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BRNO 2012

Advanced Batteries, Accumulators
and Fuel Cells

INTERNATIONAL CONFERENCE

August 26th - August 30th 2012

SCIENTIFIC AND SOCIAL PROGRAM

Organised by:

Department of Electrical and Electronic Technology,
Faculty of Electrical Engineering and Communication,
Brno University of Technology

Chairman:
Jiří Vondrák

Vice-chairman
Marie Sedlářiková

Ministry of the Environment
of the Czech Republic



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 **AMERICAN
ELEMENTS**

Sunday, August 26th

17:00 – 20:00

Registration – get together party

Monday, August 27th

8:00

Registration

9:30

Opening of ABAF – 13th

Prof. Ing. Jaroslava Dědková, CSc..

Dean of Faculty of Electrical Engineering and Communication

Prof. Ing. Jiří Vondrák, DrSc.

Organisation committee

Ass. Prof. Ing. Marie Sedlaříková, CSc.

Organisation committee

Ing. Miloš Křepelka

The Ministry of the Environment

Ing. Martin Voříšek

The Ministry of Industry and Trade of the Czech Republic

10:00

Prof. Petr Vanýsek

The electrochemical society

10:15

E. Szász

WEB OF SCIENCE AND RESEARCHER ID – MAKING YOUR WORK
VISIBLE AND ACCESSIBLE

10:30

B. Postránecká

A CHALLENGE FOR TALENTED SCIENTISTS

10:40

Coffee-break

Inorganic Materials for Power Sources

10:50

Key lecture

M. Belén, M. Concha, M. Chatenet, F. H. B. Lima, E. A. Ticianelli

STUDY OF NH_3BH_3 OXIDATION REACTION ON GOLD
ELECTRODES BY IN SITU FOURIER TRANSFORM INFRARED
SPECTROSCOPY AND DIFFERENTIAL ELECTROCHEMICAL MASS
SPECTROMETRY

11:20

P. Y. Olu, M. Rouhet, M. Chatenet, A. Bonnefont, E. Savinova

STUDY OF THE BH_4^- ELECTROOXIDATION MECHANISM ON
PT CATALYST USING ROTATING RING-DISK ELECTRODE (RRDE).

11:40 *M. O. Danilov, Ya. G. Kolbasov, A.I. Rusetskii, A.I. Slobodyanyuk*
ELECTROCATALYTIC PROPERTIES OF REDUCED GRAPHENE
OXIDE IN OXYGEN ELECTRODE

12:00 **Time for lunch**

Fuel cells and methods

13:00 **Key lecture**
T. Okada, T. Takahashi, Ch. Ono, M. Kyotani, S. Kimura, S. Matsushita and K. Akagi
LOW-COST FUEL CELL MATERIALS MADE FROM NEW SOURCES

13:30 *P. Vanyšek*
ELECTROCHEMICAL IMPEDANCE SPECTROSCOPY – JUST ONE OF
MANY TOOLS TO STUDY BATTERIES AND POWER SOURCES

13:50 *M. Alrahmani, R. Chen, S. Ibrahim*
A NUMERICAL STUDY ON THE EFFECT OF GAS CHANNEL
WETTABILITY IN PEM FUEL CELLS: STRAIGHT CHANNEL

14:10 *S. Cruz-Manzo, R. Chen*
ANALYSIS OF THE PERFORMANCE OF A POLYMER ELECTROLYTE
FUEL CELL STACK USING SIMULTANEOUS ELECTROCHEMICAL
IMPEDANCE SPECTROSCOPY MEASUREMENTS

14:30 **Coffee-break**

14:40 *F. Jinuntuya, R. Chen, H. Ostadi, K. Jiang, Y. Gao, X. Zhang*
THE IMPACTS OF IMAGE RESOLUTION ON PERMEABILITY
SIMULATION OF GAS DIFFUSION LAYER USING LATTICE
BOLTZMANN METHOD

