

# Organic Light-Emitting Devices

Synthesis, Properties, and Applications



# Organic Light Emitting Devices Synthesis Properties And Applications

**Klaus Müllen, Ullrich Scherf**



## **Organic Light Emitting Devices Synthesis Properties And Applications:**

**Organic Light Emitting Devices** Klaus Müllen,Ullrich Scherf,2006-05-12 This high class book reflects a decade of intense research culminating in excellent successes over the last few years The contributions from both academia as well as the industry leaders combine the fundamentals and latest research results with application know how and examples of functioning displays As a result all the four important aspects of OLEDs are covered syntheses of the organic materials physical theory of electroluminescence and device efficiency device conception and construction characterization of both materials and devices The whole is naturally rounded off with a look at what the future holds in store The editor Klaus Müllen is director of the highly prestigious MPI for polymer research in Mainz Germany while the authors include Nobel Laureate Alan Heeger one of the most notable founders of the field Richard Friend as well as Ching Tang Eastman Kodak s number one OLED researcher known throughout the entire community for his key publications *Photonic Bandgap Structures Novel Technological Platforms for Physical, Chemical and Biological Sensing* Marco Pisco,Andrea Cusano ,Antonello Cutolo,2012-07-27 This E Book covers the research and the development of a novel generation of photonic devices for sensing applications The E Book starts with a brief review of basic photonic crystal PhC structure related concepts and describes the numerical and technological tools useful in the design and fabrication of devices based on PhCs Next the E Book provides a selection of crossover topics emerging in the scientific community as breaking through researches technologies and sciences for the development of novel technological platforms for physical chemical and biological sensing The E Book ends with a description of the main PhC sensors to date by representing many of the exciting sensing applications that utilize photonic crystal structures *Colour Chemistry* Robert Christie,2014-09-24 Nothing provided

**The Chemistry of Environmental Engineering** Johannes Karl Fink,2020-04-07 The focus of this book is the chemistry of environmental engineering and its applications with a special emphasis on the use of polymers in this field It explores the creation and use of polymers with special properties such as viscoelasticity and interpenetrating networks examples of which include the creation of polymer modified asphalt as well as polymers with bacterial adhesion properties The text contains the issues of polymerization methods recycling methods wastewater treatment types of contaminants such as microplastics organic dyes and pharmaceutical residues After a detailed overview of polymers in Chapter 1 their special properties are discussed in the following chapter Among the topics is the importance of polymers to water purification procedures since their use in the formation of reverse osmosis membranes do not show biofouling Chapter 3 details special processing methods such as atom transfer radical polymerization enzymatic polymerization plasma treatment and several other methods can be used to meet the urgent demands of industrial applications Chapter 4 addresses the important environmental issue of recycling methods as they relate to several types of materials such as PET bottles tire rubbers asphalt compositions and other engineering resins And wastewater treatment is detailed in Chapter 5 in which the types of contaminants such as

microplastics organic dyes and pharmaceutical residues are described and special methods for their proper removal are detailed along with types of adsorbents including biosorbents Still another important issue for environmental engineering chemistry is pesticides Chapter 6 is a thorough description of the development and fabrication of special sensors for the detection of certain pesticides A detailed presentation of the electrical uses of polymer based composites is given in Chapter 7 which include photovoltaic materials solar cells energy storage and dielectric applications light emitting polymers and fast charging batteries And recent issues relating to food engineering such as food ingredient tracing protein engineering biosensors and electronic tongues are presented in Chapter 8 Finally polymers used for medical applications are described in Chapter 9 These applications include drug delivery tissue engineering porous coatings and also the special methods used to fabricate such materials

**Dyes and Chromophores in Polymer Science** Jacques Lalevée, Jean-Pierre Fouassier, 2015-06-15 The design and development of dyes and chromophores have recently attracted much attention in various research fields such as materials radiation curing laser imaging optics medicine microelectronics nanotechnology etc In this book the recent research for the use of dyes and chromophores in polymer science is presented The interaction of the visible light with the dyes or the selected chromophores is particularly important in different fields e g for photovoltaic display applications LED laser imaging or laser direct writing green chemistry with sunlight induced photopolymerization etc This book gives an overview of the dyes and chromophores for all the important fields

