

Abstract Submitted
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Hindered coalescence and break-up with insoluble surfactants

CAROLINA VANNOZZI¹, None — For Capillary numbers (Ca) greater than 0.05, the thin film between two drops undergoing a flow-induced head-on collision, in the creeping flow regime, thins to a steady state thickness h_{ss} , as shown in [1]. Here, we analyze numerically this phenomenon in the presence of surfactants. For trace amount of surfactants, h_{ss} diminishes with decreasing surfactant interfacial diffusivity (D_s) and Γ , unlike Nemer et al.'s analysis for non-diffusing surfactants[1], surfactants are still present in the dome region. For higher surfactant concentration, h_{ss} is present only for very high D_s , while, as D_s decreases, the film drains continuously. As Ca increases the two drops break-up into 4 district drops. Interestingly, for low surfactant concentrations, the dome region will thin, becoming a neck. This will continuously thin and stretch as the two extremities depart from each other following the streamlines, while keeping h_{ss} constant. This process will proceed until instabilities arise in the neck. Whereas, for high surfactant concentrations, the dome region will thin only at the center and the extremities will keep draining in place. [1] Nemer et al. 2004 Phys. Rev. Lett. 92.

¹This work was undertaken while I was affiliated with UCSB

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