

Abstract Submitted
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Hydrodynamic Interactions Mediated by Polymer Depletion Effect TAI-HSI FAN, BIN XIE, University of Connecticut — Polymer depletion has significant impact on the transport and binding of proteins as well as the aggregation of macromolecules in a molecularly crowded environment. In many synthetic colloid-polymer mixtures, polymer depletion can be used to control the stability and dynamics of colloidal dispersions. For nonadsorbing polymer solutions in which depletion phenomenon occurs, polymer chains tend to move away from the region surrounding the suspended particles to avoid the loss of configuration entropy. This depletion zone complicates particle's diffusion behavior and may cause depletion-induced flocculation due to the unbalanced osmotic force. The thermodynamic origin of the depletion-induced entropy force is well understood, but the hydrodynamics involved in particle-particle interactions taking into account the depletion effect has not been previously studied. We analyze the hydrodynamic mobility of a pair of interacting Brownian particles mediated by the polymer depletion effect. Analysis will be presented specially for limiting cases when depletion zones of uncharged particles overlap. The proposed theoretical model is important for predicting the aggregation kinetics of nucleation- and diffusion-limited flocculation processes.

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