

Fundamentals Of Polymer Science

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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.
Thermal Analysis - T. Hatakeyama 1999-05-04
Thermal Analysis Fundamentals and Applications to Polymer Science T. Hatakeyama Otsuma Women's University, Tokyo, Japan F. X. Quinn L'Oréal Recherche Avancée, Aulnay-sous-Bois, France The first edition of this classic book remains one of the very few introductory books covering both theoretical and practical aspects of thermal analysis (TA). This new edition includes a much enlarged section on MDSC, in which the instrument is described and a critical appraisal of the technique presented. Other additions include new sections on rate-controlled TGA, OTTER, and Specific Heat Spectroscopy, and a thoroughly updated section

on X-Ray DSC. This very practical book is a must for people who use thermal analysis techniques in their everyday work. "An excellent introductory text" - Review of 1st Edition.
Fundamentals of Polymer Science for Engineers - Stoyko Fakirov 2017-12-04
Fundamentals of Polymer Science for Engineers Filling a gap in the market, this textbook provides a concise, yet thorough introduction to polymer science for advanced engineering students and practitioners, focusing on the chemical, physical and materials science aspects that are most relevant for engineering applications. After covering polymer synthesis and properties, the major section of the book is devoted to polymeric materials, such as thermoplastics and polymer composites, polymer processing such as injection molding and extrusion, and methods for large-scale polymer characterization. The text concludes with an overview of engineering plastics. The emphasis throughout is on application-relevant topics, and the author focuses on real-life, industry-relevant polymeric materials.
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.

Fundamentals of Polymer Science - Michael M. Coleman 1996-07-01

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.

Fundamentals and Recent Advances in Nanocomposites Based on Polymers and Nanocellulose - Md Rezaur Rahman 2021-10-05

Fundamentals and Recent Advances in Nanocomposites Based on Polymers and Nanocellulose brings together the latest research in cellulose-based nanocomposites, covering fundamentals, processing, properties, performance, applications, and the state of the art. The book begins by explaining the fundamentals of cellulose and cellulose-based nanocomposites, including sources, extraction, types, classification, linkages, model structure, model compounds, and characterization techniques. The second part of the book covers the incorporation of cellulose fillers to improve the properties or characteristics of nanocomposites, organized by composite category, including in aerogels, thermoplastic composites, thermoset composites, bioplastic composites, carbon nanofibers, rubber composites, carbon fibers, and foaming materials. Throughout these chapters, there is an emphasis on the latest innovations and application potential. Finally, applications are explored in more detail, notably focusing on the utilization of nanocellulose in biodegradable composites for biomedical applications, along with other important industrial application areas. This book is of great interest to

researchers, scientists, and advanced students working with bio-based materials, and across polymer science, nanomaterials, composite materials, plastics engineering, chemical engineering, materials science and engineering, as well as R&D professionals, engineers, and industrialists interested in the development of bio-based materials for advanced applications or material commercialization. Presents the fundamentals of cellulose-based nanocomposites, including sources, extraction, types, classification, linkages, structure, compounds, and characterization. Discusses and analyzes the most suitable fabrication methods and processing techniques for cellulose as a reinforcement in a range of composites. Opens the door to a range of cutting-edge applications and considers key aspects such as cost, lifecycle, and biodegradability.

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. *Reactive Polymers Fundamentals and Applications* - Johannes Karl Fink 2013-04-11
The use of reactive polymers enables manufacturers to make chemical changes at a

late stage in the production process—these in turn cause changes in performance and properties. Material selection and control of the reaction are essential to achieve optimal performance. The second edition of *Reactive Polymers Fundamentals and Applications* introduces engineers and scientists to the range of reactive polymers available, explains the reactions that take place, and details applications and performance benefits. Basic principles and industrial processes are described for each class of reactive resin (thermoset), as well as additives, the curing process, and applications and uses. The initial chapters are devoted to individual resin types (e.g. epoxides, cyanacrylates, etc.); followed by more general chapters on topics such as reactive extrusion and dental applications. Material new to this edition includes the most recent developments, applications and commercial products for each chemical class of thermosets, as well as sections on fabrication methods, reactive biopolymers, recycling of reactive polymers, and case studies. Injection molding of reactive polymers, radiation curing, thermosetting elastomers, and reactive extrusion equipment are all covered as well. Most comprehensive source of information about reactive polymers Covers basics as well as most recent developments, including reactive biopolymers, recycling of reactive polymers, nanocomposites, and fluorosilicones
Indispensable guide for engineers and advanced students alike—providing extensive literature and patent review

