

Electronic Supplementary Information (ESI)

Quick removal of metronidazole from aqueous solutions by metal-organic frameworks

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Electronic supplementary information (ESI) available: Additional experimental data on metronidazole removal (Figs. S1-S4, Tables S1 and S2).

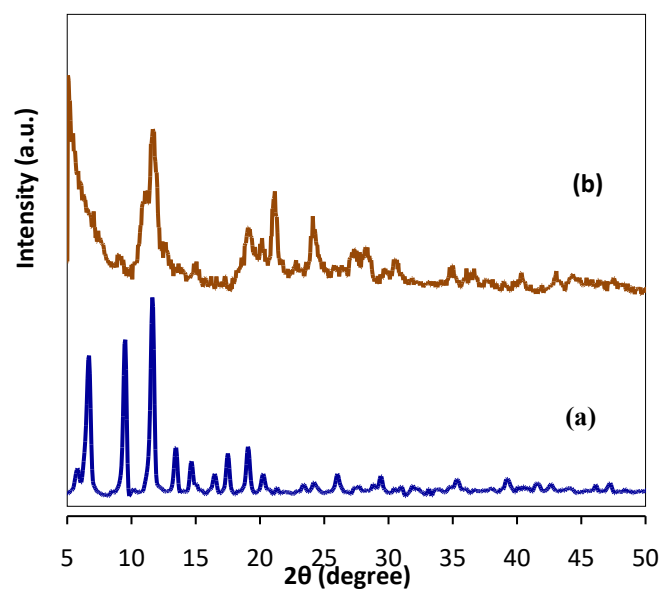


Fig. S1. PXRD patterns of HKUST-1 (a) and NH₂-MIL-101-Fe (b).

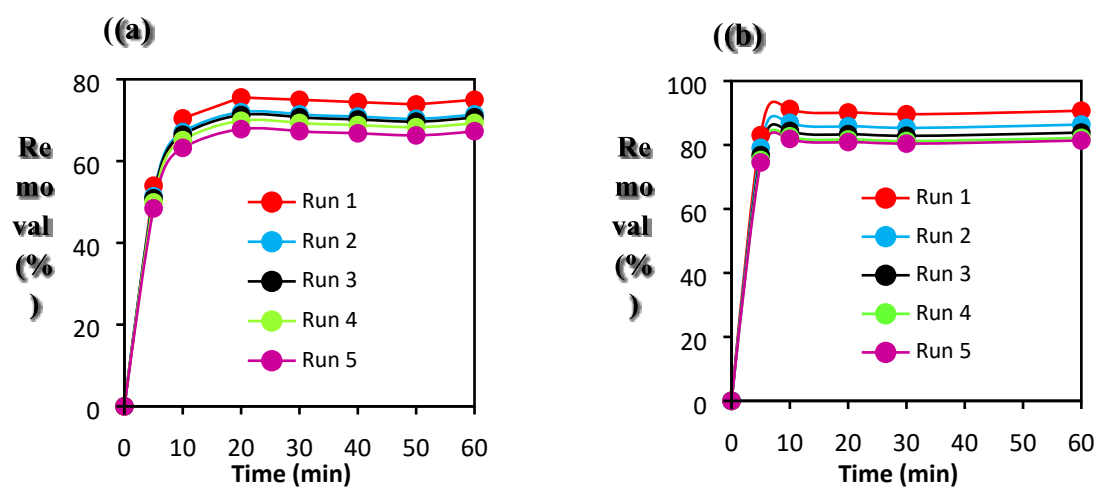


Fig. S2. Five recycling runs for the MNZ adsorption over HKUST-1 (a) and NH₂-MIL-101-Fe (b); (experimental conditions: adsorbent dosage: HKUST-1 = 0.3 g/L, NH₂-MIL-101-Fe = 0.2 g/L, initial MNZ concentration = 5 ppm, pH = 7, T = 25 °C).

