Converting metal-organic framework particles from hydrophilic to hydrophobic by an interfacial assembling route

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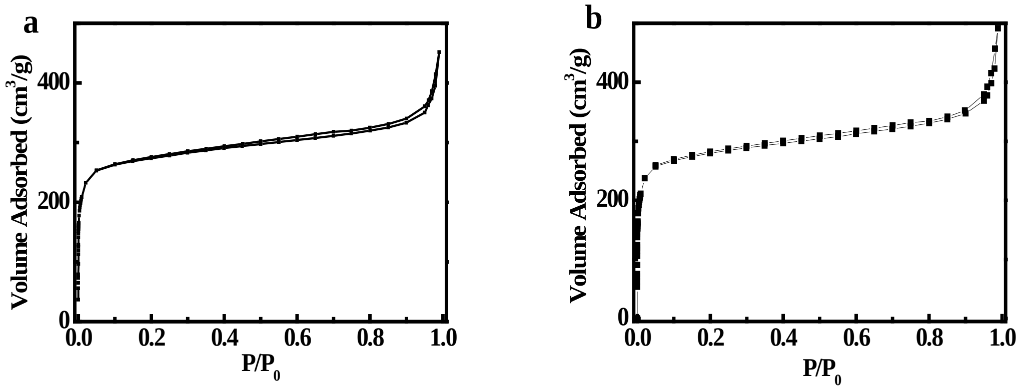


Figure S1. N_2 adsorption-desorption isotherms of (a) pristine UiO-66-NH_2 particles and (b) modified UiO-66-NH_2 particles from an emulsion with particle concentration of 1.58 mg mL $^{-1}$. The BET surface area and the total pore volume of pristine and modified UiO-66-NH_2 are 1079 m^2 g^{-1} and 0.7006 cm^3 g^{-1} and 1098 m^2 g^{-1} and 0.7628 cm^3 g^{-1}, respectively.

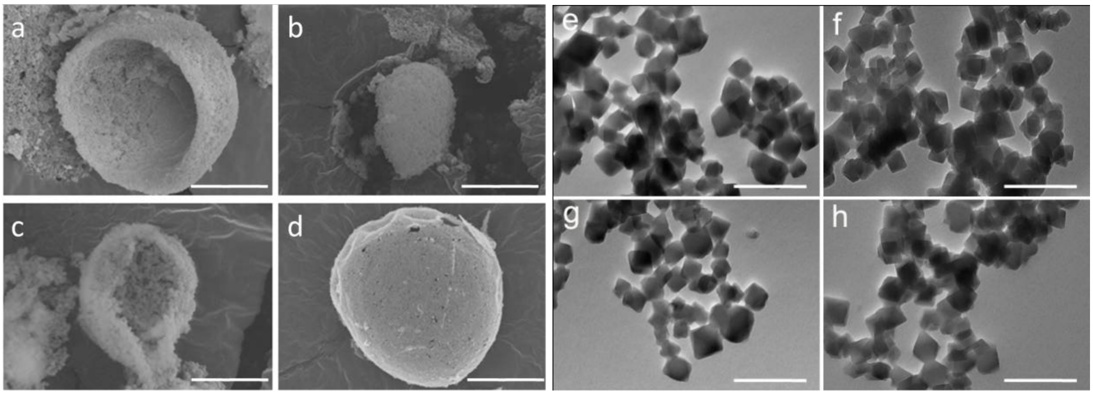


Figure S2. SEM (a-d) and TEM images (e-h) of modified UiO-66-NH_2 nanocrystals obtained from emulsions at particle concentrations (mg mL^{-1}) of (a, e) 14.29, (b, f) 7.27, (c, g) 4.69 and (d, h) 1.94. Scale bars: 10 μm in a, 3 μm in b and c, 8 μm in d, 200 nm in e-h.

