Dynamic Light Scattering The Method And Some Applications Monographs On The Physics And Chemistry Of Materials

Covering a broad range of polymer science topics, Handbook of Polymer Synthesis, Characterization, and Processing provides polymer industry professionals and researchers in polymer science and technology with a single, comprehensive handbook summarizing all aspects involved in the polymer production chain. The handbook focuses on industrially important polymers, analytical techniques, and formulation methods, with chapters covering step-growth, radical, and co-polymerization, crosslinking and grafting, reaction engineering, advanced technology applications, including conjugated, dendritic, and nanomaterial polymers and emulsions, and characterization methods, including spectroscopy, light scattering, and microscopy.
Enzymes Conjugated to Graphene, Volume 609 in the Methods in Enzymology series, highlights new advances in the field, with this new volume presenting interesting chapters on Enzyme immobilization, Detection of Urea, Enzyme immobilization Enzyme immobilization, PAMAM dendrimer modified reduced graphene oxide post functionalized by horseradish peroxidase for biosensing H2O2, HRP immobilized for LEV detection, Enzyme immobilization, Graphene biocatalysts, Enzyme immobilization, Interactions, Enzyme immobilization, GQD, Enzyme Immobilization, and Enzyme immobilization on functionalized graphene oxide nanosheets. Provides the authority and expertise of leading contributors from an international board of authors Presents the latest release in the Methods of Enzymology series Updated release includes the latest information on the enzymes conjugated to graphene
A comprehensive, practical approach to three powerful methods of polymer analysis and characterization This book serves as a complete compendium of three important methods widely used for the characterization of synthetic and natural polymers—light scattering, size exclusion chromatography (SEC), and asymmetric flow field flow fractionation (A4F). Featuring numerous up-to-date examples of experimental results obtained by light scattering, SEC, and A4F measurements, Light Scattering, Size Exclusion Chromatography and Asymmetric Flow Field Flow Fractionation takes an all-in-one approach to deliver a complete and thorough explanation of the principles, theories, and instrumentation needed to characterize polymers from the viewpoint of their molar mass distribution, size, branching, and aggregation. This comprehensive resource: Is the only book gathering light scattering, size exclusion chromatography, and asymmetric flow field flow fractionation into a single text Systematically compares results of size exclusion chromatography with results of asymmetric flow field flow fractionation, and how these two methods complement each other Provides in-depth guidelines for reproducible and correct determination of molar mass and molecular size of polymers using SEC or A4F coupled with a multi-angle light scattering detector Offers a detailed overview of the methodology, detection, and characterization of polymer branching Light Scattering, Size Exclusion Chromatography and Asymmetric Flow Field Flow Fractionation should be of great interest to all those engaged in the polymer analysis and characterization in industrial and university research, as well as in manufacturing quality control laboratories. Both beginners and experienced can confidently rely on this volume to confirm their own understanding or to help interpret their results.
