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Nota di contenuto	Preface -- Chapter 1: Recent Progress in Colloidal Quantum Dot Sensitized Solar Cells -- Chapter 2: Hierarchically Nanostructured Photoelectrodes for Quantum-Dot-Sensitized Solar Cells -- Chapter 3: Hybrid Optoelectronic Devices with Colloidal Quantum Dots -- Chapter

4: Control of photoinduced charge transfer in semiconducting quantum dot-based hybrids -- Chapter 5: Theory of Quantum Dot Arrays for Solar Cell Devices -- Chapter 6: Material Selection for the Quantum Dot Intermediate Band Solar Cell -- Chapter 7: AlGaInAs quantum dots for intermediate band formation in solar cell devices -- Chapter 8: Requisites for highly efficient hot-carrier solar cells -- Chapter 9: Increasing Efficiency with Multiple Exciton Generation -- Chapter 10: Graphene Quantum dot based organic solar cells -- Chapter 11: Graphene and Quantum Dot Nanocomposites for Photovoltaic Devices -- Chapter 12: The Dynamics of Multiple Exciton Generation in Semiconductor Quantum Dots -- Chapter 13: Light-induced charge carrier dynamics at nanostructured interfaces investigated by ultrafast electron diffractive photovoltammetry -- Chapter 14: Photonics and plasmonics for enhanced photovoltaic performance -- Index.

Sommario/riassunto

The third generation of solar cells includes those based on semiconductor quantum dots. This sophisticated technology applies nanotechnology and quantum mechanics theory to enhance the performance of ordinary solar cells. Although a practical application of quantum dot solar cells has yet to be achieved, a large number of theoretical calculations and experimental studies have confirmed the potential for meeting the requirement for ultra-high conversion efficiency. In this book, high-profile scientists have contributed tutorial chapters that outline the methods used in and the results of various quantum dot solar cell designs, including quantum dot intermediate band solar cells, hot electron quantum dot solar cells, quantum-dot sensitized solar cells, colloidal quantum dot solar cells, hybrid polymer-quantum dot solar cells, and MEG quantum dot solar cells. Both theoretical and experimental approaches are described. Quantum Dot Solar Cells helps to connect the fundamental laws of physics and the chemistry of materials with advances in device design and performance. The book can be recommended for a broad audience of chemists, electrical engineers, and materials scientists, and is suitable for use in courses on materials and device design for advanced and future optoelectronics. Features comprehensive coverage of novel technologies for quantum dot solar cells Written by leading experts in the corresponding research areas Supplies the keys to understanding the latest technologies for third-generation solar cells Provides a foundation for future research in materials and optoelectronics for energy applications.