Fundamental Principles of Polymeric Materials - Christopher S. Brazel 2012-05-22

New edition brings classic text up to date with the latest science, techniques, and applications With its balanced presentation of polymer chemistry, physics, and engineering applications, the Third Edition of this classic text continues to instill readers with a solid understanding of the core concepts underlying polymeric materials. Both students and instructors have praised the text for its clear explanations and logical organization. It begins with molecular-level considerations and then progressively builds the reader's knowledge with discussions of bulk properties, mechanical behavior, and processing methods. Following a brief introduction, *Fundamental Principles of*

Polymeric Materials is divided into four parts:
Part 1: Polymer Fundamentals Part 2: Polymer Synthesis Part 3: Polymer Properties Part 4: Polymer Processing and Performance

Thoroughly Updated and Revised Readers familiar with the previous edition of this text will find that the organization and style have been updated with new material to help them grasp key concepts and discover the latest science, techniques, and applications. For example, there are new introductory sections on organic functional groups focusing on the structures found in condensation polymerizations. The text also features new techniques for polymer analysis, processing, and microencapsulation as well as emerging techniques such as atom transfer radical polymerization. At the end of each chapter are problems—including many that are new to this edition—to test the reader's grasp of core concepts as they advance through the text. There are also references leading to the primary literature for further investigation of individual topics. A classic in its field, this text enables students in chemistry, chemical engineering, materials science, and mechanical engineering to fully grasp and apply the fundamentals of polymeric materials, preparing them for more advanced coursework.

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.

Fundamentals of Controlled/living Radical Polymerization - Nicolay V. Tsarevsky 2013

Provides an in-depth history, description, and mechanistic understanding of each of the controlled/living radical polymerization techniques and practical details necessary to carry out the reactions.

Introduction to Polymer Chemistry - Judit E. Puskas, Ph.D 2013-11-18

Fundamental concepts and reactions explained through polymers from plants and animals

Macromolecular structures introduced via biological polymers

Includes a course syllabus, study questions and exercises

Extensive lab guidance and protocols for DNA isolation, amplification using PCR

Full color figures shown throughout the text

This book connects modern synthetic polymer chemistry to its roots by exploring the chemistry of natural polymers and self-assembled macromolecular structures.

Designed to introduce students to the basics of polymer science, the text investigates intermolecular forces, functional groups and key reactions by means of polymers found in, and produced by, living plants and animals, including proteins, rubber, DNA, fibers, lignin, carbohydrates and many others. The author explains how varied natural polymeric systems illustrate a wide array of fundamental polymer concepts. Key analogies are demonstrated between mechanisms in biological and synthetic polymerization, and the text uses growth, DNA replication, self-assembly and other biological processes to assist the student in mastering the terminology and molecular-level mechanisms of polymer chemistry. To guide both instructors and students the book includes the outline of a one-semester course syllabus, end-of-chapter questions, as well as detailed instructions for setting up multiple labs dealing with gene isolation and amplification using polymerase chain reaction techniques (PCR). Each chapter also offers exercises based on real-world examples.

Fundamentals of Polymer Physics and Molecular Biophysics - Himadri B. Bohidar 2015-01-05

"Provides a physical interpretation of the data obtained in macromolecular transport phenomena in a given system and also addresses some important issues and concepts related to biopolymers such as proteins and nucleic acids"-

Radiation Curing in Polymer Science and Technology - Jean-Pierre Fouassier 1993-07-31

Volume one deals primarily with the basic principles of radiation curing: UV-curing; EB-curing; microwave curing; oligomer/resin technology; chemistry of imaging science; testing methods; equipment; coatings applications and emerging trends in photopolymers for holographic recording and laser induced reactions.

