Electronic Supplementary Information

Four new lanthanide-organic frameworks: the selective luminescent sensing and magnetic properties

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Table S1 Hydrogen bonds lengths [Å] and angles [°]for **1-Eu**.

D-H···A	d(D-H)	d(H···A)	d(D···A)	DHA
O(8)-H(8A)···O(6)	0.820	1.943	2.763	179.85
O(8)-H(8B)···O(10)	0.820	2.145	2.965	179.04
O(9)-H(9B)···O(10)	0.820	1.949	2.770	179.57
O(10)-H(10A)···O(5)	0.858	1.971	2.756	151.68
O(10)-H(10B)···N(1)	0.820	2.126	2.947	179.37
C(13)-H(13)···N(1)	0.930	2.542	3.279	136.42
C(16)-H(16C)···O(2)	0.960	2.530	3.422	154.73

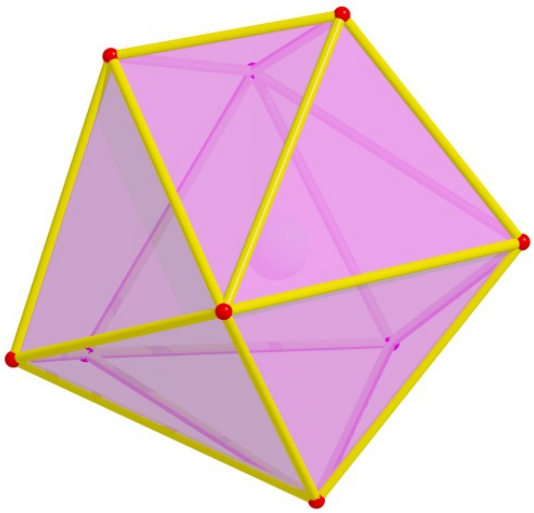


Fig. S1 Coordination arrangement ofEu^{3+} centers could be described as a distorteddodecahedron.

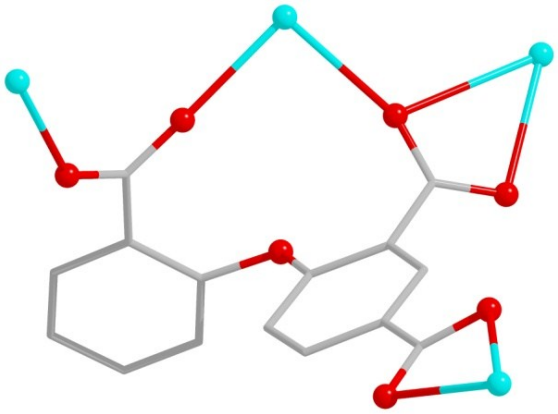


Fig. S2 The three carboxylates of L^{3+} ligands take coordination with Eu^{3+} ions.

