

Abstract Submitted
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Directing self-assembly of soft mesophases using orthogonal stimuli – effective routes to biaxial control CHINEDUM OSUJI, Yale Univ — Directed self-assembly (DSA) of soft mesophases has typically focused on controlling the orientation of anisotropic structures in a single direction, i.e. on uniaxial control. The question of biaxial control, and thereby developing single-crystal textures (in relevant mesophases) has been left largely unaddressed. We report recent progress in developing biaxial DSA in hexagonal mesophases using two routes. First, we explore localized field screening using magnetic nanoparticle arrays as a means of imposing lateral stresses to control lattice orientation in the presence of a magnetic field which otherwise controls the orientation of the long axes of the cylindrical microdomains. In the second we demonstrate the concurrent use of physical confinement and magnetic field alignment to independently control the orientation of cylinders axes and the orientation of their lattice planes, respectively, in a small molecule mesophase. Field control of the lattice orientation is possible due to a tilted arrangement of mesogens with tilt angles and therefore magnetic anisotropy coupled to the lattice orientation. X-ray scattering and TEM reveal the formation of a near single-crystal morphology.

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