

## A glucose modified filter paper for effective oil/water separation

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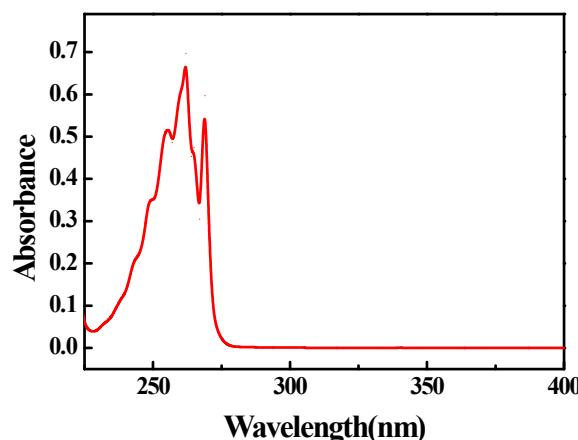


Fig. S1 The UV absorbance of toluene in hexane solution (0.5 g/L).

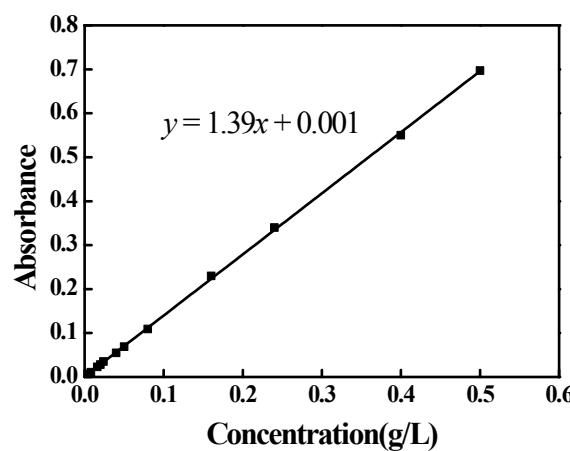


Fig. S2 UV absorbance at 262 nm as a function of toluene concentration in hexane solution.



Fig. S3 The crosslinked network formed by mixing of glucose and glutaraldehyde solution.



Fig. S4 A modified filter paper with an area of  $2.54\text{ cm}^2$  could support a column of toluene 0.72 m, a column of hexane 0.83 m, and a column of petroleum ether 0.90 m in height, respectively.

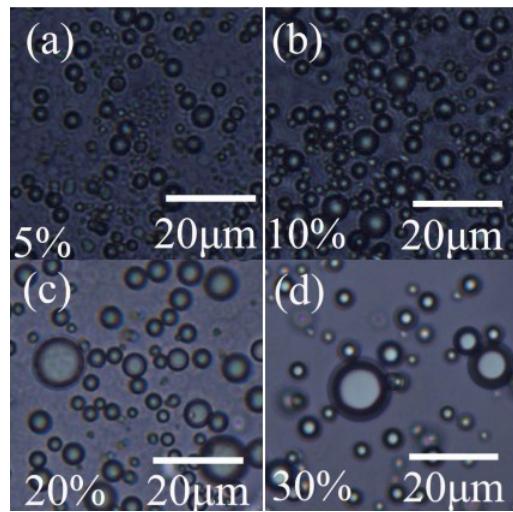


Fig. S5 The microscopic images of toluene-in-water emulsions.

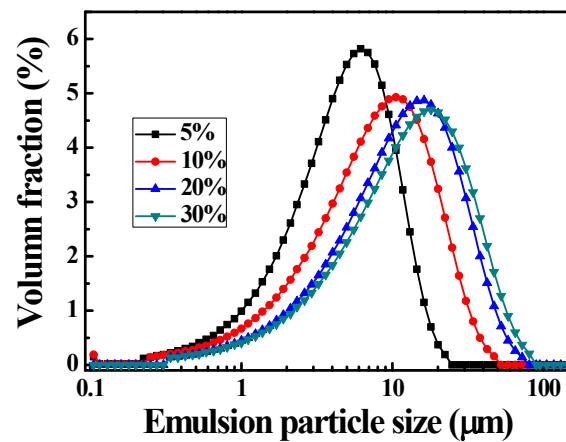


Fig. S6 The size distribution of toluene/water emulsion particles at different toluene volume fractions.

