

Mesophase Formation In Discotic Liquid Crystalline Polymers

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Physical Properties of Liquid Crystals George W. Gray 2009-08-14 This handbook is a unique compendium of knowledge on all aspects of the physics of liquid crystals. In over 500 pages it provides detailed information on the physical properties of liquid crystals as well as the recent theories and results on phase transitions, defects and textures of different types of liquid crystals. An in-depth understanding of the physical fundamentals is a prerequisite for everyone working in the field of liquid crystal research. With this book the experts as well as graduate students entering the field get all the information they need. **Supramolecular Polymers, Second Edition** Alberto Ciferri 2005-04-26 Supramolecular Polymers, Second Edition details assembly processes and structure-function correlation in natural and synthetic self-assembling materials, focusing on developments occurred over the past five years. The book highlights developments in the synthesis of complex structures, chemical design principles, and theoretical models of growth processes resulting in an increasingly accurate prediction of stability, degree of polymerization, and shape of various assemblies. It focuses on the rich variety of properties, functions, and applications of self-assembling supramolecular polymers. Supramolecular Polymers, Second Edition ties together potential applications such as those of nanostructures with dynamic-combinatorial-adaptive self-healing features, opto-electronic devices, supramolecular amphiphiles, hydrogels, organic/inorganic nanocomposites, molecular biosensors, molecular imprinting, molecular engines, templates for superlattices with prescribed symmetry. Several chapters of the first edition have been updated or rewritten, and an equal number of new chapters have been added. More than 500 drawings, photographs, micrographs, equations, and tables enhance and reinforce essential concepts presented in the book. Authored by an expert in polymer mechanics, biopolymers, liquid crystals, and supramolecular assemblies, Supramolecular Polymers, Second Edition emphasizes fundamental principles at the basis of bottom-up nanotechnology, chemical design strategies, and exciting applications for various self-assembling materials for a unified and cutting-edge account of the field.

Nuclear Magnetic Resonance Krystyna Kamienska-Trela 2015-05-20 Applications of nuclear magnetic resonance span a wide range of scientific disciplines, from physics to medicine. This series has provided an essential digest of the NMR literature for more than four decades and each volume provides unrivalled coverage of the literature on this topic. Continuous coverage on some topics such as theoretical and physical aspects of nuclear shielding is balance by the desire for coverage on newer topics like applications in biological systems and materials science. For those wanting to become rapidly acquainted with NMR or seasoned practitioners, this is an invaluable source of current methods and applications.

Photoactive Functional Soft Materials Quan Li 2019-04-29 This book covers the design, synthesis, properties, and applications of functional photoactive soft materials, including aspects of polymers, block copolymers, elastomers, biomaterials, liquid crystals, chemical and physical gels, colloids, and host-guest systems. It combines, in a unified manner, authoritative accounts describing various structural and functional aspects of photoactive soft materials. Photoactive Functional Soft Materials: Preparation, Properties, and Applications: * Brings together the state-of-the-art knowledge on photoactive functional soft materials in a unified manner * Covers a vibrant research field with tremendous application potential in areas such as optoelectronics, photonics, and energy generation * Appeals to a large interdisciplinary

audience because it is highly useful for researchers and engineers working on photonics, optoelectronics, imaging and sensing, nanotechnology, and energy materials Photoactive Functional Soft Materials: Preparation, Properties and Applications focuses on the design and fabrication of photoactive functional soft materials for materials science, nanophotonics, nanotechnology, and biomedical applications. **New Polymerization Techniques and Synthetic Methodologies** 2003-07-01 - **Liquid Crystal Dimers** Sandeep Kumar 2017-03-06 This book covers in-depth discussion of design principles, synthesis and thermal behavior of all types of liquid crystal (LC) dimers. The text presents recent advances in the field of LC dimers consisting of different mesogenic units such as calamitic, discotic and bent-core molecules. It starts with a chapter on the introduction of liquid crystal dimers, including their odd-even behavior, basic classification of dimers and common mesophases in dimers. The text shows how the molecular architectures are being used to develop new materials to study a range of interesting phenomena such as the biaxial nematic phase containing rod-like and disc-like mesogenic units. Finally, the text presents perspectives related to technological relevance of these dimers such as dopants in LC display mixtures exhibiting faster relaxation time, strong flexoelectric coupling and others to effect control over the properties of these materials.

