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Confinement-induced solidification of attractive colloidal suspensions JACINTA CONRAD, MELISSA SPANNUTH, Chemical and Biomolecular Engineering, University of Houston — Using a model colloidal-polymer suspension, we show that confinement induces solidification in attractive colloidal suspensions via a fundamentally different route from that active in hard sphere colloidal suspensions. For a range of polymer concentrations, the suspensions undergo a phase transition from a colloidal fluid with clusters to a colloidal gel with increasing confinement while polymer and particle concentration are held constant. Surprisingly, the effects of confinement appear at much larger thicknesses in attractive colloidal suspensions than in hard sphere suspensions. We find that solidification in confined attractive suspensions is not driven by structuring of the colloids at the walls or by shear-induced migration or clustering. Instead, by analyzing the cluster size distributions in the fluid phase as a function of confinement, we find that the strength of the interparticle attraction increases as the samples are confined. We further demonstrate that this change in the strength of attraction leads to increasingly arrested particle dynamics as colloidal gels are confined.

Jacinta Conrad
Chemical and Biomolecular Engineering, University of Houston

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