1. Record Nr. UNINA9910146740503321

Autore	Borsali Redouane
Titolo	Soft-Matter Characterization / / edited by Redouane Borsali, Robert Pecora
Pubbl/distr/stampa	Dordrecht : , : Springer Netherlands : , : Imprint : Springer, , 2008
ISBN	1-4020-4465-8
Edizione	[1st ed. 2008.]
Descrizione fisica	1 online resource (eReference.)
Disciplina	530.417
Soggetti	Soft condensed matter Materials - Analysis Polymers Nanotechnology Biophysics Soft and Granular Matter Characterization and Analytical Technique
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Includes index.
Nota di bibliografia	Includes bibliographical references and indexes.
Nota di contenuto	Volume I: Part I: Basic Concepts of Scattering -- Rod-like particles and Semi-rigid Polymers -- Theory of Polyelectrolytes -- Star Polymers and Dendrimers -- Micelles -- Brush-like Polymers -- Part II: Static Light Scattering -- Dynamic Light Scattering (DLS) -- Light Scattering in Shear Fields -- Fluorescence Recovery After Photobleaching -- Forced Rayleigh Scattering (FRS) -- Fluorescence Correlation Spectroscopy (FCS) -- Dynamics of Block Copolymer disordered state: RPA approach. Light Scattering by Polysaccharides -- Gels. Volume II: Part III: Neutron Scattering: SANS -- SANS Liquid Crystal -- Adsorption of polyelectrolyte micelles as studied with neutron reflectivity and ellipsometry -- X-ray Scattering: SAXS/WAXS and ASAXS -- X-Ray (XPCS) -- SAXS of Polyelectrolytes -- SAXS of Block Copolymer -- SAXS by Proteins -- Part IV: Imaging of Membranes (AFM) -- Vesicles/micelles/rods and Imaging -- Polymers at Interfaces (AFM, etc) -- Cryo-TEM -- Tweezers and Fluorescence microscopy -- Single Molecule Microscopy -- DNA Manipulation -- Brush-like Polymers -- Proteines/AFM.

Sommario/riassunto

Progress in basic soft matter research is driven largely by the experimental techniques available. Much of the work is concerned with understanding them at the microscopic level, especially at the nanometer length scales that give soft matter studies a wide overlap with nanotechnology. This 2 volume reference work, split into 4 parts, presents detailed discussions of many of the major techniques commonly used as well as some of those in current development for studying and manipulating soft matter. The articles are intended to be accessible to the interdisciplinary audience (at the graduate student level and above) that is or will be engaged in soft matter studies or those in other disciplines who wish to view some of the research methods in this fascinating field. Part 1 contains articles with a largely (but, in most cases, not exclusively) theoretical content and/or that cover material relevant to more than one of the techniques covered in subsequent volumes. It includes an introductory chapter on some of the time and space-time correlation functions that are extensively employed in other articles in the series, a comprehensive treatment of integrated intensity (static) light scattering from macromolecular solutions, as well as articles on small angle scattering from micelles and scattering from brush copolymers. A chapter on block copolymers reviews the theory (random phase approximation) of these systems, and surveys experiments on them (including static and dynamic light scattering, small-angle x-ray and neutron scattering as well as neutron spin echo (NSE) experiments). This chapter describes block copolymer behavior in the "disordered phase" and also their self-organization. The volume concludes with a review of the theory and computer simulations of polyelectrolyte solutions. Part 2 contains material on dynamic light scattering, light scattering in shear fields and the related techniques of fluorescence recovery after photo bleaching (also called fluorescence photo bleaching recovery to avoid the unappealing acronym of the usual name), fluorescence fluctuation spectroscopy, and forced Rayleigh scattering. Volume 11 concludes with an extensive treatment of light scattering from dispersions of polysaccharides. Part 3 presents articles devoted to the use of x-rays and neutrons to study soft matter systems. It contains survey articles on both neutron and x-ray methods and more detailed articles on the study of specific systems- gels, melts, surfaces, polyelectrolytes, proteins, nucleic acids, block copolymers. It includes an article on the emerging x-ray photon correlation technique, the x-ray analogue to dynamic light scattering (photon correlation spectroscopy). Part 4 describes direct imaging techniques and methods for manipulating soft matter systems. It includes discussions of electron microscopy techniques, atomic force microscopy, single molecule microscopy, optical tweezers (with applications to the study of DNA, myosin motors, etc.), visualizing molecules at interfaces, advances in high contrast optical microscopy (with applications to imaging giant vesicles and motile cells), and methods for synthesizing and atomic force microscopy imaging of novel highly branched polymers.. Soft matter research is, like most modern scientific work, an international endeavor. This is reflected by the contributions to these volumes by leaders in the field from laboratories in nine different counties. An important contribution to the international flavor of the field comes, in particular, from x-ray and neutron experiments that commonly involve the use of a few large facilities that are multinational in their staff and user base.