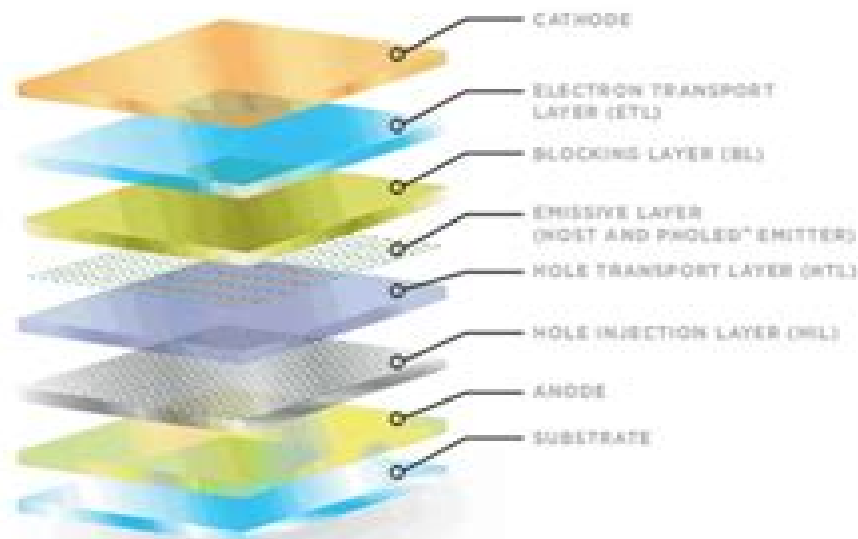
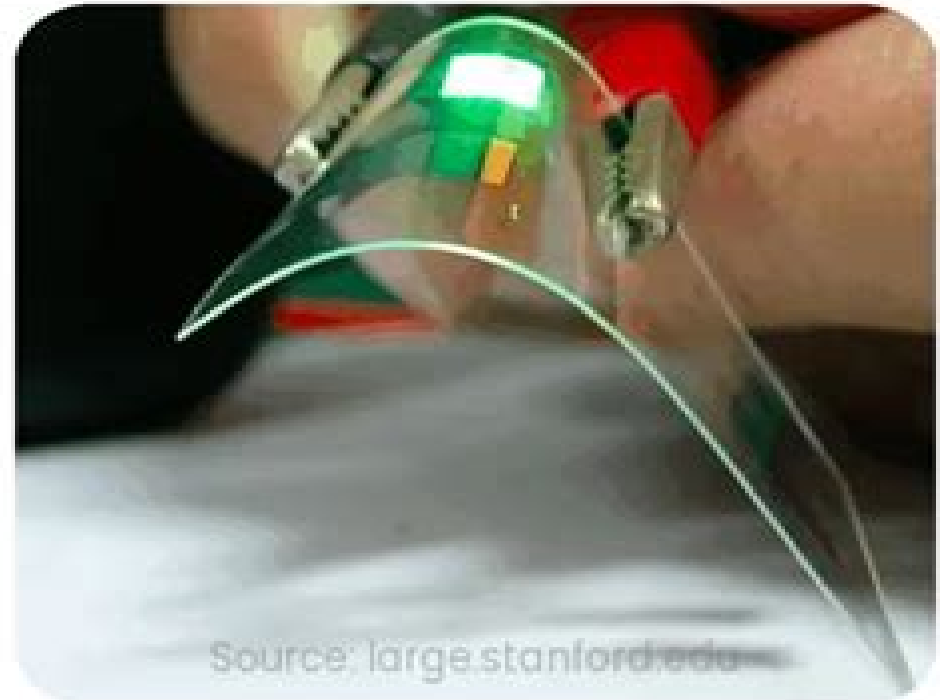


Organic Light Emitting Diode (Oled) Displays

- OLED technology, present in modern digital displays, offers superior image quality and fast refresh rates
- It operates via the electroluminescent properties of organic compounds and comprises key components like anodes, cathodes, and emissive and conductive layers
- Despite challenges like shorter lifespan, lower efficiency at high brightness, and high production costs, ongoing research aims to mitigate these issues
- OLEDs' future looks promising as they may become the standard in display tech



Source: oled.com



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Organic Light Emitting Devices Organic Light Emitting Devices

Zhigang Rick Li



Organic Light Emitting Devices Organic Light Emitting Devices:

