



## Phase behavior and dynamics of pH-responsive colloidal hydrogel suspensions

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**Abstract:** Colloidal suspensions are interesting model systems that exhibit various phase behaviors and are relatively easy to manipulate and monitor. Potential applications as photonic crystals and chemical sensors have further increased interest. While, dilute colloidal suspensions tend to be disordered liquids, ordered crystals can be formed at high concentrations. However, under certain conditions, concentrated systems can be trapped kinetically in a jammed glassy phases with very slow dynamics.

While the phase diagram for hard spheres has been studied extensively, the phase behavior and dynamics of suspensions of soft, deformable spheres is still poorly understood. We have applied particle tracking microrheology to investigate stimuli-responsive pNIPAm-co-AAc hydrogels colloids in a microfluidic device that enables us to control solvent composition. The size of these particles varies with temperature, which has been employed extensively, and with pH due to the repulsion between deprotonated AAC moieties within a particle. By controlling particle size, we also control volume fraction of the suspension. For dilute suspensions, we will present the (de)swelling of the particles as function of pH and AAC content; for concentrated systems we will present the phase behavior. Surprisingly, we found a much broader liquid/crystal coexistence region than has been observed for hard spheres.



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