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The effect of charge regulation on the stability of electrolyte films
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— The stability of a thin liquid film of an electrolyte on a solid substrate is investigated. We show that the commonly used approximation of constant charge densities at the solid-liquid and solid-gas interfaces does not lead to predictions of film rupture. To reconcile the model with experimental observations, the effects of charge regulation are incorporated into the model using a linear relationship between charge density and potential. Linear stability criteria are formulated in terms of charge regulation parameters and electrolyte properties. A nonlinear evolution equation for film thickness is derived and solved numerically over a range of parameters to determine the conditions of film rupture.

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