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 Degradation and Stabilization - N.S. Allen 1992-10-31

During the past decade, the field of polymer degradation and stabilization has become a subject of central importance in polymer science and technology. This book provides a fundamental source of information designed for those with only a basic understanding of the background of the field.

Thermal Analysis - T. Hatakeyama 1994-11-29
This textbook provides newcomers to Thermal

Analysis with a comprehensive introduction to the basic principles of the technique, such as instrument operation, sample preparation, optimization of operating conditions and a guide to interpreting results. The principal techniques are covered and their performance evaluated, and throughout the emphasis is on the practicalities, with the mathematics kept to a minimum.

Polymers and Light - Wolfram Schnabel 2007-06-27

This first book to focus on the important and topical effect of light on polymeric materials reflects the multidisciplinary nature of the topic, building a bridge between polymer chemistry and physics, photochemistry and photophysics, and materials science. Written by one experienced author, a consistent approach is maintained throughout, covering such applications as nonlinear optical materials, core materials for optical waveguides, photoresists in the production of computer chips, photoswitches and optical memories. Advanced reading for polymer, physical and organic chemists, manufacturers of optoelectronic devices, chemical engineers, and materials scientists.

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
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
Fundamentals of Polymer Science for Non-chemists - Gurusamy Manivannan 1996

Fundamentals of Polymer Science and Technology Solutions Manual - Paul C. Painter 1997

Printing on Polymers - Joanna Izdebska 2015-09-24

Printing on Polymers: Fundamentals and

Applications is the first authoritative reference covering the most important developments in the field of printing on polymers, their composites, nanocomposites, and gels. The book examines the current state-of-the-art and new challenges in the formulation of inks, surface activation of polymer surfaces, and various methods of printing. The book equips engineers and materials scientists with the tools required to select the correct method, assess the quality of the result, reduce costs, and keep up-to-date with regulations and environmental concerns. Choosing the correct way of decorating a particular polymer is an important part of the production process. Although printing on polymeric substrates can have desired positive effects, there can be problems associated with various decorating techniques. Physical, chemical, and thermal interactions can cause problems, such as cracking, peeling, or dulling. Safety, environmental sustainability, and cost are also significant factors which need to be considered. With contributions from leading researchers from industry, academia, and private research institutions, this book serves as a one-stop reference for this field—from print ink manufacture to polymer surface modification and characterization; and from printing methods to applications and end-of-life issues. Enables engineers to select the correct decoration method for each material and application, assess print quality, and reduce costs Increases familiarity with the terminology, tests, processes, techniques, and regulations of printing on plastic, which reduces the risk of adverse reactions, such as cracking, peeling, or dulling of the print Addresses the issues of environmental impact and cost when printing on polymeric substrates Features contributions from leading researchers from industry, academia, and private research institutions

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.

Fundamentals of Polymer Engineering - Arie Ram 2013-11-11

W ALL ARE SURROUNDED by plastic materials and cannot imagine modern life and utilities without the synthetic polymers. And yet, how many of us can distinguish between polyethylene and PVC? After all, most people name any polymer as "Nylon." /I Is there any distinction between polymers and plastics? This introductory textbook tries to answer these questions and many others. It endeavors to provide the basic information required in modern life about the best utilization of new materials in the plastics era; the chemical sources of synthetic polymers, and the processes in which small "simple" molecules are converted to giant macromolecules, namely, high polymers; and the understanding of the role of these unique structures, their behavior and performance, their mechanical and thermal properties, flow and deformation. As we are mainly interested in the final product, the processing of plastics, through shaping and forming, presents a significant challenge to polymer engineering. All this is broadly discussed, ending with modern issues like composites, ecology and future prediction, followed by up-to-date information and data about old as well as novel high performance polymers. The text is particularly targeted towards senior students of science and engineering (chemical, material, mechanical and others) who may use it as the first window to the world of polymers. At the same time many professionals who are involved in the resin or plastics industry may prefer this approach without elaborate math or overloading.

Polymer Physics - Ulf Gedde 2014-09-01

Polymers and Light - Thomas Lippert 2004-03-23
S. Georgiou: Laser Cleaning Methodologies of Polymer Substrates; T. Lippert: Laser Application of Polymers; J. Krueger, W. Kautek: Ultrashort Pulse Laser Interactions with

Polymers and Dielectrics; Y. Zhang: Synchrotron Radiation Direct Photo-Etching of Polymers.

