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Phase Transition, Molecular Polarizability and Histogram Equalization Studies on Two Liquid Crystals of same terminal group and different linking and End chains

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Abstract:

The optical textures and Phase transition temperatures exhibited by liquid crystalline compounds viz 4-Cyano-4'-propoxy-1,1'-biphenyl and 6-Cyano-2-naphthyl 4-heptylcyclohexanecarboxylate are recorded by Polarizing Optical Microscope (POM), for confirmation the phase transition temperatures are also estimated by (DSC) Differential Scanning Calorimeter. Using phase transition temperatures the molecular polarizabilities of the compounds are estimated by quantum dynamical method. A theoretical approach. The density and refractive indices are carried out. By density studies it is noticed that 4-Cyano-4'-propoxy-1, 1'-biphenyl compound exhibit only nematic phase and 6-Cyano-2-naphthyl 4-heptylcyclohexanecarboxylate exhibit nematic and smectic A phases. The refractive indices and density data is used to evaluate molecular polarizabilities by well known Vuk's and Neugabaur methods. The molecular polarizabilities are found to be same in theoretical and experimental methods. Histogram equalization technique is exploited on textural images to improve contrast in image.

Keywords: Density, Histogram, Liquid crystals, Phase transition, Polarizability, Refractive indices.