

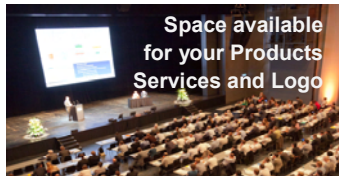
Session Program 15th European SOFC & SOE Forum

OVERVIEW

incl. GSM & MEEP symposium, Project Meetings, Tutorials

KKL Lucerne, Switzerland, 4 - 8 July **EFCF 2022**

Mo 4 July		www.GridServiceMarket.com		G Auditorium		Partner Meeting Montana		PM: Uni LU H5		PM: Terrassensaal		Tutorials: Club Rooms	
Tu 5 July		GSM 2022 - 6 th Grid Service Market symposium		G Auditorium		IEA AFC Annex 32		AdAstra/RUBY		Nautilus		FCH EIS	
We - Fr		A Luzerner Saal		Page		B Auditorium		Page		M Club Rooms			
6 July	We 9:00	A01: <u>P1</u> : Opening Session		14		B02: Fuel Electrodes		15		6 - 7 July MEEP 2022 4 th international symposium on Microbial, Enzymatic & Bio-Photovoltaic Electrochemical Reactors, Cells & Systems PM: Club Rooms CH2P			
	9:30	A02: <u>K1 - 4</u> : EU, USA, JP & Korean Programs/Partnerships		15		B03: Fuel & Oxygen Electrodes		16					
	11:00	A03: Technology status at industry I		16		B05: Oxygen electrodes		17					
	13:15	Auditorium Foyer		A04: Poster Session I covering All Session Topics		B09s: Co-Electrolysis & CO ₂ -Electrolysis		17, 29-39					
	14:30	A05: Technology status at industry II		17		B06: Lifetime Cells I		18					
	16:30	A06: Technology status at industry III & Projects Overview		18		B07: <u>K6</u> : Advanced characterization tools by AIST		20					
7 July	Th 9:00	A07: <u>K5</u> : Power to optimised X by Haldor Topsøe A/S		20		B08: Stack & System Modelling		20					
	9:30	A08: Lifetime Stacks		20		B09: Proton Conducting Materials, Cells & Stacks		21					
	11:00	A09: Performance Cell/Stack		21		B11: Lifetime Cells II		22					
	13:15	Auditorium Foyer		A10: Poster Session II covering All Session Topics		B09s: Co-Electrolysis & CO ₂ -Electrolysis		22, 29-39					
	14:30	A11: System Design, Performance & BoP		22		B12: Interconnects, Coatings, Contact Layers & Sealants		23					
	16:30	A12: Cells Design & Manufacturing I		23		B13: Cells Design & Manufacturing II		24					
8 July	Fr 9:00	A13: <u>K7</u> : H ₂ production paths and the future H ₂ mix		24		B14: Lifetime Assessment & Advanced Characterisation		24					
	9:30	A14: Other Fuels		24		B15: Advanced Characterisations		25					
	11:00	A15: SOC Integration & Energy System Perspectives		25		B16: Material Modelling		27					
	13:30	A16: Products, Demonstration & Novel Concepts		27		Legend: <u>Px</u> : = Plenary, <u>Kx</u> : = Keynote, <u>PM</u> : = Project Meetings All times are given in UTC/GMT +2 hours							
	15:05	A17: <u>P2</u> : Closing Ceremony <u>K8</u> by the EFCF Gold Medal of Honour Winner 2022		28									



EFCF 2022, 4 - 8 July

Session Program

Morning - Luzerner Saal

Wednesday, 6 July 2022

09:00 A01 - P1: Opening Session

- 09:00 **Welcome by the Organizers (A0101)**
Olivier Bucheli, Michael Spirig
European Electrolyser & Fuel Cell Forum, Luzern/Switzerland
- 09:05 **Welcome by the Chairs (A0102)**
Julie Mougín, Jérôme Laurencin
CEA-Liten, Grenoble/France
- 09:15 **Welcome to Switzerland (A0103)**
Stefan Oberholzer, Rolf Schmitz, Benoît Revaz
Swiss Federal Office of Energy, Bern/Switzerland

09:30

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We thank the SAC for the evaluation and contribution to structure the technical program.

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Cintia Hartmann, CEA, FR
Marie Petitjean, CEA, FR

We thank the SOC for the content and quality contribution of the technical contributions.

09:30 A02: Keynotes: EU, USA, JP & Korean Programs/Partnerships09:30 **K1: The Status of SOFC & SOEC R&D in the Clean Hydrogen Partnership (A0201)**09:35 A. Aguilo-Rullan, M. Atanasiu, B. Biebuyck, D. Dirmiki, D. Tsimis
Clean Hydrogen Partnership, Brussels/Belgium;09:50 **K2: U.S. Department of Energy Hydrogen and Fuel Cell Technologies Office
Opening Remarks (A0202)**William T. Gibbons, U.S. Department of Energy Hydrogen and Fuel Cell Technologies Office,
Washington/USA10:05
10:10 **K3: Recent achievements of advanced evaluation and analysis technologies
for the durability of Solid Oxide Fuel Cells stacks in Japan (A0203)**Teruhisa Horita; National Institute of Advanced Industrial Science and Technology (AIST),
Tsukuba/Japan

10:20

10:30 **K4: Overview of the Korean Hydrogen and Fuel Cell Program (A0204 tbc)**
Kisuk Chung

10:35 Korean Energy Technology Evaluation and Planning (KETEP), Korea

B02: Fuel Electrodes

Change to Auditorium

LSM based fuel electrode materials for SOECs operating under steam, co-electrolysis and CO₂-electrolysis modes (B0201)Vaibhav Vibhu (1), Izaak C. Vinke (1), Rüdiger-A. Eichel (1,2), L.G.J. (Bert) de Haart (1)
(1) Institute of Energy and Climate Research, Fundamental Electrochemistry (IEK-9);
Forschungszentrum Jülich GmbH, Jülich/Germany;
(2) Institute of Physical Chemistry, RWTH Aachen University, Aachen/Germany;**Sulfur-Activated SFM-Based Fully Ceramic Fuel Electrodes for Solid Oxide Cells (B0202)**Matthias Riegraf, Noriko Sata, Rémi Costa
German Aerospace Center (DLR), Institute of Engineering Thermodynamics; Stuttgart/Germany;**Electrode Materials for Robust Solid Oxide Electrolysis Stacks (B0203)**S. Elango Elangovan, Tyler Hafen, Taylor Rane, Dennis Larsen, Joseph Hartvigsen, Jenna Pike
OxEon Energy, LLC.; North Salt Lake/USA;**Generalization and optimization of Ni exsolution with diffusion-determined model to
achieve highly active and stable anode for solid oxide fuel cells (B0204)**Yo Han Kim and Jae-ha Myung; Department of Materials Science and Engineering, Incheon
National University; Incheon/Republic of Korea;**Reversibility limitations of metal exsolution catalysts at low dopant concentrations (B0205)**Moritz L. Weber (1,2,3), Regina Dittmann (1), Rainer Waser (1,4), Norbert H. Menzler (2), Felix
Gunkel (1), Christian Lenser (2), Olivier Guillon (2,3);
(1) Peter Gruenberg Institute (PGI-7) and JARA-FIT;
(2) Institute of Energy and Climate Research (IEK-1), Forschungszentrum Juelich GmbH,
Juelich/Germany;
(3) Institute of Mineral Engineering (GHI);
(4) Institute for Electronic Materials (IWE 2), RWTH Aachen University, Aachen/Germany;**10:50 Break - Ground Floor in the Exhibition**

11:15 A03: Technology status at industry I

- 11:15 **Gas_to_Power and Power_to_Gas solutions from SOLIDpower (A0301)**
Massimo Bertoldi (1), Antonello Nesci (2), Zacharie Wuillemin (2), Stefano Modena (1), Dario Montinaro (1), Daniele Penchini (1).
(1) SOLIDpower SpA. Mezzolombardo/Italy;
(2) SOLIDpower SA, Yverdon-les-Bains/Switzerland;
- 11:30 **Field Experiences and Development of C60 Platform for Premium Efficiency SOFC and SOEC (A0302)**
Kim Åström, Tuomas Hakala, Erkki Fontell
Convion Oy, Espoo/Finland;
- 11:45 **Commercialization of the Ceres SteelCell® Technology for Power Generation and Electrolysis (A0303)**
Robert Leah, Adam Bone, Per Hjalmarsson, Ahmet Selcuk, Mike Lankin, Mahfujur Rahman, Florence Felix, Jeffrey De Vero, Xin Wang, Laura Rios, Subhashish Mukerjee, Mark Selby
Ceres Power Ltd; Viking House, Horsham/U.K.;
- 12:00 **Power-to-X and green hydrogen at Haldor Topsoe: status and plans (A0304)**
Peter Blennow, Thomas Heiredal-Clausen, Jeppe Rass-Hansen, Michael Hultqvist, John Bøgild Hansen, Poul Georg Moses
Haldor Topsoe A/S; Lyngby/Denmark;
- 12:15 **Status of Hexis and mPower' SOFC and SOEC Activities (A0305)**
Andreas Mai (1,2), Jan G. Grolig (1), Venkatesh Sarda (1), Holger Bausinger (1), Alexander Schuler (1, 2), Amarnath Chakradeo (3), Siddharth R. Mayur (3)
(1) Hexis AG; Winterthur/Switzerland;
(2) Hexis GmbH; Konstanz/Germany;
(3) mPower GmbH; Dresden/Germany;

B03: Fuel & Oxygen Electrodes

- Influence of A-Site modifications on the properties of $(La_{0.2}Sr_{0.7-x}Ca_x)Ti_{0.95}Fe_{0.05}O_{3-\delta}$ based fuel electrode for solid oxide cell (B0301)**
S. Paydar (1), K. Kooser (2), P. Möller (1), E. Lust (1), G. Nurk (1)
(1) Institute of Chemistry, University of Tartu; Tartu/Estonia;
(2) Institute of Physics, University of Tartu; Tartu/Estonia;
- The role of noble metal current collectors in electrochemical SOC studies of MIEC catalysts (B0302)**
Mykhailo Pidburnyi, Haris Ansari, Viola Birss
Department of Chemistry, University of Calgary, Calgary/Canada;
- LSM/GDC as electrodes material for symmetrical IT – SOFC fueled by methane (B0303)**
Enrico Squizzato (1), Caterina Sanna (2), Marie Lund Traulsen (3), Paola Costamagna (2), Peter Holtappels (3), Antonella Glisenti (1,4)
(1) Department of Chemical Sciences, University of Padova, Padova/Italy;
(2) Department of Chemistry and Industrial Chemistry, University of Genoa, Genoa/Italy;
(3) Department of Energy Conversion and Storage, Tech. Uni. of Denmark, Lyngby/Denmark;
(4) CNR-ICMATE, Padova/Italy;
- Degradation behavior of $Ln_2Ni_{1-x}Co_xO_{4+\delta}$ ($Ln = La, Pr$ or Nd) and $La_{1.5}Pr_{0.5}Ni_{1-x}Co_xO_{4+\delta}$ ($x = 0, 0.1, 0.2$) oxygen electrodes under steam electrolysis conditions (B0304)**
Vaibhav Vibhu (1), Izaak C. Vinke (1), Rüdiger-A. Eichel (1,2), L.G.J. (Bert) de Haart (1)
(1) Institute of Energy and Climate Research, Fundamental Electrochemistry (IEK-9); Forschungszentrum Jülich GmbH, Jülich/Germany;
(2) Institute of Physical Chemistry, RWTH Aachen University, Aachen/Germany;
- Cobalt-free air electrode for the next generation of Solid Oxide Cells based on $(La,Sr)FeO_3$ materials (B0305)**
Claire Ferchaud, Frans van Berkel, Loek Berkeveld, Miranda Heijink-Smith, Jakobert Veldhuis, Hans van Wees
ECN part of TNO; Petten/The Netherlands;

12:30 Lunch - 2nd Floor on the Terrace / Coffee - Ground Floor in the Exhibition & 1st Floor in the Poster Area

13:15 A04: Poster Session I covering All Session Topics + **B09s: Co-Electrolysis & CO₂-Electrolysis**

Auditorium Foyer

15:00 A05: Technology status at industry II**B05: Oxygen electrodes**

- 15:00 **Status of Stack & System Development at Sunfire (A0501)**
Christian Walter, Oliver Posdziech, Matthias Boltze
Sunfire GmbH; Dresden/Germany;
- 15:15 **AVL's SOC Portfolio for a Hydrogen Based Energy System (A0502)**
Martin Hauth, Bernd Reiter
AVL List GmbH; Graz/Austria;
- 15:30 **SOC development at Elcogen (A0503)**
Matti Noponen (1), Hanna Granö-Fabritius (1), Sergii Pylypko (2), Enn Õunpuu (2)
(1) Elcogen; Vantaa/Finland;
(2) Elcogen; Tallinn/Estonia;
- 15:45 **Reversible SOEC/ SOFC System Development and Demonstration (A0504)**
Jenna Pike, S. Elango Elangovan, Joseph Hartvigsen, Dennis Larsen, Tyler Hafen, Jessica Elwell
OxEon Energy; North Salt Lake/USA;

Influence of the B-site Dopant (M = Ti, Nb) Content on the Electrochemical Performance of (La_{0.6}Sr_{0.4})_{0.99}Co_{1-x}M_xO_{3-δ} Oxygen Electrode (B0501)
Alar Heinsaar (1), Indrek Kivi (1), Jaan Aruväli (2), Gunnar Nurk (1), Enn Lust (1)
(1) Institute of Chemistry, University of Tartu.; Tartu/Estonia;
(2) Institute of Ecology and Earth Sciences, University of Tartu.; Tartu/Estonia;

Route to achieving high power densities using nanostructured cathodes on anode-supported SOFCs (B0502)
Katherine Develos-Bagarinao (1), Tomohiro Ishiyama (2), Hiroyuki Shimada (3)
Haruo Kishimoto (1), Katsuhiko Yamaji (2)
(1) Global Zero Emission Research Center, AIST West;
(2) Research Institute for Energy Conservation, AIST Central 5;
(3) Innovative Functional Materials Research Institute, AIST Chubu; National Institute of Advanced Industrial Science and Technology (AIST), Japan;

