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Structurally, therefore, the phase is intermediate between a crystal and a liquid leading to the use of the term mesophase. Where the liquid crystalline phase forms on melting the

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polymer, it is known as thermotropic, but where it is achieved by solvent addition it is called Inotropic. Increasing temperature, or solvent concentration, will eventually lead to the

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reversion of the liquid
crystal phase to the normal
isotropic polymer melt.

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The article deals with the liquid crystalline (LC) polymers which belong to interdisciplinary science attracting the attention of wide range of researchers in the fields of polymer and material...

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changed to a hazy
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Consider a polymeric liquid
being cooled towards its

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melting temperature. Once the temperature of the liquid reaches T_m the solid crystalline phase is thermodynamically favourable. In order for the liquid to undergo a phase transition to the solid

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state a two-step process
must take place: Nucleation
of solid seeds; Growth of
the seeds

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Liquid crystallinity in polymers may occur either by dissolving a polymer in a solvent (lyotropic liquid-crystal polymers) or by heating a polymer above its glass or melting transition

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point (thermotropic liquid-crystal polymers). Liquid-crystal polymers are present in melted/liquid or solid form. In solid form the main example of lyotropic LCPs is the commercial aramid known as Kevlar. Chemical

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Structure of this aramid
consists of linearly
substituted aromatic rings
linked by amide groups.

Liquid-crystal polymer -
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bestows unusual optical properties in theory with the right sort of two dimensional shape it should be possible to create nematics with

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Processing of lyotropic
liquid crystal phases is a
promising route for
overcoming this obstacle,
but nanocylinder liquid

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Crystalline science is a nascent field that tends to be fractionated based on material type.

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in solid form the main
example of lyotropic lcps is

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the commercial aramid known

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As it is well known that,
materials that have liquid

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Crystalline properties are
early discovered long time
ago. These type of materials
can carry both type of
different types of matter
(conventional liquid and
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inserting such properly to

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the backbone of any polymer
structure.

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liquid crystalline polymer
(LCP) science was produced
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Liquid crystal polymers are capable of forming regions of highly ordered structure while in the liquid phase.

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However, the degree of order is somewhat less than that of a regular solid crystal.

Typically, LCPs have outstanding mechanical properties at high temperatures, excellent chemical resistance,

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inherent flame retardancy
and good weatherability.

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an overview | ScienceDirect

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Solid is one of the four

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fundamental states of matter (the others being liquid, gas and plasma). The molecules in a solid are closely packed together and contain the least amount of kinetic energy. A solid is characterized by structural

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rigidity and resistance to a force applied to the surface. Unlike a liquid, a solid object does not flow to take on the shape of its container, nor does it ...

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Polymer Crystallinity. Most
small molecule behavior can
be understood in terms of
three states: gas, liquid,
and solid. Polymers are
large molecules with strong
intermolecular forces and

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tangled chains, and do not have a vapor phase - they decompose before the temperature gets high enough to form a vapor. The length of polymer molecules also makes it difficult for the large crystals found in the

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solid phases of most small
molecules to form.

This book is the first to
provide a comprehensive
coverage of the field of

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liquid crystalline polymers.
It examines the synthesis,
properties, applications and
the theoretical
understanding of these
materials. It is a graduate
text, intended for those who
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Crystalline polymers within the disciplines of chemistry, physics or materials science. It will also serve as a standard reference for all involved, at whatever level, with these materials, providing

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the necessary framework within which to approach the growing literature on the subject. The book will thus be of importance to all students and researchers who are studying liquid crystalline polymers, and

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will be accessible both to those approaching the subject from a background of conventional polymer science and to those with experience of small molecule liquid crystalline polymers.

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Providing an updated and comprehensive account of the properties of solid polymers, the book covers all aspects of mechanical behaviour. This includes finite elastic behavior, linear viscoelasticity and

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mechanical relaxations,
mechanical anisotropy, non-
linear viscoelasticity, yield
behavior and fracture. New
to this edition is coverage
of polymer nanocomposites,
and molecular interpretations
of yield, e.g. Bowden,

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Young, and Argon. The book begins by focusing on the structure of polymers, including their chemical composition and physical structure. It goes on to discuss the mechanical properties and behaviour

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of polymers, the statistical molecular theories of the rubber-like state and describes aspects of linear viscoelastic behaviour, its measurement, and experimental studies. Later chapters cover composites

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behaviour, relaxation
transitions, stress and
yielding. The book
concludes with a discussion
of breaking phenomena.

