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

Supplementary Information for:

In Situ Visualization of Hydrophilic Spatial Heterogeneity Inside Microfluidic Chips by Fluorescence Microscopy

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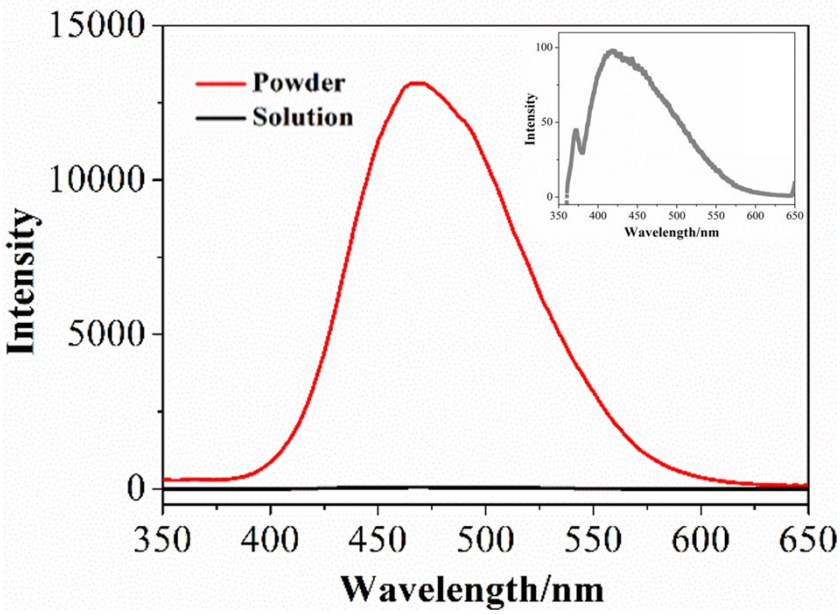

Fig. S1 Fluorescence emission spectra of TPEDB aqueous solution (50 μM) and powder under UV light irradiation (330 nm), the inset showed the enlarged spectra of TPEDB solution.

