
Optical Processes In Semiconductors Pankove

Compound Semiconductor Device Physics
Fundamentals of Semiconductor
From Physics to Economics
Nitride Semiconductors and Devices
Amorphous Semiconductors
Non-Stoichiometry in Semiconductors
A History of the Work Concept
Spectroscopic Ellipsometry for Photovoltaics
Structural, Optical, and Electronic Properties
Theory of Optical Processes in Semiconductors
Solid State Theory
Fundamentals of Semiconductors
Silicon Photonics
Optical Absorption of Impurities and Defects in Semiconducting Crystals
Synthesis, Properties and Applications
An Introduction to Fundamentals
Advanced Topics
Physics and Materials Properties
Springer Handbook of Electronic and Photonic Materials
III-V Compound Semiconductors and Devices
Defects in Semiconductors
Handbook of Nitride Semiconductors and Devices, Electronic and Optical Processes
in Nitrides
Laser Cooling of Solids
Handbook of GaN Semiconductor Materials and Devices
Delta-doping of Semiconductors
Integrated Optics: Theory and Technology
Optical Characterization of Semiconductors
Solar Cell Device Physics
Bulk and Microstructures
Numerical Data and Graphical Information
Integrated Solar Fuel Generators
Display Devices
Introduction to Isotopic Materials Science
Nanowires
Materials Science
Spectroscopic Analysis of Optoelectronic Semiconductors
Hydrogen-like Centres
Semiconductor Material and Device Characterization
Semiconductors and Semimetals

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JAIDYN CULLEN

Compound Semiconductor Device

Physics Royal Society of Chemistry

This book traces the history of the concept of work from its earliest stages and shows that its further formalization leads to equilibrium principle and to the principle of virtual works, and so pointing the way ahead for future research and applications. The idea that something remains constant in a machine operation is very old and has been expressed by many mathematicians and philosophers such as, for instance, Aristotle. Thus, a concept of energy developed. Another important idea in machine operation is Archimedes' lever principle. In modern times the concept of work is analyzed in the context of applied mechanics mainly in Lazare Carnot mechanics and the mechanics of the new generation of polytechnical engineers like Navier, Coriolis and Poncelet. In this context the word "work" is finally adopted. These engineers are also responsible for the incorporation of the concept of work into the discipline of economics when they endeavoured to combine the study of the work of machines and men together.

Fundamentals of Semiconductor

Springer

Principles of Optical Fiber Measurements focuses on the optical fiber systems, which are being added to the telephone networks of various countries around the world. This book explores the significance of optical fiber systems in the increasing variety of fiber-related products on the market. Comprised of seven chapters, this book starts with an overview of the fiber fabrication process with emphasis on the method of

measurements to reduce fiber loss in the field of optical communication. This text then examines the special methods to measure extremely low dispersion in single-mode fibers. Other chapters consider the measurement requirements of commercial fiber manufacturers to allow them to specify their products as well as for fiber users to verify that they get what they expect. The final chapter deals with the various measurement methods for determining the V value of fibers as well as the geometrical dimensions of fibers and preforms. This book is a valuable resource for specialists and readers who desire a better understanding of fiber specifications.

From Physics to Economics Academic Press

Comprehensive text and reference covers all phenomena involving light in semiconductors, emphasizing modern applications in semiconductor lasers, electroluminescence, photodetectors, photoconductors, photoemitters, polarization effects, absorption spectroscopy, more. Numerous problems. 339 illustrations.

Nitride Semiconductors and Devices

John Wiley & Sons

This book describes the intrinsic optical processes occurring in semiconductor bulk and engineered semiconductor structures such as quantum wells, quantum wires, quantum dots, and superlattices. The topic has gained attention as all optoelectronic devices used in fibre-optic communication and optical computers are made of semiconductors and their engineered structures.

Amorphous Semiconductors Springer Science & Business Media

This book describes new trends in the nanoscience of isotopic materials

science. Assuming a background in graduate condensed matter physics and covering the fundamental aspects of isotopic materials science from the very beginning, it equips readers to engage in high-level professional research in this area. The book's main objective is to provide insight into the question of why solids are the way they are, either because of how their atoms are bonded with one another, because of defects in their structure, or because of how they are produced or processed. Accordingly, it explores the science of how atoms interact, connects the results to real materials properties, and demonstrates the engineering concepts that can be used to produce or improve semiconductors by design. In addition, it shows how the concepts discussed are applied in the laboratory. The book addresses the needs of researchers, graduate students and senior undergraduate students alike. Although primarily written for materials science audience, it will be equally useful to those teaching in electrical engineering, materials science or even chemical engineering or physics curricula. In order to maintain the focus on materials concepts, however, the book does not burden the reader with details of many of the derivations and equations nor does it delve into the details of electrical engineering topics.

