Electronic Supplementary Material (ESI) for New Journal of Chemistry.

Magnetic, Luminescent, Topological and Theoretical Studies of Structurally Diverse Supramolecular Lanthanide Coordination Polymers with Flexible Glutaric Acid as Linker

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Table of Contents

CONTENTS **Page Number**

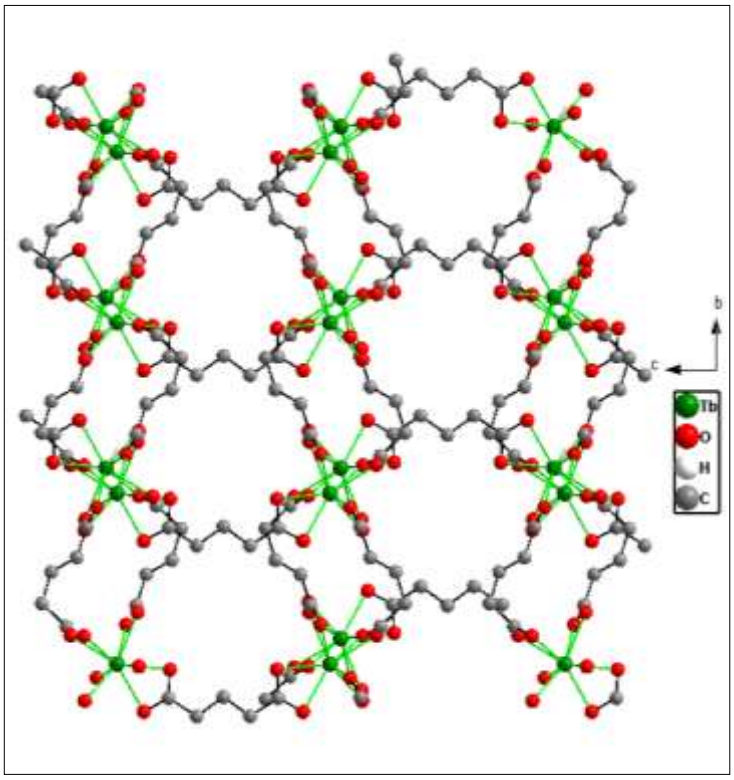


Figure S1. Packing of CP **1** along *a*-axis.

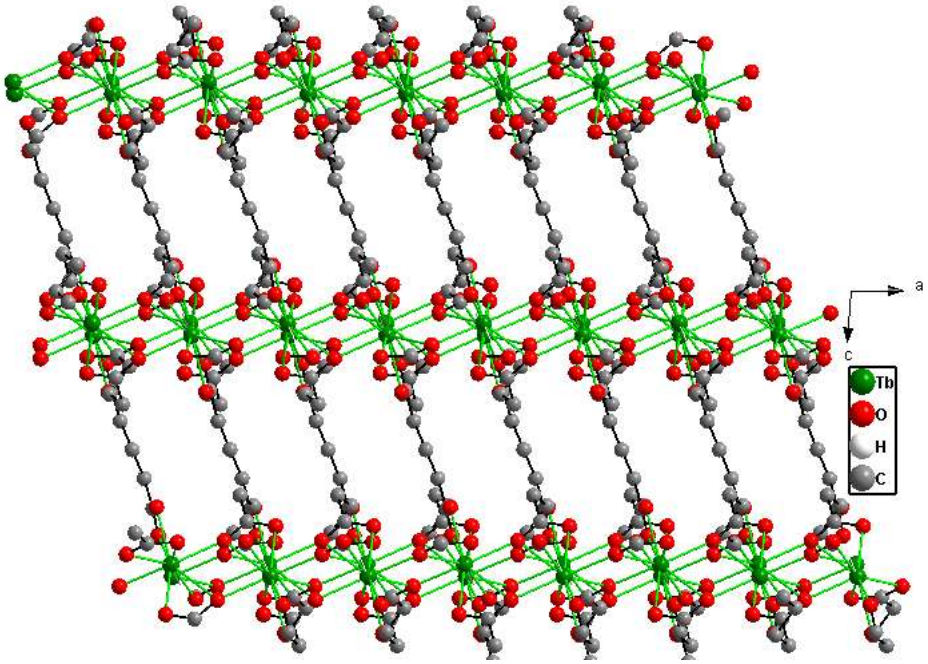


Figure S2. Packing of CP **1** along *b*-axis.

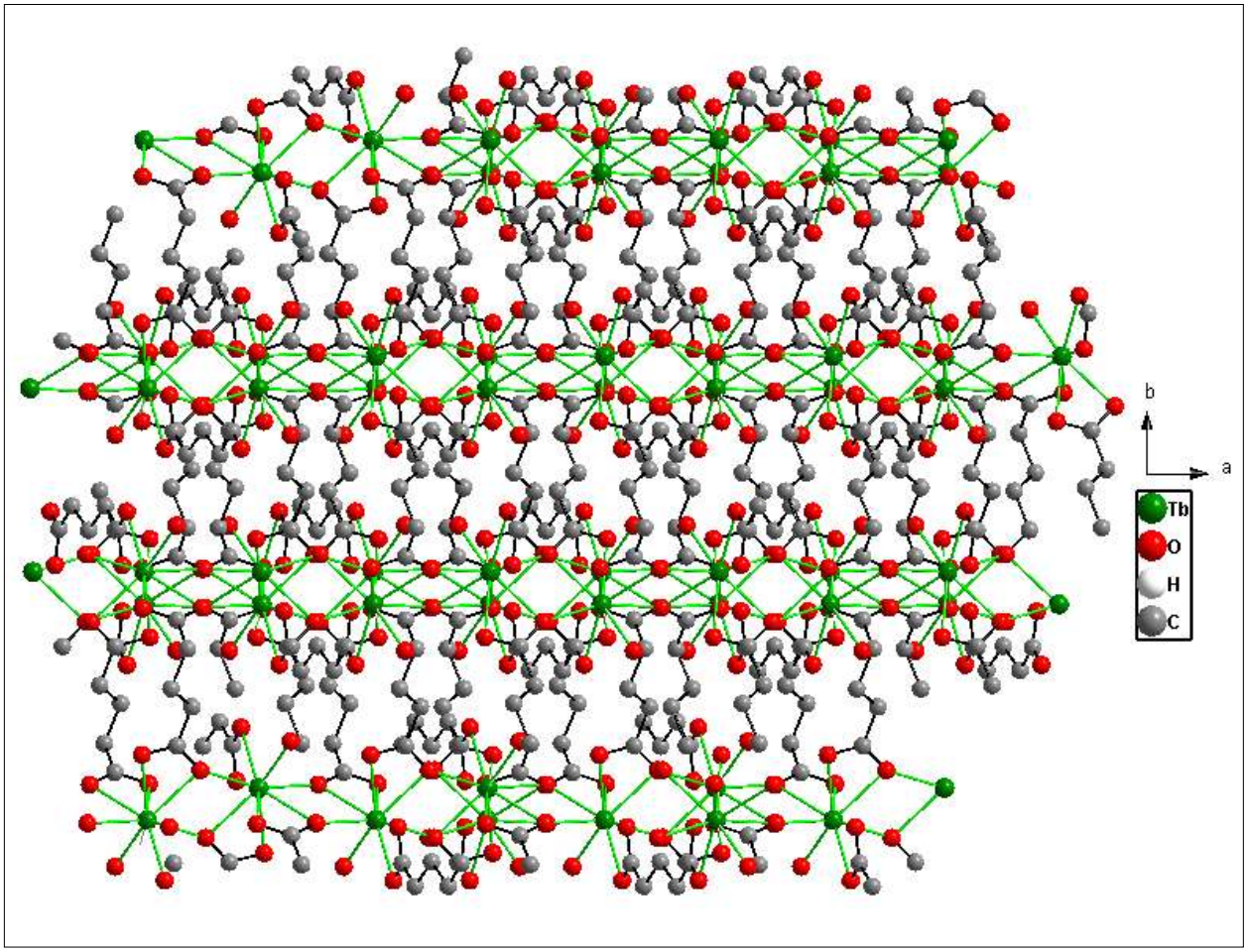
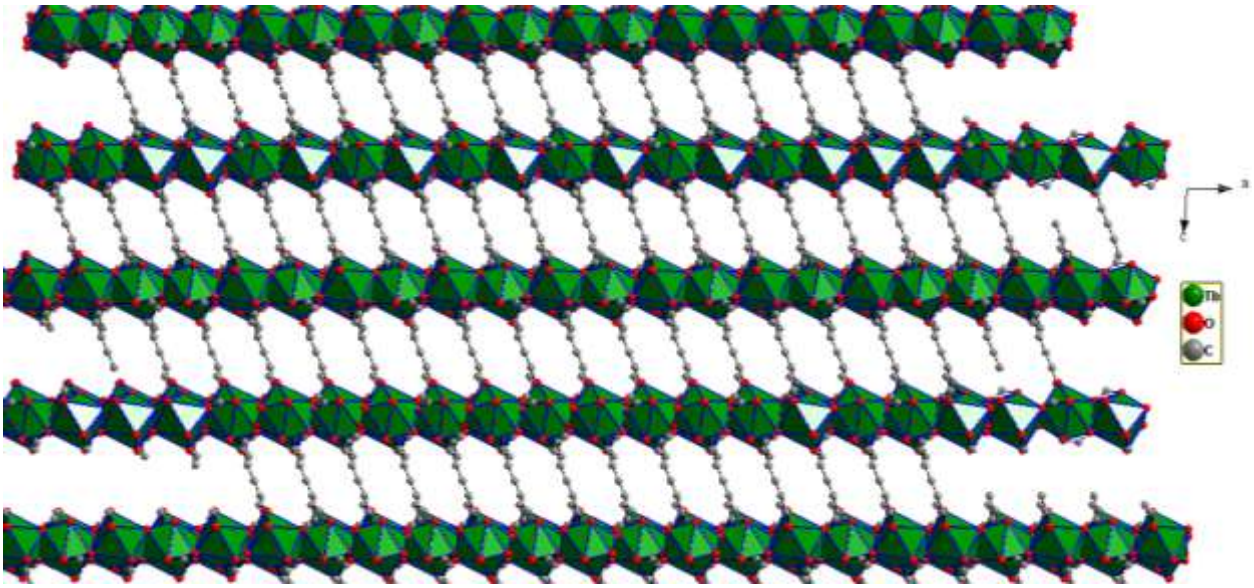


Figure S3. Packing of CP **1** along *c*-axis.



