Electronic Supplementary Material (ESI) for RSC Advances.

Supplementary Information

Title: Hydrophilic modification of SLA 3D printed droplet generators by photochemical grafting

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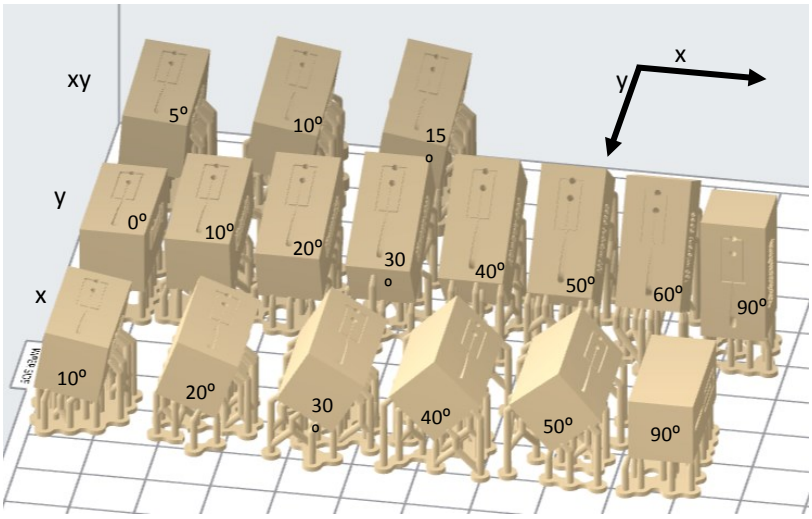

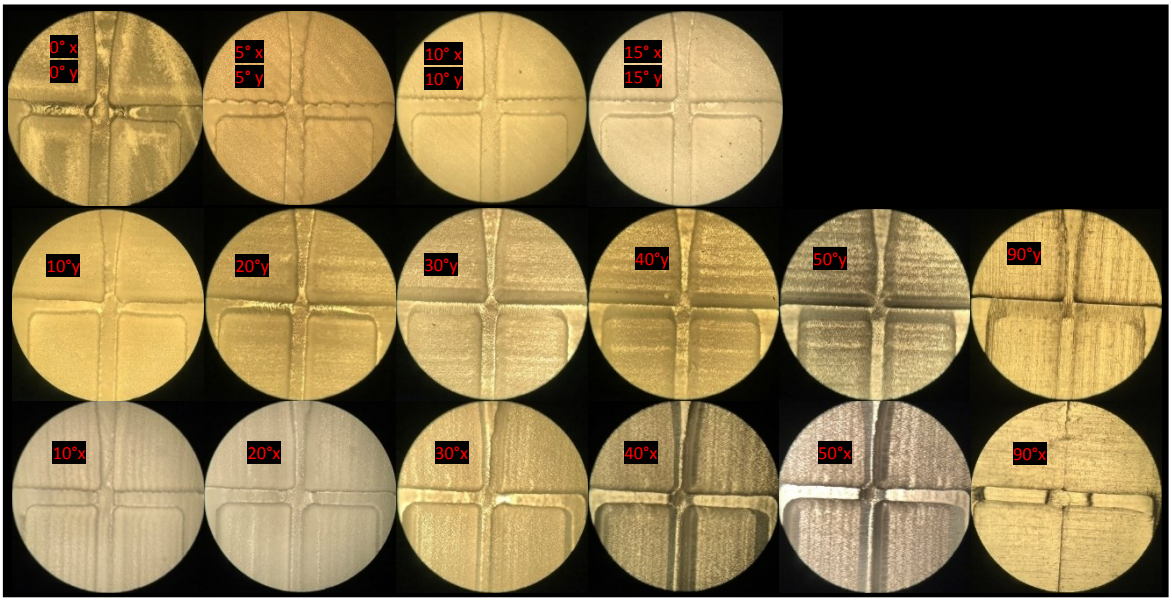

Fig. S1 Print angle tests with an early microfluidic chip design. The rotation is defined by the angle the faces of the device were pulled in X and Y directions.

S.1 Preliminary print studies

An early design of a planar device was tested at several different print angles. Fig. S1 shows the angle of rotation defined by the degree to which the top face of the device was rotated by pulling along a given axis, x or y. Rotation of 15° in both directions was chosen for future prints based on this experiment. Tilting the device too far in either direction resulted in print layers covering the channels, which is undesirable for optical properties and may result in resin becoming trapped and cured in the channels.

S.2 Droplet diameter conversion

The particle diameter (D_p) and droplet diameter (D_d) are interrelated by the following equation

$$D_p = 2\left[\frac{x_{ps}}{\rho_{ps}}\left(\frac{D_d}{2}\right)^3\right]^{1/3}$$

where x_{ps} is the concentration of polystyrene in the solution (grams of polystyrene per mL of solution, 0.05 in this report), and ρ_{ps} is the density of polystyrene (g/mL). ρ_{ps} is approximately 1.05 g/mL as reported by the polystyrene manufacturer (Scientific Polymer Products).

