Title:	Observation of “de Vries-like” properties in bent-core molecules
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Abstract:	“de Vries” liquid crystals, defined by a maximum layer shrinkage of ≤1% from the smectic A to C phase transition, are an integral component of ferroelectric liquid crystal (FLC) displays. Bona fide de Vries materials described in the literature are primarily perfluorinated, polysiloxane and polysilane-terminated rod-like (or calamitic) LCs. Herein, for the first time, we report a series of newly designed achiral unsymmetrical bent-core molecules with terminal alkoxy chains exhibiting similar properties to “de Vries” LCs. The new molecular structure is based on the systematic distribution of four phenyl rings attached via ester and imine linkers having 3-amino-2-methylbenzoic acid as the central core with a bent angle of 147°. Detailed microscopic investigations in differently aligned (planar as well as homeotropic) cells along with SAXS/WAXS studies revealed that the materials exhibited a SmA–SmC phase sequence along with the appearance of the nematic phase at higher temperatures. SAXS measurements divulged the layer spacings (d-spacings) and hence, the layer shrinkage was calculated ranging from 0.19% to 0.68% just below the SmA–SmC transition. The variation of the calculated molecular tilt angle (α) derived from the temperature-dependent SAXS data, followed the power law with exponent values 0.29 ± 0.01 and 0.25 ± 0.01 for compounds 1/10 and 1/12, respectively. The experimental values obtained were very close to the theoretically predicted values for the materials with de Vries-like properties. The analysis of temperature-dependent birefringence studies based on the prediction of the Landau theory, showed a dip across the SmA–SmC phase transition typical of compounds exhibiting the de Vries characteristics. The collective results obtained suggest “de Vries” SmA as a probable model for this bent-core system which may find applications in displays.
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