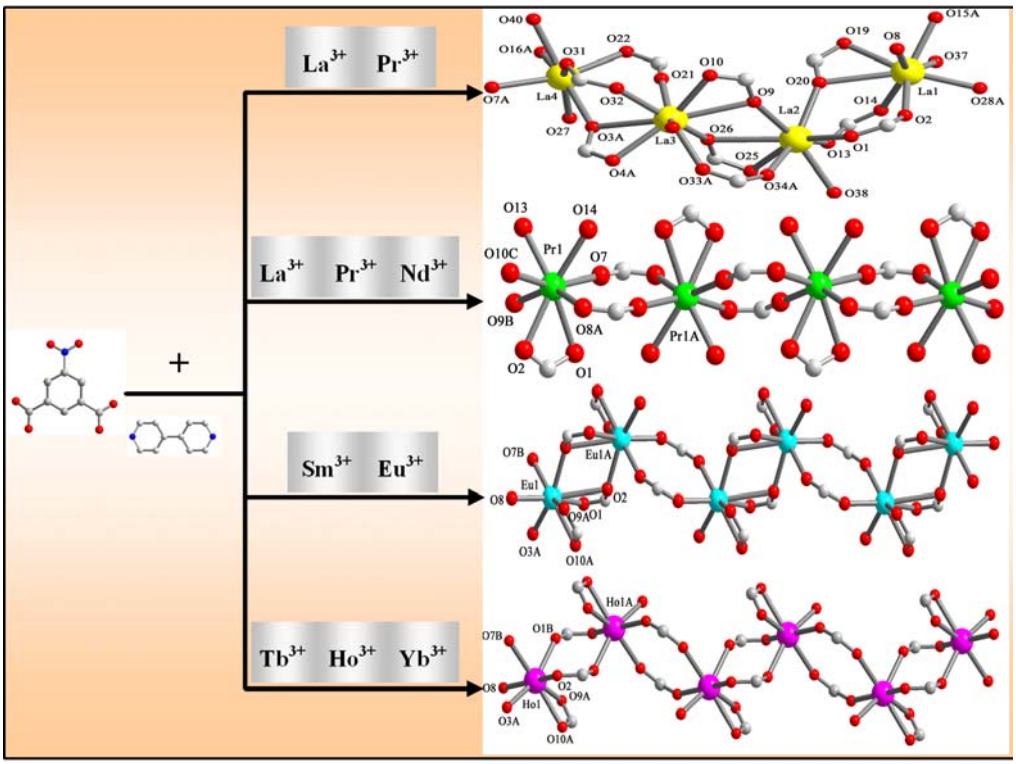
Supporting Information

Construction of 2-D Lanthanide Coordination Frameworks:

Syntheses, Structures and Luminescent Property



Scheme S1. The building units in coordination polymers of **1-10**.

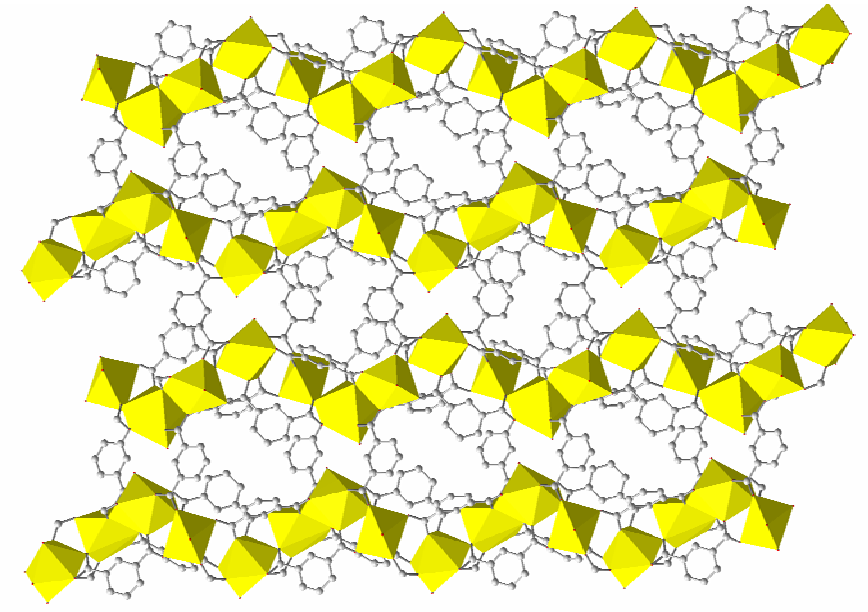


Fig. S1. View of a two-dimensional layer structure in **1.** The nitro groups of ligands are omitted for clarity.

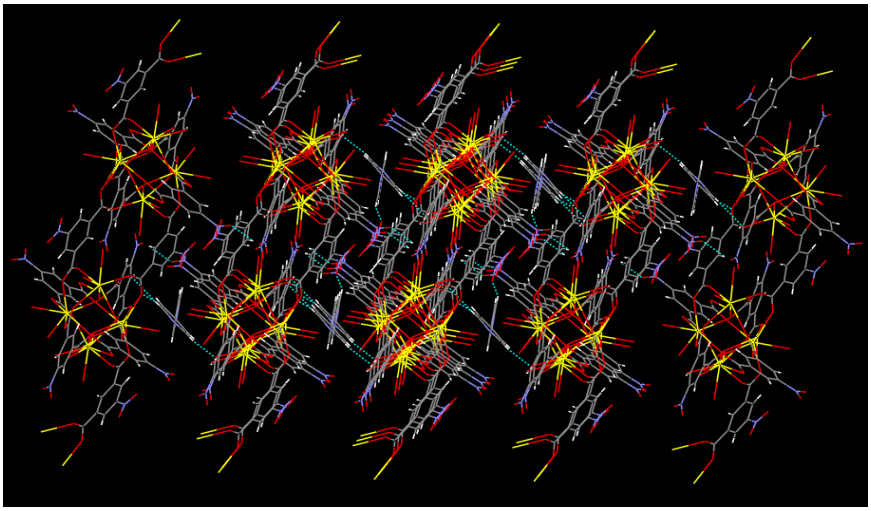
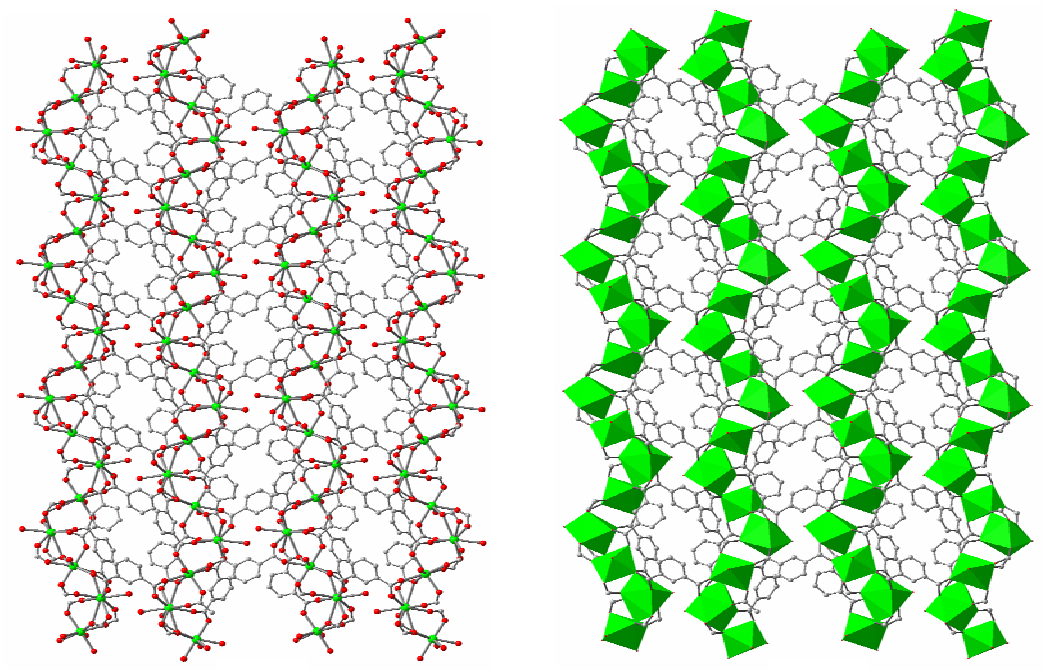
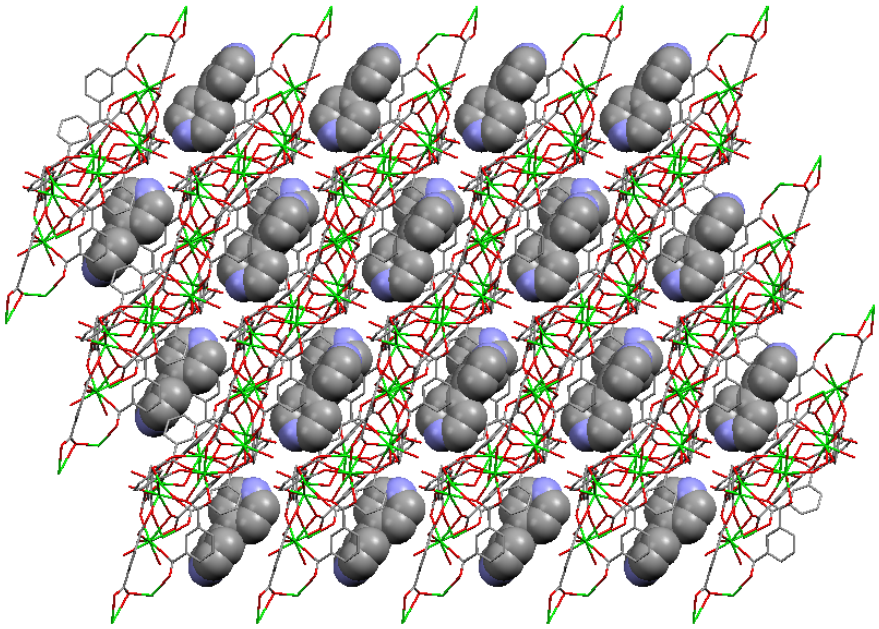


Fig. S2. View of hydrogen-bond interaction between 4,4’-bipy and frameworks in **1**.



