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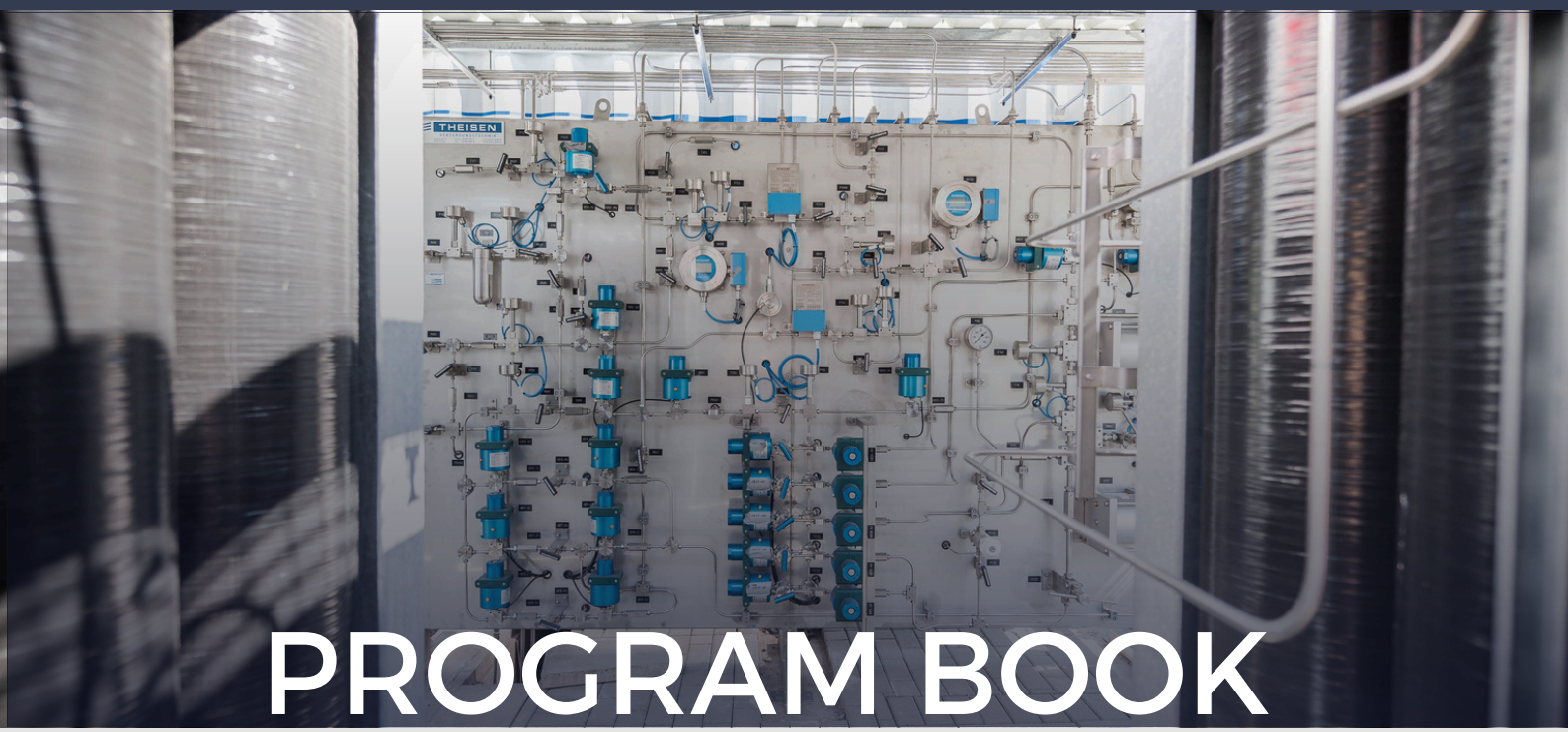
HYDROGEN ENERGY SYMPOSIUM



