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Effects of Surfactant Solubility on the Hydrodynamics of a Viscous Drop in a DC Electric Field 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 — The physico-chemistry of surfactants (amphiphilic surface active agents) is often used to control the dynamics of viscous drops and bubbles. Surfactant sorption kinetics has been shown to play a critical role in the deformation of drops in extensional and shear flows, yet to the best of our knowledge these kinetics effects on a viscous drop in an electric field have not been accounted for. In this talk we present numerical results from investigating the effects of sorption kinetics on a surfactant-covered viscous drop in an electric field. We focus on the dependence of deformation and flow on dimensionless physical parameters that characterize the extent of surfactant exchange between the drop surface and the bulk. At high surfactant coverage, we found that surfactants favor oblate drop shapes and change the circulation pattern at equilibrium.

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