

PRINCIPLES OF GROWTH AND PROCESSING OF SEMICONDUCTORS

Principles Of Growth And Processing Of Semiconductors

Pradeep Fulay, Jung-Kun Lee



Principles Of Growth And Processing Of Semiconductors:

Principles of Growth and Processing of Semiconductors Subhash Mahajan, K. S. SreeHarsha, 1999 A senior graduate text on the growth and processing of semiconductor materials semiconductor fabrication that will expose material electrical and chemical engineering majors to the principles underlying the fabrication of state of the art integrated circuits and their applications

Extended Defects in Semiconductors D. B. Holt, B. G. Yacobi, 2007-04-12 The elucidation of the effects of structurally extended defects on electronic properties of materials is especially important in view of the current advances in electronic device development that involve defect control and engineering at the nanometer level This book surveys the properties effects roles and characterization of extended defects in semiconductors The basic properties of extended defects dislocations stacking faults grain boundaries and precipitates are outlined and their effect on the electronic properties of semiconductors their role in semiconductor devices and techniques for their characterization are discussed These topics are among the central issues in the investigation and applications of semiconductors and in the operation of semiconductor devices The authors preface their treatment with an introduction to semiconductor materials and conclude with a chapter on point defect maldistributions This text is suitable for advanced undergraduate and graduate students in materials science and engineering and for those studying semiconductor physics

Dopants and Defects in Semiconductors Matthew D. McCluskey, Eugene E. Haller, 2012-02-23 Dopants and Defects in Semiconductors covers the theory experimentation and identification of impurities dopants and intrinsic defects in semiconductors The book fills a crucial gap between solid state physics and more specialized course texts The authors first present introductory concepts including basic semiconductor theory defect classifications crystal growth and doping They then explain electrical vibrational optical and thermal properties Moving on to characterization approaches the text concludes with chapters on the measurement of electrical properties optical spectroscopy particle beam methods and microscopy By treating dopants and defects in semiconductors as a unified subject this book helps define the field and prepares students for work in technologically important areas It provides students with a solid foundation in both experimental methods and the theory of defects in semiconductors

Electronic, Magnetic, and Optical Materials Pradeep Fulay, Jung-Kun Lee, 2016-11-18 This book integrates materials science with other engineering subjects such as physics chemistry and electrical engineering The authors discuss devices and technologies used by the electronics magnetics and photonics industries and offer a perspective on the manufacturing technologies used in device fabrication The new addition includes chapters on optical properties and devices and addresses nanoscale phenomena and nanoscience a subject that has made significant progress in the past decade regarding the fabrication of various materials and devices with nanometer scale features

Fabrication of GaAs Devices Albert G. Baca, Carol I.H. Ashby, Institution of Electrical Engineers, 2005-09 This book provides fundamental and practical information on all aspects of GaAs processing and gives pragmatic advice on cleaning and passivation wet and dry etching and

photolithography Other topics covered include device performance for HBTs Heterojunction Bipolar Transistors and FETs Field Effect Transistors how these relate to processing choices and special processing issues such as wet oxidation which are especially important in optoelectronic devices This book is suitable for both new and practising engineers

Comprehensive Semiconductor Science and Technology ,2024-11-28 Semiconductors are at the heart of modern living Almost everything we do be it work travel communication or entertainment all depend on some feature of semiconductor technology Comprehensive Semiconductor Science and Technology Second Edition Three Volume Set captures the breadth of this important field and presents it in a single source to the large audience who study make and use semiconductor devices Written and edited by a truly international team of experts and newly updated to capture key advancements in the field this work delivers an objective yet cohesive review of the semiconductor world The work is divided into three sections fully updated and expanded from the first edition The first section is concerned with the fundamental physics of semiconductors showing how the electronic features and the lattice dynamics change drastically when systems vary from bulk to a low dimensional structure and further to a nanometer size Throughout this section there is an emphasis on the full understanding of the underlying physics especially quantum phenomena The second section deals largely with the transformation of the conceptual framework of solid state physics into devices and systems which require the growth of high purity or doped bulk and epitaxial materials with low defect density and well controlled electrical and optical properties The third section is devoted to design fabrication and assessment of discrete and integrated semiconductor devices It will cover the entire spectrum of devices we see all around us for telecommunications computing automation displays illumination and consumer electronics Provides a comprehensive global picture of the semiconductor world Written and Edited by an international team of experts Compiles the most important semiconductor knowledge into one comprehensive resource Moves from fundamentals and theory to more advanced knowledge such as applications allowing readers to gain a deeper understanding of the field

Physical Chemistry of Semiconductor Materials and Processes ,2015-08-17 The development of solid state devices began a little more than a century ago with the discovery of the electrical conductivity of ionic solids Today solid state technologies form the background of the society in which we live The aim of this book is threefold to present the background physical chemistry on which the technology of semiconductor devices is based secondly to describe specific issues such as the role of defects on the properties of solids and the crucial influence of surface properties and ultimately to look at the physics and chemistry of semiconductor growth processes both at the bulk and thin film level together with some issues relating to the properties of nano devices Divided into five chapters it covers Thermodynamics of solids including phases and their properties and structural order Point defects in semiconductors Extended defects in semiconductors and their interactions with point defects and impurities Growth of semiconductor materials Physical chemistry of semiconductor materials processing With applications across all solid state technologies the

book is useful for advanced students and researchers in materials science physics chemistry electrical and electronic engineering It is also useful for those in the semiconductor industry **Handbook of Compound Semiconductors** Paul H. Holloway, Gary E. McGuire, 1996-12-31 This book reviews the recent advances and current technologies used to produce microelectronic and optoelectronic devices from compound semiconductors It provides a complete overview of the technologies necessary to grow bulk single crystal substrates grow hetero or homoepitaxial films and process advanced devices such as HBT s QW diode lasers etc **Semiconductor Materials** B.G. Yacobi, 2006-04-18 The technological progress is closely related to the developments of various materials and tools made of those materials Even the different ages have been defined in relation to the materials used Some of the major attributes of the present day age i e the electronic materials age are such common tools as computers and fiber optic telecommunication systems in which semiconductor materials provide vital components for various mic electronic and optoelectronic devices in applications such as computing memory storage and communication The field of semiconductors encompasses a variety of disciplines This book is not intended to provide a comprehensive description of a wide range of semiconductor properties or of a continually increasing number of the semiconductor device applications Rather the main purpose of this book is to provide an introductory perspective on the basic principles of semiconductor materials and their applications that are described in a relatively concise format in a single volume Thus this book should especially be suitable as an introductory text for a single course on semiconductor materials that may be taken by both undergraduate and graduate engineering students This book should also be useful as a concise reference on semiconductor materials for researchers working in a wide variety of fields in physical and engineering sciences *Handbook of Optoelectronic Device Modeling and Simulation* Joachim Piprek, 2017-10-10 Optoelectronic devices are now ubiquitous in our daily lives from light emitting diodes LEDs in many household appliances to solar cells for energy This handbook shows how we can probe the underlying and highly complex physical processes using modern mathematical models and numerical simulation for optoelectronic device design analysis and performance optimization It reflects the wide availability of powerful computers and advanced commercial software which have opened the door for non specialists to perform sophisticated modeling and simulation tasks The chapters comprise the know how of more than a hundred experts from all over the world The handbook is an ideal starting point for beginners but also gives experienced researchers the opportunity to renew and broaden their knowledge in this expanding field

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