Supplementary Material (ESI) for Lab on a Chip
This journal is © The Royal Society of Chemistry 2011

Simple and Cheap Microfluidic Devices for Preparation of Monodisperse Emulsions

Supplementary material

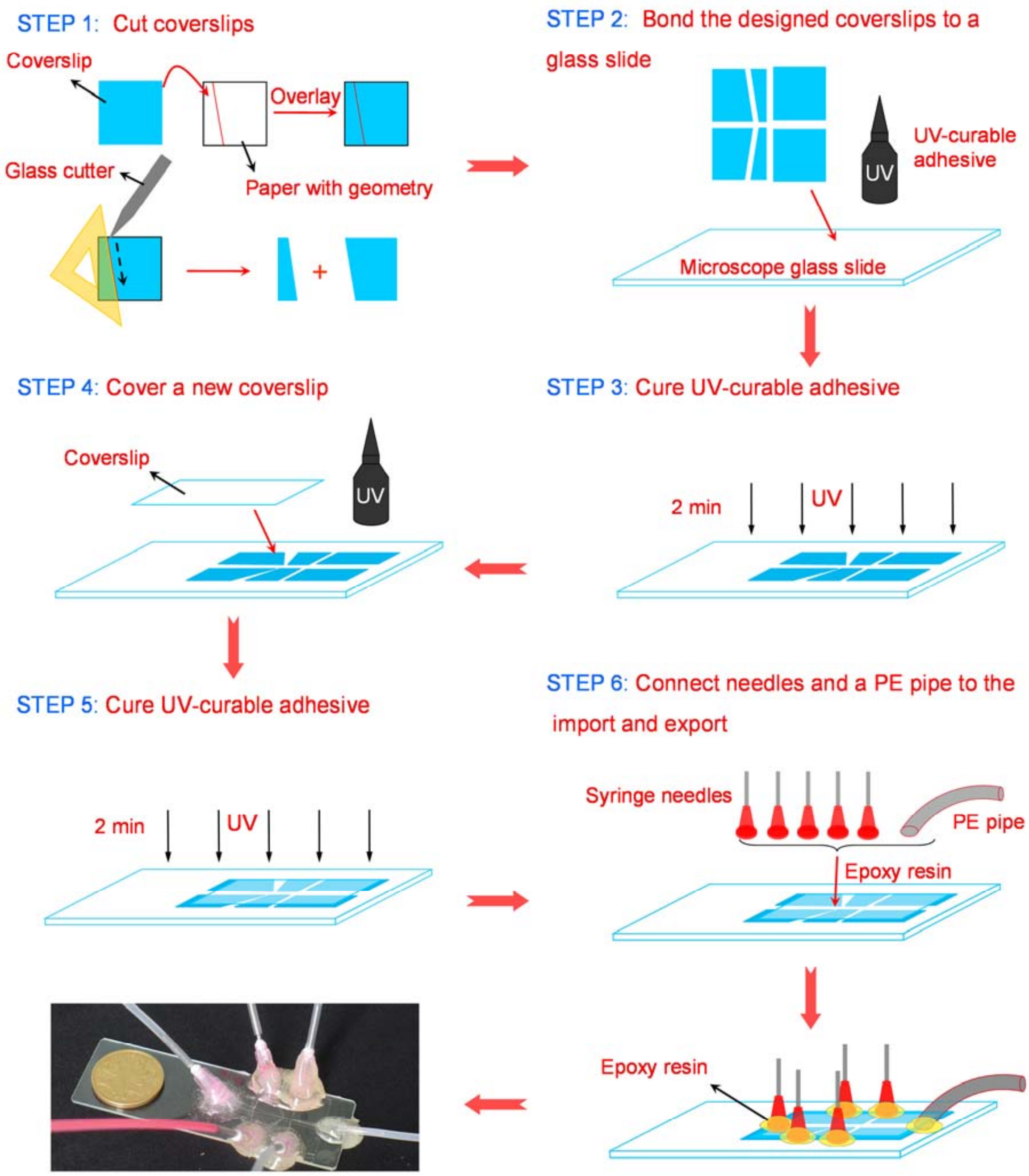
Nan-Nan Deng, Zhi-Jun Meng, Rui Xie*, Xiao-Jie Ju, Chuan-Lin Mou, Wei Wang and Liang-Ying Chu*

School of Chemical Engineering, Sichuan University, Chengdu, Sichuan, 610065, China.
E-mail: chuly@scu.edu.cn (L.-Y. Chu); xierui@scu.edu.cn (R. Xie)

Part I. Supplementary Movies S1-S4.

