**Supporting Information**

Four Ln-coordination polymers: Synthesis, crystal structure, fluorescent sensing of nitrobenzene and Tb3+, and catalytic properties

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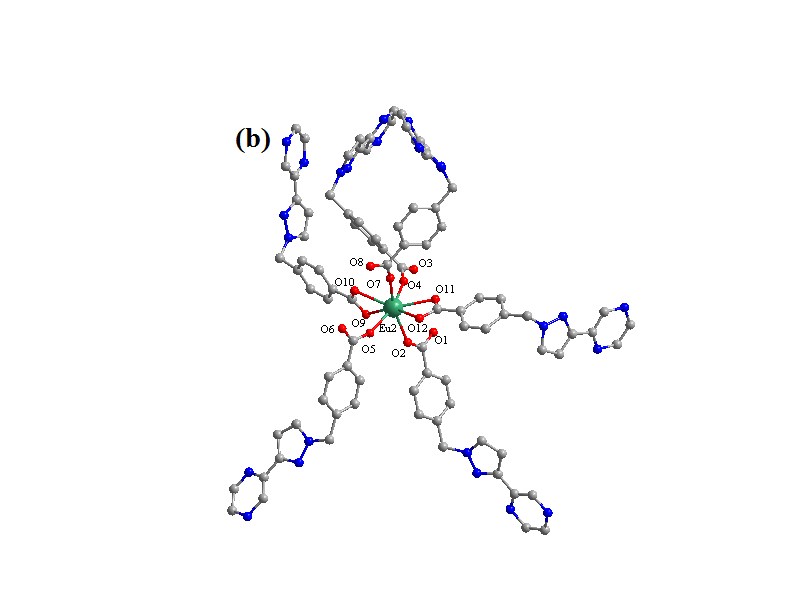
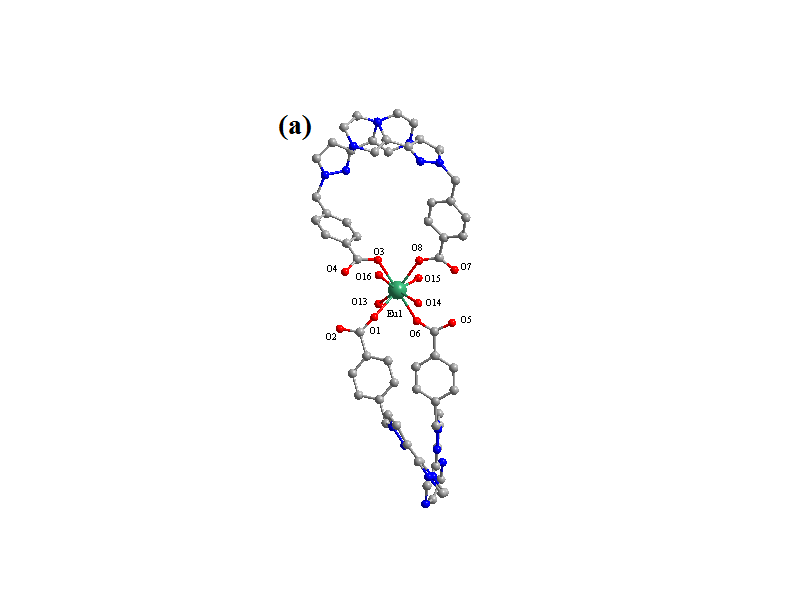


Figure S1. The coordination environment of Eu1 (a) and Eu2 (b) in **1**.

