

Polymeric Foams Science And Technology

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Polymer Foams Handbook Nigel Mills 2007-03-23 From crash helmets to packaging, this is the complete guide to understanding, selecting, processing and working with polymer foams. Water-Blown Cellular Polymers Chris Defonseka 2019-05-20 Drawing on over 45 years of hands-on experience, the author provides in-depth knowledge of water-blown cellular polymers, from their chemistry to formulation and process methodology. This book describes the manufacture of standard and specialty foams using new and emerging technologies. The author gives advice on the challenges foam producers commonly face with regard to formulations and makes recommendations for machinery and equipment.

Handbook of Manufacturing Engineering and Technology Andrew Yeh Ching Nee 2014-10-31 The Springer Reference Work Handbook of Manufacturing Engineering and Technology provides overviews and in-depth and authoritative analyses on the basic and cutting-edge manufacturing technologies and sciences across a broad spectrum of areas. These topics are commonly encountered in industries as well as in academia. Manufacturing engineering curricula across universities are now essential topics covered in major universities worldwide. *Polymer Science and Technology* Robert O. Ebewele 2000-03-23 Your search for the perfect polymers textbook ends here - with Polymer Science and Technology. By incorporating an innovative approach and consolidating in one volume the fundamentals currently covered piecemeal in several books, this efficient text simplifies the learning of polymer science. The book is divided into three main sections: polymer fundamentals; polymer formation and conversion into useful articles; and polymer properties and applications. Polymer Science and Technology emphasizes the basic, qualitative understanding of the concepts rather than rote memorization or detailed mathematical analysis. Since the book focuses on the ultimate property of the finished product, it minimizes laborious descriptions of experimental procedures used for the characterization of polymers. Instead, the author highlights how the various stages involved in the production of the finished product influence its properties. Well-organized, clear-cut, and user-friendly, Polymer Science and Technology is an outstanding textbook for teaching junior and senior level undergraduates and first year graduate students in an introductory course covering the challenging subject of polymers.

Thermoplastic Foam Processing Richard Gendron 2004-10-28 As researchers seek replacements for banned, ozone-depleting foaming agents, the authors of Thermoplastic Foam Processing: Principles and Development strive to develop a better understanding of foaming processes and find solutions for day-to-day practice. This book presents the latest research in foam extrusion and physical foaming agents with a st

Biofoams Salvatore Iannace 2015-10-28 Addresses a Growing Need for the Development of Cellular and Porous Materials in Industry Building blocks used by nature are motivating researchers to create bio-inspired cellular structures that can be used in the development of products for the plastic, food, and biomedical industry. Representing a unified effort by international experts, Biofoams: Science and Applications of Bio-Based Cellular and Porous Materials highlights the latest research and development of biofoams and porous systems, and

specifically examines the aspects related to the formation of gas bubbles in drink and food. The book offers a detailed analysis of bio-polymers and foaming technologies, biodegradable and sustainable foams, biomedical foams, food foams, and bio-inspired foams. Explores the Generation of New Materials with Wide-Ranging Technological Applicability This book introduces the science, technologies, and applications related to the use of biopolymers and biomaterials in the development of porous structures. It presents topics that include bio-based polymers for the development of biodegradable and sustainable polymeric foams, foams in food, foams in biomedical applications, biohybrids, and bio-inspired cellular and porous systems. It also includes recent studies on the design of polymer-based composites and hybrid scaffolds, weighs in on the challenges related to the production of porous polymers, and presents relevant examples of cellular architecture present in nature. In addition, this book: Focuses on materials compatible with natural tissues Discusses the engineering of bio-inspired scaffolds with the ability to mimic living tissue Reveals how to use renewable resources to develop more sustainable lightweight materials Illustrates the state of the art of porous scaffold and process techniques A book dedicated to material science, Biofoams: Science and Applications of Bio-Based Cellular and Porous Materials focuses on food technology, polymers and composites, biomedical, and chemical engineering, and examines how the principles used in the creation of cellular structures can be applied in modern industry.