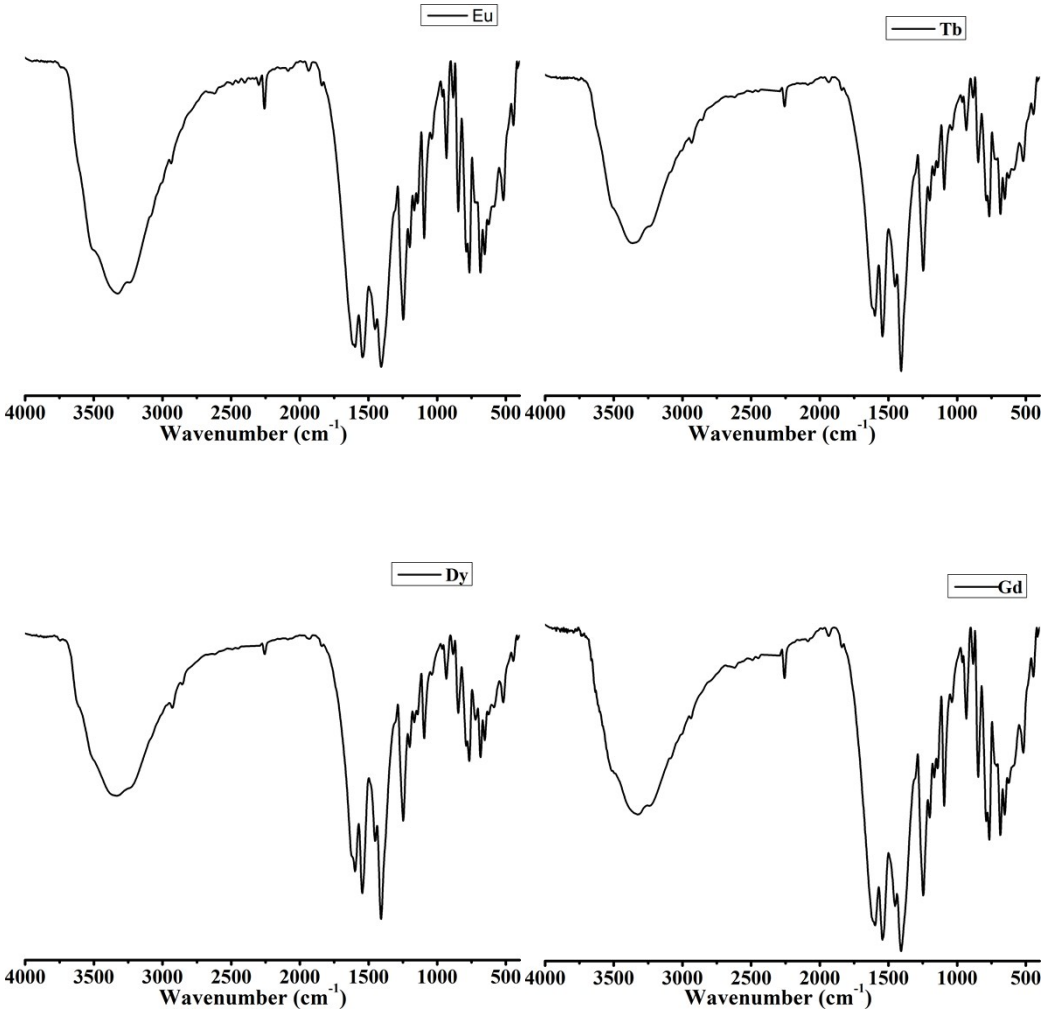
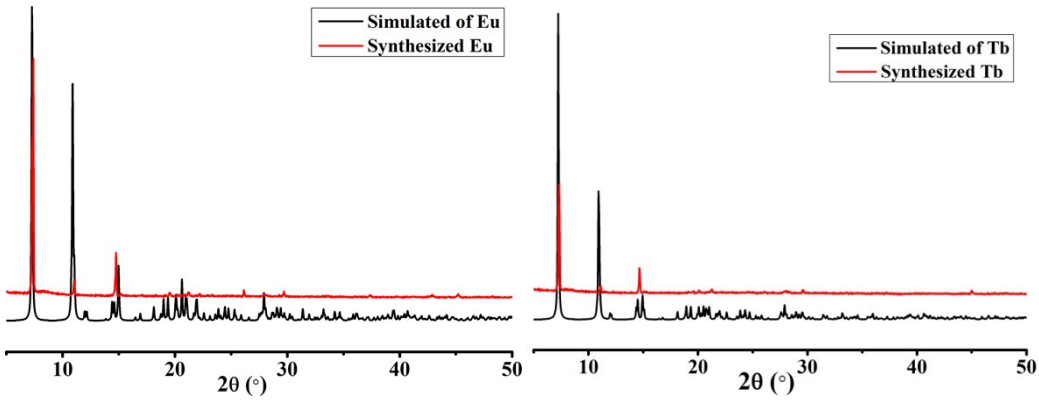


Fig. S3 TheFT-IR spectrometer of**1-Eu**, **1-Tb, 1-Dy** and **1-Gd**.



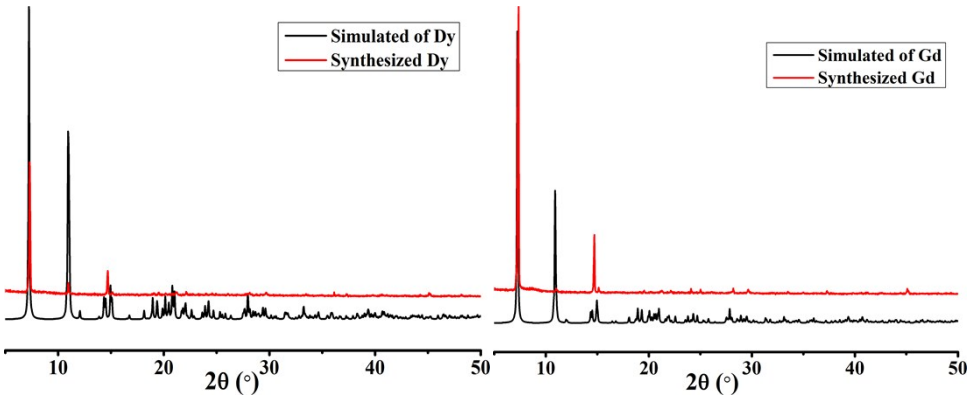


Fig. S4 PXRD patterns of **1-Eu**, **1-Tb, 1-Dy** and **1-Gd** simulated from the X-ray single-crystal structure and as-synthesized samples of **1-Eu**, **1-Tb, 1-Dy** and **1-Gd**.

