

SUPPLEMENTARY INFORMATION

pH / temperature dependent selective removal of trace Cr(VI) from aqueous solution by imidazolium ionic liquid functionalized magnetic carbon nanotubes

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Table S1 Kinetic parameters for the pseudo first order and pseudo second order model
for Cr(VI) adsorption onto Fe₃O₄/CNT-IL

C ₀ mg L ⁻¹	q _e (exp) (mg g ⁻¹)	Pseudo first order kinetics			Pseudo second order kinetics		
		k ₁	q _e , cal	R ₁ ²	k ₂	q _e , cal	R ₂ ²
1.00	1.250	0.002	0.590	0.879	0.015	1.317	0.998
2.00	2.500	0.004	1.724	0.969	0.004	2.708	0.997
3.00	3.480	0.002	2.021	0.938	0.002	3.737	0.995

Table S2 Langmuir and Freundlich parameters for Cr(VI) adsorption on
Fe₃O₄/CNT-IL

T(°C)	Langmuir model			Freundlich model		
	K _L (L mg ⁻¹)	q _m (mg g ⁻¹)	R ²	K _F	n	R ²
25	0.052	32.482	0.986	4.462	2.411	0.988
40	0.294	41.865	0.999	8.576	2.968	0.926
55	0.493	55.433	0.997	15.222	3.144	0.968

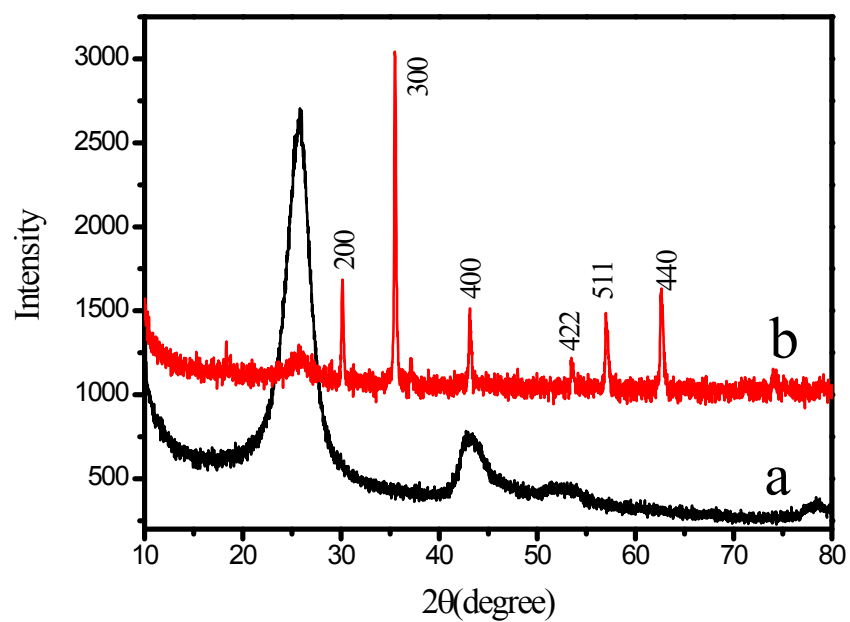


Figure S1. XRD patterns of (a) CNT-COOH and (b) $\text{Fe}_3\text{O}_4/\text{CNT-IL}$