FigureS4. Polyhedral packing of CP **1** along *c*-axis.

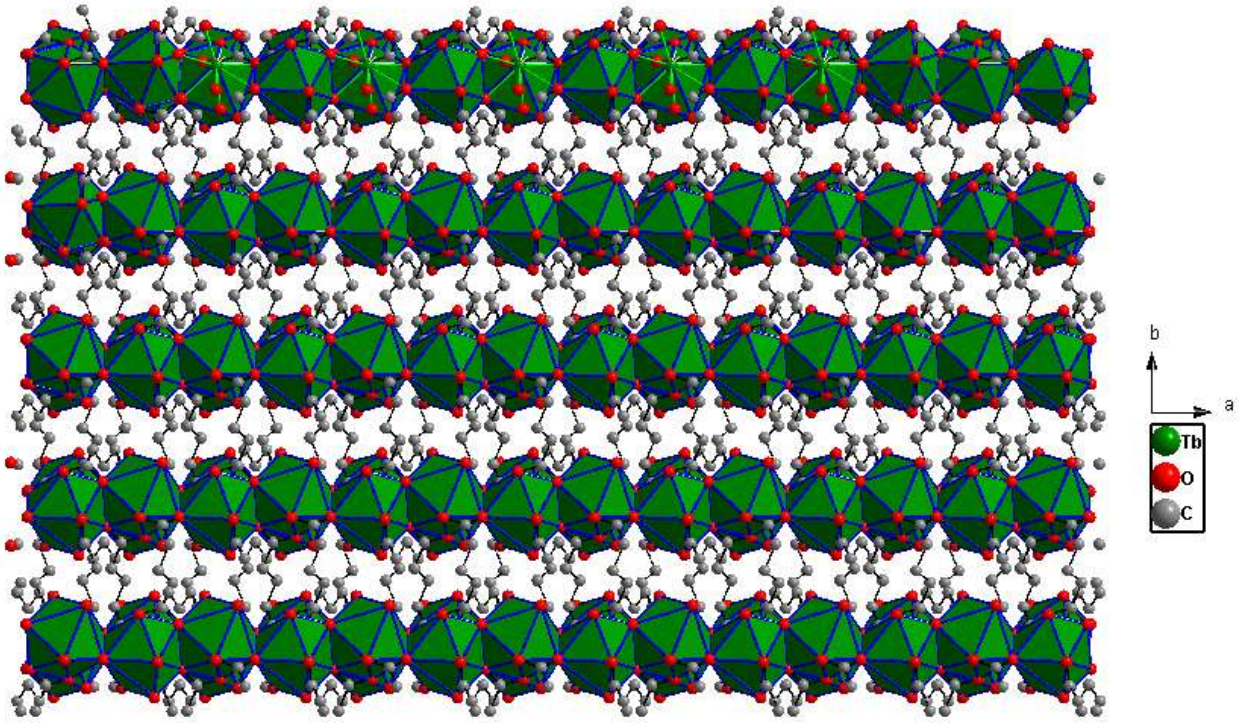


Figure S5. Polyhedral packing of CP **1** along *c*-axis.

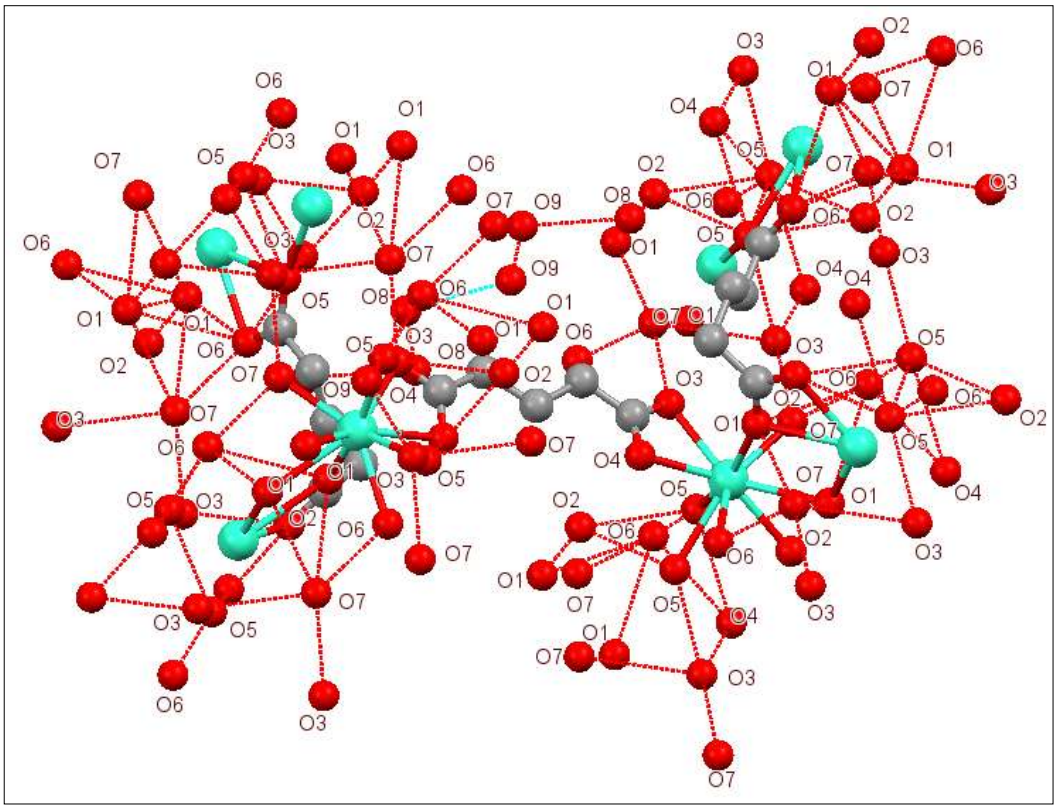


Figure S6. Hydrogen bonding geometries of CP **1.**

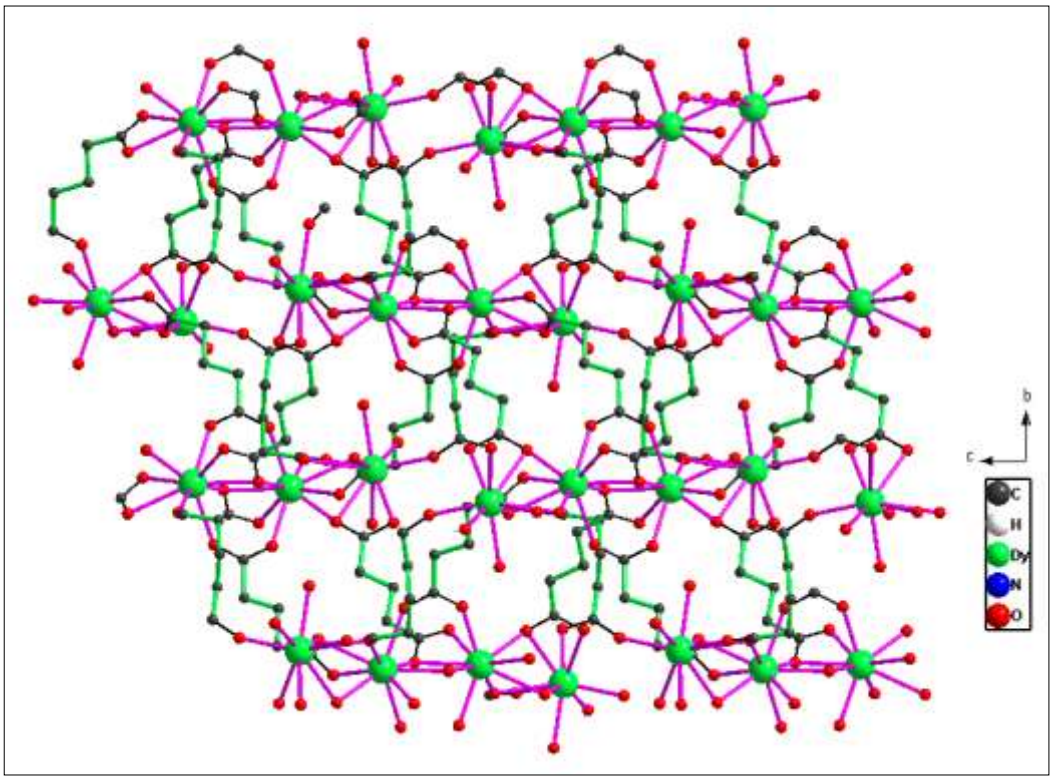


Figure S7. Packing of CP **5** along *a*-axis.

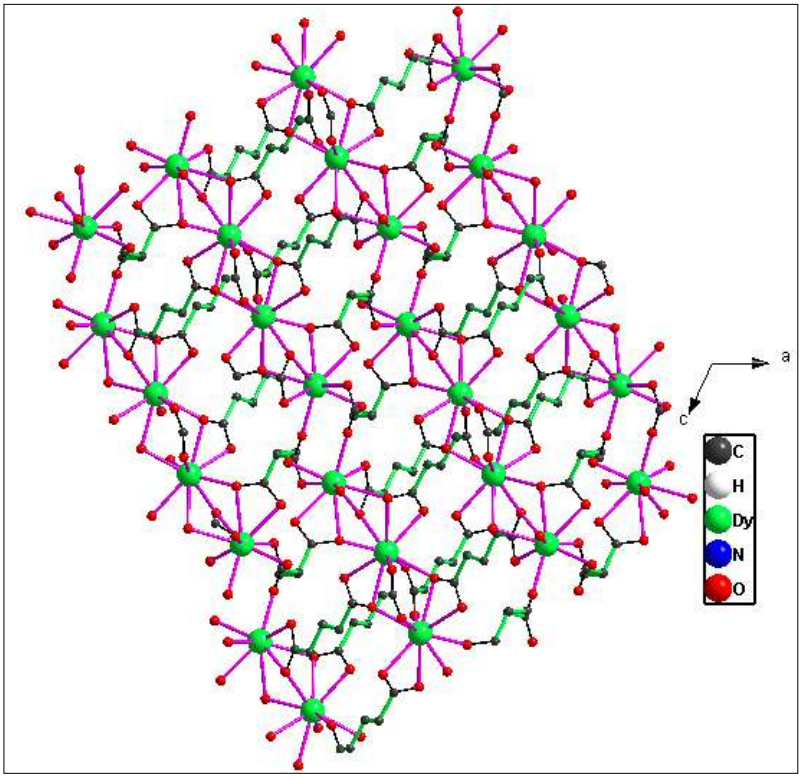


Figure S8. Packing of CP **5** along *b*-axis.