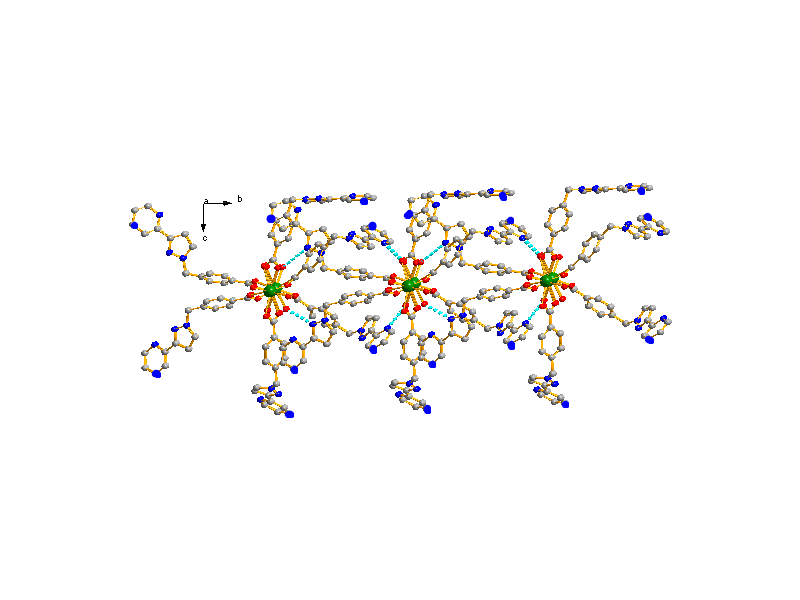


Figure S2. The 2D structure of **1**.

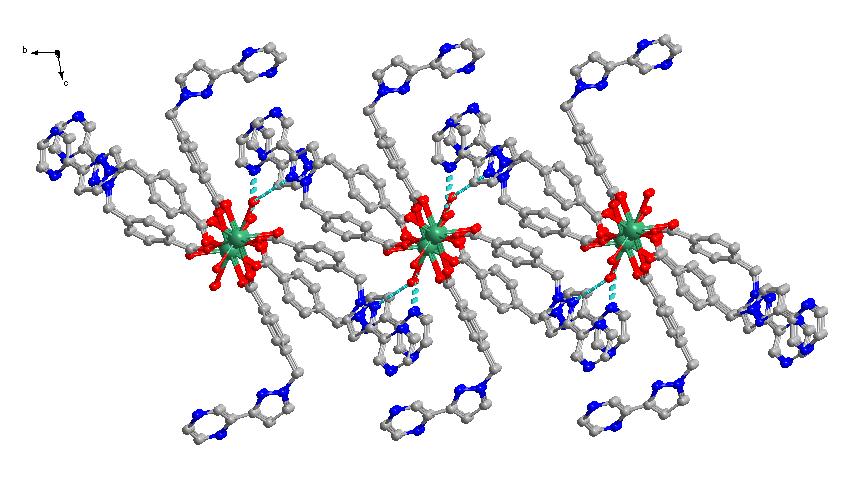


Figure S3. The 2D structure of **2**.

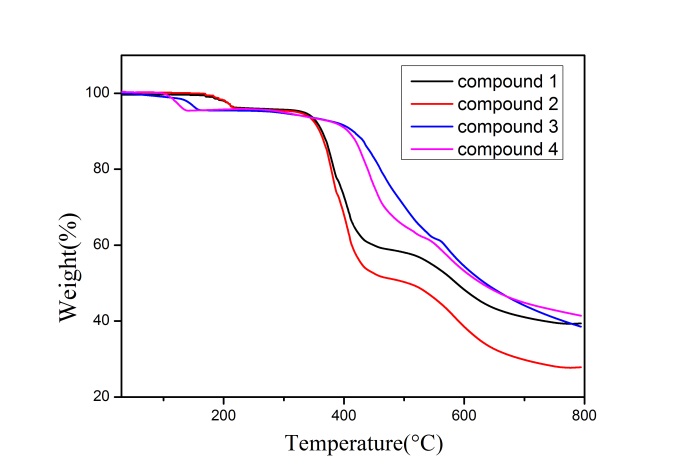


Figure S4. Thermal gravimetric analysis of **1**-**4**.

