Supporting Information

1. **Figure captions:**

Table S2 **HOMO** and **LUMO** energies value of antibiotics.

2. The solvent sensing experiment was performed as follows: Complex **2** (2.5 mg) was immersed in different organic solvents (3 mL), treated by ultrasonication for 30 minutes, including formaldehyde, ethyl acetate, isopropanol, dimethylformamide (DMF), water, acetonitrile, benzene, acetone, dimethyl sulfoxide (DMSO), xylene, ethanol, methanol and benzaldehyde.

The metal ions sensing experiment was performed as follows: Complex **2** (2.5 mg) was immersed in aqueous solution (10^{-2} mol/L, 10mL) of $M(NO_3)_n$ (M^{n+} = Fe^{2+}, Ca^{2+}, K^+, Cr^{3+}, Ba^{2+}, Al^{3+}, Mg^{2+}, Ni^{2+}, Na^+, Li^+, Co^{2+}, Cd^{2+}, Ag^+, Zn^{2+}, Cu^{2+} and Fe^{3+}), treated by ultrasonication for 30 min.

The anions sensing experiment was performed as follows: Complex **2** (2.5 mg) was immersed in aqueous solution (10^{-2} mol/L, 3mL) of Na_nX (Na_nX= NO_3^-, SO_4^{2-}, ClO_4^-, SCN^-, Br^-, I^-, Cl^-, HSO_3^-, NO_2^-, SO_3^{2-}, $Cr_2O_7^{2-}$ and CrO_4^{2-}), treated by ultrasonication for 30 min.

The antibiotics sensing experiment was performed as follows: Complex **2** (2.5 mg) was immersed in aqueous solution (10^{-2} mol/L, 3mL) of antibiotics, including sulfamethazine (SMZ), sulfadiazine (SDZ), thiamphenicol (THI), metronidazole (MDZ), dithiazoline (DTZ), chloramphenicol (CAP), nitrofurantoin (NFT) and nitrofurazone (NFZ).