(a) (b)



(c)

Fig. S3. (a) and (b) View of two-dimensional layer structure in **2.** (c) View down the a-axis of the structure of **2** showing the 4,4'-bipy molecules with space-filling representation. The nitro groups of ligands are omitted for clarity. Color code: Pr, green; O, red; C, grey.

(a)

(b)

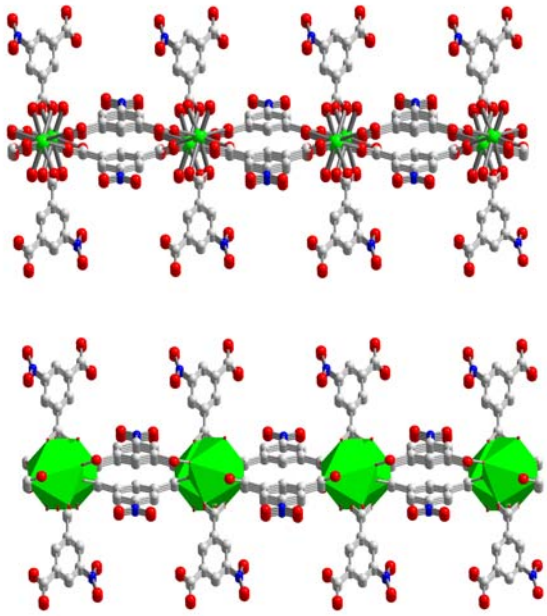


Fig. S4. View two-dimensional layer along the *a*-axis direction (e) and (f) in **4.** Colour code: Pr, green; O, red; C, grey; N, blue.

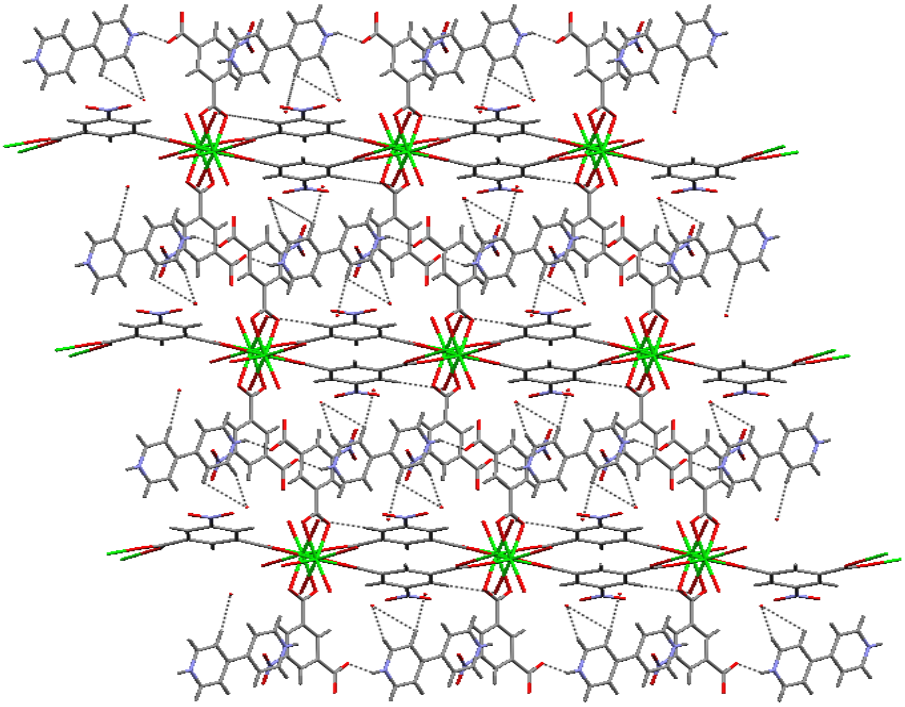


Fig. S5. View of hydrogen-bond interaction between 4,4'-bipy (or water molecules) and frameworks in **4**.

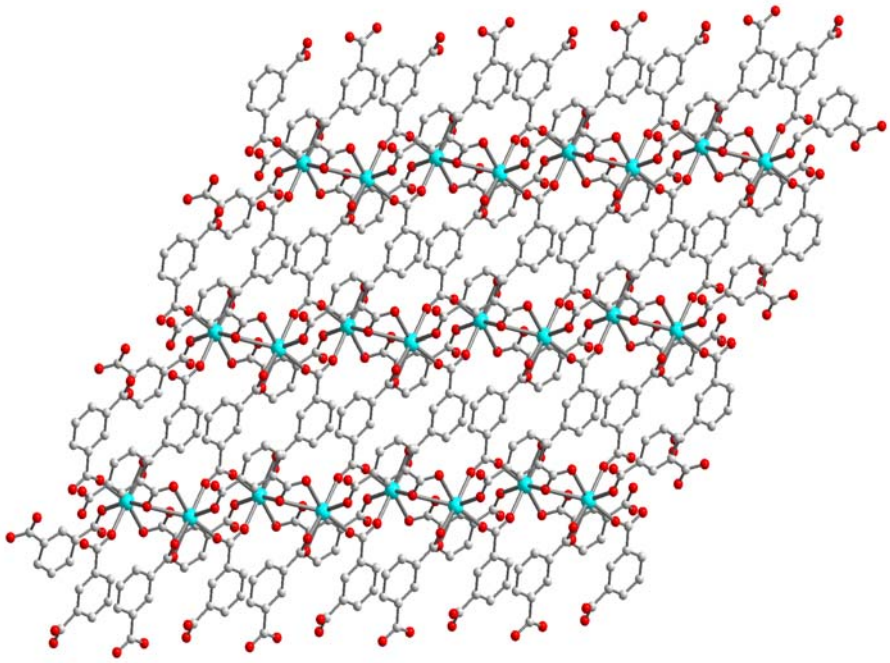


Fig. S6. View of two-dimensional layer along the [001] direction of **7**. The nitro groups of ligands are omitted for clarity**.**. The nitro groups of ligands are omitted for clarity. colour code: Eu, cyan; O, red; C, grey.

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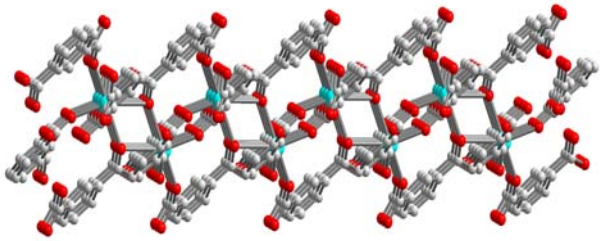
(a)



(b)

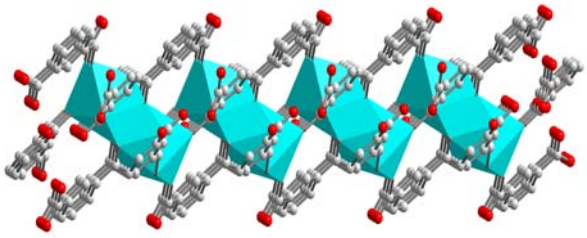


Fig. S7. View of two-dimensional layer and along the [100] direction (a) and (b) in **7.** The nitro groups of ligands are omitted for clarity. colour code: Eu, cyan; O, red; C, grey.

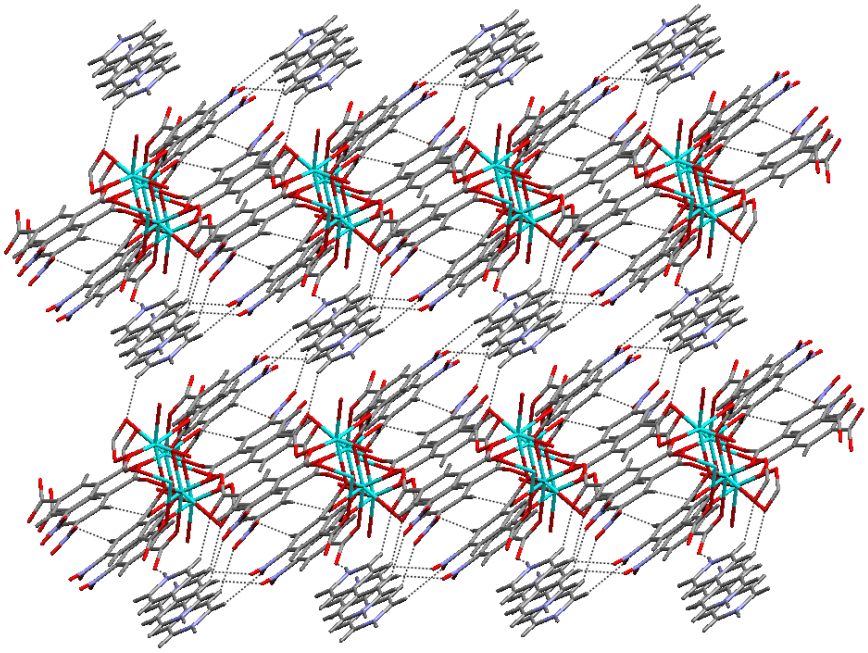


Fig.e S8. View of hydrogen-bond interaction between 4,4'-bipy and frameworks in **7**.

