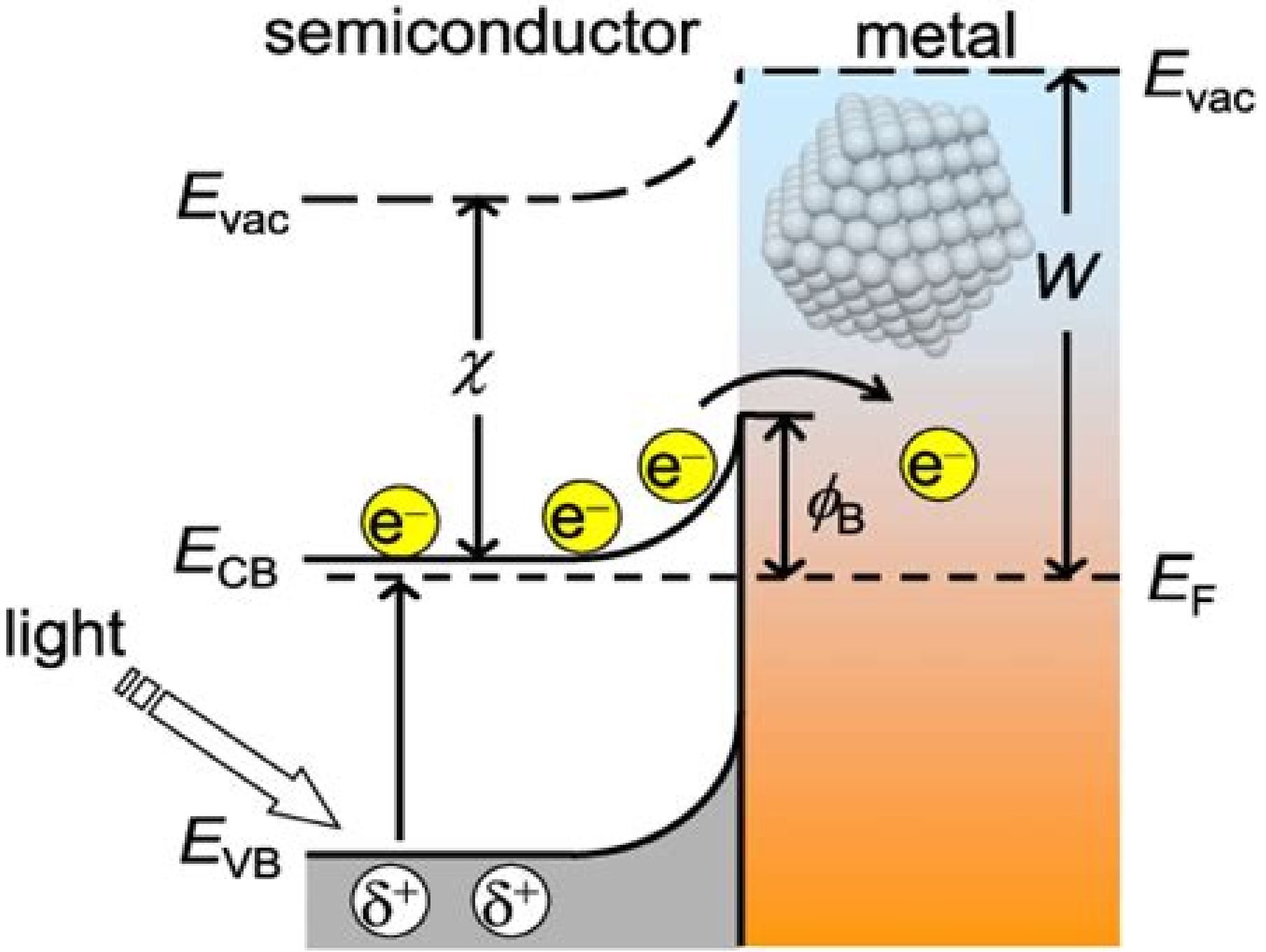
semiconductor
metal
E_{vac}
E_{vac}
W
χ
e^-
e^-
e^-
e^-
ϕ_B
E_{CB}
E_F
light
E_{VB}
δ^+
δ^+

Electronic Properties Of Semiconductor Interfaces

Winfried Mönch

Electronic Properties Of Semiconductor Interfaces:

Electronic Properties of Semiconductor Interfaces Winfried Mönch,2013-04-17 Almost all semiconductor devices contain metal semiconductor insulator semiconductor insulator metal and or semiconductor semiconductor interfaces and their electronic properties determine the device characteristics This is the first monograph that treats the electronic properties of all different types of semiconductor interfaces Using the continuum of interface induced gap states IFIGS as a unifying theme M nch explains the band structure lineup at all types of semiconductor interfaces These intrinsic IFIGS are the wave function tails of electron states which overlap a semiconductor band gap exactly at the interface so they originate from the quantum mechanical tunnel effect He shows that a more chemical view relates the IFIGS to the partial ionic character of the covalent interface bonds and that the charge transfer across the interface may be modeled by generalizing Pauling s electronegativity concept The IFIGS and electronegativity theory is used to quantitatively explain the barrier heights and band offsets of well characterized Schottky contacts and semiconductor heterostructures respectively *Electronic Properties of Semiconductor Interfaces* Winfried Monch,2014-01-15 **Field Effect in Semiconductor-electrolyte Interfaces** Pavel P. Konorov,Adil M. Yafyasov,Vladislav B. Bogevolnov,2006-10-03 Publisher description *Electronic Properties of Semiconductor Superlattices, Amorphous Semiconductors, and Metal-semiconductor Interfaces* Lin Hung Yang,1988 Electronic Properties of Semiconductor Surfaces and Metal-semiconductor Interfaces Massimo Tallarida,2005 **Electronic Properties of Semiconductor Interfaces** F. Flores,C. Tejedor,F. Guinea,J. Sanchez-Dehesa,UNIVERSIDAD AUTONOMA DE MADRID (Spain) DEPT DE FISICA DEL ESTADO SOLIDO.,1983 The objective was to analyze the electronic properties of different semiconductor interfaces The Wannier function formalism has been applied to the GaAs AlAs 111 and 100 heterojunctions and superlattices Ionic relaxations band discontinuities and interface states have been obtained Abrupt Si metal interfaces and Si interlayer metal junctions have been analyzed by means of a selfconsistent tight binding approach The barrier height has been obtained by calculating the interface density of states and the neutral level of the junction Our results show that the barrier height is mainly determined by the coupling between the semiconductor and the last layer just sitting on top of the same semiconductor Author **Semiconductor Surfaces and Interfaces** Winfried Mönch,2001-04-10 Semiconductor Surfaces and Interfaces deals with structural and electronic properties of semiconductor surfaces and interfaces The first part introduces the general aspects of space charge layers of clean surface and adatom induced surfaces states and of interface states It is followed by a presentation of experimental results on clean and adatom covered surfaces which are explained in terms of simple physical and chemical concepts Where available results of more refined calculations are considered This third edition has been thoroughly revised and updated In particular it now includes an extensive discussion of the band lineup at semiconductor interfaces The unifying concept is the continuum of interface induced gap states *Some Dynamic Electronic Properties of Semiconductor Surfaces and Interfaces [microform]* Kallin, Catherine,1984

The Electronic Properties of Semiconductors, Semiconductor-simple Metal Interfaces, and Transition Metal Alloys Jeffrey Steven Nelson,1987 Basic Properties of Semiconductors P.T. Landsberg,2016-04-19 Since Volume 1 was published in 1982 the centres of interest in the basic physics of semiconductors have shifted Volume 1 was called Band Theory and Transport Properties in the first edition but the subject has broadened to such an extent that Basic Properties is now a more suitable title Seven chapters have been rewritten by the original authors However twelve chapters are essentially new with the bulk of this work being devoted to important current topics which give this volume an almost encyclopaedic form The first three chapters discuss various aspects of modern band theory and the next two analyze impurities in semiconductors Then follow chapters on semiconductor statistics and on surfaces interfaces and band offsets as they occur in heterojunctions Chapters 8 to 19 report on newer topics though a survey of transport properties of carriers is also included Among these are transport of hot electrons and thermoelectric effects including here and elsewhere properties of low dimensional and mesoscopic structures The electron hole liquid the quantum Hall effect localisation ballistic transport coherence in superlattices current ideas on tunnelling and on quantum confinement and scattering processes are also covered

Electronic Properties of Thin Film Semiconductor Interfaces Andreas Klein,2003 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 **Handbook**

of Compound Semiconductors Paul H. Holloway,Gary E. McGuire,2008-10-19 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 **Springer Handbook of Electronic and Photonic Materials** Safa Kasap,Peter Capper,2017-10-04 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

