Emulsions stabilized by Janus amphiphilic colloidal particles
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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 emul-
sion type will be shown to depend on the geometry (Janus balance) of the Janus
particles.

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