EFCF 2020

FINAL ANNOUNCEMENT

20 – 23 October

KKL Lucerne, Switzerland

New Dates & Virtual Participation

20 October 2020
Tutorials:
- Fuel Cell, Electrolyser & H_2
- El.chem. Impedance Spectroscopy

24th conference in series of the European Fuel Cell Forum in Lucerne

14th EUROPEAN SOFC & SOE FORUM

Chaired by
Prof. Anke Hagen
Prof. Peter Vang Hendriksen
DTU Technical University of Denmark

Fuel Cells, Electrolysers & Membrane Reactors
CO_2 Emission Reduction & Reuse

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Session Program
EFCF 2020
14th European SOFC & SOE Forum

as performed
20 - 23 October 2020

Session Overview

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2	A02: P2: Keynotes by FCH JU - EU Programs, US, Japan, China	
3	A03: Technology status at industry and major groups I	B03: Manufacturing Processes
4	A04: Poster Session I (covering All Session Topics)	
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6	A06: Products and demonstrations	B06: Advanced characterization I
7	A07: Keynote Grid Flexibility - Business Models	B07: Keynote about proton conducting SOC
8	A08: System design & performance	B08: Advanced characterization II
9	A09: Emerging SO technology electrode investigation and modelling	B09: Lifetime: Stacks and cells
10	A10: Poster Session II (covering All Session Topics)	
11	A11: P3: Keynote Energy systems	
12	A12: SOC integration, Power-to-X, CO2 capture etc.	B12: Oxygen electrodes I
13	A13: Products, demonstrations, novel concepts & BoP	B13: Cells, stacks, and interconnects
14	A14: Proton Conducting Cells, Stacks and materials	B14: Oxygen electrodes II
15	A15: Cell, stack & system modelling and optimization	B15: Lifetime: Cells, components and interfaces
16	A16: System design & performance & BoP	B16: Lifetime: Interconnects and contact layers
17	A17: P4: Closing Ceremony Keynote by the EFCF Gold Medal of Honour Winner 2020	Legend: Px: = Plenary;

Morning - A-Session — Wednesday, 21 October 2020

09:00	A01: P1: Opening Session
09:00	**Welcome by the Organizers (A0101)**
	Olivier Bucheli, Michael Spirig
	European Fuel Cell Forum, Luzern/Switzerland
09:05	**Welcome by the Chairs (A0102)**
	Anke Hagen, Peter Vang Hendriksen
	Technical University of Denmark, Lyngby/Denmark
09:15	**Welcome to Switzerland (A0103)**
	Stefan Oberholzer, Rolf Schmitz, Benoît Revaz
	Swiss Federal Office of Energy, Bern/Switzerland
09:30	

Morning - A-Session — Wednesday, 21 October 2020

09:30	A02: P2: Keynotes by FCH JU - EU Programs, US, Japan, China
09:30	**The Status of SOFC and SOEC R&D in the European Fuel Cell and Hydrogen Joint Undertaking Programme (A0201)**
	Bart Biebuyck, M. Atanasiu, A. Aguilo-Rullan, D. Dirmiki, N. Lymperopoulos, D. Tsimis
	FCH JU - Fuel Cells and Hydrogen Joint Undertaking, Busssles/Belgium
09:50	**High Temperature Electrolysis for Hydrogen Production: US Research Highlights (A0202)**
	Olga Marina
	Pacific Northwest National Laboratory, Richland/WA-USA
10:10	**Current status of NEDO project on durability and reliability of SOFC cell-stacks (A0203)**
	Teruhisa Horita
	National Inst. of Advanced Industrial Science and Technology (AIST), Ibaraki/Japan
10:30	**Solid Oxide Cells Development in China (A0204)**
	Minfang Han
	(1) State Key Lab. of Power Systems, Dept. of Energy and Power Engineering, Tsinghua University, Beijing/P.R. China, (2) Beijing Key Lab. of CO2 Utilization and Reduction Technology, Dept. of Energy and Power Engineering, Tsinghua University, Beijing/P.R. China
10:50	**Break for an individual coffee & visit on www.EFCF.com/Lobby**

Morning - A-Session | Wednesday, 21 October 2020 | B-Session - Morning

11:15	A03: Technology status at industry and major groups I	B03: Manufacturing Processes
11:15	**Status of Stack & System Development at Sunfire (A0301)**	**Electrospun electrodes for IT–SOFC applications: state of the art and perspective (B0301)**
	Christian Walter, Robert Blumentritt, Oliver Posdziech, Matthias Boltze	Paola Costamagna (1), Caterina Sanna (1), Wenjing Zhang (2), Peter Holtappels (2)
	Sunfire GmbH, Dresden/Germany	(1) Dept. of Chemistry and Industrial Chemistry, Uni of Genoa , Genoa/Italy, (2) Technical Uni of Denmark, Lyngby/Denmark
11:30	**Commercialization of the Steel Cell® technology: Latest Update (A0302)**	**Thin-film Gd-doped Ceria Diffusion Barrier Layers for Electrolyte Supported Solid Oxide Cells (B0309, presented here at B0302)**
	Robert Leah, Adam Bone, Ahmet Selcuk, Mike Lankin, Mahfujur Rahman, Andy Clare, Gavin Reade, Florence Felix, Jeffrey De Vero, Xin Wang, Subhasish Mukerjee, Mark Selby	Feng Han (1), Matthias Riegraf (1), Christian Geipel (2), Christian Walter (2), Rémi Costa (1)
	Ceres Power Ltd., Horsham/UK	(1) Inst. of Engineering Thermodynamics, German Aerospace Center (DLR), Stuttgart/Deutschland, (2) Sunfire GmbH, Dresden/Germany
11:45	**Status of HEXIS' SOFC Module Development (A0303)**	**Reducing chromium removal from SOFC interconnects and BoP – Results from the EU projects MMLCR-SOFC, SCORED 2:0, and HEATSTACK (B0303)**
	Andreas Mai, Jan Grolig, Venkatesh Sarda, Michael Dold, Bernhard Schindler, Alexander Schuler	Robert Steinberger-Wilckens
	Hexis AG, Winterthur/Switzerland	Centre for Fuel Cell & Hydrogen Research, School of Chemical Engineering, Uni of Birmingham, Birmingham/UK
12:00	**Progress of SOE development at Elcogen (A0304)**	**Anode supported solid oxide fuel cells designated for operating below 750°C prepared using large-scale capable production methods (B0304)**
	Matti Noponen (1), Pauli Torri (1), Jukka Göös (1), Jouni Puranen (1), Jyrki Niinistö (1), Sergii Pylypko (2), Marek Roostar (2), Enn Õunpuu (2)	Ryszard Kluczowski (1), Michał Wierzbicki (2), Yevgeniy Naumovich (2), Agnieszka Żurawska (2), Stanisław Jagielski (2), Michał Kawalec (1), Mariusz Krauz (1)
	(1) Elcogen, Vantaa/Finland, (2) Elcogen, Tallinn/Estonia	(1) Inst. of Power Engineering Ceramic Dept. CEREL, Techniczna 1 St., Boguchwała/Poland, (2) Inst. of Power Engineering, Dept. of High Temperature Electrochemical Processes. Warsaw/Poland
12:15	**Power-to-X activities at Haldor Topsoe: our approach for electrification of the chemicals industry (A0305)**	**Manufacturing ScCeSZ/GDC Electrolyte Composite Layers for IT-SOFC by Reverse Aqueous Tape Casting (B0305)**
	Rainer Küngas, Peter Blennow, Thomas Heiredal-Clausen, Tobias Holt Nørby, Jeppe Rass-Hansen, John Bøgild Hansen, Poul Georg Moses	Abigail Snowdon, Zeyu Jiang, Robert Steinberger-Wilckens
	Haldor Topsoe A/S, Lyngby/Denmark	Centre for Fuel Cell & Hydrogen Research, School of Chemical Engineering, Uni of Birmingham, Birmingham/UK
12:30	**Lunch Break - Recreate and join the www.EFCF.com/VirtualExhibiton and go then towards www.EFCF.com/joinP - Poster Session & Community Network**	

Afternoon | www.EFCF.com/P | Wednesday, 21 October 2020 | Afternoon

13:15 A04: Poster Session I (covering All Session Topics)

Afternoon - A-Session | Wednesday, 21 October 2020 | B-Session - Afternoon

15:00	A05: Technology status at industry and major groups II	B05: Fuel electrodes
15:00	**Progress in SOC Development at the Forschungszentrum Jülich (A0501)**	**Strontium Titanate based SOFC anodes with nano scaled electrocatalysts (B0501)**
	Ludger Blum (1), Qingping Fang (1), L.G.J. (Bert) de Haart (1), Jürgen Malzbender (1), Nikolaos Margaritis (2), Norbert H. Menzler (1), Roland Peters (1)	Daniel Bøgh Drasbæk (1), Nazan Muzaffar(1,2), Nasima Arshad (2), Bhaskar Reddy Sudireddy (1), Marie Lund Traulsen(1), Peter Holtappels(1)
	Forschungszentrum Jülich GmbH: (1) Inst. of Energy and Climate Research, Jülich/Germany, (2) Central Inst. of Engineering, Electronics and Analytics, Jülich/Germany	(1) Technical Uni of Denmark, Dept. of Energy Conversion and Storage, Lyngby/Denmark, (2) Dept. of Chemistry, Allama Iqbal Open University, Islamabad/Pakistan
15:15	**Development, Manufacturing and Deployment of SOC-Based Products at SOLIDpower (A0502)**	**Transition Metal Elements as Ni/GDC modifiers for the Solid Oxide H2O Electrolysis; the case of Fe (B0502)**
	Massimo Bertoldi (1), Olivier Bucheli (2) and Andreas Pichler (1)	Charalampos Neofytidis (1,2), Evangelia Ioannidou (1,2), Fotios Zaravelis (1,2), Stylianos G. Neophytides (1), Dimitrios K. Niakolas (1)
		(1) Foundation for Research and Technology, Inst. of Chemical Engineering Sciences (FORTH/ICE-HT), Patras/Greece, (2) Dept. of Chemical Engineering, Uni of Patras, Patras/Greece
15:30	**Reversible SOC System Development and Testing: Status at AVL and Outlook (A0503)**	**Enhancing the catalytic activity of La0.3Ca0.7Fe0.7Cr0.3O3-δ (LCFCr) for CO2 electrolysis by in situ metal nanoparticle exsolution (B0503)**
	David Reichholf, Franz Koberg, Richard Schauperl, Martin Hauth	Haris Ansari, Adam Bass, Scott Paulson, Viola Birss
	AVL List GmbH, Graz/Austria	Dept. of Chemistry, Uni of Calgary, 2500 Uni Drive NW, Calgary/Canada
15:45	**Solid Oxide Cell Technology for Space Applications (A0504)**	**Review of Ni migration in SOC electrodes (B0504)**
	Brandon Buergler	Mogens Bjerg Mogensen (1), Ming Chen (1), Henrik Lund Frandsen (1), Christopher Graves (1), Anne Hauch (1), Peter Vang Hendriksen (1), Torben Jacobsen (2), Søren Højgaard Jensen (3), Theis Løve Skafte (1), Xiufu Sun (1)
	ESTEC, Noordwijk/The Netherlands	(1) Dept. of Energy Conversion and Storage, Technical Uni of Denmark (DTU), Lyngby/Denmark, (2) Dept. of Chemistry, Technical Uni of Denmark, Lyngby/Denmark, (3) DynElectro Aps, Gadstrup/Denmark
16:00	**Break - Join the www.EFCF.com/VirtualExhibiton or the www.EFCF.com/joinC - Community Networking**	