Non-Stoichiometry in Semiconductors
World Scientific

Semiconductor Statistics presents statistics aimed at complementing existing books on the relationships between carrier densities and transport effects. The book is divided into two parts. Part I provides introductory material on the electron theory of solids, and then discusses carrier statistics for semiconductors in thermal equilibrium.

Of course a solid cannot be in true thermodynamic equilibrium if any electrical current is passed; but when currents are reasonably small the distribution function is but little perturbed, and the carrier distribution for such a "quasi-equilibrium" condition is inappreciably different from that of thermal equilibrium itself. Thus the results of Part I are not invalidated when the properties of a semiconductor are measured using small current densities. Part II considers non-equilibrium statistics for semiconductors with appreciable excess carrier densities. The various kinds of recombination mechanism are examined, and the consequences discussed for steady state and transient situations. The subject matter of this book was deliberately restricted in scope in order to be of maximum value to scientists with an active interest in the basic properties of semiconducting materials.

A History of the Work Concept

Springer Science & Business Media
Nanowires are attracting wide scientific interest due to the unique properties associated with their one-dimensional geometry. Developments in the understanding of the fundamental principles of the nanowire growth mechanisms and mastering functionalization provide tools to control crystal structure, morphology, and the interactions at the material interface, and create characteristics that are superior to those of planar geometries. This book provides a comprehensive overview of the most important developments in the field of nanowires, starting from their synthesis, discussing properties, and finalizing with nanowire applications. The book consists of two parts: the first is devoted to the synthesis of nanowires and

characterization, and the second investigates the properties of nanowires and their applications in future devices.

Spectroscopic Ellipsometry for Photovoltaics John Wiley & Sons

Semiconducting and Insulating Crystals details how absorption spectroscopy provides information on the nature, concentration, charge state and configuration of impurities in crystals and also on their kinetics and transformations under annealing. After an introduction of the bulk optical properties of semiconductors and insulators and of impurities in crystals, this book presents the physical bases necessary for the understanding of impurity spectra. The description of various set-ups and accessories used in absorption spectroscopy is followed by a presentation of experimental results on specific impurities and classes of impurities and their relation with those obtained by various computation and by other experimental techniques.

Structural, Optical, and Electronic Properties Springer Science & Business Media

Optical Processes in Semiconductors Courier Corporation

Cambridge University Press

Solar Cell Device Physics offers a balanced, in-depth qualitative and quantitative treatment of the physical principles and operating characteristics of solar cell devices. Topics covered include photovoltaic energy conversion and solar cell materials and structures, along with homojunction solar cells. Semiconductor-semiconductor heterojunction cells and surface-barrier solar cells are also discussed. This book consists of six chapters and begins by introducing the reader to the basic physical principles and materials properties that are the foundations of

photovoltaic energy conversion, with emphasis on various photovoltaic devices capable of efficiently converting solar energy into usable electrical energy. The electronic and optical properties of crystalline, polycrystalline, and amorphous materials with both organic and inorganic materials are considered, together with the manner in which these properties change from one material class to another and the implications of such changes for photovoltaics. Generation, recombination, and bulk transport are also discussed. The two mechanisms of photocarrier collection in solar cells, drift and diffusion, are then compared. The remaining chapters focus on specific solar cell device classes defined in terms of the interface structure employed: homojunctions, semiconductor-semiconductor heterojunctions, and surface-barrier devices. This monograph is appropriate for use as a textbook for graduate students in engineering and the sciences and for seniors in electrical engineering and applied physics, as well as a reference book for those actively involved in solar cell research and development.

Theory of Optical Processes in Semiconductors BoD – Books on Demand

This book deals with standard spectroscopic techniques which can be used to analyze semiconductor samples or devices, in both, bulk, micrometer and submicrometer scale. The book aims helping experimental physicists and engineers to choose the right analytical spectroscopic technique in order to get specific information about their specific demands. For this purpose, the techniques including technical details such as apparatus and probed sample region are described. More important,

also the expected outcome from experiments is provided. This involves also the link to theory, that is not subject of this book, and the link to current experimental results in the literature which are presented in a review-like style. Many special spectroscopic techniques are introduced and their relationship to the standard techniques is revealed. Thus the book works also as a type of guide or reference book for people researching in optical spectroscopy of semiconductors.