***Iridium(III) in Optoelectronic and Photonics Applications*** Eli Zysman-Colman, 2017-03-07 The fundamental photophysical properties of iridium III materials make this class of materials the pre eminent transition metal complex for use in optoelectronic applications Iridium III in Optoelectronic and Photonics Applications represents the definitive account of photoactive iridium complexes and their use across a wide variety of applications This two volume set begins with an overview of the synthesis of these complexes and discusses their photophysical properties The text highlights not only mononuclear complexes but also the properties of multinuclear and polymeric iridium based materials and the assembly of iridium complexes into larger supramolecular architectures such as MOFs and soft materials Chapters devoted to the use of these iridium based materials in diverse optoelectronic applications follow including electroluminescent devices such as organic light emitting diodes OLEDs and light emitting electrochemical cells LEECs electrochemiluminescence ECL bioimaging sensing light harvesting in the context of solar cell applications in photoredox catalysis and as components for solar fuels Although primarily targeting a chemistry audience the wide applicability of these compounds transcends traditional disciplines making this text also of use to physicists materials scientists or biologists who have interests in these areas

***Macromolecular Chemistry and Physics***, 2006

**Flexible and Wearable Sensors** Ram K. Gupta, 2023-03-21 With rapid technological developments and lifestyle advancements electronic sensors are being seamlessly integrated into many devices This comprehensive handbook explores current state of the art developments in flexible and wearable sensor technology and its future challenges Numerous recent

efforts have improved the sensing capability and functionality of flexible and wearable sensors. However, there are still many challenges in making them super smart by incorporating features such as self power, self healing, and multifunctionality. These features can be developed with the use of multifunctional nanostructured materials, unique architectural designs, and other advanced technologies. This book provides details about the recent advancements, materials, and technologies used for flexible and wearable sensors. Its wide range of topics addresses the fundamentals of flexible and wearable sensors, their working principles, and their advanced applications. This handbook provides new directions to scientists, researchers, and students to better understand the principles, technologies, and applications of sensors in healthcare, energy, and the environment.

**Handbook of Conducting Polymers, 2 Volume Set** Terje A. Skotheim, John Reynolds, 2007-01-16. Learn how recent advances are fueling new possibilities in textiles, optics, electronics, and biomedicine. As the field of conjugated electrically conducting and electroactive polymers has grown, the Handbook of Conducting Polymers has been there to document and celebrate these changes along the way. Now split into two volumes. *Bulletin of the Chemical Society of Japan* Nihon Kagakkai, 2007. 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. *Handbook of Optics Third Edition, 5 Volume Set* Optical Society of America, 2010-05-18. The most comprehensive and up to date optics resource available. Prepared under the auspices of the Optical Society of America, the five carefully architected and cross referenced volumes of the Handbook of Optics Third Edition contain everything a student, scientist, or engineer requires to actively work in the field. From the design of complex optical systems to world class research and development methods, this definitive publication provides unparalleled access to the fundamentals of the discipline and its greatest minds. Individual chapters are

written by the world's most renowned experts who explain, illustrate and solve the entire field of optics. Each volume contains a complete chapter listing for the entire Handbook, extensive chapter glossaries and a wealth of references. This pioneering work offers unprecedented coverage of optics data, techniques and applications. Volume I covers geometrical and physical optics, polarized light, components and instruments. Volume II covers design, fabrications, testing, sources, detectors, radiometry and photometry. Volume III, all in full color, covers vision and vision optics. Volume IV covers optical properties of materials, nonlinear optics and quantum optics. Volume V covers atmospheric optics, modulators, fiber optics and x-ray and neutron optics. Visit [www.HandbookofOpticsOnline.com](http://www.HandbookofOpticsOnline.com) to search all five volumes and download a comprehensive index.

**Handbook of Advanced Electronic and Photonic Materials and Devices: Liquid crystals, display and laser materials** Hari Singh Nalwa, 2001. Electronic and photonic materials discussed in this handbook are the key elements of continued scientific and technological advances in the 21st century. The electronic and photonic materials comprising this handbook include semiconductors, superconductors, ferroelectrics, liquid crystals, conducting polymers, organic and superconductors, conductors, nonlinear optical and optoelectronic materials, electrochromic materials, laser materials, photoconductors, photovoltaic and electroluminescent materials, dielectric materials, nanostructured materials, supramolecular and self-assemblies, silicon and glasses, photosynthetic and respiratory proteins, etc. etc. Some of these materials have already been used and will be the most important components of the semiconductor and photonic industries: computers, internet, information processing and storage, telecommunications, satellite communications, integrated circuits, photocopiers, solar cells, batteries, light emitting diodes, liquid crystal displays, magneto-optic memories, audio and video systems, recordable compact discs, video cameras, X-ray technology, color imaging, printing, flat panel displays, optical waveguides, cable televisions, computer chips, molecular-sized transistors and switches, as well as other emerging cutting-edge technologies. Electronic and photonic materials are expected to grow to a trillion-dollar industry in the new millennium and will be the most dominating forces in the emerging new technologies in the fields of science and engineering. This handbook is a unique source of the in-depth knowledge of synthesis, processing, fabrication, spectroscopy, physical properties and applications of electronic and photonic materials, covering everything for today's and developing future technologies. This handbook consists of over one hundred state-of-the-art review chapters written by more than 200 world-leading experts from 25 different countries. With more than 23,000 bibliographic citations and several thousands of figures, tables, photographs, chemical structures and equations, this handbook is an invaluable major reference source for scientists and students working in the field of materials science, solid state physics, chemistry, electrical and optical engineering, polymer science, device engineering and computational engineering, photophysics, data storage and information technology, and technocrats. Everyone who is involved in science and engineering of electronic and photonic materials. **Key Features:** This is the first handbook ever published on electronic and photonic materials. 10 volumes summarize the advances in electronic and photonic materials made over past

