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Synthesis of eight isostructural 2D Lanthanide Coordination Polymers assembled by rigid Furan-2,5-dicarboxylic acid and flexible Adipic acid as linkers and exploration of luminescent Eu/Tb Polymers as efficient and sensitive sensors for Nitroaromatic Compounds

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1. Experimental Section-Synthesis of Ln-CPs **2-8**

Synthesis of [Sm(2 ,5-FDC)$_{0.5}$(Adip)(H$_2$O)$_2$](2)

The procedure employed for the synthesis of CP-**2** was similar to that used for CP-**1** with the stoichiometric equivalent of $Sm(NO_3)_3 \cdot 6H_2O$ (0.177 g, 0.4 mmol) used instead of $Nd(NO_3)_3 \cdot 6H_2O$. We obtained colorless block-shaped crystals for CP-**2** with the yield of 50% based on Sm^{III} ions. FTIR (KBr pellets, cm^{-1}: 3214(s), 2943(w), 2381(m), 1569(s), 1444(s), 1350(s), 788(m), 674(w), 497(w), 393(w). Anal. Calc. (%) for $C_9H_{13}O_{8.5}Sm$: C, 26.50; H, 3.18. Found (%): C, 26.71; H, 3.87.

Synthesis of [Eu(2 ,5-FDC)$_{0.5}$(Adip)(H$_2$O)$_2$](3)

The procedure employed for the synthesis of CP-**3** was similar to that used for CP-**1** with the stoichiometric equivalent of $Eu(NO_3)_3 \cdot 5H_2O$ (0.176 g, 0.4 mmol) used instead of $Eu(NO_3)_3 \cdot 6H_2O$. We obtained colorless block-shaped crystals for CP-**3** with the yield of 51%

based on Eu^{III} ions. FTIR (KBr pellets, cm^{-1}): 3241(m), 1658(s), 1538(s), 1454(s), 1397(s), 1314(s), 1172(w), 1022(w), 951(w), 831(m), 778(m), 691(m), 423(w). Anal. Calc. (%) for $C_9H_{13}O_{8.5}Eu$: C, 26.59; H, 3.19. Found (%): C, 26.88; H, 3.47.

Synthesis of [Gd(2 ,5-FDC)$_{0.5}$(Adip)(H$_2$O)$_2$](4)

The procedure employed for the synthesis of CP-**4** was similar to that used for CP-**1** with the stoichiometric equivalent of $Gd(NO_3)_3 \cdot 6H_2O$ (0.180 g, 0.4 mmol) used instead of $Nd(NO_3)_3 \cdot 6H_2O$. We obtained colorless needle-shaped crystals with 54% yield based on Gd(III). FTIR (KBr pellets, cm^{-1}): 3237(m), 1660(s), 1538(s), 1455(s), 1396(s), 1314(s), 1070(w), 1022(w), 833(m), 779(w), 691(w), 503(m), 424(w). Anal. Calc. (%) for $C_9H_{13}O_{8.5}Gd$: C, 26.05; H, 3.13. Found (%): C, 26.31; H, 3.37.

Synthesis of [Tb(2 ,5-FDC)$_{0.5}$(Adip)(H$_2$O)$_2$](5)

The procedure employed for the synthesis of CP-**5** was similar to that used for CP **1** with the stoichiometric equivalent of $Tb(NO_3)_3 \cdot 6H_2O$ (0.137 g, 0.4 mmol) used instead of $Nd(NO_3)_3 \cdot 6H_2O$. We obtained colorless needle shaped crystals with 50% yield based on Tb(III). FTIR (KBr pellets, cm^{-1}): 3241(m), 2946(m), 1959(w), 1538(s), 1455(w), 1397(w), 1314(s), 1097(w), 833(s), 778(m), 691(m), 503(m), 416(w). Anal. Calc. (%) for $C_9H_{13}O_{8.5}Tb$: C, 25.95; H, 3.12. Found (%): C, 25.66; H, 3.63.

Synthesis of [Dy(2 ,5-FDC)$_{0.5}$(Adip)(H$_2$O)$_2$](6)

The procedure employed for the synthesis of CP-**6** was similar to that used for CP-**1** with the stoichiometric equivalent of $Dy(NO_3)_3 \cdot 6H_2O$ (0.175 g, 0.4 mmol) used instead of $Nd(NO_3)_3 \cdot 6H_2O$. We obtained colorless needle-shaped crystals with 52% yield based on Dy(III). FTIR (KBr pellets, cm^{-1}): 3240(m), 2947(w), 1658(m), 1539(s), 1455(w),1399(s), 1316(w),

1172(w), 1095(w), 1022(w), 834(m), 778(m), 619(w), 504(m).). Anal. Calc. (%) for $C_9H_{13}O_{8.5}Dy$: C, 25.73; H, 3.09. Found (%): C, 25.64; H, 3.63.

Synthesis of [Ho(2 ,5-FDC)$_{0.5}$(Adip)(H$_2$O)$_2$](7)

The procedure employed for the synthesis of CP-**7** was similar to that used for CP-**1** with the stoichiometric equivalent of $Ho(NO_3)_3 \cdot 6H_2O$ (0.176 g, 0.4 mmol) used instead of $Nd(NO_3)_3 \cdot 6H_2O$. We obtained colorless needle-shaped crystals with 53% yield based on Ho(III). FTIR (KBr pellets, cm^{-1}): 3235(m), 2946(w), 2044(w), 1897(w), 1658(s), 1537(s), 1455(m), 1403(m), 1172(w), 1022(w), 834(s), 778(m), 693(m), 618(m), 502(m), 455(w), 412(m).). Anal. Calc. (%) for $C_9H_{13}O_{8.5}Ho$: C, 25.58; H, 3.07. Found (%): C, 25.75; H, 3.77.

Synthesis of [Er(2 ,5-FDC)$_{0.5}$(Adip)(H$_2$O)$_2$](8)

The procedure employed for the synthesis of CP-**8** was similar to that used for CP-**1** with the stoichiometric equivalent of $Er(NO_3)_3 \cdot 6H_2O$ (0.076 g, 0.4 mmol) used instead of $Nd(NO_3)_3 \cdot 6H_2O$. We obtained colorless needle-shaped crystals with 50% yield based on Er(III). FTIR (KBr pellets, cm^{-1}): 3237(m), 2947(w), 1658(s), 1539(s), 1456(m), 1400(m), 1316(s), 1233(m), 1022(w), 955(m), 835(m), 778(m), 691(m), 504(m), 421(m).). Anal. Calc. (%) for $C_9H_{13}O_{8.5}Er$: C, 25.44; H, 3.06. Found (%): C, 25.51; H, 3.53.

