



25<sup>th</sup>  
**ABAF**

BRNO 2024

Advanced Batteries, Accumulators  
and Fuel Cells



FACULTY OF ELECTRICAL department of electrical  
ENGINEERING and electronic technology  
AND COMMUNICATION

**The 25<sup>th</sup> International Conference on Advanced Batteries,  
Accumulators, Fuel Cells and Special Electrochemical Technologies**

# Program of Lectures and Posters

**ORGANISED BY BRNO UNIVERSITY OF TECHNOLOGY AND CO-SPONSORED BY**

*The International Society of Electrochemistry*



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We would like to express our thanks to the Brno University of Technology, Faculty of Electrical Engineering and Communication for support and help with organising 25<sup>th</sup> ABAF conference

## Sunday, August 25<sup>th</sup>

17:00 – 20:00      **Registration and Get-Together Party at Antonínská 548/1**  
3 min walk from Hotel Continental

## Monday, August 26<sup>th</sup>

8:00                      **Registration at Antonínská 548/1**

9:00                      **Opening of ABAF 25<sup>th</sup>**

*doc. Ing. Ladislav Janíček, Ph.D., MBA, LL.M.*  
Rector of Brno University of Technology

*Assoc. Prof. Tomáš Kazda, Ph.D*  
Organisation Committee

*Assoc. Prof. Ing. Marie Sedlaříková, CSc.*  
Organisation Committee

*Ing. František Klein*  
Organisation Committee

9:30                      *Prof. T. Navrátil*  
International Society of Electrochemistry

### **Lithium Systems**

9:40 – 10:20          *S. Passerini*  
Locally Concentrated Ionic Liquid Electrolytes for High-Energy Batteries

*M. Khodeir*  
Impact of Transition Metal Contaminants in the Electrolyte on the  
Electrochemistry of Oxides in Lithium-Ion Batteries

10:20                      **Coffee Break**

- 10:35 – 11:55 **P. P. Sahoo**  
Atomic Layer Deposition of Alumina for Enhanced Electrochemical Performance of LiFePO<sub>4</sub> Cathodes
- J. Červenka**  
Engineering of Nanostructured High-Capacity Anode Materials for Lithium-Ion Batteries
- K. Fröhlich**  
Performance of the ZnO Coated Silicon/Graphite Anode in Electrolyte with the Fluoroethylene Carbonate Additive
- B. Eschelmüller**  
Advancing Sustainability in Lithium-Ion Battery Production through Innovations from the BatWoMan Project

11:55 **Time for Lunch**

- 13:00 – 14:00 **G. Glanz**  
State Estimation of a Lithium-Ion Battery Pack Using Piezoelectric Transducers
- S. Keles**  
State Estimation of Lithium-Ion-Batteries using Strain Gages
- M. Zúkalová**  
Novel lithiated high-entropy spinel type oxychloride and oxyfluoride and its electrochemical performance in Li-ion batteries

14:00 **Coffee Break**

## **New Battery Systems**

- 14:15 – 14:55 **J. Buchheim**  
Aerosol-based processes to produce battery materials
- P. Mazúr**  
Optimization of performance and stability of zinc-air flow battery
- 15:00 – 17:00 **Poster Section** (+Best Poster of Young Scientists Competition)
- 17:30 Walk from Hotel Continental to Restaurant Thalie

18:00

**Restaurant Thalie**  
Dinner and Social Evening



# Tuesday, August 27<sup>th</sup>

8:30                      **Registration at Antonínská 548/1 – for non-registered participants**

## Fuel Cells

9:00 – 10:20            *D. Budáč*  
Simulation of Properties of Composite Electrodes Using Monte Carlo 3D  
Equivalent Electronic Circuit Networks

*H. Hoster*  
Electrolysis: from Nanometers to Megawatts

## Aqueous Batteries

*J. Charvát*  
Progress in redox flow battery development

*M. Baraniak*  
Novel Carbon Material with Potential Application in Lead-Acid Battery  
Technology

10:20                      **Coffee Break**

10:35 – 11:55            *M. Nádherná*  
Design of “water-in-salt” electrolytes for dual-ion batteries

*K. Tokarek*  
Ionic Liquid and Palladium Nanoparticle Modifications for Nickel-Metal  
Hydride Negative Electrode

## Photovoltaics

*S. Chivikov*  
Development of the Reversible photoelectrochemical cell

## Applications and Simulations

*M. Mikolasek*  
Advanced approaches for state-of-charge (SOC) and state-of-health (SOH)  
estimation of Li-ion batteries

11:55                      **Time for Lunch**

13:00 – 14:00 ***M. Sedlařík***  
Comparison of machine learning techniques for estimating battery health

***L. Trnková***  
Elimination Voltammetry with Linear Scan: Theory and Applications

***X. Li***  
Advanced Exploration of the Electrode-electrolyte Interface using  
Elimination Voltammetry with Linear Scan

14:30 Transport from Hotel Continental to Museum of Aviation and Ground  
Technology

15:30 ***Museum of Aviation and Ground Technology***  
Excursion



17:30 ***Golf Hotel Austerlitz***  
Dinner and Social Evening

20:30 Tesla Coil Show

21:00 Departure to Hotel Continental

# Wednesday, August 28<sup>th</sup>

8:30                      **Registration at Antonínská 548/1 – for non-registered participants**

## **Applications and Simulations**

9:00 – 10:00            *M. Ceylan*  
Development and Parameterization of a Realtime Thermal Model as an Extra Safety Layer for Battery Management Systems

*J. Meindl*  
BioLogic Battery Cyclers BCS 9xx: The New Generation of Battery Cyclers

