

A Series of Novel 3D Pillared-Chain-Layered Co (II)-Ln (III) Heterometallic Coordination Polymers

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Supporting Information

Table 1. Selected bonds (Å) and angles (°) for **1**

bonds lengths [Å] and angles [°] for 1			
La(1)-O(8)#1	2.418(3)	O(7)#2-La(1)-O(10)	75.73(12)
La(1)-O(7)#2	2.470(3)	O(5)-La(1)-O(10)	81.85(11)
La(1)-O(5)	2.471(3)	O(6)#3-La(1)-O(10)	140.02(11)
La(1)-O(6)#3	2.498(3)	O(1)-La(1)-O(10)	143.54(11)
La(1)-O(1)	2.567(3)	O(9)-La(1)-O(10)	71.46(11)
La(1)-O(9)	2.572(3)	O(8)#1-La(1)-O(2)	71.12(11)
La(1)-O(10)	2.573(3)	O(7)#2-La(1)-O(2)	79.82(11)
La(1)-O(2)	2.635(3)	O(5)-La(1)-O(2)	128.52(10)
La(1)-O(5)#3	2.924(3)	O(6)#3-La(1)-O(2)	68.50(11)
Co(2)-O(3)#4	2.050(3)	O(1)-La(1)-O(2)	50.20(10)
Co(2)-O(3)#5	2.050(3)	O(9)-La(1)-O(2)	143.56(11)
Co(2)-N(3)	2.124(4)	O(10)-La(1)-O(2)	128.33(11)
Co(2)-N(3)#6	2.124(4)	O(8)#1-La(1)-O(5)#3	133.26(11)
Co(2)-N(6)#1	2.207(4)	O(7)#2-La(1)-O(5)#3	114.14(10)
O(5)-La(1)#3	2.924(3)	O(5)-La(1)-O(5)#3	70.52(10)
O(6)-La(1)#3	2.498(3)	O(6)#3-La(1)-O(5)#3	47.16(10)
O(7)-La(1)#5	2.470(3)	O(1)-La(1)-O(5)#3	66.68(10)
N(6)-Co(2)#8	2.207(4)	O(9)-La(1)-O(5)#3	68.59(10)
O(8)-La(1)#1	2.418(3)	O(10)-La(1)-O(5)#3	134.52(10)
O(8)#1-La(1)-O(7)#2	108.02(12)	O(2)-La(1)-O(5)#3	97.00(9)
O(8)#1-La(1)-O(5)	82.16(12)	O(3)#4-Co(2)-O(3)#5	180.000(1)
O(7)#2-La(1)-O(5)	151.43(12)	O(3)#4-Co(2)-N(3)	95.07(14)
O(8)#1-La(1)-O(6)#3	138.82(13)	O(3)#5-Co(2)-N(3)	84.93(14)
O(7)#2-La(1)-O(6)#3	72.49(11)	O(3)#4-Co(2)-N(3)#6	84.93(14)
O(5)-La(1)-O(6)#3	117.68(11)	O(3)#5-Co(2)-N(3)#6	95.07(14)
O(8)#1-La(1)-O(1)	71.95(12)	N(3)-Co(2)-N(3)#6	180.0
O(7)#2-La(1)-O(1)	128.11(12)	O(3)#4-Co(2)-N(6)#1	92.88(14)
O(5)-La(1)-O(1)	80.25(11)	O(3)#5-Co(2)-N(6)#1	87.12(14)
O(6)#3-La(1)-O(1)	76.35(12)	N(3)-Co(2)-N(6)#1	88.53(15)
O(8)#1-La(1)-O(9)	143.05(12)	N(3)#6-Co(2)-N(6)#1	91.47(15)
O(7)#2-La(1)-O(9)	76.62(12)	O(3)#4-Co(2)-N(6)#7	87.12(14)
O(5)-La(1)-O(9)	79.63(11)	O(3)#5-Co(2)-N(6)#7	92.88(14)
O(6)#3-La(1)-O(9)	78.05(12)	N(3)-Co(2)-N(6)#7	91.47(15)
O(1)-La(1)-O(9)	134.85(11)	N(3)#6-Co(2)-N(6)#7	88.53(15)

O(8)#1-La(1)-O(10) 74.33(11) N(6)#1-Co(2)-N(6)#7 180.000(1)
 Symmetry transformations used to generate equivalent atoms: #1 -x+1, -y, -z+1; #2 x, y+1, z; #3 -x, -y+1, -z+1; #4 -x, -y+1, -z+2; #5 x, y-1, z; #6 -x, -y, -z+2; #7 x-1, y, z+1; #8 x+1, y, z-1;

