Supporting Information

Two samarium(III) complexes with tunable fluorescence from *in situ* reactions of 2-ethoxy-6-((pyridin-2-ylmethylimino)-methyl)phenol with Sm^{3+} ion

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Contents

Table S1. Selected bond lengths (Å) and bond angles (º) for compounds **1**-**2**.

1			
Sm(1)-N(1)	2.681(2)	O(6)-Sm(1)-O(2)	167.53(8)
Sm(1)-N(2)	2.667(2)	O(6)-Sm(1)-N(6)	67.18(8)
Sm(1)-N(3)	2.705(3)	O(2)-Sm(1)-N(6)	118.14(7)
Sm(1)-N(4)	2.774(2)	O(6)-Sm(1)-N(2)	117.98(7)
Sm(1)-N(5)	2.672(3)	O(2)-Sm(1)-N(2)	66.54(6)
Sm(1)-N(6)	2.622(3)	N(6)-Sm(1)-N(2)	138.22(8)
Sm(1)-N(7)	2.724(3)	O(6)-Sm(1)-N(5)	118.80(8)
Sm(1)-N(8)	2.747 (2)	O(2)-Sm(1)-N(5)	72.38(7)
Sm(1)-O(2)	2.398(2)	N(6)-Sm(1)-N(5)	61.42(8)
Sm(1)-O(6)	2.398(2)	N(2)-Sm(1)-N(5)	84.19(8)
N(5)-Sm(1)-N(8)	64.85(7)	O(6)-Sm(1)-N(1)	74.08(8)
N(1)-Sm(1)-N(8)	130.92(7)	O(2)-Sm(1)-N(1)	116.98(7)
N(3)-Sm(1)-N(8)	105.43(7)	N(6)-Sm(1)-N(1)	82.73(7)
N(7)-Sm(1)-N(8)	59.70(8)	N(2)-Sm(1)-N(1)	61.95(7)
O(6)-Sm(1)-N(4)	61.74(8)	N(5)-Sm(1)-N(1)	68.81(7)
O(2)-Sm(1)-N(4)	116.18(7)	O(6)-Sm(1)-N(3)	94.29(8)
N(6)-Sm(1)-N(4)	124.89(7)	O(2)-Sm(1)-N(3)	75.07(8)
N(2)-Sm(1)-N(4)	61.02(8)	N(6)-Sm(1)-N(3)	144.69(8)
N(5)-Sm(1)-N(4)	131.28(7)	N(2)-Sm(1)-N(3)	76.75(8)
N(1)-Sm(1)-N(4)	65.06(7)	N(5)-Sm(1)-N(3)	146.74(8)
N(3)-Sm(1)-N(4)	60.09(7)	N(1)-Sm(1)-N(3)	122.31(7)
N(7)-Sm(1)-N(4)	105.32(8)	O(6)-Sm(1)-N(7)	74.63(7)
N(2)-Sm(1)-N(8)	126.06(7)	O(2)-Sm(1)-N(7)	94.91(7)
N(8)-Sm(1)-N(4)	163.69(7)	N(6)-Sm(1)-N(7)	78.84(8)
N(3)-Sm(1)-N(7)	67.03(8)	N(2)-Sm(1)-N(7)	142.71(8)
O(6)-Sm(1)-N(8)	115.57(7)	N(5)-Sm(1)-N(7)	122.24(7)
O(2)-Sm(1)-N(8)	62.55(7)	N(1)-Sm(1)-N(7)	147.92(8)
N(6)-Sm(1)-N(8)	61.71(7)		

