

## 电子书推荐 2022 年第 1 期（总第 6 期）

半导体所图书馆

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### **Flexible and Wearable Electronics for Smart Clothing**

Editor(s):Gang Wang, Chengyi Hou, Hongzhi Wang

First published:28 February 2020

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#### **About this book**

Provides the state-of-the-art on wearable technology for smart clothing

The book gives a coherent overview of recent development on flexible electronics for smart clothing with emphasis on wearability and durability of the materials and devices. It offers detailed information on the basic functional components of the flexible and wearable electronics including sensing, systems-on-a-chip, interacting, and energy, as well as the integrating and connecting of electronics into textile form. It also provides insights into the compatibility and integration of functional materials, electronics, and the clothing technology.

Flexible and Wearable Electronics for Smart Clothing offers comprehensive coverage of the technology in four parts. The first part discusses wearable organic nano-sensors, stimuli-responsive electronic skins, and flexible thermoelectrics and thermoelectric textiles. The next part examines textile triboelectric nanogenerators for energy harvesting, flexible and wearable solar cells and supercapacitors, and flexible and wearable lithium-ion batteries. Thermal and humid management for next-generation textiles, functionalization of fiber materials for washable smart wearable textiles, and flexible microfluidics for wearable electronics are covered in the next section. The last part introduces readers to piezoelectric materials and devices based flexible bio-integrated electronics, printed electronics for smart clothes, and the materials and processes for stretchable and wearable e-textile devices.

-Presents the most recent developments in wearable technology such as wearable nanosensors, logic circuit, artificial intelligence, energy harvesting, and wireless communication

-Covers the flexible and wearable electronics as essential functional components for

smart clothing from sensing, systems-on-a-chip, interacting, energy to the integrating and connecting of electronics

-Of high interest to a large and interdisciplinary target group, including materials scientists, textile chemists, and electronic engineers in academia and industry

Flexible and Wearable Electronics for Smart Clothing will appeal to materials scientists, textile industry professionals, textile engineers, electronics engineers, and sensor developers.

阅读全文:

<https://onlinelibrary.wiley.com/doi/book/10.1002/9783527818556>

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## **Handbook of Microwave Component Measurements: with Advanced VNA Techniques, Second Edition**

Author(s):Joel P. Dunsmore PhD.,

First published:15 June 2020

Print ISBN:9781119477136 |Online ISBN:9781119477167

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### **About this book**

Handbook of Microwave Component Measurements Second Edition is a fully updated, complete reference to this topic, focusing on the modern measurement tools, such as a Vector Network Analyzer (VNA), gathering in one place all the concepts, formulas, and best practices of measurement science. It includes basic concepts in each chapter as well as appendices which provide all the detail needed to understand the science behind microwave measurements. The book offers an insight into the best practices for ascertaining the true nature of the device-under-test (DUT), optimizing the time to setup and measure, and to the greatest extent possible, remove the effects of the measuring equipment from that result. Furthermore, the author writes with a simplicity that is easily accessible to the student or new engineer, yet is thorough enough to provide details of measurement science for even the most advanced applications and researchers. This welcome new edition brings forward the most modern techniques used in industry today, and recognizes that more new techniques have developed since the first edition published in 2012. Whilst still focusing on the VNA, these techniques are also compatible with other vendor's advanced equipment, providing a comprehensive industry reference.

阅读全文:

<https://onlinelibrary.wiley.com/doi/book/10.1002/9781119477167>

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### **Laser - based Mid - infrared Sources and Applications**

Author(s):Konstantin L. Vodopyanov

First published:1 June 2020

Online ISBN:9781119074557 | DOI:10.1002/9781119074557

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#### **About this book**

An important guide to the major techniques for generating coherent light in the mid-infrared region of the spectrum

Laser-based Mid-infrared Sources and Applications gives a comprehensive overview of the existing methods for generating coherent light in the important yet difficult-to-reach mid-infrared region of the spectrum (2 – 20  $\mu$  m) and their applications.

The book describes major approaches for mid-infrared light generation including ion-doped solid-state lasers, fiber lasers, semiconductor lasers, and laser sources based on nonlinear optical frequency conversion, and reviews a range of applications: spectral recognition of molecules and trace gas sensing, biomedical and military applications, high-field physics and attoscience, and others. Every chapter starts with the fundamentals for a given technique that enables self-directed study, while extensive references help conduct deeper research.

