

1. Record Nr.	UNINA9910143180003321
Autore	Teraoka Iwao
Titolo	Polymer solutions [[electronic resource]] : an introduction to physical properties / / Iwao Teraoka
Pubbl/distr/stampa	New York, : Wiley-Interscience, c2002
ISBN	1-5231-4395-9 1-280-54175-X 9786610541751 0-471-46076-1 0-471-22451-0
Descrizione fisica	1 online resource (355 p.)
Disciplina	547.7 547/.70454
Soggetti	Polymer solutions Polymers
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Contents; Preface; 1 Models of Polymer Chains; 1.1 Introduction; 1.1.1 Chain Architecture; 1.1.2 Models of a Linear Polymer Chain; 1.1.3 Real Chains and Ideal Chains; 1.2 Ideal Chains; 1.2.1 Random Walk in One Dimension; 1.2.2 Random Walks in Two and Three Dimensions; 1.2.3 Dimensions of Random-Walk Chains; 1.2.4 Problems; 1.3 Gaussian Chain; 1.3.1 What is a Gaussian Chain?; 1.3.2 Dimension of a Gaussian Chain; 1.3.3 Entropy Elasticity; 1.3.4 Problems; 1.4 Real Chains; 1.4.1 Excluded Volume; 1.4.2 Dimension of a Real Chain; 1.4.3 Self-Avoiding Walk; 1.4.4 Problems; 1.5 Semirigid Chains 1.5.1 Examples of Semirigid Chains1.5.2 Wormlike Chain; 1.5.3 Problems; 1.6 Branched Chains; 1.6.1 Architecture of Branched Chains; 1.6.2 Dimension of Branched Chains; 1.6.3 Problems; 1.7 Molecular Weight Distribution; 1.7.1 Average Molecular Weights; 1.7.2 Typical Distributions; 1.7.3 Problems; 1.8 Concentration Regimes; 1.8.1 Concentration Regimes for Linear Flexible Polymers; 1.8.2 Concentration Regimes for Rodlike Molecules; 1.8.3 Problems; 2 Thermodynamics of Dilute Polymer Solutions; 2.1 Polymer Solutions

and Thermodynamics; 2.2 Flory-Huggins Mean-Field Theory; 2.2.1 Model
 2.2.2 Free Energy, Chemical Potentials, and Osmotic Pressure
 2.2.3 Dilute Solutions; 2.2.4 Coexistence Curve and Stability; 2.2.5 Polydisperse Polymer; 2.2.6 Problems; 2.3 Phase Diagram and Theta Solutions; 2.3.1 Phase Diagram; 2.3.2 Theta Solutions; 2.3.3 Coil-Globule Transition; 2.3.4 Solubility Parameter; 2.3.5 Problems; 2.4 Static Light Scattering; 2.4.1 Sample Geometry in Light-Scattering Measurements; 2.4.2 Scattering by a Small Particle; 2.4.3 Scattering by a Polymer Chain; 2.4.4 Scattering by Many Polymer Chains; 2.4.5 Correlation Function and Structure Factor
 2.4.6 Structure Factor of a Polymer Chain
 2.4.7 Light Scattering of a Polymer Solution; 2.4.8 Other Scattering Techniques; 2.4.9 Problems; 2.5 Size Exclusion Chromatography and Confinement; 2.5.1 Separation System; 2.5.2 Plate Theory; 2.5.3 Partitioning of Polymer with a Pore; 2.5.4 Calibration of SEC; 2.5.5 SEC With an On-Line Light-Scattering Detector; 2.5.6 Problems; APPENDICES; 2.A: Review of Thermodynamics for Colligative Properties in Nonideal Solutions; 2.B: Another Approach to Thermodynamics of Polymer Solutions; 2.C: Correlation Function of a Gaussian Chain
 3 Dynamics of Dilute Polymer Solutions
 3.1 Dynamics of Polymer Solutions; 3.2 Dynamic Light Scattering and Diffusion of Polymers; 3.2.1 Measurement System and Autocorrelation Function; 3.2.2 Autocorrelation Function; 3.2.3 Dynamic Structure Factor of Suspended Particles; 3.2.4 Diffusion of Particles; 3.2.5 Diffusion and DLS; 3.2.6 Dynamic Structure Factor of a Polymer Solution; 3.2.7 Hydrodynamic Radius; 3.2.8 Particle Sizing; 3.2.9 Diffusion From Equation of Motion; 3.2.10 Diffusion as Kinetics; 3.2.11 Concentration Effect on Diffusion; 3.2.12 Diffusion in a Nonuniform System; 3.2.13 Problems
 3.3 Viscosity

Sommario/riassunto

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, mode