

Figure captions

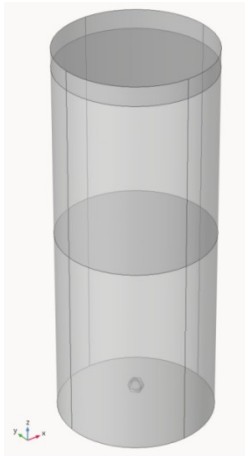


Fig. 1. Computational domain diagram

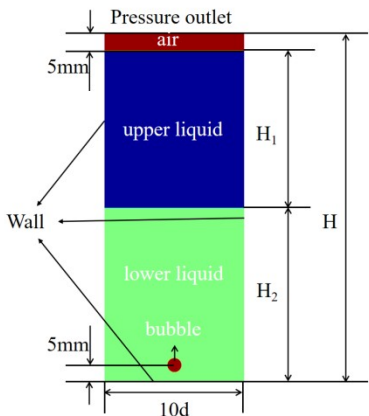


Fig. 2. Schematic diagram of physical model

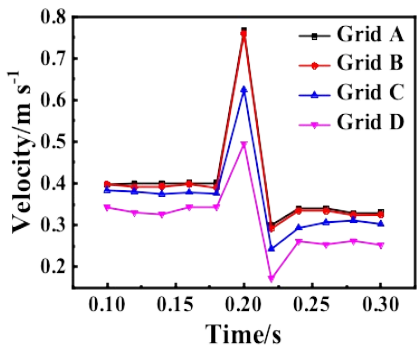


Fig. 3. Rising velocity of bubble with different mesh sizes

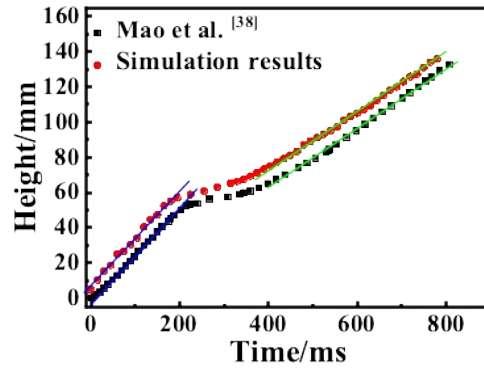


Fig. 4. Comparison between the simulation results and reference[38]

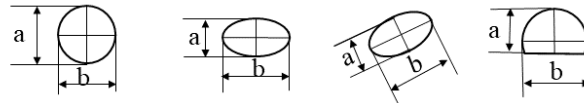
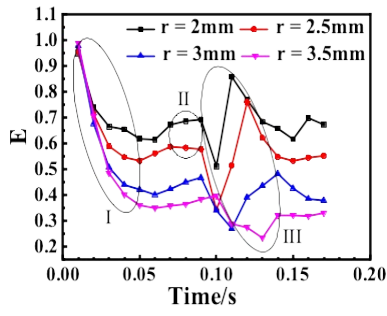
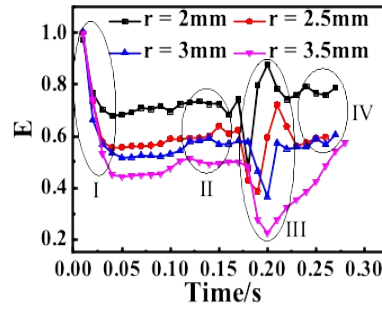