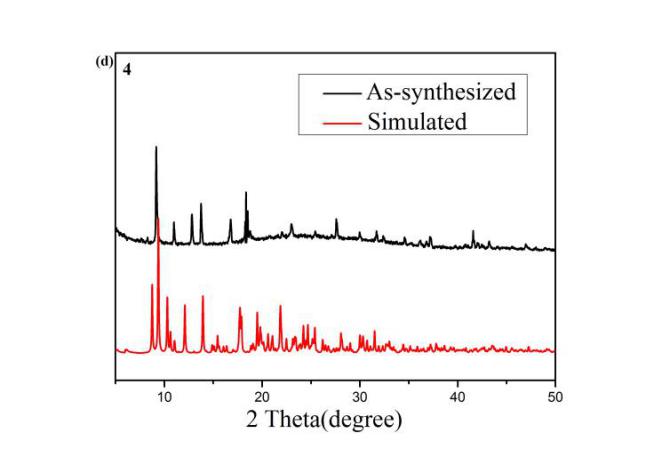
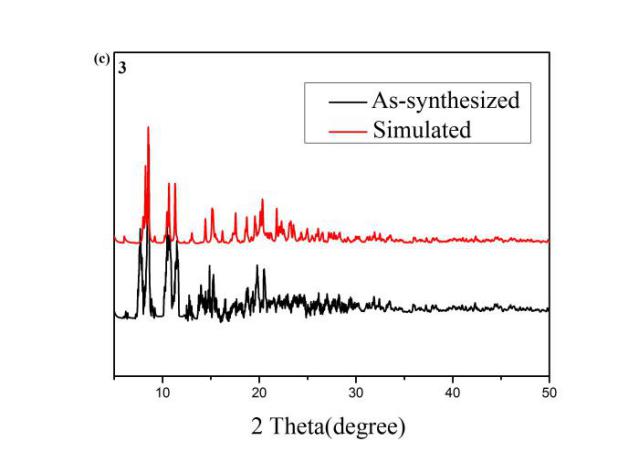
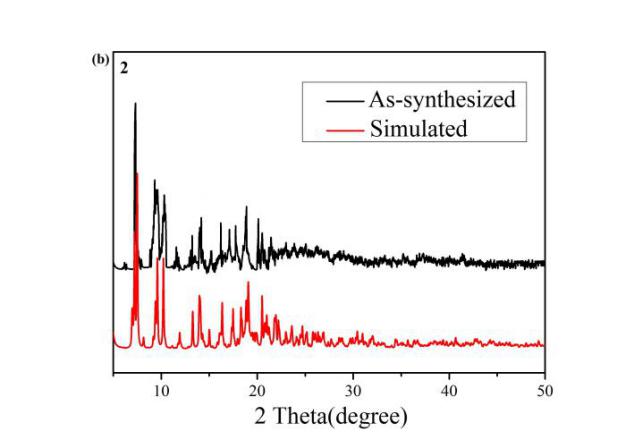
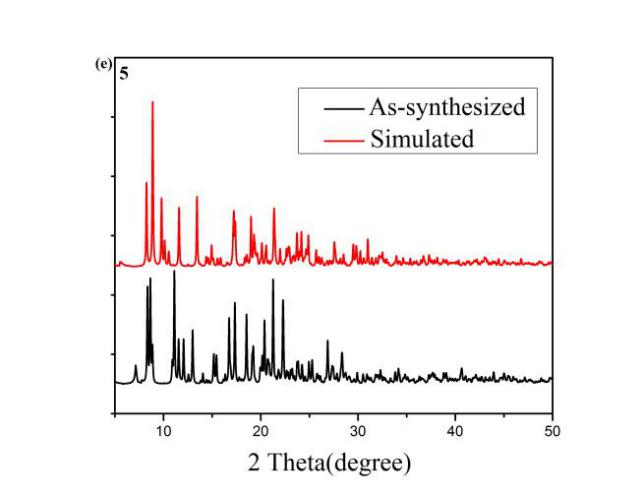
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Figure S5. The comparison of PXRD pattern of the obtained sample and simulate pattern from single crystal data of **1**-**4**.

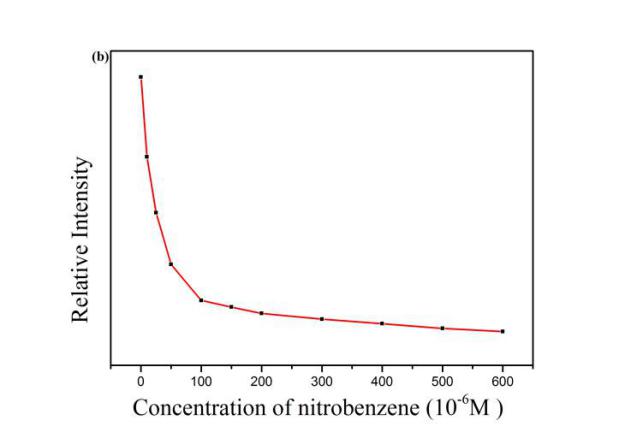
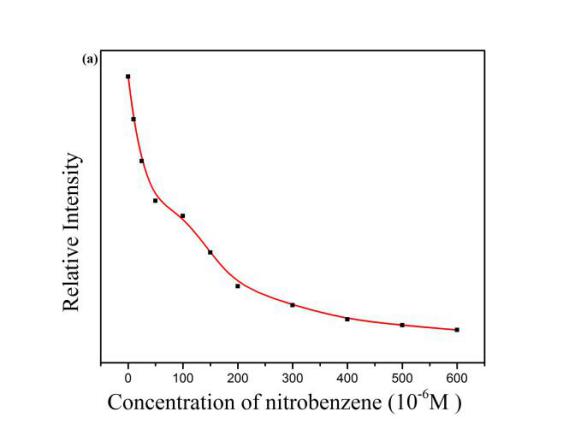


Figure S6. The relative fluorescence intensity at 618 nm of **1** (a) and at 546 nm of **2** (b)treated with various concentrations of nitrobenzene.

