Metalligand Interactions Molecular Nano Microsystems In Complex Environments

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Molecular Devices and Machines Vincenzo Balzani 2006-03-06 The miniaturization of bulky devices and machines is a process that confronts us on a daily basis. However, nanoscale machines with varied and novel characteristics may also result from the enlargement of extremely small building blocks, namely individual molecules. This bottom-up approach to nanotechnology is already being pursued in information technology, with many other branches about to follow. - Written by a team of experienced authors headed by Vincenzo Balzani, one of the pioneers in the development of molecular machines - Covers such diverse aspects as sensors, memory components, solar energy conversion, biomolecules as molecular machines, and much more - Presented in a lucid style and didactically structured, with both the expert and the newcomer in mind - Includes a glossary of terms and numerous references to the recent literature Be among the first to explore the fascinating possibilities of this future-oriented technology! A must-have for every chemist and materials scientist with an interest in nanotechnology.
Aptamers for Medical Applications Yiyang Dong 2021 This book outlines comprehensively the main medical uses of aptamers, from diagnosis to therapeutics in fourteen chapters. Pioneering topics covered include aptamer pharmaceuticals, aptamers for malign tumors, aptamers for personalized therapeutics and aptamers for point-of-care testing. The book offers an essential guide for medical scientists interested in developing aptamer-based schemes for better theranostics. It is therefore of interest for not only academic researchers, but also practitioners and medical researchers in various fields of medical science, medical research and bio-analytical chemistry.

Semiconducting Polymers Georges Hadziioannou 2006-12-15 The field of semiconducting polymers has attracted many researchers from a diversity of disciplines. Printed circuitry, flexible electronics and displays are already migrating from laboratory successes to commercial applications, but even now fundamental knowledge is deficient concerning some of the basic phenomena that so markedly influence a device's usefulness and competitiveness. This two-volume handbook describes the various approaches to doped and undoped semiconducting polymers taken with the aim to provide vital understanding of how to control the properties of these fascinating organic materials. Prominent researchers from the fields of synthetic chemistry, physical chemistry, engineering, computational chemistry, theoretical physics, and applied physics cover all aspects from compounds to devices. Since the first edition was published in 2000, significant findings and successes have been achieved in the field, and especially handheld electronic gadgets have become billion-dollar markets that promise a fertile application ground for flexible, lighter and disposable alternatives to classic silicon circuitry. The second edition brings readers up-to-date on cutting edge research in this field.

Comprehensive Nanoscience and Nanotechnology 2019-01-02 Comprehensive Nanoscience and Technology, Second Edition allows researchers to navigate a very diverse, interdisciplinary and rapidly-changing field with up-to-date, comprehensive and authoritative coverage of every aspect of modern nanoscience and nanotechnology. Presents new chapters on the latest developments in the field Covers topics not discussed to this degree of detail in other works, such as biological devices and applications of nanotechnology Compiled and written by top international authorities in the field

Soft Matter for Biomedical Applications Helena S Azevedo 2021-06-07 Dynamic soft materials that have the ability to expand and contract, change stiffness, self-heal or dissolve in response to environmental changes, are of great interest in applications ranging from biosensing and drug delivery to soft robotics and tissue engineering. This book covers the state-of-the-art and current trends in the very active and exciting field of bioinspired soft matter, its fundamentals and comprehension from the structural-property point of view, as well as materials and cutting-edge technologies that enable their design, fabrication, advanced characterization and underpin their biomedical applications. The book contents are supported by illustrated examples, schemes, and figures, offering a comprehensive and thorough overview of key aspects of soft matter. The book will provide a trusted resource for undergraduate and graduate students and will extensively benefit researchers and professionals working across the fields of chemistry, biochemistry, polymer chemistry, materials science and engineering, nanosciences, nanotechnologies, nanomedicine, biomedical engineering and medical sciences.

Basic Sciences of Nuclear Medicine Magdy M. Khalil 2021-05-26 This book provides comprehensive and detailed information on the scientific bases of nuclear medicine, addressing a wide variety of topics and explaining the concepts that underlie many of the investigations and procedures performed in the field. The book is divided into six sections that cover the physics and chemistry of nuclear medicine besides associated quality assurance/quality control procedures; dosimetry and radiation biology; SPECT and PET imaging instrumentation plus CT imaging technology in hybrid modalities; data analysis including image processing, reconstruction, radiomics, image degrading correction techniques, along with image quantitation and kinetic modeling. Within these sections, particular attention is paid to recent developments and the advances in knowledge that have taken place since release of the first edition in 2011. Several entirely new chapters have been included and the remaining chapters, thoroughly updated. Innovations in the ever-expanding field of nuclear medicine are predominantly due to integration of the basic

sciences with complex technological advances. This excellently illustrated book on the subject will be of interest to not only nuclear medicine physicists and physicians but also clinical scientists, radiologists, radiopharmacists, medical students and technologists.