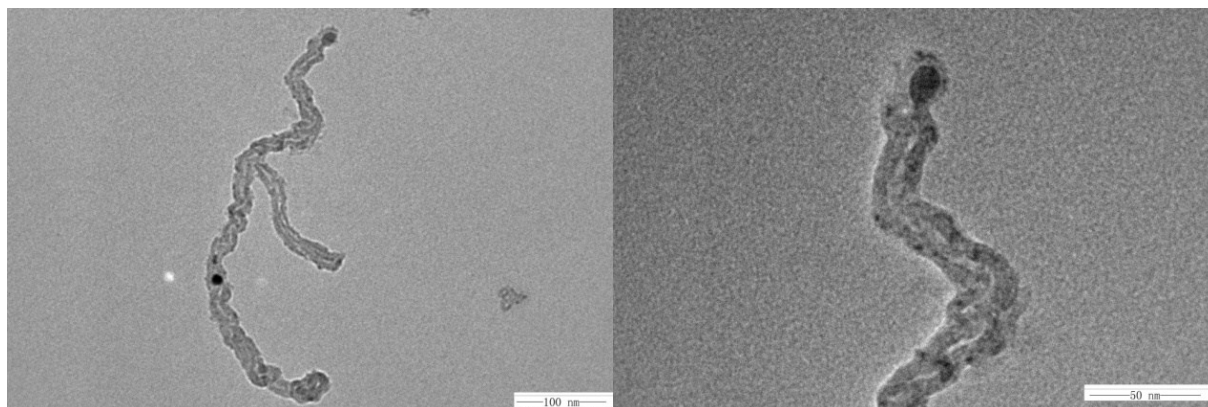


Figure S2. The TEM images of Fe₃O₄/CNT-IL

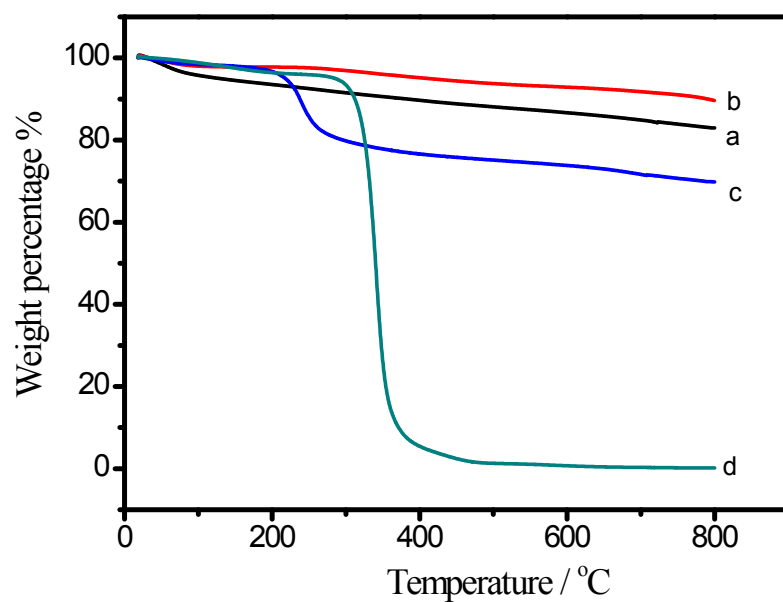


Figure S3. The TGA curve of (a) CNT-COOH, (b) Fe₃O₄/CNT-COOH, (c) Fe₃O₄/CNT-IL and (d) ionic liquid under the protection of N₂

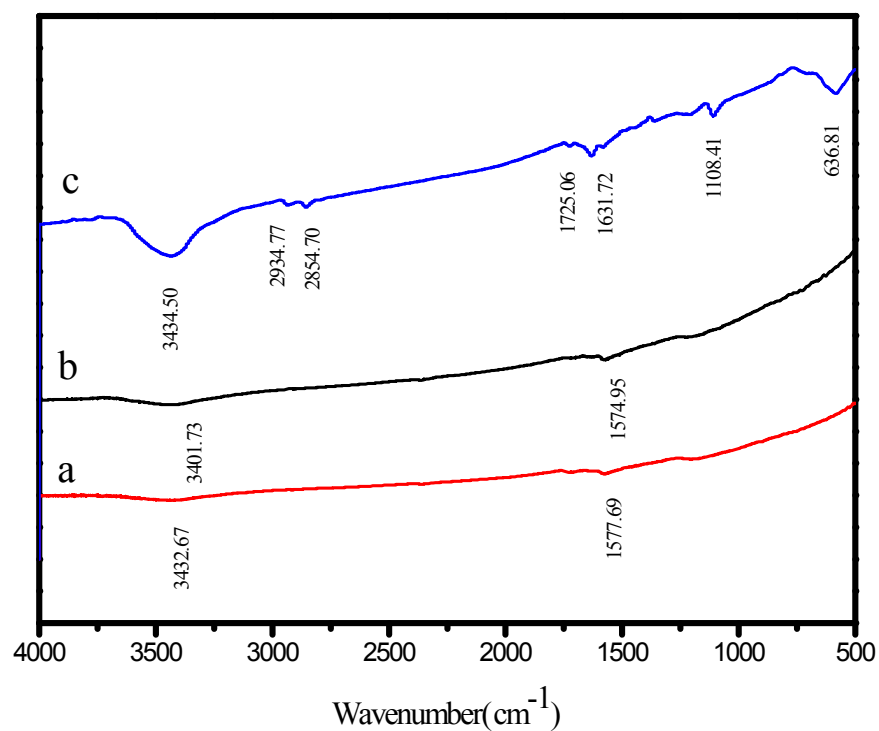


Figure S4. FT-IR spectrum of (a) CNT-COOH, (b) $\text{Fe}_3\text{O}_4/\text{CNT-COOH}$ and (c) $\text{Fe}_3\text{O}_4/\text{CNT-IL}$