16:30	A06: Products and demonstrations	B06: Advanced characterization I
16:30	**Demonstration of 200kW SOFC power generation using cleaned bio-methane gas from waste water treatment (A0601)**	**Fuel Flexibility of SOFCs (B0601)**
	Kimito Kawamura (1,2), Kenichiro Takeda (1), Toshihiro Oshima (2), Tsutomu Kawabata (2), Shunsuke Taniguchi (2), Tomomasa Kanda (1), Kazunari Sasaki (2)	André Weber
	(1) Asahi Quality and Innovations ltd. Research & Development Center, Moriya-shi/Ibaraki/JAPAN, (2) Kyushu Uni Next-Generation Fuel Cell Research Center, Fukuoka-shi/Fukuoka/JAPAN	Inst. of Applied Materials (IAM), Karlsruhe/Deutschland
16:45	**Product development and experiences of a new Convion SOFC system (A0602)**	**Equivalent circuit model of a triple-carrier conductor with partially blocking electrodes (B0602)**
	Tuomas Hakala, Kim Åström, Erkko Fontell	Kotaro Okuyama (1), Keiji Yashiro (1), Yoshitaka Aoki (2), Tatsuya Kawada (1)
	Convion Oy, Espoo/Finland	(1) Graduate School of Environmental Studies, Tohoku University, Sendai/Japan, (2) Graduate School of Engineering, Hokkaido University, Sapporo/Japan
17:00	**Development and testing of a 25 kWe Large Stack Module for SOFC and SOE applications (A0603)**	**Impedance study of ceria-based electrodes reveals an excellent fuel electrode material for solid oxide cells (B0603)**
	Z. Wuillemin (1), E. Varkaraki (1), C. Beetschen1, Y. Antonetti (1), O. Bucheli (1), S.Diethelm (1), A. Nesci (1), M. Bertoldi (2), Srikanth S. (3), D. Ullmer (3)	Andreas Nenning (1), Cornelia Bischof (2), Matthias Gerstl (1), Jürgen Fleig (1), Martin Bram (2), Alexander K. Opitz (1)
	(1) SOLIDpower SA, Yverdon-les-Bains/Switzerland, (2) SOLIDpower S.p.A., Mezzolombardo/Italy, (3) German Aerospace Center (DLR), Inst. of Engineering Thermodynamics, Stuttgart/Germany	(1) TU Wien, Inst. of Chemical Technologies and Analytics , Vienna/Austria, (2) Forschungszentrum Jülich GmbH, Inst. of Energy and Climate Research, Materials Synthesis and Processing (IEK-1), Jülich/Germany
17:15	**Practical evaluation of Solid Oxide Fuel Cell (SOFC) – Micro Gas Turbine (MGT) Hybrid Power Generation System (A0604)**	**Carbon Tolerant Does Not Mean Carbon Free: Operando Studies of Carbon Accumulation on Infiltrated Ceramic SOFC/SOEC Electrodes (B0604)**
	Yasuharu Kawabata (1,3), Daishiro Takeda (4), Kazuyoshi Ochi (4), Hiroshi Fujiki (4), Toshihiro Oshima (2), Yuya Tachikawa (1), Shunsuke Taniguchi (1,2)	Robert A. Walker, Märtha M. Welander, Daniel B. Drasbaek, Marie L. Traulsen, Bhaskar R. Sudireddy, Peter Holtappels
	(1) Center for Coevlolutionary Research for Sustainable Communities, Kyushu University, Fukuoka/Japan, (2) Next-Generation Fuel Cell Research Center(NEXT-FC), Kyushu University, Fukuoka/Japan, (3) Digital Innovation Division, Tokyo Gas Co., Ltd., Yokohama/Japan, (4) Energy Solution Division, Tokyo Gas Co., Ltd., Minato-ku/ Japan	(1) Dept. of Chemistry and Biochemistry & Montana Materials Science Program, Bozeman/USA, (2) Dept. of Energy Storage and Conversion, Technical Uni of Denmark, Lyngby/Denmark
17:30	**Experimental study of large Solid Oxide Cell (SOC) reactor module in co-generation operation mode producing hydrogen and power (A0605)**	**Grain Boundary Diffusivity in LSCF (B0605)**
	Srikanth S (1), M. P. Heddrich (1), D. Ullmer (1), S. Asif Ansar (1), Z. Wuillemin(2), E. Varkaraki (2), C. Beetschen (2), Y. Antonetti (2)	Mathew Niania (1), Samuel Cooper (2), Daniele Pergolesi (3), Thomas Lippert (3), John Kilner (1)
	(1) German Aerospace Center (DLR), Inst. of Engineering Thermodynamics, Stuttgart/Germany, (2) SOLIDPower SA, Yverdon/Switzerland	(1) Dept. of Materials, Imperial College London, Royal School of Mines, London/UK, (2) Dyson School of Design Engineering, Imperial College London, Royal School of Mines, London/UK, (3) Paul Scherrer Institut, Villigen PSI/Switzerland
17:45	**La0.65Sr0.3Cr0.85Ni0.15O3-δ perovskite electrocatalyst for high temperature steam and dry CO2 electrolysis (A0606)**	**Exploitation of the surface chemistry of La0.6Sr0.4CoO3-δ thin-film solid-oxide electrodes for the improvement of solid/gas interfaces (B0606)**
	Diana M. Amaya-Dueñas (1), Matthias Riegraf (1), Andreas Nenning (2), Alexander K. Opitz (2), Rémi Costa (1), K. Andreas Friedrich (1)	Ozden Celikbilek (1), Andrea Cavallaro (1), Gwilherme Kerherve (1), Ainara Aguadero (1), John A. Kilner (1,2), Stephen J. Skinner (1)
	(1) German Aerospace Center (DLR), Inst. of Engineering Thermodynamics, Stuttgart/Deutschland, (2) Inst. of Chemical Technologies and Analytics, Vienna Uni of Technology, Vienna/Austria	(1) Dept. of Materials, Imperial College London, London/UK, (2) International Inst. for Carbon-Neutral Energy Research (I2CNER), Kyushu University, Fukuoka/Japan
18:00	**End of Sessions**	

09:00	A07: Keynote Grid Flexibility - Business Models	B07: Keynote about proton conducting SOC
09:00	**Where flexibility migth save your case, and at what cost (A0701)**	**Proton conducting ceramics – applications, status and prospects (B0701)**
	Christoph Imboden	J.M. Serra, S. Escolástico, L. Almar
	Lucerne Uni of Applied Sciences & Arts, Lucerne/Switzerland	Consejo Superior de Investigaciones Científicas (CSIC), Madrid/Spain
09:25	**5 Min to switch from A-Session - Session to B-Session - Session for B0801**	

09:30	A08: System design & performance	B08: Advanced characterization II
09:30	**Experimental analysis of a pressurized 30 kW SOFC system with fuel gas recirculation at reaction temperature (=A0807, presented here at A0801)**	**Oxygen surface exchange in lanthanum nickelates (B0808, presented here at B0801)**
	Marius Tomberg, Matthias Metten, Christian Schnegelberger, Marc P. Heddrich, S. Asif Ansar, K. Andreas Friedrich	Artur J. Majewski (1), Maxim Ananyev (2), Peter R. Slater (3), Robert Steinberger-Wilckens (1)
	German Aerospace Center (DLR), Inst. of Engineering Thermodynamics, Stuttgart/Deutschland	(1) School of Chemical Engineering, Uni of Birmingham, Birmingham/UK, (2) Inst. of High Temperature Electrochemistry, Yekaterinburg/Russia, (3) 2 School of Chemistry, Uni of Birmingham, Birmingham/UK
09:45	**Development of highly efficient SOFC system with CO2 separation technology (A0802)**	**Distribution of Electrochemical Reaction Sites in SOFC Composite Cathode Based on Isotope Labeling Coupled with Three-dimensional Electrochemical Simulation (B0802)**
	Tatsuki Dohkoh, Shunnosuke Akabane, Marie Tsuji, Tatsuya Nakajima, Yasuharu Kawabata, Takahiro Ide, Kazuo Nakamura, Toru Hatae	Takaaki Shimura (1,2), Tsuyoshi Nagasawa (3), Naoki Shikazono (2), Katsunori Hanamura (3)
	Tokyo Gas Co., Ltd., Fundamental Technology Dept., Yokohama/Japan	(1) Dept. of Mechanical Systems Engineering, Tokyo Uni of Agriculture and Technology, Tokyo/Japan, (2) Inst. of Industrial Science, The Uni of Tokyo, Tokyo/Japan, (3) School of Engineering, Tokyo Inst. of Technology, Tokyo/Japan
10:00	**Operating Experience with a 5kW-class Reversible Solid Oxide Cell System (A0803)**	**Nanoscale spectroscopy studies of long term operated solid oxide electrolysis cells (B0803)**
	Roland Peters, Wilfried Tiedemann, Ingo Hoven, Robert Deja, Nicolas Kruse, Qingping Fang, Ludger Blum, Ralf Peters	Aline Léon (1), Julie Villanova (2), Annabelle Brisse (1), Sabine Schlabach (3)
	Forschungszentrum Jülich GmbH, Inst. of Energy and Climate Research (IEK), Jülich/Germany	(1) European Inst. for Energy Research, Karlsruhe/Germany, (2) ESRF –The European Synchrotron, Grenoble/France, (3) Karlsruhe Inst. for Technology, Inst. for Applied Mat, Karlsruhe/Germany
10:15	**Design, manufacturing and operation of movable 2 x 10 kWe rSOC system (A0804)**	**Active thermography applied to solid oxide cells (B0804)**
	V. Saarinen (1), J. Pennanen (1), M. Kotisaari (1), O. Thomann (1), O. Himanen (1), S. Di Iorio (2), P. Hanoux (2), J. Aicart (2), K. Couturier (2), X. Sun (3), M. Chen (3), B. R. Sudireddy (3)	Guillaume Jeanmonod, Jan Van herle
	(1) VTT Technical Research Centre of Finland, Espoo/Finland, (2) Univ. Grenoble Alpes – CEA/LITEN, Grenoble/France, (3) Dept. of Energy Conversion and Storage, Technical Uni of Denmark, Lyngby/Denmark	Group of Energy Materials, Faculty of Engineering Science, Sion/Switzerland
10:30	**Break - Join the www.EFCF.com/VirtualExhibiton or the www.EFCF.com/joinC - Community Networking**	

11:00	A09: Emerging SO technology electrode investigation & modelling	B09: Lifetime: Stacks and cells
11:00	**Mixed-Ionic Transport Properties of Acceptor Doped Ceria Systems (A0901)**	**Long-term stability of SOC stacks under realistic operating conditions (B0901)**
	N. J Williams, S. J Skinner	Qingping Fang, Florian Thaler, Ute de Haart, Dominik Schäfer, Roland Peters, Ludger Blum
	Dept. of Materials, Imperial College London, London/UK	Forschungszentrum Jülich GmbH, Inst. of Energy and Climate Research (IEK), Jülich/Germany
11:15	**Advancements in ceramic nanocomposite fuel cell research and challenges (=A0909, presented here at A0902)**	**Post-test analysis of an SOFC after nearly 100,000h of stack operation (B0902)**
	Muhammad Imran Asghar (1,2), Peter Lund (2)	Norbert H. Menzler, Doris Sebold
	(1) Faculty of Physics and Electronic Science, Hubei University, Wuhan Hubei/China, (2) New Energy Technologies Group, Dept. of Applied Physics, Aalto Uni School of Science, Espoo/Finland	Forschungszentrum Jülich GmbH, Inst. of Energy and Climate Research (IEK), Jülich/Germany
11:30	**High-resolution modelling of SOFC stack layers (A0903)**	**Test and characterization of reversible solid oxide cells and stacks for innovative renewable energy storage (B0903)**
	Niklas Russner, Sebastian Dierickx, André Weber, Ellen Ivers-Tiffée	Anne Hauch* (1), Alexandra Ploner (2), Sergii Pylpko (3), Julie Mougin (4), Geraud Cubizolles (4)
	Inst. for Applied Materials (IAM-WET), Karlsruhe/Germany	(1) Dept. of Energy Conversion and Storage, Technical Uni of Denmark, Lyngby/Denmark, (2) SGL Carbon GmbH, Meitingen/Germany, (3) Elcogen AS, Tallinn/Estonia, (4) Univ. Grenoble Alpes, CEA/LITEN, Grenoble Cedex 9/France
11:45	**Interaction of BZCY with YSZ, NiO and sintering aids (=A0915, presented here at A0904)**	**Long-term steam electrolysis with an SOC with thin (40 µm) 3YSZ electrolyte and Ni/GDC cathode (B0904)**
	Xinge Zhang, Luigi Alde, Mark Robertson, Jason Fahlman	Annabelle Brisse (1), Josef Schefold (1), Christian Walter (2)
	EME Research Center, National Research Council Canada, Vancouver/Canada	(1) European Inst. for Energy Research (EIFER), Karlsruhe/Germany, (2) Sunfire GmbH, Dresden/Germany
12:00	**Modeling of microstructure evolution in solid oxide cells (A0905)**	**In-operando monitoring and lifetime improvement of SOFCs on single-cell and stack level (B0905)**
	Ming Chen (1), Kaiming Cheng (2), Huixia Xu (3), Lijun Zhang (3), Martina Trini (1), Salvatore De Angelis (1), Peter Vang Hendriksen (1)	Vanja Subotić (1), Mihails Kusnezoff (2), Stefan Pofahl (3), Vincent Lawlor (3), Benjamin Königshofer (2), Teko W. Napporn (4), Stefan Megel (2), Christoph Hochenauer (1)
	(1) Dept. of Energy Conversion and Storage, Technical Uni of Denmark, Lyngby/Denmark, (2) Shandong Provincial Key Lab. of High Strength Lightweight Metallic Materials, Advanced Materials Institute, Qilu Uni of Technology, Jinan/China, (3) State Key Lab. of Powder Metallurgy, Central South University, Changsha/China	(1) Inst. of Thermal Engineering, Graz Uni of Technology, Graz/Austria, (2) Fraunhofer-Institut für Keramische Technologien und Systeme IKTS, Dresden/Germany, (3) AVL List GmbH, Graz/Austria, (4) Uni of Poitiers, Institut de Chimie des Milieux et Matériaux de Poitiers (IC2MP), Poitiers/France
12:15	**Lifetime prediction of SteelCell® stacks using advanced multiphysics modelling (A0911, presented here at A0906)**	**Degradation analysis of CFY-stacks MK35x and Illusiveness of accuracy – a guide for exact measurement (B0906)**
	Ameir Mahgoub, Robert Leah, Duncan Gawel, Gavin Reade, Jack Howlett, Nick Lawrence, Subhasish Mukerjee, Mark Selby	Stefan Megel (1), Stefan Rothe (1), Viktar Sauchuk (1), Nikolai Trofimenko (1), Jochen Schilm (1), Mihails Kusnezoff (1), Martin Hauth (2), Christoph Sallai (2)
	Ceres Power Ltd., Horsham/UK	(1) Fraunhofer IKTS, Dresden/Germany, (2) AVL GmbH, Graz/Austria
12:30	**Lunch Break - Recreate and join the www.EFCF.com/VirtualExhibiton and go then towards www.EFCF.com/joinP - Poster Session & Community Network**	

