Synthesis, structures and luminescent properties of lanthanide coordination polymers involving biphenyl-3, 4', 5 -tricarboxylate

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1- X-ray Crystallography

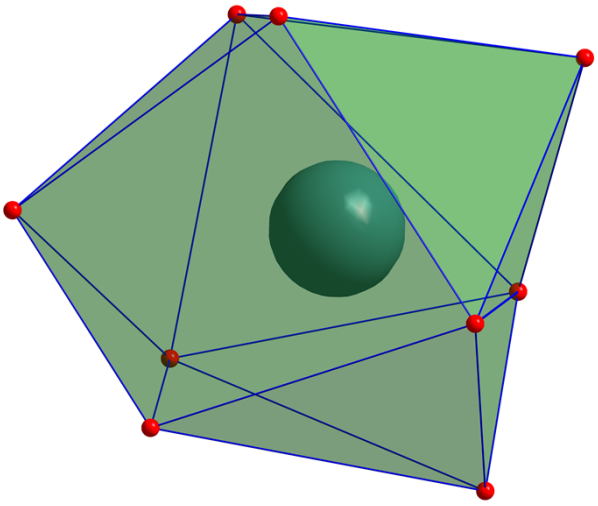

Figure S1 Coordination polyhedron of the Ce(III) ions in **1**.

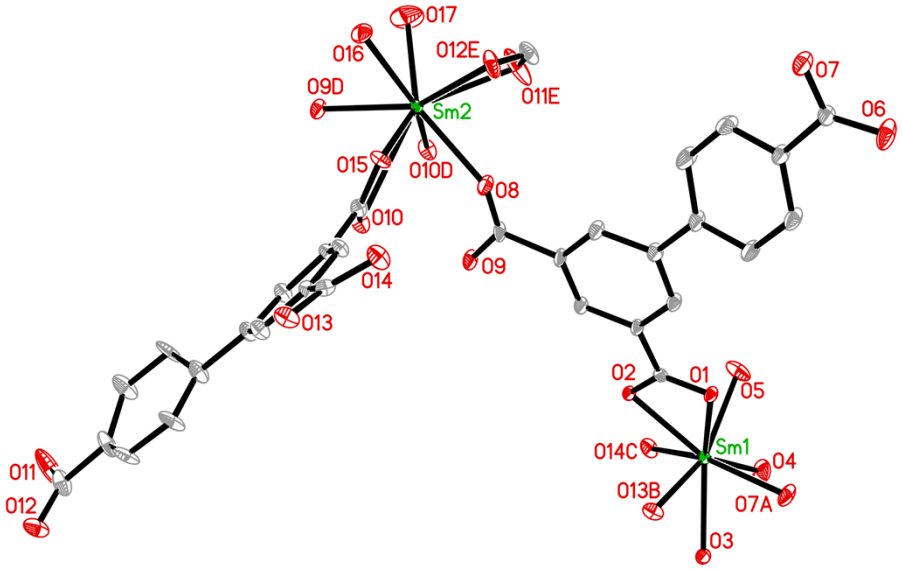

Figure S2 The coordination environments of crystallographically independent Sm(III) ions in **5**. The non-hydrogen atoms are represented by thermal ellipsoids drawn at the 30% probability level (all H atoms, coordinated and free solvent molecules are omitted for clarity, O3, O4, O16 is from coordinated water and O5, O17 is from coordinated terminal DMF). Symmetry transformations used to generate equivalent atoms: A, -*x* + 1/2, *y* + 1/2, -*z* + 1/2; B, - *x*+ 1/2, -*y* + 3/2, -*z* + 1; C, *x* + 1/2, *y* + 1/2, *z*; D, -*x* + 1, -*y* + 1, -*z* + 1; E, *x*, -*y* + 1, *z* - 1/2.

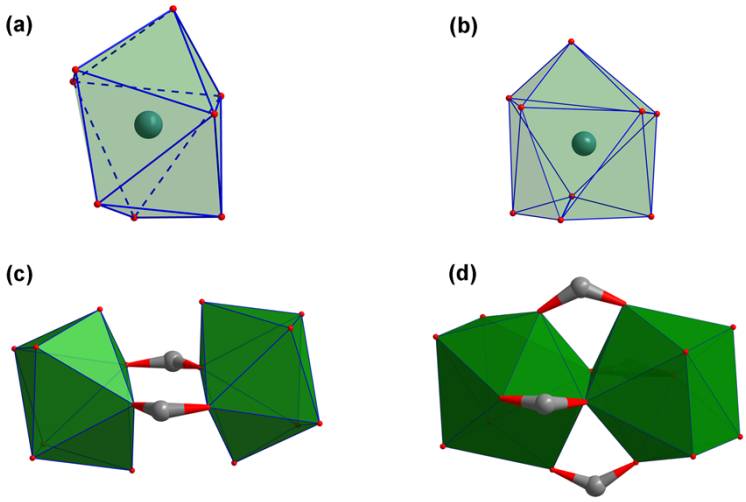

Figure S3 Coordination polyhedra of the crystallographically (a) Sm1 and (b) Sm2 ions in **5**. (c) The two bicapped trigonal prismatic are bridged by two bis(monodentate) bridging carboxyl groups and (d) the two tricapped trigonal prismatic are united by sharing an edge.

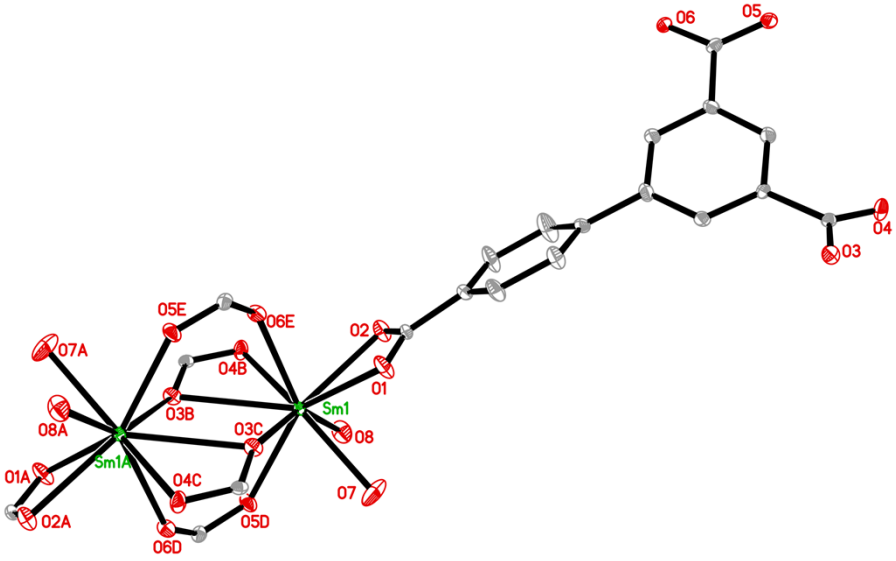

Figure S4 The coordination environments of crystallographically independent Sm(III) ions in **8**. The non-hydrogen atoms are represented by thermal ellipsoids drawn at the 30% probability level (all H atoms, coordinated and free solvent molecules are omitted for clarity, O7 and O8 are from coordinated DMSO moleucles). Symmetry transformations used to generate equivalent atoms: A, -*x* + 1/2, -*y* + 1/2, -*z* + 1; B, *x* + 1/2, *y* - 1/2, *z*; C, -*x*, -*y* + 1, -*z*; C, -*x*, -*y* + 1, -*z*; D, *x* + 1/2, -*y* + 1/2, *z* - 1/2; D, *x* + 1/2, -*y* + 1/2, *z* - 1/2; E, -*x*, *y*, -*z* + 3/2.

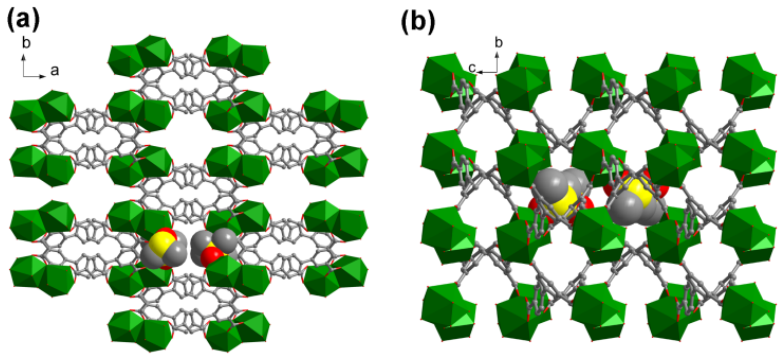

Figure S5 (a) The 1D rectangular channels along the crystallographic c-axis and (b) the 1D pear-shaped channels along the crystallographic a-axis in 8. Only two coordinated DMSO molecules were shown in space-filling model for clarify. Colour scheme: Sm polyhedra, green; C, gray; O, red; S, blue.

