

Springer Series on Polymer and Composite Materials

Mariam Al-Ali AlMa'adeed
Igor Krupa *Editors*

Polyolefin Compounds and Materials

Fundamentals and Industrial
Applications

 Springer

Polyolefin Compounds And Materials Fundamentals And Industrial Applications Springer Series On Polymer And Composite Materials

**John A. Manson, Leslie Howard
Sperling**



Polyolefin Compounds And Materials Fundamentals And Industrial Applications Springer Series On Polymer And Composite Materials:

Polyolefin Compounds and Materials Mariam Al-Ali AlMa'adeed, Igor Krupa, 2015-12-23 This book describes industrial applications of polyolefins from the researchers perspective Polyolefins constitute today arguably the most important class of polymers and polymeric materials for widespread industrial applications This book summarizes the present state of the art Starting from fundamental aspects such as the polymerization techniques to synthesize polyolefins the book introduces the topic Basic knowledge about polyolefin composites and blends is explained before applications aspects in different industry sectors are discussed The spectrum comprises a wide range of applications and industry sectors such as the packaging and food industry the textile industry automotive and buildings and even biomedical applications Topics which are addressed in the various chapters comprise synthesis and processing of the materials their classification mechanical physical and technical requirements and properties their characterization and many more In the end of the book even the disposal degradation and recycling of polyolefins are addressed and light is shed on their commercial significance and economic value In this way the book follows the entire lifetime of polyolefin compounds and materials from their synthesis and processing over applications to the recycling and reuse of disposed or degraded polyolefin substrates [Polymer Surface Modification to Enhance Adhesion](#) K. L. Mittal, Anil N. Netravali, 2024-04-02 POLYMER SURFACE MODIFICATION TO ENHANCE ADHESION This unique comprehensive and groundbreaking book is the first on this important subject Polymer Surface Modification to Enhance Adhesion comprises 13 chapters and is divided into two parts Part 1 Energetic Treatments and Part 2 Chemical Treatments Topics covered include atmospheric pressure plasma treatment of polymers to enhance adhesion corona treatment of polymer surfaces to enhance adhesion flame surface treatment of polymers to enhance adhesion vacuum UV photo oxidation of polymer surfaces to enhance adhesion optimization of adhesion of polymers using photochemical surface modification UV Ozone surface treatment of polymers to enhance adhesion adhesion enhancement of polymer surfaces by ion beam treatment polymer surface modification by charged particles laser surface modification of polymeric materials competition in adhesion between polysort and monosort functionalized polyolefinic surfaces amine terminated dendritic materials for polymer surface modification arginine glycine aspartic acid RGD modification of polymer surfaces and adhesion promoters for polymer surfaces Audience The book will be of great interest to polymer scientists surface scientists adhesionists materials scientists plastics engineers and to those involved in adhesive bonding packaging printing painting metallization biological adhesion biomedical devices and polymer composites [Materials for Biomedical Engineering: Thermoset and Thermoplastic Polymers](#) Valentina Grumezescu, Alexandru Grumezescu, 2019-03-21 Materials for Biomedical Engineering Thermoset and Thermoplastic Polymers presents the newest and most interesting approaches to intelligent polymer engineering in both current and future progress in biomedical sciences Particular emphasis is placed on the

