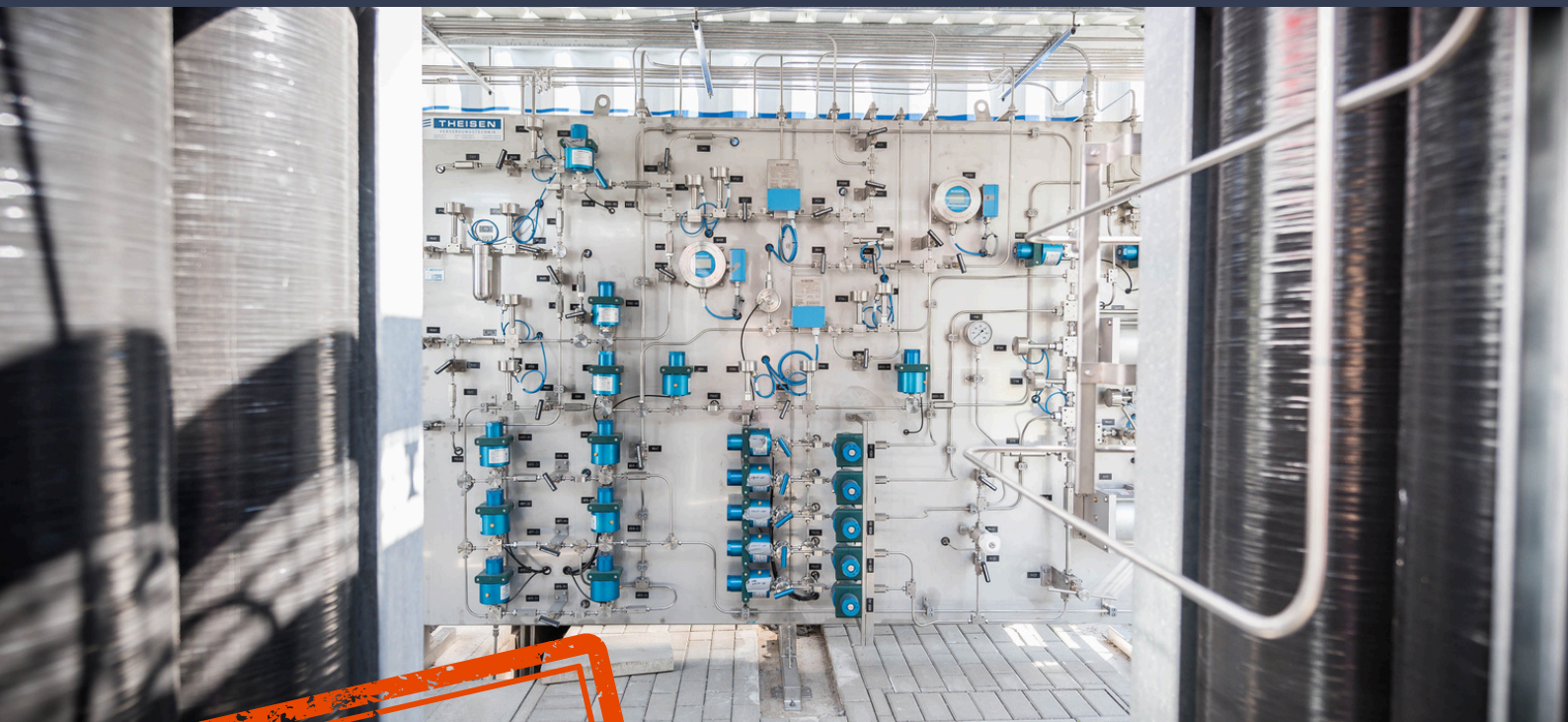


HYDROGEN ENERGY SYMPOSIUM



preliminary program
booklet (Ver: 2024-09-17)

OCTOBER 30, 2024

FIRST OCCURENCE OF AN ANNUAL SYMPOSIUM

ORGANIZED BY THE ZBT RESEARCH SCHOOL



THE HYDROGEN AND
FUEL CELL CENTER



HYDROGEN ENERGY SYMPOSIUM

----- Preliminary Agenda -----

Wed, 30 October, 2024

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. Karin Leistner

Coffee Break

10:30AM - 12:30PM

Session 1: **Electrolysis and Catalysts**

6 Short Talks

LUNCH BREAK

1:30PM - 3:30PM

Session 2: **Fuel Cells**

Invited Talk and 4 Short Talks

Coffee Break

4PM - 5PM

Session 3: **Energy Carriers**

3 Short Talks

Group photo session

5:15PM - 6PM

Keynote Lecture

Prof. Dr. Wolfgang Schuhmann

6PM - 7:30PM

Poster Reception with Drinks and Food

REGISTER

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/>

**Tha Call for Abstracts has
been closed on July 19**

CALL FOR ABSTRACTS

KEYNOTES

KEYNOTE #1

9:15 AM - 10 AM

Prof. Dr. Karin Leistner

University of Technology Chemnitz



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Jacob Müller

“Electrochemistry meets magnetism:
Electrolytic gating as an energy-efficient
tool to control magnets”