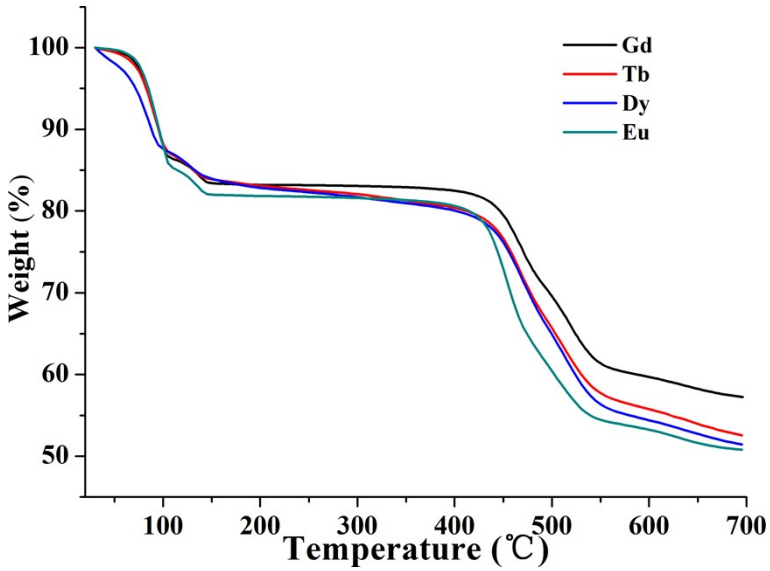


Fig.S5 The TGA plots of four compounds under N_2 environment.For **1-Tb**,the first major weight loss of 16.54% from 29 to 144°C,corresponding to two coordinated water, one guest water and one acetonitrile molecules per formula unit (cala.17.17%), the major framework can keep stable to 409°C; For **1-Dy**,the first major weight loss of 16.26% from 29 to 152°C, ascribing to two coordinated water, one guest water and one acetonitrile molecules per formula unit (cala.17.06%), the major framework can keep stable to 409°C; For **1-Gd**,the first major weight loss of 16.69% from 29 to 143°C,corresponding to two coordinated water, one guest water and one acetonitrile molecules per formula unit (cala.17.22%), the major framework can keep stable to 421°C.

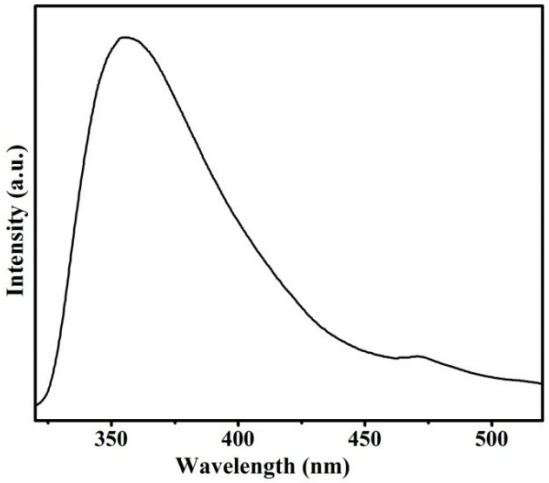
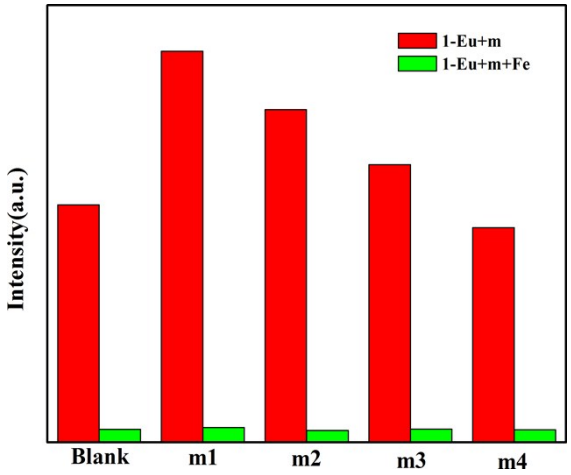
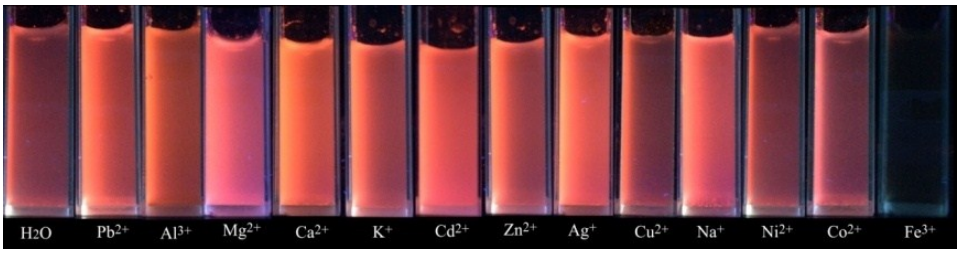


