

Abstract Submitted
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Drop deformation and breakup in a partially filled horizontal rotating cylinder¹ ANDREW WHITE, CAROLINE PEREIRA, HYAQUINO HYACINTHE, THOMAS WARD, Iowa State University — Drop deformation and breakup due to shear flow has been studied extensively in Couette devices as well as in gravity-driven flows. In these cases shear is generated either by the moving wall or the drop's motion. For such flows the drop shape remains unperturbed at low capillary number (Ca), deforms at moderate Ca , and can experience breakup as $Ca \rightarrow 1$ and larger. Here single drops of $\text{NaOH}_{(aq)}$ will be placed in a horizontal cylindrical rotating tank partially filled with vegetable oil resulting in $10^{-2} < Ca < 10^1$. It will be shown that the reactive vegetable oil- $\text{NaOH}_{(aq)}$ system, where surfactants are produced *in situ* by saponification, can yield lower minimum surface tensions and faster adsorption than non-reactive surfactant systems. Oil films between the wall and drop as well as drop shape will be observed as rotation rates and $\text{NaOH}_{(aq)}$ concentration are varied. Results will be presented in the context of previous work on bubble and drop shapes and breakup.

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