2			
Sm(1)-N(3)	2.336(4)	O(2)-Sm(1)-N(3)#1	147.85(17)
Sm(1)-N(3)#1	2.314(4)	O(2)-Sm(1)-N(3)	135.33(16)
Sm(1)-N(1)	2.470(5)	N(3)-Sm(1)-N(3)#1	71.12(17)
Sm(1)-N(4)#1	2.591(5)	O(2)-Sm(1)-O(4)	81.98(17)
Sm(1)-N(2)	2.680(6)	N(3)-Sm(1)-O(4)#1	86.62(16)
Sm(1)-O(2)	2.451(5)	N(3)-Sm(1)-O(4)	135.34(16)
Sm(1)-O(3)	2.227(4)	O(2)-Sm(1)-N(1)	72.34(17)
Sm(1)-O(4)	2.471(5)	N(3)-Sm(1)-N(1)#1	138.18(15)
O(4)-Sm(1)-N(4)#1	72.91(18)	N(3)-Sm(1)-N(1)	67.36(16)
N(1)-Sm(1)-N(4)#1	149.40(17)	O(4)-Sm(1)-N(1)	120.14(18)
O(3)-Sm(1)-N(4)#1	78.75(17)	O(2)-Sm(1)-O(3)	81.32(17)
O(2)-Sm(1)-N(2)	106.33(17)	N(3)-Sm(1)-O(3)#1	93.55(17)
N(3)-Sm(1)-N(2)#1	99.46(15)	N(3)-Sm(1)-O(3)	73.24(15)
N(3)-Sm(1)-N(2)	71.45(15)	O(4)-Sm(1)-O(3)	148.48(17)
O(4)-Sm(1)-N(2)	74.91(17)	N(1)-Sm(1)-O(3)	79.41(17)
N(1)-Sm(1)-N(2)	62.80(16)	O(2)-Sm(1)-N(4)#1	83.36(18)
O(3)-Sm(1)-N(2)	135.69(17)	N(3)#1-Sm(1)-N(4)#1	64.53(16)
N(4)#1- Sm(1)-N(2)	144.63(17)	N(3)-Sm(1)-N(4)#1	125.09(16)

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

Table S2. Hydrogen bond parameters of compounds **1** and **2**.

D-H···A	d (D-H) (Å)	d (H···A) (Å)	d (D···A) (Å)	∠ DHA (°)
		1		
O(4)-H(4A)...O(1W)	0.82	2.06	2.720(5)	137.3
O(8)-H(8)...O(7)#1	0.82	2.23	2.683(4)	115.2
O(1W)-H(1WB)...O(3)	0.85	2.38	3.199(7)	162.4
C(1)-H(1)...N(6)	0.93	2.70	3.407(4)	133.9
C(14)-H(14A)...O(7)#2	0.97	2.65	3.585(6)	161.8
C(16)-H(16)...O(2)	0.93	2.58	3.157(5)	120.8
C(46)-H(46)...O(6)	0.93	2.58	3.164(4)	120.8
		2		
C(24)-H(24A)…O(2)	0.96	2.59	3.278(13)	127.6
C(23)-H(23A)…O(7)#3	0.96	2.63	3.512(16)	153.5
O(4)-H(4A)… N(5)#4	0.858(9)	2.602(14)	3.457(10)	175.(4)
O(4)-H(4A)…O(6) #4	0.858(9)	2.48(3)	3.277(11)	155.(6)
O(4)-H(4A)… O(5)#4	0.858(9)	2.00(3)	2.782(8)	151.(5)
O(3)-H(3A)- O(5)#3	0.854(9)	1.924(17)	2.768(8)	169.(7)
C(19)-H(19)-O(7)	0.93	2.49	3.347(12)	154.1
C(21)-H(21)-O(5)#3	0.96	2.63	3.353(9)	130.4
C(15)-H(15)- O(5)#4	0.93	2.42	3.163(10)	137.2
C(9)-H(9)- O(6)	0.93	2.61	3.464(12)	153.2
C(10)-H(10)-O(7)	0.96	2.53	3.455(11)	158.4

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

Table S3. The related parameters for luminescent complexes **1** and **2**.

Parameter	**1**	**2**
Emission lifetime (τ_{obs} /us)	34.5	7.4
Quantum yield (Q_{Sm}^{Sm})	1.1%	0.2%
Energy transfer efficiency(η_{sens})	39%	3%

*The energy transfer efficiency and quantum yield were calculated through the following equation:

$$Q_{Sm}^{L} = \eta_{sens} Q_{Sm}^{Sm} = \eta_{sens} \tau_{obs} / \tau_{rad}$$

where Q_{Sm}^{L} were determined by theintegrating sphere method, Q_{Sm}^{Sm} represents the intrinsic quantum yield and τ_{obs} and τ_{rad} are the observed and radiative (or natural) lifetimes of the $^4G_{5/2}$

state.

