Polymer Conformation And Configuration A Polytechnic Press Of The Polytechnic Institute Of Brooklyn Book Frank A Bovey

Structure of Turbulence and Drag Reduction

Statistical Physics of Polymers


Essentials of Polymer Science and Engineering

Polymer Science and Technology

Polymer Conformation and Configuration


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Polymer Science and Technology

Written by expert contributors from the academic and industrial sectors, this book presents traditional and modern approaches to polymer characterization and analysis. The emphasis is on pragmatics, problem solving and property determination; real-world applications provide a context for key concepts. The characterizations focus on organic polymer and polymer product microstructure and composition. Approaches molecular characterization and analysis of polymers from the viewpoint of problem-solving and polymer property characterization, rather than from a technique championing approach Focuses on providing a means to ascertaining the optimum approach or technique(s) to solve a problem/make a property, and thereby develop an analytical competence in the molecular characterization and analysis of real-world polymer products Provides background on polymer chemistry and microstructure, discussions of polymer chain, morphology, degradation, and product failure and additive analysis, and considers the supporting roles of modeling and high-throughput analysis

Polyethylene-Based Blends, Composites and Nanocomposites

Covering all aspects of the analysis of plastics by chemical and physical methods, this book is based on both the author's personal experience and on a complete
Polymers on the Crime Scene

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.

Polymer Conformation and Configuration

Plastics play a very important role in our daily lives. Throughout the world the demand for plastic, particularly plastic packaging, continues to rapidly grow. Polymer technology deals with the manufacture and production of polymer and synthetic substances. Plastic is incredibly versatile and can be made from different ingredients, moulded into any shape, and put to a huge range of uses across industry and the rest of society, from carrier bags to electrical cables. Polymer energy system is an award winning, innovative, proprietary process to convert waste plastics into renewable energy. Some of the important example of polymers and plastics are polytetrafluoroethylene (PTFE), polyether sulphone (PES), phenol-formaldehyde (PF), polyolefins, vinyl polymers, thermoplastic polyesters, polysulphones, polyphenylene sulfide), etc. Polymers are the most rapidly growing sector of the materials industry. The Indian plastic industry has taken great strides. In the last few decades, the industry has grown to the status of a leading sector in the country with a sizable base. The material is gaining notable importance in different spheres of activity and the per capita consumption is increasing at a fast pace. Continuous advancements and developments in polymer technology, processing machineries, expertise, and cost effective manufacturing is fast replacing the typical materials in different segments with plastics. On the basis of value added, Indian share of plastic products industry is about 0.5% of national GDP. The major contents of the book are properties and applications of specialty plastics, thermoset plastics, applications of recycle plastics, introduction of polymer science, polymer additives, blends and composites, commodity thermoplastics and fibres etc. This book also consists of raw material suppliers for plastic and plastic products, manufacturers of plastic, processing machinery, plastics processing machinery and equipment (foreign), machinery and equipment for plastic converting, extruders and extrusion lines, injection moulding machines, dies, moulds and accessories, blow moulding and thermoforming machines etc. The book has been designed with the idea of blending and integrating basic polymer science and the technology of plastics into a composite structure. This book is an outcome of an endeavour in the direction of polymer and plastic processing. It would be of immense use to entrepreneurs, consultants, students and libraries etc.

Publications

The monograph is written for specialists in plant physiology and biochemistry, structural chemistry of polymers, and for specialists in agriculture and in the paper and pulp industry. It is an indispensable source of information.

Cellulose: Biosynthesis and Structure

This introductory text is intended as the basis for a two or three semester course in synthetic macromolecules. It can also serve as a self-instruction guide for engineers and scientists without formal training who find themselves working with polymers. For this reason, the material covered begins with basic concepts and proceeds to current practice, where appropriate. Serves as both a textbook and an introduction for scientists in the field. Problems accompany each chapter.

Surface Modification of Polymers

A new edition explaining the underlying science and applications of liquid crystalline polymers.