Structure and Transport Properties in Organized Polymeric Materials E Chiellini 1998-03-19 This multi-authored book includes selected contributions reviewing the results achieved in the synthesis and characterization of organized polymeric materials. The focus is on competitive materials with liquid crystalline or electroconductive properties. The fine tuning of the properties offered by advanced chemical synthesis has been investigated by a large number of state-of-the-art techniques, including both microscopic (ESR, NMR, dielectrometry, fluorescence, IR, Raman spectroscopy) and macroscopic (calorimetric, mechanical) methodologies. The book also provides an updated coverage of the most challenging applications of organized polymers as functional materials in the fields of electrooptical devices, information retrieval and organic electroconductors. Contents: Introduction (M Giordano & D Leporini) Liquid Crystals and Their Mesophases: An Introduction (E Chiellini & G Galli) Syntheses and Structures of Liquid Crystalline Polymers (G Galli & E Chiellini) Synthesis of Electroconducting Polymers (F Ciardelli & C Ruggeri) NMR Studies of Polymeric Liquid Crystals with Different Molecular Architecture (C Boeffel & H W Spiess) NMR Studies of Collective Motions and Viscoelastic Properties in Polymeric Liquid Crystals (N J Heaton & G Kothe) Electron Spin Resonance in Polymeric Liquid Crystals (L Andreatti et al.) Nonlinear Electron Spin Resonance in Polymeric Liquid Crystals (L Andreatti et al.) Infrared and Raman Spectroscopy in Polymeric Liquid Crystals (M P Fontana & M Polli) Mechanical Properties of Semiflexible Main Chain Liquid Crystalline Polymers (M Laus) Readership: Researchers in materials science (liquid crystalline polymers). keywords: Polymers; Liquid-Crystalline Polymers; Polymeric Liquid-Crystals; Viscoelasticity; Electron Spin Resonance; Nuclear Magnetic Resonance; Raman Spectroscopy **Compendium of Polymer Terminology and Nomenclature** Richard G Jones 2009-01-19 The IUPAC system of polymer nomenclature has aided the generation of unambiguous names that reflect the historical development of chemistry. However, the explosion in the circulation of information and the globalization of human activities mean that it is now necessary to have a common language for use in legal situations, patents, export-import regulations, and environmental health and safety information. Rather than

recommending a 'unique name' for each structure, rules have been developed for assigning 'preferred IUPAC names', while continuing to allow alternatives in order to preserve the diversity and adaptability of nomenclature. Compendium of Polymer Terminology and Nomenclature is the only publication to collect the most important work on this subject into a single volume. It serves as a handy compendium for scientists and removes the need for time consuming literature searches. One of a series issued by the International Union of Pure and Applied Chemistry (IUPAC), it covers the terminology used in many and varied aspects of polymer science as well as the nomenclature of several different types of polymer including regular and irregular single-strand organic polymers, copolymers and regular double-strand (ladder and spiro) organic polymers.

Reflexive Polymers and Hydrogels Nobuhiko Yui 2004-03-17 . Despite their capacity to carry out functions that previously were unobtainable, smart polymers and hydrogels tend to have painfully slow response times. On the other hand biological systems go through phase changes at an extremely fast rate. Reflexive Polymers and Hydrogels examines the natural systems that respond almost instantaneously to envi

Advances in Liquid Crystals Jagdish K. Vij 2009-09-09 Prigogine and Rice's highly acclaimed series, Advances in Chemical Physics, provides a forum for critical, authoritative reviews of current topics in every area of chemical physics. Edited by J.K. Vij, this volume focuses on recent advances in liquid crystals with significant, up-to-date chapters authored by internationally recognized researchers in the field.