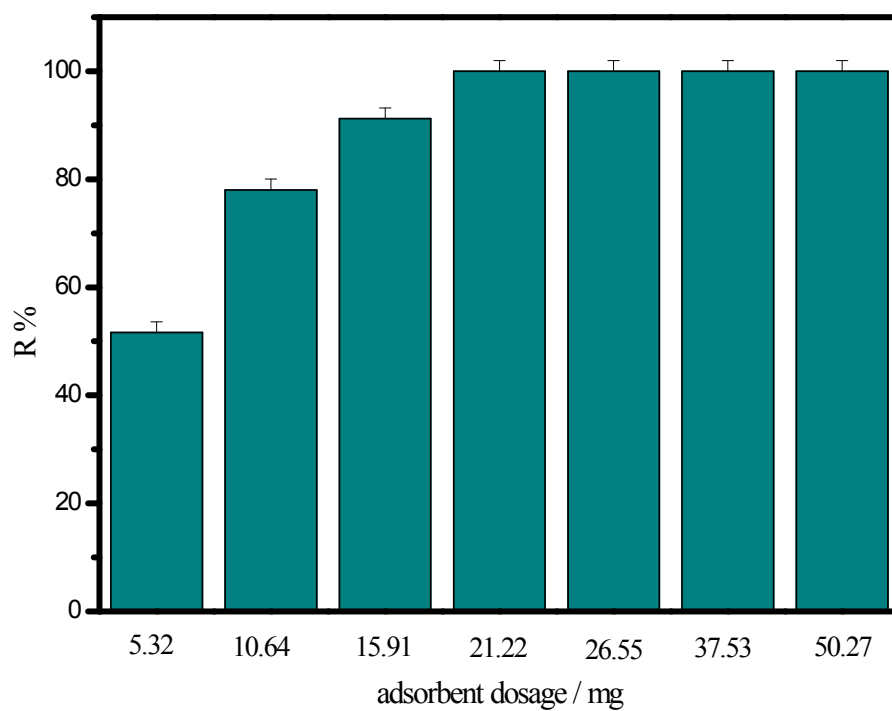


Figure S5. Effect of adsorbent dosage on Cr(VI) removal by Fe₃O₄/CNT-IL.

$C_{[\text{Cr(VI)}]} = 2.0 \text{ mg L}^{-1}$, temperature = 25 °C, contact time = 12 h, pH = 3.00 ± 0.05

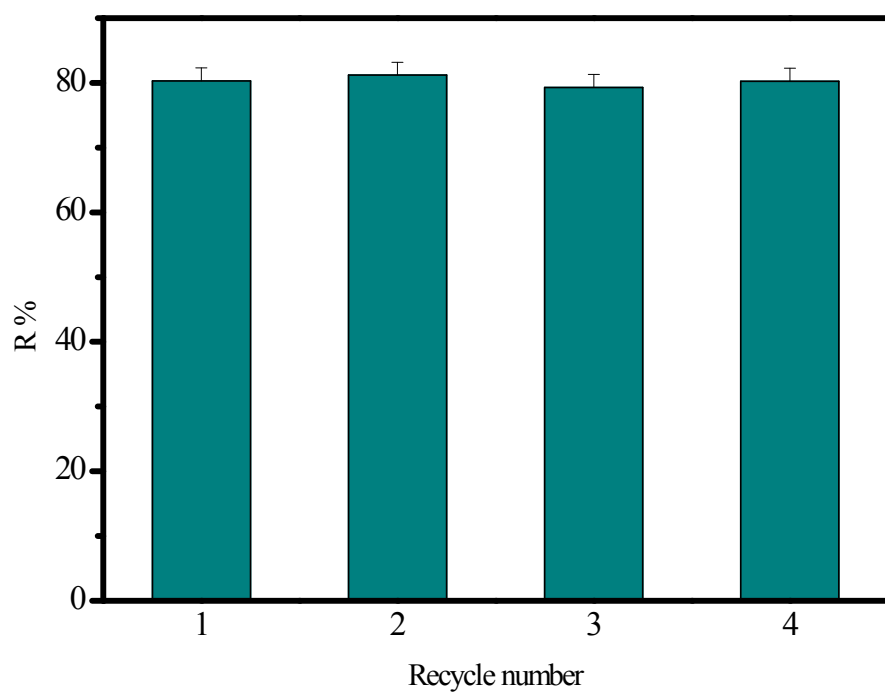


Figure S6. Adsorption-desorption cycle of Fe₃O₄/CNT-IL for Cr(VI)

Temperature =25 °C , contact time =4 h, desorption reagent: 8 % hydrazine hydrate