Viscosity Of Polymer Solutions | 1b786dffa9f1449db38ee8096e2b3411

Advances in Chemical Physics

Presenting a completely new approach to examining how polymers move in non-dilute solution, this book focuses on experimental facts, not theoretical speculations, and concentrates on polymer solutions, not dilute solutions or polymer melts. From centrifugation and solvent dynamics to viscosity and diffusion, experimental measurements and their quantitative representations are the core of the discussion. The book reveals several experiments never before recognized as revealing polymer solution properties. A novel approach to relaxation phenomena accurately describes viscoelasticity and dielectric relaxation and how they depend on polymer size and concentration. Ideal for graduate students and researchers interested in the properties of polymer solutions, the book covers real measurements on practical systems, including the very latest results. Every significant experimental method is presented in considerable detail, giving unprecedented coverage of polymers in solution.

Fundamentals of Polymer Science for Engineers

Conformation is statistical property of the macromolecules consisting of a number of N structural units, links, position of which in a space one relatively to other is not inflexibly fixed by chemical bonds and assumes the possible random configurations. The number of possible configurations at N >> 1 is so great that permits to use the statistical methods at their analysis. That is why the conformation is a result of statistical averaging on all possible configurations of the macromolecule. It was for a long time notified and confirmed by computer modelling that the conformation of polymeric chain should be described by self-avoiding random walks statistics (SARW) but not Gaussian random walks statistics, assuming the phantom behaviour of polymeric chains. Nevertheless, Gaussian statistics is dominating at the analysis of thermodynamic, dynamic and kinetic stainings of the macromolecules conformation. This book will be useful for scientists who are engaged in the physical chemistry of polymers and their solutions.

Polymer-Improved Oil Recovery
This text introduces the subject of rheology in terms understandable to non-experts and describes the application of rheological principles to many industrial products and processes.

**U.S. Government Research & Development Reports**

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.

**Polymer and Composite Rheology**

An analysis of polymer and composite rheology. This second edition covers flow properties of thermoplastic and thermoset polymers, and general principles and applications of all phases of polymer rheology, with new chapters on the rheology of particulate and fibre composites. It also includes new and expanded detail on polymer blends and emulsions, foams, reacting systems, and flow through porous media as well as composite processing operations.

**Rheology of Fluid, Semisolid, and Solid Foods**

Remarkable progress has been made in the last two decades in the study of concentrated polymer solutions leading to many new concepts, theories, and techniques in the field of polymer science. Any description of the theory of polymer solutions is now insufficient unless both concentrated and dilute solutions are given equal attention. This book reviews recent developments in the study of dilute and concentrated polymer solutions, emphasizing mainly the typical equilibrium and steady-state dynamic properties of linear homopolymers. The author strives to clarify the gap which still remains open between current theories and well-documented experimental results, thereby stimulating further efforts toward a more accurate understanding of polymer solutions. The book contains a collection of typical experimental data and their comparison with current theories, molecular or phenomenological, a summary of recent advances in the physics of concentrated polymer solutions and melts, and an elementary account of the renormalization group theory as applied to dilute solutions. Polymer Solutions should prove invaluable as a reference work for graduate students and specialists in this field.

**CRC Handbook of Solubility Parameters and Other Cohesion Parameters**

Electrospun Nanofibers covers advances in the electrospinning process including characterization, testing and modeling of electrospun nanofibers, and electrospinning for particular fiber types and applications. Electrospun Nanofibers offers systematic and comprehensive coverage for academic researchers, industry professionals, and postgraduate students working in the field of fiber science. Electrospinning is the most commercially successful process for the production of nanofibers and rising demand is driving research and development in this field. Rapid progress is being made both in terms...
of the electrospinning process and in the production of nanofibers with superior chemical and physical properties. Electrospinning is becoming more efficient and more specialized in order to produce particular fiber types such as bicomponent and composite fibers, patterned and 3D nanofibers, carbon nanofibers and nanotubes, and nanofibers derived from chitosan. Provides systematic and comprehensive coverage of the manufacture, properties, and applications of nanofibers. Covers recent developments in nanofibers materials including electrospinning of bicomponent, chitosan, carbon, and conductive fibers. Brings together expertise from academia and industry to provide comprehensive, up-to-date information on nanofiber research and development. Offers systematic and comprehensive coverage for academic researchers, industry professionals, and postgraduate students working in the field of fiber science.

**Measurements of Viscosity and Stress Relaxation of Concentrated High Polymer Solutions**

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.

