



Library Indian Institute of Science Education and Research Mohali



DSpace@IISERMohali / Thesis & Dissertation / Integrated PhD / MP-13

Please use this identifier to cite or link to this item: <http://hdl.handle.net/123456789/3758>

Title:	Functional discotic liquid crystals through molecular self-assembly for application in organic electronic devices
Authors:	Bala, Indu
Keywords:	Discotic liquid Molecular Electronic devices
Issue Date:	28-Jul-2021
Publisher:	IISERM
Abstract:	<p>Molecular self-assembly processes are crucial in many cases including a wide range of functional materials for thin-film-based devices such as organic field-effect transistors (OFETs), photovoltaics, sensing, organic light-emitting diodes (OLEDs), and so on. In such devices, fabrication of large ordered areas with ease and low cost is highly warranted for mass production. Solution processing technique prevails in that sense, however, sensitive to thin-film morphology. For this purpose, liquid crystalline (LC) materials having the ability to grow and nucleate in a constructive manner play a pivotal role in transferring the information of alignment onto thin films. This presentation will particularly discuss discotic LCs that mainly self-assemble into columnar architecture due to supramolecular interactions among the central aromatic core, and their application in organic electronics. Four examples demonstrating the design, synthesis, and characterization of discotic LCs will be discussed from the device application point of view. The first example will describe the development of heptazine core-based functional discotic materials by employing covalent and non-covalent synthetic strategies and their application in semiconductor devices. 1-4 Second example will demonstrate the non-symmetric discotic dyads based on triphenylene-pentaalkynylbenzene systems and their usability in solution-processed OLED devices. 5 The role of charge-transfer interactions in improving the self-organization behaviour of these dyads and their ambipolar charge transport behavior will be discussed. The third example will unmask new design strategies in the realization of room temperature and highly emissive discotic LCs based on perylene tetraesters. Besides, the phenomena for realizing high performance in OLED devices employing benzothiadiazole-based emitters will be discussed. 6-8 Fourth example will address the role and importance of macroscopic alignment in tetrathienoanthracene based discotic LCs towards the realization of high bulk mobility. 9 Key fundamental challenges and new technological opportunities will be highlighted in each of these examples</p>
URI:	http://hdl.handle.net/123456789/3758
Appears in Collections:	MP-13

Files in This Item:

File	Description	Size	Format	
PhD Thesis_Indu Bala_MP13009.pdf		34.71 MB	Adobe PDF	View/Open

Show full item record



Items in DSpace are protected by copyright, with all rights reserved, unless otherwise indicated.