Presented papers

**VRLA and NEW BATTERIES**

**Progress in overcoming the failure modes peculiar to VRLA batteries**
A. Cooper, EALABC (EEIG), UK
P. T. Moseley, ILZRO, USA

**New modified AGM separator and its influence on the performance of VRLAB**
D. Pavlov, V. Naidenov, S. Ruveski, M. Cherneva, CLEPS, Sofia, Bulgaria
V. Mircheva, Institute of Polymers, Sofia, Bulgaria

**Design aspects of the VRLA battery positive electrode**
R. J. Ball, R. Stevens, Department of Engineering and Applied Science, University of Bath, UK

**VRLA batteries electrochemical factors affecting life**
M. Fernandez, P. G. Gracia, F. Trinidad, Tudor Research Laboratory, EXIDE Technologies, Azuqueca de Henares, Guadalajara, Spain

**Enhanced performance of VRLABs with a spirally-wound electrode design**
J. Wang, S. Zhong, H. K. Liu, S. X. Dou, ISEM, University of Wollongong, Australia
Y. Zhu, C. Fu, LeadCelBattery Co., Shenyang, China

**Experimental and theoretical studies of the scattering in floating conditions of VRLA batteries in series**
E. Rossinot, C. Lefrou, Laboratoire d'Electrochimie et Physico-chemie des Materiaux et Interfaces, Saint Martin d'Heres, France
J. P. Cun, MGE UPS Systems, Saint Martin, France

**Oxygen cycle in lead-acid batteries. Transfer way and recombination rate in AJS cells**
M. Perrin, H. Doering, F. Schulz, ZSW, Ulm, Germany
Y. Guo, Shandong University, Jinan, China

**Life extension of cycling VRLABs with catalysts or auxiliary electrodes**
I. Dyson, P. Griffin, P. Whiteley, CMP Batteries, UK
W. Jones, Philadelphia Scientific International Inc., Montgomeryville, USA

**POSITIVE PLATE**

**SGTP – a new positive plate for lead-acid batteries**
D. Pavlov, G. Papazov, B. Monahov, CLEPS, Sofia, Bulgaria

**Tubular positive plate of the lead-acid battery. General analysis of the discharge process**
C. V. D'Alkaine, Group of Electrochemistry and Polymers, Chemistry Dept., Federal University of Sao Carlos, Sao Carlos, Brazil
R. P. Impinisi, Battery Laboratory, LACTEC, Curitiba, Brazil
A. Carubelli, Chemistry Dept., Federal University of Parana, Curitiba, Brazil

**Dependence of the structure of the interface grid/PAM on the pH value of the solution in the pores**
B. Monahov, A. Kirchev, D. Pavlov, CLEPS, Sofia, Bulgaria
In-situ EC-AFM observation of antimony effect for lead dioxide electrode
M.Shioita, Y.Yamaguchi, Y.Nakayama, Yuasa Corporation, Osaka, Japan
N.Hirai, Sh.Hara, Department of Material Science and Processing, Osaka University, Japan

Behaviour of lead dioxide in sulphuric media containing phosphoric acid
C.Francia, M.Maja, L.Solarino, P.Spinelli, Dept.of Material Science and Chemical Engineering,
Polytechnical University of Turin, Torino, Italy

Study of PCL mechanism. Influence of grid/PAM states on PCL
M.Shiomi, Y.Okada, Y.Tsuboi, S.Osumi, M.Tsubota, Japan Storage battery Co. Ltd, Kyoto, Japan

**LEAD ALLOYS**

Corrosion and electrochemical behaviour of lead film electrode in sulfuric acid solutions
I.Yolshina, Institute of High Temperature Electrochemistry, Ekateringburg, Russia

Electrochemical study in sulfuric acid of the hardening L12 phases of the PbCaSn alloys
G.Bourguignon, A.Maitre, E.Rocca, J.Steinmetz, Laboratoire de Chemie du Solide Mineral,
Vandoeuvre les Nancy, France
L.Torcheux, CEAC, Genneviilliers cedex, France

The effect of segregation of alloying elements on performance of battery grids
R.D.Prengaman, RSR Technologies, Inc., USA

Influence of curing conditions on PbCaSn grid/paste interface and lead-acid battery performance
D.Pavlov, M.Dimitrov, T.Rogachev, L.Bogdanova, CLEPS, Sofia, Bulgaria

