

Magnetite-Functionalized Eggshell Membrane Composite: A High-Performance Magnetic Adsorbent for Congo Red Dye

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[Supplementary Information](#)

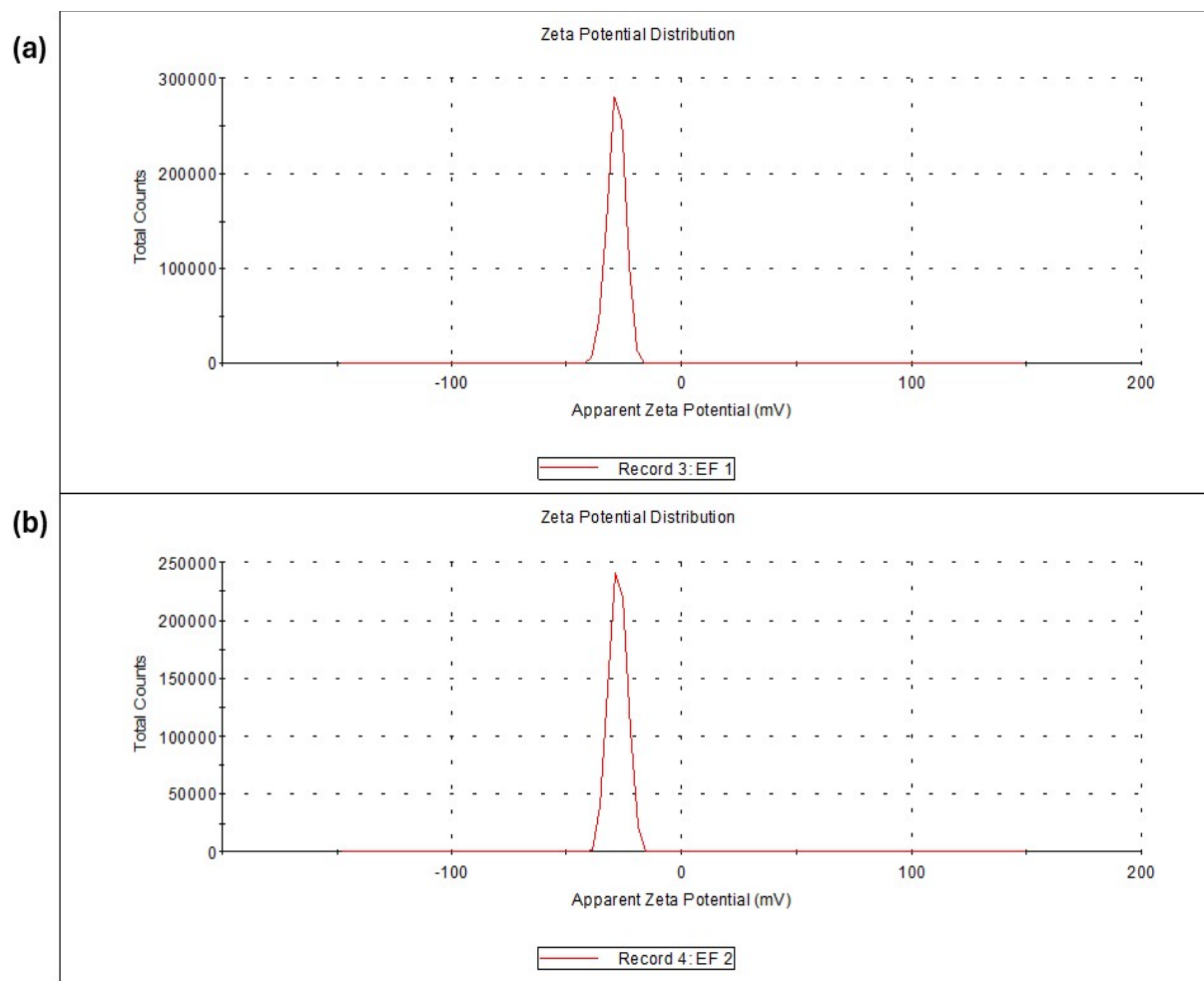


Figure S1. Zeta potential of (a) Fe₃O₄ nanoparticles and (b) Fe₃O₄@ESM

