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506 Keystone Dr.

Warrendale, PA 15086 -7573

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U.S. Army Research Office
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14. ABSTRACT
The International Conference on Solid State Ionics (SSI-20), held every two years, is the flagship event attended by researchers worldwide. As such, it was the perfect opportunity to expand the field by promoting synergistic exchange with researchers in other fields and by fostering the growth of emerging young scientists. Importantly, 2015 represented the first time in 12 years that the conference was held in the United States. This 20th iteration of the meeting represented a crucial opportunity for US participants, particularly students, to engage with the broader international electrochemistry and ionic materials community. SSI-20 attracted a broad and diverse international

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Solid state electrochemical devices, ionics, electrolyzers, high temperature oxygen, nanoionics

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a. REPORT	b. ABSTRACT	c. THIS PAGE			J. Ardie Dillen
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Report Title

Final Report: 20th International Conference on Solid State Ionics (SSI-20)

ABSTRACT

The International Conference on Solid State Ionics (SSI-20), held every two years, is the flagship event attended by researchers worldwide. As such, it was the perfect opportunity to expand the field by promoting synergistic exchange with researchers in other fields and by fostering the growth of emerging young scientists. Importantly, 2015 represented the first time in 12 years that the conference was held in the United States. This 20th iteration of the meeting represented a crucial opportunity for US participants, particularly students, to engage with the broader international electrochemistry and ionic-materials community. SSI-20 attracted a broad and diverse international attendance with more than 600 university, government, and industrial participants. Keeping with the broad, cross-cutting philosophy of this conference, presentations, posters, and discussion sections focused on a wide array of ionic materials, ionic transport and electrochemical kinetic fundamentals, and ionic-based technologies. The Conference provided an informal atmosphere for researchers to share exciting ideas, initiate new collaborations, and advance the state-of-the-art. ARO support for the conference was key in enabling travel funding for graduate students and younger scientists to attend and participate in this conference and to facilitate a dialogue among top experts and younger entrants in the field through poster sessions.

Enter List of papers submitted or published that acknowledge ARO support from the start of the project to the date of this printing. List the papers, including journal references, in the following categories:

(a) Papers published in peer-reviewed journals (N/A for none)

Received Paper

TOTAL:

Number of Papers published in peer-reviewed journals:

(b) Papers published in non-peer-reviewed journals (N/A for none)

Received Paper

TOTAL:

Number of Papers published in non peer-reviewed journals:

(c) Presentations

Number of Presentations: 560.00

Non Peer-Reviewed Conference Proceeding publications (other than abstracts):

Received Paper

TOTAL:

Number of Non Peer-Reviewed Conference Proceeding publications (other than abstracts):

Peer-Reviewed Conference Proceeding publications (other than abstracts):

Received Paper

TOTAL:

Number of Peer-Reviewed Conference Proceeding publications (other than abstracts):

(d) Manuscripts

Received Paper

TOTAL:

Number of Manuscripts:

Books

Received Book

TOTAL:

Received	Book Chapter

TOTAL:

Patents Submitted

Patents Awarded

Awards

Graduate Students

NAME	PERCENT_SUPPORTED

FTE Equivalent:
Total Number:

Names of Post Doctorates

NAME	PERCENT_SUPPORTED

FTE Equivalent:
Total Number:

Names of Faculty Supported

NAME	PERCENT_SUPPORTED

FTE Equivalent:
Total Number:

Names of Under Graduate students supported

NAME	PERCENT_SUPPORTED

FTE Equivalent:
Total Number:

Student Metrics

This section only applies to graduating undergraduates supported by this agreement in this reporting period

The number of undergraduates funded by this agreement who graduated during this period: 0.00

The number of undergraduates funded by this agreement who graduated during this period with a degree in science, mathematics, engineering, or technology fields:..... 0.00

The number of undergraduates funded by your agreement who graduated during this period and will continue to pursue a graduate or Ph.D. degree in science, mathematics, engineering, or technology fields:..... 0.00

Number of graduating undergraduates who achieved a 3.5 GPA to 4.0 (4.0 max scale):..... 0.00

Number of graduating undergraduates funded by a DoD funded Center of Excellence grant for Education, Research and Engineering:..... 0.00

The number of undergraduates funded by your agreement who graduated during this period and intend to work for the Department of Defense 0.00

The number of undergraduates funded by your agreement who graduated during this period and will receive scholarships or fellowships for further studies in science, mathematics, engineering or technology fields: 0.00

Names of Personnel receiving masters degrees

NAME

Total Number:

Names of personnel receiving PHDs

NAME

Total Number:

Names of other research staff

NAME	PERCENT_SUPPORTED

FTE Equivalent:

Total Number:

Sub Contractors (DD882)

Inventions (DD882)

Scientific Progress

See attachment.

Technology Transfer

Solid-state electrochemical devices are likely to play a key role in future energy technology developments and are also an important area of research and development for the Army Research Office. As the largest international meeting dedicated to solid state electrochemistry, ionic materials, and devices, the International Meeting for Solid State Ionics serves as a central forum to bring together top electrochemists and materials scientists working across a wide spectrum of electrochemical energy conversion materials and technologies of relevance to ARO, including batteries, capacitors, fuel cells, electrolysis, and separation membranes.

The International Conference on Solid State Ionics, held every two years, is the flagship event attended by researchers worldwide. As such, it is the perfect opportunity to expand the field by promoting synergistic exchange with researchers in other fields and by fostering the growth of emerging young scientists. The meeting venue rotates between Europe, the Americas, and Asia. Importantly, 2015 represented the first time in 12 years that the conference had been held in the United States. Thus, this 20th iteration of the meeting provided a crucial opportunity for US participants, particularly students, to engage with the broader international electrochemistry and ionic-materials community. With the Colorado Rocky Mountains as the backdrop, the chosen site of Keystone provided an informal atmosphere for researchers to share exciting ideas, initiate new collaborations, and advance the state-of-the-art. ARO support for the conference was key in enabling travel funding for graduate students and younger scientists to attend and participate in this conference, and to facilitate a dialogue among top experts and younger entrants in the field through poster session awards.

About 700 abstracts were submitted to SSI 20, with a broad range of international submissions: 130 from USA, 120 from Japan, 62 from Germany, 50 from Korea, 50 from China ... 50 % of the attendants were Students and Post-Doctorates, 30% were Professors, 10% were from National Labs and the remaining 10% were from Industry.

Topics addressed at the meeting included:

- Fuel Cells & Electrolyzers
- High-temperature oxygen-ion-conducting materials
- High-temperature proton-conducting materials
- Polymeric materials
- Nanoionics, Interfaces, and Heterostructures
- Batteries & Supercapacitors
- Anodes
- Cathodes
- Electrolytes/Separators
- Photoelectrochemistry and Solar Fuels
- Electrocatalysis
- Membranes
- Perovskite Solar Cells
- Permeation Membranes and Electrochemical Membrane Reactors
- Solid State Memory, Switches, & Sensors

The meeting was headlined by a strong group of plenary speakers, including:

- Dr. John B. Goodenough, U. Texas at Austin
- Dr. Sossina M. Haile, California Institute of Technology
- Joachim Heberle, Free University of Berlin
- Juergen Janek, Justus Liebig University Giessen
- Shu Yamaguchi, University of Tokyo

Dr. John Goodenough gave a special plenary at the meeting in what may have been his last public speaking engagement to the scientific community.

A total of 27 keynote talks, 36 invited talks, 179 contributed talks, and 384 posters were presented across five parallel sessions. The five days of the conference saw high quality presentations and vigorous discussion on the latest materials, characterization, and modeling developments for a broad spectrum of solid-state ionic materials, devices, and phenomena. Attendees were treated to new fundamental insights in defect chemistry, reactivity, and ion transport, as well as the latest advancements in solid-state devices such as atomic switches, fuel cells, electrolyzers, batteries, sensors, and membrane reactors. Emergent directions in solid-state ionics such as photoelectrochemistry, solar thermochemistry, and hybrid organic/inorganic solids were covered extensively in the conference. The fruitful scientific exchange, involving researchers new to solid-state ionics, took place not only in the oral and poster sessions but continued also during breakfast and lunch breaks.

Among the many topics presented at SSI-20, the development of new cathode materials for intermediate temperature solid-oxide and proton-conducting ceramic fuel cells emerged as a particularly important theme, as it is increasingly clear that the cathode losses dominate most ceramic fuel cell technologies as operating temperatures are reduced. For batteries, the combination of in-situ characterizations and computational simulations is leading to unprecedented understanding of redox processes and charge transport, both in the bulk and at interfaces. For hybrid inorganic/organic solids, deeper understandings of the mixed ionic and electronic conductivities are clarifying the origin of degradation in solar cells.

A selection of the many presentations at the conference was published in a special issue of Solid State Ionics (*Solid State Ionics* **288**, 1, 2016). The special issue included sections on Solid Oxide Fuel Cells & Electrolyzers, Polymer Electrolyte Fuel Cells & Electrolyzers, Electrodes & Solid Electrolytes for Batteries, Fundamentals of Transport and Reactivity & Nanoionics, Permeation Membranes, and Proton-Conducting Oxides, and provided a good cross-section of the material presented during the five- day conference.

Participants supported with ARO funds

Peter Attia, Stanford University
Rowena Brugge, Imperial College London
Daniel Clark, Colorado School of Mines
Anne Deml, Colorado School of Mines
Antoine Emery, Northwestern University
Sonia Escolastico, CSIC-UPV, Inst de Tech Quimica, Spain
Emily Frank, University of Maryland
Will Gent, Stanford University
Elisa Gilardi, Max-Planck Institute
Ryan Jacobs, University of Wisconsin-Madison
Dima Kalaev, Technion, Irael
Jae Jin Kim, MIT
Julius Koettgen, RWTH Aachen University, Germany
Andrzej Kulka, AGH University of Science & Technology, Poland

Julia Langer, Technical University Langer, Austria
Yiyang Li, Stanford University
Anders Lindman, Chalmers University of Technology, Sweden
Maxell A. Marple, UC-Davis
Matthew McDowell, Georgia Institute of Technology
Edmund Mills, UC-Davis
Andrew Motz, Colorado School of Mines
Melissa Novy, UC-Davis
Alex Rettie, University of Texas-Austin
Monica Sandoval, Univ de Lillie 1, Colombia
Daniel Shnaider, Colorado School of Mines
Rengarajan Shanmugam, Michigan State University
Eric Straley, Michigan State University
Lixin Sun, MIT
Celeste Vanden Bosch, Imperial College London
Eirini Vasileiou, CPERI, Greece

Organizers of SSI-20
Sangtae Kim (UC Davis)
William Chueh (Stanford University)
Ryan O'Hayre (Colorado School of Mines)
Joachim Maier (ISSI president; MPI for Solid State Research, Stuttgart)

20th International Conference on Solid State Ionics (SSI-20)

Chief Organizer
Sangtae Kim, University of California, Davis, USA

Co-Organizers
William Chueh, Stanford University, USA
Joachim Maier, Max Planck Institute for Solid State Research, Germany (ISSI President)
Ryan O'Hayre, Colorado School of Mines, USA

Local Organizing Committee
Scott Barnett, Northwestern University, USA
Shannon Boettcher, University of Oregon, USA
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Sossina Haile, Northwestern University, USA
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Fritz Prinz, Stanford University, USA
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Ilan Riess, Israel Institute of Technology, Israel
Werner Sitte, Montanuniversität Leoben, Austria
Shu Yamaguchi, University Tokyo, Japan
Han-Ill Yoo, Seoul National University, South Korea

Topics and Organizers

A. Solid Oxide Fuel Cells & Electrolyzers

- **Rotraut Merkle**, Max Planck Institute, Germany
- **Werner Sitte**, Univeristy of Leoben, Austria

B. Polymer Electrolyte Fuel Cells & Electrolyzers

- **Vito Di Noto**, University of Padova, Italy
- **Andew Herring**, Colorado School of Mines, USA
- **Tom Zawodzinski**, University of Tennessee, USA

C. Electrodes & Solid Electrolytes for Batteries

- **Scott Barnett**, Northwestern University, USA
- **William Chueh**, Stanford University, USA
- **Juergen Janek**, Justus Liebig University, Germany
- **Shirley Meng**, University of California, USA

D. Fundamentals of Transport and Reactivity & Nanoionics

- **Giuliano Gregori**, Max Planck Institute, Germany
- **Joshua Hertz**, University of Delaware, USA
- **Sangtae Kim**, University of California, USA
- **Bilge Yildiz**, Massachusetts Institute of Technology, USA

E. Transparent Conducting Oxides

- **Joseph Berry**, National Renewable Energy Laboratory, USA
- **David Ginley**, National Renewable Energy Laboratory, USA
- **David Paine**, Brown University, USA

F. Solid State Photoelectrochemistry

- **Shannon Boettcher**, University of Oregon, USA

G. Switching and Sensing Phenomena

- **Jennifer Rupp**, ETH Zurich, Switzerland
- **Shu Yamaguchi**, Tokyo University, Japan

H. High Temperature Routes for Solar Fuels

- **Tim Davenport**, California Institute of Technology, USA
- **Sossina Haile**, Northwestern University, USA
- **Ryan. O'Hayre**, Colorado School of Mines, USA

I. Ion Transport in Hybrid Organic-Inorganic Solids

- **Hema Karunadasa**, Stanford University, USA
- **David Cahen**, Weizmann Institute of Science, Israel

J. Permeation Membranes

- **Robert Kee**, Colorado School of Mines, USA
- **Jonathan Lane**, Praxair, USA
- **Jose Serra**, Polytechnic University of Valencia, Spain

K. Proton-Conducting Oxides

- **Hiroshige Matsumoto**, Kyushu University, Japan
- **Truls Norby**, University of Oslo, Norway

Tutorials available Sunday, June 14:

- **Advanced methods in electrochemical impedance spectroscopy**
  Instructor: Bernard Boukamp
  1-1:45 p.m. Greys Peak I/II

- **Defect chemistry in solid state ionics**
  Instructor: Truls Norby
  1:45-2:30 p.m. Greys Peak I/II

  Break 2:30-2:50 p.m. Longs Peak Foyer

- **Battery materials and electrochemistry**
  Instructor: Wei Lai
  2:50-3:35 p.m. Greys Peak I/II

- **Atomistic modeling in solid state ionics**
  Instructor: Dario Marrocchelli
  3:35-4:20 p.m. Greys Peak I/II

Student Travel Awards

A limited amount of travel support is available to assist students and postdocs in attending SSI-20. Approximately $500-$1000 in travel support per award is anticipated. To apply for a travel award, students and postdocs should email:

1. A copy of SSI-20 abstract submission
2. A brief statement describing the research activities and reasons for travel support request (1 page max)
3. A brief letter from the advisor certifying the status as a student or postdoc (1 page max)
4. The CV (2 pages max)

Items 1-4 above should be collected together as a **single PDF** file.

Send to: org@ssi-20.net with the subject line **SSI-20 Student Travel Support**.

The application deadline for student/postdoc travel support is February 27, 2015.

Proceedings

Cost

Registrations paid at the regular rate include ONE copy of the Conference Proceedings. Student, retired or unemployed registrations do not include the Conference Proceedings. Additional copies of the Conference Proceedings are available for purchase.

Submission Instructions

The submission website for this journal is located at: http://ees.elsevier.com/ssi/default.asp. To ensure that all manuscripts are correctly identified for inclusion into the special issue associated with the SSI20 conference, authors **must** select "**SI: SOSI_SSI20**" at the "Article Type" step in the submission process.

Submission Deadline

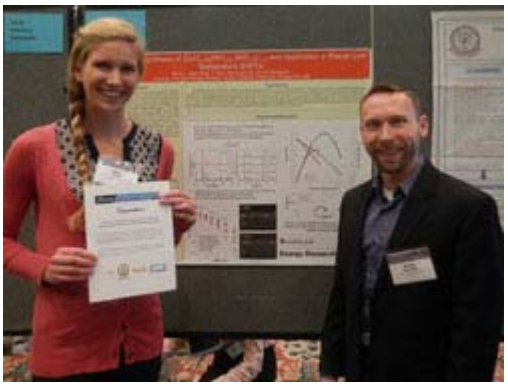
Manuscript submission is July 17.

The page limit is as follows:

- Plenary talks: no limit
- Keynote and invited talks: 6 journal pages
- Regular talks and posters: 4 journal pages

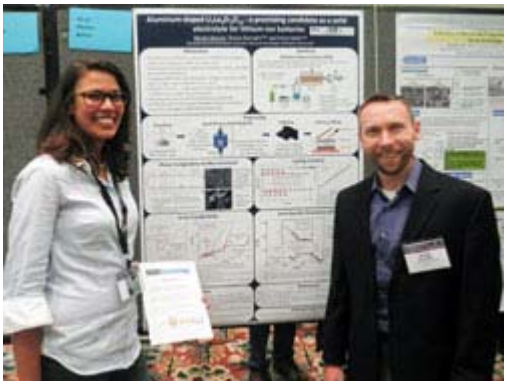
Poster Award Recipients

Monday

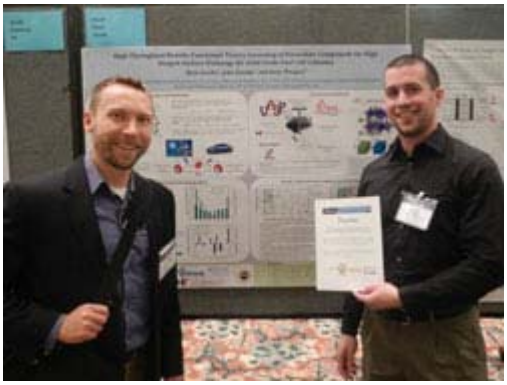


Emily Fraik

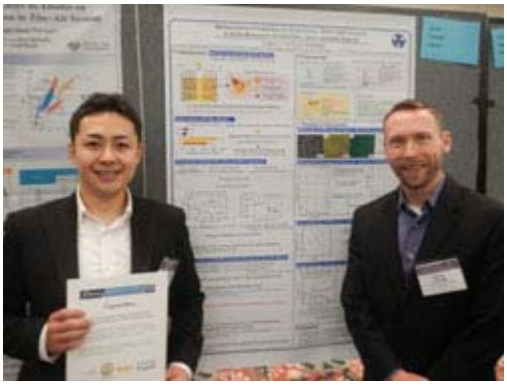
Mattia Saccoccio



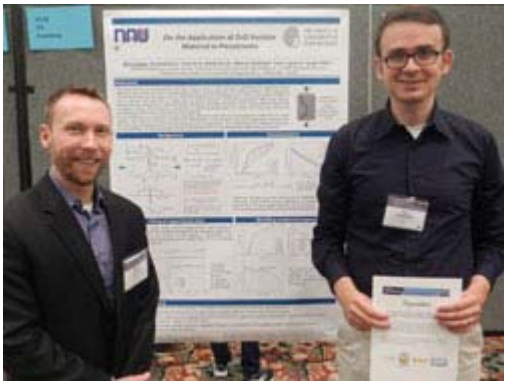
Miriam Botros



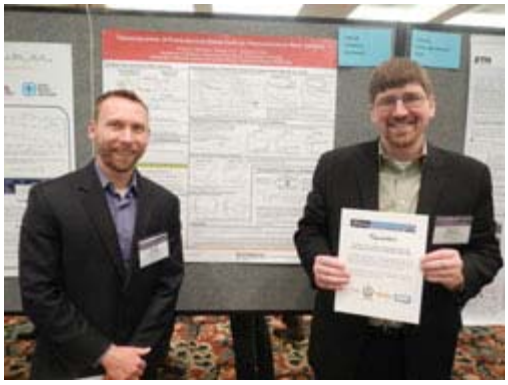
Ryan Jacobs



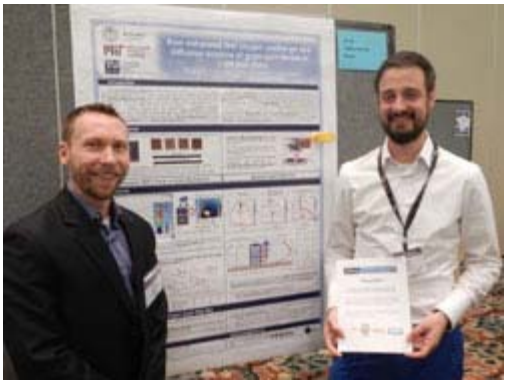
Takashi Hakari



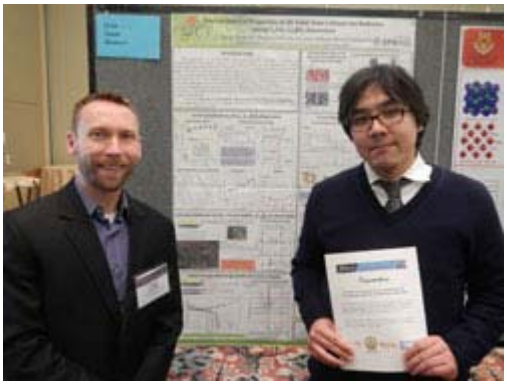
Till Froeming



Timothy Davenport

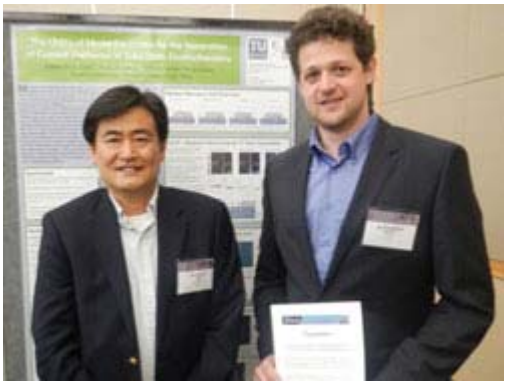


Tobias Huber

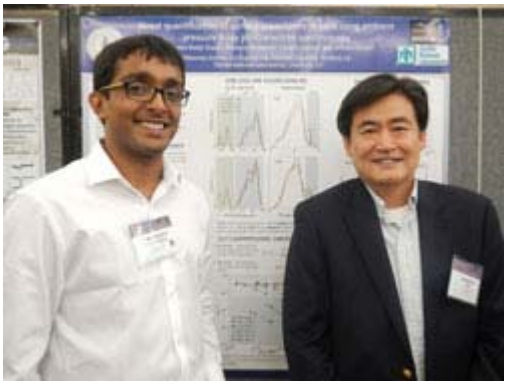


Toyoki Okumura

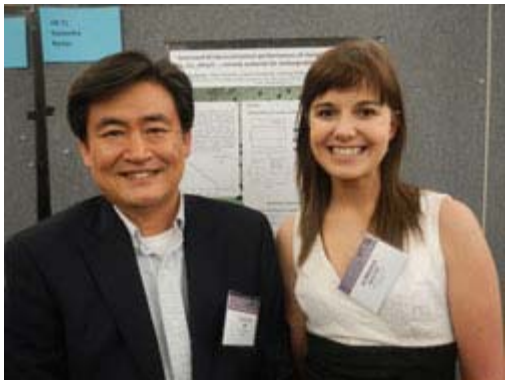
Tuesday



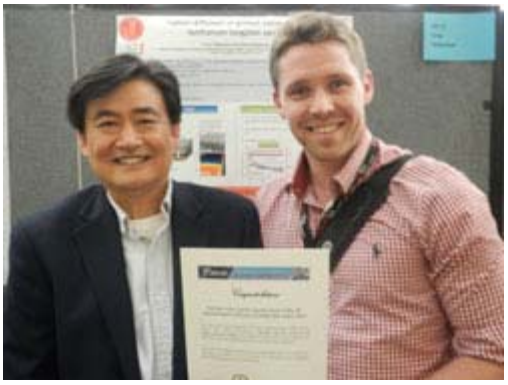
Alexander Opitz



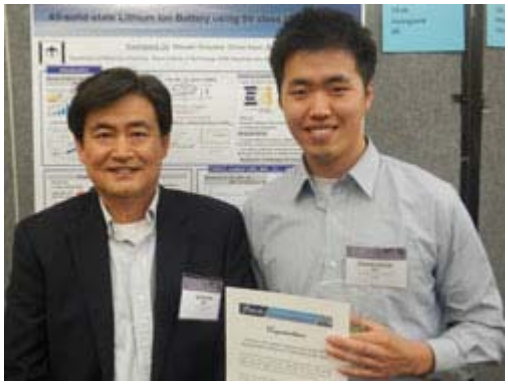
Chirranjeevi Gopal



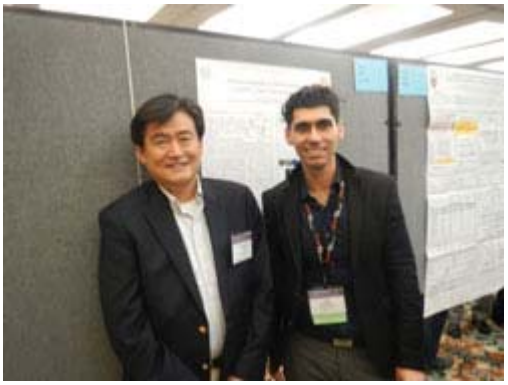
Dominika Baster



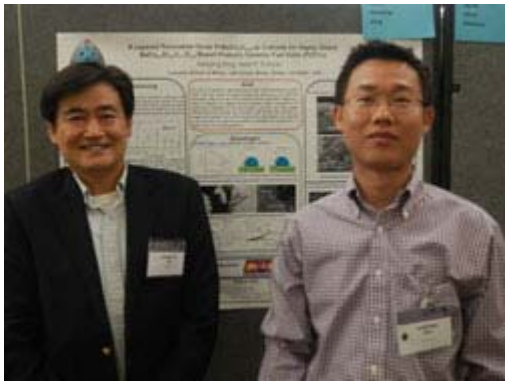
Einar Vollestad



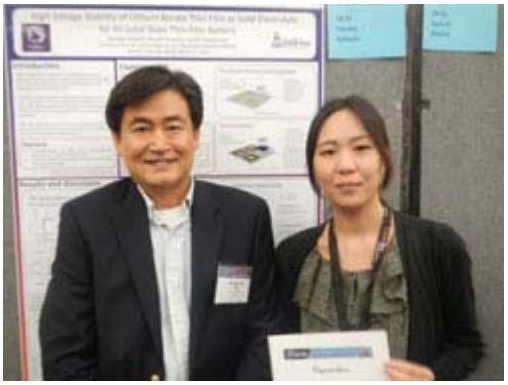
Gwangseok-Oh



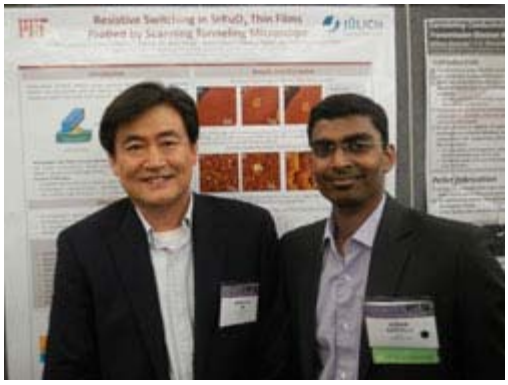
Hadi-Tavassol



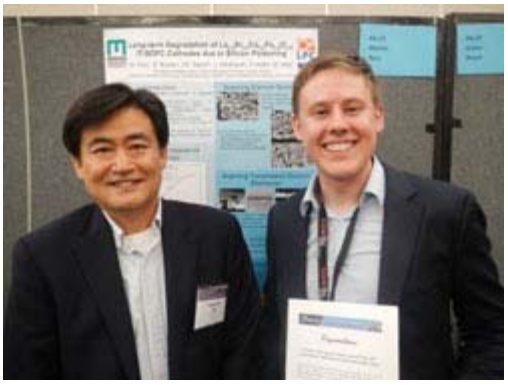
Hanping Ding



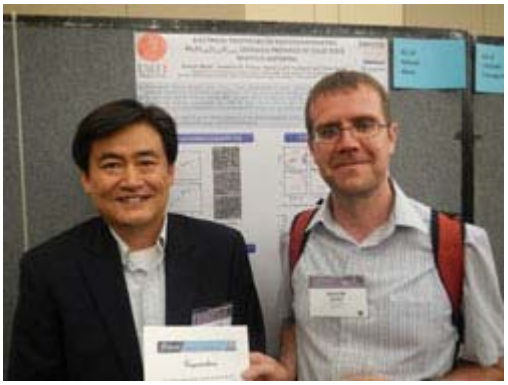
Haruka Itabashi



Kiran Adepalli



Martin Perz



Nahum Maso

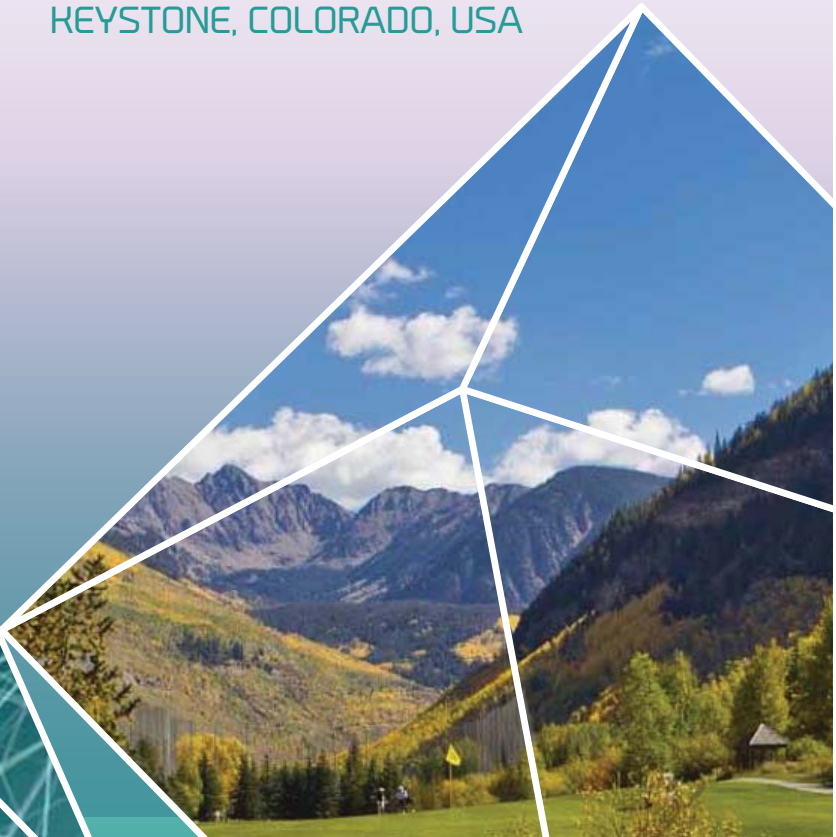
SSI-20

Program Guide

20th International Conference on Solid State Ionics

June 14-19, 2015

KEYSTONE RESORT
& CONFERENCE CENTER
KEYSTONE, COLORADO, USA



WELCOME TO THE CONFERENCE!

On behalf of the Conference Chairs and Committee Members, it is with great pleasure that I welcome you to the **20th International Conference on Solid State Ionics (SSI-20)**. With the Rocky Mountains as our backdrop, we expect you'll find an excellent and engaging technical program and an exciting place to explore in your free time.

We are confident this Conference will provide essential information on the breadth and depth of current solid state ionics research worldwide. Below are some highlights we believe will be of interest to you.

Sangtae Kim, University of California, Davis

CONFERENCE HIGHLIGHTS

THE SSI-20 PROGRAM

Scientists from around the world will converge in Keystone, Colorado this week to share ideas, present technical information and contribute to the advancement of solid state ionics. Featuring over **625 oral/poster presentations**, SSI-20 will offer a strong program of plenary, keynote, invited and contributed talks, poster sessions, and tutorials covering topics from fuel cells and electrolyzers, to proton-conducting oxides—confirming the great diversity of science that is enabled by solid state ionics.

TUTORIALS

Start the Conference off on Sunday afternoon with **four tutorial sessions** designed to complement the technica program. Attendance to these sessions is not included in the Conference registration fee. You may purchase entrance to the tutorials for $100 at the Registration Desk located in the Main Lobby. Featured topics are *Advanced Methods in Electrochemical Impedance Spectroscopy*; *Defect Chemistry in Solid State Ionics*; *Battery Materials and Electrochemistry*; and *Atomistic Modeling in Solid State Ionics*. For more details, see page 3.

WELCOME RECEPTION

Conference attendees are invited to the Welcome Reception on Sunday evening from 5:00 pm - 7:00 pm in Shavano Terrace. Before a full day of technical sessions, this is a great time to **enjoy light snacks and refreshments**, meet with old colleagues, make new connections and share information.

PLENARY SESSIONS

Don't miss the five Plenary Sessions held Monday - Friday mornings. **Shu Yamaguchi**, University of Tokyo, starts the week off on Monday with his talk, *Bulk and Surface Oxide Protonics for Energy Conversion Devices: Role of Percolation and Grotthus Mechanism in Oxide Protonics*. Next, **Sossina M. Haile**, Northwestern University, shares *Insights into Proton Transport in Superprotonic Solid Acids*. On Wednesday, *Electrode Kinetics in the Solid State* is presented by **Juergen Janek** of Justus Liebig University Giessen. Then Thursday, **Joachim Heberle**, Free University of Berlin, gives his presentation, *On the Mechanism of Cation Translocation across Channelrhodopsin*. A special Plenary Session featuring **John B. Goodenough,** University of Texas at Austin, rounds out the Conference Friday morning with *Alternative Strategies for Electrical Energy Storage*.

POSTER SESSIONS/RECEPTIONS

Poster authors will be available for **in-depth discussions on Monday and Tuesday** in Red Cloud Peak. These popular sessions are open to all Conference attendees. During the Monday afternoon session, complimentary lunch and refreshments will be served. The Tuesday evening session will include light snacks and refreshments.

ISSI YOUNG SCIENTIST AWARD

To recognize the outstanding contributions made by young scientists to the field of solid state ionics, the International Society of Solid-State Ionics established the ISSI Young Scientist Award. This year, **six young scientists** have been selected as finalists. On Tuesday, don't miss the award finalists' talks from 1:30 pm - 3:00 pm in Quandary Peak I/II.

ISSI ELECTION

All SSI-20 attendees are encouraged to attended the SSI Election on Wednesday morning in Shavano Peak. The new ISSI Vice President and Board of Directors' members will be elected.

CONFERENCE BANQUET

Make time for this year's Conference Banquet on Wednesday evening at Soda Ridge Stables. **One Conference Banquet ticket is included in your registration fee**. Additional tickets may be purchased for $80 per person at the Registration Desk located in the Main Lobby. This event takes place outside, so please plan and dress for the weather accordingly. Transportation will be provided to and from the Conference Banquet.

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B. POLYMER ELECTROLYTE FUEL CELLS AND ELECTROLYZERS

Vito Di Noto, University of Padova

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H. HIGH TEMPERATURE ROUTES FOR SOLAR FUELS

Tim Davenport, California Institute of Technology

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I. ION TRANSPORT IN HYBRID ORGANIC-INORGANIC SOLIDS

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K. PROTON-CONDUCTING OXIDES

Hiroshige Matsumoto, Kyushu University

Truls Norby, University of Oslo

PLENARY SPEAKERS

9:15 AM – 10:10 AM · SHAVANO PEAK

MONDAY

Shu Yamaguchi
University of Tokyo

Bulk and Surface Oxide Protonics for Energy Conversion Devices: Role of Percolation and Grotthus Mechanism in Oxide Protonics

Shu Yamaguchi is professor at the department of materials engineering, School of Engineering, The University of Tokyo, Japan. He is a graduate from Tokyo Institute of Technology, earning his Dr. Eng. in metallurgy on thermodynamic activity measurements in sodium silicate and phosphate melts using Na beta–alumina as a solid electrolyte in 1983. His expertise in solid state chemistry has initiated from the research on tracer diffusivity measurements of 18O in $Fe_{1-x}O$ and Co_{1-x} O using SIMS in 1980. He is engaged in the interdisciplinary area between chemical thermodynamics and solid state chemistry, such as the electronic structure in oxide protonics materials, atomic switch, surface protonics, etc.

TUESDAY

Sossina M. Haile
Northwestern University

Insights into Proton Transport in Superprotonic Solid Acids

Sossina M. Haile is the Walter P. Murphy Professor of Materials Science and Engineering at Northwestern University. She earned her PhD degree in materials science and engineering from the Massachusetts Institute of Technology in 1992. As part of her studies, Haile spent two years at the Max Plank Institute for Solid State Research, Stuttgart, Germany, first as a Fulbright Fellow, then as a Humboldt Fellow.

She has published more than 150 articles and holds 15 patents on these and other topics. Haile is the recipient of many prestigious awards including an American Competitiveness and Innovation (ACI) Fellowship in 2008 from the National Science Foundation in recognition of "her timely and transformative research in the energy field and her dedication to inclusive mentoring, education and outreach across many levels," the 2012 International Prize in Ceramics from the World Academy of Ceramics, and the 2010 Chemical Pioneers Award of the Chemical Heritage Foundation. Haile was named by *Newsweek* magazine in its 2007 end-of-the-year issue as one of twelve people to watch in 2008.

WEDNESDAY

Juergen Janek
Justus-Liebig University, Giessen

Electrode Kinetics in the Solid State

Juergen Janek received his PhD in chemistry from the University of Hannover. He finished his Habilitation and became assistant professor at the University of Hannover in 1997. After a short period in Kiel in 1999, he accepted a position as chair of physical chemistry at Justus-Liebig University, Giessen and became director of the Institute of Physical Chemistry. In 2004 he was invited to Seoul National University and Tohoku University as a visiting professor, and in 2008 he became a visiting professor at Aix Marseille University. Since 2011, he has served as scientific director of BELLA (Batteries and Electrochemistry Laboratory), a joint lab of BASF SE and Karlsruhe Institute of Technology, and member of the International Network for Batteries and Electrochemisty of BASF SE. Janek holds several patents and is author of about 200 peer–reviewed papers in a wide range of journals.

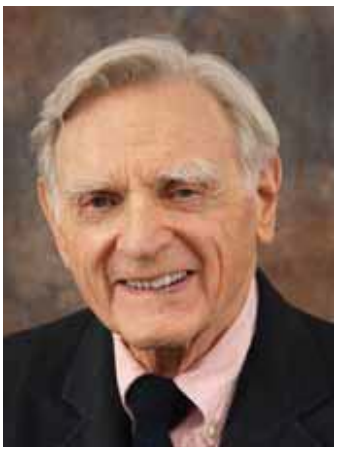
THURSDAY

Joachim Heberle
Free University of Berlin

On the Mechanism of Cation Translocation across Channelrhodopsin

Joachim Heberle has a scientific background at the interface between biology, chemistry and physics. He studied chemistry at the Universities of Stuttgart and Wuerzburg. He moved to Berlin to defend his PhD thesis in biophysics at the Free University of Berlin (1991) followed by a postdoc at the Hahn–Meitner Institute Berlin (1991–1993). He served as group leader at the Research Center Juelich (1993–2005) and received the Habilitation in Biophysical Chemistry from the University of Duesseldorf (1998).

During his time as a postdoc, he was a visiting scientist at the Universities of Tucson and Gothenburg. In 2005, he became the professorial chair for biophysical chemistry at Bielefeld University. In 2009, he accepted the offer from the physics department of the Free University of Berlin and has been a full professor in biophysics since then. Heberle served as a member of the study section of chemistry of the German Research Foundation and is currently a member of the Excellence Council of his host university.



FRIDAY

John B. Goodenough
University of Texas at Austin

SPECIAL PLENARY SPEAKER

Alternative Strategies for Electrical Energy Storage

After receiving his PhD degree in physics in 1952, John B. Goodenough was a group leader at the MIT Lincoln Laboratory where he helped to develop the ferrimagnetic spinels used in the first Ram memory of the digital computer. In the course of this work, he identified structural transitions caused by cooperative orbital ordering and he developed the rules for the sign of the interatomic spin–spin magnetic interactions. In the subsequent decade, Goodenough explored the magnetic and transport properties of transition–metal compounds, including the transition from localized to itinerant electron behavior where strong electron–lattice interactions give rise to static or dynamic charge–density waves. These studies were summarized in his two books *Magnetism and the Chemical Bond* and *Les oxydes des métaux de transition*, translated from his long review titled *Metallic Oxides*.

With the first oil crisis in the early 1970s, Goodenough turned to the study of energy materials. Called in 1976 to head the Inorganic Chemistry Laboratory of the University of Oxford, UK, he developed in England the layered $Li_{1-x}CoO_2$ for the cathode of a rechargeable Li–ion battery; it was used in the battery of the first cell telephone marketed by the SONY Corporation that launched the wireless revolution. Goodenough subsequently identified two other transition–metal oxide structures, spinel and ordered olivine, as potential cathodes material that are also used as cathodes in commercial Li–ion batteries. In 1986, Goodenough took the Virginia H. Cockrell Centennial Chair of Engineering at the University of Texas at Austin where he has returned to his fundamental studies of transition–metal oxides and their use as electrodes of Li–ion batteries and the solid–oxide fuel cell.

THANK YOU!

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ORAL PRESENTATIONS

MONDAY June 15, 2015

PLENARY

SESSION L1: Plenary I
Chair: Joachim Maier
Monday Morning, June 15, 2015
Keystone Resorts, Shavano Peak

9:15 AM INTRODUCTION

9:25 AM L1.01
Bulk and Surface Oxide Protonics for Energy Conversion Devices: Role of Percolation and Grotthus Mechanism in Oxide Protonics Shu Yamaguchi; Department of Materials Engineering School of Engineering, The University of Tokyo, Tokyo, Japan.

A: Solid Oxide Fuel Cells and Electrolyzers

* Invited Speaker
** Keynote Speaker

SESSION A1: SOFC—Cathodes I
A: Solid Oxide Fuel Cells and Electrolyzers
Chair: William Chueh
Monday Morning, June 15, 2015
Keystone Resorts, Longs Peak

10:10 AM BREAK

10:30 AM **A1.01
Oxygen Reduction Kinetics on Perovskite Oxides: Effects of Dissimilar Interfaces and Surfaces Bilge Yildiz; Massachusetts Institute of Technology, Cambridge, Massachusetts, United States.

11:00 AM A1.02
Chemical Composition Study of the LSC-113/LSC-214 Surface and its Effect on the ORR Enhancement Andrea Cavallaro, John Kilner and Stephen Skinner; Materials, Imperial College London, London, United Kingdom.

11:20 AM A1.03
Effect of Heterointerface on Oxygen Reduction Kinetics of (Sm,Sr) CoO_3-Based Electrodes Hiroki Muroyama, Hideyuki Kanazawa, Takeou Okanishi, Toshiaki Matsui and Koichi Eguchi; Kyoto University, Kyoto, Japan.

11:40 AM *A1.04
Quantitative Evaluation of Effective Reaction Area in Solid Oxide Fuel Cell Cathodes Koji Amezawa[1], Yoshinobu Fujimaki[2], Takashi Nakamura[1], Katherine D. Bagarinao[3], Katsuhiko Yamaji[3], Kiyofumi Nitta[4], Yasuko Terada[4], Keiji Yashiro[5], Fumitada Iguchi[2], Hiroo Yugami[2] and Tatsuya Kawada[5]; [1]IMRAM, Tohoku University, Sendai, Japan; [2]Graduate School of Engineering, Tohoku University, Sendai, Japan; [3]AIST, Tsukuba, Japan; [4]JASRI, Sayo, Japan; [5]Graduate School of Environmental Studies, Tohoku University, Sendai, Japan.

SESSION A3: SOFC—Cathodes II
A: Solid Oxide Fuel Cells and Electrolyzers
Chairs: Ryan O'Hayre and Harry Tuller
Monday Afternoon, June 15, 2015
Keystone Resorts, Longs Peak

2:30 PM *A3.01
Perovskite Oxides as Materials for Energy Conversion: Towards a Fundamental Understanding of Surface Properties by *Operando* Spectroscopic Methods David N. Mueller[2, 1], Michael L. Machala[2], Zixuan Guan[2], Hendrik Bluhm[3] and William C. Chueh[2, 4]; [1]Peter Gruenberg Institute (PGI-6), Research Center Juelich, Juelich, Germany; [2]Department of Materials Science & Engineering, Stanford University, Stanford, California, United States; [3]Chemical Sciences Division, Lawrence Berkeley National Laboratory, Berkeley, California, United States;[4]Stanford Institute for Materials and Energy Sciences, SLAC National Accelerator Laboratory, Menlo Park, California, United States.

2:50 PM A3.02
***In Situ* X-Ray Synchrotron Spectroscopy Study of IT-SOFC Stability under Operating Conditions** Florent Tonus and Stephen J. Skinner; Materials, Imperial College London, London, United Kingdom.

3:10 PM A3.03
Surface Chemistry of $La_{0.6}Sr_{0.4}CoO_{3-\delta}$ Thin Films and Its Impact on the Oxygen Surface Exchange Resistance Ghislain M. Rupp[1], Helena Tellez[2], John Druce[2], Andreas Limbeck[3], Tatsumi Ishihara[2], John Kilner[4, 2] and Juergen Fleig[1]; [1]Institute of Chemical Technologies and Analytics - Electrochemistry, Vienna University of Technology, Vienna, Austria;[2]International Institute for Carbon-Neutral Energy Research, Kyushu University, Fukuoka, Japan; [3]Institute of Chemical Technologies and Analytics - Instrumental Analytical Chemistry, Vienna University of Technology, Vienna, Austria; [4]Department of Materials, Imperial College London, London, United Kingdom.

3:30 PM A3.04
Surface Analysis of SOFC Cathode Degradation Using Low Energy Ion Scattering and *In-Operando* Atmospheres Mathew Niania[1], Samuel Cooper[1], Helena Tellez[2], John Druce[2], Stephen Skinner[1], Tatsumi Ishihara[2] and John Kilner[1, 2]; [1]Materials, Imperial College London, London, United Kingdom; [2]I2CNER, Kyushu University, Fukuoka, Japan.

3:50 PM A3.05
Oxide-Ion Dynamics in the MIEC SOFC Cathode Material $La_2NiO_{4+\delta}$ by Experimental and Computational Solid-State ^{17}O NMR Spectroscopy David M. Halat[1], Riza Dervisoglu[2], Gunwoo Kim[1] and Clare P. Grey[1, 2]; [1]Department of Chemistry, University of Cambridge, Cambridge, United Kingdom; [2]Department of Chemistry, Stony Brook University, Stony Brook, New York, United States.

4:10 PM *A3.06
Acceptor Doped $CeNbO_4$ as a Potential Mixed Proton Conducting Electrode Stephen Skinner and Cassandra Harris; Imperial College London, London, United Kingdom.

4:30 PM A3.07
A Cost-Effective Approach for Next Generation High-Performance Fuel-Flexible Protonic Ceramic Fuel Cell Chuancheng Duan, Jianhua Tong, Meng Shang and Ryan O'Hayre; Colorado School of Mines, Golden, Colorado, United States.

4:50 PM A3.08
A New Ternary Protonic/Oxygen Ionic/Electronic Conducting Cathode for Proton Conducting Solid Oxide Fuel Cell Liangdong Fan and Pei-Chen Su; School of Mechanical and Aerospace Engineering, Nanyang Technological University, Singapore, Singapore.

5:10 PM A3.09
Nano-CT Enabled, Bayesian Model-Based Analysis of Impedance Data for a Porous, Lanthanum Strontium Manganate Cell Giuseppe F. Brunello[1], Billy Epting[2], Shawn Litster[2], Paul A. Salvador[3], Harry O. Finklea[4], David S. Mebane[1] and Juwana De Silva[4]; [1]Mechanical and Aerospace Engineering, West Virginia University, Atlanta, Georgia, United States;[2]Department of Mechanical Engineering, Carnegie Mellon University, Pittsburgh, Pennsylvania, United States; [3]Department of Materials Science and Engineering, Carnegie Mellon University, Pittsburgh, Pennsylvania, United States; [4]Department of Chemistry, West Virginia University, Morgantown, West Virginia, United States.

C: Electrodes and Solid Electrolytes for Batteries

SESSION C1: Rational Design of Battery Materials
C: Electrodes and Solid Electrolytes for Batteries
Chair: Arumugam Manthiram
Monday Morning, June 15, 2015
Keystone Resorts, Shavano Peak

10:10 AM BREAK

10:30 AM **C1.01
Lithium Sulfur Batteries: Fundamental Understanding and Materials Design Yi Cui; Department of Materials Science and Engineering, Stanford University. Stanford Institute for Materials and Energy Sciences, SLAC National Accelerator Laboratory, Stanford, California, United States.

11:00 AM C1.02
Atomic-Scale Insights into Lithium and Sodium Battery Materials: Intercalation, Diffusion and Surfaces Saiful Islam; Chemistry, University of Bath, Bath, United Kingdom.

11:20 AM C1.03
Accelerated Computation Materials Design of Solid-Electrolyte Materials in All-Solid-State Li-Ion Batteries Yifei Mo; Materials Science and Engineering, University of Maryland, College Park, College Park, Maryland, United States.

11:40 AM OPEN DISCUSSION

SESSION C3: Solid Electrolyte I
C: Electrodes and Solid Electrolytes for Batteries
Chair: Diana Golodnitsky
Monday Afternoon, June 15, 2015
Keystone Resorts, Shavano Peak

2:30 PM *C3.01
Structure and Dynamics of Lithium Garnet Oxides Studied by Neutron Scattering and Molecular Dynamics Simulation Wei Lai[1], Yuxing Wang[1], Matthew Klenk[1] and Katharine Page[2]; [1]Michigan State University, East Lansing, Michigan, United States; [2]Oak Ridge National Lab, Oak Ridge, Tennessee, United States.

2:50 PM C3.02
A Full Study of a Garnet Ceramic Electrolyte: From Atomistic Simulation to Actual Application in Rechargeable Lithium-Metal Batteries William Manalastas[1], Randy Jalem[2, 3], Frederic Aguesse[1], Lucienne Buannic[1], Juan Miguel Lopez del Amo[1], Carlos Bernuy-Lopez[1], Gurpreet Singh[1], Ainara Aguadero[4], Anna Llordes[1], Masanobu Nakayama[3] and John Kilner[4,1]; [1]Solid State Electrolytes Group, CIC Energigune, Miñano, Spain; [2]Unit of Element Strategy Initiative for Catalysts and Batteries, Kyoto University, Kyoto, Japan; [3]Department of Materials Science and Engineering, Nagoya Institute of Technology, Nagoya, Japan; [4]Department of Materials, Imperial College, London, United Kingdom.

3:10 PM C3.03
Revealing Lithium Conduction Pathways in Lithium-Rich Garnets Using Aliovalent Dopants Rowena H. Brugge, Ainara Aguadero and John Kilner; Imperial College London, London, United Kingdom.

3:30 PM C3.04
Charge Transport Properties in the Li-Garnet $Li_{7-x}La_3Zr_{2-x}Te_xO_{12}$ System Michal Struzik, Reto Pfenninger and Jennifer L. Rupp; Department of Materials, ETH Zurich, Zurich, Switzerland.

3:50 PM C3.05
Investigating the Effects of Al Doping on the Local and Average Structure of Al-LLZ Using Atomistic Simulations Matthew Klenk and Wei Lai; Chemical Engineering and Material Science, Michigan State University, East Lansing, Michigan, United States.

4:10 PM C3.06
Influence of La Ordering in $Li_{3x}La_{2/3-x}TiO_3$ Epitaxial Films on Li-Ion Conduction Tsuyoshi Ohnishi, Kazutaka Mitsuishi, Kazunori Nishio and Kazunori Takada; National Institute for Materials Science, Tsukuba, Japan.

4:30 PM C3.07
Lithium Dendrite Growth in Hot Pressed Ta-Substituted $Li_7La_3Zr_2O_{12}$ Chih-Long Tsai[1], Vinodchandran Chandrasekharan Nair[2], Astrid Besmehn[3], Sven Uhlenbruck[1], Hans G. Gehrke[1], Thorsten Reppert[1], Paul Heitjans[2] and Olivier Guillon[1]; [1]Institut fuer Energie- und Klimaforschung: Werkstoffsynthese und Herstellungverfahren (IEK-1) , Forschungszentrum Juelich GmbH, Juelich, Germany; [2]Institut für Physikalische Chemie und Elektrochemie, Leibniz Universität Hannover , Hannover, Germany; [3]ZEA-3, Forschungszentrum Juelich GmbH, Juelich, Germany.

4:50 PM C3.08
Excellent Stability of a Solid Electrolyte upon Li^+/H^+ Exchange: A Discovery Resulting from Successfully Suppressing Electron Beam Damage Cheng Ma[1], Chengdu Liang[1], Jeffrey Sakamoto[2], Karren More[1] and Miaofang Chi[1]; [1]Center for Nanophase Materials Sciences, Oak Ridge National Laboratory, Oak Ridge, Tennessee, United States; [2]Department of Chemical Engineering and Materials Science, Michigan State University, East Lansing, Michigan, United States.

C: Electrodes and Solid Electrolytes for Batteries

SESSION C4: Interfaces in Batteries
C: Electrodes and Solid Electrolytes for Batteries
Chair: M. Stanley Whittingham
Monday Afternoon, June 15, 2015
Keystone Resorts, Quandary Peak I/II

2:30 PM *C4.01
Predicting Lithium Transport in Solid Electrolyte Interphases Yue Qi; Department of Chemical Engineering and Materials Science, Michigan State University, Lansing, Michigan, United States.

2:50 PM C4.02
Theory of Space Charge Layers in Lithium All-Solid-State Batteries Arnulf Latz[1, 2, 3], Stefanie Braun[1, 2] and Chihiro Yada[4]; [1]German Aerospace center , Stuttgart, Germany;[2]Helmholtz Institute Ulm for Electrochemical Energy Storage, Ulm, Germany; [3]Institute for Electrochemistry, University of Ulm, Ulm, Germany; [4]Toyota Motor Europe NV/SA, Zaventem, Belgium.

3:10 PM C4.03
Negligible "Negative Space-Charge Layer Effects" at LiPON/ $LiCoO_2$ Interfaces of Thin-Film Batteries Taro Hitosugi, Masakazu Haruta, Ryota Shimizu and Susumu Shiraki; Tohoku University, Sendai, Japan.

3:30 PM C4.04
Lithium and Hydrogen Storage at Abrupt Junctions Lijun Fu, Chia-Chin Chen and Joachim Maier; Max Planck Institute for Solid State Research, Stuttgart, Germany.

3:50 PM C4.05
Double Layer Formation and Energy Level Alignment at Li-Ion Electrode-Electrolyte Interfaces: Impact on Charge Transfer and Electrode Potential Rene Hausbrand, Andre Schwoebel, Wolfram Jaegermann, Mathias Fingerle and Ruben Precht; Institute of Materials Science, Darmstadt University of Technology, Darmstadt, Germany.

4:10 PM C4.06
Reduced Grain-Boundary Resistance of Oxide-Type Lithium Ion Conductors by Surface Coating Hirotoshi Yamada[1], Daisuke Tsunoe[2] and Shota Shiraishi[1]; [1]Graduate School of Engineering, Nagasaki University, Nagasaki, Japan; [2]Faculty of Engineering, Nagasaki University, Nagasaki, Japan.

4:30 PM C4.07
Investigation of Electrode-Electrolyte Interface in Bulk-Type All-Solid-State Lithium Batteries Using $LiCoO_2$ Particles Coated with Sulfide Solid Electrolyte Thin Films Yusuke Ito[1], Atsushi Sakuda[1], Takamasa Ohtomo[2], Akitoshi Hayashi[1] and Masahiro Tatsumisago[1]; [1]Department of Applied Chemistry, Osaka Prefecture University, Sakai, Japan; [2]Battery Research Division, Toyota Motor Corporation, Shizuoka, Japan.

4:50 PM C4.08
Probing Interfaces of Garnet Solid Electrolytes in Lithium Batteries Lei Cheng[1, 2], Guoying Chen[2] and Marca Doeff[2]; [1]Material Science and Engineering, University of California, Berkeley, Berkeley, California, United States; [2]Environmental Energy Technological Division, Lawrence Berkeley National Laboratory, Berkeley, California, United States.

D: Fundamentals of Transport and Reactivity and Nanoionics

SESSION D1: Fundamentals of Transport and Reactivity and Nanoionics I
D: Fundamentals of Transport and Reactivity and Nanoionics
Chair: Joachim Maier
Monday Morning, June 15, 2015
Keystone Resorts, Grays Peak I/II

10:10 AM BREAK

10:30 AM **D1.01
Oxygen Nonstoichiometry in Thin Films and Nanoparticles: Measurement, Control and Implications for Energy and Memory Related Devices Harry L. Tuller; Department of Materials Science and Engineering, MIT, Cambridge, Massachusetts, United States.

11:00 AM D1.02
Investigating Thin YSZ Perovskite Films Using Analytical Electron Microscopy Melissa Neish[2], Frank Scheltens[1], Robert E. Williams[1], Leslie J. Allen[2] and David W. McComb[1];[1]Materials Science and Engineering, The Ohio State University, Columbus, Ohio, United States; [2]School of Physics, University of Melbourne, Melbourne, Victoria, Australia.

11:20 AM D1.03
Cation Surface Segregation and Composition Depth Profile Variations in Thin Films Of SOFC Cathode Materials Analysed by Low Energy Ion Scattering Jose Santiso[1], Helena Tellez-Lozano[2], Araceli Gutierrez-Llorente[3], James Zapata[1], Roberto Moreno[1], Jaume Roqueta[1], Nuria Bagues[1], Anna Magraso[1], Jose M. Caicedo[1], John Druce[2], John A. Kilner[2] and Tatsumi Ishihara[2]; [1]ICN2 Institut Catala de Nanociencia i Nanotecnologia, Barcelona, Spain; [2]Hydrogen Production, I2CNER, International Institute for Carbon Neutral Energy Research, Fukuoka, Japan; [3]Universidad Rey Juan Carlos, Madrid, Spain.

11:40 AM D1.04
The Influence of Water on the Ionic Conductivity in Ordered Mesoporous YSZ Thin Films Matthias T. Elm[1, 2], Jonas D. Hofmann[1], Christian Suchomski[1, 3], Jueürgen Janek[1] and Torsten Brezesinski[3]; [1]Institute of Physical Chemistry, Justus-Liebig University Giessen, Giessen, Germany; [2]Institute of Experimental Physics I, Justus-Liebig University Giessen, Giessen, Germany; [3]Institute of Nanotechnology, Karlsruhe Institute of Technology, Eggenstein-Leopoldshafen, Germany.

SESSION D3: Fundamentals of Transport and Reactivity and Nanoionics II
D: Fundamentals of Transport and Reactivity and Nanoionics
Chair: Hans-Dieter Wiemhoefer
Monday Afternoon, June 15, 2015
Keystone Resorts, Grays Peak I/II

2:30 PM *D3.01
Low-Temperature Alpha Silver Iodide Confined in Glass: Structure and Dynamics Klaus Funke[1], Radha Banhatti[1], Pawel Grabowski[2], Jan Nowinski[2], Wojtek Wrobel[2], Robert Dinnebier[3] and Oxana Magdysyuk[3]; [1]Institute of Physical Chemistry, University of Muenster, Muenster, Germany; [2]Faculty of Physics, Warsaw University of Technology, Warsaw, Poland; [3]Max Planck Institut für Festkörperforschung, Stuttgart, Germany.

2:50 PM D3.02
Frequency - Dependent Conductivity and Anomalous Diffusion in Ag β-alumina Osamu Kamishima[1], Junichi Kawamura[2] and Yoshiki Iwai[2]; [1]Faculty of Science and Engineering, Setsunan University, Neyagawa, Japan; [2]Institute of Multidisciplinary Research for Advanced Materials, Tohoku University, Sendai, Japan.

3:10 PM OPEN DISCUSSION

3:30 PM D3.04
Electronic Transport of Metal Oxide Single Crystals for Solar Water Splitting: Bismuth Vanadate and Iron Oxide Alexander J. Rettie[1], William Chemelewski[2], Jeffrey Lindemuth[3], John McCloy[4], Luke Marshall[5], David Eisenberg[6], Jianshi Zhou[2], David Emin[7] and Buddie Mullins[1, 4, 8]; [1]Chemical Engineering, University of Texas at Austin, Austin, Texas, United States; [2]Materials Science and Engineering, University of Texas at Austin, Austin, Texas, United States; [3]LakeShore Cryotronics, Westerville, Ohio, United States; [4]Materials Science and Engineering, Washington State University, Pullman, Washington, United States; [5]Chemical Engineering, Northeastern University, Boston, Massachusetts, United States; [6]Van't Hoff Institute for Molecular Sciences, University of Amsterdam, Amsterdam, Netherlands; [7]Physics and Astronomy, University of New Mexico, Albuquerque, New Mexico, United States;[8]Chemistry, University of Texas at Austin, Austin, Texas, United States.

3:50 PM D3.05
Redox Reactions and Transport at Room Temperature in Nanoionic Systems Based on Macroscopic Insulators Ilia Valov; Electronic Materials, Research Centre Juelich, Juelich, Germany.

4:10 PM D3.06
Atomistic Mechanism of Lithiation of Nanomaterials as Li-Ion Battery Anodes Studied by *In Situ* TEM Xuedong Bai; Institute of Physics, Chinese Academy of Sciences, Beijing, China.

4:30 PM D3.07
The Effects of Lattice Strain and Cationic Disorder on the Li-Ion Diffusion in $LiFePO_4$ Cristina Tealdi[1, 2] and Piercarlo Mustarelli[1, 2]; [1]Department of Chemistry, University of Pavia , Pavia, Italy; [2]UdR Pavia, INSTM, Pavia, Italy.

4:50 PM D3.08
Elucidating Li Ion Dynamics and Diffusion Pathways in Li_2SnO_3 – A Comparative $^{6,7}Li$ NMR Study Julia Langer[1, 2], Patrick Bottke[1, 2] and Martin Wilkening[1, 2, 3]; [1]Institute for Chemistry and Technology of Materials, Graz University of Technology, Graz, Austria; [2]DFG Research Unit 1277, Graz University of Technology, Graz, Austria; [3]Graz University of Technology, Christian Doppler Laboratory for Lithium Batteries, Graz, Austria.

5:10 PM D3.09
Lithium Segregation Induces Localized Order-Disorder Transitions Amorphous TiO_2 Nanoparticles Subramanian Sankaranarayanan[1, 2]; [1]Center for Nanoscale Materials, Argonne National Laboratory, Argonne, Illinois, United States; [2]Computation Institute, University of Chicago, Chicago, Illinois, United States.

E: Transparent Conducting Oxides

SESSION E1: TCO I—Defects, Materials
E: Transparent Conducting Oxides
Chair: David Paine
Monday Morning, June 15, 2015
Keystone Resorts, Quandary Peak I/II

10:10 AM BREAK

10:30 AM **E1.01
Defect Theory for Transparent Conducting Oxides Stephan Lany; National Renewable Energy Laboratory, Golden, Colorado, United States.

11:00 AM E1.02
Tuning Charge Collection Efficiency at the Transparent Conductive Electrode in Polymer Photovoltaics with Solution-Processed LiF Cleva W. Ow-Yang[1, 2], Hasan Kurt[1], Junjun Jia[3] and Yuzo Shigesato[3]; [1]Materials Science and NanoEngineering, Sabanci University, Istanbul, Turkey; [2]Nanotechnology Research and Application Center, Sabanci University, Istanbul, Turkey; [3]Graduate School of Science and Engineering, Aoyama Gakuin University, Sagamihara/Kanagawa, Japan.

11:20 AM E1.03
Tuning of Electrical and Optical Properties of Polycrystalline TiO_2-Based Transparent Conducting Films Piero Mazzolini[1, 2], Giuliano Gregori[3], Valeria Russo[1], Daniel Chrastina[4], Rafael O. Ferragut[4], Carlo S. Casari[1, 2] and Andrea Li Bassi[1, 2]; [1]Energy, Politecnico di Milano, Milano, Italy; [2]CNST @PoliMI, Istituto Italiano di Tecnologia, Milano, Italy; [3]Physical Chemistry of Solids, Max Planck Institute for Solid State Research, Stuttgart, Germany; [4]L-NESS, physics department, Politecnico di Milano, Como, Italy.

11:40 AM E1.04
Indium-Zinc-Oxide TFTs Using *In Situ* Converted Al_2O_3/HfO_2 Gate Stack Yang Song[1], Stylianos Siontas[2], Alexander Zaslavsky[1, 2], David Paine[2] and Alexander Katsman[3]; [1]Physics, Brown University, Providence, Rhode Island, United States; [2]School of Engineering, Brown University, Providence, Rhode Island, United States; [3]Dept. of Materials Science and Engineering, Technion, Haifa, Israel.

F/H: Solid State Photoelectrochemistry/High Temperature Routes to Solar Fuels

SESSION F/H1: Solid State Photoelectrochemistry/High Temperature Routes to Solar Fuels I
F/H: Solid State Photoelectrochemistry/High Temperature Routes to Solar Fuels
Chair: Tim Davenport
Monday Morning, June 15, 2015
Keystone Resorts, Grays Peak III

10:10 AM BREAK

10:30 AM **F/H1.01
Concentrating Solar Thermochemical Fuels: Key Materials Issues for Commercial Viability and Scalability Ellen B. Stechel[1] and James E. Miller[2]; [1]LightWorks, Arizona State University, Tempe, Arizona, United States; [2]Sandia National Laboratories, Albuquerque, New Mexico, United States.

11:00 AM F/H1.02
Discovery of Novel Perovskites for Solar Thermochemical Water Splitting from High-Throughput First-Principles Calculations Antoine A. Emery and Chris Wolverton; Materials Science and Engineering, Northwestern University, Evanston, Illinois, United States.

11:20 AM *F/H1.03
Fuel Production from Concentrated Solar Radiation Christian Sattler and Martin Roeb; Solar Chemical Engineering, German Aerospace Center - DLR, Cologne, Germany.

11:40 AM F/H1.04
Decisive Thermodynamic Factor of Perovskite Catalysts for Thermochemical Water Splitting Yoshihiro Yamazaki[1, 2], Chih-Kai Yang[3] and Sossina M. Haile[3]; [1]Inamori Frontier Research Center, Kyushu University, Fukuoka, Japan; [2]Japan Science and Technology Agency, Kawaguchi, Japan; [3]California Institute of Technology, Pasadena, California, United States.

SESSION F/H3: Solid State Photoelectrochemistry/High Temperature Routes to Solar Fuels II
F/H: Solid State Photoelectrochemistry/High Temperature Routes to Solar Fuels
Chairs: Shannon Boettcher and Tim Davenport
Monday Afternoon, June 15, 2015
Keystone Resorts, Grays Peak III

2:30 PM *F/H3.01
Characterization of La-Mn Perovskites and Doped Ceria for Thermochemical H_2O and CO_2 Splitting Applications Jonathan Scheffe[1], Thomas Cooper[2], Michael Takacs[2] and Aldo Steinfeld[2]; [1]Mechanical and Aerospace Engineering, University of Florida, Gainesville, Florida, United States; [2]Department of Mechanical and Process Engineering, ETH Zurich, Zurich, Switzerland.

2:50 PM F/H3.02
Perovskites from Earth-Abundant Elements for Thermochemical Energy Storage Rounak Kharait[1], Luca Imponenti[1], Michael Sanders[2], Jianhua Tong[2], Ryan O'Hayre[2] and Gregory S. Jackson[1]; [1]Mechanical Engineering, Colorado School of Mines, Golden, Colorado, United States; [2]George S. Ansell Dept. of Metallurgical and Materials Engineering, Colorado School of Mines, Golden, Colorado, United States.

3:10 PM **F/H3.03
Engineering Materials and Interfaces for Efficient and Stable Photocatalytic Water Splitting Jinhui Yang, Jason K. Cooper, Francesca M. Toma and Ian D. Sharp; Lawrence Berkeley National Laboratory, Berkeley, California, United States.

3:40 PM **F/H3.04
Excited State Dynamics in Oxynitride Nanocrystals and Implications for Solar Fuel Generation Gordana Dukovic; Chemistry and Biochemistry, University of Colorado Boulder, Boulder, Colorado, United States.

4:10 PM **F/H3.05
Charge Carrier Transport and Catalysis on Solution-Processed Photoelectrodes for Solar Water Splitting Kevin Sivula; Laboratory for Molecular Engineering of Optoelectronic Nanomaterials, Institute of Chemical Science and Engineering, École Polytechnique Fédérale de Lausanne, Lausanne, Switzerland.

4:40 PM F/H3.06
Enhanced Photoactivity in Mo:$BiVO_4$ by Thermally Activating Small Polaron Hopping Liming Zhang, Xiaofei Ye, Madhur Boloor, Andrey Poletayev, Nicholas Melosh and William Chueh; Materials Science & Engineering, Stanford University, Stanford, California, United States.

5:00 PM F/H3.07
Mixed Conductivity as the Origin of Capacitive and Hysteretic Anomalies in Organo-Lead Halide Perovskites Giuliano Gregori[1], Tae-Youl Yang[1], Norman Pellet[2], Michael Graetzel[2] and Joachim Maier[1]; [1]Max Planck Institute for Solid State Research, Stuttgart, Germany; [2]Swiss Federal Institute of Technology, Lausanne, Switzerland.

POSTER PRESENTATIONS

MONDAY June 15, 2015

SESSION A2: Poster Session I
A: Solid Oxide Fuel Cells and Electrolyzers
Monday Afternoon, June 15, 2015
12:00 PM
Keystone Resorts, Red Cloud Peak

A2.01
Structural Stability of Complex Perovskites for Solid Oxide Fuel Cells from First Principles Calculations Maija M. Kuklja[1], Eugene A. Kotomin[2, 3], David Fuks[4], Yuri A. Mastrikov[2]and Joachim Maier[3]; [1]Materials Science and Engineering Department, University of Maryland College Park, College Park, Maryland, United States; [2]Institute for Solid State Physics, University of Latvia, Riga, Latvia; [3]Max Planck Institute for Solid State Research, Stuttgart, Germany; [4]Dept Materials Engineering, Ben Gurion University of the Negev, Beer Sheva, Israel.

A2.02
Long Term Degradation Effects in Doped Ceria from First Principles Steffen Grieshammer[1, 2, 3], Benjamin O. Grope[1, 2, 3], Julius Koettgen[1, 2, 3] and Manfred Martin[1, 2, 3]; [1]Institute of Physical Chemistry I, RWTH Aachen University, Aachen, Germany; [2]JARA-ENERGY, Aachen, Germany; [3]JARA-HPC, Aachen, Germany.

A2.03 WITHDRAWN

A2.04
First Principles Thermodynamics of Oxygen Vacancies in Ultrathin Films of $BaZrO_3$ Marco Arrigoni[1], Eugene A. Kotomin[1], Joachim Maier[1] and Tor S. Bjorheim[2]; [1]Physical Chemistry of Solids, Max Planck Institute for Solid State Research, Stuttgart, Germany; [2]Department of Chemistry, University of Oslo, Oslo, Norway.

A2.05
Optimum Zr Configurations in $Ce_{1-x}Zr_xO_2$ ($x \in [0,1]$) Solid Solution Using Genetic Algorithm and Density Functional Theory Jason Kim[2], Shin-Won Hwang[1], Ji-Su Kim[1], Byung-Kook Kim[3] and Yeong-Cheol Kim[1]; [1]School of Energy, Materials, and Chemical Engineering, KoreaTech, Cheonan, Korea (the Republic of); [2]School of Electrical and Computer Engineering, UNIST, Ulsan, Korea (the Republic of); [3]High Temperature Energy Materials Center, Korea Institute of Science and Technology, Seoul, Korea (the Republic of).

A2.06
Theoretical Study of Oxygen Vacancy Formation in $Ce_{0.75}Zr_{0.25}O_2$ Solid Solution Using Density Functional Theory Ji-Su Kim[1], Shin-Won Hwang[1], Jason Kim[2], Byung-Kook Kim[3]and Yeong-Cheol Kim[1]; [1]School of Energy, Materials, and Chemical Engineering, KoreaTech, Cheonan, Korea (the Republic of); [2]School of Electrical and Computer Engineering, UNIST, Ulsan, Korea (the Republic of); [3]High Temperature Energy Materials Center, Korea Institute of Science and Technology, Seoul, Korea (the Republic of).

A2.07
High-Throughput Density Functional Theory Screening of Perovskite Compounds for High Oxygen Surface-Exchange for Solid Oxide Fuel Cell Cathodes Ryan Jacobs[1], Dane Morgan[1, 3] and John Booske[2]; [1]Materials Science Program, University of Wisconsin- Madison, Madison, Wisconsin, United States; [2]Electrical and Computer Engineering, University of Wisconsin- Madison, Madison, Wisconsin, United States; [3]Materials Science and Engineering, University of Wisconsin-Madison, Madison, Wisconsin, United States.

A2.08
Accelerated Materials Design of $Na_{0.5}Bi_{0.5}TiO_3$ Oxygen Ionic Conductors Based on First Principles Calculations Xingfeng He and Yifei Mo; Department of Materials Science and Engineering, University of Maryland, College Park, College Park, Maryland, United States.

A2.09 moved A5.09

A2.10
The Effect of Oxygen Nonstoichiometry on Thermal Expansion and Conduction Mechanism of $LaNi_{1-x}Fe_xO_{3-\delta}$ Eiki Niwa and Takuya Hashimoto; Department of Physics, Nihon University, Setagaya-ku, Japan.

A2.11
Oxygen Nonstoichiometry, Electrical Properties and Thermochemical Expansion of Strontium-Rich $Nd_{2-X}Sr_xNiO_{4\pm D}$ Mixed Conductors Ekaterina Kravchenko[1, 2], Kiryl Zakharchuk[1], Jekabs Grins[3], Gunnar Svensson[3], Vladimir Pankov[2] and Aleksey Yaremchenko[1]; [1]CICECO, Department of Materials and Ceramic Engineering, University of Aveiro, Aveiro, Portugal; [2]Department of Chemistry, Belarusian State University, Minsk, Belarus; [3]Department of Materials and Environmental Chemistry, Stockholm University, Stockholm, Sweden.

A2.12
Oxygen Nonstoichiometry and Defect Chemistry of Perovskite-Structured $SrSn_{1-x}Fe_xO_{3-x/2+\delta}$ Chang Sub Kim[1], Sean R. Bishop[1, 2], Nicola H. Perry[1, 2], Jae Jin Kim[1] and Harry L. Tuller[1, 2]; [1]Department of Materials Science and Engineering & Skoltech Center for Electrochemical Energy Storage, MIT, Cambridge, Massachusetts, United States; [2]International Institute for Carbon Neutral Energy Research (WPI-I2CNER), Kyushu University, Fukuoka, Japan.

A2.13
Defect Structure and Related Properties of $SrTi_{1-x}Fe_xO_{3-d}$ Vladimir Sereda, Dmitry Tsvetkov, Ivan Ivanov and Andrey Zuev; Department of Physical Chemistry, Ural Federal University, Ekaterinburg, Russian Federation.

A2.14
Oxygen Content, Thermodynamic Stability and Electrical Properties of $YBaCo_{4-x}Zn_xO_{7-\delta}$ Dmitry S. Tsvetkov, Nadezhda S. Tsvetkova and A. Y. Zuev; Department of Chemistry, Ural Federal University, Ekaterinburg, Russian Federation.

A2.15
Iso-Octane Internal Reforming in a Solid Oxide Cell Reactor Abdullah Al-Musa[2], Mohamed Al-Saleh[2], Ayman Al-Zahrani[2], Vasileios Kyriakou[3, 4], George Marnellos[1, 4] and Nikolaos Kaklidis[1]; [1]Department of Mechanical Engineering, University of Western Macedonia, Kozani, Greece; [2]Water & Energy Research Institute, King Abdulaziz City for Science & Technology, Riyadh, Saudi Arabia; [3]Department of Chemical Engineering, Aristotle University of Thessaloniki, Thessaloniki, Greece; [4]Chemical Process & Energy Resources Institute, Centre for Research & Technology Hellas, Thessaloniki, Greece.

A2.16
Insights into Oxygen Anion Transprt in Layered Oxides via *In-Situ* Powder Neutron Diffraction Steven McIntosh[1], Alexander C. Tomkiewicz[1], Mazin A. Tamimi[1] and Ashfia Huq[2];[1]Chemical & Biomolecular Engineering, Lehigh University, Bethlehem, Pennsylvania, United States; [2]Neutron Sciences, Oak Ridge National Laboratory, Oak Ridge, Tennessee, United States.

A2.17
Oxygen Nonstoichiometry and Defect Equilibrium in the Ruddlesden–Popper Type Oxides $La_xSr_{3-x}Fe_2O_{7-\delta}$ (x=0, 0.25 and 0.5) Yihan Ling, Fang Wang, Yusuke Okamoto, Takashi Nakamura and Koji Amezawa; Institute of Multidisciplinary Research for Advanced Materials, Tohoku University, Sendai, Japan.

A2.18
Synthesis and Preliminary Characterization of $Sr_{2-x}La_xMnO_{4\pm\delta}$ ($0.25 \leq x \leq 0.6$) Series as Symmetric SOFC Electrode Monica V. Sandoval[1, 2], Freddy L. Duran[1, 2], Caroline Pirovano[2], Edouard Capoen[2], Rose Noelle Vannier[2], Pascal Roussel[2] and Gilles H. Gauthier[1]; [1]Grupo INTERFASE, Universidad Industrial de Santander, Bucaramnaga, Colombia; [2]Unité de Catalyse et de Chimie du Solide, Université Lille 1, Lille, France.

