Supporting Information

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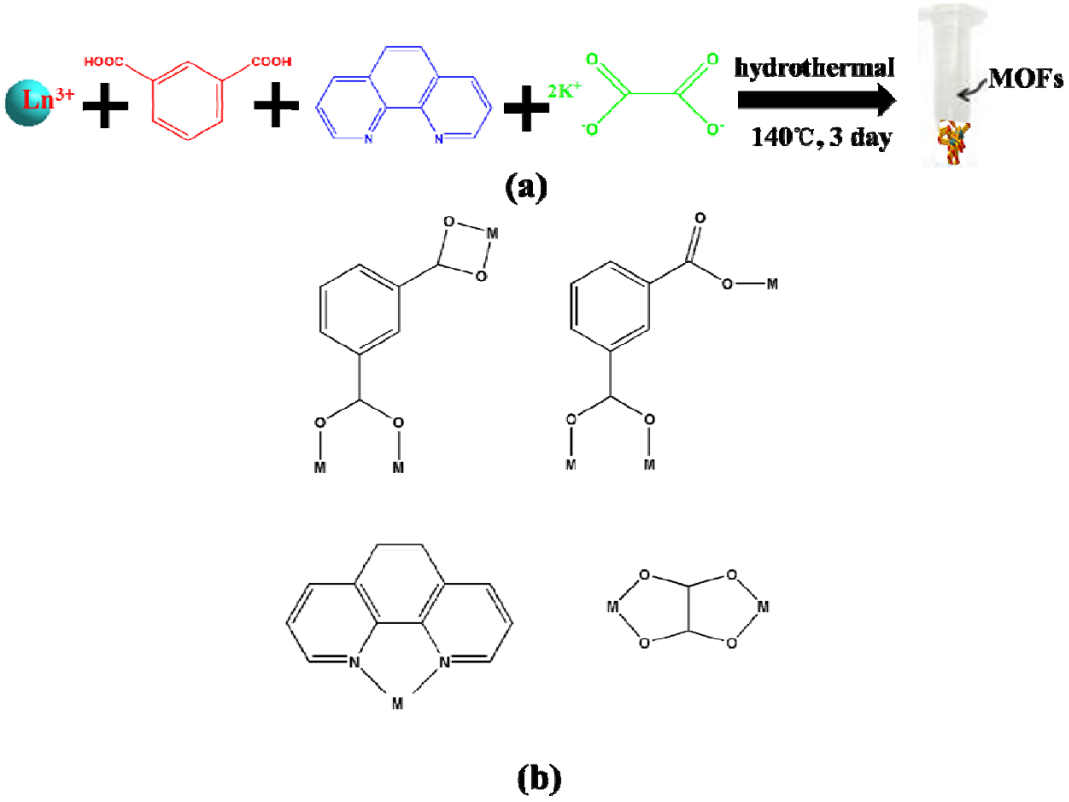


Scheme. S1 (a) Synthetic procedure formation of the target complexes. **(b)** The coordination modes of the ligands in complexes **1-3**.

