Electronic Supplementary Information

Pyridine-grafted Cr-based metal organic frameworks for adsorption and removal of Microcystin-LR from aqueous solution

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Text S1. Preparation of adsorbents

MIL-101(Cr) was synthesized according to the reported procedure.[1] 0.800 g of $Cr(NO_3)_3•9H_2O$, 0.332 g of terephthalic acid and 0.1 mL of HF were well mixed with 9.6 mL of ultrapure water. Then, the homogenous solution was poured into a Teflon lined steel autoclave. The autoclave was placed in a pre-heated oven at 220 °C for 8 h. After that, the resulting product of MIL-101(Cr) was isolated by centrifugation at 8000 rpm for 5 min and washed with DMF three times to eliminate the unreacted terephthalic acid. In order to exchange the DMF from the cavities of MIL-101(Cr), the obtained MIL-101(Cr) was washed with ethanol three times. Finally, the solid was dried at 150 °C for 12 h under vacuum and kept in a desiccator.

The synthesis of MIL-101(Cr)-Py was performed using the method described elsewhere.[2] In brief, MIL-101(Cr), pyridine, and anhydrous toluene were mixed together in the ratio of 1.0 g: 1.1 g: 150 mL, which were transferred into a 250 mL round-bottom flask and refluxed at 110 °C for 24 h. Then, the resulting solid was isolated via centrifugation and washed by dichloromethane and ethanol for several times to remove the unreacted pyridine, which was dried at 150 °C for 12 h under vacuum and kept in a desiccator.

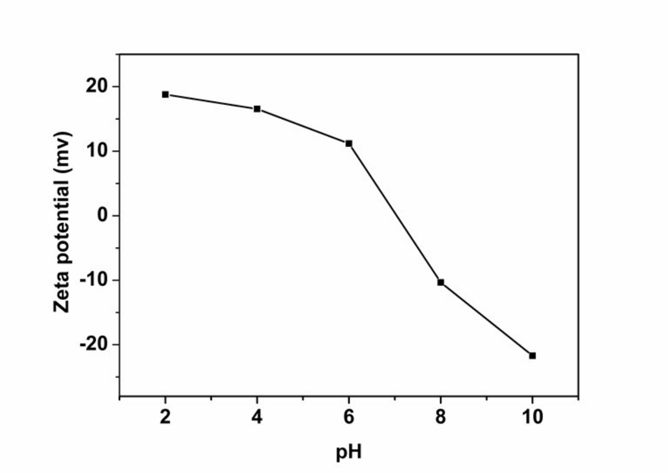

Fig. S1 Zeta potential of MIL-101(Cr)-Py in water under various pH at 25 °C.

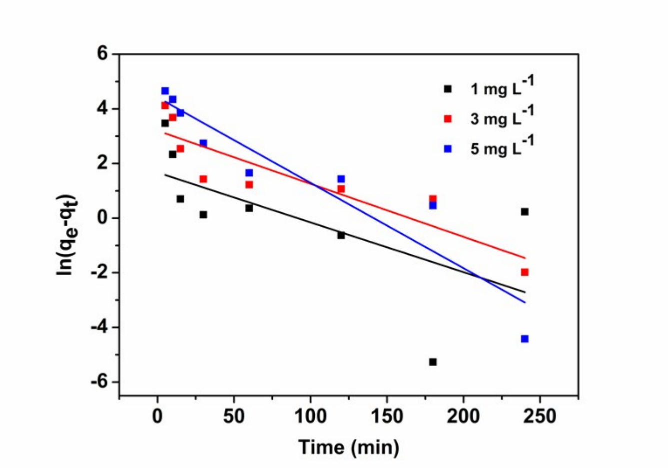

Fig. S2 Plots of pseudo-first-order kinetics for the adsorption of MC-LR at different initial concentrations on MIL-101(Cr)-Py at 25 °C.

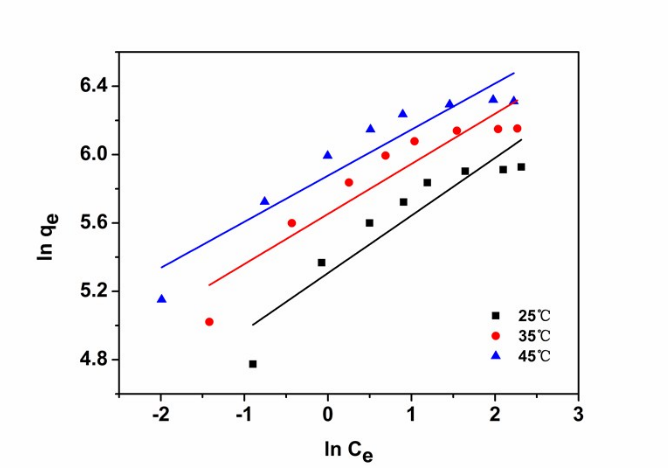

Fig. S3 Linearized Freundlich isotherms for MC-LR adsorption by MIL-101(Cr)-Py at different temperatures.

