Supporting Information

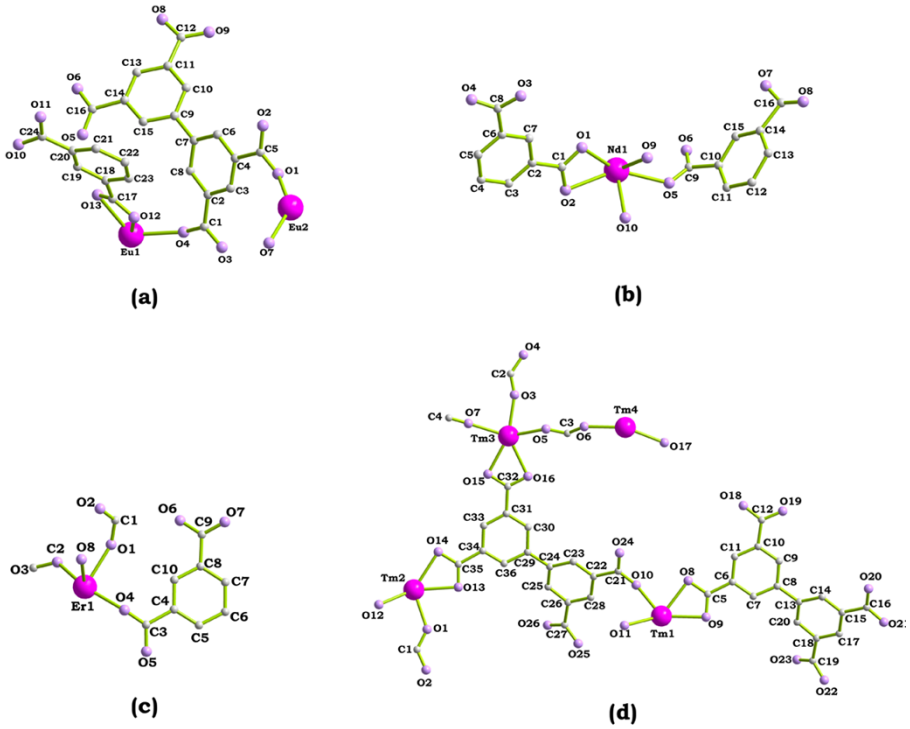


Figure S1. The asymmetric unit of (a) **1**-Eu, (b) **5**-Nd, (c) **6**-Er and (d) **7**-Tm. All hydrogen atoms have been omitted for clarity.

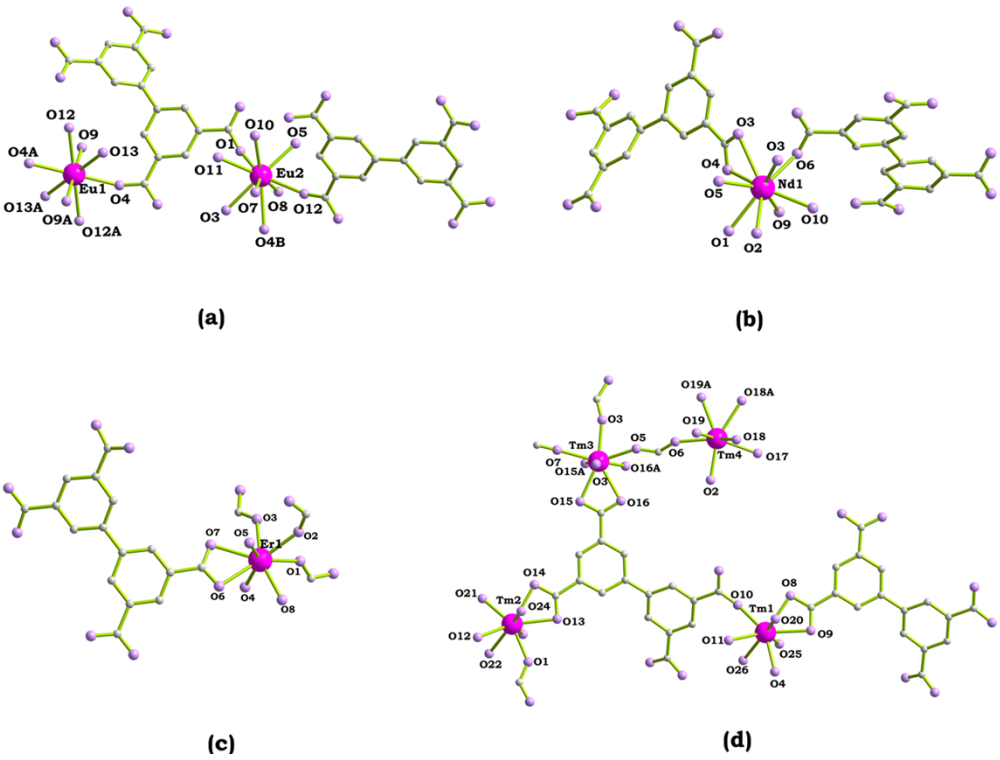


Figure S2. The coordination environment of (a) **1**-Eu, (b) **5**-Nd, (c) **6**-Er and (d) **7**-Tm. All hydrogen atoms have been omitted for clarity.

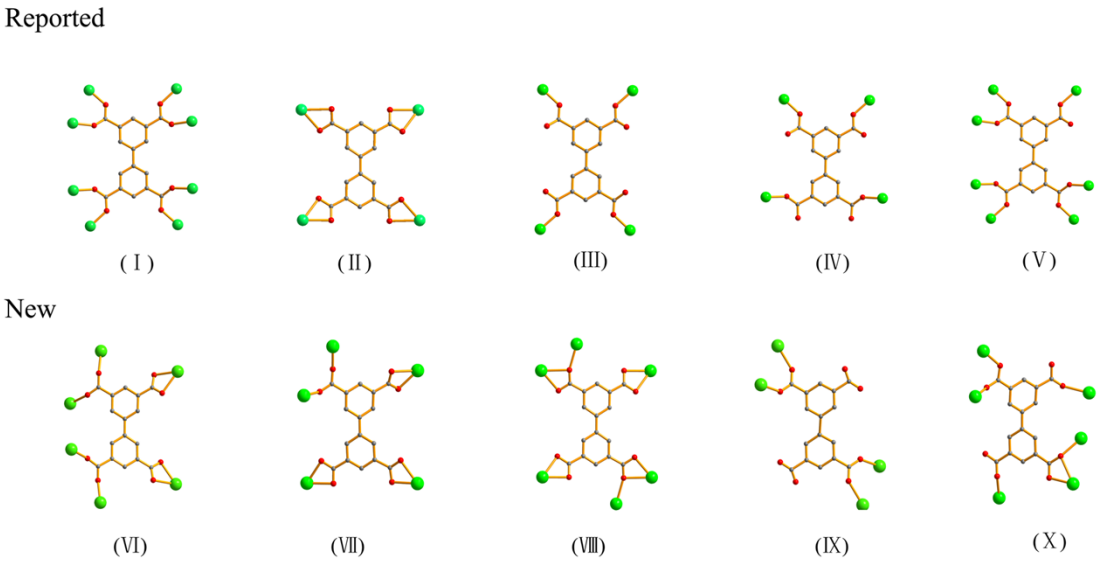


Figure S3. Coordination modes in reported compounds (I-V) and compounds **1-7** (VI-X).

$BPTC^{4-}$ ligands exhibit five distinct types of coordination mode as shown in Figure S3: (Ⅵ) μ_6-η^1:η^2:η^1:η^1:η^1:η^2:η^1:η^1, four oxygen atoms of two carboxyl groups at the diagonal coordinate two lanthanide centers with the chelating bidentate mode, and the other two carboxylic oxygen atoms coordinate two lanthanide centers with the tridentate bridging mode ; (Ⅶ) μ_6-η^1:η^2:η^1:η^1:η^1:η^1, two oxygen atoms of a carboxyl group coordinate two different lanthanide centers with the bridging monodentate mode, two oxygen atoms of two carboxyl groups at the diagonal coordinate one lanthanide center with the monodentate mode, and two carboxylic oxygen atoms of the fourth carboxyl group coordinate two lanthanide centers with the tridentate bridging mode. (Ⅷ) μ_4-η^1:η^1:η^1:η^1, four oxygen atoms of two carboxyl groups at the diagonal coordinate four lanthanide centers with the bridging monodentate mode, and the remaining carboxyl groups are uncoordinated. (Ⅸ) μ_6-η^1:η^1:η^1:η^1:η^1:η^1:η^1:η^1, four oxygen atoms of two carboxyl groups on the one side coordinate four lanthanide centers with the bridging monodentate mode, and four oxygen atoms of two carboxyl groups on the other side coordinate two lanthanide centers with the chelating bidentate mode. (Ⅹ) μ_5-η^1:η^1:η^1:η^1:η^1:η^1:η^1, six oxygen atoms of three carboxyl groups coordinate three lanthanide centers with the chelating bidentate mode, and two oxygen atoms of the fourth carboxyl group coordinate two different lanthanide centers with the chelating bidentate mode. To the best of our knowledge, these five novel coordination modes are observed for the first time in M-BPTC frameworks.