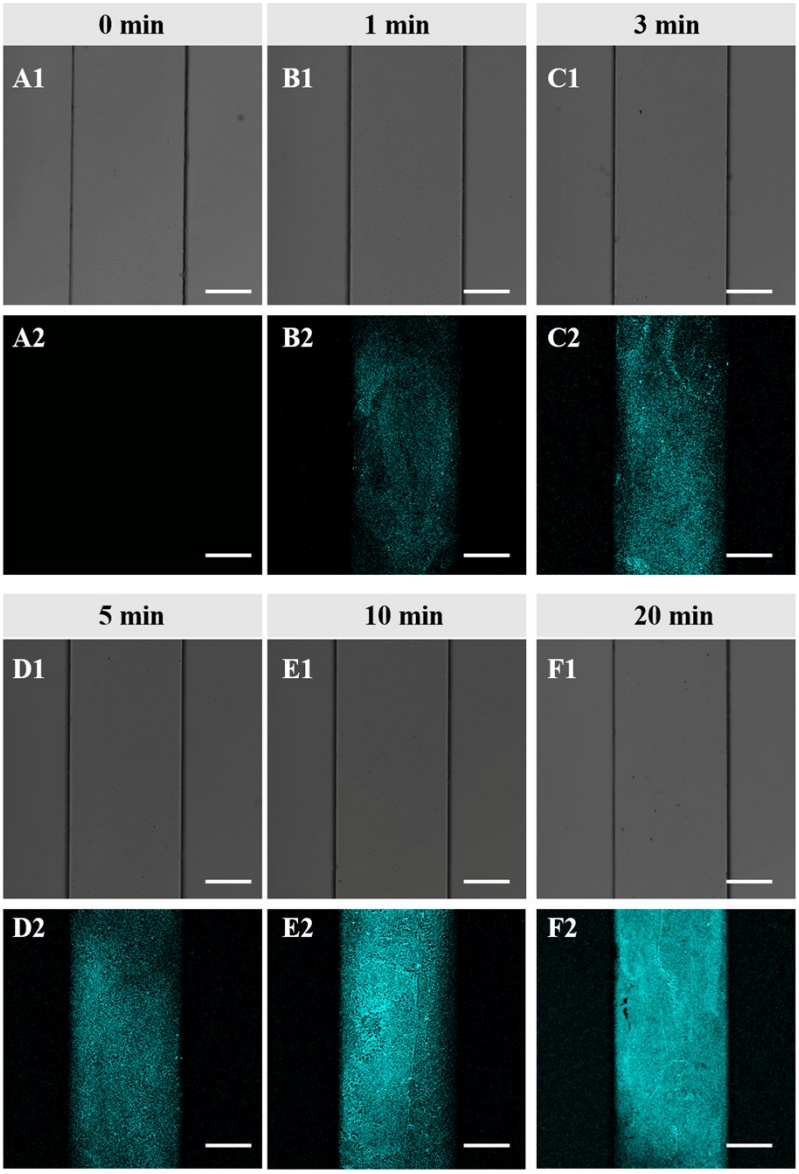

Fig. S2 Bright-field and dark-field images of confocal microscopy (1200 × 1200 μm^2) for the PDMS microfluidic channels after hydrophilization treatment in PVA for different time, from A to F: treatment time is prolonged from 0 min, 1 min, 3 min, 5 min, 10 min to 20 min. The scale bars represented for 200 μm.

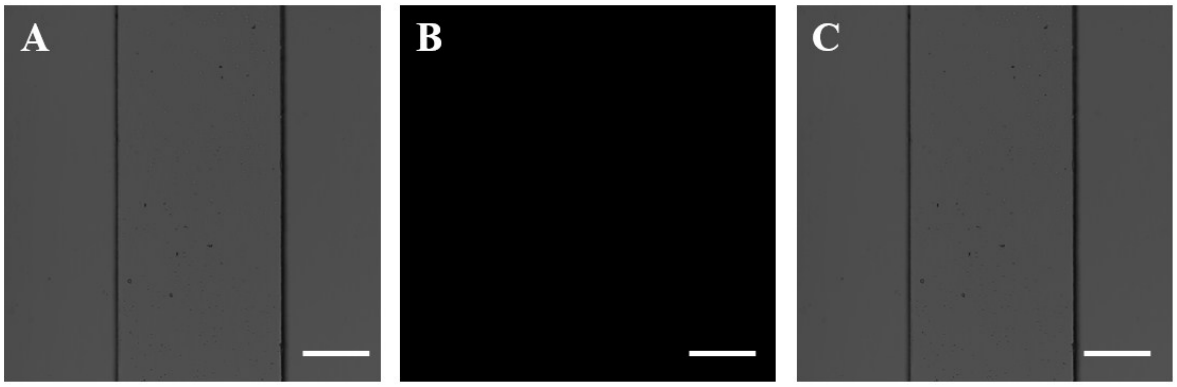

Fig. S3 Confocal microscopy images of (A) bright-field, (B) dark-field and (C) merged images (1200 × 1200 μm^2) for the PDMS microfluidic channels after the dissociation of TPEDB molecules. The scale bars represented for 200 μm.

