Supporting Information for

Fabrication of Fluorinated Raspberry Particles and their use as Building Blocks for the Construction of Superhydrophobic Films to Mimic the Wettabilities from Lotus Leaves to Rose Petals

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S1 Additional Experiments

Preparation of RPs via the one-pot addition of the reactants. PVP (0.7508g) was dissolved into EtOH (36.0 mL) in a 100 mL three-neck round-bottomed flask equipped with a reflux condenser, a syringe pump and a mechanical stirrer. This solution was stirred at 250 rpm and purged with nitrogen for 1 h at room temperature before the flask was immersed into a preheated oil bath at 75±1 ºC. A pre-dissolved solution of AIBN (0.0384 g), GMA (2.6105 g), EGDMA (0.3902 g) and EtOH (11.0 mL) was subsequently added and the polymerization was allowed to

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proceed for 11 h. In contrast to the gradual addition described in the main manuscript, the procedure described here involved the addition of the reagents in a single addition. The reaction mixture became turbid within 10 min and then became a milky solution in 1 h. The crude product was settled by centrifugation at 3,800 rpm (or 3,046 *g*) for 10 min. To remove impurities such as PVP, unreacted monomers and oligomers from the crude product, it was further purified *via* dispersal into 30 mL of THF for 12 h at room temperature before it was centrifuged at 3,800 rpm for 10 min. The precipitate was collected and repeatedly washed in sequence with 30 mL of THF (2x), 30 mL of EtOH (2x) and 30 mL of water (2x) and centrifuged at 3,800 rpm for 5 min before it was freeze-dried for 48 h. The resultant sample was denoted as RPs-13. As shown in Fig. S1a, the particles synthesized by this one-pot method had a bimodal size distribution.

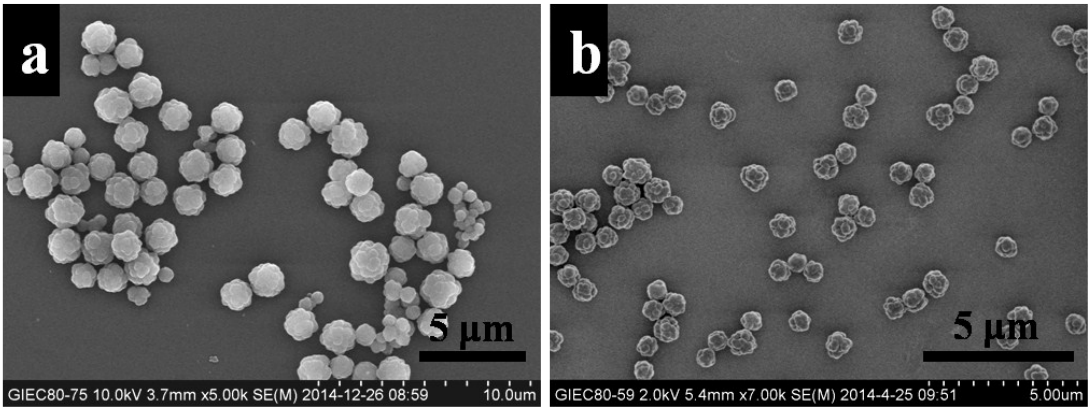

Fig. S1 SEM images of the RPs-13 particles prepared from a one-pot approach (a) and RPs-1 (b).

Table S1 The average diameters of the particle and protuberances prepared using different EGDMA contents.

Entry	RPs-3	RPs-4	RPs-5	RPs-6	RPs-7	RPs-8
Particles size/nm (SEM)	982±206	1007±148	869±48	903±66	1171±85	1254±127
Protuberances size/nm (SEM)	---	---	376±49	270 ±27	282±39	438±96

