

## Supporting Information

### **Fluorescent and energy transfer properties of heterometallic lanthanide-titanium oxo clusters coordinated with anthracenecarboxylate ligand**

Sheng Wang, Hu-Chao Su, Lan Yu, Xiao-Wei Zhao, Li-Wen Qian, Qin-Yu Zhu\* and Jie Dai\*

**Table S1.** Crystal Data and Structural Refinement Parameters for **1–3**.

**Figure S1.** FTIR spectra of **1–4**

**Figure S2.** XRD patterns of the bulk microcrystal samples of **1–4** along with those simulated from the data of single-crystal analysis.

**Figure S3.** Thermogravimetric analysis of **1–4**.

**Figure S4.** Molecular structures of **1** (a) and **2** (b) with the ellipsoid presentation.

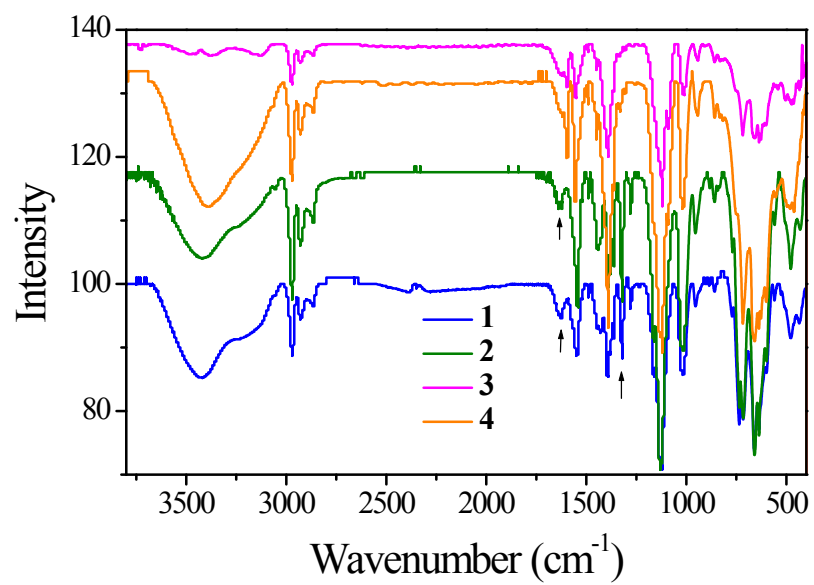
**Figure S5.** Ball-stick structures of **3** (a) and **4** (b).

**Figure S6.** Solid state fluorescence spectra of **2** and **4**, also illustrating the result of energy transfer within the cluster.

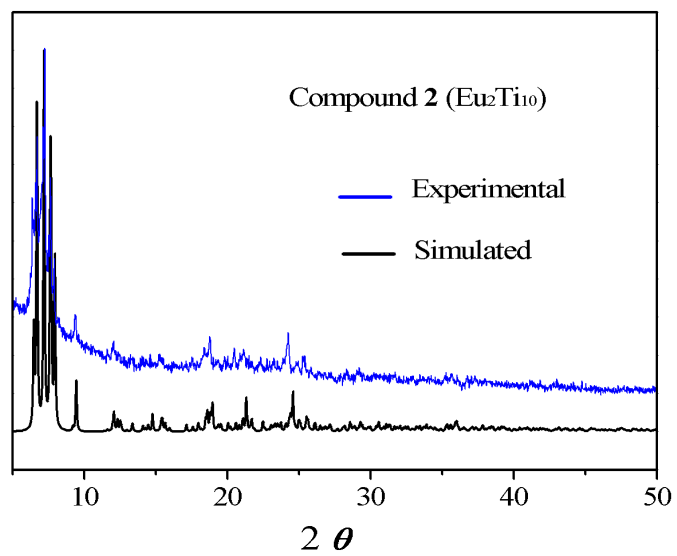
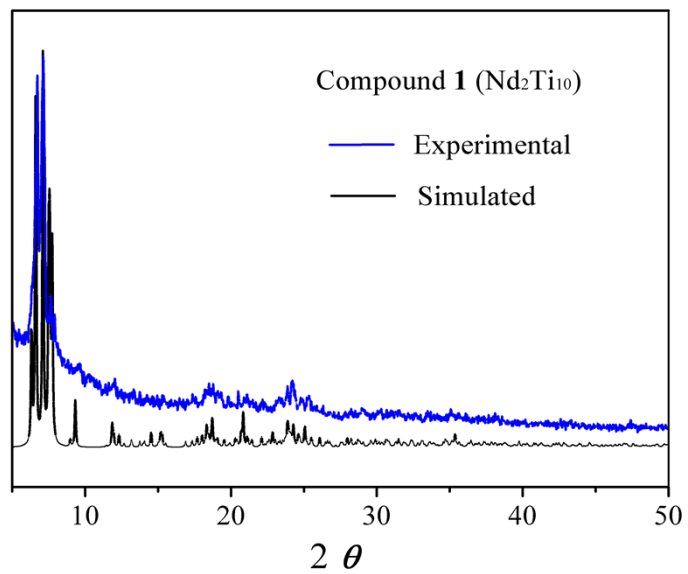
**Figure S7.** Solid state fluorescence spectra of **1** and **2**.

