Electronic Supplementary Information for

Effects of lanthanide metal size and amino ligand denticity on the solvothermal systems Ln/Sn/Se/en and Ln/Sn/Se/dien (Ln = lanthanide)

Jingjing Liang, Jiangfang Chen, Jing Zhao, Yingli Pan, Yong Zhang and Dingxian Jia*

College of Chemistry, Chemical Engineering and Materials Science, Soochow University, Suzhou 215123, People's Republic of China.

Syntheses of **1a**–**2c**

The title cpmplexes **1a**–**1d** and **2a**–**2c** were prepared by solvothermal methods from Ln/Sn/Se/en and Ln/Sn/Se/dien systems respectively. The solvothermal reaction produce crystalline samples with the yield of 55%–71%. The IR spectra of a single crystal sample and bulk material sample were recorded to examine the phase purity of bulk materials of the reactions. The IR spectra of complexes **1a** and **2a** are presented in Fig. S-IR1 and Fig. S-IR2 below, which show that the bulk crystalline samples of the solvothermal reactions are phase pure.

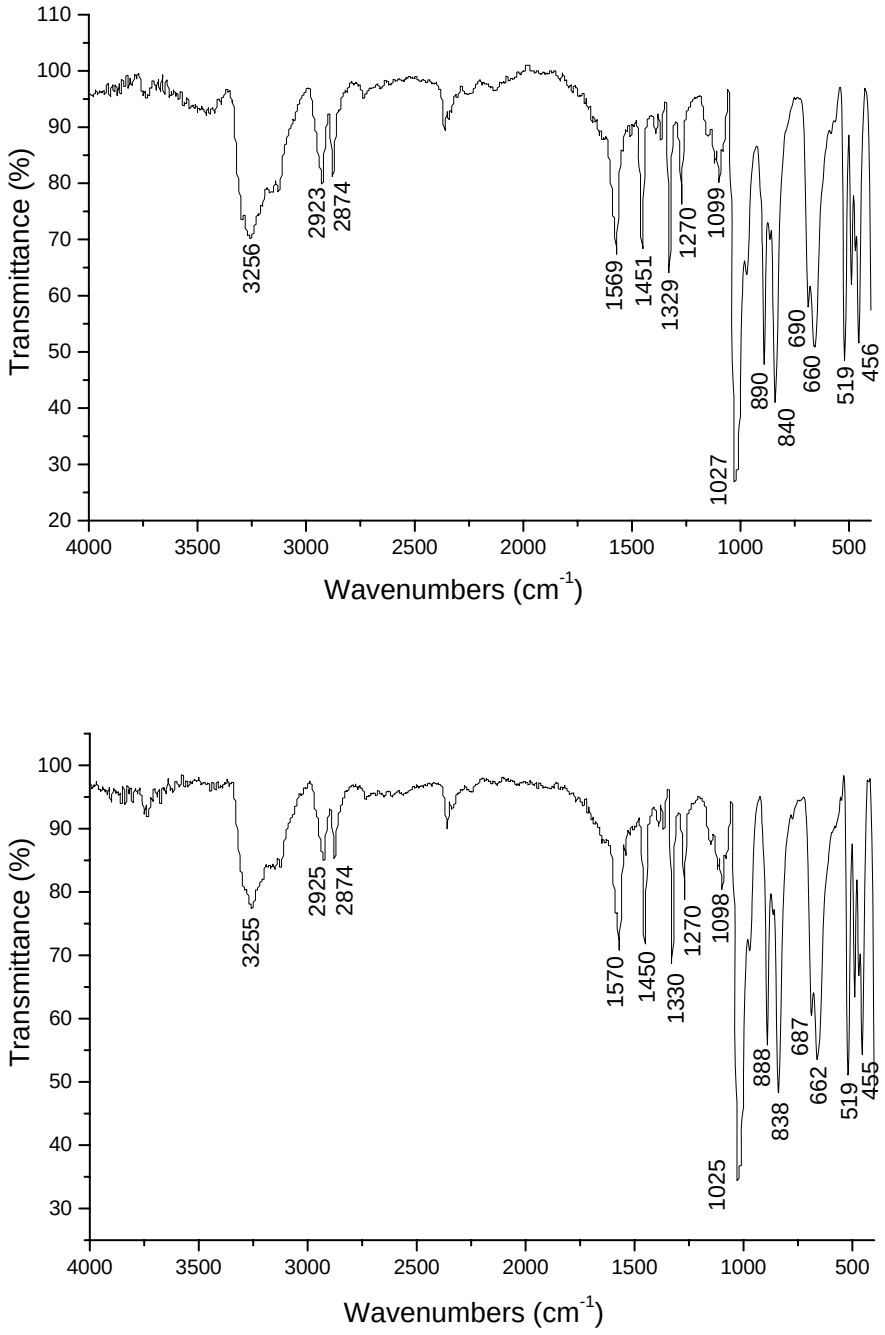

Fig. S-IR1. IR spectra of single crystal sample (top) and bulk material (bottom) of complex **1a**.