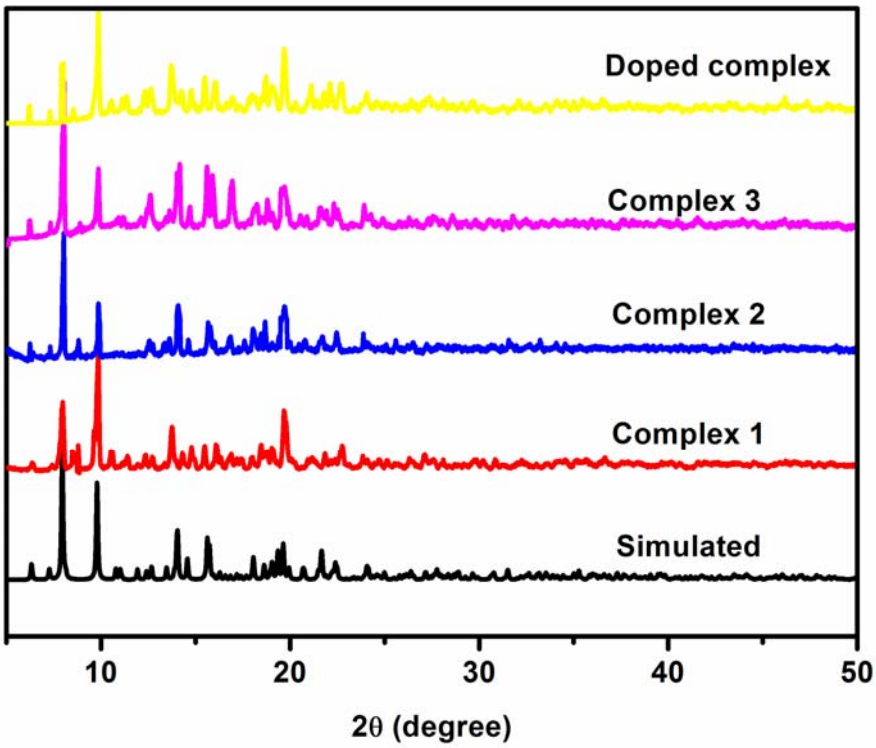


Fig. S1. The PXRD patterns for complexes **1-3** and the $Yb_{0.73}Tb_{0.25}Eu_{0.02}$ doped complex.

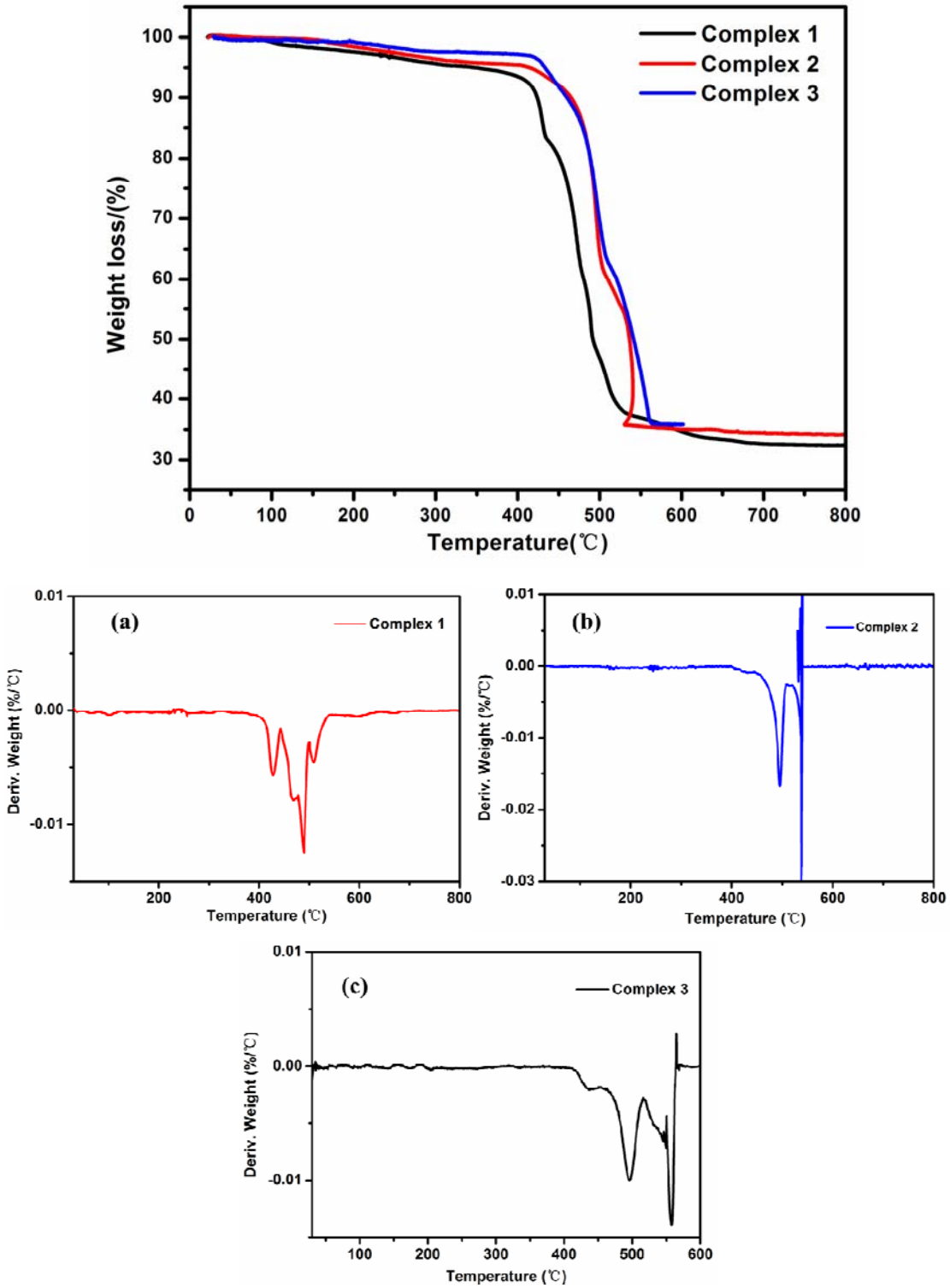
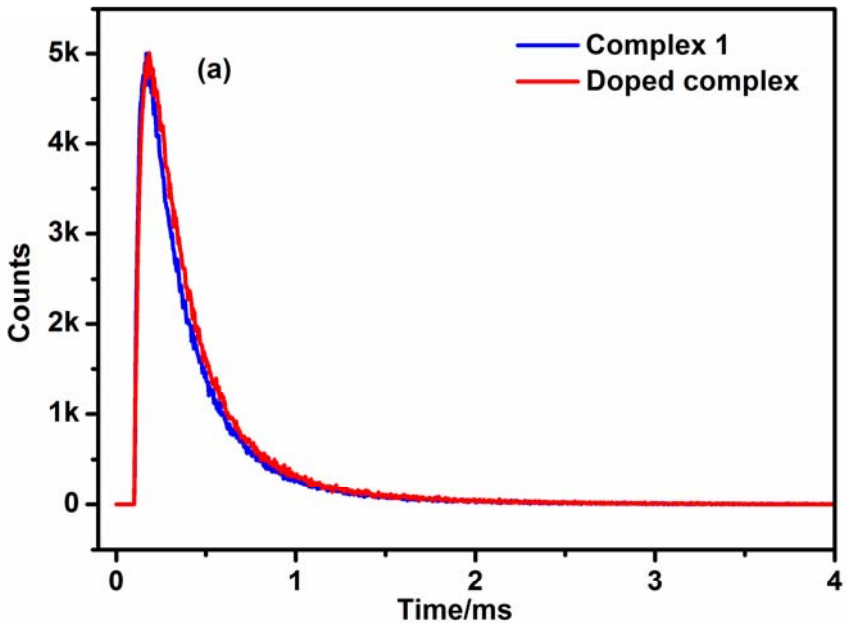