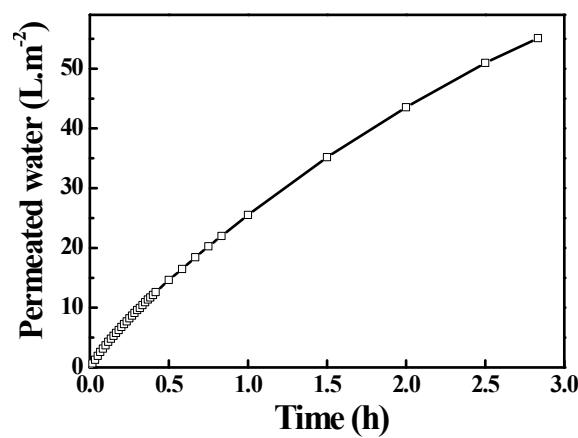


Fig. S7 The permeated water per unit area of 100 mL toluene-in-water emulsion vs. time.

Table S1 The thickness of filter papers after glucose treatment.

glucose concentration/wt%	Thickness of filter paper/mm (pore size 2.5 $\mu\text{m}$ )	Thickness of filter paper/mm (pore size 11 $\mu\text{m}$ )	Thickness of filter paper/mm (pore size 25 $\mu\text{m}$ )
Uncoated	0.200 $\pm$ 0.003	0.179 $\pm$ 0.004	0.201 $\pm$ 0.004
2%	0.204 $\pm$ 0.003	0.185 $\pm$ 0.005	0.205 $\pm$ 0.005
4%	0.208 $\pm$ 0.005	0.188 $\pm$ 0.006	0.207 $\pm$ 0.005
10%	0.214 $\pm$ 0.006	0.196 $\pm$ 0.005	0.213 $\pm$ 0.007
Saturated	0.220 $\pm$ 0.005	0.201 $\pm$ 0.005	0.219 $\pm$ 0.002

Table S2 The residual oil contents after toluene/water mixture (30:70 v/v) separation by the filter papers modified (pore size 25  $\mu\text{m}$ ) with different glucose solutions.

glucose concentration/wt%	Toluene content mg/L
Only GA	5.76 $\pm$ 2.16
2% GLC	4.56 $\pm$ 0.96
4% GLC	4.32 $\pm$ 0.72
10% GLC	6.96 $\pm$ 0.48
Saturated GLC	8.16 $\pm$ 1.07

Table S3 The residual oil contents of toluene/water mixtures (30:70 v/v) in acidic, alkaline and saturated NaCl solutions.

Oil/Water mixtures	Toluene content mg/L
$\text{H}_2\text{O}$	8.16 $\pm$ 1.07
2M $\text{H}_2\text{SO}_4$	21.83 $\pm$ 12.68
2M NaOH	28.78 $\pm$ 15.11
Saturated NaCl	19.19 $\pm$ 3.12

Table S4 The oil contents after toluene/water mixture (30:70 v/v) separations at different temperatures.

Temperatures	Toluene content mg/L
2 °C	4.32 $\pm$ 0.88
30 °C	8.16 $\pm$ 1.07
65 °C	7.92 $\pm$ 3.31

Table S5 The average sizes of toluene/water emulsion droplets at different toluene volume fractions.

Toluene volume fraction (v%)	Volume-average Emulsion particle size ( $\mu\text{m}$ )	Area-average Emulsion particle size ( $\mu\text{m}$ )
5	5.69	2.79
10	10.05	3.94
20	15.66	6.09
30	16.84	5.94