

# Deformation characteristics of a single bubble in immiscible fluids

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## Abstract

In order to investigate characteristics of bubble deformation in immiscible fluids, the bubble shape change during the interface and the relationship between aspect ratio( $E$ ) and dimensionless number of forces is obtained. A three-dimensional model is established and the free-floating behavior of a single bubble in immiscible fluids is numerically simulated by phase-field method. The simulation results are in good agreement with experimental results. The research shows that, in the lower liquid, the relationship between  $E$  and  $We$ ,  $Ta$ ,  $Re$  is distributed between two intersecting lines. In the upper liquid, the relationship between  $E$  and  $We$ ,  $Ta$ ,  $Re$  is distributed between two parallel lines. Comparing the bubble deformation and the influence of the forces. Compared with gravity, the inertial force plays a leading role in the bubble shape in the lower liquid and upper liquid. Compared with the viscous force, the surface tension dominates the bubble shape in the lower liquid.

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