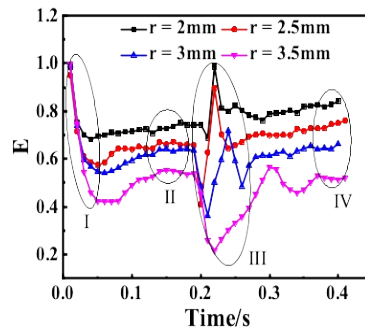
Fig. 5. Schematic diagram of E



(a)45mm



(b)70mm



(c)100mm

Fig. 6. The change of E with time

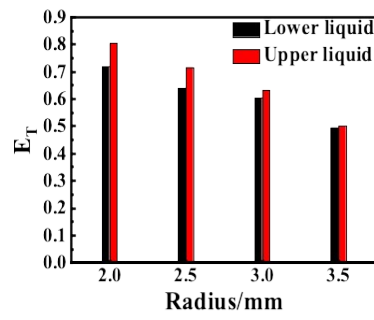


Fig. 7. E_T of different radius bubble

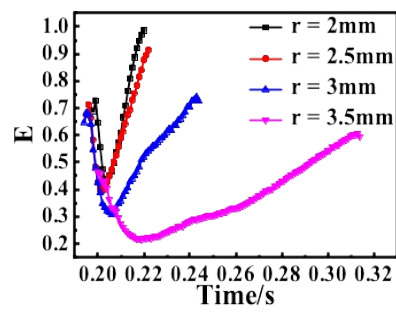
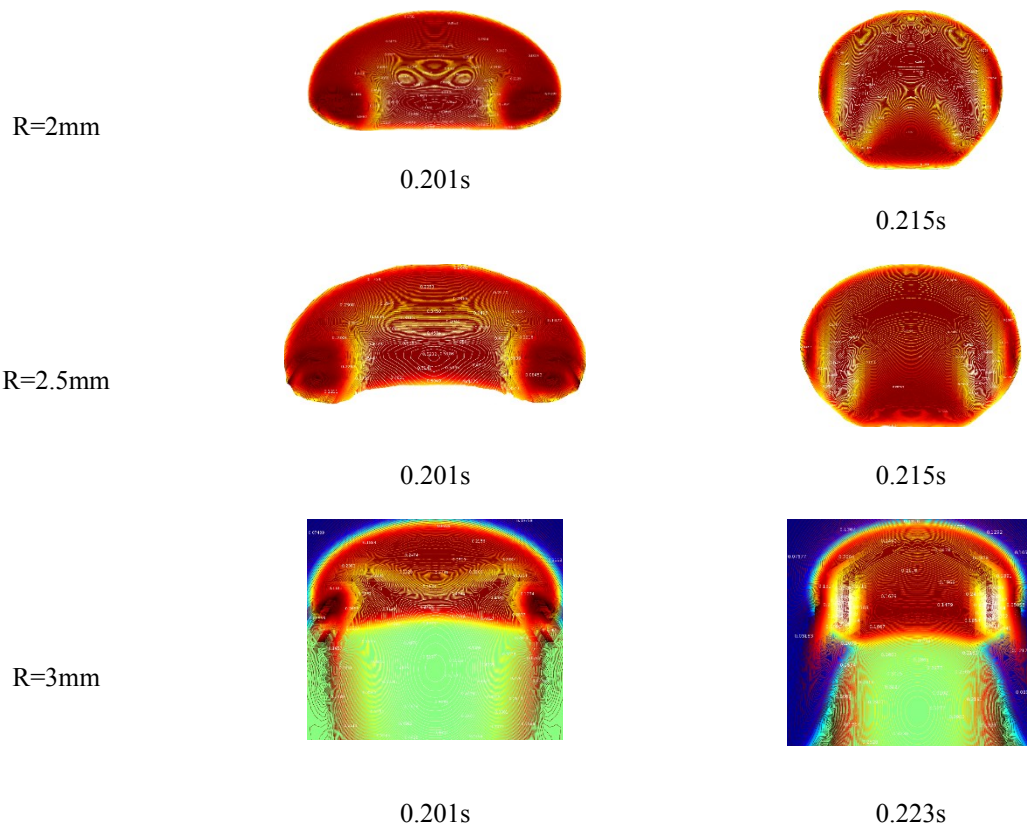
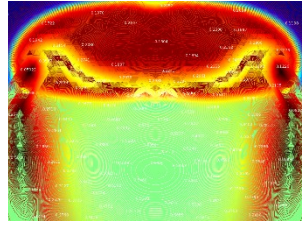


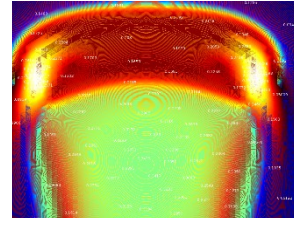
Fig. 8. Changes of aspect ratio when crossing the interface



