

Electronic Supporting Information

Structures, Luminescence, and Slow Magnetic Relaxation of Eight 3D Lanthanide-Organic Frameworks

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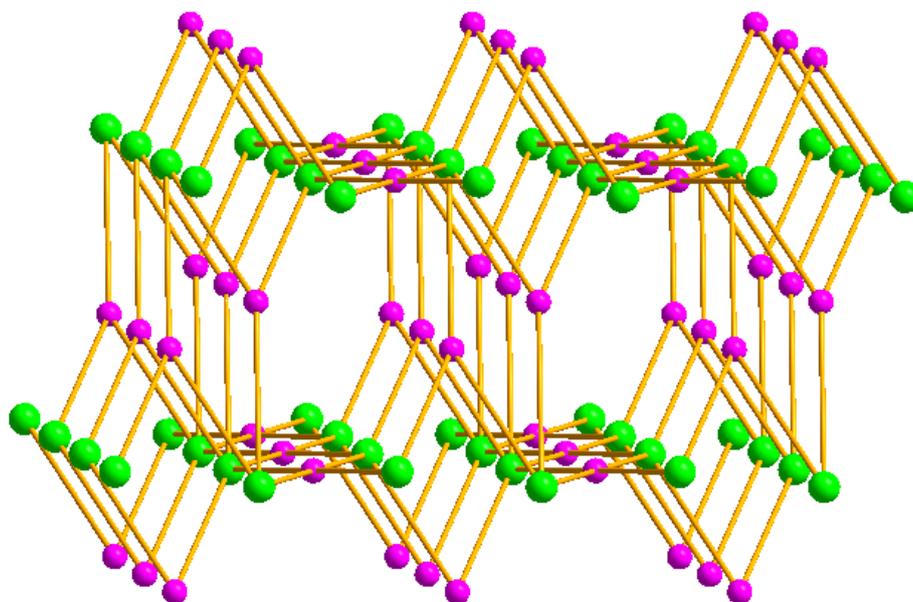


Figure S1 The detailed topological structure of compound **4**, displaying the nodes and corresponding connection number. Color codes: green, Dy, purple, ligand.

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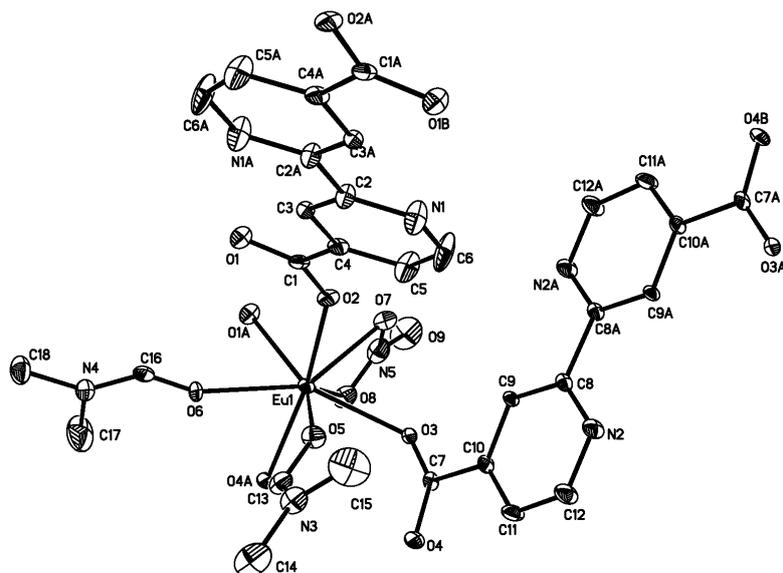


Figure S2 Molecular structure of **5**, showing the coordination environment of Eu^{3+} .

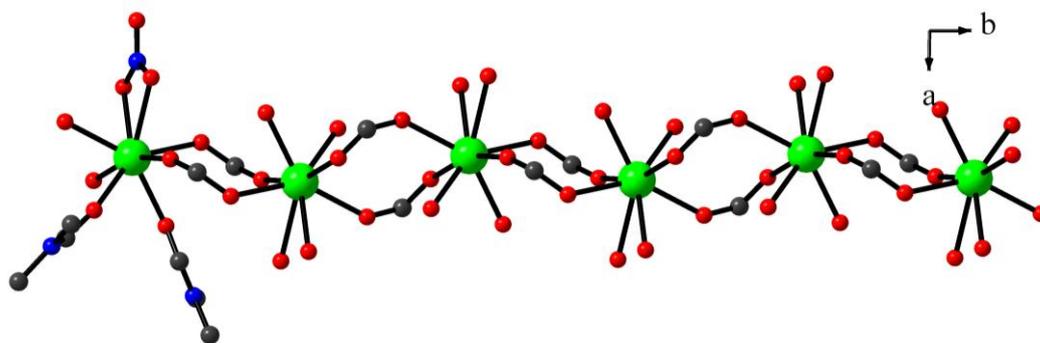


Figure S3 The 1D chain structure connected through carboxylic group of compound **5**.

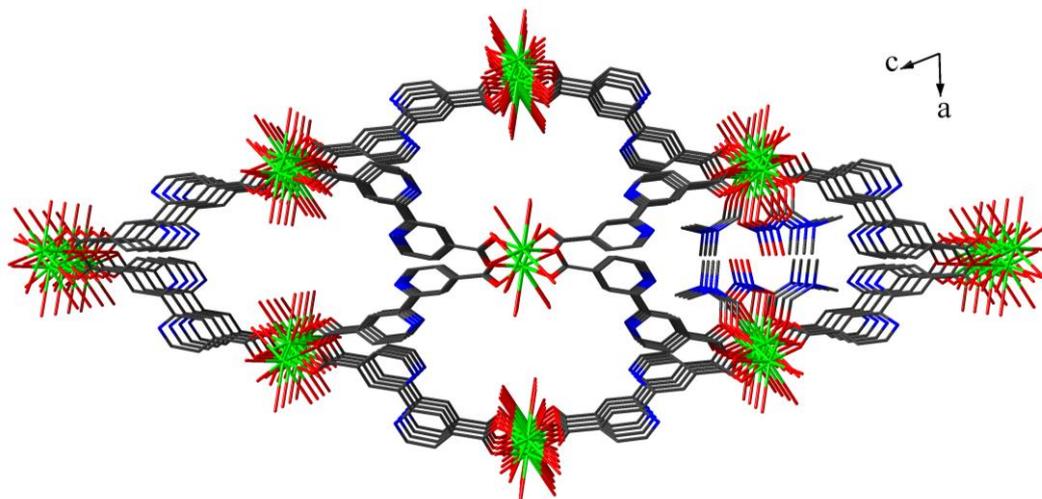


Figure S4 The 3D framework of compound **5**. Color codes: green, Eu, red, O, blue, N, gray, C. All hydrogen atoms, uncoordinated H₂O and part of DMF are omitted for clarity.

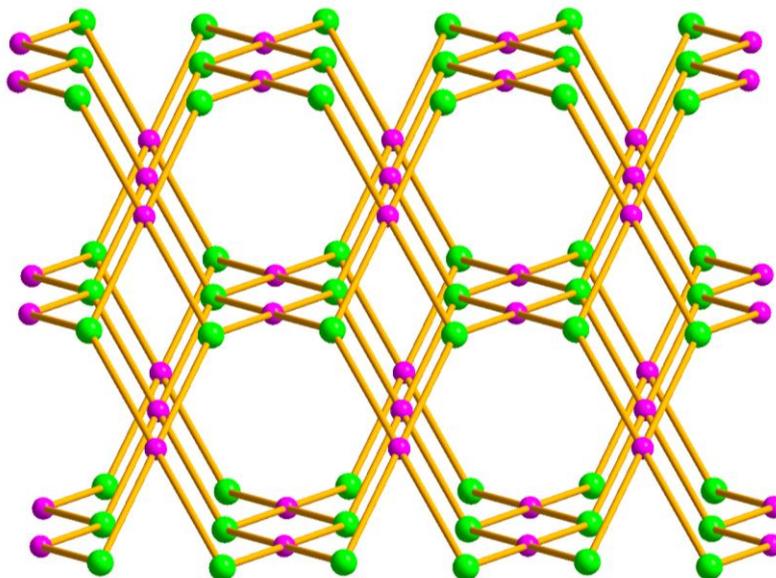


Figure S5 The detailed topological structure of compound **8**, displaying the nodes and corresponding connection number. Color codes: green, Dy, purple, ligand.