Electrochemical behaviour of lead alloys in sulfuric and phosphoric acid
I.Paleska, R.Pruszkowska-Drachal, J.Kotowski, A.Dziudzi, A.Czerwinski, Dept. of Chemistry,
Warsaw University, Poland
J.D.Milewski, M.Kopczyk, Central Laboratory of Batteries and Cells, Poznan, Poland

Oxidation and reduction behaviour of Pb and Pb-alloys characterized by In situ X-Ray grazing incidence diffraction
G.E.Nauer, Institute of Physical Chemistry, University of Vienna, Austria

In situ X-Ray characterization of the anodic behaviour of Pb-Ca alloys in sulphate electrolytes
G.E.Nauer, Institute of Physical Chemistry, University of Vienna, Austria
B.Salfinger, R.Krendelsberger, Kplus Center of Competence in Applied Electrochemistry,
Neustadt, Austria
N.Maleschitz, Banner Batterien GmbH, Linz, Austria
J.O.Besenhard, Institute of Chemical Technology of Inorganic Materials, Graz Technical University, Austria
H.Kronberger, G.Fafilek, Institute of Chemical Technology and Analytics, Vienna Technical University, Austria

Investigations on the corrosion behavior of Pb-Ca alloys used as grid materials for positive plates in lead-acid batteries
B.Salfinger, R.Krendelsberger, Kplus Center of Competence in Applied Electrochemistry,
Neustadt, Austria
N.Maleschitz, Banner Batterien GmbH, Linz, Austria
J.O.Besenhard, Institute of Chemical Technology of Inorganic Materials, Graz Technical University, Austria
H.Kronberger, G.Fafilek, Institute of Chemical Technology and Analytics, Vienna Technical University, Austria
G.E.Nauer, Institute of Physical Chemistry, University of Vienna, Austria
Electrochemical deposition of Pb and PbO$_2$ on polymer composites electrodes
A.Merzouki, L.Zerroual, N.Haddaoui, Department de Genie des Procedes, Faculte de Ingenieur, Universite Ferhat ABBAS de Setif, Algerie

**NEGATIVE PLATE**

Influence of temperature on expander stability and on the cycle life of the negative plates
G.Papazov, D.Pavlov, B.Monahov, CLEPS, Sofia, Bulgaria

The influence of different negative expanders on the performance of VRLA batteries
J.Valenciano, F.Trinidad, EXIDE Technologies - Global R&D Center, Azuqueca de Henares, Spain

Influence of phenolic group content in lignin expanders on the performance of negative lead-acid battery plates
M.Matrakova, T.Rogachev, D.Pavlov, CLEPS, Sofia, Bulgaria
B.Myrvold, Borregaard LignoTech, Norway

Influence of charge mode on the capacity and cycle life of lead-acid battery negative plates
G.Petkova, D.Pavlov, CLEPS, Sofia, Bulgaria

Improved negative active material: Structural considerations
A.Ferreira, Hollingsworth&Vose Co., West Groton, USA

In-situ EC-AFM observation with atomic resolution on Pb(100) single crystals in sulfuric acid solution
N.Hirai, K.Takeda, Sh.Hara, Dept. of Material Science and Processing, Osaka University, Japan
M.Shiota, Y.Yamaguchi, Y.Nakayama, Yuasa Corporation, Osaka, Japan

Gas-diffusion approach to the kinetics of oxygen recombination in lead-acid batteries
A.Kirchev, B.Monahov, D.Pavlov, CLEPS, Sofia, Bulgaria

Advanced Lithium-ion solid batteries with the cathode based on lithium manganese oxide
Z.Takehara, Faculty of Engineering, Kansai University, Osaka, Japan

Silver-silver sulfate reference electrodes for lead-acid batteries
P.Ruetschi, Granddevent, Switzerland

**LEAD-ACID BATTERY TECHNOLOGY**

Beneficial effects of red lead for lead-acid batteries
J.Wang, S.Zhong, G.Walter, H.K.Liu, S.X.Dou, ISEM, University of Wollongong, Australia

The role of lead hydroxide in the lead-acid battery electrodes
A.E.Saba, A.E.El-Sherief, S.E.Afifi, A.Y.Shenouda, Electrometallurgy Laboratory, Central Metallurgical Research and Development Institute, Cairo, Egypt
F.E.Heikal, Department of Chemistry, Faculty of Science, Cairo University, Giza, Egypt

Role of structural water on the mechanism of $\alpha$- and $\beta$-PbO$_2$ formation in lead-acid battery positive plates
M.Boubatra, L.Zerroual, Laboratoire d'Energetique et d'Electrochimie des solides, Universite de Setif, Algerie

