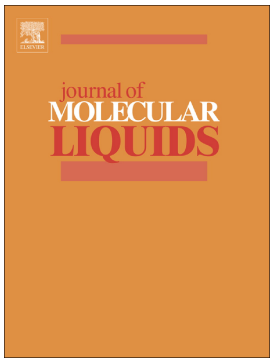

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Synthesis, Structural and Mesophase Characterization of Isoindoline-1,3-dione based Mesogenic Schiff Bases

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Abstract

Two homologous series of mesogenic Schiff-bases, [4-(((4-(1,3-dioxoisoindolin-2-yl)phenyl)imino)methyl)-3-hydroxyphenyl-4-(alkoxy)benzoate, HL_1^n, (Series I), which is an ester derivative of HL and 2-(4-((4-(alkoxy)-2-hydroxybenzylidene)amino)phenyl)isoindoline-1,3-dione, HL_2^n, (Series II), which is an alkoxy derivative of HL where HL = 2-{4-[(2-Hydroxy-benzylidene)-amino]-phenyl}-isoindole-1,3-dione) and n = $–C_8H_{17}$, $–C_{10}H_{21}$, $–C_{12}H_{25}$ and $–C_{14}H_{29}$] have been prepared and their molecular structures and thermal behaviour studied by FTIR, NMR and ESI-MS spectrometry, DSC, POM and variable temperature PXRD techniques; all these derivatives displayed an enantiotropic liquid crystalline behaviour with Nematic texture while few of them also exhibited SmA phase. Influence on thermal behaviour and mesomorphic properties upon changing the spacer was investigated in both the series. The HOMO and LUMO band gaps were found to be 2.89 and 3.26 eV for the two series respectively which were found to be in reasonable agreement with theoretical calculations (by DFT) made on optimized structure of one representative compound of each series.

Keywords: Liquid crystal; fluorescence; Isoindoline-1, 3-dione; Schiff-base.