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Chapter 1 : [PDF] Corsican Honor The Corsican 2 By William Heffernan - blog.quintoapp.com

constraints, and strong electric field exogenic impacts on various soft matter sciences, geology, biology, or medicine but hardly, if at all used in physics so biophysics, biotechnology - all these are topics of this book.

Introduction - This book, consisting of 10 chapters, should be treated as a complement that brings the reader up to date with the latest contributions to the rich literature on liquid crystals. A prominent place in this literature is occupied by the dielectric properties which are important in estimation of usefulness of these materials and in understanding the molecular processes determining various mesophases. In the field of dielectrics in general, and in connection with the structure and phase transitions the entries in references [1] can be recommended. With respect to general aspects of liquid-crystalline properties and molecular dynamics one can point out the references [2]. Most of them contain as well chapters on dielectric properties. In addition there is a number of books and monographs related strictly to the dielectric properties of liquid crystals, in particular references [3]. For the readers less familiar with this topic and interested in the basic knowledge of dielectric aspects of liquid crystals one can suggest the reviews [4]. Basic difference between properties of isotropic liquid and liquid crystal lies in the existence in the latter case of at least one degree of order. The ordering can be also considered with respect to a crystalline phase. Thus introducing at least one degree of disorder rotational or translational causes the occurrence of a mesophase which, however, is not identical with the liquid-crystalline phase. If the mesophase is to be liquid-crystalline, it should possess at least one translational degree of disorder. The disorder connected with further degrees of freedom leads to rich polymorphism. The most characteristic feature of liquid-crystalline phases is a precisely defined degree of disorder of molecules building these phases and their anisotropy which is exhibited in molecular structure and all measurable physical parameters such as polarizability. This is the reason why such phases are also called anisotropic liquids. The insertion into the molecules that form mesophases of fragments either chiral or influencing antagonistically already present fragments e. This causes the frustration phenomena, i. These induced phenomena conduce to unexpected structures banana-type or columnar-type mesophases and properties such as helicity, ferroelectricity or antiferroelectricity. Unusual progress observed in the last half-century has occurred due to use of some additional interacting fragments and structural details. Liquid crystalline polymers and metalomesogens present rapidly growing branches of knowledge of liquid crystal. Ferromagnetism and superconductivity of liquid crystals still pose a challenge. In this monograph we present different aspects of dielectric properties of mesogens. Chapter 1 presented by Otowski is dedicated to general problems of the molecular dipole s motion in electric field. Based on the broadband dielectric studies results of a few liquid-crystalline substances, their dielectric behavior is discussed by means of Nordio-Rigatti-Segre theory. The pretransitional anomalies observed in isotropic phase close to the phase transitions by means of dielectric measurements are described by Drozd-Rzoska, Rzoska and Janik in Chapter 2. An extended part of this book is devoted to chiral liquid crystals, the importance of which for applications and expectations for them are continuously increasing. The principles of the dielectric behavior of chiral liquid-crystalline compounds based on general considerations applying for other dipolar systems as well is presented by Hoffmann in Chapter 3. The problem of non-linear dielectric effects constitutes an important part of this book. A general introduction to the non-linear dielectric spectroscopy is contained in Chapter 5 elaborated by Kedziora, who concentrates himself on the isotropic phase, solutions and precritical phenomena. The problem of molecular properties of smectic materials and relaxation in ferroelectric liquid crystals with particular attention paid to electrooptic phenomena are discussed by Kuczynski in Chapter 6. Advantages of electrooptic methods applied to chiral tilted smectic liquid crystals with either ferroelectric or antiferroelectric dipole order are known. However, less popular problem of so called organic glass formers presented by Massalska-Arodz, Sciesinska, Sciesinski, Krawczyk, Inoba and Zielinski in Chapter 7 deserved attentions. Properties of these materials are discussed by using the results of complementary methods such as INS, QENS, adiabatic

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calorimetry and far-infrared spectra. Such systems seem to be fascinating not only from the point of view of surface interactions but also due to attractive properties of dispersed systems in nanoscale. Of great value is also Chapter 9 by Kocot, Merkel, Sufin, Vij and Mehl describing dendrimeric liquid crystals built of molecules containing siloxane or carbosilazane cores. The problems of dynamics and ordering are discussed in terms of IR and dielectric spectroscopy results. Chapter 10, written by Urban, is committed to the relaxation processes in calamitic liquid crystals with emphasis on pressure and temperature effects. Finally let us direct readers attention to general references relating to the new liquid crystalline compounds [49] and IUPAC classification of these systems [50]. Textures and Structures, Leonard Hill, Glasgow. B, Plenum Press, NY. Principles, Properties and Applications, Series: Ferroelectricity and Related Phenomena, Volume 7. Gordon and Breach, Philadelphia. Advances in Liquid Crystals, Vol. Solid State Physics, Supplement Physical Properties of Liquid Crystals: Liquid Crystals, Brown G. Handbook of Liquid Crystals, Demus D. Dunmur D and Toriyama K.

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Coupling between order parameters is ubiquitous in soft matter. Such a coupling produces a variety of complex phases with unique properties that can be used in new emerging technologies.