Polymeric Foams Shau-Tarng Lee 2008-12-24 Explores the Latest Developments in Polymeric Foams Since the 1960s polymeric foams have grown into a solid industry that affects almost every aspect of modern life. The industry has weathered the energy crisis in the 70s, ozone issues in the 80s, and recycle/reuse in the 90s. However, the pace of development and social climate is rapidly changing again, putting the spotlight even more firmly on performance, sustainable resources, and energy security. Coverage of New Products, Technologies, and Regulations Exploring new concepts, innovations, and developments in the field, Polymeric Foams: Technology and Development in Regulation, Process, and Products provides an international perspective on the direction of foam technologies and applications, focusing on the progress in blowing agent research and hydrofluorocarbons for the polyurethane foam industry. The text covers new foam products, including PP/PS interpolymers, nano-, and biodegradable foams. It also examines new technologies, such as injection foam molding and PVC foam; industry and environmental regulations; and research on foam performance, emission impact, and economic effects. Clearly Follows the Development Process As in most fields these days, efforts to be environmentally friendly and achieve enhanced performance for specialty applications drive research and development. Presenting a clear picture of the development process, this book covers not only new directions in the industry, but how they will impact current and future development.

Foamability of Thermoplastic Polymeric Materials Suprakas Sinha Ray 2021-09-24 Foamability of Thermoplastic Polymeric Materials presents a cutting-edge approach to thermoplastic polymeric foams, drawing on the latest research and guiding the reader through the fundamental science, foamability, structure-property-processing relationship, multi-phase

polymeric materials, degradation characteristics of biodegradable foams and advanced applications. Sections provide detailed information on foam manufacturing technologies and the fundamental science behind foaming, present insights on the factors affecting foamability, cover ways of enhancing the foamability of various polymeric materials, with special focus on multi-phase systems, discuss the degradation of biodegradable foams and special morphology development for scaffolds, packaging, acoustic and super-insulation applications, as well as cell seeding studies in scaffolds. Each application has specific requirements in terms of desired properties. This in-depth coverage and analysis helps those looking to move forward with microcellular processing and polymer foaming. This is an ideal resource for researchers, advanced students and professionals interested in the microcellular processing of polymeric materials in the areas of polymer foaming, polymer processing, plastics engineering and materials science. Offers in-depth coverage of factors affecting foamability and methods for enhancing the foamability of polymeric materials Explores innovative applications in a range of areas, including scaffolds, acoustic applications, packaging and super-insulation Provides a comprehensive, critical overview of the state-of-the-art, possible future research directions, and opportunities for industrial application

Plastics Additives G. Pritchard 2012-12-06 Although plastics are extremely successful commercially, they would never reach acceptable performance standards either in properties or processing without the incorporation of additives. With the inclusion of additives, plastics can be used in a variety of areas competing directly with other materials, but there are still many challenges to overcome. Some additives are severely restricted by legislation, others interfere with each other-in short their effectiveness varies with circumstances. *Plastics Additives* explains these issues in an alphabetical format making them easily accessible to readers, enabling them to find specific information on a specific topic. Each additive is the subject of one or more articles, providing a succinct account of each given topic. An international group of experts in additive and polymer science, from many world class companies and institutes, explain the recent rapid changes in additive technology. They cover novel additives (scorch inhibitors, compatibilizers, surface-modified particulates etc.), the established varieties (antioxidants, biocides, antistatic agents, nucleating agents, fillers, fibres, impact modifiers, plasticizers) and many others, the articles also consider environmental concerns, interactions between additives and legislative change. With a quick reference guide and introductory articles that provide the non-specialist and newcomer with relevant information, this reference book is essential reading for anyone concerned with plastics and additives.

Polyurethane and Related Foams Kaneyoshi Ashida 2006-09-22 *Polyurethane and Related Foams: Chemistry and Technology* is an in-depth examination of the current preparation, processing, and applications of polyurethanes (PURs) and other polymer foams. Drawing attention to novel raw materials, alternative blowing agents, and new processing methods, the book accentuates recent innovations that meet increasingly stringent environmental and fire safety regulations as well as higher quality products. Written by Dr. Kaneyoshi Ashida, a renowned pioneer of polyisocyanurate (PIR) foams, the book details the fundamental chemistry and material properties for each category of foams. The author presents mechanisms for chemical modification and foaming reactions, emphasizing the relationship between molecular design and enhanced physical properties. The latter half of the book focuses on polyurethane foams, the largest segment of the polyisocyanate-based foam industry. It contains a fully updated description of the chemistry, raw materials, manufacturing, formulations, analyses, and testing involved in producing a wide variety of progressive applications, including building materials. This book chronicles the scientific and technological evolution of preparation and processing methods for polyisocyanate-based foams. *Polyurethane and Related Foams: Chemistry and Technology* offers a clear and concise guide to the technologies, methods, and best practices that help the foam industry meet higher quality, health, and environmental standards. *Principles of Polymer Science and Technology in Cosmetics and Personal Care* E. Desmond