Fig. S2 The TGA curves of complexes **1**-**3** and DTG (derivative weight loss) curves from conventional TGA of complex **1** (a), complex **2** (b) and complex **3** (c).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Time/ms
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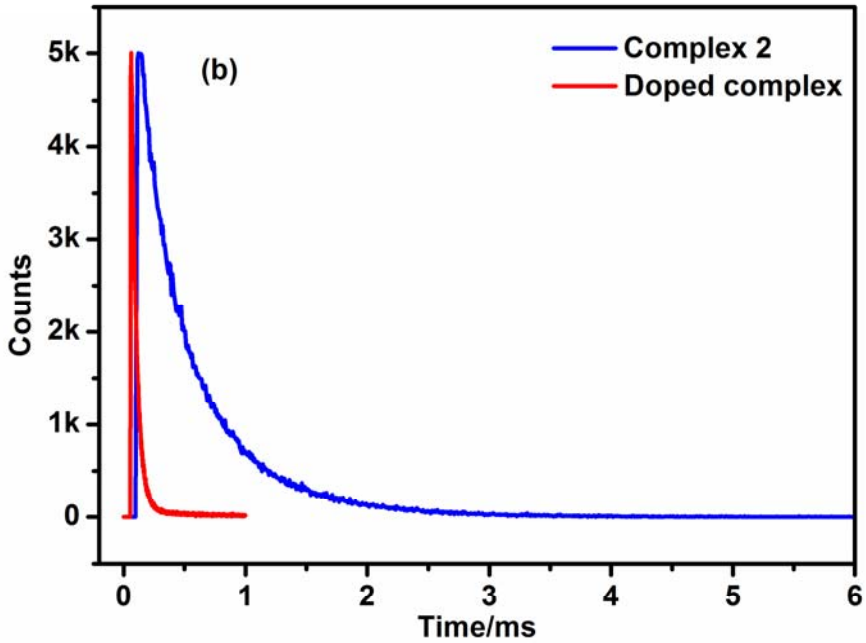
4k
3k
2k
1k
0
0
1
2
3
4