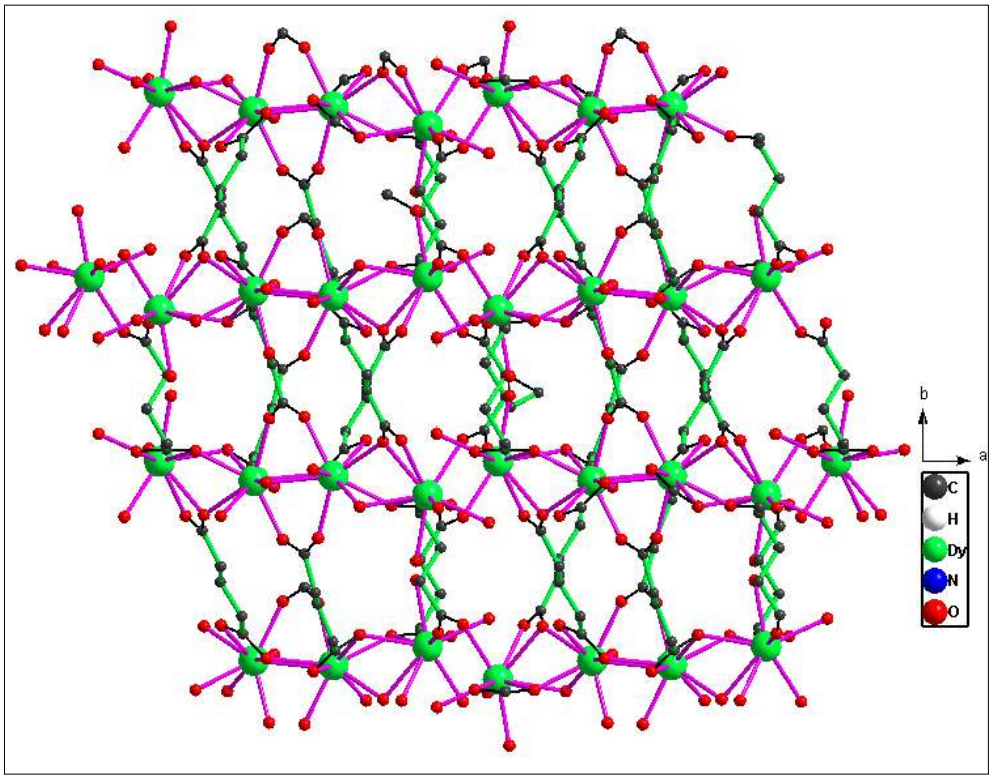


Figure S9. Packing of CP **5**along *c*-axis.

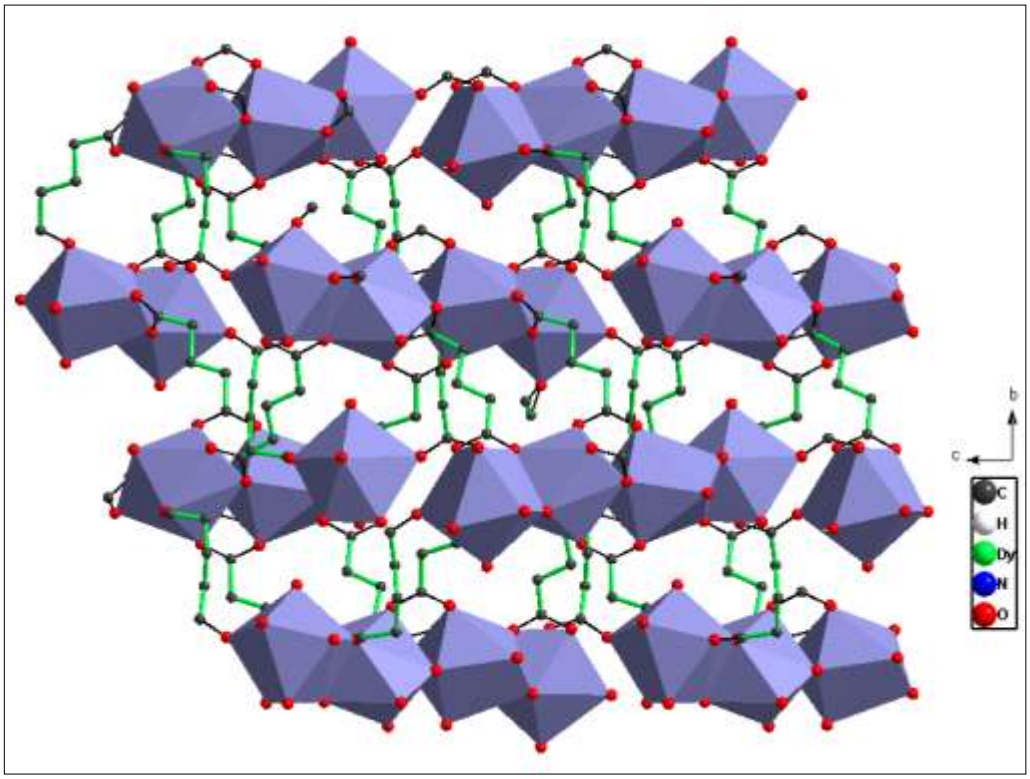


Figure S10. Polyhedral packing of CP **5** along *a*-axis.

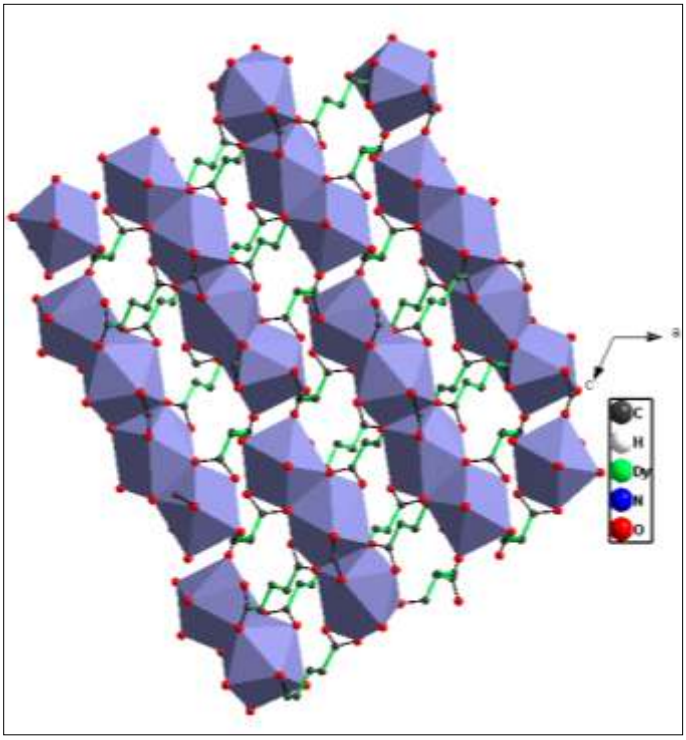


Figure S11. Polyhedral packing of CP **5** along *b*-axis.

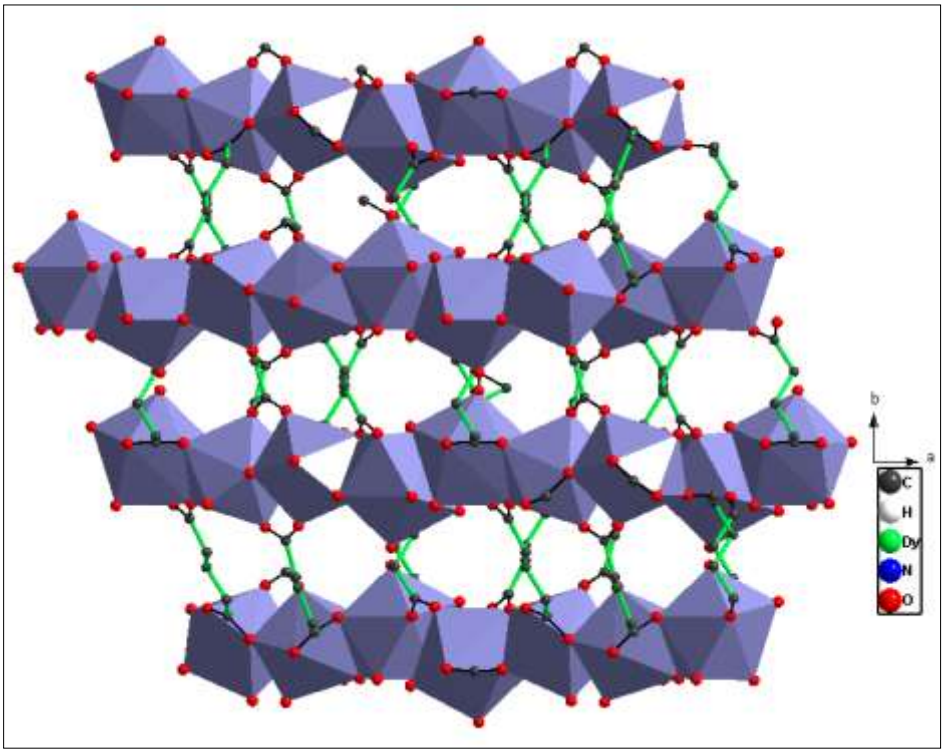


Figure S12. Polyhedral packing of CP **5** along *c*-axis.

