Abstract Submitted
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Enhancing cavitation with micromachined surfaces[1] DAVID FERNANDEZ RIVAS, LAURA STRICKER, AALDERT G. ZIJLSTRA, HAN GARDENIERS, DETLEF LOHSE, University of Twente, ANDREA PROSPERETTI, Johns Hopkins University, MESOSCALE CHEMICAL SYSTEM GROUP COLLABORATION, PHYSICS OF FLUIDS GROUP COLLABORATION, DEPARTMENT OF MECHANICAL ENGINEERING COLLABORATION — When a silicon surface with micromachined pits submerged in a liquid is exposed to continuous ultrasound at 200 kHz, bubbles are ejected from the air filled cavities. Depending on the pressure amplitude different scenarios are observed, as the bubbles ejected from the micropits interact in complex ways with each other, and with the silicon surface. We have determined the size distribution of bubbles ejected from one, two and three pits for three different electrical power settings, and correlated them with sonochemical OH* radical production. Numerical simulations of the sonochemical conversion reaction rates were obtained using the empirical bubble size distributions and are compared with experimental results. Experimental evidence of shock wave emission from the microbubble clusters, deformed microbubble shapes, jetting and surface erosion are also presented.

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