15:00 *W. Xu, D. Danilov, L. Gao, J. F. M. Oudenhoven, V. Pop
and P. H. L. Notten*
ENZYMATIC BIOFUEL CELL FOR IMPLANTABLE DEVICES

15:20 *N. Mc Carthy, A. El-Karouf, R. Chen, W. Bujalski*
THE IMPACT OF CATHODE GAS DIFFUSION LAYER STRUCTURE
ON FUEL CELL PERFORMANCE

Special simulations methods

15:40 *P. Vyroubal, J. Maxa, P. Bača, J. Tichý*
SIMULATION AND MATHEMATICAL DESCRIPTION OF CHARGING
AND DISCHARGING OF THE LEAD ACID ACCUMULATOR

16:00 – 17:00 **Poster session** (*Fuel cells, Lithium-ions accumulators, Lead-acid
accumulators*)

17:00 **Social evening**

Tuesday, August 28th

Lithium-ions accumulators

- 9:00 **Key lecture**
A. Visintin, J. E. Thomas, B. Castro, S. Real, J. Sacco, G. N. Garaventa, W. E. Triaca M. Sedlarikova , J.Vondrak
DEVELOPMENT OF LITHIUM-ION BATTERY PROTOTYPES FOR ELECTRIC CARS
- 9:30 *B. Markovsky, S. F. Amalraj, M. Talianker, D. Sharon, G. Shafir, L. Burlaka, E. Zinigrad, R. Persky, O. Haik and D. Aurbach*
STUDY OF LITHIUM – RICH LAYERED COMPOUNDS $\text{Li}(\text{MnNiCo})_2$ AS POSITIVE ELECTRODES IN LITHIUM CELLS
- 9:50 *A. Fedorková, R. Oriňáková, A. Oriňák, M. Kupková, H. D. Wiemhöfer, J. N. Audinot, J. Guillot*
ELECTROCHEMICAL AND XPS STUDIES OF PPY/PEG LiFePO_4 CATHODE MATERIAL
- 10:10 **Coffee-break**
- 10:20 *Ferrara G., Arbizzani C., Damen L., Guidotti M., Lazzari M., Vergottini F. G., Inguanta R., Piazza S., Sunseri C., Mastragostino M.*
SN-CO NANOWIRES: HIGH-PERFORMING ELECTRODES AS ANODES FOR LITHIUM-ION BATTERIES
- 10:40 *M. Sedlaříková, J. Vondrák, H. Mattheislova, M. Musil*
SAFETY ENHANCING OF LITHIUM-ION ACCUMULATORS
- 11:00 **Time for lunch**
- 12:00 – 13:30 **Poster session** (*Alkaline accumulators, Special batteries and materials, Photovoltaics*)
- 14:30 **Excursion**
TECHNICAL MUSEUM IN BRNO, WINE CELLAR

Wednesday, August 29th

Workshop organized by CLAIO Poznan (Poland) and Institute of non-ferrous metals, Gliwice (Poland) and co-sponsored by the project „Advanced technologies for production of functional materials for energy transfer, conversion and storage“.



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Supercapacitors

9:00 *K. Lota, G. Lota, A. Sierczyńska, M. Kopczyk, I. Acznik*
ASYMMETRIC CAPACITORS BASED ON CONDUCTING POLYMERS
AND METAL OXIDE/CARBON COMPOSITES AS ELECTRODES

Alcaline accumulators

9:20 *A. Sierczyńska, P. Swoboda, K. Lota, G. Lota, M. Kopczyk*
INVESTIGATION OF ELECTROCHEMICAL PROPERTIES
OF AB₂/AB₅- TYPE HYDROGEN STORAGE ALLOYS AS ANODIC
MATERIALS FOR HIGH ENERGY Ni-MH CELLS

Special batteries

9:40 *S. Styczyński, W. Missol, A. Rydzińska, D. Szal, M. Kopczyk*
PERFORMANCE OF THERMAL CELLS, BASED ON Mg-PbSO₄
ELECTROCHEMICAL SYSTEM, MADE FROM POWDER MATERIAL

