

Abstract Submitted  
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**Effects of DC and AC Electric Fields on Emulsions of Leaky Dielectric Drops Immersed in Simple Shear Flow.** ARTURO FERNANDEZ, The Catholic University of America — DNS is used to examine the effects of DC and AC electric fields on the rheological properties of emulsions. Drops are immersed in a bath of fluid between two plates, and a simple shear flow is imposed. Assuming quasi-static conditions, the electric field is described by using the leaky dielectric model proposed by Taylor. The electric stresses have two effects: (1) a dielectrophoretic attraction in the direction parallel with the electric field, (2) at the interface between the fluids, a viscous fluid motion generated by the tangential component of the electric stresses. The electrorheological response of the emulsion is governed by the competition between hydrodynamical and electrical forces. The former include viscous, inertial and capillary forces, and the latter ones depend on the electrical properties of the fluids, the strength of the electric field and the frequency, if the electric field is alternating. The emulsions exhibit a yield stress, which depends on the strength of the electric field, and behave as either shear-thinning or shear-thickening material depending on the electrical properties.

Arturo Fernandez  
The Catholic University of America

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