(b)
Complex 2
Doped complex
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Time/ms
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4k
3k
2k
1k
0
0
1
2
3
4
5
6

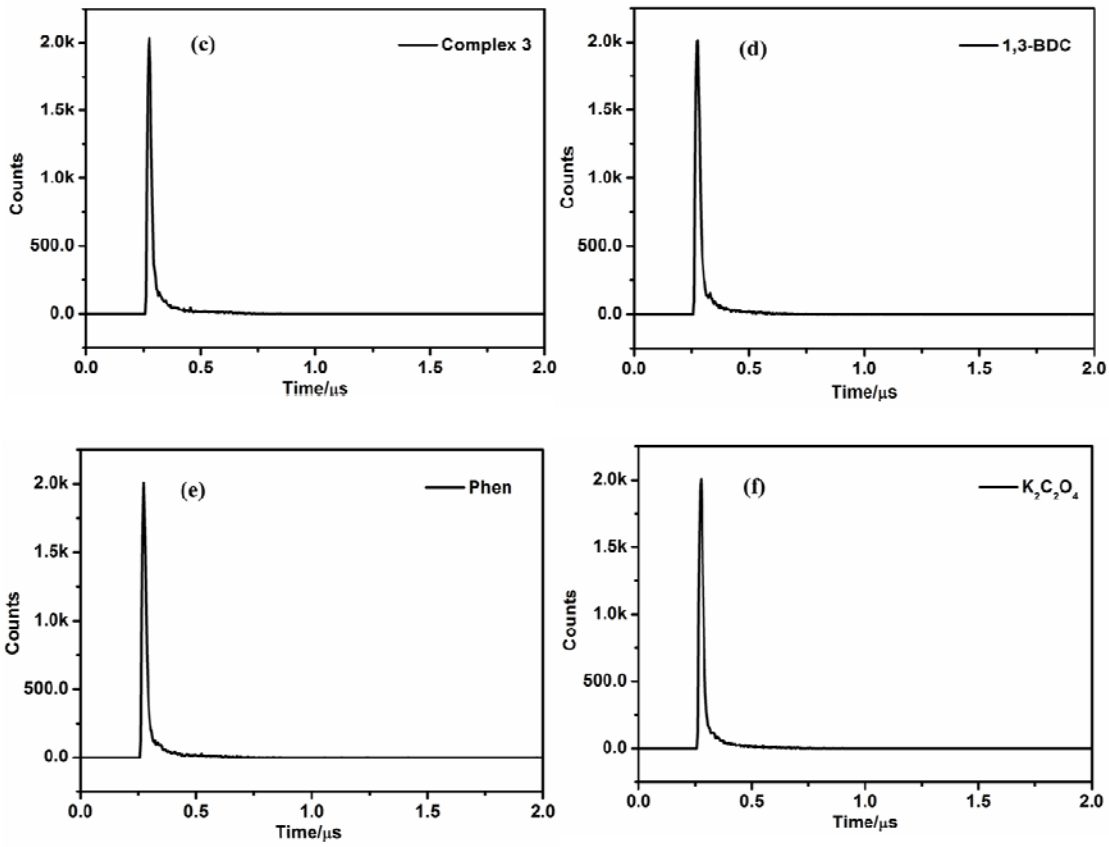

Fig. S3. Decay profile of Eu(III) (a) and Tb(III) (b) in complexes **1, 2,** and the $Yb_{0.73}Tb_{0.25}Eu_{0.02}$ doped complex, ligands 1,3-BDC (d), Phen (e) and $K_2C_2O_4$ (f).

