Organic Luminescent Materials

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Afterglow Phosphorescent Materials

Lanthanide Luminescence

A benchmark publication, the first edition of the Phosphor Handbook set the standard for references in this field. Completely revised and updated, this second edition explores new and emerging fields such as nanophosphors, nanomaterials, UV phosphors, quantum cutters, plasma display phosphors, sol-gel and other wet phosphor preparation techniques, preparation through combustion, bioluminescence phosphors and devices, and new laser materials such as OLED. It also contains new chapters on the applications of phosphors in solid state lighting, photoionization of luminescent centers in insulating phosphors, and recent developments in halide-based scintillators. The handbook provides a comprehensive description of phosphors with an emphasis on practical phosphors and their uses in various kinds of technological applications. It covers the fundamentals, namely the basic principles of luminescence, the principle phosphor materials, and their optical properties. The authors describe phosphors used in lamps, cathode-ray tubes, x-ray, and ionizing radiation detection. They cover common measurement methodology used to characterize phosphor properties, discuss a number of related items, and conclude with the history of phosphor technology and industry.

Principles and Applications of Organic Light Emitting Diodes (OLEDs)

This book introduces readers to fundamental information on phosphor and quantum dots. It comprehensively reviews the latest research advances in and applications of fluoride phosphors, oxide phosphors, nitridosilicate phosphors and various quantum dot materials. Phosphors and phosphor-based quantum dot materials have recently gained considerable scientific interest due to their wide range of applications in lighting, displays, medical and telecommunication technologies. This work will be of great interest to researchers and graduate students in materials sciences and chemistry who wish to learn more about the principles, synthesis and analysis of phosphors and quantum dot materials.

Phosphors

This book presents the fundamental scientific principles of long afterglow phosphorescent materials and a comprehensive review of both commercialized afterglow materials and the latest advances in the development of novel long afterglow materials. It is designed to supply much needed information about inorganic and organic afterglow materials, including detailed treatment of structure, classification, preparation techniques, characterization, surface

modification chemistry, and optical measurements. Special attention is given to technological applications such as photovoltaics, photocatalytic reactions, and lighting and molecular sensing. Although traditional long afterglow phosphors have been widely investigated and used in industry, and significant efforts have recently been made toward the use of these materials for bioimaging, there is to date no scientific monograph dedicated to afterglow materials. This book not only provides a beginners' guide to the fundamentals of afterglow luminescence and materials, but also gives skilled researchers essential updates on emerging trends and efforts. The work provides a special focus on organic afterglow materials, which offer several advantages such as light-weight, flexible, and wide varieties; mild preparation conditions; and good processability. This book is aimed at postgraduate students, researchers, and technologists who are engaged in the synthesis, development, and commercialization of afterglow materials. It represents essential reading on interdisciplinary frontiers in the materials science, chemistry, photophysics, and biological aspects of afterglow materials.

Luminescence Thermometry

The series Topics in Current Chemistry Collections presents critical reviews from the journal Topics in Current Chemistry organized in topical volumes. The scope of coverage is all areas of chemical science including the interfaces with related disciplines such as biology, medicine and materials science. The goal of each

thematic volume is to give the non-specialist reader, whether in academia or industry, a comprehensive insight into an area where new research is emerging which is of interest to a larger scientific audience. Each review within the volume critically surveys one aspect of that topic and places it within the context of the volume as a whole. The most significant developments of the last 5 to 10 years are presented using selected examples to illustrate the principles discussed. The coverage is not intended to be an exhaustive summary of the field or include large quantities of data, but should rather be conceptual, concentrating on the methodological thinking that will allow the non-specialist reader to understand the information presented. Contributions also offer an outlook on potential future developments in the field.

Physics and Chemistry of Luminescent Materials 16

The design and study of materials is a pivotal component to new discoveries in the various fields of science and technology. By better understanding the components and structures of materials, researchers can increase their applications across different industries. Emerging Synthesis Techniques for Luminescent Materials is a critical scholarly resource that explores the important field of emerging synthesis techniques of luminescent materials and its practical applications. Featuring coverage on a broad range of topics such as electroluminescence, glow curve analysis, and upconversion, this book is geared towards engineers, academics,

researchers, students, professionals, and practitioners seeking current research on photoluminescence and the study of rare earth doped phosphors.

