A lead-acid battery for the new millennium
R.Nelson, ILZRO, Research Triangle Park, USA

**PbO₂ ELECTRODE SYSTEMS**

Methods for suppression of the premature capacity loss (PCL) based on the gel-crystal concept for PbO₂
D.Pavlov, Central Laboratory of Electrochemical Power Sources, Sofia, Bulgaria

Phenomena of premature capacity loss in lead-acid batteries with antimony-free grids during cycling under constant-voltage-charging conditions
H.Dietz, H.Nieprasch, K.Wiesener, Dresden University of Technology, Institute of Physical Chemistry and Electrochemistry, Dresden, Germany
J.Garche, Center for Solar Energy and Hydrogen Research, Energy Storage, Ulm, Germany
J.Bauer, V.B.Autobatterien GmbH, Hannover, Germany

Influence of recharging potential and acid concentration on discharge behaviour of PbO₂ electrodes
E.Meissner, Varta Batterie AG, R & D Centre, Kelkheim, Germany

On the aggregate of spheres model theoretical considerations
A.Winsel, Varta Batterie AG, R & D Centre, Kelkheim, Germany
E.Bashtavelova, Central Laboratory of Electrochemical Power Sources, Sofia, Bulgaria

PbO₂-active mass as an electrocrystalline network
E.Bashtavelova, Central Laboratory of Electrochemical Power Sources, Sofia, Bulgaria
A.Winsel, Universit of Kassel FB-18, Kassel, Germany

Possibilities to reduce/avoid the passivation of the positive electrode of the lead-acid battery
J.Garche, H.Doering, Center for Solar Energy and Hydrogen Research, Energy Storage, Ulm, Germany

Premature capacity loss of pure lead positive plate. An example of preferential discharge in the near grid region
M.Dimitrov, Central Laboratory of Electrochemical Power Sources, Sofia, Bulgaria

New data on the energetic coefficient of the positive plate of lead-acid batteries
C.D’Alkaine, Federal University of Sao Carlos, Department of Chemistry, Sao Carlos, Brazil

Resistance measurements of the grid/active mass interface
M.Calabek, Technical University, Dept. of Electrotechnology, Brno, Czech Republic
K.Micka, Heyrovsky Institute of Physical Chemistry and Electrochemistry, Prague, Czech Republic

**LEAD ALLOYS AND THEIR ANODIC OXIDATION**

New aspects of the solid phase equilibria in the ternary (Pb, Sn, Ca) system, for xca < 25 at.%
J.Hertz, C.Fornasieri, J.P.Hilger, M.Notin, Universite de Nancy I, Laboratoire de Thermodynamique Metallurgique, Vandoeuvre-les-Nancy, France

Developments in lead alloys for lead-acid batteries
J.B.See, Pasminco Research Centre, Product Development, New Castle, NSW Australia
Corrosion in open-circuit of lead alloys positive grids
H.Breque, J.P.Hilger, J.Steinmetz, J.Hertz, Universite de Nancy I, Vandoeuvre-les-Nancy Cedex, France

Experimental study on the model of alkalization of the PbSO4 anodic layer
H.Hu, Qingdao University, Department of Chemistry, Qingdao, China

Kinetics and mechanism of the lead electrode reactions
J.R.Vilche, INIFTA, Corrosion section, La Plata, Argentina

Anodic behaviour of lead in sulfuric acid solution: influence of the antimony content
R.Babic, M.Metikos-Hukovic, University of Zagreb, Faculty of Chemical Engineering and Technology, Institute of Electrochemistry, Zagreb, Croatia
S.Brinic, Z.Grubac, University of Split, Faculty of Technology, Split, Croatia

Influence of Sb on the amorphization of the corrosion layer
B.Monahov, D.Pavlov, Central Laboratory of Electrochemical Power Sources, Sofia, Bulgaria

Property of lead alloy with over-low antimony
L.S.Yang, Z.Q.Shan, C.Y.Yang, Y.W.Zhou, Tianjin University, Dept. of Applied Chemistry, Tianjin, China

