Columnar Discotic Liquid Crystals as Organic Semiconductors

S. Holger Eichhorn and Hi Taing

Department of Chemistry and Biochemistry, University of Windsor, Windsor, Ontario, Canada, N9B 3P4.

Organic semiconductors applied in organic electronics are presently based on conductive polymers as well as small molecule glasses and crystals. Columnar mesophase of discotic liquid crystals (DLCs) are not considered, despite considerable efforts and a much enhanced understanding of their structure-property relations, because their design, purification, and processing appears to be too complex. This presentation attempts to provide an overview of recent advances in the design of semiconducting materials based on DLCs, especially the application of donor-acceptor type structures, and to highlight their deficiencies with regard to device applications.1-4 New directions that may overcome these deficiencies, such as side-chain free DLCs, will be proposed at the end.