

Abstract Submitted  
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**Sphere Forming SISO Tetrablock Terpolymers** FRANK BATES, JINGWEN ZHANG, SANGWOO LEE, University of Minnesota — A series of poly(styrene-*b*-isoprene-*b*-styrene-*b*-ethylene oxide) (SISO) tetrablock terpolymers was synthesized using anionic polymerization methods and investigated for melt morphology by synchrotron small-angle x-ray scattering (SAXS), electron microscopy and dynamic mechanical spectroscopy. Thermodynamic incompatibility between the I and O blocks, relative to that characterizing S and I and S and O leads to the formation of spherical domains containing an O core surrounded by a S rich shell embedded in a matrix of mixed S and I. Varying the composition and relative length of the internal and terminal S blocks resulted in five distinct states of ordering, including two cubic (Im3m and Pm3n symmetry), a hexagonal (p6/mm), a tetragonal (P4<sub>2</sub>/mnm) and a quasicrystalline (dodecagonal) phase. These results demonstrate the concept of decoupling domain geometry from domain packing in multiblock polymers.

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