

Full description of dipole orientation in organic light-emitting diodes

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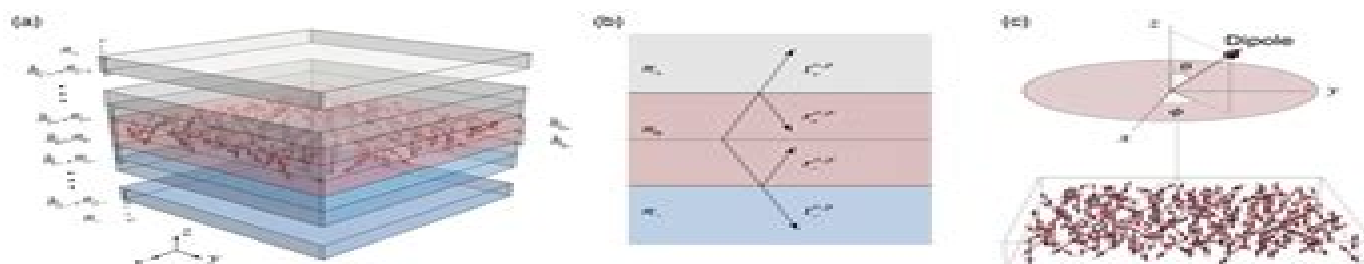


Fig 1. Recently along with the OLED manufacturing progress increasingly, it is pointed out that a possible research direction of OLEDs in the future is to take advantage of the dipoles with non-uniform horizontal orientations.

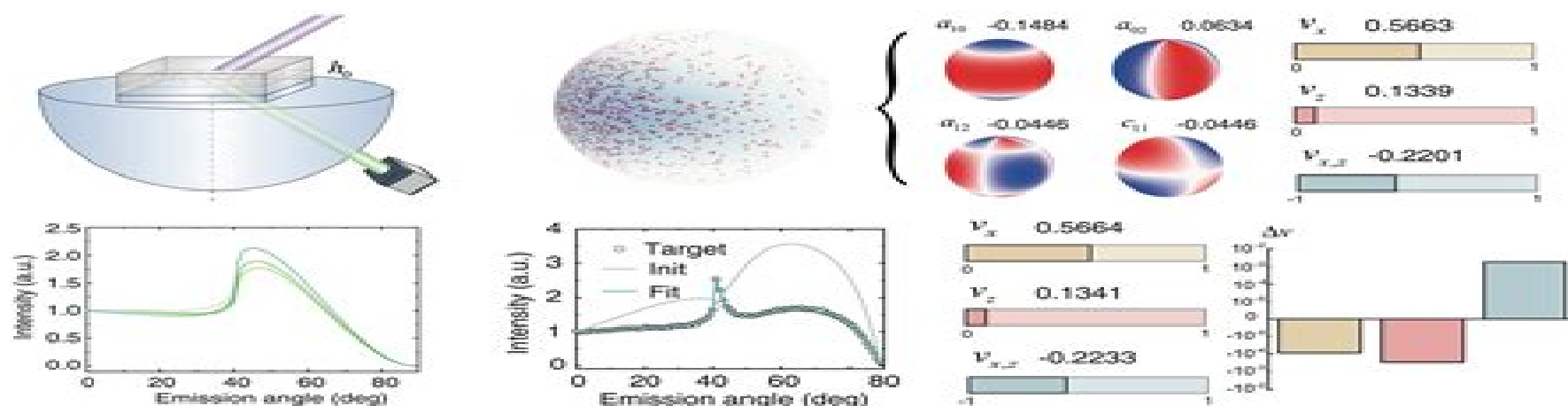


Fig 2. Experimental setup (left panel) and orientation parameters extracting (right panel). The target, initial and fitting spectrum (left). Extracted orientation parameters from the target spectrum (middle). The difference between the real and extracted orientation parameters (right).

Organic Light Emitting Devices Organic Light Emitting Devices

Zhigang Li,Zhigang Rick Li,Hong Meng

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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** Joseph Shinar, 2002

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, 2013-03-20 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 *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 o **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 Muellen 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

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

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 *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 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

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 Devices (OLEDs) and Their Optically Detected Magnetic Resonance (ODMR) Gang Li, 2003 Two major parts of work are presented in this dissertation First Optically Detected Magnetic Resonance ODMR techniques were used to study the small molecular OLEDs and films The first work is ODMR PLDMR ELDMR and EDMR studies of classical tris 8 hydroxyquinoline aluminum Alq₃ based fluorescent OLED in which the buffer layers are AlO_x and CsF The second ODMR work is on the x% Pt octaethyl porphyrin PtOEP Alq₃ based phosphorescent OLED Ph OLED The second part of work is a combinatorial study of exciplex formation at two promising high glass transition temperature organic materials In ODMR studies of fluorescent OLEDs and films low temperature enhancing resonance were observed and attributed to polaron quenching model Very different room temperature enhancing resonances were observed for OLEDs with different buffer layer The quenching resonance is attributed to magnetic enhanced formation of bipolarons dianions at organic cathode interface In ODMR studies of Ph OLEDs we found the quenching of triplet excitons TEs by polarons is much less important than that of singlet excitons SEs A rate equation model is developed to explain experimental results We also observed evidence of formation of bipolarons in the bulk of the phosphorescent dye doped layer Exciplex emission formed between organic organic interface was observed in OLEDs made by sliding shutter technique The efficiency of exciplexes is low and a method of reducing exciplex and thus enhancing device efficiency is shown By eliminate exciplex formation high efficient blue OLED is fabricated