PROGRAM BOOK

NOVEMBER 12, 2025

SECOND ANNUAL CONFERENCE

ORGANIZED BY THE ZBT RESEARCH SCHOOL

ZBT

THE HYDROGEN AND FUEL CELL CENTER

PROGRAM

HYDROGEN ENERGY SYMPOSIUM

Agenda

Wed, 12 November, 2025

Fraunhofer inHaus-Center,
Forsthausweg 1, 47057 Duisburg

REGISTRATION OPEN FROM 8:30AM

9:00AM - 09:15AM

Welcome and Introduction

9:15AM - 10:00AM

Keynote Lecture
Prof. Dr. Ulrike Krewer

10:00AM - 10:45AM

Session 1: **Energy Carriers**
2 Short Talks

Coffee Break

11:15PM - 12:30PM

Session 2: **Fuel Cells**
4 Short Talks

LUNCH BREAK

1:45PM - 3:30PM

Session 3: **Catalysts**
5 Short Talks

Coffee Break

4PM - 4:45PM

Session 4: **Electrolysis**
2 Short Talks

Group photo session

5PM - 5:45PM

Keynote Lecture
Prof. Dr. Hubert Gasteiger

5:45PM - 7:15PM

Poster Reception with Drinks and Food

CALL FOR ABSTRACTS

SUBMIT AN ABSTRACT FOR A SHORT TALK OR POSTER

We invite researchers from all fields related to hydrogen technologies to contribute an abstract outlining the motivation, methods, results and conclusions of their research.

Authors of selected abstracts will be invited to give a short oral presentation.

Others might be offered the chance to present a poster at the symposium.

Topics of interest include (but are not limited to):

- **Functional Materials and Electrochemical Systems**
- **Hydrogen Storage, Transportation, Safety and Regulations**
- **Fuel cells and Electrolyzers**
- **Hydrogen Applications in Mobility, Industry, and Energy Systems**

Submit your abstract of no more than 300 words online:

https://indico.h2fc.center/event/29/abstracts/

The Call for Abstracts was closed on July 20

KEYNOTES

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KEYNOTE #1

9:15 AM - 10 AM

Prof. Dr. Ulrike Krewer

Karlsruhe Institute of Technology

“Electrolysis: Revealing Kinetic and Transport Limitations”

© TUM

KEYNOTE #2

5 PM - 5:45 PM

Prof. Dr. Hubert Gasteiger

Technical University of Munich

„Single-Cell Based Accelerated Stress Tests for PEM Fuel Cells”

COORDINATION

Feel free to address any questions about the Symposium to:

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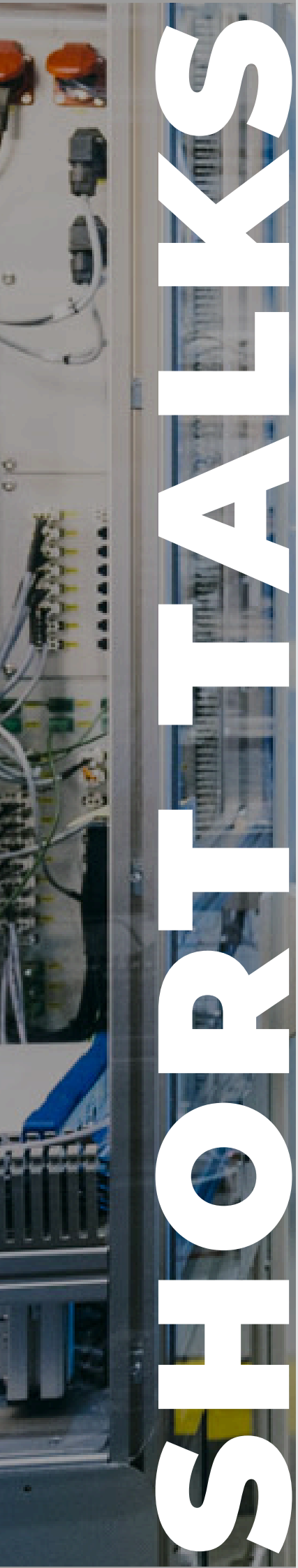
The symposium is organized by

ZBT
RESEARCH SCHOOL

ORGANIZERS



SESSION 1:
ENERGY CARRIERS
10:00 AM - 10:45 AM

SHORT TALKS (15 min)

