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Small Angle Neutron Scattering of Mixtures of Linear and Network Polyelectrolytes with an Oppositely Charged Surfactant WONJOO LEE, Materials Science and Engineering, University of Maryland, PETER KOFINAS, Bioengineering, University of Maryland, ROBERT M. BRIBER, Materials Science and Engineering, University of Maryland — In general, it has been found solutions containing a (linear) polyelectrolyte and an oppositely charged surfactant exhibit a complex range of phase behavior. We have performed small angle neutron scattering (SANS) on dilute and semi-dilute solutions of poly(2-(dimethylamino)ethyl methacrylate) (PDMAEMA) with sodium dodecylsulfate (SDS). And, a structured hydrogel was formed by crosslinking a semi-dilute PDMAEMA solution containing SDS. SANS intensity of a dilute PDMAEMA solution shows that this polymer in D₂O has only a few charges. In a dilute PDMAEMA solution with SDS, it was confirmed by SANS that spherical micelle-like structures associated along the polymer chain in a bead-and-necklace structure consistent with what has been observed in the (uncharged) poly(ethylene oxide)/SDS system. As the PDMAEMA concentration increased, a change of a peak position and a scattering shape was observed due to the interaction of the SDS with PDMAEMA. Furthermore, it is shown that the interaction between PDMAEMA and micelles is strong enough to maintain the nanoscale structure formed along the polymer chain, even after crosslinking, leading to a structured hydrogel.

Wonjoo Lee
University of Maryland

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