13:15 A10: Poster Session II (covering All Session Topics)

15:00 A11: P3: Keynote Energy systems

15:00 **Smart Energy Systems and Electrolysers in Renewable Energy Systems (A1101)**

Brian Vad Mathiesen

Department of Planning, Aalborg University, København SV/Denmark

15:25 5 Min to switch from A-Session - Session to B-Session - Session for B1201

15:30	A12: SOC integration, Power-to-X, CO2 capture etc.	B12: Oxygen electrodes I
15:30	**Integration of carbonate looping and solid oxide electrolysis cell for CO2 capture and reduction (A1201)**	**Combined effects of A-site non-stoichiometry, crystal structure and microstructure for enhanced catalytic activity of (La,Sr)(Co,Fe)O3-δ cathodes for IT-SOFCs (B1210, presented here at B1201)**
	Chengzhi Guan (1,2), Yue Lu (1), Song Wan (1), Chunfeng Hong (1), Xianlong Du (1,2), Guoping Xiao (1,2), Zhongfeng Tang (1), Jian-Qiang Wang (1,2)	Ozden Celikbilek (1,2), Cam-Anh Thieu (3,4), Fabio Agnese (5), Eleonora Cali (2), Christian Lenser (6), Norbert H. Menzler (6), Ji-Won Son (3,4), Stephen J. Skinner (2), Elisabeth Djurado (1)
	(1) Shanghai Inst. of Applied Physics, Chinese Academy of Sciences, Jiading District/Shanghai, (2) Key Lab. of Interfacial Physics and Technology, Chinese Academy of Sciences, Jiading District/Shanghai	(1) Univ. Grenoble Alpes, Univ. Savoie Mont Blanc, CNRS, Grenoble/France, (2) Dept. of Materials, Imperial College London, London/United Kingdom, (3) Center for Energy Materials Research, Korea Inst. of Science and Technology (KIST), Seoul/Korea, (4) Division of Nano & Information Technology, KIST School, Korea Uni of Science and Technology (UST), Seoul/Korea, (5) Univ. Grenoble Alpes, Grenoble Cedex 9/France, (6) Forschungszentrum Jülich GmbH, Inst. of Energy and Climate Research: Materials Synthesis and Processing (IEK-1), Jülich/Germany
15:45	**Experimental analysis of SOE stacks under pressurized co- and CO2 electrolysis operation (A1202)**	**Improved mesoporous scaffolds for composite electrodes in solid oxide devices for direct hydrogen production (B1202)**
	Marc Riedel, Marc P. Heddrich, Asif Ansar, K. Andreas Friedrich	Simone Anelli (1), Federico Baiutti (1), Aitor Hornés (1), Lucile Bernadet (1), Marc Torrell (1), Albert Tarancón (1,2)
	German Aerospace Center (DLR), Inst. for Engineering Thermodynamics, Stuttgart/Deutschland	(1) Catalonia Inst. for Energy Research (IREC), Dept. of Advanced Materials for Energy, Barcelona/Spain, (2) ICREA: Catalan Institution for Research and Advanced Studies, Barcelona/Spain
16:00	**Break - Join the www.EFCF.com/VirtualExhibiton or the www.EFCF.com/joinC - Community Networking**	

16:30	A13: Products, demonstrations, novel concepts & BoP	B13: Cells, stacks, and interconnects
16:30	**SOFC technology for heavy-duty vehicle propulsion (A1301)**	**Conditioning optimization in Sandvik Sanergy® HT 441 after the forming process (B1301)**
	Marcus Taylor, Robert Steinberger-Wilckens	Carlos Bernuy-López, Pablo Collantes-Jiménez, Ulf Bexell, Jörgen Westlinder
	Centre for Fuel Cell & Hydrogen Research, School of Chemical Engineering, Uni of Birmingham, Birmingham/UK	Surface Research, Strategic Research, AB Sandvik Materials Technology, Sandviken/Sweden
16:45	**Protonic Ceramic Electrochemical Hydrogen Compression with Planar Cell Geometries (A1302)**	**Material development for operation of solid oxide cells under specific conditions (B1302)**
	Benjamin Kee (1), Sandrine Ricote (1), Robert J. Kee (1), W.G. Coors (2)	David Udomsilp (1), Christian Lenser (1), Olivier Guillon (1,2), Norbert H. Menzler (1)
	(1) Mechanical Engineering, Colorado School of Mines, Golden/USA, (2) Hydrogène Hélix, SAS, Cannes/France	(1) Forschungszentrum Jülich GmbH, Inst. of Energy and Climate Research, Materials Synthesis and Processing (IEK-1), Jülich/Germany, (2) Jülich Aachen Research Alliance: JARA-ENERGY, Jülich/Germany
17:00	**Demonstration of High-Temperature (Co-)Electrolysis Systems and their Evolution towards Multi-MW Scale (A1303)**	**New concepts for solid oxide cells manufacturing: The use of 3D printing technologies (B1308, presented here at B1303)**
	Konstantin Schwarze, Robert Blumentritt, Thomas Geißler, Hubertus Richter, Oliver Posdziech	Arianna Pesce (1)*, Maritta Lira Dos Santos (1), Natalia Kostretsova (1), Aitor Hornes (1), Alex Morata (1), Marc Torrell (1), Albert Tarancon (1,2)
	Sunfire GmbH, Dresden/Germany	(1) IREC, Catalonia Inst. for Energy Research, Jardins de les Dones de Negre 1, Barcelona/Spain, (2) ICREA, Passeig Lluís Companys 23, Barcelona/Spain
17:15	**SOE stack deterioration caused by reactant contaminations in realistic operation conditions (A1304)**	**Fabrication and testing of MnCo2O4 based interconnect protective coatings by spray pyrolysis (B1304)**
	Dominik Schäfer, Larissa Queda, Qingping Fang, Ludger Blum	Sebastian Molin (1), Bartosz Kamecki (1,2), Jakub Karczewski (2), Piotr Jasiński (2)
	Forschungszentrum Jülich GmbH, Inst. of Energy and Climate Research (IEK), Jülich/Germany	(1) Faculty of Electronics, Telecommunications and Informatics, Gdańsk/Poland, (2) Faculty of Applied Physics and Mathematics, Gdańsk Uni of Technology, Gdańsk/Poland
17:30	**Effect of Temperature and Water Content on the Oxidation Behavior and Cr Evaporation of High-Cr Steels for SOFC Cathode Air Preheater (A1305)**	**Can Solid Oxide Fuel Cell be Operated below the Temperature of Self-Ignition of Hydrogen and Oxygen? (B1305)**
	Kun Zhang, Ahmad El-kharouf, Robert Steinberger-Wilckens	Ulf Bossel
	Centre for Fuel Cell & Hydrogen Research, School of Chemical Engineering, Uni of Birmingham, Birmingham/UK	ALMUS AG, Oberrohrdorf/Switzerland
17:45	**Solid oxide electrolyzer cells prototype based on self-produced electrode supported tape cast cells and powder metallurgy (PM) interconnects: The CoSin Project (A1308, presented here at A1306)**	**Comparison of different SOFC types running on bio-syngas at moderate working temperatures (B1312, presented here at B1306)**
	M. Carmen Monterde (1,2,3), L. Bernadet (2), A. Rodriguez (1), J. Arcos (1), F. Ramos (4), J. A. Calero (1), E. Jimenez-Piqué (3), M. Torrell (2)	Benjamin Steinrücken (1), Michael Hauser (1), Stephan Herrmann (1), Christian Lenser (2), Sebastian Fendt (1), Hartmut Spliethoff (1)
	(1) AMES PM Technical Center, Barcelona/Spain, (2) IREC, Catalonia Inst. for Energy Research, Dept. Advanced Materials for Energy, Barcelona/Spain, (3) Universitat Politécnica de Catalunya (UPC- EEBE), Barcelona/Spain, (4) FAE, Barcelona/Spain	(1) Technische Universität München, Inst. for Energy Systems, Garching/Germany, (2) Forschungszentrum Jülich GmbH, IEK-1, Jülich/Germany
18:00	**End of Sessions**	

19:30 This would be the day of the famous Dinner on the Lake.
The best boat party on lake Lucerne with a lot of music & dancing.
This year it will not take place and we can not wait for next time.

