A. BATTERY COMPONENTS (LEAD(II) OXIDES, ELECTROLYTE, SEPARATORS, ETC.)

A23. Current status of separators for automotive batteries.

K. Kitagawa and T. Shimada *(Odawara Plant, Yuasa Battery Co., Ltd. Odawara, Japan).*

Yuasa Jiho, 66 (1989) 59-63.

CA: 111(14) 118076t.

A24. Relating recombination mat separator properties to sealed lead/acid battery performance.

D.A. Crouch Jr. and J.W. Reitz *(Battery Sep. Div., Evanite Fiber Corp., Corvallis, OR, USA).*

J. Power Sources, 31 (1990) 125-33.

CA: 113(16) 135681v.

A25. Method and device for testing separators by measuring local transverse electrical resistance.

V.V. Ionov, V.V. Isakevitch, E.E. Katalevsky and A.J. Chernokoz *(NPOO 'Polimersintez', Vladimir, USSR).*

J. Power Sources, 30 (1990) 321-3.

A26. The effects of separator design on the discharge performance of a starved lead-acid cell.

T.V. Nguyen, R.E. White and H. Gu *(Dep. Chem. Eng., Texas A and M Univ., College Station, TX, 77843-3122, USA).*

J. Electrochem. Soc., 137 (1990) 2998-3004.

CA: 114(2) 9598f.

A27. Water vapor permeability of plastics used for electrolyte immobilized lead-acid battery containers.

F.J. Vaccaro and J.A. Klatte *(AT&T Bell Labs., Murray Hill, NJ, USA).*

INTELEC '89. Eleventh International Telecommunications Energy Conference. Conference Proceedings (Cat. No. 89CH2849-8), 15-18 Oct. 1989, Florence, Italy, pp. 6.4/1-5.

A28. The distribution of voltage losses among components of a battery.

H. Gu *(Dept. of Phys. Chem., General Motors Res. Lab., Warren, MI, USA).*

J. Appl. Electrochem. (UK), 19 (1989) 505-11.

B. LEAD AND LEAD ALLOYS

B99. Production and use of battery alloys.

A. Kirov, N. Kunchev and D. Petrov *(IMTM, Bulg.)*.

Metalurgiya (Sofia), 44 (1989) 6-7.

CA: 112(14) 123228u.

B100. Analysis of pure lead and lead alloys for the automotive lead/acid battery industry by inductively coupled argon plasma emission spectroscopy.

T.J. Schmitt, J.P. Walters and D.A. Wynn *(Corporate Appl. Res. Cent., Johnson Controls, Inc., Milwaukee, WI, 53209, USA)*.

Appl. Spectrosc., 43 (1989) 687-96.

CA: 111(26) 246846f.

B101. Lead alloys into 1990s.

W.F. Gillian *(Pasminco Met., Melbourne, 3000, Australia)*.

J. Power Sources, 31 (1990) 177-81.

CA: 113(16) 135618e.

B102. Polarization behaviour of lead in sulphuric acid solution containing ammonium dichromate additions.

V. Brânzoi, S. Sternberg and L. Apateanu *(Dept. of Applied Phys. Chem. and Electrochem., Polytech. Inst. of Bucharest, Bucharest, România)*.

Rev. Roum. de Chim. (România), 34 (1989) 937-44.

B103. Polarization behaviour on limited potential ranges of the $Pb/H_2SO_4+Na_2SO_4$ system.

V. Brânzoi, S. Sternberg and L. Apateanu *(Dept. of Applied Phys. Chem. and Electrochem., Polytech. Inst. of Bucharest, Bucharest, România)*.

Rev. Roum. de Chim.(România), 34 (1989) 1457 - 65.

B104. The oxidation reaction of lead sulphate formed at the interface between the grid and the active material.

Z. Takehara, K. Kanamura and M. Kawanami *(Fac. Eng., Kyoto Univ., Kyoto, Japan, 606)*.

J. Electrochem. Soc., 136 (1989) 620-5.

CA: 110(18) 157657g.

B105. The oxidation reaction of lead sulphate formed at the interface between the lead plate and the porous active material of a lead/acid battery.

Z. Takehara, K. Kanamura and M. Kawanami *(Dept. of Ind. Chem., Kyoto Univ., Kyoto, Japan).*

J. Electrochem. Soc., 137 (1990) 800-4.

B106. Comments on sample treatment in the X-ray diffraction analysis of the oxidation products of lead.

T. Laitinen, G. Sundholm and J.K. Vilhunen *(Lab. of Phys. Chem. & Electrochem., Helsinki Univ. of Technol., Espoo, Finland).*

J. Power Sources, 32 (1990) 71-80.

B107. X-ray diffraction studies of basic lead sulphates.

J.K. Vilhunen *(Neste Corp., R & D, Porvoo, Finland).*

J. Power Sources, 31 (1990) 225-31.

B108. Observation of the first stages of discontinuous transformation in lead-calcium alloys used for lead batteries.

J.P. Hilger and A. Boulahrouf *(Lab. Thermodyn. Metall., Univ. Nancy I, 54506, Vandoeuvre-Les-Nancy, France).*

Mater. Charact., 24 (1990) 159-67.

CA: 112(18) 163268p.

B109. Lead-calcium batteries for new PWR units 1400 MW N4.

P. Lenain and E. Morange *(France).*

International Conference on Operability of Nuclear Systems in Normal and Adverse Environments. OPERA 89, 18-22 Sept. 1989, Lyon, France, pp. 761-8.

B110. Continuous production of automotive lead/acid battery plates from lead-calcium-tin strip.

G. Clerici and N. Penazzi *(Ind. Magneti Marelli, Milan, Italy).*

J. Power Sources, 31 (1990) 157-62.

CA: 113(16) 135683x.

B111. A new lead-calcium alloy for maintenance-free lead/acid batteries.

Z. Shuzhen, L. Yuanduo, Z. Zhonghua and J. Zhiyun *(Changchun Inst. of Appl. Chem. Acad. Sinica, Jilin, China).*

J. Power Sources, 31 (1990) 163-8.

CA: 113(18) 155792k.

B112. Influence of tin addition to the grid of positive electrode in lead/acid batteries on its corrosion resistance.

N. Koura, M. Yamaoka and N. Takami *(Toyko Univ. of Sci., Noda, Japan, 278)*.

Denki Kagaku, Oyobi Kogyo Butsuri Kagaku, 58 (1990) 837-41.

CA: 113(24) 215302n.

B113. Phenomena at the interface between positive active material and lead-calcium-tin grids.

K. Takahashi, N. Hoshihara, H. Yasuda, T. Ishii, and H. Jumbo *(Storage Battery Div., Matsushita Battery Ind. Co. Ltd., Shizuoka, Japan)*.

J. Power Sources, 30 (1990) 23-31.

B114. Investigations of the inhibition of H_2 evolution at lead electrodes containing antimony whilst in H_2SO_4 electrolyte.

H. Doring, M. Radwan, H. Dietz, J. Garche and K. Wiesener *(Sektion Chem., Tech. Univ., Dresden, Germany)*.

J. Power Sources, 28 (1989) 381-96.

B115. Effects of some elements on the performance of lead-antimony alloys for lead/acid batteries.

J. Zhiyun, L. Yuanduo, Z. Shuzhen, G. Weiqing and Z. Zhonghua *(Changchun Inst. of Appl. Chem., Acad. Sinica, Jilin, China)*.

J. Power Sources, 31 (1990) 169-75.

B116. Dependence of the physicomechanical properties of lead-antimony alloys on the antimony content.