A2.19
The Impact of Precursor Gel Desiccation, Ceria Oxide Pre-Infiltration, and Solution Composition on Tailoring Lanthanum Strontium Cobalt Iron Oxide Nano-Particle Size Theodore E. Burye, Hongjie Tang and Jason Nicholas; Chemical Engineering and Materials Science, Michigan State University, East Lansing, Michigan, United States.

A2.20
Influence of Synthesis Method on the Electrochemical Properties of Bilayer Electrodes Based on $La_2NiO_{4+\delta}$ and $LaNi_{0.6}Fe_{0.4}O_{3-\delta}$ Elena Pikalova[3, 1], Nina Bogdanovich[3], Alexander Kolchugin[3], Alexander Pankratov[3] and Dimitry Bronin[3, 2]; [1]Department of Environmental Economics, Ural Federal University, Ekaterinburg, Russian Federation; [2]Institute of Natural Sciences, Ural Federal University, Ekaterinburg, Russian Federation; [3]Institute of High Temperature Electrochemistry, Ekaterinburg, Russian Federation.

A2.21
Oxygen Mobility in Microwave Sintered Praseodymium Nickelates-Cobaltites and Their Nanocomposites with Yittria-Doped Ceria Vladislav A. Sadykov[1, 2], Nikita F. Eremeev[1], Vasiliy A. Bolotov[1], Yuriy Y. Tanashov[1], Yulia E. Fedorova[1, 3], Daiana G. Amanbayeva[1, 4], Aleksey S. Bobin[1], Ekaterina M. Sadovskaya[1], Vitaliy S. Muzykantov[1], Vladimir V. Pelipenko[1], Anton I. Lukashevich[1], Tamara A. Krieger[1], Arkadiy V. Ishchenko[1, 2] and Alevtina L. Smirnova[5]; [1]Boreskov Institute of Catalysis, Novosibirsk, Russian Federation;[2]Novosibirsk State University, Novosibirsk, Russian Federation; [3]Novosibirsk State Pedagogical University, Novosibirsk, Russian Federation; [4]Novosibirsk State Technical University, Novosibirsk, Russian Federation; [5]South Dakota School of Mines & Technology, Rapid City, South Dakota, United States.

A2.22
Electrochemical Performance of La and Ni Co-Doped $SrTiO_3$ Anode of Solid Oxide Fuel Cell Byung Hyun Park and Gyeong Man Choi; Mat. Sci. & Eng., POSTECH, Pohang, Korea (the Republic of).

A2.23
Functionally Graded Electrodes Using Centrifuge Deposition for Solid Oxide Fuel and Electrolysis Cells Shahid P. Shafi , Ioannis Bantounas, Udo Schwingenschloegl, Enrico Traversa and Samir Boulfrad; Physical Sciences and Engineering, King Abdullah University of Science and Technology (KAUST), Thuwal, Saudi Arabia.

A2.24
The Impact of Surfactant Choice on Infiltrate Size-Tailored Nano-Composite Solid Oxide Fuel Cell Cathodes Theodore E. Burye and Jason D. Nicholas; Chemical Eng and Material Science, Michigan State University, East Lansing, Michigan, United States.

A2.25
Preparation of Thin Films by the Method of Electrophoretic Deposition of Nanopowders on the Cathode Substrate Elena Kalinina[1], Elena Pikalova[2, 3], Anastasia Men'shikova[3] and Irina Nikolaenko[4, 3]; [1]Institute of Electrophysics of the Ural Branch of the Russian Academy of Sciences, Ekaterinburg, Russian Federation; [2]Institute of High Temperature Electrochemistry, UB RAS, Ekaterinburg, Russian Federation; [3]Ural Federal University, Ekaterinburg, Russian Federation; [4]Institute of Solid State Chemistry, UB RAS , Ekaterinburg, Russian Federation.

A2.26
The Electrochemical Reduction Mechanism of $Sm_{0.35}Ba_{0.15}Sr_{0.5}Co_{0.8}Fe_{0.2}O_{3-\delta}$ and Graded Composite Cathode Jianquan Gao, Shengli An, Fen Zhou and Xiwen Song; School of Materials and Metallurgy, Inner Mongolia University of Science and Technology, Baotou, China.

A2.27
Oxygen Exchange Kinetics of Doped Lanthanum Cobaltite System Keiji Yashiro[2], Hiroki Sato[1], Mie Sasaki[1], Takashi Nakamura[3], Shinichi Hashimoto[1], Koji Amezawa[3] and Tatsuya Kawada[1]; [2]GSES, Tohoku University, Sendai, Japan; [3]IMRAM, Tohoku University, Sendai, Japan.

A2.28
Surface Modification of $La_{0.6}Sr_{0.4}Co_{0.2}Fe_{0.8}O_{3-\delta}$ by Nanometer-Thick Mixed Conducting Oxide Films Michael L. Machala, Burcu Oeguet, David N. Mueller and William C. Chueh; Stanford University, Stanford, California, United States.

A2.29
Microstructural Effect to Thermal Stability and Cathode Performance by Nanoscale ZrO_2 Capping in Platinum Based-Solid Oxide Fuel Cells Kang-Yu Liu[1], Liangdong Fan[1], Chen-Chiang Yu[2], Tsung-Han Lee[1] and Pei-Chen Su[1]; [1]School of Mechanical and Aerospace Engineering, Nanyang Technological University, Singapore, Singapore; [2]Interdisciplinary Graduate School, Nanyang Technological University, Singapore, Singapore.

A2.30
Microstructure and Functionality of Cathode/Electrolyte Interfaces in SOFCs Virginia Wilde[1], Heike Stoermer[1], Julian Szasz[2], Florian Wankmueller[2], Ellen Ivers-Tiffee[2] and Dagmar Gerthsen[1]; [1]Laboratory for Electron Microscopy (LEM), Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany; [2]Institute of Materials for Electric and Electronic Engineering (IWE), Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany.

A2.31
Bias Enhanced Fast Oxygen Exchange and Diffusion Kinetics of Grain Boundaries in LSM Thin Films Tobias M. Huber[1, 2, 3], Edvinas Navickas[4], Daio Takeshi[1], George F. Harrington[1, 2, 3], Nicola H. Perry[3, 5], Ghislain Rupp[4], Walid Hetaba[6], Michael Stoeger-Pollach[6], Harry L. Tuller[2, 5], Bilge Yildiz[3, 2], Kazunari Sasaki[5] and Juergen Fleig[4]; [1]Mechanical Engineering, Kyushu University, Fukuoka, Japan; [2]Materials Science and Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts, United States; [3]Department of Nuclear Science & Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts, United States; [4]Institute of Chemical Technologies and Analytics, Research Division Electrochemistry, Vienna University of Technology, Vienna, Austria; [5]International Center for Carbon Neutral Energy Research (I2CNER), Kyushu University, Fukuoka, Japan; [6]University Service Centre for Transmission Electron Microscopy, Vienna University of Technology, Vienna, Austria.

A2.32
Variable Temperature Multinuclear Solid State NMR Study of "Sr0.55Na0.45SiO2.775" Ryan D. Bayliss[1], Frederic Blanc[2, 3], John Corley[2], John A. Kilner[4, 5] and Stephen Skinner[4];[1]Department of Chemistry, University of Illinois at Chicago, Chicago, Illinois, United States; [2]Department of Chemistry, University of Liverpool, Liverpool, United Kingdom; [3]Stephenson Institute for Renewable Energy, University of Liverpool, Liverpool, United Kingdom; [4]Department of Materials, Imperial College London, London, United Kingdom; [5]International Institute for Carbon-Neutral Energy Research (I2CNER), Nishi-Ku, Japan.

A2.33 Withdrawn

A2.34
Kinetics of Surface Activation and Oxygen Transfer Acceleration Induced by A_2BO_4/ABO_3 Hetero-Interface for SOEC Application Bo Yu, Wenqiang Zhangwq and Jingming Xu; Tsinghua University, Beijing, China.

A2.35
Effect of Sintering Temperature on Properties of 8YSZ Prepared by SPS Jinxia Wang, Zhiqun Ding and Hongxia Zhao; School of Electronic and Information Engineering, Ningbo University of Technology, Ningbo, China.

A2.36
Methanol Synthesis at Atmospheric Pressure in Co-Ionic Electrochemical Membrane Reactors Anastasios Vourros[1, 4], Vasileios Kyriakou[4, 1], Ioannis Garagounis[1, 4], Michalis Konsolakis[2], Zisis Ioakimides[3, 4], George Marnellos[3, 4] and Michael Stoukides[1, 4]; [1]Chemical Engineering, Aristotle University of Thessaloniki, Thessaloniki, Greece; [2]School of Production Engineering and Management, Technical University of Crete, Chania, Greece; [3]Department of Mechanical Engineering, University of Western Macedonia, Kozani, Greece;[4]Chemical Process and Energy Resources Institute, Centre for Research and Technology Hellas, Thessaloniki, Greece.

A2.37
Structural and Electrical Properties of Spark Plasma Sintered Scandia- and Dysprosia-Stabilized Zirconia Robson L. Grosso[1], Ana J. Tertuliano[2], Izabel F. Machado[2] and Eliana N. Muccillo[1]; [1]Energy and Nuclear Research Institute (IPEN), Sao Paulo, Brazil; [2]Polytechnique School, Sao Paulo, Brazil.

A2.38
Electrical Properties of GDC-BCY Composite Electrolytes for Intermediate Temperature Solid Oxide Fuel Cell Xiaomei Liu, Hailin Bi, Haopeng Wang, Shenglong Yu, Fei Han, Lili Zhu, Jialing Sun and Li Pei; Key Laboratory of Physics and Technology for Advanced Batteries, Physics Department, Jilin University, Changchun, China.

A2.39
$Ni_{1-x}Cu_x$-SDC Anodes for Intermediate Temperature Solid Oxide Fuel Cell Lili Zhu[1, 2], Xiaomei Liu[1], Jialing Sun[1], Fei Han[1], Hailin Bi[1], Haopeng Wang[1], Shenglong Yu[1] and Li Pei[1]; [1] Key Laboratory of Physics and Technology for Advanced Batteries, Physics Department , Jilin University, Changchun, China; [2]Beihua University, Jilin, China.

A2.40
Electrical Conductivity of YSZ-SDC Composite Solid Electrolyte Synthesized via Glycine-Nitrate Method Prabhakar Singh; Department of Physics, Indian Institute of Technology (BHU) Varanasi, Varanasi, India.

A2.41
Wet Chemical Synthesis of $(DyO_{1.5})_x(WO_3)_y$ $(BiO_{1.5})_{1-x-y}$ and Application in Bilayer Low Temperature SOFCs Ashley L. Ruth[2], Emily A. Fraik[2], Daniel D. Taylor[1], Hee Sung Yoon[2] and Eric D. Wachsman[2]; [1]Chemistry, University of Maryland, College Park, Maryland, United States; [2]Energy Research Center, University of Maryland, College Park, Maryland, United States.

A2.42
Electrochemical Promotion of CO Oxidation on Pt/YSZ- Interaction between Multiple Promoting Species Danai Poulidi and Efstratios Stavrakakis; Chemistry and Chemical Engineering, Queen's University Belfast, Belfast, United Kingdom.

A2.43 Withdrawn

A2.44
Thin Flim Oxy-Apatites for Solid Oxide Fuel Cell Sunghwan Lee and Shriram Ramanathan; School of Engineering and Applied Sciences, Harvard University, Cambridge, Massachusetts, United States.

A2.45
Structural Stability and Conductivity of the $Bi_3Y_{1-x}W_xO_{6+3x/2}$ System Anna Borowska-Centkowska[1], Wojciech Wrobel[1], Marcin Malys[1], Isaac Abrahams[2] and Franciszek Krok[1];[1]Faculty of Physics Warsaw University of Technology, Warsaw, Poland; [2]Materials Research Institute, Queen Mary University of London, London, United Kingdom.

A2.46
High Humidity Effects in Reversible Solid Oxide Cells and in Ni-YSZ Symmetric Cells Eui-Chol Shin[1], Pyung-An Ahn[1], Hyun-Ho Seo[1], Dang-Thanh Nguyen[1], Sun-Dong Kim[2], Sang-Kuk Woo[2], Ji Haeng Yu[2] and Jong-Sook Lee[1]; [1]Materials Science and Engineering, Chonnam National University, Gwang-Ju, Korea (the Republic of); [2]Korea Institute of Energy Research , Daejeon, Korea (the Republic of).

A2.47
High-Performance Anode-Supported Solid Oxide Fuel Cell with Impregnated Electrodes Denis Osinkin[1], Nina Bogdanovich[1], Sergey Beresnev[1] and Viktor Zhuravlev[2]; [1]Laboratory of SOFC, Institution of High Temperature Electrochemistry, Yekaterinburg, Russian Federation; [2]Institute of Solid State Chemistry, Yekaterinburg, Russian Federation.

A2.48
Extending the Simple Infiltrated Microstructure Polarization Loss Estimation (SIMPLE) Model to Infiltrated Solid Oxide Fuel Cell (SOFC) Anodes Eric Straley and Jason D. Nicholas; Chemical Engineering and Material Science, Michigan State University, East Lansing, Michigan, United States.

A2.49
A High Performance Anode Material for Solid Oxide Fuel Cells: Ni Exsolution on A-Site Deficient $La_{0.4}Sr_{0.4}Sc_{0.9}Ni_{0.1}O_{3-\delta}$ Mattia Saccoccio[1], Yang Gao[1], Dengjie Chen[1], Chi Chen[1] and Francesco Ciucci[1, 2]; [1]Department of Mechanical and Aerospace Engineering, The Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong;[2]Department of Chemical and Biomolecular Engineering, The Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong.

A2.50
Fabrication of Co/Fe-Doped Ni/$BaZr_{0.8}Y_{0.2}O_{3-\delta}$ Anode for Methane-Fueled PCFC Taehyun Park[2, 1], Chuancheng Duan[2], Jianhua Tong[2], Suk Won Cha[1] and Ryan O'Hayre[2];[1]Mechanical and Aerospace Engineering, Seoul National University, Gwanak-gu, Korea (the Republic of); [2]Metallurgical and Materials Engineering, Colorado School of Mines, Golden, Colorado, United States.

A2.51
Synthesis and Preliminary Study of Pure and Zr-Substituted $YMnO_3$ Compounds as Solid Oxide Fuel Cells Electrode Zulma L. Moreno[1, 3], Alberto Caneiro[3], Pascal Roussel[2] and Gilles H. Gauthier[1]; [1]Grupo INTERFASE, Universidad Industrial de Santander, Bucaramanga, Colombia; [2]Université Lille 1, Université Lille Nord de France, Lille, France; [3]Comisión Nacional de Energía Atómica, Centro Atómico de Bariloche, San Carlos de Bariloche, Argentina.

A2.52
Structural and Electrical Properties of Ceria (Ce^{3+}) Doped Double Perovskite System $Sr_2NiMoO_{6-\delta}$ Pravin Kumar, Nitish Kumar Singh and Prabhakar Singh; Physics, Indian Institute of Technology (BHU) , Varanasi, India.

A2.53
Chemical Stability of Double-Perovskite Anode Material Sr_2MgMoO_6 for Solid Oxide Fuel Cells Masahiro Kinoshita[1], Kyota Hara[2], Tomohiro Onozawa[2], Kiyoto Shin-mura[1], Yu Otani[1], Eiki Niwa[3], Takuya Hashimoto[3] and Kazuya Sasaki[1, 2]; [1]Course of Mechanical Engineering, Graduate School of Engineering, Tokai University, Hiratsuka, Japan; [2]Department of Prime Mover Engineering, School of Engineering, Tokai University, Hiratsuka, Japan; [3]Department of Physics, College of Humanities and Sciences, Nihon University, Setagaya-ku, Japan.

A2.54
Novel Ni and Ni Alloy/γ-Al_2O_3 Anode Materials for Direct Carbon SOFCs Sergey Pikalov[2], Evgeny Selivanov[2], Olga Russkikh[1], Elena Filonova[1], Valery Polukhin[2] and Irina Nikolaenko[3]; [1]Institute of Natural Sciences, Ural Federal University, Ekaterinburg, Russian Federation; [2]Institute of Metallurgy, UB RAS, Ekaterinburg, Russian Federation; [3]Institute of Solid State Chemistry, UB RAS, Ekaterinburg, Russian Federation.

A2.55
Novel Double-Layer La_2NiO_{4+d} Cathodes: Screen Printing vs. Electrostatic Spray Deposition R. K. Sharma[1, 2], M. Burriel[3], L. Dessemond[1, 2], Jean-Marc Bassat[4] and E. Djurado[1, 2];[1]LEPMI, Univ. Grenoble Alpes, Grenoble, France; [2]LEPMI, CNRS, Grenoble, France; [3]Catalonia Institute for Energy Research (IREC), Barcelona, Spain; [4]ICMCB-CNRS, Pessac , France.

A2.56
Patterned Electrodes for the Study of CO/CO2 Electrolysis Vladislav Duboviks[1], Enrique Ruiz-Trejo[1], Farid Tariq[1], Paul Boldrin[1], Robert C. Maher[2], Gregory J. Offer[3], Gabriel Castillo[4], Javier Rodriguez Vazquez de Aldana[4], Masashi Kishimoto[1], Leslie F. Cohen[2] and Nigel P. Brandon[1]; [1]Earth Science and Engineering, Imperial College London, London, United Kingdom; [2]Physics, Imperial College London, London, United Kingdom; [3]Mechanical Engineering, Imperial College London, London, United Kingdom; [4]Ciencias, Universidad de Salamanca, Salamanca, Spain.

SESSION C2: Poster Session I
C: Electrodes and Solid Electrolytes for Batteries
Monday Afternoon, June 15, 2015
12:00 PM
Keystone Resorts, Red Cloud Peak

C2.01
Fast Li Self-Diffusion in Amorphous Li-Si Electrochemically Prepared from Semiconductor Grade, Monocrystalline Silicon — Insights from Spin-Locking Nuclear Magnetic Relaxometry Andreas Dunst, Michael Sternad, Viktor Epp and Martin Wilkening; Christian-Doppler Laboratory for Lithium Batteries, Institute for Chemistry and Technology of Materials, Graz University of Technology, Graz, Austria.

C2.02
Solubility Behavior of Nanograined Li_2MnSiO_4 Cathode Material in Liquid Electrolytes Marcin Molenda, Michal Swietoslawski and Roman Dziembaj; Faculty of Chemistry, Jagiellonian University, Krakow, Poland.

C2.03
Studies on PVA Based Nanocomposite Polymer Gel Electrolyte Membranes for High Performance Proton Conducting Batteries S. L. Agrawal[1] and Neelesh Rai[2]; [1]Department of Physics, APS University, Rewa , India; [2]Department of Physics, AKS University, Satna, India.

C2.04
Lithium in Diffusion Measurements on a Garnet-Type Solid Conductor $Li_{6.6}La_3Zr_{1.6}Ta_{0.4}O_{12}$ (LLZO-Ta) by Pulsed-Gradient Spin-Echo NMR Method Kikuko Hayamizu[1], Yasuaki Matsuda[2], Masaki Matsui[2], Yasuo Takeda[2] and Nobuyuki Imanishi[2]; [1]Institute of Applied Physics, University of Tsukuba, Tsukuba, Japan; [2]Department of Chemistry for Materials, Mie-University, Tsu, Mie, Japan.

C2.05
All Solid State Li-Garnet-Based Batteries: From Materials Development to Thin Film Microstructures Jennifer L. Rupp[1], Semih Ayfon[1], Inigo Garbayo[1], Reto Pfenninger[1], Michael Rawlence[2, 1] and Michal Struzik[1]; [1]Electrochemical Materials, ETH Zurich, Zurich, Switzerland; [2]Laboratory for Thin Films and Photovoltaics, EMPA, Dübendorf, Switzerland.

C2.06
Proof-of-Concept of All-Solid-State Metal-Metal Battery Fuminori Mizuno[1], Ruigang Zhang[1], Timothy S. Arthur[1], Donovan N. Leonard[2], Miaofang Chi[2] and Jeff Sakamoto[3];[1]Materials Research Department, Toyota Research Institute of North America, Ann Arbor, Michigan, United States; [2]Oak Ridge National Laboratory, Oak Ridge, Tennessee, United States;[3]Mechanical Engineering, University of Michigan, Ann Arbor, Michigan, United States.

C2.07 Withdrawn

C2.08
Li-Ion Conducting Polymer Electrolytes Based on Biopolymer, Agar Agar Selvasekarapandian Subramanian[1], Vinitha Thiyagarajan Upaassana[1], Sindhuja Manohar[1], Monisha Sampath[1] and Arun A[2]; [1]Physics, Materials Research Centre, Coimbatore, India; [2]Chemistry, Government Arts College, Thiruvannamalai, India.

C2.09
A Comparative Study of Impact in Conductivity of $LiNiPO_4$ on Doping Europium and Samarium in Lithium and Nickel Sites Prepared Using Modified Pechini and Polymeric Precursor Method Selvasekarapandian Subramanian[1, 2], Goutam Anbunathan V N[2], Kalpana M[2], Senthil Kumar P[3], Vinoth Pandi D[4], Sakunthala A[3] and Gunasekaran K[2]; [1]Physics, Materials Research Centre, Coimbatore, India; [2]Department of Nano Science and Technology, Tamilnadu Agricultural University, Coimbatore, India; [3]Department of Physics, Karunya University, Coimbatore, India; [4]Department of Physics, Coimbatore Institute of Technology, Coimbatore, India.

C2.10
Sputter Deposited $Li_7La_3Zr_2O_{12}$ as Electrolyte for Thin Film Cells Sandra Lobe[1], Christian Dellen[1], Hans-Gregor Gehrke[1], Chih-Long Tsai[1], Martin Finsterbusch[1], Sven Uhlenbruck[1]and Olivier Guillon[1, 2]; [1]Institute of Energy and Climate Research (IEK-1) , Forschungszentrum Jülich, Jülich, Germany; [2]Institut für Gesteinshüttenkunde, Rheinisch-Westfälische Technische Hochschule (RWTH) Aachen, Aachen, Germany.

C2.11
Evaluation of Mechanical Properties of Li_2S-P_2S_5-LiI Glass Electrolytes for All-Solid-State Lithium Batteries Atsutaka Kato[1], Atsushi Sakuda[2], Akitoshi Hayashi[1] and Masahiro Tatsumisago[1]; [1]Applied Chemistry, Osaka Prefecture University, Sakai, Japan; [2]Research Institute for Ubiquitous Energy Devices, National Institute of Advanced Industrial Science and Technology (AIST), Ikada, Japan.

C2.12
Aluminum-Doped $Li_7La_3Zr_2O_{12}$ - A Promising Candidate as a Solid Electrolyte for Lithium-Ion Batteries Miriam Botros[1], Ruzica Djenadic[1, 2, 3] and Horst Hahn[1, 2, 3]; [1]Joint Research Laboratory Nanomaterials, Technical University Darmstadtand and Karlsruhe Institute of Technology, Darmstadt, Germany; [2]Institute for Nanotechnology, Karlsruhe Institute of Technology, Eggenstein-Leopoldshafen, Germany; [3]Helmholtz Institute Ulm, Ulm, Germany.

C2.13
Microstructure-Electrical Property Relationship in Polycrystalline Sodium β"-Alumina by New Impedance Modelling Approach Jee-Hoon Kim[1], Dong-Chun Cho[1], Su-Hyun Moon[1], Eui-Chol Shin[1], Sansudae Lim[2], Sooseok Kim[2], Keedeok Yang[2], Jinhyung Beom[2] and Jong-Sook Lee[1]; [1]Materials Science and Engineering, Chonnam National University, Gwangju, Korea (the Republic of); [2]FineTech Co., Ltd., Daejeon, Korea (the Republic of).

C2.14
Non-Stoichiometry of Composites: Thermodynamic Analysis of Dissociative Storage at Interfaces Chia-Chin Chen, Lijun Fu and Joachim Maier; Max Planck Institute for Solid State Research, Stuttgart, Germany.

C2.15
Rechargeable Batteries and Condensed Matter Physics Lin Gu; Institute of Physics, Chinese Academy of Sciences, Beijing, China.

C2.16
Diatomaceous Earth and Algae Based Aqueous Binders Make Environmentally Friendly High-Performance Anodes for Lithium-Ion Batteries Muhammad Hasanuzzaman and Fride Vullum-Bruer; Materials Science and Engineering, Norwegian University of Science and Technology, NTNU, Trondheim, Norway.

C2.17
Preparation of Li_2S-$FePS_3$ Composite Positive Electrode Materials and Their Electrochemical Properties Tomonari Takeuchi[1], Hiroyuki Kageyama[1], Masahiro Ogawa[2], Koji Nakanishi[3], Toshiaki Ohta[2], Atsushi Sakuda[1], Hikari Sakaebe[1], Hironori Kobayashi[1] and Zempachi Ogumi[3]; [1]National Institute of Advanced Industrial Science and Technology, Ikeda, Japan; [2]Ritsumeikan University, Kusatsu, Japan; [3]Kyoto University, Kyoto, Japan.

C2.18
Highly Conductive Glass-Ceramic Electrolytes for Advanced Lithium Batteries Miriam Kunze, Meike Schneider, Maria-Luisa Reich, Wolfgang Schmidbauer and Andreas Roters; SCHOTT AG, Mainz, Germany.

C2.19
Investigation of O3-$Na_{0.9}[Ni_{0.45}Ti_{0.55}]O_2$ Using Electroanalytical Techniques and Ex-Situ XRD for Na-Ion Batteries Rengarajan Shanmugam and Wei Lai; CHEMS, Michigan State University, East Lansing, Michigan, United States.

C2.20
Evidence for a >1 Electron Reaction in Li_2FeSiO_4: An *in situ* Mössbauer Spectroscopy Study Anti Liivat[1], Josh Thomas[1], Jianghuai Guo[2] and Yong Yang[2]; [1]Chemistry, Uppsala University, Uppsala, Sweden; [2]Chemistry, Xiamen University , Xiamen, China.

C2.21
Optimization of Ionic Conductivity in Garnet-Type Solid State Electrolytes for Lithium Ion Batteries Sumaletha Narayanan, Xia Tong, Venkataraman Thangadurai and Kalpana Singh; Department of Chemistry, University of Calgary, Calgary, Alberta, Canada.

C2.22
Electrochemical Properties of All-Solid-State Lithium-Ion Batteries Using Li_2CO_3-Li_3BO_3 Electrolyte Toyoki Okumura, Tomonari Takeuchi, Masahiro Shikano and Hironori Kobayashi; Advanced Battery Research Group, National Institute of Advanced Industrial and Technology (AIST), Ikeda, Japan.

C2.23
Spinel-Based Solid Electrolyte for Lithium-Ion Battery Application Ruzica Djenadic[1, 2, 3], Miriam Botros[3], Chritoph Loho[3] and Horst Hahn[2, 3, 1]; [1]Helmholtz Institute Ulm, Ulm, Germany; [2]Institute of Nanotechnology, Karlsruhe Institute of Technology, Eggenstein-Leopoldshafen, Germany; [3]Joint Research Laboratory Nanomaterials – Technical University Darmstadt & Karlsruhe Institute of Technology, Darmstadt, Germany.

C2.24
Transport of Alkali Ions in an Organic Ionic Plastic Crystal Fangfang Chen and Maria Forsyth; Institute for Frontier Materials, Deakin University, Burwood, Victoria, Australia.

C2.25
Electrochemical Properties and Structural Evaluation of Amorphous MoS_3 Positive Electrode Active Materials in All-Solid-State Lithium Secondary Batteries Takuya Matsuyama[1], Minako Deguchi[1], Akitoshi Hayashi[1], Masahiro Tatsumisago[1], Tomoatsu Ozaki[2] and Shigeo Mori[3]; [1]Department of Applied Chemistry, Osaka Prefecture University, Sakai, Japan; [2]Technology Research Institute of Osaka Prefecture, Izumi, Japan; [3]Department of Materials Science, Osaka Prefecture University, Sakai, Japan.

C2.26
Comparing Electrochemical Performance of Silicate Cathodes and Chevrel Phase Mo_6S_8 in the Analogous Rechargeable Mg-Ion Battery System Xinzhi Chen[1], Lu Wang[1], Sidsel M. Hanetho[2], Paul I. Dahl[2] and Fride Vullum-Bruer[1]; [1]Department of Materials Science and Engineering, Norwegian University of Science and Technology, Trondheim, Norway;[2]Department of Sustainable Energy Technology, SINTEF Materials and Chemistry, Trondheim, Norway.

C2.27
Computer Aided Design of Polyanionic Electrolytes: A Molecular Dynamic Study Xingyu Chen; Institute of Frontier Materials, Deakin University, Melbourne, Victoria, Australia.

C2.28
Enhancement of Ionic Conductivity of Battery Electrolytes Using Nanoconfined Polymer Electrolyte, Ionic Liquids and Ionic Liquid/ Polymer Electrolyte Blends Indumini Jayasekara and Dale Teeters; Chemistry and Biochemistry, The University of Tulsa, Tulsa, Oklahoma, United States.

C2.29
Investigation of the Unique Crystalline Orientation of a Nanostructured Lithium Cobalt Oxide Thin Film Cathodes for Lithium Ion Batteries Mark Poyner and Dale Teeters; Chemistry and Biochemistry, The University of Tulsa, Tulsa, Oklahoma, United States.

C2.30
Electrical Characterization of $Na_3Sc_2(PO_4)_3$:Eu2+ Su-Hyun Moon, Yun-Hwa Kim, Dong-Chun Cho, Eui-Chol Shin, Won-Bin Im and Jong-Sook Lee; School of Materials Science and Engineering, Chonnam National University, Gwangju, Korea (the Republic of).

C2.31
Dispersive Frequency Response in Low Temperature Silver Iodide by Immittance Spectroscopy Su-Hyun Moon, Young-Hun Kim, Dong-Chun Cho, Eui-Chol Shin and Jong-Sook Lee; School of Materials Science and Engineering, Chonnam National University, Gwangju, Korea (the Republic of).

C2.32
Novel Copper-Based Layered Oxide Cathode for Room-Temperature Sodium-Ion Batteries Linqin Mu, Yong-Sheng Hu, Shuyin Xu, Yunming Li and Liquan Chen; Chinese Academy of Sciences, Institution Of Physics, Beijing, China.

C2.33
The Degradation Mechanism of Nickel-Rich Cathode Active Materials with Vinylene Carbonate in An Electrolyte for Lithium Ion Batteries at Various Temperatures Su Jung Do,Prasanna Kadirvelayutham, Yong Nam Jo, Robert Ilango Pushparaj and Chang Woo Lee; Kyung Hee University, Yongin-si, Korea (the Republic of).

C2.34
Electrochemical Properties of Sn-Co Electrode with Various Kinds of Binder Materials for Sodium Ion Batteries Yuhki Yui, Masahiko Hayashi, Katsuya Hayashi and Jiro Nakamura; NTT, Atsugi, Japan.

C2.35
Synthesis of Chatode Materials $LiFePO_4$ by Hydrothermal and Ultrasonic Method Wagiyo Honggowiranto and Evvy Kartini; Advanced Materials, National Nuclear Energy Agency, Tangerang Selatan, Indonesia.

C2.36
Characterization of Structural and Transport Properties of $LiMn_{1.7}Cu_{0.3}O_4$ Lukasz Kondracki, Anna G. Milewska and Janina Molenda; AGH University of Science and Technology, Kraków, Poland.

C2.37
Comparative Analysis of Structure-Property Relationship of Nanosilicon Anodes for Lithium-Ion Batteries Diana Golodnitsky, Emanuel Peled, Fernando Patolsky, Kathrin Freedman, Meital Goor, Keren Goldstein, Guy Davidi and Dan Schneier; School of Chemistry, Tel Aviv University, Tel Aviv, Israel.

C2.38
A Na^+ Superionic Conductor Based on NASICON and Its Application in All-Solid-State Sodium Batteries Zhizhen Zhang, Kaiqi Xu, Yong-Sheng Hu and Liquan Chen; Institute of Physics Chinese Academy of Sciences, Beijing, China.

C2.39
Impedance Measurement for Ti-Zr-Ni Alloy Electrodes Produced by Mechanical Alloying and Subsequent Annealing Akito Takasaki[1], Youhei Ariga[1], Wojciech Zajac[2] and Konrad Swierczek[2]; [1]Engineering Science and Mechanics, Shibaura Institute of Technology, Tokyo, Japan; [2]Faculty of Energy and Fuels, AGH University of Science and Technology, Krakow, Poland.

C2.40
Structural Evaluation of Delithiated $Li_xMn_{1.5}Ni_{0.5-y}Cu_yO_4$ Spinels Lukasz Kondracki, Anna Milewska, Artur Bogacki, Slawomir Lalik and Janina Molenda; AGH University of Science and Technology, Kraków, Poland.

C2.41
Synthesis, Structure and Ionic Conductivities of Novel Li-Ion Conductor $A_3Li_xTa_{6-x}Zr_xSi_4O_{26}$ (A = Ba, Sr) Akihisa Aimi[1], Yoshiyuki Inaguma[1], Miki Kubota[1], Daisuke Mori[1], Tetsuhiro Katsumata[2], Minoru Ikeda[3] and Takahisa Ohno[3, 4]; [1]Chemistry, Gakushuin University, Toshima-ku, Japan; [2]Chemistry, Tokai University, Hiratsuka-shi, Japan; [3]National Institute for Materials Science, Tsukuba-shi, Japan; [4]Global Research Center for Environment and Energy based Nanomaterials Science, Tsukuba-shi, Japan.

C2.42
Properties of Lithium-Stuffed Garnet-Type Oxide Solid Electrolyte Thick Film Fabricated by Aerosol Deposition Method Ryoji Inada, Takayuki Okada, Keiji Tsuritani, Kota Wagatsuma, Tomohiro Tojo and Yoji Sakurai; Department of Electrical and Electronic Information Engineering, Toyohashi University of Technology, Toyohashi, Japan.

C2.43
Defect Chemistry and Transport in Alkali Superoxides Oliver Gerbig, Rotraut Merkle and Joachim Maier; MPI for Solid State Research, Stuttgart, Germany.

C2.44
Dielectric and Transport Properties Study of Clay Based Solid Polymer Electrolyte Namrata Tripathi[1], Awalendra K. Thakur[3], Archana Shukla[2] and David T. Marx[1]; [1]Physics, Illinois State University, Normal, USA, Normal, Illinois, United States; [2]Physics, Indian Institute of Technology Bombay, Maharastra, Mumbai, India; [3]Physics, Indian Institute of Technology Patna, Bihar, Patna, India.

C2.45
The Effect of Cathode Microstructure on the Performance of All Solid-State Li Battery Sven Uhlenbruck, Chih-Long Tsai, Christian Dellen, Qianli Ma, Sandra Lobe and Olivier Guillon; Institute of Energy and Climate Research, Forschungszentrum Jülich GmbH, Jülich, Germany.

C2.46
Conductivity and Scaling Behavior of Nd^{3+} Ions Containing Lithium Borate Glasses Durgaprasad D. Ramteke[1, 2], Hendrik C. Swart[1] and Rupesh S. Gedam[2]; [1]Department of Physics, University of Free State , Bloemfontein , South Africa; [2]Department of Applied Physics, Visvesvaraya National Institute of Technology, Nagpur, India.

C2.47
A Battery Made from a Single Material Fudong Han[1], Tao Gao[1], Yujie Zhu[1], Karen J. Gaskell[2] and Chunsheng Wang[1]; [1]Department of Chemical and Biomolecular Engineering, University of Maryland, College Park, Maryland, United States; [2]Department of Chemistry and Biochemistry, University of Maryland, College Park, Maryland, United States.

C2.48
High Rate Growth by Pulsed Laser Deposition and Characterization of Epitaxial $LiCoO_2$ Films Kazunori Nishio[1], Tsuyoshi Ohnishi[1, 2, 3], Minoru Osada[3], Narumi Ohta[1, 2], Ken Watanabe[2] and Kazunori Takada[1, 2, 3]; [1]Global Research Center for Environment and Energy based on Nanomaterials Science, National Institute for Materials Science, Tsukuba, Japan;[2]Environment and Energy Materials Division, National Institute for Materials Science, Tsukuba, Japan; [3]International Center for Materials Nanoarchitectronics , National Institute for Materials Science, Tsukuba, Japan.

C2.49
Assembly and Electrochemical Properties of $LiFePO_4$/C Pouch Cell Evvy Kartini and Wagiyo Honggowiranto; Science and Technology Center for Advanced Materials, National Nuclear Energy Agency, South Tangerang, Indonesia.

C2.50
Towards Control over Redox Behavior and Ionic Conductivity in $LiTi_2(PO_4)_3$ Fast Lithium-Ion Conductor Wojciech Zajac[1], Mateusz Tarach[1] and Anita Trenczek-Zajac[2]; [1]Faculty of Energy and Fuels, AGH University of Science and Technology, Krakow, Poland; [2]Faculty of Materials Science and Ceramics, AGH University of Science and Technology, Krakow, Poland.

C2.51
Advanced Planar Lithium-Sulfur Batteries Based on Solid Ceramic Li-Ion Conducting Separators Feng Zhao and John Bi; Ceramatec, Inc. , Salt Lake City, Utah, United States.

C2.52
Development of NaSICON-Type Lithium Ion Conductors Feng Zhao and John Bi; Ceramatec, Inc. , Salt Lake City, Utah, United States.

C2.53
Preparation of Li_2S–P_2S_5 Solid Electrolytes Using Organic Solvents as Synthetic Media Nguyen H. Phuc, Kei Morikawa, Mitsuhiro Totani, Hiroyuki Muto and Atsunori Matsuda; Electrical and Electronic Information Engineering, Toyohashi University of Technology, Toyohashi, Japan.

C2.54
Mechanochemical Preparation of Lithium Sulfide-Lithium Iodide Solid Solutions as Active Materials for All-Solid-State Lithium Secondary Batteries Takashi Hakari, Akitoshi Hayashi and Masahiro Tatsumisago; Department of Applied Chemistry , Osaka Prefecture University, Sakai-shi, Japan.

C2.55
A Study on the Effects of Mechanical Alloys as Anodes on Corrosion and Hydrogen Evolution Reaction in Zinc-Air System Yong Nam Jo, Prasanna Kadirvelayutham, Su Jung Do, Subburaj Thiruvengadam and Chang Woo Lee; Kyung Hee University, Yongin-si, Korea (the Republic of).

C2.56
Synthesis and Electrochemical Property of Garnet-Type Lithium-Ion Conductor $Li_{7-x-y}Al_yLa_3Zr_{2-x}Ta_xO_{12}$ Yasuaki Matsuda[1], Yuya Itami[1], Masaki Matsui[1, 2], Yasuo Takeda[1] and Nobuyuki Imanishi[1]; [1]Chemistry, Mie University, Tsu, Japan; [2]PRESTO, Japan Science and Technology Agency, Honcho, Kawaguchi, Japan.

C2.57
On V Substitution in Li_2MnSiO_4/C as Potential Positive Electrode for Li-Ion Batteries Nils Wagner, Ann-Mari Svensson and Fride Vullum-Bruer; Material Science and Engineering, Norwegian University of Science and Technology, Trondheim, Norway.

C2.58
Electrical Conductivity Characterization of $LiAlO_2$ Thin Films Prepared by ALD Yang Hu, Amund Ruud, Ville Miikkulainen, Truls Norby, Ola Nilsen and Helmer Fjellvag; Centre for Materials Science and Nanotechnology, Department of Chemistry, University of Oslo, Oslo, Norway.

C2.59
Solid Electrolytes for Lithium-Sulfur Batteries Alice Cassel[1, 2, 3], Benoit Fleutot[1, 2, 3], Christine Surcin[1, 2, 3], Virginie Viallet[1, 2, 3] and Mathieu Morcrette[1, 2, 3]; [1]Laboratoire de Réactivité et Chimie des Solides, Amiens, France; [2]Réseau sur le Stockage Electrochimique de l'Energie, Amiens, France; [3]Alistore-ERI, Amiens, France.

C2.60
Preparation and Properties of Lithium Conducting Membranes from Polymer-Brush Nanoparticles Ilya Zharov[1, 2]; [1]Chemistry, University of Utah, Salt Lake City, Utah, United States; [2]Materials Science and Engineering, University of Utah, Salt Lake City, Utah, United States.

C2.61
Separators Based on Novel Triblock Polyelectrolyte for Lithium Battery: Improving Performance and Safety Kun-lin Liu and Chi-Yang Chao; Materials Science and Engineering, National Taiwan University, Taipei, Taiwan.

C2.62
Rechargeable Lithium Semi-Flow Battery Using $Li_7P_3S_{11}$ Rayavarapu Prasada Rao, Jia Ming Yuen and Stefan Adams; Materials Science & Eng., National University of Singapore, Singapore, Singapore.

C2.63
$Li_{10}SnP_2S_{12}$, an Electrolyte and Negative Electrode Material for Solid State Li-Ion Batteries? Ilyas Tarhouchi[3, 2], Virginie Viallet[1, 2], Philippe Vinatier[3, 2] and Michel Menetrier[3, 2];[1]LRCS - UMR CNRS 7314, Amiens, France; [2]Réseau sur le Stockage Electrochimique de l'Energie (RS2E), FR CNRS 3459, Amiens, France; [3]ICMCB - CNRS, Pessac, France.

C2.64
Preparation and Electrochemical Studies on Fe-Doped $LiVPO_4F$ Cathode M.V. Reddy[1, 2], Rayavarapu Prasada Rao[1], Stefan Adams[1] and B.V.R. Chowdari[2]; [1]Materials Science & Eng., National University of Singapore, Singapore, Singapore; [2]Dep. of Physics, National University of Singapore, Singapore, Singapore.

C2.65 Withdrawn

SESSION D2: Poster Session: Fundamentals of Transport and Reactivity and Nanoionics I
D: Fundamentals of Transport and Reactivity and Nanoionics
Monday Afternoon, June 15, 2015
12:00 PM
Keystone Resorts, Red Cloud Peak

D2.01
***In Situ* Optical Absorption Studies of Defect Equilibria and Kinetics: Application to $Sr(Ti,Fe)O_{3-\alpha}$ Thin Films** Nicola H. Perry[1, 2], Jaejin Kim[2] and Harry L. Tuller[2, 1]; [1]I2CNER, Kyushu University, Nishi-ku, Fukuoka, Japan; [2]Materials Science and Engineering, MIT, Cambridge, Massachusetts, United States.

D2.02
Millimeter Wave Spectroscopy and Molecular Dynamics Simulation of Ionic Liquids Teruyoshi Awano[1], Arimitsu Shikoda[1] and Toshiharu Takahashi[2]; [1]Tohoku Gakuin University , Tagajo, Japan; [2]Research Reactor Institute, Kyoto University, Kumatori, Japan.

D2.03
Structural vs. Intrinsic Carriers: Contrasting Effects of Cation Disorder on Ionic Conductivity in Pyrochlores Romain Perriot and Blas P. Uberuaga; Materials Science and Technology Division, Los Alamos National Laboratory, Los Alamos, New Mexico, United States.

D2.04
Intrinsic Material Properties Dictating the Formation Energetics of Oxygen Vacancies in Wide Gap Oxides Ann Deml[1, 2], Aaron Holder[2], Ryan O'Hayre[1], Charles Musgrave[3] and Vladan Stevanovic[1, 2]; [1]Colorado School of Mines, Golden, Colorado, United States; [2]National Renewable Energy Laboratory, Golden, Colorado, United States; [3]University of Colorado Boulder, Boulder, Colorado, United States.

D2.05
***Ab Initio* Studies on Bismuth Oxide Based Solid Electrolytes** Marcin Krynski[1], Franciszek Krok[1], Isaac Abrahams[2], Wojeciech Wrobel[1], Jozef Dygas[1] and Piotr Spiewak[3]; [1]Physics, Warsaw University of Technology, Warszawa, Poland; [2]Centre for Materials Research, School of Biological and Chemical Sciences, Queen Mary, London, United Kingdom; [3]Materials Engineering, Warsaw University of Technology, Warszawa, Poland.

D2.06
Role of Oxide Ion Transport on Promoting Iron Oxide Redox Reaction with Oxide Ion Conductors as Supports for Energy Storage and Conversion Fumihiko Kosaka[1], Hiroyuki Hatano[2], Yoshito Oshima[1] and Junichiro Otomo[1]; [1]The University of Tokyo, Kashiwa City, Japan; [2]Chuo University, Bunkyo-Ku, Japan.

D2.07
Ionic and Electronic Energy Level Diagrams for the CaF_2/BaF_2 Heterojunction Giuliano Gregori and Joachim Maier; Max Planck Institute for Solid State Research, Stuttgart, Germany.

D2.08
Glass Formation and Fast Ag Ion Conduction in the System Ag_2Se-Ga_2Se_3-$GeSe_2$ Maxwell A. Marple[1], Derrick Kaseman[1], Bruce Aitken[2], Sangtae Kim[1] and Sabyasachi Sen[1];[1]Chemical Engineering and Materials Science, University of California Davis, Davis, California, United States; [2]Corning Inc, Corning, New York, United States.

D2.09
Fast-Ion Conductor Design for Grid-Scale Batteries Stefan Adams, Haomin Chen, Lee L. Wong and Rayavarapu Prasada Rao; Materials Science & Eng., National University of Singapore, Singapore, Singapore.

D2.10
Grain Boundaries Across Length Scales; Correlating Orientation Imaging and Nanospectroscopy William J. Bowman[1], Amith Darbal[2], Madeleine Kelly[3], Gregory S. Rohrer[3], Cruz A. Hernandez[1], Kimberly McGuinness[1] and Peter A. Crozier[1]; [1]Materials Science and Engineering, Arizona State University, Tempe, Arizona, United States; [2]AppFive LLC, Tempe, Arizona, United States; [3]Materials Research Science and Engineering Center, Carnegie Mellon University, Pittsburgh, Pennsylvania, United States.

D2.11
Determining the Effect of Gas Phase Concentration Polarization on Porous Thick Film Oxygen Surface Exchange Coefficients Determined via the Curvature Relaxation Technique Yuxi Ma and Jason D. Nicholas; Chemical Engineering and Material Science, Michigan State University, East Lansing, Michigan, United States.

D2.12
The Direct Measurement of Ionic Piezoresistance Stuart N. Cook, Jae Jin Kim and Harry L. Tuller; Massachusetts Institute of Technology, Cambridge, Massachusetts, United States.

D2.13
Statistical Methods for Solid State Electrochemistry with Applications to Impedance Spectroscopy and Conductivity Relaxation Francesco Ciucci[1, 2]; [1]Mechanical and Aerospace Engineering, The Hong Kong University of Science and Technology, Kowloon, Hong Kong; [2]Chemical and Biomolecular Engineering, The Hong Kong University of Science and Technology, Kowloon, Hong Kong.

D2.14
Kinetic Unmixing and Decomposition in Ternary Oxides under Electric Field Jakyu Chun[1], Manfred Martin[2] and Han-Ill Yoo[1]; [1]Department of Materials Science and Engineering, Seoul National University, Seoul, Korea (the Republic of); [2]Institute of Physical Chemistry, RWTH Aachen University, Aachen, Germany.

D2.15 Moved to C11.09

D2.16
Influence of Space-Charge on the Surface Defect Chemistry of $BaZrO_3$ Jonathan M. Polfus[1], Tor S. Bjørheim[2], Mehdi Pishahang[1], Truls Norby[2] and Rune Bredesen[1]; [1]Materials and Chemistry, SINTEF, Oslo, Norway; [2]Department of Chemistry, University of Oslo, Oslo, Norway.

D2.17
A Novel Oxygen Pressure Relaxation Technique and Isotope Exchange on $SmBaCo_2O_{6-\delta}$ Vadim Eremin[1], Maxim Ananyev[1, 2] and Edhem Kurumchin[1]; [1]Laboratory of the Electrochemical Materials Science, Institute of High Temperature Electrochemistry, UB RAS, Yekaterinburg, Russia, Yekaterinburg, Russian Federation; [2]Institute of Chemical Technology, Ural Federal University, Yekaterinburg, Russian Federation.

D2.18
Giant Electrostriction in Doped Bi_2O_3 Ceramics Nimrod Yavo[1], Alaric Smith[2], Roman Korobko[1], Peter R. Slater[2] and Igor Lubomirsky[1]; [1]Materials and Interfaces, Weizmann Institute of Science, Rehovot, Israel; [2]School of Chemistry, University of Birmingham, Birmingham, United Kingdom.

D2.19
A Molecular Dynamics Study of Oxygen Ion Diffusion in A-Site Ordered Perovskite $PrBaCo_2O_{5.5}$: Data Mining the Oxygen Trajectories Chi Chen and Francesco Ciucci; Mechanical and Aerospace Engineering, Hong Kong University of Science and Technology, Kowloon, Hong Kong.

D2.20
A Novel Model for Gas Phase Analysis of Oxygen Isotope Exchange in Ceramic Materials with Different Diffusion Pathways Lev Putilov[1] and Maxim Ananyev[1, 2]; [1]Laboratory of the Electrochemical Materials Science, Institute of High Temperature Electrochemistry, Ural Branch of Russian Academy of Sciences, Yekaterinburg, Russian Federation; [2]Institute of Chemical Technology, Ural Federal University, Yekaterinburg, Russian Federation.

D2.21
DFT and Hybrid Calculations on the Stability of Shear Planes and Point Defects in WO_3 Marit N. Getz, Tor S. Bjorheim and Truls Norby; Department of Chemistry, University of Oslo, Oslo, Norway.

D2.22
Lithium Ion Mobility in Sulphonate-Based Ionomer Systems Containing Quaternary Ammonium Co-Cations Yogita Oza, Luke A. O'Dell and Maria Forsyth; Institute for Frontier Materials, Deakin University ARC Centre of Excellence for Electromaterials Science (ACES), Victoria, New South Wales, Australia.

SESSION E2: Poster Session
E: Transparent Conducting Oxides
Monday Afternoon, June 15, 2015
12:00 PM
Keystone Resorts, Red Cloud Peak

E2.01
Textured Transparent Conductive Oxide Electrode having Bilayer Structure of ITiO/GAZO Prepared by D.C. Magnetron Sputtering Yoshiyuki Abe and Kazuhide Hayashi; Ichikawa Research Laboratories, Sumitomo Metal Mining Co., Ltd., Ichikawa-city, Japan.

E2.02
Effect of Different Size Silver Nano Particles on Frequency and Temperature Dependent Parameters of Discotic Liquid Crystals for Solar Cell Applications Avneesh Mishra; Centre of Material Sciences, University of Allahabad, Allahabad, India.

E2.03
On the Application of ZnO Varistor Material in Piezotronics Till Froemling[1], Raschid Baraki[1], Nikola Novak[1], Michael Hofstaetter[2], Peter Supancic[2] and Juergen Roedel[1]; [1]Materials Science, Technische Universtät Darmstadt, Darmstadt, Germany; [2]ISFK, Montanuniversität Leoben, Leoben, Germany.

E2.04
Atomic Layer Deposition of Nanoscale Seed Layers for Enhanced Performance of Transparent Conducting Oxide Thin Films on Glass Stefan B. Nikodemski[1], Ryan O'Hayre[1], Arrelaine Dameron[2], David Ginley[2], John Perkins[2] and Joseph Berry[2]; [1]Metallurgical and Materials Engineering, Colorado School of Mines, Golden, Colorado, United States; [2]National Renewable Energy Laboratory, Golden, Colorado, United States.

SESSION F/H2: Poster Session: Solid State Photelectrochemistry/ High Temperature Routes to Solar Fuels
F/H: Solid State Photoelectrochemistry/High Temperature Routes to Solar Fuels
Monday Afternoon, June 15, 2015
12:00 PM
Keystone Resorts, Red Cloud Peak

F/H2.01
Material Design Criteria for Solar-to-Fuel Perovskites: Lower Temperature-Operation Range with Strontium and Cobalt Doped Lanthanum Chromates Alexander H. Bork, Markus Kubicek, Michal Struzik and Jennifer Rupp; Materials - Electrochemical Materials, ETH Zürich, Zürich, Switzerland.

F/H2.02
Thermodynamics of Praseodymium-Doped Ceria for Thermochemical Water Splitting Timothy C. Davenport[1], Webster Guan[1] and Sossina M. Haile[2]; [1]California Institute of Technology, Pasadena, California, United States; [2]Northwestern University, Evanston, Illinois, United States.

F/H2.03
Investigation on Nonstoichiometric Perovskite Oxides of $Sr_{1-x}La_xMn_{1-y}Al_yO_{3-\delta}$ for Solar Thermochemical Hydrogen Production Debora Barcellos[1], Jianhua Tong[1], Michael Sanders[1], Anthony McDaniel[2] and Ryan O'Hayre[1]; [1]Metallurgical & Materials Engineering, Colorado School of Mines, Golden, Colorado, United States; [2]Sandia National Laboratories, Livermore, California, United States.

F/H2.04
Polarization Enhanced Transport of Hot Carriers in Liquid/InGaN Semiconductor Junctions Blair C. Connelly, Anand V. Sampath, Ryan W. Enck, Chad S. Gallinat, Stephen B. Kelley, Nathaniel T. Woodward, Grace D. Metcalfe, David R. Baker, Cynthia A. Lundgren, Hongen Shen, Meredith L. Reed and Michael Wraback; US Army Research Laboratory, Adelphi, Maryland, United States.

F/H2.05
Electrocatalyst-Semiconductor Interfaces in Water Splitting Photoelectrodes Shannon W. Boettcher; Chemistry, University of Oregon, Eugene, Oregon, United States.

F/H2.06
Photoelectrochemical Water Splitting Promoted with a Disordered Surface Layer Created by Electrochemical Reduction Pengli Yan[1, 2], Yang Gan[1] and Can Li[2]; [1]Harbin Institute of Technology, Harbin, China; [2]Dalian Institute of Chemical Physics, Chinese Academy of Sciences, Dalian, China.

F/H2.07
Comprehensive Photoelectric Characterization of Dye-Sensitized Solar Cells Dang-Thanh Nguyen[1], Seok-Jae Kim[3], Eui-Chol Shin[1], Soon-Hyung Kang[2], Eun-Mi Han[3] and Jong-Sook Lee[1]; [1]School of Materials Science and Engineering, Chonnam National University, Gwangju, Korea (the Republic of); [2]Department of Chemistry Education, Chonnam National University, Gwangju, Korea (the Republic of); [3]School of Applied Chemical Engineering, Chonnam National University, Gwangju, Korea (the Republic of).

F/H2.08
Impedance Spectroscopy of Various ZnO Photoelectrodes Prepared by Solution Method Dang-Thanh Nguyen, Dong-Chun Cho, Eui-Chol Shin and Jong-Sook Lee; School of Materials Science and Engineering, Chonnam National University, Gwangju, Korea (the Republic of).

F/H2.09
Transport Properties of the Heterojunction Formed between a Fe/Y-Codoped $BaZrO_3$ Mixed Conductor and a Ti-Doped Fe_2O_3 Light Absorber for an Elevated-Temperature Solid-State Photoelectrochemical Cell Madhur Boloor, Xiaofei Ye, Liming Zhang, Nicholas A. Melosh and William C. Chueh; Materials Science and Engineering, Stanford University, Fremont, California, United States.

F/H2.10
Polarity and Doping Effects on the Photoelectrochemial Performance of ZnO Single Crystalline Anode by In-Depth Impedance Spectroscopy Eui-Chol Shin[1], Dang-Thanh Nguyen[1], Joachim Maier[2] and Jong-Sook Lee[1]; [1]Materials Science and Engineering, Chonnam National University, Gwang-Ju, Korea (the Republic of); [2]Max Planck Institute for Solid State Research, Stuttgart, Germany.

F/H2.11
Impedance Spectroscopy on Fe_2O_3 Films Prepared by Anodization for Photoelectrochemical Applications Eui-Chol Shin[1], Dong-Chun Cho[1], Dang-Thanh Nguyen[1], Soon-Hyung Kang[2], Hui-Kyung Park[1], Jaeyeong Heo[1] and Jong-Sook Lee[1]; [1]Materials Science and Engineering, Chonnam National University, Gwang-Ju, Korea (the Republic of); [2]Chemistry Education, Chonnam National University, Gwang-ju, Korea (the Republic of).

F/H2.12
Cation-Control of Aggregation in the Conjugated Polyelectrolyte TFB Meilin Li and Stefan Adams; Materials Science & Eng., National University of Singapore, Singapore, Singapore.

SESSION J1: Poster Session I
J: Permeation Membranes
Monday Afternoon, June 15, 2015
12:00 PM
Keystone Resorts, Red Cloud Peak

J1.01
Hydrogen Membranes Based on Group-IV Metal Nitrides Yoshitaka Aoki[1, 2], Chiharu Kura[1], Etsushi Tsuji[1] and Hiroki Habazaki[1]; [1]Faculty of Engineering, Hokkaido University, Sapporo, Japan; [2]JST-PRESTO, Kawaguchi, Japan.

J1.02
Synthesis and Characterization of Chitosan/Sulfonated Poly(terephthalate) Polyelectrolyte Complexes and Study of Its Effects on Water Vapor Flux in Commercial Polycarbonate Membranes Rayane d. Vale; Chemistry, Universidade Federal de São Carlos, São Carlos, Brazil.

J1.03
The Effect of Compatibilizer in sPEEK/PVdF/UAN Composite Membrane for Vanadium Redox Flow Battery Seon G. Rho[1] and Ho Y. Jung[2]; [1]School of Applied Chemical Engineering, Chonnam National University, Gwangju, Korea (the Republic of); [2]Department of Environment & Energy Engineering, Chonnam National University, Gwangju, Korea (the Republic of).

J1.04
Nickel Nanocatalyst Exsolution on Modified $La_{0.75}Sr_{0.25}Cr_{0.5}Mn_{0.5}O_3$ and $La_{0.75}Sr_{0.25}Cr_{0.5}Fe_{0.5}O_3$ Perovskites for the Fuel Oxidation Layer of Oxygen Transport Membranes Despoina Papargyriou and John T. Irvine; School of Chemistry, University of St Andrews, St Andrews, United Kingdom.

J1.05
Surface Characterization of Dual-Phase Oxygen Transport Membrane by Low Energy Ion Scattering (LEIS) Chi Ho Wong, Stephen Skinner and John Kilner; Materials, Imperial College London, London, United Kingdom.

J1.06
A and B Site Co-Doped Lanthanum Chromite Perovskite – Doped Zirconia Fluorite Composites for Oxygen Transport Membrane Systems Sapna Gupta[1, 2] and Prabhakar Singh[1, 2]; [1]Materials Science and Engineering, University of Connecticut, Storrs, Connecticut, United States; [2]Center for Clean Energy Engineering, University of Connecticut, Storrs, Connecticut, United States.

J1.07
Influence of the Oxygen Partial Pressure on the Oxygen Diffusion and Surface Exchange Coefficients in Mixed Conductors Jean-Marc Bassat; ICMCB-CNRS, Pessac , France.

J1.08
Scaling of Oxygen Transport Membranes Marie-Laure Fontaine[1], Christelle Denonville[1], Adam Stevenson[2], Christian His[2], Emmanuel Mercier[2], Caroline Tardivat[2], Xing Wen[1], Jonathan Polfus[1], Ove Paulsen[1], Paul Inge Dahl[1], Partow Henriksen[1] and Rune Bredesen[1]; [1]Materials and Chemistry, SINTEF, Oslo, Norway; [2]Saint Gobaine CREE, Cavaillon, France.

J1.09
Freeze-Casting Technique for the Manufacture of Hierarchical Porous Planar and Tubular Support for Gas Separation Ceramic Membranes Cyril Gaudillere, Julio Garcia-Fayos, Jose M. Serra and Sonia Escolastico; ITQ (UPV-CSIC), Valencia, Spain.

J1.10
Cation-Site Determination in $(Ba_{0.5}Sr_{0.5})(Co_{0.8}Fe_{0.2})O_{3-d}$ by Exploiting Channelling Effects in Transmission Electron Microscopy Matthias Meffert, Heike Stoermer and Dagmar Gerthsen; Laboratory for Electron Microscopy (LEM), Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany.

SESSION K1: Poster Session I
K: Proton-Conducting Oxides
Monday Afternoon, June 15, 2015
12:00 PM
Keystone Resorts, Red Cloud Peak

K1.01
Defect Chemistry of $LaCrO_3$ from First Principles Calculations Sarmad W. Saeed, Tor S. Bjorheim, Reidar Haugsrud and Truls Norby; Department of Chemistry, University of Oslo, Oslo, Norway.

K1.02
Investigation of Sinterability of $BaCe_{0.9}Y_{0.1}O_{3-\delta}$ at Several Schedules Profiles Huyra E. Araujo[3, 2] and Dulcina M. Souza[1, 3]; [1]Materials Engineering Department, Federal University of Sao Carlos, Sao Carlos, Brazil; [2]Federal Institute of Education, Science and Technology, Piracicaba, Brazil; [3]PPGCEM-UFSCar, Sao Carlos, Brazil.

K1.03
Lattice Expansion upon Hydration of Doped Barium Cerate/Zirconate (BZY/BCZY) Proton Conducting Ceramics as Measured by High Temperature X-Ray Diffraction (HTXRD) Grant A. Hudish[1], Sandrine Ricote[2], Anthony Manerbino[1], W. G. Coors[1] and Neal P. Sullivan[2]; [1]R&D, CoorsTek, Golden, Colorado, United States; [2]Department of Mechanical Engineering, Colorado School of Mines, Golden, Colorado, United States.

K1.04
Proton Dissolution in $BaZr_{1-x}Y_xO_{3-\delta}$ Genki Imai[1], Takashi Nakamura[2] and Koji Amezawa[2]; [1]Graduate School of Engineering, Tohoku University, Sendai, Japan; [2]Institute of Multidisciplinary Research for Advanced Materials, Tohoku University, Sendai, Japan.

K1.05
Incorporation and Dissociation Behavior of Protons in $BaZrO_3$-Based Perovskite-Type Proton Conductors Tomohiro Ishiyama[1, 3], Haruo Kishimoto[1, 3], Katherine D. Bagarinao[1, 3], Katsuhiko Yamaji[1, 3], Toshiaki Yamaguchi[2, 3] and Yoshinobu Fujishiro[2, 3]; [1]Energy Technology Research Institute, National Institute of Advanced Industrial Science and Technology, Tsukuba, Japan; [2]Advanced Manufacturing Research Institute, National Institute of Advanced Industrial Science and Technology, Nagoya, Japan; [3]CREST, Japan Science and Technology Agency (JST), Saitama, Japan.

K1.06
First Principles Calculations of Carrier Trapping in Proton Conductive Acceptor-Doped $BaZrO_3$ Akihide Kuwabara, Craig A. Fisher and Hiroki Moriwake; Japan Fine Ceramics Center, Nagoya, Japan.

K1.07
Densification and Microstructural Evolution in NiO-Added $BaZr_{0.8}Y_{0.2}O_{3-\delta}$ Ceramics Young-Woo Ryu, Joon-Hyung Lee, Young-Woo Heo and Jeong-Joo Kim; School of Materials Science & Engineering, Kyungpook National University, Daegu, Korea (the Republic of).

K1.08
Dopant Concentration Dependence of Electrical Transport in Y-Doped $BaZrO_3$ Shogo Miyoshi, Ayano Ebara and Shu Yamaguchi; Department of Materials Engineering, The University of Tokyo, Tokyo, Japan.

K1.09
Proton Trapping: A Key to Control Proton Transport in Oxides Yoshihiro Yamazaki[1, 4], Yuji Okuyama[2], Jason Potticary[3], Kentaro Yamamoto[1] and Sossina M. Haile[3]; [1]Inamori Frontier Research Center, Kyushu University, Fukuoka, Japan; [2]Miyazaki University, Miyazaki, Japan; [3]California Institute of Technology, Pasadena, Colorado, United States; [4]Japan Science and Technology Agency, Kawaguchi, Japan.

K1.10
The Effect of Yttrium Source on the Microstructure and Hygroscopic Behavior of $BaCe_{0.8}Y_{0.2}O_{3-\delta}$ Using ZnO as Sintering Aid Elcio L. Pires; Materials Engineering, Federal University of São Carlos, São Carlos, Brazil.

K1.11 Withdrawn

K1.12
Investigation of $Ba_{1-x}Gd_{0.8}La_{0.2+x}Co_2O_{6-\delta}$ (X = 0 - 0.5) as Oxygen Electrode Material for Proton Conducting Fuel Cells and Electrolyzer Cells Ragnar Strandbakke, Einar Vollestad and Truls Norby; Department of Chemistry, University of Oslo, Oslo, Norway.

K1.13
Channel-Level Modeling of Protonic Ceramic Fuel Cells and Model Calibration Kevin J. Albrecht[1], Chuancheng Duan[2], Robert J. Braun[1] and Ryan P. O'Hayre[2]; [1]Mechanical Engineering, Colorado School of Mines, Golden, Colorado, United States; [2]Materials Science, Colorado School of Mines, Golden, Colorado, United States.

K1.14
Defect Entropies of $BaZrO_3$ from First Principles Phonon Calculations Tor S. Bjorheim[1], Eugene Kotomin[2] and Joachim Maier[2]; [1]FASE, Department of Chemistry, University of Oslo, Oslo, Norway; [2]Max Planck Institute for Solid State Research, Stuttgart, Germany.

K1.15
Effect of Al_2O_3 and Y_2O_3 Addition on Proton Conductivity of Electrochemically Proton Injected Phosphate Glasses Takuya Yamaguchi[1], Kanji Sakuragi[1], Takahisa Omata[1], Tomohiro Ishiyama[2], Junji Nishii[3], Toshiharu Yamashita[4], Hiroshi Kawazoe[4], Naoaki Kuwata[5] and Junichi Kawamura[5]; [1]Graduate School of Engineering, Osaka University, Suita, Japan;[2]National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba, Japan; [3]Research Institute for Electronic Science, Hokkaido University, Sapporo, Japan; [4]Kawazoe Frontier Technologies Corp., Yokohama, Japan; [5]Tohoku University, Sendai, Japan.

K1.16
Hydrogen Induced Rupture of Si-O Bonds in Amorphous Silicon Dioxide Al-Moatasem El-Sayed[1, 2], Matthew Watkins[1, 2], Tibor Grasser[3], Valery Afanas'ev[4] , Alexander Shluger[1,2] and David Gao[1]; [1]Department of Physics and Astronomy, University College London, London, United Kingdom; [2]London Centre for Nanotechnology, London, United Kingdom; [3]Institute for Microelectronics, Technische Universitat Wien, Vienna, Austria; [4]Department of Physics, University of Leuven, Leuven, Belgium.

K1.17
Defect Associations as a Potential Cause for Limiting Proton Concentrations in Acceptor Doped Oxides Andreas Loken, Tor S. Bjorheim and Reidar Haugsrud; Department of Chemistry, University of Oslo, Oslo, Norway.

ORAL PRESENTATIONS

TUESDAY June 16, 2015

PLENARY

SESSION L2: Plenary II
Chair: Harry Tuller
Tuesday Morning, June 16, 2015
Keystone Resorts, Shavano Peak

9:15 AM INTRODUCTION

9:25 AM L2.01
Insights into Proton Transport in Superprotonic Solid Acids Sossina M. Haile; Department of Materials Science and Engineering, Northwestern University, Evanston , Illinois, United States.

A: Solid Oxide Fuel Cells and Electrolyzers

* Invited Speaker
** Keynote Speaker

SESSION A4: SOFC—Cathodes III
A: Solid Oxide Fuel Cells and Electrolyzers
Chair: Harry Tuller
Tuesday Morning, June 16, 2015
Keystone Resorts, Longs Peak

10:10 AM BREAK

10:30 AM **A4.01
Measuring Oxygen Surface Exchange Kinetics on Mixed-Conducting Composites by Electrical Conductivity Relaxation Bobing Hu[2], Yunlong Wang[2], Zhuoying Zhu[2], Changrong Xia[2] and Henny J. Bouwmeester[1, 2]; [1]Department of Science and Technology, University of Twente, Enschede, Netherlands; [2]Department of Materials Science and Engineering, AS Key Laboratory of Materials for Energy Conversion, University of Science and Technology of China, Hefei, China.

11:00 AM A4.02
On the Link between Oxygen Surface Exchange and Bulk Oxygen Anion Transport in SOFC Cathode Material Alexander C. Tomkiewicz[1], Mazin A. Tamimi[1], Ashfia Huq[2] and Steven McIntosh[1]; [1]Chemical Engineering, Lehigh University, Bethlehem, Pennsylvania, United States; [2]Neutron Sciences, Oak Ridge National Laboratory, Oak Ridge, Tennessee, United States.

11:20 AM A4.03
Fast Tracer and Slow Electrical Kinetics of ^{18}O Exchange on Mixed Conducting Surfaces: A Combined Tracer and Impedance Study Andreas Nenning, Edvinas Navickas, Sandra Kogler, Katharina Langer-Hansel, Alexander K. Opitz and Jueürgen Fleig; Institute of Chemical Technologies and Analytics, Vienna University of Technology, Vienna, Austria.

11:40 AM *A4.04
Phase Decomposition and Secondary Phase Formation in the Chromium and Silicon Poisoned IT-SOFC Cathode Materials $La_{0.6}Sr_{0.4}CoO_{3-\delta}$ and $La_2NiO_{4+\delta}$ Edith Bucher[1], Nina Schroedl[1], Christian Gspan[2], Andreas Egger[1], Christian Ganser[3], Christian Teichert[3], Ferdinand Hofer[2] and Werner Sitte[1]; [1]Chair of Physical Chemistry, Montanuniversitaet Leoben, Leoben, Austria; [2]Institute for Electron Microscopy and Nanoanalysis (FELMI), Graz University of Technology & Graz Center for Electron Microscopy (ZFE), Austrian Cooperative Research (ACR), Graz, Austria; [3]Institute of Physics, Montanuniversitaet Leoben, Leoben, Austria.

SESSION A5: SOFC—Electrolytes I
A: Solid Oxide Fuel Cells and Electrolyzers
Chair: Koji Amezawa
Tuesday Afternoon, June 16, 2015
Keystone Resorts, Longs Peak

3:10 PM BREAK

3:30 PM *A5.01
Formation of $SrZrO_3$ in Perovskite Cathode /Ceria Interlayer / Zirconia Electrolyte during Operation of Solid Oxide Fuel Cells Koichi Eguchi, Toshiaki Matsui, Hiroki Muroyama, Masahiro Komoto, Kyosuke Kishida and Haruyuki Inui; Graduate School of Engineering, Kyoto University, Kyoto, Japan.

3:50 PM A5.02
Three-Dimensional Quantification of Composition and Space Charge Potential at Doped Ceria Grain Boundaries using Atom Probe Tomography David R. Diercks[1], Jianhua Tong[1], Huayang Zhu[2], Robert Kee[2], Juan C. Nino[3], Ryan O'Hayre[1] and Brian P. Gorman[1]; [1]Metallurgical and Materials Engineering, Colorado School of Mines, Golden, Colorado, United States; [2]Mechanical Engineering, Colorado School of Mines, Golden, Colorado, United States; [3]Materials Science and Engineering, University of Florida, Gainesville, Florida, United States.

4:10 PM A5.03
Evaluation of the Chemical Expansion Coefficient Using Modulated Dilatometry Shany Hershkovitz, Lea Halimi and Yoed Tsur; Chemical Engineering, Techion IIT-Israel Institute of Technology, Haifa, Israel.

4:30 PM A5.04
Dopant Segregation Effect on Ionic Conductivity of Nanocrystalline Gadolinium-Doped Ceria Thin Film Jiwoong Bae, Yonghyun Lim and Young-Beom Kim; Mechanical Convergence Engineering, Hanyang University, Seoul, Korea (the Republic of).

4:50 PM A5.05
A First-Principles Approach to the Attempt Frequency of Oxygen Ion Jumps in Doped Ceria Julius Koettgen, Tobias Zacherle, Steffen Grieshammer and Manfred Martin; Institute of Physical Chemistry, RWTH Aachen University, Aachen, Germany.

5:10 PM A5.06
Rare Earth Doped Bismuth Lead System Wojciech Wrobel[1], Anna Borowska-Centkowska[1], Marzena Leszczynska-Redek[1], Marcin Malys[1], Marcin Krynski[1], Franciszek Krok[1] and Isaac Abrahams[2]; [1]Faculty of Physics, Warsaw University of Technology, Warsaw, Poland; [2]Materials Research Institute, Queen Mary University of London, London, United Kingdom.

B: Polymer Electrolyte Fuel Cells and Electrolyzers

SESSION B1: PEMFC/DMFC I
B: Polymer Electrolyte Fuel Cells and Electrolyzers
Chair: Andrew Herring
Tuesday Afternoon, June 16, 2015
Keystone Resorts, Grays Peak III

1:30 PM *B1.01
Nanoscaled Structure of Nafion at Interfaces Joseph Dura[1], Steven DeCaluwe[2] and Paul Kienzle[1]; [1]NCNR, National Institute of Standards and Technology, Gaithersburg, Maryland, United States; [2]Mechanical Engineering, Colorado School of Mines, Golden, Colorado, United States.

1:50 PM B1.02
Interplay between Relaxations and Structure in Anion-Exchange Membranes (AEMs) Vito Di Noto[1, 2], Graeme Nawn[1], Keti Vezzu[1, 3], Federico Bertasi[1, 2], Enrico Negro[1, 2], Sandra Lavina[1, 2], Ashley Maes[4], Andrew Herring[4], Sedef Piril Ertem[5] and Bryan Coughlin[5]; [1]Chemical Sciences, University of Padova, Padova, Italy; [2]Consorzio Interuniversitario Nazionale per la Scienza e la Tecnologia dei Materiali, Padova, Italy; [3]Veneto Nanotech S.C.p.a., Padova, Italy; [4]Colorado School of Mines, Golden, Colorado, United States; [5]Department of Polymer Science and Engineering, University of Massachusetts, Amherst, Amherst, Massachusetts, United States.

2:10 PM B1.03
Anion Exchange Membranes for Fuel Cells and Flow Batteries: Quaternary Ammonium Group Stability and Transport Properties of a Model Membrane Michael G. Marino, Giorgi Titvinidze and Klaus-Dieter Kreuer; Maier, Max Planck Institute for Solid State Research, Stuttgart, Germany.

2:30 PM B1.04
Chemically Stable and Highly Conductive Alkaline Poly(phenylene oxide) Poly(vinyl benzyl trimethyl ammonium) Di-Block Membrane for Fuel Cell Applications Tara P. Pandey, Matthew W. Liberatore and Andrew M. Herring; Chemical and Biological Engineering, Colorado School of Mines, Golden, Colorado, United States.

2:50 PM *B1.05
Thermoreversible Gels – A New Route to Create Blocky Ionomer Membranes via Non-Random Functionalization Samantha Talley, Greg Fahs, Xijing Yuan, Sonya Benson and Robert Moore; Department of Chemistry, Virginia Tech, Blacksburg, Virginia, United States.

C: Electrodes and Solid Electrolytes for Batteries

SESSION C5: Metal-Air Batteries
C: Electrodes and Solid Electrolytes for Batteries
Chair: Yue Qi
Tuesday Morning, June 16, 2015
Keystone Resorts, Shavano Peak

10:10 AM BREAK

10:30 AM **C5.01
Aprotic Sodium (And Li)-Oxygen Batteries Chun Xia, Robert Black, Russel Fernandes, Dipan Kundu, Brian Adams and Linda Nazar; Department of Chemistry, University of Waterloo, Waterloo, Ontario, Canada.

11:00 AM *C5.02
Hybrid Lithium-Air Batteries: Inexpensive Catalysts and Novel Cell Designs Arumugam Manthiram, Longjun Li and Siyang Liu; Materials Science and Engineering, University of Texas at Austin, Austin, Texas, United States.

11:20 AM *C5.03
Ionic Transport Issue in Solid Lithium Air Batteries Hao Zheng[1], Dongdong Xiao[2], Jiayue Peng[1], Jie Huang[1], Degang Xie[3], Xin Li[4], Penghan Lu[3], Yuecun Wang[3], Hangyu Xu[1], Xianlong Wei[4], Qing Chen[4], Zhiwei Shan[3], Lin Gu[2] and Hong Li[1]; [1]Renewable Energy Laboratory, Institute of Physics, Chinese Academy of Sciences, Beijing, China; [2]Laboratory for Advanced Materials, Institute of Physics, Beijing, China; [3]State Key Laboratory for Mechanical Behavior of Materials, Xi'an Jiaotong University, Xi'an, China; [4]Key Laboratory for the Physics and Chemistry of Nanodevices, Peking University, Beijing, China.

11:40 AM C5.04
Inorganic-Organic Composite Membranes for Aqueous Li-Air Batteries Dorsasadat Safanama, Zhen Feng Yow, Hu Yan, Daniel H. Chua and Stefan Adams; Materials Science & Eng., National University of Singapore, Singapore, Singapore.

SESSION C6: Solid Electrolyte II
C: Electrodes and Solid Electrolytes for Batteries
Chair: Yan Yu
Tuesday Afternoon, June 16, 2015
Keystone Resorts, Shavano Peak

1:30 PM *C6.01
Confined-in-Ceramic Solid Polymer Electrolyte for Microbattery Application Diana Golodnitsky[1], Raymond Blanga[1], Yevgeny Rakita[2] and Amir Natan[2]; [1]School of Chemistry, Tel Aviv University, Tel Aviv, Israel; [2]Engineering Department, Tel Aviv University, Tel Aviv, Israel.