2. X-Ray Crystal structures of Ln-CPs **1-8:**

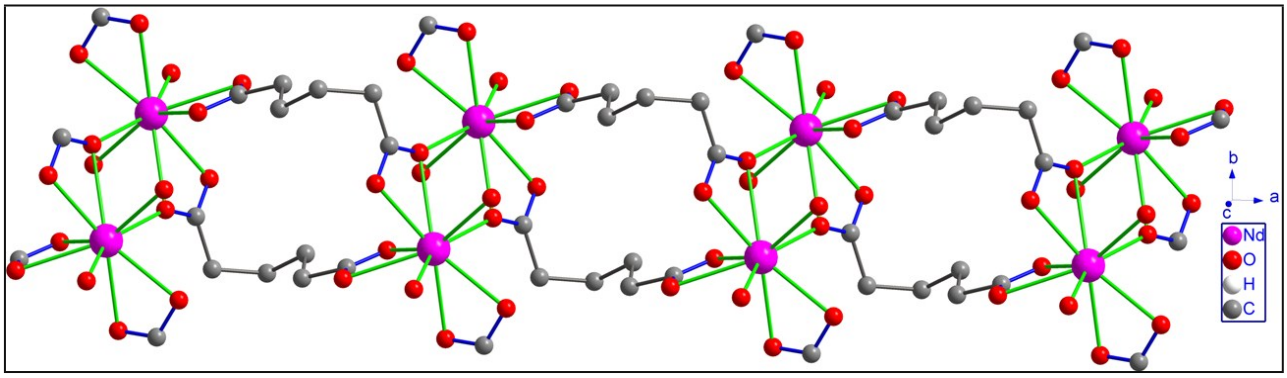

Figure S1. Extention of SBUs of Ln-CP-**1** along *c*-axis

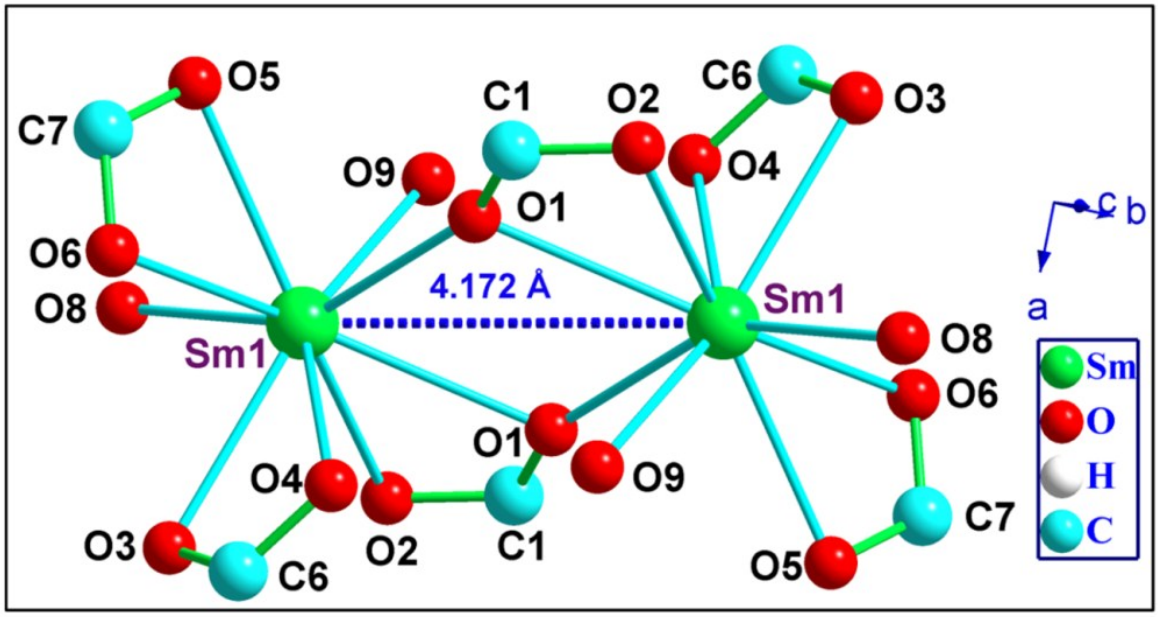

Figure S2. SBU of Ln-CP **2** (Sm…Sm = 4.172 Å).

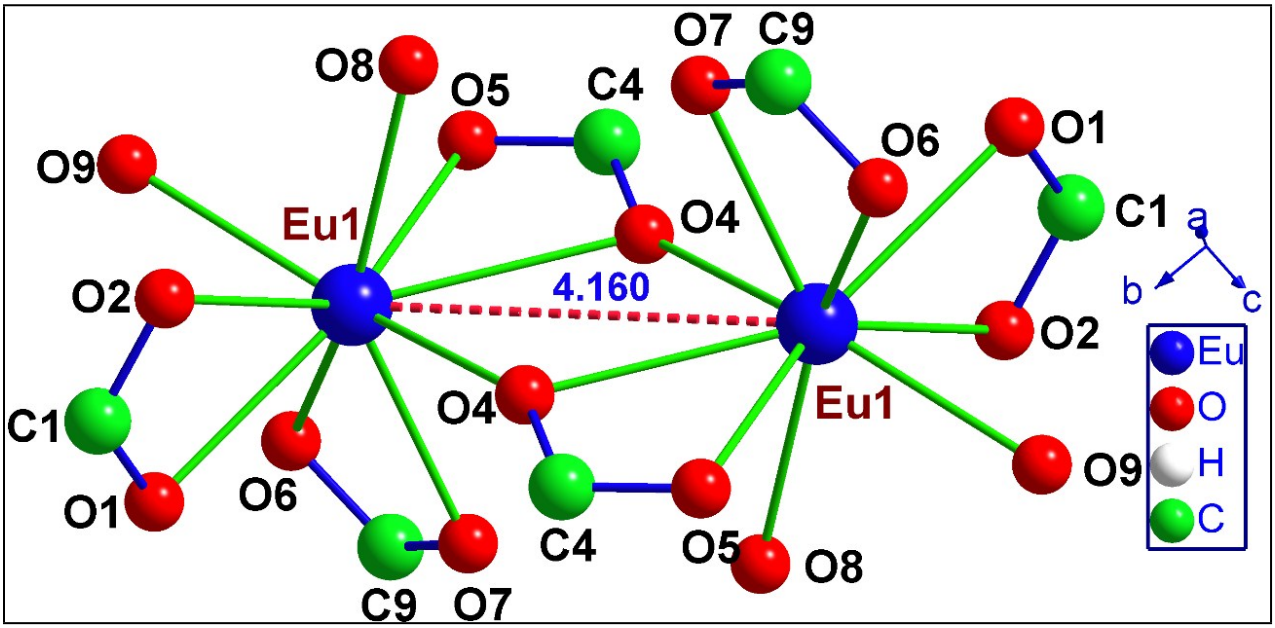

Figure S3. SBU of Ln-CP **3** (Eu…Eu = 4.160 Å).

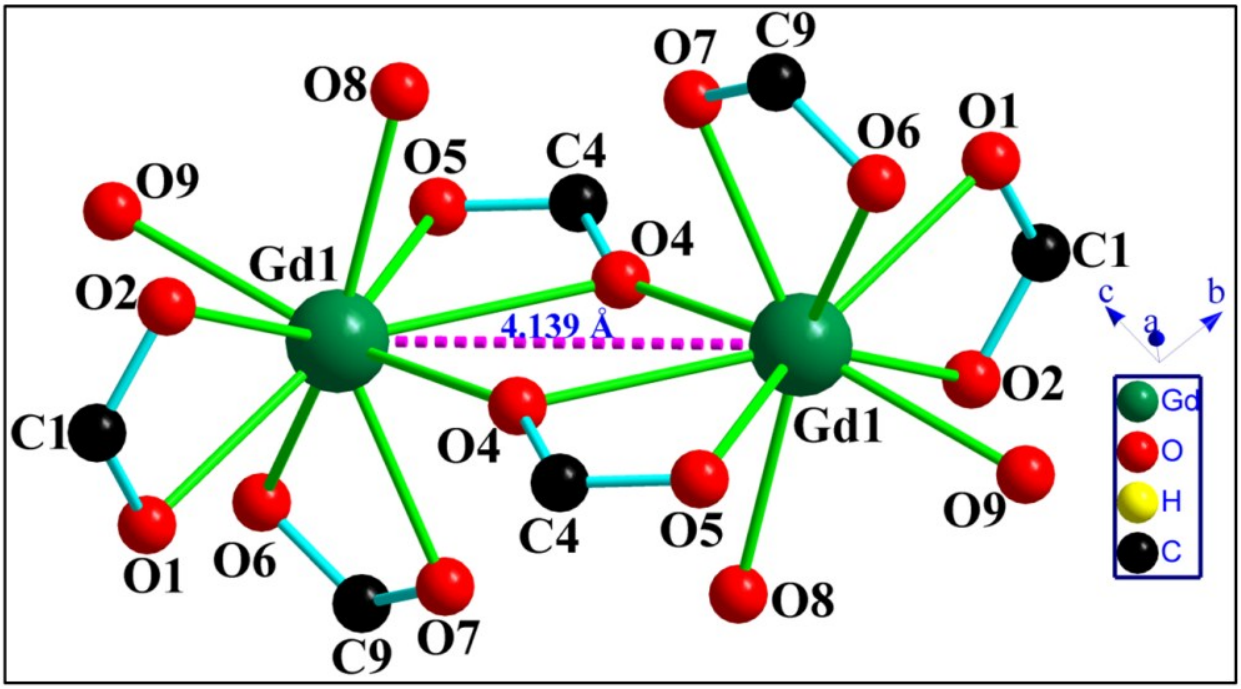

Figure S4. SBU of Ln-CP **4** (Gd…Gd = 4.139 Å).

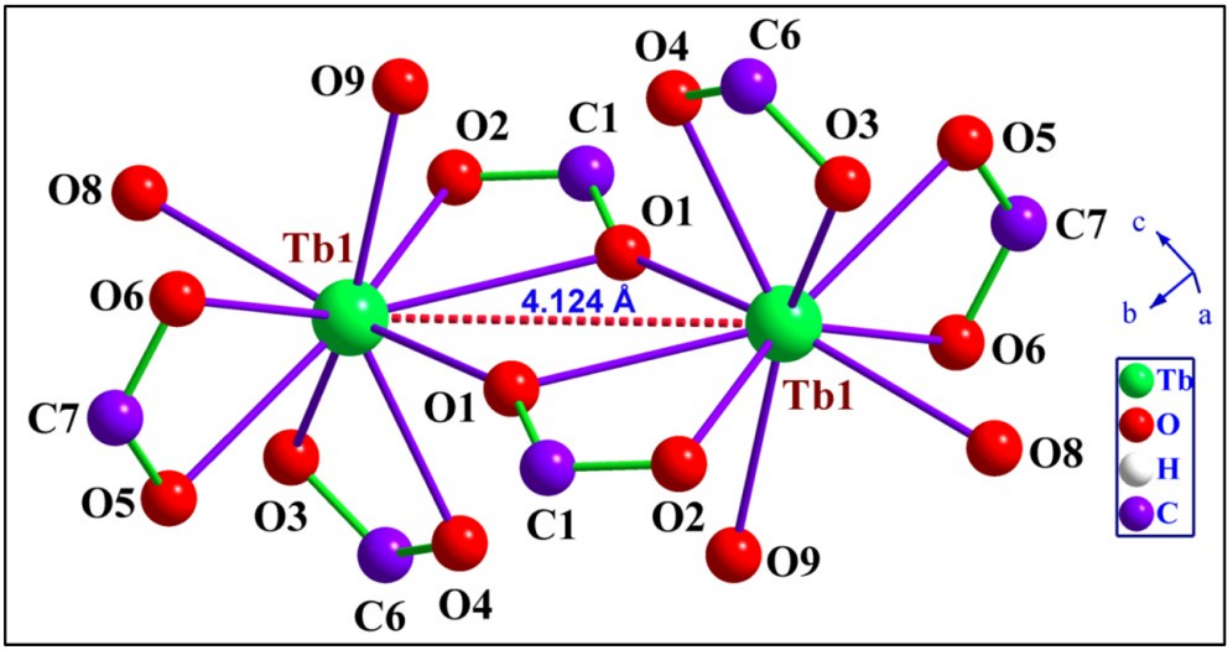

Figure S5. SBU of Ln-CP **5** (Tb…Tb = 4.124 Å).

