Carbon Nanotube And Graphene Device Physics

Carbon Nanotube and Graphene Device PhysicsCarbon Nanotube Graphene Device PhysicsGrapheneGrapheneDevice Physics of Organic and Graphene Field-Effect TransistorsTransport Phenomena in Micro- and Nanoscale Functional Materials and DevicesEmerging 2D Materials and Devices for the Internet of ThingsMicro- and Nanoelectronics2D MaterialsNanoelectronicsRecent Trends in Materials and DevicesLow Power Semiconductor Devices and Processes for Emerging Applications in Communications, Computing, and SensingApplications of GrapheneMicro-Nano Technology XVIGraphene Photonics, Optoelectronics, and PlasmonicsJournal of Nano Research Vol. 55GrapheneDevice Physics and Charge Transport of Field-effect Transistors Based on Advanced Organic Semiconductors and GrapheneJournal of the Physical Society of JapanEighteen[th] International Conference on High Magnetic Fields in Semiconductor Physics and Nanotechnology (HMF18), São Pedro, Brazil, 3-8 August 2008 H.-S. Philip Wong Hon-Sum Philip Wong Edward L. Wolf E. L. Wolf Tae-Jun Ha Joao B. Sousa Li Tao Tomasz Brozek Chatchawal Wongchoosuk Vijay Kumar Arora Vinod Kumar Jain Sumeet Walia E. L. Wolf Fei Tang Qiaoliang Bao Efstathios I. Meletis Serhii Shafraniuk Tae-Jun Ha

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the first introductory textbook to explain the properties and performance of practical nanotube devices and related applications

explaining the properties and performance of practical nanotube devices and related applications this is the first introductory textbook on the subject all the fundamental concepts are introduced so that readers without an advanced scientific background can follow all the major ideas and results additional topics covered include nanotube transistors and interconnects and the basic physics of graphene problem sets at the end of every chapter allow readers to test their knowledge of the material covered and gain a greater understanding of the analytical skill sets developed in the text this is an ideal textbook for senior undergraduate and graduate students taking courses in semiconductor device physics and nanoelectronics it is also a perfect self study guide for professional device engineers and researchers

a complete description of the science and applications of graphene a revolutionary two dimensional one atom thick material of exceedingly high electrical conductivity and tensile strength

this book consists of six chapters in the first chapter electrical and material properties and charge transport in organic and graphene based fets are introduced in the second chapter device architectures of amorphous copolymer fets are discussed the combination of recessed electrodes and surface treatments on electrical contact is investigated in the third chapter device physics and charge transport of donor acceptor copolymer based fets are discussed charge transport measurements in steady state and under non quasi static conditions reveal device physics in dual gate configuration in the fourth chapter device characteristics of ambipolar copolymer based fets are focused those possess balanced electron and hole mobilities which are both 0 5 cm2 v s the trap dos is calculated using two analytical methods in the fifth chapter charge transport in copolymer based fets employing 4 point probe configuration is studied such polymer fets possess the mobilities of up to 3 cm2 v s in the sixth chapter transformation of electrical characteristics of graphene fets with an interacting capping layer of fluoropolymers and pi conjugated organic semiconductors is investigated

transport phenomena in micro and nanoscale functional materials and devices offers a pragmatic view on transport phenomena for micro and nanoscale materials and devices both as a research tool and as a means to implant new functions in materials chapters emphasize transport properties tp as a research tool at the micro nano level and give an experimental view on underlying techniques the relevance of tp is highlighted through the interplay between a micro nanocarrier s characteristics and media characteristics long short range order and disorder excitations couplings and in energy conversions later sections contain case studies on the role of transport properties in functional nanomaterials this includes transport in thin films and nanostructures from nanogranular films to graphene and 2d semiconductors and spintronics and from read heads mrams and sensors to nano oscillators and energy conversion from figures of merit micro coolers and micro heaters to spincaloritronics

presents a pragmatic description of electrical transport phenomena in micro and nanoscale materials and devices from an experimental viewpoint provides an in depth overview of the experimental techniques available to measure transport phenomena in micro and nanoscale materials features case studies to illustrate how each technique works highlights emerging areas of interest in micro and nanomaterial transport phenomena including spintronics

emerging 2d materials and devices for the internet of things information sensing and energy applications summarizes state of the art technologies in applying 2d layered materials discusses energy and sensing device applications as essential infrastructure solutions and explores designs that will make internet of things devices faster more reliable and more accessible for the creation of mass market products the book focuses on information energy and sensing applications showing how different types of 2d materials are being used to create a new generation of products and devices that harness the capabilities of wireless technology in an eco efficient reliable way this book is an important resource for both materials scientists and engineers who are designing new wireless products in a variety of industry sectors explores how 2d materials are being used to create faster and more reliable wireless network solutions discusses how graphene based nanocomposites are being used for energy harvesting and storage applications outlines the major challenges for integrating 2d materials in electronic sensing devices

