1. Record Nr. UNINA9910130882403321

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Titolo	Chalcogenide photovoltaics [[electronic resource]] : physics, technologies, and thin film devices / / Roland Scheer and Hans-Werner Schock
Pubbl/distr/stampa	Weinheim, Germany, : Wiley-VCH Verlag GmbH & Co., 2011
ISBN	1-283-30246-2 9786613302465 3-527-63371-5 3-527-63370-7
Descrizione fisica	1 online resource (386 p.)
Altri autori (Persone)	SchockH. W (Hans-Werner)
Disciplina	621.31244
Soggetti	Photovoltaic cells - Materials Chalcogenides Compound semiconductors Electronic books.
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	Chalcogenide Photovoltaics; Contents; Preface; Symbols and Acronyms; 1 Introduction; 1.1 History of Cu(In,Ga)(S,Se)2 Solar Cells; 1.1.1 Milestones of Cu(In,Ga)(S,Se)2 Development; 1.2 History of CdTe Solar Cells; 1.2.1 Milestones of CdTe Development; 1.3 Prospects of Chalcogenide Photovoltaics; 2 Thin Film Heterostructures; 2.1 Energies and Potentials; 2.2 Charge Densities and Fluxes; 2.3 Energy Band Diagrams; 2.3.1 Rules and Conventions; 2.3.2 Absorber/Window; 2.3.3 Absorber/Buffer/Window; 2.3.4 Interface States; 2.3.5 Interface Dipoles; 2.3.6 Deep Bulk States; 2.3.7 Bandgap Gradients 2.4 Diode Currents2.4.1 Superposition Principle and Shifting Approximation; 2.4.2 Regions of Recombination; 2.4.3 Radiative Recombination; 2.4.4 Auger Recombination; 2.4.5 Defect Related Recombination; 2.4.5.1 SCR Recombination; 2.4.5.2 QNR Recombination; 2.4.5.3 Back Surface Recombination; 2.4.5.4 Interface Recombination; 2.4.6 Parallel Processes; 2.4.6.1 SCR and QNR Recombination; 2.4.6.2 SCR and IF Recombination; 2.4.7 Barriers for

Diode Current; 2.4.8 Bias Dependence; 2.4.9 Non-Homogeneities; 2.5 Light Generated Currents; 2.5.1 Generation Currents; 2.5.2 Generation Function
2.5.3 Photo Current2.5.4 Collection Function; 2.5.4.1 Absorber Quasi Neutral Region; 2.5.4.2 QNR with Graded Bandgap; 2.5.4.3 QNR with Back Surface Field; 2.5.4.4 Absorber Space Charge Region; 2.5.4.5 Buffer Layer; 2.5.4.6 Simulating the Collection Function; 2.5.5 Quantum Efficiency and Charge Collection Efficiency; 2.5.6 Barriers for Photo Current; 2.5.7 Voltage Dependence of Photo Current; 2.5.7.1 Width of SCR; 2.5.7.2 Interface Recombination; 2.5.7.3 Photo Current Barriers; 2.6 Device Analysis and Parameters; 2.6.1 Equivalent Circuits; 2.6.1.1 DC Equivalent Circuit
2.6.1.2 AC Equivalent Circuit2.6.1.3 Module Equivalent Circuit; 2.6.2 Current-Voltage Analysis; 2.6.2.1 External Collection Efficiency; 2.6.2.2 Diode Parameters; 2.6.2.3 Open Circuit Voltage; 2.6.2.4 Fill Factor; 2.6.3 Capacitance-Voltage Analysis; 2.6.4 Admittance Spectroscopy; 3 Design Rules for Heterostructure Solar Cells and Modules; 3.1 Absorber Bandgap; 3.2 Band Alignment; 3.3 Emitter Doping and Doping Ratio; 3.4 Fermi Level Pinning; 3.5 Absorber Doping; 3.6 Absorber Thickness; 3.7 Grain Boundaries; 3.8 Back Contact Barrier; 3.9 Buffer Thickness; 3.10 Front Surface Gradient
3.11 Back Surface Gradients3.12 Monolithic Series Interconnection; 4 Thin Film Material Properties; 4.1 AII-BVI Absorbers; 4.1.1 Physico-Chemical Properties; 4.1.2 Lattice Dynamics; 4.1.3 Electronic Properties; 4.1.3.1 Practical Doping Limits; 4.1.3.2 Defect Spectroscopy; 4.1.3.3 Minority Carrier Lifetime; 4.1.4 Optical Properties; 4.1.4.1 CdTe; 4.1.4.2 Multinary Phases; 4.1.5 Surface Properties; 4.1.6 Properties of Grain Boundaries; 4.2 AI-BIII-CVI 2 Absorbers; 4.2.1 Physico-Chemical Properties; 4.2.1.1 Ternary Phase Diagrams; 4.2.1.2 Multinary Phases; 4.2.1.3 Diffusion Coefficients
4.2.2 Lattice Dynamics

Sommario/riassunto

This first comprehensive description of the most important material properties and device aspects closes the gap between general books on solar cells and journal articles on chalcogenide-based photovoltaics. Written by two very renowned authors with years of practical experience in the field, the book covers II-VI and I-III-VI2 materials as well as energy conversion at heterojunctions. It also discusses the latest semiconductor heterojunction models and presents modern analysis concepts. Thin film technology is explained with an emphasis on current and future techniques for mass product