Figure S1.

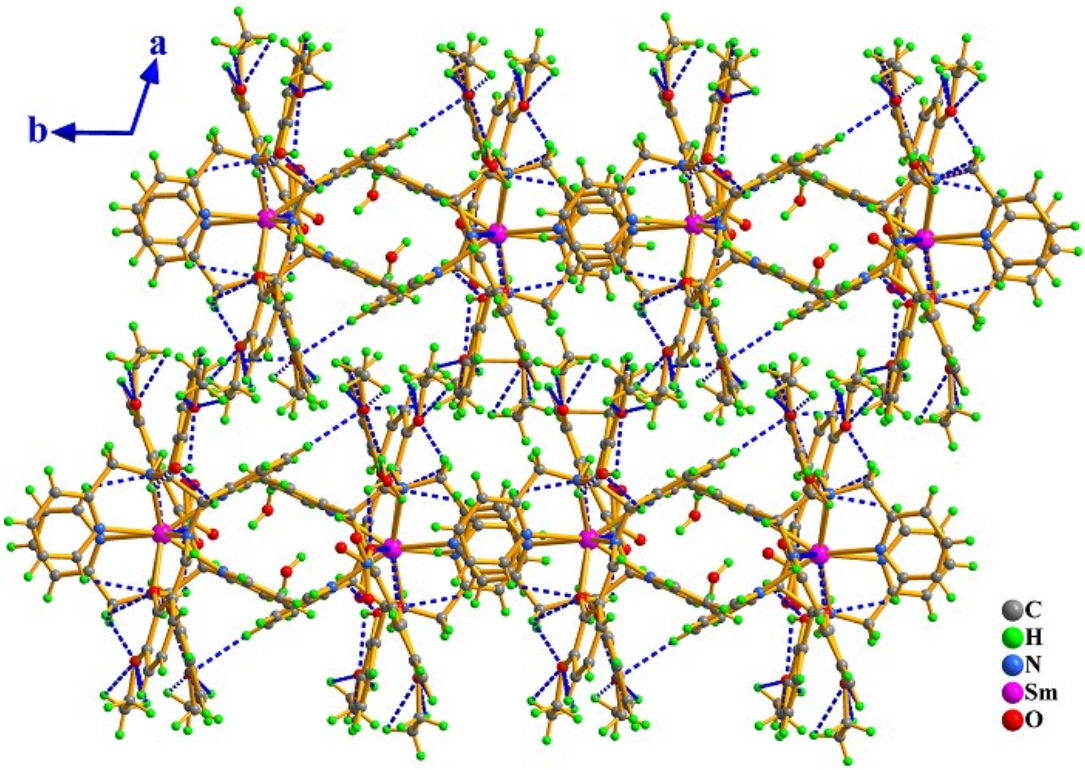


Figure S2.

