Supporting information

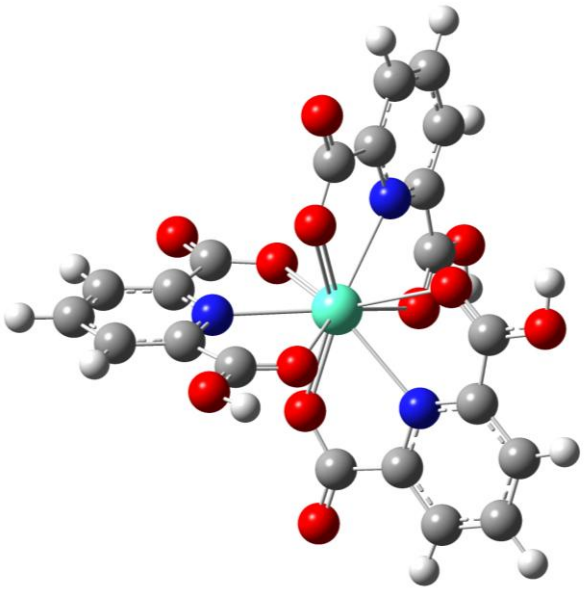
Table S1. Selected Bond Distances (Å) for Complexes **1–2**

	Tb1	**Dy1**
Ln(1)─O(5)#1	2.422(4)	2.543(7)
Ln(1)─O(5)	2.422(4)	2.498(5)
Ln(1)─O(3)#1	2.425(5)	2.487(7)
Ln(1)─O(3)	2.425(5)	2.343(7)
Ln(1)─O(1)#1	2.447(5)	2.334(7)
Ln(1)─O(1)	2.447(5)	2.331(5)
Ln(1)─N(2)	2.513(7)	2.476(9)
Ln(1)─N(1)	2.515(5)	2.495(5)
Ln(1)─N(1) #1	2.515(5)	2.525(9)

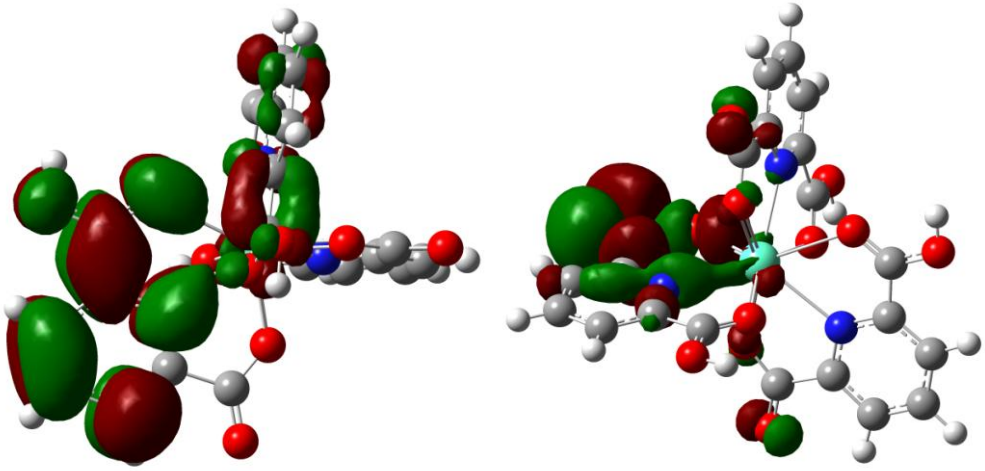
[a]Symmetry transformations used to generate equivalent atoms: #1 -x,y,-z+1/2

Table S2 Selected angles [°] for Complexes **1–2**

Ln=Tb, Dy	**Tb1**	**Dy1**
O(7)- Ln(1)-O(5)	127.7(2)	128.2(14)
O(7)- Ln(1)-O(11)	78.05(16)	80.8(2)
O(5)- Ln(1)-O(11)	147.81(16)	143(4)
O(5)- Ln(1)-O(1)	87.1(3)	89.2(3)
O(7)- Ln(1)-N(2)	63.83(10)	65.7(3)
O(11)- Ln(1)-N(2)	136.44(13)	141.2(2)
O(9)- Ln(1)-N(2)	73.46(16)	75.06(18)
N(3)- Ln(1)-N(1)	120.2(2)	120.7(3)