1:50 PM C6.02
Extremely Mobile Ions in Solid Electrolytes as Seen by NMR Martin Wilkening and Bernhard Stanje; Institute for Chemistry and Technology of Materials, Graz University of Technology, Graz, Austria.

2:10 PM C6.03
High Ionic Conductivity in the System $Na_{3+x}Sc_2(SiO_4)_x(PO_4)_{3-x}$ Marie Guin[1], Kaustubh Bhat[2], Frank Tietz[1] and Olivier Guillon[1, 3]; [1]Forschungszentrum Jülich GmbH, Institute of Energy and Climate Research (IEK-1), Jülich, Germany; [2]Forschungszentrum Jülich GmbH, Peter-Grünberg-Institute (PGI-1), Jülich, Germany; [3]Jülich Aachen Research Alliance, JARA-Energy, Aachen, Germany.

2:30 PM C6.04
Very High Li-Ion Conductivity in $Li_{1.5}Al_{0.5}Ti_{1.5}(PO_4)_3$ Prepared by a Novel Sol-Gel Method Qianli Ma[1, 2], Chih-Long Tsai[1, 2], Qi Xu[1, 2], Frank Tietz[1, 2] and Olivier Guillon[1, 2];[1]Forschungszentrum Jülich, Jülich, Germany; [2]Jülich Aachen Research Alliance, JARA-Energy, Jülich, Germany.

2:50 PM C6.05
Structural and Fast-Ion Conduction Properties of Solid Electrolytes within the Li_4SiO_4- Li_3PO_4 System Yue Deng[1], Chris Eames[2], Jean-Noël Chotard[1], Christian Masquelier[1] and Saiful Islam[2]; [1]Laboratoire de Réactivité et Chimie des Solides, Université de Picardie Jules Verne, Amiens, France; [2]Department of Chemistry, University of Bath, Bath, United Kingdom.

3:10 PM BREAK

3:30 PM C6.06
Investigation of Electrolyte-Electrolyte Interface in All-Solid-State Metal-Metal Battery Ruigang Zhang[1], Timothy S. Arthur[1], Donovan N. Leonard[2], Miaofang Chi[2] and Fuminori Mizuno[1]; [1]Toyota Technical Center, Ann Arbor, Michigan, United States; [2]Oak Ridge National Lab, Oak Ridge, Tennessee, United States.

3:50 PM C6.07
An All-Solid State NASICON Sodium Battery Operating at 200°C Fabien Lalere[1, 2], Jean-Bernard Leriche[1, 2], Mattieu Courty[1, 2], Sylvain Boulineau[1, 2], Virginie Viallet[1, 2], Christian Masquelier[1, 2] and Vincent Seznec[1, 2]; [1]Laboratoire de Réactivité et Chimie des Solides, Amiens, France; [2]Réseau de Stockage Electrochimique de l'Energie, Amiens, France.

4:10 PM C6.08
Assessment of Solid Electrolytes for All-Solid-State Lithium Batteries Philipp Braun, Moses Ender, Joerg Illig and Ellen Ivers-Tiffee; Institute for Applied Materials (IAM-WET), Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany.

4:30 PM C6.09
Solid Electrolytes in Batteries Dominik A. Weber[1], Stefan Berendts[2], Joachim Sann[1], Martin Busche[1], Sebastian Wenzel[1] and Juergen Janek[1]; [1]Physikalisch-Chemisches Institut, Justus-Liebig-Universität Gießen, Gießen, Germany; [2]Institut für Chemie, Technische Universität Berlin, Berlin, Germany.

4:50 PM C6.10
Safety Assessment of All-Solid-State Lithium-Ion Polymer Battery Using Forced Destruction System Yo Kobayashi, Kumi Shono, Takeshi Kobayashi and Hajime Miyashiro; Central Research Institute of Electric Power Industry, Tokyo, Japan.

C: Electrodes and Solid Electrolytes for Batteries

SESSION C7: Characterization of Nanoscale and Local Structures I
C: Electrodes and Solid Electrolytes for Batteries
Chair: Wei Lai
Tuesday Afternoon, June 16, 2015
Keystone Resorts, Quandary Peak I/II

3:30 PM C7.01
Soft X-Ray Absorption Spectroscopy Studies on $LiNi_{0.5}Mn_{1.5}O_4$ Spinel Ruimin Qiao[1], Jung-Hyun Kim[2], Nicholas P. Pieczonka[3], Andrew Wray[4] and Wanli Yang[1]; [1]Advanced Light Source, Lawrence Berkeley National Lab, Berkeley, California, United States; [2]Chemical & Materials Systems Laboratory, General Motors Global R&D Center, Warren, Michigan, United States; [3]Optimal CAE Inc, Plymouth, Michigan, United States; [4]Department of Physics, New York University, New York, New York, United States.

3:50 PM C7.02
Electronic Origin of the Step-Like Character of the Discharge Curve for Na_xCoO_{2-y} Cathode Janina Molenda; AGH University of Science and Technology, Krakow, Poland.

4:10 PM C7.03
In Situ TEM of Lithiation-Induced Displacement Reactions in Individual Copper Sulfide Nanocrystals Matthew McDowell[1] and Yi Cui[2]; [1]Chemistry and Chemical Engineering, California Institute of Technology, Pasadena, California, United States; [2]Materials Science and Engineering, Stanford University, Stanford, California, United States.

4:30 PM C7.04
Atomic-Scale Recognition of Structure and Intercalation Mechanism of MoS_2 and Ti_3C_2X Xuefeng Wang, Xi Shen, Yurui Gao, Zhaoxiang Wang, Richeng Yu and Liquan Chen; Institute of Physics, Chinese Academy of Sciences, Beijing, China.

4:50 PM C7.05
Phase Evolution in Single-Crystalline $LiFePo_4$ in a Micrometer-Sized Battery Followed by *In Situ* Scanning Transmission X-Ray Microscopy Nils Ohmer[1], Bernhard Fenk[1], Dominik Samuelis[1], Chia-Chin Chen[1], Joachim Maier[1], Markus Weigand[2], Eberhard Goering[2] and Gisela Schuetz[2]; [1]Max Planck Institute for Solid State Research, Stuttgart, Germany;[2]Max Planck Institute for Intelligent Systems, Stuttgart, Germany.

5:10 PM C7.06
Investigating Transient and Persistent Chemical Heterogeneity in $Li[Ni_{1/3}Co_{1/3}Mn_{1/3}]O_2$ Secondary Particles Using Transmission X-Ray Microscopy William Gent[1], Yiyang Li[1], Johanna Weker[2], Anna Wise[2], David Mueller[1] and William Chueh[1]; [1]Stanford University, Stanford, California, United States; [2]SLAC National Laboratory, Stanford, California, United States.

D: Fundamentals of Transport and Reactivity and Nanoionics

SESSION D4: Fundamentals of Transport and Reactivity and Nanoionics III
D: Fundamentals of Transport and Reactivity and Nanoionics
Chair: John Irvine
Tuesday Morning, June 16, 2015
Keystone Resorts, Grays Peak I/II

10:10 AM BREAK

10:30 AM **D4.01
Cathode Materials for Proton Conducting SOFC: Bulk Defect Chemistry and Mechanism of Oxygen Reduction Reaction Rotraut Merkle, Daniel Poetzsch and Joachim Maier; MPI for Solid State Research, Stuttgart, Germany.

11:00 AM D4.02
Oxygen Exchange and Transport in Mixed Conducting Dual Phase Composites John Druce[1], Helena Tellez[1], Tatsumi Ishihara[1] and John A. Kilner[1, 2]; [1]I2CNER, Kyushu University, Fukuoka, Japan; [2]Department of Materials, Imperial College London, London, United Kingdom.

11:20 AM D4.03
A Concept of Three Exchange Types in Oxygen Isotope Exchange Kinetic Analysis for Solid Oxide Materials Maxim Ananyev[1, 2]; [1]Laboratory of the Electrochemical Materials Science, Institute of High Temperature Electrochemistry, Ural Branch of Russian Academy of Sciences, Yekaterinburg, Russian Federation; [2]Institute of Chemical Technology, Ural Federal University, Yekaterinburg, Russian Federation.

11:40 AM D4.04
First Principles Calculations of Formation and Migration of Oxygen Vacancies in the Bulk and on Surface of Complex Perovskites for Solid Oxide Fuel Cell Cathodes Eugene Kotomin[1], Yuri Mastrikov[2], Rotraut Merkle[1], Maija Kuklja[3] and Joachim Maier[1]; [1]Dept.Phys.Chem., Max-Planck-Institute FKF, Stuttgart, Germany; [2]Institute for Solid State Physics, Riga, Latvia; [3]University of Maryland, College Park , Maryland, United States.

SESSION D5: Fundamentals of Transport and Reactivity and Nanoionics IV
D: Fundamentals of Transport and Reactivity and Nanoionics
Chairs: Rotraut Merkle and Truls Norby
Tuesday Afternoon, June 16, 2015
Keystone Resorts, Grays Peak I/II

1:30 PM *D5.01
An Extended Analysis of Dopant Strategies to Control Mixed Ion and Electron Transport in Ceria Based Oxide Solutions Jens-Peter Eufinger[2], Maximilian Daniels[1], Stefan Berendts[3], Kerstin Neuhaus[1], Sebastian Eickholt[1], Gregor Ulbrich[3], Aditya Maheshwari[1], Annika Buchheit[1], Juergen Janek[2], Martin Lerch[3] and Hans D. Wiemhoefer[1]; [1]Institute of Inorganic and Analytical Chemistry, Univ. Münster, Münster, Germany; [2]Physikalisch-Chemisches Institut, Univ. Giessen, Giessen, Germany; [3]Institute of Chemistry, Techn. Univ. Berlin, Berlin, Germany.

1:50 PM D5.02
Room Temperature Polarization Phenomena in Doped Ceria Kerstin Neuhaus[1], Gregor Ulbrich[2], Martin Lerch[2] and Hans-Dieter Wiemhöfer[1]; [1]Institute for Inorganic and Analytical Chemistry, University of Münster, Münster, Germany; [2]Institut für Chemie, Technische Universität Berlin, Berlin, Germany.

2:10 PM *D5.03
Microscopic Origin of Electrostriction in Gd-Doped Ceria and Prospects for Practical Applications in MEMS Roman Korobko[1], Eran Mishuk[1], Nimrod Yavo[1], Alyssa Lerner[2], Yuanyuan Li[2], Wachtel Wachtel[1], Anatoly Frenkel[2] and Igor Lubomirsky[1]; [1]Materials and Interfaces, Weizmann Institute of Science, Rehovot, Israel; [2]Physics Department, Yeshiva University, New York, New York, United States.

2:30 PM D5.04
An *In Situ* Optical Spectroscopic Study of Thermodynamics and Redox Kinetics of $Ce_{0.08}Y_{0.2}Zr_{0.72}O_{2-\delta}$ Jianmin Shi[1], Martin Lerch[2], Juergen Janek[3] and Klaus D. Becker[1];[1]Technische Universität Braunschweig, Braunschweig, Germany; [2]Technische Universität Berlin, Berlin, Germany; [3]Justus Liebig University Giessen, Giessen, Germany.

2:50 PM *D5.05
Effect of Chemomechanical Coupling on Defect Equilibrium and Transport in Solid State Ionic Devices Tatsuya Kawada, Yuta Kimura, Yuki Gonoi, Keiji Yashiro, Shin-ichi Hashimoto and Koji Amezawa; Tohoku University, Sendai, Japan.

3:10 PM BREAK

3:30 PM *D5.06
Electro-Chemo-Mechanics in Solid State Materials: Let`s Design the Structural-Defect Twists Jennifer L. Rupp; Electrochemical Materials, ETH Zurich, Zurich, Switzerland.

3:50 PM D5.07
Engineering Mixed Ionic Electronic Conduction in $La_{0.8}Sr_{0.2}MnO_{3+\delta}$ Nanostructures through Fast Grain Boundary Oxygen Diffusivity Aruppukottai Muruga Saranya[1], Dolors Pla[1], Alex Morata[1], Andrea Cavallaro[2], Jesus Canales-Vazquez[3], John A Kilner[2], Monica Burriel[1, 2] and Albert Tarancon[1]; [1]Catalonia Institute for Energy Research (IREC), Barcelona, Spain; [2]Imperial College London, London, United Kingdom; [3]Universidad Castilla la Mancha, Albacete, Spain.

4:10 PM D5.08
Oxidation Kinetics of Thin Metal Films & Diffusion in NiO Yeliz Unutulmazsoy, Rotraut Merkle, Joachim Maier and Jochen Mannhart; Max Planck Institute for Solid State Research, Stuttgart, Germany.

4:30 PM D5.09
H^- Ionic Conduction in Alkaline Hydrides John T. Irvine[1], George Carins[1], Maarten Verbaeken[1] and Martin Owen Jones[2]; [1]School of Chemistry, University of St Andrews, St Andrews, United Kingdom; [2]STFC, Didcot, United Kingdom.

4:50 PM D5.10
Modeling a Surface-Mediated Spinodal in Doped Mixed Conducting Perovskites David S. Mebane; Mechanical and Aerospace Engineering, West Virginia University, Morgantown, West Virginia, United States.

E: Transparent Conducting Oxides

SESSION E3: TCO 2—Materials, Processing, and Structures
E: Transparent Conducting Oxides
Chair: David Ginley
Tuesday Morning, June 16, 2015
Keystone Resorts, Quandary Peak I/II

10:10 AM BREAK

10:30 AM **E3.01
Material Design of Novel Transparent Oxide Conductors/ Semiconductors Hideo Hosono; Tokyo Institute of Technology, Yokohama, Japan.

11:00 AM E3.02
Effect of Phase Transition on Electronic Defects of Ni-Co Oxide and Its Application on Optoelectronics Shu-Yi Tsai[3, 1], Kuan-Zong Fung[1, 3], H.-Y. Bor[2] and C.-N. Wei[2]; [1]Materials Science and Engineering, National Cheng Kung University, Tainan City, Taiwan; [2]Chung-Shan Institute of Science and Technology(CSIST), Taoyuan County, Taiwan; [3]Research Center for Energy Technology and Strategy, National Cheng Kung University, Tainan City, Taiwan.

11:20 AM E3.03
Effect of Precursor Solvent on the Nature of Spin Coated 1at%Ga-ZnO Transparent Conducting Films Amit K. Srivastava and Jitendra Kumar; Materials Science, I I T Kanpur, Kanpur, India.

11:40 AM E3.04
Transparent and Conductive Coatings with Nanoparticulate Magnetic Additives Gesa Beck[1], Stephan Barcikowski[2], Bilal Goekce[2], Maja Jelic[1] and Martin Kirsch[3]; [1]Physics, Chair of Resource Strategies, Augsburg, Germany; [2]Technical Chemistry I , University of Duisburg-Essen and Center for Nanointegration Duisburg-Essen (CENIDE) , Essen, Germany; [3]Fa. Kirsch Kunststofftechnik GmbH, Ebersbach, Germany.

G: Switching and Sensing Phenomena

SESSION G1: Switching and Sensing Phenomena I
G: Switching and Sensing Phenomena
Chairs: Jennifer Rupp and Shu Yamaguchi
Tuesday Morning, June 16, 2015
Keystone Resorts, Grays Peak III

10:10 AM BREAK

10:30 AM **G1.01
Bulk Mixed Ion Electron Conduction in Highly Disordered Oxides Causes Memristive Behavior Manfred Martin[1, 2]; [1]Institute of Physical Chemistry, RWTH Aachen University, Aachen, Germany; [2]Department of Materials Science and Engineering, Seoul National University, Seoul, Korea (the Republic of).

11:00 AM *G1.02
Dislocations in $SrTiO_3$: Easy to Reduce but not so Fast for Oxygen Transport Dario Marrocchelli, Lixin Sun and Bilge Yildiz; Nuclear Science & Engineering, Massachusetts Institute of technology, Cambridge, Massachusetts, United States.

11:20 AM G1.03
Electroforming in Valence Change Memories Based on Mixed Ionic Electronic Conductors Dima Kalaev[1], Eilam Yalon[2] and Ilan Riess[1]; [1]Physics, Israel Institute of Technology, Haifa, Israel; [2]Microelectronics Research Center, Technion – Israel Institute of Technology, Haifa, Israel.

11:40 AM G1.04
Field-Enhanced Bulk Conductivity and Resistive-Switching in Ca-Doped $BiFeO_3$ Ceramics Nahum Maso[1, 2] and Anthony R. West[2]; [1]Chemistry, University of Oslo, Oslo, Norway;[2]Materials Science and Engineering, University of Sheffield, Sheffield, United Kingdom.

SESSION G2: Switching and Sensing Phenomena II
G: Switching and Sensing Phenomena
Chairs: Jennifer Rupp and Shu Yamaguchi
Tuesday Afternoon, June 16, 2015
Keystone Resorts, Grays Peak III

3:10 PM BREAK

3:30 PM *G2.01
Various Functional Nano-Ionic Devices Achieved by Controlling Hetero-Interface Characteristics using Local Ion Migration Kazuya Terabe, Takashi Tsuchiya and Masakazu Aono; MANA, National Institute for Materials Science, Tsukuba, Japan.

3:50 PM *G2.02
Ionic Switching Devices: Operation Principle and Application in Computing Daniele Ielmini; Politecnico di Milano, Milano, Italy.

4:10 PM *G2.03
$La_{0.8}Sr_{0.2}(Mn,Co)O_3$ Perovskite Oxides as Resistive Switches: Influence of B-Site Substitution on the Resistive Switching Properties Monica Burriel[1, 2], Rafael Schmitt [3], Aruppukottai Muruga Saranya[2], Alex Morata[2], Aitor Hornes[2], Sebastian Schweiger[3], Michel Bourdard[1], Jennifer L. M. Rupp[3] and Albert Tarancon[2]; [1] Laboratoire des Matériaux et du Génie Physique (LMGP), Grenoble, France; [2]Catalonia Institute for Energy Research-IREC, Barcelona, Spain; [3]ETH Zurich, Zurich, Switzerland.

4:30 PM G2.04
STM Investigations of Resistive Switching on Binary Metal Oxides and Chalcogenides Anja Wedig[1], Marco Moors[1], Tsuyoshi Hasegawa[2], Masakazu Aono[2], Rainer Waser[1, 3] and Ilia Valov[1, 3]; [1]Electronic Materials, Juelich Research Center, Juelich, Germany; [2]International Center for Materials Nanoarchitectonics, National Institute for Materials Science, Tsukuba, Japan; [3]Institute for Materials in Electrical Engineering II, RWTH Aachen University, Aachen, Germany.

4:50 PM G2.05
Strained Heterolayers as Resistive Switching Oxide: Materials and Devices Sebastian Schweiger, Reto Pfenninger and Jennifer L. Rupp; Materials, ETH Zurich, Zurich, Switzerland.

5:10 PM G2.06
Sensing Nitrogen Oxides and Ammonia with Porous Electrolyte Devices Fernando Garzon[1], Eric Brosha[2], Cortney Kreller[2] and Rangachary (Mukund) Mukundan[2]; [1]Chemical and Biological Engineering, University of New Mexico, Albuquerque, New Mexico, United States; [2]Materials Physics and Applications, Los Alamos National Laboratory, Los Alamos, New Mexico, United States.

5:30 PM G2.07
Single Crystalline $SrTiO_3$ as a Memristive Model System: Roles of Oxygen Vacancies and Schottky Barrier, and Neural Function Mimicking Xin Guo; Materials Science and Engineering, Huazhong University of Science and Technology, Wuhan, China.

K: Proton-Conducting Oxides

SESSION K2: Protonic Oxides I
K: Proton-Conducting Oxides
Chairs: Truls Norby and Yoshihiro Yamazaki
Tuesday Afternoon, June 16, 2015
Keystone Resorts, Longs Peak

1:30 PM **K2.01
Protonic Conduction in Perovskites: NMR and DFT Studies of Yttrium-Doped $BaZrO_3$ and Related Perovskites Luke Sperrin[1], Riza Dervisoglu[1], Lucienne Buannic[1], Frederic Blanc[2] and Clare Grey[1]; [1]Department of Chemistry, University of Cambridge, Cambridge, United Kingdom; [2]Department of Chemistry, University of Liverpool, Liverpool, United Kingdom.

2:00 PM K2.02
Local Structural Analysis of Sc-Doped $BaZrO_3$ Using Electric-Field Gradient at Sc Site Itaru Oikawa and Hitoshi Takamura; Department of Materials Science, Tohoku University, Sendai, Japan.

2:20 PM *K2.03
Variation of Kinetic Parameters, Chemical Diffusivity and Surface Exchange Coefficient of $Ba(Zr_{0.84}Y_{0.15}Cu_{0.01})O_{3-\delta}$ during the Conductivity Relaxation Experiments Jong-Ho Lee, Sung Min Choi, Moon-Bong Choi, Jongsup Hong, Hyoungchul Kim, Kyung Joong Yoon, Ji-Won Son and Byung-Kook Kim; High-Temperature Energy Materials Research Center, Korea Institute of Science and Technology, Seoul, Korea (the Republic of).

2:40 PM K2.04
The Influence of Dopant Levels on the Hydration Properties of SZCY and BZCY Proton Conducting Ceramics for Hydrogen Production Kwati Leonard[1], Yuji Okuyama[4], Young-Sung Lee[1] and Hiroshige Matsumoto[1, 2, 3]; [1]International Institute for Carbon-Neutral Energy Research (I2CNER-WPI), Kyushu University, Fukuoka, Japan; [2]INAMORI Frontier Research Center (IFRC), Kyushu University, Fukuoka , Japan; [3]Next Generation Fuel cell Research Center (NEXT-FC), Kyushu University, Fukuoka, Japan; [4] Organization for the Promotion of Tenure Track, University of Miyazaki, Miyazaki, Japan.

3rd ISSI Young Scientist Award

SESSION: 3rd ISSI Young Scientist Award
ISSI Young Scientist
Tuesday Afternoon, June 16, 2015
Keystone Resorts, Quandary Peak I/II

To recognize the outstanding contributions made by young scientists to the field of solid state ionics, the International Society of Solid-State Ionics established the ISSI Young Scientist Award. This year, six young scientists will be awarded. Don't miss the award recipients' talks from 1:30pm - 3:10pm in Quandary Peak I/II.

POSTER PRESENTATIONS

TUESDAY June 16, 2015

SESSION A6: Poster Session II
A: Solid Oxide Fuel Cells and Electrolyzers
Tuesday Afternoon, June 16, 2015
5:20 PM
Keystone Resorts, Red Cloud Peak

A6.01
Thermal Stability and Compatibility with SOFC/PCFC Electrolyte of $La_4BaCu_5O_{13+\delta}$ and $La_{6.4}Sr_{1.6}Cu_8O_{20\pm\delta}$ Perovskite Monica V. Sandoval[1, 2], Giovanny Martinez[1], Santiago Vasquez-Cuadriello[3], Mario A. Macias[1], Leopoldo Suescun[3], Pascal Roussel[2] and Gilles H. Gauthier[1]; [1]Grupo INTERFASE, Universidad Industrial de Santander, Bucaramanga, Colombia;[2]Unité de Catalyse et de Chimie du Solide, Université Lille 1, Lille, France; [3]Facultad de Química - Cryssmat-Lab/DETEMA , Universidad de la República, Montevideo, Uruguay.

A6.02
Electrochemical Studies of $GdPrBaCo_2O_{5+\delta}$ and $GdPrBaCoFeO_{5+\delta}$ Cathodes for Oxide Ion and Proton Conducting Solid Oxide Fuel Cells Kalpana Singh, Ashok Baral and Venkataraman Thangadurai; Department of Chemistry, University of Calgary, Calgary, Alberta, Canada.

A6.03
Development of the Composite Electrodes for the New $CaZr_{0.95}Sc_{0.05}O_{3-\delta}$ Proton-Conducting Electrolyte Elena Pikalova[1, 2], Nina Bogdanovich[1], Alexander Kolchugin[1], Dimitry Bronin[1, 3], Anton Kuz'min[1] and Azat Khasanov[3]; [1]Institute of High Temperature Electrochemistry UB RAS, Ekaterinburg, Russian Federation; [2]Department of Environmental Economics, Ural Federal University, Ekaterinburg, Russian Federation; [3]Institute of Natural Sciences, Department of Chemistry, Ural Federal University, Ekaterinburg, Russian Federation.

A6.04
A Layered Perovskite Oxide $PrBaCo_2O_{5+\delta}$ as Cathode for Highly Stable $BaCe_{0.1}Zr_{0.8}Y_{0.1}O_{3-\delta}$ Based Protonic Ceramic Fuel Cells (PCFCs) Hanping Ding and Neal P. Sullivan; Mechanical Engineering, Colorado School of Mines, Golden, Colorado, United States.

A6.05
Steam Electrode Development for BCZY Based High Temperature Protonic Electrolysers Nuria Bausa, Cecilia Solís, Sonia Escolastico and Jose M. Serra; Instituto de Tecnología Química (UPV-CSIC), Valencia, Spain.

A6.06
Atomic Layer Deposition of Dense Nano-Thin Platinum Films for Low-Temperature Solid Oxide Fuel Cells Sanghoon Ji[1], Taehyun Park[2], Gu Young Cho[2], Waqas H. Tanveer[2], Wonjong Yu[2] and Suk Won Cha[2]; [1]Graduate School of Convergence Science and Technology, Seoul National University, Seoul, Korea (the Republic of); [2]Department of Mechanical Engineering, Seoul National University, Seoul, Korea (the Republic of).

A6.07
Development of Low Temperature Operating Micro-SOFC System for Mobile Electronic Devices Shoya Murayama, Fumitada Iguchi, Makoto Shimizu and Hiroo Yugami; Graduate School of Engineering, Tohoku University, Sendai, Japan.

A6.08
$Ba_{0.95}La_{0.05}FeO_{3-\delta}$-Graphene as a Low-Cost and Synergistic Catalyst for Oxygen Evolution Reaction Mattia Saccoccio[1], Hong Zhao[1], Chi Chen[1], Dengjie Chen[1], Jian Wang[1], Yang Gao[1], Hei Ting Wan[1] and Francesco Ciucci[1, 2]; [1]Department of Mechanical and Aerospace Engineering, The Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong; [2]Department of Chemical and Biomolecular Engineering, The Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong.

A6.09
Investigation of Low Temperature Operation of Fe-Air Battery Using YSZ Electrolyte Takaaki Sakai[1, 2], Masako Ogushi[2], Atsushi Inoishi[3], Shintaro Ida[2] and Tatsumi Ishihara[2];[1]Center for Molecular Systems, Kyushu University, Fukuoka, Japan; [2]Department of Applied Chemistry, Faculty of Engineering, Kyushu University , Fukuoka, Japan; [3]Research and Education Center for Advanced Energy Materials, Devices, and Systems, Kyushu University, Fukuoka, Japan.

A6.10
Improving the Material Efficiency or Substitution of Platinum in the System Pt/YSZ Gesa Beck[1] and Christoph Bachmann[2]; [1]Physics, Chair of Resource Strategies, Augsburg, Germany; [2]Institute of Physical Chemistry, Justus-Liebig-University, Giessen, Germany.

A6.11
Conductivity and Structure of Sub-Micrometric $SrTiO_3$ -YSZ Composites Enrique Ruiz-Trejo[1], Nikolaos Bonanos[2], Karl Thyden[2] and Mogens Mogensen[2]; [1]Earth Science and Engineering, Imperial College London, London, United Kingdom; [2]Department of Energy Conversion and Storage, Technical University of Denmark, Roskilde, Denmark.

A6.12
Microstructure and Electrochemical Properties of CeO2-Based Cathodes for SOEC Application Wenqiang Zhang, Bo Yu and Jingming Xu; Tsinghua University, Beijing, China.

A6.13
Structural, Electrical and Electrochemical Properties of Calcium-Doped Lanthanum Nickelate Alexandr Kolchugin[1], Elena Pikalova[1, 3], Nina Bogdanovich[1], Dimitry Bronin[1], Sergey Pikalov[2] and Irina Nikolaenko[4]; [1]Institute of High Temperature Electrochemistry UB RAS, Ekaterinburg, Russian Federation; [2]Institute of Metallurgy UB RAS, Ekaterinburg, Russian Federation; [3]Department of Environmental Economics, Ural Federal University, Ekaterinburg, Russian Federation; [4]Institute of Solid State Chemistry UB RAS, Ekaterinburg, Russian Federation.

A6.14
Defect Structure and Related Properties of $YBaCo_2O_{6-\delta}$ Dmitry S. Tsvetkov, Anton L. Sednev, Ivan L. Ivanov, Dmitry A. Malyshkin and Andrey Y. Zuev; Department of Chemistry, Ural Federal University, Ekaterinburg, Russian Federation.

A6.15
Synthesis and Study of the Ordered Double Perovskite $NdBaMn_2O_{5+d}$ to be Used as Symmetric SOFC Electrode Material Gilles H. Gauthier[2], Konrad Swierczek[1], Pascal Roussel[3], Oscar L. Pineda[2, 1] and Zulma L. Moreno[2]; [1]AGH University of Science and Technology, Cracow, Poland; [2]Grupo INTERFASE, Universidad Industrial de Santander, Bucaramanga, Colombia; [3]Université Lille 1, Université Lille Nord de France, Lille, France.

A6.16 Withdrawn

A6.17
TOF-SIMS Characterization of Impurity Enrichment and Redistribution in Solid Oxide Electrolysis Cells during Operation Ragnar Kiebach, Kion Norrman, Ming Chen and Peter V. Hendriksen; DTU, Roskilde, Denmark.

A6.18
Role of Gadolinia-Doped Ceria Interlayer Microstructure and Orientation on the Cation Diffusion Behavior in LSCF/GDC/YSZ Model Heterostructures Jeffrey C. De Vero[1], Katherine D. Bagarinao[1], Do-Hyung Cho[1], Haruo Kishimoto[1], Katsuhiko Yamaji[1], Teruhisa Horita[1] and Harumi Yokokawa[1, 2]; [1]National Institute of Advanced Industrial Science and Technology, Tsukuba, Japan; [2]Institute of Industrial Science, University of Tokyo, Tokyo, Japan.

A6.19
The Utility of Model Electrodes for the Separation of Current Pathways in Solid State Electrochemistry Alexander K. Opitz, Markus Kubicek, Stefanie Taibl, Tobias Huber, Gerald Holzlechner, Herbert Hutter and Juergen Fleig; Institute of Chemical Technologies and Analytics, Vienna University of Technology, Vienna, Austria.

A6.20
Rapid Measurement of Chemical Diffusion in Oxide Thin Films by Color Front Motion Tracking Jae Jin Kim[1], Stuart N. Cook[1], Di Chen[1], Sean R. Bishop[1] and Harry L. Tuller[1, 2];[1]Materials Science and Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts, United States; [2]International Institute for Carbon-Neutral Energy Research (WPI-I2CNER), Kyushu University, Fukuoka, Japan.

A6.21
TraceX: Isotope Exchange Data Analysis, Back-Diffusion Simulation and Profile Fitting Samuel J. Cooper, Mathew Niania and John A. Kilner; Department of Materials, Imperial College London, London, United Kingdom.

A6.22
Impedance Spectroscopy Analysis Inspired by Evolutionary Programming as a Diagnostic Tool for SOEC Zohar Drach[1], Shany Hershkovitz[1], Domenico Ferrero[2], Andrea Lanzini[2], Massimo Santarelli[2] and Yoed Tsur; [1]Department of Chemical Engineering, Technion Israel Institute of Technology, Haifa, Israel; [2]Department of Energy (DENERG), Politchnico di Torino, Corso Duca degli Abruzzi, Turin, Italy.

A6.23
Long-Term Degradation of $La_{0.6}Sr_{0.4}Co_{0.2}Fe_{0.8}O_{3-\delta}$ IT-SOFC Cathodes due to Silicon Poisoning Martin Perz[1], Edith Bucher[1], Christian Gspan[2, 3], Joerg Waldhaeusl[1], Ferdinand Hofer[2, 3] and Werner Sitte[1]; [1]Chair of Physical Chemistry, Montanuniversitaet Leoben, Leoben, Austria; [2]Institute for Electron Microscopy and Nanoanalysis (FELMI), Graz University of Technology, Graz, Austria; [3]Graz Center for Electron Microscopy (ZFE), Austrian Cooperative Research (ACR), Graz, Austria.

A6.24 Withdrawn
Degradation Mechanisms of Cathode Materials for Intermediate

A6.25
Transmission Electron Microscopy Study of Cr Poisoning of LSCF Cathodes Na Ni and Stephen Skinner; Materials, Imperial College London, London, United Kingdom.

A6.26
Effects of Chemical and Interfacial Strain on the Transport and Mechanical Properties of $PrCoO_3$ Mabel Lew, Stevin Pramana, Andrea Cavallaro, Ji Wu and Stephen Skinner; Materials, Imperial College London, Kingston, United Kingdom.

A6.27
Electrical Properties of LSM-$Bi_3Y_{0.9}W_{0.1}O_{6.15}$ Composite Solid Membranes Marcin Malys[1], Wojciech Wrobel[1], Marcin Dudz[1], Marzena Leszczynska-Redek[1], Anna Borowska-Cenkowska[1], Maciej Wojcik[1], Kuan-Zong Fung[2], Isaac Abrahams[3] and Franciszek Krok[1]; [1]Faculty of Physics, Warsaw University of Technology, Warszawa, Poland; [2]Material Science and Engineering, National Cheng Kung University, Tainan, Taiwan; [3]Materials Research Institute, Queen Mary University of London, London, United Kingdom.

A6.28
Optimization of Pr_2CuO_4-$Ce_{0.9}Gd_{0.1}O_{1.95}$ Composite Cathode for SOFC Application Liudmila Kolchina[1], Nikolay Lyskov[2] and Galina Mazo[1]; [1]Chemistry Department, Lomonosov Moscow State University, Moscow, Russian Federation; [2]Institute of Problems of Chemical Physics RAS, Chernogolovka, Russian Federation.

A6.29
Optimized PBCO-PCO-CGO Cathode for IT-SOFC Samir Boulfrad[1], Stevin Pramana[2], Mabel Lew[2], Udo Schwingenschloegl[1], Enrico Traversa[1] and Stephen Skinner[2]; [1]Physical Sciences and Engineering, King Abdullah University of Science and Technology (KAUST), Thuwal, Saudi Arabia; [2]Department of Materials , Imperial College London, London, United Kingdom.

A6.30
Optimization of $Ba_2Co_9O_{14}$ as an Innovative SOFC's Cathode Material Ibtissam Kehal, Marie-Helene Chambrier, Aurelie Rolle, Sylvie Daviero-Minaud, Rose-Noelle Vannier and Xavier Flandre; Unité de Catalyse et de Chimie du Solide, Université Lille, Villeneuve d'Ascq, France.

A6.31
Electrochemical Characterization of B-Site Cation-Excess $Pr_2Ni_{0.75}Cu_{0.25}Ga_{0.05}O_{4+\delta}$ Cathode for IT-SOFCs Yuan Ji and Xiangwei Meng; Jilin University, Changchun, China.

A6.32
$SrCo_{1-x}Mo_xO_{3-\delta}$ Pervoskites as Cathode Materials for $LaGaO_3$-Based Intermediate-Temperature Solid Oxide Fuel Cells Rui Wang, Fangjun Jin and Tianmin He; College of Physics, Jilin University, Changchun, China.

A6.33
Tailoring of the Chemical Stability of (Ba,Sr)(Co,Fe)O_3-Based Perovskite Mixed Conductors Fang Wang[1], Koki Igarashi[2], Takashi Nakamura[1], Keiji Yashiro[3], Junichiro Mizusaki[1]and Koji Amezawa[1]; [1]Institute of Multidisciplinary Research for Advanced Materials, Tohoku University, Sendai, Japan; [2]Graduate School of Engineering, Tohoku University, Sendai, Japan; [3]Graduate School of Environmental Studies, Tohoku University, Sendai, Japan.

A6.34
$NdBa_{1-x}Co_2O_{5+\delta}$ as Cathode Materials for Intermediate Temperature Solid Oxide Fuel Cell Jialing Sun[1, 2], Xiaomei Liu[1], Lili Zhu[1], Fei Han[1], Hailin Bi[1], Haopeng Wang[1], Shenglong Yu[1] and Li Pei[1]; [1]Key Laboratory of Physics and Technology for Advanced Batteries,Physics Department, Jilin University, Changchun, China; [2]Beihua University, Jilin, China.

A6.35
Effect of Thermal Reduction on Electrical Properties of Protecting Oxides for SOFC Interconnect Applications Kuan-Zong Fung[1, 3], Shu-Yi Tsai[1] and Chung-Ta Ni[2]; [1]Materials Science and Engineering, National Cheng Kung University, Tainan City, Taiwan; [3]Research Center for Energy Technology and Strategy, National Cheng Kung University, Tainan City, Taiwan.

A6.36 moved A9.07

A6.37
Deconvolution of Four Transmission-Line-Model Impedances in Ni-YSZ/YSZ/LSM Solid Oxide Cells and Mechanistic Insights Eui-Chol Shin, Jianjun Ma, Pyung-An Ahn, Hyun-Ho Seo, Dang-Thanh Nguyen and Jong-Sook Lee; Materials Science and Engineering, Chonnam National University, Gwang-Ju, Korea (the Republic of).

A6.38
The Electrolyte Spreading Resistance - More than a Resistive Offset Andreas Nenning, Michael Doppler and Juergen Fleig; Institute of Chemical Technologies and Analytics, Vienna University of Technology, Vienna, Austria.

A6.39
Electrical Characterization of the Active Cathode Area in Solid Oxide Fuel Cells Tzvia Radlauer[1], Sioma Baltianski[2], Ilan Riess[3] and Yoed Tsur[2]; [1]Energy Engineering, Technion, Haifa, Israel; [2]Chemical Engineering, Technion, Haifa, Israel; [3]Physics, Technion, Haifa, Israel.

A6.40
Electronic Conductivity in Yttria-Stabilised Zirconia under a Small *dc* Bias Nahum Maso[1, 2] and Anthony R. West[2]; [1]Chemistry, University of Oslo, Oslo, Norway; [2]Materials Science and Engineering, The University of Sheffield, Sheffield, United Kingdom.

A6.41
Impedance Study on LSGM Single Crystals Ghislain M. Rupp[1], Michal Glowacki[2] and Juergen Fleig[1]; [1]Institute of Chemical Technologies and Analytics - Electrochemistry, Vienna University of Technology, Vienna, Austria; [2]Institute of Physics, Polish Academy of Sciences, Warsaw, Poland.

A6.42 WITHDRAWN

A6.43
Synthesis and Study of Solid Electrolytes $Nd_{5-X}Ln_XMo_3O_{16}$ (Ln = Sm, Eu, Gd) Lyudmyla I. Stackpool[1], Konstantin Chebyshev[2] and Lyudmila Pasechnik[2]; [1]Chemistry and Geology, Minnesota State University, Mankato, Mankato, Minnesota, United States; [2]Department of Inorganic Chemistry, Donetsk National University, Donetsk, Ukraine.

A6.44
Modification of Surface Oxide of Porous Fe-Cr-Al Alloy by Coating and Heat-Treatment for the Application of Metal Supported SOFCs Hung-Cuong Pham[1], Shunsuke Taniguchi[2,3,4], Yuko Inoue[4], Jyh-Tyng Chou[5], Toru Izumi[6], Koji Matsuoka[6] and Kazunari Sasaki[1, 2, 7]; [1]Hydrogen Energy Systems, Kyushu University, Fukuoka, Japan; [2]International Research Center for Hydrogen Energy, Kyushu University, Fukuoka, Japan; [3]Center for Co-evolutional Social Systems, Kyushu University, Fukuoka, Japan; [4]Next-Generation Fuel Cell Research Center (NEXT-FC), Kyushu University, Fukuoka, Japan; [5]Kurume National College of Technology, Fukuoka, Japan; [6]JX Nippon Oil and Energy Corporation, Yokohama, Japan;[7]International Inst, for Carbon Neutral Energy Research (WPI-I2CNER), Kyushu University, Fukuoka, Japan.

A6.45
Crystal Structure of $R_{10}Mo_6O_{33}$ (R = Nd, Pr) from 3 K to 973 K by Neutron Powder Diffraction Yoshihisa Ishikawa[1, 2], Sergey A. Danilkin[3], Maxim Avdeev[3], Valentina I. Voronkova[4] and Takashi Sakuma[2]; [1]Institute of Materials Structure Science, High Energy Accelerator Research Organization, Tokai, Japan; [2]Institute of Applied Beam Science, Ibaraki University, Mito, Japan; [3]Bragg Institute, Australian Nuclear Science and Technology Organization, Kirrawee, New South Wales, Australia; [4]Moscow State University, Leninskie Gory, Russian Federation.

A6.46
Long-Time Testing of Ni-YSZ Substrates under Operating Conditions Denis Osinkin[1], Dimitry Bronin[1, 2], Robert Steinberger-Wilckens[3], L.G.J. de Haart[4] and Josef Mertens[4];[1]Laboratory of SOFC, Institution of High Temperature Electrochemistry, Yekaterinburg, Russian Federation; [2]Ural Federal University, Yekaterinburg,, Russian Federation; [3]University of Birmingham, Birmingham, United Kingdom; [4]Institute of Energy and Climate Research, Fundamental Electrochemistry (IEK-9) Forschungszentrum Jülich GmbH, Jülich, Germany.

A6.47
Carbon Deposition and Sulfur Poisoning in Mo-Containing Anode Materials for SOFCs Studied in CO and CH_4 Fuels Kun Zheng and Konrad Swierczek; AGH University of Science and Technology, Faculty of Energy and Fuels, Kraków, Poland.

A6.48
Model-Composite Electrodes as a Tool to Evaluate Alternative SOFC Anode Materials and Their Sulphur Poisoning Behaviour Matthias Gerstl[2], Michael Doppler[1], Marco Brandner[3], Martin Bram[4], Juergen Fleig[1] and Alexander K. Opitz[1]; [1]Electrochemistry, Vienna University of Technology, Wien, Austria; [2]Electrochemistry, Vienna University of Technology, Vienna, Austria; [3]Innovation Services, Plansee SE, Reutte, Austria; [4]Institute of Energy and Climate Research, Forschungszentrum Juelich GmbH, Juelich, Germany.

A6.49
Electrical Conductivity and Redox Behavior of Donor and Acceptor Co-Substituted $SrTiO_3$ as Fuel Electrode Material Aleksey Yaremchenko, Javier Macias and Jorge Frade; CICECO, Department of Materials and Ceramic Engineering, University of Aveiro, Aveiro, Portugal.

A6.50
Chemical Compatibility of Doped Yttrium Chromite and Ceria Composite Anode with YSZ Electrolyte Kang Yan[1], Haruo Kishimoto[1], Katherine D. Bagarinao[1], Katsuhiko Yamaji[1], Teruhisa Horita[1] and Harumi Yokokawa[1, 2]; [1]National Institute of Advanced Industrial Science and Technology, Tsukaba, Japan; [2]the University of Tokyo, Tokyo, Japan.

A6.51
In Search for Alternative Ceramic Components for SOFC Anodes: $SrVO_3$-$SrTiO_3$ Solid Solutions Javier Macias, Aleksey Yaremchenko and Jorge Frade; Department of Materials and Ceramic Engineering, University of Aveiro, Aveiro, Portugal.

A6.52
Electrochemically Modified, Robust Solid Oxide Fuel Cell Anode for Direct-Hydrocarbon Utilization Yoonseok Choi and WooChul Jung; Materials Science and Engineering, Korea Advanced Institute of Science and Technology, Daejeon, Korea (the Republic of).

A6.53
Effect of Fuel Thermal Pretreatment on the Electrochemical Performance of a Direct Lignite Coal Fuel Cell Nikolaos Kaklidis[1], Vasileios Kyriakou[3, 2], George Marnellos[1, 2], Ana Arenillas[4] and Michalis Konsolakis[5]; [1]Department of Mechanical Engineering, University of Western Macedonia, Kozani, Greece; [2]Chemical Process & Energy Resources Institute, Centre for Research & Technology Hellas, Thessaloniki, Greece; [3]Department of Chemical Engineering, Aristotle University of Thessaloniki, Thessaloniki, Greece; [4]Instituto Nacional del Carbon, Oviedo, Spain; [5]School of Production Engineering and Management, Technical University of Crete, Chania, Greece.

SESSION B2: Poster Session: PEMFC/DMFC
B: Polymer Electrolyte Fuel Cells and Electrolyzers
Tuesday Afternoon, June 16, 2015
5:20 PM
Keystone Resorts, Red Cloud Peak

B2.01
Synthesis and Characterization of Water Stable, Silicotungstic Acid Functionalized Perfluorocyclobutyl Polymer Electrolyte Andrew R. Motz, Mei-Chen Kuo and Andrew M. Herring; Chemical and Biological Engineering , Colorado School of Mines, Lakewood, Colorado, United States.

B2.02
Synthesis and Properties of Poly(phenylene)-Poly(ether ketone) Block Copolymer Electrolytes (V)-Investigation of Chemical Composition Shogo Nagaya, Masahiro Fujita, Yuko Takeoka and Rikukawa Masahiro; Sophia University, Tokyo, Japan.

B2.03
Activity of Nanographitic Structures toward Oxygen Reactions in the Solid State CsH_2PO_4 Electrochemical System Hadi Tavassol[2, 1] and Sossina M. Haile[2, 1]; [1]Material Science, California Institute of Technology, Pasadena, California, United States; [2]Material Science, Northwestern University, Evanston, Illinois, United States.

B2.04
Characterization of PBI Based High Temperature PEMFC Using Methanol Reformed Gas Properties Sung-Kwan Ryu[3], Seung-Gon Kim[1], Minjin Kim[1, 2] and Young-Jun Sohn[1, 2];[1]Korea Institute of Energy Research, Daejeon, Korea (the Republic of); [2]University of Science and Technology, Daejeon, Korea (the Republic of); [3]Chemical Engineering, Yonsei University, Seoul, Korea (the Republic of).

B2.05
Optimization of the Lifetime for Polybenzimidazole Based High Temperature PEM Fuel Cell Stacks Minjin Kim, Young-Jun Shon and Seung-Gon Kim; Fuel Cell Research Center, Korea Institute of Energy Research, Daejeon, Korea (the Republic of).

B2.06
Application of Block Copolymers Having Aliphatic Side Chains to Cathode Ionomer (II) - Properties Related to Gas Transport Ken Akizuki[2, 3], Atsushi Ohma[3], Toyoaki Matsuura[1], Masahiro Yoshizawa-Fujita[1], Yuko Takeoka[1] and Masahiro Rikukawa[1]; [1]Department of Materials and Life Sciences, Faculty of Science and Technology, Sophia University, Tokyo, Japan;[2]Department of Materials and Life Sciences, Sophia University, Tokyo, Japan; [3]Nissan Research Center, Nissan Motor Co., Ltd., Kanagawa, Japan.

B2.07
Zirconium Phosphate-Grafted-Sulfoanted Polystyrene/Nafion Composite Membranes for Direct Methanol Fuel Cell Kun-lin Liu, Chi-Yang Chao and Cheng-Wei Pai; Materials Science and Engineering, National Taiwan University, Taipei, Taiwan.

SESSION C8: Poster Session II
C: Electrodes and Solid Electrolytes for Batteries
Tuesday Afternoon, June 16, 2015
5:20 PM
Keystone Resorts, Red Cloud Peak

C8.01
Structural and Electronic Properties of Na2MnPO4F as a Cathode Material for Na-Ion Batteries Yin Zheng, Rao Huang, Yuhua Wen and Zizhong Zhu; Xiamen University, Xiamen, China.

C8.02
Investigation of Capacity Fading of Li-Rich Layer-Structured Cathode Materials Kuan-Zong Fung[2, 1], Shu-Yi Tsai[1, 2], Chung-Ta Ni[1, 2] and Wei-Zhi Lin[1, 2]; [1]Materials Science and Engineering, National Cheng Kung University, Tainan City, Taiwan; [2]Research Center for Energy Technology and Strategy, National Cheng Kung University, Tainan City, Taiwan.

C8.03
Improvement of Cycling Performance of $LiMn_{1.5}Ni_{0.5}O_4$ Cathodes by Surface Treatment with Trimethyl Phosphite Vapor Ryosuke Okamoto[1], Kazuhiko Okubo[1], Mitsukuni Kondo[2] and Yoshiyuki Abe[1]; [1]Ichikawa Research Laboratories, Sumitomo Metal Mining Co., Ltd., Ichikawa-City, Japan; [2]Battery Research Laboratories, Sumitomo Metal Mining Co., Ltd., Niihama-city, Japan.

C8.04
Synthesis of Nanostructured $Li_3M_2(PO_4)_2F_3$ Glass-Ceramics (M = V, Fe, Ti) Tomasz K. Pietrzak, Przemyslaw P. Michalski, Agata Dorau, Anna Kaleta, Agnieszka Starobrat, Jakub Plachta, Marek Wasiucionek and Jerzy E. Garbarczyk; Physics, Warsaw University of Technology, Warszawa, Poland.

C8.05
Lithium/Polymer Electrolyte Interface Stabilization by In Situ and Ex Situ Formation of Protective Surface Layers Nassus Brown and Dale Teeters; Chemistry and Biochemistry, The University of Tulsa, Tulsa, Oklahoma, United States.

C8.06
Development of Na_3PS_4-Based Sulfide Electrolytes for All-Solid-State Batteries Masahiro Tatsumisago[1] and Akitoshi Hayashi[1, 2]; [1]Department of Applied Chemistry, Osaka Prefecture University, Sakai, Osaka, Japan; [2]ESICB, Kyoto Univ., Kyoto, Japan.

C8.07
Development of Solid Electrolyte Membranes Aude A. Hubaud[1], David Schroeder[2, 1], Brian Ingram[1] and John Vaughey[1]; [1]Argonne National Laboratory, Argonne, Illinois, United States; [2]Northern Illinois University, Dekalb, Illinois, United States.

C8.08
Reactions at Silicon Electrode Surfaces Fulya Dogan[1], Aude Hubaud[1], Zhenzhen Yang[1], Danielle Proffit[1], David Schroeder[2] and Jack Vaughey[1]; [1]Chemical Sciences and Engineering, Argonne National Laboratory, Lemont, Illinois, United States; [2]College of Engineering and Engineering Technology, Northern Illinois University, DeKalb, Illinois, United States.

C8.09
Oxygen Nonstoichiometry and Charge Transfer in the Double Perovskites $Gd_{1-x}La_xBaCo_2O_{6-\delta}$ (x=0-1) Dmitry Malyshkin, Dmitry Tsvetkov, Evgeny Sterkhov, Ivan Ivanov and Andrey Zuev; Ural Federal University, Ekaterinburg, Russian Federation.

C8.10
Synthesis and Electrochemical Performance of Carbon-Coated $0.8Li_2MnO_3$-$0.2LiCoO_2$ Cathode Material for Lithium Ion Batteries Zhuang Wang, Zhiyong Yu, Wenji Li, Mengyun Lu and Hanxing Liu; School of Materials Science and Engineering, Wuhan University of Technology, Wuhan, China.

C8.11
Advanced, Nanostructured $LiMn_2O_{4-y}S_y$ Cathode Materials Exhibiting an Outstanding Capacity and Rate Capability Marcin Molenda, Monika Bakierska and Roman Dziembaj; Faculty of Chemistry, Jagiellonian University, Krakow, Poland.

C8.12
Study of the Mechanism of Electrophoretic Deposition of Composite Lithium-Ion-Conducting Membranes Raymond Blanga and Diana Golodnitsky; Chemistry, Tel Aviv University, Biniamina, Israel.

C8.13
***Operando* X-Ray Absorption Study on Charge-Discharge Mechanism of Li_2MnO_3 and Li_2RuO_3 Lithium-Rich Cathode** Takanori Kobayashi, Koji Nakanishi, Takuya Mori, Kentaro Yamamoto, Titus Masese, Yuki Orikasa and Yoshiharu Uchimoto; Kyoto University, Kyoto-shi, Japan.

C8.14
Phase Transition Mechanism of $LiFePO_4$-$FePO_4$ Using a Thin-Film Model Electrode Takahiro Yoshinari, Kentaro Yamamoto, Eri Kato, Mori Takuya, Titus Masese, Yuki Orikasa and Yoshiharu Uchimoto; Kyoto University, Kyoto, Japan.

C8.15
Molten Salt Method of Preparation and Electrochemical Characterisation of MnO_2 M.V. Reddy, Yun Hong Lee and Stefan Adams; Materials Science & Eng., National University of Singapore, Singapore, Singapore.

C8.16
Electrochemical and Magnetic Properties of $LiMn_{1.5}Ni_{0.5}O_4$ Spinel Oxide Reiko Hanafusa, Kazuki Kotani, Kousuke Ishidzu, Yoshihiro Oka and Tatsuya Nakamura; Dept. of Electrical Engineering , University of Hyogo, Himeji, Japan.

C8.17
Influence of Synthesis Conditions on Crystal Structure and Electrochemical Properties of Spinel $Li_4Ti_5O_{12}$ Used as Anode Material for Li-Batteries Anna Drobniak, Danuta Olszewska and Wojciech Zajac; AGH University of Science and Technology, Krakow, Poland.

C8.18

$Li_4Ti_5O_{12}$ Doped with Copper as Anode Material for Li-Batteries Anna Drobniak, Danuta Olszewska and Wojciech Zajac; AGH University of Science and Technology, Krakow, Poland.

C8.19
Acoustic Emission Study of SnO Anode for Lithium-Ion Batteries Naoakai Kuwata[1], Shutaro Kato[1], Junichi Kawamura[1], Kazuhisa Sato[1, 2] and Junichiro Mizusaki[1]; [1]IMRAM, Tohoku University, Sendai, Japan; [2]Graduate School of Engineering, Tohoku University, Sendai, Japan.

C8.20
Lattice Volume Change of $Li[Ni_xCo_yMn_z]O_2$ Cathodes during Charge/Discharge Reaction and Their Cycle Performance Kosuke Ishizu, Yoshihiro Oka and Tatsuya Nakamura; University of Hyogo, Himeji, Japan.

C8.21
Investigation of All-Solid-State Li-O_2 Batteries Hirokazu Kitaura and Haoshen Zhou; Energy Technology Research Institute, National Institute of Advanced Industrial Science and Technology, Tsukuba, Japan.

C8.22
Electrochemical Properties of $LiNi_{1/3}Co_{1/3}Mn_{1/3}$ Electrodes Prepared with Water-Based Slurry Dispersed Conducting Additive by Using Plasma Treatment Yoshihiro Oka, Tomoya Sasaki, Hideyoshi Matsumoto and Tatsuya Nakamura; University of Hyogo, Himeji, Japan.

C8.23 WITHDRAWN

C8.24 WITHDRAWN

C8.25 WITHDRAWN

C8.26 WITHDRAWN

C8.27 WITHDRAWN

C8.28
Defect Interaction and Solid Electrolyte Transition in $K_3H(SeO_4)_2$ Oscar S. Hernandez-Daguer[2, 1], Diego Pena-Lara[3] and Ruben A. Vargas-Zapata[3]; [1]Department of Physics, Universidad del Atlántico, Barranquilla, Colombia; [2]Department of Physics, University of Puerto Rico., Mayaguez, Puerto Rico, United States; [3]Department of Physics, Universidad del Valle, Cali, Colombia.

C8.29
Synthesis, Structure and Electrochemical Properties of Lithium Solid Electrolyte: The Li-P-S-O System Kota Suzuki[1], Satoshi Hori[1], Masamitsu Sakuma[1], Tetsuya Nakazawa[1], Miki Kubota[2], Masaaki Hirayama[1], Masao Yonemura[2] and Ryoji Kanno[1]; [1]Electronic Chemistry, Tokyo Institute of Technology, Yokohama, Japan; [2]High Energy Accelerator Research Organization, Tokai, Japan.

C8.30
High Sensitivity Detection of Mn Ion Dissolution by *In Situ* 1H MRI Yoshiki Iwai, Masato Ohzu, Naoaki Kuwata and Junichi Kawamura; Institute of Multidisciplinary Research for Advanced Materials, Tohoku University, Sendai, Japan.

C8.31
Li Ion Conductivity in a Cation Deficient Scheelite Ryan D. Bayliss[1], Stuart N. Cook[2] and Jordi Cabana[1]; [1]Department of Chemistry, University of Illinois at Chicago, Chicago, Illinois, United States; [2]Department of Materials Science and Engineering, Massachusetts Institute of Technology, Boston, Massachusetts, United States.

C8.32
High Volt Stability of Lithium Borate Thin-Film as Solid Electrolyte for All-Solid-State Thin-Film Battery Haruka Itabashi, Naoaki Kuwata and Junichi Kawamura; IMRAM, Tohoku University, Sendai, Japan.

C8.33
Highly Reversible Capacity at the Surface of a Lithium-Rich Manganese Oxide Li_2MnO_3 Masaaki Hirayama[1], Sou Taminato[1], Kota Suzuki[1], Ryoji Kanno[1] and Masao Yonemura[2];[1]Tokyo Institute of Technology, Yokohama, Japan; [2]KEK, Tokai, Japan.

C8.34
Fabrication and Electrochemical Properties of All-Solid-State Batteries with 5V $LiNi_{0.5}Mn_{1.5}O_4$ Cathode and $Li_{10}GeP_2S_{12}$ Solid Electrolyte Gwangseok Oh, Masaaki Hirayama, Ohmin Kwon, Kota Suzuki and Ryoji Kanno; Electronic Chemistry, Tokyo Institute of Technology, Yokohama, Japan.

C8.35
Electrochemical Performance of Li_2MnO_3 Cathode Material by Fluorine Substitution Sha Wu, Zhiyong Yu, Hanxing Liu, Wenji Li and Mengyun Lu; School of Materials Science and Engineering, Wuhan University of Technology, Wuhan, China.

C8.36
EELS Investigations of Aging Mechanisms in $LiFePO_4$ Cathodes after Extended Electrochemical Cycling Samartha Channagiri[1], Nicholas Warner[2], Frank Scheltens[1], Marcello Canova[2], Yann Guezennec[2] and David W. McComb[1]; [1]Materials Science and Engineering, The Ohio State University, Columbus, Ohio, United States; [2]Center for Automotive Research, The Ohio State University, Columbus, Ohio, United States.

C8.37
Mixed Conduction Transmission Line Impedance Model for Olivine Structured Cathode Material Eui-Chol Shin[1], Jihyeon Gim[1], Jinju Song[1], Sung-Won Kang[1], Docheon Ahn[2], Jaekook Kim[1] and Jong-Sook Lee[1]; [1]Materials Science and Engineering, Chonnam National University, Gwang-Ju, Korea (the Republic of); [2]Pohang Accelerator Laboratory, Pohang, Korea (the Republic of).

C8.38
In Depth First-Principles Study with Experiment on Origins and Mechanism of Phase Transformation of Mn^{4+}-Related Bulk Li_2MnO_3 Jin-Myoung Lim[1], Duho Kim[1], Young-Geun Lim[2], Min-Sik Park[2], Young-Jun Kim[2], Kyeongjae Cho[3] and Maenghyo Cho[1]; [1]Seoul National University, Seoul, Korea (the Republic of); [2]Korea Electronics Technology Institute, Seongnam, Korea (the Republic of); [3]The University of Texas at Dallas, Richardson, Texas, United States.

C8.39
The High-Capacity Effect in the All-Glass Composites Conducting Electrons and Silver Ions Wioleta Slubowska, Jan L. Nowinski, Jerzy E. Garbarczyk and Marek Wasiucionek; Faculty of Physics, Warsaw University of Technology, Warsaw, Poland.

C8.40
Analysis of Impedance Spectroscopy of Aqueous Supercapacitors by Evolutionary Programming: Finding DFRT from Complex Capacitance Alon Oz[1], Shany Hershkovitz[2], Nataly Belman[3], Ervin Tal-Gutemacher[3] and Yoed Tsur[2]; [1]The Interdisciplinary Energy Graduate Study Program, Technion - Israel Institute of Technology, Haifa, Israel; [2]Department of Chemical Engineering, Technion - Israel Institute of Technology, Haifa, Israel; [3]Elbit Systems Land and C4I Ltd, Netanya, Israel.

C8.41
Two-Dimensional Imaging of Charge/Discharge by the Bragg Edges Analysis of the Electrode Materials for the Pulsed Neutron-Beam Transmission Spectra of a Li-Ion Battery Koichi Kino[1], Masao Yonemura[2], Yoshihisa Ishikawa[2] and Takashi Kamiyama[2, 3]; [1]Faculty of Engineering, Hokkaido University, Sapporo, Japan; [2]Institute of Materials Structure Science, High Energy Accelerator Research Organization, Tokai, Japan; [3]The Graduate University for Advanced Studies (Sokendai), Tokai, Japan.

C8.42
Alluaudite Sodium Iron Sulfate $Na_{2+2x}Fe_{2-x}(SO_4)_3$ for High Energy Density Sodium-Ion Battery Shin-ichi Nishimura[1, 2], Prabeer Barpanda[3, 1], Gosuke Oyama[1] and Atsuo Yamada[1,2]; [1]Department of Chemical System Engineering, The University of Tokyo, Bunkyo-ku, Japan; [2]ESICB, Kyoto University, Kyoto, Japan; [3]Indian Institute of Science, Bangalore, India.

C8.43 Withdrawn

C8.44
Origin of High Rate Performance of $LiFePO_4$ Investigated by Time-Resolved X-Ray Diffraction Kazufumi Otani[1], Toshiyuki Munesada[1], Takuya Mori[1], Kentaro Yamamoto[1], Titus N. Masese[1], Yuki Orikasa[1], Koji Ohara[2], Katsutoshi Fukuda[2], Yukinori Koyama[2], Toshiyuki Nohira[3], Rika Hagiwara[4], Zempachi Ogumi[2] and Yoshiharu Uchimoto[1]; [1]Graduate School of Human and Environmental Studies, Kyoto University, Kyoto, Japan; [2]Office of Society-Academia Collaboration for Innovation, Kyoto University, Uji, Japan; [3]Institute of Advanced Energy, Kyoto University, Uji, Japan; [4]Graduate School of Energy Sciences, Kyoto University, Kyoto, Japan.

C8.45
A Cation-Selective Separator as the Oxygen-Barrier for Non-Aqueous Metal-Air Batteries Xiaodi Ren[1], Mingzhe Yu[1], Mitchell E. Steindler[2], Qiang Zhao[1] and Yiying Wu[1];[1]Chemistry and Biochemistry, Ohio State University, Columbus, Ohio, United States; [2]Chemical and Biomolecular Engineering, Ohio State University, Columbus, Ohio, United States.

C8.46
How to Get a Conversion Reaction Reversible? Lithium Storage in Electroactive Metal Sulphide Nanodots Yan Yu[1, 2], Changbao Zhu[2] and Joachiam Maier[2]; [1]Department of Materials Science and Engineering, University of Science and Technology of China, Hefei, China; [2]Max-Planck-Institute for Solid State Research, Stuttgart, Germany.

C8.47
Constructing 3D Porous and Carbon-Coated Electrode Materials for High Performances Li-Ion Batteries Yan Yu[1, 2], Jun Liu[2] and Joachiam Maier[2]; [1]Department of Materials Science and Engineering, University of Science and Technology of China, Hefei, China; [2]Max Planck Institute for Solid State Research, Stuttgart, Germany.

C8.48
Synthesis and Characterization of $Li(Li_yFe_zV_{1-y-z})O_{2-\delta}$ – Anode Material for Li-Ion Batteries Bartlomiej Gedziorowski and Janina Molenda; AGH University of Science and Technology, Krakow, Poland.

C8.49
Unusual Surface Redox Behaviors of Li_2MnO_3: First-Principles Prediction and Experimental Validation Duho Kim[1], Jin-Myoung Lim[1], Young-Geun Lim[2], Min-Sik Park[2], Young-Jun Kim[2], Kyeongjae Cho[3] and Maenghyo Cho[1]; [1]School of Mechanical Aerospace Engineering, Seoul National University, Seoul, Korea (the Republic of); [2]Advanced Batteries Research Center, Korea Electronics Technology Institute, Seongnam, Korea (the Republic of); [3]Department of Materials Science and Engineering, University of Texas at Dallas, Dallas, Texas, United States.

C8.50
Ultrasonic-Assisted Synthesis of Nanostructured Transition Metal Oxides as Cathode Materials for Mg-Ion Batteries Lu Wang[1], Xinzhi Chen[1], Sidsel M. Hanetho[2] and Fride Vullum-Bruer[1]; [1]Department of Materials Science and Engineering, Norwegian University of Science and Technology, Trondheim, Norway; [2]SINTEF Materials and Chemistry, Trondheim, Norway.

C8.51
Synthesis and Electrochemical Performance of $Li_4Ti_5O_{12}$ Modified with Carbon Nanotubes Yingbin Lin and Zhigao Huang; Physics and Energy College, Fujian Normal University, Fuzhou City, China.

C8.52
Structural, Electrical and Electrochemical Properties of the $Na_{2/3}Ni_{1/3}Mn_{2/3-x}Ti_xO_{2-\delta}$ ($0 \le x \le 1/3$) Cathode Materials Anna G. Milewska and Janina Molenda; AGH Academy of Science and Technology, Krakow, Poland.

C8.53
Dynamics Study of Lithium Ion Diffusion in Super Lithium Ion Conductors, $Li_{10}GeP_2S_{12}$ (LGPS) Masao Yonemura[1], Takashi Kamiyama[1, 2], Ohmin Kwon[3], Satoshi Hori[3], Masaaki Hirayama[3], Ryoji Kanno[3], Kazuhiro Mori[4], Kaoru Shibata[5], Takeshi Yamada[6] and Yukinobu Kawakita[5]; [1]Institute of Materials Structure Science (IMSS), High Energy Accelerator Research Organization (KEK), Tokai, Japan; [2]The Graduate University for Advanced Studies (Sokendai), Tokai, Japan; [3]Department of Electronic Chemistry, Interdisciplinary Graduate School of Science and Engineering, Tokyo Institute of Technology, Yokohama, Japan; [4]Research Reactor Institute, Kyoto University, Kumatori, Japan; [5]Materials and Life Science Division, J-PARC Center, JAEA, Tokai, Japan; [6]Neutron R&D Division, CROSS-Tokai, Tokai, Japan.

C8.54
Lithium Superionic Conductors with $Li_{10}GeP_2S_{12}$-type Structure in the Li_4MS_4 – Li_3PS_4 System (M = Si, Ge, Sn): Synthesis, Conduction Mechanism and Phase Relationships Satoshi Hori[1], Ohmin Kwon[1], Kota Suzuki[1], Masaaki Hirayama[1], Masao Yonemura[2], Takashi Kamiyama[2, 3] and Ryoji Kanno[1]; [1]Electrochemistry, Tokyo Institute of Technology, Yokohama, Japan; [2]High Energy Accelerator Research Organization, Institute of Materials Structure Science, Ibaraki, Japan; [3]The Graduate University for Advanced Studies (Sokendai), Ibaraki, Japan.

C8.55
Effect of Zn-Doping on Densification of $Li_7La_3Zr_2O_{12}$ Emil Hanc, Wojciech Zajac, Angelika Orzeszek and Janina Molenda; Faculty of Energy and Fuels, AGH University of Science and Technology, Cracow, Poland.

C8.56
Evolution of Microstructure and Its Relation to Ionic Conductivity in $Li_{1+x}Al_xTi_{2-x}(PO_4)_3$ Thomas Hupfer[1], Claudia Bucharsky[1], Günter Schell[1], Anatoliy Senyshyn[2], Mykhailo Monchak[2, 3] and Michael J. Hoffmann[1]; [1]IAM-KWT, KIT, Karlsruhe, Germany; [2]FRM II, SPODI, TU Munich, Garching, Germany; [3]IAM-ESS, KIT, Karlsruhe, Germany.

C8.57
New Intercalation Cathodes for Calcium Ion Batteries Danielle Proffit[1], Albert Lipson[1], Baofei Pan[1], Brian Ingram[1], Miao Liu[2], Anubhav Jain[2], Kristin Persson[2] and Jack Vaughey[1];[1]Chemical Sciences and Engineering, Joint Center for Energy Storage Research, Argonne National Laboratory, Lemont, Illinois, United States; [2]Electrochemical Technologies Group, Joint Center for Energy Storage Research, Lawrence Berkeley National Laboratory, Berkeley, California, United States.

C8.58
Mixed Glass Former Effect in $50Li_2O$-$50[xNb_2O_5$-$(1-x)P_2O_5]$ Glasses Prashant Dabas and K. Hariharan; Physics, Indian Institute of Technology Madras, Chennai, India.

C8.59
Tin Networked Electrode Providing Enhanced Volumetric Capacity and Pressureless Operation for All-Solid-State Li-Ion Batteries Justin M. Whiteley[1], Ji Woo Kim[1], Chan Soon Kang[2], Jong Soo Cho[1], Kyu Hwan Oh[2] and Se-Hee Lee[1]; [1]Mechanical Engineering, University of Colorado, Boulder, Boulder, Colorado, United States; [2]Materials Science and Engineering, Seoul National University, Seoul, Korea (the Republic of).

C8.60
Synthesis and Electrochemical Properties of SiO_x/C Amorphous Composite as Anode Material for Lithium Ion Batteries Pengpeng Lv, Hailei Zhao, Chunhui Gao and Zhaolin Li; University of Science and Technology Beijing, Beijing, China.

C8.61
Impedance Investigation of the Processes on SiC/Li^+-Electrolyte Interface Ekaterina Antonova[2], Elizaveta Evschik[1], Alexey Levchenko[1], Viktor Berestenko[1] and Yury Dobrovolsky[1];[1]IPCP RAS, Chernogolovka, Russian Federation; [2]IHTE UB RAS, Ekaterinburg, Russian Federation.

C8.62
Synthesis and Na^+ Conduction Properties of Rare Earth-Free NASICON-Type Solid Electrolyte Toshinori Okura[1], Naoya Yoshida[1] and Kimihiro Yamashita[2]; [1]Kogakuin University, Hachioji, Japan; [2]Tokyo Medical and Dental University, Chiyoda, Japan.

C8.63
Interfacial Modification of All-Oxide-Solid-State Battery with Low Surface Energy Solid Electrolyte Shogo Komagata, Shingo Ohta and Takahiko Asaoka; Toyota Central R&D Labs. Inc., Nagakute, Japan.

C8.64 WITHDRAWN

C8.65
Evaluations of Iron Based Cathode Materials for Li-Ion Batteries--Case of $LiFe_{1-y}M_yPO_4$, Nanometric $LiFePO_4$ and $LiFeO_2$ Andrzej J. Kulka, Wojciech Zajac, Konrad Swierczek, Katarzyna Walczak and Janina Molenda; AGH-University of Science and Technology, Cracow, Poland.

C8.66
Effect of Glass Additives on Relative Density and Li-Ion Conductivity of $Li_{7-x}La_3Zr_{2-x}Nb_xO_{12}$ Solid Electrolyte Nataly C. Rosero Navarro, Taira Yamashita, Akira Miura, Mikio Higuchi and Kiyoharu Tadanaga; Hokkaido University, Sapporo, Japan.

C8.67
Sodium Ion Conducting Ceramics with $Na_5YSi_4O_{12}$-Type Structure Synthesized by a Polymerized Complex Method Naohiro Horiuchi[1], Kaede Ryu[2], Naoya Yoshida[2], Toshinori Okura[2] and Kimihiro Yamashita[1]; [1]Institute of Biomaterial & Bioengineering, Tokyo Medical and Dental University, Tokyo, Japan; [2]Kogakuin University, Hachioji-shi, Japan.

C8.68
Development of Salty-Gel Electrolytes Composed of Metal Salt and Small Amount of Organic Solvent as a New Concept for Organic Solid Electrolytes Makoto Moriya[1, 2, 3], Shohei Nabeno[3], Yutaro Hanawa[3], Wataru Sakamoto[3] and Toshinobu Yogo[3]; [1]Graduate School of Science, Shizuoka University, Shizuoka, Japan; [2]JST PRESTO, Kawaguchi, Japan; [3]EcoTopia Science Institution, Nagoya University, Nagoya, Japan.

C8.69
Investigation of Negative Electrode for All-Solid-State Lithium Ion Battery using Garnet-Type Oxide Electrolyte Tetsuro Kobayashi, Shingo Ohta and Takahiko Asaoka; Toyota Central R&D Labs.,Inc., Nagakute, Japan.

C8.70
Low Temperature Synthesis of Yb Doped $SrCeO_3$ Electrolyte Thin Film for Hydrogen Separation Yang Lei, Chao Zhang, Di He, Shuai Li, Xiaopeng Liu and Lijun Jiang; Department of Energy Materials and Technology, General Research Institute for Non-Ferrous Metals, Beijing, China.

C8.71
Improved of Electrochemical Performances of Manganese-Substituted $Na_{0.7}Co_{1-y}Mn_yO_2$ - Cathode Material for Rechargeable Sodium-Ion Batteries Dominika Baster, Filip Hartman, Lukasz Kondracki, Andrzej Kulka, Wojciech Zajac and Janina Molenda; AGH University of Science and Technology, Krakow, Poland.

C8.72
Earth-Abundant Cathode Materials for Sodium-Ion Batteries P2-$Na_{2/3}Fe_{1-y}Mn_yO_2$ Dominika Baster, Piotr Trzaska and Janina Molenda; AGH University of Science and Technology, Krakow, Poland.

C8.73
Low Temperature Conductivity Response in Polymer Blend Electrolyte Avirup Das[2], A K. Thakur[1] and K Kumar[2]; [1]Physics, Indian Institute of Technology Patna, Patna, India;[2]Physics, Indian Institute of Technology Kharagpur, Kharagpur, India.

C8.74
Supercapacitor Response of Tin Sulfide Electrodes Pradip Leuaa, Ajay D. Thakur and Awalendra K. Thakur; Physics, IIT Patna, Patna, India.

C8.75
Spinel $LiCrTiO_4$ as a LIB Anode : A Density Functional Theory Approach Biswajit Mondal and Awalendra K. Thakur; Physics, IIT Patna, Patna, India.

SESSION D6: Poster Session: Fundamentals of Transport and Reactivity and Nanoionics II
D: Fundamentals of Transport and Reactivity and Nanoionics
Tuesday Afternoon, June 16, 2015
5:20 PM
Keystone Resorts, Red Cloud Peak

D6.01
The Role of Ceria in Electro-Reduction of Nitrogen Oxide Based on Solid State Cell Reactor at Intermediate-Temperature Wenyi Tan[1, 2], Fei Chen[1], Lei Gong[1], Yunfei Bu[2], Yang Song[2] and Qin Zhong[2]; [1]Nanjing Institute of Technology, Nanjing, China; [2]School of Chemical Engineering, Nanjing University of Science & Technology, Nanjing, China.

D6.02
Li-Ion Dynamics Along the Inner Surfaces of Layer-Structured 2H-Li_xNbS_2 Bernhard Stanje[1], Viktor Epp[1], Suliman Nakhal[2], Martin Lerch[2] and Martin Wilkening[1]; [1]Institute for Chemistry and Technology of Materials, Technical University of Graz, Graz, Austria; [2]Institut für Chemie, Technische Universität Berlin, Berlin, Germany.

D6.03
Catalytic Activity and Oxygen Storage Properties of Doped $Ba_{1-x}Sr_xY_{1-y}Ln_yMn_2O_{5+\delta}$ (Ln - lanthanides) for Application in Three-Way Catalytic Converters Alicja Klimkowicz[2,1], Konrad Swierczek[2], Tomasz Rzasa[2], Akito Takasaki[1] and Bogdan Dabrowski[3]; [1]Department of Engineering Science and Mechanics, Shibaura Institute of Technology, Tokyo, Japan;[2]Faculty of Energy and Fuels, AGH University of Science and Technology, Krakow, Poland; [3]Department of Physics, Northern Illinois University, DeKalb, Illinois, United States.

D6.04
Electrical Conductivity, Oxygen Diffusion Coefficient and Surface Exchange Coefficient of $La_4Co_3O_{10}$ by Electrical Conductivity Relaxation Technique Yoshinobu Adachi, Naoyuki Hatada and Tetsuya Uda; Materials Science and Engineering, Kyoto University, Kyoto, Japan.

D6.05
Influence of Cation Nonstoichiometry to Oxygen Nonstoichiometry in Mixed Ionic and Electronic Conducting Perovskite Oxides Yusuke Okamoto[1], Akihide Kuwabara[2], Takashi Nakamura[3], Tatsuya Kawada[1] and Koji Amezawa[3]; [1]Graduate Study of Environmental Studies, Tohoku University, Sendai, Japan; [2]Japan Fine Ceramics Center, Atsuta, Japan; [3]IMRAM, Tohoku University, Sendai, Japan.