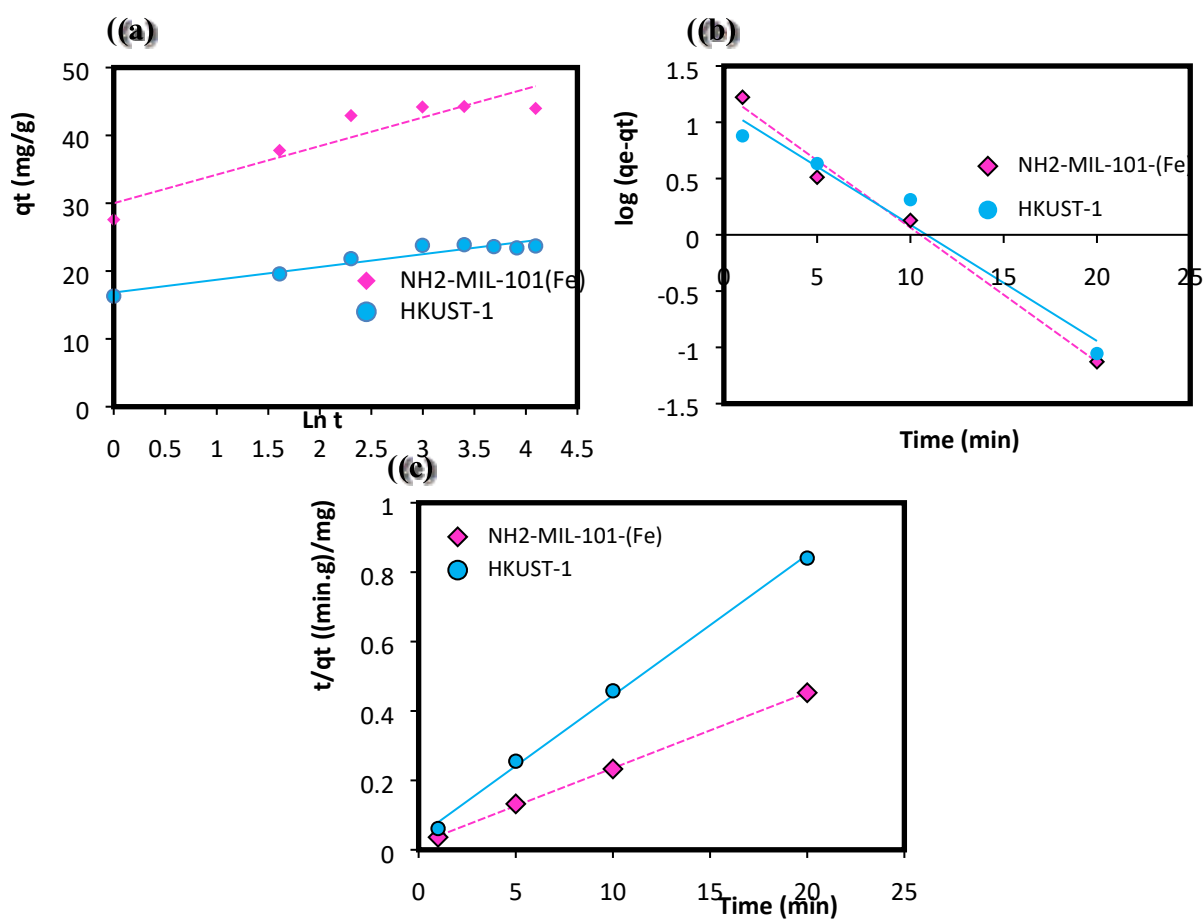


Fig. S3. Kinetics of MNZ adsorption on HKUST-1 and NH₂-MIL-101-Fe: zero-order (a) pseudo-first-order (b), and pseudo-second-order (c) (experimental conditions: adsorbent dosage: HKUST-1 = 0.3 g/L, NH₂-MIL-101-Fe = 0.2 g/L, initial MNZ concentration = 10 ppm, pH = 7, T = 25 °C).

