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Self-assembly of peptoid block copolymers with tunable conformational asymmetry ADRIANNE ROSALES, University of California, Berkeley, RONALD ZUCKERMANN, Lawrence Berkeley National Laboratory, RACHEL SEGALMAN, University of California, Berkeley — Functional polymers such as conjugated or biological molecules have been shown to have a variety of chain conformations that affect their self-assembly. Polypeptoids are sequence-specific biomimetic polymers for which the statistical segment length can be tuned by the introduction of monomers with bulky, chiral side chains, allowing one to change the polymer conformation independent of chemical structure or molecular weight. Furthermore, sequence specificity enables the precise placement of those chiral monomers along the polymer chain. This work presents a systematic study of block copolymer self-assembly using chiral polypeptoids or their racemic analogs and poly(n-butyl acrylate). For the chiral block copolymers, SAXS measurements reveal that the change in conformational asymmetry increases the morphological domain spacing and decreases the corresponding interfacial area per chain, indicating that the chiral peptoid chains can pack more closely within the domain compared to the racemic peptoid chains. The effect on domain spacing is also probed by changing the position of the chiral monomers with respect to the block copolymer junction. These results lend insight to the design of block copolymers with secondary structure.

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