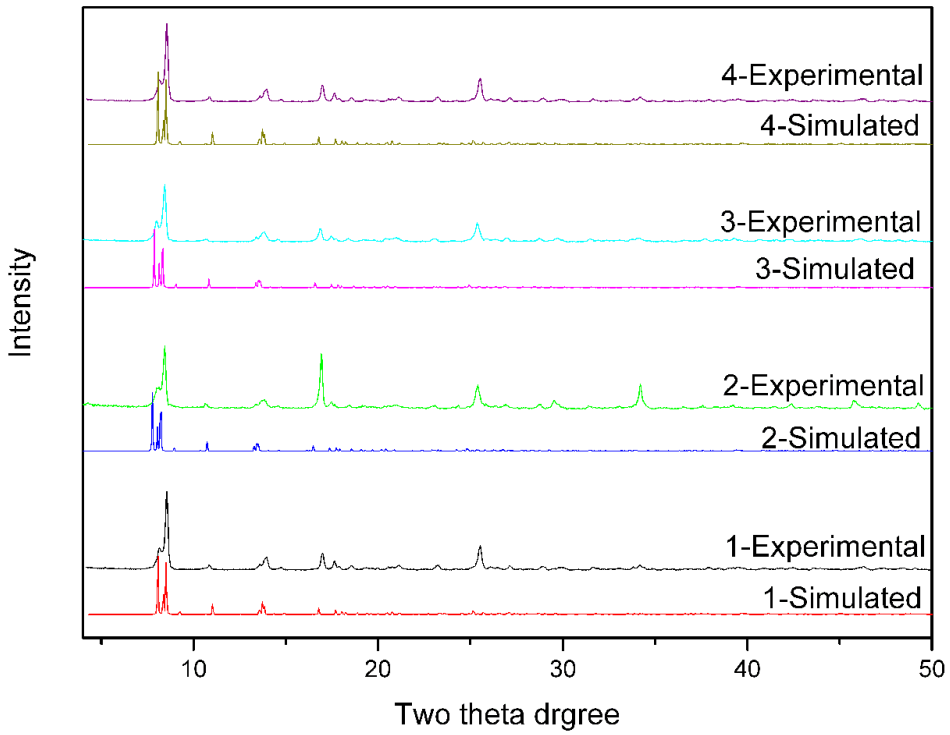


Figure S4. The simulated and experimrntal powder X-ray diffraction patterns for compounds **1**-**4** (**1**-Eu, **2**-Tb, **3**-Sm and **4**-Dy).

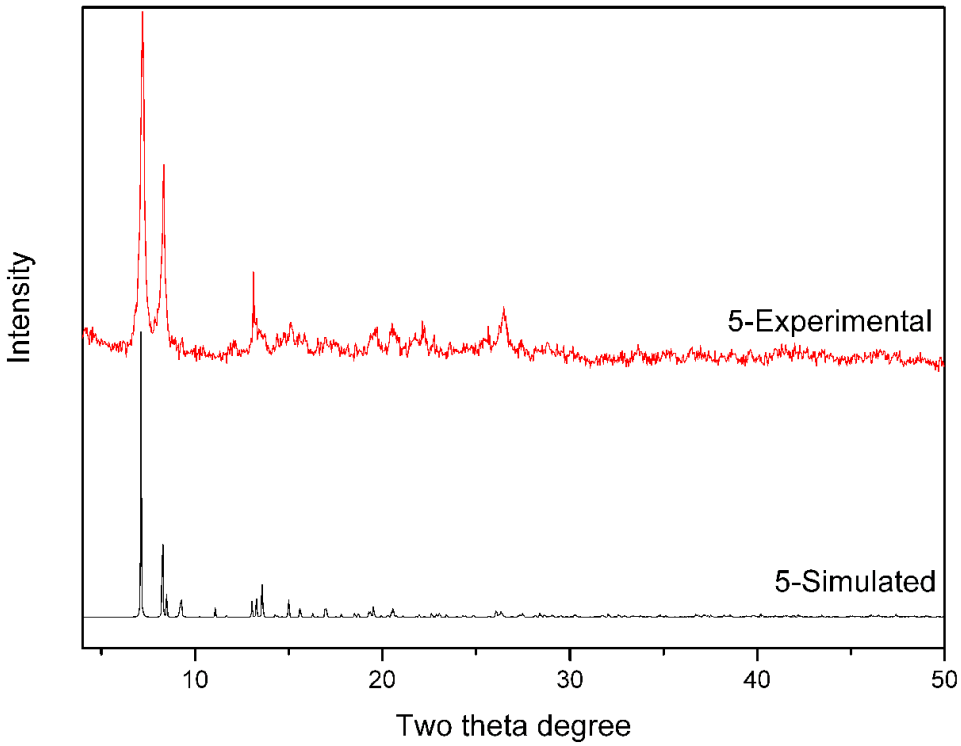


Figure S5. The simulated and experimrntal powder X-ray diffraction patterns for compound **5-**Nd.

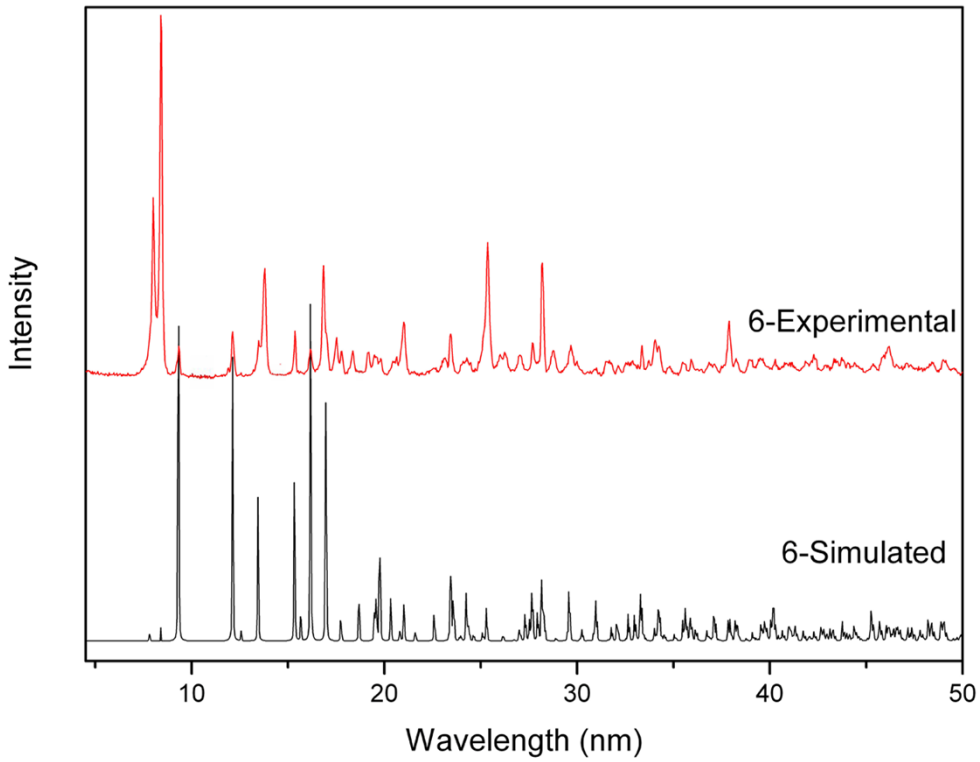


Figure S6. The simulated and experimrntal powder X-ray diffraction patterns for compound **6-**Er.

