

Ternary And Multinary Compounds Proceedings Of The

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SHAYLEE LONG

Ternary and Multinary Compounds Springer Science & Business Media

Chalcopyrites, in particular those with a wide band gap, are fascinating materials in terms of their technological potential in the next generation of thin-film solar cells and in terms of their basic material properties. They exhibit uniquely low defect formation energies, leading to unusual doping and phase behavior and to extremely benign grain boundaries. This book collects articles on a number of those basic material properties of wide-gap chalcopyrites, comparing them to their low-gap cousins. They explore the doping of the materials, the electronic structure and the transport through interfaces and grain boundaries, the formation of the electric field in a solar cell, the mechanisms and suppression of recombination, the role of inhomogeneities, and the technological role of wide-gap chalcopyrites.

Advances in Solar Energy Technology Elsevier

III-V semiconductors have attracted considerable attention due to their applications in the fabrication of electronic and optoelectronic devices as light emitting diodes and solar cells. The electrical properties of these semiconductors can also be tuned by adding impurity atoms. Because of their wide application in various devices, the search for new semiconductor materials and the improvement of existing materials is an important field of study.

This book covers all known information about phase relations in multinary systems based on III-V semiconductors, providing the first systematic account of phase equilibria in multinary systems based on III-V semiconductors and making research originally published in Russian accessible to the wider scientific community. This book will be of interest to undergraduate and graduate students studying materials science, solid state chemistry, and engineering. It will also be relevant for researchers at industrial and national laboratories, in addition to phase diagram researchers, inorganic chemists, and solid state physicists. Features: Provides up-to-date experimental and theoretical information Allows readers to synthesize semiconducting materials with predetermined properties Delivers a critical evaluation of many industrially important systems presented in the form of two-dimensional sections for the condensed phases

Wide-Gap Chalcopyrites CRC Press

Multinary compounds are now used in a wide range of devices, including photovoltaic solar cells, light emitters and detectors, and piezoelectric actuators. Ternary and Multinary Compounds provides an interdisciplinary forum for scientists and engineers working on fundamental and applied aspects of these materials. The volume focuses on optoelectronic properties, electronic band structure, charge carrier transport, optical and magnetic properties, and superconductivity. It includes chapters on the research and development of new techniques and novel materials, such as laser ablation deposition and ferroelectrics.

Pressure-Induced Phase Transitions in AB₂X₄ Chalcogenide Compounds CRC Press

The aim of this book is to provide an overview on the importance of stoichiometry in the materials science field. It presents a collection of selected research articles and reviews providing up-to-date information related to stoichiometry at various levels. Being materials science an interdisciplinary area, the book has been divided in multiple sections, each for a specific field of applications. The first two sections introduce the role of stoichiometry in nanotechnology and defect chemistry, providing examples of state-of-the-art technologies. Section three and four are focused on intermetallic compounds and metal oxides. Section five describes the importance of stoichiometry in electrochemical applications. In section six new strategies for solid phase synthesis are reported, while a cross sectional approach to the influence of stoichiometry in energy production is the topic of the last section. Though specifically addressed to readers with a background in physical science, I believe this book will be of interest to researchers working in materials science, engineering and technology.

Ternary and Multinary Compounds Springer Nature

This handbook gives a complete and detailed survey of the field of semiconductor physics. It addresses every fundamental principle, the most important research topics and results, as well as conventional and emerging new areas of application. Additionally it provides all essential reference material on crystalline bulk, low-dimensional, and amorphous semiconductors, including valuable data on their optical, transport, and dynamic properties. This updated and extended second edition includes essential coverage of rapidly advancing areas in semiconductor physics, such as topological insulators, quantum optics, magnetic nanostructures and spintronic systems. Richly illustrated and authored by a duo of internationally acclaimed experts in solar energy and semiconductor physics, this handbook delivers in-depth treatment of the field, reflecting a combined experience spanning several decades as both researchers and educators. Offering a unique perspective on many issues, Semiconductor Physics is an invaluable reference for physicists, materials scientists and engineers throughout academia and industry.