10:00 AM

- **Allan Babu (Ruhr University Bochum)**

Coauthors: Mario Corbalan; Tito Gehring; Ramineh Rad; Mira Gamache; Daniel Siegmund; Ulf-Peter Apfel

Coupled bioelectrochemical production of e-fuels and high-value chemicals from waste gases and wastewater

10:20 AM

- **Jannik Plass (ZBT)**

Coauthors: Michael Steffen; Fausto Tidona; Max Zinnemann

Model-based investigation of chemical quenching for product gas temperature reduction in ammonia cracking

SESSION 2:
FUEL CELLS
11:15 AM - 12:30 PM

SHORT TALKS (15 min)

11:15 AM

- **Sandra Temmel (INEM, HS Esslingen)**

Coauthors: Jannis Baehr; Sachin Hegde; Ralf Wörner

Optimizing Fabrication Routes for Uniform, High-Performance catalyst coated membranes for proton exchange membrane fuel cell applications

11:35 AM

- **Dennis Tonder (ZBT)**

Coauthors: Sebastian Brokamp; Marco Grundler; Paul Stannek

In-Situ Testing of Extrusion-Based Compound Bipolar Foils for PEM Fuel Cell Stacks

11:55 AM

- **Markus Schilling (Technical University Munich)**

Coauthor: Vivian Meier; Matthias Hanauer; Ulrich Berner; Hubert A. Gasteiger

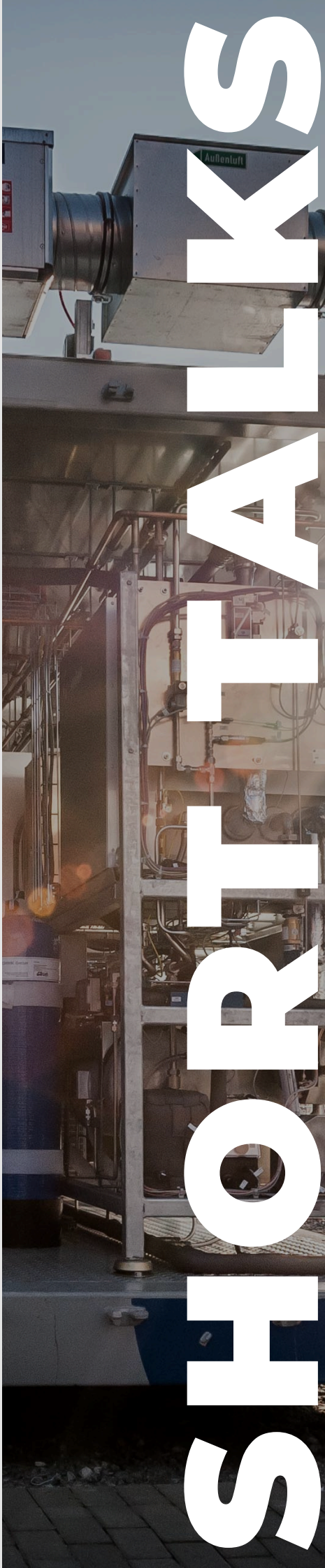
In Situ Recovery Procedure to Remove Cationic Contaminants in a PEM Fuel Cell