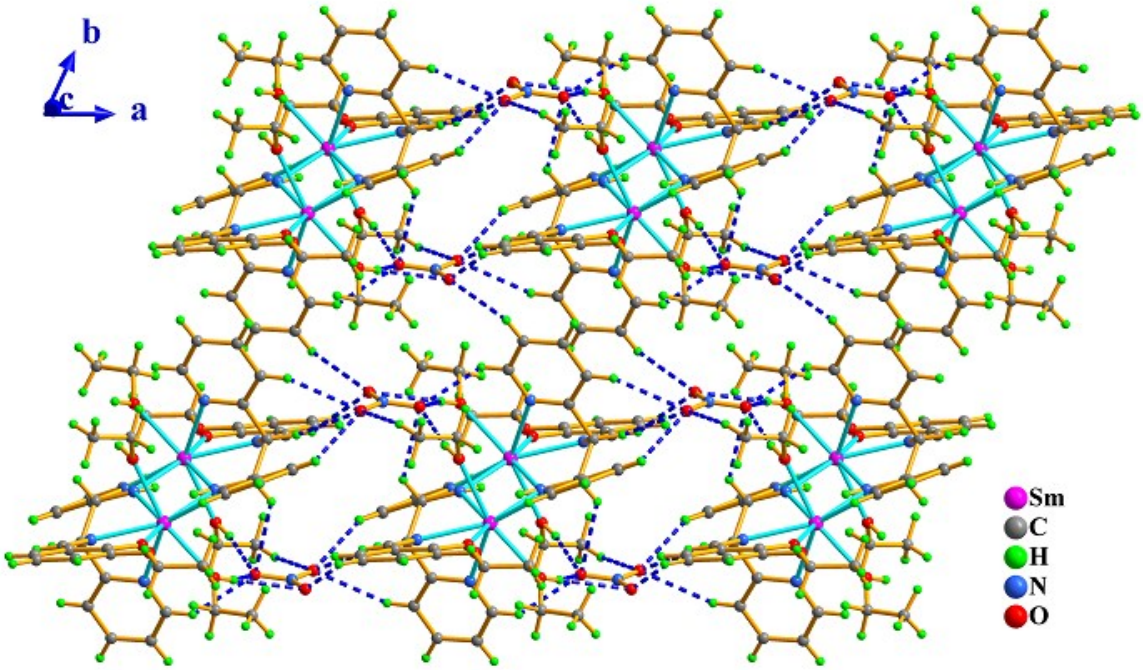
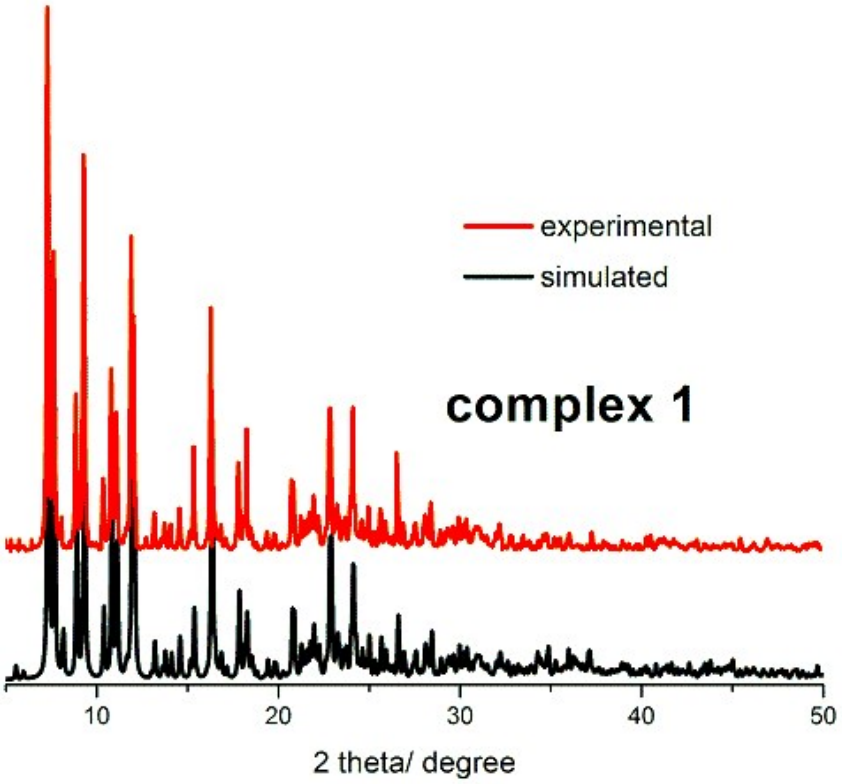


