

TABLE OF CONTENTS

| | |
|---|-----|
| Modeling: The Roadmap to Battery Requirements..... | 1 |
| <i>J. Newman, H. Hafezi, and C. Monroe</i> | |
| Recent Advances in Lithium-ion Batteries..... | 14 |
| <i>R. J. Brood</i> | |
| Test and Diagnostic Methods Used to Study Interface Phenomena in High-Power Lithium-ion Cells..... | 27 |
| <i>G. L. Henriksen</i> | |
| Performance Variations from $\text{Li}_{1+x}\text{Mn}_{2-x}\text{O}_4$ Cathode Materials: Cause and Effects..... | 36 |
| <i>W. F. Howard, Jr., S. W. Sheargold, P. M. Story, and D. Zhang</i> | |
| Layered $(1-x)\text{Li}_2\text{MnO}_3 \bullet x\text{LiMO}_2$ (M=Ni, Co, Cr, or Mn) Electrodes for Lithium Batteries..... | 47 |
| <i>C. S. Johnson and M. M. Thackeray</i> | |
| Impedance Behavior of the $\text{LiMn}_2\text{O}_4/\text{LiPF}_6\text{-DMC-EC}$ Interface During Cycling | 61 |
| <i>K. Striebel, E. Sakai, and E. Cairns</i> | |
| ^7Li MAS-NMR, X-ray Spectroscopy and Electrochemical Studies of LiMn_2O_4 -Based Spinel for Lithium Rechargeable Batteries..... | 68 |
| <i>M. C. Tucker, A. Braun, U. Bergmann, H. Wang, P. Glatzel, J. A. Reimer, S. P. Cramer, And E. J. Cairns</i> | |
| Overview of Carbon Anodes for Lithium-ion Batteries..... | 80 |
| <i>K. Kinoshita and K. Zaghib</i> | |
| Intermetallic Negative Electrodes for Lithium Batteries..... | 92 |
| <i>M. M. Thackeray, J. T. Vaughey, C. S. Johnson, A. J. Kropf, H. Tostmann, R. Benedek, T. Sarankonsri, and S. A. Hackney</i> | |
| <i>In-situ</i> X-ray Absorption Fine Structure and Raman Studies of Embedded Lithiated Manganese Oxide Particle Electrodes in Electrolyte Solutions of Relevance to Battery Applications..... | 102 |
| <i>D. A. Totir and D. A. Scherson</i> | |
| Preparation and Properties of Li Nanocomposites Produced Via Hydrogen Driven, Solid State, Metallurgical Reactions | 114 |
| <i>J. J. Reilly, J. R. Johnson, T. Vogt, G. D. Adzic, Y. Zhu, and J. McBreen</i> | |
| Multi-Phase Transformations in Intermetallic Compounds for Li-ion Batteries | 134 |
| <i>S. A. Hackney</i> | |

| | |
|--|-----|
| Design of Pore-Solid Architectures in Nanostructured Battery Materials | 144 |
| <i>J. W. Long, R. M. Stroud, K. E. Swider-Lyons, and D. R. Rolison</i> | |
| Using Block Copolymers in Nanostructured Architectures in Lithium Batteries | 153 |
| <i>A. M. Mayes and D. R. Sadoway</i> | |
| Transport Phenomena at Nanoscale Dimensions | 163 |
| <i>J. J. Watkins, B. D. Cope, J. L. Conyers, Jr., and H. S. White</i> | |
| Nanoscale Fabrication and Modification of Selected Battery Materials | 175 |
| <i>R. Kostecki, X. Y. Song, K. Kinoshita, and F. McLarnon</i> | |
| Nanostructured Silicon Based Composites: New Anode Materials for | 185 |
| Li-ion Batteries | |
| <i>I-s. Kim, P. N. Kumta, and G. E. Blomgren</i> | |
| Synthesis and Electrochemical Properties of High Surface Area Sol-Gel Materials | 197 |
| <i>J. Sakamoto, W. Dong, and B. Dunn</i> | |
| Improving the Volumetric Lithium-Insertion Capacity of V ₂ O ₅ Electrodes Prepared Using the Template Method | 208 |
| <i>J. Patrissi and C. R. Martin</i> | |
| Theoretical Study of Lithium Affinities of Salts Used in Polymer Electrolytes | 223 |
| <i>G. Baboul and L. A. Curtiss</i> | |
| ⁶ Li MAS NMR Studies of Lithium Manganese Cathode Materials | 235 |
| <i>Y. J. Lee and C. P. Grey</i> | |
| Nanostructured Electrode Materials for Rechargeable Li Batteries | 244 |
| <i>A. Singhal, G. Skandan, G. Amatucci, and N. Pereira</i> | |
| Structural Characterization and Electrochemical Performance of Cathodes for Lithium-ion Batteries | 252 |
| <i>J. McBreen, X.-Q. Yang, m. Balasubramanian, and X. Sun</i> | |
| Effect of Ni and Cu Substitution in Mn Oxide Spinel Cathode Electrodes: An Electrochemical and <i>In-situ</i> Synchrotron Spectroscopic Study | 262 |
| <i>S. Mukerjee, R. C. Urian, X. Q. Yang, J. McBreen, and Y. E. Eli</i> | |
| Interfacial Phenomena on Selected Cathode Materials | 272 |
| <i>R. Kostecki, Y. Matsuo, and F. McLarnon</i> | |
| Surface Phenomena Responsible for Impedance Rise in Lithium-ion High Power Batteries | 283 |
| <i>K. Amine, J. Luo, J. Liu, C. Chen, A. Andersson, and D. Vissers</i> | |

| | |
|---|-----|
| Characterization and Stabilization of Passivation at the Lithium/Polymer Electrolyte Interface: A Nanoscale Approach..... | 288 |
| <i>S. Gadad and D. Teeters</i> | |
| X-ray Absorption and Electrochemical Studies of Tin-Based Oxide Electrodes..... | 301 |
| <i>A. N. Mansour and S. Mukerjee</i> | |
| Novel Tunnel-Containing Manganese Oxides with Excellent Reversibility | 309 |
| <i>M. M. Doeff, T. J. Richardson, K-T. Hwang, A. Anapolsky, M. Gonzales, and L. C. De Jonghe</i> | |
| Mechanisms of Lithium Conductance in PEO from Molecular Simulation | 317 |
| <i>J. W. Halley and Y. Duan</i> | |
| Lithium-ion Conducting Channel..... | 326 |
| <i>L. G. Scanlon, L. R. Lucente, W. A. Feld, G. Sandi, D. J. Campo, A. E. Turner, C. S. Johnson, and R. A. Marsh</i> | |
| Chemical, Electrochemical, and Mechanical Requirements for Electrolytes at Electrode Interfaces | 340 |
| <i>Y. B. Han, J. Hou, J. B. Kerr, K. Kimoshita, J. K. Pugh, C. Leiva-Parades, S. E. Sloop, and S. Wang</i> | |
| Index | 353 |