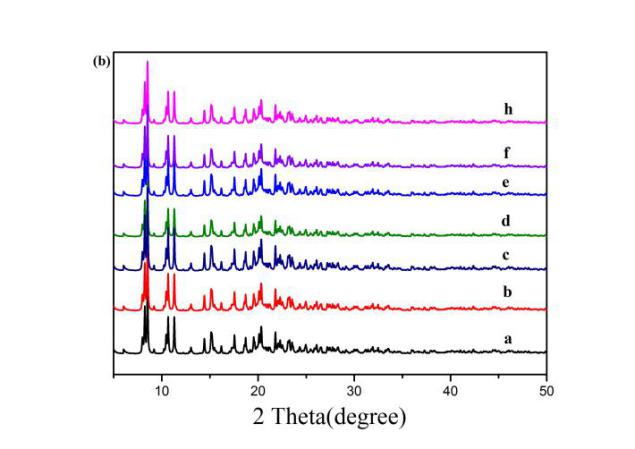
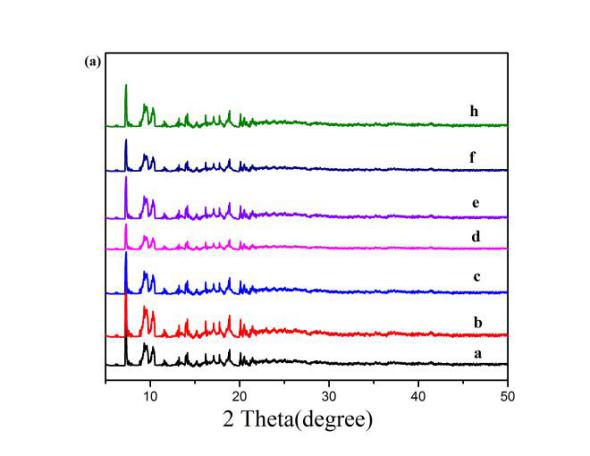


Figure S7. Powder X-ray diffraction patterns of **1** (a) and **2** (b) after being immersed in different organic solvents (a: H2O, b: MeOH, c: EtOH, d: DMF, e: DMA, f: ACN: h: NA).

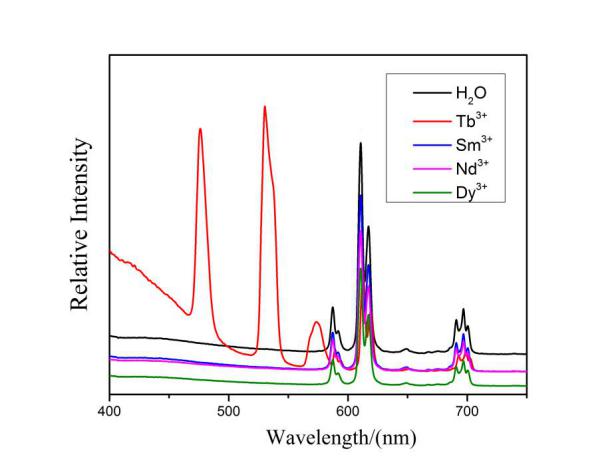


Figure S8. The fluorescence intensities of **1** withvarious Ln3+ ions.

