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Effect of chain shape on the self-assembly of bioinspired block copolymers ADRIANNE M. ROSALES, HANNAH K. MURNEN, University of California, Berkeley, RONALD N. ZUCKERMANN, Lawrence Berkeley National Laboratory, RACHEL A. SEGALMAN, University of California, Berkeley — Polymer chain shape has been shown to affect both polymer properties and block copolymer self-assembly. Polypeptoids, a class of sequence-specific bioinspired polymer, have a chain shape that can be tuned by the introduction of monomers with bulky, chiral side chains, allowing one to change the polymer conformation while preserving the chemical nature of the side chains. Here, it is shown that introducing chiral, aromatic monomers into the polypeptoid chain increases the glass transition by 20 C for a chiral, helical polypeptoid compared to its achiral, non-structured analog. Incorporation of these polypeptoids into block copolymers with poly(methyl acrylate) enables a systematic study of the effect of chain shape while maintaining similar enthalpic interactions. For two otherwise analogous block copolymers, conformational asymmetry is shown to affect both the morphological domain spacing and the order-disorder transition temperature. Future work will focus on interfacial segregation experiments to determine the effect of conformational asymmetry on the Flory-Huggins parameter.

Adrienne M. Rosales
University of California, Berkeley

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