

# Session Program for Electrolysis Systems and Advanced Inorganic Materials

Date: March 18<sup>th</sup>, 2014

Place: Hardy Hall/Clover Hall, Kambaikan, Muromachi Campus, Doshisha University

|       |       | Hardy Hall, B1F, Kambaikan                           |            |           | Clover Hall, B1F, Kambaikan |           |           |
|-------|-------|--|------------|-----------|-----------------------------|-----------|-----------|
|       |       | <b>Joint Session I</b>                               |            |           |                             |           |           |
|       |       | Chairs: Einarsrud & Amezawa                          |            |           |                             |           |           |
| 8:40  | 9:00  | Oral-1   | Haarberg   | NTNU      |                             |           |           |
| 9:00  | 9:20  | Oral-2   | Fukunaka   | Waseda U. |                             |           |           |
| 9:20  | 9:40  | Oral-3   | Norby      | UiO       |                             |           |           |
| 9:40  | 10:00 | Oral-4   | Unemoto    | Tohoku U. |                             |           |           |
| 10:00 | 10:20 | <b>Break</b>   |            |           |                             |           |           |
|       |       | <b>ES I</b>  |            |           | <b>AIM I</b>                |           |           |
|       |       | Chairs: Svensson & Inoue                             |            |           | Chairs: Selbach & Sakka     |           |           |
| 10:20 | 10:40 | Oral-E1  | H. Ito     | AIST      | Oral-A1                     | Hauback   | IFE       |
| 10:40 | 11:00 | Oral-E2  | Seland     | NTNU      | Oral-A2                     | Kang      | U. Tokyo  |
| 11:00 | 11:20 | Oral-E3  | Higuchi    | OPU       | Oral-A3                     | Dietzel   | UIB       |
| 11:20 | 11:40 | Oral-E4  | Fukami     | Kyoto U.  | Oral-A4                     | Hachiya   | Kyoto U.  |
| 11:40 | 12:00 | Oral-E5  | Svensson   | NTNU      | Oral-A5                     | Qviller   | IFE       |
| 12:00 | 13:00 | <b>Lunch</b>   |            |           |                             |           |           |
|       |       | <b>ES II</b>   |            |           | <b>AIM II</b>               |           |           |
|       |       | Chairs: Haarberg & Nohira                            |            |           | Chairs: Hauback & Unemoto   |           |           |
| 13:00 | 13:20 | Oral-E6  | Skybakmoen | SINTEF    | Oral-A6                     | Chiku     | OPU       |
| 13:20 | 13:40 | Oral-E7  | Tsuda      | Osaka U.  | Oral-A7                     | Holt      | IFE       |
| 13:40 | 13:55 | Oral-E8  | Aasheim    | NTNU      | Oral-A8                     | Matsuyama | OPU       |
| 13:55 | 14:15 | Oral-E9  | Serizawa   | CRIEPI    | Oral-A9                     | Selbach   | NTNU      |
| 14:15 | 14:30 | Oral-E10   | Koyama     | Kyoto U.  | Oral-A10                    | Y. Ito    | OPU       |
| 14:30 | 14:50 | <b>Break</b>   |            |           |                             |           |           |
|       |       | <b>ES III</b>  |            |           | <b>AIM III</b>              |           |           |
|       |       | Chairs: Skybakmoen & H. Ito                          |            |           | Chairs: Dietzel & Hatada    |           |           |
| 14:50 | 15:10 | Oral-E11   | Skaftun    | NTNU      | Oral-A11                    | Einarsrud | NTNU      |
| 15:10 | 15:25 | Oral-E12   | Shirayama  | Kyoto U.  | Oral-A12                    | Kimura    | Tohoku U. |
| 15:25 | 15:45 | Oral-E13   | Yang       | Kyoto U.  | Oral-A13                    | Wiik      | NTNU      |
| 15:45 | 15:50 | <b>Break</b>   |            |           |                             |           |           |
|       |       | <b>Joint Session II</b>                              |            |           |                             |           |           |
|       |       | Chairs: Seland & Goto                                |            |           |                             |           |           |
| 15:50 | 16:30 | Short oral presentations for posters<br>(2min. each) |            |           |                             |           |           |
| 16:30 | 17:30 | <b>Poster session (Room C)</b>                       |            |           |                             |           |           |