09:00	A14: Proton Conducting Cells, Stacks and materials	B14: Oxygen electrodes II
09:00	**Development Activities for Realizing kW-scale Protonic Ceramic Fuel Cell Stacks and Systems (A1401)** R.J. Braun, K.Ferguson, C.Duan, C. Karakaya, R. Kee, H. Zhu, N. Sullivan, R. O'Hayre (1), E. Tang, M. Pastula, A. Wood, T. Joia (2) (1) Colorado School of Mines, Golden/Colorado/U.S.A, (2) Fuel Cell Energy, Calgary/Canada	**La2Ni0.9Co0.1O4+δ – a Sr-free air electrode with fast oxygen exchange kinetics for SOECs. SOFCs. and RSOCs (B1401)** Sarah Eisbacher (1), Andreas Egger (1), Edith Bucher (1), Vanja Subotić (2), Christoph Hochenauer (2), Werner Sitte (1) (1) Montanuniversitaet Leoben, Leoben/Austria, (2) Graz University of Technology, Institute of Thermal Engineering, Graz/Austria
09:15	**On the development of planar metal supported electrochemical cells with proton conducting ceramics (A1402)** Rémi Costa (1), Haoyu Zheng (1), Feng Han (1), Noriko Sata (1), Amir Masoud Dayaghi (2), Truls Norby (2), Marit Stange (3) (1) German Aerospace Center (DLR), Inst. of Engineering Thermodynamics, Stuttgart/Deutschland, (2) Centre for Materials Science and Nanotechnology, Uni of Oslo, Oslo/Norway, (3) SINTEF, Oslo/Norway	**Ln2Ni1-xCoxO4+δ (Ln = La, Pr or Nd, x= 0, 0.1, 0.2) as high performance and durable oxygen electrodes for solid oxide cells (B1402)** V. Vibhu (1), I.C. Vinke (1), R.-A. Eichel (1,2), L.G.J. de Haart (1) (1) Inst. of Energy and Climate Research, Fundamental Electrochemistry (IEK-9), Forschungszentrum Jülich GmbH, Jülich/Germany, (2) Inst. of Physical Chemistry, RWTH Aachen University, Aachen/Germany
09:30	**Study of the oxygen diffusion behaviour of (La0.8Sr0.2)0.95Cr0.5Fe0.5O3-δ A-site deficient perovskites in humid conditions (A1403)** Zijie Sha*, Stephen J. Skinner Dept. of Materials, London/UK	**The reactivity and stability of La-nickelate cathode materials (B1412, presented here at B1403)** C.M. Harrison (1), P.R. Slater (2), R Steinberger-Wilckens (1) (1) Centre for Fuel Cell and Hydrogen Research, School of Chemical Engineering, , (2) School of Chemistry, University of Birmingham, Birmingham/U.K.
09:45	**Electrodes and operating conditions for high temperature electrolysis of CO2 for Mars exploration (A1404)** Ivar Wærnhus (1), Nelson Thambiraj (1), Jørgen Svendby (1), Arild Vik (1), Brandon Buergler (2) (1) Prototech AS, Bergen/Norway, (2) ESTEC, Noordwijk/The Netherlands	**Performance of Ruddlesden-Popper-Type Oxides as Air Electrodes for Solid Oxide Cells (B1404)** Werner Sitte, Andreas Egger, Edith Bucher, Christian Berger, Sarah Eisbacher, Nina Schrödl Montanuniversitaet Leoben, Chair of Physical Chemistry, Leoben/Austria
10:00	**Production of CO from CO2 using low-temperature, molten carbonate and solid oxide electrolysis (A1211, presented here at A1405)** Rainer Küngas, Peter Blennow, Thomas Heiredal-Clausen, Tobias Holt Nørby, Jeppe Rass-Hansen, Poul Georg Moses Haldor Topsoe A/S, Lyngby/Denmark	**Nanocrystalline La0.6Sr0.4CoO3-δ oxygen electrodes fabricated by spray pyrolysis for solid oxide cells operating at intermediate temperatures (B1410, presented here at B1405)** Bartosz Kamecki (1,2), Jakub Karczewski (2), Piotr Jasiński (1), Sebastian Molin (1) (1) Faculty of Electronics, Telecommunications and Informatics, Gdańsk/Poland, (2) Faculty of Applied Physics and Mathematics, Gdańsk Uni of Technology, Gdańsk/Poland
10:15	**Intensification of Catalytic Reactors using Electrochemical Protonic Cells (A1406)** J.M.Serra, D.Catalán-Martínez, S.Escolástico, S.Remiro-Buenamañana, L. Almar, M. Tarach, M.Valls Instituto de Tecnología Química (Universitat Politècnica de València – Consejo Superior de Investigaciones Científicas), Valencia/Spain	**Influence of the defect chemistry in calcium-doped lanthanum manganese perovskites on oxygen evolution reactions (OER) and oxygen reduction reactions (ORR) (B1406)** Sabrina A. Heuer (1,2), Trutz Theuer (1,2), Roland Schierholz (1),Hermann Tempel (1), Izaak C. Vinke (1), Lambertus G.J. de Haart (1), (2), Gjorgij Nusev (2), Hartmuth Schröttner (3), Christoph Hochenauer (1),Hans Kungl (1), Rüdiger-A. Eichel (1,2) (1) Forschungszentrum Juelich GmbH, Inst. of Energy and Climate Research, Juelich/Germany, (2) RWTH Aachen University, Inst. of Physical Chemistry, Aachen/Germany
10:30	**Break - Join the www.EFCF.com/VirtualExhibiton or the www.EFCF.com/joinC - Community Networking**	

Morning - A-Session | Friyday, 23 October 2020 | B-Session - Morning

11:00	A15: Cell, stack & system modelling and optimization	B15: Lifetime: Cells, components and interfaces
11:00	**Fabrication of Porous Structure with 3D Printing Technology (A1501)**	**see B1507, presenting here. (B1501)**
	Kotaro Miyamoto (1), Hirotaka Koga (1),Masaaki Izumi (1), Masahiko Mizui (2), Hidekazu Nishiguchi (3) (1) The Uni of Kitakyushu, Fukuoka/Japan, (2) Kyushu Kyoritsu University, Fukuoka/Japan, (3) Meiryo Corporation, Fukuoka/Japan, 1-2, Kurosaki shiroishi, Yahatanishi-ku, Kitakyushu, Fukuoka/Japan.	
11:15	**A methodology for the assessment of sealing joints in high-temperature SOFC stacks (A1502)**	**Repairing solid oxide cell electrodes during operation (B1502)**
	Sophia Bremm (1), Sebastian Dölling (1), Wilfried Becker (1), Ludger Blum (2), Roland Peters (2), Jürgen Malzbender(2), Detlef Stolten (2) (1) Technische Universität Darmstadt, Fachgebiet Strukturmechanik, Darmstadt/Germany, (2) Forschungszentrum Jülich GmbH, Jülich/Germany	Theis L. Skafte (1,2,3), Frederik Schweer-Gori (1), Søren B. Simonsen (1), Marie L. Traulsen (1), Bhaskar R. Sudireddy (1), Michael C. Tucker (2), Christopher Graves (1,3,4) (1) Technical Uni of Denmark, Dept. of Energy Conversion and Storage, Lyngby/Denmark, (2) Lawrence Berkeley National Laboratory, Energy Storage and Distributed Resources Division, Berkeley/USA, (3) Noon Energy Inc, Alto/USA, (4) Cyclotron Road Fellow, Lawrence Berkeley National Laboratory, Berkeley/USA
11:30	**Multi-scale model to describe the local degradation and mechanical failures in a SOC stack (A1503)**	**Post-mortem analysis from barrier layer's large-area cells made by PLD aged for 14.000 h in SOFC mode (B1503)**
	Henrik Lund Frandsen, Omid Babaie Rizvandi, Xing-Yuan Miao, Aiswarya Krishnakumar Padinjarethil, Anke Hagen, Anne Hauch Dept. of Energy Conversion and Storage, Technical Uni of Denmark (DTU), Lyngby/Denmark	L. Bernadet (1), M. Torrell (1), D. Montinaro (2), A. Morata (1), A. Tarancón (1,3) (1) IREC, Catalonia Inst. for Energy Research, Dept of Advanced Materials for Energy Applications, Besós/Barcelona, (2) SOLIDPower SpA, Mezzolombardo/Italy, (3) ICREA, Barcelona/Spain
11:45	**Reaction mechanism analysis and microscopic modeling for co-electrolysis (A1504)**	**Evolutions of microstructure and performance of Ni-GDC and Ni-YSZ fuel electrodes under reversible operation (B1504)**
	M. Nohl (1), L. Dittrich (1), E.E. Jaekel (1), I.C. Vinke (1), L.G.J. de Haart (1), R. A. Eichel (1,2) (1) Inst. of Energy and Climate Research, Fundamental Electrochemistry (IEK-9), Forschungszentrum Jülich GmbH, Jülich/Germany, (2) Inst. of Physical Chemistry, RWTH Aachen University, Aachen/Germany	Anna Sciazko (1,2), Takaaki Shimura (1,3), Yosuke Komatsu (1), Naoki Shikazono (1) (1) Inst. of Industrial Science, the Uni of Tokyo, Tokyo/Japan, (2) AGH Uni of Science and Technology, Krakow/Poland, (3) Tokyo Uni of Agriculture and Technology, Tokyo/Japan
12:00	**Reaction mechanisms and durability of LSCF and LSCF-CGO electrodes: a coupled approach with elementary kinetic modelling and long-term testing under aggravated conditions (A1505)**	**Towards stable SOEC operation: identification of degradation-inducing operating parameters and degradation minimization by interlayer variation (B1509, presented here at B1505)**
	E. Effori (1,2), E. Siebert (2), M. Petitjean (1), L. Dessemond (2), J. Laurencin (1) (1) Univ. Grenoble Alpes – CEA/LITEN, Grenoble/France, (2) Univ. Grenoble Alpes, Univ. Savoie Mont Blanc, CNRS, Grenoble/France	Vanja Subotić (1,2), Shotaro Futamura (2), George F. Harrington (3,4), Junko Matsuda (3), Katsuya Natsukoshi (2), Kazunari Sasaki (2,3,4) (1) Inst. of Thermal Engineering, Graz Uni of Technology, Graz/Austria, (2) Dept. of Hydrogen Energy Systems, Faculty of Engineering, Kyushu University, Fukuoka/Japan, (3) Center for Co-Evolutional Social Systems (CESS), Kyushu Uni Fukuoka/Japan, (4) Next-Generation Fuel Cell Research Center (NEXT-FC), Kyushu University, Fukuoka/Japan
12:15	**Lifetime prediction of high temperature fuel cells using machine learning (A1506)**	**Evaluation of the stability of Ni/CGO-based electrolyte-supported cells in co-electrolysis (B1506)**
	Aiswarya Krishnakumar Padinjarethil, Stefan Pollok, Anke Hagen Dept. of Energy Conversion and Storage, Technical Uni of Denmark (DTU), Lyngby/Denmark	Matthias Riegraf (1), Diana M. Amaya-Dueñas (1), Alexander Surrey (2), Rémi Costa (1) (1) German Aerospace Center (DLR), Inst. of Engineering Thermodynamics, Stuttgart/Deutschland, (2) Sunfire GmbH, Dresden/Deutschland
12:30	**Lunch Break - Recreate and join the www.EFCF.com/VirtualExhibiton and go then towards www.EFCF.com/joinP - Poster Session & Community Network**	

Afternoon - A-Session | Friday, 23 October 2020 | B-Session - Afternoon

13:30	A16: System design & performance & BoP	B16: Lifetime: Interconnects and contact layers
13:30	**Results of 5 kW SOFC CHP system development in the SOFC5-60 project (A1601)**	**In-situ diagnosis for chromium and silicon poisoning of porous air electrodes (B1601)**
	Christopher Sallai, Stephan Weißensteiner, Michael Seidl, Stephan Pickelberger, Martin Hauth AVL List GmbH, Graz/Austria	Andreas Egger, Timothy Hofmann, Edith Bucher, Werner Sitte Montanuniversitaet Leoben, Chair of Physical Chemistry, Leoben/Austria
13:45	**Thermal Integration of a 150 kW SOEC System within a Nuclear Power Plant Facility (A1602)**	**Inkjet printing of Cu-Co-Mn Oxide spinel as protective coating on solid oxide fuel cell interconnects (B1602)**
	Joshua Mermelstein, Tyler Westover, Richard Boardman Idaho National Laboratory, Idaho Falls/USA	Samaneh Daviran, Manuel Bianco, Jan Van Herle Group of Energy Materials (GEM), Lausanne/Switzerland
14:00	**Results from the operation of the first industrial size biogas-fed SOFC plant in Europe (A1603)**	**Characterization of Interconnects Operated in Real Stacks up to 9000 hours in a reversible mode (B1603)**
	M Acri, M. Gandiglio, T. Hakala, A. Hawkes, M. Rautanen, M. Santarelli Dept. Of Energy DENERG, Politecnico di Torino, Torino/Italy	Paolo Piccardo (1,2), Roberto Spotorno (1,3), Giorgia Ghiara (1), Valeria Bongiorno (1) (1) Dept. Of Chemistry and Industrial Chemistry, Uni of Genoa, Genoa/Italy, (2) CNR-ICMATE, Genova/Italy, (3) CNR-IMEM, Genova/Italy
14:15	**SchIBZ ® - experiences with liquid fuelled SOFC for ship applications (A1604)**	**not presented** **Corrosion Issues of Metallic Materials in CO2/H2O Co-Electrolysis Systems for Power-to-X Application (B1604)**
	Keno Leites thyssenkrupp Marine Systems GmbH, Hamburg/Germany	Joanna Zurek (1), Nikolaos Margaritis (2), Norbert H. Menzler (3), Willem J. Quadakkers (1), Dmitri Naumenko (1) (1) Inst. of Energy and Climate Research IEK-2, Forschungszentrum Jülich GmbH, Jülich/Germany, (2) Engineering and Technology ZEA-1, Forschungszentrum Jülich, 52425 Jülich/Germany, (3) Inst. of Energy and Climate Research IEK-1, Forschungszentrum Jülich, Jülich/Germany
14:30	**Online characterization of operational parameters in a SOFC-system with anode-exhaust gas recirculation by oxygen sensors (A1611, presented here A1605)**	**The Influence of Different Parameters on the Dual Atmosphere Effect Observed in Simulated Solid Oxide Fuel Cell Conditions (B1605)**
	Felix Schaefer (1), Sebastian Egger (1), Dietmar Steiner (1), Rüdiger-A. Eichel (2) (1) Robert Bosch GmbH, Renningen/Germany, (2) Institut für Energie- und Klimaforschung (IEK-9), Forschungszentrum Jülich, Jülich/Germany	Alberto Visibile, Kerem Gündüz, Claudia Göbel, Jan-Erik Svensson, Jan Froitzheim Energy and Materials, Chemistry and Chemical Engineering, Chalmers Uni of Technology, Gothenburg/Sweden
14:45	**Dynamic Modeling of Concentrated Solar-Integrated Reversible Solid Oxide Cell Systems for Renewable and Zero-Carbon Hydrogen Production (A1606)**	**Application of composite coatings as protection/contacting layers for metallic high-chromium-content SOFC interconnect material (B1607, presented here at B1606)**
	Jun Yong Kim, Luca Mastropasqua, Alireza Saeedmanesh, Jack Brouwer Advanced Power and Energy ProgramEngineering Lab. Facility, Uni of California, Irvine/USA	Viktar Sauchuk (1), Nikolai Trofimenko (1), Stefan Megel (1), Stefan Rothe (1), Jochen Schilm (1), Martin Andritschky (2), Michael Hiller (2), Mihails Kusnezoff (1) (1) Fraunhofer IKTS, Dresden/Germany, (2) High Tech Coatings GmbH - a Miba Group company, Vorchdorf/Austria
15:00	**5 Min to switch to A-Session - Session for A1701**	