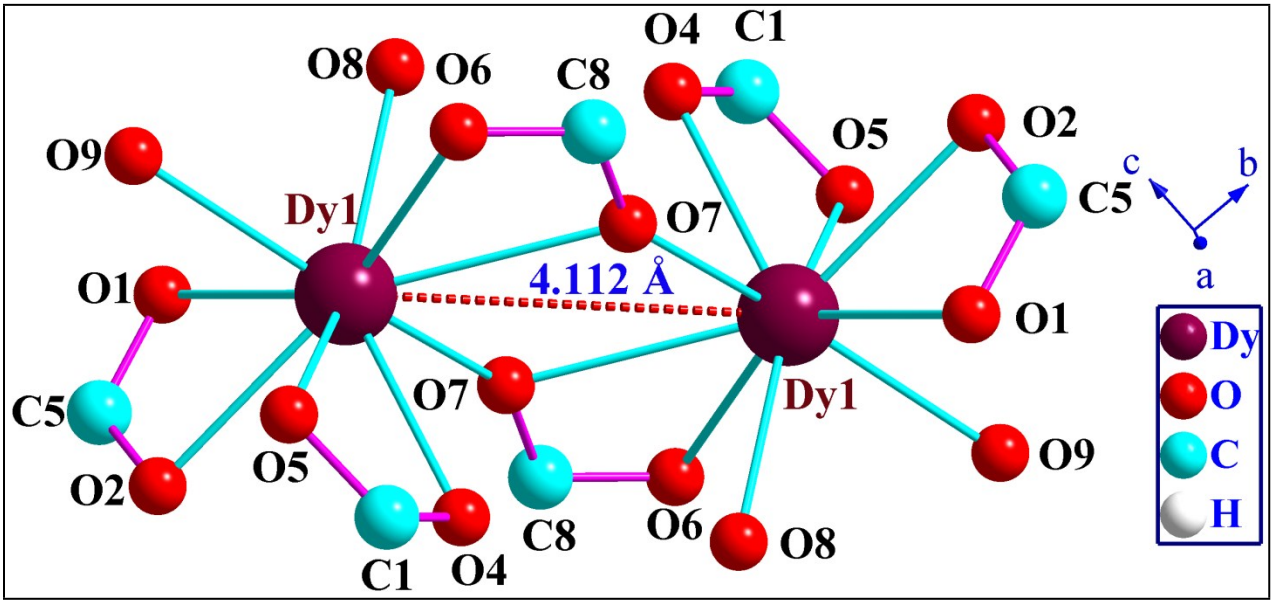

Figure S6. SBU of Ln-CP **6** (Dy…Dy = 4.112 Å).

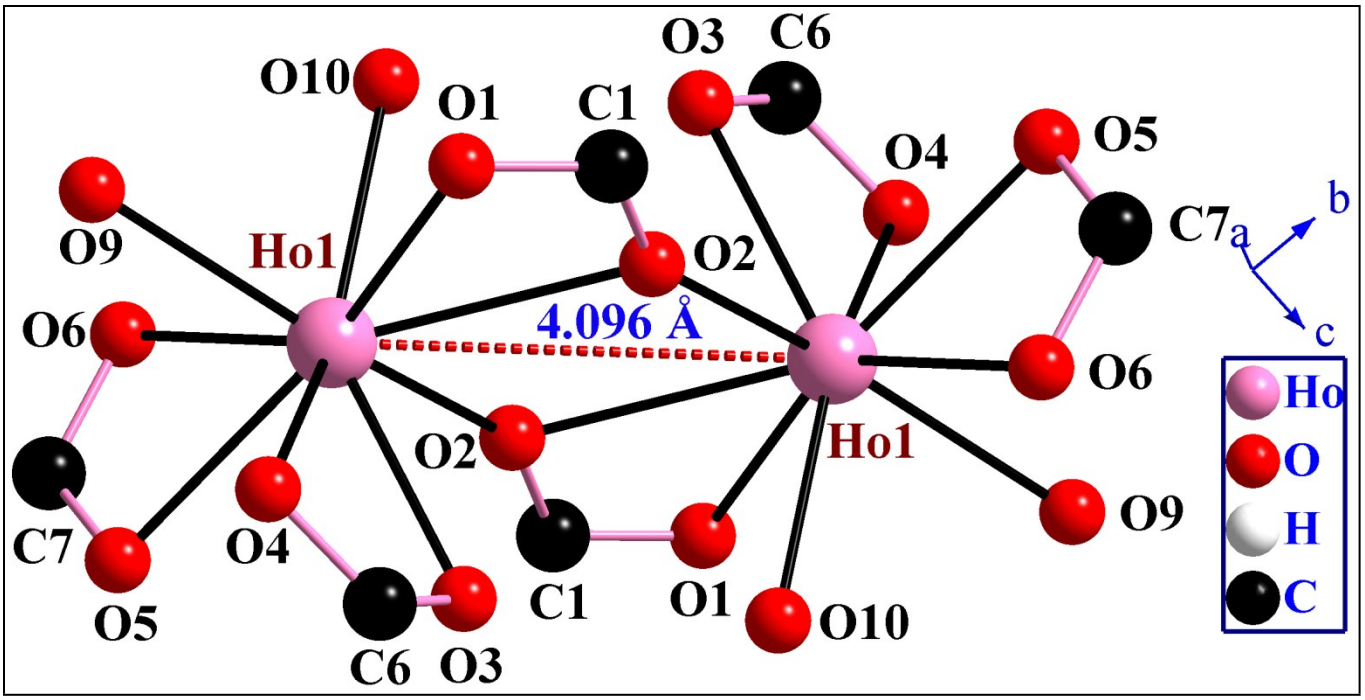

Figure S7. SBU of Ln-CP **7** (Ho…Ho = 4.096 Å).

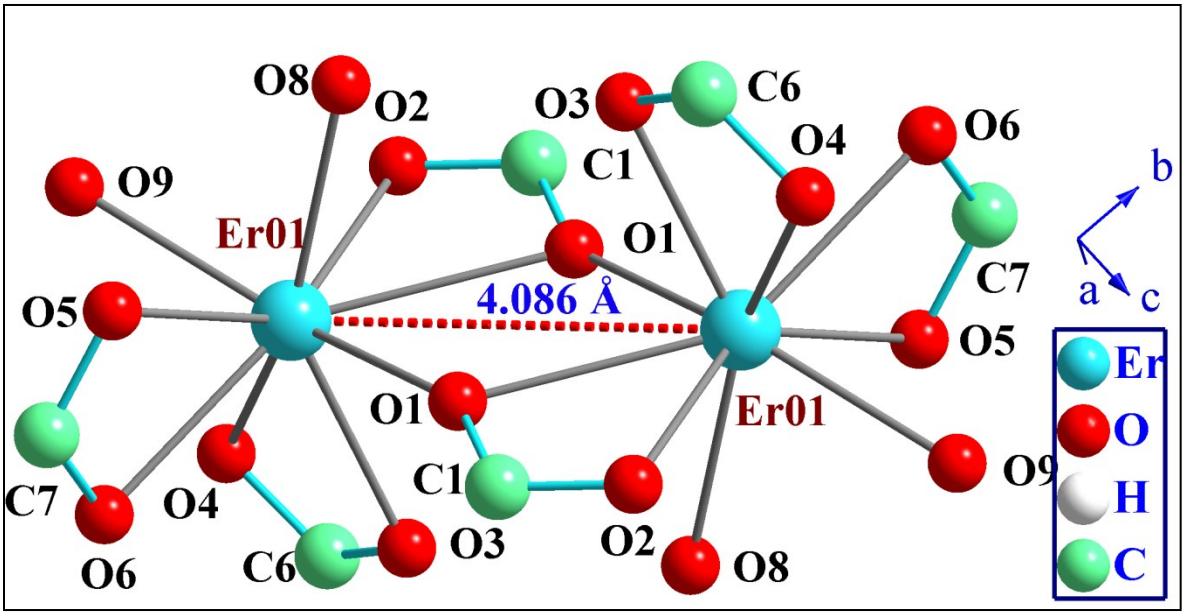

Figure S8. SBU of Ln-CP **8** (Er…Er = 4.086 Å).

