Electronic Supplementary Material (ESI) for Nanoscale.

SUPPORTING INFORMATION

Mixed-scale poly(methyl methacrylate) channel network-based single-particle manipulation via diffusiophoresis

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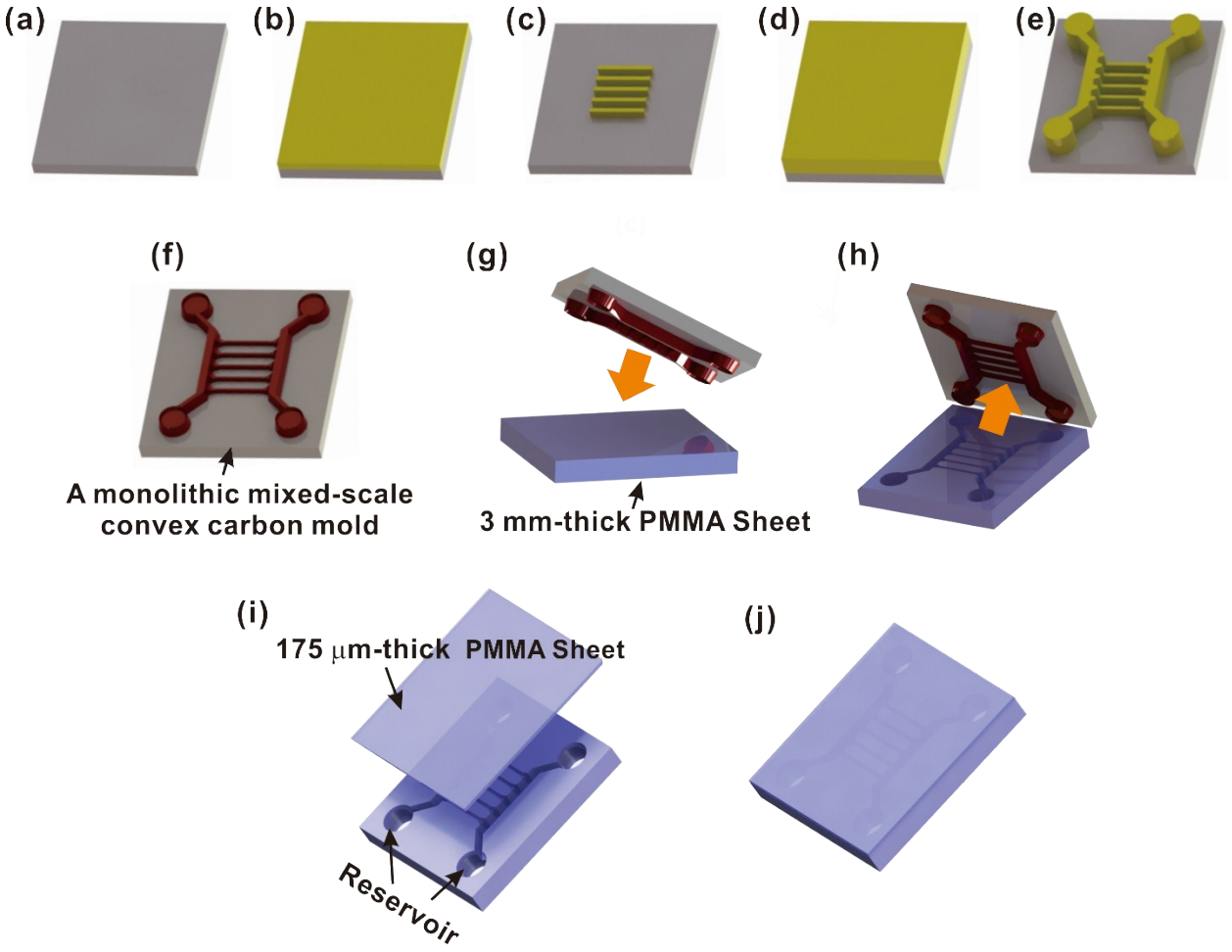

Fig. S1 Schematic of the fabrication steps used for a PMMA fluidic device consisting of a mixed-scale channel network; (a) Si wafer, (b) thin photoresist coating, (c) 1st photolithography, (d) thick photoresist coating, (e) 2nd photolithography, (f) pyrolysis, (g) hot-embossing, (h) demolding, (i) oxygen plasma treatment, (j) thermal bonding.