Table 2. Selected bonds (Å) and angles (°) for **2**

Selected bonds (Å) and angles (°) for 2			
Ce(1)-O(6)#1	2.421(3)	O(5)-Ce(1)-O(10)	75.95(9)
Ce(1)-O(5)	2.466(2)	O(8)#2-Ce(1)-O(10)	81.45(8)
Ce(1)-O(8)#2	2.468(2)	O(7)#3-Ce(1)-O(10)	140.08(9)
Ce(1)-O(7)#3	2.504(2)	O(2)-Ce(1)-O(10)	143.38(9)
Ce(1)-O(2)	2.564(3)	O(9)-Ce(1)-O(10)	71.11(9)
Ce(1)-O(9)	2.571(3)	O(6)#1-Ce(1)-O(1)	71.09(9)
Ce(1)-O(10)	2.576(3)	O(5)-Ce(1)-O(1)	79.88(9)
Ce(1)-O(1)	2.630(2)	O(8)#2-Ce(1)-O(1)	128.48(8)
Ce(1)-O(8)#3	2.907(3)	O(7)#3-Ce(1)-O(1)	68.36(9)
Co(1)-O(3)#4	2.047(2)	O(2)-Ce(1)-O(1)	50.15(8)
Co(1)-O(3)#5	2.047(2)	O(9)-Ce(1)-O(1)	143.60(9)
Co(1)-N(3)#6	2.120(3)	O(10)-Ce(1)-O(1)	128.69(8)
Co(1)-N(3)#1	2.120(3)	O(6)#1-Ce(1)-O(8)#3	133.33(8)
Co(1)-N(6)#7	2.208(3)	O(5)-Ce(1)-O(8)#3	114.16(8)
O(7)-Ce(1)#3	2.504(2)	O(8)#2-Ce(1)-O(8)#3	70.71(8)
O(3)-Co(1)#8	2.047(2)	O(7)#3-Ce(1)-O(8)#3	47.21(7)
O(6)-Ce(1)#1	2.421(3)	O(2)-Ce(1)-O(8)#3	66.70(8)
O(8)-Ce(1)#9	2.468(2)	O(9)-Ce(1)-O(8)#3	68.88(8)
O(8)-Ce(1)#3	2.907(3)	O(10)-Ce(1)-O(8)#3	134.34(8)
N(3)-Co(1)#10	2.120(3)	O(1)-Ce(1)-O(8)#3	96.83(8)
O(6)#1-Ce(1)-O(5)	107.87(9)	O(3)#4-Co(1)-O(3)#5	180.00(14)
O(6)#1-Ce(1)-O(8)#2	82.17(9)	O(3)#4-Co(1)-N(3)#6	85.28(11)
O(5)-Ce(1)-O(8)#2	151.40(9)	O(3)#5-Co(1)-N(3)#6	94.72(11)
O(6)#1-Ce(1)-O(7)#3	138.70(10)	O(3)#4-Co(1)-N(3)#1	94.72(11)
O(5)-Ce(1)-O(7)#3	72.44(9)	O(3)#5-Co(1)-N(3)#1	85.28(11)
O(8)#2-Ce(1)-O(7)#3	117.92(8)	N(3)#6-Co(1)-N(3)#1	180.0
O(6)#1-Ce(1)-O(2)	71.88(9)	O(3)#4-Co(1)-N(6)#7	86.94(11)
O(5)-Ce(1)-O(2)	128.18(9)	O(3)#5-Co(1)-N(6)#7	93.06(11)
O(8)#2-Ce(1)-O(2)	80.23(8)	N(3)#6-Co(1)-N(6)#7	88.49(11)
O(7)#3-Ce(1)-O(2)	76.47(9)	N(3)#1-Co(1)-N(6)#7	91.51(11)
O(6)#1-Ce(1)-O(9)	142.94(10)	O(3)#4-Co(1)-N(6)	93.06(11)
O(5)-Ce(1)-O(9)	76.51(9)	O(3)#5-Co(1)-N(6)	86.94(11)
O(8)#2-Ce(1)-O(9)	79.75(9)	N(3)#6-Co(1)-N(6)	91.51(11)
O(7)#3-Ce(1)-O(9)	78.26(10)	N(3)#1-Co(1)-N(6)	88.49(11)
O(2)-Ce(1)-O(9)	135.14(9)	N(6)#7-Co(1)-N(6)	180.000(1)
O(6)#1-Ce(1)-O(10)	74.40(9)		

Symmetry transformations used to generate equivalent atoms: #1 -x+1, -y, -z; #2 x, y-1, z; #3 -x, -y+1, -z; #4 x+1, y, z-1 #5 -x+1, -y+1, -z; #6 x+1, y+1, z-1 #7 -x+2, -y+1, -z-1; #8 x-1, y, z+1; #9 x, y+1, z.

