

1. Record Nr.	UNINA9910830150503321
Titolo	Lithium ion batteries : fundamentals and performance // M. Wakihara, O. Yamamoto, eds
Pubbl/distr/stampa	Weinheim, [Germany] : , : Wiley-VCH, , 1998 ©1998
ISBN	1-282-01025-5 9786612010255 3-527-61200-9 3-527-61198-3
Descrizione fisica	1 online resource (264 p.)
Disciplina	621.31242 621.312423
Soggetti	Lithium cells
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Lithium Ion Batteries Fundamentals and Performance; List of Contributors; Contents; Preface; 1 General Concepts; 1.1 Introduction; 1.2 Design Considerations; 1.2.1 Definitions; 1.2.2 Design Considerations; 1.2.3 Choosing an Electrode; 1.2.4 Anodes; 1.3 Insertion of Lithium into Structures Containing Polyanions; 1.3.1 Close-Packed Oxide-Ion Arrays; 1.3.2 NASICON Frameworks; 1.3.3 Conclusion; References; 2 Cathode Active Materials with a Three-dimensional Spinel Framework; 2.1 Introduction; 2.2 Crystal Structure of Spinel Type Phases; 2.3 Synthesis Technique 2.4 Relationship between Discharge Voltage and Thermodynamic Function of the Cathode Materials 2.5 Phase Transformation During Intercalation Processes; 2.6 Doped Spinel Phases LiMYMn <sub>2</sub> -YO <sub>4</sub> (M = Co, Cr, Ni) as 4 V-Class Cathode Material; 2.6.1 Doping Effect on Charge-Discharge Behavior of Manganese Spinel; 2.6.2 OCV and Phase Transformation; 2.6.3 Cycling Performance; 2.6.4 Structure Aspects; 2.6.5 The Chemical Diffusion Coefficients of Lithium Ions in Li <sub>x</sub> MyMn <sub>2</sub> -yO <sub>4</sub> (M=Co and Cr); 2.6.6 Low Temperature Behavior; 2.7 Conclusions; References

3 The Relationship between Structure and Cell Properties of the Cathode for Lithium Batteries 3.1 Introduction; 3.2 Titanium Disulfide and Intercalation Chemistry; 3.3 Vanadium Dichalcogenides; 3.4 Layered Oxides; 3.5 Manganese Oxides; 3.6 Vanadium Oxides; 3.7 The Future; References; 4 Design of the Lithium Anode and Electrolytes in Lithium Secondary Batteries with a Long Cycle Life; 4.1 Introduction; 4.2 Lithium Metal Anode; 4.2.1 Protection Films on Lithium Metal Anode; 4.2.2 Cycling Efficiency of Lithium Anode; 4.2.3 Morphology of Deposited Lithium 4.2.4 Mechanism of Lithium Deposition and Dissolution 4.2.5 The Amount of Dead Lithium and Cell Performance; 4.2.6 Improvement in the Cycling Efficiency of a Lithium Anode; 4.3 Safety; 4.3.1 Configuration of Prototype Cells; 4.3.2 Cell Performance; 4.3.3 Heat Generation in a Cell-General Considerations; 4.3.4 Incidents During Normal Cycling; 4.3.5 Safety Tests on AA-size Li/a-V205(-P205) Cells; 4.4 Conclusion; References; 5 Development of the Carbon Anode in Lithium Ion Batteries; 5.1 Introduction; 5.2 Structure of Carbon Materials; 5.3 Development of the Carbon Anode 5.4 Intercalation Mechanism of Graphite 5.5 Electrochemistry of Soft Carbons; 5.6 Electrochemistry of Hard Carbons; 5.7 Irreversible Surface Reactions; 5.8 Structural Modifications; 5.9 Nitrides as New Anode Materials; 5.9.1  $\text{Li}_7\text{MnN}_4$  and  $\text{Li}_3\text{FeN}_2$  (Antifluorite Structure) 56,57; 5.9.2  $\text{Li}_{3-x}\text{Co}_x\text{N}$  ( $\text{Li}_3\text{N}$  Structure) 58,59; 5.10 Summary and Conclusions; References; 6 Electrochemical Intercalation of Lithium into Carbonaceous Materials; 6.1 Introduction; 6.1.1 Negative Electrodes in Rechargeable Lithium Batteries; 6.1.2 Lithium/Carbon Intercalation Compounds; 6.1.3 Carbonaceous Host Materials 6.2 Graphitic Carbons as Host for Lithium Intercalation

---

Sommario/riassunto

Rechargeable Batteries with high energy density are in great demand as energy sources for various purposes, e.g. handies, zero emission electric vehicles, or load leveling in electric power. Lithium batteries are the most promising to fulfill such needs because of their intrinsic discharge voltage with relatively light weight. This volume has been conceived keeping in mind selected fundamental topics together with the characteristics of the lithium ion battery on the market. It is thus a comprehensive overview of the new challenges facing the further development of lithium ion batteries from

---