

**Radiation synthesis of imidazolium-based ionic liquids modified silica adsorbents
for ReO_4^- adsorption** Kangjun Xie^{a, b}, Zhen Dong^a, Nan Wang^{a, b}, Wei Qi^{a, b}, Long
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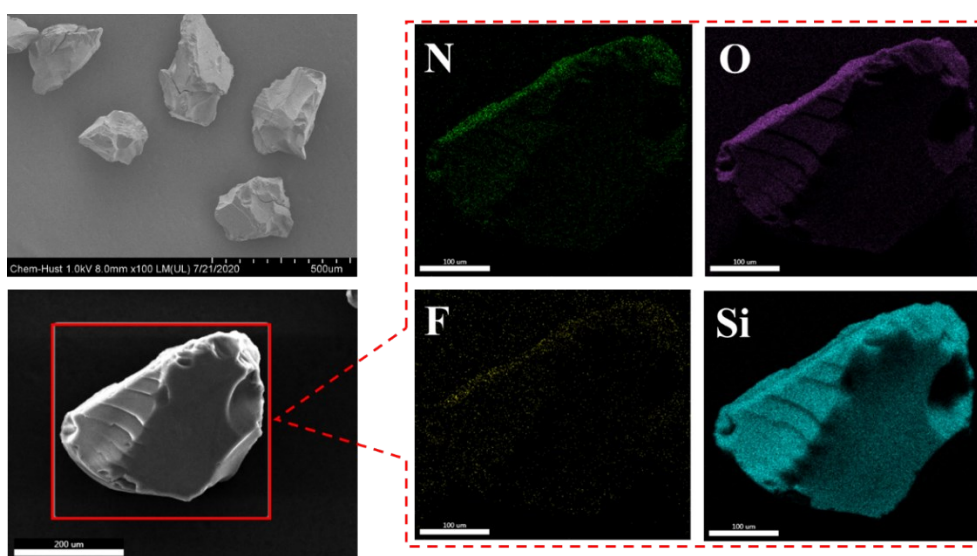


Fig. S1. SEM and elemental mapping images of Si-IL-NO₃.

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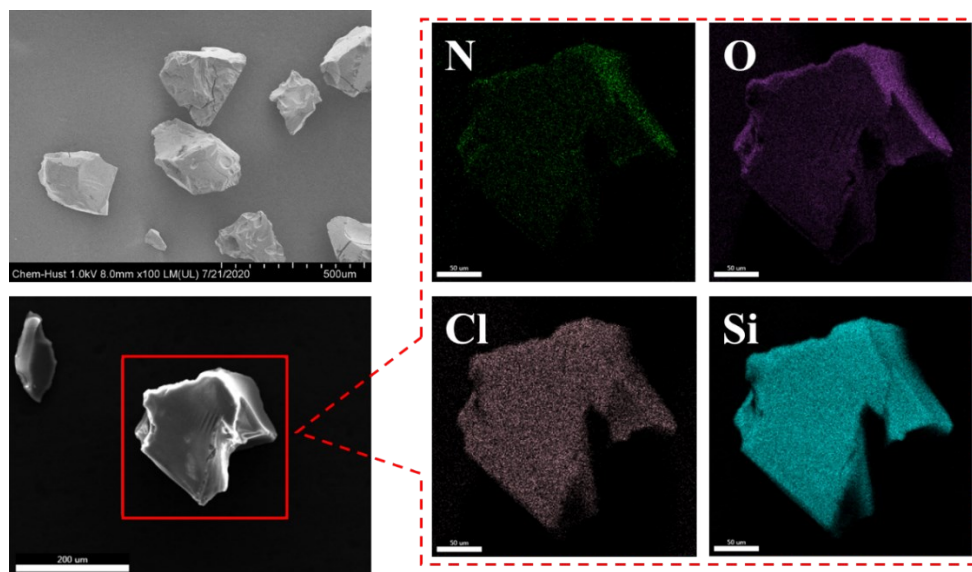


Fig. S2. SEM and elemental mapping images of Si-IL-Cl.

