EFCF 2024

FINAL ANNOUNCEMENT
2 – 5 July
KKL Lucerne, Switzerland

28th International Conference, Series est. 1994
with Exhibition & FCH/EIS Tutorials

16th EUROPEAN SOFC & SOE FORUM

2 July 2024
Tutorials:
FCH: Fuel Cell, Electrolyser & H_2
EIS: El.chem. Impedance Spectroscopy
live onsite or virtual & on-demand

Chaired by
Prof. Albert Tarancon
IREC Catalonia Institute for Energy Research

SSD 2024 Sustainable Shipping Days

GSM Grid Service Market SYMPOSIUM

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

www.EFCF.com

PROGRAM

Schedule of Events 1-5 July **Motto 2024:** Shaping solid oxide technologies for a sustainable future **www.EFCF.com/Events**

Mo, 1	08:00 – 18:00	Various Project Meetings: **AMON, NAUTILUS, IEA AFC Annex32, …**	11:00 – 18:00	**GSM 2024 – Grid Service Markets Symposium** Sessions G01-G06
	10:00 – 11:00	Registration for **GSM 2024**	19:30 – 23:00	GSM Network Dinner joint with **SSD 2024 – Sustainable Shiping Days**
Tu, 2 July	09:30 – 10:00	Registration for **Tutorials –** 2nd floor club rooms above auditorium	08:00 – 09:00	GSM & SSD On-site **Registration**
	10:00 – 17:00	…/FCH: **H2, FC & EC** Tutorial G. G. Scherer, J. Van herle	09:00 – 17:00	**GSM 2024 – Grid Service Markets Symposium** Sessions G07-G11
		…/EIS: **El.chem. Impedance Spectroscopy** Tutorial A. Weber, D. Klotz	09:00 – 18:00	**SSD 2024 – Sustainable Shiping Days** Lecture 1-4
	11:00 – 16:00	**Exhibition set-up**	12:00 – 18:00	AMON workshop on Ammonia FC System for Maritime Applications
	16:00 – 18:00	On-site **Registration** & **E&xhibition** are open, **Poster pin-up**	18:00 – 19:00	**EFCF Welcome gathering** in the splendid KKL exhibition hall
We, 3 July	08:00 – 16:00	On-site **Registration**, Speakers Warmup coffee till 09:00, info at main desk	09:00 – 18:00	Exhibition, Networking & Poster area open.
	09:00 – 18:00	**EFCF Conference Sessions 1 – 6, Keynotes K1 - 4** & **Invited Talks:**	12:30	Press Conference
		Presentations on: Programs & activities in EU, China, USA & Japan, Status of industry & major groups, Technical highlights on materials, electrodes & cell design	13:15 – 15:00	**Poster Session I**: ≈ 230 Poster in All Session Topics & Balance of Plant
			18:30 – 23:00	**Swiss Surprise** night,with separate registration
Th, 4 July	08:00 – 16:00	On-site **Registration**, Speakers Warmup coffee till 09:00, info at main desk	09:00 – 18:00	Exhibition, Networking & Poster area open
	09:00 – 18:00	**EFCF Conference Sessions 7–12, Keynotes K5 - 6** & **Invited Talks:** System Design & Integration, Demonstration, Novel Concept, Stack Design, Electrodes, advanced characterisation	13:15 – 15:00	**Poster Session II**: ≈ 230 Poster in All Session Topics & Balance of Plant
			19:20 – 23:25	Great **Dinner on the Lake -** The unique networking event
Fr, 5 July	08:00 – 09:00	On-site **Registration**, Speakers Warmup coffee till 09:00, info at main desk	15:00 – 16:15	**Closing** & **Award Ceremony:**
	09:00 – 12:00	**Exhibition**, Networking & Poster area open		Best poster, best scientific contribution & outstanding lifetime work;
	09:00 – 16:15	**EFCF Conference Sessions 13–17, Keynote K7**: Upscaling, Stack Design, Modelling & Performance, Manufacturing, Degradation, Protonic Cells		Keynote K7 by the EFCF Gold Medal of Honour Winner 2024
	10:15 – 11,00	**Poster Session III**: ca. 230 Poster in All Session Topics & Balance of Plant	16:15 – 17:00	**Goodbye** coffee and travel refreshment in front of the Luzerner Saal
			17:00	**END of EFCF 2024** joint with **GSM 2024** & **SSD 2024**

The sole purpose of the European Electrolyser and Fuel Cell Forum is the promotion of fuel cell and hydrogen technologies through the EFCF conference, literature, and media. It is a high-level exchange platform and network, hosting scientific sessions, workshops and tutorials, an exhibition, as well as recreational relaxing networking events in the charming and inspirational area of Lucerne, the heart of Switzerland.

Every summer the European Electrolyser and Fuel Cell Forum invites more than 10'000 stakeholders to participate in this internationally recognised convention on the shores of the picturesque Lake Lucerne. Up to 400 contributions were submitted. 3.5 intensive and stimulating days, with 29 sessions were organized. Various workshops from EU projects (NAUTILUS, AMON), industry and investors (Comsol, FiveT) take place. Also the 7th Grid Market Symposium GSM and the Sustainable Shipping Days SSD are organised ahead of the core EFCF, benefiting from the presence of the qualified audience. The high-level scientific content is complemented with plenary & keynote presentations on country overviews, status of leading industry & major groups, and overviews on "cutting edge technologies" and "alternate fuel solutions". New 3 poster sessions recognise the excellence of the permanently accessible poster contributions. Closing with the award ceremony, the audience will be privileged to hear the keynote from the 2024 Gold Medal of Honour winner Prof. Nigel Brandon from Imperial College London/UK and EFCF 2016 chair. Based on the convincing number and quality of submissions, about up to 700 participants from 40 countries are expected at this year's events.

This year marks the 30th anniversary of the EFCF, which began in 1994 as a pioneering platform for global experts in the field. Alternating focus between „Solid Oxide Cells" on even years and „Low Temperature Fuel Cells" on odd years, the 16th EUROPEAN SOFC & SOE FORUM in 2024 is set to be the largest dedicated SOC event worldwide.

Over the years, many strong relationships and contacts have been established at these events. This is thanks to a caretaking organisation with dedicated advisors and conference chairs, who keep a watchful eye on scientific quality. Unlike many commercial conferences, this event is organised by hydrogen and fuel cell technologists and scientists. Active members of the European fuel cell and hydrogen community, they consider the recommendations of the EFCF International Board of Advisors IBoA and observe and anticipate the trends of the sector. The conference organisers ensure that the stakeholder's needs are always the focus of the European Electrolyser and Fuel Cell Forum.

We are dedicated to continuously grow the EFCF as one of the most prominent meeting places for the comprehensive exchange of scientific and technical information and for high-level networking. This creates an environment that enables scientific breakthroughs and their subsequent transfer into industry. A very special thank you for this year's conference goes to Prof Albert Tarancón from ICREA and ICREC in Barcelona, Spain as Scientific Chair, presenting a strong scientific experience and cooperation with industrial partners. He reflects well the ambition of the EFCF: Building a bridge from science to technology – from technology to products! Together we are proud to offer a sound scientific programme, unforgettable side events and invite you to the pleasant surroundings of Lucerne. Finally, we would like to thank all the authors, exhibitors and suppliers for their excellent contributions, the Scientific Advisory Committee SAC for their review work, and our staff members for fastidiously taking care of all the organizational details. Together with the numerous participants and exhibitors, the stage has been set for an exuberant 16th EUROPEAN SOFC & SOE FORUM 2024.

Thank you Olivier Bucheli & Michael Spirig
www.EFCF.com

16th European SOFC & SOE Forum

Conference Chair:

Prof. Albert Tarancon

IREC Catalonia Institute for Energy Research

Welcome to the 16th European SOFC and SOE Forum!

We are about to open one of the most significant conferences worldwide focusing on high-temperature solid oxide cell technologies and applications. For many of you, this will not be your first time attending the EFCF in Luzern, and I am confident that you are eagerly anticipating the vibrant working atmosphere that has become a constant feature of this event. Thank you for returning; it's a pleasure to have you here again!

Newcomers will discover an impressive list of participants, including key industrial players in the sector, along with a superb venue equipped with efficient technical services to enhance your event experience. I vividly remember my own initial participation in the EFCF back in 2004 when I was a young PhD student; it was undoubtedly a turning point in my career. May this conference hold similar promise for you!

In a landscape with hundreds of conferences, having a reference event like the EFCF – one that unites scientists, industrial experts, end-users, and policymakers – is invaluable. This year's program excites us, with its focus on the latest fundamental advances, technology developments, and comprehensive overviews of the field's status across different regions (Europe, USA, Japan, and China). Additionally, we enthusiastically anticipate the inspiring keynote presentations by Prof. Jan Van Herle (EPFL, CH) and Prof. Francesco Ciucci (University of Bayreuth, DE), exploring the future of SOC technology and the potential of emerging protonic ceramic cells. Furthermore, Prof. Nigel Brandon's invited talk, accompanied by his well-deserved 2024 Christian Friedrich Schonbein Gold Medal of Honour, promises enlightenment.

As always, our program is divided into two parallel sessions – one focusing on system developments and the other on materials and components. I invite you to alternate these sessions to gain a comprehensive understanding of the latest advancements. From my perspective, the continuous cross-fertilization between practical applications and fundamental research, boosted by strong contributions from companies, remains a defining feature of our successful community.

I extend heartfelt gratitude to the real organizers, Michael and Olivier, for their professional guidance and continuous support. Additionally, I appreciate the Scientific Advisory Committee's impartial and careful evaluation of all submitted abstracts. Let me also acknowledge those accepting session chair roles, the exhibitors, the EFCF and KLL staff, and the countless others who contribute to making this event exceptional.

To each of you, I wish a productive and enjoyable conference. Enjoy these days doing science!

Albert Tarancón
Conference Chair

Conference language is English

Chaired by:

Prof. Albert Tarancón is head of the Nanoionics & Fuel Cells group ICREA at the Catalonia Institute for Energy Research IREC. Albert holds M.Sc. and PhD in Physics from the University of Barcelona (2001, 2007) and an M. Eng. in Materials Science from the Polytechnic University of Catalonia (2007). He has worked as a research associate at CSIC (ES) and as a visiting researcher at the University of Oslo (NO), Imperial College London (UK) and Caltech (USA). In 2010, Albert joined the Catalonia Institute for Energy Research (IREC) as Head of Group. Since 2018, he is ICREA Research Professor at IREC and leads a group of 35+ people dedicated to hydrogen technologies and alternative energy sources.

Albert has devoted more than 20 years to the field of Solid Oxide Cells developing innovative materials, cells and stacks close together with the major industrial players in Europe. In recent times, Albert's team is pioneering the introduction of revolutionary 3D printing technologies in the SOC community exploring unprecedented shapes and interfaces to improve performance and efficiency. In his active career, Albert has been Principal Investigator of 12 European projects, including two ERC grants, coordinating four of them on hydrogen technologies. Moreover, he has been actively involved in the definition of national and international research programmes in the field of power generation and energy storage.

Albert has authored more than 200 scientific articles in peer-reviewed journals collecting more than 6500 citations and 200+ oral presentations in international congresses (60+ invited and keynotes). Albert has been recently included in the 1% top-cited scientists in the field of "Energy". Moreover, he is currently editor of the emerging Journal of Physics Energy (IoP) and APL Energy (AIP) and the well-reputed Journal of the European Ceramic Society (Elsevier).

FCH Tutorial: Excellent Kick-Start to EFCF 2024

0.5 ECTS credits

Dr. Günther G. Scherer

Dr. Jan Van herle

The Tutorial will provide the basic concepts required to address the general but also more specialised field of fuel cells. Fuel cell technology is interdisciplinary par excellence, and requires knowledge in electrochemistry, materials science, mechanical and electrical engineering, catalysis, corrosion, thermal management, systems engineering etc. The course will cover these different aspects as broadly as possible, illustrated by many examples. All fuel cell families will be addressed i.e Hydrogen Fuel Cells (H_2FC) and High Temperature Fuel Cells (HTFC) as well as Hydrogen Production, Storage and Infrastructure (H_2PSI). Applications and examples will be mostly surrounding the two most popular fuel cell types, PEFC (G. G. Scherer = GGS) and SOFC (J. Van herle = JVh), this is due to the expertise of both lecturers in their respective specialties.

The Tutorial will be targeted to newcomers as well as those who have been working in the area of fuel cells for some time. Participants will gain, or revise, current understanding of the operation and key challenges of fuel cell technology, where considerable progress in recent years has been achieved and new insights gathered. The requirements for fuel cell market introduction will be discussed.

The Tutorial lecture topics are fuel cell operating principles, thermodynamics, kinetics, efficiencies, central notions such as electrolyte ionic conductivity, electrode overpotential, triple phase boundary, Nernst equation, fuel reforming, cell and stack architectures and design, fuels (both fossil and renewable) for different fuel cells including their treatment, all fuel cell families (SOFC, MCFC, PAFC, PEFC/DMFC, AFC).

Tutorial Schedule:

09:30 Registration & Get-Together
10:00 Welcome & Introduction (EFCF)
10:15 Lecture 1: Fundamentals of electrochemical energy Conversion (GGS)
11.00 Lecture 2: Characteristics of the important Fuel Cell technologies (GGS)
11:45 Coffee break
12.00 Lecture 3: Fuels for Fuel Cells, Fuel Processing (JVh)
12:45 Lunch break
14:00 Lecture 4: Applications of Polymer electrolyte Fuel Cells PeFC (GGS)
14:45 Lecture 5: system Aspects, Applications of High temp. Fuel Cells sOFC (JVh)
15.30 Coffee break
15:45 Lecture 6: state-of-the-Art, Challenges, summary (JVh)
17:00 End of Tutorial, Opportunity to visit the Exhibition

Missed? No Problem!
Enjoy the tutorials at any time and with repetition
ON-DEMAND www.EFCF.com/TutAccess

EIS Tutorial: Advanced Booster to EFCF 2024

0.5 ECTS credits

Dr. André Weber

Dr. Dino Klotz

Electrochemical Impedance Spectroscopy (EIS) has become an important tool in Solid State Ionics for studying mass and charge transport in electrochemical systems. It is not only of importance for fundamental research, but also for characterizing batteries, fuel cells, sensors, etc. The EIS Tutorial is focused on medium to experienced level users, who are already familiar with the principles of the SOCs (Solid Oxide Cells).

The **EIS Tutorial will support you** with new findings and relevant experiences. During the EIS Tutorial you will receive answers to questions before you have to ask them, as well as the chance to ask questions you may not dare to voice in front of a general audience. You will come into contact with the specialists and other experienced users. You enlarge your exchange and discussion network within the EIS community. Opportunity for discussion and exchange are provided, especially during the the 'EIS challenge'.

The EIS Tutorial is an excellent extension of your current know-how. It contains 5 lectures and an 'EIS challenge': The lectures will range from the basic principles, that makes EIS one of the most powerful analysing instruments available today, to more advanced applications of EIS, to very sophisticated cases and many practical experiences. Many results will be presented, and the right interpretation discussed. The lectures are followed by an 'EIS challenge', where all kinds of impedance questions, problems, and latest experiences can be discussed and exchanged with other participants.

Tutorial Schedule:

10:10 Lecture 1: Fundamentals of Electrochemical Impedance Spectroscopy
11.00 Lecture 2: Impedance Spectra Eval., Kramers-Kronig Test, DRT-Analysis, CNLS Fit
11:45 Coffee break
12.00 Lecture 3: Applications I – Analysis – Materials and (Model-) Electrodes
12:45 Lunch break
14:00 Lecture 4: Applications II – Analysis – Single Cells and Stacks
14:45 Lecture 5: Impedance Modelling and Simulation
15.30 Coffee break
15:45 Lecture 6: „EIS challenge" – Summary

Missed? No Problem!
Enjoy the tutorials at any time and with repetition
ON-DEMAND www.EFCF.com/TutAccess

Date and Place

www.EFCF.com/KKL

The 16th European SOFC & SOE Forum 2024 will be held from 2 – 5 July in the renowned Kultur- und Kongresszentrum Luzern (KKL) in Lucerne, Switzerland. The parallel lectures will be presented in the „Luzerner Saal" and the „Auditorium", while all posters will be permanently exhibited in the „Auditorium Foyer". The KKL is located next to the Railway Station on the shore of Lake Lucerne. Boat traffic, water front activities, as well as spectacular views of the old town and snow-capped mountains add to the charm of the venue. View Video on www.EFCF.com/Lucerne.

Technical Program

www.EFCF.com/Program

The **EFCF 2024** is the 16th European SOFC & SOE Forum i.e. the 28th EFCF event in **30 years** and will focus on Solid Oxide Technologies: Fuel Cells (SOFC), Electrolysers (SOE) & Electrochemical Reactors and Cells (SOC) in general as well as concepts for CO_2 Emission Reduction & Reuse. The forum will be the world's largest dedicated event, allowing industry and major groups an unparalleled opportunity to present their status and outlook. The technical program will range from fundamental science, and novel materials through cell, stack and system design, performance and BoP to the latest results on commercial deployment. The topics also cover manufacturing, lifetime, characterisation, modelling, and optimization. Also product and novel concepts, SOC integration, P2X and Grid Services as well as CO_2 capture and chemical processing applications are addressed.

In the plenary sessions overviews of the progresses in the EU, USA, Japan and China are given. Additionally, more than 20 of the leading industry players and the major R+D groups will present and summarise their current technology status. Very convincing keynote presentations are given on SOC materials for performance, advancements in protonic conductors, past and future of SOC devices for energy applications. The last keynote presentation from the this years Gold Medal of Honour winner, Prof. Nigel Brandon from Imperial College London, will be the final high light of EFCF 2024. In advance the 7th symposium on Grid Service Market **GSM 2024** runs on Monday and Tuesday. Tuesday also offers the chance to attend the **FCH** and **EIS tutorials**. Very special on Tuesday are the Sustainable Shiping Days **SSD 2024** coorganized with EU **Nautilus** and **AMON** project. And very exiting this year is the free visit of the 45 exhibitors from 16.00 on.

A highly attractive five-day program results and offers product presentations, scientific lectures, demonstrations, posters, exhibits, tutorials, workshops … a lot of know-how and contacts among the **700 expected experts**. More than **400 scientific and industrial contributions are offered** i.e.: Ca. **170 oral** presentations in **more than 40 sessions** and up to **240 posters** in five dedicated poster sessions, with extended time for technical discussions and fruitful exchange. The posters are permanently accessible throughout the entire event. All events are held in the same building group. EFCF registration covers unrestricted admission to both conference and exhibition. European global developers present innovative high temperature fuel cell and electrolysis solutions, as well as materials, development equipment, fuel cell components and supplies. The technical programme is designed to inform representatives from industry, trade, finance, utilities, and users, as well as planners, engineers, technology brokers and members of the scientific research community. Product and application information are available from the exhibitors. The **EFCF 2024**, the 16th European SOFC & SOE Forum will be the **world's largest international event on these subjects** this year.

Special Events

www.EFCF.com/SE

The following Special Events complete the EFCF program. These events use EFCF as a perfect platform because many stakeholders are already present and EFCF supports the organization and promotion of the events (see www.EFCF.com/FPM). For more details, registration and the latest information see www.EFCF.com/SE, the specific links and/or the separate announcements.

1 July 10 – 18 **2 July** 09 – 17 Terrassensaal	**GSM 2024** www.EFCF.com/GSM 7th **Grid Service Market** symposium sponsored by „24/7 ZEN" EU project
1 July 13.30 Hotel Montana	**IEA AFC Annex32** www.EFCF.com/A32 **Annual Annex Partners** (only) **Meeting** of International Energy Agency - Advanced Fuel Cells - Annex 32: Assist, through international co-operation, the development of Solid Oxide Fuel Cell technologies.
1 – 2 July **1 July** 19 – 23 Pleasure Boat **2 July** 09 – 17 Auditorium 12 – 17 BuM 2	**SSD 2024** www.EFCF.com/SSD **Sustainable Shipping Days** sponsored by „Nautilus" - Networking VIP Dinner „Sunset on the Lake" - Lecture 1 – 4, Poster Session **AMON Workshop** www.EFCF.com/AMONws „Ammonia FC System for Maritime Application" sponsored by „AMON" EU project
2 July 8 – 17 Club Rooms	**FCH-Tutorial** www.EFCF.com/FCH Fuel Cell, Electrolyser & Hydrogen 0.5 ECTS; Level: kick-start; **EIS-Tutorial** www.EFCF.com/EIS Electrochemical Impedance Spectroscopy; 0.5 ECTS; Level: advanced;
3 July 13.30 – 15.00	Workshop „Modeling Fuel Cells and Electrolyzers in **COMSOL** Multiphysics®" www.EFCF.com/COMSOL
3 July 19.30 Extern **4 July** 14.30 Luzerner Saal	Exclusive investor network dinner **FiveT - Investor Action** www.EFCF.com/FiveT Pioneering Investment Platform Presentation on Enabling Champions

Participation & Registration:
To participate in any of the public events register in advance. Some of the event will be hybrid, with the possibility to join both on-site and remote. Follow the specific links. If you have any questions or if you want to organize also an event, contact forum@efcf.com.

International Project Meetings

www.EFCF.com/FPM

As many international experts participate in the European Fuel Cell Forum, Monday and Tuesday of the conference week offer an ideal opportunity for international project meetings. Please feel free to use this time to schedule your meetings for your ongoing projects, setting-up of new projects, or for other topic related events such as the GSM symposium on „European Grid Service Markets", or SSD, Sustainable Shipping days.

To simplify project initiators' and organizers' life, the organisation of such events for registered participants and exhibitors are supported by our organization. Get more information at www.EFCF.com/FPM or send an e-mail to forum@efcf.com

GSM 2024

www.GridServiceMarket.com

The integration of a large amount of new renewable energy sources poses great challenges for the European electricity grids & markets. Network reinforcement, market harmonisation and integration are both solutions and challenges for the various players in the electricity industry. The integration of new technologies and methods to provide grid services and optimise the use of existing infrastructure is changing the face of the electricity industry in the long term.

The GSM 2024 is the 7th annual International Symposium. It will outline recent developments in European grid service markets, highlight advancements and challenges in international cooperation, and discuss technological progress. In addition, it will report on experiences and success stories, supporting a rating of the performance and future potential of new technologies.

The two-day symposium will feature sessions with invited and contributed talks and posters, and includes a special session on international research projects. The International Advisory Board (IAB) ensures that all presentations are of high quality.

The GSM 2024 symposium is chaired by Prof. Dr. Christoph Imboden from HSLU, Switzerland. It takes place at the Culture & Convention Centre Lucerne (KKL) before and in conjunction with EFCF 2024. For EFCF participants it is possible to join the GSM sessions for a reduced fee. Book on-line on www.EFCF.com/Registration.

You like to add a poster contribution?
Download the template and inform
info@GridServiceMarket.com

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SUSTAINABLE SHIPPING DAYS
SSD 2024
1–2 July
Switzerland
Lucerne
Electrolysers & Fuel Cells for Waterborne Transport

Exhibition

www.EFCF.com/ExReg

EFCF 2024 offers you a top chance to catch up on some exhibition opportunities, and share your products directly with potential new clients. The technical exhibition will be held in the splendid Foyer of the Lucerne Hall. This event offers industry, suppliers, test equipment providers and research laboratories the opportunity to showcase their latest products and services, as well as allowing important face-to-face contact with potential new clients.

Exhibitors from all over the world are invited to participate.

In addition to fuel cell, electrolyser and hydrogen technology developers showing systems, related hardware and applications, suppliers can present new materials, stack and system components, control devices, production technology, qualification and test benches and diagnostic tools alongside research and development services.

For further information please contact the European Fuel Cell Forum or visit www.EFCF.com/Exhibition. The details of confirmed exhibitors are listed in the rear of this booklet.

EFCF Online Library

www.EFCF.com/O-Lib

The EFCF online library offers fast and easy access to both free and purchased information. The library is constantly being updated, and currently contains Proceedings with ISBN dating back to 2011, with files from as far back as 1994 gradually or on request being converted and uploaded. With a free login, the current and future proceedings will be accessible. Additionally, since 2020, all eligible contributions will be assigned a DOI (Digital Object Identifier) and published online in the EFCF community of the general purpose open-access repository www.Zenodo.org. The EFCF library offers direct access to this EFCF community and the EFCF Special Issue Series of the Journal „FUEL CELLS" from Wiley-VCH. In the library you can also access the Conference Agendas with the Programs & the Book of Abstracts, as well as the impressions of all EFCF events which are made publicly available.

The EFCF Online Library also provides download access to the available presentations from the year of attendance and the 5 previous years for all registered attendees of an EFCF event with an approved login, upon permission of the authors. To obtain download rights after the conference, post-registration is possible. Please send an email to forum@EFCF.com.

Publication Offers: Proceedings (DOI), Journals

www.EFCF.com/PP

All contributions, which deliver an extended abstract, have the opportunity to be published with their own DOI in the EFCF community of the general purpose, open-access repository www.Zenodo.org.

Since 2012 a limited number of contributions will additionally be invited to be included in a Special Issue in the peer reviewed „Fuel Cells – From Fundamentals to Systems" published by Wiley-VCH, e.g.: EFCF 2013 – Volume 14, Issue 5, pg 671-774; EFCF 2019 – Volume 20, Issue 4, pg 383-514 (see www.EFCF.com/SI). Authors who wish to publish „elsewhere", can opt out. All copyrights remain with the authors.

Presentation available with approved participant login

www.EFCF.com/Presentations

At the EFCF conferences, participants are not permitted to take pictures of the presentations (literary property). This allows presenters to show their latest results, which are, for example, intended for publication in a scientific paper at a later date. However, presenters usually indicate their willingness to share their presented and eventually copyedited slides to the conference registrants. Upon receiving the authors permission, presentations of the current and previous years will be made available in the online library www.EFCF.com/PRESENTATIONS for all registered participants of the European Fuel Cell Forum with an approved login. To obtain download rights after the conference, post-registration is possible by „filing Contact Data" on the www.EFCF.com/Lib on-line form.

Who should attend?

The conference with exhibition offers an attractive programme for potential users of fuel cells, decision makers, researchers and engineers in industry, laboratories, academic institutions, governments, investors, consultants and electric power engineers. The event provides many opportunities for informal exchanges between industry, market and academia, a platform for technology transfer and recruitment of qualified students and trainees. The European Electrolyser and Fuel Cell Forum combines the personal atmosphere of a workshop with the format of a scientific conference. This is the time and the place where decision makers meet politicians, inventors meet investors, engineers meet scientists, power & transport industry meet OEMs and users meet providers. Participants from all continents are invited and welcome to attend this prestigious event.

Whilst nothing can replace the experience of attending a live EFCF event in person, EFCF offer various registration types and strive to offer an event that is accessible to all, with remote access and/or later on-demand options.

