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Introduction to Polymer Chemistry, Fourth Edition - Charles E. Carraher Jr. 2017-01-06

Introduction to Polymer Chemistry provides undergraduate students with a much-needed, well-rounded presentation of the principles and applications of natural, synthetic, inorganic, and organic polymers. With an emphasis on the environment and green chemistry and materials, this fourth edition continues to provide detailed coverage of natural and synthetic giant molecules, inorganic and organic polymers, elastomers, adhesives, coatings, fibers, plastics, blends, caulks, composites, and ceramics. Building on undergraduate work in foundational courses, the text fulfills the American Chemical Society Committee on Professional Training (ACS CPT) in-depth course requirement

Kinetics in Materials Science and Engineering - Dennis W. Readey 2017-01-27

"A pedagogical gem.... Professor Readey replaces 'black-box' explanations with detailed, insightful derivations. A wealth of practical application examples and exercise problems complement the exhaustive coverage of kinetics for all material classes." -Prof. Rainer Hebert, University of Connecticut "Prof. Readey gives a grand tour of the kinetics of materials suitable for experimentalists and modellers.... In an easy-to-read and entertaining style, this book leads the reader to fundamental, model-based understanding of kinetic processes critical to development, fabrication and application of commercially-important soft (polymers, biomaterials), hard (ceramics, metals) and composite materials. It is a must-have for anyone who really wants to understand how to make materials and how they will behave in service." --Prof. Bill Lee, Imperial College London, Fellow of the Royal Academy of Engineering "A much needed text filling the gap between an introductory course in materials science and advanced materials-specific kinetics courses. Ideal for the undergraduate interested in an in-depth study of kinetics in materials." -Prof. Mark E. Eberhart, Colorado School of Mines This book provides an in-depth introduction to the most important kinetic concepts in materials science, engineering, and processing. All types of materials are addressed, including metals, ceramics, polymers, electronic materials, biomaterials, and composites. The expert author with decades of teaching and practical experience gives a lively and accessible overview, explaining the principles that determine how long it takes to change material properties and make new and better materials. The chapters cover a broad range of topics extending from the heat treatment of steels, the processing of silicon integrated microchips, and the production of cement, to the movement of drugs through the human body. The author explicitly avoids "black box" equations, providing derivations with clear explanations.

Fundamentals of Polymer Engineering, Third Edition - Anil Kumar 2018-12-07

Exploring the chemistry of synthesis, mechanisms of polymerization, reaction engineering of step-growth and chain-growth polymerization, polymer characterization, thermodynamics and structural, mechanical, thermal and transport behavior of polymers as melts, solutions and solids, Fundamentals of Polymer Engineering, Third Edition covers essential concepts and breakthroughs in reactor design and polymer production and processing. It contains modern theories and real-world examples for a clear understanding of polymer function and development. This fully updated edition addresses new materials, applications, processing techniques, and interpretations of data in the field of polymer science. It discusses the conversion of biomass and coal to plastics and fuels, the use of porous polymers and membranes for water

purification, and the use of polymeric membranes in fuel cells. Recent developments are brought to light in detail, and there are new sections on the improvement of barrier properties of polymers, constitutive equations for polymer melts, additive manufacturing and polymer recycling. This textbook is aimed at senior undergraduate students and first year graduate students in polymer engineering and science courses, as well as professional engineers, scientists, and chemists. Examples and problems are included at the end of each chapter for concept reinforcement.

Composites Science, Technology, and Engineering - Frank R. Jones 2022-04-21

Understand critical principles of composites, such as design of durable structures, choice of fibre, matrix, manufacturing process, and mechanics with this interdisciplinary text. The book features up-to-date coverage of hybrids of fibres and particles and explanation of failure criteria, and includes a comprehensive discussion on choice of fibres, matrices, manufacturing technology, and micromechanics for durable composite structures. It provides the structure and properties of reinforcing fibres, particulates, and matrices together with a discussion of fracture mechanics. This is an essential guide for scientists and engineers wishing to discover the benefits of composite materials for designing strong and durable structures.

Introduction to Polymers - Robert J. Young 1991

Focusing on polymers, this edition aims to explore aspects of their chemistry, structure and mechanical properties. New topics discussed include ring-opening polymerization, special methods of polymerization, dynamic light scattering, small angle X-ray and neutron scattering.