15:05	**A17: P4: Closing Ceremony** **Keynote by the EFCF Gold Medal of Honour Winner 2020**
15:05	**Summary by the Chairs (A1701)** Anke Hagen, Peter Vang Hendriksen Technical University of Denmark, Lyngby/Denmark
15:20	**Information on Next EFCF:** **EFCF 2022 15th European SOFC & SOE Forum** **EFCF 2021 9th FC, Electrolyser & H2 Processing Forum (A1702)** Olivier Bucheli (1), Thomas Schmidt (2), Michael Spirig (1) (1) European Fuel Cell Forum, Lucerne/Switzerland, (2) Paul Scherer Institut, Villigen PSI/Switzerland,
15:30	**Christian Friedrich Schönbein Award** **for the Best Poster, Best Science Contribution, Medal of Honour (A1703)** Peter Vang Hendriksen, Anke Hagen Technical University of Denmark, Lyngby/Denmark
15:40	**Gold Medal Winner Keynote 2020** **History, status and prospects of SOC Systems (A1704)** Ludger Blum Forschungszentrum Jülich, Jülich/Germany
16:05	**Thank you and Closing by the Organizers (A1705)** Olivier Bucheli, Michael Spirig European Fuel Cell Forum, Luzern/Switzerland
16:15	**End of Sessions - End of Conference** **Virtual Good bye coffee and individual refreshments** **with dreams to travel once again to Lucerne. Bye-Bye**

EFCF 2020
14th European SOFC & SOE Forum
20 - 23 October 2020

Poster List

Virtually presented - On-Demand available (see gray background, dark gray, when it is also orally presented in the conference)

- Pitches on www.EFCF.com/**Lobby** ➔ EFCF Public Zone
- Full Presentations on www.EFCF.com/**Lounge** ➔ EFCF Member Zone

A03 Poster Session I covering All Session Topics	Wednesday, 21 October 2020	Afternoon 13.15 - 15:00
A09 Poster Session II covering All Session Topics	Thursday, 22 October 2020	Afternoon 13.15 - 15:00

A03: Technology status at industry and major groups I

Evaluating the market attractiveness for Fuel Cell micro-Cogeneration units by applying a Multi- Criteria Evaluation (MCE) (A0307)
Tanaka Mbavarira, Marco Kunz,
Lucerne University of Applied Sciences and Arts (HSLU), Horw/Lucerne

Development of 1 kW-class ammonia-fueled solid oxide fuel cell stack (A0308)
Masashi Kishimoto (1), Hiroki Muroyama (2), Shinsuke Suzuki (3), Masaki Saito (3), Takeshi Koide (3), Yosuke Takahashi (3), Toshitaka Horiuchi (4), Hayahide Yamasaki (4), Shohei Matsumoto (5), Hidehito Kubo (5), Naoya Takahashi (6), Akihiro Okabe (6), Satoshi Ueguchi (7), Munsuk Jun (7), Akira Tateno (7), Takahiro Matsuo (7), Toshiaki Matsui (2), Hiroshi Iwai (1), Hideo Yoshida (1), Koichi Eguchi (2)
(1) Dept. of Aeronautics and Astronautics, Kyoto University, Nishikyo-ku, Kyoto/Japan,
(2) Dept. of Energy and Hydrocarbon Chemistry, Kyoto University, Nishikyo-ku, Kyoto/Japan,
(3) Noritake Co., Ltd., Aichi/Japan,
(4) Nippon Shokubai Co., Osaka/Japan,
(5) Toyota Industries Corporation, Aichi/Japan,
(6) Mitsui Chemicals Inc., Chiba/Japan,
(7) IHI Corporation, Kanagawa/Japan

The analysis of the status of industrial ecology system and technical level in Korea's fuel cell technology sector (A0309)
Yoo Ran,
Seongkon Lee,
Energy Policy Research Center, Korea Institute of Energy Research, Daejeon/Republic of Korea

A06: Products and demonstrations

Development Of A High-Efficiency, Low-Cost Hybrid SOFC/Internal Combustion Engine Power Generator (A0608)
R.J. Braun*, N.P. Sullivan, D. Wahlstrom (1), R. Danforth (2), T. Bandhauer, D. Olsen, B. Windom (3)
(1) Colorado School of Mines, Golden/Colorado/U.S.A,
(2) Kohler Power Systems, Wisconsin/U.S.A,
(3) Colorado State University, Collins/Colorado/U.S.A

SOFC Hybrid as Solution for Bus & Truck Electrification (A0609)
Bernd Reiter, Thomas Krauss, Raphael Neubauer, Martin Hauth, Jürgen Rechberger
AVL List GmbH, Graz/Austria

A08: System design & performance

Experimental analysis of a pressurized 30 kW SOFC system with fuel gas recirculation at reaction temperature (A0807, orally presented at A0801)
Marius Tomberg, Matthias Metten, Christian Schnegelberger, Marc P. Heddrich, S. Asif Ansar, K. Andreas Friedrich
German Aerospace Center (DLR), Inst. of Engineering Thermodynamics, Stuttgart/Deutschland

The impacts of collaborations in the development of Solid oxide Fuel Cell technologies during 2000-2019: A bibliometric analysis (A0808)
Osaze Omoregbe, Ahmad El-kharouf, Robert Steinberger-Wilckens
Centre for Fuel Cell & Hydrogen Research, School of Chemical Engineering, Uni of Birmingham, Birmingham/UK

Integration and Operation of 20kW-HTSE Using SOC Technology to Produce Green Hydrogen (A0809)
Guoping Xiao, Xianlong Du, Chunfeng Hong, Huijuan Yan, Jian-Qiang Wang*
Center for Thorium Molten Salt Reactor System, Shanghai Inst. of Applied Physics, Chinese Academy of Sciences, Shanghai/China

Teaching FCH Technologies in a Masters' Course across Europe (A0810)
Robert Steinberger-Wilckens (1), Aravind Purushothaman Vellayani (2), Massimo Santarelli (3), Yegor Brodnikovskyi (4), Lars N. Cleeman (5), Karel Bouzek (6), Jan Van herle (7), Jean-Luc Delplancke (8), Ioan Iordache (9), Florence Druart (10), Vladimir Molkov (11), Olaf Jedicke (12)
(1) Uni of Birmingham, Birmingham/UK,
(2) TU Delft/Hanze Universiteit, Groningen/The Netherlands,
(3) Politecnico di Torino, Torino/Italy,
(4) KPI, Kyiv/Ukraine,
(5) DTU, Lyngby/Denmark,
(6) VSCHT, Prague/Czech Republic,
(7) EPFL, Sion/Switzerland.

B03: Manufacturing Processes

Characterization of femtosecond-laser-structured solid oxide electrolysis cell (B0308)
Tobias Marquardt (1), Andreas Gabler (2), Stephan Kabelac (1)
(1) Inst. of Thermodynamics, Leibniz Uni Hannover, Hannover/Germany,
(2) Forschungszentrum Energiespeichertechnologien, TU Clausthal, Goslar/Germany

Thin-film Gd-doped Ceria Diffusion Barrier Layers for Electrolyte Supported Solid Oxide Cells (B0309, orally presented at B0302)
Feng Han (1), Matthias Riegraf (1), Christian Geipel (2), Christian Walter (2), Rémi Costa (1)
(1) Inst. of Engineering Thermodynamics, German Aerospace Center (DLR), Stuttgart/Deutschland,
(2) Sunfire GmbH, Dresden/Germany

Additive manufacturing-based 3D printed Solid Oxide Fuel Cells (B0312)
Shrikant S. Kawale, Ozden Celikbilek, Chenyang Liao, Sivaprakash Sengodan, Stephen J. Skinner
Dept. of Material, Imperial College London,Royal School of Mines, London/UK

Large cell, short-term stability testing of Au-Mo- modified Ni/GDC for solid oxide co-electrolysis (B0313)
Nelson Thambiraj (1), Ivar Warnhus (1), Arild Vik (1), Charalampos Neofytidis (2), Evangelia Ioannidou(2), Dimitris K. Niakolas (2), Vaibhav Vibhu (3), Izaak C. Vinke (3)
(1) Prototech AS, Bergen/Norway,
(2) Foundation for Research and Technology, Inst. of Chemical Engineering Sciences, Patras/Greece,
(3) Inst. of Energy and Climate Research, IEK-9: Fundamental Electrochemistry, Forschungszentrum Jülich GmbH, Jülich/Germany

Fabrication of SOFC Stacks with Metal-Brazed Separator for Enhanced Durability under Thermal Cycling (B0314)
Hyeon-Jin Kim, Kyong Sik Yun, Ji Heang Yu
Korea Inst. of Energy Research, Daejeon/Republic of Korea

Development and characterization of metal-supported solid oxide fuel cell with high volumetric density (B0315)
Jaeseok Lee, Kunho Lee, Joongmyeon Bae
Korea Advanced Inst. of Science and Technology, Daejeon/Republic of Korea

Performances and durability of solid oxide cells manufactured with graded electrodes (B0316)
Pierre Coddet (1), Daniela Neacsa (2), Cecile Autret (2), Jérôme Laurencin (3), Julien Vulliet (1)
(1) CEA Le Ripault, Monts/France,
(2) Université de Tours, CNRS, GREMAN UMR7347, Tours/France,
(3) Univ. Grenoble Alpes – CEA/LITEN, Grenoble/France

Novel Co- and Ni- free oxygen electrode architecture with a patterned electrode/electrolyte interface (B0317)
Claire Ferchaud, Loek Berkveld, Miranda Heijink-Smith, Frans van Berkel, Yvonne van Delft
ECN part of TNO, ZG Petten/The Netherlands

Characteristics of solid oxide fuel cell components fabricated by ultrasonic spray coating process (B0318)
Seokhee, Youngwook Lee, Taeho Shin
Energy & Environmental Division, Korea Inst. of Ceramic Engineering and Technology, Gyeongsangnam-do/Republic of Korea

Engineering and optimization of electrode/electrolyte interfaces to increase solid oxide fuel cell (SOFC) performances (B0319)
Rossen Tchakalov (1), A. Chesnaud (1), A. Thorel (1), G. Dezanneau (2)
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(2) CENTRALESUPELEC, Université Paris-Saclay, Gif-sur-Yvette/France

B05: Fuel electrodes

Digital Materials Design (DMD) of SOFC electrodes (B0507)
L. Holzer (1)*, Ph. Marmet (1), Th. Hocker (1), J. G. Grolig (2), A. Mai (2), M. Fingerle (3), A. Wiegmann (3), M. Neumann (4), V. Schmidt (4)
(1) Zurich Uni of Applied Sciences, ICP, Winterthur/Switzerland,
(2) Hexis AG, Winterthur/Switzerland,
(3) Math2Market GmbH, Kaiserslautern/Germany,
(4) Uni of Ulm, Dept. of Stochastics, Ulm/Germany