Advances in Organic Light-emitting Devices Youngkyoo Kim, Chang-Sik Ha, 2008 Organic electroluminescence OEL is the phenomenon of electrically driven emission of light from organic materials including both fluorescent and phosphorescent organic solids The organic light emitting device OLED which exploits OEL emission from organic semiconducting thin films with thicknesses of less than a few hundred nanometers sandwiched between electrodes has attracted keen interest in its application to flat panel displays due to its high luminous efficiency low driving voltage tunable colors as well as a convenient device structure design and low fabrication costs when compared with every other known display device *OLED Fundamentals* Daniel J. Gaspar, Evgueni Polikarpov, 2015-05-15 A Comprehensive Source for Taking on the Next Stage of OLED R DOLED Fundamentals Materials Devices and Processing of Organic Light Emitting Diodes brings together key topics across the field of organic light emitting diodes OLEDs from fundamental chemistry and physics to practical materials science and engineering aspects to design and ma Organic Light Emitting Devices Jai Singh, 2012 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 **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 **Organic Light-Emitting Devices** Joseph Shinar, 2004 Although it has long been possible to make organic materials emit light it has only recently become possible to do so at the level and with the efficiency and control necessary to make the materials a useful basis for illumination or displays The early

electroluminescent devices provided reasonably bright light but required high operating voltages produced only a narrow range of colors and had severely limited lifetimes Recent developments however make it possible to manufacture organic light emitting devices that are thin bright efficient and stable and that produce a broad range of colors This book surveys the current status of the field It begins with an overview of the physics and chemistry of organic light emitting devices by J Shinar and V Savvateev Subsequent chapters discuss the design of molecular materials for high performance devices C Adachi and T Tsutsui and chemical degradation and physical aging K Higginson D L Thomsen B Yang and F Papadimitrakopoulos A Dodabalapur describes microcavity OLEDs and Y Shi J Liu and Y Yang discuss polymer morphology and device performance Various aspects of devices based on polyparaphenylene vinylenes are discussed in chapters by N C Greenham and R H Friend and by H Chayet V Savvateev D Davidov and R Neumann Chapters by S Tasch W Graupner and G Leising and by Y Z Wang D Gebler and A J Epstein describe OLEDs based on poly paraphenylene and poly pyridine respectively The book concludes with a chapter on polyfluorene based devices which show great promise for producing light in all colors from blue to red

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

Solution-Processed Organic Light-Emitting Devices Guohua Xie, 2023-08-29 Solution Processed Organic Light Emitting Devices provides a comprehensive reference on the principles and advances in materials design device structures and processing technologies of organic light emitting diodes OLEDs Most importantly the book analyses the dynamics of thin film growth from solutions such as solvent orthogonalization coffee ring effects and interfacial adhesion Exciton generation and utilization host guest energy transfer and interfacial interaction in the solution processed films are considered with the material and device design to maximize the electroluminescent performance of OLEDs The book reviews the materials devices and technologies dedicated to solution processed thin film devices which are not only applicable to OLEDs but may be adapted to other emerging semiconducting devices due to the similarity in methods for instance quantum dot LEDs and solar cells and perovskite based LEDs photovoltaics detectors This book is suitable for researchers in academia and industry working in the materials science and engineering chemistry and physics disciplines Discusses the most relevant and emerging solution

