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A model for electrokinetic flow with deformable interfaces MICHAEL BOOTY, New Jersey Institute of Technology, MANMAN MA, Tongji University, Shanghai, MICHAEL SIEGEL, New Jersey Institute of Technology — A hybrid or multiscale model is introduced to describe the evolution of a drop in the two-phase flow of immiscible, ionic fluid electrolytes that are driven by an electric field. It is formed from the PNP equations in the Stokes flow regime in the limit when the Debye layers are thin relative to the undeformed drop size. For arbitrary deformation, the model consists of boundary integral equations for the electrostatic potential and the interface fluid velocity together with relations that contain the coupling between the electrostatic and fluid fields within the thin Debye layers. The results of sample numerical simulations are presented, together with comparison to a small-deformation analysis in the limit of a weak applied field; further generalizations of the model are also discussed.

> Michael Booty New Jersey Institute of Technology

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