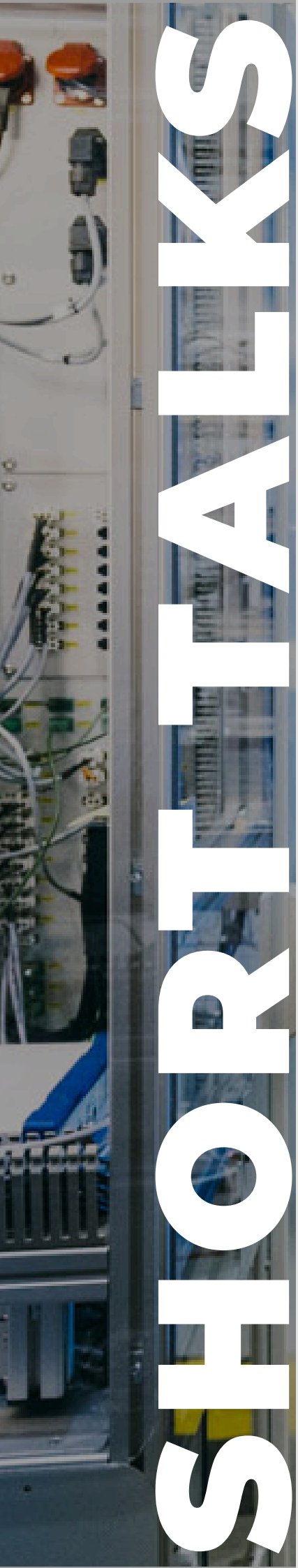
12:15 PM

- **Yawen Zhu (University of Duisburg-Essen)**

Coauthors: Doris Segets; Fatih Özcan

Developing the half-cell setup as a rapid method to examine the effect of process-related parameters on electrochemical performance





SESSION 3:
CATALYSTS
1:45 PM - 3:30 PM

SHORT TALKS (15 min)

1:45 PM

- **Mareike Sonder (Karlsruhe Institute of Technology)**

Coauthor: Rui Huang; Philipp Röse; Jan-Dierk Grunwaldt; Ulrike Krewer

The Effect of Cerium on the Oxygen Evolution Reaction Kinetics in Iridium-Based Oxides for PEM Water Electrolysis

2:05 PM

- **Vimanshu Chanda (ZBT)**

Coauthors: Sebastian Hirt; Natalia Levin; Viktor Mackert

Enhancing the Activity and Stability of MnO2 for Acidic Oxygen Evolution via Synergistic Doping with Niobium and Fluorine

2:25 PM

- **René Jahn (ZBT)**

Coauthors: Alexander Ahrend; Bastian Kaufmann; Olaf Keßler; Angela Kruth; Moritz Pilaski; Abdullah Riaz; Herrmann Seitz; Marcel Wetegrove

Raney Nickel Supported High Entropy Alloy as HER Catalysts in AEM Water Electrolysis

SHORT TALKS (15 min)

2:45 PM

- **Najeeb Hasnain (MPI for Chemical Energy Conversion)**

Coauthors: Ricardo Martínez-Hincapié; Ulrich Hagemann; Adarsh Jain; Doris Segets; Ioannis Spanos

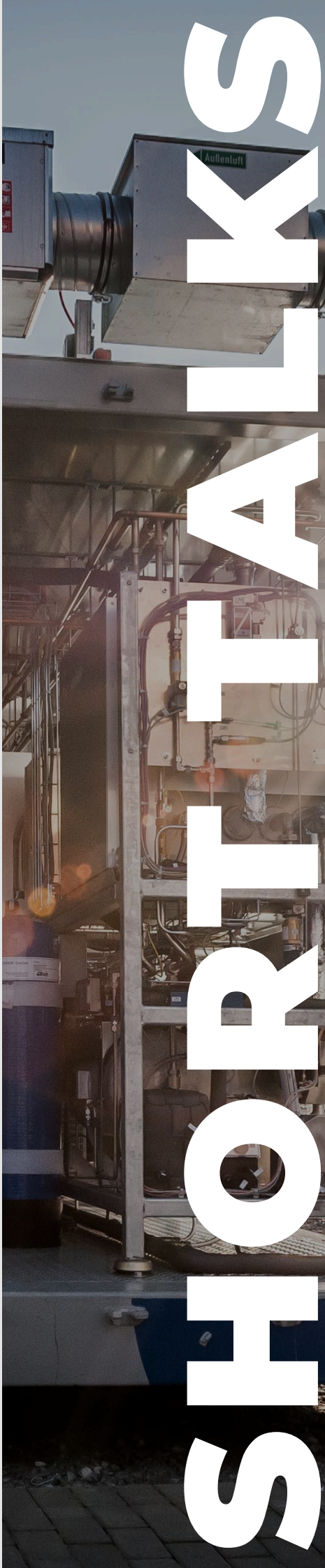
Influence of Surface Defects, Oxygen Groups, and Alkali Metals on H_2O_2 Generation at Carbon Electrodes

