

ORGANIC ELECTROLUMINESCENT MATERIALS AND DEVICES



Edited by
Seizo Miyata and **Hari Singh Nalwa**

Organic Electroluminescent Materials And Devices

Sarah Schols



Organic Electroluminescent Materials And Devices:

Organic Electroluminescent Materials and Devices S. T. Lee, 2000 **Organic Electroluminescent Materials and Devices** Seizo Miyata, 1997-07-16 Reports on the progress in organic materials that can glow a number of different colors may soon be used in a number of applications such as panel displays backlights of liquid crystal displays indicator lights light sources for optical communication watches toys and microwave ovens and has already been used in a prototype of a 40 inch color plasma display panel The topics include electron processes in organic electroluminescence making polymer light emitting diodes with polythiophenes electroluminescence and photoluminescence in fullerenes chelate metal complexes white light emitting diodes the growth and characterization of display devices using vacuum deposited organic materials and novel fabrication techniques for devices Annotation copyrighted by Book News Inc Portland OR Recent Progress of Molecular Organic Electroluminescent Materials and Devices L. S. Hung, C. H. Chen, 2002 *Organic Light-Emitting Materials and Devices* Zhigang Li, Zhigang Rick Li, Hong Meng, 2006-09-12 New advances offer flexible low cost fabrication methods for light emitting materials particularly in display technologies As researchers continue to develop novel applications for these materials feasible solutions for large scale manufacturing are increasingly important Organic Light Emitting Materials and Devices covers all aspects of **Organic Light-Emitting Materials and Devices** Zhigang Rick Li, 2017-12-19 Organic Light Emitting Materials and Devices provides a single source of information covering all aspects of OLEDs including the systematic investigation of organic light emitting materials device physics and engineering and manufacturing and performance measurement techniques This Second Edition is a compilation of the advances made in recent years and of the challenges facing the future development of OLED technology Featuring chapters authored by internationally recognized academic and industrial experts this authoritative text Introduces the history fundamental physics and potential applications of OLEDs Reviews the synthesis properties and device performance of electroluminescent materials used in OLEDs Reflects the current state of molecular design exemplifying more than 600 light emitting polymers and highlighting the most efficient materials and devices Explores small molecules based OLEDs detailing hole and electron injection and electron transport materials electron and hole blocking materials sensitizers and fluorescent and phosphorescent light emitting materials Describes solution processable phosphorescent polymer LEDs energy transfer processes polarized OLEDs anode materials and vapor deposition manufacturing techniques employed in OLED fabrication Discusses flexible display the backplane circuit technology for organic light emitting displays and the latest microstructural characterization and performance measurement techniques Contains abundant diagrams device configurations and molecular structures clearly illustrating the presented ideas Organic Light Emitting Materials and Devices Second Edition offers a comprehensive overview of the OLED field and can serve as a primary reference for those needing additional information in any particular subarea of organic electroluminescence This book should attract the attention of materials

scientists synthetic chemists solid state physicists and electronic device engineers as well as industrial managers and patent lawyers engaged in OLED related business areas

Photoelectric Materials And Devices Tao Han, Haibo Ruan, Shixiu Cao, Youwei Guan, Danyong Tang, Xin Yang, 2021-05-25 This book mainly introduces the basic theory and physical characteristics of photoelectric materials the preparation technology of photoelectric components the working principle the latest application the latest progress of photoelectric materials and devices technology and the correlation with other technologies The content mainly involves the theoretical basis of photoelectric materials micro nano photoelectric materials and devices semiconductor luminescent materials and devices inorganic photoluminescence materials LED packaging technology transparent conductive materials touch screen display screen solar cell materials and the basic principles and development trend of their applications In particular the book gives a systematic theoretical analysis of new photoelectric materials and devices such as optoelectronic materials and devices transparent conductive materials and provides application examples