Significantly reduced area specific resistance of Pr₄Ni₃O_{10±δ} - Ce_{0.75}Gd_{0.1}Pr_{0.15}O₂ composite cathode by optimizing microstructures for IT-SOFCs (B0503)
Zheng Xie, Stephen J. Skinner
Department of Materials; Imperial College London, London/UK;

Oxygen isotope exchange in SrFe_{1-x}Si_xO₃. (B0504)
Artur J. Majewski (1), Anna Khodimchuk (2), Dmitriy Zakharov (2), Maxim Ananyev (2), Peter R. Slater (3), Robert Steinberger-Wilckens (1)
(1) School of Chemical Engineering, University of Birmingham/UK;
(2) Institute of High Temperature Electrochemistry, Yekaterinburg/Russia;
(3) School of Chemistry, University of Birmingham/UK;

16:00 Break - Ground Floor in the Exhibition & 1st Floor in the Poster Area

16:30 A06: Technology status at industry III + Projects Overview**B06: Lifetime Cells I**

- 16:30 **The highly efficient power source – the stationary fuel cell system by Bosch (A0601)**
Sven Steib
Robert Bosch GmbH; Stuttgart/Germany;

Accelerated Failure of Standard Solid-Oxide Electrolysis Cells from Multiscale Modeling (B0601)

Brandon C. Wood (1), Joel Berry (1), Namhoon Kim (1), Richard D. Boardman (2), Gregory A. Hackett (3), Harry W. Abernathy (3), William K. Epting (3, 4), Olga Marina (5), Jamie Holladay (5), David Peterson (6), William T. Gibbons (6)
(1) Lawrence Livermore National Laboratory; Livermore/USA;
(2) Idaho National Laboratory; Idaho/USA;
(3) National Energy Technology Laboratory; Morgantown/USA;
(4) NETL Support Contractor, Pittsburgh, PA / Morgantown, WV / Albany, OR;
(5) Pacific Northwest National Laboratory, Washington/USA, ;
(6) Hydrogen and Fuel Cell Technologies Office, U.S. Department of Energy- EERE; Colorado/USA;
(7) Hydrogen and Fuel Cell Technologies Office, U.S. Department of Energy- EERE; Washington/USA;

- 16:45 **Status of Electrolyser Development at GENVIA (A0602)**
Patrice Tochon, Capella Festa, Najet Agrane, Gilles lafrate
GENVIA SAS; PLAINE SAINT PIERRE, BEZIER;

Accelerated testing of microstructural degradation in nickel/ceria fuel electrodes (B0602)

Yanting Liu, Felix Kullmann, André Weber
Institute for Applied Materials (IAM-WET); Karlsruhe Institute of Technology (KIT), Karlsruhe/Germany;

- 17:00 **Development of a rSOC modular product for a sustainable local energy supply (A0603)**
Nicolas Bardi, Caroline Rozain, Marc Potron, Guillaume Préaux
Sylfen; Le Cheylas;

Effect of Operating Conditions on Durability of Solid Oxide Electrolysis Cells (B0603)

Olga A. Marina, Long Le, Christopher Coyle, Dan Edwards, Jie Bao, Dewei Wang, Kerry Meinhardt, Jamie Holladay
Pacific Northwest National Laboratory; Washington/USA;

- 17:15 **Progress on Reversible Solid Oxide Cell, Stack, and System Technologies (A0604)**
Emir Dogdibegovic (1), Robert Braun (2), Scott Barnett (3), Anila Wallace (1), David Kopechek (1), Gene Arkenberg (1), Scott Swartz (1), Judy Garzanich (1), John Funk (1), Sergio Ibanez (1), Aadarsh Parashar (2), Yubo Zhang (3), Chad Sellers (1), Bradley Glenn (1)
(1) Nexceris; Ohio/USA;
(2) Colorado School of Mines; Colorado/USA;
(3) Northwestern University; Illinois/USA;

30,000 Hours Steam Electrolysis with a 3YSZ-Electrolyte Supported Cell at Elevated Current Density (B0604)

Josef Schefold (1), Aline Leon (1), Christian Walter (2)
(1) European Institute for Energy Research (EIFER); Karlsruhe/Germany;
(2) Sunfire GmbH; Dresden/Germany;

17:30 **Effect of Operating Conditions on Durability of Solid Oxide Electrolysis Cells (A0605)**
Kerry Meinhardt, Nathanael Royer, John Zaengle, Lorraine Seymour, Joelle Reiser, Jie Bao, Naveen Karri, Olga A. Marina
Pacific Northwest National Laboratory; Washington/USA;

Ni migration in Solid Oxide Cells: a coupled modeling and experimental study (B0605)
Léa Rorato (1), Yijing Shang (2), Shenglan Yang (2,3), Maxime Hubert (1), Karine Couturier (1), Lijun Zhang (3), Julien Vulliet (4), Ming Chen (2), Jérôme Laurencin (1)
(1) Univ. Grenoble Alpes - CEA/LITEN; Grenoble/France;
(2) Department of Energy Conversion and Storage, Technical University of Denmark; Roskilde/Denmark;
(3) State Key Laboratory of Powder Metallurgy, Central South University; Changsha/China;
(4) CEA, DAM, Le Ripault, Monts/France;

17:45 **Mn(II)-doped scandia stabilized zirconia electrolyte: materials, cells and stack performance (A0606)**
Marie-Laure Fontaine (1), Einar Vøllestad (1), Vegar Øyggarden (1), John Pietras (2), Julian Dailly (3), Karine Couturier (4)
(1) SINTEF AS.; Oslo/Norway;
(2) Saint-Gobain Research North America; Northborough/USA;
(3) EIFER; Karlsruhe/Germany;
(4) CEA; Univ. Grenoble Alpes – CEA/LITEN, Grenoble/France;

Effect of Current Density on Performance Degradation and Microstructural Evolution in Ni/CGO Fuel Electrode for Steam Electrolysis Operation (B0606)
Morten Phan Klitkou, Henrik Lund Frandsen, Peter Vang Hendriksen
Technical University of Denmark, Department of Energy Conversion and Storage; Lyngby/Denmark;

18:00 **End of Sessions**

18:30 **Swiss Surprise Night** Registered participants meet between KKL and railway station

Enjoy your Evening
in and around Lucerne



09:00 A07: Keynote - Power to optimised X by Haldor Topsøe A/S

09:00 **K5: Power to X: What is the optimum X from a SOEC perspective? (A0701)**
John Bøggild Hansen; Haldor Topsøe A/S, Lyngby/Denmark

B07: Keynote - Advanced characterization tools by AIST

K6: Cutting-edge technologies for probing degradation phenomena in solid oxide cells (B0701)
Katherine Develos-Bagarinao; Global Zero Emission Research Center (GZR), National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba/Japan

09:30 A08: Lifetime Stacks

09:30 **Utilizing the full power of electrochemical impedance spectroscopy to identify stack degradation mechanisms in commercial SOEC stacks (A0801)**
Daniel B. Drasbæk (1), Peter Blennow (1), Thomas Heiredal-Clausen (1), Jeppe Rass-Hansen (1), Giovanni Perin (1), Jens V. T. Høgh (1), Anne Hauch (2); (1) Haldor Topsøe A/S; (2) Dep. of Energy Conversion and Storage, Technical University of Denmark, Lyngby/Denmark;

09:45 **15000 hours test of a SOE short stack in co-electrolysis mode (A0802)**
Stefan Diethelm (1), Audrey Wesoly (1), Samaneh Daviran (1), Hamza Moussaoui (1), Dario Montinaro (2), Jan Van herle (1)
(1) Group of Energy Materials; École Polytechnique Fédérale de Lausanne/Switzerland; (2) SOLIDpower SpA, Mezzolombardo/Italy;

10:00 **Combining SOEC and biomass gasification for synthesis of methanol; use of purge gases on the oxygen electrode and their impact on cell durability (A0803)**
Peter V. Hendriksen (1), Belma Talic (1,2), Jens V. T. Høgh (1,3), P. Blennow (3), R. Küngas (3), M. Chen (1) X. Sun (1), J. Ahrenfeldt (4), U. B. Henriksen (4), W.-R. Kiebach (1)
(1) Department of Energy Conversion and Storage, Technical University of Denmark; (2) Sintef, Department of Sustainable Energy Technology, Norway; (3) Haldor Topsøe A/S, Denmark; (4) DTU Chemical Engineering, TU of Denmark;

10:15 **Benchmark Study of Performances and Durability between Different Stack Technologies for High Temperature Electrolysis (A0804)**
Jerome Aicart (1), Alexander Surrey (2), Lucas Champelovier (1), Kilian Henault (1), Chistian Geipel (2), Oliver Posdziech (2), Julie Mougín (1)
(1) Univ. Grenoble Alpes, CEA, Liten, Grenoble/France; (2) Sunfire GmbH, Dresden/Germany;

B08: Stack & System Modelling

Operation & modelling of ammonia fuelled solid oxide fuel cell, stack & systems (B0801)
Henrik Lund Frandsen, Hossein Nami, Omid Babie Rizvandi, Francesco Mondì, Claudia Goebel, Xiufu Sun, Anke Hagen, Peter Vang Hendriksen;
Department of Energy Conversion and Storage, Technical University of Denmark; Lyngby/Denmark;

A high-throughput design of a multifunctional tubular hydrogen reactor (B0802)
Santos-Blasco Joaquin (1), Catalá-Martínez David (1), Escolástico Sonia (1), Veenstra Peter (2), Vøllestad Einar (3), Fontaine Marie-Laure (3), Kiebach Wolff-Ragnar (4), Strandbakke Ragnar (5), Serra José Manuel (1);(1) Instituto de Tecnología Química (CSIC-UPV); Valencia/Spain; (2) Shell Global Solutions International B.V., The Hague/Netherlands; (3) SINTEF Industry; (4) Technical University of Denmark, Roskilde/Denmark; (5) University of Oslo, Oslo/Norway;

Comparative assessment of gas channel flow models for detailed multi-physics planar solid oxide cell and stack simulations (B0803)
Oscar Furst, Lukas Wehrle, Olaf Deutschmann
Karlsruhe Institute of Technology, Institute for Chemical Technology and Polymer Chemistry; Karlsruhe/Germany;

Transient simulation and experimental validation of a solid oxide cell module in electrolysis and polygeneration mode (B0804)
Santiago Salas Ventura, Matthias Metten, Marius Tomberg, Dirk Ullmer, Marc P. Heddrich, S. Asif Ansar
German Aerospace Center (DLR), Institute of Engineering Thermodynamics; Stuttgart/Germany;

10:30 Break - Ground Floor in the Exhibition

11:00 A09: Performance Cell/Stack

- 11:00 **Impact of GDC interlayer microstructure on strontium zirconate interphase formation and cell performance (A0901)**; Sadhana Golani (1), André Weber (1), Florian Wankmüller (2), Werner Herzhof (3), Christian Dellen (3), Norbert H. Menzler (3); (1) Inst. for Applied Materials - Electrochemical Technologies (IAM-ET); (2) Lab. for Electron Microscopy (LEM); Karlsruhe Institute of Technology (KIT), Karlsruhe/Germany; (3) Forschungszentrum Jülich GmbH, Inst. of Energy & Climate Research (IEK), Jülich/Germany;
- 11:15 **Development and Full System Testing of Novel Co-Impregnated La_{0.20}Sr_{0.25}Ca_{0.45}TiO₃ Anodes for Commercial Combined Heat and Power Units (A0902)**
Robert Price (1), Holger Bausinger (2), Gino Longo (2), Ueli Weissen (2), Mark Cassidy (1), Jan G. Grolig (2) Andreas Mai (2), John T. S. Irvine (1); (1) University of St Andrews.; School of Chemistry, St Andrews, Fife/UK.; (2) HEXIS AG; Winterthur/Switzerland;
- 11:30 **Performance and Endurance Characterization of a Commercial Prototypical SOEC Stack (A0903)**
Micah Casteel (1), Cliff Loughmiller (1), Randy Petri (1), Tyler Westover (1), Peter Blennow (2), Richard Boardman (1)
(1) Idaho National Laboratory; Idaho/USA; (2) Haldor Topsoe A/S; Lyngby/Denmark;
- 11:45 **Solid Oxide Electrolysis Stack development and upscaling (A0904)**
Stephane Di Iorio, Thibault Monnet, Géraldine Palcoux, Livia Ceruti, Julie Mougin
Univ. Grenoble Alpes – CEA/LITEN, Grenoble/France;
- 12:00 **Evaluation of temperature gradients during stack operation with internal reforming (A0905)**
Stefan Megel, Stefan Rothe, Jens Schnetter, Sebastian Hielscher, Jakob Schöne, Nikolai Trofimenko, Jochen Schilm, Mihails Kusnezoff
Fraunhofer IKTS; Dresden/Germany;
- 12:15 **Performance enhancement in SOFC stacks (A0906)**
Ute de Haart, Qingping Fang, Norbert H. Menzler, Ralf Peters
Forschungszentrum Jülich GmbH; Institute of Energy and Climate Research; Jülich/Germany;

B09: Proton Conducting Materials, Cells & Stacks

- Proton conducting ceramic based components, cells and modules development for high pressurized electrolysis (B0901)**
Marie-Laure Fontaine
SINTEF AS Oslo/Norway;
- Performance of protonic ceramic cells and systems for hydrogen production (B0902)**
A. A. Thatte (1), M. Pastula (2), R. J. Braun (1)
(1) Colorado School of Mines, Department of Mechanical Engineering; Colorado/USA;
(2) Versa Power Systems; Calgary/Canada;
- NH₃-fed IT-Proton Conducting Ceramic Cells: a BaCe_{0.7}Y_{0.2}Zr_{0.1}-based efficient nanocomposite anode. (B0903)**
Pietro Trainotti (1), Fabrice Mauvy (2), Antonella Glisenti (1,3);
(1) University of Padova Dept. of Chemical Sciences; Padova/Italy
(2) Université de Bordeaux – CNRS – PESSAC/France; (3) CNR-ICMATE, Padova/Italy;
- Proton conducting ceramic cells with Ba_{1-x}Gd_{0.8}La_{0.2+x}CO₂O_{6-δ} oxygen electrode for steam electrolysis application (B0904)**
Haoyu Zheng (1), Noriko Sata (1), Matthias Riegraf (1), Amir Masoud Dayaghi (2), Truls Norby (2), Rémi Costa (1); (1) Institute of Engineering Thermodynamics, German Aerospace Center (DLR); Stuttgart/Germany; (2) Department of Chemistry, Centre for Materials Science and Nanotechnology (SMN); University of Oslo, Oslo/Norway;
- Towards the development of large scale proton conducting ceramic cells (B0905)**
Mariya E. Ivanova (1), Wendelin Deibert (1), Norbert H. Menzler (1), Olivier Guillon (1,2); (1) Forschungszentrum Jülich GmbH, Institute of Energy and Climate Research, Materials Synthesis and Processing (IEK-1); Jülich/Germany; (2) RWTH Aachen University, Institute of Mineral Engineering (GHI), Department of Ceramics & Refractory Materials; Aachen/Germany;
- Development of Protonic Ceramic Electrochemical Cells (PCECs) at Idaho National Laboratory (B0906)**
Dong Ding, Hanping Ding, Wei Wu; Idaho National Laboratory; Idaho Falls/USA;

