Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Fabrication of Highly Distensible, Nanostructured Elastic Hydrogels from Block Copolymer Based Self-Assembly CHIH-YU TENG, TRAVIS BAILEY, Colorado State University — This work concerns the synthesis of a new class of highly distensible hydrogel membranes, based on a nanostructured solid phase framework that can be tunably expanded and contracted through the application of simple external stimuli. Our initial approach is based on blending sphere-forming poly(styrene-b-ethylene oxide) (PS-PEO) diblock copolymer amphiphiles with small amounts of the corresponding triblock copolymer (PS-PEO-PS). This triblock copolymer additive serves to create mechanical connectedness among the solid phase spherical PS domains, with its concentration and mid-block molecular weight dictating both the equilibrium dimensions and swelling dynamics of the gel. Precise control over molecular weight and composition of the copolymers was afforded through a combination of anionic and RAFT polymerization techniques, permitting the synthesis of a range of hydrogels with tunable swelling properties. Characterization of both the copolymer precursors and resultant nanostructured hydrogels through ^{1}H NMR, SEC, TEM, dynamic melt-state rheology, and SAXS will be presented.

Chih-Yu Teng
Colorado State University

Date submitted: 29 Nov 2006 Electronic form version 1.4