Since their inception more than 2.5 years ago, photon correlation techniques for the spatial, temporal or spectral analysis of fluctuating light fields have found an ever-widening range of applications. Using detectors which re spond to single quanta of the radiation field, these methods are intrinsically digital in natnre and in many experimental situations offer a unique degree of accuracy and sensitivity, not only for the study of primary light sources themselves, but most particularly in the use of a laser-beam probe to study light scattering from pure fluids, macromolecular suspensions and laminar or turbulent flowing fluids and gases. Following the earliest developments in laser scattering by dilute macro nl01ecular suspensions, in , ... hich particle sizing was the main aim, and the use of photon correlation techniques for laser-Doppler studies of flow and tnrbuence. both of which areas were the subject of NATO ASIs in Capri, Italy in 19;:3 and 19;6. significant advances have be('n made in recent years in many other areas. These were reflected in the topics covered in this NATO Advanced Research Workshop, which took place from August 2;th to 30th, 1!)!}6, at the Jagiellonian University, Krakow, Poland. These in cluded ('xperimental techniques. statist.ics and data reduction, colloids and aggregation, polymers, gels, liquid crystals and mixtures, protein solutions, critical pllf'nomena and dense media.
"Dynamic light scattering is an experimental technique now commonly found in laboratories concerned with fundamental studies of macromolecular systems"--Preface.
This book is a manual of measurement of colloids and interfaces designed especially for new researchers who have just begun research on these topics. The book is written by active researchers in the field of colloids and interfacial chemistry, based on the practical experience of the authors. In each chapter, the key points of measurement, how to analyze data correctly, points to be careful about, and merits of a particular method are concisely explained from the point of view of the readers. Not only in industries such as cosmetics and pharmaceuticals but also in academic studies of nanotechnology, correct understanding of colloid and interface phenomena is vital because the properties of these items, however small, are affected by the nature of interfaces. This book will be particularly useful for researchers who are not yet fully confident of the measurement techniques that are clearly explained here.
Laser Light Scattering: Basic Principles and Practice, Second Edition deals with the technical aspects of laser light scattering, including the basic principles and practice. Topics covered include light scattering theory, optical mixing spectrometry, photon correlation spectroscopy, and interferometry. Experimental methods and methods of data analysis are also described. This book is comprised of eight chapters and begins with a discussion on the interrelationship between laser light scattering and other types of scattering techniques that use X-rays and neutrons, with particular reference to momentum and energy transfers as well as time-averaged and time-dependent scattered intensity. The spectrum of scattered light and a single-particle approach to time-averaged scattered intensity are considered. The following chapters focus on photoelectric detection of the scattered electric field; optical mixing spectrometers; basic equations for photon correlation spectroscopy; and the principles of Fabry-Perot interferometry. The pertinent features of the experimental aspects of laser light scattering are also outlined, together with the Laplace inversion problem. The final chapter examines polymer molecular-weight distributions in relation to particle sizing. This monograph will be of interest to physicists.
Scattering Methods and their Application in Colloid and Interface Science offers an overview of small-angle X-ray and neutron scattering techniques (SAXS & SANS), as well as static and dynamic light scattering (SLS & DLS). These scattering techniques are central to the study of soft matter, such as colloidal dispersions and surfactant self-assembly. The theoretical concepts are followed by an overview of instrumentation and a detailed description of the evaluation techniques in the first part of the book. In the second part, several typical application examples are used to show the strength and limitations of these techniques. Features the latest input from the world-leading expert with personal experience in all the fields covered (SAXS, SANS, SLS and