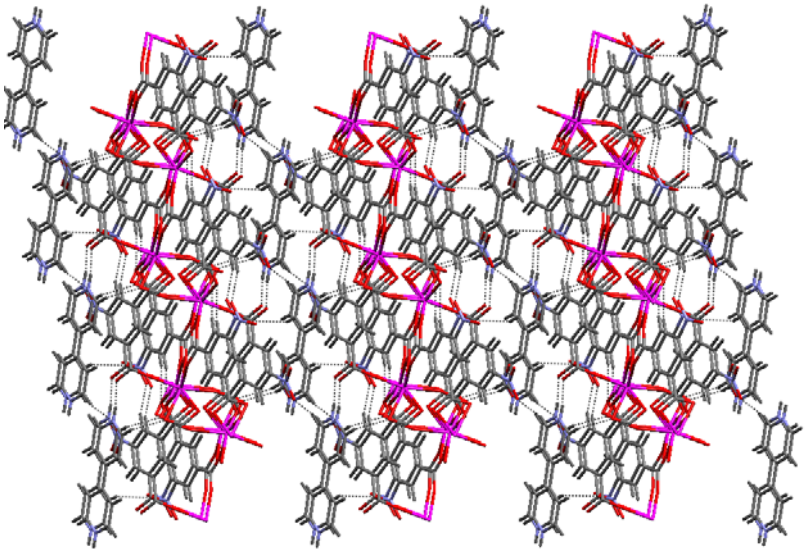
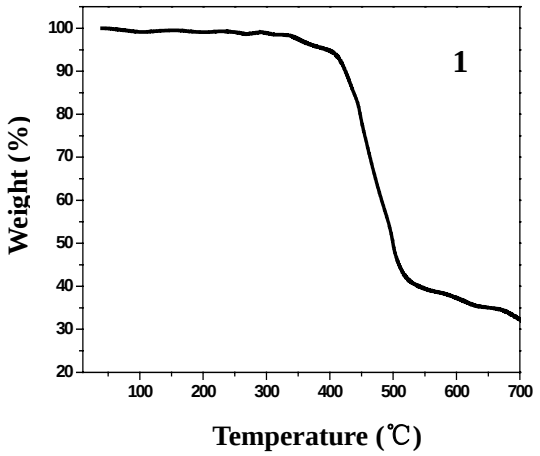
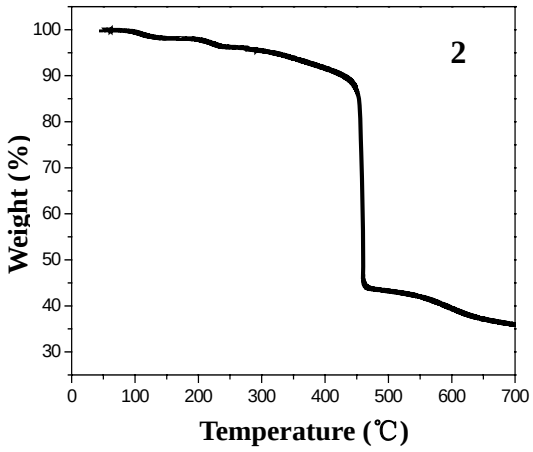


Fig. S9. View of hydrogen-bond interaction between 4,4'-bipy and frameworks in **9**.





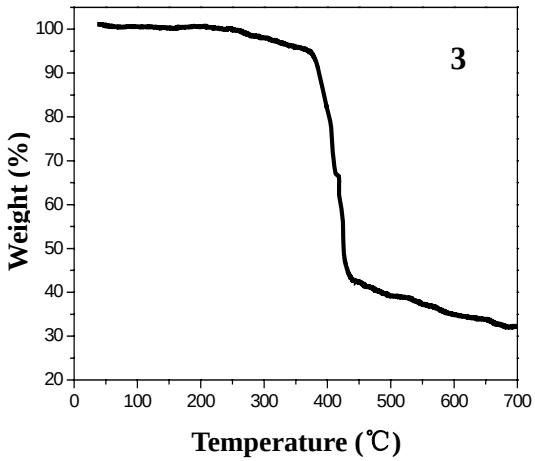


Fig. S10. Thermogravimetric curve for **1**, **2**, and **3**.

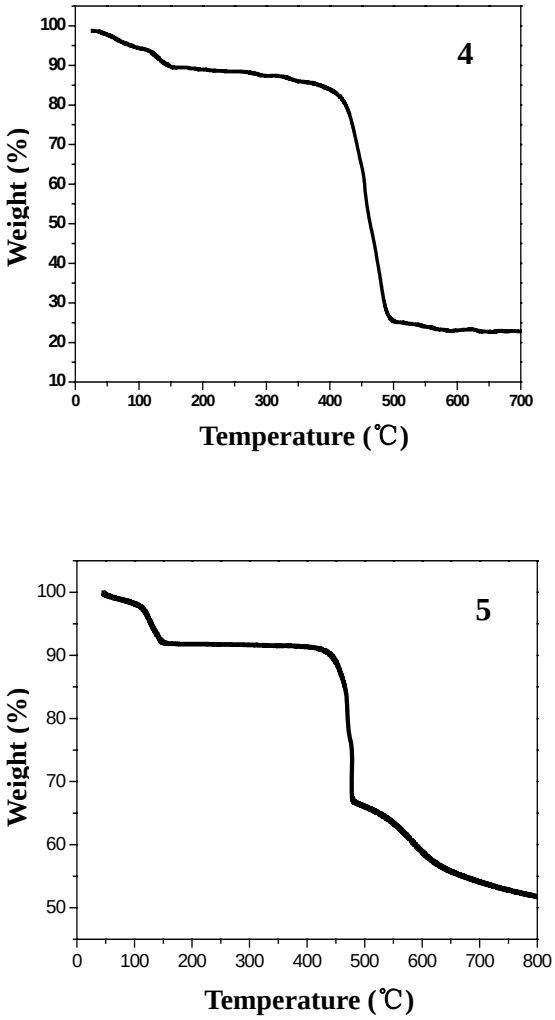


Fig. S11. Thermogravimetric curve for **4** and **5**.

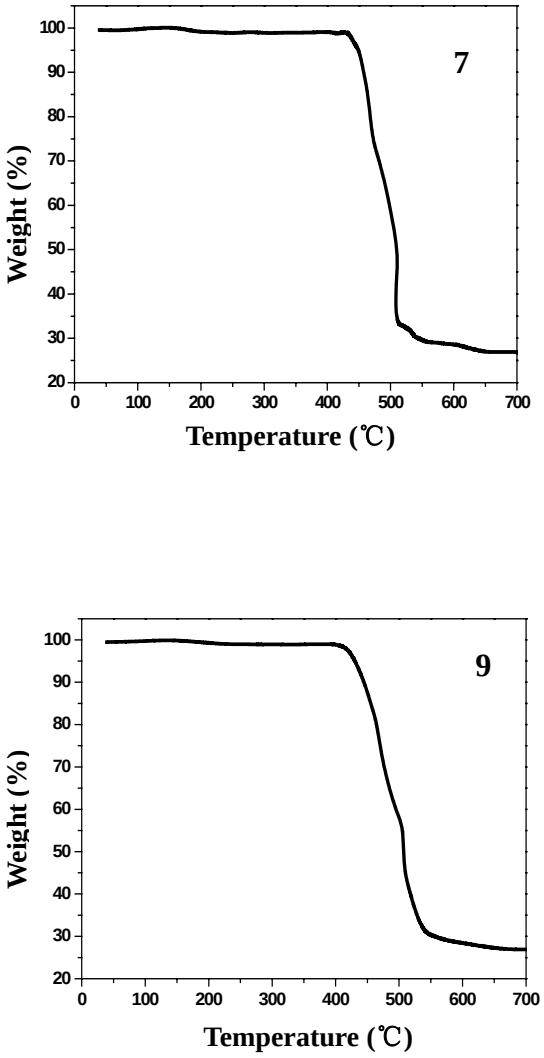


Fig. S12. Thermogravimetric curve for **7** and **9**.

Table S1. Selected bond lengths [Å] and angles [°] for **1-10**.