V.I. Barkovskii, T.P. Belova, N.Yu. Lyskova, V.P. Varlakov and V.I. Perepechenykh *(USSR)*.

Elektrotekhnika, 5 (1990) 71-2.

CA: 114(6) 47769v.

B117. Electrochemical properties of lead-strontium alloys for lead-acid batteries.

H. Wen, Q. Wang, W. Su, H. Quin and S. Zhou *(Nanjing Storage Battery-Factory, Nanjing, Peop. Rep. China)*.

Xiamen Daxue Xuebao, Ziran Kexueban, 28 (1989) 604-7.

CA: 114(10) 85266m.

B118. Resistance of expanded grids and high-rate plate performance: preliminary results.

E.M. Valeriote *(Cominco Product Technol. Centre, Mississauga, Ont. Canada)*.

J. Power Sources, 28 (1989) 93-104.

B119. Corrosion induced deformation of lead storage battery plates.

V.G. Chernov, F.I. Kukoz and S.N. Kolodkin *(Novocherk. Politekh. Inst., Novocherkassk, USSR).*

Zashch. Met., 25 (1989) 284-7.

CA: 110(22) 201456s.

B120. Lead recycling technology.

J. Kircher *(Akkumulatorenfabrik Dr. Jungfer, Karnten, Austria).*

J. Power Sources, 28 (1989) 85-91.

B121. Lead recycling: improving on our nature.

B. Bied-Charreton *(Metaleurop, Fr.).*

Mater. Tech. (Paris), 78 (1990) 21-3.

CA: 113(12) 101163n.

B122. Lead recycling from battery scrap and other raw materials in Metaleurop's lead smelting plant in Oker.

G. Schenker *(Harz-Met. GmbH, Goslar, Germany).*

Lead-Zinc '90, Proc. World Symp. Metall. Environ. Control, 119th TMS Annu. Meet., (1990) 979-99.

CA: 114(24) 232448c.

B123. Processing of recycled lead raw material in the Ukrtsink Plant.

A.D. Shinkarenko and E.A. Opishnyak *(USSR).*

Tsv. Metallurgiya, 5 (1990) 33-8.

CA: 114(22) 211057j.

B124. Recycling of lead and sulphuric acid by cathodic reduction of battery scrap.

H. Wendt and V. Plzak *(Inst. Chem. Technol., Tech. Hochsch. Darmstadt, D-6100, Darmstadt, Germany).*

Erzmetall, 42 (1989) 246-53.

CA: 111(16) 137988h.

B125. New method for processing secondary lead raw materials.

A.P. Sychev, Yu.E. Korobityn and M.Ya. Kesler *(USSR).*

Tsvetn. Met. (Moscow), 6 (1990) 30-5.

CA: 113(18) 156118g.

B126. RSR's full scale plant to electrowin lead from battery scrap.

R.D. Prengaman and H. McDonald *(RSR Corp., Dallas, TX, 75247, USA).*

Lead-Zinc '90 Proc. World Symp. Metall. Environ. Control, 119th TMS Annu. Meet., (1990) 1045-56.

CA: 114(24) 232451y.

B127. Technology for treating lead/acid battery scrap for secondary usage.

N. Lyakov *(Dept. of Metall., Higher Inst. of Chem. Technol., Sofia, Bulgaria).*

J. Power Sources, 31 (1990) 281-6.

B128. Determination of the lead components in accumulator scrap.

K. Liebscher *(Forschungsinst. Aufbereit., Akad. Wiss., Freiberg, Germany).*

Neue Huette, 35 (1990) 230-1.

CA: 113(18) 164611c.

B129. A study of the dissolution of lead sulphate from waste batteries with ethanolamines.

D.A. Begum, M.F. Islam and R.K. Biswas *(Dep. Appl. Chem. Technol., Rajshahi Univ., Rajshahi, Bangladesh).*

Hydrometallurgy, 22 (1989) 259-66.

CA: 111(14) 118562y.

B130. Kinetics of dissolution of lead sulphate from waste battery scrap in the form of powder by aqueous triethanolamine.

D.A. Begum, M.F. Islam and K.R. Biswas *(Dep. Appl. Chem. Technol., Rajshahi Univ., Rajshahi, Bangladesh).*

J. Bangladesh Chem. Soc., 3 (1990) 35-43.

CA: 114(20) 189565z.

B131. Kinetics and dissolution of lead sulphate from waste battery scrap by aqueous triethanolamine solution.

D.A. Begum, M.F. Islam and R.K. Biswas *(Dep. Appl. Chem. Technol., Univ. Rajshahi, Rajshahi, Bangladesh).*

Hydrometallurgy, 23 (1990) 397-403.

B132. Direct melting of the metallic fraction of battery grids in a refining furnace.

G. Kostov, D. Chavdarova, A. Antonov, N. Lyakov and D. Georgiev *(SO 'Metallurgprogres', Bulgaria).*

Metalurgiya (Sofia), 44 (1989) 11-12.

CA: 113(4) 27114d.

B133. Processing of storage-battery scrap and recovery of polypropylene in the Oker Lead Works.

G. Schenker *(Harz-Metall GmbH, D-3380, Goslar, Germany).*

Schriftenr. GDMB, 54 (1989) 41-61.

CA: 115(2) 10312k.

B134. Lead contamination removal by soil washing.

R.A. Evangelista and A.P. Zownir *(Roy F. Weston, Inc., Edison, NJ, USA).*

Proc. A & WMA Annu. Meet., 82 (1989) 89/98.3.

C. POSITIVE PLATES (LEAD(IV) OXIDES)

C74. Studies of α-PbO_2 and β-PbO_2 in lead/acid battery plates.

D.A.J. Rand, P.B. Harmer, R.J. Hill and J.A. Wunderlich *(CSIRO, Div. Miner. Prod., Port Melbourne, Vic. 3207, Australia).*

Electrochemistry: Current and Potential Applications, Proceedings of the 7th Australian Electrochemistry Conference (7AEC), 15-19 Feb. 1988, Sydney, Australia, pp. 20-23.

C75. Lead/acid battery positive plates manufactured from $4PbO.PbSO_4$ pastes prepared from leady oxide and red lead.

D. Pavlov and N. Kapkov *(Bulgarian Acad. of Sci., Central Lab. of Electrochem. Power Sources, Sofia, Bulgaria).*

J. Power Sources, 31 (1990) 189-201.

CA: 113(18) 155793m.

C76. Improving the curing of positive plates for lead/acid batteries.

D.A.J. Rand, R.J. Hill and M. McDonagh *(CSIRO, Div. of Miner. Prod., Port Melbourne, Vic. 3207, Australia).*

J. Power Sources, 31 (1990) 203-15.

CA: 113(20) 175480k.

C77. A study of the oxidation of tetrabasic lead sulphate ($4PbO.PbSO_4$) crystals in cured paste to lead dioxide agglomerates during formation of lead dioxide positive plates for lead/acid batteries.

D. Pavlov and E. Bashtavelova *(Cent. Lab. Electrochem. Power Sources, Bulg. Acad. Sci., 1113, Sofia, Bulgaria).*

J. Power Sources, 31 (1990) 243-54.

C78. Effect of curing on positive plate behaviour in lead/acid cells.

A. Sahari and L. Zerroual *(Unite Rech. Electrochim., INES Chim. Ind., Setif, Algeria, 19000).*

J. Power Sources, 32 (1990) 407-12.

CA: 113(26) 234583w.

C79. Hydration and amorphization of active mass lead dioxide particles and their influence on the electrical properties of the lead/acid battery positive plate.

