

## Subject Index of Volume 33

---

### Alloy(s)

- behaviour of Pb-Ca alloys in positive plates of flooded and recombinant lead/acid batteries, 59
- demands on automotive battery performance, what is best alloy?, 285
- electrochemical properties of Pb-Sr alloys for lead/acid batteries, 21
- grid alloys for maintenance-free deep-cycling batteries, 3
- improved grid alloys for deep-cycling Pb-Ca batteries, 13
- Pb-Ca alloys in production of lead/acid batteries, 51

### Automotive applications

- characteristics of valve-regulated lead/acid batteries for automotive applications under deep-discharge duty, 105

### Automotive batteries

- automotive batteries; from single component to entire part of electrical system in vehicle, 331
- automotive battery energy density; past, present and future, 247
- failure mechanisms of lead/acid automotive batteries in service in U.S.A., 257

### Automotive battery performance

- demands on automotive battery performance, what is best alloy?, 285

### Automotive battery plates

- thirteen years' experience with expanded Pb-Ca-Sn grids for automotive battery plates, 67

### Battery(ies)

- application of wrought Pb-Ca batteries in Europe, 87
- automotive batteries; from single component to entire part of electrical system in vehicle, 331
- formation of wrought Pb-Ca batteries for consistency, 77
- grid alloys for maintenance-free deep-cycling batteries, 3
- improved grid alloys for deep-cycling Pb-Ca batteries, 13

### lead/acid

- behaviour of Pb-Ca alloys in positive plates of flooded and recombinant lead/acid batteries, 59
- characteristics of valve-regulated lead/acid batteries for automotive applications under deep-discharge duty, 105
- electrochemical properties of Pb-Sr alloys for, 21
- improving performance of deep-cycling, valve-regulated lead/acid batteries, 93
- low-maintenance, valve-regulated, lead/acid batteries in utility applications, 145
- Pb-Ca alloys in production of lead/acid batteries, 51
- sealed lead/acid battery for motorcycle use, 117

### Battery applications

- pure Pb and Sn effect in deep-cycling lead/acid battery applications, 165

### Battery designer

- battery designer's challenge; satisfying ever-increasing demands of vehicle electrical systems, 309

### Battery electrical needs

- battery electrical needs for next generation of cars, 291

### Battery performance

- demands on automotive battery performance, what is best alloy?, 285

### Battery plate(s)

- effect of dopants (Group Va) on performance of positive lead/acid battery plate, 221
- thirteen years' experience with expanded Pb-Ca-Sn grids for automotive battery plates, 67
- variables affecting deep-cycling characteristics of expanded-grid lead/acid battery plates, 187

### Battery production

- processing of wastes from lead/acid battery production, 279

## Calcium

- application of wrought Pb–Ca batteries in Europe, 87
- discontinuous and continuous hardening processes in Ca and Ca–Sn micro-alloyed Pb; influence of 'secondary-lead' impurities, 27
- formation of wrought Pb–Ca batteries for consistency, 77
- Pb–Ca alloys in production of lead/acid batteries, 51
- thirteen years' experience with expanded Pb–Ca–Sn grids for automotive battery plates, 67

## Capacity decay

- reversible capacity decay of positive electrodes in lead/acid cells, 231

## Car(s)

- battery electrical needs for next generation of cars, 291
- electronics in cars; consequences for energy-supply system, 319

## Cell(s)

- maintenance-free motive-power cells using gas-recombination technology, 135
- reversible capacity decay of positive electrodes in lead/acid cells, 231

## Cycle life

- high gelled-electrolyte quality with polyacrylamide polymer; limitation of cycle-life through water loss, 127

## Deep-cycling batteries

- grid alloys for maintenance-free deep-cycling batteries, 3
- improved grid alloys for deep-cycling Pb–Ca batteries, 13
- improving performance of deep-cycling, valve-regulated lead/acid batteries, 93

## Deep-cycling battery applications

- pure Pb and Sn effect in deep-cycling lead/acid battery applications, 165

## Deep-cycling characteristics

- variables affecting deep-cycling characteristics of expanded-grid lead/acid battery plates, 187

## Deep-discharge duty

- characteristics of valve-regulated lead/acid batteries for automotive applications under deep-discharge duty, 105

## Dopants

- effect of dopants (Group Va) on performance of positive lead/acid battery plate, 221

## Electrical needs

- battery electrical needs for next generation of cars, 291

## Electrical system(s)

- automotive batteries; from single component to entire part of electrical system in vehicle, 331
- battery designer's challenge satisfying ever-increasing demands of vehicle electrical systems, 309

## Electrochemical properties

- of Pb–Sr alloys for lead/acid batteries, 21

## Electrochemistry

- influence of phosphoric acid on both electrochemistry and operating behaviour of lead/acid system, 213

## Electrodes

- reversible capacity decay in positive electrodes in lead/acid cells, 231

## Electrolyte

- high gelled-electrolyte quality with polyacrylamide polymer; limitation of cycle-life through water loss, 127

## Electronics

- electronics in cars; consequences for energy-supply system, 319

## Energy density

- automotive battery energy density; past, present and future, 247

## Energy-supply system

- electronics in cars; consequences for energy-supply system, 319

## Expanded grid

- variables affecting deep-cycling characteristics of expanded-grid lead/acid battery plates, 187

