


Shuichiro Ogawa *Editor*

Organic Electronics Materials and Devices

Second Edition

 Springer

Organic Electronics Materials And Devices

Sam-Shajing Sun, Larry R. Dalton



Organic Electronics Materials And Devices:

Organic Electronics Materials and Devices Shuichiro Ogawa, 2024-01-24 This book is an introductory text for graduate students researchers in industries and those who are just beginning to work on organic electronics materials devices and their applications The book includes mainly fundamental principles and theories for understanding organic electronics materials and devices but also provides information about state of the art technologies applications and future prospects These topics encompass physics for organic transistors structure control technologies of polymer semiconductors nanomaterials electronics organic solar cells organic electroluminescence and dynamics for excitation among others In this second edition the topics that have had particular progress in the field of organic electronics over the past seven years were added For example Thermally Activated Delayed Fluorescence TADF technology for organic LED the development of perovskite materials light emitting materials using nanomaterials and the development of skin sensors and wearable embedded devices The recent scientific understanding of organic electronics is also introduced This book will help readers to be able to contribute to society with the technologies and science of organic electronics materials in the future Organic Electronics Materials and Devices Shuichiro Ogawa, 2015 This book is an introductory text for graduate students researchers in industries and those who are just beginning to work on organic electronics materials devices and their applications The book includes mainly fundamental principles and theories for understanding organic electronics materials and devices but also provides information about state of the art technologies applications and future prospects These topics encompass physics for organic transistors structure control technologies of polymer semiconductors nanomaterials electronics organic solar cells organic electroluminescence liquid semiconductors and dynamics for excitation among others This book will help researchers to be able to contribute to society with the technologies and science of organic electronics materials in the future

Solution-Processable Components for Organic Electronic Devices Beata Luszczynska, Krzysztof Matyjaszewski, Jacek Ulanski, 2019-06-07 Provides first hand insights into advanced fabrication techniques for solution processable organic electronics materials and devices The field of printable organic electronics has emerged as a technology which plays a major role in materials science research and development Printable organic electronics soon compete with and for specific applications can even outpace conventional semiconductor devices in terms of performance cost and versatility Printing techniques allow for large scale fabrication of organic electronic components and functional devices for use as wearable electronics health care sensors Internet of Things monitoring of environment pollution and many others yet to be conceived applications The first part of Solution Processable Components for Organic Electronic Devices covers the synthesis of soluble conjugated polymers solution processable nanoparticles of inorganic semiconductors high k nanoparticles by means of controlled radical polymerization advanced blending techniques yielding novel materials with extraordinary properties The book also discusses photogeneration of charge carriers in nanostructured bulk heterojunctions and charge

carrier transport in multicomponent materials such as composites and nanocomposites as well as photovoltaic devices modelling The second part of the book is devoted to organic electronic devices such as field effect transistors light emitting diodes photovoltaics photodiodes and electronic memory devices which can be produced by solution based methods including printing and roll to roll manufacturing The book provides in depth knowledge for experienced researchers and for those entering the field It comprises 12 chapters focused on novel organic electronics components synthesis and solution based processing techniques advanced analysis of mechanisms governing charge carrier generation and transport in organic semiconductors and devices fabrication techniques and characterization methods of organic electronic devices Providing coverage of the state of the art of organic electronics *Solution Processable Components for Organic Electronic Devices* is an excellent book for materials scientists applied physicists engineering scientists and those working in the electronics industry