D. Pavlov, I. Balkanov, T.K. Halakev and P. Rachev *(Cent. Lab. Electrochem. Power Sources, Bulg. Acad. Sci., 1040, Sofia, Bulgaria).*

J. Electrochem. Soc., 136 (1989) 3189-97.

CA: 111(26) 236610k.

C80. Crystal growth of lead dioxide and its relation to the capacity-loss of the positive plate in valve-regulated sealed lead/acid batteries.

J. Yamashita, H. Yofu and Y. Matsumaru *(Yuasa Denchi K.K., Osaka, Japan).*

Yuasa Jiho, 67 (1989) 4-10.

CA: 112(12) 102074a.

C81. Crystal growth of PbO_2 and its relation to the capacity loss of positive plates in sealed lead/acid batteries.

J. Yamashita, H. Yufu and Y. Matsumaru *(Yuasa Battery Co. Ltd., Osaka, Japan).*

J. Power Sources, 30(1990) 13-21.

C82. Effect of previous charge/discharge history on the cpacity of the lead dioxide/lead sulphate electrode: the hysteresis or memory effect.

U. Hullmeine, A. Winsel and E. Voss *(Forsch. Entwicklungszent., VARTA Batterie A.-G., Kelkheim, Germany).*

J. Power Sources, 25 (1989) 27-47.

CA: 110(14) 118276n.

C83. Processes at the micro-level in the oxidation of lead(II) sulphate to lead dioxide during charging of lead/acid battery positive plates.

D. Pavlov, E. Bashtavelova, D. Simonsson and P. Ekdunge *(Cent. Lab. Electrochem. Power Sources, Bulg. Acad. Sci., 1040, Sofia, Bulgaria).*

J. Power Sources, 30 (1990) 77-97.

CA: 113(12) 100821p.

C84. Behaviour of the $PbO_2/PbSO_4$ electrode with regard to charging regime and small additions of phosphoric acid to the sulphuric acid electrolyte.

U. Hullmeine, E. Voss and A. Winsel *(VARTA Batterie AG, Res. & Dev. Centre, Kelkheim, Germany)*.

J. Power Sources, 30 (1990) 99-105.

C85. Degradation of the positive plate of the lead/acid battery during cycling.

S. Atlung and B. Zachau-Christiansen *(Inst. Phys. Chem., Tech. Univ. Denmark, Lyngby, DK 2800, Denmark)*.

J. Power Sources, 30 (1990) 131-41.

CA: 113(12) 100823r.

C86. Influence of activators and inhibitors on the positive active material of lead/acid batteries.

E. Hasik and M. Paszkiewicz *(Cent. Lab. Batteries, Cells, Poznan, Poland)*.

J. Power Sources, 30 (1990) 107-16.

CA: 113(12) 100822q.

C87. Influence of arsenic, antimony and bismuth on the properties of lead/acid battery positive plates.

D. Pavlov, A. Dakhouche and T. Rogachev *(Central Lab. of Electrochem. Power Sources, Bulg. Acad. of Sci., Sofia, Bulgaria)*.

J. Power Sources, 30 (1990) 117-29.

C88. Insertion mechanism of the lead dioxide electrode.

H.W. Uhlig *(VEB Berliner Akkumulatoren und Elementefabrik, Berlin, Germany)*.

J. Power Sources, 30 (1990) 143-52.

C89. Conducting polymers as additives to the positive electrode of lead-acid battery.

B.Z. Lubentsov, Ya.Kh. Samovarov, G.I. Zvereva and M.L. Khidekel *(Inst. Chem. Phys., 142 432, Chernogolovka, USSR)*.

Mater. Sci. Forum, 62-64 (1990) 485-6.

CA: 114(18) 167764m.

C90. Electrochemical characteristics of lead-acid battery using conducting polymers as additives to the positive electrode.

B.Z. Lubentsov, G.I. Zvereva, V.E. Dimitrienko and M.L. Khidekel *(Inst. Chem. Phys., 42 432, Chernogolovka, USSR)*.

Mater. Sci. Forum, 62-64 (1990) 487-8.

CA: 114(20) 189033z.

C91. The role of additives in the positive active mass of lead-acid cells.

S.V. Baker, P.T. Moseley and A.D. Turner (*Div. of Mater. Dev., Harwell Lab., UK*).

J. Power Sources, 27 (1989) 127-43.

C92. Discussions on the lead-acid battery. I. The role of tetrabasic lead sulphate in the lead-acid positive plate.

B. Culpin (*Div. of Adv. Res., Chloride Ind. Batteries Group, Manchester, UK*).

J. Power Sources, 25 (1989) 305-11.

C93. Discussions on the lead-acid battery. II. Hydrogen and order-disorder in PbO_2 in lead-acid positive plate.

R.J. Hill (*CSIRO, Div. Miner. Prod., Port Melbourne, Vic. 3207, Australia*).

J. Power Sources, 25 (1989) 313-20.

C94. Tin-free effect at positive lead/acid battery plates.

D. Pavlov, B. Monakhov, M. Maja and N. Penazzi (*Cent. Lab. Electrochem. Power Sources, Bulg. Acad. Sci., 1040, Sofia, Bulgaria*).

Rev. Roum. Chim., 34 (1989) 551-9.

CA: 111(2) 10183m.

C95. Mechanism of action of Sn on the passivation phenomena in the lead-acid battery positive plate (Sn-free effect).

D. Pavlov, B. Monakhov, M. Maja and N. Penazzi (*Central Lab. Electrochem. Power Sources, Bulg. Acad. Sci., Sofia, Bulgaria*).

J. Electrochem. Soc. (USA), 136 (1989) 27-33.

C96. On the effect of tin on the passivation behaviour of PbO_2 electrodes.

H. Doring, J. Garche, W. Fischer and K. Wiesener (*Sektion. Chem., Tech. Univ., Dresden, Germany*).

J. Power Sources, 28 (1989) 367-80.

CA: 112(24) 220293u.

C97. Currentless passivation of the PbO_2 electrode with respect to the influence of tin.

H. Doring, J. Garche, H. Dietz and K. Wiesener (*Dept. of Chem., Dresden Tech. Univ., Germany*).

J. Power Sources, 30 (1990) 41-5.

C98. Passivation of the positive electrode of the lead-acid battery: a consequence of self-discharge.

J. Garche (*Dept. of Chem., Dresden Univ. of Technol., Germany*).

J. Power Sources, 30 (1990) 47-54.

C99. The energetic coefficient in lead-acid battery positive plates.

C.V. D'Alkaine, M.A. Santanna Dos Santos and L.A. Avaca (*Grupo de Electroquimica, Univ. Federal Sao Carlos, Sao Paulo, Brazil*).

J. Power Sources, 30 (1990) 153-8.

C100. Oxygen cycle in sealed lead-acid batteries.

J. Mrha, K. Micka, J. Jindra and M. Musilova (*J. Heyrovsky Inst. Phys. Chem. Electrochem., Czech. Acad. Sci., 182-23, Prague, Czechoslovakia*).

J. Power Sources, 27 (1989) 91-117.

CA: 111(22) 198411m.

C101. An examination of the oxygen cycle in sealed PbO_2/Pb cells with a separator and electrolyte carrier.

J. Mrha, U. Vogel, S. Kreuels and W. Vielstich (*Inst. für Phys. Chem., Bonn Univ., Germany*).

J. Power Sources, 27 (1989) 201-18.

C102. Oxygen cycle in sealed rechargeable cells.

