November 29, 2024

Chemical Engineering Science
Professor Wei Ge, Editor

Dear Prof. Ge,

Please find enclosed the revised version of our manuscript (CES-D-24-01867): "Numerical Simulation of Bubble Deformation and Breakup under Simple Linear Shear Flows". We thank the reviewers for their comments and thoughts regarding improvement of our paper. We believe that we have addressed all of the reviewers' concerns; the changes are itemized in detail below.

NOTE: all references to equations and figures below are with reference to the numbering scheme of the revised version of the paper, not the original version. Also, changes are hi-lighted in red.

Changes made in response to comments of Reviewer 3:

1. The manuscript needs extensive revision for language and grammar.

   Response:
   We carefully made multiple run-throughs of our paper fixing all English errors and awkward constructs.

2. Discuss more your results.

   Response:
   We additionally developed a discussion for our results.

   Please see the red characters in the "Results and Discussion".

3. Improve your figures.

   Response:
   We are confused about the reviewer's comment because the reviewer did not provide which figures to improve. We carefully checked all the figures and improved Figs. 4, 5, and 10.

4. What is the novelty of your study?
   Discuss about other studies on numerical simulation of bubble deformation.
   How your study differs?
   Improve Introduction section.

Response:
We have completely rewritten the introduction in order to make our message very clear.
To summarize:
We have referred to and explained previous studies about bubble deformation and breakup in the "Introduction." Besides, we have stated the novelty of this study and the difference between this study and previous studies. In previous experimental studies on the motion of bubble deformation in a simple shear flow, only bubble deformation under very low Re number conditions ($Re \ll 1$) have been examined. Meanwhile, only a few studies have been reported for the numerical simulation of bubble deformation and breakup in a simple shear flow. These previous studies mainly examined the dynamics of bubble deformation in a shear flow. Concerning bubble breakup, Wei et al. (2012) presented only one numerical result for a bubble breakup process under the condition of Ca (capillary number) = 35. In this study, we first determined the critical Reynolds number ($Re \gg 1$) that leads to bubble breakup for $Ca = 0.3 \sim 1.0$. This is the largest novelty in this study. Additionally, our study revealed characteristics that distinguish a drop's deformation and breakup processes from a bubble.
In the revised paper, we have completely modified the "Introduction".

Again, please see the revised "Introduction." The Introduction is better now.

5. The conclusions are not supported by the results and discussion.

   Response:
   We carefully checked the "Conclusions," and believe the results and discussion properly support our conclusions.
   We have made some minor alterations to the "Conclusions." Also, we have added an additional paragraph which gives suggestions for future research.

   Please see the improved "Conclusions."

On behalf of the authors,

Mitsuhiro Ohta