
Advanced Polymeric Materials

Advances in Polymer Materials and Technology
Advanced Polymer Concretes and Compounds
Compositional Analysis of Polymers
Sustainable Composites for Aerospace Applications
Advanced Polymeric Systems
Self-Healing Polymer-Based Systems
Modification of Polymer Properties
High-Performance Polymers for Engineering-Based Composites
Advanced Polymer Processing Operations
Advanced Polymer Nanoparticles
Polymer Materials for Energy and Electronic Applications
Applied Methodologies in Polymer Research and Technology
Polymeric Materials
Advanced Polymeric Materials for Sustainability and Innovations
Advanced Polymeric Materials
Trends and Applications in Advanced Polymeric Materials
Multicomponent Polymeric Materials
Polymer Nanocomposites for Advanced Engineering and Military Applications
Advanced Fibre-Reinforced Polymer (FRP) Composites for Structural Applications
Advanced Polymers in Medicine
Advanced Polymeric Materials
Hybrid Polymer Composite Materials
Polymer Science and Engineering
Advanced Polymer Composites
Advanced Polymeric Materials
Science and Technology of Polymers and Advanced Materials
Polymer Science and Nanotechnology
Polymer Materials
Advanced Polymeric Materials
Advanced Polymeric Materials
Advanced Materials, Polymers, and Composites
Conducting Polymers for Advanced Energy Applications
Advanced ESR Methods in Polymer Research
Polymeric and Nanostructured Materials
Stabilization of Polymeric Materials
Advanced Polymeric Materials
Polymeric Materials
Principles of Polymers
Advanced Polymeric Materials for Sustainability and Innovations
Polymer-Based Advanced Functional Composites for Optoelectronic and Energy Applications

GWENDOLYN LIZETH**Advances in Polymer Materials and Technology** Elsevier

Through a balanced combination of theory and experiments, this book provides a detailed overview of the main and most up-to-date advances in the area of polymeric materials. Because the subject is essentially interdisciplinary and brings together scientists and engineers with different educational backgrounds, the book offers a research-oriented exposition of the fundamentals as well. The book is based on the editors' and authors' extensive experience in research, development, and education in the field of materials science, and especially polymer testing, polymer diagnostics, and failure analysis. A comprehensive coverage of the methods of polymer testing is provided along with the results of the authors' work on deformation and fracture behavior of polymers. This book will be useful to faculty as well as advanced-level students in materials science, materials technology, plastic technology, mechanical engineering, process engineering, and chemical engineering.

Advanced Polymer Concretes and Compounds CRC Press

Recent advances in polymer research has led to the generation of high quality materials for various applications in day to day life. The synthesis of new functional monomers has shown strong potential in generating novel polymer materials, with improved properties. Advanced Polymeric Materials includes fundamentals and numerous examples of polymer blend preparation and characterizations. Developments in

blends, polymer nanocomposites and its various characterization techniques are highlighted in the book.

Compositional Analysis of Polymers

Woodhead Publishing

Polymer-Based Advanced Functional Composites for Optoelectronic and Energy Applications explains how polymer-based smart composites and nanocomposites can be prepared and utilized for novel optical, sensor and energy-related applications. The book begins with an introductory section on the fundamentals of smart polymer composites, including structure-property relationships and conjugated polymers. Other sections examine optical applications, including the use of polymer-based smart composites for luminescent solar concentrators, electrochromic applications, light conversion applications, ultraviolet shielding applications, LED encapsulation applications, sensor applications, including gas-sensing, strain sensing, robotics and tactile sensors, with final sections covering energy-related applications, including energy harvesting, conversion, storage, vibrational energy harvesting, and more. This is an essential guide for researchers, scientists and advanced students in smart polymers and materials, polymer science, composites, nanocomposites, electronics and materials science. It is also a valuable book for scientists, R&D professionals and engineers working with products that could utilize smart polymer composites. - Provides thorough coverage of the latest pioneering research in the field of polymer-based smart composites - Offers an applications-oriented approach, enabling the reader to understand state-of-the-art optical, sensor and energy applications -

