University

P-21 **Effect of inorganic impurities on the performance of direct formic acid fuel cell**

Cheng KUAN¹, Kakeru FUJIWARA², Yugo OSAKA³, Akio KODAMA², Takuya TSUJIGUCHI³

¹Division of Mechanical Science and Engineering, Graduate school of Natural Science & Technology, Kanazawa University,

²Institute for Frontier Science Initiative, Kanazawa University,

³Faculty of Mechanical Engineering, Institute of Science and Engineering, Kanazawa University

P-22 **Quaternized Polystyrene-Based Anion Exchange Membrane: Synthesis and Electrochemical Performance**

Gülfeza KARDAS¹, Leyla BASAT¹, Murat FARSAK²

¹Cukurova University,

²Osmaniye Korkut Ata University

P-23 **Kalman Filtering Approach to Estimate State of Charge in Lithium-Ion Polymer Batteries through Initial Modeling by Pulse Power Characterization**

Shu HAMADA, Kanta WATANABE, Hirofumi TAKIKAWA, Tomohiro TOJO

Department of Electrical and Electronic Information Engineering, Graduate School of Engineering, Toyohashi University of Technology

P-24 **Zeolite-encapsulated Ni particulate catalysts with high hydrothermal stability for the steam reforming reaction of biomass pyrolysis oil**

Mana TAKANO¹, Tsuki YOKOSAWA¹, Ryo NAGURA¹, Liling HUANG¹, Hiroyasu FUJITSUKA², Kentaro KIMURA¹, Teruoki TAGO¹

¹Department of Chemical Science and Engineering, Institute of Science Tokyo,

²Department of Chemical Engineering, Kyoto University

P-25 **Comparative Energy Requirement Analysis of CO₂ Capture Using Different Amine Absorbents**

Chairunnisa CHAIRUNNISA, Takahiko MIYAZAKI

Faculty of Engineering Sciences, Kyushu University

P-26 Development of MFI zeolite-encapsulated metal nanoparticulate catalysts by dry-gel conversion method for its application for naphtha cracking reaction

Misaki ENDO¹, Koki FUKUSHIMA¹, Nodoka NAKATANI¹, Kentaro KIMURA¹,
Hiroyasu FUJITSUKA², Teruoki TAGO¹

¹Institute of Science Tokyo,

²Kyoto University

P-27 Mineral characterization and establishment of quantification method for CO₂ fixation in ERW

Kota SUGIURA¹, Tsutomu SATO², Shinya IWASAKI³, Takao NAKAGAKI¹

¹Department of Modern Mechanical Engineering, Waseda University,

²Hokkaido University,

³Japan International Research Center for Agricultural Sciences

P-28 Low-grade heat driven CO₂ recovery TSA using adsorbent-loaded heat exchanger

Koutarou ENMOTO¹, Kakeru FUJIWARA², Yugo OSAKA³, Takuya TSUJIGUCHI³, Akio KODAMA²

¹Division of Mechanical Science and Engineering, Graduate School of Natural Science & Technology, Kanazawa University,

²Institute for Frontier Science Initiative, Kanazawa University,

³Institute of Science and Engineering, Kanazawa University

P-29 Experimental Study on Biogas Separation by Internally Heated and Cooled Temperature Swing Adsorption

Ding MINGKAI¹, Kakeru FUJIWARA², Yugo OSAKA³, Takuya TSUJIGUCHI³, Akio KODAMA²

¹Division of Mechanical Science and Engineering, Graduate School of Natural Science & Technology, Kanazawa University,

²Institute for Frontier Science Initiative, Kanazawa University,

³Faculty of Mechanical Engineering, Institute of Science and Engineering, Kanazawa University

P-30 MFI zeolite-encapsulated Pt catalyst for ethane conversion to valuable hydrocarbons

Raichi ASAMI, Ken-ichi YOSIDA, Hidekazu GOTO, Kentaro KIMURA, Teruoki TAGO

Institute of Science Tokyo

P-31 Design and Evaluation of Layered MnO₂ anode with Intercalated Metal Complexes for Hydrogen Evolution

Ryo SASAKI, Kazuaki TOMONO

Department of Materials and Life Science, Graduate School of Engineering, Kanto Gakuin University, Japan

P-32 Development of Metal-Supported Solid Oxide Electrolysis Cells for active carbon recycling energy system

