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**Synthesis and Characterization of Tapered Block Copolymers**

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University of Delaware, Newark, DE 19716 — Tapered block copolymers offer the opportunity to manipulate copolymer segregation strength independent of molecular weight and chemical constituents, which allows the design of materials with improved mechanical properties while retaining the desired phase separated structures. In this work, we focus on the synthesis and characterization of poly(isoprene-*b*-isoprene/styrene-*b*-styrene-*b*-styrene/methyl methacrylate-*b*-methyl methacrylate) [P(I-IS-S-SM-M)] tapered triblock copolymers. P(I-IS-S) tapered diblock copolymers are synthesized using living anionic polymerization and treated as macroinitiators for activator regenerated by electron transfer (ARGET) atom transfer radical polymerization (ATRP). ARGET ATRP is employed to make the SM tapered interface and M block, enabling synthesis of tapered triblocks with low polydispersity ( $M_w/M_n < 1.2$ ). These materials self-assemble into well-defined nanoscale architectures depending on segment volume fractions and taper dimensions.

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