Includes an in-depth introductory section, covering important aspects such as structure-property relationships and the role of conjugated polymers
Sustainable Composites for Aerospace Applications Springer Science & Business Media

Polymer Materials for Energy and Electronic Applications is among the first books to systematically describe the recent developments in polymer materials and their electronic applications. It covers the synthesis, structures, and properties of polymers, along with their composites. In addition, the book introduces, and describes, four main kinds of electronic devices based on polymers, including energy harvesting devices, energy storage devices, light-emitting devices, and electrically driving sensors. Stretchable and wearable electronics based on polymers are a particular focus and main achievement of the book that concludes with the future developments and challenges of electronic polymers and devices. - Provides a basic understanding on the structure and morphology of polymers and their electronic properties and applications - Highlights the current applications of conducting polymers on energy harvesting and storage - Introduces the emerging flexible and stretchable electronic devices - Adds a new family of fiber-shaped electronic devices

Advanced Polymeric Systems CRC Press

Modification of Polymer Properties provides, for the first time, in one title, the latest information on gradient IPNs and gradient copolymers. The book covers the broad range of polymer modification routes in a fresh, current view representing a timely addition to the technical literature of this important

area. Historically, blends, copolymers, or filled polymers have been developed to meet specific properties, or to optimize the cost/properties relationship. Using the gradient structure approach with conventional radical polymerization, it has been shown that it is possible to optimize properties if appropriate gradients in the composition of copolymer chains are obtained. An overview of the gradient structure approach for designing polymers has not appeared in the recent literature and this title covers the different methods used to modify properties, offering the whole range of ways to modify polymers in just one volume and making this an attractive option for a wide audience of practitioners. The approach for each chapter is to explain the fundamental principles of preparation, cover properties modification, describe future research and applications as examples of materials that may be prepared for specific applications, or that are already in use, in present day applications. The book is for readers that have a basic background in polymer science, as well as those interested in the different ways to combine or modify polymer properties. - Provides an integrated view on how to modify polymer properties - Presents the entire panorama of polymer properties modification in one reference, covering the essential information in each topic - Includes the optimization of properties using gradients in polymers composition or structure

Self-Healing Polymer-Based Systems
CRC Press

This book details the use of conducting polymers and their composites in supercapacitors, batteries, photovoltaics, and fuel cells, nearly covering the entire spectrum of energy area under one title. Conducting

Polymers for Advanced Energy Applications covers a range of advanced materials based on conducting polymers, the fundamentals, and the chemistry behind these materials for energy applications. FEATURES Covers materials, chemistry, various synthesis approaches, and the properties of conducting polymers and their composites Discusses commercialization and markets and elaborates on advanced applications Presents an overview and the advantages of using conducting polymers and their composites for advanced energy applications Describes a variety of nanocomposites, including metal oxides, chalcogenides, graphene, and materials beyond graphene Offers the fundamentals of electrochemical behavior This book provides a new direction for scientists, researchers, and students in materials science and polymer chemistry who seek to better understand the chemistry behind conducting polymers and improve their performance for use in advanced energy applications.

Modification of Polymer Properties CRC Press

Featuring contributions from experts at some of the world's leading academic and industrial institutions, *Advanced Polymeric Materials: Structure Property Relationships* brings into book form a wealth of information previously available primarily only within computer programs. In a welcome narrative treatment, it provides comprehensive coverage of p