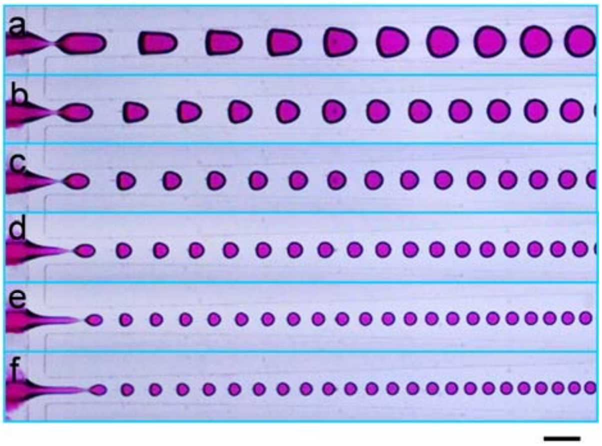
Part II. Supplementary Figures S1-S4.

Part I. Supplementary Movies S1-S4:

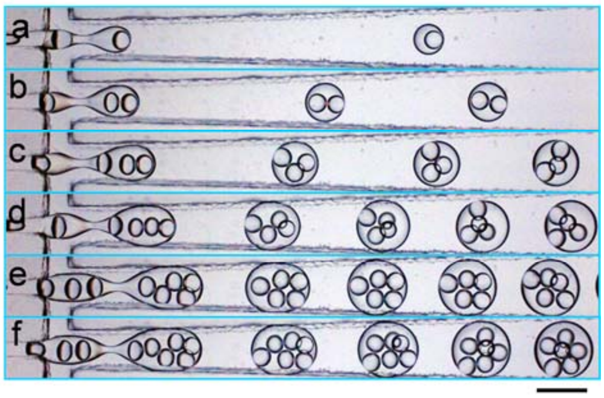


Movie S1. The process for fabricating the simple microfluidic device, Firstly, a square of the same size as coverslip is drawn on paper and a red line is drawn as the cutting position; then, coverslips are overlaid on the designed geometry and cut along the red line; lastly, sandpapers (2000CCR/R, Sharpness) are used to burnish the edges of cut coverslips to make sure the sizes and shapes of cut coverslips are the same by using a microscope with scales.

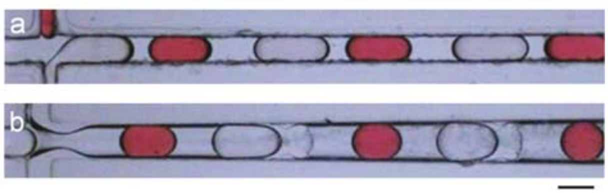
This journal is © The Royal Society of Chemistry 2011



Movie S2. Preparation processes of monodisperse W/O emulsions in a simple cross-junction device. All the inner aqueous phase flow rates (Q_I) are 500 μL/h, and the outer oil phase flow rates (Q_O) are 500 (a), 1000 (b), 1500 (c), 2000 (d), 2500 (e) and 3000 μL/h (f), respectively. The scale bar is 200 μm.



Movie S3. Preparation processes of monodisperse W/O/W emulsions in a simple double cross-junction device. The inner (Q_I) and middle (Q_M) phase flow rates are 300 and 500 μL/h respectively, and the outer phase flow rates (Q_O) are 12000 (b1), 5000 (b2), 2500 (b3), 1500 (b4), 1000 (b5) and 800 μL/h (b6) respectively. The scale bar is 400 μm.



Movie S4. Preparation processes of monodisperse O/W/O emulsions encapsulating two oil droplets containing different contents in a simple double cross-junction device. (a) In first junction, all of the three phase flow rates are 120 μL/h; (b) in second junction, the outer oil phase flow rate is 20 μL/h. The scale bar is 200 μm.