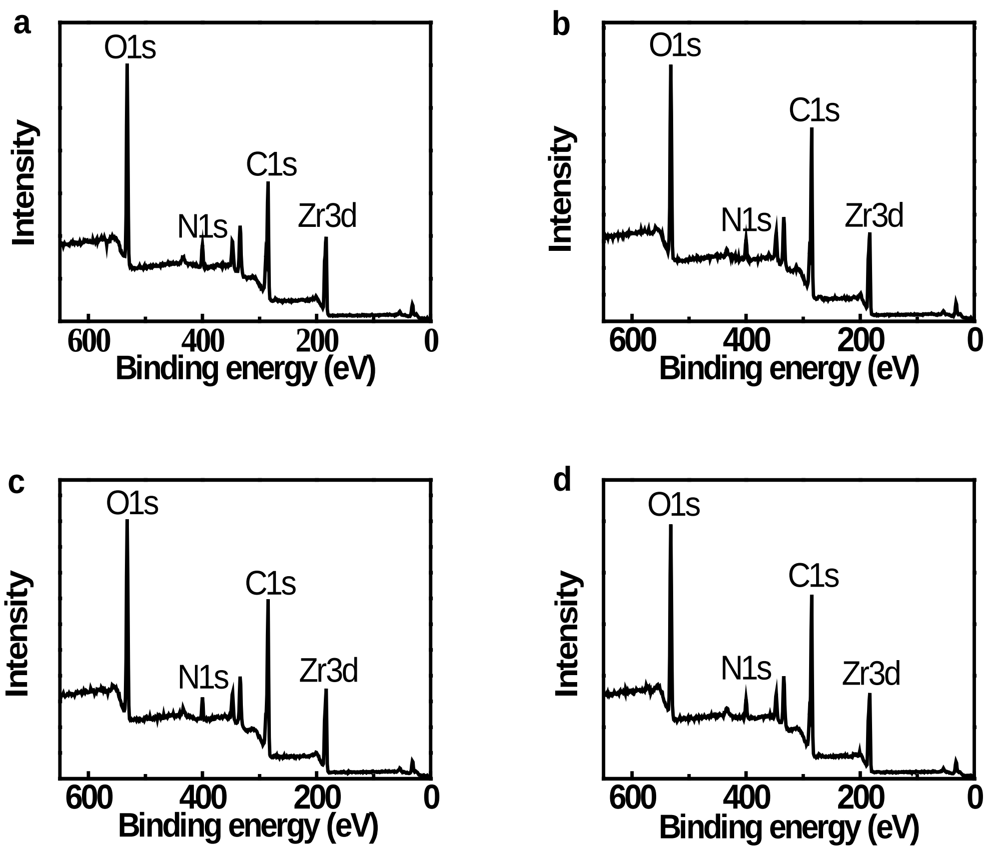


Figure S3. Wide-range XPS spectra of (a) pristine UiO-66-NH_2 nanocrystals and modified UiO-66-NH_2 nanocrystals obtained from emulsions at particle concentrations (mg mL^{-1}) of (b) 14.29, (c) 7.27 and (d) 4.69.

