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Encyclopedia of Chemical Processing - Sunggyu Lee 2006

Supplying nearly 350 expertly-written articles on technologies that can maximize and enhance the research and production phases of current and emerging chemical manufacturing practices and techniques, this second edition provides gold standard articles on the methods, practices, products, and standards recently influencing the chemical industries. New material includes: design of key unit operations involved with chemical processes; design, unit operation, and integration of reactors and separation systems; process system peripherals such as pumps, valves, and controllers; analytical techniques and equipment; current industry practices; and pilot plant design and scale-up criteria.

Principles of Polymer Systems, Sixth Edition - Ferdinand Rodriguez
2014-12-09

Maintaining a balance between depth and breadth, the Sixth Edition of Principles of Polymer Systems continues to present an integrated approach to polymer science and engineering. A classic text in the field, the new edition offers a comprehensive exploration of polymers at a level geared toward upper-level undergraduates and beginning graduate students. Revisions to the sixth edition include: A more detailed discussion of crystallization kinetics, strain-induced crystallization, block copolymers, liquid crystal polymers, and gels New, powerful radical polymerization methods Additional polymerization process flow sheets and discussion of the polymerization of polystyrene and poly(vinyl

chloride) New discussions on the elongational viscosity of polymers and coarse-grained bead-spring molecular and tube models Updated information on models and experimental results of rubber elasticity Expanded sections on fracture of glassy and semicrystalline polymers New sections on fracture of elastomers, diffusion in polymers, and membrane formation New coverage of polymers from renewable resources New section on X-ray methods and dielectric relaxation All chapters have been updated and out-of-date material removed. The text contains more theoretical background for some of the fundamental concepts pertaining to polymer structure and behavior, while also providing an up-to-date discussion of the latest developments in polymerization systems. Example problems in the text help students through step-by-step solutions and nearly 300 end-of-chapter problems, many new to this edition, reinforce the concepts presented.

Principles of Polymer Chemistry - Paul J. Flory 1953

Microscale Organic Laboratory - Dana W. Mayo 2010-01-12

This is a laboratory text for the mainstream organic chemistry course taught at both two and four year schools, featuring both microscale experiments and options for scaling up appropriate experiments for use in the macroscale lab. It provides complete coverage of organic laboratory experiments and techniques with a strong emphasis on modern laboratory instrumentation, a sharp focus on safety in the lab,

excellent pre- and post-lab exercises, and multi-step experiments. Notable enhancements to this new edition include inquiry-driven experimentation, validation of the purification process, and the implementation of greener processes (including microwave use) to perform traditional experimentation.

Principles of Polymer Chemistry - A. Ravve 2000-03-31

Principles of Polymer Chemistry, Second Edition was written for advanced undergraduate and graduate students in polymer chemistry, along with practicing chemists who need a reference guide. Many important events have taken place since the First Edition was published in 1995, and they are updated here. For example, sections have been included on controlled/living free radical polymerization, and sections on metathesis type polymerization and metallocene catalysts were expanded. The book was also expanded to include discussions of thermodynamics of elasticity, thermodynamics of polymeric solutions, and rheology and viscoelasticity. A chapter on degradation of polymers was also added.

Monitoring Polymerization Reactions - Wayne F. Reed 2014-01-21

Offers new strategies to optimize polymer reactions With contributions from leading macromolecular scientists and engineers, this book provides a practical guide to polymerization monitoring. It enables laboratory researchers to optimize polymer reactions by providing them with a better understanding of the underlying reaction kinetics and mechanisms. Moreover, it opens the door to improved industrial-scale reactions, including enhanced product quality and reduced harmful emissions. Monitoring Polymerization Reactions begins with a review of the basic elements of polymer reactions and their kinetics, including an overview of stimuli-responsive polymers. Next, it explains why certain polymer and reaction characteristics need to be monitored. The book then explores a variety of practical topics, including: Principles and applications of important polymer characterization tools, such as light scattering, gel permeation chromatography, calorimetry, rheology, and spectroscopy Automatic continuous online monitoring of polymerization (ACOMP) reactions, a flexible platform that enables characterization

tools to be employed simultaneously during reactions in order to obtain a complete record of multiple reaction features Modeling of polymerization reactions and numerical approaches Applications that optimize the manufacture of industrially important polymers Throughout the book, the authors provide step-by-step strategies for implementation. In addition, ample use of case studies helps readers understand the benefits of various monitoring strategies and approaches, enabling them to choose the best one to match their needs. As new stimuli-responsive and "intelligent" polymers continue to be developed, the ability to monitor reactions will become increasingly important. With this book as their guide, polymer scientists and engineers can take full advantage of the latest monitoring strategies to optimize reactions in both the lab and the manufacturing plant.

