

SYMPOSIUM P

Plenary
July 18 - July 22, 2022

Symposium Organizers

* Invited Paper

SESSION PI01: Plenary I
Monday Morning, July 18, 2022
Mezzanine Level, Second Floor, Grand Ballroom A

8:00 AM PI01.01

Exemplary Tuning the Properties of Ionic Thin Films for Electronic and Energy Devices Judith Macmanus-Driscoll; University of Cambridge, United Kingdom

SYMPOSIUM DT

Defects and Transport Mechanisms in Solid Electrolytes and Mixed Conductors
July 18 - July 22, 2022

Symposium Organizers

George Harrington, Kyushu University / MIT
Rotraut Merkle, Max Planck Institute for Solid State Research
Alexander Opitz, Technische Universität Wien

* Invited Paper

SESSION DT01: Grain Boundaries
Session Chair: Rotraut Merkle
Monday Morning, July 18, 2022
Mezzanine Level, Second Floor, Georgian

9:10 AM **DT01.01

Space-Charge-Mediated Phenomena at Oxide Interfaces for Electronics and Energy Applications Moritz L. Weber¹, Marc-André Rose¹, Lisa Heymann¹, Suqin He¹, Anton Kaus¹, Christian Lenser¹, Christoph Baeumer² and Felix Gunkel¹; ¹Forschungszentrum Jülich GmbH, Germany; ²Universiteit Twente, Netherlands

9:40 AM DT01.02

Variability of Grain Boundary Defect Chemistry and Anion Conductivity in an Oxide-Conducting Ceramic Using Electron Microscopy and Electrical Measurements Hasti Vahidi¹, Alejandro Mejia², Shengquan Xuan¹, Angelo Cassiadoro², Abednego Abdi², David S. Mebane² and William Bowman^{1,3}; ¹University of California Irvine, United States; ²West Virginia University Eberly College of Arts and Sciences, United States; ³University of California Irvine Materials Research Institute, United States

9:55 AM *DT01.03

Direct Measurement of Local Oxygen Kinetics in Nanocrystalline Mixed Conductors by Isotope Exchange-Atom Probe Tomography Federico Baiutti^{1,2}, Francesco Chiabrera¹, David Diercks³, Alex Morata¹ and Albert Tarancón^{1,4}; ¹Institut de Recerca en Energia de Catalunya, Spain; ²Kemijski institut, Slovenia; ³Colorado School of Mines, United States; ⁴Institutio Catalana de Recerca i Estudis Avancats, Spain

10:15 AM DT01.04

Why We Should Not Trust (But Still Might Use) the Mott–Schottky Model for Grain-Boundary Impedance Adrian L. Usler and Roger A. De Souza; Rheinisch-Westfälische Technische Hochschule Aachen, Germany

10:30 AM BREAK

SESSION DT02: Battery Materials, Cathode
Session Chair: Wolfgang Zeier
Monday Morning, July 18, 2022
Mezzanine Level, Second Floor, Arlington

9:10 AM **DT02.01

The Role of Ionic Transport in Controlling the Intercalation Mechanisms of Battery Electrode Materials—Magnetic Resonance, Diffraction and Optical Scattering Measurements Alice J. Merryweather, Christopher Schnedermann, Akshay Rao and Clare P. Grey; University of Cambridge, United Kingdom

9:40 AM DT02.02

Investigation of Lattice Oxygen Stability of Lithium-Ion Battery Cathode Li(NiMn)O₂ Takashi Nakamura¹, Xueyan Hou¹, Yuta Kimura¹, Yusuke Tamenori², Kiyofumi Nitta², Hirona Yamagishi³ and Koji Amezawa¹; ¹Tohoku Daigaku, Japan; ²Kokido Hikari Kagaku Kenkyu Center, Japan; ³Ritsumeikan Daigaku, Japan

9:55 AM *DT02.03

Designing Hysteresis Free High-Valent Redox Cathode Materials for Electrochemical Application Iwnetim I. Abate^{1,2}; ¹University of California Berkeley, United States; ²Massachusetts Institute of Technology, United States

10:15 AM DT02.04

Enhancing Capacity Retention of Na₂Mn₃O₇ Using Ti Dopants—A Density Functional Theory Study Yong-Seok Choi^{1,2,3}, Stephanie Linnell^{4,2}, Eun Jeong Kim^{4,2}, A. Robert Armstrong^{4,2} and David O. Scanlon^{1,2,3}; ¹University College London, United Kingdom; ²The Faraday Institution, United Kingdom; ³Thomas Young Centre, United Kingdom; ⁴University of St Andrews, United Kingdom

SYMPOSIUM EF

Energy and Fuels Conversion
July 18 - July 22, 2022

Symposium Organizers

Sean Bishop, Sandia National Laboratories
Georgios Dimitrakopoulos, Massachusetts Institute of
Technology
Jong-Ho Lee, Korea Institute of Science and Technology (KIST)

* Invited Paper

SESSION EF01: Oxygen-Ion Conducting Fuel Cells I
Session Chairs: Georgios Dimitrakopoulos and John Irvine
Monday Morning, July 18, 2022
Lobby Level, Avenue 34, Studio 1

9:10 AM **EF01.01

Towards the Next Generation of Solid Oxide Cells Natalia Kostretsova¹, Radostin S. Pavlov¹, Lucile Bernadet¹, Maritta Lira dos Santos¹, Marc Nuñez¹, Federico Baiutti¹, Alex Morata¹, Marc Torrell¹ and Albert Tarancón^{2,1}; ¹Institut de Recerca en Energia de Catalunya, Spain; ²Institució Catalana de Recerca i Estudis Avançats, Spain

9:40 AM *EF01.02 **WITHDRAWN**

Interaction of SOFC Fuel Electrodes with Different Fuels and Therein Contained Impurities Andre Weber; Karlsruhe Institute of Technology (KIT), Germany

10:00 AM *EF01.03

Materials Development for High-Performance Solid Oxide Cells Christian Lenser¹, Alexander Schwiers^{1,2}, Jun Zhang³, Norbert H. Menzler^{1,2} and Olivier Guillon^{1,2,4}; ¹Forschungszentrum Jülich GmbH, Germany; ²Rheinisch-Westfälische Technische Hochschule Aachen, Germany; ³Danmarks Tekniske Universitet, Denmark; ⁴JARA, Germany

10:20 AM *EF01.04

Designing Multi-Elemental Oxide Catalysts with High-Throughput Simulations and Machine Learning Jessica Karaguesian, James Damewood, Jaelyn Lunger, Daniel Schwalbe-Koda, Yang Shao-Horn and Rafael Gomez-Bombarelli; Massachusetts Institute of Technology, United States

10:40 AM BREAK

11:00 AM *EF01.05

SOCs—Recent Trends and Selected Materials Challenges Peter V. Hendriksen, Xiufu Sun, Francesco Mondì, Ming Chen, Anke Hagen and Henrik Lund Frandsen; Danmarks Tekniske Universitet, Denmark

11:20 AM EF01.06

Optimisation and Performance Evaluation of Rh/Ceria Co-Impregnated Catalyst Systems for La_{0.20}Sr_{0.25}Ca_{0.45}TiO₃ Solid Oxide Fuel Cell Anodes Robert Price¹, Ueli Weissen², Holger Bausinger², Jan G. Grolig², Andreas Mai² and John T. Irvine¹; ¹University of St Andrews, United Kingdom; ²HEXIS AG, Switzerland

11:35 AM EF01.07

Novel Strategy to Reactivate Poisoned Oxygen Exchange Kinetics in Mixed Conducting Oxides by Controlled Surface Acidity Han Gil Seo¹, Anna Staerz¹, Dennis S. Kim¹, Dino Klotz^{2,1}, Clement Nicollet³, James LeBeau¹ and Harry Tuller¹; ¹Massachusetts Institute of Technology, United States; ²Kyushu Daigaku, Japan; ³Institut des Matériaux Jean Rouxel, France

11:50 AM EF01.08

Reactivation of Exsolved Ni- and Ru-Doped Strontium Iron Titanate Solid Oxide Fuel Electrodes Travis A. Schmauss¹, Alessandro Donazzi², Yubo Zhang¹, Jakob Reinke¹ and Scott Barnett¹; ¹Northwestern University, United States; ²Politecnico di Milano, Italy

12:05 PM EF01.10

Significantly Reduced Area Specific Resistance of Pr₄Ni₃O_{10-δ} – Ce_{0.75}Gd_{0.1}Pr_{0.15}O₂ Composite Cathode by Optimizing Microstructure for IT-SOFCs Zheng Xie and Stephen J. Skinner; Imperial College London, United Kingdom

SESSION EF02: Solar Cells I

Session Chairs: Matthew Beard and Yang Yang
Monday Morning, July 18, 2022
Lobby Level, Avenue 34, Studio 2

9:10 AM **EF02.01

Addressing the Stability and Reliability Challenges in Perovskite Solar Cells via Microstructural and Interfacial Tailoring Nitin P. Padture; Brown University, United States

9:40 AM **EF02.02

Manufacturing Perovskite Solar Cells with Passivated Interfaces— Approaching Efficiency Limits with Scalable Chemistry David Ginger; University of Washington, United States

10:10 AM *EF02.03

Tin- Lead-Metal Halide Perovskite Solar Cells with Enhanced Crystallinity and Efficiency Maria Antonietta Loi; Rijksuniversiteit Groningen, Netherlands

10:30 AM EF02.04

Wasted Photons—Photogeneration Yield and Charge Carrier Collection Efficiency of Metal Oxide Photoanodes for Photoelectrochemical Water Splitting Yifat Piekner¹, David S. Ellis², Daniel A. Grave^{2,3} and Avner Rothschild²; ¹Technion Israel Institute of Technology, Technion Israel Institute of Technology, Haifa, Haifa, IL, academic, Israel; ²Technion Israel Institute of Technology, Israel; ³Ben Gurion University of the Negev, Israel

10:45 AM BREAK

11:00 AM *EF02.06

Monolithic Photoelectrochemical Tandem Devices Consisting of Tunnel Oxide Passivated Contact Silicon and BiVO₄ Enabling Unassisted Water Splitting Choongman Moon¹, Gihun Jung¹, Filipe Martinho², Stela Canulescu² and Byungha Shin¹; ¹Korea Advanced Institute of Science and Technology, Korea (the Republic of); ²Danmarks Tekniske Universitet, Denmark

11:20 AM EF02.07

A Versatile, Scalable and Facile Aqueous Route Towards CuBi₂O₄ Photocathodes and Green Hydrogen Bjorn Joos^{1,2,3}, Jonathan Van den Ham⁴, Andreas Paulus^{2,1,3}, Ken Elen^{2,1,3}, Pascal Buskens^{5,4,1}, Marlies Van Bael^{1,2,3} and An Hardy^{1,2,3}; ¹Hasselt University, Belgium; ²Interuniversitair Micro-Elektronica Centrum, Belgium; ³EnergyVille, Belgium; ⁴The Netherlands Organisation for Applied Scientific Research (TNO), Netherlands; ⁵Brightlands Materials Center, Netherlands

11:35 AM EF02.08

Polarization and Internal Electric Field Screening in Mixed Conducting Hybrid Perovskite Devices Davide Moja^{1,2}, Ilario Gelmetti³, Philip Calado², Mina Jung¹, Jenny Nelson², Piers Barnes² and Joachim Maier¹; ¹Max-Planck-Institut für Festkörperforschung, Germany; ²Imperial College London, United Kingdom; ³Institut Catala d'Investigació Química, Spain

11:50 AM EF02.09

Exsolution of CdS Nanoparticles on Lanthanum Strontium Titanate for H₂ Production Under Visible Light Shreyasi Chattopadhyay and John T. Irvine; University of St Andrews, United Kingdom

12:05 PM EF02.10

Perovskite-Based Nanostructured Materials for CO₂ Conversion into Solar Fuels Using Localized Surface Plasmon Resonance Lorenzo Rizzato¹ and Antonella Glisenti^{1,2}; ¹Università degli Studi di Padova, Italy; ²Istituto di Chimica della Materia Condensata e di Tecnologie per l'Energia Consiglio Nazionale delle Ricerche, Italy

SYMPOSIUM EI

Electrochemical Interfaces
July 18 - July 22, 2022

Symposium Organizers

Koji Amezawa, Tohoku University
WooChul Jung, Korea Advanced Institute of Science and
Technology
Jonathan Polfus, University of Oslo

* Invited Paper

SESSION EI01: Surface Chemistry
Session Chairs: Simone Mascotto and Liliana Moggi
Monday Morning, July 18, 2022
Mezzanine Level, Second Floor, Berkeley/Clarendon

9:10 AM *EI01.01

What is the Active Site of the Oxygen Reduction Reaction on Solid Oxide Fuel Cell Cathodes? Theoretical Investigation of Oxygen Reduction on the Reconstructed LSM25(001) Surface Emmanuelle Hagopian and Franziska Hess; Technische Universität Berlin, Germany

9:30 AM *EI01.02

Oxygen Vacancy Dynamics and Oxygen Exchange: Fluxionality on Reducible Oxide Surfaces Peter A. Crozier; Arizona State University, United States

9:50 AM *EI01.03

Interaction of O₂, H₂O, CO₂ with AO Terminated Perovskite and Ruddlesden Popper Oxides. The Effect of the Surface A-Site—Sr, La, Pr. Aleksandar Stajkov; Kyushu Daigaku, Japan

10:10 AM EI01.04

The Effect of Humid Operating Environments on Surface Composition Evolution of Perovskite-Type MIEC Electrodes Zijie Sha, Zonghao Shen, Eleonora Cali, John A. Kilner and Stephen J. Skinner; Imperial College London, United Kingdom

10:25 AM EI01.05

Atomic-Scale Surface Overcoat to Suppress Agglomeration and Dopant Segregation of Perovskite Cathodes Haoyu Li, Orbel Barkhordarian, Hung-Sen Kang and Min Hwan Lee; University of California Merced, United States

10:40 AM BREAK

SYMPOSIUM ES

Energy Storage
July 18 - July 22, 2022

Symposium Organizers

Ainara Aguadero, Imperial College London and Instituto de Ciencia de Materiales de Madrid
Yifei Mo, University of Maryland
Daniel Rettenwander, Norwegian University of Science and Technology (NTNU)

* Invited Paper

SESSION ES01: Solid State Batteries I
Session Chair: Eric Wachsman
Monday Morning, July 18, 2022
Lobby Level, Avenue 34, The Loft

9:10 AM **ES01.01

The Stability and Kinetics of the Li/Solid Electrolyte Interface Jeff Sakamoto; University of Michigan, United States

9:40 AM *ES01.02

Probing Transport and Chemo-Mechanics in All-Solid-State Batteries Kelsey Hatzell; Princeton University, United States

10:00 AM ES01.03

Interfacial Charge Accumulation in Li-Ion Conducting Solid Electrolytes. Theory and Experiments Leon Katzenmeier^{1,2}, Manuel Gößwein³ and Aliaksandr S. Bandarenka¹; ¹Technische Universität München, Germany; ²TUMint.Energy Research, Germany; ³Technische Universität München Fakultät für Elektrotechnik und Informationstechnik, Germany

10:15 AM ES01.04

Evaluation of the Chemical Stability of Sulfide Solid Electrolytes with Lithium Metal Using *In Situ*, *Operando* and Post-Mortem Analyses Marine Soler, Céline Barchasz, Vasily Tarnopolskiy and Frédéric Le Cras; Université Grenoble Alpes, France

10:30 AM ES01.05

Understanding Interfacial Resistance and Capacity Behavior During All Ceramic-based Cathode Composite Formation—A Case of Li₂ZrO₃ Coated LiCoO₂-Li_{6.95}Mg_{0.15}La_{2.75}Sr_{0.25}Zr₂O₁₂ Kunjoong Kim^{1,2}, Masaki Wadaguchi^{3,1}, Masato Iwasaki³, Hideaki Hikosaka³ and Jennifer Rupp^{1,2}; ¹Massachusetts Institute of Technology, United States; ²Technische Universität München Fakultät für Chemie, Germany; ³NGK Spark Plug Co. Ltd., Japan

10:45 AM BREAK**11:00 AM **ES01.06**

A Perspective on Solid-State Batteries with LLZO [Marca Doeff](#); E O Lawrence Berkeley National Laboratory, United States

11:30 AM *ES01.07

Highly Cyclable Lithium Metal Battery Employing Modified Garnet Electrolyte Sewon Kim¹, Ju-Sik Kim¹, Lincoln Míara², Yan Wang², Seong Yong Park¹, Zhen Song³, Michael Badding³, [Dongmin Im](#)¹ and Kisuk Kang⁴; ¹Samsung Advanced Institute of Technology, Korea (the Republic of); ²Samsung Advanced Institute of Technology-America, United States; ³Coming Incorporated, United States; ⁴Seoul National University, Korea (the Republic of)

11:50 AM ES01.08

Thin and Robust LAMP Solid Electrolytes with Close-to-Bulk Ionic Conductivity and its Integration in Solid-State Architectures [Juan Carlos Gonzalez-Rosillo](#)¹, Valerie Siller¹, Marc Nuñez¹, Raul Arenal², Juan Miguel Lopez del Amo³, Alex Morata¹ and Albert Tarancón^{1,4}; ¹Institut de Recerca en Energia de Catalunya, Spain; ²Universidad de Zaragoza, Spain; ³Centro de Investigacion en Energias Alternativas, Spain; ⁴Institutio Catalana de Recerca i Estudis Avancats, Spain

12:05 PM ES01.09

Chemo-Mechanics and Microstructural Design of Solid-State Batteries [Giovanna Buccì](#); Palo Alto Research Center Incorporated, United States

12:20 PM ES01.10

Advancing Cycling Capabilities of Composite Polymer Electrolytes with LLZO Nanofibers [Sanja D. Tepavcevic](#), Michael Counihan, Pallab Barai, Devon Powers and Yuepeng Zheng; Argonne National Laboratory, United States

SYMPOSIUM IE

Iono-Electronics
July 18 - July 21, 2022

Symposium Organizers

Geoffrey Beach, Massachusetts Institute of Technology
Monica Burriel, CNRS - Grenoble INP
YiYang Li, University of Michigan

9:40 AM *IE01.02

Exploring Novel Functions at Solid/Solid Electrolyte Interfaces for Application to Neuromorphic Computing [Takashi Tsuchiya](#) and Kazuya Terabe; Busshitsu Zairyo Kenkyu Kiko Kokusai Nanoarchitectonics Kenkyu Kyoten, Japan

10:00 AM IE01.03

Electrochemical Artificial Synapses Based on Intercalation of Mg²⁺ Ions [Miranda Schwacke](#), Jesus del Alamo, Ju Li and Bilge Yildiz; Massachusetts Institute of Technology, United States

10:15 AM IE01.04

Nanoporous Gadolinium-Doped Ceria-Based Protonic Solid-State Electrochemical Synapse for CMOS-Compatible Neuromorphic Computing [Seungchan Ryu](#), Han Gil Seo, Ju Li and Bilge Yildiz; Massachusetts Institute of Technology, United States

10:30 AM IE01.05

Nonvolatile Analogue Electrochemical Memory Using Tungsten Oxide [Diana Kim](#)¹, Alec Talin² and YiYang Li¹; ¹University of Michigan, United States; ²Sandia National Laboratories California, United States

10:45 AM BREAK**11:05 AM *IE01.06**

High-Precision and Low-Power Electrochemical Two-Dimensional Dynamic Synapses for Neuromorphic Computing Mohammad T. Sharbati, John R. Erickson, Feng Xiong and [Qingzhou Wan](#); University of Pittsburgh, United States

11:25 AM *IE01.08

Imaging Nanoscale Phase Segregation in Li_xCoO₂ Particles and Predicting the Scalability of Electrochemical Random Access Memory [Elliot Fuller](#)¹, David Ashby¹, Celia Polop², Enrique Vasco³, Joshua Sugar¹ and Alec Talin¹; ¹Sandia National Laboratories California, United States; ²Universidad Autonoma de Madrid, Spain; ³Consejo Superior de Investigaciones Cientificas, Spain

11:45 AM IE01.09

An Equivalent Circuit Model of Electrochemical Artificial Synapses for Neuromorphic Computing [Mantao Huang](#), Murat Onen, Jesus del Alamo, Ju Li and Bilge Yildiz; Massachusetts Institute of Technology, United States

12:00 PM IE01.10 WITHDRAWN

Pushing Electrochemical Transformations and Enhancing Carrier Doping in Functional Oxides by Electrolyte Gating [Hua Zhou](#), Wei Chen, Hui Cao, Dillon Fong and Changjiang Liu; Argonne National Laboratory, United States

12:15 PM IE01.11

CMOS-Compatible Protonic Programmable Resistor Based on Phosphosilicate Glass Electrolyte [Murat Onen](#), Nicolas Emond, Ju Li, Bilge Yildiz and Jesus del Alamo; Massachusetts Institute of Technology, United States

* Invited Paper

SESSION IE01: Electrochemical Redox Memory
Session Chairs: YiYang Li and Feng Xiong
Monday Morning, July 18, 2022
Lobby Level, Terrace

9:10 AM **IE01.01

ECRAM for Neuromorphic Computing [Alec Talin](#); Sandia National Laboratories California, United States

SYMPOSIUM DT

Defects and Transport Mechanisms in Solid Electrolytes and Mixed Conductors
July 18 - July 22, 2022

Symposium Organizers

George Harrington, Kyushu University / MIT
Rotraut Merkle, Max Planck Institute for Solid State Research
Alexander Opitz, Technische Universität Wien

* Invited Paper

SESSION DT03: Interfaces
Session Chair: Federico Baiutti
Monday Morning, July 18, 2022
Mezzanine Level, Second Floor, Georgian

11:00 AM **DT03.01

Linking Oxide Electronic Structure and Electrocatalytic Activity via X-Ray Spectroscopies Kelsey A. Stoerzinger^{1,2}; ¹Oregon State University, United States; ²Pacific Northwest National Laboratory, United States

11:30 AM DT03.02

A Lithium Dendrite Inhibiting Strategy by Metallic Coatings in Solid Electrolytes via *Operando* Study Xin Xu, Geoff McConohy, Edward Barks, Sunny Wang, Emma Kaeli and William C. Chueh; Stanford University, United States

11:45 AM *DT03.03

Relating the Varied Composition and Oxide Ion Conductivity of Ceramic Grain Boundaries Using Electron Microscopy and Electrical Measurements William Bowman¹, Hasti Vahidi¹, Huiming Guo¹, Shengquan Xuan¹, David S. Mebane², Alejandro Mejia², Angelo Cassiadoro² and Abednego Abdi²; ¹University of California Irvine, United States; ²West Virginia University, United States

12:05 PM DT03.04

Molecular Dynamics Study of Oxygen-Ion Diffusion in Yttria-Stabilized Zirconia Grain Boundaries Jose C. Madrid Madrid and Kulbir K. Ghuman; Institut national de la recherche scientifique, Canada

12:20 PM DT03.05

Investigation of Defect Behavior near the Interfaces of Au(111)/Li₃PO₄ Using Neural Network Potential Koji Shimizu¹, Yasunobu Ando², Emi Minamitani³ and Satoshi Watanabe¹; ¹The University of Tokyo, Japan; ²National Institute of Advanced Industrial Science and Technology, Japan; ³Institute for Molecular Science, Japan

SESSION DT04: Battery Materials, Theory
Session Chair: Martin Wilkening
Monday Morning, July 18, 2022
Mezzanine Level, Second Floor, Arlington

11:00 AM **DT04.01

The Complex Mechanisms that Create High Li-Ion Mobility in Oxides and Sulfides Gerbrand Ceder^{1,2}; ¹University of California Berkeley, United States; ²E O Lawrence Berkeley National Laboratory, United States

11:30 AM DT04.02

Theoretical and Experimental Studies of Ion Transport in Mixed Polyanion Solid Electrolytes Zeyu Deng¹, Tara P. Mishra^{1,2}, Eunike Mahayoni^{3,4,5}, Qianli Ma⁶, Olivier Guillon^{6,6}, Jean-Noël Chotard^{3,4,5}, Vincent Sezbec^{3,4,5}, Anthony K. Cheetham¹, Christian Masquelier^{3,4,5}, Sai Gautam Gopalakrishnan⁷ and Pieremanuele Canepa^{1,1}; ¹National University of Singapore, Singapore; ²Singapore-MIT Alliance for Research and Technology, Singapore; ³Universite de Picardie Jules Verne, France; ⁴FR CNRS 3459, France; ⁵FR CNRS 3104, France; ⁶Forschungszentrum Julich GmbH, Germany; ⁷Indian Institute of Science, India

11:45 AM *DT04.03

The Role of Anion Dynamics in Controlling Ion Mobility in Solids Don Siegel; The University of Texas at Austin, United States

12:05 PM DT04.04

Temperature Dependent Anion Rotational Dynamics Correlated to Cation Transport in Cluster Ion Anti-Perovskites Sunil Mair¹, Ping-Chun Tsai^{1,2}, Yiliang Li¹, Duhan Zhang¹, Kwangnam Kim³, Jeffrey Smith³, Alex Chien⁴, David Halat⁵, Yin Liang⁶, Jue Liu⁴, Lapidus Saul⁶, Nitash Balsara⁵, Jeffrey Reimer⁵, Don Siegel³ and Yet-Ming Chiang¹; ¹Massachusetts Institute of Technology, United States; ²National Taiwan University, Taiwan; ³University of Michigan, United States; ⁴Oak Ridge National Laboratory, United States; ⁵Lawrence Berkeley National Laboratory, United States; ⁶Argonne National Laboratory, United States

12:20 PM DT04.05

Exhaustive Investigation of NASICON-Type Na-Ion Conductors Using Molecular Dynamics Simulation and Bayesian Optimization Judith Schütt^{1,2}, Shuta Takimoto³, Steffen Grieshammer¹ and Masanobu Nakayama³; ¹Rheinisch-Westfälische Technische Hochschule Aachen, Germany; ²Forschungszentrum Julich GmbH, Germany; ³Nagoya Institute of Technology, Japan

