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## The Effect of Hydrogen Bonding and Azomethine Group Orientation on Liquid Crystal Properties in Benzylidene Aniline Compounds

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### Abstract

This study examines the effects of substituents and hydrogen bonding, orientations of imine linkage on the behavior of benzylidene aniline compounds as liquid crystals (LC). Compounds 4-carboxy benzylidene-4-X-aniline (X = H, F, Cl, Br, CH<sub>3</sub>, OCH<sub>3</sub>) 1a-6a were synthesized by the reaction of aniline and its substituted derivatives with 4-formylbenzoic acid. Compounds 4-X-benzylidene-4-carboxy aniline (X = H, F, Cl, Br, CH<sub>3</sub>, OCH<sub>3</sub>) 1b-6b were synthesized by the reaction of benzaldehyde and its substituted derivatives with 4-aminobenzoic acid using absolute ethanol as the solvent. Synthesized compounds were characterized by FT IR and <sup>1</sup>H NMR spectroscopy, liquid crystal properties were investigated using differential scanning calorimetry (DSC) and polarizing optical microscopy (POM) techniques. Based on the mesomorphic properties, it was proven that the compounds 2b-4b are dimorphic exhibiting a smectic and nematic phase, compounds 5b, 6b are monomorphic exhibiting a nematic phase, while compounds 1a-6a and 1b have not shown any mesophase. For compounds 1a-6a hydrogen bonding and reversing imine linkage (in comparison with compounds 1b-6b) caused the absence of their mesomorphic properties.

### Keywords:

Benzylideneaniline, liquid crystals, hydrogen bonding, nematic phase, smectic phase, 4-formylbenzoic acid