Bulk Chemicals from Petroleum B.K. Bhaskarao 2017 This book covers petrochemical industry feedstocks, chemicals derived from C1, C2, C3, C4, & Higher hydrocarbon atoms, synthesis gas & Chemicals and petroleum aromatics. Besides it, contains comprehensive information pertaining to polymers which include plastics, synthetic fibers & elastomers and synthetic detergents. This book will serve as a reference material for the students teachers and practicing engineers in the field of chemical, petroleum and petrochemical engineering.

Crystals and Crystallinity in Polymers Finizia Auriemma 2013-08-26 Provides the tools needed to master and apply the fundamentals of polymer crystallography Using core concepts in physics, chemistry, polymer science and engineering, this book sheds new light on the complex field of polymer crystallography, enabling readers to evaluate polymer crystallization data and determine the best methods to use for their investigations. The authors set forth a variety of tested and proven methods for analyzing ordered and disordered structures in polymer crystals, including X-ray diffraction, electron diffraction, and microscopy. In addition to the basics, the book explores several advanced and emerging topics in the field such as symmetry breaking, frustration, and the principle of density-driven phase formation. Crystals and Crystallinity in Polymers introduces two new concepts in crystallinity and crystals in synthetic polymers. First, crystallinity in polymeric materials is compatible with the absence of true three-dimensional long-range order. Second, the disorder may be described as a structural feature, using the methods of X-ray scattering and electron diffraction analysis. The book begins by introducing the basic principles and methods for building structural models for the conformation of polymer crystal chains. Next, it covers: Packing of macromolecules in polymer crystals Methods for extracting structural parameters from diffraction data Defects and disorder in polymer crystals Analytical methods for diffuse scattering from disordered polymer structures Crystal habit Influence of crystal defects and structural disorder on the physical and mechanical properties of polymeric materials Crystals and Crystallinity in Polymers examines all the possible types of structural disorder generally present in polymer crystals and describes the influence of each kind of disorder on X-ray and electron diffraction patterns. Its comprehensive, expert coverage makes it possible for readers to learn and apply the fundamentals of polymer crystallography to solve a broad range of problems.

Mechanical and Thermophysical Properties of Polymer Liquid Crystals Witold Brostow 2013-11-27 may never overcome the effects of hysteresis and stress (see Chapters 6 and 12). The first sentence of the reference work, Handbook of Liquid Crystals, reads: The terms liquid crystals, crystalline liquid, mesophase, and mesomorphous state are used synonymously to describe a state of aggregation that exhibits a molecular order in a size range similar to that of a crystal but acts more or less as a viscous liquid: [2] In other words, molecules within a liquid crystalline phase possess some orientational order and

lack positional order; furthermore, the shape of a liquid crystalline sample is determined by the vessel in which it is contained rather than by the orientational order of its aggregated molecules. The authors recognized the limitations and imprecision of this definition but, like others preceding them, could not devise a simple and generally applicable one that is better. Regardless, the terms 'liquid crystal' and 'mesophase' should not be used interchangeably. As mentioned above, all liquid crystals are mesophases, but all mesophases are not liquid crystals. Recent studies, employing elaborate and sophisticated analytical techniques, have permitted finer distinctions between classical crystals and mesophases. At the same time, they have made definitions like that from the Handbook of Liquid Crystals somewhat obsolete for reasons other than terminology. One part of the problem arises from the use of a combination of bulk properties (like flow) and microscopic properties (like molecular ordering) within the same definition.

Liquid Crystalline and Mesomorphic Polymers Valery P. Shibaev 2012-12-06 Among the various new directions in modern polymer science, the design and investigation of liquid crystal (LC) polymers have been the ones growing most actively and fruitfully. In spite of that, the possible formation of an anisotropic LC phase was only demonstrated theoretically for the first time in the 1950s by Onsager [1] and Flory [2], and then experimentally verified in the studies with polypeptides solutions. In essence, the studies of these LC lyotropic systems did not deviate from the theme of purely academic interest. It was at the beginning of the 1970s that the experimental "explosion" occurred, when aromatic polyamides were synthesized and their ability to form LC solutions in certain very aggressive solvents was discovered. The search for practical applications of such LC systems was crowned with the successful creation of the new generation of ultrastrong high-modulus thermally stable fibers, such as the Kevlar, due to the high degree of order of the macromolecules in the anisotropic LC state. In fact, these investigations coincided with the swift emergence on the practical "scene" of thermotropic low-molar-mass liquid crystals, with the use of these materials in microelectronics and electro optics (figures and letters indicators, displays in personal computers, and flat TV, etc.). Polymer scientists also began to develop methods of synthesizing thermotropic LC polymers by incorporating mesogenic fragments in the main (main-chain LC polymers) or side branchings of the macromolecules (side-chain or comb shaped polymers).

Ionic Liquid Crystals Giacomo Saielli 2019-06-24 In this book we have collected a series of state-of-the-art papers written by specialists in the field of ionic liquid crystals (ILCs) to address key questions concerning the synthesis, properties, and applications of ILCs. New compounds exhibiting ionic liquid crystalline phases are presented, both of calamitic as well as discotic type. Their dynamic and structural properties have been investigated with a series of experimental techniques including differential scanning calorimetry, polarized optical spectroscopy, X-ray scattering, and nuclear magnetic resonance, impedance spectroscopy to mention but a few. Moreover, computer simulations using both fully atomistic and highly coarse-grained force fields have been presented, offering an invaluable microscopic view of the structure and dynamics of these fascinating materials.

The Language of Shape S. Hyde 1996-11-19 This book develops the thesis that structure and function in a variety of condensed systems - from the atomic assemblies in inorganic frameworks and organic molecules, through molecular self-assemblies to proteins - can be unified when curvature and surface geometry are taken together with molecular shape and forces. An astonishing variety of synthetic and biological assemblies can be accurately modelled and understood in terms of hyperbolic surfaces, whose richness and beauty are only now being revealed by applied mathematicians, physicists, chemists and crystallographers. These surfaces, often close to periodic minimal surfaces, weave and twist through space, carving out interconnected labyrinths whose range of topologies and symmetries challenge the imaginative powers. The book offers an overview of these structures and structural transformations, convincingly demonstrating their ubiquity in covalent frameworks from zeolites used for cracking oil and pollution control to enzymes and structural proteins, thermotropic and lyotropic bicontinuous mesophases formed by surfactants, detergents and lipids, synthetic block copolymer and protein networks, as well as biological cell assemblies, from muscles to membranes in prokaryotic and eukaryotic cells. The relation between structure and function is analysed in terms of the previously neglected hidden variables of curvature and topology. Thus, the catalytic activity of zeolites and enzymes, the superior material properties of interpenetrating networks in microstructured polymer composites, the transport requirements in cells, the transmission of nerve

signals and the folding of DNA can be more easily understood in the light of this. The text is liberally sprinkled with figures and colour plates, making it accessible to both the beginning graduate student and researchers in condensed matter physics and chemistry, mineralogists, crystallographers and biologists.

Liquid Crystalline Polymers Vijay Kumar Thakur 2015-11-16 This book introduces anisotropic innovations in liquid crystalline polymers as well as new nanocomposite materials and testing techniques. The authors detail the newest discoveries of material properties, material types and phases, and material characterization. This interdisciplinary work creates valuable links that strengthen the approach to the evolving field of liquid crystalline polymers/ materials.

Liquid Crystals and their Computer Simulations Claudio Zannoni 2022-07-28 A comprehensive introduction to liquid crystals and their computer simulations suitable for students, researchers and industrial scientists.

