

Abstract Submitted
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Scaling vs simulations in the head-on collision of viscous drops with insoluble surfactants CAROLINA VANNOZZI, University of California Santa Barbara — Scaling arguments are presented to show the effect of the surface diffusivity D_s on the head-on collision of two equal-sized viscous drops in a viscous matrix with insoluble surfactants. The scaling arguments are compared to simulations [1] of the experimental system studied by Yoon et al [2] where the drops are Polybutadiene(PBD) in PDMS, stabilized by block copolymers surfactants. Overall, the scaling could predict the effect of the different parameters on the drainage time (the surface Peclet number, the Marangoni number and the pushing force due to the external flow), but could not predict the experimental or simulated values. We tested our simulations against the scaling argument of [3], that claimed that emulsions stabilized by small molecule surfactants can be described with the assumption of non-diffusing surfactants. Here, however, following the same arguments, but without using the Stokes-Einstein expression for the surfactant surface mobility employed in Ref. [3] and by simply substituting the parameters for different emulsion systems, we show that D_s can be neglected only for oil in water emulsions, not for water in oil emulsion [1].

[1] Vannozzi PoF (2012)

[2] Yoon, Hsu, Leal PoF (2007)

[3] Cristini, Blawdziewicz, Loewenberg JFM (1998)

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