(8) Uni Libre de Bruxelles, Bruxelles/Belgium,
(9) UPB Bucharest, Bucharest/Romania,
(10) INP, Grenoble/France,
(11) Ulster Uni, Ulster/Northern Ireland, (12) KIT, Karlsruhe/Germany

Operation Characteristics according to Steam Temperature of External Steam-related SOEC System (A0813)
Young Sang Kim (1), Young Duk Lee (1,2), Kook Young Ahn (1,2)
(1) Dept. of Clean Fuel and Power Generation, Korea Inst. of Machinery & Materials (KIMM), Daejeon/South Korea,
(2) Uni of Science and Technology (UST), Daejeon/South Korea

A09: Emerging SO technology electrode investigation and modelling

Advancements in ceramic nanocomposite fuel cell research and challenges (A0909, orally presented at A0902)
Muhammad Imran Asghar (1,2), Peter Lund (2); (1) Faculty of Physics and Electronic Science, Hubei University, Wuhan Hubei/China, (2) New Energy Technologies Group, Dept. of Applied Physics, Aalto Uni School of Science, Espoo/Finland

Lifetime prediction of SteelCell® stacks using advanced multiphysics modelling (A0911, orally presented at A0906)
Ameir Mahgoub, Robert Leah, Duncan Gawel, Gavin Reade, Jack Howlett, Nick Lawrence, Subhasish Mukerjee, Mark Selby
Ceres Power Ltd., Horsham/UK

Model based engineering for improved SOFC system development (A0912)
Raphael Neubauer, Thomas Krauss, Bernd Reiter, Juergen Rechberger
AVL List GmbH, Graz/Austria

Transmission Line Modeling of Composite Electrodes (A0913)
Sebastian Dierickx, Florian Wankmüller, André Weber, Ellen Ivers-Tiffée
Inst. of Applied Materials (IAM), Karlsruhe/Deutschland

CFD simulation of SOC stack layer under fuel cell and electrolysis conditions (A0914)
Stephan Herrmann (1), Sebastian Wilhelm (1), Maximilian Hauck (1), Felix Fischer (1), Jeremias Weinrich (2), Matthias Gaderer (2), Hartmut Spliethoff (1)
(1) Lehrstuhl für Energiesysteme, Technische Universität München (TUM), Garching/Germany,
(2) Professur für Regenerative Energiesysteme, Technische Universität München, Straubing/Germany

Interaction of BZCY with YSZ, NiO and sintering aids (A0915, orally presented at A0904)
Xinge Zhang, Luigi Alde, Mark Robertson, Jason Fahlman
EME Research Center, National Research Council Canada, Vancouver/Canada

Effect of the Porosity of Cathode Layers on the Performance of Solid Oxide Fuel Cells (A0916)
N. Alhazmi (1), G.N.Almutairi (2), Feraih Alenazey (2), B. AlOtaibi(2)
(1) Materials Science Research Institute, ,
(2) Energy Research Institute, King Abdul Aziz City for Science and Technology (KACST), Riyadh/Saudi Arabia

Multiphase-field simulations of nickel-coarsening in SOFC-anodes (A0917)
Paul W. Hoffrogge (1), Daniel Schneider (1,2), Florian Wankmüller (1), André Weber (1), Patricia Haremski (3), Anika Marusczyk (3), Matthias Wieler (3), Piero Lupetin (3), Britta Nestler (1,2)
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(2) Inst. of Digital Materials Science (IDM), Karlsruhe Uni of Applied Sciences, Karlsruhe/Deutschland,
(3) Robert Bosch GmbH, Renningen/Deutschland

Transient Analysis of the solid oxide fuel cell coupled absorption refrigeration system for refrigerated transportation (A0918)
Bhargav Pandya, Ahmad El-kharouf, Robert Steinberger-Wilckens
Centre for Fuel Cell & Hydrogen Research, School of Chemical Engineering, Uni of Birmingham, Birmingham/UK

A study of Surface modified Ba(Sr)Co(Fe)O3 perovskite electrocatalyst for Oxygen Electrode Reaction beyond Room Temperature Application (A0919)
Kim Han Seul, Lee Young Wook, Kwang Chul Roh, Shin Tae Ho
(1) Energy & Environmental Division, Korea Inst. of Ceramic Engineering & Technology (KICET), Jinju-si/South Korea,
(2) Dept. of Nanofusion Technology, Pusan National University, Busan/Republic of Korea,
(3) Dept. of Applied Science for Electronics and Materials, Kyushu University, Fukuoka/Japan

High performance BaZrO3 based oxide ion electrotyle for Solid oxide fuel cells (A0920)
Akanksha Yadav,
Preetam Singh,
Department of Ceramic Engineering, Varanasi/India

Investigating Ruddlesden-Popper (n=1) oxide materials for hydrogen production via chemical looping water splitting (A0921)
George Wilson, Andrea Cavallaro, Ainara Aguadero
Dept. of Materials, Imperial College London, London/UK

High-performance backbone-supported BaZr0.8Ce0.05Y0.15O3-d systems for membrane reactors with multi-product streams (A0923)
S. Robinson, H. Tempel, H. Kungl, R. Eichel
Inst. of Energy and Climate Research - Fundamental Electrochemistry (IEK-9),Forschungszentrum Jülich GmbH, Jülich/Germany

Design of Multiple Repetitive Electrolyte Structure to Improve Thermal Durability of Solid Oxide Fuel Cell Using Thin Film Electrolyte (A0924)
Taehong Kim, Sungmin Kang, Minseok Bae, Jaeseok Lee, Joongmyeon Bae
Dept. of Mechanical Engineering, Korea Advanced Inst. of Science and Technology (KAIST), Daejeon/Republic of Korea

A12: SOC integration, Power-to-X, CO2 capture etc.

E-fuels for SOFC mobility – A Systematic Approach (A1207)
Robert Steinberger-Wilckens
Centre for Fuel Cell & Hydrogen Research, School of Chemical Engineering, Uni of Birmingham, Birmingham/UK

Cation-swapped homogeneous nanoparticles in perovskite oxides for Solid oxide fuel cell anodes (B0508)
Sivaprakash Sengodan
Dept. of Materials, Imperial College London, London/UK

Electrochemical performance and carbon resistance comparison between Sn, Cu, Ag, and Rh-doped Ni/ScCeSZ anode SOFCs operated by biogas (B0509)
Zeyu Jiang, Abigail Snowdon, Ahmad El-kharouf, Robert Steinberger-Wilckens
Centre for Fuel Cell & Hydrogen Research, School of Chemical Engineering, Uni of Birmingham, Birmingham/UK

Microstructure, performance and stability of thin film Ni-YSZ anodes (B0510)
Buse Bilbey (1), Meltem Sezen (2), Cleva Ow-Yang (3), Aligül Büyükaksoy (1,4)
(1) Dept. of Materials Science and Engineering,, Kocaeli/Turkey,
(2) SUNUM Nanotechnology Research Center, Sabancı University, Tuzla/Istanbul,
(3) Faculty of Engineering and Natural Sciences, Sabancı University, Tuzla/Istanbul,
(4) Inst. of Nanotechnology, Gebze Technical University, Kocaeli/Turkey

Improving the performance of solid oxide electrolysis cell with GDC nanoparticles-modified Ni-YSZ cathode (B0511)
Xiao Lin, Linjuan Zhang, Guoping Xiao, Jing Zhou, Yu Wang, Jian-Qiang Wang*
Shanghai Inst. of Applied Physics, Chinese Academy of Sciences, Shanghai/P. R. China

Gd0.1Ce0.9O2-δ nanosol coating in porous metal support for development of high performance metal-supported solid oxide fuel cells (B0512)
Sang-Kuk Woo, Sun-dong Kim Energy Materials Laboratory, Korea Institute of Energy Research (KIER) Sang-Kuk Woo, Sun-dong Kim
Energy Materials Laboratory, Korea Inst. of Energy Research (KIER), Daejeon/Republic of Korea

Investigation on B-site exsolved titanates and its structure-property relationship as fuel electrode in solid oxide cells (B0513)
Shuai He,
School of Chemistry, University of St Andrews, Fife/United Kingdom

Advanced Anodes for Direct Hydrocarbon Fueled-SOFCs with Improved Thermal Management (B0515)
Boxun Hu (1), Seraphim Belko (1), Michael Reisert (1), Junsung Hong (1), Ashish Aphale (1), Rabi Bhattacharya (2), Brian J. Koeppel (3), Mike Tucker (4), Prabhakar Singh (1)
(1) Uni of Connecticut, Storrs CT/USA,
(2) UES Inc., Dayton/USA,
(3) Pacific Northwest National Laboratory, Richland WA/USA,
(4) Lawrence Berkeley National Lab, Berkeley/USA

B06: Advanced characterization I

Discrimination of the RWGS and the CO2 Electro-Catalytic reduction reactions on Ni/GDC during Solid Oxide H2O/CO2 Co-Electrolysis (B0607)
Evangelia Ioannidou (1,2), Mara Chavani (1,2), Stylianos G. Neophytides (1), Dimitrios K. Niakolas (1)
(1) Foundation for Research and Technology, Inst. of Chemical Engineering Sciences (FORTH/ICE-HT), Patras/Greece,
(2) Dept. of Chemical Engineering, Uni of Patras, Patras/Greece

Recent Process about the SOEC Materials by Synchrotron Radiation-based X-ray absorption Spectra (B0608)
Linjuan Zhang*, Ze Liu, Yuxuan Zhang, Xiao Lin, Jian-Qiang Wang
Dept. of Molten Salt Chemistry and Engineering, Shanghai Inst. of Applied Physics, Shanghai/China

SOFC In-Field Test of an Advanced Monitoring and Diagnostics Tool (B0609)
Jan Pieter Ouweltjes (1), Francesco Galiano (2), Marco Gallo (3), Pavle Boškoski (4), Stefan Pofahl (5), Aki Nieminen (6), Bertrand Morel (7), Andrea Leonardi (8)
(1) SOLIDpower SA, Yverdon-les-BainsSwitzerland,
(2) Bitron, Grugliasco/Italy,
(3) Uni of Salerno, Salerno/Italy,
(4) Jožef Stefan Institute, Ljubljana/Slovenia,
(5) AVL List, Graz/Austria,
(6) VTT, Espoo/Finland,
(7) CEA, Grenoble/France,
(8) SOLIDpower SpA, Mezzolombardo/Italy,

Mechanical characterization of thin 3YSZ electrolyte-supported solid oxide fuel cells (SOFC) (B0610)
Tom Liensdorf, Ferdinand Dömling, Carolin Sitzmann, Nico Langhof, Walter Krenkel
Ceramic Materials Engineering, Uni of Bayreuth, Bayreuth/Bavaria

B08: Advanced characterization II

A novel method to determine the transport coefficients of an YSZ electrolyte based on impedance spectroscopy (B0807)
Pablo Radici, Nele Geesmann, Gerardo Valadez Huerta, Stephan Kabelac
Inst. of Thermodynamics, Leibniz Uni Hannover, Hannover/Germany

Oxygen surface exchange in lanthanum nickelates (B0808, orally presented at B0801)
Artur J. Majewski (1), Maxim Ananyev (2), Peter R. Slater (3), Robert Steinberger-Wilckens (1)
(1) School of Chemical Engineering, Uni of Birmingham, Birmingham/UK,
(2) Inst. of High Temperature Electrochemistry, Yekaterinburg/Russia,
(3) 2 School of Chemistry, Uni of Birmingham, Birmingham/UK

Towards in operando XAS investigation of CO2 electrolysis in Solid Oxide Cells: Ca doping in La1-xMxCrFeO3-δ perovskites (B0809)
Oliver Calderon, Viola Ingrid Birss, Simon Trudel
Dept. of Chemistry, Uni of Calgary, Calgary AB/Canada

B09: Lifetime: Stacks and cells

Quantitative evaluation of SOFC anode microstructure based on optical microscope (B0907)
Dong Yan, JiaJun Yang, Jian Pu, Bo Chi, Jian Li
Center for Fuelcell Innovation, Huazhong Uni of Science and Technology, Wuhan/China

Anode fuel recirculation on solid oxide fuel cells (SOFCs) fueled with landfill gas (B0908)
Hendrik Langnickel, Daniele Reschiotto, Christopher Graves, Anke Hagen
DTU Energy, Technical Uni of Denmark, Lyngby/Denmark

