

1. Record Nr.	UNINA9910831193703321
Autore	Ma Jianmin
Titolo	Battery technologies : materials and components // Jianmin Ma
Pubbl/distr/stampa	Weinheim : , : John Wiley & Sons, Inc., , [2021] ©2021
ISBN	3-527-83003-0 3-527-83005-7 3-527-83004-9
Descrizione fisica	1 online resource (384 pages)
Disciplina	621.31
Soggetti	Electric batteries - Materials Electric batteries - Recycling
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Cover -- Title Page -- Copyright -- Contents -- Preface -- Chapter 1 Lilon Battery -- 1.1 Introduction -- 1.1.1 History of the Lithiumlon Battery -- 1.1.2 Basic Structure of Lithiumlon Battery -- 1.1.3 Working Mechanisms of Lithiumlon Battery -- 1.1.4 Characteristics of Lithium Ion Batteries -- 1.2 Cathode Materials for Lithiumlon Batteries -- 1.2.1 LayerStructured Cathode Materials -- 1.2.2 SpinelStructured Cathode Materials -- 1.2.3 OlivineStructured Cathode Materials -- 1.3 Anode Materials for LIBs -- 1.3.1 Intercalation Anode Materials -- 1.3.2 Alloy Anode Materials -- 1.3.3 Conversion Anode Materials -- 1.3.4 Lithium Metal Anode -- 1.4 Electrolyte -- 1.4.1 Liquid Electrolyte -- 1.4.1.1 Lithium Salts -- 1.4.1.2 Organic Solvent -- 1.4.1.3 Functional Additives -- 1.4.2 Solid Electrolyte -- 1.4.2.1 Polymer Electrolyte -- 1.4.2.2 Li3N and its Derivatives -- 1.4.2.3 Perovskite Solid Electrolyte -- 1.4.2.4 LISICON -- 1.4.2.5 NASICON -- 1.4.2.6 Garnet -- 1.4.2.7 Glassy Inorganic Solid Electrolyte -- 1.5 Separators -- 1.5.1 Polyolefin Separator -- 1.5.2 Polymers with High Melting Points for Separators -- 1.5.3 Inorganic Composite Separators -- 1.6 Conclusions and Perspective -- Acknowledgments -- References -- Chapter 2 Li-O2 Battery -- 2.1 Li-O2 Battery -- 2.1.1 Introduction -- 2.1.2 Cathode Materials -- 2.1.2.1 CarbonBased Materials -- 2.1.2.2 Noble Metal