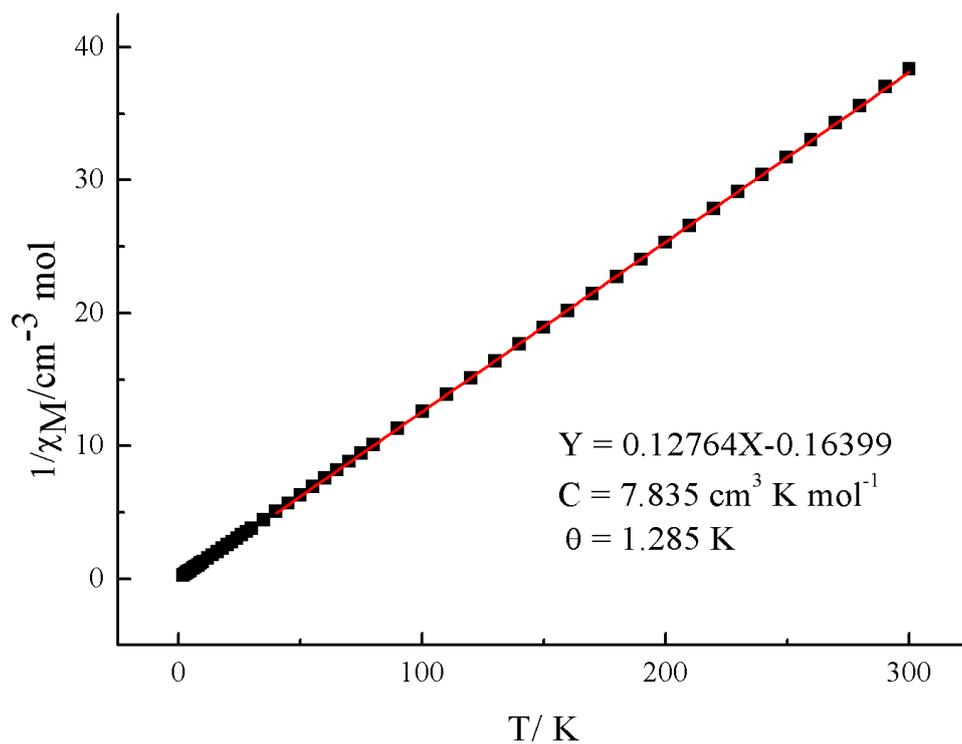


Figure S6. The plots of $1/\chi_M$ versus T for compound **2** and the linear fit of Curie-Weiss law at 1000 Oe field.

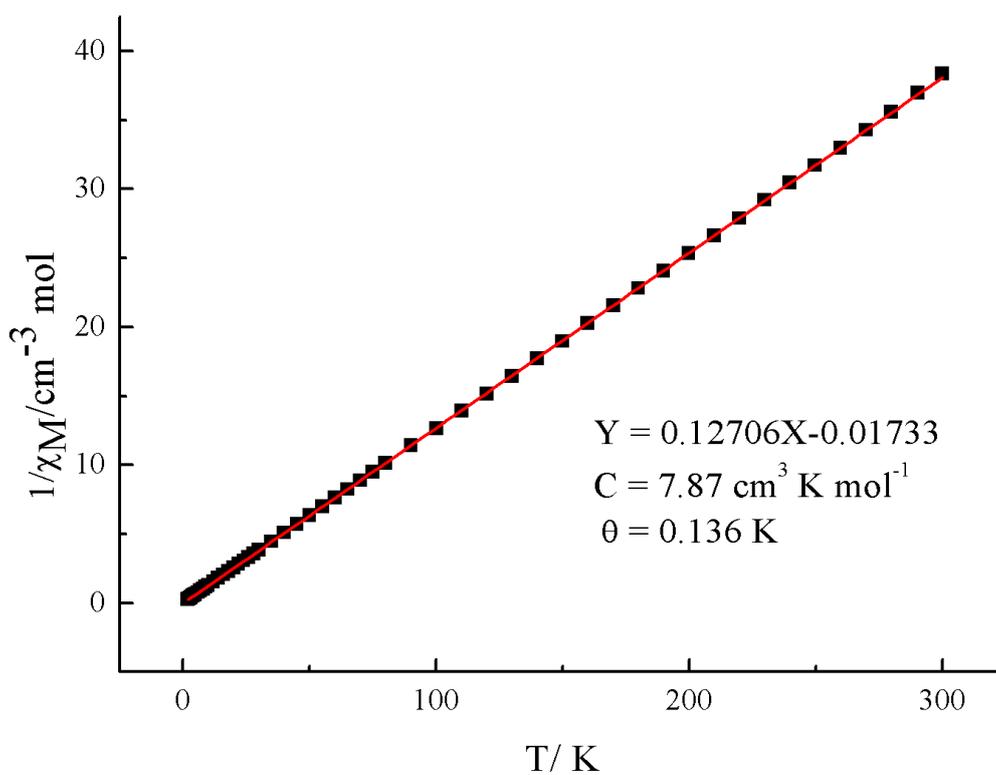


Figure S7. The plots of $1/\chi_M$ versus T for compound **6** and the linear fit of Curie-Weiss law at 1000 Oe field.

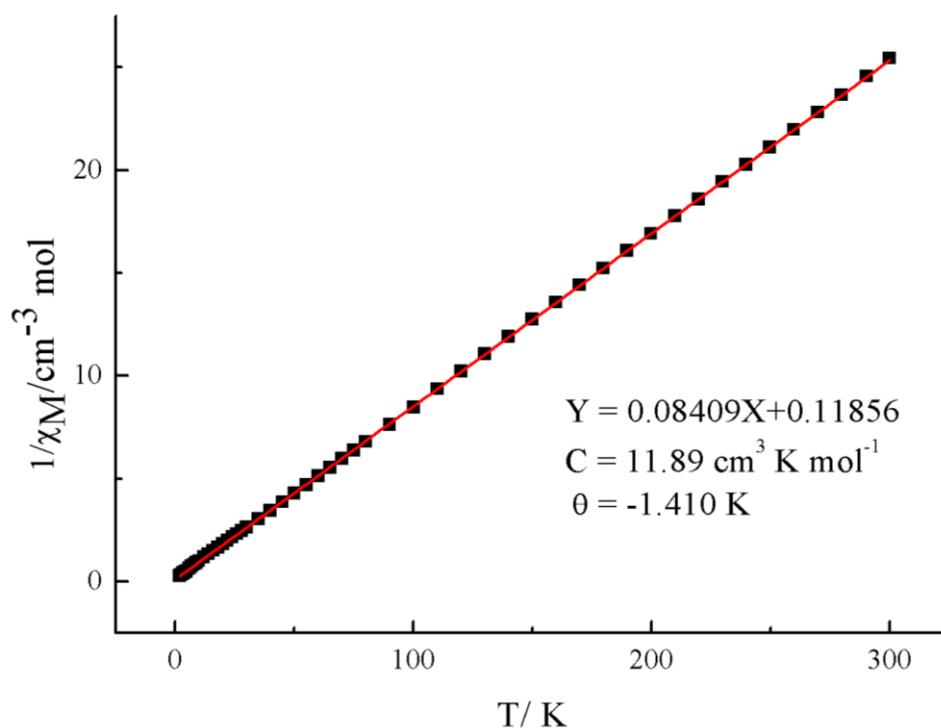


Figure S8. The plots of $1/\chi_M$ versus T for compound **3** and the linear fit of Curie-Weiss law at 1000 Oe field.

