

SUPPLEMENTARY INFORMATION

Rapid and inexpensive blood typing on thermoplastic chips

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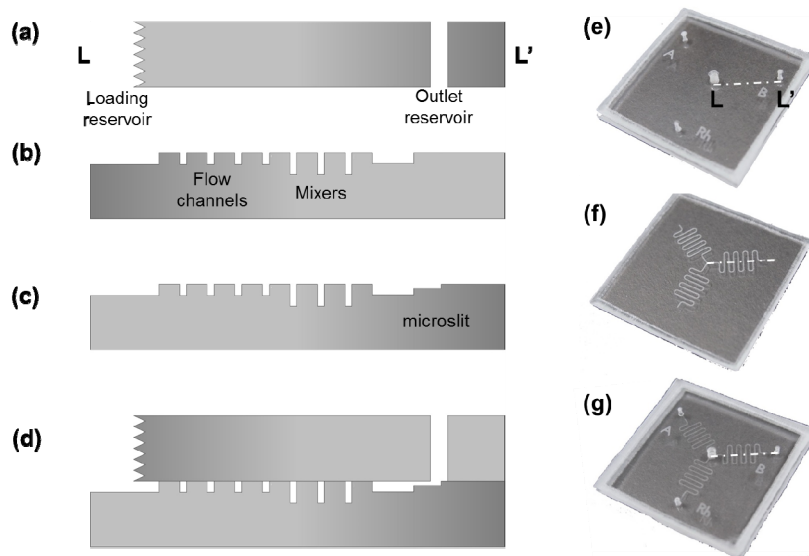


Figure S1 A schematic illustration and corresponding images of the fabrication sequence. (a)(e) The top cover chip was drilled to create a threaded screw interface at the loading reservoir port, as well as at the outlet reservoirs. (b)(f) The bottom layer chip was patterned with the serpentine reaction channels, chaotic micromixers, and low-aspect ratio filters. (c) The two chips were sealed into one device after the bottom chip was swelled with cyclohexane during the selective solvent swelling process, (d)(g) followed by directly pressing the two substrates together using a uniform pressure of 3.45 MPa for 1 min at room temperature. The schematic illustration (a)(b)(c)(d) is not to scale.

Table S1 Results of the optimal loading volume test are shown. 5 different volumes, from 4-8 μL , of ultrapure water were used to load the blood typing chip. The waste volume, including both the volume of the flow channel and the dead volume within the flow path, remained the same when the loading volume was $\leq 6 \mu\text{L}$, which indicates that a loading volume below this amount pumps less sample into the reaction channels. When the loading volume was $\geq 6 \mu\text{L}$, additional pumping volume could not be delivered. The results indicate that the optimal loading volume is 6 μL , which enables $\sim 5 \mu\text{L}$ to be pumped with $\sim 1 \mu\text{L}$ of waste.

Loading volume (μL)	Pumping volume (μL)	Waste volume (μL)
8	4.8	3.2
7	4.8	2.2
6	4.8	1.2
5	3.8	1.2
4	2.8	1.2

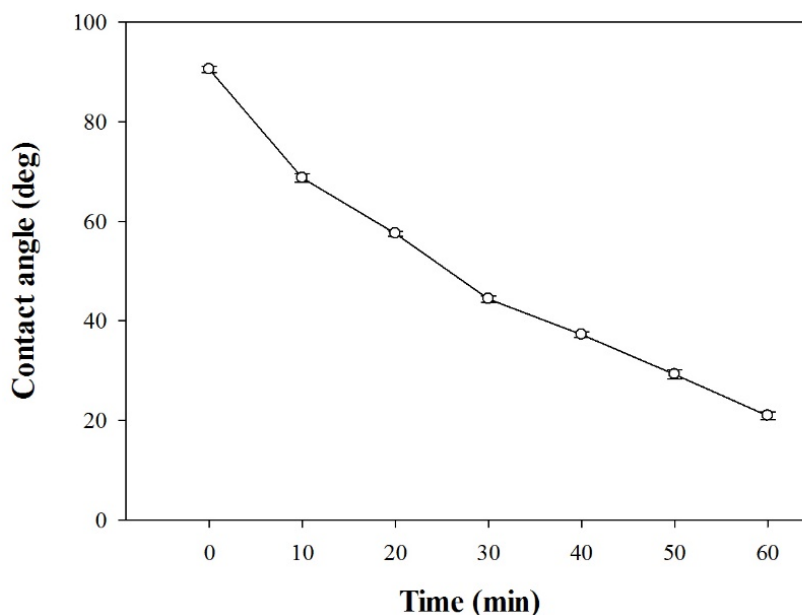


Fig. S2 Water contact angle measurements were taken of the COP chip surface after different UV/ozone exposure times. The contact angle on the modified COP chip surface decreased with UV/ozone exposure ($n= 5$). Although the contact angle continues to decrease, just 30 min of UV/ozone exposure provides sufficient surface modification to prevent non-polar solvent uptake at the patterned region of the polymer.

Table S2 Statistics of the blood typing test results. In order to verify the feasibility of the proposed platform, 30 blood samples were tested. The results show 100% sensitivity and specificity when compared to blood typing results obtained using a column agglutination method at a medical center.

Blood Type	A Rh⁺	B Rh⁺	O Rh⁺	AB Rh⁺	Total
Number of samples	7	7	11	5	30
False positives	0	0	0	0	0
False negatives	0	0	0	0	0
Sensitivity (100 %)	100	100	100	100	100
Specificity (100 %)	100	100	100	100	100