VDI Heat Atlas - VDI Gesellschaft 2010-07-21

For more than 50 years, the Springer VDI Heat Atlas has been an indispensable working means for engineers dealing with questions of heat transfer. Featuring 50% more content, this new edition covers most fields of heat transfer in industrial and engineering applications. It presents the interrelationships between basic scientific methods, experimental techniques, model-based analysis and their transfer to technical applications.

Carraher's Polymer Chemistry - Charles E. Carraher Jr. 2017-10-12

Carraher's Polymer Chemistry, Tenth Edition integrates the core areas of polymer science. Along with updating of each chapter, newly added content reflects the growing applications in Biochemistry, Biomaterials, and Sustainable Industries. Providing a user-friendly approach to the world of polymeric materials, the book allows students to integrate their chemical knowledge and establish a connection between fundamental and applied chemical information. It contains all of the elements of an introductory text with synthesis, property, application, and characterization. Special sections in each chapter contain definitions, learning objectives, questions, case studies and additional reading.

Principles of Polymer Science - P. Bahadur 2005

"Principles of Polymer Science introduces several basic and advanced aspects of polymers for the undergraduate and graduate students in chemistry, chemical engineering and materials science. The second and thoroughly revised edition includes the technical aspects of synthesis, characterization, behaviour and technology in a straightforward and lucid manner. Separate chapters on natural, inorganic

and specialty polymers would attract readers from interdisciplinary courses."--BOOK JACKET.

Molecular Mobility in Deforming Polymer Glasses - Nikhil Padhye 2021

This book bridges disparate fields in an exploration of the phenomena and applications surrounding molecular mobility in glassy materials experiencing inelastic deformation. The subjects of plastic deformation and polymer motion/interdiffusion currently belong to the two different fields of continuum mechanics and polymer physics, respectively. However, molecular motion associated with plastic deformation is a key ingredient to gain fundamental understanding, both at the macroscopic and microscopic level. This short monograph provides necessary background in the aforementioned fields before addressing the topic of molecular mobility accompanied by macroscopic inelastic deformation in an accessible and easy-to-understand manner. A new phenomenon of solid-state deformation-induced bonding in polymers is discussed in detail, along with some broad implications in several manufacturing sectors. Open questions pertaining to mechanisms, mechanics, and modeling of deformation-induced bonding in polymers are presented. The book's clear language and careful explanations will speak to readers of diverse backgrounds.

Ceramic Materials - C. Barry Carter 2013-01-04

Ceramic Materials: Science and Engineering is an up-to-date treatment of ceramic science, engineering, and applications in a single, comprehensive text. Building on a foundation of crystal structures, phase equilibria, defects, and the mechanical properties of ceramic materials, students are shown how these materials are processed for a wide diversity of applications in today's society. Concepts such as how and why ions move, how ceramics interact with light and magnetic fields, and how they respond to temperature changes are discussed in the context of their applications. References to the art and history of ceramics are included throughout the text, and a chapter is devoted to ceramics as gemstones. This course-tested text now includes expanded chapters on the role of ceramics in industry and their impact on the environment as well as a chapter devoted to applications of ceramic materials in clean energy technologies. Also new are expanded sets of text-specific homework problems and other resources for instructors. The revised and updated Second Edition is further enhanced with color illustrations throughout the text.

Polymers - J.M.G. Cowie 2007-07-27

Extensively revised and updated to keep abreast of recent advances, *Polymers: Chemistry and Physics of Modern Materials*, Third Edition continues to provide a broad-based, high-information text at an introductory, reader-friendly level that illustrates the multidisciplinary nature of polymer science. Adding or amending roughly 50% of the material, t