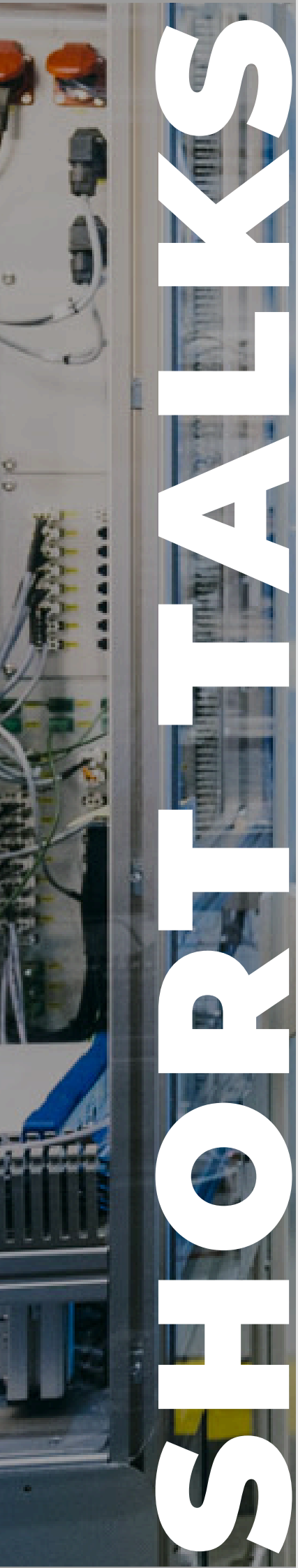
3:05 PM

- **Benjamin Mockenhaupt (University of Duisburg-Essen)**

Coauthors: Corina Andronescu; Florian de Kock; Jing Li; Paula Perroni; Stephan Barcikowski; Ioannis Spanos

The influence of membrane degradation products on nickel catalyst activity in alkaline water electrolysis





SESSION 4:
ELECTROLYSIS
4 PM - 4:45 PM

SHORT TALKS (15 min)

4:00 PM

- **Debora Brinker (Karlsruhe Institute of Technology)**

Coauthor: André Weber

Identifying the Loss Processes Contributing to the Overall Cell Performance in PEM Water Electrolysis by the Distribution of Relaxation Times

4:20 PM

- **Bastian Kaufmann (ZBT)**

Coauthors: Miriam Hesse; Alexandra Muskatewitz; Moritz Pilaski

Integrated reference electrode for AEM-WE MEA-characterization

POSTERS

Can be exhibited during the whole day. Dedicated Poster Session starts at 5:45pm

#1

- **Florian Kuschel (ZBT)**

Coauthors: Lukas Feierabend; Natalia Levin

Machine learning-driven design of advanced AST protocols for accurate lifetime forecasting of electrolyzers

#2

- **Inci Nur Sahin (University of Duisburg-Essen)**

Coauthors: Ulf Peter Apfel; Sepideh Izadi; Andrzej Mikula; Kevinjeorjios Pellumbi; Gabi Schierning; Mathias Smialkowski

Pentlandite for Green Hydrogen? Linking Electron Transport Properties to Catalytic Activity in HER

#3

- **Ricarda Sophie Scheich (ZBT)**

Coauthors: Thorsten Notthoff; Susanne Palecki

Freeze damage in PEMFC for heavy-duty applications and strategies for safe use at subfreezing temperatures

#4

- **Christina Meinert (University of Duisburg-Essen)**

Coauthors: Timo Wagner; Vineetha Vinayakumar; Nicolas Wöhrl; Doris Segets; Axel Lorke

Coral-like structures on Nickel Surfaces Obtained by Remote Nitrogen Plasma Treatment