Liquid Crystals II D.M.P. Mingos 2003-09-04 The liquid crystalline state may be identified as a distinct and unique state of matter which is characterised by properties which resembles those of both solids and liquids. It was first recognised in the middle of the last century through the study of nerve myelin and derivatives of cholesterol. The research in the area really gathered momentum, however, when as a result of the pioneering work of Gray in the early 1970's organic compounds showing liquid crystalline properties were shown to be suitable to form the basis of display devices in the electronic products. The study of liquid crystals is truly multidisciplinary and has attracted the attention of physicists, biologists, chemists, mathematicians and electronics engineers. It is therefore impossible to cover all these aspects fully in two small volumes and therefore it was decided in view of the overall title of the series to concentrate on the structural and bonding aspects of the subject. The Chapters presented in these two volumes have been organised to cover the following fundamental aspects of the subject. The calculation of the structures of liquid crystals, an account of their dynamical properties and a discussion of computer simulations of liquid crystalline phases formed by Gay Berne mesogens. The relationships between molecular conformation and packing are analysed in some detail. The crystal structures of liquid crystal mesogens and the importance of their X ray scattering properties for characterisational purposes are discussed.

Side Chain Liquid Crystal Polymers C.B. McArdle 1990-04-30

Liquid Crystal Dimers Santanu Kumar Pal 2017-03-06 "Discusses the design principles, synthesis and thermal behaviour of all types of LC dimers"--

Handbook of Liquid Crystals, 8 Volume Set John W. Goodby 2014-04-14 Much more than a slight revision, this second edition of the successful "Handbook of Liquid Crystals" is completely restructured and streamlined, with updated as well as completely new topics, 100% more content and a new team of editors and authors. As such, it fills the gap for a definitive, single source reference for all those working in the field of organized fluids and will set the standard for the next decade. The Handbook's new structure facilitates navigation and combines the presentation of the content by topic and by liquid-crystal type: A fundamentals volume sets the stage for an understanding of the liquid crystal state of matter, while individual volumes cover the main types and forms, with a final volume bringing together the diverse liquid crystal phases through their applications. This unrivaled, all-embracing coverage represents the undiluted knowledge on liquid crystals, making the Handbook a must-have wherever liquid crystals are investigated, produced or used, and in institutions where their science and technology is taught. Also available electronically on Wiley Online Library, www.wileyonlinelibrary.com/ref/holc Volume 1: Fundamentals of Liquid Crystals Volume 2: Physical Properties and Phase Behavior of Liquid Crystals Volume 3: Nematic and Chiral Nematic Liquid Crystals Volume 4: Smectic and Columnar Liquid Crystals Volume 5: Non-Conventional Liquid Crystals Volume 6: Nanostructured and Amphiphilic Liquid Crystals Volume 7: Supermolecular and Polymeric Liquid Crystals Volume 8: Applications of Liquid Crystals

Polymer-modified Liquid Crystals Ingo Dierking 2019-01-03 A state-of-the-art account of current developments in polymer-dispersed liquid crystals and polymer-stabilized liquid crystals research.

An Introduction to Liquid Crystals Gregory A DiLisi 2019-09-24 Practically every display technology in use today relies on the flat, energy-efficient construction made possible by liquid crystals. These displays provide visually-crisp, vibrantly-colored images that a short time ago were thought only possible in science fiction. Liquid crystals are known mainly for their use in display technologies, but they also provide many diverse and useful applications: adaptive optics, electro-optical devices, films, lasers, photovoltaics, privacy

windows, skin cleansers and soaps, and thermometers. The striking images of liquid crystals changing color under polarized lighting conditions are even on display in many museums and art galleries - true examples of 'science meeting art'. Although liquid crystals provide us with visually stunning displays, fascinating applications, and are a rich and fruitful source of interdisciplinary research, their full potential may yet remain untapped.

Nuclear Magnetic Resonance of Liquid Crystals Ronald Y. Dong 2012-12-06 Liquid crystals have become ubiquitous in the displays for electronic devices, ranging from wrist watches to laptop computers. Nuclear magnetic resonance is one of the important mechanisms for determining their structures and properties. This book covers NMR techniques used in studying liquid crystals and present up to date results from such studies. Ronald Dong has worked on NMR in liquid crystals for much of his professional career. Topics covered include: Nuclear spin dynamics, orientational order, molecular field theories of liquid-crystal molecules, nuclear spin relaxation, spin relaxation, rotational and translational dynamics, internal dynamics of liquid-crystal molecules, NMR in liquid crystals; an appendix covers rotations, Euler angles and Wigner rotation matrices.

