

Abstract Submitted
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Sedimentation and deformation of an aqueous sodium hydroxide drop in vegetable oil¹ ANDREW WHITE, HYAQUINO HYACINTHE, THOMAS WARD, Iowa State University — The addition of water droplets in fuels is known to provide benefits such as decreased Nitrous Oxide NO_x emissions. Unfortunately the shelf life of a water-fuel emulsion is limited by the sedimentation rate of the water droplets. It is well known that adding surfactants can significantly slow the sedimentation rate due to the introduction of Marangoni stresses. In the case of a vegetable oil fuel, adding sodium hydroxide ($NaOH$) to the water droplets will produce surfactants through saponification in the form of sodium-carboxylate salts. Pendant drops of aqueous $NaOH$ solutions with pH between 11 and 13 will be suspended in several oils such as corn, olive, canola and soybean oil in order to measure the interfacial tension. The change in interfacial tension with time will be used to estimate the surfactant concentration and the saponification rate. Then individual drops will be placed in the oils to observe the settling velocity and drop deformation.

¹NSF CBET

Thomas Ward
Iowa State University

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