#5

- **David Diaz (University of Duisburg-Essen)**

Effect of hydrogen diffusion on tribological behavior for 42CrMo4 steel

#6

- **Holger Kraus (ZBT)**

Coauthors: Jörg Karstedt; Lars Kühnemann

PowerPaste – Next-Generation Mobile Hydrogen Supply

#7

- **Stephan Michler (INEM, HS Esslingen)**

Coauthors: Sandra Temmel; Rafael Baltoglou; Ralf Wörner; Daniel Ölschläger

Ink Matters Meets Membrane Pre-Treatment: Optimizing Ni-CCMs for Performance testing in AEM Electrolysis

#8

- **Margot Olde Nordkamp (Saxion University of Applied Sciences)**

Coauthors: Lukas Feierabend; Florian Kuschel; Kirill Resnikow

A Literature-Based Overview of Degradation Pathways and Models in Low-Temperature Water Electrolyzers

#9

- **Alexandros Perrakis (ZBT)**

Coauthors: Marco Grundler

Extrusion of highly thermally and electrically conductive Polyphenylene sulphide (PPS)-Graphite compound Plates

#10

- **Jan Strater (ZBT)**

Coauthors: Julian Kapp; Verena Lukassek; Viktor Mackert; Susanne Palecki

Structural degradation in PEM fuel cells under repeated cold start cycling

#11

- **Sk. Riad Bin Ashraf (University of Duisburg-Essen)**

Coauthors: Tan Gurpinar; Bernd Noche

Blockchain-Based Weld Certification for Green Hydrogen Infrastructure in Steel and Chemical Industries

#12

- **Dino Woelk (Westfälische Hochschule, University of Applied Sciences Gelsenkrichen)**

Coauthors: Mitja Wiedemann; Maximilian Cieluch; Sahin Ergüven; Norbert Kazamer; Christopher Schaak; Poroshat Haddadi; Christian Elieser Höß; Marcel Peichert; Manfred Kunrath; Andreas Bund; Clemens Pollerberg; Michael Brodmann

Multilayer Ni-NiFe electrode structures for AEM water electrolysis produced by powder metallurgy and electrochemical deposition

#13

- **Maximilian Cieluch (Westfälische Hochschule, University of Applied Sciences Gelsenkrichen)**

Coauthors: Leonard Böhm; Norbert Kazamer; Florian Wirkert; Ulf Peter Apfel; Michael Brodmann

Enhancing Anion-Exchange-Membrane Water Electrolysis via advanced electrodeposition of porous NiFe structures

#14

- **Elisabeth Verweyen (ZBT)**

Coauthors: Sebastian Hirt; Natalia Levin; Moritz Pilaski; Pascal Sous

Testing the applicability of compound-based bipolar plates in proton as well as anion exchange membrane water electrolysis

#15

- **Amir Najafi (ZBT)**

Coauthors: Lars Kühnemann, Pascal Sous

Development and Validation of a Modular Single-Cell Test Platform for PEM Electrolysis for Systematic Component Evaluation

#16

- **Salman Fettah (ZBT)**

Coauthors: Mounir Kouachi; Lars Kühnemann

Development of a Dispensed Silicone Sealing Solution for Compound Bipolar Foils in PEM Fuel Cells

#17

- **Ruben Bueno Villoro (Ruhr Universität Bochum)**

Coauthors: Christian Liebscher; Claudio Pistidda; Christina Scheu; Ava Karami; Yuanyuan Shang

Unravelling the Impact of Microstructure and Impurities on the properties of FeTi for hydrogen storage

#18

- **Pascal Sous (ZBT)**

Coauthors: Sebastian Hirt; Natalia Levin

Influence of PTL properties on the performance of PEM Water Electrolysis

#19

- **Hesham Solh (ZBT)**

Coauthors: Sebastian Hirt; Natalia Levin; Pascal Sous

Impedance Spectroscopy for PEM Water Electrolysis: Equivalent circuit modelling vs. Distribution of Relaxation Times Analysis

#20

- **Saiqa Hafeez (Fraunhofer-UMSICHT, Ruhr University Bochum)**

Coauthors: Julia Jökel; Ulf-Peter Apfel

Optimization of Decal Transfer Method for Anion Exchange Membrane Water Electrolysis (AEMWE)