1			
La(1)-O(8)	2.413(4)	La(2)-O(34)$^{\#3}$	2.363(3)
La(1)-O(28)$^{\#1}$	2.417(4)	La(2)-O(13)	2.423(4)
La(1)-O(14)	2.419(3)	La(2)-O(1)	2.431(4)
La(1)-O(2)	2.443(4)	La(2)-O(25)	2.510(4)
La(1)-O(15)$^{\#2}$	2.459(3)	La(2)-O(9)	2.543(4)
La(1)-O(19)	2.530(4)	La(2)-O(20)	2.564(3)
La(1)-O(37)	2.676(4)	La(2)-O(38)	2.571(4)
La(1)-O(20)	2.930(4)	La(2)-O(26)	2.915(5)
La(3)-O(32)	2.416(4)	La(4)-O(16)$^{\#5}$	2.404(3)
La(3)-O(10)	2.481(4)	La(4)-O(31)	2.419(3)
La(3)-O(21)	2.487(4)	La(4)-O(22)	2.444(5)
La(3)-O(33)$^{\#3}$	2.494(4)	La(4)-O(7)$^{\#4}$	2.449(4)
La(3)-O(26)	2.540(4)	La(4)-O(27)	2.465(4)
La(3)-O(4)$^{\#4}$	2.564(3)	La(4)-O(3)$^{\#4}$	2.569(4)
La(3)-O(39)	2.637(4)	La(4)-O(40)	2.583(4)
La(3)-O(9)	2.814(4)	La(3)-O(3)$^{\#4}$	2.874(4)
O(8)-La(1)-O(28)$^{\#1}$	106.78(16)	O(34)$^{\#3}$-La(2)-O(13)	137.71(14)
O(8)-La(1)-O(14)	142.86(12)	O(34)$^{\#3}$-La(2)-O(1)	83.69(15)
O(28)$^{\#1}$-La(1)-O(14)	97.01(16)	O(13)-La(2)-O(1)	107.25(15)
O(8)-La(1)-O(2)	71.37(14)	O(34)$^{\#3}$-La(2)-O(25)	80.89(15)
O(28)$^{\#1}$-La(1)-O(2)	79.88(18)	O(13)-La(2)-O(25)	70.18(14)
O(14)-La(1)-O(2)	85.65(13)	O(1)-La(2)-O(25)	151.05(16)
O(8)-La(1)-O(15)$^{\#2}$	81.34(13)	O(34)$^{\#3}$-La(2)-O(9)	76.55(13)
O(28)$^{\#1}$-La(1)-O(15)$^{\#2}$	85.96(16)	O(13)-La(2)-O(9)	142.66(14)
O(14)-La(1)-O(15)$^{\#2}$	129.32(12)	O(1)-La(2)-O(9)	87.62(13)
O(2)-La(1)-O(15)$^{\#2}$	143.81(13)	O(25)-La(2)-O(9)	112.15(13)
O(8)-La(1)-O(19)	91.82(15)	O(34)$^{\#3}$-La(2)-O(20)	151.25(13)
O(28)$^{\#1}$-La(1)-O(19)	154.62(16)	O(13)-La(2)-O(20)	71.02(13)
O(14)-La(1)-O(19)	76.59(15)	O(1)-La(2)-O(20)	85.47(14)
O(2)-La(1)-O(19)	123.31(15)	O(25)-La(2)-O(20)	118.75(15)
O(15)$^{\#2}$-La(1)-O(19)	79.81(13)	O(9)-La(2)-O(20)	76.46(11)
O(8)-La(1)-O(37)	146.70(12)	O(34)$^{\#3}$-La(2)-O(38)	73.86(13)
O(28)$^{\#1}$-La(1)-O(37)	72.47(16)	O(13)-La(2)-O(38)	70.02(15)
O(14)-La(1)-O(37)	67.53(12)	O(1)-La(2)-O(38)	75.46(14)
O(2)-La(1)-O(37)	138.01(14)	O(25)-La(2)-O(38)	76.78(15)
O(15)$^{\#2}$-La(1)-O(37)	65.36(12)	O(9)-La(2)-O(38)	147.20(13)
O(19)-La(1)-O(37)	82.48(15)	O(20)-La(2)-O(38)	128.53(12)
O(8)-La(1)-O(20)	78.00(12)	O(16)$^{\#5}$-La(4)-O(31)	140.59(12)
O(28)$^{\#1}$-La(1)-O(20)	152.62(15)	O(16)$^{\#5}$-La(4)-O(22)	77.70(16)
O(14)-La(1)-O(20)	68.22(12)	O(31)-La(4)-O(22)	102.31(16)
O(2)-La(1)-O(20)	76.22(14)	O(16)$^{\#5}$-La(4)-O(7)$^{\#4}$	91.85(14)

O(15)$^{\#2}$-La(1)-O(20)	121.34(12)	O(31)-La(4)-O(7)$^{\#4}$	78.40(13)
O(19)-La(1)-O(20)	47.14(11)	O(22)-La(4)-O(7)$^{\#4}$	164.46(19)
O(37)-La(1)-O(20)	118.50(13)	O(16)$^{\#5}$-La(4)-O(27)	73.17(13)
O(32)-La(3)-O(10)	77.41(13)	O(31)-La(4)-O(27)	145.67(13)
O(32)-La(3)-O(21)	81.87(12)	O(22)-La(4)-O(27)	89.53(19)
O(10)-La(3)-O(21)	81.49(18)	O(7)$^{\#4}$-La(4)-O(27)	98.51(16)
O(32)-La(3)-O(33)$^{\#3}$	128.56(11)	O(16)$^{\#5}$-La(4)-O(3)$^{\#4}$	145.55(12)
O(10)-La(3)-O(33)$^{\#3}$	106.46(16)	O(31)-La(4)-O(3)$^{\#4}$	73.82(12)
O(21)-La(3)-O(33)$^{\#3}$	149.34(12)	O(22)-La(4)-O(3)$^{\#4}$	99.64(17)
O(32)-La(3)-O(26)	150.70(13)	O(7)$^{\#4}$-La(4)-O(3)$^{\#4}$	95.47(13)
O(10)-La(3)-O(26)	111.52(14)	O(27)-La(4)-O(3)$^{\#4}$	72.46(13)
O(21)-La(3)-O(26)	72.45(13)	O(16)$^{\#5}$-La(4)-O(40)	68.81(13)
O(33)$^{\#3}$-La(3)-O(26)	77.16(12)	O(31)-La(4)-O(40)	71.78(13)
O(32)-La(3)-O(4)$^{\#4}$	76.62(13)	O(22)-La(4)-O(40)	89.85(19)
O(10)-La(3)-O(4)$^{\#4}$	145.61(15)	O(7)$^{\#4}$-La(4)-O(40)	75.53(14)
O(21)-La(3)-O(4)$^{\#4}$	116.39(14)	O(27)-La(4)-O(40)	141.19(14)
O(33)$^{\#3}$-La(3)-O(4)$^{\#4}$	73.75(12)	O(3)$^{\#4}$-La(4)-O(40)	145.52(12)
O(26)-La(3)-O(4)$^{\#4}$	102.14(14)	O(10)-La(3)-O(3)$^{\#4}$	136.50(14)
O(32)-La(3)-O(39)	70.33(13)	O(21)-La(3)-O(3)$^{\#4}$	68.94(13)
O(10)-La(3)-O(39)	71.24(17)	O(33)$^{\#3}$-La(3)-O(3)$^{\#4}$	115.33(11)
O(21)-La(3)-O(39)	144.36(14)	O(26)-La(3)-O(3)$^{\#4}$	89.66(12)
O(33)$^{\#3}$-La(3)-O(39)	63.43(13)	O(4)$^{\#4}$-La(3)-O(3)$^{\#4}$	47.47(11)
O(26)-La(3)-O(39)	138.74(13)	O(39)-La(3)-O(3)$^{\#4}$	117.16(14)
O(4)$^{\#4}$-La(3)-O(39)	79.01(15)	O(9)-La(3)-O(3)$^{\#4}$	149.80(10)
O(32)-La(3)-O(9)	125.46(11)	O(26)-La(3)-O(9)	67.03(12)
O(10)-La(3)-O(9)	48.27(11)	O(4)$^{\#4}$-La(3)-O(9)	152.65(11)
O(21)-La(3)-O(9)	85.25(14)	O(39)-La(3)-O(9)	92.92(14)
O(33)$^{\#3}$-La(3)-O(9)	79.26(11)	O(32)-La(3)-O(3)$^{\#4}$	67.67(11)
2			
Pr(1)-O(8)	2.374(4)	Pr(3)-O(33)$^{\#3}$	2.383(4)
Pr(1)-O(27)	2.373(4)	Pr(3)-O(3)	2.413(4)
Pr(1)-O(16)$^{\#1}$	2.379(4)	Pr(3)-O(25)	2.427(4)
Pr(1)-O(20)	2.396(4)	Pr(3)-O(32)	2.451(4)
Pr(1)-O(9)$^{\#2}$	2.416(4)	Pr(3)-O(14)	2.462(5)
Pr(1)-O(1)	2.484(4)	Pr(3)-O(22)$^{\#4}$	2.525(4)
Pr(1)-O(37)	2.628(4)	Pr(3)-O(39)	2.597(4)
Pr(1)-O(2)	2.908(4)	Pr(3)-O(26)	2.836(4)
Pr(2)-O(31)	2.330(3)	Pr(3)-O(21)$^{\#4}$	2.893(4)
Pr(2)-O(19)	2.383(4)	Pr(4)-O(10)$^{\#5}$	2.352(3)
Pr(2)-O(7)	2.384(4)	Pr(4)-O(4)	2.383(4)
Pr(2)-O(13)	2.435(4)	Pr(4)-O(34)$^{\#3}$	2.388(3)
Pr(2)-O(26)	2.505(4)	Pr(4)-O(28)$^{\#4}$	2.404(4)
Pr(2)-O(38)	2.525(4)	Pr(4)-O(15)	2.409(5)
Pr(2)-O(2)	2.542(4)	Pr(4)-O(21)$^{\#4}$	2.523(4)