Light-Active Functional Organic Materials

Proceedings of the Sixth International Conference on Luminescent Materials

Rare earth–doped luminescent materials play an integral role in modern life because of their tremendous applications ranging from scintillators, color displays, fluorescent lamps, and intensifying screens to dosimetry of ionizing radiations. Written and edited by prominent luminescence researchers, this book details cutting-edge research on luminescence materials and is illustrated throughout with excellent figures and references. It will appeal to anyone involved in luminescence research and its applications, especially advanced undergraduate-, graduate-, and postgraduate-level students of spectroscopy, solid state physics, luminescence, material synthesis, and optical properties and researchers working on the synthesis of optical materials, the characterization of luminescence materials, solid state lighting, radiation dosimetry luminescence, and phosphor applications.

Advances in Optical Communication

This book provides a critical review of recent advances in the development of fluorescent organic nanoparticles as materials of choice for the design and fabrication of sensors, bioimaging agents and drug delivery systems. The properties and functions of nanoparticles differ significantly from those of their parent entities or their bulk phases. Two of their most important features are their increased surface-to volume ratio, and the formation of surface structures differing from those in their bulk phases. In addition, the book discusses the synthesis of fluorescent conjugated polymers, self-assembled fluorescent nanoparticles, polydopamine nanoparticles, and aggregation-induced-emission or aggregation-induced-emission enhancement nanomaterials. In closing, the book provides an outlook on future research and development in fluorescent organic nanoparticles as smart materials with an impressive range of potential applications.

Phosphors, Up Conversion Nano Particles, Quantum Dots and Their Applications

Luminescence, for example, as fluorescence, bioluminescence, and phosphorescence, can result from chemical changes, electrical energy, subatomic motions, reactions in crystals, or stimulation of an atomic system. This subject

continues to have a major technological role for humankind in the form of applications such as organic and inorganic light emitters for flat panel and flexible displays such as plasma displays, LCD displays, and OLED displays. Luminescent Materials and Applications describes a wide range of materials and applications that are of current interest including organic light emitting materials and devices, inorganic light emitting diode materials and devices, down-conversion materials, nanomaterials, and powder and thin-film electroluminescent phosphor materials and devices. In addition, both the physics and the materials aspects of the field of solid-state luminescence are presented. Thus, the book may be used as a reference to gain an understanding of various types and mechanisms of luminescence and of the implementation of luminescence into practical devices. The book is aimed at postgraduate students (physicists, electrical engineers, chemical engineers, materials scientists, and engineers) and researchers in industry, for example, at lighting and display companies and academia involved in studying conduction in solids and electronic materials. It will also provide an excellent starting point for all scientists interested in luminescent materials. Finally it is hoped that this book will not only educate, but also stimulate further progress in this rapidly evolving field.

Organic Electronic Materials

Inspired by naturally occurring light-active molecular systems such as

photosynthesis, scientists have long devoted their efforts to understanding how light and molecules interact. Based on a raft of knowledge on light absorption, energy migration and electron transfer, fluorescence and phosphorescence, and various photochemical reactions, light can now be utilized for energy conversion, information storage, medical applications, and development of next-generation photofunctional materials that cannot be obtained via conventional organic synthesis. This book overviews some of the cutting-edge p-conjugated molecular and polymer materials for organic photovoltaics, artificial photosynthesis, and organic light-emitting devices. It gives insights into the interactions between light and molecules and discusses sophisticated molecular designs, self-assembly and self-organization strategies, and state-of-the-art unconventional analytical methods.

Emerging Synthesis Techniques for Luminescent Materials

Zinc oxide (ZnO) in its nanostructured form is emerging as a promising material with great potential for the development of many smart electronic devices. This book presents up-to-date information about various synthesis methods to obtain device-quality ZnO nanostructures. It describes both high-temperature (over 100° C) and low-temperature (under 100° C) approaches to synthesizing ZnO nanostructures; device applications for technical and medical devices, light-emitting diodes, electrochemical sensors, nanogenerators, and photodynamic

therapy; and the concept of self-powered devices and systems using ZnO nanostructures. The book emphasizes the utilization of non-conventional substrates such as plastic, paper, and textile as new platforms for developing electronics.