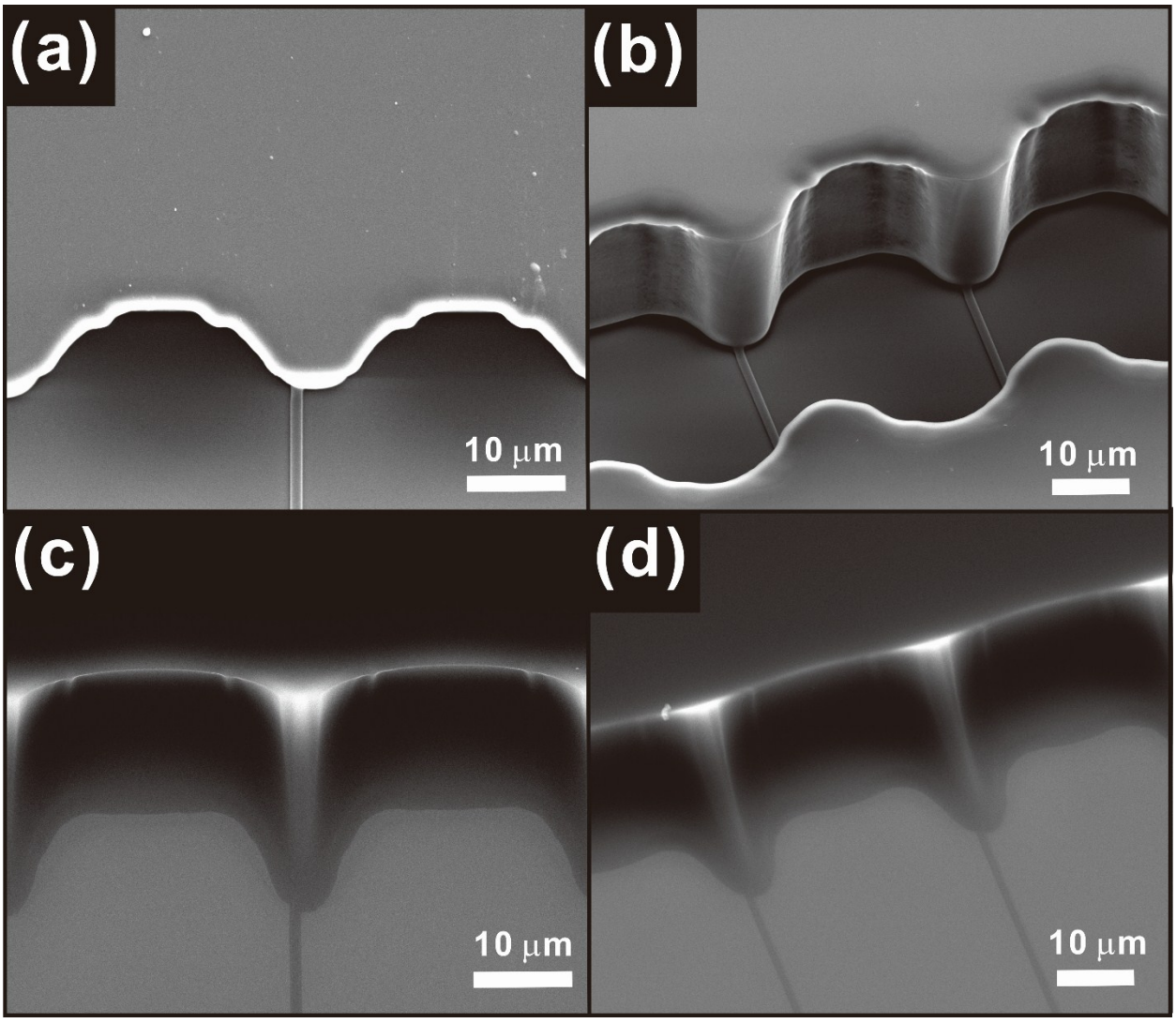

Fig. S2 Scanning electron microscopy images of (a, b) a SU-8 polymer triangular prism and (c, d) corresponding pyrolyzed Kingfisher-beak-shaped microfunnel carbon stamp.

