Electronic Supplementary Information

Fast adsorption and removal of 2-methyl-4-chlorophenoxy acetic acid from aqueous solution with amine functionalized zirconium metal-organic framework

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**Text S1. Preparation of UiO-66**

UiO-66 was synthesized according to the work of Cavka et al.\(^1\) Briefly, ZrCl\(_4\) (0.159 g) and terephthalic acid (0.102 g) were well mixed with 20 mL DMF by sonication in a Teflon lined steel autoclave. The autoclave was then placed in a pre-heated oven at 120°C for 24 h. After that, the white solid product of UiO-66 was collected by centrifugation at 8000 rpm for 5 min and washed with DMF for three times. Then, the obtained UiO-66 was soaked in ethanol overnight to exchange the DMF from the cavities of UiO-66. Finally, the solid was dried at 150°C under vacuum overnight and kept in a desiccator.
Scheme S1 Chemical structure of MCPA.

Fig. S1 Zeta potentials of UiO-66-NH$_2$ in water under various pH at 25°C.

Fig. S2 N$_2$ adsorption-desorption isotherms of UiO-66-NH$_2$. 
Fig. S3 Effect of adsorbent dosage on the adsorption of MCPA on UiO-66-NH$_2$.

Fig. S4 Effect of scaled up quantities keeping the same ratio on the adsorption of MCPA on UiO-66-NH$_2$ (1 g L$^{-1}$ of adsorbent).

Fig. S5 The adsorption kinetics of MCPA at different initial concentrations on UiO-66-NH$_2$ at 25°C and pH 6.0 within 30 min
Fig. S6 Plots of pseudo-first-order kinetics for the adsorption of MCPA at different initial concentrations on UiO-66-NH$_2$ at 25°C and pH 6.0.

Fig. S7 Linearized Freundlich isotherms for MCPA adsorption by the UiO-66-NH$_2$ at different temperatures.

Fig. S8 Plots of $\ln (q_e/C_e)$ vs. $q_e$ at various temperatures for the adsorption of MCPA on UiO-66-NH$_2$. 
Fig. S9 Plot of $\ln K_0$ against $1/T$ for the adsorption of MCPA on UiO-66-NH$_2$.

Fig. S10 Effect of ionic strength on the adsorption of MCPA on UiO-66-NH$_2$

Fig. S11 XRD patterns of (a) regenerated UiO-66-NH$_2$ after six cycles
(b) as-synthesized UiO-66-NH$_2$
Fig. S12 FT-IR spectra of regenerated UiO-66-NH$_2$ after six cycles and as-synthesized UiO-66-NH$_2$

Fig. S13 Linearized Langmuir isotherms for MCPA adsorption by different adsorbents at 25°C.

References