Physics and Applications of Non-Crystalline Semiconductors in Optoelectronics Springer Science & Business Media

Although, carbon is only one of one hundred plus elements, the polymer science literature consists primarily of studies on carbon based polymers. In part, this reflects the varied feedstock sources and in part, the type of bonds and bond forming reactions available to form organic polymers that are not available to the inorganic and organometallic chemist. However, recent intense interest in polymers with novel optical, electronic or magnetic properties or polymers that can serve as precursors to ceramic, semiconductor, metallic or superconductor materials has served as a driver for the development of novel synthetic routes and characterization techniques that have launched many new inorganic and organometallic oligomers and polymer systems. The following chapters represent an effort to provide an overview of several new and continuing areas of development in inorganic and organometallic polymer science. This book represents the second in a series of books we have edited on inorganic and organometallic polymer chemistry (1. Transformation of Organo-metallics into Common and Exotic Materials, NATO ASI Series Vol 141. 3. Inorganic and Organometallic Polymers with Special Properties, NATO ASI Series in press). In this series, we attempt to develop, for the reader, an understanding of the breadth, depth and potential of inorganic and organometallic polymer science.

Optical Properties Of Solids - Proceedings Of The Taiwan-japan Workshop On Solid-state Optical Spectroscopy #N/A

A companion volume to Ternary Alloys Based on II-VI Semiconductor Compounds (CRC Press, 2013) and Quaternary Alloys Based on II-VI Semiconductor Compounds (CRC Press, 2014), Multinary Alloys Based on II-VI Semiconductors provides up-to-date experimental and theoretical information on phase relations based on II-VI semiconductor systems with five or

[Multinary Alloys Based on III-V Semiconductors](#) Springer Science & Business Media

Multinary compounds are now used in a wide range of devices, including photovoltaic solar cells, light emitters and detectors, and piezoelectric actuators. Ternary and Multinary Compounds provides an interdisciplinary forum for scientists and engineers working on fundamental and applied aspects of these materials. The volume focuses on optoelectronic properties, electronic band structure, charge carrier transport, optical and magnetic properties, and superconductivity. It includes chapters on the research and development of new techniques and novel materials, such as laser ablation deposition and ferroelectrics.

Handbook of the Physics of Thin-Film Solar Cells Royal Society of Chemistry

Optoelectronics - Materials and Techniques is the first part of an edited anthology on the multifaceted areas of optoelectronics by a selected group of authors including promising novices to the experts in the field. Photonics and optoelectronics are making an impact multiple times the semiconductor revolution made on the quality of our life. In telecommunication, entertainment devices, computational techniques, clean energy harvesting, medical instrumentation, materials and device characterization and scores of other areas of R

[Advances in Solar Energy Technology](#) World Scientific

This volume compiles the papers presented at the conference which cover the various facets of semiconductor research with emphasis on microelectronics, VLSI and special aspects related to semiconductor applications. There are four sections: Microelectronics; Materials; Photovoltaics; and Gallium Arsenide Devices.

Proceedings of the ... International Conference on Ternary and Multinary Compounds Elsevier

Here is one of the first single-author treatments of organometallic vapor-phase epitaxy (OMVPE)--a leading technique for the fabrication of semiconductor materials and devices. Also included are metal-organic molecular-beam epitaxy (MOMBE) and chemical-beam epitaxy (CBE) ultra-high-vacuum deposition techniques using organometallic source molecules. Of interest to researchers, students, and people in the semiconductor industry, this book provides a basic foundation for understanding the technique and the application of OMVPE for the growth of both III-V and II-VI semiconductor materials and the special structures required for device applications. In addition, a comprehensive summary detailing the OMVPE results observed to date in a wide range of III-V and II-VI semiconductors is provided. This includes a comparison of results obtained through the use of other epitaxial techniques such as molecular beam epitaxy (MBE), liquid-phase epitaxy (LPE), and vapor phase epitaxy using halide transport.

