
Vermiculite Modified with Fe³⁺ Polyhydroxy Cations Is a Low-Cost and Highly Available Adsorbent for the Removal of Phosphate Ions

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Table S1. Effect of mass of FeOH-Vt on the adsorption of Phosphate from a 15.0 mg·L⁻¹ (in P) after 200 min of contact time under stirring. Temperature = 25.0 ± 0.5°C.

Mass (mg)	Mean Mass (mg)	Initial P (mg·L ⁻¹)	Final P (mg·L ⁻¹)	Removed P (mg·L ⁻¹)	Adsorbed P (mg)	q (mg·g ⁻¹)	Mean q (mg·g ⁻¹)	SD ^a on q	Adsorption %	Mean %	SD on Adsorption %
25.6	25.3	15.0	13.02	1.98	0.0198	0.774	0.836	0.073	13.21	14.06	1.1
25.2		15.0	12.93	2.06	0.0206	0.818			13.74		
25.0		15.0	12.71	2.29	0.0229	0.917			15.29		
50.7	50.4	15.0	9.54	5.46	0.0546	1.078	1.021	0.056	36.43	34.32	2.0
50.3		15.0	10.14	4.86	0.0486	0.966			32.38		
50.2		15.0	9.88	5.12	0.0512	1.020			34.15		
75.3	75.2	15.0	6.35	8.65	0.0865	1.149	1.124	0.045	57.67	56.36	2.1
75.4		15.0	6.92	8.08	0.0808	1.072			53.86		
75.0		15.0	6.37	8.63	0.0863	1.151			57.53		
100.0	100.2	15.0	3.68	11.32	0.1132	1.132	0.981	0.075	75.47	68.84	6.7
100.1		15.0	4.65	10.35	0.1035	1.034			68.98		
100.4		15.0	5.69	9.31	0.0931	0.928			62.08		

^a Standard deviation

Table S2. Adsorption kinetics data obtained in a dispersion of 2.0 g of FeOH-Vt in 200 mL of an initial $4.84 \times 10^2 \mu\text{mol L}^{-1}$ phosphate solution ($15.0 \text{ mg}\cdot\text{L}^{-1}$ in P).

Time (min)	q ($\text{mg}\cdot\text{g}^{-1}$)	q ($\mu\text{mol}\cdot\text{g}^{-1}$)	Adsorption %
5	0.165	5.327	21.2
10	0.242	7.798	26.3
20	0.339	10.935	32.8
40	0.483	15.581	42.5
80	0.727	23.483	58.9
120	0.914	29.505	71.4
160	1.032	33.293	79.2
200	1.138	36.726	86.4
240	1.182	38.161	89.3
280	1.221	39.405	91.9
320	1.248	40.307	93.8
360	1.246	40.233	93.6

Table S3. Data of adsorption isotherms ($25.0 \pm 0.5 \text{ }^\circ\text{C}$) in dispersions of 100 mg of FeOH-Vt in 10 mL phosphate solution with initial concentrations between 1.0 and $250.0 \text{ mg}\cdot\text{L}^{-1}$ in P.

Initial P conc. ($\text{mg}\cdot\text{L}^{-1}$)	Final P conc. ($\text{mg}\cdot\text{L}^{-1}$)	q ($\text{mg}\cdot\text{g}^{-1}$)	Adsorption %
1.0	<LOD	0.097	>99
5.0	0.814	0.406	83
10.0	3.399	0.659	69
25.0	12.57	1.168	49
50.0	31.97	1.762	35
100.0	75.47	2.488	24.9
200.0	161.0	3.877	19.5
250.0	210.6	4.313	15.8