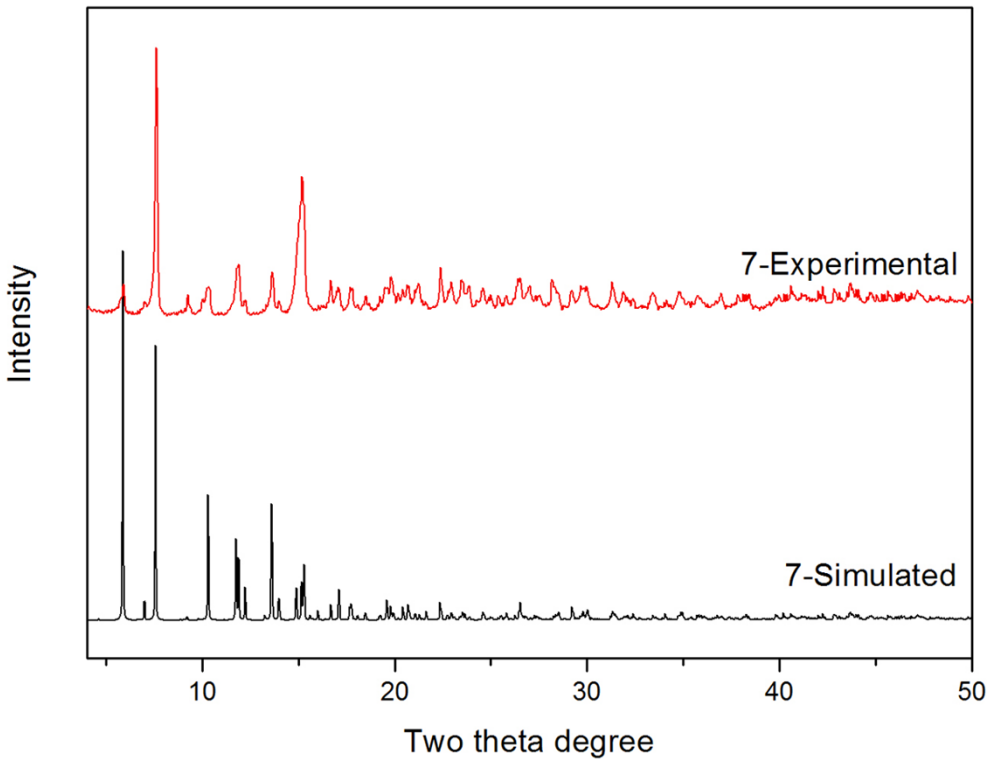


Figure S7. The simulated and experimrntal powder X-ray diffraction patterns for

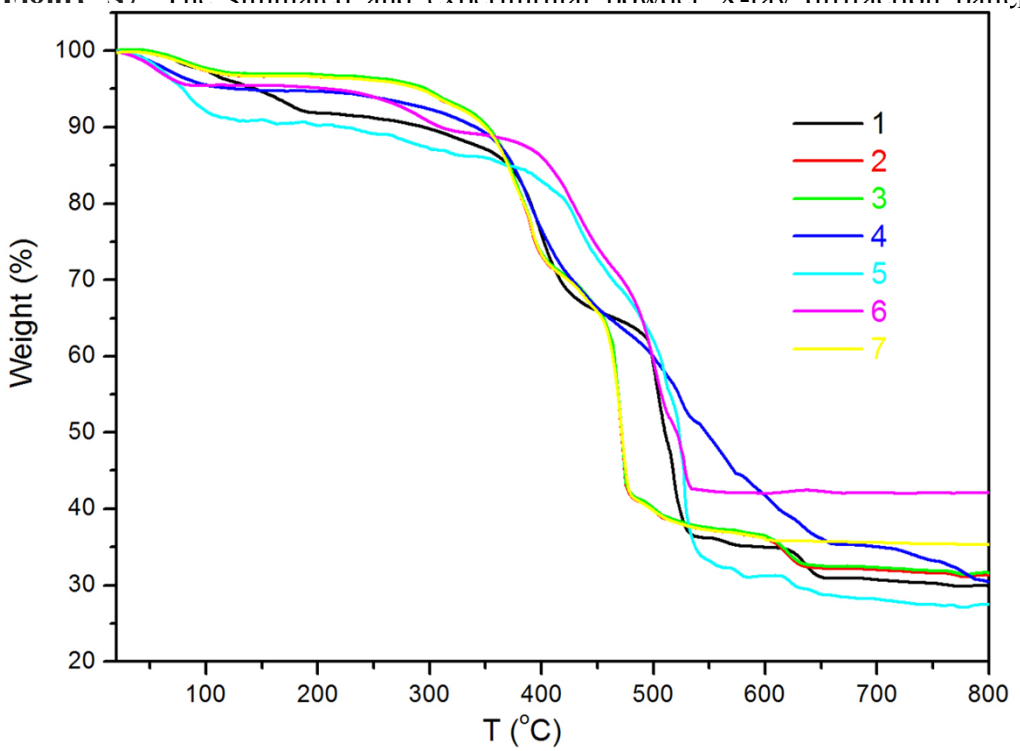


Figure S8. TGA diagrams of compounds **1**-**7**.

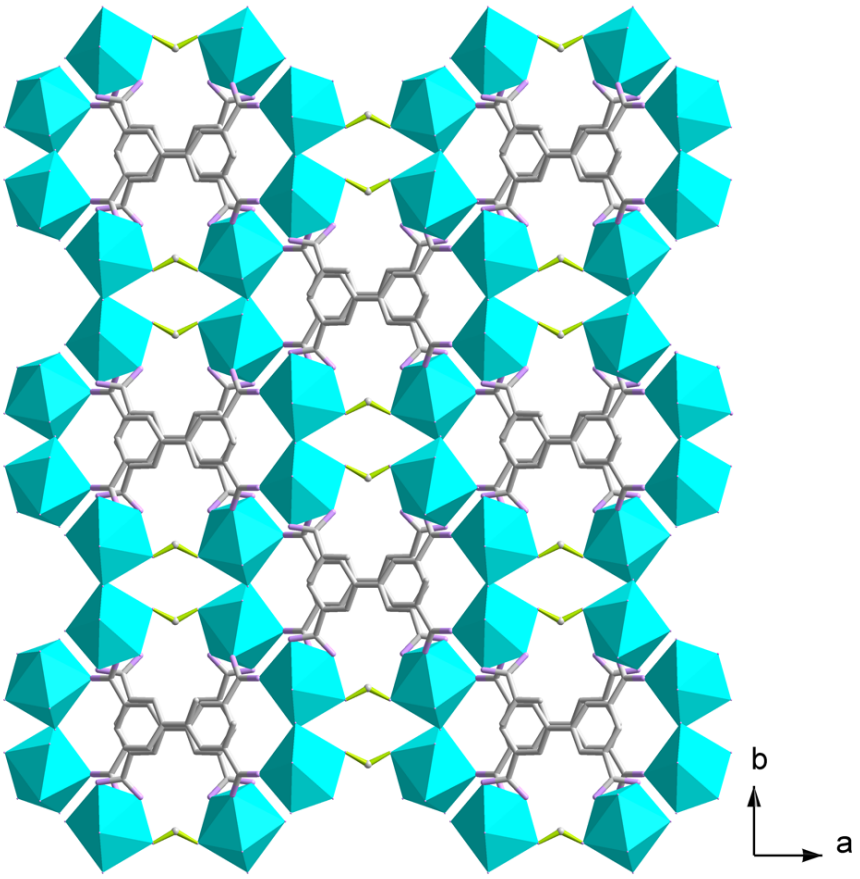


Figure S9. View of polyhedral representation of octagon rings in compound **6** along *c* axis.

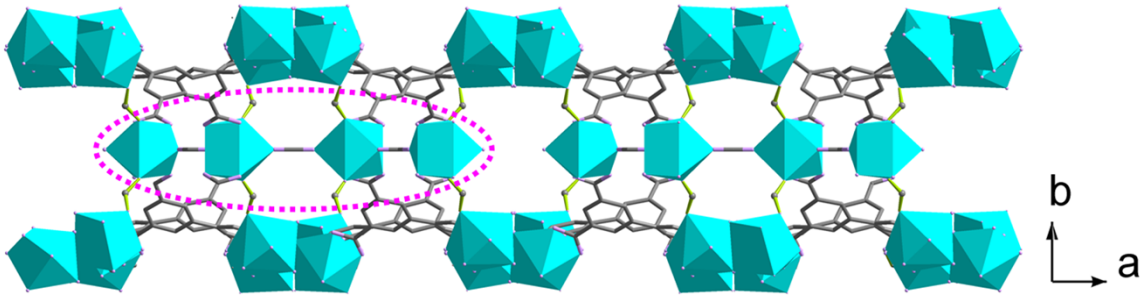


Figure S10. Tm4-C2-Tm3-C1-Tm3A-C2A-Tm4A discontinuous chain surrounded in compound **7** by a pink dotted line along *c* axis.

