Emulsions stabilized by Janus amphiphilic colloidal particles
SHAN JIANG, MITCH SCHULTZ, QIAN CHEN, JEFFREY MOORE, STEVE GRANICK, University of Illinois at Urbana-Champaign — Emulsions stabilized by amphiphilic colloidal particles were investigated by both theoretical calculation and experiments. The concept of Janus balance is defined as the dimensionless ratio of work to transfer an amphiphilic colloidal particle (a ‘Janus particle’) from the oil-water interface into the oil phase, normalized by the work needed to move it into the water phase. The calculation shows that the emulsion will be most stable when the Janus balance is unity. Experimentally, large quantities of Janus particles with different Janus balance were synthesized. The emulsion type and emulsion stability were investigated by using these particles to stabilize oil-water emulsions. It is found that Janus particles can stabilize emulsions for extended times. Finally, the emulsion type will be shown to depend on the geometry (Janus balance) of the Janus particles.

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