Essentials Of Polymer Science And Engineering

Essentials of Polymer Science and EngineeringPolymer Science: A Comprehensive ReferenceTextbook of Polymer SciencePolymer Science and TechnologyIntroduction to Physical Polymer SciencePolymer Science and EngineeringThe Elements of Polymer Science and EngineeringPolymer Science and Technology for Engineers and ScientistsPolymer Science and EngineeringThe Elements of Polymer Science and EngineeringEncyclopedia of Polymer Science and EngineeringA Prehistory of Polymer ScienceThe Elements of Polymer Science and EngineeringIntroduction to Polymer Science and ChemistryPolymer Science and Technology (paperback)Handbook of Polymer Science and TechnologyPolymer Science and EngineeringIntroduction to Polymer Science and TechnologyEncyclopedia of Polymer Science and TechnologyPolymer Science and Materials Paul C. Painter Fred W. Billmeyer Joel R. Fried Leslie H. Sperling National Research Council Alfred Rudin R. A. Pethrick Assembly of Mathematical and Physical Sciences (U.S.). Ad Hoc Panel on Polymer Science and Engineering Alfred Rudin Gary Patterson Carnegie Mellon University Alfred Rudin Manas Chanda Joel R. Fried Nicholas P. Cheremisinoff Committee on Polymer Science and Engineering Herman Francis Mark AV. Tobolsky
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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

the progress in polymer science is revealed in the chapters of polymer science a comprehensive reference ten volume set in volume 1 this is reflected in the improved understanding of the properties of polymers in solution in bulk and in confined situations such as in thin films volume 2 addresses new characterization techniques such as high resolution optical microscopy scanning probe microscopy and other procedures for surface and interface characterization volume 3 presents the great progress achieved in precise synthetic polymerization techniques for vinyl monomers to control macromolecular

architecture the development of metallocene and post metallocene catalysis for olefin polymerization new ionic polymerization procedures and atom transfer radical polymerization nitroxide mediated polymerization and reversible addition fragmentation chain transfer systems as the most often used controlled living radical polymerization methods volume 4 is devoted to kinetics mechanisms and applications of ring opening polymerization of heterocyclic monomers and cycloolefins romp as well as to various less common polymerization techniques polycondensation and non chain polymerizations including dendrimer synthesis and various click procedures are covered in volume 5 volume 6 focuses on several aspects of controlled macromolecular architectures and soft nano objects including hybrids and bioconjugates many of the achievements would have not been possible without new characterization techniques like afm that allowed direct imaging of single molecules and nano objects with a precision available only recently an entirely new aspect in polymer science is based on the combination of bottom up methods such as polymer synthesis and molecularly programmed self assembly with top down structuring such as lithography and surface templating as presented in volume 7 it encompasses polymer and nanoparticle assembly in bulk and under confined conditions or influenced by an external field including thin films inorganic organic hybrids or nanofibers volume 8 expands these concepts focusing on applications in advanced technologies e g in electronic industry and centers on combination with top down approach and functional properties like conductivity another type of functionality that is of rapidly increasing importance in polymer science is introduced in volume 9 it deals with various aspects of polymers in biology and medicine including the response of living cells and tissue to the contact with biofunctional particles and surfaces the last volume is devoted to the scope and potential provided by environmentally benign and green polymers as well as energy related polymers they discuss new technologies needed for a sustainable economy in our world of limited resources provides broad and in depth coverage of all aspects of polymer science from synthesis polymerization properties and characterization methods and techniques to nanostructures sustainability and energy and biomedical uses of polymers provides a definitive source for those entering or researching in this area by integrating the multidisciplinary aspects of the science into one unique up to date reference work electronic version has complete cross referencing and multi media components volume editors are world experts in their field including a nobel prize winner

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

this text describes how plastics rubber and fibers are synthesized processed into useful materials characterized and compounded with fillers and other additives to improve performance for specific applications their use in a wide variety of technologies including membrane separations electronics and energy production and storage is described a new chapter in the third edition shows how computer correlations and simulations can be used to predict properties of new plastics and to better understand how existing plastics perform

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

polymers are used in everything from nylon stockings to commercial aircraft to artificial heart valves and they have a key role in addressing international competitiveness and other national issues polymer science and engineering explores the universe of polymers describing their properties and wide ranging potential and presents the state of the science with a hard look at downward trends in research support leading experts offer findings recommendations and research directions lively vignettes provide snapshots of polymers in everyday applications the volume includes an overview of the use of polymers in such fields as medicine and biotechnology information and communication housing and construction energy and transportation national defense and environmental protection the committee looks at the various classes of polymersâ plastics fibers composites and other materials as well as polymers used as membranes and coatingsâ and how their composition and specific methods of processing result in unparalleled usefulness the reader can also learn the science behind the technology including efforts to model polymer synthesis after nature s methods and breakthroughs in characterizing polymer properties needed for twenty first century applications this informative volume will be important to chemists engineers materials scientists researchers industrialists and policymakers interested in the role of polymers as well as to science and engineering educators and students