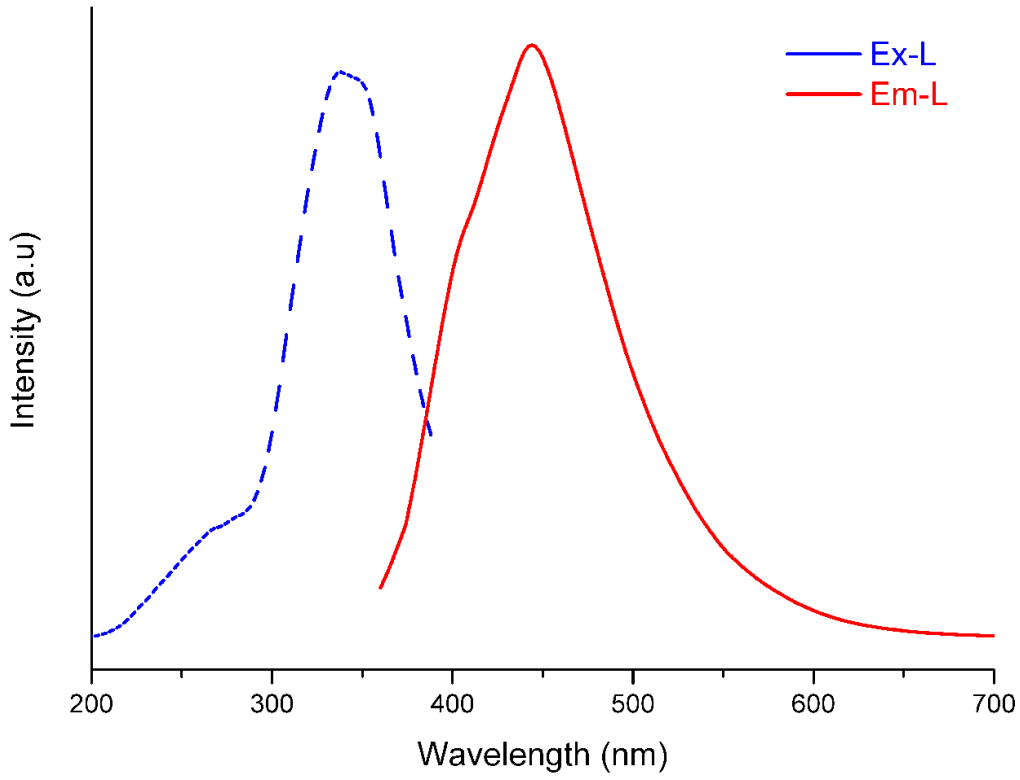
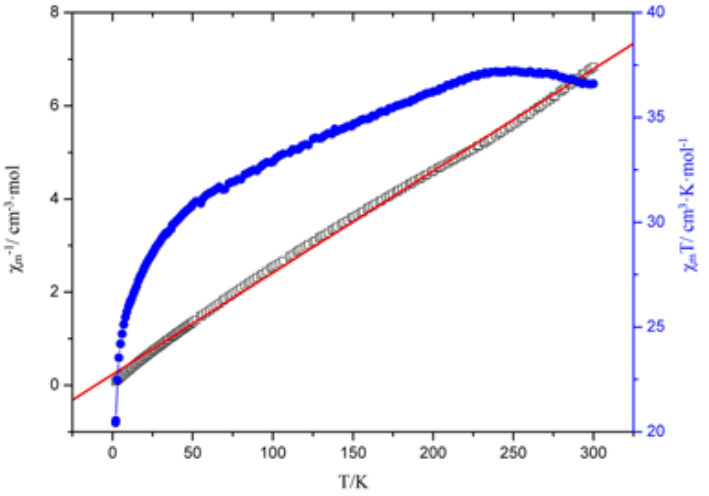
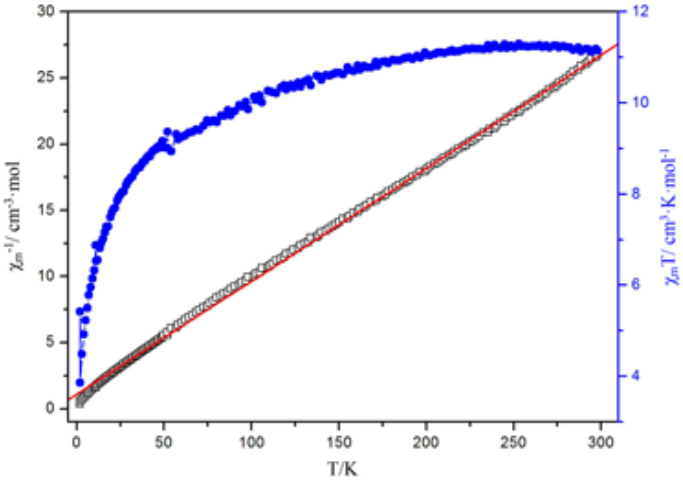


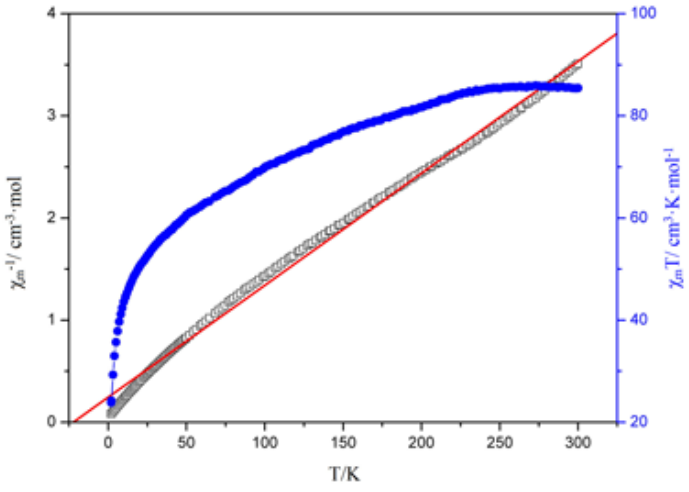
Figure S11. Solid state excitation and emission spectra of H_4BPTC ligand.


χm-1/ cm-3·mol
χmT/ cm3·K·mol-1
T/K

(a)


χm-1/ cm-3·mol
χmT/ cm3·K·mol-1
T/K

(b)


χm-1/ cm-3·mol
χmT/ cm3·K·mol-1
T/K

(c)

Figure S12. Plots of the χ_m^{-1} and $\chi_m T$ vs T for (a) compound **2**, (b) compound **6** and (c) compound **7**. Red straight lines correspond to the best fit according to χ_m^{-1} vs T.

Table S1. Selected bond lengths [Å] and bond angles [°] for compound **1**

Eu(1)—O(9)[a]	2.316(3)	Eu(1)—O(9)[b]	2.316(3)
Eu(1)—O(4)	2.455(3)	Eu(1)—O(13)[c]	2.450(3)
Eu(1)—O(12)[c]	2.585(3)	Eu(1)—O(12)	2.585(3)
Eu(1)—O(4)[c]	2.363(3)	Eu(1)—O(13)	2.450(3)
Eu(2)—O(1)	2.338(3)	Eu(2)—O(5)[g]	2.418(3)
Eu(2)—O(8)[f]	2.410(3)	Eu(2)—O(10)[d]	2.477(3)
Eu(2)—O(7)	2.438(4)	Eu(2)—O(4)[e]	2.677(3)
Eu(2)—O(11)[d]	2.492(3)	Eu(2)—O(12)[g]	2.430(3)
Eu(2)—O(3)[e]	2.482(3)		
O(9)[a]—Eu(1)—O(9)[b]	180.0	O(9)[a]—Eu(1)—O(4)[c]	78.87(11)
O(9)[b]—Eu(1)—O(4)[c]	101.13(11)	O(9)[a]—Eu(1)—O(4)	101.13(11)
O(9)[b]—Eu(1)—O(4)	78.87(11)	O(4)[c]—Eu(1)—O(4)	180.0
O(9)[a]—Eu(1)—O(13)[c]	101.11(14)	O(9)[b]—Eu(1)—O(13)[c]	78.89(14)
O(4)[c]—Eu(1)—O(13)[c]	72.24(11)	O(4)—Eu(1)—O(13)[c]	107.76(11)
O(9)[a]—Eu(1)—O(13)	78.89(14)	O(9)[b]—Eu(1)—O(13)	101.11(14)
O(4)[c]—Eu(1)—O(13)	107.76(11)	O(4)—Eu(1)—O(13)	72.24(11)
O(13)[c]—Eu(1)—O(13)	180.00(14)	O(9)[a]—Eu(1)—O(12)[c]	80.72(13)
O(9)[b]—Eu(1)—O(12)[c]	99.28(13)	O(4)[c]—Eu(1)—O(12)[c]	113.16(10)
O(4)—Eu(1)—O(12)[c]	66.84(10)	O(13)[c]—Eu(1)—O(12)[c]	50.83(10)
O(13)—Eu(1)—O(12)[c]	129.17(10)	O(9)[a]—Eu(1)—O(12)	99.28(13)
O(9)[b]—Eu(1)—O(12)	80.72(13)	O(4)[c]—Eu(1)—O(12)	66.84(10)
O(4)—Eu(1)—O(12)	113.16(10)	O(13)[c]—Eu(1)—O(12)	129.17(10)
O(13)—Eu(1)—O(12)	50.83(10)	O(12)[c]—Eu(1)—O(12)	180.0
O(1)—Eu(2)—O(8)[f]	72.21(12)	O(1)—Eu(2)—O(5)[g]	77.64(11)
O(8)[f]—Eu(2)—O(5)[g]	75.57(12)	O(1)—Eu(2)—O(12)[g]	142.24(12)
O(8)[f]—Eu(2)—O(12)[g]	79.00(11)	O(5)[g]—Eu(2)—O(12)[g]	71.85(11)
O(1)—Eu(2)—O(7)	143.79(13)	O(8)[f]—Eu(2)—O(7)	138.33(13)
O(5)[g]—Eu(2)—O(7)	122.17(13)	O(12)[g]—Eu(2)—O(7)	73.24(13)
O(1)—Eu(2)—O(10)[d]	87.02(12)	O(8)[f]—Eu(2)—O(10)[d]	144.58(13)
O(5)[g]—Eu(2)—O(10)[d]	72.07(12)	O(12)[g]—Eu(2)—O(10)[d]	103.77(11)
O(7)—Eu(2)—O(10)[d]	73.40(13)	O(1)—Eu(2)—O(3)[e]	85.63(11)
O(8)[f]—Eu(2)—O(3)[e]	82.12(12)	O(5)[g]—Eu(2)—O(3)[e]	155.30(12)
O(12)[g]—Eu(2)—O(3)[e]	114.36(11)	O(7)—Eu(2)—O(3)[e]	81.80(14)
O(10)[d]—Eu(2)—O(3)[e]	125.54(11)	O(1)—Eu(2)—O(11)[d]	72.29(12)
O(8)[f]—Eu(2)—O(11)[d]	138.25(12)	O(5)[g]—Eu(2)—O(11)[d]	116.85(12)
O(12)[g]—Eu(2)—O(11)[d]	142.12(12)	O(7)—Eu(2)—O(11)[d]	71.61(13)
O(10)[d]—Eu(2)—O(11)[d]	52.50(11)	O(3)[e]—Eu(2)—O(11)[d]	73.97(11)