Pr(2)-O(14)	3.040(4)	Pr(4)-O(40)	2.552(4)
O(8)-Pr(1)-O(27)	142.53(14)	O(31)-Pr(2)-O(19)	85.69(15)
O(8)-Pr(1)-O(16)$^{\#1}$	96.41(17)	O(31)-Pr(2)-O(7)	137.85(16)
O(27)-Pr(1)-O(16)$^{\#1}$	107.38(16)	O(19)-Pr(2)-O(7)	106.01(16)
O(8)-Pr(1)-O(20)	85.11(14)	O(31)-Pr(2)-O(13)	81.99(17)
O(27)-Pr(1)-O(20)	71.76(15)	O(19)-Pr(2)-O(13)	156.2(2)
O(16)$^{\#1}$-Pr(1)-O(20)	79.40(18)	O(7)-Pr(2)-O(13)	71.31(15)
O(8)-Pr(1)-O(9)$^{\#2}$	130.58(12)	O(31)-Pr(2)-O(26)	75.98(14)
O(27)-Pr(1)-O(9)$^{\#2}$	80.91(14)	O(19)-Pr(2)-O(26)	87.72(14)
O(16)$^{\#1}$-Pr(1)-O(9)$^{\#2}$	85.30(18)	O(7)-Pr(2)-O(26)	143.04(15)
O(20)-Pr(1)-O(9)$^{\#2}$	142.72(13)	O(13)-Pr(2)-O(26)	108.76(15)
O(8)-Pr(1)-O(1)	77.54(16)	O(31)-Pr(2)-O(38)	73.06(14)
O(27)-Pr(1)-O(1)	91.07(16)	O(19)-Pr(2)-O(38)	76.57(15)
O(16)$^{\#1}$-Pr(1)-O(1)	154.67(16)	O(7)-Pr(2)-O(38)	70.81(16)
O(20)-Pr(1)-O(1)	123.82(14)	O(13)-Pr(2)-O(38)	80.37(19)
O(9)$^{\#2}$-Pr(1)-O(1)	80.54(13)	O(26)-Pr(2)-O(38)	146.09(13)
O(8)-Pr(1)-O(37)	67.89(14)	O(31)-Pr(2)-O(2)	151.52(14)
O(27)-Pr(1)-O(37)	146.69(15)	O(19)-Pr(2)-O(2)	84.21(15)
O(16)$^{\#1}$-Pr(1)-O(37)	72.24(16)	O(7)-Pr(2)-O(2)	70.63(14)
O(20)-Pr(1)-O(37)	137.60(16)	O(13)-Pr(2)-O(2)	115.60(18)
O(9)$^{\#2}$-Pr(1)-O(37)	65.79(14)	O(26)-Pr(2)-O(2)	77.06(13)
O(1)-Pr(1)-O(37)	82.79(15)	O(38)-Pr(2)-O(2)	129.61(13)
O(8)-Pr(1)-O(2)	68.42(13)	O(33)$^{\#3}$-Pr(3)-O(3)	80.83(13)
O(27)-Pr(1)-O(2)	77.52(13)	O(33)$^{\#3}$-Pr(3)-O(25)	79.27(15)
O(16)$^{\#1}$-Pr(1)-O(2)	152.24(17)	O(3)-Pr(3)-O(25)	80.47(19)
O(20)-Pr(1)-O(2)	76.32(13)	O(33)$^{\#3}$-Pr(3)-O(32)	130.65(12)
O(9)$^{\#2}$-Pr(1)-O(2)	122.35(12)	O(3)-Pr(3)-O(32)	148.52(13)
O(1)-Pr(1)-O(2)	47.55(11)	O(25)-Pr(3)-O(32)	103.33(17)
O(37)-Pr(1)-O(2)	118.91(13)	O(33)$^{\#3}$-Pr(3)-O(14)	147.94(13)
O(22)$^{\#4}$-Pr(3)-O(21)$^{\#4}$	47.33(11)	O(3)-Pr(3)-O(14)	72.94(15)
O(39)-Pr(3)-O(21)$^{\#4}$	116.07(13)	O(25)-Pr(3)-O(14)	113.27(17)
O(26)-Pr(3)-O(21)$^{\#4}$	148.16(10)	O(32)-Pr(3)-O(14)	77.04(14)
O(10)$^{\#5}$-Pr(4)-O(4)	80.91(15)	O(33)$^{\#3}$-Pr(3)-O(22)$^{\#4}$	76.98(14)
O(10)$^{\#5}$-Pr(4)-O(34)$^{\#3}$	139.94(13)	O(3)-Pr(3)-O(22)$^{\#4}$	118.49(15)
O(4)-Pr(4)-O(34)$^{\#3}$	99.48(15)	O(25)-Pr(3)-O(22)$^{\#4}$	146.23(15)
O(10)$^{\#5}$-Pr(4)-O(28)$^{\#4}$	91.74(14)	O(32)-Pr(3)-O(22)$^{\#4}$	75.43(13)
O(28)$^{\#4}$-Pr(4)-O(15)	98.75(17)	O(14)-Pr(3)-O(22)$^{\#4}$	99.49(17)
O(28)$^{\#4}$-Pr(4)-O(21)$^{\#4}$	96.86(14)	O(33)$^{\#3}$-Pr(3)-O(39)	70.27(14)
O(15)-Pr(4)-O(21)$^{\#4}$	73.64(13)	O(3)-Pr(3)-O(39)	142.35(16)
O(10)$^{\#5}$-Pr(4)-O(40)	69.21(13)	O(25)-Pr(3)-O(39)	71.05(17)
O(4)-Pr(4)-O(40)	91.4(2)	O(32)-Pr(3)-O(39)	64.66(14)
O(28)$^{\#4}$-Pr(4)-O(40)	76.11(15)	O(14)-Pr(3)-O(39)	141.00(15)
O(15)-Pr(4)-O(40)	141.67(13)	O(22)$^{\#4}$-Pr(3)-O(39)	78.50(15)
O(21)$^{\#4}$-Pr(4)-O(40)	144.29(12)	O(33)$^{\#3}$-Pr(3)-O(26)	127.09(12)

O(4)-Pr(4)-O(28)$^{\#4}$	167.2(2)	O(3)-Pr(3)-O(26)	82.66(14)
O(34)$^{\#3}$-Pr(4)-O(28)$^{\#4}$	79.38(13)	O(25)-Pr(3)-O(26)	48.48(13)
O(10)$^{\#5}$-Pr(4)-O(15)	73.07(15)	O(32)-Pr(3)-O(26)	77.47(13)
O(4)-Pr(4)-O(15)	89.2(2)	O(14)-Pr(3)-O(26)	67.91(15)
O(34)$^{\#3}$-Pr(4)-O(15)	146.65(14)	O(22)$^{\#4}$-Pr(3)-O(26)	152.13(13)
O(10)$^{\#5}$-Pr(4)-O(21)$^{\#4}$	146.50(13)	O(39)-Pr(3)-O(26)	95.71(14)
O(4)-Pr(4)-O(21)$^{\#4}$	95.00(17)	O(33)$^{\#3}$-Pr(3)-O(21)$^{\#4}$	67.13(11)
O(34)$^{\#3}$-Pr(4)-O(21)$^{\#4}$	73.56(12)	O(3)-Pr(3)-O(21)$^{\#4}$	71.17(14)
O(14)-Pr(3)-O(21)$^{\#4}$	86.86(14)	O(25)-Pr(3)-O(21)$^{\#4}$	138.59(16)
O(34)$^{\#3}$-Pr(4)-O(40)	70.73(12)	O(32)-Pr(3)-O(21)$^{\#4}$	116.69(13)
3			
La(1)-O(7)	2.408(3)	La(1)-O(1)	2.562(3)
La(1)-O(8)$^{\#1}$	2.480(3)	La(1)-O(14)	2.583(4)
La(1)-O(9)$^{\#2}$	2.485(4)	La(1)-O(2)	2.584(4)
La(1)-O(10)$^{\#3}$	2.493(4)	La(1)-O(13)	2.539(3)
O(7)-La(1)-O(8)$^{\#1}$	100.87(12)	O(13)-La(1)-O(2)	144.12(11)
O(7)-La(1)-O(9)$^{\#2}$	150.73(14)	O(1)-La(1)-O(2)	50.77(10)
O(8)$^{\#1}$-La(1)-O(9)$^{\#2}$	74.44(13)	O(14)-La(1)-O(2)	127.97(14)
O(7)-La(1)-O(10)$^{\#3}$	90.02(12)	O(8)$^{\#1}$-La(1)-O(2)	73.71(13)
O(8)$^{\#1}$-La(1)-O(10)$^{\#3}$	145.90(13)	O(9)$^{\#2}$-La(1)-O(2)	127.78(12)
O(9)$^{\#2}$-La(1)-O(10)$^{\#3}$	110.21(13)	O(10)$^{\#3}$-La(1)-O(2)	77.92(13)
O(7)-La(1)-O(13)	83.56(12)	O(13)-La(1)-O(14)	69.75(14)
O(8)$^{\#1}$-La(1)-O(13)	139.93(13)	O(1)-La(1)-O(14)	147.03(12)
O(9)$^{\#2}$-La(1)-O(13)	82.59(12)	O(7)-La(1)-O(2)	75.88(12)
O(10)$^{\#3}$-La(1)-O(13)	72.94(12)	O(10)$^{\#3}$-La(1)-O(14)	139.75(13)
O(7)-La(1)-O(1)	125.87(12)	O(13)-La(1)-O(1)	133.79(11)
O(8)$^{\#1}$-La(1)-O(1)	75.00(13)	O(7)-La(1)-O(14)	71.49(13)
O(9)$^{\#2}$-La(1)-O(1)	81.54(13)	O(8)$^{\#1}$-La(1)-O(14)	74.04(14)
O(10)$^{\#3}$-La(1)-O(1)	72.50(11)	O(9)$^{\#2}$-La(1)-O(14)	79.55(14)
4			
Pr(1)-O(10)$^{\#1}$	2.391(2)	Pr(1)-O(13)	2.510(2)
Pr(1)-O(7)	2.412(2)	Pr(1)-O(14)	2.535(2)
Pr(1)-O(8)$^{\#2}$	2.430(2)	Pr(1)-O(1)	2.534(2)
Pr(1)-O(9)$^{\#3}$	2.482(2)	Pr(1)-O(2)	2.551(2)
O(10)$^{\#1}$-Pr(1)-O(7)	89.15(8)	O(13)-Pr(1)-O(2)	145.17(6)
O(10)$^{\#1}$-Pr(1)-O(8)$^{\#2}$	158.25(8)	O(14)-Pr(1)-O(2)	129.45(8)
O(7)-Pr(1)-O(8)$^{\#2}$	102.35(8)	O(1)-Pr(1)-O(2)	51.43(7)
O(10)$^{\#1}$-Pr(1)-O(9)$^{\#3}$	104.60(7)	O(14)-Pr(1)-O(1)	148.63(7)
O(7)-Pr(1)-O(9)$^{\#3}$	147.53(7)	O(10)$^{\#1}$-Pr(1)-O(2)	75.86(8)
O(8)$^{\#2}$-Pr(1)-O(9)$^{\#3}$	75.39(8)	O(7)-Pr(1)-O(2)	77.98(8)
O(10)$^{\#1}$-Pr(1)-O(13)	88.61(8)	O(8)$^{\#2}$-Pr(1)-O(2)	124.30(8)
O(7)-Pr(1)-O(13)	70.70(8)	O(9)$^{\#3}$-Pr(1)-O(2)	77.18(8)
O(8)$^{\#2}$-Pr(1)-O(13)	78.13(8)	O(9)$^{\#3}$-Pr(1)-O(1)	75.83(7)
O(9)$^{\#3}$-Pr(1)-O(13)	137.47(8)	O(13)-Pr(1)-O(1)	127.79(7)

