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Numercial study of deformable droplet-pair subjected to sudden acceleration by an external flow SHAOPING QUAN, JING LOU, Institute of High Performance Computing — Numerical simulations of two deformable drops placed in tandem subjected to a sudden acceleration by a gaseous flow are performed by solving the integral form of the full Navier-Stokes equations using a finite volume/moving mesh interface tracking method. The interface is zero thickness and moves in a Lagrangian fashion. The unsteady interaction between the droplet-pair is studied by varying the minimum initial distance between the two droplets. The interaction on the shapes, the deformation factors, the drag coefficients, and the fluid fields are examined and compared to the single droplet. A mushroom shape is formed with a dimpled cap of the upstream drop and a bell shape of the downstream one for high Weber numbers and small initial separation distances. The drag coefficient of the downstream droplet is dramatically reduced, especially for the large Weber numbers, while drag force of the upstream drop is slightly decreased. It is found that when the spacing is less than zero, there is a sudden increase of drag coefficient for the downstream drop, while a sharp reduction for the upstream drop. For smaller Weber numbers, the two droplets experience oscillations, however, the oscillation modes are not the same. The two drops might coalescence for small separation distances.

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