processable materials for OLED applications Reviews device engineering to address defects charge transport and exciton generation in fabricated solution processable thin films Provides the methods to grow multilayered thin films from solutions with organic semiconductors with particular attention to new technologies to overcome interfacial mixing effects Organic Light-Emitting Diodes (OLEDs) Alastair Buckley,2013-08-31 Organic light emitting diodes OLEDs are opening up exciting new applications in the area of lighting and displays OLEDs are self emissive and by careful materials and device design can generate colours across the visible spectrum Together with simple monolithic fabrication on a range of different substrates these diverse material properties give OLEDs key advantages over existing display and lighting technology This important book summarises key research on materials engineering and the range of applications of these versatile materials Part one covers materials for OLEDs Chapters review conjugated polymers transparent conducting thin films iridium complexes and phosphorescent materials Part two discusses the operation and engineering of OLED devices Chapters discuss topics such as highly efficient pin type OLEDs amorphous organic semiconductors nanostructuring techniques light extraction colour tuning printing techniques fluorenone defects and disruptive characteristics as well as durability issues Part three explores the applications of OLEDs in displays and solid state lighting Applications discussed include displays microdisplays and transparent OLEDs sensors and large area OLED lighting panels Organic light emitting diodes OLEDs is a standard reference for engineers working in lighting display technology and the consumer electronics sectors as well as those researching OLEDs Summarises key research on the materials engineering and applications of OLEDs Reviews conjugated polymers transparent conducting thin films Considers nanostructuring OLEDs for increasing levels of efficiency **Principles and Applications of Organic Light Emitting Diodes (OLEDs)** N. Thejo Kalyani,Hendrik C. Swart,Sanjay J. Dhoble,2017-05-15 Principles and Applications of Organic Light Emitting Diodes OLEDs explores the ways in which the development of organic semiconductor materials is opening up new applications in electronic and optoelectronic luminescent devices The book begins by covering the principles of luminescence and the luminescent properties of organic semiconductors It then covers the development of luminescent materials for OLEDs discussing the advantages and disadvantages of organic versus inorganic luminescent materials The fabrication and characterization of OLEDs is also covered in detail including information on and comparisons of vacuum deposition and solution techniques Finally applications of OLEDs are explored including OLEDs in solid state lighting colored lighting displays and potential future applications such as ultra thin and flexible technologies This book is an excellent resource both for experts and newcomers to the field of organic optoelectronics and OLEDs It is ideal for scientists working on optical devices lighting display and imaging technologies and for all those engaged in research in photonics luminescence and optical materials Provides a one stop guide to OLED technology for the benefit of newcomers to the field of organic optoelectronics Comprehensively covers the luminescent properties of organic semiconductors and their development into OLED materials Offers practical information on OLED fabrication and their

applications in solid state lighting and displays making this essential reading for optoelectronics engineers and materials scientists

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

Organic Light Emitting Diode Marco Mazzeo, 2010-08-18 Organic light emitting diodes OLEDs have attracted enormous attention in the recent years because of their potential for flat panel displays and solid state lighting This potential lies in the amazing flexibility offered by the synthesis of new organic compounds and by low cost fabrication techniques making these devices very promising for the market The idea that flexible devices will replace standard objects such as television screens and lighting sources opens indeed a new scenario where the research is very exciting and multidisciplinary The aim of the present book is to give a comprehensive and up to date collection of contributions from leading experts in OLEDs The subjects cover fields ranging from molecular and nanomaterials used to increase the efficiency of the devices to new technological perspectives in the realization of structures for high contrast organic displays and low cost organic white light sources The volume therefore presents a wide survey on the status and relevant trends in OLEDs research thus being of interest to anyone active in this field In addition the present volume could also be used as a state of the art introduction for young scientists

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 Devices** Joseph Shinar,2012-11-26 Although it has long been possible to make organic materials emit light it has only recently become possible to do so at the level and with the efficiency and control necessary to make the materials a useful basis for illumination in any but the most specialized uses This book surveys the current status of the field Handbook of Organic Light Emitting Devices Jarvis Stern,2015-03-23 This book discusses modern developments in the field of organic electroluminescence with contributions from several researchers with internationally established expertise in the field Novel developments give way to flexible low cost fabrication techniques for light emitting materials primarily in display technologies The book includes unique contributions on the synthesis of appropriate organic materials fabrication of natural light emitting devices and natural white light emitting devices classification of these devices and a few designs for most favorable performance The cost effective chemical technology offers many exciting possibilities for organic solar cells OSCs and OLEDs to be futuristic solutions for lighting and power generation An ordinary flexible substrate can be used to produce OLEDs on one surface in front of a room and OSCs on the other surface in front of the sun Thus such a device can be used to generate power in the day and light rooms in the night time This book discusses all such aspects of such OLEDs WOLEDs and OSCs as well **Polymers for Light-emitting Devices and Displays** Inamuddin,Rajender Boddula,Mohd Imran Ahamed,Abdullah M. Asiri,2020-05-01 Polymers for Light Emitting Devices and Displays provides an in depth overview of fabrication methods and unique properties of polymeric semiconductors and their potential applications for LEDs including organic electronics displays and optoelectronics Some of the chapter subjects include The newest polymeric materials and processes beyond the classical structure of PLED Conjugated polymers and their application in the light emitting diodes OLEDs PLEDs as optoelectronic devices The novel work carried out on electrospun nanofibers used for LEDs The roles of diversified architectures layers components and their structural modifications in determining efficiencies and parameters of PLEDs as high performance devices Polymer liquid crystal devices PLCs their synthesis and applications in various liquid crystal devices LCs and displays Reviews the state of art of materials and technologies to manufacture hybrid white light emitting diodes based on inorganic light sources and organic wavelength converters Organic Light Emitting Diode Seung Hwan Ko,2011-07-27 This book contains a collection of latest research developments on Organic light emitting diodes OLED It is a promising new research area that has received a lot of attention in recent years Here you will find interesting reports on cutting edge science and technology related to materials fabrication processes and real device applications of OLEDs I hope that the book will lead to systematization of OLED study creation of new research field and further promotion of OLED technology for the bright future of our society **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 ns 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. **Organic**