Table 3. Selected bonds (Å) and angles (°) for **3**

Selected bonds (Å) and angles (°) for 3			
Pr(1)-O(8)	2.319(4)	O(10)-Pr(1)-O(9)	71.91(16)
Pr(1)-O(6)#1	2.346(4)	O(8)-Pr(1)-O(2)	79.13(16)
Pr(1)-O(5)	2.373(4)	O(6)#1-Pr(1)-O(2)	73.72(16)
Pr(1)-O(7)	2.383(4)	O(5)-Pr(1)-O(2)	129.13(16)
Pr(1)-O(10)	2.462(4)	O(7)-Pr(1)-O(2)	74.77(17)
Pr(1)-O(9)	2.467(5)	O(10)-Pr(1)-O(2)	143.88(15)
Pr(1)-O(2)	2.486(4)	O(9)-Pr(1)-O(2)	130.49(15)
Pr(1)-O(1)	2.531(4)	O(8)-Pr(1)-O(1)	129.07(16)
Co(1)-O(3)#2	2.031(4)	O(6)#1-Pr(1)-O(1)	71.79(16)
Co(1)-O(3)	2.031(4)	O(5)-Pr(1)-O(1)	80.15(15)
Co(1)-N(3)#3	2.110(5)	O(7)-Pr(1)-O(1)	70.63(16)
Co(1)-N(3)#4	2.110(5)	O(10)-Pr(1)-O(1)	131.19(14)
Co(1)-N(6)#5	2.218(6)	O(9)-Pr(1)-O(1)	142.97(16)
Co(1)-N(6)#6	2.218(6)	O(2)-Pr(1)-O(1)	51.68(13)
N(3)-Co(1)#9	2.110(5)	O(3)#2-Co(1)-O(3)	180.0(4)
O(6)-Pr(1)#1	2.346(4)	O(3)#2-Co(1)-N(3)#3	95.17(19)
O(8)-Pr(1)-O(6)#1	83.65(16)	O(3)-Co(1)-N(3)#3	84.83(19)
O(8)-Pr(1)-O(5)	150.77(18)	O(3)#2-Co(1)-N(3)#4	84.83(19)
O(6)#1-Pr(1)-O(5)	109.30(16)	O(3)-Co(1)-N(3)#4	95.17(19)
O(8)-Pr(1)-O(7)	112.38(16)	N(3)#3-Co(1)-N(3)#4	180.0(3)
O(6)#1-Pr(1)-O(7)	140.88(18)	O(3)#2-Co(1)-N(6)#5	85.6(2)
O(5)-Pr(1)-O(7)	74.47(16)	O(3)-Co(1)-N(6)#5	94.4(2)
O(8)-Pr(1)-O(10)	80.10(16)	N(3)#3-Co(1)-N(6)#5	91.7(2)
O(6)#1-Pr(1)-O(10)	74.88(16)	N(3)#4-Co(1)-N(6)#5	88.3(2)
O(5)-Pr(1)-O(10)	78.40(16)	O(3)#2-Co(1)-N(6)#6	94.4(2)
O(7)-Pr(1)-O(10)	140.96(17)	O(3)-Co(1)-N(6)#6	85.6(2)
O(8)-Pr(1)-O(9)	77.20(17)	N(3)#3-Co(1)-N(6)#6	88.3(2)
O(6)#1-Pr(1)-O(9)	143.92(17)	N(3)#4-Co(1)-N(6)#6	91.7(2)
O(5)-Pr(1)-O(9)	77.45(16)	N(6)#5-Co(1)-N(6)#6	180.0(3)
O(7)-Pr(1)-O(9)	75.15(18)		

Symmetry transformations used to generate equivalent atoms: #1 -x+1, -y+1, -z+1; #2 -x+2, -y, -z; #3 x, y-1, z; #4 -x+2, -y+1, -z; #5 x+1, y, z-1; #6 -x+1, -y, -z+1; #7 x-1 y, z+1; #8 -x+2, -y+1, -z+1; #9 x, y+1, z.

Table 4. Selected bonds (Å) and angles (°) for **4**

Selected bonds (Å) and angles (°) for 4			
Nd(1)-O(5)	2.371(3)	O(5)-Nd(1)-O(9)	73.85(12)
Nd(1)-O(8)#1	2.403(4)	O(8)#1-Nd(1)-O(9)	81.29(12)
Nd(1)-O(6)#2	2.419(3)	O(6)#2-Nd(1)-O(9)	76.58(13)
Nd(1)-O(7)#3	2.432(4)	O(7)#3-Nd(1)-O(9)	140.41(13)
Nd(1)-O(10)	2.504(4)	O(10)-Nd(1)-O(9)	71.91(13)
Nd(1)-O(2)	2.505(3)	O(2)-Nd(1)-O(9)	143.43(12)

Nd(1)-O(9)	2.510(4)	O(5)-Nd(1)-O(1)	71.31(13)
Nd(1)-O(1)	2.565(3)	O(8)#1-Nd(1)-O(1)	129.10(12)
Co(1)-O(3)#4	2.042(4)	O(6)#2-Nd(1)-O(1)	79.25(12)
Co(1)-O(3)	2.042(4)	O(7)#3-Nd(1)-O(1)	69.33(13)
Co(1)-N(3)#5	2.118(4)	O(10)-Nd(1)-O(1)	143.22(13)
Co(1)-N(3)#6	2.118(4)	O(2)-Nd(1)-O(1)	51.40(11)
Co(1)-N(6)#6	2.208(4)	O(9)-Nd(1)-O(1)	128.58(11)
Co(1)-N(6)#5	2.208(4)	O(3)#4-Co(1)-O(3)	180.0(3)
N(3)-Co(1)#7	2.118(4)	O(3)#4-Co(1)-N(3)#5	95.58(15)
O(6)-Nd(1)#2	2.419(3)	O(3)-Co(1)-N(3)#5	84.42(15)
O(8)#1-Nd(1)-O(6)#2	151.48(13)	O(3)#4-Co(1)-N(3)#6	84.42(15)
O(5)-Nd(1)-O(7)#3	139.74(14)	O(3)-Co(1)-N(3)#6	95.58(15)
O(8)#1-Nd(1)-O(7)#3	116.29(12)	N(3)#5-Co(1)-N(3)#6	180.0(3)
O(6)#2-Nd(1)-O(7)#3	73.06(12)	O(3)#4-Co(1)-N(6)#6	86.66(15)
O(5)-Nd(1)-O(10)	143.21(14)	O(3)-Co(1)-N(6)#6	93.34(15)
O(8)#1-Nd(1)-O(10)	79.04(13)	N(3)#5-Co(1)-N(6)#6	91.84(15)
O(6)#2-Nd(1)-O(10)	77.14(13)	N(3)#6-Co(1)-N(6)#6	88.16(15)
O(7)#3-Nd(1)-O(10)	77.00(14)	O(3)#4-Co(1)-N(6)#5	93.34(15)
O(5)-Nd(1)-O(2)	73.05(12)	O(3)-Co(1)-N(6)#5	86.66(15)
O(8)#1-Nd(1)-O(2)	79.67(12)	N(3)#5-Co(1)-N(6)#5	88.16(15)
O(6)#2-Nd(1)-O(2)	128.52(12)	N(3)#6-Co(1)-N(6)#5	91.84(15)
O(7)#3-Nd(1)-O(2)	76.16(13)	N(6)#6-Co(1)-N(6)#5	180.0(3)
O(10)-Nd(1)-O(2)	133.35(12)		