DLS) Includes unified notation throughout the book to enhance its readability Provides—in a single source—scattering theory, evaluation of techniques and a variety of applications
Light scattering has provided an important method for characterizing macro-molecules for at least three decades. Now, through the use of intense, coherent laser light and efficient spectrum analyzers and autocorrelators, experiments in the frequency and time domains can be used to study molecular motion, e.g. diffusion and flow and other dynamic processes, as well as the equilibrium properties of solutions. As a result, laser light scattering has become a powerful form of spectroscopy with applications in physics, biochemistry, and other fields. This volume, which employs a relatively simple approach in order to reach the widest audience, focuses on two main topics: classical light scattering (scattering intensity, concentration dependence, size dependence, and polydispersity) and dynamic light scattering (time and frequency dependence, translational diffusion, directed flow, rotational motion, and more). A series of useful appendixes and a list of references complete this concise, accessible work, a valuable resource for physicists, chemists, and anyone interested in the increasingly important field of laser light scattering.
This volume examines important experimental techniques needed tocharacterise inorganic materials in order to elucidate theirproperties for practical application. Addressing methods thatexamine the structures and properties of materials over lengthscales ranging from local atomic order to long-range order on themeso- and macro-scopic scales, Multi Length-ScaleCharacterisation contains five detailed chapters: Measurement of Bulk Magnetic Properties Thermal Methods Atomic Force Microscopy Gas Sorption in the Analysis of Nanoporous Solids Dynamic Light Scattering Ideal as a complementary reference work to other volumes in theseries (Local Structural Characterisation and Structurefrom Diffraction Methods) or as an examination of the specificcharacterisation techniques in their own right, MultiLength-Scale Characterisation is a valuable addition to theInorganic Materials Series.
Light scattering is a very powerful method for characterizing the structure of polymers and nanoparticles in solution. As part of the Springer Laboratory series, this book provides a simple-to-read and illustrative textbook probing the seemingly very complicated topic of light scattering from polymers and nanoparticles in dilute solution, and goes further to cover some of the latest technical developments in experimental light scattering.
Basic Fundamentals of Drug Delivery covers the fundamental principles, advanced methodologies and technologies employed by pharmaceutical scientists, researchers and pharmaceutical industries to transform a drug candidate or new chemical entity into a final administrable drug delivery system. The book also covers various approaches involved in optimizing the therapeutic performance of a biomolecule while designing its appropriate advanced formulation. Provides up-to-date information on translating the physicochemical properties of drugs into drug delivery systems Explores how drugs are administered via various routes, such as orally, parenterally, transdermally or through inhalation Contains extensive references and further reading for course and self-study
This 2-volume set includes extensive discussions of scattering techniques (light, neutron and X-ray) and related fluctuation and grating techniques that are at the forefront of this field. Most of the scattering techniques are Fourier space techniques. Recent advances have seen the development of powerful direct imaging methods such as atomic force microscopy and scanning probe microscopy. In addition, techniques that can be used to manipulate soft matter on the nanometer scale are also in rapid development. These include the scanning probe microscopy technique mentioned above as well as optical and magnetic tweezers.
In the twenty years since their inception, modern dynamic light-scattering techniques have become increasingly sophisticated, and their applications have grown exceedingly diverse. Applications of the techniques to problems in physics, chemistry, biology, medicine, and fluid mechanics have prolifer ated. It is probably no longer possible for one or two authors to write a monograph to cover in depth the advances in scattering techniques and the main areas in which they have made a major impact. This volume, which we expect to be the first of aseries, presents reviews of selected specialized areas by renowned experts. It makes no attempt to be comprehensive; it emphasizes a body of related applications to polymeric, biological, and colloidal systems, and to critical phenomena. The well-known monographs on dynamic light scattering by Berne and Pecora and by Chu were published almost ten years ago. They provided comprehensive treatments of the general principles of dynamic light scat tering and gave introductions to a wide variety of applications, but natu rally they could not treat the new applications and advances in older ones that have arisen in the last decade. The new applications include studies of interacting particles in solution (Chapter 4); scaling approaches to the dynamics of polymers, including polymers in semidilute solution (Chapter 5); the use of both Fabry-Perot interferometry and photon correlation spectroscopy to study bulk polymers (Chapter 6); studies of micelles and microemulsions (Chapter 8); studies of polymer gels (Chapter 9).
This book focuses on the practical aspects of particle size measurement: a major difference with existing books, which have a more theoretical approach. Of course, the emphasis still lies on the measurement techniques. For optimum application, their theoretical background is accompanied by quantitative quality aspects, limitations and problem identification. In addition the book covers the phenomena of sampling and dispersion of powders, either of which may be dominant in the overall analysis error. Moreover, there are chapters on the general aspects of quality for particle size analysis, quality management, reference materials and written standards, in- and on-line measurement, definitions and multilingual terminology, and on the statistics required for adequate interpretation of results. Importantly, a relation is made to product performance, both during processing as well as in final application. In view of its set-up, this book is well suited to support particle size measurement courses.
Particle characterization is an important component in product research and development, manufacture, and quality control of particulate materials and an important tool in the frontier of sciences, such as in biotechnology and nanotechnology. This book systematically describes one major branch of modern particle characterization technology - the light scattering methods. This is the first monograph in particle science and technology covering the principles, instrumentation, data interpretation, applications, and latest experimental development in laser diffraction, optical particle counting, photon correlation spectroscopy, and electrophoretic light scattering. In addition, a summary of all major particle sizing and other characterization methods, basic statistics and sample preparation techniques used in particle characterization, as well as almost 500 latest references are provided. The book is a must for industrial users of light scattering techniques characterizing a variety of particulate systems and for undergraduate or graduate students who want to learn how to use light scattering to study particular materials, in chemical

