

# LABAT'2002

10-13 June 2002, Varna, Bulgaria

## 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.Ruevski*, *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-chimie des Materiaux et Interfaces, Saint Martin d'Herès, 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. Shiota, 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, Ekaterinburg, Russia

**Electrochemical study in sulfuric acid of the hardening L<sub>12</sub> phases of the PbCaSn alloys**

*G. Bourguignon, A. Maitre, E. Rocca, J. Steinmetz*, Laboratoire de Chimie du Solide Mineral, Vandoeuvre les Nancy, France  
*L. Torcheux*, CEAC, Gennevilliers 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. Faflek*, 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. Faflek*, 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<sub>2</sub> 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*, Grandevent, 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.Affifi, 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<sub>2</sub> 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*, GENECEA, 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*, GENECEA, 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 Mechatronics 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, Bulgari