## Joint Session I

Place: Hardy Hall, B1F, Kambaikan, Muromachi Campus

Chair: Mari-Ann Einarsrud and Koji Amezawa

- 8:40 – 9:00 Geir Martin Haarberg, NTNU  
“Thermoelectric Cells with Molten Carbonate Electrolytes”
- 9:00 – 9:20 Yasuhiro Fukunaka, Waseda University  
“Silicon Carbide as Carbothermic Reductants”
- 9:20 – 9:40 Truls Norby, University of Oslo  
“High Temperature Steam and CO<sub>2</sub> Electrolysis with Proton Conducting Ceramics”
- 9:40 – 10:00 Atsushi Unemoto, Tohoku University  
“Complex Hydrides for All-solid-state Energy Devices”
- 10:00 – 10:20 Break

## Parallel Session

### Electrolysis Systems I

Place: Hardy Hall, B1F, Kambaikan, Muromachi Campus

Chair: Ann Mari Svensson and Hiroshi Inoue

- 10:20 – 10:40 Hiroshi Ito, AIST  
“Optimization of Gas Diffusion Layer for Unitized Reversible Fuel Cells”
- 10:40 – 11:00 Frode Seland, NTNU  
“Increasing and Decreasing Mass Transport Effects in Oxidation Processes at Noble Metal Electrodes in Acidic Aqueous Electrolytes”
- 11:00 – 11:20 Eiji Higuchi, Osaka Prefecture University  
“Effect of Au Core Size on Electrocatalytic Activity for Oxygen Reduction Reaction of Au Core/Pt Shell Nanoparticle-loaded Carbon Black Electrodes”
- 11:20 – 11:40 Kazuhiro Fukami, Kyoto University  
“Suppression of Zinc Dendritic Growth using Microporous Electrodes Caused by High Efficiency of the Deposition in Confined Nanopores”
- 11:40 – 12:00 Ann Mari Svensson, NTNU  
“The Carbon-electrolyte Interface in Li-ion Battery Electrodes”

## Advanced Inorganic Materials I

Place: Clover Hall, B1F, Kambaikan, Muromachi Campus

Chair: Sverre Magnus Selbach and Tetsuo Sakka

- 10:20 – 10:40 Bjørn C. Hauback, IFE  
“Metal Borohydrides for Hydrogen Storage”
- 10:40 – 11:00 Jungshin Kang, The University of Tokyo  
“Development of a New Ti Ore Upgrading Process Using  $\text{TiCl}_4$  for Production of High-grade  $\text{TiO}_2$ ”
- 11:00 – 11:20 Pascal D. C. Dietzel, University of Bergen  
“Dramatic Change of Interaction with Hydrogen in Coordination Polymers with Open Metal Sites”
- 11:20 – 11:40 Kan Hachiya, Kyoto University  
“The Observation of the Mode-selective Phonon Excitation by Mid-infrared Free-electron Laser through Anti-Stokes Raman Scattering”
- 11:40 – 12:00 Atle Qviller, IFE  
“Characterization of Hydrogenated Silicon Films for Advanced Solar Cells using Reflectometry”
- 12:00 – 13:00 Lunch

## Parallel Session

### Electrolysis Systems II

Place: Hardy Hall, B1F, Kambaikan, Muromachi Campus

Chair: Geir Martin Harberg and Toshiyuki Nohira

- 13:00 – 13:20 Egil Skybakmoen, SINTEF  
“Molten Salts Research Topics at SINTEF/NTNU”
- 13:20 – 13:40 Tetsuya Tsuda, Osaka University  
“Electroplating of Al-W-Mn Ternary Alloy System in Aluminum Chloride-1-Ethyl-3-methylimidazolium Chloride Molten Salt”
- 13:40 – 13:55 Henrik Åsheim, NTNU  
“Monitoring of Low Cell Voltage PFC Formation in 200 to 300 kA Aluminium Electrolysis cells”
- 13:55 – 14:15 Nobuyuki Serizawa, CRIEPI  
“Dissolution Reaction of Ammonia in a  $\text{LiCl-KCl-CsCl}$  Eutectic Melt Under the Presence of Hydride Ion”