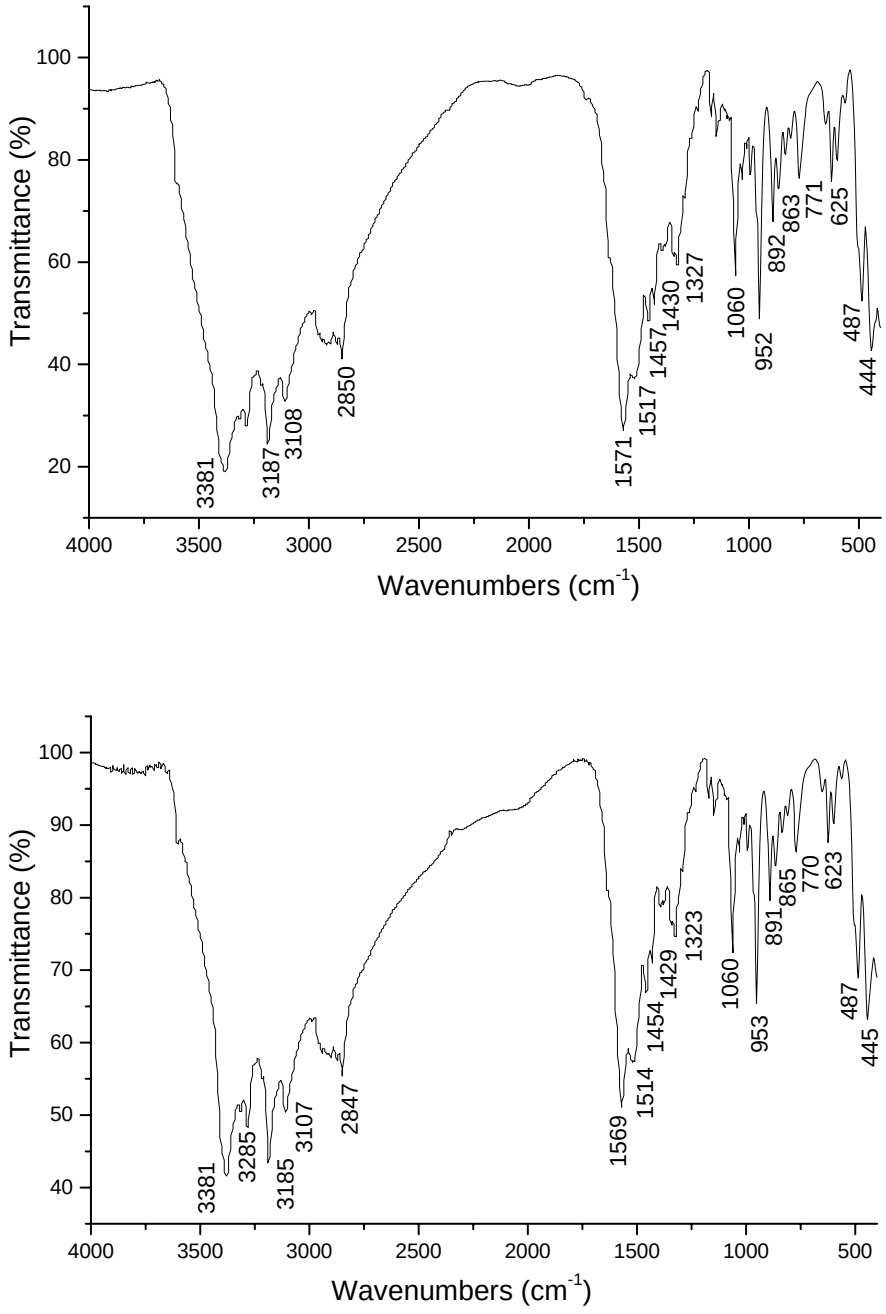

Fig. S-IR2. IR spectra of single crystal sample (top) and bulk material (bottom) of complex **2a**.

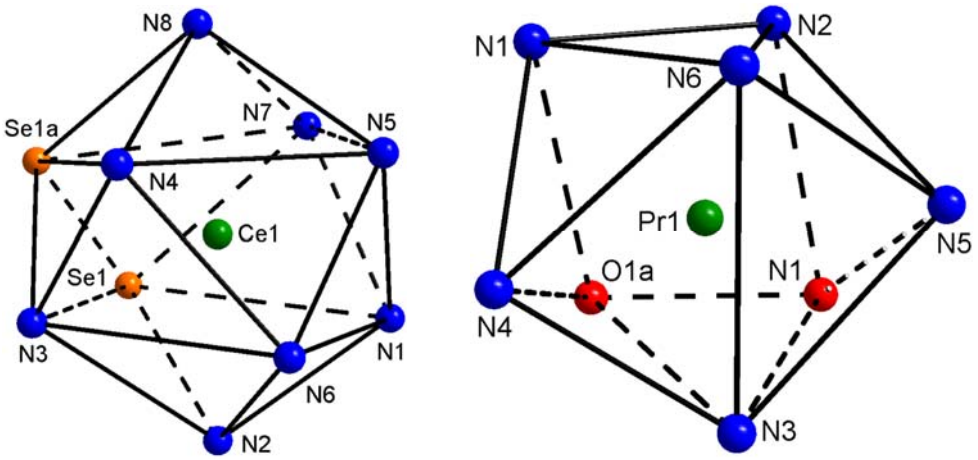

Fig. S1 The bicapped square antiprism of CeN_8Se_2 in **1a** (left) and bicapped trigonal prism of PrN_6O_2 in **1b** (right).