Based Materials -- 2.1.2.3 Nonnoble MetalBased Materials -- 2.1.3  
Anode Materials -- 2.1.4 Electrolyte -- 2.1.4.1 Organic Electrolyte --  
2.1.4.2 QuasiSolidState Electrolyte -- 2.1.4.3 SolidState Electrolyte --  
2.1.5 Separator -- 2.1.6 From Li-O<sub>2</sub> Batteries to Li-Air Batteries --  
2.1.7 Summary and Perspective -- Acknowledgments -- References --  
Chapter 3 Li-Sulfur Battery -- 3.1 Introduction -- 3.2 Fundamentals --  
3.3 Cathodes -- 3.3.1 S Cathodes -- 3.3.1.1 Physical Confinement.  
3.3.1.2 Physical Blocking -- 3.3.1.3 Polymeric Organosulfur -- 3.3.1.4  
Chemical Adsorption and Catalysis -- 3.3.2 Li<sub>2</sub>S Cathodes -- 3.4  
Electrolytes -- 3.4.1 Ether Electrolyte -- 3.4.2 CarbonateBased --  
3.4.3 NitrileBased -- 3.4.4 Sulfones/SulfoxidesBased -- 3.4.5 Ionic  
Liquids -- 3.4.6 Polymer/SolidState Electrolytes -- 3.4.7 Additives --  
3.5 Anodes -- 3.5.1 Li Anodes -- 3.5.2 Carbon Anodes -- 3.5.3 Silicon  
Anodes -- 3.6 Challenges and Perspectives -- References -- Chapter 4  
Nalon Battery -- 4.1 Introduction -- 4.1.1 History of SodiumIon  
Batteries -- 4.1.2 Composition and Working Mechanism of SIBs -- 4.2  
Cathode Materials for SIBs -- 4.2.1 Layered Transition Metal Oxide --  
4.2.2 Polyanionic Compounds -- 4.2.3 Hexacyanoferrates -- 4.2.4  
Organic Compounds -- 4.3 Anode Materials for SIBs -- 4.3.1 Insertion  
Anode Materials -- 4.3.1.1 Carbon Materials -- 4.3.1.2 TitaniumBased  
Oxide -- 4.3.2 Alloyed Anode Materials -- 4.3.3 ConversionType  
Anode Materials -- 4.4 Electrolytes for SIBs -- 4.4.1 Aqueous  
Electrolytes -- 4.4.2 Organic Electrolytes -- 4.4.3 SolidState  
Electrolytes -- 4.4.3.1 Solid Polymer Electrolytes -- 4.4.3.2 Inorganic  
Solid Electrolytes -- 4.5 Separators for SIBs -- 4.5.1 Glass Fiber  
Separator -- 4.5.2 Modified Polyolefin Separator -- 4.5.3 Other  
Separator -- References -- Chapter 5 Na-O<sub>2</sub> Battery -- 5.1  
Introduction -- 5.2 Fundamental Principles -- 5.3 Cathode Materials --  
5.3.1 Carbon Materials -- 5.3.2 Metals and Their Oxides -- 5.3.2.1  
Noble Metals and Their Oxides -- 5.3.2.2 Nonnoble Metals and Their  
Oxides -- 5.3.2.3 Dual Functional Composites -- 5.4 Anode Materials  
-- 5.4.1 Modification of Na Metal Anode -- 5.4.2 Carbon Materials  
Modified Na Anode -- 5.4.3 Metal Alloys/Composites/Hybrids -- 5.5  
Electrolytes -- 5.5.1 CarbonateBased Electrolyte -- 5.5.2 EtherBased  
Electrolyte -- 5.5.3 DMSO and ACNBased Electrolytes.  
5.5.4 Ionic LiquidBased Electrolyte -- 5.6 Mechanism Studies -- 5.7  
Conclusion and Perspectives -- Acknowledgments -- References --  
Chapter 6 ZnIon Battery -- 6.1 Introduction -- 6.2 Fundamentals --  
6.3 Cathode Materials -- 6.3.1 ManganeseBased Materials -- 6.3.2  
VanadiumBased Materials -- 6.3.3 Prussian Blue Analogous -- 6.3.4  
Other Types of Cathode Materials -- 6.4 Zn Anode -- 6.4.1 Zinc Alloy  
Anode -- 6.4.2 Surface Modification of Zn Anode -- 6.4.3 Structural  
Optimization of the Zn Anode -- 6.5 Aqueous Electrolytes -- 6.5.1  
Types of Zinc Salts -- 6.5.2 Concentration of Zinc Salt -- 6.5.3  
Electrolyte Additives -- 6.6 Challenges and Perspectives -- References  
-- Chapter 7 Zn-Air Battery -- 7.1 Introduction -- 7.1.1 Metal-Air  
Batteries -- 7.1.2 History of ZincBased Technologies -- 7.1.3  
Secondary Zinc-Air Batteries -- 7.1.3.1 Rechargeability -- 7.1.3.2  
Industrial Approximations -- 7.1.3.3 Limitations -- 7.2 Electrolyte  
System -- 7.2.1 Mechanisms for Zinc Dissolution -- 7.2.2 Strategies  
for Developing An Optimal Electrolyte System for Secondary Zinc-Air  
Batteries -- 7.2.2.1 Additives -- 7.2.2.2 Alternatives to Alkaline  
Aqueous Electrolyte -- 7.3 Bifunctional Air Electrode -- 7.3.1  
Mechanism for Bifunctional Air Electrode -- 7.3.2 Materials for  
Bifunctional Air Electrode -- 7.3.2.1 Catalysts -- 7.3.2.2 Binder --  
7.3.2.3 Conductive Agents -- 7.3.2.4 Current Collector -- 7.3.3  
Electrode Structure -- 7.4 Zinc Anode -- 7.4.1 Zinc Electrode  
Configuration -- 7.4.2 Materials for Zinc Anode -- 7.4.2.1 Active

Material -- 7.4.2.2 Additives -- 7.4.2.3 Gelling Agents and Binders --  
7.4.2.4 Current Collector -- 7.4.3 Zinc Anode Processing -- 7.5  
Membranes -- 7.6 Summary and Perspectives -- References -- Chapter  
8 Allon Battery -- 8.1 Introduction -- 8.2 Historical Development of  
Aluminum Batteries -- 8.2.1 Primary Aluminum Batteries: Aqueous  
Systems.  