Chain Structure and Conformation of Macromolecules

Polymeric crystals are more complex in nature than other materials’ crystal structures due to significant structural disorder present. In fact, they actually exist in a semicrystalline state where the crystals are embedded in an amorphous phase to create a highly interconnected network. Presenting an in-depth and current overview of polymer crystals, Crystals and Crystallinity in Polymers provides researchers, engineers, and graduate students with guidelines to help select the proper crystallization method, evaluate polymer crystallization data, determine which methods to utilize for particular cases, and understand the different analytical techniques utilized.

Applied Polymer Science: 21st Century

Macromolecules is an introductory book about macromolecules, specifically about the fundamental aspects of macromolecules, such as their nature, the ways they are formed, and their behavior. This book also focuses on the basics of macromolecules, which includes history, composition, and properties. The topics covered in this book include polymerization kinetics, chemical reactions, and degradation of macromolecules. This book also discusses biological molecules, including naturally occurring materials, synthetic macromolecules, and model compounds. Students majoring in chemistry or other related fields, such as materials engineering, will find this book very useful.

Polymer Conformation and Configuration

Biomaterials, Artificial Organs and Tissue Engineering

From the reviews: “This book is a very useful addition to polymer literature, and it is a pleasure to recommend it to the polymer community.” (J.E. Mark, University of Cincinnati, POLYMER NEWS)

Macromolecules

The book provides comprehensive, up-to-date information on the physical properties of polymers including, viscoelasticity, flammability, miscibility, optical properties, surface properties and more. Containing carefully selected reprints from the Wiley’s renowned Encyclopedia of Polymer Science and Technology, this reference features the same breadth and quality of coverage and clarity of presentation found in the original.
Introduction to Physical Polymer Science

Maintaining quality of life in an ageing population is one of the great challenges of the 21st Century. This book summarises how this challenge is being met by multi-disciplinary developments of specialty biomaterials, devices, artificial organs and in-vitro growth of human cells as tissue engineered constructs. Biomaterials, Artificial Organs and Tissue Engineering is intended for use as a textbook in a one semester course for upper level BS, MS and Meng students. The 25 chapters are organized in five parts: Part one provides an introduction to living and man-made materials for the non-specialist; Part two is an overview of clinical applications of various biomaterials and devices; Part three summarises the bioengineering principles, materials and designs used in artificial organs; Part four presents the concepts, cell techniques, scaffold materials and applications of tissue engineering; Part five provides an overview of the complex socio-economic factors involved in technology based healthcare, including regulatory controls, technology transfer processes and ethical issues. Comprehensive introduction to living and man-made materials Looks at clinical applications of various biomaterials and devices Bioengineering principles, materials and designs used in artificial organs are summarised

Principles of Polymerization

Diffusion in Polymers

The Definitive Guide to Polymer Principles, Properties, Synthesis, Applications, and Simulations Now fully revised, Polymer Science and Technology. Third Edition, systematically reviews the field’s current state and emerging advances. Leading polymer specialist Joe Fried offers modern coverage of both processing principles and applications in multiple industries, including medicine, biotechnology, chemicals, and electronics. This edition’s new and expanded coverage ranges from advanced synthesis to the latest drug delivery applications. New topics include controlled radical polymerization, click chemistry, green chemistry, block copolymers, nanofilms, electrospinning, and more. A brand-new chapter offers extensive guidance for predicting polymer properties, including additional coverage of group correlations, and new discussions of the use of topological indices and neural networks. This is also the first introductory polymer text to fully explain computational polymer science, including molecular dynamics and Monte Carlo methods. Simulation concepts are supported with many application examples, ranging from prediction of PVT values to permeability and free volume. Fried thoroughly covers synthetic polymer chemistry; polymer properties in solution and in melt, rubber, and solid states; and all important categories of plastics. This revised edition also adds many new calculations, end-of-chapter problems, and references. In-depth coverage includes Polymer synthesis: step-and chain-growth; bulk, solution, suspension, emulsion, solid-state, and plasma; ionic liquids, and macromers; and genetic engineering. Amorphous and crystalline states; transitions, mechanical properties, and solid-state characterization. Polymers and the environment: degradation, stability, and more Additives, blends, block copolymers, and composites—including interpenetrating networks, nanocomposites, buckyballs, carbon nanotubes, graphene, and POSS Biopolymers, natural polymers, fibers, thermoplastics, elastomers, and thermosets Engineering and specialty polymers, from polycarbonates to ionic polymers and high-performance fibers Polymer rheology, processing, and modeling Correlations and simulations: group contribution, topological indices, artificial neural networks, molecular dynamics, and Monte Carlo simulations

