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Supporting Information for the Manuscript

Efficient pure white light emission based on a three-component La:Eu,Tb-doped luminescent lanthanide metal−organic framework

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S1. Structure Solution of LnMOF-1-13.

The crystals of all complexes are stable in DMF solvents and powder in other solvents, such as water, methonal. The crystals are also sensitive to the loss of crystallization solvent (DMF). The diffracting measurements were performed several times for different crystals from different batches at three temperatures (RT, 200 K, and 100 K) leading in each case to severe disorder issues related to the crystallization solvent. This disorder affects also the organic ligands coordinated to the Ln centers.

Single-crystal X-ray diffraction data for LnMOF-**1**-**5** & **7**-**11** were collected on a Bruker Smart Apex II diffractometer equipped with 1 K CCD detector, using a graphite monochromator with Mo-K*α* radiation (λ = 0.71073 Å) at room temperature (except LnMOF-**7** at 200 K) and the data for LnMOF-**6** & **12**-**13** were collected in the Beijing Synchrotron Radiation Facility (BSRF) beamline 3W1A, which were mounted on an MARCCD-165 detector (λ = 0.71000 Å) with the storage ring working at 2.5 GeV. In the process, the crystals were protected by liquid nitrogen at 100(2) K. Data reduction and correction were processed with SAINTPlus or HKL2000 softwares. Absorption corrections were performed *via* the SADABS or HKL2000 programs. All the structures were solved by means of direct methods with SHELXS-2016, and refined on F^2 with full-matrix least-squares techniques using the program SHELXL-2016. Anisotropic thermal parameters were used to refine all non-hydrogen atoms of compounds LnMOF-**1**-**13** except disorder water and formic acid molecules. In the processes of the refinements of all complexes, solvent water molecules and some auxiliary ligands (DMF and formic acid, the latter from the decomposition of DMF) bound to rare earth metals ions were found to be seriously disordered and they were refined with parts of occupancies from the diffracting data and the reports of element analyses.

EXYZ and EADP instructions were employed to respectively restrict the coordinates and U_{ij} parameters of two or more atoms sharing the same site.

Please note that the ADP ratios are larger for some peripheral atoms. This confirms that the large ADP ratios are related to crystallization solvent disorder. Finally the larger ADP ratios for some atoms don't affect the most important part of the structure.

The details of last structure refinements for the 13 complexes were listed below.

S1.1. LnMOF-1($[La_2(C_{16}H_9O_7)_2(C_3H_7ON)_2(H_2O)_{0.7}(CHOOH)_{1.3}]_n\cdot 4.7nH_2O$) and LnMOF-2($[Ce_2(C_{16}H_9O_7)_2(C_3H_7ON)_2(H_2O)_{0.7}(CHOOH)_{1.3}]_n\cdot 4.7nH_2O$)

In LnMOF-**1** & **2**, the Ln_2 unit was coordinated by two organic ligands, two DMF, part water and part formic acid. O9 (formic acid(O9, C20, O10)) and O9A (water) atoms share a same site with occupancies of 65% and 35%.

The last refinement of LnMOF-**1** or LnMOF-**2** was processed by 50 restraints and 7 (for LnMOF-**1**, **5** for LnMOF-**2**) omitted reflections. ISOR and DFIX instructions were used for restraints of the seriously disordered atoms (C11 & C12 in the organic ligand; N1, C18, C19 & C17 in DMF; O10 & C20 in formic acid) and relevant distances(O9-C20 and C20-O10). ALERT reports from PLATON indicate that 7 (LnMOF-**1**) or 5 (LnMOF-**2**) reflections with $\sum(F_O^2 - (F_C^2)/\sum F_O^2$< - 100.0 or for which I(obs) and I(calc) differ more that 10 times $\sum W$. Those reflections are removed from the final refinement.

H atoms of some disordered oxygen atoms (O10, O9A, O11, O12, O13 & O14) were omitted, but their contributions were also included in the overall formula.

S1.2. LnMOF-3, $[Pr_2(C_{16}H_9O_7)_2(C_3H_7ON)_2(H_2O)(CHOOH)]\cdot 5H_2O$

In LnMOF-**3**, the Pr_2 unit was coordinated by two organic ligands, two DMF, part water and part formic acid. O9 (formic acid(O9, C20, O10)) and O9A (water) atoms share a same site with occupancies of 50% and 50%.

The last refinement of LnMOF-**3** was processed by 50 restraints and 6 omitted reflections. ISOR and DFIX instructions were used for restraints of the seriously disordered atoms (C11 & C12 in the organic ligand; N1, C18, C19 & C17 in DMF; O10 & C20 in formic acid) and relevant distances (O9-C20 and C20-O10). ALERT reports from PLATON indicate that 6 reflections with $\sum(F_O^2 - (F_C^2)/\sum F_O^2$< - 100.0 or for which I(obs) and I(calc) differ more that 10 times $\sum W$. Those reflections are removed from the final refinement.

H atoms of some disordered oxygen atoms (O10, O9A, O11, O12, O13 & O14) were omitted, but their contributions were also included in the overall formula.

S1.3. LnMOF-4, $[Sm_2(C_{16}H_9O_7)_2(C_3H_7ON)_2(H_2O)(CHOOH)]\cdot 2.5H_2O$

In LnMOF-**4**, the Sm_2 unit was coordinated by two organic ligands, two DMF, part water and part formic acid. O9 (formic acid) and O9A (water) atoms share a same site with occupancies of 50% and 50%.

The last refinement of LnMOF-**4** was processed by 71 restraints and 1 omitted reflection. ISOR and DFIX instructions were used for restraints of the seriously disordered atoms (O5, C10, C11 & C12 in the organic ligand; O8, N1, C18, C19 & C17 in DMF; O10 & C20 in formic acid) and relevant distances (N1-C18, N1-C19, O8-C17, O9-C20 and C20-O10). ALERT reports from PLATON indicate that 1 reflection with $\sum(F_O^2 - (F_C^2)/\sum F_O^2$< - 100.0 or for which I(obs) and I(calc) differ more that 10 times $\sum W$. Those reflections are removed from the final refinement.

H atoms of some disordered oxygen atoms (O10, O9A, O11, O12 & O13) were omitted, but their contributions were also included in the overall formula.

S1.4. LnMOF-5, $[Eu_2(C_{16}H_9O_7)_2(C_3H_7ON)_2(H_2O)(CHOOH)]\cdot 3H_2O$; LnMOF-7, $[Dy_2(C_{16}H_9O_7)_2(C_3H_7ON)_2(H_2O)(CHOOH)]\cdot 3H_2O$

In LnMOF-**5**, the Eu_2(or Dy_2 for LnMOF-**7**) unit was coordinated by two organic ligands, part DMF, part water and part formic acid. O8 (DMF1(O8, C17, N1, C18 & C19)) and O8A (formic acid(O8A, C17A, O10)) atoms share a same site with occupancies of 50% and 50%. C17 (DMF1(O8, C17, N1, C18 & C19)) and C17A (formic acid(O8A, C17A, O10)) atoms share a same site with occupancies of 50% and 50%. N1 (DMF1(O8, C17, N1, C18 & C19)) and O10 (formic acid(O8A, C17A, O10)) atoms share a same site with occupancies of 50% and 50%. O9 (DMF2(O9, C20, N2, C21 & C22)) and O9A (water) atoms share a same site with occupancies of 50% and 50%.

The last refinement of LnMOF-**5** (or LnMOF-**7**) was processed by 66 (or 48 for LnMOF-**7**) restraints and 5 (2 for LnMOF-**7**) omitted reflections.

For LnMOF-**5** ISOR instructions were used for restraints of the seriously disordered atoms (O5, C11 & C12 in the organic ligand; N1, C18, C19 & C17 in DMF1; N2, C20, C21 & C22 in DMF2). ALERT reports from PLATON indicate that 5 reflections with $\sum(F_O^2 - (F_C^2)/\sum F_O^2$< - 100.0 or for which I(obs) and I(calc) differ more that 10 times $\sum W$. Those reflections are removed from the final refinement. H atoms of some disordered oxygen atoms (O10, O9A, O11 & O12) were omitted, but their contributions were also included in the overall formula.

For LnMOF-**7** ISOR instructions were used for restraints of the seriously disordered atoms (N1, C18, C19 & C17 in DMF1; N2, C20, C21 & C22 in DMF2). ALERT reports from PLATON indicate that 2 reflections with $\sum(F_O^2 - (F_C^2)/\sum F_O^2$< - 100.0 or for which I(obs) and I(calc) differ more that 10 times $\sum W$. Those reflections are removed from the final refinement.

H atoms of some disordered oxygen atoms (O10, O9A, O11 & O12) were omitted, but their contributions were also included in the overall formula.

S1.5. LnMOF-6, $[Tb_2(C_{16}H_9O_7)_2(C_3H_7ON)_2(CHOOH)_2]\cdot 2H_2O$

In LnMOF-**6**, the Tb_2 unit was coordinated by two organic ligands, part DMF and part formic acid. O8 (DMF1 (O8, C17, N1, C18 & C19)) and O8A (formic acid1 (O8A, C17A, O10A)) atoms share a same site with occupancies of 50% and 50%. C17 (DMF1 (O8, C17, N1, C18 & C19)) and C17A (formic acid1 (O8A, C17A, O10A)) atoms share a same site with occupancies of 50% and 50%. N1 (DMF1 (O8, C17, N1, C18 & C19)) and O10A (formic acid1 (O8A, C17A, O10A)) atoms share a same site with occupancies of 50% and 50%. O9 (DMF2 (O9, C20, N2, C21 & C22)) and O9A (formic acid2 (O9A, C20A, O11A)) atoms share a same site with occupancies of 50% and 50%. C20 (DMF2 (O9, C20, N2, C21 & C22)) and C20A (formic acid2 (O9A, C20A, O11A)) atoms share a same site with occupancies of 50% and 50%. O9 (DMF2 (O9, C20, N2, C21 & C22)) and O11A (formic acid2 (O9A, C20A, O11A)) atoms share a same site with occupancies of 50% and 50%

The last refinement of LnMOF-**6** was processed by 96 restraints and 2 omitted reflections. ISOR instructions were used for restraints of the seriously disordered atoms (O5, C10, C11 & C12 in the organic ligand; O8, N1, C18, C19 & C17 in DMF1; O9, N2, C20, C21 & C22 in DMF2); C17A (formic acid1 (O8A, C17A, O10A); O11A (formic acid2(O9A, C20A, O11A). ALERT reports from PLATON indicate that 5 reflections with $\sum(F_O^2-(F_C^2)/\sum F_O^2 <$ - 100.0 or for which I(obs) and I(calc) differ more that 10 times $\sum W$. Those reflections are removed from the final refinement.

The DISP instructions were used in the SHELXL2016 refinements in order to correct anomalous scattering values (f' and f'') of elements (C, H, N, O and Tb) for the synchrotron wavelength used.