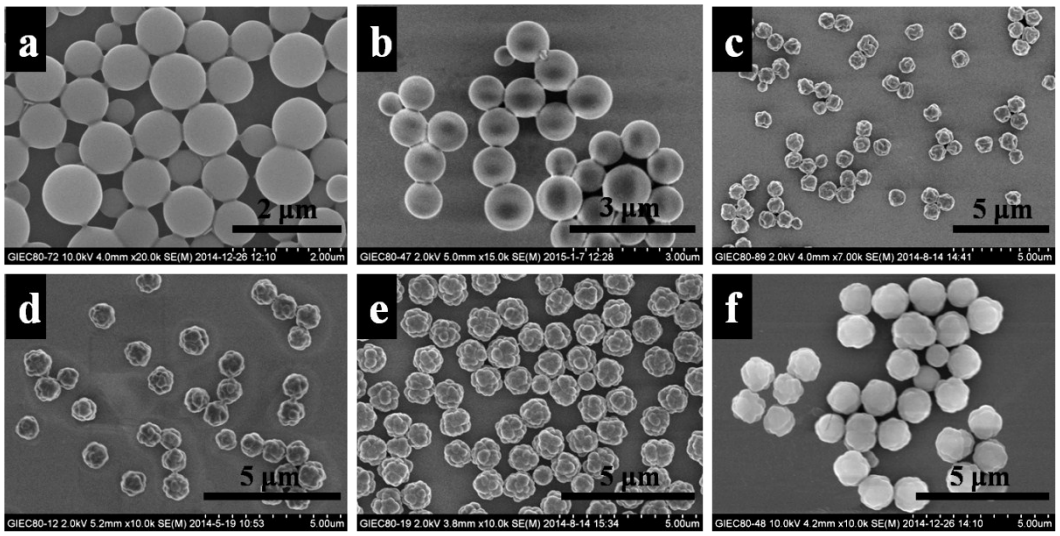

Fig. S2 Additional SEM images of particles prepared using different EGDMA contents based on the overall monomer mass of 0 wt% (a), 3 wt% (b), 7 wt% (c), 13 wt% (d), 30 wt% (e), and 60 wt% (f) corresponding to RPs-3, RPs-4, RPs-5, RPs-6, RPs-7 and RPs-8, respectively.

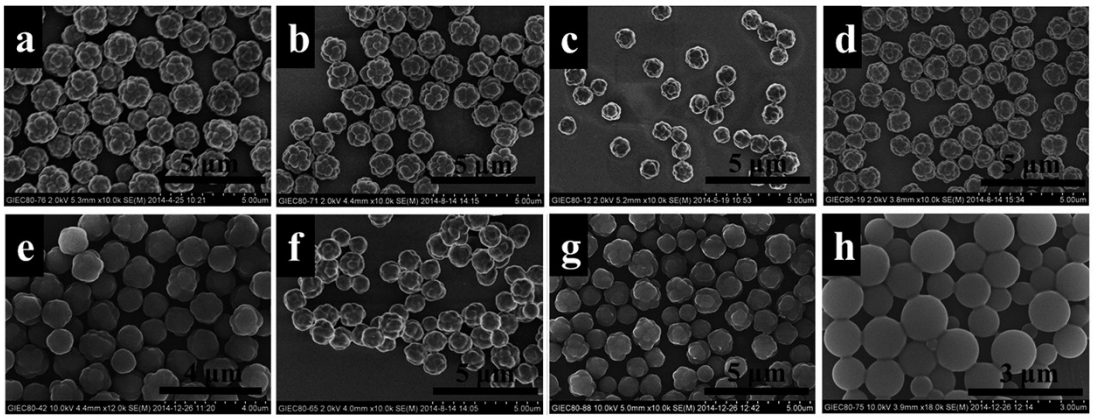

Fig. S3 Additional SEM images of various particles, including RPS-1 (a), RPs-2 (b) RPs-6 (c), RPs-7 (d), RPs-9 (e), RPs-10 (f), RPs-11 (g)and RPs-12 (h).