Microstructural Characterization of Materials - David Brandon 2013-03-21

Microstructural characterization is usually achieved by allowing some form of probe to interact with a carefully prepared specimen. The most commonly used probes are visible light, X-ray radiation, a high-energy electron beam, or a sharp, flexible needle. These four types of probe form the basis for optical microscopy, X-ray diffraction, electron microscopy, and scanning probe microscopy. *Microstructural Characterization of Materials*, 2nd Edition is an introduction to the expertise involved in assessing the microstructure of engineering materials and to the experimental methods used for this purpose. Similar to the first edition, this 2nd edition explores the methodology of materials characterization under the three headings of crystal structure, microstructural morphology, and microanalysis. The principal methods of characterization, including diffraction analysis, optical microscopy, electron microscopy, and chemical microanalytical techniques are treated both qualitatively and quantitatively. An additional chapter has been added to the new edition to cover surface probe microscopy, and there are new sections on digital image recording and analysis, orientation imaging microscopy, focused ion-beam instruments, atom-probe microscopy, and 3-D image reconstruction. As well as being fully updated, this second edition also includes revised and expanded examples and exercises, with a solutions manual available at <http://develop.wiley.co.uk/microstructural2e/> *Microstructural Characterization of Materials*, 2nd Edition will appeal to senior undergraduate and graduate students of material science, materials engineering, and materials chemistry, as well as to qualified engineers and more advanced researchers, who will find the book a useful and comprehensive general reference source.

Complex Macromolecular Architectures - Nikos Hadjichristidis 2011-04-20

The field of CMA (complex macromolecular architecture) stands at the cutting edge of materials science, and has been a locus of intense research activity in recent years. This book gives an extensive description of the synthesis, characterization, and self-assembly of recently-developed advanced architectural materials with a number of potential applications. The architectural polymers, including bio-conjugated hybrid polymers with poly(amino acid)s and gluco-polymers, star-branched and dendrimer-like hyperbranched polymers, cyclic polymers, dendrigraft polymers, rod-coil and helix-coil block copolymers, are introduced chapter by chapter in the book. In particular, the book also emphasizes the topic of synthetic breakthroughs by living/controlled polymerization since 2000. Furthermore, renowned authors contribute on special topics such as helical polyisocyanates, metallopolymers, stereospecific polymers, hydrogen-bonded supramolecular polymers, conjugated polymers, and polyrotaxanes, which have attracted considerable interest as novel polymer materials with potential future applications. In addition, recent advances in reactive blending achieved with well-defined end-functionalized polymers are discussed from an industrial point of view. Topics on polymer-based nanotechnologies, including self-assembled architectures and suprastructures, nano-structured materials and devices, nanofabrication, surface nanostructures, and their AFM imaging analysis of hetero-phased polymers are also included. Provides comprehensive coverage of recently developed advanced architectural materials Covers hot new areas such as click chemistry o chain walking o polyhomologation o ADMET Edited by highly regarded scientists in the field Contains contributions from 26 leading experts from Europe, North America, and Asia Researchers in academia and industry specializing in polymer chemistry will find this book to be an ideal survey of the most recent advances in the area. The book is also suitable as supplementary reading for students enrolled in Polymer Synthetic Chemistry, Polymer Synthesis, Polymer Design, Advanced Polymer Chemistry, Soft Matter Science, and Materials Science courses. Color versions of selected figures can be found at www.wiley.com/go/hadjichristidis

Polymer Physics - U.W. Gedde 2013-12-11

This book is the result of my teaching efforts during the last ten years at the Royal Institute of Technology. The purpose is to present the subject of polymer physics for undergraduate and graduate students, to focus the fundamental aspects of the subject and to show the link between experiments and theory. The intention is not to present a compilation of the currently available literature on the subject. Very few reference citations have thus been made. Each chapter has essentially the same structure: starting with an introduction, continuing with the actual subject, summarizing the chapter in 300-500 words, and finally presenting problems and a list of relevant references for the reader. The solutions to the problems presented in Chapters 1-12 are given in Chapter 13. The theme of the book is essentially polymer science, with the exclusion of that part dealing directly with chemical reactions. The fundamentals in polymer science, including some basic polymer chemistry, are presented as an introduction in the first chapter. The next eight chapters deal with different phenomena (processes) and states of polymers. The last three chapters were written with the intention of making the reader think practically about polymer physics. How can a certain type of problem be solved? What kinds of experiment should be conducted? This book would never have been written without the help of my friend and adviser, Dr Anthony Bristow, who has spent many hours reading through the manuscript. criticizing the content.