This text is a primer for

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liquid crystals, polymers,
rubber and elasticity. It is
directed at physicists,
chemists, material
scientists, engineers and
applied mathematicians at
the graduate student level
and beyond.

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This is the fourth edition of a work which first appeared in 1965. The first edition had approximately one thousand pages in a single volume. This latest volume has almost three

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thousand pages in 3 volumes
which is a fair measure of
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all the topics previously
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Mechanical behavior of
intermetallic compounds; and
(most novel) a chapter on
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analyses the conceptual
mismatch between
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or engineering studying
polymer science

This book introduces various applications of liquid crystalline polymers as the

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emerging new class of high performance novel materials. The authors detail the advantageous properties of these LCs including optical anisotropic, transparency and easy control over structure. This

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interdisciplinary work
includes valuable input from
international projects with
special focus on the use of
liquid crystalline polymers
and/or nanocomposites.

The classic book that

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to crystallography and the
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Students and researchers in metallurgy, materials science, physics, chemistry, electrical, civil and mechanical engineering.

Liquid crystal polymers are sometimes called super

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polymers--with good reason. Their wide range of exceptional properties and ease of processing make them design candidates for many demanding applications. This new book provides a thorough review of LCP technology

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with the emphasis on the chemistry, synthesis and characterization of the material in its many variants. Additional chapters cover processing and applications. From the Editor's Preface The field

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of thermotropic liquid
crystalline polymers has
grown substantially in the
last two decades, with
fundamental research,
publications, commercial
products, and patents. In
the 1980's, Dr. Ralph Miano

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led my colleagues and me at Hoechst Celanese in commercializing the first thermotropic liquid crystalline polymers, based on Dr. Gordon Calundann's composition patents. Today, more than seven companies

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have produced thermotropic liquid crystalline polymer materials, with at least 50 variants available. Hence, it is timely to compile a comprehensive review on the nature of this type of material and the ongoing

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Cambridge in this field...
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The goals of this book are to summarize previous work, provide new insights into this class of polymers, and add to the understanding of the formation of liquid crystallinity. This book

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Covers a wide range of topics and addresses different disciplines in the field. The chapters are arranged as a learning scheme for the professional, from basic science to applied engineering. The

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first few chapters summarize the syntheses of various polyester, polyester-amid, and polyimide liquid crystalline polymers. The science and origins of liquid crystal formation are revealed. Next, we introduce

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the characterizations of these materials by their different chemical and physical aspects. Because most commercially available thermotropic liquid crystalline polymers have been used in the form of

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Composites, we have also incorporated a chapter on polymer blends, detailing blending mechanisms and resultant properties. Two chapters on thermosetting liquid crystalline polymers integrate them with other

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topics, because of their unique importance and their applications for microelectronics and packaging. The final chapter deals with the engineering and processing aspects of thermoplastic liquid

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Crystalline polymers for a
variety of applications.

This book deals with three
related areas having both
fundamental and
technological interest. In
the first part, the

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Objective is to provide a bird's eye view on structure in polymeric solids. This is then complemented by a chapter, directly technological in its emphasis, dealing with the influence of processing on

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polymeric materials. In spite of the technological interest, this leads to some of the current fundamental theory. Part II, concerned with liquid crystals, starts with a discussion of the physics of the various types

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of material, and concludes with a treatment of optical applications. Again, aspects of the theory are stressed though this part is basically phenomenological in character. In Part III, an account is given first of

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the use of chemical-bonding arguments in understanding the electronic structure of low-dimensional solids, followed by a comprehensive treatment of the influence of dimensionality on phase transitions. A brief summary

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of dielectric screening in
low-dimensional solids
follows. Space-charge layers
are then treated, including
semiconductor inversion
layers. Effects of limited
dimensionality on
superconductivity are also

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emphasized. Part IV concludes the volume with two specialized topics: electronic structure of biopolymers, and topological defects and disordered systems. The Editors wish to acknowledge that this book

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had its origins in the material presented at a course organized by the International Centre for Theoretical Physics, Trieste.

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