

Abstract Submitted
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Microgels: Structure, Dynamics, and Possible Applications.

JOHN MCKENNA, Cleveland State University, KIRIL STRELETZKY — We cross-linked Hydroxypropylcellulose (HPC) polymer chains to produce microgel nanoparticles and studied their structure and dynamics using Dynamic Light Scattering spectroscopy. The complex nature of the fluid and large size distribution of the particles renders typical characterization algorithm CONTIN ineffective and inconsistent. Instead, the particles spectra have been fit to a sum of stretched exponentials. Each term offers three parameters for analysis and represents a single mode. The results of this analysis show that the microgels undergo a transition to a fewer modes around 41C. The CONTIN size distribution analysis shows similar results, but these come with much less consistency and resolution. Our experiments prove that microgel particles shrink under volume phase transition. The shrinkage is reversible and depends on the amount of cross-linker, salt and polymer concentrations and rate of heating. Reversibility of microgel volume phase transition property might be particularly useful for a controlled drug delivery and release.

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