International Board of Advisors

www.EFCF.com/IBoA

Session Program 16th European SOFC & SOE Forum

OVERVIEW and GSM 2024, SSD 2024, Tutorials, Project Meetings

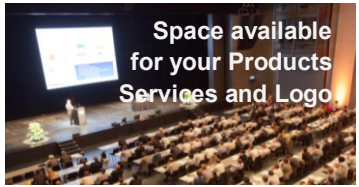
KKL Lucerne, Switzerland, 1 - 5 July **EFCF 2024**

Mo 1 July Tu 2 July	**GSM 2024** www.GridServiceMarket.com **7th Grid Service Market symposium**	**G** Terrassen-saal	**SSD 2024** www.EFCF.com/SSD **Sustainable Shiping Days** +AMON workshop 'Ammonia FC Systems'	**S** Auditorium BuM 1	PMs: **AMON**, **NAUTILUS** **IEA AFC** Annex 32 Montana www.EFCF.com/**Tutorials:** FCH, EIS Club Rooms

We - Fr		A Luzerner Saal	Page	B Auditorium	Page
3 July	We 9:00	A01: P1: Opening Session			
	9:30	A02: K1 - 4: EU, CN , USA & JP programs/partnerships	15	B02: Materials and Cell modelling	
	11:00	A03: Technology status at industry I		B03: Fuel electrodes I	
	13:15	Club Rooms	A04: Poster Session I covering All Session Topics + B09s:	Balance of plant components	17, 29-39
	14:30	A05: Technology status at industry II		B05: Novel cell design	
	16:30	A06: Technology status at industry III & New Opportunities		B06: Innovative cell approaches	
4 July	Th 9:00	A07: K5: Systems	20	B07: K6: Materials	20
	9:30	A08: System design, modelling and performance I		B08: Novel stack design	
	11:00	A09: System design, modelling and performance II		B09: Oxygen electrodes	
	13:15	Club Rooms	A10: Poster Session II covering All Session Topics + B09s:	Balance of plant components	22, 29-39
	14:30	A11: System integration		B11: Advanced characterization	
	16:30	A12: Technology demonstration and novel concepts		B12: Fuel electrodes II	
5 July	Fr 9:00	A13: Upscaling challenges		B13: Degradation phenomena I	
	9:30	Club Rooms	A14: Poster Session III covering All Session Topics + B09s:	Balance of plant components	22, 29-39
	11:00	A15: Stack design, modelling and performance		B15: Protonic Cells	
	13:30	A16: Novel manufacturing strategies		B16: Degradation phenomena II	
	15:05	A17: P2: Closing Ceremony K7 by the EFCF Gold Medal of Honour Winner 2024	28		

Legend: Px: = Plenary, Kx: = Keynote, PM: = Project Meetings

All times are given in UTC/GMT +2 hours



EFCF 2024, 3 - 5 July
Session Program

Morning - Luzerner Saal - www.EFCF.com/JoinA Wednesday, 3 July 2024

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 Chair (A0102)**
Albert Tarancón
IREC Catalonia Institute for Energy Research, Barcelona/Spain;

09:15 **Welcome to Switzerland (A0103)**
Stefan Oberholzer, Rolf Schmitz, Benoît Revaz
Swiss Federal Office of Energy, Bern/Switzerland;

09:30

Legend: Px: = Plenary, Kx = Keynote;
All times are given in **UTC/GMT +2 hours**

Scientific Advisory Committee I (A-M) **www.EFCF.com/SAC**

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Jérome Laurencin, CEA, FR
Pere Margalef, SNAM, IT

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

09:30 A02: Keynotes: EU, CN, USA & JP Programs/Partnerships

09:35 **K1: The Status of High Temperature electrolyser and fuel cell R&D in the European Clean Hydrogen Joint Undertaking Programme (A0201)**
Mirela Atanasiu, Mirela Atanasiu, Eleni Kontonasiou, Dionisis Tsimis, Nikolaos Lymperopoulos, Antonio Aguilo-Rullan
Clean Hydrogen Joint Undertaking, Operations & Communications Unit, Brussels/Belgium;

09:50 **K2: SOC activities in China (A0202)**
Minfang Han
Tsinghua University,
Department of Energy and Power Engineering, Beijing/China;

10:05

10:10 **K3: Solid Oxide Cell program and activities USA (A0203)**
Jack Brouwer
National Fuel Cell Research Center (NFCRC),
Mechanical and Aerospace Engineering,
University of California, Irvine//USA;

10:20

10:30 **K4: Overview of the recent SOC activities in Japan (A0204)**
Kenta Goto

10:35 Fuel Cell and Hydrogen Technology Office
Smart Community and Energy Systems Department
New Energy and Industrial Technology Development Organization (NEDO)
Kawasaki City, Kanagawa/Japan;

B02: Materials and Cell modelling

Modeling the impact of Ni migration and coarsening on the hydrogen electrode and cell performances based on three-dimensional microstructures (B0201)
Ángel Triviño, Davide Cademartori, Maxime Hubert, Jérôme Laurencin
Commissariat à l'énergie atomique et aux énergies alternatives (CEA/Liten), DTCH/STH2, Grenoble/France;

Predicting dynamic microstructure degradation by physically constrained machine learning (B0202)
Anna Sciazko, Yosuke Komatsu, Takaaki Shimura, Naoki Shikazono
the University of Tokyo, Institute of Industrial Science, Tokyo/Japan;

Microstructural and Electrochemical Modeling of Nanostructured SOCs Electrodes (B0203)
Davide Cademartori (1), Maxime Hubert (2), Maria Paola Carpanese (3), Jerome Laurencin (2)
(1) University of Genoa, DICCA, Genova/Italy;
(2) CEA Liten, Liten, Grenoble/France;
(3) University of Genoa, Dicca, Genova/Italy;

Assessing the performance of $Ce_{0.9}Gd_{0.1}O_{2-\delta}$ (GDC10) electrolyte-based solid oxide fuel cells for high power-density operation (B0204)
Akhil Ashar, Huayang Zhu, Robert Kee, Gregory Jackson, Robert Braun
Colorado School of Mines, Department of Mechanical Engineering, Golden, Colorado/USA;

Electro-chemo-mechanics in a ceria based electrolyzer cell (B0205)
Christian Lenser (1), Denise Ramler (1,2), Stefan Kucharski (1), Luzie Wehner (2,3), Egbert Wessel (2,3), Jürgen Malzbender (2,3), Lukas Schöller (3), Daniel Schneider (3), Britta Nestler (3), Iurii Kogut (4), André Weber (4), Norbert H. Menzler (1);
Forschungszentrum Jülich GmbH, Institute of Energy and Climate Research: (1) Materials Synthesis and Processing (IEK-1); (2) Structure & Function of Materials (IEK-2), Jülich/Germany; (3) IAM-MMS, (4) IAM-ET of Karlsruhe Institute of Technology (KIT), Institute for Applied Materials, Karlsruhe/Germany;

10:50 Break - Ground & 1st Floor in the Exhibition & 2nd Floor in the Poster Area

11:15 A03: Technology status at industry I

11:15 **Technology update of Ceres electrolysis programme (A0301)**
Per Hjalmarsson, Chandra Macauley, Robert Leah, Mahfujur Rahman Rahman, Mike Lankin, Ian Methley, Joshua Ryley, Jonathan Harman, Caroline Hargrove, Mark Selby
Ceres Power, Horsham/United Kingdom;

11:30 **Recent advances in Power-to-X and SOEC activities at Topsoe (A0302)**
Andreas Mai (1), Peter Blennow (2), Thomas Heiredal-Clausen (2), Malte Fittkau Birkmose (2), Majken Holstebroe (2), Jeppe Rass-Hansen (2), Michael Hultqvist (2), Poul Georg Moses (2)
(1) Topsoe Germany GmbH, Essen/Germany;
(2) Topsoe A/S, Lyngby/Denmark;

11:45 **SolydEra: a reversible Solid Oxide technology for multiple applications (A0303)**
Massimo Bertoldi (1), Dario Montinaro (1), Stefano Modena (1), Daniele Penchini (1), Antonello Nesci (2), Zacharie Wuillemin (2)
(1) SolydEra SpA, Mezzolombardo/Italy;
(2) SolydEra SA, Yverdon-les-Bains/Switzerland;

12:00 **Elcogen, key component provider for solid oxide systems (A0304)**
Matti Noponen, Antonio Alfano, Jouni Puranen, Valtteri Pulkkinen
Elcogen, Vantaa/Finland;

12:15 **Development and Industrialization at Sunfire (A0305)**
Christian Walter
sunfire GmbH, stack development, Dresden/Germany;

B03: Fuel electrodes I

Development and testing of 10mol% scandia-1mol% yttria stabilised zirconia/nickel fuel electrodes for solid oxide electrolysis cells (B0301)
Julian Taubmann, Mona Yarahmadi, Henrik Lund Frandsen, Peyman Khajavi
Technical University of Denmark, Energy Conversion and Storage, Lyngby/Denmark;

Electrochemical and Degradation Behavior of Novel Mixed $Sr_2Fe_{2-x}Mo_{x-y}MyO_{6-\delta}$ Electrode Materials Under High-Temperature Electrolysis Conditions (B0302)
Stephanie Elisabeth Wolf (1,2), Vaibhav Vibhu (1), Izaak C. Vinke (1), L.G.J. de Haart (1), Rüdiger-A. Eichel (1,2)
(1) Forschungszentrum Jülich GmbH, Institute of Energy and Climate Research, Fundamental Electrochemistry (IEK-9), Juelich/Germany;
(2) RWTH Aachen University, Institute of Physical Chemistry, Aachen/Germany;

Breaking the Bottleneck in Limiting Performance and Durability of Ni/YSZ Based Solid Oxide Electrolysis Cells (B0303)
Ming Chen, Miao Yu, Vasileios Bilalis, Yijing Shang, Xiaofeng Tong, Simona Ovtar, Hua Liu, Yun Xie; Technical University of Denmark, Department of Energy Conversion and Storage, Kgs. Lyngby/Denmark;

Investigations of a strontium-iron-titanate-based fuel electrode in Solid Oxide Electrolysis Cells (SOECs) (B0304)
Franziska Winterhalder (1), Yousef Farzin (2), Yoo Jung Sohn (3), Olivier Guillon (3), André Weber (2), Norbert Menzler (3); (1) Forschungszentrum Jülich, Institute of Energy and Climate Research (IEK), IEK-1 Materials Synthesis and Processing , Solid Oxide Fuel and Electrolysis Cells (SOFC and SOEC) , Jülich/Germany; (2) Karlsruhe Institute of Technology (KIT), Institute for Applied Materials - Electrochemical Technologies (IAM-ET), Karlsruhe/Germany;
(3) Forschungszentrum Jülich GmbH, Institute of Energy and Climate Research (IEK), Materials Synthesis and Processing (IEK-1), Jülich/Germany;

On the behavior of p- and n-type Perovskites in Solid Oxide Electrolysis fuel electrode conditions (B0305)
Ralf Wurster, Rémi Costa, K. Andreas Friedrich
German Aerospace Center (DLR), Technische Thermodynamik, Stuttgart/Germany;

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

15:00 A05: Technology status at industry II

B05: Novel cell design

15:00 **Solid Oxide Products Development at FuelCell Energy (A0501)**
Hossein Ghezel-Ayagh
FuelCell Energy, Advanced Technology, Danbury/USA;

Feasibility of fuel electrode supported solid oxide cells with Ni/CGO fuel electrode and demonstration of mechanical robustness under reducing conditions (B0501)
Henrik Lund Frandsen, Morten Phan Klitkou, Albert Lopez Moragas, Julian Taubmann, Mona Yarahmadi, Peyman Khajavi, Peter Vang Hendriksen
Technical University of Denmark, Department of Energy Conversion and Storage, Kgs Lyngby/Denmark;

15:15 **High temperature electrolysis activities at ENGIE Lab CRIGEN (A0502)**
Ersan Gurbuz, Pierre Olivier
ENGIE, Stains/France;

Development and long-term testing of Ni-CGO based fuel electrode supported solid oxide cells (B0502)
Albert Lopez de Moragas (1), Morten Phan Klitkou (2), Julian Taubmann (2), Mona Yarahmadi (2), Peyman Khajavi (2), Steven Pirou (2), Peter Vang Hendriksen (2), Henrik Lund Frandsen (2)
(1) DTU, DTU Energy, Copenhagen/Denmark;
(2) DTU, Lyngby/Denmark;

15:30 **Pathways to FT from CO2 (oxeonenergy) (A0503)**
Michele Hollist (1), Jessica Elwell (2), Joseph Hartvigsen (2), S. Elangovan (2)
(1) OxEon Energy, Design and Analysis, North Salt Lake/US;
(2) OxEon Energy, North Salt Lake/US;

Towards increased stability, performance and robustness of SOEC: the CELCER-EHT project (B0503)
Elisa Grindler, Florence Lefebvre-Joud
Univ Grenoble Alpes – CEA/LITEN, Grenoble/France;

15:45 **Status of Development at VERMES SOC Technology (A0504)**
Qingping Fang
Vermes Microdispensing GmbH, Solid Oxide Cells, Holzkirchen/Germany;

Complete self-supported Solid Oxide Cells by hybrid multimaterial 3D printing (B0504)
Natalia Kostretsova (1), Simone Anelli (2), Marc Nuñez (1), Alex Morata (1), Federico Smeacetto (2), Marc Torrell (1), Albert Tarancón (1,3)
(1) Catalonia Institute for Energy Research, Sant Adrià del Besós/Spain;
(2) Politecnico di Torino, Turin/Italy;
(3) ICREA, Barcelona/Spain;

16:00 Break - Ground & 1st Floor in the Exhibition & 2nd Floor in the Poster Area

16:30	A06: Technology status and new opportunities	B06: Innovative cell approaches
16:30	**Solid Oxide Electrolysis development at TNO (A0601)** Claire Ferchaud (1), Frans van Berkel (2), Michiel Langerman (2), Maciej Stodolny (2), Eduardo Da Rosa Silva (2), Cahit Benel (2), Robert Makkus (2); (1) ECN part of TNO, Sustainable Process Energy, Petten/Netherlands; (2) TNO, Petten/Netherlands;	**An Efficient Electro-Catalysts Coating Strategy for Enabling Stable, Robust and Active Self-sustainable Reversible Protonic ceramic electrochemical cells (B0601)** Hanchen Tian (1), Wei Li (2), Chengxin Li (1), Xingbo Liu (2); (1) Xi'an Jiaotong University, Xi'an City/China; (2) West Virginia University, Morgantown/United States;
16:45	**Solid Oxide Fuel and Electrolysis Cells: Research Highlights at DTU Energy (A0602)** Anke Hagen, Henrik Lund Frandsen DTU, DTU Energy, Kongens Lyngby/Denmark;	**Improved syngas production within Solid Oxide Cells using AC:DC operations (B0602)** Federico Mattera (1,2), Thomas Erik Lyck Smitshuysen (2), Vincenzo Liso (1), Mads Pagh Nielsen (1), Søren Højgaard Jensen (1,2); (1) Aalborg University, AAU Energy, Aalborg Øst; (2) Dynelectro ApS, Viby Sjælland/Denmark;
17:00	**Solid Oxide Fuel Cells Designs for Aviation (Airbus) (A0603)** Pedro Nehter (1), Helge Geisler (2), Vignesh Ahilan (2), Oliver Rohr (3), Christian Metzner (3) (1) Airbus Operations GmbH, Central Research and Technology, Hamburg/Germany; (2) Airbus Operations GmbH, Hamburg; (3) Airbus Defense and Space, Taufkirchen/Germany;	**Electrochemical conversion of propane based on high-temperature CO_2 electrolysis in SOECs (B0603)** Zhishan Li; Foshan Xianhu Laboratory, Foshan/China;
17:15	**Current Status on Solid Oxide Fuel Cell Technologies Developments for Space Applications (A0604)** Brandon Buergler, Geraldine Palissat, Brigitte Lamaze, Martin Haag European Space Agency, Electric Energineering, Noordwijk/Netherlands;	**Hydrogen production at intermediate temperatures with Proton Ceramic Electrolysis Cells (PCECs) (B0604)** Leon Schley, Vaibhav Vibhu, Lucy Nohl, Izaak C. Vinke, L.G.J. Bert de Haart, Rüdiger-A. Eichel FZ Jülich, IEK-9, Jülich/Germany;
17:30	**Reversible SOEC/ SOFC System Development and Demonstrations (oxeonenergy) (A0605)** Jenna Pike, S. Elango Elangovan, Joseph Hartvigsen, Dennis Larsen, Tyler Hafen, Abel Gomez, Michele Hollist, Skyler Valdez, Todd Mendenhall, Jessica Elwell OxEon Energy, North Salt Lake/United States;	**Highly performant thin film functional layers for solid oxide cells (B0605)** Lucile Bernadet (1), Fjorelo Buzi (1), Kosova Kreka (1), Federico Baiutti (1), Jordi Orrit Prat (2), Raül Bonet Montserrat (2), Jaume Caro Prados (2), Dario Montinaro (3), Marc Torrell (1), Alex Morata (1), Albert Tarancón (1) (1) IREC, Advanced Materials for Energy, Sant Adrià de Besòs/Spain; (2) EURECAT, Manresa/Spain; (3) SolydEra SpA, Mezzolombardo/Italy;
17:45	**Noon Energy's novel carbon-oxygen battery for ultra-low-cost long-duration energy storage (A0606)** Theis L. Skafte, Pawel Piotrowicz, Sunjay Melkote, Allen Liang, Chris Graves Noon Energy, 470 Ramona St., Palo Alto/CA;	**A Comparative Study on Stability Issues of Metal Supported Solid Oxide Cells (B0606 = B0608)** M. Imran Asghar, Buse Bilbey, Axel Savikko: Tampere University, Engineering Materials Science, Faculty of Engineering and Natural Sciences, Tampere/Finland;

18:00 End of Sessions

18:30 Swiss Surprise Night Registered participants meet at the lakeside entry of the KKL

19:00 Exclusive Investor Network Dinner By personal invitation from FiveT - www.EFCF.com/FiveT

09:00	A07: System Keynote Session	B07: Material Keynote Session
09:00 - 09:25	**K5: SOC materials for performance, efficiency and reliability (A0701)** Jan Van herle EPFL École polytechnique fédérale de Lausanne Valais/Wallis, Sion/Switzerland;	**K6: Recent developments in protonic ceramic conductors and the exciting evolution taking place during the last years (B0701)** Francesco Ciucci; University of Bayreuth, Bayreuth/Germany;
09:30	**A08: System design, modelling and performance I**	**B08: Novel stack design**
09:30	**Modular multi-fuel combined heat and power SOFC-system (A0801)** Vanja Subotić, Michael Höber Graz University of Technology, Institute of Thermal Engineering, Graz/Austria;	**Use of multiscale analytical techniques combined with thermodynamic and multiphysics modeling for lifetime prediction of Ceres SteelCell® technology (B0801)** Robert Leah, Jeffrey de Vero, Eva Hammer, Ash Stott, Duncan Gawel, Justine Delage, Agnieszka Dybalska, Alice Williams, Santanu Ray, Subhasish Mukerjee, Caroline Hargrove, Mark Selby Ceres Power Ltd., private, Horsham/United Kingdom;
09:45	**Upscaling SOE and r-SOC modules for industrial applications (SolydEra) (A0802)** Zacharie Wuillemin (1), Antonello Nesci (1), Florian Waeber (1), Stefan Diethelm (1), Jan Pieter Ouweltjes (1) , Massimo Bertoldi (2) (1) SolydEra SA, Yverdon-les-Bains/Switzerland; (2) SolydEra SpA, Pergine Valsugana/Italy;	**Electrochemical performance comparative study of two solid oxide cell architectures on stack (B0802)** Laura Parvaix (1), Olivier Amsellem (1), Nicolas Massué (1), Manasa Rath (2), Freddy Kukk (2) (1) Genvia/France; (2) Elcogen/Estonia;
10:00	**R&D Status of Synthetic Liquid Fuel Production with SOEC and FT Synthesis (A0803)** Yohei Tanaka, Katsuhiko Yamaji, Naoki Takada National Institute of Advanced Industrial Science and Technology, Research Institute for Energy Conservation, Tsukuba/Japan;	**Overcoming the performance degradation of a SOEC stack by controlling the steam supply and electrochemical reaction zone: A novel design approach (B0803)** JangHyun Lim Yonsei University, Mechanical Engineering, Seoul/South Korea;
10:15	**Development of 10 kW rSOC system related to production of e-fuels (A0804)** Ville Saarinen (1), Jari Pennanen (2), Olli Himanen (2) (1) VTT Technical Research Centre of Finland, Fuel Cells & Hydrogen, Espoo/Finland; (2) VTT Technical Research Centre of Finland, Espoo/Finland;	**New concepts for high-pressure Solid Oxide Electrolysis Cells enabled by additive manufacturing (B0804)** Antonio Gianfranco Sabato (1), Santiago Marquez Gonzalez (1), Ana Maria Martos (1), Lucile Bernadet (1), Alex Morata (1), Marc Torrell (1), Albert Tarancon (1,2) (1) IREC, Sant Adrià de Besòs/Spain; (2) ICREA, Barcelona/Spain;
10:30	**Break - Ground & 1st Floor in the Exhibition & 2nd Floor in the Poster Area**	

11:00	A09: System design, modelling and performance II	B09: Oxygen electrodes
11:00	**Dynamic Operation of Solid Oxide Electrolysis (A0901)** Nicholas Kane, Jeremy Hartvigsen, Amey Shigrekar, Jan Lambrechtsen, Temitayo Olowu, Micah Casteel; Idaho National Laboratory, Idaho Falls/United States;	**Prediction of oxygen reduction performance of quaternary $La_{0.8}Sr_{0.2}(Co,Fe,Mn)O_3$ perovskites with machine learning based on spectroscopic characterization data (B0901)** Carlota Bozal-Ginesta; Catalonia Institute for Energy Research, Barcelona/Spain;
11:15	**Dynamic model of a 100kW-scale SOFC system integrated with on-site hydrogen production (A0902)** Amparo Gonzalez Castano (1), Michael Alders (1), Peter Wasserscheid (1, 2) (1) Forschungszentrum Jülich GmbH, Institut für nachhaltige Wasserstoffwirtschaft, H2-Demonstrationsvorhaben (INW-D), Jülich; (2) Friedrich-Alexander-Uni, Erlangen/Germany;	**Contribution of numerical modelling to the design oxygen electrodes for micro-solid oxide cells: a case study of high-performance nano-columnar La_2NiO_4 (B0902)** Silvère Panisset LMGP, Grenoble/France;
11:30	**Analytical Calculation Method for Polarization Resistance of Planar SOFCs (A0903= A0907)** Yaodong Liu, Jingjing Liang, Minfang Han Tsinghua University, Department of Power and Energy Engineering, Beijing/China;	**Influence of phase ratio and morphology on electrochemical performance of LSCF-GDC air electrodes for co-electrolysis (B0903)** Barbara Buxbaum (1), Andreas Egger (1), Priya Paulachan (2), Johanna Schöggl (2), Roland Brunner (2), Edith Bucher (1); (1) Montanuniversität Leoben, Chair of Physical Chemistry, (2) Materials Center Leoben Forschung GmbH, Leoben/Austria;
11:45	**Enhancing Power Modulation in Solid Oxide Fuel Cell Systems with Model Predictive Control considering Thermal Stress (A0904)** Matthis de Lange (1), Pablo Segovia (2,3), Rudy Negenborn (1), Lindert van Biert (1) (1) Delft University of Technology, Maritime & Transport Technology, Delft/Netherlands; (2) Universitat Politècnica de Catalunya, Automatic Control, Barcelona/Spain; (3) Institut de Robòtica i Informàtica Industrial, CSIC-UPS, Barcelona/Spain;	**Oxygen Reduction Reaction Mechanism on Mixed-Conducting Perovskite-type Oxides for Intermediate-Temperature Solid Oxide Fuel Cells (B0904)** Amanda Ndubuisi, Venkataraman Thangadurai University of Calgary, Chemistry, Calgary/Canada;
12:00	**On the lifetime and performance of solid oxide electrolysis systems under different operation modes (A0905);** Javid Beyrami, Rafael Nogueira Nakashima, Arash Nemati, Henrik Lund Frandsen; Technical uni of denmark, Energy conversion & storage, Lyngby/Denmark;	**Development of nanostructured LSCF/GDC composite electrodes of solid oxide cells by in situ polarization method (B0905)** San Ping Jiang; Foshan Xianhu Laboratory, Foshan/China;
12:15	**SOFC & Battery hybrid experimental proof of concept and transient simulation for maritime load following (A0906)** Santiago Salas Ventura (1), Matthias Metten (1), Daniele Fortunati (1), Cem Ünlübayir (2), Stefan Diethelm (3), Marc P. Heddrich (1), S. Asif Ansar (1); (1) German Aerospace Center (DLR), Inst. of Engineering Thermodynamics, Stuttgart; (2) RWTH Aachen University, Chair for Electrochemical Energy Conversion and Storage Systems, Institute for Power Electronics and Electrical Drives (ISEA), Aachen/Germany; (3) SolydEra SA, Yverdon-les-Bains/Switzerland;	**Copper-based air electrode for Solid Oxide Cells (SOC): potential and challenges (B0906)** Ryszard Kluczowski (1), Yevgeniy Naumovich (1), Anna Niemczyk (1), Krystian Machaj (1), Piotr Winiarz (2), Konrad Świerczek (2), Keyun Li (2) (1) Institute of Power Engineering, Warsaw/Poland; (2) AGH University of Krakow, Kraków/Poland;
12:30	**Lunch - 2nd Floor on the Terrace, Coffee & Sweets - Ground & 1st Floor in the Exhibition & 2nd Floor in the Poster Area**	

13:15 A10: Poster Session II covering All Oral Session Topics **+ A09s: Balance of plant components**

Club Rooms & Auditorum Foyer

13:30 Workshop 3rd floor BuM 1
Modeling Fuel Cells & Electrolyzers in COMSOL Multiphysics®

14:30 Enabling Champions by Pioneering Investment Platform

14:30 **Enabling Champions to Scale up the Hydrogen Economy (A0401)**
Nicolas Brahy, Pierre-Etienne Franc, David Crnjac, FiveT Hydrogen AG, Pfäffikon SZ/Switzerland

15:00 A11: System integration

15:00 **Integration of reversible high temperature fuel cell technology to improve the efficiency of hybrid energy storage with negative carbon emission (A1101)**
Gabriele Loreti (1), Francesco Marino (2), Davide Pumiglia (3), Massimiliano Della Pietra (3), Yuri De Pra (3), Viviana Cigolotti (3), Giulia Monteleone (3); (1) Uni of Tuscia, Dep. of Economics, Engineering, Society & Business Administration, Viterbo; (2) Uni degli Studi di Napoli Parthenope, Dep. of Engineering, Napoli; (3) ENEA It, Nat. Agency for Energy, New Technologies & Sustainable Economic Development, Dep. of Energy Technologies & Renewable Sources, Lab. of Energy Storage, Batteries & H_2 Production & Use (TERIN-PSU-ABI), Roma/Italy;

15:15 **Pressurized SOE stack technology for industrial process integration (A1102)**
Michiel Langerman (1), Eduardo da Rosa Silva (1), Dennis Nauta (1), Hans van Wees (1), Jakobert Veldhuis (1), Robert Makkus (1), Frans van Berkel (1), Claire Ferchaud (1), Ilaria Mirabelli (2), Hans ten Dam (2); (1) TNO - Netherlands Organisation for Applied Scientific Research, STIP, Petten/Netherlands; (2) HyGear, Arnhem/Netherlands;

15:30 **Development of Highly Efficient Co-SOEC-Based Power-to-Liquid Plant (A1103)**
Edvin Korlat, Manuel Tandl, Bernd Reiter
AVL List GmbH, DSE, Graz/Austria;

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15:45 **Transient Operating Strategies for Multi-MW Solid Oxide Electrolysis Systems Promoting Power-Following Operation (A1104)**
René Lorenz, Matthias Metten, Marc P. Heddrich, S. Asif Ansar
German Aerospace Center (DLR), Institute of Engineering Thermodynamics, Stuttgart/Germany;

B11: Advanced characterization

Low Frequency EIS Responses from Conversion of Reactants and Components in SOCs (B1101)
Mogens B. Mogensen (1), Xiufu Sun (1), Julian Taubmann (1), Søren H. Jensen (2), Torben Jacobsen (3)
(1) Technical University of Denmark, Energy Conversion and Storage, Kgs. Lyngby/Denmark;
(2) Aalborg University, Department of Energy Technology, Aalborg/Denmark;
(3) Technical University of Denmark, Department of Chemistry, Kgs. Lyngby/Denmark;

Determination of temperature distribution in SOC stack during co-electrolysis using regenerated fiber Bragg gratings (B1102)
Shengzhi Liang (1,2), Dominik Schäfer (1), Rüdiger -A Eichel (1,2)
(1) Forschungszentrum Jülich GmbH, Institute of Energy and Climate Research, Jülich; (2) RWTH Aachen University, Institute of Physical Chemistry, Aachen/Germany;

In-situ TEM reduction of a solid oxide cell with NiO/YSZ and NiO/BZCY materials for fuel electrode (B1103)
Svetlana Korneychuk (1,2,3), Cedric Grosselindemann (4), Laura-Alena Schäfer (5), Mariya E. Ivanova (5), Norbert H. Menzler (5), André Weber (4), Astrid Pundt (1)
Karlsruhe Institute of Technology: (1) IAM-WK; (2) INT; (3) KNMFi; (4) IAM-ET, Karlsruhe; (5) Forschungszentrum Jülich GmbH, Institute of Energy and Climate Research (IEK), IEK-1: Materials Synthesis and Processing, Jülich/Germany;

