

Abstract Submitted
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Determination of Colloidal Osmotic Equation of State by Dielectrophoresis JACOB MAZZA, HAO HUANG, H. DANIEL OU-YANG, Lehigh University — Osmotic equation of state $[P(N,T)]$ of a colloidal suspension, where P is the osmotic pressure, N the particle number density and T the absolute temperature, describes both the mechanical properties and phase behavior of a colloidal suspension. As an alternative to the conventional sedimentation or scattering approaches to determine $P(N,T)$, we propose a new approach by dielectrophoresis (DEP). Spatial distributions of the density of fluorescent nanoparticles in a DEP field – imaged by confocal microscopy – can be used to determine the DEP force field at low particle concentration, at which the inter-particle interactions are negligible. Using the known force field and Einstein's osmotic equilibrium equation, we calculate $P(N,T)$ from the particle density profiles of interacting, charge-stabilized polystyrene latex particles under different salt concentrations.

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