Breakup of bubbles in Advanced-Flow Reactor at low Reynolds numbers

Yan Zuoyi¹, Huan Li², Yan Zhongyi², tianming Chen², wenyi Zou², and Huidong Zheng²

¹Fuzhou University

²Affiliation not available

August 7, 2021

Abstract

In order to study the behavior and mechanism of the bubble breakup in Advanced-Flow Reactor (AFR), visualization experimental study was carried out in a single Corning G1 module. The results show that the breakup behavior in AFR has a significant regularity at low Reynolds numbers ($Re < 1000$), which is closely related to the capillary number Ca and the virtual length l_0 of bubbles, and the criterions is also obtained. Most of bubbles in arc-shaped junction divergence of AFR are breakup with permanent obstruction (POB), which could be divided into two stages: squeezing stage and rapid pinch-off stage. The modified equation obtained in this paper can roughly describe the change of the bubble neck at the squeezing stage of POB. The research results provide a theoretical basis for industrial application of AFR and the development of next-generation reactors.

Hosted file

manuscript.docx available at <https://authorea.com/users/429541/articles/533216-breakup-of-bubbles-in-advanced-flow-reactor-at-low-reynolds-numbers>