Polymers in Drug Delivery - Ijeoma F. Uchegbu 2006-05-19

Together, the nano explosion and the genomic revolution are ushering in a new frontier in drug delivery. In recent years we've seen how polymers can play a crucial role in controlling the rate of drug release, enhancing solubility and uptake, and limiting degradation and toxicity. In the very near future, they may well be used to deliver gene therapy

Introduction to Polymers, Third Edition - Robert J. Young 2011-06-27

Thoroughly updated, *Introduction to Polymers, Third Edition* presents the science underpinning the synthesis, characterization and properties of polymers. The material has been completely reorganized and expanded to include important new topics and provide a coherent platform for teaching and learning the fundamental aspects of contemporary polymer science. New to the Third Edition Part I This first part covers newer developments in polymer synthesis, including 'living' radical polymerization, catalytic chain transfer and free-radical ring-opening polymerization, along with strategies for the synthesis of conducting

polymers, dendrimers, hyperbranched polymers and block copolymers. Polymerization mechanisms have been made more explicit by showing electron movements. Part II In this part, the authors have added new topics on diffusion, solution behaviour of polyelectrolytes and field-flow fractionation methods. They also greatly expand coverage of spectroscopy, including UV visible, Raman, infrared, NMR and mass spectroscopy. In addition, the Flory-Huggins theory for polymer solutions and their phase separation is treated more rigorously. Part III A completely new, major topic in this section is multicomponent polymer systems. The book also incorporates new material on macromolecular dynamics and reptation, liquid crystalline polymers and thermal analysis. Many of the diagrams and micrographs have been updated to more clearly highlight features of polymer morphology. Part IV The last part of the book contains major new sections on polymer composites, such as nanocomposites, and electrical properties of polymers. Other new topics include effects of chain entanglements, swelling of elastomers, polymer fibres, impact behaviour and ductile fracture. Coverage of rubber-toughening of brittle plastics has also been revised and expanded. While this edition adds many new concepts, the philosophy of the book remains unchanged. Largely self-contained, the text fully derives most equations and cross-references topics between chapters where appropriate. Each chapter not only includes a list of further reading to help readers expand their knowledge of the subject but also provides problem sets to test understanding, particularly of numerical aspects.

Fundamentals of Polymer Engineering, Third Edition - Anil Kumar 2018-12-07

Exploring the chemistry of synthesis, mechanisms of polymerization, reaction engineering of step-growth and chain-growth polymerization, polymer characterization, thermodynamics and structural, mechanical, thermal and transport behavior of polymers as melts, solutions and solids, Fundamentals of Polymer Engineering, Third Edition covers essential concepts and breakthroughs in reactor design and polymer production and processing. It contains modern theories and real-world examples for a clear understanding of polymer function and development. This fully updated edition addresses new materials, applications, processing techniques, and interpretations of data in the field of polymer science. It discusses the conversion of biomass and coal to plastics and fuels, the use of porous polymers and membranes for water purification, and the use of polymeric membranes in fuel cells. Recent developments are brought to light in detail, and there are new sections on the improvement of barrier properties of polymers, constitutive equations for polymer melts, additive manufacturing and polymer recycling. This textbook is aimed at senior undergraduate students and first year graduate students in polymer engineering and science courses, as well as professional engineers, scientists, and chemists. Examples and problems are included at the end of each chapter for concept reinforcement.

An Introduction to Polymer Physics - David I. Bower 2002-05-30

Publisher Description

Introduction to Polymer Science and Chemistry - Manas Chanda 2013-01-11

Industry and academia remain fascinated with the diverse properties and applications of polymers. However, most introductory books on this enormous and important field do not stress practical problem solving or include recent advances, which are critical for the modern polymer scientist-to-be. Updating the popular first edition of "the polymer book for the new millennium," Introduction to Polymer Science and Chemistry: A Problem-Solving Approach, Second Edition seamlessly integrates exploration of the fundamentals of polymer science and polymer chemistry. See What's New in the Second Edition: Chapter on living/controlled radical polymerization, using a unique problem-solving approach Chapter on polymer synthesis by "click" chemistry, using a unique problem-solving approach Relevant and practical work-out problems and case studies Examples of novel methods of synthesis of complex polymer molecules by exciting new techniques Figures and schematics of the novel synthetic pathways described in the new examples Author Manas Chanda takes an innovative problem-solving approach in which the text presents worked-out problems or questions with answers at every step of the development of a new theory or concept, ensuring a better grasp of the subject and scope for self study. Containing 286 text-embedded solved problems and 277 end-of-chapter home-study problems (fully answered separately in a Solutions Manual), the book provides a comprehensive understanding of the subject. These features and more set this book apart from other currently available polymer chemistry texts.