Crystals and Crystallinity in Polymers

Introduction to Physical Polymer Science

In polymer science and technology, the advanced development of various new polymer materials with excellent properties and functions is desirable. For this purpose it is necessary to determine the exact relationship between physical properties and molecular structure-dynamics with powerful techniques. One such technique is solid state NMR. Recently, high resolution NMR studies of solids have been realized by using advanced pulse and mechanical techniques, which has resulted in a variety of structural and dynamical information on polymer systems. Solid state NMR has provided characteristic information which cannot be obtained by other spectroscopic methods. This book is divided into two parts. The first part covers the principles of NMR, important NMR parameters such as chemical shifts, relaxation times, dipolar interactions, quadrupolar interactions, pulse techniques and new NMR methods. In the second part, applications of NMR to a variety of polymer systems in the solid state are described. Features of this book: • Contains an up-to-date and comprehensive account of solid state NMR of polymers by leading researchers in the field • Provides a compilation of solid state NMR of polymers, which makes it an ideal reference book for both NMR researchers and general polymer scientists. This book will be of interest to the NMR community, and will be invaluable for both the beginner and the expert.

Crystals and Crystallinity in Polymers

Updated and revised, it focuses on the role of molecular conformation and configuration in determining the physical behavior of polymers. New features include the amorphous and crystalline states of polymers; macromolecular hypothesis and historical development of polymers; and fluoropolymers; solid-state and spectroscopic methods; transfer rates and processes; high temperature materials; and surface, interfacial and electrical behavior of polymers, nonlinear optics and high temperature substances. Each chapter includes several classroom demonstrations and problem sets.

Fundamentals of Fiber Science

Examines various aspects of diffusion in polymers that are being quantitatively described and engineered—detailing the phenomenology of diffusion and outlining areas for future research. Examining the importance of fundamental studies throughout.

Liquid Crystalline Polymers

Polymers and Plastics Technology Handbook

“"The only comprehensive reference on polymer crystallization, Handbook of Polymer Crystallization provides readers with a broad, in-depth guide on the subject, covering the numerous problems encountered during crystallization as well as solutions to resolve those problems to achieve the desired result."”—Provided by publisher.


Solid State NMR of Polymers

The 75th Anniversary Celebration of the Division of Polymeric Materials: Science and Engineering of the American Chemical Society, in 1999 sparked this third edition of Applied Polymer Science with emphasis on the developments of the last few years and a serious look at the challenges and expectations of the 21st Century. This book is divided into six sections, each with an Associate Editor responsible for the contents with the group of Associate Editors acting as a board to interweave and interconnect various topics and to insure complete coverage. These areas represent both traditional areas and emerging areas, but always with coverage that is timely. The areas and associated chapters represent views where PMSE and its members have made and are continuing to make vital contributions. The authors are leaders in their fields and have graciously donated their efforts to encourage the scientists of the next 75 years to further contribute to the well being of the society in which we all live. Synthesis, characterization, and application are three of the legs that hold up a steady table. The fourth is creativity. Each of the three strong legs are present in this book with creativity present as the authors were asked to look forward in predicting areas in need of
work and potential applications. The book begins with an introductory history chapter introducing readers to PMSE. The second chapter introduces the very basic science, terms and concepts critical to polymer science and technology. Sections two, three and four focus on application areas emphasizing emerging trends and applications. Section five emphasizes the essential areas of characterization. Section six contains chapters focusing of the synthesis of the materials.

Polymer Solutions

Polymer Conformation and Configuration focuses on the stereochemistry and conformation of vinyl polymers and the application of nuclear magnetic resonance (NMR) spectroscopy to their study and polypeptide conformation by NMR and optical methods. The book first offers information on the configuration of vinyl polymer chains and configurational sequences and the mechanism of vinyl propagation. Discussions focus on the effect of polymerization temperature, polysisopropyl acrylate, polypropylene, Coleman-Fox Propagation Mechanism, and sequence statistics. The text then elaborates on the observation of polymer chain conformation by NMR, including model compound conformations, averaging of vicinal couplings, conformer populations, and polymer chain conformation. The publication also takes a look at the conformations of N-disubstituted polypeptide chains. The manuscript is a valuable reference for readers interested in polymer conformation and configuration.