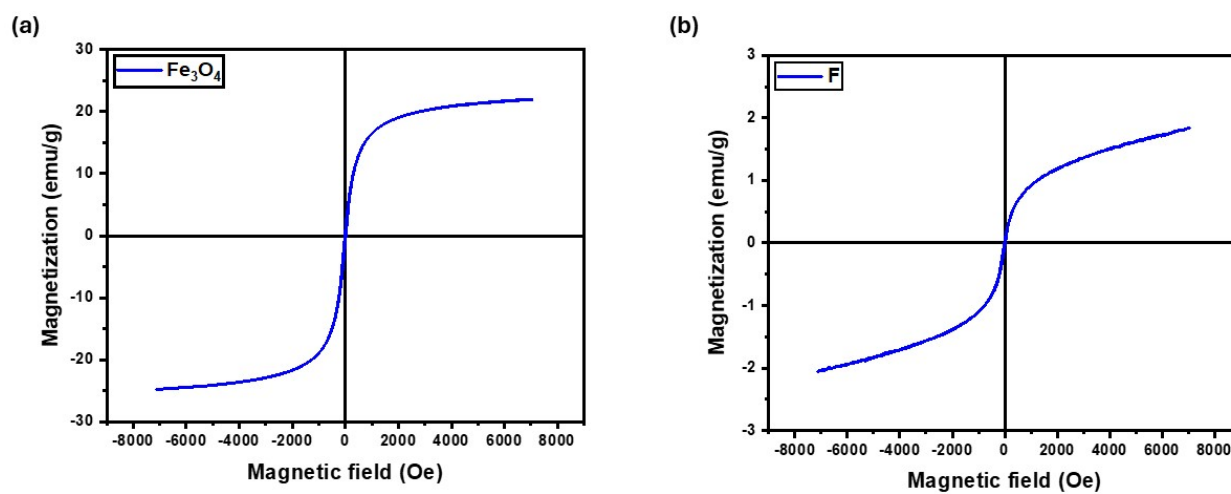


Figure S2. Magnetization curve of (a) Fe₃O₄ nanoparticles and (b) Fe₃O₄@ESM

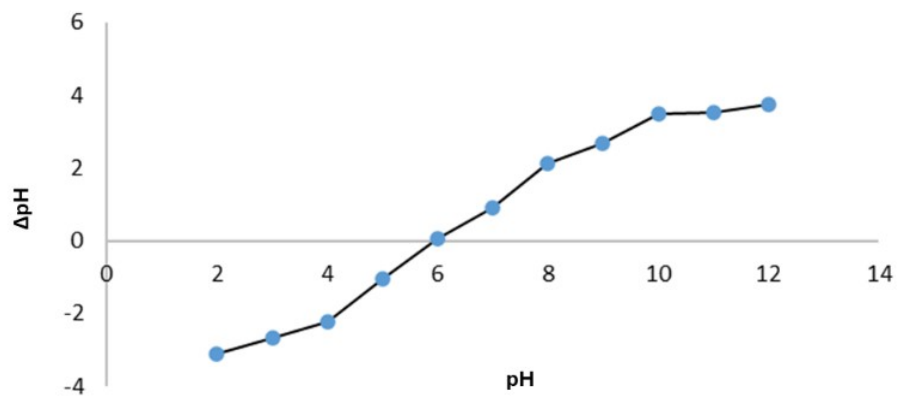
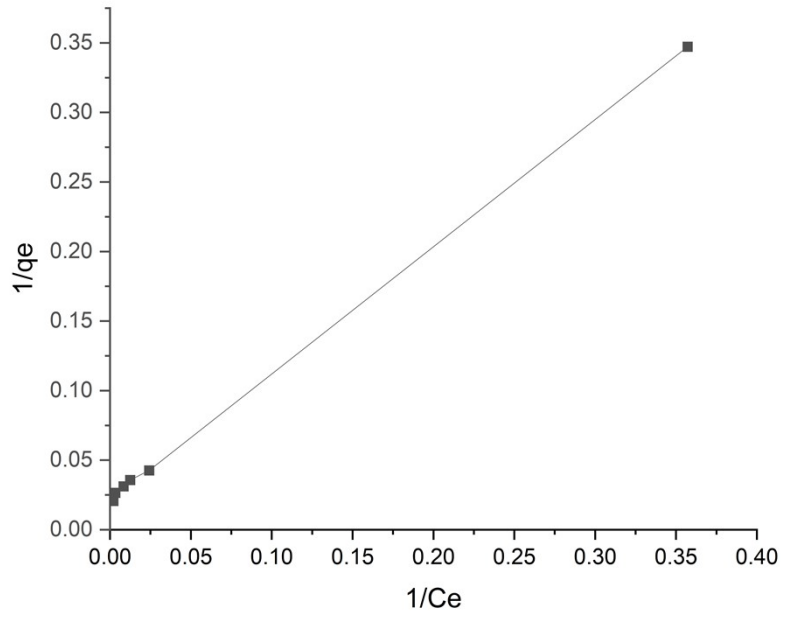
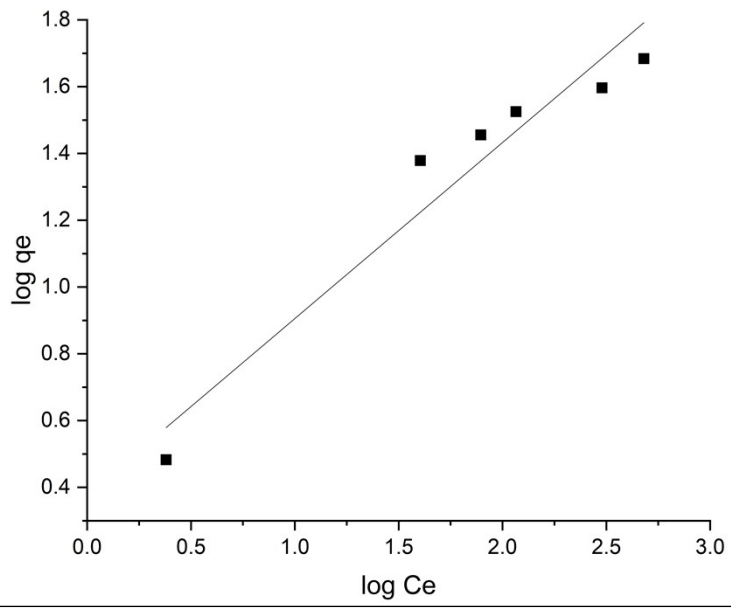