Polymer Science and Technology - Joel R. Fried 1995

Polymer Chemistry - David M. Teegarden 2004

This high school textbook introduces polymer science basics, properties, and uses. It starts with a broad overview of synthetic and natural polymers and then covers synthesis and preparation, processing methods, and demonstrations and experiments. The history of polymers is discussed alongside the s [Introduction to Polymer Science and Technology](#) -

Highly Elastic Polymer Solutions Under Shear - Michael Joseph MacDonald 1996

[Polymers](#) - J.M.G. Cowie 1991-06-01

This text follows a broad sequence of preparation, characterization, physical and mechanical properties and structure-property relations. Polymers: Chemistry and Physics of Modern Materials, Second Edition covers several methods of polymerization, properties, and advanced applications such as liquid crystals and polymers used in the electronics industry. Topics also include Step-Growth, Free Radical Addition, and Ionic Polymerization; Copolymerization; Polymer Stereochemistry and Characterization; Structure-Property Relationship; Polymer Liquid Crystals; and Polymers for the Electronics Industry.

[Fundamentals of Polymer Science](#) - Michael M. Coleman 2019-01-25

Now in its second edition, this widely used text provides a unique presentation of today's polymer science. It is both comprehensive and readable. The authors are leading educators in this field with extensive background in industrial and academic polymer research. The text starts with a description of the types of microstructures found in polymer

Introduction to Polymers, Second Edition - Robert J. Young 1991-05-23

Introduction to Polymers, Second Edition discusses the synthesis, characterization, structure, and mechanical properties of polymers in a single text, giving approximately equal emphasis to each of these major topics. It has thus been possible to show the interrelationship of the different aspects of the subject in a coherent framework. The book has been written to be self-contained, with most equations fully derived and critically discussed. It is supported by a large number of diagrams and micrographs and is fully referenced for more advanced reading. Problems have been supplied at the end of each chapter so that students can test their understanding and practice the manipulation of data.

Principles of Polymer Chemistry - Paul J. Flory 1953

[Introduction to Soft Matter](#) - Ian W. Hamley 2013-03-18

This book provides an introduction to this exciting and relatively new subject with chapters covering natural and synthetic polymers, colloids, surfactants and liquid crystals highlighting the many and varied applications of these materials. Written by an expert in the field, this book will be an essential reference for people working in both industry and academia and will aid in understanding of this increasingly popular topic. Contains a new chapter on biological soft matter Newly edited and updated chapters including updated coverage of recent aspects of polymer science. Contain problems at the end of each chapter to facilitate understanding

Solutions Manual - Introduction to Polymers Third Edition - Robert J. Young 2007-04-26

Chemical Resistance of Commodity Thermoplastics - Erwin Baur 2016-06-24

Chemical Resistance of Commodity Thermoplastics provides a comprehensive, cross-referenced compilation of chemical resistance data that explains the effect of thousands of reagents, the environment and other exposure media on the properties and characteristics of commodity thermoplastics - plastics which are generally used in higher performance applications. A huge range of exposure media are included, from aircraft fuel to alcohol, corn syrup to hydrochloric acid, and salt to silver acetate. This information has been substantially updated, curated, and organized by the engineers at M-Base Engineering + Software, a leading supplier of material databases, material information systems, product information systems, and material related simulation software. This book is a must-have reference for engineers and scientists

designing and working with plastics and elastomers in environments where they come into contact with corrosive or reactive substances, from food, pharmaceuticals, and medical devices, to the automotive, aerospace, and semiconductor industries. Explains the effect of thousands of reagents, the environment and other exposure media on the properties and characteristics of commodity thermoplastics Organized by the engineers at M-Base Engineering + Software, a leading supplier of material databases, material information systems, product information systems, and material related simulation software A must-have reference for engineers and scientists designing and working with plastics and elastomers in environments where they come into contact with corrosive or reactive substances

