Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Polyelectrolyte Complexation: A Field-Theoretic Description of Phase Behavior DEBRA AUDUS, GLENN FREDRICKSON, University of California, Santa Barbara

— Our research focuses on a type of polyelectrolyte complexation called complex coacervation where two oppositely charged polymers in solution phase separate to form a dense polymer phase, known as the coacervate, and a supernatant, which typically has very low concentrations of polymer. To understand the effects of various parameters on coacervation, we previously developed a simple analytic theory for flexible polymers and small ions, which reproduces many general experimental trends. However, this theory is only valid for symmetric oppositely charged polymers, which limits its direct applicability to many experimental systems. Consequently, we have extended this theory to describe more complicated experimental systems where salt concentrations are high, pH equilibria shift with the complexation process, polymer concentrations are highly asymmetric, and counterion condensation may play an important role. To validate the modified theory, we compare our predictions with an exhaustive study of the phase behavior of polyacrylic acid and polyallylamine hydrochloride.

Debra Audus
University of California, Santa Barbara

Date submitted: 19 Nov 2009

Electronic form version 1.4