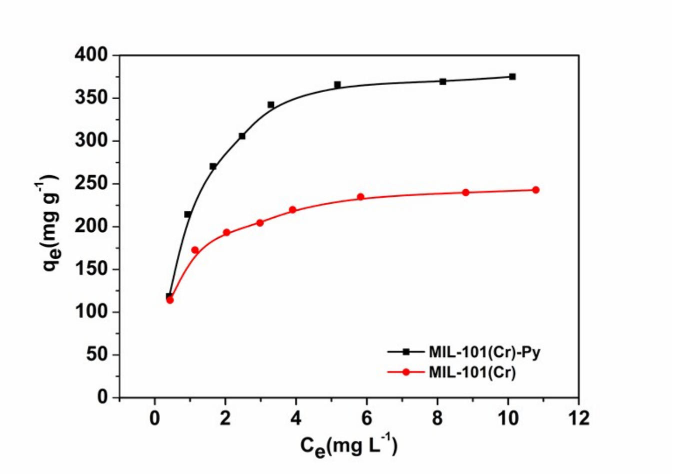

Fig. S4 Adsorption isotherms for the adsorption of MC-LR on MIL-101(Cr) and MIL-101(Cr)-Py at 25 °C.

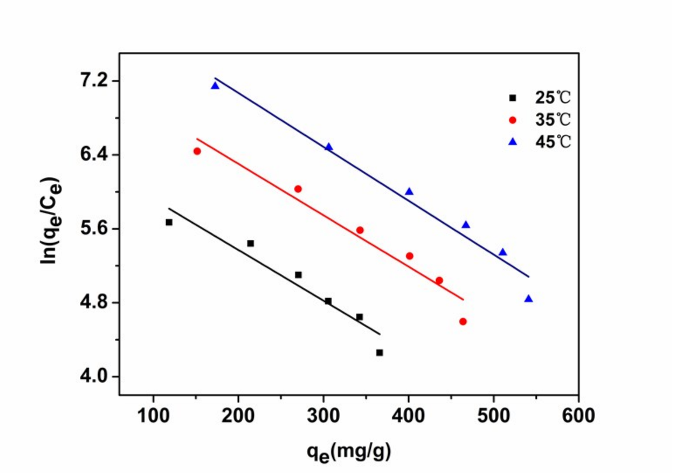

Fig. S5 Plots of ln (q_e/C_e) vs. q_e at various temperatures for the adsorption of MC-LR on MIL-101(Cr)-Py.

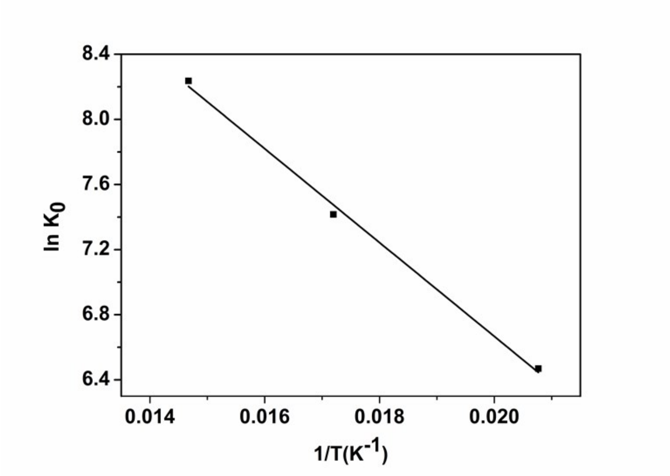

Fig. S6 Plot of ln K_0 against $1/T$ for the adsorption of MC-LR on MIL-101(Cr)-Py.