O(1)—Eu(2)—O(4)^{e}	125.05(11)	O(8)^{f}—Eu(2)—O(4)^{e}	71.30(11)
O(5)^{g}—Eu(2)—O(4)^{e}	128.84(10)	O(12)^{g}—Eu(2)—O(4)^{e}	64.45(10)
O(7)—Eu(2)—O(4)^{e}	68.91(12)	O(10)^{d}—Eu(2)—O(4)^{e}	142.30(11)
O(3)^{e}—Eu(2)—O(4)^{e}	49.93(9)	O(11)^{d}—Eu(2)—O(4)^{e}	113.90(11)

Symmetry transformations used to generate equivalent atoms: *a* x-1, y, z; *b* -x+1, -y+2, -z; *c* -x, -y+2, -z; *d* -x, -y+1, -z+1; *e* -x, -y+1, -z; *f* -x+1, -y+1, -z; *g* x, y-1, z.

Table S2. Selected bond lengths [Å] and bond angles [°] for compound **2**

Tb(1)—O(6)^{e}	2.284(4)	Tb(1)—O(6)^{f}	2.284(4)
Tb(1)—O(2)^{c}	2.324(4)	Tb(1)—O(9)	2.418(4)
Tb(1)—O(10)	2.565(4)	Tb(1)—O(10)^{c}	2.565(4)
Tb(1)—O(2)	2.324(4)	Tb(1)—O(9)^{c}	2.418(4)
Tb(2)—O(3)^{d}	2.308(5)	Tb(2)—O(5)^{e}	2.375(4)
Tb(2)—O(10)	2.419(4)	Tb(2)—O(11)^{a}	2.447(4)
Tb(2)—O(12)^{a}	2.482(4)	Tb(2)—O(2)	2.679(4)
Tb(2)—O(8)^{c}	2.396(4)	Tb(2)—O(1)	2.453(4)
O(9)—Tb(1)—O(9)^{c}	180.000(1)	O(6)^{e}—Tb(1)—O(2)	100.52(15)
O(6)^{f}—Tb(1)—O(2)	79.48(15)	O(6)^{e}—Tb(1)—O(2)^{c}	79.48(15)
O(6)^{f}—Tb(1)—O(2)^{c}	100.52(15)	O(2)—Tb(1)—O(2)^{c}	180.000(1)
O(6)^{e}—Tb(1)—O(9)	100.98(19)	O(2)^{c}—Tb(1)—O(9)	72.38(15)
O(2)—Tb(1)—O(9)	107.62(15)	O(8)^{b}–Tb(1)–O(3)^{a}	72.07(10)
O(6)^{e}—Tb(1)—O(9)^{c}	79.02(19)	O(6)^{f}—Tb(1)—O(9)^{c}	100.98(19)
O(2)—Tb(1)—O(9)^{c}	72.38(15)	O(2)^{c}—Tb(1)—O(9)^{c}	107.62(15)
O(9)—Tb(1)—O(9)^{c}	180.000(1)	O(6)^{e}—Tb(1)—O(10)	79.28(17)
O(6)^{f}—Tb(1)—O(10)	100.72(17)	O(2)—Tb(1)—O(10)	66.87(14)
O(2)^{c}—Tb(1)—O(10)	113.13(14)	O(9)—Tb(1)—O(10)	51.23(14)
O(9)^{c}—Tb(1)—O(10)	128.77(14)	O(6)^{e}—Tb(1)—O(10)^{c}	100.72(17)
O(6)^{f}—Tb(1)—O(10)^{c}	79.28(17)	O(2)—Tb(1)—O(10)^{c}	113.13(14)
O(2)^{c}—Tb(1)—O(10)^{c}	66.87(14)	O(9)—Tb(1)—O(10)^{c}	128.77(14)
O(9)^{c}—Tb(1)—O(10)^{c}	51.23(14)	O(10)—Tb(1)—O(10)^{c}	180.000(1)
O(3)^{d}—Tb(2)—O(5)^{e}	72.41(17)	O(3)^{d}—Tb(2)—O(8)^{c}	78.13(15)
O(5)^{e}—Tb(2)—O(8)^{c}	75.67(16)	O(3)^{d}—Tb(2)—O(13)	143.37(18)
O(5)^{e}—Tb(2)—O(13)	138.08(17)	O(8)^{c}—Tb(2)—O(13)	122.51(19)
O(3)^{d}—Tb(2)—O(10)	142.35(16)	O(5)^{e}—Tb(2)—O(10)	78.98(16)
O(8)^{c}—Tb(2)—O(10)	71.37(15)	O(13)—Tb(2)—O(10)	73.62(18)
O(3)^{d}—Tb(2)—O(11)^{a}	86.20(17)	O(5)^{e}—Tb(2)—O(11)^{a}	144.37(16)
O(8)^{c}—Tb(2)—O(11)^{a}	72.18(15)	O(13)—Tb(2)—O(11)^{a}	74.29(18)
O(10)—Tb(2)—O(11)^{a}	81.67(15)	O(3)^{d}—Tb(2)—O(1)	85.71(15)
O(5)^{e}—Tb(2)—O(1)	114.49(9)	O(8)^{c}—Tb(2)—O(1)	155.24(16)
O(13)—Tb(2)—O(1)	81.32(19)	O(10)—Tb(2)—O(1)	114.09(14)
O(11)^{a}—Tb(2)—O(1)	125.72(14)	O(3)^{d}—Tb(2)—O(12)^{a}	71.96(17)
O(5)^{e}—Tb(2)—O(12)^{a}	137.70(16)	O(8)^{c}—Tb(2)—O(12)^{a}	117.72(15)

O(13)—Tb(2)—O(12)[a]	71.54(19)	O(10)—Tb(2)—O(12)[a]	142.55(17)
O(11)[a]—Tb(2)—O(12)[a]	52.86(14)	O(1)—Tb(2)—O(12)[a]	73.67(14)
O(3)[d]—Tb(2)—O(2)	125.78(15)	O(5)[e]—Tb(2)—O(2)	71.35(14)
O(8)[c]—Tb(2)—O(2)	128.00(13)	O(13)—Tb(2)—O(2)	68.27(16)
O(10)—Tb(2)—O(2)	63.76(13)	O(11)[a]—Tb(2)—O(2)	142.53(16)
O(1)—Tb(2)—O(2)	50.34(12)	O(12)[a]—Tb(2)—O(2)	113 .80(15)

Symmetry transformations used to generate equivalent atoms: *a* -x+1, -y+2, -z; *b* x+1, y, z; *c* -x+1, -y+2,- z+1; *d* -x+1, -y+1, -z+1; *e* x-1, y, z; *f* -x+2, -y+2, -z+1.

