

Abstract Submitted
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Aggregation and Coalescence of Emulsion Droplets via Electrohydrodynamic Flows C.R. VIGO, W.D. RISTENPART, Univ. Calif. at Davis — Electrohydrodynamic (EHD) flows are known to cause rigid colloids to aggregate near electrodes [1]. Here we report that EHD flows also induce immiscible liquid droplets to aggregate and, for sufficiently strong electric fields, to coalesce. We measure the aggregation and coalescence rates of micron-scale olive oil droplets in water, and we interpret the coalescence rates in terms of a balance between EHD flow and repulsive colloidal scale (DLVO) forces. The results have broad implications for industrial processes in which trace amounts of immiscible oils need to be removed from aqueous solutions.

[1] Ristenpart, Aksay & Saville, *J. Fluid Mechanics* 575, 83, (2007).

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