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Effect of surfactant on bubble/liquid transport in a T-junction microchannel with sudden contraction[1] KUO-LONG PAN, HUAI-JHU CHEN, National Taiwan University — We studied the effect of surfactant on the transport phenomena of bubbles in microfluidic devices. A T-junction microchannel with a sudden contraction section was used in the experiment, and the channel dimensions were 200 by 100 μm. Variations in the transport velocities of different bubbles were observed when they passed the sudden contraction area. Different liquids were adopted as the continuous phase. The work is composed of three parts First, the commercial software, Fluent, was used to analyze the effect of surface tension on the transport phenomena in the microchannel. Second, the roles of surface tension and viscosity were investigated by changing the concentration of ethanol solution. Third, the effects of surfactant type were studied by adding S111n (anionic) and S131 (amphoteric) respectively in water. Experimental results showed that when the concentration of surfactant exceeded the critical micelle concentration (CMC) limit while at the same surface tension, the bubbles would exhibit distinct patterns. Specifically, the wetting behaviors of the bubbles were different using the two dissimilar types of surfactant solutions, for which the wettability of S131 was higher than that of S111n. As a consequence, the transport velocities of the bubbles in S131 solutions were faster than that in S111n solutions

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Kuo-Long Pan
National Taiwan University

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