Goddard 1999-03-10 *Principles of Polymer Science and Technology in Cosmetics and Personal Care*
Radiation Technology for Advanced Materials: Guozhong Wu 2018-11-26 *Radiation Technology for Advanced Materials* presents a range of radiation technology applications for advanced materials. The book aims to bridge the gap between researchers and industry, describing current uses and future prospects. It describes the mature radiation processing technology used in preparing heat shrinkable materials and in wire and cable materials, giving commercial cases. In addition, the book illustrates future applications, including high-performance fibers, special self-lubricating materials, special ultra-fine powder materials, civil fibers, natural polymeric materials, battery separator membranes, special filtration materials and metallic nanomaterials. Chapters cover radiation technology in high-performance fiber and functional textiles, radiation crosslinking and typical applications, radiation crosslinking for polymer foaming material, radiation degradation and application, radiation emulsion polymerization, radiation effects of ionic liquids, radiation technology in advanced new materials, and future prospects. Presents a range of radiation technology applications and their application to advanced materials Covers the mature radiation processing technology used to prepare heat shrinkable materials and wire cable materials, describing real-world commercial applications Shows the promising application of radiation technology in preparing high-performance Si and carbon fibers Describes the radiation degradation/radiation effect used to prepare fine powder materials Discusses radiation modification and radiation grafting techniques used to synthesize materials, such as civil fibers, natural polymeric materials and others
Polyurethanes Mark F. Sonnenschein 2020-12-29 This book, cohesively written by an expert author with supreme breadth and depth of perspective on polyurethanes, provides a comprehensive overview of all aspects of the science and technology on one of the most commonly produced plastics. Covers the applications, manufacture, and markets for polyurethanes, and discusses analytical methods, reaction mechanisms, morphology, and synthetic routes Provides an up-to-date view of the current markets and trend analysis based on patent activity and updates chapters to include new research Includes two new chapters on PU recycling and PU hybrids, covering the opportunities and challenges in both
Polymeric foams : science and technology ; developed from a symposium sponsored by the Division of Polymer Chemistry, Inc. Kishan C. Khemani 1997
Polypropylene J. Karger-Kocsis 2012-12-06 My heart sank when I was approached by Dr Hastings and by Professor Briggs (Senior Editor of *Materials Science and Technology* and Series Editor of *Polymer Science and Technology Series* at Chapman & Hall, respectively) to edit a book with the provisional title *Handbook of Polypropylene*. My reluctance was due to the fact that my former book [1] along with that of Moore [2], issued in the meantime, seemed to cover the information demand on polypropylene and related systems. Encouraged, however, by some colleagues (the new generation of scientists and engineers needs a good reference book with easy information retrieval, and the development with metallocene catalysts deserves a new update!), I started on this venture. Having some experience with polypropylene systems and being aware of the current literature, it was easy to settle the titles for the book chapters and also to select and approach the most suitable potential contributors. Fortunately, many of my first-choice authors accepted the invitation to contribute. Like all editors of multi-author volumes, I recognize that obtaining contributors follows an S-type curve of asymptotic saturation when the number of willing contributors is plotted as a function of time. The saturation point is, however, never reached and as a consequence, Dear Reader, you will also find some topics of some relevance which are not explicitly treated in this book (but, believe me, I have considered them).

