21st ABAF
BRNO 2020
Advanced Batteries, Accumulators and Fuel Cells

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

The 21st 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

The Electrochemical Society

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Sunday, September 6th

17:00 – 20:00 **Registration and Get-Together Party**

Monday, September 7th

8:00 **Registration**

9:30 **Opening of ABAF 21st**

Prof. RNDr. Vladimír Aubrecht, CSc.
Dean of Faculty of Electrical Engineering and Communication

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

Ing. Tomáš Kazda, Ph.D
Organisation Committee

Ing. František Klein
Organisation Committee

10:00 *Assoc. Prof. Miroslav Fojta*
International Society of Electrochemistry
A Look at the Present with Our Vision for the Future

10:20 **Coffee Break**

Section I.

10:30 – 11:30 *R. Holze*
Active Masses for Supercapacitor Electrodes Based on Copolymers and Composites of Re-dox-active Comonomers and Intrinsically Conducting Polymers

X. Lu
A Facile Surface Modification through SiO2 Coating for Improving the Electrochemical Performance of Ni-rich Cathode Material

A.R. Kathribail
Polymerisation of Furfuryl Alcohol as Carbon Coating Method for LiNi0.6Mn0.2Co0.2O2 Cathode Materials for High-Performance Lithium-ion Battery Applications

11:30	**Time for Lunch**
12:30 – 13:30	*H. Hoster* Lithium-Ion Batteries: from Atomic Scale Processes to Data-driven Diagnostics *T. Syrový* Printed Electrode Layers for Li-ion Batteries *V. Knap* Analysis of Battery Performance and Degradation in CubeSat GOMX-3
13:30	**Coffee Break**
13:40 – 14:40	*L.Chladil* EERA Perspectives of Challenges and Research Opportunities in the Field of Electrochemical Energy Storage *O. Čech* Inverse Vulcanization of Sulfur – Amorphous Electroactive Polymer for Li-S Batteries *T. Kazda* Influence of the Working Temperature to the Properties of Li-ion Batteries
14:40	**Coffee Break**
14:50 – 15:50	*J. Mrlík* Deactivation of Negative Felt Electrode of Vanadium Redox Flow Battery: Double Half-cell Set-up Experiments *P.Mazur* Quinone and Viologen Derivatives for Aqueous Redox Flow Battery Electrolytes *T.Rabbow* Comparison and Optimization of Cell Designs and Graphite Fiber Electrodes on VRFB Performance
15:50	**Coffee Break**
16:00 – 17:00	**Poster Section** (+Best Poster of Young Scientists Competition)
17:30	Departure from Hotel Continental to Restaurant

18:00 **Restaurant Na Knofliku**
Dinner and Social Evening

Tuesday, September 8th

Section II.

9:00 – 10:00 *J. Amici*
Solid Composite Polymer Electrolytes for High Energy Density and Safe Lithium Metal Cells

A. Straková-Fedorková
Development of New Cathodes for Stable and Safer Lithium-Sulphur Batteries – Results of NATO SPS Research Project

M. Zukalová
Novel Inorganic Host Materials for Li-S Batteries

10:00 **Coffee Break**

10:10 – 11:10 *K. Fröhlich*
Strategies Enhancing the Electrochemical Performance of NMC811 High Energy Electrodes for xEV Applications

B. Eschelmüller
Quantification of Critical Process Parameters of Li-ion Pouch Cell Production

M. Mika
New Hybrid Phospho-Siloxane Membranes for H2/O2 Fuel Cells

11:10 **Coffee Break**

11:20 – 12:00 *P. Šabacká, A. Maxová*
Temperature Profile Analysis in Supersonic Flow in the Experimental Chamber

V. Horák
The Thermodynamic Model for Vacuum Technology

12:00 **Time for Lunch**

13:00 **Pernstejn Castle + Porta Coeli Brewery**
Excursion and Dinner
Departure from Hotel Continental 13:00

Wednesday, September 9th

Section III.

9:00 – 10:00	*L. Kavan* Interface Engineering in Energy Conversion and Storage: Case Studies of Titania *P. Janderka* Pragolab, Bio-Logic: New Electrochemical and Scanning Instrumentation from Bio-Logic SAS *J. Teichman* TechSoft Engineering: Formula Student Race Car Battery Pack Thermal Management
10:00	**Coffee Break**
10:10 – 11:30	*J. Kašpárek* EV Battery: Production of Li-ion Batteries in the Czech Republic *P. Kratochvíl* Ecobat: Collection and Recycling of Waste Batteries in the EU and in the Czech Republic *J. Vejbor* EVC Group: Battery Integration Business Just Before the 2020 Tesla Battery Day *J. Marušinec* ASEP: Electromobility in the Czech Republic
11:30	**Coffee Break**
11:40 – 12:40	**Poster Section** (+Best Poster of Young Scientists Competition)
12:40	**Time for Lunch**
13:40 – 16:00	**University Laboratories Excursion –** Department of Electrical and Electronic Technology, FEEC, Brno University of Technology
16:30	Departure from Hotel Continental to Restaurant