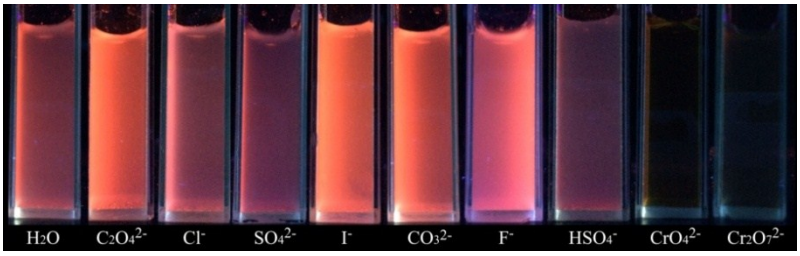
Fig. S6 The emission spectra of H_3L



(a)

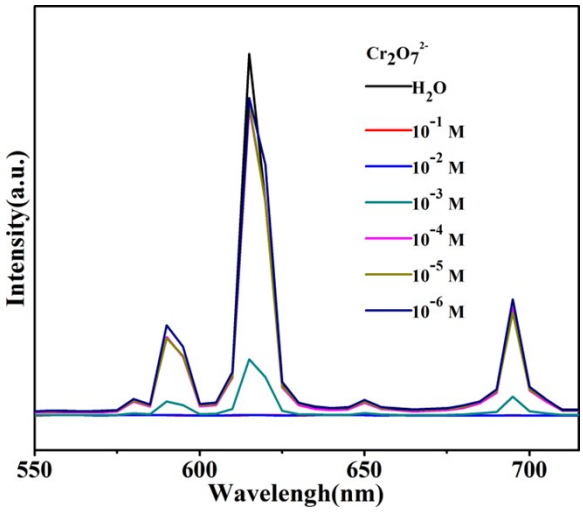


(b)

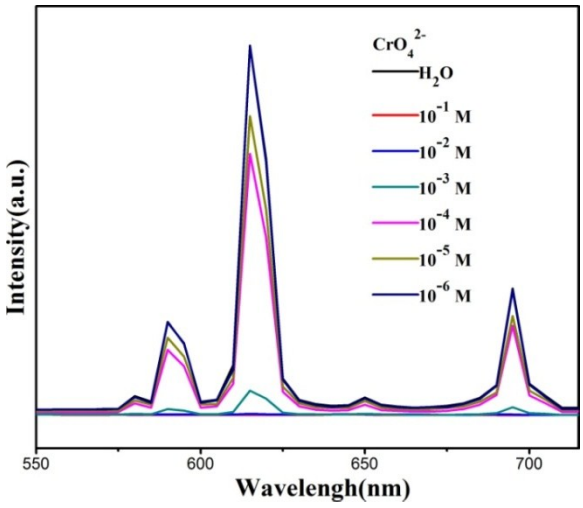


(c)

Fig. S7(a) Luminescence intensity at 617 nm of **1-Eu** dispersed in water with addition of different mixed ions (10^{-1}M) mixed solution added Fe^{3+} ions (10^{-1} M) (m1: Cu^{2+}/Al^{3+}/Pb^{2+}; m2: Zn^{2+}/Cd^{2+}/Ag^{+}; m3: K^{+}/Mg^{2+}; m4: Na^{+}/Ca^{2+}/Co^{2+}).(b)Pictures of different M^{n+}@**1-Eu** solutions (M = Pb^{2+}, Al^{3+}, Mg^{2+}, Ca^{2+}, K^{+}, Cd^{2+}, Zn^{2+}, Ag^{+}, Cu^{2+}, Na^{+}, Ni^{2+}, Co^{2+}, and Fe^{3+}, respectively).(c)Pictures of different **1-Eu**@A^{x-} solutions (A = $C_2O_4^{2-}$, Cl^{-}, SO_4^{2-} , I^{-}, CO_3^{2-}, F^{-}, HSO_4^{-}, CrO_4^{2-} and $Cr_2O_7^{2-}$, respectively).

