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Toward the development of erosion-free ultrasonic cavitation cleaning with gas-supersaturated water TATSUYA YAMASHITA, KEITA ANDO, Department of Mechanical Engineering, Keio University — In ultrasonic cleaning, contaminant particles attached at target surfaces are removed by liquid flow or acoustic waves that are induced by acoustic cavitation bubbles. However, the inertial collapse of such bubbles often involve strong shock emission or water hammer by re-entrant jets, thereby giving rise to material erosion. Here, we aim at developing an erosion-free ultrasonic cleaning technique with the aid of gas-supersaturated water. The key idea is that (gaseous) cavitation is triggered easily even with low-intensity sonication in water where gases are dissolved beyond Henry's saturation limit, allowing us to buffer violent bubble collapse. In this presentation, we report on observations of the removal of micron/submicron-sized particles attached at glass surfaces by the action of gaseous cavitation bubbles under low-intensity sonication.

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