Textbook of Polymer Science - Fred W. Billmeyer 1984-03-21

This Third Edition of the classic, best-selling polymer science textbook surveys theory and practice of all major phases of polymer science, engineering, and technology, including polymerization, solution theory, fractionation and molecular-weight measurement, solid-state properties, structure-property relationships, and the preparation, fabrication and properties of commercially-important plastics, fibers, and elastomers.

Encyclopedic Dictionary of Polymers - Jan Woodall Gooch 2007

This reference contains more than 7,500 polymeric material terms, including the names of chemicals, processes, formulae, and analytical methods that are used frequently in the polymer and engineering fields. In view of the evolving partnership between physical and life sciences, this title includes an appendix of biochemical and microbiological terms (thus offering previously unpublished material, distinct from all competitors.) Each succinct entry offers a broadly accessible definition as well as cross-references to related terms. Where appropriate to enhance clarity further, the volume's definitions may also offer equations, chemical structures, and other figures. Please note that this publication is available as print only OR online only OR print + online bundle. It is of special importance for chemists, polymer scientists, materials scientists, chemical engineers, and other academics and

technicians interested in adhesives, coatings, elastomers, inks, plastics, and textiles.

Polymers - Opportunities and Risks I - Peter Eyerer 2010-08-06

Since their first industrial use polymers have gained a tremendous success. The two volumes of "Polymers - Opportunities and Risks" elaborate on both their potentials and on the impact on the environment arising from their production and applications. Volume 11 "Polymers - Opportunities and Risks I: General and Environmental Aspects" is dedicated to the basics of the engineering of polymers – always with a view to possible environmental implications. Topics include: materials, processing, designing, surfaces, the utilization phase, recycling, and depositing. Volume 12 "Polymers - Opportunities and Risks II: Sustainability, Product Design and Processing" highlights raw materials and renewable polymers, sustainability, additives for manufacture and processing, melt modification, biodegradation, adhesive technologies, and solar applications. All contributions were written by leading experts with substantial practical experience in their fields. They are an invaluable source of information not only for scientists, but also for environmental managers and decision makers.

Chemical Reaction Engineering - Martin Schmal 2021-08-15

The first English edition of this book was published in 2014. This book was originally intended for undergraduate and graduate students and had one major objective: teach the basic concepts of kinetics and reactor design. The main reason behind the book is the fact that students frequently have great difficulty to explain the basic phenomena that occur in practice. Therefore, basic concepts with examples and many exercises are presented in each topic, instead of specific projects of the industry. The main objective was to provoke students to observe kinetic phenomena and to think about them. Indeed, reactors cannot be designed and operated without knowledge of kinetics. Additionally, the empirical nature of kinetic studies is recognized in the present edition of the book. For this reason, analyses related to how experimental errors affect kinetic studies are performed and illustrated with actual data. Particularly, analytical and numerical solutions are derived to represent

the uncertainties of reactant conversions in distinct scenarios and are used to analyze the quality of the obtained parameter estimates.

Consequently, new topics that focus on the development of analytical and numerical procedures for more accurate description of experimental errors in reaction systems and of estimates of kinetic parameters have been included in this version of the book. Finally, kinetics requires knowledge that must be complemented and tested in the laboratory. Therefore, practical examples of reactions performed in bench and semi-pilot scales are discussed in the final chapter. This edition of the book has been organized in two parts. In the first part, a thorough discussion regarding reaction kinetics is presented. In the second part, basic equations are derived and used to represent the performances of batch and continuous ideal reactors, isothermal and non-isothermal reaction systems and homogeneous and heterogeneous reactor vessels, as illustrated with several examples and exercises. This textbook will be of great value to undergraduate and graduate students in chemical engineering as well as to graduate students in and researchers of kinetics and catalysis.