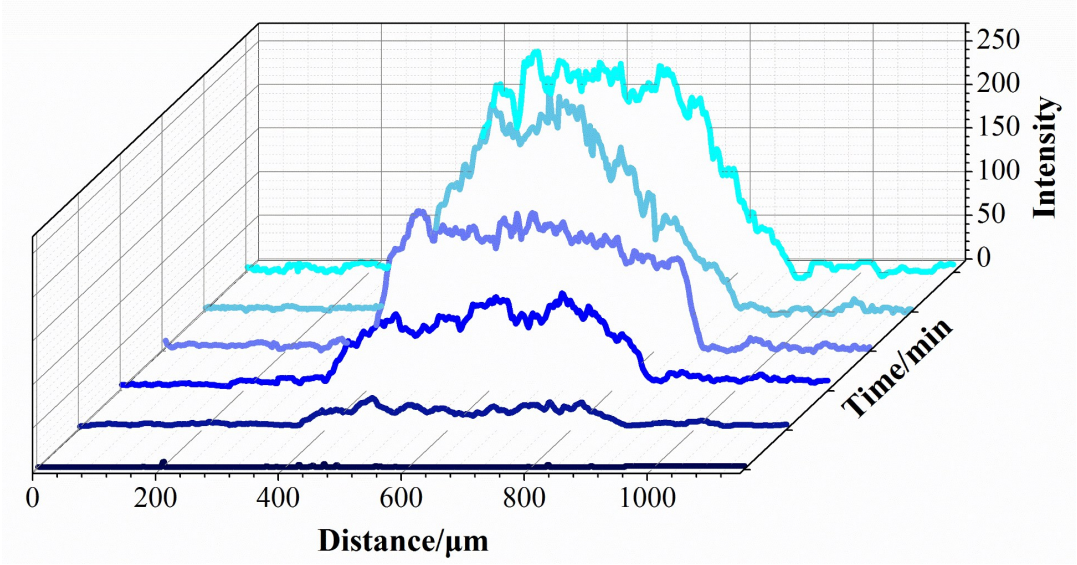

Fig. S4 Fluorescent intensity analysis for the PDMS microfluidic channels after treatment in PVA for different time (0 min, 1 min, 3 min, 5 min, 10 min and 20 min).

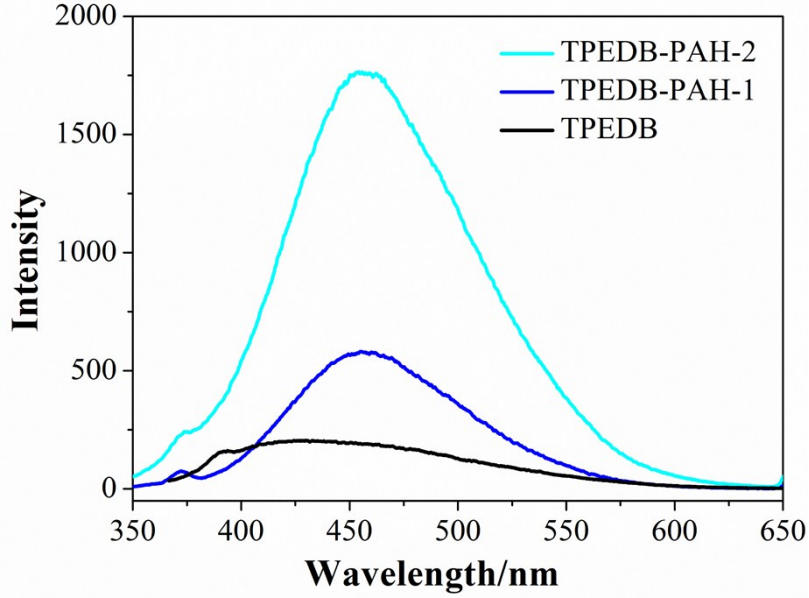

Fig. S5 Fluorescent emission spectra for TPEDB, TPEDB-PAH-1 and TPEDB-PAH-2 composites with the excitation of 330 nm.