Part II. Supplementary Figures S1-S4:

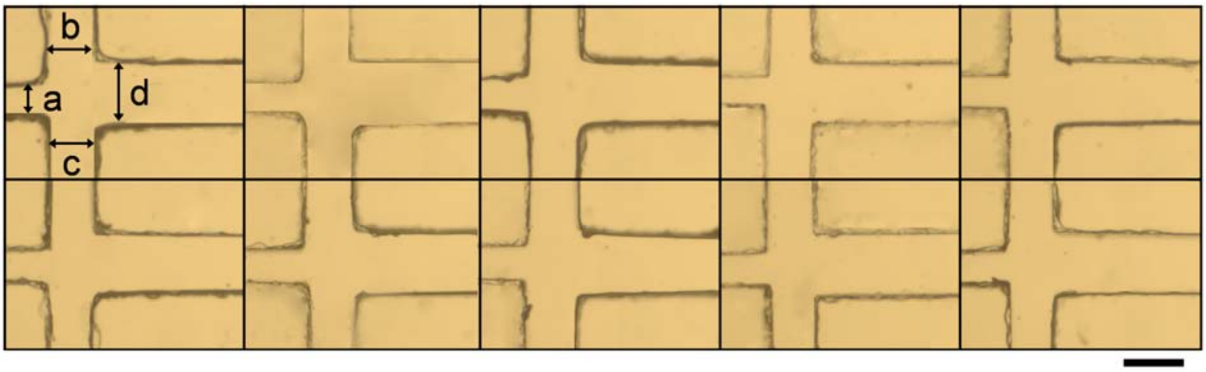


Fig. S1. Photomicrographs of channels of ten cross-junction microfluidic devices, in which the widths of a, b, c and d are all designed as 100, 150, 150 and 200 μm. The scale bar is 200 μm.

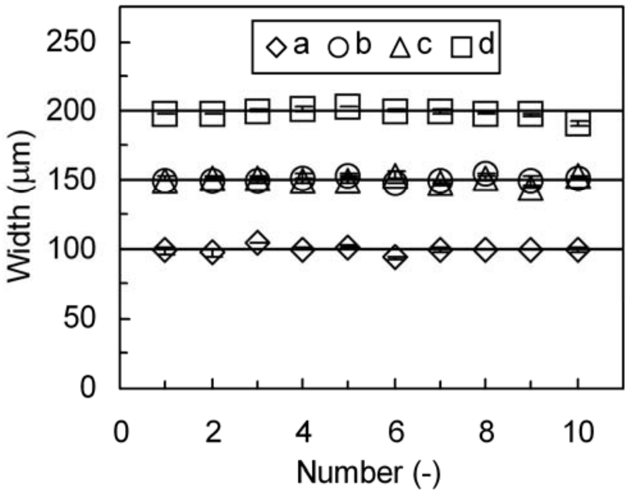


Fig. S2. Reproducibility of microfluidic devices prepared with the proposed method, in which the widths and offsets of 10 devices are presented with the same geometry.

