Supporting Information (SI) on

Plasma-grafting amidoxime/metal-organic framework composites for the selective sequestration of U(VI)

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Adsorption Kinetic Models. The pseudo-first-order and pseudo-second-order models can be described by Eqns. (S1) and (S2), respectively:

\[ \ln (q_e - q_t) = \ln q_e - k_1 \times t \]  
(S1)

\[ \frac{t}{q_t} = \frac{1}{K_2 \times q_e^2} + \frac{t}{q_e} \]  
(S2)

where \( q_e \) and \( q_t \) are the adsorption amounts of U(VI) (mg/g) at equilibrium time (h) and time t (h), respectively; \( k_1 \) (h\(^{-1}\)) and \( k_2 \) (g/(mg×h)) represent the kinetic rate constants of the pseudo first-order and pseudo-second-order models, respectively.

The calculated kinetic parameters of pseudo first-order and pseudo-second-order models are shown in Table S1.

<table>
<thead>
<tr>
<th>Pseudo-first-order</th>
<th>Pseudo-second-order</th>
</tr>
</thead>
<tbody>
<tr>
<td>( q_e ) (mg/g)</td>
<td>( K_1 ) (h(^{-1}))</td>
</tr>
<tr>
<td>3.3458</td>
<td>0.2036</td>
</tr>
</tbody>
</table>

Langmuir and Freundlich Models. The Langmuir and Freundlich models can be depicted as Eqns. (S3) and (S4), respectively:

\[ \frac{C_e}{q_e} = \frac{C_e}{q_{\text{max}}} + \frac{1}{K_L \times q_{\text{max}}} \]  
(S3)

\[ \ln q_e = \ln K_F + \frac{1}{n} \times \ln C_e \]  
(S4)

where \( C_e \) (mol/L) is the equilibrium concentration of U(VI) remaining in the liquid.
phase, $q_e$ (mg/g) is the amount of U(VI) adsorbed on adsorbent after adsorption equilibrium, $K_L$ (L/mg) is a constant related to the enthalpy of adsorption, and $q_{\text{max}}$ (mg/g), the maximum sorption capacity, represents the amount of sorbate at complete monolayer coverage. $K_F$ (mg$^{1-n}$L$^n$/g) is the Freundlich constant related to the sorption capacity and $1/n$ a constant representing the degree of dependence of sorption with equilibrium concentration.

**Table S2.** Optimized parameters for Langmuir and Freundlich models of U(VI) adsorption on the AO/MOF composites

<table>
<thead>
<tr>
<th>T</th>
<th>$q_{\text{m}}$ (mg/g)</th>
<th>$K_L$ (L/mg)</th>
<th>$R^2$</th>
<th>$Ln K_F$ (mg$^{1-n}$L$^n$/g)</th>
<th>$1/n$</th>
<th>$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>293 K</td>
<td>454.55</td>
<td>0.5238</td>
<td>0.9987</td>
<td>4.8359</td>
<td>0.6758</td>
<td>0.9739</td>
</tr>
<tr>
<td>313 K</td>
<td>476.19</td>
<td>1.6154</td>
<td>0.9958</td>
<td>5.183</td>
<td>0.6089</td>
<td>0.961</td>
</tr>
<tr>
<td>333 K</td>
<td>497.51</td>
<td>0.7731</td>
<td>0.9992</td>
<td>5.4257</td>
<td>0.4928</td>
<td>0.9265</td>
</tr>
</tbody>
</table>