14:15 – 14:30 Akira Koyama, Kyoto University  
“Two-dimensional Growth of Polypyrrole Thin Films on Insulating Substrates by Electropolymerization”

#### Advanced Inorganic Materials II

Place: Clover Hall, B1F, Kambaikan, Muromachi Campus

Chair: Bjørn Hauback and Atsushi Unemoto

13:00 – 13:20 Masanobu Chiku, Osaka Prefecture University  
“Construction and Characterization of the Aluminum Rechargeable Battery using  $V_2O_5$  as the Positive Electrode Material”

13:20 – 13:40 Arve Holt, IFE  
“Production of Silicon Nano Particles for High-capacity Anode Material in Lithium-ion Batteries”

13:40 – 13:55 Takuya Matsuyama, Osaka Prefecture University  
“Characterization of  $TiS_3$  Electrode Active Materials in All-solid-state Lithium Batteries with Sulfide Solid Electrolytes”

13:55 – 14:15 Sverre Magnus Selbach, NTNU  
“DFT Studies of Graphite Intercalation Compounds and Defects in Ternary Oxides”

14:15 – 14:30 Yusuke Ito, Osaka Prefecture University  
“Formation of Electrode-electrolyte Interface for Bulk-type All-solid-state Lithium Batteries using Sulfide Solid Electrolyte Thin Films”

14:30 – 14:50 Break

#### Parallel Session

##### Electrolysis Systems III

Place: Hardy Hall, B1F, Kambaikan, Muromachi Campus

Chair: Egil Skybakmoen and Hiroshi Ito

14:50 – 15:10 Siri Marie Skaftun, NTNU  
“Anode Processes in Zinc Electrowinning”

15:10 – 15:25 Sakae Shirayama, Kyoto University  
“Separation Process for Nickel and Cobalt by Utilizing Aqueous Polymer Two Phase (AFTP) System”

15:25 – 15:45 Xiao Yang, Kyoto University  
“Direct Electrochemical Reduction of  $SiO_2$  Granules in Molten  $CaCl_2$ ”

## Advanced Inorganic Materials III

Place: Clover Hall, B1F, Kambaikan, Muromachi Campus

Chair: Pascal D. C. Dietzel and Noriyuki Hatada

- 14:50 – 15:10 Mari-Ann Einarsrud, NTNU  
“Hydrothermal Synthesis of Oxide Materials for Energy Technology”
- 15:10 – 15:25 Yuta Kimura, Tohoku University  
“Internal friction and Anelastic Properties of SOFC Components”
- 15:25 – 15:45 Kjell Wiik, NTNU  
“Stability and Oxygen Transport Properties of B-site Substituted Lanthanum Strontium Ferrite”
- 15:45 – 15:50 Break

### Joint Session II

Chair: Frode Seland and Takuya Goto

15:50 – 16:30 Short Presentations for Posters (2 min each)

16:30 – 17:30 Poster Session

Place: Gallery, B1F, Kambaikan, Muromachi Campus

(With a short presentation)

- ES-AIM-P1 Tetsuo Sakka, Kyoto University  
“Mechanism of Long-range Repulsion Between Polystyrene Particles Adsorbed at an Oil-water Interface”
- ES-AIM-P2 Maiken Sandland, NTNU  
“Chlorine Evolution for Removal of Chloride from Aqueous Nitrate Solution”
- ES-AIM-P3 Kazuya Minami, Kyoto University  
“Interfacial Structure Between Ionic Liquids and Gold Electrode and its Potential Dependence Studied using Surface Enhanced Infrared Absorption Spectroscopy”
- ES-AIM-P4 Naoya Nishi, Kyoto University  
“Structure of Ionic Liquids at the Mercury Interface Studied using Electrocapillary Measurements”
- ES-AIM-P5 Rebecca Jayne Thorne, NTNU  
“Carbon Anodes for Aluminium Electrolysis-How can energy consumption be reduced?”