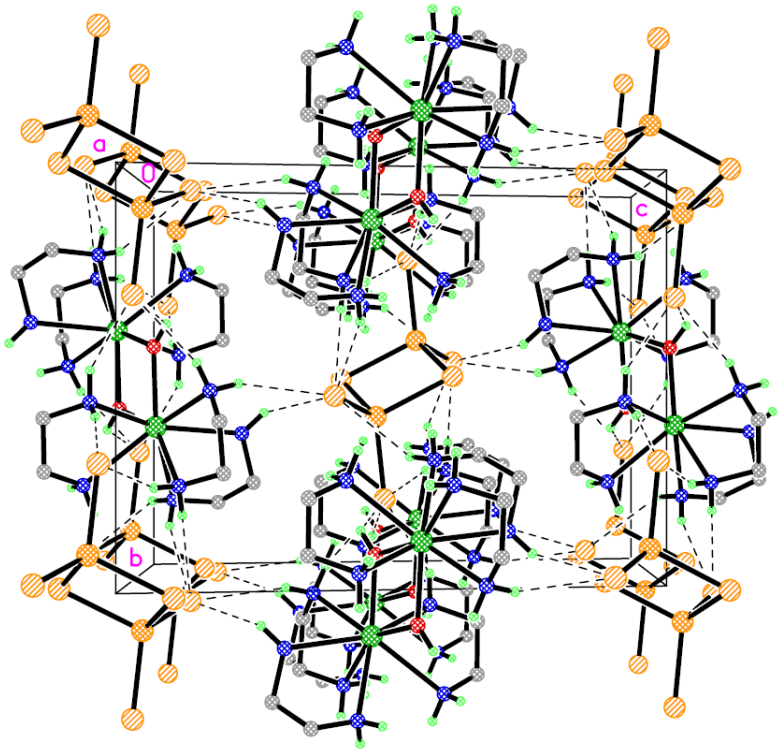

Fig. S2 A section of crystal packing in **1b** showing the N–H···Se interactions (shown in dashed lines).

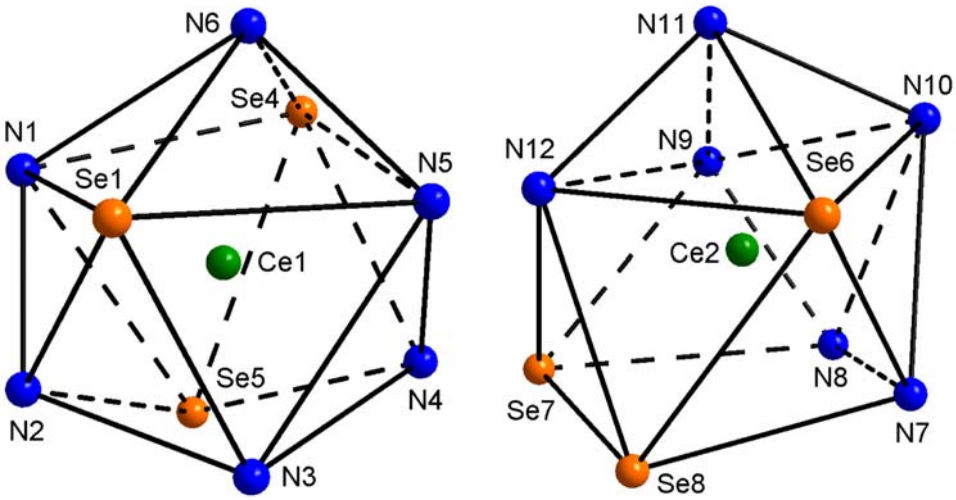

Fig. S3 The monocapped square antiprisms of Ce(1)N_6Se_3 (left) and Ce(2)N_6Se_3 (right) in **2a**.

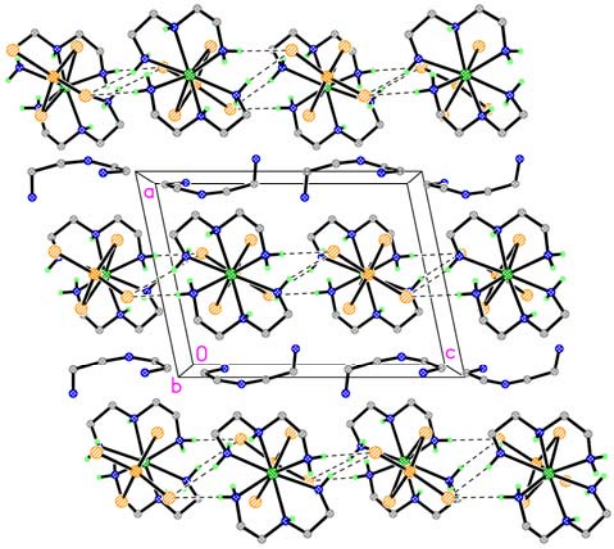

Fig. S4 Crystal packing diagram of **2c** viewed along *b* axis. Hydrogen atoms of CH_2 are omitted for clarity.