Fig. S1

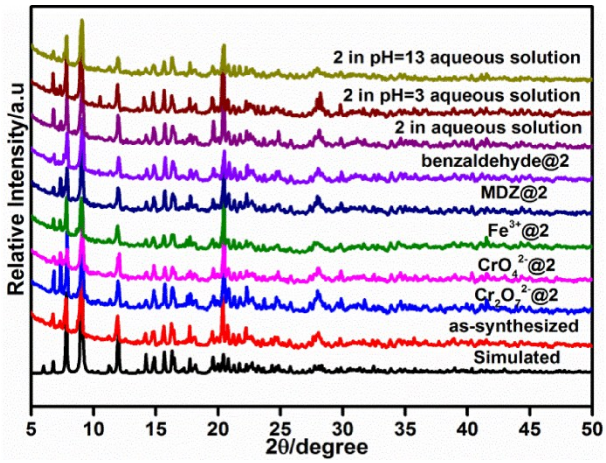

Fig. S2

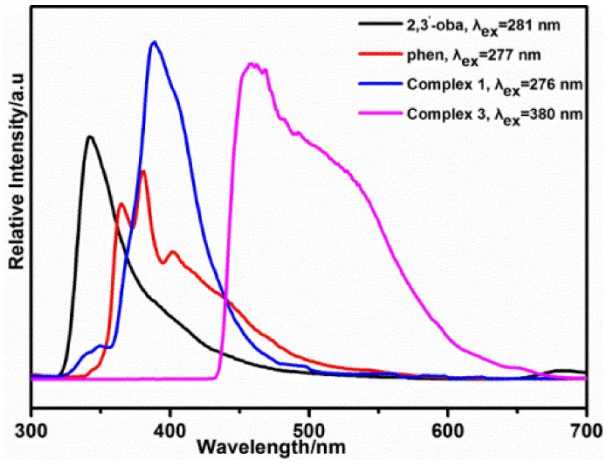

Fig. S3

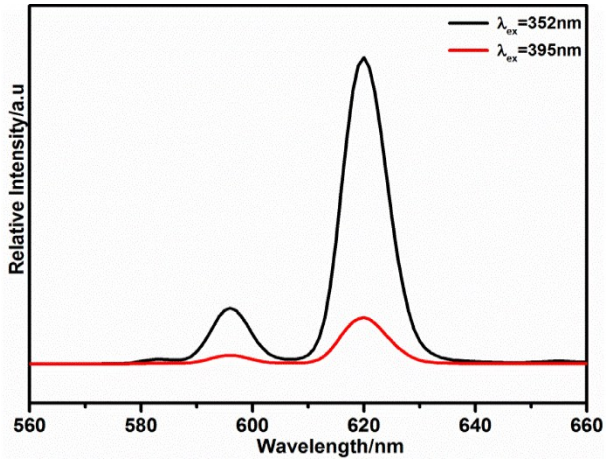

Fig. S4

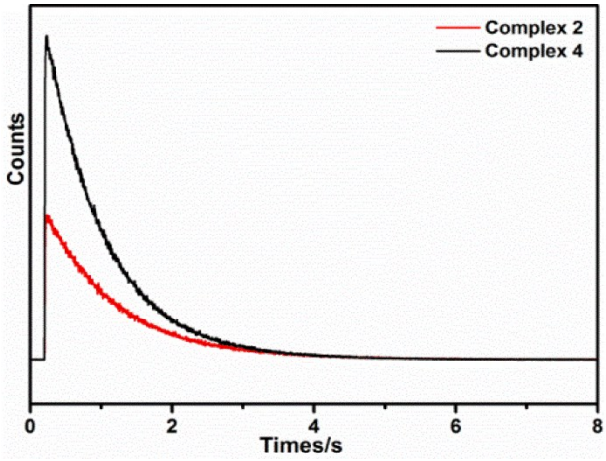

Fig. S5

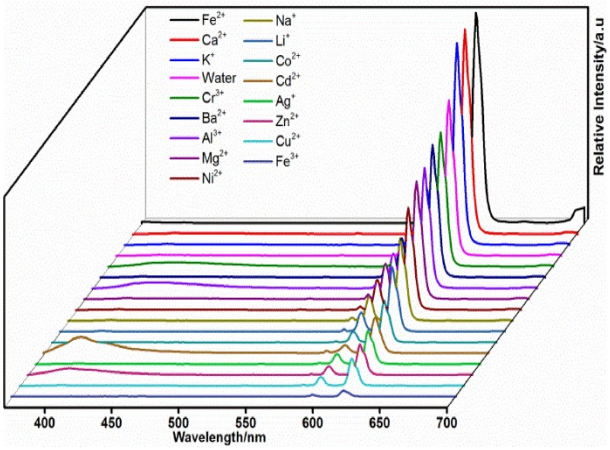

Fig. S6

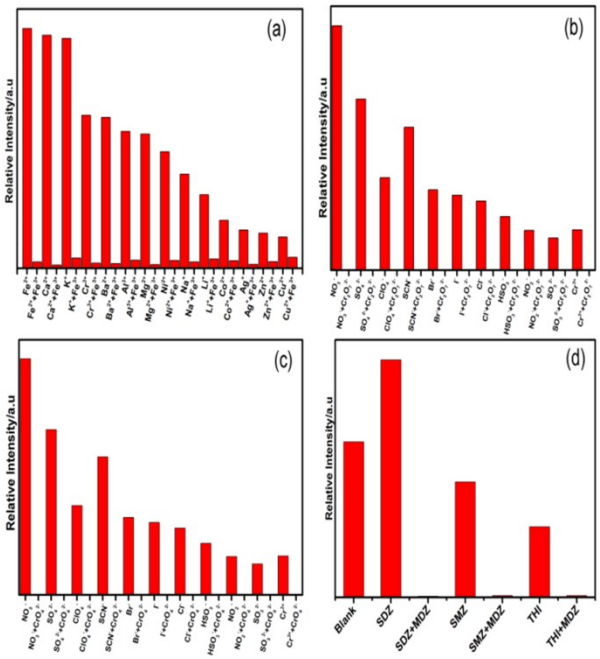

Fig. S7

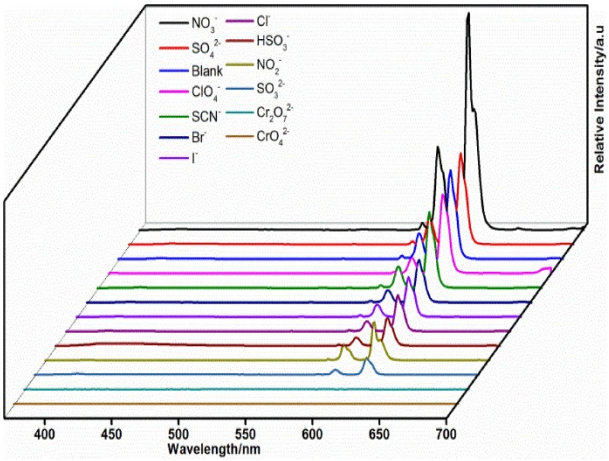

Fig. S8

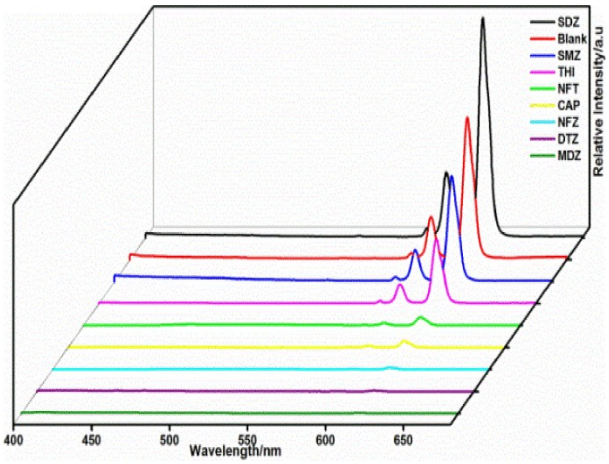

Fig. S9

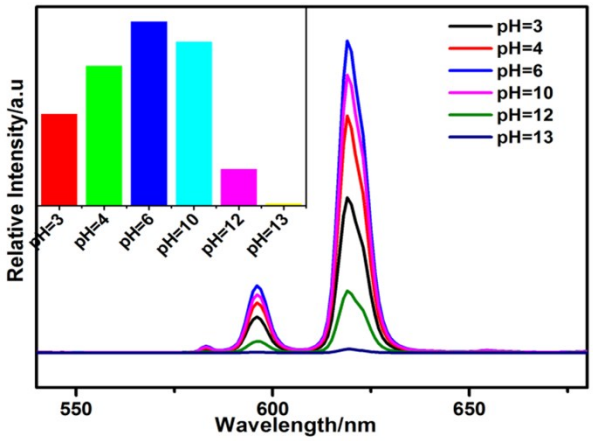

Fig. S10

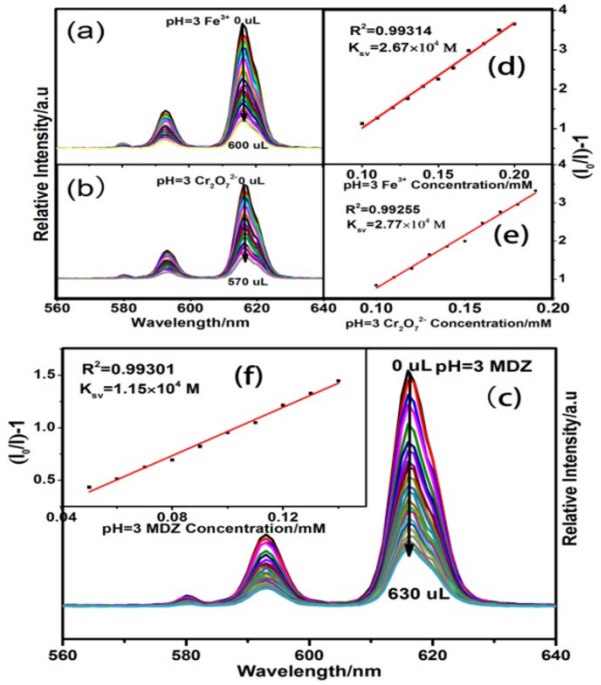

Fig. S11

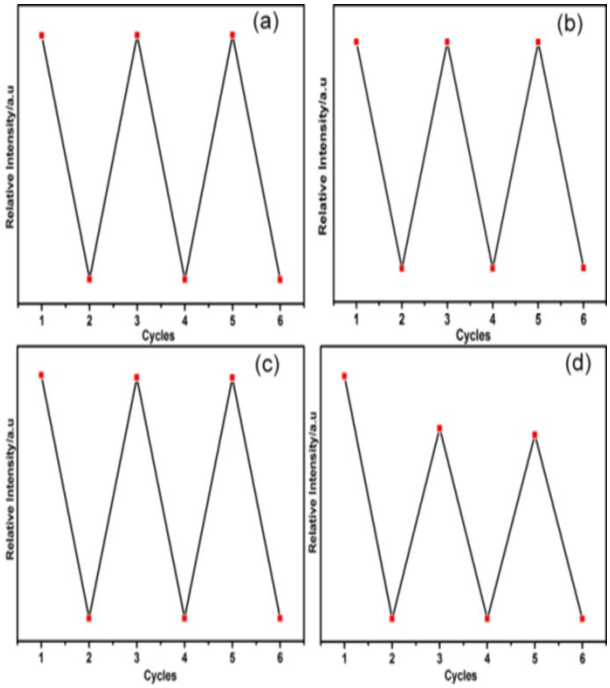