## Failure mechanisms

- failure mechanisms of lead/acid automotive batteries in service in U.S.A., 257

## Gas-recombination technology

- maintenance-free motive-power cells using gas-recombination technology, 135

- Gelled-electrolyte
  - high gelled-electrolyte quality with polyacrylamide polymer; limitation of cycle-life through water loss, 127
- Grid alloys
  - grid alloys for maintenance-free deep-cycling batteries, 3
  - improved grid alloys for deep-cycling Pb-Ca batteries, 13
- Grids
  - thirteen years' experience with expanded Pb-Ca-Sn grids for automotive battery plates, 67
- Hardening processes
  - discontinuous and continuous hardening processes in Ca and Ca-Sn micro-alloyed Pb; influence of 'secondary-lead' impurities, 27
- Lead
  - discontinuous and continuous hardening processes in Ca and Ca-Sn micro-alloyed Pb; influence of 'secondary-lead' impurities, 27
  - pure Pb and Sn effect in deep-cycling lead/acid battery applications, 165
  - thirteen years' experience with expanded Pb-Ca-Sn grids for automotive battery plates, 67
- Lead/acid battery(ies)
  - behaviour of Pb-Ca alloys in positive plates of flooded and recombinant lead/acid batteries, 59
  - characteristics of valve-regulated lead/acid batteries for automotive applications under deep-discharge duty, 105
  - electrochemical properties of Pb-Sr alloys for lead/acid batteries, 21
  - failure mechanisms of lead/acid automotive batteries in service in U.S.A., 257
  - improving performance of deep-cycling, valve-regulated lead/acid batteries, 93
  - low-maintenance, valve-regulated, lead/acid batteries in utility applications, 145
  - Pb-Ca alloys in production of lead/acid batteries, 51
  - pure Pb and Sn effect in deep-cycling lead/acid battery applications, 165
  - sealed lead/acid battery for motorcycle use, 117
- Lead/acid battery plate(s)
  - effect of dopants (Group Va) on performance of positive lead/acid battery plate, 221
  - variables affecting deep-cycling characteristics of expanded-grid lead/acid battery plates, 187
- Lead/acid battery production
  - processing of wastes from lead/acid battery production, 279
- Lead/acid cells
  - reversible capacity decay in positive electrodes in lead/acid cells, 231
- Lead/acid system
  - influence of phosphoric acid on both electrochemistry and operating behaviour of lead/acid system, 213
- Lead-calcium alloys
  - behaviour of Pb-Ca alloys in positive plates of flooded and recombinant lead/acid batteries, 59
  - Pb-Ca alloys in production of lead/acid batteries, 51
- Lead-calcium batteries
  - application of wrought Pb-Ca batteries in Europe, 87
  - formation of wrought Pb-Ca batteries for consistency, 77
  - improved grid alloys for deep-cycling Pb-Ca batteries, 13
- Lead-strontium alloys
  - electrochemical properties of Pb-Sr alloys for lead/acid batteries, 21
- Low-maintenance batteries
  - low-maintenance, valve-regulated, lead/acid batteries in utility applications, 145
- Maintenance-free batteries
  - grid alloys for maintenance-free deep-cycling batteries, 3
- Maintenance-free cells
  - maintenance-free motive power cells using gas-recombination technology, 135
- Motive-power cells
  - maintenance-free motive-power cells using gas-recombination technology, 135
- Motorcycle(s)
  - sealed lead/acid battery for motorcycle use, 117

**Operating behaviour**

influence of phosphoric acid on both electrochemistry and operating behaviour of lead/acid system, 213

**Phosphoric acid**

influence of phosphoric acid on both electrochemistry and operating behaviour of lead/acid system, 213

**Polyacrylamide polymer**

high gelled-electrolyte quality with polyacrylamide polymer; limitation of cycle-life through water loss, 127

**Positive plates**

behaviour of Pb–Ca alloys in positive plates of flooded and recombinant lead/acid batteries, 59

**Strontium**

electrochemical properties of Pb–Sr alloys for lead/acid batteries, 21

**Temperature-controlled formation, 275****Tin**

discontinuous and continuous hardening processes in Ca and Ca–Sn micro-alloyed Pb; influence of 'secondary-lead' impurities, 27

pure Pb and Sn effect in deep-cycling lead/acid battery applications, 165

thirteen years' experience with expanded Pb–Ca–Sn grids for automotive battery plates, 67

**Utility applications**

low-maintenance, valve-regulated, lead/acid batteries in utility applications, 145

**Valve-regulated batteries**

characteristics of valve-regulated lead/acid batteries for automotive applications under deep-discharge duty, 105

improving performance of deep-cycling, valve-regulated, lead/acid batteries, 93

low-maintenance, valve-regulated, lead/acid batteries in utility applications, 145

**Vehicle(s)**

automotive batteries; from single component to entire part of electrical system in vehicle, 331

battery designer's challenge satisfying ever-increasing demands of vehicle electrical systems, 309

**Wastes**

processing of wastes from lead/acid battery production, 279

**Water loss**

high gelled-electrolyte quality with polyacrylamide polymer; limitation of cycle-life through water loss, 127