H atoms of some disordered oxygen atoms (O10A, O11A, O12 & O13) were omitted, but their contributions were also included in the overall formula.

S1.6. LnMOF-8, $[Er_2(C_{16}H_9O_7)_2(C_3H_7ON)_3(CHOOH)]\cdot 3H_2O$

In LnMOF-**8**, the Er_2 unit was coordinated by two organic ligands, part DMF and part formic acid. O8 (DMF1 (O8, C17, N1, C18 & C19)) and O8A (formic acid1 (O8A, C17A, O10)) atoms share a same site with occupancies of 75% and 25%. C17 (DMF1 (O8, C17, N1, C18 & C19)) and C17A (formic acid1 (O8A, C17A, O10)) atoms share a same site with occupancies of 75% and 25%. N1 (DMF1 (O8, C17, N1, C18 & C19)) and O10 (formic acid1 (O8A, C17A, O10)) atoms share a same site with occupancies of 75% and 25%. O9 (DMF2 (O9, C20, N2, C21 & C22)) and O9A (formic acid2 (O9A, C20A, O11)) atoms share a same site with occupancies of 75% and 25%. C20 (DMF2 (O9, C20, N2, C21 & C22)) and C20A (formic acid2 (O9A, C20A, O11)) atoms share a same site with occupancies of 75% and 25%. O9 (DMF2 (O9, C20, N2, C21 & C22)) and O11 (formic acid2(O9A, C20A, O11)) atoms share a same site with occupancies of 75% and 25%.

The last refinement of LnMOF-**8** was processed by 67 restraints and 3 omitted reflections. ISOR and DFIX instructions were used for restraints of the seriously disordered atoms (O5, C11 & C12 in the organic ligand; N1, C18, C19 & C17 in DMF1; N2, C20, C21 & C22 in DMF2) and relevant distance (O8-C17). ALERT reports from PLATON indicate that 3 reflections with $\sum(F_O^2-(F_C^2)/\sum F_O^2 < -100.0$ or for which I(obs) and I(calc) differ more that 10 times $\sum W$. Those reflections are removed from the final refinement.

H atoms of some disordered oxygen atoms (O10A, O11, O12 & O13) were omitted, but their contributions were also included in the overall formula.

S1.7. LnMOF-9, $[Nd_2(C_{16}H_9O_7)_2(C_3H_7ON)_{1.2}(H_2O)_{1.4}(CHOOH)_{1.4}]\cdot 3.6H_2O$

In LnMOF-**9**, the Nd_2 unit was coordinated by two organic ligands, part DMF, part water and part formic acid. O8 (DMF (O8, C17, N1, C18 & C19)) and O8A (water) atoms share a same site with occupancies of 60% and 40%. O9 (formic acid (O9, C20 & O10)) and O9A (water) atoms share a same site with occupancies of 70% and 30%.

The last refinement of LnMOF-9 was processed by 70 restraints and 4 omitted reflections. ISOR and DFIX instructions were used for restraints of the seriously disordered atoms (O5, C9, C11 & C12 in the organic ligand; N1, C18, C19 & C17 in DMF; O9, O10 & C20 in formic acid) and relevant distances (N1-C18, N1-C19, O8-C17, O9-C20 and C20-O10). ALERT reports from PLATON indicate that 4 reflections with $\sum(F_O^2-(F_C^2)/\sum F_O^2 < -100.0$ or for which I(obs) and I(calc) differ more that 10 times $\sum W$. Those reflections are removed from the final refinement.

H atoms of some disordered oxygen atoms (O8A, O9A, O10, O11, O12 & O13) were omitted, but their contributions were also included in the overall formula.

S1.8. LnMOF-10, $[Gd_2(C_{16}H_9O_7)_2(C_3H_7ON)_2(H_2O)(CHOOH)]\cdot 3H_2O$

In LnMOF-**10**, the Gd_2 unit was coordinated by two organic ligands, two DMF, part water and part formic acid. O9 (formic acid (O9, C20, O10)) and O9A (water) atoms share a same site with occupancies of 50% and 50%.

The last refinement of LnMOF-**10** was processed by 49 restraints and 4 omitted reflections. ISOR and DFIX instructions were used for restraints of the seriously disordered atoms (C11 & C12 in the organic ligand; N1, C18, C19 & C17 in DMF; O10 and C20 in formic acid) and relevant distance (C20-O10). ALERT reports from PLATON indicate that 4 reflections with $\sum(F_O^2-(F_C^2)/\sum F_O^2 < -100.0$ or for which I(obs) and I(calc) differ more that 10 times $\sum W$. Those reflections are removed from the final refinement.

H atoms of some disordered oxygen atoms (O9A, O10, O11, O12 & O13) were omitted, but their contributions were also included in the overall formula.

S1.9. LnMOF-11, $[Ho_2(C_{16}H_9O_7)_2(C_3H_7ON)_{2.4}(H_2O)_{1.6}]\cdot 3H_2O$

In LnMOF-**11**, the Ho_2 unit was coordinated by two organic ligands, part DMF and part water. O8

(DMF1 (O8, C17, N1, C18 & C19)) and O8A (water) atoms share a same site with occupancies of 70% and 30%. O9 (DMF2 (O9, C20, N2, C21 & C22)) and O9A (water) atoms share a same site with occupancies of 50% and 50%.

The last refinement of LnMOF-**11** was processed by 72 restraints and 4 omitted reflections. ISOR instructions were used for restraints of the seriously disordered atoms (O5, C11 & C12 in the organic ligand;O8, N1, C18, C19 & C17 in DMF1; N2, C20, C21 & C22 in DMF2). ALERT reports from PLATON indicate that 4 reflections with $\sum(F_O^2-(F_C^2)/\sum F_O^2$< - 100.0 or for which I(obs) and I(calc) differ more that 10 times $\sum W$. Those reflections are removed from the final refinement.

H atoms of some disordered oxygen atoms (O8A, O9A, O10 & O11) were omitted, but their contributions were also included in the overall formula.

S1.10. LnMOF-12, $[(Eu_{0.10}La_{0.44}Tb_{0.46})_2(C_{16}H_9O_7)_2(C_3H_7ON)_2(H_2O)(CHOOH)]\cdot 7H_2O$ and LnMOF-13, $[(Eu_{0.11}La_{0.66}Tb_{0.23})_2(C_{16}H_9O_7)_2(C_3H_7ON)_2(H_2O)(CHOOH)]\cdot 7H_2O$

In LnMOF-**12**, the $(La_{0.44}Eu_{0.10}Tb_{0.46})_2$ (or $(La_{0.66}Eu_{0.11}Tb_{0.23})_2$ for LnMOF-**13**) unit was coordinated by two organic ligands, two DMF, part formic acid and water. O9 (formic acid (O9, C20, O10) and O9A (water) atoms share a same site with occupancies of 50% and 50%. La1, Eu1 and Tb1 atoms share a same site with occupancies of 44%, 10% and 46% (or La1, Eu1 and Tb1 atoms share a same site with occupancies of 66%, 11% and 23%).

For LnMOF-**12**, the last refinement was processed by 56 restraints and 3 omitted reflections. ISOR and DFIX instructions were used for restraints of the seriously disordered atoms (O5, C11 & C12 in the organic ligand; N1, C18, C19 & C17 in DMF; O10 and C20 (formic acid (O9, C20, O10) and relevant distance (O9-C20, C20-O10). ALERT reports from PLATON indicate that 3 reflections with $\sum(F_O^2-(F_C^2)/\sum F_O^2$< - 100.0 or for which I(obs) and I(calc) differ more that 10 times $\sum W$. Those reflections are removed from the final refinement.

For LnMOF-**13**, the last refinement was processed by 56 restraints and 4 omitted reflections. ISOR and DFIX instructions were used for restraints of the seriously disordered atoms (O5, C11 & C12 in the organic ligand; N1, C18, C19 & C17 in DMF; O10 and C20 (formic acid (O9, C20, O10) and relevant distance (O9-C20, C20-O10). ALERT reports from PLATON indicate that 4 reflections with $\sum(F_O^2-(F_C^2)/\sum F_O^2$< - 100.0 or for which I(obs) and I(calc) differ more that 10 times $\sum W$. Those reflections are removed from the final refinement.

The DISP instructions were used in the SHELXL2016 refinements in order to correct anomalous scattering values (f' and f'') of elements (C, H, N, O, Eu, La and Tb) for the synchrotron wavelength used.

H atoms of some disordered oxygen atoms (O9A, O10, O11, O12, O13, O14 & O15) were omitted, but their contributions were also included in the overall formula.

S2. Supporting Tables and Figures.

Table S1. Selected bond lengths (Å) and bond angles (°) for compounds LnMOF-1-13.

Table S2. The original ratio of lanthanide metal salts and the corresponding ICP results in LnMOF-12 ＆ 13.

Table S3. The corresponding CIE coordinates of LnMOF-12 ＆ 13 excited at 345, 355, 365 and 380nm.

Fig. S1. IR spectras of LnMOF-1–13 (KBr, cm^{-1}).

Fig. S2. PXRD patterns of compounds LnMOF-2-4, LnMOF-7-11 and LnMOF-12-13 in the range from 5 to 60 degrees.

Fig. S3. Thermogravimetric analyses (TGA) curve of compound LnMOF-5.

Fig. S4. Solid-state emission spectra for the ligand H_3L (a) and LnMOF-1 (b), 2 (c), 3 (d), 7 (e) and 10 (f), respectively.

Fig. S5. The fluorescence decay curves of LnMOF-5 and LnMOF-6.

Fig. S6. Emission spectras of LnMOF-12 ＆ 13 excitation under 345 nm (a), 355 nm (b), 365 nm (c) and 380 nm (d).

Fig. S7. Plots of χ_M (black), $\chi_M T$ (blue) and χ_M^{-1} (insert) vs. T for LnMOF-10.

Table S1. Selected bond lengths (Å) and bond angles (°) for compounds LnMOF-**1**-**13**.

