

Supplementary Information

Preparation, characterization and application of CS@PDA@Fe₃O₄ nanocomposite as a new magnetic nano-adsorber for the removal of metals and dyes in wastewater

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3. XPS spectra

1. Characterization of CS@PDA@Fe₃O₄ biopolymer adsorbent

1-1a FT-IR

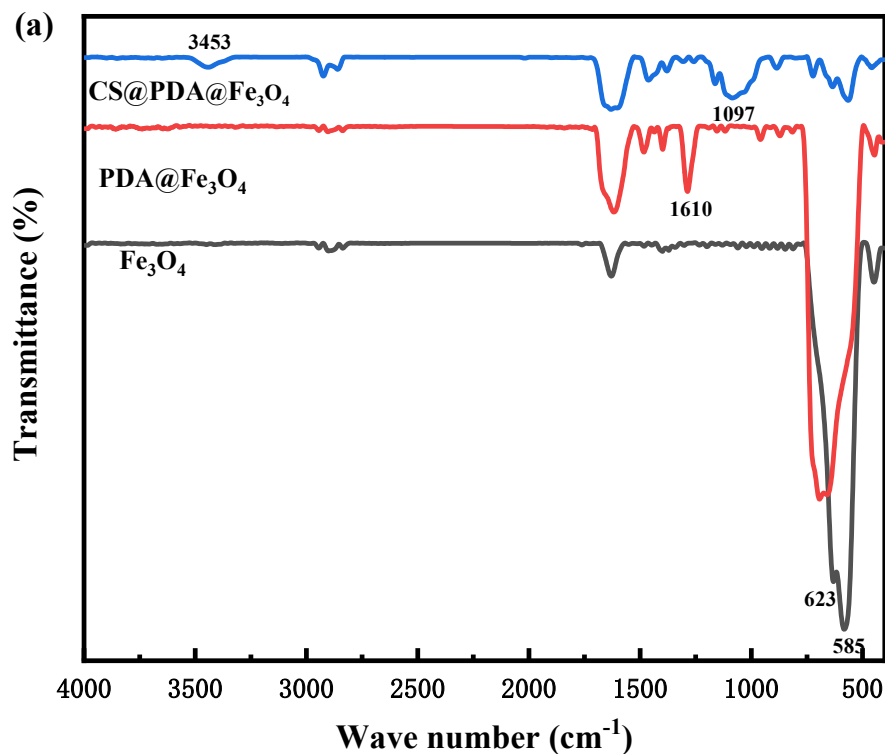


Figure S 1 FT-IR of Fe₃O₄ PDA@Fe₃O₄ and CS@PDA@Fe₃O₄