Laser-based Mid-infrared Sources and Applications provides up-to-date information on the state-of the art mid-infrared sources, discusses in detail the advancements made over the last two decades such as microresonators and interband cascade lasers, and explores novel approaches that are currently subjects of intense research such as supercontinuum and frequency combs generation. This important book:

- Explains the fundamental principles and major techniques for coherent mid-infrared light generation
- Discusses recent advancements and current cutting-edge research in the field
- Highlights important biomedical, environmental, and military applications

Written for researchers, academics, students, and engineers from different disciplines, the book helps navigate the rapidly expanding field of mid-infrared laser-based technologies.

阅读全文:

<https://onlinelibrary.wiley.com/doi/book/10.1002/9781119074557>

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## **Molecular - Scale Electronics: Concept, Fabrication and Applications**

Editor(s): Xuefeng Guo, Dong Xiang, Yu Li

First published: 10 July 2020

Print ISBN: 9783527345489 | Online ISBN: 9783527818914

| DOI: 10.1002/9783527818914

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### **About this book**

Provides in-depth knowledge on molecular electronics and emphasizes the techniques for designing molecular junctions with controlled functionalities

This comprehensive book covers the major advances with the most general applicability in the field of molecular electronic devices. It emphasizes new insights into the development of efficient platform methodologies for building such reliable devices with desired functionalities through the combination of programmed bottom-up self-assembly and sophisticated top-down device fabrication. It also helps to develop an understanding of the device fabrication processes and the characteristics of the resulting electrode-molecule interface.

Beginning with an introduction to the subject, *Molecular-Scale Electronics: Concept, Fabrication and Applications* offers full chapter coverage on topics such as: Metal Electrodes for Molecular Electronics; Carbon Electrodes for Molecular Electronics; Other Electrodes for Molecular Electronics; Novel Phenomena in Single-Molecule Junctions; and Supramolecular Interactions in Single-Molecule Junctions. Other chapters discuss Theoretical Aspects for Electron Transport through Molecular Junctions; Characterization Techniques for Molecular Electronics; and Integrating Molecular Functionalities into Electrical Circuits. The book finishes with a summary of the primary challenges facing the field and offers an outlook at its future.

\* Summarizes a number of different approaches for forming molecular-scale junctions and discusses various experimental techniques for examining these nanoscale circuits in detail

\* Gives overview of characterization techniques and theoretical simulations for molecular electronics

\* Highlights the major contributions and new concepts of integrating molecular functionalities into electrical circuits

\* Provides a critical discussion of limitations and main challenges that still exist for the development of molecular electronics

\* Suited for readers studying or doing research in the broad fields of Nano/molecular electronics and other device-related fields

Molecular-Scale Electronics is an excellent book for materials scientists, electrochemists, electronics engineers, physical chemists, polymer chemists, and solid-state chemists. It will also benefit physicists, semiconductor physicists, engineering scientists, and surface chemists.

阅读全文:

<https://onlinelibrary.wiley.com/doi/book/10.1002/9783527818914>

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## **Nitride Semiconductor Technology: Power Electronics and Optoelectronic Devices**

Editor(s):Fabrizio Roccaforte, Mike Leszczynski

First published:3 August 2020

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### **About this book**

The book "Nitride Semiconductor Technology" provides an overview of nitride semiconductors and their uses in optoelectronics and power electronics devices. It explains the physical properties of those materials as well as their growth methods. Their applications in high electron mobility transistors, vertical power devices, LEDs, laser diodes, and vertical-cavity surface-emitting lasers are discussed in detail. The book further examines reliability issues in these materials and puts forward perspectives of integrating them with 2D materials for novel high-frequency and high-power devices.

In summary, it covers nitride semiconductor technology from materials to devices and provides the basis for further research.

阅读全文:

<https://onlinelibrary.wiley.com/doi/book/10.1002/9783527825264>

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## **Semiconductor Basics: A Qualitative, Non - mathematical Explanation of How Semiconductors Work and How They Are Used**

Author(s):George Domingo

First published:10 August 2020

Print ISBN:9781119702306 |Online ISBN:9781119597124

|DOI:10.1002/9781119597124

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### **About this book**

An accessible guide to how semiconductor electronics work and how they are manufactured, for professionals and interested readers with no electronics engineering background

Semiconductor Basics is an accessible guide to how semiconductors work. It is written for readers without an electronic engineering background. Semiconductors are the basis for almost all modern electronic devices. The author—an expert on the topic—explores the fundamental concepts of what a semiconductor is, the different types in use, and how they are different from conductors and insulators. The book has a large number of helpful and illustrative drawings, photos, and figures.