KEYNOTE #2

5 PM - 5:45 PM

Prof. Dr. Wolfgang Schuhmann

Ruhr University Bochum



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Kramer

“From high-throughput catalyst discovery
and nanoelectrochemistry to electrolyzers
for energy conversion reactions”

COORDINATION

Feel free to address any questions about the Symposium to:



Dr. Theresa Schredelseker

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SCIENTIFIC COMMITTEE



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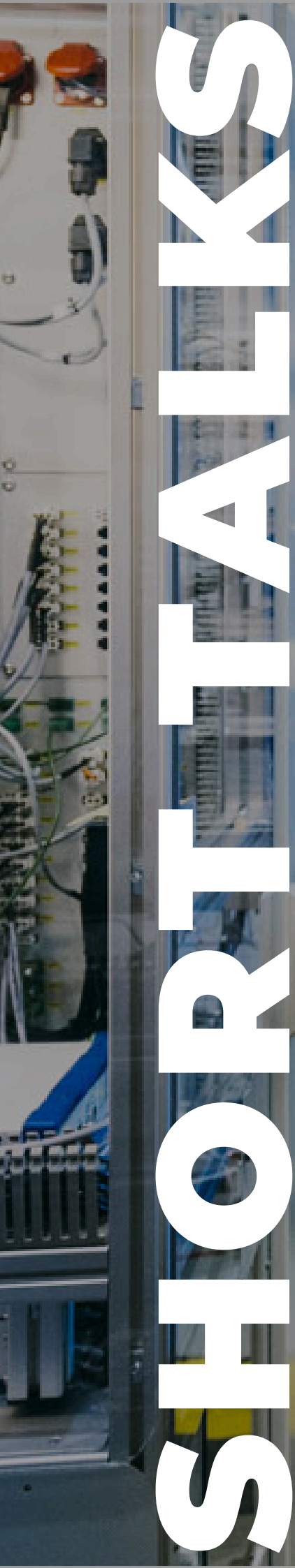


The symposium is supported by



MAT4HY.NRW
MATERIALS FOR FUTURE HYDROGEN TECHNOLOGIES

ORGANISERS



SHORT TALKS

SESSION 1: ELECTROLYSIS AND CATALYSTS 10:30 AM - 12:30 PM

SHORT TALKS (15 min)

10:30

- **Haujin Salih (Westfälische Hochschule)**

Coauthors: Michael Brodmann, Maximilian Cieluch, Cemal Esen, Norbert Kazamer, Florian Wirkert

Femtosecond laser-induced periodic nanosurface structuring on porous nickel transport layers for use in alkaline membrane water electrolyzers

10:50

- **Adarsh Jain (University of Duisburg-Essen),**

Coauthors: Christian Marcks, Ahammed Suhail Odungat, Jacob Johny, Lars Grebener, Mohit Chatwani, Mena-Alexander Kräenbring, Marc Frederic Tesch, Anna K. Mechler, Vineetha Vinayakumar, Doris Segets

Strategic Nano-Catalyst Arrangement on anode supports: The Influence of Drying Dynamics on Catalyst Layer Formation for Alkaline Water Electrolysis

11:10

- **Miriam Hesse (ZBT)**

Coauthors: Ulf-Peter Apfel, Bastian Kaufmann, Mila Manolova, Thomas E. Müller, Moritz Pilaski, Enado Pineti, Ivan Radev, Seniz Sörgel

Improving Cost and Performance in Anion Exchange Membrane Water Electrolysis: Non-Noble Metal Catalysts Optimize Electrodes for Hydrogen Production

SHORT TALKS (15 min)

11:30

- **Florian Wirkert (Westfälische Hochschule)**

Coauthors: Maximilian Cieluch, Norbert Kazamer, Mathilda Reboul, Ulrich Rost; Jeffrey Roth, Florian Wirkert

