

Multifunctional Fe₃O₄ Nanoparticles for Highly Sensitive Detection and Removal of Al(III) in aqueous solution

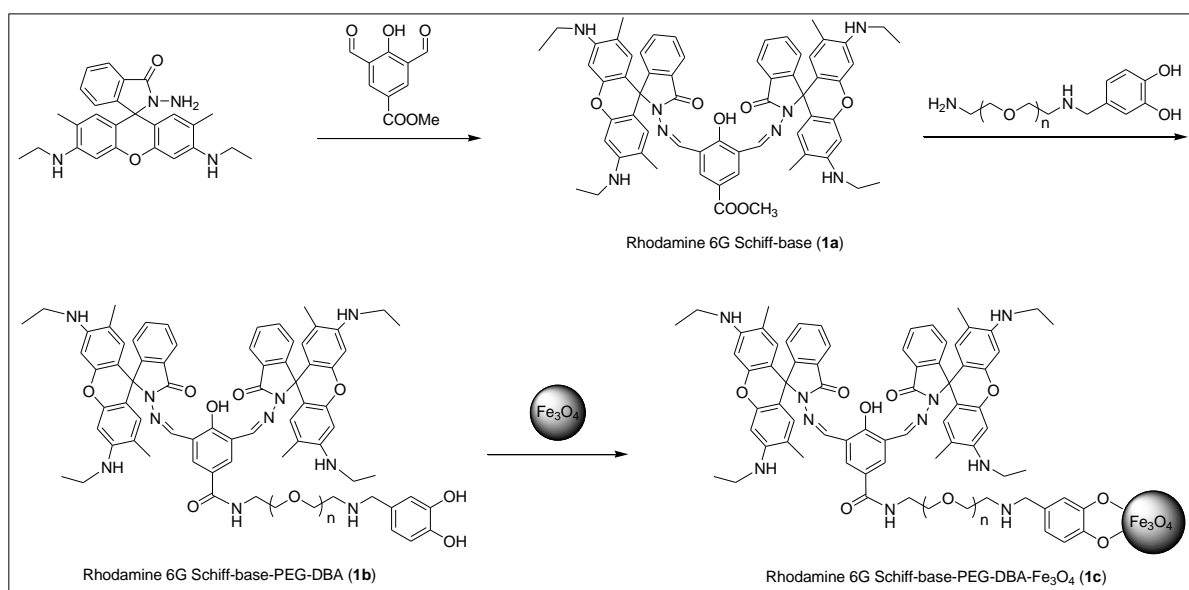
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Scheme 1 S1. Synthesis of 1c