Anodic behaviour of Pb-Sn alloys in H2SO4 solutions
M.Bojinov, Central Laboratory of Electrochemical Power Sources, Sofia, Bulgaria
K.Salmi, G.Sundholm, Helsinki University of Technology, Dept. of Physical Chemistry, Espoo, Finland

Catalytic effect of bi on the formation of lead (IV) oxides on Pb-Bi alloys in H2SO4 solutions
M.Bojinov, D.Pavlov, Central Laboratory of Electrochemical Power Sources, Sofia, Bulgaria

Joining of lead-antimony and lead-calcium alloy lugs by a laboratory cast-on-strap joining process
Z.W.Chen, J.B.See, Pasminco Research Centre, Product Development, New Castle, NSW Australia

The lead alloys for the maintenance-free and sealed lead-acid batteries
C.Ronglong, Chongqing Institute of Storage Batteries, Chongqing, China

VALVE-REGULATED BATTERIES.
BATTERY CHARGE, DISCHARGE AND TESTING

Valve regulated lead-acid batteries. Systems, properties and application
H.Tuphorn, Accumulatorenfabrik Sonnenschein GmbH, Budingen, Germany

Ten minutes rechargeable valve regulated lead-acid battery even after deeply discharged and stood
T.Yazaku, Y.Ehara, K.Asai, J.Takahashi, Japan Storage Battery Co., Ltd., Small Battery Division, Kyoto, Japan
K.Matsumoto, S.Kubotani, AIWA Co., Ltd., Technical Headquarters, Saitama, Japan

Evaluating the state of health of lead-acid flooded and valve-regulated batteries: a comparison of conductance testing vs. traditional methods
D.O.Feder, Electrochemical Energy Storage Systems, Inc., Madison, NJ, USA
M.J.Hlavac, Midtronics, Inc., Willowbrook, IL, USA
W.Koster, Midtronics, Inc., Utrecht, The Netherlands
Influence of acid-stratification on charge, discharge and self-discharge in lead-acid batteries (model type)
    A.Preusse, H.Dietz, K.Wiesener, Dresden University of Technology, Institute of Physical Chemistry and Electrochemistry, Dresden, Germany

Electrolyte stratification in lead-acid batteries: effect of grid Sb and relationship to capacity loss
    L.Apateanu, A.F.Hollenkamp, M.J.Koop, CSIRO, Division of Mineral Products, Port Melbourne, Vic, Australia

Pulse charging recombinant lead-acid batteries with variable frequency tied to the state of charge
    D.K.Nowak, University of Alabama in Huntsville, Johnson Research Center, Huntsville, AL, USA

The composite character of the discharge capacity of the lead-acid cell
    N.F.Compagnone, Societa Industriale Accumulator (SINAC), R&D Department, Romano di Lombardi (BG), Italy

Impedance behaviour of the positive plate of lead-acid battery during the first cycle
    Z.Stoynov, T.Kosev, B.Stoyanova, V.Kantchev, Central Laboratory of Electrochemical Power Sources, Sofia, Bulgaria

Impedance behaviour of the positive plate during formation
    T.Kosev, S.Ruevski, B.Stoyanova, V.Kantchev, Z.Stoynov, Central Laboratory of Electrochemical Power Sources, Sofia, Bulgaria

Fast charging of lead-acid batteries
    D.Calasanzio, FIAMM S.p.A., R & D Laboratory, Montecchio Maggiore, Italy
    M.Maja, P.Spinelli, Polytechnical University of Turin, Turin, Italy

BTS600 a new approach for battery testing
    R.Kiessling, Digatron Industrie-Elektronik GmbH, Aachen, Germany

Driving cycle testing of EV batteries and EV systems
    D.D.Brandt, Bitrode Corporation, Fenton, Missouri, USA

A programmable power source for the investigation and testing of batteries
    S.Gishin, Technical University, Dept. of Electrical Apparatus, Sofia, Bulgaria

BATTERY TECHNOLOGY

Performance characteristics of lead oxides in pasted lead-acid battery electrodes
    S.E.Afifi, A.E.Saba, A.Y.Shenouda, Central Metallurgical R&D Institute, Electrometallurgy Lab., Cairo, Egypt

