Electrokinetic Stabilization of Thin Surfactant Films

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Ionic surfactant solutions were used to study gravitational drainage from thin vertical planar films supported on a frame with the upper and lower parts being electrodes. The imposed electric field resulted in the following physical phenomena: (i) surface charge redistribution, (ii) electroosmotic flow in the diffuse layer, and (iii) pressure build-up near the electrode to which the electroosmotic flow is directed. The interplay of these phenomena stabilized the film drainage irrespectively of polarity. Similar effects were observed with foams.