Supplemental information

1. Dry etching of PDMS

To optimize etching conditions of PDMS, we measured etching rate and surface roughness of PDMS under different etching conditions of the CHF_3/O_2 ratio, total gas pressure, and radio frequency (RF) power. The surface of each sample was partially masked with Kapton tape prior to etching in order to create a distinct step feature that could be measured using Dektak (Dektak 6M, Veeco Instruments Inc., USA). The etching rate and surface roughness are summarized in Table S1. Considering etching rate and surface roughness, the etching conditions were determined to be a process pressure of 10 Pa, a RF power of 200 W, and a gas composition of 25% O_2 and 75% CHF_3.

Table S1. Dry etching conditions for PDMS at varying gas ratios, pressures, and RF powers.

Sample number	Process pressure [Pa]	RF power [W]	Gas composition O_2 [%]	Gas composition CHF_3 [%]	Etching rate [μm/h]	Surface roughness [nm]
1	10	200	0	100	5.5	105
2	10	200	25	75	9.5	27
3	10	200	50	50	6.0	12
4	10	200	75	25	5.6	18
5	10	200	100	0	2.1	27
6	5	200	25	75	7.5	11
7	20	200	25	75	11.5	22
8	5	250	25	75	7.9	13
9	5	300	25	75	14.3	64

2. Preparation of *E. coli* cells expressing fluorescent proteins

A plasmid containing a construct for GFP (pEGFP, Clontech, CA, USA) or DsRed (pDsRed-Monomer, Clontech) was transfected into *E. coli* BL21 (DE3) cells (Invitrogen, CA, USA). Transfected *E. coli* cells were grown at 37 °C in LB medium (5 g/L of yeast extract, 10 g/L of bactotryptone, 5 g/L of NaCl) containing 100 mg/L ampicillin. The growth of *E. coli* was monitored with a spectrophotometer (V-570, JASCO, Tokyo, Japan) by measuring the amount of light (600 nm) scattered by the culture. When the level of absorbance at 600 nm reached 0.6 OD units, isopropyl β-D-thiogalactopyranoside was added to a final concentration of 0.3 mM and the *E. coli* cells were incubated for 24 h at 16 °C. The culture medium containing cells was centrifuged and fluorescent *E. coli* cells were harvested.

3. Supplementary movie caption

Movie 1. Movie of microsphere sorting with 8 parallel sorters. Yellow-green and crimson fluorescent microspheres were injected into a chip. About 17 yellow-green microspheres were detected and sorted to right-side collection channels every second. Bright stream lines indicate the flows of the wanted yellow-green microspheres, while dark stream lines indicate the flows of the unwanted crimson microspheres. The blinking spots are reflections of IR laser, which heated metal dots for 10 ms in the waste channel to control flow. The movie was captured every 33 ms.