Structure and molecular packing in smectic B_{Cr} and A_d phases of Schiff base liquid crystal compounds through the analyses of layer spacing, entropy and crystal structure.

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Streszczenie

Single-crystal structural analyses and heat capacity measurements were performed on two Schiff base liquid crystal compounds, 5CBAA (4-chlorobenzylidene-4'-pentyloxyaniline) and 5ABCA (4-pentyloxybenzylidene-4'-chloroaniline). The alkyloxy-chain of a 5CBAA molecule was conformationally ordered in the crystal at room temperature. While that of 5ABCA was partially disordered in the room temperature phase but ordered in a low-temperature phase at 100 K. The structural phase transition involving the disordering of the conformation was observed at 107 K in the heat capacity of 5ABCA. Both compounds showed two liquid crystalline phases, SmB_{Cr} and SmA_d. The net entropy change associated with the chain disordering was essentially the same in them despite the difference in the orientation of their central -CH[double bond, length as m-dash]N- moiety. The layer-spacings of SmB_{Cr} and SmA_d phases were analyzed for their chain-length dependence in both series of mesogens (nCBAA and nABCA), as well as in the case of nBBAA (4-bromobenzylidene-4'-alkyloxyaniline). The results reveal that these smectic structures are composed of alternately stacked core- and chain-layers with an antiparallel arrangement of cores and a bent-form of molecules.

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