Fig. S12

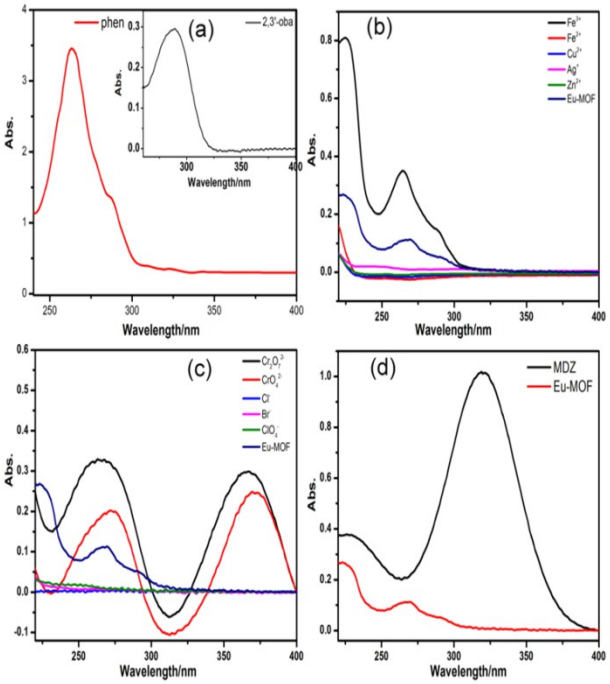

Fig. S13

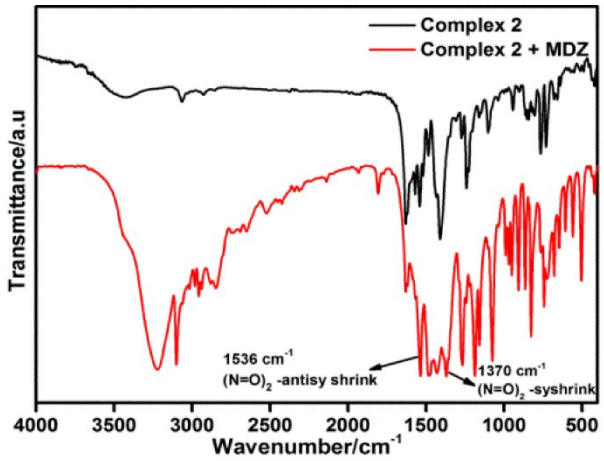

Fig. S14

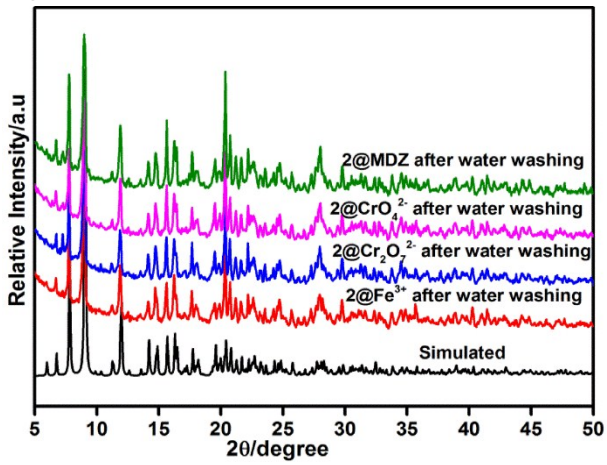

Fig. S15

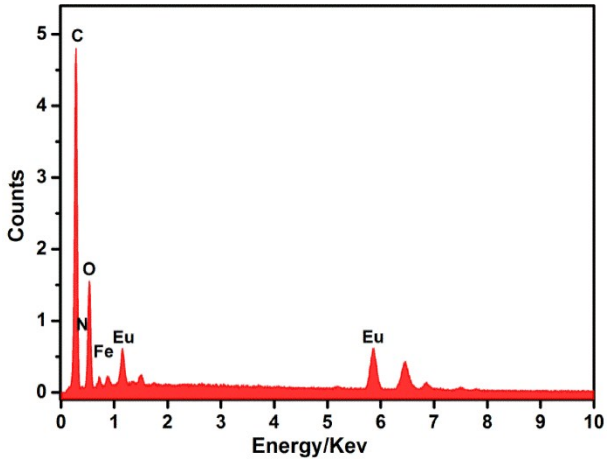

Fig. S16

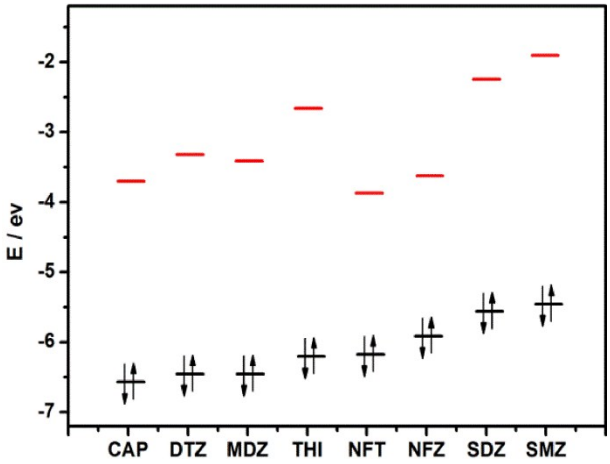

Table S1

	1		
La(1)-La(1)#1	4.0991(5)	La(2)-La(2)#2	4.2291(5)
La(1)-O(10)	2.601(3)	La(2)-O(7)#2	2.528(3)
La(1)-O(14)	2.480(3)	La(2)-O(7)	2.676(3)
La(1)-O(11)	2.494(3)	La(2)-O(2)	2.431(3)
La(1)-N(1)	2.689(4)	La(2)-N(4)	2.712(4)
La(1)-O(9)	2.512(3)	La(2)-O(5)	2.638(3)
La(1)-O(12)	2.438(3)	La(2)-O(3)	2.559(3)
La(1)-O(13)	2.945(3)	La(2)-O(6)	2.575(3)
La(1)-O(13)#1	2.471(3)	La(2)-N(3)	2.716(4)
La(1)-N(2)	2.736(4)	La(2)-O(4)	2.534(3)
O(10)-La(1)-N(1)	92.13(11)	O(7)#2-La(2)-O(7)	71.31(11)
O(10)-La(1)-O(13)	124.87(10)	O(7)#2-La(2)-N(4)	81.83(11)
O(10)-La(1)-N(2)	74.25(10)	O(7)-La(2)-N(4)	142.52(11)
O(14)-La(1)-O(10)	87.77(11)	O(7)#2-La(2)-O(5)	150.66(11)
O(14)-La(1)-O(11)	81.71(12)	O(7)#2-La(2)-O(3)	67.69(10)
O(14)-La(1)-N(1)	131.57(12)	O(7)#2-La(2)-O(6)	118.10(10)
O(14)-La(1)-O(9)	135.38(11)	O(7)#2-La(2)-N(3)	93.13(11)