Luminescence

These proceedings report the lectures and seminars of a course entitled "Luminescence of Inorganic Solids," held at Erice, Italy, June 15-30, 1977. This course \'7aS an activity of the International School of Atomic and No1ecu1ar Spectroscopy of the "Ettore Hajorana" Centre for Scientific Culture. The course opened with an overvievl of the present status of luminescence research and with an assessment of its future trends. The following lectures introduced the basic formalism behind the interaction of matter with the radiation field and the lattice phonons. The luminescence properties of various classes of in organic materials were treated next, for the specific cases of unfilled-shell activators (transition metal, lanthanide and actinide ions) and filled-s~e11 activators (s2 and d10 ions). Different models suitable for the description of the luminescence properties of semiconductors vlere examined next. The dynamics of energy transfer and relaxation in the excited state of t;1e activators were treated in lectures devoted to the luminescence phenomena of sensitization, concentration quenching and thermal quenching. Finally, the relevance of luminescence studies to the field of

phosphor technology and to the laser field Has examined. Each lecturer began the treatment of this topic(s) at a fundamental level and finally reached the current level of research. The sequence of the lectures was determined by the requirements of a didactical presentation. The emphasis of the course was primarily on basic principles. The formal lectures Here complemented by seminars and discussions.

Luminescent Materials

In this, the only up-to-date book on this key technology, the number-one expert in the field perfectly blends academic knowledge and industrial applications. Adopting a didactical approach, Professor Ronda discusses all the underlying principles, such that both researchers as well as beginners in the field will profit from this book. The focus is on the inorganic side and the phenomena of luminescence behind the manifold applications illustrated here, including displays, LEDs, lamps, and medical applications. Valuable reading for chemists and electrochemists, as well as materials scientists, those working in the optical and chemical industry, plus lamp and lighting manufacturers.

Luminescence

This book brings together selected contributions both on the fundamental information on the physics and chemistry of these materials, new physical ideas and decisive experiments. It constitutes both an insightful treatise and a handy reference for specialists and graduate students working in solid state physics and chemistry, material science and related fields.

Phosphor Handbook

The broad vision of this book is to offer book lovers a comprehensive appraisal of topics in the global advancements of experimental facts, instrumentation, and practical applications of LED and OLED materials and their applications. The prime feature of this book is connected with LED and OLED materials approaches of fabrication, optimization limits, and their extensive technical applications. This book is comprised of seven chapters encompassing the importance of LEDs and OLEDs, the history of LEDs and OLEDs with necessary examples, the phototoxic-cum-bactericidal effect due to the usage of blue LED irradiation, DC network indoor and outdoor LED lighting, WLEDs with thermally activated delayed fluorescence emitters, tetradentate cyclometalated platinum (II) complex-based efficient organic LEDs, the impact of the use of large LED lighting loads in low-voltage networks, highly efficient OLEDs using thermally activated delayed fluorescent materials, and AlGaN deep ultraviolet LEDs. Individual chapters provide a base for the wide range of common bibliophiles in diversified fields, students, and researchers, who may

conduct research pertinent to this book and will find simply explained basics as well as advanced principles of designated subjects related to these phenomena. The book was created from seven contributions from experts in the diversified fields of LED and OLED fabrication and technology from over 15 research institutes across the globe.