**Polymer Rheology**

For fluid dynamics and problems, there are many related industrial processes that require the study and application of new models for complex flow conditions and systems. The goals of this new edited book is to present a variety of industrial application and models that address current work and results for some of these problems. The book contains state-of-the-art surveys for select models and applications that offer the most illustrative use of new model analysis and application. The chapters are organized into three broad categories: flows of nonlinear materials, flow accompanied by thermal processes, and nonlinear flows in porous media. Topics and Features: * Polymer problems in extrusion * Modeling of glass problems * Pipelining of gases and slurries * Polymerization process * Thermally induced flows in polymers * Composite materials in manufacturing * Flows through active porous media. The book is an essential resource and reference for the analysis and modeling of problems in fluid dynamics and filtration. All researchers, practitioners, and professionals in fluid dynamics, chemical process engineering, materials engineering, and applied math will find the book a useful presentation of current methods and applications.

**Modern Theory of Polymer Solutions**

This laboratory handbook offers clear guidelines and tips for the practical everyday application of viscometry, as well as supplying a comprehensive companion for the interpretation of viscosimetric data from simple to complex polymer solutions.

**Viscometry of Polymers and Polyelectrolytes**
Conformation of Macromolecules

The Structure and Rheology of Complex Fluids describes the microstructures of polymeric, colloidal, amphiphilic, and liquid crystalline liquids, and the relationship between microstructure and mechanical and flow properties. It provides illustrations, practical examples, and worked problems. This book can serve as both a textbook for a graduate course and a research monograph.

Principles of Polymer Design and Synthesis

Chemical Enhanced Oil Recovery (cEOR)

Increasing innovations and applications make microfluidics a versatile choice for researchers in many disciplines. This book consists of multiple review chapters that aim to cover recent advances and new applications of microfluidics in biology, electronics, energy, and materials sciences. It provides comprehensive views of various aspects of microfluidics ranging from fundamentals of fabrication, flow control, and droplet manipulation to the most recent exploration in emerging areas such as material synthesis, imaging and novel spectroscopy, and marriage with electronics. The chapters have many illustrations showcasing exciting results. This book should be useful for those who are eager to learn more about microfluidics as well as researchers who want to pick up new concepts and developments in this fast-growing field.

Viscosity of Polymer Solutions

Elements of Polymer Science & Engineering

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.
Structure of Turbulence and Drag Reduction

The Advances in Chemical Physics series provides the chemical physics field with a forum for critical, authoritative evaluations of advances in every area of the discipline. This volume explores topics from Thermodynamic Properties of Polyelectrolyte Solutions to ion-binding of polyelectrolytes. The book features: The only series of volumes available that presents the cutting edge of research in chemical physics Contributions from experts in this field of research Representative cross-section of research that questions established thinking on chemical solutions An editorial framework that makes the book an excellent supplement to an advanced graduate class in physical chemistry or chemical physics

Polymer Physics

This revised third edition of Rheology of Fluid, Semisolid, and Solid Foods includes the following important additions: · A section on microstructure · Discussion of the quantitative characterization of nanometer-scale milk protein fibrils in terms of persistence and contour length. · A phase diagram of a colloidal glass of hard spheres and its relationship to milk protein dispersions · Microrheology, including detailed descriptions of single particle and multiparticle microrheological measurements · Diffusive Wave Spectroscopy · Correlation of Bostwick consistometer data with property-based dimensionless groups · A section on the effect of calcium on the morphology and functionality of whey protein nanometer-scale fibrils · Discussion of how tribology and rheology can be used for the sensory perception of foods

An Introduction to Rheology

Many industrial formulations such as detergents, paints, foodstuff and cosmetics contain both surfactants and polymers and their interaction govern many of the properties. This book is unique in that it discusses the solution chemistry of both surfactants and polymers and also the interactions between the two. The book, which is based on successful courses given by the authors since 1992, is a revised and extended version of the first edition that became a market success with six reprints since 1998. Surfactants and Polymers in Aqueous Solution is broad in scope, providing both theoretical insights and practical help for those active in the area. This book contains a thorough discussion of surfactant types and gives information of main routes of preparation. A chapter on novel surfactants has been included in the new edition. Physicochemical phenomena such as self-assembly in solution, adsorption, gel formation and foaming are discussed in detail. Particular attention is paid to the solution behaviour of surfactants and polymers containing polyoxyethylene chains. Surface active polymers are presented and their interaction with surfactants is a core topic of the book. Protein-surfactant interaction is also important and a new chapter deals with this issue. Microemulsions are treated in depth and several important application such as detergency and their use as media for chemical reactions are presented. Emulsions and the choice of emulsifier is discussed in some detail. The new edition also contains chapters on rheology and wetting. Surfactants and Polymers in Aqueous Solution is aimed at those dealing with surface chemistry research at universities and with surfactant formulation in industry.

