

New Method to Study Biaxiality of Liquid Crystals with Positive Dielectric Anisotropy– the Case of a Bent-Core Material

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We propose that, for materials having positive dielectric anisotropy, the biaxiality can be clearly verified or excluded by measuring the transmitted light intensity as a function of electric field. If the material is biaxial and is observed in homeotropically aligned cells, the Schlieren texture should not disappear (transmitted intensity is not zero) even at very high fields, since the field does not affect the distribution of the second director normal to the main director. On the other hand, if the material is uniaxial the transmitted intensity should decrease with increasing field and a perfect homeotropic texture can be achieved at high fields. We have studied a bent-core compound A131 in which a uniaxial-biaxial nematic (N_u - N_b) transition has been reported by Prasad et al. (J. Am. Chem. Soc. 127 (2005) 17224). This material has a positive dielectric anisotropy at low frequencies (below about 100 kHz), so we could apply the technique described above. Our studies indicate that the material is uniaxial in the entire nematic range.