J. Mrha,J. Jindra and M. Musilova (*J. Heyrovsky Inst. of Phys. Chem. Electrochem., Czech. Acad. Sci., Prague, Czechoslovakia*).

J. Power Sources, 31 (1990) 139-44.

C103. Oxygen evolution on lead dioxide in sulphuric acid solutions.

M.K. Dimitrov (*Central Lab. Electrochem. Power Sources, Bulg. Acad. Sci., 1040, Sofia, Bulgaria*).

J. Power Sources, 31 (1990) 121-4.

C104. Advances in manufacturing systems for tubular positive plates for stationary and traction lead-acid batteries.

W.E. Fetzer (*Accumulatorenwerke Hoppecke, Brilon, Germany*).

J. Power Sources, 31 (1990) 255-62.

C105. Structure and properties of electrochemically active thin PbO_2 films for reserve batteries.

S. Tabat, A. Nowacki and B. Szczesniak (*Central Lab. of Batteries & Cells, Poznan, Poland*).

J. Power Sources, 31 (1990) 339-48.

C106. Electrochemical properties of a lead dioxide electrode with the current leads produced from low-alloyed alloys.

G.A. Kolikova, M.M. Barsukova and G.E. Demin (*USSR*).

Ref. Zh. Khim., 1989, Abstr. No. 15L230.

CA: 112(26) 242113n.

D. NEGATIVE PLATES

D28. Film formation in the Pb(II) region of the Pb/H_2SO_4 system.

L.A. Avaca, E.R. Gonzales, G. Tremiliosi-Filho and C.V. D'Alkaine (*Grupo de Electroquimica, Sao Paulo Univ., Brazil*).

J. Power Sources, 30 (1990) 161-7.

D29. Kinetics of hydrogen evolution reaction on lead-acid battery negative electrodes with silicate and antimony added to the electrolyte.

K. Vijayamohanan, S. Sathyanarayana and S.N. Joshi (*Indian Inst. of Sci., Bangalore, India*).

J. Power Sources, 30 (1990) 169-75.

D30. Impedance of porous electrochemical systems: study of the negative active mass of the lead-acid battery.

K.V. Rybalka and L.A. Beketaeva (*A.N. Frumkin Inst. Electrochem., Moscow, USSR*).

J. Power Sources, 30 (1990) 269-73.

CA: 113(12) 100837y.

D31. Accelerated curing of the negative plates for lead-acid batteries.

S. Ruevski and D. Pavlov (*Cent. Lab. Electrochem. Power Sources, Bulg. Acad. Sci., 1040, Sofia, Bulgaria*).

J. Power Sources, 31 (1990) 217-23.

CA: 113(16) 135684y.

D32. Structural changes in the active mass of the negative electrode of the lead-acid battery during charging.

L.A. Beketaeva, K.V. Rybalka and D. Simonsson (*A.N. Frumkin Inst. of Electrochem., Acad. of Sci., Moscow, USSR*).

J. Power Sources, 32 (1990) 143-50.

D33. Behaviour of negative plates for lead-acid batteries at high temperature.

T. Hayashi and A. Tokunaga (*Lead-Acid Battery Lab., Japan Storage Battery Co., Ltd., Kyoto, Japan, 601*).

Prog. Batteries Sol. Cells, 8 (1989) 240-2.

CA: 112(16) 142713q.

D34. Expander for the negative electrode of a lead storage battery.

V.I. Barkovskii, T.N. Mal'cheskaya and E.V. Popov (*USSR*).

Soviet Electrical Egineering, 61 (1990) 134-5.

D35. Mechanisms by which organic expanders improve the performance of lead-acid batteries.

G.J. Szava *(Boregaard Ind. Ltd., N-1701, Sarpsborg, Norway).*

J. Power Sources, 28 (1989) 149-53.

CA: 112(14) 122199y.

D36. Effect of organic additives on the lead-acid negative plate.

S. Gust, E. Hameenoja, J. Ahl, T. Laitinen, A. Savonen and G. Sundholm *(Neste Oy, Corp. Res. Dev., SF-06101, Porvoo, Finland).*

J. Power Sources, 30 (1990) 185-92.

CA: 113(12) 100829x.

D37. Additives to negative plate and performance of lead-acid batteries (Part 4).

K. Nakamura, T. Hayashi, K. Takahashi, A. Tokunaga and M. Tsubota *(Nippon Denchi K.K., Kyoto, Japan).*

GS News Tech. Rep., 49 (1990) 20-5.

CA: 114(18) 167766p.

D38. Design of additives to enhance the performance of the lead anode in sulphuric acid.

S.B. Hall, G.A. Wright and I.G. Mawston *(Dept. of Chem., Auckland Univ., New Zealand).*

J. Power Sources, 30 (1990) 193-8.

D39. Application of quality concepts and experimental design to processing of negative plates for valve-regulated sealed lead/acid batteries.

M.E. Fiorino and V.A. Edwards *(AT&T Bell Labs., Murray Hill, NJ, USA).*

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E. ASPECTS OF MANUFACTURE

E82. A hygenic, free-flowing, granular oxide for improved lead-acid batteries.

M.J. Weighall, D.W.H. Lambert, D.A.J. Rand and W.G.A. Baldsing *(CSIRO, Div. of Miner. Prod., Port Melbourne, Vic. 3207, Australia).*

Power Sources 12: Research and Development in Non-Mechanical Electrical Power Sources, Proceedings of the 16th International Power Sources Symposium, Sept. 1988, Bournemouth, UK, pp. 77-91.

E83. Technical and research aspects of lead/acid battery production.

W.F. Gillian, A.M. Hardman, R. Kiessling, D.W.H. Lambert, J.E. Manders and D.A.J. Rand *(CSIRO, Div. of Miner. Prod., Port Melbourne, Vic. 3207, Australia).*

J. Power Sources, 28 (1989) 217-38.

E84. Lead-acid battery pastes containing basic lead sulphate ($4PbO.PbSO_4$) and lead oxide (Pb_3O_4).

D. Pavlov and N. Kapkov *(Cent. Lab. Electrochem. Power Sources, Bulg. Acad. Sci., 1040, Sofia, Bulgaria).*

J. Electrochem. Soc., 137 (1990) 16-21.

CA: 112(10) 80953g.

E85. Desulfurization of lead battery paste.

K.F. Lamm, M. Poetzschke and T. Probst *(BSB Recycl. GmbH, 5423, Braubach, Germany).*

Schriftenr. GDMB, 56 (1989) 229-48.

CA: 114(22) 211074n.

E86. Desulfurization in processing of battery paste. I. Theoretical principles and analysis of raw materials.

A. Paulin, A. Arsov and A. Fajmut *(VTOZD Montanistika, FNT, Ljubljana, Yugoslavia).*

Rud. - Metal. Zb., 37 (1990) 125-40.

CA: 113(12) 101181s.

E87. Desulfurization in metallurgical treatment of battery paste. Part II. Desulfurization experiments.

A. Paulin, A. Arsov and A. Fajmut *(VTOZD Montanistika, FNT, Ljubljana, Yugoslavia).*

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E92. Improvements to Barton-pot equipment for manufacturing leady oxide.

J.E. Dix *(Linklater Corp., Costa Mesa, CA, USA).*

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D. Pavlov and N. Kapkov *(Cent. Lab. Electrochem. Power Sources, Bulg. Acad. Sci., 1040, Sofia, Bulgaria).*

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A. Kozawa *(IBA Inc., Cleveland, OH, 44135, USA)*.