Light-Emitting Devices (OLEDs) and Their Optically Detected Magnetic Resonance (ODMR). , 2003 Organic Light Emitting Devices OLEDs both small molecular and polymeric have been studied extensively since the first efficient small molecule OLED was reported by Tang and VanSlyke in 1987. Burroughes report on conjugated polymer based OLEDs led to another track in OLED development. These developments have resulted in full color highly efficient up to 20% external efficiency 60 lm W power efficiency for green emitters and highly bright 140 000 Cd m² DC 2 000 000 Cd m² AC stable 40 000 hr at 5 mA cm² devices. OLEDs are Lambertian emitters which intrinsically eliminates the view angle problem of liquid crystal displays LCDs. Thus OLEDs are beginning to compete with the current dominant LCDs in information display. Numerous companies are now active in this field including large companies such as Pioneer Toyota Estman Kodak Philipps DuPont Samsung Sony Toshiba and Osram and small companies like Cambridge Display Technology CDT Universal Display Corporation UDC and eMagin. The first small molecular display for vehicular stereos was introduced in 1998 and polymer OLED displays have begun to appear in commercial products. Although displays are the major application for OLEDs at present they are also candidates for next generation solid state lighting. In this case the light source needs to be white in most cases. Organic transistors organic solar cells et cetera are also being developed vigorously. Optimization of

Multilayer Organic Light-emitting Devices Heike Riel, 2003 Organische Leuchtdioden aus Polymeren und niedermolekularen Verbindungen für großflächige OLED-Anzeigen Anis Kammoun, 2008-12-01 Die OLED Technologie gilt bereits als Hoffnungsträger für Beleuchtungsanwendungen. Die Forschungsaktivitäten konzentrieren sich heutzutage auf die Herstellung von transparenten großflächigen und vor allem kostensparenden Flächenstrahlern. Im Gegensatz zur Displayfertigung wo hohe Komponentenpreise üblich sind können im Beleuchtungssektor keine erheblichen Prozesskosten

toleriert werden Kostengünstigere Fertigungstechnologien müssen deshalb entwickelt werden Die Zielsetzung dieser Arbeit bestand in der Anpassung der OLED Technologie für den Einsatz in Beleuchtungsanzeigen Im Vordergrund steht dabei die technologische Erforschung von lumineszierenden konjugierten Polymeren Mit dieser Materialklasse lassen sich durch den Einsatz von kostengünstigen nasschemischen Beschichtungstechnologien großflächige Flächenstrahler einfach herstellen Aufgrund der ständigen Entwicklung von neuen Polymeren mit unterschiedlichen Emissionsspektren können dabei vielfarbige Bauelemente realisiert werden Durch eine Kombination der 3 Komplementärfarben können weiße polymere Leuchtdioden erzeugt werden Ferner bietet die Materialklasse der niedermolekularen Verbindungen deren Beschichtung unter Ultrahochvakuum UHV engl ultra high vacuum stattfindet die Möglichkeit effiziente phosphoreszierende Leuchtdioden zu realisieren Durch den Einsatz von roten und grünen phosphoreszenten Emittern in hocheffizienten Emissionssystemen können die vorausgesetzten hohen Wirkungsgrade und Leuchtdichten erzielt werden Beide Materialsysteme zur Herstellung von OLEDs weisen individuelle Vorteile bezüglich Eigenschaften und Prozessierbarkeit auf Die speziellen Anforderungen die sich bei der Anwendung organischer Leuchtdioden in Beleuchtungsanzeigen ergeben legen eine Kombination der beiden Materialgruppen und somit der jeweiligen Vorteile nahe

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