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Self-Assembly of Side Group Liquid Crystalline Block Copolymers in a Nematic Solvent ROHAN HULE, ZULEIKHA KURJI, PAUL PIROGOVSKY, JULIA KORNFIELD, California Institute of Technology, CALTECH TEAM — The local chain conformation and self-assembled morphology of diblock copolymers consisting of Side-Group Liquid Crystalline Polymers (SGLCPs) and random coil blocks are investigated using SANS, USANS and TEM. The innate orientational order of the mesogen couples with the flexible backbone in the SGLCP block. Two distinct types of mesogen chemistry and orientational coupling are examined that produce either a prolate or oblate spontaneous anisotropy of the SGLCP conformation in a small molecule nematic solvent. The conformational preference of the SGLCP block induces formation of unusually large, anisotropic self-assembled microstructures that display a remarkable restructuring across the nematic-to-isotropic transition temperature of the thermotropic solvent driven by favorable solvation of the coil. Dimensions extracted via core-shell form factor fits and Guinier analyses have been substantiated by TEM observations. Morphological and conformational comprehension of these coil-SGLCP diblocks opens new opportunities in responsive LC interfaces with in-built functionality of the coil domain.

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