2- Powder X-Ray Diffraction

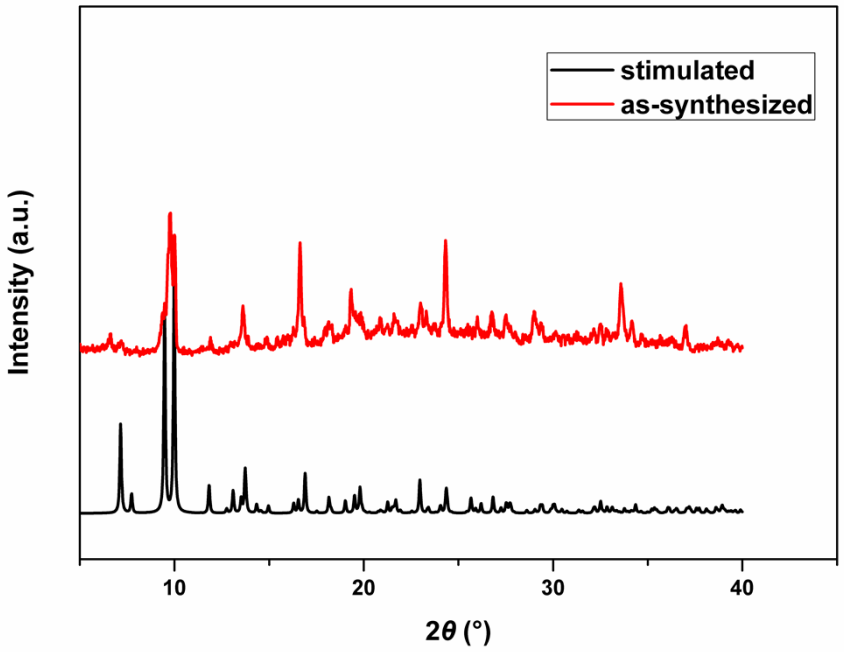

Figure S6 PXRD pattern of compound **1**.

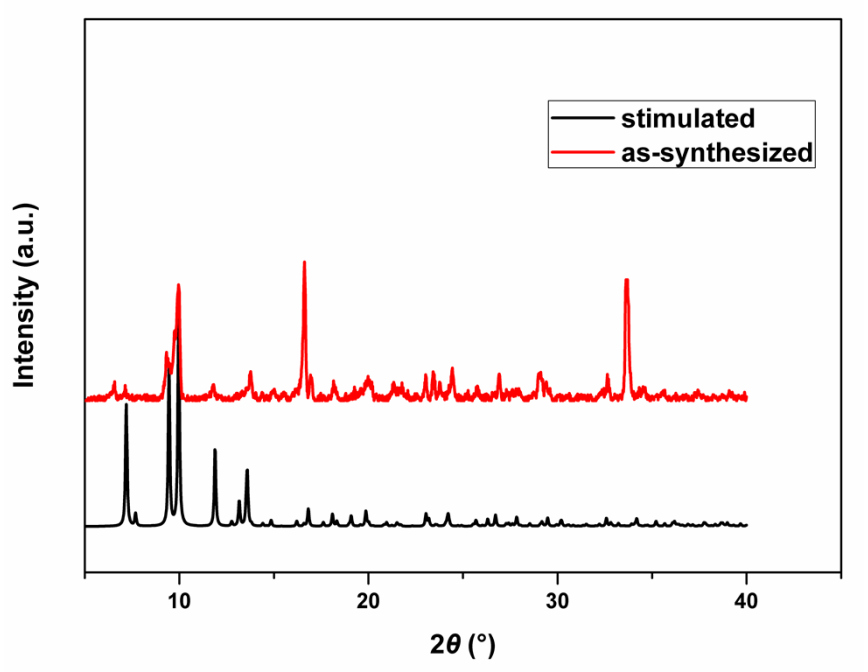

Figure S7 PXRD pattern of compound **2**.

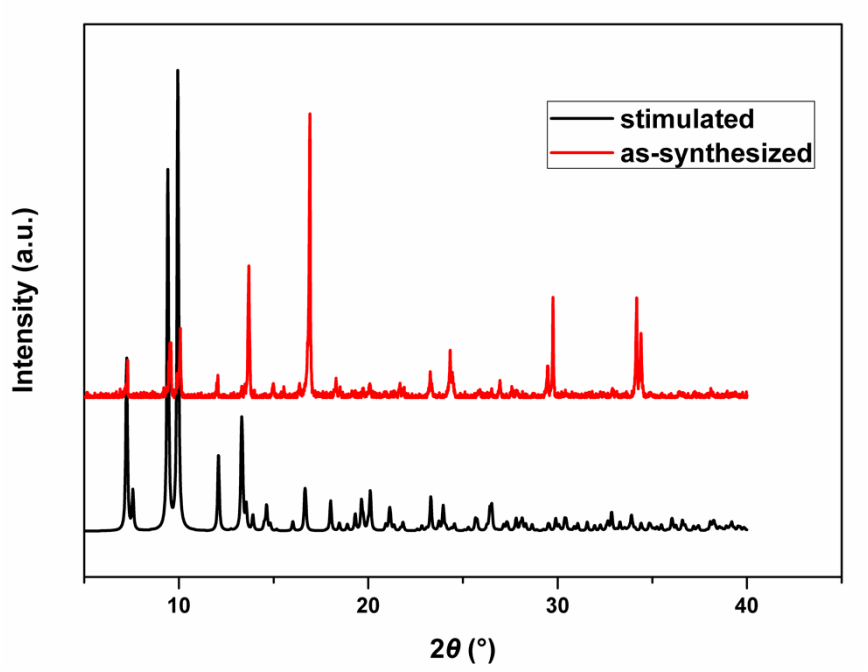

Figure S8 PXRD pattern of compound **3**.

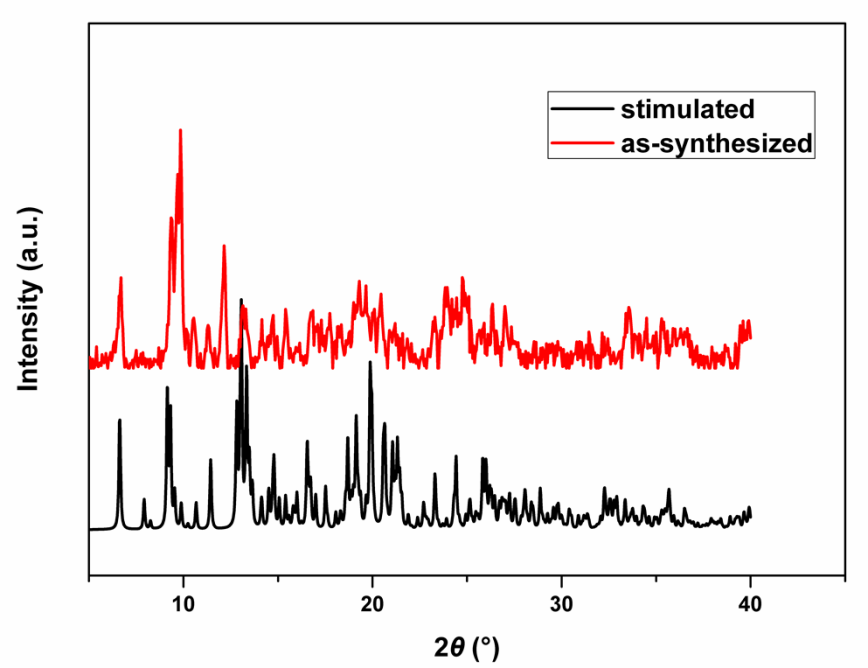

Figure S9 PXRD pattern of compound **4**.

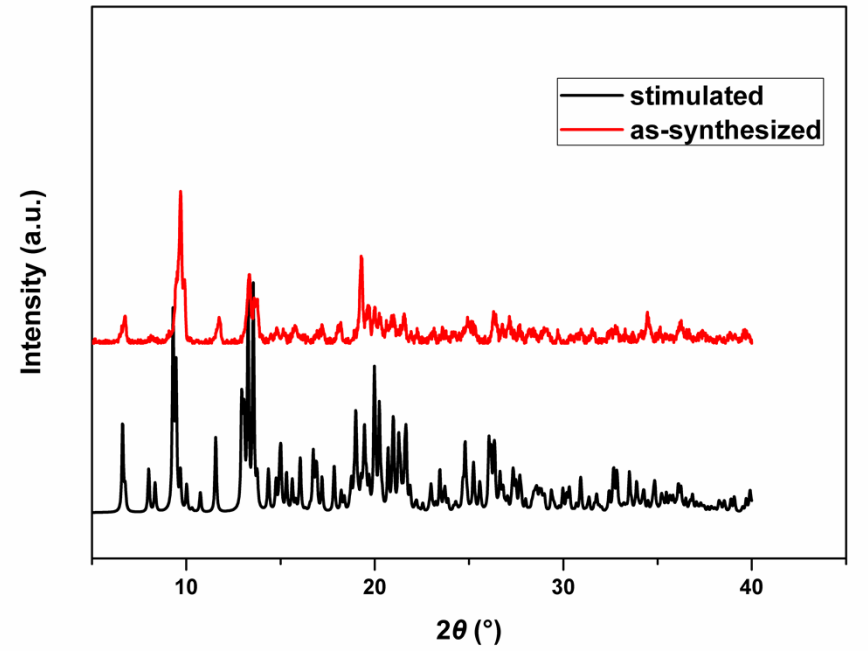

Figure S10 PXRD pattern of compound **5**.