Waste2GridS: Converting wastes efficiently and flexibly for grid balancing services and sector coupling (A1208)
Ligang Wang (1), Mar Perez-Fortes (1), Yi Zong (2), Vincenzo Motola (3), Stefan Diethelm (4), Alessandro Agostini (3), Olivier Bucheli (4), Jan Van herle (1)
(1) Swiss Federal Inst. of Technology, Lausanne/Switzerland,
(2) Technical Uni of Denmark, Lyngby/Denmark,
(3) ENEA, Rome/Italy,
(4) SOLIDpower SA, Switzerland

Nuclear Hydrogen Production Research by High Temperature Steam Electrolysis in SINAP (A1210)
Jian-Qiang Wang (1,2), Guoping Xiao (1,2), Chengzhi Guan (1,2), Linjuan Zhang (1,2), Xiao Lin (1,2)
(1) Key Lab. of Interfacial Physics and Technology, Chinese Academy of Sciences, Shanghai/China,
(2) Shanghai Inst. of Applied Physics, Chinese Academy of Sciences, Shanghai/China

Production of CO from CO2 using low-temperature, molten carbonate and solid oxide electrolysis (A1211, orally presented at A1405)
Rainer Küngas, Peter Blennow, Thomas Heiredal-Clausen, Tobias Holt Nørby, Jeppe Rass-Hansen, Poul Georg Moses
Haldor Topsoe A/S, Lyngby/Denmark

Sn Electrodeposition on Gas Diffusion Electrodes for the Electrochemical CO2 Reduction (A1212)
Mila Manolova (1), Renate Freudenberger (1), Joachim Hildebrand (2), Elias Klemm (2), Fabian Bienen (3), Denis Kopljar (3), Norbert Wagner (3)
(1) fem - Research Inst. for Precious Metals & Metals Chemistry, Schwäbisch Gmünd/Germany,
(2) ITC - Inst. of Chemical Technology, Uni of Stuttgart, Stuttgart/Germany,
(3) DLR – German Aerospace Center, Inst. of Engineering Thermodynamics, Stuttgart/Germany

Operation and Scale-Up of a Lab. scale Power-to-Liquid plant (A1214)
Gregor Herz, Michael Gallwitz, Paul Adam, Erik Reichelt
Fraunhofer IKTS, Dresden/Germany

Experimental investigation of reversible Solid Oxide Cells for fast switching between co-electrolysis and natural gas-based fuel cell operation (A1215)
Luca Mastropasqua (1), Alireza Saeedmanesh (1), Derek McVey (2), Jack Brouwer (1)
(1) Advanced Power and Energy ProgramEngineering Lab. Facility, Uni of California, Irvine/USA,
(2) HydroLoop, Inc., Irvine/USA

Model-based assessment of the integration of a high temperature electrolysis in green steelmaking routes (A1217)
Nils Müller, Gregor Herz, Erik Reichelt, Matthias Jahn
Fraunhofer IKTS, Dresden/Germany

System Assessment of Synthetic Fuel Production via CO2/H2O Co-Electrolysis (A1218)
Samuel Sogbesan, Robert Steinberger-Wilckens
Centre for Fuel Cell & Hydrogen Research, School of Chemical Engineering, College of Engineering and Physical Sciences, Uni of Birmingham, Birmingham/UK

Utilization of Solid Wastes as H2S Adsorbent for Biogas-fueled SOFC System (A1219)
Hendrik Setiawan (1), Mio Sakamoto (2), Yusuke Shiratori (2,3)
(1) Dept. of Hydrogen Energy Systems, Graduate School of Engineering, Kyushu University, Fukuoka/Japan,
(2) International Research Center for Hydrogen Energy, Kyushu University, Fukuoka/Japan,
(3) Dept. of Mechanical Engineering. Faculty of Engineering, Kyushu University, Fukuoka/Japan

Development of a zero-dimensional transient model of reversible SOE integrated PV system under real-world operating conditions (A1220)
Alper Can Ince, Mustafa Fazil Serincan, Selim Sivrioglu
Gebze Technical University, Faculty of Engineering, Mechanical Engineering Department, Kocaeli/Turkey

Integrating SOEs with a methanation reactor for methane gas production using an MCFC for CO2 capture from biogas (A1221)
Mohammed Kazeem Ayodeji, Robert Steinberger-Wilckens
Centre for Fuel Cell & Hydrogen ResearchSchool of Chemical Engineering, College of Engineering and Physical Sciences, Uni of Birmingham, Birmingham/UK

Experimental Investigation of H2O and CO2 Electrolysis and H2O/CO2 Co-electrolysis (A1222)
Alireza Saeedmanesh (1), Luca Mastropasqua (1), Derek McVay (2), Jack Brouwer (1)
(1) Advanced Power and Energy ProgramEngineering Lab. Facility, Uni of California, Irvine/USA,
(2) HydroLoop, Inc., Irvine/California

Reversible solid oxide cell systems for integration with natural gas pipelines and grid energy management (A1223)
E. Reznicek, R.J. Braun
Colorado School of Mines, Dept. of Mechanical Engineering, Golden/Colorado/U.S.A

Evaluation of different CCUS systems based on the MCFC technology for decarbonising the power generation sector (A1224)
Stavros Michailos
Uni. of Sheffield, Sheffield/UK

A13: Products, demonstrations, novel concepts & BoP

Biogas cleaning and integration with solid oxide fuel cells (A1307)
Jan Van herle (1), Nuria Montpart (2), Marta Gandiglio (3), Serge Biollaz (4), Stephen McPhail (5), Sander Reijerkerk (6), Bertrand Morel (7), Frank Mittmann (8), Stefan Diethelm (10), Fabrizio Gualandris (11)
(1) Ecole Polytechnique Federale de Lausanne (EPFL), Mech. Eng. Institute, Group of Energy Materials (GEM), Sion/Switzerland,
(2) EREP SA, Aclens/Switzerland,
(3) Politecnico de Torino, Dpt. Energy, Torino/Italy,
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(5) Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico (ENEA), Energy Technologies Dpmt, Rome/Italy,
(6) Biokomp SRL, Villaverla/Italy,
(7) Arol-Energy SA, Le Bourget du Lac/France,
(8) Commissariat à l'énergie atomique et aux énergies alternatives (CEA), Grenoble/France,

Long term behaviour of solid oxide electrolyser (SOEC) stacks (B0910)
Michael Lang, Corinna Bohn, Nageeb Alqubati, Michael Braig
German Aerospace Center (DLR), Inst. for Engineering Thermodynamics, Stuttgart/Deutschland

Degradation Analysis of SOFC Performance (B0911)
Tohru Yamamoto (1,2), Akifumi Ido (1), Koichi Asano (1), Hiroshi Morita (1,2), Yoshihiro Mugikura (1,2)
(1) Central Research Inst. of Electric Power Industry (CRIEPI), Kanagawa/Japan,
(2) Yokohama National University, Kanagawa/Japan

Cyclic degradation analysis of reversible Solid Oxide Cell short-stack (B0912)
Suhas Nuggehalli Sampathkumar (1,2), Mar Pérez-Fortes (1), Stefan Diethelm (1), David Constantin (1), Philippe Aubin (1), Guillaume Jeanmonod (1), Jan Van herle (1), Bhaskar Reddy Sudireddy (2), Xiufu Sun (2), Karine Couturier (3), Stéphane Di Iorio (3), Pierre Hanoux (3)
(1) École Polytechnique Fédérale de Lausanne (EPFL), Sion/Switzerland,
(2) Technical University of Denmark (DTU), Lyngby/Denmark,
(3) Univ. Grenoble Alpes – CEA/LITEN, Grenoble/France

B12: Oxygen electrodes I

Proton Conductivity of BaCe0.2Zr0.7Y0.1O3 (B1207)
Izaak C. Vinke (1), Hans Kungl (1), L.G.J.(Bert) de Haart (1), Rüdiger-A Eichel (1,2)
(1) Inst. of Energy and Climate Research, Fundamental Electrochemistry (IEK-9), Forschungszentrum Jülich GmbH, Jülich/Germany,
(2) Inst. of Physical Chemistry, RWTH Aachen University, Aachen/Germany

Nanofibrous LaCoO3 perovskite cathode for solid oxide fuel cells fabricated via chemically assisted electrodeposition (B1209)
Seung-Bok Lee (1,2), Saeed Ur Rehman (1), Tak-Hyoung Lim (1,2), Jong-Eun Hong (1), Hye-Sung Kim (1), Dong Woo Joh (1), Seok-Joo Park (1,2), Rak-Hyun Song (1,2)
(1) Korea Inst. of Energy Research, Daejeon/Korea,
(2) Korea Uni of Science and Technology, Daejeon/Korea

Combined effects of A-site non-stoichiometry, crystal structure and microstructure for enhanced catalytic activity of (La,Sr)(Co,Fe)O3-δ cathodes for IT-SOFCs (B1210, orally presented at B1201)
Ozden Celikbilek (1,2), Cam-Anh Thieu (3,4), Fabio Agnese (5), Eleonora Cali (2), Christian Lenser (6), Norbert H. Menzler (6), Ji-Won Son (3,4), Stephen J. Skinner (2), Elisabeth Djurado (1)
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(2) Dept. of Materials, Imperial College London, London/United Kingdom,
(3) Center for Energy Materials Research, Korea Inst. of Science and Technology (KIST), Seoul/Korea,
(4) Division of Nano & Information Technology, KIST School, Korea Uni of Science and Technology (UST), Seoul/Korea,
(5) Univ. Grenoble Alpes, Grenoble Cedex 9/France,
(6) Forschungszentrum Jülich GmbH, Inst. of Energy and Climate Research: Materials Synthesis and Processing (IEK-1), Jülich/Germany

Fe nano particle-dispersed Ni-YSZ hydrogen electrode for high-temperature solid electrolyzer cells (B1211)
Kyoung-Jin Lee, Min-Jin Lee, Haejin Hwang
Inha University, Incheon/Korea

Ceramic Composite Fuel Electrode of La(Sr)Cr(Mn)O3 / Ce(Mn, Fe)O2 for CO2 reduction in Solid Oxide Electrochemical Cells (B1212)
Min Kyu Kim, Young Wook Lee, Tae Ho Shin
Energy & Environmental Division, Korea Inst. of Ceramic Engineering & Technology (KICET), Jinju-si/South Korea

B13: Cells, stacks, and interconnects

Design and Optimization of Fiber Electrodes for Direct Carbon Fuel Cells (B1307)
Min Xu, John T.S. Irvine
School of Chemistry, Uni of St Andrews, Scotland/UK

New concepts for solid oxide cells manufacturing: The use of 3D printing technologies (B1308, orally presented at B1303)
Arianna Pesce (1)*, Maritta Lira Dos Santos (1), Natalia Kostretsova (1), Aitor Hornes (1), Alex Morata (1), Marc Torrell (1), Albert Tarancon (1,2)
(1) IREC, Catalonia Inst. for Energy Research, Jardins de les Dones de Negre 1, Barcelona/Spain,
(2) ICREA, Passeig Lluís Companys 23, Barcelona/Spain

Influence of spinel protective coating on Crofer interconnects conductivity (B1309)
Pierre Coquoz, Fabien Morand, Daniela Correia, Raphael Ihringer
Fiaxell Sàrl, Lausanne/Switzerland

Comparison of different SOFC types running on bio-syngas at moderate working temperatures (B1312, orally presented at B1306)
Benjamin Steinrücken (1), Michael Hauser (1), Stephan Herrmann (1), Christian Lenser (2), Sebastian Fendt (1), Hartmut Spliethoff (1)
(1) Technische Universität München, Inst. for Energy Systems, Garching/Germany,
(2) Forschungszentrum Jülich GmbH, IEK-1, Jülich/Germany

Electrochemical study of thin film perovskite electrodes for SOEC applications (B1313)
Mykhailo Pidburtnyi,
Haris Ansari,
Viola Birss,
Department of Chemistry, University of Calgary, Calgary/Canada

In Situ Surface Modification of the Cathode for CO2 Electrochemical Reduction in SOEC (B1314)
Wenqiang Zhang, Bo Yu*, Jing Chen
Inst. of Nuclear and New Energy Technology, Tsinghua University, Beijing/P. R. China

