Sadao Adachi

Properties of Group-IV, III-V and II-VI Semiconductors

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Properties Of Semiconductor Alloys Group Iv Iii V And Ii Vi Semiconductors

Sadao Adachi

Properties Of Semiconductor Alloys Group Iv Iii V And Ii Vi Semiconductors:

Properties of Semiconductor Alloys Sadao Adachi,2009-04-20 The main purpose of this book is to provide a comprehensive treatment of the materials aspects of group IV III V and II VI semiconductor alloys used in various electronic and optoelectronic devices The topics covered in this book include the structural thermal mechanical lattice vibronic electronic optical and carrier transport properties of such semiconductor alloys The book reviews not only commonly known alloys SiGe AlGaAs GaInPAs and ZnCdTe but also new alloys such as dilute carbon alloys CSiGe CSiSn etc III N alloys dilute nitride alloys GaNAs and GaInNAs and Mg or Be based II VI semiconductor alloys Finally there is an extensive bibliography included for those who wish to find additional information as well as tabulated values and graphical information on the properties of semiconductor alloys Properties of Semiconductor Alloys Sadao Adachi,2009-03-12 The main purpose of this book is to provide a comprehensive treatment of the materials aspects of group IV III V and II VI semiconductor alloys used in various electronic and optoelectronic devices The topics covered in this book include the structural thermal mechanical lattice vibronic electronic optical and carrier transport properties of such semiconductor alloys The book reviews not only commonly known alloys SiGe AlGaAs GaInPAs and ZnCdTe but also new alloys such as dilute carbon alloys CSiGe CSiSn etc III N alloys dilute nitride alloys GaNAs and GaInNAs and Mg or Be based II VI semiconductor alloys Finally there is an extensive bibliography included for those who wish to find additional information as well as tabulated values and graphical information on the properties of semiconductor alloys **Properties of Group-IV, III-V and II-VI Semiconductors** Sadao Adachi,2005-06-14 Almost all the semiconductors of practical interest are the group IV III V and II VI semiconductors and the range of technical applications of such semiconductors is extremely wide The purpose of this book is twofold to discuss the key properties of the group IV III V and II VI semiconductors to systemize these properties from a solid state physics aspect The majority of the text is devoted to the description of the lattice structural thermal elastic lattice dynamic electronic energy band structural optical and carrier transport properties of these semiconductors Some corrective effects and related properties such as piezoelectric elastooptic and electrooptic properties are also discussed The book contains convenient tables summarizing the various material parameters and the definitions of important semiconductor properties In addition graphs are included in order to make the information more quantitative and intuitive The book is intended not only for semiconductor device engineers but also physicists and physical chemists and particularly students specializing in the fields of semiconductor synthesis crystal growth semiconductor device physics and technology **The Physics of Semiconductors** Marius Grundmann,2021-03-06 The 4th edition of this highly successful textbook features copious material for a complete upper level undergraduate or graduate course guiding readers to the point where they can choose a specialized topic and begin supervised research The textbook provides an integrated approach beginning from the essential principles of solid state and semiconductor physics to their use in various classic and modern semiconductor devices for

applications in electronics and photonics The text highlights many practical aspects of semiconductors alloys strain heterostructures nanostructures amorphous semiconductors and noise which are essential aspects of modern semiconductor research but often omitted in other textbooks This textbook also covers advanced topics such as Bragg mirrors resonators polarized and magnetic semiconductors nanowires quantum dots multi junction solar cells thin film transistors and transparent conductive oxides The 4th edition includes many updates and chapters on 2D materials and aspects of topology The text derives explicit formulas for many results to facilitate a better understanding of the topics Having evolved from a highly regarded two semester course on the topic The Physics of Semiconductors requires little or no prior knowledge of solid state physics More than 2100 references guide the reader to historic and current literature including original papers review articles and topical books providing a go to point of reference for experienced researchers as well **Physical Properties of High-Temperature Superconductors** Rainer Wesche,2015-05-13 A much needed update on complex high temperature superconductors focusing on materials aspects this timely book coincides with a recent major break through of the discovery of iron based superconductors It provides an overview of materials aspects of high temperature superconductors combining introductory aspects description of new physics material aspects and a description of the material properties This title is suitable for researchers in materials science physics and engineering Also for technicians interested in the applications of superconductors e g as biomagnets **Glancing Angle Deposition of Thin Films** Matthew M. Hawkeye,Michael T. Taschuk,Michael J. Brett,2014-07-03 This book provides a highly practical treatment of Glancing Angle Deposition GLAD a thin film fabrication technology optimized to produce precise nanostructures from a wide range of materials GLAD provides an elegant method for fabricating arrays of nanoscale helices chevrons columns and other porous thin film architectures using physical vapour deposition processes such as sputtering or evaporation The book gathers existing procedures methodologies and experimental designs into a single cohesive volume which will be useful both as a ready reference for those in the field and as a definitive guide for those entering it It covers Development and description of GLAD techniques for nanostructuring thin films Properties and characterization of nanohelices nanoposts and other porous films Design and engineering of optical GLAD films including fabrication and testing and chiral films Post deposition processing and integration to optimize film behaviour and structure Deposition systems and requirements for GLAD fabrication A patent survey extensive relevant literature and a survey of GLAD s wide range of material properties and diverse applications *Metalorganic Vapor Phase Epitaxy (MOVPE)* Stuart Irvine,Peter Capper,2019-09-04 Systematically discusses the growth method material properties and applications for key semiconductor materials MOVPE is a chemical vapor deposition technique that produces single or polycrystalline thin films As one of the key epitaxial growth technologies it produces layers that form the basis of many optoelectronic components including mobile phone components GaAs semiconductor lasers and LEDs III Vs nitrides optical communications oxides infrared detectors photovoltaics II IV materials