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

Applications of Organic and Printed Electronics Eugenio Cantatore, 2012-08-30 The book focuses on various substrate independent large throughput technologies techniques that are able to build electronics on cheap low cost flexible and temperature sensitive substrates like PEN or other plastic foils and using inexpensive and large throughput methods like printing Most of these technologies in fact have the potential to enable the revolutionary applications that will be discussed in the book The book therefore goes beyond organic technologies i e technologies that use functional organic materials namely semiconductors to explore a broader and even more interesting area of research The book presents a comprehensive landscape of the new applications enabled by substrate independent high throughput electronic technologies and their business potential It explains the link between innovation in technology and in products It also provides the reader with a clear understanding of the technology and the research challenges in the field The book is divided in two parts The first is devoted to applications where the most important selling point is large area To this domain belong roll up flexible and emissive displays based on organic devices used in backplanes or as display medium unobtrusive electronics enabling ambient intelligence applications and the increasingly important photovoltaic applications The second part is devoted to applications where cost reduction is the main factor RFIDs smart labels organic sensors and printed sensor system belong to this domain A chapter is devoted to each different application Each chapter is originally developed for the book by a group of world wide recognized experts in the specific field of application

Polymers for Light-emitting Devices and Displays Inamuddin, Rajender Boddula, Mohd Imran Ahamed, Abdullah M. Asiri, 2020-05-27 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 Electronics** Stephen R. Forrest, 2020-07-22 This textbook provides a basic understanding of the principles of the field of organic electronics through to their applications in organic devices Useful for both students and practitioners it is a teaching text as well as an invaluable resource that serves as a jumping off point for those interested in learning working and innovating in this rapidly growing field Organics serve as a platform for very low cost and high performance optoelectronic and electronic devices that cover large areas are lightweight and can be both flexible and conformable to fit onto irregularly shaped surfaces such as foldable smart phones Organic electronics is at the core of the global organic light emitting device OLED display industry OLEDs also have potential uses as lighting sources Other emerging organic electronic applications include organic solar cells and organic thin film transistors useful in medical and a range of other sensing memory and logic applications This book is a product of both one and two semester courses that have been taught over a period of more than two decades It is divided into two sections Part I Foundations lays down the fundamental principles of the field of organic electronics It is assumed that the reader has an elementary knowledge of quantum mechanics and electricity and magnetism A background knowledge of organic chemistry is not required Part II Applications focuses on organic electronic devices It begins with a discussion of organic thin film deposition and patterning followed by chapters on organic light emitters detectors and thin film transistors The last chapter describes several devices and phenomena that are not covered in the previous chapters since they lie somewhat outside of the current mainstream of the field but are nevertheless important **Organic Light Emitting Diode (OLED) Toward Smart Lighting and Displays Technologies** Laxman Singh, Rituraj Dubey, R. N. Rai, 2023-09-29 The book Organic Light Emitting Diode OLED Toward Smart Lighting and Displays Technologies edited by Laxman Singh Rituraj Dubey and Prof R N Rai strives to address the multiple aspects of OLEDs and their applications in developing smart lightings and displays OLEDs have been used in almost all kinds of digital displays like those of mobile phones laptops tablets phablets TVs etc due to their outstanding features including superior color quality low cost wide viewing angle easy fabrication mercury free manufacture tenability stretchability flexibility etc Investigations related to the synthesis of new organic materials and fabrication techniques have inspired us to write this book which will fulfil the desire and thirst of OLEDs based researchers Features Nanolithographic techniques used and the challenges involved Printing technology for fabrication Designing of hybrid perovskites Stretchable and flexible materials used Metal dielectric composites and efficiency of organic semiconductor via molecular doping for OLEDs applications Organic small molecule materials and display technologies involved New generation of organic materials with respect to photophysical approach Mixed valence conjugated coordination polymers used Electroluminescent polymer used Blue fluorescent and phosphorescent organic materials used In comparison to other books available related to similar topics this book aims at those audiences who are looking for a single source for a

comprehensive understanding of strategies and their challenges with respect to material fabrication of OLEDs This book covers the pace and productivity at a uniform level in each chapter with respect to the audiences from doctoral student to postdoctoral researchers or from postdoctoral researchers to multidisciplinary field researchers with a background in physics chemistry materials science and engineering who are already working with organic materials and their applications

One-Dimensional Metals Siegmar Roth, David Carroll, 2015-07-21 Low dimensional solids are of fundamental interest in materials science due to their anisotropic properties Written not only for experts in the field this book explains the important concepts behind their physics and surveys the most interesting one dimensional systems and discusses their present and emerging applications in molecular scale electronics Chemists polymer and materials scientists as well as students will find this book a very readable introduction to the solid state physics of electronic materials In this completely revised and expanded third edition the authors also cover graphene as one of the most important research topics in the field of low dimensional materials for electronic applications In addition the topics of nanotubes and nanoribbons are widely enlarged to reflect the research advances of the last years

Organic Light Emitting Devices for Illumination ,2012 An organic light emitting device an a method of obtaining illumination from such a device is provided The device has a plurality of regions each region having an organic emissive layer adapted to emit a different spectrum of light The regions in combination emit light suitable for illumination purposes The area of each region may be selected such that the device is more efficient than an otherwise equivalent device having regions of equal size The regions may have an aspect ratio of at least about four All parts of any given region may be driven at the same current

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