SYMPOSIUM EI

Electrochemical Interfaces
July 18 - July 22, 2022

Symposium Organizers

Koji Amezawa, Tohoku University
WooChul Jung, Korea Advanced Institute of Science and Technology
Jonathan Polfus, University of Oslo

* Invited Paper

SESSION EI02: Oxygen Exchange Kinetics
Session Chairs: Franziska Hess and Alexander Opitz
Monday Morning, July 18, 2022
Mezzanine Level, Second Floor, Berkeley/Clarendon

11:00 AM **EI02.01

Mixed Conducting Oxide Thin Films—Model Systems for Kinetic Studies or a Nightmare? Juergen Fleig; Technische Universität Wien, Austria

11:30 AM EI02.02

2D Optical Transmission Relaxation Measurements of Inhomogeneous Oxygen Surface Exchange Kinetics in $\text{SrTi}_{0.65}\text{Fe}_{0.35}\text{O}_{3-\delta}$ [Emily J. Skiba](#) and Nicola H. Perry; University of Illinois at Urbana-Champaign, United States

11:45 AM EI02.03

Investigating Oxygen Reduction Pathways on Pristine SOFC Cathode Surfaces by *In Situ* PLD Impedance Spectroscopy [Christoph Riedl](#), Mathäus Siebenhofer, Alexander Schmid, Andreas Limbeck, Alexander K. Opitz, Juergen Fleig and Markus Kubicek; Technische Universität Wien, Austria

12:00 PM **EI02.04

Impact of Operating Environment on the Key Electrochemical Processes in Solid Oxide Cells [Stephen J. Skinner](#), Zijie Sha, Mudasir Yattoo, Zheng Xie and Chen-Yu Tsai; Imperial College London, United Kingdom

12:30 PM EI02.05

Investigation of the Oxygen Exchange Kinetics on Erbium-Stabilized Bi_2O_3 at Intermediate Temperature [Seung Jin Jeong](#)¹, Ruiyun Huang², Richard Kim³, Sossina Haile⁴ and WooChul Jung¹; ¹Korea Advanced Institute of Science and Engineering (KAIST), Korea (the Republic of); ²Applied Materials Inc, United States; ³Georgia Institute of Technology, United States; ⁴Northwestern University, United States

SYMPOSIUM DT

Defects and Transport Mechanisms in Solid Electrolytes and Mixed Conductors
July 18 - July 22, 2022

Symposium Organizers

George Harrington, Kyushu University / MIT
Rotraut Merkle, Max Planck Institute for Solid State Research
Alexander Opitz, Technische Universität Wien

* Invited Paper

SESSION DT05: Mixed Conductors I
Session Chair: Nicola Perry
Monday Afternoon, July 18, 2022
Mezzanine Level, Second Floor, Georgian

2:00 PM **DT05.01

Oxygen Surface Exchange Kinetics of Sm-Doped Ceria Catalyzed by Co-Based Oxides [Hitoshi Takamura](#); Tohoku Daigaku, Japan

2:30 PM DT05.02

Defect Structure and Iso/Non-Isothermal Transport Properties of $\text{Ba}_{0.95}\text{La}_{0.05}\text{Co}_{0.8}\text{Fe}_{0.12}\text{Nb}_{0.8}\text{O}_{3-\delta}$ [Hohan Bae](#)¹, Jong Hoon Joo² and Sun-Ju Song¹; ¹Chonnam National University, Korea (the Republic of); ²Gwangju Institute of Science and Technology School of Earth Sciences and Environmental Engineering, Korea (the Republic of)

2:45 PM *DT05.03

Tailoring the Mixed Ionic/Electronic Conductivity in Mesoporous CeO_2/YSZ Nanocomposites by Surface Engineering [Erdogan Celik](#)¹, Yanjiao Ma², Torsten Brezesinski² and [Matthias T. Elm](#)^{1,1,1}; ¹Justus Liebig Universität Giessen, Germany; ²Karlsruher Institut für Technologie, Germany

3:05 PM DT05.04

Elucidating Oxygen Ion and Proton Transport in the Triple-Conducting Oxide $\text{BaCo}_{0.4}\text{Fe}_{0.4}\text{Zr}_{0.1}\text{Y}_{0.1}\text{O}_{3-\delta}$ (BCFZY4411) and Tuning the Co/Fe Ratio in the BCFZY System to Boost Electrolysis and Fuel Cell Performance [Yewon Shin](#)¹, Youdong Kim¹, Michael D. Sanders¹, Steve Harvey², Michael Walker¹ and Ryan O'Hayre¹; ¹Colorado School of Mines, United States; ²National Renewable Energy Laboratory, United States

3:20 PM DT05.05

Hexagonal Rare-Earth Manganites—From Materials Development to Practical Application of Oxygen Production in Temperature Swing Process [Kacper Cichy](#)¹, Alicja Klimkiewicz², Katarzyna Jarosz¹ and Konrad Swierczek^{1,3}; ¹Akademia Gorniczko-Hutnicza imienia Stanisława Staszica w Krakowie Wydział Energetyki i Paliw, Poland; ²Shibaura Kogyo Daigaku, Japan; ³Akademia Gorniczko-Hutnicza imienia Stanisława Staszica w Krakowie, Poland

SESSION DT06: Mechanistic Aspects of Li⁺Transport
Session Chair: Bettina Lotsch
Monday Afternoon, July 18, 2022
Mezzanine Level, Second Floor, Arlington

2:00 PM **DT06.01

Understanding (Effective) Ionic Transport in Solids and Solid-State Batteries [Wolfgang Zeier](#); University of Muenster, Germany

2:30 PM DT06.02

Study of Composition and Temperature Dependence of Li Dynamics in $\text{Li}_x\text{La}_3\text{Zr}_x\text{Ta}_{7-x}\text{O}_{12}$ with Machine-Learning Interatomic Potentials [Wei Lai](#) and Jin Dai; Michigan State University, United States

2:45 PM *DT06.03

Modeling the Defect Chemistry, Transport Properties and Stability of Anti-Perovskite Materials [Francesco Ciucci](#); The Hong Kong University of Science and Technology, Hong Kong

3:05 PM DT06.04

Native Defect Engineering in Solid Electrolytes Toward Reproducible High Ionic Conductivity [Saneyuki Ohno](#)¹, Masaki Shimoda¹, Cheng-Wei Lee² and Prashun Gorai^{2,3}; ¹Kyushu Daigaku, Japan; ²Colorado School of Mines, United States; ³National Renewable Energy Laboratory, United States

3:20 PM DT06.05

Li-Ion Conductivity in Metal Hydride-Based Nanocomposite Electrolytes—The Effect of Nanoscaffold Porosity and Surface Chemistry [Laura M. de Kort](#), Petra de Jongh and Peter Ngene; Universiteit Utrecht, Netherlands

SYMPOSIUM EF

Energy and Fuels Conversion
July 18 - July 22, 2022

Symposium Organizers

Sean Bishop, Sandia National Laboratories
Georgios Dimitrakopoulos, Massachusetts Institute of Technology
Jong-Ho Lee, Korea Institute of Science and Technology (KIST)

* Invited Paper

SESSION EF03: PEM Fuel/Electrolysis Cells I

Session Chair: Sanjeev Mukerjee
Monday Afternoon, July 18, 2022
Lobby Level, Avenue 34, Studio 2

2:00 PM **EF03.01

Elucidation of the Factors Controlling Oxygen Evolution on Model Surfaces [Ifan Stephens](#); Imperial College London, United Kingdom

2:30 PM **EF03.02

Advancing Fuel Cells for Heavy-Duty Applications [Rod L. Borup](#)¹, Adam Weber², Deborah Myers³, K. C. Neyerlin⁴, Ahmet Kusoglu², Rajesh Ahluwalia³, Rangachary Mukundan¹, David Cullen⁵ and Greg Kleen⁶; ¹Los Alamos National Laboratory, United States; ²E O Lawrence Berkeley National Laboratory, United States; ³Argonne National Laboratory, United States; ⁴National Renewable Energy Laboratory, United States; ⁵Oak Ridge National Laboratory, United States; ⁶DOE Golden Field Office, United States

3:00 PM *EF03.03

Activity, Degradation and Integration of Oxygen Reduction and Evolution Electrocatalysts in Polymer Electrolyte Fuel Cells and Water Electrolyzers [Deborah Myers](#), Nancy Kariuki, Jaehyung Park and A. Jeremy Kropf; Argonne National Laboratory, United States

3:20 PM *EF03.04

Optimization of Manufacturing Techniques for Highly-Performing Membrane-Electrode Assemblies in PEM Fuel Cells [Xianguo Li](#); University of Waterloo, Canada

3:40 PM BREAK

4:00 PM *EF03.05

An Overview of the H2NEW Consortium [Bryan Pivovar](#); National Renewable Energy Laboratory, United States

4:20 PM *EF03.06

High Temperature Polymer Electrolyte Fuel Cells as a Unique Clean Power Technology for a Wide Array of Markets [Vasilis Gregoriou](#) and [Emory S. De Castro](#); Advent Technologies SA, Greece

4:40 PM EF03.07

Synthesis of Proton-Conducting Inorganic-Organic Composites Based on Strong Acid Salts of Heterocyclic Compounds and Their Application to Medium-Temperature Anhydrous Fuel Cells [Keiichiro Maegawa](#), Jin Nishida, Go Kawamura and Atsunori Matsuda; Toyohashi University of Technology, Japan

4:55 PM EF03.08

Transition Metals High-Entropy Spinel Oxides Prepared by Spray Pyrolysis Technique—Microstructural and Electrical Investigations of Thin Films [Bartosz Kamecki](#), Krystian Lankauf, Piotr Jasinski, Jakub Karczewski and Sebastian Molin; Politechnika Gdanska, Poland

5:10 PM EF03.09

Development and Characterization of Crosslinked PPO-Based Anion Exchange Membranes for AEM Fuel Cells [Andrea Basso Peressut](#), Joelle Montagna, Paola Moretti, Alessia Arrigoni, Saverio Latorrata, Chiara Bertarelli and Giovanni Dotelli; Politecnico di Milano, Italy

5:25 PM EF03.10

Mesoscale Model for Ostwald Ripening of Catalyst Nano-Particles [Giovanna Bucci](#)¹ and W. Craig Carter²; ¹Palo Alto Research Center Incorporated, United States; ²Massachusetts Institute of Technology, United States

SESSION EF04: Ceramic Membrane Reactors I

Session Chairs: Georgios Dimitrakopoulos and Ahmed Ghoniem
Monday Afternoon, July 18, 2022
Lobby Level, Avenue 34, Studio 1

2:00 PM **EF04.01

Proton-Conducting Electroceramics for Electricity Generation, Energy Storage and Fuels Synthesis [Neal Sullivan](#)¹, Long Q. Le², Carolina Herradon¹, Charlie Meisel¹, Youdong Kim¹, Jake Huang¹ and Ryan O'Hayre¹; ¹Colorado School of Mines, United States; ²Pacific Northwest National Laboratory, United States

2:30 PM **EF04.02 **WITHDRAWN**

Circular Materials for the Green Energy Transition [Anke Weidenkaff](#); Fraunhofer IWKS and Technical University of Darmstadt, Germany

3:00 PM *EF04.03 **WITHDRAWN**

Tubular Oxygen Transport Membranes for Energy [Ralf Kriegel](#) and [Olga Ravkina](#); Fraunhofer-Institut für Keramische Technologien und Systeme IKTS - Standort Hermsdorf, Germany

3:20 PM *EF04.04

Inorganic Proton Conducting Membranes for Use in the Petrochemical Industry [Arian Nijmeijer](#)^{1,2}; ¹Shell Global Solutions International BV, Netherlands; ²Universiteit Twente Faculteit Technische Natuurwetenschappen, Netherlands

3:40 PM BREAK

4:00 PM **EF04.05

Ionic Conducting Ceramic Membranes for Membrane Reactors—Potential Applications—Microstructures, Performance and Components [Wilhelm A. Meulenber](#)¹, Stefan Baumann¹, Wendelin Deibert¹, Nikolaos Margaritis², Remzi Can Samsun², Ralf Peters² and Olivier Guillon¹; ¹Forschungszentrum Julich Institut für Energie- und Klimaforschung, Germany; ²Forschungszentrum Julich GmbH, Germany

4:30 PM **EF04.06

Catalytic Ionic-Membrane Reactors for Energy Storage and Synthetic Chemistry [Jose M. Serra](#); Instituto de Tecnologia Química, Spain

5:00 PM *EF04.07

Protonic Ceramics in Intermediate-Temperature Membrane Reactors [Robert Kee](#), Huayang Zhu and Sandrine Ricote; Colorado School of Mines, United States

5:20 PM *EF04.08

Nanoengineered Electrocatalysts Through Exsolution in Solid Electrolyte Membrane Reactors Towards Efficient Power-To-Chemical Transformations [Vasileios Kyriakou](#); Rijksuniversiteit Groningen, Netherlands

5:40 PM EF04.09

Membrane Separation Reactor—Challenges and Steps Towards Hydrogen Mobility Xanthi Georgolamprou¹, Stéven Pirou¹, Sandrine Ricote², Wolff-Ragnar Kiebach¹ and Peter V. Hendriksen¹; ¹Danmarks Tekniske Universitet, Denmark; ²Colorado School of Mines, United States

SYMPOSIUM EI

Electrochemical Interfaces
July 18 - July 22, 2022

Symposium Organizers

Koji Amezawa, Tohoku University
WooChul Jung, Korea Advanced Institute of Science and Technology
Jonathan Polfus, University of Oslo

* Invited Paper

SESSION EI03: Grain Boundaries and Heterostructures
Session Chairs: Peter Crozier and Aleksandar Staykov
Monday Afternoon, July 18, 2022
Mezzanine Level, Second Floor, Berkeley/Clarendon

2:00 PM **EI03.01

Grain Boundaries in MIECs—A Help or a Hindrance? John A. Kilner^{1,2};
¹Imperial College London, United Kingdom; ²Kyushu Daigaku Carbon Neutral Energy Kokusai Kenkyujo, Japan

2:30 PM *EI03.02

Dynamics of Oxygen Ions in SrCoO_{3-δ} Heterostructures Dillon Fong¹, Guoxiang Hu², Vitalii Starchenko³, Gang Wan¹, Eric Dufresne⁴, Yongqi Dong¹, Huajun Liu⁵, Hua Zhou⁴, Hyoungjeen Jeon³, Kayahan Saritas³, Jaron Krogel³, Fernando Reborado³, Ho Nyung Lee³, Alec Sandy⁴, Irene C. Almazan¹ and Panchapakesan Ganesh³; ¹Argonne National Laboratory, United States; ²Rutgers University New Brunswick, United States; ³Oak Ridge National Laboratory, United States; ⁴Argonne National Laboratory Advanced Photon Source, United States; ⁵Agency for Science Technology and Research, Singapore

2:50 PM EI03.03

Reactions of Oxygen and Hydrogen at the Aluminum Oxide/Aluminum Interface Using *Ab Initio* Grand Canonical Monte Carlo Vrinda Somji and Bilge Yildiz; Massachusetts Institute of Technology, United States

3:05 PM EI03.04

Self-Assembly SrCo_{0.8}Fe_{0.2}O_{3-δ}/Fe₃O₄ Heterostructure Proton Membrane for Advanced Semiconductor Ionic Fuel Cell Nabeela Akbar; China University of Geosciences, China

3:20 PM EI03.05

Nano-Scale Imaging and Spectroscopy of Interfaces in (Co,Cu,Mg,Ni,Zn)O High Entropy Oxides Hasti Vahidi¹, Alexander Davis Dupuy¹, Justin Cortez¹, Julie M. Schoenung¹ and William Bowman^{1,2};
¹University of California Irvine, United States; ²University of California Irvine Materials Research Institute, United States

3:35 PM BREAK

SYMPOSIUM ES

Energy Storage
July 18 - July 22, 2022

Symposium Organizers

Ainara Aguadero, Imperial College London and Instituto de Ciencia de Materiales de Madrid
Yifei Mo, University of Maryland
Daniel Rettenwander, Norwegian University of Science and Technology (NTNU)

* Invited Paper

SESSION ES02: Solid State Batteries II
Session Chair: Tianwei Jin
Monday Afternoon, July 18, 2022
Lobby Level, Avenue 34, The Loft

2:00 PM *ES02.01

An In-Depth Look at of the Degradation Mechanisms of High-Nickel Cathodes in Lithium-Ion Batteries Arumugam Manthiram; The University of Texas at Austin, United States

2:20 PM *ES02.02

Solid-State Batteries for EV Application—Opportunities and Challenges Mei Cai; General Motors Corp, United States

2:40 PM ES02.03

Design and Production of Three-Dimensionally-Structured Oxide Composite Cathodes for All-Solid-State Lithium Batteries Johannes Kriegl¹, Enkhtsetseg Dashjav², Maximilian Scheller¹, Fabian Konwitschny¹, Frank Tietz^{2,3} and Michael Zaeh¹; ¹Technische Universität Munchen, Germany; ²Forschungszentrum Julich GmbH, Germany; ³Forschungszentrum Julich Helmholtz-Institut Munster Institut für Energie- und Klimaforschung Elektrochemische Verfahrenstechnik, Germany

2:55 PM ES02.05

Improving the Electrochemical Performance of Li₇P₂S₈X Solid Electrolyte with Compositional Tuning and Doping Process Rajesh Rajagopal and Kwang-Sun Ryu; University of Ulsan, Korea (the Republic of)

3:10 PM ES02.06

Ionic and Electronic Transport Properties of Li_{0.29-δ}La_{0.57}TiO₃ Investigated by Electrocoloration, GITT and EIS Joseph R. Ring, Andreas Nennung and Juergen Fleig; Technische Universität Wien, Austria

3:25 PM BREAK

4:00 PM *ES02.07

The Role of Adhesion on Interfacial Stability in All-Solid-State Batteries with Alkali-Metal Anodes Juan D. Seymour¹, Edouard Quere¹, Rowena Brugge^{1,2} and Ainara Aguadero^{1,3}; ¹Imperial College London, United Kingdom; ²University of Cambridge, United Kingdom; ³Instituto de Ciencia de Materiales de Madrid, Spain

4:20 PM ES02.08

Stable Solid-State Sodium Batteries Based on Na-Metal and NASICON Electrolyte Qianli Ma¹, Frank Tietz¹, Dina Fattakhova-Rohlfing^{1,2} and Olivier Guillon^{1,3}; ¹Forschungszentrum Jülich GmbH, Forschungszentrum Jülich GmbH, Jülich, Nordrhein-Westfalen, DE, academic/govt, Germany; ²Department of Engineering and Center for Nanointegration Duisburg-Essen (CENIDE), Universität Duisburg-Essen, Germany; ³JARA, Germany

4:35 PM ES02.09

How to Achieve High Room Temperature Li-Ion Conductivity and Cyclability in Complex Hydride Solid-State-Electrolyte Valerio Gulino, Peter Ngene and Petra de Jongh; Universiteit Utrecht, Netherlands

4:50 PM ES02.10

Utilizing Model Thin Film Polymer Electrolytes to Understand Polymer Electrolyte Modification in Polymer-Ceramic Composite Electrolytes Sara C. Sand¹, Jennifer Rupp² and Bilge Yildiz^{1,1}; ¹Massachusetts Institute of Technology, United States; ²Technische Universität München, Germany

5:05 PM ES02.11

Novel Solution-Processing via Dynamic Sulfide Radical Anions for Rapid Synthesis of Sulfide Solid Electrolytes Hirotada Gamo, Jin Nishida, Atsushi Nagai, Kazuhiro Hikima and Atsunori Matsuda; Toyohashi Gijyutsu Kagaku Daigaku, Japan

5:20 PM *ES02.12

Argyrodite-Type Solid State Ion Conductors for Solid State Batteries Linda Nazar, Laidong Zhou, A. Assoud and K. Kaup; University of Waterloo, Canada

SYMPOSIUM IE

Iono-Electronics
July 18 - July 21, 2022

Symposium Organizers

Geoffrey Beach, Massachusetts Institute of Technology
Monica Burriel, CNRS - Grenoble INP
YiYang Li, University of Michigan

* Invited Paper

SESSION IE02: Organic Iono-Electronics
Session Chairs: Simone Fabiano and Aristide Gumyusenge
Monday Afternoon, July 18, 2022
Lobby Level, Terrace

2:00 PM **IE02.01

Mixed Conduction in Polymeric Materials—Uses and Opportunities in Neuromorphic Computing Alberto Salleo; Stanford University, United States

2:30 PM *IE02.02

Organic Mixed Ionic-Electronic Conductors for Low-Power Electronics Simone Fabiano; Linköping University, Sweden

2:50 PM *IE02.03

Designing Polymeric Mixed Ionic/Electronic Conductors for Organic Electrochemical Transistors Jonathan Rivnay; Northwestern University, United States

3:10 PM IE02.04 WITHDRAWN

Ionic Communication for Implantable Bioelectronics Zifang Zhao¹, Jennifer Gelinas^{2,2} and Dion Khodagholy¹; ¹Columbia University, United States; ²Columbia University Irving Medical Center, United States

3:25 PM *IE02.05

Organic Neuromorphic Electronics—Bio-Inspired Functions and Sensorimotor Learning in Robotics Paschalis Gkoupidenis; Max-Planck-Institut für Polymerforschung, Germany

3:45 PM BREAK**4:05 PM *IE02.06**

Organic Neuromorphic Electronics and Biohybrid Systems Yoeri van de Burgt; Technische Universiteit Eindhoven, Netherlands

4:25 PM *IE02.07

Translational Neuroelectronics Dion Khodagholy; Columbia University, United States

4:45 PM *IE02.08

Design and Processing of Novel Organic Semiconductors for Electronics that Learn Aristide Gumyusenge; Massachusetts Institute of Technology, United States

5:05 PM IE02.09

Understanding the Device Physics of Ion-Gated Organic Electrochemical Transistors—A Study of the Channel Overlap Effect Anastasios Polyrvavas and Dion Khodagholy; Columbia University, United States

SYMPOSIUM DT

Defects and Transport Mechanisms in Solid Electrolytes and Mixed Conductors
July 18 - July 22, 2022

Symposium Organizers

George Harrington, Kyushu University / MIT
Rotraut Merkle, Max Planck Institute for Solid State Research
Alexander Opitz, Technische Universität Wien

* Invited Paper

SESSION DT07: Proton Uptake and Transport I
Session Chair: WooChul Jung
Monday Afternoon, July 18, 2022
Mezzanine Level, Second Floor, Georgian

4:00 PM *DT07.01

Exploration and Diffusion Mechanism of High Oxide-Ion and Proton Ceramic Conductors Masatomo Yashima and Kotaro Fujii; Tokyo Kogyo Daigaku, Japan

4:20 PM DT07.02

Proton Uptake and Transport Properties of Self-Generated Ba(Ce,Fe,Y)O_{3-δ} Composites Christina Nader¹, Judith Lammer², Tolga Acartürk³, Christian Berger³, Edith Bucher¹, Andreas Egger¹, Werner Grogger², Montaut Merkle³, Ulrich Starke³, Joachim Maier³ and Werner Sitte¹; ¹Montanuniversität Leoben, Austria; ²Technische Universität Graz, Austria; ³Max-Planck-Institut für Festkörperforschung, Germany

4:35 PM *DT07.03

Computational Modeling and Simulation of Ion Transport in Oxides for Energy Conversion Manfred Martin; Rheinisch-Westfälische Technische Hochschule Aachen, Germany

4:55 PM DT07.04

High-Throughput Screening of Solid-State Proton Conductors Based on Physical Descriptors of Proton Conduction Konstantin Klyukin^{1,2}, Pjotr Zguns¹, Ju Li¹ and Bilge Yildiz^{1,1}; ¹Massachusetts Institute of Technology, United States; ²Auburn University, United States

5:10 PM DT07.05

Dopant Configurations and Hydration Behavior in Heavily Sc-Doped BaZrO₃ from Machine-Learning Assisted First-Principles Statistical Thermodynamics Shusuke Kasamatsu¹, Akihide Kuwabara², Kenta Hoshino^{3,3}, Junji Hyodo³ and Yoshihiro Yamazaki^{3,3}; ¹Yamagata University, Japan; ²Japan Fine Ceramics Center, Japan; ³Kyushu University, Japan

5:25 PM DT07.06

Proton Transport in Cubic Perovskite BaZrO₃ Solid Solutions with Concentrated Lattice Defects Lei A. Zhang; Carnegie Mellon University, United States

5:40 PM DT07.07

Oxygen Non-Stoichiometry and Mixed Conductivity of Ti and Mg Doped BaCo_{0.4}Fe_{0.4}Y_{0.2}O_{3-δ} Perovskite Md Saiful Alam^{1,2}, Isao Kagomiya¹ and Ken-ichi Kakimoto¹; ¹Nagoya Institute of Technology, Japan; ²University of Chittagong, Bangladesh

SESSION DT08: Battery Electrolytes I
Session Chair: Wei Lai
Monday Afternoon, July 18, 2022
Mezzanine Level, Second Floor, Arlington

4:00 PM *DT08.01

Ion Polarization Mechanisms and Dendrite Initiation Dynamics in Li-Conducting Ceramic Electrolytes Peng Bai; Washington University in St Louis, United States

4:20 PM DT08.02

Modulating Grain Boundary Chemistry to Mitigate Li Filament Formation in Garnet-Type Solid-State Electrolytes Hyunwon Chu, Thomas Defferriere, Kunjoong Kim, Haemin Paik, Lingping Kong, Harry Tuller and Jennifer Rupp; Massachusetts Institute of Technology, United States