12:30 Lunch - 2nd Floor on the Terrace / Coffee - Ground Floor in the Exhibition & 1st Floor in the Poster Area

13:15 A10: Poster Session II covering All Session Topics + **B09s: Co-Electrolysis & CO₂-Electrolysis**

Auditorium Foyer

15:00 A11: System Design, Performance & BoP

- 15:00 **Ammonia SOFC System Development (A1101)**
Bernd Reiter, Martin Hauth, Raphael Neubauer, Clemens Mair, Markus Reinbacher
AVL List GmbH; Graz/Austria;
- 15:15 **Progress in the development of LNG and Diesel-fueled SOFC systems for maritime applications (A1102)**
Jan Hollmann (1), Marco Fuchs (1), Elmar Pohl (2), Oliver Heymann (2), Carsten Spieker (3), Ulrich Gardemann (3), Michael Steffen (3), Stephan Kabelac (1)
(1) Institute of Thermodynamics, Leibniz University Hannover; Hannover/Germany
(2) OWI Science for Fuels gGmbH; Herzogenrath; (3) Zentrum für BrennstoffzellenTechnik (ZBT GmbH); Duisburg;
- 15:30 **Experimental results of a 10/40 kW rSOC lab system (A1103)**
Roland Peters, Nicolas Kruse, Wilfried Tiedemann, Ingo Hoven, Robert Deja, Qingping Fang, Ralf Peters
Forschungszentrum Jülich GmbH; Institute of Energy and Climate Research; Jülich/Germany;
- 15:45 **Highly efficient SOFC system with CFY-stack module operated with gasified biomass - HiEff-BioPower - (A1104)**
Martin Hauth (1), Ortwin Dumböck (1), Christopher Sallai (1), Stefan Megel (2), Jens Schnetter (2), Mihails Kusnezoff (2), Klaus Supancic (3), Thomas Brunner (3), Ingwald Obernberger (3)
(1) AVL List GmbH; Graz/Austria; (2) Fraunhofer IKTS; Dresden/Germany; (3) BIOS BIOENERGIESYSTEME GmbH; Graz/Austria;

B11: Lifetime Cells II

- Electrochemical and degradation behaviour of Ni-GDC electrode under steam-, co- and CO₂-electrolysis (B1101)**
Ifeanyi Chukwu D. Unachukwu (1,2), Vaibhav Vibhu (1), Jan Uecker (1,2), Izaak C. Vinke (1), Rüdiger-A. Eichel (1,2), L.G.J. (Bert) de Haart (1)
(1) Institute of Energy and Climate Research, Fundamental Electrochemistry (IEK-9); Forschungszentrum Jülich GmbH, Jülich/Germany
(2) Institute of Physical Chemistry, RWTH Aachen University; Aachen/Germany;
- A systematic analysis of the durability behavior of Ni/CGO-based electrolyte-supported cells in co-electrolysis (B1102)**
Matthias Riegraf (1), Noriko Sata (1), Chen-Yu Tsai (2), Mariana Heringer Boucas (2), Christian Geipel (2), Rémi Costa (1)
(1) German Aerospace Center (DLR), Institute of Engineering Thermodynamics; Stuttgart/Germany
(2) Sunfire GmbH, Dresden/Germany;
- Modeling of Ni Migration in Ni-YSZ Electrodes During Solid Oxide Electrolysis (B1103)**
Qian Zhang, Peter W Voorhees, Scott A Barnett
Northwestern University; Evanston/USA;
- Microstructures of Ni-GDC electrodes with carbon deposition (B1104)**
Anna Sciazko (1), Yosuke Komatsu (1), Akiko Nakamura (2), Yusuke Sunada (1), Zhufeng Ouyang (1), Toru Hara (2), Naoki Shikazono (1)
(1) Institute of Industrial Science, The University of Tokyo; Tokyo/JAPAN;
(2) National Institute for Material Science, Tsukuba/JAPAN;

16:00 Break - Ground Floor in the Exhibition & 1st Floor in the Poster Area

16:30 A12: Cells Design & Manufacturing I

- 16:30 **Metal-Supported Solid Oxide Cells for Chemical Conversion, Electrolysis, and Power Production (A1201)**
Michael Tucker, Boxun Hu, Martha Welander, Fengyu Shen, Grace Lau
Lawrence Berkeley National Laboratory; CA/USA;
- 16:45 **Influence of substrate nature on electrochemical performance of electrolyte supported cells for operation as SOFC/SOEC (A1202)**
Nikolai Trofimenko, Sindy Mosch, Mihails Kusnezoff; Fraunhofer IKTS, Dresden/Germany
- 17:00 **Innovative architectural oxygen electrodes for solid oxide cells using electrostatic spray deposition (A1203)**
Elisabeth Djurado (1), Rakesh Sharma (1), Özden Çelikbilek (1), Nur I. Khamidy (1,2), Lydia Yefsah (1,2), Jérôme Laurencin (2); (1) Univ. Grenoble Alpes, Univ. Savoie Mont Blanc, CNRS, Grenoble/France; (2) Univ. Grenoble Alpes, CEA, LITEN, DTCH, Grenoble/France;
- 17:15 **Progress in the development of metal-supported-cell architecture with proton conducting ceramics (A1204)** Rémi Costa, Haoyu Zheng, Feng Han, Matthias Riegraf, Noriko Sata;
German Aerospace Center, Institute of Engineering Thermodynamics Electrochemical Energy Technology; Stuttgart/Germany;
- 17:30 **Development of high-flexible SOFCs via phase-controlled YSZ for high performance and mechanical durability (A1205)**
Bo-Ram Won, Jae-ha Myung
Department of Materials Science and Engineering, Incheon National University;
Incheon/Republic of Korea;
- 17:45 **Status of Solid Oxide Cell development at TNO (A1206)**
Frans van Berkel, Manoj Shinde, Claire Ferchaud
TNO; Petten/The Netherlands;



18:00 End of Sessions

19:15 Dinner on the Lake

B12: Interconnects, Coatings, Contact Layers & Sealants

- (Co,Cu,Mn)₃O₄ contact layers: their mechanical, electrical and Cr retention properties (B1201)**
Claudia Goebel (1), Yousef Alizad Farzin (1), Ilaria Ritucci (1), Mareddy Reddy (2), Jan Froitzheim (2), Ragnar Kiebach (1), Henrik Lund Frandsen (1);
(1) DTU Energy, Technical University of Denmark; Kongens Lyngby/ Denmark;
(2) Energy and Materials, Chalmers University of Technology; Gothenburg/Sweden
- Stability of glass ceramic sealants in atmospheres with increased water contents (B1202)**
Axel Rost (1), Jochen Schilm (1), Hassan Javed (2), Kai Herbrig (2)
(1) Fraunhofer IKTS, Dresden/Germany; (2) sunfire GmbH; Dresden/Germany;
- Sintering of cobalt free coatings for prevention of chromium poisoning in Solid Oxide Fuel Cells (B1203)** Justyna Ignaczak (1), Sebastian Molin (1), Ming Chen (2) Piotr Jasiński (1); (1) Faculty of Electronics, Telecommunications and Informatics, Gdańsk University of Technology; Gdańsk/Poland; (2) Department of Energy Conversion and Storage, Technical University of Denmark; Fysikvej, Lyngby/Denmark;
- Diffusion barrier coatings against the dual atmosphere effect on IT-SOFCs (B1204)**
Matthieu Tomas, Alberto Visibile, Jan-Erik Svensson, Jan Froitzheim
Energy and Materials, Chalmers University of Technology; Gothenburg/Sweden;
- Design and characterization of improved glass sealant-interconnect interfaces in reversible solid oxide cells (B1205)** Federico Smeacetto (1), Hassan Javed (2), Elisa Zanchi (1), Chiara Bert (3), Domenico Ferrero (3), Christian Walter (2), Massimo Santarelli (3);
(1) Department of Applied Science and Technology (DISAT), Turin/Italy; (2) Sunfire GmbH; Dresden/Germany; (3) Department of Energy (ENERG), Turin/Italy;
- Co-Sintering of Spinel-Based Coating/Contact Dual-Layer Structure for SOFC Cathode-Side Application (B1206)** Yutian Yu (1), Fupeng Cheng (1), Yue Lu (1), Chengzhi Guan (1,2), Jianqiang Wang (1,2); (1) Shanghai Institute of Applied Physics, Chinese Academy of Sciences.; Shanghai/PR China; (2) Dalian National Laboratory for Clean Energy, Chinese Academy of Sciences.; Liaoning Province/PR China;

Boarding 19.20 - Lake side of KKL pier 5/6 - Departure 19.30
Back 23.00 (short stop in Brunnen 22.30 for return by train)

09:00 A13: Keynote - H₂ production paths and the future H₂ mix

- 09:00 **K7: The various H₂ production paths and their expected importance in the future mix (A1301)**
Sebastian Mayer McKinsey & Company, Inc. München/Germany

09:15

B13: Cells Design & Manufacturing II

- Analysis of ceramic nanocomposite fuel cell fabricated through a hybrid of 3D printing and laser scribing (B1301)**
Muhammad Imran Asghar (1,2), Peter Lund (1)
(1) New Energy Technologies Group, Department of Applied Physics, Aalto University School of Science; Espoo/Finland;
(2) Faculty of Physics and Electronic Science, Hubei University; Hubei/China;
- Metal exsolved electrode infiltrated in 8YSZ electrolyte with porous scaffold produced by hybrid 3D printing (B1302)**
Maritta Lira (1), Natalia Kostretsova (1), Simone Anelli (1), Alex Morata (1), Marc Torrell (1), Albert Tarancón (1,2)
(1) IREC, Catalonia Institute for Energy Research; Barcelona/Spain;
(2) ICREA; Barcelona/Spain;

09:30 A14: Other Fuels

- 09:30 **Ammonia as a fuel for SOFCs - Cracking kinetics of ammonia over Ni/YSZ (A1401)**
Claudia Goebel (1), Omid Babaie Rizvandi (1), John Bøgild Hansen (2), Henrik Lund Frandsen (1), Anke Hagen (1), Peter Vang Hendriksen (1)
(1) DTU Energy, Technical University of Denmark; Kongens Lyngby;
(2) Haldor Topsoe A/S; Kongens Lyngby;

- 09:45 **Ammonia fueled SOFC for shipping – The Aegir project (A1402)**
Anke Hagen, Riccardo Caldogno, Xiufu Sun
Technical University of Denmark, DTU Energy; Lyngby/Denmark;

B14: Lifetime Assessment & Advanced Characterisation

- Local investigation of a segmented reversible-SOC: Performance mapping and durability analysis supported by electrochemical modelling and post-mortem characterization (B1401)**
Hamza Moussaoui (1), Audrey Wesoly (1), Stefan Diethelm (1,2), Gerald Hammerschmid (1), Zacharie Willemin (2), Dario Montinaro (3), Jan Van herle (1)
(1) Group of Energy Materials, École Polytechnique Fédérale de Lausanne/Switzerland;
(2) SOLIDpower SA, Yverdon-les-Bains/Switzerland;
(3) SOLIDpower S.p.A., Mezzolombardo/Italy;
- X-Ray synchrotron nanoprobe characterization of diffusion barrier layers for avoiding degradation in SOFCs aged for 14000h (B1402)**
Lucile Bernadet (1), Jaime Segura (2), Dario Montinaro (3) Marc Torrell (1), Alex Morata (1), Albert Tarancón (1,4)
(1) IREC, Catalonia Institute for Energy Research, Dept of Advanced Materials for Energy Applications; Barcelona/Spain;
(2) ID16B, European Synchrotron (ESRF); Grenoble/France;
(3) SOLIDPower SpA, Mezzolombardo/Italy;
(4) ICREA, Barcelona/Spain;

10:00 **Effect of metal dopants (Sn, Ag, Cu) on the electrochemical performance and carbon resistance of the biogas operated IT-SOFC anodes (A1403)**
Zeyu Jiang, Kun Zhang, Abigail Snowdon, Ahmad El-kharouf, Robert Steinberger-Wilckens
Centre for Fuel Cell and Hydrogen Research, School of Chemical Engineering; University of Birmingham, Birmingham/UK;

10:15 **Impedance analysis of chlorine poisoning on nickel-ceria anode of solid oxide fuel cell operated in H₂ and biogas (A1404)**
M.J. Escudero, J.L. Serrano, T. González-Ayuso
Energy Department, CIEMAT; Madrid/Spain;

Nanoscale X-ray absorption spectroscopy at the Ni K-edge on solid oxide electrolysis cell (B1403)
Aline Léon (1), Julie Villanova (2), Annabelle Brisse (1) Sabine Schlabach(3)
(1) European Institute for Energy Research; Karlsruhe/Germany;
(2) ESRF –The European Synchrotron; Grenoble/France;
(3) Karlsruhe Institute for Technology, Institute for Applied Materials, Karlsruhe Nano Micro Facility and Institute of Nanotechnology, Eggenstein-Leopoldshafen/Germany

