Electronic Supplementary Material (ESI) for Lab on a Chip.

Supporting Information

Precision ejection of microfluidic droplets into air with a superhydrophobic outlet

Authors: Pengfei Zhang[a], Kai-Chun Chang[a], Adam R. Abate[a, b, c, *]

Affiliations:

[a] Department of Bioengineering and Therapeutic Sciences, University of California, San Francisco, San Francisco, CA, USA

[b] California Institute for Quantitative Biosciences, University of California, San Francisco, San Francisco, CA, USA

[c] Chan Zuckerberg Biohub, San Francisco, CA, USA

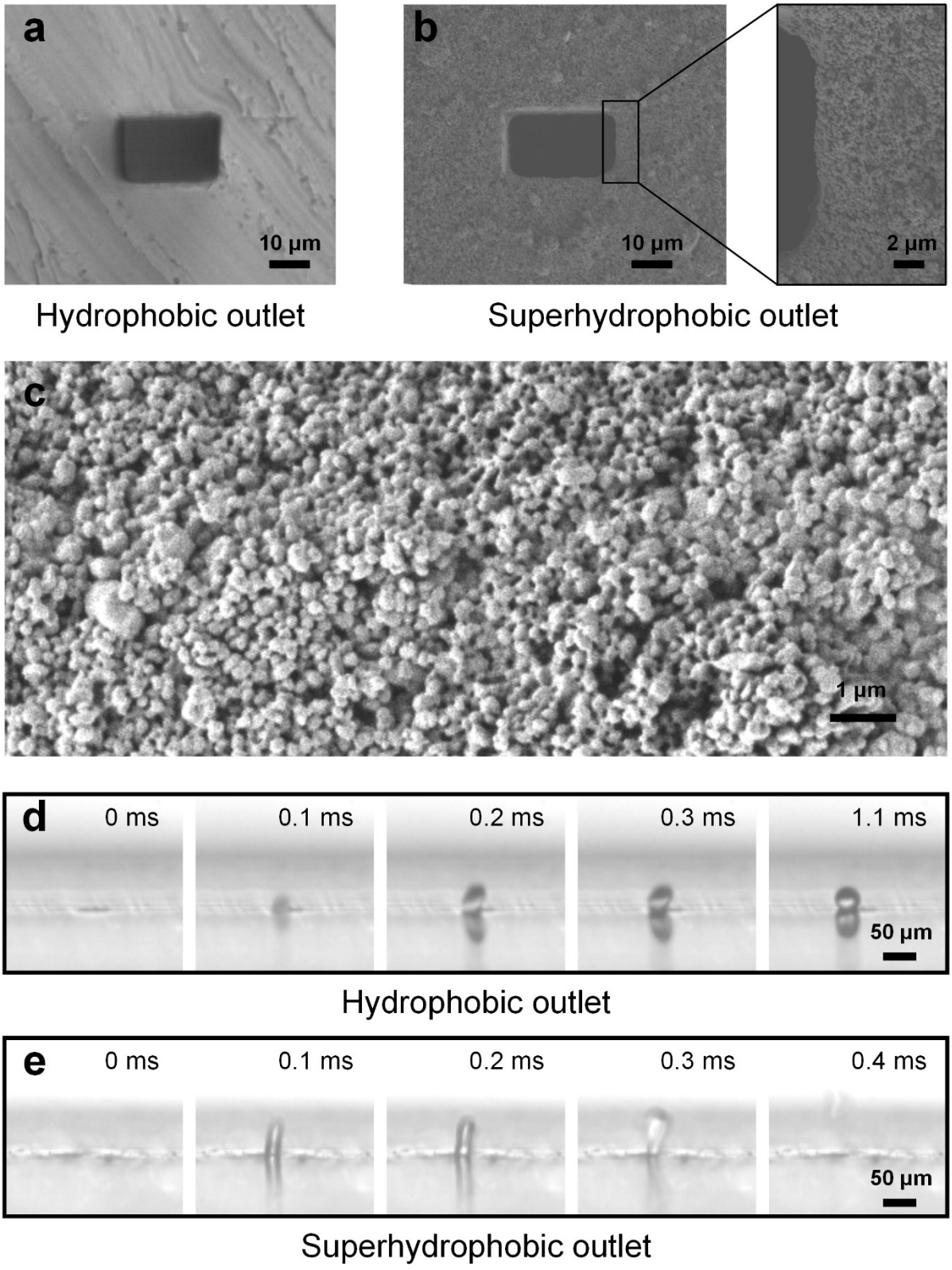

Fig. S1 Comparison of droplet ejection with hydrophobic and superhydrophobic outlets. (a) Microscope image of a hydrophobic outlet. (b) SEM image of a superhydrophobic outlet with PTFE nanoparticles coating. (c) A high-resolution SEM image to show the density, distribution, and sizes of nanoparticles. (d) Time-lapsed images showing that the droplet is adhered on the surface during ejection from a hydrophobic outlet. (e) Time-lapsed images showing that the droplet can be ejected from a superhydrophobic outlet.