1-1b Saturation magnetization

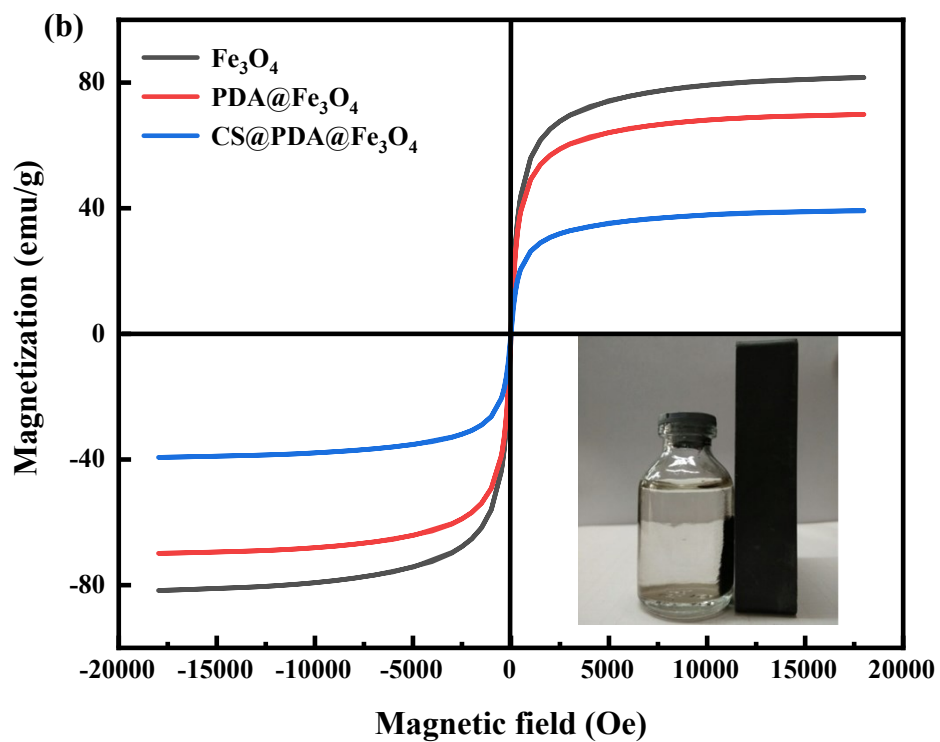


Figure S 2 Saturation magnetization of Fe₃O₄ PDA@Fe₃O₄ and CS@PDA@Fe₃O₄

1-1c X-ray spectra

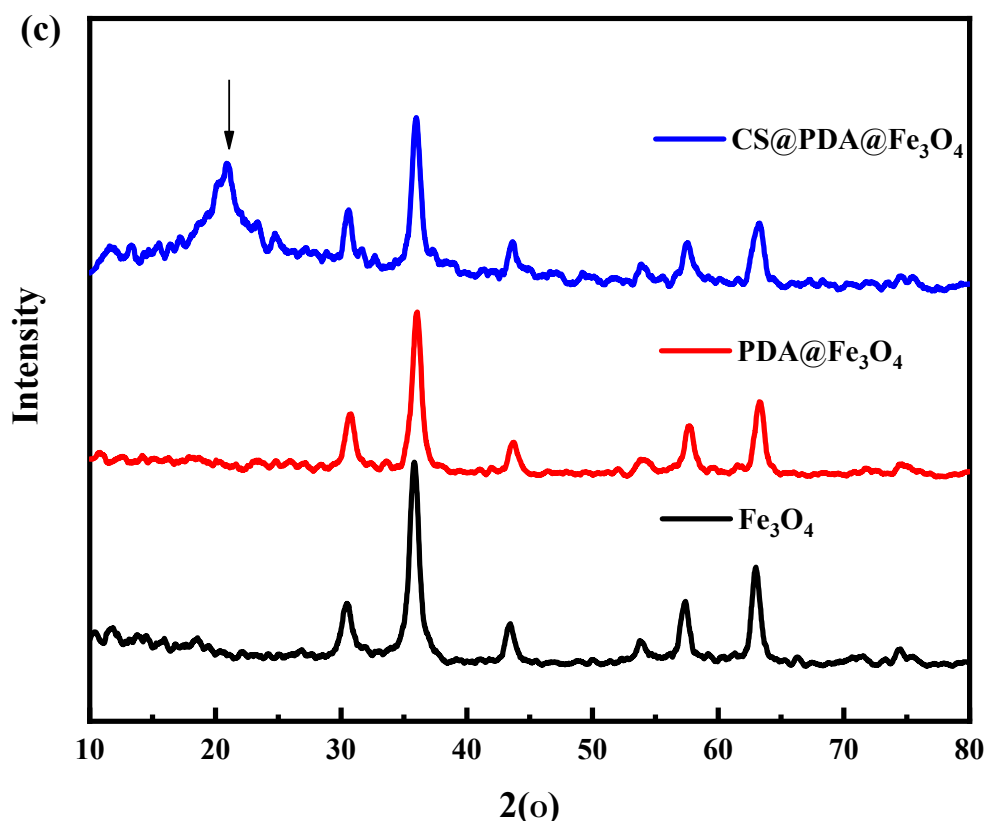


Figure S 3 X-ray of Fe₃O₄ PDA@Fe₃O₄ and CS@PDA@Fe₃O₄

1-1d-g SEM and TEM

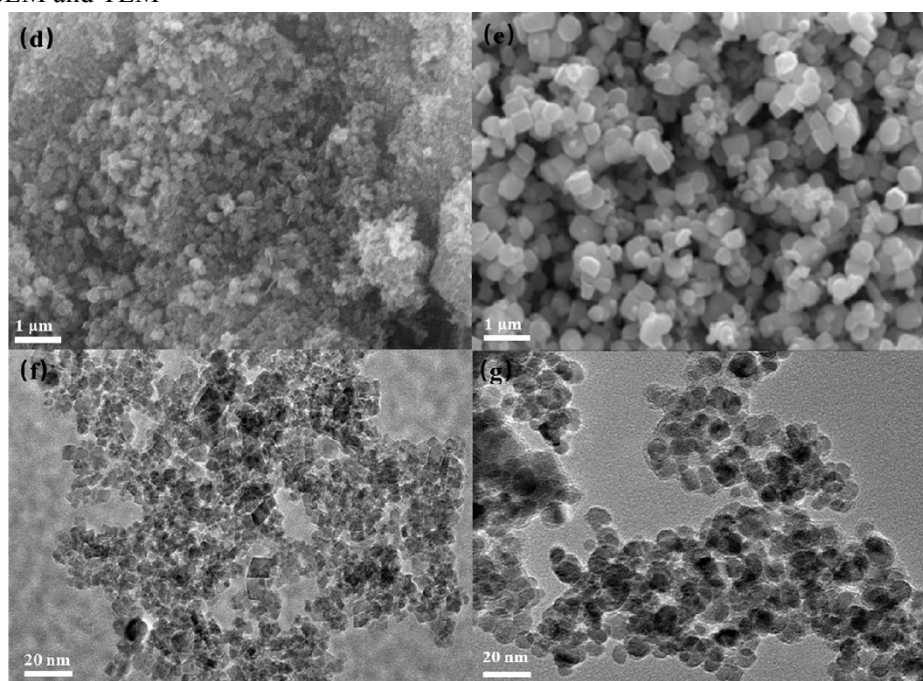


Figure S 4 SEM images of Fe₃O₄, (e) SEM images of CS@PDA@Fe₃O₄; (f) TEM image of Fe₃O₄, (g) TEM image of CS@PDA@Fe₃O₄.