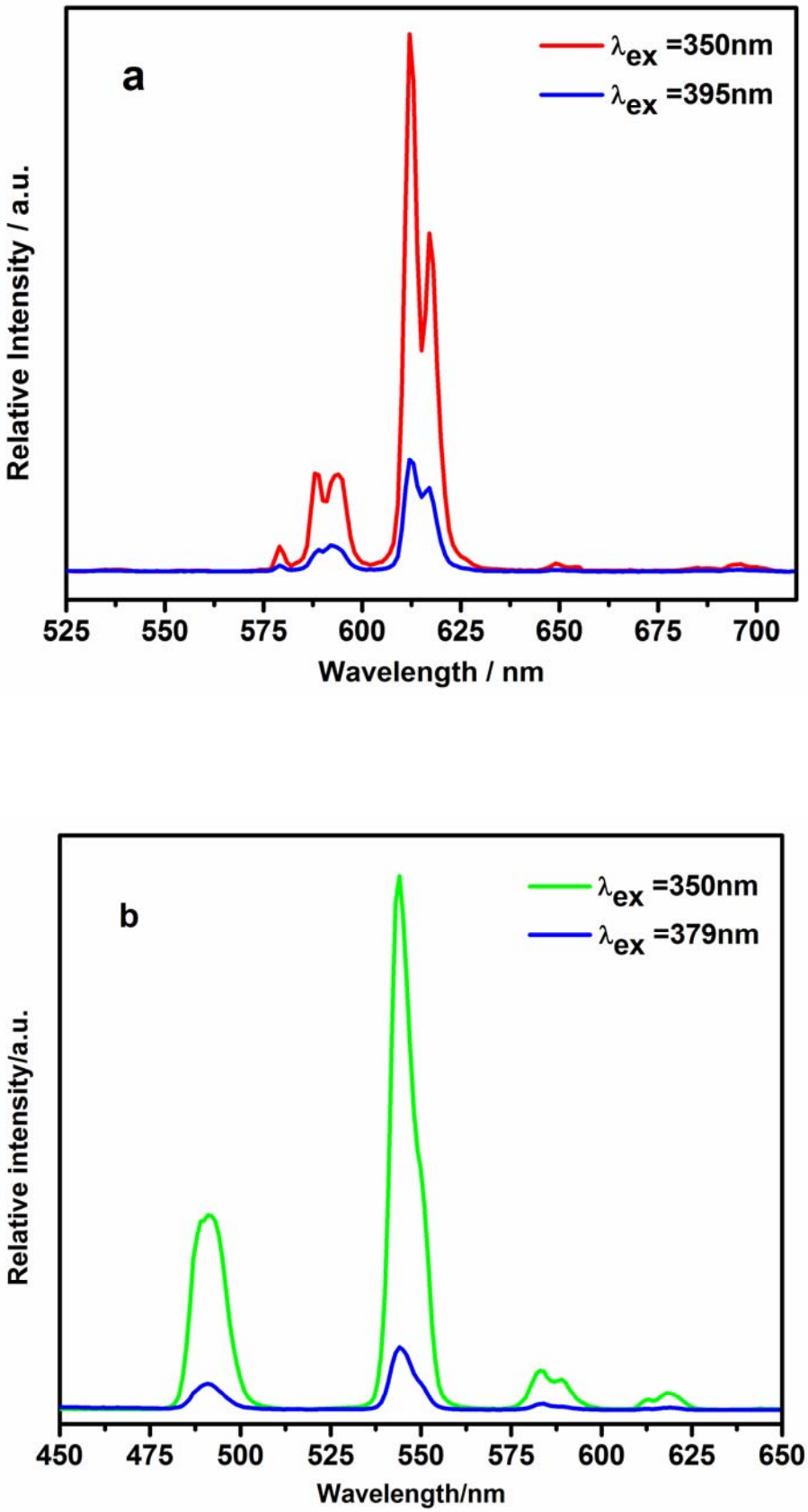

Fig. S4. Emission spectra of complexes **1** (a) and **2** (b).