Table S1. Selected bond lengths (Å) and angles (°) for **1a**

Sn(1)–Se(2)	2.4567(6)	Sn(1)–Se(3)	2.4648(6)
Sn(1)–Se(4)	2.5870(6)	Sn(1)–Se(4)#1	2.5868(6)
Ce(1)–Se(1)	3.2183(6)	Ce(1)–Se(1)#2	3.3034(6)
Se(1)–Se(1)#2	2.3731(11)		
Ce(1)–N(1)	2.752(4)	Ce(1)–N(2)	2.822(4)
Ce(1)–N(3)	2.728(4)	Ce(1)–N(4)	2.750(4)
Ce (1)–N(5)	2.712(4)	Ce(1)–N(6)	2.735(4)
Ce(1)–N(7)	2.708(4)	Ce(1)–N(8)	2.769(4)
Se(2)–Sn(1)–Se(3)	114.40(2)	Se(4)–Sn(1)–Se(4)#1	94.410(17)
Se(2)–Sn(1)–Se(4)	110.83(2)	Se(3)–Sn(1)–Se(4)	110.565(19)
Se(3)–Sn(1)–Se(4)#1	106.55(2)	Se(2)–Sn(1)–Se(4)#1	118.29(2)
Sn(1)–Se(4)–Sn(1) #1	85.590(17)	Ce(1)–Se(1)–Ce(1)#2	137.349(18)
Se(1)#2–Se(1)–Ce(1)#2	66.76(2)	Se(1)#2–Se(1)–Ce(1)	70.59(2)
Se(1)–Ce(1)–Se(1)#2	42.651(18)	Se(1)–Ce(1)–N(1)	87.66(10)
Se(1)–Ce(1)–N(2)	66.73(9)	Se(1)–Ce(1)–N(3)	77.82(10)
Se(1)–Ce(1)–N(4)	129.85(9)	Se(1)–Ce(1)–N(5)	149.00(8)
Se(1)–Ce(1)–N(6)	133.35(8)	Se(1)–Ce(1)–N(7)	72.72(10)
Se(1)–Ce(1)–N(8)	104.70(8)	Se(1)#2–Ce(1)–N(1)	126.77(10)
Se(1)#2–Ce(1)–N(2)	101.32(8)	Se(1)#2–Ce(1)–N(3)	66.93(9)
Se(1)#2–Ce(1)–N(4)	92.29(9)	Se(1)#2–Ce(1)–N(5)	139.87(8)
Se(1)#2–Ce(1)–N(6)	148.43(8)	Se(1)#2–Ce(1)–N(7)	78.06(9)
Se(1)#2–Ce(1)–N(8)	70.19(8)	N(1)–Ce(1)–N(2)	61.95(12)
N(1)–Ce(1)–N(3)	130.86(13)	N(1)–Ce(1)–N(4)	140.89(13)
N(1)–Ce(1)–N(5)	71.03(12)	N(1)–Ce(1)–N(6)	75.17(12)
N(1)–Ce(1)–N(7)	67.53(13)	N(1)–Ce(1)–N(8)	121.04(12)
N(2)–Ce(1)–N(3)	69.20(13)	N(2)–Ce(1)–N(4)	117.71(12)
N(2)–Ce(1)–N(5)	117.94(11)	N(2)–Ce(1)–N(6)	66.89(12)
N(2)–Ce(1)–N(7)	114.65(12)	N(2)–Ce(1)–N(8)	171.25(12)
N(3)–Ce(1)–N(4)	61.39(13)	N(3)–Ce(1)–N(5)	133.16(12)
N(3)–Ce(1)–N(6)	81.53(12)	N(3)–Ce(1)–N(7)	144.58(13)
N(3)–Ce(1)–N(8)	108.07(12)	N(4)–Ce(1)–N(5)	77.33(12)
N(4)–Ce(1)–N(6)	70.43(12)	N(4)–Ce(1)–N(7)	127.65(13)
N(4)–Ce(1)–N(8)	65.89(12)	N(5)–Ce(1)–N(6)	63.61(11)
N(5)–Ce(1)–N(7)	78.30(12)	N(5)–Ce(1)–N(8)	70.20(11)
N(6)–Ce(1)–N(7)	133.45(12)	N(6)–Ce(1)–N(8)	121.43(12)
N(7)–Ce(1)–N(8)	62.41(12)		

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

Table S2. Selected bond lengths (Å) and angles (°) for **1b**

Sn(1)–Se(1)	2.4545(6)	Sn(1)–Se(3)#1	2.5873(6)
Sn(1)–Se(2)	2.4671(6)	Sn(1)–Se(3)	2.5826(7)
Pr(1)···Pr(1)#2	3.8927(6)		
Pr(1)–O(1)	2.363(3)	Pr(1)–O(1)#2	2.345(3)
Pr(1)–N(1)	2.681(4)	Pr(1)–N(2)	2.600(4)
Pr(1)–N(3)	2.667(5)	Pr(1)–N(4)	2.642(4)
Pr(1)–N(5)	2.668(4)	Pr(1)–N(6)	2.636(4)
Se(1)–Sn(1)–Se(2)	111.36(2)	Se(1)–Sn(1)–Se(3)#1	113.65(2)
Se(1)–Sn(1)–Se(3)	110.75(2)	Se(2)–Sn(1)–Se(3)	114.01(2)
Se(3)#1–Sn(1)–Se(2)	112.59(2)	Se(3)#1–Sn(1)–Se(3)	93.400(19)
Sn(1)–Se(3)–Sn(1)#1	86.60(2)	Pr(1)–O(1)–Pr(1)#2	111.55(14)
O(1)–Pr(1)–O(1)#2	68.45(14)	O(1)–Pr(1)–N(1)	127.13(14)
O(1)–Pr(1)–N(2)	79.25(13)	O(1)–Pr(1)–N(3)	92.95(14)
O(1)–Pr(1)–N(4)	137.43(14)	O(1)–Pr(1)–N(5)	75.22(12)
O(1)–Pr(1)–N(6)	137.65(12)	O(1)#2–Pr(1)–N(1)	80.13(14)
O(1)#2–Pr(1)–N(2)	99.63(14)	O(1)#2–Pr(1)–N(3)	99.59(15)
O(1)#2–Pr(1)–N(4)	79.41(13)	O(1)#2–Pr(1)–N(5)	142.83(12)
O(1)#2–Pr(1)–N(6)	152.65(12)	N(1)–Pr(1)–N(2)	65.04(15)
N(1)–Pr(1)–N(3)	134.64(15)	N(1)–Pr(1)–N(4)	70.47(15)
N(1)–Pr(1)–N(5)	130.52(14)	N(1)–Pr(1)–N(6)	75.75(14)
N(2)–Pr(1)–N(3)	154.85(15)	N(2)–Pr(1)–N(4)	134.88(15)
N(2)–Pr(1)–N(5)	80.65(14)	N(2)–Pr(1)–N(6)	81.79(15)
N(3)–Pr(1)–N(4)	65.04(15)	N(3)–Pr(1)–N(5)	74.22(14)
N(3)–Pr(1)–N(6)	88.48(15)	N(4)–Pr(1)–N(5)	126.32(14)
N(4)–Pr(1)–N(6)	80.51(14)	N(5)–Pr(1)–N(6)	64.51(12)