Luminescent Materials and their Applications

Smart Textiles and Their Applications outlines the fundamental principles of applied smart textiles, also reporting on recent trends and research developments. Scientific issues and proposed solutions are presented in a rigorous and constructive way that fully presents the various results, prototypes, and case-studies obtained from academic and industrial laboratories worldwide. After an introduction to smart textiles and their applications from the editor, Part One reviews smart textiles for medical purposes, including their use in health monitoring, treatment delivery, and assistive technologies. Part Two covers smart textiles for transportation and energy, with chapters covering smart textiles for the monitoring of structures and processes, as well as smart textiles for energy generation. The final section considers smart textiles for protection, security, and communication, and includes chapters covering electrochromic textile displays, textile antennas, and smart materials for personal protective equipment. Scientific issues and proposed solutions are presented in a rigorous and constructive way

regarding various results, prototypes, and case-studies obtained from academic and industrial laboratories worldwide Useful for researchers and postgraduate students, and also for existing companies and start-ups that are developing products involving smart textiles Authored and edited by an international team who are experts in the field ensure comprehensive coverage and global relevance

A New Generation of Organic Light-Emitting Materials and Devices

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 highcost 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 focus 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.

Luminescence

The papers included in this issue of ECS Transactions were originally presented in the symposium ¿Physics and Chemistry of Luminescent Materials, including the 4th Symposium on Persistent Phosphors¿, held during the PRiME 2008 joint international meeting of The Electrochemical Society and The Electrochemical Society of Japan, with the technical cosponsorship of the Japan Society of Applied Physics, the Korean Electrochemical Society, the Electrochemistry Division of the Royal Australian Chemical Institute, and the Chinese Society of Electrochemistry. This meeting was held in Honolulu, Hawaii, from October 12 to 17, 2008.

Organic Light-Emitting Materials and Devices

Persistent Phosphors: From Fundamentals to Applications provides an introduction to the key synthesis methods, characterization methods, physical mechanisms, and applications of this important luminescent materials system. The book covers basic persistent phosphorescence, introducing concepts such as emission, luminescence, phosphorescence, persistent phosphorescence and the development of persistent phosphors. Then, synthesis methods are reviewed and

the connections between synthesis methods and improved materials properties are discussed. Characterization methods to investigate the trapping and de-trapping mechanism are also presented. Other sections cover the theoretical framework and energy band engineering models and materials with a focus on activators, hosts, emission bands and excitation bands. Finally, the most relevant applications of persistent phosphors are included for use in displays, safety signs, bio-labels and energy. Persistent Phosphors is an invaluable reference for materials scientists and engineers in academia and R&D. It is a key resource for chemists and physicists. Presents characterization techniques to reveal the photophysical and photochemical properties of defects for this important category of luminescent materials Discusses the structural role of defects in polycrystals and the capture-storing-migration-release progress of excited carriers Demonstrates the synthesis routes and potential applications for persistent phosphor materials

Organic Luminescent Materials

High-speed optical communication is very much useful in telecommunication systems, data processing and networking. It consists of a transmitter that encodes a message into an optical signal, a channel that carries this optical signal to its desired destination, and a receiver that reproduces the message from the received optical signal. It presents up to date results on communication systems, along with the explanations of their relevance, from leading researchers in this field. The

chapters of this book cover general concepts of high-speed optical communication, optical devices used optical communication, and optical communication systems. In recent years, optical devices and other enhanced signal processing functions are also considered in depth for high-speed optical communications systems. Commonly used optical devices are light emitting diodes and photodetectors. This book is targeted at research, development and design engineers from the teams in manufacturing industry, academia and telecommunication industries.

Physics and Chemistry of Luminescent Materials, including the 4th Symposium on Persistent Phosphors

The second, updated edition of this essential reference book provides a wealth of detail on a wide range of electronic and photonic materials, starting from fundamentals and building up to advanced topics and applications. Its extensive coverage, with clear illustrations and applications, carefully selected chapter sequencing and logical flow, makes it very different from other electronic materials handbooks. It has been written by professionals in the field and instructors who teach the subject at a university or in corporate laboratories. The Springer Handbook of Electronic and Photonic Materials, second edition, includes practical applications used as examples, details of experimental techniques, useful tables that summarize equations, and, most importantly, properties of various materials,

as well as an extensive glossary. Along with significant updates to the content and the references, the second edition includes a number of new chapters such as those covering novel materials and selected applications. This handbook is a valuable resource for graduate students, researchers and practicing professionals working in the area of electronic, optoelectronic and photonic materials.