Rikuya MIYAZAKI¹, Yoshino IKEDA², Yuko MARUYAMA³, Hiroki TAKASU⁴, Yukitaka KATO⁴

¹Graduate Major in Nuclear Engineering, Department of Transdisciplinary Science and Engineering, Institute of Science Tokyo,

²Graduate Major in Global Engineering for Development, Environment and Society, Department of Transdisciplinary Science and Engineering, School of Environment and Society, Institute of Science Tokyo,

³Graduate Major in Nuclear Engineering, Department of Chemical Science and Engineering, Institute of Science Tokyo,

⁴Laboratory for Zero-Carbon Energy, Institute of Integrated Research, Institute of Science Tokyo

P-33 **Effects of cell layer difference on performance of metal-supported solid oxide electrolysis cell for carbon dioxide reduction in carbon recycling ironmaking system**

Yoshino IKEDA¹, Rikuya MIYAZAKI², Daisuke MORITOMO², Hiroki TAKASU³, Yukitaka KATO³

¹Graduate Major in Global Engineering for Development, Environment and Society, Department of Transdisciplinary Science and Engineering, School of Environment and Society, Institute of Science Tokyo,

²Graduate Major in Nuclear Engineering, Department of Transdisciplinary Science and Engineering, School of Environment and Society, Institute of Science Tokyo, Japan, ³Laboratory for Zero-Carbon Energy, Institute of Innovative Research, Institute of Science Tokyo, Japan

P-34 **Dry reforming of methane using core-shell catalysts prepared by flame spray pyrolysis**

Isaki OGATA¹, Kakeru FUJIWARA², Koichi HIGASHIMINE³, Yuga OSAKA⁴, Takuya TSUJIGUCHI⁴, Akio KODAMA²

¹Division of Mechanical Science and Engineering, Kanazawa University,

²Institute for Frontier Science Initiative, Kanazawa University,

³Center for Nano Materials and Technology, Japan Advanced Institute of Science and Technology,

⁴Faculty of Mechanical Engineering, Institute of Science and Engineering, Kanazawa University

P-35 **Size-controlled hydrothermal synthesis of high-entropy oxide nanoparticles as oxygen evolution electrocatalysts**

Ryoga KATO^{1,2}, Takaaki TOMAI^{2,3}, Kazuyuki IWASE²

¹Department of Chemical Engineering, Graduate school of engineering, Tohoku University,

²Institute of Multidisciplinary Research for Advanced Materials, Tohoku University,

³The frontier research institute for interdisciplinary sciences, Tohoku University

P-36 **CO₂ mineralization of seawater-derived MgO using pressurized ball mill**

Ryunosuke ITAHANA, Shoei OISHI, Takao NAKAGAKI

Department of Modern Mechanical Engineering, Waseda University

P-37 **Modulating the Electrochemical CO₂ Reduction Reaction Performance by Loading CoTPP onto High-Surface-Area Activated Carbon**

Siti RAHMAH¹, Yuta NAKAYASU^{1,2}, Kazuyuki IWASE³, Masaru WATANABE¹

¹Research Centre of Supercritical Fluid Technology, Department of Chemical Engineering, Graduate School of Engineering, Tohoku University, Japan,

²Frontier Research Institute for Interdisciplinary Sciences, Tohoku University, Japan,

³Institute of Multidisciplinary Research for Advanced Materials, Tohoku University, Japan

P-38 **CO₂ methanation by microwave irradiation using spiral-shaped Ru/CeO₂ catalyst bed**

Masaki KOBAYASHI¹, Taishi NANBU¹, Choji FUKUHARA²

¹Graduate School of Engineering, Hachinohe Institute of Technology,

²Graduate School of Integrated Science and Technology, Shizuoka University

P-39 **Suppressing Coke Formation via Fe Incorporation in Ni@Silicalite-1 Catalyst for Dry Reforming of Methane**

Liling HUANG¹, Ryo NAGURA¹, Hiroyasu FUJITSUKA², Kentaro KIMURA¹, Teruoki TAGO¹

¹Applied Chemistry, Department of Chemical Science and Engineering, Institute of Science Tokyo,

²Division of Chemical Engineering, Graduate School of Engineering, Kyoto University

