

Abstract Submitted  
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**Electrohydrodynamics of a surfactant-covered drop**<sup>1</sup> ANDREW OBERLANDER, Brown University, MALIKA OURIEMI, IFPEN, France, PETIA VLAHOVSKA, Brown University — We present an experimental study of the behavior of a drop covered with insoluble surfactant in a uniform DC electric field. Steady drop shapes, drop evolution upon application of the field, and drop relaxation after the field is turned off are observed for a polybutadiene (PB) drop suspended in silicon oil (PDMS). The surfactant is generated at the drop interface by reaction between end-functionalized PB and PDMS. The experimental data is compared with the theory of Nganguia et al (2013) for the steady shapes, and a new model developed by us which accounts for polarization relaxation. The latter effect turns to be significant for our system of very low conductivity fluids, for which the Maxwell-Wagner time is of the order of tens of seconds. We will discuss the complex interplay of shape deformation, surfactant redistribution, and interfacial charging in droplet electrohydrodynamics. Our results are important for understanding electrorheology of emulsions commonly found in the petroleum industry.

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Petia Vlahovska  
Brown University

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