Solid State Theory Elsevier

The second, updated edition of this essential reference book provides a wealth of detail on a wide range of electronic and photonic materials, starting from fundamentals and building up to advanced topics and applications. Its extensive coverage, with clear illustrations and applications, carefully selected chapter sequencing and logical flow, makes it very different from other electronic materials handbooks. It has been written by professionals in the field and instructors who teach the subject at a university or in corporate laboratories. The Springer Handbook of Electronic and Photonic Materials, second edition, includes practical applications used as examples, details of experimental techniques, useful tables that summarize equations, and, most importantly, properties of various materials, as well as an extensive glossary. Along with significant updates to the content and the references, the second edition includes a number of new chapters such as those covering novel materials and selected applications. This handbook is a valuable resource for graduate students, researchers and practicing professionals working in the area of electronic, optoelectronic and photonic materials.

Fundamentals of Semiconductors

Elsevier

This textbook gives a complete and fundamental introduction to the properties of III-V compound semiconductor devices, highlighting the theoretical and practical aspects of their device physics. Beginning with an introduction to the basics of semiconductor physics, it presents an overview of the physics and preparation of compound semiconductor materials, as well as a detailed look at the electrical and optical properties of compound semiconductor heterostructures. The book concludes with chapters dedicated to a number of heterostructure electronic and photonic devices, including the high-electron-mobility transistor, the heterojunction bipolar transistor, lasers, unipolar photonic devices, and integrated optoelectronic devices. Featuring chapter-end problems, suggested references for further reading, as well as clear, didactic schematics accompanied by six information-rich appendices, this textbook is ideal for graduate students in the areas of semiconductor physics or electrical engineering. In addition, up-to-date results from published research make this textbook especially well-suited as a self-study and reference guide for engineers and researchers in related industries.

Silicon Photonics Courier Corporation

This timely monograph addresses an important class of semiconductors and devices that constitute the underlying technology for blue lasers. It succinctly treats structural, electrical and optical properties of nitrides and the substrates on which they are deposited, band structures of nitrides, optical processes, deposition and fabrication technologies, light-emitting diodes, and lasers. It also includes many tables and figures

detailing the properties and performance of nitride semiconductors and devices.

Optical Absorption of Impurities and Defects in Semiconducting Crystals

Elsevier

Semiconductors and Semimetals

Synthesis, Properties and Applications Springer

This textbook presents the basic elements needed to understand and engage in research in semiconductor physics. It deals with elementary excitations in bulk and low-dimensional semiconductors, including quantum wells, quantum wires and quantum dots. The basic principles underlying optical nonlinearities are developed, including excitonic and many-body plasma effects. The fundamentals of optical bistability, semiconductor lasers, femtosecond excitation, optical Stark effect, semiconductor photon echo, magneto-optic effects, as well as bulk and quantum-confined Franz-Keldysh effects are covered. The material is presented in sufficient detail for graduate students and researchers who have a general background in quantum mechanics.

An Introduction to Fundamentals

Springer

This book describes the critical areas of research and development towards viable integrated solar fuels systems, the current state of the art of these efforts and outlines future research needs.

Advanced Topics Academic Press

This volume, number 91 in the Semiconductor and Semimetals series, focuses on defects in semiconductors.

Defects in semiconductors help to explain several phenomena, from diffusion to getter, and to draw theories on materials' behavior in response to electrical or mechanical fields. The volume includes chapters focusing specifically on electron and proton

irradiation of silicon, point defects in zinc oxide and gallium nitride, ion implantation defects and shallow junctions in silicon and germanium, and much more. It will help support students and scientists in their experimental and theoretical paths. Expert contributors Reviews of the most important recent literature Clear illustrations A broad view, including examination of defects in different semiconductors

Physics and Materials Properties

Springer

Bridging the gap between a general solid-state physics textbook and research articles, the renowned authors provide detailed explanations of the electronic, vibrational, transport, and optical properties of semiconductors. Their approach is a physical and intuitive one, rather than formal and pedantic. This textbook has been written with both students and researchers in mind, and the authors therefore present theories to explain experimental results.

Throughout, the emphasis is on understanding the physical properties of Si, and similar tetrahedrally coordinated semiconductors, with explanations based on physical insights. Each chapter is enriched by an extensive collection of tables of material parameters, figures and problems -- many of the latter 'lead students by the hand' to arrive at the results.

Springer Handbook of Electronic and Photonic Materials Cambridge University Press

The three volumes of this handbook treat the fundamentals, technology and nanotechnology of nitride semiconductors with an extraordinary clarity and depth. They present all the necessary basics of semiconductor and device physics and engineering together with an extensive reference section.

Volume 2 addresses the electrical and optical properties of nitride materials. It includes semiconductor metal contacts, impurity and carrier concentrations, and carrier transport in semiconductors.

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