the two decades This handbook is a unique source of the in depth knowledge of synthesis processing spectroscopy physical properties and applications of electronic and photonic materials Over 100 state of the art review chapters written by more than 200 leading experts from 25 different countries About 25 000 bibliographic citations and several thousand figures tables photographs chemical structures and equations Easy access to electronic and photonic materials from a single reference Each chapter is self contained with cross references Single reference having all inorganic organic and biological materials Witten in very clear and concise fashion for easy understanding of structure property relationships in electronic and photonic materials

**Handbook of Advanced Electronic and Photonic Materials and Devices: Light-emitting diodes, lithium batteries and polymer devices** Hari Singh Nalwa, 2001 Electronic and photonic materials discussed in this handbook are the key elements of continued scientific and technological advances in the 21st century The electronic and photonic materials comprising this handbook include semiconductors superconductors ferroelectrics liquid crystals conducting polymers organic and superconductors conductors nonlinear optical and optoelectronic materials electrochromic materials laser materials photoconductors photovoltaic and electroluminescent materials dielectric materials nanostructured materials supramolecular and self assemblies silicon and glasses photosynthetic and respiratory proteins etc etc Some of these materials have already been used and will be the most important components of the semiconductor and photonic industries computers internet information processing and storage telecommunications satellite communications integrated circuits photocopiers solar cells batteries light emitting diodes liquid crystal displays magneto optic memories audio and video systems recordable compact discs video cameras X ray technology color imaging printing flat panel displays optical waveguides cable televisions computer chips molecular sized transistors and switches as well as other emerging cutting edge technologies Electronic and photonic materials are expected to grow to a trillion dollar industry in the new millennium and will be the most dominating forces in the emerging new technologies in the fields of science and engineering This handbook is a unique source of the in depth knowledge of synthesis processing fabrication spectroscopy physical properties and applications of electronic and photonic materials covering everything for today s and developing future technologies This handbook consists of over one hundred state of the art review chapters written by more than 200 world leading experts from 25 different countries With more than 23 000 bibliographic citations and several thousands of figures tables photographs chemical structures and equations this handbook is an invaluable major reference source for scientists and students working in the field of materials science solid state physics chemistry electrical and optical engineering polymer science device engineering and computational engineering photophysics data storage and information technology and technocrats everyone who is involved in science and engineering of electronic and photonic materials Key Features This is the first handbook ever published on electronic and photonic materials 10 volumes summarize the advances in electronic and photonic materials made over past the two decades This handbook is a unique source of the in depth knowledge of synthesis processing

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*Handbook of Advanced Electronic and Photonic Materials and Devices: Chalcogenide glasses and sol-gel materials* Hari Singh Nalwa, 2001

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Handbook of Advanced Electronic and Photonic Materials and Devices: Ferroelectrics and dielectrics Hari Singh Nalwa, 2001 Electronic and photonic materials discussed in this handbook are the key elements of continued scientific and technological advances in the 21st century The electronic and photonic materials comprising this handbook include semiconductors superconductors ferroelectrics liquid crystals conducting polymers organic and superconductors conductors nonlinear optical and optoelectronic materials electrochromic materials laser materials photoconductors photovoltaic and electroluminescent materials dielectric materials nanostructured materials supramolecular and self assemblies silicon and glasses photosynthetic and respiratory proteins etc etc Some of these materials have already been used and will be the most important components of the semiconductor and photonic industries computers internet information processing and storage telecommunications satellite communications integrated circuits photocopiers solar cells batteries light emitting diodes liquid crystal displays magneto optic memories audio and video systems recordable compact discs video cameras X ray technology color imaging printing flat panel displays optical waveguides cable televisions computer chips molecular sized transistors and switches as well as other emerging cutting edge technologies Electronic and photonic materials are expected to grow to a trillion dollar industry in the new millennium and will be the most dominating forces in the emerging new technologies in the fields of science and engineering This handbook is a unique source of the in depth knowledge of synthesis processing fabrication spectroscopy physical properties and applications of electronic and photonic materials covering everything for today s and developing future technologies This handbook consists of over one hundred state of the art review chapters written by more than 200 world leading experts from 25 different countries With more than 23 000 bibliographic citations and several thousands of figures tables photographs chemical structures and equations this handbook is an invaluable major reference source for scientists and students working in the field of materials science solid state physics chemistry electrical and optical engineering polymer science device engineering and computational engineering photophysics data storage and information technology and technocrats everyone who is involved in science and engineering of electronic and photonic materials