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

Table S3. Selected bond lengths (Å) and angles (°) for **1c**

Sn(1)–Se(1)	2.471(5)	Sn(1)–Se(3)#1	2.581(4)
Sn(1)–Se(2)	2.458(4)	Sn(1)–Se(3)	2.588(5)
Nd(1)···Nd(1)#2	3.878(4)		
Nd(1)–O(1)	2.35(3)	Nd(1)–O(1)#2	2.34(4)
Nd(1)–N(1)	2.61(3)	Nd(1)–N(2)	2.66(4)
Nd(1)–N(3)	2.65(3)	Nd(1)–N(4)	2.60(4)
Nd(1)–N(5)	2.64(3)	Nd(1)–N(6)	2.64(3)
Se(1)–Sn(1)–Se(2)	111.24(17)	Se(1)–Sn(1)–Se(3)#1	113.91(17)
Se(1)–Sn(1)–Se(3)	113.00(16)	Se(2)–Sn(1)–Se(3)	113.51(18)
Se(3)#1–Sn(1)–Se(2)	110.69(18)	Se(3)#1–Sn(1)–Se(3)	93.42(14)
Sn(1)–Se(3)–Sn(1)#1	86.58(14)	Nd(1)–O(1)–Nd(1)#2	111.5(11)

O(1)–Nd(1)–O(1)#2	68.5(11)	O(1)–Nd(1)–N(1)	137.7(11)
O(1)–Nd(1)–N(2)	74.9(11)	O(1)–Nd(1)–N(3)	127.0(11)
O(1)–Nd(1)–N(4)	79.2(11)	O(1)–Nd(1)–N(5)	92.3(12)
O(1)–Nd(1)–N(6)	136.9(12)	O(1)#2–Nd(1)–N(1)	152.5(10)
O(1)#2–Nd(1)–N(2)	142.6(10)	O(1)#2–Nd(1)–N(3)	80.7(11)
O(1)#2–Nd(1)–N(4)	100.6(11)	O(1)#2–Nd(1)–N(5)	99.7(13)
O(1)#2–Nd(1)–N(6)	79.7(10)	N(1)–Nd(1)–N(2)	64.8(11)
N(1)–Nd(1)–N(3)	75.1(11)	N(1)–Nd(1)–N(4)	81.0(12)
N(1)–Nd(1)–N(5)	88.9(13)	N(1)–Nd(1)–N(6)	80.6(12)
N(2)–Nd(1)–N(3)	129.7(11)	N(2)–Nd(1)–N(4)	79.4(11)
N(2)–Nd(1)–N(5)	74.0(12)	N(2)–Nd(1)–N(6)	125.8(11)
N(3)–Nd(1)–N(4)	64.9(11)	N(3)–Nd(1)–N(5)	136.0(12)
N(3)–Nd(1)–N(6)	72.3(12)	N(4)–Nd(1)–N(5)	153.3(12)
N(4)–Nd(1)–N(6)	136.5(12)	N(5)–Nd(1)–N(6)	64.6(11)

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

Table S4. Selected bond lengths (Å) and angles (°) for **1d**

Sn(1)–Se(1)	2.4609(8)	Sn(1)–Se(3)#1	2.5887(8)
Sn(1)–Se(2)	2.4626(8)	Sn(1)–Se(3)	2.5787(8)
Gd(1)···Gd(1)#2	3.8119(6)		
Gd(1)–O(1)	2.312(4)	Gd(1)–O(1)#2	2.295(4)
Gd(1)–N(1)	2.609(5)	Gd(1)–N(2)	2.530(5)
Gd(1)–N(3)	2.557(5)	Gd(1)–N(4)	2.609(5)
Gd(1)–N(5)	2.573(5)	Gd(1)–N(6)	2.579(5)
Se(1)–Sn(1)–Se(2)	111.50(3)	Se(1)–Sn(1)–Se(3)#1	113.21(3)
Se(1)–Sn(1)–Se(3)	110.10(3)	Se(2)–Sn(1)–Se(3)	114.06(3)
Se(3)#1–Sn(1)–Se(2)	113.13(3)	Se(3)#1–Sn(1)–Se(3)	93.74(2)
Sn(1)–Se(3)–Sn(1)#1	86.26(2)	Gd(1)–O(1)–Gd(1)#2	111.64(17)
O(1)–Gd(1)–O(1)#2	68.36(17)	O(1)–Gd(1)–N(1)	128.67(16)
O(1)–Gd(1)–N(2)	80.50(16)	O(1)–Gd(1)–N(3)	139.57(15)
O(1)–Gd(1)–N(4)	75.03(15)	O(1)–Gd(1)–N(5)	135.11(17)
O(1)–Gd(1)–N(6)	88.78(15)	O(1)#2–Gd(1)–N(1)	78.99(16)
O(1)#2–Gd(1)–N(2)	99.31(16)	O(1)#2–Gd(1)–N(3)	150.83(15)
O(1)#2–Gd(1)–N(4)	143.08(15)	O(1)#2–Gd(1)–N(5)	79.77(16)
O(1)#2–Gd(1)–N(6)	100.61(17)	N(1)–Gd(1)–N(2)	66.64(17)
N(1)–Gd(1)–N(3)	74.76(17)	N(1)–Gd(1)–N(4)	130.53(16)
N(1)–Gd(1)–N(5)	71.13(17)	N(1)–Gd(1)–N(6)	136.78(17)
N(2)–Gd(1)–N(3)	81.85(17)	N(2)–Gd(1)–N(4)	78.76(16)
N(2)–Gd(1)–N(5)	137.03(17)	N(2)–Gd(1)–N(6)	151.99(17)
N(3)–Gd(1)–N(4)	65.97(15)	N(3)–Gd(1)–N(5)	79.90(17)
N(3)–Gd(1)–N(6)	90.10(17)	N(4)–Gd(1)–N(5)	126.49(16)
N(4)–Gd(1)–N(6)	73.47(16)	N(5)–Gd(1)–N(6)	66.40(16)