engineering, material sciences, physical chemistry and other related fields.

An Introduction to Dynamic Light Scattering by Macromolecules provides an introduction to the basic concepts of dynamic light scattering (DLS), with an emphasis on the interpretation of DLS data. It presents the appropriate equations used to interpret DLS data. The material is presented in order of increasing complexity of the systems under examination, ranging from dilute solutions of noninteracting particles to concentrated multicomponent solutions of strongly interacting particles and gels. Problems are presented at the end of each chapter to emphasize these concepts. Since a major emphasis of this textbook is the interpretation of DLS data obtained by polarized light scattering studies on macromolecular solutions, the results of complementary experimental techniques are also presented in order to gain insight into the dynamics of these systems. This textbook is intended for (1) advanced undergraduate students and graduate students in the chemical, physical, and biological sciences; (2) scientists who might wish to apply DLS methods to systems of interest to them but who have no formal training in the field of DLS; and (3) those who are simply curious as to the type of information that might be obtained from DLS techniques.

Dynamic light scattering (DLS) is an important concept that has found applications in the characterization of the biophysical properties of materials for a wide range of applications. DLS studies are extensively employed in material science and engineering to evaluate particle size distribution and surface charge for applications in nanomaterial synthesis, biomolecular analysis, pharmaceutical development and environmental applications. The aim of this book is to provide an overview of research advances relating to the principle and applications of DLS in various fields. The book is divided into two parts Part 1 discusses the uses of DLS in material science and engineering applications and Part 2 focuses on applications of DLS in biological sciences. Chapter 1 aims to provide an overview of the working principle, mathematical models and different types of DLS analysis methods. In addition, recent trends in DLS studies and applications in various fields are also discussed. Chapter 2 discusses the uses of DLS for nanomaterial characterization in terms of the size, size distribution and zeta potential of particles. Chapter 3 compares two techniques (DLS and SAXS) and provides evidence that nanocatalyst can be characterized more effectively by modifying DLS with SAXS. In Chapter 4 the authors demonstrate the application of DLS in characterizing self-assembling and stimuli-responsive di-block copolymers in aqueous media and their association with low molecular weight drugs. Chapter 5 discusses slow and ultraslow dynamics, probed by DLS measurements, in common organic molecular liquids, ionic liquids (ILs), aqueous solutions of salts and molecular solids and liquid-liquid binary mixtures.

Light Scattering Technology for Food Property, Quality and Safety Assessment discusses the development and application of various light scattering techniques for measuring the structural and rheological properties of food, evaluating composition and quality attributes, and detecting pathogens in food. The first four chapters cover basic concepts, principles, theories, and modeling of light transfer in food and biological materials. Chapters 5 and 6 describe parameter estimation methods and basic techniques for determining optical absorption and scattering properties of food products. Chapter 7 discusses the spatially-resolved measurement technique for determining the optical properties of food and biological materials, whereas Chapter 8 focuses on the time-resolved spectroscopic technique for measuring optical properties and quality or maturity of horticultural products. Chapter 9 examines practical light scattering techniques for nondestructive quality assessment of fruits and vegetables. Chapter 10 presents the theory of light transfer in meat muscle and the measurement of optical properties for determining the postmortem condition and textural properties of muscle foods and meat analogs. Chapter 11 covers the applications of spatially-resolved light scattering techniques for assessing quality and safety of animal products. Chapter 12 looks into light scattering for milk and dairy processing. Chapter 13 examines the applications of dynamic light scattering for measuring the microstructure and rheological properties of food. Chapter 14 shows the applications of a biospeckle technique for assessing the quality and condition of fruits and vegetables. Chapter 15 provides a detailed description of Raman scattering spectroscopic and imaging techniques in food quality and safety assessment. Chapter 16, the final chapter, focuses on applications of light scattering techniques for the detection of food-borne pathogens.

This book describes the state of the art across the broad range of spectroscopic techniques used in the study of biological systems. It reviews some of the latest advances achieved in the application of these techniques in the analysis and characterization of small and large biological compounds, covering topics such as VUV/UV and UV-visible spectroscopies, fluorescence spectroscopy, IR and Raman techniques, dynamic light scattering (DLS), circular dichroism (CD/SR-CD), pulsed electron paramagnetic resonance techniques, Mössbauer spectroscopy, nuclear magnetic resonance, X-ray methods and electron and ion impact spectroscopies. The second part of the book focuses on modelling methods and illustrates how these tools have been used and integrated with other experimental and theoretical techniques including also electron transfer processes and fast kinetics methods. The book will benefit students, researchers and professionals working with these techniques to understand the fundamental mechanisms of biological systems.

This book focuses on the widely used experimental techniques available for the structural, morphological, and spectroscopic characterization of materials. Recent developments in a wide range of experimental techniques and their application to the quantification of materials properties are an essential side of this book. Moreover, it provides concise but thorough coverage of the practical and theoretical aspects of the analytical techniques used to characterize a wide variety of functional nanomaterials. The book provides an overview of widely used characterization techniques for a broad audience: from beginners and graduate students, to advanced specialists in both academia and industry.