Principles of Polymer Chemistry - A. Ravve 2012-05-24

This successful textbook undergoes a change of character in the third edition. Where earlier editions covered organic polymer chemistry, the third edition covers both physical and organic chemistry. Thus kinetics and thermodynamics of polymerization reactions are discussed. This edition is also distinct from all other polymer textbooks because of its coverage of such currently hot topics as photonic polymers, electricity conducting polymers, polymeric materials for immobilization of reagents and drug release, organic solar cells, organic light emitting diodes. This textbook contains review questions at the end of every chapter, references for further reading, and numerous examples of commercially important processes.

Acrylic Fiber Technology and Applications - James Masson 1995-03-07

This work examines the science and technology used in the manufacture of acrylic fibre for both mass-produced commodity products and premium products. It elucidates the chemistry and fibre production

techniques of speciality acrylics such as flame-retardant, water-reversible bicomponent, producer dyed and others. Capacity figures for developing countries are published here.; This work is intended for: polymer, fibre and textile scientists, chemists and engineers; physical and dye chemists; textile company managers; and upper-level undergraduate and graduate students in these disciplines.

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.

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. *Ionizing Radiation Technologies* - Shima Shayanfar 2022-08-02
Ionizing Radiation Technologies An authoritative overview of major advances in the application of ionizing radiation technologies to industrial, agricultural, and municipal waste products In *Ionizing Radiation Technologies: Managing and Extracting Value from Wastes*, a team of expert researchers delivers a broad overview of the value trapped in waste streams and how a strategic application of ionizing

radiation technologies can be valuable from both an environmental and an economic perspective. A valuable addition to the discussions around sustainability and green technologies, the book introduces ionizing radiation technologies, including gamma (cobalt-60) irradiation and high and low energy electron beam technologies. The contributions included explore the major advances taking place in the application of ionizing radiation technologies to derive high value end-products from agricultural, municipal, and industrial wastes. Each chapter reviews original research and data and considers likely future directions in research and development. The book also includes: A thorough introduction to the application of ionizing radiation technologies to agricultural waste, including the production of activated carbon Comprehensive explorations of the application of ionizing radiation technologies to municipal waste, including municipal solid wastes and recycling wastewater Practical discussions of the application of ionizing radiation technologies to industrial waste, including textile wastewater management and polymer recycling In-depth examinations of the economics of waste valorization, including several case studies of businesses involved in waste valorization Perfect for consulting engineers and industry professionals involved in waste management and mitigation, Ionizing Radiation Technologies will also earn a place in the libraries of professionals at government agencies, international food organizations, and NGOs focused on waste management, environment sustainability, and urban planning.

Polyphenols in Plants - Ronald Ross Watson 2018-08-14

Polyphenols in Plants: Isolation, Purification and Extract Preparation, 2nd edition, provides a detailed insight into polyphenols that occur naturally in plants and how they can be affected during growth and development, then effectively removed and optimized for various applications in food production. Historically, plants have been the major sources for drugs and health promotion. While there are a small number of nutrients contained, the growing focus is on the very diverse, complex ring structures: polyphenols that are not nutritious. In order to study or use them in patient treatment, the polyphenols need to be isolated,

identified, and purified for application and study. This book brings together experts in the field who share their ongoing examination of isolation and purification of polyphenols as well as determination of their structures and composition. *Polyphenols in Plants* covers a range of new topics including polyphenols in vegetable waste and agricultural byproducts, extraction methods and characterization of polyphenols, and isolation techniques in the development of new compounds and their use in cancer therapy. This book will be useful to plant scientists and dietary supplement producers, as well as scientists in the food industry and alternative medicine who are interested in the specific health benefits of various dietary extracts and other polyphenol resources. Fully revised and updated to present the latest developments in the field Advances understanding of isolation, characterization, and identification of critical polyphenols vital to industrial development as therapies Defines conditions of growth affecting polyphenol levels Describes techniques critical to identifying and defining polyphenols

Principles of Polymerization - George G. Odian 1970

Extensively updated, *Principles of Polymerization*, Fourth Edition provides an excellent textbook for today's students of polymer chemistry, chemical engineering, and materials science, as well as a current reference for the researcher or other practitioner working in these areas.

