Supporting Information

Title: Spontaneous Nanoparticle Formation coupled with Selective Adsorption in Magadiite

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Figure S1. Adsorption isotherms of magadiite and octosilicate with reaction times at an initial metal concentration of 1 mM in 1.0 wt% NaCl solution.

a) Cu$^{2+}$ isotherms b) Pb$^{2+}$ isotherms

Figure S1. Adsorption isotherms of magadiite and octosilicate with reaction times at an initial metal concentration of 1 mM in 1.0 wt% NaCl solution.
Figure S2. Adsorption performances of magadiite from the aqueous quaternary Cu-Cd-Zn-Pb solution at each metal cation concentration of 0.25 mM.

Figure S3. Adsorption performances of octosilicate from the quaternary Cu-Cd-Zn-Pb solutions at each metal cation concentration of 0.25 mM.

a) 1.0 wt% NaCl solution  

(b) aqueous solution
Figure S4. Competitive adsorption of octosilicate for Cu$^{2+}$ and Pb$^{2+}$ with different relative concentration ratios at a total metal cation concentration of 1.0 mM.

a) In NaCl solution

b) In aqueous solution
a) Treated with Cu$^{2+}$ solutions               b) Treated with Pb$^{2+}$ solutions

Figure S5. Changes in XRD pattern of octosilicate treated with different concentrations of Cu$^{2+}$ and Pb$^{2+}$ for 6 hours in 1.0 wt% NaCl solutions, respectively.
a) Cu$^{2+}$ adsorption

b) Pb$^{2+}$ adsorption
c) Langmuir and Freundlich isotherm constants

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<th>Langmuir</th>
<th>Freundlich</th>
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<tr>
<td></td>
<td>$q_{max}$ (mg/g)</td>
<td>$K_L$ (L/mg)</td>
</tr>
<tr>
<td>Cu$^{2+}$</td>
<td>68.9063</td>
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<tr>
<td>Pb$^{2+}$</td>
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<td>0.0475</td>
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Langmuir: $\frac{C_e}{q_e} = \frac{1}{q_m K_L} + \frac{C_e}{q_m}$

Freundlich: $\ln q_e = \ln K_f + \frac{1}{n} \ln C_e$

Figure S6. Adsorption isotherms of magadiite treated with different Cu$^{2+}$ and Pb$^{2+}$ concentrations for 6 hours in 1.0 wt% NaCl solutions, respectively.
Figure S7. Various nanoparticles formed from the treatments with 1mM metal cation solutions unless specified. Magadiite was treated for 6 hours and octosilicate for 12 hours, respectively. The nanoparticle phases were identified by both XRD patterns and lattice images (not shown).