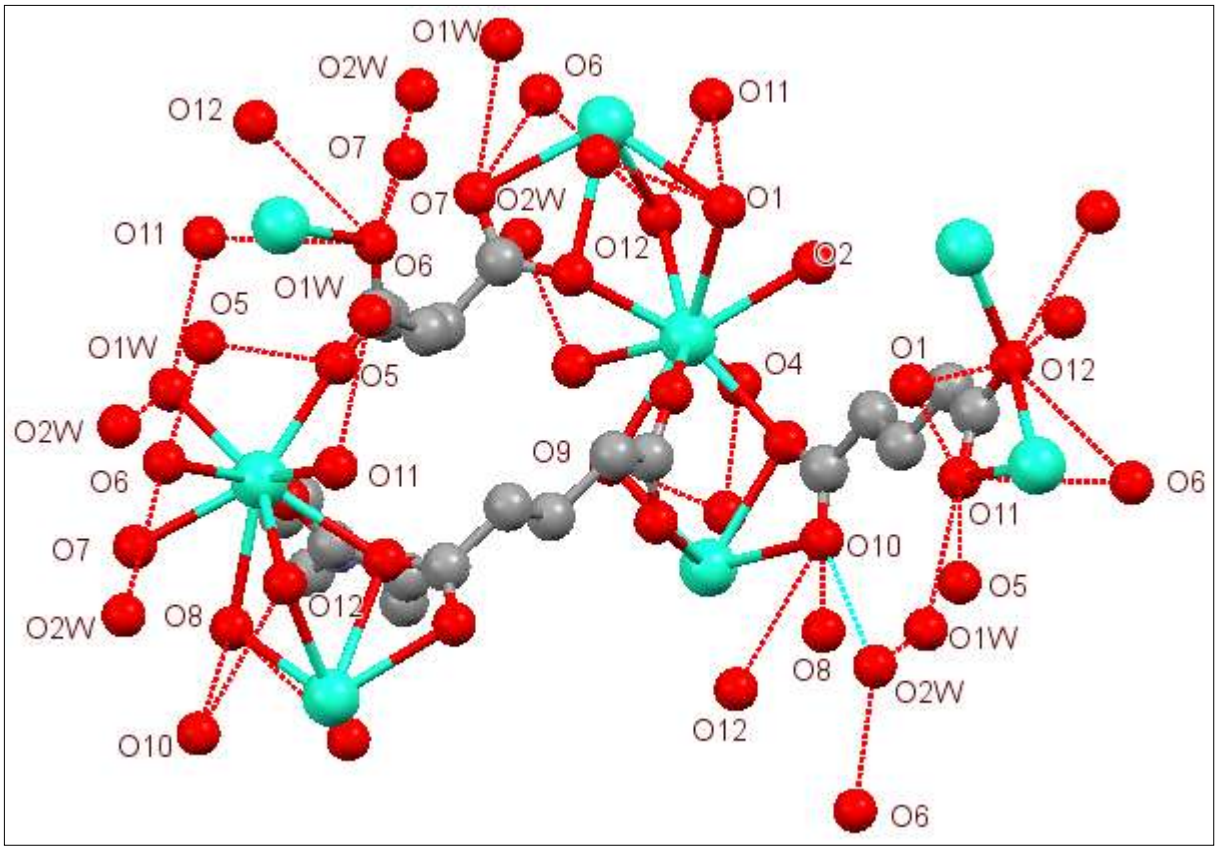


Figure S13. Hydrogen bonding geometries of CP **5.**

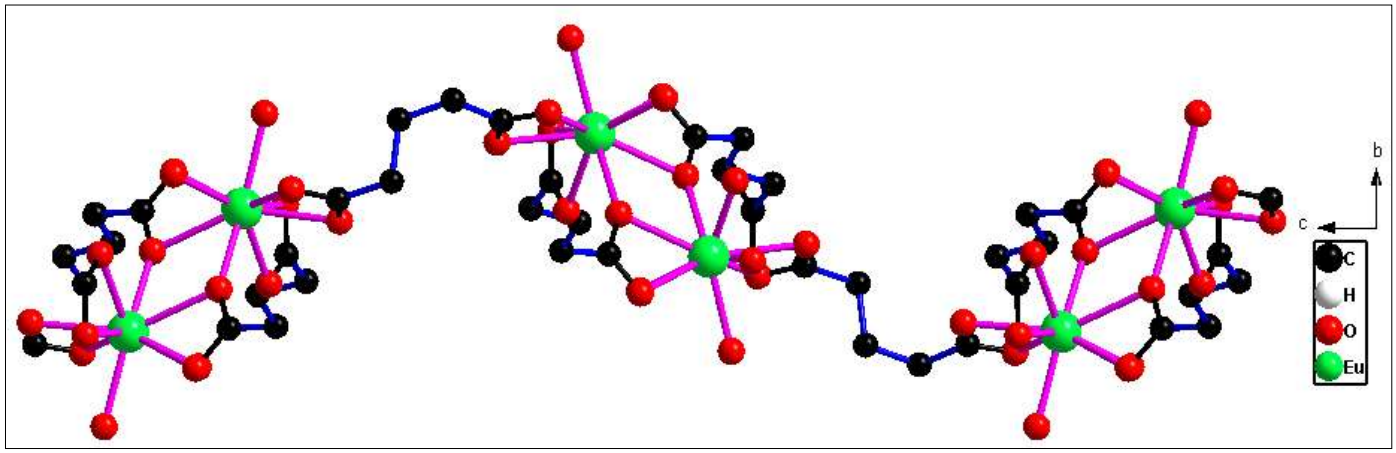


Figure S14. Packing of CP **7** along *a*-axis.

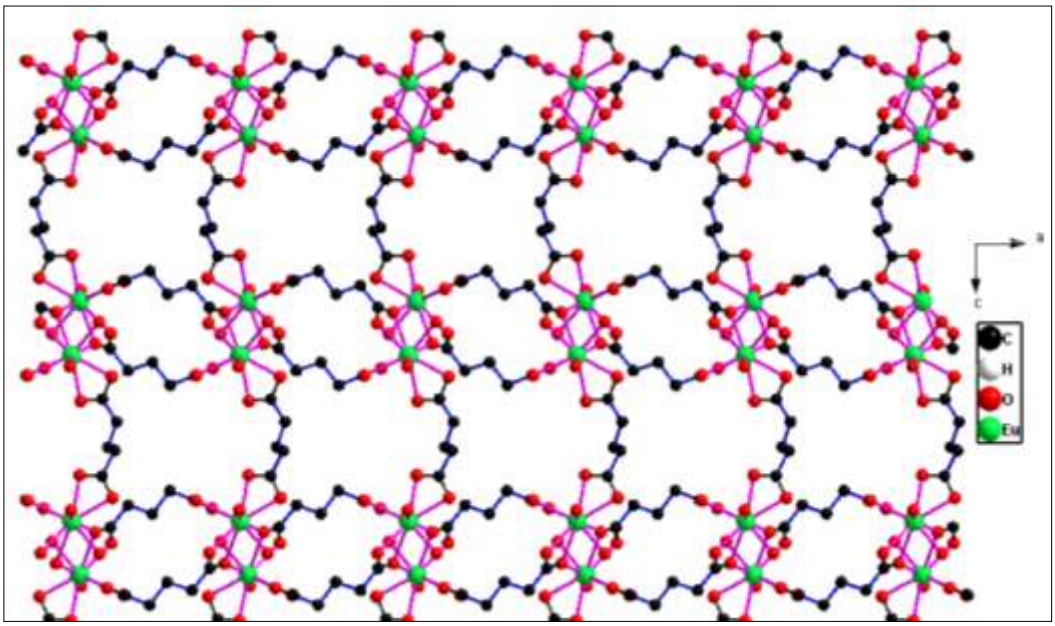


Figure S15. Packing of CP **7** along *b*-axis.

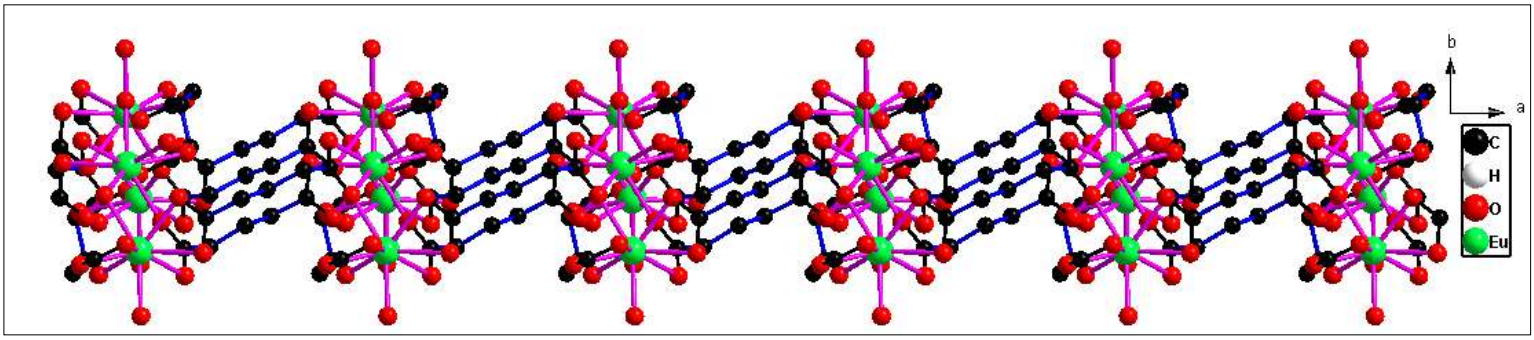


Figure S16. Packing of CP **7** along *c*-axis.