1991 Solar World Congress Springer Science & Business Media

This book on pressure-induced phase transitions in AB₂X₄ chalcogenide compounds deals with one important AmBnXp material. The interest in these materials is caused by their properties. The results are discussed for three main groups of structural families: cubic-spinel structures, defective

tetragonal structures, and other structures like layered and wurtzite-type modifications. A systematic analysis of the behavior of cubic (spinel), tetragonal (defect chalcopyrites and stannites) and other crystal modifications of AB₂X₄ compounds under hydrostatic pressure is performed. The behavior of Al₁Al₂S₄, Al₁Ga₂S₄, Al₁Al₂Se₄ and Al₁Ga₂Se₄ compounds with defective tetragonal structures, compounds with layered and wurtzite structures under hydrostatic pressure and the pressure dependence of the band gap, lattice parameters, interatomic distances, vibrational modes and pressure-induced phase transitions is discussed. Many of these compounds, except oxide spinels, undergo a pressure-induced phase transition towards the rocksalt-type structure. The phase transition is preceded by disorder in the cation sublattice. The dependence of the transition pressure to the rocksalt-type structure as a function of the compound ionicity and the size criterion is analyzed. At high pressures, all ordered-vacancy compounds are found to exhibit a band anticrossing between several conduction bands that leads to a strong decrease of its pressure coefficient and consequently to a strong non-linear pressure dependence of the direct bandgap energy. Theoretical studies of phase transitions in several ordered-vacancy compounds reveal that the existence of ordered vacancies alter the cation-anion bond distances and their compressibilities. The book is written for students, Ph D. students and specialists in materials science, phase transitions and new materials.

SERI Photovoltaic Advanced Research and Development Bibliography, 1982-1985 John Wiley & Sons

Zinc oxide (ZnO) belongs to the class of transparent conducting oxides that can be used as transparent electrodes in electronic devices or heated windows. In this book the material properties of, the deposition technologies for, and applications of zinc oxide in thin film solar cells are described in a comprehensive manner. Structural, morphological, optical and electronic properties of ZnO are treated in this review.

Low-temperature Synthesis of New Ternary Chalcogenide Compounds of Cu, Au, and Hg Using Alkali Metal Polychalcogenide Fluxes Springer Science & Business Media

Photovoltaic systems enable the sun's energy to be converted directly into electricity using semiconductor solar cells. The ultimate goal of photovoltaic research and development is to reduce the cost of solar power to reach or even become lower than the cost of electricity generated from fossil and nuclear fuels. The power conversion efficiency and the cost per unit area of the photovoltaic system are critical factors that determine the cost of photovoltaic electricity. Until recently, the power conversion efficiency of single-junction photovoltaic cells has been limited to approximately 33% - the so-called Shockley-Queisser limit. This book presents the latest developments in photovoltaics which seek to either reach or surpass the Shockley-Queisser limit, and to lower the cell cost per unit area. Progress toward this ultimate goal is presented for the three generations of photovoltaic cells: the 1st generation based on crystalline silicon semiconductors; the 2nd generation based on thin film silicon, compound semiconductors, amorphous silicon, and various mesoscopic structures; and the 3rd generation based on the unique properties of nanoscale materials, new inorganic and organic photoconversion materials, highly efficient multi-junction cells with low cost solar concentration, and novel photovoltaic processes. The extent to which photovoltaic materials and processes can meet the expectations of efficient and cost effective solar energy conversion to electricity is discussed. Written by an international team of expert contributors, and with researchers in academia, national research laboratories, and industry in mind, this book is a comprehensive guide to recent progress in photovoltaics and essential for any library or laboratory in the field.