Research in Progress 1990

Macromolecular Design of Polymeric Materials Hatada 1997-01-02 Providing a range of information on polymers and polymerization techniques, this text covers the gamut of polymer science from synthesis, structure and properties to function and applications. It analyzes speciality polymers, including acrylics, fluoropolymers, polysilanes, polyphosphazenes, and inorganic and conducting polymers. The book examines the stereochemistry of polymerization and the stereoregularity of polymers.

Liquid Crystals Beyond Displays Quan Li 2012-05-29 The chemistry, physics, and applications of liquid crystals beyond LCDs Liquid Crystals (LCs) combine order and mobility on a molecular and supramolecular level. But while these remarkable states of matter are most commonly associated with visual display technologies, they have important applications for a variety of other fields as well. *Liquid Crystals Beyond Displays: Chemistry, Physics, and Applications* considers these, bringing together cutting-edge research from some of the most promising areas of LC science. Featuring contributions from respected researchers from around the globe, this edited volume emphasizes the chemistry, physics, and applications of LCs in areas such as photovoltaics, light-emitting diodes, field-effect transistors, lasers, molecular motors, nanophotonics and biosensors. Specific chapters look at magnetic LCs, lyotropic chromonic LCs, LC-based chemical sensors, LCs in metamaterials, and much more. Introducing readers to the fundamentals of LC science through the use of illustrative examples, *Liquid Crystals Beyond Displays* covers not only the most recent research in the myriad areas in which LCs are being utilized, but also looks ahead, addressing potential future developments. Designed for physicists, chemists, engineers, and biologists working in academia or industry, as well as graduate students specializing in LC technology, this is the first book to consider LC applications across a wide range of fields.

Polymer Thin Films Ophelia Kwan Chui Tsui 2008 Ch. 1. Block copolymer thin films / J.-Y. Wang, S. Park and T. P. Russell -- ch. 2. Equilibration of block copolymer films on chemically patterned surfaces / G. S. W. Craig, H. Kang and P. F. Nealey -- ch. 3. Structure formation and evolution in confined cylinder-forming block copolymers / G. J. A. Sevink and J. G. E. M. Fraaije -- ch. 4. Block copolymer lithography for magnetic device fabrication / J. Y. Cheng and C. A. Ross -- ch. 5. Hierarchical structuring of polymer nanoparticles by self-organization / M. Shimomura ... [et al.] -- ch. 6. Wrinkling polymers for surface structure control and functionality / E. P. Chan and A. J. Crosby -- ch. 7. Crystallization in polymer thin films: morphology and growth / R. M. Van Horn and S. Z. D. Cheng -- ch. 8. Friction at soft polymer surface / M. K. Chaudhury, K. Vorvolakos and D. Malotky -- ch. 9. Relationship between molecular architecture, large-strain mechanical response and adhesive performance of model, block copolymer-based pressure sensitive adhesives / C. Creton and K. R. Shull -- ch. 10. Stability and dewetting of thin liquid films / K. Jacobs, R. Seemann and S. Herminghaus -- ch. 11. Anomalous dynamics of polymer Films / O. K. C. Tsui.

Liquid Crystal Polymers D. Coates 2000 Liquid crystal polymers (LCPs) have a wide range of uses, from strong engineering plastics to delicate gels for use in liquid crystal (LC) displays. For this reason, it is essential reading for materials scientists, engineers or technologists in industry, as well as research laboratories or academia. An additional indexed section containing several hundred abstracts from the

Rapra Polymer Library database gives useful references for further reading.

Self-order and Form in Polymeric Materials A. Keller 1995-03-31 This multicontributor volume reviews the state-of-the-art in this important area of polymer structure. The understanding of polymer structure and morphology is examined from both theoretical and experimental viewpoints. Includes crystalline, amorphous and liquid crystalline polymers.