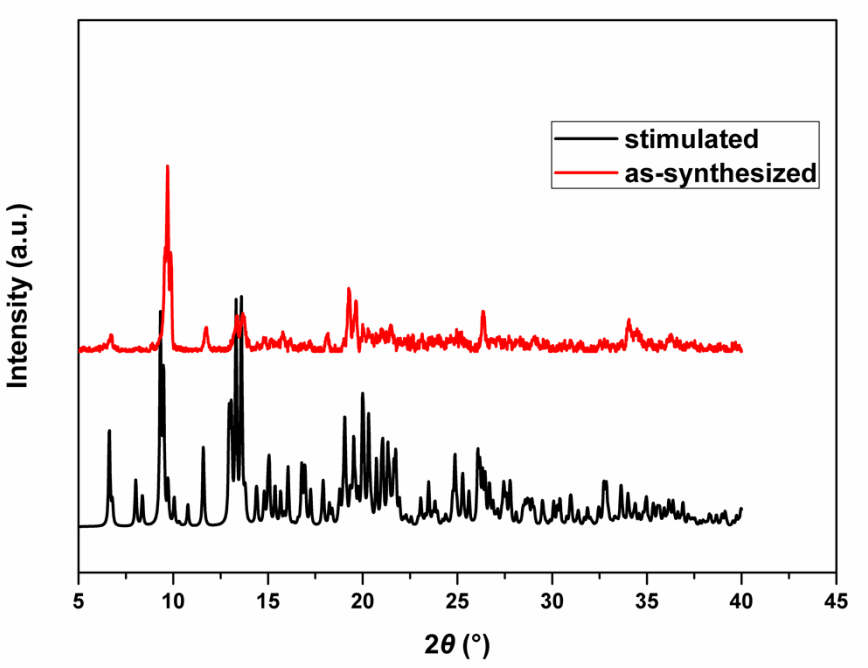

Figure S11 PXRD pattern of compound **6**.

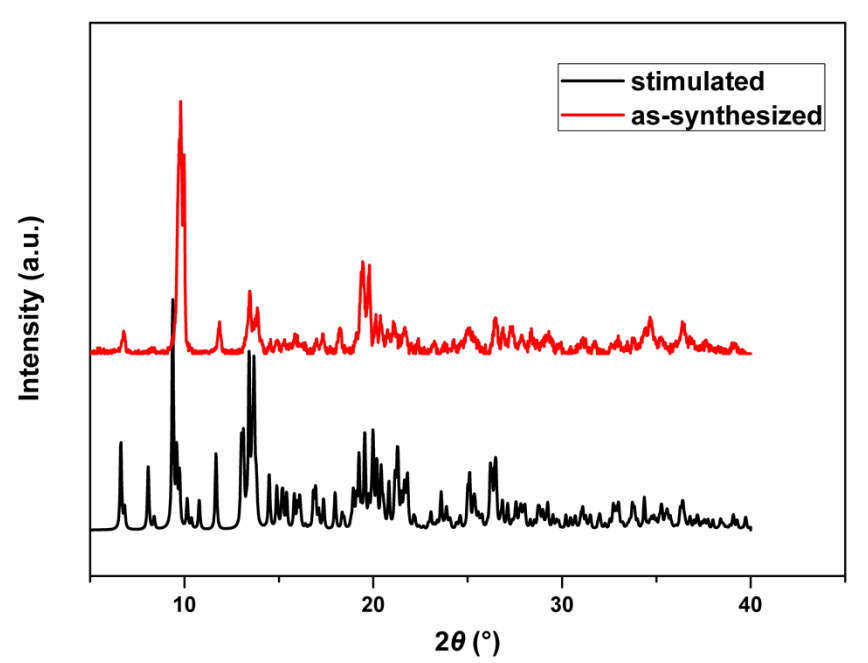

Figure S12 PXRD pattern of compound **7**.

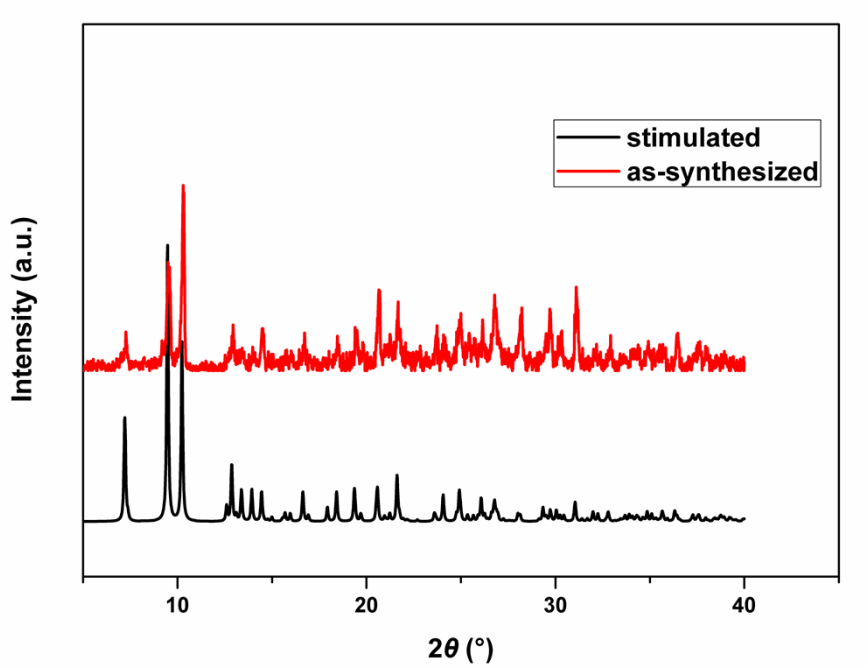

Figure S13 PXRD pattern of compound **8**.

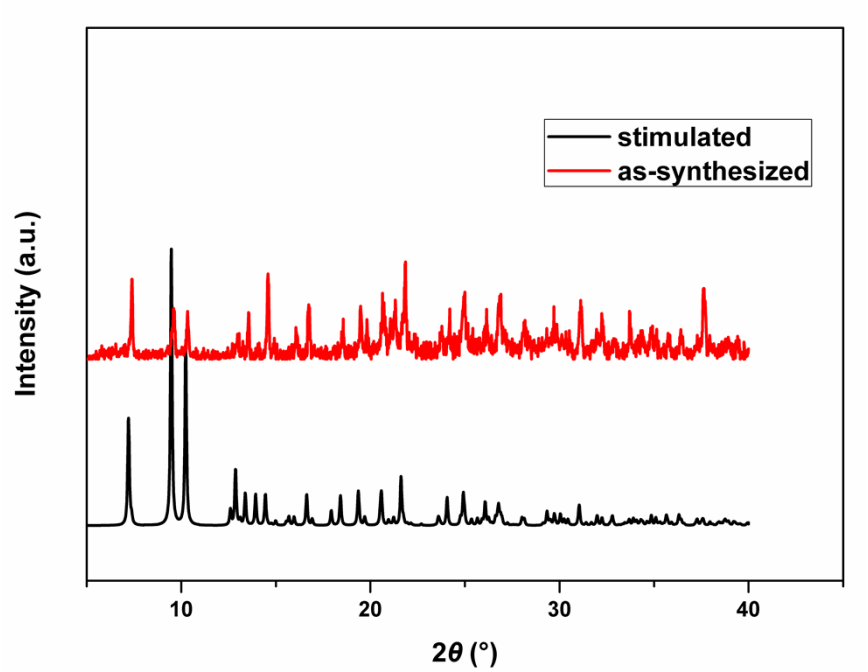

Figure S14 PXRD pattern of compound **9**.

3- Thermogravimetric Analysis

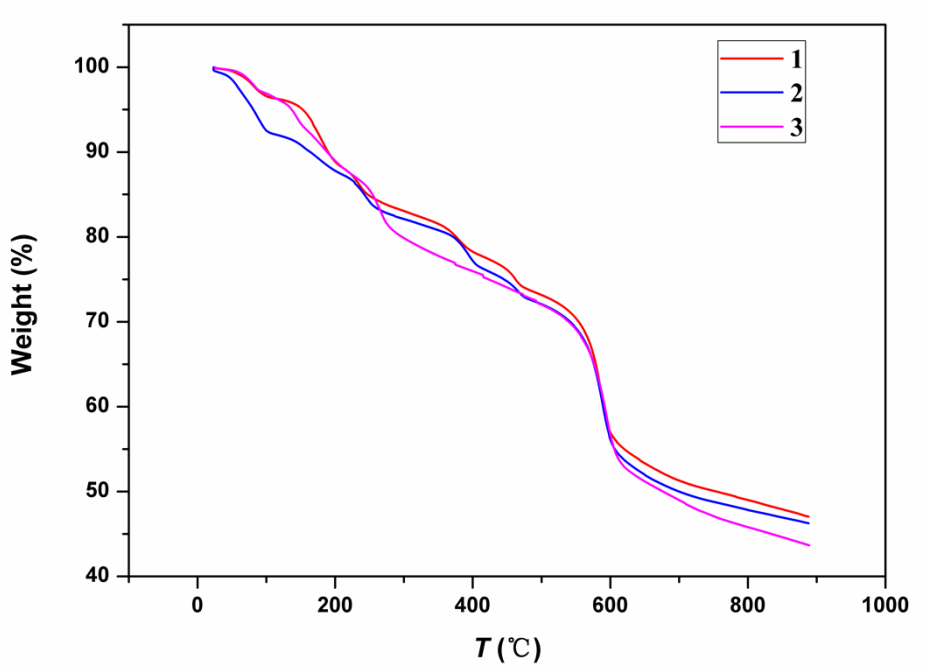

Figure S15 The TGA curves of compounds **1**-**3**.

