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

Supplemental material

Table 1 compares various 3D microfluidics structure fabrication methods, which are referred in this paper to provide direct comparison between each one. This table includes the information of lateral resolution, layer thickness resolution, HAR, vias, interlayer deformability, and ability to bond structures between hard substrates of these different approaches.

Video 1 shows the tunable channel deformation when different pneumatic pressure values were applied to the side channel. The sidewalls of the microchannel can fully touch at pressure over 60psi.

Video 2 shows the focused single-stream fluorescent real-time video of GFP-E. Coli flowing at an average velocity about 14 cm/s. The medium conductivity is 30 mS/m. An a.c. signal (5MHz, 56.6V peak-to-peak) is applied, and the sidewall gap is deformed down to around 3 μm when 60psi is applied to the side channels.

Method	Lateral Resolution	Vertical Resolution	HAR	Vias	Interlayer Deformable Structure	Bonded between Hard Substrates
Hybrid Stamp (this paper)	6μm	4μm	5	Yes	Yes	Yes
Polymer-Film Stamp [14]	150μm	100μm	1	Yes	No	No
Glass Hard Stamp [13]	30μm	160μm	0.33	Yes	No	No
PDMS Curing Inhibiting Layer on Glass Hard Stamp [25]	100μm	60μm	0.33	Yes	No	No
PDMS Curing Inhibiting Layer Polymer-Film Stamp [26]	100μm	50μm	0.5	Yes	Yes	No
Regular PDMS Stamp [24]	100μm	50μm	0.5	Yes	No	No
Laser Cutting on Bulk PDMS Support [27]	800μm	36μm	0.045	Yes	No	Yes
Thermal Plastic Hot Embossing [15]	30μm	90μm	3	Yes	No	No
PDMS Spin	25μm	36μm	1.44	Yes	No	No

Coating [22]						
Air-Blowing [23]	130µm	70µm	1.86	Yes	No	Yes
Multi-Layer Soft Lithography [21]	50µm	9µm	0.18	No	Yes	No
Multilayer Photoresist Direct Patterning and Stacking [16]	200µm	20µm	0.1	Yes	No	Yes

Table 1 compares various 3D microfluidics structure fabrication methods, which are referred in this paper to provide direct comparison between each one.