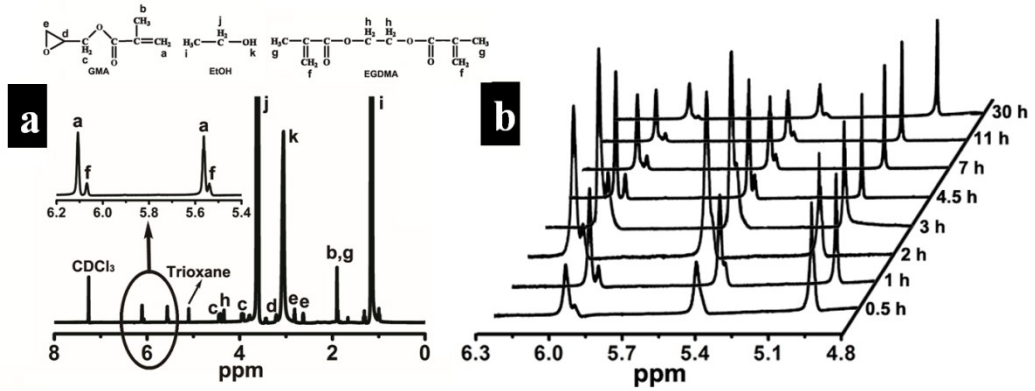

Fig. S4 ^{1}H NMR spectrum of the supernatant of the reaction mixture collected at 4.5 h (a), ^{1}H NMR spectra in the range of 4.8 and 6.3 ppm of the supernatant that was collected at different reaction times (b).

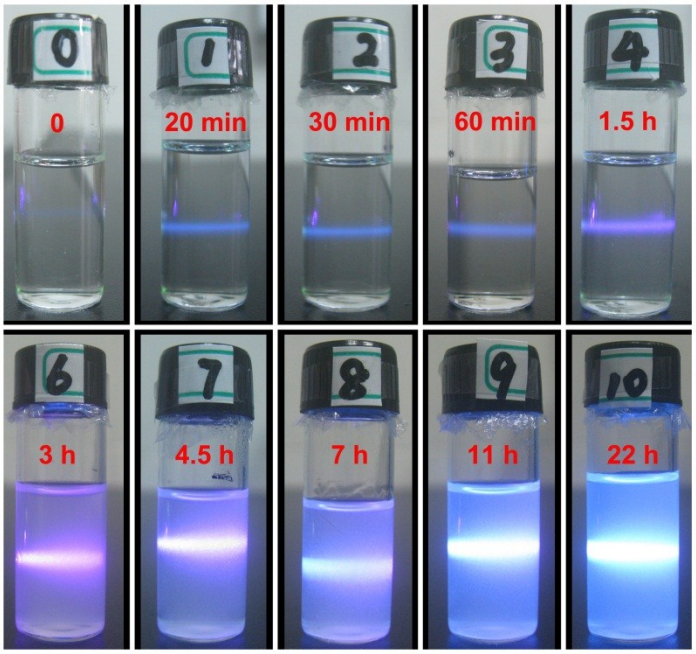

Fig. S5 Photographs of a laser beam passing through the reaction mixtures that has been collected at different polymerization times.

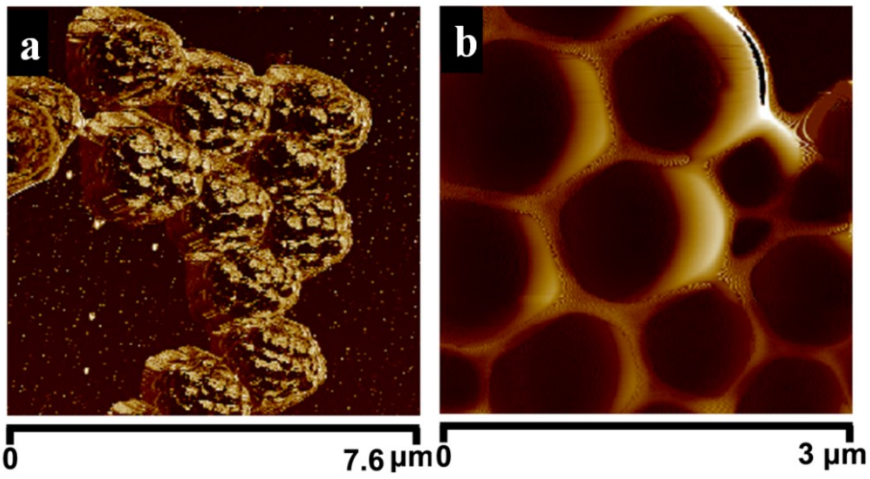

Fig. S6 AFM phase images of RPs -1 (a) and RPs-12 prepared in the absence of EGDMA (b).