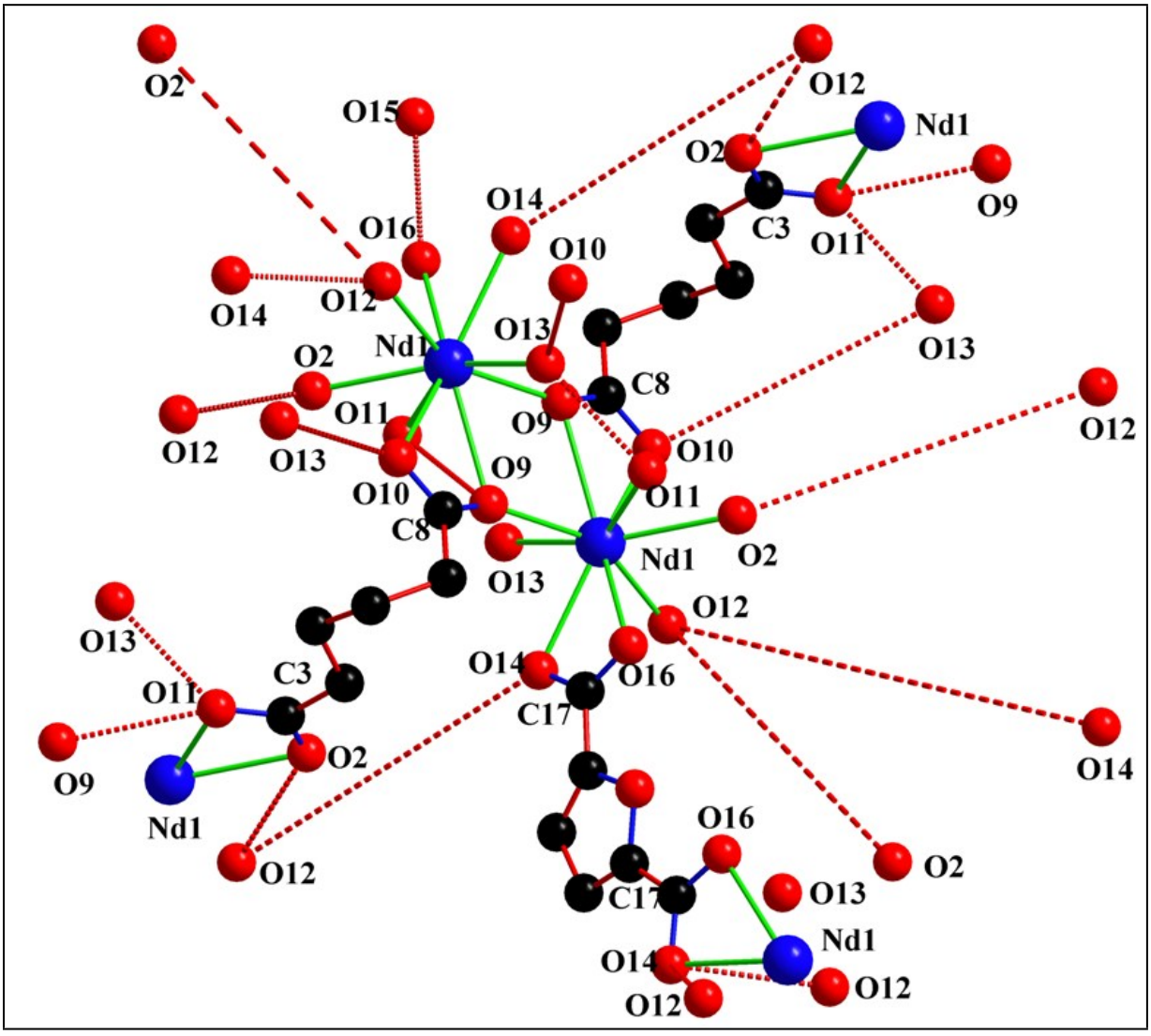

Figure S9. Hydrogen bonding positions in Ln CP-1

3. Characterization by FTIR, PXRD and TGA**:**

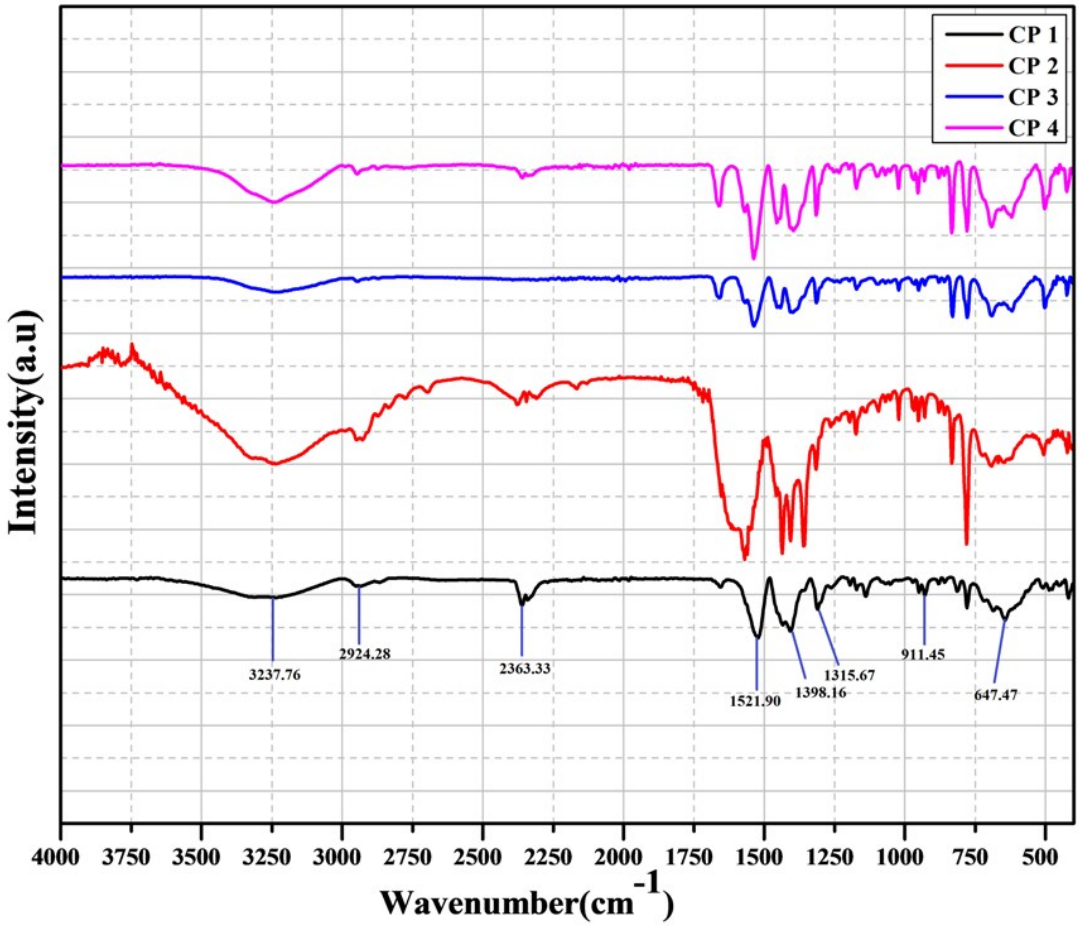

Figure S10. FTIR spectra of Ln-CP **1-4**.

