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Supporting Information

A multifunctional and recyclable terbium (III) coordination polymer: displaying highly selective and sensitive detection of Fe^{3+}, Cr^{VI} anions, and picric acid in aqueous media

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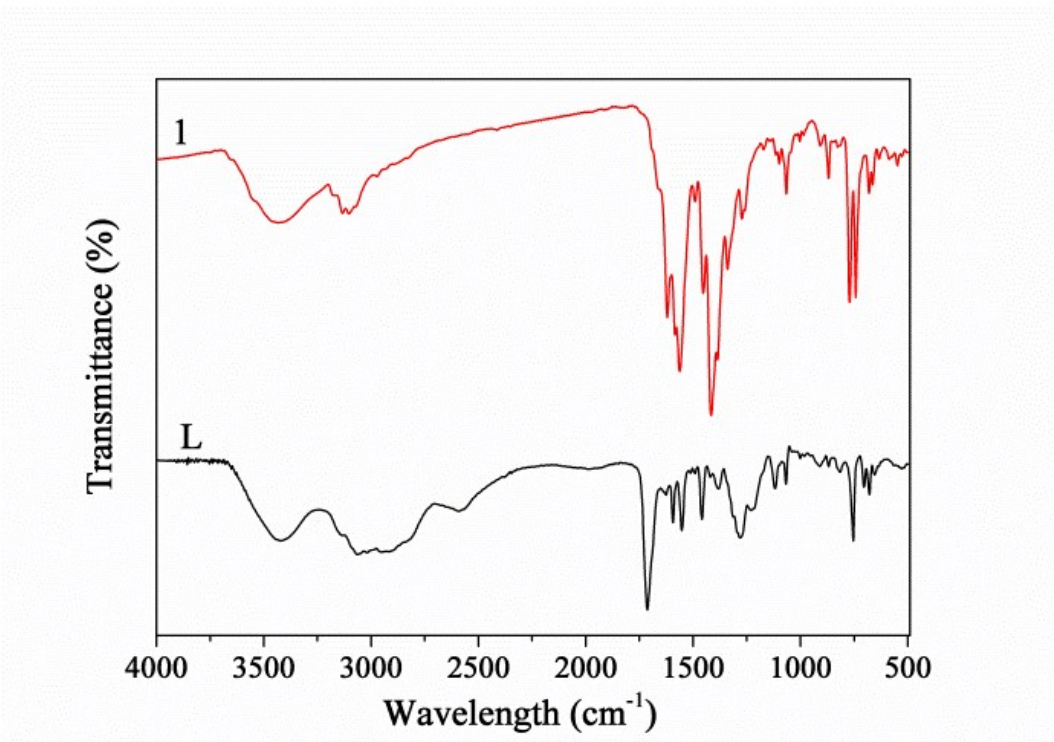

Figure S1. IR spectra of **1** and L.

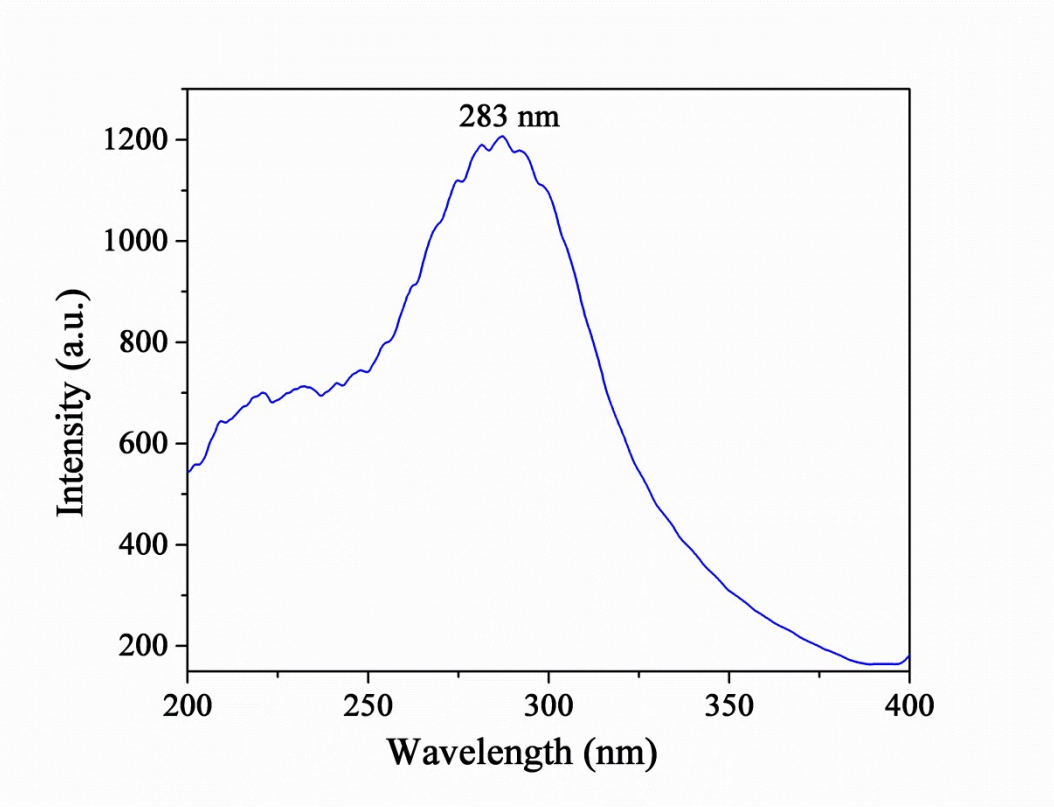

Figure S2. The solid-state excitation spectrum of L at room temperature (em = 415 nm).