4:35 PM DT08.03

Defect Models for Li-Ion Transport in Al- and Nb-Doped LLZO Madeeha K. Pedersen and Truls Norby; Universitetet i Oslo Det Matematisk-naturvitenskapelige Fakultet, Norway

4:50 PM *DT08.05

Interface-Induced High Ionic Conductivities in Complex Hydride-Based Nanocomposite Materials Peter Ngene and Laura M. de Kort; Universiteit Utrecht Faculteit Betawetenschappen, Netherlands

5:10 PM DT08.06

Can Substitutions Affect the Oxidative Stability of Lithium Argyrodite Solid Electrolytes? Ananya Banik¹, Yunsheng Liu², Saneyuki Ohno³, Yannik Rudel¹, Alberto Jiménez-Solano⁴, Andrei Gloskovskii⁵, Nella M. Vargas-Barbosa⁶, Yifei Mo² and Wolfgang Zeier¹; ¹Westfälische Wilhelms-Universität Münster, Germany; ²University of Maryland at College Park, United States; ³Kyushu Daigaku Kogakubu Daigakuin Kogakufu, Japan; ⁴Max-Planck-Institut für Festkörperforschung, Germany; ⁵Deutsches Elektronen-Synchrotron, Germany; ⁶Forschungszentrum Jülich Helmholtz-Institut Münster Institut für Energie- und Klimaforschung Elektrochemische Verfahrenstechnik, Germany

5:25 PM DT08.07

Enhanced Mobility of Lithium and Sodium Ions in Phosphate Glasses Obtained by WO₃ and MoO₃ Addition Sanja Renka¹, Luka Pavić¹, Grégory Tricot², Tomáš Hostinský³, Petr Kalenda³, Petr Mošner³, Ladislav Koudelka³, Andrea Mogaš-Milanković¹ and Ana Šantić¹; ¹Institut Ruder Boskovic, Croatia; ²Université de Lille, France; ³Univerzita Pardubice Fakulta chemicko-technologická, Czechia

5:40 PM DT08.08

Synthesis of Highly Li-Ion Conductive Garnet-Type Solid Ceramic Electrolytes by Solution-Process-Derived Sintering Additives Nataly C. Rosero-Navarro, Akira Miura and Kiyoharu Tadanaga; Hokkaido Daigaku, Japan

SYMPOSIUM EI

Electrochemical Interfaces
July 18 - July 22, 2022

Symposium Organizers

Koji Amezawa, Tohoku University
WooChul Jung, Korea Advanced Institute of Science and Technology
Jonathan Polfus, University of Oslo

* Invited Paper

SESSION EI04: Interfaces and Space Charge
Session Chairs: Dillon Fong and Jeong Woo Han
Monday Afternoon, July 18, 2022
Mezzanine Level, Second Floor, Berkeley/Clarendon

4:00 PM EI04.01

Discrete Modeling of Ionic Space Charge Zones in Solids Chuanlian Xiao, Chia-Chin Chen and Joachim Maier; Max-Planck-Institut für Festkörperforschung, Germany

4:15 PM **EI04.02

The Consequences of Space-Charge Zones for Short-Circuit Diffusion along Extended Defects Roger A. De Souza; Rheinisch-Westfälische Technische Hochschule Aachen, Germany

4:45 PM EI04.03

Interfacial Zirconate Formation Influenced by the Porosity of Sm-Doped Ceria Barrier Layers Yoosuf Picard^{1,2}, Bo Guan^{3,2} and Harry Abernathy³; ¹National Energy Technology Laboratory, United States; ²NETL Support Contractor, United States; ³National Energy Technology Laboratory Morgantown, United States

5:00 PM EI04.04

Opto-Ionic Materials—The Role of Above Band-Gap Radiation on Ionic Transport Across Grain-Boundaries and Surfaces in Gd-Substituted Ceria Using Surface Exchange and Tracer Diffusion Studies George Harrington and Roger A. De Souza; Rheinisch-Westfälische Technische Hochschule Aachen, Germany

5:15 PM EI04.05 WITHDRAWN

An Electrochemical Model of the LSM/YSZ Interface Jose Bohorquez^{1,2} and David S. Mebane^{1,2}; ¹West Virginia University, United States; ²National Energy Technology Laboratory Morgantown, United States

5:30 PM EI04.06

Electrochemical Control of Resistance States in Pr_xCe_{1-x}O₂/La_{2-x}Ce_xCuO₄ Bilayer Stack for Rational Design of Large Area Switching Devices Thomas Defferriere¹, Jennifer Rupp^{2,1} and Harry Tuller¹; ¹Massachusetts Institute of Technology, United States; ²Technische Universität München, Germany

5:45 PM EI04.07

Enhanced Activity and Stability in Perovskite Oxide Fuel and Electrolysis Cell by Self-Formation of Secondary Phases Sanaz Koochfar, Tyler Hafen, Jenna Pike and Bilge Yildiz; Massachusetts Institute of Technology, United States

SYMPOSIUM P

Plenary
July 18 - July 22, 2022

Symposium Organizers

* Invited Paper

SESSION PI02: Plenary II
Tuesday Morning, July 19, 2022
Mezzanine Level, Second Floor, Grand Ballroom A

8:00 AM PI02.01

The Key Role of Solid State Ionics in the Development of Li-Ion Batteries M. Stanley Whittingham; Binghamton University SUNY, United States

SYMPOSIUM DT

Defects and Transport Mechanisms in Solid Electrolytes and Mixed Conductors
July 18 - July 22, 2022

Symposium Organizers

George Harrington, Kyushu University / MIT
Rotraut Merkle, Max Planck Institute for Solid State Research
Alexander Opitz, Technische Universität Wien

* Invited Paper

SESSION DT10: Exsolution
Session Chair: Alexander Opitz
Tuesday Morning, July 19, 2022
Mezzanine Level, Second Floor, Georgian

9:10 AM **DT10.01

New Strategies to Overcome the Limitations of Nanoparticle Ex-Solution WooChul Jung; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

9:40 AM DT10.02

Metal Exsolution Dynamics at Complex Oxide Surfaces Moritz L. Weber^{1,2,3}, Bretislav Smid⁴, Sarah Fearn², Uwe Breuer¹, Marc-André Rose^{1,5,3}, Jia Guo², Andrea Cavallaro², Liam Yasin², Samuel J. Cooper², Norbert H. Menzler^{1,3}, Stephen J. Skinner², Regina Dittmann^{1,5}, Rainer Waser^{1,5,3}, Ainara Aguadero^{2,6}, Olivier Guillon^{1,3,7}, Felix Gunkel^{1,5} and Christian Lenser¹; ¹Forschungszentrum Jülich GmbH, Germany; ²Imperial College London, United Kingdom; ³Rheinisch-Westfälische Technische Hochschule Aachen, Germany; ⁴Univerzita Karlova Matematicko-fyzikalni fakulta, Czechia; ⁵Jülich-Aachen Research Alliance (JARA-FIT), 52425 Jülich, Germany; ⁶Instituto de Ciencia de Materiales de Madrid, Spain; ⁷Jülich-Aachen Research Alliance (JARA-Energy), Germany

9:55 AM *DT10.03 WITHDRAWN

Exsolution—Rethinking the Role of Nanoparticles in Materials Dragos Neagu; University of Strathclyde, United Kingdom

10:15 AM DT10.04

Quantitative Correlation of Surface Cation Segregation and Surface Activity of Sr(Ti,Fe)O_{3-δ} Through Microscopic Observation Hyunseung Kim¹, Kyuseon Jang¹, Bonjae Koo^{1,2}, Jun Kyu Kim¹, Jongsu Seo¹, Pyuck-Pa Choi¹ and WooChul Jung¹; ¹Korea Advanced Institute of Science and Technology, Korea (the Republic of); ²Sungshin Women's University, Korea (the Republic of)

SESSION DT11: Battery Materials, Anode
 Session Chair: Don Siegel
 Tuesday Morning, July 19, 2022
 Mezzanine Level, Second Floor, Arlington

9:10 AM **DT11.01

Solid-State Batteries—An Electrode Challenge Dominic Spencer Jolly¹, Ziyang Ning¹, Xiangwen Gao^{1,2}, Guanchen Li^{1,2}, Dominic L. Melvin^{1,2}, T. James Marrow¹, Charles Monroe^{1,2} and Peter G. Bruce^{1,2,3}; ¹University of Oxford, United Kingdom; ²The Faraday Institution, United Kingdom; ³The Henry Royce Institute, United Kingdom

9:40 AM DT11.02 WITHDRAWN

Atomistic Simulations of Transition Metal Niobates as Next-Gen Battery Electrodes Benedict Saunders, Tanmoy Chakraborty, Wilgner L. da Silva, Alexandru Tanase, Richard I. Walton and Bora Karasulu; University of Warwick, United Kingdom

9:55 AM *DT11.03

The Dynamic Local Chemistries at the Interfaces of All-Solid-State Batteries with Alkali Metal Anodes Edouard Quere¹, Rowena Brugge¹, Federico M. Pesci¹, Andrea Cavallaro¹, Nomaan Nabi¹, Ieuan D. Seymour¹ and Ainara Aguadero^{2,1}; ¹Imperial College London, United Kingdom; ²Consejo Superior de Investigaciones Científicas, Spain

10:15 AM DT11.04

Highly-Conducting Alluaudite-Type Nanocrystallized Glass-Ceramics for Sodium-Ion Batteries Maciej Nowagiel, Mateusz J. Samsel, Aldona Zaleska and Tomasz K. Pietrzak; Politechnika Warszawska, Poland

SYMPOSIUM EF

Energy and Fuels Conversion
 July 18 - July 22, 2022

Symposium Organizers

Sean Bishop, Sandia National Laboratories
 Georgios Dimitrakopoulos, Massachusetts Institute of
 Technology

Jong-Ho Lee, Korea Institute of Science and Technology (KIST)

* Invited Paper

SESSION EF06: Proton Conducting Electrolysis Cells I
 Session Chairs: Vasileios Kyriakou and Jong-Ho Lee
 Tuesday Morning, July 19, 2022
 Lobby Level, Avenue 34, Studio 1

9:10 AM **EF06.01

Process Intensified Flexible Chemical and Fuel Production Using Protonic Ceramic Electrochemical Cells at Intermediate Temperatures Dong Ding; Idaho National Laboratory, United States

9:40 AM *EF06.02

Advanced Manufacturing of High-Performance Protonic Ceramic Electrochemical Cells and Stacks Jianhua (Joshua) Tong; Clemson University, United States

10:00 AM EF06.03

High-Performance Reversible Protonic Ceramic Fuel Cells Francesco Ciucci; The Hong Kong University of Science and Technology, Hong Kong

10:15 AM EF06.04 WITHDRAWN

A Universal Bifunctional Air-Electrode for Oxygen-Ion- and Proton-Conducting Solid Oxide Cells with Exceptional Activity and Stability Jun Hyuk Kim, Dongyeon Kim, Sejong Ahn, Kang Taek Lee and WooChul Jung; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

10:30 AM BREAK**11:00 AM EF06.05**

Exploring the Impact of Ba(ZrYPr)O₃₋₈ Overlayers on Water Splitting Kinetics with Pr₂NiO_{4+δ} Anodes in Proton-Conducting Electrolysis Cells Mayuri M. Kushare¹, Sandrine Ricote¹, Jesse Fosheim¹, Su Jeong Heo², Andriy Zakutayev² and Gregory Jackson¹; ¹Colorado School of Mines, United States; ²National Renewable Energy Laboratory, United States

11:15 AM EF06.06

A Proton Conducting Electrolyte with Improved Conductivity for Solid Oxide Electrolysis Cells Hanping Ding, Clarita Regalado Vera and Dong Ding; Idaho National Laboratory, United States

11:30 AM EF06.07

A Novel High-Entropy Perovskite Oxide Electrolyte for Reversible Protonic Ceramic Electrochemical Cells Minda Zou, Hua Huang, Hua Huang and Jianhua (Joshua) Tong; Clemson University, United States

11:45 AM EF06.08

Utilizing Mixed Ionic and Electronic Conducting Materials to Enhance Performance of Proton-Conducting Ceramic Electrochemical Devices Charlie Meisel¹, Long Q. Le², Carolina Herradon¹, Jake Huang¹, Youdong Kim¹, Ryan O'Hayre¹ and Neal Sullivan¹; ¹Colorado School of Mines, United States; ²Pacific Northwest National Laboratory, United States

12:00 PM EF06.09

Effect of Partial Conductivities on the Polarisation Resistance of Positrodes for Proton Ceramic Fuel Cells and Electrolysers Kalpana Singh, Truls Norby and Ragnar Strandbakke; Universitetet i Oslo Det Matematisk-naturvitenskapelige Fakultet, Norway

12:15 PM EF06.10

Improving performance of Layered Cobaltite Cathode Materials for Reversible Protonic Ceramic Cells Park Kwangho, Minkyong Jo, Gwangmin Park and Jun-young Park; Sejong University, Korea (the Republic of)

12:30 PM EF06.11

Performance Evaluation and Modelling of Electrocatalytic CO₂ Reduction in a Tubular Protonic Membrane Reactor Imanol Quina¹, David Catalan-Martinez¹, Sonia Escolástico¹, Laura Almar¹, Amir Masoud Dayaghi², Camilla Vigan³ and Jose M. Serra¹; ¹Instituto de Tecnología Química, Spain; ²Universitetet i Oslo, Norway; ³CoorsTek Membrane Sciences AS, Norway

SESSION EF07: Solar Cells II
 Session Chairs: David Ginger and Nitin Padture
 Tuesday Morning, July 19, 2022
 Lobby Level, Avenue 34, Studio 2

9:10 AM **EF07.01

Recent Progress of Organic and Perovskite PV at UCLA Yang Yang;
 University of California Los Angeles, United States

9:40 AM **EF07.02 WITHDRAWN

Self-Healing in Solar Cells, Starring CIGS and Halide Perovskites David Cahen^{1,2}; ¹Weizmann Institute of Science, Israel; ²Bar-Ilan University, Israel

10:10 AM **EF07.03

Controlling Charge, Spin and Light in Lead-Halide Inspired Hybrid Semiconductors and Semiconductor Nanocrystals Matthew C. Beard;
 National Renewable Energy Laboratory, United States

10:40 AM BREAK**11:00 AM *EF07.04**

Build a Direct Relationship Between Ultrafast Carrier Dynamics and Quantum Devices Jianbo Gao; Clemson University, United States

11:20 AM *EF07.05

Materials Engineering Approaches for Interface and Bulk for Perovskite Solar Cells Nikolai Tsvetkov; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

11:40 AM EF07.06

Supported Bimetallic Nanostructures Through Galvanic Restructuring of Exsolved Nanoparticles for Catalytic Versatility Xiaolan Kang;
 Universitetet i Oslo, Norway

11:55 AM EF07.07

Photocatalytic Oxygen Evolution Reaction for Bismuth Ferrite Loaded with IrO₂ Wegdan Ramadan¹ and Detlef Bahnemann^{2,3}; ¹Alexandria University Faculty of Science, Egypt; ²Institut für Technische Chemie, Leibniz Universität Hannover, Callinstr. 3, D-30167, Germany; ³Saint-Petersburg State University, Laboratory “Photoactive Nanocomposite Materials”, 198504, Russian Federation

12:10 PM EF07.08

Unraveling the Structural Properties of Ba₂CuWO₆ Thin Films Olivia Wenzel, Moritz Braun, Heike Stoermer, Michael Hoffmann and Dagmar Gerthsen; Karlsruher Institut für Technologie, Germany

12:25 PM EF07.09

Ionic Effect on Space Charges at Interfaces Between MAPbI₃ and Contact Materials Mina Jung, Gee Yeong Kim, Alessandro Senocrate, Davide Moia and Joachim Maier; Max-Planck-Institute Stuttgart, Germany

SYMPOSIUM EI

Electrochemical Interfaces

July 18 - July 22, 2022

Symposium Organizers

Koji Amezawa, Tohoku University
 WooChul Jung, Korea Advanced Institute of Science and Technology
 Jonathan Polfus, University of Oslo

* Invited Paper

SESSION EI06: Electrochemistry Fundamentals
 Session Chairs: Christoph Baeumer and Sung-Yoon Chung
 Tuesday Morning, July 19, 2022
 Mezzanine Level, Second Floor, Berkeley/Clarendon

9:10 AM **EI06.01

Coupled Ion-Electron Transfer Reactions Between Solids, Liquids and Gas William C. Chueh; Stanford University, United States

9:40 AM *EI06.02

Correlation of Local Structures and Electronic States with Oxygen Evolution Electrocatalysis in Oxides Sung-Yoon Chung; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

10:00 AM **EI06.03

Chemical Capacitances at Electrochemical Interfaces in SOFC—The Origin and the Use for Characterization of Electrochemical Reaction Site Tatsuya Kawada¹, Keiji Yashiro¹, Kota Watanabe¹, Mirai Takeda¹, Masami Sato^{1,2}, Mayu Muramatsu³ and Kenjiro Terada⁴; ¹Tohoku University, Japan; ²Mechanical Design & Analysis Corporation, Japan; ³Keio University, Japan; ⁴Tohoku University, Japan

10:30 AM EI06.04

Operando Observation of Chemical Potential Distribution in Solid-State Ionics Devices by Using X-Ray Absorption Spectroscopy Koji Amezawa¹, Masaharu Yanagi¹, Yuta Kimura¹, Takashi Nakamura¹, Hirokazu Katsui², Kiyofumi Nitta³, Oki Sekizawa³ and Tatsuya Kawada¹; ¹Tohoku University, Japan; ²AIST, Japan; ³JASRI, Japan

10:45 AM BREAK

SYMPOSIUM ES

Energy Storage
July 18 - July 22, 2022

Symposium Organizers

Ainara Aguadero, Imperial College London and Instituto de
Ciencia de Materiales de Madrid
Yifei Mo, University of Maryland
Daniel Rettenwander, Norwegian University of Science and
Technology (NTNU)

11:40 AM ES04.09

Innovative Single Ion Conducting Block Copolymer for Lithium Metal Batteries Gabriele Lingua^{1,2}, Petr S. Vlasov³, Alexander S. Shaplov⁴ and Claudio Gerbaldi^{1,2}; ¹Politecnico di Torino, Italy; ²Consorzio Interuniversitario Nazionale per la Scienza e Tecnologia dei Materiali, Italy; ³Sankt-Peterburgskij gosudarstvennyj universitet Institut himii, Russian Federation; ⁴Luxembourg Institute of Science and Technology, Luxembourg

11:55 AM ES04.10

Challenges Toward Solid-State Lithium-Sulfur Batteries—Transport and Reaction Current Distribution in Composite Cathodes with High Interfacial Area Density Saneyuki Ohno; Kyushu Daigaku, Japan

12:10 PM ES04.11

Electronic Conduction Induced Dendrite Formation in Solid Electrolytes Fudoong Han; Rensselaer Polytechnic Institute, United States

SYMPOSIUM IE

Iono-Electronics
July 18 - July 21, 2022

Symposium Organizers

Geoffrey Beach, Massachusetts Institute of Technology
Monica Burriel, CNRS - Grenoble INP
YiYang Li, University of Michigan

* Invited Paper

SESSION ES04: Solid State Batteries III
Tuesday Morning, July 19, 2022
Lobby Level, Avenue 34, The Loft

9:10 AM **ES04.01

Enabling High-Rate Lithium Metal Anodes by Tailored Structures and Interfaces Eric Wachsman^{1,2}; ¹University of Maryland, United States; ²Ion Storage Systems, United States

9:40 AM *ES04.02

In Situ Solidification for Forming Continuous Ion Transport Path Hong Li; Institute of Physics, Chinese Academy of Sciences, China

10:00 AM ES04.03

Combining an *Operando* and an *Ex Situ* XPS Study to Explain the Aging Dynamics of Na Metal|NaSICON Interfaces in Solid-State Batteries Edouard Quérel¹, Nicholas J. Williams¹, Stephen J. Skinner¹ and Ainara Aguadero^{1,2}; ¹Imperial College London, United Kingdom; ²Instituto de Ciencia de Materiales de Madrid, Spain

10:15 AM ES04.04

Electrochemical Kinetics of Solid-Electrolyte Interphase Growth at the Na⁰/NZSP Interface Nicholas J. Williams¹, Edouard Quérel¹, Ieuan D. Seymour¹, Stephen J. Skinner¹ and Ainara Aguadero^{2,1}; ¹Imperial College London, United Kingdom; ²Instituto de Ciencia de Materiales de Madrid, Spain

10:30 AM ES04.05

Fabrication of Thin Sheets of the Sodium Superionic Conductor Na₅YSi₄O₁₂ with Aqueous Tape Casting Aikai Yang^{1,2}, Ruijie Ye^{1,2}, Qianli Ma¹, Frank Tietz¹ and Olivier Guillon^{1,2}; ¹Forschungszentrum Julich GmbH, Germany; ²Rheinisch-Westfälische Technische Hochschule Aachen, Germany

10:45 AM BREAK

11:00 AM *ES04.06

Interfacial Characterizations and Designs for Polymer Electrolyte-Based Solid-State Batteries Yuan Yang; Columbia University, United States

11:20 AM *ES04.07

Perspectives on the Opportunity and Challenge of Solid-State Automotive Batteries Raimund Koerver and Aron Varga; Bayerische Motoren Werke AG, Germany

* Invited Paper

SESSION IE04: Resistive Switching I
Session Chairs: Monica Burriel and Stephan Menzel
Tuesday Morning, July 19, 2022
Lobby Level, Terrace

9:10 AM **IE04.01

Redox-Based Memristive Switching in Metal Oxides—Variants and Prospects in Neuromorphic Computing Rainer Waser^{1,2}, Regina Dittmann^{1,2} and Stephan Menzel^{1,2}; ¹Forschungszentrum Julich GmbH, Germany; ²RWTH Aachen University, Germany

9:40 AM *IE04.02

CMOS based Neuromorphic Test Platform Enabled Advances in Resistive Memory and Selector Device Karsten Beckmann; SUNY Polytechnic, United States

10:00 AM IE04.03

Composition-Driven Phase Separation in Amorphous TaO_x for Valence-Change Memory Jingxian Li¹, Anirudh Appachar¹, Elisa Harrison², Sabrina Peczonecyk², Wenhao Sun¹ and YiYang Li¹; ¹University of Michigan, United States; ²Ford Motor Company, United States

10:15 AM IE04.04

Memristively Programmable Transistors for Neuromorphic Applications Sarah Beck, André Kosak, Raphael Ahlmann and Stefan Tappertzshofen; Technische Universität Dortmund, Germany

10:30 AM BREAK

11:00 AM **IE04.05

Point Defect Transport in Electroceramics and Implications for Electronic Conductivity Elizabeth Dickey; Carnegie Mellon University, United States

11:30 AM *IE04.06 **WITHDRAWN**

Effects of Materials Configuration and Capping Layer for Design Strategies in Memristive Devices Shaochuan Chen¹ and Iliia Valov^{2,1};

¹Rheinisch-Westfälische Technische Hochschule Aachen, Germany;

²Forschungszentrum Jülich GmbH, Germany

11:50 AM *IE04.07

Complex Oxides as Building Blocks for Brain-Inspired Computers and Evolutionary Intelligence Shriram Ramanathan; Purdue University, United States

12:10 PM IE04.08

Insight into the Switching Mechanisms of $\text{La}_2\text{NiO}_{4+\delta}$ Analog-Type Memristive Devices Suitable for Artificial Synapse Applications Khanh Khuu¹,

Gauthier Lefèvre², Carmen Jimenez¹, Fabrice Wilhelm³, Serge Blonkowski⁴,

Eric Jalaguier⁴, Ahmad Bsiesy² and Monica Burriel¹; ¹Univ. Grenoble Alpes, CNRS, Grenoble INP, LMGP, France; ²Univ. Grenoble Alpes, CNRS, CEA/LETI Minatoc, LTM, France; ³ESRF, France; ⁴Univ. Grenoble Alpes, CEA, LETI, France

¹Univ. Grenoble Alpes, CNRS, CEA/LETI Minatoc, LTM, France; ²ESRF, France; ³ESRF, France; ⁴Univ. Grenoble Alpes, CEA, LETI, France

12:25 PM IE04.09

Engineering of $\text{Pr}_x\text{Ca}_{1-x}\text{MnO}_3$ Based Interface Type Resistive Switching Devices for Neuromorphic Applications Alexander Gutsche, Sebastian Siegel, Sebastian Hamsch and Regina Dittmann; Forschungszentrum Jülich GmbH, Germany

11:30 AM DT12.02

Impact of Molecular Water on the Defect Chemistry of LiSCN —A Pseudohalide with Nonspherical Anion Markus Joos¹, Maurice Conrad², Rotraut Merkle¹, Thomas Schleid² and Joachim Maier¹; ¹Max-Planck-Institut für Festkörperforschung, Germany; ²Universität Stuttgart, Germany

11:45 AM *DT12.03

Proton Conductivity and Thermal Stability of Anhydrous Silico- and Germano-Phosphoric Acid Glasses Takahisa Omata¹, Aman Sharma¹, Isse Suzuki¹, Tomohiro Ishiyama² and Junji Nishii³; ¹Tohoku University, Japan;

²National Institute of Advanced Industrial Science and Technology (AIST),

Japan; ³Hokkaido University, Japan

12:05 PM DT12.04

Models for Surface Protonic Conductivity in Chemisorbed and Physisorbed Water Layers in Porous Nanoscopic CeO_2 Xinwei Sun and Truls Norby; Universitetet i Oslo Det Matematisk-naturvitenskapelige Fakultet, Norway

12:20 PM DT12.05

OH⁻ Conductivity and Water Uptake of Anion Exchange Thin Films Yuki Nagao, Fangfang Wang and Dongjin Wang; Japan Advanced Institute of Science and Technology, Japan

SESSION DT13: Battery Electrolytes II
Session Chair: Iwnetim Abate
Tuesday Morning, July 19, 2022
Mezzanine Level, Second Floor, Arlington

