Laterally-substituted Liquid Crystal Monomers and their T-Shaped and H-shaped oligomers

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Our studies on supermolecular liquid crystalline materials that exhibit two or more different mesogens tethered covalently to a core by a flexible spacer have highlighted the essential role of the molecular parameters in determining their mesogenic behaviour. [1] Laterally substituted mesogens have been used extensively to induce the nematic phase in a variety of liquid crystal polymers. [2] In this report we describe a family of laterally substituted 2,5-di(p-alkoxybenzyloxy)benzoate mesogens with different terminal groups on the lateral aliphatic chain, obtained from various synthetic routes. They exhibit the nematic phase with a wide temperature range. Their mesomorphic behaviour is influenced by the aliphatic tail length, length of the lateral chain and the end group on the lateral chain, showing a small odd-even effect.

LC dimers and oligomers comprising the laterally substituted mesogens and diphenylacetylene derivatives were also developed. Both the T-shaped and H-shaped oligomers exhibit stable nematic phases. The comparison between the LC monomers and LC oligomers offers further insight into the molecular design required to induce liquid crystalline behaviour in more complex supermolecular materials.

References:
