

Abstract Submitted
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The influence of ionic strength on electrohydrodynamic aggregation of colloidal particles SUKHLEEN SAINI, WILLIAM RISTENPART, Dept. Chemical Engineering and Materials Science, University of California Davis — Colloidal particles suspended in various electrolytes have been widely observed to aggregate near electrodes in response to oscillatory electric fields, a phenomenon believed to result from electrohydrodynamic flows induced around the particles. Most work has focused on elucidating the effects of the applied field strength, frequency, and electrolyte type on the aggregation rate, with less attention paid to the ionic strength. Here we demonstrate that the ionic strength of the electrolyte strongly affects both the aggregate morphology and aggregation dynamics. Optical microscopy observations reveal that an applied field causes micron-scale colloids in aqueous NaCl to rapidly aggregate over a wide range of ionic strengths, but with significant differences in aggregate morphology: at higher ionic strengths (~ 1 mM), particles arrange as hexagonal close packed (HCP) crystals, but at lower ionic strengths (~ 0.2 mM), the particle aggregates are randomly closed packed (RCP). We interpret these results in terms of the effect of the ionic strength on the height of the particles over the electrode and their corresponding diffusivity, and we discuss preliminary modeling efforts of the effect of ionic strength on the electrohydrodynamic driving force for aggregation.

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