This comprehensive introduction to principles underlying laser light scattering focuses on time dependence of fluctuations in fluid systems; also serves as introduction to theory of time correlation functions. 1976 edition.

This fourth volume of Light Scattering Reviews is composed of three parts. The ?rstpartisconcernedwiththeoreticalandexperimentalstudiesofsinglelightsc- tering by small nonspherical particles. Light scattering by small particles such as, for instance, droplets in the terrestrial clouds is a well understood area of physical optics. On the other hand, exact theoretical calculations of light scattering p- terns for most of nonspherical and irregularly shaped particles can be performed only for the restricted values of the size parameter, which is proportional to the ratio of the characteristic size of the particle to the wavelength?. For the large nonspherical particles, approximations are used (e. g. , ray optics). The exact th- retical techniques such as the T-matrix method cannot be used for extremely large particles, such as those in ice clouds, because then the size parameter in the v- iblex=2?a/???,wherea is the characteristic size (radius for

spheres), and the associated numerical codes become unstable and produce wrong answers. Yet another problem is due to the fact that particles in many turbid media (e. g. , dust clouds) cannot be characterized by a single shape. Often, refractive indices also vary. Because of problems with theoretical calculations, experimental (i. e. , la- ratory) investigations are important for the characterization and understanding of the optical properties of such types of particles. The ?rst paper in this volume, written by B. Gustafson, is aimed at the descr- tionofscaledanalogueexperimentsinelectromagneticscattering.

Dynamic Light ScatteringThe Method and Some ApplicationsOxford University Press on Demand

Published continuously since 1944, Advances in Protein Chemistry and Structural Biology has been a continuous, essential resource for protein chemists. Covering reviews of methodology and research in all aspects of protein chemistry, including purification/expression, proteomics, modeling and structural determination and design, each volume brings forth new information about protocols and analysis of proteins while presenting the most recent findings from leading experts in a broad range of protein-related topics. Covers reviews of methodology and research in all aspects of protein chemistry Brings forth new information about protocols and analysis of proteins while presenting the most recent findings from leading experts in a broad range of protein-related topics

Molecular Characterization of Polymers presents a range of advanced and cutting-edge methods for the characterization of polymers at the molecular level, guiding the reader through theory, fundamentals, instrumentation, and applications, and supporting the end goal of efficient material selection and improved material performance. Each chapter focuses on a specific technique or family of techniques, including the different areas of chromatography, field flow fractionation, long chain branching, static and dynamic light scattering, mass spectrometry, NMR, X-Ray and neutron scattering, polymer dilute solution viscometry, microscopy, and vibrational spectroscopy. In each case, in-depth coverage explains how to successfully implement and utilize the technique. This practical resource is highly valuable to researchers and advanced students in polymer science, materials science, and engineering, and to those from other disciplines and industries who are unfamiliar with polymer characterization techniques. Introduces a range of advanced characterization methods, covering aspects such as molecular weight, polydispersity, branching, composition, and tacticity Enables the reader to understand and to compare the available technique, and implement the selected technique(s), with a view to improving properties of the polymeric material Establishes a strong link between basic principles, characterization techniques, and real-life applications

This Advanced Study Institute was held at \-lellesley College, Wellesley, MA. , from 3 to 12 August 1980. It followed by four years the second "Capri ~,chool on Photon Correlation Spectroscopy". During the intervening period there had been many new applications of dynamic light scattering techniques to the study of systems whose properties depend either on collective molecular interactions or on the formation or activity of supramo1ecu1ar structures. Con sequently, emphasis at this conference was on light scattering studies of subjects such as dynamical correlations in dense polymer solutions, phase transitions in gels, spinodal decomposition of binary fluids, Benard instabilities in nonequilibrium fluids, the formation of micelles and phospholipid vesicles, and movements of the molecular assemblies of muscle tissue. The instructional pro gramme also included tutorial lectures on two complementary spec troscopic techniques which have benefited from dramatic advances in instrumentation, these being small angle X-ray (SAXS) and small angle neutron (SANS) scattering. Strong cold neutron and synchro tron X-ray sources have become available, and data now can be acquired rapidly with newly developed position-sensitive detectors. Several reviews of recent applications of SAXS and SANS were also provided. The organizers of the ASI hoped to provide a forum for theoreticians and experimentalists to assess advances in fields which, although related, were sufficiently different that a great deal of unfamiliar information could be communicated. The order ing of the papers in this volume closely approximates that of the talks presented at the Advanced Study Institute.