B14: Oxygen electrodes II

Nanostructured La0.6Sr0.4Co0.2Fe0.8O3-δ/Gd0.2Ce0.8O1.9 Composite Cathode for High Performance IT-SOFC (B1407)
Kazuyoshi Sato (1), Chizuru Iwata (1), Naokatsu Kannari (1), Hiroya Abe (2), Yongtae Kim (3), Naoki Shikazono (3)
(1) Graduate School of Science and Engineering, Gunma University, Gunma/Japan,
(2) Joining and Welding Research Institute, Osaka University, Osaka/JAPAN,
(3) Inst. of Industrial Science, The Uni of Tokyo, Tokyo/JAPAN

(9) Sunfire GmbH, Dresden/Germany,
(10) SOLIDpower SA, Yverdon/Switzerland,
(11) SOLIDpower SpA, Mezzolombardo/Italy

Solid oxide electrolyzer cells prototype based on self-produced electrode supported tape cast cells and powder metallurgy (PM) interconnects: The CoSin Project (A1308, orally presented at A1306)
M. Carmen Monterde (1,2,3), L. Bernadet (2), A. Rodriguez (1), J. Arcos (1), F. Ramos (4), J. A. Calero (1), E. Jimenez-Piqué (3), M. Torrell (2)
(1) AMES PM Technical Center, Barcelona/Spain,
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(3) Universitat Politécnica de Catalunya (UPC- EEBE), Barcelona/Spain,
(4) FAE, Barcelona/Spain

Energy and Exergy evaluation of a novel tri-generation system using Solid Oxide Fuel Cell (SOFC) and Humidification-dehumidification (HDH) desalination unit (A1309)
Hamid Reza Abbasi (2), Hossein Pourrahmani (1), Nazanin Chitgar (2), Jan Van herle (1)
(1) Group of Energy Materials (GEM), Ecole Polytechnique Federale de Lausanne (EPFL), Sion/Switzerland,
(2) School of Mechanical Engineering, Iran Uni of Science and Technology, Tehran/Iran

Biogas-powered reversible SOC system (A1310)
Stephan Herrmann, Hartmut Spliethoff
Lehrstuhl für Energiesysteme, Technische Universität München (TUM), Garching/Germany

Modeling a residential SOFC – hybrid desiccant cooling system and system analysis priority on cooling ability and CO2 emission (A1311)
Yulho Lee (1,2), Sungjin Park (1), Sanggyu Kang (2)
(1) Dept. of Mechanical and System Design Engineering, Seoul/Korea,
(2) Mechanical Engineering, Gwangju Inst. of Science and Technology, Gwangju/Korea

Experimental and CFD analysis of hotbox heat management using extended pipes (A1312)
Israel Torres Pineda (1), Van-Tien Giap (2), Young Duk Lee (1,2), Young Sang Kim (1), Dong Keun Lee (1), Kook Young Ahn (1,2)
(1) Center for Clean Fuel and Power Generation, Korea Inst. of Machinery & Materials (KIMM), Daejeon/South Korea,
(2) Dept. of Environmental and Energy Mechanical Engineering, Uni of Science and Technology (UST), Daejeon/South Korea

A14: Proton Conducting Cells, Stacks and materials

Innovative symmetrical proton conducting ceramic cells for on-board hydrogen storage (A1407)
Steven Pirou
Technical University of Denmark, Lyngby/Denmark

A15: Cell, stack & system modelling and optimization

Fault identification in the solid oxide fuel cell stack: Classification based and hybrid approaches (A1507)
Periasamy Vijay, M. O. Tade, Zongping Shao
Dept. of Chemical Engineering, Curtin University, Western Australia/Australia

Part-load Operations of Water-Cooled Solid Oxide Fuel Cell Stack (A1508)
Mungmuang Promsen (1), Yosuke Komatsu (1), Anna Sciazko (1,2), Shozo Kaneko (1), Naoki Shikazono (1)
(1) Inst. of Industrial Science, The Uni of Tokyo, Tokyo/Japan,
(2) Dept. of Fundamental Research in Energy Engineering, AGH Uni of Science and Technology, 30059 Krakow/Poland

Modeling and characterization of an intermediate temperature solid oxide fuel cell stack (A1509)
J. Lesmayoux (1), A. Jaafar (1), C. Turpin (1), J. B. Jollys (2), J. Göös (3), M. Noponen (3)
(1) LAPLACE, Uni of Toulouse, CNRS, Toulouse/France,
(2) Safran Power Unit, Toulouse/France,
(3) Elcogen, Vantaa/Finland

Computational analysis of mass transfer limitation in porous electrodes of solid oxide electrochemical cell (A1511)
Marcin Blesznowski (1), Monika Jalowiecka (1,2), Wojciech Orciuch (2), Lukasz Makowski (2), Jakub Kupecki (1)
(1) Dept. of High Temperature Electrochemical Processes (HiTEP), Inst. of Power Engineering, Warsaw/Poland,
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Analysing the Impact of Electrode Materials and Microstructures on SOFC Stack and System Level Performance (A1512)
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Towards model-based optimization of CGO/Ni anodes (A1513)
Philip Marmet (1), Lorenz Holzer (1), Thomas Hocker (1), Jan G. Grolig (2), Andreas Mai (2), Joseph M. Brader (3)
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Estimation of triple-phase boundary activity in LSCF-GDC cathode of solid oxide fuel cells (A1514)
Masashi Kishimoto (1), Shunya Hanai (1), Tomoki Kimura (1), Yuya Tanimura (1), Hiroshi Iwai (2), Hideo Yoshida (1)
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Characteristics of a Planar SOFC With Load Variation (A1515)
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Characterization of oxidized iron-copper coated 441-type ferritic stainless steel interconnect material (B1408)
Line Larby, Ulf Bexell, Carlos Bernuy-López, Niklas Norrby, Mikael Stenström, Jörgen Westlinder
Surface Research, Strategic Research, AB Sandvik Materials Technology, Sandviken/Sweden

Extension of catalyst lifetime for application of diesel-fueled pre-reforming in a commercial SOFC system (B1409)
Tobias Schiekel, Elmar Pohl
OWI Oel-Waerme-Institut gGmbH, Herzogenrath/Germany

Nanocrystalline La0.6Sr0.4CoO3-δ oxygen electrodes fabricated by spray pyrolysis for solid oxide cells operating at intermediate temperatures (B1410, orally presented at B1405)
Bartosz Kamecki (1,2), Jakub Karczewski (2), Piotr Jasiński (1), Sebastian Molin (1)
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Water effect on the overpotential at low currents in a SOFC (B1411)
Samuel Koomson, Arthur Ebenezer, Choong-Gon Lee
Dept. of Chemical & Biological Eng., Hanbat National University, Daejeon/Korea

The reactivity and stability of La-nickelate cathode materials (B1412, orally presented at B1403)
C.M. Harrison (1), P.R. Slater (2), R Steinberger-Wilckens (1)
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(2) School of Chemistry, University of Birmingham, Birmingham/U.K.

B15: Lifetime: Cells, components and interfaces

Analysis of H2S related performance degradation- and regeneration of Ni/YSZ and Ni/GDC SOFCs fueled with biomass gasifier product gas (B1507)
Gernot Pongratz (1), Vanja Subotic (1), Christoph Hochenauer (1), Andrés Anca-Couce (1), Robert Scharler (2)
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(2) BEST – Bioenergy and Sustainable Technologies GmbH, Graz/Austria

Towards stable SOEC operation: identification of degradation-inducing operating parameters and degradation minimization by interlayer variation (B1509, orally presented at B1505)
Vanja Subotić (1,2), Shotaro Futamura (2), George F. Harrington (3,4), Junko Matsuda (3), Katsuya Natsukoshi (2), Kazunari Sasaki (2,3,4)
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Degradation monitoring and performance optimization of rSOC (B1510)
Benjamin Königshofer (1), Gernot Pongratz (1), Pavle Boškoski (2), Đani Juričić, Vanja Subotić (1)
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Effect of Strontium Segregation on Electrochemical Impedance Spectra for La0.6Sr0.4Co0.2Fe0.8O3-δ Cathodes (B1511)
Hirofumi Sumi (1), Hongqian Wang (2), Scott A. Barnett (2)
(1) National Inst. of Advanced Industrial Science and Technology (AIST), Nagoya/Japan,
(2) Northwestern University, Illinois/USA

SOFC directly fed with ammonia: performance and durability for two anode microstructures (B1512)
Bertrand Morel (1), Nunzia Coppola (2), Thibault de Sorbier (3), Cesare Pianese (2), Luigi Maritato (2), Julie Mougin (1)
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(3) TechnipFMC - Technip France, Courbevoie/France

Real-time Operando Observation of Nickel-Gadolinia Doped Ceria Patterned Electrode (B1513)
Yasuhiko Suzuki (1), Yosuke Komatsu (1), Anna Sciazko (1,2), Zhenjun Jiao (1,3), Naoki Shikazono (1)
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(2) AGH University of Science and Technology, Krakow/Poland,
(3) Harbin Institute of Technology (Shenzhen), Shenzhen/China

B16: Lifetime: Interconnects and contact layers

Application of composite coatings as protection/contacting layers for metallic high-chromium-content SOFC interconnect material (B1607, orally presented at B1606)
Viktar Sauchuk (1), Nikolai Trofimenko (1), Stefan Megel (1), Stefan Rothe (1), Jochen Schilm (1), Martin Andritschky (2), Michael Hiller (2), Mihails Kusnezoff (1)
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(2) High Tech Coatings GmbH - a Miba Group company, Vorchdorf/Austria

Anode and electrolyte supported Solid Oxide Fuel Cells: experimentation and modelling (A1516)
Aiswarya Krishnakumar Padinjarethil (1), Fiammetta Rita Bianchi (2), Barbara Bosio (2), Anke Hagen (1)
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Modeling and simulation of an H2 production system based on solid oxide electrolysis (A1517)
David Abad (1,2), Fernando Vega (1), Benito Navarrete (1)
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(2) National Hydrogen Center. Prolongación Fernando el Santo, Puertollano (Ciudad Real)/Spain

A16: System design & performance & BoP

High efficient SOFC system with CFY-stack module operated with gasified biomass - HieffBioPower - (A1607)
Stefan Megel (1), Jens Schnetter (1), Mihails Kusnezoff (1), Martin Hauth (2), Stefan Weissensteiner (2), Michael Seidl (2), Christopher Sallai (2), Gerhard Weiß (3), Thomas Brunner (3), Ingwald Obernberger (3)
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(2) AVL List GmbH, Graz/Austria,
(3) BIOS BIOENERGIESYSTEME GmbH, Graz/Austria

Design of a 10-kW SOFC Hot Box Module with Recirculation (A1608)
Maximilian Hauck (1), Sebastian Wilhelm (1), Stephan Herrmann (1), Felix Fischer (1), Jeremias Weinrich (2), M. Gaderer (2), Sebastian Fendt (1), Hartmut Spliethoff (1)
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(2) Technical Uni of Munich, Regenerative Energy Systems, Straubing/Deutschland

Consistent modeling and testing theory of high effectiveness heat exchanger performance by means of Shannon 1948 entropy (A1609)
Jean-Paul Janssens (1), Michel Dubuisson (2)
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(2) BOSAL Energy Conversion Industry, Vianen/The Netherlands

Experimental and CFD analysis of hotbox heat management using extended pipes (A1610)
Israel Torres Pineda (1), Tien Giap Van (2), Young Sang Kim (1), Young Duk Lee (1,2)
(1) Environmental Systems Research Division, Korea Institute of Machinery & Materials , Daejeon/South Korea ,
(2) Department of Environmental and Energy Mechanical Engineering, University of Science and Technology (UST), Daejeon/South Korea

Online characterization of operational parameters in a SOFC-system with anode-exhaust gas recirculation by oxygen sensors (A1611, orally presented at A1605)
Felix Schaefer (1), Sebastian Egger (1), Dietmar Steiner (1), Rüdiger-A. Eichel (2)
(1) Robert Bosch GmbH, Renningen/Germany,
(2) Institut für Energie- und Klimaforschung (IEK-9), Forschungszentrum Jülich, Jülich/Germany

Development of Reversible Electrolysis-Fuel Cell Stacks using 100 cm2 Anode-supported Flat-tubular cells (A1612)
Segi Byun, Sun-dong Kim, Tae Woo Kim, Yoonseok Choi, Doo Won Seo, Hyo Jung Hwang, Sang-Kuk Woo
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