Luminescence

Historically, black body radiation in the tungsten filament lamp was our primary industrial means for producing 'artificial' light, as it replaced gas lamps. Solid state luminescent devices for applications ranging from lamps to displays have proliferated since then, particularly owing to the develop ment of semiconductors and phosphors. Our lighting products are now mostly phosphor based and this 'cold light' is replacing an increasing fraction of tungsten filament lamps. Even light emitting diodes now chal lenge such lamps for automotive brake lights. In the area of information displays, cathode ray tube phosphors have proved themselves to be outstandingly efficient light emitters with excellent colour capability. The current push for flat panel displays is quite intense, and much confusion exists as to where development and commercialization will occur most rapidly, but with the need for colour, it is now apparent that solid state luminescence will play a primary role, as gas phase plasma displays do not conveniently permit colour at the high resolution needed today. The long term challenge to develop electroluminescent displays

continues, and high performance fluorescent lamps currently illuminate liquid crystal monochrome and colour displays. The development of tri component rare earth phosphors is of particular importance.

Solid State Luminescence

This second edition of the well-established bestseller is completely updated and revised with approximately 30 % additional material, including two new chapters on applications, which has seen the most significant developments. The comprehensive overview written at an introductory level covers fundamental aspects, principles of instrumentation and practical applications, while providing many valuable tips. For photochemists and photophysicists, physical chemists, molecular physicists, biophysicists, biochemists and biologists, lecturers and students of chemistry, physics, and biology.

Luminescent Materials in Display and Biomedical Applications

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

Lanthanide-Based Multifunctional Materials

In this, the only up-to-date book on this key technology, the number-one expert in the field perfectly blends academic knowledge and industrial applications. Adopting a didactical approach, Professor Ronda discusses all the underlying

principles, such that both researchers as well as beginners in the field will profit from this book. The focus is on the inorganic side and the phenomena of luminescence behind the manifold applications illustrated here, including displays, LEDs, lamps, and medical applications. Valuable reading for chemists and electrochemists, as well as materials scientists, those working in the optical and chemical industry, plus lamp and lighting manufacturers.

Luminescent Materials and Applications

This book is an introductory text for graduate students, researchers in industries, and those who are just beginning to work on organic electronics materials, devices and their applications. The book includes mainly fundamental principles and theories for understanding organic electronics materials and devices, but also provides information about state-of-the-art technologies, applications and future prospects. These topics encompass physics for organic transistors, structure control technologies of polymer semiconductors, nanomaterials electronics, organic solar cells, organic electroluminescence, liquid semiconductors and dynamics for excitation, among others. This book will help researchers to be able to contribute to society with the technologies and science of organic electronics materials in the future.

Organic Electronics Materials and Devices

This book introduces readers to fundamental information on phosphor and quantum dots. It comprehensively reviews the latest research advances in and applications of fluoride phosphors, oxide phosphors, nitridosilicate phosphors and various quantum dot materials. Phosphors and phosphor-based quantum dot materials have recently gained considerable scientific interest due to their wide range of applications in lighting, displays, medical and telecommunication technologies. This work will be of great interest to researchers and graduate students in materials sciences and chemistry who wish to learn more about the principles, synthesis and analysis of phosphors and quantum dot materials.

Luminescence of Inorganic Solids

Everyone starting work in this field is faced with the lack of basic books. Here, two renowned researchers introduce the reader to luminescence and its applications, describing the principles of the luminescence processes in a clear way and dealing not only with physics, but also with the chemistry of systems. Particular attention is paid to materials such as lamp phosphors, cathode-ray and X-ray phosphors, scintillators and many other applications.

Molecular Fluorescence

Rare earth (RE) doped inorganic nanoparticles is one of the most promising materials for applications in solid state lasers, flat panel displays, plasma display panels, fluorescent lamps, and white LEDs, bio-labels, thermoluminescence dosimeters etc. In recent years a lot of research is going on the display devices applications. Therefore in this field got a Nobel prize in year 2014 (Physics and Chemistry). The book gives the impact of the photoluminescence and study of rare earth doped phosphors for fluorescent lamps, TV tubes, electroluminescent display devices, high quality image intensifiers and SSL (Solid State Lightening), LED (Light Emitting Diode), biomedical application of luminescent materials and LASER materials Application. Discusses WLED (White light emitting diode) for single host and single dopant and removal of the costly tri - band phosphor by single one.