Processes during the production of lead-acid battery positive plates from 4PbO.PbSO₄ pastes
    J.Vilhunen, Neste Oy, Scientific Services, Analytical Research, Porvoo, Finland
    J.Tummavuori, University of Jyvaskyla, Department of Chemistry, Jyvaskyla, Finland

Influence of the electrode paste composition on the characteristics of the active mass
    Y.V.Kamenev, Accumulator Institute "Istochnik", St.Petersburg, Russia

Influence of the current-carrying agents on the positive plate formation
    Y.V.Kamenev, V.N.Leonov, Accumulator Institute "Istochnik", St.Petersburg, Russia

The influence of a rest period during anodic formation on the electrochemical behaviour of the positive electrode
    J.Garche, Center for Solar Energy and Hydrogen Research, Energy Storage, Ulm, Germany
Energy consumption at lead-acid battery plates formation
G.Papazov, Central Laboratory of Electrochemical Power Sources, Sofia, Bulgaria

The processes in the positive plates during pickling before formation
D.Pavlov, S.Ruevski, T.Rogachev, Central Laboratory of Electrochemical Power Sources, Sofia, Bulgaria

Wrapping technology for gas-recombination batteries
A.Schwetz, Elbak Batteriewerke GmbH, Machinery Division, Graz, Austria

Influence of the expander structure on the performance of the lead-acid battery negative plate
S.Gancheva, D.Pavlov, Central Laboratory of Electrochemical Power Sources, Sofia, Bulgaria

Pasting with hydraulic power
D.Melnik, MAC Engineering and Equipment Company. Inc., Benton Harbor, MI, USA

Investigations on the corrosion behaviour of Pb-Ag-Sn alloy under the influence of A.C. superimposition
R.Vijayavalli, Central Electrochemical Research Institute, Karaikudi, Tamilnadu, India

MODELS

A simplifies model for the lead-acid battery
P.Ekdunge, The Royal Institute of Technology, Dept. Applied Electrochemistry, Stockholm, Sweden

Mathematical modelling and model validation for the lead-acid cell

Modeling and optimization of the lead-acid battery characteristics
V.K.Luzhin, Moscow Power Engineering Institute, Dept. Chemistry, Moscow, Russia

Simulation of the photoelectric plants with use of the lead-acid battery as an energy storage
V.K.Luzhin, Moscow Power Engineering Institute, Dept. Chemistry, Moscow, Russia

Automatic device for standard porometry
Y.M.Volchkovich, I.A.Blinov, V.E.Sosenkin, V.S.Bagotzky, V.E.Kazarinov, A.N.Frumkin Institute of Electrochemistry, Moscow, Russia
E.E.Katalevski, Joint Venture "Vladisart", Vladimir, Russia

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Optimization of active material composition vor valve regulated led-acid batteries
J.Kwasnik, J.D.Milewski, T.Pukacka, B.Szczesniak, Central Laboratory of Batteries and Cells, Poznan, Poland

Recent progress of sealed lead-acid batteries and their competitive batteries for various applications in Japan
A.Kozawa, H.Ogawa, IBA Inc., Nagoya, Japan

The application of a lead-acid/nickel-iron dual battery hybrid in a photovoltaic system
J.Garche, Center for Solar Energy and Hydrogen Research, Energy Storage, Ulm, Germany
P.Adelmann, Technical University, Ulm, Germany
Polypropylene material for separators
C.Krogmann, Shell Chemie, Koin GmbH, Wesseling, Germany

SLI battery failure mode analysis PE envelope vs. cellulosic leaf-type separator
S.Reiser, Grace GmbH, Battery Separator Technical Center, Norderstedt, Germany

Development of a new battery separator for enhanced electrochemical properties
S.L.Paik, Amerace, Microporous Products, Inc., Piney Flats, TN, USA

Nonwoven materials for lead-acid batteries
F.Steffens, Consulting Services, Neuchatel, Switzerland

The basis of the technology of waste and battery scrap processing
A.Rusin, B.Masevich, L.Khegai, Accumulator Institute "Istochnik", Lead-Acid Battery Department, St.Petersburg, Russia