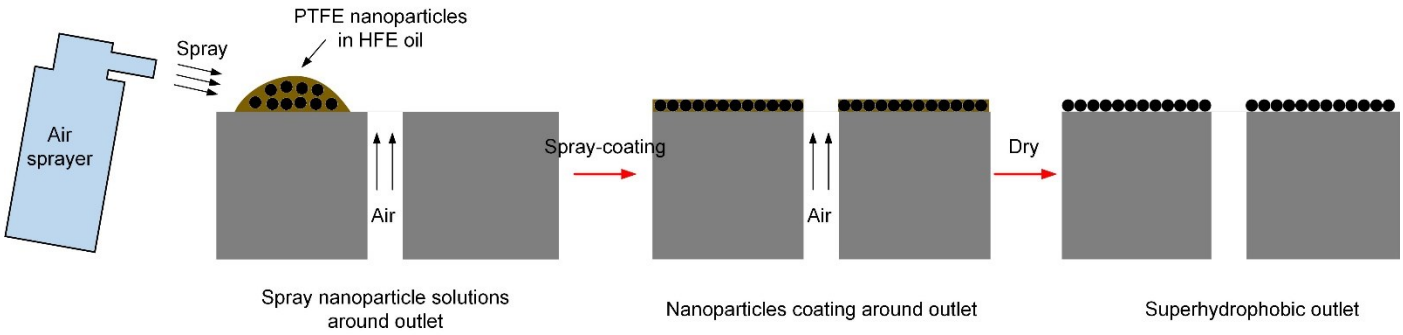

Fig. S2 Schematic of preparation process of superhydrophobic outlet. Solutions of PTFE nanoparticles suspended in HFE oil are sprayed around the outlet and then dried to form a PTFE nanoparticles coating.

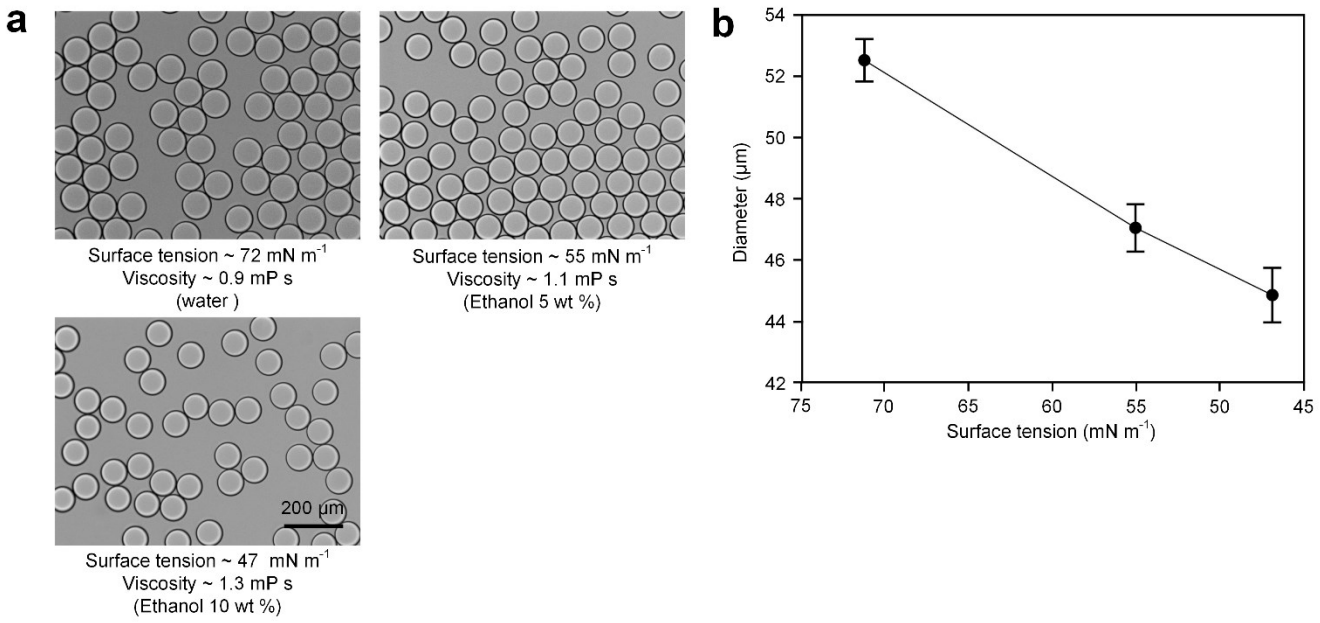

Fig. S3 Influence of surface tension of fluid on droplet formation. (a) Images of droplets formed with different liquids on device 50. Droplet formation is stable when surface tension is beyond ~ 47 mN m^{-1}. (b) Plot of droplet diameter as a function of the surface tension of fluid. Notably, droplet diameter decreases with surface tension, and within this range, droplet diameter decreases as viscosity increases.