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Title: Unsymmetrically substituted room temperature discotic liquid crystals based on hexa-peri-hexabenzocoronene core

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Keywords: Discotics
Hexabenzocoronene
Alkoxy
Liquid crystals
Columnar

Issue Date: 2016

Publisher: Wiley-Blackwell

Citation: ChemistrySelect, 1(5), pp. 880-885

Abstract: The first discotic system based-on alkoxy (tri- & di-) substituted hexa-peri-hexabenzocoronene (HBC) that self-organizes into room temperature columnar structure is reported. Tri- and di-substituted HBC derivatives showed reddish and yellowish green fluorescence under long wavelength (365 nm) UV light illumination in solution as well as in thin films in the liquid crystalline (LC) state at room temperature, respectively. Thermotropic LC behavior of these compounds was studied by differential scanning calorimetry, polarized optical microscopy and small- and wide-angle X-ray scattering. Tri-alkoxy derivative was found to self-organize into a highly ordered columnar rectangular mesophase, while the other (di-) possessed a columnar hexagonal mesophase, indicating that in spite of their non-planarity, the aromatic cores in the mesophase are tightly packed to give highly ordered phases. This system is a promising candidate as an active component of organic light emitting devices, due to its facile processability, low band gap, luminescence and exceptionally higher ordered self-organization behavior in the mesophase derived from X-ray scattering studies.

URI: <https://chemistry-europe.onlinelibrary.wiley.com/doi/abs/10.1002/slct.201600107> (<https://chemistry-europe.onlinelibrary.wiley.com/doi/abs/10.1002/slct.201600107>)
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