LnMOF-1			
La1—O9A	2.479 (4)	La1—O8	2.545 (4)
La1—O9	2.479 (4)	La1—O7^{iii}	2.554 (4)
La1—O4^{i}	2.489 (3)	La1—O3^{iv}	2.596 (4)
La1—O2^{ii}	2.495 (4)	La1—O6^{iii}	2.600 (4)
La1—O1	2.495 (3)	La1—O4^{iv}	2.712 (3)
O9—La1—O4^{i}	145.10 (15)	O2^{ii}—La1—O3^{iv}	76.40 (13)
O9—La1—O2^{ii}	141.36 (16)	O1—La1—O3^{iv}	89.50 (14)
O4^{i}—La1—O2^{ii}	72.55 (12)	O8—La1—O3^{iv}	149.32 (15)
O9A—La1—O1	71.81 (16)	O7^{iii}—La1—O3^{iv}	82.71 (13)
O9—La1—O1	71.81 (16)	O9—La1—O6^{iii}	108.10 (18)
O4^{i}—La1—O1	76.56 (12)	O4^{i}—La1—O6^{iii}	89.19 (12)
O2^{ii}—La1—O1	132.43 (12)	O2^{ii}—La1—O6^{iii}	70.49 (14)
O9A—La1—O8	77.14 (19)	O1—La1—O6^{iii}	144.21 (14)
O9—La1—O8	77.14 (19)	O8—La1—O6^{iii}	73.98 (14)
O4^{i}—La1—O8	79.06 (14)	O7^{iii}—La1—O6^{iii}	50.43 (13)
O2^{ii}—La1—O8	134.20 (15)	O3^{iv}—La1—O6^{iii}	125.59 (12)
O1—La1—O8	71.17 (15)	O9—La1—O4^{iv}	105.73 (17)
O9—La1—O7^{iii}	71.74 (16)	O4^{i}—La1—O4^{iv}	73.42 (11)
O4^{i}—La1—O7^{iii}	137.38 (12)	O2^{ii}—La1—O4^{iv}	71.04 (12)
O2^{ii}—La1—O7^{iii}	80.20 (14)	O1—La1—O4^{iv}	65.95 (12)
O1—La1—O7^{iii}	143.49 (14)	O8—La1—O4^{iv}	133.08 (14)
O8—La1—O7^{iii}	98.60 (16)	O7^{iii}—La1—O4^{iv}	127.29 (13)
O9—La1—O3^{iv}	74.20 (19)	O3^{iv}—La1—O4^{iv}	48.51 (10)
O4^{i}—La1—O3^{iv}	120.34 (11)	O6^{iii}—La1—O4^{iv}	141.00 (13)
Symmetry codes: (i) -*x*+1/2, *y*-1/2, -*z*+3/2; (ii) -*x*+1/2, -*y*+1/2, -*z*+2; (iii) *x*-1/2, -*y*+1/2, *z*+1/2; (iv) *x*, -*y*+1, *z*+1/2.			
LnMOF-2			
Ce1—O4^{i}	2.462 (4)	Ce1—O8	2.522 (5)
Ce1—O1	2.468 (4)	Ce1—O7^{iii}	2.529 (4)
Ce1—O9A	2.471 (5)	Ce1—O3^{iv}	2.575 (4)
Ce1—O9	2.471 (5)	Ce1—O6^{iii}	2.581 (4)
Ce1—O2^{ii}	2.472 (4)	Ce1—O4^{iv}	2.700 (4)
O4^{i}—Ce1—O1	77.10 (15)	O9—Ce1—O3^{iv}	75.5 (2)
O4^{i}—Ce1—O9A	144.83 (17)	O2^{ii}—Ce1—O3^{iv}	76.69 (16)
O1—Ce1—O9A	72.03 (18)	O8—Ce1—O3^{iv}	149.57 (17)
O4^{i}—Ce1—O9	144.83 (17)	O7^{iii}—Ce1—O3^{iv}	81.80 (15)
O1—Ce1—O9	72.03 (18)	O4^{i}—Ce1—O6^{iii}	89.13 (14)
O4^{i}—Ce1—O2^{ii}	72.65 (14)	O1—Ce1—O6^{iii}	144.78 (16)

O1—Ce1—O2^{ii}	132.52 (15)	O9—Ce1—O6^{iii}	106.6 (2)
O9—Ce1—O2^{ii}	142.02 (18)	O2^{ii}—Ce1—O6^{iii}	70.43 (16)
O4^{i}—Ce1—O8	78.47 (17)	O8—Ce1—O6^{iii}	73.72 (17)
O1—Ce1—O8	71.84 (17)	O7^{iii}—Ce1—O6^{iii}	50.93 (15)
O9A—Ce1—O8	76.3 (2)	O3^{iv}—Ce1—O6^{iii}	125.60 (14)
O9—Ce1—O8	76.3 (2)	O4^{i}—Ce1—O4^{iv}	73.34 (14)
O2^{ii}—Ce1—O8	133.65 (17)	O1—Ce1—O4^{iv}	65.98 (14)
O4^{i}—Ce1—O7^{iii}	137.55 (14)	O9—Ce1—O4^{iv}	107.83 (19)
O1—Ce1—O7^{iii}	143.27 (16)	O2^{ii}—Ce1—O4^{iv}	70.73 (14)
O9—Ce1—O7^{iii}	71.24 (18)	O8—Ce1—O4^{iv}	133.20 (16)
O2^{ii}—Ce1—O7^{iii}	79.65 (16)	O7^{iii}—Ce1—O4^{iv}	126.36 (15)
O8—Ce1—O7^{iii}	99.58 (19)	O3^{iv}—Ce1—O4^{iv}	48.86 (12)
O4^{i}—Ce1—O3^{iv}	120.74 (13)	O6^{iii}—Ce1—O4^{iv}	140.62 (15)
O1—Ce1—O3^{iv}	88.81 (16)		
Symmetry codes: (i) -*x*+1/2, *y*-1/2, -*z*+3/2; (ii) -*x*+1/2, -*y*+1/2, -*z*+2; (iii) *x*-1/2, -*y*+1/2, *z*+1/2; (iv) *x*, -*y*+1, *z*+1/2.			
LnMOF-3			
Pr1—O4^{i}	2.443 (3)	Pr1—O6^{iii}	2.510 (4)
Pr1—O1	2.453 (4)	Pr1—O8	2.514 (5)
Pr1—O2^{ii}	2.455 (3)	Pr1—O3^{iv}	2.552 (4)
Pr1—O9	2.468 (5)	Pr1—O7^{iii}	2.558 (4)
Pr1—O9A	2.468 (5)	Pr1—O4^{iv}	2.690 (4)
O4^{i}—Pr1—O1	72.75 (13)	O1—Pr1—O3^{iv}	77.32 (14)
O4^{i}—Pr1—O2^{ii}	77.56 (13)	O2^{ii}—Pr1—O3^{iv}	88.22 (14)
O1—Pr1—O2^{ii}	132.87 (13)	O9—Pr1—O3^{iv}	75.64 (19)
O4^{i}—Pr1—O9	144.42 (16)	O6^{iii}—Pr1—O3^{iv}	81.16 (13)
O1—Pr1—O9	142.46 (17)	O8—Pr1—O3^{iv}	148.84 (16)
O2^{ii}—Pr1—O9	71.62 (16)	O4^{i}—Pr1—O7^{iii}	89.04 (13)
O4^{i}—Pr1—O9A	144.42 (16)	O1—Pr1—O7^{iii}	70.50 (15)
O1—Pr1—O9A	142.46 (17)	O2^{ii}—Pr1—O7^{iii}	144.80 (15)
O2^{ii}—Pr1—O9A	71.62 (16)	O9—Pr1—O7^{iii}	106.07 (18)
O4^{i}—Pr1—O6^{iii}	137.71 (13)	O6^{iii}—Pr1—O7^{iii}	51.43 (13)
O1—Pr1—O6^{iii}	79.22 (14)	O8—Pr1—O7^{iii}	73.57 (15)
O2^{ii}—Pr1—O6^{iii}	142.92 (14)	O3^{iv}—Pr1—O7^{iii}	126.01 (13)
O9—Pr1—O6^{iii}	71.33 (16)	O4^{i}—Pr1—O4^{iv}	73.21 (12)
O4^{i}—Pr1—O8	78.52 (16)	O1—Pr1—O4^{iv}	70.83 (13)
O1—Pr1—O8	133.73 (16)	O2^{ii}—Pr1—O4^{iv}	65.97 (13)
O2^{ii}—Pr1—O8	71.92 (16)	O9—Pr1—O4^{iv}	108.59 (17)
O9—Pr1—O8	75.4 (2)	O6^{iii}—Pr1—O4^{iv}	125.92 (13)
O9A—Pr1—O8	75.4 (2)	O8—Pr1—O4^{iv}	133.07 (15)
O6^{iii}—Pr1—O8	100.14 (17)	O3^{iv}—Pr1—O4^{iv}	49.36 (11)

O4^{i}—Pr1—O3^{iv}	121.25 (12)	O7^{iii}—Pr1—O4^{iv}	140.72 (14)
Symmetry codes: (i) *x*, -*y*+1, *z*+1/2; (ii) -*x*+1/2, -*y*+3/2, -*z*+1; (iii) -*x*+1, *y*, -*z*+1/2; (iv) -*x*+1/2, *y*+1/2, -*z*+1/2.			
LnMOF-4			
Sm1—O4^{i}	2.378 (5)	Sm1—O9A	2.465 (7)
Sm1—O1	2.398 (5)	Sm1—O9	2.465 (7)
Sm1—O2^{ii}	2.421 (5)	Sm1—O3^{iv}	2.482 (5)
Sm1—O8	2.435 (7)	Sm1—O7^{iii}	2.518 (5)
Sm1—O6^{iii}	2.463 (5)	Sm1—O4^{iv}	2.687 (5)
O4^{i}—Sm1—O1	73.47 (17)	O1—Sm1—O3^{iv}	77.63 (19)
O4^{i}—Sm1—O2^{ii}	78.78 (18)	O2^{ii}—Sm1—O3^{iv}	87.1 (2)
O1—Sm1—O2^{ii}	133.12 (18)	O8—Sm1—O3^{iv}	75.5 (3)
O4^{i}—Sm1—O8	144.4 (2)	O6^{iii}—Sm1—O3^{iv}	80.94 (19)
O1—Sm1—O8	142.0 (2)	O9—Sm1—O3^{iv}	147.6 (2)
O2^{ii}—Sm1—O8	71.6 (2)	O4^{i}—Sm1—O7^{iii}	87.52 (19)
O4^{i}—Sm1—O6^{iii}	136.41 (18)	O1—Sm1—O7^{iii}	71.4 (2)
O1—Sm1—O6^{iii}	78.0 (2)	O2^{ii}—Sm1—O7^{iii}	144.3 (2)
O2^{ii}—Sm1—O6^{iii}	143.1 (2)	O8—Sm1—O7^{iii}	105.2 (3)
O8—Sm1—O6^{iii}	71.6 (2)	O6^{iii}—Sm1—O7^{iii}	52.00 (19)
O4^{i}—Sm1—O9A	78.6 (3)	O9—Sm1—O7^{iii}	72.3 (2)
O1—Sm1—O9A	134.6 (2)	O3^{iv}—Sm1—O7^{iii}	127.39 (18)
O2^{ii}—Sm1—O9A	72.8 (2)	O4^{i}—Sm1—O4^{iv}	73.91 (17)
O8—Sm1—O9A	74.1 (3)	O1—Sm1—O4^{iv}	69.69 (17)
O6^{iii}—Sm1—O9A	99.9 (3)	O2^{ii}—Sm1—O4^{iv}	66.67 (17)
O4^{i}—Sm1—O9	78.6 (3)	O8—Sm1—O4^{iv}	110.4 (2)
O1—Sm1—O9	134.6 (2)	O6^{iii}—Sm1—O4^{iv}	125.05 (19)
O2^{ii}—Sm1—O9	72.8 (2)	O9—Sm1—O4^{iv}	134.4 (2)
O8—Sm1—O9	74.1 (3)	O3^{iv}—Sm1—O4^{iv}	49.94 (16)
O6^{iii}—Sm1—O9	99.9 (3)	O7^{iii}—Sm1—O4^{iv}	140.2 (2)
O4^{i}—Sm1—O3^{iv}	122.86 (18)		
Symmetry codes: (i) *x*, -*y*+1, *z*+1/2; (ii) -*x*+1/2, -*y*+1/2, -*z*+1; (iii) -*x*+1, *y*, -*z*+1/2; (iv) -*x*+1/2, *y*-1/2, -*z*+1/2.			
LnMOF-5			
Eu1—O4^{i}	2.373 (3)	Eu1—O9	2.472 (4)
Eu1—O2^{ii}	2.394 (3)	Eu1—O9A	2.472 (4)
Eu1—O1	2.408 (3)	Eu1—O3^{iv}	2.479 (3)
Eu1—O8	2.426 (4)	Eu1—O6^{iii}	2.505 (3)
Eu1—O8A	2.426 (4)	Eu1—O4^{iv}	2.668 (3)
Eu1—O7^{iii}	2.455 (3)		
O4^{i}—Eu1—O2^{ii}	73.50 (10)	O7^{iii}—Eu1—O9A	101.18 (15)
O4^{i}—Eu1—O1	78.43 (10)	O4^{i}—Eu1—O3^{iv}	122.36 (10)