Device Architecture and Materials for Organic Light-Emitting Devices Sarah Schols, 2011-05-10 Device Architecture and Materials for Organic Light Emitting Devices focuses on the design of new device and material concepts for organic light emitting devices thereby targeting high current densities and an improved control of the triplet concentration A new light emitting device architecture the OLED with field effect electron transport is demonstrated This device is a hybrid between a diode and a field effect transistor Compared to conventional OLEDs the metallic cathode is displaced by one to several micrometers from the light emitting zone reducing optical absorption losses The electrons injected by the cathode accumulate at an organic heterojunction and are transported to the light emission zone by field effect High mobilities for charge carriers are achieved in this way enabling a high current density and a reduced number of charge carriers in the device Pulsed excitation experiments show that pulses down to 1 s can be applied to this structure without affecting the light intensity suggesting that pulsed excitation might be useful to reduce the accumulation of triplets in the device The combination of all these properties makes the OLED with field effect electron transport particularly interesting for waveguide devices and future electrically pumped lasers In addition triplet emitter doped organic materials as well as the use of triplet scavengers in conjugated polymers are investigated

A New Generation of Organic Light-Emitting Materials and Devices Shi-Jian Su, Lian Duan, Hisahiro Sasabe, 2019-11-27 Since the invention of the first efficient organic light emitting diodes OLEDs by C T Tang and S VanSlyke OLEDs have attracted close interest as a promising candidate for next generation full color displays and future solid state lighting sources because of a number of advantages like high brightness and contrast high luminous efficiency fast response time wide viewing angle low power consumption and light weight The recombination of holes and electrons under electrical excitation typically generates 25% singlet excitons and 75% triplet excitons For traditional fluorescent OLEDs only 25% singlet excitons can be utilized to emit light while the other 75% triplet excitons are generally wasted through nonradiative transition By adopting noble metal

phosphorescent complexes an internal quantum efficiency IQE of 100% could be achieved by utilizing both the 25% singlet excitons and 75% triplet excitons. However, these phosphors usually contain nonrenewable and high-cost iridium or platinum noble metals. Most recently, unity IQE has been readily achieved through noble metal-free purely organic emitters such as thermally activated delayed fluorescence (TADF) emitters, hybridized local and charge transfer state (HLCT) hot exciton emitters, binary or ternary mixed donor-acceptor exciplex emitters, and neutral p-radical emitters, etc. In addition, the combination of conventional p-type hole transport and n-type electron transport materials in an appropriate device structure can also provide an uncommon efficiency. Both strategies are essential and attractive for high performance and low cost full color displays and white OLED applications. This Research Topic mainly focuses on this new generation of organic light emitting materials and devices, including design, synthesis, and characterization of light emitting organic molecules with tunable excited states and their structural, electrical, and photophysical properties. Contributions relating to carrier transporting materials and corresponding device engineering are also included. Two mini reviews and thirteen original research articles by recognized academic experts in their respective fields are collected in this Research Topic, which will offer a broad perspective of noble metal-free organic light emitters, including conventional fluorescent emitters, TADF emitters, HLCT emitters, exciplex emitters, aggregation-induced emission (AIE) luminogens, and their corresponding devices. We believe this eBook should attract the attention of multidisciplinary researchers in the fields of materials science, organic synthesis, and electronic device engineering, especially for those engaged in OLED-related areas.

Organic Electroluminescence Zakya H. Kafafi, 2018-10-03. Organic light emitting diode (OLED) technology has achieved significant penetration in the commercial market for small, low voltage, and inexpensive displays. Present and future novel technologies based on OLEDs involve rigid and flexible flat panel displays, solid state lighting, and lasers. Display applications may range from hand-held devices to large flat panel screens that can be rolled up or hung flat on a wall or a ceiling. Organic Electroluminescence gives an overview of the on-going research in the field of organic light emitting materials and devices, covering the principles of electroluminescence in organic thin films, as well as recent trends, current applications, and future potential uses. The book begins by giving a background of organic electroluminescence in terms of history and basic principles. It offers details on the mechanisms of electroluminescence in thin organic films. It presents in-depth discussions of the parameters that control the external electroluminescence quantum efficiency, including the photoluminescence quantum yield, the light output coupling factor, carrier charge injection and transport, and electron and hole recombination processes in organic semiconductors. The authors address the design and the characterization of amorphous charge transport materials with high glass transition temperatures, light emitting small molecules, and conjugated polymers. The book covers state-of-the-art concepts and technologies such as fluorescent and phosphorescent OLEDs, various approaches for patterning organics, and active matrix organic emissive displays, including their back panel thin film transistors and pixel electronics. It concludes by summarizing

future directions for OLEDs in organic light emitting displays large area distributed solid state light sources and lasers using organic thin films nanostructures and photonic crystals Organic Electroluminescence is an excellent resource and reference for stu