Supramolecular Chemistry and Self-assembly Jack Halpern 2002

Chemistry in Action: Making Molecular Movies with Ultrafast Electron Diffraction and Data Science Lai Chung Liu 2020-09-10 The thesis provides the necessary experimental and analytical tools to unambiguously observe the atomically resolved chemical reactions. A great challenge of modern science has been to directly observe atomic motions during structural transitions, and while this was first achieved through a major advance in electron source brightness, the information content was still limited and new methods for image reconstruction using femtosecond electron diffraction methods were needed. One particular challenge lay in reconciling the innumerable possible nuclear configurations with the observation of chemical reaction mechanisms that reproducibly give the same kind of chemistry for large classes of molecules. The author shows that there is a simple solution that occurs during barrier crossing in which the highly anharmonic potential at that point in nuclear rearrangements couples high- and low-frequency vibrational modes to give highly localized nuclear motions, reducing hundreds of potential degrees of freedom to just a few key modes. Specific examples are given in this thesis, including two photoinduced phase transitions in an organic system, a ring closure reaction, and two direct observations of nuclear reorganization driven by spin transitions. The emerging field of structural dynamics promises to change the way we think about the physics of chemistry and this thesis provides tools to make it happen.

Who's Who in Fluorescence 2009 Chris D. Geddes 2009-04-02 th The Who’s Who in Fluorescence 2009 is the 7 volume of the Who’s who series. The previous six volumes (2003 – 2008) have been very well received by the fluorescence community, with 1000’s of copies being distributed around the world, through conferences and workshops, as well as through internet book sites. In addition, the Institute of Fluorescence (http://theinstituteoffluorescence.com/) mailed 100’s of copies of the 2008 volume to contributors around the world. This new 2009 volume features some 419 entries from no fewer than 41 countries worldwide, as compared to 418 entries (38 different countries) in 2008 and 405 entries in the 2007 volume, respectively. We have received 29 new entries this year, and deleted 25 entries that were not updated by contributors from past years. In 2008, 129 AIM numbers were submitted as compared to 106 in 2007. This year the number has risen again to 136 AIM numbers submitted. This year we also see the introduction of the h-index number listing, a publication statistic provided by the Thompson’s ISI Web of Science. Some 42 contributors provided their h-numbers. In 2009 we also see a continued and strong company support, in light of the current world economic climate, which will enable us to further disseminate the volume in 2009– 2010. In this regard we especially thank the instrumentation companies for their continued support, where without their financial contributions, it is likely that the volume would not be the success it is today.

Comprehensive Supramolecular Chemistry II George W. Gokel 2017-06-22 Comprehensive Supramolecular Chemistry II, Second Edition is a ‘one-stop shop’ that covers supramolecular chemistry, a field that originated from the work of researchers in organic, inorganic and physical chemistry, with some biological influence. The original edition was structured to reflect, in part, the origin of the field. However, in the past two decades, the field has changed a great deal as reflected in this new work that covers the general principles of supramolecular chemistry and molecular recognition, experimental and computational methods in supramolecular chemistry, supramolecular receptors, dynamic supramolecular chemistry, supramolecular engineering, crystallographic

(engineered) assemblies, sensors, imaging agents, devices and the latest in nanotechnology. Each section begins with an introduction by an expert in the field, who offers an initial perspective on the development of the field. Each article begins with outlining basic concepts before moving on to more advanced material. Contains content that begins with the basics before moving on to more complex concepts, making it suitable for advanced undergraduates as well as academic researchers Focuses on application of the theory in practice, with particular focus on areas that have gained increasing importance in the 21st century, including nanomedicine, nanotechnology and medicinal chemistry Fully rewritten to make a completely up-to-date reference work that covers all the major advances that have taken place since the First Edition published in 1996