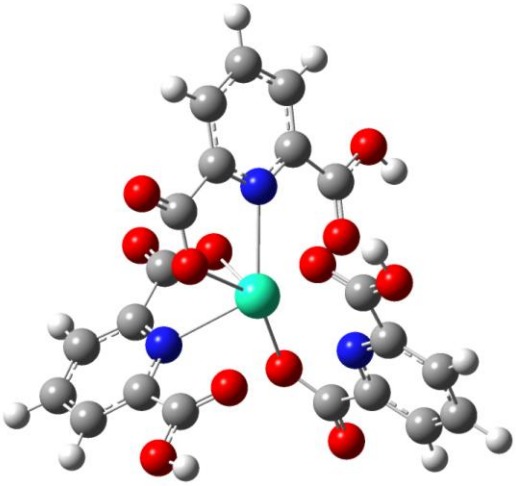
(a) Molecular structure of **Tb1**



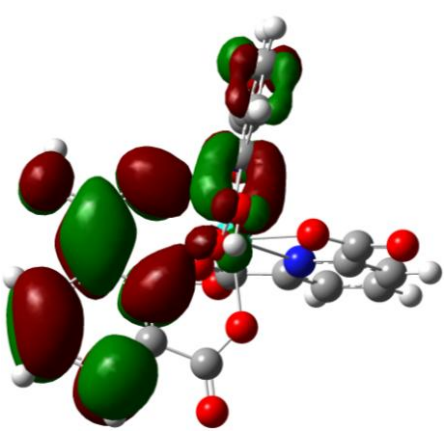
(b) LUMO of **Tb1**

(c) HOMO of **Tb1**

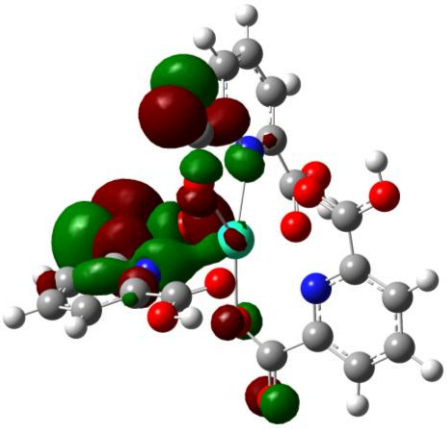
Figure S1. The structures and frontier molecular orbitals (FMOs) of **Tb1** with f orbitals



(a) Molecular structure of **Dy1**



(b) LUMO of **Dy1**



(c) HOMO of **Dy1**

Figure S2. The structures and frontier molecular orbitals (FMOs) of **Dy1** with *f* orbitals.

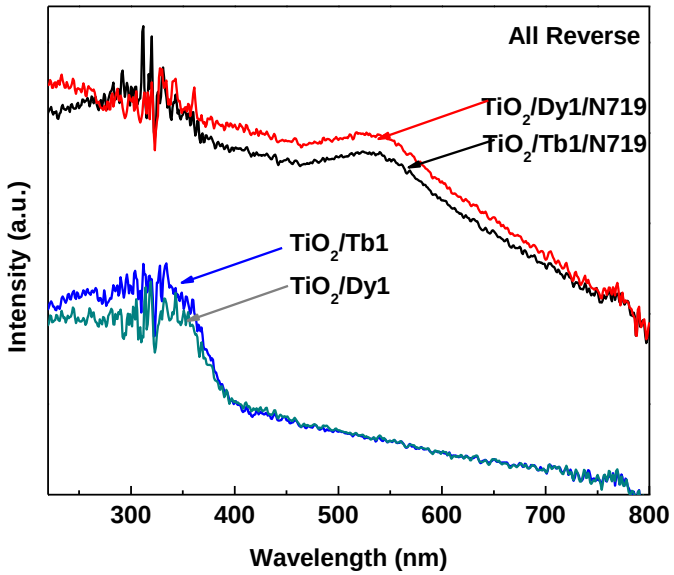


Figure S4 . SPS of lanthanide complex co-sensitized TiO_2 and raw TiO_2.

