Electronic Supporting Information (ESI)

Amphiphobic polyHIPEs with pH-triggered transition to hydrophilic-oleophobic for controlled removal of water from oil-water mixtures

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1. Experimental

Table S1 Recipes and properties of the RH-*X*-*Y*s

	RH-20-5	RH-35-5	RH-50-5	RH-35-3	RH-35-7
Continuous aqueous phase (g)					
DEAEMA	0.50	0.90	1.30	0.90	0.90
AAm	1.80	1.40	1.00	1.40	1.40
MBAAm	0.25	0.25	0.25	0.25	0.25
F127	0.60	0.60	0.60	0.60	0.60
H_2O	8.40	8.40	8.40	8.40	8.40
Total	11.55	11.55	11.55	11.55	11.55
Total (volume, mL)	9.5	9.5	9.5	9.5	9.5
Dispersed organic phase (mL)					
Toluene	34.60	34.60	34.60	34.60	34.60
FMA	1.73	1.73	1.73	1.03	2.76
Total	36.33	36.33	36.33	35.63	37.36
Initiators added after HIPE formation					
APS	0.15	0.15	0.15	0.15	0.15
TEMED	0.08	0.08	0.08	0.08	0.08
DEAEMA content (%)	19.61	35.29	50.98	35.29	35.29
FMA content (%)	4.76	4.76	4.76	2.89	7.39
Dispersed phase fraction (%)	79.3	79.3	79.3	78.9	79.7
Double-bond concentration within the continuous phase (mol/L)					
	3.72	3.31	2.90	3.31	3.31
Double-bond concentration within the dispersed phase (mol/L)					
	0.15	0.15	0.15	0.09	0.24
Theoretical density (g/cc)*	0.06-0.09	0.06-0.09	0.06-0.09	0.06-0.08	0.06-0.11
Density (g/cc)	0.17	0.16	0.17	0.17	0.19
Density (g/cc)**	0.19	0.18	0.19	0.18	0.19

* Maximum and minimum densities were calculated with and without FMA, respectively.

**Density of the corresponding RH-*X*-*Y*-Cls.

2. Results and discussion

Table S2. Cl contents (from EDS) within the RH-35-*Y*-Cls.

	RH-35-3-Cl	RH-35-5-Cl	RH-35-7-Cl
Cl content (%)	0.246±0.134	0.1±0.076	0.231±0.071

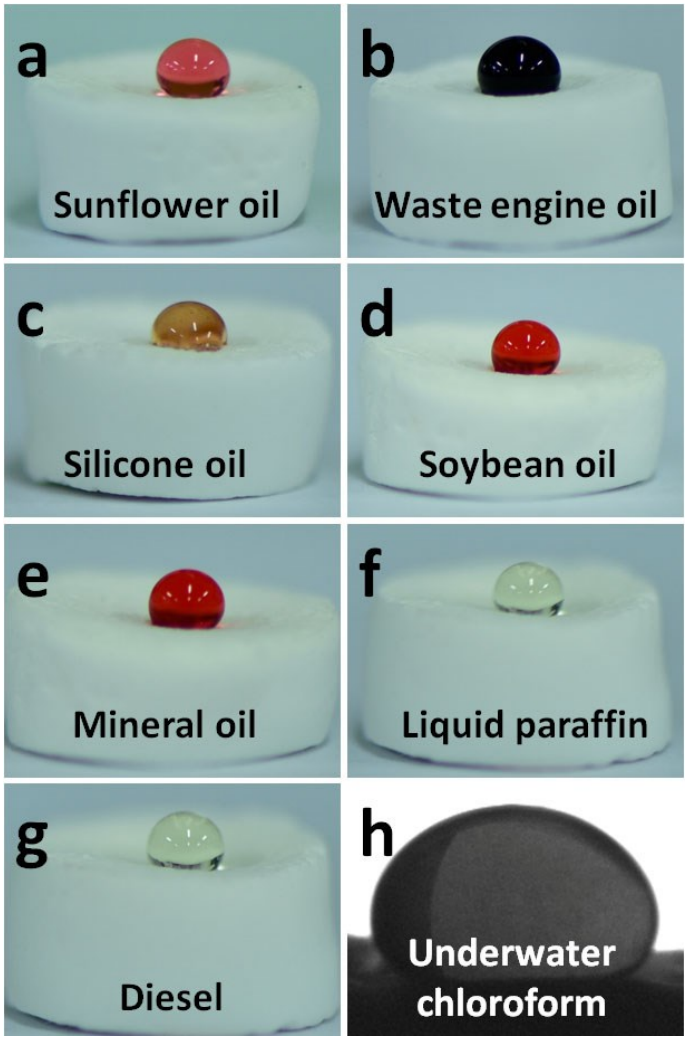

Fig. S1 Optical images of various oils on dry RH-35-5-Cl in air: (a) sunflower oil; (b) waste engine oil; (c) silicone oil; (d) soybean oil; (e) mineral oil; (f) liquid paraffin; (g) diesel; Soybean oil, paraffin oil and mineral oil were dyed with oil red O; Micrograph of (h) chloroform on water-swollen RH-35-5-Cl under water.