Liquid Biphasic System Pau Loke Show 2020-11-28 Downstream bioprocesses have a significant role to play in the creation of a sustainable biobased economy, enabling the creation of new products and systems from the more sustainable bioprocessing of natural products. Liquid Biphasic System: Fundamentals and Applications in Bioseparation Technology explores in detail the fundamental processes and applications of this new separation system, aiding in the understanding of the basic principles of the technique and offering constructive criticisms of the latest findings. Including coverage of the background, principles, mechanisms, and applications, Liquid Biphasic System addresses how to adapt the technology for the purification of useful compounds with greater cost efficiency and greener processing. It is essential reading for bioprocess engineers, biochemical engineers, biosystem engineers, chemists, and microbiologists working in the fields of bioprocessing. Researchers, scientists, and engineers concerned with the selection and evaluation of alternative bioseparation processes will find the book particularly useful. Provides information and examples of advanced separations in a single source Includes detailed descriptions of novel bioseparation systems Covers the latest technologies related to advanced liquid–liquid separation and their applications in various industries

Proceedings of the Fourth International Conference on Microelectronics, Computing and Communication Systems Vijay Nath 2020-09-19 This book presents high-quality papers from the Fourth International Conference on Microelectronics, Computing & Communication Systems (MCCS 2019). It discusses the latest technological trends and advances in MEMS and nanoelectronics, wireless communication, optical communication, instrumentation, signal processing, image processing, bioengineering, green energy, hybrid vehicles, environmental science, weather forecasting, cloud computing, renewable energy, RFID, CMOS sensors, actuators, transducers, telemetry systems, embedded systems and sensor network applications. It includes papers based on original theoretical, practical and experimental simulations, development, applications, measurements and testing. The applications and solutions discussed here provide excellent reference material for future product development.

Metallointercalators Janice Aldrich-Wright 2011-04-06 A comprehensive treatment of the characterisation techniques used in investigating inorganic and organic molecules that interact with biomolecules is presented to the reader in a clear fashion. The work consists of two parts: (i) synthetic aspects of metallointercalators along with targeting and improving transport and (ii) the various techniques that are used for probing their interactions, such as; DNA-NMR, PGSE-NMR, DNA ESI-MS, Linear and Circular Dichroism, Fluorescence Spectroscopy, Confocal Microscopy, Viscosity, TGA and dialysis, Microarrays, biological analysis. Chapters are devoted to the synthesis and the techniques used to study the interactions of inorganic complexes with biomolecules. Considerably detailed examples are used to help illustrate the application of these techniques. This book is a useful resource for an array of inorganic and organic advanced

undergraduate and graduate courses and for researchers in drug discovery.

Luminescence Thermometry Miroslav Dramićanin 2018-04-21 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

Nanofabrication Zheng Cui 2009-01-01 This book provides the reader with the most up-to-date information and development in the Nanofabrication area. It presents a one-stop description at the introduction level on most of the technologies that have been developed which are capable of making structures below 100nm. Principles of each technology are introduced and illustrated with minimum mathematics involved. The book serves as a practical guide and first hand reference for those working in nanostructure fabrication.

Spectroscopic Techniques for Polymer Characterization Yukihiro Ozaki 2021-12-06 Demonstrates the vast potential of spectroscopic characterization possibilities in polymer research, it clearly outlines and describes the principles, advantages, instrumentation, experimental techniques, and noteworthy applications of cutting-edge spectroscopy.

Materials Nanoarchitectonics Katsuhiko Ariga 2018-01-15 A unique overview of the manufacture of and applications for materials nanoarchitectonics, placing otherwise hard-to-find information in context. Edited by highly respected researchers from the most renowned materials science institute in Japan, the first part of this volume focuses on the fabrication and characterization of zero to three-dimensional nanomaterials, while the second part presents already existing as well as emerging applications in physics, chemistry, biology, and biomedicine.

Chemical Physics of Thin Film Deposition Processes for Micro- and Nano-Technologies Y. Pauleau 2012-12-06 An up-to-date collection of tutorial papers on the latest advances in the deposition and growth of thin films for micro and nano technologies. The emphasis is on fundamental aspects, principles and applications of deposition techniques used for the fabrication of micro and nano devices. The deposition of thin films is described, emphasising the gas phase and surface chemistry and its effects on the growth rates and properties of films. Gas-phase phenomena, surface chemistry, growth mechanisms and the modelling of deposition processes are thoroughly described and discussed to provide a clear understanding of the growth of thin films and microstructures via thermally activated, laser induced, photon assisted, ion beam assisted, and plasma enhanced vapour deposition processes. A handbook for engineers and scientists and an introduction for students of microelectronics.

