Title:	DESIGN AND SYNTHESIS OF SOME NON- CONVENTIONAL CHIRAL DISCOTIC LIQUID CRYSTALS
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Abstract:	Molecular self-assembly has emerged as a new method for developing soft functional materials with broad implications in materials science and biology. The development of microscopic ordering in supramolecular assemblies is significant because molecular architecture plays a crucial role in the optoelectronic properties of the material. It has been the focus of growing areas of chemical research for more than a half-century, involving the design, synthesis, and characterization of novel organic compounds, followed by their application as functional smart materials. In this direction, the molecular engineering of liquid crystals (LCs), particularly discotic liquid crystals (DLCs), has gained expedient space in supramolecular self-assembled systems. Molecular shapes, terminal groups and flexible alkyl chains are the fundamental variables and strategies for designing DLCs with a particular type of molecular organization. The inclusion of chirality into DLCs is fascinating for material scientists, not only because it allows for the creation of cholesteric and ferroelectric liquid crystals but also as a tool for understanding the overall self-assembly of these molecules. The assimilation of chirality results in several chirality-related effects such as circularly polarized luminescence (CPL), non-linear optical effect (NLO), ferroelectricity and so on, which can be utilized in novel displays, electro- optical devices, light shutters, polarisation modulators, lasers and other photonic devices, sensors, etc. This presentation particularly discusses the rational design, synthesis and, finally, the effect of chirality induction in the DLCs. The first part will explain the basic introduction to liquid crystals and describe the development of a perylene-pentaakylnyl-based triad by employing a covalent synthetic strategy. The second part will demonstrate the unique design and synthesis of chiral discotic liquid crystals, which are self-assembled in helicoidal columns and act as a naked-eye HCl sensor. The third part of the presentation deals with the design and synthesis of the luminescent chiral DLCs, which freezes to glassy states at room temperature and address the role of macroscopic ordering in CPL active materials. This presentation explains the impact of the shape and size of a central core and the side mesogenic unit on supramolecular self-assembly. The helicoidal columnar self-assembly of chiral DLCs explained via the amplification of molecular chirality to the supramolecular assemblies. Fundamental challenges and technological opportunities will be highlighted in each of these examples.
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