Organic Electronics Franky So, 2009-11-24 In the near future organic semiconductors may be used in a variety of products including flat screen TVs e book readers and third generation organic photovoltaics applications to name just a few While organic electronics has received increased attention in scientific journals those working in this burgeoning field require more in depth cover *Handbook of Flexible Organic Electronics* Stergios Logothetidis, 2014-12-03 Organic flexible electronics represent a highly promising technology that will provide increased functionality and the potential to meet future challenges of scalability flexibility low power consumption light weight and reduced cost They will find new applications because they can be used with curved surfaces and incorporated in to a number of products that could not support traditional electronics The book covers device physics processing and manufacturing technologies circuits and packaging metrology and diagnostic tools architectures and systems engineering Part one covers the production properties and characterisation of flexible organic materials and part two looks at applications for flexible organic devices Reviews the properties and production of various flexible organic materials Describes the integration technologies of flexible organic electronics and their manufacturing methods Looks at the application of flexible organic materials in smart integrated systems and circuits chemical sensors microfluidic devices organic non volatile memory devices and printed batteries and other power storage devices *Iontronics* Janelle Leger, Magnus Berggren, Sue Carter, 2016-04-19 With contributions from a community of experts the book focuses on the use of ionic functions to define the principle of operation in polymer devices It begins by reviewing the scientific understanding and important scientific discoveries made on the electrochemistry of conjugated polymers It examines the known effects of ion incorporation including the theory and modulation of electrochemistry in polymer films and it explores the coupling of electronic and ionic transport in polymer films

Electrical Characterization of Organic Electronic Materials and Devices Professor Peter Stallinga, 2009-10-08 Think like an electron Organic electronic materials have many applications and potential in low cost electronics such as electronic barcodes and in light emitting devices due to their easily tailored properties While the chemical aspects and

characterization have been widely studied characterization of the electrical properties has been neglected and classic textbook modeling has been applied This is most striking in the analysis of thin film transistors TFTs using thick bulk transistor MOS FET descriptions At first glance the TFTs appear to behave as regular MOS FETs However upon closer examination it is clear that TFTs are unique and merit their own model Understanding and interpreting measurements of organic devices which are often seen as black box measurements is critical to developing better devices and this therefore has to be done with care Electrical Characterization of Organic Electronic Materials and Devices Gives new insights into the electronic properties and measurement techniques for low mobility electronic devices Characterizes the thin film transistor using its own model Links the phenomena seen in different device structures and different measurement techniques Presents clearly both how to perform electrical measurements of organic and low mobility materials and how to extract important information from these measurements Provides a much needed theoretical foundation for organic electronics

Introduction to Organic Electronic Devices Guangye Zhang, Chen Xie, Peng You, Shunpu Li, 2022-10-13 This book comprehensively describes organic electronic devices developed in the past decades It not only covers the mainstream devices including organic light emitting diodes OLEDs organic photovoltaics OPVs and organic thin film transistors OTFTs but also includes devices of recent interest such as organic immune transistors organic photocatalysis devices and thermoelectrical devices The book starts from the introduction of basic theory of organic semiconductor materials and devices which acquaints the readers with the concepts of each type of device described in the following chapters It also discusses the working principles device layout and fabrication process of these devices The book is intended for undergraduate and postgraduate students who are interested in organic electronics researchers engineers working in the field of organic electronic devices systems Handbook of Organic Electronics and Photonics: Electronic materials and devices Hari Singh Nalwa, 2008-01-01 According to Nalwa founder and editor in chief of the Journal of Nanoscience and Nanotechnology organic materials and polymers offer a range of advantages in electronic and photonic applications including a higher degree of tailoring and versatility in the manipulation of their physical properties ease of modification and functionalization ease of processing and fabrication low cost mass production environmental stability and biocompatibility He presents a three volume handbook covering the synthesis and electrical properties of these materials as well as a range of applications The first volume on electronic materials and devices includes 13 chapters discussing such topics as synthetic approaches to band gap control in conjugated polymeric materials synthesis characteristics and applications of conducting polymer nanotubes nanowires and nanocomposites charge transport and morphology in conjugated polymers nano microfabrication techniques for organic electronics and photonics self assembled supramolecular structures for organic electronics and photonics organic thin film transistor fundamentals and applications electropolymers for mechatronics and artificial muscles and biologically inspired large contraction conducting polymer actuators The second volume switches focus towards photonic materials and

devices and includes 12 chapters discussing such topics as organic nonlinear optical crystals and single crystalline thin films organic semiconducting thin films organic random lasers nonlinear optical properties of organometallic and metalloorganic compounds nonlinear optical responses and photoinduced electron transfer process in phthalocyanines and related compounds liquid crystal diffractive optical elements magnetoresistance and spin effects in organic light emitting diodes and photoinduced transfer between electron donors and fullerenes as unique electron acceptors The final volume is concerned with devices and includes 10 chapters on such topics single molecule transistors nanostructured arrays as suitable materials for batteries sensors and electrochromic devices organic field effect transistors flexible display applications in organic electronics and photonics physics and technology and organic light emitting diodes organic and polymeric solar cells luminescent lanthanide complexes for advanced photonic applications and DNA based biosensors **Organic Electronics**