Characterization of Nanophase Materials Zhong Lin Wang 2000 Engineering of nanophase materials and devices is of vital interest in electronics, semiconductors and optics, catalysis, ceramics and

magnetism. Research associated with nanoparticles has widely spread and diffused into every field of scientific research, forming a trend of nanocrystal engineered materials. The unique properties of nanophase materials are entirely determined by their atomic scale structures, particularly the structures of interfaces and surfaces. Development of nanotechnology involves several steps, of which characterization of nanoparticles is indespensable to understand the behavior and properties of nanoparticles, aiming at implementing nanotechnolgy, controlling their behavior and designing new nanomaterials systems with super performance. The book will focus on structural and property characterization of nanocrystals and their assemblies, with an emphasis on basic physical approach, detailed techniques, data interpretation and applications. Intended readers of this comprehensive reference work are advanced graduate students and researchers in the field, who are specialized in materials chemistry, materials physics and materials science.

Fundamentals of Microfabrication and Nanotechnology, Three-Volume Set Marc J. Madou 2018-12-14 Now in its third edition, Fundamentals of Microfabrication and Nanotechnology continues to provide the most complete MEMS coverage available. Thoroughly revised and updated the new edition of this perennial bestseller has been expanded to three volumes, reflecting the substantial growth of this field. It includes a wealth of theoretical and practical information on nanotechnology and NEMS and offers background and comprehensive information on materials, processes, and manufacturing options. The first volume offers a rigorous theoretical treatment of micro- and nanosciences, and includes sections on solid-state physics, quantum mechanics, crystallography, and fluidics. The second volume presents a very large set of manufacturing techniques for micro- and nanofabrication and covers different forms of lithography, material removal processes, and additive technologies. The third volume focuses on manufacturing techniques and applications of Bio-MEMS and Bio-NEMS. Illustrated in color throughout, this seminal work is a cogent instructional text, providing classroom and self-learners with worked-out examples and end-of-chapter problems. The author characterizes and defines major research areas and illustrates them with examples pulled from the most recent literature and from his own work.

Diatom Nanotechnology Dusan Losic 2017-10-30 Diatoms are single cell algae composed of silica. They represent one of the most outstanding natural materials with exceptional structural, mechanical, optical, photonic and chemical properties optimized through millions years of evolution. The unique nano and micro silica structures of the material combined with its availability as a low cost mineral from diatomaceous earth are attractive for solving many of today’s environmental, energy and health problems. Diatom Nanotechnology provides a comprehensive overview of the material and its uses. The first part of the book looks at the distinctive porous silica structure of diatoms, the mechanism of their formation and their properties. Individual chapters then explore the broad range of their applications in nanotechnology including nanofabrication, optical biosensors, gas sensors, water purifications, photonics, drug delivery, batteries, solar cells, supercapacitors, new adsorbents and composite materials. With contributions from leading international experts, the book represents an important resource for academics, researchers, industry professionals, postgraduate and advanced level undergraduate students providing them with the latest developments on this emerging and dynamic field.

Materials Research to Meet 21st-Century Defense Needs National Research Council 2003-03-25 In order to achieve the revolutionary new defense capabilities offered by materials science and engineering, innovative management to reduce the risks associated with translating research results will be needed along with the R&D. While payoff is expected to be high from the promising areas of materials research, many of the benefits are

likely to be evolutionary. Nevertheless, failure to invest in more speculative areas of research could lead to undesired technological surprises. Basic research in physics, chemistry, biology, and materials science will provide the seeds for potentially revolutionary technologies later in the 21st century.

Introduction to Biophotonics Paras N. Prasad 2004-01-16 Paras Prasad's text provides a basic knowledge of a broadrange of topics so that individuals in all disciplines can rapidlyacquire the minimal necessary background for research anddevelopment in biophotonics. Introduction to Biophotonics serves asboth a textbook for education and training as well as a referencebook that aids research and development of those areas integratinglight, photonics, and biological systems. Each chapter contains atopic introduction, a review of key data, and description of futuredirections for technical innovation. Introduction to Biophotonicscovers the basic principles of Optics Optical spectroscopy Microscopy Each section also includes illustrated examples and reviewquestions to test and advance the reader's knowledge.Sections on biosensors and chemosensors, important tools forcombating biological and chemical terrorism, will be of particularinterest to professionals in toxicology and other environmentaldisciplines. Introduction to Biophotonics proves a valuablereference for graduate students and researchers in engineering,chemistry, and the life sciences.