Principles of Polymerization - George Odian 2004-02-09

The new edition of a classic text and reference The large chains of molecules known as polymers are currently used in everything from "wash and wear" clothing to rubber tires to protective enamels and paints. Yet the practical applications of polymers are only increasing; innovations in polymer chemistry constantly bring both improved and entirely new uses for polymers onto the technological playing field. *Principles of Polymerization*, Fourth Edition presents the classic text on polymer synthesis, fully updated to reflect today's state of the art. New and expanded coverage in the Fourth Edition includes: * Metallocene and post-metallocene polymerization catalysts * Living polymerizations (radical, cationic, anionic) * Dendrimer, hyperbranched, brush, and other polymer architectures and assemblies * Graft and block copolymers *

High-temperature polymers * Inorganic and organometallic polymers * Conducting polymers * Ring-opening polymerization * In vivo and in vitro polymerization Appropriate for both novice and advanced students as well as professionals, this comprehensive yet accessible resource enables the reader to achieve an advanced, up-to-date understanding of polymer synthesis. Different methods of polymerization, reaction parameters for synthesis, molecular weight, branching and crosslinking, and the chemical and physical structure of polymers all receive ample coverage. A thorough discussion at the elementary level prefaces each topic, with a more advanced treatment following. Yet the language throughout remains straightforward and geared towards the student. Extensively updated, *Principles of Polymerization*, Fourth Edition provides an excellent textbook for today's students of polymer chemistry, chemical engineering, and materials science, as well as a current reference for the researcher or other practitioner working in these areas. **Encyclopedia of Chemical Processing (Online)** - Sunggyu Lee 2005-11-01

This second edition *Encyclopedia* supplies nearly 350 gold standard articles on the methods, practices, products, and standards influencing the chemical industries. It offers expertly written articles on technologies at the forefront of the field to maximize and enhance the research and production phases of current and emerging chemical manufacturing practices and techniques. This collecting of information is of vital interest to chemical, polymer, electrical, mechanical, and civil engineers, as well as chemists and chemical researchers. A complete reconceptualization of the classic reference series the *Encyclopedia of Chemical Processing and Design*, whose first volume published in 1976, this resource offers extensive A-Z treatment of the subject in five simultaneously published volumes, with comprehensive indexing of all five volumes in the back matter of each tome. It includes material on the design of key unit operations involved with chemical processes; the design, unit operation, and integration of reactors and separation systems; process system peripherals such as pumps, valves, and controllers; analytical techniques and equipment; and pilot plant design

and scale-up criteria. This reference contains well-researched sections on automation, equipment, design and simulation, reliability and maintenance, separations technologies, and energy and environmental issues. Authoritative contributions cover chemical processing equipment, engineered systems, and laboratory apparatus currently utilized in the field. It also presents expert overviews on key engineering science topics in property predictions, measurements and analysis, novel materials and devices, and emerging chemical fields. ALSO AVAILABLE ONLINE This Taylor & Francis encyclopedia is also available through online subscription, offering a variety of extra benefits for both researchers, students, and librarians, including: Citation tracking and alerts Active reference linking Saved searches and marked lists HTML and PDF format options Contact Taylor and Francis for more information or to inquire about subscription options and print/online combination packages. US: (Tel) 1.888.318.2367; (E-mail) e-reference@taylorandfrancis.com International: (Tel) +44 (0) 20 7017 6062; (E-mail) online.sales@tandf.co.uk

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

Encyclopedia of Supramolecular Chemistry - J. L. Atwood 2004 Covers the fundamentals of supramolecular chemistry; supramolecular advancements and methods in the areas of chemistry, biochemistry, biology, environmental and materials science and engineering, physics, computer science, and applied mathematics.

