Title:	Phase Behaviours of Asymmetric Benti-Shaped Mesogens and the study of Interfacial Phenomenon involving Nematics
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Abstract:	Abstract Liquid crystals (LCs) are fascinating molecules due to their intriguing properties like long-range orientational order, less positional order plus birefringence. Their occurrence as the intermediate state of matter imparts them with the liquid-like flow and crystal-like positional ordering. Among the three major categories depending on the molecular shape, bent-shaped molecules are drawing massive attention from researchers these days. In general, bent-shaped liquid crystals possess distinctive banana phases. However, the small ringed bent-shaped molecules particularly the three and four rings act as a borderline between the rod-like and banana-shaped LCs. These frontier molecules were found to exhibit the nematic and smectic phases. Materials displaying these phases were called hockey-stick-shaped LCs when asymmetric and Boomerang LCs while V-shape or symmetric. Hence, miniaturization plays a key role here. This enables the reallocation of the LC phase from higher temperatures to room temperature. Furthermore, it results in a reduction in the number of synthetic steps, low viscosity, lowering in melting point, etc. In the present thesis, the aim is the surveillance of mesomorphic fluctuations of novel bent-core systems as a result of chemical structural modifications. The consequences of variable aliphatic chain units, terminal polar functional group (i.e., F, Cl, Br, I, NO 2) substitution as well as the imine bond linkage isomerism on the liquid crystalline phase behavior have been focused on. The type and range of the LC phase of synthesized compounds are predicted through elaborative temperature-dependent small-angle and wide-angle X-ray scattering studies together with polarizing optical photomicrographs and differential scanning calorimetry. The density functional theory calculations have also been performed to obtain the molecular parameters such as molecular length, bent-angle, resultant dipole moment and principal polarizability components. In the latter part, hydrogen bond-assisted anchoring transitions amid nematic 5CB (4-Cyano-4'- pentylbiphenyl) LC and phenols at the LC-aqueous interface have been studied. The Raman spectroscopy accompanied by the polarizing optical microscopy is being utilized to monitor the interfacial H-bonding interactions.
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