Evaluating Material Combinations for Alkaline Membrane Water Electrolysis: From Laboratory Studies to High-Pressure Stack Operation

11:50

- **Janna Wierper (Fraunhofer UMSICHT)**

Coauthors: Jannick Hiltrop, Kevinjeorjios Pellumbi, Julia Jökel, Ulf-Peter Apfel

Establishment of Selenide Hydrogen Evolution Catalysts in PEM Water Electrolysis

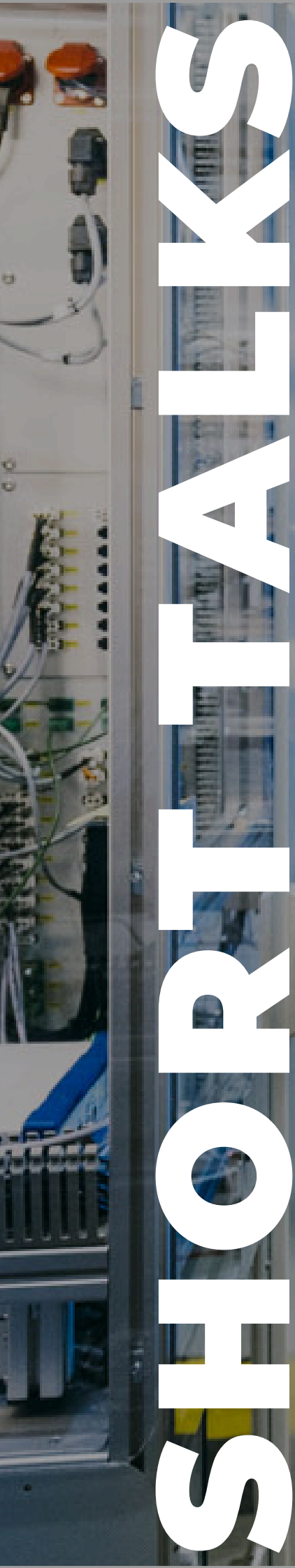
12:10

- **Muhammad Munawar (University of Duisburg-Essen)**

Coauthor: Rossitza Pentcheva

Understanding the mechanism of selective reduction of hematite (0001) surface by hydrogen adsorption





SHORT TALKS

SESSION 2: FUEL CELLS

1:30 PM - 3:30 PM

INVITED TALK (30 min)

1:30 PM

- **Vladimir Atanasov (University of Stuttgart)**,

Coauthor: Hyenograe Cho

Recent advances in HT-PEMFC at University of Stuttgart

SHORT TALKS (15 min)

2:00 PM

- **Masoumeh Mohammadi (Capgemini Engineering)**,

Coauthors: Oliver Hegen, Andreas Kötter

Modeling and Analysis of Catalyst Particle Degradation in Proton Exchange Membrane Fuel Cells for Enhanced Lifetime and Cost-Efficiency

2:20 PM

- **Adib Caidi (ZBT)**

Coauthors: Thomas Lange, Volker Peinecke, Ivan Radev, Doris Segets, Fatih Özcan

Gradient Engineering for Enhanced Performance and Pt Utilization in Cathode Catalyst Layers of PEM Fuel Cells

SHORT TALKS (15 min)

2:40 PM

- **Adrian Dörnbach (University of Duisburg-Essen)**

Coauthors: Janosch Luttmer, Arun Nagarajah

Research of multi-life strategies for fuel cell systems by systematic repurposing

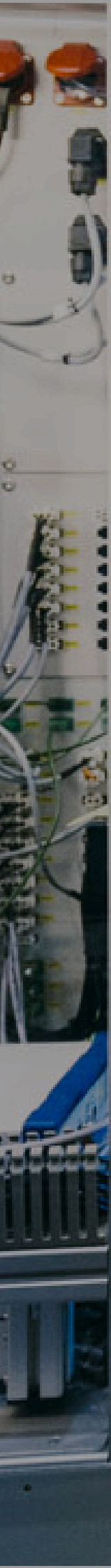
3:00 PM

- **Viktor Mackert (ZBT)**

Coauthors: Julian Kapp, Jan Strater, Verena Lukassek, Susanne Palecki, Harry Hoster

Impact of Repeated Frost Exposure and Cold Start on Pore Structure and Performance in PEM Fuel Cells





SHORT TALKS

SESSION 3: ENERGY CARRIERS 4:00 PM - 5:00 PM

SHORT TALKS (15 min)