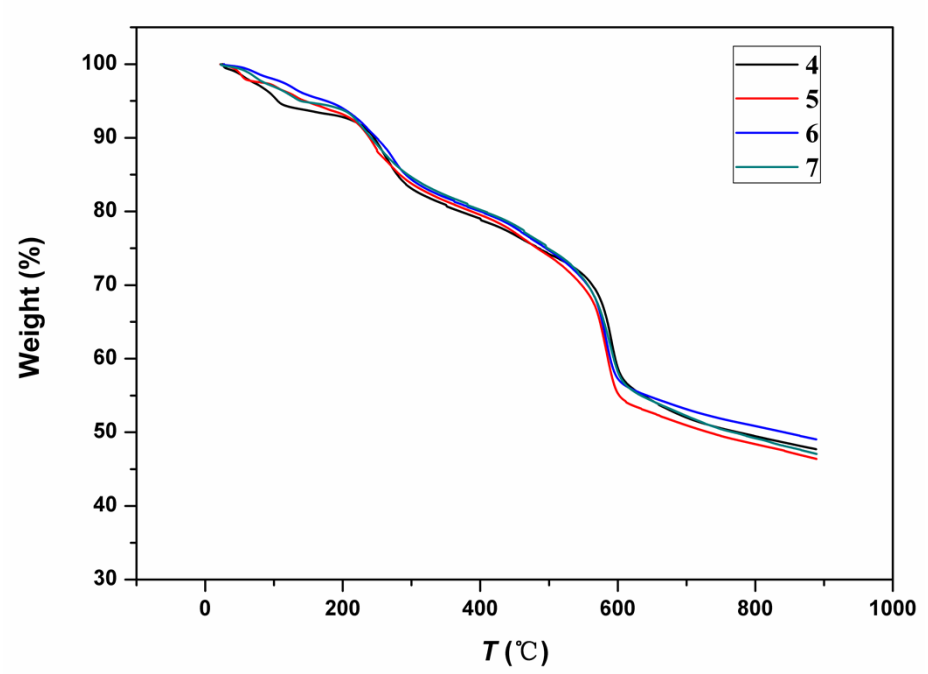

Figure S16 The TGA curves of compounds **4**-**7**.

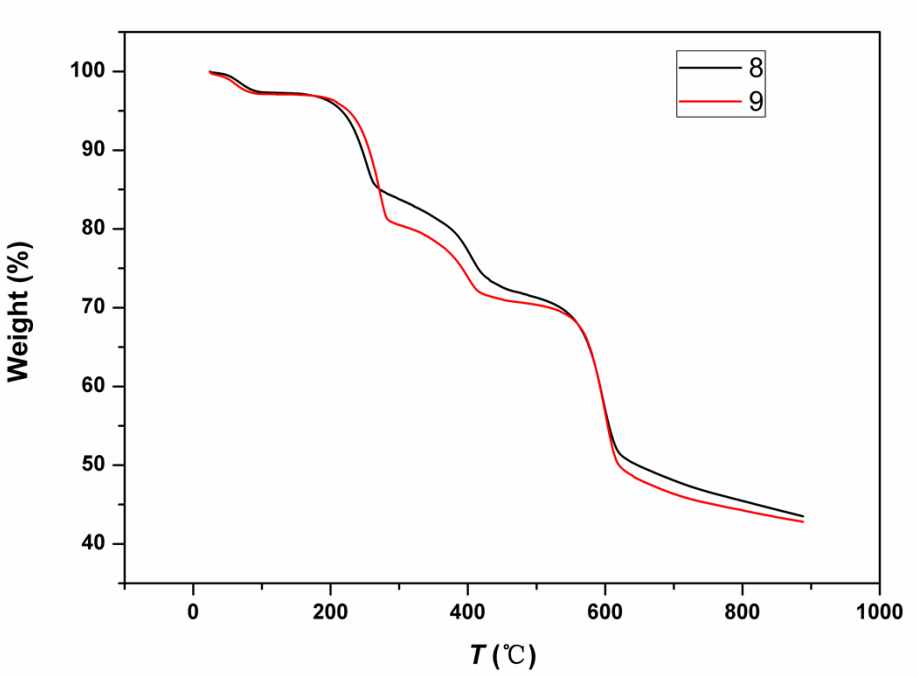

Figure S17 The TGA curves of compounds **8-9**.

4- IR spectra of 1-9

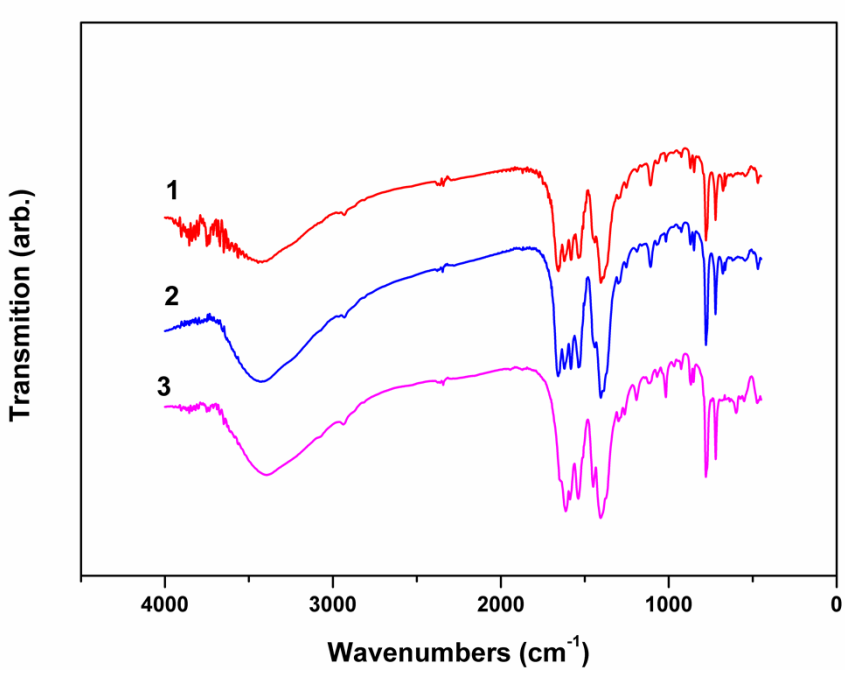

Figure S18 IR spectra of compounds **1-3**.

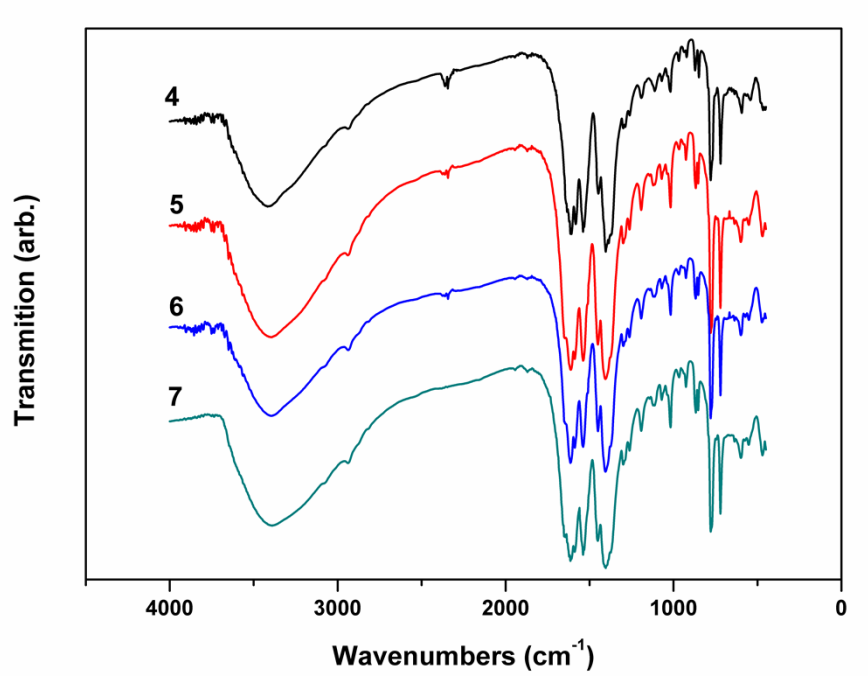

Figure S19 IR spectra of compounds **4-7**.

