Supplementary Information

1. **Table S1** Selected bond distances (Å) for complexes **1-5**

Complex **1**

Er(1)-O(13)	2.324(6)	Er(2)-O(7)	2.383(7)
Er(1)-O(15)#1	2.350(7)	Er(2)-O(12)	2.4208(8)
Er(1)-O(8)#1	2.367(6)	Er(2)-N(1)#1	2.642(7)
Er(1)-O(5)	2.367(6)	Er(2)-N(5)	2.655(7)
Er(1)-O(14)	2.377(6)	Er(2)-Er(1)#1	3.4402(12)
Er(1)-O(4)	2.394(7)	Er(2)-Er(3)	3.5166(11)
Er(1)-O(12)	2.4326(8)	Er(3)-O(13)	2.274(6)
Er(1)-N(6)	2.665(8)	Er(3)-O(15)	2.277(6)
Er(1)-N(2)	2.759(8)	Er(3)-O(8)	2.294(6)
Er(1)-Er(2)	3.4236(12)	Er(3)-O(14)	2.301(5)
Er(1)-Er(2)#1	3.4402(12)	Er(3)-O(11)	2.361(7)
Er(1)-Er(3)	3.5316(9)	Er(3)-O(10)	2.389(7)
Er(2)-O(13)	2.334(6)	Er(3)-O(9)	2.409(7)
Er(2)-O(8)#1	2.355(5)	Er(3)-O(12)	2.5783(12)
Er(2)-O(14)#1	2.360(6)	Er(3)-Er(2)#1	3.557(2)
Er(2)-O(15)	2.371(6)	Er(3)-Er(1)#1	3.5579(13)
Er(2)-O(6)	2.377(6)		

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

Complex **2**

Ho(1)-O(14)	2.327(6)	Ho(2)-O(8)	2.405(7)
Ho(1)-O(16)	2.357(6)	Ho(2)-O(9)	2.410(7)
Ho(1)-O(10)	2.358(6)	Ho(2)-O(13)	2.4293(8)
Ho(1)-O(15)	2.371(6)	Ho(2)-N(2)#1	2.639(8)
Ho(1)-O(11)	2.375(6)	Ho(2)-N(6)	2.647(8)
Ho(1)-O(12)	2.398(7)	Ho(2)-Ho(1)#1	3.4503(12)
Ho(1)-N(5)	2.666(8)	Ho(2)-Ho(3)	3.5333(11)
Ho(1)-N(1)	2.750(8)	Ho(3)-O(16)	2.259(6)
Ho(1)-Ho(2)	3.4374(12)	Ho(3)-O(14)	2.269(6)
Ho(1)-Ho(2)#1	3.4503(12)	Ho(3)-O(10)#1	2.292(6)
Ho(1)-Ho(3)	3.5466(10)	Ho(3)-O(15)#1	2.301(7)
Ho(1)-Ho(3)#1	3.5765(13)	Ho(3)-O(6)	2.370(7)
Ho(2)-O(14)	2.350(7)	Ho(3)-O(5)	2.426(8)
Ho(2)-O(15)	2.357(6)	Ho(3)-O(7)	2.436(7)
Ho(2)-O(16)#1	2.362(7)	Ho(3)-O(13)	2.5935(12)
Ho(2)-O(10)#1	2.369(6)	Ho(3)-Ho(2)#1	3.574(2)

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

Complex **3**

Dy(1)-O(16)	2.339(4)	Dy(2)-O(7)	2.411(5)
Dy(1)-O(14)	2.360(4)	Dy(2)-O(15)	2.4405(7)
Dy(1)-O(5)	2.374(4)	Dy(2)-N(8)#1	2.642(5)
Dy(1)-O(11)	2.387(4)	Dy(2)-N(4)	2.658(5)
Dy(1)-O(13)	2.395(4)	Dy(2)-Dy(1)#1	3.4655(11)
Dy(1)-O(12)	2.423(5)	Dy(2)-Dy(3)#1	3.5450(10)
Dy(1)-O(15)	2.4527(7)	Dy(3)-O(16)#1	2.275(4)
Dy(1)-N(3)	2.670(5)	Dy(3)-O(14)	2.285(4)
Dy(1)-N(7)	2.747(6)	Dy(3)-O(5)	2.298(4)
Dy(1)-Dy(2)	3.4545(11)	Dy(3)-O(11)#1	2.303(4)
Dy(1)-Dy(2)#1	3.4655(11)	Dy(3)-O(8)	2.383(5)
Dy(1)-Dy(3)#1	3.5629(9)	Dy(3)-O(9)	2.422(5)
Dy(2)-O(16)	2.359(4)	Dy(3)-O(10)	2.429(5)
Dy(2)-O(5)	2.361(4)	Dy(3)-O(15)	2.6060(12)
Dy(2)-O(14)#1	2.382(4)	Dy(3)-Dy(2)#1	3.5451(10)
Dy(2)-O(11)#1	2.386(4)	Dy(3)-Dy(1)#1	3.5630(9)
Dy(2)-O(6)	2.404(4)		