Table S1. Selected bond lengths (Å) and angles (°) for complexes **1-3**

		1	
Eu(1)-O(12)#1	2.313(7)	Eu(1)-O(11)#2	2.325(7)
Eu(1)-O(2)	2.405(7)	Eu(1)-O(1)	2.406(7)
Eu(1)-O(5)	2.436(7)	Eu(1)-O(6)	2.438(7)
Eu(1)-N(1)	2.576(8)	Eu(1)-N(2)	2.577(9)
Eu(2)-O(7)#3	2.277(6)	Eu(2)-O(8)#4	2.328(7)
Eu(2)-O(9)	2.341(7)	Eu(2)-O(4)	2.390(6)
Eu(2)-O(3)	2.458(6)	Eu(2)-O(13)	2.492(8)
Eu(2)-N(4)	2.608(8)	Eu(2)-N(3)	2.631(8)
O(12)#1-Eu(1)-O(11)#2	84.6(3)	O(12)#1-Eu(1)-O(2)	106.8(3)
O(11)#2-Eu(1)-O(2)	154.9(2)	O(12)#1-Eu(1)-O(1)	77.1(3)
O(11)#2-Eu(1)-O(1)	138.9(2)	O(2)-Eu(1)-O(1)	66.2(2)
O(12)#1-Eu(1)-O(5)	87.3(2)	O(11)#2-Eu(1)-O(5)	82.2(3)
O(2)-Eu(1)-O(5)	76.3(2)	O(1)-Eu(1)-O(5)	132.4(3)
O(12)#1-Eu(1)-O(6)	139.7(2)	O(11)#2-Eu(1)-O(6)	80.7(2)
O(2)-Eu(1)-O(6)	76.2(2)	O(1)-Eu(1)-O(6)	134.9(2)
O(5)-Eu(1)-O(6)	53.7(2)	O(12)#1-Eu(1)-N(1)	87.0(3)
O(11)#2-Eu(1)-N(1)	70.3(3)	O(2)-Eu(1)-N(1)	131.2(2)
O(1)-Eu(1)-N(1)	72.2(3)	O(5)-Eu(1)-N(1)	152.3(3)
O(6)-Eu(1)-N(1)	122.0(3)	O(12)#1-Eu(1)-N(2)	145.7(3)
O(11)#2-Eu(1)-N(2)	101.5(3)	O(2)-Eu(1)-N(2)	81.9(3)
O(1)-Eu(1)-N(2)	76.4(3)	O(5)-Eu(1)-N(2)	126.9(3)
O(6)-Eu(1)-N(2)	74.4(3)	N(1)-Eu(1)-N(2)	64.2(3)
O(7)#3-Eu(2)-O(8)#4	85.9(2)	O(7)#3-Eu(2)-O(9)	76.7(3)
O(8)#4-Eu(2)-O(9)	140.8(3)	O(7)#3-Eu(2)-O(4)	143.0(2)
O(8)#4-Eu(2)-O(4)	79.7(2)	O(9)-Eu(2)-O(4)	133.1(2)
O(7)#3-Eu(2)-O(3)	77.1(2)	O(8)#4-Eu(2)-O(3)	80.3(2)
O(9)-Eu(2)-O(3)	127.7(3)	O(4)-Eu(2)-O(3)	67.1(2)
O(7)#3-Eu(2)-O(13)	109.2(3)	O(8)#4-Eu(2)-O(13)	149.9(2)
O(9)-Eu(2)-O(13)	69.2(3)	O(4)-Eu(2)-O(13)	72.7(3)
O(3)-Eu(2)-O(13)	78.1(3)	O(7)#3-Eu(2)-N(4)	86.4(2)
O(8)#4-Eu(2)-N(4)	73.3(3)	O(9)-Eu(2)-N(4)	70.9(3)
O(4)-Eu(2)-N(4)	120.8(3)	O(3)-Eu(2)-N(4)	149.7(3)
O(13)-Eu(2)-N(4)	131.8(3)	O(7)#3-Eu(2)-N(3)	146.7(2)
O(8)#4-Eu(2)-N(3)	97.6(3)	O(9)-Eu(2)-N(3)	80.1(3)
O(4)-Eu(2)-N(3)	69.5(2)	O(3)-Eu(2)-N(3)	136.2(2)
O(13)-Eu(2)-N(3)	83.9(3)	N(4)-Eu(2)-N(3)	63.5(3)
		2	
Tb(1)-O(1)	2.269(7)	Tb(1)-O(2)#1	2.277(8)
Tb(1)-O(12)	2.379(7)	Tb(1)-O(13)	2.399(7)
Tb(1)-O(5)	2.412(7)	Tb(1)-O(6)	2.426(7)