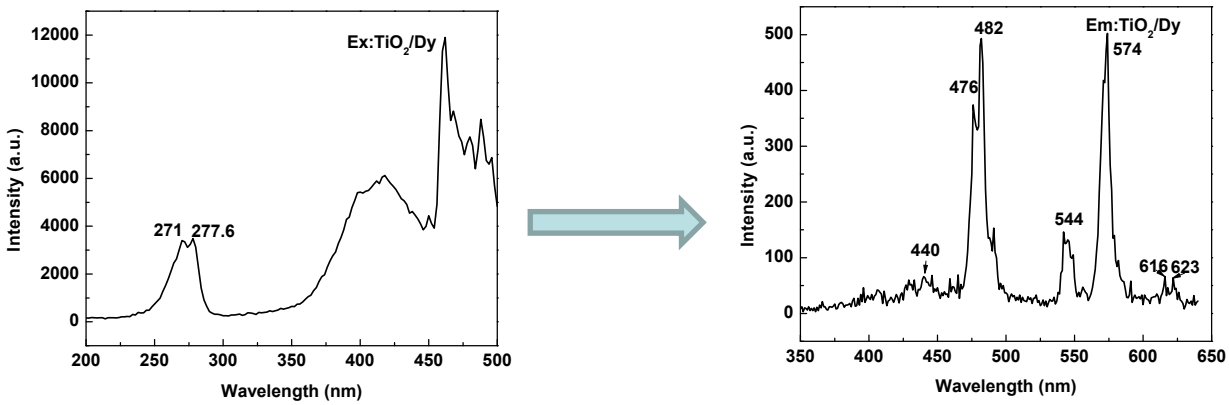


Figure S5. Solid-state emission spectrum for Dy1 (excited at 270 nm) at room temperature.

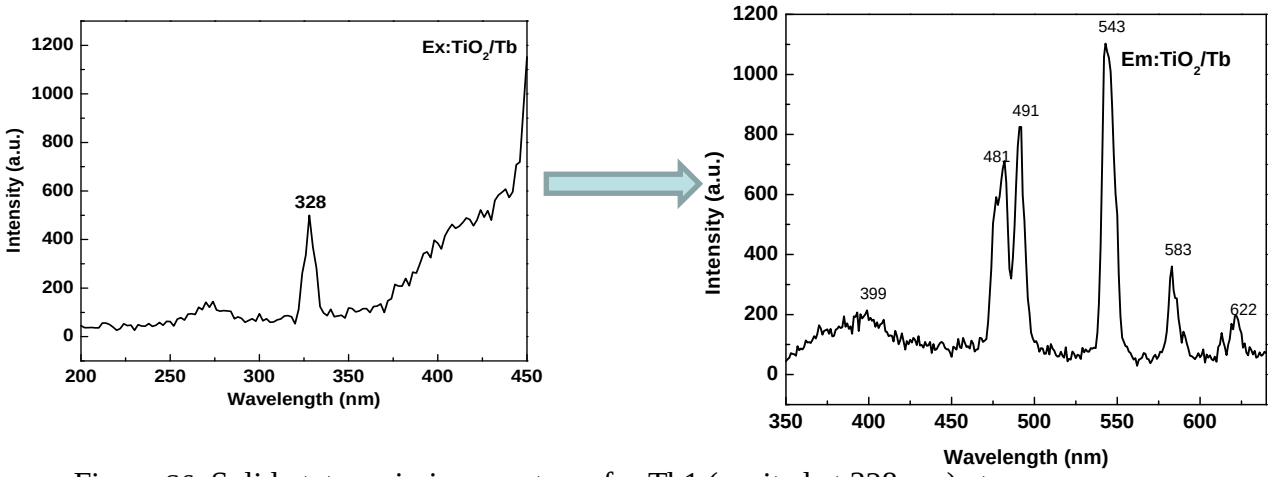


Figure S6. Solid-state emission spectrum for Tb1 (excited at 328 nm) at room temperature.