INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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SHORT ABSTRACT

Liquid crystals (LCs) are unique functional soft materials combining both order and mobility on molecular, supramolecular and macroscopic levels. Conventionally, the anisometric molecules employed to stabilize thermotropic LC phases are either rod-like (calamitic) or disc-like (discotic). Calamitics form the backbone of the well-established flat panel display industry. Discotic LCs which mainly stabilize columnar (Col) phases have made notable progress in recent years, and slowly they are finding a foothold in the main stream of organic electronics. It is also known that LC behavior is realizable with molecules differing in their shape from conventional ones. The general feature of majority of such materials is the molecular structural contrast within a molecule i.e., these molecules are made up of chemically different molecular parts that are incompatible with each other. Some of the important examples of nonconventional systems are oligomers, polycatenars, bent-core molecules, polyhydroxy amphiphiles, octahedral complexes, star shaped molecules, rod-coil molecules and dendrimers. In the case of nonconventional LCs, the main driving force for the self-assembly to form LC phases is based on the nano segregation of chemically or physically different building blocks and the tendency to efficiently fill the space in condensed state. In this thesis, several non-conventional molecular designs that stabilize Col LC phases have been discussed.