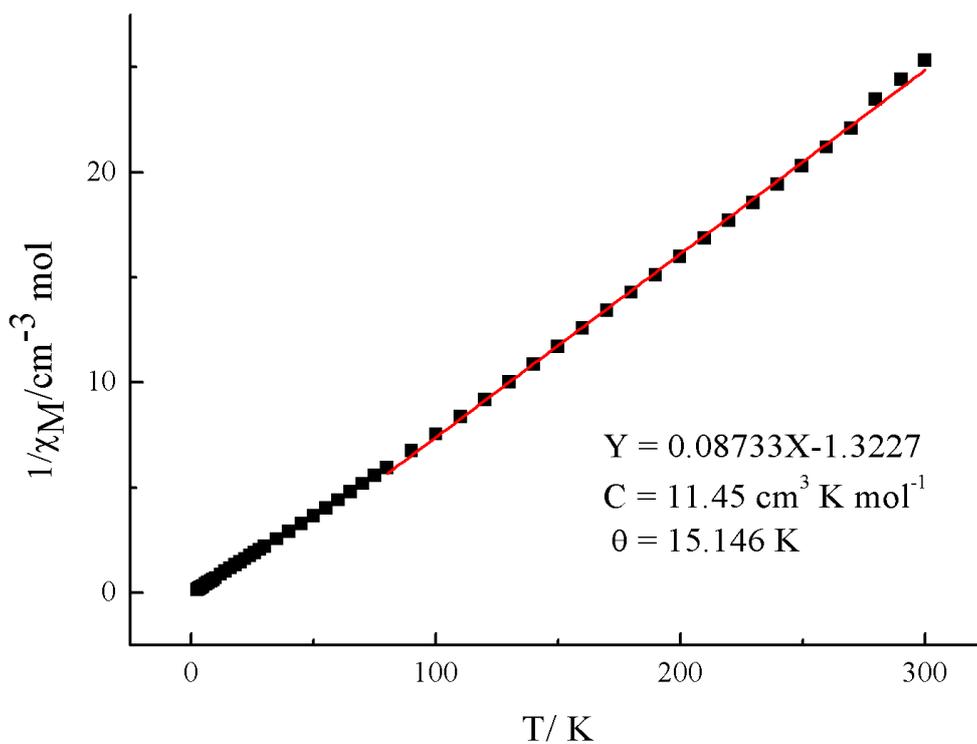


Figure S9. The plots of $1/\chi_M$ versus T for compound **7** and the linear fit of Curie-Weiss law at 1000 Oe field.

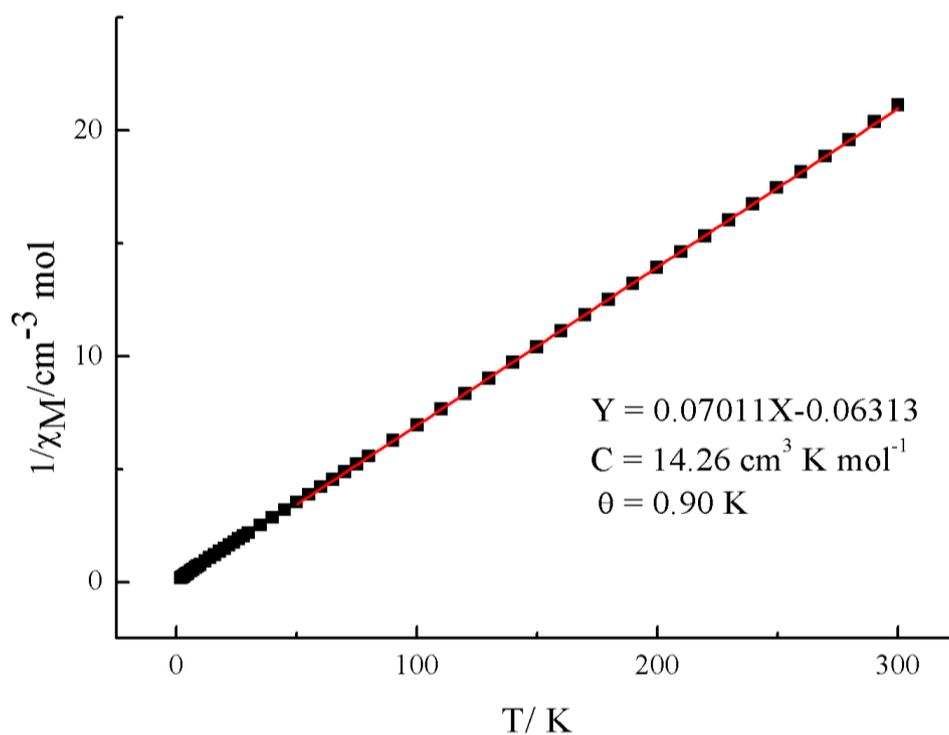


Figure S10. The plots of $1/\chi_M$ versus T for compound **4** and the linear fit of Curie-Weiss law at 1000 Oe field.

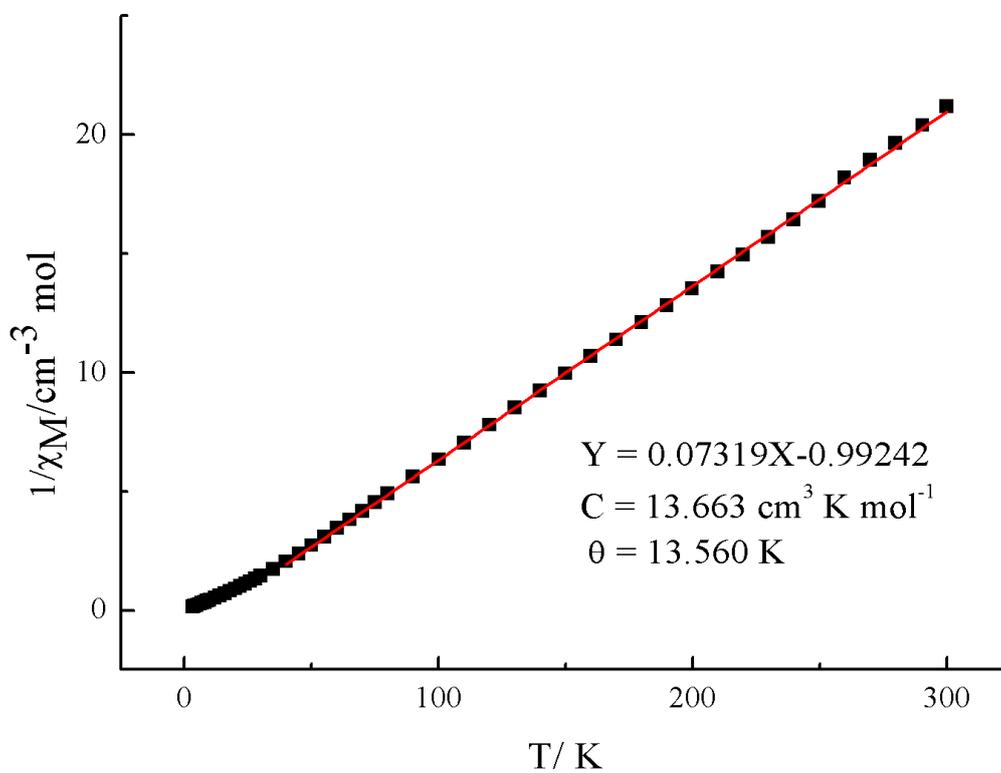


Figure S11. The plots of $1/\chi_M$ versus T for compound **8** and the linear fit of Curie-Weiss law at 1000 Oe field.

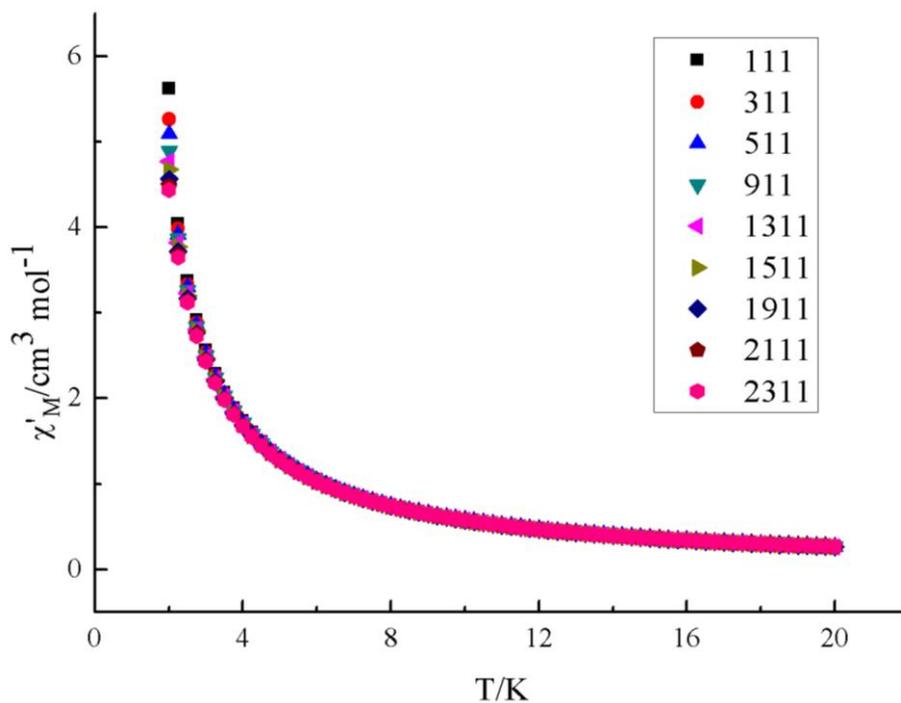


Figure S12. Temperature dependence of the in phase (χ') ac susceptibilities for **4** at the indicated frequencies at $H_{\text{dc}} = 0$ Oe.