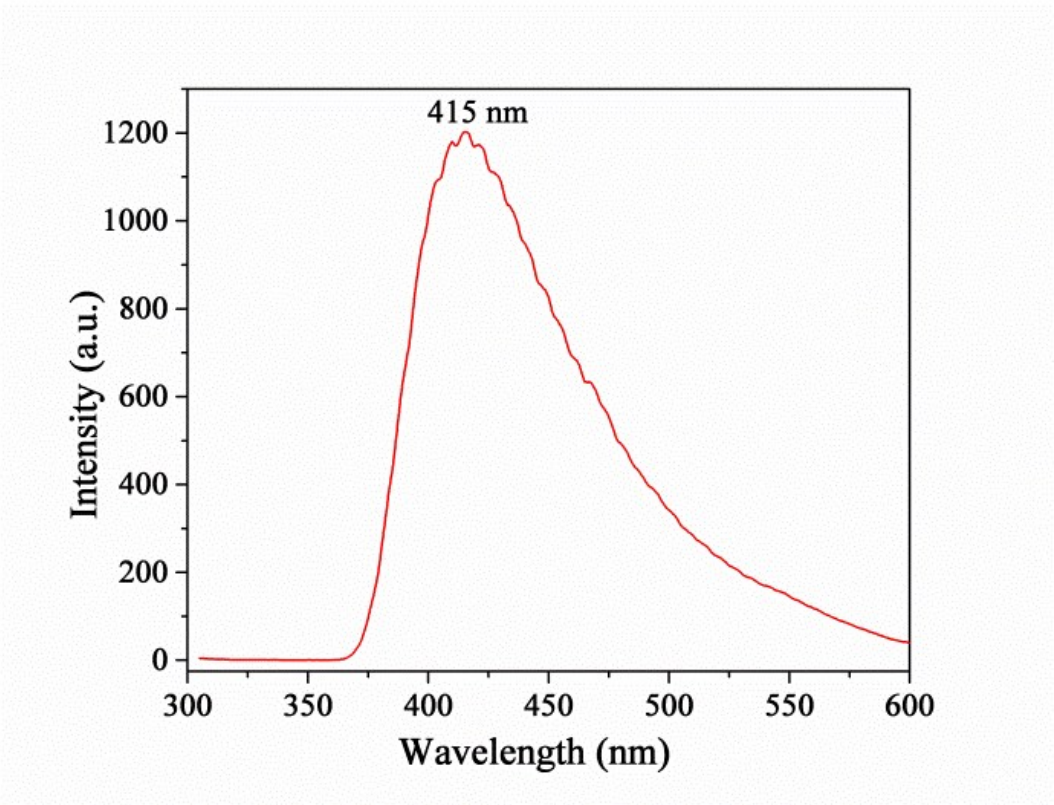

Figure S3. The solid-state emission spectrum of L at room temperature (ex =283 nm).

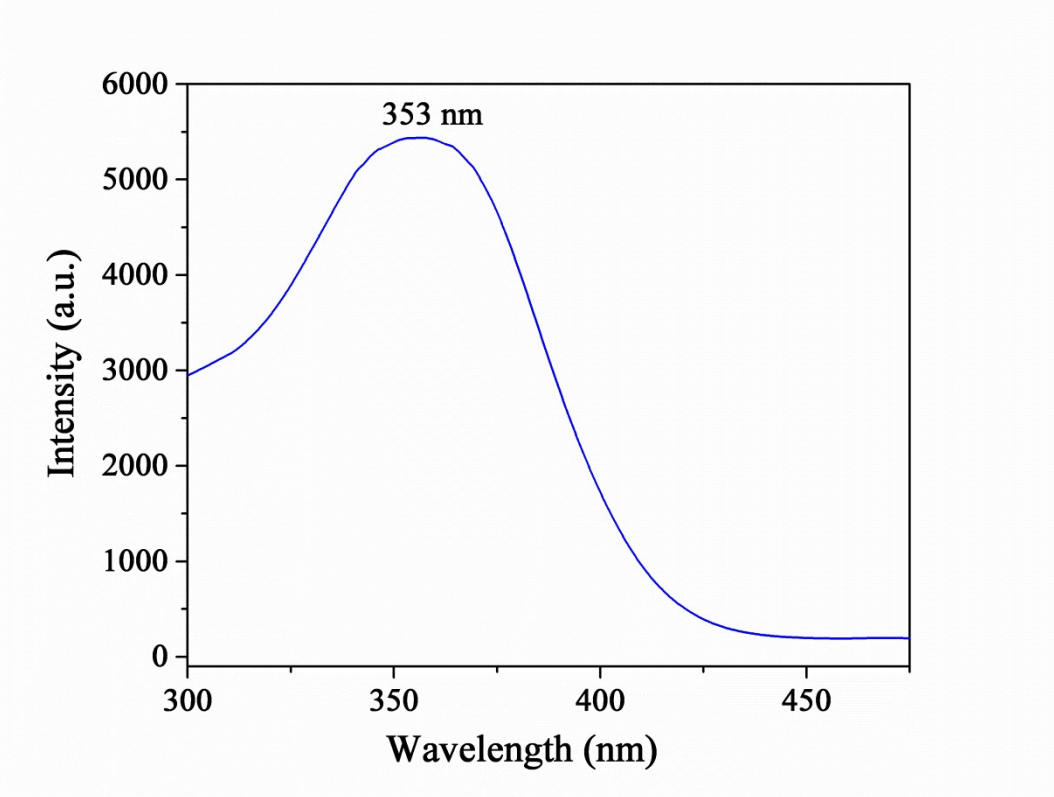

Figure S4. The solid-state excitation spectrum of **1** at room temperature (em = 547 nm)

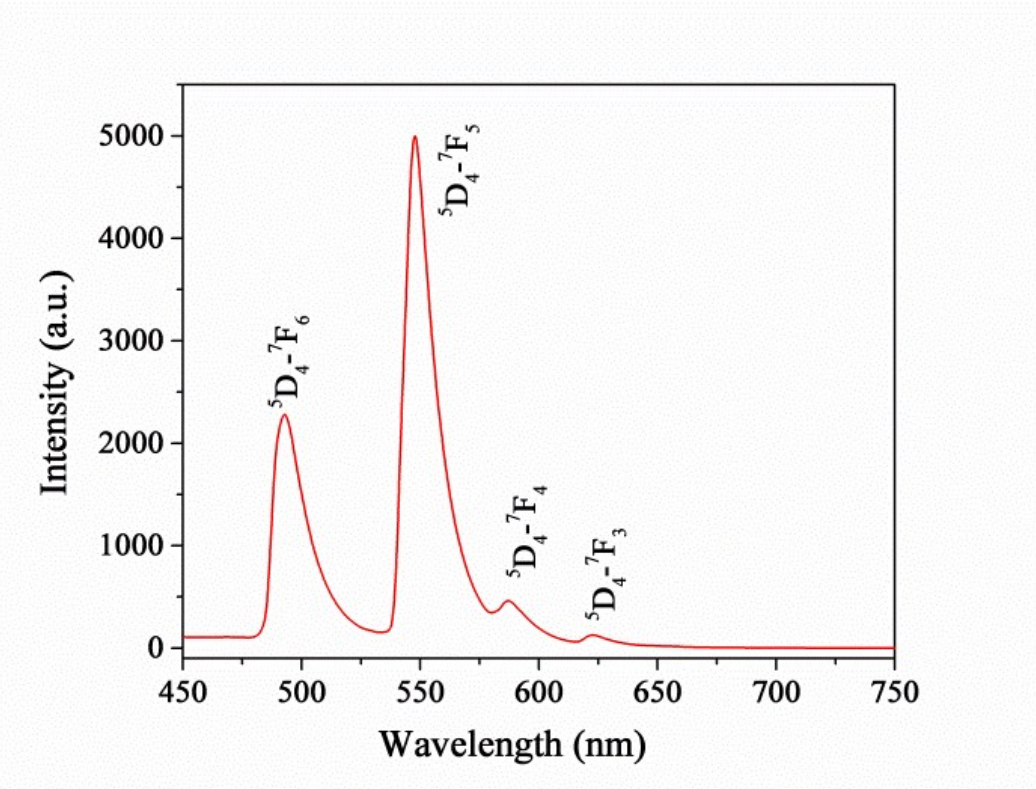

Figure S5. The solid-state emission spectrum of **1** at room temperature (ex = 353 nm).

