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Nota di contenuto	Liquid Crystals; Contents; Preface; Chapter 1. Introduction to Liquid Crystals; 1.1. Molecular Structures and Chemical Compositions; 1.1.1. Chemical Structures; 1.2. Electronic Properties; 1.2.1. Electronic Transitions and Ultraviolet Absorption; 1.2.2. Visible and Infrared Absorption; 1.3. Lyotropic, Polymeric, and Thermotropic Liquid Crystals; 1.3.1. Lyotropic Liquid Crystals; 1.3.2. Polymeric Liquid Crystals; 1.3.3. Thermotropic Liquid Crystals: Nematics, Cholesterics, and Smectics; 1.3.4. Other Liquid Crystalline Phases and Molecular Engineered Structures; 1.4. Mixtures and Composites 1.4.1. Mixtures1.4.2. Dye-Doped Liquid Crystals; 1.4.3. Polymer-Dispersed Liquid Crystals; 1.5. Liquid Crystal Cells and Sample Preparation; 1.5.1. Bulk Thin Film; 1.5.2. Liquid Crystal Optical Slab Waveguide, Fiber, and Nanostructured Photonic Crystals; References; Chapter 2. Order Parameter, Phase Transition, and Free Energies; 2.1. Basic Concepts; 2.1.1. Introduction; 2.1.2. Scalar and Tensor Order Parameters; 2.1.3. Long- and Short-Range Order; 2.2. Molecular Interactions and Phase Transitions; 2.3. Molecular Theories and Results for the Liquid Crystalline Phase 2.3.1. Maier-Saupe Theory: Order Parameter Near T(c)2.3.2. Nonequilibrium and Dynamical Dependence of the Order Parameter;

2.4. Isotropic Phase of Liquid Crystals; 2.4.1. Free Energy and Phase Transition; 2.4.2. Free Energy in the Presence of an Applied Field; References; Chapter 3. Nematic Liquid Crystals; 3.1. Introduction; 3.2. Elastic Continuum Theory; 3.2.1. The Vector Field: Direct Axis  $n(r)$ ; 3.2.2. Elastic Constants, Free Energies, and Molecular Fields; 3.3. Dielectric Constants and Refractive Indices 3.3.1. dc and Low-Frequency Dielectric Permittivity, Conductivities, and Magnetic Susceptibility 3.3.2. Free Energy and Torques by Electric and Magnetic Fields; 3.4. Optical Dielectric Constants and Refractive Indices; 3.4.1. Linear Susceptibility and Local Field Effect; 3.4.2. Equilibrium Temperature and Order Parameter Dependences of Refractive Indices; 3.5. Flows and Hydrodynamics; 3.5.1. Hydrodynamics of Ordinary Isotropic Fluids; 3.5.2. General Stress Tensor for Nematic Liquid Crystals; 3.5.3. Flows with Fixed Director Axis Orientation; 3.5.4. Flows with Director Axis Reorientation 3.6. Field-Induced Director Axis Reorientation Effects 3.6.1. Field-Induced Reorientation without Flow Coupling: Freedericksz Transition; 3.6.2. Reorientation with Flow Coupling; References; Chapter 4. Cholesteric, Smectic, and Ferroelectric Liquid Crystals; 4.1. Cholesteric Liquid Crystals; 4.1.1. Free Energies; 4.1.2. Field-Induced Effects and Dynamics; 4.1.3. Twist and Conic Mode Relaxation Times; 4.2. Light Scattering in Cholesterics; 4.2.1. General Optical Propagation and Reflection: Normal Incidence; 4.2.2. Cholesteric Liquid Crystal as a One-Dimensional Photonic Crystal 4.2.3. Cholesteric Liquid Crystals with Magneto-Optic Activity: Negative Refraction Effect

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#### Sommario/riassunto

The fundamental science and latest applications of liquid crystal technologies 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. F

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