2. EDS of CS@PDA@Fe₃O₄

Table S 1. Compositions of Fe₃O₄, PDA@Fe₃O₄ and CS@PDA@Fe₃O₄

Sample name	Fe (%)	O (%)	C (%)	N (%)	Si (%)
Fe ₃ O ₄	64.75	35.25	—	—	—
Fe ₃ O ₄ @PDA	25.50	41.44	29.40	3.66	—
Fe ₃ O ₄ @PDA@CS	2.74	39.40	48.49	8.99	0.99

3. XPS spectra

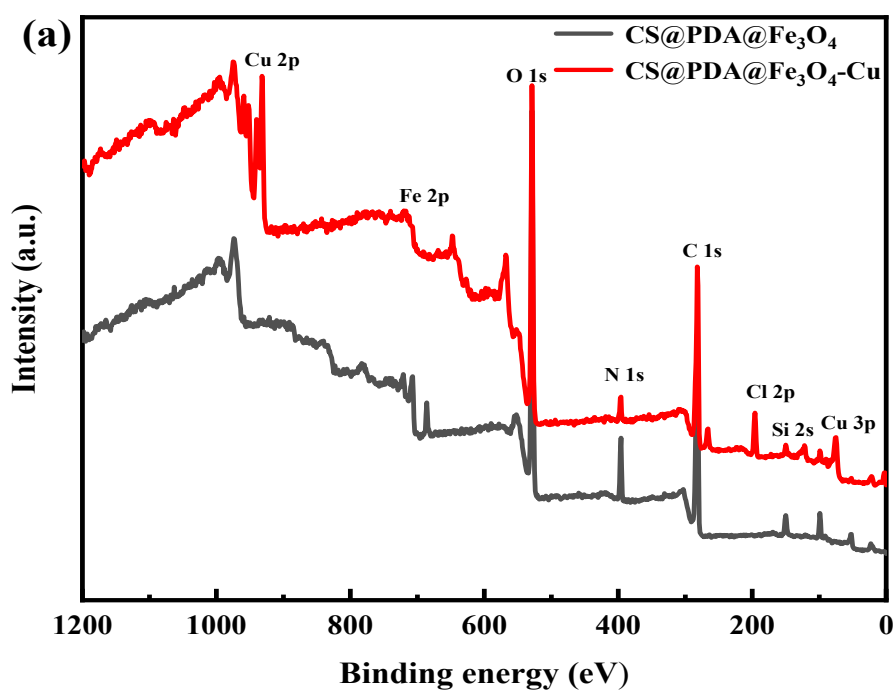


Figure S 5 XPS spectra of (a) wide scan of the virgin and Cu (II)-loaded CS@PDA@Fe₃O₄