Photoluminescent Materials and Electroluminescent Devices

The aim of this book is to give readers a broad review of topical worldwide advancements in theoretical and experimental facts, instrumentation and practical applications erudite by luminescent materials and their prospects in dealing with different types of luminescence like photoluminescence, electroluminescence, thermo-luminescence, triboluminescence, bioluminescence design and

applications. The additional part of this book deals with the dynamics, rare-earth ions, photon down-/up-converting materials, luminescence dating, lifetime, bioluminescence microscopical perspectives and prospects towards the basic research or for more advanced applications. This book is divided into four main sections: luminescent materials and their associated phenomena; photo-physical properties and their emerging applications; thermoluminescence dating: from theory to applications, and bioluminescence perspectives and prospects. Individual chapters should serve the broad spectrum of common readers of diverse expertise, layman, students and researchers, who may in this book find easily elucidated fundamentals as well as progressive principles of specific subjects associated with these phenomena. This book was created by 14 contributions from experts in different fields of luminescence and technology from over 20 research institutes worldwide.

Lanthanide-Doped Luminescent Nanomaterials

Lanthanides have fascinated scientists for more than two centuries now, and since efficient separation techniques were established roughly 50 years ago, they have increasingly found their way into industrial exploitation and our everyday lives. Numerous applications are based on their unique luminescent properties, which are highlighted in this volume. It presents established knowledge about the photophysical basics, relevant lanthanide probes or materials, and describes

instrumentation-related aspects including chemical and physical sensors. The uses of lanthanides in bioanalysis and medicine are outlined, such as assays for in vitro diagnostics and research. All chapters were compiled by renowned scientists with a broad audience in mind, providing both beginners in the field and advanced researchers with comprehensive information on on the given subject.

Fluorescent Organic Nanoparticles

Luminescence Thermometry: Methods, Materials, and Applications presents the state-of-the art applications of luminescence thermometry, giving a detailed explanation of luminescence spectroscopic schemes for the read-out of temperature, while also describing the diverse materials that are capable of sensing temperature via luminescence. Chapters cover the fundamentals of temperature, traditional thermometers and their figures of merit, a concise description of optical thermometry methods, luminescence and instrumentation, and an explanation of the ways in which increases in temperature quench luminescence. Additional sections focus on materials utilized for luminescence thermometry and the broad range of applications for luminescence thermometry, including temperature measurement at the nanoscale and the application of multifunctional luminescent materials. Provides an overview of luminescence thermometry applications, including high-temperature, biomedical, nanoscale and multifunctional Delves into luminescence thermometry by materials group,

including Rare-earth and transition Metal Ion Doped, Semiconductors, Quantum Dots and Organic materials Gives a concise introduction of the latest methods of temperature measurement, including luminescence spectroscopic schemes and methods of analysis

Light-Emitting Diode

The book encompasses the nanoscale semiconductor field by amalgamating a broad multidisciplinary arena including applications for energy conservation, materials performance enhancement, electronic circuitry, video displays, lighting, photovoltaics, quantum computing, memory, chemo- and biosensors, pharmaceuticals and medical diagnostics inter alia. The first section presents a comprehensive introductory overview of the photophysics, instrumentation and experimental methodology of nanomaterial luminescence. In the second and third sections of the book, invited experts highlight more specific advanced research areas that have either shown potential for, or have already realized, significant impact on the day-to-day aspects of modern life and the world economy.

Phosphors, Up Conversion Nano Particles, Quantum Dots and Their Applications

The papers included in this issue of ECS Transactions were originally presented in the symposium ¿Physics and Chemistry of Luminescent Materials 16¿, held during the 212th meeting of The Electrochemical Society, in Washington, DC, from October 7 to 12, 2007.

Organic Light Emitting Diodes

This book addresses the development of OLEDs based on rare-earth and transition metal complexes, especially focusing on europium, terbium, ruthenium, and rhenium. The idea is to explain how these organic materials can be used to build OLEDs. Taking into account the actual state of the art and the expected pathways, the book proposes further developments in the field. It presents intensive experimental results for a better explanation. This book is meant for scientists and engineers who work in this new OLED framework. It also has didactic utility for graduation students and teachers working on optoelectronics.