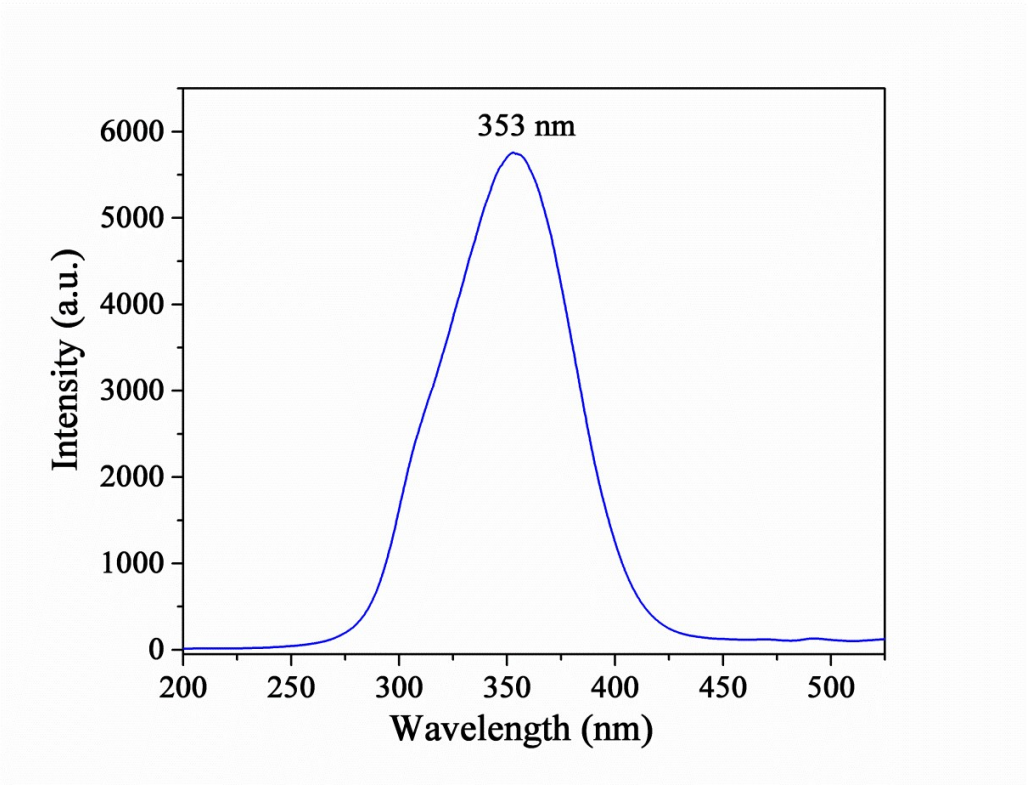

Figure S6. The excitation spectrum of **1** in deionized water (em = 547 nm).

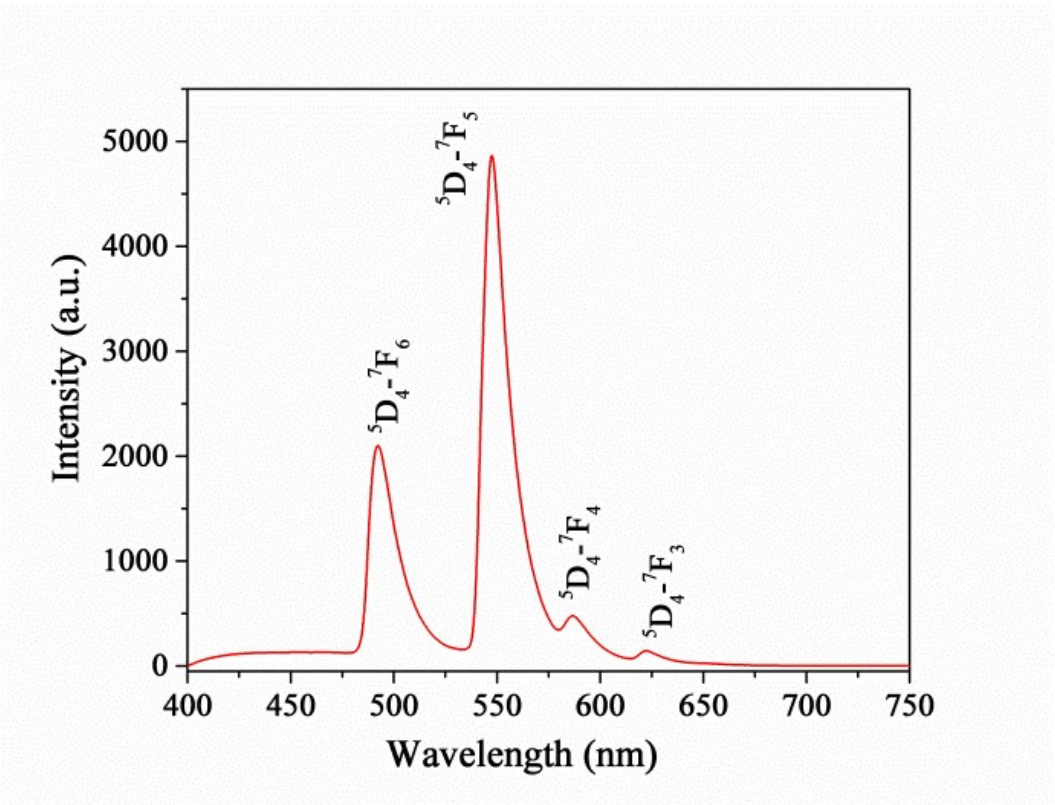

Figure S7. The emission spectrum of **1** in deionized water (em = 353 nm).