Chemical Engineering and Chemical Process Technology - Volume V

Chemical Engineering and Chemical Process Technology is a theme component of Encyclopedia of Chemical Sciences, Engineering and Technology Resources in the global Encyclopedia of Life Support Systems (EOLSS), which is an integrated compendium of twenty Encyclopedias. Chemical engineering is a branch of engineering, dealing with processes in which materials undergo changes in their physical or chemical state. These changes may concern size, energy content, composition and/or other application properties. Chemical engineering deals with many processes belonging to chemical industry or related industries (petrochemical, metallurgical, food, pharmaceutical, fine chemicals, coatings and colors, renewable raw materials, biotechnological, etc.), and finds application in manufacturing of such products as acids, alcohols, salts, fuels, fertilizers, crop protection agents, ceramics, glass, paper, colors, dyestuffs, plastics, cosmetics, vitrinal and many others. It plays a significant role in the environment, biotechnology, nanotechnology, energy, and production and sustainable economical development. The Theme on Chemical Engineering and Chemical Process Technology deals, in five volumes and covers several topics such as: Fundamentals of Chemical Engineering; Unit Operations – Fluids; Unit Operations – Solids; Chemical Reaction Engineering; Process Development, Modeling, Optimization and Control; Process Management; The Future of Chemical Engineering; Chemical Engineering Education; Main Products, which are then expanded into multiple subtopics, each as a chapter. These five volumes are aimed at the following five major target audiences: University and College students Educators, Professional practitioners, Research personnel and Policy analysts, managers, and decision makers and NGOs.

The Analysis of Plastics

An Introduction to Polymer Physics

This revised and updated Second Edition of the best-selling reference/text is essential reading for students and scientists who seek a thorough and practical introduction to the field of polymer spectroscopy. Eleven chapters cover the fundamental aspects and experimental applications of the primary spectroscopic methods. The advantages and disadvantages of the various techniques for particular polymer systems are also discussed. The goal of the author is not to make the reader an expert in the field, but rather to provide enough information about the different spectroscopic methods that the reader can determine how the available techniques can be used to solve a particular polymer problem. This Second Edition contains new and updated information on techniques in IR and NMR, as well as an all-new chapter on Mass Spectrometry.

Molecular Characterization and Analysis of Polymers

Connects fiber chemistry and structure to properties that can be designed and engineered Micro- and nanoscale, synthetic and natural polymer and non-polymer fibers explained with applications to industrial, electronic, biomedical and energy Information pertinent for fiber, textile, composite, polymer and materials specialists This volume provides the basic chemical and mathematical theory needed to understand and modify the connections among the structure, formation and properties of many different types of mammal and natural fibers. At a fundamental level it explains how polymeric and non-polymer fibers are organized, how such fibers are formed, both synthetically and biologically, and how primary and secondary properties, from basic flow to thermal and electrical qualities, are derived from molecular and submolecular organization, thus establishing the quantitative and predictive relationships needed for fiber engineering. The book goes on to show how fiber chemistry and modes of processing for dozens of materials such as silks, ceramics, glass and carbon can be used to control functional, optical, conductive, thermal and other properties. Its discussion ranges over microscale and nanoscale fibers (nanofibers), covering methods such as spinning and electrospinning, as well as biological fiber generation through self-assembly. Technologies in this text apply to the analysis and design of fibers for industrial, electronic, optical, medical and energy storage applications.