Polymers in Organic Electronics Sulaiman Khalifeh,2020-04-01 Polymers in Organic Electronics Polymer Selection for Electronic Mechatronic and Optoelectronic Systems provides readers with vital data guidelines and techniques for optimally designing organic electronic systems using novel polymers The book classifies polymer families types complexes composites nanocomposites compounds and small molecules while also providing an introduction to the fundamental principles of polymers and electronics Features information on concepts and optimized types of electronics and a classification system of electronic polymers including piezoelectric and pyroelectric optoelectronic mechatronic organic electronic complexes and more The book is designed to help readers select the optimized material for structuring their organic electronic system Chapters discuss the most common properties of electronic polymers methods of optimization and polymeric structured printed circuit boards The polymeric structures of optoelectronics and photonics are covered and the book concludes with a chapter emphasizing the importance of polymeric structures for packaging of electronic devices Provides key identifying details on a range of polymers micro polymers nano polymers resins hydrocarbons and oligomers Covers the most common electrical electronic and optical properties of electronic polymers Describes the underlying theories on the mechanics of polymer conductivity Discusses polymeric structured printed circuit boards including their rapid prototyping and optimizing their polymeric structures Shows optimization methods for both polymeric structures of organic active electronic components and organic passive electronic components

Organic Light-Emitting Materials and Devices Zhigang Li,Zhigang Rick Li,Hong Meng,2006-09-12 New advances offer flexible low cost fabrication methods for light emitting materials particularly in display technologies As researchers continue to develop novel applications for these materials feasible solutions for large scale manufacturing are increasingly important Organic Light Emitting Materials and Devices covers all aspects of organic light emitting diodes OLEDs focusing on the unique characteristics of electroluminescent materials device structures and fabrication technologies Written by internationally recognized experts across several fields this book first explains the multilayered structure and fundamental physics that account for OLED design The book compiles information on the synthesis properties and device performance of nearly 1 000 organic small molecule and polymer based electroluminescent materials It also investigates practical manufacturing techniques for OLED fabrication as well as methods used for microstructural characterization performance measurement and defect analysis Later chapters discuss the patent status of the currently employed organic light emitting materials potential applications of OLEDs and the challenges facing future developments from both academic and industrial perspectives Incorporating the latest research on hundreds of light emitting organic materials Organic Light Emitting Materials and Devices reflects the current understanding of molecular design in the field and reveals the most stable and efficient electroluminescent materials as well

as the vast potential for future applications *Applications of Organic and Printed Electronics* Eugenio Cantatore, 2012-09-19 Organic and printed electronics can enable a revolution in the applications of electronics and this book offers readers an overview of the state of the art in this rapidly evolving domain The potentially low cost compatibility with flexible substrates and the wealth of devices that characterize organic and printed electronics will make possible applications that go far beyond the well known displays made with large area silicon electronics Since organic electronics are still in their early stage undergoing transition from lab scale and prototype activities to production this book serves as a valuable snapshot of the current landscape of the different devices enabled by this technology reviewing all applications that are developing and those can be foreseen *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 **Advances in Organic Synthesis: Volume 16** Atta-ur-Rahman, 2022-03-10 Advances in Organic Synthesis is a book series devoted to the latest advances in synthetic approaches towards challenging structures The series presents comprehensive reviews written by eminent authorities on different synthetic approaches to selected target molecules and new methods developed to achieve specific synthetic transformations or optimal product yields Advances in Organic Synthesis is essential for all organic chemists in academia and the industry who wish to keep abreast of rapid and important developments in the field Contents of this volume include these 7 reviews Recent advances in copper catalyzed heterocyclic syntheses Application of modern green chemistry methods in the synthesis of quinolines quinazolines and quinazolinones Electroluminescence polymers a review on synthesis by organic compounds Multicomponent approach for the synthesis of xanthenes From atoms to macromolecules 100 years of polymer research An overview of oxidizing and reducing agents in total synthesis Amino acid derived ionic liquids novel biodegradable catalytic systems for green synthesis of heterocycles **Organic Light Emitting Devices** Jai Singh, 2012-11-14 This book describes the state of the art advancement in the field of organic electroluminescence contributed by many researchers with internationally established expertise in the field It includes original contributions on the synthesis of suitable organic materials fabrication of organic light emitting devices OLEDs and organic white light emitting devices WOLEDs characterization of these devices and some designs for optimal performance All chapters are self