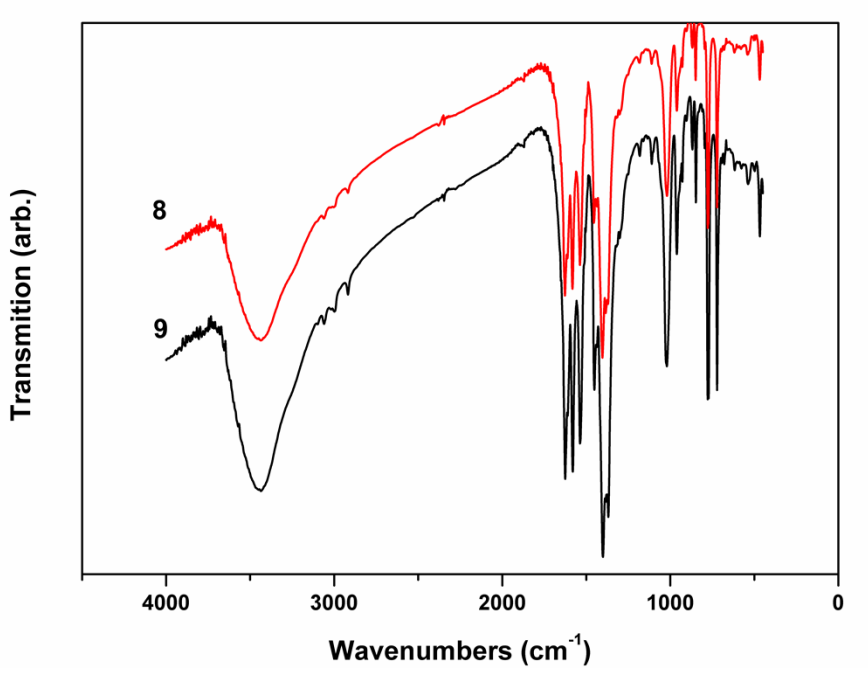

Figure S20 IR spectra of compounds **8 - 9**.

5- Selected bonds and angles of 1-9

Table S1 Selected bond lengths (Å) and angles (deg) of compound **1-3**

1		**2**		**3**	
Ce1—O1	2.448 (3)	Pr1—O4i	2.426 (3)	Eu1—O1	2.361 (5)

Ce1—O4$_{i}$	2.455 (3)	Pr1—O1	2.432 (3)	Eu1—O4$_{i}$	2.362 (5)
Ce1—O2$_{ii}$	2.471 (3)	Pr1—O2$_{ii}$	2.458 (3)	Eu1—O2$_{ii}$	2.417 (4)
Ce1—O8	2.502 (5)	Pr1—O8	2.481 (5)	Eu1—O8	2.435 (7)
Ce1—O3$_{iii}$	2.526 (3)	Pr1—O3$_{iii}$	2.507 (3)	Eu1—O3$_{iii}$	2.450 (5)
Ce1—O5$_{i}$	2.557 (3)	Pr1—O6$_{iv}$	2.538 (3)	Eu1—O7	2.469 (6)
Ce1—O6$_{iv}$	2.566 (3)	Pr1—O5$_{iv}$	2.540 (3)	Eu1—O6$_{iv}$	2.478 (5)
Ce1—O7	2.565 (4)	Pr1—O7	2.545 (4)	Eu1—O5$_{iv}$	2.496 (5)
Ce1—O4$_{iii}$	2.761 (3)	Pr1—O4$_{iii}$	2.755 (3)	Eu1—O4$_{iii}$	2.765 (5)
O1—Ce1—O4$_{i}$	73.00 (11)	O4$_{i}$—Pr1—O1	73.02 (11)	O1—Eu1—O4$_{i}$	73.84 (17)
O1—Ce1—O2$_{ii}$	132.20 (11)	O4$_{i}$—Pr1—O2$_{ii}$	80.49 (11)	O1—Eu1—O2$_{ii}$	132.07(17)
O4$_{i}$—Ce1—O2$_{ii}$	79.78 (11)	O1—Pr1—O2$_{ii}$	132.26 (11)	O4$_{i}$—Eu1—O2$_{ii}$	81.18 (17)
O1—Ce1—O8	140.19 (17)	O4$_{i}$—Pr1—O8	84.28 (17)	O1—Eu1—O8	139.4 (2)
O4$_{i}$—Ce1—O8	85.14 (17)	O1—Pr1—O8	139.83 (16)	O4$_{i}$—Eu1—O8	82.1 (3)
O2$_{ii}$—Ce1—O8	72.86 (16)	O2$_{ii}$—Pr1—O8	73.05 (16)	O2$_{ii}$—Eu1—O8	73.5 (2)
O1—Ce1—O3$_{iii}$	71.05 (12)	O4$_{i}$—Pr1—O3$_{iii}$	123.00 (11)	O1—Eu1—O3$_{iii}$	73.22 (18)
O4$_{i}$—Ce1—O3$_{iii}$	122.20 (10)	O1—Pr1—O3$_{iii}$	71.86 (12)	O4$_{i}$—Eu1—O3$_{iii}$	124.00(16)
O2$_{ii}$—Ce1—O3$_{iii}$	92.66 (12)	O2$_{ii}$—Pr1—O3$_{iii}$	91.62 (13)	O2$_{ii}$—Eu1—O3$_{iii}$	88.85 (18)
O8—Ce1—O3$_{iii}$	146.93 (17)	O8—Pr1—O3$_{iii}$	146.68 (17)	O8—Eu1—O3$_{iii}$	146.4 (2)
O1—Ce1—O5$_{iv}$	72.40 (12)	O4$_{i}$—Pr1—O6$_{iv}$	130.35 (11)	O1—Eu1—O7	136.7 (2)
O4$_{i}$—Ce1—O5$_{iv}$	82.92 (11)	O1—Pr1—O6$_{iv}$	75.73 (12)	O4$_{i}$—Eu1—O7	149.1 (2)
O2$_{ii}$—Ce1—O5$_{iv}$	142.02 (12)	O2$_{ii}$—Pr1—O6$_{iv}$	147.03 (13)	O2$_{ii}$—Eu1—O7	73.2 (2)
O8—Ce1—O5$_{iv}$	72.19(16)	O8—Pr1—O6$_{iv}$	96.09 (17)	O8—Eu1—O7	74.4 (3)
O3$_{iii}$—Ce1—O5$_{iv}$	125.05 (11)	O3$_{iii}$—Pr1—O6$_{iv}$	80.71 (11)	O3$_{iii}$—Eu1—O7	73.2 (2)
O1—Ce1—O6$_{iv}$	75.05 (12)	O4$_{i}$—Pr1—O5$_{iv}$	82.82 (11)	O1—Eu1—O6$_{iv}$	76.44 (19)
O4$_{i}$—Ce1—O6$_{iv}$	129.84 (10)	O1—Pr1—O5$_{iv}$	72.66 (13)	O4$_{i}$—Eu1—O6$_{iv}$	131.13(17)
O2$_{ii}$—Ce1—O6$_{iv}$	148.23 (12)	O2$_{ii}$—Pr1—O5$_{iv}$	142.40 (13)	O2$_{ii}$—Eu1—O6$_{iv}$	145.57(18)
O8—Ce1—O6$_{iv}$	95.92 (17)	O8—Pr1—O5$_{iv}$	71.94 (16)	O8—Eu1—O6$_{iv}$	96.9 (3)
O3$_{iii}$—Ce1—O6$_{iv}$	80.81 (11)	O3$_{iii}$—Pr1—O5$_{iv}$	125.56 (11)	O3$_{iii}$—Eu1—O6$_{iv}$	81.63 (18)
O5$_{iv}$—Ce1—O6$_{iv}$	50.79 (11)	O6$_{iv}$—Pr1—O5$_{iv}$	51.21 (11)	O7—Eu1—O6$_{iv}$	72.3 (2)
O1—Ce1—O7	134.76 (15)	O4$_{i}$—Pr1—O7	150.90 (14)	O1—Eu1—O5$_{iv}$	73.25 (19)
O4$_{i}$—Ce1—O7	151.44 (14)	O1—Pr1—O7	135.43 (15)	O4$_{i}$—Eu1—O5$_{iv}$	82.51 (18)
O2$_{ii}$—Ce1—O7	74.91 (14)	O2$_{ii}$—Pr1—O7	74.17 (14)	O2$_{ii}$—Eu1—O5$_{iv}$	143.00(18)
O8—Ce1—O7	75.0 (2)	O8—Pr1—O7	74.9 (19)	O8—Eu1—O5$_{iv}$	71.5 (2)
O3$_{iii}$—Ce1—O7	72.54 (16)	O3$_{iii}$—Pr1—O7	72.46 (16)	O3$_{iii}$—Eu1—O5$_{iv}$	127.55(17)
O5$_{iv}$—Ce1—O7	109.42 (16)	O6$_{iv}$—Pr1—O7	72.93 (15)	O7—Eu1—O5$_{iv}$	107.9 (2)
O6$_{iv}$—Ce1—O7	73.47 (14)	O5$_{iv}$—Pr1—O7	108.97 (16)	O6$_{iv}$—Eu1—O5$_{iv}$	51.95 (18)
O1—Ce1—O4$_{iii}$	67.84 (10)	O4$_{i}$—Pr1—O4$_{iii}$	76.29 (10)	O1—Eu1—O4$_{iii}$	67.18 (16)
O4$_{i}$—Ce1—O4$_{iii}$	76.11 (9)	O1—Pr1—O4$_{iii}$	67.49 (11)	O4$_{i}$—Eu1—O4$_{iii}$	76.62 (16)
O2$_{ii}$—Ce1—O4$_{iii}$	67.91 (11)	O2$_{ii}$—Pr1—O4$_{iii}$	68.04 (11)	O2$_{ii}$—Eu1—O4$_{iii}$	67.60 (16)
O8—Ce1—O4$_{iii}$	138.77 (15)	O8—Pr1—O4$_{iii}$	138.69 (15)	O8—Eu1—O4$_{iii}$	137.8 (2)
O3$_{iii}$—Ce1—O4$_{iii}$	48.92 (9)	O3$_{iii}$—Pr1—O4$_{iii}$	49.19 (10)	O3$_{iii}$—Eu1—O4$_{iii}$	49.12 (15)
O5$_{iv}$—Ce1—O4$_{iii}$	138.90 (12)	O6$_{iv}$—Pr1—O4$_{iii}$	124.26 (11)	O7—Eu1—O4$_{iii}$	108.1 (2)
O6$_{iv}$—Ce1—O4$_{iii}$	124.31 (11)	O5$_{iv}$—Pr1—O4$_{iii}$	138.84 (12)	O6$_{iv}$—Eu1—O4$_{iii}$	124.56(17)
O7—Ce1—O4$_{iii}$	105.71 (15)	O7—Pr1—O4$_{iii}$	106.39 (15)	O5$_{iv}$—Eu1—O4$_{iii}$	138.95(18)

