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Interfacial Behavior of Surfactant Covered Double Emulsion in Extensional Flow HEEMIN LEE, YOUNGWOON KIM, SUSIE RYU, JOONSANG LEE, Yonsei University — Surfactants significantly influence on the deformation, breakup and release of droplets. In this study, we investigated the interaction between the inner and outer interfaces of a surfactant covered double emulsion by using a three-dimensional lattice Boltzmann method. Simulations are run under 3D extensional flow. As the surfactant was concentrated on the tip, droplet was more easily deformed. We changed the initial surfactant concentration of the inner droplet and surfactant distribution of the outer droplet was delayed as the concentration increased. This result showed the effect of the inner droplet structure and Marangoni flow, which arises from the interfacial tension gradient, on external droplet surface. Next, high deformation was applied to the double emulsion and the breakup process of droplet was observed. The surfactant covered double emulsion was more stable in breakup and had elasticity to recover to its initial form.

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