Fundamentals of Polymer Physics and Molecular Biophysics

A molecular view on the fundamental issues in polymer physics is provided with an aim at students in chemistry, chemical engineering, condensed matter physics and material science courses. An updated translation by the author, a renowned Chinese chemist, it has been proven to be an effective source of
learning for many years. Up-to-date developments are reflected throughout the work in this concise presentation of the topic. The author aims at presenting the subject in an efficient manner, which makes this particularly suitable for teaching polymer physics in settings where time is limited, without having to sacrifice the extensive scope that this topic demands.

**Polymer Solutions**

Rheology is the science that studies the behavior of the flow of matter in a liquid state or soft solids under the application of stress or deformation to obtain a response to an applied force. In polymers, rheology is an important tool to understand behavior under processing conditions and to design equipment. Another application for rheology in the polymer field is to understand structure-property relationships by means of molecular weight, molecular weight distribution, stereochemistry, morphology, melt degradation, and performance under processing. This book covers the essential criteria for selecting the best test types for various applications and new developments, for accurately interpreting results, and for determining other areas where rheology and rheological phenomena may be useful in your work.

**Electrospun Nanofibers**

The CRC Handbook of Solubility Parameters and Other Cohesion Parameters, Second Edition, which includes 17 new sections and 40 new data tables, incorporates information from a vast amount of material published over the last ten years. The volume is based on a bibliography of 2,900 reports, including 1,200 new citations. The detailed, careful construction of the handbook develops the concept of solubility parameters from empirical, thermodynamic, and molecular points of view and demonstrates their application to liquid, gas, solid, and polymer systems.

**Encyclopedic Dictionary of Polymers**

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.

**Polymer and Composite Rheology, Second Edition,**

Presenting a completely new approach to examining how polymers move in non-dilute solution, this book focuses on experimental facts, not theoretical speculations, and concentrates on polymer solutions, not dilute solutions or polymer melts. From centrifugation and solvent dynamics to viscosity and diffusion, experimental measurements and their quantitative representations are the core of the discussion. The book reveals several experiments never before recognized as revealing polymer solution properties. A novel approach to relaxation phenomena accurately describes viscoelasticity and dielectric relaxation and how they depend on polymer size and concentration. Ideal for graduate students and researchers interested in the properties of polymer solutions, the book covers real measurements on practical systems, including the very latest results. Every significant experimental method is presented in
considerable detail, giving unprecedented coverage of polymers in solution.

**Advances in Microfluidics**

The importance of oil in the world economy cannot be overstated, and methods for recovering oil will be the subject of much scientific and engineering research for many years to come. Even after the application of primary depletion and secondary recovery processes (usually waterflooding), much oil usually remains in a reservoir, and indeed in some heterogeneous reservoir systems as much as 70% of the original oil may remain. Thus, there is an enormous incentive for the development of improved or enhanced methods of oil recovery, aimed at recovering some portion of this remaining oil. The techniques used range from 'improved' secondary flooding methods (including polymer and certain gas injection processes) through to 'enhanced' or 'tertiary' methods such as chemical (surfactant, caustic, foam), gas miscible (carbon dioxide, gas reinjection) and thermal (steam soak and drive, in-situ combustion). The distinction between the classification of the methods usually refers to the target oil that the process seeks to recover. That is, in 'improved' recovery we are usually aiming to increase the oil sweep efficiency, whereas in 'tertiary' recovery we aim to mobilise and recover residual or capillary trapped oil. There are a few books and collections of articles which give general overviews of improved and enhanced oil recovery methods. However, for each recovery method, there is such a wide range of interconnected issues concerning the chemistry, physics and fluid mechanics of flow in porous media, that rarely are these adequately reviewed.

**Phenomenology of Polymer Solution Dynamics**

**The Substrates**

Polysaccharides are the subject of heightened interest today, and this book is a concise and fully up-to-date study of the properties of food polysaccharides, describing their interaction with water, the mass-volume-pressure-relationship, various types of mathematical modeling, and the common phenomenology under different combinations of stimuli. New empirical and theoretical equations, which are not often identified with food technologies, are used to support the findings. Polysaccharide Dispersions: Chemistry and Technology in Food is written in a simple, nontechnical style and should be equally comprehensible to the student, the researcher, the plant manager, and the casual observer with only a modest technical background. Contains fundamental principles, practical applications, and new discoveries regarding polysaccharides Presents material in a simple, easy to understand style Focuses exclusively on the food industry