,2007 Introduction to Organic Electronic and Optoelectronic Materials and Devices Sam-Shajing Sun,Larry R.

Dalton,2008-05-29 Reflecting rapid growth in research and development on organic polymeric electronic and photonic materials and devices Introduction to Organic Electronic and Optoelectronic Materials and Devices provides comprehensive coverage of the state of the art in an accessible format The book presents fundamentals principles and mechanisms complem

Conjugated Polymers for Organic Electronics Andrew Grimsdale,Paul Dastoor,2024-04-04 Focusing on how conjugated polymers can be designed and made for use in efficient organic electronic devices this book covers the tools for future development of more environmentally and economically friendly devices Including examples of interdisciplinary science it exemplifies how chemists and physicists work together to enable the design and synthesis of high performance material in devices allowing polymer based electronic devices to become viable commercial products It provides the main classes of conjugated polymers and their applications in organic electronic devices such as transistors light emitting diodes and solar cells making this a comprehensive introduction This complete guide includes the methods for making conjugated polymers the properties and specific structures that make them suitable for use and how their synthesis can be optimised to improve device performance Written by experts in the field this is the ideal guide for researchers and practitioners across materials science physics chemistry and electrical engineering Organic Semiconductors for Optoelectronics Hiroyoshi

Naito,2021-07-30 Comprehensive coverage of organic electronics including fundamental theory basic properties characterization methods device physics and future trends Organic semiconductor materials have vast commercial potential for a wide range of applications from self emitting OLED displays and solid state lighting to plastic electronics and organic solar cells As research in organic optoelectronic devices continues to expand at an unprecedented rate organic semiconductors are being applied to flexible displays biosensors and other cost effective green devices in ways not possible with conventional inorganic semiconductors Organic Semiconductors for Optoelectronics is an up to date review of the both the fundamental theory and latest research and development advances in organic semiconductors Featuring contributions

from an international team of experts this comprehensive volume covers basic properties of organic semiconductors characterization techniques device physics and future trends in organic device development Detailed chapters provide key information on the device physics of organic field effect transistors organic light emitting diodes organic solar cells organic photosensors and more This authoritative resource Provides a clear understanding of the optoelectronic properties of organic semiconductors and their influence to overall device performance Explains the theories behind relevant mechanisms in organic semiconducting materials and in organic devices Discusses current and future trends and challenges in the development of organic optoelectronic devices Reviews electronic properties device mechanisms and characterization techniques of organic semiconducting materials Covers theoretical concepts of optical properties of organic semiconductors including fluorescent phosphorescent and thermally assisted delayed fluorescent emitters An important new addition to the Wiley Series in Materials for Electronic Optoelectronic Applications Organic Semiconductors for Optoelectronics bridges the gap between advanced books and undergraduate textbooks on semiconductor physics and solid state physics It is essential reading for academic researchers graduate students and industry professionals involved in organic electronics materials science thin film devices and optoelectronics research and development

Organic Radical Polymers Sanjoy

Mukherjee, Bryan W. Boudouris, 2017 Organic Electronic and Photonic Materials and Devices: Volume 660 Steven C.