Spectroscopy of Polymers

Properties and Behavior of Polymers, 2 Volume Set

A guide to modifying and functionalizing the surfaces of polymers Surface Modification of Polymers is an essential guide to the myriad methods that can be employed to modify and functionalize the surfaces of polymers. The functionalization of polymer surfaces is often required for applications in sensors, membranes, medicinal devices, and others. The contributors invited experts on the topic to describe the polymer surface in detail and discuss the internal and external factors that influence surface properties. This comprehensive guide to the most important methods for the introduction of new functionalities is an authoritative resource for everyone working in the field. This book explores many applications, including the plasma polymerization technique, organic surface functionalization by initiated chemical vapor deposition, photoinduced functionalization on polymer surfaces, functionalization of polymers by hydrolysis, aminolysis, reduction, oxidation, surface modification of nanoparticles, and many more. Inside, readers will find information on various applications in the biomedical field, food science, and membrane science. This important book: -Offers a range of polymer functionalization methods for biomedical applications, water filtration membranes, and food science -Contains discussions of the key surface modification methods, including plasma and chemical techniques, as well as applications for nanotechnology, environmental filtration, food science, and biomedicine -Includes contributions from a team of international renowned experts Written for polymer chemists, materials scientists, plasma physicists, analytical chemists, surface physicists, and surface chemists. Surface Modification of Polymers offers a comprehensive and application-oriented review of the important functionalization methods with a special focus on biomedical applications, membrane science, and food science.

Handbook of Polymer Crystallization

Chain Structure and Conformation of Macromolecules provides an introduction to the chain structures of synthetic polymers and their determination in solution and in the solid state. This book discusses the synthetic methods and polymerization mechanisms. Organized into eight chapters, this book begins with an overview of the brief history of the macromolecular concept and of stereochemical and geometrical isomerism in synthetic polymer chains. This text then introduces vibrational spectroscopy and nuclear magnetic resonance spectroscopy. Other chapters consider the geometric isomerism in diene copolymers as well as the rotational isomeric state method of calculation of polymer chain dimensions. This book discusses as well copolymerization and the measurement of copolymer structure. The final chapter deals with the NMR observation of polymers in the solid state by the method of magic angle spinning, by which both dynamic measurements and high resolution structural information are possible. This book is a valuable resource for organic chemists, chemical engineers, and research workers.

Polymer Science
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.

Ab Initio Calculations of Conformational Effects on 13C NMR Spectra of Amorphous Polymers

This book approaches the analysis of forensic contact traces from a polymer science perspective. The development of characterization methods of new or unusual traces and the improvement of existing protocols is described. The book starts with a general introduction to polymers and the issues related to transfer, persistence and recovery of polymeric traces. The chapters present a distinctive feature of polymers, discussing how it can be measured, what the practical difficulties which can be encountered in the analysis, and how useful that information is for comparison or identification purposes. Practical tips for the realization of the forensic analyses are included.

Polymer Conformation and Configuration

This book is at once an introduction to polymers and an imaginative invitation to the field of polymer science and engineering as a whole, including plastics and plastics processing. Created by two of the best-known scientists in America, the text explains and helps students as well as professionals appreciate all major topics in polymer chemistry and engineering: polymerization synthesis and kinetics, applications of probability theory, structure and morphology, thermal and solution properties, mechanical properties, biological properties and plastics processing methods. Essentials of Polymer Science and Engineering, designed to supercede many standard texts (including the authors'), is unique in a number of ways. Special attention has been paid to explaining fundamentals and providing high-level visuals. In addition, the text is replete with engaging profiles of polymer chemists and their discoveries. The book explains the science of polymer engineering, and at the same time, tells the story of the field from its beginnings to the present, indicating when and how polymer discoveries have played a role in history and society. The book comes well equipped with study questions and problems and is suitable for a one- or two-semester course for chemistry students at the undergraduate and graduate levels.

The Elements of Polymer Science and Engineering

Publisher Description

Publications of the National Bureau of Standards Catalog

The book focuses on the recent technical research accomplishments in the area of polyethylene-based blends, composites and nanocomposites by looking at the various aspects of processing, morphology, properties and applications. In particular, the book details the important developments in areas such as the structure-properties relationship of polyethylene; modification of polyethylene with radiation and ion implantation processes; stabilization of irradiated polyethylene by the introduction of antioxidants; reinforcement of polyethylene through carbon-based materials as additives; characterization of carbon-based polyethylenes composites, polyethylene-based blends with thermoplastic and thermoset; characterization of polyethylene-based thermoplastic and thermoset blends; polyethylene-based blends with natural rubber and synthetic rubber; characterization of polyethylene-based natural rubber and synthetic rubber blends; characterization of polyethylene-based composites.