This third edition of the biomedical optics classic Tissue Optics covers the continued intensive growth in tissue optics—in particular, the field of tissue diagnostics and imaging—that has occurred since 2007. As in the first two editions, Part I describes fundamentals and basic research, and Part II presents instrumentation and medical applications. However, for the reader’s convenience, this third edition has been reorganized into 14 chapters instead of 9. The chapters covering optical coherence tomography, digital holography and interferometry, controlling optical properties of tissues, nonlinear spectroscopy, and imaging have all been substantially updated. The book is intended for researchers, teachers, and graduate and undergraduate students specializing in the physics of living systems, biomedical optics and biophotonics, laser biophysics, and applications of lasers in biomedicine. It can also be used as a textbook for courses in medical physics, medical engineering, and medical biology.

Biophysical Characterization of Proteins in Developing Biopharmaceuticals, Second Edition, presents the latest on the analysis and characterization of the higher-order structure (HOS) or conformation of protein based drugs. Starting from the very basics of protein structure, this book explains the best way to achieve this goal using key methods commonly employed in the biopharmaceutical industry. This book will help today’s industrial scientists plan a career in this industry and successfully implement these biophysical methodologies. This updated edition has been fully revised, with new chapters focusing on the use of chromatography and electrophoresis and the biophysical characterization of very large biopharmaceuticals. In addition, best practices of applying statistical analysis to biophysical characterization data is included, along with practical issues associated with the concept of a biopharmaceutical’s developability and the technical decision-making process needed when dealing with biophysical characterization data. Presents basic protein characterization methods and tools applicable to (bio)pharmaceutical research and development Highlights the capabilities and limitations of each technique Discusses the underlining science of each tool Empowers industrial biophysical chemists by providing a roadmap for applying biophysical tools Outlines the needs for new characterization and analytical tools in the biopharmaceutical industry

This volume of Current Topics in Membranes focuses on Membrane Protein Crystallization, beginning with a review of past successes and general trends, then further discussing challenges of mebranes protein crystallization, cell free production of membrane proteins and novel lipids for membrane protein crystallization. This publication also includes tools to enchance membrane protein crystallization, technique advancements, and crystallization strategies used for photosystem I and its complexes, establishing Membrane Protein Crystallization as a needed, practical reference for researchers.

This book presents a compilation of self-contained chapters covering a wide range of topics within the broad field of soft condensed matter. Each chapter starts with basic definitions to bring the reader up-to-date on the topic at hand, describing how to use fluid flows to generate soft materials of high value either for applications or for basic research. Coverage includes topics related to colloidal suspensions and soft materials and how they differ in behavior, along with a roadmap for researchers on how to use soft materials to study relevant physics questions related to geometrical frustration.

Milk proteins have nutritional value and extraordinary biological properties. Research over the last decades has provided new insight into the structure and the function of milk bioactive peptides. Some of these peptides are delivered directly into milk, and some are encrypted in major proteins such as caseins and lactoglobulins. These peptides have antimicrobial functions modulating the gut microflora. Even when milk is undisputedly the first food for mammals, milk proteins sometimes can be a health threat, either because of allergic reaction or because of toxicity. In this regard, in vitro studies showed donkey's casein and major whey proteins to be more digestible than cows' for human consumption. In this book, readers will find updated research on the major milk proteins' structure, bioactive peptides, milk protein allergy, therapeutic strategies, and chemical markers that can be used to detect cow milk intolerance in infants. This book provides the most current scientific information on milk proteins, from structure to biological properties. It will be of great benefit for those interested in milk production, milk chemistry, and human health.