The author uses only simple arithmetic to help understand the device operation and applications. The book reviews the key devices that can be constructed using semiconductor materials such as diodes and transistors and all the large electronic systems based on these two component such as computers, memories, LCDs and related technology like Lasers LEDs and infrared detectors. The text also explores integrated circuits and explains how they are fabricated. The author concludes with some projections about what can be expected in the future. This important book:

Offers an accessible guide to semiconductors using qualitative explanations and analogies, with minimal mathematics and equations

Presents the material in a well-structured and logical format

Explores topics from device physics fundamentals to transistor formation and fabrication and the operation of the circuits to build electronic devices and systems

Includes information on practical applications of p-n junctions, transistors, and integrated circuits to link theory and practice

Written for anyone interested in the technology, working in semiconductor labs or in the semiconductor industry, Semiconductor Basics offers clear explanations about how semiconductors work and its manufacturing process.

阅读全文:

<https://onlinelibrary.wiley.com/doi/book/10.1002/9781119597124>

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## **Photodetectors: Devices, Circuits and Applications**

Author(s):Silvano Donati

First published:15 December 2020

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|DOI:10.1002/9781119769958

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### **About this book**

Explore this comprehensive introduction to the foundations of photodetection from one of the leading voices in the field

The newly revised Photodetectors: Devices, Circuits and Applications delivers a thoroughly updated exploration of the fundamentals of photodetection and the novel technologies and concepts that have arisen since the release of the first edition twenty years ago. The book offers discussions of established and emerging photodetection technologies, including photomultipliers, the SPAD, the SiPM, the SNSPD, the UTC, the WSPD/TSPD, the QWIP, and the LT-GaAs. New examinations of correlation measurements on ultrafast pulses and single-photon detectors for quantum communications and LiDARs have also been added.

Each chapter includes selected problems for students to work through to aid in learning and retention. A booklet of solutions is also provided. The book is especially ideal for students and faculties of Engineering, with an emphasis on first principles, design, and the engineering of photodetectors. Issues in the book are grouped through the development of concepts, as opposed to collections of technical details.

Perfect for undergraduate students interested in the science or design of modern optoelectronics, Photodetectors: Devices, Circuits and Applications also belongs on the bookshelves of professors teaching PhD seminars in advanced courses on photodetection and noise, as well as engineers and physicists seeking a guide to an optimum photodetection solution.

阅读全文:

<https://onlinelibrary.wiley.com/doi/book/10.1002/9781119769958>

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## **Silicon Containing Hybrid Copolymers**

Editor(s):Chaobin He, Zibiao Li

First published:9 March 2020

Print ISBN:9783527346646 |Online ISBN:9783527823499

|DOI:10.1002/9783527823499

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### **About this book**

Combines chemistry and material science in order to provide a complete overview of the design, synthesis, and applications of organo-silica

This book offers comprehensive and systematic coverage of the latest developments in functional hybrid silicon copolymers, their applications, and how they were developed in relation to previous works in the preparation of various functional groups terminated silicone materials.

Silicon Containing Hybrid Copolymers begins with a chapter that introduces readers to organo-silicon materials. It then presents a chapter on reactive functionally terminated polyorganosiloxanes, and contains a section on the methods and advances of functionalized polyhedral oligomeric silsesquioxanes (POSS) and copolymers. Nanostructured self-assemblies from silicon containing hybrid copolymers are discussed?as are superhydrophobic materials derived from hybrid silicon. Other chapters examine silicone copolymers for healthcare and personal care applications; construction of organic optoelectronic materials by using polyhedral oligomeric silsesquioxanes (POSS); and 3D printing silicone materials and devices. The book also includes an overview of material toughening and fire retardancy in regards to hybrid POSS nanocomposites. This title:

-Focuses on design and synthesis strategies, providing a valuable resource for researchers in academia and industry

-Presents recent applications, with emphasis on the underlying strategies and the influence from previous designs, in fields such as healthcare and consumer care

-Combines synthetic pathways with design specific considerations to provide the reader with greater control over the design process

Silicon Containing Hybrid Copolymers is an ideal book for materials scientists, polymer chemists, and bioinorganic chemists.