Polymeric Foams 2006

Foaming with Supercritical Fluids Ernesto Di Maio 2021-11-06 *Foaming with Supercritical Fluids*, Volume Nine provides a comprehensive description of the use of supercritical fluids as

blowing agents in polymer foaming. To this aim, the fundamental issues on which the proper design and control of this process are rooted are discussed in detail, with specific attention devoted to the theoretical and experimental aspects of sorption thermodynamics of a blowing agent within a polymer, the effect of the absorbed blowing agent on the thermal, interfacial and rheological properties of the expanding matter, and the phase separation of the gaseous phase, and of the related bubble nucleation and growth phenomena. Several foaming technologies based on the use of supercritical blowing agents are then described, addressing the main issues in the light of the underlying chemical-physical phenomena. Offers strong fundamentals on polymer properties important on foaming Outlines the use of supercritical fluids for foaming Covers theoretical points-of-view, including foam formation of the polymer/gas solution to the setting of the final foam Discusses the several processing technologies and applications

Polymeric Foams Structure-Property-Performance Bernard Obi 2017-12-14 Polymeric Foams Structure-Property-Performance: A Design Guide is a response to the design challenges faced by engineers in a growing market with evolving standards, new regulations, and an ever-increasing variety of application types for polymeric foam. Bernard Obi, an author with wide experience in testing, characterizing, and applying polymer foams, approaches this emerging complexity with a practical design methodology that focuses on understanding the relationship between structure-properties of polymeric foams and their performance attributes. The book not only introduces the fundamentals of polymer and foam science and engineering, but also goes more in-depth, covering foam processing, properties, and uses for a variety of applications. By connecting the diverse technologies of polymer science to those from foam science, and by linking both micro- and macrostructure-property relationships to key performance attributes, the book gives engineers the information required to solve pressing design problems involving the use of polymeric foams and to optimize foam performance. With a focus on applications in the automotive and transportation industries, as well as uses of foams in structural composites for lightweight applications, the author provides numerous case studies and design examples of real-life industrial problems from various industries and their solutions. Provides the science and engineering fundamentals relevant for solving polymer foam application problems Offers an exceptionally practical methodology to tackle the increasing complexity of real-world design challenges faced by engineers working with foams Discusses numerous case studies and design examples, with a focus on automotive and transportation Utilizes a practical design methodology focused on understanding the relationship between structure-properties of polymeric foams and their performance attributes

Polymer Nanocomposite Foams Vikas Mittal 2013-10-18 Advancements in polymer nanocomposite foams have led to their application in a variety of fields, such as automotive, packaging, and insulation. Employing nanocomposites in foam formation enhances their property profiles, enabling a broader range of uses, from conventional to advanced applications. Since many factors affect the generation of nanost

Polymeric Foams S.-T. Lee 2022-05-19 Polymeric Foams: Innovations in Technologies and Environmentally Friendly Materials offers the latest in technology and environmental innovations within the field of polymeric foams. It outlines how application-focused research in polymeric foam can continue to improve living quality and enhance social responsibility. This book: Addresses technological innovations including those in bead foams, foam injection molding, foams in tissue engineering, foams in insulation, and silicon rubber foam Discusses environmentally friendly innovations in PET foam, degradable and renewable foam, and physical blowing agents Describes principles as well as applications from internationally recognized foam experts This work is aimed at researchers and industry professionals across chemical, mechanical, materials, polymer engineering, and anyone else developing and applying these advanced polymeric materials.

Handbook of Foaming and Blowing Agents George Wypych 2022-03-12 Handbook of Foaming and Blowing Agents, Second Edition includes the most current information on foaming

technology, guiding users on the proper selection of formulation, which is highly dependent on the mechanisms of action of blowing agents and foaming agents, as well as dispersion and solubility. The book includes properties of 23 groups of blowing agents and the typical range of technical performance for each group, including general properties, physical-chemical properties, health and safety, environmental impact, and applications in different products and polymers. All information is illustrated by chemical reactions and diagrams. Chapters in the book look at foaming mechanisms with the use of solid blowing agents, which are decomposed to the gaseous products by application of heat, production of gaseous products by chemical reaction, and foaming by gases and evaporating liquids. Introduces the fundamental mechanisms of action of blowing agents and foaming Includes best practice guidance to help engineers and technicians improve the efficiency of their existing foaming processes Enables practitioners to select blowing agents and foaming methods more effectively, thus reducing the risk of poor specification Introduces useful analytical techniques for foaming Discusses the environmental impact of foaming processes

Polymer Recycling John Scheirs 1998-09-16 Provides an overview of state-of-the-art recycling techniques together with current and potential applications. Presents material that is normally only available in the form of conference proceedings Includes flow charts detailing the recycling process Helps identify the problems encountered in the recycling of polymers Presents pie graphs and photographs of commercial outlets A comprehensive volume which will prove to be invaluable for polymer manufacturers, recyclers and marketers as well as environmental authorities and materials engineers.