O(10)$^{\#1}$-Pr(1)-O(14)	71.94(9)	O(13)-Pr(1)-O(14)	71.52(7)
O(7)-Pr(1)-O(14)	137.86(7)	O(10)$^{\#1}$-Pr(1)-O(1)	126.31(8)
O(8)$^{\#2}$-Pr(1)-O(14)	87.42(9)	O(7)-Pr(1)-O(1)	72.39(7)
O(9)$^{\#3}$-Pr(1)-O(14)	74.60(8)	O(8)$^{\#2}$-Pr(1)-O(1)	75.17(8)
5			
Nd(1)-O(1)	2.3751(16)	Nd(1)-O(7)	2.5057(17)
Nd(1)-O(4)$^{\#1}$	2.4039(16)	Nd(1)-O(8)	2.5422(15)
Nd(1)-O(3)$^{\#2}$	2.4209(16)	Nd(1)-O(13)	2.5351(18)
Nd(1)-O(2)$^{\#3}$	2.4489(16)	Nd(1)-O(14)	2.4921(16)
O(1)-Nd(1)-O(4)$^{\#1}$	89.36(5)	O(2)$^{\#3}$-Nd(1)-O(13)	74.15(6)
O(1)-Nd(1)-O(3)$^{\#2}$	154.72(5)	O(14)-Nd(1)-O(13)	71.04(6)
O(4)$^{\#1}$-Nd(1)-O(3)$^{\#2}$	105.24(5)	O(7)-Nd(1)-O(13)	147.20(5)
O(1)-Nd(1)-O(2)$^{\#3}$	102.88(6)	O(8)-Nd(1)-O(13)	129.66(6)
O(4)$^{\#1}$-Nd(1)-O(2)$^{\#3}$	147.14(5)	O(1)-Nd(1)-C(15)	102.06(7)
O(3)$^{\#2}$-Nd(1)-O(2)$^{\#3}$	76.02(6)	O(14)-Nd(1)-O(8)	144.57(5)
O(1)-Nd(1)-O(14)	86.11(6)	O(7)-Nd(1)-O(8)	51.84(4)
O(4)$^{\#1}$-Nd(1)-O(14)	70.95(5)	O(1)-Nd(1)-O(13)	72.35(6)
O(3)$^{\#2}$-Nd(1)-O(14)	79.57(6)	O(4)$^{\#1}$-Nd(1)-O(13)	138.62(5)
O(2)$^{\#3}$-Nd(1)-O(14)	139.31(6)	O(3)$^{\#2}$-Nd(1)-O(13)	83.28(6)
O(1)-Nd(1)-O(7)	127.52(6)	O(2)$^{\#3}$-Nd(1)-O(8)	75.42(6)
O(4)$^{\#1}$-Nd(1)-O(7)	72.75(5)	O(1)-Nd(1)-O(8)	76.61(6)
O(3)$^{\#2}$-Nd(1)-O(7)	77.18(6)	O(4)$^{\#1}$-Nd(1)-O(8)	78.06(6)
O(2)$^{\#3}$-Nd(1)-O(7)	75.70(6)	O(3)$^{\#2}$-Nd(1)-O(8)	126.04(5)
O(14)-Nd(1)-O(7)	129.31(5)		
6			
Sm-O(2)$^{\#1}$	2.315(4)	Sm-O(4)$^{\#4}$	2.457(4)
Sm-O(1)	2.321(4)	Sm-O(7)	2.457(4)
Sm-O(9)$^{\#2}$	2.327(4)	Sm-O(3)$^{\#4}$	2.454(4)
Sm-O(8)$^{\#3}$	2.388(4)	Sm-O(8)	2.838(4)
O(2)$^{\#1}$-Sm-O(1)	83.79(14)	O(7)-Sm-O(8)	48.61(12)
O(2)$^{\#1}$-Sm-O(9)$^{\#2}$	84.51(15)	C(8)$^{\#4}$-Sm-O(8)	67.86(14)
O(1)-Sm-O(9)$^{\#2}$	82.34(17)	O(2)$^{\#1}$-Sm-O(8)	154.28(13)
O(2)$^{\#1}$-Sm-O(8)$^{\#3}$	95.12(15)	O(1)-Sm-O(8)	108.77(14)
O(1)-Sm-O(8)$^{\#3}$	76.28(16)	O(9)$^{\#2}$-Sm-O(8)	118.70(13)
O(9)$^{\#2}$-Sm-O(8)$^{\#3}$	158.52(16)	O(8)$^{\#3}$-Sm-O(8)	67.55(15)
O(2)$^{\#1}$-Sm-O(3)$^{\#4}$	106.56(15)	O(3)$^{\#4}$-Sm-O(8)	67.34(14)
O(1)-Sm-O(3)$^{\#4}$	163.33(14)	O(4)$^{\#4}$-Sm-O(8)	78.61(13)
O(9)$^{\#2}$-Sm-O(3)$^{\#4}$	85.64(15)	O(2)$^{\#1}$-Sm-O(7)	157.10(14)
O(8)$^{\#3}$-Sm-O(3)$^{\#4}$	114.81(14)	O(1)-Sm-O(7)	84.65(15)
O(2)$^{\#1}$-Sm-O(4)$^{\#4}$	78.23(14)	O(9)$^{\#2}$-Sm-O(7)	74.39(14)
O(1)-Sm-O(4)$^{\#4}$	143.02(15)	O(8)$^{\#3}$-Sm-O(7)	101.24(14)
O(9)$^{\#2}$-Sm-O(4)$^{\#4}$	127.01(17)	O(3)$^{\#4}$-Sm-O(7)	81.01(15)
O(8)$^{\#3}$-Sm-O(4)$^{\#4}$	73.50(15)	O(4)$^{\#4}$-Sm-O(7)	121.70(14)
O(3)$^{\#4}$-Sm-O(4)$^{\#4}$	53.44(14)		

