

Pallab Bhattacharya Semiconductor Optoelectronic Devices

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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 captures the breadth of this important field, and presents it in a single source to the large audience who study, make, and exploit semiconductors. Previous attempts at this achievement have been abbreviated, and have omitted important topics. Written and Edited by a truly international team of experts, this work delivers an objective yet cohesive global review of the semiconductor world. The work is divided into three sections. 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. The second section deals largely with the transformation of the conceptual framework of solid

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state physics into devices and systems which require the growth of extremely high purity, nearly defect-free bulk and epitaxial materials. The last section is devoted to exploitation of the knowledge described in the previous sections to highlight the spectrum of devices we see all around us. Provides a comprehensive global picture of the semiconductor world Each of the work's three sections presents a complete description of one aspect of the whole Written and Edited by a truly international team of experts

Publishes papers reporting on research and development in optical science and engineering and the practical applications of known optical science, engineering, and technology.

The characterization and precisely controlled building of atomic-scale multilayers have been the subject of intensive R&D worldwide. Nanometric structures based on III-V semiconductors have attracted particular attention. Since 1970, around 15,000 papers have been published in all, of which 10,000 have appeared in the last 6 years. The resulting improved materials control is enabling engineers to achieve major improvements in the performance of microelectronic and optoelectronic devices such as QW lasers, tunnelling devices, modulators, switches and photodetectors. In this book, the large volume of research results which have accumulated is evaluated and distilled down to

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a useful, manageable concentration of up-to-date knowledge for electronic engineers and solid-state physicists. This has been carried out by an invited international team of over 50 specialists under the editorship of Professor Bhattacharya with support from INSPEC, who also compiled the subject index. There are 40 individually-written, self-contained modules ("Datareviews"), each specially commissioned to fit into a pre-determined structure. Subjects reviewed in depth include historical perspective, theory, epitaxial growth and doping, structure (e.g. X-ray diffraction), electronic properties, optical properties, modulation doping and devices. Each Datareview comprises tables, text, figures and expert guidance to the literature, as appropriate. Properties of III-V quantum wells and superlattices is intended both as a look-up source of evaluated data and as a finely-structured state-of-the-art review for academic and industrial R&D workers. A new volume in the field's bestselling optics reference--an entirely new opus focusing exclusively on fiber-optics. Contains an ultra-handly, comprehensive index to all four Handbook of Optics volumes.

Compound Semiconductors 2004 was the 31st Symposium in this distinguished international series, held at Hoam Convention Center of Seoul National University, Seoul, Korea from September 12 to September 16, 2004. It attracted over 180 submissions from leading scientists in academic and industrial research institutions, and remains a major forum for the compound semiconductor research community since the

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first one held in 1966 at Edinburgh, UK under the name of 'International Symposium on Gallium Arsenide and related Compounds'. These proceedings provide an international perspective on the latest research and an overview of recent, important developments in III-V compounds, II-VI compounds and IV-IV compounds. In the total of 106 papers, notable progress was reported in the development of zinc oxide and spintronics. Steady advances were seen in traditional topics such as III-V based electronic and optoelectronic devices, growth and processing, and characterization. Novel research trends were observed in quantum structures, such as quantum wires and dots, which are promising for future developments in nanotechnology. As the primary forum for research into these materials and their device applications the book is an essential reference for researchers working on compound semiconductors in semiconductor physics, device physics, materials science, chemistry and electronic and electrical engineering.

Test Prep for Analog Electronics—GATE, PSUS AND ES Examination

This textbook provides a thorough and accessible treatment of semiconductor lasers from a design and engineering perspective. It includes both the physics of devices as well as the engineering, designing and testing of practical lasers. The material is presented clearly with many examples provided. Readers of the book will come to understand the finer aspects of the theory, design, fabrication and test of these devices and have an excellent background for further study of optoelectronics. This book also: Provides a multi-faceted approach to explaining the theories behind semiconductor lasers, utilizing mathematical examples, illustrations and written theoretical presentations Offers a balance of relevant optoelectronic topics, with specific attention given to distributed feedback lasers, growth techniques and

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waveguide cavity design Provides a summary of every chapter, worked examples, and problems for readers to solve Incorporates and explains recent breakthroughs in laser design

The first true "introduction" to semiconductor optoelectronic devices, this book provides an accessible, well-organized overview of optoelectronic devices that emphasizes basic principles. Coverage begins with an optional review of key concepts— such as properties of compound semiconductor, quantum mechanics, semiconductor statistics, carrier transport properties, optical processes, and junction theory— then progress gradually through more advanced topics. The "Second Edition" has been both updated and expanded to include the recent developments in the field.

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The ever growing demand for clean energy potentially can be met by solar-to-electrical energy conversion. This book on "Recent Advances in Photovoltaics" presents a detailed overview of recent research and developments in the field of photovoltaics and solar cells. It starts with the basic theory and gradual progress in the field of photovoltaics and various generations of solar cells. The search for new materials and/or new structures such as multi-junctions, nanostructures, photoelectrochemical cells, organic solar cells etc. for improved performance is discussed. The experimental investigations on certain materials and modelling for better results are also described in the book. Photovoltaics, Solar Cells, Multi-Junctions Solar Cells, Nanostructured Solar Cells, Photoelectrochemical Solar Cells, Organic Solar Cells, Polymer Solar Cells

A detailed, modern introduction to semiconductors made in silicon and III-V compounds. This book develops the device physics of pn junctions, bipolar transistors, Schottky barriers,

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a significant activity in Optics were well represented, including senior and young researchers as well as graduated students talking about their PhD and MSc thesis work. Topics discussed included: atmospheric optics; color, vision and radiometry; diffractive optics; education for optics; guided optics; holography and interferometry; lasers and quantum optics; metamaterials; nonlinear optics; optical instruments; optical materials and applications; optical metrology; optical processing; optical spectroscopy; thin films.

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