Polymeric Foams Shau-Tarng Lee 2006-08-21 Polymers are among the major hallmarks of 20th-century science, and the explosive outgrowth and tremendous importance of polymeric foams is a testament to their amazing versatility and unique properties. With applications from automotive to acoustic and medical, polymeric foams pervade all areas of our lives. If this growth is to continue into the

Reinforced Polymer Matrix Syntactic Foams Nikhil Gupta 2013-09-21 Reinforced Syntactic Foams: Effect of Nano and Micro-Scale Reinforcement examines the fabrication processes, mechanism of reinforcement, and structure-property correlations of reinforced syntactic foams. The authors present the state of the art in this field, compare the properties of various types of syntactic foam systems comprising different matrix, hollow particle, and reinforcement materials. The book further identifies theories useful in predicting the properties of reinforced syntactic foams and conducting parametric studies to understand the possibility for tailoring their properties.

Polymer Foams David Eaves 2001-01-01 This report provides an overview of the current status of the foam industry. The implications of the Montreal Protocol for blowing agents and for foam production are discussed. The different polymeric foams are considered individually with discussion of key properties, material and processing development and end-use applications. The impact of other environmental influences is also examined, with discussion of waste recovery issues such as the Packaging Waste Directive and the End-of-Life Vehicle Directive.

Handbook of Polymeric Foams and Foam Technology Daniel Klempner 2004 Describing all classes of polymeric foams, including their chemistry, synthesis, commercial production methods, properties, and applications, this handbook is designed to support engineers in their effort to develop practical solutions for industrial design and manufacturing challenges.

Polyurethane and Related Foams Kaneyoshi Ashida 2006-09-22 Polyurethane and Related Foams: Chemistry and Technology is an in-depth examination of the current preparation, processing, and applications of polyurethanes (PURs) and other polymer foams. Drawing attention to novel raw materials, alternative blowing agents, and new processing methods, the book accentuates recent innovations that meet increasingly stringent environmental and fire safety regulations as well as higher quality products. Written by Dr. Kaneyoshi Ashida, a renowned pioneer of polyisocyanurate (PIR) foams, the book details the fundamental chemistry

and material properties for each category of foams. The author presents mechanisms for chemical modification and foaming reactions, emphasizing the relationship between molecular design and enhanced physical properties. The latter half of the book focuses on polyurethane foams, the largest segment of the polyisocyanate-based foam industry. It contains a fully updated description of the chemistry, raw materials, manufacturing, formulations, analyses, and testing involved in producing a wide variety of progressive applications, including building materials. This book chronicles the scientific and technological evolution of preparation and processing methods for polyisocyanate-based foams. *Polyurethane and Related Foams: Chemistry and Technology* offers a clear and concise guide to the technologies, methods, and best practices that help the foam industry meet higher quality, health, and environmental standards.

Recycling of Polyurethane Foams Sabu Thomas 2018-06-06 Recycling of Polyurethane Foams introduces the main degradation/depolymerization processes and pathways of polyurethane foam materials, focusing on industrial case studies and academic reviews from recent research and development projects. The book can aid practitioners in understanding the basis of polymer degradation and its relationship with industrial processes, which can be of substantial value to industrial complexes the world over. The main pathways of polymer recycling via different routes and industrial schemes are detailed, covering all current techniques, including regrinding, rebinding, adhesive pressing and compression moulding of recovered PU materials that are then compared with depolymerization approaches. The book examines life cycle assessment and cost analysis associated with polyurethane foams waste management, showing the potential of various techniques. This book will help academics and researchers identify and improve on current depolymerization processes, and it will help industry sustainability professionals choose the appropriate approach for their own waste management systems, thus minimizing the costs and environmental impact of their PU-based end products. Offers a comprehensive review of all polyurethane foam recycling processes, including both chemical and mechanical approaches Assesses the potential of each recycling process Helps industry-based practitioners decide which approach to take to minimize the cost and environmental impact of their end product Enables academics and researchers to identify and improve upon current processes of degradation and depolymerization

Polymeric Foams Shau-Tarnng Lee 2004-05-27 This book is the inaugural volume a series entitled *Polymeric Foams: Technology and Applications*. Generally, thermoplastic and thermoset foams have been treated as two separate practices in industry. *Polymeric Foams: Mechanisms and Materials* presents the basics of foaming in general build a strong foundation to those working in both thermoplastic and thermoset foams. The book addresses scientific principles behind polymeric foaming and presents foaming chemistry and physics, resin and blowing agents, and foaming mechanisms in separate chapters, thus providing an overall and fundamental understanding of foaming for polymeric foam products and processes.