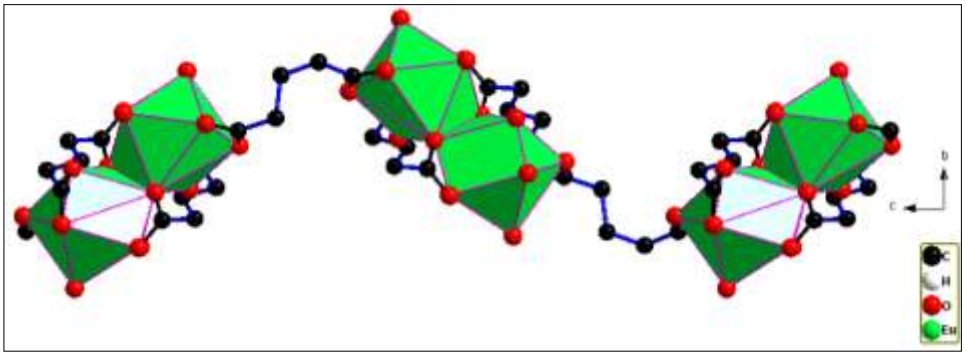


Figure S17. Polyhedral packing of CP **7** along *a*-axis.

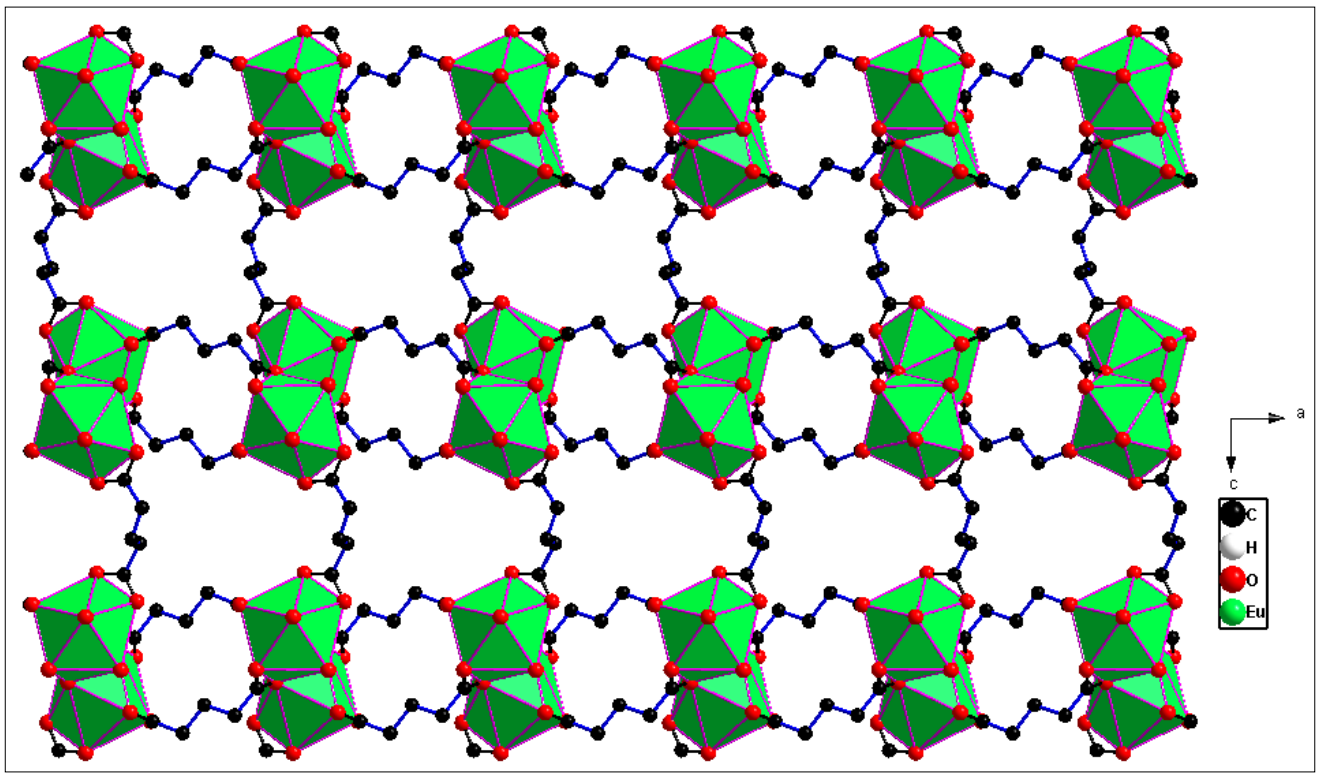


Figure S18. Polyhedral packing of CP **7** along *b*-axis.

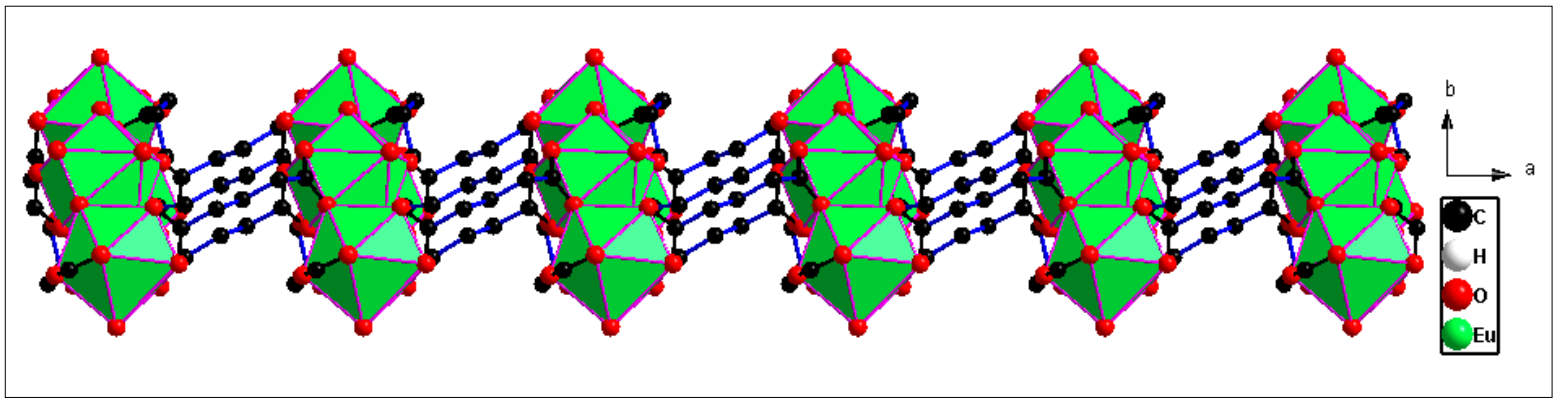


Figure S19. Polyhedral packing of CP **7** along *c*-axis.