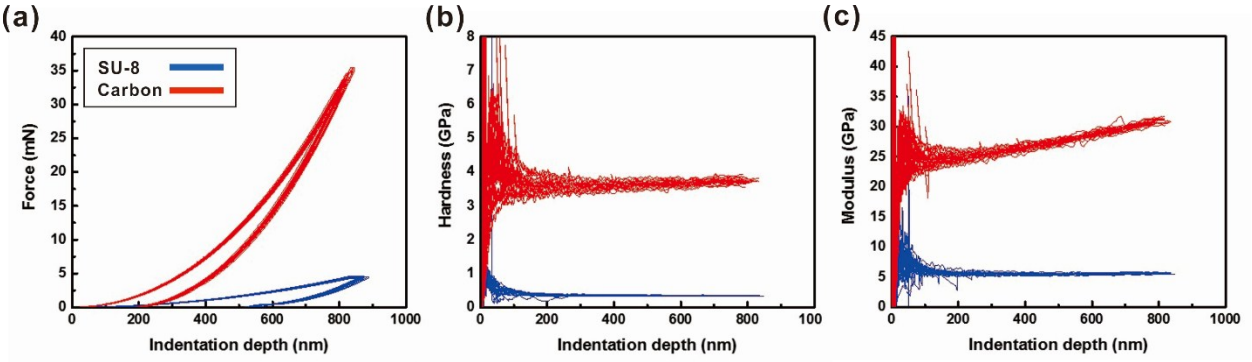

Fig. S3 Characteristic curves of SU-8 negative photoresist and pyrolyzed carbon obtained using a nanoindenter: (a) Force versus indentation depth, (b) calculated hardness versus indentation depth, and (c) elastic modulus versus indentation depth.

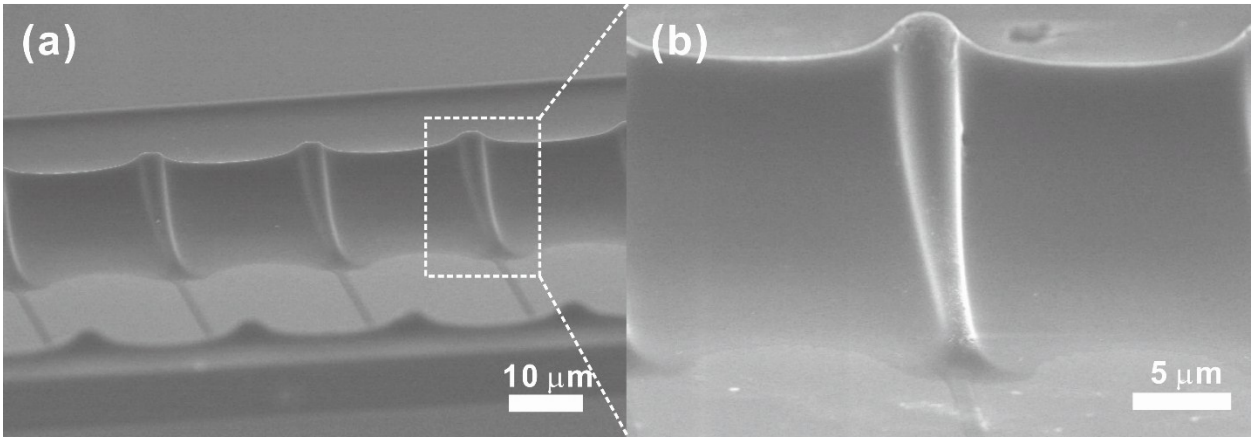

Fig. S4 SEM images of (a) a mixed-scale carbon stamp and (b) enlarged view of a three-dimensional microfunnel after 50 repeated imprinting processes.

