

Abstract Submitted
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Structured Hydrogels using Micelles as Templates WONJOO LEE, PETER KOFINAS, ROBERT M. BRIBER, University of Maryland, College Park — Molecularly imprinted polymers can be created by crosslinking polymers in the presence of molecular templates. If the pores generated after the removing of templates have almost the same size and shape as the template, the material has a potential to be used for separation, biosensor and drug delivery applications. In this work, micelles were used as the template as they can be easily removed from the hydrogel and a range of structures are accessible by combining a (linear) polyelectrolyte and an oppositely charged surfactant. Poly(2-(dimethylamino)ethyl methacrylate) (PDMAEMA) was synthesized and quaternized using methyl iodide. We have performed small angle neutron scattering (SANS) on solutions and hydrogels of PDMAEMA with sodium dodecylsulfate (SDS) under different contrast matching conditions. A structured hydrogel was then formed by chemically crosslinking the semi-dilute PDMAEMA solution which contained SDS. It was confirmed that spherical micelle-like structures were 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. Furthermore, it was shown that the interaction between PDMAEMA and micelles is strong enough to maintain the nanoscale structure formed along the PDMAEMA chain, even after crosslinking, leading to a structured hydrogel.

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