Advancements in Electrochemical Impedance Spectroscopy for SOEC Stack Performance Evaluation and Quality Control at Topsoe (B1104); Daniel Drasbæk, Christian B. Schandel, Fotis Zaravelis, Peter Blennow, Thomas Heiredal-Clausen, Jeppe Rass-Hansen, Giovanni Perin, Anne Hauch, Andreas Mai; Haldor Topsøe, kgs. Lyngby/Denmark;

16:00 Break - Ground & 1st Floor in the Exhibition & 2nd Floor in the Poster Area

16:30 A12: Technology demonstration and novel concepts

16:30 **Development and Operation of 250 kW Platform for Premium Efficiency Industrial SOEC and rSOC (A1201)**
Kim Åström, Tuomas Hakala, Erkko Fontell
Convion Ltd, Fuel Cells, Espoo/Finland;

16:45 **Direct Use of European Seawater in Solid Oxide Electrolysis Cells (A1202)**
Jan Uecker (1), Bintou Issa Dembele (2), Lucy Nohl (2), Niklas Eyckeler (2), Vaibhav Vibhu (2), Izaak C. Vinke (2), L.G.J (Bert) de Haart (2), Rüdiger-A. Eichel (2)
(1) Forschungszentrum Juelich GmbH, IEK-9, Juelich/Germany;
(2) Forschungszentrum Jülich, Jülich/Germany;

17:00 **Robust remote power supply (RoRePower) (A1203)**
Jari Kiviaho (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, Dresden/Germany
(3) SolydEra SpA; Trento/Italy;
(4) new enerday GmbH, Neubrandenburg / Germany; (5) EFCF AG, Lucerne/Switzerland (6) 3E Energy Oy, Tuusula, Suomi-Finland;

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17:15 **NH3-SOFC and SOEC-operation with MK35x stacks (A1204)**
Stefan Megel, Sebastian Hielscher, Stefan Rothe, Nikolai Trofimenko, Mihails Kusnezoff, Sindy Mosch, Laura Nousch, Paul Adam, Mathias Hartmann
Fraunhofer Gesellschaft, IKTS, Dresden/Germany;

17:30 **Pressurized testing of a 40-cell metal-supported solid oxide electrolysis stack (A1205)**
Aadarsh Parashar (1), Danny Fennell (2), Per Hjalmarsson (2), Neal Sullivan (1), Robert J Braun (1)
(1) Colorado School of Mines, Mechanical Engineering, Golden/United States;
(2) Ceres Power, Horsham/United Kingdom;

B12: Fuel electrodes II

Single cell and short-stack reversible operation with nickel free fuel electrodes in CO/CO_2 environment (B1201)
Veronika Rečková (1), Ivar Wærnhus (2), Maria-Eleftheria Farmaki (3), Kalliopi-Maria Papazisi (3), Dimitrios Tsiplakides (3), Stella Balomenou (3), Brandon Buergler (4)
(1) Clara Venture Labs, Bergen/Norway;
(2) Clara Venture Labs, Research and Analysis, Bergen/Norway;
(3) CPERI-CERTH, Thessaloniki/Greece;
(4) European Space Agency, Noordwijk/Netherlands;

Enhanced CO_2 electrolysis through Mn substitution coupled with Ni exsolution in Lanthanum Calcium Titanate electrodes (B1202)
NUOXI ZHANG (1), Aaron Naden (1), Lihong Zhang (2), Xiaoxia Yang (2), Paul Connor (1), John Irvine (1)
(1) University of St Andrews, School of Chemistry, St Andrews/United Kingdom;
(2) Beijing Institute of Technology, Beijing Key Laboratory for Chemical Power Source and Green Catalysis, Beijing/China;

Enhancing the performance of solid oxide CO_2 electrolysis cell using co-doped double perovskite cathode (B1203)
Mohammadali Emadi (1), Eric Croiset (2)
(1) University of Waterloo, Chemical Engineering, Waterloo/Canada;
(2) University of Waterloo, Waterloo/Canada;

B1204 - Replacement previewed: B1207, B1208 or **B1209**
tbc

Engineering of ZDC nanocatalyst into a LSCM/ScSZ backbone for enhancing CO2 reduction in solid oxide electrolysis cells (B1205)
Haodong Wu, Xiangling Yue
University of St Andrews, School of Chemistry, St Andrews/UK;

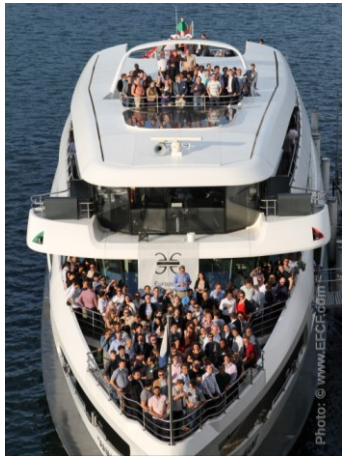
17:45 **Hot Balance of Plant (H-BoP) systems for SOEC Megawatt Solutions (A1206=A1207)**
Jean-Paul Janssens, Michel Dubuisson, Luk Dedene
BOSAL, Energy Conversion Industry, Lummen/Belgium;

Enhancement of the intrinsic Ni/GDC activity under rSOC operation by means of Fe-Au doping: An electro-kinetic study (B1206)
Dimitrios Niakolas (1), Fotios Zaravelis (2), Stylianos Neophytides (2)
(1) FORTH/ICE-HT, LEP, Patras/Greece; (2) FORTH/ICE-HT, Patras/Greece;

18:00 End of Sessions

19:30 Dinner on the Lake **www.EFCF,com/DoL**

19:20 - Boarding lake side of KKL pier 5/6
22:00 - Short stop in Brunnen for early return by train.
23:15 - Back at pier 5/6, after party until 24:00



Scientific Advisory Committee II (M-Z) **www.EFCF.com/SAC**

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Rak-Hyun Song, KIER, KR
Marc Torrell, IREC, ES
Dimitrios Tsiplakides, AUTH, GR
Jan van Herle, EPFL, CH
Christian Walter, Sunfire, DE

Thanks to the SAC
for the quality evalutaion of all contributions.

09:00	A13: Upscaling challenges	B13: Degradation phenomena I
09:00	**The European Hydrogen Academy (A1301)** Robert Steinberger-Wilckens (1), Karel Bouzek (2), Martin Paidar (2) (1) University of Birmingham, UK, Centre for Fuel Cell & Hydrogen Research, Birmingham/United Kingdom; (2) University of Chemistry and Technology, Prague/Czech Republic;	**Investigating Durability of Solid Oxide Electrolysis Cells Using Accelerated Stress Testing (B1301)** Olga Marina, Long Le, Renaldo Springer, Christopher Coyle, Seraphim Belko, Lorraine Seymour, Surendra Karki, Danny Edwards, Tian Liu, Jie Bao Pacific Northwest National Laboratory, Richland/United States;
09:15	**Life Cycle Assessment of Methane Production via Solid Oxide Electrolyzer: Examining from Stack Manufacturing to System Level (A1302)** Xinyi Wei (1,2), Shivom Sharma (1), Arthur Waeber (1), Francois Marechal (1), Jan Van herle (2) (1) IPESE; (2) GEM, The École polytechnique fédérale de Lausanne (EPFL), Energy, Sion/Switzerland;	**Characterization and modelling of SOFC degradation via accelerated life test and design of experiments method (B1302)** Guillaume Jeanmonod (1), Hangyu Yu (2), Marie-Lise Tremblay (1), Cédric Frantz (2), Jean-François Labrecque (1), Sylvio Savoie (1), Jan Van herle (2) (1) Hydro-Québec (IREQ), Varennes/Canada; (2) École Polytechnique Fédérale de Lausanne, Group of Energy Materials, Faculty of Engineering Sciences, Sion/Switzerland;
09:30	**Kiln furniture solutions for SOFC/SOEC (A1303)** Giovanni Massasso Saint Gobain Research Provence, Ceramics, CAVAILLON/France;	**Study on SrO formation and Sr diffusion mechanism in LSCF electrode using DFT (B1303)** Karthikeyan Saravanabavan (1,2), Cintia Hartmann (2), Gregory Geneste (3,4), Patrice Tochon (1), Jerome Laurencin (2) (1) Genvia SAS, Béziers/France; (2) Univ. Grenoble Alpes, CEA, Liten, DTCH, Grenoble/France; (3) CEA, DAM, DIF, Arpajon/France; (4) Université Paris-Saclay, CEA, Laboratoire Matière en Conditions Extrêmes, Bruyères-le-Châtel/France;
09:45	**OUTFOX: Optimized up-scaled technology for next-generation solid oxide electrolysis (A1304)** Cahit Benel TNO, STIP, PETTEN/Netherlands;	**Sulfur Poisoning of SOC Fuel Electrodes: Influence of Gas Composition, Polarization and Time (B1304)** Daniel Esau (1), Samuel Aaron Horlick (2), Chen-Yu Tsai (2), Franz-Martin Fuchs (3), André Weber (4) (1) KIT, IAM-ET, Karlsruhe/Germany; (2) Sunfire GmbH, Dresden/Germany; (3) Kerafol Keramische Folien GmbH & Co. KG, Eschenbach/Germany; (4) Institute for Applied Materials – Electrochemical Technologies (IAM-ET), Karlsruhe Institute of Technology, Karlsruhe/Germany;
10:00	**Break - Ground & 1st Floor in the Exhibition & 2nd Floor in the Poster Area**	

11:00 A15: Stack design, modelling and performance

11:00 **Fast Dynamic Electrolysis Operation of a 30-cell Solid Oxide Stack (A1501)**
Alessandro Micero (1), Alexander Surrey (2), Josef Schefold (1), Aline Léon (1)
(1) EIFER, Karlsruhe/Germany;
(2) Sunfire GmbH, Dresden/Germany;

11:15 **Topsoe Stack Platform for Upscaling & Commercialization of SOEC in Power-to-X (A1502)**
Thomas Heiredal-Clausen, Daniel Bovin Drasbæk, Peter Blennow, Jeppe Rass-Hansen, Christian Bækhøj Schandel, Tobias Holt Nørby, Michael Hultqvist
Topsoe, Power to X, Kongens Lyngby/Denmark;

11:30 **A time-dependent model simulating the degradation in a solid oxide cell stack during 100 kh of operation (A1503)**
Shangzhe Yu (1,2), Dominik Schäfer (1), Rüdiger-A. Eichel (1,2); (1) Institute of Energy and Climate Research, Fundamental Electrochemistry (IEK-9), Forschungszentrum Jülich GmbH, Jülich; (2) Institute of Physical Chemistry, RWTH Aachen University, Aachen/Germany;

11:45 **Dynamic simulation for a SOFC cell stack with electrode polarization model (A1504)**
Kojun Suzuki, Akifumi Ido, Takumi Imabayashi, Koichi Asano
Central Research Institute of Electric Power Industry (CRIEPI),Kanagawa/Japan;

12:00 **Computationally inexpensive solid oxide cell stack internal manifold flow model (A1505)**
Oscar Furst, Olaf Deutschmann; Karlsruhe Institute of Technology, Institute for Chemical Technology and Polymer Chemistry, Karlsruhe/Germany;

12:15 **+10 kh AC:DC Operation of a SolydEra G8-80 stack (A1506)**
Søren Jensen (1), Thomas Lyck Smitshuysen (2), Martin Nørby Nielsen (2), Jan Pieter Ouweltjes (3), Dario Montinaro (3), Mogens Bjerg Mogensen (4)
(1) Aalborg University, Department of Energy, Aalborg; (2) DynElectro ApS, Viby Sjælland/Denmark; (3) SolydEra SpA, Mezzolombardo/Italy; (4) Technical Univer,sity of Denmark, Department of energy Conversion and Storage, Kgs. Lyngby/Denmark

B15: Protonic Cells

Additive manufacturing of low-temperature ceramic fuel cells (B1501)
Muhammad Imran Asghar, Sini Virtanen, Buse Bilbey, Axel Savikko
Tampere University, Renewable Energy Technologies Group, Faculty of Engineering and Natural Sciences, Tampere/Finland;

Innovation in cell and stack designs for hydrogen production (B1502)
Kalpana Singh, Marie-Laure Fontaine, Einar Vøllestad, Ragnar Strandbakke, Elena Stefan, Christelle Denonville, Belma Talic
SINTEF, Thin Film and Membrane Technologies, Oslo/Norway;

Protonic Ceramic Electrolysis Cells: from the 3D printing to integration issues (B1503 = B1507)
Simone Anelli (1), Domenico Ferrero (2), Massimo Santarelli (2), Federico Smeacetto (1)
(1) Politecnico di Torino, Department of Applied Science and Technology (DISAT), Turin/Italy;
(2) Politecnico di Torino, Department of Energy (DENERG), Turin/Italy;

Hydrogen production at intermediate temperatures with proton conducting ceramic cells: perspectives and challenges. (B1504)
Haoyu Zheng, Feng Han, Noriko Sata, Rémi Costa; German Aerospace Center (DLR), Institute of Technical Thermodynamics, Electrochemical Energy Technology, Stuttgart/Germany;

Effect of Fe catalytic decomposition layer of ammonia on the performance and stability of direct ammonia proton ceramic fuel cell (B1505); Juan Zhou; Nanjing Uni of Science & Technology, School of Energy & Power Engineering, Nanjing/China;

B1506
Replacement previewed:
B1507, B1508 or **B1509**
tbc

12:30 Lunch, Coffee & Sweets - 2nd Floor on the Terrace, Remove poster from 13:00, otherwise they will be disposed of

13:30	A16: Novel manufacturing strategies	B16: Degradation phenomena II
13:30	**Boosted Efficient Engineering of $Ce(Mn, Fe)O_2$ on Perovskite Oxide via Spray for CO_2 electrolysis (A1601)** Sang Won Lee, Tao Ho Shin; Korea Institute of Ceramic Engineering and Technology, Hydrogen Energy Materials Centra, JinJu-si/South Korea;	**Robust steam electrolysis in Metal Supported Cells (B1601)** Javier Zamudio-García, Riccardo Caldogno, Bhaskar R. Sudireddy, Peter V. Hendriksen, Anke Hagen Technical University of Denmark (DTU), Energy Conversion and Storage, Lyngby/Denmark;
13:45	**Study of laser treatment effects on the electrolyte and fuel electrode of Solid Oxide Cells (A1602)** Miguel Morales (1,2), Sandra García-González (1,2), Dario Montinaro (3), Emilio Jiménez-Piqué (1,2) (1) CIEFMA-Department of Materials Science and Engineering; (2) Barcelona Research Center in Multiscale Science and Engineering, Universitat Politècnica de Catalunya-BarcelonaTech, Barcelona/Spain; (3) SolydEra SpA, Mezzolombardo-TN/Italy;	**Mitigating degradation of GDC electrodes in SOEC operation (B1602)** Anna Sciazko, Yosuke Komatsu, Takaaki Shimura, Naoki Shikazono the University of Tokyo, Institute of Industrial Science, Tokyo/Japan;
14:00	**New strategies and innovative manufacturing technologies for high-pressure resistant interfaces and enhanced reversible solid oxide cell systems (A1603)** Federico Smeacetto (1), Elisa Zanchi (1), Antonio Sabato (2), Milena Salvo (1), Simone Anelli (1), Lucile Bernadet (2), Marc Torrell (2), Albert Tarancon (2); (1) Politecnico di Torino, Applied Science and Technology, TORINO/Italy; (2) Institut de Recerca en Energia de Catalunya, Barcelona/Spain;	**Dynamic Operation of High Temperature Electrolysis Cells (B1603)** Michael Tucker, Zhikuan Zhu, Boxun Hu Lawrence Berkeley National Laboratory, Energy Conversion Group, Berkeley/United States;
14:15	**A1604 - Replacement previewed: A1607, A1608** or **A1609** tbc	**Massive nanoindentation as a novel approach for assessing the Ni-YSZ degradation of Solid Oxide Cells (B1604)** Sandra García González (1), Laia Ortiz Membrado (1), Emilio Jiménez Piqué (1), Dario Montinaro (2), Miguel Morales Comas (1); (1) CIEFMA-UPC (Universitat Politècnica de Catalunya), Department of materials science and engineering , Barcelona/Spain; (2) SolydEra SpA, Mezzolombardo/Italy;
14:30	**Production strategies for proton conducting SOC (A1605)** Elisa Mercadell (19 , Andrea Bartoletti (1), Angela Gondolini (1), Massimiliano Lo Faro (2), Alessandra Sanson (1) (1) CNR-ISSMC, Faenza/Italy; (2) CNR-ITAE, Messina/Italy;	**Steam Electrolysis with Electrolyte Supported Cells: Durability at High Current Density & Lower Temperature (B1605)** Josef Schefold (1), Aline Léon (1), Christian Geipel (2); (1) European Institute for Energy Research, EIFER, Karlsruhe/Germany; (2) Sunfire GmbH, Dresden/Germany;
14:45	**3D-structured interfaces by laser machining on 3D printed electrolyte supported Solid Oxide Cells (A1606)** Miguel Laguna-Bercero (1), Andres Acin (1), Ruth Lahoz (1), Angel Larrea (1), Alodia Orera (1), Marc Torrell (2), Albert Tarancon (2); (1) Instituto De Nanociencia Y Materiales De Aragon, Zaragoza/Spain; (2) IREC, Catalonia Institute for Energy Research, Barcelona/Spain;	**Analysis and simulation of degradation phenomena in solid oxide cells (B1606)** Dario Montinaro (1), Francesca De Genua (1), Crossley Kenneth Welsh (2) (1) SolydEra SpA, Mezzolombardo/Italy; (2) Paul Scherrer Institute, Villigen PSI/Switzerland;
15:00	**5 Min to change from B16 Session to Luzerner Saal for A17 Plenary Session**	

15:05	**A17: P2: Closing Ceremony** **Keynote by the EFCF Gold Medal of Honour Winner 2024**
15:05	**Summary by the Chair (A1701)** Albert Tarancón IREC Catalonia Institute for Energy Research, Barcelona/Spain;
15:20	**Information on Next EFCF:** **EFCF 2026 18th European SOFC & SOE Forum** **EFCF 2025 11th 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, Barcelona/Spain;
15:30	**Christian Friedrich Schönbein Award** **for the Best Poster, Best Science Contribution, Medal of Honour (A1703)** Albert Tarancón IREC Catalonia Institute for Energy Research, Barcelona/Spain;
15:40	**K7: EFCF 2024 Gold Medal Winner Keynote on** **Past and future of science, engineering and technology** **of electrochemical SOC devices for energy applications (A1704)** Nigel Brandon ICL Imperial College London, London/UK; honourably elected by the International Board of Advisors (IBoA)
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**

Poster List covering All Oral Session Topics + A09s: Balance of plant components

Club Rooms 3rd floor

A04 Poster Session I	**Wednesday, 3 July 2024**	**Afternoon 13:15 - 15:00**
A10 Poster Session II	**Thursday, 4 July 2024**	**Afternoon 13:15 - 15:00**
A14 Poster Session III	**Friday, 5 July 2024**	**Morning 10:15 - 11:00**

A03: Technology status at industry I

Efficient and robust operating conditions via model-based system development for SOEC systems in the MW range (AVL) (A0307)
Raphael Neubauer, Michaela Unterweger, Martin Piffl, Bernd Reiter; AVL List GmbH, Graz/Austria;

A05: Technology status at industry II

The road to realization in Elcogen stack material progression from ex-situ evaluation to stack-level testing (A0507)
Jouni Puranen, Madan Patnamsetty, Oskari Qvick, Maisa Virtanen, Antonio Alfano, Matti Noponen Elcogen Oy, Vantaa/Finland;

Commercialization of Ceres SteelCell technology for green hydrogen and power generation (A0508)
Robert Leah, Adam Bone, Per Hjalmarsson, Mahfujur Rahman, Subhasish Mukerjee, Caroline Hargrove, Mark Selby; Ceres Power Ltd., private, Horsham/UK;

A06: Technology status and new opportunities

Advancing in the hydrogen supply chain: Hydrogen and electricity storage by qualifying iron oxides and the rSOC system (Wolf-energetik) (A0608)
Julien Göthel; Wolf Energetik GmbH, Dresden/Germany;

HyPT: The Hydrogen Production Technologies Global Centre (A0609)
Bernardo J. M. Sarruf (1), Artur Majewski (1), Michael Pidburtnyi (2), Viola Birss (2), Robert Steinberger-Wilckens (1); University of Birmingham, (1) School of Chemical Engineering, Birmingham/UK; (2) Department of Chemistry, Calgary/Canada;

B02: Materials and Cell modelling

Modelling the effect of cell morphology and operating conditions on proton-conducting ceramic electrolyzer performance (B0209)
Julian C. Restrepo (1), Aayan Banerjee (2); (1) University of Twente, Departament of chemical engineering, Enschede/Netherlands;(2) University of Twente, Enschede/Netherlands;

Detailed numerical simulation of the performance of the functional layer of SOE cathodes (B0210)
Álvaro Manuel Rodríguez Cambra, María García-Camprubí
Instituto Tecnológico de Aragón, CFD, Zaragoza/Spain;

A08: System design, modelling and performance I

High-efficiency and low-weight integrated solid oxide fuel cell system for transportation applications (A0807)

Akhil Ashar (1), Yifan Gu (1), Fuqiong Lei (1), Cyrus Boushehri (2), Lucas Pratt (3), Huayang Zhu (1), Tyrone Vincent (2), Gregory Jackson (1), Christopher Cadou (3), Robert Braun (1)
(1) Colorado School of Mines, Mechanical Engineering, Golden/US;
(2) Colorado School of Mines, Electrical Engineering, Golden/US;
(3) University of Maryland, Aerospace Engineering, College Park/US;

Direct integration of fuel processing units into a low-power Solid Oxide Fuel Cell Stack (A0808)

Inès Richard (1), Céline Wyss (1), Thomas Zähringer (2), Luc Conti (1), Timothée Frei (1), Daniel M. Meier (2), Mahmoud Hadad (1); (1) Inergio Technologies SA, Renens/Switzerland;
(2) Zurich University of Applied Sciences (ZHAW), Winterthur/Switzerland;

Design and demonstration of integrated Power-to-X processes using co-electrolysis and FT synthesis (A0809)

Paul Adam, Ralf Näke, Gregor Herz, Stefan Megel, Erik Reichelt
Fraunhofer IKTS, Dresden/Germany;

Gas-tightness studies at high temperature: application to SOE (A0810)

Vulliez Karl; CEA, DTCH, GRENOBLE/France;

REACTT: REliable Advanced Diagnostics and Control Tools for increased lifetime of solid oxide cell Technology (A0811)

Dani Juricic (1), Bertrand Morel (2), Pierpaolo Polverino (3), Jan van Herle (4), Carlo Tanzi (5), Jan Pieter Ouweltjes (6), Pyry Makinen (7), Manuel Tandl (8), Davide Pumiglia (9), Gregory Francois (10)
(1) Institute Joyef Stefan, Department of Systems and Control, Ljubljana/Slovenia;
(2) Univ. Grenoble Alpes, CEA-Liten, Grenoble/France;
(3) University of Salerno, Dept. of Industrial Engineering, Fisciano/Italy;
(4) Ecole Polytechnique Fédérale de Lausanne, Lausanne/Switzerland; (5) Bitron S.p.A.,Torino/Italy;
(6) SolydEra SA,, Yverdon-les-Bains/Switzerland;
(7) Teknologian tutkimuskeskus VTT, Espoo/Finland; (8) AVL LIST GMBH,, Graz/Austria;
(9) ENEA, Department of Energy Technologies and Renewable Sources; Energy Storage, Batteries and Hydrogen Production & Use (TERIN-PSU-ABI), Roma/Italy;
(10) Haute Ecole Spécialisée de Suisse Occidentale Valais-Wallis, Sion/Switzerland;

The safe operating conditions of co-electrolysis on industrial-size Ni-YSZ cathode based solid oxide electrolysis cells (B0211)

jingjing Liang (1), Minfang Han (1), François Maréchal (2)
(1) Tsinghua University, Department of Energy and Power Engineering, Beijing/China;
(2) École Polytechnique Fédérale de Lausanne, Sion/Switzerland;

Numerical analysis of variations in SOC characteristics under fuel cell and electrolysis operation modes (B0212)

Omid Babaie Rizvandi, Robert J. Braun
Department of Mechanical Engineering, Colorado School of Mines, Golden, Colorado/US;

Kinetics of Methane Reforming on an SOEC Cathode (B0213)

Jean-Hugues Boilley; Engie Lab CRIGEN, Hydrogen Lab, Stains/France;

Distortion of 8YSZ membranes during sintering: Multiscale modeling & experiments (B0214)

Xuhao Liu, Li Duan, Shihao Zhou, Xianhang Li, Zhaoyue Yao,
Pingping Zhu, Zheng Zhong, Zilin Yan; Harbin Institute of Technology, Shenzhen/China;

Model of electro-chemo-mechanical relationships in ceria-based SOECs: a 3D FEM approach (B0215)

Iurii Kogut (1), Christian Lenser (2), Denise Ramler (2,3), Stefan Kucharski (2), Luzie Wehner (4), Egbert Wessel (4), Jürgen Malzbender (4), Norbert H. Menzler (2,3), André Weber (1)
(1) Karlsruhe Institute of Technology, Institute of Applied Materials - Electrochemical Technologies (IAM-ET), Karlsruhe/Germany; (2) Forschungszentrum Jülich GmbH, Institute for Energy and Climate Research, Materials Synthesis and Processing (IEK-1), Jülich/Germany;
(3) RWTH Aachen University, Institute of Mineral Engineering (GHI), Aachen/Germany;
(4) Forschungszentrum Jülich GmbH, Institute for Energy and Climate Research, Structure and Function of Materials (IEK-2), Jülich/Germany;

Application of NDIR-TDLAS spectroscopy for rapid vapor and multi-gas analysis in high-temperature fuel cell/electrolyzer cells (B0216)

Stefano Frangini, Massimiliano Della Pietra, Davide Pumiglia, Simone Mataloni, Francesca Santoni
ENEA CR Casaccia, Dept. Energy Technologies, Rome/Italy;

Multiphysics modelling and EIS as a tool for predicting SOFC performance and rational cell design (B0217)

Andrea Pizzato; University of Padova, Departement of Industrial Engineering, Padova/Italy;

Multi-Objective Optimization of NH3-SOFC Systems: Integrating Cell Nitriding Considerations for Sustainable Power Generation (A0812)

Xinyi Wei (1, 2), Arthur Waeber (1), Shivom Sharma (1), Francois Marechal (1), Jan Van Herle (2)
(1) IPESE; (2) GEM, The École polytechnique fédérale de Lausanne (EPFL), Energy, Sion/Switzerland;

Investigation on SOE performance under elevated pressure with AC:DC operation (A0813)

Xiaoti Cui, Yaqi Li, Søren Højgaard Jensen, Simon Lennart Sahlin
Aalborg University, Departrment of Energy, Aalborg/Denmark;

Assessment of SOFC-based combined cycle power plants integrated in ship heat and power networks: A trend analysis (A0816)

Niek Goselink (1), Lindert van Biert (2)
(1) Delft University of Techonology, Maritime and Transport Technology, Delft/Netherlands;
(2) Delft University of Technology, Maritime and Transport Technology, Delft/Netherlands;

Comparison of Diesel SOFC System Concepts: Targeting the Highest Electrical Efficiency (A0817)

Laura Nousch (1), Marie-Lise Tremblay (2), Guillaume Jeanmonod (2), Simon Besner (2), Mathias Hartmann (1), Martin Simoneau (2), Daniela Herold (1)
(1) Fraunhofer Institute of Ceramic Technologies and Systems IKTS, Dresden/Germany;
(2) Hydro-Quebec Research Institute (IREQ), Varennes/Canada;

Exergy volumetric and gravimetric analysis of a fuel flexible HELP-SOFC APU system for trucks, busses and coaches (A0818)

Herish Farhan Khola (1), Xulia Placer Dalama (1), Amogh Amladi (1), Theo Woudstra (1), B.C. Jaspers (2), P. V. Aravind (1)
(1) University of Groningen, Energy Conversion, ESRIG, Groningen/Netherlands;
(2) Circonica Circular Energy B.V., Leiden/Netherlands;

