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Study of dynamics of microbubble generation in microchannels RYOJI MIYAZAKI, YOSHIMASA GOSHIMA, SHU TAKAGI, YOICHIRO MATSUMOTO, The University of Tokyo — The novel technique to generate micrometer-order bubbles was developed by using a microchannel with a squeezed T-junction, and the mechanism of bubble generation was investigated by using a high-speed camera with 106 Hz and the microscopy. The experiments were conducted by using three kinds of channels with the different cross-section size, and pure water, ethanol and silicon oil were selected as the liquid phase to examine the effect of the cross-section size of the channels and the physicality of the liquid phase. The liquid velocity at the T-junction and the gas pressure were set at 0.1∼3.0 m/s and 10∼200 kPa, respectively. The experimental results indicate that the proposed technique realizes to generate 10∼30 μm diameter bubbles, and the diameter of the generated bubble becomes smaller with an increase of the liquid velocity, until limit points of bubble generation. From the experiment near the bubble generated limit, liquid pressure balances with the gas pressure and the Laplace pressure under the bubble generated limit, and the bubble diameter is dominated by Weber number which is defined using an equivalent diameter of the cross-section of the channel and the mean velocity of the liquid phase.

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