D6.06
Structure, Transport and Stability of Layered Ruddlesden-Popper $La_{n+1}Ni_nO_{3n+1}$ (n = 1, 2 and 3) Epitaxial Films Kuan-Ting Wu[1, 2], Monica Burriel[5, 2], Fan Yang[3], David McComb[3], John Kilner[2, 4] and Stephen Skinner[2]; [1]Department of Applied Chemistry, Kyushu University, Fukuoka, Japan; [2]Department of Materials, Imperial College London, London, United Kingdom; [3]Department of Materials Science and Engineering, Ohio State University, Columbus, Ohio, United States; [4]International Institute for Carbon-Neutral Energy Research (wpi-I2CNER), Fukuoka, Japan; [5]Laboratoire des Matériaux et du Génie Physique (LMGP), Grenoble, France.

D6.07
Low Temperature Protonic Transport in Nanocrystalline Porous Oxides Sindre O. Stub[1], Per M. Rorvik[2], Reidar Haugsrud[1] and Truls Norby[1]; [1]Centre for Materials Science and Nanotechnology, Department of Chemistry, University of Oslo, Oslo, Norway; [2]Sector for Sustainable Energy Technology, SINTEF Materials and Chemistry, Oslo, Norway.

D6.08
The Influence of Aging and Humidity on Transport Properties of Ceria Thin Films at Low Temperatures Matthias Kleine-Boymann, Matthias Elm, Raika W. Oppermann and Juergen Janek; Institute of Physical Chemistry, Justus-Liebig University, Giessen, Germany.

D6.09
Correlation between Mobile Oxygen Ion Distances and Characteristic Length Scales for $La_{2-x}Er_xMo_2O_9$ Type Oxide Ion Conductor Tanmoy Paul and Aswini Ghosh; Solid State Physics, Indian Association for the Cultivation of Science, Kolkata, India.

D6.10
Tuning the Defect Structure of $La_{0.5}Sr_{0.5}Co_{0.5}Mn_{0.5}O_{3-\delta}$ for Optimized Redox Behavior under Polarisation Conditions Celeste A. van den Bosch, George F. Harrington, Stephen J. Skinner and Ainara Aguadero; Department of Materials, Imperial College London, London, United Kingdom.

D6.11
Defect Chemistry and Diffusion in $Cu_2ZnSnSe_4$ and Cu_2ZnSnS_4 Thin Films Steven Harvey, Glenn Teeter and Ingrid Repins; National Renewable Energy Laboratory, Golden, Colorado, United States.

D6.12
Ionic Conductivity Modification in Nanoscale Proton-Conducting Oxide Heterostructures Prepared by Pulsed Laser Deposition Stefan B. Nikodemski[1], Daniel Clark[1], Jianhua Tong[1], Ryan O'Hayre[1], Philip Parilla[2], David Ginley[2] and Joseph Berry[2]; [1]Metallurgical and Materials Engineering, Colorado School of Mines, Golden, Colorado, United States; [2]National Renewable Energy Laboratory, Golden, Colorado, United States.

D6.13
Investigating the Origins of Modified Transport Properties of YSZ in Confined Systems George Harrington[1, 2, 3], Andrea Cavallaro[3], Tobias M. Huber[1, 2], Harry L. Tuller [2, 4], Bilge Yildiz[5, 2], Kazunari Sasaki[6, 1], David W. McComb[7, 3], Stephen J. Skinner[3] and John A. Kilner[3]; [1]Next-Generation Fuel Cell Research Centre, Kyushu University, Fukuoka, Japan;[2]Department of Materials, Massachusetts Institute of Technology, Cambridge, Massachusetts, United States; [3]Department of Materials, Imperial College London, London, United Kingdom;[4]International Institute for Carbon Neutral Energy Research, Kyushu University, Fukuoka, Japan; [5]Lab. for Electrochemical Interfaces, Massachusetts Institute of Technology, Cambridge, Massachusetts, United States; [6]Department of Mechanical Engineering, Kyushu University, Fukuoka, Japan; [7]Department of Materials Science and Engineering, The Ohio State University, Columbus, Ohio, United States.

D6.14
Understanding Proton Conductivity within Porous Organic Cage Networks Scott Lewis, Ming Liu, Linjiang Chen, Iain Aldous, Marc Little, Samantha Chong, Laurence Hardwick and Andrew I. Cooper; Chemistry, University of Liverpool, Liverpool, United Kingdom.

D6.15
Highly-Conductive Nanomaterials Based on Li_2O–FeO–V_2O_5–P_2O_5 Glasses Tomasz K. Pietrzak, Jerzy E. Garbarczyk, Marek Wasiucionek, Jan L. Nowinski and Przemyslaw P. Michalski; Physics, Warsaw University of Technology, Warszawa, Poland.

D6.16
The Mixed Alkali Effect in $(Li_{1-x}A_x)_2Si_2O_5$ (A = K, Rb) Glasses Melissa Novy, Sabyasachi Sen and Sangtae Kim; Materials Science and Engineering, UC Davis, Davis, California, United States.

D6.17 moved to D7.02

D6.18
Ionic Conductivity of β-eucryptite Doped with Mg Yachao Chen and Ivar E. Reimanis; Colorado School of Mines, Golden, Colorado, United States.

D6.19
Analysis of Grain Boundary Conductivity of Ionic Oxides at Elevated Temperature: Doped CeO_2 and Bi_2O_3 – a Case Study NoWoo Kwak and WooChul Jung; Material Science & Engineering, Korea Advanced Institute of Science and Technology (KAIST), Daejeon, Korea (the Republic of).

D6.20
Interfacial Ionic Conductivity in Epitaxial $Y_2Zr_2O_7$ Thin Films Elisa Gilardi[1], Giuliano Gregori[1], Yi Wang[2], Wilfried Sigle[2], Peter A. van Aken[2] and Joachim Maier[1]; [1]Physical Chemistry of Solids, Max Planck Institute for Solid State Research, Stuttgart, Germany; [2]Stuttgart Center for Electron Microscopy, Max Planck Institute for Intelligent System, Stuttgart, Germany.

D6.21
Nanocomposite Ceramics Based on $Ce_{0.9}Gd_{0.1}O_{1.95}$ and MgO Jens Zosel[1], Vladimir Vashook[1], Evgeni Sperling[2], Kristina Ahlborn[1], Frank Gerlach[1], Wolfgang Fichtner[1], Matthias Schelter[1], Ulrich Guth[1, 2] and Michael Mertig[1]; [1]Kurt-Schwabe-Institut für Mess- und Sensortechnik e.V. Meinsberg, Waldheim, Germany; [2]Chemistry, Dresden University of Technology, Dresden, Germany.

D6.22
Reduction Stages of Ni-doped Polycrystalline YSZ Amy Morrissey[1], James R. O'Brien[2], Jianhua Tong[1] and Ivar E. Reimanis[1]; [1]Colorado School of Mines, Golden, Colorado, United States; [2]Off Grid Research, San Diego, California, United States.

D6.23
Electrical and Oxide Ionic Conductivity in Metal Disparsed Pr_2NiO_4-Based Oxides Junji Hyodo[1, 2], Shintaro Ida[1, 2] and Tatsumi Ishihara[1, 2]; [1]Applied Chemistry, Kyushu University, Fukuoka, Japan; [2]International Institute for Carbon Neutral Energy Research (I2CNER), Fukuoka, Japan.

D6.24
Encroachment of Titanium Oxide on Ni Surface for Ni/TiO_2 under Reducing Atmosphere Fangfang Wang[1, 2], Haruo Kishimoto[1, 2], Katherine D. Bagarinao [1, 2], Katsuhiko Yamaji[1, 2], Teruhisa Horita[1, 2] and Harumi Yokokawa[3]; [1]National Institute of Advanced Industrial Science and Technology, Tsukuba, Japan; [2]CREST, JST, Kawaguchi, Japan; [3]The University of Tokyo, Tokyo, Japan.

D6.25
Ionic Transport Properties of $NdBaInO_4$ Stephen Skinner, Yuning Zhou and Manyu Chen; Imperial College London, London, United Kingdom.

D6.26
Oxygen Transport Properties of Ca/W-Substituted Lanthanum Nickelate Peter V. Hendriksen and Simona Ovtar; Department of Energy Conversion and Storage, Technical University of Denmark, Roskilde, Denmark.

D6.27
Characterization of Solid Lithium Ceramic and Glass-Ceramic Nano-Thin Film Electrolytes Prepared by RF Magnetron Sputtering Erik Burton and Dale Teeters; Chemistry and Biochemistry, University of Tulsa, Tulsa, Oklahoma, United States.

D6.28
Characterisation of Electrochemical Transport Parameters in Multi-Ion Systems Truls Norby, Ragnar Strandbakke, Anna Evans and Shay A. Robinson; Department of Chemistry, University of Oslo, Oslo, Norway.

D6.29
Dependence of Surface Defect Chemistry on Sr Concentration in $La_{1-x}Sr_xFeO_{3-\delta}$ Zixuan Guan; Applied Physics, Stanford University, Stanford, California, United States.

D6.30
Glass Transition in Superprotonic Phase of Inorganic Solid Acid Haruyuki Takahashi, Yoshitaka Suzuki and Takashi Sakuma; Graduate School of Science and Engineering, Ibaraki University, Hitachi, Japan.

D6.31
Unraveling the Origin of Surface Capacitance in Mixed Ion Electron Conducting Oxides Chirranjeevi Balaji Gopal, Albert Z. Feng and William Chueh; Materials Science and Engineering, Stanford University, Menlo Park, California, United States.

D6.32 WITHDRAWN
s.

D6.33
Correlating Conductivity and Composition of $Ca_xCe_{1-x}O_{2-\delta}$ Grain Boundaries via Aberration-Corrected Transmission Electron Microscopy William J. Bowman, Kimberly McGuinness, Cruz A. Hernandez and Peter A. Crozier; Materials Science and Engineering, Arizona State University, Tempe, Arizona, United States.

D6.34 WITHDRAWN

SESSION G3: Poster Session
G: Switching and Sensing Phenomena
Tuesday Afternoon, June 16, 2015
5:20 PM
Keystone Resorts, Red Cloud Peak

G3.01
Resistive Switching in $SrRuO_3$ Probed by Scanning Tunneling Microscopy Kiran K. Adepalli[1, 2], Marco Moors[3], Qiyang Lu[1], Rainer Waser[3], Harry Tuller[1], Ilia Valov[3] and Bilge Yildiz[2]; [1]Materials Science and Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts, United States; [2]Nuclear Science and Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts, United States; [3]Peter Grünberg Institute, Forschungszentrum Jülich, Jülich , Germany.

G3.02
Topotactic Phase Transition in $SrCoO_x$ Controlled by Electrochemical Potential Qiyang Lu[1] and Bilge Yildiz[1, 2]; [1]Department of Materials Science and Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts, United States; [2]Department of Nuclear Science and Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts, United States.

G3.03
Atomistic Modelling of the Formation of Conducting Filaments in Resistive RAM Cells David Z. Gao, Samuel R. Bradley, Manveer Munde and Alexander L. Shluger; Physics and Astronomy, University College London, London, United Kingdom.

G3.04
Controllable Resistive ON- and OFF-States by Two Switching Mechanisms in Epitaxial Strontium Titanate-Based Resistive Switches Markus Kubicek, Rafael Schmitt, Felix Messerschmitt and Jennifer Rupp; Department of Materials, ETH Zurich, Zurich, Switzerland.

G3.05
Enhanced Stability of Ag-SbTe Chalcogenide Solid Electrolyte by Nitrogen Doping Young Sam Park[2] and Seung-Yun Lee[1]; [1]Department of Applied Materials Engineering, Hanbat National University, Daejeon, Korea (the Republic of); [2]ETRI, Daejeon, Korea (the Republic of).

G3.06
YSZ-based NO_2 Sensor Utilizing Hierarchical In_2O_3 Electrode Fangmeng Liu[1, 2], Yehui Guan[1, 2], Ruize Sun[1, 2], Xishuang Liang[1, 2], Peng Sun[1, 2], Yuan Gao[1, 2] and Geyu Lu[1, 2];[1]College of Electronic Science and Engineering, Jilin University, Changchun, China; [2]State Key Laboratory on Integrated Optoelectronics, Jilin University, Changchun, China.

G3.07
Mixed Potential Type Acetone Sensor Using Stabilized Zirconia And $M_3V_2O_8$ (M: Zn, Co, Ni and Mg) Sensing Electrode Fangmeng Liu [1, 2], Yehui Guan[1, 2], Ruize Sun[1, 2], Xishuang Liang [1, 2], Peng Sun[1, 2], Fengmin Liu [1, 2] and Geyu Lu[1, 2]; [1]College of Electronic Science and Engineering, Jilin University, Changchun, China; [2]State Key Laboratory on Integrated Optoelectronics, Jilin University, Changchun, China.

G3.08
Electrolyte Related Parameters of Coulometric Solid State Devices Jens Zosel, Matthias Schelter, Vladimir Vashook, Ulrich Guth and Michael Mertig; Kurt-Schwabe-Institut für Mess- und Sensortechnik e.V. Meinsberg, Waldheim, Germany.

G3.09
Enhanced Ambient-Dependent Photoresponse of $LaAlO_3$/$SrTiO_3$ Heterointerface via Catalytic Pd Nanoparticles Haeri Kim[1, 2], Ngai Yui Chan[3], Ji-yan Dai[3] and Dongwook Kim[1];[1]Physics, Ewha Womans University, Lexington, Kentucky, United States; [2]Clean Energy Research Center, Korea Institute of Science and Technology (KIST), Seoul, Korea (the Republic of); [3]The Hong Kong Polytechnic University, Hong Kong, Hong Kong.

G3.10
Hybrid Organic-Inorganic Perovksite Thin Films for Nonvolatile Memory and Broadband Photodetector Koo Tak Hong[1], Jaeho Choi[1], Ki Chang Kwon[1], Sunghak Park[1], Sooyoung Kim[2], Ki Tae Nam[1] and Ho Won Jang[1]; [1]Materials Science & Engineering, Seoul National University, Seoul, Korea (the Republic of); [2]School of Chemical Engineering and Materials Science, Chung-Ang University, Seoul, Korea (the Republic of).

SESSION I1: Poster Session
I: Ion Transport in Hybrid Organic-Inorganic Solids
Tuesday Afternoon, June 16, 2015
5:20 PM
Keystone Resorts, Red Cloud Peak

I1.01
Hydration and Proton Transfer in DNA-M (M=H, Li, Na) Saki Ito, Hitoki Semizo and Yasumitsu Matsuo; Department of Science and Engineering, Setsunan University, Osaka, Japan.

I1.02
Synthesis and Characterization of Bis (acetylacetonato κ-O, O') [zinc (II)/cobalt (II)] Hybrid Organic-Inorganic Complexes as Solid Metal Organic Precursor Reza Rooydell,Matin Roshanzamir Modaberi, Sanjaya Brahma and Chuan-Pu Liu; MSE Material and Science Engineering, National Cheng Kong University, Tainan, Taiwan.

I1.03 Withdrawn

SESSION J2: Poster Session II
J: Permeation Membranes
Tuesday Afternoon, June 16, 2015
5:20 PM
Keystone Resorts, Red Cloud Peak

J2.01
Oxygen Permeation Characteristics of Strontium Cobaltite Membranes Shivendra K. Jaiswal[2] and Jitendra Kumar[1]; [1]Materials Science, I I T Kanpur, Kanpur, India; [2]Physics, NIT Patna, Patna, India.

J2.02
Investigation of Ceramic Composite Membranes for Hydrogen Gas Separation Jason Fish[1, 2], Sandrine Ricote[3], Ryan O'Hayre[1] and Nikolaos Bonanos[2]; [1]Metallurgical and Materials Engineering, Colorado School of Mines, Golden, Colorado, United States; [2]Energy Conversion and Storage, Technical University of Denmark, Roskilde, Denmark; [3]Mechanical Engineering, Colorado School of Mines, Golden, Colorado, United States.

J2.03
Hydrogen Permeability of TiN_x Thin Films Prepared by RF Reactive Sputtering Chiharu Kura[1], Yoshitaka Aoki[1, 2], Etsushi Tsuji[1, 2] and Hiroki Habazaki[1, 2]; [1]Graduate School of Chemical Sciences and Engineering, Hokkaido University, Sapporo, Japan; [2]Graduate School of Engineering, Hokkaido University, Sapporo, Japan.

J2.04
Influence of Crystal Orientation on the Deuterium Permeation of Cr_2O_3 Coatings Deposited by MOCVD Di He, Shuai Li, Xiaopeng Liu, Yang Lei, Chao Zhang, Shumao Wang and Lijun Jiang; Department of Energy Materials and Technology, General Research Institute for Nonferrous Metals, Beijing, China.

J2.05
The Composite Membrane Based on Sulfonated Graphene Oxide/ Sulfonated Poly(Ether Ether Ketone) for Unitized Regenerative Fuel Cells Seon G. Rho[1] and Ho Y. Jung[2];[1]School of Applied Chemical Engineering, Chonnam National University, Gwangju, Korea (the Republic of); [2]Department of Environment & Energy Engineering, Chonnam National University, Gwangju, Korea (the Republic of).

J2.06
The Application of 3D Imaging Techniques, Simulation and Diffusion Experiments to Explore Transport Properties in Porous OTM Support Materials Bernhard Tjaden[1], Zac Dehaney-Steven[2], Philip Withers[3], Robert Bradley[3], Jonathan Lane[4], Dan J. Brett[1] and Paul R. Shearing[1]; [1]Chemical Engineering, UCL, London, United Kingdom; [2]School of Chemistry, University of St Andrews, St Andrews, United Kingdom; [3]School of Materials, The University of Manchester, Manchester, United Kingdom; [4]Praxair, Inc, Tonawanda, New York, United States.

J2.07
LSCr-ScSZ Composites as Dense Separation Layers in Oxygen Transport Membranes Zonghao Shen, Stephen J. Skinner and John A. Kilner; Materials, Imperial College London, London, United Kingdom.

J2.08
Rapid Oxygen Transport Membrane Evaluation at St Andrews Zac Dehaney-Steven, Despoina Papargyriou and John Irvine; School of Chemistry, University of St Andrews, St Andrews, United Kingdom.

J2.09
Dual Phase Composite Materials as Oxygen Suppliers under Harsh CO_2 and SO_2-Containing Environments Julio Garcia-Fayos[1], Maria Balaguer[1, 2] and Jose M. Serra[1]; [1]ITQ (UPV-CSIC), Valencia, Spain; [2]IEK-1, Forschungszentrum Jülich, Jülich, Germany.

J2.10
Oxygen Transport in $(Ba_{0.5}Sr_{0.5})(Co_{0.8}Fe_{0.2})_{1-x}Y_xO_{3-\delta}$ (x = 0.01…0.1) Determined by ECR Measurements Lana-Simone Unger, Christian Niedrig, Wolfgang Menesklou, Stefan Wagner and Ellen Ivers-Tiffee; Institute for Applied Materials (IAM-WET), Karlsruhe Institute of Technology (KIT) , Karlsruhe, Germany.

J2.11
Chemical State and Electrical Conducting Property of $Ba_{2-x}La_xFe_2O_{5+\delta}$ Tsubasa Sato[1], Takashi Okiba[1], Katsumi Shozugawa[2], Motoyuki Matsuo[2], Fumito Fujishiro[3], Eiki Niwa[1] and Takuya Hashimoto[3]; [1]College of Humanities and Sciences, Nihon University, Setagaya-ku, Japan; [2]College of Arts and Sciences, The University of Tokyo, Meguro-ku, Japan; [3]Kochi University, Faculty of Science, Akebono-cho, Japan.

J2.12
Study of Y-doped $(Ba_{0.5}Sr_{0.5})(Co_{0.8}Fe_{0.2})O_{3-d}$ by Analytical Transmission Electron Microscopy Matthias Meffert[1], Lana S. Unger[2], Heike Stoermer[1], Christian Niedrig[2], Stefan F. Wagner[2], Ellen Ivers-Tiffee[2] and Dagmar Gerthsen[1]; [1]Laboratory for Electron Microscopy (LEM), Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany; [2]Institute of Materials for Electrical and Electronic Engineering (IWE), Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany.

J2.13
Oxygen Non-Stoichiometry and Thermo-Chemical Expansion of Ba0.5Sr0.5Co0.8Fe0.2O3-δ Studied by High Temperature X-Ray Diffraction and Thermogravimetry Mtabazi G. Sahini[1], Julian R. Tolchard[2], Kjell Wiik[1] and Tor Grande[1]; [1]Materials Science and Engineering, Norwegian University of Science and Technology (NTNU), Trondheim, Norway; [2]SINTEF Materialer og kjemi, Trondheim, Norway.

SESSION K3: Poster Session II
K: Proton-Conducting Oxides
Tuesday Afternoon, June 16, 2015
5:20 PM
Keystone Resorts, Red Cloud Peak

K3.01
Effect of Ba Nonstoichiometry in $Ba_x(Zr_{0.8}Y_{0.2})O_{3-\delta}$ on Population of 5-Coordinated Y Joon-Hyung Lee[1], Young-Woo Heo[1], Jeong-Joo Kim[1], Zhehong Gan[2] and Oc Hee Han[3];[1]School of Materials Science & Engineering, Kyungpook National University, Daegu, Korea (the Republic of); [2]National High Magnetic Field Laboratory, Tallahassee, Florida, United States; [3]Korea Basic Science Institute, Western Seoul Center, Seoul, Korea (the Republic of).

K3.02
Studies of Y-Doped Ba (Ce, Zr) O_3 for Electrochemical Promotion Applications Efstratios Stavrakakis and Danai Poulidi; Chemistry and Chemical Engineering, Queen's University Belfast, Belfast, United Kingdom.

K3.03
Moving Boundary Diffusion Mechanism for Non-Monotonic Conductivity Relaxation of Proton Conducting Perovskites Gye-Rok Kim[1], Hyun-Ho Seo[1], Jung-Mo Jo[1], Eui-Chol Shin[1], Ji Haeng Yu[2] and Jong-Sook Lee[1]; [1]Materials Science and Engineering, Chonnam National University, Gwangju, Korea (the Republic of); [2]Korea Institute of Energy Research, Daejeon, Korea (the Republic of).

K3.04
The Influence of NiO Sintering Additive on the Stability and Conductivity of $BaCe_{0.9-x}Zr_xY_{0.1}O_{3-d}$ Proton-Conducting Ceramics Sandrine Ricote[1], Anthony Manerbino[2], David Martinefski[2], W. Grover Coors[2] and Neal P. Sullivan[1]; [1]Department of Mechanical Engineering, Colorado School Of Mines, Golden, Colorado, United States; [2]CoorsTek Inc., Golden, Colorado, United States.

K3.05
Development of Cu-Based Anodes for BZCY72 Proton Ceramic Membrane Reactors Shay A. Robinson[1], Christian Kjoølseth[2], W. Grover Coors[2] and Truls Norby[1]; [1]Chemistry, University of Oslo, Oslo, Norway; [2]Protia AS, Oslo, Norway.

K3.06
Hydrogen Permeation Degradation due to Yttrium Migration in Dense $BaCe_{0.8}Y_{0.2}O_{3-\delta}$-$Ce_{0.8}Y_{0.2}O_{2-\delta}$ Composite-Ceramic Membranes Wade A. Rosensteel, Sandrine Ricote and Neal P. Sullivan; Mechanical Engineering - Colorado Fuel Cell Center, Colorado School of Mines, Golden, Colorado, United States.

K3.07
Correlation between Structural and Transport Properties of Proton-Conducting $Ba_{1-x}Ln_x(Zr,In,Sn)O_{3-\delta}$ (Ln - lanthanides) Oxide Konrad Swierczek[1], Xin Liu[2], Alicja Klimkowicz[1, 3], Wojciech Zajac[1] and Bogdan Dabrowski[4]; [1]Faculty of Energy and Fuels, AGH University of Science and Technology, Kraków, Poland; [2]School of Materials Science and Engineering, University of Science and Technology Beijing , Beijing, China; [3]Department of Engineering Science and Mechanics, Shibaura Institute of Technology, Tokyo, Japan;[4]Department of Physics, Northern Illinois University, DeKalb , Illinois, United States.

K3.08
Studies of Chemical Stability of Dense $BaCe_{0.6-x}Zr_{0.2}Y_{0.2}M_xO_{3-\delta}$ (M-transition metal) Protonic Conductors Mateusz Tarach, T. Jerominek, M. Szymula and Wojciech Zajac; AGH University of Science and Technology, Faculty of Energy and Fuels, Department of Hydrogen Energy, Krakow, Poland.

K3.09
Enhanced Chemical Stability and Sinterability of Refined Proton-Conducting Perovskite: Case Study of $BaCe_{0.5}Zr_{0.3}Y_{0.2}O_{3-\delta}$ Ji Haeng Yu[1], Muhammad Hakim[2], Chung-Yul Yoo[1]and Jong Hoon Joo[1]; [1]Advanced Materials and Devices Lab., Korea Institute of Energy Research, Daejeon, Korea (the Republic of); [2]Advanced Energy Technology, University of Science and Technology, Daejeon, Korea (the Republic of).

K3.10
Effect of Titanium Doping on Structural Stability and Electrical Properties of Proton-Conducting Solid Electrolyte $BaCe_{0.8}Sm_{0.2}O_{3-\delta}$ Hailei Zhao, Chunyang Yang, Zhihong Du, Yongna Shen and Chunli Yan; University of Science and Technology Beijing, Beijing, China.

K3.11
Up-Scaling of Metallic Nanoparticle Production by Electrical Discharge for Use in Catalytic Membrane Reactor Christelle Denonville[1], Jicheng Feng[2], Marie-Laure Fontaine[1], Harald Fjeld[3], Amin A. Azar[1] and Andreas Schmidt-Ott[2]; [1]SINTEF Materials and Chemistry, Oslo, Norway; [2]Delft University of Technology, Delft, Netherlands; [3]PROTIA AS, Oslo, Norway.

K3.12
Proton Conductors Based on Lanthanum Scandate for an Electrolyte of Intermediate Temperature Operating SOFCs Takuya Yamane[1], Fumitada Iguchi[1], Hisahi Kato[2], Takahiro Ouchi[2], Makoto Shimizu[1] and Hiroo Yugami[1]; [1]Graduate School of Engineering, Tohoku University, Sendai, Japan; [2]Tohoku Electric Power Co., Inc., Sendai, Japan.

K3.13
Ni - $BaCe_{0.89}Gd_{0.1}Cu_{0.01}O_3$ as Perspective Anode Material for Proton-Conducting SOFC Denis Osinkin[1], Nina Bogdanovich[1], Elena Pikalova[1, 2] and Dimitry Bronin[1, 2]; [1]Laboratory of SOFC, Institution of High Temperature Electrochemistry, Yekaterinburg, Russian Federation; [2]Ural Federal University, Yekaterinburg, Russian Federation.

K3.15
Development of Anode-Supported Electrochemical Cell Based on Proton-Conductive $Ba(CeZr)O_3$ Electrolyte Toshiaki Yamaguchi, Hiroyuki Shimiada, Haruo Kishimoto and Yoshinobu Fujishiro; National Institute of Advanced Industrial Science and Technology, Nagoya, Japan.

K3.14
Electrical Properties of Nonstoichiometric $Ba_xZr_{0.85}Y_{0.15}O_{2.925}$ Ceramics Prepared by Solid State Reactive Sintering Nahum Maso[1], Jonathan . Polfus[2], Marie-Laure Fontaine[2] and Truls E. Norby[1]; [1]Chemistry, University of Oslo, Oslo, Norway; [2]SINTEF Materials and Chemistry, Oslo, Norway.

K3.16
Transport Kinetics of the Mixed Conductor Lanthanum Tungstate Andreas Falkenstein[1, 2] and Manfred Martin[1, 2]; [1]Institute of Physical Chemistry I, RWTH Aachen University, Aachen, Germany; [2]JARA-ENERGY, Aachen, Germany.

K3.17
Surface Segregation in Sr Doped $LaNbO_4$: Implications for Proton Transport Cheng Li and Stephen J. Skinner; Department of Materials, Imperial College London, London, United Kingdom.

K3.18
Impedance Spectroscopy on Proton Conducting Oxides $La_{1-x}A_xNbO_4$ (x=Sr,Ca) Su-Hyun Moon, Dieu Nguyen, Dong-Chun Cho, Young-Hun Kim, Eui-Chol Shin, John G. Fisher and Jong-Sook Lee; School of Materials Science and Engineering, Chonnam National University, Gwangju, Korea (the Republic of).

K3.19
Cation Diffusion in Proton Conducting Lanthanum Tungstate Einar Vollestad and Reidar Haugsrud; Department of Chemistry, University of Oslo, Oslo, Norway.

K3.20
Thermodynamics and Stoichiometry Relaxation Kinetics in Materials with Three Carriers: Analytic Relations and Numerical Simulations Daniel Poetzsch, Rotraut Merkle and Joachim Maier; MPI for Solid State Research, Stuttgart, Germany.

K3.21
Nanoscale Stabilization of Scheelite-Type Structure in $La_{0.99}Ca_{0.01}NbO_4$ Thin Films Cristina Tealdi[1, 2], Eliana Quartarone[1, 2], Piercarlo Mustarelli[1, 2] and Lorenzo Malavasi[1, 2];[1]Department of Chemistry, University of Pavia , Pavia, Italy; [2]UdR Pavia, INSTM, Pavia, Italy.

K3.22
Modeling of Defect Segregation and Space-Charge Formation in Proton-Conducting Oxides Edit E. Helgee, Anders Lindman and Goeran Wahnstroem; Applied Physics, Chalmers University of Technology, Gothenburg, Sweden.

ORAL PRESENTATIONS

WEDNESDAY June 17, 2015

ISSI ELECTION

Keystone Resorts, Shavano Peak
8:00 AM - 9:00 AM

All SSI-20 attendees are encouraged to attended the ISSI Election. The new ISSI Vice President and Board of Directors' members will be elected.

PLENARY

SESSION L3: Plenary III
Chair: Klaus Funke
Wednesday Morning, June 17, 2015
Keystone Resorts, Shavano Peak

9:15 AM INTRODUCTION

9:25 AM L3.01
Electrode Kinetics in the Solid State Juergen Janek; Institute of Physical Chemistry, Justus-Liebig University, Giessen, Germany.

A: Solid Oxide Fuel Cells and Electrolyzers

* Invited Speaker
** Keynote Speaker

SESSION A7: SOFC
A: Solid Oxide Fuel Cells and Electrolyzers
Chair: Stephen Skinner
Wednesday Morning, June 17, 2015
Keystone Resorts, Longs Peak

10:10 AM BREAK

10:30 AM **A7.01
SOFC Cathode Oxygen Reduction Reaction Mechanisms under Real World Conditions Eric D. Wachsman, Y. L. Huang, C. Pellegrinelli, J. A. Taillon and L. G. Salamanca-Riba; University of Maryland Energy Research Center, University of Maryland, College Park, Maryland, United States.

11:00 AM A7.02
Correlation Between Cation Ordering and Oxygen Vacancies in Layered Double Perovskite Cathodes Carlos Bernuy-Lopez, Mari-Ann Einarsrud and Tor Grande; NTNU, Trondheim, Norway.

11:20 AM A7.03
Fabrication and Performance of Stainless Steel-Supported SOFC Kun Joong Kim, Byung Hyun Park, Sun Jae Kim and Gyeong Man Choi; Mat. Sci. & Eng., POSTECH, Pohang, Korea (the Republic of).

11:40 AM A7.04
Cobalt-Free Polycrystalline $Ba_{0.95}La_{0.05}FeO_{3-\delta}$ Thin Films as Cathodes for Intermediate-Temperature Solid Oxide Fuel Cells Francesco Ciucci[1, 2], Chi Chen[1] and Dengjie Chen[1];[1]Mechanical and Aerospace Engineering, The Hong Kong University of Science and Technology, Kowloon, Hong Kong; [2]Chemical and Biomolecular Engineering, The Hong Kong University of Science and Technology, Kowloon, Hong Kong.

B: Polymer Electrolyte Fuel Cells and Electrolyzers

SESSION B3: PEMFC/DMFC II
B: Polymer Electrolyte Fuel Cells and Electrolyzers
Chair: Thomas Zawodzinski
Wednesday Morning, June 17, 2015
Keystone Resorts, Quandary Peak I/II

10:10 AM BREAK

10:30 AM OPEN DISCUSSION

11:00 AM B3.02
Anion Transport in Polymer Electrolytes Andrew Herring, Ashley Maes, Himanshu Sarode, Ye Liu and Tara Pandey; Chemical and Biological Engineering, Colorado School of Mines, Golden, Colorado, United States.

11:20 AM B3.03
Effect of Hydration on Mechanical Properties of Anion Exchange Membranes Benjamin Caire, Melissa Vandiver, Andrew Herring and Matthew W. Liberatore; Chemical and Biological Engineering, Colorado School of Mines, Golden, Colorado, United States.

11:40 AM B3.04
Fundamental Understanding of Water Contribution for Ion Mobility in Anion Exchange Membranes Applied in Alkaline Fuel Cells Ye Liu[1], Bingzi Zhang[2], Söenke Seifert[3], Yuan Yang[4], Yushan Yan[2], Matthew Liberatore[1] and Andrew Herring[1]; [1]Chemical Engineering, Colorado School of Mines, Golden, Colorado, United States; [2]Chemical Engineering, University of Delaware, Newark, Delaware, United States; [3]Argonne National Laboratory, Argonne, Illinois, United States; [4]Chemistry, Colorado School of Mines, Golden, Colorado, United States.

C: Electrodes and Solid Electrolytes for Batteries

SESSION C9: Characterization of Nanoscale and Local Structures II
C: Electrodes and Solid Electrolytes for Batteries
Chair: Miran Gaberscek
Wednesday Morning, June 17, 2015
Keystone Resorts, Shavano Peak

10:10 AM BREAK

10:30 AM C9.01
A Simple *In Situ* Approach to Study the Solid Electrolyte / Lithium Interphase by Photoelectron Spectroscopy Thomas Leichtweiss, Sebastian Wenzel, Dominik Krueger, Achim Kronenberger, Joachim Sann and Juergen Janek; Institute of Physical Chemistry, Justus-Liebig-University Giessen, Giessen, Germany.

10:50 AM C9.02
***Operando* SAXS/WAXS Measurements of Amorphous and Nano-Crystalline Anodes for Na-Ion Batteries** Sabrina Sartori; Department of Physics, University of Oslo, Oslo, Norway.

11:10 AM C9.03
***In Situ* Raman Spectroscopy of Thin-Film Battery Li/Li_3PO_4/$LiMn_2O_4$ Using a Transparent Electrode** Naoakai Kuwata[1], Tatsunori Okawa[1], Yasutaka Matsuda[1], Osamu Kamishima[2]and Junichi Kawamura[1]; [1]IMRAM, Tohoku University, Sendai, Japan; [2]Faculty of Science and Engineering, Setsunan University, Neyagawa, Japan.

11:30 AM C9.04
Pore Collapse and Regrowth in Silicon Electrodes for Rechargeable Batteries Steven C. DeCaluwe[2, 1, 4], Bal-Mukund Dar[3], Joseph A. Dura[2] and Howard Wang[3, 4, 5]; [1]NIST Center for Neutron Research, Gaithersburg, Maryland, United States; [2]Mechanical Engineering, Colorado School of Mines, Golden, Colorado, United States; [3]Institute for Materials Research and Dept. of Mechanical Engineering, State University of New York, Binghamton, New York, United States; [4]Materials Science and Engineering, University of Maryland, College Park, Maryland, United States; [5]Material Measurement Laboratory, National Institute of Standards and Technology, Gaithersburg, Maryland, United States.

I: Ion Transport in Hybrid Organic-Inorganic Solids

SESSION I2: Ion Transport in Hybrid Perovskites
I: Ion Transport in Hybrid Organic-Inorganic Solids
Chair: Hemamala Karunadasa
Wednesday Morning, June 17, 2015
Keystone Resorts, Grays Peak I/II

10:10 AM BREAK

10:30 AM **I2.01
Electromigration of Ions in Hybrid Perovskites for Switchable Photovoltaic, Memristors and Synapses Jinsong Huang; Department of Mechanical and Materials Engineering, University of Nebraska, Lincoln, Lincoln, Nebraska, United States.

11:00 AM I2.02
Photo-Induced Instability in Mixed Halide Perovskite Absorbers Daniel Slotcavage[1], Eric Hoke[1], Emma Dohner[2], Andrea Bowring[1], Hemamala Karunadasa[2] and Michael McGehee[1];[1]Materials Science & Engineering, Stanford University, Stanford, California, United States; [2]Chemistry, Stanford University, Stanford, California, United States.

11:20 AM I2.03
Ionic Conductivity in 3-D Organic-Inorganic Mixed Halide Perovskites Abraham Saldivar Valdes and Hemamala Karunadasa; Chemistry, Stanford University, Stanford, California, United States.

11:40 AM I2.04
Uniform Perovskite Layers for Low Hysteresis Planar Heterojunction Solar Cells Yanbo Li[1, 2], Ian D. Sharp[2] and Francesca Maria Toma[1, 2]; [1]Lawrence Berkeley National Lab, Berkeley, California, United States; [2]Joint Center for Artificial Photosynthesis, Berkeley, California, United States.

J: Permeation Membranes

SESSION J3: Permeation Membranes I
J: Permeation Membranes
Chairs: Jonathan Lane and Martin Sogaard
Wednesday Morning, June 17, 2015
Keystone Resorts, Grays Peak III

10:10 AM BREAK

10:30 AM **J3.01
Advances in ITM Technology for Oxygen and Syngas Production Michael F. Carolan[1], Lori L. Anderson[1], Phillip A. Armstrong[1], Robert R. Broekhuis[1], Charles M. Woods[1], Mark Hutcheon[1], Charles A. Lewinsohn[2], Jack Chen[2] and Dale Taylor[2]; [1]Air Products and Chemicals, Inc., Allentown, Pennsylvania, United States; [2]Ceramatec, Inc. , Salt Lake City, Utah, United States.

11:00 AM J3.02
Lattice Structure and Oxygen Permeability of In-Doped $BaFeO_{3-\delta}$ Perovskite-Type Oxides Yao Lu[1], Hailei Zhao[1], Xing Cheng[1], Kun Zheng[2] and Konrad Swierczek[2]; [1]University of Science and Technology Beijing, Beijing, China; [2]AGH University of Science and Technology, Krakow, Poland.

11:20 AM *J3.03
Influence of Yttrium Doping on $Ba_{0.5}Sr_{0.5}Co_{0.8}Fe_{0.2}O_{3-\delta}$ Lana-Simone Unger[1], Stefan Baumann[2], Christian Niedrig[1], Wolfgang Menesklou[1], Stefan Wagner[1], Wilhelm A. Meulenberg[2]and Ellen Ivers-Tiffee[1]; [1]Institute for Applied Materials (IAM-WET), Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany; [2]Institute of Energy and Climate Research IEK-1 Materials Synthesis and Processing, Forschungszentrum Jülich GmbH, Jülich, Germany.

11:40 AM J3.04
Stability and Oxygen Permeability of Sol-Gel Derived $SrCo_{0.8}Fe_{0.2}O_{3-\delta}$ Based Compound Membranes Vijay K. Kashyap and Jitendra Kumar; Materials Science, I I T Kanpur, Kanpur, India.

ORAL PRESENTATIONS

THURSDAY June 18, 2015

PLENARY

SESSION L4: Plenary IV
Chair: Maria Forsyth
Thursday Morning, June 18, 2015
Keystone Resorts, Shavano Peak

9:15 AM INTRODUCTION

9:25 AM L4.01
On the Mechanism of Cation Translocation across Channelrhodopsin Joachim Heberle; Experimental Molecular Biophysics, Freie Universität Berlin, Berlin, Germany.

A: Solid Oxide Fuel Cells and Electrolyzers

* Invited Speaker
** Keynote Speaker

SESSION A8: SOEC
A: Solid Oxide Fuel Cells and Electrolyzers
Chair: Steven McIntosh
Thursday Morning, June 18, 2015
Keystone Resorts, Longs Peak

10:10 AM BREAK

10:30 AM **A8.01
Prospects and Challenges of Solid Oxide Electrolysis Peter V. Hendriksen[1], Ming Chen[1], Ragnar Kiebach[1], Xiufu Sun[1], Karsten Agersted[1], Yi-Lin Liu[1], Sebastian Molin[1], Sune D. Ebbesen[1], Christopher Graves[1], Anne Hauch[1], Karen Brodersen[1], Mogens B. Mogensen[1], Johan Hjelm[1], Soren H. Jensen[1], Christodoulos Chatzichristodoulou[1] and Brian V. Mathiesen[2];[1]Department of Energy Conversion and Storage, Technical University of Denmark, Roskilde, Denmark; [2]Department of Development and Planning, Aalborg University, Copenhagen SV, Denmark.

11:00 AM A8.02
Surface and Bulk Properties of Polarized Mixed Conducting LSF Electrodes: An in-situ Study in H_2/H_2O and O_2 by Simultaneous near-Ambient Pressure XPS and Impedance Spectroscopy Alexander K. Opitz[1], Andreas Nenning[1], Sandra Kogler[1], Christoph Rameshan[2], Raffael Rameshan[3, 4], Raoul Blume[4, 5], Michael Haevecker[4, 5], Axel Knop-Gericke[4], Guenther Rupprechter[2], Bernhard Kloetzer[3] and Juergen Fleig[1]; [1]Insititute of Chemical Technologies and Analytics, Vienna University of Technology, Vienna, Austria; [2]Institute of Materials Chemistry, Vienna University of Technology, Vienna, Austria; [3]Institute of Physical Chemistry, University of Innsbruck, Innsbruck, Austria; [4]Department of Inorganic Chemistry, Fritz Haber Institute of the Max Planck Society, Berlin, Germany; [5]Catalysis for Energy, Group E-GKAT, Helmholtz-Zentrum Berlin fuer Materialien und Energie GmbH, Berlin, Germany.

11:20 AM A8.03
Infiltrated Double Perovskite Electrodes for Proton Conducting Steam Electrolysers Einar Vollestad, Ragnar Strandbakke and Truls Norby; Department of Chemistry, University of Oslo, Oslo, Norway.

11:40 AM A8.04
Compositional Engineering of Perovskite Oxides for Highly Efficient Oxygen Reduction Reactions Chi Chen[1], Dengjie Chen[1], Zongping Shao[2] and Francesco Ciucci[1]; [1]Mechanical and Aerospace Engineering, Hong Kong University of Science and Technology, Kowloon, Hong Kong; [2]Nanjing Tech University, Nanjing, China.

SESSION A9: SOFC—Electrolytes II, Anodes
A: Solid Oxide Fuel Cells and Electrolyzers
Chairs: John Irvine and Manfred Martin
Thursday Afternoon, June 18, 2015
Keystone Resorts, Longs Peak

1:30 PM *A9.01
Oxide Ion Conductivity in Doped $LnBaInO_4$(Ln=La, Nd) Tatsumi Ishihara[1], Yu Yan[2], Takaaki Sakai[2] and Shintaro Ida[2]; [1]International Institute for Carbon Neutral Energy Research, Kyushu University, Fukuoka, Japan; [2]Department of Applied Chemistry, Faculty of Engineering, Kyushu University, Fukuoka, Japan.

1:50 PM A9.02
Double Perovskite Oxide $Sr_2FeMo_{2/3}Mg_{1/3}O_6$ as Redox Stable Anode Material for Solid Oxide Fuel Cells Zhihong Du, Hailei Zhao, Yang Zhang and Mengya Fang; University of Science and Technology Beijing, Beijing, China.

2:10 PM A9.03
Structural and Transport Properties of Doped LAMOX - Electrolytes for IT SOFC Svetlana Pavlova[1], Yuliya Bespalko[1], Vladislav Sadykov[1], Vladimir Pelipenko[1], Nikita Eremeev[1], Tamara Krieger[1], Yurii Chesalov[1], Ekaterina Sadovskaya[1], Artem Ulihin[2], Nikolai Uvarov[2] and Alevtina Smirnova[3]; [1]Boreskov Institute of Catalysis SB RAS, Novosibirsk, Russian Federation; [2]Institute of Solid State Chemistry SB RAS, Novosivirsk, Russian Federation; [3]South Dakota School of Mines and Technology, Rapid City, South Dakota, United States.

2:30 PM A9.04
Ubiquitous Current Constriction Impedance in Oxide Ion Conductors Described by Capacitance Spectroscopy Young-Hun Kim[1], Su-Hyun Moon[1], Dong-Chun Cho[1], Eui-Chol Shin[1], Ji Haeng Yu[3], Jong-Ho Lee[2] and Jong-Sook Lee[1]; [1]Materials Science and Engineering, Chonnam National University, Gwangju, Korea (the Republic of); [2]Korea Institute of Science and Technology, Seoul, Korea (the Republic of); [3]Korea Institute of Energy Research, Daejeon, Korea (the Republic of).

2:50 PM A9.05
Factors Impacting Chemical Expansion in Perovskite Oxides Nicola H. Perry[1, 2], Dario Marrocchelli[3], Harry L. Tuller[2, 1] and Sean R. Bishop[2, 1]; [1]I2CNER, Kyushu University, Nishi-ku, Fukuoka, Japan; [2]Materials Science and Engineering, MIT, Cambridge, Massachusetts, United States; [3]Nuclear Science and Engineering, MIT, Cambridge, Massachusetts, United States.

3:10 PM BREAK

3:30 PM *A9.06
Sintering-Resistant Metal Nanoparticles for High Temperature Electrocatalysis Yoonseok Choi, Siwon Lee and WooChul Jung; DMSE, KAIST, Daejeon, Korea (the Republic of).

3:50 PM A9.07
Evaluation of Degradation Behavior of Ni-YSZ Using Electrochemical Capacitance Mirai Takeda[1], Keiji Yashiro[1], Shinichi Hashimoto[2] and Tatsuya Kawada[1]; [1]Graduate School of Environment Studies, Tohoku University , Sendai, Japan; [2]Graduate School of Engineering, Tohoku University , Sendai, Japan.

4:10 PM A9.08
Ca_2MnAlO_5 and $La_4Ti_2O_{10}$ Derivatives as Potential SOFC's Anodes Xavier Flandre, Ibtissam Kehal, Christian Eroume, Aurelie Rolle, Edouard Capoen, Axel Loefberg and Rose-Noelle Vannier; Solid State Chemistry, Unit of Catalysis and Solid state Chemistry, Villeneuve d'Ascq, France.

4:30 PM A9.09
Thin Film Carbide Anodes for Solid Oxide Fuel Cells Jun Jiang, Xiaofei Guan and Shriram Ramanathan; School of Engineering and Applied Sciences, Harvard University, Cambridge, Massachusetts, United States.

4:00 PM A9.10
Nanoscaled Ni/YSZ Anodes for Solid Oxide Fuel Cells: Processing and Characterization Dino Klotz[1], Julian T. Szasz[1], Heike Stoermer[2], Dagmar Gerthsen[2] and Ellen Ivers-Tiffee[1];[1]Institute for Applied Materials (IAM-WET), Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany; [2]Laboratorium für Elektronenmikroskopie (LEM), Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany.

5:10 PM A9.11
Redox Stability and Electrical Properties of $Sr_{1-x}Y_xV_{1-y}Nb_yO_3$ for Prospective SOFC Anodes Javier Macias, Aleksey Yaremchenko and Jorge Frade; Department of Materials and Ceramic Engineering, University of Aveiro, Aveiro, Portugal.

B: Polymer Electrolyte Fuel Cells and Electrolyzers

SESSION B4: PEMFC/DMFC III
B: Polymer Electrolyte Fuel Cells and Electrolyzers
Chair: Vito Di Noto
Thursday Afternoon, June 18, 2015
Keystone Resorts, Grays Peak III

1:30 PM *B4.01
Nano-Structured Aromatic Ionomers for PEMFC Cristina Iojoiu[1, 2], Huu Dat Nguyen[2, 1], Olesia Danyliv[1, 2] and Sandrine Lyonnard[3]; [1]LEPMI, CNRS, Saint Martin d'Hères, France;[2]Grenoble University, Saint Martin D'Hères , France; [3]INAC SPrAM, CEA Grenoble, Grenoble, France.

1:50 PM B4.02
Nafion/Zirconium Sulfonylphosphonate Composite Membranes for DMFC and PEMFC Kun-lin Liu[1], Chia-Chin Hsu[1], Cheng-Wei Pai[1], Ying-Ling Liu[2] and Chi-Yang Chao[2];[1]Materials Science and Engineering, National Taiwan University, Taipei, Taiwan; [2]Department of Chemical Engineering, National Tsing Hua University, Taipei, Taiwan.

2:10 PM B4.03
Preparation and Properties of DMFC Membranes from Polymer-Brush Nanoparticles Ilya Zharov[1, 2] and Shelley D. Minteer[1, 2]; [1]Chemistry, University of Utah, Salt Lake City, Utah, United States; [2]Materials Science and Engineering, University of Utah, Salt Lake City, Utah, United States.

2:30 PM B4.04
Activity Trends and Design Principles for Multi-Transition-Metal (Oxy)hydroxide Oxygen Evolution Catalysts Shannon W. Boettcher; Chemistry, University of Oregon, Eugene, Oregon, United States.

2:50 PM B4.05
Synthesis and Characterization of Pd-Ni-Sn Electrocatalyst for Use in Direct Ethanol Fuel Cells Sompoch Jongsomjit[1], Paweena Prapainainar[2, 3, 4] and Korakot Sombatmankhong[5];[1]Interdisciplinar y Graduate Program in Advanced and Sustainable Environmental Engineering (International Program),Faculty of Engineering, Kasetsart University , Ladyao, Jatujak, Thailand; [2]Department of Chemical Engineering, Faculty of Engineering, Kasetsart University, Ladyao, Jatujak, Thailand; [3]National Center of Excellence for Petroleum, Petrochemicals and Advance Material, Kasetsart University, Ladyao, Jatujak, Thailand; [4]Department of Chemistry and NANOTEC Center for Nanoscale Materials Design for Green Nanotechnology, Kasetsart University, Ladyao, Jatujak, Thailand; [5]National Metal and Materials Technology Center, Thanon Phahonyothin, Tambon Khlong Nueng, Amphoe Khlong Luang, Thailand.

C: Electrodes and Solid Electrolytes for Batteries

SESSION C10: Fundamentals of LIB Electrodes I
C: Electrodes and Solid Electrolytes for Batteries
Chair: William Chueh
Thursday Morning, June 18, 2015
Keystone Resorts, Shavano Peak

10:10 AM BREAK

10:30 AM **C10.01
The Ultimate Limits of Intercalation Reactions for Battery Electrodes Stanley Whittingham; NECCES, SUNY, Binghamton, New York, United States.

11:00 AM *C10.02
Parameters Influencing Reversible Intercalation of Cations in Spinel Oxides Jordi Cabana; Chemistry, University of Illinois at Chicago, Chicago, Illinois, United States.

11:20 AM C10.03
Revealing the Origins of Lithiation Heterogeneities in $LiFePO_4$ Using Nanoscale Chemical Imaging Yiyang Li[1], William E. Gent[1], Jongwoo Lim[1], Johanna Nelson Weker[2], Norman Jin[1], Sophie Meyer[1], Daniel A. Cogswell[3], Tolek Tyliszczak[4] and William C. Chueh[1]; [1]Stanford University, Stanford, California, United States; [2]SLAC National Accelerator Center, Menlo Park, California, United States; [3]Samsung Advanced Institute of Technology-America, Cambridge, Massachusetts, United States; [4]Berkeley National Laboratory, Berkeley, California, United States.

11:40 AM C10.04
Computational Identification and Experimental Realisation of Lithium Vacancy Introduction into the Olivine $LiMgPO_4$ Leopoldo Enciso-Maldonado[1], Matthew S. Dyer[1], Michael D. Jones[1], Ming Li[1], Michael J. Pitcher[1], Mona K. Omir[1], John B. Claridge[1], Frederic Blanc[1, 2] and Matthew J. Rosseinsky[1]; [1]Department of Chemistry, University of Liverpool, Liverpool, United Kingdom; [2]Stephenson Institute for Renewable Energy, University of Liverpool, Liverpool, United Kingdom.

SESSION C11: Beyond Lithium
C: Electrodes and Solid Electrolytes for Batteries
Chair: Scott Barnett
Thursday Afternoon, June 18, 2015
Keystone Resorts, Shavano Peak

1:30 PM *C11.01
Room-Temperature Sodium-Ion Batteries: Improving the Rate Capability Using Porous Carbon Networks Yan Yu, Joachiam Maier and Changbao Zhu; Max Planck Institute for Solid State Research, Stuttgart, Germany.

1:50 PM C11.02
Recent Progress for Room-Temperature Stationary Sodium-Ion Batteries Yong-Sheng Hu; Key Laboratory for Renewable Energy, Institute of Physics, Chinese Academy of Sciences, Beijing, China.

2:10 PM C11.03
Structural Study of $Na_{2/3}[Ni_{1/3}Ti_{2/3}]O_2$ Using Neutron Diffraction and Atomistic Simulations for Na-Ion Batteries Rengarajan Shanmugam and Wei Lai; CHEMS, Michigan State University, East Lansing, Michigan, United States.

2:30 PM C11.04
Electrochemical Properties for MXene $Ti_3C_2T_x$ as Negative Electrode in a Non-Aqueous Sodium-Ion Electrolyte Satoshi Kajiyama, Hiroki Iinuma, Masashi Okubo and Atsuo Yamada; Department of Chemical System Engineering, School of Engineering, The University of Tokyo, Tokyo, Japan.

2:50 PM C11.05
Amorphous Cathodes for Magnesium Batteries Timothy S. Arthur, Keiko Kato, Fuminori Mizuno and Jason Germain; Materials Research, Toyota Research Institute of North America, Ann Arbor, Michigan, United States.

3:10 PM BREAK

3:30 PM C11.06
Magnesium Ion Intercalation into a Spinel like *λ*-Manganese Oxide Ryan D. Bayliss[1], Chunjoong Kim[1], Tanghong Yi[1], Abdullah Adil[1], Patrick J. Phillips[2], Baris Key[3], Young-Sang Yu[4], Tiffany L. Kinnibrugh[5], Karena W. Chapman[5], Peter J. Chupas[5], Robert K. Klie[2] and Jordi Cabana[1]; [1]Department of Chemistry, University of Illinois at Chicago, Chicago, Illinois, United States; [2]Department of Physics, University of Illinois at Chicago, Chicago, Illinois, United States; [3]Chemical Sciences and Engineering Division, Argonne National Laboratory, Argonne, Illinois, United States; [4]Advanced Light Source, Lawrence Berkeley National Laboratory, Berkeley, California, United States; [5]Advanced Photon Source, Argonne National Laboratory, Argonne, Illinois, United States.

3:50 PM C11.07
Rechargeable Magnesium Battery Using Polyanion Compounds Cathode and Triglyme Electrolyte Yuki Orikasa, Titus Masese, Yukinori Koyama, Takuya Mori, Masashi Hattori, Kentaro Yamamoto, Cedric Tassel, Yoji Kobayashi, Takeshi Abe, Hiroshi Kageyama and Yoshiharu Uchimoto; Kyoto University, Kyoto, Japan.

4:10 PM C11.08
Reversible Intercalation of Multivalent Ions into Nanostrctured Vanadium Oxide Cathodes Premkumar Senguttuvan and Christopher S Johnson; Chemical Sciences and Engineering, Argonne National Laboratory, Argonne, Illinois, United States.

4:30 PM C11.09
Data-Driven Models of Ion Conduction for Rapid Screening of New Generation Conductors Using Statistical Methods Austin Sendek[1], Qian Yang[3], Yi Cui[2] and Evan Reed[2]; [1]Applied Physics, Stanford University, Stanford, California, United States; [2]Materials Science, Stanford University, Stanford, California, United States; [3]Institute for Computational and Mathematical Engineering, Stanford University, Stanford, California, United States.

D: Fundamentals of Transport and Reactivity and Nanoionics

SESSION D7: Fundamentals of Transport and Reactivity and Nanoionics V
D: Fundamentals of Transport and Reactivity and Nanoionics
Chair: Jennifer Rupp
Thursday Morning, June 18, 2015
Keystone Resorts, Grays Peak I/II

10:10 AM BREAK

10:30 AM **D7.01
Oxygen Thermotransport in Mixed Conductor Oxides Han-Ill Yoo; Materials Science and Engineering, Seoul National University, Seoul, Korea (the Republic of).

11:00 AM D7.02
Reduction of the Grain Boundary Resistance in Yttria Stabilized Zirconia Thin Films: Incorporation of Mg^{2+} from the Substrate Edmund M. Mills[1], Matthias Kleine-Boymann[2], Juergen Janek[2], Hao Yang[1], Nigel Browning[3], Yayoi Takamura[1] and Sangtae Kim[1]; [1]CHMS, UC Davis, Davis, California, United States; [2]Institute of Physical Chemistry, Justus-Liebig University Geissen, Geissen, Germany; [3]Pacific Northwest National Laboratory, Richland, Washington, United States.

11:20 AM D7.03
Determination of Transport Coefficients *D* and *K* in Materials Having Mixed Ionic-Electronic Conductivity Kun Zheng[1], Konrad Swierczek[1], Alicja Klimkowicz[1, 2] and Grzegorz Brus[1]; [1]Faculty of Energy and Fuels, AGH University of Science and Technology, Kraków, Poland; [2]Department of Engineering Science and Mechanics, Shibaura Institute of Technology, Tokyo, Japan.

11:40 AM D7.04
Oxide-Ion Conduction with Strong Correlation in Apatite-Type Lanthanum Silicate Kazuaki Toyoura[1], Kouta Imaizumi[1], Atsutomo Nakamura[1] and Katsuyuki Matsunaga[1, 2];[1]Nagoya University, Nagoya, Japan; [2]Japan Fine Ceramics Center, Nagoya, Japan.

SESSION D8: Fundamentals of Transport and Reactivity and Nanoionics VI
D: Fundamentals of Transport and Reactivity and Nanoionics
Chairs: Roger De Souza and Han-Ill Yoo
Thursday Afternoon, June 18, 2015
Keystone Resorts, Grays Peak I/II

1:30 PM *D8.01
The Transport Properties of Dislocations in the Perovskite-Oxide SrTiO Roger A. De Souza; Institute of Physical Chemistry, RWTH Aachen University, Aachen, Germany.

1:50 PM D8.02
Driving Forces Related to Acceptor-Oxygen Vacancy Defect Complex Formation in Perovskite Oxides Russell Maier; NIST, Gaithersburg, Maryland, United States.

2:10 PM D8.03
Conductivity Relaxation Experiments on Donor Doped Barium Titanate Ceramics: Effect of Microstructure Wolfgang Preis and Werner Sitte; Chair of Physical Chemistry, Montanuniversitaet Leoben, Leoben, Austria.

2:30 PM D8.04
Oxygen Diffusion/Exchange Processes in Two-Dimensional $Ln_2NiO_{4+\delta}$ (Ln=La, Pr, and Nd) Single Crystals: IEDP/LEIS Measurements Jean-Marc Bassat[2], Helena Tellez[1], Monica Burriel[3], M. Ceretti[4], Remi Castaing[2, 3], W. Paulus[4], A. Villesuzanne[2], P. Veber[2], Tatsumi Ishihara[1] and John Kilner[1, 3]; [1]Hydrogen Production Division, International Institute for Carbon-Neutral Energy Research, Fukuoka, Japan; [2]Institut de Chimie de la Matière Condensée de Bordeaux, Pessac, France; [3]Department of Materials, Imperial College London, London, United Kingdom; [4]Institut Charles Gerhardt, Montpellier, France.

2:50 PM D8.05
Influence of Dislocations on Electrical and Chemical Properties in Metal Oxides Lixin Sun[1], Dario Marrocchelli[1] and Bilge Yildiz[1, 2]; [1]Department of Nuclear Science and Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts, United States; [2]Department of Material Science and Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts, United States.

3:10 PM BREAK

3:30 PM *D8.06
Space Charge Layers and Their Role in Properties of Interfaces in Solid State Ionics Truls Norby; Department of Chemistry, University of Oslo, Oslo, Norway.

3:50 PM D8.07
Defect Chemistry of CeO_2 Surfaces from First Principles and Space Charge Theory Tor S. Bjorheim[1], Eugene Kotomin[2] and Joachim Maier[2]; [1]FASE, Department of Chemistry, University of Oslo, Oslo, Norway; [2]Max Planck Institute for Solid State Research, Stuttgart, Germany.

4:10 PM D8.08
On Determining the Built-In Potential at Grain Boundaries in Ion-Conducting Oxides Sangtae Kim[1], Seong K. Kim[1], Sergey Khodorov[2] and Igor Lubomirsky[2]; [1]University of California, Davis, Davis, California, United States; [2]Weizmann Institute of Science, Rehovot, Israel.

4:30 PM D8.09
Solid Oxide-Molten Carbonate Nanocomposite Fuel Cells II: Surface Charge Effects Mehmet Ali Gulgun[1, 2], Yelda Yorulmaz[1], Hazal Batili[1], Cinar Oncel[1], Shalima Shawuti[3] and Miran Ceh[4]; [1]FENS, Sabanci University, Istanbul, Turkey; [2]Nanotechnology Application Center, Sabanci University, Istanbul, Turkey; [3]Physics Dept, Istanbul University, Istanbul, Turkey;[4]Department for Nanostructured Materials, Josef Stefan Institute, Ljubljana, Slovenia.

4:50 PM D8.10
Accurate Measurement of Fast Grain Boundary Ionic Diffusion by ToF-SIMS Depth Profiling with Selective Attenuation of Specific Secondary Ions (SASI) Helena Tellez[1], John Druce[1], Tatsumi Ishihara[1, 2] and John Kilner[3, 1]; [1]Hydrogen Production Division, International Institute for Carbon-Neutral Energy Research, Fukuoka, Japan; [2]Department of Applied Chemistry, Kyushu University, Fukuoka, Japan; [3]Department of Materials, Imperial College London, London, United Kingdom.

J: Permeation Membranes

SESSION J4: Permeation Membranes II
J: Permeation Membranes
Chairs: Henny Bouwmeester and Robert Kee
Thursday Morning, June 18, 2015
Keystone Resorts, Grays Peak III

10:10 AM BREAK

10:30 AM **J4.01
Dual Phase Membranes for Oxygen Separation Martin Sogaard, Jonas Gurauskis, Andreas Kaiser, Peter V. Hendriksen and Wolff-Ragnar Kiebach; Department of Energy Conversion and Storage, Technical University of Denmark, Roskilde, Denmark.

11:00 AM J4.02
Phase Inversion Tape Casting and Oxygen Permeation Properties of $Zr_{0.84}Y_{0.16}O_{1.92}$-$La_{0.8}Sr_{0.2}Cr_{0.5}Fe_{0.5}O_{3-\delta}$ Dual-Phase Composite Membranes with Asymmetric Structure Yu Zhang, Ronghua Yuan, Jianfeng Gao and Chusheng Chen; University of Science and Technology of China, Hefei, China.

11:20 AM J4.03
Microstructural Influence on Oxygen Transport of $Ce_{0.8}Gd_{0.2}O_{2-\delta}$ - $FeCo_2O_4$ Dual Phase Membrane Madhumidha Ramasamy[1], Stefan Baumann[1], Falk Schulze-Kueppers[1], Maria Balaguer[1], Wilhelm A. Meulenberg[1], Justinas Palisaitis[2], Joachim Mayer[2], Ramesh Bhave[3], Daejin Kim[3] and Martin Bram[1]; [1]Institute of Energy and Climate Research, Forschungszentrum Juelich GmbH, Juelich, Germany; [2]Ernst Ruska-Centre (ER-C) for Microscopy and Spectroscopy with Electrons, Juelich, Germany; [3]Chemical Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee, United States.

11:40 AM J4.04
Dramatically Enhanced Oxygen Permeation Fluxes in Fluorite-Rich Dual-Phase Membrane by Surface Modification Jong Hoon Joo, Kyong Sik Yun, Chung-Yul Yoo and Ji Haeng Yu; Korea Institute of Energy Research, Daejeon, Korea (the Republic of).

SESSION J5: Permeation Membranes III
J: Permeation Membranes
Chairs: Truls Norby and Jose Serra
Thursday Afternoon, June 18, 2015
Keystone Resorts, Grays Peak III

3:10 PM BREAK

3:30 PM *J5.01
Ceramic Permeation Membranes and Membrane Reactors Ian S. Metcalfe; Chemical Engineering, Newcastle University, Newcastle upon Tyne, United Kingdom.

3:50 PM J5.02
Defect Chemistry and Oxygen Transport Properties of Bi-Sr-Fe-Based Perovskite-Type Oxides Doohyun Baek, Itaru Oikawa, Atsunori Kamegawa and Hitoshi Takamura; Department of Materials Science, Tohoku University, Sendai, Japan.

4:10 PM J5.03
Low Metal Content Silver/Doped Ceria Composites for Oxygen Separation and Methane Partial Oxidation Enrique Ruiz-Trejo[1], Paul Boldrin[1], Jawwad Darr[2], Alan Atkinson[3] and Nigel P. Brandon[1]; [1]Earth Science and Engineering, Imperial College London, London, United Kingdom; [2]Chemistry, University College London, London, United Kingdom; [3]Materials, Imperial College London, London, United Kingdom.

4:30 PM J5.04
Characterization of Dual Phase $BaCe_{1-x}Eu_xO_{3-\delta}$:$Ce_{1-y}Y_yO_{2-\delta}$ (x=0-0.2; y=0-0.2) Ceramic Composite for Membrane Application in H_2-Separation Maria Balaguer[1], Mariya E. Ivanova[1], Sonia Escolastico[2], Justinas Palisaitis[3], Yoo Jung Sohn[1], Jose M. Serra[2], Wilhelm A. Meulenberg[1], Olivier Guillon[1] and Joachim Mayer[3]; [1]Institute for Energy and Climate Research Materials Synthesis and Processing (IEK-1), Forschungszentrum Jülich GmbH, Jülich, Germany; [2]Instituto de Tecnologia Quimica , Valencia, Spain; [3]Ernst Ruska Center, Jülich, Germany.

4:50 PM J5.05
Hydrogen Permeation through CO_2-Stable Dual Phase Ceramic Membranes Sonia Escolastico, Cecilia Solis and Jose M. Serra; Instituto de Tecnología Química (UPV-CSIC), Valencia, Spain.

5:10 PM J5.06
Chemical Stability of Cercer H_2 Membranes in the Lanthanum Tungstate–Lanthanum Chromite System Jonathan M. Polfus, Zuoan Li, Martin F. Sunding, Wen Xing, Marie-Laure Fontaine, Partow P. Henriksen and Rune Bredesen; Materials and Chemistry, SINTEF, Oslo, Norway.

K: Proton-Conducting Oxides

SESSION K4: Protonic Oxides II
K: Proton-Conducting Oxides
Chairs: Marie-Laure Fontaine and Jose Serra
Thursday Morning, June 18, 2015
Keystone Resorts, Quandary Peak I/II

10:10 AM BREAK

10:30 AM **K4.01
Development of Proton Conducting Electrolyser Cells Marie-Laure Fontaine, Jonathan Polfus, Wen Xing, Rune Bredesen and Christelle Denonville; Materials and Chemistry, SINTEF, Oslo, Norway.

11:00 AM K4.02
Exploring BCZY Proton-Conducting Ceramics for Use in Electrolysis Michael Dippon[3], Sean Babiniec[1], Hanping Ding[1], Sandrine Ricote[1] and Neal P. Sullivan[2]; [1]Mechanical Engineering, Colorado School of Mines, Golden, Colorado, United States; [3]Institute of Materials for Electrical and Electronic Engineering, Karlsruhe Institute of Technology, Karlsruhe, Germany.

11:20 AM K4.03
CsH_2PO_4-Based Fuel Cells and Electrolyzers Laura Navarrete and Jose M. Serra; ITQ (UPV-CSIC), Valencia, Spain.

11:40 AM K4.04
Electrochemical Synthesis of Ammonia under Atmospheric Pressure Using a $BaCe_{0.2}Zr_{0.7}Y_{0.1}O_{2.9}$ Electrolyte Michael Stoukides[1, 2], Eirini Vasileiou[1, 2], Vasileios Kyriakou[1, 2], Ioannis Garagounis[1, 2], Anastasios Vourros[1, 2], Anthony Manerbino[3] and Grover Coors[3]; [1]Chemical Engineering, Aristotle University of Thessaloniki, Thessaloniki, Greece; [2]Chemical Process and Energy Resources Institute, Centre for Research and Technology Hellas, Thessaloniki, Greece; [3]CoorsTekInc, Golden, Colorado, United States.

SESSION K5: Protonic Oxides III
K: Proton-Conducting Oxides
Chairs: Tor Grande, Jong-Ho Lee, Anna Magraso and Hiroshige Matsumoto
Thursday Afternoon, June 18, 2015
Keystone Resorts, Quandary Peak I/II

1:30 PM K1.12
Investigation of $Ba_{1-x}Gd_{0.8}La_{0.2+x}Co_2O_{6-\delta}$ (X = 0 - 0.5) as Oxygen Electrode Material for Proton Conducting Fuel Cells and Electrolyzer Cells Ragnar Strandbakke, Einar Vollestad and Truls Norby; Department of Chemistry, University of Oslo, Oslo, Norway.
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1:50 PM K5.02
A Novel High-Performance Triple Conducting Oxide Cathode for Protonic Ceramic Fuel Cell Jianhua Tong, Meng Shang, Chuancheng Duan, David Shnaider and Ryan O'Hayre; MME, Colorado School of Mines, Golden, Colorado, United States.

2:10 PM K5.03
All-Oxide Composite Cathode Materials Prepared by *In Situ* Oxidation Driven Decomposition Tor Grande, Mari-Ann Einarsrud and Guttorm Syvertsen-Wiig; Materials Science and Engineering, Norwegian University of Science and Technology, Trondheim, Norway.

2:30 PM K5.04
Catalytic Properties of Proton Conducting Oxides in Cermet Electrodes and as Ceramic Supports for Dehydrogenation Catalysts Hyun H. Shin and Steven McIntosh; Chemical Engineering, Lehigh University, Bethlehem, Pennsylvania, United States.

2:50 PM K5.05
Chemical Stability and Membrane-Catalyst Compatibility of Selected Proton Conducting Materials Potentially Applicable in Hydrogen Membrane Reactors Mariya E. Ivanova[1], Desiree van Holt[1, 2], Emanuel Forster[3], Maria Balaguer[1], Wendelin Deibert[1], Wilhelm A. Meulenberg[1], Michael Mueller[3] and Olivier Guillon[1]; [1]Institute for Energy and Climate Research Materials Synthesis and Processing (IEK-1), Forschungszentrum Jülich GmbH, Jülich, Germany; [2] Institute of Energy and Climate Research Fundamental Electrochemistry (IEK-9), Forschungszentrum Jülich GmbH, Jülich, Germany; [3]Institute for Energy and Climate Research (IEK) IEK-2: Material Structure and Properties, Forschungszentrum Jülich GmbH, Jülich, Germany.

3:10 PM BREAK

3:30 PM K5.06
Y-doped Barium Zirconate prepared by Flame Spray Synthesis as Electrolyte for Intermediate Temperature Proton Conducting Fuel Cells Francesco Bozza and Thomas Graule; Laboratory for High Performance Ceramics, EMPA, Dübendorf, Switzerland.

3:50 PM K5.07
Size and Shape of Oxygen Vacancies and Protons in Acceptor-Doped Barium Zirconate Erik Jedvik, Anders Lindman and Goeran Wahnstroem; Applied Physics, Chalmers University of Technology, Göteborg, Sweden.

4:10 PM K5.08
Proper Theoretical Description of Oxidation of Acceptor-Doped Perovskites Anders Lindman, Paul Erhart and Göran Wahnström; Applied Physics, Chalmers University of Technology, Gothenburg, Sweden.

4:30 PM K5.09
Understanding Blocking Grain Boundaries within Proton Conducting Ceramics Using Atom Probe Tomography Daniel Clark[1], Dave Diercks[1], Huayang Zhu[2], Robert Kee[2], Sandrine Ricote[2], Brian Gorman[1] and Ryan O'Hayre[1]; [1]Metallurgical and Materials Engineering, Colorado School of Mines, Golden, Colorado, United States; [2]Mechanical Engineering, Colorado School of Mines, Golden, Colorado, United States.

4:50 PM K5.10
On the Impact of Strain on the Proton Conductivity of Barium Zirconate Thin Films Anna Magraso[1, 3], Jonathan Polfus[2] and Jose Santiso[1]; [1]ICN2, Bellaterra, Spain; [2]SINTEF, Oslo, Norway; [3]Dep. Chemistry, University of Oslo, Oslo, Norway.

ORAL PRESENTATIONS

FRIDAY June 19, 2015

PLENARY

SESSION L5: Special Plenary
Chair: M. Stanley Whittingham
Friday Morning, June 19, 2015
Keystone Resorts, Shavano Peak

9:15 AM INTRODUCTION

9:25 AM L5.01
Alternative Strategies for Electrical Energy Storage John Goodenough; University of Texas at Austin, Austin, Texas, United States.

A: Solid Oxide Fuel Cells and Electrolyzers

* Invited Speaker
** Keynote Speaker

SESSION A10: SOFC—Cathodes IV
A: Solid Oxide Fuel Cells and Electrolyzers
Chair: Werner Sitte
Friday Morning, June 19, 2015
Keystone Resorts, Longs Peak

10:10 AM BREAK

10:30 AM *A10.01
A Novel R-P Structure Cathode with High Performance for Intermediate Temperature Solid Oxide Fuel Cells Ranran Peng, Zhiquan Wang, Daoming Huan, Wenqiang Yang and Yalin Lu; University of Science and Technology of China, Hefei, China.

10:50 AM A10.02
Optimization of the Electrochemical Performances of $Ca_3Co_4O_{9+\delta}$ as Air Electrode for Solid Oxide Cell Aurelie Rolle[1], Xavier Flandre[2], Hussein A. Abbas Mohamed[1], Da Huo[2], Giuliano Mignardi[2], Sylvie Daviero-Minaud[2], Edouard Capoen[3], Marie-Helene Chambrier[4], Elisabeth Djurado[5], Amelie Salauen[5], Monica Burriel[5] and Rose-Noelle Vannier[1]; [1]UCCS, ENSCL, Villeneuve d'Ascq, France; [2]UCCS, Université Lille1, Villeneuve d'Ascq, France; [3]UCCS, CNRS, Villeneuve d'Ascq, France; [4]UCCS, Université Jean Perrin, Villeneuve d'Ascq, France; [5]LEPMI, Grenoble-INP - UdS - UJF, Saint Martin d'Hères, France.

11:10 AM A10.03
Effect of $La_{0.6}Sr_{0.4}Co_{0.2}Fe_{0.8}O_{3-\delta}$ Microstructure on Oxygen Surface Exchange Kinetics Katherine D. Bagarinao, Haruo Kishimoto, Katsuhiko Yamaji and Teruhisa Horita; National Institute of Advanced Industrial Science and Technology, Tsukuba, Japan.

11:30 AM A10.04
Oxygen Surface Exchange Kinetics of Praseodymium Nickelates Saim Saher[1], Jean-Marc Bassat[2] and Henny J. Bouwmeester[1]; [1]MESA+ Institute for Nanotechnology, Faculty of Science and Technology, University of Twente, Enschede, Netherlands; [2]Institut de Chimie de la Matière Condensée de Bordeaux (ICMCB-CNRS), Université Bordeaux I, Pessac-Cedex, France.

C: Electrodes and Solid Electrolytes for Batteries

SESSION C12: Fundamentals of LIB Electrodes II
C: Electrodes and Solid Electrolytes for Batteries
Chair: Jordi Cabana
Friday Morning, June 19, 2015
Keystone Resorts, Shavano Peak

10:10 AM BREAK

10:30 AM **C12.01
Powerful Electrical Model Explaining the Operation of Insertion Batteries Miran Gaberscek; National Institute of Chemistry, Ljubljana, Slovenia.

11:00 AM C12.02
Layered Cathode Materials Prepared by Spray Pyrolysis for High-Energy Lithium-Ion Batteries Feng Lin[1], Yuyi Li[1], Dennis Nordlund[2], Tsu-Chien Weng[2], Huolin Xin[3], Yijin Liu[2]and Marca Doeff[1]; [1]Lawrence Berkeley National Lab, Berkeley, California, United States; [2]SLAC, Menlo Park, California, United States; [3]BNL, Upton, New York, United States.

11:20 AM C12.03
Stabilizing the Structure of Li-Rich Oxide Cathode Materials Zhaoxiang Wang[1], Yurui Gao[1], Xin Feng[1], Jun Ma[1], Yongning Zhou[2], Lin Gu[1], Qingyu Kong[3], Xiao-qing Yang[2] and Liquan Chen[1]; [1]Institute of Physics, Chinese Academy of Sciences, Beijing, China; [2]Brookhaven National Laboratory, Upton, New York, United States; [3]Argonne National Laboratory, Argonne, California, United States.

11:40 AM C12.04
Integrated Nano-Domains of Disordered and Ordered Spinel Phases in $LiNi_{0.5}Mn_{1.5}O_4$ for Li-Ion Batteries Jung-Hyun Kim[1], Ashfia Huq[2], Craig A. Bridges[2], Miaofang Chi[2], Nicholas P. Pieczonka[3], Arumugam Manthiram[4] and Bob R. Powell[1]; [1]Chemical and Materials Systems Laboratory, General Motors R&D Center, Warren, Michigan, United States; [2]Oak Ridge National Laboratory, Oak Ridge , Tennessee, United States; [3]Optimal CAE., Plymouth, Michigan, United States; [4]Materials Science and Engineering Program, The University of Texas at Austin, Austin, Texas, United States.