**Complex Flows in Industrial Processes**

Providing a comprehensive review of the state-of-the-art advanced research in the field, Polymer Physics explores the interrelationships among polymer structure, morphology, and physical and mechanical behavior. Featuring contributions from renowned experts, the book covers the basics of important areas in polymer physics while projecting into the future, making it a valuable resource for students and chemists, chemical engineers, materials scientists, and polymer scientists as well as professionals in related industries.
Plastics

"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"--

Surfactants and Polymers in Aqueous Solution

Commercial application of chemical enhanced oil recovery (cEOR) processes is expected to grow significantly over the next decade. Thus, Chemical Enhanced Oil Recovery (cEOR): A Practical Overview offers key knowledge and understanding of cEOR processes using an evidence-based approach intended for a broad audience ranging from field operators, researchers, to reservoir engineers dealing with the development and planning of cEOR field applications. This book is structured into three sections; the first section surveys overall EOR processes. The second section focuses on cEOR processes, while the final section describes the electrorheology technology. These sections are presented using a practical and realistic approach tailored for readers looking to improve their knowledge and understanding of cEOR processes in a nutshell.

Viscoelastic and Viscoplastic Materials

This book provides an important structural analysis of polymer solutions and melts, using fractal analysis. The book covers the theoretical fundamentals of macromolecules fractal analysis. It then goes on to discuss the fractal physics of polymer solutions and the fractal physics of melts. The intended audience of the book includes specialists in chemistry and physics of polymer synthesis and those in the field of polymers and polymer composites processing.

Polysaccharide Dispersions

This book is mainly concerned with building a narrow but secure ladder which polymer chemists or engineers can climb from the primary level to an advanced level without great difficulty (but by no means easily, either). This book describes some fundamentally important topics, carefully chosen, covering subjects from thermodynamics to molecular weight and its distribution effects. For help in self-education the book adopts a "Questions and Answers" format. The mathematical derivation of each equation is shown in detail. For further reading, some original references are also given. Numerous physical properties of polymer solutions are known to be significantly different from those of low molecular weight solutions. The most probable explanation of this obvious discrepancy is the large molar volume ratio of solute to solvent together with the large number of consecutive segments that constitute each single molecule of the polymer chains present as solute. Thorough understanding of the physical chemistry of polymer solutions requires some prior mathematical background in its students. In the original literature, detailed mathematical derivations of the equations are universally omitted for the sake of space-saving and simplicity. In textbooks of polymer science only extremely rough schemes of the theories and then the final equations are shown. As a consequence, the student cannot learn, unaided, the details of the theory in which he or she is interested from the existing textbooks; however, without a full understanding of the theory, one cannot analyze actual experimental data to obtain more basic and realistic physical quantities. In particular, if one intends to apply the theories in industry, accurate understanding and ability to modify the theory are essential.

The Structure and Rheology of Complex Fluids
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 quantitative examples and problems to fully develop concepts * Contains practical lead-ins to emulsion polymerization, viscoelasticity and polymer rheology

In 1976 a similar titled IUTAM Symposium (Structure of Turbulence and Drag Reduction) was held in Washington. However, the progress made during the last thirteen years as well as the much promising current research desired a second one this year. In Washington drag reduction by additives and by direct manipulation of the walls (compliant walls and heated surfaces) were discussed. In the meantime it became evident that drag reduction also occurs when turbulence is influenced by geometrical means, e.g. by influencing the pressure distribution by the shape of the body (airfoils) or by the introduction of streamwise perturbances on a body (riblets). In the recent years turbulence research has seen increasing attention being focused on the investigation of coherent structures, mainly in Newtonian fluids. We all know that these structures are a significant feature of turbulent flows, playing an important role in the energy balance in such flows. However their place in turbulence theories as well as the factors influencing their development are still poorly understood. Consequently, the investigation of phenomena in which the properties of coherent structures are altered provides a promising means of improving our understanding of turbulent flows in general.

This book introduces numerous selected advanced topics in viscoelastic and viscoplastic materials. The book effectively blends theoretical, numerical, modeling and experimental aspects of viscoelastic and viscoplastic materials that are usually encountered in many research areas such as chemical, mechanical and petroleum engineering. The book consists of 14 chapters that can serve as an important reference for researchers and engineers working
in the field of viscoelastic and viscoplastic materials.

**Phenomenology of Polymer Solution Dynamics**

An analysis of polymer and composite rheology. This second edition covers flow properties of thermoplastic and thermoset polymers, and general principles and applications of all phases of polymer rheology, with new chapters on the rheology of particulate and fibre composites. It also includes new and expanded detail on polymer blends and emulsions, foams, reacting systems, and flow through porous media as well as composite processing operations.

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