

A. Krier (Ed.)

# Mid-infrared Semiconductor Optoelectronics



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# Mid Infrared Semiconductor Optoelectronics Springer Series In Optical Sciences

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## **Mid Infrared Semiconductor Optoelectronics Springer Series In Optical Sciences:**

Mid-infrared Semiconductor Optoelectronics Anthony Krier, 2007-05-22 Optoelectronic devices operating in the mid infrared wavelength range offer applications in a variety of areas from environmental gas monitoring around oil rigs to the detection of narcotics They could also be used for free space optical communications thermal imaging applications and the development of homeland security measures Mid infrared Semiconductor Optoelectronics is an overview of the current status and technological development in this rapidly emerging area the basic physics some of the problems facing the design engineer and a comparison of possible solutions are laid out the different lasers used as sources for mid infrared technology are considered recent work in detectors is reviewed the last part of the book is concerned with applications With a world wide authorship of experts working in many mid infrared related fields this book will be an invaluable reference for researchers and graduate students drawn from physics electronic and electrical engineering and materials science

Mid-infrared Semiconductor Optoelectronics ,2006 Optoelectronic devices operating in the mid infrared wavelength range offer applications in a variety of areas from environmental gas monitoring around oil rigs to the detection of narcotics They could also be used for free space optical communications thermal imaging applications and the development of homeland security measures Mid infrared Semiconductor Optoelectronics is an overview of the current status and technological development in this rapidly emerging area The basic physics some of the problems facing the design engineer and a comparison of possible solutions are laid out The different lasers used as sources for mid infrared technology are considered Recent work in detectors is reviewed and the last part of the book is concerned with applications With a world wide authorship of experts working in many mid infrared related fields this book will be an invaluable reference for researchers and graduate students drawn from physics electronic and electrical engineering and materials science

*Photonic Crystals* Alessandro Massaro, 2012-03-30 The second volume of the book concerns the characterization approach of photonic crystals photonic crystal lasers photonic crystal waveguides and plasmonics including the introduction of innovative systems and materials Photonic crystal materials promises to enable all optical computer circuits and could also be used to make ultra low power light sources Researchers have studied lasers from microscopic cavities in photonic crystals that act as reflectors to intensify the collisions between photons and atoms that lead to lasing but these lasers have been optically pumped meaning they are driven by other lasers Moreover the physical principles behind the phenomenon of slow light in photonic crystal waveguides as well as their practical limitations are discussed This includes the nature of slow light propagation its bandwidth limitation coupling of modes and particular kind terminating photonic crystals with metal surfaces allowing to propagate in surface plasmon polariton waves The goal of the second volume is to provide an overview about the listed issues

**2D Excitonic Materials and Devices** ,2023-11-23 Semiconductors and Semimetals series highlights new advances in the field with this new volume presenting interesting chapters Each chapter is written by an international board

of authors Provides the latest information on cancer research Offers outstanding and original reviews on a range of cancer research topics Serves as an indispensable reference for researchers and students alike

**ECOS 2012 The 25th International Conference on Efficiency, Cost, Optimization and Simulation of Energy Conversion Systems and Processes (Perugia, June 26th-June 29th, 2012)** Umberto Desideri, Enrico Sciubba, Giampaolo Manfrida, 2012 The 8 volume set contains the Proceedings of the 25th ECOS 2012 International Conference Perugia Italy June 26th to June 29th 2012 ECOS is an acronym for Efficiency Cost Optimization and Simulation of energy conversion systems and processes summarizing the topics covered in ECOS Thermodynamics Heat and Mass Transfer Exergy and Second Law Analysis Process Integration and Heat Exchanger Networks Fluid Dynamics and Power Plant Components Fuel Cells Simulation of Energy Conversion Systems Renewable Energies Thermo Economic Analysis and Optimisation Combustion Chemical Reactors Carbon Capture and Sequestration Building Urban Complex Energy Systems Water Desalination and Use of Water Resources Energy Systems Environmental and Sustainability Issues System Operation Control Diagnosis and Prognosis Industrial Ecology

**Optics Letters**, 2008

**Functional Materials for Sustainable Energy Applications** J A Kilner, S J Skinner, S J C Irvine, P P Edwards, 2012-09-28 Global demand for low cost efficient and sustainable energy production is ever increasing Driven by recent discoveries and innovation in the science and technology of materials applications based on functional materials are becoming increasingly important Functional materials for sustainable energy applications provides an essential guide to the development and application of these materials in sustainable energy production Part one reviews functional materials for solar power including silicon based thin film and dye sensitized photovoltaic solar cells thermophotovoltaic device modelling and photoelectrochemical cells Part two focuses on functional materials for hydrogen production and storage Functional materials for fuel cells are then explored in part three where developments in membranes catalysts and membrane electrode assemblies for polymer electrolyte and direct methanol fuel cells are discussed alongside electrolytes and ion conductors novel cathodes anodes thin films and proton conductors for solid oxide fuel cells Part four considers functional materials for demand reduction and energy storage before the book concludes in part five with an investigation into computer simulation studies of functional materials With its distinguished editors and international team of expert contributors Functional materials for sustainable energy applications is an indispensable tool for anyone involved in the research development manufacture and application of materials for sustainable energy production including materials engineers scientists and academics in the rapidly developing interdisciplinary field of sustainable energy An essential guide to the development and application of functional materials in sustainable energy production Reviews functional materials for solar power Focuses on functional materials for hydrogen production and storage fuel cells demand reduction and energy storage