O(14)-La(1)-O(13)	46.71(10)	O(7)-La(2)-N(3)	143.92(11)
O(14)-La(1)-N(2)	73.10(11)	O(7)#2-La(2)-O(4)	152.26(11)
O(11)-La(1)-O(10)	74.52(10)	O(2)-La(2)-O(7)	72.68(10)
O(11)-La(1)-N(1)	144.35(12)	O(2)-La(2)-O(7)#2	73.70(11)
O(11)-La(1)-O(9)	72.02(11)	O(2)-La(2)-N(4)	124.55(12)
O(11)-La(1)-O(13)	70.30(10)	O(2)-La(2)-O(5)	77.57(11)
O(11)-La(1)-N(2)	140.24(11)	O(2)-La(2)-O(3)	132.86(10)
N(1)-La(1)-O(13)	139.26(10)	O(2)-La(2)-O(6)	100.22(12)
N(1)-La(1)-N(2)	60.47(12)	O(2)-La(2)-N(3)	71.73(12)
O(9)-La(1)-O(10)	51.11(10)	O(2)-La(2)-O(4)	124.85(11)
O(9)-La(1)-N(1)	73.93(12)	N(4)-La(2)-N(3)	60.68(13)
O(9)-La(1)-O(13)	140.98(10)	O(5)-La(2)-O(7)	105.67(11)
O(9)-La(1)-N(2)	105.52(11)	O(5)-La(2)-N(4)	110.42(12)
O(12)-La(1)-O(10)	148.54(10)	O(5)-La(2)-N(3)	72.07(12)
O(12)-La(1)-O(14)	83.80(12)	O(3)-La(2)-O(7)	70.13(10)
O(12)-La(1)-O(11)	133.49(11)	O(3)-La(2)-N(4)	75.78(12)
O(12)-La(1)-N(1)	71.70(11)	O(3)-La(2)-O(5)	140.14(11)
O(12)-La(1)-O(9)	139.98(11)	O(3)-La(2)-O(6)	76.25(11)
O(12)-La(1)-O(13)#1	76.20(11)	O(3)-La(2)-N(3)	134.74(12)
O(12)-La(1)-O(13)	67.67(10)	O(6)-La(2)-O(7)	49.37(10)
O(12)-La(1)-N(2)	74.30(11)	O(6)-La(2)-N(4)	135.07(13)
O(13)#1-La(1)-O(10)	130.69(10)	O(6)-La(2)-O(5)	72.67(12)
O(13)#1-La(1)-O(14)	128.68(11)	O(6)-La(2)-N(3)	144.74(12)
O(13)#1-La(1)-O(11)	79.16(11)	O(4)-La(2)-O(7)	130.78(10)
O(13)#1-La(1)-N(1)	85.69(11)	O(4)-La(2)-N(4)	70.61(11)
O(13)#1-La(1)-O(9)	81.42(11)	O(4)-La(2)-O(5)	49.97(11)
O(13)#1-La(1)-O(13)	81.99(11)	O(4)-La(2)-O(3)	101.43(11)
O(13)#1-La(1)-N(2)	140.53(11)	O(4)-La(2)-O(6)	81.41(11)
N(2)-La(1)-O(13)	109.73(10)	O(4)-La(2)-N(3)	76.42(12)

Symmetry transformations used to generate equivalent atoms:1, #1 -x,-y+1,-z; #2 -x+1,-y+1,-z+1.

2

Eu(1)-Eu(1)#1	4.1475(6)	Eu(2)-Eu(2)#2	3.9251(6)
Eu(1)-N(1)	2.650(5)	Eu(2)-N(3)	2.555(5)
Eu(1)-N(2)	2.547(5)	Eu(2)-N(4)	2.647(4)
Eu(1)-O(1)	2.362(4)	Eu(2)-O(3)	2.446(3)
Eu(1)-O(2)#1	2.335(4)	Eu(2)-O(4)	2.452(4)
Eu(1)-O(6)	2.488(4)	Eu(2)-O(8)#2	2.385(4)
Eu(1)-O(7)	2.400(3)	Eu(2)-O(8)	2.642(4)
Eu(1)-O(11)	2.360(4)	Eu(2)-O(9)	2.476(4)
Eu(1)-O(12)#1	2.330(4)	Eu(2)-O(13)	2.398(3)
		Eu(2)-O(14)#2	2.350(4)
N(2)-Eu(1)-N(1)	63.02(15)	O(3)-Eu(2)-O(4)	53.17(12)