8.2.2 Rechargeable Aluminum Batteries: Nonaqueous Systems -- 8.3  
Electrolytes for AlBased Batteries -- 8.3.1 Al Electrodeposition in CILs  
and Their Use in Rechargeable AlBased Batteries -- 8.3.2 Al  
Electrodeposition Using Alternative Electrolytes and Their Use in  
Rechargeable AlBased Batteries -- 8.4 Rechargeable Aluminum  
Batteries Classification -- 8.4.1 Metal Oxide/SulfideBased Aluminum  
Batteries -- 8.4.2 PolymerBased Aluminum Batteries -- 8.4.3 Graphite  
Based Aluminum Batteries -- 8.5 Rechargeable Aluminum Batteries  
Based on Graphitic Cathodes -- 8.5.1 Carbon Paper -- 8.5.2 Pyrolytic  
Graphite -- 8.5.3 Graphitic Foam -- 8.5.4 GrapheneBased Cathode --  
8.5.5 Graphite FlakesBased Cathodes -- 8.6 Conclusions --  
References -- Chapter 9 AlAir Batteries -- 9.1 Introduction -- 9.2  
Aluminum Anodes -- 9.2.1 Al Alloying Elements -- 9.2.2 Research  
Progress of Al Anodes -- 9.2.2.1 Aluminum Microalloying -- 9.2.2.2  
Heat Treatment of Al Anodes -- 9.2.2.3 Processing of Al Anodes --  
9.2.2.4 Surface coating on Al anodes -- 9.3 Air Cathodes -- 9.3.1  
Structure of Air Cathodes -- 9.3.2 Integrated Cathode -- 9.3.3 Oxygen  
Reduction Reaction -- 9.3.4 Electrocatalysts -- 9.3.4.1 Precious Metals  
and Alloys -- 9.3.4.2 Transition Metal Oxides -- 9.3.4.3 CarbonBased  
Catalysts -- 9.3.4.4 SingleAtom Catalysts -- 9.4 Electrolytes -- 9.4.1  
Aqueous Electrolytes -- 9.4.2 Corrosion Inhibitors -- 9.4.3 Polymer  
Electrolytes -- 9.5 Al-Air Battery Structure Design -- 9.6 Recycle of Al-  
Air Batteries -- 9.7 Rechargeable Al-Air Batteries -- 9.8 Summary and  
Outlook -- References -- Chapter 10 Duallon Battery -- 10.1 Cation-  
Anion Duallon Battery -- 10.1.1 Introduction -- 10.1.2 Cathode  
Materials -- 10.1.2.1 Graphitic Materials -- 10.1.2.2 Organic Materials  
-- 10.1.2.3 Other Materials -- 10.1.3 Anode Materials -- 10.1.3.1  
Metallic Materials -- 10.1.3.2 AlloyingType Materials.  
10.1.3.3 IntercalationType Materials -- 10.1.3.4 ConversionType  
Materials -- 10.1.4 Electrolyte -- 10.1.4.1 Organic Electrolyte --  
10.1.4.2 Ionic Liquid Electrolyte -- 10.1.4.3 Aqueous Electrolyte --  
10.2 Multilon Battery -- 10.2.1 Triplelon Battery -- 10.2.1.1 Dual  
Cation-Anion Battery -- 10.2.1.2 Dual Anion-Cation Battery -- 10.2.2  
Quadruplelon Battery -- 10.3 Summary and Perspective --  
Acknowledgments -- References -- Index -- EULA.

---