Smart Textiles and Their Applications

Lanthanide-Based Multifunctional Materials: From OLEDs to SIMs serves as a comprehensive and state-of the art review on these promising compounds, delivering a panorama of their extensive and rapidly growing applications. After an

introductory chapter on the theoretical description of the optical and magnetic behaviour of lanthanides and on the prediction of their properties by ab-initio methods, four chapters are devoted to lanthanide-based OLEDs, including the latest trends in visible emitters, the emerging field of near infrared emitters and the first achievements attained in the field of chiral OLEDs. The use of lanthanide complexes as molecular magnets spreads over another two chapters, which explain the evolution of 4f-elements-based SIMs and the most recent advances in heterometallic 3d–4f SMMs. Other very active research areas are covered in the remaining five chapters, dedicated to lanthanide-doped germanate and tellurite glasses, luminescent materials for up-conversion, luminescent thermosensors, multimodal imaging and therapeutic agents, and chemosensors. The book is aimed at academic and industrial researchers, undergraduates and postgraduates alike, and is of particular interest for the Materials Science, Applied Physics and Applied Chemistry communities. Includes the latest progress on lanthanide-based materials and their applications (in OLEDs, SIMs, doped matrices, up-conversion, thermosensors, theragnostics and chemosensors) Presents basic and applied aspects of the Physics and Chemistry of lanthanide compounds, as well as future lines of action Covers successful examples of devices and proofs-of-concept and provides guidelines for the rational design of new materials

Persistent Phosphors

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 illutrating 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.

Springer Handbook of Electronic and Photonic Materials

This practical guide familiarizes its readers with techniques for the synthesis of luminophors, explains their luminescence properties and describes numerous applications. It helps chemists to concentrate their efforts on the synthesis of luminophors that are of practical value. The first part of the book compiles major classes of organic luminescent materials, ranging from aromatic hydrocarbons and their substitution products to compounds with an exocyclic C=N group and naphthalic acid derivatives. The second part - applications - reflects modern trends and technological uses. Optical brighteners, organic scintillators, tunable lasers, flaw detection: they all depend on organic luminophors. In addition, their use in analytical chemistry, biology and medicine has expanded considerably, a fact which this book also takes into account.

Zinc Oxide Nanostructures

Lanthanide-Doped Luminescent Nanomaterials reviews the latest advances in the development of lanthanide-doped luminescent inorganic nanoparticles for potential bioapplications. This book covers the chemical and physical fundamentals of these nanoparticles, such as the controlled synthesis methodology, surface modification chemistry, optical physics, and their promising applications in diverse bioassays, with an emphasis on heterogeneous and homogeneous in-vitro biodetection of tumor biomarkers. This book is intended for those readers who are interested in systematically understanding the materials design strategy, optical behavior of lanthanide ions, and practical bioapplications of lanthanide nanoparticles. It primarily focuses on the interdisciplinary frontiers in chemistry, physics and biological aspects of luminescent nanomaterials. All chapters were written by scientists active in this field and for a broad audience, providing both beginners and advanced researchers with comprehensive information on the subject. Xueyuan Chen is a Professor at Fujian Institute of Research on the Structure of Matter (FJIRSM), Chinese Academy of Sciences. Yongsheng Liu is a Research Associate Professor at FJIRSM, Chinese Academy of Sciences. Datao Tu is a Research Assistant Professor at FJIRSM, Chinese Academy of Sciences.