Optimization of SOFC power plant for power generation system (A0819)

Raúl Roldán González
Centro de Investigación de Energías, Medioambientales y Tecnológicas (CIEMAT), Energy departament, Madrid/Spain;

Reliable Dynamic Operation of SOFC Systems with Anode Off-Gas Recirculation using Multi-linear and Neural Network Model Predictive Control (A0820)

Jan Hollmann, Stephan Kabelac
Institute of Thermodynamics, Leibniz University Hannover, Hannover/Germany;

One-dimensional steady-state modeling and structure optimization of segmented-in-series tubular SOFCs (B0218)

Huiyu Zhang, Yun Liu, Shaodong Sun, Xin Liu, Chengxin Li
Xi'an Jiaotong University, State Key Laboratory of Mechanical Behavior of Materials, Xi'an/China;

Enhanced initial performances and durability of Solid oxide cells by H_2 electrode microstructure optimisation and high density barrier layer (B0219)

L. Guesnet (1), M. Lagny (1), J. Bigarre (1), J. Laurencin (2), E. Aubry (3), P. Briois (3), L. Huc (4), J. Vulliet (1)
(1) CEA, DAM, Le Ripault, F-37260 Monts/France;
(2) Univ. Grenoble Alpes, CEA/LITEN, Grenoble/France;
(3) FEMTO-ST institute, UMR CNRS6174, Department MN2S, Montbéliard/France;
(4) CIRIMAT, 35 Chemin des Maraîchers, Toulouse/France;

Modeling and experimental validation for SOFC/SOEC coupled with ethanol internal reforming (B0220)

Samuel Tadeu de Paula Andrade, Rosana Zacarias Domingues, Welerson Jesus Lima, Nicolas Tadeu Domingues Fernandes, Rudolf Huebner, Esly Ferreira da Costa Junior, Tulio Matencio; Federal University of Minas Gerais, Materials and Fuel Cell Laboratory - LaMPaC, Belo Horizonte/Brazil;

An h-adaptative CG method for SOC simulations (B0221)

Albert Costa-Solé (1), Abel Gargallo-Peiró (1), Marc Torrell (2), Albert Tarancón (2,3), Daniel Mira (1)
(1) Barcelona Supercomputing Center - BSC, Barcelona/Spain;
(2) Institut de Recerca en Energia de Catalunya (IREC), Barcelona/Spain;
(3) Institució Catalana de Recerca i Estudis Avançats (ICREA), Barcelona/Spain;

Reduction of Thermal Gradients in Support Electrodes of High-Temperature SOEC Cells (B0222)

J. Vidal (1), C.Pino-Muñoz (2), C. Cuevas (3), K. Ramam (1), F. Sanhueza (1)
(1) Department of Materials Engineering, University of Concepción, Concepción/Chile;
(2) Department of Earth Science and Engineering, Imperial College London, London/UK;
(3) Department of Mechanical Engineering, University of Concepción, Concepción/Chile;

Digital twin of reversible solid oxide cells powering robotic autonomous platforms for environmental monitoring (B0223)

Fiammetta Rita Bianchi, Barbara Bosio; University of Genova, DICCA, Genova/Italy;

A mixed modeling and experimental evaluation of the efficiency of an SOFC system fed by hydrocarbon (A0821)
Guillaume Jeanmonod, Raynald Labrecque, Simon Besner, Jean-François Labrecque
Hydro-Québec, Varennes/Canada;

Operation of SOFC on a variation of fuels with internal fuel processing (A0822)
Ivar Wærnhus; Clara Venture Labs, Bergen/Norway;

Advanced microtubular solid oxide cells for stack integration and operation under pressure (A0823)
Miguel Ángel Morales-Zapata, Miguel Ángel Laguna-Bercero, Alodia Orera; Institute of Nanoscience and Materials of Aragon, Materials and Fluids Science and Technology , Zaragoza/Spain;

Prediction of SOC stack performance and failure probability based on historic experiments (A0824)
Christian Mänken (1), Dominik Schäfer (1), Rüdiger-Albert Eichel (2)
(1) Institute of Energy and Climate Research, Fundamental Electrochemistry (IEK-9), (2) Institute of Energy and Climate Research, Fundamental Electrochemistry (IEK-9), Forschungszentrum Jülich GmbH, Electrochemical Process and System Technology, Jülich/Germany;

A09: System design, modelling and performance II

Analytical Calculation Method for Polarization Resistance of Planar SOFCs (A0907= A0903)
Yaodong Liu, Jingjing Liang, Minfang Han
Tsinghua University, Department of Power and Energy Engineering, Beijing/China;

Analyzing CO Production Pathways in Solid Oxide Electrolysis Cells Operating in Co-Electrolysis Mode (A0908)
Jun Yong Kim (1), Christian Rose (1), Luca Mastropasqua (2), Jack Brouwer (1)
(1) Clean Energy Institute, Irvine/US; (2) University of Wisconsin-Madison, Madison/US;

Analysis and Optimization of a Solid Oxide Fuel Cell System 0D-Model with the focus on Electrified Aircraft Propulsion (A0909)
Jan-Christoph Jeske, Luca Eichhorn, Stefan Kazula; German Aerospace Center, Cottbus/Germany;

Techno Economic Analysis of a Multi-Module High Temperature Electrolysis System Under Intermittent Operation (A0910)
Vito Verde (1,2), Ersan Gurbuz (2), Pierre Olivier (2), Assia Saker (2), Fausto Gallucci (1)
(1) Eindhoven University of Technology, Eindhoven/The Netherlands;
(2) ENGIE Lab Crigen, Stains/France;

Multi-physics Simulation of Three-dimensional Gas Flow with Electro-Chemical Reaction in SOECs (B0224)
Naoki Takada, Yohei Tanaka, Katsuhiko Yamaji
National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba/Japan;

B03: Fuel electrodes I

Ceria-nickel fuel electrodes for reversible SOC operation (B0309)
Bernardo Sarruf (1), Kamil Nowicki (2), Aaron Naden (2), John Irvine (2), Robert Steinberger-Wilckens (1)
(1) University of Birmingham, School of Chemical Engineering, Birmingham/UK;
(2) University of St Andrews, School of Chemistry, St Andrews/UK;

Synthesis and Characterization of NiO-GDC Nanowires for High- Performance Solid Oxide Fuel Cell Anodes (B0310)
Hicham Helal (1), Stefano Botticini (1), Federica Rigoni (1), Dario Zappa (1), Hadjer Hakkoum (1), Daniel H.C. Chua (2), Pooi See Lee (3), Elisabetta Comini (1)
(1) University of Brescia, Dept. of Information Engineering, Sensor Lab., Brescia/Italy;
(2) National University of Singapore, Department of Materials Science & Engineering, Singapore;
(3) School of Materials Science and Engineering, Nanyang Technological University, Singapore;

Enhanced rSOC operation of Ni/GDC by means of Fe-Au doping: Physicochemical and electrochemical investigation for the optimum Fe-Au content (B0311)
Dimitrios Niakolas (1), Athina Souvalioti (2), Fotios Zaravelis (2), Evangelia Ioannidou (2), Labrini Sygellou (2), Stylianos Neophytides (2)
(1) FORTH/ICE-HT, LEP, Patras/Greece; (2) FORTH/ICE-HT, Patras/Greece;

Mechanochemical synthesis of oxide perovskites as earth-abundant electrodes for symmetrical SOCs (B0312)
Leila Zouridi (1,2), Dimitris Totnios (3), Anastasios Vourros (4), Ioannis Garagounis (4), Lampros Papoutsakis(2), Emmanuel Daskalos (4), George Karagiannakis (4), George Marnellos (3,4), Vassilios Binas (2,5); (1) Department of Materials Science & Technology (MST), Uni of Crete (UOC); (2) Institute of Electronic Structure & Laser (IESL), Foundation for Research & Technology-Hellas (FORTH), Heraklion; (3) Department of Chemical Engineering, Aristotle University of Thessaloniki; (4) Chemical Process & Energy Resources Inst., Centre for Research & Technology Hellas; (5) Dep. of Chemistry, Aristotle Uni of Thessaloniki (AUTH), Thessaloniki/Greece;

Dynamic analysis of a validated reversible Solid Oxide Cell system using gPROMS (A0912)
Arthur Waeber, Xinyi Wie; EPFL Valais Wallis, IPESE lab, Sion/Switzerland;

Study and Performance Analysis of a Turbocharged Hybrid SOFC System by Defining the Right 0-1D Simulation Tool (A0913)
Federico Iester (1), Jean-Francois Tissot (2), Loredana Magistri (1), Aristide Fausto Massardo (1)
(1) Uni degli Studi di Genova, TPG, Genova/Italy; (2) Accelleron Industries, Baden/Switzerland;

Behavior and performance of solid oxide fuel cells fed by alternative hydrogen carriers (A0914)
Gabriella Di Cicco; Università degli Studi di Cassino e del Lazio Meridionale, Dipartimento di Ingegneria Civile e Meccanica (DICEM), Cassino/Italy;

Modeling and real-time optimization of a µ-CHP SOFC system (A0915)
Hangyu Yu (1), Tafarel de Avila Ferreira (2), Grégory François (2), Jan Van herle (1)
(1) École Polytechnique Fédérale de Lausanne, Group of Energy Materials, Faculty of Engineering Sciences, Sion/Switzerland; (2) HES-SO Valais-Wallis, Sion/Switzerland;

A data-driven prognosis of the remaining useful life (RUL) of Solid Oxide Cell (SOC) systems (A0916)
Žiga Gradišar, Luka Žnidarič, Đani Juričić
Jožef Stefan Institute , Department of Systems and Control, Ljubljana/Slovenia;

Parametric study for an ammonia-fed SOFC-ICE hybrid system for railway application (A0917)
MinKyoung Park (1), Jaeheon Choe (2), Minki Cho (2), Suyong Choi (2), Wonjae Choi (1)
(1) Korea Railroad Research Institute, Uiwang-si, Gyeonggi-do/South Korea;
(2) Ewha Womans University, Seoul/South Korea;

Development of a macro-level electrochemical simulation model for solid oxide electrolysis cells in co-electrolysis operation (A0918)
Stefan Beringer (1), Klara Treusch (1), Bianca Grabner (1), Marie Macherhammer (1), Alexander Trattner (1,2)
(1) HyCentA Research GmbH, Graz/Austria; (2) Graz University of Technology – Institute of Thermodynamics and Sustainable Propulsion Systems, Graz/Austria;

System design for an ammonia-fueled SOFC (A0920)
Arash Nemati, Rafael Nogueira Nakashima, Javid Beyrami, Henrik Lund Frandsen
Technical University of Denmark (DTU), Energy, Lyngby/Denmark;

Effect of Grain Boundary on Electrochemical Reaction of Nicke/Yttria-Stabilized Zirconia Triple Phase Boundary (B0313)
Takaaki Shimura, Takao Okabe, Yosuke Komatsu, Anna Sciazko, Naoki Shikazono
Institute of Industrial Science, The University of Tokyo, Tokyo/Japan

B05: Novel cell design

Direct Internal Dry Reforming of a CH_4/CO_2 gas mixture in Solid Oxide Cells (B0507)
Lucy Nohl, Jan Uecker (1,2), Chenlu Li (1,2), Markus Nohl (1), Vaibhav Vibhu (1), Izaak C. Vinke (1), Rüdiger-A. Eichel (1,2), L.G.J. de Haart (1); (1) Forschungszentrum Jülich GmbH, IEK-9, Jülich/Germany; (2) Institute of Physical Chemistry, RWTH Aachen University, Aachen/Germany;

Advances of 24/7 ZEN on the development of reversible SOEC/SOFC system for grid balancing: from materials to system (B0508)
Marc Torrell (1), Lucile Bernadet (2), Kyriakos Panopoulos (3), Antonello Nesci (4), Dario Montinaro (5), Gabriela Reyes Delgado (6), Markus Friedl (7), Nikolaos Ntavos (8), Stephen McPhail (9), Federico Smeacetto (10), Dimitris Niakolas (11), Oliver Woll (12), Spyridon Economou (13), Yves DeVos (14), Elissavet Kaligka (15)
(1) IREC, SOFC, Sant Adria del Besos/; (2) IREC, SOFC, Sant Adria del Besos/Spain; (3) CERTH, Thessaloniki/Greece; (4) SOLYDERA, Yverdon-les-Bains/Switzerland; (5) SOLYDERA, Mezzolombardo/Italy; (6) INERCO, Sevilla/Spain; (7) OST, Rapperswil-Jona/Switzerland; (8) CLUBE, Kozani/Greece; (9) CLUBE, Granarolo dell'Emilia/Italy; (10) POLITO, Torino TO/Italy; (11) FORTH, Vassilika Vouton, Heraklion/Greece; (12) HSLU, Luzern/Switzerland; (13) EUNICE, Marousi, Athens; (14) BOSAL, Lummen/Belgium; (15) DESFA, Halandri /Greece;

Micro-structured hollow fiber SOEC for high-performance, cost-effective electrolysis to H2 or syngas (B0509)
Peng Yan, Kang Li; Imperial College London, Department of Chemical Engineering, London/UK;

Characteristics of a new ferritic stainless steel for SOFC interconnect and its performance for metal supported SOFCs (B0510)
Chengxin Li, Yuan Gao, Tianyi Zhang, Liyan Lou, Yichen Fan, Hanchen Tian, Jiutao Gao
Xi'an Jiaotong University, Xi'an/China;

The model-based design of a metal-supported solid oxide electrolysis cell. (B0511)
Wisse Hersbach, Aayan Banerjee
University of Twente, Department of Chemical Engineering, Enschede/Netherlands;

Modeling degradation of systems with reversible solid oxide cells (rSOC) considering Ni-coarsening (A0921)

Jakub Kupecki (1), Guoqiang Liu (2), Zexin Li (2), Zhuo Wang (2), Xi Li (2)
(1) Institute of Power Engineering - National Research Institute, Warsaw/Poland; (2) Huazhong University of Science and Technology,, School of Artificial Intelligence and Automation, Key Laboratory of Imaging Processing and Intelligent Control of Education Ministry, Wuhan/China;

Design and construction of 100 kW SOEC plant (A0923)

Yan Yang, Gang Wang, Hongtao Wang

Simulation Study of Reversible Solid Oxide Cell with Thermal Battery (A0924)

Huiju Roh, Hyewon Hwang, Wonjae Choi
Department of Mechanical and Biomedical Engineering, Ewha Womans University
Graduate Program in System Health Science and Engineering, Ewha Womans University;

A09s: Balance of Plant components

Heat storage for the coupling of Waste Heat Recovery and hydrogen production in a Solid-Oxide electrolyser (A09s07)

Titouan Fabiani (1,2,3), Patrice Tochon (1), Nolwenn Le Pierrès (2), Pierre Dumoulin (3)
(1) Genvia SAS, Hérault, Béziers/France; (2) Univ Savoie Mont-Blanc, CNRS, LOCIE, Savoie, Le Bourget-du-Lac/France; (3) CEA, LITEN, DTCH, LCST, Isère, Grenoble/France;

Numerical and experimental investigation into ejector aided passive anode off-gas recirculation for marine SOFC applications (A09s08); Yohan John (1), Oliver Heymann (2), Melanie Grote (2), Elmar Pohl (2), Tobias Schiekel (2); (1) OWI Science for Fuels gGmbH, affliated to RWTH Aachen: (1) Hochtemperaturtechnik; (2) Herzogenrath/Germany;

Bi-reforming of waste gases as a sustainable preliminary stage in E-fuel production paths (A09s09)

Daniel Reiner, Christoph Hochenauer, Vanja Subotić
Graz University of Technology, Institute of Thermal Engineering, Graz/Austria;

Improving Hydrogen Production Study Based on an Integrated Multi-Stage Steam Methane Fuel Processor with Anode and Cathode Off-Gas Recirculation for Residential Solid Oxide Fuel Cell Applications (A09s11)

Jungrok Oh (1), Sungjea Park (1), Kyuhyung Park (1), Sukkee Um (2)
Hanyang University (1) Graduated School; (2) Mechanical Engineering, Seoul/South Korea;

B06: Innovative cell approaches

New Strategies for Achieving high performance in Solid Oxide Electrochemical Devices @ KICET (B0607)

TAEHO SHIN; Korea Institute of Ceramic Engineering & Technology, Hydrogen Energy Materials Center, Jinu-si/South Korea;

Reversible Solid Oxide Cell Developments of the International Future Lab of Hydrogen Economy: A holistic approach combining traditional methods with digital twinning and artificial intelligence (AI) based machine learning (ML) (B0608 = B0606)

Murphy Peksen;
Technical University of Munich, Chair of Energy Systems, TUM School of Engineering and Design, Garching b. Munich/Germany;

A Comparative Study on Stability Issues of Metal Supported Solid Oxide Cells (B0609)

Buse Bilbey, Axel Savikko, M. Imran Asghar
Tampere University, Engineering Materials Science, Faculty of Engineering and Natural Sciences, Tampere/Finland;

A Novel Cross-scale Multiphysics coupled Framework for Solid oxide cells considering mechanical damages (B0610)

Yunpeng Su, Wenyue Yang, Zhenjun Jiao
Harbin Institute of Technology (Shenzhen), School of Science, Shenzhen/China;

Thin Film Based MEA Characterization for Solid-State Ammonia Synthesis (B0611)

Robin von Mallinckrodt
The Hydrogen and Fuel Cell Center (ZBT GmbH), Duisburg/Germany;

Metal-Supported Solid Oxide Cells for Chemical Conversion (B0612)

Michael Tucker (1), Boxun Hu (1), Ka-Young Park (2), Fanglin Chen (2)
(1) Lawrence Berkeley National Laboratory, Energy Conversion Group, Berkeley/US;
(2) University of South Carolina, Columbia/US;

Degradation analysis of a 60-cell SOC stack during reversible SOFC/SOFC cycling (B0613)

Michael Lang (1), Young-sang Lee (2), In-sung Lee (2), Patric Szabo (1), Jongsup Hong (3), Joonhoon Cho (3), Remi Costa (1)
(1) German Aerospace Center (DLR), Institute of Engineering Thermodynamics, Electrochemical Energy Technology, 70569 Stuttgart/Germany;
(2) E&KOA, 34325 Daejeon/South Korea; (3) Yonsei University, Seoul/South Korea;

Review and Evaluation of Enabling Technologies for the Coupling of Gas Turbine with Solid Oxide Fuel Cell (A09s12)

Luca Eichhorn, Jan-Christoph Jeske, Stefan Kazula, Dimitrios Dimos, Stefanie de Graaf
German Aerospace Center, Cottbus/Germany;

Review and Evaluation of Enabling Technologies for Coupling Gas Turbine with Solid Oxide Fuel Cell (A09s12)

Luca Eichhorn (1), Jan-Christoph Jeske (1), Stefan Kazula (1), Dimitrios Dimos (1), Stefanie de Graaf (1), Daniel Ewald (2), André Weber (2), Luca Mantelli (3), Mario Luigi Ferrari (3)
(1) German Aerospace Center (DLR), Institute of Electrified Aero Engines;
(2) Institute for Applied Materials – Electrochemical Technologies (IAM-ET), Karlsruhe Institute of Technology (KIT), Karlsruhe/Germany; (3) University of Genoa/Switzerland;

Development of a test bench for 1 kW reversible SOEC/SOFC stacks (A09s13)

Francisco Fernández Vega (1), Juan Carlos Molina (1), Enrique del Pozo (1), Baltasar Toharias (2), Laura González-Morán (3), Alfredo Iranzo (2)
(1) MC2 Ingeniería y Sistemas, S.L., Sevilla/Spain; (2) Thermal Engineering Group, University of Sevilla, Sevilla/Spain; (3) AICIA – Thermal Engineering Group, Sevilla/Spain;

A11: System integration

Optimal Electrolysis Routes & Dimensioning for a Sustainable Aviation Fuel PtL Plant (A1107)

Robert Weiss (1), Marjut Suomalainen (2)
(1) VTT Technical REserach Centre of Finland Ltd, Fuel Cells and Hydrogen, Espoo/Finland;
(2) VTT Technical Reserach Centre of Finland Ltd, Espoo/Finland;

SO_2 impurity on SOEC stacks during syngas production (A1109)

Obinna Edeh, Dominik Schäfer , Rüdiger-A. Eichel ; Forschungszentrum Juelich (IEK-9), Electrochemical Process and System Technology, Jülich/Germany;

The Utilization of Sodium Chloride Concentrated Wastewaters in Solid Oxide Electrolysis Cells (A1110)

Jan Uecker (1), Lucy Nohl (2), Vaibhav Vibhu (2), Izaak C. Vinke (2), L.G.J. (Bert) de Haart (2), Rüdiger-A. Eichel (2)
(1) Forschungszentrum Juelich GmbH, IEK-9, (2) Forschungszentrum Jülich, Jülich/Germany;

Efficient Rh – based Catalysts for Pre-Reforming Reactions for SOFC (A1111)

Pragati Joshi (1), Christian Hulteberg (2), Christian Breuer (1), Minna Olsson (2); (1) Heraeus Precious Metal, Hanau/Germany; (2) Hulteberg Chemistry & Engineering AB, Malmö/Sweden;

Numerical investigation of planar electrochemical oxygen pumps for future space missions (B0614)

Dominik Jankowski (1), Srdjan Marković (1), Brandon E. Buergler (2), Brigitte Lamaze (2), Jorge Barreto (3), Mónica Afonso (3), Sérgio Oliveira (3), Vanja Subotić (1)
(1) Graz University of Technology, Institute of Thermal Engineering, Graz/Austria;
(2) European Space Agency, ESTEC, Noordwijk/Netherlands;
(3) Omnidea, Lda., Arruda dos Vinhos/Portugal;

Electrochemically Enhanced Low-temperature Catalytic Ammonia Synthesis (B0615)

Philipp Blanck (1), Oscar Furst (1), Julian Dailly (2), Olaf Deutschmann (1)
(1) Karlsruhe Institute of Technology, Institute for Chemical Technology and Polymer Chemistry (ITCP), Karlsruhe; (2) European Institute for Energy Research (EIfER), Karlsruhe/Germany;

Efficient and stable anode for direct ammonia solid oxide fuel cell in intermediate temperature operation assisted by non-precious metal catalyst (B0616)

Yunseo Choi, Jongsup Hong; Yonsei University, Mechanical Engineering, Seoul/South Korea;

Effect of Ce(Mn,Fe)O2 and FeMo metal Catalysts on the direct ammonia-fuled Solid Oxide Fuel Cell Performance (B0617)

Dong Jae Park, Tae Ho Shin
Korea Institute Of Ceramic Engineering and Technology, Jinju-si, Gyeongsangnam-do/South Korea;

Fuel feasibility of Solid oxide fuel cell powered by syngas from the reforming of bio-oil (B0618)

Guo Qunwei, Geng Jiaqi, Pu Jian; School of Materials Science and Engineering, Huazhong University of Science and Technology, Wuhan/China;

Degradation analysis of a high-performance reversible SOC with tri-layer electrolyte (B0619)

Jun Zhang, Fuhuan Wang, Yucun Zhou, Liangfei Xu, Jianqiu Li; Beijing Huairou Lab, Beijing/China;

B08: Novel stack design

Performance and Durability improvement of large-area anode supported solid oxide fuel cell and stack (B0807)

Amjad Hussain, Rak-Hyun Song, Dong Woo Joh, Jong-Eun Hong, Seung-Bok Lee, Tak-Hyoung Lim
Korea Institute of Energy Research, South Korea., Advanced Energy and System Engineering, Daejeon/South Korea;

Fabrication of SOFC Stacks with Metal-Brazed and Stamped Separator for Enhanced Durability (B0808)

Kyongsik yun, Hyeon-Jin Kim, Ji Heang Yu
Korea Institute of Energy Reserch, Daejeon/South Korea;

Dynamic Integration of SOEC in Renewable Power-to-X Process Chains: Evaluating Heat Management and Efficiency (A1112)

Philipp Rentschler (1), Nils Hackhausen (1), Peter Holtappels (1), Gael Corre (1), Christoph Klahn (1,2), Roland Dittmeyer (1)
(1) Karlsruhe Institute of Technology, Institute for Micro Process Engineering (IMVT), Eggenstein-Leopoldshafen/Germany;
(2) Karlsruhe Institute of Technology, Institute of Mechanical Process Engineering and Mechanics (MVM), Karlsruhe/Germany;

Hydrogen and syngas-production by Solid Oxide Electrolysis in off-shore PtX-applications (A1113)

Matthias Metten, Faisal Sedeqi, René Lorenz, Maximilian Groß, Daruska Miric Fuentes, Christian Schnegelberger, Florian Stährfeldt, Marc P. Heddrich, S. Asif Ansar
German Aerospace Center (DLR) - Institute of Engineering Thermodynamics, Energy System Integration, Stuttgart/Germany;

Methanol out of thin Air – SOEC with Combined Water and CO2 Capture (A1114)

Nicolas Kruse (1), Roland Peters (1), Rüdiger Eichel (1,2)
(1) FZ Jülich, Institute of Energy and Climate Research, Jülich/Germany;
(2) RWTH Aachen University, Institute of Physical Chemistry, Aachen/Germany;

SOFC versus Supercritical Gas Turbine: A Techno-Economic Analysis of an Efficient and Decarbonized Energy System Fueled by E-Methanol (A1115)

Hossein Madi, Tilman Schildhauer; Paul Scherrer Institut, Villigen PSI/Switzerland;

The innovative integration project of solid oxide electrolysis cells and Fischer-Tropsch reactor for conversion of CO_2 and CH4 into high-value products in Brazil (A1116)

Marina Machado (1), Lays N. Rodrigues (1), Leandro da Conceição (1), Layssa Okamura (1), Bruno Previdello (1), Tiago Pereira (2), Marcella Mathias (2), João Monnerat (3), Vivian Thyssen (1)
(1) Innovation SENAI Institute for Biomass, Três Lagoas/Brazil;
(2) ISI Biomass, Decarbonization Technologies, Três Lagoas/Brazil;

Formation of an efficient electricity storage system by integrating a reversible SOC and a solid-state iron oxide storage (A1117)

Claudia Hain (1), Radek Vostal (1), Julien Göthel (1), René Unger (2), Torsten Schwan (2), Monika Wicke (2), Dario Montinaro (3)
(1) Wolf Energetik GmbH, Dresden/Germany;
(2) EA Systems Dresden GmbH, Dresden/Germany;
(3) SolydEra SpA, Mezzolombardo/Italy;

Innovative SOE Stacks: Scaling Towards Sustainable Hydrogen Production (B0809)

Miguel Fantova (1,2), Gonzalo Jiménez (1,2), Cristian Inostroza (1), Alba Acevedo (1), Jon Barcos (1,2), Paula Ciaurriz (1), Xabier Judez (1), Mónica Aguado (1,2), Iñigo Garbayo (1)
(1) Grid Integration, Electrical Storage and Hydrogen Department, National Renewable Energy Center of Spain (CENER), Polígono Industrial Rocaforte, Navarra/Spain;
(2) Public University of Navarre, Campus de Arrosadia, Pamplona-Iruña/Spain;

Performance Evaluation of Co-electrolysis of CO_2/H_2O for Solid Oxide Cells (B0810)

Yi-Jing Wu (1), Szu-Han Wu (1), Szu-Han Wu (1), Wei-Xin Kao (1), Liang-Wei Huang (1), Chien-Kuo Liu (1), Ruey-Yi Lee (2), Chun-Hsiu Wang (3)
(1) National Atomic Research institute, Material Research, Taoyuan/Taiwan;
(2) National Atomic Research institute, Taoyuan/Taiwan;
(3) China Steel Corporation, Kaohsiung/Taiwan;

Unlocking the Potential of 3D Printing for Complex Shape Electrolytes for SOC Stack Applications (B0811)

Santiago Márquez González (1),Simone Anelli (3), Marc Nuñez (1), Ana Maria Martos (1), Marc Torrell (1), Albert Tarancón (1,2)
(1) IREC, Catalonia Institute for Energy Research;
(2) ICREA, Barcelona/Spain;
(3) Department of applied Science and Technology (DISAT), Politecnico di Torino, Torino/Italy;

Thermal effects on polarisation curve in high compacity CEA stack: experimental and simulation comparison (B0812)