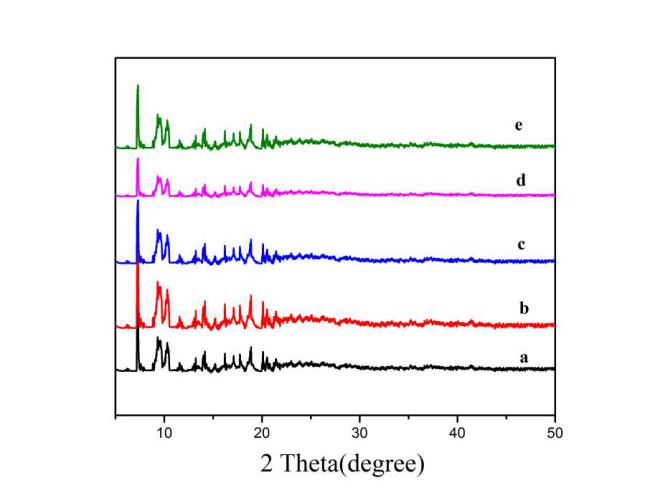


Figure S9. Powder X-ray diffraction patterns of **1** (a)after being immersed in different Ln3+ ions (a: H2O, b: Sm3+, c: Tb3+, d: Nd3+, e: Dy3+).

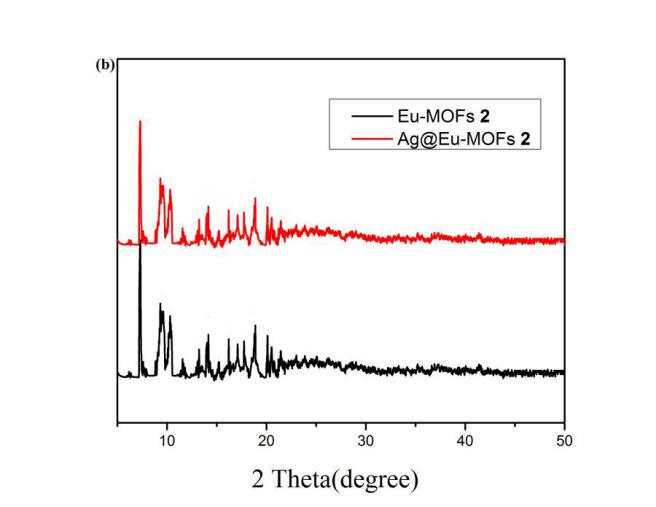


Figure S10. Powder X-ray diffraction patterns of Ag@ compound **1** and compound **1**.

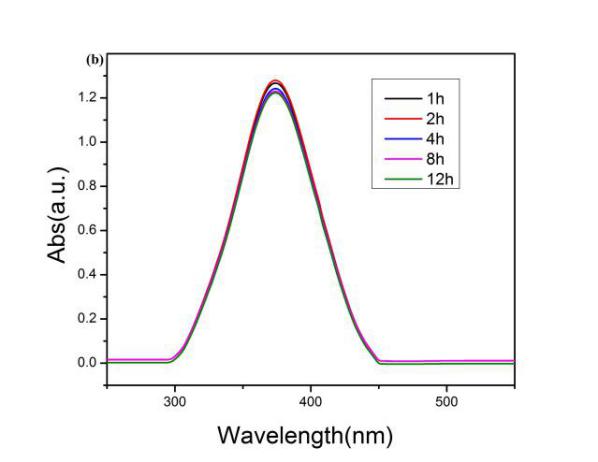
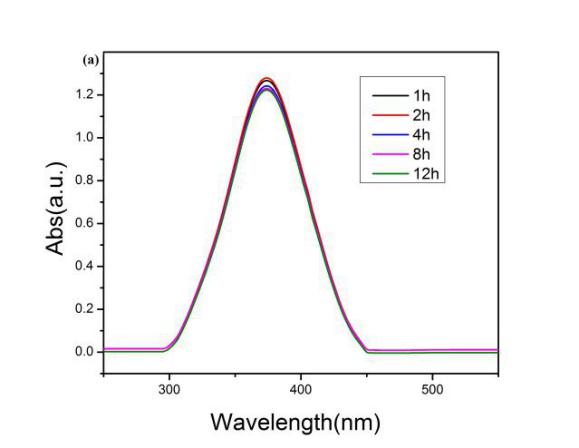


Figure S11. Catalytic performance of no catalysts (a) and **1** (b).