Modelling and experimental investigation of a reversible SOC using Total Harmonic Distortion Analysis as an advanced online monitoring tool (B1404)
Gerald Hammerschmid (1, 2), Hamza Moussaoui (1), Vanja Subotić (2), Jan Van herle (1)
(1) Group of Energy Materials; École Polytechnique Fédérale de Lausanne/Switzerland;
(2) Institute of Thermal Engineering, Graz University of Technology, Graz/Austria;

10:30 Break - Ground Floor in the Exhibition

Morning - Luzerner Saal

Friday, 8 July 2022

Auditorium - Morning

11:00 A15: SOC Integration & Energy System Perspectives

11:00 **Comprehensive electrochemical analysis of a 150 kW reversible SOC system installed at a power plant Mellach in Austria (A1501)**
Vanja Subotić (1), Benjamin Königshofer (1), Michael Höber (1), Christoph Hochenauer (1), Markus Koroschetz (2), Martin Hochfellner (2), Jörg Brabandt (3), Jens Baumgartner (3)
(1) Institute of Thermal Engineering, Graz University of Technology; Graz/Austria;
(2) VERBUND Thermal Power GmbH; Wildon/Austria;
(3) Sunfire GmbH; Dresden/Germany;

B15: Advanced Characterisations

A SOFC working in an Environmental Transmission Electron Microscope (B1501)
Q. Jeangros (1), M. Bugnet (2), T. Epicier (2,3) C. Frantz (4) S. Diethelm (4), D. Montinaro (5), E. Tyukalova (6), Y. Pivak (7), J. Van herle (4), A. Hessler-Wyser (1), M. Duchamp (6,8)
(1) Photovoltaics and Thin-Film Electronics Laboratory (PVLab), École Polytechnique Fédérale de Lausanne (EPFL); Neuchâtel/Switzerland;
(2) Univ Lyon, CNRS, INSA-Lyon, UCBL, MATEIS, Villeurbanne/France;
(3) Univ Lyon, UCBL, IRCELYON, Villeurbanne/France;
(4) Group of Energy Materials (GEM), École Polytechnique Fédérale de Lausanne (EPFL), Sion/Switzerland;
(5) SOLIDpower S.p.A., Mezzolombardo/Italy;
(6) Lab. for in situ & operando Electron Nanoscopy, School of Mater. Sci. and Engineer., Nanyang Technological University (NTU), Singapore;
(7) DENSSolutions, Delft/The Netherlands;
(8) MajuLab, International Joint Research Unit UMI 3654, CNRS, Université Côte d'Azur, Sorbonne Université, National University of Singapore, NTU, Singapore;

- 11:15 **Wind2Hydrogen via solid oxide electrolysis (A1502)**
Ming Chen (1), Jens Høgh (1,2), Peter Blennow (2), Xiufu Sun (1), Yi Zong (3)
(1) Department of Energy Conversion and Storage, Technical University of Denmark; Lyngby/Denmark;
(2) Haldor Topsøe, Lyngby/Denmark;
(3) Department of Electrical Engineering, Technical University of Denmark; Lyngby/Denmark;
- 11:30 **Demonstration and Scale-Up of High-Temperature Electrolysis Systems (A1503)**
Konstantin Schwarze (1), Oliver Posdziech (1), Simon Kroop (2)
(1) Sunfire GmbH; Dresden/Germany;
(2) Salzgitter Mannesmann Forschung GmbH; Salzgitter/Germany;
- 11:45 **Operation strategy of the four-type energy supply system with SOFC: Focusing on CO₂ enrichment for smart-farm application (A1504)**
Gwangwoo Han (1), Kyoung-Ho Lee (1), Wang-Je Lee (1), Young-Sub Ahn (1), Hong-Jin Joo (1), Jong-Eun Hong (2)
(1) Renewable Heat Integration Laboratory, Korea Institute of Energy Research; Daejeon/South Korea;
(2) Fuel Cell Laboratory, Korea Institute of Energy Research, DaejeonSouth/Korea;
- 12:00 **Process Development of Synthetic Liquid Fuel Production with Solid Oxide Electrolysis Cell and FT synthesis (A1505)**
Yohei Tanaka (1), Tomohiro Ishiyama (2), Katsuhiko Yamaji (2)
National Institute of Advanced Industrial Science and Technology (AIST):
(1) AIST East, Ibaraki/Japan;
(2) AIST Central 5, Ibaraki/Japan;
- 12:15 **Optimal design of SOFC-based cogeneration systems for the building sector (A1506)**
Paolo Marocco, Marta Gandiglio, Massimo Santarelli
Department of Energy, Politecnico di Torino; Torino/Italy;
- Study of the oxygen diffusion behaviour of (La_{0.8}Sr_{0.2})_{0.95}Cr_{0.5}Fe_{0.5}O_{3-δ} A-site deficient perovskite oxides in humid conditions (B1502)**
Zijie Sha, Eleonora Cali, Zonghao Shen, Ecaterina Ware, Gwilherm Kerherve, Stephen J. Skinner
Department of Materials; Imperial College London, London/UK.;
- Oxygen diffusion and surface exchange coefficients determined under high pressure: Comparisons between oxygen deficient vs. oxygen over-stoichiometric air electrode materials (B1503)**
Jérôme Laurencin (1), Aurélien Flura (2), Giuseppe Sdanghi (1,2), Sébastien Fourcade (2), Vaibhav Vibhu (3), Jean-Paul Salvetat and Jean-Marc Bassat (4)
(1) CEA Grenoble, DRT/LITEN/DTBH/SCSH, Grenoble/France;
(2) CNRS, Univ. Bordeaux, Pessac/France;
(3) Institute of Energy / Climate Research, IEK-9, FZJ GmbH, Jülich/Germany;
(4) CNRS, Placamat, UMS 3626, 33600 Pessac/France;
- Investigation of a solid oxide electrolysis cell poisoned by sulfur using lock-in thermography (B1504)**
Guillaume Jeanmonod (1), Jan Van herle (2)
(1) Hydro-Québec Research Institute (IREQ); Varennes/Canada;
(2) Group of Energy Materials, Faculty of Engineering Science; Sion/Switzerland;
- Development of La_{0.35}Sr_{0.55}Ti_{0.95}Ni_{0.05}O_{3-δ} model electrodes and characterization with EIS and NAP-XPS (B1505)**
Mait Ainsar (1), Kuno Kooser (2), Margus Kodu (2), Glen Kelp (2), Tavo Romann (1), Enn Lust (1), Gunnar Nurk (1)
(1) Institute of Chemistry, University of Tartu.; Tartu/Estonia;
(2) Institute of Physics, University of Tartu.; Tartu/Estonia;
- Current interruption technique for the investigation of solid electrolyte electrolysis cells (B1506)**
Marina Bockelmann; CUTEC Clausthal Research Center for Environmental Technologies, TU Clausthal; Clausthal-Zellerfeld/Germany;

12:30 Lunch & Coffee - 2nd Floor on the Terrace & still open the Poster Area on the 1st Floor

13:30 A16: Products, Demonstration & Novel Concepts

- 13:30 **Large Stack Module and System Development for SOFC, SOE and Reversible Operation in Industrial Processes (A1601)**
Zacharie Wuillemin (1), Florian Waeber (1), Cédric Beetschen (1), Yannik Antonetti (1), Fabrice Schärer (1), Florian Denève (1), Thierry Cornu (1), Gabriele Proserpi (1), Antonello Nesci (1), Massimo Bertoldi (2); (1) SOLIDpower SA; Yverdon-les-Bains/Switzerland; (2) SOLIDpower SpA; Mezzolombardo/Italy;
- 13:45 **Evaluation of a hybrid SOFC & battery genset for cruise ship applications (A1602)**
Matthias Metten (1), Santiago Salas Ventura (1), Dirk Ullmer (1), Marc P. Heddrich (1), Cem Ünlübayir (2), Stefan Diethelm (3), S. Asif Ansar (1); (1) German Aerospace Center (DLR), Institute of Engineering Thermodynamics; Stuttgart; (2) RWTH Aachen University, Institute for Power Electronics and Electrical Drives (ISEA), Chair for Electrochemical Energy Conversion and Storage Systems; Aachen; (3) SOLIDpower SA; Yverdon-les-Bains;
- 14:00 **C2FUEL Solid Oxide Electrolyser Demonstration System (A1603)**
Timo Lehtinen, Matti Noponen
Elcogen; Vantaa/Finland;
- 14:15 **Electrothermal balanced operation - A new operation method for improved SOEC performance (A1604)**
Søren Højgaard Jensen (1,2), Anne Lyck Smits huysen (1), Samuel Simon Araya (2), Simon Lehnart Sahlin (2), Xiaoti Cui (2), Chris Graves (3), Theis Løye Skafte (3), Henrik Lund Frandsen (4), Omid Babaie Rizvandi (4), Anne Hauch (4), Mogens Mogensen (4), John Bøggild Hansen (5) (1) DynElectro ApS; Sjælland; (2) AAU, Department of Energy. Aalborg/Denmark; (3) Noon Energy Inc. CA/USA; (4) DTU, Department of Energy; (5) Haldor Topsoe A/S. Lyngby/Denmark;
- 14:30 **Results of 200kw SOFC power generation using biomethane gas from wastewater treatment process (A1605)**
Kimito Kawamura (1,2), Toshihiro Oshima (2), Tsutomu Kawabata (2), Shunsuke Taniguchi (2), Tomomasa Kanda (1), Kazunari Sasaki (2); (1) Asahi Quality and Innovations Ltd.; (2) Kyushu University Next-Generation Fuel Cell Research Center; Fukuoka-shi/Fukuoka/JAPAN;

B16: Material Modelling

- Reaction mechanisms of mixed ionic and electronic conductors used as oxygen electrodes in Solid Oxide Cell: focus on $\text{La}_{1-x}\text{Sr}_x\text{Co}_{y-1}\text{Fe}_y\text{O}_{3-\delta}$ and $\text{La}_2\text{NiO}_{4+\delta}$ (B1601)**
Lydia Yefsah (1,2), Giuseppe Sdanghi (2,3), Giuseppe Sassone (2), Jean-Marc Bassat (3), Maxime Hubert (2), Elisabeth Djurado (1), Jérôme Laurencin (2)
(1) Univ. Grenoble Alpes, CNRS, LEPMI, Grenoble/France; (2) Univ. Grenoble Alpes, CEA-Liten, DTCH, Grenoble/France; (3) CNRS, Univ. Bordeaux, ICMCB, Pessac/France;
- Microstructural optimization of the hydrogen electrode for solid oxide cells by a multiscale modelling approach (B1602)**
Manon PRIOUX (1), Eduardo DA ROSA SILVA (1), Maxime HUBERT (1), Julien VULLIET (2), Jérôme LAURENCIN (1)
(1) Univ. Grenoble Alpes – CEA/LITEN, Grenoble/France;
(2) CEA, DAM, Le Ripault, Monts/France;
- Development of a Fluid-Electrochemo-Stress Coupled Simulation Method for SOFC Degradation Prediction (B1603)**
Mayu Muramatsu (1), Masami Sato (2), Reika Nomura (3), Kenjiro Terada (3), Keiji Yashiro (4), Tatsuya Kawada (4), Harumi Yokokawa (5); (1) Department of Mechanical Engineering, Keio University; Yokohama/Japan; (2) Graduate School of Engineering, Tohoku University; Sendai/Japan; (3) International Research Institute of Disaster Science, Tohoku University; Sendai/Japan; (4) Graduate School of Environmental Studies, Tohoku University; Sendai/Japan; (5) Institute of Industrial Science, the University of Tokyo; Tokyo/Japan;
- Advanced linkage of multi-physics modelling towards experimental impedance spectroscopy (B1604)**
Julian Taubmann, Xiufu Sun, Omid Babaie Rizvandi, Henrik Lund Frandsen
Department of Energy Conversion and Storage, Technical University of Denmark; Lyngby/Denmark;
- DFT study on elementary reaction pathways for $\text{La}_{1-x}\text{Sr}_x\text{Co}_{1-y}\text{Fe}_y\text{O}_3$ electrode material (B1605)**
Cintia Hartmann (1,2,3), Grégory Geneste (1,2), Jérôme Laurencin (3)
(1) CEA, Arpajon/France;
(2) Université Paris-Saclay, CEA, Laboratoire Matière en Conditions Extrêmes; Bruyères-le-Châtel/France; (3) Univ. Grenoble Alpes - CEA/LITEN; Grenoble/France;

14:45 Commercial-scale SOFC systems (ComSos) (A1606)

Jari Kiviahio (1), Aki Nieminen (1), Markus Münch (2), Florian Waeber (3), Stefano Modena (4) Massimo Santarelli (5), Marta Gandiglio (5), Jeroen Buunk (6), Arjen de Jong (6), Tuomas Hakala (7)

(1) VTT Technical Research Centre of Finland Ltd, Espoo/Finland;
(2) Sunfire GMBH, (3) SolidPower SA, (4) SolidPower SpA;

Modelling of an RSOC with Open Source Tools (B1606)

Maximilian Hauck (1), Stephan Herrmann (1), Burak Polat (1), Benjamin Steinrücken (1), Luis Poblitzki (1), Felix Fischer (1), Jeremias Weinrich (2), M. Gaderer (2), Hartmut Spliethoff (1) (1) Technical University of Munich, Chair of Energy Systems; Garching/Deutschland;
(2) Technical University of Munich, Regenerative Energy Systems; Straubing/Deutschland;

15:00 5 Min to change from Session B16 to Luzerner Saal for Plenary Session A17

Afternoon - Luzerner Saal

Friday, 8 July 2022

**15:05 A17 - P2: Closing Ceremony
Keynote by the EFCF Gold Medal of Honour Winner 2022****15:05 Summary by the Chairs (A1701)**

Julie Mougín, Jérôme Laurencin
CEA-Liten, Grenoble/France

15:20 Information on Next EFCF:

EFCF 2024 16th European SOFC & SOE Forum

EFCF 2023 10th FC, Electrolyser & H₂ Processing Forum (A1702)

Michael Spirig (1), Albert Tarancón Chair 2024 (2), Olivier Bucheli (1)

(1) European Electrolyser & Fuel Cell Forum, Lucerne/Switzerland;
(2) IREC Catalonia Institute for Energy Research, Sant Adrià de Besòs/Espanien

15:30 Christian Friedrich Schönbein Award

for the Best Poster, Best Science Contribution, Medal of Honour (A1703)