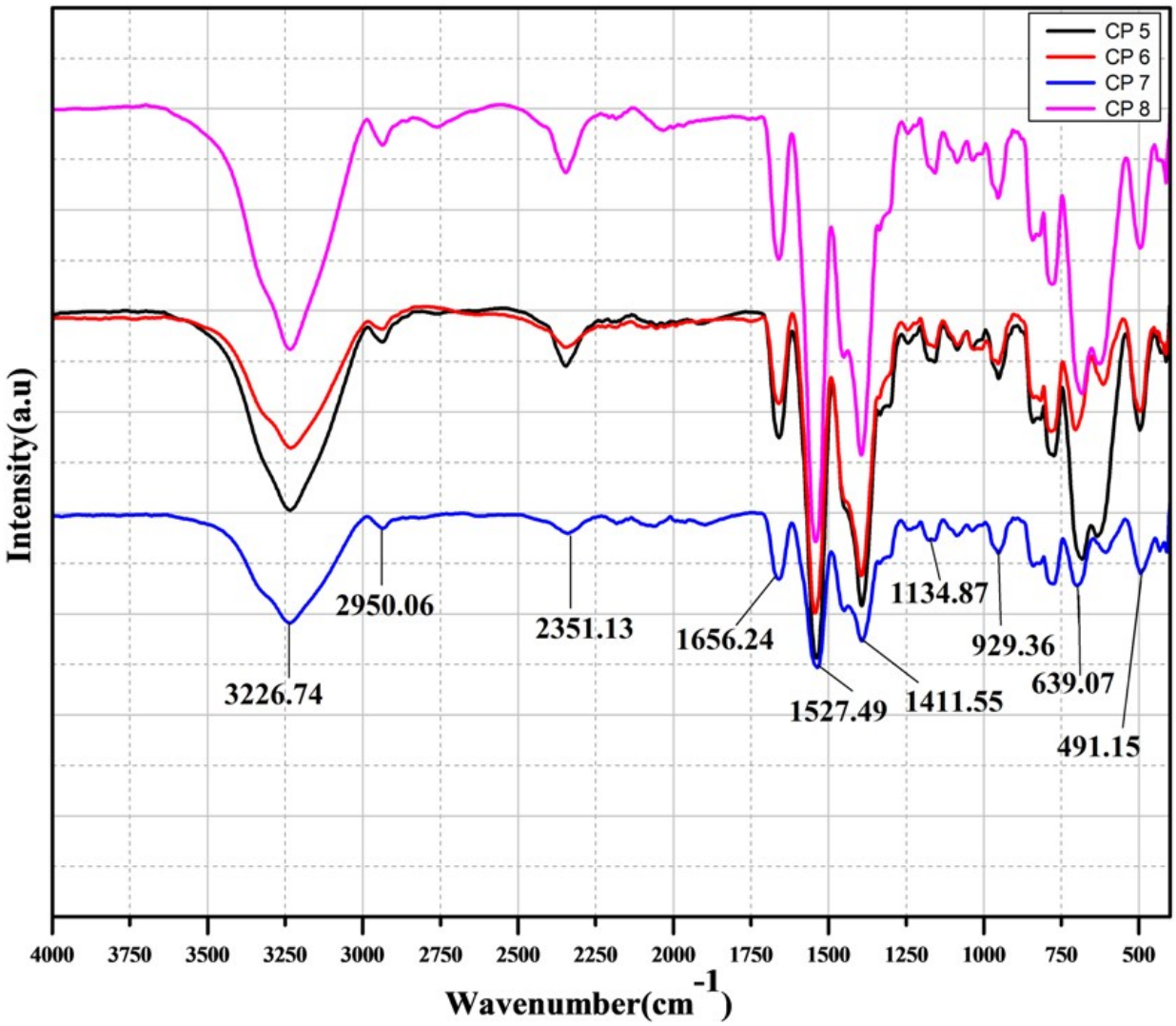

Figure S11 . FTIR spectra of Ln-CP **5-8**.

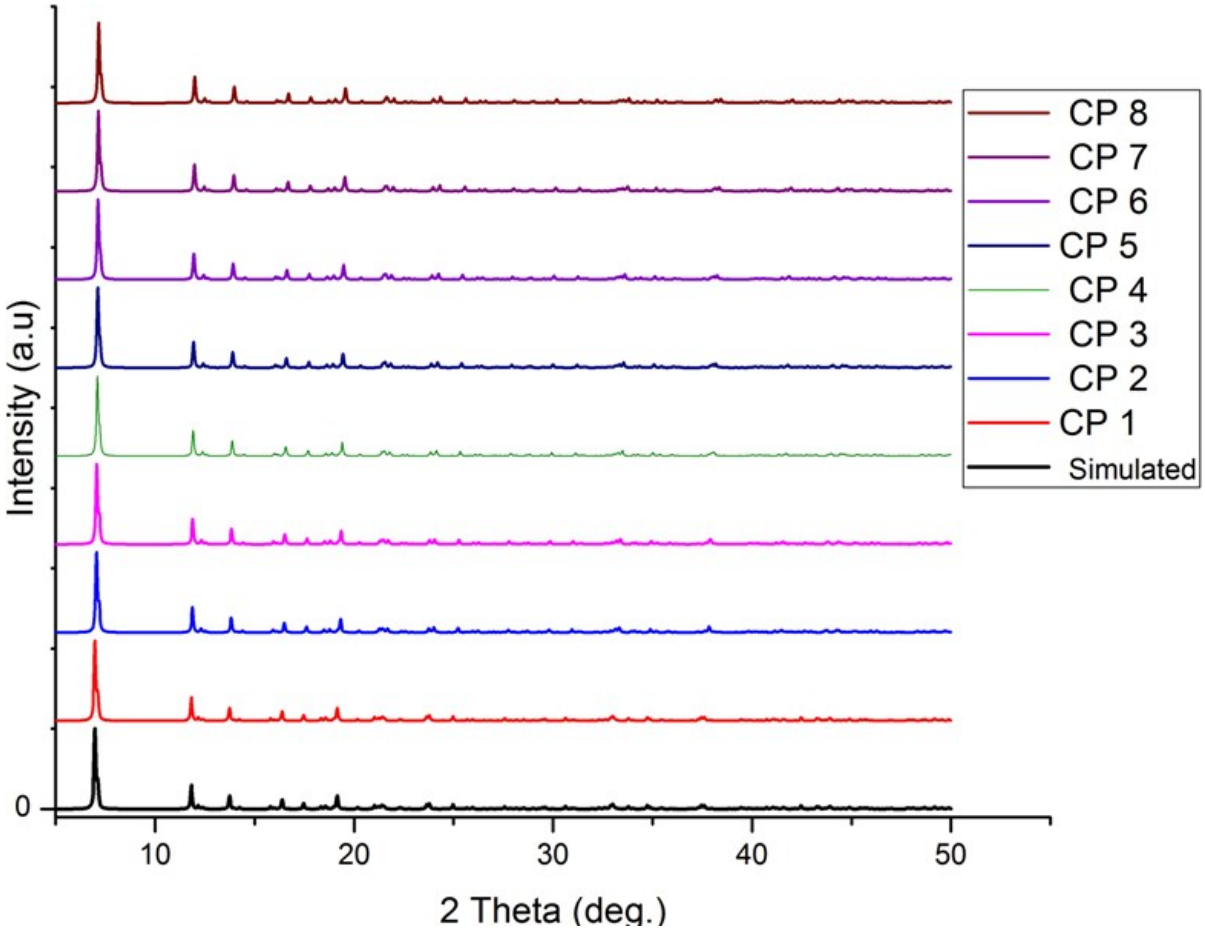

Figure S12. PXRD Patterns of CPs **1-8**.

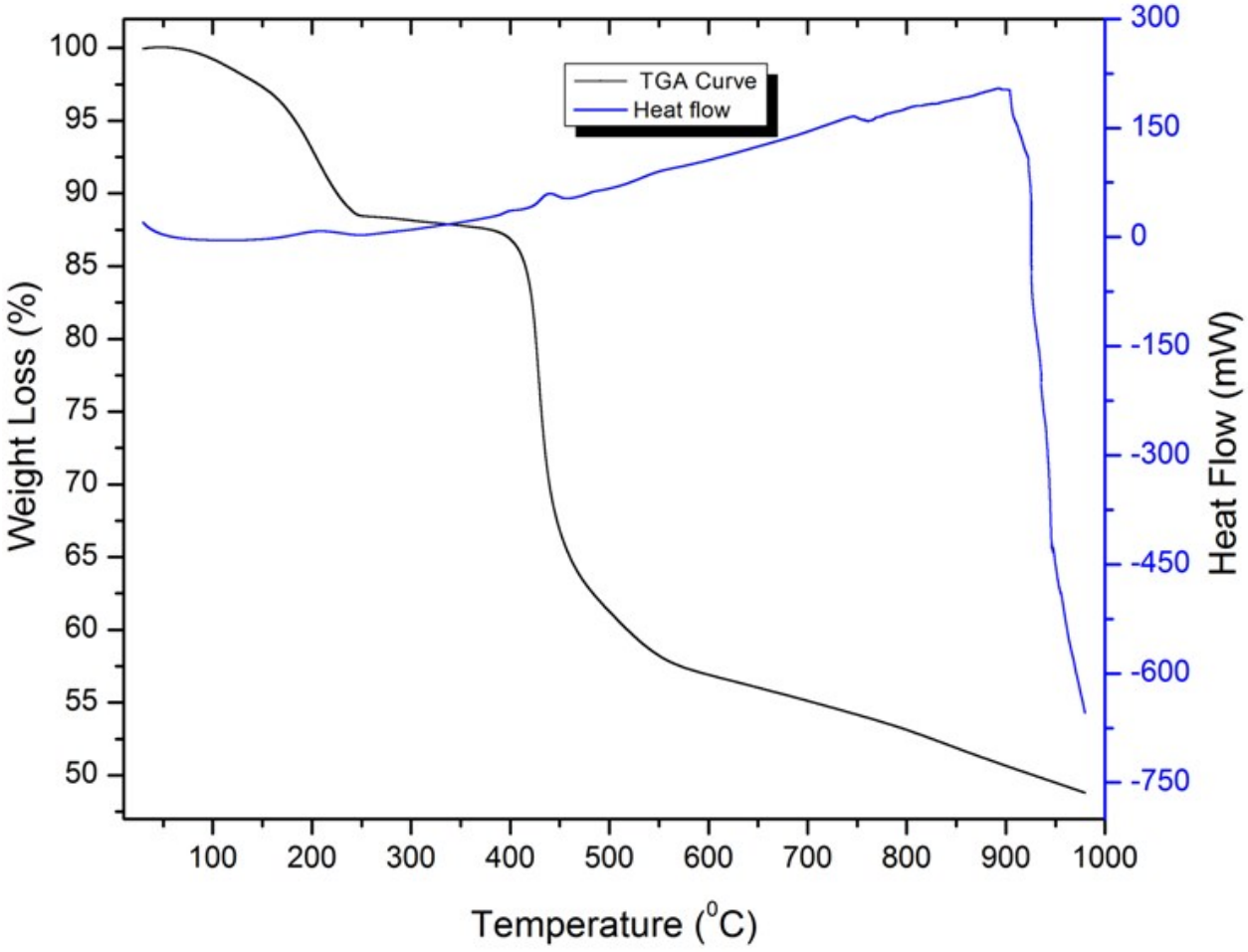

Figure S13. TGA curve for Ln-CP **3**.