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

Table S5. Selected bond lengths (Å) and angles (°) for **2a**

Sn(1)–Se(1)	2.4905(9)	Sn(1)–Se(2)	2.4455(9)
Sn(1)–Se(3)	2.5635(11)	Sn(1)–Se(3)#1	2.6142(11)
Sn(2)–Se(4)	2.4825(9)	Sn(2)–Se(5)	2.4860(10)
Sn(2)–Se(6)	2.5145(10)	Sn(2)–Se(7)	2.5671(11)
Ce(1)–Se(1)	3.3989(10)	Ce(1)–Se(4)	3.2182(10)
Ce(1)–Se(5)	3.2847(8)	Ce(2)–Se(6)	3.1167(8)
Ce(2)–Se(7)#2	3.2088(9)	Ce(2)–Se(8)	2.9806(5)
Se(7)–Se(8)	2.6757(9)		
Ce(1)–N(1)	2.682(6)	Ce(1)–N(2)	2.676(7)
Ce(1)–N(3)	2.695(6)	Ce(1)–N(4)	2.689(7)
Ce (1)–N(5)	2.710(7)	Ce(1)–N(6)	2.702(6)
Ce(2)–N(7)	2.647(7)	Ce(2)–N(8)	2.700(6)
Ce(2)–N(9)	2.737(7)	Ce(2)–N(10)	2.717(6)
Ce(2)–N(11)	2.732(8)	Ce(2)–N(12)	2.719(7)
Se(1)–Sn(1)–Se(2)	116.66(3)	Se(3)–Sn(1)–Se(3)#1	93.93(3)
Se(1)–Sn(1)–Se(3)	112.09(4)	Se(2)–Sn(1)–Se(3)	112.34(4)
Se(2)–Sn(1)–Se(3)#1	109.01(4)	Se(1)–Sn(1)–Se(3)#1	110.45(4)
Se(4)–Sn(2)–Se(5)	105.94(3)	Se(4)–Sn(2)–Se(6)	111.56(3)
Se(4)–Sn(2)–Se(7)	104.28(4)	Se(5)–Sn(2)–Se(6)	108.69(4)
Se(5)–Sn(2)–Se(7)	118.18(3)	Se(6)–Sn(2)–Se(7)	108.13(3)
Sn(1)–Se(1)–Ce(1)	111.31(3)	Sn(1)–Se(3)–Sn(1)#1	86.07(3)
Sn(2)–Se(4)–Ce(1)	87.00(3)	Sn(2)–Se(5)–Ce(1)	85.48(3)
Sn(2)–Se(6)–Ce(2)	105.69(3)	Sn(2)–Se(7)–Se(8)	90.93(3)
Sn(2)–Se(7)–Ce(2)#2	121.27(3)	Se(8)–Se(7)–Ce(2)#2	60.055(18)
Se(7)#2–Se(8)–Ce(2)#2	111.12(2)	Se(7)#2–Se(8)–Ce(2)	68.88(2)
Ce(8)–Se(8)–Ce(2)#2	180.	Se(7)–Se(8)–Se(7)#2	180.0
Se(1)–Ce(1)–Se(4)	136.98(2)	Se(1)–Ce(1)–Se(5)	143.15(3)
Se(4)–Ce(1)–Se(5)	75.16(2)		
Se(1)–Ce(1)–N(1)	86.67(14)	Se(1)–Ce(1)–N(2)	68.54(13)
Se(1)–Ce(1)–N(3)	71.10(14)	Se(1)–Ce(1)–N(4)	127.87(14)
Se(1)–Ce(1)–N(5)	75.18(17)	Se(1)–Ce(1)–N(6)	72.60(15)
Se(4)–Ce(1)–N(1)	78.30(16)	Se(4)–Ce(1)–N(2)	133.25(13)
Se(4)–Ce(1)–N(3)	147.70(16)	Se(4)–Ce(1)–N(4)	76.63(15)
Se(4)–Ce(1)–N(5)	90.80(16)	Se(4)–Ce(1)–N(6)	64.71(15)
Se(5)–Ce(1)–N(1)	83.55(13)	Se(5)–Ce(1)–N(2)	75.37(13)
Se(5)–Ce(1)–N(3)	86.67(13)	Se(5)–Ce(1)–N(4)	67.22(13)
Se(5)–Ce(1)–N(5)	131.28(17)	Se(5)–Ce(1)–N(6)	137.59(14)
N(1)–Ce(1)–N(2)	63.0(2)	N(1)–Ce(1)–N(3)	126.6(2)
N(1)–Ce(1)–N(4)	145.38(19)	N(1)–Ce(1)–N(5)	139.7(2)
N(1)–Ce(1)–N(6)	75.7(2)	N(2)–Ce(1)–N(3)	63.7(2)
N(2)–Ce(1)–N(4)	122.4(2)	N(2)–Ce(1)–N(5)	135.7(2)
N(2)–Ce(1)–N(6)	123.6(2)	N(3)–Ce(1)–N(4)	71.7(2)
N(3)–Ce(1)–N(5)	81.3(2)	N(3)–Ce(1)–N(6)	135.21(19)
N(4)–Ce(1)–N(5)	64.2(2)	N(4)–Ce(1)–N(6)	113.5(2)