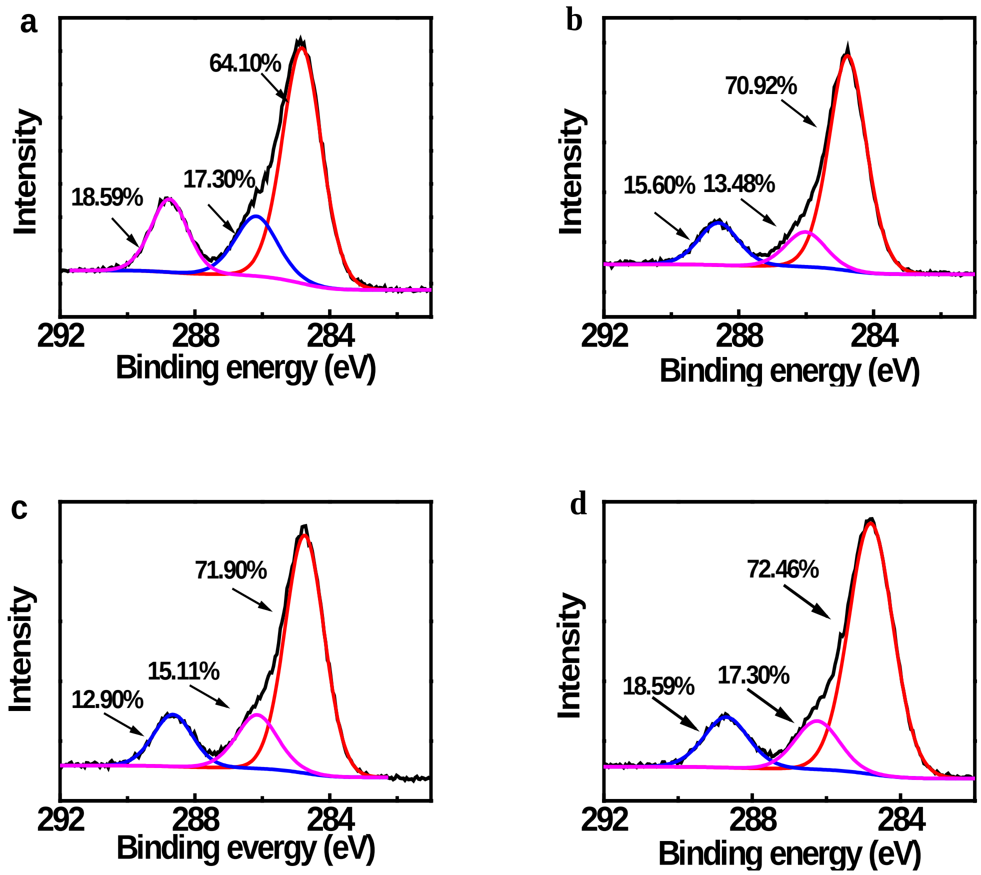
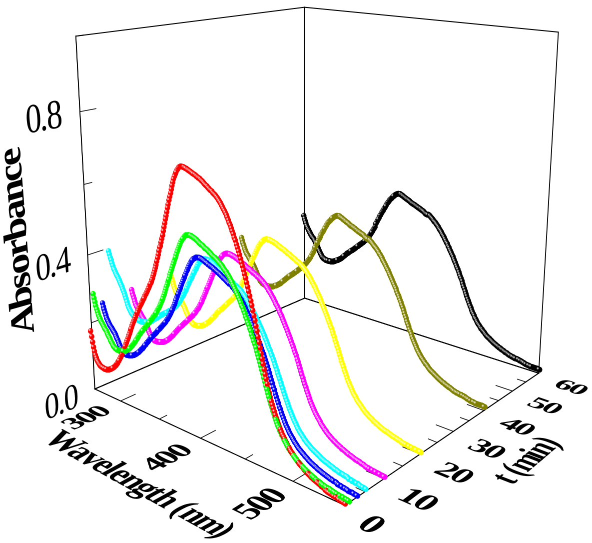


Figure S4. C1s XPS spectra of (a) pristine UiO-66-NH_2 nanocrystals and modified UiO-66-NH_2 nanocrystals obtained from emulsions at particle concentrations (mg mL^{-1}) of (b) 14.29, (c) 7.27 and (d) 4.69. The labels (%) refer to the three types of carbon bond: C-C or C=C (284.8 eV), C-O or C-N (286.3 eV) and COOH (288.7 eV).

a


Absorbance
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300
400
500
Wavelength (nm)
0
10
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30
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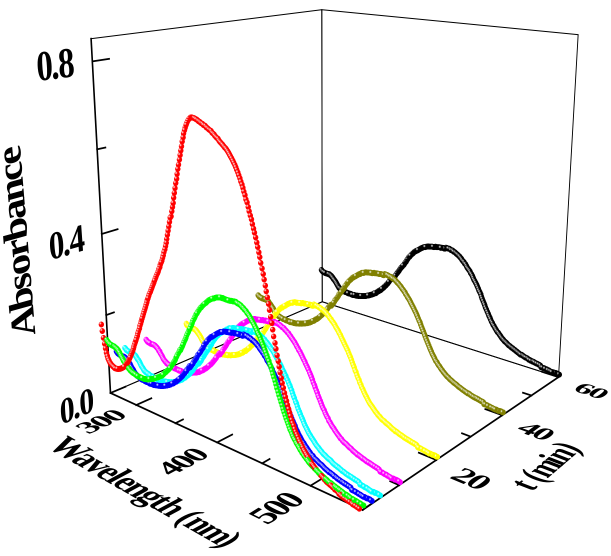
50
60
t (min)