Jérôme Laurencin, Julie Mougín
CEA-Liten, Grenoble/France

15:40 K8: Advanced tools and concepts for investigating electrode kinetics in SOCs (A1704)

Jürgen Fleig, EFCF Gold Medal of Honour Winner 2022
Institute of Chemical Technologies and Analytics, TU Wien, Vienna/Austria

16:05 Thank you and Closing by the Organizers (A1705)

Olivier Bucheli, Michael Spirig
European Electrolyser & Fuel Cell Forum, Luzern/Switzerland

16:15 End of Sessions - End of Conference

Good bye coffee and travel refreshment in front of the Luzerner Saal

Solid Oxide Technologies

Fuel Cells**EFCF** 2024

Lucerne Switzerland 2 - 5 July

Electrolysers & Electroch. Reactors**CO₂ Emission Reduction & Reuse**

**Come Back
as an Author**

Poster List

A04: Poster Session I

A10: Poster Session II

covering All Session Topics + **B09s: Co-Electrolysis & CO₂-Electrolysis**

Wednesday, 6 July 2022

Thursday, 7 July 2022

Auditorium Foyer

Afternoon 13.15 - 15:00

Afternoon 13.15 - 15:00

A03: Technology status at industry I

Test beds, Tools and Instruments for Advanced SOFC Research and Development (A0307)

Vikrant Venkataraman

Instrumentation & Test Systems Department, Fuel Cell Business Unit, AVL List GmbH; Graz/Austria

Fuel Cell Innovations: An example of strategic industrial cooperation between Asia and the MENA region for the industrialization of hydrogen and fuel cells. (A0308)

Tae-Won Lee

Fuel Cell Innovations; Daejeon/South Korea;

Current status of Ceres electrolysis programme (A0309)

Per Hjalmarsson, Jon Harman, Amin Zerfa, Chandra Mackuley, Ian Methley, Hacib Benaissa, Caroline Hargrove

Ceres Power, Horsham/United Kingdom

A06: Technology status at industry III + Projects Overview

Performance and durability of 3YSZ electrolyte supported cell and stack operated in steam electrolysis and co-electrolysis (A0607)

Aline Léon, Cahit Benel, Alexandria Dritschler

European Institute for Energy Research; Karlsruhe/Germany;

SOFC stack development at INER (A0608)

Hung-Hsiang Lin (1), Szu-Han Wu (1), Yi-Jing Wu (1), Chun-Liang Chang (1), Yung-Neng Cheng

(1), Chien-Kuo Liu (1), Ruey-yi Lee (1), Wei-Hsun Hsu (2), Hwei-Long Lee (2)

(1) Institute of Nuclear Energy Research; Taoyuan City/Taiwan (R.O.C.);

(2) Porite Taiwan Co., Ltd.; Miaoli County/Taiwan (R.O.C.);

B02: Fuel Electrodes

Influence of La-Sr balance and A-site deficiency on surface chemistry of (La_{1-y}Sr_y)_xCr_{0.5}Mn_{0.45}Ni_{0.05}O_{3-d} solid oxide cell electrode (B0207)

Indrek Kivi (1), Ove Korjus (1), Jaan Aruväli (2), Priit Möller (1) Gunnar Nurk (1)

(1) Institute of Chemistry, University of Tartu.; Tartu/Estonia;

(2) Institute of Ecology and Earth Sciences, University of Tartu.; Tartu/Estonia;

Physical and Electrochemical Characterization of La_{0.25}Sr_{0.25}Ca_xTi_{0.95}Ni_{0.05-y}Sn_yO_{3-δ} (x = 0.40, 0.45; y = 0...0.05) Solid Oxide Cell Fuel Electrodes (B0208)

Martin Maide (1), Jaan Aruväli (2), Marian Külaviir (2), Enn Lust (1), Gunnar Nurk (1)

(1) Institute of Chemistry, University of Tartu.; Tartu/Estonia;

(2) Institute of Ecology and Earth Sciences, University of Tartu.; Tartu/Estonia;

Synergistically improved in-situ exsolution catalyst via NiFe alloy nano particles on perovskite electrode scaffold (B0209)

Hyeongwon Jeong, Jae-ha Myung

Dept. Materials science and engineering, Incheon national university; Incheon/South Korea;

Influence of dopants on contact resistance in AS-SOFCs between doped ceria & YSZ (B0210)

Alexander Schwiers, Christian Lenser, Olivier Guillon, Norbert H. Menzler

Forschungszentrum Jülich GmbH, Institute of Energy and Climate Research (IEK), IEK-1: Materials

Synthesis and Processing; Juelich/Germany;

Ammonia fuelled-Solid Oxide Fuel Cells:

Architecture for suitable anode based on Ni exsolution in titanate (B0211)

Jonathan Cavazzani (1), Enrico Squizzato (1), Elena Brusamarello (1), Antonella Glisenti (1,2)

(1) Department of Chemical Sciences, University of Padova; Padova/Italy;

(2) CNR-ICMATE, Padova/Italy;

EFCF 2023

4 - 7 July

Lucerne

Switzerland

Low

Temperature

Fuel Cells, Electrolysers & H₂ Processing

A08: Lifetime Stacks

Combining SOEC and biomass gasification for synthesis of methanol; use of purge gases on the oxygen electrode and their impact on cell durability (A0807 = A0803)

Peter V. Hendriksen (1), Belma Talic (1,2), Jens V. T. Høgh (1,3), P. Blennow (3), R. Küngas (3), M. Chen (1) X. Sun (1), J. Ahrenfeldt (4), U. B. Henriksen (4), W.-R. Kiebach (1)
 (1) Department of Energy Conversion and Storage, Technical University of Denmark;
 (2) Sintef, Department of Sustainable Energy Technology, Norway ;
 (3) Haldor Topsøe A/S, Denmark;
 (4) DTU Chemical Engineering, Technical University of Denmark;

Experimental Report on Galvanostatic Operation of Electrolyte-Supported Stacks for High Temperature Electrolysis (A0808)

Jerome Aicart (1), Lionel Tallobre (1), Alexander Surrey (2), Denis Reynaud (1), Julie Mougin (2)
 (1) Univ. Grenoble Alpes, CEA, Liten, Grenoble/France; (2) Sunfire GmbH, Dresden/Germany;

PVD Gd-doped Ceria Layers for Electrolyte Supported SOCs: Stack Test (A0809)

Feng Han (1), Michael Lang (1), Patric Szabo (1), Christian Geipel (2), Christian Walter (2), Rémi Costa (1)
 (1) Institute of Engineering Thermodynamics, German Aerospace Center (DLR); Stuttgart/Germany;
 (2) Sunfire GmbH; Dresden/Germany;

Long-term Degradation Analysis of SOFC Performance (2) (A0810)

Koichi Asano, Takumi Imabayashi, Akifumi Ido, Hiroshi Morita, Tohru Yamamoto, Yoshihiro Mugikura; Central Research Institute of Electric Power Industry (CRIEPI); Kanagawa/Japan;

A09: Performance Cell/Stack

The influence of LSCF sintering atmosphere on the formation of impurity phases and stack performance (A0907)

Christian Dellen (1), Qingping Fang (1), Nikolaos Margaritis (2), Michael Müller (1), Norbert H. Menzler (1)
 (1) Forschungszentrum Jülich GmbH, Institute of Energy and Climate Research (IEK); Jülich/Germany;
 (2) Forschungszentrum Jülich GmbH, Central Institute of Engineering, Electronics and Analytics; Jülich/Germany;

A11: System Design, Performance & BoP

Pre-reforming of liquid fuels for utilization in commercial SOFC systems (A1107)

Tobias Schiek, Elmar Pohl
 OWI Science for Fuels gGmbH; Herzogenrath/Germany;

Exsolution of Ni-Ru bimetallic nanoparticles from A-site deficient lanthanum nickel ruthenium double perovskites (B0212)

Jia Guo (1), Rongsheng Cai (2), Stephen J Skinner(1)
 (1) Department of Materials; Imperial College London, London/UK;
 (2) Department of Materials; University of Manchester, Manchester/UK;

Nickel free fuel electrodes for CO₂ electrolysis (B0213)

Veronika Rečková (1,2), Ivar Wærnhus (1), Nelson Thambiraj (1), Maria-Eleftheria Farnaki (3), Kalliopi-Maria Papazisi (3), Dimitrios Tsiplakides (3), Stella Balomenou (3) Brandon Buerger (4)
 (1) Clara Venture Labs, Bergen/Norway;
 (2) Department of Inorganic technology, UCT Prague, Prague 6/Czech Republic;
 (3) Chemical Process and Energy Resources Institute, Centre for Research and Technology Hellas (CPERI-CERTH), Thessaloniki/Greece;
 (4) European Space Agency (ESA), Noordwijk/The Netherlands;

Finding the optimum loading of Au & Mo in NiO/GDC and the influence of Fe for the reversible operation of solid oxide cells (B0214)

Fotios Zaravelis (1,2), Stylianos G. Neophytides (1), Dimitrios K. Niakolas (1)
 (1) Foundation for Research and Technology, Institute of Chemical Engineering Sciences (FORTH/ICE-HT); Patras/Greece;
 (2) Department of Chemical Engineering, University of Patras, Greece;

Exsolution of palladium nanoparticles from A-site layered double perovskite PrBaMn₂O_{5+δ} (B0215)

Ritika Vastani, Eleonora Cali, Sivaprakash Sengodan, Stephen J. Skinner
 Imperial College London; London/UK.;

B03: Fuel & Oxygen Electrodes

The European project NewSOC

Next Generation Solid Oxide Fuel Cell and Electrolysis Technology at midterm (B0307)

Anke Hagen (1), Jerome Laurencin (2), Julien Vulliet (3), Nunzia Coppola (4), Luigi Maritato (4), Pierpaolo Polverino (4), Giovanni Carapella (5), Fotios Zaravelis (6), Charalampos Neofytidis (6), Evangelia Ioannidou (6), Stylianos Neophytides (6), Dimitrios K. Niakolas (6), Stella Balomenou (7), Dimitrios Tsiplakides (7), Kalliopi-Maria Papazisi (7), Claire Ferchaud (8), Frans van Berkel (8);
 (1) Fysikvej B., Lyngby/Denmark; (2) Univ. Grenoble Alpes, CEA/LITEN, Grenoble/France; (3) CEA/DAM, Monts/France; (4) Dipartimento di Ingegneria Industriale DIIN, Università degli Studi di Salerno, Fisciano(SA)/Italy; (5) Dipartimento di Fisica "E.R. Caianiello", Università degli Studi di Salerno, Fisciano(SA)/Italy; (6) Institute of Chemical Engineering Sciences, Foundation for Research and Technology-Hellas (FORTH-ICEHT), Patras/Greece; (7) Chemical Process and Energy Resources Institute/CERTH, Thessaloniki/Greece; (8) TNO, Netherlands Organization for Applied Scientific Research, Petten/The Netherlands;

Investigation on Additive Manufactured High Temperature Alloys for SOFC Components (A1108)

Dagmar Kuckelberg, Elmar Pohl; OWI Science for Fuels GmbH; Herzogenrath/Germany;

Solid oxide fuel cell – internal combustion engine hybrid system fueled by ammonia (A1109)

Minkyong Park, Wonjae Choi
Division of Mechanical and Biomedical Engineering, Ewha Womans University; Seoul/South Korea;

Solid Oxide Fuel Cell Systems for decentralized, hydrogen based power generation (A1110)

Bernd Reiter, Martin Hauth, Raphael Neubauer; AVL List GmbH, Graz/Austria;

Operation of Co-SOEC reactors for syngas production utilizing CO₂ from air (A1111)

Marius Tomberg (1), Marc P. Heddrich (1), Dirk Ullmer (1), S. Asif Ansar (1), K. Andreas Friedrich (1,2)

- (1) German Aerospace Center (DLR), Institute of Engineering Thermodynamics; Stuttgart;
- (2) University of Stuttgart, Institute for Building Energetics, Thermotechnology and Energy Storage; Stuttgart;

Advanced Sorbents for Desulfurization and Purification of Natural Gas, LPG and Biogas Feedstocks (A1112)

Gokhan Alptekin; SulfaTrap LLC; Colorado/United States;

From prototype, prove of concepts, towards reliable serial design and robust production processes for SOFC and SOEC Hot Balance of Plant systems. (A1113)

Jean-Paul Janssens (1), Michel Dubuisson (2)

- (1) R&D BOSAL Energy; Lummen/Belgium;
- (2) BOSAL Energy Conversion Industries; Vianen/The Netherlands;

Techno-economic evaluation of hydrogen production via solid oxide electrolyser powered by solar energy (A1114)

Yumeng Zhang (1), Ligang Wang (1), Jan Van herle (2)

- (1) Innovation Research Institute of Energy and Power, North China Electric Power University; Beijing/China;
- (2) Group of Energy Materials, Swiss Federal Institute of Technology in Lausanne; Sion/Switzerland;

Development and validation of a reversible prototype system to test 1.5 kW SOC stacks (A1115)

Lucile Bernadet (1), Lilia Sutac (1), James Zapata (2), Maria Serra (3),

Jaume Roqueta (2), Marc Torrell (1), Albert Tarancón (1,3)

- (1) IREC, Catalonia Institute for Energy Research, Dept of Advanced Materials for Energy Applications, Sant Adrià del Besòs;
- (2) AESA; (3) IRI, CSIC-UPCC, (4) ICREA, 08010 Barcelona/Spain

Investigation of LSF as an anode material for SOFC (B0308)

Buse Bilbey (1,2), M. Imran Asghar (2), Leyla Colakerol Arslan (3), Peter D. Lund (2), Aligul Büyükkaksoy (1)

- (1) Department of Materials Science and Engineering; Gebze Technical University, Gebze, Kocaeli/Turkey;
- (2) New Energy Technologies Group, Aalto University School of Science, Aalto, Espoo/Finland;
- (3) Department of Physics; Gebze Technical University, Gebze, Kocaeli/Turkey;

Pr- and Co-substitution in rare earth nickelates – application as SOEC air electrodes (B0309)

Andreas Egger, Sarah Eisbacher-Lubensky, Kathrin Sampl, Edith Bucher, Werner Sitte
Montanuniversitaet Leoben, Chair of Physical Chemistry; Leoben/Austria;