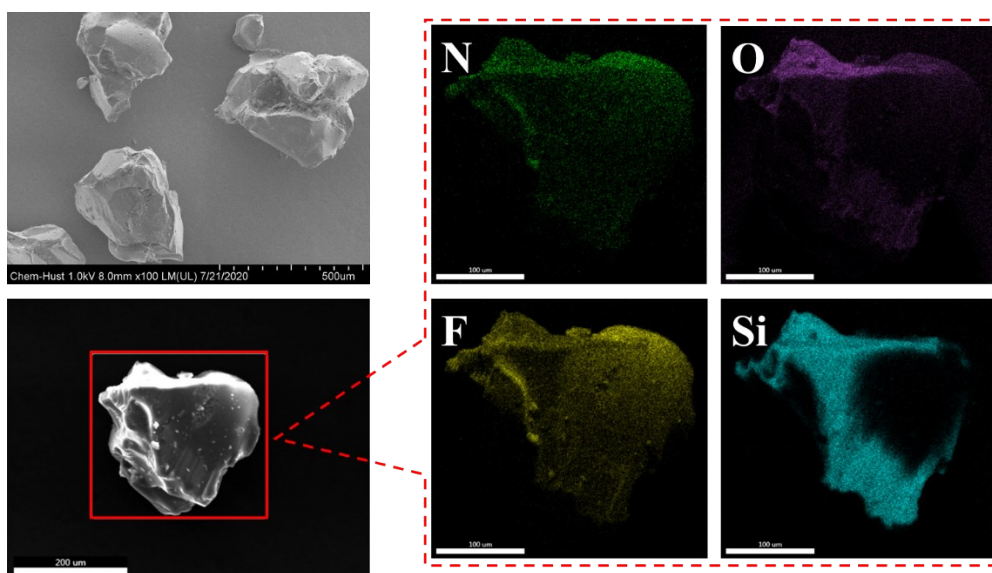


Fig. S3. SEM and elemental mapping images of Si-IL-NTf₂.

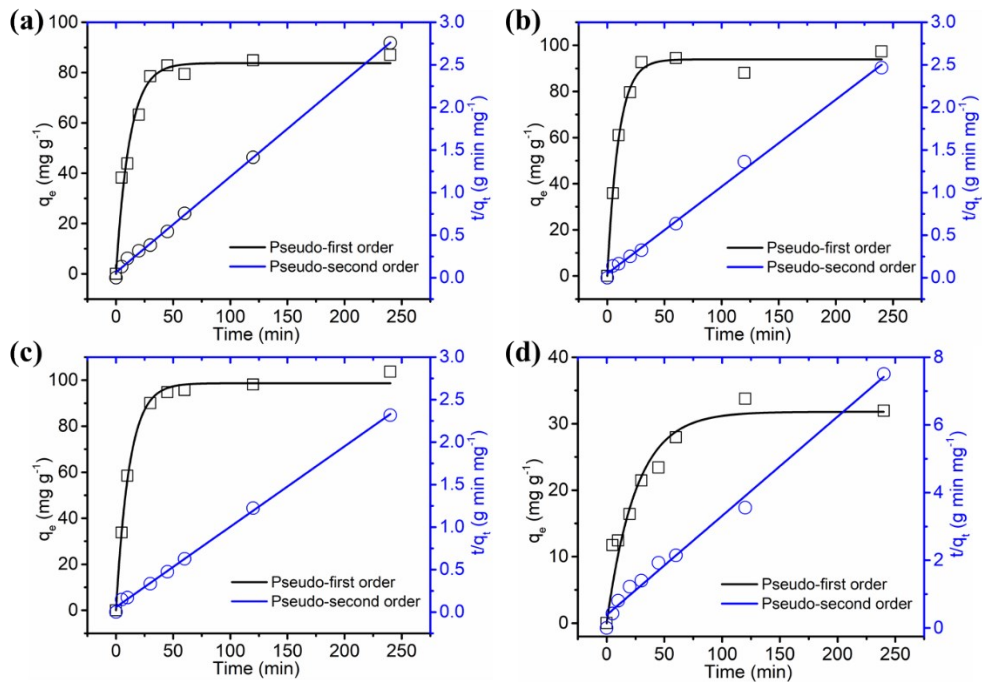


Fig. S4. Fitted adsorption kinetic curves of Si-IL-BF₄ (a), Si-IL-NO₃ (b), Si-IL-Cl (c), and Si-IL-NTf₂ (d).

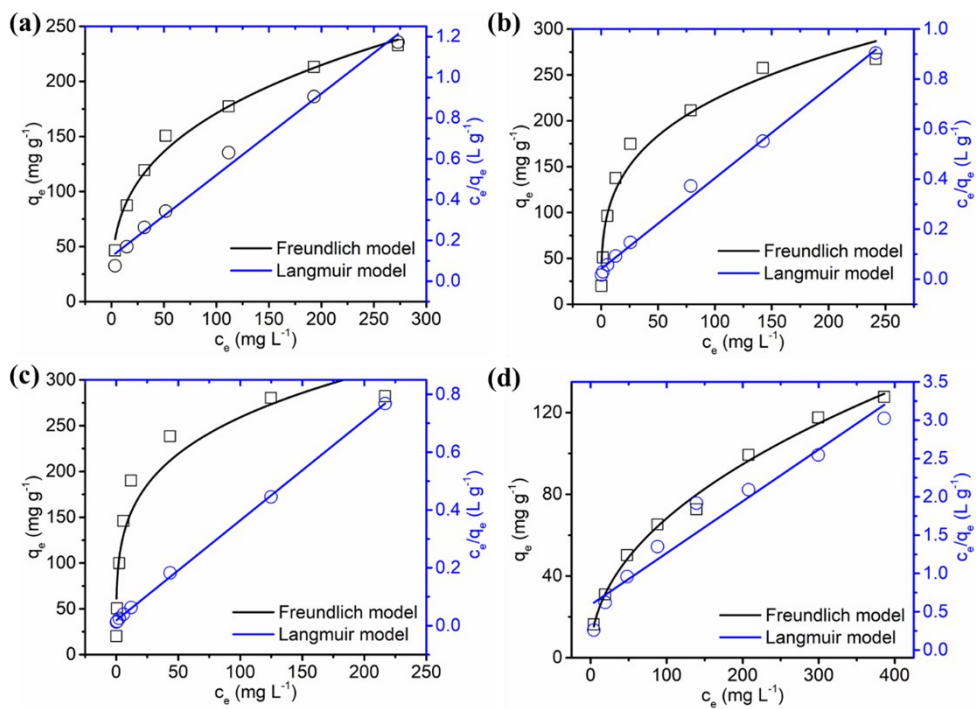


Fig. S5. Fitted adsorption isotherm curves of Si-IL-BF₄ (a), Si-IL-NO₃ (b), Si-IL-Cl (c), and Si-IL-NTf₂ (d).