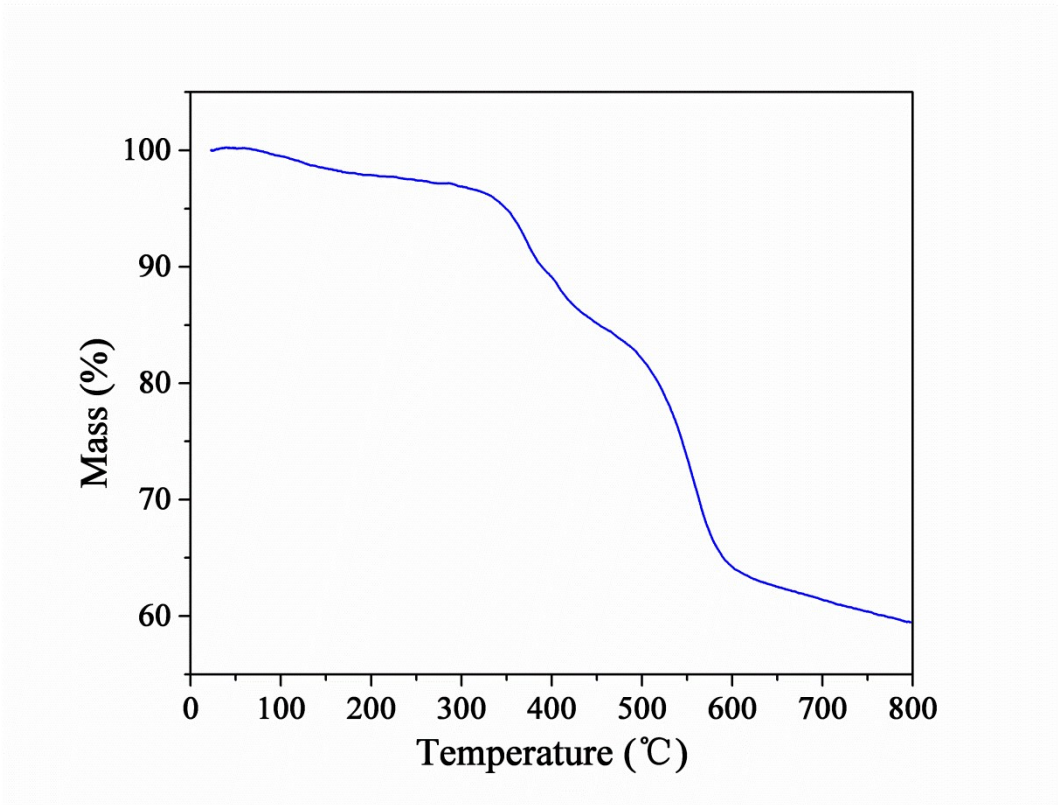

Figure S8. The TGA curves of **1**.

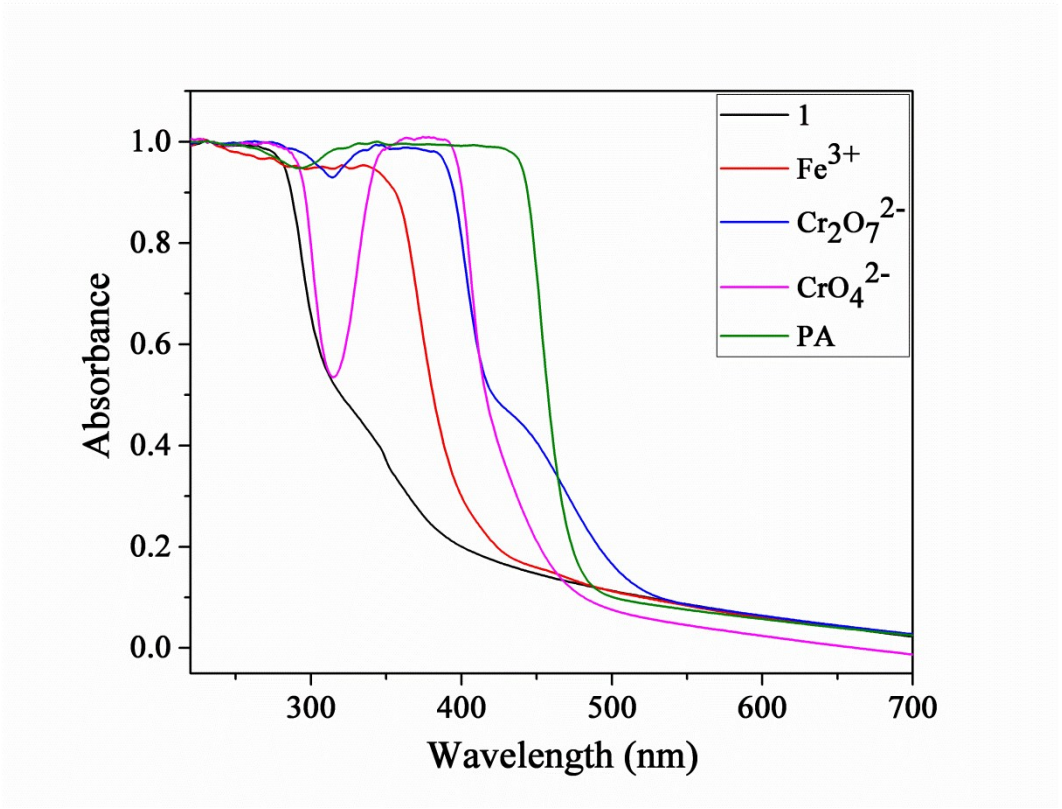

Figure S9. The absorbance spectra of **1** and other analytes in deionized water.

Figure S10. Color changes of **1** in the presence of various analytes in deionized water.

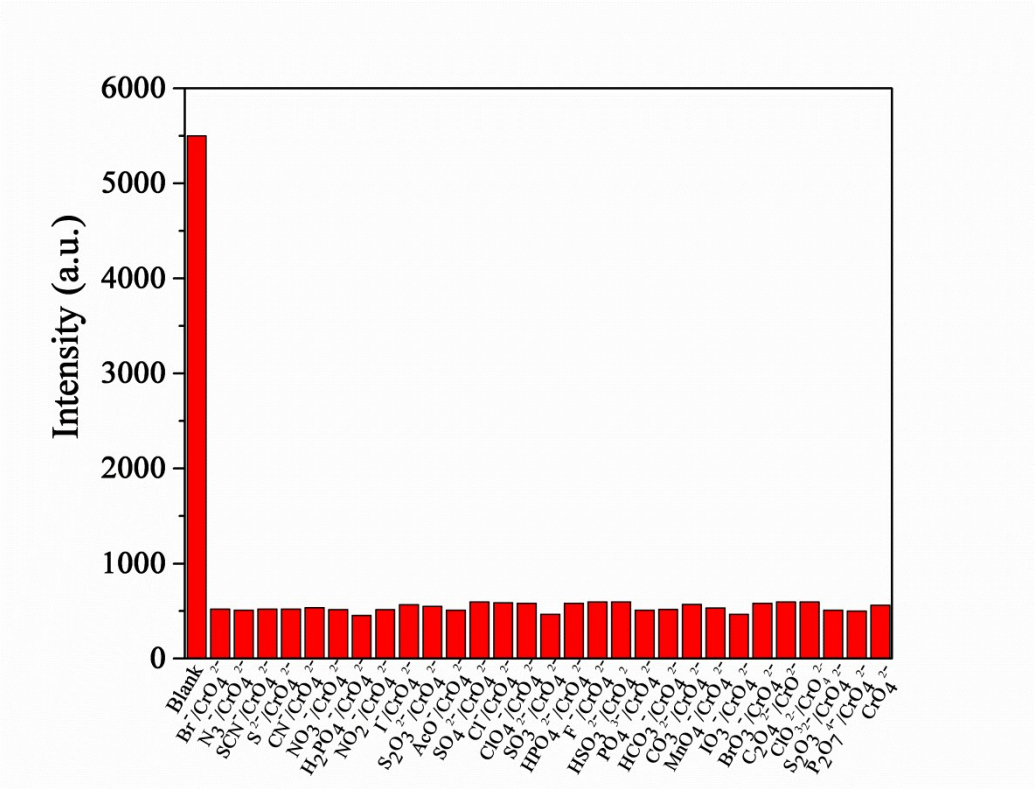

Figure S11. Luminescence intensity at 547 nm of **1** with CrO_4^{2-} (1×10^{-3} M) in the presence of other anions (1×10^{-3} M) in deionized water.