b


Absorbance
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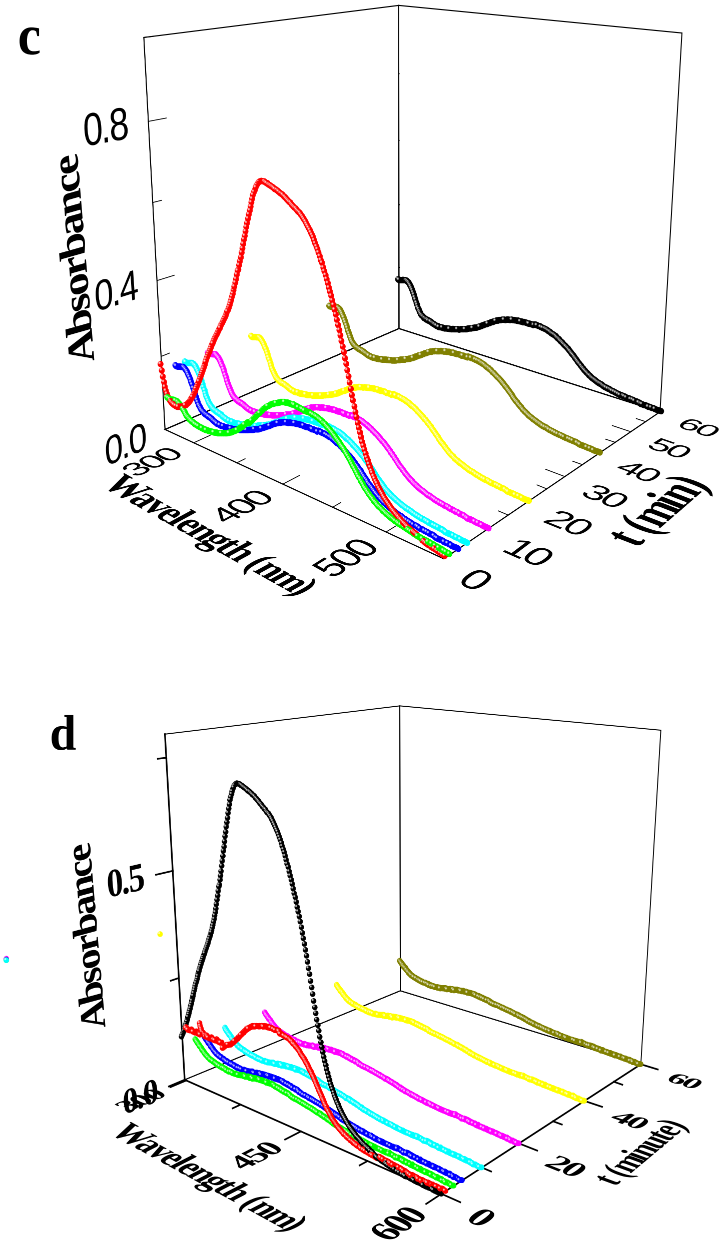

Figure S5. UV-Vis spectra of solutions of 4.6×10^{-5} mol L^{-1} Sudan Orange G in hexane containing (a) pristine UiO-66-NH_2 particles and modified UiO-66-NH_2 particles obtained from emulsions at particle concentrations (mg mL^{-1}) of (b) 14.29, (c) 4.69 and (d) 1.58 at different times. The particle concentration in hexane was 2 mg mL^{-1}.

