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Characterization of Surface Acoustic Wave Nebulization: Atomization dynamics and resulting droplet size distribution ALICIA CLARK, ALBERTO ALISEDA, University of Washington Department of Mechanical Engineering, SCOTT HERON, YUE HUANG, DAVID GOODLETT, University of Washington Department of Medicinal Chemistry — High-speed imaging and Phase Doppler Particle Analyzer (PDPA) measurements are used to characterize the size and velocity distributions of micron-sized droplets produced by a surface acoustic wave (SAW) microelectronic nebulizer. The effects of drop composition, electric field amplitude and pulsation frequency, and initial drop volume have been experimentally studied. We observe that the droplets created in pure water are smaller, $\sim$2 μm, and the plume more concentrated near the nebulizer, with small second probability peak for large diameters, $\sim$100 μm. Pure methanol droplets have larger diameters, $\sim$ 5 μm, and lower volume concentration in the nebulizer plume, as corresponds to less efficient atomization process. The influence of fluid viscosity and surface tension will be discussed. Measurements of the velocity distribution show a strong dependency with excitation amplitude and duty factor.

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