D: Fundamentals of Transport and Reactivity and Nanoionics

SESSION D9: Fundamentals of Transport and Reactivity and Nanoionics VII
D: Fundamentals of Transport and Reactivity and Nanoionics
Chair: Igor Lubomirsky
Friday Morning, June 19, 2015
Keystone Resorts, Grays Peak I/II

10:10 AM BREAK

10:30 AM **D9.01
Molecular Insights Into Structure and Dynamics of Organic Ionic Plastic Crystal Electrolytes Maria Forsyth[1, 2]; [1]Institute for Frontier Materials, Deakin University, Burwood, Victoria, Australia; [2]ARC Center of Excellence for Electromaterials Science, Burwood , Victoria, Australia.

11:00 AM *D9.02
Structure and Lithium Ion Dynamics of the Tetragonal LGPS-Type Superionic Conductors $Li_{11-x}M_{2-x}P_{1+x}S_{12}$ with M = Si, Ge, Sn Alexander Kuhn[1], Sascha Harm[1, 2] and Bettina V. Lotsch[1, 2]; [1]Chemistry , Max Planck Institute for Solid State Research, Stuttgart, Germany; [2]Chemistry, University of Munich (LMU), Munich, Germany.

11:20 AM D9.03
Correlation Between the Electronic Structure and the Interstitial Oxygen Formation in Layered Perovskite Oxides Takashi Nakamura[1], Yihan Ling[1], Ryo Oike[1], Yusuke Tamenori[2]and Koji Amezawa[1]; [1]IMRAM, Tohoku University, Sendai, Japan; [2]JASRI, Sayo-gun, Japan.

11:40 AM OPEN DISCUSSION

I: Ion Transport in Hybrid Organic-Inorganic Solids

SESSION I3: Ion Transport in Organic-Inorganic Hybrid Solids
I: Ion Transport in Hybrid Organic-Inorganic Solids
Chair: Abraham Saldivar Valdes
Friday Morning, June 19, 2015
Keystone Resorts, Grays Peak III

10:10 AM BREAK

10:30 AM **I3.01
Discovery of Molecular Disorders in Coordination Frameworks for Solid State Ionics Satoshi Horike; Kyoto University, Kyoto, Japan.

10:55 AM **I3.02
Designing Proton Conducting MOFs George Shimizu; Chemistry, University of Calgary, Calgary, Alberta, Canada.

11:20 AM I3.03
Effect of Ionic Liquid 1-Butyl-3-Methylimidazolium Methylsulfate on (Polyethylene Oxide, PEO + Sodium Methyl Sulfate Salt, Nams) Polymer Electrolyte Membrane Rajendra K. Singh; Physics, Banaras Hindu University, Varanasi, India.

11:40 AM I3.04
On the Origin and Underappreciated Effects of Ion Doping in Silica Xiaohui Song and Hongyu Chen; Chemistry and Biological Chemistry, Nanyang Technological University, Singapore, Singapore.

K: Proton-Conducting Oxides

SESSION K6: Protonic Oxides V
K: Proton-Conducting Oxides
Chairs: Tor Bjorheim and Jong-Sook Lee
Friday Morning, June 19, 2015
Keystone Resorts, Quandary Peak I/II

10:10 AM BREAK

10:30 AM *K6.01
Hydride Conduction in Oxyhydrides Genki Kobayashi[1, 2]; [1]Research Center of Integrative Molecular Systems, Institute for Molecular Science, Okazaki, Japan; [2]Precursory Research for Embryonic Science and Technology, Japan Science and Technology Agency, Kawaguchi, Japan.

10:50 AM K6.02
Development of Hydrogen Sensor Using Proton Conductor with Redox Protonation Yuji Okuyama[1], Shinya Nagamine[2], Akira Nakajima[3], Fusako Takahashi[4], Koji Kimata[4], Tomoko Oshima[4], Go Sakai[5] and Naoki Matsunaga[5]; [1]Organaization for Promotion of Tenure Track, University of Miyazaki, Miyazaki, Japan; [2]Department of Applied Chemistry, Faculty of Engineering, University of Miyazaki, Miyazaki, Japan; [3]Frontier Science Research Center, University of Miyazaki, Miyazaki, Japan; [4]Functional Materials R&D Center, TYK Corp., Tajimi, Japan; [5]Department of Environmental Robotics, Faculty of Engineering, University of Miyazaki, Miyazaki, Japan.

11:10 AM K6.03
Impact of the Electrochemical Proton-Carrier Injection on the Structure of $NaO_{1/2}$-WO_3-$NbO_{5/2}$-$LaO_{3/2}$-$PO_{5/2}$ Glass Takahisa Omata[1], Tomohiro Ishiyama[2], Junji Nishii[3], Toshiharu Yamashita[4], Hiroshi Kawazoe[4], Naoaki Kuwata[5] and Junichi Kawamura[5]; [1]Graduate School of Engineering, Osaka University, Suita, Japan; [2]National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba, Japan; [3]Research Institute for Electronic Science, Hokkaido University, Sapporo, Japan; [4]Kawazoe Frontier Technologies Corp., Yokohama, Japan; [5]Tohoku University, Sendai, Japan.

11:30 AM K6.04
Surface-Proton Conductivity of Titanium Phosphate Nanoparticles in Water Hiroshige Matsumoto, Osamu Fujiwara, Kwati Leonard and Young-Sung Lee; International Institute for Carbon-Neutral Energy, Kyushu University, Fukuoka, Japan.

20th International Conference on Solid State Ionics (SSI-20)

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Joachim Maier, Max Planck Institute for Solid State Research, Germany (ISSI President)
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Shu Yamaguchi, University Tokyo, Japan
Han-Ill Yoo, Seoul National University, South Korea

Topics and Organizers

A. Solid Oxide Fuel Cells & Electrolyzers

- **Rotraut Merkle**, Max Planck Institute, Germany
- **Werner Sitte**, Univeristy of Leoben, Austria

B. Polymer Electrolyte Fuel Cells & Electrolyzers

- **Vito Di Noto**, University of Padova, Italy
- **Andew Herring**, Colorado School of Mines, USA
- **Tom Zawodzinski**, University of Tennessee, USA

C. Electrodes & Solid Electrolytes for Batteries

- **Scott Barnett**, Northwestern University, USA
- **William Chueh**, Stanford University, USA
- **Juergen Janek**, Justus Liebig University, Germany
- **Shirley Meng**, University of California, USA

D. Fundamentals of Transport and Reactivity & Nanoionics

- **Giuliano Gregori**, Max Planck Institute, Germany
- **Joshua Hertz**, University of Delaware, USA
- **Sangtae Kim**, University of California, USA
- **Bilge Yildiz**, Massachusetts Institute of Technology, USA

E. Transparent Conducting Oxides

- **Joseph Berry**, National Renewable Energy Laboratory, USA
- **David Ginley**, National Renewable Energy Laboratory, USA
- **David Paine**, Brown University, USA

F. Solid State Photoelectrochemistry

- **Shannon Boettcher**, University of Oregon, USA

G. Switching and Sensing Phenomena

- **Jennifer Rupp**, ETH Zurich, Switzerland
- **Shu Yamaguchi**, Tokyo University, Japan

H. High Temperature Routes for Solar Fuels

- **Tim Davenport**, California Institute of Technology, USA
- **Sossina Haile**, Northwestern University, USA
- **Ryan. O'Hayre**, Colorado School of Mines, USA

I. Ion Transport in Hybrid Organic-Inorganic Solids

- **Hema Karunadasa**, Stanford University, USA
- **David Cahen**, Weizmann Institute of Science, Israel

J. Permeation Membranes

- **Robert Kee**, Colorado School of Mines, USA
- **Jonathan Lane**, Praxair, USA
- **Jose Serra**, Polytechnic University of Valencia, Spain

K. Proton-Conducting Oxides

- **Hiroshige Matsumoto**, Kyushu University, Japan
- **Truls Norby**, University of Oslo, Norway

Tutorials available Sunday, June 14:

- **Advanced methods in electrochemical impedance spectroscopy**
  Instructor: Bernard Boukamp
  1-1:45 p.m. Greys Peak I/II

- **Defect chemistry in solid state ionics**
  Instructor: Truls Norby
  1:45-2:30 p.m. Greys Peak I/II

  Break 2:30-2:50 p.m. Longs Peak Foyer

- **Battery materials and electrochemistry**
  Instructor: Wei Lai
  2:50-3:35 p.m. Greys Peak I/II

- **Atomistic modeling in solid state ionics**
  Instructor: Dario Marrocchelli
  3:35-4:20 p.m. Greys Peak I/II

Student Travel Awards

A limited amount of travel support is available to assist students and postdocs in attending SSI-20. Approximately $500-$1000 in travel support per award is anticipated. To apply for a travel award, students and postdocs should email:

1. A copy of SSI-20 abstract submission
2. A brief statement describing the research activities and reasons for travel support request (1 page max)
3. A brief letter from the advisor certifying the status as a student or postdoc (1 page max)
4. The CV (2 pages max)

Items 1-4 above should be collected together as a **single PDF** file.

Send to: org@ssi-20.net with the subject line **SSI-20 Student Travel Support**.

The application deadline for student/postdoc travel support is February 27, 2015.

Proceedings

Cost

Registrations paid at the regular rate include ONE copy of the Conference Proceedings. Student, retired or unemployed registrations do not include the Conference Proceedings. Additional copies of the Conference Proceedings are available for purchase.

Submission Instructions

The submission website for this journal is located at: http://ees.elsevier.com/ssi/default.asp. To ensure that all manuscripts are correctly identified for inclusion into the special issue associated with the SSI20 conference, authors **must** select "**SI: SOSI_SSI20**" at the "Article Type" step in the submission process.

Submission Deadline

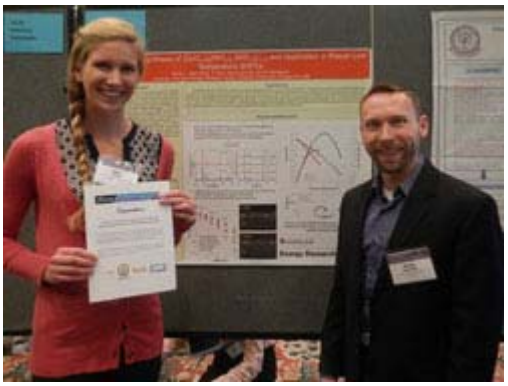
Manuscript submission is July 17.

The page limit is as follows:

- Plenary talks: no limit
- Keynote and invited talks: 6 journal pages
- Regular talks and posters: 4 journal pages

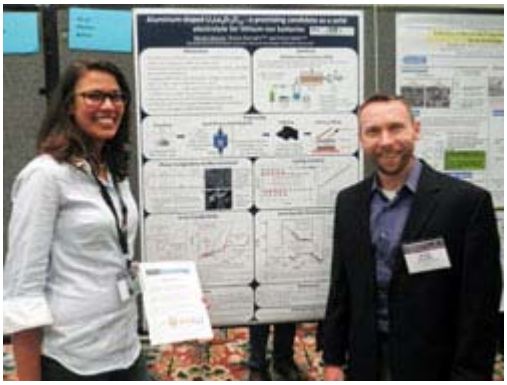
Poster Award Recipients

Monday

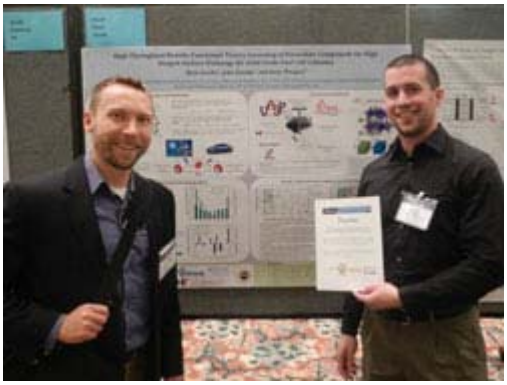


Emily Fraik

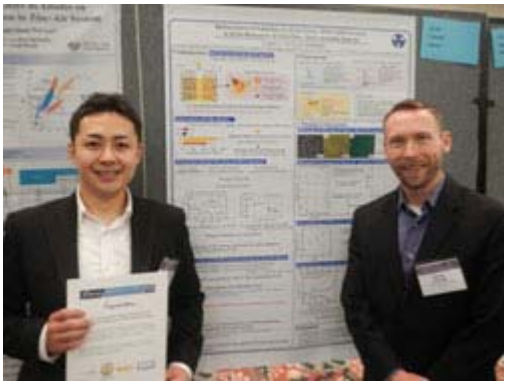
Mattia Saccoccio



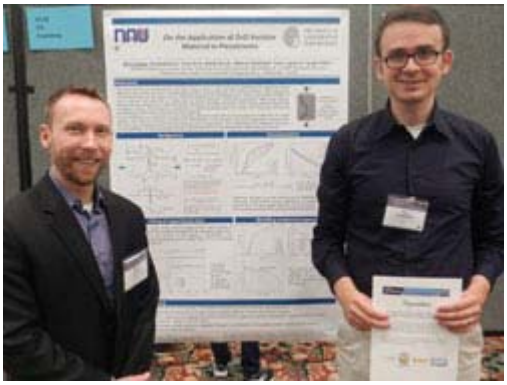
Miriam Botros



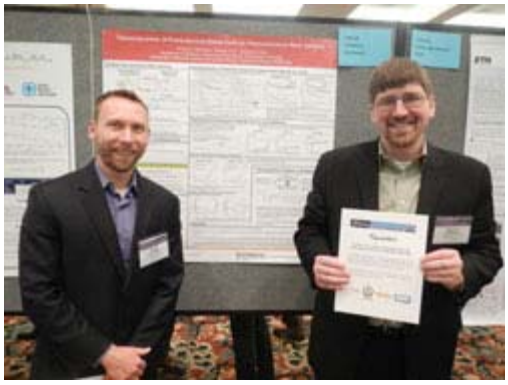
Ryan Jacobs



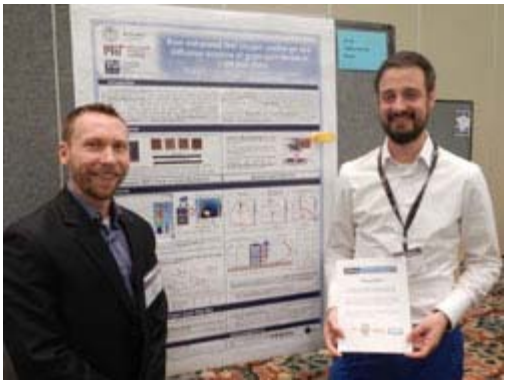
Takashi Hakari



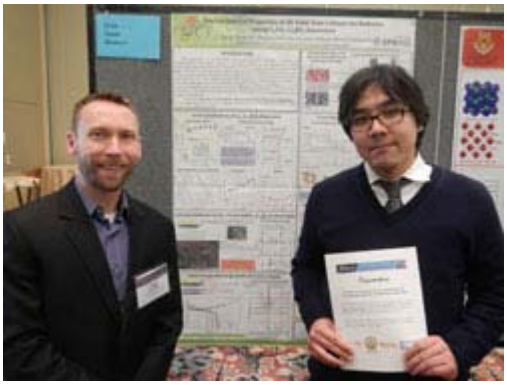
Till Froeming



Timothy Davenport

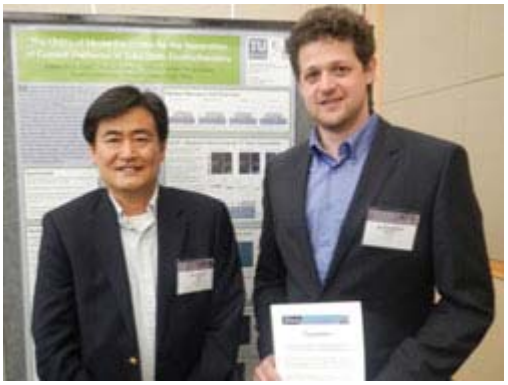


Tobias Huber



Toyoki Okumura

Tuesday



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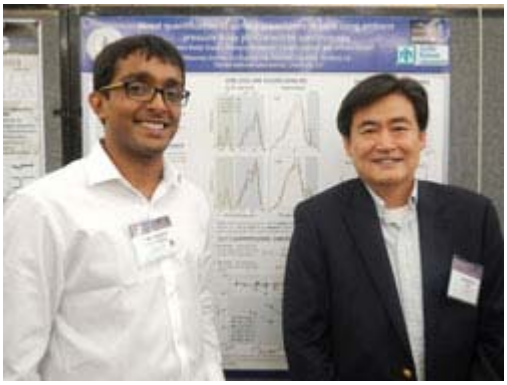

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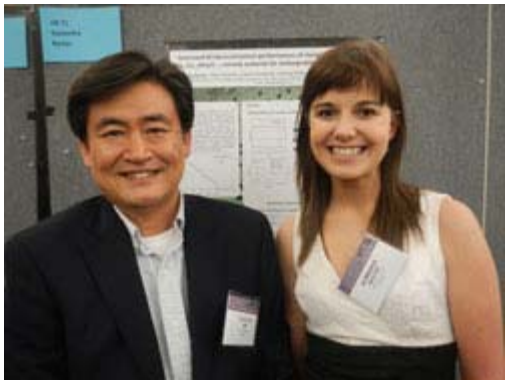
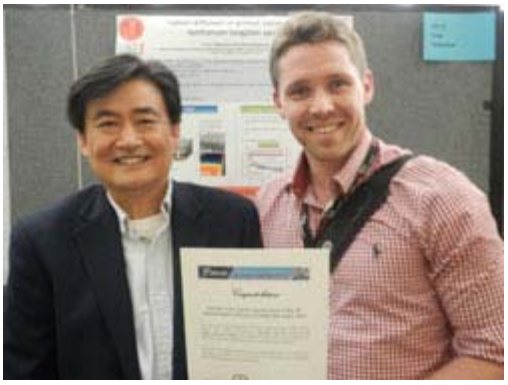
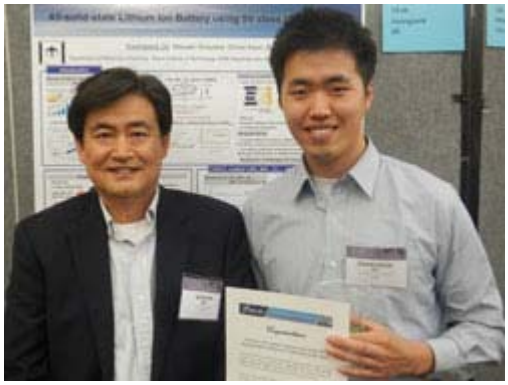


Dominika Baster



Einar Vollestad



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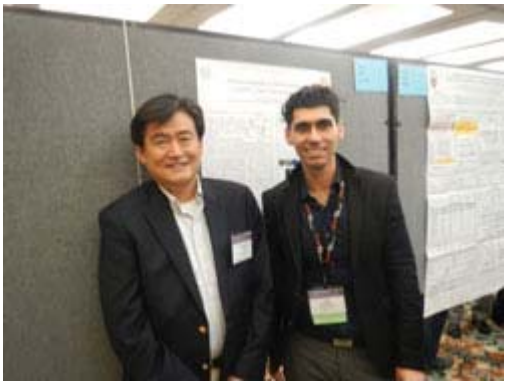
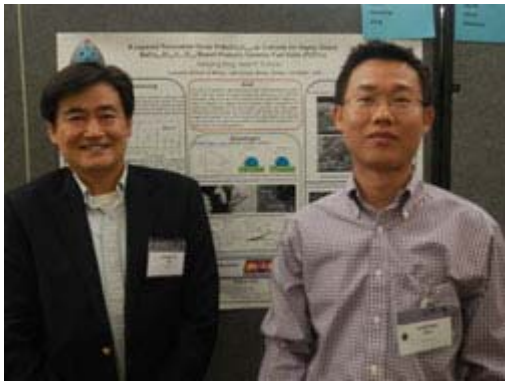
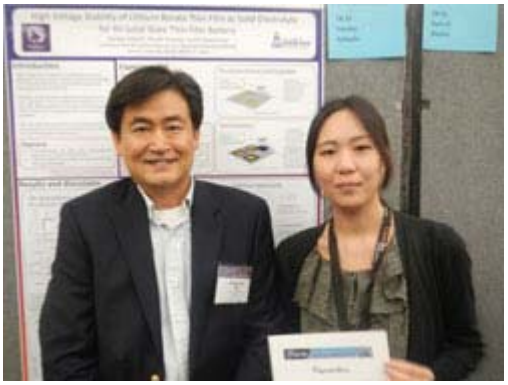


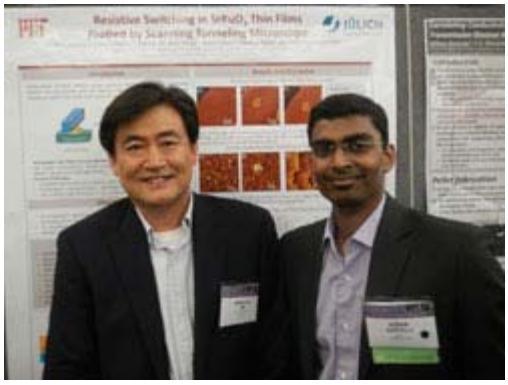
Hadi-Tavassol



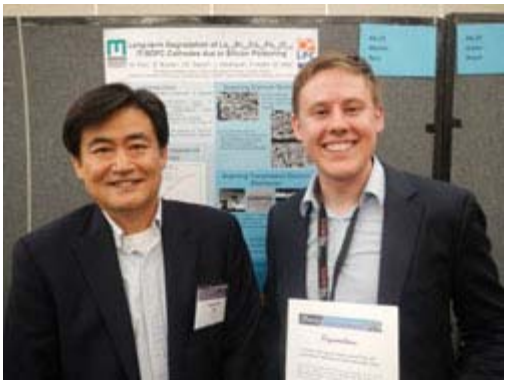
Hanping Ding



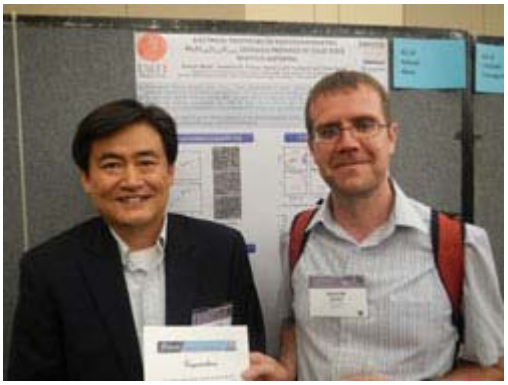
Haruka Itabashi



Kiran Adepalli



Martin Perz



Nahum Maso

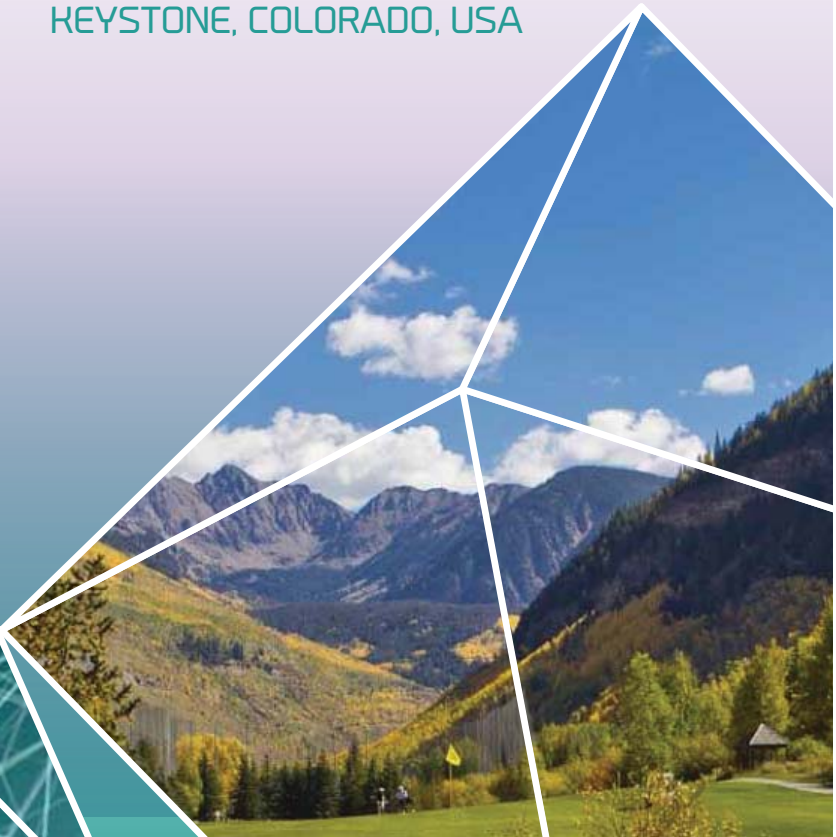
SSI-20

Program Guide

20th International Conference on Solid State Ionics

June 14-19, 2015

KEYSTONE RESORT
& CONFERENCE CENTER
KEYSTONE, COLORADO, USA



WELCOME TO THE CONFERENCE!

On behalf of the Conference Chairs and Committee Members, it is with great pleasure that I welcome you to the **20th International Conference on Solid State Ionics (SSI-20)**. With the Rocky Mountains as our backdrop, we expect you'll find an excellent and engaging technical program and an exciting place to explore in your free time.

We are confident this Conference will provide essential information on the breadth and depth of current solid state ionics research worldwide. Below are some highlights we believe will be of interest to you.

Sangtae Kim, University of California, Davis

CONFERENCE HIGHLIGHTS

THE SSI-20 PROGRAM

Scientists from around the world will converge in Keystone, Colorado this week to share ideas, present technical information and contribute to the advancement of solid state ionics. Featuring over **625 oral/poster presentations**, SSI-20 will offer a strong program of plenary, keynote, invited and contributed talks, poster sessions, and tutorials covering topics from fuel cells and electrolyzers, to proton-conducting oxides—confirming the great diversity of science that is enabled by solid state ionics.

TUTORIALS

Start the Conference off on Sunday afternoon with **four tutorial sessions** designed to complement the technica program. Attendance to these sessions is not included in the Conference registration fee. You may purchase entrance to the tutorials for $100 at the Registration Desk located in the Main Lobby. Featured topics are *Advanced Methods in Electrochemical Impedance Spectroscopy*; *Defect Chemistry in Solid State Ionics*; *Battery Materials and Electrochemistry*; and *Atomistic Modeling in Solid State Ionics*. For more details, see page 3.

WELCOME RECEPTION

Conference attendees are invited to the Welcome Reception on Sunday evening from 5:00 pm - 7:00 pm in Shavano Terrace. Before a full day of technical sessions, this is a great time to **enjoy light snacks and refreshments**, meet with old colleagues, make new connections and share information.

PLENARY SESSIONS

Don't miss the five Plenary Sessions held Monday - Friday mornings. **Shu Yamaguchi**, University of Tokyo, starts the week off on Monday with his talk, *Bulk and Surface Oxide Protonics for Energy Conversion Devices: Role of Percolation and Grotthus Mechanism in Oxide Protonics*. Next, **Sossina M. Haile**, Northwestern University, shares *Insights into Proton Transport in Superprotonic Solid Acids*. On Wednesday, *Electrode Kinetics in the Solid State* is presented by **Juergen Janek** of Justus Liebig University Giessen. Then Thursday, **Joachim Heberle**, Free University of Berlin, gives his presentation, *On the Mechanism of Cation Translocation across Channelrhodopsin*. A special Plenary Session featuring **John B. Goodenough,** University of Texas at Austin, rounds out the Conference Friday morning with *Alternative Strategies for Electrical Energy Storage*.

POSTER SESSIONS/RECEPTIONS

Poster authors will be available for **in-depth discussions on Monday and Tuesday** in Red Cloud Peak. These popular sessions are open to all Conference attendees. During the Monday afternoon session, complimentary lunch and refreshments will be served. The Tuesday evening session will include light snacks and refreshments.

ISSI YOUNG SCIENTIST AWARD

To recognize the outstanding contributions made by young scientists to the field of solid state ionics, the International Society of Solid-State Ionics established the ISSI Young Scientist Award. This year, **six young scientists** have been selected as finalists. On Tuesday, don't miss the award finalists' talks from 1:30 pm - 3:00 pm in Quandary Peak I/II.

ISSI ELECTION

All SSI-20 attendees are encouraged to attended the SSI Election on Wednesday morning in Shavano Peak. The new ISSI Vice President and Board of Directors' members will be elected.

CONFERENCE BANQUET

Make time for this year's Conference Banquet on Wednesday evening at Soda Ridge Stables. **One Conference Banquet ticket is included in your registration fee**. Additional tickets may be purchased for $80 per person at the Registration Desk located in the Main Lobby. This event takes place outside, so please plan and dress for the weather accordingly. Transportation will be provided to and from the Conference Banquet.

TABLE OF CONTENTS

COMMITTEES

CHIEF ORGANIZER

Sangtae Kim, University of California, Davis

CO-ORGANIZERS

William Chueh, Stanford University

Joachim Maier ***(ISSI President)***, Max Planck Institute for Solid State Research

Ryan O'Hayre, Colorado School of Mines

LOCAL ORGANIZING COMMITTEE

Scott Barnett, Northwestern University

Shannon Boettcher, University of Oregon

Yi Cui, Stanford University

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C. ELECTRODES AND SOLID ELECTROLYTES FOR BATTERIES

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D. FUNDAMENTALS OF TRANSPORT AND REACTIVITY AND NANOIONICS

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H. HIGH TEMPERATURE ROUTES FOR SOLAR FUELS

Tim Davenport, California Institute of Technology

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I. ION TRANSPORT IN HYBRID ORGANIC-INORGANIC SOLIDS

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K. PROTON-CONDUCTING OXIDES

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PLENARY SPEAKERS

9:15 AM – 10:10 AM · SHAVANO PEAK

MONDAY

Shu Yamaguchi
University of Tokyo

Bulk and Surface Oxide Protonics for Energy Conversion Devices: Role of Percolation and Grotthus Mechanism in Oxide Protonics

Shu Yamaguchi is professor at the department of materials engineering, School of Engineering, The University of Tokyo, Japan. He is a graduate from Tokyo Institute of Technology, earning his Dr. Eng. in metallurgy on thermodynamic activity measurements in sodium silicate and phosphate melts using Na beta–alumina as a solid electrolyte in 1983. His expertise in solid state chemistry has initiated from the research on tracer diffusivity measurements of 18O in $Fe_{1-x}O$ and Co_{1-x} O using SIMS in 1980. He is engaged in the interdisciplinary area between chemical thermodynamics and solid state chemistry, such as the electronic structure in oxide protonics materials, atomic switch, surface protonics, etc.

TUESDAY

Sossina M. Haile
Northwestern University

Insights into Proton Transport in Superprotonic Solid Acids

Sossina M. Haile is the Walter P. Murphy Professor of Materials Science and Engineering at Northwestern University. She earned her PhD degree in materials science and engineering from the Massachusetts Institute of Technology in 1992. As part of her studies, Haile spent two years at the Max Plank Institute for Solid State Research, Stuttgart, Germany, first as a Fulbright Fellow, then as a Humboldt Fellow.

She has published more than 150 articles and holds 15 patents on these and other topics. Haile is the recipient of many prestigious awards including an American Competitiveness and Innovation (ACI) Fellowship in 2008 from the National Science Foundation in recognition of "her timely and transformative research in the energy field and her dedication to inclusive mentoring, education and outreach across many levels," the 2012 International Prize in Ceramics from the World Academy of Ceramics, and the 2010 Chemical Pioneers Award of the Chemical Heritage Foundation. Haile was named by *Newsweek* magazine in its 2007 end-of-the-year issue as one of twelve people to watch in 2008.

WEDNESDAY

Juergen Janek
Justus-Liebig University, Giessen

Electrode Kinetics in the Solid State

Juergen Janek received his PhD in chemistry from the University of Hannover. He finished his Habilitation and became assistant professor at the University of Hannover in 1997. After a short period in Kiel in 1999, he accepted a position as chair of physical chemistry at Justus-Liebig University, Giessen and became director of the Institute of Physical Chemistry. In 2004 he was invited to Seoul National University and Tohoku University as a visiting professor, and in 2008 he became a visiting professor at Aix Marseille University. Since 2011, he has served as scientific director of BELLA (Batteries and Electrochemistry Laboratory), a joint lab of BASF SE and Karlsruhe Institute of Technology, and member of the International Network for Batteries and Electrochemisty of BASF SE. Janek holds several patents and is author of about 200 peer–reviewed papers in a wide range of journals.

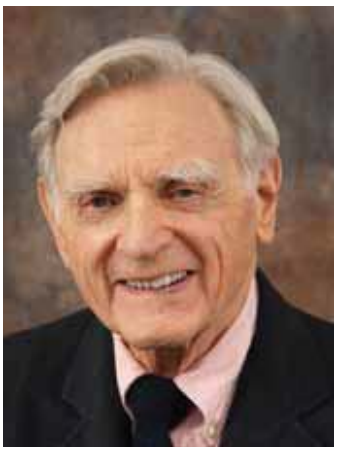
THURSDAY

Joachim Heberle
Free University of Berlin

On the Mechanism of Cation Translocation across Channelrhodopsin

Joachim Heberle has a scientific background at the interface between biology, chemistry and physics. He studied chemistry at the Universities of Stuttgart and Wuerzburg. He moved to Berlin to defend his PhD thesis in biophysics at the Free University of Berlin (1991) followed by a postdoc at the Hahn–Meitner Institute Berlin (1991–1993). He served as group leader at the Research Center Juelich (1993–2005) and received the Habilitation in Biophysical Chemistry from the University of Duesseldorf (1998).

During his time as a postdoc, he was a visiting scientist at the Universities of Tucson and Gothenburg. In 2005, he became the professorial chair for biophysical chemistry at Bielefeld University. In 2009, he accepted the offer from the physics department of the Free University of Berlin and has been a full professor in biophysics since then. Heberle served as a member of the study section of chemistry of the German Research Foundation and is currently a member of the Excellence Council of his host university.



FRIDAY

John B. Goodenough
University of Texas at Austin

SPECIAL PLENARY SPEAKER

Alternative Strategies for Electrical Energy Storage

After receiving his PhD degree in physics in 1952, John B. Goodenough was a group leader at the MIT Lincoln Laboratory where he helped to develop the ferrimagnetic spinels used in the first Ram memory of the digital computer. In the course of this work, he identified structural transitions caused by cooperative orbital ordering and he developed the rules for the sign of the interatomic spin–spin magnetic interactions. In the subsequent decade, Goodenough explored the magnetic and transport properties of transition–metal compounds, including the transition from localized to itinerant electron behavior where strong electron–lattice interactions give rise to static or dynamic charge–density waves. These studies were summarized in his two books *Magnetism and the Chemical Bond* and *Les oxydes des métaux de transition*, translated from his long review titled *Metallic Oxides*.

With the first oil crisis in the early 1970s, Goodenough turned to the study of energy materials. Called in 1976 to head the Inorganic Chemistry Laboratory of the University of Oxford, UK, he developed in England the layered $Li_{1-x}CoO_2$ for the cathode of a rechargeable Li–ion battery; it was used in the battery of the first cell telephone marketed by the SONY Corporation that launched the wireless revolution. Goodenough subsequently identified two other transition–metal oxide structures, spinel and ordered olivine, as potential cathodes material that are also used as cathodes in commercial Li–ion batteries. In 1986, Goodenough took the Virginia H. Cockrell Centennial Chair of Engineering at the University of Texas at Austin where he has returned to his fundamental studies of transition–metal oxides and their use as electrodes of Li–ion batteries and the solid–oxide fuel cell.

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ORAL PRESENTATIONS

MONDAY June 15, 2015

PLENARY

SESSION L1: Plenary I
Chair: Joachim Maier
Monday Morning, June 15, 2015
Keystone Resorts, Shavano Peak

9:15 AM INTRODUCTION

9:25 AM L1.01
Bulk and Surface Oxide Protonics for Energy Conversion Devices: Role of Percolation and Grotthus Mechanism in Oxide Protonics Shu Yamaguchi; Department of Materials Engineering School of Engineering, The University of Tokyo, Tokyo, Japan.

A: Solid Oxide Fuel Cells and Electrolyzers

* Invited Speaker
** Keynote Speaker

SESSION A1: SOFC—Cathodes I
A: Solid Oxide Fuel Cells and Electrolyzers
Chair: William Chueh
Monday Morning, June 15, 2015
Keystone Resorts, Longs Peak

10:10 AM BREAK

10:30 AM **A1.01
Oxygen Reduction Kinetics on Perovskite Oxides: Effects of Dissimilar Interfaces and Surfaces Bilge Yildiz; Massachusetts Institute of Technology, Cambridge, Massachusetts, United States.

11:00 AM A1.02
Chemical Composition Study of the LSC-113/LSC-214 Surface and its Effect on the ORR Enhancement Andrea Cavallaro, John Kilner and Stephen Skinner; Materials, Imperial College London, London, United Kingdom.

11:20 AM A1.03
Effect of Heterointerface on Oxygen Reduction Kinetics of (Sm,Sr) CoO_3-Based Electrodes Hiroki Muroyama, Hideyuki Kanazawa, Takeou Okanishi, Toshiaki Matsui and Koichi Eguchi; Kyoto University, Kyoto, Japan.

11:40 AM *A1.04
Quantitative Evaluation of Effective Reaction Area in Solid Oxide Fuel Cell Cathodes Koji Amezawa[1], Yoshinobu Fujimaki[2], Takashi Nakamura[1], Katherine D. Bagarinao[3], Katsuhiko Yamaji[3], Kiyofumi Nitta[4], Yasuko Terada[4], Keiji Yashiro[5], Fumitada Iguchi[2], Hiroo Yugami[2] and Tatsuya Kawada[5]; [1]IMRAM, Tohoku University, Sendai, Japan; [2]Graduate School of Engineering, Tohoku University, Sendai, Japan; [3]AIST, Tsukuba, Japan; [4]JASRI, Sayo, Japan; [5]Graduate School of Environmental Studies, Tohoku University, Sendai, Japan.

SESSION A3: SOFC—Cathodes II
A: Solid Oxide Fuel Cells and Electrolyzers
Chairs: Ryan O'Hayre and Harry Tuller
Monday Afternoon, June 15, 2015
Keystone Resorts, Longs Peak

2:30 PM *A3.01
Perovskite Oxides as Materials for Energy Conversion: Towards a Fundamental Understanding of Surface Properties by *Operando* Spectroscopic Methods David N. Mueller[2, 1], Michael L. Machala[2], Zixuan Guan[2], Hendrik Bluhm[3] and William C. Chueh[2, 4]; [1]Peter Gruenberg Institute (PGI-6), Research Center Juelich, Juelich, Germany; [2]Department of Materials Science & Engineering, Stanford University, Stanford, California, United States; [3]Chemical Sciences Division, Lawrence Berkeley National Laboratory, Berkeley, California, United States;[4]Stanford Institute for Materials and Energy Sciences, SLAC National Accelerator Laboratory, Menlo Park, California, United States.

2:50 PM A3.02
***In Situ* X-Ray Synchrotron Spectroscopy Study of IT-SOFC Stability under Operating Conditions** Florent Tonus and Stephen J. Skinner; Materials, Imperial College London, London, United Kingdom.

3:10 PM A3.03
Surface Chemistry of $La_{0.6}Sr_{0.4}CoO_{3-\delta}$ Thin Films and Its Impact on the Oxygen Surface Exchange Resistance Ghislain M. Rupp[1], Helena Tellez[2], John Druce[2], Andreas Limbeck[3], Tatsumi Ishihara[2], John Kilner[4, 2] and Juergen Fleig[1]; [1]Institute of Chemical Technologies and Analytics - Electrochemistry, Vienna University of Technology, Vienna, Austria;[2]International Institute for Carbon-Neutral Energy Research, Kyushu University, Fukuoka, Japan; [3]Institute of Chemical Technologies and Analytics - Instrumental Analytical Chemistry, Vienna University of Technology, Vienna, Austria; [4]Department of Materials, Imperial College London, London, United Kingdom.

3:30 PM A3.04
Surface Analysis of SOFC Cathode Degradation Using Low Energy Ion Scattering and *In-Operando* Atmospheres Mathew Niania[1], Samuel Cooper[1], Helena Tellez[2], John Druce[2], Stephen Skinner[1], Tatsumi Ishihara[2] and John Kilner[1, 2]; [1]Materials, Imperial College London, London, United Kingdom; [2]I2CNER, Kyushu University, Fukuoka, Japan.

3:50 PM A3.05
Oxide-Ion Dynamics in the MIEC SOFC Cathode Material $La_2NiO_{4+\delta}$ by Experimental and Computational Solid-State ^{17}O NMR Spectroscopy David M. Halat[1], Riza Dervisoglu[2], Gunwoo Kim[1] and Clare P. Grey[1, 2]; [1]Department of Chemistry, University of Cambridge, Cambridge, United Kingdom; [2]Department of Chemistry, Stony Brook University, Stony Brook, New York, United States.

4:10 PM *A3.06
Acceptor Doped $CeNbO_4$ as a Potential Mixed Proton Conducting Electrode Stephen Skinner and Cassandra Harris; Imperial College London, London, United Kingdom.

4:30 PM A3.07
A Cost-Effective Approach for Next Generation High-Performance Fuel-Flexible Protonic Ceramic Fuel Cell Chuancheng Duan, Jianhua Tong, Meng Shang and Ryan O'Hayre; Colorado School of Mines, Golden, Colorado, United States.

4:50 PM A3.08
A New Ternary Protonic/Oxygen Ionic/Electronic Conducting Cathode for Proton Conducting Solid Oxide Fuel Cell Liangdong Fan and Pei-Chen Su; School of Mechanical and Aerospace Engineering, Nanyang Technological University, Singapore, Singapore.

5:10 PM A3.09
Nano-CT Enabled, Bayesian Model-Based Analysis of Impedance Data for a Porous, Lanthanum Strontium Manganate Cell Giuseppe F. Brunello[1], Billy Epting[2], Shawn Litster[2], Paul A. Salvador[3], Harry O. Finklea[4], David S. Mebane[1] and Juwana De Silva[4]; [1]Mechanical and Aerospace Engineering, West Virginia University, Atlanta, Georgia, United States;[2]Department of Mechanical Engineering, Carnegie Mellon University, Pittsburgh, Pennsylvania, United States; [3]Department of Materials Science and Engineering, Carnegie Mellon University, Pittsburgh, Pennsylvania, United States; [4]Department of Chemistry, West Virginia University, Morgantown, West Virginia, United States.

C: Electrodes and Solid Electrolytes for Batteries

SESSION C1: Rational Design of Battery Materials
C: Electrodes and Solid Electrolytes for Batteries
Chair: Arumugam Manthiram
Monday Morning, June 15, 2015
Keystone Resorts, Shavano Peak

10:10 AM BREAK

10:30 AM **C1.01
Lithium Sulfur Batteries: Fundamental Understanding and Materials Design Yi Cui; Department of Materials Science and Engineering, Stanford University. Stanford Institute for Materials and Energy Sciences, SLAC National Accelerator Laboratory, Stanford, California, United States.

11:00 AM C1.02
Atomic-Scale Insights into Lithium and Sodium Battery Materials: Intercalation, Diffusion and Surfaces Saiful Islam; Chemistry, University of Bath, Bath, United Kingdom.

11:20 AM C1.03
Accelerated Computation Materials Design of Solid-Electrolyte Materials in All-Solid-State Li-Ion Batteries Yifei Mo; Materials Science and Engineering, University of Maryland, College Park, College Park, Maryland, United States.

11:40 AM OPEN DISCUSSION

SESSION C3: Solid Electrolyte I
C: Electrodes and Solid Electrolytes for Batteries
Chair: Diana Golodnitsky
Monday Afternoon, June 15, 2015
Keystone Resorts, Shavano Peak

2:30 PM *C3.01
Structure and Dynamics of Lithium Garnet Oxides Studied by Neutron Scattering and Molecular Dynamics Simulation Wei Lai[1], Yuxing Wang[1], Matthew Klenk[1] and Katharine Page[2]; [1]Michigan State University, East Lansing, Michigan, United States; [2]Oak Ridge National Lab, Oak Ridge, Tennessee, United States.

2:50 PM C3.02
A Full Study of a Garnet Ceramic Electrolyte: From Atomistic Simulation to Actual Application in Rechargeable Lithium-Metal Batteries William Manalastas[1], Randy Jalem[2, 3], Frederic Aguesse[1], Lucienne Buannic[1], Juan Miguel Lopez del Amo[1], Carlos Bernuy-Lopez[1], Gurpreet Singh[1], Ainara Aguadero[4], Anna Llordes[1], Masanobu Nakayama[3] and John Kilner[4,1]; [1]Solid State Electrolytes Group, CIC Energigune, Miñano, Spain; [2]Unit of Element Strategy Initiative for Catalysts and Batteries, Kyoto University, Kyoto, Japan; [3]Department of Materials Science and Engineering, Nagoya Institute of Technology, Nagoya, Japan; [4]Department of Materials, Imperial College, London, United Kingdom.

3:10 PM C3.03
Revealing Lithium Conduction Pathways in Lithium-Rich Garnets Using Aliovalent Dopants Rowena H. Brugge, Ainara Aguadero and John Kilner; Imperial College London, London, United Kingdom.

3:30 PM C3.04
Charge Transport Properties in the Li-Garnet $Li_{7-x}La_3Zr_{2-x}Te_xO_{12}$ System Michal Struzik, Reto Pfenninger and Jennifer L. Rupp; Department of Materials, ETH Zurich, Zurich, Switzerland.

3:50 PM C3.05
Investigating the Effects of Al Doping on the Local and Average Structure of Al-LLZ Using Atomistic Simulations Matthew Klenk and Wei Lai; Chemical Engineering and Material Science, Michigan State University, East Lansing, Michigan, United States.

4:10 PM C3.06
Influence of La Ordering in $Li_{3x}La_{2/3-x}TiO_3$ Epitaxial Films on Li-Ion Conduction Tsuyoshi Ohnishi, Kazutaka Mitsuishi, Kazunori Nishio and Kazunori Takada; National Institute for Materials Science, Tsukuba, Japan.

4:30 PM C3.07
Lithium Dendrite Growth in Hot Pressed Ta-Substituted $Li_7La_3Zr_2O_{12}$ Chih-Long Tsai[1], Vinodchandran Chandrasekharan Nair[2], Astrid Besmehn[3], Sven Uhlenbruck[1], Hans G. Gehrke[1], Thorsten Reppert[1], Paul Heitjans[2] and Olivier Guillon[1]; [1]Institut fuer Energie- und Klimaforschung: Werkstoffsynthese und Herstellungverfahren (IEK-1) , Forschungszentrum Juelich GmbH, Juelich, Germany; [2]Institut für Physikalische Chemie und Elektrochemie, Leibniz Universität Hannover , Hannover, Germany; [3]ZEA-3, Forschungszentrum Juelich GmbH, Juelich, Germany.

4:50 PM C3.08
Excellent Stability of a Solid Electrolyte upon Li^+/H^+ Exchange: A Discovery Resulting from Successfully Suppressing Electron Beam Damage Cheng Ma[1], Chengdu Liang[1], Jeffrey Sakamoto[2], Karren More[1] and Miaofang Chi[1]; [1]Center for Nanophase Materials Sciences, Oak Ridge National Laboratory, Oak Ridge, Tennessee, United States; [2]Department of Chemical Engineering and Materials Science, Michigan State University, East Lansing, Michigan, United States.

C: Electrodes and Solid Electrolytes for Batteries

SESSION C4: Interfaces in Batteries
C: Electrodes and Solid Electrolytes for Batteries
Chair: M. Stanley Whittingham
Monday Afternoon, June 15, 2015
Keystone Resorts, Quandary Peak I/II

2:30 PM *C4.01
Predicting Lithium Transport in Solid Electrolyte Interphases Yue Qi; Department of Chemical Engineering and Materials Science, Michigan State University, Lansing, Michigan, United States.

2:50 PM C4.02
Theory of Space Charge Layers in Lithium All-Solid-State Batteries Arnulf Latz[1, 2, 3], Stefanie Braun[1, 2] and Chihiro Yada[4]; [1]German Aerospace center , Stuttgart, Germany;[2]Helmholtz Institute Ulm for Electrochemical Energy Storage, Ulm, Germany; [3]Institute for Electrochemistry, University of Ulm, Ulm, Germany; [4]Toyota Motor Europe NV/SA, Zaventem, Belgium.

3:10 PM C4.03
Negligible "Negative Space-Charge Layer Effects" at LiPON/ $LiCoO_2$ Interfaces of Thin-Film Batteries Taro Hitosugi, Masakazu Haruta, Ryota Shimizu and Susumu Shiraki; Tohoku University, Sendai, Japan.

3:30 PM C4.04
Lithium and Hydrogen Storage at Abrupt Junctions Lijun Fu, Chia-Chin Chen and Joachim Maier; Max Planck Institute for Solid State Research, Stuttgart, Germany.

3:50 PM C4.05
Double Layer Formation and Energy Level Alignment at Li-Ion Electrode-Electrolyte Interfaces: Impact on Charge Transfer and Electrode Potential Rene Hausbrand, Andre Schwoebel, Wolfram Jaegermann, Mathias Fingerle and Ruben Precht; Institute of Materials Science, Darmstadt University of Technology, Darmstadt, Germany.

4:10 PM C4.06
Reduced Grain-Boundary Resistance of Oxide-Type Lithium Ion Conductors by Surface Coating Hirotoshi Yamada[1], Daisuke Tsunoe[2] and Shota Shiraishi[1]; [1]Graduate School of Engineering, Nagasaki University, Nagasaki, Japan; [2]Faculty of Engineering, Nagasaki University, Nagasaki, Japan.

4:30 PM C4.07
Investigation of Electrode-Electrolyte Interface in Bulk-Type All-Solid-State Lithium Batteries Using $LiCoO_2$ Particles Coated with Sulfide Solid Electrolyte Thin Films Yusuke Ito[1], Atsushi Sakuda[1], Takamasa Ohtomo[2], Akitoshi Hayashi[1] and Masahiro Tatsumisago[1]; [1]Department of Applied Chemistry, Osaka Prefecture University, Sakai, Japan; [2]Battery Research Division, Toyota Motor Corporation, Shizuoka, Japan.

4:50 PM C4.08
Probing Interfaces of Garnet Solid Electrolytes in Lithium Batteries Lei Cheng[1, 2], Guoying Chen[2] and Marca Doeff[2]; [1]Material Science and Engineering, University of California, Berkeley, Berkeley, California, United States; [2]Environmental Energy Technological Division, Lawrence Berkeley National Laboratory, Berkeley, California, United States.

D: Fundamentals of Transport and Reactivity and Nanoionics

SESSION D1: Fundamentals of Transport and Reactivity and Nanoionics I
D: Fundamentals of Transport and Reactivity and Nanoionics
Chair: Joachim Maier
Monday Morning, June 15, 2015
Keystone Resorts, Grays Peak I/II

10:10 AM BREAK

10:30 AM **D1.01
Oxygen Nonstoichiometry in Thin Films and Nanoparticles: Measurement, Control and Implications for Energy and Memory Related Devices Harry L. Tuller; Department of Materials Science and Engineering, MIT, Cambridge, Massachusetts, United States.

11:00 AM D1.02
Investigating Thin YSZ Perovskite Films Using Analytical Electron Microscopy Melissa Neish[2], Frank Scheltens[1], Robert E. Williams[1], Leslie J. Allen[2] and David W. McComb[1];[1]Materials Science and Engineering, The Ohio State University, Columbus, Ohio, United States; [2]School of Physics, University of Melbourne, Melbourne, Victoria, Australia.

11:20 AM D1.03
Cation Surface Segregation and Composition Depth Profile Variations in Thin Films Of SOFC Cathode Materials Analysed by Low Energy Ion Scattering Jose Santiso[1], Helena Tellez-Lozano[2], Araceli Gutierrez-Llorente[3], James Zapata[1], Roberto Moreno[1], Jaume Roqueta[1], Nuria Bagues[1], Anna Magraso[1], Jose M. Caicedo[1], John Druce[2], John A. Kilner[2] and Tatsumi Ishihara[2]; [1]ICN2 Institut Catala de Nanociencia i Nanotecnologia, Barcelona, Spain; [2]Hydrogen Production, I2CNER, International Institute for Carbon Neutral Energy Research, Fukuoka, Japan; [3]Universidad Rey Juan Carlos, Madrid, Spain.

11:40 AM D1.04
The Influence of Water on the Ionic Conductivity in Ordered Mesoporous YSZ Thin Films Matthias T. Elm[1, 2], Jonas D. Hofmann[1], Christian Suchomski[1, 3], Jueürgen Janek[1] and Torsten Brezesinski[3]; [1]Institute of Physical Chemistry, Justus-Liebig University Giessen, Giessen, Germany; [2]Institute of Experimental Physics I, Justus-Liebig University Giessen, Giessen, Germany; [3]Institute of Nanotechnology, Karlsruhe Institute of Technology, Eggenstein-Leopoldshafen, Germany.

SESSION D3: Fundamentals of Transport and Reactivity and Nanoionics II
D: Fundamentals of Transport and Reactivity and Nanoionics
Chair: Hans-Dieter Wiemhoefer
Monday Afternoon, June 15, 2015
Keystone Resorts, Grays Peak I/II

2:30 PM *D3.01
Low-Temperature Alpha Silver Iodide Confined in Glass: Structure and Dynamics Klaus Funke[1], Radha Banhatti[1], Pawel Grabowski[2], Jan Nowinski[2], Wojtek Wrobel[2], Robert Dinnebier[3] and Oxana Magdysyuk[3]; [1]Institute of Physical Chemistry, University of Muenster, Muenster, Germany; [2]Faculty of Physics, Warsaw University of Technology, Warsaw, Poland; [3]Max Planck Institut für Festkörperforschung, Stuttgart, Germany.

2:50 PM D3.02
Frequency - Dependent Conductivity and Anomalous Diffusion in Ag β-alumina Osamu Kamishima[1], Junichi Kawamura[2] and Yoshiki Iwai[2]; [1]Faculty of Science and Engineering, Setsunan University, Neyagawa, Japan; [2]Institute of Multidisciplinary Research for Advanced Materials, Tohoku University, Sendai, Japan.

3:10 PM OPEN DISCUSSION

3:30 PM D3.04
Electronic Transport of Metal Oxide Single Crystals for Solar Water Splitting: Bismuth Vanadate and Iron Oxide Alexander J. Rettie[1], William Chemelewski[2], Jeffrey Lindemuth[3], John McCloy[4], Luke Marshall[5], David Eisenberg[6], Jianshi Zhou[2], David Emin[7] and Buddie Mullins[1, 4, 8]; [1]Chemical Engineering, University of Texas at Austin, Austin, Texas, United States; [2]Materials Science and Engineering, University of Texas at Austin, Austin, Texas, United States; [3]LakeShore Cryotronics, Westerville, Ohio, United States; [4]Materials Science and Engineering, Washington State University, Pullman, Washington, United States; [5]Chemical Engineering, Northeastern University, Boston, Massachusetts, United States; [6]Van't Hoff Institute for Molecular Sciences, University of Amsterdam, Amsterdam, Netherlands; [7]Physics and Astronomy, University of New Mexico, Albuquerque, New Mexico, United States;[8]Chemistry, University of Texas at Austin, Austin, Texas, United States.

3:50 PM D3.05
Redox Reactions and Transport at Room Temperature in Nanoionic Systems Based on Macroscopic Insulators Ilia Valov; Electronic Materials, Research Centre Juelich, Juelich, Germany.

4:10 PM D3.06
Atomistic Mechanism of Lithiation of Nanomaterials as Li-Ion Battery Anodes Studied by *In Situ* TEM Xuedong Bai; Institute of Physics, Chinese Academy of Sciences, Beijing, China.

4:30 PM D3.07
The Effects of Lattice Strain and Cationic Disorder on the Li-Ion Diffusion in $LiFePO_4$ Cristina Tealdi[1, 2] and Piercarlo Mustarelli[1, 2]; [1]Department of Chemistry, University of Pavia , Pavia, Italy; [2]UdR Pavia, INSTM, Pavia, Italy.

4:50 PM D3.08
Elucidating Li Ion Dynamics and Diffusion Pathways in Li_2SnO_3 – A Comparative $^{6,7}Li$ NMR Study Julia Langer[1, 2], Patrick Bottke[1, 2] and Martin Wilkening[1, 2, 3]; [1]Institute for Chemistry and Technology of Materials, Graz University of Technology, Graz, Austria; [2]DFG Research Unit 1277, Graz University of Technology, Graz, Austria; [3]Graz University of Technology, Christian Doppler Laboratory for Lithium Batteries, Graz, Austria.

5:10 PM D3.09
Lithium Segregation Induces Localized Order-Disorder Transitions Amorphous TiO_2 Nanoparticles Subramanian Sankaranarayanan[1, 2]; [1]Center for Nanoscale Materials, Argonne National Laboratory, Argonne, Illinois, United States; [2]Computation Institute, University of Chicago, Chicago, Illinois, United States.

E: Transparent Conducting Oxides

SESSION E1: TCO I—Defects, Materials
E: Transparent Conducting Oxides
Chair: David Paine
Monday Morning, June 15, 2015
Keystone Resorts, Quandary Peak I/II

10:10 AM BREAK

10:30 AM **E1.01
Defect Theory for Transparent Conducting Oxides Stephan Lany; National Renewable Energy Laboratory, Golden, Colorado, United States.

11:00 AM E1.02
Tuning Charge Collection Efficiency at the Transparent Conductive Electrode in Polymer Photovoltaics with Solution-Processed LiF Cleva W. Ow-Yang[1, 2], Hasan Kurt[1], Junjun Jia[3] and Yuzo Shigesato[3]; [1]Materials Science and NanoEngineering, Sabanci University, Istanbul, Turkey; [2]Nanotechnology Research and Application Center, Sabanci University, Istanbul, Turkey; [3]Graduate School of Science and Engineering, Aoyama Gakuin University, Sagamihara/Kanagawa, Japan.

11:20 AM E1.03
Tuning of Electrical and Optical Properties of Polycrystalline TiO_2-Based Transparent Conducting Films Piero Mazzolini[1, 2], Giuliano Gregori[3], Valeria Russo[1], Daniel Chrastina[4], Rafael O. Ferragut[4], Carlo S. Casari[1, 2] and Andrea Li Bassi[1, 2]; [1]Energy, Politecnico di Milano, Milano, Italy; [2]CNST @PoliMI, Istituto Italiano di Tecnologia, Milano, Italy; [3]Physical Chemistry of Solids, Max Planck Institute for Solid State Research, Stuttgart, Germany; [4]L-NESS, physics department, Politecnico di Milano, Como, Italy.

11:40 AM E1.04
Indium-Zinc-Oxide TFTs Using *In Situ* Converted Al_2O_3/HfO_2 Gate Stack Yang Song[1], Stylianos Siontas[2], Alexander Zaslavsky[1, 2], David Paine[2] and Alexander Katsman[3]; [1]Physics, Brown University, Providence, Rhode Island, United States; [2]School of Engineering, Brown University, Providence, Rhode Island, United States; [3]Dept. of Materials Science and Engineering, Technion, Haifa, Israel.

F/H: Solid State Photoelectrochemistry/High Temperature Routes to Solar Fuels

SESSION F/H1: Solid State Photoelectrochemistry/High Temperature Routes to Solar Fuels I
F/H: Solid State Photoelectrochemistry/High Temperature Routes to Solar Fuels
Chair: Tim Davenport
Monday Morning, June 15, 2015
Keystone Resorts, Grays Peak III

10:10 AM BREAK

10:30 AM **F/H1.01
Concentrating Solar Thermochemical Fuels: Key Materials Issues for Commercial Viability and Scalability Ellen B. Stechel[1] and James E. Miller[2]; [1]LightWorks, Arizona State University, Tempe, Arizona, United States; [2]Sandia National Laboratories, Albuquerque, New Mexico, United States.

11:00 AM F/H1.02
Discovery of Novel Perovskites for Solar Thermochemical Water Splitting from High-Throughput First-Principles Calculations Antoine A. Emery and Chris Wolverton; Materials Science and Engineering, Northwestern University, Evanston, Illinois, United States.

11:20 AM *F/H1.03
Fuel Production from Concentrated Solar Radiation Christian Sattler and Martin Roeb; Solar Chemical Engineering, German Aerospace Center - DLR, Cologne, Germany.

11:40 AM F/H1.04
Decisive Thermodynamic Factor of Perovskite Catalysts for Thermochemical Water Splitting Yoshihiro Yamazaki[1, 2], Chih-Kai Yang[3] and Sossina M. Haile[3]; [1]Inamori Frontier Research Center, Kyushu University, Fukuoka, Japan; [2]Japan Science and Technology Agency, Kawaguchi, Japan; [3]California Institute of Technology, Pasadena, California, United States.

SESSION F/H3: Solid State Photoelectrochemistry/High Temperature Routes to Solar Fuels II
F/H: Solid State Photoelectrochemistry/High Temperature Routes to Solar Fuels
Chairs: Shannon Boettcher and Tim Davenport
Monday Afternoon, June 15, 2015
Keystone Resorts, Grays Peak III

2:30 PM *F/H3.01
Characterization of La-Mn Perovskites and Doped Ceria for Thermochemical H_2O and CO_2 Splitting Applications Jonathan Scheffe[1], Thomas Cooper[2], Michael Takacs[2] and Aldo Steinfeld[2]; [1]Mechanical and Aerospace Engineering, University of Florida, Gainesville, Florida, United States; [2]Department of Mechanical and Process Engineering, ETH Zurich, Zurich, Switzerland.

2:50 PM F/H3.02
Perovskites from Earth-Abundant Elements for Thermochemical Energy Storage Rounak Kharait[1], Luca Imponenti[1], Michael Sanders[2], Jianhua Tong[2], Ryan O'Hayre[2] and Gregory S. Jackson[1]; [1]Mechanical Engineering, Colorado School of Mines, Golden, Colorado, United States; [2]George S. Ansell Dept. of Metallurgical and Materials Engineering, Colorado School of Mines, Golden, Colorado, United States.

3:10 PM **F/H3.03
Engineering Materials and Interfaces for Efficient and Stable Photocatalytic Water Splitting Jinhui Yang, Jason K. Cooper, Francesca M. Toma and Ian D. Sharp; Lawrence Berkeley National Laboratory, Berkeley, California, United States.

3:40 PM **F/H3.04
Excited State Dynamics in Oxynitride Nanocrystals and Implications for Solar Fuel Generation Gordana Dukovic; Chemistry and Biochemistry, University of Colorado Boulder, Boulder, Colorado, United States.

4:10 PM **F/H3.05
Charge Carrier Transport and Catalysis on Solution-Processed Photoelectrodes for Solar Water Splitting Kevin Sivula; Laboratory for Molecular Engineering of Optoelectronic Nanomaterials, Institute of Chemical Science and Engineering, École Polytechnique Fédérale de Lausanne, Lausanne, Switzerland.

4:40 PM F/H3.06
Enhanced Photoactivity in Mo:$BiVO_4$ by Thermally Activating Small Polaron Hopping Liming Zhang, Xiaofei Ye, Madhur Boloor, Andrey Poletayev, Nicholas Melosh and William Chueh; Materials Science & Engineering, Stanford University, Stanford, California, United States.

5:00 PM F/H3.07
Mixed Conductivity as the Origin of Capacitive and Hysteretic Anomalies in Organo-Lead Halide Perovskites Giuliano Gregori[1], Tae-Youl Yang[1], Norman Pellet[2], Michael Graetzel[2] and Joachim Maier[1]; [1]Max Planck Institute for Solid State Research, Stuttgart, Germany; [2]Swiss Federal Institute of Technology, Lausanne, Switzerland.

POSTER PRESENTATIONS

MONDAY June 15, 2015

SESSION A2: Poster Session I
A: Solid Oxide Fuel Cells and Electrolyzers
Monday Afternoon, June 15, 2015
12:00 PM
Keystone Resorts, Red Cloud Peak

A2.01
Structural Stability of Complex Perovskites for Solid Oxide Fuel Cells from First Principles Calculations Maija M. Kuklja[1], Eugene A. Kotomin[2, 3], David Fuks[4], Yuri A. Mastrikov[2]and Joachim Maier[3]; [1]Materials Science and Engineering Department, University of Maryland College Park, College Park, Maryland, United States; [2]Institute for Solid State Physics, University of Latvia, Riga, Latvia; [3]Max Planck Institute for Solid State Research, Stuttgart, Germany; [4]Dept Materials Engineering, Ben Gurion University of the Negev, Beer Sheva, Israel.

A2.02
Long Term Degradation Effects in Doped Ceria from First Principles Steffen Grieshammer[1, 2, 3], Benjamin O. Grope[1, 2, 3], Julius Koettgen[1, 2, 3] and Manfred Martin[1, 2, 3]; [1]Institute of Physical Chemistry I, RWTH Aachen University, Aachen, Germany; [2]JARA-ENERGY, Aachen, Germany; [3]JARA-HPC, Aachen, Germany.

A2.03 WITHDRAWN

A2.04
First Principles Thermodynamics of Oxygen Vacancies in Ultrathin Films of $BaZrO_3$ Marco Arrigoni[1], Eugene A. Kotomin[1], Joachim Maier[1] and Tor S. Bjorheim[2]; [1]Physical Chemistry of Solids, Max Planck Institute for Solid State Research, Stuttgart, Germany; [2]Department of Chemistry, University of Oslo, Oslo, Norway.

A2.05
Optimum Zr Configurations in $Ce_{1-x}Zr_xO_2$ ($x \in [0,1]$) Solid Solution Using Genetic Algorithm and Density Functional Theory Jason Kim[2], Shin-Won Hwang[1], Ji-Su Kim[1], Byung-Kook Kim[3] and Yeong-Cheol Kim[1]; [1]School of Energy, Materials, and Chemical Engineering, KoreaTech, Cheonan, Korea (the Republic of); [2]School of Electrical and Computer Engineering, UNIST, Ulsan, Korea (the Republic of); [3]High Temperature Energy Materials Center, Korea Institute of Science and Technology, Seoul, Korea (the Republic of).

A2.06
Theoretical Study of Oxygen Vacancy Formation in $Ce_{0.75}Zr_{0.25}O_2$ Solid Solution Using Density Functional Theory Ji-Su Kim[1], Shin-Won Hwang[1], Jason Kim[2], Byung-Kook Kim[3]and Yeong-Cheol Kim[1]; [1]School of Energy, Materials, and Chemical Engineering, KoreaTech, Cheonan, Korea (the Republic of); [2]School of Electrical and Computer Engineering, UNIST, Ulsan, Korea (the Republic of); [3]High Temperature Energy Materials Center, Korea Institute of Science and Technology, Seoul, Korea (the Republic of).

A2.07
High-Throughput Density Functional Theory Screening of Perovskite Compounds for High Oxygen Surface-Exchange for Solid Oxide Fuel Cell Cathodes Ryan Jacobs[1], Dane Morgan[1, 3] and John Booske[2]; [1]Materials Science Program, University of Wisconsin- Madison, Madison, Wisconsin, United States; [2]Electrical and Computer Engineering, University of Wisconsin- Madison, Madison, Wisconsin, United States; [3]Materials Science and Engineering, University of Wisconsin-Madison, Madison, Wisconsin, United States.

A2.08
Accelerated Materials Design of $Na_{0.5}Bi_{0.5}TiO_3$ Oxygen Ionic Conductors Based on First Principles Calculations Xingfeng He and Yifei Mo; Department of Materials Science and Engineering, University of Maryland, College Park, College Park, Maryland, United States.

A2.09 moved A5.09

A2.10
The Effect of Oxygen Nonstoichiometry on Thermal Expansion and Conduction Mechanism of $LaNi_{1-x}Fe_xO_{3-\delta}$ Eiki Niwa and Takuya Hashimoto; Department of Physics, Nihon University, Setagaya-ku, Japan.

A2.11
Oxygen Nonstoichiometry, Electrical Properties and Thermochemical Expansion of Strontium-Rich $Nd_{2-X}Sr_xNiO_{4\pm D}$ Mixed Conductors Ekaterina Kravchenko[1, 2], Kiryl Zakharchuk[1], Jekabs Grins[3], Gunnar Svensson[3], Vladimir Pankov[2] and Aleksey Yaremchenko[1]; [1]CICECO, Department of Materials and Ceramic Engineering, University of Aveiro, Aveiro, Portugal; [2]Department of Chemistry, Belarusian State University, Minsk, Belarus; [3]Department of Materials and Environmental Chemistry, Stockholm University, Stockholm, Sweden.

A2.12
Oxygen Nonstoichiometry and Defect Chemistry of Perovskite-Structured $SrSn_{1-x}Fe_xO_{3-x/2+\delta}$ Chang Sub Kim[1], Sean R. Bishop[1, 2], Nicola H. Perry[1, 2], Jae Jin Kim[1] and Harry L. Tuller[1, 2]; [1]Department of Materials Science and Engineering & Skoltech Center for Electrochemical Energy Storage, MIT, Cambridge, Massachusetts, United States; [2]International Institute for Carbon Neutral Energy Research (WPI-I2CNER), Kyushu University, Fukuoka, Japan.

A2.13
Defect Structure and Related Properties of $SrTi_{1-x}Fe_xO_{3-d}$ Vladimir Sereda, Dmitry Tsvetkov, Ivan Ivanov and Andrey Zuev; Department of Physical Chemistry, Ural Federal University, Ekaterinburg, Russian Federation.

A2.14
Oxygen Content, Thermodynamic Stability and Electrical Properties of $YBaCo_{4-x}Zn_xO_{7-\delta}$ Dmitry S. Tsvetkov, Nadezhda S. Tsvetkova and A. Y. Zuev; Department of Chemistry, Ural Federal University, Ekaterinburg, Russian Federation.

A2.15
Iso-Octane Internal Reforming in a Solid Oxide Cell Reactor Abdullah Al-Musa[2], Mohamed Al-Saleh[2], Ayman Al-Zahrani[2], Vasileios Kyriakou[3, 4], George Marnellos[1, 4] and Nikolaos Kaklidis[1]; [1]Department of Mechanical Engineering, University of Western Macedonia, Kozani, Greece; [2]Water & Energy Research Institute, King Abdulaziz City for Science & Technology, Riyadh, Saudi Arabia; [3]Department of Chemical Engineering, Aristotle University of Thessaloniki, Thessaloniki, Greece; [4]Chemical Process & Energy Resources Institute, Centre for Research & Technology Hellas, Thessaloniki, Greece.

A2.16
Insights into Oxygen Anion Transprt in Layered Oxides via *In-Situ* Powder Neutron Diffraction Steven McIntosh[1], Alexander C. Tomkiewicz[1], Mazin A. Tamimi[1] and Ashfia Huq[2];[1]Chemical & Biomolecular Engineering, Lehigh University, Bethlehem, Pennsylvania, United States; [2]Neutron Sciences, Oak Ridge National Laboratory, Oak Ridge, Tennessee, United States.

A2.17
Oxygen Nonstoichiometry and Defect Equilibrium in the Ruddlesden–Popper Type Oxides $La_xSr_{3-x}Fe_2O_{7-\delta}$ (x=0, 0.25 and 0.5) Yihan Ling, Fang Wang, Yusuke Okamoto, Takashi Nakamura and Koji Amezawa; Institute of Multidisciplinary Research for Advanced Materials, Tohoku University, Sendai, Japan.

A2.18
Synthesis and Preliminary Characterization of $Sr_{2-x}La_xMnO_{4\pm\delta}$ ($0.25 \leq x \leq 0.6$) Series as Symmetric SOFC Electrode Monica V. Sandoval[1, 2], Freddy L. Duran[1, 2], Caroline Pirovano[2], Edouard Capoen[2], Rose Noelle Vannier[2], Pascal Roussel[2] and Gilles H. Gauthier[1]; [1]Grupo INTERFASE, Universidad Industrial de Santander, Bucaramnaga, Colombia; [2]Unité de Catalyse et de Chimie du Solide, Université Lille 1, Lille, France.

A2.19
The Impact of Precursor Gel Desiccation, Ceria Oxide Pre-Infiltration, and Solution Composition on Tailoring Lanthanum Strontium Cobalt Iron Oxide Nano-Particle Size Theodore E. Burye, Hongjie Tang and Jason Nicholas; Chemical Engineering and Materials Science, Michigan State University, East Lansing, Michigan, United States.

A2.20
Influence of Synthesis Method on the Electrochemical Properties of Bilayer Electrodes Based on $La_2NiO_{4+\delta}$ and $LaNi_{0.6}Fe_{0.4}O_{3-\delta}$ Elena Pikalova[3, 1], Nina Bogdanovich[3], Alexander Kolchugin[3], Alexander Pankratov[3] and Dimitry Bronin[3, 2]; [1]Department of Environmental Economics, Ural Federal University, Ekaterinburg, Russian Federation; [2]Institute of Natural Sciences, Ural Federal University, Ekaterinburg, Russian Federation; [3]Institute of High Temperature Electrochemistry, Ekaterinburg, Russian Federation.

A2.21
Oxygen Mobility in Microwave Sintered Praseodymium Nickelates-Cobaltites and Their Nanocomposites with Yittria-Doped Ceria Vladislav A. Sadykov[1, 2], Nikita F. Eremeev[1], Vasiliy A. Bolotov[1], Yuriy Y. Tanashov[1], Yulia E. Fedorova[1, 3], Daiana G. Amanbayeva[1, 4], Aleksey S. Bobin[1], Ekaterina M. Sadovskaya[1], Vitaliy S. Muzykantov[1], Vladimir V. Pelipenko[1], Anton I. Lukashevich[1], Tamara A. Krieger[1], Arkadiy V. Ishchenko[1, 2] and Alevtina L. Smirnova[5]; [1]Boreskov Institute of Catalysis, Novosibirsk, Russian Federation;[2]Novosibirsk State University, Novosibirsk, Russian Federation; [3]Novosibirsk State Pedagogical University, Novosibirsk, Russian Federation; [4]Novosibirsk State Technical University, Novosibirsk, Russian Federation; [5]South Dakota School of Mines & Technology, Rapid City, South Dakota, United States.

A2.22
Electrochemical Performance of La and Ni Co-Doped $SrTiO_3$ Anode of Solid Oxide Fuel Cell Byung Hyun Park and Gyeong Man Choi; Mat. Sci. & Eng., POSTECH, Pohang, Korea (the Republic of).

A2.23
Functionally Graded Electrodes Using Centrifuge Deposition for Solid Oxide Fuel and Electrolysis Cells Shahid P. Shafi , Ioannis Bantounas, Udo Schwingenschloegl, Enrico Traversa and Samir Boulfrad; Physical Sciences and Engineering, King Abdullah University of Science and Technology (KAUST), Thuwal, Saudi Arabia.

A2.24
The Impact of Surfactant Choice on Infiltrate Size-Tailored Nano-Composite Solid Oxide Fuel Cell Cathodes Theodore E. Burye and Jason D. Nicholas; Chemical Eng and Material Science, Michigan State University, East Lansing, Michigan, United States.

A2.25
Preparation of Thin Films by the Method of Electrophoretic Deposition of Nanopowders on the Cathode Substrate Elena Kalinina[1], Elena Pikalova[2, 3], Anastasia Men'shikova[3] and Irina Nikolaenko[4, 3]; [1]Institute of Electrophysics of the Ural Branch of the Russian Academy of Sciences, Ekaterinburg, Russian Federation; [2]Institute of High Temperature Electrochemistry, UB RAS, Ekaterinburg, Russian Federation; [3]Ural Federal University, Ekaterinburg, Russian Federation; [4]Institute of Solid State Chemistry, UB RAS , Ekaterinburg, Russian Federation.

A2.26
The Electrochemical Reduction Mechanism of $Sm_{0.35}Ba_{0.15}Sr_{0.5}Co_{0.8}Fe_{0.2}O_{3-\delta}$ and Graded Composite Cathode Jianquan Gao, Shengli An, Fen Zhou and Xiwen Song; School of Materials and Metallurgy, Inner Mongolia University of Science and Technology, Baotou, China.

A2.27
Oxygen Exchange Kinetics of Doped Lanthanum Cobaltite System Keiji Yashiro[2], Hiroki Sato[1], Mie Sasaki[1], Takashi Nakamura[3], Shinichi Hashimoto[1], Koji Amezawa[3] and Tatsuya Kawada[1]; [2]GSES, Tohoku University, Sendai, Japan; [3]IMRAM, Tohoku University, Sendai, Japan.

A2.28
Surface Modification of $La_{0.6}Sr_{0.4}Co_{0.2}Fe_{0.8}O_{3-\delta}$ by Nanometer-Thick Mixed Conducting Oxide Films Michael L. Machala, Burcu Oeguet, David N. Mueller and William C. Chueh; Stanford University, Stanford, California, United States.

A2.29
Microstructural Effect to Thermal Stability and Cathode Performance by Nanoscale ZrO_2 Capping in Platinum Based-Solid Oxide Fuel Cells Kang-Yu Liu[1], Liangdong Fan[1], Chen-Chiang Yu[2], Tsung-Han Lee[1] and Pei-Chen Su[1]; [1]School of Mechanical and Aerospace Engineering, Nanyang Technological University, Singapore, Singapore; [2]Interdisciplinary Graduate School, Nanyang Technological University, Singapore, Singapore.