阅读全文:

<https://onlinelibrary.wiley.com/doi/book/10.1002/9783527823499>



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## **Ferroic Materials for Smart Systems: From Fundamentals to Device Applications**

Author(s):Jiyan Dai

First published:3 January 2020

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### **About this book**

Presents state-of-the-art knowledge?from basic insights to applications?on ferroic materials-based devices

This book covers the fundamental physics, fabrication methods, and applications of ferroic materials and covers bulk, thin films, and nanomaterials. It provides a thorough overview of smart materials and systems involving the interplays among the mechanical strain, electrical polarization, magnetization, as well as heat and light. Materials presented include ferroelectric, multiferroic, piezoelectric, electrostrictive, magnetostrictive, and shape memory materials as well as their composites. The book also introduces various sensor and transducer applications, such as ultrasonic transducers, surface acoustic wave devices, microwave devices, magneto-electric devices, infrared detectors and memories.

Ferroic Materials for Smart Systems: Fabrication, Devices and Applications introduces advanced measurement and testing techniques in ferroelectrics, including FeRAM and ferroelectric tunnelling based resistive switching. It also looks at ferroelectricity in emerging materials, such as 2D materials and high-k gate dielectric material HfO<sub>2</sub>. Engineering considerations for device design and fabrication are examined, as well as applications for magnetostrictive devices. Multiferroics of materials possessing both ferromagnetic and ferroelectric orders is covered, along with ferroelastic materials represented by shape memory alloy and magnetic shape memory alloys.

-Brings together physics, fabrication, and applications of ferroic materials in a coherent manner

-Discusses recent advances in ferroic materials technology and applications

-Covers dielectric, ferroelectric, pyroelectric and piezoelectric materials

-Introduces electrostrictive materials and magnetostrictive materials

-Examines shape memory alloys and magneto-shape-memory alloys

-Introduces devices based on the integration of ferroelectric and ferromagnetic materials such as multiferroic memory device and ME coupling device for sensor applications

Ferroic Materials for Smart Systems: Fabrication, Devices and Applications will appeal to a wide variety of researchers and developers in physics, materials science and engineering.

阅读全文:

<https://onlinelibrary.wiley.com/doi/book/10.1002/9783527815388>

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### **Layered 2D Advanced Materials and Their Allied Applications**

Editor(s): Inamuddin, Rajender Boddula, Mohd Imran Ahamed, Abdullah M. Asiri

First published: 8 May 2020

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#### **About this book**

Ever since the discovery of graphene, two-dimensional layered materials (2DLMs) have been the central tool of the materials research community. The reason behind their importance is their superlative and unique electronic, optical, physical, chemical and mechanical properties in layered form rather than in bulk form. The 2DLMs have been applied to electronics, catalysis, energy, environment, and biomedical applications.

The following topics are discussed in the book's fifteen chapters:

- The research status of the 2D metal-organic frameworks and the different techniques used to synthesize them.
- 2D black phosphorus (BP) and its practical application in various fields.
- Reviews the synthesis methods of MXenes and provides a detailed discussion of their structural characterization and physical, electrochemical and optical properties, as well as applications in catalysis, energy storage, environmental management, biomedicine, and gas sensing.
- The carbon-based materials and their potential applications via the photocatalytic process using visible light irradiation.

- 2D materials like graphene, TMDCs, few-layer phosphorene, MXene in layered form and their heterostructures.
- The structure and applications of 2D perovskites.
- The physical parameters of pristine layered materials, ZnO, transition metal dichalcogenides, and heterostructures of layered materials are discussed.
- The coupling of graphitic carbon nitride with various metal sulfides and oxides to form efficient heterojunction for water purification.
- The structural features, synthetic methods, properties, and different applications and properties of 2D zeolites.
- The methods for synthesizing 2D hollow nanostructures are featured and their structural aspects and potential in medical and non-medical applications.
- The characteristics and structural aspects of 2D layered double hydroxides (LDHs) and the various synthesis methods and role of LDH in non-medical applications as adsorbent, sensor, catalyst, etc.
- The synthesis of graphene-based 2D layered materials synthesized by using top-down and bottom-up approaches where the main emphasis is on the hot-filament thermal chemical vapor deposition (HFTCVD) method.
- The different properties of 2D h-BN and borophene and the various methods being used for the synthesis of 2D h-BN, along with their growth mechanism and transfer techniques.
- The physical properties and current progress of various transition metal dichalcogenides (TMDC) based on photoactive materials for photoelectrochemical (PEC) hydrogen evolution reaction.
- The state-of-the-art of 2D layered materials and associated devices, such as electronic, biosensing, optoelectronic, and energy storage applications

阅读全文:

<https://onlinelibrary.wiley.com/doi/book/10.1002/9781119655190>