Table S1. Selected bond lengths (Å) and angles (deg) of **1**-**4**.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Compound **1** |  |  |  |  |  |
| Eu1-O1 | 2.309(7) | Eu1-O6 | 2.323(6) | Eu1-O8 | 2.3337(6) |
| Eu1-O3 | 2.3726) | Eu1-O16 | 2.397(6) | Eu1-O15 | 2.430(6) |
| Eu1-O13 | 2.430(6) | Eu1-O14 | 2.472(6) | Eu2-O5 | 2.276(6) |
| Eu2-O7 | 2.287(6) | Eu2-O4i | 2.289(6) | Eu2-O2i | 2.322(6) |
| Eu2-O10 | 2.425(6) | Eu1-O11 | 2.442(7) | Eu1-O12 | 2.492(7) |
| Eu2-O9 | 2.530(7) |  |  |  |  |
| O8-Eu1-O14 | 73.2(2) | O2i-Eu2-O10 | 126.5(2) | O5-Eu2-O12 | 78.3(2) |
| O3-Eu1-O14 | 145.3(2) | O5-Eu2-O11 | 129.6(2) | O7-Eu2-O12 | 72.8(2) |
| O16-Eu1-O14 | 74.1(2) | O8-Eu1-O14 | 73.2(2) | O4i-Eu2-O12 | 123.5(2) |
| O15-Eu1-O14 | 117.6(2) | O3-Eu1-O14 | 145.3(2) | O2i-Eu2-O12 | 83.8(2) |
| O13-Eu1-O14 | 141.2(2) | O16-Eu1-O14 | 74.1(2) | O10-Eu2-O12 | 138.2(2) |
| O5-Eu2-O7 | 94.1(2) | O15-Eu1-O14 | 117.6(2) | O11-Eu2-O12 | 52.5(2) |
| O5-Eu2-O4i | 158.2(2) | O13-Eu1-O14 | 141.2(2) | O5-Eu2-O9 | 87.0(2) |
| O7-Eu2-O4i | 91.4(2) | O1-Eu1-C16 | 94.1(2) | O7-Eu2-O9 | 126.0(2) |
| O5-Eu2-O2i | 82.4(2) | O6-Eu1-C16 | 138.7(2) | O4i-Eu2-O9 | 72.7(2) |
| O7-Eu2-O2i | 156.5(3) | O8-Eu1-C16 | 94.3(2 | O2i-Eu2-O9 | 77.3(2) |
| O4i-Eu2-O2i | 100.5(2) | O7-Eu2-O11 | 82.1(2) | O10-Eu2-O9 | 52.4(2) |
| O5-Eu2-O10 | 78.4(2) | O4i-Eu2-O11 | 72.1(2) | O11-Eu2-O9 | 134.9(2) |
| O7-Eu2-O10 | 74.9(2) | O2i-Eu2-O11 | 82.4(2) | O12-Eu2-O9 | 157.4(2) |
| O4i-Eu2-O10 | 82.7(2) | O10-Eu2-O11 | 145.3(2) |  |  |
| Compound **2** |  |  |  |  |  |
| Sm1-O6 | 2.365(5) | Sm1-O3 | 2.421(5) | Sm1-O8 | 2.476(5) |
| Sm1-O2 | 2.412(4) | Sm1-O1ii | 2.441(5) | Sm1-O7 | 2.502(5) |
| Sm1-O4i | 2.416(5) | Sm1-O5i | 2.445(5) |  |  |
| O6-Sm1-O2 | 148.02(18) | O6-Sm1-O5i | 121.67(17) | O1ii-Sm1-O8 | 69.91(17) |
| O6-Sm1-O4i | 71.13(17) | O2-Sm1-O5i | 78.07(16) | O5i-Sm1-O8 | 134.99(17) |
| O2-Sm1-O4i | 138.04(16) | O4i-Sm1-O5i | 90.59(18) | O6-Sm1-O7 | 136.56(16) |
| O6-Sm1-O3 | 76.98(17) | O3-Sm1-O5i | 74.39(17) | O2-Sm1-O7 | 70.56(16) |
| O2-Sm1-O3 | 86.08(15) | O1ii-Sm1-O5i | 140.41(17) | O4i-Sm1-O7 | 67.52(16) |
| O4i-Sm1-O3 | 129.86(16) | O6-Sm1-O8 | 75.31(17) | O3-Sm1-O7 | 142.16(17) |
| O6-Sm1-O1ii | 91.37(17) | O2-Sm1-O8 | 73.40(17) | O1ii-Sm1-O7 | 68.81(17) |