Innovative RF-sputtering technique for the realization of the cathode/electrolyte barrier layer on high performance large area industrial SOFCs (B0310)

- Nunzia Coppola (1), Hafiz Sami Ur Rehman (1), Pierpaolo Polverino (1), Giovanni Carapella (2), Dario Moninaro (3), Francesca Martinelli (3), Alice Galdi (1), Cesare Pianese (1), Luigi Maritato (1)
- (1) Dipartimento di Ingegneria Industriale DIIN, Università degli Studi di Salerno; Fisciano(SA)/Italy;
 - (2) Dipartimento di Fisica "E.R. Caianiello", Università degli Studi di Salerno; Fisciano(SA)/Italy;
 - (3) SOLIDpower S.p.A.; Mezzolombardo (TN)/Italy;

Investigation of infiltrated YSZ backbone electrodes at intermediate temperature range (B0311)

Bartosz Kamecki (1,2), Yun Xie (2), Xiaofeng Tong (2,3), Piotr Jasiński (1), Sebastian Molin (1), Ming Chen (2)

- (1) Laboratory of Functional Materials, Gdańsk University of Technology; Gdańsk/Polska;
- (2) Department of Energy Conversion and Storage, Technical University of Denmark; Lyngby/Denmark;
- (3) Innovation Research Institute of Energy and Power, North China Electric Power University, Beijing/China;

La₂NiO_{4+δ} Thin Films with Columnar Nanostructure for Enhanced Oxygen Exchange Kinetics (B0312)

Adeel Riaz (1,2), Alexander Stangl (1), Laetitia Rapenne (1), Carmen Jiménez (1), Michel Mermoux (2), Mónica Burriel (1)

- (1) Univ. Grenoble Alpes, CNRS, Grenoble/France;
- (2) Univ. Grenoble Alpes, Univ. Savoie Mont Blanc, 38000 Grenoble/France;

Investigation of the effect of modulated structure on ion transport in Mo doped LaNbO₄ (B0313)

Yidong Han, Stephen Skinner;

Department of Materials; Exhibition Road, Imperial College London, London/UK;

A12: Cells Design & Manufacturing I

Monolithic Solid Oxide Cells by 3D printing (A1207)

Natalia Kostretsova (1), Simone Anelli (1), Marc Nuñez (1), Alex Morata (1), Marc Torrell (1), Albert Tarancón (1,2)

- (1) Catalonia Institute for Energy Research; Barcelona/Spain;
(2) ICREA; Barcelona/Spain;

ReScale: Large scale manufacturing of Solid Oxide Cells (A1208)

Anne Lyck Smitshuysen (1,2), Søren Højgaard Jensen (1,3), Karsten Klemens Hansen (1), Bhaskar Reddy Sudireddy (2), Henrik Lund Frandsen (2)

- (1) DynElectro ApS; Viby Sjælland;
(2) DTU, Department of Energy Conversion and Storage; Lyngby; (3) AAU, Department of Energy; Aalborg;

Hybrid additive manufacturing fabrication of symmetric solid oxide cells (A1209)

Simone Anelli (1), Massimo Rosa (2), Federico Baiutti (1), Marc Torrell (1), Vincenzo Esposito (3), Albert Tarancón (1,4)

- (1) Catalonia Institute for Energy Research (IREC), Department of Advanced Materials for Energy; Barcelona/Spain;
(2) GBU Performance, Brembo S.p.A., Curno/Italy;
(3) Department of Energy Conversion and Storage, Technical University of Denmark; Lyngby/Denmark; (4) ICREA, 08010 Barcelona/Spain;

Cu-doped lanthanum strontium titanate: copper exsolution to realize an efficient anode for direct methane-Solid Oxide Fuel Cells (A1211)

Jonathan Cavazzani (1), Víctor Longo (1,2), Enrico Squizzato (1), Antonella Glisenti (1,3)

- (1) Department of Chemical Sciences, University of Padova; Padova/Italy;
(2) Department ChiBioFarAm, ERIC aisbl and CASPE/INSTM, University of Messina; Messina/Italy;
(3) CNR-ICMATE, Padova/Italy;

Fabrication of Sc and Y co-doped ZrO₂ solid electrolyte thin film on a porous electrode substrate via simple drop-coating method for IT-SOFCs (A1212)

Dale Mhar Alfeche, Rinlee Butch M. Cervera
Energy Storage and Conversion Materials Research Laboratory, Department of Mining, Metallurgical, & Materials Engineering; University of the Philippines Diliman, Quezon City/Philippines;

La_{0.2}Pr_{0.2}Nd_{0.2}Sm_{0.2}Sr_{0.2}CoO_{3-δ}

A high entropy perovskite for SOEC and SOFC air electrodes (B0314)

Patrick Pretschuh, Edith Bucher, Andreas Egger, Werner Sitte
Montanuniversitaet Leoben, Chair of Physical Chemistry.; Leoben/Austria;

High entropy oxides as novel electrode materials for SOCs (B0315)

Lucile Bernadet (1), Simon Schweidler (2), Miriam Botros (2), Marc Torrell (1), Albert Tarancón (1,3)

- (1) IREC, Catalonia Institute for Energy Research, Dept of Advanced Materials for Energy Applications; Barcelona/Spain;
(2) Karlsruhe Institute of Technology (KIT), Institute of Nanotechnology; Eggenstein-Leopoldshafen/Germany;
(3) ICREA; Barcelona/Spain;

Nanofiber-based composite electrodes for application in intermediate temperature solid oxide cell (B0316)

Caterina Sanna (1), Enrico Squizzato (2), Peter Holtappels (3), Antonella Glisenti (2), Paola Costamagna (1)

- (1) Department of Chemistry and Industrial Chemistry, University of Genoa; Genoa/Italy;
(2) Department of Chemical Sciences, University of Padua; Padua/Italy;
(3) Department of Energy Conversion and Storage, Technical University of Denmark; Lyngby/Denmark;

B08: Stack & System Modelling

Comparative thermodynamic analysis of marine SOFC system for alternative fuels (B0807)

Berend van Veldhuizen (1), Lindert van Biert (1), Klaas Visser (1), Aravind Purushothaman Vellayani (2), Hans Hopman (1)

- (1) Delft University of Technology; Delft; (2) University of Groningen; Groningen;

A Fast Open Source Solid Oxide Cell Stack Model in Python (B0808)

Nicolas Kruse, Roland Peters
Forschungszentrum Jülich GmbH, Institute of Energy and Climate Research; Jülich/Germany;

Solid Oxide Electrolysis Cell Reliability Analysis Using Modeling (B0809)

Jie Bao, Naveen Karri, Brian Koeppel, Olga A. Marina
Pacific Northwest National Laboratory; Washington/USA;

Hot Stand-by Operation Effect of a SOFC Hybrid System for Decentralized Power Generation in Single-Family Homes (B0810)

Laura Nousch, Mathias Hartmann
Fraunhofer Institute of Ceramic Technologies and Systems IKTS; Dresden/Germany;

Fabrication and CFD modelling of a graded porous scaffold for Reversible Solid Oxide Cells (rSOCs) (A1213)

Davide Cademartori (1), Elisa Mercadelli (2), Angela Gondolini (2), Alessandra Sanson (2), Ahmad El-Kharouf (3), Robert Steinberger-Wilckens (3), Davide Clematis (1), Antonio Maria Asensio (1), Maria Paola Carpanese (1)

(1) Department of Civil, Chemical and Environmental Engineering, University of Genoa (UNIGE-DICCA); Genoa/Italy;

(2) Institute of Science and Technology for Ceramics, national research council (CNR-ISTEC); Faenza/Italy;

(3) School of Chemical Engineering, University of Birmingham; Birmingham/United Kingdom;

Planar metal supported SOFC fabricated by sequential aqueous tape casting, constrained cosintering and screen-printing. (A1214)

Laura Parvaix, Pascal Lenormand, Patrick Rozier, Damien Quéré
CIRIMAT,; Université Toulouse 3 – Paul Sabatier, Toulouse cedex 9/France;

Effect of anode thickness on thin-film solid oxide fuel cells deposited on nanoporous substrates (A1215)

Myung Seok Lee, Suk Won Cha
Seoul National University; Seoul/Republic of Korea;

Direct Methane Low Temperature Solid Oxide Fuel Cells (DM-LT-SOFC): a dream come true (A1216)

Enrico Squizzato (1), Giovanni Carollo (1), Daniele Rossi (2), Antonella Glisenti (1,3)

(1) Department of Chemical Sciences, University of Padova; Padova/Italy;

(2) Pietro Fiorentini S.p.A, Arcugnano/Italy; (3) CNR-ICMATE, Padova/Italy;

A hybrid synthesis-fabrication method for SOFCs using carboxylic composite as a novel self-pore forming and sintering agent (A1217)

Mohammadmehdi Choolaei, Qiong Cai, Bahman Amini Horri
University of Surrey Stag Hill, Department of Chemical and Process Engineering, Faculty of Physical Sciences and Engineering; Guildford/UK;

Production and Characterisation of Tubular NiO-ScCeSZ Solid Oxide Fuel Cells Produced by Hot Extrusion (A1218)

Recep Akdeniz (1), Ahmad El-Kharouf (1), Robert Steinberger-Wilckens (1), Ali Murat Soydan (2)

(1) School of Chemical Engineering, University of Birmingham; Edgbaston, Birmingham/UK;

(2) Gebze Technical University, Institute of Energy Technologies; Kocaeli/Turkey;

SFE and SFS, spray processes: chemical new routes to produce disruptive materials (A1219)

Denis Spitzer
NS3E Laboratory; SAINT-LOUIS/France;

Multiphysics modeling of high-temperature electrolysis for SOCs on lab-scale level (B0811)

Markus Nohl (1,2), Stephanie E. Wolf (1,2), Lucy Dittrich, (1), Izaak C. Vinke (1), Rüdiger-A. Eichel (1,2), L.G.J. (Bert) de Haart (1)

(1) Institute of Energy and Climate Research, Fundamental Electrochemistry (IEK-9); Forschungszentrum Jülich GmbH, Jülich/Germany;

(2) Institute of Physical Chemistry, RWTH Aachen University; Aachen/Germany;

Development of SOEC Stack Dynamic Model and Validation (B0812)

Dongkeun Lee (1), Young Sang Kim (1,2), Kook Young Ahn (1,2)

(1) Korea Institute of Machinery & Materials (KIMM); Daejeon/South Korea;

(2) University of Science and Technology (UST);

Off-design operation of proton conducting Solid oxide Fuel Cell (H+SOFC) (B0813)

Jarosław Milewski, Arkadiusz Szczęśniak
Warsaw University of Technology, Faculty of Power and Aeronautical Engineering, Institute of Heat Engineering; Warsaw/Poland;

Parametric study on high power SOEC system (B0814)

Tuananh Bui (1,2), Young Sang Kim (1,2), Van-Tien Giap (1), Dong Keun Lee (1), Kook Young Ahn (1,2)

(1) Korea Institute of Machinery & Materials; Daejeon/Korea;

(2) University of Science and Technology; Daejeon/Korea;

SOE stack prototyping through modeling and integration of advanced materials (B0815)

Gonzalo Jiménez Martín, Xabier Judez, Paula Ciaurriz, Mónica Aguado Alonso, Iñigo Garbayo
Hydrogen Area, Grid Integration, National Renewable Energy Center of Spain (CENER), Sangüesa (Navarra)/Spain

B09: Proton Conducting Materials, Cells & Stacks

Cold Sintering Process contribution to BaZrCe_yO_{3-δ} electrolyte densification (B0907)

Pablo Castellani, Clément Nicolle, Eric Quarez, Olivier Joubert, Annie Le Gal La Salle
Institut des Matériaux Jean-Rouxel de Nantes (IMN-CNRS); Nantes/France;

Fabrication and testing

of thin-film based metal-supported proton ceramic electrochemical cells (B0908)

M. Stange (1), C. Denonville (1), E. Stefan (1), A.M. Dayaghi (2), Y. Larring1, P.M Rørvik (1), R. Haugsrud (2), T. Norby (2)

(1) SINTEF Industry; Oslo/Norway;

(2) University of Oslo, Department of Chemistry, SMN, Oslo/Norway;

A14: Other Fuels

Ammonia decomposition and utilization as fuel in solid oxide fuel cells (A1407)

Belma Talic, Per Martin Rørvik, Vegar Øygdalen

SINTEF Industry, Department of Sustainable Energy Technology; Oslo/Norway;

Operating an SOFC single cell on reformed biogas with periodic sulfide poisonings (A1408)

Cédric Frantz, Jan Van herle

Group of Energy Materials, Faculty of Engineering Sciences (STI);

Ecole Polytechnique Fédérale de Lausanne (EPFL), Sion/Switzerland;

Coupling a SOFC Short Stack with an Entrained Flow Gasifier (A1409)

Benjamin Steirnücken (1), Stephan Herrmann (1), Maximilian Hauck (1), Philipp Johné (1), Philipp Leuter (1), Andreas Ewald (1), Lukas Pusterhofer (1), Alexander Schwiers (2,3), Christian Lenser (2), Norbert H. Menzler (2,3), Hartmut Spliethoff (1)

(1) Technical University of Munich, Chair of Energy Systems; Garching/Germany;

(2) Forschungszentrum Jülich GmbH, IEK-1: Materials Synthesis and Processing; Jülich/Germany;

(3) RWTH Aachen University, Institute of Mineral Engineering; Aachen/Germany;

Deep biogas cleaning for exploitation in Solid Oxide Fuel Cells: experimental and techno-economic evaluation (A1410)

Gandiglio Marta, Elena Rozzi, Andrea Lanzini, Massimo Santarelli

Department of Energy, Politecnico di Torino; Torino/Italy;

SOFC-Stack coupled with wood gasification: Influence on the Performance and Degradation (A1411)

Fabian Grimm, Federica Torrigino, Jürgen Karl

FAU Erlangen-Nürnberg; Lehrstuhl für Energieverfahrenstechnik; Nürnberg/Germany;

Effect of ammonia fuel on single cell degradation (A1412)

Maryam Asghari (1,2), Suhas Nuggehalli Sampathkumar (1), Cedric Frantz (1), Jack Brouwer (2), Jan Van herle (1)