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

Complex **4**

Cl(5)-Gd(2)	2.777(5)	Gd(2)-O(7)	2.430(7)
Gd(1)-O(11)	2.373(6)	Gd(2)-O(10)	2.597(6)
Gd(1)-O(8)#1	2.385(6)	Gd(2)-O(6)	2.617(7)
Gd(1)-O(9)	2.387(6)	Gd(2)-N(1)	2.700(8)
Gd(1)-O(14)	2.392(6)	Gd(2)-Gd(1)#1	3.6216(9)
Gd(1)-O(15)	2.445(6)	Gd(2)-Gd(3)#1	3.6404(18)
Gd(1)-O(16)	2.456(6)	Gd(3)-O(9)#1	2.352(6)
Gd(1)-O(10)	2.4598(7)	Gd(3)-O(14)#1	2.363(6)
Gd(1)-N(5)	2.717(8)	Gd(3)-O(8)#1	2.383(6)
Gd(1)-N(2)	2.744(7)	Gd(3)-O(14)	2.400(6)
Gd(1)-Gd(2)	3.5135(8)	Gd(3)-O(17)	2.451(7)
Gd(1)-Gd(3)	3.5232(8)	Gd(3)-O(13)	2.462(7)
Gd(1)-Gd(3)#1	3.6114(9)	Gd(3)-O(10)	2.572(6)
Gd(2)-O(8)	2.341(6)	Gd(3)-O(12)	2.575(7)
Gd(2)-O(11)#1	2.353(6)	Gd(3)-N(6)	2.668(8)
Gd(2)-O(9)	2.371(6)	Gd(3)-Gd(1)#1	3.6113(9)
Gd(2)-O(11)	2.387(6)	Gd(3)-Gd(2)#1	3.6404(18)

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

Complex **5**

Cl(4)-Tb(4)	2.700(7)	O(15)-Tb(3)#1	2.416(8)
N(7)-Tb(4)	2.685(9)	O(16)-Tb(3)	2.351(7)
N(8)-Tb(2)	2.720(9)	O(16)-Tb(4)	2.361(7)
O(6)-Tb(4)	2.442(9)	O(16)-Tb(2)	2.377(8)
O(7)-Tb(4)	2.641(9)	O(17)-Tb(2)	2.376(7)
O(8)-Tb(3)	2.469(8)	O(17)-Tb(4)	2.396(8)
O(9)-Tb(3)	2.593(8)	Tb(1)-O(14)#1	2.383(8)
O(10)-Tb(2)	2.441(7)	Tb(1)-O(15)#1	2.398(7)
O(11)-Tb(3)	2.427(9)	Tb(1)-O(12)#1	2.483(8)
O(12)-Tb(1)	2.483(8)	Tb(1)-N(2)#1	2.743(10)
O(13)-Tb(1)	2.440(10)	Tb(1)-Tb(3)#1	3.5163(9)
O(13)-Tb(2)	2.476(10)	Tb(1)-Tb(3)	3.5163(9)
O(13)-Tb(4)#1	2.5671(12)	Tb(1)-Tb(4)#1	3.6101(11)
O(13)-Tb(4)	2.5671(12)	Tb(2)-O(17)#1	2.376(7)
O(13)-Tb(3)#1	2.5857(7)	Tb(2)-O(16)#1	2.377(8)
O(13)-Tb(3)	2.5858(7)	Tb(2)-O(10)#1	2.441(7)
O(14)-Tb(4)	2.322(7)	Tb(2)-Tb(4)	3.4959(11)
O(14)-Tb(1)	2.383(8)	Tb(2)-Tb(4)#1	3.4959(11)
O(14)-Tb(3)	2.387(7)	Tb(2)-Tb(3)#1	3.6185(9)
O(15)-Tb(4)	2.345(8)	Tb(3)-O(17)#1	2.348(7)
O(15)-Tb(1)	2.398(7)	Tb(3)-Tb(4)	3.6241(14)

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

2. Magnetic data for complex 1,2,3,5

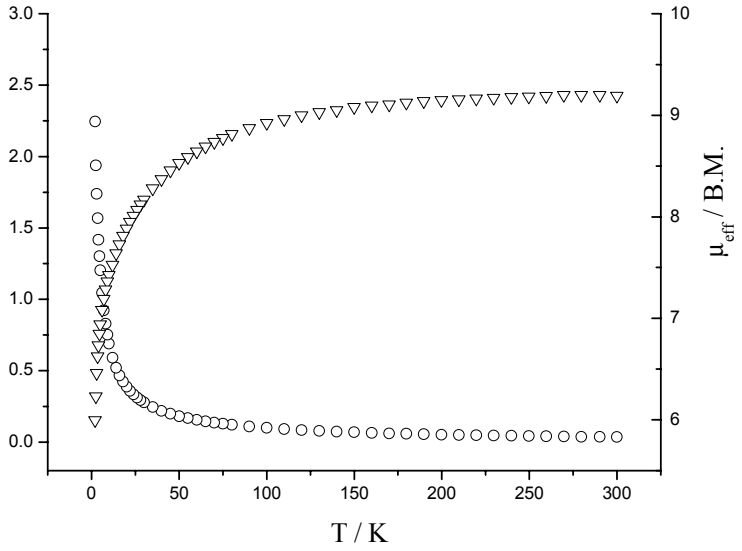

Fig S1. Experimental variations of χ_M (O) and μ_{eff} (∇) versus T for complex **1**