Fundamentals of Polymer-Clay

Nanocomposites - Gary W. Beall 2011-07-07
Written for graduate students, researchers, and practitioners, this book provides a complete introduction to the science, engineering, and commercial applications of polymer-clay nanocomposites. Starting with a discussion of general concepts, the authors define specific terms used in the field, providing newcomers with a strong foundation to the area. The physical and mechanical properties of polymer-clay nanocomposites are then described, with chapters on thermodynamics and kinetics, engineering properties, barrier properties, and flame retardancy. Mechanisms underpinning observed effects, such as UV resistance, solvent resistance, and hardness, are also explained. In-depth discussions of clay and clay surface treatment, fabrication, and characterization of nanocomposites are provided, and particular emphasis is placed on the proper use and interpretation of analytical techniques, helping readers to avoid artifacts in their own work. With commercial applications discussed throughout, and experimental results connected with theory, this is an ideal reference for those working in polymer science.

Fundamentals of Polymerization - Broja Mohan Mandal 2013

Over the last twenty years, the field of the chemistry of polymerization witnessed enormous growth through the development of new concepts, catalysts, processes etc. Examples are: non classical living polymerizations (group transfer polymerization, living carbocationic polymerization, living radical polymerization and living ring-opening metathesis polymerization (ROMP)); new catalysts (metallocenes and late transition metal catalysts for stereospecific polymerization, Schrock and Grubbs catalyst for ROMP among others) and new processes such as miniemulsion, microemulsion polymerization and dispersion polymerization (in polar solvents). Apart from the developments in the chemistry of polymerization, methods have been developed for the evaluation of highly reliable rate constants of propagation in radical as well as cationic polymerization. All these have revolutionized the field of synthetic polymer

chemistry. In the book, fundamentals of both the new and old polymerization chemistry have been dealt with. The new chemistry has been given nearly equal space along with the old.

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. *Polymer Science and Nanotechnology* - Ravin Narain 2020-06-16

Polymer Science and Nanotechnology: Fundamentals and Applications brings together the latest advances in polymer science and nanoscience. Sections explain the fundamentals of polymer science, including key aspects and methods in terms of molecular structure, synthesis, characterization, microstructure, phase structure and processing and properties before discussing the materials of particular interest and utility for novel applications, such as hydrogels, natural polymers, smart polymers

and polymeric biomaterials. The second part of the book examines essential techniques in nanotechnology, with an emphasis on the utilization of advanced polymeric materials in the context of nanoscience. Throughout the book, chapters are prepared so that materials and products can be geared towards specific applications. Two chapters cover, in detail, major application areas, including fuel and solar cells, tissue engineering, drug and gene delivery, membranes, water treatment and oil recovery. Presents the latest applications of polymers and polymeric nanomaterials, across energy, biomedical, pharmaceutical, and environmental fields Contains detailed coverage of polymer nanocomposites, polymer nanoparticles, and hybrid polymer-metallic nanoparticles Supports an interdisciplinary approach, enabling readers from different disciplines to understand polymer science and nanotechnology and the interface between them

Nitroxide Mediated Polymerization - Didier Gigmes 2016

The first book dedicated to nitroxide-mediated polymerization and covers the history and development of NMP, as well as current techniques of academic and industrial interest.

Introduction to Physical Polymer Science - Leslie H. Sperling 2005-12-07

An Updated Edition of the Classic Text Polymers constitute the basis for the plastics, rubber, adhesives, fiber, and coating industries. The Fourth Edition of Introduction to Physical Polymer Science acknowledges the industrial success of polymers and the advancements made in the field while continuing to deliver the comprehensive introduction to polymer science that made its predecessors classic texts. The Fourth Edition continues its coverage of amorphous and crystalline materials, glass transitions, rubber elasticity, and mechanical behavior, and offers updated discussions of polymer blends, composites, and interfaces, as well as such basics as molecular weight determination. Thus, interrelationships among molecular structure, morphology, and mechanical behavior of polymers continue to provide much of the value of the book. Newly introduced topics include: Nanocomposites, including carbon nanotubes and exfoliated montmorillonite clays The structure, motions,

and functions of DNA and proteins, as well as the interfaces of polymeric biomaterials with living organisms The glass transition behavior of nano-thin plastic films In addition, new sections have been included on fire retardancy, friction and wear, optical tweezers, and more.