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J. Kwasnik and H. Krysiak *(Cent. Lab. Batteries Cells 61-362, Poznan, Poland)*.

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A.M. Hardman *(Chloride Tech. and Trading, Manchester, UK)*.

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H. Lundqvist *(A-Tekniikka Oy, Vantaa, Finland)*.

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M. Maja, N. Penazzi, M. Baudino and M.V. Ginatta *(Dep. Mater. Sci. Chem. Eng., Polytech. Turin, Turin, Italy)*.

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K. Perce *(Dept of the Environ., London, UK)*.

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R.Haak, M. Deckert and I. Sauer *(Arbeitshygieneinsp., Rat Bez. Suhl, Suhl, Germany)*.

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R. Varma, Z. Tomczuk, S. Kazadi and N. P. Yao *(Chem. Technol. Div., Argonne Natl. Lab., Argonne, IL, 60439, USA).*

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A. Armenta *(Grupo de Energia Solar, Fac. de Fisicas, Univ. Complutense, Madrid, Spain).*

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K. Vijayamohanan, S. Sathyanarayana and S. N. Joshi *(Solid State and Structural Chem. Unit, Indian Inst. of Sci., Bangalore, India).*

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J. Hadfield *(Manitoba Telephone Syst., Winnipeg, Man., Canada).*

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N.F. Compagnone *(Ind. Magneti Marelli, Srl, Romano di Lombardia, Italy).*

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D.B. Mathews, D.A. Atkinson and A. Bazeley *(Sch. of Phys. Sci., Flinders Univ. of South Australia, Bedford Park, SA, Australia).*

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G198. Thermal management of valve regulated lead-acid batteries — a comparison of gelled vs. absorbed electrolyte technologies.

S.D. Gerner, G.H. Brilmyer and D.H. Bornemann *(Johnson Controls Inc., Milwaukee, WI, USA)*.

INTELEC '90 Twelfth International Telecommunications Energy Conference (Cat. No. 90CH2928-0), 21-25 Oct. 1990, Orlando, FL, USA, pp.161-4.

G199. Trial results, performance and economic benefits of lowered cell float potential in a working central office environment.

W. Brecht, D.O. Feder, J.M. McAndrews and A.J. Williamson *(C & D Charter Power Syst. Inc., Plymouth Meeting, PA, USA)*.

INTELEC '89. Eleventh International Telecommunications Energy Conference. Conference Proceedings (Cat. No. 89CH2849-8), 15-18 Oct. 1989, Florence, Italy, pp. 12.1/1-6.

G200. Float voltage characteristics of valve regulated lead-acid batteries.

A.I. Harrison and R.P. Bullough *(Chloride Ind. Batteries Group, Manchester, UK)*.

INTELEC '90. Twelfth International Telecommunications Energy Conference (Cat. No. 90CH2928-0), 21-25 Oct. 1990, Orlando, FL, USA, pp. 213-18.

G201. Increased float voltage and the effects of negative self-discharge on flooded lead calcium telecommunications cells.

T.G. Martinez and A.F.S. Novak *(Pacific Bell, San Ramon, CA, USA)*.

INTELEC '90. Twelfth International Telecommunications Energy Conference (Cat. No. 90CH2928-0), 21-25 Oct 1990, Orlando, FL, USA, pp.234-41.

G202. Simple stationary lead-acid battery monitor.

M. Yamanaka, T. Matsui and Y. Tomokuni *(Yuasa Denchi K.K., Osaka, Japan)*.

Yuasa Jiho, 68 (1990) 40-6.

CA: 113(8) 62611k.

G203. Poly(aniline)-coated electrodes for gas recombination in lead/acid batteries.

S. Sarkar and I.N. Basumallick *(Dept. of Chem., Visva-Bharati, Santiniketan, India)*.

J. Power Sources, 31 (1990) 89-92.

G204. Effects of bismuth on the electrochemical performance of lead/acid batteries.

D.M. Rice *(Pasminco Metals, Melbourne, Vic., Australia)*.

J. Power Sources, 28 (1989) 69-83.

G205. The effect of bismuth on the lead-acid battery system.

M. Johnson *(Univ. Technol. Loughborough, Loughborough, UK)*.

Diss. Abstr. Int. B 1990, 51(2), 901.

CA: 114(6) 46497t.

G206. The influence of traces of impurities in lead-acid battery electrolytes.

P.L. Buldini, A. Laghi, P. Saxena, J. L. Sharma and A. Toponi *(Lab. Analisi Chimica Mater., CNR-Lamel, Bologna, Italy)*.

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G207. Effect of Cd, Ni, Zn, and Co ions on electrode reactions of the lead-acid battery.

H. Sanchez, Y. Meas, I. Gonzales and M.S. Quiroz *(Dept. de Quimica, Univ. Autonoma Metropolitana-Iztapalapa, Mexico)*.

J. Power Sources, 32 (1990) 43-53.

G208. Effect of perchlorate ion on the lead/sulphuric acid/lead(II) oxide system.

A.G. Mateescu, C.D. Mateescu, I. Toma and L. Serbânescu *(Intrepr. "Acumulatorul", Bucharest, România)*.

Rev. Chim. (Bucharest), 40 (1989) 714-16.

CA: 112(10) 80932z.

G209. The effect of a lignosulphate type additive on the lead-acid battery positive plate reactions.

S.E. Ovuru and J.A. Harrison *(Dept. of Chem. Eng., Univ. of Sci. & Technol., Port Harcourt, Nigeria)*.

J. Power Sources, 27 (1989) 245-59.

G210. Influence of cobalt ions on the behaviour of maintenance-free lead/acid batteries with antimony alloys.

K.H. Christian and R. Ackermann *(VEB Grubenlampen-und Akkumulatorenwerke Zwickau, 9502, Zwickau, Germany)*.

J. Power Sources, 31 (1990) 151-3.

CA: 113(16)135682w.

G211. Influence of separators, expanders and electrolyte purity on the performance of maintenance-free lead/acid batteries.

J. Cerny and V. Koudelka *(Akuma sp, Mlada Boleslav, Czechoslovakia).*

J. Power Sources, 31 (1990) 183-7.

G212. The effects of grid design variables in valve regulated batteries.

D. Calasanzio, G. Baudo and M. Ottaviani *(FIAMM SpA, Montecchio Maggiore, Italy).*

INTELEC '89. Eleventh International Telecommunications Energy Conference. Conference Proceedings (Cat. No. 89CH2849-8), 15-18 Oct. 1989, Florence, Italy, pp. 6.2/1-5.

G213. An investigation of the effect of silica addition on the rate of oxygen transfer in lead-acid batteries.

W.B. Brecht *(Evanite Fiber Corp., Corvallis, OR, USA).*

INTELEC '90 Twelfth International Telecommunications Energy Conference (Cat. No. 90CH2928-0), 21-25 Oct. 1990, Orlando, FL, USA, pp. 219-25.

G214. The effects of service reliability on the manufacturing quality of valve-regulated sealed lead/acid batteries.

W. Jones *(British Telecommunications plc, Martlesham Heath, Ipswich, UK).*

6th Battery Conference and Exhibition. Conference Proceedings (ERA 90-0300), 4 Oct. 1990, London, UK, pp. 2.2/1-5.

G215. Heat effects in lead-acid batteries during float service.

D. Berndt *(VARTA Batterie A.-G., Germany).*

5th Battery Seminar. Seminar Proceedings, 11 April 1989, London, UK, pp. 1-4-17.

G216. Sealed batteries in transient limiting distribution networks — methods of measuring their internal resistance.

