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Effects of molecular architecture and degree of hydration on the structure and properties of electrostatically self-assembled block copolymers[1] MATTHEW TIRRELL, University of Chicago, DANIEL KROGSTAD, NATHANIEL LYND, JASON SPRUELL, SOO-HYUNG CHOI, CRAIG HAWKER, EDWARD KRAMER, University of California, Santa Barbara
— Mixtures of water-soluble block copolymers, with one neutral block and the other blocks(s) either positively or negatively charged, are known to form micelles in water with micellar cross that are formed from polyelectrolyte complexes. At sufficiently high total polymer concentrations, such micellar suspensions undergo a disorder-order transition to a bcc structure. This typically occurs between 10 to 15% polymer concentration. In this work, we present new data comparing the behavior of diblock copolymers and triblock copolymers. Initial results suggest that very similar final structures are formed in the two systems, when the diblock is just one of two symmetrical halves of the triblock. Kinetically, diblocks assemble much more rapidly and exhibit different rheological properties from triblocks. We are also investigating the structures formed and properties developed when these systems are dehydrated to less than 50% water content.

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