Stephane Di Iorio, Thomas Carlioz, Manon Elie
CEA, LITEN/DTBH/SCSH, Grenoble/France;

Progress in the Development of a Durable SOC Stack for Highly Efficient SOFC and SOEC Systems (B0813)

JI Haeng Yu (1), Hyeon Jin Kim (1), Kyeong Sik Yun (1), Dae Keun Lee (2), Woo-Nam Jeong (2)
(1) Korea Institute of Energy Research, Hydrogen Research Dept., Daejeon/South Korea;
(2) Korea Institute of Energy Research, Energy Convergence System Research Dept., Daejeon/South Korea;

A12: Technology demonstration and novel concepts

Hot Balance of Plant (H-BoP) systems for SOEC Megawatt Solutions (A1207=A1206)

Jean-Paul Janssens, Michel Dubuisson, Luk Dedene
BOSAL, Energy Conversion Industry, Lummen/Belgium;

Dynamic simulation of marine SOFC power plant (A1208)

Berend van Veldhuizen (1), Lindert van Biert (1), Klaas Visser (1), Hans Hopman (1), Aravind Purushothaman Vellayani (2)
(1) Delft University of Technology, Department of Maritime and Transport Technology, Delft/Netherlands;
(2) University of Groningen, Energy Conversion, Energy and Sustainability Research Institute, Groningen/Netherlands;

Advancement on Fuel and Operation Mode Flexible Solid Oxide Cell Stacks and Modules (A1209)

Antonio Alfano, Jouni Puranen, Valtteri Pulkkinen, Matti Noponen
Elcogen Oy, Research & Development, Vantaa/Finland;

State-of-the-Health Monitoring of Ni Catalysts During Syngas Production (A1210)

Marina Orlic, Michael Höber, Daniel Reiner, Christoph Hochenauer, Vanja Subotić
University of technology graz, Institute for thermal engineering, Graz/Austria;

Modeling and Experimental Characterization of a 30-kW Multi-Stack Solid Oxide Fuel Cell Module (A1211)

Gus Floerchinger, Omid Rizvandi, Neal Sullivan, Rob Braun
Department of Mechanical Engineering, Colorado School of Mines, Golden, Colorado/USA;

Controlling Cation Segregation in Double Perovskite Oxides for Intermediate Temperature Solid Oxide Fuel Cell Applications (A1212)

Jyotsana Kala, Vicky Dhongde, Suddhasatwa Basu, Brajesh Kumar Mani, Mohammad Ali Haider
Physics and Chemical Engineering department, Indian Institute of Technology Delhi, Physics, Delhi/India;

Diesel Fueled SOFC Powered Electric Combat Vehicle (A1213)

Subir Roychoudhury (1), Saurabh Vilekar (1), Christian Junaedi (1), Tim LaBreche (1), Kevin Centeck (2)
(1) precision combustion, inc., north haven/US; (2) U.S. Army, Combat Capabilities Development Command (DEVCOM) Ground Vehicle Systems Center (GVSC), Detroit Arsenal, MI/US;

B09: Oxygen electrodes

Grain size effects in high entropy perovskite air electrodes investigated with advanced 3D imaging (B0907)

Andreas Egger (1), Patrick Pretschuh (1), Priya Paulachan (2), Johanna Schöggl (2), Roland Brunner (2), Edith Bucher (1)
(1) Montanuniversität Leoben, Chair of Physical Chemistry, Leoben/Austria;
(2) Materials Center Leoben, Leoben/Austria;

Mixed La/Pr n=3 Ruddlesden-Popper nickelates as stable and efficient oxygen electrodes for high temperature water electrolysis (B0909)

Romuald Frugier (1), Sebastien Fourcade (1), Jean-Marc Bassat (1), Jacinthe Gamon (1), Vaibhav Vibhu (2)
(1) ICMCB-CNRS, Pessac/France;; (2) Forschungszentrum Jülich , Institute of Energy and Climate Research, Fundamental Electrochemistry, Jülich/Germany;

Oxygen Diffusion and Surface Exchange Coefficient Measurements of Layered Perovskite Materials (B0910)

Stephanie Elisabeth Wolf (1), Vaibhav Vibhu (1), Jacinthe Gamon (2), Izaak C. Vinke (1), L.G.J. (Bert) de Haart (1), Jean-Marc Bassat (2), Rüdiger-A. Eichel (1)
(1) Forschungszentrum Jülich GmbH, Institute of Energy and Climate Research, Fundamental Electrochemistry (IEK-9), Juelich/Germany;
(2) Université de Bordeaux, CNRS, Bordeaux INP, ICMCB, Pessac/France;

Combustion synthesis of high-performing cobalt-free oxygen electrodes for reversible Solid Oxide Cells (B0911)

Natasha Di Benedetto (1), Kosova Kreka (1), Lucile Bernadet (1), Dario Montinaro (2), Leopoldo Suescun (3), Marc Torrell (1), Albert Tarancón (1,4)
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Elucidating Reaction Mechanisms in Reversible Solid Oxide Cells using a Perovskite Catalyst: A Comprehensive Analysis (B0912)

Mykhailo Pidburtnyi, Viola Birss
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Solid Oxide System Development at Dynelectro using AC:DC Operation for Thermal Management (A1214)

Joshua Mermelstein, Søren Højgaard Jensen; Dynelectro, Viby Sjælland/Denmark;

Demonstration of Carbon-free Power Generation by Using Ammonia in SOFC Systems – Experimental Results (A1215)

Laura Nousch, Florian Hewelt, Mathias Hartmann and Daniela Herold
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Self-generated partial oxidation of methane electrode catalyst for assisted high temperature electrolysis (A1216)

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SOEC for clean ammonia synthesis (A1217)

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Experimental and numerical investigation innovative Sabatier reactor dedicated Power-to-Gas systems (A1218)

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Electrochemical Fuel Cycles based on High Temperature Fuel Cells and Electrolysis (A1219)

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Pressurized hydrogen produced by high temperature steam electrolysis: the European project PressHyous (A1220)

Marie Petitjean (1), Claire Houzé (1), Jérôme Aicart (1), Karl Vulliez (1), Brigitte Gonzalez (1), Christian Tantolin (1), Julie Mougin (1), Ibrahim Dündar (2), Andrei Denissenko (2), Philippe Aubin (3), Romain Jordan (3), Jan van Herle (3), Olivier Amsellem (4), Nicolas Valaye (4), Nicolas Massué (4), Patrice Tochon (4), Gabriel Magnaval (5), Manuele Margni (5), Hans ten Dam (6), Eduardo Da Rosa Silva (7), Robert Makkus (7), Claire Ferchaud (7), Marjut Suomalainen (8), Jari Pennanen (8) Olli Himannen (8), Meire Domingos (9), François Maréchal (9); (1) Univ. Grenoble Alpes –

Effect of Urea Content on SOEC Electrode Morphologies (B0914)

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High-performance proton-conducting solid oxide fuel cell $LaMnO_3$ based cathode material (B0915)

Hailu Dai
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Facile anion engineering: Constructing an active and stable air electrode for proton ceramic fuel cells (B0916)

Chenghao Yang, YiTong Li, Ao Hu, Jian Pu, Bo Chi
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Robust cobalt-free high-entropy perovskite $La_{0.2}Pr_{0.2}Nd_{0.2}Sm_{0.2}Sr_{0.2}FeO_3$ air electrode with enhanced performance (B0917)

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A Low-Temperature Synthesis Approach for the fabrication of $Sm_{0.5}Sr_{0.5}CoO_{3-\delta}$ Cathode Material in Solid Oxide Fuel Cells (B0918)

Wajahat Kazmi (1), Sajjad Hussain (2)
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Structural characterization, 3 electrodes manufacturing and EIS analysis of perovskite-based air electrode materials for symmetrical IT-SOFC (B0919)

Amir Yazdani, Davide Cademartori, Olena Bielska, Maria Paola Carpanese
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Is gadolinium-doped ceria really needed for an improved electrochemical performance of air electrode materials? (B0921)

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Testing of Pressurized Solid Oxide Cells (A1221)

Cedric Grosselindemann (1), Marvin Dorn (1), Frank Manuel Bauer (2), Manuel Seim (1), Mischa Geörg (3), Ralf Rössler (4), Astrid Pundt (4), André Weber (1)
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Zero-electricity electrolytic reactor produces hydrogen and syngas for onsite energy, fuel, and feedstocks (A1222)

Stefan Reinartz, Eric Flynn ; Utility Global, Inc., Marketing, Hourston/US;

Feasibility of liquid alkane reforming in c ombination with solid oxide fuel cell (A1223)

Jiaqi Geng, Qunwei Guo, Bo Chi, Jian Pu; Huazhong Uni of Science & Technology, Wuhan/China;

Mo incorporated NiFe-LDH as advanced oxygen evolution reaction electrocatalysts for efficient water electrolysis (A1224)

Asiya M. Tamboli, Younghan Jung, JunSeok OH, Sejin Im, Junseok Sim, Wansik Kim, Prof Kim Chang-Hee Korea Institute of Energy Technology, School of Energy Technology, Naju/South Korea;

Testing Platform for SOFC Stack Modules Utilising Marine Fuels (A1225)

Werneri Huhtinen, Santeri Saxelin, Jeremias Hopsu
VTT Technical Research Centre of Finland Ltd., Espoo/Finland;

A13: Upscaling challenges

Transforming end-of-life SOC metallic components into commercial grade austenitic stainless steels (A1307)

Jeraldine Lastam (1), Dmitry Sergeev (1,2), Michael Müller (1), Ruth Schwaiger (1,3)
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(3) RWTH Aachen University, Chair of Energy Engineering Material, Faculty 5, Aachen/Germany;

Coupling auto-combustion to exsolution for the synthesis of nanostructured A-site deficient LSF and LSM electrode materials (B0922)

Siavash M. Alizadeh (1), Yury V.Kolen'ko (1), Elise Berrier (2)
(1) International Iberian Nanotechnology Laboratory, Nanochemistry, Braga/Portugal;
(2) Université de Lille, CNRS, Centrale Lille, ENSCL, Univ. Artois – UCCS, Lille/France;

Robust, cost-effective iron and cobalt-based nano-structured electrodes for advanced solid oxide fuel cells (B0923)

Aroosa Javed, Daniel Sikstrom, Venkataraman Thangadurai
University of Calgary, Chemistry, Calgary/Canada;

Mechanistic insights into the oxygen reduction and evolution reactions on doped cobalt oxide (B0924)

Deepak Seth (1), Mohd Ussama (1), Jyotsana Kala (2), M Ali Haider (1)
(1) Indian Institute Of Technology Delhi, Chemical Engineering, New Delhi/India;
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High Entropy Oxides: A breakthrough for stable SOFC cathodes at high current densities (B0925)

Antonio Maria Asensio (1), Kosova Kreka (1), Miriam Botros (2), Simon Schweidler (2), Marc Torrell (1), Albert Tarancón (1,3)
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Development of nanostructured mixed ionic and electronic $La_{0.6}Sr_{0.4}Co_{0.2}FeO_{3-\delta}$ perovskite by photonic sintering as anode material for HT-SOECs (B0926)

Kylian Doche (1), Elisa Grindler (2), Marilyne Roumanie (2), Mohamed Saadaoui (3), Patrice Tochon (4)
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B11: Advanced characterization

In-depth analysis of a SOEC through localized fuel electrode multisampling technique (B1107)

Francesco Marino (1), Davide Pumiglia (2), Francesca Santoni (2), Maria Anna Murmura (3), Luca Simonetti (2), Viviana Cigolotti (2), Elio Jannelli (1)
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(2) ENEA Casaccia Research Centre, Rome/Italy; (3) University of Rome “La Sapienza", Department of Chemical Engineering Materials and Environment, Rome/Italy;

A15: Stack design, modelling and performance

Simulation Models in the Center of Solid Oxide Electrolyzer and Fuel Cell Systems Development (A1508)

Aleš Cvikl (1), Christoph Pötsch (2), Nežka Brunec (1), Gašper Zajc (1), Ivo Prah (1)
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Scalable Fabrication and Prototyping of CENER's Solid Oxide Electrolyzer Stacks (A1509)

Xabier Judez (1), Gonzalo Jiménez-Martín (1,2), Miguel Fantova (1,2), Alba Acevedo Fernández (1), Cristian Inostroza (1), Cecilia M. López García (1,2), Jon Barcos (1,2), Carmen Arbeloa Llorente (1), Paula Ciaurriz (1), Mónica Aguado (1,2), Iñigo Garbayo (1)
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Proton ceramic fuel cell stack simulations with three mobile charge carriers (A1510)

Felix Ehrlich, Oscar Furst, Olaf Deutschmann
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Model reduction approach applied to the thermal simulation of a solid oxide electrolysis stack (A1511)

Quentin Brillaut (1), Christian Tantolin (2), Patrice Tochon (1), Florence Lefebvre-Joud (2)
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Multiphysics Modeling of Solid Oxide Cell Stacks under Dynamic Current Loads (A1512)

Shidong Zhang, Roland Peters, Nicolas Kruse, Robert Deja, Rüdiger-A. Eichel
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Towards a fully experimentally parametrized and spatially resolved physical SOE stack model (A1513)

Marius Mueller (1), Markus Klinsmann (1), Ulrich Sauter (1), Jean-Claude Njodzefon (1), André Weber (2)
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Nano-X-ray diffraction of long-term operated solid oxide electrolysis cells (B1108)

Aline LEON (1), Simon Soille (1), Sabine Schlabach (2), Klaudia Hradil (3), Julie Villanova (4)
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Solid Oxide Electrolysis and Fuel Cell Efficiency: Identifying Strategies for Triple Phase Boundary, Nickel Percolation, and Voids (B1109)

Dirk Laeveren; Thermo Fisher Scientific, Materials and Structural Devision, Eindhoven/Netherlands;

Towards understanding YSZ electrolyte degradation behavior with NiO dissolution (B1110)

Katherine Develos-Bagarinao (1), Qingchuan Bai (1), Tomohiro Ishiyama (2), Toshiaki Yamaguchi (3), Haruo Kishimoto (1)
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Identification of different SOE degradation mechanisms by applying advanced online monitoring tools (B1111)

Vanja Subotić, Benjamin Königshofer
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Room and high temperature tensile strength of ultrathin 3YSZ ceramic tapes for SOEC (B1112)

Ilaria Bombarda, Carolin Sitzmann, Nico Langhof, Stefan Schafföner
University of Bayreuth, Chair of Ceramic Materials Engineering, Bayreuth/Germany;

Dissection of the electrochemical impedance spectrum: complex software solution. (B1113)

Yevgeniy Naumovich
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Fracture behavior of zirconia and ceria-based electrolyte materials (B1114)

Luzie Wehner, Denise Ramler, Christian Lenser, Egbert Wessel, Jürgen Malzbender, Ruth Schwaiger; Forschungszentrum Jülich, Jülich/Germany;

Multi-Flanges for intensive cell development and LCT for large cell and stack evaluation (B1115)

Pierre Coquoz, Raphael Ihringer, Jean Girardon; Fiaxell Sarl, Lausanne/Switzerland;

Electrochemical Characterization and Modeling of stack-like Contacting for Solid Oxide Cells (A1514)

Daniel Ewald (1), Cedric Grosselindemann (1), Daniel Esau (1), Franz-Martin Fuchs (2), André Weber (1)
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Performance-uniformity Oriented Current Collector Designing for Industrial-sized Solid Oxide Fuel Cell Stack (A1515)

Dong Yan, Han Yan, Lichao Jia, Jian Li
Huazhong University of Science and Technology, Wuhan/China;

Constitutive model to determine the contacting configuration in a fuel cell stack (A1516)

Ralston Pinto; RWTH Aachen University, Institute of Engineering Mechanics, Hallstadt/Germany;

Uniformity analysis on a 6-stack SOFC with alternating air flows (A1517)

Sarng Woo Karng (1), Baekjin Kim (2), Gwang Hoon Rhee (3)
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Modeling of Glass Sealing Processes for Solid Oxide Cell Stacks (A1518)

Olga Marina, James Fitzpatrick, Kerry Meinhardt, Naveen Karri, Brian Koeppel, Jie Bao, Jin Tongan, Lorraine Seymour
Pacific Northwest National Laboratory, Richland/US;

A16: Novel manufacturing strategies

Comparison of $(Mn,Cu,Fe)O_4$ and $MnCo_2O_4$ protective coatings deposition methods: evaluation of wet powder spray, roller painting, and electrophoretic deposition (A1607)

Omid Ekhlasiosgouei (1), Piotr Jasinski (1), Federico Smeacetto (2), Sebstian Molin (1)
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Understanding Performance of SOECs by Combination of Advanced Characterization Techniques (B1116)

Peter Blennow, Elise Despesse, Giovanni Perin, Karl Thydén, Ramchandra Tiruvalam, Lars Fahl Lundegaard, Søren Birk Rasmussen, Anne Hauch; Topsoe A/S, Kgs. Lyngby/Denmark;

Local insights into degradation of solid oxide electrolysis cells by segmented durability testing (B1117)

Julian Taubmann, Anders Bogh Jacobsen, Harald Sigurd Okkels, Henrik Lund Frandsen
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Advanced cell holder design for parallel testing of SOC single cells (B1118)

Thomas Hupfer, Kevin Widmann, Petra Wagner, Sebastian Dierickx
Robert Bosch GmbH, Renningen/Germany;

Power-to-X: DoE-based investigation of industrial-sized ESC stack to optimize process parameters for e-fuel generation with a combined SOEC and Fischer-Tropsch synthesis process (B1119)

Felix Muetter, Christoph Hochenauer, Vanja Subotić
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Surface-enhanced Raman nanostructure and in situ analysis of high temperature processes (B1121)

Jingying Huang (1), Youkun Tao (2), Jing Shao (1)
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B12: Fuel electrodes II

Doped Ceria as Ni-free and efficient fuel electrode materials for Solid Oxide Electrolysis Cells (B1207)

Vaibhav Vibhu, Rishabh Kumar, Jan Uecker, Izaak C. Vinke, Rüdiger-A. Eichel, L.G.J. (Bert) de Haart
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The role of Nickel in ceria-based fuel electrodes (B1209)

Felix Kullmann (1), Kea Limbeck (1), Sebastian Dierickx (2), André Weber (1)
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Optimizing GDC electrolytes of AS-SOCs: Insights into microstructure formation and cell processing (A1608)

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Comparative Analysis of MnCuFe-Oxide and MnCo-Oxide Spinels as Protective Coatings for SOCs Interconnects (A1609)

Justyna Ignaczak, Piotr Jasinski, Sebastian Molin
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Improved oxidation resistance and Cr retention of coated AISI441: from sample to SOC stack (A1610)

Karine Couturier (1), Nathalie Giacometti (1), Pierre Hanoux (1), Thomas David (1), Thanh-Loan Lai (1), Jolan Bestautte (2), Théo Dejob (3), Fabien Rouillard (4)
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Development of planar SOC cells for the fabrication of a SOEC prototype (A1611)

Juan Zueco-Vincelle, Andrés Campos-Galera, Carmen de la Torre-Gamara, Aida Alconchel-Allué, Miguel Ángel Laguna-Bercero, Alodia Orera
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One-step fabrication of a thin and dense buffer layer for a scalable SOFC (A1612)

Fuhuan Wang, Jun Zhang, Yucun Zhou, Jianqiu Li, Liangfei Xu; Beijing Huairou Lab, Beijing/China;

Synthesis and development of dual-conduction electrolyte for Solid Oxide Fuel Cells (A1613)

Andrea Bartoletti (1), Simone Casadio (1), Riccardo Ceccato (2), Emanuela Callone (2) Sandra Dirè (2), Katia Monzillo (3), Vincenzo Vaiano (3), Maria Carmenza Diaz Lacharme (4), Alessandro Donazzi (4), Angela Gondolini (1)
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Degradation and microstructural analysis of Ni-GDC electrode under high temperature electrolysis conditions (B1210)

Vaibhav Vibhu, Ifeanyichukwu D. Unachukwu, Krzysztof Dzieciol, Roland Schierholz, Izaak C. Vinke, Rüdiger-A. Eichel, L.G.J. (Bert) de Haart; Forschungszentrum Jülich (FZJ), Institute of Energy and Climate Research, Fundamental Electrochemistry (IEK-9), Jülich/Germany;

Molybdenum-based double perovskites: suitable anode materials for waste derived fuel-fed SOFCs (B1211)

Davide Chinello, Antonella Glisenti
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Phase stability of $La_{0.3}Ca_{0.7}Fe_{0.7}Cr_{0.3}$ (LCFCr) anodes during syngas oxidation (B1212)

Adam Bass, Arash Yahyazadeh, Anand Singh, Scott Paulson, Viola Birss
University of Calgary, Calgary/Canada;

First-Principle Descriptors Explaining the Composition Dependence of Activation Energy for CO_2, H20 Reactions at $LaxM_{1-X}Fe_{0.75}Cr_{0.25}O_{3-5}$ (M= Sr and Ca) Perovskites (B1213)

Irfan Aydogdu (1), Oliver Calderon (2), Simon Trudel (3), Sathish Ponnurangam (4), Viola Ingrid Birss (3); University of Calgary: (1), Chemical and Petroleum Engineering; (2) Chemistry, (3) Chemistry, (4) Chemical and Petroleum Engineering, Calgary/Canada;

Performance analysis of methane fueled SOFC with Ni-CeZrT as catalyst (B1214)

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(2) Department of Material Science, Metallurgical Engineering and Inorganic Chemistry, Faculty of Science, University of Cadiz, Cadiz/Spain;

Enhanced activity of Fe-Au-Ni/GDC solid oxide fuel cell electrodes for internal dry reforming of methane (B1215)

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Anode Functional Layers for Solid Oxide Fuel Cells Produced via Reactive Magnetron Sputtering (B1217)

Katharina Steier (1), Inyoung Jang (2), Anna Hankin (2), Peter Kelly (1), Justyna Kulczyk-Malecka (1); (1) Surface Engineering Group, Manchester Fuel Cell Innovation Centre, Manchester Metropolitan University, M1 5GD, Manchester/UK;
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3D-printed La1-xSrxMnO3-based electrodes for High Temperature Ceramic Devices (A1614)
Isabel María Peláez Tirado (1), Natalia Kostretsova (2), José Miguel Ramos Fajardo (1), Sabrina Tair (1), Miguel Castro García (1), Jesús Canales Vázquez (1), Albert Tarancón (2), Marc Torrell (2), Juan Carlos Pérez Flores (1)
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Reproducibility studies for scalable fabrication of solid oxide cells (A1615)
Kandela Ruiz, Violeta Ureña, Alba Acevedo, Yuli Betancur, Paula Ciaurriz, Xabier Judez, Mónica Aguado, Iñigo Garbayo; National Renewable Energy Center of Spain (CENER), Grid Integration, Electrical Storage and Hydrogen, Sangüesa/Spain;

Reduced Cr evaporation in SOFC interconnects with denser coatings deposited by HiPIMS (A1617); Jose Antonio SantiagoNano4Energy SL, Madrid/Spain;

Protective Ceramic Coatings on SOFC Metallic Interconnects with Ni Buffer Layer (A1618)
Jelin Choi; Uni of Science and Technology, Energy Engineering Department, Daejeon/South Korea;

B16: Degradation phenomena II

Degradation of Solid Oxide Cells in Dry and Humid Air (B1607)
Ozden Celikbilek, Jerome Laurencin; CEA, LITEN, Grenoble/France;

Temperature control to mitigate sulfur-induced anode deactivation (B1608)
Cédric Frantz; EPFL, Group of Energy Materials, Sion/Switzerland;

Studies of ammonia-fueled SOFC stacks: insight into the possible failure reason (B1609)
Krystian Machaj, Anna Niemczyk, Marek Skrzypkiewicz, Piotr Ostrowski, Magdalena Kosiorek, Leszek Ajdys, Monika Łazor, Michał Wierzbicki, Aleksandra Koprowska; Institute of Power Engineering, CPE - Dep. of High Temperature Electrochemical Processes, Warszawa/Poland;

Effect of biofuels impurities on Solid Oxide short stacks performance & degradation (B1610)
Stefan Diethelm (1,2), Audrey Wesoly (1), Jan Van herle (1), Jan Pieter Ouweltjes (2), Dario Montinaro (3); (1) EPFL Valais Wallis, Sion/Switzerland; (2) SolydEra SA, Yverdon-les-Bains/Switzerland; (3) SolydEra SpA, Mezzolombardo (TN)/Italy;

Systematic electrochemical analysis of Solid Oxide Fuel Cells fueled by contaminated bio-syngas. Part 2: Multi-contaminants (B1611)
Davide Pumiglia (1), Andrea Monforti Ferrario (1), Jan Pieter Ouweltjes (2), Mohammad Alboghobeish (1), Livia Della Seta (1); (1) ENEA CR Casaccia, TERIN-PSU-ABI, Rome/Italy; (2) SolydEra SA, Yverdon-les-Bains/Switzerland;

B13: Degradation phenomena I

Phase-field modeling of microstructural evolution in solid oxide fuel cell anode during redox cycling (B1307)
Wenyue Yang, Zhenjun Jiao
Harbin Institute of Technology (Shenzhen), School of Science, Shenzhen/China;

Modeling-based Impedance Diagnostics of Degradation in Solid Oxide Cells (B1308)
Marisa Knappe, Felix Schmidt, Thomas Kadyk, Michael Eikerling
Forschungszentrum Jülich, Institute of Energy and Climate Research - Theory and Computation of Energy Materials, Jülich/Germany;

Simulation Study of Nitridation-Phenomenon Considered Ammonia-Fueled Solid Oxide Fuel Cell (B1309)
Huiju Roh (1), Wonjae Choi (2); Ewha Womans University, (1) System Health & Engineering, (2) Ewha Womans University, System Health Science & Engineering, Seoul/South Korea;

Multi-physics modelling of nickel migration in solid oxide electrolysis cells (B1310)
Julian Taubmann, Vasileios Bilalis, Xiufu Sun, Ming Chen, Christodoulos Chatzichristodoulou, Henrik Lund Frandsen
Technical University of Denmark, Energy Conversion and Storage, Lyngby/Denmark;

Prediction of EIS based on long short-term memory (LSTM) neural network (B1311)
Zewei Lyu (1), Anna Sciazko (1), Naoki Shikazono (1), Minfang Han (2)
(1) The University of Tokyo, Institute of Industrial Science, Tokyo/Japan;
(2) Tsinghua University, Department of Energy and Power Engineering, Beijing/China;

Modeling of internal and interfacial fractures in solid oxide electrolysis cell stacks (B1312)
Yifeng Hong, Arash Nemati, Peyman Khajavi, Henrik Lund Frandsen
DTU Energy, Department of Energy Conversion and Storage, Kongens Lyngby/Denmark;

Machine Learning Assisted Characterization of Steam Electrodes in SOEC to Understand Performance Degradation (B1313)
Olga Marina, Jie Bao, Danny Edwards, Long Le, Tian Liu, Vivian Liu, Edward Quin, Dewei Wang, Yunxiang Che; Pacific Northwest National Laboratory, Richland/US;

Accelerated stress test and quantitative analysis of degradation in nickel/ceria fuel electrodes (B1612)

Yanting Liu (1), Martin Juckel (2), Norbert H Menzler (2), André Weber (3)
(1) KIT, IAM-WET, Karlsruhe; (2) Forschungszentrum Jülich GmbH, IEK1, Jülich;
(3) Karlsruhe Institute of Technology (KIT), Institute for Applied Materials - Electrochemical Technologies (IAM-ET), Karlsruhe/Germany;

Unveiling the high-temperature degradation mechanism of solid oxide electrolysis cells through direct imaging of nanoscale interfacial phenomena (B1613)

Hyejung Chang (1), Haneul Choi (1), Jisu Shin (1), Changho Yeon (2), Sun-Young Park (3), Jong-Ho Lee (1), Kyung Joong Yoon (1), Chan-Woo Lee (2)
(1) Korea Institute of Science and Technology, Center for Energy Materials, Seoul/South Korea;
(2) Korea Institute of Energy Research, Computational Science and Engineering Laboratory, Daejeon/South Korea; (3) Korea Institute of Science and Technology, Computational Science and Engineering Laboratory, Seoul/South Korea;

Study of a glass-ceramic sealant over the stack lifetime (B1614)