I. Sajfar, M. Malaric and R.P. Bullough *(Telecom. Equipment Factory, Zagreb, Yugoslavia).*

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G217. Operation of large RAPS batteries.

N.R. Sheridan and R.O. Winter *(Dept. of Resource Ind., Brisbane, Qld., Australia).*

Living in the Greenhouse. Proceedings of the Australian and New Zealand Solar Energy Society Conference, 28 Nov. - 1 Dec. 1990, Auckland, New Zealand, pp. 419-27.

G218. The design of a battery monitor for RAPS system.

A. Walton, A. Gorrie and K. O'Niell *(James Cook Univ. of North Queensland, Townsville, Qld, Australia).*

Living in the Greenhouse. Proceedings of the Australian and New Zealand Solar Energy Society Conference, 28 Nov. - 1 Dec 1990, Auckland, New Zealand, pp.429-33.

G219. Stationary batteries: prevention of premature failures.

P.N. Khare *(India).*

IEEMA J. (India), 10 (1990) 13-14, 16, 18, 20, 22, 24, 26, 28-9.

H. THEORETICAL ASPECTS AND REVIEWS

H58. Discussions on the lead/acid battery system.

A.M. Hardman, R.T. Hopwood, J.E. Manders, D.A.J. Rand, J.W. Reitz and H. Tuphorn *(CSIRO, Div. Miner. Prod., Port Melbourne, Victoria 3207, Australia).*

J. Power Sources, 23 (1988) 257-77.

H59. Modelling of depletion of a lead battery.

V.G. Chernov and V.V. Budnikov *(Novocherk. Polytekh. Inst., Novocherkassk, USSR).*

Izv. Sev.-Kavk. Nauchn. Tsentra Vyssh. Shk., Tekh. Nauki, 3 (1988) 19-23.

H60. Domestic remote-area power supplies: modelling battery usage for energy storage.

R.B. Zmood, T.A. McCluskey, D.A.J. Rand and W.G.A. Baldsing *(Dept. of Commun. & Electr. Eng., R. Melbourne Inst. of Technol., Vic., Australia).*

Proc. 24th Intersoc. Energy Conv. Engineering Conf., 6-11 Aug. 1989, Washington, DC, USA, pp. 1689-94.

H61. Economic models for battery energy storage: improvements for existing methods.

R.C. Reckrodt, M.D. Anderson and R.M. Kluczny.

IEEE Transactions on Energy Conversion, 5 (1990) 659-65.

H62. Applications of mathematical models in lead-acid battery design.

H. Gu *(Dept. of Phys. Chem., Gen. Motors Res. Lab., Warren, MI, USA).*

IEEE Aerospace and Electronics Systems Magazine, 5 (1990) 3-6.

H63. The lead-acid battery: low bias and galvanostatic modeling.

M.A. Larrea and J.L. Marin *(Spain)*.

Mundo Electronico, 211 (1990) 97-104.

H64. Mathematical modelling of current-potential curves for the lead/sulfuric acid system.

S. Sternberg, L. Apateanu and V. Brânzoi *(Polytech. Inst. Bucharest, Bucharest, România)*.

J. Power Sources, 30 (1990) 243-8.

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H65. Computer model for battery paste calculations.

I.G. Mawston *(Yuasa JRA Batteries Ltd., Auckland, New Zealand, 6)*.

J. Power Sources, 28 (1989) 127-40.

CA: 112(14) 122198x.

H66. The aggregate-of-spheres ('Kugelhaufen') model of the lead dioxide/lead (II) sulphate electrode.

A. Winsel, E. Voss and U. Hullmeine *(Res. Dev. Cent., VARTA Batterie A.-G., D-6233, Kelkheim/Ts., Germany)*.

J. Power Sources, 30 (1990) 209-26.

CA: 113(12) 100831s.

H67. Contribution to the calculation of E-I curves for electrode processes with insoluble film formation. I. The influence of the potential sweep rate on the Pb/Pb^{2+} electrode process in sulphuric acid solutions.

S. Sternberg, V. Brânzoi and L. Apateanu *(Dept. of Applied Phys. Chem. and Electrochem., Polytech. Inst. of Bucharest, Bucharest, România)*.

Rev. Roum. de Chim. (România), 34 (1989) 1281-86.

H68. Contribution to the calculation of E-I curves for electrode processes with insoluble films formation. II. Computation model of the E-I curves at the Pb/Pb^{2+} electrode process in sulphuric acid solutions.

S. Sternberg, L. Apateanu, V. Brânzoi and M. Gaust *(Dept. of Applied Phys. Chem. and Electrochem., Polytech. Inst. of Bucharest, Bucharest, România)*.

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H69. A simplified model of the lead/acid battery.

M. Maja and P. Spinelli *(Dip. Sci. Mater. Ing. Chim., Politec. Torino, Turin, Italy)*.

J. Power Sources, 30 (1990) 201-7.

CA: 113(12) 100830r.

H70. Mathematical modelling of tubular-plate lead/acid batteries.

O.E. Abdel-Salam *(Chem. Eng. Dep., Univ. Sci. Technol., Irbid, Jordan)*.

J. Power Sources, 30 (1990) 227-35.

CA: 113(12) 100832t.

H71. Mathematical models for anodic polarization of lead/acid positive electrodes.

P. Bjornbom *(Dept. of Chem. Technol., R. Inst. of Technol., Stockholm, Sweden)*.

J. Power Sources, 30 (1990) 237-41.

H72. A conductive film model for the lead anode in sulphuric acid.

S.B. Hall and G.A. Wright *(Chem. Dep., Univ. Auckland, Auckland, New Zealand)*.

Corros. Sci., 31 (1990) 709-1.

CA: 115(22) 236238c.

H73. Modelling and analysis of lead/acid battery operation.

D. Mayer and S. Biscaglia *(École des Mines de Paris, Valbonne, France)*.

CEC - Ninth E.C. Photovoltaic Solar Energy Conference. Proceedings of the International Conference, 25-29 Sept. 1989, Freiburg, Germany, pp. 245-8.

H74. Modelling and analysis of lead/acid battery operation.

D. Mayer and S. Biscaglia *(École des Mines de Paris, Valbonne, France)*.

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H75. Modelling the operational behaviour of lead-acid battery storage in renewable energy systems.

T. Degner, H. Gabler, J. Luther and E. Wiemken *(Dept. of Phys., Oldenburg Univ., Germany)*.

Clean and Safe Energy Forever. Proceedings of the 1989 Congress of the International Solar Energy Society, 4-8 Sept. 1989, Kobe City, Japan, pp. 1638-42.

H76 Modelling of the cold-cranking performance of automotive lead/acid batteries.

M.P. Loponen and P. Jalas *(Technol. Cent., Neste Oy, SF-06101, Porvoo, Finland)*.

J. Power Sources, 30 (1990) 249-54.

CA: 113(12) 100835w.

H77. An adaptive battery reserve time prediction algorithm.

A.M. Pesco, R.V. Biagetti, R.S. Chidamber and C.R. Vnkatram *(J.P. Morgan & Co., New York, NY, USA).*

INTELEC '89. Eleventh International Telecommunications Energy Conference. Conference Proceedings (Cat. No. 89CH2849-8), 15-18 Oct. 1989, Florence, Italy, pp. 6.1/1-7.

H78. Design fundamentals of high power density, pulsed discharge, lead/acid batteries. I. Experimental.

R.M. LaFollette and D.N. Bennion *(Dept. of Chem. Eng., Brigham Young Univ., Provo, UT, USA).*

J. Electrochem. Soc., 137 (1990) 3693-701.

H79. Design fundamentals of high power density, pulsed discharge, lead/acid batteries. II. Modelling.