Inorganic Materials for Power Sources

10:00 *G. Lota, A. Sierczyńska, K. Lota*
AB₅-TYPE HYDROGEN STORAGE ALLOY MODIFIED WITH
CARBON USED AS ANODIC MATERIALS IN BOROHYDRIDE FUEL
CELL

10:20 **Coffe-break**

Lithium-ions accumulators

10: 30 *M. Walkowiak, M. Osińska-Broniarz, M. Pokora, P. Półrolniczak,
and M. Kopczyk*
STRUCTURAL AND ELECTROCHEMICAL PROPERTIES OF
COMPOSITE GEL ELECTROLYTES WITH OXIDE NANOFILLERS

10:50 *P. Półrolniczak, M. Walkowiak, A. Wrona, A. Martyla, M. Kopczyk*
SYNTHESIS AND ELECTROCHEMICAL LITHIUM INSERTION INTO
SKUTTERUDITE-TYPE MATERIALS

11:10 – 12:00 **Poster session** (Workshop organized by CLAIO Poznan)

12:00 **Time for lunch**

**Electric Vehicles and the other Applications
(ABAF program continuation)**

12:50 *Jiří Bendl, Miloš Křepelka,*
MINISTRY OF THE ENVIRONMENT OF THE CZECH REPUBLIC:
CLEAN MOBILITY

13:10 *B. Klima, P. Hutak, R. Cipin, J. Knobloch, Z. Nouman and
J. Vondrus*
BATTERY MONITORING SYSTEM FOR THE AIRPLANE VUT
051 RAY

13:30 *M. Morte, A. Doucek, J. Kyncl*
THE HYDROGEN BUS AS A MATHEMATICAL MODEL IN
MATLAB© – COMPARISON WITH ITS ACTUAL OPERATION

13:50 **Coffe-break**

14:00 *D. Červinka, P. Vorel*
HIGH-POWER CHARGER FOR SUPER-EL ELECTRIC PASSENGER
CAR

14:20 *J. Kašpárek*
PRODUCTION OF BATTERIES LiFePO_4 FOR ELECTRIC VEHICLES
AND ACCUMULATION SYSTEMS

14:40 *J. Marušinec*
RESTART ELECTRIC VEHICLES IN THE YEAR 2012

15:30 **Excursion to hydroelectric power plant and social evening**

List of posters

1. Fuel cells

G. Ya. Akimov, Yu. A. Komysa

COLD ISOSTATIC PRESSING EFFECT ON MICROSTRUCTURE AND ELECTRICAL CHARACTERISTICS OF ScCeSZ CERAMICS

M. Kunovjánek, J. Vondrák

PVA/KOH MEMBRANE FOR ELECTROLYSIS WITH HIGH CONDUCTIVITY

P. Prochazka, I. Pazdera, K. Bencalik

USAGE OF THE FUEL CELL-POWERED ELECTRIC DRIVE IN AVIATION

I. Yu. Prokhorov, O. I. Radionova, G. Ya. Akimov

MECHANISMS OF IONIC CONDUCTION IN PVA BASED NANOCOMPOSITES

J. Subarda, M. Kunovjanek, M. Musil

PVA MEMBRANES FOR THE PEM FUEL CELLS

2. Lithium-ion accumulators

R. Apostolova, O. Kolomoyets, E. Shembel

INFLUENCE OF THE ELECTROLYTE AGITATION AT THE SYNTHESIS OF THE ELECTROLYTIC NICKEL SULFIDES ON THEIR ELECTROCHEMICAL CHARACTERISTICS IN LITHIUM ACCUMULATOR MODEL