Figure S3.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simulated
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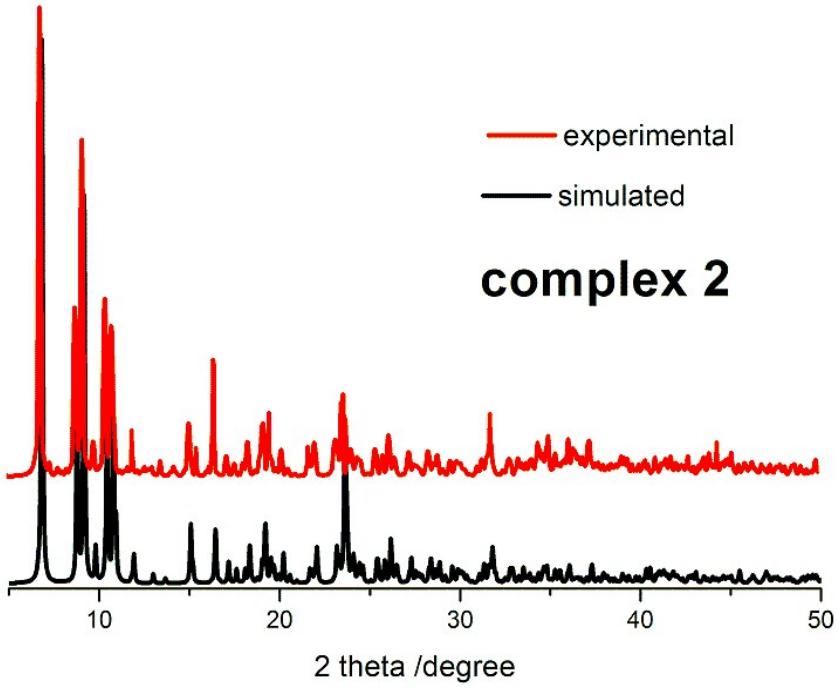
20
30
40
50
2 theta/ degree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10
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30
40
50
2 theta /degree

Figure S4.