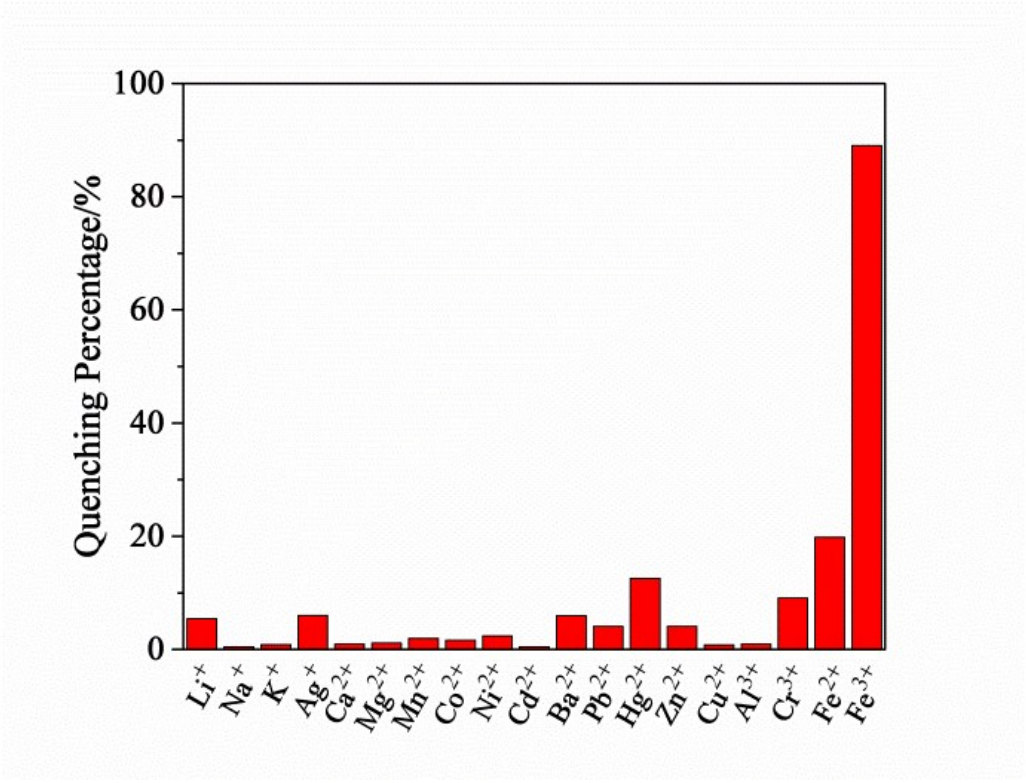

Figure S12. Luminescence quenching efficiencies of various cations towards **1** at 5 mM concentration.

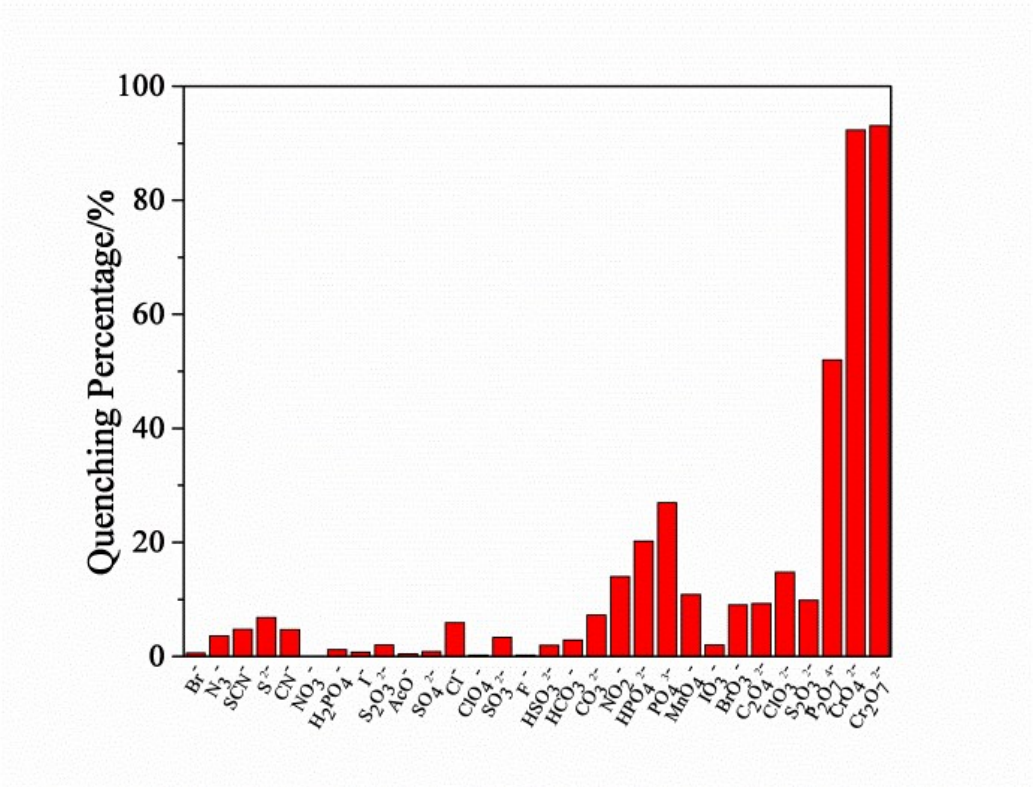

Figure S13. Luminescence quenching efficiencies of various anions towards **1** at 1 mM concentration.

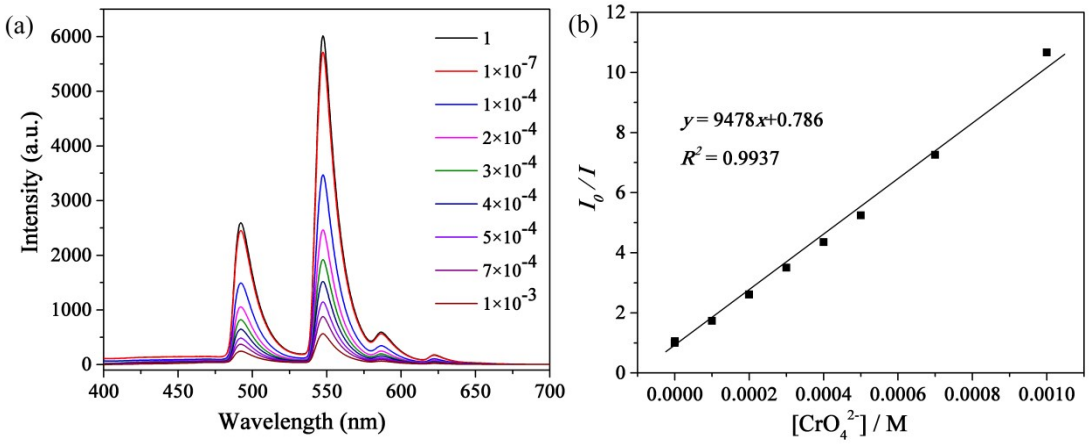

Figure S14. (a) Luminescence responses of **1** toward different concentrations of CrO_4^{2-} (0–1 mM) in deionized water (λ_{ex}= 353 nm). (b) Stern–Volmer plot of I_0/I versus increasing concentrations of CrO_4^{2-}.