Preparation and characterization of thin electrodes for lead-acid batteries
A.Caballero, M.Cruz, L.Hernan, J.Morales, L.Sanchez, Departamento de Quimica Inorganica, Universidad de Cordoba, Cordoba, Spain
Process and products of grid making by electrodeposition
H.Warlimont, DSL Dresden, Material Innovation GmbH, Dresden, Germany

Effect of mixed additives on LAB fluid
A.Bhattacharya, I.N.Basumallick, Department of Chemistry, Visva-Bharati, Santiniketan, India

Electroplated reticulated vitreous carbon current collectors for high specific energy, deep-cycle lead-acid batteries: Opportunities and challenges
E.Gyenge, S.Splinter, J.Jung, BC Research Inc., Power Research and Development Laboratory, Vancouver, Canada
A.Snaper, Power Technology Inc., Las Vegas, USA
B.Mahato, Battery Consultation Services, Huntington Beach, CA, USA

High speed wrapping and stacking of VRLA and SLI cells
A.Schwetz, BM-Battery Machines GmbH, Ebersdorf, Austria

Control of the drying process of the tubular battery plates
M.Mladenov, CLEPS, Sofia, Bulgaria
V.Genchev, Institute of Biomechanics, Sofia, Bulgaria
I.Hristakiev, Medical Technique Engineering, Sofia, Bulgaria

Synergistic effects of Novel Battery Manufacturing Processes for lead-acid batteries
A.Rochliadi, R.De Marco, Department of Applied Chemistry, Curtin University of Technology, Perth, Australia

BATTERY OPERATION and BATTERY TESTING

Restoration of lead-acid battery capacity
S.Pandya, K.V.International, Gandhinagar, India

Characterization of photovoltaic batteries using radio element detection
F. Mattera, D.Desmettre, J-L.Martin. Ph.Malbranche, GENEC-CEA, Cadarache, Saint Paul lez Durance, France

Results and comparison of seven accelerated cycling test procedures for the photovoltaic application
E.Potteau, D.Desmettre, F. Mattera, O.Bach, J-L.Martin., Ph.Malbranche, GENEC-CEA, Cadarache, Saint Paul lez Durance, France

Sulfation as applied to lead-acid batteries: The myth and the reality
H.A.Catherino, AMSTA-TR-E/PWR 267, USA TACOM, Warren. MI, USA
F.F.Feres, Exide Technologies, Auburn Hills, MI, USA

Microstructure of PE-separators
H.Winkler, Daramic, Separatorenerzeugung GmbH, Feistritz, Austria

Refining of secondary lead and ecology
Z.Vaisgant, A.Morachevskiy, M.Habachev, BC Rigel, Elta Ltd. St.Petersburg, Russia

BATTERY MODELS, IMPEDANCE MEASUREMENTS

Simultaneous measurements of potential and high-frequency resistance of a LAB element
F.Huet, R.P.Nogueira, UPR 15 du CNRS, Universite Pierre et Marie Curie, Paris, France
L.Torcheux, P.Lailler, CEAC, Gennevilliers, France

Electrical network modeling of the lead-acid battery for the analysis and design of vehicle electrical subsystems
A.Buzzi, A.Fiumara, M.Gosso, P.Guglielminotti, FIAT Research Center, Torino, Italy
A.Canova, M.Repetto, Dept.of Electrical Engineering, Polytechnical University of Turin, Italy
P.Spinelli, Dept.of Chemical Engineering and Material Science, Polytechnical University of Turin, Italy
Impedance-based non-linear dynamic battery modeling for automotive applications
  S.Buller, M.Thele, E.Karden, R.W.De Doncker, Institute for Power Electronics and Electrical Drives, Aachen University of Technology, Germany

Simulation of the impedance characteristics of recombinant lead-acid batteries
  F.Gobal, Department of Chemistry, Sharif University of Technology, Tehran, Iran

Mobile data integration for electrochemical battery testing with continuous surveillance
  K.Belov, Central Laboratory of Mechatronic and Instrumentation, Sofia, Bulgaria
  M.Mladenov, CLEPS, Sofia, Bulgaria

Noise controlled self-adaptive Ir compensated potentiostatic system
  P.Andreev, CLEPS, Sofia, Bulgaria

An efficient Ir and E/R compensated electronic source
  P.Andreev, CLEPS, Sofia, Bulgaria