

Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

Deformation and stability of surfactant - or particle - laden drop
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present an experimental study of the behavior of a drop covered with insoluble sur-
factant or colloidal particles 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 leaky dielectric fluids: Polybutadiene (PB), Silicon oil (PDMS),
and Castor oil (CO). The surfactant is generated at the drop interface by reaction
between end-functionalized PB and PDMS. The experimental data is compared with
existing theoretical models for the steady shape of surfactant covered droplet, and
adjusted models taking into account the presence of colloidal spheres with range of
electrical properties. We will discuss the complex interplay of shape deformation,
surfactant elasticity, particle redistribution, and interfacial charging in droplet elec-
trohydrodynamics. Our results are important for understanding electrorheology of
emulsions commonly found in the petroleum industry. We acknowledge grant NSF
CBET 1437545 for funding.

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Date submitted: 30 Jul 2015

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