High-Performance Polymers for Engineering-Based Composites John Wiley & Sons

This comprehensive compilation of contemporary research initiatives in polymer science & technology details

the advancement in the fields of coatings, sensors, energy harvesting and gas transport. Polymers are the most versatile material and used in all industrial sectors because of their light weight, ease of processing and manufacturing, the ability to mold into intricate shapes, and its cost-effectiveness. They can easily be filled with a range of reinforcing agents like fibers, particulates, flakes and spheres in micro/nano sizes and compete with conventional materials in terms of performance, properties and durability. Polymers continue to be discovered and the demand for them is increasing. The book comprises a series of chapters outlining recent developments in various high performance applications of Advanced Polymeric Materials. The topics covered encompass specialized applications of polymeric matrices, their blends, composites and nanocomposites pertaining to smart & high performance coatings, high barrier packaging, solar energy harvesting, power generation using polymers, polymer sensors, conducting polymers, gas transport membranes and smart drug delivery systems. Thus, the theme of the book embraces all the latest innovations and future applications of polymers and related materials. What is novel about this book is that it delineates the applications from a research point of view through descriptions highlighting specific developmental criteria.

Advanced Polymer Processing Operations CRC Press

Polymers are used in everything from nylon stockings to commercial aircraft to artificial heart valves, and they have a key role in addressing international competitiveness and other national issues. *Polymer Science and Engineering* explores the universe of polymers,

describing their properties and wide-ranging potential, and presents the state of the science, with a hard look at downward trends in research support. Leading experts offer findings, recommendations, and research directions. Lively vignettes provide snapshots of polymers in everyday applications. The volume includes an overview of the use of polymers in such fields as medicine and biotechnology, information and communication, housing and construction, energy and transportation, national defense, and environmental protection. The committee looks at the various classes of polymers—plastics, fibers, composites, and other materials, as well as polymers used as membranes and coatings—and how their composition and specific methods of processing result in unparalleled usefulness. The reader can also learn the science behind the technology, including efforts to model polymer synthesis after nature's methods, and breakthroughs in characterizing polymer properties needed for twenty-first-century applications. This informative volume will be important to chemists, engineers, materials scientists, researchers, industrialists, and policymakers interested in the role of polymers, as well as to science and engineering educators and students.

Advanced Polymer Nanoparticles William Andrew

This volume provides in-depth knowledge and recent research on polymers and nanostructured materials from synthesis to advanced applications. Leading researchers from industry, academia, government, and private research institutions across the globe have contributed to this volume, covering new research on

nanocomposites, polymer technology, and electrochemistry.

Polymer Materials for Energy and Electronic Applications CRC Press

The aim of this new compendium is to provide a solid understanding of the recent developments in advanced polymeric materials from macro- to nano-length scales. Composites are becoming more important because they can help to improve our quality of life, such as being put into service in flight vehicles, automobiles, boats, pipelines, buildings, roads

Applied Methodologies in Polymer Research and Technology Academic Press

Polymer Science and Nanotechnology: Fundamentals and Applications brings together the latest advances in polymer science and nanoscience. Sections explain the fundamentals of polymer science, including key aspects and methods in terms of molecular structure, synthesis, characterization, microstructure, phase structure and processing and properties before discussing the materials of particular interest and utility for novel applications, such as hydrogels, natural polymers, smart polymers and polymeric biomaterials. The second part of the book examines essential techniques in nanotechnology, with an emphasis on the utilization of advanced polymeric materials in the context of nanoscience. Throughout the book, chapters are prepared so that materials and products can be geared towards specific applications. Two chapters cover, in detail, major application areas, including fuel and solar cells, tissue engineering, drug and gene delivery, membranes, water treatment and oil recovery. - Presents the latest applications of polymers and polymeric nanomaterials,

across energy, biomedical, pharmaceutical, and environmental fields - Contains detailed coverage of polymer nanocomposites, polymer nanoparticles, and hybrid polymer-metallic nanoparticles - Supports an interdisciplinary approach, enabling readers from different disciplines to understand polymer science and nanotechnology and the interface between them

Polymeric Materials CRC Press

High-Performance Polymers for Engineering-Based Composites presents a selection of investigations and innovative research in polymer chemistry and advanced materials. The book includes case studies in the field of nanocomposites. The volume provides coverage of new research in polymer science and engineering with applications in chemical engineering