Polymer Science Dictionary M. Alger 1996-12-31 More than 10,000 entries with expanded encyclopaedic-style definitions make this major reference work invaluable to practitioners, researchers and students working in the area of polymer science and technology. This new edition now includes liquid crystal polymers, new characterisation methods and polymers with special electrical properties

Studies of Liquid Crystalline Polymers Scott Richard Clingman 1998 Several series of liquid crystalline polymers comprised of various chain architectures have been designed, synthesized and characterized to examine the influence of chain architecture on polymer chain dynamics.

Liquid Crystalline Semiconductors Richard J. Bushby 2012-11-28 This is an exciting stage in the development of organic electronics. It is no longer an area of purely academic interest as increasingly real applications are being developed, some of which are beginning to come on-stream. Areas that have already been commercially developed or which are under intensive development include organic light emitting diodes (for flat panel displays and solid state lighting), organic photovoltaic cells, organic thin film transistors (for smart tags and flat panel displays) and sensors. Within the family of organic electronic materials, liquid crystals are relative newcomers. The first electronically conducting liquid crystals were reported in 1988 but already a substantial literature has developed. The advantage of liquid crystalline semiconductors is that they have the easy processability of amorphous and polymeric semiconductors but they usually have higher charge carrier mobilities. Their mobilities do not reach the levels seen in crystalline organics but they circumvent all of the difficult issues of controlling crystal growth and morphology. Liquid crystals self-organise, they can be aligned by fields and surface forces and, because of their fluid nature, defects in liquid crystal structures readily self-heal. With these matters in mind this is an opportune moment to bring together a volume on the subject of 'Liquid Crystalline Semiconductors'. The field is already too large to cover in a comprehensive manner so the aim has been to bring together contributions from leading researchers which cover the main areas of the chemistry (synthesis and structure/function relationships), physics (charge transport mechanisms and optical properties) and potential applications in photovoltaics, organic light emitting diodes (OLEDs) and organic field-effect transistors (OFETs). This book will provide a useful introduction to the field for those in both industry and academia and it is hoped that it will help to stimulate future developments.

Chemistry of Discotic Liquid Crystals Sandeep Kumar 2016-04-19 The self-contained properties of discotic liquid crystals (DLCs) render them powerful functional materials for many semiconducting device applications and models for energy and charge migration in self-organized dynamic functional soft materials. The past three decades have seen tremendous interest in this area, fueled primarily by the possibility of creating a new generation of organic semiconductors and wide viewing displays using DLCs. While a number of books on classical calamitic liquid crystals are available, there are, as yet, no books that are dedicated exclusively to the basic design principles, synthesis, and physical properties of DLCs. The first reference book to cover DLCs, *Chemistry of Discotic Liquid Crystals: From Monomers to Polymers* highlights the chemistry and thermal behavior of DLCs. Divided into six chapters, each with a general description, background, and context for the concepts involved, the book begins with a basic introduction to liquid crystals, describing molecular self-assembly and various types of liquid crystals. It outlines their classification, covers their history and general applications, and focuses on DLCs and their discovery, structure, characterization, and alignment. The book goes on to examine the chemistry and physical properties of various monomeric DLCs, including 25 sections describing the synthesis and mesomorphic properties of monomeric DLCs formed by different cores. The bulk of the book covers the chemistry and mesomorphism of discotic dimers, oligomers, and polymers and concludes with a look at some applicable properties of DLCs. A comprehensive and up-to-date resource, this book is designed to be accessible and of value not just for students and researchers but also to the directors and principal investigators working in this field, providing the foundation and fuel to advance this fast-growing technological field.