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photographs chemical structures and equations Easy access to electronic and photonic materials from a single reference Each chapter is self contained with cross references Single reference having all inorganic organic and biological materials Witten in very clear and concise fashion for easy understanding of structure property relationships in electronic and photonic materials *Handbook of Advanced Electronic and Photonic Materials and Devices: Nonlinear optical materials* Hari Singh Nalwa, 2001 Electronic and photonic materials discussed in this handbook are the key elements of continued scientific and technological advances in the 21st century The electronic and photonic materials comprising this handbook include semiconductors superconductors ferroelectrics liquid crystals conducting polymers organic and superconductors conductors nonlinear optical and optoelectronic materials electrochromic materials laser materials photoconductors photovoltaic and electroluminescent materials dielectric materials nanostructured materials supramolecular and self assemblies silicon and glasses photosynthetic and respiratory proteins etc etc Some of these materials have already been used and will be the most important components of the semiconductor and photonic industries computers internet information processing and storage telecommunications satellite communications integrated circuits photocopiers solar cells batteries light emitting diodes liquid crystal displays magneto optic memories audio and video systems recordable compact discs video cameras X ray technology color imaging printing flat panel displays optical waveguides cable televisions computer chips molecular sized transistors and switches as well as other emerging cutting edge technologies Electronic and photonic materials are expected to grow to a trillion dollar industry in the new millennium and will be the most dominating forces in the emerging new technologies in the fields of science and engineering This handbook is a unique source of the in depth knowledge of synthesis processing fabrication spectroscopy physical properties and applications of electronic and photonic materials covering everything for today s and developing future technologies This handbook consists of over one hundred state of the art review chapters written by more than 200 world leading experts from 25 different countries With more than 23 000 bibliographic citations and several thousands of figures tables photographs chemical structures and equations this handbook is an invaluable major reference source for scientists and students working in the field of materials science solid state physics chemistry electrical and optical engineering polymer science device engineering and computational engineering photophysics data storage and information technology and technocrats everyone who is involved in science and engineering of electronic and photonic materials Key Features This is the first handbook ever published on electronic and photonic materials 10 volumes summarize the advances in electronic and photonic materials made over past the two decades This handbook is a unique source of the in depth knowledge of synthesis processing spectroscopy physical properties and applications of electronic and photonic materials Over 100 state of the art review chapters written by more than 200 leading experts from 25 different countries About 25 000 bibliographic citations and several thousand figures tables photographs chemical structures and equations Easy access to electronic and photonic materials from a single reference Each chapter is

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**Handbook of Advanced Electronic and Photonic Materials and Devices: Semiconductors** Hari Singh Nalwa, 2001

Electronic and photonic materials discussed in this handbook are the key elements of continued scientific and technological advances in the 21st century The electronic and photonic materials comprising this handbook include semiconductors superconductors ferroelectrics liquid crystals conducting polymers organic and superconductors conductors nonlinear optical and optoelectronic materials electrochromic materials laser materials photoconductors photovoltaic and electroluminescent materials dielectric materials nanostructured materials supramolecular and self assemblies silicon and glasses photosynthetic and respiratory proteins etc etc Some of these materials have already been used and will be the most important components of the semiconductor and photonic industries computers internet information processing and storage telecommunications satellite communications integrated circuits photocopiers solar cells batteries light emitting diodes liquid crystal displays magneto optic memories audio and video systems recordable compact discs video cameras X ray technology color imaging printing flat panel displays optical waveguides cable televisions computer chips molecular sized transistors and switches as well as other emerging cutting edge technologies Electronic and photonic materials are expected to grow to a trillion dollar industry in the new millennium and will be the most dominating forces in the emerging new technologies in the fields of science and engineering This handbook is a unique source of the in depth knowledge of synthesis processing fabrication spectroscopy physical properties and applications of electronic and photonic materials covering everything for today s and developing future technologies This handbook consists of over one hundred state of the art review chapters written by more than 200 world leading experts from 25 different countries With more than 23 000 bibliographic citations and several thousands of figures tables photographs chemical structures and equations this handbook is an invaluable major reference source for scientists and students working in the field of materials science solid state physics chemistry electrical and optical engineering polymer science device engineering and computational engineering photophysics data storage and information technology and technocrats everyone who is involved in science and engineering of electronic and photonic materials

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International Aerospace Abstracts ,1999

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