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Long-time cavitation threshold of silica water mixture under acoustic drive ADRIEN BUSSONNIRE, QINGXIA LIU, PEICHUN AMY TSAI, University of Alberta — The low cavitation threshold of water observed experimentally has been attributed to the presence of pre-existing tiny bubbles stabilized by impurities. However, the origin and stability of these cavitation nuclei remain unresolved. We therefore investigate the long-time cavitation evolution of water seeded with micron-sized silica particles under the influences of several parameters. Experimentally, cavitation is induced by a High Intensity Focused Ultrasound and subsequently detected by monitoring the backscattered sound. Degassed or aerated solutions of different concentrations are subjected to acoustic pulses (with the amplitude ranging from 0.1 to 1.7 MPa and a fixed repetition frequency between 0.1 and 6.5 Hz). The cavitation threshold was measured by fitting the cavitation probability curve, averaged over 1000 pulses. Surprisingly, our results shown that the cavitation threshold stabilizes at a reproducible value after a few thousand pulses. Moreover, this long-time threshold was found to decrease with increasing particle concentration, pulse period, and initial oxygen level. In contrast to the depletion of nuclei expected under long acoustic cavitation, the results suggest stabilized nuclei population depending on concentration, oxygen level, and driving period.

Adrien Bussonnire
University of Alberta

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