Symmetry codes: (i) x, $-y+1$, $z+1/2$; (ii) $-x+1/2$, $-y+3/2$, $-z$; (iii) $-x+1/2$, $y+1/2$, $-z-1/2$; (iv) $-x+1$, y, $-z-1/2$.

Table S2 Selected bond lengths (Å) and angles (deg) of compound **4-6**

4		**5**	
La1—O13$_{i}$	2.398 (11)	Sm1—O7$_{i}$	2.333 (3)
La1—O7$_{ii}$	2.410 (7)	Sm1—O13$_{ii}$	2.347 (3)
La1—O14$_{iii}$	2.460 (7)	Sm1—O14$_{iii}$	2.356 (3)
La1—O5	2.477 (8)	Sm1—O5	2.374 (4)
La1—O3	2.535 (7)	Sm1—O1	2.490 (3)
La1—O4	2.56 (4)	Sm1—O2	2.493 (3)
La1—O2	2.558 (6)	Sm1—O4B	2.501 (16)
La1—O1	2.576 (6)	Sm1—O3	2.511 (3)
La1—O4B	2.62 (4)	Sm1—O4	2.547 (16)
La2—O10$_{iv}$	2.437 (7)	Sm2—O10$_{iv}$	2.349 (3)
La2—O9$_{iv}$	2.464 (6)	Sm2—O8	2.385 (3)
La2—O8	2.472 (7)	Sm2—O9$_{iv}$	2.395 (3)
La2—O15	2.496 (6)	Sm2—O15	2.414 (3)
La2—O17	2.499 (9)	Sm2—O17	2.420 (4)
La2—O16	2.548 (7)	Sm2—O16	2.466 (3)
La2—O12$_{v}$	2.549 (7)	Sm2—O12$_{v}$	2.485 (3)
La2—O11$_{v}$	2.627 (9)	Sm2—O11$_{v}$	2.523 (4)
La2—O10	2.873 (7)	Sm2—O10	2.907 (3)
O13$_{i}$—La1—O7$_{ii}$	86.0 (3)	O7$_{i}$—Sm1—O13$_{ii}$	85.00 (15)
O13$_{i}$—La1—O14$_{iii}$	113.1 (3)	O7$_{i}$—Sm1—O14$_{iii}$	150.32 (14)
O7$_{ii}$—La1—O14$_{iii}$	148.0 (3)	O13$_{ii}$—Sm1—O14$_{iii}$	108.03 (12)
O13$_{i}$—La1—O5	147.5 (3)	O7$_{i}$—Sm1—O5	100.58 (16)
O7$_{ii}$—La1—O5	100.5 (3)	O13$_{ii}$—Sm1—O5	149.15 (14)
O14$_{iii}$—La1—O5	77.5 (3)	O14$_{iii}$—Sm1—O5	81.98 (14)
O13$_{i}$—La1—O3	75.3 (3)	O7$_{i}$—Sm1—O1	78.46 (11)
O7$_{ii}$—La1—O3	77.1 (2)	O13$_{ii}$—Sm1—O1	77.84 (11)
O14$_{iii}$—La1—O3	83.1 (3)	O14$_{iii}$—Sm1—O1	129.65 (11)
O5—La1—O3	137.1 (3)	O5—Sm1—O1	73.72 (14)
O13$_{i}$—La1—O4	141.9 (13)	O7$_{i}$—Sm1—O2	129.20 (12)
O7$_{ii}$—La1—O4	77.8 (13)	O13$_{ii}$—Sm1—O2	73.27 (11)
O14$_{iii}$—La1—O4	71.5 (13)	O14$_{iii}$—Sm1—O2	80.46 (11)
O5—La1—O4	70.1 (13)	O5—Sm1—O2	80.06 (14)
O3—La1—O4	67.6 (13)	O1—Sm1—O2	52.62 (9)
O13$_{i}$—La1—O2	72.8 (2)	O7$_{i}$—Sm1—O4B	69.5 (3)
O7$_{ii}$—La1—O2	127.9 (2)	O13$_{ii}$—Sm1—O4B	137.7 (5)
O14$_{iii}$—La1—O2	83.5 (3)	O14$_{iii}$—Sm1—O4B	83.8 (3)
O5—La1—O2	78.4 (3)	O5—Sm1—O4B	71.0 (5)
O3—La1—O2	136.8 (2)	O1—Sm1—O4B	125.9 (4)
O4—La1—O2	143.0 (14)	O2—Sm1—O4B	148.7 (5)
O13$_{i}$—La1—O1	77.7 (2)	O7$_{i}$—Sm1—O3	78.89 (11)

O7^{ii}—La1—O1	78.7 (2)	O13^{ii}—Sm1—O3	73.06 (11)
O14^{iii}—La1—O1	129.0 (3)	O14^{iii}—Sm1—O3	79.72 (12)
O5—La1—O1	72.6 (3)	O5—Sm1—O3	137.76 (14)
O3—La1—O1	144.6 (2)	O1—Sm1—O3	144.33 (11)
O4—La1—O1	130.8 (12)	O2—Sm1—O3	132.89 (10)
O2—La1—O1	50.90 (18)	O4B—Sm1—O3	69.4 (5)
O13^{i}—La1—O4B	141.6 (11)	O7^{i}—Sm1—O4	82.4 (3)
O7^{ii}—La1—O4B	70.8 (9)	O13^{ii}—Sm1—O4	140.2 (4)
O14^{iii}—La1—O4B	79.0 (9)	O14^{iii}—Sm1—O4	70.5 (3)
O5—La1—O4B	68.9 (11)	O5—Sm1—O4	70.5 (4)
O3—La1—O4B	70.1 (10)	O1—Sm1—O4	135.2 (4)
O4—La1—O4B	7.9 (17)	O2—Sm1—O4	140.8 (4)
O2—La1—O4B	145.5 (11)	O4B—Sm1—O4	13.3 (3)
O1—La1—O4B	124.3 (7)	O3—Sm1—O4	67.5 (4)
O10^{iv}—La2—O9^{iv}	78.1 (2)	O10^{iv}—Sm2—O8	76.12 (13)
O10^{iv}—La2—O8	75.7 (3)	O10^{iv}—Sm2—O9^{iv}	78.16 (12)
O9^{iv}—La2—O8	130.4 (2)	O8—Sm2—O9^{iv}	130.62 (11)
O10^{iv}—La2—O15	123.4 (2)	O10^{iv}—Sm2—O15	124.35 (11)
O9^{iv}—La2—O15	88.4 (3)	O8—Sm2—O15	73.76 (13)
O8—La2—O15	72.6 (3)	O9^{iv}—Sm2—O15	87.53 (12)
O10^{iv}—La2—O17	83.6 (3)	O10^{iv}—Sm2—O17	84.53 (16)
O9^{iv}—La2—O17	75.3 (4)	O8—Sm2—O17	140.52 (17)
O8—La2—O17	140.7 (4)	O9^{iv}—Sm2—O17	76.39 (17)
O15—La2—O17	145.1 (3)	O15—Sm2—O17	143.50 (16)
O10^{iv}—La2—O16	150.2 (3)	O10^{iv}—Sm2—O16	149.71 (13)
O9^{iv}—La2—O16	75.5 (2)	O8—Sm2—O16	133.56 (13)
O8—La2—O16	132.8 (3)	O9^{iv}—Sm2—O16	76.13 (12)
O15—La2—O16	69.4 (3)	O15—Sm2—O16	70.26 (12)
O17—La2—O16	76.7 (3)	O17—Sm2—O16	74.11 (16)
O10^{iv}—La2—O12^{v}	133.4 (2)	O10^{iv}—Sm2—O12^{v}	131.97 (12)
O9^{iv}—La2—O12^{v}	147.0 (2)	O8—Sm2—O12^{v}	74.37 (13)
O8—La2—O12^{v}	75.8 (3)	O9^{iv}—Sm2—O12^{v}	148.40 (12)
O15—La2—O12^{v}	80.9 (2)	O15—Sm2—O12^{v}	81.68 (12)
O17—La2—O12^{v}	96.1 (4)	O17—Sm2—O12^{v}	95.04 (18)
O16—La2—O12^{v}	71.5 (2)	O16—Sm2—O12^{v}	72.27 (12)
O10^{iv}—La2—O11^{v}	85.7 (3)	O10^{iv}—Sm2—O11^{v}	83.49 (14)
O9^{iv}—La2—O11^{v}	146.0 (3)	O8—Sm2—O11^{v}	72.24 (17)
O8—La2—O11^{v}	72.0 (3)	O9^{iv}—Sm2—O11^{v}	144.35 (14)
O15—La2—O11^{v}	125.2 (3)	O15—Sm2—O11^{v}	127.85 (13)
O17—La2—O11^{v}	73.4 (4)	O17—Sm2—O11^{v}	71.61 (19)
O16—La2—O11^{v}	109.2 (3)	O16—Sm2—O11^{v}	108.94 (17)
O12^{v}—La2—O11^{v}	50.6 (3)	O12^{v}—Sm2—O11^{v}	51.74 (14)
O10^{iv}—La2—O10	76.9 (2)	O10^{iv}—Sm2—O10	77.26 (11)
O9^{iv}—La2—O10	66.6 (2)	O8—Sm2—O10	66.62 (11)