4. Crystallographic Information (Tables)

Table S1. Selected Bond lengths (Å) for CP-**1**.

Nd1—O14	2.531 (5)	Nd1—O12	2.424 (5)
Nd1—O9	2.435 (5)	Nd1—O13	2.445 (5)
Nd1—O9^{i}	2.631 (5)	Nd1—O11^{ii}	2.475 (5)
Nd1—O2^{ii}	2.561 (5)	Nd1—O16	2.491 (5)
Nd1—O10^{i}	2.516 (5)		

Symmetry code(s): (i) −*x*+2, −*y*+1, −*z*+1; (ii) *x*+1, *y*, *z*.

Table S2. Selected Bond angles (°) for CP-**1.**

O14—Nd1—O9^{i}	138.47 (15)	O12—Nd1—O13	83.76 (19)
O14—Nd1—O2^{ii}	124.06 (18)	O12—Nd1—O11^{ii}	130.21 (18)
O9—Nd1—O14	81.87 (17)	O12—Nd1—O16	82.5 (2)
O9—Nd1—O9^{i}	66.81 (17)	O13—Nd1—O14	75.38 (17)
O9—Nd1—O2^{ii}	125.80 (16)	O13—Nd1—O9^{i}	72.07 (16)
O9—Nd1—O10^{i}	116.36 (16)	O13—Nd1—O2^{ii}	148.33 (19)
O9—Nd1—O13	77.99 (18)	O13—Nd1—O10^{i}	77.48 (19)
O9—Nd1—O11^{ii}	74.24 (17)	O13—Nd1—O11^{ii}	142.98 (17)
O9—Nd1—O16	92.0 (2)	O13—Nd1—O16	126.99 (19)
O2^{ii}—Nd1—O9^{i}	96.83 (18)	O11^{ii}—Nd1—O14	123.29 (19)
O10^{i}—Nd1—O14	142.98 (18)	O11^{ii}—Nd1—O9^{i}	74.72 (17)
O10^{i}—Nd1—O9^{i}	49.90 (15)	O11^{ii}—Nd1—O2^{ii}	51.59 (16)
O10^{i}—Nd1—O2^{ii}	73.06 (19)	O11^{ii}—Nd1—O10^{i}	93.39 (19)

O12—Nd1—O14	73.37 (19)	O11^{ii}—Nd1—O16	78.33 (19)
O12—Nd1—O9	152.27 (17)	O16—Nd1—O14	51.62 (17)
O12—Nd1—O9^{i}	126.61 (18)	O16—Nd1—O9^{i}	149.29 (18)
O12—Nd1—O2^{ii}	79.57 (17)	O16—Nd1—O2^{ii}	77.3 (2)
O12—Nd1—O10^{i}	79.10 (18)	O16—Nd1—O10^{i}	147.4 (2)

Symmetry code(s): (i) −*x*+2, −*y*+1, −*z*+1; (ii) *x*+1, *y*, *z*.

Table S3. Selected Bond lengths (Å) for CP-**2**.

Sm1—O1	2.3961 (18)	Sm1—O8	2.386 (2)
Sm1—O1^{i}	2.606 (2)	Sm1—O9	2.414 (2)
Sm1—O5	2.513 (2)	Sm1—O3^{ii}	2.530 (2)
Sm1—O2^{i}	2.491 (2)	Sm1—O6	2.461 (2)
Sm1—O4^{ii}	2.436 (2)		

Symmetry code(s): (i) −*x*+2, −*y*+1, −*z*+1; (ii) *x*+1, *y*, *z*.

Table S4. Selected Bond angles (°) for CP-**2**.

O1—Sm1—O1^{i}	67.02 (7)	O8—Sm1—O1^{i}	126.76 (7)
O1—Sm1—O5	81.03 (7)	O8—Sm1—O5	73.19 (7)
O1—Sm1—O2^{i}	117.09 (6)	O8—Sm1—O2^{i}	79.24 (7)
O1—Sm1—O4^{ii}	74.92 (7)	O8—Sm1—O4^{ii}	130.33 (7)
O1—Sm1—O9	78.73 (7)	O8—Sm1—O9	82.68 (7)
O1—Sm1—O3^{ii}	126.76 (6)	O8—Sm1—O3^{ii}	79.13 (7)
O1—Sm1—O6	91.49 (8)	O8—Sm1—O6	82.74 (8)

O5—Sm1—O1^{i}	137.57 (6)	O9—Sm1—O1^{i}	71.73 (7)
O5—Sm1—O3^{ii}	123.08 (7)	O9—Sm1—O5	75.33 (7)
O2^{i}—Sm1—O1^{i}	50.35 (6)	O9—Sm1—O2^{i}	77.25 (8)
O2^{i}—Sm1—O5	143.08 (7)	O9—Sm1—O4^{ii}	143.64 (7)
O2^{i}—Sm1—O3^{ii}	73.59 (8)	O9—Sm1—O3^{ii}	147.95 (7)
O4^{ii}—Sm1—O1^{i}	75.11 (7)	O9—Sm1—O6	127.64 (7)
O4^{ii}—Sm1—O5	123.67 (7)	O3^{ii}—Sm1—O1^{i}	98.75 (7)
O4^{ii}—Sm1—O2^{i}	92.90 (8)	O6—Sm1—O1^{i}	149.08 (7)
O4^{ii}—Sm1—O3^{ii}	51.95 (6)	O6—Sm1—O5	52.31 (7)
O4^{ii}—Sm1—O6	78.00 (8)	O6—Sm1—O2^{i}	146.88 (8)
O8—Sm1—O1	151.31 (7)	O6—Sm1—O3^{ii}	75.87 (8)

Symmetry code(s): (i) −*x*+2, −*y*+1, −*z*+1; (ii) *x*+1, *y*, *z*.

Table S5. Hydrogen bonding parameters of CP-**2**.

D—H···*A*	*D*—H (Å)	H···*A* (Å)	*D*···*A* (Å)	*D*—H···*A* (°)
O8—H8A···O3^{i}	0.86	1.97	2.709 (3)	143.1
O8—H8B···O5^{i}	0.86	1.98	2.686 (3)	138.1
O9—H9A···O4^{ii}	0.87	2.03	2.682 (3)	131.6
O9—H9B···O2^{iii}	0.87	1.98	2.694 (3)	138.1

Symmetry code(s): (i) *x*+1/2, *y*, −*z*+1/2; (ii) −*x*+1, −*y*+1, −*z*+1; (iii) −*x*+3/2, −*y*+1, *z*−1/2

Table S6. Selected Bond lengths (Å) for CP-**3**.

Eu1—O2	2.505 (3)	Eu1—O9	2.370 (3)
Eu1—O4^{i}	2.597 (3)	Eu1—O1	2.449 (3)

Eu1—O4	2.386 (3)	Eu1—O8	2.398 (3)
Eu1—O5^{i}	2.484 (3)	Eu1—O6^{ii}	2.520 (3)
Eu1—O7^{ii}	2.426 (3)		

Symmetry code(s): (i) −*x*, −*y*+1, −*z*+1; (ii) *x*−1, *y*, *z*.

Table S7. Selected Bond angles (°) for CP-**3**.

O2—Eu1—O4^{i}	137.42 (9)	O9—Eu1—O4	151.10 (10)
O2—Eu1—O6^{ii}	123.01 (11)	O9—Eu1—O4^{i}	127.30 (11)
O4—Eu1—O2	81.11 (10)	O9—Eu1—O5^{i}	79.62 (11)
O4—Eu1—O4^{i}	66.86 (11)	O9—Eu1—O7^{ii}	130.25 (11)
O4—Eu1—O5^{i}	117.13 (10)	O9—Eu1—O1	82.09 (13)
O4—Eu1—O7^{ii}	74.99 (10)	O9—Eu1—O8	82.68 (11)
O4—Eu1—O1	91.80 (12)	O9—Eu1—O6^{ii}	78.99 (10)
O4—Eu1—O8	78.72 (11)	O1—Eu1—O2	52.52 (10)
O4—Eu1—O6^{ii}	126.92 (10)	O1—Eu1—O4^{i}	149.18 (11)
O5^{i}—Eu1—O2	142.94 (11)	O1—Eu1—O5^{i}	146.55 (12)
O5^{i}—Eu1—O4^{i}	50.55 (9)	O1—Eu1—O6^{ii}	75.62 (12)
O5^{i}—Eu1—O6^{ii}	73.55 (12)	O8—Eu1—O2	74.81 (11)
O7^{ii}—Eu1—O2	123.87 (11)	O8—Eu1—O4^{i}	72.08 (10)
O7^{ii}—Eu1—O4^{i}	75.09 (11)	O8—Eu1—O5^{i}	77.64 (12)
O7^{ii}—Eu1—O5^{i}	92.83 (12)	O8—Eu1—O7^{ii}	143.95 (11)
O7^{ii}—Eu1—O1	78.08 (11)	O8—Eu1—O1	127.33 (11)
O7^{ii}—Eu1—O6^{ii}	52.06 (10)	O8—Eu1—O6^{ii}	148.11 (11)
O9—Eu1—O2	72.74 (11)	O6^{ii}—Eu1—O4^{i}	98.99 (11)

Symmetry code(s): (i) −*x*, −*y*+1, −*z*+1; (ii) *x*−1, *y*, *z*.