Principles of Polymer Design and Synthesis - Wei-Fang Su 2013-10-09 How can a scientist or engineer synthesize and utilize polymers to solve our daily problems? This introductory text, aimed at the advanced undergraduate or graduate student, provides future scientists and engineers with the fundamental knowledge of polymer design and

synthesis to achieve specific properties required in everyday applications. In the first five chapters, this book discusses the properties and characterization of polymers, since designing a polymer initially requires us to understand the effects of chemical structure on physical and chemical characteristics. Six further chapters discuss the principles of polymerization reactions including step, radical chain, ionic chain, chain copolymerization, coordination and ring opening. Finally, material is also included on how commonly known polymers are synthesized in a laboratory and a factory. This book is suitable for a one semester course in polymer chemistry and does not demand prior knowledge of polymer science.

Fundamentals of Polymer Engineering, Revised and Expanded -

Anil Kumar 2003-01-21

Exploring the characterization, thermodynamics and structural, mechanical, thermal and transport behavior of polymers as melts, solutions and solids, this text covers essential concepts and breakthroughs in reactor design and polymer production and processing. It contains modern theories, end-of-chapter problems and real-world examples for a clear understanding of polymer function and development. *Fundamentals of Polymer Engineering, Second Edition* provides a thorough grounding in the fundamentals of polymer science for more advanced study in the field of polymers. Topics include reaction engineering of step-growth polymerization, emulsion polymerization, and polymer diffusion.

Inorganic Polymers - James E. Mark 2005-04-21

Polymer chemistry and technology form one of the major areas of molecular and materials science. This field impinges on nearly every aspect of modern life, from electronics technology, to medicine, to the wide range of fibers, films, elastomers, and structural materials on which everyone depends. Although most of these polymers are organic materials, attention is being focused increasingly toward polymers that contain inorganic elements as well as organic components. The goal of *Inorganic Polymers* is to provide a broad overview of inorganic polymers in a way that will be useful to both the uninitiated and those already

working in this field. There are numerous reasons for being interested in inorganic polymers. One is the simple need to know how structure affects the properties of a polymer, particularly outside the well-plowed area of organic materials. Another is the bridge that inorganic polymers provide between polymer science and ceramics. More and more chemistry is being used in the preparation of ceramics of carefully controlled structure, and inorganic polymers are increasingly important precursor materials in such approaches. This new edition begins with a brief introductory chapter. That is followed with a discussion of the characteristics and characterization of polymers, with examples taken from the field. Other chapters in the book detail the synthesis, reaction chemistry, molecular structure, and uses of polyphosphazenes, polysiloxanes, and polysilanes. The coverage in the second edition has been updated and expanded significantly to cover advances and interesting trends since the first edition appeared. Three new chapters have been added, focusing on ferrocene-based polymers, other phosphorous-containing polymers, and boron-containing polymers; inorganic-organic hybrid composites; and preceramic inorganic polymers.

Macromolecular Design of Polymeric Materials - Hatada 1997-01-02

Providing a range of information on polymers and polymerization techniques, this text covers the gamut of polymer science from synthesis, structure and properties to function and applications. It analyzes speciality polymers, including acrylics, fluoropolymers, polysilanes, polyphosphazenes, and inorganic and conducting polymers. The book examines the stereochemistry of polymerization and the stereoregularity of polymers.

Principles of Polymer Engineering - N. G. McCrum 1997

Polymers have an important role in manufacturing and their engineering properties form an important part of any course in engineering. This revised and updated second edition develops the principles of polymer engineering from the underlying materials science, and is aimed at undergraduate and postgraduate students in engineering and materials science. The opening chapters explain why plastics and rubbers have

such distinctive properties and how these are affected by temperature, strain rate, and other factors. The book then explores how these properties can be exploited within these property constraints to produce functional components. Major changes for this second edition include an introductory chapter on the environmental impact of polymers, emphasizing the important issues, and substantially revised sections on fracture testing for toughened polymers, yield, processing, heat transfer, and polymer forming.

The Handy Chemistry Answer Book - Justin P. Lomont 2013-10-01
Simplifying the complex chemical reactions that take place in everyday through the well-stated answers for more than 600 common chemistry questions, this reference is the go-to guide for students and professionals alike. The book covers everything from the history, major personalities, and groundbreaking reactions and equations in chemistry to laboratory techniques throughout history and the latest developments in the field. Chemistry is an essential aspect of all life that connects with and impacts all branches of science, making this readable resource invaluable across numerous disciplines while remaining accessible at any level of chemistry background. From the quest to make gold and early models of the atom to solar cells, bio-based fuels, and green chemistry and sustainability, chemistry is often at the forefront of technological change and this reference breaks down the essentials into an easily understood format.