#21

- **Leonard Böhm (Westfälische Hochschule)**

Coauthors: Ulf-Peter Apfel; Michael Brodmann; Maximilian Cieluch; Norbert Kazamer; Florian Wirkert

Optimized cathodes for Anion Exchange Membrane Water Electrolysis via NiMo electrodeposition on carbon nano fiber support material

#22

- **Ali Raza Khan (Max Planck Institute for Chemical Energy Conversion)**

Coauthors: Corina Andronescu; Muhammad Usman Anwar; Steffen Franzka; Stefan Kleszczynski; Bhawana Kumari; Ricardo Martínez-Hincapié; Jan Wegner; Viktor Čolić

Additively Manufactured 3D Ni Electrodes: Geometry-Dependent Electrochemical Performance for Glycerol Oxidation

#23

- **Marco Brand (Westfälische Hochschule, University of Applied Sciences Gelsenkrichen)**

Coauthors: Michael Brodmann; Daniel-Wladimir Donnerstag; Tim Hülser; Norbert Kazamer; Frederik Kunze; Mathias Spree; Florian Wirkert

Enhancing proton exchange membrane electrolysis (PEMEL) with resource-efficient perovskite and graphene-based membrane electrode assemblies

#24

- **Fatih Özcan (Universität Duisburg-Essen)**

Coauthors: Lars Grebener; Ahammed Suhail Odungat; Yawen Zhu; Oliver Pasdag; Ivan Radev; Edward Nürenberg; Adalbert Kubina; Volker Peinecke; Sebastian Kohsakowski; Doris Segets

From Ink Design to Microstructure: A Multi-Scale Approach to CCM Fabrication for PEM Fuel Cells

#25

- **Usman Naeem (Helmholtz Institute Erlangen-Nürnberg for Renewable Energy)**

Coauthors: Serhiy Cherevko; Gabriel Christiano da Silva; Olga Kasian; Karl Mayrhofer

Tracking Iridium Dissolution and Retention Pathways as a Function of Catalyst Loading in PEMWE

#26

- **Miriam Hesse (ZBT)**

Coauthors: Bastian Kaufmann; Ivan Radev; Şeniz Sörgel; Thomas E. Müller; Ulf-Peter Apfel; Mila Manolova

Ni-S-Based Catalysts for PGM-Free Water Splitting in Anion Exchange Membrane Electrolyzers

#27

- **Ava Karami (Max-Planck Institute for Sustainable Materials)**

Investigating the Impact of Impurities in Recycled TiFe Alloys on Microstructure and Hydrogen Storage Performance

#28

- **Fausto Tidona (ZBT)**

Coauthors: Katharina Beck; Lena Engelmeier; Ceyhun Oskay; Michael Steffen

Degradation and Failure Mechanisms of High-Temperature Structural Materials in Ammonia Cracking Systems

#29

- **Max Zinnemann (ZBT)**

Coauthors: Jannik Plass; Michael Steffen; Fausto Tidona

Model-Integrated Simulation of an Electrically Heated Ammonia Cracker Using a Custom Multiphysics Framework

#30

- **Dominik Schojda (University of Duisburg-Essen)**

Coauthors: Lena Engelmeier; Jannik Plass; Juergen Roes; Fausto Tidona

Simulation–Experiment Correlation for a Thermally Segmented Ammonia Cracker: Multiphysics Validation and Design Implications

#31

- **Andre Oliveira (Max Planck Institute for Chemical Energy Conversion)**

Coauthors: Ali Raza Khan; Viktor Čolić

Role of Support Materials in Modulating the Electrochemical Activity of Lanthanum Cobalt Oxide Perovskite for the OER

#32

- **Elias Klarhorst (ZBT)**

Coauthors: Lukas Feierabend; Jens Wartmann

Model-Based Analysis of Absorption-Enhanced Ammonia Production Powered by Renewable Energy

#33

- **Muhammad Munawar (MPI for Sustainable Materials and University of Duisburg-Essen)**

Coauthors: Rossitza Pentcheva

Insights into Hydrogen-Induced Reduction of Maghemite and Hematite: A Comparative DFT Perspective