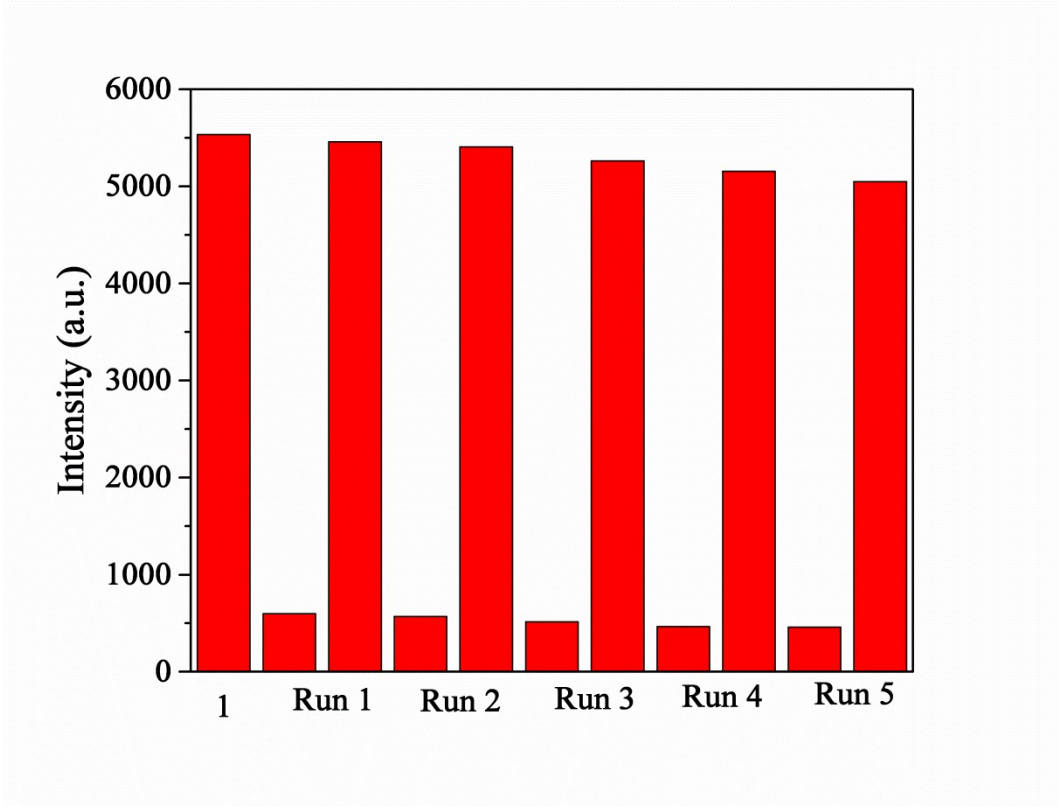

Figure S15. Repeatability of the quenching ability of **1** in deionized water and in the presence of CrO_4^{2-} (1 mM).

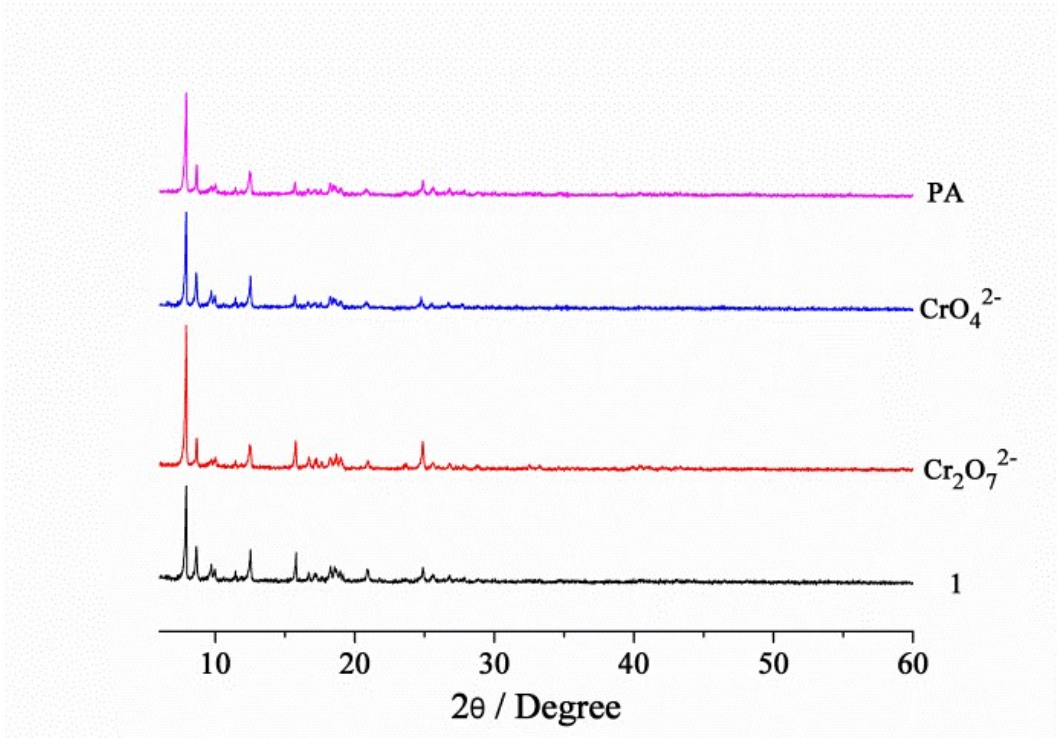

Figure S16. The PXRD patterns of **1** after five cycles experiment for the detection of various analytes.

