STUDIES OF ORIENTATIONAL ORDER OF LIQUID CRYSTALS IN POLYMER MATRIX

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ABSTRACT

Infrared spectrophotometry was employed to obtain the order parameter, S , as a function of temperature, for nematic liquid crystal in stretched polystyrene (PS) film. The nematic solutes used in this thesis are the first six members of the homologous series P-(n-alkyloxybenzylidene) -p-n-butylanilines (ABBA). Both ABBA and PS were prepared and the mesomorphic transition temperatures of the prepared ABBA were determined by several methods.

The temperature dependence of the orientational order of 20.0% (by weight) ABBA in stretched PS film is different from that of pure ABBA and pure PS. In general, the order parameters of both the solutes and solvent decrease with increasing temperature. The implication of these results are discussed in term of the thermal motion of polystyrene. The orientation of the solute molecule originated from its properties and related to the perturbation by stretched polymer.

The absorption band at 757 cm^{-1}, due to C-H out of plane bending of the mono-substituted benzene ring, is chosen to determine the order parameter, S, of polystyrene. This absorption band shows dichroism of parallel type. The other absorption band chosen to determine the order

parameter of ABBA is 837 cm^{-1} which shows dichroism of perpendicular type. The orientation behavior of ABBA in the stretched polystyrene film has been discussed in terms of the difference in the dichroic behavior.