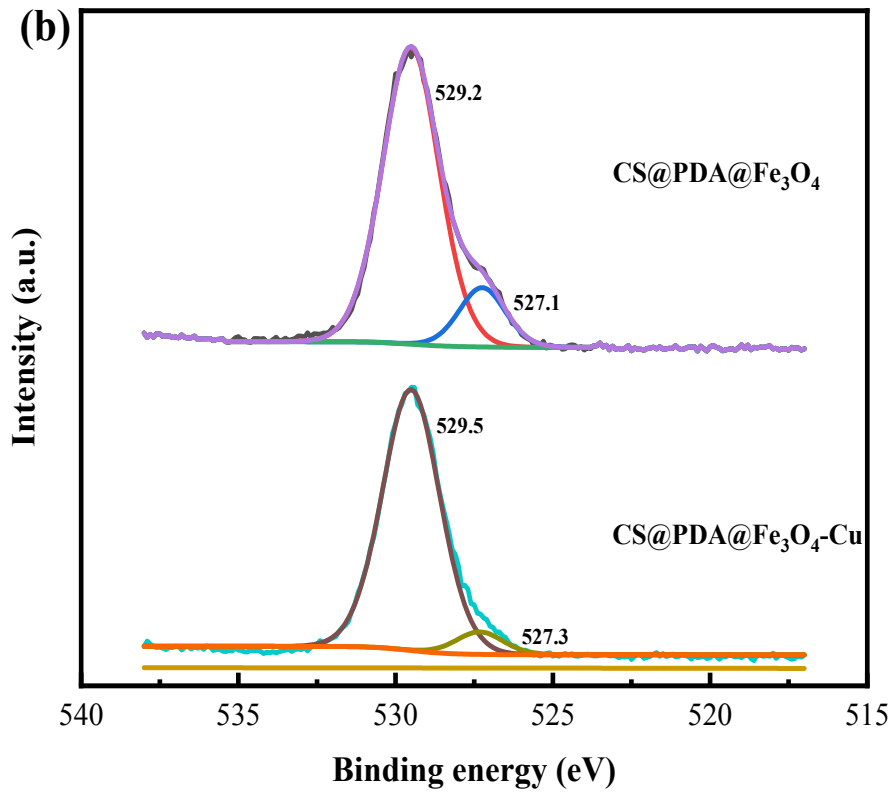


Figure S 6 XPS spectra of N 1s of the virgin and Cu (II)-loaded CS@PDA@Fe₃O₄

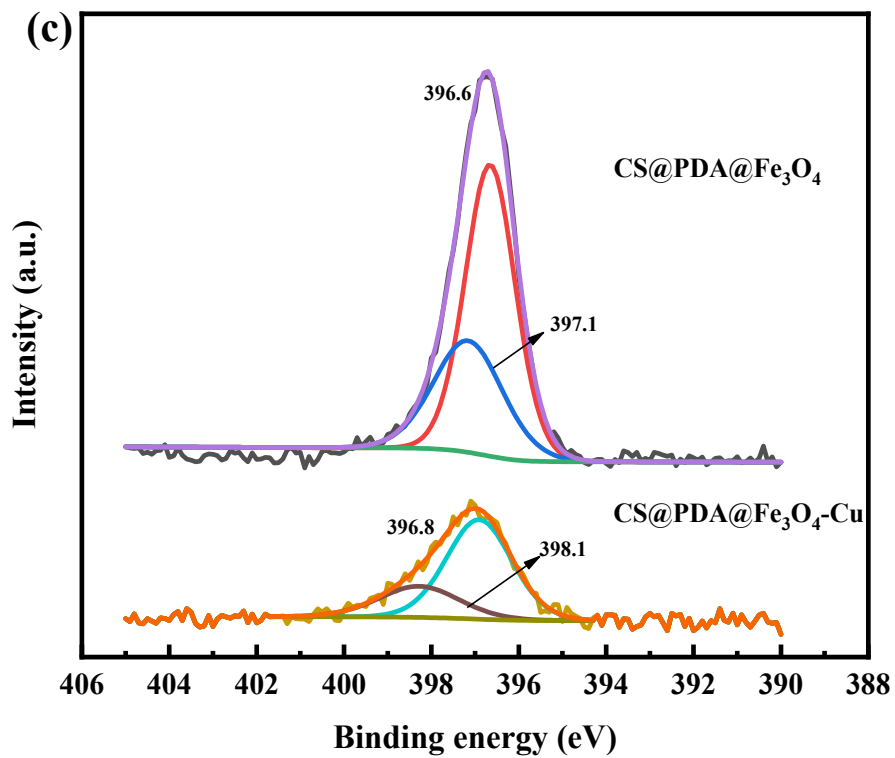


Figure S 7 O 1s of the virgin and Cu (II)-loaded CS@PDA@Fe₃O₄