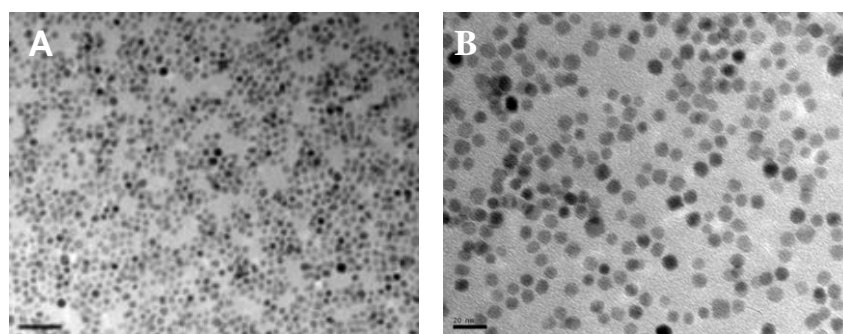
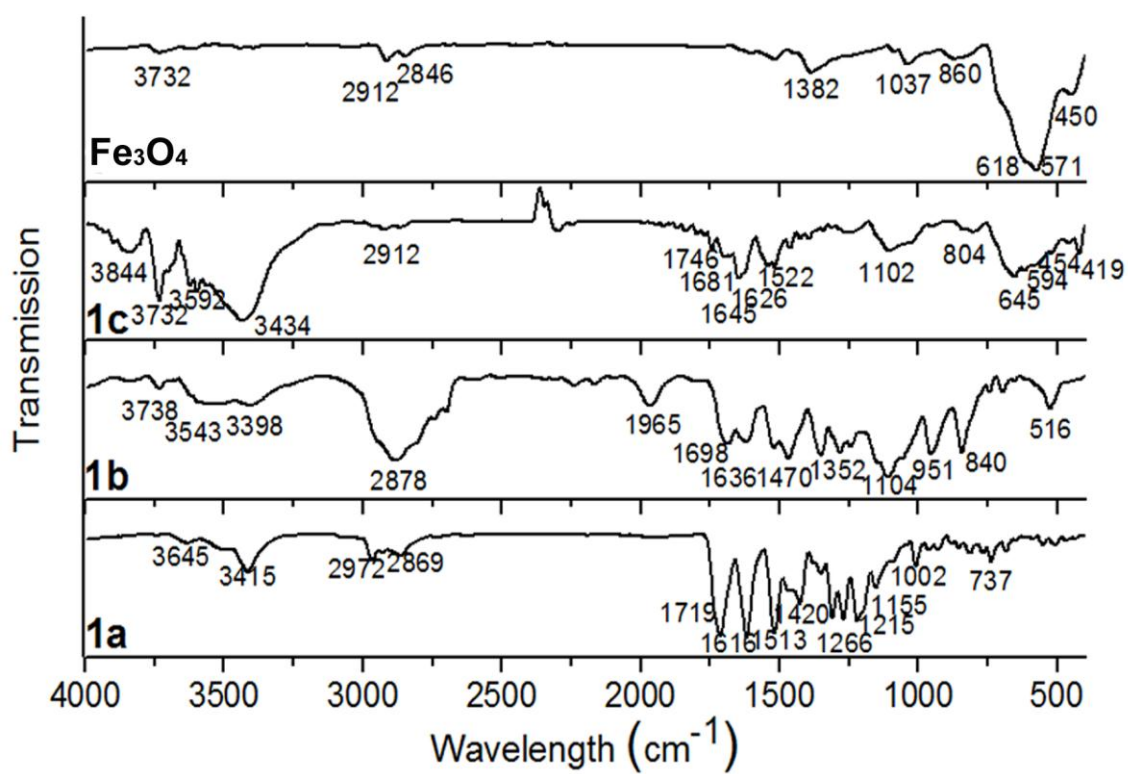


Figure S1. TEM images of (A) the as-synthesized Fe₃O₄ nanoparticles from their hexane dispersion and (B) the 6G Schiff-Base-modified Fe₃O₄ nanoparticles from their water dispersion.