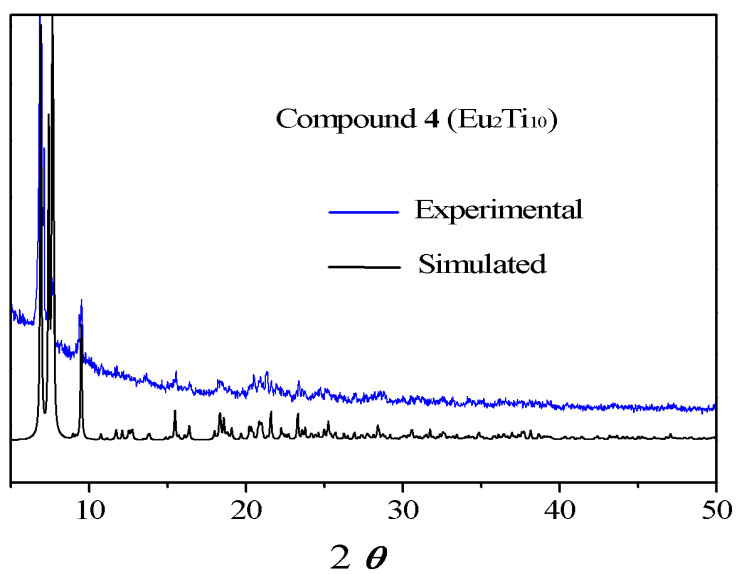
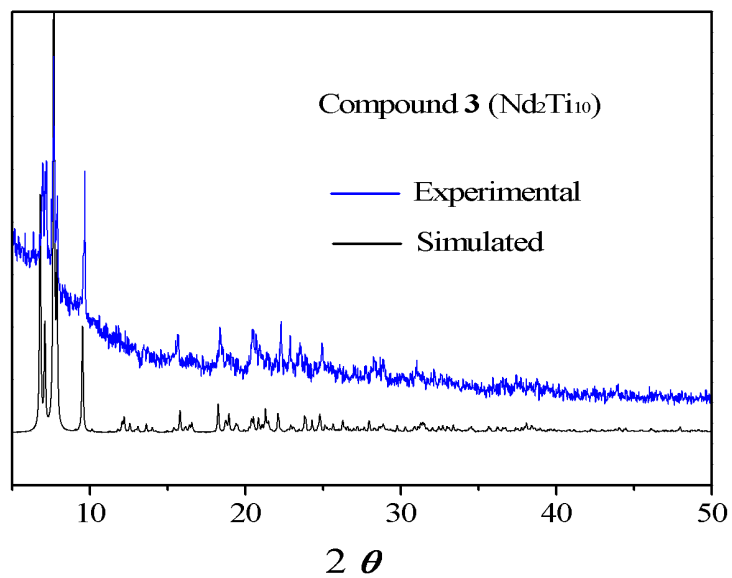
**Table S1.** Crystal Data and Structural Refinement Parameters for **1–3**.