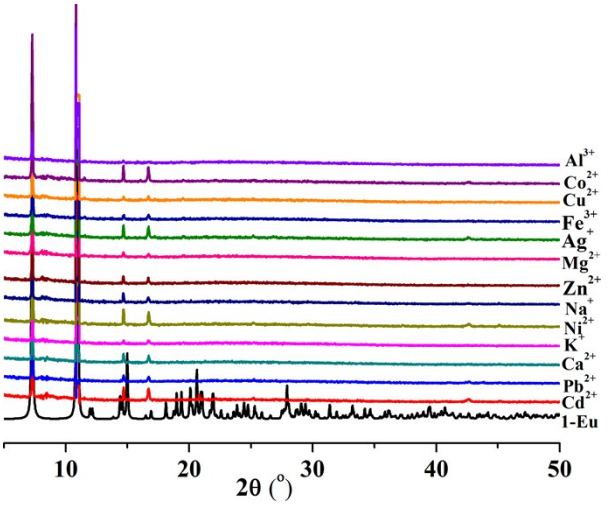


(a)

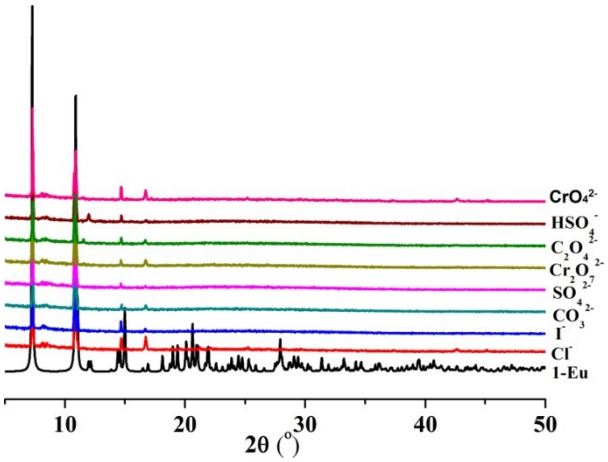


(b)

Fig.S8 Luminescent spectra of **1-Eu** in aqueoussolutionwith $Cr_2O_7^{2-}$(a)and CrO_4^{2-}(b) ions at different concentration (ca. 10^{-6}-10^{-1}M).



(a)



(b)

Fig. S9(a) ThePXRD patterns of **1-Eu** treated by different $M(NO_3)_x$(M = Na^+, K^+, Mg^{2+}, Ag^+,Ca^{2+}, Cd^{2+}, Zn^{2+}, Co^{2+}, Cu^{2+}, Al^{3+}, Ni^{2+}, Fe^{3+} and Pb^{2+}) aqueous solutions.(b)ThePXRD patterns of **1-Eu** treated by differentK_x(A) (A=F^-, Cl^-, I^-, $C_2O_4^{2-}$, CO_3^{2-}, $Cr_2O_7^{2-}$, SO_4^{2-},HSO_4^- and CrO_4^{2-}) aqueous solutions.

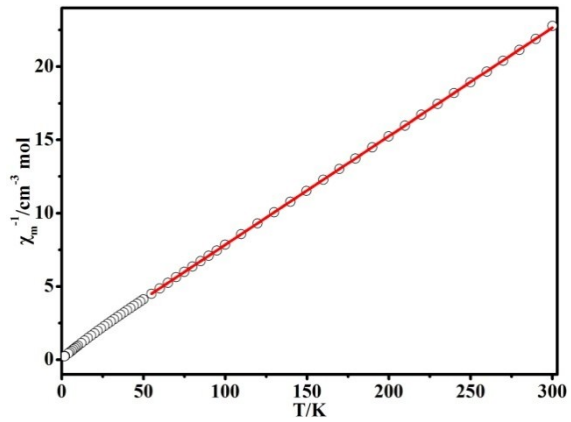


Fig. S10 The inverse magnetic susceptibility data (χ_M^{-1}) of **1-Dy.**