[Transparent Conductive Zinc Oxide](#) ASM International(OH)

This handbook is a compendium giving a comprehensive description of the basics of semiconductor physics relevant to the design and analysis of thin film solar cell materials. It starts from the basics of material science, describing the material and its growth, defect and electrical properties, the basics of its interaction with photons and the involved statistics, proceeding to space charge effects in semiconductors and pn-junctions. Most attention is given to analyze homo- and hetero-junction solar cells using various models and applying the field-of-direction analysis for discussing current voltage characteristics, and helping to discover the involvement of high-field effects in solar cells. The comprehensive coverage of the main topics of - and relating to - solar cells with extensive reference to literature helps scientists and engineers at all levels to reach a better understanding and improvement of solar cell properties and their production. The author is one of the founders of thin film solar cell research.

Thin-Film Solar Cells Springer Science & Business Media

Contents:Fundamental Aspects of Crystal Growth from the Melt (C Paorici & L Zanotti)Phase Diagrams in Crystal Growth (A N Christensen)Growth Procedures and Perfection of Semiconductor Materials (A Lindegaard-Andersen)Atomistic Aspects of Crystal Growth and Epitaxy (I Markov)Fundamentals of Liquid Phase Epitaxial Growth (P Kordos)Determination of Few Selected Basic Parameters of the Investigation of AIII-BV Semiconductors Using X-Ray Methods (H Bruhl)Multijunction Solar Cells (I Chambouleyron)Application of the Mossbauer Spectroscopy to the Study of Magnetic Materials (G Albanese)Metallic Magnetism in Modern Materials (D Givord)and others Readership: Materials scientists.

[Semiconductor Physics](#) The Electrochemical Society

This proceedings volume contains review articles on solid-state spectroscopies by leading researchers in Japan and Taiwan. Topics include excitons and biexcitons, size effects in quantum dots and microcrystals, nonlinear optical properties, optical spectra of disordered systems, electronic and optical properties of metal-dielectric and semiconductor superlattices, photoemission, Raman spectroscopy, and photoreflectance studies on solids.

[Multinary Alloys Based on II-VI Semiconductors](#) BoD - Books on Demand

Addressing the growing demand for larger capacity in information technology, VLSI Micro- and Nanophotonics: Science, Technology, and Applications explores issues of science and technology of micro/nano-scale photonics and integration for broad-scale and chip-scale Very Large Scale Integration photonics. This book is a game-changer in the sense that it is quite possibly the first to focus on "VLSI Photonics". Very little effort has been made to develop integration technologies for micro/nanoscale photonic devices and applications, so this reference is an important and necessary early-stage perspective on this field. New demand for VLSI photonics brings into play various technological and scientific issues, as well as evolutionary and revolutionary challenges—all of which are discussed in this book. These include topics such as miniaturization, interconnection, and integration of photonic devices at micron, submicron, and nanometer scales. With its "disruptive creativity" and unparalleled coverage of the photonics revolution in information technology, this book should greatly impact the future of micro/nano-photonics and IT as a whole. It offers a comprehensive overview of the science and engineering of micro/nanophotonics and photonic integration. Many books on micro/nanophotonics focus on understanding the

properties of individual devices and their related characteristics. However, this book offers a full perspective from the point of view of integration, covering all aspects of benefits and advantages of VLSI-scale photonic integration—the key technical concept in developing a platform to make individual devices and components useful and practical for various applications.

[The Cumulative Book Index](#) Springer Science & Business

In the first comprehensive treatment of these technologically important materials, the authors provide theories linking the properties of semiconductor alloys to their constituent compounds. Topics include crystal structures, bonding, elastic properties, phase diagrams, band structures, transport, ab-initio theories, and semi-empirical theories. Each chapter includes extensive tables and figures as well as problem sets.

[Physics Of Semiconductor Devices - Proceedings Of The Fourth International Workshop](#) The Electrochemical Society

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 production, and the book closes with a compendium of failure analysis in photovoltaic thin film modules. With its overview of the semiconductor physics and technology needed, this practical book is ideal for students, researchers, and manufacturers, as well as for the growing number of engineers and researchers working in companies and institutes on chalcogenide photovoltaics.