| O2-Sm1-O1ii | 84.10(15) | O4i-Sm1-O8 | 133.45(18) | O5i-Sm1-O7 | 71.97(17) |
| O4i-Sm1-O1ii | 79.50(16) | O3-Sm1-O8 | 69.65(17) | O8-Sm1-O7 | 126.92(17) |
| O3-Sm1-O1ii | 139.53(16) |  |  |  |  |
| Compound **3** |  |  |  |  |  |
| Nd1-O3 | 2.411(4) | Nd1-O5 | 2.454(4) | Nd1-O8 | 2.513(5) |
| Nd1-O6i | 2.436(4) | Nd1-O2ii | 2.469(4) | Nd1-O7 | 2.534(5) |
| Nd1-O1 | 2.439(4) | Nd1-O4i | 2.481(4) | Nd1-O3i | 2.967(5) |
| O6i-Nd1-O1 | 138.48(15) | O2ii-Nd1-O4i | 139.48(15) | O2ii-Nd1-O7 | 68.75(16) |
| O3-Nd1-O5 | 76.23(15) | O3-Nd1-O8 | 75.94(16) | O4i-Nd1-O7 | 71.35(15) |
| O6i-Nd1-O5 | 130.35(14) | O6i-Nd1-O8 | 132.52(16) | O8-Nd1-O7 | 126.47(15) |
| O1-Nd1-O5 | 85.86(14) | O1-Nd1-O8 | 72.96(15) | O3-Nd1-O3i | 75.84(15) |
| O3-Nd1-O2ii | 92.51(15) | O5-Nd1-O8 | 69.77(15) | O6i-Nd1-O3i | 72.33(14) |
| O6i-Nd1-O2ii | 79.32(15) | O2ii-Nd1-O8 | 69.13(15) | O1-Nd1-O3i | 119.81(13) |
| O1-Nd1-O2ii | 83.66(14) | O4i-Nd1-O8 | 134.79(15) | O5-Nd1-O3i | 64.16(14) |
| O5-Nd1-O2ii | 138.88(16) | O3-Nd1-O7 | 136.74(15) | O2ii-Nd1-O3i | 151.52(13) |
| O3-Nd1-O4i | 122.11(15) | O6i-Nd1-O7 | 67.58(15) | O4i-Nd1-O3i | 46.43(13) |
| O6i-Nd1-O4i | 92.03(16) | O1-Nd1-O7 | 70.98(15) | O8-Nd1-O3i | 130.22(13) |
| O1-Nd1-O4i | 77.03(14) | O5-Nd1-O7 | 142.60(16) | O7-Nd1-O3i | 101.98(14) |
| O5-Nd1-O4i | 75.13(15) |  |  |  |  |
| Compound **4** |  |  |  |  |  |
| Nd1-O4 | 2.353(9) | Nd1-O5 | 2.425(9) | Nd1-O2 | 2.522(9) |
| Nd1-O6i | 2.364(10) | Nd1-O7 | 2.501(9) | Nd1-O1 | 2.511(10) |
| Nd1-O3ii | 2.415(9) | Nd1-O8 | 2.509(10) |  |  |
| O4-Nd1-O6i | 153.1(3) | O4-Nd1-O8 | 135.6(3) | O7-Nd1-O2 | 150.5(3) |
| O4-Nd1-O3ii | 103.0(3) | O6i-Nd1-O8 | 70.6(3) | O8-Nd1-O2 | 128.3(3) |
| O6i-Nd1-O3ii | 81.8(3) | O3ii-Nd1-O8 | 85.4(3) | O4-Nd1-O1 | 73.2(3) |
| O4-Nd1-O5 | 82.6(3) | O5-Nd1-O8 | 77.9(3) | O6i-Nd1-O1 | 82.5(3) |
| O6i-Nd1-O5 | 101.7(3) | O7-Nd1-O8 | 69.1(3) | O3ii-Nd1-O1 | 76.5(3) |
| O3ii-Nd1-O5 | 160.6(3) | O4-Nd1-O2 | 82.9(3) | O5-Nd1-O1 | 122.8(3) |
| O4-Nd1-O7 | 70.8(3) | O6i-Nd1-O2 | 72.9(3) | O7-Nd1-O1 | 128.0(3) |
| O6i-Nd1-O7 | 135.3(3) | O3ii-Nd1-O2 | 123.8(4) | O8-Nd1-O1 | 149.5(3) |
| O3ii-Nd1-O7 | 76.5(3) | O5-Nd1-O2 | 75.0(3) | O2-Nd1-O1 | 51.5(3) |
| O5-Nd1-O7 | 88.2(3) |  |  |  |  |

Symmetry codes: (i) 1+x, y, z; (ii) -1+x, y, z