SYMPOSIUM DT

Defects and Transport Mechanisms in Solid Electrolytes and Mixed Conductors
July 18 - July 22, 2022

Symposium Organizers

George Harrington, Kyushu University / MIT
Rotraut Merkle, Max Planck Institute for Solid State Research
Alexander Opitz, Technische Universität Wien

11:00 AM **DT13.01

Ion Dynamics in Solid Electrolytes as Probed by NMR—From Site Disorder to Interfacial Effects and Dimensionality Martin Wilkening; Technische Universität Graz, Austria

11:30 AM DT13.02

Kinetic Isotope Effect, Critical Phonon Occupation and Activation Barriers in Fast Lithium-Ion Conductors Matthias T. Agne¹, Joop Frerichs², Michael R. Hansen² and Wolfgang Zeier^{2,1}; ¹Forschungszentrum Jülich Institut für Energie- und Klimaforschung, Germany; ²Westfälische Wilhelms-Universität Münster, Germany

11:45 AM *DT13.03

Phase Control and Microstructure Engineering in Thiophosphate and Halide Solid Electrolytes Bettina V. Lotsch^{1,2}; ¹Max-Planck-Institut für Festkörperforschung, Germany; ²Ludwig-Maximilians-Universität München, Germany

12:05 PM DT13.04

Decoupling Lithium and Host-Framework Stoichiometry Effects in $\text{Li}_{6+x}\text{PS}_{5+x}\text{I}_{1-x}$ Argyrodite Solid Electrolytes Lucy Morgan, Saiful Islam and Benjamin Morgan; University of Bath, United Kingdom

* Invited Paper

SESSION DT12: Solid/Liquid
Session Chair: TBD
Tuesday Morning, July 19, 2022
Mezzanine Level, Second Floor, Georgian

11:00 AM **DT12.01

Recent News in the Development of Useful and Scientifically Accurate Models of the Electrochemical Interface in Solids David S. Mebane^{1,2};

¹National Energy Technology Laboratory, United States; ²West Virginia University, United States

SYMPOSIUM EI

Electrochemical Interfaces
July 18 - July 22, 2022

Symposium Organizers

Koji Amezawa, Tohoku University
WooChul Jung, Korea Advanced Institute of Science and
Technology
Jonathan Polfus, University of Oslo

* Invited Paper

SESSION EI07: Solid Oxide Cells
Session Chairs: Yoshitaka Aoki and William Chueh
Tuesday Morning, July 19, 2022
Mezzanine Level, Second Floor, Berkeley/Clarendon

11:00 AM *EI07.01

Electrochemical Characterization of the Effects of Nanocatalyst Infiltration on the Air Electrode Reaction Kinetics Using the Transmission Line Model Jaewoon Hong^{1,2}, Hohan Bae¹ and Sun-Ju Song¹; ¹Chonnam National University, Korea (the Republic of); ²University of Maryland at College Park, United States

11:20 AM EI07.02 **WITHDRAWN**

Nanostructured LSC Thin-Film Electrodes with Improved Electrochemical Performance and Long-Term Stability Katherine Develos-Bagarinao¹, Ozden Celikbilek², Gwilherm Kerherve³, Sarah Fearn³, Stephen J. Skinner³ and Haruo Kishimoto¹; ¹National Institute of Advanced Industrial Science and Technology, Japan; ²Centre National de la Recherche Scientifique, France; ³Imperial College London, United Kingdom

11:35 AM *EI07.03

Multi-Doped Stabilized Bismuth Oxides as Functional Interlayers and Oxygen Electrode Components for Reversible Solid Oxide Cells at Reduced Temperatures Kang Taek Lee; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

11:55 AM EI07.04

Electrochemical Conversion of Methane to Ethylene Utilizing Highly Durable Barium Niobate Perovskites Kannan Ramaiyan, Luke Denoyer, Angelica Benavidez, Kyle Troche and Fernando Garzon; University of New Mexico College of Arts and Sciences, United States

12:10 PM **EI07.05

Recent Developments in Catalysts for Reversible Solid Oxide Cells Yucun Zhou, Nicholas Kane, Weilin Zhang, Zheyu Luo and Meilin Liu; Georgia Institute of Technology, United States

SYMPOSIUM DT

Defects and Transport Mechanisms in Solid Electrolytes and
Mixed Conductors
July 18 - July 22, 2022

Symposium Organizers

George Harrington, Kyushu University / MIT
Rotraut Merkle, Max Planck Institute for Solid State Research
Alexander Opitz, Technische Universität Wien

* Invited Paper

SESSION DT14: Surface Reaction
Session Chair: Matthias Elm
Tuesday Afternoon, July 19, 2022
Mezzanine Level, Second Floor, Georgian

2:00 PM **DT14.01

Electrochemical Characterization of Thin Films During Pulsed Laser Deposition Markus Kubicek; Technische Universität Wien, Austria

2:30 PM DT14.02

Bulk and Surface Oxygen Transport Properties of Mixed Oxide-Ion and Electron Conductors Obtained by Combined Oxygen Permeation Cell and Oxygen Probe Method Kevin Huang; University of South Carolina System, United States

2:45 PM *DT14.03

Relationship Between Acidity and Oxygen Exchange Kinetics in Mixed Conducting Oxides Clement Nicolle; Institut des Matériaux Jean Rouxel, France

3:05 PM DT14.04

Characterization of LaNiO₃-PrNiO₃ Solid Solutions as Oxygen Electrode Materials for SOEC Aleksey Yaremchenko¹, Dzyana Boiba¹, Mikhail Patrakeev², Kiryl Zakharchuk¹ and Blanca I. Arias-Serrano^{1,3}; ¹University of Aveiro, Portugal; ²Institute of Solid State Chemistry UB RAS, Russian Federation; ³Leibniz Institute for Plasma Science and Technology, Germany

3:20 PM DT14.05

Investigating the Oxygen Exchange Properties of Multilayered SrTi_{0.3}Fe_{0.7}O_{3-δ} | La_{0.6}Sr_{0.4}CoO_{3-δ} Thin-Film Electrodes via *In Situ* Impedance Spectroscopy During Pulsed Laser Deposition Christin Boehme¹, Matthäus Siebenhofer¹, Sergej Raznjevic², Christoph Riedl¹, Zaoli Zhang², Juergen Fleig¹ and Markus Kubicek¹; ¹Technische Universität Wien, Austria; ²Austrian Academy of Sciences, Austria

SESSION DT15: Polymer Electrolytes; Ca, Mg Conductors
Session Chair: Montse Casas Cabanas
Tuesday Afternoon, July 19, 2022
Mezzanine Level, Second Floor, Arlington

2:00 PM **DT15.01

Effect of Yield Stress on Stability of Solid Block Copolymer Electrolytes Against Lithium Metal Electrodes Nitash Balsara; Lawrence Berkeley National Laboratory, United States

2:30 PM DT15.02

Calcium Electrolytes—Conduction Mechanism Investigation Tanguy Picard¹, Nicolas Sergent¹, Cristina Iojoiu^{1,2}, Fannie Alloin^{1,2}, Jean-Sébastien Filhol^{3,2} and Marie-Liesse Doublet^{3,2}; ¹Laboratoire d'Electrochimie et de Physico-chimie des Matériaux et des Interfaces, France; ²RS2E, France; ³Institut Charles Gerhardt de Montpellier, France

2:45 PM *DT15.03

Ion Transport in Electrolytes with Salt Aggregates Lei Cheng; Argonne National Laboratory, United States

3:05 PM DT15.05

Investigation of MgZ₂Se₄ (Z = Sc, Er, Tm, Y) Spinels as Mg-Ion Conductors for All-Solid-State Mg Batteries Clarissa Glaser¹, Marcus Rohnke^{1,2} and Jürgen Janek^{1,2}; ¹Justus Liebig University Giessen, Germany; ²Center for Materials Research, Germany

SYMPOSIUM EF

Energy and Fuels Conversion
July 18 - July 22, 2022

Symposium Organizers

Sean Bishop, Sandia National Laboratories
Georgios Dimitrakopoulos, Massachusetts Institute of
Technology

Jong-Ho Lee, Korea Institute of Science and Technology (KIST)

* Invited Paper

SESSION EF08: Oxygen-Ion Conducting Electrolysis Cells I
Session Chairs: Georgios Dimitrakopoulos and Poul Moses
Tuesday Afternoon, July 19, 2022
Lobby Level, Avenue 34, Studio 1

2:00 PM **EF08.01

The Puzzling Interplay Between Operating Conditions, Overpotentials and Degradation Mechanisms Anne Hauch, Ming Chen, Henrik Lund Frandsen, Anke Hagen, Peter V. Hendriksen, Søren H. Jensen, Rainer Küngas, Theis Skafte, Mogens Mogensen, Xiufu Sun and Marie L. Traulsen; Danmarks Tekniske Universitet, Denmark

2:30 PM **EF08.02

Degradation Processes in Solid Oxide Electrolysis Cells Scott Barnett, Qian Zhang, Jerren Grimes, Dalton Cox, Junsung Hong, Beom-Kyeong Park, tianrang Yang and Peter Voorhees; Northwestern Univ, United States

3:00 PM *EF08.03

Exsolution of Nanoparticles on Ni Doped (La,Sr)FeO₃—Its Effect on Co-Electrolysis of CO₂ and H₂O for Syngas Production Umit Ozkan¹, Jaesung Kim¹, Dhruba Deka¹, Matt Ferree¹, Seval Gunduz¹, Jean-Marc Millet² and Anne Co¹; ¹The Ohio State University, The Ohio State University, Columbus, OH, US, academic, United States; ²Institut de Recherche sur la Catalyse et l'Environnement de Lyon, France

3:20 PM *EF08.04

Solid Oxide Cells—Theory and Stability of Oxygen Electrodes Xiao-Dong Zhou; University of Louisiana at Lafayette, United States

3:40 PM BREAK**4:00 PM EF08.05**

Pr- and Co-Substituted Rare Earth Nickelates as Air Electrodes for Solid Oxide Electrolysis Cells Werner Sitte, Sarah Eisbacher-Lubensky, Kathrin Sampl, Andreas Egger and Edith Bucher; Montanuniversitat Leoben, Austria

4:15 PM EF08.06

Tailoring Nano-Catalysts Exsolution with *In Situ* Ion Irradiation Towards Enhanced H₂O Splitting Jiayue Wang¹, Kevin B. Woller¹, Abinash Kumar¹, Iradwikanari Waluyo², Adrian Hunt², Zhan Zhang³, Hua Zhou³, James LeBeau¹ and Bilge Yildiz^{1,1}; ¹Massachusetts Institute of Technology, United States; ²Brookhaven National Laboratory, United States; ³Argonne National Laboratory, United States

4:30 PM EF08.08

Controlling the Dispersion of Pt Catalyst Through Heteroatom Doping of CeO₂ Support Seunghyun Kim¹, Gunjoo Kim¹, Kyeounghak Kim², Sangwoo Kim¹, Yong Beom Kim¹, Jeong Woo Han², Hyunjoo Lee¹ and WooChul Jung¹; ¹Korea Advanced Institute of Science and Technology, Korea (the Republic of); ²Pohang University of Science and Technology, Korea (the Republic of)

4:45 PM EF08.09

Chemical Capacitance Peaks of La_{0.6}Sr_{0.4}CoO_{3-δ} Electrodes Upon Anodic Polarization Caused by Extremely High Oxygen Gas Pressures in Pores Martin Krammer¹, Alexander Schmid¹, Matthäus Siebenhofer^{1,2}, Christopher Herzig¹, Andreas Nenning¹, Andreas Limbeck¹, Christoph Rameshan¹, Markus Kubicek¹ and Juergen Fleig¹; ¹Technische Universität Wien, Austria; ²Centre for Electrochemical Surface Technology GmbH, Austria

5:00 PM EF08.10

Synthesizing Functional Ceramic Materials for Solid Oxide Cells in Minutes Through Thermal Shock Weiwei Fan¹, Zhichu Ren¹, Zhu Sun², Xiahui Yao¹, Bilge Yildiz¹ and Ju Li¹; ¹Massachusetts Institute of Technology, United States; ²Xi'an Jiaotong University, China

5:15 PM EF08.11 WITHDRAWN

***In Situ* Optical Studies of Operando Generated Ni-Based Alloy Nanomaterials as Fuel Electrodes in Solid Oxide Electrochemical Cells** Syed N. Qadri¹ and Xiangling Yue²; ¹U.S. Naval Research Laboratory, United States; ²University of St. Andrews, United Kingdom

5:30 PM EF08.12

Steam/Carbon Dioxide Co-Electrolysis and Methanation in SOEC Modified by Transition Metals Nanoparticles Patryk Blaszczyk¹, Sea-Fue Wang², Marcin Zajac³, Beata M. Bochentyn¹ and Piotr Jasinski⁴; ¹Politechnika Gdanska Wydział Fizyki Technicznej i Matematyki Stosowanej, Poland; ²National Taipei University of Technology, Taiwan; ³National Synchrotron Radiation Center SOLARIS, Poland; ⁴Politechnika Gdanska Wydział Elektroniki Telekomunikacji i Informatyki, Poland

SESSION EF09: Solar Fuels I
Session Chairs: Sean Bishop and Avner Rothschild
Tuesday Afternoon, July 19, 2022
Lobby Level, Avenue 34, Studio 2

2:00 PM **EF09.01

Thermochemical Properties of Non-Stoichiometric Perovskite and Related Oxides for Solar Fuel Generation Sossina Haile; Northwestern University, United States

2:30 PM **EF09.02

Sustainable Transportation Fuels from Sunlight and Air Remo Schäppi and Aldo Steinfeld; Eidgenössische Technische Hochschule Zurich, Switzerland

3:00 PM *EF09.03

Solar Fuels—From Lab to Market [Christian Sattler](#), Martin Roeb, Freidemann Call and Josua Vieten; Deutsches Zentrum für Luft- und Raumfahrt eV, Germany

3:20 PM *EF09.04

Efficient Plasma-Assisted Dry Methane Reforming [Mruthunjaya Uddi](#), Chien-Hua Chen, Yue Xiao, Josh Kintzer and Joshua Przyjemski; Advanced Cooling Technologies Inc, United States

3:40 PM BREAK**4:00 PM **EF09.05**

Prospecting for Green Hydrogen Using Complex Perovskites and Concentrated Sunlight [Anthony H. McDaniel](#); Sandia National Laboratories California, United States

4:30 PM **EF09.06

Efficient Redox Reactor Train System and Materials for Solar Hydrogen Production [Ahmed F. Ghoniem](#); Massachusetts Institute of Technology, United States

5:00 PM *EF09.07

Materials Discovery, Characterization and Development for Lower Temperature Thermochemical H₂ Production [Jonathan Scheffe](#), Dylan McCord, Elizabeth Gager, Ximeng Wang, Juan Nino and Simon Phillpot; University of Florida, United States

5:20 PM *EF09.08 ~~WITHDRAWN~~

Bridging Photoelectrochemical and Thermochemical Approaches for Solar Fuel Processing [Sophia Haussener](#); Ecole Polytechnique Federale de Lausanne, Switzerland

5:40 PM *EF09.09

Strategies to Improve CeO₂ Performance for Solar-Driven Chemical Looping Syngas Production and CO₂ Splitting [Alfonso J. Carrillo](#); Instituto de Tecnologia Quimica, Spain

SYMPOSIUM EI

Electrochemical Interfaces

July 18 - July 22, 2022

Symposium Organizers

Koji Amezawa, Tohoku University
WooChul Jung, Korea Advanced Institute of Science and Technology
Jonathan Polfus, University of Oslo

* Invited Paper

SESSION EI08: Proton-Conducting Cells
Session Chairs: Meilin Liu and Sun-Ju Song
Tuesday Afternoon, July 19, 2022
Mezzanine Level, Second Floor, Berkeley/Clarendon

2:00 PM **EI08.01

Mixed Proton/Hole/Oxygen Vacancy Conductors—Bulk Defect Chemistry, Transport Properties and Surface Reaction Aspects [Rotraut Merkle](#)¹, Giulia Raimondi¹, Maximilian F. Hoedl¹, Andrew Chesnokov², Denis Gryaznov², Eugene Kotomin^{1,2} and Joachim Maier¹; ¹Max Planck Institute for Solid State Research, Germany; ²University of Riga, Latvia

2:30 PM EI08.02

Hydration, Stability and Electrochemistry of A- and B-Site Substituted Double Perovskite Cobaltites [Ragnar Strandbakke](#)¹, Maria Balaguer², Alfonso J. Carrillo², Sebastian Wachowski³, Iga Szpunar³, Aleksandra Mielewczyk-Gryn³, Magnus H. Sørby⁴, Øygarden Vegar⁵, Einar Vøllestad⁵, Maria Gazda³, Jose M. Serra² and Truls Norby¹; ¹Universitetet i Oslo, Norway; ²Instituto de Tecnologia Quimica, Spain; ³Politechnika Gdanska Wydział Fizyki Technicznej i Matematyki Stosowanej, Poland; ⁴Institutt for energiteknikk, Norway; ⁵SINTEF Industry, Norway

2:45 PM *EI08.03

Determination and Suppression of Electronic Leakage in Proton-Conducting Cells [Hirosige Matsumoto](#) and Leonard Kwati; Kyushu Daigaku, Japan

3:05 PM *EI08.04

Importance of Anode Functional Layer for Protonic Solid Oxide Electrolysis Cells [Yoshitaka Aoki](#), Chunmei Tang and Hiroki Habazaki; Hokkaido Daigaku, Japan

3:25 PM *EI08.05

A Discussion on the Electrochemistry of Positrodes in Proton Ceramic Electrochemical Cells [Einar Vøllestad](#); SINTEF, Norway

3:45 PM BREAK

SYMPOSIUM ES

Energy Storage
July 18 - July 22, 2022

Symposium Organizers

Ainara Aguadero, Imperial College London and Instituto de Ciencia de Materiales de Madrid
Yifei Mo, University of Maryland
Daniel Rettenwander, Norwegian University of Science and Technology (NTNU)

* Invited Paper

SESSION ES05: Solid State Batteries IV
Session Chair: Moran Balaish
Tuesday Afternoon, July 19, 2022
Lobby Level, Avenue 34, The Loft

2:00 PM **ES05.01

Developments of Lithium-Ion Conductors with the LGPS Type Structure Ryoji Kanno and Satoshi Hori; Tokyo Institute of Technology, Japan

2:30 PM *ES05.02

Solid-State Lithium-Metal Batteries at QuantumScape Tim Holme; QuantumScape, United States

2:50 PM ES05.03

Efficient Process Development and Component Design for Sulfide-Based All-Solid-State Batteries Hans-Christoph Toepfer^{1,2}, Tobias Kutsch², Robin Schuster² and Rüdiger Daub¹; ¹Technische Universität München, Germany; ²TUMint. Energy Research GmbH, Germany

3:05 PM ES05.04

Influence of Powder and Nanowire LLZO Fillers on Electrochemical Properties of PEO Membranes Mir Mehraj Ud Din^{1,2} and Daniel Rettenwander^{1,2}; ¹NTNU Norwegian University of Science and Technology, Norway; ²International Christian Doppler Laboratory for Solid-State Batteries, NTNU Norwegian University of Science and Technology, Norway

3:20 PM ES05.05

Deconvoluting Processing Effects on Interfaces in Solid-State Batteries Justine Ruhl and Wolfgang Zeier; Westfälische Wilhelms-Universität Münster, Germany

3:35 PM BREAK

4:00 PM *ES05.06

Multiscale Investigation of Sulfide Based Solid Electrolyte Adrien Fauchier-Magnan¹, Patrice Perrenot², Emmanuelle Suard³, François Fauth⁴ and Claire Villevieille¹; ¹Laboratoire d'Electrochimie et de Physico-chimie des Materiaux et des Interfaces, France; ²Commissariat à l'énergie atomique et aux énergies alternatives Siège administratif, France; ³Institut Laue-Langevin, France; ⁴Consorcio para la Construcción Equipamiento y Explotación del Laboratorio de Luz Sincrotron, Spain

4:20 PM ES05.07

On the Mixed Ionic-Electronic Conductivity in Co-Doped Li₇La₃Zr₂O₁₂ System Jakub Burnos, Marcin Malys, Przemyslaw Michalski and Michał M. Struzik; Warsaw University of Technology, Poland

4:35 PM ES05.08

Enhancing the Interface Between Polymer Electrolyte and Li Metal in Solid-State Batteries Ander Orue¹, Mikel Arrese-Igor^{1,2}, Rosalia Cid¹, Nuria Gómez¹, Juan Miguel Lopez del Amo¹, William Manalastas³ and Pedro Lopez-aranguren¹; ¹Centro de Investigación en Energías Alternativas, Spain; ²Universidad del País Vasco, Spain; ³Nanyang Technological University School of Materials Science and Engineering, Singapore

4:50 PM ES05.09

3D Operando High-Resolution Imaging of Inhomogeneous Electrochemical Reaction in Composite Solid-State Battery Electrodes Yuta Kimura¹, Su Huang¹, Takashi Nakamura¹, Nozomu Ishiguro¹, Oki Sekizawa², Kiyofumi Nitta², Tomoya Uruga², Tomonari Takeuchi³, Toyoki Okumura³, Mizuki Tada^{4,5}, Yoshiharu Uchimoto⁶ and Koji Amezawa¹; ¹Tohoku Daigaku, Japan; ²Kokido Hikari Kagaku Kenkyu Center, Japan; ³Sangyo Gijutsu Sogo Kenkyujo Kansai Center, Japan; ⁴Nagoya Daigaku, Japan; ⁵RIKEN SPring-8 Center, Japan; ⁶Kyoto Daigaku, Japan

5:05 PM ES05.10

Li₁₀GeP₂O₁₂ Electrolyte for All-Solid-State Batteries Giuliana Materzanini¹, Leonid Kahle^{2,3}, Aris Marcolongo^{2,3}, Tommaso Chiarotti^{4,2} and Nicola Marzari^{4,2}; ¹Université catholique de Louvain, Belgium; ²National Centre for Computational Design and Discovery of Novel Materials, Switzerland; ³IBM RSM Zurich Research Laboratory, Switzerland; ⁴Ecole Polytechnique Federale de Lausanne, Switzerland

5:20 PM ES05.11

Engineering Ion Migration at Cathode Electrolyte Interfaces for High Performance All-Solid-State Batteries Yuxuan Zhang¹, Thomas Kivevele², Han Wook Song³ and SungHwan Lee¹; ¹Purdue University, United States; ²Nelson Mandela African Institution of Science and Technology, Tanzania, United Republic of; ³Research Institute of Standard and Science, Korea (the Republic of)

5:35 PM ES05.12

Thermodynamic Aspects of LiCoO₂ Grain Growth on Li-Garnet Electrolyte Thin-Film for All-Solid-State Batteries Anatolii Morozov¹, Haemin Paik², Anton O. Boev¹, Dmitry A. Aksyonov¹, Svetlana A. Lipovskikh¹, Keith J. Stevenson¹, Jennifer Rupp² and Artem M. Abakumov¹; ¹Skolkovskij institut nauki i tehnologii, Russian Federation; ²Massachusetts Institute of Technology, United States

5:50 PM ES05.13 **WITHDRAWN**

Ultrathin LLZO-Polymer Composite Solid Polymer Electrolytes for Solid-State Batteries P. Sivaraj, Sagar A. Joshi and Seema Agarwal; Universität Bayreuth, Germany

SYMPOSIUM IE

Iono-Electronics
July 18 - July 21, 2022

Symposium Organizers

Geoffrey Beach, Massachusetts Institute of Technology
Monica Burriel, CNRS - Grenoble INP
YiYang Li, University of Michigan

* Invited Paper

SESSION IE05: Resistive Switching II
Session Chairs: Karsten Beckmann and Suhas Kumar
Tuesday Afternoon, July 19, 2022
Lobby Level, Terrace

2:00 PM **IE05.01

Ion-Based Volatile Memristors and Mem-Transistors for Neuromorphic Engineering Daniele Ielmini; Politecnico di Milano, Italy

2:30 PM *IE05.02

On the Conduction Mechanism of Valence Change Memories Stephan Menzel; Forschungszentrum Jülich GmbH, Germany

2:50 PM IE05.03

Retention Secured Non-Linear and Self-Rectifying Analog Charge Trap Memristor for Neuromorphic Application Geunyoung Kim, Hanchan Song, Jae Bum Jeon and Kyung Min Kim; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

3:05 PM IE05.04

Advanced Dynamic Physical Model of Valence Change Mechanism Memristors Juseong Park, Gwangmin Kim, Geunyoung Kim and Kyung Min Kim; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

3:20 PM IE05.05

Lithium Intercalation as a Pathway to Diverse Biomimetic Functionality—Beyond Merely Changing Resistance W. A. Doolittle, Alex S. Weidenbach, Bill Zivasatienraj, Aheli Ghosh and Timothy M. McCrone; Georgia Institute of Technology, United States

3:35 PM BREAK

4:00 PM **IE05.06

Detecting and Engineering Oxygen Vacancies in Tantalum Oxide Memristive Devices Regina Dittmann; Forschungszentrum Jülich, Germany

4:30 PM *IE05.07

Metal-Insulator Transition and Resistive Switching Effects in Metallic Perovskite Oxides Teresa Puig¹, Juan Carlos Gonzalez-Rosillo¹, Rafael Ortega¹, Anna Palau¹, Jordi Sune², Ivan Maggio-Aprile³, Regina Dittmann⁴ and Xavier Obradors¹; ¹Consejo Superior de Investigaciones Científicas, Spain; ²Universitat Autònoma de Barcelona, Spain; ³Université de Genève, Switzerland; ⁴Forschungszentrum Jülich, Germany

4:50 PM *IE05.08

Material Strategies for Memristor-Based AI Hardware and Their Heterointegration Jeehwan Kim; Massachusetts Institute of Technology, United States