Annabelle LAPLACE (1), Rémi Moles (1), Emma Blondeau (1), Jean Gabriel Begos (1), Charlène Vallat (1), Elise Regnier (1), Lilou Schintu (1), Karl Vulliez (2)
(1) CEA , ISEC, Univ. Montpellier, France; (2) CEA, LITEN, Univ. Grenoble Alpes/France;

Stability of steels and solid oxide fuel cells using ammonia as fuel (B1615)

Anders Bogh Jacobsen, Peter Vang Hendriksen, Henrik Lund Frandsen, Claudia Goebel, Arash Nemati, Xiufu Sun
Technical University of Denmark (DTU), DTU Energy, Kgs. Lyngby/Denmark;

Investigating the Impact of Chlorides on LSCF Cathode Degradation in Solid Oxide Fuel Cells (SOFCs) at Elevated Temperatures (B1617)

Ivan Kirillov
Forschungszentrum Jülich, Structure and Function of Materials (IEK-2), Jülich/Germany;

Investigating Degradation Phenomena of Ni/YSZ Electrodes under High Cathodic Polarization (B1618)

Miao Yu, Vasileios Bilalis, Ming Chen; Technical Uni of Denmark, DTU Energy, Lyngby/Denmark;

Analysis of Cell Performance and Degradation Factors of rSOC Single Cell (B1619)

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

B15: Protonic Cells

Protonic Ceramic Electrolysis Cells: from the 3D printing to integration issues (B1507=B1503)

Simone Anelli (1), Domenico Ferrero (2), Massimo Santarelli (2), Federico Smeacetto (1)
(1) Politecnico di Torino, Department of Applied Science and Technology (DISAT), Turin/Italy;
(2) Politecnico di Torino, Department of Energy (DENERG), Turin/Italy;

Scalable Manufacturing of Metal-Supported Proton-Conducting Ceramic Cells (B1508)

Christian Rose (1), Luca Mastropasqua (2), Jack Brouwer (1)
(1) University of California-Irvine, Mechanical and Aerospace Engineering, Irvine/US;
(2) University of Wisconsin-Madison, Mechanical Engineering, Madison/US;

Degradation of Protonic Ceramic Fuel Cells (PCFCs) Tested with Chromium-Containing Metallic Interconnects and Preventive Measures (B1509)

Sungeun Yang, Yeji Lim, Jong Heon Chong, Puspendu Guha, Deok-Hwang Kwon, Jong-Ho Lee, Ho-Il Ji; Korea Institute of Science and Technology (KIST), Seoul/South Korea;

High durable air electrode for proton conducting ceramic fuel cell (B1510)

Yitong Li; Huazhong Uni of science & technology, Materials Science & Engineering, Wuhan/China;

$Ba_{0.5}Sr_{0.5}Zr_{0.25}Fe0.65Ni0.1O3$: transition metal doping strategy successfully in designing triple conduction cathodes for proton-conducting SOFCs (B1511)

Yanru Yin, Lichao Jia, Jian Li;
Huazhong University of Science and Technology, Wuhan/China;

Efficient composite electrodes based on copper dopped strontium ferrite for protonic ceramic hydrogen pump (B1512)

Xuefa Xia;
University of St Andrews, School of Chemistry, St Andrews/UK;

Electrochemical Hydrogen Sulfide Decomposition using Proton Conducting Ceramic for Pure Hydrogen Production (B1513)

Taehong Kim; Kaist,
Mechanical Engineering, Daejeon/South Korea;

Fabrication of large-scale anode-supported protonic ceramic cells with high-density electrolyte sintering process (B1514)

Kwangho Park, Minkyeong Jo, Jun-young Park
Sejong university, Seoul/South Korea;

Advancements in High-Temperature Durability of Porous FeCr Alloys: Insights from Pre-Oxidation and ALD Modifications (B1620)
Damian Koszelow, Piotr Jasinski, Sebastian Molin; Gdansk University of Technology, Faculty of Electronics, Telecommunications and Informatics, Gdansk/Poland;

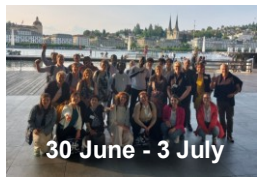
Long-term Degradation Analysis of SOFC Performance (3) (B1622)
Koichi Asano, Takumi Imabayashi, Akifumi Ido, Takayuki Ozeki, Hiroshi Morita, Tohru Yamamoto, Yoshihiro Mugikura
Central Research Institute of Electric Power Industry (CRIEPI), Yokosuka/Japan;

Operation of High Temperature Electrolysis Stacks in the 10-to-20 kWDC range (B1623)
Jerome Aicart; CEA, LPH, Grenoble/France;

Creep rupture of the joint of an SOFC braze seal with metallic interconnect (B1624)
Chih-Kuang Lin (1), Wei-Tong Hung (1), Liang-Wei Huang (2), Chien-Kuo Liu (2), Ruey-Yi Lee (2)
(1) National Central University, Department of Mechanical Engineering, Tao-Yuan City/Taiwan;
(2) National Atomic Research Institute, Department of Material Research, Tao-Yuan City/Taiwan;

The effect of pre-heat treatment of AluChrom 318 on the corrosion and Cr evaporation behaviour in an SOFC cathode air pre-heater (B1625)
Kun Zhang (1), Ahmad El-Kharouf (2), Robert Steinberger-Wilckens (1)
(1) University of Birmingham, Birmingham/UK; (2) Arup, Sheffield/UK;

Chemical Interaction Study of Tar-induced Degradation of Ni-8YSZ Substrate under Syngas Atmosphere (B1626)
Benjamin Steinrücken, Florian Kerscher, Hartmut Spliethoff
TU Munich, Mechanical Engineering, Garching bei München/Germany;



Ionic transport characteristics of a disordered hexagonal perovskite Ba7Nb4MoO20 by Isovalent doping (B1515)
Tae Woo Kim (1), Yoonseok Choi (2), Yong Youn (3)
(1) Korea Institute of Energy Research (KIER), Energy Materials Lab; (2) Korea Institute of Energy Research (KIER), Hydrogen Convergence Materials Laboratory; (3) Korea Institute of Energy Research (KIER), Energy AI & Computational Science Laboratory, Daejeon/South Korea;

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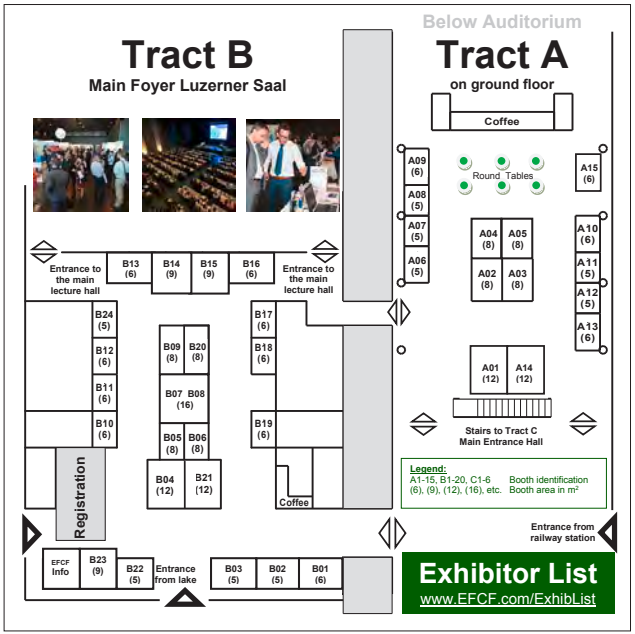

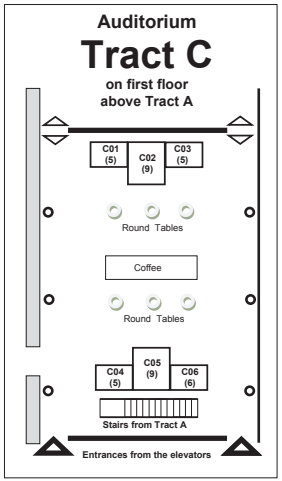

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A06	Heraeus Precious Metals GmbH & Co KG
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A11	Admiral Instruments
A12	WOLF Energetik GmbH
A13	INERGIO Technologies SA
A14	Eco Analytics
A15	Celectis
	TRAKT B
B01	Fiaxell Sarl
B02	SulfaTrap LLC
B03	Nexceris – fuelcellmaterials
B04	Burkert Schweiz AG
B05	I-GraphX GmbH
B06	BioLogic Science Instruments GmbH
B07/08	Forschungszentrum Jülich GmbH
B09	Morgan Advanced Materials
B10	Haiku Tech Europe B.V.
B11	COMSOL Multiphysics GmbH
B12	Imerys Murg GmbH
B13	SolydEra S.p.A.

Booth No	Institution
B14	German Aerospace Centre
B15	ONEJOON GmbH
B16	SRT-Microcéramique
B17	Scribner
B18	FLEXITALLIC Ltd
B19	HORIBA FuelCon
B20	smk systeme metall kunststoff gmbh & co. kg
B21	Kerafol Keramische Folien GmbH & Co. KG
B22	VERMES Microdispensing GmbH
B23	Zahner-Elektrik GmbH & Co. KG
B24	Linde AMT GmbH

Booth No	Institution
	TRAKT C
C01	Ceramic Powder Technology AS
C02	Samsung Electro-Mechanics
C03	Johnson Matthey
C04	Ivium Technologies
C05	Bosal Energy N.V.
C06	Feintool International Holding AG
C06	SITEC Industrietechnologie GmbH

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List of Exhibitors

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Booth NO	Company	Exhibits	Web
A11	**Admiral Instruments** Arizona / **United States**	EIS-capable Electrochemistry Instruments & Accessories	www.admiralinstruments.com
B06	**BioLogic Science Instruments GmbH** Göttingen / **Germany**	Potentiostats, galvanostats, impedance analyzers, battery cyclers, accessories for fuel cell testing	www.biologic.net
B04	**Burkert Schweiz AG** Lummen / **Switzerland**	Shut-off, Proportional solenoid valve, Mass Flow Meters, Mass Flow Controller, Electromotive Valves, Proportional motor valve, Sensors	www.buerkert.ch
C05	**Bosal Energy N.V.** Grenoble / **Belgium**	Heat and Flow Management Solutions / Heat Exchanger	www.bosal.com
A08	**CAP CO., Ltd.** Yokohama / **Japan**	Hot Gas Recycle Blower for SOFC & SOEC	www.cap-co.jp
A01	**CEA - LITEN** Grenoble / **France**	Power Stack and Cells	www.liten.cea.fr

A15	**Celectis** Sion / **Switzerland**	Hydrogen Technologies, Fuel Cells, Electrolysers, System components	www.celectis.com
C01	**Ceramic Powder Technology AS** Tiller / **Norway**	Advanced ceramic oxide powders, SOC, SOC materials, high quality oxide powders Catalyst, piezo, membranes	www.cerpotech.com
B11	**COMSOL Multiphysics GmbH** Zürich / **Switzerland**	Simulation software for fuel cells and electrolysers and the H2 economy	www.comsol.com
A14	**Eco Analytics** Münsing / **Germany**	Eco Analytics AG and Eco Analytics GmbH offers the right solution for the measurement and monitoring of toxic and explosive gases and vapors, as well as recurring tests	www.ecoanalytics.gmbh
A02	**Elcogen SA** Tallin / **Estonia**	Solid Oxide Cell, Stacks and Modules	www.elcogen.com
A09	**Euro Support B.V.** Amersfoort / **The Netherlands**	Materials for electrolysers, fuel cells and batteries	www.eurosupport.com
C06	**Feintool International Holding AG** Lyss / **Switzerland**	STACK UP ON - Leading hydrogen solutions	www.feintool.com
B01	**Fiaxell Sarl** Lausanne / **Switzerland**	SOFC/SOEC testing rig for small, medium and large cell, ceramic processing, tape casting, screen printing, inks, gas management	www.fiaxell.com
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B07/B08	**Forschungszentrum Jülich GmbH** Jülich / **Germany**	R&D for oxygen-ion and proton conducting cells, stacks and systems	www.fz-juelich.de
B14	**German Aerospace Centre** DLR TT, Stuttgart / DLR MS, Geesthacht / **Germany**	NAUTILUS - EU´s Horizon 2020 project focused on low-emission Nautical Integrated Hybrid Energy System for Long-haul Cruise Ships	www.nautilus-project.eu
B10	**Haiku Tech Europe BV** Maastricht / **The Netherlands**	Equipment for multilayer ceramics and fule cells	www.haikutech.com
A06	**Heraeus Precious Metals GmbH & Co KG** Hanau / **Germany**	Precious Metal Catalysts	www.heraeus-precious-metals.com

B19	**HORIBA FuelCon AG** Barleben / **Germany**	Test, assembly and manufacturing systems for fuel cells and electrolyzers	www.horiba-fuelcon.com
B05	**I-GraphX GmbH** Reinbek / **Germany**	H2 Purity measurement 5.0 (99,999%), Analysis of: H2 CO N2 O2 H2S NH3, microGC, Gas chromatography	www.i-graphx.com
B12	**Imerys Murg GmbH** Laufenburg / **Germany**	Zirconia, Alumina, Silica, ion conducting materials; SOFC, SOEC, SOC; Hydrogen, gas separation, membrane, turbine	www.imerys.com
A13	**INERGIO Technologies SA** Renens / **Switzerland**	500W system (45 kg) and some samples	www.inergio.ch
C04	**Ivium Technologies** Eindhoven / **The Netherlands**	Potentiostats/galvanostats with integrated EIS	www.ivium.eu
C03	**Johnson Matthey** London / **United Kingdom**	Fuel processing / reforming catalysts; Combustion (after treatment) catalysts; Partial / Selective oxidation; Chromium Traps; Sulphur Traps / Guard bed	www.matthey.com
B21	**Kerafol Keramische Folien GmbH & Co. KG** Eschenbach / **Germany**	Electrolytes, Solid-Oxide Cells, Glass tapes, Sintering Setters	www.kerafol.com
A05	**Keramischer OFENBAU GmbH** Hildesheim / **Germany**	efficient kilns for SOFC and SOEC production	www.Keramischer OFENBAU.de
B24	**Linde AMT GmbH** Wiggensbach / **Germany**	Chemically Synthesized Multi-Component Powders and Shapes	www.linde-amt.com
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B03	**Nexceris – fuelcellmaterials** Lewis Center OH / **United States**	SOFC + SOEC Products + Technologies	www.nexceris.com
A10	**Niterra EMEA GmbH** Ratingen / **Germany**	The tech. provider of reversibile SOC, SOEC and Co-Electrolysis	www.ngkntk.de
B15	**ONEJOON GmbH** Bovenden / **Germany**	Debinding & Sintering furnaces to produce Solid Oxide Electrolyser Cells & Solid Oxide Fuel Cells	www.onejoon.de

A03	**Saint-Gobain** Rödental / **Germany**	Ceramic Slab / Plates; Saggers; Rollers for rollers hearth kilns; Alumina plates	www.ceramicsrefractories.saint-gobain.com
C02	**Samsung Electro-Mechanics** Suwon City / **Republic of Korea**	Solid Oxide Electrolysis Cell	www.samsungsem.com
B17	**Scribner** Southern Pines / **United States**	Fuel Cell Test Systems, Electrolyzer Test Systems, Fixtures, etc…	www.scribner.com
C06	**SITEC Industrietechnologie GmbH** Chemnitz / **Germany**	STACK UP ON - Leading hydrogen solutions	www.sitec-technology.de
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B13	**SolydEra S.p.A.** Pergine Valsugana / **Italy**	Fuel Cell systems / stacks	www.solydera.com
B16	**SRT-Microcéramique** Vendôme / **France**	Solid oxide cells	www.srt-microceramique.com
B02	**SulfaTrap LLC** Colorado / **United States**	Desulfurization Sorbents Systems	www.sulfatrap.com
A04	**Tutco SureHeat** Berlin / **Germany**	Electrical air/gas/steam heaters	www.tutcosureheat.com
B22	**VERMES Microdispensing GmbH** Holzkirchen / **Germany**	SOC stack	https://soc.vermes.com
A07	**Vireca** Ledeberg / **Belgium**	Solid oxide electrolysers SOEC and fuel cells SOFC	www.vireca.eu
A12	**WOLF Energetik GmbH** Dresden / **Germany**	Energy storage technology	www.wolf-energetik.de
B23	**ZAHNER-elektrik GmbH & Co. KG** Kronach / **Germany**	Potentiostats, EIS Equipment	www.zahner.de

Special Networking Events

www.EFCF.com/Events

Welcome Gathering
Tuesday, 2 July: 18:00, in the exhibition, ground floor: Meet old friends, find new contacts, and exchange already with the exhibitors – a perfect start to the conference.

Swiss Surprise (optional, limited to 80 participants)
Wednesday, 3 July: 18:30, place to be announced. A special surprise is offered in an unusual place close to Lucerne: An enjoyable evening with Swissness, music, drinks, and dinner. Tickets are sold on a first-come-first-serve-basis for CHF 135 per person. During your on-line registration (www.EFCF.com/Regstration) please select the option to purchase tickets in advance for you and your guests.

Dinner on the Lake
Thursday, 4 July: 19:30 Pier 6 („Brücke 6") next to Congress Center: A very special pleasure-boat (flagship of the fleet) will take us on a tour of the lake past a magnificent landscape to the „Rutli" glade, birthplace of Switzerland (1291). Enjoy the unique blend of music, drinks, and a candle-light dinner while gliding past beautiful scenery. Live music contributes to this unforgettable evening. Included in the EFCF registration fee. Please choose this option during your on-line registration on www.EFCF.com/Regstration to purchase additional tickets for your guests (CHF 135 per person).



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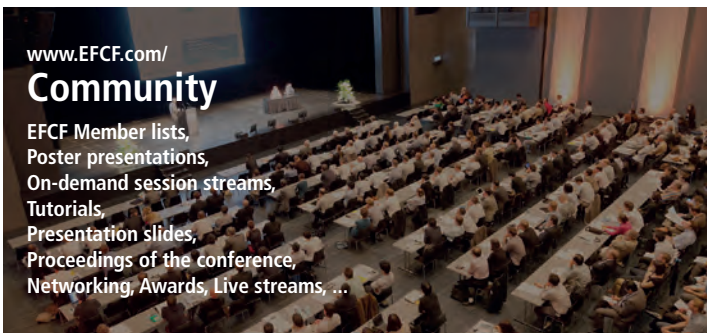
During the European Full Cell Forum your guests and yourself have the possibility to explore the beautiful region of Lucerne together with an experienced local guide. Bucher Travel Inc. and the Lucerne Tourist Office are able to organize for you and your guests entertaining trips around local attractions. It is possible to take a tour of Lucerne visiting the medieval part of the city, followed by a tour of the picturesque surrounding area e.g. Mount Pilatus, the Glass Factory & Mount Stanserhorn, etc. The excursions are arranged locally on a daily basis depending on weather conditions and requests. To get more information about the programmes and to book an activity, please visit www.EFCF.com – Registration – Spouse Programmes or contact in advance Bucher Travel Inc., booking@buchertravel.ch, +41 41 418 55 46 and/or visit www.luzern.com. The EFCF team can support you on-site at the registration desk in finding further offers and opportunities, except during the main registration time (Tuesday afternoon, Wednesday morning). Accompanying persons may participate in the „Swiss Surprise" and „Dinner on the Lake" for CHF 135.– per person as well as in the lunches on the terrace of the KKL. Please purchase guest tickets as long as they are available during your on-line registration. Additional lunch tickets are only sold on site until fully booked. The exhibitions can always be visited for free.



EFCF 2025

1 – 4 July

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The Gotthard trans-alpine **autobahn and railway pass through Lucerne**, and provide easy access by car, train or bus from north or south. Lucerne is ca. 1 hour from Zurich.

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By airplane:
Zurich is the gateway for the European Fuel Cell Forum. Choose **Zurich as your destination**. From Zurich airport you can take a **train to Lucerne**. The train station is below the airport terminal complex, and trains with one change (at Zurich main station) leave at 15 and 48 minutes past the hour. The pleasant train journey takes a little over 1 hour. Most hotels are within walking distance from the Lucerne train station and the conference location at the KKL.

We hope you have a pleasant journey and
we look forward to welcoming you in Lucerne!

European Fuel Cell Forum
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Fuel Cells, Electrolysers & H_2 Processing
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1 – 4 July 2025
Lucerne, Switzerland

Chaired by

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EFCF 2025

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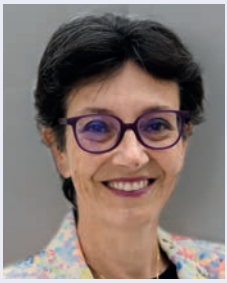
The EFCF 2025 addresses issues of low-temperature FUEL CELLS and ELECTROLYZERS incl. CO_2 REDUCTION. These technologies are also strongly linked to HYDROGEN and its PROCESSING. The conference topics will range from the fundamental science of relevant materials and intricately coupled transport and reaction processes; H_2 purification, compression, storage & distribution; all the way to the accelerated integration into real-world devices, requiring innovative engineering solutions. The EFCF 2025 will continue the strong tradition as one of the leading international meetings in the field.

Technical Status and Achievements: The following companies have presented in the previous EFCF editions:

Automotive OEM: Audi, BMW, Daimler, Fiat, Hyundai, Honda, Nissan, Renault, Toyota
Electrolyser & H_2 Industry: AirLiquide, AREVA/Helion, Giner, Hydrogenics, IHT, ITM, Linde, NEL/Proton OnSite, Shell, Siemens

Chairs of the Conference



Prof. Stefania Specchia — Politecnico di Torino / Italy

Prof. Stefania Specchia is Full Professor of Chemical Plant Design at the Politecnico di Torino since 2019, and external Adjunct Researcher of the of the CNR-ITAE since 2014. She has key competences in sustainable chemical engineering, H_2 production through fuel processing, & electrocatalysts for low-temperature fuel cells.

Stefania lead scientifically several EU, international & national projects, & industry-funded contracts and is in the board of the POLITO-Japan Hub international flagship cooperation project.

Stefania's works include 163 papers, 8 book chapters & international patents. She presented as invited & keynote speaker at >70 conferences. The Scopus database reports: >5,400 citations, h-index 45, top 2% most-cited scientists.

Dr. Antonino S. Aricò — National Research Council CNR / Italy

Since 2020, Dr. Aricò is director of the of the CNR-ITAE (CNR = Italian National Research Council, ITAE = Institute of Advanced energy Technobgies) and has high competences in electrochemical energy conversion research. He has been coordinator for EU, FCH JU, international, and industry-funded contracts on water electrolysis, fuel cells, coupling renewable power sources with H_2 & organic fuel electrochemical generation.

Antonino's research includes 380 papers, 8 patents, 2 books, 10 book chapters, presented at >300 conferences. The Scopus database, reports >24,000 citations & 2016 "under 150 world Most Cited Scholars in Energy Research". He is from 2014 in the States Representatives Group (SRG) of the FCH JU resp. and today Italian SRG representative for the EC Clean Hydrogen JU.

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Olivier Bucheli & Michael Spirig

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Tutors:


Dr. Günther G. Scherer
formerly PSI, Switzerland

MER Dr. Jan Van Herle
EPFL, Switzerland (right)

www.EFCF.com/FCH

Related with **EFCF 2024**, 2 - 5 July
16th European SOFC and SOE Forum
28th Int. Conference Series, Tutorials & Exhibition est. 1994

PROGRAM

FCH Tutorial: Live 2 July 2024

www.**EFCF**.com/**FCH**

09:30 Registration, welcome refreshments

10:00 Welcome and Introduction

10:00 **Lecture 1 Fundamentals of Electrochemical Energy Conversion**

11.00 **Lecture 2 Characteristics of the important Fuel Cell & Electrolyser Technologies**

11:45 Coffee break

12.00 **Lecture 3 Fuels for fuel cells, fuel processing**

12:45 Lunch break

14:00 **Lecture 4 Applications of Polymer Electrolyte Technologies** such as PEFC, DMFC, H2FC, …

14:45 **Lecture 5 System aspects, applications of Solid Oxide Technologies** such as SOFC, SOE, SOMR

15.30 Coffee break

15:45 **Lecture 6 State-of-the-art, challenges, summary**

17:00 End of FCH Tutorial, Visit the exhibition and poster area of EFCF

The Tutorial language is English.

Registration, Services & Fees

Both **on-site** & **virtual** participation are available & include: Complete documentation of the tutorial lectures, exchange with FCH experts & users, admission to the EFCF exhibition, VAT & the **certificate of attendance** with confirmation of **0.5 ECTS credits.** Additionally for onsite participants: Welcome refreshments, business lunch, snacks, drinks & access to the poster session.

On-line Registration : www.**EFCF**.com/**TutReg**

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CHF 400 for live, virtual participation (+CHF 50 late fee from 15 May)

CHF 350 for on-demand access to recorded lectures
- ca. 2-3 weeks after live performance published
- email exchange with the tutors possible

Exhibitors & groups are entitled to rebates. Ask forum@efcf.com.

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Tutors:


Dr. André Weber
KIT, Germany

Dr. Dino Klotz

www.EFCF.com/EIS

Related with **EFCF 2024**, 2 - 5 July
16th European SOFC & SOE Forum
28th Int. Conference Series, Tutorials & Exhibition est. 1994

PROGRAM

EIS Tutorial: Live 2 July 2024
www.EFCF.com/**EIS**

09:30 Registration, welcome refreshments
10:00 Welcome and Introduction
10:10 **Lecture 1 Fundamentals of Electrochemical Impedance Spectroscopy**
11.00 **Lecture 2 Impedance Spectra Eval., Kramers-Kronig Test, DRT-Analysis, CNLS Fit**
11:45 Coffee break
12.00 **Lecture 3 Applications I - Analysis - Materials and (Model-) Electrodes**
12:45 Lunch break
14:00 **Lecture 4 Applications II - Analysis - Single Cells and Stacks**
14:45 **Lecture 5 Impedance Modelling and Simulation**
15.30 Coffee break
15:45 **Lecture 6 "EIS challenge" - Summary**
17:00 End of EIS Tutorial, Visit the exhibition and poster area of EFCF

The EIS Tutorial language is English.

Registration, Services & Fees

Both **on-site** & **virtual** participation are available & include: Complete documentation of the tutorial lectures, exchange with EIS experts & users, admission to the EFCF exhibition, VAT & the **certificate of attendance** with confirmation of **0.5 ECTS credits.** Additionally for onsite participants: Welcome refreshments, business lunch, snacks, drinks & access to the poster session.

On-line registration: www.**EFCF**.com/**TutReg**

CHF 580 for live, on-site participation
CHF 400 for live, virtual participation (+CHF 50 late fee from 15 May)
CHF 350 for on-demand access to recorded lectures
- ca. 2-3 weeks after live performance published
- email exchange with the tutors possible

Exhibitors & groups are entitled to rebates. Ask forum@efcf.com.

ANNOUNCEMENT

SSD 2024
1 – 2 July

Lucerne, Switzerland

SUSTAINABLE SHIPPING DAYS

Electrolysers & Fuel Cells for waterborne transport

Conference
Exhibition
Network

Chaired by:

Dr. Syed Asif Ansar
ESI – Energy System Integration
DLR – German Aerospace Center

Featuring

- Marine fuel cell technology
- Advanced propulsion systems
- Electrolysis & green marine fuels
- Ship integration & port eco systems

Organised by

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SSD 2024

1 – 2 July

Scope

The Sustainable Shipping Days 2024 (SSD) aim to explore and promote advancements in maritime sustainability through the integration of fuel cell-based onboard energy systems and electrolysis technology at ports for fuel supply. Over one and a half days, this event will facilitate connecting experts, industry leaders, and researchers in these vital fields. It will focus on presenting and fostering in-depth discussions about the latest developments in maritime fuel cell technology, showcasing its potential to power ships, enhance energy efficiency, and reduce emissions. Furthermore, the conference will emphasize the pivotal role of electrolysis in green hydrogen production for sustainable fuel supply at ports for ambitions of net-zero. It will encourage dialogues regarding the integration of these technologies into the shipping industry, with a keen eye on their broader impacts on environmental conservation, energy security, and market dynamics.