(1) École Polytechnique Fédérale de Lausanne (EPFL); Sion/Switzerland;

(2) University of California, Advanced Power and Energy Program; Engineering Laboratory Facility, California/USA;

The biogas-oxyfuel process as a carbon source for high-temperature co-electrolysis and degradation by oxidized trace contaminants (A1413)

Dominik Schäfer, Felix Schorn, Remzi Can Samsun, Qingping Fang, Ralf Peters

Forschungszentrum Jülich GmbH, Institute of Energy and Climate Research Jülich/Germany

Proton World class Innovative Novel Nanoscale

optimized electrodes and electrolytes for Electrochemical Reactions: WINNER (B0909)

Marie-Laure Fontaine

SINTEF AS Oslo; Oslo/Norway;

Characterization of metal-supported BZCY721 protonic conducting ceramic membranes for pressurized hydrogen separation (B0910)

Luca Mastropasqua, Jack Brouwer

National Fuel Cell Research Center, University of California, California/USA;

Direct measurements of hydrogen exchange and diffusion kinetics

at elevated temperatures in proton-conducting solid oxide materials (B0911)

Mudasir A Yatoo, Stephen J Skinner

Department of Materials, Faculty of Engineering, Imperial College London; Royal School of Mines, London/U.K.;

Self-assembly SrCo_{0.8}Fe_{0.2}O_{3-δ}/Fe₃O₄ heterostructure proton membrane for advanced semiconductor ionic fuel cell (B0912)

Nabeel Akbar (1), Sara Paydar (1), Wu Yan (1), Bin Zhu (1,2)

(1) Engineering Research Center of Nano-Geo Materials of Ministry of Education, Faculty of Materials Science and Chemistry, China University of Geosciences; Wuhan/China;

(2) Jiangsu Provincial Key Laboratory of Solar Energy Science and Technology/ Energy Storage Joint Research Center, School of Energy and Environment; Southeast University, Nanjing/China;

Molten salt synthesis of perovskite as electrolyte material for proton-conducting cell (B0913)

Linjuan Zhang, Ze Liu, Yuxuan Zhang, Jian-Qiang Wang

Shanghai Institute of Applied Physics; Chinese Academy of Sciences, Shanghai/China;

Characterization of Mechanical Properties of Half-Cells

for Proton-Conducting Ceramic Cells and Effect of Ageing and Operating Conditions (B0914)

Federico Palmerini (1), Peyman Khajavi (1), Henrik Lund Frandsen (1), Peter Vang Hendriksen (1), Dustin Beeaff (2), Ragnar Kiebach (1)

(1) DTU Energy, Department of Energy Conversion and Storage, Technical University of Denmark; Lyngby/Denmark;

(2) CoorsTek Membrane Sciences; Oslo/Norway;

Synthesis & characterization of BSCF air electrode material for protonic conducting cells (B0915)

Castellani Pablo (1), Schmider Daniel (2), Notar Catherine (2), Nicollet Clément (1), Quarez Eric (1), Dailly Julian (2), Joubert Olivier (1), Le Gal La Salle Annie (1)

(1) Institut des Matériaux Jean-Rouxel de Nantes (IMN-CNRS); Nantes/France;

(2) European Institute for Energy Research (EIFER); Karlsruhe/Deutschland;

A15: SOC Integration & Energy System Perspectives

Solid Oxide Fuel Cells Operated on Hydrogen and Natural Gas Blends and the Impact on Waste Heat Recovery (A1507)

Alejandro C. Lavernia, Maryam Asghari, Luca Mastropasqua, Jack Brouwer
National Fuel Cell Research Center, University of California, CA/USA;

Development of a Highly Efficient Co-SOEC-Based Power-to-Liquid Plant (A1508)

Martin Hauth, Bernd Reiter, Manuel Tandl
AVL List GmbH; Graz/Austria;

Assessing reversible solid oxide cell systems for grid-energy storage based on H₂/H₂O and CH₄/H₂O-CO₂ chemistries (A1509)

A. Parashar, J. Hosseinpour, E. Reznicek, R.J. Braun
Colorado School of Mines, Department of Mechanical Engineering; Golden, Colorado/U.S.A.;

Solid Oxide Co-Electrolysis Augmentation of Bio-Gas to Liquid Fuel Synthesis (A1510)

Joseph Hartvigsen, Jessica Elwell, Nathan Davis, Michele Hollist, S. Elangovan
OxEon Energy, LLC.; Utah/USA;

Green hydrogen production with concentrating solar tower system coupled with SOE (A1511)

Luca Mastropasqua (1), Jun Yong Kim (1), Andrea Giotri (2), Marco Binotti (2), Paolo Silva (2), Jack Brouwer (1)
(1) National Fuel Cell Research Center, University of California, CA/USA;
(2) Department of Energy, Politecnico di Milano; Milano/Italy;

Hydrogen and syngas production by solid oxide electrolysis with solar heat integration (A1512)

Michael Lang (1), Patric Szabo (1), Bruno Lachmann (2), Vamshi Krishna Thanda (2), Nathalie Monnerie (2), Remi Costa (1)
(1) German Aerospace Center (DLR), Institute for Engineering Thermodynamics; Stuttgart/Germany;
(2) German Aerospace Center (DLR), Institute for Future Fuels; Köln-Porz;

Waste2Watts: Techno-economic evaluation of biogas-fed SOFC power system integrated with CCS and CCU (A1513)

Hangyu Yu (1), Ligang Wang (2), Jan Van herle (1)
(1) Group of Energy Materials, Faculty of Engineering Sciences (STI), École Polytechnique Fédérale de Lausanne (EPFL); Sion/Switzerland;
(2) Innovation Research Institute of Energy and Power, North China Electric Power University (NCEPU); Beijing/China;

Design, development, and characterization

of BCZY(Yb)-based proton-conducting ceramic cells and stacks for H₂ extraction (B0916)

Stéven Pirou (1), Federico Palmerini (1), Peyman Khajavi (1), Xanthi Georgolamprou (1), Qingjie Wang (1), Ming Chen (1), Sandrine Ricote (2), Ragnar Kiebach (1)
(1) Technical University of Denmark, Department of Energy Conversion and Storage; Lyngby/Denmark;
(2) Colorado School of Mines, Department of Mechanical Engineering; Golden/USA;

B09s: Co-Electrolysis & CO₂ Electrolysis

Flexible solid oxide cells for low carbon fuel utilisation and syngas production by co-electrolysis (B09s07)

Bernardo Jordão Moreira Sarruf, Robert Steinberger-Wilckens
Centre for Fuel Cells and Hydrogen Research, School of Chemical Engineering; University of Birmingham, Edgbaston, Birmingham/UK;

3D microstructural characterization

of Ni/YSZ electrodes in long-term CO₂ electrolysis (B09s09)

Yijing Shang (1), Anne Lyck Smitshuysen (1), Miao Yu (1), Yuliang Liu (1,2), Peter Stanley Jørgensen (1), Ming Chen (1)
(1) Department of Energy Conversion and Storage, Technical University of Denmark; Lyngby/Denmark;
(2) School of Materials Science and Engineering, Henan University of Science & Technology; Luoyang/China;

Effect of PH₂ and of the PH₂O/PCO₂ ratio on the CO origin and the occurring electro-catalytic interactions on Ni/GDC during H₂O/CO₂ co-electrolysis (B09s11)

Evangelia Ioannidou (1,2), Mara Chavani (1,2), Stylianos G. Neophytides (1), Dimitrios K. Niakolas (1)
(1) Foundation for Research and Technology, Institute of Chemical Engineering Sciences (FORTH/ICE-HT); Patras/Greece;
(2) Department of Chemical Engineering, University of Patras, Greece;

Electrochemical performance and microstructure analysis of solid oxide cells operated in CO₂ electrolysis (B09s12)

Miao Yu (1), Xiufu Sun (1), Yuliang Liu (1,2), Yijing Shang (1), Ming Chen (1)
(1) Department of Energy Conversion and Storage, Technical University of Denmark; Lyngby/Denmark;
(2) School of Materials Science and Engineering, Henan University of Science & Technology; Luoyang/China;

A16: Products, Demonstration & Novel Concepts

Robust remote power supply (RoRePower) (A1607)

Jari Kiviahio (1), Jyrki Mikkola (1), Markus Münch (2), Daniele Penchini (3) Matthias Boltze (4), Michael Spirig (5), Mari Tuomaala (6)

- (1) VTT Technical Research Centre of Finland Ltd, Espoo/Finland;
 (2) Sunfire GMBH, (3) SolidPower SpA; (4) Sunfire Fuel Cells GmbH,
 (5) European Fuel Cell Forum AG (6) 3E Energy Oy;

Development status of a 70% efficient hybrid SOFC system for 100 kW-class distributed generation applications (A1608)

R.J. Braun, G. Floerchinger, N. Sullivan, T. Vincent (1), R. Danforth (2), I. Frampton (2), T. Bandhauer, D. Olsen, B. Windom (3)

- (1) Colorado School of Mines, Golden; Colorado/U.S.A.;
 (2) Kohler Power Systems, Kohler, Wisconsin/U.S.A.;
 (3) Colorado State University, Ft. Collins, Colorado/U.S.A.;

ShipFC project: NH₃-SOFC to decarbonise commercial shipping application (A1609)

Colin Bettini (1), Tjalve Magnusson Svendsen (2), Ivar Wærnhus (2), Laurence Grand-Clément (1)
 (1) Pers-ee, Smarter Energy; Lyon/France; (2) Clara Venture Labs; Bergen/Norway;

Electrochemical processes and energy systems towards step-wise emission reduction of marine transport (A1610)

S. Asif Ansar, Matthias Metten, Santiago Salas Ventura, Dirk Ullmer, Christian Schnegelberger
 German Aerospace Center (DLR), Institute of Engineering Thermodynamics; Stuttgart/Germany;

Techno-economic analysis of maritime fuel cell hybrid power system in commercial operations (A1611)

Colin Bettini, Laurence Grand-Clément, Valentina Ruiz
 Pers-ee, Smarter Energy; Lyon/France;

Lightweight tubular solid oxide fuel cell for aeronautical application (A1612)

Vignesh Ahilan, Pedro Nehter, Helge Geisler
 Electrification Technologies (XRE), Airbus Operations GmbH; Hamburg/Germany;

High Pressure Water Electrolyser Development for Space Exploration Surface Missions (A1613)

Nelson Thambiraj (1), Ivar Wærnhus (1), Arild Vik (1), Maria-Eleftheria Farmaki (2), Kalliopi-Maria Papazisi (2), Dimitrios Tsiplakides (2), Stella Balomenou (2), Brandon Buerkler (3), Brigitte Lamaze (3)

- (1) Clara Venture Labs; Bergen/Norway;
 (2) Chemical Process and Energy Resources Institute, Centre for Research and Technology Hellas (CPERI-CERTH), Thessaloniki/Greece;
 (3) European Space Agency (ESA), Noordwijk/The Netherlands;

Analysis of the hysteresis in current-voltage characteristic curves during solid oxide electrolysis (B09s13)

Lucy Dittrich (1), Izaak C. Vinke (1), Rüdiger-A. Eichel (1,2), L.G.J. (Bert) de Haart (1)
 (1) Institute of Energy and Climate Research, Fundamental Electrochemistry (IEK-9);
 Forschungszentrum Jülich GmbH, Jülich/Germany;
 (2) Institute of Physical Chemistry, RWTH Aachen University; Aachen/Germany;

Development of SOEC performance evaluation method (B09s14)

Takumi Imabayashi, Koichi Asano, Yoshihiro Mugikura
 Central Research Institute of Electric Power Industry (CRIEPI); Kanagawa/Japan;

B11: Lifetime Cells II

Degradation studies of 1000 h aged SOECs:

From lab analysis to local level simulation (B1107)

Aiswarya Krishnakumar Padinjarethil (1), Fiammetta Rita Bianchi (2), Anke Hagen (1), Barbara Bosio (2)

- (1) Department of Energy Conversion and Storage, Technical University of Denmark (DTU), Lyngby/Denmark;
 (2) Department of Civil, Chemical and Environmental Engineering, University of Genoa, Genoa;

Accelerated Stress Testing of Standard Solid-Oxide Electrolysis Cells (B1108)

Jeremy Hartvigsen (1), Micah Casteel (1), Josh Gomez (1), Lucun Wang (1), Richard Boardman (1), Cameron Priest (1), Dong Ding (1), Scott Swatz (2), Gene Arkenberg (2), Olga Marina (3), David Ginley (4), Mike Tucker (5), David Peterson (6), William T. Gibbons (7)

- (1) Idaho National Laboratory; Idaho/USA;
 (2) Nexceris;
 (3) Pacific Northwest National Laboratory, WA/USA;
 (4) National Renewable Energy Laboratory, CO/USA
 (5) Lawrence Berkley National Laboratory, CA/USA;
 (6) Hydrogen & Fuel Cell Technologies Office (HFTO), EERE, U.S. Dep. of Energy, CO/USA;
 (7) Hydrogen and Fuel Cell Technologies Office (HFTO), U.S. Department of Energy- EERE, Washington/USA;

Regeneration of Co-Fe nano-catalysts

on Sr₂Fe_{1.5-x}Co_xMo_{0.5}O_{6.5} electrodes for symmetrical RSOCs (B1109)

Hye-jin Jeon (1), Jae-ha Myung (1)
 Department of Materials Science and Engineering; Incheon National Univ. Incheon/Korea;

Design and Qualification of a Solid Oxide Electrolysis Stack for Rocket Propellant on Mars (A1614)

Jessica Elwell, Joseph Hartvigsen, S. Elango Elangovan, Dennis Larsen, Tyler Hafen, Michele Hollist; OxEon Energy, LLC.; UT/USA;

Solid Oxide Fuel Cell Technology developments for Space Applications (A1615)

Brandon Buerigler, Brigitte Lamaze, Geraldine Palissat
ESTEC; Noordwijk/The Netherlands;

Reducing green hydrogen production costs by improving the SOEC cell technology (A1616)

Hua Liu(1), Lasse Røngaard Clausen(2), Ligang Wang(3), Ming Chen(1)

(1) Department of Energy Conversion and Storage, Lyngby/Denmark;