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

Table 5. Selected bonds (Å) and angles (°) for **5**

Selected bonds (Å) and angles (°) for 5			
Sm(1)-O(6)#1	2.334(3)	O(7)#3-Sm(1)-O(10)	78.64(10)
Sm(1)-O(8)#2	2.355(3)	O(9)-Sm(1)-O(10)	72.37(10)
Sm(1)-O(5)	2.387(3)	O(6)#1-Sm(1)-O(1)	78.75(10)
Sm(1)-O(7)#3	2.390(3)	O(8)#2-Sm(1)-O(1)	73.42(10)
Sm(1)-O(9)	2.462(3)	O(5)-Sm(1)-O(1)	74.73(11)
Sm(1)-O(10)	2.466(3)	O(7)#3-Sm(1)-O(1)	129.33(10)
Sm(1)-O(1)	2.492(3)	O(9)-Sm(1)-O(1)	130.33(10)
Sm(1)-O(2)	2.531(3)	O(10)-Sm(1)-O(1)	143.35(10)
Co(1)-O(3)#4	2.048(3)	O(6)#1-Sm(1)-O(2)	128.94(10)
Co(1)-O(3)	2.048(3)	O(8)#2-Sm(1)-O(2)	71.79(10)
Co(1)-N(3)#5	2.116(3)	O(5)-Sm(1)-O(2)	70.38(10)
Co(1)-N(3)#6	2.116(3)	O(7)#3-Sm(1)-O(2)	80.13(10)
Co(1)-N(6)#7	2.210(3)	O(9)-Sm(1)-O(2)	142.73(11)
Co(1)-N(6)#8	2.210(3)	O(10)-Sm(1)-O(2)	131.18(9)
O(7)-Sm(1)#3	2.390(3)	O(1)-Sm(1)-O(2)	51.84(9)

O(8)-Sm(1)#9	2.355(3)	O(3)#4-Co(1)-O(3)	180.0(3)
N(6)-Co(1)#10	2.210(3)	O(3)#4-Co(1)-N(3)#5	94.78(13)
O(6)-Sm(1)#1	2.334(3)	O(3)-Co(1)-N(3)#5	85.22(13)
O(6)#1-Sm(1)-O(8)#2	83.65(11)	O(3)#4-Co(1)-N(3)#6	85.22(13)
O(6)#1-Sm(1)-O(5)	112.16(10)	O(3)-Co(1)-N(3)#6	94.78(13)
O(8)#2-Sm(1)-O(5)	140.55(11)	N(3)#5-Co(1)-N(3)#6	180.0(2)
O(6)#1-Sm(1)-O(7)#3	150.94(11)	O(3)#4-Co(1)-N(6)#7	94.28(13)
O(8)#2-Sm(1)-O(7)#3	109.39(10)	O(3)-Co(1)-N(6)#7	85.72(13)
O(5)-Sm(1)-O(7)#3	74.65(10)	N(3)#5-Co(1)-N(6)#7	87.94(13)
O(6)#1-Sm(1)-O(9)	77.30(11)	N(3)#6-Co(1)-N(6)#7	92.06(13)
O(8)#2-Sm(1)-O(9)	144.24(12)	O(3)#4-Co(1)-N(6)#8	85.72(13)
O(5)-Sm(1)-O(9)	75.14(11)	O(3)-Co(1)-N(6)#8	94.28(13)
O(7)#3-Sm(1)-O(9)	77.49(10)	N(3)#5-Co(1)-N(6)#8	92.06(13)
O(6)#1-Sm(1)-O(10)	80.15(10)	N(3)#6-Co(1)-N(6)#8	87.94(13)
O(8)#2-Sm(1)-O(10)	74.75(10)	N(6)#7-Co(1)-N(6)#8	180.000(1)
O(5)-Sm(1)-O(10)	141.51(10)		

Symmetry transformations used to generate equivalent atoms: #1 -x+1, -y+1, -z+1; #2 x-1, y+1, z; #3 -x+1, -y, -z+1; #4 -x+1, -y, -z; #5 x, y-1, z; #6 -x+1, -y+1, -z; #7 x-1, y, z; #8 -x+2, -y, -z; #9 x+1, y-1, z; #10 x+1, y, z; #11 x, y+1, z.