Polymer Chemistry - Timothy P. Lodge 2020-07-14

A well-rounded and articulate examination of polymer properties at the molecular level, Polymer Chemistry focuses on fundamental principles based on underlying chemical structures, polymer synthesis, characterization, and properties. It emphasizes the logical progression of concepts and provide mathematical tools as needed as well as fully derived problems for advanced calculations. The much-anticipated Third Edition expands and reorganizes material to better develop polymer chemistry concepts and update the remaining chapters. New examples and problems are also featured throughout. This revised edition: Integrates concepts from physics, biology, materials science, chemical engineering, and statistics as needed. Contains mathematical tools and step-by-step derivations for example problems Incorporates new theories and experiments using the latest tools and instrumentation and topics that appear prominently in current polymer science journals. The number of homework problems has been greatly increased, to over 350 in all. The worked examples and figures have been augmented. More examples of relevant synthetic chemistry have been introduced into Chapter 2 ("Step-Growth Polymers"). More details about atom-transfer radical polymerization and reversible addition/fragmentation chain-transfer polymerization have been added to Chapter 4 ("Controlled Polymerization"). Chapter 7 (renamed "Thermodynamics of Polymer Mixtures") now features a separate section on thermodynamics of polymer blends. Chapter 8 (still called "Light Scattering by Polymer Solutions") has been supplemented with an extensive introduction to small-angle neutron scattering. Polymer Chemistry, Third Edition offers a logical presentation of topics that can be scaled to meet the needs of introductory as well as more advanced courses in chemistry, materials science, polymer science, and chemical engineering.

Polymer Characterisation - B.J. Hunt 2012-12-06

Polymers continue to play an ever increasing role in the modern world. In fact it is quite inconceivable to most people that we could ever have existed of the increased volume and variety of materials without them. As a result currently available, and the diversity of their application, characterisation has become an essential requirement of industrial and academic laboratories involved with polymeric materials. On the one hand requirements may come from polymer specialists involved in the design and synthesis of new materials who require a detailed understanding of the relationship between the precise molecular architecture and the properties of the polymer in order to improve its capabilities and range of applications. On the other hand, many analysts who are not polymer specialists are faced with the problems of analysing and testing a wide range of polymeric materials for quality control or material specification purposes. We hope this book will be a useful reference for all scientists and techno or industrial laboratories, logists involved with polymers, whether in academic and irrespective of their scientific discipline. We have attempted to include in one volume all of the most important techniques. Obviously it is not possible to do this in any great depth but we have encouraged the use of specific examples to illustrate the range of possibilities. In addition numerous references are given to more detailed texts on specific subjects, to direct the reader where appropriate. The book is divided into II chapters.

Lubricant Additives - Leslie R. Rudnick 2017-07-12

This indispensable book describes lubricant additives, their synthesis, chemistry, and mode of action. All important areas of application are covered, detailing which lubricants are needed for a particular application. Laboratory and field performance data for each application is provided and the design of cost-effective, environmentally friendly technologies is fully explored. This edition includes new chapters on chlorohydrocarbons, foaming chemistry and physics, antifoams for nonaqueous lubricants, hydrogenated styrene-diene viscosity modifiers, alkylated aromatics, and the impact of REACH and GHS on the lubricant

industry.

Polymer Physics - Michael Rubinstein 2003-06-26

Polymer Physics provides an introduction to the field for upper level undergraduates and first year graduate students. Any student with a working knowledge of calculus, physics and chemistry should be able to read this book. The essential tools of the polymer physical chemist or engineer are derived in this book without skipping any steps.

Chemical Information for Chemists - Judith N Currano 2014

This book is a chemical information book aimed specifically at practicing chemists. Useful for students on undergraduate and graduate courses, it could also be a guide to new information specialists who are facing the challenging diversity of chemical literature.