R.M. LaFollette and D.N. Bennion *(Dept. of Chem. Eng., Brigham Young Univ., Provo, UT, 84602,USA).*

J. Electrochem. Soc., 137 (1990) 3701-7.

CA: 114(4) 27169w.

H80. Microelectrode studies of lead-acid battery electrochemistry.

L.J. Li, M. Fleischmann and L.M. Peter *(Dept. Chem., Univ. Southampton, UK, S09 5NH).*

Electrochim. Acta, 34 (1989) 459-74.

H81. Behaviour of the $PbO/PbSO_4$ electrode in sulphuric acid containing tin ions.

E.Voss, U. Hullmeine and A. Winsel *(VARTA Batterie AG, Res. & Dev. Center, Kelkheim, Germany).*

J. Power Sources, 30 (1990) 33-40.

H82. Oxidation mechanisms of lead sulphate in sulphuric acid — overview.

Z.-I. Takehara *(Dept. of Ind. Chem., Kyoto Univ., Japan).*

J. Power Sources, 30 (1990) 55-75.

H83. Study of electrode processes in Pb/H_2SO_4 plus additive systems.

S. Sternberg, V. Brânzoi and L. Apateanu *(Polytech. Inst. of Bucharest, Dept. of Applied Phys. Chem. and Electrochem., Bucharest, România).*

J. Power Sources, 30 (1990) 177-83.

H84. Failure mechanisms in lead-acid batteries.

M.L. Whitehead *(ERA Technol. Ltd., Leatherhead, UK).*

5th Battery Seminar. Seminar Proceedings, 11 April 1989, London, UK, pp. 2-1-11.

H85. Non-stationary impedance analysis of lead/acid batteries.

Z. Stoinov, B. Savova-Stoinov and T. Kosev *(Cent. Lab. Electrochem. Power Sources., Bulg. Acad. Sci., 1040, Sofia, Bulgaria).*

J. Power Sources, 30 (1990) 275-85.

CA: 113(12) 100838z.

H86. Impedance measurements of the lead/sodium sulphate system: synthesis of AC analogue circuit.

M. Bojinov and B. Monahov *(Cent. Lab. of Electrochem. Power Sources, Bulg. Acad. of Sci., Sofia, Bulgaria).*

J. Power Sources, 30 (1990) 287-99.

H87. Impedance studies of inter-cell welds in automotive lead/acid batteries.

Z. Stoinov, B. Savova-Stoinov and T. Kosev *(Cent. Lab. Electrochem. Power Sour., Bulg. Acad. Sci., 1040, Sofia, Bulgaria).*

J. Power Sources, 30 (1990) 301-7.

CA: 113(12) 100840u.

H88. Current distribution in lead/acid and nickel/cadmium accumulators.

J. Meiwes and H.C. Skudelny *(Inst. Power Electron. Electr. Drives, Aachen Univ. Technol., Aachen, Germany).*

J. Power Sources, 27 (1989) 45-58.

CA: 111(18) 157381h.

H89. Sealed lead-acid batteries gas-recombination mechanisms.

J.P. Pompon and J. Bouet *(Compagnie Eur. d'Accumulateurs, Clichy, France).*

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H90. Preliminary results from an improved theoretical approach towards characterizing sealed lead/acid cells.

M. Maja and N. Penazzi *(Dipartimento di Sci. dei Materiali e Ingegneria Chimica, Politecnico di Torino, Italy).*

J. Power Sources, 31 (1990) 115-19.

H91. Study of sealed lead/acid cells.

J. Mrha, J. Jindra, M. Musilova, B.I. Tsenter, I.A. Aguf and R.V. Mustaffin *(J. Heyrovsky Inst. Phys. Chem. Electrochem., Czech. Acad. Sci., 18223, Prague, Czechoslovakia).*

J. Power Sources, 32 (1990) 303-12.

CA: 113(20) 175496v.

H92. A study on designing the disposition of sealed lead/acid batteries in a cubicle for sufficient heat dissipation.

K. Ozaki, Y. Nagai, and A. Yokogi *(Yuasa Denchi K. K., Japan).*

Yuasa Jiho, 69 (1990) 32-7.

CA: 114(12) 105663u.

H93. Stationary battery design and usage and its impact on life.

S.S. Misra, *(C & D Charter Power Systems, Inc., Plymouth Meeting, PA, USA).*

INTELEC '90. Twelfth International Telecommunications Energy Conference (Cat. No. 90CH2928-0), 21-25 Oct. 1990, Orlando, Fl, USA, pp. 250-5.

H94. The lead accumulator - the most famous chargeable battery system.

G. Latzel *(D-8012, Riemerling, Germany).*

Prax. Naturwiss., Chem., 38 (1989) 27-32.

CA: 111(15) 133271w.

H95. Lead batteries, power and protection for 90's.

M.G. Mayer *(Lead Dev. Assoc., London, UK, W1N 3LQ).*

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H96. Lead/acid batteries - a tradition in re-cycling.

M.C. Boddy *(H. J. Enthoven & Sons, Matlock, UK).*

6th Battery Conference and Exhibition. Conference Proceedings (ERA 90-0300), 4 Oct. 1990, London, UK, pp. 4.3/1-4.

H97. A real alternative to lead accumulators? (Na-S secondary cells).

G. Clerici *(Italy).*

TE Int. (Italy), 14 (1990) 28-31.

H98. Evolution of electric secondary batteries from the time of Gaston Planté to the present.

J. F. Fauvarque *(Conservatoire Natl. Arts Metiers, France).*

Rev. Gen. Electr., 3 (1990) 7-12.

CA: 112(23) 215633a.

H99. The lead/acid battery industry in China.

S. Wu, R. Cui and F. Zhu *(Chongqing Storage Battery Factory, China).*

J. Power Sources, 28 (1989) 37-43.

H100. The lead/acid battery industry in Pakistan.

S.H.M. Zaidi *(Exide Pakistan Ltd., Karachi, Pakistan)*.

J. Power Sources, 28 (1989) 45-54.

H101. The lead/acid battery industry in Europe.

M.G. Mayer *(Lead Dev. Assoc., London, UK)*.

J. Power Sources, 28 (1989) 55-65.

H102. Marketing forecast - the Indian scene.

A. Raychaudhuri *(NICCO Batteries Ltd., Delhi, India)*.

J. Power Sources, 31 (1990) 383-93.

H103. The lead/acid storage battery industry in Turkey.

M.N. Turkeri *(Elecktrosan. Ltd., Tech. Dept., Ankara, Turkey)*.

J. Power Sources, 31 (1990) 395-400.

H104. On the historical development of the lead/acid battery, especially in Europe.

J. Garche *(Dep. Chem., Dresden Univ. Technol., 8027, Dresden, Germany)*.

J. Power Sources, 31 (1990) 401-6.

CA: 113(15) 131185p.

H105. Rechargeable batteries: today and tomorrow.

D.A.J. Rand and R. Woods *(CSIRO, Div. Miner. Prod., Port Melbourne, Vic. 3207, Australia)*.

In L. Wood and A.J. Jones (Eds.), New Developments in Electrode Materials and their Applications, Dept. of Industry, Technology and Commerce, Canberra, Australia, March 1990, pp. 190-207.

I. APPLICATIONS (TRACTION, AUTOMOTIVE, STATIONARY, ETC.)

I189. High specific energy lead-acid battery system for electric vehicle propulsion.