O. Cech, P. Kovar, M. Sedlarikova, J. Vondrak

BROOKITE TiO₂ NANORODS FOR LITHIUM-ION ANODES

M. Frk, J. Máca, Z. Rozsivalová

DYNAMIC VISCOSITY OF SOLVENTS FOR ELECTROLYTES OF LITHIUM-ION ACCUMULATORS

N. I. Globa, Yu. V. Shmatok, V. D. Prisyazhyi

ELECTROCHEMICAL CHARACTERISTICS OF Li_xMnO₂ SYNTHESIZED BY MICROWAVE METHOD

N. I. Globa, V. D. Prisyazhyi, O. B. Pushyk, Al. V. Potapenko

ELECTROLYTES FOR Li-ION BATTERIES OPERATING IN WIDE TEMPERATURE RANGE

O. Kaválek, J. Vondrák

ELECTROCHEMICAL DEPOSITION OF TIN AND SILICON STUDIED BY EQCM

M. Sedlaříková, T. Kazda, J. Vondrák

EFFECT OF POTASSIUM ON THE STABILITY OF THE STRUCTURE OF LiCoO₂

M. Sedlaříková, J. Vondrák, J. Libich, O. Dvořák, H. Matheislová

ENHANCE CAPACITY AND SAFETY OF LITHIUM-ION ACCUMULATORS

J. Máca, J. Vondrák, M. Sedlaříková
USE OF DIMETHYL SULFONE IN APROTIC ELECTROLYTES

A. Martyła, M. Walkowiak, A. Wrona, K. Bilewska, P. Półrolniczak
STRUCTURAL ANALYSIS OF CoSb₃ BASED POWDERS OBTAINED BY
DIFFERENT SYNTHETIC ROUTES

M. Osínska-Broniarz, M. Walkowiak, T. Jesionowski
EFFECT OF FUNCTIONALYSED SILSESQUOXANES ON LITHIUM CATION
TRANSPORT IN PEO BASED POLYMER ELECTROLYTES

Z. Štichová, J. Máca, M. Sedlaříková, J. Vondrák
ELECTROCHEMISTRY OF SULFOLANE AT LOW TEMPERATURES

P. Vyroubal, J. Maxa, T. Kazda, J. Vondrák
MODELING AND NUMERICAL SIMULATION OF LITHIUM ION BATTERY

J. Máca, J. Vondrák, M. Sedlaříková, M. Zatloukal, K. Bartušek
PHASE DIAGRAM FOR MIXTURES OF SULFOLANE – DIMETHYLCARBONATE
FOR USING IN ELECTROLYTES FOR LITHIUM – ION BATTERIES

3. **Lead-acid accumulators**

P. Abraham, P. Bača, S. Vaculík
ACTIVE MASS AND COLLECTOR CORROSION RESISTIVITY AND IMPEDANCE
CHANGES OF PULSE CHARGED LEAD-ACID ACCUMULATOR

INFLUENCE OF VARIOUS AMOUNTS OF TITANIUM DIOXIDE IN NEGATIVE
PLATE TO IMPEDANCE PROPERTIES OF LEAD-ACID ACCUMULATOR

P. Křivík
HEAT CHANGES IN THE LEAD ACID BATTERY CELL

P. Křivík, P. Bača, P. Tošer
CONDUCTIVE CERAMIC AS AN ADDITIVE OF NEGATIVE ACTIVE MASS OF
LEAD ACID BATTERY

J. Wesółowski, M. Lula
INFLUENCE OF CHEMICAL COMPOSITION OF LEAD ALLOYS USED IN LEAD-
ACID BATTERIES ON THEIR ELECTRICAL PERFORMANCE

K. Tonar, P. Tošer, P. Bača, K. Micka
DIFFERENT ELECTROLYTE ADDITIVES FOR LEAD ACID BATTERIES IN
ELECTRIC VEHICLE APPLICATIONS

4. **Alkaline accumulators**

K. Becker, M. Pokora, K. Leszczyńska-Sejda, Z. Szolomicki, A. Wrona, M. Osadnik
CONCEPT FOR RECOVERY OF VALUABLE COMPONENTS FROM BLACK MASS,
SEPARATED FROM Ni-MH BATTERY SCRAP

O. Kaválek, L. Chladil, J. Máca
EFFECT OF INHIBITORS ON Zn-DENDRITE FORMATION

A. Sierczynska, M. Kopczyk, M. Woch, P. Swoboda, K. Lota, G. Lota
THE EFFECT OF NICKEL CONTENT IN NEGATIVE MASS ON ELECTRODE
CAPABILITY IN Ni-MH SYSTEM