Program

The Sustainable Shipping Days 2024 (SSD) program offers an engaging and dynamic agenda, including high-level keynotes, focused invited talks, and the unveiling of results from national and EU projects. Designed to facilitate the exchange of knowledge and foster meaningful connections, the program sets the stage through pre-event gatherings, including an inviting aperitif and an enjoyable dinner, fostering an atmosphere conducive to enriching interactions. SSD extend an invitation to partake in a comprehensive exchange with the Electrolyser & Fuel Cell Forum (EFCF) 2024 community at the EFCF-Welcome Reception. EFCF, spanning the ensuing three days amidst the picturesque backdrop of Lucerne, gathers the world's foremost experts in the field. The combined SSD and EFCF experience offers an exclusive opportunity to propel sustainable shipping forward, with a primary focus on the integration of maritime fuel cells and integrated electrolysis plants within ports.

Who should join:

- OEMs of Fuel Cells, Electrolysers & Storage Systems
- Marine Fuel Suppliers
- Marine Genset Manufactures
- Ship Yards, Ship Owners & Ship Operators
- Port Builders, Integrators, Operators & Authorities
- Investors, Banks, Scouts
- Marine Safety & Classification Organisations
- Regulators, Consultants
- R&D specialists in the related fields

Chair of the Conference

Head of Department ESI / DLR

Dr. Syed Asif Ansar currently holds the position of Head of the Department of Energy System Integration (ESI) at the German Aerospace Center (DLR). His primary focus centers around the development of technologies aimed at reducing carbon intensity in both waterborne and airborne transport sectors.

To achieve this, his department, comprising a dedicated team of over 70 professionals, concentrates on advancing the domains of Fuel Cell and Battery powertrains, as well as the generation of hydrogen and its derivatives through cutting-edge Electrolyser technologies. The laboratories are equipped with comprehensive experimental facilities spanning both laboratory to pilot-scale operations.

Dr. Ansar's has also served as a member of the Roadmap Leaders Committee of the EU Clean Hydrogen Partnership and a steering board member of the EERA Fuel Cell and Hydrogen. He has authored over 80 published papers, multiple book chapters, and secured 10 patents. He attained his doctorate from the University of Limoges, France in 2004.

Partnership with:

NAUTILUS

www.Nautilus-Project.eu

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SSD 2024
1 – 2 July

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www.EFCF.com/**SSDboard**

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Spyros Paris Voutetakis	Director	Process Systems Design and Implementation Laboratory/CPERI/CERTH	www.certh.gr/root.en
Malte Zeretzke	Head or R&D	Carnival Maritime	www.carnival-maritime.com

Program Overview

www.EFCF.com/**SSDprogram**

MONDAY, 1 July 2024	
19.30 – 22.30	**SSD Networking Dinner**
TUESDAY, 2 July 2024	
08.00	Registration
09.00	**Welcome & Opening**
09.10	Keynote Lecture
10.00	Lecture 1: **Demonstrators and Operations**
11.10	Lecture 2: **Green marine fuels production**
12.10	**Lunch & Poster Session**
14.00	Lecture 3: **Advanced propulsion systems**
15.30	Lecture 4: **Marine Fuel Cell Technology**
16.50	Interactive Summary
17.00	**End of the meeting**
18.00 – 19.00	EFCF Welcome Reception

The Sustainable Shipping Days 2024 (SSD) will be held alongside the already well established and highly respected European Electrolyser & Fuel Cell Forum established 1994, with 400 - 500 experts attending, 20-30 exhibitors, tutorials, ... see www.EFCF.com.

This offers further opportunities with researchers and industry members in the field of high temperature Fuel Cells, Electrolysers, & H_2 Processing research from around the world as well as to visit the accompanying exhibition or to join attractive networking events.

Registration is open. Attractive combination tickets and group rebates are available.

Services & Fees

www.EFCF.com/**SSDfee**

Conference		**Physical**			**Virtual**	
	Early	Regular	Late	Regular	Late
Registration deadlines	- 31 March	from 1 April	from 15 May	- 14 May	from 15 May
• Students, trainees and unemployed person etc. with valid identification	**300**	+150	+100 CHF	**270**	+50 CHF
• Academic staff, Governement, Industry, Trade	**690**	+150	+100 CHF	**450**	+50 CHF

Attractive rebates are offered: In combination with an EFCF registration; For group registration (starting from 3 attendees); For exhibitors/sponsors, contact SSD@efcf.com. Physical fees include: Access to conference, plus all advantages of the virtual access as well as business lunch, all refreshments and the SSD Networking Evening on July 1. Virtual fees include: Virtual live and on-demand access as well as access to the virtual community rooms during and to the member zone after the conference.

Venue & Access

www.EFCF.com/**Lucerne**

The Sustainable Shipping Days SSD 2024 is held at the Culture and Convention Centre Lucerne (KKL) in conjunction with the Fuel Cell, Electrolyser & H2 Technology and Supplier Exhibition.

The KKL conference centre is a well-known location on the picturesque waterfront of the Lake Lucerne, easy to reach by plane and train, and within a short walk from charming hotels and the historical town centre.

SSD 2024 will take place as a physical and virtual event, offering participants from all continents regardless of restrictions and origin the opportunity to contribute and participate. However, being present in Lucerne in person is an unbeatable win-win situation for all.

Lecture Program

SSD 2024 1 – 2 July

Lucerne, Switzerland

SUSTAINABLE SHIPPING DAYS

Electrolysers & Fuel Cells for waterborne transport

Monday, July 1

19:00 **Meeting point for registered guests >pier 6** www.EFCF.com/SSDcirrus

19:30-22:30 SSD Networking Dinner

Tuesday, July 2

08:00 **On-site Registration & Welcome Coffee**
Warm-up: Possibility to view & discuss mounted posters

Poster Presenters
are asked to arrive early to put up their posters so that they can be seen by those stakeholders already at the venue

Auditorium KKL Luzern

09:00	**S00**	**Welcome & Opening / Keynote**		
	S0001	**Welcome by the Organizers**	Olivier Bucheli	European Electrolyser & Fuel Cell Forum, Lucerne/Switzerland
	S0002	**Welcome by the Chair**	Syed Asif Ansar	German Aerospace Center (DLR), Stuttgart/Germany
	S0003	**Fuel cells and batteries as alternative power conversion technologies for sustainable shipping**	Peter Lystrup Christensen	Mærsk Mc-Kinney Møller Center for Zero Carbon Shipping, Copenhagen/Denmark
	S0004	**The EU mandate to decarbonize the waterborne industry**	Moisés Blanco Ríos	European Commission, DG RTD
	S0005	**EC funding opportunities**	Anna Karamigkou	European Commission, CINEA
10:00	**S01**	**Lecture 1: Demonstrators and Operations**		
	S0101	**Fuel Cell Integration projects from Pa-X-ell to NAUTILUS**	Ragnar Christenson	MEYER NEPTUN Engineering, Rostock/Germany
	S0102	**The role of H2-based technologies for maritime decarbonization**	Andrea Borzacchiello	Fincantieri, Trieste/Italy
10:40		Coffee break in the poster area		
11:10	**S02**	**Lecture 2: Green Marine Fuels Production**		
	S0201	**Challenges and perspectives of (drop-in) synthetic fuels for net-zero Shipping**	Srikanth Santhanam	Shell, Amsterdam/Netherlands
	S0202	**Clean Ammonia as Marine fuel. Opportunities and Challenges**	Rob Stevens	Topsoe A/S, Lyngby/Denmark
	S0203	**RH2INE - Facilitating a hydrogen ecosystem in inland waterway transport**	Stefan Garche	NRW.Energy4climate, Dusseldorf/Germany
12:10		Lunch & Poster Session		
14:00	**S03**	**Lecture 3: Advanced Propulsion Systems**		
	S0301	**Decarbonization with future fuels and new technologies in the maritime industry**	Mathias Moser	MAN, Augsburg/Germany
	S0302	**ABB Dynafin™, a revolutionary propulsion concept to significantly increase ship efficiency**	Janne Pohjalainen	ABB Oy, Helsinki/Finland
	S0303	**Powering the depths: the singular challenges in advancing submersible fuel cell propulsion systems**	Jessica Lück	thyssenkrupp Marine Systems GmbH, Kiel/Germany
15:00		Coffee break in the poster area		
15:30	**S04**	**Lecture 4: Marine Fuel Cell Technology**		
	S0401	**SOFC-based generators from SolydEra with high power density and improved serviceability**	Massimo Bertoldi	Solydera, Trento/Italy
	S0402	**Multifuel Solid Oxide Fuel Cell systems for Maritime use – Recent Advancements by Alma Clean Power**	Tjalve Svendsen	Alma Clean Power, Bergen/Norway
	S0403	**Fuel Cell Hybrid Electric Energy for Shipping**	Manfred Stefener	Freudenberg, Munich/Germany
	S0404	**Ready for the Marine Future: Harnessing Advanced Fuel Cell Systems with Renewable Fuels**	Andreas Bodén	PowerCell, Gothenburg/Sweden
	S0405	**Interactive Summary**	Syed Asif Ansar	German Aerospace Center (DLR), Stuttgart/Germany
17:00		End of the meeting		
18:00-19:00		EFCF Welcome Reception		

Paralell Session: AMON Workshop

13:30-15:00
Ammonia FC System for Maritime Application

More information:
www.EFCF.com/AMONws

www.EFCF.com/SSD
www.EFCF.com/Registration

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European Fuel Cell Forum
www.EFCF.com forum@efcf.com

SSD 2024 1 – 2 July

Workshop on

Ammonia FC System for Maritime Application

2 July 2024, 12.30 – 17.30, Lucerne KKL/Switzerland

System, Safety & Future in NH_3 based Power Production

The AMON project is **developing** and **demonstrating a novel system** for the utilization and direct conversion of ammonia into electrical energy with high efficiency using a solid oxide fuel cell system. In the AMON workshop, the system and the **challenges of engineering and integration** as well as the maritime **safety** aspects of such a development will be presented and discussed. This will support you in identifying the relevant points for further **integration, application** and **operation**. You will **meet key know-how owner** and **discuss the future** of ammonia-based power generation. You will also learn about the **added values** such as simplicity, efficiency, reliability, availability and scalability of such innovative ammonia fuel cell systems.

Organised by **CH JU project**

amon
AMMONIA TO POWER

Development of a next generation AMmONia Fuel Cell system

www.AMON-project.eu

Clean Hydrogen Partnership

The project is supported by the Clean Hydrogen Partnership and its members Hydrogen Europe and Hydrogen Europe Research, under Grant Agreement No 101101521

In conjunction with
SUSTAINABLE SHIPPING DAYS
www.EFCF.com/**SSD**

SSD 2024
1 – 2 July

joint with SSD 2024 1 – 2 July

Workshop Program:

see also **SSD program**
www.EFCF.com/**SSDprogram**

12.30	**Registration** & visit the **SSD poster session**
13.30	**Introduction** **on Ammonia FC system** Matteo Testi, FBK, Trento/ITA
13.45	**Engineering & Integration** Debasish Chakraborty Alpha Laval Lund/SWE & Copenhagen/DEN
14.00	**Safety aspects on ammonia power systems** Alvaro Fernandez, KIWA, Apeldoorn/NLD
14.20	**Panel** with Enduser, Marine and Ammonia Experts ***"How do you see NH_3 use in the context of power production?*** ***On shore - On board: Chances, needs, risks, market potentials."*** Debasish Chakraborty, Alfa Laval, Lund/SWE & Copenhagen/DEN Elli Varkaraki Yara Technology & Project, Geneva/CH Víctor Collazos Rodríguez, Fundación Valenciaport, Valencia/ESP Marco Matrascia, SOL Group, Monza/ITA
15.00	Coffee Break joining SSD network and poster session
15.30	**Marine Fuel Cell Technology**, SSD Lecture 4 with AMON partner Solydera: SOFC x Ammonia and PowerCell, Alma, Freudenberg
17.30	**End** AMON Workshop & SSD
18.00	**EFCF Welcome Reception** sponsored by www.EFCF.com

Who should join:

- OEMs of Fuel Cells, Electrolysers & Storage Systems
- Marine Fuel Suppliers
- Marine Genset Manufacturers
- Ship Yards, Ship Owners & Ship Operators
- Port Builders, Integrators, Operators & Authorities
- Investors, Banks, Scouts
- Marine Safety & Classification Organisations
- Regulators, Consultants
- R&D specialists in the related fields

Registration

If you like to join the **AMON workshop** for **free** you must register here www.EFCF.com/**AMONwsReg**

If you like to attend the **SSD** get all information here www.EFCF.com/**SSD** and please register here www.EFCF.com/**Registration**

Contact for:

SSD, Workshop, EFCF

Maria Santin & Michael Spirig
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AMON project

Matteo Testi
infoamon@fbk.eu

AMON project partners

www.AMON-project.eu

Posters

SSD 2024 1 – 2 July

Lucerne, Switzerland

SUSTAINABLE SHIPPING DAYS

Electrolysers & Fuel Cells for waterborne transport

Tuesday, July 2

08:00 **On-site Registration & Welcome Coffee**
Warm-up: Possibility to view & discuss mounted posters

Poster Presenters
are asked to arrive early to put up their posters so that they can be seen by those stakeholders already at the venue

Auditorium KKL Luzern

	Title	Author(s)	Affiliation(s)
P01	**Testing Platform for SOFC Stack Modules Utilising Marine Fuels**	Werneri Huhtinen, Santeri Saxelin, Jeremias Hopsu	VTT Technical Research Centre of Finland Ltd., Espoo/Finland
P02	**AMON: Strategic Insights into Non-Carbon Energy: Comparative Analysis of Hydrogen and Ammonia in Solid Oxide Fuel Cell**	Xinyi Wei (1, 2), Arthur Waeber (1), Shivom Sharma (1), Francois Marechal (1), Jan Van herle (2)	(1) IPESE, EPFL Valais Wallis, 1950 Sion, Switzerland; (2) GEM, EPFL Valais Wallis, 1950 Sion, Switzerland
P03	**Preliminary Estimation of Experimental Test of Short Stack Ammonia Solid Oxide Fuel Cell**	Luca Pratticò, Michele Rizzi, Matteo Testi	HYdrogen Technologies and Resilient Energy Systems, Center for Sustainable Energy, Fondazione Bruno Kessler
P04	**Development of ammonia fueled SOFCs - from catalyst to system level**	Arash Nemati Anders Bogh Jacobsen, Henrik Lund Frandsen	Department of Energy Conversion and Storage, Technical University of Denmark
P05	**Electrochemical processes and energy systems towards step-wise emission reduction of maritime transport**	S. Salas Ventura (1), M. Metten (1), D. Fortunati (1), C. Schnegelberger (1), A. Ansar (1), A. Thomas (2), M. Zeretzke (3), J. van Herle (4), E. Pina (4), M. Šimková (5), T. Hacker (6), F. Grimm (7), D. Sahnen (8), P.V. Aravind (9), A. Amladi (9), C. Ünlübayir (10), S. Diethelm (11), A. Sissinio (12), S. Modena (12), B. N. van Veldhuizen (13), L. Van Biert (13), J. Pagels (14), J. Pennanen (15), L. Hepo-oja (15)	(1) DLR Institute of Engineering Thermodynamics, Stuttgart, Germany; (2) Chantiers de l'Atlantique, Saint Nazaire, France; (3) Carnival Maritime, Hamburg, Germany; (4) École Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland; (5) Grant Garant, Prague Czech Republic; (6) Lloyd's Register EMEA, London, United Kingdom; (7) MAN Energy Solutions, Augsburg, Germany; (8) Meyer Werft, Papenburg, Germany; (9) Rijksuniversiteit Groningen (RUG), Groningen, Netherlands; (10) Rheinisch-Westfälische Technische Hochschule (RWTH) Aachen University, Aachen, Germany; (11) SolydEra SA, Yverdon-les-bains, Switzerland; (12) SolydEra SPA, Mezzolombardo, Italy; (13) Technische Universiteit Delft (TU Delft), Delft, Netherlands; (14) Lunds Universitet (ULUND), Lund, Sweden; (15) Teknologian tutkimuskeskus VTT Oy (VTT), Espoo, Finland
P06	**HELENUS: High Efficiency Low Emissions Nautical Solid Oxide Fuel Cell**	Dheeraj B. Gosala	DLR Institute of Maritime Energy Systems, Geesthacht, Germany
P07	**H2MARINE: Hydrogen PEM fuel cell stacks for marine applications**	K. Panopoulos (1), M. Bampaou (1), K. Papaioannou (1), J. Ihonen (2), J. Dombrovskis (3), J. Hunger (4), A. Fischer (5), P. Braun (6), M. Binder (6), M. Paetzold (7), A. Speidel (7), N. Ntavos (8), M. Schmitt (9), G. Skevis (10), S. Mamalis (10), M. Matian (11), J. van Herle (12), W. Weisenstein (13)	(1) Centre for Research and Technology Hellas (CERTH), Chemical Process and Energy Resources Institute (CPERI), 57001 Thessaloniki, Greece; (2) VTT Technical Research Centre of Finland Ltd, FI-02044 Espoo, Finland; (3) PowerCell Sweden, SE-41834 Gothenburg, Sweden; (4) Zentrum für Sonnenenergie-und Wasserstoff-Forschung, 89071 Ulm, Germany; (5) Institute of Inorganic and Analytical Chemistry, University of Freiburg, 79104 Freiburg, Germany; (6) Greenerity GmbH, 63755 Alzenau, Germany; (7) Reinz Dichtungs GmbH, 89233 NeuUlm, Germany; (8) Cluster of Bioeconomy and Environment of Western Macedonia, 50100 Kozani, Greece; (9) thyssenkrupp Marine Systems GmbH, 24143 Kiel, Germany (10) CLEOS,17564 Athens, Greece (11) EH Group Engineering AG, 1260 Nyon, Switzerland (12) Group of Energy Materials, Swiss Federal Institute of Technology, Lausanne (EPFL), 1951 Sion, Switzerland (13) Beyond Gravity Schweiz AG, 8058 Zürich, Switzerland
P08	**Reliable Dynamic Operation of SOFC Systems with Anode Off-Gas Recirculation using Multi-linear and Neural Network Model Predictive Control**	Jan Hollmann, Stephan Kabelac	Institute of Thermodynamics, Leibniz University Hannover, Am Welfengarten 1, D-30167 Hannover/Germany
P09	**Assessment of SOFC-based combined cycle power plants integrated in ship heat and power networks: A trend analysis**	Niek Goselink, Lindert van Biert	Department of Maritime & Transport Technology, Delft University of Technology, Delft, Netherlands
P10	**Dynamic simulation of marine SOFC power plant**	Berend van Veldhuizen (1), Lindert van Biert (1), Klaas Visser (1), Hans Hopman (1), Aravind Purushothaman Vellayani (2)	(1) Delft University of Technology, Department of Maritime and Transport Technology, Delft/Netherlands; (2) University of Groningen, Energy Conversion, Energy and Sustainability Research Institute, Groningen/Netherlands
P11	**Emission Analysis and Health Benefits of Introducing SOFCs in shipping – Nautilus Project**	J. Pagels(1), A. Oudin(2), R. Rittner(2), S. Ansar(3), J. Rex (1), P. Nilsson(1) and A. Kristensson(4)	(1) Dept. Design Sciences, Lund University, LTH, Lund, SE 22100 Sweden; (2) Department of Laboratory Medicine, Lund University, Lund; (3) Department of Clinical Sciences, Lund University, Lund; (4) Department of Physics, Lund University, Lund

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SSD 2024 1 – 2 July

Session Program

GRID SERVICE MARKET SYMPOSIUM

GSM 2024

KKL, Lucerne 1 – 2 July

SWITZERLAND

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GSM 2024, 1 - 2 July

KKL, Lucerne Switzerland

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7th Grid Service Market Symposium featuring grid flexibility & business

Chaired by:
Prof. Christoph Imboden
HSLU, Lucerne/Switzerland

Supported by: **GSM International Advisory Board (IAB)**

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- **Thomas Kudela**	Ørsted A/S, Denmark	- **Sebastian Ziegler**	50 Hertz, Germany

GSM SCOPE

www.GridServiceMarket.com/Scope

The electricity market is changing, opening opportunities for more flexibility in generation, storage and consumption. The integration of a large amount of new renewable energy sources poses great challenges for the European electricity grids & markets. Network reinforcement, market harmonisation and integration are solutions and challenges for the various players in the electricity industry.
New technologies such as Power to X, Batteries, Demand Side Response DSR, Water Electrolysers, Fuel Cells and others compete or complement each other in terms of technical capabilities and economic performance. The integration of such new technologies and methods, to provide grid services and optimise the use of existing infrastructure, is changing the face of the electricity industry in the long term.

GSM AIM

The 7th GSM-Symposium aims to outline recent developments in the European grid service markets, to highlight advancements and challenges in international cooperation and to reflect the technological progress. In addition, it reports on experiences and success stories, which support a rating of the performance, and future potential of new sustainable technologies.

GSM STAKEHOLDERS

The 7th GSM-Symposium addresses grid and technology experts, scouts and managers from the electricity industry, administration bodies and researchers interested in the commercial aspects of grid services and new technologies. Experts present their contributions to technological advances and propulsive business solutions. The international audience will exchange on market logic, regulations and harmonization activities, future trends, operations, technology capabilities, and long term business plans and other business related aspects of European grid service markets.

Session Program

KKL Terrassensaal, 5th floor

Monday, 1 July

Legend:
K - Keynote
P - Poster (with gray background)

			Presenter, Organisation, City/Country
10:00		**On-site GSM registration**	
11:00	**G01**	**OPENING & WELCOME**	**Presenter, Organisation, City/Country**
	G0101	**Welcome by the symposium chair**	Christoph Imboden (1), Michael Spirig (2), Olivier Bucheli (2) (1) Lucerne Uni of Applied Sciences & Arts, Horw, (2) European Electrolyser & Fuel Cell Forum AG, Lucerne/Switzerland
	G0102	**Welcome by TSO Swissgrid**	Bastian Schwark Swissgrid AG, Aarau/Switzerland
11:15	**G02**	**FUTURE OF GRID SERVICE MARKETS I**	Session-chair: **Thomas Kudela, Ivana Kockar**
K	G0201	**No transition without transmission**	Anser Shakoor GE Vernova, Bracknell/UK;
	G0202	**Industry's critical perspective on the NC DR**	Thomas König Enspired GmbH, Vienna/Austria;
	G0203	**Flexibility gap is looming: How do we bridge it?**	Ksenia Tolstrup Magnus Energy B.V. Naarden/The Netherlands;
12:35		Lunch break and coffee in the poster area	
13:20		**POSTER Pitches**	Session-chair: **Christoph Imboden**
6xP		**G0310, G0311, G0312** **G0410, G0411, G0412**	**5 min pitches** to introduce each poster see title, authours and institutions in the corresponding sessions
13:50	**G03**	**ADVANCED TECHNOLOGIES PROVIDING FLEXIBILITY I**	Session-chair: **Andreas Svendstrup-Bjerre**
	G0301	**Grid services and wholesale markets: the missing link**	Antonio Zecchino, Maurice Dierick Alpiq AG, Olten/Switzerland;
	G0302	**C3S Energy Service to ENTSO-E:** **Impacts of climate change in the Pan- European Climate Database (PECD)**	Alberto Troccoli (1,4), Giovanni Aldrigo (1), Stefano Campostrini (1), Stefano Cordeddu (1), Letizia Lusito (1), Elena Restivo (1), Susanna Strada (1), Mattia Zaramella (1), Matti Koivisto (2), Polyneikis Kanellas (2), Rodrigo Amaro e Silva (3), Yves-Marie Saint-Drenan (3) (1) Inside Climate Service s.r.l., Padova/Italy, (2) Dept of Wind & Energy Systems, Technical University of Denmark, Roskilde/Denmark, (3) Centre Observation, Impacts, Energy, Mines Paris - PSL University, Sophia Antipolis/France,
	G0303	**Water electrolysis powered by renewables:** **Optimizing the cost of green hydrogen production across Europe**	Paolo Marocco, Marta Gandiglio, Massimo Santarelli Department of Energy, Politecnico di Torino, Turin/Italy;
P	G0310	**Modelling charging behaviour of electric vehicles** **to estimate the potential flexibility income**	Enrique Romano, Andre S. Eggli, Claas Wagner Hochschule Luzern , Technik und Architektur, Horw/Switzerland;
P	G0311	**Optimal V2X operation of EV fleets** **with PV-battery charging station for demand-side flexibility provision**	Federica Bellizio, Philipp Heer Empa, Dübendorf/Switzerland;
P	G0312	**Relief of the power grid through cost-effective hydrogen generation**	Gabriele Humbert*, Hanmin Cai, Binod Prasad Koirala, Philipp Heer Urban Energy System Laboratory, Empa, Dübendorf/Switzerland;
15:00		Coffee break & poster visit	
15:30	**G04**	**ENABLING TECHNOLOGIES I**	Session-chair: **Ivana Kockar**
	G0401	**Intraday Solar Irradiance Forecasting** **Using Public Cameras**	Roy Sarkis (1), Ilker Oguz (2), Demetri Psaltis (3), Mario Paolone (4), Christophe Moser (2), Luisa Lambertini (1) Swiss Federal Institute of Technology, Lausanne/Switzerland; (1) College of Management, (2) Lab of applied photonic devices, (3) Optics Laboratory, (4) Distributed Electrical Systems Laboratory;
	G0402	**Provision of System Services by Offshore Wind** **Experiences and outlook**	Thomas Kudela Ørsted AS, Denmark;
K	G0403	**Resolving grid congestion with non-wire solutions**	Stefan Doerig smartEn & tiko Energy Solutions, Zurich/Switzerland;
P	G0410	**The influence of the World and European football championships on the electricity consumption diagram (load curve) of the Republic Croatia**	Petar Ribaric, Davor Bošnjak HEP, Zagreb/Croatia;
P	G0411	**Exploring the Potential of Quantum Computing** **for Electrical Power System Optimization**	Zlatko Ofak (1), Dino Mileta (1), Tin Bobetko (1), Dario Jukić (2), Karlo Lelas (3), Hrvoje Buljan (4) (1) Uprise d.o.o, Zagreb/Croatia; University of Zagreb, Zagreb/Croatia, (2) Faculty of Civil Engineering, (3) Faculty of Textile Technology, (4) Faculty of Science;
P	G0412	**Developing the DSO role using local flexibility markets** **for long-term, short-term and real-time operations**	Svein Jørgen Sønning NODES AS, Lysaker, Oslo/ Norway;
16:35		Short bio break	

24/7 ZEN

G05 Co-creating the Future
sponsored by **24-7zenproject.eu**

5 min presentation & common Q&A

Session-chair: **Christoph Imboden, Michael Moser**

G0501	**Equigy:** **European collaboration for distributed flexibility**	Raphael Wu, Lyuba Schulz Swissgrid Ltd, Aarau/Switzerland;
G0502	**DigIPlat:** **Transboundary Exchange in Flexibilities in D-A-CH**	Albrecht Reuter Fichtner IT Consulting GmbH, Stuttgart/Germany;
G0503	**ENFLATE:** **Market-based procurement of grid-friendly flexibility**	André S. Eggli (1), Sébastien Rolland (2), Christoph Imboden (1), Davide Orifici (2) (1) Lucerne University of Applied Sciences and Arts, Lucerne/Switzerland; (2) European Power Exchange EPEX SPOT, Paris/France;
G0504	**A Case Study for Unveiling Flexibility Options** **in Achieving Swiss National Energy Goals**	Olena Levon (1), André Eggli (2), Christoph Imboden (2) (1) HSLU, Institute of Electrical Engineering, Horw/Switzerland; (2) HSLU, Institute of Innovation and Technology Management, Horw/Switzerland;
G0505	**Flexibility provision from local energy communities exemplified** **by the SUSTENANCE and SERENE H2020 projects**	Birgitte Bak-Jensen (1), Rakesh Sinha (1), Sanjay Chaaudhary (1), Hessam Golmohamadi (1), Gerwin Hoogsteen (2), Aditya Pappu (2), Bahman Ahmadi (2), Richard van Leeuwen (3), Javier F. Gonzales (3); Patryk Chaja (4), Weronika Radziszewska (4), Zakir Rather (5) (1) Aalborg University, Energy, Aalborg East/Denmark; (2) University of Twente, Faculty of Electrical Engineering, Mathematics & Computer Science, AE Enschede/Netherlands; (3) Saxion University of Applied Science, Sustainable energy systems, DH Deventer/Netherlands; (4) Institute of Fluid-Flow Machinery, Polish Academy of Science, Gdansk/Poland; (5) Indian Institute of Technology Bombay, Mumbai /India;
G0506	**Q&A to the Project Presentations I**	Christoph Imboden (1), Michael Moser (2) (1) Lucerne Uni of Applied Sciences & Arts, Horw/Switzerland; (2) Swiss Federal Office of Energy, Bern/Switzerland;
G0507	**VPP implementations:** **Different types of services developed, experiences and platforms**	Gary Howorth, Ivana Kockar Electronic and Electrical Engineering Dept, University of Strathclyde, Glasgow/UK;
v G0508	**Empowering Prosumers in the Energy Transition:** **The REEFLEX Approach to Flexibility Markets and Improved Grid Management**	Gregorio Fernández (1), Asier Rueda (1), Lorena Elorza-Uriarte (1), Marcos Remiro-Cinca (1), Georgios Skaltsis (2) (1) CIRCE Technology Centre, Zaragoza/Spain; (2) CERTH ITI, Thessaloniki/Greece;
G0509	**Opentunity creates Opportunities:** **NODES™ Flexibility Market solutions in Greece, Switzerland and Spain**	Gesa Milzer NODES AS, , Lysaker, Oslo/ Norway;
G0510	**Q&A to the Project Presentations II** **Summary of the day & outlook**	Christoph Imboden (1), Michael Moser (2) (1) Lucerne Uni of Applied Sciences & Arts, Horw,/Switzerland; (2) Swiss Federal Office of Energy, Bern/Switzerland;