O(1)-Eu(1)-N(1)	66.78(14)	O(3)-Eu(2)-O(8)	156.51(12)
O(1)-Eu(1)-N(2)	78.34(16)	O(3)-Eu(2)-O(9)	144.07(13)
O(1)-Eu(1)-O(6)	143.60(14)	O(4)-Eu(2)-N(3)	72.27(14)
O(1)-Eu(1)-O(7)	139.85(15)	O(4)-Eu(2)-N(4)	120.09(14)
O(2)#1-Eu(1)-N(1)	145.99(16)	O(4)-Eu(2)-O(8)	137.44(11)
O(2)#1-Eu(1)-N(2)	141.82(16)	O(4)-Eu(2)-O(9)	134.66(13)
O(2)#1-Eu(1)-O(1)	129.13(16)	O(8)#2-Eu(2)-N(3)	148.29(14)
O(2)#1-Eu(1)-O(6)	73.39(13)	O(8)#2-Eu(2)-N(4)	141.75(13)
O(2)#1-Eu(1)-O(7)	86.45(16)	O(8)-Eu(2)-N(4)	101.16(13)
O(2)#1-Eu(1)-O(11)	74.97(14)	O(8)#2-Eu(2)-O(3)	88.11(12)
O(6)-Eu(1)-N(1)	112.39(13)	O(8)#2-Eu(2)-O(4)	76.34(13)
O(6)-Eu(1)-N(2)	70.48(14)	O(8)#2-Eu(2)-O(8)	77.43(13)
O(7)-Eu(1)-N(1)	73.10(13)	O(8)#2-Eu(2)-O(9)	126.92(12)
O(7)-Eu(1)-N(2)	82.23(14)	O(8)#2-Eu(2)-O(13)	80.14(12)
O(7)-Eu(1)-O(6)	53.93(12)	O(9)-Eu(2)-N(3)	75.39(14)
O(11)-Eu(1)-N(1)	77.19(13)	O(9)-Eu(2)-N(4)	68.42(13)
O(11)-Eu(1)-N(2)	140.20(15)	O(9)-Eu(2)-O(8)	50.36(11)
O(11)-Eu(1)-O(1)	85.55(15)	O(13)-Eu(2)-N(3)	86.87(14)
O(11)-Eu(1)-O(6)	130.66(12)	O(13)-Eu(2)-N(4)	135.84(14)
O(11)-Eu(1)-O(7)	87.45(13)	O(13)-Eu(2)-O(3)	126.85(13)
O(12)#1-Eu(1)-N(1)	133.75(15)	O(13)-Eu(2)-O(4)	73.70(12)
O(12)#1-Eu(1)-N(2)	81.48(15)	O(13)-Eu(2)-O(8)	69.21(11)
O(12)#1-Eu(1)-O(1)	78.29(15)	O(13)-Eu(2)-O(9)	73.63(12)
O(12)#1-Eu(1)-O(2)#1	79.94(17)	O(14)#2-Eu(2)-N(3)	132.35(14)
O(12)#1-Eu(1)-O(6)	78.94(13)	O(14)#2-Eu(2)-N(4)	71.62(14)
O(12)#1-Eu(1)-O(7)	132.87(14)	O(14)#2-Eu(2)-O(3)	82.24(13)
O(12)#1-Eu(1)-O(11)	130.56(13)	O(14)#2-Eu(2)-O(4)	124.91(13)
N(3)-Eu(2)-N(4)	62.65(15)	O(14)#2-Eu(2)-O(8)	75.63(12)
N(3)-Eu(2)-O(8)	124.48(13)	O(14)#2-Eu(2)-O(8)#2	71.07(12)
O(3)-Eu(2)-N(3)	76.75(14)	O(14)#2-Eu(2)-O(9)	100.36(13)
O(3)-Eu(2)-N(4)	78.82(13)	O(14)#2-Eu(2)-O(13)	138.46(12)

Symmetry transformations used to generate equivalent atoms**:2**，#1 -x+1,-y+1,-z+1; #2 -x,-y+2,-z+1.

3			
Gd(1)-O(12)	2.480(3)	Gd(2)-Gd(2)#1	3.9165(5)
Gd(1)-O(14)	2.353(3)	Gd(2)-O(6)	2.399(3)
Gd(1)-O(11)	2.385(3)	Gd(2)-O(4)	2.484(4)
Gd(1)-O(9)	2.354(4)	Gd(2)-O(3)	2.638(3)
Gd(1)-C(54)	2.786(5)	Gd(2)-O(3)#1	2.377(3)
Gd(1)-O(10)	2.329(3)	Gd(2)-O(7)	2.345(3)
Gd(1)-O(13)	2.326(4)	Gd(2)-O(2)	2.451(3)
Gd(1)-N(1)	2.634(4)	Gd(2)-O(1)	2.438(3)
Gd(1)-N(2)	2.553(4)	Gd(2)-N(3)	2.635(4)
		Gd(2)-N(4)	2.552(4)