Table S8. Hydrogen bonding parameters of CP-**3**.

D—H···*A*	*D*—H (Å)	H···*A* (Å)	*D*···*A* (Å)	*D*—H···*A* (°)
O9—H9B···O2^{i}	0.86	1.91	2.695 (4)	150.3
O8—H8A···O7^{ii}	0.87	1.87	2.689 (4)	156.4

Symmetry code(s): (i) *x*−1/2, *y*, −*z*+1/2; (ii) −*x*+1, −*y*+1, −*z*+1.

Table S9. Selected Bond lengths (Å) for CP-**4**.

Gd1—O2	2.495 (4)	Gd1—O8	2.378 (5)
Gd1—O4^{i}	2.583 (4)	Gd1—O7^{ii}	2.413 (5)
Gd1—O4	2.375 (4)	Gd1—O9	2.360 (5)
Gd1—O1	2.446 (5)	Gd1—O6^{ii}	2.518 (5)
Gd1—O5^{i}	2.468 (4)		

Symmetry code(s): (i) −*x*, −*y*+1, −*z*+1; (ii) *x*−1, *y*, *z*.

Table S10. Selected Bond angles (°) for CP-**4**.

O2—Gd1—O4^{i}	137.18 (14)	O8—Gd1—O1	127.77 (17)
O2—Gd1—O6^{ii}	122.99 (16)	O8—Gd1—O5^{i}	77.55 (18)
O4—Gd1—O2	80.92 (15)	O8—Gd1—O7^{ii}	144.05 (16)
O4—Gd1—O4^{i}	66.88 (17)	O8—Gd1—O6^{ii}	147.51 (17)

O4—Gd1—O1	91.77 (18)	O7^{ii}—Gd1—O2	123.87 (16)
O4—Gd1—O5^{i}	117.40 (15)	O7^{ii}—Gd1—O4^{i}	75.22 (16)
O4—Gd1—O8	78.95 (16)	O7^{ii}—Gd1—O1	77.79 (17)
O4—Gd1—O7^{ii}	75.05 (16)	O7^{ii}—Gd1—O5^{i}	92.81 (18)
O4—Gd1—O6^{ii}	127.42 (15)	O7^{ii}—Gd1—O6^{ii}	52.49 (15)
O1—Gd1—O2	52.88 (15)	O9—Gd1—O2	72.92 (16)
O1—Gd1—O4^{i}	149.05 (16)	O9—Gd1—O4^{i}	127.15 (17)
O1—Gd1—O5^{i}	146.18 (18)	O9—Gd1—O4	151.05 (16)
O1—Gd1—O6^{ii}	75.42 (18)	O9—Gd1—O1	82.3 (2)
O5^{i}—Gd1—O2	142.95 (16)	O9—Gd1—O5^{i}	79.35 (17)
O5^{i}—Gd1—O4^{i}	50.78 (14)	O9—Gd1—O8	82.41 (17)
O5^{i}—Gd1—O6^{ii}	73.23 (17)	O9—Gd1—O7^{ii}	130.29 (16)
O8—Gd1—O2	74.89 (16)	O9—Gd1—O6^{ii}	78.59 (15)
O8—Gd1—O4^{i}	71.93 (15)	O6^{ii}—Gd1—O4^{i}	99.31 (16)

Symmetry code(s): (i) −*x*, −*y*+1, −*z*+1; (ii) *x*−1, *y*, *z*.

Table S11. Hydrogen bonding parameters of CP-**4**.

D—H···*A*	*D*—H (Å)	H···*A* (Å)	*D*···*A* (Å)	*D*—H···*A* (°)
O8—H8A···O7^{i}	0.86	1.91	2.684 (6)	149.0
O8—H8B···O5^{ii}	0.86	2.08	2.699 (6)	128.5
O9—H9A···O6^{iii}	0.87	2.07	2.699 (7)	129.1

O9—H9B···O2^{iii}	0.87	1.89	2.685 (6)	151.1

Symmetry code(s): (i) −*x*+1, −*y*+1, −*z*+1; (ii) −*x*+1/2, −*y*+1, *z*+1/2; (iii) *x*−1/2, *y*, −*z*+3/2.

Table S12. Selected Bond lengths (Å) for CP-**5**.

Tb1—O1	2.3578 (19)	Tb1—O4^{ii}	2.395 (2)
Tb1—O1^{i}	2.581 (2)	Tb1—O5	2.417 (2)
Tb1—O6	2.484 (2)	Tb1—O3^{ii}	2.502 (2)
Tb1—O2^{i}	2.454 (2)	Tb1—O9	2.368 (2)
Tb1—O8	2.341 (2)		

Symmetry code(s): (i) −*x*, −*y*+1, −*z*+1; (ii) *x*−1, *y*, *z*.

Table S13. Selected Bond angles (°) for CP-**5**.

O1—Tb1—O1^{i}	66.84 (8)	O8—Tb1—O3^{ii}	78.41 (7)
O1—Tb1—O6	80.77 (7)	O8—Tb1—O9	82.50 (8)
O1—Tb1—O2^{i}	117.60 (7)	O4^{ii}—Tb1—O1^{i}	74.89 (7)
O1—Tb1—O4^{ii}	75.08 (7)	O4^{ii}—Tb1—O6	124.32 (8)
O1—Tb1—O5	91.58 (8)	O4^{ii}—Tb1—O2^{i}	92.26 (8)
O1—Tb1—O3^{ii}	127.50 (7)	O4^{ii}—Tb1—O5	78.09 (8)
O1—Tb1—O9	78.96 (7)	O4^{ii}—Tb1—O3^{ii}	52.58 (7)
O6—Tb1—O1^{i}	136.90 (7)	O5—Tb1—O1^{i}	148.89 (7)
O6—Tb1—O3^{ii}	123.14 (8)	O5—Tb1—O6	53.06 (7)
O2^{i}—Tb1—O1^{i}	50.99 (6)	O5—Tb1—O2^{i}	146.00 (8)
O2^{i}—Tb1—O6	143.06 (7)	O5—Tb1—O3^{ii}	75.47 (8)
O2^{i}—Tb1—O3^{ii}	72.91 (8)	O3^{ii}—Tb1—O1^{i}	99.44 (7)

O8—Tb1—O1	150.99 (7)	O9—Tb1—O1^{i}	72.22 (7)
O8—Tb1—O1^{i}	127.52 (8)	O9—Tb1—O6	74.35 (8)
O8—Tb1—O6	72.82 (7)	O9—Tb1—O2^{i}	78.16 (8)
O8—Tb1—O2^{i}	79.59 (8)	O9—Tb1—O4^{ii}	144.05 (7)
O8—Tb1—O4^{ii}	130.23 (7)	O9—Tb1—O5	127.42 (8)
O8—Tb1—O5	82.17 (9)	O9—Tb1—O3^{ii}	147.67 (8)

Symmetry code(s): (i) −*x*, −*y*+1, −*z*+1; (ii) *x*−1, *y*, *z*.

Table S14. Hydrogen bonding parameters of CP-**5**.

D—H···*A*	*D*—H (Å)	H···*A* (Å)	*D*···*A* (Å)	*D*—H···*A* (°)
O8—H8A···O3^{i}	0.85	1.98	2.710 (3)	143.8
O8—H8B···O6^{i}	0.85	2.12	2.689 (3)	124.0
O9—H9A···O4^{ii}	0.85	1.83	2.678 (3)	176.5

Symmetry code(s): (i) *x*−1/2, *y*, −*z*+1/2; (ii) −*x*+1, −*y*+1, −*z*+1.

Table S15. Selected Bond lengths (Å) for CP-**6**.

Dy1—O1	2.479 (2)	Dy1—O5	2.494 (2)
Dy1—O7	2.346 (2)	Dy1—O2	2.407 (3)
Dy1—O7^{i}	2.575 (2)	Dy1—O4	2.387 (2)
Dy1—O6	2.439 (2)	Dy1—O9	2.330 (2)
Dy1—O8	2.357 (2)		

Symmetry code(s): (i) −*x*+1, −*y*+1, −*z*+1.

Table S16. Selected Bond angles (°) for CP-**6**.