4:00 PM

- **Fausto Tidona (ZBT)**

Coauthors: Fabian Jochmann, Florian Mach, Jannik Plass, Daniel Raitz von Frentz, Thomas Sadlowski, Michael Steffen, Benjamin Stengel

Development of an Ammonia Cracker System for Decarbonization of Maritime Shipping

4:20 PM

- **Parsa Ghofrani (University of Duisburg-Essen)**

Coauthors: Carsten Spieker, Andreas Kempf, Irenäus Wlokas

Numerical Evaluation of an Industrial-Scale Non-Premixed Burner for Combustion of Ammonia with Ammonia-Cracking Products in a Wide Range of Fuel Compositions and Burner Power

4:40 PM

- **Lukas Willmeroth (ZBT)**

Coauthors: Stefan Bever, Marin Frank, Alexander Kvasnicka

Challenges for operation of type IV tanks and for heavy-duty hydrogen stations

POSTERS

Can be exhibited during the whole day.
Dedicated Poster Session starts 5:30pm

#1

- **Leonard Böhm (Westfälische Hochschule)**

Coauthors: Ulf-Peter Apfel, Michael Brodmann, Maximilian Cieluch, Norbert Kazamer, Gabriela Marginean, Pit Podleschny, Florian Wirkert

Effect of ethylene glycol on NiMo pulsed electrodeposition for AEM water electrolysis cathodes

#2

- **Luis Felipe Rico Cortes (University of Duisburg-Essen)**

Coauthors: Irenäus Wlokas, Andreas Kempf

Spark Ignition Internal Combustion Engine Simulations for Homogeneous Air-Hydrogen Mixtures

#3

- **Robin von Mallinckrodt (ZBT)**

Coauthors: Robert Hoffmann, Angela Kruth, Olga Ravkina, Annette-E. Surkus, Jan Wallis, Jens Wartmann

Thin Film Based MEA Characterization for Solid-State Ammonia Synthesis

#4

- **Florian Kuschel (ZBT)**

Coauthors: Lukas Feierabend, Jens Wartmann


Analysis of Dynamic Energy Conversion Systems in the Conceptual System Design Phase

#5

- **Ehsan Zarmehri (ZBT)**

Metal (Pb, V, Cu) and nitrogen co-doped carbon nanotube electrocatalyst for oxygen reduction reaction in fuel cell





POSTERS

#6

- **Laura Tropf (ZBT)**

Coauthors: Zehua Dou, Hagen Ritter, Jürgen Czarske, David Weik

Real-time water detection in fuel cell channels using surface acoustic waves

#7

- **Tom Alzer (University of Duisburg-Essen)**

Coauthors: Irenäus Wlokas, Andreas Kempf

Modeling and Simulation of the Deflagration-to-Detonation Transition of Hydrogen/Oxygen mixtures in Smooth Channels

#8

- **Vineetha Vinayakumar (University of Duisburg-Essen)**

Coauthors: Adarsh Jain, Mohit Chatwani, Timo Wagner, Christian Marcks, Jacob Johny, Garlef Wartner, Ignacio Sanjuán Moltó, Vimanshu Chanda, Nicolas Wöhrl, Marc Frederic Tesch, Ioannis Spanos, Oleg Prymak, Corina Andronescu, Anna K. Mechler, Doris Segets

A Coherent Workflow for Enhancing Transition Metal Oxide Anode Materials in Alkaline Electrolysis

#9

- **Parsa Ghofrani (University of Duisburg-Essen)**

Coauthors: Irenäus Wlokas, Andreas Kempf

Towards Modeling and Simulation of Hydrogen Direct Reduction of Iron Ore Particles: Flash Reduction

#10

- **Cheau Tyan Foo (University of Duisburg-Essen)**

Coauthors: Khadijeh Mohri

Tomographic imaging of reactive and non-reactive hydrogen: safety and combustion behaviour

#11

- **Yuri Shimwefeleni (Hochschule RheinMain)**

Integration of Hydrogen Safety Standards, Codes, and Regulations into National Hydrogen Regulations: The Namibian Context

#12

- **Fatih Özcan (University of Duisburg-Essen)**

Coauthors: Amin Said Amin, Adib Caidi, Thomas Lange, Volker Peinecke, Doris Segets

Advancing Energy Applications: Standardized Surface Characterization of Carbon Materials

#13

- **Vimanshu Chanda (ZBT)**

Coauthors: Sebastian Hirt, Natalia Levin

Developing a platinum group metal-free electrocatalyst for oxygen evolution reaction in proton exchange membrane water electrolysis

