

Study of Mesomorphism Through a Novel Homologous Series and Its Relation to Molecular Structure

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Abstract

A novel homologous series 4-(4'-n-alkoxy benzoyloxy)-3-chloro phenyl azo,3",4"-dichlorobenzenes was synthesized with a view to understand and establish the relation between mesomorphism and the molecular structure. The novel series consists of 12 members, which showed commencement of monotropic nematic mesophase formation from the butoxy homologue and continued up to the hexadecyloxy homologue without exhibition of a smectic mesophase. The textures of the nematic mesophase are threaded or Schlieren in type. Transition temperatures were determined by an optical polarizing microscope equipped with a heating stage. Isotropic-nematic transition curve of the phase diagram behaved in normal manner with exhibition of odd-even effect. Solid-isotropic transition curve behaved descending tendency by adopting zigzag path up to the pentyloxy homologue; which include methoxy to propoxy homologues as nonmesomorphic derivatives. Thermal stability for the nematic is just a few degrees (1°C to 2°C). Analytical and spectral data support the molecular structures. The mesomorphic properties of present novel series are compared with structurally similar other known homologous series.

Keywords: liquid crystal, Montropy, Mesomorph, Meshomorphogy, nematic