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Electro-coalescence: Effects of a D.C. electric field on droplet coalescence at a planar interface HAMARZ ARYAFAR, PIROUZ KAVEHPOUR, MAE, UCLA — In these series of experiments, we investigate the effects of an electric field on a water droplet suspended in a silicone oil medium coalescing into a pool of water. A neutrally-charged water droplet is deposited inside a layer of silicone oil slightly above a planar silicone oil-water interface. By introducing a DC electric field, we apply additional forces to the interface and droplet. In most cases, the presence of the electric field causes the droplet to initiate coalescence. The effect of this additional field in the conjunction with the effect of other physical properties of liquids such as viscosity and interfacial tension are studied by utilizing a digital high-speed camera. The characteristics of this phenomenon are compared with those of equivalent systems in absence of the electric field. Along with the presences of a lower electric field threshold must be surpassed in ordered to create instantaneous coalescence, a relationship between partial coalescence and electric field strength is observed.

> Pirouz Kavehpour MAE, UCLA

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