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Optical Activity Produced by Layer Chirality in Bent-Core Liquid Crystals[1] LOREN HOUGH, CHENHUI ZHU, MICHI NAKATA, LCMRC, Physics Department, University of Colorado, Boulder, NATTAPORN CHATTHAM, Department of Physics, Faculty of Science, Kasetsart University, Bangkok Thailand, GERT DANTLGRABER, CARSTEN TSCHIERSKE, Institute of Organic Chemistry, Martin-Luther Universit Halle-Wittenburg, NOEL CLARK, LCMRC, Physics Department, University of Colorado, Boulder — Recent observations of large optical activity in chiral smectic liquid crystalline phases formed from achiral bent-core molecules have been attributed to both a helical superstructure and to layer optical chirality (LOC). The LOC model predicts that optical activity is produced by the local chiral layer structure formed by the simultaneous tilt and polar ordering of bent-core molecules (Hough and Clark PRL, 95, 107802 (2005)). The LOC model predicts that optical activity should be present in the well ordered B2 phase. However, in most materials, the optical activity is masked by birefringence. We studied the SmC_AP_Asubphase of GDa104 (Dantlgraber, et al. Chem. Mater. 14, 1149 (2002).), which has a tilt angle of $\sim$45 degrees (orthoconic), and thus very low birefringence. In this system, we directly demonstrate that layer chirality produces optical activity consistent with the LOC model.

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