N(5)–Ce(1)–N(6)	64.7(2)	Se(6)–Ce(2)–Se(7)#2	130.94(2)
Se(6)–Ce(2)–Se(8)	87.73(2)	Se(7)#2–Ce(2)–Se(8)	51.065(19)
Se(6)–Ce(2)–N(7)	70.44(12)	Se(6)–Ce(2)–N(8)	132.88(14)
Se(6)–Ce(2)–N(9)	147.88(19)	Se(6)–Ce(2)–N(10)	79.46(14)
Se(6)–Ce(2)–N(11)	75.35(15)	Se(6)–Ce(2)–N(12)	76.62(13)
Se(7)#2–Ce(2)–N(7)	112.26(14)	Se(7)#2–Ce(2)–N(8)	79.54(13)
Se(7)#2–Ce(2)–N(9)	72.92(18)	Se(7)#2–Ce(2)–N(10)	149.42(14)
Se(7)#2–Ce(2)–N(11)	114.64(15)	Se(7)#2–Ce(2)–N(12)	68.09(14)
Se(8)–Ce(2)–N(7)	73.27(14)	Se(8)–Ce(2)–N(8)	90.53(15)
Se(8)–Ce(2)–N(9)	122.29(18)	Se(8)–Ce(2)–N(10)	151.02(17)
Se(8)–Ce(2)–N(11)	136.94(15)	Se(8)–Ce(2)–N(12)	74.25(17)
N(7)–Ce(2)–N(8)	64.07(19)	N(7)–Ce(2)–N(9)	125.5(2)
N(7)–Ce(2)–N(10)	78.0(2)	N(7)–Ce(2)–N(11)	132.8(2)
N(7)–Ce(2)–N(12)	134.0(2)	N(8)–Ce(2)–N(9)	64.1(2)
N(8)–Ce(2)–N(10)	79.8(2)	N(8)–Ce(2)–N(11)	129.8(2)
N(8)–Ce(2)–N(12)	147.04(18)	N(9)–Ce(2)–N(10)	77.8(2)
N(9)–Ce(2)–N(11)	74.5(2)	N(9)–Ce(2)–N(12)	99.3(2)
N(10)–Ce(2)–N(11)	64.4(2)	N(10)–Ce(2)–N(12)	126.5(2)
N(11)–Ce(2)–N(12)	63.5(2)		

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

Table S6. Selected bond lengths (Å) and angles (°) for **2b**

Sn(1)–Se(1)	2.4906(10)	Sn(1)–Se(2)	2.4481(10)
Sn(1)–Se(3)	2.5559(11)	Sn(1)–Se(3)#1	2.6143(11)
Sn(2)–Se(4)	2.4831(11)	Sn(2)–Se(5)	2.4817(10)
Sn(2)–Se(6)	2.5162(9)	Sn(2)–Se(7)	2.5572(10)
Nd(1)–Se(1)	3.4046(11)	Nd(1)–Se(4)	3.2605(9)
Nd(1)–Se(5)	3.1867(11)	Nd(2)–Se(6)	3.0712(9)
Nd(2)–Se(7)#2	3.1871(9)	Nd(2)–Se(8)	2.9575(5)
Se(7)–Se(8)	2.6758(9)		
Nd(1)–N(1)	2.610(6)	Nd(1)–N(2)	2.651(6)
Nd(1)–N(3)	2.632(7)	Nd(1)–N(4)	2.618(7)
Nd (1)–N(5)	2.599(7)	Nd(1)–N(6)	2.620(6)
Nd(2)–N(7)	2.594(7)	Nd(2)–N(8)	2.646(7)
Nd(2)–N(9)	2.670(6)	Nd(2)–N(10)	2.654(6)
Nd(2)–N(11)	2.666(7)	Nd(2)–N(12)	2.667(7)
Se(1)–Sn(1)–Se(2)	116.50(3)	Se(3)–Sn(1)–Se(3)#1	93.81(3)
Se(1)–Sn(1)–Se(3)	111.97(4)	Se(2)–Sn(1)–Se(3)	112.86(4)
Se(2)–Sn(1)–Se(3)#1	108.69(4)	Se(1)–Sn(1)–Se(3)#1	110.65(3)
Se(4)–Sn(2)–Se(5)	105.47(3)	Se(4)–Sn(2)–Se(6)	108.22(4)
Se(4)–Sn(2)–Se(7)	118.35(3)	Se(5)–Sn(2)–Se(6)	112. 00(3)
Se(5)–Sn(2)–Se(7)	104.62(4)	Se(6)–Sn(2)–Se(7)	108.19(3)
Sn(1)–Se(1)–Nd(1)	111.37(4)	Sn(1)–Se(3)–Sn(1)#1	86.19(3)
Sn(2)–Se(4)–Nd(1)	85.58(3)	Sn(2)–Se(5)–Nd(1)	87.23(3)
Sn(2)–Se(6)–Nd(2)	106.05(3)	Sn(2)–Se(7)–Se(8)	90.72(3)
Sn(2)–Se(7)–Nd(2)#2	121.43(4)	Se(8)–Se(7)–Nd(2)#2	59.834(18)
Se(7)#2–Se(8)–Nd(2)#2	68.702(19)	Se(7)#2–Se(8)–Nd(2)	111.298(19)
Nd(8)–Se(8)–Nd(2)#2	180.0	Se(7)–Se(8)–Se(7)#2	180.0
Se(1)–Nd(1)–Se(4)	142.55(3)	Se(1)–Nd(1)–Se(5)	137.08(3)
Se(4)–Nd(1)–Se(5)	75.59(2)		
Se(1)–Nd(1)–N(1)	129.19(15)	Se(1)–Nd(1)–N(2)	74.59(16)
Se(1)–Nd(1)–N(3)	72.77(17)	Se(1)–Nd(1)–N(4)	70.95(15)
Se(1)–Nd(1)–N(5)	68.26(14)	Se(1)–Nd(1)–N(6)	86.68(15)
Se(4)–Nd(1)–N(1)	66.54(15)	Se(4)–Nd(1)–N(2)	132.02(15)
Se(4)–Nd(1)–N(3)	137.41(16)	Se(4)–Nd(1)–N(4)	87.08(15)
Se(4)–Nd(1)–N(5)	75.07(14)	Se(4)–Nd(1)–N(6)	83.88(14)
Se(5)–Nd(1)–N(1)	75.58(17)	Se(5)–Nd(1)–N(2)	91.50(18)
Se(5)–Nd(1)–N(3)	64.55(17)	Se(5)–Nd(1)–N(4)	147.24(15)
Se(5)–Nd(1)–N(5)	133.35(14)	Se(5)–Nd(1)–N(6)	77.72(17)
N(1)–Nd(1)–N(2)	65.5(2)	N(1)–Nd(1)–N(3)	114.3(2)
N(1)–Nd(1)–N(4)	72.0(2)	N(1)–Nd(1)–N(5)	122.6(2)
N(1)–Nd(1)–N(6)	144.1(2)	N(2)–Nd(1)–N(3)	65.8(2)
N(2)–Nd(1)–N(4)	79.6(2)	N(2)–Nd(1)–N(5)	134.9(2)
N(2)–Nd(1)–N(6)	139.0(2)	N(3)–Nd(1)–N(4)	135.1(2)
N(3)–Nd(1)–N(5)	122.8(2)	N(3)–Nd(1)–N(6)	73.9(2)
N(4)–Nd(1)–N(5)	64.8(2)	N(4)–Nd(1)–N(6)	128.5(2)