O(12)-Gd(1)-N(1)	113.03(11)	O(6)-Gd(2)-O(1)	127.53(11)
O(12)-Gd(1)-N(2)	70.89(13)	O(6)-Gd(2)-C(13)	66.43(12)
O(14)-Gd(1)-N(1)	76.62(12)	O(6)-Gd(2)-N(3)	135.67(12)
O(14)-Gd(1)-O(12)	130.70(12)	O(4)-Gd(2)-O(3)	50.27(11)
O(14)-Gd(1)-O(11)	87.67(12)	O(4)-Gd(2)-N(4)	75.76(12)
O(14)-Gd(1)-N(2)	140.07(13)	O(4)-Gd(2)-N(3)	68.56(12)
O(11)-Gd(1)-N(1)	73.79(12)	O(3)#1-Gd(2)-O(6)	80.11(11)
O(11)-Gd(1)-O(12)	53.62(11)	O(3)#1-Gd(2)-O(4)	126.74(11)
O(11)-Gd(1)-N(2)	82.66(13)	O(3)#1-Gd(2)-O(3)	77.42(12)
N(2)-Gd(1)-N(1)	63.47(13)	O(3)#1-Gd(2)-N(4)	147.47(13)
O(9)-Gd(1)-N(1)	67.23(13)	O(3)#1-Gd(2)-O(2)	75.90(12)
O(9)-Gd(1)-O(12)	144.65(13)	O(3)#1-Gd(2)-O(1)	88.37(11)
O(9)-Gd(1)-O(14)	84.55(14)	O(3)#1-Gd(2)-N(3)	141.85(12)
O(9)-Gd(1)-O(11)	141.01(13)	N(4)-Gd(2)-O(3)	124.65(11)
O(9)-Gd(1)-N(2)	79.27(14)	N(4)-Gd(2)-N(3)	63.54(14)
O(10)-Gd(1)-N(1)	134.17(14)	O(7)-Gd(2)-O(6)	137.90(11)
O(10)-Gd(1)-O(12)	79.19(12)	O(7)-Gd(2)-O(4)	100.36(13)
O(10)-Gd(1)-O(14)	130.09(13)	O(7)-Gd(2)-O(3)	75.21(11)
O(10)-Gd(1)-O(11)	132.80(13)	O(7)-Gd(2)-O(3)#1	70.92(11)
O(10)-Gd(1)-N(2)	81.79(14)	O(7)-Gd(2)-N(4)	133.50(13)
O(10)-Gd(1)-O(9)	78.16(14)	O(7)-Gd(2)-O(2)	124.70(12)
O(13)-Gd(1)-N(1)	145.38(14)	O(7)-Gd(2)-O(1)	82.30(11)
O(13)-Gd(1)-O(12)	73.05(13)	O(7)-Gd(2)-N(3)	71.89(12)
O(13)-Gd(1)-O(14)	74.96(13)	O(2)-Gd(2)-O(4)	134.90(12)
O(13)-Gd(1)-O(11)	85.66(15)	O(2)-Gd(2)-O(3)	137.37(11)
O(13)-Gd(1)-N(2)	141.98(14)	O(2)-Gd(2)-N(4)	71.99(13)
O(13)-Gd(1)-O(9)	128.32(14)	O(2)-Gd(2)-N(3)	120.40(12)
O(13)-Gd(1)-O(10)	80.04(16)	O(1)-Gd(2)-O(4)	143.96(12)
O(6)-Gd(2)-O(4)	73.17(12)	O(1)-Gd(2)-O(3)	156.30(11)
O(6)-Gd(2)-O(3)	69.02(10)	O(1)-Gd(2)-N(4)	76.76(12)
O(6)-Gd(2)-N(4)	86.27(12)	O(1)-Gd(2)-O(2)	53.49(11)
O(6)-Gd(2)-O(2)	74.08(11)	O(1)-Gd(2)-N(3)	78.51(12)
O(6)-Gd(2)-C(14)	100.70(14)	N(3)-Gd(2)-O(3)	101.03(12)

Symmetry transformations used to generate equivalent atoms:**3**, #1 -x,-y+1,-z+2.

4

Tb(1)-O(1)#1	2.331(3)	Tb(2)-O(12)	2.440(4)
Tb(1)-O(9)#2	2.372(3)	Tb(2)-O(5)	2.326(3)
Tb(1)-O(10)#2	2.488(3)	Tb(2)-O(6)	2.364(4)
Tb(1)-O(15)#3	2.340(4)	Tb(2)-O(6)#5	2.635(3)
Tb(1)-O(14)#4	2.333(4)	Tb(2)-O(7)#5	2.468(4)
Tb(2)-O(4)#5	2.380(3)	Tb(2)-O(11)	2.423(3)
Tb(1)-N(1)	2.627(4)	Tb(2)-N(3)	2.617(4)
Tb(1)-N(2)	2.529(4)	Tb(2)-N(4)	2.544(4)