Scientific and Technical Aerospace Reports ,1989 **Nanoscale Characterization of Surfaces and Interfaces** N. John DiNardo,2008-09-26 Derived from the highly acclaimed series Materials Science and Technology this book provides in depth coverage of STM AFM and related non contact nanoscale probes along with detailed applications such as the manipulation of atoms and clusters on a nanometer scale The methods are described in terms of the physics and the technology of the methods and many high quality images demonstrate the power of these techniques in the investigation of surfaces and the processes which occur on them Topics include Semiconductor Surfaces and Interfaces Insulators Layered Compounds Charge Density Wave Systems Superconductors Electrochemisty at Liquid Solid Interfaces Biological Systems Metrological Applications Nanoscale Surface Forces Nanotribology Manipulation on the Nanoscale Materials scientists surface scientists electrochemists as well as scientists working in catalysis and microelectronics will find this book an invaluable source of information **Electron Transfer in Nanomaterials** Garry Rumbles,Tim Lian,Kei Murakoshi,2006

Gan-based Materials And Devices: Growth, Fabrication, Characterization And Performance Robert F Davis,Michael S Shur,Harry B Dietrich,2004-05-07 The unique materials properties of GaN based semiconductors have stimulated a great deal of interest in research and development regarding nitride materials growth and optoelectronic and nitride based electronic devices High electron mobility and saturation velocity high sheet carrier concentration at heterojunction interfaces high breakdown field and low thermal impedance of GaN based films grown over SiC or bulk AlN substrates make nitride based electronic devices very promising The chemical inertness of nitrides is another key property This volume written by

experts on different aspects of nitride technology addresses the entire spectrum of issues related to nitride materials and devices and it will be useful for technologists scientists engineers and graduate students who are working on wide bandgap materials and devices The book can also be used as a supplementary text for graduate courses on wide bandgap semiconductor technology **Semiconductor Interfaces and Microstructures** Zhe Chuan Feng,1992 1 Carrier transport in artificially structured two dimensional semiconductor systems W Walukiewicz 2 Miniband conduction in semiconductor superlattices A Sibille J F Palmier C Minot 3 Barrier width dependence of optical properties in semiconductor superlattices J J Song J F Zhou and J M Jacob 4 Radiative processes in GaAs AlGaAs heterostructures P O Holtz B Monemar and J Merz 5 Type I type II transition in GaAs AlAs superlattices G H Li 6 Photoluminescence studies of interface roughness in GaAs AlAs quantum well structures D Gammon B V Shanabrook and D S Katzer 7 Optical and magneto optical properties of narrow In symbol Ga symbol As GaAs quantum wells D C Reynolds and K R Evans 8 Growth and studies of antimony based III V compounds by magnetron sputter epitaxy using metalorganic and solid elemental sources J B Webb and R Rousina 9 Properties of Cd symbol Mn symbol Te films and Cd symbol Mn symbol Te CdTe superlattices grown by pulsed laser evaporation and epitaxy J M Wrobel and J J Dubowski 10 Zn symbol Cd symbol Se symbol Te symbol quatenary II VI wide bandgap alloys and heterostructures R E Nahory M J S P Brasil and M C Tamargo 11 Intersubband transitions in SiGe Si quantum structures R P G Karunasiri K L Wang and J S Park 12 High temperature discrete devices in 6H SiC sublimation epitaxial growth device technology and electrical performance M M Anikin und weitere **An Essential Guide to Electronic Material Surfaces and Interfaces** Leonard J. Brillson,2016-08-01 An Essential Guide to Electronic Material Surfaces and Interfaces is a streamlined yet comprehensive introduction that covers the basic physical properties of electronic materials the experimental techniques used to measure them and the theoretical methods used to understand predict and design them Starting with the fundamental electronic properties of semiconductors and electrical measurements of semiconductor interfaces this text introduces students to the importance of characterizing and controlling macroscopic electrical properties by atomic scale techniques The chapters that follow present the full range of surface and interface techniques now being used to characterize electronic optical chemical and structural properties of electronic materials including semiconductors insulators nanostructures and organics The essential physics and chemistry underlying each technique is described in sufficient depth for students to master the fundamental principles with numerous examples to illustrate the strengths and limitations for specific applications As well as references to the most authoritative sources for broader discussions the text includes internet links to additional examples mathematical derivations tables and literature references for the advanced student as well as professionals in these fields This textbook fills a gap in the existing literature for an entry level course that provides the physical properties experimental techniques and theoretical methods essential for students and professionals to understand and participate in solid state electronics physics and materials science research An

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