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**Gas column oscillation inside a closed-end hole and its expelling by irradiating an acoustic wave** TOSHIYUKI SANADA, YUKI MIZUSHIMA, Shizuoka University, MASAO WATANABE, Hokkaido Univeristy — Filling the small and high aspect holes with liquid is a fundamental process for both cleaning and painting. However, due to the presence of surface tension, it is challenging to expel the gas through small holes with closed ends. Here we show a new method of expelling gas from a hole by acoustic wave irradiation. We used two acoustic waves, constant frequency sinusoidal waves, and time-varying frequency waves, i.e., sweeping waves. The acoustic wave could discharge only a part of the gas with a constant frequency, but the sweeping wave entirely expelled the gas. We also observed the expelling process using a high-speed video camera. As a result, the gas expelling consists of three stages. At these stages, the natural frequencies of the gas column and bubbles were critical. In the first stage, the entire air column oscillates, and in the second stage, the gas column in the hole was divided into multiple bubbles. Then, the bubbles were discharged by its oscillating motion.

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