	<b>1</b>	<b>2</b>	<b>3</b>
formula	C <sub>76</sub> H <sub>126</sub> Cl <sub>2</sub> Nd <sub>2</sub> N <sub>2</sub> O <sub>42</sub> Ti <sub>10</sub>	C <sub>76</sub> H <sub>126</sub> Cl <sub>2</sub> Eu <sub>2</sub> N <sub>2</sub> O <sub>42</sub> Ti <sub>10</sub>	C <sub>62</sub> H <sub>124</sub> Cl <sub>2</sub> Nd <sub>2</sub> O <sub>42</sub> Ti <sub>10</sub>
fw	2578.17	2593.61	2379.83
cryst size (mm <sup>3</sup> )	0.20 × 0.30 × 0.50	0.20 × 0.30 × 0.50	0.25 × 0.25 × 1.00
cryst syst	triclinic	triclinic	monoclinic
space group	<i>P</i> $\bar{1}$	<i>P</i> $\bar{1}$	<i>P</i> 2 <sub>1</sub> / <i>n</i>
<i>a</i> (Å)	14.890(3)	14.6136(8)	15.092(3)
<i>b</i> (Å)	14.976(3)	14.7178(8)	17.568(4)
<i>c</i> (Å)	15.484(3)	15.0540(8)	18.631(4)
$\alpha$ (deg)	64.46(3)	64.8600(15)	90.00
$\beta$ (deg)	77.29(3)	78.1730(15)	91.72(3)
$\gamma$ (deg)	63.90(3)	64.3150(14)	90.00
<i>V</i> (Å <sup>3</sup> )	2795.8(10)	2640.6(2)	4937.5(17)
<i>Z</i>	1	1	2
$\rho_{\text{calcd}}$ (g cm <sup>-3</sup> )	1.531	1.646	1.599
<i>F</i> (000)	1306	1324	2408
$\mu$ (mm <sup>-1</sup> )	1.707	2.012	1.924
<i>T</i> (K)	293(2)	296(2)	293(2)
reflns collected	25538	57727	26691
unique reflns	12333	12176	11132
observed reflns	6538	9583	8909
GOF on <i>F</i> <sup>2</sup>	1.055	1.023	1.198
<i>R</i> <sub>1</sub> [ <i>I</i> > 2 $\sigma$ ( <i>I</i> )]	0.0786	0.0401	0.0759
<i>wR</i> <sub>2</sub>	0.1466	0.1045	0.1381

