

Synthesis of Sulfur-doped magnetic iron oxides for efficient removal of Pb from aqueous solutions

Junqing Xu ^{1‡}, Meitian Pan ^{1‡}, Cong Zou², Xueqiong Huang², Takeshi Hagio³, Ryoichi Ichino³, Long Kong^{2*}, Liang Li²

¹ China-UK Low Carbon College, Shanghai Jiao Tong University, Shanghai 201306, China

² School of Environment Science and Engineering, Shanghai Jiao Tong University, Shanghai 200240, China

³ Institutes of Innovation for Future Society, Nagoya University, Nagoya 464-8603, Japan

* Correspondence: longmao88@sjtu.edu.com; Tel.: +86-54747567

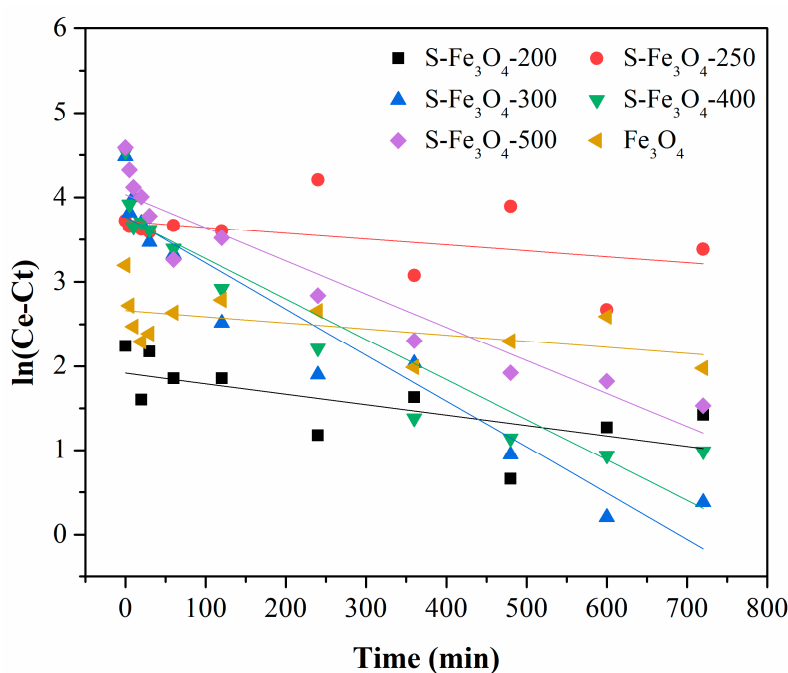


Fig S1 Test of pseudo-first-order model for adsorption of Pb (II) on different adsorbents. The symbols are experimental data and the solid lines represent the fitted curves.

Table S1 Adsorption kinetics parameters for pseudo-first-order and pseudo-second-order model of Pb (II) adsorption.

Adsorbents	$q_{e,exp}$ (mg/g)	pseudo-first-order			pseudo-second-order		
		k_1 (min ⁻¹)	$q_{e,1}$ (mg/g)	R^2	K_2 (g·mg ⁻¹ ·min ⁻¹)	$q_{e,2}$ (mg/g)	R^2
S-Fe ₃ O ₄ -200	9.40	1.24×10^{-3}	6.80	0.3963	7.29×10^{-4}	8.77	0.8184
S-Fe ₃ O ₄ -250	41.58	6.97×10^{-4}	41.11	0.1369	4.27×10^{-5}	52.63	0.5205
S-Fe ₃ O ₄ -300	88.71	5.47×10^{-3}	43.43	0.9173	6.43×10^{-4}	90.91	0.9995
S-Fe ₃ O ₄ -400	93.98	4.78×10^{-3}	42.76	0.8893	6.09×10^{-4}	90.91	0.9994
S-Fe ₃ O ₄ -500	98.27	3.93×10^{-3}	56.56	0.9051	3.31×10^{-4}	100.00	0.9979
Fe ₃ O ₄ -300	24.45	7.24×10^{-4}	14.31	0.2255	4.10×10^{-4}	21.74	0.8285

Table S2 Weight Percentage of major elements of S-Fe₃O₄ synthesized with different S/Fe molar ratio from XRF analysis

Sample	O/%	Fe/%	S/%	Others/%	S content in Fe ₃ O ₄ (wt%)
Fe ₃ O ₄ :S-0.5	47.31	51.25	0.83	0.61	61.74
Fe ₃ O ₄ :S-1	43.92	54.89	1.10	0.09	49.90
Fe ₃ O ₄ :S-2	49.03	49.94	0.85	0.21	58.75
Fe ₃ O ₄ :S-3	49.15	48.91	1.86	0.08	26.30
Fe ₃ O ₄ :S-4	47.67	48.31	3.93	0.09	12.29
Fe ₃ O ₄ :S-5	43.05	51.61	5.22	0.12	9.89