S.3 Water wetting behavior photographs

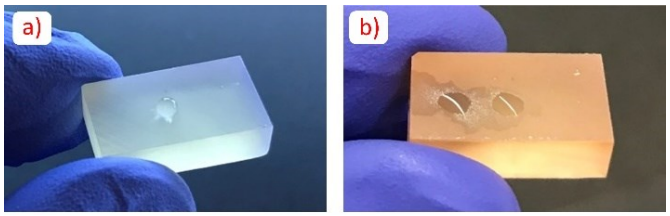

Fig. S2 Water droplet on the surface of an (a) unmodified surface and (b) surface modified by ultraviolet photografting. Note the water spreading from the edges of the droplet onto the part in (b)

S.4 Assembled device photographs

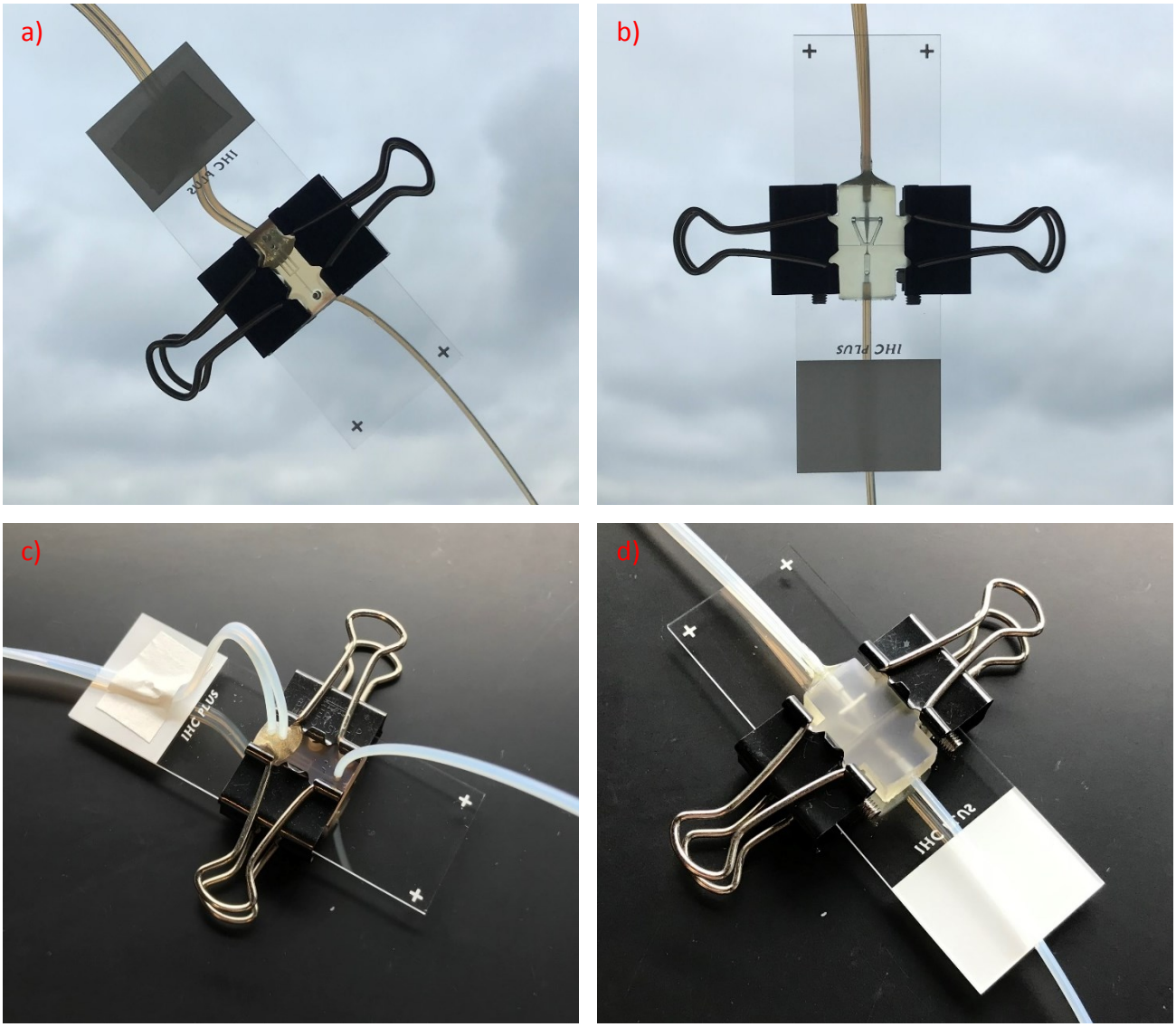

Fig. S3 Glass side of fully assembled (a) planar and (b) concentric devices. Top side of fully assembled (c) planar and (d) concentric devices.