properties needed for each selected polymer and how to increase their biomedical potential in varying applications such as drug delivery and tissue engineering These materials are intended for use in diagnoses therapy and prophylaxis but are also relatable to other biomedical related applications such as sensors Recent developments and future perspectives regarding their use in biomedicine are discussed in detail making this book an ideal source on the topic Highlights the most well known applications of thermoset and thermoplastic polymers in biological and biomedical engineering Presents novel opportunities and ideas for developing or improving technologies in materials for companies those in biomedical industries and others Features at least 50% of references from the last 2 3 years Synthetic and Mineral Fibers, Their Composites and Applications Sanjay Mavinkere Rangappa,Vinod Ayyappan,Gaurav Manik,Suchart Siengchin,2024-07-25 Synthetic and Mineral Fibers Their Composites and Applications reviews recent advances and technological developments in this important research field The book provides an up to date record of significant research findings and observations along with an update on current and future potential applications The book provides vital information on recent advancements modern processing technologies manufacturing and applications and summarizes lifecycle and performance parameters for these types of composites This book will be a valuable reference resource for academic and industrial researchers and materials scientists and engineers working in the development of polymer composite materials reinforced with synthetic and mineral fibers for applications in aerospace medical defense automotive and construction sectors Covers both synthetic and mineral fibers their composites and applications Highlights recent advances in mineral fiber reinforced polymer composites modern processing methods and functionalization Provides updates on hybrid combination of both synthetic and mineral fiber composite technologies Features applications in aerospace medical defense and the construction industries *Polyolefin Fibres* S C O Ugbolue,2017-06-09 Polyolefin Fibres Structure Properties and Industrial Applications Second Edition explores one of the most widely used commercial polymers with a focus on the most important polyolefins namely polyethylene polypropylene and polyolefin bicomponent fibres These versatile fibres are durable chemically resistant lightweight economical and functional This new edition has been updated and expanded to include cutting edge research on a broad range of advanced applications Part I covers the structure and properties of polyolefin fibres incorporating a new chapter on the environmental aspects of polyolefin use Part II examines the methods for improving the functionality of polyolefins providing essential information for those engaged in developing high performance materials A final group of chapters addresses how polyolefin fibres can be incorporated into specific textile applications such as automotive geotextile biomedical and hygiene products and explores potential future development This book is an essential reference for textile technologists and manufacturers polymer and fibre scientists yarn and fabric manufacturers biomedical and device engineers and industrialists and researchers Introduces the types properties and structure of polyolefin fibers for readers new to the polyolefins field Examines methods to improve the functionality of polyolefin fibers providing essential information for textile technologists

and research and development managers engaged in developing high performance materials Presents existing and potential applications of polyolefin fibers exploring how they can expand the range of commercial polyolefin based products

Nanohybrids Gaurav Sharma,Alberto García-Peñas,2021-01-20 The book covers preparation designing and utilization of nanohybrid materials for biomedical applications These materials can improve the effectiveness of drugs promote high cell growth in new scaffolds and lead to biodegradable surgical sutures The use of hybrid magneto plasmonic nanoparticles may lead to non invasive therapies The most promising materials are based on silica nanostructures polymers bioresorbable metals liposomes biopolymeric electrospun nanofibers graphene and gelatin Much research focuses on the development of biomaterials for cell regeneration and wound healing applications Keywords Biomedical Materials Cell Growth Cell Regeneration Wound Healing Surgical Sutures Non invasive Therapies Drug Transport Tissue Engineering Cardiovascular Implants Fracture Repair Implants Biodegradable Materials Hybrid Magneto plasmonic Nanoparticles Silica Nanostructures Polymers Bioresorbable Metals Liposomes Biopolymeric Electrospun Nanofibers Graphene Gelatin based Hydrogels

Nanofillers for Sustainable Applications N.M. Nurazzi,E. Bayraktar,M.N.F. Norrrahim,H.A. Aisyah,N. Abdullah,M.R.M. Asyraf,2023-12-22 Nanofillers for Sustainable Applications provides an in depth review of the wide ranging applications of nanofillers It explores both synthetic and natural nanofillers and focuses on their use as reinforcement and active fillers in composite structures Covering various aspects of nanofillers including synthesis methods characteristics properties and compatibility this book highlights the potential of nanofillers as functional materials for different applications and offers a collection of comparative studies to showcase their efficacy It emphasizes sustainability intelligent design and high end applications in fields such as packaging pulp and paper aerospace automotive medicine chemical industry biodiesel and chemical sensors This book is organized into several sections covering topics such as synthetic nanomaterials nanosafety natural nanofillers polymer composites metal nanofillers nanofillers in various industries nanofillers in renewable energy nanofillers in biomedical sectors and nanofillers in automotive and aerospace industries This book will be a useful reference for undergraduate and graduate students and academic researchers in the fields of materials science nanomaterials and polymer composites Key features Focuses on the fabrication approaches used for nanofillers in nanocomposites Covers materials selection design solutions manufacturing techniques and structural analysis highlighting their potential as functional materials in different applications Explores the positive environmental impact and material property improvements resulting from increased composite utilization across diverse industries Discusses other types of nanofillers like nanocellulose metal based graphene and wood based materials Includes case studies from leading industrial and academic experts *Long-Term Properties of Polyolefins* Ann-Christine Albertsson,2004-04-22 **Recycled Polymer Blends and**