## **Lithium-ion Battery Applications**

*G. Harper*  
Envisioning the Future Circular Economy of Lithium Ion Batteries

10:00                      **Coffe Break**

10:15 – 11:55            *J. Votava*  
High purity manganese products from the Chvaletice tailings

*M. Zemanová*  
Factory engineering within the battery value chain

*J. Reiter*  
R&D Development Path of Inobat's Cell Chemistry

*J. Rýc*  
Presentation of EVC Group activities

*J. Kašpárek*  
Battery production of EV battery

12:00 – 12:30            **Poster Section** - Best Poster of Young Scientists Competition Voting

12:30                      **Time for lunch**

13:30 – 15:30            **University Laboratories Excursion** – Department of Electrical and Electronic Technology, FEEC, Brno University of Technology



15:00 / 16:00

Walk from Hotel Continental to the Town Centre (2 Groups)

15:30 / 16:30

**Brno Underground** (2 Groups)  
Excursion



17:30

**Restaurant U Mamlasů**  
Dinner and Closing Ceremony



# List of Posters

## Lithium Batteries and Related Systems

**J. Báňa:** Innovative approaches to recycling graphite from lithium-ion batteries by enhancing capacity with silicon from PV

**H. Hálová:** Spray drying Synthesis and Electrostatic Precipitation in Li-ion Battery Cathode Material Production

**K. Jaško:** Electrochemical Impedance Spectroscopy for Lithium-ion Batteries

**J. Kasper:** Kinetic Model for Improved Dynamic Current Response in Lithium-ion Battery Electrical Circuit Models

**O. Klvač:** Preparation of Battery Cross-sections Using Broad Ion Beam Polishing

**K. Pershina:** Non-Faradaic Capacitance of Porous Manganese Dioxide Nanoparticles

**Y. Polishchuk:** Synthesis of Graphene by Controlled Gas Detonation Method for Batteries Application

**Y. Pustovalov:** Innovative Anode based on Nanographite and Silicon Powder Without Binder for High Energy Batteries

**Y. Shmatok:** Ni and La Doping Effect on Characteristics of LiMn<sub>2</sub>O<sub>4</sub> as Cathode Material for Lithium-Ion Batteries with Aprotic

**M. Šedina:** Exploring the Influence of Temperature on Li-ion Batteries

**M. Vuksanovic:** Shellac - Application of a Sustainable Biopolymer as a Binder for Si/Gr-Anodes in Li-Ion Batteries

## Supercapacitors

**N. Globa:** Specific Conductivities of Tetraalkylammonium Bis(oxalato)borates in Acetonitrile, Dimethyl Sulfoxide, and Propylene Carbonate

**P. Ondrejka:** Enhancing Supercapacitor Performance: Molybdenum Oxide Substrate for Molybdenum Sulfide Electrodes

**O. Zima:** Integration of Nickel-Ammonium Complex Precipitation, Reduction and Electrochemical Activation for Superior Nickel Hydroxide Supercapacitor Electrodes

## Fuel Cells

**M.O. Danilov:** Graphitic carbon nitride - nitride partially unzipped carbon nanotubes nanocomposite: synthesis, properties and application for oxygen electrodes of alkaline fuel cells

**Y. Polishchuk:** Analysis of the Electrochemical Method of Producing Environmentally Friendly Hydrogen Energy Carrier According to the Evans Diagram

**M. G. Stadt:** High-Temperature Electrochemistry for the Investigation of Redox Reactions on Metal Surfaces

**D. Xing:** On The Stability of Perowskit Oxygen Evolution Electrocatalysts in alkaline Solutions

## **Aqueous Batteries**

**Y. He:** Suspension electrolyte for zinc metal dual-ion batteries

**P. Křivík:** Temperature Changes in a Lead-Acid Battery During Cycling

## **New Systems of Batteries**

**P. Čudek:** Preparation and analysis of biological derived carbon for lithium-sulfur batteries

**M. Spurný:** Solid-state composite materials for redox-mediated flow batteries

**A. Šimek:** Use of Raman spectroscopy to examine the suitability of carbonaceous materials for Li-ion vs. Na-ion anodes

**M. Tahertalari:** Silicon/Graphite Composite as Lithiophilic Lithium Metal Anode

## **Photovoltaics**

**T. Finsterle:** The Effect of Backsheet Repairs on Insulation Resistance in Photovoltaic Modules

**J. Vaněk:** Comparison of the use of a virtual battery in a photovoltaic system

## **Corrosion, Applications and Simulations**

**S. Bátorová:** Influence of Scan Rate on Potentodynamic Polarisation Measurement of Sintered Materials

**F. Frösch:** A Versatile Electrochemical Cell for In-Situ GI-XRD Measurements on Lab-Scale XRD Devices

**M. Kemény:** Distribution of Relaxation Times (DRT) for Determination of Internal Temperature of EV Battery Modules

**F. Märzweiler:** Investigation of Ion Mobility and Breakdown Process in Polyimide Insulations

**M. Novák:** A Current Pulse Response as an Alternative to EIS Measurements for Accurate Internal Temperature Estimation of Lithium-Ion Battery Cells

**M. Rae:** Development of Machine Learning Methods for State of Charge Estimation of Li-ion Batteries: A Comparative Study

**P. Slotová:** Corrosion of Fe-Mg Material in 0.9 % NaCl Solution

**D. Trochta:** Advanced in-situ SEM Analysis of Electrode Structural Changes in Li-ion Coin Cell During Cycling

**P. Vyroubal:** HPPC Data Preparation for Reduced Order Model of Li-Ion Battery

# NOTES