Table S3. Selected bond lengths [Å] and bond angles [°] for compound **3**

Sm(1)—O(3)	2.455(3)	Sm(1)—O(2)	2.555(3)
Sm(1)—O(4)	2.328(3)	Sm(1)—O(4)[a]	2.328(3)
Sm(1)—O(8)[c]	2.387(3)	Sm(1)—O(8)[b]	2.387(3)
Sm(1)—O(2)[a]	2.555(3)	Sm(1)—O(3)[a]	2.455(3)
Sm(2)—O(2)	2.442(3)	Sm(2)—O(8)[b]	2.667(3)
Sm(2)—O(7)[c]	2.411(3)	Sm(2)[f]—O(8)	2.667(3)
Sm(2)—O(5)	2.426(3)	Sm(2)[d]—O(10)	2.351(3)
Sm(2) —O(12)[e]	2.493(3)	Sm(2)[c]—O(7)	2.411(3)
Sm(2)—O(10)[d]	2.351(3)	Sm(1)[f]—O(8)	2.387(3)
Sm(2)—O(1)	2.422(4)	Sm(2)[e]—O(12)	2.493(3)
Sm(2)—O(9)[b]	2.488(3)	Sm(2)[e]—O(13)	2.496(3)
Sm(2)—O(13)[e]	2.496(3)	Sm(2)[f]—O(9)	2.488(3)
Sm(2)—O(2)—Sm(1)	107.41(11)	O(4)[a]—Sm(1)—O(4)	180.000(1)
O(4)[a]—Sm(1) —O(8)[b]	77.41(11)	O(4)—Sm(1)—O(8)[b]	102.59(11)
O(4)[a]—Sm(1) —O(8)[c]	102.59(11)	O(4)—Sm(1)—O(8)[c]	77.41(11)
O(8)[b]—Sm(1) —O(8)[c]	180.000(1)	O(4)[a]—Sm(1)—O(3)[a]	102.11(13)
O(4) —Sm(1) —O(3)[a]	77.89(13)	O(8)[b]—Sm(1)—O(3)[a]	72.07(10)
O(8)[c]—Sm(1) —O(3)[a]	107.93(10)	O(4)[a]—Sm(1)—O(3)	77.89(13)
O(4) —Sm(1) —O(3)	102.11(13)	O(8)[b]—Sm(1)—O(3)	107.93(10)
O(8)[c]—Sm(1) —O(3)	72.07(10)	O(3)[a]—Sm(1)—O(3)	180.000(1)
O(4)[a]—Sm(1) —O(2)	97.96(12)	O(4)—Sm(1)—O(2)	82.04(12)
O(8)[b]—Sm(1) —O(2)	66.97(10)	O(8)[c]—Sm(1)—O(2)	113.03(10)
O(3)[a]—Sm(1) —O(2)	128.60(9)	O(3)—Sm(1)—O(2)	51.40(9)
O(4)[a]—Sm(1) —O(2)[a]	82.04(12)	O(4) —Sm(1) —O(2)[a]	97.96(12)
O(8)[b]—Sm(1) —O(2)[a]	113.03(10)	O(8)[c]—Sm(1) —O(2)[a]	66.97(10)
O(3)[a]—Sm(1) —O(2)[a]	51.40(9)	O(3) —Sm(1) —O(2)[a]	128.60(9)
O(2)—Sm(1) —O(2)[a]	180.000(1)	O(4)[a]—Sm(1) —C(17)[a]	91.95(13)
O(10)[d]—Sm(2)—O(7)[c]	77.47(10)	O(10)[d]—Sm(2)—O(1)	144.17(12)
O(7)[c]—Sm(2)—O(1)	121.83(12)	O(10)[d]—Sm(2)—O(5)	72.10(11)
O(7)[c]—Sm(2)—O(5)	75.35(10)	O(1) —Sm(2)—O(5)	138.43(11)
O(10)[d]—Sm(2)—O(2)	140.97(11)	O(7)[c]—Sm(2)—O(2)	71.17(10)
O(1)—Sm(2)—O(2)	74.10(13)	O(5)—Sm(2)—O(2)	77.87(11)
O(10)[d]—Sm(2)—O(9)[b]	86.22(10)	O(7)[c]—Sm(2)—O(9)[b]	155.99(10)

O(1)—Sm(2)—O(9)b	81.46(13)	O(5)—Sm(2)—O(9)[b]	82.97(11)
O(2)—Sm(2)—O(9)b	114.49(9)	O(10)[d]—Sm(2)—O(12)[e]	86.85(11)
O(7)[c]—Sm(2)—O(12)[e]	71.34(11)	O(1)—Sm(2)—O(12)[e]	73.80(12)
O(5)—Sm(2)—O(12)[e]	143.72(11)	O(2)—Sm(2)—O(12)[e]	104.04(10)
O(9)[b]—Sm(2)—O(12)[e]	125.74(10)	O(10)[d]—Sm(2)—O(13)[e]	72.62(11)
O(7)[c]—Sm(2)—O(13)[e]	116.71(10)	O(1)—Sm(2)—O(13)[e]	71.65(12)
O(5)—Sm(2)—O(13)[e]	138.65(11)	O(2)—Sm(2)—O(13)[e]	142.97(11)
O(9)[b]—Sm(2)—O(13)[e]	73.83(10)	O(12)[e]—Sm(2)—O(13)[e]	52.83(10)
O(10)[d]—Sm(2)—O(8)[b]	124.97(9)	O(7)[c]—Sm(2)—O(8)[b]	128.45(9)
O(1)—Sm(2)—O(8)[b]	69.40(10)	O(5)—Sm(2)—O(8)[b]	71.04(10)
O(2)—Sm(2)—O(8)[b]	64.42(9)	O(9)[b]—Sm(2)—O(8)[b]	50.09(9)
O(12)[e]—Sm(2)—O(8)[b]	143.16(10)	O(13)[e]—Sm(2)—O(8)[b]	114.42(10)
Sm(1)[f]—O(8)—Sm(2)[f]	105.56(10)	O(7)[c]—Sm(2)—C(23)[e]	93.33(12)

Symmetry transformations used to generate equivalent atoms: *a* -x+1, -y+2, -z+1; *b* x+1, y, z; *c*-x, -y+2, -z+1; *d* -x, -y+1, -z+1; *e* -x+1, -y+2, -z; *f* x-1, y, z.

Table S4. Selected bond lengths [Å] and bond angles [°] for compound **4**

Dy(1)—O(6)[e]	2.284(4)	Dy(1)—O(6)[f]	2.284(4)
Dy(1)—O(2)[c]	2.324(4)	Dy(1)—O(9)	2.418(4)
Dy(1)—O(10)	2.565(4)	Dy(1)—O(10)[c]	2.565(4)
Dy(1)—O(2)	2.324(4)	Dy(1)—O(9)[c]	2.418(4)
Dy(2)—O(3)[d]	2.308(5)	Dy(2)—O(5)[e]	2.375(4)
Dy(2)—O(10)	2.419(4)	Dy(2)—O(11)[a]	2.447(4)
Dy(2)—O(12)[a]	2.482(4)	Dy(2)—O(2)	2.679(4)
Dy(2)—O(8)[c]	2.396(4)	Dy(2)—O(1)	2.453(4)
O(9)—Dy(1)—O(9)[c]	180.000(1)	O(6)[e]—Dy(1)—O(2)	100.52(15)
O(6)[f]—Dy(1)—O(2)	79.48(15)	O(6)[e]—Dy(1)—O(2)[c]	79.48(15)
O(6)[f]—Dy(1)—O(2)[c]	100.52(15)	O(2)—Dy(1)—O(2)[c]	180.000(1)
O(6)[e]—Dy(1)—O(9)	100.98(19)	O(2)[c]—Dy(1)—O(9)	72.38(15)
O(2)—Dy(1)—O(9)	107.62(15)	O(8)[b]–Dy(1)–O(3)[a]	72.07(10)
O(6)[e]—Dy(1)—O(9)[c]	79.02(19)	O(6)[f]—Dy(1)—O(9)[c]	100.98(19)
O(2)—Dy(1)—O(9)[c]	72.38(15)	O(2)[c]—Dy(1)—O(9)[c]	107.62(15)
O(9)—Dy(1)—O(9)[c]	180.000(1)	O(6)[e]—Dy(1)—O(10)	79.28(17)
O(6)[f]—Dy(1)—O(10)	100.72(17)	O(2)—Dy(1)—O(10)	66.87(14)
O(2)[c]—Dy(1)—O(10)	113.13(14)	O(9)—Dy(1)—O(10)	51.23(14)
O(9)[c]—Dy(1)—O(10)	128.77(14)	O(6)[e]—Dy(1)—O(10)[c]	100.72(17)
O(6)[f]—Dy(1)—O(10)[c]	79.28(17)	O(2)—Dy(1)—O(10)[c]	113.13(14)
O(2)[c]—Dy(1)—O(10)[c]	66.87(14)	O(9)—Dy(1)—O(10)[c]	128.77(14)
O(9)[c]—Dy(1)—O(10)[c]	51.23(14)	O(10)—Dy(1)—O(10)[c]	180.000(1)
O(3)[d]—Dy(2)—O(5)[e]	72.41(17)	O(3)[d]—Dy(2)—O(8)[c]	78.13(15)
O(5)[e]—Dy(2)—O(8)[c]	75.67(16)	O(3)[d]—Dy(2)—O(13)	143.37(18)
O(5)[e]—Dy(2)—O(13)	138.08(17)	O(8)[c]—Dy(2)—O(13)	122.51(19)
O(3)[d]—Dy(2)—O(10)	142.35(16)	O(5)[e]—Dy(2)—O(10)	78.98(16)

