

Abstract Submitted
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Sorption-controlled electrohydrodynamics of a surfactant-covered viscous drop HERVE NGANGUIA, Indiana University of Pennsylvania, WEI-FAN HU, National Chung Hsing University, MING-CHIH LAI, National Chiao Tung University, YUAN-NAN YOUNG, New Jersey Institute of Technology — Surfactants physico-chemistry is often exploited to control the dynamics of viscous drops and bubbles. For instance, the adsorption-desorption kinetics plays a critical role in the deformation of drops in extensional and shear flows. By contrast these kinetics effects have yet to be accounted for drops in an electric field to the best of our knowledge. In this talk we present work on the effects of sorption kinetics on a surfactant-covered viscous drop in an electric field (both dc and ac). Specifically, we look at the dependence of drops deformation on three dimensionless numbers: the electric capillary number Ca_E , Biot number Bi , and Peclet number Pe . We present the numerical methods employed for simulations, and discuss preliminary results from our findings as well as future extensions. We also illustrate how our results may be applied to explain recent experiments on extreme drop deformation under an electric field (Brosseau and Vlahovska, PRL 2017).

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