Long Afterglow Phosphorescent Materials

It is pertinent to note that Luminescence phenomenon has once again occupied a central stage with the announcement of Nobel Prize in October 2014 to three

Japanese scientists. The discovery of Galium Nitride proved to be a revolutionary step forward in creation of Blue LEDs. With the advent of LED lamps we now have more long-lasting and more efficient alternatives to older light sources. The Volume under reference consists of 9 Chapters, written by experts in the area of Luminescent Materials. First 5 Chapters are contributed as Review Papers and the last 4 are based on Research Papers.Chapter 1 is contributed by H.S. Virk, editor of this Volume, under the Title: □History of Luminescence from Ancient to Modern Times□. It traces the history of Luminescence based on E. Newton Harvey□s 770 page volume, which is a Classic in this area and narrates interesting stories from ancient cultures to modern times. The author has summarized the results of investigations of Bangalore Group under Sir CV Raman, the Indian Nobel Laureate of 1930. He has called □The Physics Nobel Prize 2014,□ an Award for Luminescence.Chapter 2 is contributed by Sanjay Tiwari and JV Yakhmi on an important Topic: □Recent Advances in Luminescent Nanomaterials for Solid State Lighting Applications□. In fact, the recent Nobel Prize 2014 in Physics has been awarded for development of Luminescent Materials. The authors write: □Luminescent nanomaterials have attracted great interest worldwide because of their unusual structural, optical and electronic properties as well as efforts to prepare miniaturised devices. By understanding and manipulating these properties, the performance of the resulting optical structure can be tailored for desired end-use applications□.Chapter 3: □Persistence Mechanisms and Applications of Long Afterglow Phosphors□ is contributed by NPL, New Dehli Group

of V. Shankar and D. Haranath. The authors present a broad review of long persistence (LP) materials that are a special kind of photon energy storage and conversion materials. These are also known as long afterglow phosphors or long decay phosphors (LDP). This review Paper covers the recent advances in the blue, green and red-emitting LP phosphors/nanophosphors, persistence mechanism involved and the basic problems associated with their luminescence efficiency and persistence times.Chapter 4 by the Group of SK Omanwar: □Exploring Synthesis Techniques for Yttrium Based Phosphors□ is focused on synthesis techniques developed by author□s group. An inter-comparison of various techniques is listed and data presented in 9 tables. The synthesis methods of yttrium based phosphors in terms of the particle sizes, morphology, required temperatures for synthesis, cost required for synthesis, and required time, are presented in this review in detail.Chapter 5 is contributed by the team of BP Chandra, a renowned scholar in ML, under the title: □Mechanoluminescence of Coloured Alkali Halide Crystals□. It is one of the longest Chapters in this volume and focusses on both Theoretical and Experimental aspects of elastico-mechanoluminescence (EML), plastico-mechanoluminescence (PML) and fracto- mechanoluminescence (FML) of coloured alkali halide crystals in all details.Chapters 6 & 7 are contributed by an upcoming Group working under Dr Sanjay Dhoble of RTM university Nagpur. The authors investigate PL and TL properties of Eu2+ and Ce3+ Activated BaAlSi5O2N7 Phosphors in the 6th Chapter: □Photoluminescence and Thermoluminescence Properties of Eu2+ and Ce3+ Activated BaAlSi5O2N7 Phosphors□. TL dose

response of BaAlSi6O2N7:Eu2+ Phosphor was found to be linear in the dose range from 5.8 mGy to 22.5 mGy, and above this, it goes to the saturation level. 7th chapter: "Photoluminescence Properties of YAl3(BO3)4:RE3+ (RE=Ce/Dy/Tb) Phosphors" is also focused on PL properties of phosphors. It was found that this phosphor acts as a potential color tunable UV phosphor for white light LED devices.Chapters 8 & 9 are contributed by Meera Ramrakhiani Group of RD University, Jabalpur. EL studies have been made by this group of young researchers in their contributed Papers: "Electroluminescence in Organically Capped Cd1-x ZnxSe Chalcogenide Nanocrystals" and "Synthesis and Electroluminescence of Silver Doped ZnS/PVK Nanocomposite", respectively. It is interesting to note that research work on Nanocomposites has been recognized to boost the economy at global level. Effect of Silver doping and ZnS loading has been investigated on the performance of ZnS/PVK nanocomposite in the last Chapter of this Volume.

ROMANCE ACTION & ADVENTURE MYSTERY & THRILLER BIOGRAPHIES & HISTORY CHILDREN'S YOUNG ADULT FANTASY HISTORICAL FICTION HORROR LITERARY FICTION NON-FICTION SCIENCE FICTION