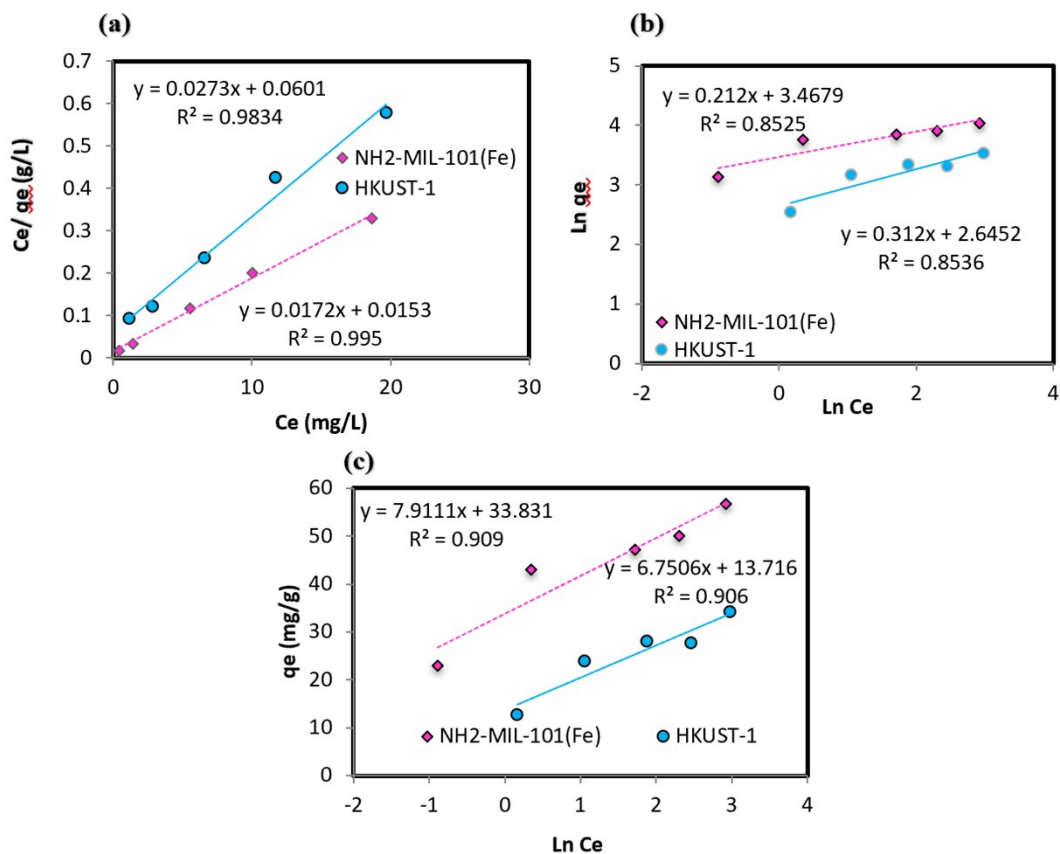


Fig. S4. Isotherm models for MNZ adsorption on HKUST-1 and NH₂-MIL-101-Fe: Langmuir (a), Freundlich (b), and Temkin (c) (experimental conditions: adsorbent HKUST-1 = 0.3 g/L, NH₂-MIL-101-Fe = 0.2 g/L, initial MNZ concentration = 10 ppm, pH = 7, T = 25 °C).

Table S1. Summary data on MNZ adsorption by HKUST-1 and NH₂-MIL-101-(Fe).

HKUST-1	Adsorbent dosage: 0.3 g/l pH=7 Contact time=20 minutes		NH ₂ -MIL-101-(Fe)	Adsorbent dosage: 0.2 g/l pH=7 Contact time=10 minutes	
Concentration	5 ppm	10 ppm	Concentration	5 ppm	10 ppm
Maximum Removal (%)	75.6	69.9	Maximum Removal (%)	91.3	87.2
Maximum Adsorption Capacity	12.71	30.14	maximum adsorption capacity	22.9	42.92
Isotherm	Langmuir		Isotherm	Langmuir	
Kinetic Model	pseudo-second-order		Kinetic Model	pseudo-second-order	

Table S2. Summary for MNZ removal by different adsorbents.

Adsorbent	Removal (%)	Adsorption condition				Ref
		Time (min)	Dose (g.L ⁻¹)	pH	Temp (°C)	
UiO-66-NH ₂	NR	130	0.1	6	25	[1]
HKUST-1-based SnO ₂	NR	240	2	3	NR	[2]
nanoCoFe ₂ O ₄ @MC	85.3	120	0.2	11	NR	[3]
CuCoFe ₂ O ₄ @MC/AC	93.78	15	0.4	3	NR	[4]
CuFe ₂ O ₄ @PBC	96.3	60	0.4	3	NR	[5]
combination of pyrite with ZVI	~ 100	360	ZVI=1 Pyrite=4	5-9	NR	[6]
Fe-Ce@N-BC	97.5	60	NR	NR	NR	[7]
PAA/PVDF-NZVI	98	120	NR	5	NR	[8]
GO/ β -CD/Ag	93.5	20	0.4	2	15	[9]

AMGG	84	27	0.86	5.9	26	[10]
mixture of NiO and ZnO	87.7	50	NR	NR	NR	[11]
HKUST-1	69.9	20	0.3	7	25	This Work
NH ₂ -MIL-101-(Fe)	91.3	10	0.2	7	25	

NR = Not Reported

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