O(8)[c]—Dy(2)—O(10)	71.37(15)	O(13)—Dy(2)—O(10)	73.62(18)
O(3)[d]—Dy(2)—O(11)[a]	86.20(17)	O(5)[e]—Dy(2)—O(11)[a]	144.37(16)
O(8)[c]—Dy(2)—O(11)[a]	72.18(15)	O(13)—Dy(2)—O(11)[a]	74.29(18)
O(10)—Dy(2)—O(11)[a]	81.67(15)	O(3)[d]—Dy(2)—O(1)	85.71(15)
O(5)[e]—Dy(2)—O(1)	114.49(9)	O(8)[c]—Dy(2)—O(1)	155.24(16)
O(13)—Dy(2)—O(1)	81.32(19)	O(10)—Dy(2)—O(1)	114.09(14)
O(11)[a]—Dy(2)—O(1)	125.72(14)	O(3)d—Dy(2)—O(12)[a]	71.96(17)
O(5)[e]—Dy(2)—O(12)[a]	137.70(16)	O(8)[c]—Dy(2)—O(12)[a]	117.72(15)
O(13)—Dy(2)—O(12)[a]	71.54(19)	O(10)—Dy(2)—O(12)[a]	142.55(17)
O(11)[a]—Dy(2)—O(12)[a]	52.86(14)	O(1)—Dy(2)—O(12)[a]	73.67(14)
O(3)[d]—Dy(2)—O(2)	125.78(15)	O(5)[e]—Dy(2)—O(2)	71.35(14)
O(8)[c]—Dy(2)—O(2)	128.00(13)	O(13)—Dy(2)—O(2)	68.27(16)
O(10)—Dy(2)—O(2)	63.76(13)	O(11)[a]—Dy(2)—O(2)	142.53(16)
O(1)—Dy(2)—O(2)	50.34(12)	O(12)[a]—Dy(2)—O(2)	113 .80(15)

Symmetry transformations used to generate equivalent atoms: *a* -x+1, -y+2, -z; *b* x+1, y, z; *c* -x+1, -y+2,- z+1; *d* -x+1, -y+1, -z+1; *e* x-1, y, z; *f* -x+2, -y+2, -z+1.

Table S5. Selected bond lengths [Å] and bond angles [°] for compound **5**

Nd(1)—O(3)[a]	2.406(3)	Nd(1)—O(5)	2.438(3)
Nd(1)—O(10)	2.463(5)	Nd(1)—O(1)	2.473(4)
Nd(1)—O(9)	2.515(5)	Nd(1)—O(2)	2.552(3)
Nd(1)—O(6)[b]	2.438(4)	Nd(1)—O(3)[c]	2.728(4)
Nd(1)—O(4)[c]	2.493(4)		
O(3)[a]—Nd(1)—O(5)	78.40(13)	O(3)[a]—Nd(1)—O(6)[b]	73.96(13)
O(5)—Nd(1)—O(6)[b]	133.21(13)	O(3)[a]—Nd(1)—O(10)	145.79(14)
O(5)—Nd(1)—O(10)	75.88(14)	O(6)[b]—Nd(1)—O(10)	140.15(15)
O(3)[a]—Nd(1)—O(1)	92.19(13)	O(5)—Nd(1)—O(1)	145.02(14)
O(6)[b]—Nd(1)—O(1)	73.51(15)	O(10)—Nd(1)—O(1)	96.08(17)
O(3)[a]—Nd(1)—O(4)[c]	123.87(12)	O(5)—Nd(1)—O(4)[c]	86.77(14)
O(6)[b]—Nd(1)—O(4)[c]	78.55(14)	O(10)—Nd(1)—O(4)[c]	78.55(14)
O(10)—Nd(1)—O(4)[c]	76.81(15)	O(1)—Nd(1)—O(4)[c]	125.09(12)
O(3)[a]—Nd(1)—O(9)	78.51(17)	O(5)—Nd(1)—O(9)	72.85(16)
O(6)[b]—Nd(1)—O(9)	134.63(16)	O(10)—Nd(1)—O(9)	72.63(17)
O(1)—Nd(1)—O(9)	72.27(16)	O(4)[c]—Nd(1)—O(9)	146.49(15)
O(3)[a]—Nd(1)—O(2)	135.89(12)	O(5)—Nd(1)—O(2)	145.62(12)
O(6)[b]—Nd(1)—O(2)	72.19(13)	O(10)—Nd(1)—O(2)	71.58(14)
O(1)—Nd(1)—O(2)	51.45(12)	O(4)[c]—Nd(1)—O(2)	75.41(12)
O(5)—Nd(1)—O(3)[c]	68.78(13)	O(6)[b]—Nd(1)—O(3)[c]	68.03(13)
O(10)—Nd(1)—O(3)[c]	115.04(15)	O(1)—Nd(1)—O(3)[c]	141.45(13)
O(4)[c]—Nd(1)—O(3)[c]	49.31(11)	O(9)—Nd(1)—O(3)[c]	136.77(16)
O(2)—Nd(1)—O(3)[c]	115.96(12)	O(3)[a]—Nd(1)—Nd(1)[b]	40.29(8)
O(5)—Nd(1)—Nd(1)[b]	68.84(9)	O(6)[b]—Nd(1)—Nd(1)[b]	65.58(9)
O(10)—Nd(1)—Nd(1)[b]	140.47(12)	O(1)—Nd(1)—Nd(1)[b]	123.09(11)

O(4)[c]—Nd(1)—Nd(1)[b]	83.83(8)	O(9)—Nd(1)—Nd(1)[b]	111.72(15)
O(2)—Nd(1)—Nd(1)[b]	135.78(10)	O(3)[c]—Nd(1)—Nd(1)[b]	34.76(7)
Nd(1)[a]—O(3)—Nd(1)[d]	104.95(12)		

Symmetry transformations used to generate equivalent atoms: *a* -x, y, -z+1/2; *b* -x, -y+1, -z; *c* x, -y+1, z-1/2; *d* x, -y+1, z+1/2.

Table S6. Selected bond lengths [Å] and bond angles [°] for compound **7**

Er(1)—O(8)	2.388(2)	Er(1)—O(4)	2.253(2)
Er(1)—O(5)[a]	2.294(2)	Er(1)—O(3)	2.350(2)
Er(1)—O(1)	2.352(2)	Er(1)—O(2)[b]	2.356(2)
Er(1)—O(2)[b]	2.356(2)	Er(1)—O(6)[c]	2.423(2)
Er(1)—O(7)[c]	2.465(2)	Er(1)—C(9)[c]	2.807(3)
O(4)—Er(1)—O(5)[a]	86.19(8)	O(4)—Er(1)—O(3)	153.14(8)
O(5)[a]—Er(1)—O(3)	88.41(8)	O(4)—Er(1)—O(1)	90.59(8)
O(5)[a]—Er(1)—O(1)	143.03(8)	O(3)—Er(1)—O(1)	78.15(8)
O(3)—Er(1)—O(2)[b]	73.39(9)	O(5)[a]—Er(1)—O(2)[b]	76.12(7)
O(1)—Er(1)—O(2)[b]	67.08(7)	O(4)—Er(1)—O(8)	93.92(10)
O(5)[a]—Er(1)—O(8)	145.92(7)	O(3)—Er(1)—O(8)	105.03(9)
O(1)—Er(1)—O(8)	71.03(8)	O(2)[b]—Er(1)—O(8)	137.49(8)
O(4)—Er(1)—O(6)[c]	132.66(7)	O(5)[a]—Er(1)—O(6)[c]	81.17(8)
O(3)—Er(1)—O(6)[c]	72.06(8)	O(2)[b]—Er(1)—O(6)[c]	138.80(8)
O(1)—Er(1)—O(6)[c]	125.23(8)	O(8)—Er(1)—O(6)[c]	73.82(9)
O(4)—Er(1)—O(7)[c]	79.33(7)	O(5)[a]—Er(1)—O(7)[c]	76.82(7)
O(3)—Er(1)—O(7)[c]	124.84(7)	O(1)—Er(1)—O(7)[c]	138.59(7)
O(2)[b]—Er(1)—O(7)[c]	146.65(8)	O(8)—Er(1)—O(7)[c]	69.76(7)
O(6)[c]—Er(1)—O(7)[c]	53.40(7)	O(4)—Er(1)—O(2)[b]	79.77(9)

Symmetry transformations used to generate equivalent atoms: *a* -x+1/2,-y+3/2,-z; *b* x,-y+1,z-1/2; *c* -x+1/2,y+1/2,-z+1/2.

