

Discotic liquid crystals: versatile organic semiconductors

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Discotic liquid crystals are currently viewed as a new generation of organic semiconductors with unique features that differentiate them from the more conventional conjugated polymers. [1] Amongst these unique features, one can cite their liquid character that allows the easy alignment of single-domain thin films [2], their solid state quantum yield of fluorescence that exceeds 60% [3], and their extended pi-pi overlap that give rise to large band width on the order of 1 eV [4]. We have synthesized a library of donor and acceptor discotic molecules with tailored thermotropic behaviour, columnar composition and mesophases [5-7]. This has allowed us to elucidate some of the mechanisms that lead to the homeotropic and uniaxial alignment needed for solar cells and field effect transistors, respectively [2,8-10]. We intend to discuss and to highlight the physical and chemical principles that ultimately govern thin film morphology and semiconductor performances

References

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