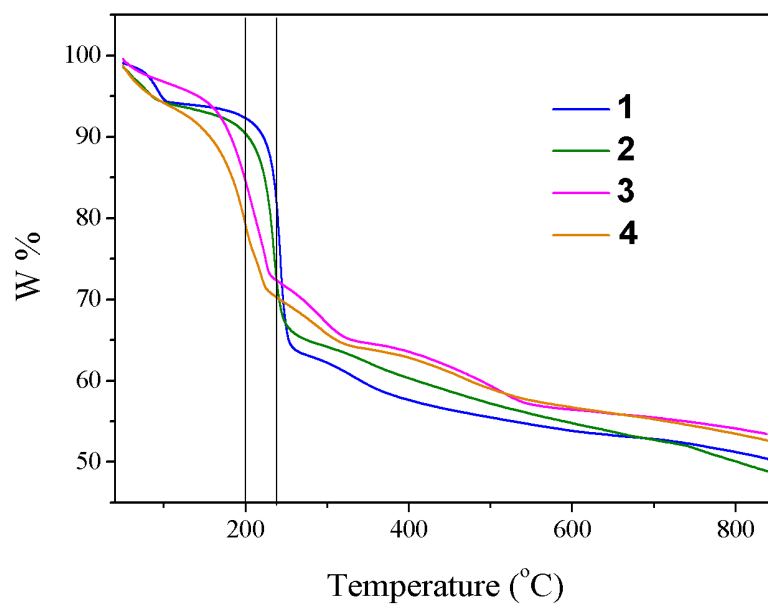


**Figure S1.** FTIR spectra of 1-4.

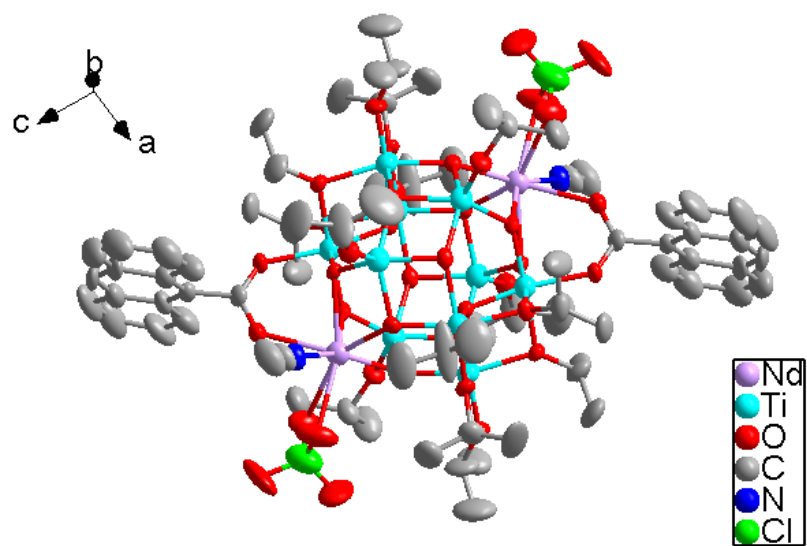




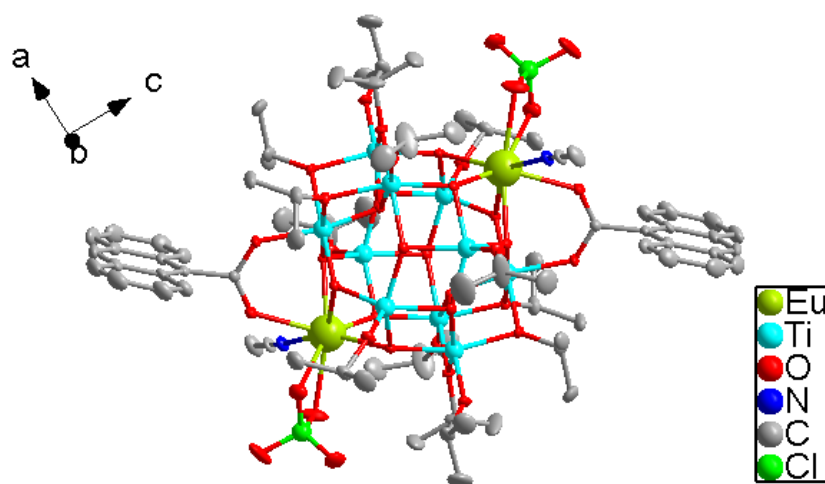
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**Figure S3.** Thermogravimetric analysis of 1-4.

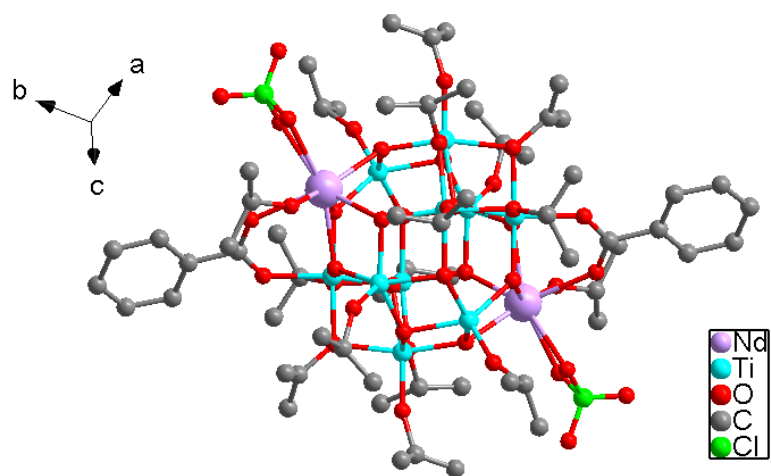


(a)