A2.30
Microstructure and Functionality of Cathode/Electrolyte Interfaces in SOFCs Virginia Wilde[1], Heike Stoermer[1], Julian Szasz[2], Florian Wankmueller[2], Ellen Ivers-Tiffee[2] and Dagmar Gerthsen[1]; [1]Laboratory for Electron Microscopy (LEM), Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany; [2]Institute of Materials for Electric and Electronic Engineering (IWE), Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany.

A2.31
Bias Enhanced Fast Oxygen Exchange and Diffusion Kinetics of Grain Boundaries in LSM Thin Films Tobias M. Huber[1, 2, 3], Edvinas Navickas[4], Daio Takeshi[1], George F. Harrington[1, 2, 3], Nicola H. Perry[3, 5], Ghislain Rupp[4], Walid Hetaba[6], Michael Stoeger-Pollach[6], Harry L. Tuller[2, 5], Bilge Yildiz[3, 2], Kazunari Sasaki[5] and Juergen Fleig[4]; [1]Mechanical Engineering, Kyushu University, Fukuoka, Japan; [2]Materials Science and Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts, United States; [3]Department of Nuclear Science & Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts, United States; [4]Institute of Chemical Technologies and Analytics, Research Division Electrochemistry, Vienna University of Technology, Vienna, Austria; [5]International Center for Carbon Neutral Energy Research (I2CNER), Kyushu University, Fukuoka, Japan; [6]University Service Centre for Transmission Electron Microscopy, Vienna University of Technology, Vienna, Austria.

A2.32
Variable Temperature Multinuclear Solid State NMR Study of "Sr0.55Na0.45SiO2.775" Ryan D. Bayliss[1], Frederic Blanc[2, 3], John Corley[2], John A. Kilner[4, 5] and Stephen Skinner[4];[1]Department of Chemistry, University of Illinois at Chicago, Chicago, Illinois, United States; [2]Department of Chemistry, University of Liverpool, Liverpool, United Kingdom; [3]Stephenson Institute for Renewable Energy, University of Liverpool, Liverpool, United Kingdom; [4]Department of Materials, Imperial College London, London, United Kingdom; [5]International Institute for Carbon-Neutral Energy Research (I2CNER), Nishi-Ku, Japan.

A2.33 Withdrawn

A2.34
Kinetics of Surface Activation and Oxygen Transfer Acceleration Induced by A_2BO_4/ABO_3 Hetero-Interface for SOEC Application Bo Yu, Wenqiang Zhangwq and Jingming Xu; Tsinghua University, Beijing, China.

A2.35
Effect of Sintering Temperature on Properties of 8YSZ Prepared by SPS Jinxia Wang, Zhiqun Ding and Hongxia Zhao; School of Electronic and Information Engineering, Ningbo University of Technology, Ningbo, China.

A2.36
Methanol Synthesis at Atmospheric Pressure in Co-Ionic Electrochemical Membrane Reactors Anastasios Vourros[1, 4], Vasileios Kyriakou[4, 1], Ioannis Garagounis[1, 4], Michalis Konsolakis[2], Zisis Ioakimides[3, 4], George Marnellos[3, 4] and Michael Stoukides[1, 4]; [1]Chemical Engineering, Aristotle University of Thessaloniki, Thessaloniki, Greece; [2]School of Production Engineering and Management, Technical University of Crete, Chania, Greece; [3]Department of Mechanical Engineering, University of Western Macedonia, Kozani, Greece;[4]Chemical Process and Energy Resources Institute, Centre for Research and Technology Hellas, Thessaloniki, Greece.

A2.37
Structural and Electrical Properties of Spark Plasma Sintered Scandia- and Dysprosia-Stabilized Zirconia Robson L. Grosso[1], Ana J. Tertuliano[2], Izabel F. Machado[2] and Eliana N. Muccillo[1]; [1]Energy and Nuclear Research Institute (IPEN), Sao Paulo, Brazil; [2]Polytechnique School, Sao Paulo, Brazil.

A2.38
Electrical Properties of GDC-BCY Composite Electrolytes for Intermediate Temperature Solid Oxide Fuel Cell Xiaomei Liu, Hailin Bi, Haopeng Wang, Shenglong Yu, Fei Han, Lili Zhu, Jialing Sun and Li Pei; Key Laboratory of Physics and Technology for Advanced Batteries, Physics Department, Jilin University, Changchun, China.

A2.39
$Ni_{1-x}Cu_x$-SDC Anodes for Intermediate Temperature Solid Oxide Fuel Cell Lili Zhu[1, 2], Xiaomei Liu[1], Jialing Sun[1], Fei Han[1], Hailin Bi[1], Haopeng Wang[1], Shenglong Yu[1] and Li Pei[1]; [1] Key Laboratory of Physics and Technology for Advanced Batteries, Physics Department , Jilin University, Changchun, China; [2]Beihua University, Jilin, China.

A2.40
Electrical Conductivity of YSZ-SDC Composite Solid Electrolyte Synthesized via Glycine-Nitrate Method Prabhakar Singh; Department of Physics, Indian Institute of Technology (BHU) Varanasi, Varanasi, India.

A2.41
Wet Chemical Synthesis of $(DyO_{1.5})_x(WO_3)_y$ $(BiO_{1.5})_{1-x-y}$ and Application in Bilayer Low Temperature SOFCs Ashley L. Ruth[2], Emily A. Fraik[2], Daniel D. Taylor[1], Hee Sung Yoon[2] and Eric D. Wachsman[2]; [1]Chemistry, University of Maryland, College Park, Maryland, United States; [2]Energy Research Center, University of Maryland, College Park, Maryland, United States.

A2.42
Electrochemical Promotion of CO Oxidation on Pt/YSZ- Interaction between Multiple Promoting Species Danai Poulidi and Efstratios Stavrakakis; Chemistry and Chemical Engineering, Queen's University Belfast, Belfast, United Kingdom.

A2.43 Withdrawn

A2.44
Thin Flim Oxy-Apatites for Solid Oxide Fuel Cell Sunghwan Lee and Shriram Ramanathan; School of Engineering and Applied Sciences, Harvard University, Cambridge, Massachusetts, United States.

A2.45
Structural Stability and Conductivity of the $Bi_3Y_{1-x}W_xO_{6+3x/2}$ System Anna Borowska-Centkowska[1], Wojciech Wrobel[1], Marcin Malys[1], Isaac Abrahams[2] and Franciszek Krok[1];[1]Faculty of Physics Warsaw University of Technology, Warsaw, Poland; [2]Materials Research Institute, Queen Mary University of London, London, United Kingdom.

A2.46
High Humidity Effects in Reversible Solid Oxide Cells and in Ni-YSZ Symmetric Cells Eui-Chol Shin[1], Pyung-An Ahn[1], Hyun-Ho Seo[1], Dang-Thanh Nguyen[1], Sun-Dong Kim[2], Sang-Kuk Woo[2], Ji Haeng Yu[2] and Jong-Sook Lee[1]; [1]Materials Science and Engineering, Chonnam National University, Gwang-Ju, Korea (the Republic of); [2]Korea Institute of Energy Research , Daejeon, Korea (the Republic of).

A2.47
High-Performance Anode-Supported Solid Oxide Fuel Cell with Impregnated Electrodes Denis Osinkin[1], Nina Bogdanovich[1], Sergey Beresnev[1] and Viktor Zhuravlev[2]; [1]Laboratory of SOFC, Institution of High Temperature Electrochemistry, Yekaterinburg, Russian Federation; [2]Institute of Solid State Chemistry, Yekaterinburg, Russian Federation.

A2.48
Extending the Simple Infiltrated Microstructure Polarization Loss Estimation (SIMPLE) Model to Infiltrated Solid Oxide Fuel Cell (SOFC) Anodes Eric Straley and Jason D. Nicholas; Chemical Engineering and Material Science, Michigan State University, East Lansing, Michigan, United States.

A2.49
A High Performance Anode Material for Solid Oxide Fuel Cells: Ni Exsolution on A-Site Deficient $La_{0.4}Sr_{0.4}Sc_{0.9}Ni_{0.1}O_{3-\delta}$ Mattia Saccoccio[1], Yang Gao[1], Dengjie Chen[1], Chi Chen[1] and Francesco Ciucci[1, 2]; [1]Department of Mechanical and Aerospace Engineering, The Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong;[2]Department of Chemical and Biomolecular Engineering, The Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong.

A2.50
Fabrication of Co/Fe-Doped Ni/$BaZr_{0.8}Y_{0.2}O_{3-\delta}$ Anode for Methane-Fueled PCFC Taehyun Park[2, 1], Chuancheng Duan[2], Jianhua Tong[2], Suk Won Cha[1] and Ryan O'Hayre[2];[1]Mechanical and Aerospace Engineering, Seoul National University, Gwanak-gu, Korea (the Republic of); [2]Metallurgical and Materials Engineering, Colorado School of Mines, Golden, Colorado, United States.

A2.51
Synthesis and Preliminary Study of Pure and Zr-Substituted $YMnO_3$ Compounds as Solid Oxide Fuel Cells Electrode Zulma L. Moreno[1, 3], Alberto Caneiro[3], Pascal Roussel[2] and Gilles H. Gauthier[1]; [1]Grupo INTERFASE, Universidad Industrial de Santander, Bucaramanga, Colombia; [2]Université Lille 1, Université Lille Nord de France, Lille, France; [3]Comisión Nacional de Energía Atómica, Centro Atómico de Bariloche, San Carlos de Bariloche, Argentina.

A2.52
Structural and Electrical Properties of Ceria (Ce^{3+}) Doped Double Perovskite System $Sr_2NiMoO_{6-\delta}$ Pravin Kumar, Nitish Kumar Singh and Prabhakar Singh; Physics, Indian Institute of Technology (BHU) , Varanasi, India.

A2.53
Chemical Stability of Double-Perovskite Anode Material Sr_2MgMoO_6 for Solid Oxide Fuel Cells Masahiro Kinoshita[1], Kyota Hara[2], Tomohiro Onozawa[2], Kiyoto Shin-mura[1], Yu Otani[1], Eiki Niwa[3], Takuya Hashimoto[3] and Kazuya Sasaki[1, 2]; [1]Course of Mechanical Engineering, Graduate School of Engineering, Tokai University, Hiratsuka, Japan; [2]Department of Prime Mover Engineering, School of Engineering, Tokai University, Hiratsuka, Japan; [3]Department of Physics, College of Humanities and Sciences, Nihon University, Setagaya-ku, Japan.

A2.54
Novel Ni and Ni Alloy/γ-Al_2O_3 Anode Materials for Direct Carbon SOFCs Sergey Pikalov[2], Evgeny Selivanov[2], Olga Russkikh[1], Elena Filonova[1], Valery Polukhin[2] and Irina Nikolaenko[3]; [1]Institute of Natural Sciences, Ural Federal University, Ekaterinburg, Russian Federation; [2]Institute of Metallurgy, UB RAS, Ekaterinburg, Russian Federation; [3]Institute of Solid State Chemistry, UB RAS, Ekaterinburg, Russian Federation.

A2.55
Novel Double-Layer La_2NiO_{4+d} Cathodes: Screen Printing vs. Electrostatic Spray Deposition R. K. Sharma[1, 2], M. Burriel[3], L. Dessemond[1, 2], Jean-Marc Bassat[4] and E. Djurado[1, 2];[1]LEPMI, Univ. Grenoble Alpes, Grenoble, France; [2]LEPMI, CNRS, Grenoble, France; [3]Catalonia Institute for Energy Research (IREC), Barcelona, Spain; [4]ICMCB-CNRS, Pessac , France.

A2.56
Patterned Electrodes for the Study of CO/CO2 Electrolysis Vladislav Duboviks[1], Enrique Ruiz-Trejo[1], Farid Tariq[1], Paul Boldrin[1], Robert C. Maher[2], Gregory J. Offer[3], Gabriel Castillo[4], Javier Rodriguez Vazquez de Aldana[4], Masashi Kishimoto[1], Leslie F. Cohen[2] and Nigel P. Brandon[1]; [1]Earth Science and Engineering, Imperial College London, London, United Kingdom; [2]Physics, Imperial College London, London, United Kingdom; [3]Mechanical Engineering, Imperial College London, London, United Kingdom; [4]Ciencias, Universidad de Salamanca, Salamanca, Spain.

SESSION C2: Poster Session I
C: Electrodes and Solid Electrolytes for Batteries
Monday Afternoon, June 15, 2015
12:00 PM
Keystone Resorts, Red Cloud Peak

C2.01
Fast Li Self-Diffusion in Amorphous Li-Si Electrochemically Prepared from Semiconductor Grade, Monocrystalline Silicon — Insights from Spin-Locking Nuclear Magnetic Relaxometry Andreas Dunst, Michael Sternad, Viktor Epp and Martin Wilkening; Christian-Doppler Laboratory for Lithium Batteries, Institute for Chemistry and Technology of Materials, Graz University of Technology, Graz, Austria.

C2.02
Solubility Behavior of Nanograined Li_2MnSiO_4 Cathode Material in Liquid Electrolytes Marcin Molenda, Michal Swietoslawski and Roman Dziembaj; Faculty of Chemistry, Jagiellonian University, Krakow, Poland.

C2.03
Studies on PVA Based Nanocomposite Polymer Gel Electrolyte Membranes for High Performance Proton Conducting Batteries S. L. Agrawal[1] and Neelesh Rai[2]; [1]Department of Physics, APS University, Rewa , India; [2]Department of Physics, AKS University, Satna, India.

C2.04
Lithium in Diffusion Measurements on a Garnet-Type Solid Conductor $Li_{6.6}La_3Zr_{1.6}Ta_{0.4}O_{12}$ (LLZO-Ta) by Pulsed-Gradient Spin-Echo NMR Method Kikuko Hayamizu[1], Yasuaki Matsuda[2], Masaki Matsui[2], Yasuo Takeda[2] and Nobuyuki Imanishi[2]; [1]Institute of Applied Physics, University of Tsukuba, Tsukuba, Japan; [2]Department of Chemistry for Materials, Mie-University, Tsu, Mie, Japan.

C2.05
All Solid State Li-Garnet-Based Batteries: From Materials Development to Thin Film Microstructures Jennifer L. Rupp[1], Semih Ayfon[1], Inigo Garbayo[1], Reto Pfenninger[1], Michael Rawlence[2, 1] and Michal Struzik[1]; [1]Electrochemical Materials, ETH Zurich, Zurich, Switzerland; [2]Laboratory for Thin Films and Photovoltaics, EMPA, Dübendorf, Switzerland.

C2.06
Proof-of-Concept of All-Solid-State Metal-Metal Battery Fuminori Mizuno[1], Ruigang Zhang[1], Timothy S. Arthur[1], Donovan N. Leonard[2], Miaofang Chi[2] and Jeff Sakamoto[3];[1]Materials Research Department, Toyota Research Institute of North America, Ann Arbor, Michigan, United States; [2]Oak Ridge National Laboratory, Oak Ridge, Tennessee, United States;[3]Mechanical Engineering, University of Michigan, Ann Arbor, Michigan, United States.

C2.07 Withdrawn

C2.08
Li-Ion Conducting Polymer Electrolytes Based on Biopolymer, Agar Agar Selvasekarapandian Subramanian[1], Vinitha Thiyagarajan Upaassana[1], Sindhuja Manohar[1], Monisha Sampath[1] and Arun A[2]; [1]Physics, Materials Research Centre, Coimbatore, India; [2]Chemistry, Government Arts College, Thiruvannamalai, India.

C2.09
A Comparative Study of Impact in Conductivity of $LiNiPO_4$ on Doping Europium and Samarium in Lithium and Nickel Sites Prepared Using Modified Pechini and Polymeric Precursor Method Selvasekarapandian Subramanian[1, 2], Goutam Anbunathan V N[2], Kalpana M[2], Senthil Kumar P[3], Vinoth Pandi D[4], Sakunthala A[3] and Gunasekaran K[2]; [1]Physics, Materials Research Centre, Coimbatore, India; [2]Department of Nano Science and Technology, Tamilnadu Agricultural University, Coimbatore, India; [3]Department of Physics, Karunya University, Coimbatore, India; [4]Department of Physics, Coimbatore Institute of Technology, Coimbatore, India.

C2.10
Sputter Deposited $Li_7La_3Zr_2O_{12}$ as Electrolyte for Thin Film Cells Sandra Lobe[1], Christian Dellen[1], Hans-Gregor Gehrke[1], Chih-Long Tsai[1], Martin Finsterbusch[1], Sven Uhlenbruck[1]and Olivier Guillon[1, 2]; [1]Institute of Energy and Climate Research (IEK-1) , Forschungszentrum Jülich, Jülich, Germany; [2]Institut für Gesteinshüttenkunde, Rheinisch-Westfälische Technische Hochschule (RWTH) Aachen, Aachen, Germany.

C2.11
Evaluation of Mechanical Properties of Li_2S-P_2S_5-LiI Glass Electrolytes for All-Solid-State Lithium Batteries Atsutaka Kato[1], Atsushi Sakuda[2], Akitoshi Hayashi[1] and Masahiro Tatsumisago[1]; [1]Applied Chemistry, Osaka Prefecture University, Sakai, Japan; [2]Research Institute for Ubiquitous Energy Devices, National Institute of Advanced Industrial Science and Technology (AIST), Ikada, Japan.

C2.12
Aluminum-Doped $Li_7La_3Zr_2O_{12}$ - A Promising Candidate as a Solid Electrolyte for Lithium-Ion Batteries Miriam Botros[1], Ruzica Djenadic[1, 2, 3] and Horst Hahn[1, 2, 3]; [1]Joint Research Laboratory Nanomaterials, Technical University Darmstadtand and Karlsruhe Institute of Technology, Darmstadt, Germany; [2]Institute for Nanotechnology, Karlsruhe Institute of Technology, Eggenstein-Leopoldshafen, Germany; [3]Helmholtz Institute Ulm, Ulm, Germany.

C2.13
Microstructure-Electrical Property Relationship in Polycrystalline Sodium β"-Alumina by New Impedance Modelling Approach Jee-Hoon Kim[1], Dong-Chun Cho[1], Su-Hyun Moon[1], Eui-Chol Shin[1], Sansudae Lim[2], Sooseok Kim[2], Keedeok Yang[2], Jinhyung Beom[2] and Jong-Sook Lee[1]; [1]Materials Science and Engineering, Chonnam National University, Gwangju, Korea (the Republic of); [2]FineTech Co., Ltd., Daejeon, Korea (the Republic of).

C2.14
Non-Stoichiometry of Composites: Thermodynamic Analysis of Dissociative Storage at Interfaces Chia-Chin Chen, Lijun Fu and Joachim Maier; Max Planck Institute for Solid State Research, Stuttgart, Germany.

C2.15
Rechargeable Batteries and Condensed Matter Physics Lin Gu; Institute of Physics, Chinese Academy of Sciences, Beijing, China.

C2.16
Diatomaceous Earth and Algae Based Aqueous Binders Make Environmentally Friendly High-Performance Anodes for Lithium-Ion Batteries Muhammad Hasanuzzaman and Fride Vullum-Bruer; Materials Science and Engineering, Norwegian University of Science and Technology, NTNU, Trondheim, Norway.

C2.17
Preparation of Li_2S-$FePS_3$ Composite Positive Electrode Materials and Their Electrochemical Properties Tomonari Takeuchi[1], Hiroyuki Kageyama[1], Masahiro Ogawa[2], Koji Nakanishi[3], Toshiaki Ohta[2], Atsushi Sakuda[1], Hikari Sakaebe[1], Hironori Kobayashi[1] and Zempachi Ogumi[3]; [1]National Institute of Advanced Industrial Science and Technology, Ikeda, Japan; [2]Ritsumeikan University, Kusatsu, Japan; [3]Kyoto University, Kyoto, Japan.

C2.18
Highly Conductive Glass-Ceramic Electrolytes for Advanced Lithium Batteries Miriam Kunze, Meike Schneider, Maria-Luisa Reich, Wolfgang Schmidbauer and Andreas Roters; SCHOTT AG, Mainz, Germany.

C2.19
Investigation of O3-$Na_{0.9}[Ni_{0.45}Ti_{0.55}]O_2$ Using Electroanalytical Techniques and Ex-Situ XRD for Na-Ion Batteries Rengarajan Shanmugam and Wei Lai; CHEMS, Michigan State University, East Lansing, Michigan, United States.

C2.20
Evidence for a >1 Electron Reaction in Li_2FeSiO_4: An *in situ* Mössbauer Spectroscopy Study Anti Liivat[1], Josh Thomas[1], Jianghuai Guo[2] and Yong Yang[2]; [1]Chemistry, Uppsala University, Uppsala, Sweden; [2]Chemistry, Xiamen University , Xiamen, China.

C2.21
Optimization of Ionic Conductivity in Garnet-Type Solid State Electrolytes for Lithium Ion Batteries Sumaletha Narayanan, Xia Tong, Venkataraman Thangadurai and Kalpana Singh; Department of Chemistry, University of Calgary, Calgary, Alberta, Canada.

C2.22
Electrochemical Properties of All-Solid-State Lithium-Ion Batteries Using Li_2CO_3-Li_3BO_3 Electrolyte Toyoki Okumura, Tomonari Takeuchi, Masahiro Shikano and Hironori Kobayashi; Advanced Battery Research Group, National Institute of Advanced Industrial and Technology (AIST), Ikeda, Japan.

C2.23
Spinel-Based Solid Electrolyte for Lithium-Ion Battery Application Ruzica Djenadic[1, 2, 3], Miriam Botros[3], Chritoph Loho[3] and Horst Hahn[2, 3, 1]; [1]Helmholtz Institute Ulm, Ulm, Germany; [2]Institute of Nanotechnology, Karlsruhe Institute of Technology, Eggenstein-Leopoldshafen, Germany; [3]Joint Research Laboratory Nanomaterials – Technical University Darmstadt & Karlsruhe Institute of Technology, Darmstadt, Germany.

C2.24
Transport of Alkali Ions in an Organic Ionic Plastic Crystal Fangfang Chen and Maria Forsyth; Institute for Frontier Materials, Deakin University, Burwood, Victoria, Australia.

C2.25
Electrochemical Properties and Structural Evaluation of Amorphous MoS_3 Positive Electrode Active Materials in All-Solid-State Lithium Secondary Batteries Takuya Matsuyama[1], Minako Deguchi[1], Akitoshi Hayashi[1], Masahiro Tatsumisago[1], Tomoatsu Ozaki[2] and Shigeo Mori[3]; [1]Department of Applied Chemistry, Osaka Prefecture University, Sakai, Japan; [2]Technology Research Institute of Osaka Prefecture, Izumi, Japan; [3]Department of Materials Science, Osaka Prefecture University, Sakai, Japan.

C2.26
Comparing Electrochemical Performance of Silicate Cathodes and Chevrel Phase Mo_6S_8 in the Analogous Rechargeable Mg-Ion Battery System Xinzhi Chen[1], Lu Wang[1], Sidsel M. Hanetho[2], Paul I. Dahl[2] and Fride Vullum-Bruer[1]; [1]Department of Materials Science and Engineering, Norwegian University of Science and Technology, Trondheim, Norway;[2]Department of Sustainable Energy Technology, SINTEF Materials and Chemistry, Trondheim, Norway.

C2.27
Computer Aided Design of Polyanionic Electrolytes: A Molecular Dynamic Study Xingyu Chen; Institute of Frontier Materials, Deakin University, Melbourne, Victoria, Australia.

C2.28
Enhancement of Ionic Conductivity of Battery Electrolytes Using Nanoconfined Polymer Electrolyte, Ionic Liquids and Ionic Liquid/ Polymer Electrolyte Blends Indumini Jayasekara and Dale Teeters; Chemistry and Biochemistry, The University of Tulsa, Tulsa, Oklahoma, United States.

C2.29
Investigation of the Unique Crystalline Orientation of a Nanostructured Lithium Cobalt Oxide Thin Film Cathodes for Lithium Ion Batteries Mark Poyner and Dale Teeters; Chemistry and Biochemistry, The University of Tulsa, Tulsa, Oklahoma, United States.

C2.30
Electrical Characterization of $Na_3Sc_2(PO_4)_3$:Eu2+ Su-Hyun Moon, Yun-Hwa Kim, Dong-Chun Cho, Eui-Chol Shin, Won-Bin Im and Jong-Sook Lee; School of Materials Science and Engineering, Chonnam National University, Gwangju, Korea (the Republic of).

C2.31
Dispersive Frequency Response in Low Temperature Silver Iodide by Immittance Spectroscopy Su-Hyun Moon, Young-Hun Kim, Dong-Chun Cho, Eui-Chol Shin and Jong-Sook Lee; School of Materials Science and Engineering, Chonnam National University, Gwangju, Korea (the Republic of).

C2.32
Novel Copper-Based Layered Oxide Cathode for Room-Temperature Sodium-Ion Batteries Linqin Mu, Yong-Sheng Hu, Shuyin Xu, Yunming Li and Liquan Chen; Chinese Academy of Sciences, Institution Of Physics, Beijing, China.

C2.33
The Degradation Mechanism of Nickel-Rich Cathode Active Materials with Vinylene Carbonate in An Electrolyte for Lithium Ion Batteries at Various Temperatures Su Jung Do,Prasanna Kadirvelayutham, Yong Nam Jo, Robert Ilango Pushparaj and Chang Woo Lee; Kyung Hee University, Yongin-si, Korea (the Republic of).

C2.34
Electrochemical Properties of Sn-Co Electrode with Various Kinds of Binder Materials for Sodium Ion Batteries Yuhki Yui, Masahiko Hayashi, Katsuya Hayashi and Jiro Nakamura; NTT, Atsugi, Japan.

C2.35
Synthesis of Chatode Materials $LiFePO_4$ by Hydrothermal and Ultrasonic Method Wagiyo Honggowiranto and Evvy Kartini; Advanced Materials, National Nuclear Energy Agency, Tangerang Selatan, Indonesia.

C2.36
Characterization of Structural and Transport Properties of $LiMn_{1.7}Cu_{0.3}O_4$ Lukasz Kondracki, Anna G. Milewska and Janina Molenda; AGH University of Science and Technology, Kraków, Poland.

C2.37
Comparative Analysis of Structure-Property Relationship of Nanosilicon Anodes for Lithium-Ion Batteries Diana Golodnitsky, Emanuel Peled, Fernando Patolsky, Kathrin Freedman, Meital Goor, Keren Goldstein, Guy Davidi and Dan Schneier; School of Chemistry, Tel Aviv University, Tel Aviv, Israel.

C2.38
A Na^+ Superionic Conductor Based on NASICON and Its Application in All-Solid-State Sodium Batteries Zhizhen Zhang, Kaiqi Xu, Yong-Sheng Hu and Liquan Chen; Institute of Physics Chinese Academy of Sciences, Beijing, China.

C2.39
Impedance Measurement for Ti-Zr-Ni Alloy Electrodes Produced by Mechanical Alloying and Subsequent Annealing Akito Takasaki[1], Youhei Ariga[1], Wojciech Zajac[2] and Konrad Swierczek[2]; [1]Engineering Science and Mechanics, Shibaura Institute of Technology, Tokyo, Japan; [2]Faculty of Energy and Fuels, AGH University of Science and Technology, Krakow, Poland.

C2.40
Structural Evaluation of Delithiated $Li_xMn_{1.5}Ni_{0.5-y}Cu_yO_4$ Spinels Lukasz Kondracki, Anna Milewska, Artur Bogacki, Slawomir Lalik and Janina Molenda; AGH University of Science and Technology, Kraków, Poland.

C2.41
Synthesis, Structure and Ionic Conductivities of Novel Li-Ion Conductor $A_3Li_xTa_{6-x}Zr_xSi_4O_{26}$ (A = Ba, Sr) Akihisa Aimi[1], Yoshiyuki Inaguma[1], Miki Kubota[1], Daisuke Mori[1], Tetsuhiro Katsumata[2], Minoru Ikeda[3] and Takahisa Ohno[3, 4]; [1]Chemistry, Gakushuin University, Toshima-ku, Japan; [2]Chemistry, Tokai University, Hiratsuka-shi, Japan; [3]National Institute for Materials Science, Tsukuba-shi, Japan; [4]Global Research Center for Environment and Energy based Nanomaterials Science, Tsukuba-shi, Japan.

C2.42
Properties of Lithium-Stuffed Garnet-Type Oxide Solid Electrolyte Thick Film Fabricated by Aerosol Deposition Method Ryoji Inada, Takayuki Okada, Keiji Tsuritani, Kota Wagatsuma, Tomohiro Tojo and Yoji Sakurai; Department of Electrical and Electronic Information Engineering, Toyohashi University of Technology, Toyohashi, Japan.

C2.43
Defect Chemistry and Transport in Alkali Superoxides Oliver Gerbig, Rotraut Merkle and Joachim Maier; MPI for Solid State Research, Stuttgart, Germany.

C2.44
Dielectric and Transport Properties Study of Clay Based Solid Polymer Electrolyte Namrata Tripathi[1], Awalendra K. Thakur[3], Archana Shukla[2] and David T. Marx[1]; [1]Physics, Illinois State University, Normal, USA, Normal, Illinois, United States; [2]Physics, Indian Institute of Technology Bombay, Maharastra, Mumbai, India; [3]Physics, Indian Institute of Technology Patna, Bihar, Patna, India.

C2.45
The Effect of Cathode Microstructure on the Performance of All Solid-State Li Battery Sven Uhlenbruck, Chih-Long Tsai, Christian Dellen, Qianli Ma, Sandra Lobe and Olivier Guillon; Institute of Energy and Climate Research, Forschungszentrum Jülich GmbH, Jülich, Germany.

C2.46
Conductivity and Scaling Behavior of Nd^{3+} Ions Containing Lithium Borate Glasses Durgaprasad D. Ramteke[1, 2], Hendrik C. Swart[1] and Rupesh S. Gedam[2]; [1]Department of Physics, University of Free State , Bloemfontein , South Africa; [2]Department of Applied Physics, Visvesvaraya National Institute of Technology, Nagpur, India.

C2.47
A Battery Made from a Single Material Fudong Han[1], Tao Gao[1], Yujie Zhu[1], Karen J. Gaskell[2] and Chunsheng Wang[1]; [1]Department of Chemical and Biomolecular Engineering, University of Maryland, College Park, Maryland, United States; [2]Department of Chemistry and Biochemistry, University of Maryland, College Park, Maryland, United States.

C2.48
High Rate Growth by Pulsed Laser Deposition and Characterization of Epitaxial $LiCoO_2$ Films Kazunori Nishio[1], Tsuyoshi Ohnishi[1, 2, 3], Minoru Osada[3], Narumi Ohta[1, 2], Ken Watanabe[2] and Kazunori Takada[1, 2, 3]; [1]Global Research Center for Environment and Energy based on Nanomaterials Science, National Institute for Materials Science, Tsukuba, Japan;[2]Environment and Energy Materials Division, National Institute for Materials Science, Tsukuba, Japan; [3]International Center for Materials Nanoarchitectronics , National Institute for Materials Science, Tsukuba, Japan.

C2.49
Assembly and Electrochemical Properties of $LiFePO_4$/C Pouch Cell Evvy Kartini and Wagiyo Honggowiranto; Science and Technology Center for Advanced Materials, National Nuclear Energy Agency, South Tangerang, Indonesia.

C2.50
Towards Control over Redox Behavior and Ionic Conductivity in $LiTi_2(PO_4)_3$ Fast Lithium-Ion Conductor Wojciech Zajac[1], Mateusz Tarach[1] and Anita Trenczek-Zajac[2]; [1]Faculty of Energy and Fuels, AGH University of Science and Technology, Krakow, Poland; [2]Faculty of Materials Science and Ceramics, AGH University of Science and Technology, Krakow, Poland.

C2.51
Advanced Planar Lithium-Sulfur Batteries Based on Solid Ceramic Li-Ion Conducting Separators Feng Zhao and John Bi; Ceramatec, Inc. , Salt Lake City, Utah, United States.

C2.52
Development of NaSICON-Type Lithium Ion Conductors Feng Zhao and John Bi; Ceramatec, Inc. , Salt Lake City, Utah, United States.

C2.53
Preparation of Li_2S–P_2S_5 Solid Electrolytes Using Organic Solvents as Synthetic Media Nguyen H. Phuc, Kei Morikawa, Mitsuhiro Totani, Hiroyuki Muto and Atsunori Matsuda; Electrical and Electronic Information Engineering, Toyohashi University of Technology, Toyohashi, Japan.

C2.54
Mechanochemical Preparation of Lithium Sulfide-Lithium Iodide Solid Solutions as Active Materials for All-Solid-State Lithium Secondary Batteries Takashi Hakari, Akitoshi Hayashi and Masahiro Tatsumisago; Department of Applied Chemistry , Osaka Prefecture University, Sakai-shi, Japan.

C2.55
A Study on the Effects of Mechanical Alloys as Anodes on Corrosion and Hydrogen Evolution Reaction in Zinc-Air System Yong Nam Jo, Prasanna Kadirvelayutham, Su Jung Do, Subburaj Thiruvengadam and Chang Woo Lee; Kyung Hee University, Yongin-si, Korea (the Republic of).

C2.56
Synthesis and Electrochemical Property of Garnet-Type Lithium-Ion Conductor $Li_{7-x-y}Al_yLa_3Zr_{2-x}Ta_xO_{12}$ Yasuaki Matsuda[1], Yuya Itami[1], Masaki Matsui[1, 2], Yasuo Takeda[1] and Nobuyuki Imanishi[1]; [1]Chemistry, Mie University, Tsu, Japan; [2]PRESTO, Japan Science and Technology Agency, Honcho, Kawaguchi, Japan.

C2.57
On V Substitution in Li_2MnSiO_4/C as Potential Positive Electrode for Li-Ion Batteries Nils Wagner, Ann-Mari Svensson and Fride Vullum-Bruer; Material Science and Engineering, Norwegian University of Science and Technology, Trondheim, Norway.

C2.58
Electrical Conductivity Characterization of $LiAlO_2$ Thin Films Prepared by ALD Yang Hu, Amund Ruud, Ville Miikkulainen, Truls Norby, Ola Nilsen and Helmer Fjellvag; Centre for Materials Science and Nanotechnology, Department of Chemistry, University of Oslo, Oslo, Norway.

C2.59
Solid Electrolytes for Lithium-Sulfur Batteries Alice Cassel[1, 2, 3], Benoit Fleutot[1, 2, 3], Christine Surcin[1, 2, 3], Virginie Viallet[1, 2, 3] and Mathieu Morcrette[1, 2, 3]; [1]Laboratoire de Réactivité et Chimie des Solides, Amiens, France; [2]Réseau sur le Stockage Electrochimique de l'Energie, Amiens, France; [3]Alistore-ERI, Amiens, France.

C2.60
Preparation and Properties of Lithium Conducting Membranes from Polymer-Brush Nanoparticles Ilya Zharov[1, 2]; [1]Chemistry, University of Utah, Salt Lake City, Utah, United States; [2]Materials Science and Engineering, University of Utah, Salt Lake City, Utah, United States.

C2.61
Separators Based on Novel Triblock Polyelectrolyte for Lithium Battery: Improving Performance and Safety Kun-lin Liu and Chi-Yang Chao; Materials Science and Engineering, National Taiwan University, Taipei, Taiwan.

C2.62
Rechargeable Lithium Semi-Flow Battery Using $Li_7P_3S_{11}$ Rayavarapu Prasada Rao, Jia Ming Yuen and Stefan Adams; Materials Science & Eng., National University of Singapore, Singapore, Singapore.

C2.63
$Li_{10}SnP_2S_{12}$, an Electrolyte and Negative Electrode Material for Solid State Li-Ion Batteries? Ilyas Tarhouchi[3, 2], Virginie Viallet[1, 2], Philippe Vinatier[3, 2] and Michel Menetrier[3, 2];[1]LRCS - UMR CNRS 7314, Amiens, France; [2]Réseau sur le Stockage Electrochimique de l'Energie (RS2E), FR CNRS 3459, Amiens, France; [3]ICMCB - CNRS, Pessac, France.

C2.64
Preparation and Electrochemical Studies on Fe-Doped $LiVPO_4F$ Cathode M.V. Reddy[1, 2], Rayavarapu Prasada Rao[1], Stefan Adams[1] and B.V.R. Chowdari[2]; [1]Materials Science & Eng., National University of Singapore, Singapore, Singapore; [2]Dep. of Physics, National University of Singapore, Singapore, Singapore.

C2.65 Withdrawn

SESSION D2: Poster Session: Fundamentals of Transport and Reactivity and Nanoionics I
D: Fundamentals of Transport and Reactivity and Nanoionics
Monday Afternoon, June 15, 2015
12:00 PM
Keystone Resorts, Red Cloud Peak

D2.01
***In Situ* Optical Absorption Studies of Defect Equilibria and Kinetics: Application to $Sr(Ti,Fe)O_{3-\alpha}$ Thin Films** Nicola H. Perry[1, 2], Jaejin Kim[2] and Harry L. Tuller[2, 1]; [1]I2CNER, Kyushu University, Nishi-ku, Fukuoka, Japan; [2]Materials Science and Engineering, MIT, Cambridge, Massachusetts, United States.

D2.02
Millimeter Wave Spectroscopy and Molecular Dynamics Simulation of Ionic Liquids Teruyoshi Awano[1], Arimitsu Shikoda[1] and Toshiharu Takahashi[2]; [1]Tohoku Gakuin University , Tagajo, Japan; [2]Research Reactor Institute, Kyoto University, Kumatori, Japan.

D2.03
Structural vs. Intrinsic Carriers: Contrasting Effects of Cation Disorder on Ionic Conductivity in Pyrochlores Romain Perriot and Blas P. Uberuaga; Materials Science and Technology Division, Los Alamos National Laboratory, Los Alamos, New Mexico, United States.

D2.04
Intrinsic Material Properties Dictating the Formation Energetics of Oxygen Vacancies in Wide Gap Oxides Ann Deml[1, 2], Aaron Holder[2], Ryan O'Hayre[1], Charles Musgrave[3] and Vladan Stevanovic[1, 2]; [1]Colorado School of Mines, Golden, Colorado, United States; [2]National Renewable Energy Laboratory, Golden, Colorado, United States; [3]University of Colorado Boulder, Boulder, Colorado, United States.

D2.05
***Ab Initio* Studies on Bismuth Oxide Based Solid Electrolytes** Marcin Krynski[1], Franciszek Krok[1], Isaac Abrahams[2], Wojeciech Wrobel[1], Jozef Dygas[1] and Piotr Spiewak[3]; [1]Physics, Warsaw University of Technology, Warszawa, Poland; [2]Centre for Materials Research, School of Biological and Chemical Sciences, Queen Mary, London, United Kingdom; [3]Materials Engineering, Warsaw University of Technology, Warszawa, Poland.

D2.06
Role of Oxide Ion Transport on Promoting Iron Oxide Redox Reaction with Oxide Ion Conductors as Supports for Energy Storage and Conversion Fumihiko Kosaka[1], Hiroyuki Hatano[2], Yoshito Oshima[1] and Junichiro Otomo[1]; [1]The University of Tokyo, Kashiwa City, Japan; [2]Chuo University, Bunkyo-Ku, Japan.

D2.07
Ionic and Electronic Energy Level Diagrams for the CaF_2/BaF_2 Heterojunction Giuliano Gregori and Joachim Maier; Max Planck Institute for Solid State Research, Stuttgart, Germany.

D2.08
Glass Formation and Fast Ag Ion Conduction in the System Ag_2Se-Ga_2Se_3-$GeSe_2$ Maxwell A. Marple[1], Derrick Kaseman[1], Bruce Aitken[2], Sangtae Kim[1] and Sabyasachi Sen[1];[1]Chemical Engineering and Materials Science, University of California Davis, Davis, California, United States; [2]Corning Inc, Corning, New York, United States.

D2.09
Fast-Ion Conductor Design for Grid-Scale Batteries Stefan Adams, Haomin Chen, Lee L. Wong and Rayavarapu Prasada Rao; Materials Science & Eng., National University of Singapore, Singapore, Singapore.

D2.10
Grain Boundaries Across Length Scales; Correlating Orientation Imaging and Nanospectroscopy William J. Bowman[1], Amith Darbal[2], Madeleine Kelly[3], Gregory S. Rohrer[3], Cruz A. Hernandez[1], Kimberly McGuinness[1] and Peter A. Crozier[1]; [1]Materials Science and Engineering, Arizona State University, Tempe, Arizona, United States; [2]AppFive LLC, Tempe, Arizona, United States; [3]Materials Research Science and Engineering Center, Carnegie Mellon University, Pittsburgh, Pennsylvania, United States.

D2.11
Determining the Effect of Gas Phase Concentration Polarization on Porous Thick Film Oxygen Surface Exchange Coefficients Determined via the Curvature Relaxation Technique Yuxi Ma and Jason D. Nicholas; Chemical Engineering and Material Science, Michigan State University, East Lansing, Michigan, United States.

D2.12
The Direct Measurement of Ionic Piezoresistance Stuart N. Cook, Jae Jin Kim and Harry L. Tuller; Massachusetts Institute of Technology, Cambridge, Massachusetts, United States.

D2.13
Statistical Methods for Solid State Electrochemistry with Applications to Impedance Spectroscopy and Conductivity Relaxation Francesco Ciucci[1, 2]; [1]Mechanical and Aerospace Engineering, The Hong Kong University of Science and Technology, Kowloon, Hong Kong; [2]Chemical and Biomolecular Engineering, The Hong Kong University of Science and Technology, Kowloon, Hong Kong.

D2.14
Kinetic Unmixing and Decomposition in Ternary Oxides under Electric Field Jakyu Chun[1], Manfred Martin[2] and Han-Ill Yoo[1]; [1]Department of Materials Science and Engineering, Seoul National University, Seoul, Korea (the Republic of); [2]Institute of Physical Chemistry, RWTH Aachen University, Aachen, Germany.

D2.15 Moved to C11.09

D2.16
Influence of Space-Charge on the Surface Defect Chemistry of $BaZrO_3$ Jonathan M. Polfus[1], Tor S. Bjørheim[2], Mehdi Pishahang[1], Truls Norby[2] and Rune Bredesen[1]; [1]Materials and Chemistry, SINTEF, Oslo, Norway; [2]Department of Chemistry, University of Oslo, Oslo, Norway.

D2.17
A Novel Oxygen Pressure Relaxation Technique and Isotope Exchange on $SmBaCo_2O_{6-\delta}$ Vadim Eremin[1], Maxim Ananyev[1, 2] and Edhem Kurumchin[1]; [1]Laboratory of the Electrochemical Materials Science, Institute of High Temperature Electrochemistry, UB RAS, Yekaterinburg, Russia, Yekaterinburg, Russian Federation; [2]Institute of Chemical Technology, Ural Federal University, Yekaterinburg, Russian Federation.

D2.18
Giant Electrostriction in Doped Bi_2O_3 Ceramics Nimrod Yavo[1], Alaric Smith[2], Roman Korobko[1], Peter R. Slater[2] and Igor Lubomirsky[1]; [1]Materials and Interfaces, Weizmann Institute of Science, Rehovot, Israel; [2]School of Chemistry, University of Birmingham, Birmingham, United Kingdom.

D2.19
A Molecular Dynamics Study of Oxygen Ion Diffusion in A-Site Ordered Perovskite $PrBaCo_2O_{5.5}$: Data Mining the Oxygen Trajectories Chi Chen and Francesco Ciucci; Mechanical and Aerospace Engineering, Hong Kong University of Science and Technology, Kowloon, Hong Kong.

D2.20
A Novel Model for Gas Phase Analysis of Oxygen Isotope Exchange in Ceramic Materials with Different Diffusion Pathways Lev Putilov[1] and Maxim Ananyev[1, 2]; [1]Laboratory of the Electrochemical Materials Science, Institute of High Temperature Electrochemistry, Ural Branch of Russian Academy of Sciences, Yekaterinburg, Russian Federation; [2]Institute of Chemical Technology, Ural Federal University, Yekaterinburg, Russian Federation.

D2.21
DFT and Hybrid Calculations on the Stability of Shear Planes and Point Defects in WO_3 Marit N. Getz, Tor S. Bjorheim and Truls Norby; Department of Chemistry, University of Oslo, Oslo, Norway.

D2.22
Lithium Ion Mobility in Sulphonate-Based Ionomer Systems Containing Quaternary Ammonium Co-Cations Yogita Oza, Luke A. O'Dell and Maria Forsyth; Institute for Frontier Materials, Deakin University ARC Centre of Excellence for Electromaterials Science (ACES), Victoria, New South Wales, Australia.

SESSION E2: Poster Session
E: Transparent Conducting Oxides
Monday Afternoon, June 15, 2015
12:00 PM
Keystone Resorts, Red Cloud Peak

E2.01
Textured Transparent Conductive Oxide Electrode having Bilayer Structure of ITiO/GAZO Prepared by D.C. Magnetron Sputtering Yoshiyuki Abe and Kazuhide Hayashi; Ichikawa Research Laboratories, Sumitomo Metal Mining Co., Ltd., Ichikawa-city, Japan.

E2.02
Effect of Different Size Silver Nano Particles on Frequency and Temperature Dependent Parameters of Discotic Liquid Crystals for Solar Cell Applications Avneesh Mishra; Centre of Material Sciences, University of Allahabad, Allahabad, India.

E2.03
On the Application of ZnO Varistor Material in Piezotronics Till Froemling[1], Raschid Baraki[1], Nikola Novak[1], Michael Hofstaetter[2], Peter Supancic[2] and Juergen Roedel[1]; [1]Materials Science, Technische Universtät Darmstadt, Darmstadt, Germany; [2]ISFK, Montanuniversität Leoben, Leoben, Germany.

E2.04
Atomic Layer Deposition of Nanoscale Seed Layers for Enhanced Performance of Transparent Conducting Oxide Thin Films on Glass Stefan B. Nikodemski[1], Ryan O'Hayre[1], Arrelaine Dameron[2], David Ginley[2], John Perkins[2] and Joseph Berry[2]; [1]Metallurgical and Materials Engineering, Colorado School of Mines, Golden, Colorado, United States; [2]National Renewable Energy Laboratory, Golden, Colorado, United States.

SESSION F/H2: Poster Session: Solid State Photelectrochemistry/ High Temperature Routes to Solar Fuels
F/H: Solid State Photoelectrochemistry/High Temperature Routes to Solar Fuels
Monday Afternoon, June 15, 2015
12:00 PM
Keystone Resorts, Red Cloud Peak

F/H2.01
Material Design Criteria for Solar-to-Fuel Perovskites: Lower Temperature-Operation Range with Strontium and Cobalt Doped Lanthanum Chromates Alexander H. Bork, Markus Kubicek, Michal Struzik and Jennifer Rupp; Materials - Electrochemical Materials, ETH Zürich, Zürich, Switzerland.

F/H2.02
Thermodynamics of Praseodymium-Doped Ceria for Thermochemical Water Splitting Timothy C. Davenport[1], Webster Guan[1] and Sossina M. Haile[2]; [1]California Institute of Technology, Pasadena, California, United States; [2]Northwestern University, Evanston, Illinois, United States.

F/H2.03
Investigation on Nonstoichiometric Perovskite Oxides of $Sr_{1-x}La_xMn_{1-y}Al_yO_{3-\delta}$ for Solar Thermochemical Hydrogen Production Debora Barcellos[1], Jianhua Tong[1], Michael Sanders[1], Anthony McDaniel[2] and Ryan O'Hayre[1]; [1]Metallurgical & Materials Engineering, Colorado School of Mines, Golden, Colorado, United States; [2]Sandia National Laboratories, Livermore, California, United States.

F/H2.04
Polarization Enhanced Transport of Hot Carriers in Liquid/InGaN Semiconductor Junctions Blair C. Connelly, Anand V. Sampath, Ryan W. Enck, Chad S. Gallinat, Stephen B. Kelley, Nathaniel T. Woodward, Grace D. Metcalfe, David R. Baker, Cynthia A. Lundgren, Hongen Shen, Meredith L. Reed and Michael Wraback; US Army Research Laboratory, Adelphi, Maryland, United States.

F/H2.05
Electrocatalyst-Semiconductor Interfaces in Water Splitting Photoelectrodes Shannon W. Boettcher; Chemistry, University of Oregon, Eugene, Oregon, United States.

F/H2.06
Photoelectrochemical Water Splitting Promoted with a Disordered Surface Layer Created by Electrochemical Reduction Pengli Yan[1, 2], Yang Gan[1] and Can Li[2]; [1]Harbin Institute of Technology, Harbin, China; [2]Dalian Institute of Chemical Physics, Chinese Academy of Sciences, Dalian, China.

F/H2.07
Comprehensive Photoelectric Characterization of Dye-Sensitized Solar Cells Dang-Thanh Nguyen[1], Seok-Jae Kim[3], Eui-Chol Shin[1], Soon-Hyung Kang[2], Eun-Mi Han[3] and Jong-Sook Lee[1]; [1]School of Materials Science and Engineering, Chonnam National University, Gwangju, Korea (the Republic of); [2]Department of Chemistry Education, Chonnam National University, Gwangju, Korea (the Republic of); [3]School of Applied Chemical Engineering, Chonnam National University, Gwangju, Korea (the Republic of).

F/H2.08
Impedance Spectroscopy of Various ZnO Photoelectrodes Prepared by Solution Method Dang-Thanh Nguyen, Dong-Chun Cho, Eui-Chol Shin and Jong-Sook Lee; School of Materials Science and Engineering, Chonnam National University, Gwangju, Korea (the Republic of).

F/H2.09
Transport Properties of the Heterojunction Formed between a Fe/Y-Codoped $BaZrO_3$ Mixed Conductor and a Ti-Doped Fe_2O_3 Light Absorber for an Elevated-Temperature Solid-State Photoelectrochemical Cell Madhur Boloor, Xiaofei Ye, Liming Zhang, Nicholas A. Melosh and William C. Chueh; Materials Science and Engineering, Stanford University, Fremont, California, United States.

F/H2.10
Polarity and Doping Effects on the Photoelectrochemial Performance of ZnO Single Crystalline Anode by In-Depth Impedance Spectroscopy Eui-Chol Shin[1], Dang-Thanh Nguyen[1], Joachim Maier[2] and Jong-Sook Lee[1]; [1]Materials Science and Engineering, Chonnam National University, Gwang-Ju, Korea (the Republic of); [2]Max Planck Institute for Solid State Research, Stuttgart, Germany.

F/H2.11
Impedance Spectroscopy on Fe_2O_3 Films Prepared by Anodization for Photoelectrochemical Applications Eui-Chol Shin[1], Dong-Chun Cho[1], Dang-Thanh Nguyen[1], Soon-Hyung Kang[2], Hui-Kyung Park[1], Jaeyeong Heo[1] and Jong-Sook Lee[1]; [1]Materials Science and Engineering, Chonnam National University, Gwang-Ju, Korea (the Republic of); [2]Chemistry Education, Chonnam National University, Gwang-ju, Korea (the Republic of).

F/H2.12
Cation-Control of Aggregation in the Conjugated Polyelectrolyte TFB Meilin Li and Stefan Adams; Materials Science & Eng., National University of Singapore, Singapore, Singapore.

SESSION J1: Poster Session I
J: Permeation Membranes
Monday Afternoon, June 15, 2015
12:00 PM
Keystone Resorts, Red Cloud Peak

J1.01
Hydrogen Membranes Based on Group-IV Metal Nitrides Yoshitaka Aoki[1, 2], Chiharu Kura[1], Etsushi Tsuji[1] and Hiroki Habazaki[1]; [1]Faculty of Engineering, Hokkaido University, Sapporo, Japan; [2]JST-PRESTO, Kawaguchi, Japan.

J1.02
Synthesis and Characterization of Chitosan/Sulfonated Poly(terephthalate) Polyelectrolyte Complexes and Study of Its Effects on Water Vapor Flux in Commercial Polycarbonate Membranes Rayane d. Vale; Chemistry, Universidade Federal de São Carlos, São Carlos, Brazil.

J1.03
The Effect of Compatibilizer in sPEEK/PVdF/UAN Composite Membrane for Vanadium Redox Flow Battery Seon G. Rho[1] and Ho Y. Jung[2]; [1]School of Applied Chemical Engineering, Chonnam National University, Gwangju, Korea (the Republic of); [2]Department of Environment & Energy Engineering, Chonnam National University, Gwangju, Korea (the Republic of).

J1.04
Nickel Nanocatalyst Exsolution on Modified $La_{0.75}Sr_{0.25}Cr_{0.5}Mn_{0.5}O_3$ and $La_{0.75}Sr_{0.25}Cr_{0.5}Fe_{0.5}O_3$ Perovskites for the Fuel Oxidation Layer of Oxygen Transport Membranes Despoina Papargyriou and John T. Irvine; School of Chemistry, University of St Andrews, St Andrews, United Kingdom.

J1.05
Surface Characterization of Dual-Phase Oxygen Transport Membrane by Low Energy Ion Scattering (LEIS) Chi Ho Wong, Stephen Skinner and John Kilner; Materials, Imperial College London, London, United Kingdom.

J1.06
A and B Site Co-Doped Lanthanum Chromite Perovskite – Doped Zirconia Fluorite Composites for Oxygen Transport Membrane Systems Sapna Gupta[1, 2] and Prabhakar Singh[1, 2]; [1]Materials Science and Engineering, University of Connecticut, Storrs, Connecticut, United States; [2]Center for Clean Energy Engineering, University of Connecticut, Storrs, Connecticut, United States.

J1.07
Influence of the Oxygen Partial Pressure on the Oxygen Diffusion and Surface Exchange Coefficients in Mixed Conductors Jean-Marc Bassat; ICMCB-CNRS, Pessac , France.

J1.08
Scaling of Oxygen Transport Membranes Marie-Laure Fontaine[1], Christelle Denonville[1], Adam Stevenson[2], Christian His[2], Emmanuel Mercier[2], Caroline Tardivat[2], Xing Wen[1], Jonathan Polfus[1], Ove Paulsen[1], Paul Inge Dahl[1], Partow Henriksen[1] and Rune Bredesen[1]; [1]Materials and Chemistry, SINTEF, Oslo, Norway; [2]Saint Gobaine CREE, Cavaillon, France.

J1.09
Freeze-Casting Technique for the Manufacture of Hierarchical Porous Planar and Tubular Support for Gas Separation Ceramic Membranes Cyril Gaudillere, Julio Garcia-Fayos, Jose M. Serra and Sonia Escolastico; ITQ (UPV-CSIC), Valencia, Spain.

J1.10
Cation-Site Determination in $(Ba_{0.5}Sr_{0.5})(Co_{0.8}Fe_{0.2})O_{3-d}$ by Exploiting Channelling Effects in Transmission Electron Microscopy Matthias Meffert, Heike Stoermer and Dagmar Gerthsen; Laboratory for Electron Microscopy (LEM), Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany.

SESSION K1: Poster Session I
K: Proton-Conducting Oxides
Monday Afternoon, June 15, 2015
12:00 PM
Keystone Resorts, Red Cloud Peak

K1.01
Defect Chemistry of $LaCrO_3$ from First Principles Calculations Sarmad W. Saeed, Tor S. Bjorheim, Reidar Haugsrud and Truls Norby; Department of Chemistry, University of Oslo, Oslo, Norway.

K1.02
Investigation of Sinterability of $BaCe_{0.9}Y_{0.1}O_{3-\delta}$ at Several Schedules Profiles Huyra E. Araujo[3, 2] and Dulcina M. Souza[1, 3]; [1]Materials Engineering Department, Federal University of Sao Carlos, Sao Carlos, Brazil; [2]Federal Institute of Education, Science and Technology, Piracicaba, Brazil; [3]PPGCEM-UFSCar, Sao Carlos, Brazil.

K1.03
Lattice Expansion upon Hydration of Doped Barium Cerate/Zirconate (BZY/BCZY) Proton Conducting Ceramics as Measured by High Temperature X-Ray Diffraction (HTXRD) Grant A. Hudish[1], Sandrine Ricote[2], Anthony Manerbino[1], W. G. Coors[1] and Neal P. Sullivan[2]; [1]R&D, CoorsTek, Golden, Colorado, United States; [2]Department of Mechanical Engineering, Colorado School of Mines, Golden, Colorado, United States.

K1.04
Proton Dissolution in $BaZr_{1-x}Y_xO_{3-\delta}$ Genki Imai[1], Takashi Nakamura[2] and Koji Amezawa[2]; [1]Graduate School of Engineering, Tohoku University, Sendai, Japan; [2]Institute of Multidisciplinary Research for Advanced Materials, Tohoku University, Sendai, Japan.

K1.05
Incorporation and Dissociation Behavior of Protons in $BaZrO_3$-Based Perovskite-Type Proton Conductors Tomohiro Ishiyama[1, 3], Haruo Kishimoto[1, 3], Katherine D. Bagarinao[1, 3], Katsuhiko Yamaji[1, 3], Toshiaki Yamaguchi[2, 3] and Yoshinobu Fujishiro[2, 3]; [1]Energy Technology Research Institute, National Institute of Advanced Industrial Science and Technology, Tsukuba, Japan; [2]Advanced Manufacturing Research Institute, National Institute of Advanced Industrial Science and Technology, Nagoya, Japan; [3]CREST, Japan Science and Technology Agency (JST), Saitama, Japan.

K1.06
First Principles Calculations of Carrier Trapping in Proton Conductive Acceptor-Doped $BaZrO_3$ Akihide Kuwabara, Craig A. Fisher and Hiroki Moriwake; Japan Fine Ceramics Center, Nagoya, Japan.

K1.07
Densification and Microstructural Evolution in NiO-Added $BaZr_{0.8}Y_{0.2}O_{3-\delta}$ Ceramics Young-Woo Ryu, Joon-Hyung Lee, Young-Woo Heo and Jeong-Joo Kim; School of Materials Science & Engineering, Kyungpook National University, Daegu, Korea (the Republic of).

K1.08
Dopant Concentration Dependence of Electrical Transport in Y-Doped $BaZrO_3$ Shogo Miyoshi, Ayano Ebara and Shu Yamaguchi; Department of Materials Engineering, The University of Tokyo, Tokyo, Japan.

K1.09
Proton Trapping: A Key to Control Proton Transport in Oxides Yoshihiro Yamazaki[1, 4], Yuji Okuyama[2], Jason Potticary[3], Kentaro Yamamoto[1] and Sossina M. Haile[3]; [1]Inamori Frontier Research Center, Kyushu University, Fukuoka, Japan; [2]Miyazaki University, Miyazaki, Japan; [3]California Institute of Technology, Pasadena, Colorado, United States; [4]Japan Science and Technology Agency, Kawaguchi, Japan.

K1.10
The Effect of Yttrium Source on the Microstructure and Hygroscopic Behavior of $BaCe_{0.8}Y_{0.2}O_{3-\delta}$ Using ZnO as Sintering Aid Elcio L. Pires; Materials Engineering, Federal University of São Carlos, São Carlos, Brazil.

K1.11 Withdrawn

K1.12
Investigation of $Ba_{1-x}Gd_{0.8}La_{0.2+x}Co_2O_{6-\delta}$ (X = 0 - 0.5) as Oxygen Electrode Material for Proton Conducting Fuel Cells and Electrolyzer Cells Ragnar Strandbakke, Einar Vollestad and Truls Norby; Department of Chemistry, University of Oslo, Oslo, Norway.

K1.13
Channel-Level Modeling of Protonic Ceramic Fuel Cells and Model Calibration Kevin J. Albrecht[1], Chuancheng Duan[2], Robert J. Braun[1] and Ryan P. O'Hayre[2]; [1]Mechanical Engineering, Colorado School of Mines, Golden, Colorado, United States; [2]Materials Science, Colorado School of Mines, Golden, Colorado, United States.

K1.14
Defect Entropies of $BaZrO_3$ from First Principles Phonon Calculations Tor S. Bjorheim[1], Eugene Kotomin[2] and Joachim Maier[2]; [1]FASE, Department of Chemistry, University of Oslo, Oslo, Norway; [2]Max Planck Institute for Solid State Research, Stuttgart, Germany.

K1.15
Effect of Al_2O_3 and Y_2O_3 Addition on Proton Conductivity of Electrochemically Proton Injected Phosphate Glasses Takuya Yamaguchi[1], Kanji Sakuragi[1], Takahisa Omata[1], Tomohiro Ishiyama[2], Junji Nishii[3], Toshiharu Yamashita[4], Hiroshi Kawazoe[4], Naoaki Kuwata[5] and Junichi Kawamura[5]; [1]Graduate School of Engineering, Osaka University, Suita, Japan;[2]National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba, Japan; [3]Research Institute for Electronic Science, Hokkaido University, Sapporo, Japan; [4]Kawazoe Frontier Technologies Corp., Yokohama, Japan; [5]Tohoku University, Sendai, Japan.

K1.16
Hydrogen Induced Rupture of Si-O Bonds in Amorphous Silicon Dioxide Al-Moatasem El-Sayed[1, 2], Matthew Watkins[1, 2], Tibor Grasser[3], Valery Afanas'ev[4] , Alexander Shluger[1,2] and David Gao[1]; [1]Department of Physics and Astronomy, University College London, London, United Kingdom; [2]London Centre for Nanotechnology, London, United Kingdom; [3]Institute for Microelectronics, Technische Universitat Wien, Vienna, Austria; [4]Department of Physics, University of Leuven, Leuven, Belgium.

K1.17
Defect Associations as a Potential Cause for Limiting Proton Concentrations in Acceptor Doped Oxides Andreas Loken, Tor S. Bjorheim and Reidar Haugsrud; Department of Chemistry, University of Oslo, Oslo, Norway.

ORAL PRESENTATIONS

TUESDAY June 16, 2015

PLENARY

SESSION L2: Plenary II
Chair: Harry Tuller
Tuesday Morning, June 16, 2015
Keystone Resorts, Shavano Peak

9:15 AM INTRODUCTION

9:25 AM L2.01
Insights into Proton Transport in Superprotonic Solid Acids Sossina M. Haile; Department of Materials Science and Engineering, Northwestern University, Evanston , Illinois, United States.

A: Solid Oxide Fuel Cells and Electrolyzers

* Invited Speaker
** Keynote Speaker

SESSION A4: SOFC—Cathodes III
A: Solid Oxide Fuel Cells and Electrolyzers
Chair: Harry Tuller
Tuesday Morning, June 16, 2015
Keystone Resorts, Longs Peak

10:10 AM BREAK

10:30 AM **A4.01
Measuring Oxygen Surface Exchange Kinetics on Mixed-Conducting Composites by Electrical Conductivity Relaxation Bobing Hu[2], Yunlong Wang[2], Zhuoying Zhu[2], Changrong Xia[2] and Henny J. Bouwmeester[1, 2]; [1]Department of Science and Technology, University of Twente, Enschede, Netherlands; [2]Department of Materials Science and Engineering, AS Key Laboratory of Materials for Energy Conversion, University of Science and Technology of China, Hefei, China.

11:00 AM A4.02
On the Link between Oxygen Surface Exchange and Bulk Oxygen Anion Transport in SOFC Cathode Material Alexander C. Tomkiewicz[1], Mazin A. Tamimi[1], Ashfia Huq[2] and Steven McIntosh[1]; [1]Chemical Engineering, Lehigh University, Bethlehem, Pennsylvania, United States; [2]Neutron Sciences, Oak Ridge National Laboratory, Oak Ridge, Tennessee, United States.

11:20 AM A4.03
Fast Tracer and Slow Electrical Kinetics of ^{18}O Exchange on Mixed Conducting Surfaces: A Combined Tracer and Impedance Study Andreas Nenning, Edvinas Navickas, Sandra Kogler, Katharina Langer-Hansel, Alexander K. Opitz and Jueürgen Fleig; Institute of Chemical Technologies and Analytics, Vienna University of Technology, Vienna, Austria.

11:40 AM *A4.04
Phase Decomposition and Secondary Phase Formation in the Chromium and Silicon Poisoned IT-SOFC Cathode Materials $La_{0.6}Sr_{0.4}CoO_{3-\delta}$ and $La_2NiO_{4+\delta}$ Edith Bucher[1], Nina Schroedl[1], Christian Gspan[2], Andreas Egger[1], Christian Ganser[3], Christian Teichert[3], Ferdinand Hofer[2] and Werner Sitte[1]; [1]Chair of Physical Chemistry, Montanuniversitaet Leoben, Leoben, Austria; [2]Institute for Electron Microscopy and Nanoanalysis (FELMI), Graz University of Technology & Graz Center for Electron Microscopy (ZFE), Austrian Cooperative Research (ACR), Graz, Austria; [3]Institute of Physics, Montanuniversitaet Leoben, Leoben, Austria.

SESSION A5: SOFC—Electrolytes I
A: Solid Oxide Fuel Cells and Electrolyzers
Chair: Koji Amezawa
Tuesday Afternoon, June 16, 2015
Keystone Resorts, Longs Peak

3:10 PM BREAK

3:30 PM *A5.01
Formation of $SrZrO_3$ in Perovskite Cathode /Ceria Interlayer / Zirconia Electrolyte during Operation of Solid Oxide Fuel Cells Koichi Eguchi, Toshiaki Matsui, Hiroki Muroyama, Masahiro Komoto, Kyosuke Kishida and Haruyuki Inui; Graduate School of Engineering, Kyoto University, Kyoto, Japan.

3:50 PM A5.02
Three-Dimensional Quantification of Composition and Space Charge Potential at Doped Ceria Grain Boundaries using Atom Probe Tomography David R. Diercks[1], Jianhua Tong[1], Huayang Zhu[2], Robert Kee[2], Juan C. Nino[3], Ryan O'Hayre[1] and Brian P. Gorman[1]; [1]Metallurgical and Materials Engineering, Colorado School of Mines, Golden, Colorado, United States; [2]Mechanical Engineering, Colorado School of Mines, Golden, Colorado, United States; [3]Materials Science and Engineering, University of Florida, Gainesville, Florida, United States.

4:10 PM A5.03
Evaluation of the Chemical Expansion Coefficient Using Modulated Dilatometry Shany Hershkovitz, Lea Halimi and Yoed Tsur; Chemical Engineering, Techion IIT-Israel Institute of Technology, Haifa, Israel.

4:30 PM A5.04
Dopant Segregation Effect on Ionic Conductivity of Nanocrystalline Gadolinium-Doped Ceria Thin Film Jiwoong Bae, Yonghyun Lim and Young-Beom Kim; Mechanical Convergence Engineering, Hanyang University, Seoul, Korea (the Republic of).

4:50 PM A5.05
A First-Principles Approach to the Attempt Frequency of Oxygen Ion Jumps in Doped Ceria Julius Koettgen, Tobias Zacherle, Steffen Grieshammer and Manfred Martin; Institute of Physical Chemistry, RWTH Aachen University, Aachen, Germany.

5:10 PM A5.06
Rare Earth Doped Bismuth Lead System Wojciech Wrobel[1], Anna Borowska-Centkowska[1], Marzena Leszczynska-Redek[1], Marcin Malys[1], Marcin Krynski[1], Franciszek Krok[1] and Isaac Abrahams[2]; [1]Faculty of Physics, Warsaw University of Technology, Warsaw, Poland; [2]Materials Research Institute, Queen Mary University of London, London, United Kingdom.

B: Polymer Electrolyte Fuel Cells and Electrolyzers

SESSION B1: PEMFC/DMFC I
B: Polymer Electrolyte Fuel Cells and Electrolyzers
Chair: Andrew Herring
Tuesday Afternoon, June 16, 2015
Keystone Resorts, Grays Peak III

1:30 PM *B1.01
Nanoscaled Structure of Nafion at Interfaces Joseph Dura[1], Steven DeCaluwe[2] and Paul Kienzle[1]; [1]NCNR, National Institute of Standards and Technology, Gaithersburg, Maryland, United States; [2]Mechanical Engineering, Colorado School of Mines, Golden, Colorado, United States.

1:50 PM B1.02
Interplay between Relaxations and Structure in Anion-Exchange Membranes (AEMs) Vito Di Noto[1, 2], Graeme Nawn[1], Keti Vezzu[1, 3], Federico Bertasi[1, 2], Enrico Negro[1, 2], Sandra Lavina[1, 2], Ashley Maes[4], Andrew Herring[4], Sedef Piril Ertem[5] and Bryan Coughlin[5]; [1]Chemical Sciences, University of Padova, Padova, Italy; [2]Consorzio Interuniversitario Nazionale per la Scienza e la Tecnologia dei Materiali, Padova, Italy; [3]Veneto Nanotech S.C.p.a., Padova, Italy; [4]Colorado School of Mines, Golden, Colorado, United States; [5]Department of Polymer Science and Engineering, University of Massachusetts, Amherst, Amherst, Massachusetts, United States.

2:10 PM B1.03
Anion Exchange Membranes for Fuel Cells and Flow Batteries: Quaternary Ammonium Group Stability and Transport Properties of a Model Membrane Michael G. Marino, Giorgi Titvinidze and Klaus-Dieter Kreuer; Maier, Max Planck Institute for Solid State Research, Stuttgart, Germany.

2:30 PM B1.04
Chemically Stable and Highly Conductive Alkaline Poly(phenylene oxide) Poly(vinyl benzyl trimethyl ammonium) Di-Block Membrane for Fuel Cell Applications Tara P. Pandey, Matthew W. Liberatore and Andrew M. Herring; Chemical and Biological Engineering, Colorado School of Mines, Golden, Colorado, United States.

2:50 PM *B1.05
Thermoreversible Gels – A New Route to Create Blocky Ionomer Membranes via Non-Random Functionalization Samantha Talley, Greg Fahs, Xijing Yuan, Sonya Benson and Robert Moore; Department of Chemistry, Virginia Tech, Blacksburg, Virginia, United States.

C: Electrodes and Solid Electrolytes for Batteries

SESSION C5: Metal-Air Batteries
C: Electrodes and Solid Electrolytes for Batteries
Chair: Yue Qi
Tuesday Morning, June 16, 2015
Keystone Resorts, Shavano Peak

10:10 AM BREAK

10:30 AM **C5.01
Aprotic Sodium (And Li)-Oxygen Batteries Chun Xia, Robert Black, Russel Fernandes, Dipan Kundu, Brian Adams and Linda Nazar; Department of Chemistry, University of Waterloo, Waterloo, Ontario, Canada.

11:00 AM *C5.02
Hybrid Lithium-Air Batteries: Inexpensive Catalysts and Novel Cell Designs Arumugam Manthiram, Longjun Li and Siyang Liu; Materials Science and Engineering, University of Texas at Austin, Austin, Texas, United States.

11:20 AM *C5.03
Ionic Transport Issue in Solid Lithium Air Batteries Hao Zheng[1], Dongdong Xiao[2], Jiayue Peng[1], Jie Huang[1], Degang Xie[3], Xin Li[4], Penghan Lu[3], Yuecun Wang[3], Hangyu Xu[1], Xianlong Wei[4], Qing Chen[4], Zhiwei Shan[3], Lin Gu[2] and Hong Li[1]; [1]Renewable Energy Laboratory, Institute of Physics, Chinese Academy of Sciences, Beijing, China; [2]Laboratory for Advanced Materials, Institute of Physics, Beijing, China; [3]State Key Laboratory for Mechanical Behavior of Materials, Xi'an Jiaotong University, Xi'an, China; [4]Key Laboratory for the Physics and Chemistry of Nanodevices, Peking University, Beijing, China.

11:40 AM C5.04
Inorganic-Organic Composite Membranes for Aqueous Li-Air Batteries Dorsasadat Safanama, Zhen Feng Yow, Hu Yan, Daniel H. Chua and Stefan Adams; Materials Science & Eng., National University of Singapore, Singapore, Singapore.

SESSION C6: Solid Electrolyte II
C: Electrodes and Solid Electrolytes for Batteries
Chair: Yan Yu
Tuesday Afternoon, June 16, 2015
Keystone Resorts, Shavano Peak

1:30 PM *C6.01
Confined-in-Ceramic Solid Polymer Electrolyte for Microbattery Application Diana Golodnitsky[1], Raymond Blanga[1], Yevgeny Rakita[2] and Amir Natan[2]; [1]School of Chemistry, Tel Aviv University, Tel Aviv, Israel; [2]Engineering Department, Tel Aviv University, Tel Aviv, Israel.

1:50 PM C6.02
Extremely Mobile Ions in Solid Electrolytes as Seen by NMR Martin Wilkening and Bernhard Stanje; Institute for Chemistry and Technology of Materials, Graz University of Technology, Graz, Austria.

2:10 PM C6.03
High Ionic Conductivity in the System $Na_{3+x}Sc_2(SiO_4)_x(PO_4)_{3-x}$ Marie Guin[1], Kaustubh Bhat[2], Frank Tietz[1] and Olivier Guillon[1, 3]; [1]Forschungszentrum Jülich GmbH, Institute of Energy and Climate Research (IEK-1), Jülich, Germany; [2]Forschungszentrum Jülich GmbH, Peter-Grünberg-Institute (PGI-1), Jülich, Germany; [3]Jülich Aachen Research Alliance, JARA-Energy, Aachen, Germany.

2:30 PM C6.04
Very High Li-Ion Conductivity in $Li_{1.5}Al_{0.5}Ti_{1.5}(PO_4)_3$ Prepared by a Novel Sol-Gel Method Qianli Ma[1, 2], Chih-Long Tsai[1, 2], Qi Xu[1, 2], Frank Tietz[1, 2] and Olivier Guillon[1, 2];[1]Forschungszentrum Jülich, Jülich, Germany; [2]Jülich Aachen Research Alliance, JARA-Energy, Jülich, Germany.

2:50 PM C6.05
Structural and Fast-Ion Conduction Properties of Solid Electrolytes within the Li_4SiO_4- Li_3PO_4 System Yue Deng[1], Chris Eames[2], Jean-Noël Chotard[1], Christian Masquelier[1] and Saiful Islam[2]; [1]Laboratoire de Réactivité et Chimie des Solides, Université de Picardie Jules Verne, Amiens, France; [2]Department of Chemistry, University of Bath, Bath, United Kingdom.

3:10 PM BREAK

3:30 PM C6.06
Investigation of Electrolyte-Electrolyte Interface in All-Solid-State Metal-Metal Battery Ruigang Zhang[1], Timothy S. Arthur[1], Donovan N. Leonard[2], Miaofang Chi[2] and Fuminori Mizuno[1]; [1]Toyota Technical Center, Ann Arbor, Michigan, United States; [2]Oak Ridge National Lab, Oak Ridge, Tennessee, United States.

3:50 PM C6.07
An All-Solid State NASICON Sodium Battery Operating at 200°C Fabien Lalere[1, 2], Jean-Bernard Leriche[1, 2], Mattieu Courty[1, 2], Sylvain Boulineau[1, 2], Virginie Viallet[1, 2], Christian Masquelier[1, 2] and Vincent Seznec[1, 2]; [1]Laboratoire de Réactivité et Chimie des Solides, Amiens, France; [2]Réseau de Stockage Electrochimique de l'Energie, Amiens, France.

4:10 PM C6.08
Assessment of Solid Electrolytes for All-Solid-State Lithium Batteries Philipp Braun, Moses Ender, Joerg Illig and Ellen Ivers-Tiffee; Institute for Applied Materials (IAM-WET), Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany.

4:30 PM C6.09
Solid Electrolytes in Batteries Dominik A. Weber[1], Stefan Berendts[2], Joachim Sann[1], Martin Busche[1], Sebastian Wenzel[1] and Juergen Janek[1]; [1]Physikalisch-Chemisches Institut, Justus-Liebig-Universität Gießen, Gießen, Germany; [2]Institut für Chemie, Technische Universität Berlin, Berlin, Germany.

4:50 PM C6.10
Safety Assessment of All-Solid-State Lithium-Ion Polymer Battery Using Forced Destruction System Yo Kobayashi, Kumi Shono, Takeshi Kobayashi and Hajime Miyashiro; Central Research Institute of Electric Power Industry, Tokyo, Japan.

C: Electrodes and Solid Electrolytes for Batteries

SESSION C7: Characterization of Nanoscale and Local Structures I
C: Electrodes and Solid Electrolytes for Batteries
Chair: Wei Lai
Tuesday Afternoon, June 16, 2015
Keystone Resorts, Quandary Peak I/II

3:30 PM C7.01
Soft X-Ray Absorption Spectroscopy Studies on $LiNi_{0.5}Mn_{1.5}O_4$ Spinel Ruimin Qiao[1], Jung-Hyun Kim[2], Nicholas P. Pieczonka[3], Andrew Wray[4] and Wanli Yang[1]; [1]Advanced Light Source, Lawrence Berkeley National Lab, Berkeley, California, United States; [2]Chemical & Materials Systems Laboratory, General Motors Global R&D Center, Warren, Michigan, United States; [3]Optimal CAE Inc, Plymouth, Michigan, United States; [4]Department of Physics, New York University, New York, New York, United States.

3:50 PM C7.02
Electronic Origin of the Step-Like Character of the Discharge Curve for Na_xCoO_{2-y} Cathode Janina Molenda; AGH University of Science and Technology, Krakow, Poland.

4:10 PM C7.03
In Situ TEM of Lithiation-Induced Displacement Reactions in Individual Copper Sulfide Nanocrystals Matthew McDowell[1] and Yi Cui[2]; [1]Chemistry and Chemical Engineering, California Institute of Technology, Pasadena, California, United States; [2]Materials Science and Engineering, Stanford University, Stanford, California, United States.