7			
Eu(1)-O(8)	2.300(3)	Eu(1)-O(9)$^{\#4}$	2.456(3)
Eu(1)-O(7)$^{\#1}$	2.313(3)	Eu(1)-O(2)	2.850(3)
Eu(1)-O(3)$^{\#2}$	2.315(3)	Eu(1)-O(10)$^{\#4}$	2.439(3)
Eu(1)-O(2)$^{\#3}$	2.374(3)	Eu(1)-O(1)	2.437(3)
O(8)-Eu(1)-O(7)$^{\#1}$	83.93(9)	O(10)$^{\#4}$-Eu(1)-O(2)	67.31(9)
O(8)-Eu(1)-O(3)$^{\#2}$	84.37(10)	O(1)-Eu(1)-O(2)	48.42(8)
O(7)$^{\#1}$-Eu(1)-O(3)$^{\#2}$	82.17(11)	O(9)$^{\#4}$-Eu(1)-O(2)	78.13(9)
O(8)-Eu(1)-O(2)$^{\#3}$	95.86(10)	O(2)$^{\#3}$-Eu(1)-O(2)	67.06(9)
O(7)$^{\#1}$-Eu(1)-O(2)$^{\#3}$	76.37(10)	O(8)-Eu(1)-O(2)	154.01(9)
O(3)$^{\#2}$-Eu(1)-O(2)$^{\#3}$	158.38(10)	O(7)$^{\#1}$-Eu(1)-O(2)	109.20(9)
O(8)-Eu(1)-O(10)$^{\#4}$	106.15(10)	O(3)$^{\#2}$-Eu(1)-O(2)	118.88(9)
O(7)$^{\#1}$-Eu(1)-O(10)$^{\#4}$	163.24(10)	O(10)$^{\#4}$-Eu(1)-O(1)	81.24(10)
O(3)$^{\#2}$-Eu(1)-O(10)$^{\#4}$	85.50(10)	O(8)-Eu(1)-O(9)$^{\#4}$	78.29(9)
O(2)$^{\#3}$-Eu(1)-O(10)$^{\#4}$	114.93(9)	O(7)$^{\#1}$-Eu(1)-O(9)$^{\#4}$	143.24(10)
O(8)-Eu(1)-O(1)	157.56(10)	O(3)$^{\#2}$-Eu(1)-O(9)$^{\#4}$	127.00(11)
O(7)$^{\#1}$-Eu(1)-O(1)	84.63(9)	O(2)$^{\#3}$-Eu(1)-O(9)$^{\#4}$	73.81(10)
O(3)$^{\#2}$-Eu(1)-O(1)	74.99(10)	O(10)$^{\#4}$-Eu(1)-O(9)$^{\#4}$	53.36(9)
O(2)$^{\#3}$-Eu(1)-O(1)	100.11(9)	O(1)-Eu(1)-O(9)$^{\#4}$	121.30(9)
8			
Tb(1)-O(3)$^{\#1}$	2.278(4)	Tb(1)-O(7)	2.399(4)
Tb(1)-O(4)$^{\#2}$	2.280(4)	Tb(1)-O(1)	2.413(4)
Tb(1)-O(9)$^{\#3}$	2.286(4)	Tb(1)-O(2)	2.432(4)
Tb(1)-O(8)$^{\#4}$	2.328(4)		
O(3)$^{\#1}$-Tb(1)-O(4)$^{\#2}$	84.20(14)	O(9)$^{\#3}$-Tb(1)-O(1)$^{\#5}$	85.27(14)
O(3)$^{\#1}$-Tb(1)-O(9)$^{\#3}$	85.49(15)	O(8)$^{\#4}$-Tb(1)-O(1)$^{\#5}$	115.04(14)
O(4)$^{\#2}$-Tb(1)-O(9)$^{\#3}$	82.16(16)	O(7)-Tb(1)-O(1)$^{\#5}$	79.95(14)
O(3)$^{\#1}$-Tb(1)-O(8)$^{\#4}$	95.91(15)	O(1)-Tb(1)-O(1)$^{\#5}$	0.00(17)
O(4)$^{\#2}$-Tb(1)-O(8)$^{\#4}$	76.12(15)	O(3)$^{\#1}$-Tb(1)-O(2)	77.92(14)
O(9)$^{\#3}$-Tb(1)-O(8)$^{\#4}$	157.95(15)	O(4)$^{\#2}$-Tb(1)-O(2)	143.37(15)
O(3)$^{\#1}$-Tb(1)-O(7)	159.88(15)	O(9)$^{\#3}$-Tb(1)-O(2)	127.23(16)
O(4)$^{\#2}$-Tb(1)-O(7)	85.30(14)	O(8)$^{\#4}$-Tb(1)-O(2)	74.27(15)
O(9)$^{\#3}$-Tb(1)-O(7)	76.09(15)	O(7)-Tb(1)-O(2)	119.80(14)
O(8)$^{\#4}$-Tb(1)-O(7)	98.18(15)	O(1)-Tb(1)-O(2)	53.84(13)
O(3)$^{\#1}$-Tb(1)-O(1)	106.87(14)	O(1)$^{\#5}$-Tb(1)-O(2)	53.84(13)
O(4)$^{\#2}$-Tb(1)-O(1)	162.55(15)	O(7)-Tb(1)-O(1)	79.95(14)
O(9)$^{\#3}$-Tb(1)-O(1)	85.27(14)	O(3)$^{\#1}$-Tb(1)-O(1)$^{\#5}$	106.87(14)
O(8)$^{\#4}$-Tb(1)-O(1)	115.04(14)	O(4)$^{\#2}$-Tb(1)-O(1)$^{\#5}$	162.55(15)
9			
Ho(1)-O(8)	2.248(3)	Ho(1)-O(2)	2.291(3)
Ho(1)-O(7)$^{\#1}$	2.256(3)	Ho(1)-O(1)$^{\#2}$	2.365(3)
Ho(1)-O(3)$^{\#1}$	2.265(3)	Ho(1)-O(10)$^{\#3}$	2.378(3)
Ho(1)-O(9)$^{\#3}$	2.419(3)		
O(8)-Ho(1)-O(7)$^{\#1}$	85.10(11)	O(1)$^{\#2}$-Ho(1)-O(10)$^{\#3}$	78.85(11)

O(8)-Ho(1)-O(3)$^{\#1}$	86.02(12)	O(8)-Ho(1)-O(9)$^{\#3}$	77.76(11)
O(7)$^{\#1}$-Ho(1)-O(3)$^{\#1}$	81.59(13)	O(7)#1-Ho(1)-O(9)$^{\#3}$	143.75(12)
O(8)-Ho(1)-O(2)	96.94(12)	O(3)$^{\#1}$-Ho(1)-O(9)$^{\#3}$	127.96(13)
O(7)$^{\#1}$-Ho(1)-O(2)	76.16(12)	O(2)-Ho(1)-O(9)$^{\#3}$	74.55(12)
O(3)$^{\#1}$-Ho(1)-O(2)	157.18(12)	O(1)$^{\#2}$-Ho(1)-O(9)$^{\#3}$	117.74(11)
O(8)-Ho(1)-O(1)$^{\#2}$	162.45(12)	O(10)$^{\#3}$-Ho(1)-O(9)$^{\#3}$	54.48(11)
O(7)$^{\#1}$-Ho(1)-O(1)$^{\#2}$	85.75(11)	O(8)-Ho(1)-O(10)$^{\#3}$	106.84(12)
O(3)$^{\#1}$-Ho(1)-O(1)$^{\#2}$	77.84(12)	O(7)$^{\#1}$-Ho(1)-O(10)#3	161.45(12)
O(2)-Ho(1)-O(1)$^{\#2}$	95.37(11)	O(3)$^{\#1}$-Ho(1)-O(10)$^{\#3}$	85.08(12)
O(2)-Ho(1)-O(10)$^{\#3}$	115.28(11)		
10			
Yb(1)-O(4)$^{\#1}$	2.213(5)	Yb(1)-O(10)$^{\#4}$	2.329(5)
Yb(1)-O(3)$^{\#2}$	2.224(5)	Yb(1)-O(1)	2.349(6)
Yb(1)-O(8)	2.228(6)	Yb(1)-O(2)	2.392(5)
Yb(1)-O(9)$^{\#3}$	2.241(6)		
O(4)$^{\#1}$-Yb(1)-O(3)$^{\#2}$	85.3(2)	O(10)$^{\#4}$-Yb(1)-O(2)	115.21(19)
O(4)$^{\#1}$-Yb(1)-O(8)	81.7(2)	O(1)-Yb(1)-O(2)	54.86(19)
O(3)$^{\#2}$-Yb(1)-O(8)	87.3(2)	O(3)$^{\#2}$-Yb(1)-O(10)$^{\#4}$	165.7(2)
O(4)$^{\#1}$-Yb(1)-O(9)$^{\#3}$	76.6(2)	O(8)-Yb(1)-O(10)$^{\#4}$	79.9(2)
O(3)$^{\#2}$-Yb(1)-O(9)$^{\#3}$	97.3(2)	O(9)$^{\#3}$-Yb(1)-O(10)$^{\#4}$	92.1(2)
O(8)-Yb(1)-O(9)$^{\#3}$	157.3(2)	O(4)$^{\#1}$-Yb(1)-O(1)	160.3(2)
O(4)$^{\#1}$-Yb(1)-O(10)$^{\#4}$	86.4(2)	O(3)$^{\#2}$-Yb(1)-O(1)	108.0(2)
O(10)$^{\#4}$-Yb(1)-O(1)	77.4(2)	O(8)-Yb(1)-O(1)	84.4(2)
O(4)$^{\#1}$-Yb(1)-O(2)	144.4(2)	O(9)$^{\#3}$-Yb(1)-O(1)	114.7(2)
O(3)$^{\#2}$-Yb(1)-O(2)	77.9(2)	O(8)-Yb(1)-O(2)	127.9(2)
O(9)$^{\#3}$-Yb(1)-O(2)	74.7(2)		

Symmetry transformations used to generate equivalent atoms:

For **1**: （#1） x-1, y+1, z; (#2) -x, -y+2, -z+1; (#3) -x+1, -y+1, -z; (#4) x+1, y-1, z; (#5) -x+1, -y+1, -z+1. For **2**: （#1） x+1, y-1, z; (#2) -x+1, -y, -z+1; (#3) -x, -y+1, -z+2; (#4) x-1, y+1, z; (#5) -x, -y+1, -z+1. For 3: (#1) -x+2, -y+2, -z+1; (#2) x-1, y-1, z; (#3) -x+2, -y+3, -z+1. For **4**: (#1) -x+1, -y+2, -z+1; (#2) -x+1, -y+1, -z+1; (#3) x+1, y-1, z. For **5**: (#1) -x+2, -y+1, -z+1; (#2) x-1, y-1, z; (#3) -x+2, -y, -z+1. For **6**: (#1) -x+2, -y+1, -z+1; (#2) x+1, y, z; (#3) -x+1, -y+1, -z+1; (#4) x-1, y+1, z. For **7**: (#1) -x+2, -y+1, -z+1; (#2) x+1, y, z; (#3) -x+1, -y+1, -z+1; (#4) -x+1,- y+2, -z+1). For **8**: (#1) -x+1, -y+2, -z+1; (#2) x+1, y-1, z; (#3) x+1, y, z; (#4) -x+1, -y+1, -z+1; (#5) x, y, z. For 9: (#1) -x+2, -y+1, -z+1; (#2) -x+1, -y+1, -z+1; (#3) -x+1, -y+2, -z+1; For **10**: (#1) x+1, y-1, z; (#2) -x+1, -y+2, -z+1; (#3) -x+2, -y+1, -z+1; (#4) x-1, y, z.

