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Graphene-Based Composites as Anodes for LIBs; 2.4.2.1 The Lithium Storage Mechanisms of Anode Materials; 2.4.2.2 Graphene-Si/Sn Composites as Anodes for LIBs; 2.4.2.3 Graphene-Metal Oxide Composites as Anodes for LIBs; 2.4.2.4 Graphene-TiO2/MoS2 Composites as Anodes for LIBs; 2.5 Two-Dimensional (2D) Flexible and Binder-Free Graphene-Based Electrodes; 2.5.1 Graphene-Based Flexible Anode Materials for LIBs; 2.5.1.1 2D Flexible and Binder-Free Graphene Electrodes
2.5.1.2 2D Flexible and Binder-Free Graphene-Based Hybrid Anode Electrodes2.5.2 Graphene-Based Flexible Cathode Materials for LIBs; 2.6 Three-Dimensional Macroscopic Graphene-Based Electrodes; 2.7 Summary and Perspectives; References; Chapter 3 Graphene-Based Energy Devices; 3.1 Introduction; 3.2 Graphene for Li-Ion Batteries; 3.2.1 Anode Materials; 3.2.2 Cathode Materials; 3.3 Graphene for Supercapacitors; 3.4 Graphene for Li-Sulfur Batteries; 3.5 Graphene for Fuel Cells; 3.6 Graphene for Solar Cells; 3.7 Summary; References; Chapter 4 Graphene-Based Nanocomposites for Supercapacitors
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Sommario/riassunto

The book starts out with a brief overview of the fundamentals of graphene, including the main synthesis techniques, characterization methods and properties. The first main part is concerned with graphene for energy storage applications such as lithium-ion batteries, supercapacitors and hydrogen storage. The second part covers graphene-based energy-generation devices, in particular conventional as well as microbial and enzymatic fuel cells. Concluding chapters on graphene photovoltaics round off the book. In all chapters not only the device architectures on a laboratory scale will be discussed,