Tb(1)-O(2)	2.317(4)		
O(1)#1-Tb(1)-O(9)#2	87.93(13)	O(5)-Tb(2)-O(12)	124.57(12)
O(1)#1-Tb(1)-O(10)#2	131.51(13)	O(5)-Tb(2)-O(6)#5	75.21(11)
O(1)#1-Tb(1)-N(1)	76.55(12)	O(5)-Tb(2)-O(6)	71.48(12)
O(1)#1-Tb(1)-O(15)#3	74.43(13)	O(5)-Tb(2)-O(7)#5	100.27(13)
O(1)#1-Tb(1)-O(14)#4	83.82(14)	O(5)-Tb(2)-O(4)#5	138.37(11)
O(1)#1-Tb(1)-N(2)	140.33(13)	O(5)-Tb(2)-O(11)	82.42(12)
O(9)#2-Tb(1)-O(10)#2	53.86(12)	O(5)-Tb(2)-N(4)	133.34(14)
O(9)#2-Tb(1)-N(1)	74.00(13)	O(5)-Tb(2)-N(3)	71.56(13)
O(9)#2-Tb(1)-N(2)	82.86(14)	O(6)#5-Tb(2)-Tb(2)#5	36.20(8)
O(10)#2-Tb(1)-N(1)	113.00(12)	O(6)-Tb(2)-O(12)	75.42(12)
O(10)#2-Tb(1)-N(2)	70.25(14)	O(6)-Tb(2)-O(6)#5	77.37(13)
N(1)-Tb(1)-C(40)#2	94.15(14)	O(6)-Tb(2)-O(7)#5	126.89(12)
O(15)#3-Tb(1)-O(9)#2	85.65(15)	O(6)-Tb(2)-O(4)#5	79.79(12)
O(15)#3-Tb(1)-O(10)#2	74.06(13)	O(6)-Tb(2)-O(11)	88.49(12)
O(15)#3-Tb(1)-N(1)	144.93(14)	O(6)-Tb(2)-N(4)	147.03(14)
O(15)#3-Tb(1)-N(2)	142.40(14)	O(6)-Tb(2)-N(3)	142.07(13)
O(14)#4-Tb(1)-O(9)#2	141.23(14)	O(7)#5-Tb(2)-O(6)#5	50.52(11)
O(14)#4-Tb(1)-O(10)#2	144.57(13)	O(7)#5-Tb(2)-N(4)	75.84(13)
O(14)#4-Tb(1)-N(1)	67.23(14)	O(7)#5-Tb(2)-N(3)	68.47(13)
O(14)#4-Tb(1)-O(15)#3	127.62(14)	O(4)#5-Tb(2)-O(12)	73.71(13)
O(14)#4-Tb(1)-N(2)	79.83(15)	O(4)#5-Tb(2)-O(6)#5	69.48(11)
N(2)-Tb(1)-N(1)	63.82(13)	O(4)#5-Tb(2)-O(7)#5	73.60(13)
O(2)-Tb(1)-O(1)#1	129.27(14)	O(4)#5-Tb(2)-O(11)	126.97(12)
O(2)-Tb(1)-O(9)#2	133.26(13)	O(4)#5-Tb(2)-N(4)	86.09(13)
O(2)-Tb(1)-O(10)#2	79.40(13)	O(4)#5-Tb(2)-N(3)	135.89(13)
O(2)-Tb(1)-N(1)	134.31(14)	O(11)-Tb(2)-O(12)	53.31(12)
O(2)-Tb(1)-O(15)#3	80.17(16)	O(11)-Tb(2)-O(6)#5	156.37(11)
O(2)-Tb(1)-O(14)#4	78.06(14)	O(11)-Tb(2)-O(7)#5	143.77(13)
O(2)-Tb(1)-N(2)	82.04(14)	O(11)-Tb(2)-N(4)	76.47(12)
O(12)-Tb(2)-O(6)#5	137.26(12)	O(11)-Tb(2)-N(3)	78.53(13)
O(12)-Tb(2)-O(7)#5	135.12(13)	N(4)-Tb(2)-O(6)#5	124.94(12)
O(12)-Tb(2)-N(4)	72.05(14)	N(4)-Tb(2)-N(3)	63.75(14)
O(12)-Tb(2)-N(3)	120.58(13)	N(3)-Tb(2)-O(6)#5	101.06(12)

Symmetry transformations used to generate equivalent atoms:4, #1 -x+2,-y,-z; #2 x,y,z-1; #3 -x+1,y-1/2,-z+1/2; #4 x+1,-y+1/2,z-1/2; #5 -x+1,-y,-z+1.

Table S2

Analytes	HUMO(ev)	LUMO(ev)
CAP	-6.579	-3.692
DTZ	-6.427	-3.336
MDZ	-6.42	-3.425
THI	-6.206	-2.661

NFT	-6.205	-3.864
NFZ	-5.905	-3.624
SDZ	-5.538	-2.26
SMZ	-5.457	-1.898