O2^{ii}—Eu1—O1	133.16 (10)	O2^{ii}—Eu1—O3^{iv}	78.21 (12)
O4^{i}—Eu1—O8	144.12 (13)	O1—Eu1—O3^{iv}	86.44 (11)
O2^{ii}—Eu1—O8	142.23 (13)	O8—Eu1—O3^{iv}	75.52 (16)
O1—Eu1—O8	71.60 (12)	O7^{iii}—Eu1—O3^{iv}	80.28 (11)
O4^{i}—Eu1—O8A	144.12 (13)	O9—Eu1—O3^{iv}	147.87 (14)
O2^{ii}—Eu1—O8A	142.23 (13)	O4^{i}—Eu1—O6^{iii}	88.61 (11)
O1—Eu1—O8A	71.60 (12)	O2^{ii}—Eu1—O6^{iii}	71.09 (12)
O4^{i}—Eu1—O7^{iii}	137.80 (11)	O1—Eu1—O6^{iii}	144.97 (12)
O2^{ii}—Eu1—O7^{iii}	78.13 (12)	O8—Eu1—O6^{iii}	104.75 (15)
O1—Eu1—O7^{iii}	142.44 (11)	O7^{iii}—Eu1—O6^{iii}	52.46 (11)
O8—Eu1—O7^{iii}	71.10 (13)	O9—Eu1—O6^{iii}	72.64 (14)
O4^{i}—Eu1—O9	77.98 (14)	O3^{iv}—Eu1—O6^{iii}	127.27 (11)
O2^{ii}—Eu1—O9	133.78 (14)	O4^{i}—Eu1—O4^{iv}	73.12 (10)
O1—Eu1—O9	72.87 (13)	O2^{ii}—Eu1—O4^{iv}	70.18 (10)
O8—Eu1—O9	74.74 (17)	O1—Eu1—O4^{iv}	66.13 (10)
O7^{iii}—Eu1—O9	101.18 (15)	O8—Eu1—O4^{iv}	110.55 (14)
O4^{i}—Eu1—O9A	77.98 (14)	O7^{iii}—Eu1—O4^{iv}	124.75 (11)
O2^{ii}—Eu1—O9A	133.78 (14)	O9—Eu1—O4^{iv}	133.41 (13)
O1—Eu1—O9A	72.87 (13)	O3^{iv}—Eu1—O4^{iv}	50.14 (9)
O8A—Eu1—O9A	74.74 (17)	O6^{iii}—Eu1—O4^{iv}	140.46 (12)
Symmetry codes: (i) -*x*+1/2, *y*-1/2, -*z*+1/2; (ii) -*x*+1/2, -*y*+1/2, -*z*+1; (iii) *x*-1/2, -*y*+1/2, *z*+1/2; (iv) *x*, -*y*+1, *z*+1/2.			
LnMOF-6			
Tb1—O4^{i}	2.341 (4)	Tb1—O8	2.408 (7)
Tb1—O2^{ii}	2.357 (6)	Tb1—O6^{iii}	2.432 (4)
Tb1—O1	2.365 (4)	Tb1—O3^{iv}	2.442 (4)
Tb1—O9	2.376 (6)	Tb1—O7^{iii}	2.493 (4)
Tb1—O9A	2.376 (6)	Tb1—O4^{iv}	2.629 (4)
Tb1—O8A	2.408 (7)		
O4^{i}—Tb1—O2^{ii}	73.92 (16)	O4^{i}—Tb1—O3^{iv}	122.72 (15)
O4^{i}—Tb1—O1	78.62 (14)	O2^{ii}—Tb1—O3^{iv}	78.21 (17)
O2^{ii}—Tb1—O1	133.21 (18)	O1—Tb1—O3^{iv}	86.04 (15)
O4^{i}—Tb1—O9	142.25 (19)	O9—Tb1—O3^{iv}	77.7 (2)
O2^{ii}—Tb1—O9	143.8 (2)	O8—Tb1—O3^{iv}	148.46 (18)
O1—Tb1—O9	71.07 (18)	O6^{iii}—Tb1—O3^{iv}	78.87 (15)
O4^{i}—Tb1—O9A	142.25 (19)	O4^{i}—Tb1—O7^{iii}	88.91 (14)
O2^{ii}—Tb1—O9A	143.8 (2)	O2^{ii}—Tb1—O7^{iii}	71.33 (19)
O1—Tb1—O9A	71.07 (18)	O1—Tb1—O7^{iii}	145.30 (16)
O4^{i}—Tb1—O8A	76.8 (2)	O9—Tb1—O7^{iii}	103.3 (2)
O2^{ii}—Tb1—O8A	133.2 (2)	O8—Tb1—O7^{iii}	72.5 (2)
O1—Tb1—O8A	73.2 (2)	O6^{iii}—Tb1—O7^{iii}	53.32 (15)

O9A—Tb1—O8A	73.3 (2)	O3^{iv}—Tb1—O7^{iii}	127.15 (15)
O4^{i}—Tb1—O8	76.8 (2)	O4^{i}—Tb1—O4^{iv}	72.63 (15)
O2^{ii}—Tb1—O8	133.2 (2)	O2^{ii}—Tb1—O4^{iv}	70.25 (16)
O1—Tb1—O8	73.2 (2)	O1—Tb1—O4^{iv}	65.72 (14)
O9—Tb1—O8	73.3 (2)	O9—Tb1—O4^{iv}	112.6 (2)
O4^{i}—Tb1—O6^{iii}	138.54 (15)	O8—Tb1—O4^{iv}	132.4 (2)
O2^{ii}—Tb1—O6^{iii}	77.58 (18)	O6^{iii}—Tb1—O4^{iv}	124.09 (15)
O1—Tb1—O6^{iii}	141.90 (16)	O3^{iv}—Tb1—O4^{iv}	50.97 (14)
O9—Tb1—O6^{iii}	71.61 (19)	O7^{iii}—Tb1—O4^{iv}	140.63 (16)
O8—Tb1—O6^{iii}	102.9 (2)		
Symmetry codes: (i) -*x*+1/2, *y*+1/2, -*z*+1/2; (ii) -*x*+1/2, -*y*+3/2, -*z*; (iii) *x*+1/2, -*y*+3/2, *z*-1/2; (iv) *x*, -*y*+1, *z*-1/2.			
LnMOF-7			
Dy1—O1	2.321 (3)	Dy1—O2^{iv}	2.423 (3)
Dy1—O4^{i}	2.351 (3)	Dy1—O9A	2.430 (4)
Dy1—O3^{ii}	2.371 (3)	Dy1—O9	2.430 (4)
Dy1—O8	2.394 (4)	Dy1—O7^{iii}	2.466 (3)
Dy1—O8A	2.394 (4)	Dy1—O1^{iv}	2.669 (3)
Dy1—O6^{iii}	2.419 (3)		
O1—Dy1—O4^{i}	73.94 (11)	O2^{iv}—Dy1—O9A	147.62 (15)
O1—Dy1—O3^{ii}	78.81 (11)	O1—Dy1—O9	77.85 (15)
O4^{i}—Dy1—O3^{ii}	133.03 (11)	O4^{i}—Dy1—O9	134.14 (14)
O1—Dy1—O8	143.66 (14)	O3^{ii}—Dy1—O9	73.41 (14)
O4^{i}—Dy1—O8	142.34 (14)	O8—Dy1—O9	73.73 (18)
O3^{ii}—Dy1—O8	71.76 (13)	O6^{iii}—Dy1—O9	101.37 (16)
O1—Dy1—O8A	143.66 (14)	O2^{iv}—Dy1—O9	147.62 (15)
O4^{i}—Dy1—O8A	142.34 (14)	O1—Dy1—O7^{iii}	87.87 (11)
O3^{ii}—Dy1—O8A	71.76 (13)	O4^{i}—Dy1—O7^{iii}	71.36 (13)
O1—Dy1—O6^{iii}	137.71 (11)	O3^{ii}—Dy1—O7^{iii}	144.99 (12)
O4^{i}—Dy1—O6^{iii}	77.74 (12)	O8—Dy1—O7^{iii}	104.18 (16)
O3^{ii}—Dy1—O6^{iii}	142.29 (12)	O6^{iii}—Dy1—O7^{iii}	53.23 (11)
O8—Dy1—O6^{iii}	70.99 (14)	O2^{iv}—Dy1—O7^{iii}	127.80 (11)
O1—Dy1—O2^{iv}	122.90 (11)	O9—Dy1—O7^{iii}	72.19 (14)
O4^{i}—Dy1—O2^{iv}	78.06 (12)	O1—Dy1—O1^{iv}	73.16 (11)
O3^{ii}—Dy1—O2^{iv}	85.91 (12)	O4^{i}—Dy1—O1^{iv}	69.67 (10)
O8—Dy1—O2^{iv}	76.29 (16)	O3^{ii}—Dy1—O1^{iv}	66.14 (10)
O6^{iii}—Dy1—O2^{iv}	79.87 (11)	O8—Dy1—O1^{iv}	111.98 (14)
O1—Dy1—O9A	77.85 (15)	O6^{iii}—Dy1—O1^{iv}	124.38 (11)
O4^{i}—Dy1—O9A	134.14 (14)	O2^{iv}—Dy1—O1^{iv}	50.54 (9)
O3^{ii}—Dy1—O9A	73.41 (14)	O9—Dy1—O1^{iv}	133.67 (14)
O8A—Dy1—O9A	73.73 (18)	O7^{iii}—Dy1—O1^{iv}	140.01 (13)