Composites Hanafi Ismail,Sapuan S. M.,Ilyas R. A.,2023-09-23 This book presents an authoritative account of the potential of recycled polymer blends and composites such as recycled rubber Polypropylene Poly Vinylidene Fluoride PVDF

polyhydroxybutyrate 3 valerate PHBV Polyethylene and similar compounds in polymer recycling industries It highlights the latest research on fundamentals of recycled polymer blends and composites such as physical chemical mechanical and thermal properties and morphological studies The book also provides a comprehensive state of the art review of recycling of polymer blends and composites for sustainability Polymeric substances recycled from excess sludge in wastewater treatment plants reinserction of Poly Vinylidene Fluoride PVDF polyolefin and Polypropylene post Industrial waste by primary recycling as well as the recent development of biomass and COVID 19 plastic waste derived char filled natural starch biocomposite briquettes are also covered

Advanced Functional Polymers Khubab Shaker,Asif Hafeez,2023 This book highlights different domains of functional polymers from membranes and coatings to composite materials It includes their synthesis routes and techniques characterization properties and applications The book also provides the basics and advances about different functional polymers and composites with an up to date progress in the field of research and their application on a domestic and industrial scale The main topics to be covered include polymeric membranes paints and coatings smart polymers self healing elastomers biodegradable polymers food packaging and functional composite materials

New Advances in Polyolefins T.C. Chung,2012-12-06 Polyolefin is one of the most important materials produced in the chemical industry The research in this area is not only scientifically challenging but also potentially economically rewarding Many research activities such as developing new catalysts understanding polymerization mechanisms modifying the products and improving the physical properties of the material have been proceeding at a very fast pace especially in the industrial laboratories in many countries It is very important and exciting to bring researchers active in this area from both the academic and industrial sectors to communicate their new findings To the best of my knowledge a symposium covering diverse aspects of polyolefin research has not been held in the USA for many years With this in mind a symposium entitled Recent Advances in Polyolefins was held at the National ACS Meeting in Washington D C August 23 28 1992 This symposium covered both scientific and technological aspects of polyolefin which included four sections CatalystIPolymerization Functionalization of Polyolefins Blends of Polyolefins with Other Polymers and Applications More than 50 papers including 20 foreign contributions were presented during three and a half days of meetings It was truly exciting to see key researchers from both academic and industrial laboratories exchange their recent results and to share the important developments in polyolefins This volume is based on the same spirit and is intended to capture some of the most recent and emerging technical achievements presented at the meeting

Advances in Polyolefins R.B. Seymour,T.C. Cheng,2013-05-22

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Principles of Polymer

Composites Alexander A. Berlin,Stanislav A. Volfson,Nicolai S. Enikolopian,Sajibzhan S. Negmatov,1985-12-01 Polymer composites represent a field of intense and growing interest to consumers and producers of plastics They are used to solve

the most acute problems energy and oil conservation improvement of the properties of polymer materials and the increase of their use Even special problems such as inflammability of plastics and industrial wastes are closely connected with polymer composites The achievements in this field are well known Polymer composites have been widely used in building furniture electric appliances cars and other fields Their production is growing at a higher rate than that of polymers as a whole In the present book the emphasis is put on the principles that may become the foundation of designing new highly effective composites The authors analyze their favorable properties as compared to unfilled polymers as well as the means to improve moldability and strength Economical and technical problems are examined Special attention is paid to the matching of the components development of technological processes of composites production and to new ideas in the field Fundamental and practical aspects of calculating properties and structure of composites are examined The scope of the book does not include composites based on continuous reinforcing fibers polymeric concretes nor other special purpose materials in which polymers are used to modify the properties of inorganic materials The book reflects mainly ideas developed at the Institute of Chemical Physics of the USSR Academy of Sciences but it also contains a review of the latest works in the field Polymer Blends and Composites Muralisrinivasan Natamai Subramanian,2017-04-11 Because it is critically important to manufacture quality products a reasonable balance must be drawn between control requirements and parameters for improved processing method with respect to plastics additives An important contribution to the commercial polymer industry Polymer Blends and Composites is one of the first books to combine plastics additives testing and quality control The book is a comprehensive treatise on properties that provides detailed guidelines for selecting and using blends and composites for applications A valuable resource for operators processors engineers chemists the book serves to stimulate those already active in natural polymer composites **Polyolefin Blends** Domasius Nwabunma,Thein Kyu,2008-02-13 The definitive reference on the properties and applications of polyolefin blends Polyolefins account for more than half of total plastics consumption in the world In recent years usage of and research on polyolefin blends have increased significantly due to new applications in medicine packaging and other fields and the development of novel polyolefins With a special emphasis on nano and micro structures of crystals and phase morphology Polyolefin Blends condenses and consolidates current information on polyolefins so that the reader can compare select and integrate a material solution Focusing exclusively on the fundamental aspects as well as applications of polyolefin blends this authoritative reference Features an introductory chapter that serves as a guide to polyolefin blends Includes chapters covering formulation design processing characterization modeling and simulation engineering performance properties and applications Covers polyolefin polyolefin blends and polyolefin non polyolefin blends Discusses miscibility phase behavior functionalization compatibilization microstructure crystallization hierarchical morphology and physical and mechanical properties Covers new research trends including in situ reactor blending and reactive processing such as compatibilization functionalization in the melt Contains practical examples from open literature