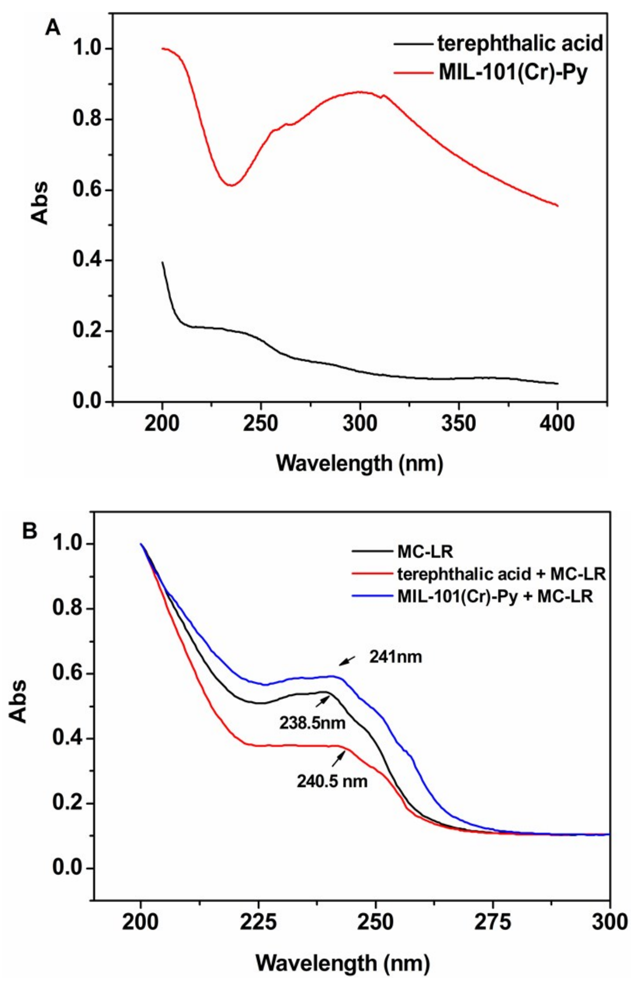

Fig. S7 UV absorption spectra of terephthalic acid and MIL-101(Cr)-Py (A) and MC-LR with terephthalic acid and MIL-101(Cr)-Py in aqueous solution (B).

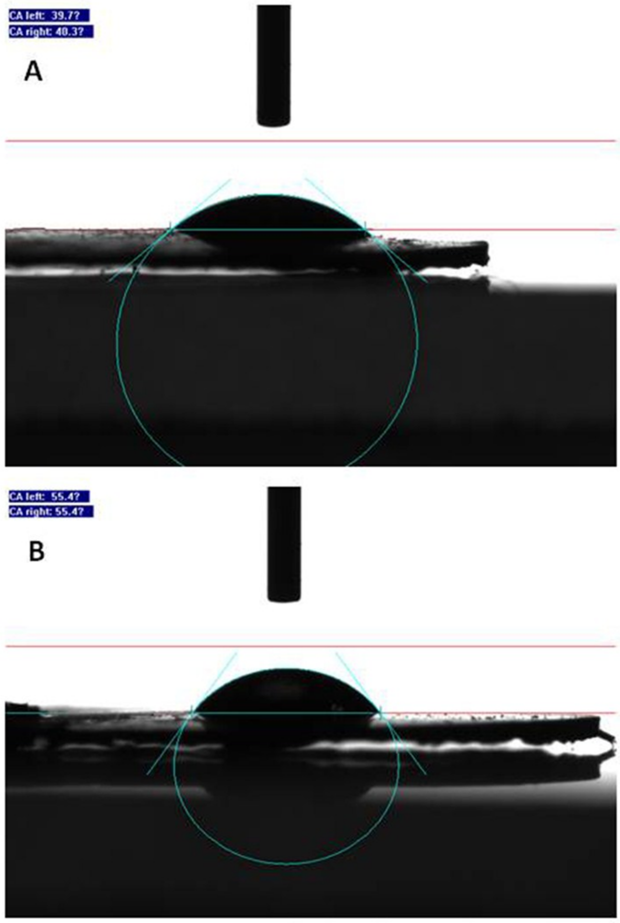

Fig. S8 Plot of contact angle between water and MIL-101(Cr)-Py (A) and MIL-101(Cr) (B).

Table S1. Elemental analysis of MIL-101(Cr) and MIL-101(Cr)-Py.

adsorbent	elements contents(%)		
	C(%)	H(%)	N(%)
MIL-101(Cr)-Py	39.33	3.69	0
MIL-101(Cr)	44.77	1.16	3.68

Table S2 Comparison of adsorption capacities of various adsorbents for MC-LR.

adsorbent	Q_0 (mg g^{-1})	reference
MIL-101(Cr)-Py	409.8	this work
MIL-101(Cr)	256.4	this work
commercial activated carbon	1.482	3
Mesoporous carbon Grapheme oxide	1.700	3
Fe_3O_4@Al-B	161.3	4
Photonated mesoporous graphitic carbon	2.361	5
Mesoporous carbon	35.67	6

References

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