17:00 **Restaurant Thalie Brno**
Dinner and Closing Ceremony

List of Posters

Lithium Batteries and Related Systems

R. Apostolova: Electrolyticaly Synthesized K,Na,V-oxide Compounds for Li-batteries

D. Capková: Alternative Binder for Lithium-Sulfur Batteries

P. Čudek: Xanthan Gum as the Binder for the Lithium-Sulfur Batteries

N. Globa: Enhancing of Electrochemical Characteristics of Li-S System by Means of Optimization of Sulfur Electrode and Electrolyte Composition

J. Libich: Intercalation Properties of Expanded Graphite Electrode in Lithium-Ion Battery

D. Kunický: Comparison of High-Voltage Cathode Materials for Lithium-Ion Batteries

J. Máca: Flame Retardant Influence on Negative Electrode for Lithium Ion Accumulators

S. S. Madani: A Review of Mechanical Stress on Lithium-Ion Cells

S. S. Madani: Characterization of Lithium-Ion Battery Cells

S. S. Madani: Thermal Management of Lithium-Ion Batteries

Y. Polishchuk: Polymer Structure of Sulfur Ensures Low Self Discharge of Li-S Primary and Secondary Batteries. Synergistic Effect of Sulfur Structure and Design of Sulfur Electrode

A. V. Potapenko: Enhancing Electrochemical Properties of LiMn2O4/LiNi0.5Mn1.5O4 Core / Shell Composites

E. Shembel: Melanin as Semiconductor with Polymer Structure is Effective Modifier for Electrodes of High Energy Li - Ion Batteries. Influence structure and nature of melanin on efficiency of cathode based on LiMn2O4.

E. Shembel: Solid Polymer Electrolytes and Modified Electrodes are Basis for New Generation of High-Energy Lithium Batteries

A. K. Thakur: A State of Art Critical Review on Advancement in Mxenes for Lithium and Sodium Ion Batteries in the View of Atomic Layer Spacing

I. Veselkova: Electrochemical Characterization of Gel Polymer Electrolyte Used in Lithium-Ion Batteries

Fuel Cells

M. Danilov: Obtaining quantum dots of graphene from partially unzipped multi-walled carbon nanotubes

M. Danilov: Photoelectrochemical Systems for Hydrogen Evolution Using Ion-Conducting Membranes

Aqueous Batteries

A. Bulat: Synergistic Effect of Nanotechnology and Optimized Industrial Manufacturing Process for Lead Electrodes Enhances the Performance of Lead-Acid Batteries

L. Chladil: Effect of Surfactants to Decomposition of Supersaturated Zinc Electrolytes in Ni-Zn Battery

P. Křivík: Influence of temperature on impedance changes of lead-acid battery cell

J. Smejkal: Study of Particles Formed by Decomposition of Supersaturated Zinc Electrolyte in Ni-Zn Batteries

Supercapacitors

Q. B. Le: Reduced Graphene Oxide Composited with amorphous Ni-MOF and PANI applied as electrodes for Supercapacitor

Photovoltaics

K. Mairhofer: Development of an Illumination System for the Generation of Electron-Hole Pairs in SiC

P. Maule: Development of recycling of photovoltaic systems from the point of view of prolonging the total service life of photovoltaic modules and circular energy

J. Vaněk: Real-measured properties of photovoltaic modules

Corrosion, Applications and Simulations

R. Cipín: Approximation of Alkaline Battery Transfer Function Using Neural Network

D. Dobrocky: Change of geometric accuracy of structural steels after carburizing in gas

M. Folprecht: Battery Powered Multipurpose DC-DC Converter

Z. Joska: Adhesion of PVD Coatings on the Surface of Small Arm

O. Klvač: Ex-situ cell with positioner for XRD measurements in an inert atmosphere

D. Kusmič: Corrosion Resistance of Plasma Nitrided Austenitic Stainless Steel AISI 304 (X5CrNi18 10)

M. Mačák: Numerical Model of a Magnetohydrodynamic Pump

M. Mačák: Numerical Model of a Scanning Electrochemical Microscope

R. Nafeev: The Technological Aspects of Iron Electrode Material

J. Procházka: Possibilities of the Utilization of Nitriding on Case-Hardening Steels

V. Redko: Innovative Non-Destructive Electromagnetic Testing of Interface Resistance - the Basis of New Technologies for Production Electrodes of High-Energy Batteries.

J. Reinbold: Investigations on Hydrogen Permeation through Pd in Contact with Organic Liquids by a Modified Devanathan-Stachurski Set Up

M. Sedlaříková: Iron-Magnesium Materials for Biodegradable Implants Prepared by Powder Metallurgy

V. Síťař: The Usage of the Power Load as a Physical Diagram for Electric Vehicle Charging Modelling

Z. Studený: Tribological Properties of DLC Coating for Parts of Weapons

M. Toman: Thermal Model of Li-ion Battery Pack in PCM Case

R. Tománek: Design of Power Coupled Resonant Circuit for Wireless Power Transfer

P. Vorel: Compact Battery Power Source for Oscilloscope

P. Vyroubal: Simulation of Thermal Runaway Effect in Lithium-Ion Batteries

A. Zsigmond: Testing of a Prototype Device using Electrochemical Impedance Spectroscopy (EIS) Method

Notes