Figure S3. pHpzc of Fe₃O₄@ESM.

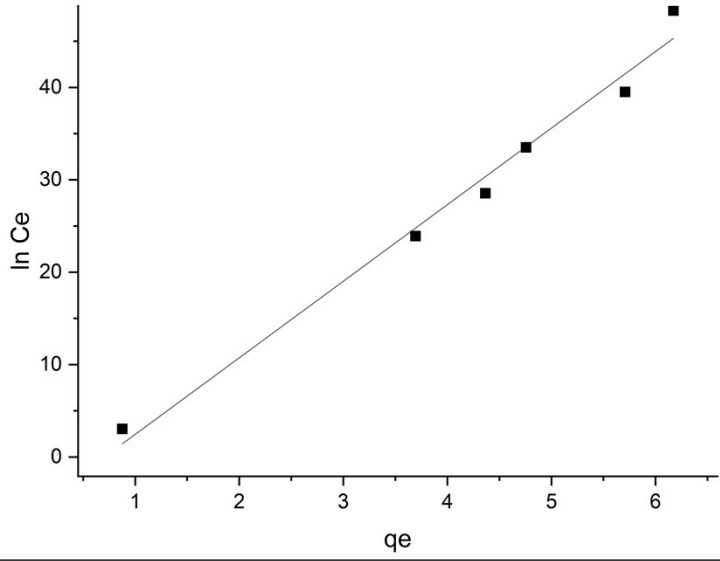
(a)



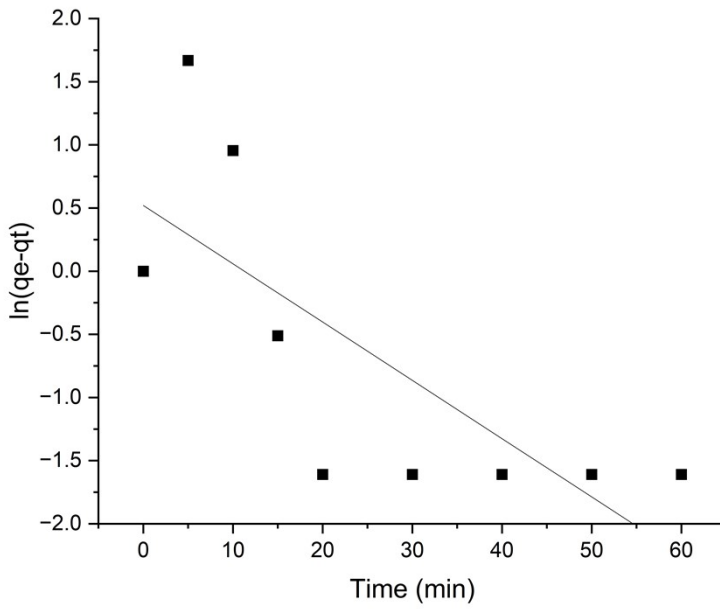
(b)