P-40 **Evaluation of a Carbon Capture Process Based on a Blended Aqueous Solution of Ammonia and Methyl-diethanolamine through Simulation**

Hyerin KIM, Jin-Young KIM, Jae-Bum LEE, Kwon-Woo LEE, Min-Kyeong OH, Seong-Yun BAE, Sang-Jun HAN, Jong-Ho MOON

Department of Chemical Engineering, Chungbuk National University, Republic of Korea

P-41 **Development and thermodynamic analysis of DEEA/PZ blended amine absorbents for CO₂ capture**

Jinyoung KIM, Hyerin KIM, Jaebeom LEE, Kwonwoo LEE, Shaukat Ali MAZARI, Minkyong OH, Seongyun BAE, Jongho MOON

Department of Chemical Engineering, Chungbuk National University

P-42 **Effects of Electrolyte Concentration on the Performance of Layered MnO₂ Capacitors**

Ryota SUGAWARA¹, Ryosuke OKAWA², Ryo SASAKI², Masami MATSUI², Kazuaki TOMONO²

¹Department of Applied Chemistry, Faculty of Science and Engineering, Kanto Gakuin University, Japan,

²Department of Materials and Life Science, Graduate School of Engineering, Kanto Gakuin University, Japan

P-43 **Composite materials with high thermal conductivity for calcium oxide/water thermochemical energy storage**

Satoshi TOSHIMA¹, Saeki HANA¹, Tsuyoshi IZAKI², Takashi KATO³, Shigejiko FUNAYAMA³, Hiroki TAKASU³, Yukitaka KATO³

¹Graduate Major in Nuclear Engineering, Department of Chemical Science and Engineering, Institute of Science Tokyo,

²Graduate Major in Nuclear Engineering, Department of Transdisciplinary Science and Engineering, Institute of Science Tokyo,

³Laboratory for Zero-Carbon Energy, Institute of Integrated Research, Institute of Science Tokyo

P-44 **Binary Fe-Co Sites on Biomass-Derived Carbon for Bifunctional ORR/OER in Metal-Air Batteries**

Edwin Osebe NYANGAU¹, Hiroya ABE², Masaru WATANABE¹, Yuta NAKAYASU^{1,2}

¹Research Center of Supercritical Fluid Technology, Graduate School of Engineering Tohoku University,

²Frontier Research Institute for Interdisciplinary Sciences, Tohoku University

P-45 **Catalytic Combustion-Based Energy-Saving insert for Radiant Tube**

Yi-Hsing LIN, Chung-Wei FU, Yu-Lun LAI

Green Energy and Environment Research Laboratories, Industrial Technology Research Institute

P-46 **A new experimental protocol for the heat storage performance assessment of plant waxes, based on the evolution of micro- and nano- scale surface features during crystallization**

G. Claudiu SAVULESCU, Maja RUCKER

Eindhoven University of Technology

P-47 **Study on Morphology Formation of Granules by Spray Drying Method**

Shogo YANAGIHARA, Koichi NAKASO, Kuniaki GOTOH

Graduate school of Environmental, Life, Natural Science, and, Technology, Okayama University

- P-48** **Development of Palladium-Copper Alloy Membrane with Porous Nickel Support Introduced by Electroplating for High-Purity Hydrogen Separation**
So NIWA¹, Yoshinari HOZUMI², Ryu HAMAMURA², Hiroki TAKASU³, Shigehiko FUNAYAMA³, Yukitaka KATO³

¹Graduate Major in Nuclear Engineering, Department of Transdisciplinary Science and Engineering, Institute of Science Tokyo,

²Graduate Major in Nuclear Engineering, Department of Chemical Science and Engineering, Institute of Science Tokyo,

³Laboratory for Zero-Carbon Energy, Institute of Innovative Research, Institute of Science Tokyo

- P-49** **Elucidation of water partition behavior for continuous esterification process design**

Tomoyasu KUBO, Kousuke HIROMORI, Atsushi TAKAHASHI, Naomi SHIBASAKI-KITAKAWA
 Department of Chemical Engineering, Graduate School of Engineering, Tohoku University, Japan

- P-50** **Development of optical measurement methods of temperature and nanoparticle concentration distributions to investigate diffusions in nanofluid**
Ryo SAIGUSA, Keita AIZAWA, Hiroki KUSUDO, Tetsushi BIWA, Eita SHOJI

