

Abstract Submitted
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Reverse Micelles Enable Strong Electrostatic Interactions of Colloidal Particles in Nonpolar Solvents ERIC R. DUFRESNE, Yale University, MING F. HSU, GE Global Research, DAVID A. WEITZ, Harvard University — We demonstrate that colloidal particles can have surprisingly strong electrostatic interactions in nonpolar environments when ions are solubilized by reverse micelles. We find that particles interact with a screened Coulomb potential consistent with screening lengths from 0.17 to 1.4 μm and a surface potential, $e\zeta$, of about $4k_B T$. A simple thermodynamic model, relating the structure of the micelles to the equilibrium ionic strength, is in good agreement with both conductivity and interaction measurements. Since dissociated ions are solubilized by reverse micelles, the entropic incentive to charge a particle surface is qualitatively changed, and surface entropy plays an important role.

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