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Particle Charging and Interaction in Nonpolar Colloidal Dispersions Mediated by Nonionic Surfactants SVEN BEHRENS, Georgia Tech —
The electrostatic stabilization of colloidal dispersions is usually considered the domain of polar media only, but some surfactants are known to raise the conductivity of liquids with low electric permittivity and to mediate charge-stabilization of nonpolar dispersions. Here we report an example of the counterintuitive electrostatic effects of nonionic surfactants on colloidal particles in nonpolar solvents. PMMA particles in hexane solutions of sorbitan oleate (Span) surfactants exhibit a field-dependent electrophoretic mobility. In the zero field limit, we find large surface potentials whose decay with increasing surfactant concentration resembles the salt-induced screening in aqueous solutions. The amount of surface charge and screening ions in the nonpolar bulk is further characterized via ensemble measurements of the particles' pair interaction energy. In contrast to the behavior reported for systems with *ionic* surfactants, we observe particle charging and a screened Coulomb type interaction both above and below the surfactant's critical micelle concentration.

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