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Field-Theoretic Studies of Nanostructured Triblock Polyelectrolyte Gels DEBRA AUDUS, GLENN FREDRICKSON, University of California, Santa Barbara — Recently, experimentalists have developed nanostructured, reversible gels formed from triblock polyelectrolytes (Hunt et al. 2011, Lemmers et al. 2010, 2011). These gels have fascinating and tunable properties that reflect a heterogeneous morphology with domains on the order of tens of nanometers. The complex coacervate domains, aggregated oppositely charged end-blocks, are embedded in a continuous aqueous matrix and are bridged by uncharged, hydrophilic polymer mid-blocks. We report on simulation studies that employ statistical field theory models of triblock polyelectrolytes, and we explore the equilibrium self-assembly of these remarkable systems. As the charge complexation responsible for the formation of coacervate domains is driven by electrostatic correlations, we have found it necessary to pursue full "field-theoretic simulations" of the models, as opposed to the familiar self-consistent field theory approach. Our investigations have focused on morphological trends with mid- and end-block lengths, polymer concentration, salt concentration and charge density.

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