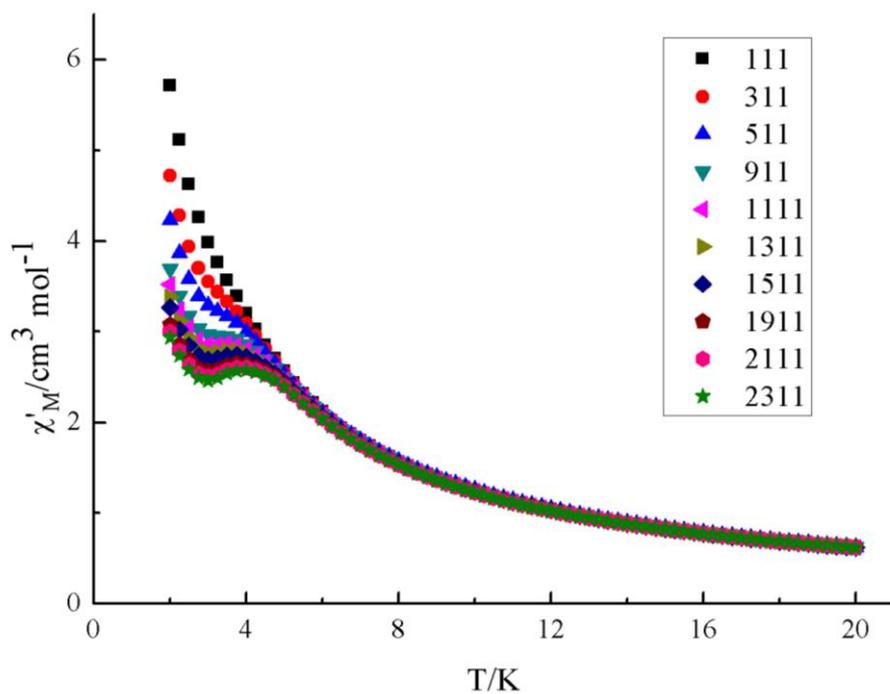


Figure S13. Temperature dependence of the in phase (χ') ac susceptibilities for **8** at the indicated frequencies at $H_{\text{dc}} = 0$ Oe.

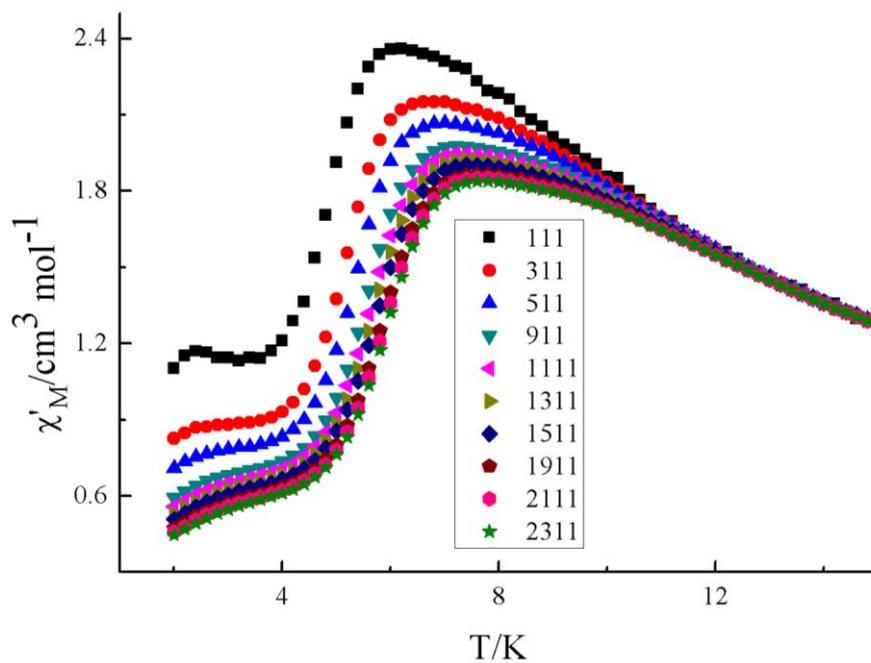


Figure S14. Temperature dependence of the in phase (χ') ac susceptibilities for **4** at the indicated frequencies at $H_{dc} = 2000$ Oe.

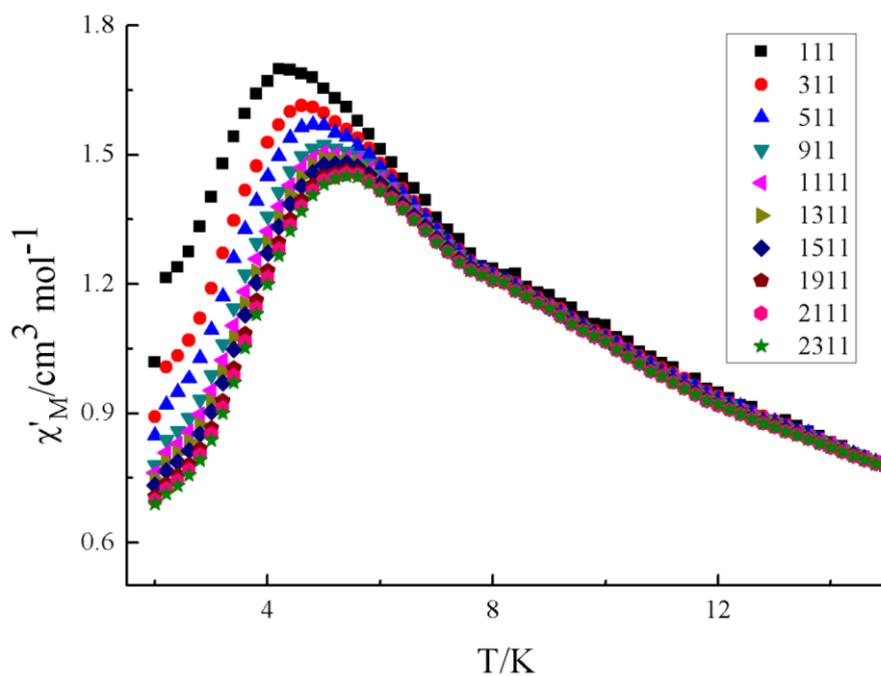


Figure S15. Temperature dependence of the in phase (χ') ac susceptibilities for **8** at the indicated frequencies at $H_{dc} = 2000$ Oe.

