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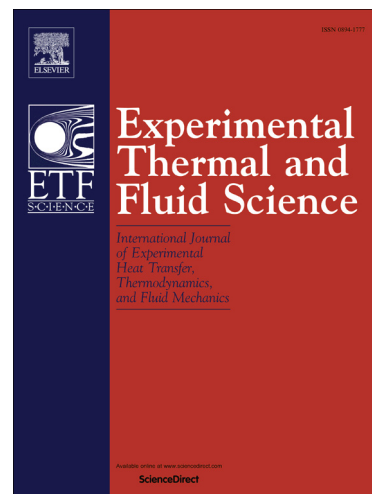
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Observations on bubble shapes in bubble columns under different flow conditions

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ABSTRACT

The bubble shape is fundamental for every aspect of modelling bubbly flows. The interface is usually highly deformable so that the bubble shape is in general dependent on the surrounding turbulent flow field. Since recent work on this topic addressed almost entirely single-bubbles rising in quiescent flow, the extent of such flow field dependencies as well as swarm effects is rather unknown. This study examines the effect on the bubble shape in bubbly flows with a liquid background flow that is generated by natural convection in the bubbly flow regime when flow properties, i.e. the gas flow rate, sparger setup, and column geometry, are changed by evaluating six different bubble column experiments. The results of this integral approach reveal that the bubble shape of small bubbles is distinctly influenced whereas the shape of large bubbles is unchanged. Averaged over all flow rates, we find that the size-dependent bubble shapes are quite similar for all six experiments. Further studies focusing on single local effects like the shear rate or wake effects are highly desirable to obtain a deeper understanding of the underlying processes; for this purpose, the given results can help to assess the most important effect and in which extend it should be studied.

KEYWORDS

Bubble shape, Bubbly flows, Bubble column, Turbulent flow, Swarm effects

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