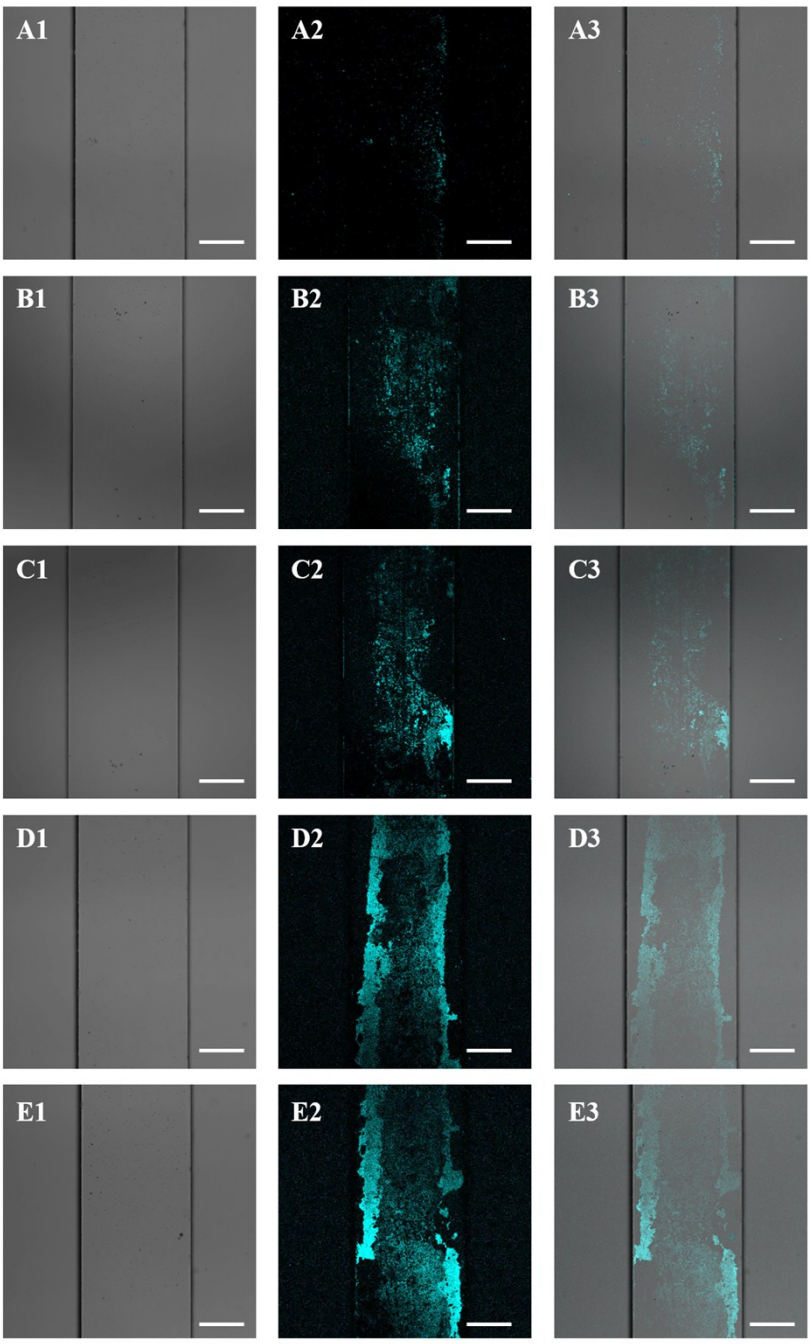

Fig. S6 Bright-field, dark-field and merged images of confocal microscopy (1200 × 1200 μm^2) for the PDMS microfluidic channels after hydrophilization treatment in PAH for different time, from A to E: treatment time is prolonged from 1 min, 3 min, 5 min, 10 min to 20 min. The scale bars represented for 200 μm.

