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Numerical investigation of rotational separation in binary droplet collision[1] TAKAJI INAMURO, AOI NAKAMURA, FUMINORI HORAI, Kyoto University, KUO-LONG PAN, National Taiwan University — The phenomena of binary droplet collision are of fundamental importance in the studies of raindrop formation, spraying processes, dispersed phase systems, and so on. Recently, one of the authors experimentally found a new regime of collisions, named rotational separation in moderate Weber numbers and impact parameters. In this study, in order to numerically confirm the regime of rotational separation and also to validate the improved two-phase LBM developed by the authors, we apply the method to the simulations of rotational separation in the collision of two equal-size droplets. The density and viscosity ratios of the liquid to the gas are fixed at 600 and 70, respectively, which are the same conditions of the experiment with dodecane droplets in the air. The simulations are performed for various Weber numbers of $30 \leq We \leq 40$ and for various impact parameters of $0.30 \leq B \leq 0.50$ at the Ohnesorge number of $Oh = 0.0126$. We found that the rotational separation can be simulated at around $We = 33$ and $B = 0.42$

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