O6^{iii}—Dy1—O9A	101.37 (16)		
Symmetry codes: (i) *x*, -*y*+1, *z*-1/2; (ii) -*x*+1/2, *y*-1/2, -*z*+3/2; (iii) -*x*+1, -*y*+1, -*z*+1; (iv) -*x*+1/2, -*y*+1/2, -*z*+1.			
LnMOF-8			
Er1—O3^{i}	2.290 (3)	Er1—O9	2.398 (4)
Er1—O2^{i}	2.331 (3)	Er1—O9A	2.398 (4)
Er1—O1	2.350 (3)	Er1—O6^{ii}	2.403 (3)
Er1—O8A	2.368 (4)	Er1—O7^{ii}	2.447 (3)
Er1—O8	2.368 (4)	Er1—O3	2.683 (3)
Er1—O4	2.392 (3)		
O3^{i}—Er1—O2^{i}	74.29 (10)	O3^{i}—Er1—O6^{ii}	137.62 (10)
O3^{i}—Er1—O1	78.92 (10)	O2^{i}—Er1—O6^{ii}	77.55 (11)
O2^{i}—Er1—O1	132.86 (10)	O1—Er1—O6^{ii}	142.31 (11)
O3^{i}—Er1—O8A	143.55 (13)	O8—Er1—O6^{ii}	70.90 (12)
O2^{i}—Er1—O8A	142.13 (13)	O4—Er1—O6^{ii}	79.88 (10)
O1—Er1—O8A	71.95 (11)	O9—Er1—O6^{ii}	101.15 (15)
O3^{i}—Er1—O8	143.55 (13)	O3^{i}—Er1—O7^{ii}	87.44 (11)
O2^{i}—Er1—O8	142.13 (13)	O2^{i}—Er1—O7^{ii}	71.61 (12)
O1—Er1—O8	71.95 (11)	O1—Er1—O7^{ii}	144.98 (11)
O3^{i}—Er1—O4	123.16 (10)	O8—Er1—O7^{ii}	104.03 (14)
O2^{i}—Er1—O4	77.93 (11)	O4—Er1—O7^{ii}	128.24 (10)
O1—Er1—O4	85.53 (11)	O9—Er1—O7^{ii}	71.63 (13)
O8A—Er1—O4	76.41 (15)	O6^{ii}—Er1—O7^{ii}	53.57 (11)
O8—Er1—O4	76.41 (15)	O3^{i}—Er1—O3	73.11 (10)
O3^{i}—Er1—O9	77.74 (15)	O2^{i}—Er1—O3	69.26 (9)
O2^{i}—Er1—O9	134.21 (13)	O1—Er1—O3	66.15 (9)
O1—Er1—O9	74.00 (13)	O8A—Er1—O3	112.63 (13)
O8—Er1—O9	73.56 (17)	O8—Er1—O3	112.63 (13)
O4—Er1—O9	147.64 (14)	O4—Er1—O3	50.76 (9)
O3^{i}—Er1—O9A	77.74 (15)	O9—Er1—O3	134.04 (13)
O2^{i}—Er1—O9A	134.21 (13)	O9A—Er1—O3	134.04 (13)
O1—Er1—O9A	74.00 (13)	O6^{ii}—Er1—O3	124.32 (10)
O8A—Er1—O9A	73.56 (17)	O7^{ii}—Er1—O3	139.69 (11)
O4—Er1—O9A	147.64 (14)		
Symmetry codes: (i) -*x*+3/2, -*y*+3/2, -*z*+1; (ii) *x*+1/2, -*y*+3/2, *z*-1/2.			
LnMOF-9			
Nd1—O1	2.335 (4)	Nd1—O2^{iv}	2.443 (4)
Nd1—O4^{i}	2.369 (4)	Nd1—O8	2.446 (6)
Nd1—O3^{ii}	2.379 (4)	Nd1—O8A	2.446 (6)
Nd1—O9	2.410 (5)	Nd1—O7^{iii}	2.485 (5)
Nd1—O9A	2.410 (5)	Nd1—O1^{iv}	2.681 (4)

Nd1—O6^{iii}	2.435 (4)		
O1—Nd1—O4^{i}	73.90 (15)	O2^{iv}—Nd1—O8	147.80 (19)
O1—Nd1—O3^{ii}	78.59 (15)	O1—Nd1—O8A	77.9 (2)
O4^{i}—Nd1—O3^{ii}	132.89 (15)	O4^{i}—Nd1—O8A	134.21 (18)
O1—Nd1—O9	143.70 (18)	O3^{ii}—Nd1—O8A	73.30 (18)
O4^{i}—Nd1—O9	142.27 (17)	O9A—Nd1—O8A	74.3 (2)
O3^{ii}—Nd1—O9	71.45 (17)	O6^{iii}—Nd1—O8A	100.9 (2)
O1—Nd1—O9A	143.70 (18)	O2^{iv}—Nd1—O8A	147.80 (19)
O4^{i}—Nd1—O9A	142.27 (17)	O1—Nd1—O7^{iii}	88.00 (15)
O3^{ii}—Nd1—O9A	71.45 (17)	O4^{i}—Nd1—O7^{iii}	71.39 (17)
O1—Nd1—O6^{iii}	137.70 (15)	O3^{ii}—Nd1—O7^{iii}	144.97 (16)
O4^{i}—Nd1—O6^{iii}	78.09 (16)	O9—Nd1—O7^{iii}	104.94 (19)
O3^{ii}—Nd1—O6^{iii}	142.38 (16)	O6^{iii}—Nd1—O7^{iii}	52.90 (15)
O9—Nd1—O6^{iii}	71.25 (18)	O2^{iv}—Nd1—O7^{iii}	127.48 (15)
O1—Nd1—O2^{iv}	122.85 (14)	O8—Nd1—O7^{iii}	72.29 (18)
O4^{i}—Nd1—O2^{iv}	77.81 (16)	O1—Nd1—O1^{iv}	73.18 (15)
O3^{ii}—Nd1—O2^{iv}	86.30 (16)	O4^{i}—Nd1—O1^{iv}	69.44 (14)
O9—Nd1—O2^{iv}	75.7 (2)	O3^{ii}—Nd1—O1^{iv}	66.33 (14)
O6^{iii}—Nd1—O2^{iv}	80.08 (15)	O9—Nd1—O1^{iv}	111.20 (18)
O1—Nd1—O8	77.9 (2)	O6^{iii}—Nd1—O1^{iv}	124.63 (15)
O4^{i}—Nd1—O8	134.21 (18)	O2^{iv}—Nd1—O1^{iv}	50.49 (13)
O3^{ii}—Nd1—O8	73.30 (18)	O8—Nd1—O1^{iv}	133.85 (18)
O9—Nd1—O8	74.3 (2)	O7^{iii}—Nd1—O1^{iv}	139.86 (16)
O6^{iii}—Nd1—O8	100.9 (2)		
Symmetry codes: (i) *x*, -*y*+1, *z*+1/2; (ii) -*x*+3/2, *y*-1/2, -*z*+1/2; (iii) -*x*+1, -*y*+1, -*z*+1; (iv) -*x*+3/2, -*y*+1/2, -*z*+1.			
LnMOF-10			
Gd1—O6^{i}	2.356 (4)	Gd1—O8A	2.438 (5)
Gd1—O4^{ii}	2.383 (4)	Gd1—O8	2.438 (5)
Gd1—O5^{iii}	2.403 (4)	Gd1—O7^{iv}	2.454 (4)
Gd1—O9A	2.430 (5)	Gd1—O2	2.502 (4)
Gd1—O9	2.430 (5)	Gd1—O6^{iv}	2.665 (4)
Gd1—O1	2.434 (4)		
O6^{i}—Gd1—O4^{ii}	73.58 (15)	O5^{iii}—Gd1—O7^{iv}	87.05 (16)
O6^{i}—Gd1—O5^{iii}	79.34 (15)	O9A—Gd1—O7^{iv}	75.81 (19)
O4^{ii}—Gd1—O5^{iii}	133.42 (15)	O9—Gd1—O7^{iv}	75.81 (19)
O6^{i}—Gd1—O9A	144.11 (17)	O1—Gd1—O7^{iv}	80.61 (15)
O4^{ii}—Gd1—O9A	142.21 (17)	O8A—Gd1—O7^{iv}	147.66 (17)
O5^{iii}—Gd1—O9A	71.11 (16)	O8—Gd1—O7^{iv}	147.66 (17)
O6^{i}—Gd1—O9	144.11 (17)	O6^{i}—Gd1—O2	86.49 (15)
O4^{ii}—Gd1—O9	142.21 (17)	O4^{ii}—Gd1—O2	71.25 (16)