Principles of Polymerization - George G. Odian 1981
Extensively updated, *Principles of Polymerization*, Fourth Edition provides an excellent textbook for today's students of polymer chemistry, chemical engineering, and materials science, as well as a current reference for the researcher or other practitioner working in these areas.

Polymer Chemistry - Fred J. Davis 2004-09-30
This book has been designed to appeal to both chemists working in, and new to, the area of polymer synthesis. It contains detailed instructions for the preparation of a wide-range of polymers by a wide variety of different techniques, and describes how this synthetic methodology can be applied to the development of new materials. It includes details of

well-established techniques, e.g. chain-growth or step-growth processes together with more up-to-date examples using methods such as atom-transfer radical polymerisation. Less-well known procedures are also included, e.g. electrochemical synthesis of conducting polymers and the preparation of liquid crystalline elastomers with highly ordered structures. Other topics covered include general polymerisation methodology, controlled/'living' polymerisation methods, the formation of cyclic oligomers during step-growth polymerisation, the synthesis of conducting polymers based on heterocyclic compounds, dendrimers, the preparation of imprinted polymers and liquid crystalline polymers. The main bulk of the text is preceded by an introductory chapter detailing some of the techniques available to the scientist for the characterisation of polymers, both in terms of their chemical composition and in terms of their properties as materials. The book is intended not only for the specialist in polymer chemistry, but also for the organic chemist with little experience who requires a practical introduction to the field.

Principles of Polymerization - George Odian 2004-03-25
The new edition of a classic text and reference The large chains of molecules known as polymers are currently used in everything from "wash and wear" clothing to rubber tires to protective enamels and paints. Yet the practical applications of polymers are only increasing; innovations in polymer chemistry constantly bring both improved and entirely new uses for polymers onto the technological playing field. *Principles of Polymerization*, Fourth Edition presents the classic text on polymer synthesis, fully updated to reflect today's state of the art. New and expanded coverage in the Fourth Edition includes: * Metallocene and post-metallocene polymerization catalysts * Living polymerizations (radical, cationic, anionic) * Dendrimer, hyperbranched, brush, and other polymer architectures and assemblies * Graft and block copolymers * High-temperature polymers * Inorganic and organometallic polymers * Conducting polymers * Ring-opening polymerization * In vivo and in vitro polymerization Appropriate for both novice and advanced students as well as professionals, this comprehensive yet accessible resource enables the reader to achieve an advanced, up-to-date understanding of

polymer synthesis. Different methods of polymerization, reaction parameters for synthesis, molecular weight, branching and crosslinking, and the chemical and physical structure of polymers all receive ample coverage. A thorough discussion at the elementary level prefaces each topic, with a more advanced treatment following. Yet the language throughout remains straightforward and geared towards the student. Extensively updated, *Principles of Polymerization*, Fourth Edition provides an excellent textbook for today's students of polymer chemistry, chemical engineering, and materials science, as well as a current reference for the researcher or other practitioner working in these areas.

Principles of Polymerization - George Odian 1991-11

Describes the physical and organic chemistry of the reactions by which polymer molecules are synthesized. Begins by introducing the characteristics which distinguish polymers from their much smaller sized homologs. Proceeds to a detailed study of three types of polymerization reactions: step, chain and ring-opening. Reactions are characterized as to their kinetic and thermodynamic features, their scope and utility for synthesis of different types of polymer structures, and the process conditions which are used to carry them out. Assumes a background in organic and physical chemistry and can serve as either a self-teaching guide to polymers for the beginner or as a handy reference for the experienced polymer chemist. Each chapter includes a selection of problems to aid learning and a solutions manual is available on request.