This journal is © The Royal Society of Chemistry 2011

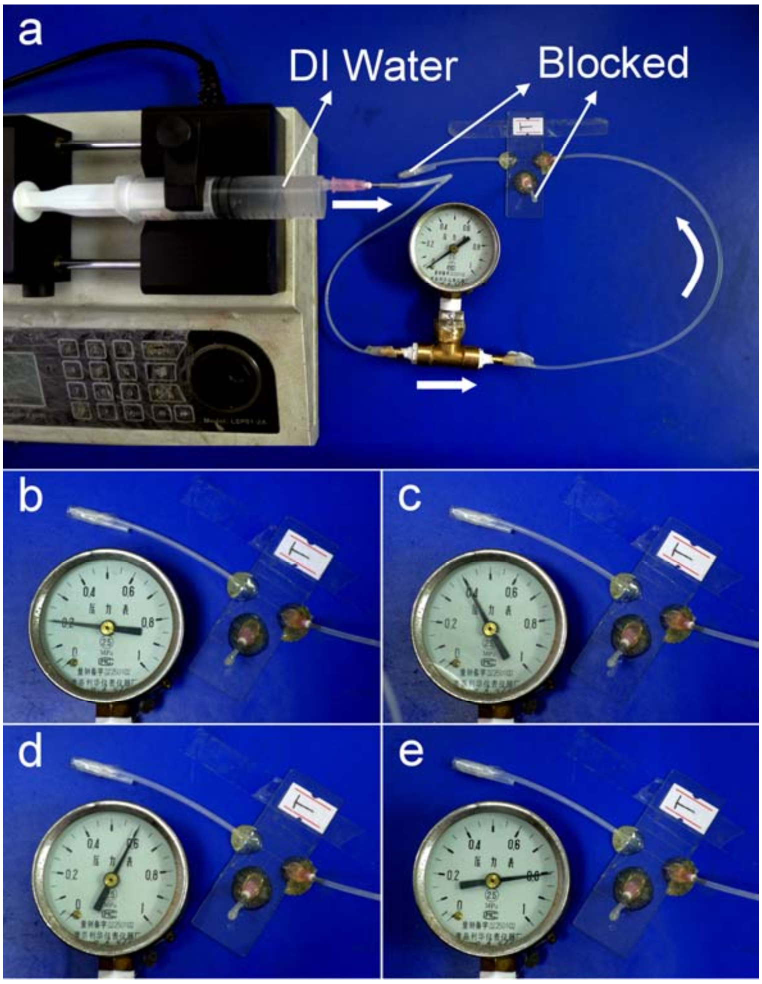


Fig. S3. (a) The photograph of connection of pressure testing device, in which the single T-junction device is intact without any fluid leakage as the driving pressure increases from 0.2 (b), 0.4 (c), 0.6 (d) to 0.8 MPa (e).

Electronic Supplementary Material (ESI) for Lab on a Chip
This journal is © The Royal Society of Chemistry 2011

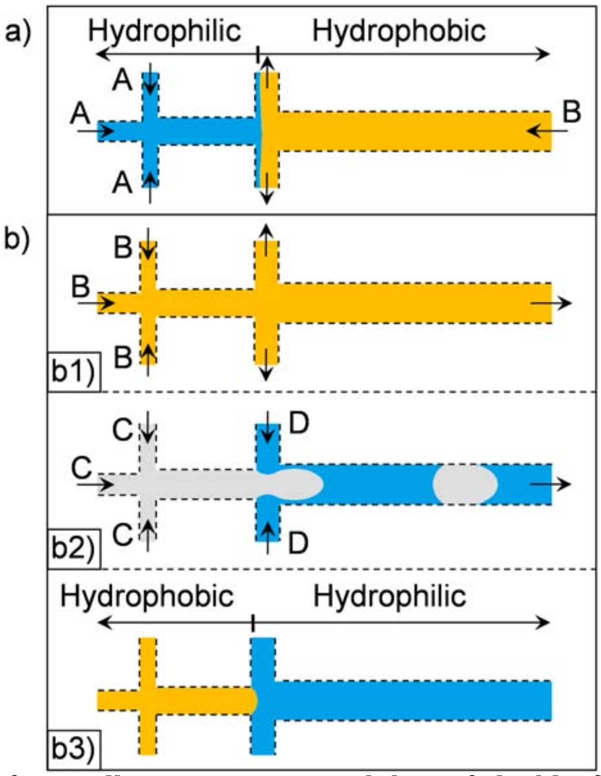


Fig. S4. Schematics of spatially patterning wettability of double flow-focus channels by using flow confinement method. A = DI water, B = 10 vol.% CTMS, C = air or SO, and D = 10 vol.% HF or 2 mol/L NaOH. (a) Injecting the inlets of first flow-focus junction with DI water and the outlet with 10 vol.% CTMS to modify the second junction to be hydrophobic. (b) Modifying the first flow-focus junction to be hydrophobic. (b1) Modifying the entire internal channel surface hydrophobic with 10 vol.% CTMS, (b2) injecting the inlets of first flow-focus junction with air or SO and the inlet of second flow-focus junction with 10 vol.% HF or 2 mol/L NaOH to make second junction back to hydrophilic, (b3) distribution of modified channel surface wettability.