

Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Structure-property relationships in ABA copolymer gels with A homopolymer additions MICHELLE SEITZ, Northwestern University, REBECCA ROTTSOLK, William Fremd High School, KIRT PAGE, NIST, KENNETH SHULL, Northwestern University — ABA acrylic triblock copolymers with poly(methyl methacrylate) endblocks and poly(butyl acrylate) midblocks transition from free flowing liquids to elastic solids with decreasing temperature in alcohol solvents. Homopolymer PMMA chains can be solubilized in the micelle cores if they are shorter than the endblocks. Indentation and compression tests were used to determine gel's modulus and large strain behavior. Gels with volume fractions of PMMA less than ~ 0.2 are highly elastic and have moduli dictated by stretching of bridging midblocks. At higher PMMA contents, gels exhibit greater permanent deformation and moduli over an order of magnitude larger than would be expected from rubber elasticity alone. Small angle X-ray and neutron scattering and mean field simulations were used to correlate changes in gel structure and micelle morphology with the addition of homopolymer.

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Date submitted: 20 Nov 2008

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