Structured Fluids - Thomas A. Witten 2010-01-07

Over the last thirty years, the study of liquids containing polymers, surfactants, or colloidal particles has developed from a loose assembly of facts into a coherent discipline with substantial predictive power. These liquids expand our conception of what condensed matter can do. Such structured-fluid phenomena dominate the physical environment within living cells. This book teaches how to think of these fluids from a unified point of view, showing the far-reaching effects of thermal fluctuations in producing forces and motions. Keeping mathematics to a minimum, the book seeks the simplest explanations that account for the distinctive scaling properties of these fluids. An example is the growth of viscosity of

a polymer solution as the cube of the molecular weight of the constituent polymers. Another is the hydrodynamic radius of a colloidal aggregate, which remains comparable to its geometrical radius even though the density of particles in the aggregate becomes arbitrarily small. The book aims for a simplicity, unity and depth not found in previous treatments. The text is supplemented by numerous figures, tables and problems to aid the student.

Polymerization Process Modeling - N. A. Dotson 1996-12-17

Large numbers of chemical engineers work with polymerization reactions and the problems and the challenges particular to the production of polymers. These problems have no counterparts in small-molecule reactions, and thus usually are neglected in standard reactor courses. This book provides a clearly written, comprehensive textbook on polymerization reactor engineering, appropriate for senior-level undergraduate and 1st- and 2nd-year graduate students. It focuses on polymer structure and structure-property relationships conditions that can play a role in dictating structure.

The Chemistry of Polymers - John W Nicholson 2007-10-31

"The Chemistry of Polymers is a concise, easy-to-read, inexpensive introduction to the subject and fulfils the need for a polymer text written from an applied angle. It covers the basics of polymer chemistry while emphasising the practical applications and is essential for those who wish to acquire a rapid overview of the field. This book covers the basics of polymer synthesis, characterisation, reaction kinetics and materials science, as well as important specialised topics such as polymer degradation, polymers and pollution, and a variety of technological developments. Now in its second edition, the book has been revised and expanded to reflect recent developments in the subject. There are, for example, extensive updates to the "Special topics in polymer chemistry" section, with an additional section on optically active polymers, expanded sections on ionic and co-ordination polymerisations, and copolymerisation, and additional examples of new environmental legislation are outlined wherever appropriate."

Handbook on Applications of Ultrasound - Dong Chen 2011-07-26

Ultrasonic irradiation and the associated sonochemical and sonophysical effects are complementary techniques for driving more efficient chemical reactions and yields. Sonochemistry—the chemical effects and applications of ultrasonic waves—and sustainable (green) chemistry both aim to use less hazardous chemicals and solvents, reduce energy consumption, and increase product selectivity. A comprehensive collection of knowledge, *Handbook on Applications of Ultrasound* covers the most relevant aspects linked to and linking green chemistry practices to environmental sustainability through the uses and applications of ultrasound-mediated and ultrasound-assisted biological, biochemical, chemical, and physical processes. Chapters are presented in the areas of: Medical applications Drug and gene delivery Nanotechnology Food technology Synthetic applications and organic chemistry Anaerobic digestion Environmental contaminants degradation Polymer chemistry Industrial syntheses and processes Reactor design Electrochemical systems Combined ultrasound–microwave technologies While the concepts of sonochemistry have been known for more than 80 years, in-depth understanding of this phenomenon continues to evolve. Through a review of the current status of chemical and physical science and engineering in developing more environmentally friendly and less toxic synthetic processes, this book highlights many existing applications and the enormous potential of ultrasound technology to upgrade present industrial, agricultural, and environmental processes.

Azo Polymers - Xiaogong Wang 2016-10-19

This book explores functional polymers containing aromatic azo chromophores in side-chain, main-chain and other parts of their structures, known as azo polymers and which share common photoresponsive properties. It focuses on the molecular architecture of azo polymers, the synthetic methods and their most important functions, such as photoinduced birefringence and dichroism, surface-relief-grating (SRG) formation, and light-driven deformation of liquid crystal elastomers. It combines a general survey of the subject and in-depth discussions of each topic, including numerous illustrations, figures, and photographs. Offering a balance between an introduction to the core

concepts and a snapshot of hot and emerging topics, it is of interest to graduate students and researchers working in this and related fields.

Xiaogong Wang is a Professor at the Department of Chemical Engineering, Tsinghua University, China.