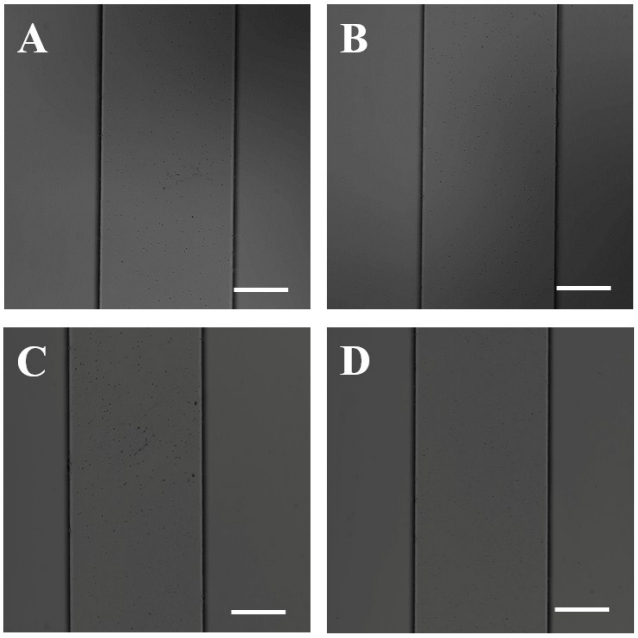

Fig. S7 Bright field images of confocal microscopy (1200 × 1200 μm^2) for the PDMS microfluidic channels after different treatment: (A) HCl and H_2O_2, (B) 3% glycerol, (C) 3% PEG and (D) 3% PVA. The scale bars represented for 200 μm.

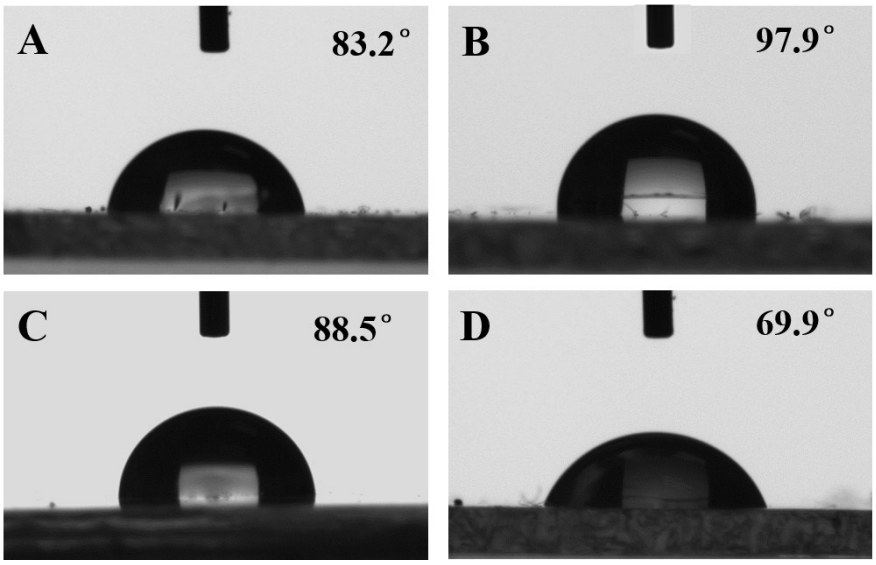

Fig. S8 Contact angles of PDMS flat substrates under different hydrophilization treatment: (A) HCl-H_2O_2 mixture, (B) 3% glycerol, (C) 3% PEG and (D) 3% PVA.

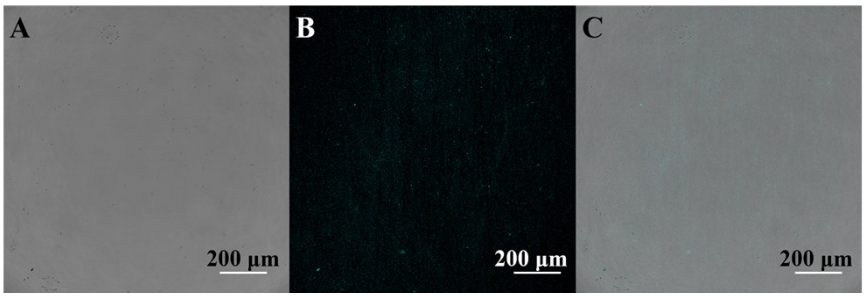

Fig. S9 (A) Bright-field, (B) dark-field and (C) merged images of confocal microscopy (1500 × 1500 μm^2) for the glass substrate labelled by the TPEDB molecules.

