Poster

CHARACTERIZATION OF BUBBLY AND SLUG FLOW REGIMES GENERATED IN A MINICHANNEL IN MICROGRAVITY CONDITIONS

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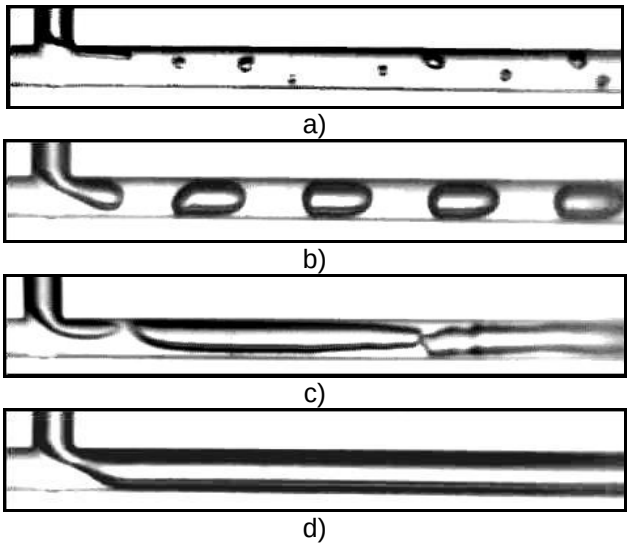
Keywords: Two-phase flow; Microgravity; Flow patterns; Bubbly and slug flows; Minichannel; Minibubble.

Abstract

We performed a characterization of the bubbly and slug flow regimes in minichannels in conditions relevant to microgravity. Two-phase flows were generated on ground by means of a T-junction device (1 mm i.d.), whose operation is independent to changes in gravity level [1]. Air and water were injected at several superficial velocities ranging from 0 up to 2 m/s. The generation and detachment of the minibubbles is provided by the liquid cross-flow (see figure). In nominal conditions small Bond and Weber numbers are achieved for the air/water mixture flow. Therefore, capillary forces dominate over buoyancy and inertial forces [2]. Laminar regime can also be assumed. Bubbly, slug, churn and annular flows were observed (see figure). The characterization consists in the analysis of the bubble and the unit cell lengths, the bubble velocity and the void fraction in both bubbly and slug flow regimes.



Representative photographs of flow patterns in the 1 mm i.d. circular tube:
a) bubbly; b) slug; c) churn and d) annular.

References

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