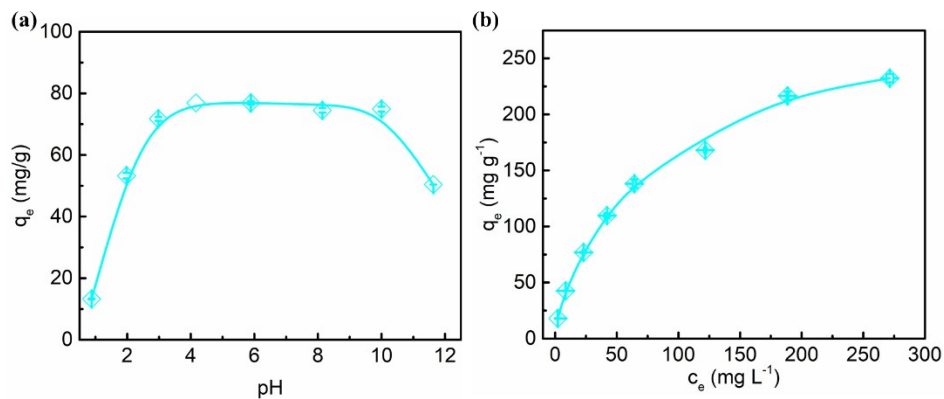


Fig. S6. The effect of pH (a) and initial ReO_4^- concentration (b) on the adsorption capacity of Si-IL- SO_4 .

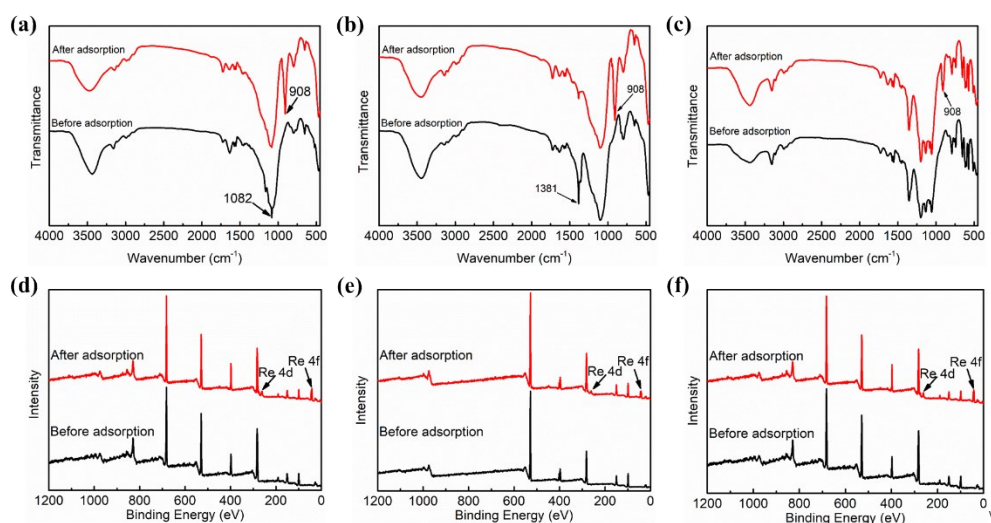


Fig. S7. FT-IR spectra of Si-IL- BF_4 (a), Si-IL- NO_3 (b), and Si-IL- NTf_2 (c) before and after adsorption. XPS spectra of Si-IL- BF_4 (d), Si-IL- NO_3 (e), and Si-IL- NTf_2 (f) before and after adsorption.

Table S1. The composition of the simulated Hanford wastewater.

Anion	Concentration (mol L^{-1})	Molar ratio (anions to ReO_4^-)
ReO_4^-	1.94×10^{-4}	1.0
NO_3^-	6.07×10^{-2}	314
Cl^-	6.39×10^{-2}	330
NO_2^-	1.69×10^{-1}	873
SO_4^{2-}	6.64×10^{-5}	0.34
CO_3^{2-}	4.30×10^{-4}	2.22

Table S2. The composition of the simulated radioactive wastewater.

Composition	Concentration (mmol L^{-1})
ReO_4^-	0.1
UO_2^{2+}	0.1
Ce^{3+}	0.1

Eu ³⁺	0.1
Nd ³⁺	0.1
Sr ²⁺	0.1
La ³⁺	0.1
Sc ³⁺	0.1
HNO ₃	500
