

OPTOELECTRONIC PROPERTIES of SEMICONDUCTORS and SUPERLATTICES

M. O. Manasreh, series editor

Volume 1

LONG WAVELENGTH INFRARED DETECTORS

Edited by

Manijeh Razeghi



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Long Wavelength Infrared Detectors

Jin-Ying Zhang



Long Wavelength Infrared Detectors:

Long Wavelength Infrared Detectors Razeghi,1997-11-21 This work presents a comprehensive overview of the development of new generations of infrared detectors based on artificially synthesized quantum structures Featuring contributions from researchers working at the cutting edge of this field this volume will become an essential reference for advanced graduate students and researchers alike

Long Wavelength Infrared Detectors Taylor & Francis Group,2020-12-18

Long Wavelength Infrared Detec M. Razeghi,1996 This series focuses on electro optical applications of advance semiconductors such as quantum wells and superlattices Volume 1 is dedicated to the long wavelength infrared detectors based on III V Semiconductor quantum wells and superlattices as a new generation for infrared detectors based on artifiically synthesized quantum structures The chapters are contributed by the leading researchers at some of the best industrial academic and government laboratories in the world Although written primarily as a reference work this book is appropriate as a supplementary text for graduate courses in this area

Proceedings of the Sixth International Symposium on Long Wavelength Infrared Detectors and Arrays: Physics and Applications Sheng S. Li,1999

Long Wavelength Infrared Detectors Razeghi,2020-03-09 This timely work presents a comprehensive overview of the development of new generations of infrared detectors based on artificially synthesized quantum structures The growth of quantum wells and superlattices is well documents in this volume as are the principal new superlattice technologies for long wavelength infrared detection Featuring insightful contributions from researchers working at the cutting edge of this exciting field this volume is sure to become an essential reference for advanced graduate students and researchers alike

III-V Multiple Quantum Well Long Wavelength Infrared Detectors Deepak Kumar Sengupta,1997

Proceedings of the Third International Symposium on Long Wavelength Infrared Detectors and Arrays: Physics and Applications III Sheng S. Li,1995

International Symposium on Long Wavelength Infrared Detectors and Arrays: Physics and Applications ,

Proceedings of the First International Symposium on Long Wavelength Infrared Detectors and Arrays: Physics and Applications Farhad Radpour,Victor R. McCrary,1995

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Semiconductor Quantum Wells and Superlattices for Long-wavelength Infrared Detectors Mahmoud Omar Manasreh,1993 Provides a basic understanding of how semiconductor quantum wells and superlattices can be used for long wavelength infrared detectors and related systems It represents a step towards a knowledge of novel structures that could be used for high performance infrared detectors and imaging rays

Proceedings of the Third International Symposium on Long Wavelength Infrared Detectors and Arrays: Physics and Applications III Sheng S. Li,1995

*Proceedings of the Sixth International Symposium on Long Wavelength Infrared Detectors and Arrays: Physics and Applications ,*1999

Long Wavelength Infrared Detectors Utilizing Multiple Quantum Wells in III-V Compound

Semiconductors Mark Alan Dodd, 1994 Data are presented on various infrared detectors based on multiple GaAs AlGaAs quantum wells Due to the great flexibility in the growth dimensions and composition of these structures the electrical and optical characteristics of the photodetector may be significantly altered This investigation explores both theoretically and experimentally the effect of modifying the well and barrier parameters As GaAs AlGaAs based materials are prevalent in optical generation devices such as LEDs and lasers it is natural to explore these materials use for optical receivers as well While most LEDs and lasers operate in the visible and near infrared less than one micrometer structures can operate to detect radiation with longer wavelengths The simplest method to achieve longer wavelength absorption is through the use of quantum mechanical wells and their associated bound energy states The energy level of the bound state may be changed by altering the well width or barrier composition This allows one to tune the spectral response of the photodetector for a given application Three fundamental classes of quantum well infrared detectors QWIDs are examined Each of these n type well doped structures has its merits and drawbacks The bound to bound state energy class is shown to have low dark current but also low responsivity The bound to continuum class results in high dark current high responsivity detectors The bound to miniband QWIDs have low dark currents and moderate responsivity All three classes are explored in greater detail in an effort to increase responsivity This was accomplished by altering the doping profile of the fundamental structure to include doping of the barrier The results indicate that a factor of six increase is possible for the bound to continuum structure An increase in operating temperature is an additional benefit of the revised doping profile As QWIDs do not typically respond to normally incident radiation an optical grating must be used to couple the radiation so that it may be absorbed A variety of one and two dimensional gratings are studied and their impact on performance is reported The fabrication technique used to form the grating is also examined A deposited metal grating with a thin gold overcoat was found to yield the most efficient coupling and therefore the highest responsivity

Stacked Silicide/silicon Mid- to Long-wavelength Infrared Detector, 1990 The use of stacked Schottky barriers 16 with epitaxially grown thin silicides 10 combined with selective doping 22 of the barriers provides high quantum efficiency infrared detectors 30 at longer wavelengths that is compatible with existing silicon VLSI technology

Innovative Long Wavelength Infrared Detector Workshop Proceedings Jet propulsion lab pasadena ca, 1995 The focus of the workshop was on innovative long wavelength infrared LWIR detectors with the potential of meeting future NASA and DoD long duration space application needs Requirements are for focal plane arrays which operate near 65K using active refrigeration with mission lifetimes of five to ten years The workshop addressed innovative concepts new material systems novel device physics and current progress in relation to benchmark technology It also provided a forum for discussion of performance characterization producability reliability and fundamental limitations of device physics It covered the status of the incumbent HgCdTe technology which shows encouraging progress towards LWIR arrays and provided a snapshot of research and development in several new contender technologies These contenders span quantum wells

heterojunctions and superlattices in columns 2 6 3 5 and 4 semiconductor materials and promise producible LWIR arrays with the required performance The workshop also included a session on new innovations for high performance thermal detectors

Scientific and Technical Aerospace Reports ,1994 New Ternary Alloy Systems for Infrared Detectors Antoni Rogalski,1994 **Handbook of Infrared Detection Technologies** M. Henini,M Razeghi,2002-12-11 Introduction Comparison of Photon and Thermal Detectors Performance GaAs AlGaAs Based Quantum Well Infra red Photodetector Focal Plane Arrays GaInAs P Based Qwips on GaAs InP and Si Substrates for Focal Plane Arrays InAs Galn Sb Superlattices A Promising Material System for Infra red Detection GaSb InAs Superlattices for Infra red FPAs MCT Properties Growth Methods and Characterization HgCdTe 2D Arrays Technology and Performance Limits Status of HgCdTe MBE Technology Silicon Infra red Focal Plane Arrays PolySiGe Uncooled Microbolometers for Thermal Infra red Detection Infra red Silicon Germanium Detectors Fundamentals of Spin Filtering in Ferromagnetic Metals with Application to Spin Sensors *Infrared Detectors* Antonio Rogalski,2010-11-15 Completely revised and reorganized while retaining the approachable style of the first edition *Infrared Detectors* Second Edition addresses the latest developments in the science and technology of infrared IR detection Antoni Rogalski an internationally recognized pioneer in the field covers the comprehensive range of subjects necessary to un

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