Table S2. Hydrogen bonds for **1-10** [Å and °]

D-H···A	d(D-H)	d(H···A)	d(D···A)	<(DHA)
1				
C(2)-H(2A)···O(27)$^{\#1}$	0.93	2.54	3.452(7)	165.5
C(53)-H(53A)···O(33)$^{\#2}$	0.93	2.57	3.474(7)	163.0
C(57)-H(57A)···O(17)$^{\#3}$	0.93	2.29	3.042(8)	137.5
C(56)-H(56A)···O(35)$^{\#4}$	0.93	2.33	3.218(8)	159.6
C(49)-H(49A)···O(15)$^{\#5}$	0.93	2.66	3.566(8)	163.8
C(49)-H(49A)···O(16)$^{\#6}$	0.93	2.58	3.391(8)	146.1
2				
C(54)-H(54A)···O(11)$^{\#1}$	0.93	2.33	3.044(8)	133.2
C(26)-H(26A)···O(15)$^{\#1}$	0.93	2.51	3.412(7)	165.0
C(52)-H(52A)···O(1)$^{\#2}$	0.93	2.72	3.540(8)	148.2
C(42)-H(42A)···O(39)$^{\#3}$	0.93	2.66	3.565(7)	165.2
C(53)-H(53A)···O(9)$^{\#4}$	0.93	2.63	3.536(8)	163.9
C(10)-H(10A)···O(18)$^{\#5}$	0.93	2.59	2.977(7)	105.6
C(49)-H(49A)···O(32)$^{\#6}$	0.93	2.59	3.489(8)	163.6
C(58)-H(58A)···O(36)$^{\#7}$	0.93	2.32	3.197(9)	157.8
3				
N(3)-H(3A)···O(3)$^{\#1}$	0.86	1.68	2.439(11)	146.4
C(12)-H(12)···O(2)$^{\#2}$	0.93	2.54	3.458(6)	170.2
4				
C(12)-H(12A)···O(13)$^{\#1}$	0.93	2.72	3.649(4)	178.0
N(3)-H(3A)···O(3)$^{\#2}$	0.86	1.76	2.531(6)	147.9
C(20)-H(20A)···O(16)$^{\#3}$	0.93	2.39	3.291(7)	164.1
C(21)-H(21A)···O(15)$^{\#4}$	0.93	2.50	3.046(7)	117.8
5				
C(18)-H(18A)···O(15)$^{\#1}$	0.93	2.60	3.50(2)	164.2
C(4)-H(4A)···O(8)$^{\#2}$	0.93	2.59	3.501(6)	167.7
C(21)-H(21A)···O(16)$^{\#3}$	0.93	2.41	2.96(3)	117.5
C(20)-H(20A)···O(15)$^{\#3}$	0.93	2.16	3.07(2)	167.2
N(3)-H(3A)···O(9)$^{\#4}$	0.86	1.73	2.493(13)	146.8
6				
N(3)-H(3A)···O(10)$^{\#1}$	0.86	1.70	2.540(7)	166.5
C(17)-H(17A)···O(12)$^{\#2}$	0.93	2.70	3.609(9)	164.4
C(18)-H(18A)···O(5)$^{\#2}$	0.93	2.32	3.061(9)	136.6
C(20)-H(20A)···O(11)$^{\#3}$	0.93	2.62	3.154(9)	116.9
C(21)-H(21A)···O(3)$^{\#4}$	0.93	2.29	3.082(7)	143.1
C(2)-H(2A)···O(4)$^{\#5}$	0.93	2.55	3.432(7)	159.1
7				
N(3)-H(3A) ···O(4)$^{\#1}$	0.86	1.69	2.537(4)	166.7
C(17)-H(17A) ···O(6)$^{\#2}$	0.93	2.70	3.611(6)	165.0

C(18)-H(18A) ···O(11)$^{\#3}$	0.93	2.31	3.058(6)	136.8
C(21)-H(21A) ···O(10)$^{\#4}$	0.93	2.29	3.094(5)	144.4
C(20)-H(20A) ···O(5)$^{\#5}$	0.93	2.64	3.176(6)	117.1
C(14)-H(14A) ···O(1)$^{\#6}$	0.93	2.66	3.549(4)	160.9
C(6)-H(6A)···O(12)$^{\#6}$	0.93	2.39	3.200(5)	145.6
8				
N(3)-H(3A)···O(10)$^{\#1}$	0.86	1.70	2.544(6)	166.8
C(17)-H(17A)···O(1)$^{\#2}$	0.93	2.29	3.095(7)	144.6
C(18)-H(18A)···O(11)$^{\#3}$	0.93	2.70	3.204(9)	114.9
C(21)-H(21A) ···O(12)$^{\#4}$	0.93	2.69	3.597(9)	164.3
C(14)-H(14A)···O(5)$^{\#5}$	0.93	2.38	3.199(8)	146.6
C(4)-H(4A)···O(7)$^{\#6}$	0.93	2.68	3.579(6)	162.1
C(2)-H(2A)···O(2)$^{\#7}$	0.93	2.51	3.385(6)	157.7
9				
N(3)-H(3A)···O(4)$^{\#1}$	0.86	1.68	2.527(5)	167.4
C(18)-H(18A)···O(5)$^{\#2}$	0.93	2.72	3.221(7)	114.9
C(21)-H(21A)···O(6)$^{\#3}$	0.93	2.69	3.591(7)	164.2
C(17)-H(17A)···O(10)$^{\#2}$	0.93	2.29	3.097(6)	145.3
C(20)-H(20A)···O(11)$^{\#4}$	0.93	2.31	3.051(7)	136.8
C(14)-H(14A)···O(1)$^{\#5}$	0.93	2.71	3.613(5)	163.5
C(6)-H(6A)···O(12)$^{\#6}$	0.93	2.40	3.214(6)	146.0
10				
C(12)-H(12A)···O(6)$^{\#1}$	0.93	2.34	3.068(12)	134.7
C(13)-H(13A)···O(11)$^{\#2}$	0.93	2.67	3.574(13)	164.4
C(9)-H(9A)···O(1)	0.93	2.30	3.105(11)	145.0
N(3)-H(3A)···O(7)	0.86	1.71	2.553(9)	167.1

Symmetry transformations used to generate equivalent atoms:

For **1**: (#1) x-1, y+1, z; (#2) -x+1, -y+1, -z; (#3) -x+1, -y, -z+1; (#4) -x+2, -y, -z; (#5) -x, -y+1, -z+1. For **2**: (#1) x+1, y-1, z; (#2) -x+1, -y, -z+1; (#3) -x, -y+1, -z+2; (#4) x, y, z; (#5) -x+1, -y+1, -z+1; (#6) -x+2, -y, -z+1. For **3**: (#1) x-1, y-1, z+1; (#2) -x+2, -y+3, -z+1 For **4**: (#1) -x+1, -y+2, -z+1; (#2) x, y, z-1; (#3) -x+1, -y+2, -z; (#4) -x+2, -y+1, -z. For **5**: (#1) x, y, z; (#2) -x+2, -y+1, -z+1; (#3) -x+1, -y+1, -z+2; (#4) x-1, y, z+1. For **6**: (#1) x+1, y, z; (#2) -x+1, -y, -z+2; (#3) x, y+1, z; (#4) x-1, y+1, z; (#5) -x+3, -y, -z+1. For **7**: (#1) -x, -y+1, -z+1; (#2) x, y+1, z-1; (#3) -x+2, -y+2, -z; (#4) x, y-1, z; (#5) -x+1, -y, -z+1; (#6) -x+2, -y+1, -z+1. For **8**: (#1) x+1, y, z; (#2) x, y, z; (#3) x, y+1, z; (#4) -x+1, -y, -z+2; (#5) x+1, y-1, z; (#6) x-1, y+1, z; (#7) -x+1, -y+2, -z+1. For **9**: (#1) -x+2, -y+1, -z+1; (#2) -x+1, -y+2, -z+1; (#3) x, y-1, z+1; (#4) x-1, y-1, z+1; (#5) x+1, y, z; (#6) x-1, y, z. For **10**: (#1) -x, -y+1, -z+2; (#2) -x+2, -y, -z+2.