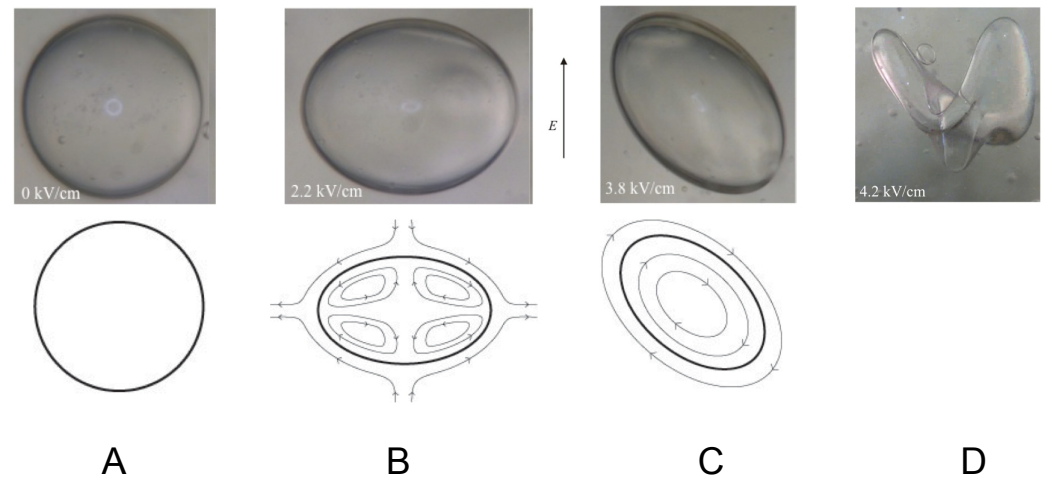


Effect of surfactants on drop electro-hydrodynamics

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Goal: understanding of the essential microphysical mechanisms that govern the flow behavior of surfactant-laden emulsions in electric fields

Exposure to a uniform direct current (DC) electric field with increasing strength excites a variety of drop responses. A. the drop is spherical in the absence of electric field. B. weak fields induce axisymmetric oblate deformation. C. in strong fields, the drop is tilted with respect to the applied field direction and the flow is rotational. D. stronger fields break the drop up. The sketches illustrate the drop shape and flow streamlines.



We have initiated a systematic experimental study of drop electro-hydrodynamics in strong field. During the first year, we have investigated drop responses to applied uniform DC electric field and classified the different modes in phase diagrams; we quantified the steady shapes of droplets in electric field. During the second year, the focus was on transient behavior as well as theoretical modeling.