Polymeric Liquid Crystals Alexandre Blumstein 2013-06-29 This book originated in the Proceedings of the Second Symposium on Polymeric Liquid Crystals held by the Division of Polymer Chemistry in the framework of the 1983 Fall Meeting of the American Chemical Society. At the First Symposium in 1977, the literature in this field could be encompassed in a single volume. To day, that is no longer possible. The field of Polymeric Liquid Crystals grew, and continues to grow, at a very rapid pace. At present, we know of every major mesophase in its polymeric form and of polymeric glasses, elastomers and fluids in their liquid crystalline form. Every year, new polymeric mesophases are being discovered. The aim of this book is to go beyond a compilation of papers presented at the 1983 ACS Fall Meeting. It is conceived as a learning tool for the benefit of the scientist interested in Polymeric Liquid Crystals. The book is divided into three sections. The first section contains articles discussing synthetic, physico chemical, structural and rheological aspects of Polymeric Liquid Crystals in their generality. A chapter on methods currently used in this field is also included. There are also chapters on theoretical and classification aspects of PLCs. These self-contained tutorial chapters provide an introduction to this field as well as to the specific papers given in the book. They provide an exhaustive coverage of literature on the subject from its inception to the present.

Compendium of Polymer Terminology and Nomenclature International Union of Pure and Applied Chemistry. Commission on Macromolecular Nomenclature 2009 This new edition of the "Purple Book" is one of a series of books issued by the International Union of Pure and Applied Chemistry.

Liquid Crystal Polymers: From Structures to Applications A.A. Collyer 2012-12-06 The subject of liquid crystals and their use in electronic displays and in non-linear optical systems has become of tremendous importance during the last decade; and the incorporation of liquid crystal units into polymeric materials has led to a group of new materials with diverse properties. Some of these properties have been utilized in new products and some have yet to be used. Much published work has appeared that deals with specific materials or particular applications, and it was felt that a book was needed to examine and explain the underlying principles governing the diverse properties of these liquid crystal polymers, LCPs. The current work describes the diverse nature of LCPs, their synthesis, characterization, properties and finally their applications. It describes the manner in which liquid crystallinity or mesomorphism occurs in small molecules, monomer liquid crystals and polymer liquid crystals. Chapter 1 gives a classification of the various ways in which the mesogens may be connected to the polymer chains. Currently, the bulk of LCP material is based on main chain or longitudinal LCPs for use in engineering applications. The side chain or comb polymers are intended for use in electronics and opto-electronic systems and as surfactants. Many other variants and possibilities exist but their properties have not yet been fully studied or used. In this respect it is hoped that the current work will indicate future possibilities as well as discussing current opinion. v Preface vi Chapters 2 and 3 describe methods of characterizing the mesophases.

Handbook of Surfaces and Interfaces of Materials, Five-Volume Set Hari Singh Nalwa 2001-10-26 This handbook brings together, under a single cover, all aspects of the chemistry, physics, and engineering of surfaces and interfaces of materials currently studied in academic and industrial research. It covers different experimental and theoretical aspects of surfaces and interfaces, their physical properties, and spectroscopic techniques that have been applied to a wide class of inorganic, organic, polymer, and biological materials. The diversified technological areas of surface science reflect the explosion of scientific information on surfaces and interfaces of materials and their spectroscopic characterization. The large volume of experimental data on chemistry, physics, and engineering aspects of materials surfaces and interfaces remains scattered in so many different periodicals, therefore this handbook compilation is needed. The information presented in this multivolume reference draws on two decades of pioneering research on the surfaces and interfaces of materials to offer a complete perspective on the topic. These five volumes-Surface and Interface Phenomena; Surface Characterization and Properties; Nanostructures, Micelles, and Colloids; Thin Films and Layers; Biointerfaces and Applications-provide multidisciplinary review chapters and summarize the current status of the field covering important scientific and technological developments made over past decades in surfaces and interfaces of materials and spectroscopic techniques with contributions from internationally recognized experts from all over the world. Fully cross-referenced, this book has clear, precise, and wide appeal as an essential reference source

long due for the scientific community. The complete reference on the topic of surfaces and interfaces of materials The information presented in this multivolume reference draws on two decades of pioneering research Provides multidisciplinary review chapters and summarizes the current status of the field Covers important scientific and technological developments made over past decades in surfaces and interfaces of materials and spectroscopic techniques Contributions from internationally recognized experts from all over the world

Introduction to Physical Polymer Science Leslie H. Sperling 2015-02-02 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.