Electronic Supplementary Material (ESI) for RSC Advances.

SUPPORTING INFORMATION

Droplet Generation In Cross-flow For Cost-Effective 3D-Printed "Plug-and-Play" Microfluidic Devices

Jia Ming Zhang [a], Andres A. Aguirre-Pablo [a], Er Qiang Li [a], Ulrich Buttner [b] and Sigurdur T. Thoroddsen *[a,c]

[a] *Division of Physical Sciences and Engineering, King Abdullah University of Science and Technology (KAUST), Thuwal, 23955-6900, Saudi Arabia.*

[b] *Division of Computer, Electrical and Mathematical Sciences and Engineering, King Abdullah University of Science and Technology (KAUST), Thuwal, 23955-6900, Saudi Arabia.*

[c] *Clean Combustion Research Center, King Abdullah University of Science and Technology (KAUST), Thuwal, 23955-6900, Saudi Arabia.*

***Corresponding author, email: sigurdur.thoroddsen@kaust.edu.sa**

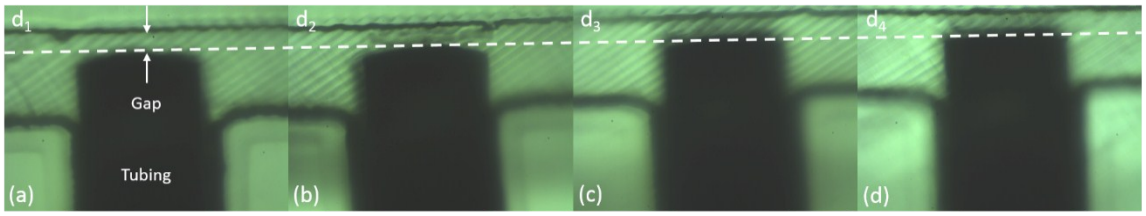

Fig. S1 Multiple replicate printed devices for testing the reproducibility of the printed gap distance. (a) d_1=275 µm. (b) d_2=270 µm. (a) d_3=262 µm. (a) d_4=256 µm.

The droplet sizes can be tuned by different parameters, such as flow rate ratio, viscosity ratio and geometric dimensions. For fixed fluid properties, the primary factor which influences drop sizes in our device is the gap distance. To ensure the reproducibility of droplet sizes, the consistency of the printed gap distance is crucial. Here we printed four replicate devices on four different days respectively, to test the consistency of printed gap distance. As shown in Fig. S1, the designed gap distance is 300 µm and the actually printed distance of these four gaps are 266 ± 10 µm. This printed resolution can guarantee the reproducibility of droplet sizes generated in our device. Further fine adjustment, in drop sizes, can be achieved through minor changes in the flow rates.