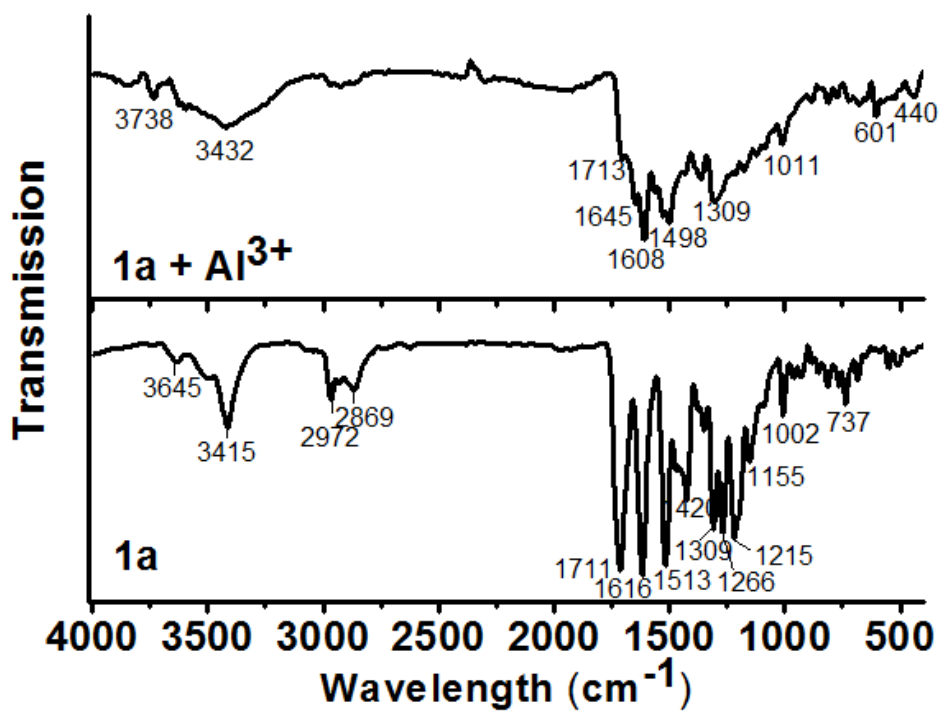


Figure S2. IR spectra of 1a, 1b, 1c, Fe₃O₄ and 1a + Al³⁺.

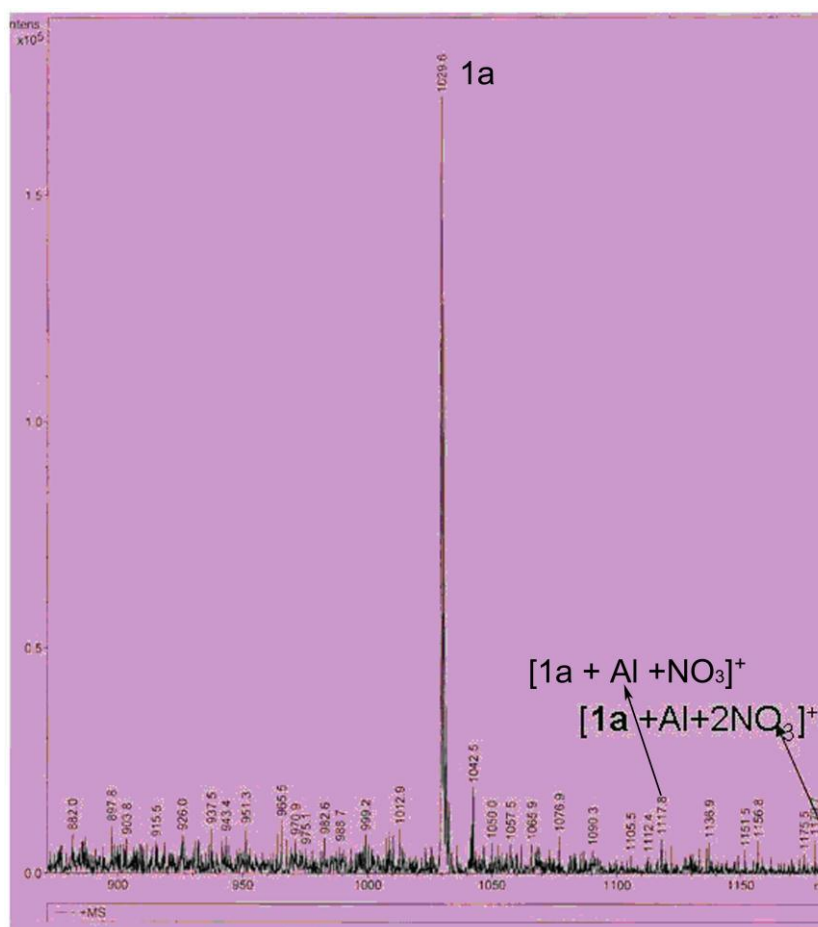


Figure S3. The ESI-MS spectra of 1a:Al complex.

