Supplementary Material (ESI) for Lab on a Chip

Supporting Information

Multiple Modular Microfluidic (M^3) Reactors for the Synthesis of Polymer Particles

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Correlation between volume of orifice of FFDG and volume of droplet

A module of M^3 reactor was prepared by standard soft lithography technique.[1] The target dimensions of the orifice in the flow-focusing droplet generator were 65 μm (width)×100 μm (height)×100 (length) μm. Water was emulsified in light mineral oil with 4 wt% of Span 80. The average diameter of the droplets was 125 μm. Fig S1 shown the variations in the volume of droplets (top) and the volume of orifice (bottom).

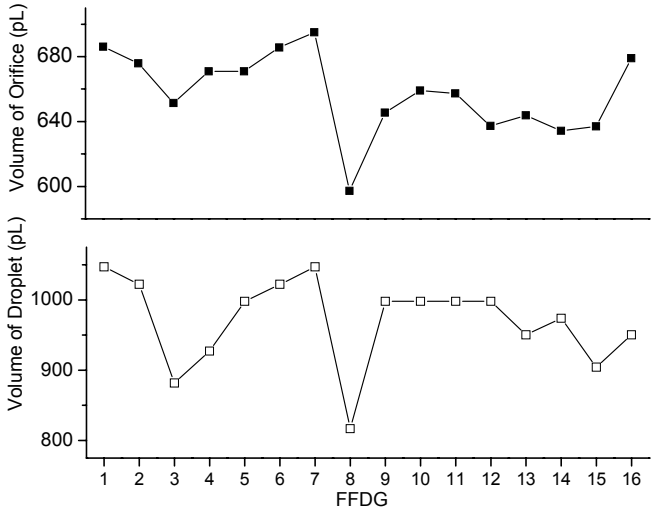
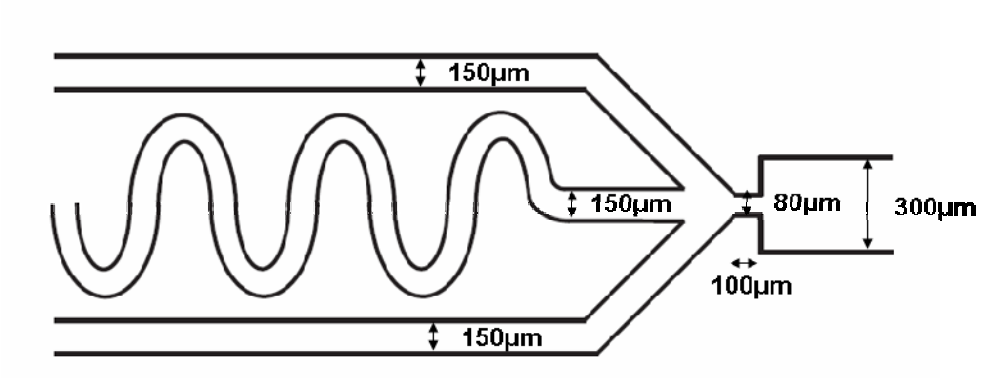


Fig. S1 Correlation between the volumes of orifices in sixteen flow-focusing droplet generators (■) connected in a manifold manner in a module and the volumes of droplets (□) generated in these droplet generators. The flow rates of water and mineral oil are 3.2 and 0.53 mL/hr per droplet generator, respectively.