Tissue Engineering - W. Mark Saltzman 2004-07-15

Tissue or organ transplantation are among the few options available for patients with excessive skin loss, heart or liver failure, and many common ailments, and the demand for replacement tissue greatly exceeds the supply, even before one considers the serious constraints of immunological tissue type matching to avoid immune rejection. Tissue engineering promises to help sidestep constraints on availability and overcome the scientific challenges, with huge medical benefits. This book lays out the principles of tissue engineering. It will be a useful reference work for those associated with this field and as a textbook for specialized courses in the subject. It is a companion volume to Saltzman's OUP book on drug delivery.

Handbook of Pyrrolidone and Caprolactam Based Materials, 6 Volume Set - Osama M. Musa 2021-07-06

HANDBOOK OF PYRROLIDONE AND CAPROLACTAM BASED MATERIALS Brings together, for the first time, a comprehensive review of all aspects of pyrrolidone- and caprolactam-based materials This comprehensive, six-volume set describes the broad technical universe of γ - and ϵ - lactams, reviewing in-depth the chemistry of the small lactam-based molecules, uncovering their unique properties and showing how they have enabled a myriad of commercially important applications. From synthesis, through production and into applications, this extensive work targets significant and recent trends in γ - and ϵ -lactam science and technology and addresses all key aspects of pyrrolidone- and caprolactam-based materials to produce a definitive overview of the field. Handbook of Pyrrolidone and Caprolactam Based Materials provides a detailed and modern portrait of the impact of pyrrolidone- and caprolactam-based materials on the world, as well as potential future possibilities. Volume One presents the chemistry of small lactam-based molecules and uncovers their unique properties. Volume Two covers

polymeric materials, including polyvinyl pyrrolidone and polyvinyl caprolactam, and reviews homopolymerization, copolymerization, controlled radical polymerization and acrylate based pyrrolidone polymerizations. Volume Three examines the physical chemistry and molecular interactions of pyrrolidone and caprolactam based materials. Volume Four expands upon the characterization theme from the third volume, and includes detailed discussions of nuclear magnetic resonance (NMR) and Fourier transform-infrared (FT-IR) spectroscopy, thermal and mechanical properties, and imaging techniques. Volume Five explores pharmaceutical applications in both ingredients and materials, as well as the antimicrobial properties and applications of pyrrolidone and caprolactam-based materials, and their toxicology. Volume Six covers personal and home care, skin care, transdermal applications and wound care, oral care, adhesion related applications and digital applications such as inkjet technology. Handbook of Pyrrolidone and Caprolactam Based Materials will appeal to industrial scientists and engineers interested in polymer development and manufacturing. It will also benefit academic researchers working in the fields of chemistry, materials science, and chemical and process engineering.

Polymer Solutions - Iwao Teraoka 2004-04-07

Polymer Solutions: An Introduction to Physical Properties offers a fresh, inclusive approach to teaching the fundamentals of physical polymer science. Students, instructors, and professionals in polymer chemistry, analytical chemistry, organic chemistry, engineering, materials, and

textiles will find Iwao Teraoka's text at once accessible and highly detailed in its treatment of the properties of polymers in the solution phase. Teraoka's purpose in writing Polymer Solutions is twofold: to familiarize the advanced undergraduate and beginning graduate student with basic concepts, theories, models, and experimental techniques for polymer solutions; and to provide a reference for researchers working in the area of polymer solutions as well as those in charge of chromatographic characterization of polymers. The author's incorporation of recent advances in the instrumentation of size-exclusion chromatography, the method by which polymers are analyzed, renders the text particularly topical. Subjects discussed include: Real, ideal, Gaussian, semirigid, and branched polymer chains Polymer solutions and thermodynamics Static light scattering of a polymer solution Dynamic light scattering and diffusion of polymers Dynamics of dilute and semidilute polymer solutions Study questions at the end of each chapter not only provide students with the opportunity to test their understanding, but also introduce topics relevant to polymer solutions not included in the main text. With over 250 geometrical model diagrams, Polymer Solutions is a necessary reference for students and for scientists pursuing a broader understanding of polymers.

Encyclopedic Dictionary of Polymers - Jan W. Gooch 2010-11-08

This is the first complete book of polymer terminology ever published. It contains more than 7,500 polymeric material terms. Supplementary electronic material brings important relationships to life, and audio supplements include pronunciation of each term.