5:10 PM *IE05.09

Novel Thermal Material Properties for Post-CMOS Neuromorphic Computing Suhas Kumar; Sandia National Laboratories California, United States

5:30 PM IE05.10

Demonstration of Neuromodulation-Inspired Stashing System for Energy-Efficient Spiking Neural Network Using a Self-Rectifying Memristor Array Woon Hyung Cheong, Jae Bum Jeon, Jae Hyun In, Geunyoung Kim, Hanchan Song, Juseong Park and Kyung Min Kim; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

5:45 PM IE05.11

A Flexible and Self-Rectifying Synaptic 32 x 32 Crossbar Array for a Wearable Neuromorphic Application Younghyun Lee, Geunyoung Kim and Kyung Min Kim; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

SYMPOSIUM DT

Defects and Transport Mechanisms in Solid Electrolytes and Mixed Conductors
July 18 - July 22, 2022

Symposium Organizers

George Harrington, Kyushu University / MIT
Rotraut Merkle, Max Planck Institute for Solid State Research
Alexander Opitz, Technische Universität Wien

* Invited Paper

SESSION DT16: Proton Uptake and Transport II
Session Chair: Hitoshi Takamura
Tuesday Afternoon, July 19, 2022
Mezzanine Level, Second Floor, Georgian

4:00 PM *DT16.01

Proton Conductivity and Mobility in Triple-Conducting Perovskites $\text{Ba}_{0.95}\text{La}_{0.05}\text{Fe}_{1-x}(\text{Y},\text{Zn})\text{O}_{3-\delta}$ Christian Berger¹, Rotraut Merkle¹, Jörg Exner², Ralf Moos² and Joachim Maier¹; ¹Max-Planck-Institut für Festkörperforschung, Germany; ²University of Bayreuth, Germany

4:20 PM DT16.02

Understanding the Origin of Enhanced Catalytic Activity in $\text{LnCo}_{0.5}\text{Ni}_{0.5}\text{O}_{3-\delta}$ (Ln = Pr, La) Perovskites Type Oxides on Protonic Electrochemical Devices Leonard Kwati, Aleksandar Staykov and Hiroshige Matsumoto; Kyushu Daigaku, Japan

4:35 PM *DT16.03

Surface Exchange Study of Proton Ceramic Electrochemical Cell's Positrode by Gas Phase Analysis Vincent Thoréton and Reidar Haugrud; Universitetet i Oslo, Norway

4:55 PM DT16.04

In Situ Growth of Palladium Nanoparticles on A-Site Layered Double Perovskite $\text{PrBaMn}_2\text{O}_5+\delta$ Ritika Vastani, Sivapakash Sengodan and Stephan J. Skinner; Imperial College London, United Kingdom

5:10 PM DT16.05

Thermodynamics of Proton Transport in Doped Barium Cerate-Zirconate Triple Conducting Oxides Jagoda E. Budnik, Tadeusz Miruszewski, Aleksandra Mielewczyk-Gryn and Maria Gazda; Politechnika Gdanska, Poland

5:25 PM DT16.06

High Entropy Rare-Earth Ortho-Niobates - Structural, Thermal and Electrical Properties Arkadiusz Dawczak, Aleksandra Mielewczyk-Gryn, Wojciech Skubida and Maria Gazda; Politechnika Gdanska, Poland

5:40 PM DT16.07

Exploration of Off-Stoichiometric CsH_2PO_4 —A Novel Superprotonic Compound and Non-Stoichiometry in Cubic $[\text{Cs}_{1-x}\text{H}_x]\text{H}_2\text{PO}_4$ Louis S. Wang¹, Sawankumar V. Patel², Erica Truong², Yan-Yan Hu² and Sossina Haile¹; ¹Northwestern University, United States; ²Florida State University, United States

SESSION DT17: Battery Electrolytes III Including F-Conductors

Session Chair: Lei Cheng

Tuesday Afternoon, July 19, 2022

Mezzanine Level, Second Floor, Arlington

4:00 PM *DT17.01

Stacking Faults Assist Lithium-Ion Conduction in a Halide Based Superionic Conductor, LiYCl_6 Hayden Evans¹, Elias Sebt², Hengning Chen³, Craig Brown¹, Pieremanuele Canepa³ and Raphael Clement²; ¹National Institute of Standards and Technology, United States; ²University of California Santa Barbara, United States; ³National University of Singapore, Singapore

4:20 PM DT17.02

Identifying Driving Forces for Activation Barrier Changes, Using a Two-Dimensional Substitution Approach in the Solid Solution $\text{Na}_3\text{P}_{1-x}\text{Sb}_x\text{S}_4$ → Se_y Paul S. Till and Wolfgang Zeier; Westfälische Wilhelms-Universität Münster, Germany

4:35 PM DT17.03

Ionic Conductivity Increase in Sodium Antiperovskites Due to Octahedral Tilt Disorder Yiliang Li¹, Yin Liang², Ping-Chun Tsai¹, Duhan Zhang¹, Sunil Mair¹, Matthew Ko¹, Lapidus Saul² and Yet-Ming Chiang¹; ¹Massachusetts Institute of Technology, United States; ²Argonne National Laboratory, United States

4:50 PM *DT17.04 WITHDRAWN

Evaluation of Ion Transport Properties in Solid Solutions of PbSnF_4 Using ^{19}F NMR Arunkumar Dorai, Takahisa Omata and Junichi Kawamura; Tohoku Daigaku, Japan

5:10 PM DT17.05

Structural Features and Diffusion Mechanisms in a Disordered Fluoride-Ion Conductor Briseis Mercadier^{1,2,3}, Samuel Coles⁴, Mathieu Duttine⁵, Christophe Legein⁶, Monique Body⁶, Olaf Borkiewicz⁷, Christian Masquelier^{2,1}, Benjamin J. Morgan⁴ and Damien Dambournet^{3,1,8}; ¹RS2E - Réseau sur le stockage électrochimique de l'énergie, France; ²Laboratoire Reactivité et Chimie des Solides, France; ³Physicochimie des Electrolytes et Nanosystemes Interfaciaux, France; ⁴University of Bath Faculty of Science, United Kingdom; ⁵Institut de Chimie de la Matière Condensée de Bordeaux, France; ⁶Institut des Molecules et Matériaux du Mans, France; ⁷Argonne National Laboratory Advanced Photon Source, United States; ⁸Sorbonne Université, France

5:25 PM DT17.06

Nano-Scale Two-Phase Separation in $\text{Ba}_{0.6}\text{La}_{0.4}\text{F}_{2.4}$ Solid-State Electrolyte Shun Sasano¹, Ryo Ishikawa¹, Kazuaki Kawahara¹, Atsushi Mineshige², Naoya Shibata^{1,3} and Yuichi Ikuhara^{1,3}; ¹Tokyo Daigaku, Japan; ²Hyogo Kenritsu Daigaku, Japan; ³Ippan Zaidan Hojin Fine Ceramics Center, Japan

5:40 PM DT17.07

Fluoride-Ion Solid Electrolyte of La-Sr-F-S Multiple-Anion Compounds Shintaro Tachibana¹, Kazuto Ide², Hisatsugu Yamasaki², Takeshi Tojigamori², Hidenori Miki², Takashi Saito³, Takashi Kamiyama³ and Yuki Orikasa¹; ¹Ritsumeikan University, Japan; ²Toyota Motor Corporation, Japan; ³High Energy Accelerator Research Organization(KEK), Japan

SYMPOSIUM EI

Electrochemical Interfaces

July 18 - July 22, 2022

Symposium Organizers

Koji Amezawa, Tohoku University

WooChul Jung, Korea Advanced Institute of Science and Technology

Jonathan Polfus, University of Oslo

* Invited Paper

SESSION EI09: Solid-Liquid Interfaces

Session Chairs: Hiroshige Matsumoto and Einar Vøllestad

Tuesday Afternoon, July 19, 2022

Mezzanine Level, Second Floor, Berkeley/Clarendon

4:00 PM EI09.01

High-Performance Anion Exchange Membrane Water Electrolyzers Enabled by Highly Active Oxygen Evolution Reaction Electrocatalysts—Synergistic Effect of Doping and Heterostructure Chuancheng Duan and Yoo Sei Park; Kansas State University, United States

4:15 PM *EI09.02

Interface Properties of Model Perovskite Oxide Electrocatalysts Christoph Baeumer^{1,2}; ¹Universiteit Twente Faculteit Technische Natuurwetenschappen, Netherlands; ²Forschungszentrum Julich GmbH, Germany

4:35 PM EI09.04

Operando Spectroscopic Studies on the Interfacial Chemistry of Oxygen Evolution Reaction Electrocatalysts Allen Yu-Lun Liang^{1,2}, Christoph Baeumer³, J. T. Mefford^{1,2} and William C. Chueh^{1,2}; ¹Stanford University, United States; ²Stanford Linear Accelerator Center, United States; ³Universiteit Twente, Netherlands

4:50 PM EI09.05

Advancing the Fundamental Understanding of MgCO_3 Formation in the Liquid/Solid Interface of Molten Salt-Promoted MgO During CO_2 Capture Alexander Hansen Bork¹, Margarita Rekhina¹, Elena Willinger¹, Jakub Drnec², Norbert Ackerl¹, Joakim Reuteler¹, Sachin Jog¹, David Gut¹, Robert Zboray³, Paula Abdala¹ and Christoph R. Mueller¹; ¹Eidgenössische Technische Hochschule Zurich, Switzerland; ²ESRF, France; ³Swiss Federal Laboratories for Materials Science and Technology, Switzerland

5:05 PM EI09.06

Effects of Defects and Metal Ion Dopants in Low Dimensional Carbon Catalysts on Carbon Dioxide Electroreduction at Triphasic Interfaces
Soumyabrata Roy¹, Ram M. Yadav¹, Zhengyuan Li², Jingjie Wu² and Pulickel Ajayan¹; ¹Rice University, United States; ²University of Cincinnati, United States

5:20 PM EI09.07 **WITHDRAWN**

Operando Electrochemical Atomic Force Microscopy of Model Electrocatalysts Andrew R. Akbashev; Paul Scherrer Institut, Switzerland

SYMPOSIUM P

Plenary
 July 18 - July 22, 2022

Symposium Organizers

* Invited Paper

SESSION PI03: Plenary III
 Wednesday Morning, July 20, 2022
 Mezzanine Level, Second Floor, Grand Ballroom A

8:00 AM PI03.01

Oxide Surfaces at the Atomic Scale Ulrike Diebold; TU Wien, Austria

SYMPOSIUM DT

Defects and Transport Mechanisms in Solid Electrolytes and Mixed Conductors
 July 18 - July 22, 2022

Symposium Organizers

George Harrington, Kyushu University / MIT
 Rotraut Merkle, Max Planck Institute for Solid State Research
 Alexander Opitz, Technische Universität Wien

* Invited Paper

SESSION DT19: Simulation Techniques
 Session Chair: George Harrington
 Wednesday Morning, July 20, 2022
 Mezzanine Level, Second Floor, Georgian

9:10 AM **DT19.01

Accelerated Computations of Ionic Transport in Complex and Correlated Materials Boris Kozinsky; Harvard University, United States

9:40 AM DT19.02

Probing Ion Migration in ABX_3 Perovskite Compounds—Five Fallacies of Simulations Roger A. De Souza; Rheinisch-Westfälische Technische Hochschule Aachen, Germany

9:55 AM *DT19.03

Kinetic Monte Carlo Simulations of Ionic Conductivity in Electrolyte Materials Steffen Grieshammer; Rheinisch-Westfälische Technische Hochschule Aachen, Germany

10:15 AM DT19.04

Computation Material Design via Defect Optimizations of Li-Ion Conductors for Solid-State Li-Ion Batteries Sokseha Muy and Nicola Marzari; Ecole Polytechnique Federale de Lausanne, Switzerland

SESSION DT20: Fundamentals of Hybrid Perovskites
 Session Chair: Clare Grey
 Wednesday Morning, July 20, 2022
 Mezzanine Level, Second Floor, Arlington

9:10 AM **DT20.01

Solid State Ionics of the “Photo-Perovskites” Joachim Maier; Max-Planck-Institut für Festkörperforschung, Germany

9:40 AM *DT20.02

Understanding the Effect of Cation and Anion Substitution on Vacancy Migration in Perovskite Solar Cells Matt Pilot¹, Sam Perring², Peter Baker³, Dibyajyoti Ghosh⁴, Saiful Islam⁵ and Petra Cameron¹; ¹University of Bath, United Kingdom; ²Loughborough University, United Kingdom; ³Rutherford Appleton Laboratory, United Kingdom; ⁴Indian Institute of Technology Delhi, India; ⁵University of Oxford, United Kingdom

10:00 AM DT20.03

Nonlinear Ion Mobility at High Electric Field Strengths in the Perovskites SrTiO₃ and CH₃NH₃PbI₃ Dennis Kemp and Roger A. De Souza; Rheinisch-Westfälische Technische Hochschule Aachen, Germany

10:15 AM DT20.04

The Thermodynamics of Photo De-Mixing in Two-Dimensional Dion-Jacobson Mixed Halide Perovskites Yaru Wang¹, Alessandro Senocrate¹, Marko Mladenovic², Algirdas Dučinskas³, Gee Yeong Kim¹, Ursula Rothlisberger², Jovana Milić³, Davide Moia¹, Michael Grätzel³ and Joachim Maier¹; ¹Max-Planck-Institut für Festkörperforschung, Germany; ²Institute of Chemical Sciences and Engineering, École Polytechnique Fédérale de Lausanne (EPFL), Switzerland; ³Ecole polytechnique Fédérale de Lausanne (EPFL), Switzerland

SYMPOSIUM EF

Energy and Fuels Conversion
July 18 - July 22, 2022

Symposium Organizers

Sean Bishop, Sandia National Laboratories
Georgios Dimitrakopoulos, Massachusetts Institute of Technology

Jong-Ho Lee, Korea Institute of Science and Technology (KIST)

* Invited Paper

SESSION EF11: Proton Conducting Fuel Cells I
Session Chairs: Vasileios Kyriakou and Neal Sullivan
Wednesday Morning, July 20, 2022
Lobby Level, Avenue 34, Studio 1

9:10 AM **EF11.01

Combinatorial Screening of Triple Ionic-Electronic Conducting Oxide Electrodes for Fuel Cell and Electrolysis Applications Meagan Papac^{1,2,3}, Jake Huang^{2,3}, Yewon Shin², Youdong Kim², Andriy Zakutayev³ and Ryan O'Hayre^{2,3}; ¹National Institute of Standards and Technology, United States; ²Colorado School of Mines, United States; ³National Renewable Energy Laboratory, United States

9:40 AM *EF11.02

Improving Performance and Durability of Intermediate Temperature Proton Conducting Solid Oxide Electrolysis Cells Via Materials Design and Catalyst Surface Engineering Hanchen Tian, Wenyuan Li and Xingbo Liu; West Virginia University, United States

10:00 AM *EF11.03

Surface and Bulk Oxygen Kinetics of BCFZY Triple Conducting Electrode Materials Kyle Brinkman; Clemson University, United States

10:20 AM *EF11.04

Linking Atomistic and Electrochemical Modelling of Proton Ceramic Electrochemical Cells Jonathan Polfus¹, Jónína Gudmundsdóttir¹, Kalpana Singh¹, Ragnar Strandbakke¹ and Einar Völlestad²; ¹Universitetet i Oslo Det Matematisk-naturvitenskapelige Fakultet, Norway; ²SINTEF, Norway

10:40 AM BREAK

SYMPOSIUM EI

Electrochemical Interfaces
July 18 - July 22, 2022

Symposium Organizers

Koji Amezawa, Tohoku University
WooChul Jung, Korea Advanced Institute of Science and Technology
Jonathan Polfus, University of Oslo

* Invited Paper

SESSION EI10: Exsolution and Nanoparticles
Session Chairs: Min Hwan Lee and Ragnar Strandbakke
Wednesday Morning, July 20, 2022
Mezzanine Level, Second Floor, Berkeley/Clarendon

9:10 AM *EI10.01

Insights into the Exsolution Process Using Synchrotron Radiation Methods Benedikt Ehrhardt, Benjamin Rudolph, Emna Fezai, Filippo Colombo and Simone Mascotto; Universität Hamburg, Germany

9:30 AM *EI10.02

Electrochemical Activity Switching of Exsolution Catalysts Alexander K. Opitz, Harald Summerer, Andreas Nenning, Melanie Maurer and Christoph Rameshan; Technische Universität Wien, Austria

9:50 AM EI10.03

Low Energy Ion Scattering Analysis of Fe Exsolution in LSF Philipp Brüner¹, Thomas Grehl¹, Alexander K. Opitz² and Jiayue Wang³; ¹IONTOF GmbH, Germany; ²Technische Universität Wien, Austria; ³Massachusetts Institute of Technology, United States

10:05 AM EI10.04

Exsolution-Reoxidation Cycle in Ni & Co-doped Sr(Ti,Fe)O₃ Electrodes for Intermediate Temperature Symmetric-Solid Oxide Cells Mariano Santaya¹, Catalina Jimenez², Mauricio D. Arce^{2,1}, Horacio Troiani¹, Emilia Carbonio^{2,3}, Lucia Toscani¹, Yanet Mansilla¹, Axel Knop-Gericke^{3,4}, Regan Wilks², Marcus Bär^{2,5} and Liliana V. Mogni¹; ¹INN-CNEA-CONICET, Argentina; ²Helmholtz Zentrum Berlin, Germany; ³Fritz-Haber-Institut der Max-Planck-Gesellschaft, Germany; ⁴Max Planck Institute for Chemical Energy Conversion, Germany; ⁵Friedrich Alexander Universität Erlangen Nürnberg, Germany

10:20 AM BREAK

10:50 AM **EI10.05

Mechanistic Study for the Concurrent Process of Phase Transition and Exsolution and Its Application on Thermal Catalytic Reactions Jeong Woo Han; Pohang University of Science and Technology, Korea (the Republic of)

11:20 AM *EI10.06

Gas Reactions on Electrodes for Reversible and Symmetrical Solid Oxide Fuel Cells Boosted by Deliberate Surface Design Liliana V. Mogni^{1,2,3}, Mariano Santaya^{1,2}, Catalina Jimenez⁴, Mauricio D. Arce^{4,1}, Horacio Troiani², Yanet Mansilla^{1,2}, Lucia Toscani^{1,2}, Emilia Carbonio^{4,5}, Axel Knop-Gericke^{5,6}, Regan Wilks⁴, Marianne van der Merwe⁴, Raul Garcia Diez⁴, Enggar Wibowo⁴ and Marcus Bär⁴; ¹CONICET Patagonia Norte, Argentina; ²Comision Nacional de Energia Atomica, Argentina; ³Instituto Balseiro, Argentina; ⁴Helmholtz-Zentrum Berlin für Materialien und Energie GmbH, Germany; ⁵Fritz-Haber-Institut der Max-Planck-Gesellschaft, Germany; ⁶Max-Planck-Institut für chemische Energiekonversion, Germany

11:40 AM EI10.07

Clarifying True Value of Activated Oxygen Incorporation Reaction by Heterogeneous Catalyst [Jinwook Kim](#), Geon Gug Yang, Yoonseok Choi, Hyunseung Kim, Seongwoo Nam, Jongsu Seo, Jun Kyu Kim and WooChul Jung; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

11:55 AM EI10.08

Controlling the Size of Au Nanoparticles on Reducible Oxides with Electrochemical Potential [Dongha Kim](#), Georgios Dimitrakopoulos and Bilge Yildiz; Massachusetts Institute of Technology, United States

12:10 PM EI10.09

Deposition and Stabilization of Bimetallic Oxide Nanoparticles for Enhanced Electro-Catalytic Activity of $\text{La}_{0.6}\text{Sr}_{0.4}\text{CoO}_3$ SOFC Cathode [Nikolai Tsvetkov](#) and WooChul Jung; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

12:25 PM EI10.10

Effects of Surface Additives on Electrochemical Performance and Chemical Capacitance in Mixed Conducting Oxides [Han Gil Seo](#)¹, Anna Staerz¹, Dino Klotz^{2,1} and Harry Tuller¹; ¹Massachusetts Institute of Technology, United States; ²Kyushu Daigaku, Japan

SYMPOSIUM ES

Energy Storage
July 18 - July 22, 2022

Symposium Organizers

Ainara Aguadero, Imperial College London and Instituto de Ciencia de Materiales de Madrid
Yifei Mo, University of Maryland
Daniel Rettenwander, Norwegian University of Science and Technology (NTNU)

* Invited Paper

SESSION ES07: Solid State Batteries V
Session Chair: Ieuan Seymour
Wednesday Morning, July 20, 2022
Lobby Level, Avenue 34, The Loft

9:10 AM **ES07.01

Electrochemical-Mechanical Coupling at a Li Metal / Solid Electrolyte Interface [Paul Albertus](#); University of Maryland at College Park, United States

9:40 AM *ES07.02

Synthesis, Characterization and Processability of Oxide- and Phosphate-Based Ceramic Lithium-Ion Conductors [Montse Casas Cabanas](#); Centro de Investigacion en Energias Alternativas, Spain

10:00 AM ES07.03

Automated Rapid Screening of Fast-Ion Conducting Solids and Interfaces [Stefan Adams](#); National University of Singapore, Singapore

10:15 AM ES07.04

Structure-Mechanics Correlation in Amorphous Oxynitride Lithium Ionic Conductor (Lipon) [Sergiy Kalnaus](#)¹, Andrew Westover¹, Mordechai Kornbluth², Erik Herbert³ and Nancy Dudney¹; ¹Oak Ridge National Laboratory, United States; ²Robert Bosch LLC, United States; ³Michigan Technological University Department of Materials Science and Engineering, United States

10:30 AM ES07.05

Exploration of Li-P-S-O System for Discovery of New Solid Electrolyte [Audric Neveu](#)¹, Vincent Pele², Christian Jordy² and Valerie Pralong¹; ¹Laboratoire de Cristallographie et Sciences des Materiaux, France; ²SAFT, France

10:45 AM BREAK**11:00 AM *ES07.00**

Processing Thin But Robust Electrolytes for Solid-State Batteries [Moran Balaish](#)^{1,1}, Juan Carlos Gonzalez-Rosillo², Kun Joong Kim³, Zachary D. Hood⁴ and Jennifer Rupp^{3,1,1}; ¹Technische Universitat Munchen, Germany; ²Institut de Recerca en Energia de Catalunya, Spain; ³Massachusetts Institute of Technology, United States; ⁴Argonne National Laboratory, United States

11:20 AM ES07.06

Structural Investigation of LAGP/PEO Composite for Solid-State Batteries Using Vibrational and Nuclear Magnetic Resonance Spectroscopies L. J. Deiner¹, Kalle Levon², [David Clarkson](#)³, Mounesha Garaga³ and Steve Greenbaum³; ¹New York City College of Technology, United States; ²New York University, United States; ³Hunter College, United States

11:35 AM ES07.07

High Cell Level Energy Density of Metal Sulfide Based All-Solid-State Batteries [Hongli Zhu](#); Northeastern University, United States

11:50 AM ES07.09

The Mechanism of Lithium Dendrite Formation and Propagation Under Pulsed Charging Conditions in Solid-State Lithium Batteries [Florian Flatscher](#)¹, Verena Reisecker², Lukas Porz¹, Cole Fincher³, Maria de las Mercedes Linares Moreau⁴, Paolo Falcaro⁴, Sigurd Wenner⁵, Juergen Fleig⁶, Yet-Ming Chiang³ and Daniel Rettenwander¹; ¹Norges teknisk-naturvitenskapelige universitet, Norway; ²Technische Universitat Graz, Austria; ³Massachusetts Institute of Technology, United States; ⁴Technische Universitat Graz Fakultat fur Technische Chemie Verfahrenstechnik und Biotechnologie, Austria; ⁵SINTEF Industri, Norway; ⁶Technische Universitat Wien, Austria

12:05 PM ES07.10

Nasicon Structured $\text{Li}_1.3\text{Al}_0.3\text{Ti}_1.7(\text{PO}_4)_3$ Dispersed Solid Polymer Electrolytes and Their Applications in Electric Double Layer Supercapacitors [Shrishi Sharma](#) and Anshuman Dalvi; Birla Institute of Technology & Science Pilani, India

12:20 PM ES07.11

All-Solid-State Li Batteries with NCM-LLZO Based Composite Cathodes [Christoph Roitzheim](#)^{1,2}, Martin Finsterbusch¹, Olivier Guillon^{1,3} and Dina Fattakhova-Rohlfing^{1,2}; ¹Forschungszentrum Julich GmbH, Germany; ²Universitat Duisburg-Essen, Germany; ³Rheinisch-Westfalische Technische Hochschule Aachen, Germany

SYMPOSIUM IE

Iono-Electronics
July 18 - July 21, 2022

Symposium Organizers

Geoffrey Beach, Massachusetts Institute of Technology
Monica Burriel, CNRS - Grenoble INP
YiYang Li, University of Michigan

* Invited Paper

SESSION IE07: Sensors

Session Chairs: Moran Balaish and Joon-Hyung Lee
Wednesday Morning, July 20, 2022
Lobby Level, Terrace

9:10 AM *IE07.01

Functional Organic Neuromorphics Biointerfaces [Francesca Santoro](#)^{1,2,3};
¹Rheinisch-Westfälische Technische Hochschule Aachen, Germany;
²Forschungszentrum Jülich GmbH, Germany; ³Istituto Italiano di Tecnologia
Center for Advanced Biomaterials for Healthcare, Italy

9:30 AM IE07.06

Interaction of Hydrogen with HfO₂ for Application as Memristive Gas-Sensitive Devices [Sarah Beck](#); Technische Universität Dortmund, Germany

9:45 AM IE07.04

Widening the Range of Trackable Environmental and Health Pollutants for Li-Garnet-Based Sensors [Moran Balaish](#)^{1,1} and Jennifer Rupp^{1,2,1};
¹Technische Universität München, Germany; ²Massachusetts Institute of Technology, United States

