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Influence of the spacer and the existence of the odd-even effect in symmetrical chiral liquid crystal dimers

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A new series of chiral liquid crystal dimers, which contained biphenyl-naphthyl mesogenic cores linked by ester linkages and a terminal vinyl group were synthesized. The transition temperatures of the dimers were confirmed by DSC and hot stage optical polarizing microscope. All of the dimers showed anisotropic behavior and revealed the existence of SmX*, SmC*, SmA*, N*, BPI* and BPII* textures as observed by hot stage optical polarizing microscope. An odd-even effect was exhibited by the dimers in which dimers with an even number of spacers generated SmX*, SmC*, SmA*, N*, BPI* and BPII* phases while dimers with odd spacers exhibited SmX*, SmA*, N*, BPI* and BPII* phases. The duration of the mesophases decreased with an increase in the chiral chain length. The synthesized vinyl substituted liquid crystalline dimers are particularly useful in understanding liquid crystal polymorphism and act as model compounds for liquid crystal polymers.

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