O5^{iii}—Gd1—O9	71.11 (16)	O5^{iii}—Gd1—O2	144.08 (16)
O6^{i}—Gd1—O1	136.38 (15)	O9A—Gd1—O2	105.66 (18)
O4^{ii}—Gd1—O1	78.05 (16)	O9—Gd1—O2	105.66 (18)
O5^{iii}—Gd1—O1	142.56 (16)	O1—Gd1—O2	52.92 (15)
O9A—Gd1—O1	71.62 (18)	O8A—Gd1—O2	71.58 (18)
O9—Gd1—O1	71.62 (18)	O8—Gd1—O2	71.58 (18)
O6^{i}—Gd1—O8A	78.81 (18)	O7^{iv}—Gd1—O2	127.74 (15)
O4^{ii}—Gd1—O8A	134.46 (17)	O6^{i}—Gd1—O6^{iv}	73.72 (14)
O5^{iii}—Gd1—O8A	73.35 (18)	O4^{ii}—Gd1—O6^{iv}	69.69 (14)
O9A—Gd1—O8A	73.6 (2)	O5^{iii}—Gd1—O6^{iv}	66.66 (14)
O1—Gd1—O8A	99.3 (2)	O9A—Gd1—O6^{iv}	110.90 (17)
O6^{i}—Gd1—O8	78.81 (18)	O9—Gd1—O6^{iv}	110.90 (17)
O4^{ii}—Gd1—O8	134.46 (17)	O1—Gd1—O6^{iv}	125.39 (15)
O5^{iii}—Gd1—O8	73.35 (18)	O8A—Gd1—O6^{iv}	134.65 (18)
O9—Gd1—O8	73.6 (2)	O8—Gd1—O6^{iv}	134.65 (18)
O1—Gd1—O8	99.3 (2)	O7^{iv}—Gd1—O6^{iv}	50.59 (13)
O6^{i}—Gd1—O7^{iv}	123.27 (14)	O2—Gd1—O6^{iv}	139.77 (16)
O4^{ii}—Gd1—O7^{iv}	77.51 (15)		
Symmetry codes: (i) -*x*+2, -*y*, -*z*; (ii) -*x*+2, *y*, -*z*-1/2; (iii) *x*-1/2, -*y*+1/2, *z*+1/2; (iv) *x*-1/2, *y*+1/2, *z*.			
LnMOF-11			
Ho1—O4^{i}	2.309 (3)	Ho1—O3^{iv}	2.414 (3)
Ho1—O2^{ii}	2.346 (3)	Ho1—O9A	2.424 (4)
Ho1—O1	2.365 (3)	Ho1—O9	2.424 (4)
Ho1—O8	2.391 (4)	Ho1—O7^{iii}	2.458 (3)
Ho1—O8A	2.391 (4)	Ho1—O4^{iv}	2.680 (3)
Ho1—O6^{iii}	2.409 (3)		
O4^{i}—Ho1—O2^{ii}	74.10 (10)	O3^{iv}—Ho1—O9A	147.50 (14)
O4^{i}—Ho1—O1	78.96 (11)	O4^{i}—Ho1—O9	77.64 (15)
O2^{ii}—Ho1—O1	132.89 (10)	O2^{ii}—Ho1—O9	134.24 (14)
O4^{i}—Ho1—O8	143.40 (13)	O1—Ho1—O9	73.62 (13)
O2^{ii}—Ho1—O8	142.45 (13)	O8—Ho1—O9	73.65 (17)
O1—Ho1—O8	71.55 (12)	O6^{iii}—Ho1—O9	101.64 (15)
O4^{i}—Ho1—O8A	143.40 (13)	O3^{iv}—Ho1—O9	147.50 (14)
O2^{ii}—Ho1—O8A	142.45 (13)	O4^{i}—Ho1—O7^{iii}	87.62 (11)
O1—Ho1—O8A	71.55 (12)	O2^{ii}—Ho1—O7^{iii}	71.63 (13)
O4^{i}—Ho1—O6^{iii}	137.62 (11)	O1—Ho1—O7^{iii}	144.98 (12)
O2^{ii}—Ho1—O6^{iii}	77.54 (12)	O8—Ho1—O7^{iii}	104.26 (15)
O1—Ho1—O6^{iii}	142.31 (11)	O6^{iii}—Ho1—O7^{iii}	53.50 (11)
O8—Ho1—O6^{iii}	71.31 (13)	O3^{iv}—Ho1—O7^{iii}	128.31 (11)
O4^{i}—Ho1—O3^{iv}	122.97 (11)	O9—Ho1—O7^{iii}	71.96 (14)
O2^{ii}—Ho1—O3^{iv}	78.11 (12)	O4^{i}—Ho1—O4^{iv}	73.13 (11)

O1—Ho1—O3^{iv}	85.40 (12)	O2^{ii}—Ho1—O4^{iv}	69.34 (10)
O8—Ho1—O3^{iv}	76.31 (14)	O1—Ho1—O4^{iv}	66.16 (10)
O6^{iii}—Ho1—O3^{iv}	79.94 (11)	O8—Ho1—O4^{iv}	112.23 (13)
O4^{i}—Ho1—O9A	77.64 (15)	O6^{iii}—Ho1—O4^{iv}	124.15 (11)
O2^{ii}—Ho1—O9A	134.24 (14)	O3^{iv}—Ho1—O4^{iv}	50.55 (9)
O1—Ho1—O9A	73.62 (13)	O9—Ho1—O4^{iv}	133.70 (13)
O8A—Ho1—O9A	73.65 (17)	O7^{iii}—Ho1—O4^{iv}	139.86 (12)
O6^{iii}—Ho1—O9A	101.64 (15)		
Symmetry codes: (i) -*x*+1/2, *y*-1/2, -*z*+3/2; (ii) -*x*+1/2, -*y*+1/2, -*z*+2; (iii) *x*-1/2, -*y*+1/2, *z*+1/2; (iv) *x*, -*y*+1, *z*+1/2.			
LnMOF-12			
La1—O1^{i}	2.432 (3)	La1—O8	2.484 (5)
La1—O3^{ii}	2.436 (3)	La1—O6	2.514 (4)
La1—O9A	2.440 (5)	La1—O2^{iv}	2.531 (3)
La1—O9	2.440 (5)	La1—O7	2.554 (3)
La1—O4^{iii}	2.441 (3)	La1—O1^{iv}	2.659 (3)
O1^{i}—La1—O3^{ii}	77.46 (12)	O9—La1—O2^{iv}	75.83 (17)
O1^{i}—La1—O9A	144.74 (14)	O4^{iii}—La1—O2^{iv}	76.77 (12)
O3^{ii}—La1—O9A	71.94 (15)	O8—La1—O2^{iv}	148.55 (15)
O1^{i}—La1—O9	144.74 (14)	O6—La1—O2^{iv}	80.18 (11)
O3^{ii}—La1—O9	71.94 (15)	O1^{i}—La1—O7	88.80 (11)
O1^{i}—La1—O4^{iii}	73.14 (11)	O3^{ii}—La1—O7	143.45 (13)
O3^{ii}—La1—O4^{iii}	133.72 (12)	O9A—La1—O7	105.53 (16)
O9—La1—O4^{iii}	141.84 (15)	O9—La1—O7	105.53 (16)
O1^{i}—La1—O8	79.52 (17)	O4^{iii}—La1—O7	70.81 (12)
O3^{ii}—La1—O8	71.44 (15)	O8—La1—O7	72.84 (13)
O9A—La1—O8	74.5 (2)	O6—La1—O7	51.87 (12)
O9—La1—O8	74.5 (2)	O2^{iv}—La1—O7	125.87 (11)
O4^{iii}—La1—O8	134.38 (15)	O1^{i}—La1—O1^{iv}	73.15 (11)
O1^{i}—La1—O6	137.48 (11)	O3^{ii}—La1—O1^{iv}	66.13 (11)
O3^{ii}—La1—O6	143.25 (13)	O9—La1—O1^{iv}	108.68 (16)
O9A—La1—O6	71.33 (15)	O4^{iii}—La1—O1^{iv}	71.53 (11)
O9—La1—O6	71.33 (15)	O8—La1—O1^{iv}	133.27 (15)
O4^{iii}—La1—O6	78.25 (13)	O6—La1—O1^{iv}	125.83 (11)
O8—La1—O6	99.90 (18)	O2^{iv}—La1—O1^{iv}	50.04 (10)
O1^{i}—La1—O2^{iv}	121.58 (10)	O7—La1—O1^{iv}	141.55 (11)
O3^{ii}—La1—O2^{iv}	89.61 (13)		
Symmetry codes: (i) -*x*+1, -*y*+1, -*z*; (ii) *x*-1/2, -*y*+3/2, *z*+1/2; (iii) -*x*+1, *y*, -*z*-1/2; (iv) *x*-1/2, *y*+1/2, *z*.			
LnMOF-13			
La1—O3^{i}	2.458 (4)	La1—O8	2.511 (6)
La1—O1^{ii}	2.460 (4)	La1—O6	2.535 (4)

La1—O4^{iii}	2.463 (4)	La1—O2^{iv}	2.552 (4)
La1—O9A	2.473 (6)	La1—O7	2.577 (4)
La1—O9	2.473 (6)	La1—O1^{iv}	2.667 (3)
O3^{i}—La1—O1^{ii}	76.87 (14)	O1^{ii}—La1—O2^{iv}	121.03 (12)
O3^{i}—La1—O4^{iii}	133.80 (14)	O4^{iii}—La1—O2^{iv}	76.07 (14)
O1^{ii}—La1—O4^{iii}	73.05 (13)	O9—La1—O2^{iv}	74.7 (2)
O3^{i}—La1—O9A	71.59 (17)	O8—La1—O2^{iv}	147.99 (17)
O1^{ii}—La1—O9A	145.06 (16)	O6—La1—O2^{iv}	81.00 (14)
O4^{iii}—La1—O9A	141.18 (17)	O3^{i}—La1—O7	142.45 (15)
O3^{i}—La1—O9	71.59 (17)	O1^{ii}—La1—O7	88.49 (12)
O1^{ii}—La1—O9	145.06 (16)	O4^{iii}—La1—O7	70.79 (14)
O4^{iii}—La1—O9	141.18 (17)	O9A—La1—O7	107.57 (19)
O3^{i}—La1—O8	70.69 (18)	O9—La1—O7	107.57 (19)
O1^{ii}—La1—O8	81.1 (2)	O8—La1—O7	72.99 (15)
O4^{iii}—La1—O8	135.49 (18)	O6—La1—O7	51.55 (14)
O9A—La1—O8	74.7 (2)	O2^{iv}—La1—O7	125.82 (13)
O9—La1—O8	74.7 (2)	O3^{i}—La1—O1^{iv}	66.31 (14)
O3^{i}—La1—O6	143.70 (15)	O1^{ii}—La1—O1^{iv}	73.32 (13)
O1^{ii}—La1—O6	137.10 (13)	O4^{iii}—La1—O1^{iv}	71.89 (13)
O4^{iii}—La1—O6	78.57 (15)	O9—La1—O1^{iv}	106.27 (19)
O9A—La1—O6	72.13 (17)	O8—La1—O1^{iv}	133.68 (17)
O9—La1—O6	72.13 (17)	O6—La1—O1^{iv}	126.69 (13)
O8—La1—O6	98.3 (2)	O2^{iv}—La1—O1^{iv}	49.61 (11)
O3^{i}—La1—O2^{iv}	90.88 (16)	O7—La1—O1^{iv}	141.85 (13)
Symmetry codes: (i) *x*-1/2, -*y*+3/2, *z*+1/2; (ii) -*x*+1, -*y*+1, -*z*; (iii) -*x*+1, *y*, -*z*-1/2; (iv) *x*-1/2, *y*+1/2, *z*.			

Table S2. The original ratios of lanthanide metal salts and the corresponding ICP results in LnMOF-**12** ＆**13**.

	Original ratio			ICP Results		
$La_{1-x-y}Eu_xTb_yL$	**La(1-x-y)**	**Eu(x)**	**Tb(y)**	**La(1-x-y)**	**Eu(x)**	**Tb(y)**
$La_{0.44}$ $Eu_{0.10}Tb_{0.46}L$ (LnMOF-12)	0.65	0.11	0.28	0.44	0.10	0.46
$La_{0.66}$ $Eu_{0.11}Tb_{0.23}L$ (LnMOF-13)	0.76	0.11	0.13	0.66	0.11	0.23

Table S3. The corresponding CIE coordinates of LnMOF-**12** & **13** excited at 345, 355, 365 and 380 nm..