Inorganic Frameworks as Smart Nanocarriers for Drug Delivery brings together recent research in the area of inorganic frameworks for drug delivery. Different types of nanocarriers are presented and discussed in detail, providing an up-to-date overview on inorganic nanoparticles with pharmaceutical applications. Written by a diverse range of international academics, this book is a valuable reference resource for researchers in biomaterials, the pharmaceutical industry, and those who want to learn more about the current applications of inorganic smart nanocarriers. Includes assembly methods for a variety of smart nanocarrier systems, also showing how they are applied Highlights how metal-oxide nanoparticles are effectively used in drug delivery Assesses the pros and cons of different metallic nanomaterials as drug carriers

For the first time in one set of books, coherent-domain optical methods are discussed in the framework of various applications, which are characterized by a strong light scattering. A few chapters describe basic research containing the updated results on coherent and polarized light non-destructive interactions with a scattering medium, in particular, diffraction, interference, and speckle formation at multiple scattering. These chapters allow for understanding coherent-domain diagnostic techniques presented in later chapters. A large portion of Volume I is dedicated to analysis of various aspects of optical coherence tomography (OCT) - a very new and growing field of coherent optics. Two chapters on laser scanning confocal microscopy give insight to recent extraordinary results on in vivo imaging and compare the possibilities and achievements of confocol, excitation multiphoton, and OCT microscopy. This two volume reference contains descriptions of holography, interferometry and optical heterodyning techniques in their application for diagnostics of turbid materials. The most prospective methods of coherent and polarization optical imaging and spectroscopy, including polarization-sensitive optical coherent tomography, polarization diffusion wave spectroscopy, and elastic and quasi-elastic light scattering spectroscopies and image techniques, are presented.

Scattering experiments, using X-ray, light and neutron sources (in historical order) are key techniques for studying structure and dynamics in systems containing colliods, polymers, surfactants and biological macromolecules, summarized here as soft condensed matter. The education in this field in Europe is very heterogeneous and frequently inadequate, which severely limits an efficient use of these methods, especially at large-scale facilities. The series of "Bombannes" schools and the completely revised and updated second edition of the lecture notes are devoted to a practical approach to current methodology of static and dynamic techiques. Basic information on data interpretation, on the complementarity of the different types of radiation, as well as information on recent applications and developments is presented. The aim is to avoid over - as well as under-exploitation of data.

Thermal and Rheological Measurement Techniques for Nanomaterials Characterization, Second Edition covers thermal and rheological measurement techniques, including their principle working methods, sample preparation and interpretation of results. This important reference is an ideal source for materials scientists and industrial engineers who are working with nanomaterials and need to know how to determine their properties and behaviors. Outlines key characterization techniques to determine the thermal and rheological behavior of different nanomaterials Explains how the thermal and rheological behavior of nanomaterials affect their usage Provides a method-orientated approach that explains how to successfully use each technique

Advances in Nanomedicine for the Delivery of Therapeutic Nucleic Acids addresses several issues related to safe and effective delivery of nucleic acids (NAs) using nanoparticles. A further emphasis would be laid on the mechanism of delivery of NAs, the barriers encountered and the strategies adapted to combat them. An exhaustive account of the advantages as well shortcomings of all the delivery vectors being employed in delivery of various NAs will be provided. On final note the regulatory aspects of nanoparticles mediated NA would be discussed, with focus on their clinical relevance. The design and development of nucleic acid-based therapeutics for the treatment of diseases arising from genetic abnormalities has made significant progress over the past few years. NAs have been widely explored for the treatment of cancer and infectious diseases or to block cell proliferation and thereby caused diseases. Advances in synthetic oligonucleotide chemistry resulted in synthesis of NAs that are relatively stable in in vivo environments. However, cellular targeting and intracellular delivery of NAs still remains a challenge. Further development of NA-based therapeutics depends on the progress of safe and effective carriers for systemic administration. Nanomedicine has facilitated availability of vectors with diminished cytotoxicity and enhanced efficacy which are rapidly emerging as systems of choice. These vectors protect NAs from enzymatic degradation by forming condensed complexes along with targeted tissue and cellular delivery. During the past few years, a myriad reports have appeared reporting delivery of NAs mediated by nanoparticles. This book will provide an overview of nanoparticles being employed in the in vitro and in vivo delivery of therapeutically relevant NAs like DNA, siRNA, LNA, PNA, etc. Provides a complete overview of the applicatiosn of nanomedicine in the delivery of nucleic acids, from characterization of nanoparticles, to in vitro and in vivo studies Discusses delivery issues of less well explored nucleic acids, like PNAs, Ribozymes, DNAzymes, etc. Summarizes the current state of research in nucleic acid delivery and underscores the future of nanomedicine in this field