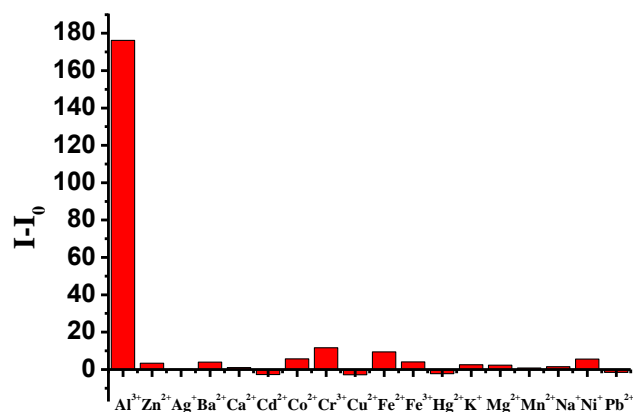


Figure S4. Fluorescence changes of **1c** after addition of 4 equiv of metal ions. Excitation wavelength was 515 nm, and the emission was at 544-547 nm. Slit: excitation/emission = 5.0/5.0. $[\mathbf{1c}] = 10 \mu\text{M}$; $[\text{M}^+] = 40 \mu\text{M}$. I_0 is the intensity of free **1c** and I is the intensity of **1c** after adding metal cation.

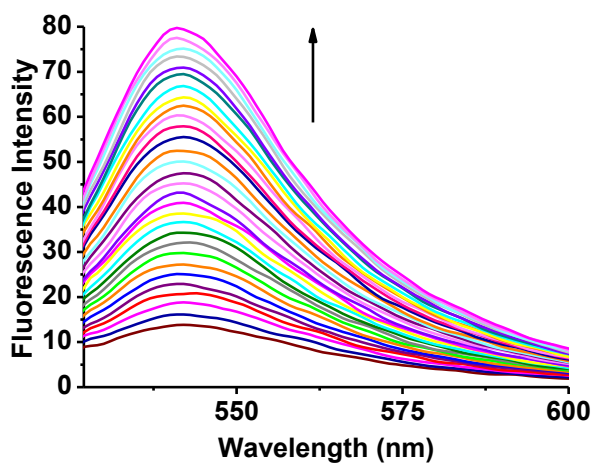


Figure S5. Fluorescent emission changes of **1c** (10^{-7}M) upon addition of Al^{3+} (by 0.27 ppb) in HEPES buffer (PH = 7) at 25 °C. Slit: excitation/emission = 5.0/5.0.

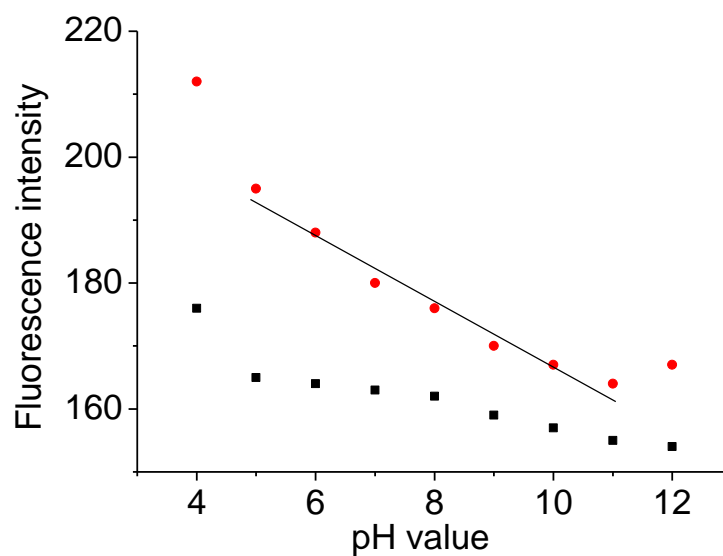


Figure S6. Variation of fluorescence intensity for the dispersion (10 μ M) of **1c** in H₂O measured with (above) and without (below) Al³⁺ ions (40 μ M) as a function of pH value.

Sample No.	1	2	3	4	5	6	7
V _{Al³⁺} (ml)	50	50	50	50	50	50	50
C _{Al³⁺} ^{start} (ppm)	1.45	1.45	1.45	1.45	1.45	1.45	1.45
m _{1c} (mg)	0	5	10	20	30	50	80
C _{Al³⁺} ^{final} (mg/L)	1.45	1.22	1.08	0.77	0.69	0.40	0.18