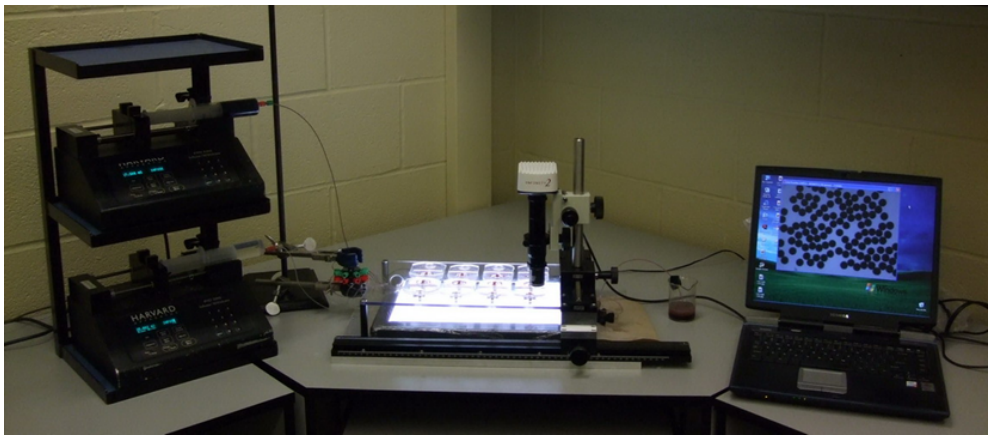
Optical characterization system

A custom-made optical characterization system was developed to monitor the generation of droplets in eight modules of the M^3 reactor. The modules were laid out horizontally on a transparent leveled table, in order to eliminate gravitationally-induced differences in pressure. The modules were placed 'face down' with their inlets and outlets connected through access holes in the table to the bottom side of the modules. This enabled an optical system to scan across the modules' top side without obstruction. Horizontal translation of the CCD camera and microscope optics was achieved by using two connected linear rack and pinion stages. Illumination was provided by cold cathode fluorescent light table operating at 25 kHz, which provided consistent, flicker- and heat-free backlighting. The focusing of the 2x objective was achieved by translating the optics assembly vertically *via* a course and fine focusing assembly (Edmund Optic A54-794).

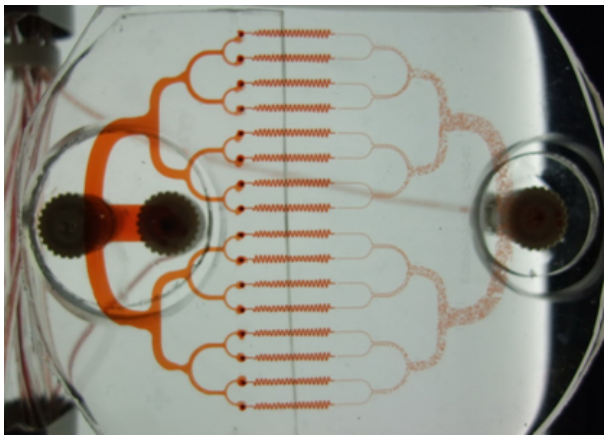
Dimensions of an individual flow-focusing droplet generator



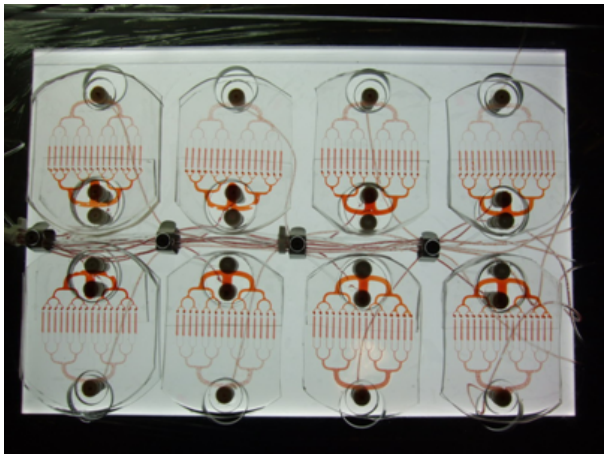
Experimental setup



An individual module of the M³ reactor (top view). A food dye was introduced in the aqueous droplet phase.



Eight modules of the M³ reactor



References

1. Xia, Y., Whitesides, G. M. *Angew. Chem. Int. Ed.* **1998**, *37*, 550.