O8—La2—O10	66.9 (2)	O9^{iv}—Sm2—O10	66.98 (11)
O15—La2—O10	47.87 (19)	O15—Sm2—O10	48.02 (10)
O17—La2—O10	139.8 (3)	O17—Sm2—O10	141.60 (16)
O16—La2—O10	104.4 (2)	O16—Sm2—O10	106.59 (11)
O12^{v}—La2—O10	122.8 (2)	O12^{v}—Sm2—O10	122.24 (12)
O11^{v}—La2—O10	138.1 (3)	O11^{v}—Sm2—O10	137.59 (16)

Symmetry codes: (i) $-x + 1/2, y + 1/2, -z + 1/2$; (ii) $-x + 1/2, -y + 3/2, -z + 1$; (iii) $x + 1/2, y + 1/2, z$; (iv) $-x + 1, -y + 1, -z + 1$; (v) $x, -y + 1, z - 1/2$.

Table S3 Selected bond lengths (Å) and angles (deg) of compound **6**-**7**

6		**7**	
Eu1—O7^{i}	2.329 (6)	Tb1—O7^{i}	2.282 (6)
Eu1—O13^{ii}	2.339 (6)	Tb1—O14^{ii}	2.295 (5)
Eu1—O14^{iii}	2.353 (6)	Tb1—O13^{iii}	2.300 (6)
Eu1—O5	2.367 (7)	Tb1—O5	2.364 (7)
Eu1—O2	2.485 (5)	Tb1—O4B	2.42 (2)
Eu1—O1	2.486 (5)	Tb1—O1	2.447 (5)
Eu1—O4B	2.49 (3)	Tb1—O2	2.462 (5)
Eu1—O3	2.505 (5)	Tb1—O3	2.478 (5)
Eu1—O4	2.54 (3)	Tb1—O4	2.53 (3)
Eu2—O10^{iv}	2.343 (6)	Tb2—O10^{iv}	2.294 (6)
Eu2—O8	2.378 (6)	Tb2—O8	2.313 (6)
Eu2—O9^{iv}	2.394 (5)	Tb2—O9^{iv}	2.339 (5)
Eu2—O15	2.405 (6)	Tb2—O15	2.374 (6)
Eu2—O17	2.411 (8)	Tb2—O17	2.407 (7)
Eu2—O16	2.458 (6)	Tb2—O16	2.434 (6)
Eu2—O12^{v}	2.485 (6)	Tb2—O12^{v}	2.450 (6)
Eu2—O11^{v}	2.519 (8)	Tb2—O11^{v}	2.476 (7)
Eu2—O10	2.901 (6)	O7^{i}—Tb1—O14^{ii}	151.3 (2)
O7^{i}—Eu1—O13^{ii}	85.1 (3)	O7^{i}—Tb1—O13^{iii}	85.2 (3)
O7^{i}—Eu1—O14^{iii}	150.4 (2)	O14^{ii}—Tb1—O13^{iii}	106.2 (2)
O13^{ii}—Eu1—O14^{iii}	107.9 (2)	O7^{i}—Tb1—O5	100.7 (3)
O7^{i}—Eu1—O5	100.4 (3)	O14^{ii}—Tb1—O5	83.0 (2)
O13^{ii}—Eu1—O5	149.1 (3)	O13^{iii}—Tb1—O5	149.3 (2)
O14^{iii}—Eu1—O5	82.2 (3)	O7^{i}—Tb1—O4B	71.5 (5)
O7^{i}—Eu1—O2	129.2 (2)	O14^{ii}—Tb1—O4B	83.4 (5)
O13^{ii}—Eu1—O2	73.3 (2)	O13^{iii}—Tb1—O4B	139.1 (6)
O14^{iii}—Eu1—O2	80.4 (2)	O5—Tb1—O4B	70.0 (6)
O5—Eu1—O2	80.1 (2)	O7^{i}—Tb1—O1	78.3 (2)
O7^{i}—Eu1—O1	78.3 (2)	O14^{ii}—Tb1—O1	129.37 (19)
O13^{ii}—Eu1—O1	77.9 (2)	O13^{iii}—Tb1—O1	77.78 (19)
O14^{iii}—Eu1—O1	129.7 (2)	O5—Tb1—O1	74.1 (2)
O5—Eu1—O1	73.6 (3)	O4B—Tb1—O1	126.8 (4)
O2—Eu1—O1	52.74 (16)	O7^{i}—Tb1—O2	129.8 (2)

O7^{i}—Eu1—O4B	69.4 (5)	O14^{ii}—Tb1—O2	78.91 (19)
O13^{ii}—Eu1—O4B	137.7 (8)	O13^{iii}—Tb1—O2	73.7 (2)
O14^{iii}—Eu1—O4B	83.9 (5)	O5—Tb1—O2	79.7 (2)
O5—Eu1—O4B	71.0 (8)	O4B—Tb1—O2	146.5 (6)
O2—Eu1—O4B	148.7 (8)	O1—Tb1—O2	53.21 (16)
O1—Eu1—O4B	125.8 (6)	O7^{i}—Tb1—O3	79.9 (2)
O7^{i}—Eu1—O3	79.1 (2)	O14^{ii}—Tb1—O3	78.8 (2)
O13^{ii}—Eu1—O3	73.0 (2)	O13^{iii}—Tb1—O3	72.5 (2)
O14^{iii}—Eu1—O3	79.6 (2)	O5—Tb1—O3	138.1 (2)
O5—Eu1—O3	137.8 (3)	O4B—Tb1—O3	70.7 (5)
O2—Eu1—O3	132.81 (17)	O1—Tb1—O3	144.3 (2)
O1—Eu1—O3	144.4 (2)	O2—Tb1—O3	131.81 (17)
O4B—Eu1—O3	69.5 (8)	O7^{i}—Tb1—O4	83.2 (6)
O7^{i}—Eu1—O4	82.4 (6)	O14^{ii}—Tb1—O4	70.7 (5)
O13^{ii}—Eu1—O4	140.2 (7)	O13^{iii}—Tb1—O4	138.2 (7)
O14^{iii}—Eu1—O4	70.6 (5)	O5—Tb1—O4	72.5 (7)
O5—Eu1—O4	70.6 (7)	O4B—Tb1—O4	13.2 (5)
O2—Eu1—O4	140.8 (6)	O1—Tb1—O4	137.7 (5)
O1—Eu1—O4	135.1 (6)	O2—Tb1—O4	140.7 (7)
O4B—Eu1—O4	13.4 (5)	O3—Tb1—O4	65.9 (7)
O3—Eu1—O4	67.5 (7)	O10^{iv}—Tb2—O8	76.8 (3)
O10^{iv}—Eu2—O8	76.2 (2)	O10^{iv}—Tb2—O9^{iv}	77.4 (2)
O10^{iv}—Eu2—O9^{iv}	78.0 (2)	O8—Tb2—O9^{iv}	128.5 (2)
O8—Eu2—O9^{iv}	130.6 (2)	O10^{iv}—Tb2—O15	124.8 (2)
O10^{iv}—Eu2—O15	124.3 (2)	O8—Tb2—O15	74.7 (3)
O8—Eu2—O15	73.8 (2)	O9^{iv}—Tb2—O15	85.0 (2)
O9^{iv}—Eu2—O15	87.5 (2)	O10^{iv}—Tb2—O17	83.2 (3)
O10^{iv}—Eu2—O17	84.6 (3)	O8—Tb2—O17	142.8 (3)
O8—Eu2—O17	140.5 (3)	O9^{iv}—Tb2—O17	75.4 (3)
O9^{iv}—Eu2—O17	76.4 (3)	O15—Tb2—O17	141.5 (3)
O15—Eu2—O17	143.5 (3)	O10^{iv}—Tb2—O16	148.5 (2)
O10^{iv}—Eu2—O16	149.7 (2)	O8—Tb2—O16	134.4 (3)
O8—Eu2—O16	133.5 (2)	O9^{iv}—Tb2—O16	77.4 (2)
O9^{iv}—Eu2—O16	76.2 (2)	O15—Tb2—O16	71.1 (2)
O15—Eu2—O16	70.3 (2)	O17—Tb2—O16	72.4 (3)
O17—Eu2—O16	74.1 (3)	O10^{iv}—Tb2—O12^{v}	131.7 (2)
O10^{iv}—Eu2—O12^{v}	132.0 (2)	O8—Tb2—O12^{v}	74.3 (2)
O8—Eu2—O12^{v}	74.3 (2)	O9^{iv}—Tb2—O12^{v}	149.8 (2)
O9^{iv}—Eu2—O12^{v}	148.5 (2)	O15—Tb2—O12^{v}	82.9 (2)
O15—Eu2—O12^{v}	81.7 (2)	O17—Tb2—O12^{v}	97.6 (3)
O17—Eu2—O12^{v}	95.0 (3)	O16—Tb2—O12^{v}	72.5 (2)
O16—Eu2—O12^{v}	72.2 (2)	O10^{iv}—Tb2—O11^{v}	83.0 (3)
O10^{iv}—Eu2—O11^{v}	83.7 (3)	O8—Tb2—O11^{v}	74.2 (3)
O8—Eu2—O11^{v}	72.2 (3)	O9^{iv}—Tb2—O11^{v}	144.0 (3)