the elements of polymer science and engineering fourth edition updates on the field of polymers which has advanced considerably since the book s last publication a key feature of this new edition is the inclusion of new and updated content on such concepts as multifunctional polymers bioderived polymers computation modeling polymer sustainability and newer manufacturing methods like 3d printing improvements to the book s pedagogy include the addition of more worked examples more end of chapter problems and new figures to better illustrate key concepts this book is ideal for advanced undergraduate and graduate students in physics chemistry chemical engineering and anyone in related courses this edition has also been reorganized to become more aligned with how instructors currently teach the course it is ideal for one or two semester introductory courses in polymer science and engineering taught primarily to senior undergraduate and first year graduate students in a variety of disciplines but primarily chemical engineering and materials science focuses on the applications of polymer chemistry engineering and technology explains terminology applications and the versatility of synthetic polymers connects polymerization chemistry with engineering applications contains practical lead ins to emulsion polymerization viscoelasticity and polymer rheology

a thorough introduction to polymer science covering a wide range of technique for the fabrication of articles from thermoplastic and thermoset resins polymers and composites are widely used for a range of applications in engineering and technology selecting the correct material which is fit for purpose is a critical decision faced by engineers and scientists who do not necessarily have an in depth knowledge of the chemistry or physics of polymers this text book provides a practical insight into the factors which influence the performance of a polymer or composite allowing informed selections to be made it is the result of thirty years of teaching polymer science and technology to engineers and scientists and provides a solid foundation from which more advanced study may be developed the book complements introductory courses on polymers and composites but also contains specialist material on the chemistry and physics of polymers appropriate for scientists seeking a general knowledge of polymer science the production of articles from thermoplastics and thermoset resins is considered with respect to the vital issue of fabrication method and a broad appreciation polymers as adhesives in medical applications and in the fabrication of semiconductor circuits also included are the important topics of adhesion fatigue viscoelasticity basic composite design theoretical description of polymer polymer synthesis and characterization

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 in the subject who find themselves working with polymers for this reason the material covered begins with basic concepts and proceeds to current practice where appropriate

polymer science is now an active and thriving community of scientists engineers and technologists but there was a time not so long ago when there was no such community the prehistory of polymer science helps to provide key insights into current issues and historical problems the story will be divided into an ancient period from greek times to the creation of the molecular consensus a nascent period from dalton to kekule to van t hoff and a period of paradigm formation and controversy from staudinger to mark to carothers the prehistory concludes with an account of the epochal 1935 discussion of the faraday society on polymerization after this meeting an active community engaged in trying to solve the central problems defined by the discussions

tremendous developments in the field of polymer science its growing importance and an increase in the number of polymer science courses in both physics and chemistry departments have led to the revision of the first edition this new edition addresses subjects as spectroscopy nmr dynamic light scattering and other modern techniques unknown before the publication of the first edition the second edition focuses on both theory physics and chemistry and engineering applications which make it useful for chemistry physics and chemical engineering departments key features focuses on applications of polymer chemistry engineering and technology explains terminology applications and versatility of synthetic polymers connects polymerization chemistry with engineering applications leads reader from basic concepts to technological applications highlights the vastly valuable resource of polymer technology uses quanitative examples and problems to fully develop concepts contains practical lead ins to emulsion polymerization viscoelasticity and polymer rheology

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 this volume seamlessly integrates exploration of the fundamentals of polymer science and polymer chemistry it is peppered with helpful questions and answers throughout to enhance understanding of presented theories and concepts

appropriate for upper level undergraduate and graduate level courses in chemical engineering chemistry and materials science and engineering it is also useful as a reference for engineers and chemists working in the synthetic plastics and chemical process industries this book presents a comprehensive up to date review of the current state of polymer science and technology and emerging areas of growth in addition to synthetic polymer chemistry the book also covers the properties of polymers in solutions and in the melt rubber and solid states surveying all important categories of plastics it includes detailed coverage of both polymer processing principles and the latest polymer applications in a wide range of industries including medicine biotechnology chemicals and electronics

polymers are used in everything from nylon stockings to commercial aircraft to artificial heart valves and they have a key role in addressing international competitiveness and other national issues polymer science and engineering explores the universe of polymers describing their properties and wide ranging potential and presents the state of the science with a hard look at downward trends in research support leading experts offer findings recommendations and research directions lively vignettes provide snapshots of polymers in everyday applications the volume includes an overview of the use of polymers in such fields as medicine and biotechnology information and communication housing and construction energy and transportation national defense and environmental protection the committee looks at the various classes of polymers plastics fibers composites and other materials as well as polymers used as membranes and coatings and how their composition and specific methods of processing result in unparalleled usefulness the reader can also learn the science behind the

technology including efforts to model polymer synthesis after nature s methods and breakthroughs in characterizing polymer properties needed for twenty first century applications this informative volume will be important to chemists engineers materials scientists researchers industrialists and policymakers interested in the role of polymers as well as to science and engineering educators and students

an earlier edition was published under the title encyclopedia of polymer science and engineering

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