

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Effect of chain shape and monomer sequence on self-assembly of polypeptoid-polystyrene block copolymers ADRIANNE ROSALES, HANNAH MURNEN, University of California, Berkeley, RONALD ZUCKERMANN, Molecular Foundry, Lawrence Berkeley National Laboratory, RACHEL SEGALMAN, University of California, Berkeley — Polymer chain shape has profound effects on block copolymer self-assembly. In nature, chain shape is controlled by the monomer sequence of biological polymers, but such precise control is difficult with classical synthetic systems. Polypeptoids, a class of sequence-specific bioinspired polymer, are shown to have a chain shape which can be tuned by the introduction of monomers with bulky, chiral side chains. Here, it is shown that introducing chiral monomers into the peptoid chain increases chain stiffness, as reflected by a 20C increase in the glass transition temperature for a chiral polypeptoid compared to its achiral analog. Incorporation into block copolymers enables 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 self-assembled morphology and its order-disorder transition temperature. The ability to tune polymer properties with this biomimetic system will lend insight to the relationship between monomer sequence and self-assembled nanostructures.

Adrienne Rosales
University of California, Berkeley

Date submitted: 17 Nov 2010

Electronic form version 1.4