Table S7. Selected bond lengths [Å] and bond angles [°] for compound **7**

Tm(1)—O(4)[e]	2.271(3)	Tm(1)—O(20)[c]	2.276(3)
Tm(1)—O(26)[a]	2.358(3)	Tm(1)—O(25)[a]	2.460(3)
Tm(1)—O(10)	2.243(3)	Tm(2)—O(21)[f]	2.224(3)
Tm(1)—O(9)	2.412(3)	Tm (1)—O(8)	2.398(3)
Tm(1)—O(11)	2.343(3)	Tm(2) —O(13)	2.409(3)
Tm(2)—O(24)[d]	2.259(3)	Tm(2)—O(23)[a]	2.335(3)
Tm(2)—O(22)[a]	2.470(3)	Tm(2)—O(1)	2.276(3)
Tm(2)—O(14)	2.437(3)	Tm(3)—O(3)	2.254(3)
Tm(2)—O(12)	2.340(3)	Tm(3)—O(7)	2.302(5)
Tm(3)—O(3)[g]	2.254(3)	Tm(3)—O(15)[g]	2.363(3)
Tm(3)—O(16)[g]	2.428(3)	Tm(3)—O(16)	2.428(3)
Tm(3)—O(5)	2.266(4)	Tm(3)—O(15)	2.363(3)
Tm(4)—O(6)	2.268(4)	Tm(4)—O(17)	2.329(5)
Tm(4)—O(2)[d]	2.249(3)	Tm(4)—O(2)h	2.249(3)

Tm(4)—O(19)[i]	2.358(3)	Tm(4)—O(19)[b]	2.358(3)
Tm(4)—O(18)[i]	2.415(3)	Tm(4)—O(18)[b]	2.415(3)
O(10)—Tm(1)—O(4)[e]	150.13(10)	O(10)—Tm(1)—O(20)[c]	107.28(11)
O(4)[e]—Tm(1)—O(20)[c]	86.96(11)	O(10)—Tm(1)—O(11)	76.71(11)
O(4)[e]—Tm(1)—O(11)	81.51(11)	O(20)[c]—Tm(1)—O(11)	76.62(10)
O(10)—Tm(1)—O(26)[a]	91.61(13)	O(4)[e]—Tm(1)—O(26)[a]	88.89(12)
O(20)[c]—Tm(1)—O(26)[a]	148.11(10)	O(11)—Tm(1)—O(26)[a]	133.86(10)
O(10)—Tm(1)—O(8)	76.41(10)	O(4)[e]—Tm(1)—O(8)	133.20(10)
O(20)[c]—Tm(1)—O(8)	76.70(11)	O(11)—Tm(1)—O(8)	134.02(11)
O(26)[a]—Tm(1)—O(8)	83.36(11)	O(10)—Tm(1)—O(9)	129.04(10)
O(4)[e]—Tm(1)—O(9)	79.42(10)	O(20)[c]—Tm(1)—O(9)	75.35(10)
O(11)—Tm(1)—O(9)	146.70(11)	O(26)[a]—Tm(1)—O(9)	72.81(10)
O(8)—Tm(1)—O(9)	54.17(9)	O(10)—Tm(1)—O(25)[a]	80.66(10)
O(4)[e]—Tm(1)—O(25)[a]	75.51(10)	O(20)[c]—Tm(1)—O(25)[a]	152.39(10)
O(11)—Tm(1)—O(25)[a]	79.77(10)	O(26)[a]—Tm(1)—O(25)[a]	54.18(9)
O(8)—Tm(1)—O(25)[a]	130.72(11)	O(9)—Tm(1)—O(25)[a]	120.78(9)
O(21)[f]—Tm(2)—O(24)[d]	106.61(12)	O(21)[f]—Tm(2)—O(1)	154.68(11)
O(24)[d]—Tm(2)—O(1)	86.19(11)	O(21)[f]—Tm(2)—O(23)[a]	89.61(13)
O(24)[d]—Tm(2)—O(23)[a]	152.97(10)	O(1)—Tm(2)—O(23)[a]	87.80(13)
O(21)[f]—Tm(2)—O(12)	79.41(15)	O(24)[d]—Tm(2)—O(12)	75.67(11)
O(1)—Tm(2)—O(12)	82.92(14)	O(23)[a]—Tm(2)—O(12)	129.60(11)
O(21)[f]—Tm(2)—O(13)	127.98(11)	O(24)[d]—Tm(2)—O(13)	78.81(10)
O(1)—Tm(2)—O(13)	75.25(10)	O(23)[a]—Tm(2)—O(13)	74.17(10)
O(12)—Tm(2)—O(13)	147.29(12)	O(21)[f]—Tm(2)—O(14)	76.58(10)
O(24)[d]—Tm(2)—O(14)	76.57(10)	O(1)—Tm(2)—O(14)	128.35(10)
O(23)[a]—Tm(2)—O(14)	86.75(10)	O(12)—Tm(2)—O(14)	135.90(12)
O(13)—Tm(2)—O(14)	53.91(9)	O(21)[f]—Tm(2)—O(22)[a]	80.47(11)
O(24)[d]—Tm(2)—O(22)[a]	148.28(10)	O(1)—Tm(2)—O(22)[a]	77.61(11)
O(23)[a]—Tm(2)—O(22)[a]	54.23(10)	O(12)—Tm(2)—O(22)[a]	75.40(10)
O(13)—Tm(2)—O(22)[a]	121.82(10)	O(14)—Tm(2)—O(22)[a]	134.55(10)
O(3)[g]—Tm(3)—O(3)	106.1(2)	O(3)[g]—Tm(3)—O(5)	73.42(12)
O(3)—Tm(3)—O(5)	73.42(12)	O(3)[g]—Tm(3)—O(7)	81.22(13)
O(3)—Tm(3)—O(7)	81.22(13)	O(5)—Tm(3)—O(7)	136.94(18)
O(3)[g]—Tm(3)—O(15)[g]	158.09(12)	O(3)—Tm(3)—O(15)[g]	82.94(14)
O(5)—Tm(3)—O(15)[g]	128.48(10)	O(7)—Tm(3)—O(15)[g]	80.54(12)
O(3)[g]—Tm(3)—O(15)	82.94(14)	O(3)—Tm(3)—O(15)	158.09(12)
O(5)—Tm(3)—O(15)	128.48(10)	O(7)—Tm(3)—O(15)	80.54(12)
O(15)[g]—Tm(3)—O(15)	82.19(17)	O(3)—Tm(3)—O(16)[g]	83.76(15)
O(3)[g]—Tm(3)—O(16)[g]	145.52(12)	O(7)—Tm(3)—O(16)[g]	133.26(11)
O(5)—Tm(3)—O(16)[g]	78.27(12)	O(15)—Tm(3)—O(16)[g]	100.14(12)
O(15)[g]—Tm(3)—O(16)[g]	53.75(10)	O(3)[g]—Tm(3)—O(16)	83.76(15)
O(3)—Tm(3)—O(16)	145.52(12)	O(7)—Tm(3)—O(16)	133.26(11)
O(5)—Tm(3)—O(16)	78.27(12)	O(15)[g]—Tm(3)—O(16)	100.14(12)

O(15)—Tm(3)—O(16)	53.75(10)	O(16)[g]—Tm(3)—O(16)	71.43(18)
O(2)[d]—Tm(4)—O(2)[h]	95.7(2)	O(2)[d]—Tm(4)—O(6)	78.27(12)
O(2)[h]—Tm(4)—O(6)	78.27(12)	O(2)[d]—Tm(4)—O(17)	80.37(13)
O(2)[h]—Tm(4)—O(17)	80.37(13)	O(6)—Tm(4)—O(17)	147.94(19)
O(2)[d]—Tm(4)—O(19)[i]	87.53(15)	O(2)[h]—Tm(4)—O(19)[i]	150.21(12)
O(6)—Tm(4)—O(19)[i]	73.40(12)	O(17)—Tm(4)—O(19)[i]	129.23(11)
O(2)[d]—Tm(4)—O(19)[b]	150.21(12)	O(2)[h]—Tm(4)—O(19)[b]	87.53(15)
O(6)—Tm(4)—O(19)[b]	73.40(12)	O(17)—Tm(4)—O(19)[b]	129.23(11)
O(19)[i]—Tm(4)—O(19)[b]	75.8(2)	O(2)[d]—Tm(4)—O(18)[i]	86.56(14)
O(2)[h]—Tm(4)—O(18)[i]	155.95(12)	O(6)—Tm(4)—O(18)[i]	125.44(11)
O(17)—Tm(4)—O(18)[i]	76.39(12)	O(19)[i]—Tm(4)—O(18)[i]	53.66(10)
O(19)[b]—Tm(4)—O(18)[i]	102.38(14)	O(2)[d]—Tm(4)—O(18)[b]	155.95(12)
O(2)[h]—Tm(4)—O(18)[b]	86.56(14)	O(6)—Tm(4)—O(18)[b]	125.44(11)
O(17)—Tm(4)—O(18)[b]	76.39(12)	O(19)[i]—Tm(4)—O(18)[b]	102.38(14)
O(19)[b]—Tm(4)—O(18)[b]	53.66(10)	O(18)[i]—Tm(4)—O(18)[b]	82.07(18)

Symmetry transformations used to generate equivalent atoms: *a* -x+1,y,-z+2; *b* -x+1,-y+1,-z+1; *c* -x+1/2,-y+1/2,-z+1; *d* -x+3/2,-y+1/2,-z+2; *e* x-1/2,y-1/2,z; *f* x+1,y,z+1; *g* x,-y+1,z; *h* -x+3/2,y+1/2,-z+2; *i* -x+1,y,-z+1.