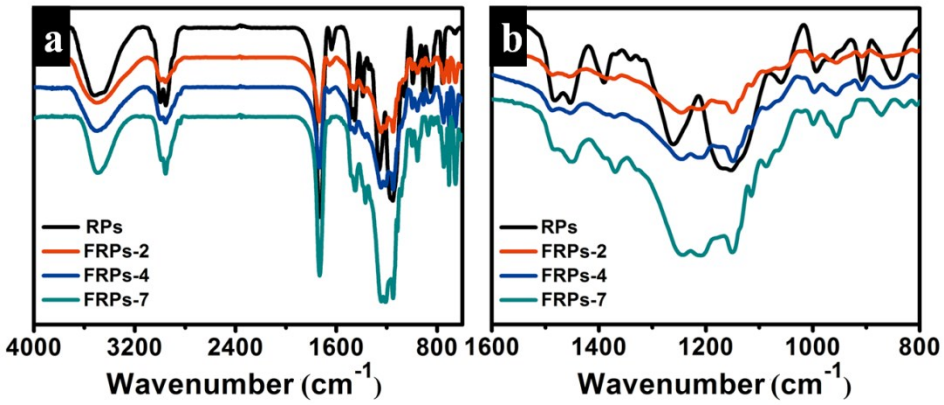

Fig. S7 FT-IR spectra of RPs-1 and the FRPs with different fluorination degrees.

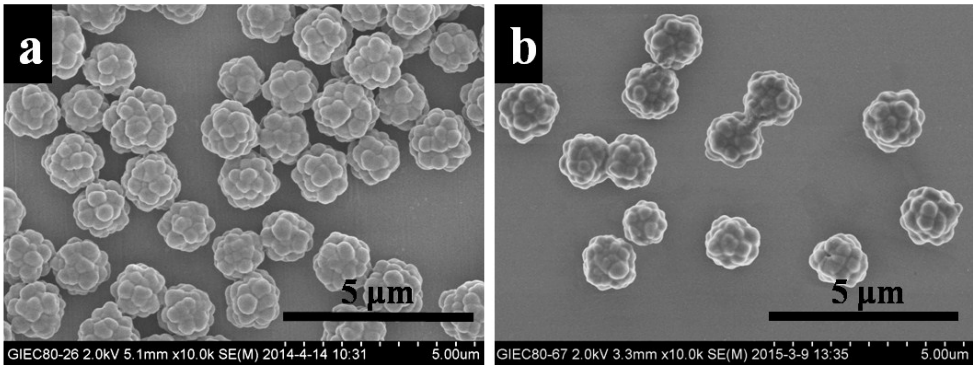

Fig. S8 SEM images of RPs-1 before (a) and of FRPs-7 after (b) they were reacted with PFDT.

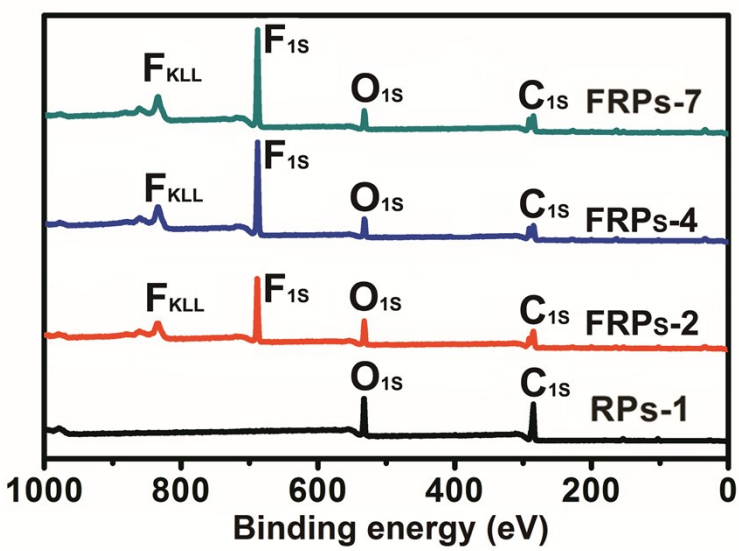

Fig. S9 XPS spectra of RPs-1 and FRPs with different fluorination degrees.