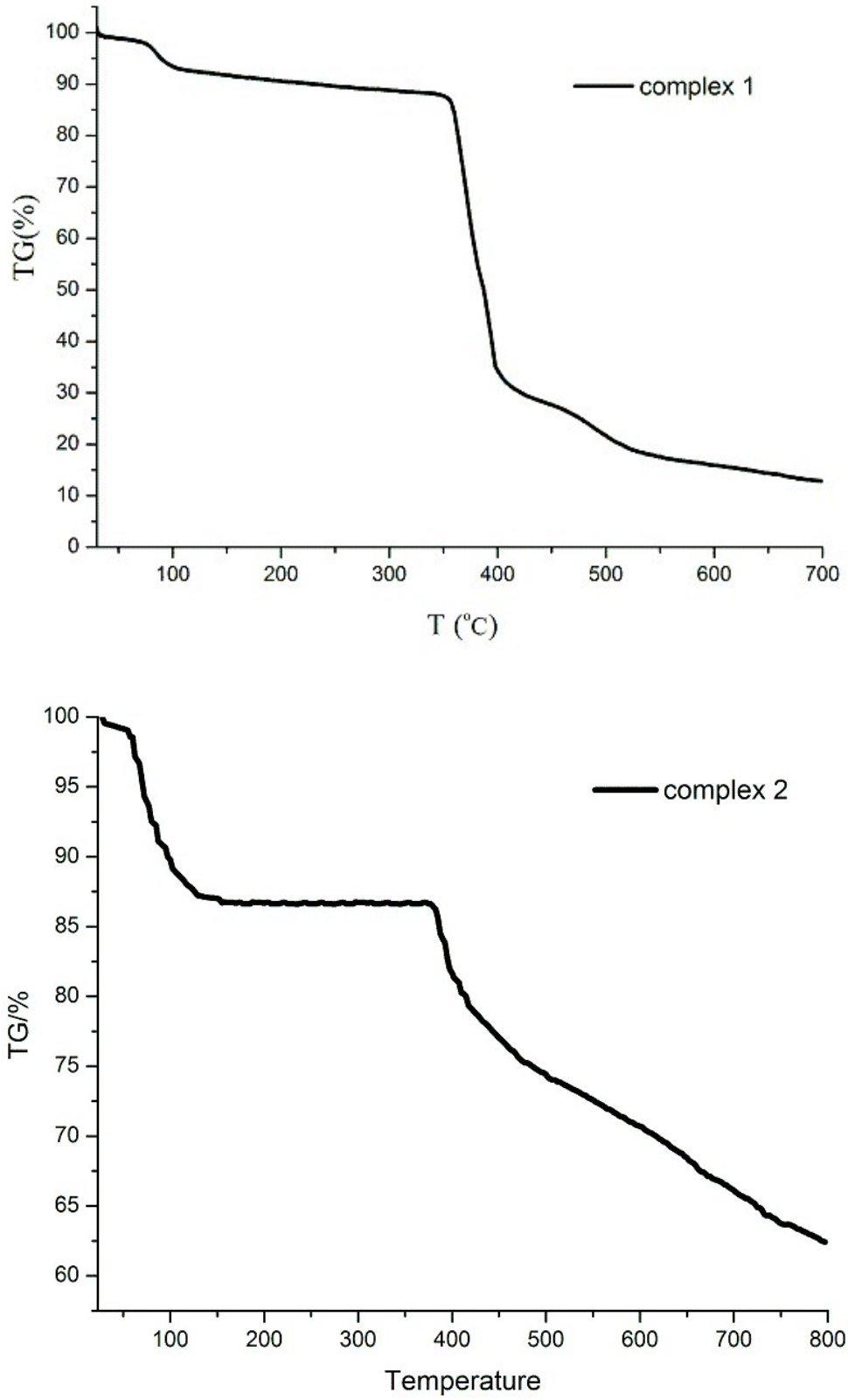

Figure S5.

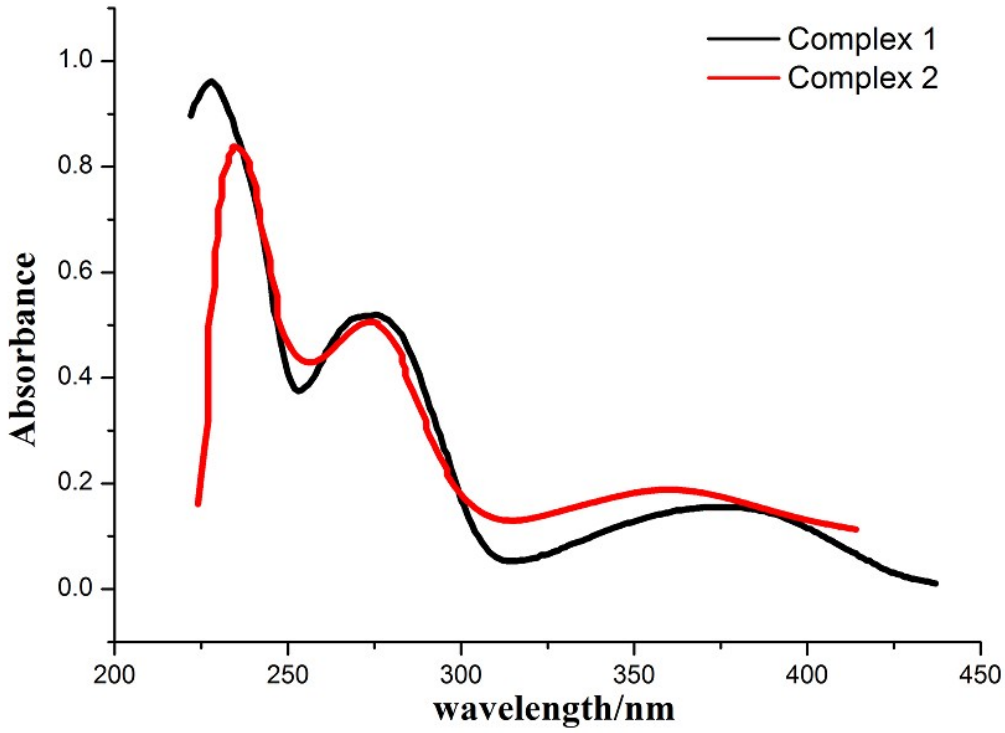

Figure S6.