Catenanes, Rotaxanes, and Knots Gottfried Schill 2017-01-31 Organic Chemistry, Volume 22: Catenanes, Rotaxanes, and Knots provides information pertinent to the synthesis of catenanes and rotaxanes. This book discusses the manner of interaction between the molecular subunits in catenanes in the solid, liquid, and gaseous states. Organized into 19 chapters, this volume begins with an overview of the idea of synthesizing molecules composed of separate entities that are mechanically connected to one another. This text then examines the stereochemistry and the other physical and chemical properties related to the mechanical connections in these compounds. Other chapters consider the determination of the absolute configuration of catenanes by extension of the Cahn–Ingold–Prelog rules. This book discusses as well the bond that mechanically connects the catenated rings. The final chapter deals with the model studies of the synthesis of knots, double wound rotaxanes, and higher linear catenanes. This book is a valuable resource for chemists, students, and research workers.

Nanotechnology in a Nutshell Christian Ngô 2014-01-04 A new high-level book for professionals from Atlantis Press providing an overview of nanotechnologies now and their applications in a broad variety of fields, including information and communication technologies, environmental sciences and engineering, societal life, and medicine, with provision of customized treatments. The book shows where nanotechnology is now - a fascinating time when the science is transitioning into complex systems with impact on new products. Present and future developments are addressed, as well as a larger number of new industrial and research opportunities deriving from this domain. An overview for professionals, researchers and policy-makers of this very rapidly expanding field. Brief chapters and colour figures with a contained overall length make the book attractive at an attractive price - a must for every professional's shelf. Mihail C. Roco, National Science Foundation and National Nanotechnology Initiative, wrote the preface underlying the importance and weight of the present book to this exciting and epoch-awakening field of research and applications: "Nanotechnology is well recognized as a science and technology megatrend for the beginning of the 21st century. This book aims to show where nanotechnology is now - transitioning to complex systems and fundamentally new products - and communicates the societal promise of nanotechnology to specialists and the public. Most of what has already made it into the marketplace is in the form of "First Generation" products, passive nanostructures with steady behaviour. Many companies

have “Second Generation” products, active nanostructures with changing behaviour during use, and embryonic “Third Generation” products, including 3-dimensional nanosystems. Concepts for “Fourth Generation” products, including heterogeneous molecular nanosystems, are only in research.”

An Atlas for Large-Area Electronic Skins Weidong Yang 2020-08-31 Electronic skins are critical for many applications in human-machine-environment interactions. Tactile sensitivity over large areas can be especially applied to prosthetics. Moreover, the potential for wearables, interactive surfaces, and human robotics have propelled research in this area. In this Element, we provide an account and directional atlas of the progress in materials and devices for electronic skins, in the context of sensing principles and skin-like features. Additionally, we give an overview of essential electronic circuits and systems used in large-area tactile sensor arrays. Finally, we present the challenges and provide perspectives on future developments.

Fluorescence Spectroscopy, Imaging and Probes Ruud Kraayenhof 2012-12-06 The increased use of fluorescence techniques is greatly enhanced by the improved instrumentation pioneered by inventive scientists and now made available commercially by several high-tech companies. Moreover, the design and development of many new molecular probes with higher selectivity for specific microenvironmental properties has stimulated many new researchers to employ fluorescence techniques for solving their problems. This topic book, the second in his series, reflects this exciting scientific progress and deals, among others, with new approaches and new probes in fluorescence spectroscopy, single molecule fluorescence, applications in biomembrane and enzyme studies and imaging of living cells.

Hybrid Organic-Inorganic Interfaces Marie Helene Delville 2018-02-20 Hybrid organic-inorganic materials and the rational design of their interfaces open up the access to a wide spectrum of functionalities not achievable with traditional concepts of materials science. This innovative class of materials has a major impact in many application domains such as optics, electronics, mechanics, energy storage, and conversion, protective coatings, catalysis, sensing, and nanomedicine. The properties of these materials do not only depend on the chemical structure, and the mutual interaction between their nano-scale building blocks, but are also strongly influenced by the interfaces they share. This handbook focuses on the most recent investigations concerning the design, control, and dynamics of hybrid organic-inorganic interfaces, covering: (i) characterization methods of interfaces, (ii) innovative computational approaches and simulation of interaction processes, (iii) in-situ studies of dynamic aspects controlling the formation of these interfaces, and (iv) the role of the interface for process optimization, devices, and applications in such areas as optics, electronics, energy, and medicine.