R=3.5mm

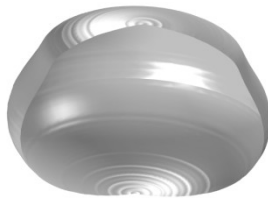


0.206s

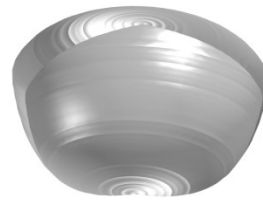


0.245s

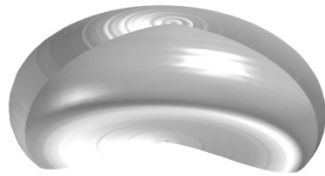
Fig. 9. The bubble vortex distribution map in the interface



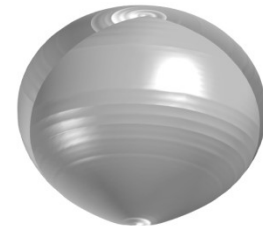
(a) 0.194s



(b) 0.196s

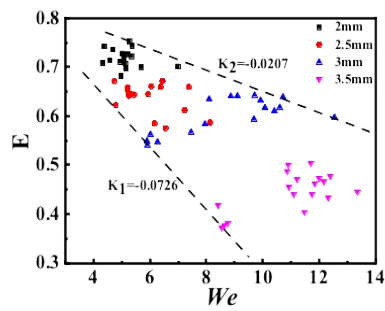


(c) 0.216s

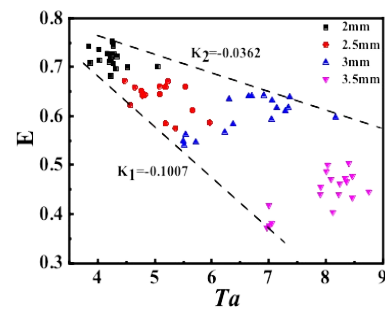


(d) 0.240s

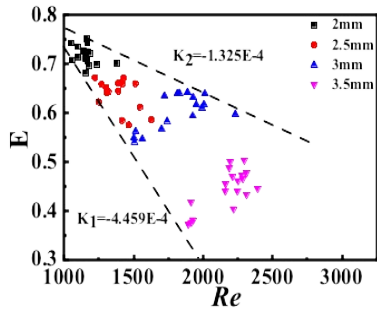
Fig. 10. The profile of the bubble when crossing interface(R=3mm)



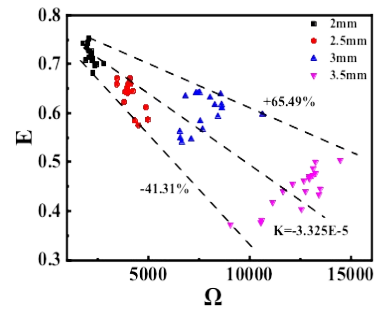
(a)



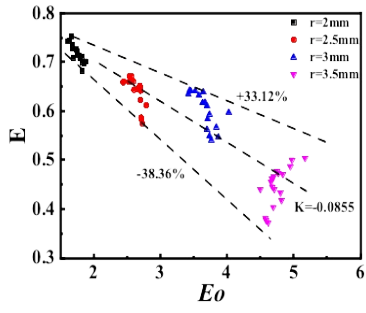
(b)



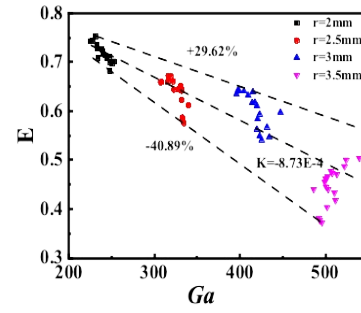
(c)



(d)

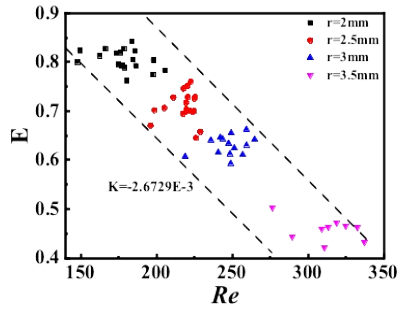


(e)

