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Numerical simulation of cocontinuous morphologies JUNSEOK KIM, JOHN LOWENGRUB, VITTORIO CRISTINI, UC Irvine, UC IRVINE TEAM — In strongly sheared emulsions, experiments (e.g., Galloway and Macosko 2001) have shown that systems consisting of one continuous (matrix) and one dispersed (drops) phase may undergo a coalescence cascade leading to a system in which both phases are continuous, i.e., cocontinuous, (sponge-like). Such configurations may have desirable diffusional, mechanical and electrical properties and thus have wide-ranging applications. Using a diffuse interface method developed by Kim and Lowengrub 2001, we perform numerical simulations of the interface length per unit area as a function of volume fractions in 2-d. In this approach, interfaces have small but finite thickness and limited chemical diffusion is used to change the topology of interfaces. In this presentation, we discuss the effects of the viscosity ratio, surface tension, and flow on interface length per unit area and compare it with experiment results. The use of adaptive mesh refinement techniques recently developed by Kim, Wise and Lowengrub will also be discussed.

Xiaoming Zheng
UC Irvine

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