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Sedimenting droplets with a reactive interface ANGELA M. JIMENEZ, SIGOLENE LECUYER, HOWARD A. STONE, Harvard University, ANDREW BELMONTE, Penn State University — Droplets of a CTAB (cetyl trimethylammonium bromide) solution sedimenting in oleic acid exhibit peculiar behavior and shape transformations. This is due to the fact that cationic and anionic surfactants interact at the interface, which results in the formation of a thin visco-elastic skin on the surface of the droplet. We study this phenomenon experimentally, as a function of CTAB concentration (2-60 mM) and droplet volume (3-50 μl). We report two main observations: 1) at low enough CTAB concentrations, droplets have a steady shape, and the sedimentation speed is increased compared to a pure water droplet of the same volume. This can be accounted for by small changes in the shape of the droplet, which is not spherical anymore. 2) at higher CTAB concentrations, droplets develop a thin "tail" that progressively grows as they fall down. We study the dynamics of this elongation and determine mechanical properties of the visco-elastic interface.

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