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Synthesis of Optimal Polymeric Microgels & their Characterization with Light Scattering CHRISTIAN GUNDER, KIRIL STRELETZKY, Department of Physics, Cleveland State University — Polymeric microgels were synthesized in by chemically crosslinking hydroxypropylcellulose (HPC) chains with each other in aqueous solutions of sodium hydroxide at temperatures above the low critical solution temperature (LCST) of HPC. In order to create a narrower size distribution of HPC microgels, surfactant was added. It was found that the LCST of the solution moved from 40C up to 80C with an increase in surfactant concentration from 0 to 12 g/l. Formed microgels were characterized by dynamic light scattering (DLS). Microgel solutions synthesized so far resulted in reasonably monodispersed nanoparticles with Rh of 90-150 nm below the known LCST for HPC, and Rh of 50-90 nm above the known LCST for HPC. Surprisingly, some of the microgels revealed weak VH signal, indicating their potential geometric anisotropy. Further studies were done in an attempt to explore the effect of synthesis temperature and crosslinker concentration on microgel size, polydispersity, and swelling ratio. It was found that maintaining a pH of 12 for the aqueous sodium hydroxide solvent was critical to ensure reproducibility of synthesis. However, it was also found that the pH of the solvent had no effect on the overall LCST of the HPC in surfactant-free solutions.

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