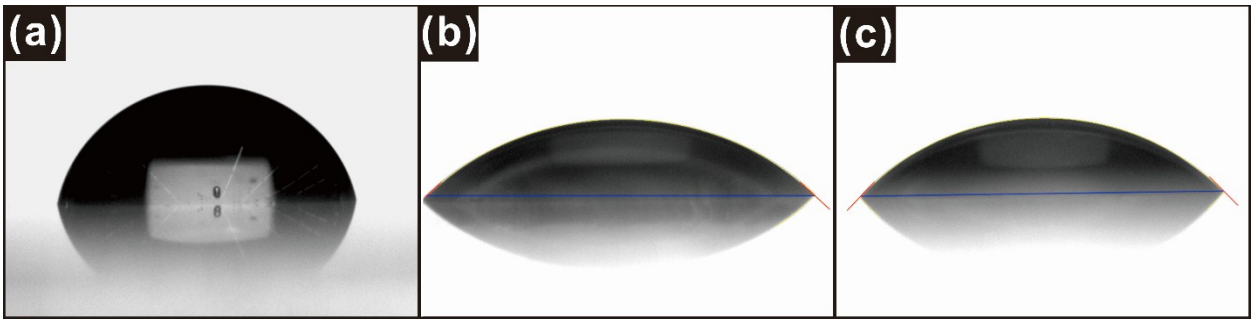

Fig. S5 Contact angles of distilled water on (a) bare PMMA (~74°), (b) oxygen-plasma-treated PMMA (~43°), and (c) oxygen-plasma-treated PMMA after heating (~45°) under the same conditions as those used in the thermal PMMA bonding process (85 °C for 3 min).

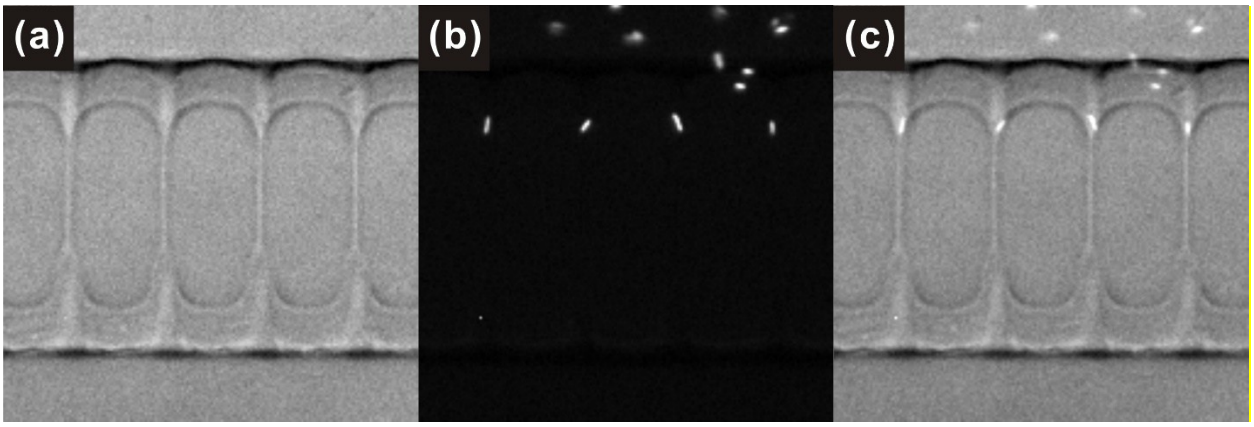

Fig. S6 Images of diffusiophoresis-based bacterial single-cell entrapment. (a) Optical image, (b) fluorescent image with GFP filter, and (c) overlapped image of the optical and fluorescent images.

Table S1 Elastic moduli and hardness values of the SU-8 photoresist, pyrolyzed carbon, silicon and polyurethane acrylate (PUA).

	[a]SU-8	[a]Pyrolyzed carbon	[b]Silicon	[c]PUA
Elastic modulus (GPa)	5.5±0.1	28.8±0.4	130 - 188	2.75
Hardness (GPa)	0.35±0.01	3.67±0.07	10.2	0.03

[a]These values were obtained from nanoindenter experiments.

[b]Referred from Wikipedia (www.wikipedia.org).

[c]S. Tanaka, M. Tsutsui, H. Theodore, H. Yuhui, A. Arima, T. Tsuji, K. Doi, S. Kawano, M. Taniguchi, T. Kawai, *Sci. Rep.* 2016, **6**, 31670.