Moss, 2001-09-04 The MRS Symposium Proceeding series is an internationally recognised reference suitable for researchers and practitioners *Organic Electronics - From Fundamentals to Applications* Arun Dev Dhar Dwivedi, Debashish

Maji, Parthsarathi Chakrabarti, 2025-10-22 Organic Electronics From Fundamentals to Applications offers a comprehensive exploration of the rapidly evolving field of organic electronic materials and devices Bridging the gap between fundamental science and cutting edge technological applications this edited volume brings together contributions from leading researchers and experts across academia and industry The book begins with a solid foundation in chemistry physics and materials science underlying organic semiconductors and conductive polymers It then transitions to the design and fabrication of devices including organic light emitting diodes OLEDs organic photovoltaics OPVs organic field effect transistors OFETs and sensors Advanced chapters delve into emerging applications including wearable electronics flexible displays biomedical devices and sustainable energy systems This volume is tailored for researchers graduate students and professionals in materials science electrical and electronics engineering applied physics and nanotechnology The clear and accessible presentation combined with in depth technical insights makes it equally valuable for newcomers and seasoned practitioners in the field By showcasing the latest developments and future directions Organic Electronics From Fundamentals to Applications serves as both a foundational resource and a catalyst for innovation in the interdisciplinary world of organic electronics Whether you aim to understand the basics or seek to advance the frontier of organic device technology this book will equip you with the knowledge and inspiration to explore new possibilities in flexible lightweight and

sustainable electronics **Wspc Reference On Organic Electronics, The: Organic Semiconductors (In 2 Volumes)**
 Seth R Marder, Jean-luc Bredas, 2016-06-24 This 2 volume set provides the reader with a basic understanding of the foundational concepts pertaining to the design synthesis and applications of conjugated organic materials used as organic semiconductors in areas including organic photovoltaic devices light emitting diodes field effect transistors spintronics actuation bioelectronics thermoelectrics and nonlinear optics While there are many monographs in these various areas the emphasis here is both on the fundamental chemistry and physics concepts underlying the field of organic semiconductors and on how these concepts drive a broad range of applications This makes the volumes ideal introductory textbooks in the subject They will thus offer great value to both junior and senior scientists working in areas ranging from organic chemistry to condensed matter physics and materials science and engineering Number of Illustrations and Tables 168 b w illus 242 colour illus 13 tables *The Physics of Organic Electronics* Luis Alcácer, 2020 This reference text provides a comprehensive and concise overview of organic electronics covering both the theoretical background physics and the physics of the materials and devices behind the technology **Introduction to Organic Electronic and Optoelectronic Materials and Devices**
 Sam-Shajing Sun, Larry R. Dalton, 2008 Reflecting rapid growth in research and development on organic polymeric electronic and photonic materials and devices Introduction to Organic Electronic and Optoelectronic Materials and Devices provides comprehensive coverage of the state of the art in an accessible format The book presents fundamentals principles and mechanisms complem **Handbook of Organic Materials for Optical and (Opto)Electronic Devices** Oksana Ostroverkhova, 2013-08-31 Small molecules and conjugated polymers the two main types of organic materials used for optoelectronic and photonic devices can be used in a number of applications including organic light emitting diodes photovoltaic devices photorefractive devices and waveguides Organic materials are attractive due to their low cost the possibility of their deposition from solution onto large area substrates and the ability to tailor their properties The Handbook of organic materials for optical and opto electronic devices provides an overview of the properties of organic optoelectronic and nonlinear optical materials and explains how these materials can be used across a range of applications Parts one and two explore the materials used for organic optoelectronics and nonlinear optics their properties and methods of their characterization illustrated by physical studies Part three moves on to discuss the applications of optoelectronic and nonlinear optical organic materials in devices and includes chapters on organic solar cells electronic memory devices and electronic chemical sensors electro optic devices The Handbook of organic materials for optical and opto electronic devices is a technical resource for physicists chemists electrical engineers and materials scientists involved in research and development of organic semiconductor and nonlinear optical materials and devices Comprehensively examines the properties of organic optoelectronic and nonlinear optical materials Discusses their applications in different devices including solar cells LEDs and electronic memory devices An essential technical resource for physicists chemists electrical engineers and

materials scientists

Reviewing **Organic Electronics Materials And Devices**: Unlocking the Spellbinding Force of Linguistics

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