sources and commercial products With chapters contributed by leading experts from several countries this is a must have reference for scientists and engineers conducting research on polyolefin blends and for professionals in medical packaging and other commodity fields It is also an excellent text for graduate students studying polymer science and polymer processing Specialty Polymers Ram K. Gupta, 2023-01-31 This comprehensive volume provides current state of the art information on specialty polymers that can be used for many advanced applications The book covers the fundamentals of specialty polymers synthetic approaches and chemistries to modify their properties to meet the requirements for special applications along with current challenges and prospects Chapters are written by global experts making this a suitable textbook for students and a one stop resource for researchers and industry professionals Key Features Presents synthesis characterization and applications of specialty polymers for advanced applications Provides fundamentals and requirements for polymers to be used in many advanced and emerging areas Details novel methods and advanced technologies used in polymer industries Covers the state of the art progress on specialty polymers for a range of advanced applications

Polymers, Polymer Blends, Polymer Composites and Filled Polymers Abdulakh K. Mikitaev, Mukhamed Kh Ligidov, Gennadii Efremovich Zaikov, 2006 Polymers are substances containing a large number of structural units joined by the same type of linkage These substances often form into a chain like structure Starch cellulose and rubber all possess polymeric properties Today the polymer industry has grown to be larger than the aluminium copper and steel industries combined Polymers already have a range of applications that far exceeds that of any other class of material available to man Current applications extend from adhesives coatings foams and packaging materials to textile and industrial fibres elastomers and structural plastics Polymers are also used for most composites electronic devices biomedical devices optical devices and precursors for many newly developed high tech ceramics This book presents leading edge research in this rapidly changing and evolving field Polymer Blends Handbook L. A. Utracki, Charles Wilkie, 2014-01-31 Written by an international group of highly respected contributors this fundamental reference work covers all aspects of polymer blends science engineering technology and applications *Principles of Polymer Composites* Alexander A. Berlin, Stanislav A. Volfson, Nicolai S. Enikolopian, Sajibzhan S. Negmatov, 1986 Polymer composites represent a field of intense and growing interest to consumers and producers of plastics They are used to solve the most acute problems energy and oil conservation improvement of the properties of polymer materials and the increase of their use Even special problems such as inflammability of plastics and industrial wastes are closely connected with polymer composites The achievements in this field are well known Polymer composites have been widely used in building furniture electric appliances cars and other fields Their production is growing at a higher rate than that of polymers as a whole In the present book the emphasis is put on the principles that may become the foundation of designing new highly effective composites The authors analyze their favorable properties as compared to unfilled polymers as well as the means to improve moldability and strength Economical and

technical problems are examined Special attention is paid to the matching of the components development of technological processes of composites production and to new ideas in the field Fundamental and practical aspects of calculating properties and structure of composites are examined The scope of the book does not include composites based on continuous reinforcing fibers polymeric concretes nor other special purpose materials in which polymers are used to modify the properties of inorganic materials The book reflects mainly ideas developed at the Institute of Chemical Physics of the USSR Academy of Sciences but it also contains a review of the latest works in the field

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Composite Materials Introduction

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