Abstract Submitted
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**Effects of small concentration surfactants on the coalescence of viscous drops**[1] CAROLINA VANNOZZI, University of California Santa Barbara — Boundary integral simulations, employing Dai and Leal's code [Phys. Fluids **20,** 040802 (2008)], are used to study the effects of small concentrations of insoluble surfactants $C_s$ on head-on collisions of two equal-sized viscous drops in a matrix of equal viscosity in a hyperbolic extensional flow, for low Reynolds numbers. The parameters were chosen to mimic the experiments of Yoon et al. [Phys. Fluids **19**, 023102 (2007)], which were performed with polymeric drops stabilized by block-copolymer insoluble surfactants in a polymer matrix, where both fluids acted as Newtonian viscous fluids. In these experiments a discontinuous transition in the coalescence process was found for low $C_s$ as the Capillary number Ca was increased. Thus, for Ca>$Ca_c$ a minimum surfactant concentration exists below which the system behaves like a clean interface system. Here, by varying $C_s$, i.e. the Marangoni number Ma, and the surface diffusivity, i.e. the interfacial Peclet number $Pe_s$, we explain the origin of the transition and its dependence on the parameters. The transition occurs if $Pe_s$ >$Pe_{sc}$, Ca>$Ca_c$ and Ma<$Ma_c$.

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Carolina Vannozzi
University of California Santa Barbara

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