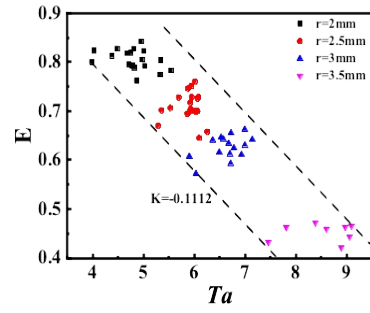


(f)

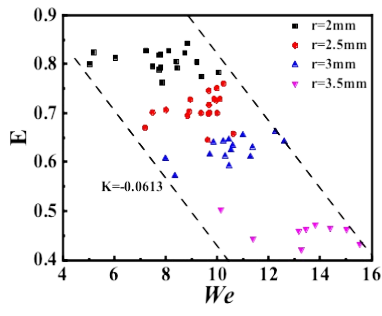
Fig. 11. Relationship between E and We , Ta , Re , Ω , Eo , Ga in the lower liquid



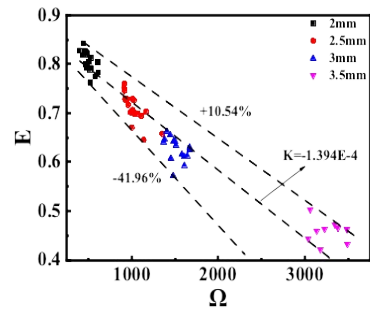
(a)



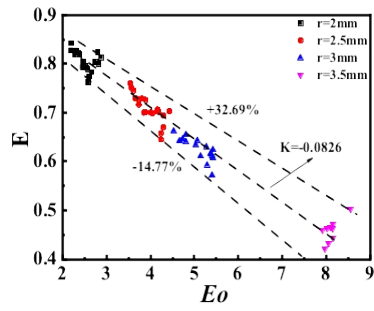
(b)



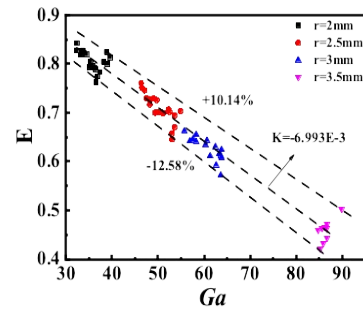
(c)



(d)

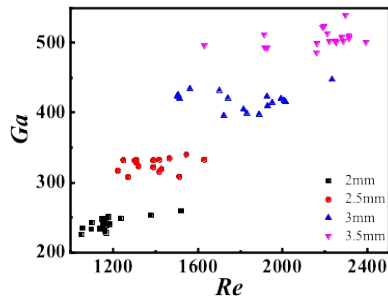


(e)

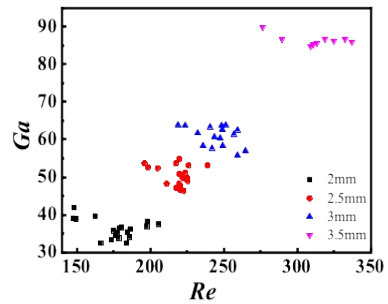


(f)

Fig. 12. Relationship between E and Re , Ta , We , Ω , Eo , Ga in the upper liquid



(a)



(b)

Fig. 13. Relationship between Ga and Re

(a) lower liquid (b) upper liquid

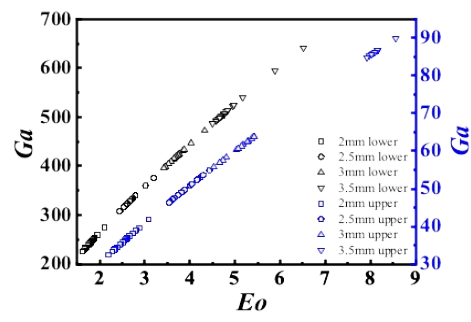


Fig. 14. Relationship between Ga and Eo