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Synthesis and Study of Mesomorphic Properties of Liquid Crystalline Compounds Involving Lateral -OCH₃ Group and Vinyl Carboxylate Central Linkage

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ABSTRACT

In the present investigation, a newly synthesized ester homologous series of mesogenic compounds having a vinyl carboxylate group as central linkage with two phenyl rings and a laterally substituted methoxy group as well as -CH=CH-COOC₄H₉ terminal end group were synthesized. Eleven homologues were synthesized. Among these eleven homologues first seven derivatives C₁ to C₇ of the investigated series are nonmesomorphic by nature. Rest of the homologs are smectic by nature, among these C₈, C₁₀ and C₁₂ homologues show monotropically smectic phase, while the last member of the series C₁₄ show smectic phase enantiotropically. Thus, presently investigated series is predominately smectogenic by nature without exhibiting nematic mesophase. Transition temperatures and textures of synthesized compounds were observed through an optical polarizing microscope equipped with a heating stage. The textures of smectogenic mesophase are focal conic fan-shaped. Some representative members were characterized by IR, ¹HNMR, mass spectroscopy and elemental analysis. Transition temperatures of homologues are plotted versus the number of carbon atoms present in n-alkyl chain of left n-alkoxy terminal end group. Isotropic-smectic / smectic-isotropic transition curve behaves in a normal ascending manner. Thermal stability and other mesogenic characteristics are compared with other structurally similar homologous series. The mesogenic phase length ranges between 5 °C and 24 °C and is of middle-order melting type.

Keywords: Liquid crystals, Mesomorphism, Smectogenic, Thermotropic, DSC