

Supplementary Material

Table S1

BET surface area, average pore diameters, and pore volume of the FeOOH polymorphs.

FeOOH polymorphs	BET area (m ² /g)	Pore size (nm)	Pore volume (cm ³ /g)
α -FeOOH	147	14	0.28
β -FeOOH	48	36	0.14
γ -FeOOH	294	3	0.22
δ -FeOOH	187	9	0.41

Table S2

The final pH values and Cr(VI) removal efficiencies by the four FeOOH polymorphs.

pH ₀	α -FeOOH		β -FeOOH		γ -FeOOH		δ -FeOOH	
	pH _s	Removal efficiency	pH _s	Removal efficiency	pH _s	Removal efficiency	pH _s	Removal efficiency
3.0	2.9	85.5%	2.7	35.4%	5.3	100.0%	6.9	84.6%
5.0	3.4	89.4%	2.8	25.9%	6.9	74.4%	8.0	28.7%
7.0	3.6	90.3%	2.9	47.1%	7.5	51.8%	8.3	20.6%
9.0	3.7	94.5%	3.0	52.0%	7.8	43.7%	8.6	19.4%

pH₀: The initial pH value; pH_s: The final pH value after reaction for 120 min;

Removal efficiency: The Cr(VI) removal efficiency after reaction for 120 min.

Table S3

The Langmuir, Freundlich and Redlich–Peterson isotherm parameters for Cr(VI) adsorption on FeOOH polymorphs.

Adsorbent	Langmuir			Freundlich			Redlich-Peterson			
	q_m (mg/g)	K_L (L/mg)	R^2	K_F (mg/g)	n	R^2	a (L/mg)	b (L/mg)	m	R^2
α -FeOOH	24.272	0.181	0.885	8.139	4.583	0.994	8.714	0.700	0.864	0.991
β -FeOOH	16.644	0.884	0.809	9.456	9.093	0.909	9.800	0.713	0.958	0.903
γ -FeOOH	32.357	0.075	0.818	12.316	5.765	0.996	7.858	0.526	0.857	0.951
δ -FeOOH	34.452	0.010	0.991	1.581	1.970	0.982	0.389	0.020	0.905	0.995