Low density cellular plastics N.C. Hilyard 2012-12-06 Foams are gas filled integral structures in which the gas is finely dispersed throughout a continuously connected solid phase. The bulk density is usually substantially lower than that of the solid component, and for the foams which form the focus for this book the volume fraction of the gas phase is considerably greater than 0.5 and in most instances in excess of 0.9. Many of the materials encountered in every day experience, such as bread, plants and trees, structural materials for buildings, comfort materials for domestic and automotive seating, shock absorbers or car bumpers and materials for noise control, have one thing in common - the cellular nature of their physical structure. Why are these structures so important in the natural and man-made world? The reasons are both technical and commercial. From a technical viewpoint cellular materials offer: 1. high specific stiffness and strength - making them suitable for structural applications; 2. close to ideal energy management - hence their use in thermal and acoustic insulation, vibration damping, acoustic absorption and shock mitigation; and 3. comfort - hence their use for domestic and automotive seating.

Foam Extrusion S.-T. Lee 2014-04-07 Combining the science of foam with the engineering of extrusion processes, *Foam Extrusion: Principles and Practice* delivers a detailed discussion of the theory, design, processing, and application of degradable foam extraction. In one comprehensive volume, the editors present the collective expertise of leading academic, research, and industry specialists while laying the scientific foundation in such a manner that the microscopic transition from a nucleus to a void (nucleation) and macroscopic movement from a void to an object (formation) are plausibly addressed. To keep pace with significant improvements in foam extrusion technology, this Second Edition: Includes new chapters on the latest developments in processing/thermal management, rheology/melt strength, and biodegradable and sustainable foams Features extensive updates to chapters on extrusion equipment, blowing agents, polyethylene terephthalate (PET) foam, and microcellular innovation Contains new coverage of cutting-edge foaming mechanisms and technology, as well as new case studies, examples, and figures Capturing the interesting evolution of the field, *Foam Extrusion: Principles and Practice, Second Edition* provides scientists, engineers, and product development professionals with a modern, holistic view of foam extrusion to enhance research and development and aid in the selection of the optimal screw, die design, and foaming system. *Handbook of Polymer Foams* David Eaves 2004-01-01 This Handbook reviews the chemistry, manufacturing methods, properties and applications of the synthetic polymer foams used in most applications. In addition, a chapter is included on the fundamental principles, which apply to all polymer foams. There is also a chapter on the blowing agents used to expand polymers and a chapter is on microcellular foams - a relatively new development where applications are still being explored.

Polymeric Foams Kishan C. Khemani 1997 Comprises the proceedings of the AMA's symposium concerning Recent Advances in Polymeric Foam Science and Technology held in Orlando, Florida in August 1996. The volume's 15 chapters represent recent developments in polymeric foam science and technology, beginning with an overview of the field and markets. Each of the next 14 chapters begins with a review of the field, followed by discussion of new results. Topics include new developments in the areas of siloxane, carbon, polyimide, polyester, and polyisocyanurate foams; newly emerging areas of microcellular polymeric foams produced via solid-state and extrusion foaming techniques; recent advances in the area of polyurethane foam; issues in the study of the morphology of cellular solids; physical and theoretical aspects of foams and foaming processes; and modeling studies of inherently foamable intumescent polymers used as fire retardant. Annotation copyrighted by Book News, Inc., Portland, OR

Polymer Science and Engineering National Research Council 1994-01-01 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.

Flexible Polyurethane Foams Chris Defonseka 2019-08-05 Flexible and viscoelastic polyurethane foams have enormous potential as viable business ventures and have replaced many traditional materials used in everyday life. This book describes the chemistry of flexible and viscoelastic polyurethane foams as well as calculations and formulating methodology for quality production. The author presents detailed information on foam manufacturing, based on over 45 years of hands-on industry experience.