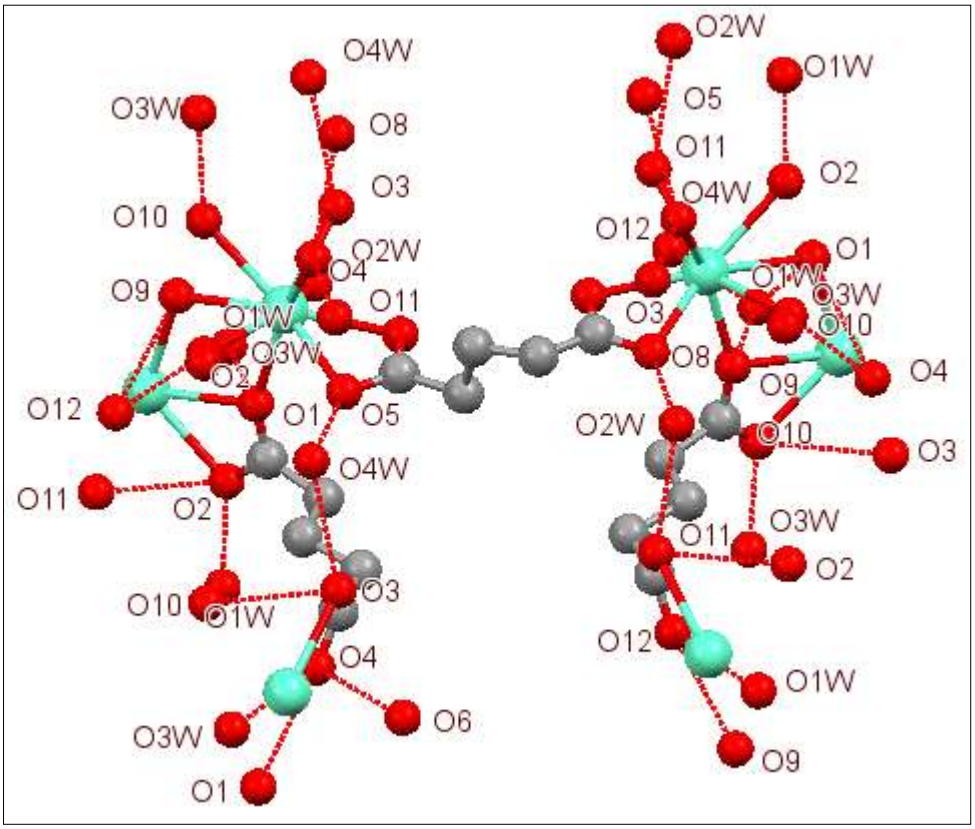


Figure S20 Hydrogen bonding geometries of CP **7.**

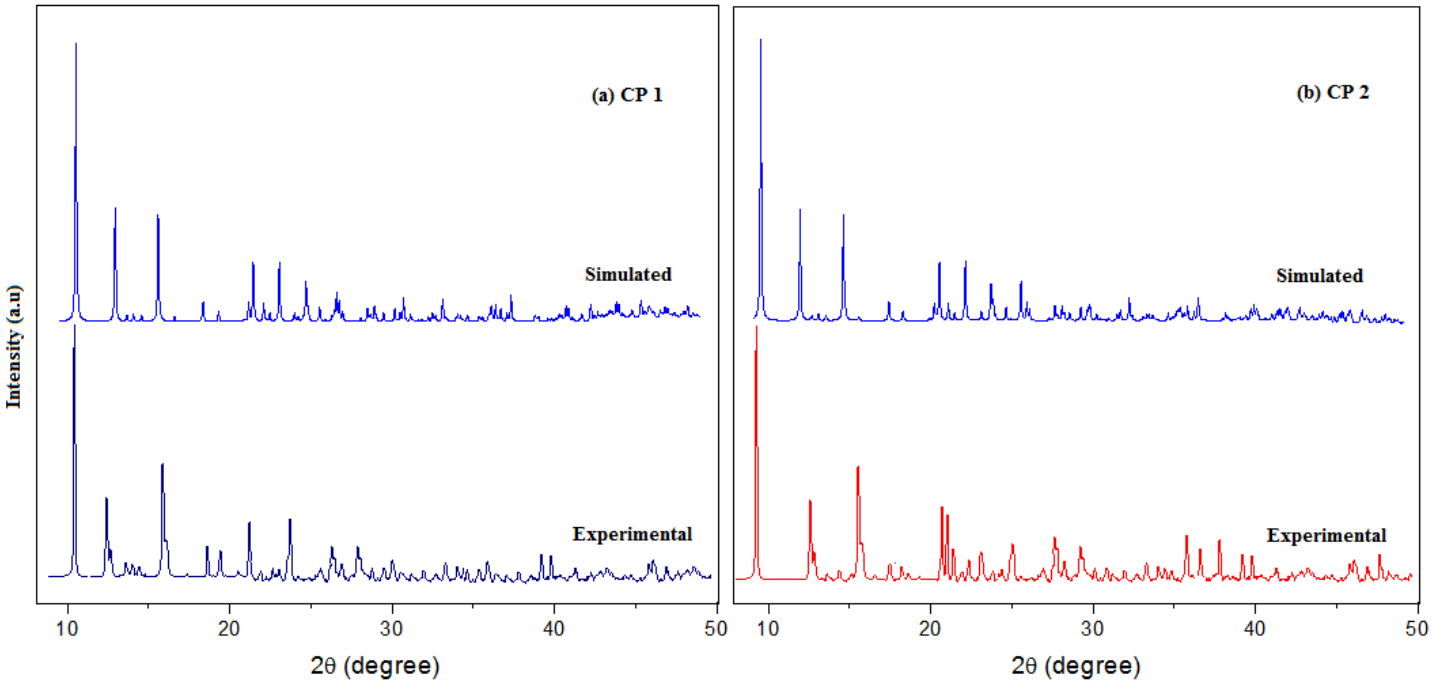


Figure S21. PXRD pattern of CP **1** and CP **2**.

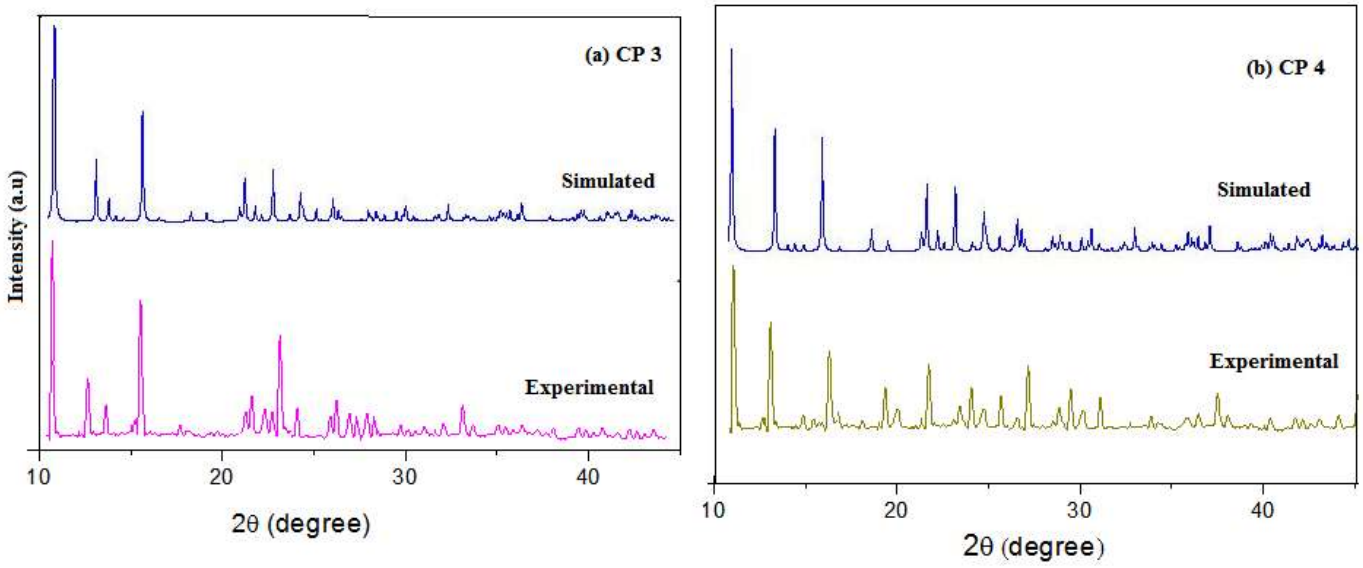


Figure S22. PXRD pattern of CP **3** and CP **4**.

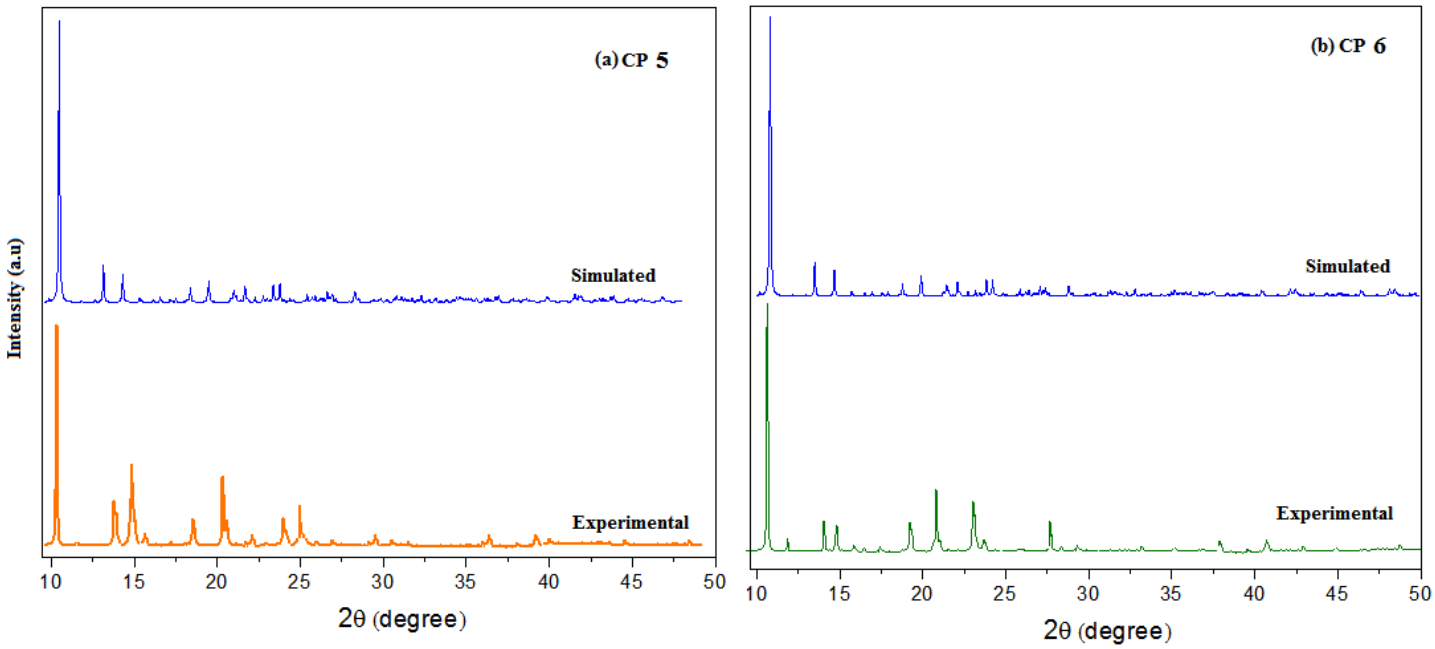


Figure S23. PXRD pattern of CP **5** and CP **6**.

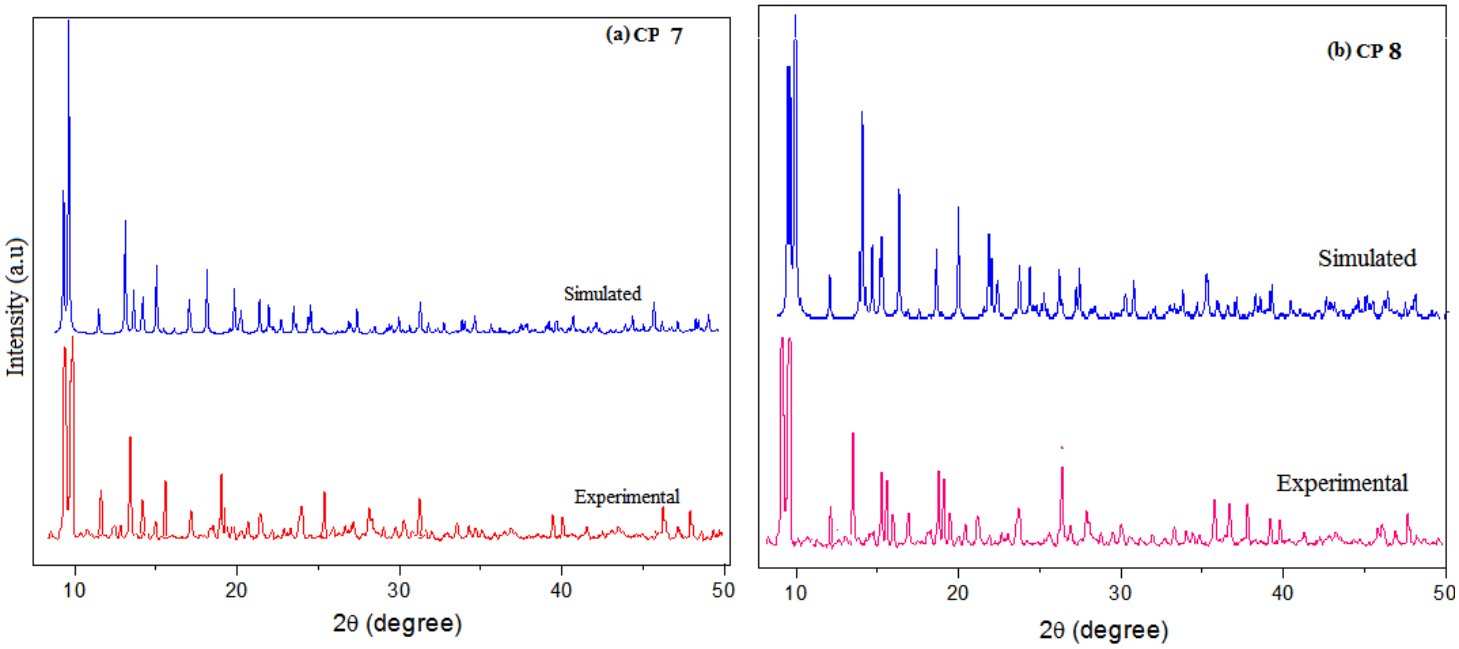


Figure S24. PXRD pattern of CP **7** and CP **8**.