4:30 PM C7.04
Atomic-Scale Recognition of Structure and Intercalation Mechanism of MoS_2 and Ti_3C_2X Xuefeng Wang, Xi Shen, Yurui Gao, Zhaoxiang Wang, Richeng Yu and Liquan Chen; Institute of Physics, Chinese Academy of Sciences, Beijing, China.

4:50 PM C7.05
Phase Evolution in Single-Crystalline $LiFePo_4$ in a Micrometer-Sized Battery Followed by *In Situ* Scanning Transmission X-Ray Microscopy Nils Ohmer[1], Bernhard Fenk[1], Dominik Samuelis[1], Chia-Chin Chen[1], Joachim Maier[1], Markus Weigand[2], Eberhard Goering[2] and Gisela Schuetz[2]; [1]Max Planck Institute for Solid State Research, Stuttgart, Germany;[2]Max Planck Institute for Intelligent Systems, Stuttgart, Germany.

5:10 PM C7.06
Investigating Transient and Persistent Chemical Heterogeneity in $Li[Ni_{1/3}Co_{1/3}Mn_{1/3}]O_2$ Secondary Particles Using Transmission X-Ray Microscopy William Gent[1], Yiyang Li[1], Johanna Weker[2], Anna Wise[2], David Mueller[1] and William Chueh[1]; [1]Stanford University, Stanford, California, United States; [2]SLAC National Laboratory, Stanford, California, United States.

D: Fundamentals of Transport and Reactivity and Nanoionics

SESSION D4: Fundamentals of Transport and Reactivity and Nanoionics III
D: Fundamentals of Transport and Reactivity and Nanoionics
Chair: John Irvine
Tuesday Morning, June 16, 2015
Keystone Resorts, Grays Peak I/II

10:10 AM BREAK

10:30 AM **D4.01
Cathode Materials for Proton Conducting SOFC: Bulk Defect Chemistry and Mechanism of Oxygen Reduction Reaction Rotraut Merkle, Daniel Poetzsch and Joachim Maier; MPI for Solid State Research, Stuttgart, Germany.

11:00 AM D4.02
Oxygen Exchange and Transport in Mixed Conducting Dual Phase Composites John Druce[1], Helena Tellez[1], Tatsumi Ishihara[1] and John A. Kilner[1, 2]; [1]I2CNER, Kyushu University, Fukuoka, Japan; [2]Department of Materials, Imperial College London, London, United Kingdom.

11:20 AM D4.03
A Concept of Three Exchange Types in Oxygen Isotope Exchange Kinetic Analysis for Solid Oxide Materials Maxim Ananyev[1, 2]; [1]Laboratory of the Electrochemical Materials Science, Institute of High Temperature Electrochemistry, Ural Branch of Russian Academy of Sciences, Yekaterinburg, Russian Federation; [2]Institute of Chemical Technology, Ural Federal University, Yekaterinburg, Russian Federation.

11:40 AM D4.04
First Principles Calculations of Formation and Migration of Oxygen Vacancies in the Bulk and on Surface of Complex Perovskites for Solid Oxide Fuel Cell Cathodes Eugene Kotomin[1], Yuri Mastrikov[2], Rotraut Merkle[1], Maija Kuklja[3] and Joachim Maier[1]; [1]Dept.Phys.Chem., Max-Planck-Institute FKF, Stuttgart, Germany; [2]Institute for Solid State Physics, Riga, Latvia; [3]University of Maryland, College Park , Maryland, United States.

SESSION D5: Fundamentals of Transport and Reactivity and Nanoionics IV
D: Fundamentals of Transport and Reactivity and Nanoionics
Chairs: Rotraut Merkle and Truls Norby
Tuesday Afternoon, June 16, 2015
Keystone Resorts, Grays Peak I/II

1:30 PM *D5.01
An Extended Analysis of Dopant Strategies to Control Mixed Ion and Electron Transport in Ceria Based Oxide Solutions Jens-Peter Eufinger[2], Maximilian Daniels[1], Stefan Berendts[3], Kerstin Neuhaus[1], Sebastian Eickholt[1], Gregor Ulbrich[3], Aditya Maheshwari[1], Annika Buchheit[1], Juergen Janek[2], Martin Lerch[3] and Hans D. Wiemhoefer[1]; [1]Institute of Inorganic and Analytical Chemistry, Univ. Münster, Münster, Germany; [2]Physikalisch-Chemisches Institut, Univ. Giessen, Giessen, Germany; [3]Institute of Chemistry, Techn. Univ. Berlin, Berlin, Germany.

1:50 PM D5.02
Room Temperature Polarization Phenomena in Doped Ceria Kerstin Neuhaus[1], Gregor Ulbrich[2], Martin Lerch[2] and Hans-Dieter Wiemhöfer[1]; [1]Institute for Inorganic and Analytical Chemistry, University of Münster, Münster, Germany; [2]Institut für Chemie, Technische Universität Berlin, Berlin, Germany.

2:10 PM *D5.03
Microscopic Origin of Electrostriction in Gd-Doped Ceria and Prospects for Practical Applications in MEMS Roman Korobko[1], Eran Mishuk[1], Nimrod Yavo[1], Alyssa Lerner[2], Yuanyuan Li[2], Wachtel Wachtel[1], Anatoly Frenkel[2] and Igor Lubomirsky[1]; [1]Materials and Interfaces, Weizmann Institute of Science, Rehovot, Israel; [2]Physics Department, Yeshiva University, New York, New York, United States.

2:30 PM D5.04
An *In Situ* Optical Spectroscopic Study of Thermodynamics and Redox Kinetics of $Ce_{0.08}Y_{0.2}Zr_{0.72}O_{2-\delta}$ Jianmin Shi[1], Martin Lerch[2], Juergen Janek[3] and Klaus D. Becker[1];[1]Technische Universität Braunschweig, Braunschweig, Germany; [2]Technische Universität Berlin, Berlin, Germany; [3]Justus Liebig University Giessen, Giessen, Germany.

2:50 PM *D5.05
Effect of Chemomechanical Coupling on Defect Equilibrium and Transport in Solid State Ionic Devices Tatsuya Kawada, Yuta Kimura, Yuki Gonoi, Keiji Yashiro, Shin-ichi Hashimoto and Koji Amezawa; Tohoku University, Sendai, Japan.

3:10 PM BREAK

3:30 PM *D5.06
Electro-Chemo-Mechanics in Solid State Materials: Let`s Design the Structural-Defect Twists Jennifer L. Rupp; Electrochemical Materials, ETH Zurich, Zurich, Switzerland.

3:50 PM D5.07
Engineering Mixed Ionic Electronic Conduction in $La_{0.8}Sr_{0.2}MnO_{3+\delta}$ Nanostructures through Fast Grain Boundary Oxygen Diffusivity Aruppukottai Muruga Saranya[1], Dolors Pla[1], Alex Morata[1], Andrea Cavallaro[2], Jesus Canales-Vazquez[3], John A Kilner[2], Monica Burriel[1, 2] and Albert Tarancon[1]; [1]Catalonia Institute for Energy Research (IREC), Barcelona, Spain; [2]Imperial College London, London, United Kingdom; [3]Universidad Castilla la Mancha, Albacete, Spain.

4:10 PM D5.08
Oxidation Kinetics of Thin Metal Films & Diffusion in NiO Yeliz Unutulmazsoy, Rotraut Merkle, Joachim Maier and Jochen Mannhart; Max Planck Institute for Solid State Research, Stuttgart, Germany.

4:30 PM D5.09
H^- Ionic Conduction in Alkaline Hydrides John T. Irvine[1], George Carins[1], Maarten Verbaeken[1] and Martin Owen Jones[2]; [1]School of Chemistry, University of St Andrews, St Andrews, United Kingdom; [2]STFC, Didcot, United Kingdom.

4:50 PM D5.10
Modeling a Surface-Mediated Spinodal in Doped Mixed Conducting Perovskites David S. Mebane; Mechanical and Aerospace Engineering, West Virginia University, Morgantown, West Virginia, United States.

E: Transparent Conducting Oxides

SESSION E3: TCO 2—Materials, Processing, and Structures
E: Transparent Conducting Oxides
Chair: David Ginley
Tuesday Morning, June 16, 2015
Keystone Resorts, Quandary Peak I/II

10:10 AM BREAK

10:30 AM **E3.01
Material Design of Novel Transparent Oxide Conductors/ Semiconductors Hideo Hosono; Tokyo Institute of Technology, Yokohama, Japan.

11:00 AM E3.02
Effect of Phase Transition on Electronic Defects of Ni-Co Oxide and Its Application on Optoelectronics Shu-Yi Tsai[3, 1], Kuan-Zong Fung[1, 3], H.-Y. Bor[2] and C.-N. Wei[2]; [1]Materials Science and Engineering, National Cheng Kung University, Tainan City, Taiwan; [2]Chung-Shan Institute of Science and Technology(CSIST), Taoyuan County, Taiwan; [3]Research Center for Energy Technology and Strategy, National Cheng Kung University, Tainan City, Taiwan.

11:20 AM E3.03
Effect of Precursor Solvent on the Nature of Spin Coated 1at%Ga-ZnO Transparent Conducting Films Amit K. Srivastava and Jitendra Kumar; Materials Science, I I T Kanpur, Kanpur, India.

11:40 AM E3.04
Transparent and Conductive Coatings with Nanoparticulate Magnetic Additives Gesa Beck[1], Stephan Barcikowski[2], Bilal Goekce[2], Maja Jelic[1] and Martin Kirsch[3]; [1]Physics, Chair of Resource Strategies, Augsburg, Germany; [2]Technical Chemistry I , University of Duisburg-Essen and Center for Nanointegration Duisburg-Essen (CENIDE) , Essen, Germany; [3]Fa. Kirsch Kunststofftechnik GmbH, Ebersbach, Germany.

G: Switching and Sensing Phenomena

SESSION G1: Switching and Sensing Phenomena I
G: Switching and Sensing Phenomena
Chairs: Jennifer Rupp and Shu Yamaguchi
Tuesday Morning, June 16, 2015
Keystone Resorts, Grays Peak III

10:10 AM BREAK

10:30 AM **G1.01
Bulk Mixed Ion Electron Conduction in Highly Disordered Oxides Causes Memristive Behavior Manfred Martin[1, 2]; [1]Institute of Physical Chemistry, RWTH Aachen University, Aachen, Germany; [2]Department of Materials Science and Engineering, Seoul National University, Seoul, Korea (the Republic of).

11:00 AM *G1.02
Dislocations in $SrTiO_3$: Easy to Reduce but not so Fast for Oxygen Transport Dario Marrocchelli, Lixin Sun and Bilge Yildiz; Nuclear Science & Engineering, Massachusetts Institute of technology, Cambridge, Massachusetts, United States.

11:20 AM G1.03
Electroforming in Valence Change Memories Based on Mixed Ionic Electronic Conductors Dima Kalaev[1], Eilam Yalon[2] and Ilan Riess[1]; [1]Physics, Israel Institute of Technology, Haifa, Israel; [2]Microelectronics Research Center, Technion – Israel Institute of Technology, Haifa, Israel.

11:40 AM G1.04
Field-Enhanced Bulk Conductivity and Resistive-Switching in Ca-Doped $BiFeO_3$ Ceramics Nahum Maso[1, 2] and Anthony R. West[2]; [1]Chemistry, University of Oslo, Oslo, Norway;[2]Materials Science and Engineering, University of Sheffield, Sheffield, United Kingdom.

SESSION G2: Switching and Sensing Phenomena II
G: Switching and Sensing Phenomena
Chairs: Jennifer Rupp and Shu Yamaguchi
Tuesday Afternoon, June 16, 2015
Keystone Resorts, Grays Peak III

3:10 PM BREAK

3:30 PM *G2.01
Various Functional Nano-Ionic Devices Achieved by Controlling Hetero-Interface Characteristics using Local Ion Migration Kazuya Terabe, Takashi Tsuchiya and Masakazu Aono; MANA, National Institute for Materials Science, Tsukuba, Japan.

3:50 PM *G2.02
Ionic Switching Devices: Operation Principle and Application in Computing Daniele Ielmini; Politecnico di Milano, Milano, Italy.

4:10 PM *G2.03
$La_{0.8}Sr_{0.2}(Mn,Co)O_3$ Perovskite Oxides as Resistive Switches: Influence of B-Site Substitution on the Resistive Switching Properties Monica Burriel[1, 2], Rafael Schmitt [3], Aruppukottai Muruga Saranya[2], Alex Morata[2], Aitor Hornes[2], Sebastian Schweiger[3], Michel Bourdard[1], Jennifer L. M. Rupp[3] and Albert Tarancon[2]; [1] Laboratoire des Matériaux et du Génie Physique (LMGP), Grenoble, France; [2]Catalonia Institute for Energy Research-IREC, Barcelona, Spain; [3]ETH Zurich, Zurich, Switzerland.

4:30 PM G2.04
STM Investigations of Resistive Switching on Binary Metal Oxides and Chalcogenides Anja Wedig[1], Marco Moors[1], Tsuyoshi Hasegawa[2], Masakazu Aono[2], Rainer Waser[1, 3] and Ilia Valov[1, 3]; [1]Electronic Materials, Juelich Research Center, Juelich, Germany; [2]International Center for Materials Nanoarchitectonics, National Institute for Materials Science, Tsukuba, Japan; [3]Institute for Materials in Electrical Engineering II, RWTH Aachen University, Aachen, Germany.

4:50 PM G2.05
Strained Heterolayers as Resistive Switching Oxide: Materials and Devices Sebastian Schweiger, Reto Pfenninger and Jennifer L. Rupp; Materials, ETH Zurich, Zurich, Switzerland.

5:10 PM G2.06
Sensing Nitrogen Oxides and Ammonia with Porous Electrolyte Devices Fernando Garzon[1], Eric Brosha[2], Cortney Kreller[2] and Rangachary (Mukund) Mukundan[2]; [1]Chemical and Biological Engineering, University of New Mexico, Albuquerque, New Mexico, United States; [2]Materials Physics and Applications, Los Alamos National Laboratory, Los Alamos, New Mexico, United States.

5:30 PM G2.07
Single Crystalline $SrTiO_3$ as a Memristive Model System: Roles of Oxygen Vacancies and Schottky Barrier, and Neural Function Mimicking Xin Guo; Materials Science and Engineering, Huazhong University of Science and Technology, Wuhan, China.

K: Proton-Conducting Oxides

SESSION K2: Protonic Oxides I
K: Proton-Conducting Oxides
Chairs: Truls Norby and Yoshihiro Yamazaki
Tuesday Afternoon, June 16, 2015
Keystone Resorts, Longs Peak

1:30 PM **K2.01
Protonic Conduction in Perovskites: NMR and DFT Studies of Yttrium-Doped $BaZrO_3$ and Related Perovskites Luke Sperrin[1], Riza Dervisoglu[1], Lucienne Buannic[1], Frederic Blanc[2] and Clare Grey[1]; [1]Department of Chemistry, University of Cambridge, Cambridge, United Kingdom; [2]Department of Chemistry, University of Liverpool, Liverpool, United Kingdom.

2:00 PM K2.02
Local Structural Analysis of Sc-Doped $BaZrO_3$ Using Electric-Field Gradient at Sc Site Itaru Oikawa and Hitoshi Takamura; Department of Materials Science, Tohoku University, Sendai, Japan.

2:20 PM *K2.03
Variation of Kinetic Parameters, Chemical Diffusivity and Surface Exchange Coefficient of $Ba(Zr_{0.84}Y_{0.15}Cu_{0.01})O_{3-\delta}$ during the Conductivity Relaxation Experiments Jong-Ho Lee, Sung Min Choi, Moon-Bong Choi, Jongsup Hong, Hyoungchul Kim, Kyung Joong Yoon, Ji-Won Son and Byung-Kook Kim; High-Temperature Energy Materials Research Center, Korea Institute of Science and Technology, Seoul, Korea (the Republic of).

2:40 PM K2.04
The Influence of Dopant Levels on the Hydration Properties of SZCY and BZCY Proton Conducting Ceramics for Hydrogen Production Kwati Leonard[1], Yuji Okuyama[4], Young-Sung Lee[1] and Hiroshige Matsumoto[1, 2, 3]; [1]International Institute for Carbon-Neutral Energy Research (I2CNER-WPI), Kyushu University, Fukuoka, Japan; [2]INAMORI Frontier Research Center (IFRC), Kyushu University, Fukuoka , Japan; [3]Next Generation Fuel cell Research Center (NEXT-FC), Kyushu University, Fukuoka, Japan; [4] Organization for the Promotion of Tenure Track, University of Miyazaki, Miyazaki, Japan.

3rd ISSI Young Scientist Award

SESSION: 3rd ISSI Young Scientist Award
ISSI Young Scientist
Tuesday Afternoon, June 16, 2015
Keystone Resorts, Quandary Peak I/II

To recognize the outstanding contributions made by young scientists to the field of solid state ionics, the International Society of Solid-State Ionics established the ISSI Young Scientist Award. This year, six young scientists will be awarded. Don't miss the award recipients' talks from 1:30pm - 3:10pm in Quandary Peak I/II.

POSTER PRESENTATIONS

TUESDAY June 16, 2015

SESSION A6: Poster Session II
A: Solid Oxide Fuel Cells and Electrolyzers
Tuesday Afternoon, June 16, 2015
5:20 PM
Keystone Resorts, Red Cloud Peak

A6.01
Thermal Stability and Compatibility with SOFC/PCFC Electrolyte of $La_4BaCu_5O_{13+\delta}$ and $La_{6.4}Sr_{1.6}Cu_8O_{20\pm\delta}$ Perovskite Monica V. Sandoval[1, 2], Giovanny Martinez[1], Santiago Vasquez-Cuadriello[3], Mario A. Macias[1], Leopoldo Suescun[3], Pascal Roussel[2] and Gilles H. Gauthier[1]; [1]Grupo INTERFASE, Universidad Industrial de Santander, Bucaramanga, Colombia;[2]Unité de Catalyse et de Chimie du Solide, Université Lille 1, Lille, France; [3]Facultad de Química - Cryssmat-Lab/DETEMA , Universidad de la República, Montevideo, Uruguay.

A6.02
Electrochemical Studies of $GdPrBaCo_2O_{5+\delta}$ and $GdPrBaCoFeO_{5+\delta}$ Cathodes for Oxide Ion and Proton Conducting Solid Oxide Fuel Cells Kalpana Singh, Ashok Baral and Venkataraman Thangadurai; Department of Chemistry, University of Calgary, Calgary, Alberta, Canada.

A6.03
Development of the Composite Electrodes for the New $CaZr_{0.95}Sc_{0.05}O_{3-\delta}$ Proton-Conducting Electrolyte Elena Pikalova[1, 2], Nina Bogdanovich[1], Alexander Kolchugin[1], Dimitry Bronin[1, 3], Anton Kuz'min[1] and Azat Khasanov[3]; [1]Institute of High Temperature Electrochemistry UB RAS, Ekaterinburg, Russian Federation; [2]Department of Environmental Economics, Ural Federal University, Ekaterinburg, Russian Federation; [3]Institute of Natural Sciences, Department of Chemistry, Ural Federal University, Ekaterinburg, Russian Federation.

A6.04
A Layered Perovskite Oxide $PrBaCo_2O_{5+\delta}$ as Cathode for Highly Stable $BaCe_{0.1}Zr_{0.8}Y_{0.1}O_{3-\delta}$ Based Protonic Ceramic Fuel Cells (PCFCs) Hanping Ding and Neal P. Sullivan; Mechanical Engineering, Colorado School of Mines, Golden, Colorado, United States.

A6.05
Steam Electrode Development for BCZY Based High Temperature Protonic Electrolysers Nuria Bausa, Cecilia Solís, Sonia Escolastico and Jose M. Serra; Instituto de Tecnología Química (UPV-CSIC), Valencia, Spain.

A6.06
Atomic Layer Deposition of Dense Nano-Thin Platinum Films for Low-Temperature Solid Oxide Fuel Cells Sanghoon Ji[1], Taehyun Park[2], Gu Young Cho[2], Waqas H. Tanveer[2], Wonjong Yu[2] and Suk Won Cha[2]; [1]Graduate School of Convergence Science and Technology, Seoul National University, Seoul, Korea (the Republic of); [2]Department of Mechanical Engineering, Seoul National University, Seoul, Korea (the Republic of).

A6.07
Development of Low Temperature Operating Micro-SOFC System for Mobile Electronic Devices Shoya Murayama, Fumitada Iguchi, Makoto Shimizu and Hiroo Yugami; Graduate School of Engineering, Tohoku University, Sendai, Japan.

A6.08
$Ba_{0.95}La_{0.05}FeO_{3-\delta}$-Graphene as a Low-Cost and Synergistic Catalyst for Oxygen Evolution Reaction Mattia Saccoccio[1], Hong Zhao[1], Chi Chen[1], Dengjie Chen[1], Jian Wang[1], Yang Gao[1], Hei Ting Wan[1] and Francesco Ciucci[1, 2]; [1]Department of Mechanical and Aerospace Engineering, The Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong; [2]Department of Chemical and Biomolecular Engineering, The Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong.

A6.09
Investigation of Low Temperature Operation of Fe-Air Battery Using YSZ Electrolyte Takaaki Sakai[1, 2], Masako Ogushi[2], Atsushi Inoishi[3], Shintaro Ida[2] and Tatsumi Ishihara[2];[1]Center for Molecular Systems, Kyushu University, Fukuoka, Japan; [2]Department of Applied Chemistry, Faculty of Engineering, Kyushu University , Fukuoka, Japan; [3]Research and Education Center for Advanced Energy Materials, Devices, and Systems, Kyushu University, Fukuoka, Japan.

A6.10
Improving the Material Efficiency or Substitution of Platinum in the System Pt/YSZ Gesa Beck[1] and Christoph Bachmann[2]; [1]Physics, Chair of Resource Strategies, Augsburg, Germany; [2]Institute of Physical Chemistry, Justus-Liebig-University, Giessen, Germany.

A6.11
Conductivity and Structure of Sub-Micrometric $SrTiO_3$ -YSZ Composites Enrique Ruiz-Trejo[1], Nikolaos Bonanos[2], Karl Thyden[2] and Mogens Mogensen[2]; [1]Earth Science and Engineering, Imperial College London, London, United Kingdom; [2]Department of Energy Conversion and Storage, Technical University of Denmark, Roskilde, Denmark.

A6.12
Microstructure and Electrochemical Properties of CeO2-Based Cathodes for SOEC Application Wenqiang Zhang, Bo Yu and Jingming Xu; Tsinghua University, Beijing, China.

A6.13
Structural, Electrical and Electrochemical Properties of Calcium-Doped Lanthanum Nickelate Alexandr Kolchugin[1], Elena Pikalova[1, 3], Nina Bogdanovich[1], Dimitry Bronin[1], Sergey Pikalov[2] and Irina Nikolaenko[4]; [1]Institute of High Temperature Electrochemistry UB RAS, Ekaterinburg, Russian Federation; [2]Institute of Metallurgy UB RAS, Ekaterinburg, Russian Federation; [3]Department of Environmental Economics, Ural Federal University, Ekaterinburg, Russian Federation; [4]Institute of Solid State Chemistry UB RAS, Ekaterinburg, Russian Federation.

A6.14
Defect Structure and Related Properties of $YBaCo_2O_{6-\delta}$ Dmitry S. Tsvetkov, Anton L. Sednev, Ivan L. Ivanov, Dmitry A. Malyshkin and Andrey Y. Zuev; Department of Chemistry, Ural Federal University, Ekaterinburg, Russian Federation.

A6.15
Synthesis and Study of the Ordered Double Perovskite $NdBaMn_2O_{5+d}$ to be Used as Symmetric SOFC Electrode Material Gilles H. Gauthier[2], Konrad Swierczek[1], Pascal Roussel[3], Oscar L. Pineda[2, 1] and Zulma L. Moreno[2]; [1]AGH University of Science and Technology, Cracow, Poland; [2]Grupo INTERFASE, Universidad Industrial de Santander, Bucaramanga, Colombia; [3]Université Lille 1, Université Lille Nord de France, Lille, France.

A6.16 Withdrawn

A6.17
TOF-SIMS Characterization of Impurity Enrichment and Redistribution in Solid Oxide Electrolysis Cells during Operation Ragnar Kiebach, Kion Norrman, Ming Chen and Peter V. Hendriksen; DTU, Roskilde, Denmark.

A6.18
Role of Gadolinia-Doped Ceria Interlayer Microstructure and Orientation on the Cation Diffusion Behavior in LSCF/GDC/YSZ Model Heterostructures Jeffrey C. De Vero[1], Katherine D. Bagarinao[1], Do-Hyung Cho[1], Haruo Kishimoto[1], Katsuhiko Yamaji[1], Teruhisa Horita[1] and Harumi Yokokawa[1, 2]; [1]National Institute of Advanced Industrial Science and Technology, Tsukuba, Japan; [2]Institute of Industrial Science, University of Tokyo, Tokyo, Japan.

A6.19
The Utility of Model Electrodes for the Separation of Current Pathways in Solid State Electrochemistry Alexander K. Opitz, Markus Kubicek, Stefanie Taibl, Tobias Huber, Gerald Holzlechner, Herbert Hutter and Juergen Fleig; Institute of Chemical Technologies and Analytics, Vienna University of Technology, Vienna, Austria.

A6.20
Rapid Measurement of Chemical Diffusion in Oxide Thin Films by Color Front Motion Tracking Jae Jin Kim[1], Stuart N. Cook[1], Di Chen[1], Sean R. Bishop[1] and Harry L. Tuller[1, 2];[1]Materials Science and Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts, United States; [2]International Institute for Carbon-Neutral Energy Research (WPI-I2CNER), Kyushu University, Fukuoka, Japan.

A6.21
TraceX: Isotope Exchange Data Analysis, Back-Diffusion Simulation and Profile Fitting Samuel J. Cooper, Mathew Niania and John A. Kilner; Department of Materials, Imperial College London, London, United Kingdom.

A6.22
Impedance Spectroscopy Analysis Inspired by Evolutionary Programming as a Diagnostic Tool for SOEC Zohar Drach[1], Shany Hershkovitz[1], Domenico Ferrero[2], Andrea Lanzini[2], Massimo Santarelli[2] and Yoed Tsur; [1]Department of Chemical Engineering, Technion Israel Institute of Technology, Haifa, Israel; [2]Department of Energy (DENERG), Politchnico di Torino, Corso Duca degli Abruzzi, Turin, Italy.

A6.23
Long-Term Degradation of $La_{0.6}Sr_{0.4}Co_{0.2}Fe_{0.8}O_{3-\delta}$ IT-SOFC Cathodes due to Silicon Poisoning Martin Perz[1], Edith Bucher[1], Christian Gspan[2, 3], Joerg Waldhaeusl[1], Ferdinand Hofer[2, 3] and Werner Sitte[1]; [1]Chair of Physical Chemistry, Montanuniversitaet Leoben, Leoben, Austria; [2]Institute for Electron Microscopy and Nanoanalysis (FELMI), Graz University of Technology, Graz, Austria; [3]Graz Center for Electron Microscopy (ZFE), Austrian Cooperative Research (ACR), Graz, Austria.

A6.24 Withdrawn
Degradation Mechanisms of Cathode Materials for Intermediate

A6.25
Transmission Electron Microscopy Study of Cr Poisoning of LSCF Cathodes Na Ni and Stephen Skinner; Materials, Imperial College London, London, United Kingdom.

A6.26
Effects of Chemical and Interfacial Strain on the Transport and Mechanical Properties of $PrCoO_3$ Mabel Lew, Stevin Pramana, Andrea Cavallaro, Ji Wu and Stephen Skinner; Materials, Imperial College London, Kingston, United Kingdom.

A6.27
Electrical Properties of LSM-$Bi_3Y_{0.9}W_{0.1}O_{6.15}$ Composite Solid Membranes Marcin Malys[1], Wojciech Wrobel[1], Marcin Dudz[1], Marzena Leszczynska-Redek[1], Anna Borowska-Cenkowska[1], Maciej Wojcik[1], Kuan-Zong Fung[2], Isaac Abrahams[3] and Franciszek Krok[1]; [1]Faculty of Physics, Warsaw University of Technology, Warszawa, Poland; [2]Material Science and Engineering, National Cheng Kung University, Tainan, Taiwan; [3]Materials Research Institute, Queen Mary University of London, London, United Kingdom.

A6.28
Optimization of Pr_2CuO_4-$Ce_{0.9}Gd_{0.1}O_{1.95}$ Composite Cathode for SOFC Application Liudmila Kolchina[1], Nikolay Lyskov[2] and Galina Mazo[1]; [1]Chemistry Department, Lomonosov Moscow State University, Moscow, Russian Federation; [2]Institute of Problems of Chemical Physics RAS, Chernogolovka, Russian Federation.

A6.29
Optimized PBCO-PCO-CGO Cathode for IT-SOFC Samir Boulfrad[1], Stevin Pramana[2], Mabel Lew[2], Udo Schwingenschloegl[1], Enrico Traversa[1] and Stephen Skinner[2]; [1]Physical Sciences and Engineering, King Abdullah University of Science and Technology (KAUST), Thuwal, Saudi Arabia; [2]Department of Materials , Imperial College London, London, United Kingdom.

A6.30
Optimization of $Ba_2Co_9O_{14}$ as an Innovative SOFC's Cathode Material Ibtissam Kehal, Marie-Helene Chambrier, Aurelie Rolle, Sylvie Daviero-Minaud, Rose-Noelle Vannier and Xavier Flandre; Unité de Catalyse et de Chimie du Solide, Université Lille, Villeneuve d'Ascq, France.

A6.31
Electrochemical Characterization of B-Site Cation-Excess $Pr_2Ni_{0.75}Cu_{0.25}Ga_{0.05}O_{4+\delta}$ Cathode for IT-SOFCs Yuan Ji and Xiangwei Meng; Jilin University, Changchun, China.

A6.32
$SrCo_{1-x}Mo_xO_{3-\delta}$ Pervoskites as Cathode Materials for $LaGaO_3$-Based Intermediate-Temperature Solid Oxide Fuel Cells Rui Wang, Fangjun Jin and Tianmin He; College of Physics, Jilin University, Changchun, China.

A6.33
Tailoring of the Chemical Stability of (Ba,Sr)(Co,Fe)O_3-Based Perovskite Mixed Conductors Fang Wang[1], Koki Igarashi[2], Takashi Nakamura[1], Keiji Yashiro[3], Junichiro Mizusaki[1]and Koji Amezawa[1]; [1]Institute of Multidisciplinary Research for Advanced Materials, Tohoku University, Sendai, Japan; [2]Graduate School of Engineering, Tohoku University, Sendai, Japan; [3]Graduate School of Environmental Studies, Tohoku University, Sendai, Japan.

A6.34
$NdBa_{1-x}Co_2O_{5+\delta}$ as Cathode Materials for Intermediate Temperature Solid Oxide Fuel Cell Jialing Sun[1, 2], Xiaomei Liu[1], Lili Zhu[1], Fei Han[1], Hailin Bi[1], Haopeng Wang[1], Shenglong Yu[1] and Li Pei[1]; [1]Key Laboratory of Physics and Technology for Advanced Batteries,Physics Department, Jilin University, Changchun, China; [2]Beihua University, Jilin, China.

A6.35
Effect of Thermal Reduction on Electrical Properties of Protecting Oxides for SOFC Interconnect Applications Kuan-Zong Fung[1, 3], Shu-Yi Tsai[1] and Chung-Ta Ni[2]; [1]Materials Science and Engineering, National Cheng Kung University, Tainan City, Taiwan; [3]Research Center for Energy Technology and Strategy, National Cheng Kung University, Tainan City, Taiwan.

A6.36 moved A9.07

A6.37
Deconvolution of Four Transmission-Line-Model Impedances in Ni-YSZ/YSZ/LSM Solid Oxide Cells and Mechanistic Insights Eui-Chol Shin, Jianjun Ma, Pyung-An Ahn, Hyun-Ho Seo, Dang-Thanh Nguyen and Jong-Sook Lee; Materials Science and Engineering, Chonnam National University, Gwang-Ju, Korea (the Republic of).

A6.38
The Electrolyte Spreading Resistance - More than a Resistive Offset Andreas Nenning, Michael Doppler and Juergen Fleig; Institute of Chemical Technologies and Analytics, Vienna University of Technology, Vienna, Austria.

A6.39
Electrical Characterization of the Active Cathode Area in Solid Oxide Fuel Cells Tzvia Radlauer[1], Sioma Baltianski[2], Ilan Riess[3] and Yoed Tsur[2]; [1]Energy Engineering, Technion, Haifa, Israel; [2]Chemical Engineering, Technion, Haifa, Israel; [3]Physics, Technion, Haifa, Israel.

A6.40
Electronic Conductivity in Yttria-Stabilised Zirconia under a Small *dc* Bias Nahum Maso[1, 2] and Anthony R. West[2]; [1]Chemistry, University of Oslo, Oslo, Norway; [2]Materials Science and Engineering, The University of Sheffield, Sheffield, United Kingdom.

A6.41
Impedance Study on LSGM Single Crystals Ghislain M. Rupp[1], Michal Glowacki[2] and Juergen Fleig[1]; [1]Institute of Chemical Technologies and Analytics - Electrochemistry, Vienna University of Technology, Vienna, Austria; [2]Institute of Physics, Polish Academy of Sciences, Warsaw, Poland.

A6.42 WITHDRAWN

A6.43
Synthesis and Study of Solid Electrolytes $Nd_{5-X}Ln_XMo_3O_{16}$ (Ln = Sm, Eu, Gd) Lyudmyla I. Stackpool[1], Konstantin Chebyshev[2] and Lyudmila Pasechnik[2]; [1]Chemistry and Geology, Minnesota State University, Mankato, Mankato, Minnesota, United States; [2]Department of Inorganic Chemistry, Donetsk National University, Donetsk, Ukraine.

A6.44
Modification of Surface Oxide of Porous Fe-Cr-Al Alloy by Coating and Heat-Treatment for the Application of Metal Supported SOFCs Hung-Cuong Pham[1], Shunsuke Taniguchi[2,3,4], Yuko Inoue[4], Jyh-Tyng Chou[5], Toru Izumi[6], Koji Matsuoka[6] and Kazunari Sasaki[1, 2, 7]; [1]Hydrogen Energy Systems, Kyushu University, Fukuoka, Japan; [2]International Research Center for Hydrogen Energy, Kyushu University, Fukuoka, Japan; [3]Center for Co-evolutional Social Systems, Kyushu University, Fukuoka, Japan; [4]Next-Generation Fuel Cell Research Center (NEXT-FC), Kyushu University, Fukuoka, Japan; [5]Kurume National College of Technology, Fukuoka, Japan; [6]JX Nippon Oil and Energy Corporation, Yokohama, Japan;[7]International Inst, for Carbon Neutral Energy Research (WPI-I2CNER), Kyushu University, Fukuoka, Japan.

A6.45
Crystal Structure of $R_{10}Mo_6O_{33}$ (R = Nd, Pr) from 3 K to 973 K by Neutron Powder Diffraction Yoshihisa Ishikawa[1, 2], Sergey A. Danilkin[3], Maxim Avdeev[3], Valentina I. Voronkova[4] and Takashi Sakuma[2]; [1]Institute of Materials Structure Science, High Energy Accelerator Research Organization, Tokai, Japan; [2]Institute of Applied Beam Science, Ibaraki University, Mito, Japan; [3]Bragg Institute, Australian Nuclear Science and Technology Organization, Kirrawee, New South Wales, Australia; [4]Moscow State University, Leninskie Gory, Russian Federation.

A6.46
Long-Time Testing of Ni-YSZ Substrates under Operating Conditions Denis Osinkin[1], Dimitry Bronin[1, 2], Robert Steinberger-Wilckens[3], L.G.J. de Haart[4] and Josef Mertens[4];[1]Laboratory of SOFC, Institution of High Temperature Electrochemistry, Yekaterinburg, Russian Federation; [2]Ural Federal University, Yekaterinburg,, Russian Federation; [3]University of Birmingham, Birmingham, United Kingdom; [4]Institute of Energy and Climate Research, Fundamental Electrochemistry (IEK-9) Forschungszentrum Jülich GmbH, Jülich, Germany.

A6.47
Carbon Deposition and Sulfur Poisoning in Mo-Containing Anode Materials for SOFCs Studied in CO and CH_4 Fuels Kun Zheng and Konrad Swierczek; AGH University of Science and Technology, Faculty of Energy and Fuels, Kraków, Poland.

A6.48
Model-Composite Electrodes as a Tool to Evaluate Alternative SOFC Anode Materials and Their Sulphur Poisoning Behaviour Matthias Gerstl[2], Michael Doppler[1], Marco Brandner[3], Martin Bram[4], Juergen Fleig[1] and Alexander K. Opitz[1]; [1]Electrochemistry, Vienna University of Technology, Wien, Austria; [2]Electrochemistry, Vienna University of Technology, Vienna, Austria; [3]Innovation Services, Plansee SE, Reutte, Austria; [4]Institute of Energy and Climate Research, Forschungszentrum Juelich GmbH, Juelich, Germany.

A6.49
Electrical Conductivity and Redox Behavior of Donor and Acceptor Co-Substituted $SrTiO_3$ as Fuel Electrode Material Aleksey Yaremchenko, Javier Macias and Jorge Frade; CICECO, Department of Materials and Ceramic Engineering, University of Aveiro, Aveiro, Portugal.

A6.50
Chemical Compatibility of Doped Yttrium Chromite and Ceria Composite Anode with YSZ Electrolyte Kang Yan[1], Haruo Kishimoto[1], Katherine D. Bagarinao[1], Katsuhiko Yamaji[1], Teruhisa Horita[1] and Harumi Yokokawa[1, 2]; [1]National Institute of Advanced Industrial Science and Technology, Tsukaba, Japan; [2]the University of Tokyo, Tokyo, Japan.

A6.51
In Search for Alternative Ceramic Components for SOFC Anodes: $SrVO_3$-$SrTiO_3$ Solid Solutions Javier Macias, Aleksey Yaremchenko and Jorge Frade; Department of Materials and Ceramic Engineering, University of Aveiro, Aveiro, Portugal.

A6.52
Electrochemically Modified, Robust Solid Oxide Fuel Cell Anode for Direct-Hydrocarbon Utilization Yoonseok Choi and WooChul Jung; Materials Science and Engineering, Korea Advanced Institute of Science and Technology, Daejeon, Korea (the Republic of).

A6.53
Effect of Fuel Thermal Pretreatment on the Electrochemical Performance of a Direct Lignite Coal Fuel Cell Nikolaos Kaklidis[1], Vasileios Kyriakou[3, 2], George Marnellos[1, 2], Ana Arenillas[4] and Michalis Konsolakis[5]; [1]Department of Mechanical Engineering, University of Western Macedonia, Kozani, Greece; [2]Chemical Process & Energy Resources Institute, Centre for Research & Technology Hellas, Thessaloniki, Greece; [3]Department of Chemical Engineering, Aristotle University of Thessaloniki, Thessaloniki, Greece; [4]Instituto Nacional del Carbon, Oviedo, Spain; [5]School of Production Engineering and Management, Technical University of Crete, Chania, Greece.

SESSION B2: Poster Session: PEMFC/DMFC
B: Polymer Electrolyte Fuel Cells and Electrolyzers
Tuesday Afternoon, June 16, 2015
5:20 PM
Keystone Resorts, Red Cloud Peak

B2.01
Synthesis and Characterization of Water Stable, Silicotungstic Acid Functionalized Perfluorocyclobutyl Polymer Electrolyte Andrew R. Motz, Mei-Chen Kuo and Andrew M. Herring; Chemical and Biological Engineering , Colorado School of Mines, Lakewood, Colorado, United States.

B2.02
Synthesis and Properties of Poly(phenylene)-Poly(ether ketone) Block Copolymer Electrolytes (V)-Investigation of Chemical Composition Shogo Nagaya, Masahiro Fujita, Yuko Takeoka and Rikukawa Masahiro; Sophia University, Tokyo, Japan.

B2.03
Activity of Nanographitic Structures toward Oxygen Reactions in the Solid State CsH_2PO_4 Electrochemical System Hadi Tavassol[2, 1] and Sossina M. Haile[2, 1]; [1]Material Science, California Institute of Technology, Pasadena, California, United States; [2]Material Science, Northwestern University, Evanston, Illinois, United States.

B2.04
Characterization of PBI Based High Temperature PEMFC Using Methanol Reformed Gas Properties Sung-Kwan Ryu[3], Seung-Gon Kim[1], Minjin Kim[1, 2] and Young-Jun Sohn[1, 2];[1]Korea Institute of Energy Research, Daejeon, Korea (the Republic of); [2]University of Science and Technology, Daejeon, Korea (the Republic of); [3]Chemical Engineering, Yonsei University, Seoul, Korea (the Republic of).

B2.05
Optimization of the Lifetime for Polybenzimidazole Based High Temperature PEM Fuel Cell Stacks Minjin Kim, Young-Jun Shon and Seung-Gon Kim; Fuel Cell Research Center, Korea Institute of Energy Research, Daejeon, Korea (the Republic of).

B2.06
Application of Block Copolymers Having Aliphatic Side Chains to Cathode Ionomer (II) - Properties Related to Gas Transport Ken Akizuki[2, 3], Atsushi Ohma[3], Toyoaki Matsuura[1], Masahiro Yoshizawa-Fujita[1], Yuko Takeoka[1] and Masahiro Rikukawa[1]; [1]Department of Materials and Life Sciences, Faculty of Science and Technology, Sophia University, Tokyo, Japan;[2]Department of Materials and Life Sciences, Sophia University, Tokyo, Japan; [3]Nissan Research Center, Nissan Motor Co., Ltd., Kanagawa, Japan.

B2.07
Zirconium Phosphate-Grafted-Sulfoanted Polystyrene/Nafion Composite Membranes for Direct Methanol Fuel Cell Kun-lin Liu, Chi-Yang Chao and Cheng-Wei Pai; Materials Science and Engineering, National Taiwan University, Taipei, Taiwan.

SESSION C8: Poster Session II
C: Electrodes and Solid Electrolytes for Batteries
Tuesday Afternoon, June 16, 2015
5:20 PM
Keystone Resorts, Red Cloud Peak

C8.01
Structural and Electronic Properties of Na2MnPO4F as a Cathode Material for Na-Ion Batteries Yin Zheng, Rao Huang, Yuhua Wen and Zizhong Zhu; Xiamen University, Xiamen, China.

C8.02
Investigation of Capacity Fading of Li-Rich Layer-Structured Cathode Materials Kuan-Zong Fung[2, 1], Shu-Yi Tsai[1, 2], Chung-Ta Ni[1, 2] and Wei-Zhi Lin[1, 2]; [1]Materials Science and Engineering, National Cheng Kung University, Tainan City, Taiwan; [2]Research Center for Energy Technology and Strategy, National Cheng Kung University, Tainan City, Taiwan.

C8.03
Improvement of Cycling Performance of $LiMn_{1.5}Ni_{0.5}O_4$ Cathodes by Surface Treatment with Trimethyl Phosphite Vapor Ryosuke Okamoto[1], Kazuhiko Okubo[1], Mitsukuni Kondo[2] and Yoshiyuki Abe[1]; [1]Ichikawa Research Laboratories, Sumitomo Metal Mining Co., Ltd., Ichikawa-City, Japan; [2]Battery Research Laboratories, Sumitomo Metal Mining Co., Ltd., Niihama-city, Japan.

C8.04
Synthesis of Nanostructured $Li_3M_2(PO_4)_2F_3$ Glass-Ceramics (M = V, Fe, Ti) Tomasz K. Pietrzak, Przemyslaw P. Michalski, Agata Dorau, Anna Kaleta, Agnieszka Starobrat, Jakub Plachta, Marek Wasiucionek and Jerzy E. Garbarczyk; Physics, Warsaw University of Technology, Warszawa, Poland.

C8.05
Lithium/Polymer Electrolyte Interface Stabilization by In Situ and Ex Situ Formation of Protective Surface Layers Nassus Brown and Dale Teeters; Chemistry and Biochemistry, The University of Tulsa, Tulsa, Oklahoma, United States.

C8.06
Development of Na_3PS_4-Based Sulfide Electrolytes for All-Solid-State Batteries Masahiro Tatsumisago[1] and Akitoshi Hayashi[1, 2]; [1]Department of Applied Chemistry, Osaka Prefecture University, Sakai, Osaka, Japan; [2]ESICB, Kyoto Univ., Kyoto, Japan.

C8.07
Development of Solid Electrolyte Membranes Aude A. Hubaud[1], David Schroeder[2, 1], Brian Ingram[1] and John Vaughey[1]; [1]Argonne National Laboratory, Argonne, Illinois, United States; [2]Northern Illinois University, Dekalb, Illinois, United States.

C8.08
Reactions at Silicon Electrode Surfaces Fulya Dogan[1], Aude Hubaud[1], Zhenzhen Yang[1], Danielle Proffit[1], David Schroeder[2] and Jack Vaughey[1]; [1]Chemical Sciences and Engineering, Argonne National Laboratory, Lemont, Illinois, United States; [2]College of Engineering and Engineering Technology, Northern Illinois University, DeKalb, Illinois, United States.

C8.09
Oxygen Nonstoichiometry and Charge Transfer in the Double Perovskites $Gd_{1-x}La_xBaCo_2O_{6-\delta}$ (x=0-1) Dmitry Malyshkin, Dmitry Tsvetkov, Evgeny Sterkhov, Ivan Ivanov and Andrey Zuev; Ural Federal University, Ekaterinburg, Russian Federation.

C8.10
Synthesis and Electrochemical Performance of Carbon-Coated $0.8Li_2MnO_3$-$0.2LiCoO_2$ Cathode Material for Lithium Ion Batteries Zhuang Wang, Zhiyong Yu, Wenji Li, Mengyun Lu and Hanxing Liu; School of Materials Science and Engineering, Wuhan University of Technology, Wuhan, China.

C8.11
Advanced, Nanostructured $LiMn_2O_{4-y}S_y$ Cathode Materials Exhibiting an Outstanding Capacity and Rate Capability Marcin Molenda, Monika Bakierska and Roman Dziembaj; Faculty of Chemistry, Jagiellonian University, Krakow, Poland.

C8.12
Study of the Mechanism of Electrophoretic Deposition of Composite Lithium-Ion-Conducting Membranes Raymond Blanga and Diana Golodnitsky; Chemistry, Tel Aviv University, Biniamina, Israel.

C8.13
***Operando* X-Ray Absorption Study on Charge-Discharge Mechanism of Li_2MnO_3 and Li_2RuO_3 Lithium-Rich Cathode** Takanori Kobayashi, Koji Nakanishi, Takuya Mori, Kentaro Yamamoto, Titus Masese, Yuki Orikasa and Yoshiharu Uchimoto; Kyoto University, Kyoto-shi, Japan.

C8.14
Phase Transition Mechanism of $LiFePO_4$-$FePO_4$ Using a Thin-Film Model Electrode Takahiro Yoshinari, Kentaro Yamamoto, Eri Kato, Mori Takuya, Titus Masese, Yuki Orikasa and Yoshiharu Uchimoto; Kyoto University, Kyoto, Japan.

C8.15
Molten Salt Method of Preparation and Electrochemical Characterisation of MnO_2 M.V. Reddy, Yun Hong Lee and Stefan Adams; Materials Science & Eng., National University of Singapore, Singapore, Singapore.

C8.16
Electrochemical and Magnetic Properties of $LiMn_{1.5}Ni_{0.5}O_4$ Spinel Oxide Reiko Hanafusa, Kazuki Kotani, Kousuke Ishidzu, Yoshihiro Oka and Tatsuya Nakamura; Dept. of Electrical Engineering , University of Hyogo, Himeji, Japan.

C8.17
Influence of Synthesis Conditions on Crystal Structure and Electrochemical Properties of Spinel $Li_4Ti_5O_{12}$ Used as Anode Material for Li-Batteries Anna Drobniak, Danuta Olszewska and Wojciech Zajac; AGH University of Science and Technology, Krakow, Poland.

C8.18

$Li_4Ti_5O_{12}$ Doped with Copper as Anode Material for Li-Batteries Anna Drobniak, Danuta Olszewska and Wojciech Zajac; AGH University of Science and Technology, Krakow, Poland.

C8.19
Acoustic Emission Study of SnO Anode for Lithium-Ion Batteries Naoakai Kuwata[1], Shutaro Kato[1], Junichi Kawamura[1], Kazuhisa Sato[1, 2] and Junichiro Mizusaki[1]; [1]IMRAM, Tohoku University, Sendai, Japan; [2]Graduate School of Engineering, Tohoku University, Sendai, Japan.

C8.20
Lattice Volume Change of $Li[Ni_xCo_yMn_z]O_2$ Cathodes during Charge/Discharge Reaction and Their Cycle Performance Kosuke Ishizu, Yoshihiro Oka and Tatsuya Nakamura; University of Hyogo, Himeji, Japan.

C8.21
Investigation of All-Solid-State Li-O_2 Batteries Hirokazu Kitaura and Haoshen Zhou; Energy Technology Research Institute, National Institute of Advanced Industrial Science and Technology, Tsukuba, Japan.

C8.22
Electrochemical Properties of $LiNi_{1/3}Co_{1/3}Mn_{1/3}$ Electrodes Prepared with Water-Based Slurry Dispersed Conducting Additive by Using Plasma Treatment Yoshihiro Oka, Tomoya Sasaki, Hideyoshi Matsumoto and Tatsuya Nakamura; University of Hyogo, Himeji, Japan.

C8.23 WITHDRAWN

C8.24 WITHDRAWN

C8.25 WITHDRAWN

C8.26 WITHDRAWN

C8.27 WITHDRAWN

C8.28
Defect Interaction and Solid Electrolyte Transition in $K_3H(SeO_4)_2$ Oscar S. Hernandez-Daguer[2, 1], Diego Pena-Lara[3] and Ruben A. Vargas-Zapata[3]; [1]Department of Physics, Universidad del Atlántico, Barranquilla, Colombia; [2]Department of Physics, University of Puerto Rico., Mayaguez, Puerto Rico, United States; [3]Department of Physics, Universidad del Valle, Cali, Colombia.

C8.29
Synthesis, Structure and Electrochemical Properties of Lithium Solid Electrolyte: The Li-P-S-O System Kota Suzuki[1], Satoshi Hori[1], Masamitsu Sakuma[1], Tetsuya Nakazawa[1], Miki Kubota[2], Masaaki Hirayama[1], Masao Yonemura[2] and Ryoji Kanno[1]; [1]Electronic Chemistry, Tokyo Institute of Technology, Yokohama, Japan; [2]High Energy Accelerator Research Organization, Tokai, Japan.

C8.30
High Sensitivity Detection of Mn Ion Dissolution by *In Situ* 1H MRI Yoshiki Iwai, Masato Ohzu, Naoaki Kuwata and Junichi Kawamura; Institute of Multidisciplinary Research for Advanced Materials, Tohoku University, Sendai, Japan.

C8.31
Li Ion Conductivity in a Cation Deficient Scheelite Ryan D. Bayliss[1], Stuart N. Cook[2] and Jordi Cabana[1]; [1]Department of Chemistry, University of Illinois at Chicago, Chicago, Illinois, United States; [2]Department of Materials Science and Engineering, Massachusetts Institute of Technology, Boston, Massachusetts, United States.

C8.32
High Volt Stability of Lithium Borate Thin-Film as Solid Electrolyte for All-Solid-State Thin-Film Battery Haruka Itabashi, Naoaki Kuwata and Junichi Kawamura; IMRAM, Tohoku University, Sendai, Japan.

C8.33
Highly Reversible Capacity at the Surface of a Lithium-Rich Manganese Oxide Li_2MnO_3 Masaaki Hirayama[1], Sou Taminato[1], Kota Suzuki[1], Ryoji Kanno[1] and Masao Yonemura[2];[1]Tokyo Institute of Technology, Yokohama, Japan; [2]KEK, Tokai, Japan.

C8.34
Fabrication and Electrochemical Properties of All-Solid-State Batteries with 5V $LiNi_{0.5}Mn_{1.5}O_4$ Cathode and $Li_{10}GeP_2S_{12}$ Solid Electrolyte Gwangseok Oh, Masaaki Hirayama, Ohmin Kwon, Kota Suzuki and Ryoji Kanno; Electronic Chemistry, Tokyo Institute of Technology, Yokohama, Japan.

C8.35
Electrochemical Performance of Li_2MnO_3 Cathode Material by Fluorine Substitution Sha Wu, Zhiyong Yu, Hanxing Liu, Wenji Li and Mengyun Lu; School of Materials Science and Engineering, Wuhan University of Technology, Wuhan, China.

C8.36
EELS Investigations of Aging Mechanisms in $LiFePO_4$ Cathodes after Extended Electrochemical Cycling Samartha Channagiri[1], Nicholas Warner[2], Frank Scheltens[1], Marcello Canova[2], Yann Guezennec[2] and David W. McComb[1]; [1]Materials Science and Engineering, The Ohio State University, Columbus, Ohio, United States; [2]Center for Automotive Research, The Ohio State University, Columbus, Ohio, United States.

C8.37
Mixed Conduction Transmission Line Impedance Model for Olivine Structured Cathode Material Eui-Chol Shin[1], Jihyeon Gim[1], Jinju Song[1], Sung-Won Kang[1], Docheon Ahn[2], Jaekook Kim[1] and Jong-Sook Lee[1]; [1]Materials Science and Engineering, Chonnam National University, Gwang-Ju, Korea (the Republic of); [2]Pohang Accelerator Laboratory, Pohang, Korea (the Republic of).

C8.38
In Depth First-Principles Study with Experiment on Origins and Mechanism of Phase Transformation of Mn^{4+}-Related Bulk Li_2MnO_3 Jin-Myoung Lim[1], Duho Kim[1], Young-Geun Lim[2], Min-Sik Park[2], Young-Jun Kim[2], Kyeongjae Cho[3] and Maenghyo Cho[1]; [1]Seoul National University, Seoul, Korea (the Republic of); [2]Korea Electronics Technology Institute, Seongnam, Korea (the Republic of); [3]The University of Texas at Dallas, Richardson, Texas, United States.

C8.39
The High-Capacity Effect in the All-Glass Composites Conducting Electrons and Silver Ions Wioleta Slubowska, Jan L. Nowinski, Jerzy E. Garbarczyk and Marek Wasiucionek; Faculty of Physics, Warsaw University of Technology, Warsaw, Poland.

C8.40
Analysis of Impedance Spectroscopy of Aqueous Supercapacitors by Evolutionary Programming: Finding DFRT from Complex Capacitance Alon Oz[1], Shany Hershkovitz[2], Nataly Belman[3], Ervin Tal-Gutemacher[3] and Yoed Tsur[2]; [1]The Interdisciplinary Energy Graduate Study Program, Technion - Israel Institute of Technology, Haifa, Israel; [2]Department of Chemical Engineering, Technion - Israel Institute of Technology, Haifa, Israel; [3]Elbit Systems Land and C4I Ltd, Netanya, Israel.

C8.41
Two-Dimensional Imaging of Charge/Discharge by the Bragg Edges Analysis of the Electrode Materials for the Pulsed Neutron-Beam Transmission Spectra of a Li-Ion Battery Koichi Kino[1], Masao Yonemura[2], Yoshihisa Ishikawa[2] and Takashi Kamiyama[2, 3]; [1]Faculty of Engineering, Hokkaido University, Sapporo, Japan; [2]Institute of Materials Structure Science, High Energy Accelerator Research Organization, Tokai, Japan; [3]The Graduate University for Advanced Studies (Sokendai), Tokai, Japan.

C8.42
Alluaudite Sodium Iron Sulfate $Na_{2+2x}Fe_{2-x}(SO_4)_3$ for High Energy Density Sodium-Ion Battery Shin-ichi Nishimura[1, 2], Prabeer Barpanda[3, 1], Gosuke Oyama[1] and Atsuo Yamada[1,2]; [1]Department of Chemical System Engineering, The University of Tokyo, Bunkyo-ku, Japan; [2]ESICB, Kyoto University, Kyoto, Japan; [3]Indian Institute of Science, Bangalore, India.

C8.43 Withdrawn

C8.44
Origin of High Rate Performance of $LiFePO_4$ Investigated by Time-Resolved X-Ray Diffraction Kazufumi Otani[1], Toshiyuki Munesada[1], Takuya Mori[1], Kentaro Yamamoto[1], Titus N. Masese[1], Yuki Orikasa[1], Koji Ohara[2], Katsutoshi Fukuda[2], Yukinori Koyama[2], Toshiyuki Nohira[3], Rika Hagiwara[4], Zempachi Ogumi[2] and Yoshiharu Uchimoto[1]; [1]Graduate School of Human and Environmental Studies, Kyoto University, Kyoto, Japan; [2]Office of Society-Academia Collaboration for Innovation, Kyoto University, Uji, Japan; [3]Institute of Advanced Energy, Kyoto University, Uji, Japan; [4]Graduate School of Energy Sciences, Kyoto University, Kyoto, Japan.

C8.45
A Cation-Selective Separator as the Oxygen-Barrier for Non-Aqueous Metal-Air Batteries Xiaodi Ren[1], Mingzhe Yu[1], Mitchell E. Steindler[2], Qiang Zhao[1] and Yiying Wu[1];[1]Chemistry and Biochemistry, Ohio State University, Columbus, Ohio, United States; [2]Chemical and Biomolecular Engineering, Ohio State University, Columbus, Ohio, United States.

C8.46
How to Get a Conversion Reaction Reversible? Lithium Storage in Electroactive Metal Sulphide Nanodots Yan Yu[1, 2], Changbao Zhu[2] and Joachiam Maier[2]; [1]Department of Materials Science and Engineering, University of Science and Technology of China, Hefei, China; [2]Max-Planck-Institute for Solid State Research, Stuttgart, Germany.

C8.47
Constructing 3D Porous and Carbon-Coated Electrode Materials for High Performances Li-Ion Batteries Yan Yu[1, 2], Jun Liu[2] and Joachiam Maier[2]; [1]Department of Materials Science and Engineering, University of Science and Technology of China, Hefei, China; [2]Max Planck Institute for Solid State Research, Stuttgart, Germany.

C8.48
Synthesis and Characterization of $Li(Li_yFe_zV_{1-y-z})O_{2-\delta}$ – Anode Material for Li-Ion Batteries Bartlomiej Gedziorowski and Janina Molenda; AGH University of Science and Technology, Krakow, Poland.

C8.49
Unusual Surface Redox Behaviors of Li_2MnO_3: First-Principles Prediction and Experimental Validation Duho Kim[1], Jin-Myoung Lim[1], Young-Geun Lim[2], Min-Sik Park[2], Young-Jun Kim[2], Kyeongjae Cho[3] and Maenghyo Cho[1]; [1]School of Mechanical Aerospace Engineering, Seoul National University, Seoul, Korea (the Republic of); [2]Advanced Batteries Research Center, Korea Electronics Technology Institute, Seongnam, Korea (the Republic of); [3]Department of Materials Science and Engineering, University of Texas at Dallas, Dallas, Texas, United States.

C8.50
Ultrasonic-Assisted Synthesis of Nanostructured Transition Metal Oxides as Cathode Materials for Mg-Ion Batteries Lu Wang[1], Xinzhi Chen[1], Sidsel M. Hanetho[2] and Fride Vullum-Bruer[1]; [1]Department of Materials Science and Engineering, Norwegian University of Science and Technology, Trondheim, Norway; [2]SINTEF Materials and Chemistry, Trondheim, Norway.

C8.51
Synthesis and Electrochemical Performance of $Li_4Ti_5O_{12}$ Modified with Carbon Nanotubes Yingbin Lin and Zhigao Huang; Physics and Energy College, Fujian Normal University, Fuzhou City, China.

C8.52
Structural, Electrical and Electrochemical Properties of the $Na_{2/3}Ni_{1/3}Mn_{2/3-x}Ti_xO_{2-\delta}$ ($0 \le x \le 1/3$) Cathode Materials Anna G. Milewska and Janina Molenda; AGH Academy of Science and Technology, Krakow, Poland.

C8.53
Dynamics Study of Lithium Ion Diffusion in Super Lithium Ion Conductors, $Li_{10}GeP_2S_{12}$ (LGPS) Masao Yonemura[1], Takashi Kamiyama[1, 2], Ohmin Kwon[3], Satoshi Hori[3], Masaaki Hirayama[3], Ryoji Kanno[3], Kazuhiro Mori[4], Kaoru Shibata[5], Takeshi Yamada[6] and Yukinobu Kawakita[5]; [1]Institute of Materials Structure Science (IMSS), High Energy Accelerator Research Organization (KEK), Tokai, Japan; [2]The Graduate University for Advanced Studies (Sokendai), Tokai, Japan; [3]Department of Electronic Chemistry, Interdisciplinary Graduate School of Science and Engineering, Tokyo Institute of Technology, Yokohama, Japan; [4]Research Reactor Institute, Kyoto University, Kumatori, Japan; [5]Materials and Life Science Division, J-PARC Center, JAEA, Tokai, Japan; [6]Neutron R&D Division, CROSS-Tokai, Tokai, Japan.

C8.54
Lithium Superionic Conductors with $Li_{10}GeP_2S_{12}$-type Structure in the Li_4MS_4 – Li_3PS_4 System (M = Si, Ge, Sn): Synthesis, Conduction Mechanism and Phase Relationships Satoshi Hori[1], Ohmin Kwon[1], Kota Suzuki[1], Masaaki Hirayama[1], Masao Yonemura[2], Takashi Kamiyama[2, 3] and Ryoji Kanno[1]; [1]Electrochemistry, Tokyo Institute of Technology, Yokohama, Japan; [2]High Energy Accelerator Research Organization, Institute of Materials Structure Science, Ibaraki, Japan; [3]The Graduate University for Advanced Studies (Sokendai), Ibaraki, Japan.

C8.55
Effect of Zn-Doping on Densification of $Li_7La_3Zr_2O_{12}$ Emil Hanc, Wojciech Zajac, Angelika Orzeszek and Janina Molenda; Faculty of Energy and Fuels, AGH University of Science and Technology, Cracow, Poland.

C8.56
Evolution of Microstructure and Its Relation to Ionic Conductivity in $Li_{1+x}Al_xTi_{2-x}(PO_4)_3$ Thomas Hupfer[1], Claudia Bucharsky[1], Günter Schell[1], Anatoliy Senyshyn[2], Mykhailo Monchak[2, 3] and Michael J. Hoffmann[1]; [1]IAM-KWT, KIT, Karlsruhe, Germany; [2]FRM II, SPODI, TU Munich, Garching, Germany; [3]IAM-ESS, KIT, Karlsruhe, Germany.

C8.57
New Intercalation Cathodes for Calcium Ion Batteries Danielle Proffit[1], Albert Lipson[1], Baofei Pan[1], Brian Ingram[1], Miao Liu[2], Anubhav Jain[2], Kristin Persson[2] and Jack Vaughey[1];[1]Chemical Sciences and Engineering, Joint Center for Energy Storage Research, Argonne National Laboratory, Lemont, Illinois, United States; [2]Electrochemical Technologies Group, Joint Center for Energy Storage Research, Lawrence Berkeley National Laboratory, Berkeley, California, United States.

C8.58
Mixed Glass Former Effect in $50Li_2O$-$50[xNb_2O_5$-$(1-x)P_2O_5]$ Glasses Prashant Dabas and K. Hariharan; Physics, Indian Institute of Technology Madras, Chennai, India.

C8.59
Tin Networked Electrode Providing Enhanced Volumetric Capacity and Pressureless Operation for All-Solid-State Li-Ion Batteries Justin M. Whiteley[1], Ji Woo Kim[1], Chan Soon Kang[2], Jong Soo Cho[1], Kyu Hwan Oh[2] and Se-Hee Lee[1]; [1]Mechanical Engineering, University of Colorado, Boulder, Boulder, Colorado, United States; [2]Materials Science and Engineering, Seoul National University, Seoul, Korea (the Republic of).

C8.60
Synthesis and Electrochemical Properties of SiO_x/C Amorphous Composite as Anode Material for Lithium Ion Batteries Pengpeng Lv, Hailei Zhao, Chunhui Gao and Zhaolin Li; University of Science and Technology Beijing, Beijing, China.

C8.61
Impedance Investigation of the Processes on SiC/Li^+-Electrolyte Interface Ekaterina Antonova[2], Elizaveta Evschik[1], Alexey Levchenko[1], Viktor Berestenko[1] and Yury Dobrovolsky[1];[1]IPCP RAS, Chernogolovka, Russian Federation; [2]IHTE UB RAS, Ekaterinburg, Russian Federation.

C8.62
Synthesis and Na^+ Conduction Properties of Rare Earth-Free NASICON-Type Solid Electrolyte Toshinori Okura[1], Naoya Yoshida[1] and Kimihiro Yamashita[2]; [1]Kogakuin University, Hachioji, Japan; [2]Tokyo Medical and Dental University, Chiyoda, Japan.

C8.63
Interfacial Modification of All-Oxide-Solid-State Battery with Low Surface Energy Solid Electrolyte Shogo Komagata, Shingo Ohta and Takahiko Asaoka; Toyota Central R&D Labs. Inc., Nagakute, Japan.

C8.64 WITHDRAWN

C8.65
Evaluations of Iron Based Cathode Materials for Li-Ion Batteries--Case of $LiFe_{1-y}M_yPO_4$, Nanometric $LiFePO_4$ and $LiFeO_2$ Andrzej J. Kulka, Wojciech Zajac, Konrad Swierczek, Katarzyna Walczak and Janina Molenda; AGH-University of Science and Technology, Cracow, Poland.

C8.66
Effect of Glass Additives on Relative Density and Li-Ion Conductivity of $Li_{7-x}La_3Zr_{2-x}Nb_xO_{12}$ Solid Electrolyte Nataly C. Rosero Navarro, Taira Yamashita, Akira Miura, Mikio Higuchi and Kiyoharu Tadanaga; Hokkaido University, Sapporo, Japan.

C8.67
Sodium Ion Conducting Ceramics with $Na_5YSi_4O_{12}$-Type Structure Synthesized by a Polymerized Complex Method Naohiro Horiuchi[1], Kaede Ryu[2], Naoya Yoshida[2], Toshinori Okura[2] and Kimihiro Yamashita[1]; [1]Institute of Biomaterial & Bioengineering, Tokyo Medical and Dental University, Tokyo, Japan; [2]Kogakuin University, Hachioji-shi, Japan.

C8.68
Development of Salty-Gel Electrolytes Composed of Metal Salt and Small Amount of Organic Solvent as a New Concept for Organic Solid Electrolytes Makoto Moriya[1, 2, 3], Shohei Nabeno[3], Yutaro Hanawa[3], Wataru Sakamoto[3] and Toshinobu Yogo[3]; [1]Graduate School of Science, Shizuoka University, Shizuoka, Japan; [2]JST PRESTO, Kawaguchi, Japan; [3]EcoTopia Science Institution, Nagoya University, Nagoya, Japan.

C8.69
Investigation of Negative Electrode for All-Solid-State Lithium Ion Battery using Garnet-Type Oxide Electrolyte Tetsuro Kobayashi, Shingo Ohta and Takahiko Asaoka; Toyota Central R&D Labs.,Inc., Nagakute, Japan.

C8.70
Low Temperature Synthesis of Yb Doped $SrCeO_3$ Electrolyte Thin Film for Hydrogen Separation Yang Lei, Chao Zhang, Di He, Shuai Li, Xiaopeng Liu and Lijun Jiang; Department of Energy Materials and Technology, General Research Institute for Non-Ferrous Metals, Beijing, China.

C8.71
Improved of Electrochemical Performances of Manganese-Substituted $Na_{0.7}Co_{1-y}Mn_yO_2$ - Cathode Material for Rechargeable Sodium-Ion Batteries Dominika Baster, Filip Hartman, Lukasz Kondracki, Andrzej Kulka, Wojciech Zajac and Janina Molenda; AGH University of Science and Technology, Krakow, Poland.

C8.72
Earth-Abundant Cathode Materials for Sodium-Ion Batteries P2-$Na_{2/3}Fe_{1-y}Mn_yO_2$ Dominika Baster, Piotr Trzaska and Janina Molenda; AGH University of Science and Technology, Krakow, Poland.

C8.73
Low Temperature Conductivity Response in Polymer Blend Electrolyte Avirup Das[2], A K. Thakur[1] and K Kumar[2]; [1]Physics, Indian Institute of Technology Patna, Patna, India;[2]Physics, Indian Institute of Technology Kharagpur, Kharagpur, India.

C8.74
Supercapacitor Response of Tin Sulfide Electrodes Pradip Leuaa, Ajay D. Thakur and Awalendra K. Thakur; Physics, IIT Patna, Patna, India.

C8.75
Spinel $LiCrTiO_4$ as a LIB Anode : A Density Functional Theory Approach Biswajit Mondal and Awalendra K. Thakur; Physics, IIT Patna, Patna, India.

SESSION D6: Poster Session: Fundamentals of Transport and Reactivity and Nanoionics II
D: Fundamentals of Transport and Reactivity and Nanoionics
Tuesday Afternoon, June 16, 2015
5:20 PM
Keystone Resorts, Red Cloud Peak

D6.01
The Role of Ceria in Electro-Reduction of Nitrogen Oxide Based on Solid State Cell Reactor at Intermediate-Temperature Wenyi Tan[1, 2], Fei Chen[1], Lei Gong[1], Yunfei Bu[2], Yang Song[2] and Qin Zhong[2]; [1]Nanjing Institute of Technology, Nanjing, China; [2]School of Chemical Engineering, Nanjing University of Science & Technology, Nanjing, China.

D6.02
Li-Ion Dynamics Along the Inner Surfaces of Layer-Structured 2H-Li_xNbS_2 Bernhard Stanje[1], Viktor Epp[1], Suliman Nakhal[2], Martin Lerch[2] and Martin Wilkening[1]; [1]Institute for Chemistry and Technology of Materials, Technical University of Graz, Graz, Austria; [2]Institut für Chemie, Technische Universität Berlin, Berlin, Germany.

D6.03
Catalytic Activity and Oxygen Storage Properties of Doped $Ba_{1-x}Sr_xY_{1-y}Ln_yMn_2O_{5+\delta}$ (Ln - lanthanides) for Application in Three-Way Catalytic Converters Alicja Klimkowicz[2,1], Konrad Swierczek[2], Tomasz Rzasa[2], Akito Takasaki[1] and Bogdan Dabrowski[3]; [1]Department of Engineering Science and Mechanics, Shibaura Institute of Technology, Tokyo, Japan;[2]Faculty of Energy and Fuels, AGH University of Science and Technology, Krakow, Poland; [3]Department of Physics, Northern Illinois University, DeKalb, Illinois, United States.

D6.04
Electrical Conductivity, Oxygen Diffusion Coefficient and Surface Exchange Coefficient of $La_4Co_3O_{10}$ by Electrical Conductivity Relaxation Technique Yoshinobu Adachi, Naoyuki Hatada and Tetsuya Uda; Materials Science and Engineering, Kyoto University, Kyoto, Japan.

D6.05
Influence of Cation Nonstoichiometry to Oxygen Nonstoichiometry in Mixed Ionic and Electronic Conducting Perovskite Oxides Yusuke Okamoto[1], Akihide Kuwabara[2], Takashi Nakamura[3], Tatsuya Kawada[1] and Koji Amezawa[3]; [1]Graduate Study of Environmental Studies, Tohoku University, Sendai, Japan; [2]Japan Fine Ceramics Center, Atsuta, Japan; [3]IMRAM, Tohoku University, Sendai, Japan.

D6.06
Structure, Transport and Stability of Layered Ruddlesden-Popper $La_{n+1}Ni_nO_{3n+1}$ (n = 1, 2 and 3) Epitaxial Films Kuan-Ting Wu[1, 2], Monica Burriel[5, 2], Fan Yang[3], David McComb[3], John Kilner[2, 4] and Stephen Skinner[2]; [1]Department of Applied Chemistry, Kyushu University, Fukuoka, Japan; [2]Department of Materials, Imperial College London, London, United Kingdom; [3]Department of Materials Science and Engineering, Ohio State University, Columbus, Ohio, United States; [4]International Institute for Carbon-Neutral Energy Research (wpi-I2CNER), Fukuoka, Japan; [5]Laboratoire des Matériaux et du Génie Physique (LMGP), Grenoble, France.

D6.07
Low Temperature Protonic Transport in Nanocrystalline Porous Oxides Sindre O. Stub[1], Per M. Rorvik[2], Reidar Haugsrud[1] and Truls Norby[1]; [1]Centre for Materials Science and Nanotechnology, Department of Chemistry, University of Oslo, Oslo, Norway; [2]Sector for Sustainable Energy Technology, SINTEF Materials and Chemistry, Oslo, Norway.

D6.08
The Influence of Aging and Humidity on Transport Properties of Ceria Thin Films at Low Temperatures Matthias Kleine-Boymann, Matthias Elm, Raika W. Oppermann and Juergen Janek; Institute of Physical Chemistry, Justus-Liebig University, Giessen, Germany.

D6.09
Correlation between Mobile Oxygen Ion Distances and Characteristic Length Scales for $La_{2-x}Er_xMo_2O_9$ Type Oxide Ion Conductor Tanmoy Paul and Aswini Ghosh; Solid State Physics, Indian Association for the Cultivation of Science, Kolkata, India.

D6.10
Tuning the Defect Structure of $La_{0.5}Sr_{0.5}Co_{0.5}Mn_{0.5}O_{3-\delta}$ for Optimized Redox Behavior under Polarisation Conditions Celeste A. van den Bosch, George F. Harrington, Stephen J. Skinner and Ainara Aguadero; Department of Materials, Imperial College London, London, United Kingdom.

D6.11
Defect Chemistry and Diffusion in $Cu_2ZnSnSe_4$ and Cu_2ZnSnS_4 Thin Films Steven Harvey, Glenn Teeter and Ingrid Repins; National Renewable Energy Laboratory, Golden, Colorado, United States.

D6.12
Ionic Conductivity Modification in Nanoscale Proton-Conducting Oxide Heterostructures Prepared by Pulsed Laser Deposition Stefan B. Nikodemski[1], Daniel Clark[1], Jianhua Tong[1], Ryan O'Hayre[1], Philip Parilla[2], David Ginley[2] and Joseph Berry[2]; [1]Metallurgical and Materials Engineering, Colorado School of Mines, Golden, Colorado, United States; [2]National Renewable Energy Laboratory, Golden, Colorado, United States.

D6.13
Investigating the Origins of Modified Transport Properties of YSZ in Confined Systems George Harrington[1, 2, 3], Andrea Cavallaro[3], Tobias M. Huber[1, 2], Harry L. Tuller [2, 4], Bilge Yildiz[5, 2], Kazunari Sasaki[6, 1], David W. McComb[7, 3], Stephen J. Skinner[3] and John A. Kilner[3]; [1]Next-Generation Fuel Cell Research Centre, Kyushu University, Fukuoka, Japan;[2]Department of Materials, Massachusetts Institute of Technology, Cambridge, Massachusetts, United States; [3]Department of Materials, Imperial College London, London, United Kingdom;[4]International Institute for Carbon Neutral Energy Research, Kyushu University, Fukuoka, Japan; [5]Lab. for Electrochemical Interfaces, Massachusetts Institute of Technology, Cambridge, Massachusetts, United States; [6]Department of Mechanical Engineering, Kyushu University, Fukuoka, Japan; [7]Department of Materials Science and Engineering, The Ohio State University, Columbus, Ohio, United States.

D6.14
Understanding Proton Conductivity within Porous Organic Cage Networks Scott Lewis, Ming Liu, Linjiang Chen, Iain Aldous, Marc Little, Samantha Chong, Laurence Hardwick and Andrew I. Cooper; Chemistry, University of Liverpool, Liverpool, United Kingdom.

D6.15
Highly-Conductive Nanomaterials Based on Li_2O–FeO–V_2O_5–P_2O_5 Glasses Tomasz K. Pietrzak, Jerzy E. Garbarczyk, Marek Wasiucionek, Jan L. Nowinski and Przemyslaw P. Michalski; Physics, Warsaw University of Technology, Warszawa, Poland.

D6.16
The Mixed Alkali Effect in $(Li_{1-x}A_x)_2Si_2O_5$ (A = K, Rb) Glasses Melissa Novy, Sabyasachi Sen and Sangtae Kim; Materials Science and Engineering, UC Davis, Davis, California, United States.

D6.17 moved to D7.02

D6.18
Ionic Conductivity of β-eucryptite Doped with Mg Yachao Chen and Ivar E. Reimanis; Colorado School of Mines, Golden, Colorado, United States.

D6.19
Analysis of Grain Boundary Conductivity of Ionic Oxides at Elevated Temperature: Doped CeO_2 and Bi_2O_3 – a Case Study NoWoo Kwak and WooChul Jung; Material Science & Engineering, Korea Advanced Institute of Science and Technology (KAIST), Daejeon, Korea (the Republic of).

D6.20
Interfacial Ionic Conductivity in Epitaxial $Y_2Zr_2O_7$ Thin Films Elisa Gilardi[1], Giuliano Gregori[1], Yi Wang[2], Wilfried Sigle[2], Peter A. van Aken[2] and Joachim Maier[1]; [1]Physical Chemistry of Solids, Max Planck Institute for Solid State Research, Stuttgart, Germany; [2]Stuttgart Center for Electron Microscopy, Max Planck Institute for Intelligent System, Stuttgart, Germany.

