Abstract Submitted
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The effects of surfactant dynamics on deposition patterns in evaporating colloidal drops[1] NARINA JUNG, HAEWON SEO, Mechanical and Nuclear Engineering, UNIST, PILWON KIM, Mathematical Science, UNIST, CHUN SANG YOO, Mechanical and Nuclear Engineering, UNIST — Evaporation of a colloidal droplet typically leaves ring-like deposit patterns on a substrate, now well-known as the coffee ring effect. We investigate the effect of surfactant dynamics on the deposition process in a drying droplet. A coarse grained model has been developed to simulate cases with Marangoni stresses, adsorption kinetics, and intermolecular interaction of surfactant particles and to examine the related deposit formation of colloidal particles. By using the two-dimensional lattice for the lateral cross-section of a droplet, we are able to capture the full dynamics of recirculating flows with surfactant and colloidal particles during drying. The roles of surfactant on droplet and colloidal particle dynamics are investigated by systematically varying parameters, such as the maximum area fraction and the initial concentration of surfactant. We further highlight important factors to generate Marangoni eddies.

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