Chemical Resistance of Engineering Thermoplastics - Erwin Baur 2016-06-24

Chemical Resistance of Engineering Thermoplastics provides a comprehensive, cross-referenced compilation of chemical resistance data that explains the effect of thousands of reagents, the environment, and other exposure media on the properties and characteristics of engineering thermoplastics - plastics which are generally used in higher performance applications. A huge range of exposure media are included, from aircraft fuel to alcohol, corn syrup to hydrochloric acid, and salt to silver acetate. This information has been substantially updated, curated, and organized by the engineers at M-Base Engineering + Software, a leading supplier of material databases, material information systems, product information systems, and material related simulation software. This book is a must-have reference for engineers and scientists who are designing and working with plastics and elastomers in environments where they come into contact with corrosive or reactive substances, from food, pharmaceuticals, and medical devices to the automotive, aerospace, and semiconductor industries. Explains the effect of thousands of reagents, the environment, and other exposure media on the properties and characteristics of engineering thermoplastics Substantially updated, curated, and organized by the engineers at M-Base Engineering + Software, a leading supplier of material databases and material information systems Provides a comprehensive, cross-referenced compilation of chemical resistance data

Polymer Reactor Engineering - C. McGreavy 2012-12-06

Approximately half of the world production of the petrochemical industry (more than 100 million tonnes) is in the form of polymers, yet it would probably surprise most people to learn how much their lifestyle depends on polymers ranging, as they do, from detergents, kitchenware and electrical appliances to furnishings and a myriad other domestic goods. Still less are they likely to be aware of the extensive part they play in engineering applications for mechanical machine components and advanced high performance aircraft. This versatility derives from the fact that polymeric materials are made up of a range of molecules of varying length, whose properties are related to molecular structure and the proportions of the chains in the mixture. For example, polypropylene is a commodity polymer which is produced in hundreds of different grades to meet specific market requirements. This depends on the catalyst as well as the operating conditions and reactor design. A major area for growth is in substituting polymers for conventional materials such as ceramics and metals. Not only can they match these materials in terms of mechanical strength and robustness but they have very good resistance to chemical attack. Polyamides, for example, are widely used for car bumpers and new polymers are being developed for engine manifolds and covers. In 1993 there is, typically, 100 kg of various polymers used in cars and this is continually increasing, giving a net weight reduction and hence better fuel economy.

Comprehensive Materials Processing - 2014-04-07

Comprehensive Materials Processing provides students and professionals with a one-stop resource consolidating and enhancing the literature of the materials processing and manufacturing universe. It provides authoritative analysis of all processes, technologies, and techniques for converting industrial materials from a raw state into finished parts or products. Assisting scientists and engineers in the selection, design, and use of materials, whether in the lab or in industry, it matches the adaptive complexity of emergent materials and processing technologies. Extensive traditional article-level academic discussion of core theories and applications is supplemented by applied case studies and advanced multimedia features. Coverage encompasses the general categories of solidification, powder, deposition, and

deformation processing, and includes discussion on plant and tool design, analysis and characterization of processing techniques, high-temperatures studies, and the influence of process scale on component characteristics and behavior. Authored and reviewed by world-class academic and industrial specialists in each subject field Practical tools such as integrated case studies, user-defined process schemata, and multimedia modeling and functionality Maximizes research efficiency by collating the most important and established information in one place with integrated applets linking to relevant outside sources

Introduction to Polymers - Young 1992-03-15

Introduction to Polymer Science and Chemistry - Manas Chanda 2006-03-28

With such a wide diversity of properties and applications, is it any wonder that industry and academia have such a fascination with polymers? A solid introduction to such an enormous and important field is critical to the modern polymer scientist-to-be, but most of the available books do not stress practical problem solving

or include recent advances. Serving as the polymer book for the new millennium, Introduction to Polymer Science and Chemistry: A Problem Solving Approach unites the fundamentals of polymer science and polymer chemistry in a seamless presentation. Emphasizing polymerization kinetics, the author uses a unique question-and-answer approach when developing theory or introducing new concepts. The first four chapters introduce polymer science, focusing on physical and molecular properties, solution behavior, and molecular weights. The remainder of the book explores polymer chemistry, devoting individual, self-contained chapters to the main types of polymerization reactions: condensation; free radical; ionic; coordination; and ring-opening. It introduces recent advances such as supramolecular polymerization, hyperbranching, photoemulsion polymerization, the grafting-from polymerization process, polymer brushes, living/controlled radical polymerization, and immobilized metallocene catalysts. With numerical problems accompanying the discussion at every step along with numerous end-of-chapter exercises, Introduction to Chemical Polymer Science: A Problem Solving Approach is an ideal introductory text and self-study vehicle for mastering the principles and methodologies of modern polymer science and chemistry.