D6.21
Nanocomposite Ceramics Based on $Ce_{0.9}Gd_{0.1}O_{1.95}$ and MgO Jens Zosel[1], Vladimir Vashook[1], Evgeni Sperling[2], Kristina Ahlborn[1], Frank Gerlach[1], Wolfgang Fichtner[1], Matthias Schelter[1], Ulrich Guth[1, 2] and Michael Mertig[1]; [1]Kurt-Schwabe-Institut für Mess- und Sensortechnik e.V. Meinsberg, Waldheim, Germany; [2]Chemistry, Dresden University of Technology, Dresden, Germany.

D6.22
Reduction Stages of Ni-doped Polycrystalline YSZ Amy Morrissey[1], James R. O'Brien[2], Jianhua Tong[1] and Ivar E. Reimanis[1]; [1]Colorado School of Mines, Golden, Colorado, United States; [2]Off Grid Research, San Diego, California, United States.

D6.23
Electrical and Oxide Ionic Conductivity in Metal Disparsed Pr_2NiO_4-Based Oxides Junji Hyodo[1, 2], Shintaro Ida[1, 2] and Tatsumi Ishihara[1, 2]; [1]Applied Chemistry, Kyushu University, Fukuoka, Japan; [2]International Institute for Carbon Neutral Energy Research (I2CNER), Fukuoka, Japan.

D6.24
Encroachment of Titanium Oxide on Ni Surface for Ni/TiO_2 under Reducing Atmosphere Fangfang Wang[1, 2], Haruo Kishimoto[1, 2], Katherine D. Bagarinao [1, 2], Katsuhiko Yamaji[1, 2], Teruhisa Horita[1, 2] and Harumi Yokokawa[3]; [1]National Institute of Advanced Industrial Science and Technology, Tsukuba, Japan; [2]CREST, JST, Kawaguchi, Japan; [3]The University of Tokyo, Tokyo, Japan.

D6.25
Ionic Transport Properties of $NdBaInO_4$ Stephen Skinner, Yuning Zhou and Manyu Chen; Imperial College London, London, United Kingdom.

D6.26
Oxygen Transport Properties of Ca/W-Substituted Lanthanum Nickelate Peter V. Hendriksen and Simona Ovtar; Department of Energy Conversion and Storage, Technical University of Denmark, Roskilde, Denmark.

D6.27
Characterization of Solid Lithium Ceramic and Glass-Ceramic Nano-Thin Film Electrolytes Prepared by RF Magnetron Sputtering Erik Burton and Dale Teeters; Chemistry and Biochemistry, University of Tulsa, Tulsa, Oklahoma, United States.

D6.28
Characterisation of Electrochemical Transport Parameters in Multi-Ion Systems Truls Norby, Ragnar Strandbakke, Anna Evans and Shay A. Robinson; Department of Chemistry, University of Oslo, Oslo, Norway.

D6.29
Dependence of Surface Defect Chemistry on Sr Concentration in $La_{1-x}Sr_xFeO_{3-\delta}$ Zixuan Guan; Applied Physics, Stanford University, Stanford, California, United States.

D6.30
Glass Transition in Superprotonic Phase of Inorganic Solid Acid Haruyuki Takahashi, Yoshitaka Suzuki and Takashi Sakuma; Graduate School of Science and Engineering, Ibaraki University, Hitachi, Japan.

D6.31
Unraveling the Origin of Surface Capacitance in Mixed Ion Electron Conducting Oxides Chirranjeevi Balaji Gopal, Albert Z. Feng and William Chueh; Materials Science and Engineering, Stanford University, Menlo Park, California, United States.

D6.32 WITHDRAWN
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D6.33
Correlating Conductivity and Composition of $Ca_xCe_{1-x}O_{2-\delta}$ Grain Boundaries via Aberration-Corrected Transmission Electron Microscopy William J. Bowman, Kimberly McGuinness, Cruz A. Hernandez and Peter A. Crozier; Materials Science and Engineering, Arizona State University, Tempe, Arizona, United States.

D6.34 WITHDRAWN

SESSION G3: Poster Session
G: Switching and Sensing Phenomena
Tuesday Afternoon, June 16, 2015
5:20 PM
Keystone Resorts, Red Cloud Peak

G3.01
Resistive Switching in $SrRuO_3$ Probed by Scanning Tunneling Microscopy Kiran K. Adepalli[1, 2], Marco Moors[3], Qiyang Lu[1], Rainer Waser[3], Harry Tuller[1], Ilia Valov[3] and Bilge Yildiz[2]; [1]Materials Science and Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts, United States; [2]Nuclear Science and Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts, United States; [3]Peter Grünberg Institute, Forschungszentrum Jülich, Jülich , Germany.

G3.02
Topotactic Phase Transition in $SrCoO_x$ Controlled by Electrochemical Potential Qiyang Lu[1] and Bilge Yildiz[1, 2]; [1]Department of Materials Science and Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts, United States; [2]Department of Nuclear Science and Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts, United States.

G3.03
Atomistic Modelling of the Formation of Conducting Filaments in Resistive RAM Cells David Z. Gao, Samuel R. Bradley, Manveer Munde and Alexander L. Shluger; Physics and Astronomy, University College London, London, United Kingdom.

G3.04
Controllable Resistive ON- and OFF-States by Two Switching Mechanisms in Epitaxial Strontium Titanate-Based Resistive Switches Markus Kubicek, Rafael Schmitt, Felix Messerschmitt and Jennifer Rupp; Department of Materials, ETH Zurich, Zurich, Switzerland.

G3.05
Enhanced Stability of Ag-SbTe Chalcogenide Solid Electrolyte by Nitrogen Doping Young Sam Park[2] and Seung-Yun Lee[1]; [1]Department of Applied Materials Engineering, Hanbat National University, Daejeon, Korea (the Republic of); [2]ETRI, Daejeon, Korea (the Republic of).

G3.06
YSZ-based NO_2 Sensor Utilizing Hierarchical In_2O_3 Electrode Fangmeng Liu[1, 2], Yehui Guan[1, 2], Ruize Sun[1, 2], Xishuang Liang[1, 2], Peng Sun[1, 2], Yuan Gao[1, 2] and Geyu Lu[1, 2];[1]College of Electronic Science and Engineering, Jilin University, Changchun, China; [2]State Key Laboratory on Integrated Optoelectronics, Jilin University, Changchun, China.

G3.07
Mixed Potential Type Acetone Sensor Using Stabilized Zirconia And $M_3V_2O_8$ (M: Zn, Co, Ni and Mg) Sensing Electrode Fangmeng Liu [1, 2], Yehui Guan[1, 2], Ruize Sun[1, 2], Xishuang Liang [1, 2], Peng Sun[1, 2], Fengmin Liu [1, 2] and Geyu Lu[1, 2]; [1]College of Electronic Science and Engineering, Jilin University, Changchun, China; [2]State Key Laboratory on Integrated Optoelectronics, Jilin University, Changchun, China.

G3.08
Electrolyte Related Parameters of Coulometric Solid State Devices Jens Zosel, Matthias Schelter, Vladimir Vashook, Ulrich Guth and Michael Mertig; Kurt-Schwabe-Institut für Mess- und Sensortechnik e.V. Meinsberg, Waldheim, Germany.

G3.09
Enhanced Ambient-Dependent Photoresponse of $LaAlO_3$/$SrTiO_3$ Heterointerface via Catalytic Pd Nanoparticles Haeri Kim[1, 2], Ngai Yui Chan[3], Ji-yan Dai[3] and Dongwook Kim[1];[1]Physics, Ewha Womans University, Lexington, Kentucky, United States; [2]Clean Energy Research Center, Korea Institute of Science and Technology (KIST), Seoul, Korea (the Republic of); [3]The Hong Kong Polytechnic University, Hong Kong, Hong Kong.

G3.10
Hybrid Organic-Inorganic Perovksite Thin Films for Nonvolatile Memory and Broadband Photodetector Koo Tak Hong[1], Jaeho Choi[1], Ki Chang Kwon[1], Sunghak Park[1], Sooyoung Kim[2], Ki Tae Nam[1] and Ho Won Jang[1]; [1]Materials Science & Engineering, Seoul National University, Seoul, Korea (the Republic of); [2]School of Chemical Engineering and Materials Science, Chung-Ang University, Seoul, Korea (the Republic of).

SESSION I1: Poster Session
I: Ion Transport in Hybrid Organic-Inorganic Solids
Tuesday Afternoon, June 16, 2015
5:20 PM
Keystone Resorts, Red Cloud Peak

I1.01
Hydration and Proton Transfer in DNA-M (M=H, Li, Na) Saki Ito, Hitoki Semizo and Yasumitsu Matsuo; Department of Science and Engineering, Setsunan University, Osaka, Japan.

I1.02
Synthesis and Characterization of Bis (acetylacetonato κ-O, O') [zinc (II)/cobalt (II)] Hybrid Organic-Inorganic Complexes as Solid Metal Organic Precursor Reza Rooydell,Matin Roshanzamir Modaberi, Sanjaya Brahma and Chuan-Pu Liu; MSE Material and Science Engineering, National Cheng Kong University, Tainan, Taiwan.

I1.03 Withdrawn

SESSION J2: Poster Session II
J: Permeation Membranes
Tuesday Afternoon, June 16, 2015
5:20 PM
Keystone Resorts, Red Cloud Peak

J2.01
Oxygen Permeation Characteristics of Strontium Cobaltite Membranes Shivendra K. Jaiswal[2] and Jitendra Kumar[1]; [1]Materials Science, I I T Kanpur, Kanpur, India; [2]Physics, NIT Patna, Patna, India.

J2.02
Investigation of Ceramic Composite Membranes for Hydrogen Gas Separation Jason Fish[1, 2], Sandrine Ricote[3], Ryan O'Hayre[1] and Nikolaos Bonanos[2]; [1]Metallurgical and Materials Engineering, Colorado School of Mines, Golden, Colorado, United States; [2]Energy Conversion and Storage, Technical University of Denmark, Roskilde, Denmark; [3]Mechanical Engineering, Colorado School of Mines, Golden, Colorado, United States.

J2.03
Hydrogen Permeability of TiN_x Thin Films Prepared by RF Reactive Sputtering Chiharu Kura[1], Yoshitaka Aoki[1, 2], Etsushi Tsuji[1, 2] and Hiroki Habazaki[1, 2]; [1]Graduate School of Chemical Sciences and Engineering, Hokkaido University, Sapporo, Japan; [2]Graduate School of Engineering, Hokkaido University, Sapporo, Japan.

J2.04
Influence of Crystal Orientation on the Deuterium Permeation of Cr_2O_3 Coatings Deposited by MOCVD Di He, Shuai Li, Xiaopeng Liu, Yang Lei, Chao Zhang, Shumao Wang and Lijun Jiang; Department of Energy Materials and Technology, General Research Institute for Nonferrous Metals, Beijing, China.

J2.05
The Composite Membrane Based on Sulfonated Graphene Oxide/ Sulfonated Poly(Ether Ether Ketone) for Unitized Regenerative Fuel Cells Seon G. Rho[1] and Ho Y. Jung[2];[1]School of Applied Chemical Engineering, Chonnam National University, Gwangju, Korea (the Republic of); [2]Department of Environment & Energy Engineering, Chonnam National University, Gwangju, Korea (the Republic of).

J2.06
The Application of 3D Imaging Techniques, Simulation and Diffusion Experiments to Explore Transport Properties in Porous OTM Support Materials Bernhard Tjaden[1], Zac Dehaney-Steven[2], Philip Withers[3], Robert Bradley[3], Jonathan Lane[4], Dan J. Brett[1] and Paul R. Shearing[1]; [1]Chemical Engineering, UCL, London, United Kingdom; [2]School of Chemistry, University of St Andrews, St Andrews, United Kingdom; [3]School of Materials, The University of Manchester, Manchester, United Kingdom; [4]Praxair, Inc, Tonawanda, New York, United States.

J2.07
LSCr-ScSZ Composites as Dense Separation Layers in Oxygen Transport Membranes Zonghao Shen, Stephen J. Skinner and John A. Kilner; Materials, Imperial College London, London, United Kingdom.

J2.08
Rapid Oxygen Transport Membrane Evaluation at St Andrews Zac Dehaney-Steven, Despoina Papargyriou and John Irvine; School of Chemistry, University of St Andrews, St Andrews, United Kingdom.

J2.09
Dual Phase Composite Materials as Oxygen Suppliers under Harsh CO_2 and SO_2-Containing Environments Julio Garcia-Fayos[1], Maria Balaguer[1, 2] and Jose M. Serra[1]; [1]ITQ (UPV-CSIC), Valencia, Spain; [2]IEK-1, Forschungszentrum Jülich, Jülich, Germany.

J2.10
Oxygen Transport in $(Ba_{0.5}Sr_{0.5})(Co_{0.8}Fe_{0.2})_{1-x}Y_xO_{3-\delta}$ (x = 0.01…0.1) Determined by ECR Measurements Lana-Simone Unger, Christian Niedrig, Wolfgang Menesklou, Stefan Wagner and Ellen Ivers-Tiffee; Institute for Applied Materials (IAM-WET), Karlsruhe Institute of Technology (KIT) , Karlsruhe, Germany.

J2.11
Chemical State and Electrical Conducting Property of $Ba_{2-x}La_xFe_2O_{5+\delta}$ Tsubasa Sato[1], Takashi Okiba[1], Katsumi Shozugawa[2], Motoyuki Matsuo[2], Fumito Fujishiro[3], Eiki Niwa[1] and Takuya Hashimoto[3]; [1]College of Humanities and Sciences, Nihon University, Setagaya-ku, Japan; [2]College of Arts and Sciences, The University of Tokyo, Meguro-ku, Japan; [3]Kochi University, Faculty of Science, Akebono-cho, Japan.

J2.12
Study of Y-doped $(Ba_{0.5}Sr_{0.5})(Co_{0.8}Fe_{0.2})O_{3-d}$ by Analytical Transmission Electron Microscopy Matthias Meffert[1], Lana S. Unger[2], Heike Stoermer[1], Christian Niedrig[2], Stefan F. Wagner[2], Ellen Ivers-Tiffee[2] and Dagmar Gerthsen[1]; [1]Laboratory for Electron Microscopy (LEM), Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany; [2]Institute of Materials for Electrical and Electronic Engineering (IWE), Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany.

J2.13
Oxygen Non-Stoichiometry and Thermo-Chemical Expansion of Ba0.5Sr0.5Co0.8Fe0.2O3-δ Studied by High Temperature X-Ray Diffraction and Thermogravimetry Mtabazi G. Sahini[1], Julian R. Tolchard[2], Kjell Wiik[1] and Tor Grande[1]; [1]Materials Science and Engineering, Norwegian University of Science and Technology (NTNU), Trondheim, Norway; [2]SINTEF Materialer og kjemi, Trondheim, Norway.

SESSION K3: Poster Session II
K: Proton-Conducting Oxides
Tuesday Afternoon, June 16, 2015
5:20 PM
Keystone Resorts, Red Cloud Peak

K3.01
Effect of Ba Nonstoichiometry in $Ba_x(Zr_{0.8}Y_{0.2})O_{3-\delta}$ on Population of 5-Coordinated Y Joon-Hyung Lee[1], Young-Woo Heo[1], Jeong-Joo Kim[1], Zhehong Gan[2] and Oc Hee Han[3];[1]School of Materials Science & Engineering, Kyungpook National University, Daegu, Korea (the Republic of); [2]National High Magnetic Field Laboratory, Tallahassee, Florida, United States; [3]Korea Basic Science Institute, Western Seoul Center, Seoul, Korea (the Republic of).

K3.02
Studies of Y-Doped Ba (Ce, Zr) O_3 for Electrochemical Promotion Applications Efstratios Stavrakakis and Danai Poulidi; Chemistry and Chemical Engineering, Queen's University Belfast, Belfast, United Kingdom.

K3.03
Moving Boundary Diffusion Mechanism for Non-Monotonic Conductivity Relaxation of Proton Conducting Perovskites Gye-Rok Kim[1], Hyun-Ho Seo[1], Jung-Mo Jo[1], Eui-Chol Shin[1], Ji Haeng Yu[2] and Jong-Sook Lee[1]; [1]Materials Science and Engineering, Chonnam National University, Gwangju, Korea (the Republic of); [2]Korea Institute of Energy Research, Daejeon, Korea (the Republic of).

K3.04
The Influence of NiO Sintering Additive on the Stability and Conductivity of $BaCe_{0.9-x}Zr_xY_{0.1}O_{3-d}$ Proton-Conducting Ceramics Sandrine Ricote[1], Anthony Manerbino[2], David Martinefski[2], W. Grover Coors[2] and Neal P. Sullivan[1]; [1]Department of Mechanical Engineering, Colorado School Of Mines, Golden, Colorado, United States; [2]CoorsTek Inc., Golden, Colorado, United States.

K3.05
Development of Cu-Based Anodes for BZCY72 Proton Ceramic Membrane Reactors Shay A. Robinson[1], Christian Kjoølseth[2], W. Grover Coors[2] and Truls Norby[1]; [1]Chemistry, University of Oslo, Oslo, Norway; [2]Protia AS, Oslo, Norway.

K3.06
Hydrogen Permeation Degradation due to Yttrium Migration in Dense $BaCe_{0.8}Y_{0.2}O_{3-\delta}$-$Ce_{0.8}Y_{0.2}O_{2-\delta}$ Composite-Ceramic Membranes Wade A. Rosensteel, Sandrine Ricote and Neal P. Sullivan; Mechanical Engineering - Colorado Fuel Cell Center, Colorado School of Mines, Golden, Colorado, United States.

K3.07
Correlation between Structural and Transport Properties of Proton-Conducting $Ba_{1-x}Ln_x(Zr,In,Sn)O_{3-\delta}$ (Ln - lanthanides) Oxide Konrad Swierczek[1], Xin Liu[2], Alicja Klimkowicz[1, 3], Wojciech Zajac[1] and Bogdan Dabrowski[4]; [1]Faculty of Energy and Fuels, AGH University of Science and Technology, Kraków, Poland; [2]School of Materials Science and Engineering, University of Science and Technology Beijing , Beijing, China; [3]Department of Engineering Science and Mechanics, Shibaura Institute of Technology, Tokyo, Japan;[4]Department of Physics, Northern Illinois University, DeKalb , Illinois, United States.

K3.08
Studies of Chemical Stability of Dense $BaCe_{0.6-x}Zr_{0.2}Y_{0.2}M_xO_{3-\delta}$ (M-transition metal) Protonic Conductors Mateusz Tarach, T. Jerominek, M. Szymula and Wojciech Zajac; AGH University of Science and Technology, Faculty of Energy and Fuels, Department of Hydrogen Energy, Krakow, Poland.

K3.09
Enhanced Chemical Stability and Sinterability of Refined Proton-Conducting Perovskite: Case Study of $BaCe_{0.5}Zr_{0.3}Y_{0.2}O_{3-\delta}$ Ji Haeng Yu[1], Muhammad Hakim[2], Chung-Yul Yoo[1]and Jong Hoon Joo[1]; [1]Advanced Materials and Devices Lab., Korea Institute of Energy Research, Daejeon, Korea (the Republic of); [2]Advanced Energy Technology, University of Science and Technology, Daejeon, Korea (the Republic of).

K3.10
Effect of Titanium Doping on Structural Stability and Electrical Properties of Proton-Conducting Solid Electrolyte $BaCe_{0.8}Sm_{0.2}O_{3-\delta}$ Hailei Zhao, Chunyang Yang, Zhihong Du, Yongna Shen and Chunli Yan; University of Science and Technology Beijing, Beijing, China.

K3.11
Up-Scaling of Metallic Nanoparticle Production by Electrical Discharge for Use in Catalytic Membrane Reactor Christelle Denonville[1], Jicheng Feng[2], Marie-Laure Fontaine[1], Harald Fjeld[3], Amin A. Azar[1] and Andreas Schmidt-Ott[2]; [1]SINTEF Materials and Chemistry, Oslo, Norway; [2]Delft University of Technology, Delft, Netherlands; [3]PROTIA AS, Oslo, Norway.

K3.12
Proton Conductors Based on Lanthanum Scandate for an Electrolyte of Intermediate Temperature Operating SOFCs Takuya Yamane[1], Fumitada Iguchi[1], Hisahi Kato[2], Takahiro Ouchi[2], Makoto Shimizu[1] and Hiroo Yugami[1]; [1]Graduate School of Engineering, Tohoku University, Sendai, Japan; [2]Tohoku Electric Power Co., Inc., Sendai, Japan.

K3.13
Ni - $BaCe_{0.89}Gd_{0.1}Cu_{0.01}O_3$ as Perspective Anode Material for Proton-Conducting SOFC Denis Osinkin[1], Nina Bogdanovich[1], Elena Pikalova[1, 2] and Dimitry Bronin[1, 2]; [1]Laboratory of SOFC, Institution of High Temperature Electrochemistry, Yekaterinburg, Russian Federation; [2]Ural Federal University, Yekaterinburg, Russian Federation.

K3.15
Development of Anode-Supported Electrochemical Cell Based on Proton-Conductive $Ba(CeZr)O_3$ Electrolyte Toshiaki Yamaguchi, Hiroyuki Shimiada, Haruo Kishimoto and Yoshinobu Fujishiro; National Institute of Advanced Industrial Science and Technology, Nagoya, Japan.

K3.14
Electrical Properties of Nonstoichiometric $Ba_xZr_{0.85}Y_{0.15}O_{2.925}$ Ceramics Prepared by Solid State Reactive Sintering Nahum Maso[1], Jonathan . Polfus[2], Marie-Laure Fontaine[2] and Truls E. Norby[1]; [1]Chemistry, University of Oslo, Oslo, Norway; [2]SINTEF Materials and Chemistry, Oslo, Norway.

K3.16
Transport Kinetics of the Mixed Conductor Lanthanum Tungstate Andreas Falkenstein[1, 2] and Manfred Martin[1, 2]; [1]Institute of Physical Chemistry I, RWTH Aachen University, Aachen, Germany; [2]JARA-ENERGY, Aachen, Germany.

K3.17
Surface Segregation in Sr Doped $LaNbO_4$: Implications for Proton Transport Cheng Li and Stephen J. Skinner; Department of Materials, Imperial College London, London, United Kingdom.

K3.18
Impedance Spectroscopy on Proton Conducting Oxides $La_{1-x}A_xNbO_4$ (x=Sr,Ca) Su-Hyun Moon, Dieu Nguyen, Dong-Chun Cho, Young-Hun Kim, Eui-Chol Shin, John G. Fisher and Jong-Sook Lee; School of Materials Science and Engineering, Chonnam National University, Gwangju, Korea (the Republic of).

K3.19
Cation Diffusion in Proton Conducting Lanthanum Tungstate Einar Vollestad and Reidar Haugsrud; Department of Chemistry, University of Oslo, Oslo, Norway.

K3.20
Thermodynamics and Stoichiometry Relaxation Kinetics in Materials with Three Carriers: Analytic Relations and Numerical Simulations Daniel Poetzsch, Rotraut Merkle and Joachim Maier; MPI for Solid State Research, Stuttgart, Germany.

K3.21
Nanoscale Stabilization of Scheelite-Type Structure in $La_{0.99}Ca_{0.01}NbO_4$ Thin Films Cristina Tealdi[1, 2], Eliana Quartarone[1, 2], Piercarlo Mustarelli[1, 2] and Lorenzo Malavasi[1, 2];[1]Department of Chemistry, University of Pavia , Pavia, Italy; [2]UdR Pavia, INSTM, Pavia, Italy.

K3.22
Modeling of Defect Segregation and Space-Charge Formation in Proton-Conducting Oxides Edit E. Helgee, Anders Lindman and Goeran Wahnstroem; Applied Physics, Chalmers University of Technology, Gothenburg, Sweden.

ORAL PRESENTATIONS

WEDNESDAY June 17, 2015

ISSI ELECTION

Keystone Resorts, Shavano Peak
8:00 AM - 9:00 AM

All SSI-20 attendees are encouraged to attended the ISSI Election. The new ISSI Vice President and Board of Directors' members will be elected.

PLENARY

SESSION L3: Plenary III
Chair: Klaus Funke
Wednesday Morning, June 17, 2015
Keystone Resorts, Shavano Peak

9:15 AM INTRODUCTION

9:25 AM L3.01
Electrode Kinetics in the Solid State Juergen Janek; Institute of Physical Chemistry, Justus-Liebig University, Giessen, Germany.

A: Solid Oxide Fuel Cells and Electrolyzers

* Invited Speaker
** Keynote Speaker

SESSION A7: SOFC
A: Solid Oxide Fuel Cells and Electrolyzers
Chair: Stephen Skinner
Wednesday Morning, June 17, 2015
Keystone Resorts, Longs Peak

10:10 AM BREAK

10:30 AM **A7.01
SOFC Cathode Oxygen Reduction Reaction Mechanisms under Real World Conditions Eric D. Wachsman, Y. L. Huang, C. Pellegrinelli, J. A. Taillon and L. G. Salamanca-Riba; University of Maryland Energy Research Center, University of Maryland, College Park, Maryland, United States.

11:00 AM A7.02
Correlation Between Cation Ordering and Oxygen Vacancies in Layered Double Perovskite Cathodes Carlos Bernuy-Lopez, Mari-Ann Einarsrud and Tor Grande; NTNU, Trondheim, Norway.

11:20 AM A7.03
Fabrication and Performance of Stainless Steel-Supported SOFC Kun Joong Kim, Byung Hyun Park, Sun Jae Kim and Gyeong Man Choi; Mat. Sci. & Eng., POSTECH, Pohang, Korea (the Republic of).

11:40 AM A7.04
Cobalt-Free Polycrystalline $Ba_{0.95}La_{0.05}FeO_{3-\delta}$ Thin Films as Cathodes for Intermediate-Temperature Solid Oxide Fuel Cells Francesco Ciucci[1, 2], Chi Chen[1] and Dengjie Chen[1];[1]Mechanical and Aerospace Engineering, The Hong Kong University of Science and Technology, Kowloon, Hong Kong; [2]Chemical and Biomolecular Engineering, The Hong Kong University of Science and Technology, Kowloon, Hong Kong.

B: Polymer Electrolyte Fuel Cells and Electrolyzers

SESSION B3: PEMFC/DMFC II
B: Polymer Electrolyte Fuel Cells and Electrolyzers
Chair: Thomas Zawodzinski
Wednesday Morning, June 17, 2015
Keystone Resorts, Quandary Peak I/II

10:10 AM BREAK

10:30 AM OPEN DISCUSSION

11:00 AM B3.02
Anion Transport in Polymer Electrolytes Andrew Herring, Ashley Maes, Himanshu Sarode, Ye Liu and Tara Pandey; Chemical and Biological Engineering, Colorado School of Mines, Golden, Colorado, United States.

11:20 AM B3.03
Effect of Hydration on Mechanical Properties of Anion Exchange Membranes Benjamin Caire, Melissa Vandiver, Andrew Herring and Matthew W. Liberatore; Chemical and Biological Engineering, Colorado School of Mines, Golden, Colorado, United States.

11:40 AM B3.04
Fundamental Understanding of Water Contribution for Ion Mobility in Anion Exchange Membranes Applied in Alkaline Fuel Cells Ye Liu[1], Bingzi Zhang[2], Söenke Seifert[3], Yuan Yang[4], Yushan Yan[2], Matthew Liberatore[1] and Andrew Herring[1]; [1]Chemical Engineering, Colorado School of Mines, Golden, Colorado, United States; [2]Chemical Engineering, University of Delaware, Newark, Delaware, United States; [3]Argonne National Laboratory, Argonne, Illinois, United States; [4]Chemistry, Colorado School of Mines, Golden, Colorado, United States.

C: Electrodes and Solid Electrolytes for Batteries

SESSION C9: Characterization of Nanoscale and Local Structures II
C: Electrodes and Solid Electrolytes for Batteries
Chair: Miran Gaberscek
Wednesday Morning, June 17, 2015
Keystone Resorts, Shavano Peak

10:10 AM BREAK

10:30 AM C9.01
A Simple *In Situ* Approach to Study the Solid Electrolyte / Lithium Interphase by Photoelectron Spectroscopy Thomas Leichtweiss, Sebastian Wenzel, Dominik Krueger, Achim Kronenberger, Joachim Sann and Juergen Janek; Institute of Physical Chemistry, Justus-Liebig-University Giessen, Giessen, Germany.

10:50 AM C9.02
***Operando* SAXS/WAXS Measurements of Amorphous and Nano-Crystalline Anodes for Na-Ion Batteries** Sabrina Sartori; Department of Physics, University of Oslo, Oslo, Norway.

11:10 AM C9.03
***In Situ* Raman Spectroscopy of Thin-Film Battery Li/Li_3PO_4/$LiMn_2O_4$ Using a Transparent Electrode** Naoakai Kuwata[1], Tatsunori Okawa[1], Yasutaka Matsuda[1], Osamu Kamishima[2]and Junichi Kawamura[1]; [1]IMRAM, Tohoku University, Sendai, Japan; [2]Faculty of Science and Engineering, Setsunan University, Neyagawa, Japan.

11:30 AM C9.04
Pore Collapse and Regrowth in Silicon Electrodes for Rechargeable Batteries Steven C. DeCaluwe[2, 1, 4], Bal-Mukund Dar[3], Joseph A. Dura[2] and Howard Wang[3, 4, 5]; [1]NIST Center for Neutron Research, Gaithersburg, Maryland, United States; [2]Mechanical Engineering, Colorado School of Mines, Golden, Colorado, United States; [3]Institute for Materials Research and Dept. of Mechanical Engineering, State University of New York, Binghamton, New York, United States; [4]Materials Science and Engineering, University of Maryland, College Park, Maryland, United States; [5]Material Measurement Laboratory, National Institute of Standards and Technology, Gaithersburg, Maryland, United States.

I: Ion Transport in Hybrid Organic-Inorganic Solids

SESSION I2: Ion Transport in Hybrid Perovskites
I: Ion Transport in Hybrid Organic-Inorganic Solids
Chair: Hemamala Karunadasa
Wednesday Morning, June 17, 2015
Keystone Resorts, Grays Peak I/II

10:10 AM BREAK

10:30 AM **I2.01
Electromigration of Ions in Hybrid Perovskites for Switchable Photovoltaic, Memristors and Synapses Jinsong Huang; Department of Mechanical and Materials Engineering, University of Nebraska, Lincoln, Lincoln, Nebraska, United States.

11:00 AM I2.02
Photo-Induced Instability in Mixed Halide Perovskite Absorbers Daniel Slotcavage[1], Eric Hoke[1], Emma Dohner[2], Andrea Bowring[1], Hemamala Karunadasa[2] and Michael McGehee[1];[1]Materials Science & Engineering, Stanford University, Stanford, California, United States; [2]Chemistry, Stanford University, Stanford, California, United States.

11:20 AM I2.03
Ionic Conductivity in 3-D Organic-Inorganic Mixed Halide Perovskites Abraham Saldivar Valdes and Hemamala Karunadasa; Chemistry, Stanford University, Stanford, California, United States.

11:40 AM I2.04
Uniform Perovskite Layers for Low Hysteresis Planar Heterojunction Solar Cells Yanbo Li[1, 2], Ian D. Sharp[2] and Francesca Maria Toma[1, 2]; [1]Lawrence Berkeley National Lab, Berkeley, California, United States; [2]Joint Center for Artificial Photosynthesis, Berkeley, California, United States.

J: Permeation Membranes

SESSION J3: Permeation Membranes I
J: Permeation Membranes
Chairs: Jonathan Lane and Martin Sogaard
Wednesday Morning, June 17, 2015
Keystone Resorts, Grays Peak III

10:10 AM BREAK

10:30 AM **J3.01
Advances in ITM Technology for Oxygen and Syngas Production Michael F. Carolan[1], Lori L. Anderson[1], Phillip A. Armstrong[1], Robert R. Broekhuis[1], Charles M. Woods[1], Mark Hutcheon[1], Charles A. Lewinsohn[2], Jack Chen[2] and Dale Taylor[2]; [1]Air Products and Chemicals, Inc., Allentown, Pennsylvania, United States; [2]Ceramatec, Inc. , Salt Lake City, Utah, United States.

11:00 AM J3.02
Lattice Structure and Oxygen Permeability of In-Doped $BaFeO_{3-\delta}$ Perovskite-Type Oxides Yao Lu[1], Hailei Zhao[1], Xing Cheng[1], Kun Zheng[2] and Konrad Swierczek[2]; [1]University of Science and Technology Beijing, Beijing, China; [2]AGH University of Science and Technology, Krakow, Poland.

11:20 AM *J3.03
Influence of Yttrium Doping on $Ba_{0.5}Sr_{0.5}Co_{0.8}Fe_{0.2}O_{3-\delta}$ Lana-Simone Unger[1], Stefan Baumann[2], Christian Niedrig[1], Wolfgang Menesklou[1], Stefan Wagner[1], Wilhelm A. Meulenberg[2]and Ellen Ivers-Tiffee[1]; [1]Institute for Applied Materials (IAM-WET), Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany; [2]Institute of Energy and Climate Research IEK-1 Materials Synthesis and Processing, Forschungszentrum Jülich GmbH, Jülich, Germany.

11:40 AM J3.04
Stability and Oxygen Permeability of Sol-Gel Derived $SrCo_{0.8}Fe_{0.2}O_{3-\delta}$ Based Compound Membranes Vijay K. Kashyap and Jitendra Kumar; Materials Science, I I T Kanpur, Kanpur, India.

ORAL PRESENTATIONS

THURSDAY June 18, 2015

PLENARY

SESSION L4: Plenary IV
Chair: Maria Forsyth
Thursday Morning, June 18, 2015
Keystone Resorts, Shavano Peak

9:15 AM INTRODUCTION

9:25 AM L4.01
On the Mechanism of Cation Translocation across Channelrhodopsin Joachim Heberle; Experimental Molecular Biophysics, Freie Universität Berlin, Berlin, Germany.

A: Solid Oxide Fuel Cells and Electrolyzers

* Invited Speaker
** Keynote Speaker

SESSION A8: SOEC
A: Solid Oxide Fuel Cells and Electrolyzers
Chair: Steven McIntosh
Thursday Morning, June 18, 2015
Keystone Resorts, Longs Peak

10:10 AM BREAK

10:30 AM **A8.01
Prospects and Challenges of Solid Oxide Electrolysis Peter V. Hendriksen[1], Ming Chen[1], Ragnar Kiebach[1], Xiufu Sun[1], Karsten Agersted[1], Yi-Lin Liu[1], Sebastian Molin[1], Sune D. Ebbesen[1], Christopher Graves[1], Anne Hauch[1], Karen Brodersen[1], Mogens B. Mogensen[1], Johan Hjelm[1], Soren H. Jensen[1], Christodoulos Chatzichristodoulou[1] and Brian V. Mathiesen[2];[1]Department of Energy Conversion and Storage, Technical University of Denmark, Roskilde, Denmark; [2]Department of Development and Planning, Aalborg University, Copenhagen SV, Denmark.

11:00 AM A8.02
Surface and Bulk Properties of Polarized Mixed Conducting LSF Electrodes: An in-situ Study in H_2/H_2O and O_2 by Simultaneous near-Ambient Pressure XPS and Impedance Spectroscopy Alexander K. Opitz[1], Andreas Nenning[1], Sandra Kogler[1], Christoph Rameshan[2], Raffael Rameshan[3, 4], Raoul Blume[4, 5], Michael Haevecker[4, 5], Axel Knop-Gericke[4], Guenther Rupprechter[2], Bernhard Kloetzer[3] and Juergen Fleig[1]; [1]Insititute of Chemical Technologies and Analytics, Vienna University of Technology, Vienna, Austria; [2]Institute of Materials Chemistry, Vienna University of Technology, Vienna, Austria; [3]Institute of Physical Chemistry, University of Innsbruck, Innsbruck, Austria; [4]Department of Inorganic Chemistry, Fritz Haber Institute of the Max Planck Society, Berlin, Germany; [5]Catalysis for Energy, Group E-GKAT, Helmholtz-Zentrum Berlin fuer Materialien und Energie GmbH, Berlin, Germany.

11:20 AM A8.03
Infiltrated Double Perovskite Electrodes for Proton Conducting Steam Electrolysers Einar Vollestad, Ragnar Strandbakke and Truls Norby; Department of Chemistry, University of Oslo, Oslo, Norway.

11:40 AM A8.04
Compositional Engineering of Perovskite Oxides for Highly Efficient Oxygen Reduction Reactions Chi Chen[1], Dengjie Chen[1], Zongping Shao[2] and Francesco Ciucci[1]; [1]Mechanical and Aerospace Engineering, Hong Kong University of Science and Technology, Kowloon, Hong Kong; [2]Nanjing Tech University, Nanjing, China.

SESSION A9: SOFC—Electrolytes II, Anodes
A: Solid Oxide Fuel Cells and Electrolyzers
Chairs: John Irvine and Manfred Martin
Thursday Afternoon, June 18, 2015
Keystone Resorts, Longs Peak

1:30 PM *A9.01
Oxide Ion Conductivity in Doped $LnBaInO_4$(Ln=La, Nd) Tatsumi Ishihara[1], Yu Yan[2], Takaaki Sakai[2] and Shintaro Ida[2]; [1]International Institute for Carbon Neutral Energy Research, Kyushu University, Fukuoka, Japan; [2]Department of Applied Chemistry, Faculty of Engineering, Kyushu University, Fukuoka, Japan.

1:50 PM A9.02
Double Perovskite Oxide $Sr_2FeMo_{2/3}Mg_{1/3}O_6$ as Redox Stable Anode Material for Solid Oxide Fuel Cells Zhihong Du, Hailei Zhao, Yang Zhang and Mengya Fang; University of Science and Technology Beijing, Beijing, China.

2:10 PM A9.03
Structural and Transport Properties of Doped LAMOX - Electrolytes for IT SOFC Svetlana Pavlova[1], Yuliya Bespalko[1], Vladislav Sadykov[1], Vladimir Pelipenko[1], Nikita Eremeev[1], Tamara Krieger[1], Yurii Chesalov[1], Ekaterina Sadovskaya[1], Artem Ulihin[2], Nikolai Uvarov[2] and Alevtina Smirnova[3]; [1]Boreskov Institute of Catalysis SB RAS, Novosibirsk, Russian Federation; [2]Institute of Solid State Chemistry SB RAS, Novosivirsk, Russian Federation; [3]South Dakota School of Mines and Technology, Rapid City, South Dakota, United States.

2:30 PM A9.04
Ubiquitous Current Constriction Impedance in Oxide Ion Conductors Described by Capacitance Spectroscopy Young-Hun Kim[1], Su-Hyun Moon[1], Dong-Chun Cho[1], Eui-Chol Shin[1], Ji Haeng Yu[3], Jong-Ho Lee[2] and Jong-Sook Lee[1]; [1]Materials Science and Engineering, Chonnam National University, Gwangju, Korea (the Republic of); [2]Korea Institute of Science and Technology, Seoul, Korea (the Republic of); [3]Korea Institute of Energy Research, Daejeon, Korea (the Republic of).

2:50 PM A9.05
Factors Impacting Chemical Expansion in Perovskite Oxides Nicola H. Perry[1, 2], Dario Marrocchelli[3], Harry L. Tuller[2, 1] and Sean R. Bishop[2, 1]; [1]I2CNER, Kyushu University, Nishi-ku, Fukuoka, Japan; [2]Materials Science and Engineering, MIT, Cambridge, Massachusetts, United States; [3]Nuclear Science and Engineering, MIT, Cambridge, Massachusetts, United States.

3:10 PM BREAK

3:30 PM *A9.06
Sintering-Resistant Metal Nanoparticles for High Temperature Electrocatalysis Yoonseok Choi, Siwon Lee and WooChul Jung; DMSE, KAIST, Daejeon, Korea (the Republic of).

3:50 PM A9.07
Evaluation of Degradation Behavior of Ni-YSZ Using Electrochemical Capacitance Mirai Takeda[1], Keiji Yashiro[1], Shinichi Hashimoto[2] and Tatsuya Kawada[1]; [1]Graduate School of Environment Studies, Tohoku University , Sendai, Japan; [2]Graduate School of Engineering, Tohoku University , Sendai, Japan.

4:10 PM A9.08
Ca_2MnAlO_5 and $La_4Ti_2O_{10}$ Derivatives as Potential SOFC's Anodes Xavier Flandre, Ibtissam Kehal, Christian Eroume, Aurelie Rolle, Edouard Capoen, Axel Loefberg and Rose-Noelle Vannier; Solid State Chemistry, Unit of Catalysis and Solid state Chemistry, Villeneuve d'Ascq, France.

4:30 PM A9.09
Thin Film Carbide Anodes for Solid Oxide Fuel Cells Jun Jiang, Xiaofei Guan and Shriram Ramanathan; School of Engineering and Applied Sciences, Harvard University, Cambridge, Massachusetts, United States.

4:00 PM A9.10
Nanoscaled Ni/YSZ Anodes for Solid Oxide Fuel Cells: Processing and Characterization Dino Klotz[1], Julian T. Szasz[1], Heike Stoermer[2], Dagmar Gerthsen[2] and Ellen Ivers-Tiffee[1];[1]Institute for Applied Materials (IAM-WET), Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany; [2]Laboratorium für Elektronenmikroskopie (LEM), Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany.

5:10 PM A9.11
Redox Stability and Electrical Properties of $Sr_{1-x}Y_xV_{1-y}Nb_yO_3$ for Prospective SOFC Anodes Javier Macias, Aleksey Yaremchenko and Jorge Frade; Department of Materials and Ceramic Engineering, University of Aveiro, Aveiro, Portugal.

B: Polymer Electrolyte Fuel Cells and Electrolyzers

SESSION B4: PEMFC/DMFC III
B: Polymer Electrolyte Fuel Cells and Electrolyzers
Chair: Vito Di Noto
Thursday Afternoon, June 18, 2015
Keystone Resorts, Grays Peak III

1:30 PM *B4.01
Nano-Structured Aromatic Ionomers for PEMFC Cristina Iojoiu[1, 2], Huu Dat Nguyen[2, 1], Olesia Danyliv[1, 2] and Sandrine Lyonnard[3]; [1]LEPMI, CNRS, Saint Martin d'Hères, France;[2]Grenoble University, Saint Martin D'Hères , France; [3]INAC SPrAM, CEA Grenoble, Grenoble, France.

1:50 PM B4.02
Nafion/Zirconium Sulfonylphosphonate Composite Membranes for DMFC and PEMFC Kun-lin Liu[1], Chia-Chin Hsu[1], Cheng-Wei Pai[1], Ying-Ling Liu[2] and Chi-Yang Chao[2];[1]Materials Science and Engineering, National Taiwan University, Taipei, Taiwan; [2]Department of Chemical Engineering, National Tsing Hua University, Taipei, Taiwan.

2:10 PM B4.03
Preparation and Properties of DMFC Membranes from Polymer-Brush Nanoparticles Ilya Zharov[1, 2] and Shelley D. Minteer[1, 2]; [1]Chemistry, University of Utah, Salt Lake City, Utah, United States; [2]Materials Science and Engineering, University of Utah, Salt Lake City, Utah, United States.

2:30 PM B4.04
Activity Trends and Design Principles for Multi-Transition-Metal (Oxy)hydroxide Oxygen Evolution Catalysts Shannon W. Boettcher; Chemistry, University of Oregon, Eugene, Oregon, United States.

2:50 PM B4.05
Synthesis and Characterization of Pd-Ni-Sn Electrocatalyst for Use in Direct Ethanol Fuel Cells Sompoch Jongsomjit[1], Paweena Prapainainar[2, 3, 4] and Korakot Sombatmankhong[5];[1]Interdisciplinar y Graduate Program in Advanced and Sustainable Environmental Engineering (International Program),Faculty of Engineering, Kasetsart University , Ladyao, Jatujak, Thailand; [2]Department of Chemical Engineering, Faculty of Engineering, Kasetsart University, Ladyao, Jatujak, Thailand; [3]National Center of Excellence for Petroleum, Petrochemicals and Advance Material, Kasetsart University, Ladyao, Jatujak, Thailand; [4]Department of Chemistry and NANOTEC Center for Nanoscale Materials Design for Green Nanotechnology, Kasetsart University, Ladyao, Jatujak, Thailand; [5]National Metal and Materials Technology Center, Thanon Phahonyothin, Tambon Khlong Nueng, Amphoe Khlong Luang, Thailand.

C: Electrodes and Solid Electrolytes for Batteries

SESSION C10: Fundamentals of LIB Electrodes I
C: Electrodes and Solid Electrolytes for Batteries
Chair: William Chueh
Thursday Morning, June 18, 2015
Keystone Resorts, Shavano Peak

10:10 AM BREAK

10:30 AM **C10.01
The Ultimate Limits of Intercalation Reactions for Battery Electrodes Stanley Whittingham; NECCES, SUNY, Binghamton, New York, United States.

11:00 AM *C10.02
Parameters Influencing Reversible Intercalation of Cations in Spinel Oxides Jordi Cabana; Chemistry, University of Illinois at Chicago, Chicago, Illinois, United States.

11:20 AM C10.03
Revealing the Origins of Lithiation Heterogeneities in $LiFePO_4$ Using Nanoscale Chemical Imaging Yiyang Li[1], William E. Gent[1], Jongwoo Lim[1], Johanna Nelson Weker[2], Norman Jin[1], Sophie Meyer[1], Daniel A. Cogswell[3], Tolek Tyliszczak[4] and William C. Chueh[1]; [1]Stanford University, Stanford, California, United States; [2]SLAC National Accelerator Center, Menlo Park, California, United States; [3]Samsung Advanced Institute of Technology-America, Cambridge, Massachusetts, United States; [4]Berkeley National Laboratory, Berkeley, California, United States.

11:40 AM C10.04
Computational Identification and Experimental Realisation of Lithium Vacancy Introduction into the Olivine $LiMgPO_4$ Leopoldo Enciso-Maldonado[1], Matthew S. Dyer[1], Michael D. Jones[1], Ming Li[1], Michael J. Pitcher[1], Mona K. Omir[1], John B. Claridge[1], Frederic Blanc[1, 2] and Matthew J. Rosseinsky[1]; [1]Department of Chemistry, University of Liverpool, Liverpool, United Kingdom; [2]Stephenson Institute for Renewable Energy, University of Liverpool, Liverpool, United Kingdom.

SESSION C11: Beyond Lithium
C: Electrodes and Solid Electrolytes for Batteries
Chair: Scott Barnett
Thursday Afternoon, June 18, 2015
Keystone Resorts, Shavano Peak

1:30 PM *C11.01
Room-Temperature Sodium-Ion Batteries: Improving the Rate Capability Using Porous Carbon Networks Yan Yu, Joachiam Maier and Changbao Zhu; Max Planck Institute for Solid State Research, Stuttgart, Germany.

1:50 PM C11.02
Recent Progress for Room-Temperature Stationary Sodium-Ion Batteries Yong-Sheng Hu; Key Laboratory for Renewable Energy, Institute of Physics, Chinese Academy of Sciences, Beijing, China.

2:10 PM C11.03
Structural Study of $Na_{2/3}[Ni_{1/3}Ti_{2/3}]O_2$ Using Neutron Diffraction and Atomistic Simulations for Na-Ion Batteries Rengarajan Shanmugam and Wei Lai; CHEMS, Michigan State University, East Lansing, Michigan, United States.

2:30 PM C11.04
Electrochemical Properties for MXene $Ti_3C_2T_x$ as Negative Electrode in a Non-Aqueous Sodium-Ion Electrolyte Satoshi Kajiyama, Hiroki Iinuma, Masashi Okubo and Atsuo Yamada; Department of Chemical System Engineering, School of Engineering, The University of Tokyo, Tokyo, Japan.

2:50 PM C11.05
Amorphous Cathodes for Magnesium Batteries Timothy S. Arthur, Keiko Kato, Fuminori Mizuno and Jason Germain; Materials Research, Toyota Research Institute of North America, Ann Arbor, Michigan, United States.

3:10 PM BREAK

3:30 PM C11.06
Magnesium Ion Intercalation into a Spinel like *λ*-Manganese Oxide Ryan D. Bayliss[1], Chunjoong Kim[1], Tanghong Yi[1], Abdullah Adil[1], Patrick J. Phillips[2], Baris Key[3], Young-Sang Yu[4], Tiffany L. Kinnibrugh[5], Karena W. Chapman[5], Peter J. Chupas[5], Robert K. Klie[2] and Jordi Cabana[1]; [1]Department of Chemistry, University of Illinois at Chicago, Chicago, Illinois, United States; [2]Department of Physics, University of Illinois at Chicago, Chicago, Illinois, United States; [3]Chemical Sciences and Engineering Division, Argonne National Laboratory, Argonne, Illinois, United States; [4]Advanced Light Source, Lawrence Berkeley National Laboratory, Berkeley, California, United States; [5]Advanced Photon Source, Argonne National Laboratory, Argonne, Illinois, United States.

3:50 PM C11.07
Rechargeable Magnesium Battery Using Polyanion Compounds Cathode and Triglyme Electrolyte Yuki Orikasa, Titus Masese, Yukinori Koyama, Takuya Mori, Masashi Hattori, Kentaro Yamamoto, Cedric Tassel, Yoji Kobayashi, Takeshi Abe, Hiroshi Kageyama and Yoshiharu Uchimoto; Kyoto University, Kyoto, Japan.

4:10 PM C11.08
Reversible Intercalation of Multivalent Ions into Nanostrctured Vanadium Oxide Cathodes Premkumar Senguttuvan and Christopher S Johnson; Chemical Sciences and Engineering, Argonne National Laboratory, Argonne, Illinois, United States.

4:30 PM C11.09
Data-Driven Models of Ion Conduction for Rapid Screening of New Generation Conductors Using Statistical Methods Austin Sendek[1], Qian Yang[3], Yi Cui[2] and Evan Reed[2]; [1]Applied Physics, Stanford University, Stanford, California, United States; [2]Materials Science, Stanford University, Stanford, California, United States; [3]Institute for Computational and Mathematical Engineering, Stanford University, Stanford, California, United States.

D: Fundamentals of Transport and Reactivity and Nanoionics

SESSION D7: Fundamentals of Transport and Reactivity and Nanoionics V
D: Fundamentals of Transport and Reactivity and Nanoionics
Chair: Jennifer Rupp
Thursday Morning, June 18, 2015
Keystone Resorts, Grays Peak I/II

10:10 AM BREAK

10:30 AM **D7.01
Oxygen Thermotransport in Mixed Conductor Oxides Han-Ill Yoo; Materials Science and Engineering, Seoul National University, Seoul, Korea (the Republic of).

11:00 AM D7.02
Reduction of the Grain Boundary Resistance in Yttria Stabilized Zirconia Thin Films: Incorporation of Mg^{2+} from the Substrate Edmund M. Mills[1], Matthias Kleine-Boymann[2], Juergen Janek[2], Hao Yang[1], Nigel Browning[3], Yayoi Takamura[1] and Sangtae Kim[1]; [1]CHMS, UC Davis, Davis, California, United States; [2]Institute of Physical Chemistry, Justus-Liebig University Geissen, Geissen, Germany; [3]Pacific Northwest National Laboratory, Richland, Washington, United States.

11:20 AM D7.03
Determination of Transport Coefficients *D* and *K* in Materials Having Mixed Ionic-Electronic Conductivity Kun Zheng[1], Konrad Swierczek[1], Alicja Klimkowicz[1, 2] and Grzegorz Brus[1]; [1]Faculty of Energy and Fuels, AGH University of Science and Technology, Kraków, Poland; [2]Department of Engineering Science and Mechanics, Shibaura Institute of Technology, Tokyo, Japan.

11:40 AM D7.04
Oxide-Ion Conduction with Strong Correlation in Apatite-Type Lanthanum Silicate Kazuaki Toyoura[1], Kouta Imaizumi[1], Atsutomo Nakamura[1] and Katsuyuki Matsunaga[1, 2];[1]Nagoya University, Nagoya, Japan; [2]Japan Fine Ceramics Center, Nagoya, Japan.

SESSION D8: Fundamentals of Transport and Reactivity and Nanoionics VI
D: Fundamentals of Transport and Reactivity and Nanoionics
Chairs: Roger De Souza and Han-Ill Yoo
Thursday Afternoon, June 18, 2015
Keystone Resorts, Grays Peak I/II

1:30 PM *D8.01
The Transport Properties of Dislocations in the Perovskite-Oxide SrTiO Roger A. De Souza; Institute of Physical Chemistry, RWTH Aachen University, Aachen, Germany.

1:50 PM D8.02
Driving Forces Related to Acceptor-Oxygen Vacancy Defect Complex Formation in Perovskite Oxides Russell Maier; NIST, Gaithersburg, Maryland, United States.

2:10 PM D8.03
Conductivity Relaxation Experiments on Donor Doped Barium Titanate Ceramics: Effect of Microstructure Wolfgang Preis and Werner Sitte; Chair of Physical Chemistry, Montanuniversitaet Leoben, Leoben, Austria.

2:30 PM D8.04
Oxygen Diffusion/Exchange Processes in Two-Dimensional $Ln_2NiO_{4+\delta}$ (Ln=La, Pr, and Nd) Single Crystals: IEDP/LEIS Measurements Jean-Marc Bassat[2], Helena Tellez[1], Monica Burriel[3], M. Ceretti[4], Remi Castaing[2, 3], W. Paulus[4], A. Villesuzanne[2], P. Veber[2], Tatsumi Ishihara[1] and John Kilner[1, 3]; [1]Hydrogen Production Division, International Institute for Carbon-Neutral Energy Research, Fukuoka, Japan; [2]Institut de Chimie de la Matière Condensée de Bordeaux, Pessac, France; [3]Department of Materials, Imperial College London, London, United Kingdom; [4]Institut Charles Gerhardt, Montpellier, France.

2:50 PM D8.05
Influence of Dislocations on Electrical and Chemical Properties in Metal Oxides Lixin Sun[1], Dario Marrocchelli[1] and Bilge Yildiz[1, 2]; [1]Department of Nuclear Science and Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts, United States; [2]Department of Material Science and Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts, United States.

3:10 PM BREAK

3:30 PM *D8.06
Space Charge Layers and Their Role in Properties of Interfaces in Solid State Ionics Truls Norby; Department of Chemistry, University of Oslo, Oslo, Norway.

3:50 PM D8.07
Defect Chemistry of CeO_2 Surfaces from First Principles and Space Charge Theory Tor S. Bjorheim[1], Eugene Kotomin[2] and Joachim Maier[2]; [1]FASE, Department of Chemistry, University of Oslo, Oslo, Norway; [2]Max Planck Institute for Solid State Research, Stuttgart, Germany.

4:10 PM D8.08
On Determining the Built-In Potential at Grain Boundaries in Ion-Conducting Oxides Sangtae Kim[1], Seong K. Kim[1], Sergey Khodorov[2] and Igor Lubomirsky[2]; [1]University of California, Davis, Davis, California, United States; [2]Weizmann Institute of Science, Rehovot, Israel.

4:30 PM D8.09
Solid Oxide-Molten Carbonate Nanocomposite Fuel Cells II: Surface Charge Effects Mehmet Ali Gulgun[1, 2], Yelda Yorulmaz[1], Hazal Batili[1], Cinar Oncel[1], Shalima Shawuti[3] and Miran Ceh[4]; [1]FENS, Sabanci University, Istanbul, Turkey; [2]Nanotechnology Application Center, Sabanci University, Istanbul, Turkey; [3]Physics Dept, Istanbul University, Istanbul, Turkey;[4]Department for Nanostructured Materials, Josef Stefan Institute, Ljubljana, Slovenia.

4:50 PM D8.10
Accurate Measurement of Fast Grain Boundary Ionic Diffusion by ToF-SIMS Depth Profiling with Selective Attenuation of Specific Secondary Ions (SASI) Helena Tellez[1], John Druce[1], Tatsumi Ishihara[1, 2] and John Kilner[3, 1]; [1]Hydrogen Production Division, International Institute for Carbon-Neutral Energy Research, Fukuoka, Japan; [2]Department of Applied Chemistry, Kyushu University, Fukuoka, Japan; [3]Department of Materials, Imperial College London, London, United Kingdom.

J: Permeation Membranes

SESSION J4: Permeation Membranes II
J: Permeation Membranes
Chairs: Henny Bouwmeester and Robert Kee
Thursday Morning, June 18, 2015
Keystone Resorts, Grays Peak III

10:10 AM BREAK

10:30 AM **J4.01
Dual Phase Membranes for Oxygen Separation Martin Sogaard, Jonas Gurauskis, Andreas Kaiser, Peter V. Hendriksen and Wolff-Ragnar Kiebach; Department of Energy Conversion and Storage, Technical University of Denmark, Roskilde, Denmark.

11:00 AM J4.02
Phase Inversion Tape Casting and Oxygen Permeation Properties of $Zr_{0.84}Y_{0.16}O_{1.92}$-$La_{0.8}Sr_{0.2}Cr_{0.5}Fe_{0.5}O_{3-\delta}$ Dual-Phase Composite Membranes with Asymmetric Structure Yu Zhang, Ronghua Yuan, Jianfeng Gao and Chusheng Chen; University of Science and Technology of China, Hefei, China.

11:20 AM J4.03
Microstructural Influence on Oxygen Transport of $Ce_{0.8}Gd_{0.2}O_{2-\delta}$ - $FeCo_2O_4$ Dual Phase Membrane Madhumidha Ramasamy[1], Stefan Baumann[1], Falk Schulze-Kueppers[1], Maria Balaguer[1], Wilhelm A. Meulenberg[1], Justinas Palisaitis[2], Joachim Mayer[2], Ramesh Bhave[3], Daejin Kim[3] and Martin Bram[1]; [1]Institute of Energy and Climate Research, Forschungszentrum Juelich GmbH, Juelich, Germany; [2]Ernst Ruska-Centre (ER-C) for Microscopy and Spectroscopy with Electrons, Juelich, Germany; [3]Chemical Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee, United States.

11:40 AM J4.04
Dramatically Enhanced Oxygen Permeation Fluxes in Fluorite-Rich Dual-Phase Membrane by Surface Modification Jong Hoon Joo, Kyong Sik Yun, Chung-Yul Yoo and Ji Haeng Yu; Korea Institute of Energy Research, Daejeon, Korea (the Republic of).

SESSION J5: Permeation Membranes III
J: Permeation Membranes
Chairs: Truls Norby and Jose Serra
Thursday Afternoon, June 18, 2015
Keystone Resorts, Grays Peak III

3:10 PM BREAK

3:30 PM *J5.01
Ceramic Permeation Membranes and Membrane Reactors Ian S. Metcalfe; Chemical Engineering, Newcastle University, Newcastle upon Tyne, United Kingdom.

3:50 PM J5.02
Defect Chemistry and Oxygen Transport Properties of Bi-Sr-Fe-Based Perovskite-Type Oxides Doohyun Baek, Itaru Oikawa, Atsunori Kamegawa and Hitoshi Takamura; Department of Materials Science, Tohoku University, Sendai, Japan.

4:10 PM J5.03
Low Metal Content Silver/Doped Ceria Composites for Oxygen Separation and Methane Partial Oxidation Enrique Ruiz-Trejo[1], Paul Boldrin[1], Jawwad Darr[2], Alan Atkinson[3] and Nigel P. Brandon[1]; [1]Earth Science and Engineering, Imperial College London, London, United Kingdom; [2]Chemistry, University College London, London, United Kingdom; [3]Materials, Imperial College London, London, United Kingdom.

4:30 PM J5.04
Characterization of Dual Phase $BaCe_{1-x}Eu_xO_{3-\delta}$:$Ce_{1-y}Y_yO_{2-\delta}$ (x=0-0.2; y=0-0.2) Ceramic Composite for Membrane Application in H_2-Separation Maria Balaguer[1], Mariya E. Ivanova[1], Sonia Escolastico[2], Justinas Palisaitis[3], Yoo Jung Sohn[1], Jose M. Serra[2], Wilhelm A. Meulenberg[1], Olivier Guillon[1] and Joachim Mayer[3]; [1]Institute for Energy and Climate Research Materials Synthesis and Processing (IEK-1), Forschungszentrum Jülich GmbH, Jülich, Germany; [2]Instituto de Tecnologia Quimica , Valencia, Spain; [3]Ernst Ruska Center, Jülich, Germany.

4:50 PM J5.05
Hydrogen Permeation through CO_2-Stable Dual Phase Ceramic Membranes Sonia Escolastico, Cecilia Solis and Jose M. Serra; Instituto de Tecnología Química (UPV-CSIC), Valencia, Spain.

5:10 PM J5.06
Chemical Stability of Cercer H_2 Membranes in the Lanthanum Tungstate–Lanthanum Chromite System Jonathan M. Polfus, Zuoan Li, Martin F. Sunding, Wen Xing, Marie-Laure Fontaine, Partow P. Henriksen and Rune Bredesen; Materials and Chemistry, SINTEF, Oslo, Norway.

K: Proton-Conducting Oxides

SESSION K4: Protonic Oxides II
K: Proton-Conducting Oxides
Chairs: Marie-Laure Fontaine and Jose Serra
Thursday Morning, June 18, 2015
Keystone Resorts, Quandary Peak I/II

10:10 AM BREAK

10:30 AM **K4.01
Development of Proton Conducting Electrolyser Cells Marie-Laure Fontaine, Jonathan Polfus, Wen Xing, Rune Bredesen and Christelle Denonville; Materials and Chemistry, SINTEF, Oslo, Norway.

11:00 AM K4.02
Exploring BCZY Proton-Conducting Ceramics for Use in Electrolysis Michael Dippon[3], Sean Babiniec[1], Hanping Ding[1], Sandrine Ricote[1] and Neal P. Sullivan[2]; [1]Mechanical Engineering, Colorado School of Mines, Golden, Colorado, United States; [3]Institute of Materials for Electrical and Electronic Engineering, Karlsruhe Institute of Technology, Karlsruhe, Germany.

11:20 AM K4.03
CsH_2PO_4-Based Fuel Cells and Electrolyzers Laura Navarrete and Jose M. Serra; ITQ (UPV-CSIC), Valencia, Spain.

11:40 AM K4.04
Electrochemical Synthesis of Ammonia under Atmospheric Pressure Using a $BaCe_{0.2}Zr_{0.7}Y_{0.1}O_{2.9}$ Electrolyte Michael Stoukides[1, 2], Eirini Vasileiou[1, 2], Vasileios Kyriakou[1, 2], Ioannis Garagounis[1, 2], Anastasios Vourros[1, 2], Anthony Manerbino[3] and Grover Coors[3]; [1]Chemical Engineering, Aristotle University of Thessaloniki, Thessaloniki, Greece; [2]Chemical Process and Energy Resources Institute, Centre for Research and Technology Hellas, Thessaloniki, Greece; [3]CoorsTekInc, Golden, Colorado, United States.

SESSION K5: Protonic Oxides III
K: Proton-Conducting Oxides
Chairs: Tor Grande, Jong-Ho Lee, Anna Magraso and Hiroshige Matsumoto
Thursday Afternoon, June 18, 2015
Keystone Resorts, Quandary Peak I/II

1:30 PM K1.12
Investigation of $Ba_{1-x}Gd_{0.8}La_{0.2+x}Co_2O_{6-\delta}$ (X = 0 - 0.5) as Oxygen Electrode Material for Proton Conducting Fuel Cells and Electrolyzer Cells Ragnar Strandbakke, Einar Vollestad and Truls Norby; Department of Chemistry, University of Oslo, Oslo, Norway.
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1:50 PM K5.02
A Novel High-Performance Triple Conducting Oxide Cathode for Protonic Ceramic Fuel Cell Jianhua Tong, Meng Shang, Chuancheng Duan, David Shnaider and Ryan O'Hayre; MME, Colorado School of Mines, Golden, Colorado, United States.

2:10 PM K5.03
All-Oxide Composite Cathode Materials Prepared by *In Situ* Oxidation Driven Decomposition Tor Grande, Mari-Ann Einarsrud and Guttorm Syvertsen-Wiig; Materials Science and Engineering, Norwegian University of Science and Technology, Trondheim, Norway.

2:30 PM K5.04
Catalytic Properties of Proton Conducting Oxides in Cermet Electrodes and as Ceramic Supports for Dehydrogenation Catalysts Hyun H. Shin and Steven McIntosh; Chemical Engineering, Lehigh University, Bethlehem, Pennsylvania, United States.

2:50 PM K5.05
Chemical Stability and Membrane-Catalyst Compatibility of Selected Proton Conducting Materials Potentially Applicable in Hydrogen Membrane Reactors Mariya E. Ivanova[1], Desiree van Holt[1, 2], Emanuel Forster[3], Maria Balaguer[1], Wendelin Deibert[1], Wilhelm A. Meulenberg[1], Michael Mueller[3] and Olivier Guillon[1]; [1]Institute for Energy and Climate Research Materials Synthesis and Processing (IEK-1), Forschungszentrum Jülich GmbH, Jülich, Germany; [2] Institute of Energy and Climate Research Fundamental Electrochemistry (IEK-9), Forschungszentrum Jülich GmbH, Jülich, Germany; [3]Institute for Energy and Climate Research (IEK) IEK-2: Material Structure and Properties, Forschungszentrum Jülich GmbH, Jülich, Germany.

3:10 PM BREAK

3:30 PM K5.06
Y-doped Barium Zirconate prepared by Flame Spray Synthesis as Electrolyte for Intermediate Temperature Proton Conducting Fuel Cells Francesco Bozza and Thomas Graule; Laboratory for High Performance Ceramics, EMPA, Dübendorf, Switzerland.

3:50 PM K5.07
Size and Shape of Oxygen Vacancies and Protons in Acceptor-Doped Barium Zirconate Erik Jedvik, Anders Lindman and Goeran Wahnstroem; Applied Physics, Chalmers University of Technology, Göteborg, Sweden.

4:10 PM K5.08
Proper Theoretical Description of Oxidation of Acceptor-Doped Perovskites Anders Lindman, Paul Erhart and Göran Wahnström; Applied Physics, Chalmers University of Technology, Gothenburg, Sweden.

4:30 PM K5.09
Understanding Blocking Grain Boundaries within Proton Conducting Ceramics Using Atom Probe Tomography Daniel Clark[1], Dave Diercks[1], Huayang Zhu[2], Robert Kee[2], Sandrine Ricote[2], Brian Gorman[1] and Ryan O'Hayre[1]; [1]Metallurgical and Materials Engineering, Colorado School of Mines, Golden, Colorado, United States; [2]Mechanical Engineering, Colorado School of Mines, Golden, Colorado, United States.

4:50 PM K5.10
On the Impact of Strain on the Proton Conductivity of Barium Zirconate Thin Films Anna Magraso[1, 3], Jonathan Polfus[2] and Jose Santiso[1]; [1]ICN2, Bellaterra, Spain; [2]SINTEF, Oslo, Norway; [3]Dep. Chemistry, University of Oslo, Oslo, Norway.

ORAL PRESENTATIONS

FRIDAY June 19, 2015

PLENARY

SESSION L5: Special Plenary
Chair: M. Stanley Whittingham
Friday Morning, June 19, 2015
Keystone Resorts, Shavano Peak

9:15 AM INTRODUCTION

9:25 AM L5.01
Alternative Strategies for Electrical Energy Storage John Goodenough; University of Texas at Austin, Austin, Texas, United States.

A: Solid Oxide Fuel Cells and Electrolyzers

* Invited Speaker
** Keynote Speaker

SESSION A10: SOFC—Cathodes IV
A: Solid Oxide Fuel Cells and Electrolyzers
Chair: Werner Sitte
Friday Morning, June 19, 2015
Keystone Resorts, Longs Peak

10:10 AM BREAK

10:30 AM *A10.01
A Novel R-P Structure Cathode with High Performance for Intermediate Temperature Solid Oxide Fuel Cells Ranran Peng, Zhiquan Wang, Daoming Huan, Wenqiang Yang and Yalin Lu; University of Science and Technology of China, Hefei, China.

10:50 AM A10.02
Optimization of the Electrochemical Performances of $Ca_3Co_4O_{9+\delta}$ as Air Electrode for Solid Oxide Cell Aurelie Rolle[1], Xavier Flandre[2], Hussein A. Abbas Mohamed[1], Da Huo[2], Giuliano Mignardi[2], Sylvie Daviero-Minaud[2], Edouard Capoen[3], Marie-Helene Chambrier[4], Elisabeth Djurado[5], Amelie Salauen[5], Monica Burriel[5] and Rose-Noelle Vannier[1]; [1]UCCS, ENSCL, Villeneuve d'Ascq, France; [2]UCCS, Université Lille1, Villeneuve d'Ascq, France; [3]UCCS, CNRS, Villeneuve d'Ascq, France; [4]UCCS, Université Jean Perrin, Villeneuve d'Ascq, France; [5]LEPMI, Grenoble-INP - UdS - UJF, Saint Martin d'Hères, France.

11:10 AM A10.03
Effect of $La_{0.6}Sr_{0.4}Co_{0.2}Fe_{0.8}O_{3-\delta}$ Microstructure on Oxygen Surface Exchange Kinetics Katherine D. Bagarinao, Haruo Kishimoto, Katsuhiko Yamaji and Teruhisa Horita; National Institute of Advanced Industrial Science and Technology, Tsukuba, Japan.

11:30 AM A10.04
Oxygen Surface Exchange Kinetics of Praseodymium Nickelates Saim Saher[1], Jean-Marc Bassat[2] and Henny J. Bouwmeester[1]; [1]MESA+ Institute for Nanotechnology, Faculty of Science and Technology, University of Twente, Enschede, Netherlands; [2]Institut de Chimie de la Matière Condensée de Bordeaux (ICMCB-CNRS), Université Bordeaux I, Pessac-Cedex, France.

C: Electrodes and Solid Electrolytes for Batteries

SESSION C12: Fundamentals of LIB Electrodes II
C: Electrodes and Solid Electrolytes for Batteries
Chair: Jordi Cabana
Friday Morning, June 19, 2015
Keystone Resorts, Shavano Peak

10:10 AM BREAK

10:30 AM **C12.01
Powerful Electrical Model Explaining the Operation of Insertion Batteries Miran Gaberscek; National Institute of Chemistry, Ljubljana, Slovenia.

11:00 AM C12.02
Layered Cathode Materials Prepared by Spray Pyrolysis for High-Energy Lithium-Ion Batteries Feng Lin[1], Yuyi Li[1], Dennis Nordlund[2], Tsu-Chien Weng[2], Huolin Xin[3], Yijin Liu[2]and Marca Doeff[1]; [1]Lawrence Berkeley National Lab, Berkeley, California, United States; [2]SLAC, Menlo Park, California, United States; [3]BNL, Upton, New York, United States.

11:20 AM C12.03
Stabilizing the Structure of Li-Rich Oxide Cathode Materials Zhaoxiang Wang[1], Yurui Gao[1], Xin Feng[1], Jun Ma[1], Yongning Zhou[2], Lin Gu[1], Qingyu Kong[3], Xiao-qing Yang[2] and Liquan Chen[1]; [1]Institute of Physics, Chinese Academy of Sciences, Beijing, China; [2]Brookhaven National Laboratory, Upton, New York, United States; [3]Argonne National Laboratory, Argonne, California, United States.

11:40 AM C12.04
Integrated Nano-Domains of Disordered and Ordered Spinel Phases in $LiNi_{0.5}Mn_{1.5}O_4$ for Li-Ion Batteries Jung-Hyun Kim[1], Ashfia Huq[2], Craig A. Bridges[2], Miaofang Chi[2], Nicholas P. Pieczonka[3], Arumugam Manthiram[4] and Bob R. Powell[1]; [1]Chemical and Materials Systems Laboratory, General Motors R&D Center, Warren, Michigan, United States; [2]Oak Ridge National Laboratory, Oak Ridge , Tennessee, United States; [3]Optimal CAE., Plymouth, Michigan, United States; [4]Materials Science and Engineering Program, The University of Texas at Austin, Austin, Texas, United States.

D: Fundamentals of Transport and Reactivity and Nanoionics

SESSION D9: Fundamentals of Transport and Reactivity and Nanoionics VII
D: Fundamentals of Transport and Reactivity and Nanoionics
Chair: Igor Lubomirsky
Friday Morning, June 19, 2015
Keystone Resorts, Grays Peak I/II

10:10 AM BREAK

10:30 AM **D9.01
Molecular Insights Into Structure and Dynamics of Organic Ionic Plastic Crystal Electrolytes Maria Forsyth[1, 2]; [1]Institute for Frontier Materials, Deakin University, Burwood, Victoria, Australia; [2]ARC Center of Excellence for Electromaterials Science, Burwood , Victoria, Australia.

11:00 AM *D9.02
Structure and Lithium Ion Dynamics of the Tetragonal LGPS-Type Superionic Conductors $Li_{11-x}M_{2-x}P_{1+x}S_{12}$ with M = Si, Ge, Sn Alexander Kuhn[1], Sascha Harm[1, 2] and Bettina V. Lotsch[1, 2]; [1]Chemistry , Max Planck Institute for Solid State Research, Stuttgart, Germany; [2]Chemistry, University of Munich (LMU), Munich, Germany.

11:20 AM D9.03
Correlation Between the Electronic Structure and the Interstitial Oxygen Formation in Layered Perovskite Oxides Takashi Nakamura[1], Yihan Ling[1], Ryo Oike[1], Yusuke Tamenori[2]and Koji Amezawa[1]; [1]IMRAM, Tohoku University, Sendai, Japan; [2]JASRI, Sayo-gun, Japan.

11:40 AM OPEN DISCUSSION

I: Ion Transport in Hybrid Organic-Inorganic Solids

SESSION I3: Ion Transport in Organic-Inorganic Hybrid Solids
I: Ion Transport in Hybrid Organic-Inorganic Solids
Chair: Abraham Saldivar Valdes
Friday Morning, June 19, 2015
Keystone Resorts, Grays Peak III

10:10 AM BREAK

10:30 AM **I3.01
Discovery of Molecular Disorders in Coordination Frameworks for Solid State Ionics Satoshi Horike; Kyoto University, Kyoto, Japan.

10:55 AM **I3.02
Designing Proton Conducting MOFs George Shimizu; Chemistry, University of Calgary, Calgary, Alberta, Canada.

11:20 AM I3.03
Effect of Ionic Liquid 1-Butyl-3-Methylimidazolium Methylsulfate on (Polyethylene Oxide, PEO + Sodium Methyl Sulfate Salt, Nams) Polymer Electrolyte Membrane Rajendra K. Singh; Physics, Banaras Hindu University, Varanasi, India.

11:40 AM I3.04
On the Origin and Underappreciated Effects of Ion Doping in Silica Xiaohui Song and Hongyu Chen; Chemistry and Biological Chemistry, Nanyang Technological University, Singapore, Singapore.

K: Proton-Conducting Oxides

SESSION K6: Protonic Oxides V
K: Proton-Conducting Oxides
Chairs: Tor Bjorheim and Jong-Sook Lee
Friday Morning, June 19, 2015
Keystone Resorts, Quandary Peak I/II

10:10 AM BREAK

10:30 AM *K6.01
Hydride Conduction in Oxyhydrides Genki Kobayashi[1, 2]; [1]Research Center of Integrative Molecular Systems, Institute for Molecular Science, Okazaki, Japan; [2]Precursory Research for Embryonic Science and Technology, Japan Science and Technology Agency, Kawaguchi, Japan.

10:50 AM K6.02
Development of Hydrogen Sensor Using Proton Conductor with Redox Protonation Yuji Okuyama[1], Shinya Nagamine[2], Akira Nakajima[3], Fusako Takahashi[4], Koji Kimata[4], Tomoko Oshima[4], Go Sakai[5] and Naoki Matsunaga[5]; [1]Organaization for Promotion of Tenure Track, University of Miyazaki, Miyazaki, Japan; [2]Department of Applied Chemistry, Faculty of Engineering, University of Miyazaki, Miyazaki, Japan; [3]Frontier Science Research Center, University of Miyazaki, Miyazaki, Japan; [4]Functional Materials R&D Center, TYK Corp., Tajimi, Japan; [5]Department of Environmental Robotics, Faculty of Engineering, University of Miyazaki, Miyazaki, Japan.

11:10 AM K6.03
Impact of the Electrochemical Proton-Carrier Injection on the Structure of $NaO_{1/2}$-WO_3-$NbO_{5/2}$-$LaO_{3/2}$-$PO_{5/2}$ Glass Takahisa Omata[1], Tomohiro Ishiyama[2], Junji Nishii[3], Toshiharu Yamashita[4], Hiroshi Kawazoe[4], Naoaki Kuwata[5] and Junichi Kawamura[5]; [1]Graduate School of Engineering, Osaka University, Suita, Japan; [2]National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba, Japan; [3]Research Institute for Electronic Science, Hokkaido University, Sapporo, Japan; [4]Kawazoe Frontier Technologies Corp., Yokohama, Japan; [5]Tohoku University, Sendai, Japan.

11:30 AM K6.04
Surface-Proton Conductivity of Titanium Phosphate Nanoparticles in Water Hiroshige Matsumoto, Osamu Fujiwara, Kwati Leonard and Young-Sung Lee; International Institute for Carbon-Neutral Energy, Kyushu University, Fukuoka, Japan.