O9^{iv}—Eu2—O11^{v}	144.4 (3)	O15—Tb2—O11^{v}	130.8 (2)
O15—Eu2—O11^{v}	127.8 (2)	O17—Tb2—O11^{v}	72.4 (4)
O17—Eu2—O11^{v}	71.7 (4)	O16—Tb2—O11^{v}	107.4 (3)
O16—Eu2—O11^{v}	108.8 (3)	O12^{v}—Tb2—O11^{v}	52.4 (3)
O12^{v}—Eu2—O11^{v}	51.6 (2)		
O10^{iv}—Eu2—O10	77.1 (2)		
O8—Eu2—O10	66.7 (2)		
O9^{iv}—Eu2—O10	66.8 (2)		
O15—Eu2—O10	48.10 (17)		
O17—Eu2—O10	141.5 (3)		
O16—Eu2—O10	106.6 (2)		
O12^{v}—Eu2—O10	122.4 (2)		
O11^{v}—Eu2—O10	137.6 (3)		

Symmetry codes: (i) $-x + 1/2, y + 1/2, -z + 1/2$; (ii) $x + 1/2, y + 1/2, z$; (iii) $-x + 1/2, -y + 3/2, -z + 1$; (iv) $-x + 1, -y + 1, -z + 1$; (v) $x, -y + 1, z - 1/2$.

Table S4 Selected bond lengths (Å) and angles (deg) of compound **8-9**

8		**9**	
Sm1—O3^{i}	2.3795 (16)	Nd1—O3^{i}	2.4083 (15)
Sm1—O7	2.410 (2)	Nd1—O7	2.442 (2)
Sm1—O6^{ii}	2.4181 (16)	Nd1—O6^{ii}	2.4548 (15)
Sm1—O5^{iii}	2.4519 (18)	Nd1—O8	2.4744(18)
Sm1—O8	2.4536 (19)	Nd1—O5^{iii}	2.4775 (15)
Sm1—O2	2.4747 (19)	Nd1—O2	2.4934 (16)
Sm1—O4^{iv}	2.4839 (16)	Nd1—O4^{iv}	2.5174(16)
Sm1—O1	2.5348 (19)	Nd1—O1	2.5602 (17)
Sm1—O3^{iv}	2.7472 (17)	Nd1—O3^{iv}	2.7585 (14)
O3^{i}—Sm1—O7	81.45 (7)	O3^{i}—Nd1—O7	81.73 (6)
O3^{i}—Sm1—O6^{ii}	74.56 (6)	O3^{i}—Nd1—O6^{ii}	74.29 (5)
O7—Sm1—O6^{ii}	138.78 (7)	O7—Nd1—O6^{ii}	138.88 (7)
O3^{i}—Sm1—O5^{iii}	81.23 (6)	O3^{i}—Nd1—O8	149.22 (5)
O7—Sm1—O5^{iii}	75.30 (8)	O7—Nd1—O8	76.56 (7)
O6^{ii}—Sm1—O5^{iii}	131.44 (6)	O6^{ii}—Nd1—O8	135.65 (6)
O3^{i}—Sm1—O8	148.83 (6)	O3^{i}—Nd1—O5^{iii}	81.21 (5)
O7—Sm1—O8	76.17 (7)	O7—Nd1—O5^{iii}	75.02 (7)
O6^{ii}—Sm1—O8	135.92 (6)	O6^{ii}—Nd1—O5^{iii}	131.50 (5)
O5^{iii}—Sm1—O8	72.35 (6)	O8—Nd1—O5^{iii}	72.32 (5)
O3^{i}—Sm1—O2	129.54 (6)	O3^{i}—Nd1—O2	129.13 (5)
O7—Sm1—O2	93.29 (8)	O7—Nd1—O2	92.57 (7)
O6^{ii}—Sm1—O2	77.66(6)	O6^{ii}—Nd1—O2	78.11 (5)

O5^{iii}—Sm1—O2	145.89 (6)	O8—Nd1—O2	73.92 (6)
O8—Sm1—O2	73.73 (7)	O5^{iii}—Nd1—O2	145.88 (5)
O3^{i}—Sm1—O4^{iv}	123.26 (6)	O3^{i}—Nd1—O4^{iv}	122.95 (5)
O7—Sm1—O4^{iv}	148.25 (7)	O7—Nd1—O4^{iv}	148.64 (6)
O6^{ii}—Sm1—O4^{iv}	71.86 (6)	O6^{ii}—Nd1—O4^{iv}	71.33 (5)
O5^{iii}—Sm1—O4^{iv}	88.27 (6)	O8—Nd1—O4^{iv}	72.88 (5)
O8—Sm1—O4^{iv}	72.98 (6)	O5^{iii}—Nd1—O4^{iv}	89.03 (6)
O2—Sm1—O4^{iv}	85.24 (6)	O2—Nd1—O4^{iv}	85.71 (5)
O3^{i}—Sm1—O1	79.47 (6)	O3^{i}—Nd1—O1	79.40 (5)
O7—Sm1—O1	71.18 (8)	O7—Nd1—O1	71.10 (7)
O6^{ii}—Sm1—O1	71.81 (6)	O6^{ii}—Nd1—O1	71.98 (5)
O5^{iii}—Sm1—O1	143.30 (6)	O8—Nd1—O1	112.98 (5)
O8—Sm1—O1	112.61 (6)	O5^{iii}—Nd1—O1	142.88 (6)
O2—Sm1—O1	51.95 (6)	O2—Nd1—O1	51.50 (6)
O4^{iv}—Sm1—O1	128.37 (6)	O4^{iv}—Nd1—O1	128.04 (5)
O3^{i}—Sm1—O3^{iv}	76.05 (6)	O3^{i}—Nd1—O3^{iv}	76.32 (5)
O7—Sm1—O3^{iv}	137.49 (8)	O7—Nd1—O3^{iv}	137.65 (6)
O6^{ii}—Sm1—O3^{iv}	67.58 (6)	O6^{ii}—Nd1—O3^{iv}	67.62 (5)
O5^{iii}—Sm1—O3^{iv}	66.01 (5)	O8—Nd1—O3^{iv}	105.90 (5)
O8—Sm1—O3^{iv}	106.72 (6)	O5^{iii}—Nd1—O3^{iv}	66.21(5)
O2—Sm1—O3^{iv}	128.75 (6)	O2—Nd1—O3^{iv}	129.26 (5)
O4^{iv}—Sm1—O3^{iv}	49.27 (5)	O4^{iv}—Nd1—O3^{iv}	48.94 (5)
O1—Sm1—O3^{iv}	136.73 (5)	O1—Nd1—O3^{i}	137.06 (5)

Symmetry codes: (i) $-x, -y+1, -z+1$; (ii) $-x, y, -z+3/2$; (iii) $x+1/2, -y+1/2, z-1/2$; (iv) $x+1/2, y-1/2, z$.