10:00 AM IE07.05

Mixed Potential Electrochemical Sensors—Ceramic Substrate and Electrolyte Effects on Sensor Response to Methane and Simulated Natural Gas [Sleight Halley](#)¹, Kannan Ramaiyan¹, Kamil Agi², Fernando Garzon¹ and Lok-kun Tsui¹; ¹University of New Mexico College of Arts and Sciences, United States; ²SensorComm Technologies, United States

SYMPOSIUM DT

Defects and Transport Mechanisms in Solid Electrolytes and Mixed Conductors
July 18 - July 22, 2022

Symposium Organizers

George Harrington, Kyushu University / MIT
Rotraut Merkle, Max Planck Institute for Solid State Research
Alexander Opitz, Technische Universität Wien

* Invited Paper

SESSION DT21: Defects and Transport Mechanisms

Session Chair: Steffen Grieshammer
Wednesday Morning, July 20, 2022
Mezzanine Level, Second Floor, Georgian

11:00 AM **DT21.01

Defects and Transport in Inherently Disordered Oxide Structures [Truls Norby](#); Universitetet i Oslo Det Matematisk-naturvitenskapelige Fakultet, Norway

11:30 AM DT21.02

Role of the Anion Sublattice Defects in the Mixed Conducting Properties of Layered-Perovskites [Susana Garcia-Martin](#); Universidad Complutense de Madrid, Spain

11:45 AM *DT21.03

Mixed Conductors Beyond Simple Perovskites [Konrad Swierczek](#); Akademia Gorniczo-Hutnicza imienia Stanisława Staszica w Krakowie Wydział Energetyki i Paliw, Poland

12:05 PM DT21.04

Explaining the Interference Between Electronic and Ionic Movement—A Case Study in Ceria [John P. Arnold](#) and Manfred Martin; Rheinisch-Westfälische Technische Hochschule Aachen, Germany

12:20 PM DT21.05

Unraveling, with *Ab Initio* Modeling—The Connection Between Electronic Structure and Dynamical Properties of the Sodium Bismuth Titanate [Marcin Krynski](#)¹, Marcin Malys¹, Franciszek Krok¹, Isaac Abrahams² and Wojciech Wrobel¹; ¹Politechnika Warszawska, Poland; ²Queen Mary University of London, United Kingdom

SESSION DT22: Beyond Classical Electrochemical Characterization

Session Chair: Francesco Ciucci
Wednesday Morning, July 20, 2022
Mezzanine Level, Second Floor, Arlington

11:00 AM *DT22.00

Characteristics of Ion Transport in Polymerized Ionic Liquids - Mechanisms and Ion Hopping [Stephen J Paddison](#); University of Tennessee, Knoxville, United States

11:20 AM *DT22.01

Photo-Enhanced Ionic Grain Boundary Conductivity in Solid Electrolytes Dino Klotz^{1,2}, Thomas Defferriere², Juan Carlos Gonzalez-Rosillo³, Jennifer Rupp⁴ and Harry Tuller^{2,1}; ¹Kyushu Daigaku, Japan; ²Massachusetts Institute of Technology, United States; ³Institut de Recerca en Energia de Catalunya, Spain; ⁴Technische Universitat Munchen, Germany

11:40 AM DT22.04

Characterization of Anisotropic Strain in Anelastic Materials by Raman Spectroscopy Daniel Freidzon¹, Olga Kraynis¹, Ellen Wachtel¹, Igor Lubomirsky¹ and Tsachi Livneh²; ¹Weizmann Institute of Science, Israel; ²Nuclear Research Center Negev Library, Israel

11:55 AM DT22.05

In Situ Raman-spectroscopic Investigation of Phase Transitions in Polycrystalline WO₃ Thin Films During Ion Insertion and Extraction Markus S. Friedrich, Alexander Strack, Jan L. Dornseifer and Peter J. Klar; Justus Liebig Universität Giessen, Germany

12:10 PM DT22.06

Investigating the Contributions of Point Defects to the Activation Energy of the Oxygen Exchange Reaction on Pristine Mixed Conducting Surfaces Matthäus Siebenhofer^{1,2}, Christoph Riedl², Alexander Schmid², Sergej Raznjevic³, Zaoli Zhang³, Andreas Limbeck², Alexander K. Opitz², Juergen Fleig² and Markus Kubicek²; ¹CEST Centre for Electrochemical Surface Technology, Austria; ²Technische Universität Wien, Austria; ³Erich Schmid Institute of Materials Science, Austria

SYMPOSIUM EF

Energy and Fuels Conversion
July 18 - July 22, 2022

Symposium Organizers

Sean Bishop, Sandia National Laboratories
Georgios Dimitrakopoulos, Massachusetts Institute of Technology
Jong-Ho Lee, Korea Institute of Science and Technology (KIST)

* Invited Paper

SESSION EF12: Unlocking the Potential of Industrial-Scale Electrolysis
Session Chairs: Georgios Dimitrakopoulos and Ryan O'Hayre
Wednesday Morning, July 20, 2022
Lobby Level, Avenue 34, Studio 1

11:00 AM *EF12.01

Solid Oxide Electrolysis Materials Challenges and Compromises S. Elangovan, Joseph Hartvigsen, Tyler Hafen, Jenna Pike, Taylor Rane and Dennis Larsen; OxEon Energy, LLC, United States

11:20 AM *EF12.02

Solid Oxide High Temperature Electrolysis Venkat Venkataraman; Bloom Energy, United States

11:40 AM *EF12.03

Power-to-X and Green Hydrogen at Haldor Topsoe—Status and Plans Poul G. Moses, Peter Blennow, John B. Hansen, Michael Hultqvist, Jeppe Rass-Hansen and Thomas Heiredal-Clausen; Haldor Topsoe AS, Denmark

12:00 PM *EF12.04

Scaling Up Proton Ceramic Electrolysis Technology—An Overview of Materials, Cells, Stacks and System Development Marie-Laure Fontaine; SINTEF Industri, Norway

12:20 PM *EF12.05

Scalable Electrochemical Proton Ceramic Reactors for Hydrogen Technologies Christian Kjøseth; CoorsTek Membrane Sciences AS, Norway

SYMPOSIUM IE

Iono-Electronics
July 18 - July 21, 2022

Symposium Organizers

Geoffrey Beach, Massachusetts Institute of Technology
Monica Burriel, CNRS - Grenoble INP
YiYang Li, University of Michigan

* Invited Paper

SESSION IE08: Transparent Conductors
Session Chair: Joon-Hyung Lee
Wednesday Morning, July 20, 2022
Lobby Level, Terrace

11:00 AM *IE08.02

Development of Sn-Rich Nano Fluorites in Indium Tin Oxide (ITO) Sintered Body Seong-Uk Oh¹, Dokyum Kim¹, Young-Woo Heo¹, Ji Hoon Lee¹, Tae Hoon Lee¹, Jeong-Joo Kim¹, Yong Hyuk Hur² and Joon-Hyung Lee¹; ¹Kyungpook National University, Korea (the Republic of); ²LT metal Co., Ltd., Korea (the Republic of)

11:20 AM *IE08.05 **WITHDRAWN**

Zn Anode-Based Electrochromic Devices Wu Zhang¹, Haizeng Li² and Abdulhakem Elezzabi¹; ¹University of Alberta, Canada; ²Shandong University, China

11:40 AM IE08.03

The Role of Back Channel Controlling Layer for Suppressed Channel Length Dependency of Fully Integrated In-Ga-Zn-O Thin-Film Transistors Kyung Min Kim^{1,2}, Sang-Hoon Jung², Joon-Young Yang², Soo Young Yoon² and Hyun Jae Kim¹; ¹Yonsei University, Korea (the Republic of); ²LG Display Co Ltd, Korea (the Republic of)

11:55 AM IE08.04 **WITHDRAWN**

Designer Dopants for Improved Transparent Conducting Oxides David O. Scanlon; University College London, United Kingdom

SYMPOSIUM P

Plenary
July 18 - July 22, 2022

Symposium Organizers

* Invited Paper

SESSION PI06: ISSI Young Scientist Award
Wednesday Afternoon, July 20, 2022
Mezzanine Level, Second Floor, Grand Ballroom A

1:00 PM 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, FIVE YOUNG SCIENTISTS WILL BE AWARDED. DON'T MISS THE AWARD RECIPIENTS' TALKS FROM 1:00PM - 2:30PM IN GRAND BALLROOM A.

SESSION PI04: Plenary IV
Thursday Morning, July 21, 2022
Mezzanine Level, Second Floor, Grand Ballroom A

8:00 AM PI04.01
Strain Effects on Surface Activity and Oxide Ion Conductivity Tatsumi Ishihara; Kyushu Daigaku, Japan

SYMPOSIUM DT

Defects and Transport Mechanisms in Solid Electrolytes and Mixed Conductors
July 18 - July 22, 2022

Symposium Organizers

George Harrington, Kyushu University / MIT
Rotraut Merkle, Max Planck Institute for Solid State Research
Alexander Opitz, Technische Universität Wien

* Invited Paper

SESSION DT23: In-Situ/Operando Characterization Techniques
Session Chair: Kelsey Stoerzinger
Thursday Morning, July 21, 2022
Mezzanine Level, Second Floor, Georgian

9:10 AM **DT23.01

***In Situ* Characterization of Radiation-Induced Transport** Cortney Kreller, Blas Uberuaga, James Valdez, Benjamin Derby and Yong Wang; Los Alamos National Laboratory, United States

9:40 AM DT23.02

Study of Ion Transport and Defects in Electrode Thin Films by *Operando* Spectroscopic Ellipsometry Alex Morata¹, Juan Carlos Gonzalez-Rosillo¹, Yunqing Tang¹, Valerie Siller¹, Francesco Chiabrera¹, Michel Stchakovsky², Marc Nuñez¹, Nerea Alayo¹ and Albert Tarancón^{1,3}; ¹Institut de Recerca en Energia de Catalunya, Spain; ²Horiba Scientific, France; ³Institució Catalana de Recerca i Estudis Avancats, Spain

9:55 AM *DT23.03

Studies of Point Defects in Ionic System with Scanning Transmission Electron Microscopy, from Static Displacements to Migration Dynamics James LeBeau; Massachusetts Institute of Technology, United States

10:15 AM DT23.04

***In Situ* Solid-Phase Crystallization of Functional Ceramics in the Transmission Electron Microscope** Jenna Wardini¹, Jairo Gonzalez¹, George Harrington^{2,3} and William Bowman^{1,4}; ¹University of California Irvine, United States; ²Kyushu Daigaku, Japan; ³Massachusetts Institute of Technology, United States; ⁴University of California Irvine Materials Research Institute, United States

SYMPOSIUM EF

Energy and Fuels Conversion
July 18 - July 22, 2022

Symposium Organizers

Sean Bishop, Sandia National Laboratories
Georgios Dimitrakopoulos, Massachusetts Institute of
Technology

Jong-Ho Lee, Korea Institute of Science and Technology (KIST)

* Invited Paper

SESSION EF13: Oxygen-Ion Conducting Fuel Cells II
Session Chair: Albert Tarancón
Thursday Morning, July 21, 2022
Lobby Level, Avenue 34, Studio 1

9:40 AM *EF13.02

Sintering Aids for Electrolyte in Solid Oxide Cells Ho-II Ji, Junseok Kim and Jong-Ho Lee; Korea Institute of Science and Technology, Korea (the Republic of)

10:00 AM *EF13.03

Solid-State Climate-Friendly Aviation Propulsion David Tew; Advanced Research Projects Agency-Energy, United States

10:20 AM EF13.04

Low-Temperature Exsolution of Nanoparticles from A-Site Deficient Lanthanum Nickel Ruthenium Double Perovskites Jia Guo¹, Rongsheng Cai² and Stephen J. Skinner¹; ¹Imperial College London, United Kingdom; ²The University of Manchester, United Kingdom

10:35 AM BREAK

11:00 AM EF13.05 **WITHDRAWN**

Rationally Design Internal Reforming Catalysts for High-Performance and Durable Methane-Fueled Metal-Supported Solid Oxide Fuel Cells Chuancheng Duan¹, Fan Liu¹, AbdulJabbar Mohammed Hussain², Nilesh Dale², Yoshihisa Furuya², Yohei Miura³ and Yosuke Fukuyama³; ¹Kansas State University, United States; ²Nissan Technical Centre North America, United States; ³Nissan Research Centre, Nissan Motor Corporation Limited, Japan

11:15 AM EF13.06

Ni-Based Bimetallic Catalysts for Internal Reforming of Methane with Steam and Carbon Dioxide at Low-Temperature Proton-Conducting Ceramic Fuel Cells Kyungpyo Hong and Jongsup Hong; Yonsei University, Korea (the Republic of)

11:30 AM EF13.07

Tailored Nano-Columnar La₂NiO_{4+δ} Thin Films for Enhanced SOC Cathode Performance Alexander Stangl¹, Adeel Riaz¹, Laetitia Rapenne¹, José Manuel Caicedo², Juan de Dios Sirvent³, Federico Baiutti³, Carmen Jimenez^{1,4}, Albert Tarancón^{3,5}, Michel Mermoux⁶ and Monica Burriel¹; ¹Laboratoire des Matériaux et du Génie Physique, France; ²Institut Catala de Nanociencia i Nanotecnologia, Spain; ³Institut de Recerca en Energia de Catalunya, Spain; ⁴Departement of Materials Chemistry, National Institute of Chemistry, Slovenia; ⁵Institutio Catalana de Recerca i Estudis Avancats, Spain; ⁶Laboratoire d'Electrochimie et de Physico-chimie des Matériaux et des Interfaces, France

11:45 AM EF13.08

Study on Ruddlesden-Popper Materials as Candidates for Methane-Fueled SOFCs Simone Tomadini¹ and Antonella Glisenti^{1,2}; ¹Universita degli Studi di Padova, Italy; ²CNR-ICMATE, Italy

12:00 PM EF13.09

Advantages of Ionic Conductors over Electronic Conductors as Infiltrates in SOFC Electrodes Elucidates Using Microstructurally Resolved HPC Simulations of Electrochemistry Hokon Kim^{1,2}, William K. Epting¹, Harry W. Abernathy¹, Gregory Hackett¹, Anthony D. Rollett^{1,2} and Paul A. Salvador^{1,2}; ¹National Energy Technology Laboratory, United States; ²Carnegie Mellon University, United States

12:15 PM EF13.10

Relationship Between Active Sites Distribution and 3D Microstructure of LSM/YSZ Composite Cathode by Oxygen Isotope Labeling Combined with FIB-SEM Technique Tsuyoshi Nagasawa¹, Takaaki Shimura², Naoki Shikazono² and Katsunori Hanamura¹; ¹Tokyo Kogyo Daigaku, Japan; ²Tokyo Daigaku, Japan

SESSION EF14: PEM Fuel/Electrolysis Cells II
Session Chairs: Deborah Myers and Ifan Stephens
Thursday Morning, July 21, 2022
Lobby Level, Avenue 34, Studio 2

9:10 AM **EF14.01

Enabling Hydrogen at Scale Using Low-Temperature Electrolysis with Sustainable Materials Sanjeev Mukerjee and Ian Kendrick; Northeastern University, United States

9:40 AM *EF14.02

Durability of PEM Water Electrolyzer Against the Voltage Fluctuation Generated by Wind Power Akari Hayashi; Kyushu Daigaku, Japan

10:00 AM *EF14.03

Demonstration of Electrolyzer Operation at a Nuclear Plant to Allow for Dynamic Participation in an Organized Electricity Market and In-House Hydrogen Supply Uganbayar Otgonbaatar; Exelon Corporation, United States

10:20 AM *EF14.04

Polyketone Functionalization—New Ways to Ion Conducting Polymers Vito Di Noto, Paolo Sgarbossa, Ketì Vezzù, Giovanni Crivellaro, Afaaf Rahat Alvi and Gioele Pagot; Universita degli Studi di Padova, Italy

10:40 AM BREAK

SYMPOSIUM EI

Electrochemical Interfaces
July 18 - July 22, 2022

Symposium Organizers

Koji Amezawa, Tohoku University
WooChul Jung, Korea Advanced Institute of Science and
Technology
Jonathan Polfus, University of Oslo

* Invited Paper

SESSION EI11: Solid-State Batteries I
Session Chairs: Kisuk Kang and Kazunori Takada
Thursday Morning, July 21, 2022
Mezzanine Level, Second Floor, Berkeley/Clarendon

9:10 AM **EI11.01

Kinetics and Stability of Anode and Cathode Interfaces in Thiophosphate Based Solid-State Batteries Jürgen Janek^{1,2}; ¹Justus Liebig Universität Giessen, Germany; ²Karlsruher Institut für Technologie, Germany

9:40 AM *EI11.02

Drastic Reduction of Solid Electrolyte–Electrode Interface Resistances Taro Hitosugi; Tokyo Institute of Technology, Japan

10:00 AM EI11.03

Electrochemical Stability of Electrode/Electrolyte Interfaces in Metal Borohydride Solid Electrolytes Matthew Ko, Yiliang Li and Yet-Ming Chiang; Massachusetts Institute of Technology, United States

10:15 AM EI11.04

Quantitative Investigation of the Resistances at the Interfaces of Sulfide Electrolytes and Positive Electrodes Kazunori Nishio¹, Daisuke Imazeki¹, Kosuke Kurushima², Yuki Takeda¹, Ryo Nakayama¹, Ryota Shimizu¹ and Taro Hitosugi¹; ¹Tokyo Kogyo Daigaku, Japan; ²Kabushiki Kaisha Toray Research Center Kenkyu Bumon Shiga, Japan

10:30 AM BREAK

11:00 AM **EI11.05

Modeling of the Potential Distribution and the Electrical Double Layer in Solid-State Batteries Yue Qi; Brown University, United States

11:30 AM EI11.06 **WITHDRAWN**

Electrochemical Protocols for Failure Mitigation and Safe Operation of All-Solid-State Batteries Ruhul Amin, Anand Parejiya, Marm Dixit, Rachid Essheli and Ilias Belharouak; Oak Ridge National Laboratory, United States

11:45 AM EI11.07

Elucidation of the Kinetics at the Na|Na_{3.4}Zr₂Si_{2.4}P_{0.6}O₁₂ Solid-State Battery Electrode Interface Till Ortmann^{1,1}, Simon Burkhardt^{1,1}, Janis K. Eckhardt^{1,1}, Ziming Ding^{2,3}, Joachim Sann^{1,1}, Marcus Rohnke^{1,1}, Qianli Ma⁴, Olivier Guillon^{4,5}, Christian Kübel^{2,2} and Jürgen Janek^{1,1}; ¹Justus Liebig Universität Giessen, Germany; ²Karlsruher Institut für Technologie, Germany; ³Technische Universität Darmstadt, Germany; ⁴Forschungszentrum Jülich GmbH, Germany; ⁵JARA, Germany

12:00 PM EI11.08

Surface Modifications as a Route Towards Improved Solid-State Sodium Metal Batteries Wojciech Zajac, Aleksandra Boron, Weronika Sordyl and Michal Chmiest; Akademia Gorniczo-Hutnicza imienia Stanislawia Staszica w Krakowie, Poland

12:15 PM EI11.09

Anion Control of the Electrolyte Na_{3-x}SbS_{4-x}Br_x Extends Cycle Life in Solid-State Sodium Batteries Xin Zhang and Stefan Adams; National University of Singapore, Singapore

SYMPOSIUM ES

Energy Storage
July 18 - July 22, 2022

Symposium Organizers

Ainara Aguadero, Imperial College London and Instituto de Ciencia de Materiales de Madrid
Yifei Mo, University of Maryland
Daniel Rettenwander, Norwegian University of Science and Technology (NTNU)

* Invited Paper

SESSION ES08: Li-ion Batteries I
Session Chair: M Rosa Palacin
Thursday Morning, July 21, 2022
Lobby Level, Avenue 34, The Loft

9:10 AM **ES08.01

Rational Concentration Gradient Designs and Morphology Control Stabilizing Ni-rich NMC Cathodes Khalil Amine and Tongchao Liu; Argonne National Laboratory, United States

9:40 AM *ES08.07

Convection-Enhanced Electrochemical Energy Storage—Design Guidelines from Simulation Weiran Gao, Javit Drake and Fikile Brushett; Massachusetts Institute of Technology, United States

10:00 AM ES08.03

Parameter Identification of Lithium-Ion Batteries by Coupling of Electrochemical Spectroscopy and a Physics-Based Model Xinfang Jin and Xiting Duan; University of Massachusetts Lowell, United States

10:15 AM ES08.04

Measuring Full Sets of Electrochemical Transport Parameters in Thin Films of Lithium Intercalation Compounds Andreas Bumberger, Claudia Schrenk, Matthias Kogler, Joseph R. Ring, Andreas Neening and Juergen Fleig; Technische Universität Wien, Austria

10:30 AM ES08.05

Origins of Excellent Cycling Stability in the Sn-Rich Spinel-Structured High Entropy Oxide Anode Materials for Li-Ion Cells [Maciej Mozdierz](#)¹, Konrad Swierczek¹, Juliusz Dabrowa², Marta Gajewska³ and Jakub Cieslak⁴; ¹Akademia Gorniczo-Hutnicza imienia Stanisława Staszica w Krakowie Wydział Energetyki i Paliw, Poland; ²Akademia Gorniczo-Hutnicza imienia Stanisława Staszica w Krakowie Wydział Inżynierii Materialowej i Ceramiki, Poland; ³Akademia Gorniczo-Hutnicza imienia Stanisława Staszica w Krakowie, Poland; ⁴Akademia Gorniczo-Hutnicza imienia Stanisława Staszica w Krakowie Wydział Fizyki i Informatyki Stosowanej, Poland

10:45 AM BREAK**11:00 AM ES08.06**

Investigation of the Conversion Mechanism of Positive Electrode Materials into Water-Soluble Sulfates for Easier Metals Recycling of Spent Li-Ion Batteries [Lydia Hamitouche](#); Sorbonne Université Faculté des Sciences et Ingénierie, France

11:15 AM ES08.08

Complex Phase Evolution in Fast Charging Lithium-Ion Battery Electrodes from Operando Synchrotron Diffraction and Complementary Techniques [Kent Griffith](#); Northwestern University, United States

11:30 AM ES08.09

Mathematical Design of Intercalation Materials [Ananya Renuka Balakrishna](#); University of Southern California, United States

11:45 AM ES08.10

Searching for Polyanionic Cathode Materials for Li-Ion Batteries in Underexplored Chemical Spaces [Bonan Zhu](#)^{1,2}, Chris J. Pickard^{3,4} and David O. Scanlon^{1,2}; ¹University College London, United Kingdom; ²The Faraday Institution, United Kingdom; ³University of Cambridge, United Kingdom; ⁴Tohoku Daigaku, Japan

12:00 PM ES08.12

How to Thermodynamically Describe Massive Stoichiometric Change in Battery Electrodes? Application to Nano-LiFePO₄ [Yue Zhu](#) and Joachim Maier; Max-Planck-Institut für Festkörperforschung, Germany

SYMPOSIUM IE

Iono-Electronics
July 18 - July 21, 2022

Symposium Organizers

Geoffrey Beach, Massachusetts Institute of Technology
Monica Burriel, CNRS - Grenoble INP
YiYang Li, University of Michigan

* Invited Paper

SESSION IE09: Mechano-Ionics
Session Chairs: Konstantin Klyukin and Jose Santiso
Thursday Morning, July 21, 2022
Lobby Level, Terrace

9:40 AM **IE09.01

Non-Classical Electrostriction in Ion Conductors—Current Understanding and Potential Applications [Igor Lubomirsky](#); Weizmann Institute of Science Faculty of Chemistry, Israel

10:10 AM *IE09.03

Symmetry-Breaking Yields Emergent Phenomena at Oxide Interfaces Haiwu Zhang¹, Daesung Park², Dennis Valbjørn Christensen¹, Dragan Damjanovic², Vincenzo Esposito¹ and [Nini Pryds](#)¹; ¹Danmarks Tekniske Universitet, Denmark; ²Swiss Federal Institute of Technology-EPFL, Switzerland

10:30 AM BREAK

SYMPOSIUM DT

Defects and Transport Mechanisms in Solid Electrolytes and Mixed Conductors
July 18 - July 22, 2022

Symposium Organizers

George Harrington, Kyushu University / MIT
Rotraut Merkle, Max Planck Institute for Solid State Research
Alexander Opietz, Technische Universität Wien

* Invited Paper

SESSION DT24: MIEC: Chemo-Mechanics
Session Chair: Cortney Kreller
Thursday Morning, July 21, 2022
Mezzanine Level, Second Floor, Georgian

11:00 AM **DT24.01

Achieving Near-Zero Chemical Strain in Perovskites by Tailoring Metal-Oxygen Bond Charge Distribution and Angles [Nicola H. Perry](#); University of Illinois at Urbana-Champaign, United States

11:30 AM DT24.02

Chemical Expansion of Cerium Oxide Based Thin Films Hendrik Wulfmeier¹, Dhyani Kohlmann¹, Thomas Defferriere², Carsten Steiner³, Marvin Schewe¹, Christian Rembe¹, Ralf Moos², Harry Tuller² and [Holger Fritze](#)¹; ¹Technische Universität Clausthal, Germany; ²Massachusetts Institute of Technology, United States; ³Universität Bayreuth, Germany

11:45 AM *DT24.03

Descriptors of Oxygen Ion Migration to Accelerate New Ion Conductor Discoveries [Daniele Vivona](#)¹, Kiarash Gordiz¹, Randall Meyer², Sumathy Ramar² and Yang Shao-Horn^{1,1,1}; ¹Massachusetts Institute of Technology, United States; ²ExxonMobil Research and Engineering Company Annandale, United States