Department of Mechanical System Engineering Tohoku University

- P-51** **Evaluation of interfacial thermal resistance between surface-modified metal oxide and polymer using molecular dynamics simulation**
Takamasa SAITO¹, Takao TSUKADA², Eita SHOJI³, Gota KIKUGAWA⁴, Donatas SURBLYS⁴, Momoji KUBO⁵, Masaki KUBO¹

¹Department of Chemical Engineering, Tohoku University,

²New Industry Creation Hatchery Center, Tohoku University,

³Department of Mechanical Systems Engineering, Tohoku University,

⁴Institute of Fluid Science, Tohoku University,

⁵Institute for Materials Research, Tohoku University

- P-52** **Sorption of Ionic Organic Dyes by Layered MnO₂ with Interlayer Lipid Ions**
Masami MATSUI, Yume KUROKAMI, Takumi SATO, Kazuaki TOMONO

Department of Materials and Life Science, Graduate School of Engineering, Kanto Gakuin University, Japan

- P-53** **Ammonia adsorption and desorption behavior of MOFs(Metal-Organic Frameworks)**

Ryosuke OMAE, Ryota FUJISAWA, Manabu TOKUSHIGE, Junichi RYU

Graduate School of Engineering, Chiba University

- P-54** **Bubble formation during pool boiling of water in a narrow vertical channel under subatmospheric pressure conditions**

Dominika KACZMAREK¹, Amin ALTAMIRANO², Marie-Christine DULUC², Bartosz ZAJACKOWSKI¹, Brice TRÉMÉAC²

¹Wroclaw University of Science and Technology, Department of Thermal Sciences,

²Laboratoire du froid et des systemes energetiques et thermiques (LaFset), Conservatoire national des arts et metiers

- P-55** **Investigation of the Separation Performance of CMS for Binary Gas Systems in the Kinetic-Separation TSA Process**

Taiki SAKAMOTO¹, Yugo OSAKA², Kakeru FUJIWARA³, Takuya TSUJIGUCHI², Akio KODAMA³

¹Division of Mechanical Science and Engineering, Graduate School of Natural Science and Technology, Kanazawa University,

²Institute of Science and Engineering, Kanazawa University,

³Institute for Frontier Science Initiative, Kanazawa University

P-56 Withdrawal

P-57 Evaluation of interfacial affinity between organic molecule-modified films and various solvents using molecular simulations

Yusuke TAKAOKA¹, Gota KIKUGAWA²

¹Graduate School of Engineering, Tohoku University, ²Institute of Fluid Science, Tohoku University

P-58 Accuracy improvement of Thermophysical Property Estimation for CO₂ Mineralization of steelmaking slag Using DNN

Manami ITO, Takao NAKAGAKI

Division of Modern Mechanical Engineering, School of Creative Science and Engineering, Waseda University

P-59 Evaluation of nanofluids for heat recovery in a shell-and-tube heat exchanger: a net energy perspective

Keitaro TSUCHIYAMA, Kazuki FUKUSHIMA, Koki YAGIHARA, Hajime OHNO, Yasuhiro FUKUSHIMA

Department of Frontier Sciences for Advanced Environment, Tohoku University

P-60 Nitriding-induced Degradation of Stainless Steels in Ammonia-fueled Gas Turbine System

Doowon JEONG, Hwasung YEOM

Division of Advanced Nuclear Engineering, Pohang University of Science and Technology (POSTECH)

P-61 Optimization and Development of Dual-Stage Separation System for Ammonia Decomposition: TSA-Based NH₃ Removal and PSA-Driven H₂/N₂ Purification

Gwonwoo LEE, Jaebum LEE, Hyerin KIM, Jinyoung KIM, Shaukat Ali MAZARI, Minseo YUN, Eunuk YU, Ankit BELBASE, Jongho MOON

Chungbuk National University

P-62 Monitoring of Flow Rate, Viscosity, and Density in Microchannel by AI-based Fluid Soft Sensor

Kosuke NIHEI, Yuya MURAKAMI

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P-63 Kinetic Investigation of Dushman Reaction in CSTR using Hybrid Neural Network

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P-64 Comparing Sodium-Ion and Lithium-Ion Batteries: Safety and Sustainability

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P-66 Safety management in a power plant conversion using hydrogen/methane blending

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