**Vertical External Cavity Surface Emitting Lasers** Michael Jetter, Peter Michler, 2021-09-16 Vertical External Cavity Surface Emitting Lasers Provides comprehensive coverage of the advancement of vertical external cavity surface

emitting lasers Vertical external cavity surface emitting lasers VECSELs emit coherent light from the infrared to the visible spectral range with high power output Recent years have seen new device developments such as the mode locked integrated MIXSEL and the membrane external cavity surface emitting laser MECSEL expand the application of VECSELs to include laser cooling spectroscopy telecommunications biophotonics and laser based displays and projectors In Vertical External Cavity Surface Emitting Lasers VECSEL Technology and Applications leading international research groups provide a comprehensive fully up to date account of all fundamental and technological aspects of vertical external cavity surface emitting lasers This unique book reviews the physics and technology of optically pumped disk lasers and discusses the latest developments of VECSEL devices in different wavelength ranges Topics include OP VECSEL physics continuous wave CW lasers frequency doubling carrier dynamics in SESAMs and characterization of nonlinear lensing in VECSEL gain samples This authoritative volume Summarizes new concepts of DBR free and MECSEL lasers for the first time Covers the mode locking concept and its application Provides an overview of the emerging concept of self mode locking Describes the development of next generation OPS laser products Vertical External Cavity Surface Emitting Lasers VECSEL Technology and Applications is an invaluable resource for laser specialists semiconductor physicists optical industry professionals spectroscopists telecommunications engineers and industrial physicists *American Book Publishing Record* ,2007

*Wavelength Filters in Fibre Optics* Herbert Venghaus,2006-07-07 Wavelength filters constitute an essential element of fibre optic networks This book gives a comprehensive account of the principles and applications of such filters including their technological realisations Following an introductory chapter on wavelength division multiplexing in current and future fibre optic networks the book covers in detail arrayed waveguide gratings AWGs Fabry Perot filters dielectric multilayer filters fibre Bragg gratings three dimensional reflection gratings and acousto optical filters It **Quantum Well Infrared**

**Photodetectors** Harald Schneider,Hui C. Liu,2007 Addressed to both students as a learning text and scientists engineers as a reference this book discusses the physics and applications of quantum well infrared photodetectors QWIPs It is assumed that the reader has a basic background in quantum mechanics solid state physics and semiconductor devices To make this book as widely accessible as possible the treatment and presentation of the materials is simple and straightforward The topics for the book were chosen by the following criteria they must be well established and understood and they should have been or potentially will be used in practical applications The monograph discusses most aspects relevant for the field but omits at the same time detailed discussions of specialized topics such as the valence band quantum wells *Ultrafast Photonics* A. Miller,D.T. Reid,D.M. Finlayson,2019-08-22 Ultrafast photonics has become an interdisciplinary topic of high international research interest because of the spectacular development of compact and efficient lasers producing optical pulses in the femtosecond range This book brings together contributions from experts at major research initiatives around the world to address all aspects of this very active field Topics covered range from the fundamental physics of optical

interactions and material properties through to new system concepts for ultrahigh capacity data transfer and processing using femtosecond pulses with emphasis on areas of specific scientific breakthroughs and subsequent technological advances

Light-Driven Alignment Boris P. Antonyuk, 2009 This book deals with influencing the properties of solids by light driven electron transport The theoretical basis of these effects light driven ordering and self organisation as well as optical motors are presented With light as a tool new ways to produce materials are opened *Subject Guide to Books in Print* ,1991

Nanomaterial Synthesis and Integration for Sensors, Electronics, Photonics, and Electro-optics Nibir K. Dhar, Achyut K. Dutta, M. Saiful Islam, 2006 Proceedings of SPIE present the original research papers presented at SPIE conferences and other high quality conferences in the broad ranging fields of optics and photonics These books provide prompt access to the latest innovations in research and technology in their respective fields Proceedings of SPIE are among the most cited references in patent literature *Solid State Crystals 2002* Jaroslaw Rutkowski, Antoni Rogalski, 2003 **Spectroscopic**

**Analysis of Optoelectronic Semiconductors** Juan Jimenez, Jens W. Tömm, 2016-08-16 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 *Physics Briefs* ,1993

*Comprehensive Semiconductor Science and Technology* ,2011-01-28 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 Six Volume Set 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 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      *International Books in Print* ,1979

## **Mid Infrared Semiconductor Optoelectronics Springer Series In Optical Sciences** Book Review: Unveiling the Magic of Language

In a digital era where connections and knowledge reign supreme, the enchanting power of language has become more apparent than ever. Its capability to stir emotions, provoke thought, and instigate transformation is truly remarkable. This extraordinary book, aptly titled "**Mid Infrared Semiconductor Optoelectronics Springer Series In Optical Sciences**," written by a highly acclaimed author, immerses readers in a captivating exploration of the significance of language and its profound impact on our existence. Throughout this critique, we shall delve to the book's central themes, evaluate its unique writing style, and assess its overall influence on its readership.

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