J.L. Heder, P.A. Budney and M.G. Andrew (*Johnson Controls Inc., Milwaukee, WI, USA*).

Proceedings of the 24th Intersociety Energy Conversion Engineering Conference IECEC-89 (Cat. No. 89CH2781-3), 6-11 Aug. 1989, Washington, DC, USA, pp. 1647-51.

I190. Advanced lead-acid batteries for EV propulsion.

M.G. Andrew, P.A. Budney and J.L. Heder (*UK*).

Electr. Veh. Dev. (UK), 8 (1989) 59-60.

I191. An advanced tubular plate lead-acid battery system for EV applications.

J. McWhinnie, B.P. Kelly, R.I. Sims and G. Clegg (*UK*).

Electr. Veh. Dev. (UK), 8 (1989) 65-6.

I192. A high power sealed, lead-acid battery for electric vehicles.

D.B. Edwards and B. Carter (*Idaho Univ., Moscow, ID, USA*).

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I193. Design and evaluation of a sealed lead-acid aircraft battery.

D.G. Vutetakis (*Battelle, Columbus, OH, USA*).

Proceedings of the 34th International Power Sources Symposium (Cat. No. 90CH2863-9), 25-28 June 1990, Cherry Hill, NJ, USA, pp. 61-3.

I194. New lead-acid traction batteries needing no topping-up for one year.

M. Takura (*Yuasa Battery Co., Ltd., Takatsuki, Japan, 569*).

Prog. Batteries Sol. Cells, 8 (1989) 245-8.

CA: 112(16) 142715s.

I195. Development of lead-acid traction batteries requiring no maintenance for one year.

M. Takura, T. Matsui, S. Sasabe and Y. Kasai (*Yuasa Denchi K.K., Osaka, Japan*).

Yuasa Jiho, 67 (1989) 28-35.

CA: 112(12) 102077d.

I196. Development of sealed lead-acid battery for small electric traction vehicles.

K. Kawakita and K. Asada *(Yuasa Denchi K.K., Japan)*.

Yuasa Jiho, 69 (1990) 15-18.

CA: 114(12) 105660r.

I197. Improvement of SLA battery for motorcycles.

Y. Nakayama, S. Nakao, T. Isoi and H. Furukawa *(Yuasa Denchi K.K., Japan)*.

Yuasa Jiho, 69 (1990) 9-14.

CA: 114(12) 105659x.

I198. Future trends in automotive lead/acid batteries.

T. Yuasa *(Yuasa Battery Co. Ltd., Tokyo, Japan)*.

J. Power Sources, 28 (1989) 11-21.

I199. The battery system as a principal component in UPS systems.

T. Suntio, A. Kujala and L. Jonsson *(Fiskars Oy Ab Electron. Power Syst., Helsinki, Finland)*.

Power Quality '89. Official Proceedings of the First International Conference, 15-20 Oct. 1989, Long Beach, CA, USA, pp. 439-53.

I200. Stationary battery maintenance and testing (for UPS).

M.W. Migliaro and M.P. O'Brien *(Impell Corp., Melville, NY, USA)*.

Power Quality '89. Official Proceedings of the First International Conference, 15-20 Oct. 1989, Long Beach, CA, USA, pp. 435-8.

I201. Stationary battery selection (for UPS applications).

M.W. Migliaro and M.P. O'Brien *(Impell Corp., Melville, NY, USA)*.

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I202. Batteries and AC phenomena in UPS systems: the battery point of view.

A.I. Harrison *(Chloride Ind. Batteries Group, Manchester, UK)*.

INTELEC '89. Eleventh International Telecommunications Energy Conference. Conference Proceedings (Cat. No. 89CH2849-8), 15-18 Oct. 1989, Florence, Italy, pp. 12.5/1-6.

I203. Improved batteries permit smaller UPS systems.

G. Braun *(Gates Energy Products Inc., Gainesville, Fl, USA)*.

PCIM '90. USA Official Proceedings of the Twenty-First-International Power Conversion Conference, 21-26 Oct. 1990, Philadelphia, PA, USA, pp. 54-60.

I204. Batteries at the UPS level. A life for the safety.

T. Wolstenholme.

Elektr. Energ.-Tech. (Germany), 35 (1990) 24-6.

I205. The batteries as a principal component in DC UPS systems.

T. Suntio and A. Glad *(Fiskars Power Syst., Espoo, Finland)*.

INTELEC '90. Twelfth International Telecommunications Energy Conference (Cat. No. 90CH2928-0), 21-25 Oct. 1990, Orlando, Fl, USA, pp. 400-11.

I206. Lead/acid stationary batteries for power sector in India.

G. Sivaramaiah and V.R. Subramanian *(Battery Society of India, Indian Lead Zinc Inf. Centre, New Delhi, India).*

J. Power Sources, 28 (1989) 201-5.

I207. Industrial applications of large lead-acid batteries for emergency and peak power demand.

W.C. Spindler *(Batteries Inc., Riverside, CA, 92506, USA).*

Lead-zinc '90, Proc. World Symp. Metall. Environ. Control, 119th TMS Annu. Meet., (1990) 757-65.

CA: 114(24) 231964f.

I208. Peak-levelling battery installations.

M. Maljean and A. Depreter, *(France).*

Revue E, 106 (1990) 10-13.

I209. Lead/acid batteries in USA load-levelling applications.

D.S. Carr *(Int. Lead Zinc Res. Organ. Inc., Research Triangle Park, NC, USA).*

J. Power Sources, 31 (1990) 297-310.

I210. Sealed, lead-acid, maintenance-free battery for cultivator use.

T. Yamada *(Eng. Dep., Japan Storage Battery Co., Ltd., Kyoto, Japan, 601).*

Prog. Batteries Sol. Cells, 8 (1989) 243-4.

CA: 112(16) 142714r.

I211. Sealed maintenance-free batteries. Theory and applications.

H. Tuphorn *(Accumulatorenfabrik Sonnenschein GmbH, Germany).*

Rev. Gen. Electr., 3 (1990) 45-9.

CA: 112(24) 220244d.

I212. A new dual reserve power system for small telephone exchanges.

J.A. O'Connors *(British Telecommun. Power & Building Eng. Services, London, UK).*

INTELEC '89. Eleventh International Telecommunications Energy Conference. Conference Proceedings (Cat. No.89CH2849-8), 15-18 Oct. 1989, Florence, Italy, pp. 10.2/1-4.

I213. Immobilized electrolyte lead-acid battery technologies for the Telecommunications Industry.

L.J. Scerbo, T.M. Taylor, C.K. Dyer, D.C. Pote, R.E. Willis and T.D. O'Sullivan *(Bellcore, Morristown, NY, USA).*

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I214. Factors to be considered when choosing a back-up battery for telecommunications.

B. Gray *(Accumulatorenfabrik Sonnenschein GmbH, Büdingen, Germany).*

INTELEC '89. Eleventh International Telecommunications Energy Conference. Conference Proceedings (Cat. No. 89CH2848-8), 15-18 Oct. 1989, Florence, Italy, pp. 12.8/1-5.

I215. A 25th cell in a 48 volt telephone battery plant. Float, capacity and recharge behaviour after a one year field trial in a working telephone central office environment.

D.O. Feder, J.M. McAndrews and A.J. Williamson *(USA).*

INTELEC '90. Twelfth International Telecommunications Energy Conference (Cat. No. 90CH2928-0), 21-25 Oct. 1990, Orlando, FL, USA, pp.226-33.

I216. Prediction of remaining battery discharge time in telecommunications systems.

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