T. Máca, L. Nezgoda, J. Vondrák, M. Sedlaříková
EFFECT OF COBALT ADDITION ON STRUCTURE AND ELECTROCHEMICAL
BEHAVIOUR OF NICKEL HYDROXIDE SYNTHESIZED BY CHEMICAL
PRECIPITATION METHOD UNDER DIFFERENT CONDITIONS

M. Musil, M. Kunovjanek, O. Čech
MEMBRANES FOR ALKALINE ACCUMULATORS

D. Pléha, P. Dvořák, M. Kunovjének, M. Musil, O. Čech
SEPARATORS FOR ALKALINE ACCUMULATORS

A. Sierczynska, A. Wrona, K. Lota, G. Lota, P. Swoboda, M. Kopczyk
CARBON MODIFICATIONS OF AB₅-TYPE HYDROGEN STORAGE ALLOY USED
AS ANODE MATERIALS IN Ni-MH CELLS

J. Vrbický, J. Vondrák, M. Sedlaříková
SURFACTANT ELECTROLYTE ADITIVES EFFECT ON ALPHA NICKEL
HYDROXIDE

5. Special batteries and materials

V.I. Barbashov, E.V. Nesova
ANISOTROPY IN CONDUCTIVITY OF SCANDIA-STABILIZED ZIRCONIA

V. Barbashov, E. Nesova, N. Pismenova
LAPLACE'S PRESSURE INDUCED RHOMBOHEDRAL PHASE IN THE SCANDIA-
STABILIZED ZIRCONIA CERAMICS

D. Červinka, P. Vorel
CONNECTING ISSUES OF THE FAST-CHARGERS FOR TRACTION BATTERY TO
DISTRIBUTION NETWORK

J. Kadlec, Z. Joska, J. Kadlec jr.
STUDY OF BIOCOMPATIBLE Zr AND ZrN/DLC COATING DEPOSITED ON
MEDICAL TOOLS

T. Binar, J. Kadlec, M. Rejzek, M. Vlkovský
EFFECT OF ENVIRONMENTAL TEMPERATURE ON THE BRITTLE-FRACTURE
CHARACTERISTICS UNDER DYNAMIC LOADING AND ASSESSMENT OF
DEFORMATION ON LOW-ALLOY STEEL DEVICES USED IN CONTAINERIZATION

K. Lota, G. Lota, A. Sierczynska
CARBON NANOTUBES AS A SUPPORT OF ELECTRODE ACTIVE MATERIAL FOR
ELECTROCHEMICAL CAPACITORS

J. Máca, P. Abraham, P. Bača
APPLICATION OF WIND TURBINE TO TEACHING

I. Jakubis, M. Sedlaříková, J. Vondrák
ELECTRODEPOSITED THIN LAYERS OF TiO₂

6. Photovoltaics

L. Šimonová, J. Vaněk, S. Demchikhin
RECYCLING OF PHOTOVOLTAIC CELLS WITH THE POSSIBILITY OF RE-USE
SOME COMPONENTS

P. Tošer, P. Bača, J. Neoral
THE WAYS HOW TO MEASURE THE CHARACTERISTICS OF THE SOLAR CELL

J. Vanek, J. Strnadel
LONG TIME MONITORING OF HEAT DISTRIBUTION IN PHOTOVOLTAIC
MODULE BY THE THERMOVISION

J. Vanek, T. Kaderka
V-I CHARACTERISTIC MEASUREMENT OF SOLAR CELL

A. Vesely, J. Vanek, R. Stojan
CONCENTRATOR PHOTOVOLTAIC SYSTEMS

P. Vyroubal, J. Maxa, J. Vaněk, M. Solčanský
DESIGN AND OPTIMALIZATION OF CONCENTR
ATOR SOLAR PANELS COOLING SYSTEM USING COMPUTER SIMULATION

Notes

Notes

Information

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