sufficient in presenting their contents The cost effective chemical technology offers many exciting possibilities for OLEDs and organic solar cells OSCs to be futuristic solutions for lighting and power generation A common flexible substrate can be used to fabricate OLEDs on one side facing a room and OSCs on the other side facing the sun The device thus fabricated can generate power in the day time and light a room house at night The book covers developments on OLEDs WOLEDs and briefly on OSCs as well Papers Presented at the Asia-Pacific Symposium on Organic Electroluminescent Materials and Devices S.-T. Lee,2000 *Multiphoton and Light Driven Multielectron Processes in Organics: New Phenomena, Materials and Applications* F. Kajzar,Vladimir M. Agranovich,2000-06-30 Proceedings of the NATO Advanced Research Workshop Menton France 26 31 August 1999 Organic Light-emitting Materials and Devices ,1999 **Organic Optoelectronics** Wenping Hu,Fenglian Bai,Xiong Gong,Xiaowei Zhan,Hongbing Fu,Thomas Bjornholm,2012-11-05 Written by internationally recognized experts in the field with academic as well as industrial experience this book concisely yet systematically covers all aspects of the topic The monograph focuses on the optoelectronic behavior of organic solids and their application in new optoelectronic devices It covers organic field effect and organic electroluminescent materials and devices organic photonics materials and devices as well as organic solids in photo absorption and energy conversion Much emphasis is laid on the preparation of functional materials and the fabrication of devices from materials synthesis and purification to physicochemical properties and the basic processes and working principles of the devices The only book to cover fundamentals applications and the latest research results this is a handy reference for both researchers and those new to the field From the contents Electronic process in organic solids Organic polymeric semiconductors for field effect transistors Organic polymeric field effect transistors Organic circuits and organic single molecular transistors Polymer light emitting Diodes PLEDs devices and materials Organic solids for photonics Organic photonic devices Organic solar cells based on small molecules Polymer solar cells Dye sensitized solar cells DSSCs Organic thermoelectric power devices *Rare Earth Coordination Chemistry* Chun-Hui Huang,2011-09-23 Edited by a highly regarded scientist and with contributions from sixteen international research groups spanning Asia and North America Rare Earth Coordination Chemistry Fundamentals and Applications provides the first one stop reference resource for important accomplishments in the area of rare earth Consisting of two parts Fundamentals and Applications readers are armed with the systematic basic aspects of rare earth coordination chemistry and presented with the latest developments in the applications of rare earths The systematic introduction of basic knowledge application technology and the latest developments in the field makes this ideal for readers across both introductory and specialist levels

Decoding **Organic Electroluminescent Materials And Devices**: Revealing the Captivating Potential of Verbal Expression

In an era characterized by interconnectedness and an insatiable thirst for knowledge, the captivating potential of verbal expression has emerged as a formidable force. Its ability to evoke sentiments, stimulate introspection, and incite profound transformations is genuinely awe-inspiring. Within the pages of "**Organic Electroluminescent Materials And Devices**," a mesmerizing literary creation penned by a celebrated wordsmith, readers set about an enlightening odyssey, unraveling the intricate significance of language and its enduring affect our lives. In this appraisal, we shall explore the book is central themes, evaluate its distinctive writing style, and gauge its pervasive influence on the hearts and minds of its readership.

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