Excitation wavelength (nm)	345	355	365	380
CIE / Sample (La:Eu:Tb)	X, Y	X, Y	X, Y	X, Y
0.44:0.10:0.46	0.332, 0.333	0.336, 0.345	0.308, 0.293	0.348, 0.320
0.66:0.11:0.23	0.316, 0.310	0.315, 0.326	0.292, 0.279	0.330, 0.308

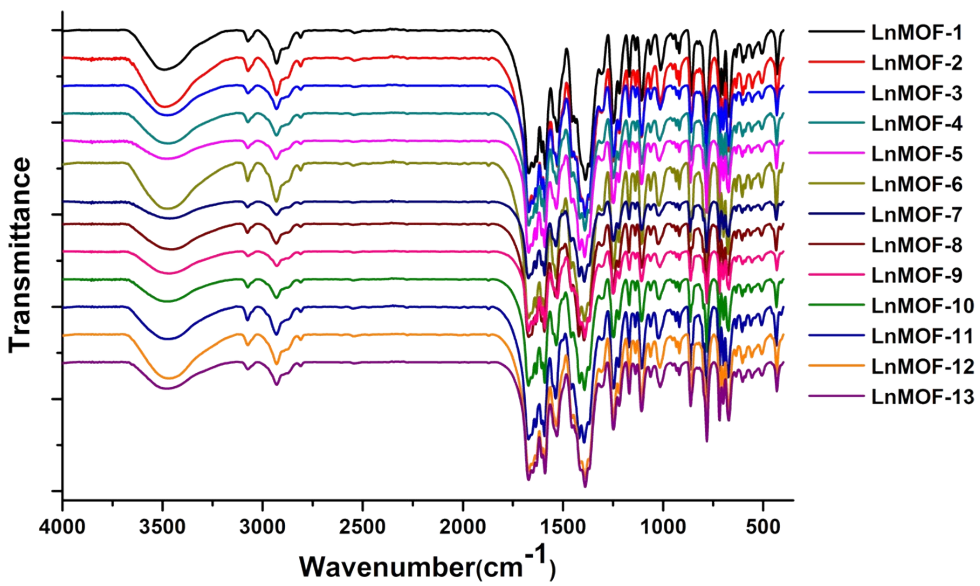
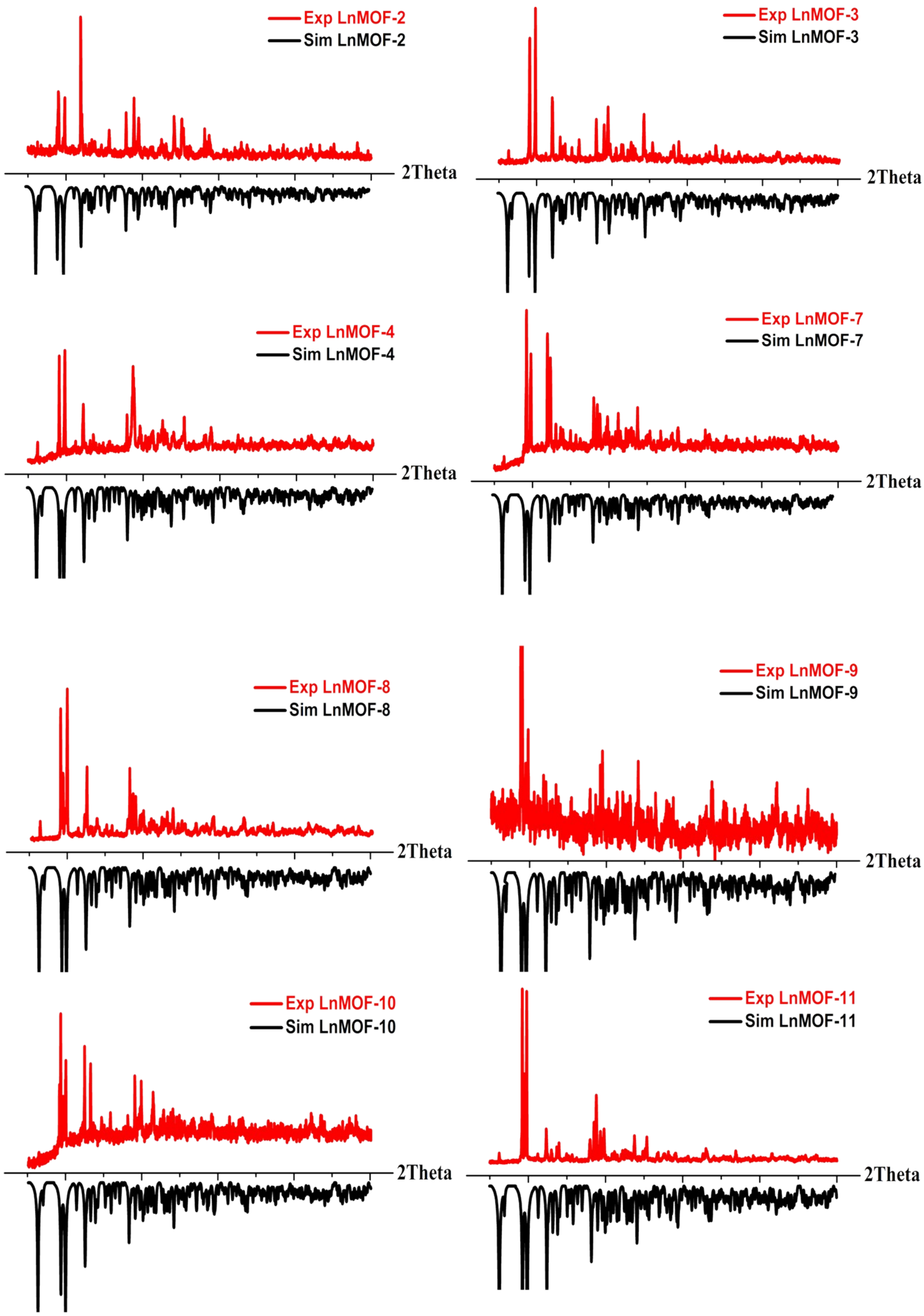


Fig. S1 IR spectra of LnMOF-**1**–**13**(KBr, cm^{-1}).



Exp LnMOF-2
Sim LnMOF-2
2Theta
Exp LnMOF-3
Sim LnMOF-3
2Theta
Exp LnMOF-4
Sim LnMOF-4
2Theta
Exp LnMOF-7
Sim LnMOF-7
2Theta
Exp LnMOF-8
Sim LnMOF-8
2Theta
Exp LnMOF-9
Sim LnMOF-9
2Theta
Exp LnMOF-10
Sim LnMOF-10
2Theta
Exp LnMOF-11
Sim LnMOF-11
2Theta

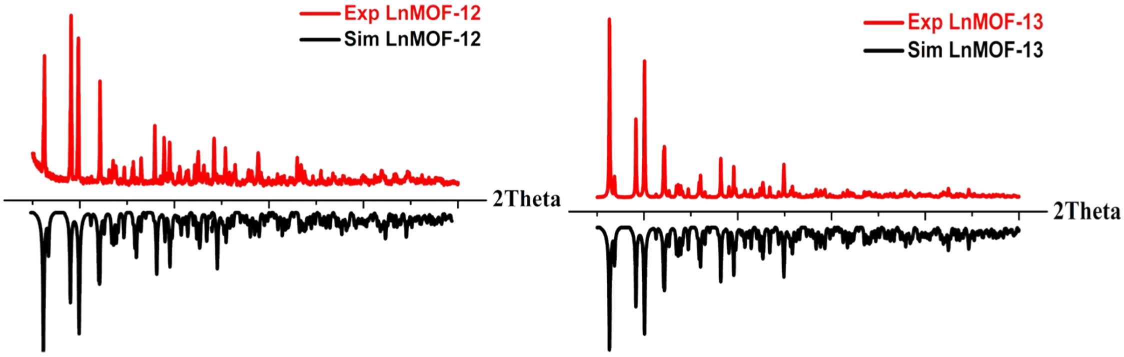


Fig. S2 PXRD patterns of LnMOF-**2-4,** LnMOF-**7-11** and LnMOF-**12-13** in the range from 5 to 60 degrees.

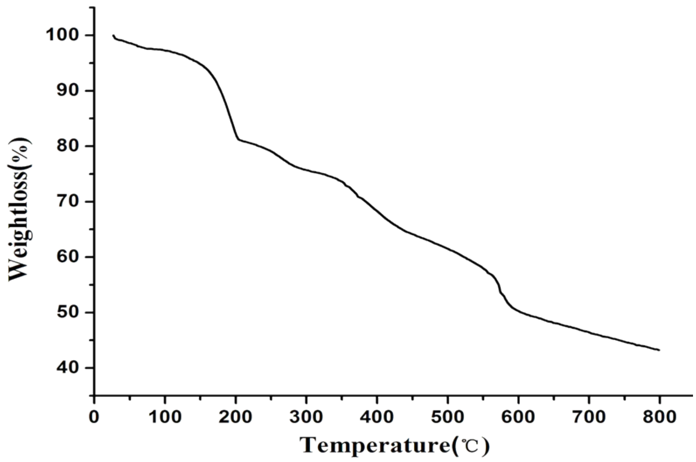
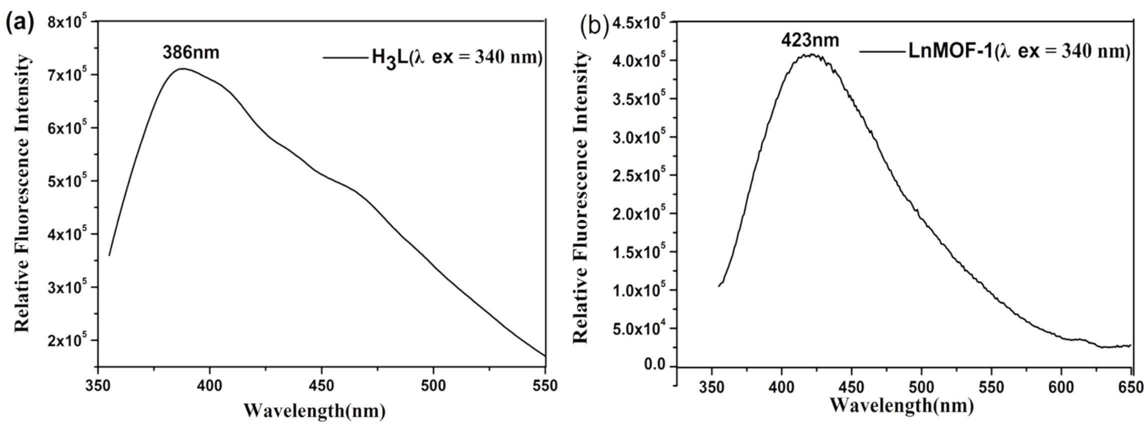


Fig. S3 Thermogravimetric analyses (TGA) curve of LnMOF-**5**.



