

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Characterization of a Poly(styrene-block-methylacrylate-random-octadecylacrylate-block-styrene) Shape Memory ABA Triblock Copolymer PENGZHAN FEI, KEVIN CAVICCHI — A new ABA triblock copolymer of poly(styrene-block-methylacrylate-random-octadecylacrylate-block-styrene) (PS-b-PMA-r-PODA-b-PS) was synthesized by reversible addition fragmentation chain transfer polymerization. The triblock copolymer can generate a three-dimensional, physically crosslinked network by self-assembly, where the glassy PS domains physically crosslink the midblock chains. The side chain crystallization of the polyoctadecylacrylate (PODA) side chain generates a second reversible network enabling shape memory properties. Shape memory tests by uniaxial deformation and recovery of molded dog-bone shape samples demonstrate that shape fixities above 96% and shape recoveries above 98% were obtained for extensional strains up to 300%. An outstanding advantage of this shape memory material is that it can be very easily shaped and remolded by elevating the temperature to 140°C, and after remolding the initial shape memory properties are totally recovered by eliminating the defects introduced by the previous deformation cycling.

Pengzhan Fei

Date submitted: 15 Nov 2010

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