Liquid Crystals: Second Edition

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Abstract

An excellent professional reference and superior upper-level student text, Liquid Crystals, Second Edition is a comprehensive treatment of all the basic principles underlying the unique physical and optical properties of liquid crystals. Written by an internationally known pioneer in the nonlinear optics of liquid crystals, the book also provides a unique, in-depth discussion of the mechanisms and theoretical principles behind all major nonlinear optical phenomena occurring in liquid crystals. Fully revised and updated with the latest developments, this Second Edition covers: Basic physics and optical properties of liquid crystals. Nematics, as well as other mesophases such as smectics, ferroelectrics, and cholesterics. Fundamentals of liquid crystals for electro-optics, and display and non-display related applications. Various theoretical and computational techniques used in describing optical propagation through liquid crystals and anisotropic materials. Nonlinear optics of liquid crystals, including updated literature reviews and fundamental discussions. Structured to follow a natural sequence of instruction, from basic physics to the latest specialized optical, electro-optical, and nonlinear applications, Liquid Crystals is a textbook that grounds students in the fundamentals before introducing them to the most current discoveries in the field. Written in a clear, reader-friendly style, it features numerous figures, tables, and illustrations, including important and hard-to-find device and material parameters. Invaluable to students, researchers, and those working with liquid crystal applications in various industries, Liquid Crystals, Second Edition is the most comprehensive and up-to-date resource available.

Fingerprint

- Liquid Crystals
- Liquid Crystals
- Nonlinear Optics
- Students
- Physics
- Optical Properties
- Light Propagation
- Textbooks
- Electrooptical Effects
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- Physical Properties
- Display Devices

All Science Journal Classification (ASJC) codes

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- Materials Science(all)

Cite this
Liquid crystals (LCs) are a state of matter which has properties between those of conventional liquids and those of solid crystals. For instance, a liquid crystal may flow like a liquid, but its molecules may be oriented in a crystal-like way. There are many different types of liquid-crystal phases, which can be distinguished by their different optical properties (such as textures). The contrasting areas in the textures correspond to domains where the liquid-crystal molecules are oriented in different Liquid Crystal Thermometers. The use of liquid crystals as temperature sensors is possible because of the selective reflection of light by chiral nematic (cholesteric) liquid crystals. A chiral nematic liquid crystal reflects light having a characteristic wavelength determined by its pitch and by the viewing angle (the angle between the eye of the observer and the surface of the liquid crystal). Because the pitch of a chiral nematic compound is temperature-dependent, observed color is a function of temperature. Liquid crystals are substances that exhibit a phase of matter that has properties between those of a conventional liquid, and those of a solid crystal. For instance, a liquid crystal (LC) may flow like a liquid, but have the molecules in the liquid arranged and/or oriented in a crystal-like way. There are many different types of LC phases, which can be distinguished based on their different optical properties (such as birefringence). When viewed under a microscope using a polarized light source...