Introduction to Physical Polymer Science, Fourth Edition provides both an essential introduction to the field as well as an entry point to the latest research and developments in polymer science and engineering, making it an indispensable text for chemistry, chemical engineering, materials science and engineering, and polymer science and engineering students and professionals.

Solid State Polymerization - Constantine D. Papaspyrides 2009-04-27

The most current guide to solid state polymerization Solid State Polymerization (SSP) is an indispensable tool in the design, manufacture, and study of polymers, plastics, and fibers. SSP presents significant advantages over other polymerization techniques due to low operating temperatures, inexpensive equipment, and simple and environmentally sound procedures. Combining fundamentals of polymer science, chemistry, physical chemistry, and engineering, SSP also offers many research applications for a wide range of students and investigators. Gathering and filtering the latest literature on SSP, Solid State Polymerization offers a unique, one-stop resource on this important process. With chapters contributed by leaders in the field, this text summarizes SSP, and provides essential coverage that includes: An introduction to SSP, with chemical and physical steps, apparatus, advantages, and parameters SSP physical chemistry and mechanisms Kinetic aspects of polyesters and polyamides SSP Catalysis in SSP processes Application of SSP under high pressure conditions in the laboratory Engineering aspects regarding process modeling and industrial application Recent developments and future possibilities Solid State Polymerization provides the most up-to-date coverage of this constantly developing field to academic and industry professionals, as well as graduate and postgraduate-level students in chemical engineering, materials science and engineering, polymer chemistry, polymer processing and polymer engineering.

Principles of Polymer Chemistry - Paul J. Flory 1953

Essentials of Polymer Science and Engineering - Paul C. Painter 2009

"Written by two of the best-known scientists in the field, Paul C. Painter and Michael M. Coleman, this unique text helps students, as well as professionals in industry, understand the science, and appreciate the history, of polymers. Composed in a witty and accessible style, the book presents a comprehensive account of polymer chemistry and related engineering concepts, highly illustrated with worked problems and hundreds of clearly explained formulas. In contrast to other books, 'Essentials' adds historical information about polymer science and scientists and shows how laboratory discoveries led to the development of modern plastics."--DEStech Publications web-site.

Fundamentals of Polymer Science and Engineering - Anil Kumar 1981

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.

Fundamental Polymer Science - Ulf W. Gedde 2019-12-20

This successor to the popular textbook, "Polymer Physics" (Springer, 1999), is the result of a quarter-century of teaching experience as well as critical comments from specialists in the various sub-fields, resulting in better explanations and more complete coverage of key topics. With a new chapter on polymer synthesis, the perspective has been broadened significantly to encompass polymer science rather than "just" polymer physics. Polysaccharides and proteins are included in essentially all chapters, while polyelectrolytes are new to the second edition. Cheap computing power has greatly expanded the role of simulation and modeling in the past two decades, which is reflected in many of the chapters. Additional problems and carefully prepared graphics aid in understanding. Two principles are key to the textbook's appeal: 1) Students learn that, independent of the origin of the polymer, synthetic or native, the same general laws apply, and 2) students should benefit from the book without an extensive knowledge of mathematics. Taking the reader from the basics to an advanced level of understanding, the text meets the needs of a wide range of students in chemistry, physics, materials science, biotechnology, and civil engineering, and is suitable for both masters- and doctoral-level students. Praise for the previous edition: ...an excellent book, well written, authoritative, clear and concise, and copiously illustrated with appropriate line drawings, graphs and tables. - Polymer International ...an extremely useful book. It is a pleasure to recommend it to physical chemists and materials scientists, as well as physicists interested in the properties of polymeric materials. - Polymer News This valuable book is ideal for those who wish to get a brief background in polymer science as well as for those who seek a further grounding in the subject. - Colloid Polymer Science The solutions to the exercises are given in the final chapter,

making it a well thought-out teaching text. -

Polymer Science