12:05 PM DT24.04

Chemo-Mechanically Driven Hierarchical Structure Evolution in Crystallizing SrTi_{0.65}Fe_{0.35}O_{3-d} Films and Correlation to Electrical Conductivity [Haley Buckner](#)¹, Qing Ma², Joshua Simpson-Gomez¹, Emily J. Skiba¹ and Nicola H. Perry¹; ¹University of Illinois at Urbana-Champaign, United States; ²Argonne National Laboratory Advanced Photon Source, United States

12:20 PM DT24.05

Oxygen Nonstoichiometry in Lanthanum-Cerium Cuprate Thin Films Determined by Resonant Nanogravimetry [Hendrik Wulfmeier](#)¹, Thomas Defferriere², Harry Tuller² and Holger Fritze¹; ¹Technische Universität Clausthal, Germany; ²Massachusetts Institute of Technology, United States

SYMPOSIUM EF

Energy and Fuels Conversion
July 18 - July 22, 2022

Symposium Organizers

Sean Bishop, Sandia National Laboratories
Georgios Dimitrakopoulos, Massachusetts Institute of
Technology

Jong-Ho Lee, Korea Institute of Science and Technology (KIST)

SYMPOSIUM IE

Iono-Electronics
July 18 - July 21, 2022

Symposium Organizers

Geoffrey Beach, Massachusetts Institute of Technology
Monica Burriel, CNRS - Grenoble INP
YiYang Li, University of Michigan

* Invited Paper

SESSION EF15: Solar Fuels II
Session Chairs: Sean Bishop and Anthony McDaniel
Thursday Morning, July 21, 2022
Lobby Level, Avenue 34, Studio 2

11:00 AM **EF15.01

Decoupled Water Splitting for Green Hydrogen Production at Scale
Avner Rothschild; Technion Israel Institute of Technology, Israel

11:30 AM *EF15.02

Mixed Metal Oxides for Enhanced Solar Fuel Production via Thermochemical Redox Cycling Asim Riaz¹, Christopher Bodger¹, Jingjing Chen¹, Adrian Lowe¹, Takuya Suzuki¹, Wojciech Lipinski² and Jonathan Scheffe³; ¹Australian National University, Australia; ²Polna 1a, Poland; ³University of Florida, United States

11:50 AM EF15.03

Dual Phase Composites of LSM-CeO₂ with Fast Oxygen Exchange for Solar Thermochemical Fuel Production—Exploiting the Full Oxygen Carrier Capacity of Perovskites Alexander Hansen Bork^{1,2}, Alfonso J. Carrillo^{1,3}, Zachary D. Hood¹, Bilge Yildiz¹ and Jennifer Rupp¹; ¹Massachusetts Institute of Technology, United States; ²Eidgenössische Technische Hochschule Zurich, Switzerland; ³Universitat Politècnica de Valencia, Spain

12:05 PM EF15.04

Surface Restructuring of Oxygen Carrier Enables Low-Temperature CO₂ Splitting DongHwan Oh, Seyeon Park, Jaewan Ahn, Seunghyun Kim, Il-Doo Kim and WooChul Jung; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

12:20 PM EF15.05

Impact of Conductivity on the CO₂ Splitting Kinetics of Lanthanide-Doped Cerium Oxide for Chemical Looping Reforming of Methane Marwan Laqdiem, Alfonso J. Carrillo, Jose M. Serra, Julio Garcia-Fayos and Maria Balaguer; Instituto de Tecnología Química, Spain

12:35 PM EF15.06

Screening Ruddlesden-Popper (n=1) Oxide Materials for Thermochemical Water Splitting by Density Functional Theory George E. Wilson, Ieuan D. Seymour, Andrea Cavallaro, Stephen J. Skinner and Ainara Agudero; Imperial College London, United Kingdom

* Invited Paper

SESSION IE10: Metal-Insulator transition
Session Chairs: Konstantin Klyukin and Jose Santiso
Thursday Morning, July 21, 2022
Lobby Level, Terrace

11:00 AM *IE10.01

Strain Effects in Vanadium Dioxide Films with Metal-Insulator Electronic Transition Jose Santiso¹, Felip Sandiumenge², Laura Rodríguez¹, Carlos Frontera² and Gustau Catalán¹; ¹Institut Català de Nanociència i Nanotecnologia, Spain; ²Institut de Ciència de Materials de Barcelona, Spain

11:20 AM IE10.04

Hydrogen Intercalation Voltages in V₂O₅, Ta₂O₅, MoO₃, WO₃ from First Principles Piotr Zguns and Bilge Yildiz; Massachusetts Institute of Technology, United States

11:35 AM IE10.05

Second-order Flexible Mott Neuron Gwangmin Kim, Jae Hyun In, Younghyun Lee and Kyung Min Kim; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

11:50 AM IE10.06

Self-Clocking, Fast and Variation Tolerant True Random Number Generator Based on a Stochastic Mott Memristor Jae Hyun In, Gwangmin Kim and Kyung Min Kim; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

SYMPOSIUM DT

Defects and Transport Mechanisms in Solid Electrolytes and Mixed Conductors
July 18 - July 22, 2022

Symposium Organizers

George Harrington, Kyushu University / MIT
Rotraut Merkle, Max Planck Institute for Solid State Research
Alexander Opitz, Technische Universität Wien

* Invited Paper

SESSION DT25: Mixed Conductors II
Session Chair: James LeBeau
Thursday Afternoon, July 21, 2022
Mezzanine Level, Second Floor, Georgian

2:00 PM **DT25.01

***In Situ* Raman Spectroscopy—Novel Approaches to Study Oxygen Defect Dynamics in Mixed Conducting Oxides** Alexander Stangl¹, Adeel Riaz¹, Odette Chaix-Pluchery¹, Dolores Pla¹, Caroline Pirovano², Stefano Ambrosio¹, Federico Baiutti³, Albert Tarancón³, Carmen Jimenez¹, Michel Mermoux⁴ and Monica Burriel¹; ¹Laboratoire des Matériaux et du Génie Physique, France; ²Université de Lille, France; ³Institut de Recerca en Energia de Catalunya, Spain; ⁴Laboratoire d'Electrochimie et de Physico-chimie des Matériaux et des Interfaces, France

2:30 PM DT25.02

Selected Examples of High-Throughput Experimental Studies in Solid State Ionics and Solid State Electrochemistry Sossina Haile; Northwestern University, United States

2:45 PM *DT25.03

Simultaneous Electrical Impedance and Optical Absorption Measurements for Rapid Characterization of Defect and Transport Properties of Praseodymium Substituted Ceria Dmitri Kalaev and Harry Tuller; Massachusetts Institute of Technology, United States

3:05 PM DT25.04

Peculiarities of Ionic Conductivity Mechanisms in Bi_{1-x}Pr_xO_{1.5} Rhombohedral System Jan Jamroz¹, Wojciech Wrobel¹, Marcin Krynski¹, Marcin Malys¹, Isaac Abrahams² and Franciszek Krok¹; ¹Politechnika Warszawska, Poland; ²Queen Mary University of London, United Kingdom

3:20 PM DT25.05

Novel Model-Building Tools for the Development of Near-Surface Mixed Ionic-Electronic Conducting Emulator Models for High-Temperature CO₂ Electrolysis Cells Alejandro Mejia^{1,2} and David S. Mebane¹; ¹West Virginia University, United States; ²Idaho National Laboratory, United States

SYMPOSIUM EF

Energy and Fuels Conversion
July 18 - July 22, 2022

Symposium Organizers

Sean Bishop, Sandia National Laboratories
Georgios Dimitrakopoulos, Massachusetts Institute of Technology
Jong-Ho Lee, Korea Institute of Science and Technology (KIST)

* Invited Paper

SESSION EF16: Proton Conducting Fuel Cells II
Session Chairs: Dong Ding and Jose M. Serra
Thursday Afternoon, July 21, 2022
Lobby Level, Avenue 34, Studio 2

2:00 PM EF16.01

Composite Effects on PCFC Cathodes Investigated by Utilizing Patterned Thin-Film Model Electrodes Zhuo Diao, Katsuya Nishidate, Takaaki Imaizumi, Yuta Kimura, Takashi Nakamura, Keiji Yashiro, Tatsuya Kawada and Koji Amezawa; Tohoku Daigaku, Japan

2:15 PM EF16.02

Fabrication of High Performance Tubular Protonic Ceramic Fuel Cells Youdong Kim, Charlie Meisel, Carolina Herradon, Jake Huang, Neal Sullivan and Ryan O'Hayre; Colorado School of Mines, United States

2:30 PM EF16.03

3D Printing of Electrodes for Proton Ceramic Electrochemical Cells—Recent Developments and Challenges Sebastian Wachowski¹, Malgorzata Nadolska¹, Mateusz Cieslik¹, Joanna Pospiech¹, Marek Chmielewski¹, Tomasz Sobczyk¹, Aleksandra Mielewczyk-Gryn¹, Maria Gazda¹, Jose M. Serra², Einar Vollestad³ and Ragnar Strandbakke⁴; ¹Politechnika Gdanska, Poland; ²Instituto de Tecnologia Química, Spain; ³SINTEF Industry, Norway; ⁴Universitetet i Oslo, Norway

2:45 PM EF16.04

Revitalizing Performance and Expanding Lifetime of Protonic Ceramic Cells by Interfacial Acid Etch Wenjuan Bian¹, Wei Wu¹, Meng Zhou², Congrui Jin³, Hanping Ding¹, Yanhao Dong⁴, Ju Li⁴ and Dong Ding¹; ¹Idaho National Laboratory Research Library, United States; ²New Mexico State University Board of Regents, United States; ³University of Nebraska, Lincoln, United States; ⁴Massachusetts Institute of Technology, United States

3:00 PM BREAK

SESSION EF17: Oxygen-Ion Conducting Electrolysis Cells II
Session Chairs: Georgios Dimitrakopoulos and Anne Hauch
Thursday Afternoon, July 21, 2022
Lobby Level, Avenue 34, Studio 1

2:00 PM **EF17.01

Emergent Nanomaterials for CO₂ Electrochemical Conversion John T. Irvine; University of St Andrews, United Kingdom

2:30 PM **EF17.02

Perspectives of Hydrogen and Syngas Production Using High Temperature Electrolyzers Olga A. Marina, Kerry Meinhardt, Dan Edwards and Jie Bao; Pacific Northwest National Laboratory, United States

3:00 PM *EF17.04

Solid Oxide Electrolysis Cells for CO₂ Electroreduction Weishen Yang; Chinese Academy of Sciences, China

3:20 PM BREAK**4:00 PM EF17.05**

Engineering the Surface of Ceria for CO₂ Reduction in High Temperature Solid Oxide Electrolysis Cells (SOECs) Elena Marzia Sala¹, Nicola Mazzanti¹, Francesco M. Chiabrera¹, Simone Sanna², Mogens Mogensen¹, Peter V. Hendriksen¹ and Christodoulos Chatzichristodoulou¹; ¹Danmarks Tekniske Universitet, Denmark; ²Universita degli Studi di Roma Tor Vergata, Italy

4:15 PM EF17.06

Perovskite-Like Pr(A)MnO₃ (A = Ca, Sr) as Anode Materials for Solid Oxide Fuel-Assisted Electrolysis Cells Aleksey Yaremchenko¹, Dzyana Boiba¹, Mikhail Patrakev², Aleksey Lisenkov¹, Aleksandr Bamburov¹ and Blanca I. Arias-Serrano^{1,3}; ¹University of Aveiro, Portugal; ²Institute of Solid State Chemistry UB RAS, Russian Federation; ³Leibniz Institute for Plasma Science and Technology, Germany

4:30 PM EF17.08

Rapid Assessment and Optimization of Electrodes for Solid Oxide Fuel Cells and Electrolyzers Using Long-Term Performance Modeling and Machine Learning William K. Epting^{1,2}, Yinkai Lei^{1,2}, Jerry H. Mason^{1,2}, Thomas Kalapos^{1,2}, Gregory Hackett¹ and Harry W. Abernathy¹; ¹National Energy Technology Laboratory, United States; ²NETL Support Contractor, United States

4:45 PM EF17.09

Designing REBa_{0.5}Sr_{0.5}CoCuO_{5+δ} (RE: Selected Lanthanides, Y) Perovskites for the Anode-Supported Solid Oxide Fuel Cells Piotr Winiarz¹, Keyun Li¹, Kun Zheng¹, Muhammet E. Alagöz², Anna Niemczyk³, Ryszard Kluczkowski⁴, Yevgeniy Naumovich³ and Konrad Swierczek¹; ¹Akademia Gorniczo-Hutnicza imienia Stanisława Staszica w Krakowie Wydział Energetyki i Paliw, Poland; ²Middle East Technical University, Turkey; ³Center for Hydrogen Technologies, Poland; ⁴Institute of Power Engineering, Poland

5:00 PM EF17.10

Phase-Field Modeling of Crack Growth and Mitigation in Solid Oxide Cells Fei Xue^{1,2}, Yinkai K. Lei^{1,2}, Tian-Le Cheng^{1,2}, William K. Epting^{1,2}, Gregory Hackett¹, Harry W. Abernathy¹ and You-Hai Wen¹; ¹National Energy Technology Laboratory, United States; ²NETL Support Contractor, United States

5:15 PM EF17.11

Ionic Conductivity of LaO_xF_{3-2x} Based Compounds in Air and H₂ Yatir Sadia^{1,2}, Inna Shusterman² and Brian Rosen³; ¹Ben Gurion University of the Negev, Israel; ²Nuclear Research Center of the Negev, Israel; ³Tel Aviv University, Israel

5:30 PM EF17.12

A Highly Robust and Reactive Metal-Oxide Nanocomposite Electrocatalyst for Facile Oxygen Reduction Reaction in Solid Oxide Fuel Cell Cathode SungHyun Jeon¹, Jongsu Seo¹, Jeonwoo Shin², Sung Je Lee², Han Gil Seo^{1,3}, Siwon Lee^{1,4}, Jinwook Kim¹, Nikolai Tsvetkov¹, Jihwan An² and WooChul Jung¹; ¹Korea Advanced Institute of Science and Technology, Korea (the Republic of); ²Seoul National University of Science and Technology, Korea (the Republic of); ³Massachusetts Institute of Technology, United States; ⁴University of Pennsylvania, United States

SYMPOSIUM EI

Electrochemical Interfaces

July 18 - July 22, 2022

Symposium Organizers

Koji Amezawa, Tohoku University
WooChul Jung, Korea Advanced Institute of Science and Technology
Jonathan Polfus, University of Oslo

* Invited Paper

SESSION EI12: Solid-State Batteries II

Session Chairs: Taro Hitosugi and Jongwoo Lim

Thursday Afternoon, July 21, 2022

Mezzanine Level, Second Floor, Berkeley/Clarendon

2:00 PM *EI12.02

Electron and Ion Transfer at Solid-Solid Interface—DFT-Based Electrochemistry with Explicit Interface Model Yoshitaka Tateyama; National Institute for Materials Science, Japan

2:20 PM EI12.03

In Operando Characterization of Interface Between Al doped Li₇La₃Zr₂O₁₂ Garnet Solid Electrolyte and LiNi_{0.6}Mn_{0.2}Co_{0.2}O₂ Cathode by Soft X-Ray Absorption Spectroscopy Younggyu Kim and Bilge Yildiz; Massachusetts Institute of Technology, United States

2:35 PM BREAK**3:00 PM **EI12.04**

Thin-Film Solid-State Batteries with Epitaxial LiCoO₂ Films Kazunori Takada and Tsuyoshi Ohnishi; Busshitsu Zairyo Kenkyu Kiko, Japan

3:30 PM EI12.05

High Voltage Bipolar Stacking of Sulfide Based All Solid-State Batteries Hongli Zhu; Northeastern University, United States

3:45 PM EI12.06

Surface Tension of Melted Electrolytes at Nanostructural Cathode Interfaces and Their Effect on Lithium-Ion Transport Properties in Lithium-Metal Solid-State Batteries Abu Md Numan-Al-Mobin, Ian Kasten, Karen Ly, Greydon Shangreux and Alevtina Smirnova; South Dakota School of Mines and Technology, United States

SYMPOSIUM ES

Energy Storage
July 18 - July 22, 2022

Symposium Organizers

Ainara Aguadero, Imperial College London and Instituto de
Ciencia de Materiales de Madrid
Yifei Mo, University of Maryland
Daniel Rettenwander, Norwegian University of Science and
Technology (NTNU)

* Invited Paper

SESSION ES09: Li-ion Batteries II
Session Chair: Emma Kendrick
Thursday Afternoon, July 21, 2022
Lobby Level, Avenue 34, The Loft

2:15 PM ES09.01

Chemo-Mechanical Deformations in Lithium Cobalt Oxide Cathode During Li-Ion Intercalation Bertan Özdoğru and Ömer Ö. Capraz;
Oklahoma State Regents for Higher Education, United States

2:30 PM ES09.03

Probing Parasitic Gas Evolving Reactions in Nickel-Rich LiNi_xMn_yCo_zO₂ Lithium-Ion Battery Cathodes with On-Chip Electrochemistry Mass Spectrometry Daisy Thornton^{1,2}, Bethan Davies^{1,2}, Soren Scott¹, Zonghao Shen^{1,2}, Ainara Aguadero¹, Mary Ryan¹ and Ifan Stephens¹; ¹Imperial College London, United Kingdom; ²The Faraday Institution, United Kingdom

2:45 PM ES09.04

Impact of the Li/Mn Superstructure Rearrangement on the O Redox Reaction in Li-Rich NMC Electrodes Andrzej J. Kulka, Anna Plewa, Katarzyna Walczak, Justyna Plotek and Katarzyna Redel; Akademia Gorniczo-Hutnicza imienia Stanisława Staszica w Krakowie, Poland

3:00 PM ES09.05

Physics-Based Transmission Line Model for Impedance Analysis of Lithium-Ion Batteries—Case Studies on Manganese-Rich and Nickel-Rich Layered Oxide Cathodes Thuy Linh Pham¹, Thi Ngoc Tran Tran¹, Aqsa Nazir¹, Eui-Chol Shin¹, Namsoo Shin², Chan-Jin Park¹, Jaekook Kim¹ and Jong-Sook Lee¹; ¹Chonnam National University, Korea (the Republic of); ²Deep Solutions Inc., Korea (the Republic of)

3:15 PM ES09.07

Real Time Crystallization of LiCoO₂ from β-Co(OH)₂ and Co₃O₄—Synthetic Pathways and Structural Evolution Marie Duffiet¹, Damian Goonetilleke¹, François Fauth², Torsten Brezesinski¹, Jürgen Janek^{1,3} and Matteo Bianchini^{1,4,5}; ¹Karlsruher Institut für Technologie, Germany; ²CELLS-ALBA, Spain; ³Justus Liebig Universität Giessen, Germany; ⁴BASF SE, Germany; ⁵Universität Bayreuth, Germany

3:30 PM BREAK

3:45 PM *ES09.08

Zintl Chemistry in Batteries—Comparative Study of Lithium and Sodium Electrochemical Reactions with Lead Christopher Johnson¹, Jehee Park^{1,2}, Jinhyup Han¹, Shabbir Ahmed¹, Seong-Min Bak³, Seoung-Bum Son¹, Jiyeon Gim¹, Youngsik Kim² and Eungje Lee¹; ¹Argonne National Laboratory, United States; ²Ulsan National Institute of Science and Technology, Korea (the Republic of); ³Brookhaven National Laboratory, United States

4:05 PM ES09.09

Self-Discharge of Layered Oxide Cathodes Induced by Carbonate-Mediated Hydrogenation Gang Wan^{1,2}, Travis P. Pollard³, Lin Ma³, Marshall Schroeder³, Hans-Georg Steinrück⁴, Chia-Chin Chen⁵, Zihua Zhu⁶, Steve Harvey⁷, Yingge Du⁶, Christopher Tassone², Zhenxing Feng⁸, Joseph Franklin^{9,10}, Kang Xu³, Oleg Borodin³ and Michael Toney¹¹; ¹Stanford University, United States; ²Stanford Linear Accelerator Center, United States; ³US Army Research Laboratory, United States; ⁴Universität Paderborn, Germany; ⁵National Taiwan University, Taiwan; ⁶Pacific Northwest National Laboratory, United States; ⁷National Renewable Energy Laboratory, United States; ⁸Oregon State University, United States; ⁹E O Lawrence Berkeley National Laboratory, United States; ¹⁰University College London, United Kingdom; ¹¹University of Colorado Boulder, United States

4:20 PM ES09.10 WITHDRAWN

The Interplay Between Thermodynamics and Kinetics in the Solid-State Synthesis of Layered Oxides Wenhao Sun; University of Michigan, United States

4:35 PM ES09.11

Controlled Synthesis and Integration of Energy Materials by Lithiation-Assisted Epitaxy Le Wang¹, Zhenzhong Yang², Hua Zhou³ and Yingge Du¹; ¹Pacific Northwest National Laboratory, United States; ²East China Normal University, China; ³Argonne National Laboratory, United States

4:50 PM ES09.12

Incorporation of Sodium Into Layered-Spinel Nanoparticles as Promising Cathode for Lithium-Ion Batteries Nerly L. Mosquera and Jorge A. Calderón Gutierrez; Universidad de Antioquia, Colombia

5:05 PM ES09.13

Real-Time Measurements of Young's Modulus and Partial Molar Volume of Commercial Graphite Electrodes During Electrochemical Cycling Dawei Li¹, Yikai Wang² and Junqian Zhang³; ¹University of Shanghai for Science and Technology, China; ²University of Kentucky, United States; ³Shanghai University, China

5:20 PM ES09.14

Quantifying Variability Between Individual Battery Particles Using Single-Particle Electrochemistry Lindsay Gubow, Jinhong Min and YiYang Li; University of Michigan College of Engineering, United States

SYMPOSIUM IE

Iono-Electronics
July 18 - July 21, 2022

Symposium Organizers

Geoffrey Beach, Massachusetts Institute of Technology
Monica Burriel, CNRS - Grenoble INP
YiYang Li, University of Michigan

* Invited Paper

SESSION IE11: Magnetoionics and Ferroelectrics
Session Chairs: Geoffrey Beach and Sean Bishop
Thursday Afternoon, July 21, 2022
Lobby Level, Terrace

2:00 PM **IE11.01

Electrolyte Gating of Perovskites and Pyrites for Magneto-Ionics [Chris Leighton](#); University of Minnesota Twin Cities, United States

2:30 PM *IE11.02

Magneto-Ionic Control of Heterostructures and Interfaces [Kai Liu](#); Georgetown University, United States

2:50 PM *IE11.03

Effect of Hydrogen Intercalation on Electronic and Magnetic Properties of Functional Materials—Insights from First Principles [Konstantin Klyukin](#); Auburn University, United States

3:10 PM IE11.04

DC Lifetime and Thermally Stimulated Depolarization Current (TSDC) of Bi(Zn,Ti)O₃-BaTiO₃ (BZT-BT) [Sean Bishop](#), Mia Blea-Kirby, Amanda Peretti, Luis Jauregui, William Bachman and Jon Bock; Sandia National Laboratories, United States

3:25 PM IE11.05

Improvement of Hydrogen-Based Magneto-Ionic Effect in Ni Films by Changing the Electrolyte Composition Maksim Kutuzau^{1,2}, Stefan Topolovec³, Markus Göbner^{3,1}, Roland Würschum³, Sandra Schiemenz² and Karin Leistner^{1,2}; ¹Technische Universität Chemnitz, Germany; ²Leibniz-Institut für Festkörper- und Werkstoffforschung Dresden eV, Germany; ³Technische Universität Graz, Austria

3:40 PM BREAK

4:00 PM *IE11.06

Low Voltage-Tunable Magnetism in Thin Films and Nanostructures by Magneto-Ionic Approaches [Karin Leistner](#)^{1,2}; ¹Technische Universität Chemnitz, Germany; ²Leibniz-Institut für Festkörper- und Werkstoffforschung Dresden eV, Germany

4:20 PM *IE11.07

Atomically-Precise Synthesis of “Stubborn” Metal Oxides [Bharat Jalan](#); University of Minnesota Twin Cities, United States

4:40 PM *IE11.08

Magneto-Ionics Using Nitrogen Ion Transport—Towards Emulation of New Neomorph Functionalities Zhengwei Tan¹, Julius de Rojas¹, Jose Luis Costa-Kramer², Alberto Quintana³, Enric Menéndez¹ and [Jordi Sort](#)¹; ¹Universitat Autònoma de Barcelona Facultat de Ciències, Spain; ²Consejo Superior de Investigaciones Científicas, Spain; ³Georgetown University, United States

5:00 PM IE11.09

Tuning Magnetization of Nanoporous Pd(Co) via Pseudo-Capacitive Reactions Markus Göbner^{1,2}, Stefan Topolovec², Alexander Steiner², Karin Leistner^{1,3}, Heinz Krenn⁴ and Roland Würschum²; ¹Technische Universität Chemnitz, Germany; ²Technische Universität Graz, Austria; ³Leibniz-Institut für Festkörper- und Werkstoffforschung Dresden eV, Germany; ⁴Karl-Franzens-Universität Graz, Austria

5:15 PM IE11.10

Ionic Control Over Polarization Switching in 2D Layered van der Waals Materials Sabine M. Neumayer¹, Mengwei Si², Junkang Li², Pai-Ying Liao², Lei Tao³, Andrew O'Hara³, Sokrates Pantelides³, Peide Ye², Petro Maksymovych¹ and Nina Balke⁴; ¹Oak Ridge National Laboratory, United States; ²Purdue University, United States; ³Vanderbilt University, United States; ⁴NC State University, United States

5:30 PM IE11.11

ON-OFF Ferromagnetism in Co₃O₄ by Voltage-Driven Oxygen Ion Transport [Enric Menéndez](#)¹, Sofia Martins¹, Julius de Rojas¹, Alberto Quintana² and [Jordi Sort](#)^{1,3}; ¹Universitat Autònoma de Barcelona, Spain; ²Georgetown University, United States; ³Institució Catalana de Recerca i Estudis Avançats (ICREA), Spain