(c)



(d)



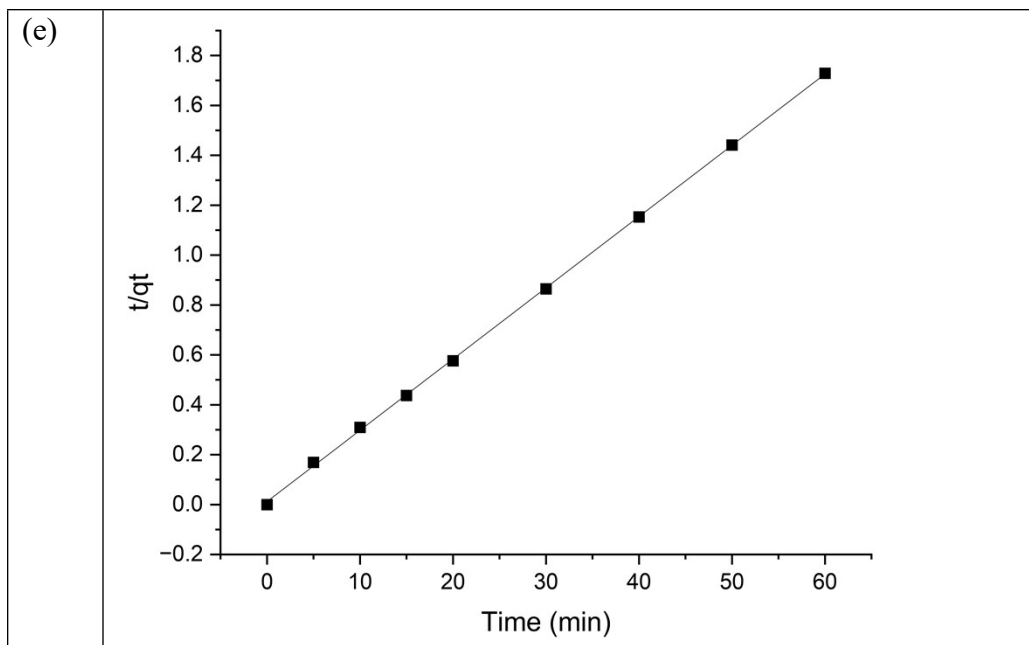


Figure S4. a) Langmuir isotherm, b) Freundlich isotherm, c) Temkin isotherm, d) Pseudo-first-order kinetics, and e) Pseudo-second-order kinetics for CR adsorption onto $\text{Fe}_3\text{O}_4@\text{ESM}$.

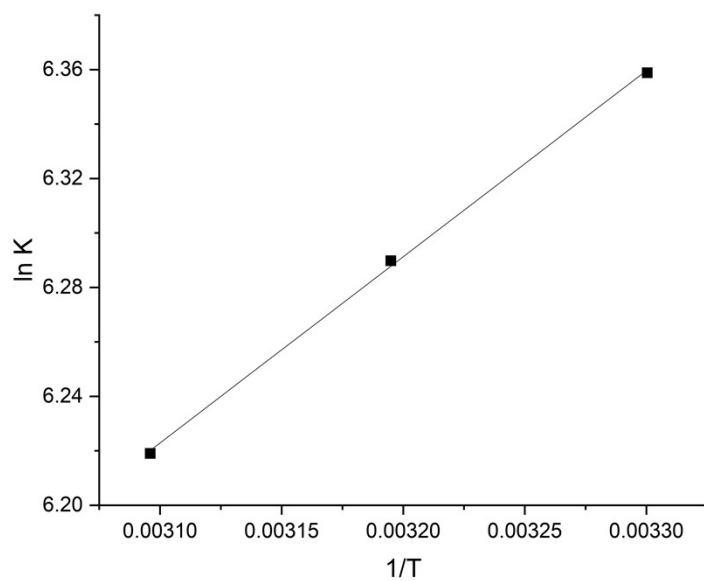


Figure S5. Van't Hoff plot for the adsorption of Congo Red onto $\text{Fe}_3\text{O}_4@\text{ESM}$ (plot of $\ln(K)$ versus $1/T$).

Table S6. Validation of SPE through standard addition method in real sample.

Added (mg)	Wastewater	
	Found (mg)	% Recovery
0	29.5 ± 4.0	-
125	152.9 ± 9.1	98.7
250	274.3 ± 6.6	97.9
500	509.8 ± 9.8	96.1

*Mean ± S.D