Applied Methodologies in Polymer Research and Technology Abbas Hamrang 2014-10-28 This book covers a broad range of polymeric materials and provides industry professionals and researchers in polymer science and technology with a single, comprehensive book summarizing all aspects involved in the functional materials production chain. This volume presents the latest developments and trends in advanced polymer materials and structures. It discusses the developments of advanced polymers and respective tools to characterize and predict the material properties and behavior. This book has an important role in advancing polymer materials in macro and nanoscale. Its aim is to provide original, theoretical, and important experimental results that use non-routine methodologies. It also includes chapters on novel applications of more familiar experimental techniques and analyses of composite problems that indicate the need for new experimental approaches. This new book:

- Provides a collection of articles that highlight some important areas of current interest in key polymeric materials and technology
- Gives an up-to-date and thorough exposition of the present state of the art of key polymeric materials and technology
- Describes the types of techniques now available to the engineers and technicians and discusses their capabilities, limitations, and applications
- Provides a balance between materials science and chemical aspects, basic and applied research
- Focuses on topics with more advanced methods
- Emphasizes precise mathematical development and actual experimental details
- Explains modification methods for changing of different materials properties

Eco-friendly and Smart Polymer Systems Hamid Mirzadeh 2020-05-29 This proceedings book presents the main findings of the 13th International Seminar on Polymer Science and Technology (ISPST 2018), which was held at Amirkabir University of Technology, Tehran, on November 10–22, 2018. This forum was the culmination of more than three decades of academic and industrial activities of Iranian scholars and professionals, and the participation of many notable international scientists, in covering various important polymer-related subjects of concern to Iran and the world at large, including polymer synthesis, processing and properties, as well as issues concerning polymer degradation, stability, and environmental aspects. For the past half a century, the growing concern for advancing human health, quality of life, and – especially in the last few decades – avoiding and combating environmental pollution have shaped and driven scientific activities geared toward the creation of smart materials that are compatible with the human body, and have prompted scientists and technologists to pursue research using natural and sustainable sources. This book highlights efforts to responsibly address the problems

caused by, and which can potentially be solved by, polymers and plastics.

Porous Materials Peisheng Liu 2014-08-12 Engineers and scientists alike will find this book to be an excellent introduction to the topic of porous materials, in particular the three main groups of porous materials: porous metals, porous ceramics, and polymer foams. Beginning with a general introduction to porous materials, the next six chapters focus on the processing and applications of each of the three main materials groups. The book includes such new processes as gel-casting and freeze-drying for porous ceramics and self-propagating high temperature synthesis (SHS) for porous metals. The applications discussed are relevant to a wide number of fields and industries, including aerospace, energy, transportation, construction, electronics, biomedical and others. The book concludes with a chapter on characterization methods for some basic parameters of porous materials. *Porous Materials: Processing and Applications* is an excellent resource for academic and industrial researchers in porous materials, as well as for upper-level undergraduate and graduate students in materials science and engineering, physics, chemistry, mechanics, metallurgy, and related specialties. A comprehensive overview of processing and applications of porous materials – provides younger researchers, engineers and students with the best introduction to this class of materials. Includes three full chapters on modern applications - one for each of the three main groups of porous materials. Introduces readers to several characterization methods for porous materials, including methods for characterizing pore size, thermal conductivity, electrical resistivity and specific surface area.

Polymeric Foams Shau-Tarnng Lee 2016-11-03 Polymeric foams are sturdy yet lightweight materials with applications across a variety of industries, from packaging to aerospace. As demand for these materials increase, so does innovation in the development of new processes and products. This book captures the most dynamic advances in processes, technologies, and products related to the polymeric foam market. It describes the latest business trends including new microcellular commercialization, sustainable foam products, and nanofoams. It also discusses novel processes, new and environmentally friendly blowing agents, and the development and usage of various types of foams, including bead and polycarbonate, polypropylene, polyetherimide microcellular, and nanocellular. The book also covers flame-retardant foams, rigid foam composites, and foam sandwich composites and details applications in structural engineering, electronics, and insulation. Authored by leading experts in the field, this book minimizes the gap between research and application in this important and growing area.

Polymers for Food Applications Tomy J. Gutiérrez 2018-08-09 This book presents an exhaustive review on the use of polymers for food applications. Polymer-based systems for food applications such as: films, foams, nano- and micro-encapsulated, emulsions, hydrogels, prebiotics, 3D food printing, edible polymers for the development of foods for people with special feeding regimes, sensors, among others, have been analyzed in this work.