Tb(1)-N(1)	2.540(10)	Tb(1)-N(2)	2.541(8)
Tb(2)-O(8)#2	2.296(7)	Tb(2)-O(7)#3	2.305(7)
Tb(2)-O(3)#4	2.319(7)	Tb(2)-O(10)	2.333(7)
Tb(2)-O(9)	2.438(8)	Tb(2)-O(11)	2.445(7)
Tb(2)-N(4)	2.565(8)	Tb(2)-N(3)	2.572(8)
O(1)-Tb(1)-O(2)#1	85.1(3)	O(1)-Tb(1)-O(12)	139.1(2)
O(2)#1-Tb(1)-O(12)	76.7(2)	O(1)-Tb(1)-O(13)	153.9(2)
O(2)#1-Tb(1)-O(13)	105.5(3)	O(12)-Tb(1)-O(13)	67.0(2)
O(1)-Tb(1)-O(5)	81.0(2)	O(2)#1-Tb(1)-O(5)	86.7(3)
O(12)-Tb(1)-O(5)	133.0(2)	O(13)-Tb(1)-O(5)	76.1(2)
O(1)-Tb(1)-O(6)	79.7(2)	O(2)#1-Tb(1)-O(6)	139.7(2)
O(12)-Tb(1)-O(6)	135.7(2)	O(13)-Tb(1)-O(6)	76.9(2)
O(5)-Tb(1)-O(6)	54.3(2)	O(1)-Tb(1)-N(1)	101.6(3)
O(2)#1-Tb(1)-N(1)	145.3(3)	O(12)-Tb(1)-N(1)	76.3(3)
O(13)-Tb(1)-N(1)	83.3(3)	O(5)-Tb(1)-N(1)	127.9(3)
O(6)-Tb(1)-N(1)	74.7(3)	O(1)-Tb(1)-N(2)	71.3(3)
O(2)#1-Tb(1)-N(2)	87.4(3)	O(12)-Tb(1)-N(2)	71.5(3)
O(13)-Tb(1)-N(2)	131.7(3)	O(5)-Tb(1)-N(2)	152.1(3)
O(6)-Tb(1)-N(2)	121.6(3)	N(1)-Tb(1)-N(2)	63.6(3)
O(8)#2-Tb(2)-O(7)#3	84.7(2)	O(8)#2-Tb(2)-O(3)#4	76.7(2)
O(7)#3-Tb(2)-O(3)#4	140.7(3)	O(8)#2-Tb(2)-O(10)	143.4(2)
O(7)#3-Tb(2)-O(10)	79.4(3)	O(3)#4-Tb(2)-O(10)	133.6(3)
O(8)#2-Tb(2)-O(9)	109.1(3)	O(7)#3-Tb(2)-O(9)	149.9(3)
O(3)#4-Tb(2)-O(9)	69.4(3)	O(10)-Tb(2)-O(9)	73.7(3)
O(8)#2-Tb(2)-O(11)	77.1(2)	O(7)#3-Tb(2)-O(11)	80.2(2)
O(3)#4-Tb(2)-O(11)	127.2(3)	O(10)-Tb(2)-O(11)	67.8(2)
O(9)-Tb(2)-O(11)	77.3(2)	O(8)#2-Tb(2)-N(4)	86.1(3)
O(7)#3-Tb(2)-N(4)	73.3(3)	O(3)#4-Tb(2)-N(4)	71.1(3)
O(10)-Tb(2)-N(4)	119.8(3)	O(9)-Tb(2)-N(4)	132.5(3)
O(11)-Tb(2)-N(4)	149.7(3)	O(8)#2-Tb(2)-N(3)	145.7(3)
O(7)#3-Tb(2)-N(3)	98.9(3)	O(3)#4-Tb(2)-N(3)	79.4(3)
O(10)-Tb(2)-N(3)	70.0(3)	O(9)-Tb(2)-N(3)	84.6(3)
O(11)-Tb(2)-N(3)	137.3(3)	N(4)-Tb(2)-N(3)	62.9(3)