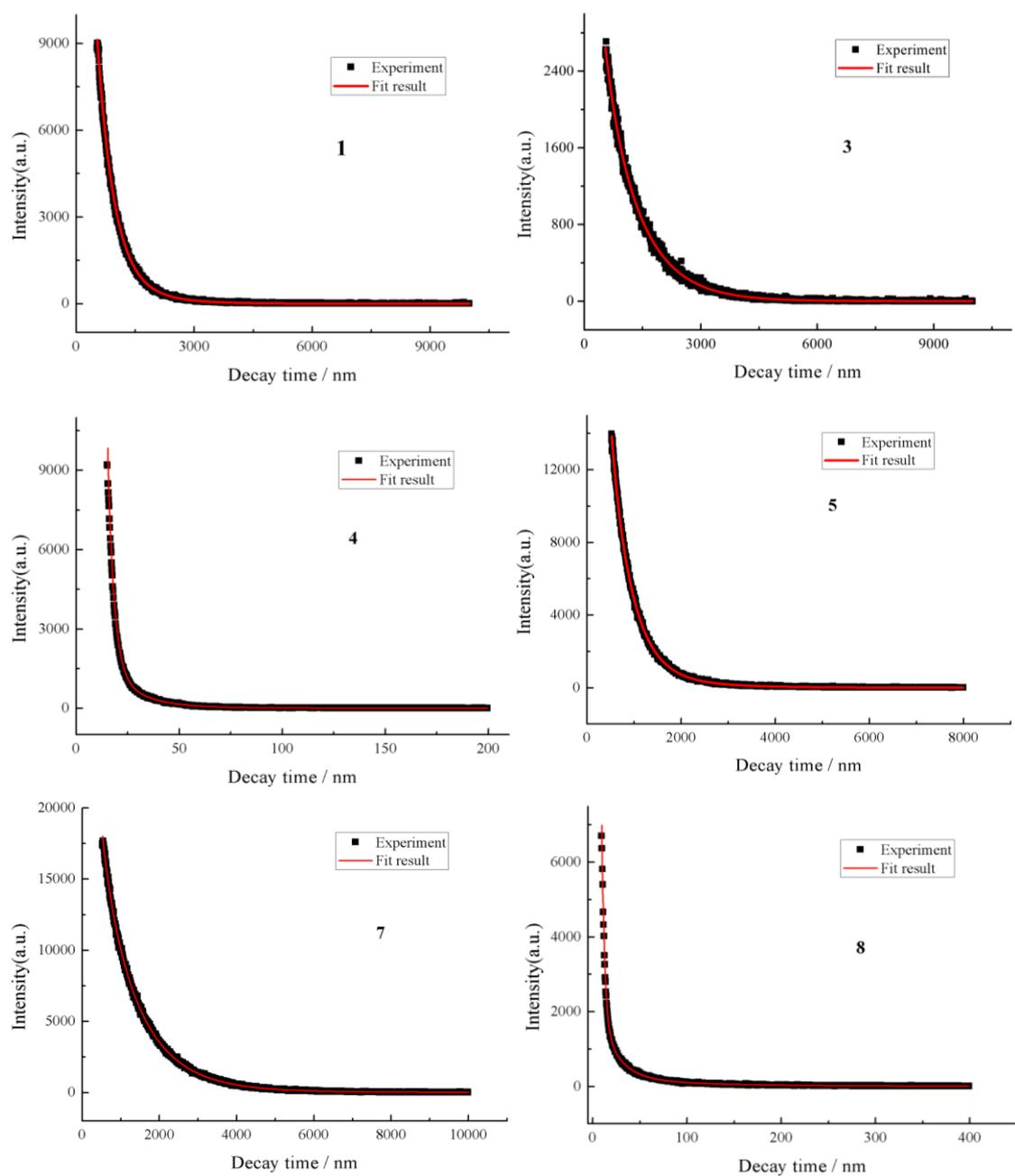


Figure S16. Luminescence decay curves of compounds **1**, **3**, **4**, **5**, **7** and **8**.

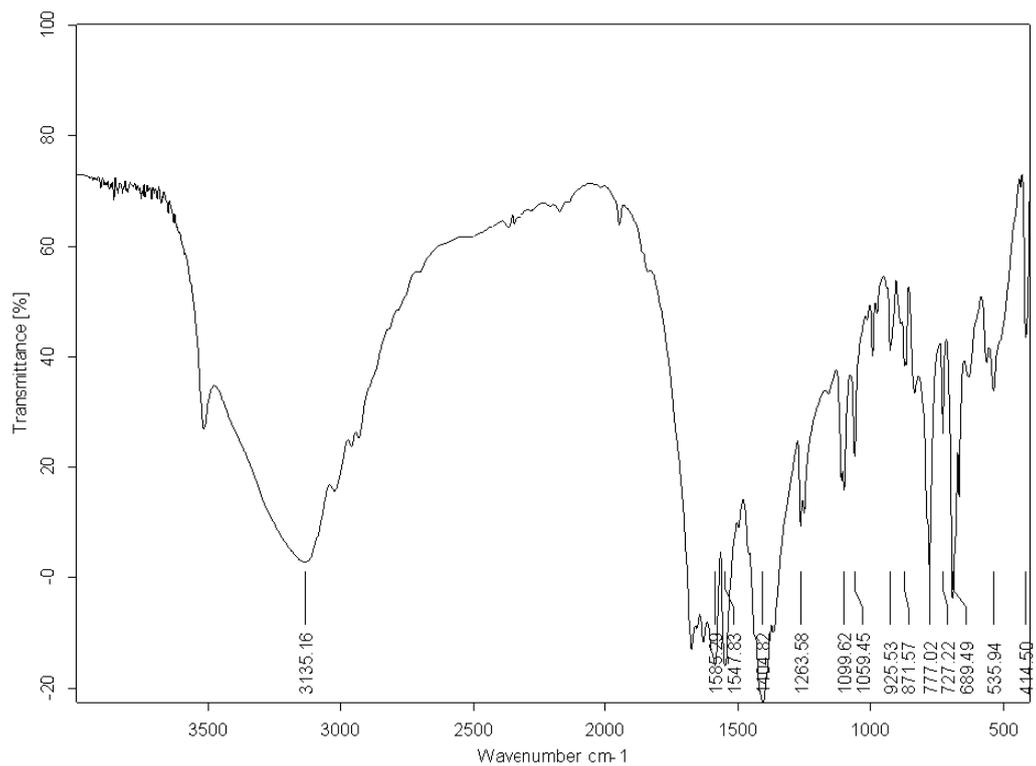


Figure S17. The IR spectrum curve of compounds **1**.

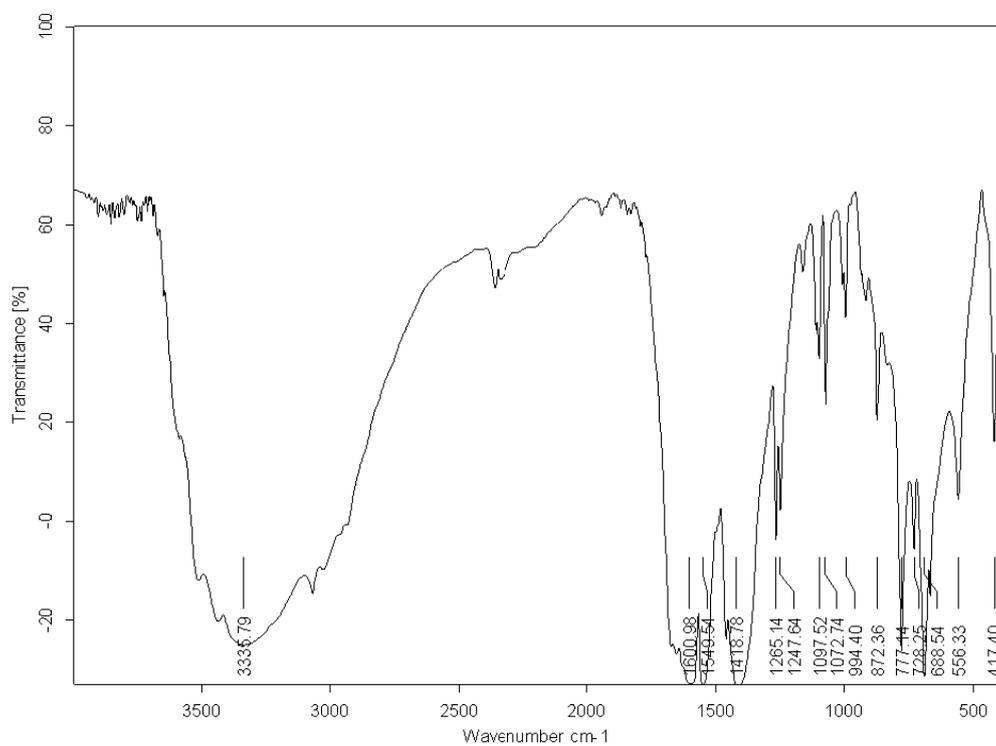


Figure S18. The IR spectrum curve of compounds **2**.