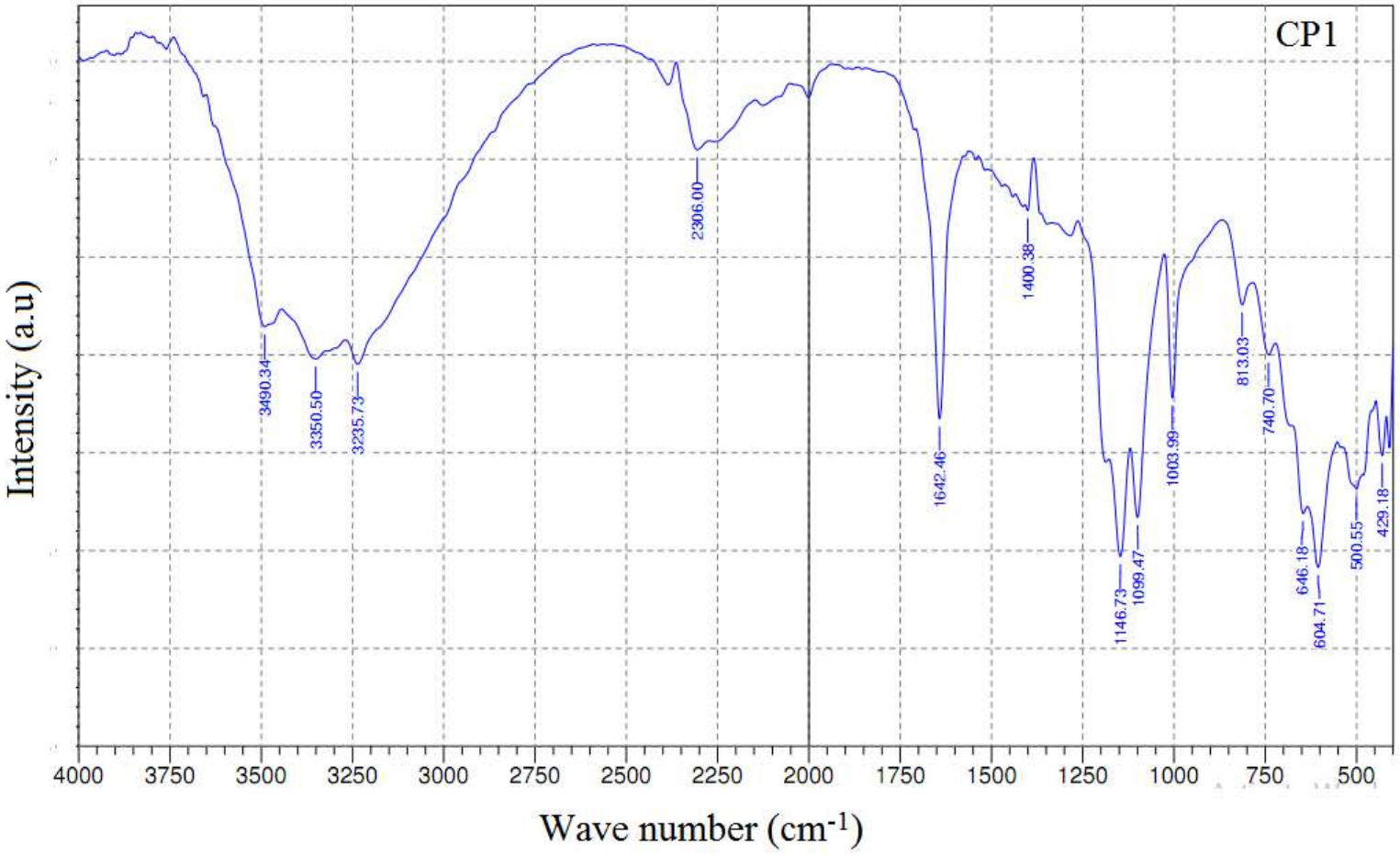


Figure S25. FTIR spectrum of CP **1.**

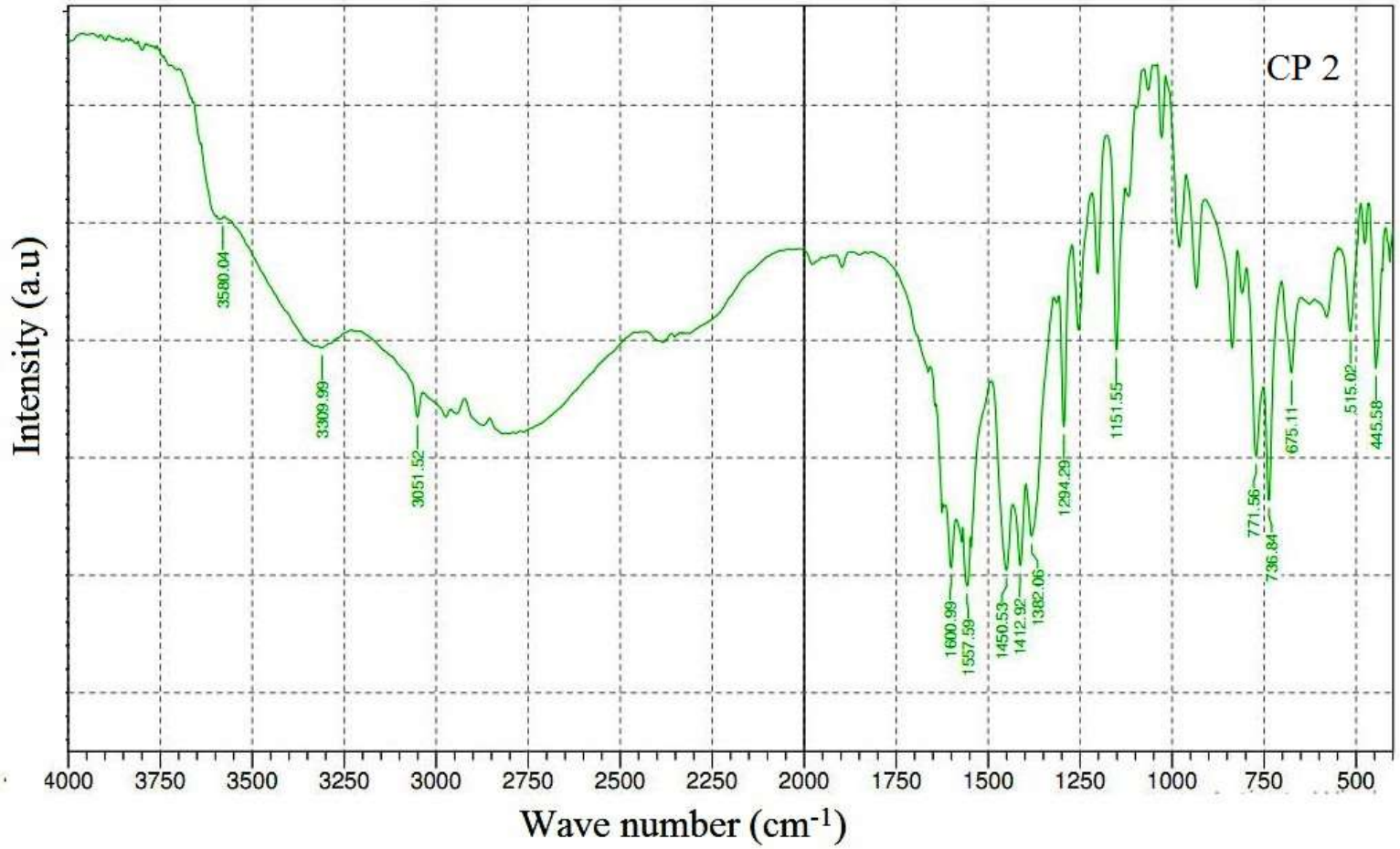


Figure S26. FTIR spectrum of CP **2.**

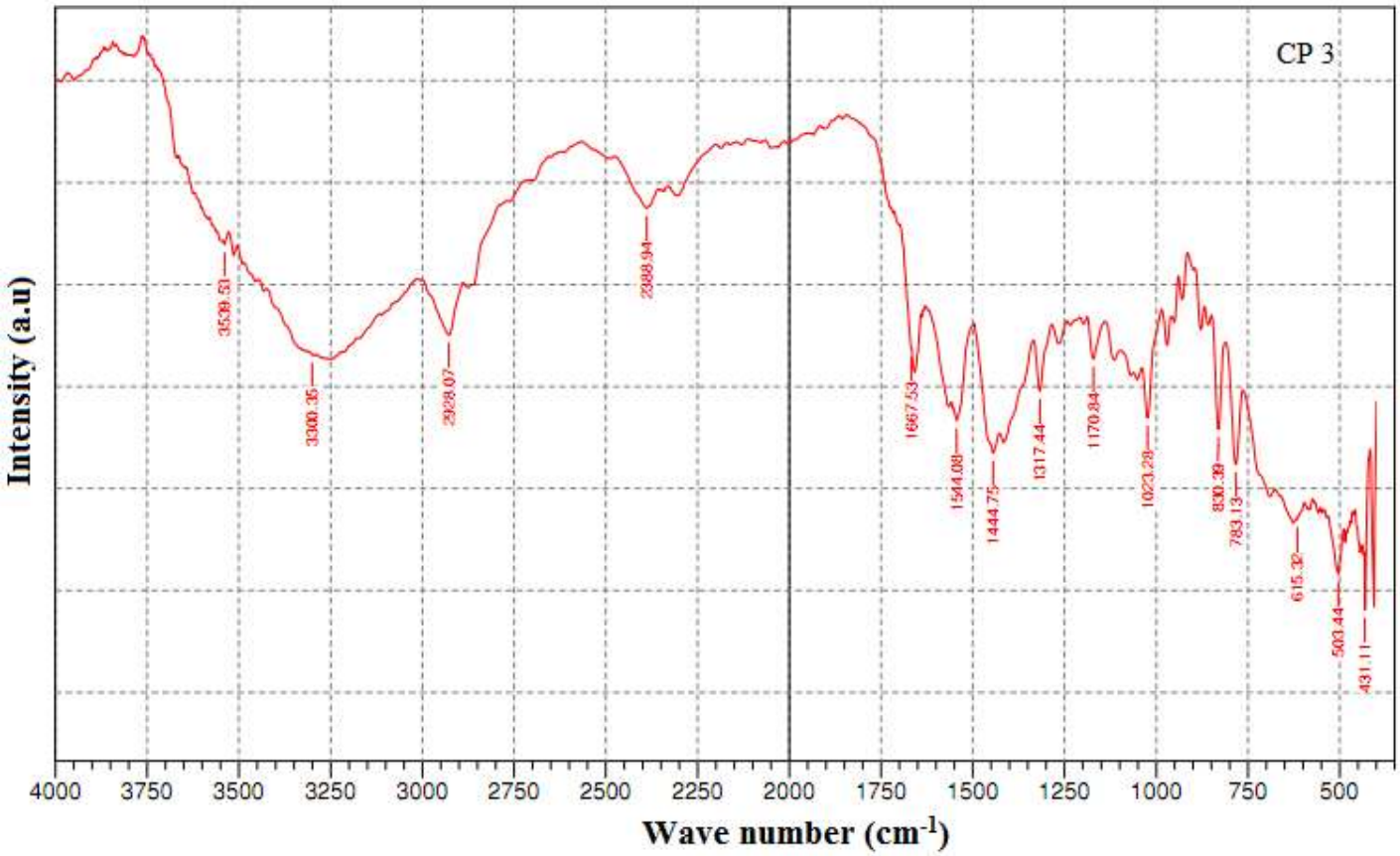


