Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Synthesis and characterization of thermoreversible hydrogels from associating polymers JUN JIANG, CHUNHUA LI, State University of New York at Stony Brook, MICHAEL RUBINSTEIN, University of North Carolina at Chapel Hill, RALPH COLBY, Pennsylvania State University, DANIEL COHN, Hebrew University of Jersualem, MIRIAM RAFAILOVICH, JONATHAN SOKOLOV, State University of New York at Stony Brook, STATE UNIVERSITY OF NEW YORK AT STONY BROOK TEAM, UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL COLLABORATION, PENNSYLVANIA STATE UNIVERSITY COLLABORATION, HEBREW UNIVERSITY OF JERSUALEM COLLABORATION — Multiblock copolymers of poly(ethylene oxide)$_{99}$-poly(propylene oxide)$_{69}$-poly(ethylene oxide)$_{99}$ were synthesized by coupling with hexamethylene diisocyanate (HDI). The rheological, morphological and structural properties of the gel were characterized as a function of temperature, composition and block number. Mixtures of multiblock and single block copolymers were also studied. Using neutron scattering we found that a large degree of alignment could be induced in the single block gel, but no order could be found in the multi-block or homopolymer multiblock mixture. The yield strain in samples with 3.2 of multiblocks was nearly an order of magnitude higher than the single bock gel. This was interpreted in terms of an ordered layered state of micelles being formed by steady shear. A model based on the competition between forming non-interacting micelles and forming bridges will be presented.

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Date submitted: 27 Nov 2005 Electronic form version 1.4