

55g Shear Thickening in Polymer Stabilized Colloidal Dispersions

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The shear thickening transition in polymer stabilized colloidal dispersions is analyzed in terms of a micromechanical model that incorporates both the stabilizing forces of the polymer brush and the associated modification of the hydrodynamic interactions due to the brush. Comparison is made to simulations and experiments on model, well characterized dispersions. The model is shown to provide a quantitative prediction for the onset of shear thickening. Comparison with experiment indicates the sensitivity of the shear thickening transition to both the interaction potential arising from the brush as well as the hydrodynamic permeability of the brush.