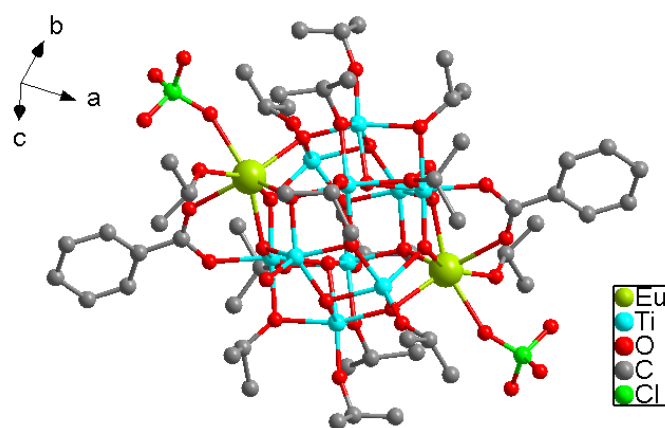


(b)

**Figure S4.** Molecular structures of 1 (a) and 2 (b) with the ellipsoid presentation.



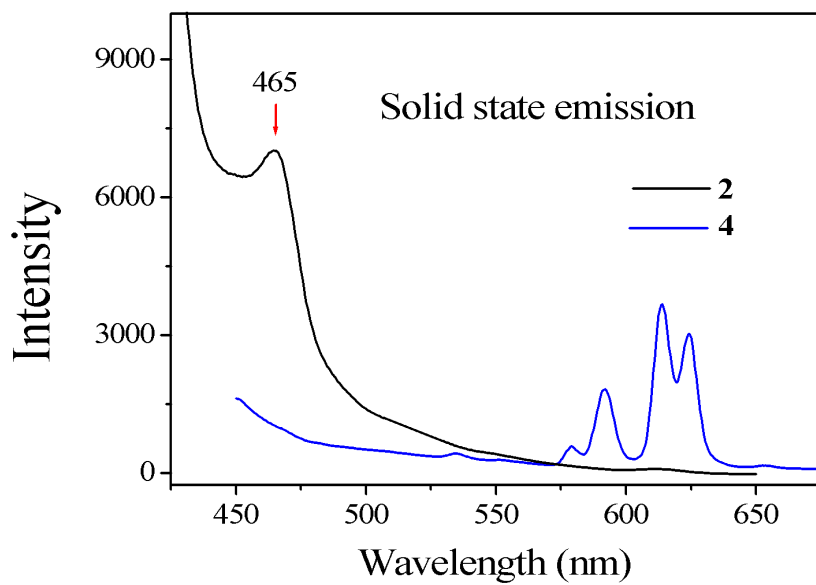
(a)



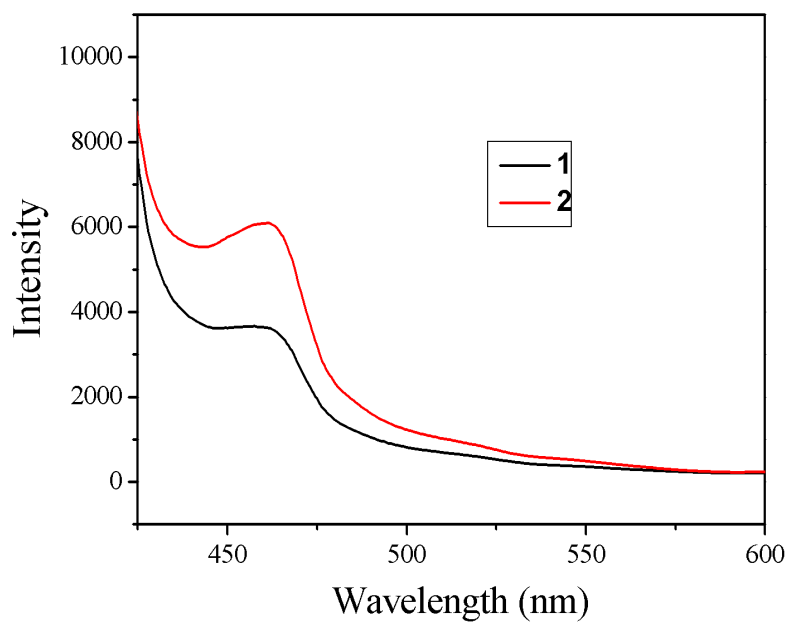
(b)

**Figure S5.** Ball-stick structures of **3** (a) and **4** (b).





**Figure S6.** Solid state fluorescence spectra of **2** and **4**, also illustrating the result of energy transfer within the cluster.



**Figure S7.** Solid state fluorescence spectra of **1** and **2**.