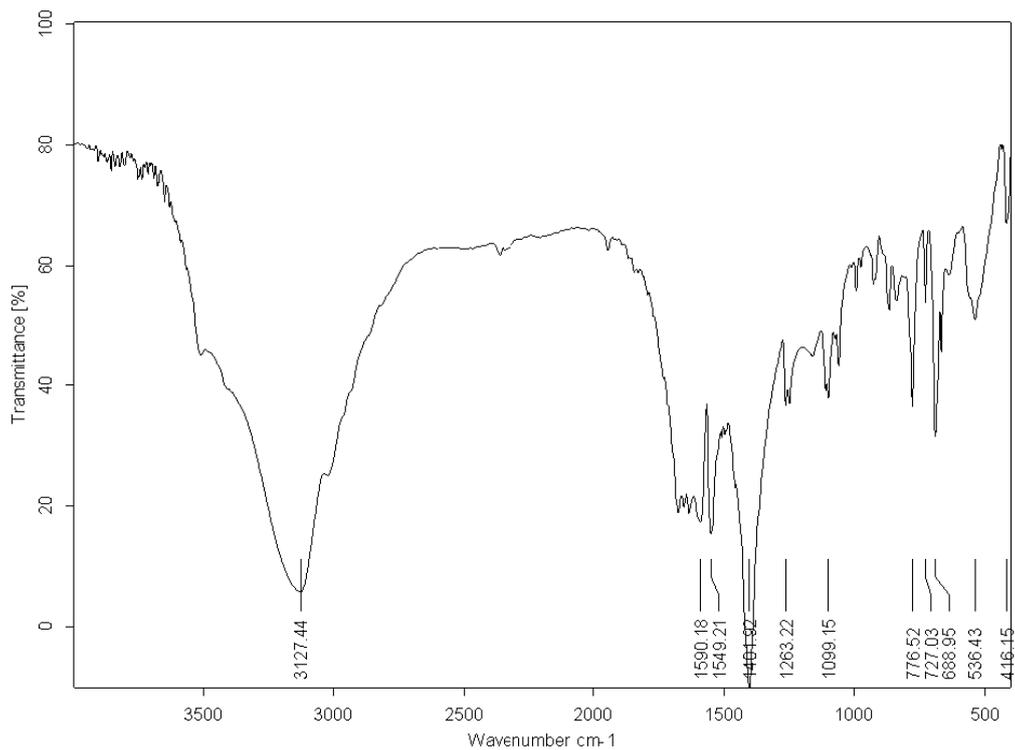


Figure S19. The IR spectrum curve of compounds **3**.

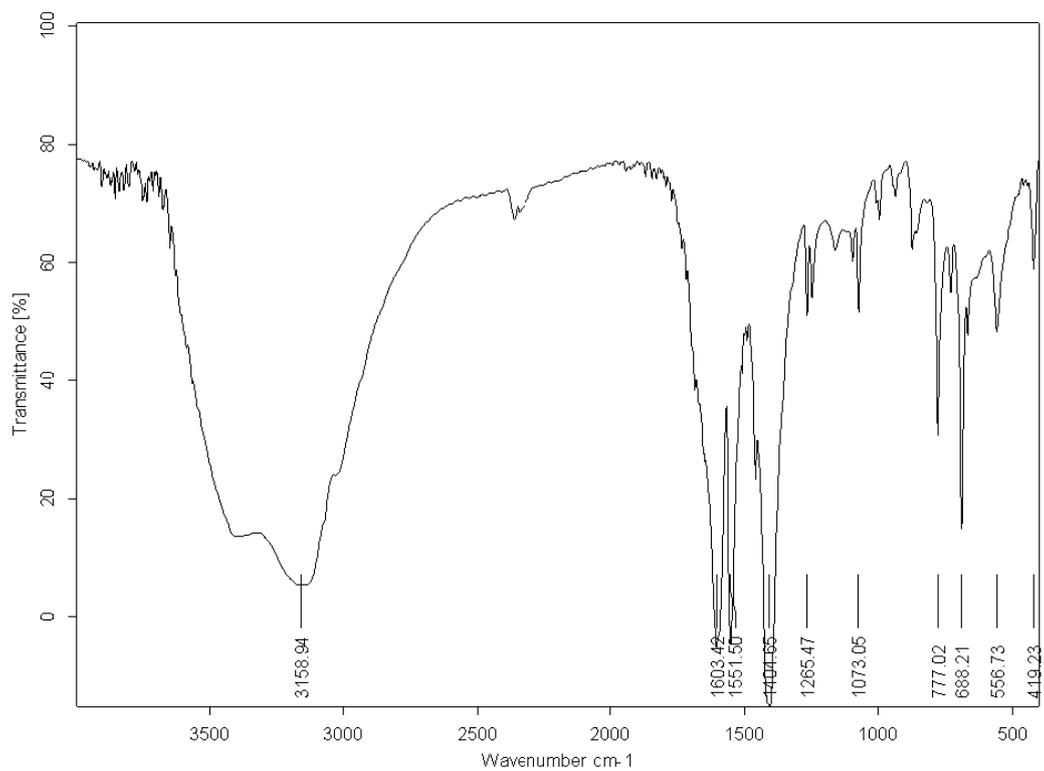


Figure S20. The IR spectrum curve of compounds **4**.

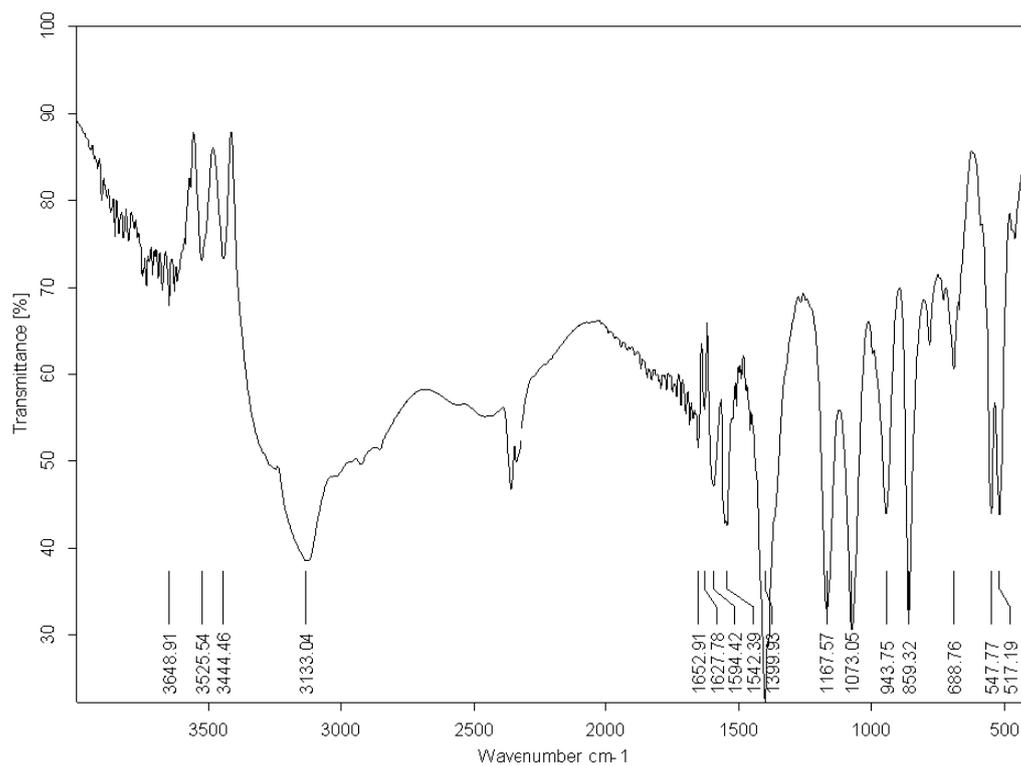


Figure S21. The IR spectrum curve of compounds **5**.

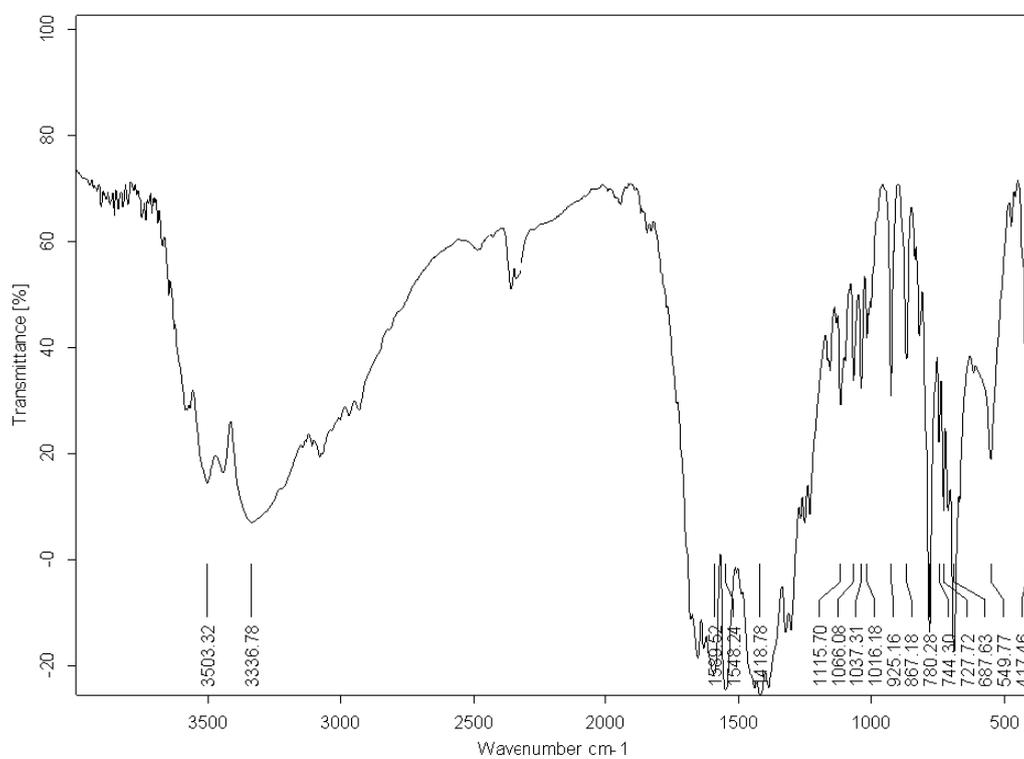


Figure S22. The IR spectrum curve of compounds **6**.

