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Dynamics of suspensions of pH-responsive hydrogel colloids[1] JAE KYU CHO, VICTOR BREEDVELD[2], Georgia Institute of Technology — Colloidal hydrogel particles have attracted interest as building blocks for chemical sensors, photonic crystals and as drug delivery vehicles. In addition, they are interesting model systems to study the phase behavior of colloidal particles with soft interaction potentials. The most commonly used pNIPAm hydrogels are temperature sensitive, showing a swelling-deswelling transition around 30 degrees Celcius; by including acrylic acid comonomer, one can obtain pNIPAm-co-AAc hydrogels that are also pH responsive. For this work, we have investigated the dynamics of swelling and deswelling of these stimuli responsive colloids in both diluted and concentrated suspensions via particle tracking video-microscopy in a transparent dialysis cell. The device allows us to change the solvent composition (e.g. pH) in a controlled manner while simultaneously tracking the motion of hydrogel particles. In dilute suspensions, we have studied the swelling-deswelling response of hydrogels of different sizes and varying AAc and cross-linker contents to elucidate the kinetics of the microstructural rearrangements of the hydrogel. In concentrated suspensions, the pH-induced particle expansion causes transitions between fluid, glassy and crystalline phases. Data will be presented on the dynamics of the observed phase behavior, in particular crystal growth and jamming.

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