(2) Department of Mechanical Engineering, DTU; Lyngby/Denmark;

(3) Institute of Energy Power Innovation, North China Electric Power University; Beijing/China;

Recycling possibilities and strategies for solid oxide cell stacks (A1617)

Stephan Sarner (1,2), Norbert H. Menzler (1,2), Andreas Mai (3), Venkatesh Sarda (3), Dmitry Sergeev (1), Nikolaos Margaritis (4), Olivier Guillon (1,2,5)

(1) Forschungszentrum Jülich GmbH, Institute of Energy and Climate Research;

(2) RWTH Aachen University, Institute of Mineral Engineering;

(3) Hexis GmbH;

(4) Forschungszentrum Jülich GmbH, Central Institute of Engineering;

(5) JARA: Jülich-Aachen-Research-Alliance; Jülich/Germany;

Training Staff in Fuel Cell and Hydrogen Technologies – Continuous Professional Development and Blended Learning (A1618)

Robert Steinberger-Wilckens, Naser Al-Mufachi, Ahmad El-kharouf, Yousif Al-Sagheer, Kun Zhang, Artur Majewski, John Hooper
University of Birmingham, Birmingham/UK;

CO₂ methanation over Ni/YSZ catalysts: Effect of operating conditions (A1619)

Osaze Omoregbe, Ahmad El-kharouf, Robert Steinberger-Wilckens
Centre for Fuel Cell and Hydrogen Research, School of Chemical Engineering, University of Birmingham; Birmingham/U.K;

Table-Top SOFC Demonstration in Five Minutes (A1620)

Ulf Bossel
ALMUS AG, Oberrohrdorf/Switzerland;

Sulfur poisoning of Ni/CGO fuel electrodes at low operating temperature (B1110)

Felix Kullmann (1), Martin Juckel (2), André Weber (1)
(1) Institute of Applied Materials – Electrochemical Technologies; Karlsruhe Institute of Technology (KIT), Karlsruhe/Germany;

(2) Institute of Energy and Climate Research – Materials Synthesis and Processing; Forschungszentrum Jülich, Jülich/Germany;

Effect of inlet gas composition on the durability of solid oxide electrolysis cells (B1111)

Xiufu Sun (1), Anders Kring Clausen (1), Peter Vang Hendriksen (1), Anne Hauch (1), Timo Lehtinen (2), Matti Noponen (2)

(1) Dep. of Energy Conversion & Storage, Technical University of Denmark ; Lyngby/Denmark;

(2) Elcogen; Vantaa/Finland;

Time-Dependent Degradation Process Identification of Solid Oxide Electrolysis Cells (B1112)

Stephanie E. Wolf (1,2), Eric Tröster (1), Vaibhav Vibhu (1), Izaak C. Vinke (1), Rüdiger-A. Eichel (1,2), L.G.J. (Bert) de Haart (1)

(1) Institute of Energy and Climate Research, Fundamental Electrochemistry (IEK-9);

Forschungszentrum Jülich GmbH, Jülich/Germany;

(2) Institute of Physical Chemistry, RWTH Aachen University; Aachen/Germany;

LT-SOFCs: Effect of Molybdenum Doping on Carbon Deposition and Anode Performance of La_{0.6}Sr_{0.4}(Co_{0.8}Fe_{0.2})_{1-x}Mo_xO_{3-δ} (B1113)

Kimia Y. Javan, Vincenzo M. Sglavo
University of Trento, Department of Industrial Engineering; Trento/Italy;

Comparative study

on solid oxide fuel cell anode microstructure evolution after long-term operation (B1114)

Dong Yan (1), JiaQi Geng (1), ZhenJun Jiao(2), LiChao Jia (1), Jian Li (1)

(1) School of Materials Science and Engineering, State Key Lab of Material Processing and Die&Mould Technology, Huazhong University of Science and Technology; Wuhan/China;

(2) College of Science, Harbin Institute of Technology, Shenzhen/China;

Investigation protocols on SOFC anodes

after accelerated aging: microstructural and electrochemical characterization (B1115)

Paolo Piccardo (1,2), Daria Vladikova (3), Blagoy Burdin (3), Roberto Spotorno (1)

(1) Metal Group, DCCI, University of Genoa; Genoa/Italy;

(2) ICMATE-CNR; Genova/Italy; (3) Institute of Electrochemistry and Energy Systems - Bulgarian Academy of Sciences, IEES, Sofia/Bulgaria;

B15: Advanced Characterisations

Investigation of interface & electrolyte processes of a state-of-the-art SOFC (B1507)

Felix Kullmann (1), Cedric Grosseindemann (1), Franz-Martin Fuchs (2), André Weber (1)
 (1) Institute of Applied Materials – Electrochemical Technologies; Karlsruhe Institute of Technology (KIT), Karlsruhe/Germany; (2) Kerafol Keramische Folien GmbH & Co. Eschenbach/Germany;

Grey-Box Data-Driven Model for the prediction of the impedance response of an IT-SOFC for fast cell and batch characterization (B1508)

Andrea Monforti Ferrario (1,2), Davide Pumiglia (1), Massimiliano Della Pietra (1), Stephen McPhail (1), NN (3)
 (1) ENEA, Laboratory of Energy Storage, Batteries and Hydrogen Production & Use (TERIN-PSU-ABI), C.R. Casaccia; Rome/Italy;
 (2) Department of Industrial Engineering and Mathematical Sciences (DIISM), Università Politecnica delle Marche; Ancona/Italy; (3) Elcogen AS; Tallinn/Estonia;

FIB-SEM 3D reconstruction of SOC electrodes for determining microstructure modeling data (B1509)

Markus Nohl (1,2), Roland Schierholz (1), Krzysztof Dzieciol (1), Vaibhav Vibhu (1), Izaak C. Vinke (1), Rüdiger-A. Eichel (1,2), L.G.J. (Bert) de Haart (1)
 (1) Institute of Energy and Climate Research, Fundamental Electrochemistry (IEK-9); Forschungszentrum Jülich GmbH, Jülich/Germany;
 (2) Institute of Physical Chemistry, RWTH Aachen University; Aachen/Germany;

B16: Material Modelling

Numerical model of Steam Electrolysis in Solid Oxide Cells with Ni/Gd-Doped Ceria (CGO) fuel Electrode (B1607)

Andrey Koksharov, Matthias Riegraff, Rémi Costa, Arnulf Latz, Thomas Jahnke
 German Aerospace Center (DLR), Institute of Technical Thermodynamics; Stuttgart/Germany;

Composite conductivity of MIEC-based SOFC anodes: Implications for microstructure optimization (B1608)

Philip Marmet (1), Thomas Hocker (1), Jan G. Grolig (2), Holger Bausinger (2), Andreas Mai (2), Joseph M. Brader (3), Lorenz Holzer (1)
 (1) Zurich University of Applied Sciences, Institute of Computational Physics;
 (2) Hexis AG, Winterthur/Switzerland;

Deconvolution of the electrochemical impedance spectra of solid oxide electrolysis cells: A quantitative and time-dependent analysis (B1116)

Vasileios Bilalis, Henrik Lund Frandsen, Ming Chen
 Department of Energy Conversion and Storage, Technical University of Denmark; Lyngby/Denmark;

Development of strategies to mitigate degradation of solid oxide electrolysis cells (B1117)

Benjamin Königshofer (1), Michael Höber (1), Pavle Boškoski (2), Đani Juričić (2), Gjorgij Nusev (3), Christoph Hochenauer (1), Vanja Subotić (1)
 (1) Institute of Thermal Engineering, Graz University of Technology; Graz/Austria;
 (2) Jožef Stefan Institute; Ljubljana/Slovenia;
 (3) Jožef Stefan International Postgraduate School; Ljubljana/Slovenia;

Online Monitoring and Experimental Investigation of Methane Utilization Along Anode Supported SOFCs (B1118)

Michael Höber, Benjamin Königshofer, Christoph Hochenauer, Vanja Subotić
 Institute of Thermal Engineering, Graz University of Technology; Graz/Austria;

B12: Interconnects, Coatings, Contact Layers & Sealants

Influence of steel composition and alloying elements on the oxidation mechanism and electrical properties in single and dual atmosphere (B1207)

Jouni Puranen, Antonio Alfano, Matti Noponen, Elcogen Oy; Vantaa/Finland;

Accelerating ageing test on solid oxide cell interconnects (B1208)

S. Daviran (1), S. Poitel (1), D. Montinaro (2), C. Walter (3), K. Herbrig (3), J. Ouweltjes (4), H. Javed (2), P. Bowen (1), J. Van herle (1)
 (1) Swiss Federal Institute of Technology, Switzerland;
 (2) SOLIDPower SpA, Mezzolombardo/Italy;
 (3) SUNFire, Dresden, GmbH; (4) SOLIDpower SA, Yverdon-les-Bains/Switzerland;

Comparison of uncoated and Ce/Co coated FeCr steels for SOFC interconnects (B1209)

M. J. Reddy, J. E. Svensson, J. Froitzheim
 Energy and Materials, Department of Chemistry and Chemical Engineering, Chalmers University of Technology, Gothenburg/Sweden;

Molten Salt Synthesis Activities for Solid Oxide Convertors (B1210)

Chengzhi Guan (1,2), Yutian Yu (1), Fupeng Cheng (1), Zhijie Wang (1), Yue Lu (1), Youchen Lin (1), Ruizhu Li (1), Zhen Zhang (1), Chunyu Xie (1), Xiao Lin (1), Jianqiang Wang (1,2)
 (1) Shanghai Institute of Applied Physics, Chinese Academy of Sciences.; Shanghai/PR China;
 (2) Dalian National Laboratory for Clean Energy, Chinese Academy of Sciences.; Liaoning Province/PR China;

Comparison of an SOC with Ni/CGO Fuel Electrode during Operation with H₂/H₂O and CO/CO₂ (B1609)

Cedric Grosselindemann (1), Felix Kullmann (1), Hendrik Pöpke (2), André Weber (1)
(1) Institute for Applied Materials – Electrochemical Technologies (IAM-ET), KIT; Karlsruhe/Germany; (2) Kerafol Keramische Folien GmbH & Co. KG; Eschenbach/Germany;

Numerical analysis of the effects of tar components on single planar SOFC under high fuel utilization (B1610)

Yixing Li, Fabian Grimm, Jürgen Karl
FAU Erlangen-Nürnberg; Lehrstuhl für Energieverfahrenstechnik; Nürnberg/Germany;

Homogenized three-dimensional modeling on the chemical reactions coupled transport phenomena in solid oxide cell (SOC) stacks with an open-source library (B1611)

Shidong Zhang, Roland Peters, Nicolas Kruse, Robert Deja, Ralf Peters
Forschungszentrum Jülich GmbH, Institute of Energy and Climate Research; Jülich/Germany;

1D Modeling of an Electrolyte Supported Planar SOFC with 8YSZ and 10Sc1CeSZ based on Non-Equilibrium Thermodynamics (B1612)

Aydan Gedik (1), Gerardo Valadez Huerta (2), Nico Lubos (1), Stephan Kabelac (1)
(1) Institute of Thermodynamics, Leibniz University Hannover; Hannover/Germany;
(2) Research Initiative for Supra-Materials, Shinshu University; Nagano/Japan;

Computational design for tailoring the distortion of surface octahedra in La_{1-x}Sr_xFeO_{3-δ} (LSF) as a cathode for H-SOFC (B1613)

Xi Xu (1), Lei Bi (2), Stephen Skinner (1)
(1) Department of Materials, Imperial College London; London/U.K.; (2) School of Resource Environment and Safety Engineering, University of South China; Hengyang/China;

Transient study of heat & mass transfer phenomena in solid oxide fuel cells - SOFCs (B1614)

Chen Lin (1), Stephan Herrmann (1), Benjamin Steinrücken (1), Sebastian Wilhelm (1), Hartmut Spliethoff (1,2)
(1) Institute for Energy System, TUM School of Engineering and Design; Technical University of Munich, Garching/Germany; (2) Bavarian Center for Applied Energy Research; Garching/Germany;

An Integrated Modeling Approach to Link Structural Degradation with the Performance of Solid Oxide Cells (B1615)

Marisa Knappe (1,2), Felix Schmidt (1,2), Thomas Kadyk (1,3), Michael Eikerling (1,2,3)
(1) Theory and Computation of Energy Materials (IEK-13), Institute of Energy and Climate Research, Forschungszentrum Jülich GmbH, Jülich/Germany; (2) Chair of Theory and Computation of Energy Materials, Faculty of Georesources and Materials Engineering, RWTH Aachen University, Aachen/Germany; (3) Jülich Aachen Research Alliance, JARA Energy, Jülich/Germany;

Study and improvement of sealing solutions for solid oxide cells (B1211)

Karl Vulliez (1), Annabelle Laplace (2), Géraldine Palcoux(1), Stephane Di Iorio(1), Livia Ceruti (1), Julie Mougin (1), Aurelien Lecoq (1), Rémi Moles (2)
(1) Univ. Grenoble Alpes – CEA/LITEN; Grenoble/France;
(2) CEA, DES, ISEC, DE2D, Laboratoire de Développement des Matrices de; Conditionnement, Univ. Montpellier, Marcoule/France;

Microstructural and compositional changes in AISI 441 induced by diffusion of nickel (B1212)

Louis Sadowski Cavicholi (1,2), Tobias Holt Nørby (1), John Hald (2), Karen Pantleon (2)
(1) Haldor Topsøe A/S, Green Hydrogen - Electrolysis Solutions,; Lyngby/Denmark;
(2) Technical University of Denmark, Dept. of Mechanical Engineering, Lyngby/Denmark;

Effects of thermal aging

on the joint strength of an SOFC braze seal with metallic interconnect (B1213)

Yu-Wei Tseng (1), Chih-Kuang Lin (1), Liang-Wei Huang (2), Chien-Kuo Liu (2), Ruey-Yi Lee (2)
(1) Department of Mechanical Engineering, National Central University; Tao-Yuan/Taiwan;
(2) Nuclear Fuels and Materials Division, Institute of Nuclear Energy Research; Tao-Yuan/Taiwan;



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Solid Oxide Technologies
Fuel Cells, Electrolysers, Electrochem. Reactors
CO₂ Emission Reduction, Reuse