Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Forming Reversible Gels with Triblock Polyelectrolytes: a Field-theoretic Study DEBRA AUDUS, GLENN FREDRICKSON, UC Santa Barbara — Recently, two research groups have formed reversible gels using triblock polyelectrolytes (Lemmers et al. 2010; Hunt et al., in preparation). This gel formation is driven by a phenomenon called complex coacervation, in which two oppositely charged homopolymers in solution phase separate into a polymer rich phase, known as a coacervate, and a solution phase. If instead, the polymers are triblocks with a neutral midblock and charged end blocks, under appropriate conditions they will microphase separate into micelles with cores of coacervated charged groups and coronas of neutral midblocks. These neutral midblocks act as bridges between the micelles, thereby creating a gel. One of the advantages of forming gels in this way is that the coacervate domains, and thus the gel, can be easily tuned by varying parameters such as pH, salt concentration and temperature. In order to understand the microstructures and solution sensitivity of these reversible gels, we have numerically simulated field-theoretic models of triblock polyelectrolyte mixtures in an implicit solvent. Because coacervation is driven by charge correlations, the usual mean-field assumption fails, and it is necessary to study the model beyond the level of SCFT.

Debra Audus
UC Santa Barbara

Date submitted: 09 Nov 2010 Electronic form version 1.4