Supporting information (SI) on

The highly efficient photoreduction of U(VI) using triazine-linked covalent

organic frameworks

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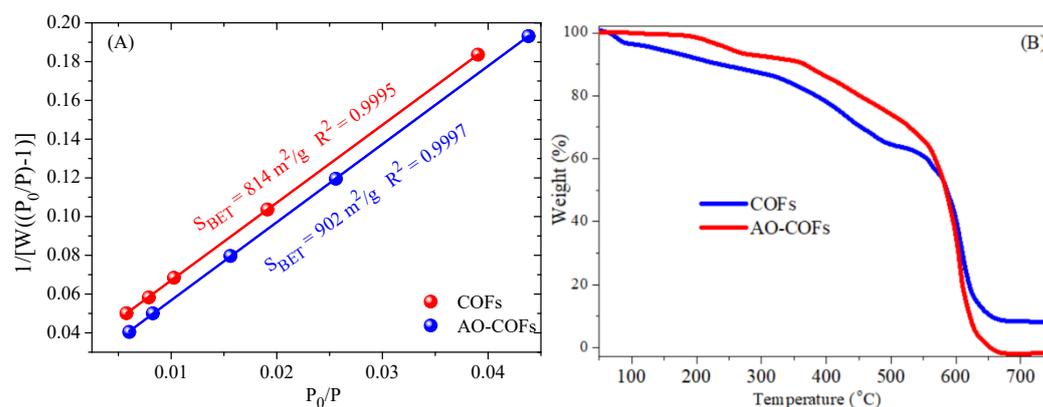
S1 Characterization

Figure S1 The characterization of COFs and AO-COFs, A: Brunauer-Emmett-Teller

(BET) plots; B: Thermogravimetric analysis (TGA) decomposition profiles;

S2 Photocatalytic kinetic experiments

The removal kinetics of U(VI) on COF, AO-COF and B/AO-COF were fitted by

pseudo-first-order and pseudo-second-order kinetic models. The linear formations of

pseudo-first-order and pseudo-second-order models can be described by Eqns. (S1) and

(S2), respectively:

$$-Log(C_e/C_0) = K_1 t \qquad\qquad (S1)$$

$$t/Q_t = t/Q_{max} + 1/(K_2*Q^2_{max}) \qquad\qquad (S2)$$

where K_1 and K_2 are the constants of pseudo-first-order and pseudo-second-order

kinetic model, respectively; C_e and C_0 (mg/L) are the concentration at equilibrium and

initial concentration, respectively; Q_t and Q_{max} (mg/g) refer to adsorption amount at t
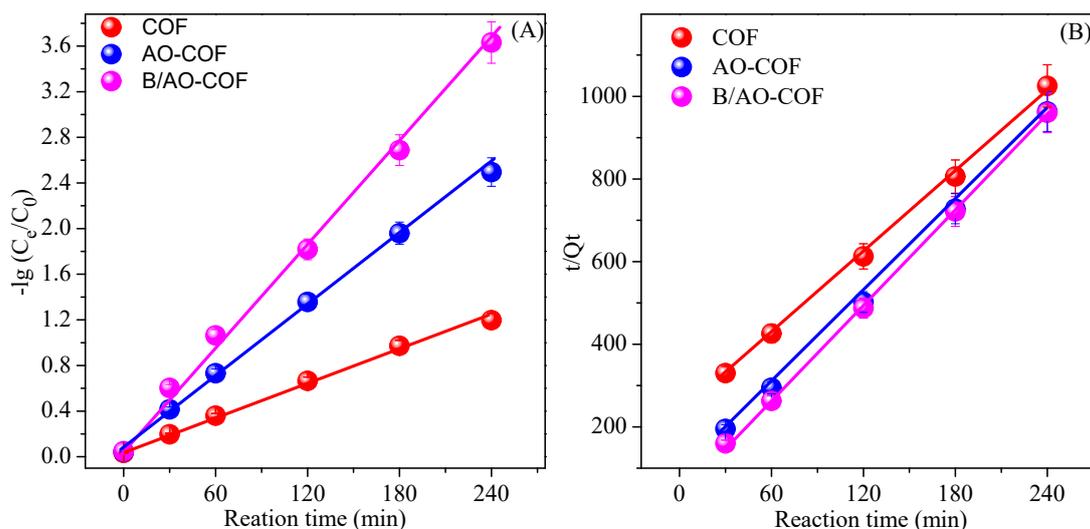
and equilibrium, respectively.

Figure S2 The fitting of removal kinetics of U(VI) on COF, AO-COF and B/AO-COF by pseudo-first-order (A) and pseudo-second-order (B) kinetic models

Table S1 Parameters of pseudo-first-order and pseudo-second-order kinetic models

	pseudo-first-order			pseudo-second-order		
	$K_1(min^{-1})$	$C_0(mg*L^{-1})$	R^2	$K_2 g/(mg·min)$	$Q_{max}(mg*g^{-1})$	R^2
COF	0.0049	1.06	0.9966	0.0477	0.304	0.9989
AO-COF	0.0102	1.102	0.9982	0.1762	0.2735	0.999
B/AO-COF	0.0145	1.124	0.9981	0.3989	0.2617	0.9995

S3 Enhancement factor

Enhancement factor (EF) of U(VI) on B/AO-COF can be calculated as Eqn. S3:

$$EF (\%) = v_{mc}*100 \%/ v_{oc} \qquad (S3)$$

v_{mc} and v_{mc}: degradation rate of modified catalyst and original catalyst, respectively.

As shown in Figure 3A, the degradation rate of COF and B/AO-COF after 60 min

irradiation was 60 and 95%, respectively. Therefore, EF= 95%*100%/60%=158 %.

S4 Comparison of extraction capacity of uranium from seawater

Table S2 Summary of maximum extraction capacity of uranium from seawater

Adsorbent	Capacity(mg/g)	Reference
UiO-66-AO	2.68	[1]
MIL-101-AO	4.6	[2]
PAO	4.62	[3]
AF1	5.04	[4]
MISS-PAF-1	5.79	[5]
DNA-TN-AO	6.02	[6]
UiO-66-C$_3$N$_4$	6.85	[7]
TP-DBD	10.31	[8]
ZIF-8/TA	11.2	[9]
CID NFs	11.39	[10]
BP-PAO	11.76	[11]
Fe@PDA-PAO	12.67	[12]
AO-COF2	12.7	This work

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