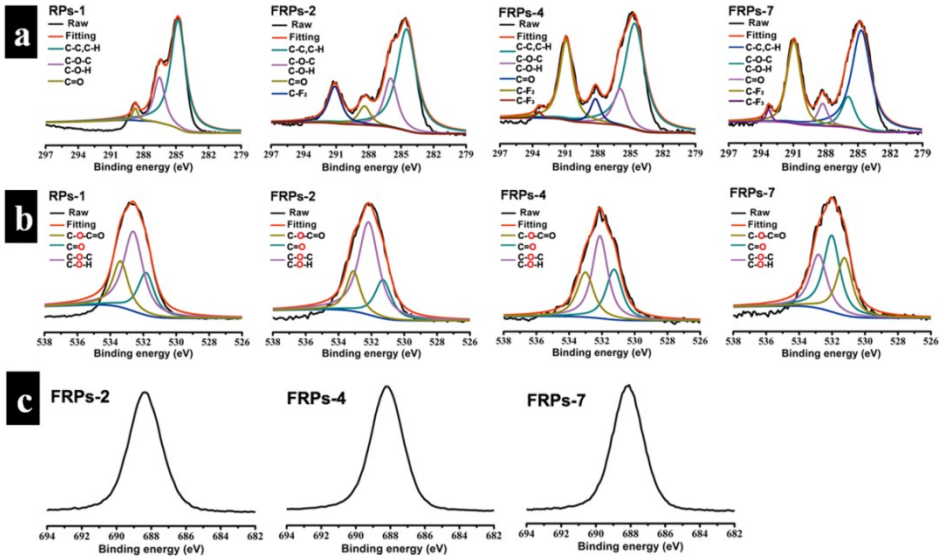

Fig. S10 C1s (a), O1s (b) and F1s (c) XPS spectra along with their corresponding fitting curved of RPs and FRPs with different fluorination degrees.

Table S2 Atomic composition and functional abundances of RPs and FRPs deposited onto glass slides. These values were calculated from the survey XPS spectra shown in Fig. S9 and the high resolution C1s spectra and O1s spectra shown in Fig. S10.

Sample	C						O		F	S	Si
	C-C C-H	C-O-C C-O-H	C=O	CF_2	CF_3	C-O-C=O	C-O-C C-O-H	C-O-C=O			(glass)
RPs-1	51.39%	15.65%	2%	0	0	6.39%	14.07%	6.39%	0	0	4.08%
FRPs-2	27.97%	9.52%	3.29%	6.94%	0	3.77%	10.95%	3.22%	29.18%	1.66%	3.42%
FRPs-4	22.86%	5.44%	2.62%	11.17%	0.36%	3.85%	6.14%	3.56%	39.64%	2.12%	2.24%
FRPs-7	22.21%	4.76%	2.54%	11.99%	0.93%	3.45%	4.83%	3.46%	41.49%	2.22%	2.12%

Table S3 The theoretical chemical structures of various particles with different fluorination degrees.

Fluorination degree	Theoretical chemical structure[a]
0	$C_{1.39}O_1$
20%	$C_{11.78}O_6F_{5.79}S_{0.34}$
22%	$C_{11.78}O_6F_{6.37}S_{0.37}$
50%	$C_{16.89}O_6F_{14.48}S_{0.85}$
55%	$C_{17.75}O_6F_{15.94}S_{0.94}$
60%	$C_{18.60}O_6F_{17.39}S_{1.02}$
65%	$C_{19.45}O_6F_{18.83}S_{1.11}$
70%	$C_{20.30}O_6F_{20.28}S_{1.19}$
100%	$C_{25.42}O_6F_{28.97}S_{1.70}$

[a]calculated based on feed recipe of monomer, and monomer conversion from ^{1}H NMR, using an expression as:

$$\text{C:O:F:S} = [\,7 \times n(\text{EGDMA}) + 14 \times n(\text{GMA}) \times f + 4 \times n(\text{GMA}) \times (1-f)\,] : [3 \times n(\text{GMA}) \times f + 3 \times n(\text{GMA}) \times (1-f) + 4 \times n(\text{EGDMA})] : [17 \times n(\text{GMA}) \times f] : [n(\text{GMA}) \times f\,]$$

where n(GMA)/n(EGDMA) is the molar ratio of th reacted GMA to EGDMA during the copolymerization at 7 h, and f is the fluorination degree.