Table 6. Selected bonds (Å) and angles (°) for **6**

Selected bonds (Å) and angles (°) for 6			
Eu(1)-O(6)	2.317(3)	O(10)-Eu(1)-O(9)	72.87(13)
Eu(1)-O(5)	2.343(4)	O(6)-Eu(1)-O(1)	78.45(13)
Eu(1)-O(8)	2.373(4)	O(5)-Eu(1)-O(1)	73.67(13)
Eu(1)-O(7)	2.375(4)	O(8)-Eu(1)-O(1)	74.69(14)
Eu(1)-O(10)	2.445(4)	O(7)-Eu(1)-O(1)	129.26(13)
Eu(1)-O(9)	2.448(4)	O(10)-Eu(1)-O(1)	129.87(13)
Eu(1)-O(1)	2.474(4)	O(9)-Eu(1)-O(1)	143.05(13)
Eu(1)-O(2)	2.513(3)	O(6)-Eu(1)-O(2)	128.86(12)
Co(1)-O(3)#3	2.037(4)	O(5)-Eu(1)-O(2)	72.14(13)
Co(1)-O(3)#4	2.037(4)	O(8)-Eu(1)-O(2)	70.79(13)
Co(1)-N(3)	2.121(4)	O(7)-Eu(1)-O(2)	79.87(13)
Co(1)-N(3)#5	2.121(4)	O(10)-Eu(1)-O(2)	142.78(13)
Co(1)-N(6)	2.209(4)	O(9)-Eu(1)-O(2)	130.97(12)
Co(1)-N(6)#5	2.209(4)	O(1)-Eu(1)-O(2)	52.00(11)
O(3)-Co(1)#6	2.037(4)	O(3)#3-Co(1)-O(3)#4	180.000(1)
O(6)-Eu(1)-O(5)	83.65(14)	O(3)#3-Co(1)-N(3)	94.75(17)
O(6)-Eu(1)-O(8)	111.31(13)	O(3)#4-Co(1)-N(3)	85.25(17)
O(5)-Eu(1)-O(8)	141.16(14)	O(3)#3-Co(1)-N(3)#5	85.25(17)
O(6)-Eu(1)-O(7)	151.27(15)	O(3)#4-Co(1)-N(3)#5	94.75(17)
O(5)-Eu(1)-O(7)	109.29(13)	N(3)-Co(1)-N(3)#5	180.00(19)
O(8)-Eu(1)-O(7)	75.06(13)	O(3)#3-Co(1)-N(6)	94.99(17)
O(6)-Eu(1)-O(10)	76.93(14)	O(3)#4-Co(1)-N(6)	85.01(17)

O(5)-Eu(1)-O(10)	143.96(14)	N(3)-Co(1)-N(6)	87.94(16)
O(8)-Eu(1)-O(10)	74.75(14)	N(3)#5-Co(1)-N(6)	92.06(16)
O(7)-Eu(1)-O(10)	78.09(14)	O(3)#3-Co(1)-N(6)#5	85.01(17)
O(6)-Eu(1)-O(9)	80.40(13)	O(3)#4-Co(1)-N(6)#5	94.99(17)
O(5)-Eu(1)-O(9)	74.16(13)	N(3)-Co(1)-N(6)#5	92.06(16)
O(8)-Eu(1)-O(9)	141.79(13)	N(3)#5-Co(1)-N(6)#5	87.94(16)
O(7)-Eu(1)-O(9)	78.88(13)	N(6)-Co(1)-N(6)#5	180.000(1)

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

Table 7. Selected bonds (Å) and angles (°) for **7**

Selected bonds (Å) and angles (°) for 7			
Gd(1)-O(7)	2.300(3)	O(6)#2-Gd(1)-O(10)	78.08(13)
Gd(1)-O(5)	2.331(3)	O(9)-Gd(1)-O(10)	72.63(12)
Gd(1)-O(8)#1	2.362(3)	O(7)-Gd(1)-O(1)	78.55(13)
Gd(1)-O(6)#2	2.366(3)	O(5)-Gd(1)-O(1)	73.91(12)
Gd(1)-O(9)	2.440(3)	O(8)#1-Gd(1)-O(1)	73.91(12)
Gd(1)-O(10)	2.444(4)	O(6)#2-Gd(1)-O(1)	129.19(12)
Gd(1)-O(1)	2.477(3)	O(9)-Gd(1)-O(1)	143.46(11)
Gd(1)-O(2)	2.505(3)	O(10)-Gd(1)-O(1)	129.44(12)
Co(1)-O(3)#3	2.038(4)	O(7)-Gd(1)-O(2)	129.03(12)
Co(1)-O(3)	2.038(4)	O(5)-Gd(1)-O(2)	72.03(12)
Co(1)-N(3)#4	2.122(4)	O(8)#1-Gd(1)-O(2)	71.11(13)
Co(1)-N(3)#5	2.122(4)	O(6)#2-Gd(1)-O(2)	79.81(12)
Co(1)-N(6)#5	2.209(4)	O(9)-Gd(1)-O(2)	131.49(11)
Co(1)-N(6)#4	2.209(4)	O(10)-Gd(1)-O(2)	142.55(12)
O(6)-Gd(1)#2	2.366(3)	O(1)-Gd(1)-O(2)	52.09(11)
O(8)-Gd(1)#1	2.362(3)	O(3)#3-Co(1)-O(3)	180.000(1)
N(3)-Co(1)#6	2.122(4)	O(3)#3-Co(1)-N(3)#4	94.56(15)
O(7)-Gd(1)-O(5)	83.94(13)	O(3)-Co(1)-N(3)#4	85.44(15)
O(7)-Gd(1)-O(8)#1	110.30(12)	O(3)#3-Co(1)-N(3)#5	85.44(15)
O(5)-Gd(1)-O(8)#1	141.07(14)	O(3)-Co(1)-N(3)#5	94.56(15)
O(7)-Gd(1)-O(6)#2	151.15(14)	N(3)#4-Co(1)-N(3)#5	180.000(1)
O(5)-Gd(1)-O(6)#2	109.25(12)	O(3)#3-Co(1)-N(6)#5	85.02(16)
O(8)#1-Gd(1)-O(6)#2	75.93(12)	O(3)-Co(1)-N(6)#5	94.98(16)
O(7)-Gd(1)-O(9)	80.08(13)	N(3)#4-Co(1)-N(6)#5	91.69(16)
O(5)-Gd(1)-O(9)	74.66(12)	N(3)#5-Co(1)-N(6)#5	88.31(16)
O(8)#1-Gd(1)-O(9)	141.91(13)	O(3)#3-Co(1)-N(6)#4	94.98(16)
O(6)#2-Gd(1)-O(9)	79.06(12)	O(3)-Co(1)-N(6)#4	85.02(16)
O(7)-Gd(1)-O(10)	76.82(13)	N(3)#4-Co(1)-N(6)#4	88.31(16)
O(5)-Gd(1)-O(10)	144.32(14)	N(3)#5-Co(1)-N(6)#4	91.69(16)
O(8)#1-Gd(1)-O(10)	74.41(14)	N(6)#5-Co(1)-N(6)#4	180.000(1)