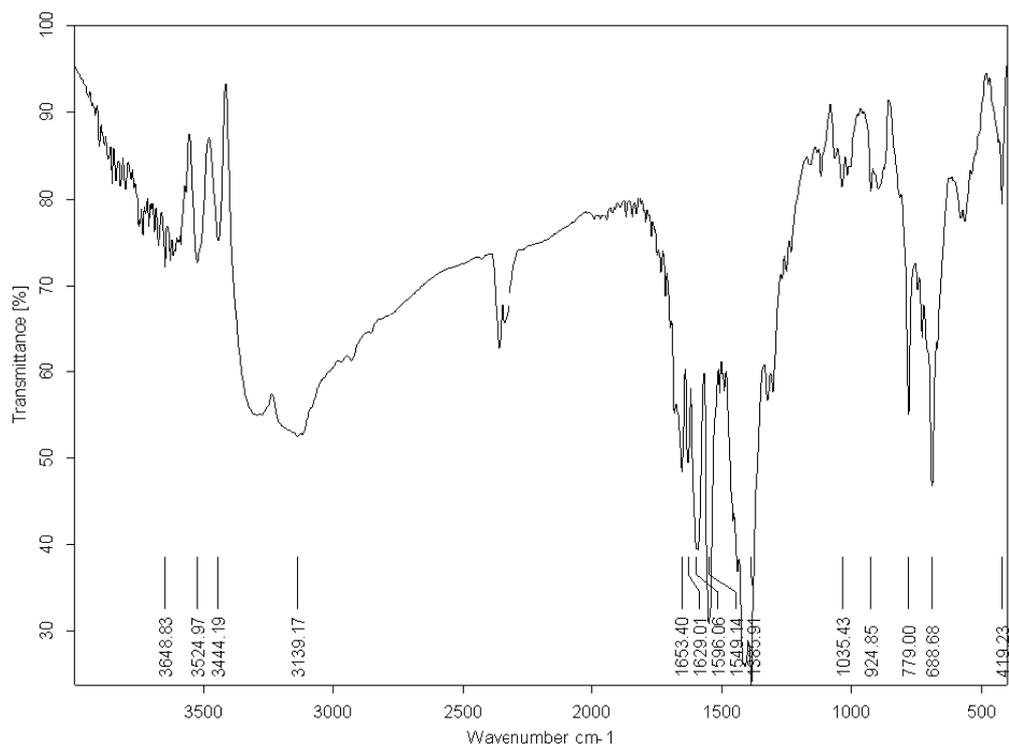


Figure S23. The IR spectrum curve of compounds **7**.

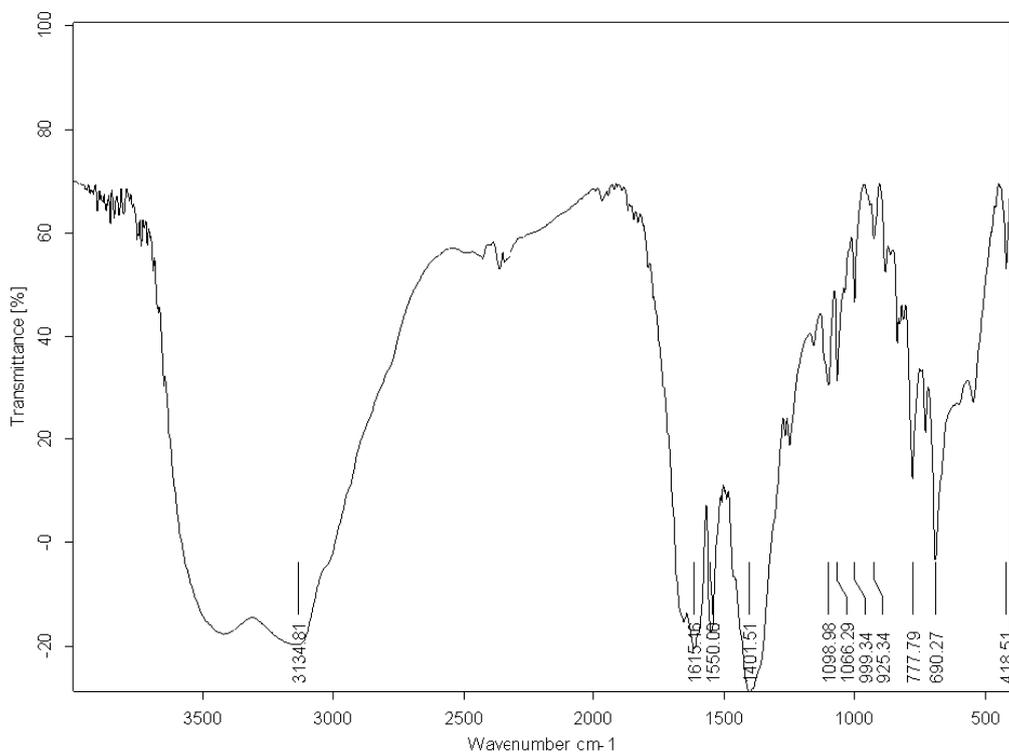


Figure S24. The IR spectrum curve of compounds **8**.

Table S1. Selected Bond Lengths (Å) and Angles (deg) for **1 – 8**.