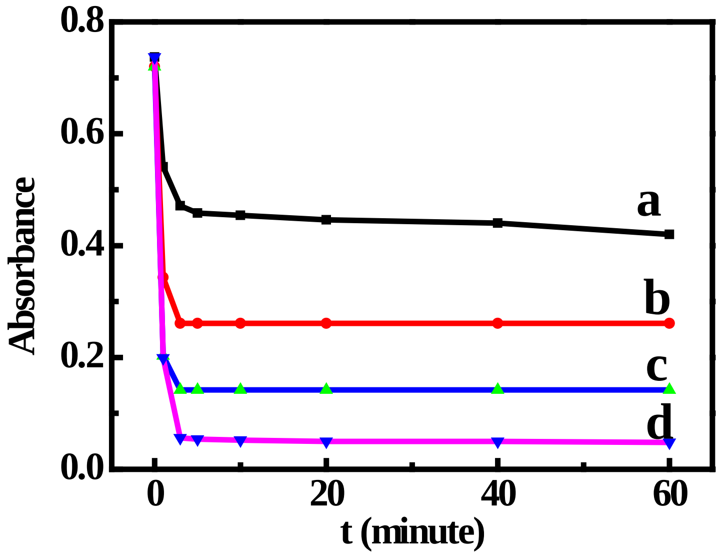

Figure S6. Dependence of the absorbance of Sudan Orange G in hexane (4.6×10^{-5} mol L^{-1}) with time in the presence of (a) pristine UiO-66-NH_2 particles and modified UiO-66-NH_2 particles obtained from emulsions at particle concentrations (mg mL^{-1}) of (b) 14.29, (c) 4.69 and (d) 1.58.

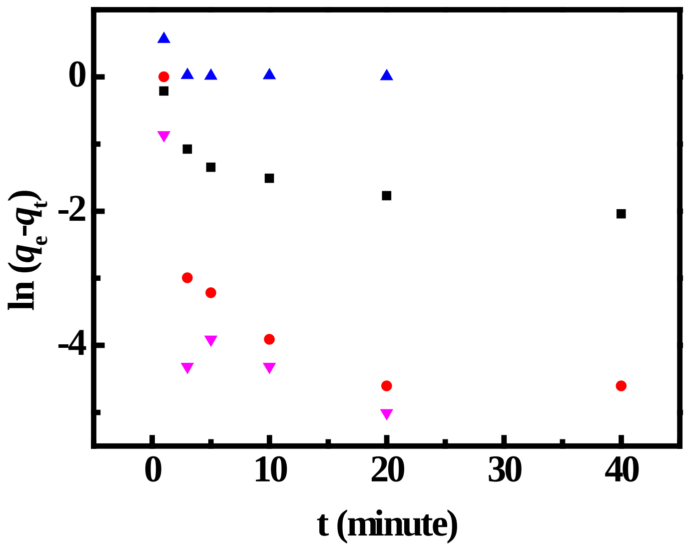

Figure S7. Pseudo-first order kinetic plot for Sudan Orange G adsorption on (red) pristine UiO-66-NH_2 particles and modified UiO-66-NH_2 particles obtained from emulsions at particle concentrations (mg mL^{-1}) of (pink) 14.29, (blue) 4.69 and (black) 1.58. The poor linearity proves that the adsorption doesn't follow pseudo-first order kinetics.

Table S1. Parameters relating to the adsorption of Sudan Orange G on pristine UiO-66-NH_2 and modified UiO-66-NH_2 nanocrystals.

Adsorbent	$q_{e,exp}$[c] (mg g^{-1})	k_1 (min^{-1}) or k_2 (g mg^{-1} min^{-1}) [d]	$q_{e,cal}$[e] (mg g^{-1})	R^2[f] (%)
UiO-66-NH_2	2.12[a]	3.43×10^{-2}	2.40	62.7
M-UiO-66-NH_2[g]	3.07[a]	7.85×10^{-2}	1.29	27.1
M-UiO-66-NH_2[h]	3.87[a]	0.0167	13.02	44.9
M-UiO-66-NH_2[i]	4.60[a]	0.1432	8.93	45.7
UiO-66-NH_2	2.12[b]	0.48	2.11	99.8
M-UiO-66-NH_2[g]	3.07[b]	4.78	3.08	100.0
M-UiO-66-NH_2[h]	3.87[b]	4.30	3.88	100.0
M-UiO-66-NH_2[i]	4.60[b]	1.98	4.61	100.0

[a] Calculated using pseudo-first order model. [b] Calculated using pseudo-second order model. [c] The amount of dye adsorbed on the adsorbent (mg g^{-1}) at equilibrium. [d] k_1 is the first order rate constant, k_2 is the second order rate constant. [e],[f] Calculated from linear plot of $\ln(q_e-q_t)$ *vs* t for the pseudo-first order model and linear plot of t/q_t *vs* t for the pseudo-second order model. [g],[h],[i] Modified UiO-66-NH_2 particles obtained from emulsions at particle concentrations of 14.29, 4.69 and 1.58 mg mL^{-1}, respectively.