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Diastereomeric domains formed by chiral liquid crystals confined in a network of helical nanofilaments[1] MICHAEL TUCHBAND, DONG CHEN, BALAZS HORANYI, EVA KORBLOVA, DAVID WALBA, JOSEPH MACLENNAN, MATTHEW GLASER, NOEL CLARK, Univ of Colorado - Boulder
— Mixtures of the bent-core liquid crystal material NOBOW with guest mesogens are well dispersed in the isotropic phase. Upon cooling, the NOBOW forms B4 helical nanofilaments which often nucleate and phase-separate directly from the isotropic melt, forming locally homochiral dendritic networks which act as a porous medium of large internal area. The guest material is then confined to the nanoscale interstitial volumes between the twisted filaments. A typical cell contains a conglomerate of independently nucleated left- and right-handed B4 domains many tens of microns across. Polarized optical microscopy reveals that chiral guest liquid crystal materials with a specific twist of the director form optically distinguishable diastereomeric domains in the left- and right-handed chiral domains. Due to the different twist environments of the pores in the left- and right-handed helical nanofilament networks, the molecular arrangements of chiral guest material and the corresponding changes of birefringence in the left- and right-handed chiral domains differ as the chiral guest transitions from isotropic to cholesteric, and then to smectic.

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