18:00 **End** of sessions

19:30 **GSM Network Dinner**

22:00 **Return to Lucerne, boat standing until 23.00**

Tuesday, 2 July

08:30 On-site GSM registration

09:00 G06 ADVANCED TECHNOLOGIES PROVIDING FLEXIBILITY II

Session-chair: **Carlo Alberto Nucci, Christoph Imboden**

K G0601	**Local Energy Communities**	Nikos Hatziargyriou National Technical University of Athens, Athens/Greece;
G0602	**A V2G Business Case in the Netherlands**	Baerte de Brey ElaadNL, Arnhem/The Netherlands;
G0603	**The value of flexibility** **for electrolyzers and the electricity system**	Simon Hedegard Jensen Energinet (Danish TSO), Fredericia/Denmark;

10:30 Coffee break& poster visit

11:00 G07 ENABLING TECHNOLOGIES II & Operation and Regional Coordination

Session-chair: **Nikos Hatziargyriou, Thomas Kudela**

G0701	**Sector coupling for renewable energy sources integration** **A case study for the German gas transmission network**	Luisa Di Francesco (1), Marco Cavana (1), Yifei Lu (2), Pierluigi Leone (1), Andrea Benigni (2) (1) Politecnico di Torino, Department of Energy “Galileo Ferraris”, Torino/Italy; (2) Forschungszentrum Jülich, IEK-10: Energy Systems Engineering, Jülich/Germany;
G0702	**UrbanTwin:** **Development of Local Energy Strategy and Grid Infrastructure 2050**	Pål Forr Austnes (1), Riccardo Saporiti (2), Catarina G. Braz (3), Bingqian Liu (3), Luc Girardin (3), Mario Paolone (1), Fabio Nobile (2), François Maréchal (3); EPFL Switzerland: (1) Distributed Electrical Systems Laboratory – Power Systems group, Lausanne; (2) Scientific Computing and Uncertainty Quantification, Lausanne; (3) Industrial Process and Energy Systems Engineering Group, Sion;
G0703	**Managing and optimizing a set of photovoltaic installations** **at the low-voltage grid level: A data-driven concept through** **Machine Learning models and spatio-temporal modeling**	Thibaud Alt (1), Beat Wolf (2), Jean-Philippe Bacher (3), Frédéric Montet (2) (1) Groupe E SA, Granges-Paccot/Switzerland; (2) iCoSys institute, HES-SO University of Applied Sciences and Arts, Fribourg/Switzerland; (3) ENERGY institute, HES-SO University of Applied Sciences and Arts, Fribourg/Switzerland;
G0704	**Interoperability by Sovereign** **and Secure Data Exchange in Trustworthy Data Spaces**	Andreas Rumsch, Eugen Rodel, Christoph Imboden Lucerne University of Applied Sciences and Arts, Horw/Switzerland;

12:20 Lunch break and coffee in the poster area

13:05 **POSTER SESSION**

Session-chair: **Christoph Imboden**

13:50 G08 GRID SERVICE OPERATION

Session-chair: **Andreas Svendstrup-Bjerre**

G0801	**Regional Coordination Center:** **Cases and duties**	Stelios Kromlidis (1), Ioannis Kampouris (1,2) (1) SELENE-CC RCC, Thessaloniki/Greece; (2) IPTO – ADMIE TSO, Athens/Greece;
G0802	**Data-driven predictive control for demand side management:** **Theoretical and experimental results**	Mingzhou Yin (1), Hanmin Cai (2), Andrea Gattiglio (2), Fazel Khayatian (2), Roy S. Smith (1), Philipp Heer (2) (1) Automatic Control Laboratory, Swiss Federal Institute of Technology in Zürich, Zürich/Switzerland; (2) Urban Energy Systems Laboratory, Swiss Federal Laboratories for Material Science and Technology (Empa), Dübendorf/Switzerland;
G0803	**Assesment of economic surplus** **of the European balancing platforms**	David Steber (1), Ulf Kasper (1), Andreas Kindsmüller (1), Dominik Schlipf (2), Alexander Warsewa (2), Simon Remppis (2) (1) Amprion GmbH, System Operation - Balancing, Pulheim/Germany; (2) TransnetBW GmbH, System Operation - Balancing, Wendlingen/Germany;

14:50 Coffee break& poster visit

15:15 G09 FUTURE OF GRID SERVICE MARKETS II

Session-chair: **Carlo Alberto Nucci, Christoph Imboden**

G0901	**Meeting Ireland's 2023 30% Flexibility Targets:** **The Regulatory Approach**	Robert O'Rourke CRU, Dublin/Ireland;
K G0902	**The energy transition requires the convergence of SmartGrids & Smart Renewables with the rest of the Energy system enabled by AIOT**	Maher Chebbo UNIVERS, Courbevoie/France;

16:10 CLOSING

G0903	**Final Discussion & Active Summary**	Christoph Imboden & Board Members Lucerne Uni of Applied Sciences & Arts, Horw/Switzerland
G0904	**Closing**	Christoph Imboden (1), Michael Spirig (2), Olivier Bucheli (2) (1) Lucerne Uni of Applied Sciences & Arts, Horw, (2) European Electrolyser & Fuel Cell Forum AG, Lucerne/Switzerland

16:50 **End of sessions & end of official part of GSM Symposium**

Networking possibilites on Tuesday evening

18:00 **EFCF Welcome Reception: GSM participants are kindly invited by EFCF**

19:00 **End GSM 2024**

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GSM 2024

KKL Lucerne, 1 – 2 July

Grid Service Market Symposium

featuring: Grid Flexibility & Business

Invited Speakers & Presentations

G0902

Dr. Maher Chebbo, Managing Director Europe at UNIVERS, Norway

www.univers.com

Speech: The energy transition requires the convergence of SmartGrids & Smart Renewables with the rest of the Energy system enabled by AIOT

In 2050, EU carbon-neutral and especially renewable energy alternatives to fossil fuels are to be implemented for all energy needs. The use of crude oil for all domestic, commercial, industrial, buildings, cities and mobility needs is marginal thanks to the substitution of crude-oil with wind, solar, hydro, hydrogen, geo-storage, biomass, biofuels and other renewable energy sources, such as CO2-free electricity for cars, trains, urban buses and delivery trucks.

Massive & immediate sustainability investments are required in SmartGrids, Renewables (Wind, Solar, Hydro, Hydrogen, Geo-storage, Virtual Power Plants), Smart Cities (Smart Buildings, Green Transportations such as Green Ports, Green Airports, Green Railways, Batteries Giga-factories & Industrial Parks), eMobility & Carbon Lifecycle Management for Enterprises, Districts, Cities and Nations. Digital & Clean Technology Platforms, like EnOS platform, support these massive & immediate investments towards the journey to Net Zero and accelerate the transition to a more sustainable world by combining energy data, non-energy data, carbon data, well-being data and economics data covering CAPEX, OPEX, NPV, IRR and fully measurable outcome-based-financing.

Bio: Maher acted in Global and EMEA Senior Executive roles within large Corporates (GE Digital, SAP, Cap Gemini) as well as successful Startups (accenta.ai), Digital, AI and Data Science, Energy, Telecommunications, Manufacturing, Mobility & Cleantech (Renewables, Batteries & BESS, Green Hydrogen, Green Ammonia, Smart Cities, Smart Building, Geo-Storage, EV Charging, Carbon Management). He is currently Managing Director for Europe at Univers.

Maher is a non-Executive Board member of Elisa, Telecom operator of Finland.

Maher has been President of ESMIG (European Smart Metering Industry Group), is a member of the Council of Engineers for Energy Transition of UN (CEET) and is chairing the digital batteries task force at Batteries Europe.

Maher's areas of expertise are AI, ML, AIOT, Blockchain, SmartGrids, Cleantech, Smart Renewables, Smart Cities, SaaS, PaaS, Cloud, AI, AIOT, ML, Cyber Security, and Data Science.

G0603

Baerte de Brey, Chief International Officer within Elaad, NL

www.REScoop.eu

Speech: Technical & regulatory lessons learned from scaling up V2G in different EUropean countries

Bio: Baerte works at Stedin, a Dutch DSO on e-mobility, and is the Chief International Officer within ElaadNL. Responsible for analyzing the long-term effect of electric mobility on the electricity grids, Baerte helps building a sustainable business case around this transition. This includes vehicle2grids, EV-storage and cyber security. He graduated from Leiden University in 2001 with a law degree and received a MBA from Nyenrode Business University in 2006. On behalf of Stedin, he is one of the executive board members of ElaadNL, the knowledge and innovation center in the field of (smart) charging infrastructure. As an expert for the European Commission, he sometimes reviews collective European programs concerning EV interoperability and smart charging. In his spare time he is Vice-President of Avere, the European Association for e-mobility.

G0301

Maurice Dierick, Head of Development and Projects at Alpiq, Switzerland

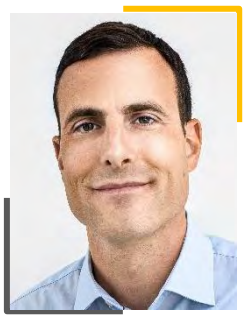
www.alpiq.com

Speech: Grid services and wholesale markets: the missing link

Grid services are focused on relatively short timelines, from seconds to several hours. For a successful energy transition, it is clear that long-duration, commercial energy storage will be needed. But what about the time horizon of several hours to several days? Although a number of technologies have reached industrial readiness maturity, it is not clear whether under the current regulatory framework, there is a business case that allows for sufficient investment in these solutions. So, should this perhaps be considered as a new category of grid services, to be provided under market conditions rather than under a subsidy model?

Bio: Maurice Dierick, Dipl. Ing. Maschinenbau, is Head Development & Projects at Alpiq. Prior to this, he was the Head of Market at Swissgrid and a member of the Board at ENTSO-E. From 1998 to 2015, he worked as a consultant in the energy sector, supporting various transformation projects in the field of asset management at German, French, Australian and Swiss power companies. He started his career as an engineer at major industrial companies in France and Germany.

G0403



Stefan Dörig, Head of Regulatory and Public Affairs, tiko Energy Solutions, Switzerland

www.tiko.energy

Speech: Resolving grid congestion with non-wire solutions

Grid congestions will soon become a European challenge. An EU strategy is needed, focusing on harmonized approaches, promoting non-wire solutions, and complementing existing EU rules if necessary. To support this strategy actions are required, including improving planning processes, incentivizing operational investments, implementing cost-reflective network tariffs, promoting local self-balancing initiatives, and developing a dedicated data exchange layer for efficient grid management.

Bio: Stefan Dörig is Member of the management board at tiko Energy Solutions and Chairman of the board at smartEn. Supporting swisscleantech Association with Public Affairs. Former Energy Counselor at the Mission of Switzerland to the European Union. Historian and economist. Part-time politician and proud owner of a Maltese dog called Patron.

G0704

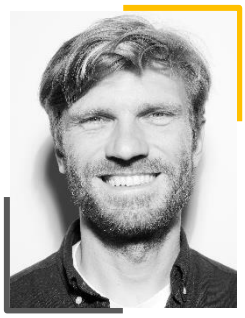
Simon Hedegård Jessen, Energy Systems Engineer, Energinet, Danish TSO

www.energienet.dk

Speech: The value of flexibility for electrolyzers and the electricity system

The expected massive integration of variable renewable electricity production requires implementation of flexible consumption, to meet the ambitious climate goals.
This presentation highlights how to unlock flexibility from electrolyzers, hence, quantifying the value of operating the electrolyzers dynamically. With regard to flexibility, it is often the implicit flexibility, i.e. reacting on day-ahead price signals, that is in focus. However, explicit flexibility from electrolyzers is anticipated to enable cost-efficient balancing of a 100% renewable-based electricity system. Therefore, the presentation will promote active participation in ancillary service markets (explicit flexibility), to showcase the value proposition for the electrolyzer owners and magnify their business cases.

Bio: Simon Hedegård Jessen is an energy systems engineer at the Ancillary Service department of the Danish TSO, Energinet. His work is dedicated towards developing and designing ancillary service requirements for the successful transition of the energy system transformation. His focus is particularly on evaluation and analysis of PtX integration, hydrogen backbone development and compatibility with ancillary service markets, respecting legal-, economical- and technical aspects. Prior to joining the Ancillary Service department of Energinet, he has been studying BSc and MSc in energy systems engineering at University of Southern Denmark.



Thomas König, Regulatory Expert, enspired GmbH, Vienna, Austria

www.enspired-trading.com

Speech: Industry's critical perspective on the Network Code on Demand Response

In many cases relying on existing assets and infrastructure is more sustainable than building new ones. When applying this principle on the energy transition, considering higher utilization of the small-scale flexibility from households, commerce and services seems essential: In Germany e.g., this makes up over half of the power consumption. Additionally, there is over 10 GWh capacity of power storage installed in households. With a growing number of heat pumps and electric vehicles consumption will rise significantly – as well as flexibility supply.

This tremendous amount of flexibility has not been unleashed but there lies a great chance for consumers to source their energy at lower cost. At the same time, it is a great chance for aggregators and traders to develop new business models. But they have to be brought together: and this is where the Network Code unfolds its strengths. It gives guidelines for processes for system operators, suppliers, and service providers, but also requirements for respective stakeholders to enable Demand Response.

However, Consumers are only onboarded on that journey if it pays off. Hence, all action taken need to be converted into one price signal for the consumers to react. Also, the price signal does not come out of the

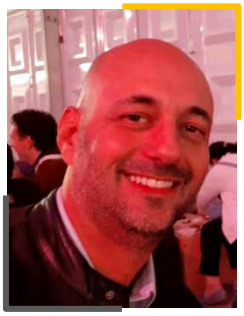
blue – it requires the effort of many stakeholders in the background. Whereas the power producing and consuming assets are already in place, the surrounding infrastructure for measuring/aggregating is not. Building this infrastructure requires large Investments and which have to return. These Investments will only be taken, when providers of those services are rewarded adequately.

The basis for that is trust in markets and the Network Code on Demand Response will be measured upon that. And again, it will be the price signal leading to success and everything that distorts it should be limited to absolute needs of system security. Here we can take a closer look from a trader's point of view on the;

- *Interactions between (local) markets on one side and foreseen possibilities like Flexible Connection Agreements, rule-based Redispatch and so-called temporary limits on the other side*
- *effects of coordination between markets*
- *market design of local markets*

Bio: Thomas König is Regulatory Expert at enspired and in his Role as Representative for Energy Traders Europe part of the Drafting Committee of the Network Code on Demand Response. His past thirteen years in the Energy Branch circled around short term markets but from different viewpoints. Starting very operatively with power plant dispatch and Intraday trading at Iqony (formerly Steag) he later focused on the conditions to make that happen: engaging in the regulatory world being an internal advisor and representative in associations like BDEW and Energy Traders Germany. Another angle was taken during his work for Amprion in International Regulations before entering enspired.

G0801



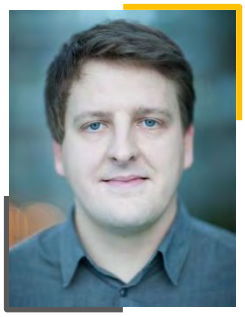
Dr. Stelios Kromlidis, Director of Operational Business Department, SEleNe, Greece

www.selene-cc.eu

Speech: Regional Coordination Center: Cases and duties

Bio: Dr. Kromlidis is the Director of Operational Business Department at SEleNe-CC (in Thessaloniki) and has many years of experience in the TSO and Power industry. He has received a MSc Degree from UMIST in Power Systems Engineering and a PhD from The University of Manchester. Prior to Selene-CC he has worked at the RSC of Coreso SA (on behalf of National Grid). He has been involved in ENTSO-E projects related to CIM and CGMES and has a background on Battery Energy Storage and Power Quality Improvement. He is currently leading a team of 16 (operators, IT and admin) at Selene-CC that delivers all the RSC services.

G0402



Thomas Kudela, Regulatory Affairs Manager, Ørsted, Denmark

www.orsted.com

Speech: Provision of System Services by Offshore Wind – Experiences and outlook

New capabilities required for the energy transition

- *Case study aFRR provision*
- *Challenges for intermittent producers*
- *Ancillary Services in the future electricity system.*

Bio: Thomas Kudela is a Regulatory Affairs Manager with more than fifteen years of experience in the field of European, German, GB and Nordic energy market policy and regulation. He has experience in business development and stakeholder engagement to shape regulatory frameworks for the energy transition.

G0509

Gesa Milzer, Senior Project Manager, NODESTM AS, Oslo

www.nodesmarket.com

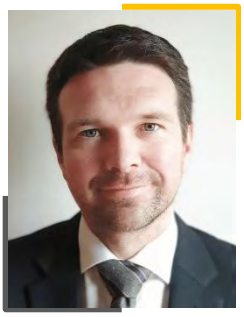
Speech: Opentunity creates Opportunities – NODESTM Flexibility Market solutions in Greece, Switzerland, and Spain

The EU Horizon project OPENTUNITY aims to improve system interoperability, secure and reliable data exchange among grid operators and prosumers using common format and system standards to reduce system integration efforts and costs via an interconnected flexibility ecosystem. Flexibility markets are an important component to such an ecosystem as they enable grid operators to use distributed flexibility to manage their grids while Flexibility Service Providers can monetize on their flexibility availability. Flexibility markets may thus improve grid resiliency and help to optimize operational costs while avoiding expensive grid investments.
NODESTM market and technology solutions facilitate access to flexibility across all grid levels and coordination among grid operators to utilize the currently unused flexibility potential.

In the Opentunity flexibility market pilots in Spain, Switzerland, and Greece NODESTM presents market solutions to enable the use of distributed flexibility for grid services while providing a level playing field for all asset types.

Bio: Gesa Milzer is Senior Project Manager at NODESTM with focus on continental Europe. She started working in the energy sector at Vattenfall in 2009. In 2015, after a Ph.D. in Marine Geology, she decided to combine her environmental background and experience in the energy sector to work as International Business Manager in Power Production Forecasting at Meteológica, managing the accounts and commercial activities in the DACH region and the Netherlands.

G0901



Robert O'Rourke, Senior Manager Electricity Networks, Commission for Regulation of Utilities, Ireland

www.cru.ie

Speech: Meeting Ireland's 2030 30% Flexibility Targets: The Regulatory Approach

Ireland has ambitious renewables targets of 80% RES by 2030, mainly from wind generation. Improving the flexibility of the transmission and distribution systems, and the market, will be a key component of achieving this.

Ireland's NRA, the CRU, has been given the responsibility under the National Climate Action Plan to develop a National Energy Demand Strategy and policies to increase system flexibility to 30% by 2030.

This strategy is due to be published in Q2 2024 along with a decision on the proposed mechanism to procure local demand response and energy storage services on the distribution system as part of a wider suite of measures to procure flexibility on the electricity system.

Bio: Robert O'Rourke is the senior manager for Electricity Networks at the Commission for Regulation of Utilities in Ireland and is responsible for the economic regulation of the transmission and distribution network companies, and the integration of renewables onto the Irish system, including the design of a new ancillary services market.

G0502

Dr.-Ing. Albrecht Reuter, Managing Director of Fichtner IT Consulting GmbH and Director of Business Development Smart Grids of Fichtner GmbH & Co. KG

Speech: DigIPlat: Transboundary Exchange of Flexibilites in D-A-CH

Bio: Dr.-Ing. Albrecht Reuter began his career at Brown, Boveri & Cie AG in Mannheim overseeing the construction works of power plants, before continuing as an international energy consultant at Lahmeyer International GmbH in Frankfurt. From 1983 until 1995 he worked at the University of Stuttgart, in charge of the department dealing with “Energy Planning in Developing Countries” and “Systems Analysis” at the Institute for Energy Economics and the Rational Use of Energy (IER), where he was awarded his doctor’s degree under the supervision of Prof. Dr. Alfred Voss. Thereafter Dr. Reuter continued to become the Division Manager for Energy Management as well as a member of the Executive Board at Verbundplan GmbH in Austria. Before finally joining Fichtner IT Consulting in 2008, he was the general manager of IRM Consulting & Services GmbH in Vienna.

Albrecht Reuter is renowned throughout professional circles via his numerous publications and through his regular appearances at international conferences. He is the initiator as well as the scientific leader of the renowned Energy Talks Ossiach, an international energy conference held on a yearly basis since 1997. He is chairman of the energy committee at IHK Stuttgart and board member of iER.

G0501

Lyuba Schulz, Market Program Manager, Swissgrid, Aarau

www.swissgrid.ch

Speech: Equigy: European collaboration for distributed flexibility

As a joint venture between 5 Transmission System Operators (TSOs), Equigy aims at enabling Distributed Energy Sources (DERs) to provide services to system operators by 1) developing a data exchange platform and 2) fostering international collaboration and standardization. We will present Equigy and the related “TDC Phase B” project where a consortium of Swiss distribution system operators, aggregators and the TSO develop a concept to use DER flexibility in a coordinated and grid-safe way.

Bio: Lyuba has been involved in various topics related to the system and market design, such as grid planning or imbalance pricing. In the past 5 years her work was focused on the integration of the decentralized energy sources (DER) in electricity markets.

Dr. Anser Shakoor, leads GE Vernova's Consulting Services business in Europe

www.ge.com

Speech: No Transition Without Transmission

Energy Transition is happening across the globe at different pace in different geographies. However, most of the drivers of this transition and posed challenges are similar across different jurisdictions. There are lessons to be shared and actions to be taken now to ensure that the future systems are reliable, economic, and sustainable. Key considerations are:

- *Optimal grid planning and integration of renewable energy – lessons from the past*
- *Avoiding the derailing of decarbonization train by;*
  - *maintaining system reliability and availability of adequate system flexibility,*
  - *improved system management & control, and technological innovations*
  - *ensuring finance, appropriate market design and consumer affordability.*
- *Net Zero Target is a 'Mission Possible' – however, all low-carbon technologies and timely grid reinforcement are essential and concrete actions are required 'now'.*

Bio: Anser Shakoor is a leading expert in energy transition focusing on reliable and efficient grid integration of renewable energy and storage, economic operation of energy assets, and electricity markets. He has over 25 years of diverse experience providing strategic advisory services to utilities, large energy consumers and energy infrastructure developers/investors across Europe, South Asia, Middle East, and North America.

Dr Shakoor has led multiple high-profile projects in the energy industry including Energy Roadmap 2050 for EC & European Climate Foundation, the Smart Energy Roadmap for the UK Committee on Climate Change, Reaching Net Zero Carbon in Great Britain.

Prior to joining GE, Dr Shakoor was the Head of Energy Portfolio Management (EMEA) at Hitachi Energy, Head of Advisory (EMEA) at ABB, Manager European Power Market Outlook Analysis at AFRY (former Poyry) and a Fellow at the UK Energy Research Centre.

He holds a PhD in Power System Economics.

G0412

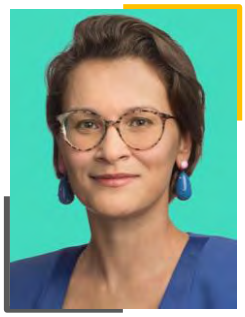
Svein Jørgen Sønning, Head of Technology at NODES

www.NODESmarket.com

Speech: Developing the DSO role using local flexibility markets for long-term, short-term, and real time operations.

Bio: Svein Jørgen is a tech and energy optimist with responsibility for NODES overall tech strategy. Ahead of joining NODESTM, he was focusing on developing novel product offerings for flexibility service providers and the grid at a vertically integrated utility in Scandinavia. Over the last years, Svein Jørgen has had a key role in expanding NODESTM flexibility markets from Europe to transformative initiatives in Canada.

G0203



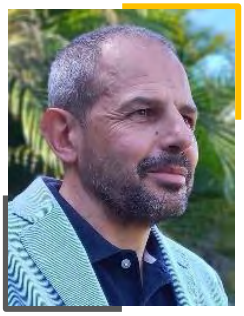
Dr. Ksenia Tolstrup, is a Principal at Magnus Energy

www.magnus.nl

Speech: Flexibility gap is looming: How do we bridge it?

The decarbonization of the European energy system will require more flexibility to ensure system stability and operational security. Yet, a flexibility gap is looming. European countries are using different approaches to bridge this gap. How are the existing flexibility services evolving to attract more providers? What new flexibility services are emerging? How do they fit with the incentives on the supply and demand side?
This talk will address these questions and will put it into a broader system perspective.

Bio: Dr. Ksenia Tolstrup co-leads Magnus Energy's Technical Advisory Practice and is involved in several projects related to electricity market and regulatory analysis, balancing, flexibility, and hydrogen transition. Ksenia has almost a decade of experience in the energy sector - in consulting and in research. As a Senior Research Engineer at AIT Austrian Institute of Technology she led multiple research projects and authored over 30 top-journal articles, conference papers and project reports. In 2021 she obtained her PhD cum laude in energy economics from Delft University of Technology.



Alberto Troccoli, Co-founder and Managing Director of WEMC, UK

www.wemcouncil.org

Speech: C3S Energy Service to ENTSO-E: Impacts of climate change in the Pan-European Climate Database (PECD)

Bio: Prof. Alberto Troccoli is the co-founder and Managing Director of WEMC and a visiting professor at the University of East Anglia (UK). He has over 25 years of experience in the fields of meteorology and climate, and in the last 10+ years has been exploring their applications in the energy, and other, sectors. His career includes time at several leading institutions such as NASA, ECMWF (UK), the University of Reading (UK) and CSIRO (Australia). He is the main author of the UN-led Global Framework for Climate Services (GFCS) Energy Sector implementation plan and the leader of the C3S Energy operational service. In addition, he has published extensively and is also the chief editor and an author of four books. Recently, he has led the development of the Teal tool (tealtool.earth), a user-friendly free interactive visualisation tool which allows global historical climate and carbon emissions data (and soon climate projections too) to be easily visualised, understandable and accessible. Its design is distinctive and modern incorporating the teal colour that gives the tool its name. It is conceived to both raise awareness about our changing climate and to be used to assist with decision making by the industry and policy makers. Alberto holds a PhD in Physical Oceanography from the University of Edinburgh (UK).

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Prof. Christoph Imboden

Institute for Innovation & Technology Management
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Christoph is professor for product innovation at the Lucerne University of Applied Sciences and Arts HSLU and Head of Research at the Institute for Innovation & Technology Management. He is engaged in several research projects focusing on power economy.

He studied electrical engineering at the ETH Zurich, received his doctorate in 1995 and an executive MBA at the University of Zurich in 2006. After working in different positions in the industry, he started working for HSLU in 2012.
Christoph has been the chair of GSM since 2017. He looks back to more than twenty years of industrial experience in different application areas of the energy, communication and information technologies.

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