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

-y+1, -z; #3 -x, -y+2, -z+1; #4 x, y+1, z; #5 -x, -y+1, -z+1; #6 x, y-1, z; #7 -x+1, -y, -z.

Table 8. Selected bonds (Å) and angles (°) for **8**

Selected bonds (Å) and angles (°) for 8			
Tb(1)-O(8)#1	2.291(4)	O(6)#3-Tb(1)-O(9)	78.49(17)
Tb(1)-O(5)	2.326(5)	O(10)-Tb(1)-O(9)	72.88(17)
Tb(1)-O(7)#2	2.343(4)	O(8)#1-Tb(1)-O(1)	78.38(16)
Tb(1)-O(6)#3	2.351(5)	O(5)-Tb(1)-O(1)	73.96(16)
Tb(1)-O(10)	2.420(4)	O(7)#2-Tb(1)-O(1)	74.22(17)
Tb(1)-O(9)	2.422(5)	O(6)#3-Tb(1)-O(1)	128.78(16)
Tb(1)-O(1)	2.454(4)	O(10)-Tb(1)-O(1)	143.42(16)
Tb(1)-O(2)	2.498(4)	O(9)-Tb(1)-O(1)	129.17(16)
Co(1)-O(3)	2.042(5)	O(8)#1-Tb(1)-O(2)	128.87(16)
Co(1)-O(3)#4	2.042(5)	O(5)-Tb(1)-O(2)	72.01(16)
Co(1)-N(3)#5	2.123(6)	O(7)#2-Tb(1)-O(2)	72.06(16)
Co(1)-N(3)#6	2.123(6)	O(6)#3-Tb(1)-O(2)	79.35(16)
Co(1)-N(6)#6	2.212(5)	O(10)-Tb(1)-O(2)	131.12(14)
Co(1)-N(6)#5	2.212(5)	O(9)-Tb(1)-O(2)	142.74(17)
O(7)-Tb(1)#8	2.343(4)	O(1)-Tb(1)-O(2)	52.29(14)
O(8)-Tb(1)#1	2.291(4)	O(3)-Co(1)-O(3)#4	180.000(1)
O(6)-Tb(1)#3	2.351(4)	O(3)-Co(1)-N(3)#5	85.5(2)
N(3)-Co(1)#7	2.123(6)	O(3)#4-Co(1)-N(3)#5	94.5(2)
O(8)#1-Tb(1)-O(5)	83.28(17)	O(3)-Co(1)-N(3)#6	94.5(2)
O(8)#1-Tb(1)-O(7)#2	110.15(16)	O(3)#4-Co(1)-N(3)#6	85.5(2)
O(5)-Tb(1)-O(7)#2	141.85(17)	N(3)#5-Co(1)-N(3)#6	180.0(3)
O(8)#1-Tb(1)-O(6)#3	151.77(18)	O(3)-Co(1)-N(6)#6	95.3(2)
O(5)-Tb(1)-O(6)#3	109.49(16)	O(3)#4-Co(1)-N(6)#6	84.7(2)
O(7)#2-Tb(1)-O(6)#3	75.76(16)	N(3)#5-Co(1)-N(6)#6	91.9(2)
O(8)#1-Tb(1)-O(10)	80.04(16)	N(3)#6-Co(1)-N(6)#6	88.1(2)
O(5)-Tb(1)-O(10)	74.48(16)	O(3)-Co(1)-N(6)#5	84.7(2)
O(7)#2-Tb(1)-O(10)	141.55(17)	O(3)#4-Co(1)-N(6)#5	95.3(2)
O(6)#3-Tb(1)-O(10)	79.49(16)	N(3)#5-Co(1)-N(6)#5	88.1(2)
O(8)#1-Tb(1)-O(9)	77.04(18)	N(3)#6-Co(1)-N(6)#5	91.9(2)
O(5)-Tb(1)-O(9)	144.21(18)	N(6)#6-Co(1)-N(6)#5	180.0(3)
O(7)#2-Tb(1)-O(9)	73.67(18)		

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

Table 9. Selected bonds (Å) and angles (°) for **9**

Selected bonds (Å) and angles (°) for 9			
Dy(1)-O(8)#1	2.275(4)	O(7)#2-Dy(1)-O(10)	74.56(16)