#14

- **Maximilian Cieluch (Westfälische Hochschule)**

Coauthors: Norbert Kazamer, Leonard Böhm, Swen Zerebecki, Florian Wirkert, Ulf-Peter Apfel, Michael Brodmann

Effect of electrolyte pH on additive-free NiFe electrodeposition for electrocatalytic OER applications in AEM water electrolysis

#15

- **Henrik Thomas (University of Duisburg-Essen)**

Coauthors: Andreas Kempf, Irenäus Wlokas

Numerical Simulation of Hydrogen-Air Mixing in Pipe Systems





POSTERS

#16

- **Bastian Kaufmann (ZBT)**

Coauthors: Maike Berger, Rainer Cremer, Miriam Hesse, Regina Palkovits, Stefan Palkovits, Moritz Pilaski, Martin Welters

Anode catalyst layers for AEM-WE: Implementation, characterisation and evaluation of different synthesis routes

#17

- **Max Zinnemann (ZBT)**

Coauthors: Niklas Nickig, Jannik Plass, Michael Steffen

Dynamic simulation of an ammonia cracking process, using 1D process simulation combined with an embedded reactor simulation model

#18

- **Jannik Plass (ZBT)**

Coauthors: Michael Steffen, Max Zinnemann

2D continuum model of a pillow plate reactor for in-situ hydrogen generation via ammonia cracking

#19

- **Alexandra Muskatewitz (ZBT)**

Coauthors: Miriam Hesse, Bastian Kaufmann, Ivan Radev, Wladimir Philippi, Harry Hoster

Reference Electrode Techniques for Comprehensive Electrochemical Analysis in Anion Exchange Membrane Water Electrolysis

#20

- **Laura Huwald (Fraunhofer UMSICHT)**

Coauthors: Michael Joemann, Maximilian Wand

Ultrathin Composite Bipolar Plates from Powder-to-Roll Process for PEM Fuel Cells

#21

- **Paul Stannek (ZBT)**

Coauthor: Marco Grundler

"TheBiPo" - Thermoforming of bipolar plates for fuel cells

#22

- **Maximilian Wand (Fraunhofer UMSICHT)**

Coauthors: Dennis Tonder, Laura Huwald, Michael Joemann

Alternative Welding Methods for Ultra-Thin Composite Bipolar Plates

#23

- **Marco Grundler (ZBT)**

Coauthor: Paul Stannek

Carbon fiber reinforced thin-walled graphite-polymer bipolar plates for fuel cells

#24

- **Alexandros Perrakis (ZBT)**

Coauthor: Marco Grundler

Development and optimization of Graphite PPS Sheets for High temperature proton exchange membrane fuel cells

#25

- **Sercan Erdogan (ZBT)**

Coauthors: Simon Dondrup, Lukas Feierabend

Optical investigation and quantification of liquid water in the cathode side gas channels of PEM fuel cells

#26

- **Nadine Zimmerer (Karlsruhe Institute of Technology)**

Coauthors: Philipp Quarz, Linus Janning, Philip Scharfer, Wilhelm Schabel

About Crack Formation in Catalyst Layers for PEM Fuel Cells and Electrolysers





POSTERS

#27

- **Linus Janning (Karlsruhe Institute of Technology)**

Coauthors: Nadine Zimmerer, Philipp Quarz, Philip Scharfer, Wilhelm Schabel

Concept for Investigating the Selective Solvent Uptake of Nafion Membranes for PEM fuel cells and electrolysis

#28

- **Elisabeth Verweyen (ZBT)**

Coauthors: Sebastian Brokamp, Marco Grundler

Producing bio-based electrically and thermally conductive graphitic bipolar plates via injection molding for low temperature proton exchange membrane fuel cells.

#29

- **Julian Kapp (ZBT)**

Coauthors: Ivan Radev, Ehsan Zarmehri

Effects of accelerated stress testing conditions on metallic bipolar plate durability in PEM fuel cells - decoupling degradation and development of accelerated stress tests for proton exchange membrane fuel cell conditions

#30

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

Coauthors: Ahammed Suhail Odungat, Lars Grebener, Oliver Pasdag, Edward Nürenberg, Sebastian Kohsakowski, Volker Peinecke, Doris Segets, Fatih Özcan

Investigating the effects of different manufacturing approaches on the electrochemical performance of cathode catalyst layers in fuel cells through a gas diffusion electrode-based half-cell setup