Molecular Imaging Shankar Vallabhajosula 2009-07-13 Radioisotope-based molecular imaging probes provide unprecedented insight into biochemistry and function involved in both normal and disease states of living systems, with unbiased in vivo measurement of regional radiotracer activities offering very high specificity and sensitivity. No other molecular imaging technology including functional magnetic resonance imaging (fMRI) can provide such high sensitivity and specificity at a tracer level. The applications of this technology can be very broad ranging from drug development, pharmacokinetics, clinical investigations, and finally to routine diagnostics in radiology. The design and the development of radiopharmaceuticals for molecular imaging studies using PET/MicroPET or SPECT/MicroSPECT are a unique challenge. This book is intended for a broad audience and written with the main purpose of educating the reader on various aspects including potential clinical utility, limitations of drug development, and regulatory compliance and approvals.

Nanostructured Materials T. Daniel Thangadurai 2020-02-27 This book discusses the early stages of the development of nanostructures, including synthesis techniques, growth mechanisms, the physics and chemistry of nanostructured materials, various innovative characterization techniques, the need for functionalization and different functionalization methods as well as the various properties of nanostructured materials. It focuses on the applications of nanostructured materials, such as mechanical applications, nanoelectronics and microelectronic devices, nano-optics, nanophotonics and nano-optoelectronics, as well as piezoelectric, agriculture, biomedical and, environmental remediation applications, and anti-microbial and antibacterial properties. Further, it includes a chapter on nanomaterial research developments, highlighting work on the life-cycle analysis of nanostructured materials and toxicity aspects.

Gold Nanoparticles in Biomedical Applications Lev Dykman 2017-12-12 This book discusses fabrication of functionalized gold nanoparticles (GNPs) and multifunctional nanocomposites, their optical properties, and applications in biological studies. This is the very first book of its kind to comprehensively discuss published data on in vitro and in vivo biodistribution, toxicity, and uptake of GNP by mammalian cells providing a systematization of data over the GNP types and parameters, their surface functionalization, animal and cell models. As distinct from other related books, Gold Nanoparticles in Biomedical Applications discusses the immunological properties of GNPs and summarizes their applications as an antigen carrier and adjuvant in immunization for the preparation of antibodies in vivo. Although the potential of GNPs in nanobiotechnology has been recognized for the past decade, new insights into the unique properties of multifunctional nanostructures have recently emerged. With these developments in mind, this book unites ground breaking experimental data with a discussion of hybrid nanoparticle systems that combine different nanomaterials to create multifunctional structures. These novel hybrids constitute the material basis of theranostics, bringing together the advanced properties of functionalized GNPs and composites into a single multifunctional nanostructure with simultaneous diagnostic and therapeutic functions. Such nanohybrids can be physically and chemically tailored for a particular organ, disease, and patient thus making personalized medicine available.

Bioremediation and Biotechnology Khalid Rehman Hakeem 2020-01-26 Toxic substances threatens aquatic and terrestrial ecosystems and ultimately human health. The book is a thoughtful effort in bringing forth the role of biotechnology for bioremediation and restoration of the ecosystems degraded by toxic and heavy metal pollution. The introductory chapters of the book deal with the understanding of the issues concerned with the pollution caused by toxic elements and heavy metals and their impacts on the different ecosystems followed by the techniques involved in monitoring of the pollution. These techniques include use of bio-indicators as well as modern techniques for the assessment and monitoring of toxicants in the environment. Detailed chapters discussing the role of microbial biota, aquatic plants, terrestrial plants to enhance the accumulation efficiency of these toxic and heavy metals are followed by remediation techniques involving myco-remediation, bio-pesticides, bio-fertilizers, phyto-remediation and rhizo-filtration. A sizable portion of the book has been dedicated to the advanced bio-remediation techniques which are finding their way from the laboratory to the field for revival of the degraded ecosystems. These involve bio-films, micro-algae, genetically modified plants and filter feeders. Furthermore, the book is a detailed comprehensive account for the treatment technologies from unsustainable to sustainable. We believe academicians, researchers and students will find this book informative as a complete reference for biotechnological intervention for sustainable treatment of pollution.