etc Featuring contributions by an international group of academics and industrialists this book looks at the fundamentals of MOVPE and the key areas of equipment safety precursor chemicals and growth monitoring It covers the most important materials from III V and II VI compounds to quantum dots and nanowires including sulfides and selenides and oxides ceramics Sections in every chapter of Metalorganic Vapor Phase Epitaxy MOVPE Growth Materials Properties and Applications cover the growth of the particular materials system the properties of the resultant material and its applications The book offers information on arsenides phosphides and antimonides nitrides lattice mismatched growth CdTe MCT mercury cadmium telluride ZnO and related materials equipment and safety and more It also offers a chapter that looks at the future of the technique Covers in order the growth method material properties and applications for each material Includes chapters on the fundamentals of MOVPE and the key areas of equipment safety precursor chemicals and growth monitoring Looks at important materials such as III V and II VI compounds quantum dots and nanowires Provides topical and wide ranging coverage from well known authors in the field Part of the Materials for Electronic and Optoelectronic Applications series Metalorganic Vapor Phase Epitaxy MOVPE Growth Materials Properties and Applications is an excellent book for graduate students researchers in academia and industry as well as specialist courses at undergraduate postgraduate level in the area of epitaxial growth MOVPE MOCVD MBE *Handbook of II-VI Semiconductor-Based Sensors and Radiation Detectors* Ghenadii Korotcenkov,2023-04-20 Three volumes book Handbook of II VI Semiconductor Based Sensors and Radiation Detectors is the first to cover both chemical sensors and biosensors and all types of photodetectors and radiation detectors based on II VI semiconductors It contains a comprehensive and detailed analysis of all aspects of the application of II VI semiconductors in these devices The first volume Materials and Technologies of a three volume set describes the physical chemical and electronic properties of II VI compounds which give rise to an increased interest in these semiconductors Technologies that are used in the development of various devices based on II VI connections such as material synthesis deposition characterization processing and device fabrication are also discussed in detail in this volume It covers also topics related to synthesis and application of II VI based nanoparticles and quantum dots as well their toxicity biocompatibility and biofunctionalization **Earth-Abundant Materials for Solar Cells** Sadao Adachi,2015-10-28 Systematically describes the physical and materials properties of copper based quaternary chalcogenide semiconductor materials enabling their potential for photovoltaic device applications Intended for scientists and engineers in particular in the fields of multinary semiconductor physics and a variety of photovoltaic and optoelectronic devices *Optical Properties of Materials and Their Applications* Jai Singh,2020-01-07 Provides a semi quantitative approach to recent developments in the study of optical properties of condensed matter systems Featuring contributions by noted experts in the field of electronic and optoelectronic materials and photonics this book looks at the optical properties of materials as well as their physical processes and various classes Taking a semi quantitative approach to the subject it presents a summary of the basic

concepts reviews recent developments in the study of optical properties of materials and offers many examples and applications Optical Properties of Materials and Their Applications 2nd Edition starts by identifying the processes that should be described in detail and follows with the relevant classes of materials In addition to featuring four new chapters on optoelectronic properties of organic semiconductors recent advances in electroluminescence perovskites and ellipsometry the book covers optical properties of disordered condensed matter and glasses concept of excitons photoluminescence photoinduced changes and electroluminescence in noncrystalline semiconductors and photoinduced bond breaking and volume change in chalcogenide glasses Also included are chapters on nonlinear optical properties of photonic glasses kinetics of the persistent photoconductivity in crystalline III V semiconductors and transparent white OLEDs In addition readers will learn about excitonic processes in quantum wells optoelectronic properties and applications of quantum dots and more Covers all of the fundamentals and applications of optical properties of materials Includes theory experimental techniques and current and developing applications Includes four new chapters on optoelectronic properties of organic semiconductors recent advances in electroluminescence perovskites and ellipsometry Appropriate for materials scientists chemists physicists and electrical engineers involved in development of electronic materials Written by internationally respected professionals working in physics and electrical engineering departments and government laboratories Optical Properties of Materials and Their Applications 2nd Edition is an ideal book for senior undergraduate and postgraduate students and teaching and research professionals in the fields of physics chemistry chemical engineering materials science and materials engineering

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Properties Of Semiconductor Alloys Group Iv Iii V And Ii Vi Semiconductors Introduction

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