5:45 PM IE11.12

Ferroelectric Ordering and Energy Storage Density in Mixed Doped Lead Zirconate Titanate Ceramics by La³⁺ and Sc³⁺ Cations [Mohan K. Bhattarai](#), Karuna Mishra and Ram Katiyar; Universidad de Puerto Rico Recinto de Rio Piedras, Puerto Rico

SYMPOSIUM DT

Defects and Transport Mechanisms in Solid Electrolytes and Mixed Conductors
July 18 - July 22, 2022

Symposium Organizers

George Harrington, Kyushu University / MIT
Rotraut Merkle, Max Planck Institute for Solid State Research
Alexander Opitz, Technische Universität Wien

* Invited Paper

SESSION DT26: Field and Strain Effects
Session Chair: Clement Nicollet
Thursday Afternoon, July 21, 2022
Mezzanine Level, Second Floor, Georgian

4:00 PM *DT26.01 **WITHDRAWN**

Mechanically Induced Dislocations and Their Effects on Electrical Properties of Oxide Ceramics [Till Frömling](#), Qaisar Khushi Muhammad, Lukas Porz and Jürgen Rödel; Technische Universität Darmstadt, Germany

4:20 PM DT26.02

Understanding the Structure-Strain-Ion Conduction Relationships in Fluorite-Bixbyite Heterostructures Gene Yang, Mohammad El loubani and Dongkyu Lee; University of South Carolina, United States

4:35 PM DT26.03

Large Non-Classical Electrostriction in Aliovalent and Isovalent Doped Ceria Maxim Varenik, Ellen Wachtel, David Ehre, Elad Gaver and Igor Lubomirsky; Weizmann Institute of Science, Israel

4:50 PM DT26.06

Understanding Delamination of Oxygen Electrode by Electro-Chemical and Mechanical Coupled Modeling Puvikarasan Jayapragasam¹, Yeting Wen², Xinfang Jin¹ and Kevin Huang²; ¹University of Massachusetts Lowell, United States; ²University of South Carolina, United States

5:05 PM DT26.07

Microwave-Assisted Sintering of a Disordered Hexagonal Perovskite Ba₇Nb₄MoO₂₀ Electrolyte for Protonic Ceramic Electrochemical Cells Yoonseok Choi, Tae-Woo Kim, Sun-Dong Kim, Hye-Sung Kim and Ji Haeng Yu; Korea Institute of Energy Research, Korea (the Republic of)

5:20 PM DT26.08

Effects of Sintering Additives on the Proton Uptake of BaZr_{0.4}Ce_{0.4}Y_{0.1}Yb_{0.1}O_{2.9} Amir Masoud Dayaghi¹, Laura Almar², Sonia Escolástico Rozalén², Einar Vøllestad³, Jose M. Serra² and Truls Norby¹; ¹Universitetet i Oslo, Norway; ²Instituto de Tecnología Química, Spain; ³SINTEF Community, Norway

SYMPOSIUM EF

Energy and Fuels Conversion
July 18 - July 22, 2022

Symposium Organizers

Sean Bishop, Sandia National Laboratories
Georgios Dimitrakopoulos, Massachusetts Institute of
Technology

Jong-Ho Lee, Korea Institute of Science and Technology (KIST)

4:30 PM EF18.03

Structural Investigation of Exsolved Nanoparticles from Thin Films by X-Ray Scattering Emna Fezai¹, Jun Kyu Kim², Matthias Schwartzkopf³, WooChul Jung² and Simone Mascotto¹; ¹Universität Hamburg Fakultät für Mathematik Informatik und Naturwissenschaften, Germany; ²Korea Advanced Institute of Science and Technology, Korea (the Republic of); ³Deutsches Elektronen-Synchrotron, Germany

4:45 PM EF18.04

High Performance Thin-Film Air Electrodes of Ag/Ce_{0.9}Gd_{0.1}O_{2.8} for Low Temperature Solid Oxide Cells with Vertically Aligned Nanocomposite Design Ozden Celikbilek^{1,2}, Matthew P. Wells³, Judith Macmanus-Driscoll³, Gwilherm Kerherve², Laetitia Rapenne¹, Marlu Cesar Steil¹, Elisabeth Siebert¹, David Muñoz-Rojas¹, Monica Burriel¹ and Stephen J. Skinner²; ¹Université Grenoble Alpes, France; ²Imperial College London, United Kingdom; ³University of Cambridge, United Kingdom

5:00 PM EF18.05

Increasing Functionality While Maintaining Electrochemical Performance - High Entropy-Based Air-Electrodes for Intermediate- and Low-Temperature Solid Oxide Fuel Cells Juliusz Dabrowa¹, Klaudia Zielińska¹, Anna Stepien¹, Marek Zajusz¹, Maria Szymczak¹, Maciej Mozdziej¹, Margarita Nowakowska¹, Katarzyna Berent², Keyun Li¹ and Konrad Swierczek¹; ¹Akademia Gorniczko-Hutnicza imienia Stanisława Staszica w Krakowie, Poland; ²Akademia Gorniczko-Hutnicza imienia Stanisława Staszica w Krakowie Akademickie Centrum Materialow i Nanotechnologii, Poland

5:15 PM EF18.06

Exploring the Structures and Properties of Functional High-Entropy Spinel Materials Mirosław Stygar, Juliusz Dabrowa, Marek Zajusz, Jakub Cieslak, Maciej Mozdziej, Katarzyna Berent and Ewa Durda; AGH University of Science and Technology, Poland

5:30 PM EF18.07

Relating Nanoscale Microstructure and Performance in Nanocatalyst-Infiltrated Solid Oxide Fuel Cell Anodes Jillian Rix, Alexey Nikiforov, Uday Pal, Srikanth Gopalan and Soumendra Basu; Boston University, United States

* Invited Paper

SESSION EF18: Oxygen-Ion Conducting Fuel Cells III
Session Chairs: Peter Hendriksen and Xingbo Liu
Thursday Afternoon, July 21, 2022
Lobby Level, Avenue 34, Studio 2

4:00 PM EF18.01 WITHDRAWN

Design, Manufacturing and Performance of High-Power Density Monolithic Metal-Supported Solid Oxide Fuel Cells Stéven Pirou, Belma Talic, Karen Brodersen, Theis Skafte, Anne Hauch, Åsa H. Persson, Henrik Lund Frandsen, Jens Høgh, Henrik Henriksen and Anke Hagen; Danmarks Tekniske Universitet, Denmark

4:15 PM EF18.02

A-Site Exsolution of Ceria for a High-Performance Fuel Electrode of a Solid-Oxide Cell Chengsheng Ni, Bangxin Li, Debo He and Jiupai Ni; Southwest University, China

SYMPOSIUM P

Plenary
July 18 - July 22, 2022

Symposium Organizers

* Invited Paper

SESSION PI05: Plenary V
Friday Morning, July 22, 2022
Mezzanine Level, Second Floor, Grand Ballroom A

8:00 AM PI05.01

Computational Design of Fast Oxygen Kinetics in Materials Dane Morgan; University of Wisconsin-Madison, United States

SYMPOSIUM DT

Defects and Transport Mechanisms in Solid Electrolytes and
Mixed Conductors
July 18 - July 22, 2022

Symposium Organizers

George Harrington, Kyushu University / MIT
Rotraut Merkle, Max Planck Institute for Solid State Research
Alexander Opitz, Technische Universität Wien

* Invited Paper

SESSION DT28: Grain Boundaries/Interfaces
Session Chair: William Bowman
Friday Morning, July 22, 2022
Mezzanine Level, Second Floor, Georgian

9:10 AM **DT28.01 **WITHDRAWN**

Designing Novel Electroactive Materials by an Electrolyte Engineering Approach Alexis Grimaud; Collège de France, CNRS, France

9:40 AM DT28.02

A Molecular-Dynamics Study of Oxygen Diffusion in Polycrystalline (La,Sr)FeO₃ Alexander Bonkowski¹, John A. Kilner² and Roger A. De Souza¹; ¹Rheinisch-Westfälische Technische Hochschule Aachen, Germany; ²Imperial College London, United Kingdom

9:55 AM *DT28.03

Photo-Enhanced Ionic Conductivity Across Grain Boundaries in Polycrystalline Solid Oxide Electrolytes at Reduced Temperatures Thomas Defferriere¹, Dino Klotz², Jennifer Rupp^{3,1} and Harry Tuller¹; ¹Massachusetts Institute of Technology, United States; ²Kyushu Daigaku, Japan; ³Technische Universität München, Germany

10:15 AM DT28.04

Oxygen In/Excorporation Kinetics by Electrical Conductivity Relaxation—Application in Dual-Phase Ce_{0.9}Gd_{0.1}O_{2-δ}:La_{0.6}Sr_{0.4}Co_{0.2}Fe_{0.8}O_{3-δ} Composites and Single-Phase La_{0.8}Sr_{0.2}FeO_{3-δ} Thuy Linh Pham¹, Ji Haeng Yu², Hohan Bae¹, Sun-Ju Song¹ and Jong-Sook Lee¹; ¹Chonnam National University, Korea (the Republic of); ²Korea Institute of Energy Research, Korea (the Republic of)

SYMPOSIUM EF

Energy and Fuels Conversion
July 18 - July 22, 2022

Symposium Organizers

Sean Bishop, Sandia National Laboratories
Georgios Dimitrakopoulos, Massachusetts Institute of
Technology

Jong-Ho Lee, Korea Institute of Science and Technology (KIST)

* Invited Paper

SESSION EF20: Oxygen-Ion Conducting Fuel Cells IV
Session Chairs: Kohei Ito and Ho-II Ji
Friday Morning, July 22, 2022
Lobby Level, Avenue 34, Studio 1

9:10 AM EF20.01

Tungsten Doped Sr₂Fe_{2-x}W_xO_{6-δ} Electrode Materials with *In Situ* Exsolved Nanoparticles for Significantly Boosting the Performance of Symmetrical SOFCs Kun Zheng^{1,2}, Jakub Lach¹, Konrad Swierczek^{1,2} and Piotr Winiarz¹; ¹Akademia Gorniczko-Hutnicza imienia Stanislaw Staszica w Krakowie Wydział Energetyki i Paliw, Poland; ²AGH University of Science and Technology, AGH Centre of Energy, Poland

9:25 AM EF20.02

Systematical Study of Controlled Exsolution via Phase Transition and Its Application on Solid Oxide Fuel Cell Chaesung Lim and Jeong Woo Han; Pohang University of Science and Technology, Korea (the Republic of)

9:40 AM EF20.03

Exsolution of Single Metals and Alloys for Tailored Adsorption/Desorption of Ammonia and Its Conversion in Hydrogen for Working Solid Oxide Fuel Cells Jonathan Cavazzani¹ and Antonella Glisenti^{1,2}; ¹Università degli Studi di Padova, Italy; ²Istituto di Chimica della Materia Condensata e di Tecnologie per l'Energia Consiglio Nazionale delle Ricerche, Italy

SYMPOSIUM EI

Electrochemical Interfaces
July 18 - July 22, 2022

Symposium Organizers

Koji Amezawa, Tohoku University
WooChul Jung, Korea Advanced Institute of Science and
Technology
Jonathan Polfus, University of Oslo

9:55 AM EF20.05

Low Temperature Surface Composition of LSM and Its Impact on the Oxygen Reduction Mechanism of ESB/LSM Composite Electrodes Victor Duffort^{1,2}, Martin Pajot^{1,3}, Soukaina Mountadir^{1,2}, Anne-Sophie Mamede^{1,4} and Rose-Noëlle Vannier^{1,4}; ¹Unite de Catalyse et Chimie du Solide, France; ²Centre National de la Recherche Scientifique, France; ³Universite de Lille, France; ⁴Ecole Centrale de Lille, France

10:10 AM EF20.07

Application of Cu-Rich Perovskites for Solid Oxide Cells Operating at Lowered Temperatures Keyun Li¹, Anna Niemczyk², Konrad Swierczek¹, Piotr Winiarz¹, Kun Zheng¹, Yevgeniy Naumovich², Jakub Kupecki², Anna Stepien¹ and Bogdan Dabrowski³; ¹Akademia Gorniczo-Hutnicza imienia Stanisława Staszica w Krakowie Wydział Energetyki i Paliw, Poland; ²Instytut Energetyki, Poland; ³Polska Akademia Nauk, Poland

10:25 AM EF20.08

Comparison of New Designed Materials as Fuel Electrode for Solid Oxide Cells Applications Simone Tomadini¹, Enrico Squizzato¹, Giovanni Carollo¹ and Antonella Glisenti^{1,2}; ¹Universita degli Studi di Padova, Italy; ²CNR-ICMATE, Italy

10:40 AM BREAK

11:00 AM EF20.09 **WITHDRAWN**

Accelerated Degradation of SOFC Anode Under High Siloxane Concentrations Jiashen Tian, Derall M. Riley and Ryan J. Milcarek; Arizona State University Ira A Fulton Schools of Engineering, United States

11:15 AM EF20.10 **WITHDRAWN**

Electrochemical Performance of YSZ Electrolyte Recycled from Solid Oxide Electrolysers or Fuel Cells Waste Materials Gudaysew T. Yenesew, Eric Quarez, Annie Le Gal La Salle, Clement Nicollet and Olivier Joubert; Universite de Nantes, France

11:30 AM EF20.11

Synthesis and Electrochemical Performance of A-Site Non-Stoichiometry Titanate Electrode in SOFCs Cairong Jiang, Yao Jiang and Jianjun Ma; Sichuan University of Science and Engineering, China

11:45 AM EF20.12

Structure, Electrical Properties and Determination of Phase Stability Region of Mn-Cu-Fe Oxide System Justyna K. Ignaczak¹, Ming Chen², Sebastian Molin¹ and Piotr Jasinski¹; ¹Politechnika Gdanska, Poland; ²Danmarks Tekniske Universitet, Denmark

* Invited Paper

SESSION EI13: Batteries
Session Chairs: Yoshitaka Tateyama and Ömer Çapraz
Friday Morning, July 22, 2022
Mezzanine Level, Second Floor, Berkeley/Clarendon

9:10 AM **EI13.01

New Battery Chemistry from Conventional Layered Cathode Materials for Advanced Lithium-Ion Batteries Kisuk Kang; Seoul National University College of Engineering, Korea (the Republic of)

9:40 AM *EI13.02

Manipulating Phase Transformation During Electrochemical Reactions—Lithium-Ion Batteries and Battery-Inspired Electrocatalysis Jongwoo Lim; Seoul National University, Korea (the Republic of)

10:00 AM EI13.04

The Impact of Alkali Metal Ion Intercalation on Redox Chemistry and Mechanical Deformations—A Case Study on Intercalation of Li, Na, and K Ions into FePO₄ Cathode Bertan Özdoğru¹, Younghwan Cha², Behrad Koohbor³, Bharat Gwalani⁴, Vijayakumar Murugesan⁴, Min-Kyu Song² and Ömer Ö. Çapraz¹; ¹Oklahoma State University, United States; ²Washington State University, United States; ³Rowan University, United States; ⁴Pacific Northwest National Laboratory, United States

10:15 AM EI13.05

Ion Exchange at the Liquid-Solid Interface in Spinel Oxide Thin-Film Model Cathode for Multivalent Batteries Jae Jin Kim¹, Bilash KC², Haesun Park³, Guennadi Evmenenko⁴, Bruce Buchholz⁴, Robert Klie², Peter Zapol³, Brian Ingram¹ and Timothy Fister¹; ¹Argonne National Laboratory, United States; ²University of Illinois at Chicago, United States; ³Argonne National Laboratory Materials Science Division, United States; ⁴Northwestern University, United States

10:30 AM BREAK

11:00 AM EI13.06

In Situ Stress Generation During Oxygen Evolution and Reduction Reactions on Au Positive Electrode in Li-O₂ Batteries Hannah Dykes, Bertan Özdoğru and Ömer Ö. Çapraz; Oklahoma State Regents for Higher Education, United States

11:15 AM EI13.07

Novel Double Perovskite Oxide-Based Bifunctional Electrocatalysts for Oxygen Evolution/Reduction Reactions Aman Bhardwaj, Thomas Fischer and Sanjay Mathur; University of Cologne, Germany

SYMPOSIUM ES

Energy Storage
July 18 - July 22, 2022

Symposium Organizers

Ainara Aguadero, Imperial College London and Instituto de Ciencia de Materiales de Madrid
Yifei Mo, University of Maryland
Daniel Rettenwander, Norwegian University of Science and Technology (NTNU)

* Invited Paper

SESSION ES11: Beyond Li-ion I
Session Chair: Montse Casas Cabanas
Friday Morning, July 22, 2022
Lobby Level, Avenue 34, The Loft

9:10 AM **ES11.01

Calcium Based Batteries—Lessons Learnt and Challenges Ahead M Rosa Palacin; Institut de Ciència de Materials de Barcelona, Spain

9:40 AM *ES11.02

Interplay of Chemistry and Function at Lithium and Calcium Metal Anode Interfaces Betar Gallant; Massachusetts Institute of Technology, United States

10:00 AM ES11.03

From Simple to High Entropy Transition Metals Oxides—Applications in Electrochemical Energy Storage Janina Molenda; Akademia Gorniczno-Hutnicza imienia Stanisława Staszica w Krakowie, Poland

10:15 AM ES11.04

Phenomena of Multi-Way Sodium Storage in Transition Metal Dichalcogenides- MoS_2 vs. MoSe_2 Anna F. Plewa¹, Andrzej J. Kulka¹, Emil Hanc², Katarzyna Walczak¹ and Janina Molenda¹; ¹Akademia Gorniczno-Hutnicza imienia Stanisława Staszica w Krakowie Wydział Energetyki i Paliw, Poland; ²Instytut Gospodarki Surowcami Mineralnymi i Energia Polskiej Akademii Nauk, Poland

10:30 AM ES11.05

A Ternary Metal Fluoride Pb_2CuF_6 as a Cathode Material for Fluoride-Ion Batteries Takeshi Tojigamori^{1,2}, Hiroshi Nakajima³, Hidenori Miki¹, Naoki Matsui², Tomotaka Nakatani⁴, So Fujinami⁴, Kousuke Noi^{4,1}, Hirofumi Tsukasaki³, Kota Suzuki², Masaaki Hirayama², Shigeo Mori³, Takeshi Abe⁴ and Ryoji Kanno²; ¹Toyota Jidosha Kabushiki Kaisha Higashifuji Kenkyujo, Japan; ²Tokyo Kogyo Daigaku, Japan; ³Osaka Furitsu Daigaku, Japan; ⁴Kyoto Daigaku, Japan

10:45 AM BREAK

11:00 AM *ES11.07

Sustainability of Sodium-Ion Batteries Emma Kendrick; University of Birmingham, United Kingdom

11:20 AM ES11.10

Tailoring High Capacity NASICON Cathodes for Sodium-Ion Batteries Premkumar Senguttuvan and Subham Ghosh; Jawaharlal Nehru Centre for Advanced Scientific Research, India

11:35 AM ES11.11

On the Thermodynamic Origin of the Formation of Li-Dendrites in an Electrochemical Cell Yudong Wang, Anil Virkar and Xiao-Dong Zhou; University of Louisiana at Lafayette, United States

11:50 AM ES11.12

High-Rate Long-Lifespan Lithium-Sulfur Batteries via Stereolithography Technique and Oxidative Chemical Vapor Deposition Yuxuan Zhang¹, Thomas Kivevele², Han Wook Song³ and SungHwan Lee¹; ¹Purdue University, United States; ²Nelson Mandela African Institution of Science and Technology, Tanzania, United Republic of; ³Research Institute of Standard and Science, Korea (the Republic of)

12:05 PM ES11.13

Devising Cathodes for Lithium Sulfur Batteries Doped with Ferroelectric Materials Yielding Sustainable High-Capacity Performance Claudia C. Zuluaga-Gomez¹, Christian Plaza², Gerardo Morell¹, Margarita Correa³, Yi Lin⁴ and Ram Katiyar¹; ¹Universidad de Puerto Rico Recinto de Río Piedras, Puerto Rico; ²Massachusetts Institute of Technology, United States; ³Universidad del Atlántico, Colombia; ⁴National Institute of Aerospace, United States

SESSION ES12: Flow Batteries
Session Chair: Mir Mehraj Ud Din
Friday Morning, July 22, 2022
Lobby Level, Avenue 34, Studio 2

9:10 AM *ES12.01

Strategies for Addressing Crossover in Non-Aqueous Redox Flow Batteries Shelley Minteer; The University of Utah, United States

9:30 AM *ES12.02

High Performance and Low Cost Flow Batteries for Large Scale Grid Storage Hongli Zhu; Northeastern University, United States

9:50 AM ES12.03

Composite Lithium-Conductive LATP+PVdF Membranes—Development, Optimization and Applicability for Hybrid Redox Flow Batteries Keith J. Stevenson; Skolkovskij institut nauki i tehnologii, Russian Federation

10:05 AM ES12.05 **WITHDRAWN**

Evaluation of the Polarization Resistance using Gaussian Processes and the Hilbert Transform Baptiste D. Py, Adeleke Maradesa and Francesco Ciucci; The Hong Kong University of Science and Technology School of Engineering, Hong Kong

10:20 AM BREAK

SYMPOSIUM DT

Defects and Transport Mechanisms in Solid Electrolytes and Mixed Conductors
July 18 - July 22, 2022

Symposium Organizers

George Harrington, Kyushu University / MIT
Rotraut Merkle, Max Planck Institute for Solid State Research
Alexander Opitz, Technische Universität Wien

* Invited Paper

SESSION DT29: Transport Mechanisms
Session Chair: Thomas Defferriere
Friday Morning, July 22, 2022
Mezzanine Level, Second Floor, Georgian

11:00 AM *DT29.00

Al States in Al₂O₃-Doped Sc₂O₃ Stabilized ZrO₂ Studied by Al-27 NMR
Itaru Oikawa¹, Akihiro Fujimaki¹, Fuminori Tamazaki², Hiroshi Okamoto²
and Hitoshi Takamura¹; ¹Tohoku Daigaku, Japan; ²Daiichi Kigenso Kagaku
Kogyo Co Ltd, Japan

11:20 AM DT29.01

Hydride Ion Conductivity in Materials with K₂NiF₄-Type Structure
Henrik Rodenburg and Peter Ngenue; Universiteit Utrecht Faculteit
Betawetenschappen, Netherlands

11:35 AM DT29.04

Crystal Structure and Ionic Conductivity of Novel Rare Earth Niobate
LnNbO₄ (Ln = Nd, Sm, Eu, Gd) by Substituting Nb with W Yue Jin Shan,
Ryo Kawaguchi, Ryoji Akizawa and Keitaro Tezuka; Utsunomiya
University, Japan

11:50 AM DT29.05

Exploring Charged Defects and Dopability Limits of Solid Electrolytes, a
Computational Study Yasmine Benabed^{1,2}, Diana Dahliah², Mickaël Dollé¹
and Geoffroy Hautier^{3,2}; ¹Université de Montreal, Canada; ²Université
catholique de Louvain, Belgium; ³Thayer School of Engineering at
Dartmouth, United States

12:05 PM DT29.06 **WITHDRAWN**

Investigating the Impact of the Microstructure on the Charge Transport
in Microstructured Ceria Thin Films Jan L. Dornseifer, Janis K. Eckhardt,
Matthias T. Elm, Christian Heiliger and Peter J. Klar; Justus Liebig
Universität Giessen, Germany

SYMPOSIUM ES

Energy Storage
July 18 - July 22, 2022

Symposium Organizers

Ainara Aguadero, Imperial College London and Instituto de
Ciencia de Materiales de Madrid
Yifei Mo, University of Maryland
Daniel Rettenwander, Norwegian University of Science and
Technology (NTNU)

* Invited Paper

SESSION ES14: New Approaches and Theory
Session Chair: Nicholas Williams
Friday Morning, July 22, 2022
Lobby Level, Avenue 34, Studio 2

11:00 AM *ES14.01 **WITHDRAWN**

New Insights into Lithium Superionic Conductors and Their Interfaces
from Accurate, Large Scale Simulations with Machine Learning
Interatomic Potentials Shyue Ping Ong, Ji Qi, Manas Chandrappa, Yunxing
Zuo, Swastika Banerjee, Hideyuki Komatsu and Chi Chen; University of
California San Diego, United States

11:20 AM *ES14.02

Understanding Materials Dynamics in Solid-State Batteries with High-
Capacity Anodes Matthew McDowell; Georgia Institute of Technology,
United States

11:40 AM ES14.03

Interpretable Tree-Based and Graph Neural Network Approaches for
Novel Solid State Electrolyte Design Shreyas J. Honrao, Stephen R. Xie and
John W. Lawson; NASA Ames Research Center, United States

11:55 AM ES14.04 **WITHDRAWN**

New Applications of the Finite Gaussian Processes Distribution of
Relaxation Times Model Adeleke Maradesa, Baptiste D. Py, Emanuele
Quattrocchi and Francesco Ciucci; The Hong Kong University of Science
and Technology School of Engineering, Hong Kong

12:10 PM ES14.05

Unification of Bulk Storage and Supercapacitive Storage Chuanlian Xiao,
Robert Usiskin and Joachim Maier; Max-Planck-Institut für
Festkörperforschung, Germany

12:25 PM ES14.06

In Situ Strain Measurements on LAGP Solid Electrolyte in Symmetrical
Li/LAGP/Li Battery During Li Plating and Stripping Bertan Özdoğan and
Ömer Ö. Capraz; Oklahoma State Regents for Higher Education, United
States

Closing Session

Friday Afternoon, July 22, 2022
Mezzanine Level, Second Floor, Grand Ballroom A

1:00 PM

Poster Announcement and ISSI Young Scientist Award Winner
Announcement