micro and nanoelectronics emerging device challenges and solutions presents a comprehensive overview of the current state of the art of micro and nanoelectronics covering the field from fundamental science and material properties to novel ways of making nanodevices containing contributions from experts in both industry and academia this cutting edge text discusses emerging silicon devices for cmos technologies fully depleted device architectures characteristics and scaling explains the specifics of silicon compound devices sige sic and their unique properties explores various options for post cmos nanoelectronics such as spintronic devices and nanoionic switches describes the latest developments in carbon nanotubes iii v devices structures and more micro and nanoelectronics emerging device challenges and solutions provides an excellent representation of a complex engineering field examining emerging materials and device architecture alternatives with the potential to shape the future of nanotechnology

two dimensional 2d materials have attracted a great deal of attention in recent years due to their potential applications in gas chemical sensors healthcare monitoring biomedicine electronic skin wearable sensing technology and advanced electronic devices graphene is one of today s most popular 2d nanomaterials alongside boron nitrides molybdenum disulfide black phosphorus and metal oxide nanosheets all of which open up new opportunities for future devices this book provides insights into models and theoretical backgrounds important properties characterizations and

applications of 2d materials including graphene silicon nitride aluminum nitride zno thin film phosphorene and molybdenum disulfide

brings the band structure of carbon based devices into the limelight a shift to carbon is positioning biology as a process of synthesis in mainstream engineering silicon is quickly being replaced with carbon based electronics devices are being reduced down to nanometer scale and further potential applications are being considered while traditionally engineers are trained by way of physics chemistry and mathematics nanoelectronics quantum engineering of low dimensional nanoensembles establishes biology as an essential basic science for engineers to explore unifies science and engineering from quantum physics to nanoengineering drawing heavily on published papers by the author this research driven text offers a complete review of nanoelectronic transport starting from quantum waves to ohmic and ballistic conduction and saturation limited extreme nonequilibrium conditions in addition it highlights a new paradigm using non equilibrium arora s distribution function neadf and establishes this function as the starting point from band theory to equilibrium to extreme nonequilibrium carrier statistics the author focuses on nano electronic device design and development including carbon based devices and provides you with a vantage point for the global outlook on the future of nanoelectronics devices and ulsi encompassing ten chapters this illuminating text converts the electric field response of drift velocity into current voltage relationships that are driven by the presence of critical voltage and saturation current arising from the unidirectional drift of carriers applies the effect of these scaled down dimensions to nano mosfet metal oxide semiconductor field effect transistor considers specialized applications that can be tried through a number of suggested projects that are all feasible with matlab codes nanoelectronics quantum engineering of low dimensional nanoensembles contains the latest research in nanoelectronics identifies problems and other factors to consider when it comes to nanolayer design and application and ponders future trends print versions of this book also include access to the ebook version

this book presents the proceedings of the international conference on recent trends in materials and devices which was conceived as a major contribution to large scale efforts to foster indian research and development in the field in close collaboration with the community of non resident indian researchers from all over the world the research articles collected in this volume selected from among the submissions for their intrinsic quality and originality as well as for their potential value for further collaborations document and report on a wide range of recent and significant results for various applications and scientific developments in the areas of materials and devices the technical sessions covered include photovoltaics and energy storage semiconductor materials and devices sensors smart and polymeric materials optoelectronics nanotechnology and nanomaterials mems and nems as well as emerging technologies

the book addresses the need to investigate new approaches to lower energy requirement in multiple application areas and serves as a guide into emerging circuit technologies it explores revolutionary device concepts sensors and associated circuits and architectures that will greatly extend the practical engineering limits of energy efficient computation the book responds to the need to develop disruptive new system architectures and semiconductor processes aimed at achieving the highest level of computational energy efficiency for general purpose computing systems discusses unique technologies and material only available in specialized journal and conferences covers emerging materials and device structures such as ultra low power technologies nanoelectronics and microsystem manufacturing explores semiconductor processing and manufacturing device design and performance contains practical applications in the engineering field as well as graduate studies written by international experts from both academia and industry

graphene is presented and analyzed as a replacement for silicon the primary focus is on solar cell and cmos device technologies with attention to the fabrication methods including extensions needed in each case specialized applications for graphene within the existing silicon technology are discussed and found to be promising

selected peer reviewed papers from the 16th annual conference and 5th international conference of the chinese society of micro nano technology csmnt 2014 august 31 september 3 2014 chengdu china

graphene has been hailed as a rising star in photonics and optoelectronics the wonderful optical properties of graphene make possible the multiple functions of signal emission transmission modulation and detection to be realized in one material this book compiles and details cutting edge research in graphene photonics plasmonics and broadband optoelectronic devices particularly it emphasizes the ability to integrate graphene photonics onto the silicon platform to afford broadband operation in light routing and amplification which involves components such as the polarizer the modulator and the photodetector it also includes other functions such as a saturable absorber and an optical limiter the book provides a comprehensive overview of the interrelationship between the operation of these conceptually new photonic devices and the fundamental physics of graphene involved in the interactions between graphene and light

the 55th volume of the journal of nano research presents readers with the collection of peer reviewed papers by the results of the research from the field of synthesis and the use of various nanomaterials and nanostructures we hope that this volume of the journal will be useful and interesting for a wide range of engineers scientists and students whose activity is related with the creation and using of nanomaterials and nanotechnologies in different branches of human activity

graphene is the first example of two dimensional materials and is the most important growth area of contemporary research it forms the basis for new nanoelectronic applications graphene which comprises field effect structures has remarkable physical properties this book focuses on practical applications determined by the unique properties of gr

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