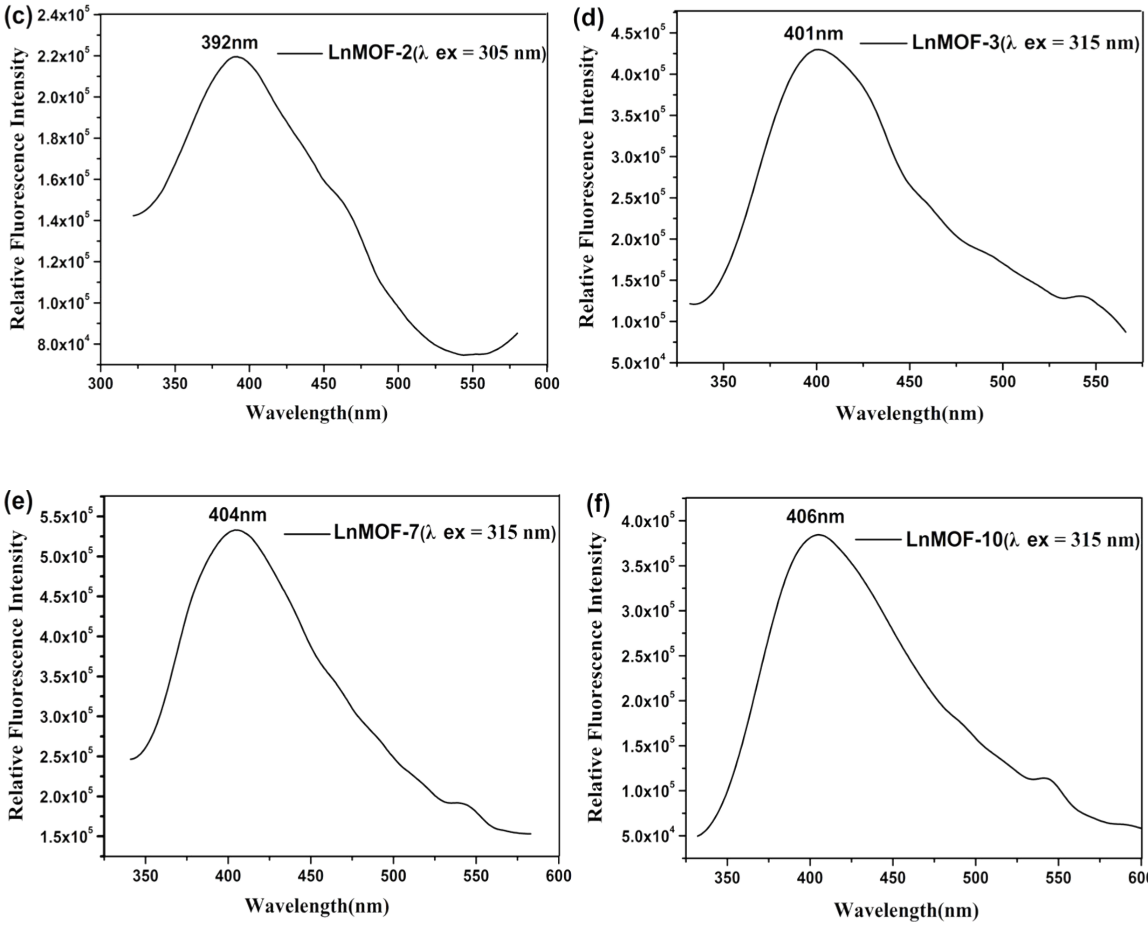


Fig. S4 Solid-state emission spectra for the ligand H_3L (a) and compounds LnMOF-**1** (b), **2** (c), **3** (d), **7** (e) and **10** (f), respectively.

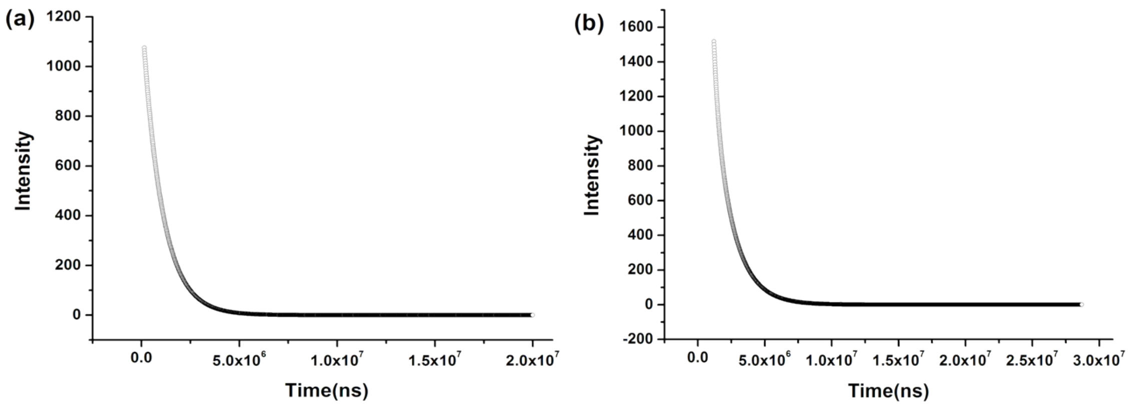


Fig. S5 The fluorescence decay curves of LnMOF-**5** and LnMOF-**6**.

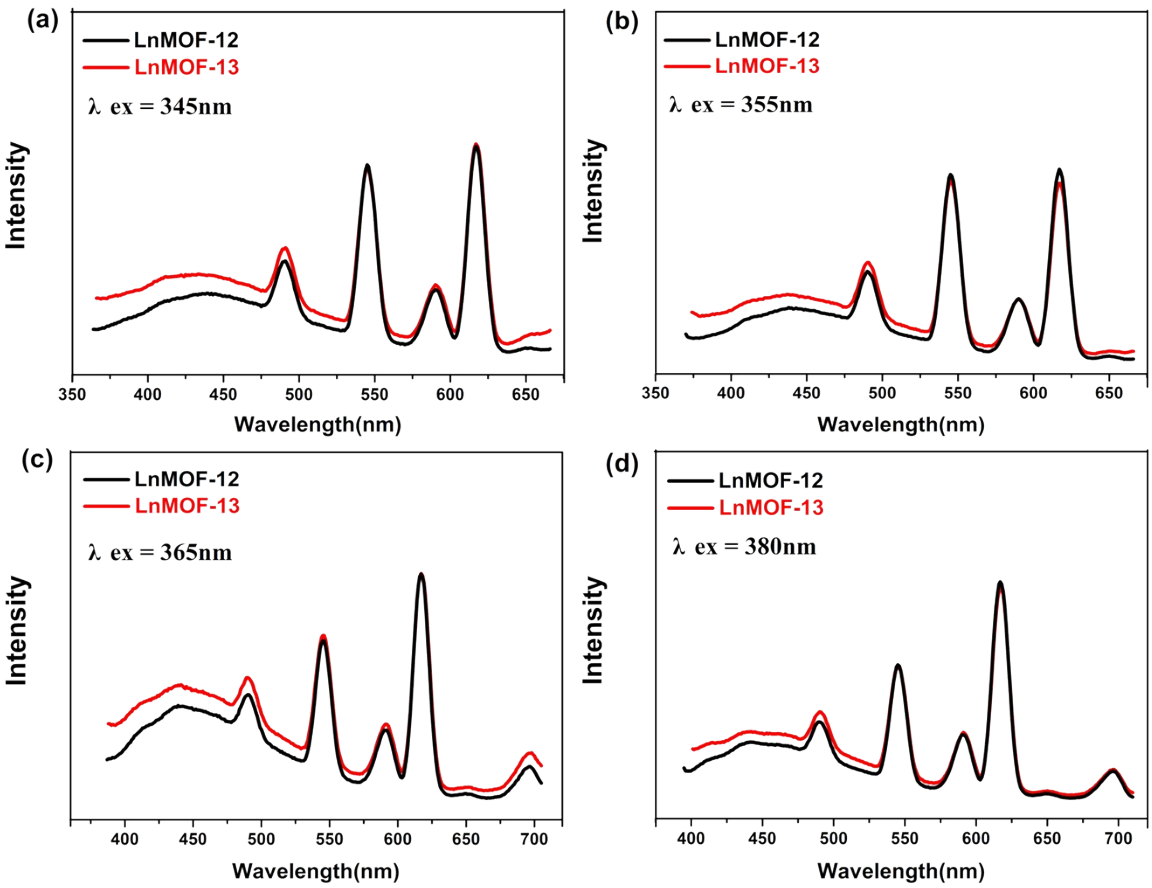


Fig. S6 Emission spectra of LnMOF-**12** & **13** excitation under 345 nm, 355 nm, 365 nm and 380 nm.

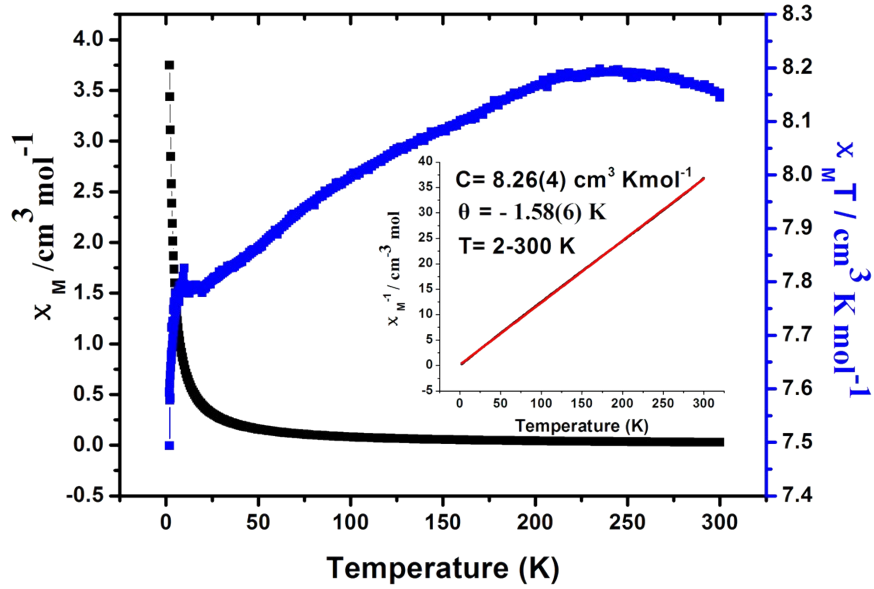


Fig. S7 Plots of χ_M (black), χ_MT (blue) and χ_M^{-1} (insert) vs. T for LnMOF-**10**.