O1—Dy1—O7^{i}	136.63 (7)	O5—Dy1—O7^{i}	99.97 (8)
O1—Dy1—O5	122.88 (8)	O2—Dy1—O1	53.17 (8)
O7—Dy1—O1	80.58 (8)	O2—Dy1—O7^{i}	148.65 (8)
O7—Dy1—O7^{i}	66.67 (9)	O2—Dy1—O6	145.96 (9)
O7—Dy1—O6	117.70 (8)	O2—Dy1—O5	75.25 (9)
O7—Dy1—O8	79.26 (8)	O4—Dy1—O1	124.42 (9)
O7—Dy1—O5	127.93 (8)	O4—Dy1—O7^{i}	74.77 (8)
O7—Dy1—O2	91.48 (9)	O4—Dy1—O6	92.11 (9)
O7—Dy1—O4	75.16 (8)	O4—Dy1—O5	52.97 (7)
O6—Dy1—O1	143.13 (8)	O4—Dy1—O2	78.10 (9)
O6—Dy1—O7^{i}	51.25 (7)	O9—Dy1—O1	73.34 (8)
O6—Dy1—O5	72.95 (9)	O9—Dy1—O7^{i}	127.03 (9)
O8—Dy1—O1	74.81 (8)	O9—Dy1—O7	151.05 (8)
O8—Dy1—O7^{i}	71.87 (8)	O9—Dy1—O6	78.97 (9)
O8—Dy1—O6	77.66 (9)	O9—Dy1—O8	81.94 (8)
O8—Dy1—O5	147.03 (8)	O9—Dy1—O5	78.13 (8)
O8—Dy1—O2	127.98 (8)	O9—Dy1—O2	82.96 (10)
O8—Dy1—O4	143.89 (8)	O9—Dy1—O4	130.50 (8)

Symmetry code(s): (i) −*x*+1, −*y*+1, −*z*+1.

Table S17. Hydrogen bonding parameters of CP-**6**.

D—H···*A*	*D*—H (Å)	H···*A* (Å)	*D*···*A* (Å)	*D*—H···*A* (°)

O8—H8A···O4^{i}	0.87	2.02	2.672 (3)	130.8
O8—H8B···O6^{ii}	0.87	1.99	2.706 (3)	139.0
O9—H9A···O5^{ii}	0.87	1.97	2.716 (3)	142.6
O9—H9B···O1^{iii}	0.87	1.96	2.690 (3)	140.3

Symmetry code(s): (i) −*x*+1, −*y*+1, −*z*+1; (ii) *x*+1/2, *y*, −*z*+1/2; (iii) *x*−1/2, *y*, −*z*+1/2.

Table S18. Selected Bond lengths (Å) for CP-**7**.

Ho1—O6	2.468 (4)	Ho1—O5	2.409 (5)
Ho1—O2	2.562 (4)	Ho1—O3^{ii}	2.373 (4)
Ho1—O2^{i}	2.332 (4)	Ho1—O10	2.337 (4)
Ho1—O1	2.426 (4)	Ho1—O4^{ii}	2.488 (4)
Ho1—O9	2.317 (4)		

Symmetry code(s): (i) −*x*+1, −*y*+1, −*z*+1; (ii) −*x*+2, −*y*+1, −*z*+1.

Table S19. Selected Bond angles (°) for CP-**7**.

O6—Ho1—O2	136.34 (13)	O9—Ho1—O10	81.87 (15)
O6—Ho1—O4^{i}	122.81 (14)	O9—Ho1—O4^{i}	77.95 (14)
O2^{ii}—Ho1—O6	80.60 (14)	O5—Ho1—O6	53.56 (14)
O2^{ii}—Ho1—O2	66.47 (16)	O5—Ho1—O2	148.54 (15)
O2^{ii}—Ho1—O1	117.52 (14)	O5—Ho1—O1	145.96 (16)
O2^{ii}—Ho1—O5	91.63 (17)	O5—Ho1—O4^{i}	74.91 (16)
O2^{ii}—Ho1—O3^{i}	75.24 (14)	O3^{i}—Ho1—O6	124.62 (15)

O2^{ii}—Ho1—O10	79.25 (15)	O3^{i}—Ho1—O2	74.82 (15)
O2^{ii}—Ho1—O4^{i}	128.13 (14)	O3^{i}—Ho1—O1	92.13 (16)
O1—Ho1—O6	142.93 (15)	O3^{i}—Ho1—O5	77.96 (16)
O1—Ho1—O2	51.28 (13)	O3^{i}—Ho1—O4^{i}	53.11 (14)
O1—Ho1—O4^{i}	73.21 (16)	O10—Ho1—O6	74.62 (15)
O9—Ho1—O6	73.29 (15)	O10—Ho1—O2	71.81 (14)
O9—Ho1—O2^{ii}	151.02 (14)	O10—Ho1—O1	77.50 (17)
O9—Ho1—O2	127.12 (15)	O10—Ho1—O5	128.18 (15)
O9—Ho1—O1	79.04 (15)	O10—Ho1—O3^{i}	143.95 (15)
O9—Ho1—O5	82.97 (18)	O10—Ho1—O4^{i}	146.97 (15)
O9—Ho1—O3^{i}	130.48 (15)	O4^{i}—Ho1—O2	100.35 (14)

Symmetry code(s): (i) −*x*+2, −*y*+1, −*z*+1; (ii) −*x*+1, −*y*+1, −*z*+1.

Table S20. Selected Bond lengths (Å) for CP-**8**.

Er01—O5	2.460 (4)	Er01—O9	2.306 (4)
Er01—O1	2.322 (4)	Er01—O4^{ii}	2.478 (4)
Er01—O1^{i}	2.557 (4)	Er01—O6	2.399 (4)
Er01—O2^{i}	2.411 (4)	Er01—O3^{ii}	2.358 (4)
Er01—O8	2.328 (4)		

Symmetry code(s): (i) −*x*+2, −*y*+1, −*z*+1; (ii) *x*+1, *y*, *z*.

Table S21. Selected Bond angles (°) for CP-**8**.

O5—Er01—O1^{i}	136.17 (12)	O9—Er01—O5	73.26 (14)
O5—Er01—O4^{ii}	122.69 (14)	O9—Er01—O1	150.93 (13)
O1—Er01—O5	80.49 (13)	O9—Er01—O1^{i}	127.35 (14)
O1—Er01—O1^{i}	66.37 (14)	O9—Er01—O2^{i}	79.17 (15)
O1—Er01—O2^{i}	117.63 (13)	O9—Er01—O8	81.80 (14)
O1—Er01—O8	79.34 (14)	O9—Er01—O4^{ii}	77.60 (13)
O1—Er01—O4^{ii}	128.50 (13)	O9—Er01—O6	82.90 (17)
O1—Er01—O6	91.63 (16)	O9—Er01—O3^{ii}	130.44 (14)
O1—Er01—O3^{ii}	75.37 (14)	O4^{ii}—Er01—O1^{i}	100.66 (14)
O2^{i}—Er01—O5	143.12 (14)	O6—Er01—O5	53.70 (13)
O2^{i}—Er01—O1^{i}	51.47 (12)	O6—Er01—O1^{i}	148.40 (14)
O2^{i}—Er01—O4^{ii}	72.96 (15)	O6—Er01—O2^{i}	145.70 (15)
O8—Er01—O5	74.53 (14)	O6—Er01—O4^{ii}	74.77 (15)
O8—Er01—O1^{i}	71.89 (13)	O3^{ii}—Er01—O5	124.89 (15)
O8—Er01—O2^{i}	77.73 (15)	O3^{ii}—Er01—O1^{i}	74.60 (14)
O8—Er01—O4^{ii}	146.73 (14)	O3^{ii}—Er01—O2^{i}	91.67 (16)
O8—Er01—O6	128.23 (14)	O3^{ii}—Er01—O4^{ii}	53.38 (13)
O8—Er01—O3^{ii}	143.95 (14)	O3^{ii}—Er01—O6	78.12 (15)

Symmetry code(s): (i) −*x*+2, −*y*+1, −*z*+1; (ii) *x*+1, *y*, *z*.

Table S22. Hydrogen bonding parameters of CP-**8**.

D—H···*A*	*D*—H (Å)	H···*A* (Å)	*D*···*A* (Å)	*D*—H···*A* (°)
O8—H8A···O3^{i}	0.86	1.87	2.669 (5)	153.8
O8—H8B···O2^{ii}	0.86	2.11	2.715 (5)	127.2

O9—H9A···O4^{iii}	0.88	2.01	2.711 (6)	136.1
O9—H9B···O5^{iii}	0.88	1.92	2.691 (5)	146.5

Symmetry code(s): (i) −*x*+1, −*y*+1, −*z*+1; (ii) −*x*+3/2, −*y*+1, *z*−1/2; (iii) *x*+1/2, *y*, −*z*+1/2.

5. Stern -Volmer Constants and Quenching Efficiencies Table

Table S23. Stern – Volmer Constants and Quenching Efficiencies Table

Ln-CP with Nitroanalyte	Stern -Volmer Constant (K_{sv}) L/mol	Quenching Efficiency (%)
Eu-CP with 4-NT	1.30×10^5	98.15
Eu-CP with 1,3 DNB	1.22×10^5	98.00
Eu-CP with 2,4,6-TNP	2.10×10^4	92.33
Tb-CP with 4- NT	1.36×10^4	92.48
Tb-CP with 1,3 DNB	1.88×10^4	96.61
Tb-CP with 2,4,6-TNP	7.87×10^3	89.81