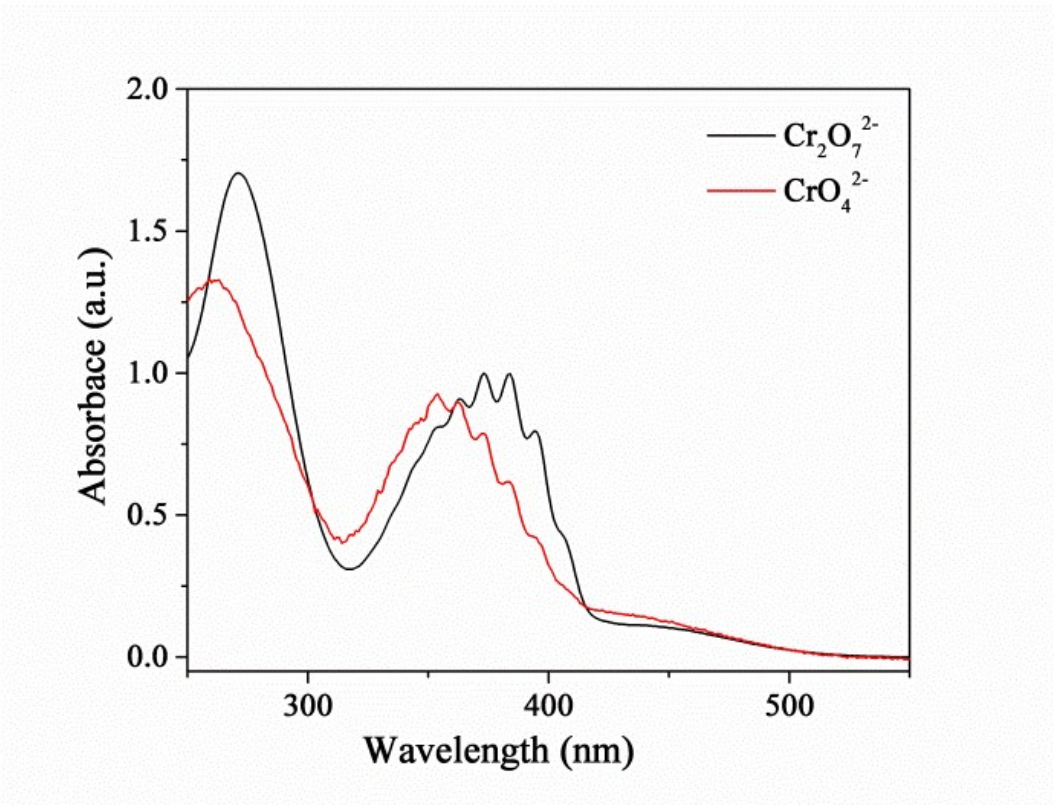

Figure S17. Absorbance spectra of CrO_4^{2-} and $Cr_2O_7^{2-}$ in deionized water.

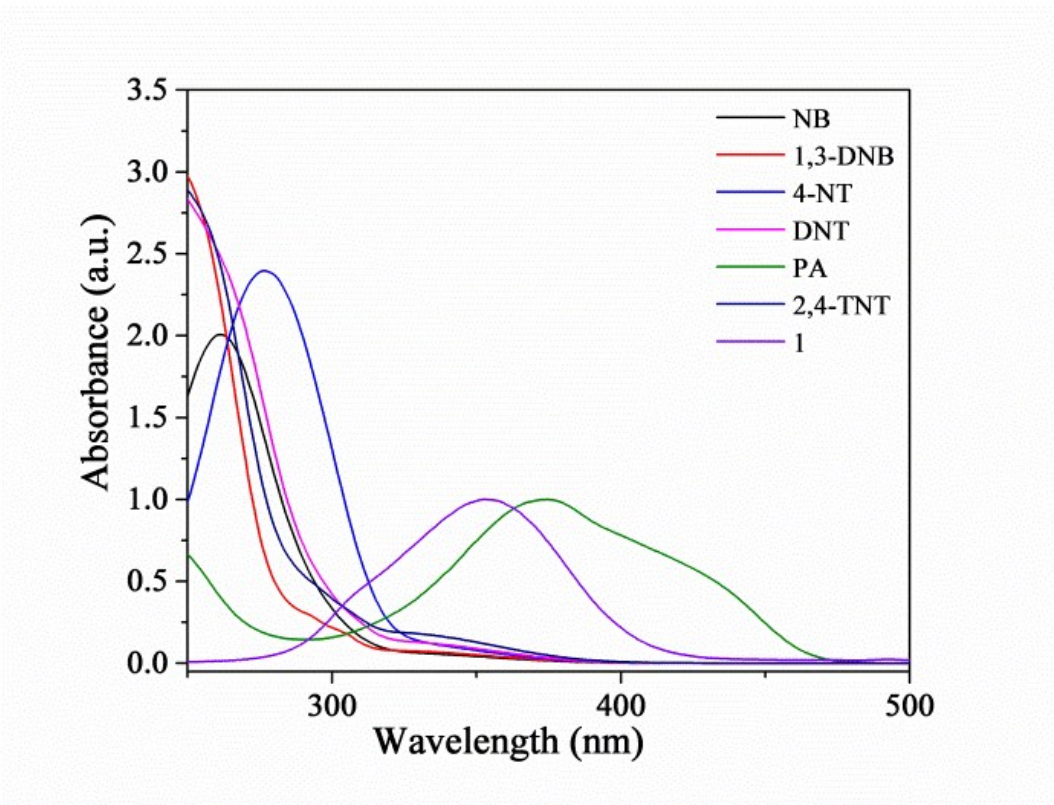

Figure S18. The absorbance spectra of various NAEs in deionized water.

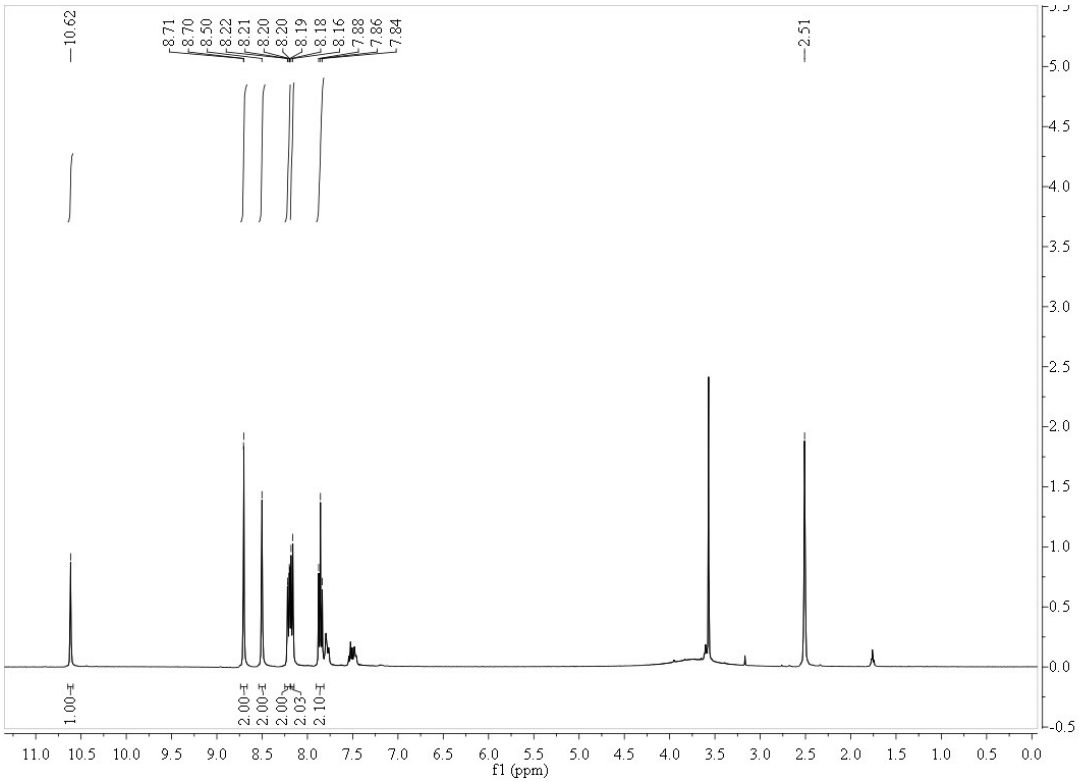

Figure S19. The ^{1}H NMR spectra of ligand L in DMSO-d_6.