Tribology of Diamond-like Carbon Films Christophe Donnet

2007-12-06 This book highlights some of the most important structural, chemical, mechanical and tribological characteristics of DLC films. It is particularly dedicated to the fundamental tribological issues that impact the performance and durability of these coatings. The book provides reliable and up-to-date information on available industrial DLC coatings and includes clear definitions and descriptions of various DLC films and their properties.

Molecular Machines and Motors J.-P. Sauvage 2001-07-03 This series presents critical reviews of the present position and future trends in modern chemical research. It consists of short and concise reports on chemistry, each written by the world's renowned experts, and still valid and useful after 5 or 10 years.

Shape Memory Polymers Jinlian Hu 2014-05-27 Shape-memory polymers (SMP) are a unique branch of the smart materials family which are capable of changing shape on-demand upon exposure to external stimulus. The discovery of SMP made a significant breakthrough in the developments of novel smart materials for a variety of engineering applications, superseded the traditional materials, and also influenced the current methods of product designing. This book provides the latest advanced information of on-going research domains of SMP. This will certainly enlighten the reader to the achievements and tremendous potentials of SMP. The basic fundamentals of SMP, including shape-memory mechanisms and mechanics are described. This will aid reader to become more familiar with SMP and the basic concepts, thus guiding them in undergoing independent research in the SMP field. The book also provides the reader with associated challenges and existing application problems of SMP. This could assist the reader to focus more on these issues and further exploit their knowledge to look for innovative solutions. Future outlooks of SMP research are discussed as well. This book should prove to be extremely useful for academics, R&D managers, researcher scientists, engineers, and all others related to the SMP research.

Spark Ablation Andreas Schmidt-Ott 2020-02-07 In many fields, the special properties of nanoparticles, which come into play especially for sizes The authors of this book all have many years of experience in spark ablation and its applications. The introductory chapters give an overview of the technological fields that can exploit these size effects, and explain the process of spark ablation in the gas phase, as well as principles of immobilizing the particles to create novel products and materials. Fundamentals of the spark ablation process are then treated, as well as the characteristics of the particles formed. The rest of the book deals with a selection of application fields that profit from the spark ablation source from the perspective of research.

Nanomaterials Chemistry C. N. R. Rao 2007-09-24 With this handbook, the distinguished team of editors has combined the expertise of leading nanomaterials scientists to provide the latest overview of this field. They cover the whole spectrum of nanomaterials, ranging from theory, synthesis, properties, characterization to application, including such new developments as quantum dots, nanoparticles, nanoporous materials, nanowires, nanotubes, and nanostructured polymers. The result is recommended reading for everybody working in nanoscience: Newcomers to the field can acquaint themselves with this exciting subject, while specialists will find answers to all their questions as well as helpful suggestions for further research.

Applied Nanotechnology Vladimir Ivanovitch Kodolov 2016-12-08 This important book presents a collection of scientific papers on recent theoretical and practical advances in nanostructures, nanomaterials, and nanotechnologies. Highlighting some of the latest developments and trends in the field, the volume presents the developments of advanced nanostructured materials and the respective tools to characterize and predict their properties and behavior.

Wearable Energy Storage Devices Allibai Mohanan Vinu Mohan 2021-10-25 Flexible and stretchable energy storage devices are

increasingly being needed for a wide variety of applications such as wearable electronics, electronic papers, electronic skins, smart clothes, bendable smart phones and implantable medical devices. Wearable Energy Storage Devices discusses flexible and stretchable supercapacitors and batteries, stretchable and self-healing gel electrolytes, and hybrid wearable energy storage-harvesting devices.

Triboelectric Nanogenerators Zhong Lin Wang 2016-08-17 This book introduces an innovative and high-efficiency technology for mechanical energy harvesting. The book covers the history and development of triboelectric nanogenerators, basic structures, working principles, performance characterization, and potential applications. It is divided into three parts: Part A illustrates the fundamental working modes of triboelectric nanogenerators with their prototype structures and theoretical analysis; Part B and Part C introduce two categories of applications, namely self-powered systems and self-powered active sensors. The book will be an ideal guide to scientists and engineers beginning to study triboelectric nanogenerators or wishing to deepen their knowledge of the field. Readers will be able to place the technical details about this technology in context, and acquire the necessary skills to reproduce the experimental setups for fabrication and measurement.