- ES-AIM-P6 Kazuma Maeda, Kyoto University  
 “New Electrodeposition Process of Silicon Utilizing Water-soluble KF-KCl Molten Salt”
- ES-AIM-P7 Peng Cui, NTNU  
 “The Influence of Additives LiF and KF on Current Efficiency in Aluminium Electrolysis”
- ES-AIM-P8 Yoshihide Sakanaka, Doshisha University  
 “Electrochemical Formation of Silicon Film from Silica in Molten Salt”
- ES-AIM-P9 Rauan Meirbekova, NTNU  
 “Effect of Current Density on Current Efficiency in Aluminium Electrolysis in a Laboratory Cell”
- ES-AIM-P10 Takeyuki Shima, Kyoto University  
 “Electrolytic Reduction of SiO<sub>2</sub> on Liquid Zn Cathode in Molten CaCl<sub>2</sub>”
- ES-AIM-P11 Xue Kang, NTNU  
 “Seebeck Coefficient in (Li/Na)<sub>2</sub>CO<sub>3</sub>-MgO Eutectic Molten Salt”
- ES-AIM-P12 Norihiro Kotani, Osaka Prefecture University  
 “Preparation and Electrochemical Characterization of TiV<sub>2.1-x</sub>Cr<sub>x</sub>Ni<sub>0.3</sub> ( $x = 0.4, 0.5, 1.0$ ) Hydrogen Storage Alloys for Use in Nickel-metal Hydride Batteries”
- ES-AIM-P13 Naoto Tanibata, Osaka Prefecture University  
 “All-solid-state Sodium Batteries using Amorphous TiS<sub>3</sub> Electrode with High Capacity”
- ES-AIM-P14 Nils Wagner, NTNU  
 “Wet Chemical Synthesis of Li<sub>2</sub>MnSiO<sub>4</sub> as Potential Cathode Material for Li-ion Batteries”
- ES-AIM-P15 Naoto Koretaka, Osaka Prefecture University  
 “Electrochemical Analysis of Charge Transfer Reaction at the Li<sub>2</sub>S-P<sub>2</sub>S<sub>5</sub> Solid Electrolyte / Li Alloy Electrode Interface”
- ES-AIM-P16 Dehlia Eide Brennhaugen, Tohoku University  
 “Systematic Investigations of Factors Governing the Reaction Distribution in LiCoO<sub>2</sub> Composite Cathodes”
- ES-AIM-P17 Takeshi Kunisawa, Osaka Prefecture University  
 “Preparation and Characterization of Conversion Positive Electrode Materials for the Aluminum Rechargeable Battery”

- ES-AIM-P18 Ayaka Hosoya, Osaka University  
“Catalytic Combustion-type Carbon Monoxide Gas Sensor Employing Rare Earth Oxide Based Catalyst”
- ES-AIM-P19 Belma Talic, NTNU  
“Oxidation of Interconnects for Solid Oxide Fuel Cells”
- ES-AIM-P20 Erwan Le Roux, UiB  
“New impetus in Tailor-made Catalysts Development for the Selective Production of Value-added Chemicals from Natural Gas”
- (Without a short presentation)
- ES-AIM-P21 Takuya Matsuyama, Osaka Prefecture University  
(OA-8) “Characterization of  $\text{TiS}_3$  Electrode Active Materials in All-solid-state Lithium Batteries with Sulfide Solid Electrolytes”
- ES-AIM-P22 Yusuke Ito, Osaka Prefecture University  
(OA-10) “Formation of Electrode-electrolyte Interface for Bulk-type All-solid-state Lithium Batteries using Sulfide Solid Electrolyte Thin Films”
- ES-AIM-P23 Jungshin Kang, The University of Tokyo  
(OA-2) “Development of a New Ti Ore Upgrading Process using  $\text{TiCl}_4$  for Production of High-grade  $\text{TiO}_2$ ”