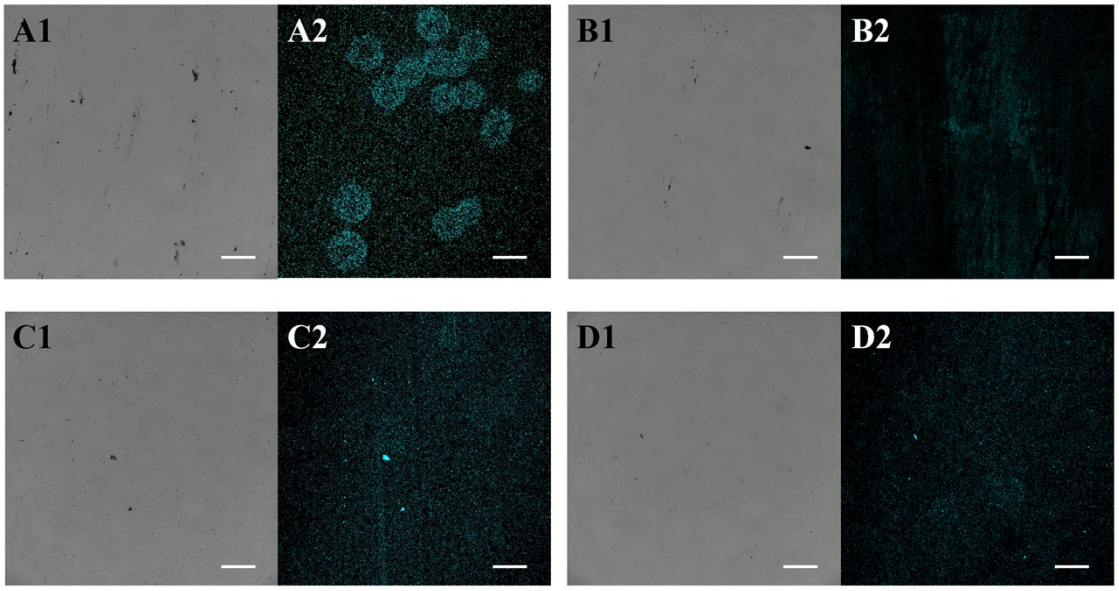

Fig. S10 Bright-field and dark-field images of confocal microscopy (1500 × 1500 μm^2) for the glass substrate treated by (A) HCl-H_2O_2 mixture, (B) 3% glycerol, (C) 3% PEG and (D) 3% PVA, followed by the fluorescent labelling of the TPEDB molecules. Scale bars represented for 200 μm.

Table S1. Fluorescent imaging analysis of PDMS microfluidic channels after treatment in PVA solution for different time.

Time treated in PVA solution/min	Mean values/pixel
0	0.54
1	13.44
3	22.30
5	33.69
10	45.14
20	49.99

Table S2. Fluorescent imaging analysis of PDMS microfluidic channels after treatment in HCl-H_2O_2 mixture, 3% glycerol, 3% PEG and 3% PVA for 10 min.

Treatment	Mean values/pixel
HCl-H_2O_2	23.37
3% glycerol	16.68
3% PEG	13.93
3% PVA	44.05

Table S3. Contact angle measurements of glass substrate after treatment in HCl-H_2O_2 mixture, 3% glycerol, 3% PEG and 3% PVA for 10 min.

Treatment	Contact angle/degree	Mean values/pixel
Blank	55.6	4.89
HCl-H_2O_2	32.4	19.32
3% glycerol	50.9	7.65
3% PEG	45.5	9.35
3% PVA	49.2	9.03