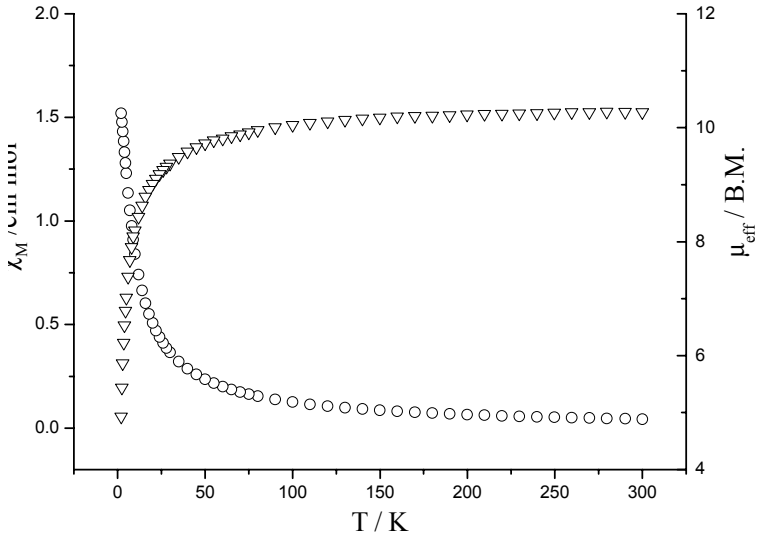

Fig S2. Experimental variations of χ_M (O) and μ_{eff} (∇) versus T for complex **2**

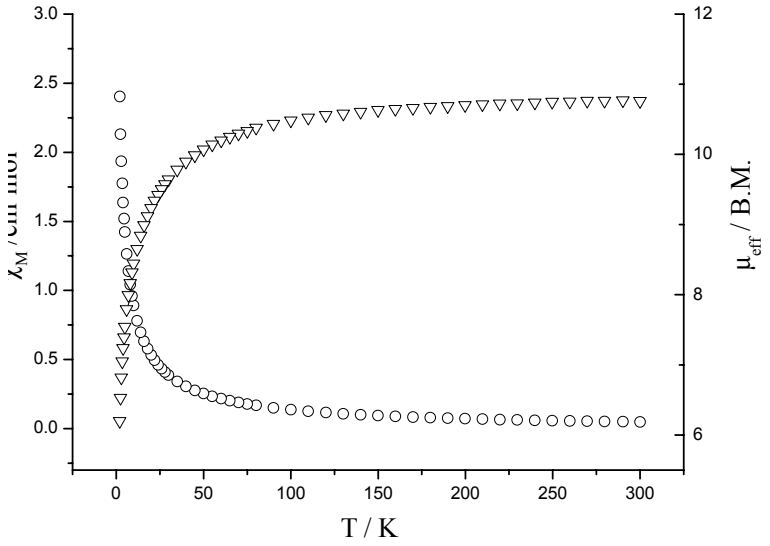

Fig S3. Experimental variations of χ_M (O) and μ_{eff} (∇) versus T for complex **3**

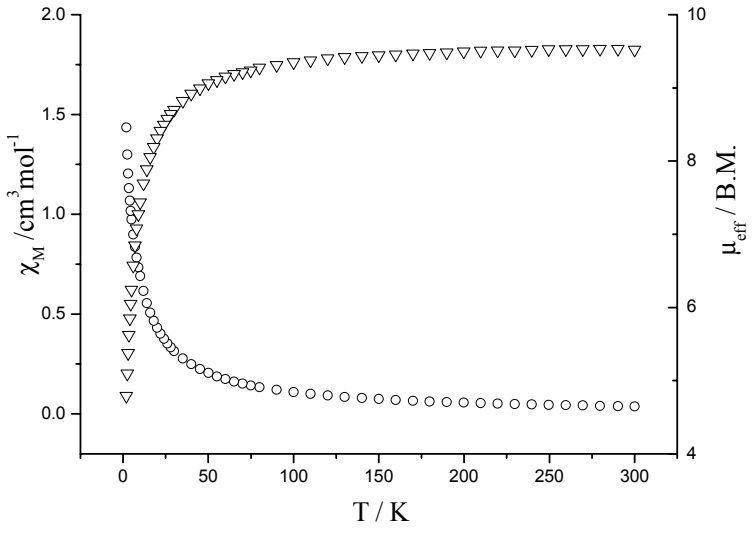

Fig S4. Experimental variations of χ_M (O) and μ_{eff} (∇) versus T for complex **5**