N(5)–Nd(1)–N(6)	63.8(2)	Se(6)–Nd(2)–Se(7)#2	131.60(2)
Se(6)–Nd(2)–Se(8)	88.105(19)	Se(7)#2–Nd(2)–Se(8)	51.464(17)
Se(6)–Nd(2)–N(7)	69.90(14)	Se(6)–Nd(2)–N(8)	133.39(14)
Se(6)–Nd(2)–N(9)	146.44(17)	Se(6)–Nd(2)–N(10)	79.41(14)
Se(6)–Nd(2)–N(11)	75.00(14)	Se(6)–Nd(2)–N(12)	77.37(13)
Se(7)#2–Nd(2)–N(7)	112.80(13)	Se(7)#2–Nd(2)–N(8)	78.96(13)
Se(7)#2–Nd(2)–N(9)	72.66(16)	Se(7)#2–Nd(2)–N(10)	148.85(14)
Se(7)#2–Nd(2)–N(11)	114.85(15)	Se(7)#2–Nd(2)–N(12)	67.59(13)
Se(8)–Nd(2)–N(7)	73.17(13)	Se(8)–Nd(2)–N(8)	90.43(13)
Se(8)–Nd(2)–N(9)	122.79(16)	Se(8)–Nd(2)–N(10)	150.33(16)
Se(8)–Nd(2)–N(11)	137.38(15)	Se(8)–Nd(2)–N(12)	74.15(14)
N(7)–Nd(2)–N(8)	65.2(2)	N(7)–Nd(2)–N(9)	127.7(2)
N(7)–Nd(2)–N(10)	77.3(2)	N(7)–Nd(2)–N(11)	132.1(2)
N(7)–Nd(2)–N(12)	133.9(2)	N(8)–Nd(2)–N(9)	65.3(2)
N(8)–Nd(2)–N(10)	79.3(2)	N(8)–Nd(2)–N(11)	129.5(2)
N(8)–Nd(2)–N(12)	145.92(18)	N(9)–Nd(2)–N(10)	78.1(2)
N(9)–Nd(2)–N(11)	73.0(2)	N(9)–Nd(2)–N(12)	97.4(2)
N(10)–Nd(2)–N(11)	64.9(2)	N(10)–Nd(2)–N(12)	127.8(2)
N(11)–Nd(2)–N(12)	64.2(2)		

Symmetry transformations used to generate equivalent atoms: #1 –x+3, –y, –z; #2 –x+1, –y+1, –z+1.

Table S7. Selected bond lengths (Å) and angles (°) for **2c**

Sn(1)–Se(1)	2.5403(7)	Sn(1)–Se(2)	2.5009(7)
Gd(1)–Se(1)	2.9341(7)	Gd(1)–N(1)	2.600(4)
Gd(1)–N(2)	2.589(5)	Gd(1)–N(3)	2.578(4)
Se(1)–Sn(1)–Se(1)#1	104.92(3)	Se(1)–Sn(1)–Se(2)	112.06(2)
Se(1)–Sn(1)–Se(2)#1	105.41(2)	Se(2)–Sn(1)–Se(2)#1	116.49(3)
Sn(1)–Se(1)–Gd(1)	84.18(2)		
Se(1)–Gd(1)–Se(1)#1	86.71(3)	Se(1)–Gd(1)–N(1)	74.40(11)
Se(1)–Gd(1)–N(2)	140.39(10)	Se(1)–Gd(1)–N(3)	153.91(10)
Se(1)–Gd(1)–N(1)#1	82.22(11)	Se(1)–Gd(1)–N(2)#1	84.39(11)
Se(1)–Gd(1)–N(3)#1	91.07(11)	N(1)–Gd(1)–N(2)	66.18(15)
N(1)–Gd(1)–N(3)	131.05(15)	N(1)–Gd(1)–N(1)#1	147.7(2)
N(1)–Gd(1)–N(2)#1	131.37(16)	N(1)–Gd(1)–N(3)#1	72.17(15)
N(2)–Gd(1)–N(3)	64.91(14)	N(2)–Gd(1)–N(2)#1	124.9(2)
N(2)–Gd(1)–N(3)#1	80.84(15)	N(3)–Gd(1)–N(3)#1	101.8(2)
Se(1)#1–Sn(1)–Se(1)–Gd(1)	0	Sn(1)–Se(1)–Gd(1)–Se(1)#1	0

Symmetry transformations used to generate equivalent atoms: #1 x+1, y, –z+3/2.