Dy(1)-O(5)	2.308(4)	O(6)#3-Dy(1)-O(10)	79.04(16)
Dy(1)-O(7)#2	2.338(4)	O(9)-Dy(1)-O(10)	72.54(15)
Dy(1)-O(6)#3	2.350(4)	O(8)#1-Dy(1)-O(2)	78.26(15)
Dy(1)-O(9)	2.407(4)	O(5)-Dy(1)-O(2)	73.93(15)
Dy(1)-O(10)	2.426(5)	O(7)#2-Dy(1)-O(2)	73.89(15)
Dy(1)-O(2)	2.467(4)	O(6)#3-Dy(1)-O(2)	129.19(15)
Dy(1)-O(1)	2.490(4)	O(9)-Dy(1)-O(2)	143.39(15)
Co(1)-O(3)#4	2.025(5)	O(10)-Dy(1)-O(2)	129.06(15)
Co(1)-O(3)	2.025(5)	O(8)#1-Dy(1)-O(1)	129.43(15)
Co(1)-N(3)#5	2.126(5)	O(5)-Dy(1)-O(1)	71.70(15)
Co(1)-N(3)#6	2.126(5)	O(7)#2-Dy(1)-O(1)	71.45(15)
Co(1)-N(6)#5	2.245(5)	O(6)#3-Dy(1)-O(1)	79.02(15)
Co(1)-N(6)#6	2.245(5)	O(9)-Dy(1)-O(1)	131.05(14)
O(6)-Dy(1)#3	2.350(4)	O(10)-Dy(1)-O(1)	142.94(16)
O(7)-Dy(1)#7	2.338(4)	O(2)-Dy(1)-O(1)	52.85(14)
N(6)-Co(1)#8	2.245(5)	O(3)#4-Co(1)-O(3)	180.0(2)
O(8)-Dy(1)#1	2.275(4)	O(3)#4-Co(1)-N(3)#5	94.9(2)
N(3)-Co(1)#8	2.126(5)	O(3)-Co(1)-N(3)#5	85.1(2)
O(8)#1-Dy(1)-O(5)	84.22(16)	O(3)#4-Co(1)-N(3)#6	85.1(2)
O(8)#1-Dy(1)-O(7)#2	110.02(15)	O(3)-Co(1)-N(3)#6	94.9(2)
O(5)-Dy(1)-O(7)#2	140.97(16)	N(3)#5-Co(1)-N(3)#6	180.00(17)
O(8)#1-Dy(1)-O(6)#3	151.55(16)	O(3)#4-Co(1)-N(6)#5	95.07(19)
O(5)-Dy(1)-O(6)#3	108.59(15)	O(3)-Co(1)-N(6)#5	84.93(19)
O(7)#2-Dy(1)-O(6)#3	76.36(15)	N(3)#5-Co(1)-N(6)#5	88.4(2)
O(8)#1-Dy(1)-O(9)	80.14(16)	N(3)#6-Co(1)-N(6)#5	91.6(2)
O(5)-Dy(1)-O(9)	74.79(15)	O(3)#4-Co(1)-N(6)#6	84.93(19)
O(7)#2-Dy(1)-O(9)	141.93(15)	O(3)-Co(1)-N(6)#6	95.07(19)
O(6)#3-Dy(1)-O(9)	79.06(16)	N(3)#5-Co(1)-N(6)#6	91.6(2)
O(8)#1-Dy(1)-O(10)	76.32(16)	N(3)#6-Co(1)-N(6)#6	88.4(2)
O(5)-Dy(1)-O(10)	144.25(16)	N(6)#5-Co(1)-N(6)#6	180.000(1)

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

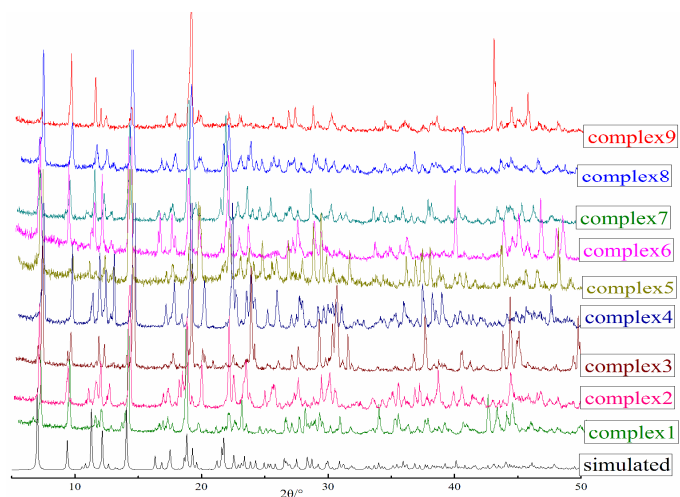


Figure S1. XRPD patterns of **1-9** compared with a simulated pattern.

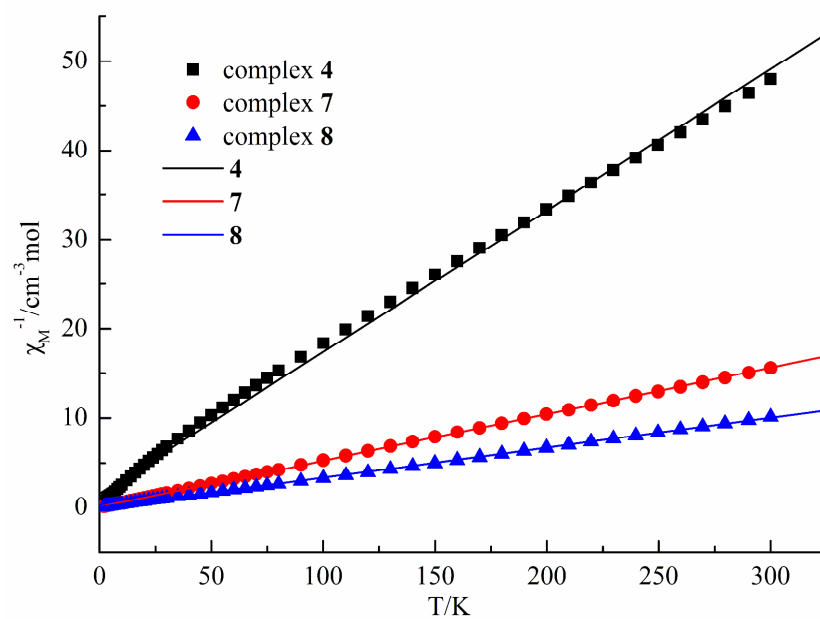


Figure S2. Temperature dependence of χ_M^{-1} curve for **4, 7, 8** (The solid lines represent the best fit to the Curie Weiss Law)