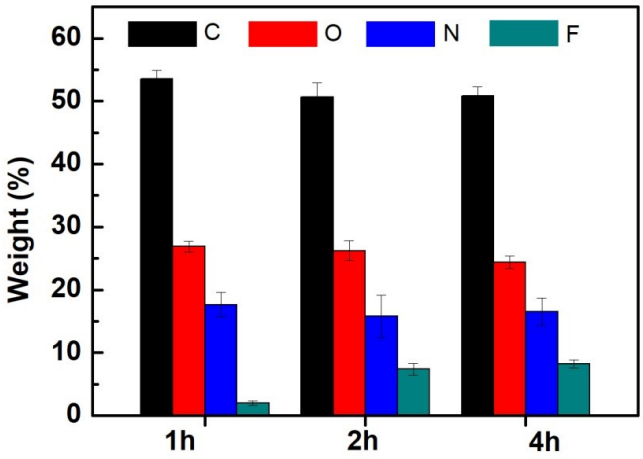

Fig. S2 Elemental (C, O, N, F, and Cl) contents (determined by EDS) of RH-35-5 from polymerization for 1, 2 and 4 h.

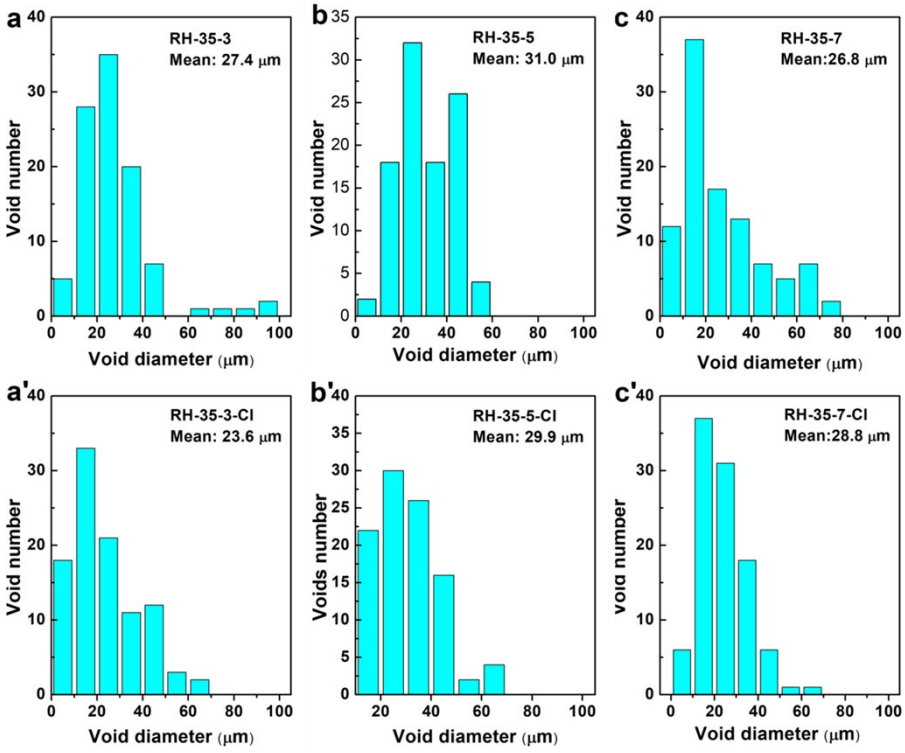

Fig. S3 Void diameter of (a-c) the RH-35-*Y*s and (a'-c') the RH-35-*Y*-Cls: (a) RH-35-3; (b) RH-35-5; (c) RH-35-7; (a') RH-35-3-Cl; (b') RH-35-5-Cl; (c') RH-35-7-Cl.

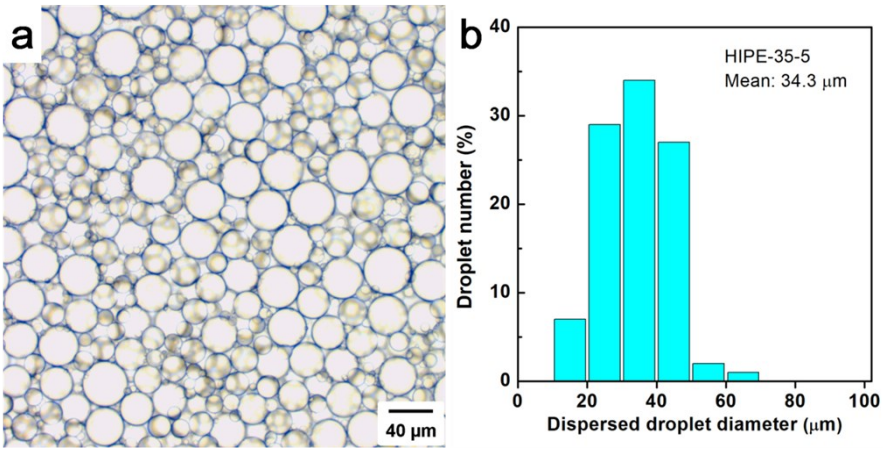

Fig. S4 (a) A typical optical micrograph and dispersed droplet distribution of the HIPE (HIPE-35-5) for RH-35-5 preparation.

3. Videos

Video 1: To show the absorption of water under hexadecane triggered by adding an HCl solution.

Video 2: To show the continuous removal of water from hexadecane-water mixture under help of a peristaltic pump.