

Abstract Submitted
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Effects of Soluble Surfactant on Drop Formation YING-CHIH LIAO, ELIAS FRANSES, OSMAN BASARAN, School of Chemical Engineering, Purdue University — Surfactants are routinely used to control the breakup of drops and jets in applications as diverse as emulsion and dispersion formation, ink jet printing, crop spraying, microarraying, and microencapsulation. Dynamics of formation of drops of incompressible Newtonian liquids containing a nonionic alkyl ethyleneoxide surfactant from a tube into air are studied experimentally using high-speed visualization and computationally using finite element analysis (FEA). Surfactant solutions at different concentrations below the critical micelle concentration (cmc) are formed by dissolving the surfactant in either water or mixtures of glycerol and water. In the absence of surfactant, computed results are shown to accord well with earlier predictions made with FEA. When surfactants are present, computed predictions are demonstrated to be in excellent agreement with the new experimental measurements. The effects of surfactant on volumes of primary drops and dynamics of satellite drops are also reported.

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