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Hydrogen by Water Splitting; References; Part 2: SYNTHESIS OF METAL CHALCOGENIDE NANOSTRUCTURES; 4 Metal-Selenide Nanostructures: Growth and Properties; 4.1 Introduction; 4.2 Growth and Properties of Different Groups of Metal-Selenide Nanostructures; 4.2.1 Metal Selenides from II-VI Semiconductors; 4.2.2 ZnSe; 4.2.3 CdSe; 4.2.4 HgSe; 4.3 Metal Selenides from III-VI Semiconductors; 4.3.1 In₂Se₃; 4.4 Metal Selenides from IV-VI Semiconductors; 4.4.1 SnSe; 4.4.1 PbSe; 4.5 Metal Selenides from V-VI Semiconductors; 4.5.1 Sb₂Se₃; 4.5.2 Bi₂Se₃; 4.6 Metal Selenides from Transition Metal (TM); 4.6.1 Copper Selenide (CuSe, Cu₃Se₂); 4.6.2 Iron Selenide (FeSe₂, FeSe); 4.6.3 MoSe₂; 4.6.3 WSe₂; 4.7 Ternary Metal-Selenide Compounds; 4.7.1 CuInSe₂ (Copper Indium Diselenide); 4.7.2 CdSSe; 4.7.3 CdZnSe; 4.8 Summary and Future Outlook; Acknowledgment; References; 5 Growth Mechanism and Surface Functionalization of Metal Chalcogenide Nanostructures; 5.1 Introduction; 5.1.2 Structure of Layered Transition Metal Chalcogenides (LTMCs); 5.2 Synthetic Methods for Layered Metal Chalcogenides; 5.2.1 Laser Ablation; 5.2.2 Arc Discharge; 5.2.3 Microwave-Induced Plasma; 5.2.4 Electron Beam Irradiation; 5.2.5 Spray Pyrolysis; 5.2.6 Sulfidization with H₂S; 5.2.7 Hydrothermal; 5.2.8 Metal Organic Chemical Vapor Deposition (MOCVD) Technique; 5.2.9 Vapor-Liquid-Solid (VLS) Growth; 5.2.10 Oxide-to-Sulfide Conversion; 5.2.11 Hot-Injection Solution Synthesis; 5.2.12 Liquid Exfoliation; 5.3 Surface Functionalization of Layered Metal Dichalcogenide Nanostructures; 5.3.1 Surface Functionalization Based on Polymeric Ligands; 5.3.2 Surface Functionalization Based on Pearson Hardness; 5.3.3 Surface Functionalization of Metal Chalcogenides by Silane; 5.4 Applications of Inorganic Nanotubes and Fullerenes; 5.4.1 Energy; References; 6 Optical and Structural Properties of Metal Chalcogenide Semiconductor Nanostructures; 6.1 Optical Properties of Metal Chalcogenide Semiconductor Nanostructures; 6.1.2 Metal Chalcogenide Nanocrystals; 6.2 Structural Properties and Defects of Metal Chalcogenide Semiconductor Nanostructures; References; 7 Structural and Optical Properties of CdS Nanostructures; 7.1 Introduction; 7.2 Nanomaterials

Sommario/riassunto

This first ever reference book that focuses on metal chalcogenide semiconductor nanostructures for renewable energy applications encapsulates the state-of-the-art in multidisciplinary research on the metal chalcogenide semiconductor nanostructures (nanocrystals, nanoparticles, nanorods, nanowires, nanobelts, nanoflowers, nanoribbons and more). The properties and synthesis of a class of nanomaterials is essential to renewable energy manufacturing and this book focuses on the synthesis of metal chalcogenide nanostructures, their growth mechanism, optical, electrical, and other important pro