1					
Eu(1)-O(7)	2.324(4)	O(7)-Eu(1)-O(4)	150.18(16)	O(4)-Eu(1)-O(6)#1	86.72(15)
Eu(1)-O(4)	2.336(4)	O(7)-Eu(1)-O(6)#1	105.62(15)	O(4)-Eu(1)-O(3)#2	97.05(15)
Eu(1)-O(6)#1	2.403(4)	O(7)-Eu(1)-O(3)#2	87.71(15)	O(4)-Eu(1)-O(1)#3	79.55(15)
Eu(1)-O(3)#2	2.407(4)	O(7)-Eu(1)-O(1)#3	79.06(16)	O(4)-Eu(1)-O(8)	139.32(16)
Eu(1)-O(1)#3	2.418(4)	O(7)-Eu(1)-O(8)	70.46(15)	O(4)-Eu(1)-O(5)	69.84(17)
Eu(1)-O(8)	2.441(4)	O(7)-Eu(1)-O(5)	139.33(17)	O(4)-Eu(1)-O(9)	74.38(16)
Eu(1)-O(5)	2.484(5)	O(7)-Eu(1)-O(9)	79.05(15)		
Eu(1)-O(9)	2.491(4)				
2					
Gd(1)-O(8)	2.294(7)	O(8)-Gd(1)-O(3)#1	149.7(3)	O(3)#1-Gd(1)-O(4)	96.8(3)
Gd(1)-O(3)#1	2.325(7)	O(8)-Gd(1)-O(4)	87.7(3)	O(3)#1-Gd(1)-O(7)#2	86.8(3)
Gd(1)-O(4)	2.376(7)	O(8)-Gd(1)-O(7)#2	106.2(3)	O(3)#1-Gd(1)-O(2)#3	79.6(3)
Gd(1)-O(7)#2	2.376(7)	O(8)-Gd(1)-O(2)#3	79.0(3)	O(3)#1-Gd(1)-O(5)	139.7(3)
Gd(1)-O(2)#3	2.399(7)	O(8)-Gd(1)-O(5)	70.6(3)	O(3)#1-Gd(1)-O(9)	69.8(3)
Gd(1)-O(5)	2.421(8)	O(8)-Gd(1)-O(9)	139.7(3)	O(3)#1-Gd(1)-O(6)	74.3(3)
Gd(1)-O(9)	2.482(9)	O(8)-Gd(1)-O(6)	78.7(3)		
Gd(1)-O(6)	2.483(8)				
3					
Tb(1)-O(6)	2.274(5)	O(6)-Tb(1)-O(4)	150.1(2)	O(4)-Tb(1)-O(5)#1	87.6(2)
Tb(1)-O(4)	2.316(6)	O(6)-Tb(1)-O(5)#1	104.3(2)	O(4)-Tb(1)-O(3)#2	96.5(2)
Tb(1)-O(5)#1	2.358(5)	O(6)-Tb(1)-O(3)#2	88.4(2)	O(4)-Tb(1)-O(1)#3	79.63(19)
Tb(1)-O(3)#2	2.376(5)	O(6)-Tb(1)-O(1)#3	78.9(2)	O(4)-Tb(1)-O(8)	140.0(2)
Tb(1)-O(1)#3	2.392(7)	O(6)-Tb(1)-O(8)	69.9(2)	O(4)-Tb(1)-O(7)	70.2(2)
Tb(1)-O(8)	2.417(7)	O(6)-Tb(1)-O(7)	139.05(19)	O(4)-Tb(1)-O(9)	73.9(2)
Tb(1)-O(7)	2.439(7)	O(6)-Tb(1)-O(9)	79.7(2)		
Tb(1)-O(9)	2.452(6)				
4					
Dy(1)-O(6)	2.272(9)	O(6)-Dy(1)-O(3)#1	149.4(4)	O(3)#1-Dy(1)-O(4)#2	96.9(4)
Dy(1)-O(3)#1	2.311(9)	O(6)-Dy(1)-O(4)#2	88.6(4)	O(3)#1-Dy(1)-O(5)#3	87.0(4)
Dy(1)-O(4)#2	2.363(9)	O(6)-Dy(1)-O(5)#3	104.8(3)	O(3)#1-Dy(1)-O(2)	79.6(3)
Dy(1)-O(5)#3	2.364(9)	O(6)-Dy(1)-O(2)	78.1(3)	O(3)#1-Dy(1)-O(7)	139.4(4)
Dy(1)-O(2)	2.393(9)	O(6)-Dy(1)-O(7)	71.1(3)	O(3)#1-Dy(1)-O(9)	69.8(4)
Dy(1)-O(7)	2.394(10)	O(6)-Dy(1)-O(9)	140.3(4)	O(3)#1-Dy(1)-O(8)	75.0(4)
Dy(1)-O(9)	2.447(10)	O(6)-Dy(1)-O(8)	78.3(3)		
Dy(1)-O(8)	2.454(10)				
5					
Eu(1)-O(4)#1	2.321(7)	O(4)#1-Eu(1)-O(2)	160.9(3)	O(2)-Eu(1)-O(6)	90.9(3)
Eu(1)-O(2)	2.351(7)	O(4)#1-Eu(1)-O(6)	74.6(3)	O(2)-Eu(1)-O(3)	96.1(3)
Eu(1)-O(6)	2.358(8)	O(4)#1-Eu(1)-O(3)	88.7(3)	O(2)-Eu(1)-O(5)	74.9(3)
Eu(1)-O(3)	2.360(7)	O(4)#1-Eu(1)-O(5)	89.3(3)	O(2)-Eu(1)-O(1)#2	88.0(3)

Eu(1)-O(5)	2.373(8)	O(4)#1-Eu(1)-O(1)#2	99.5(3)	O(2)-Eu(1)-O(7)	76.4(3)
Eu(1)-O(1)#2	2.373(8)	O(4)#1-Eu(1)-O(7)	122.5(3)	O(2)-Eu(1)-O(8)	126.9(3)
Eu(1)-O(7)	2.496(10)	O(4)#1-Eu(1)-O(8)	72.1(3)		
Eu(1)-O(8)	2.530(9)				
6					
Gd(1)-O(2)#1	2.278(4)	O(2)#1-Gd(1)-O(2)#2	163.1(2)	O(2)#2-Gd(1)-O(1)#3	92.63(13)
Gd(1)-O(2)#2	2.278(4)	O(2)#1-Gd(1)-O(1)#3	93.02(13)	O(2)#2-Gd(1)-O(1)	93.02(13)
Gd(1)-O(1)#3	2.349(3)	O(2)#1-Gd(1)-O(1)	92.63(13)	O(2)#2-Gd(1)-O(4)#3	88.69(17)
Gd(1)-O(1)	2.349(3)	O(2)#1-Gd(1)-O(4)#3	77.90(16)	O(2)#2-Gd(1)-O(4)	77.90(16)
Gd(1)-O(4)#3	2.368(4)	O(2)#1-Gd(1)-O(4)	88.69(17)	O(2)#2-Gd(1)-O(3)#3	123.9(2)
Gd(1)-O(4)	2.368(4)	O(2)#1-Gd(1)-O(3)#3	73.1(2)	O(2)#2-Gd(1)-O(3)	73.1(2)
Gd(1)-O(3)#3	2.481(5)	O(2)#1-Gd(1)-O(3)	123.9(2)		
Gd(1)-O(3)	2.481(5)				
7					
Tb(1)-O(1)#1	2.264(7)	O(1)#1-Tb(1)-O(1)#2	163.2(4)	O(1)#2-Tb(1)-O(2)#3	92.7(2)
Tb(1)-O(1)#2	2.264(7)	O(1)#1-Tb(1)-O(2)#3	92.8(3)	O(1)#2-Tb(1)-O(2)	92.8(3)
Tb(1)-O(2)#3	2.335(5)	O(1)#1-Tb(1)-O(2)	92.7(2)	O(1)#2-Tb(1)-O(3)	89.0(3)
Tb(1)-O(2)	2.335(5)	O(1)#1-Tb(1)-O(3)	77.7(3)	O(1)#2-Tb(1)-O(3)#3	77.7(3)
Tb(1)-O(3)	2.361(9)	O(1)#1-Tb(1)-O(3)#3	89.0(3)	O(1)#2-Tb(1)-O(4)	124.0(3)
Tb(1)-O(3)#3	2.361(9)	O(1)#1-Tb(1)-O(4)	72.8(3)	O(1)#2-Tb(1)-O(4)#3	72.8(3)
Tb(1)-O(4)	2.506(12)	O(1)#1-Tb(1)-O(4)#3	124.0(3)		
Tb(1)-O(4)#3	2.506(12)				
8					
Dy(1)-O(3)#1	2.242(4)	O(3)#1-Dy(1)-O(3)#2	162.7(3)	O(3)#2-Dy(1)-O(4)	92.43(14)
Dy(1)-O(3)#2	2.242(4)	O(3)#1-Dy(1)-O(4)	93.32(15)	O(3)#2-Dy(1)-O(4)#3	93.32(15)
Dy(1)-O(4)	2.316(3)	O(3)#1-Dy(1)-O(4)#3	92.43(14)	O(3)#2-Dy(1)-O(5)	77.93(18)
Dy(1)-O(4)#3	2.316(3)	O(3)#1-Dy(1)-O(5)	88.35(19)	O(3)#2-Dy(1)-O(5)#3	88.35(19)
Dy(1)-O(5)	2.342(4)	O(3)#1-Dy(1)-O(5)#3	77.93(18)	O(3)#2-Dy(1)-O(2)	124.6(2)
Dy(1)-O(5)#3	2.342(4)	O(3)#1-Dy(1)-O(2)	72.7(2)	O(3)#2-Dy(1)-O(2)#3	72.7(2)
Dy(1)-O(2)	2.472(5)	O(3)#1-Dy(1)-O(2)#3	124.6(2)		
Dy(1)-O(2)#3	2.472(5)				

Symmetry transformations used to generate equivalent atoms for **1**: #1 -x+1,-y,-z+2, #2 -x,-y,-z+2, #3 -x,-y+1,-z+1;
 for **2**: #1 -x+1,-y,-z+2, #2 -x,-y,-z+2, #3 x,y-1,z+1; for **3**: #1 -x,-y+1,-z, #2 -x+1,-y+1,-z, #3 -x+1,-y,-z+1; for **4**: #1
 -x+1,-y+1,-z+1, #2 x,y+1,z-1, #3 -x,-y+2,-z; for **5**: #1 -x+2,-y,-z, #2 -x+2,-y+1,-z; for **6**: #1 x,-y+1,z-1/2, #2
 -x,-y+1,-z+1, #3 -x,y,-z+1/2; for **7**: #1 -x,-y,-z+1, #2 x,-y,z-1/2, #3 -x,y,-z+1/2; for **8**: #1 x,-y+2,z-1/2, #2
 -x,-y+2,-z+2, #3 -x,y,-z+3/2.