3

Yb(1)-O(11)#1	2.228(6)	Yb(1)-O(12)#2	2.230(7)
Yb(1)-O(1)	2.329(6)	Yb(1)-O(6)	2.351(6)
Yb(1)-O(2)	2.357(7)	Yb(1)-O(5)	2.370(6)
Yb(2)-O(7)#3	2.229(6)	Yb(2)-O(8)#4	2.263(6)
Yb(2)-O(9)	2.269(6)	Yb(2)-O(4)	2.291(6)
Yb(2)-O(13)	2.388(7)	Yb(2)-O(3)	2.393(6)
Yb(2)-N(4)	2.512(8)	Yb(2)-N(3)	2.530(7)
O(11)#1-Yb(1)-O(12)#2	84.8(2)	O(11)#1-Yb(1)-O(1)	139.2(2)

O(12)#2-Yb(1)-O(1)	76.7(3)	O(11)#1-Yb(1)-O(6)	79.5(2)
O(12)#2-Yb(1)-O(6)	139.1(3)	O(1)-Yb(1)-O(6)	136.2(2)
O(11)#1-Yb(1)-O(2)	152.5(2)	O(12)#2-Yb(1)-O(2)	104.7(2)
O(1)-Yb(1)-O(2)	68.3(2)	O(6)-Yb(1)-O(2)	76.6(2)
O(11)#1-Yb(1)-O(5)	80.9(2)	O(12)#2-Yb(1)-O(5)	84.9(2)
O(1)-Yb(1)-O(5)	132.0(2)	O(6)-Yb(1)-O(5)	55.6(2)
O(2)-Yb(1)-O(5)	74.5(2)	O(11)#1-Yb(1)-N(1)	71.8(3)
O(12)#2-Yb(1)-N(1)	87.2(3)	O(1)-Yb(1)-N(1)	71.2(3)
O(1)-Tb(1)-N(4)	141.58(16)	O(8)#5-Tb(1)-N(4)	75.36(17)
O(6)-Yb(1)-N(1)	122.2(3)	O(2)-Yb(1)-N(1)	133.3(3)
O(5)-Yb(1)-N(1)	152.2(3)	O(11)#1-Yb(1)-N(2)	102.8(3)
O(12)#2-Yb(1)-N(2)	147.0(3)	O(1)-Yb(1)-N(2)	76.9(3)
O(6)-Yb(1)-N(2)	73.7(3)	O(2)-Yb(1)-N(2)	83.4(3)
O(5)-Yb(1)-N(2)	127.8(3)	N(1)-Yb(1)-N(2)	65.7(3)
O(7)#3-Yb(2)-O(8)#4	84.2(2)	O(7)#3-Yb(2)-O(9)	76.8(2)
O(8)#4-Yb(2)-O(9)	140.3(2)	O(7)#3-Yb(2)-O(4)	143.6(2)
O(8)#4-Yb(2)-O(4)	78.6(2)	O(9)-Yb(2)-O(4)	134.4(2)
O(7)#3-Yb(2)-O(13)	109.3(2)	O(8)#4-Yb(2)-O(13)	149.0(2)
O(9)-Yb(2)-O(13)	70.7(2)	O(4)-Yb(2)-O(13)	74.3(3)
O(7)#3-Yb(2)-O(3)	76.8(2)	O(8)#4-Yb(2)-O(3)	80.4(2)
O(9)-Yb(2)-O(3)	127.0(2)	O(4)-Yb(2)-O(3)	68.9(2)
O(13)-Yb(2)-O(3)	76.0(2)	O(7)#3-Yb(2)-N(4)	85.4(2)
O(8)#4-Yb(2)-N(4)	72.5(2)	O(9)-Yb(2)-N(4)	71.4(2)
O(4)-Yb(2)-N(4)	118.6(2)	O(13)-Yb(2)-N(4)	134.5(2)
O(3)-Yb(2)-N(4)	149.0(2)	O(7)#3-Yb(2)-N(3)	146.0(2)
O(8)#4-Yb(2)-N(3)	100.2(2)	O(9)-Yb(2)-N(3)	78.8(2)
O(4)-Yb(2)-N(3)	69.3(2)	O(13)-Yb(2)-N(3)	84.1(3)
O(3)-Yb(2)-N(3)	137.1(2)	N(4)-Yb(2)-N(3)	64.4(2)

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

Table S2. Lifetimes of complex **3** and the ligands.

Sample	Lifetimes/μs
Complex **3**	2.869
1,3-BDC	3.550
Phen	2.959
$K_2C_2O_4$	4.193