Advanced Polymeric Materials for Sustainability and Innovations Springer

This book has been written in a concise manner to include all fundamental aspects of polymer science including recent inventions in polymerisation's and polymers. It covers atom transfer radical polymerisation (ATRP), reversible addition-fragmentation chain transfer (RAFT), nitroxide-mediated polymerisation (NMP), click chemistry as well as stereopolymerisation, ring opening metathesis polymerisation (ROMP), group transfer polymerisation (GTP), plasma polymerisation etc. in addition to the usual polymerisation mechanisms such as radical, ionic and step polymerisations. It also includes new developments of polymer science which are considered as hot topics of functional polymers like smart or intelligent polymers, light emitting polymers, conducting polymers, magnetic polymers, optically active

and/or chiral polymers, liquid crystalline polymers, self-healing polymers, polymers for biomedical applications, dendrimers and/or dendritic polymers and polymer nanocomposites etc.

Advanced Polymeric Materials CRC Press

This book reviews several domains of polymer science, especially new trends in polymerization synthesis, physical-chemical properties, and inorganic systems. Composites and nanocomposites are also covered in this book, emphasizing nanotechnologies and their impact on the enhancement of physical and mechanical properties of these new materials. Kinetics and simulation are discussed and also considered as promising techniques for achieving chemistry and predicting physical property goals. This book presents a selection of interdisciplinary papers on the state of knowledge of each topic under consideration through a combination of overviews and original unpublished research.

Trends and Applications in Advanced Polymeric Materials CRC Press

This book covers recent advancements in the field of polymer science and technology. Frontiers areas, such as polymers based on bio-sources, polymer based ferroelectrics, polymer nanocomposites for capacitors, food packaging and electronic packaging, piezoelectric sensors, polymers from renewable resources, superhydrophobic materials and electrospinning are topics of discussion. The contributors to this book are expert researchers from various academic institutes and industries from around the world.

Multicomponent Polymeric Materials Elsevier

Plastics are used worldwide in everyday life, e.g. as food packaging, electronics, construction, automotive parts, and

household appliances. To produce these products with the desired service lifetimes the use of suitable stabilizers is necessary. This book provides a concise and comprehensive overview of the basic mechanisms of plastic degradation processes caused by heat and light. At its core is a detailed description of the stabilization of different polymers, including an explanation of stabilization mechanisms and the influence of commonly used additives such as fillers, flame retardants and pigments on the stability of plastic. Every polymer scientist, material technologist, or application engineer dealing with the design of the properties of plastics will benefit from this new overview.

Polymer Nanocomposites for Advanced Engineering and Military Applications John Wiley & Sons

Technical and technological development demands the creation of new materials that are stronger, more reliable, and more durable-materials with new properties. This new book covers a broad range of polymeric materials and technology and provides researchers in polymer science and technology with new research on the functional materials production c

Advanced Fibre-Reinforced Polymer (FRP) Composites for Structural Applications Univ. Press of Mississippi

Discusses materials-dominated issues

around composites such as interfaces, interphases, and fabrication; mechanics, mechanical properties, and design considerations such as predicting elastic constants and designing for improved impact resistance; and polymer composites for special applications incl *Advanced Polymers in Medicine* CRC Press

This book collects the articles published in the Special Issue "Polymeric Materials: Surfaces, Interfaces and Bioapplications". It shows the advances in polymeric materials, which have tremendous applications in agricultural films, food packaging, dental restoration, antimicrobial systems, and tissue engineering. These polymeric materials are presented as films, coatings, particles, fibers, hydrogels, or networks. The potential to modify and modulate their surfaces or their content by different techniques, such as click chemistry, ozonation, breath figures, wrinkle formation, or electrospray, are also explained, taking into account the relationship between the structure and properties in the final application. Moreover, new trends in the development of such materials are presented, using more environmental friendly and safe methods, which, at the same time, have a high impact on our society.