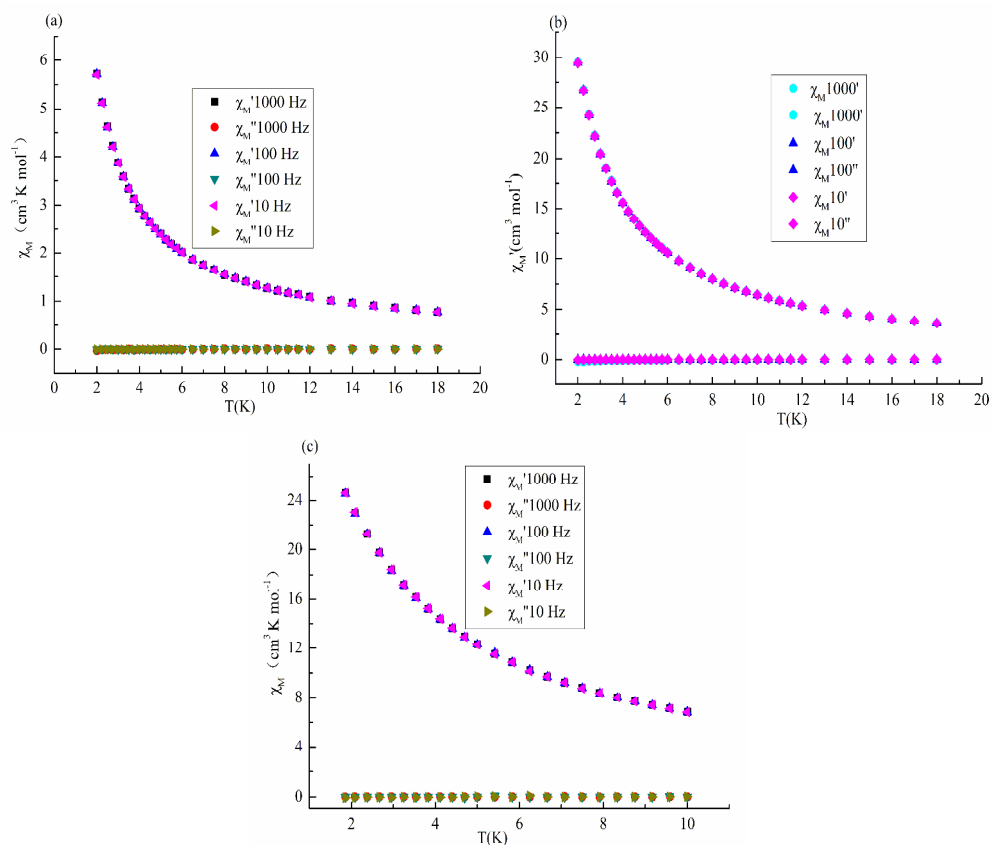


Figure S3. Plots of the in-phase and out-of-phase in ac susceptibility studies vs. T in 0 Oe field oscillating at the indicated frequencies for complexes **4**, **7** and **8**.

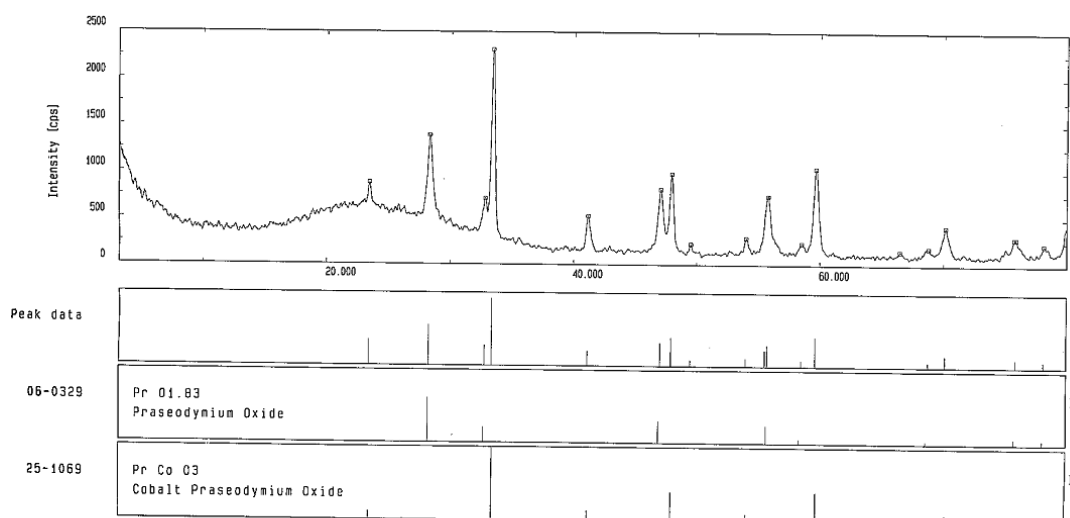


Figure S4. XRPD analysis of the remnants of complex **3** after thermal degradation