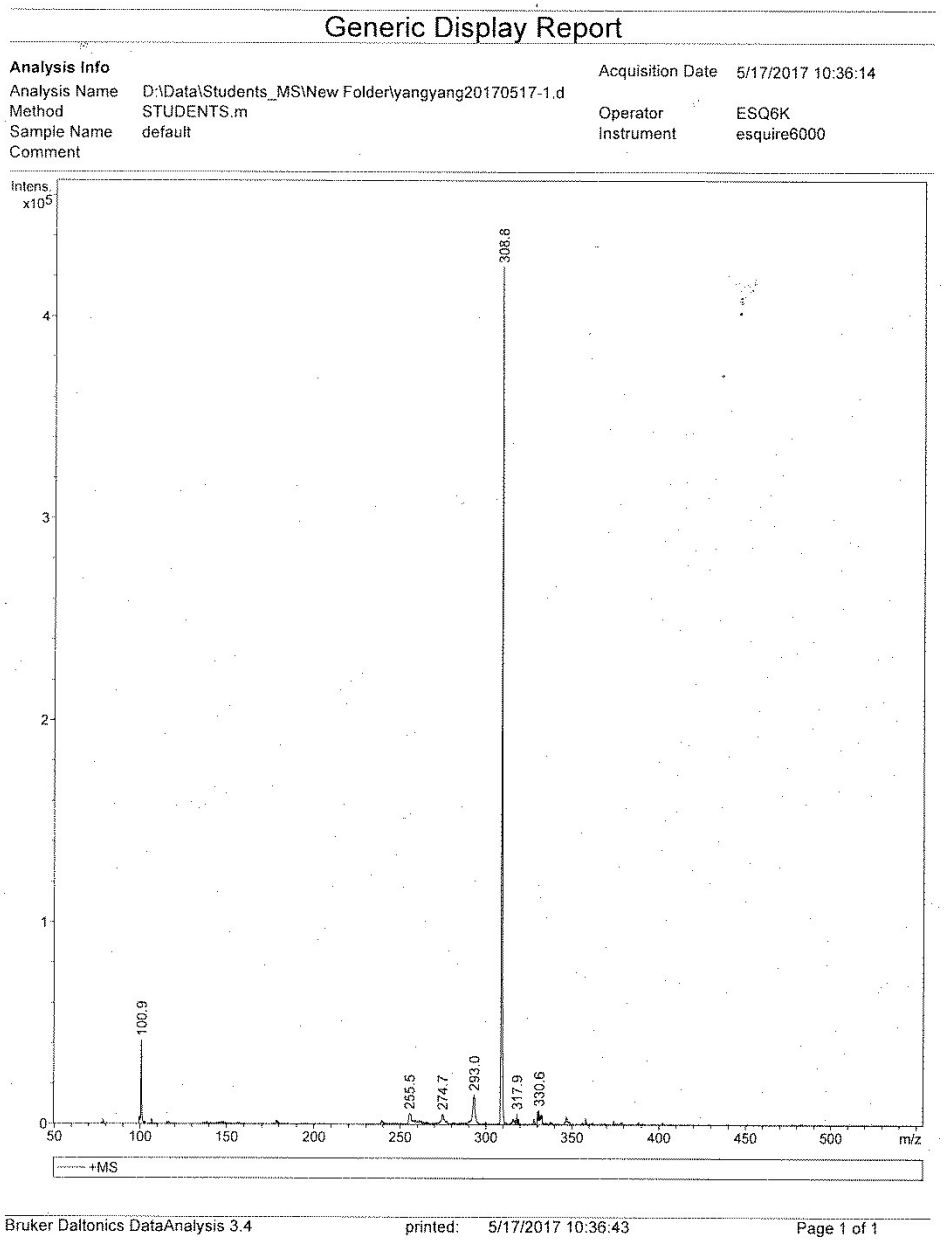

Figure S20. The Mass spectra of ligand L.

Table S1. Crystal data and structure refinement for **1.**

Compound	1
Empirical formula	$C_{34}H_{22}N_5O_{11}Tb$
Formula weight	835.50
Crystal system	triclinic
Space group	P—1
a/Å	10.5191(14)
b/Å	11.2198(14)
c/Å	13.7378(16)
α/°	92.717(10)
β/°	102.283(11)
γ/°	92.021(10)
Volume/Å^3	1580.8(3)
Z	2
D_{calc} g/cm^3	1.755
μ/mm^{-1}	2.286
F(000)	828.0
Crystal size/mm^3	0.34×0.24×0.23
Reflections collected	11784
Independent reflections	5105
Data/restraints/parameters	6183/12/460
Goodness-of-fit on F^2	1.068
Final R indexes [I>=2σ (I)]	R_1= 0.0541, wR_2= 0.1262
Final R indexes [all data]	R_1= 0.0698, wR_2= 0.1391

Table S2. Crystal data and structure refinement for **1.**

Probes	Detection limit/M (Fe^{3+}/Cr^{VI}/PA)	Testing platform	References
1[1]	1×10^{-5} 1×10^{-5} 1×10^{-5}	DMF solution	*Chem. Eur. J.*, 2016, **22**, 18769
2-Eu[2]	4.3×10^{-5} 1.7×10^{-5} 2.2×10^{-5}	Aqueous solution	*Dalton Trans.*, 2017, **46**,13878
2-Tb[2]	1.6×10^{-5} 2.5×10^{-5} 1.8×10^{-5}	Aqueous solution	*Dalton Trans.*, 2017, **46**,13878
3[3]	1.0×10^{-5} 5.0×10^{-5} ---	DMF solution	*Dalton Trans.*, 2018, **47**, 3272
4[4]	5×10^{-7} 1×10^{-6} 5×10^{-7}	CH_3CN solution	*Dalton Trans.*, 2018, **47**, 7480
5[5]	1.0×10^{-5} 1.0×10^{-5} ---	DMF solution	*J. Solid. State. Chem.*, 2018,**262**, 282
6[6]	1.8×10^{-5} 1.8×10^{-5} ---	DMF solution	*ChemPlusChem.*, 2016, **81**, 1299
This work	1×10^{-8} 1×10^{-7} 1×10^{-8}	Aqueous solution	

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6. L. Jian-Qiang, L. Gao-Peng, L. Wei-Cong, L. Qing-Lin, L. Bao-Hong, G. R. W., H. Lei and B. S. R., *ChemPlusChem.*, 2016, **81**, 1299.