Figure S27. FTIR spectrum of CP **3.**

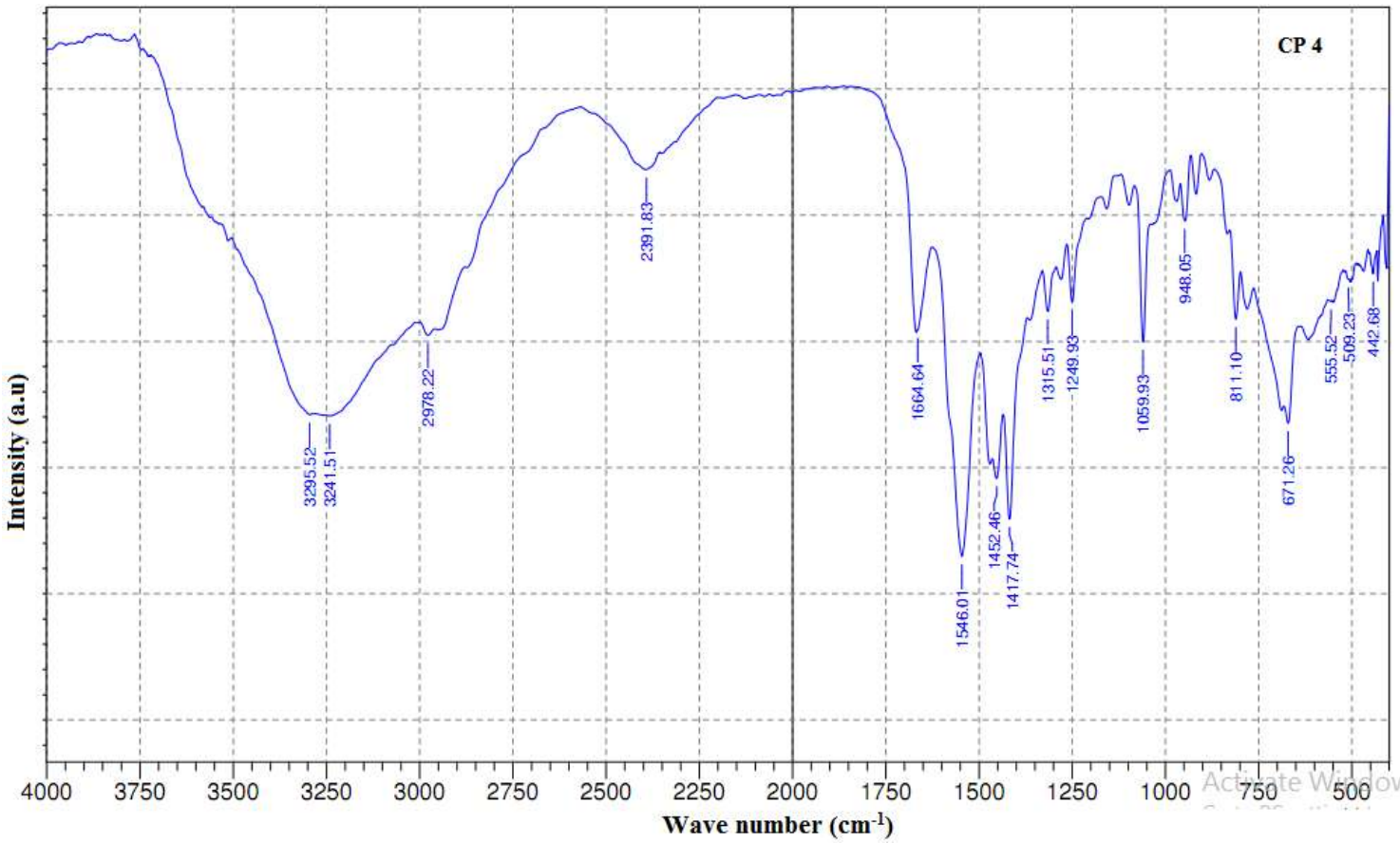


Figure S28. FTIR spectrum of CP **4.**

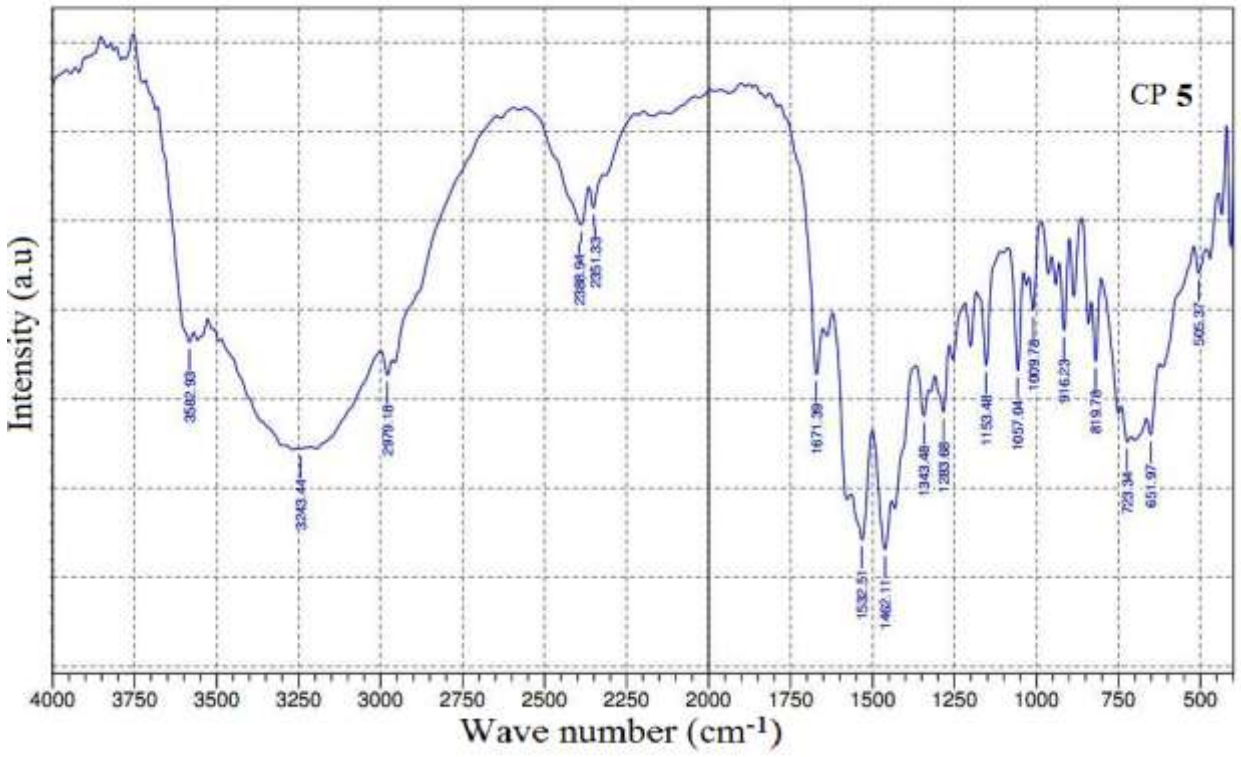


Figure S29. FTIR spectrum of CP **5.**

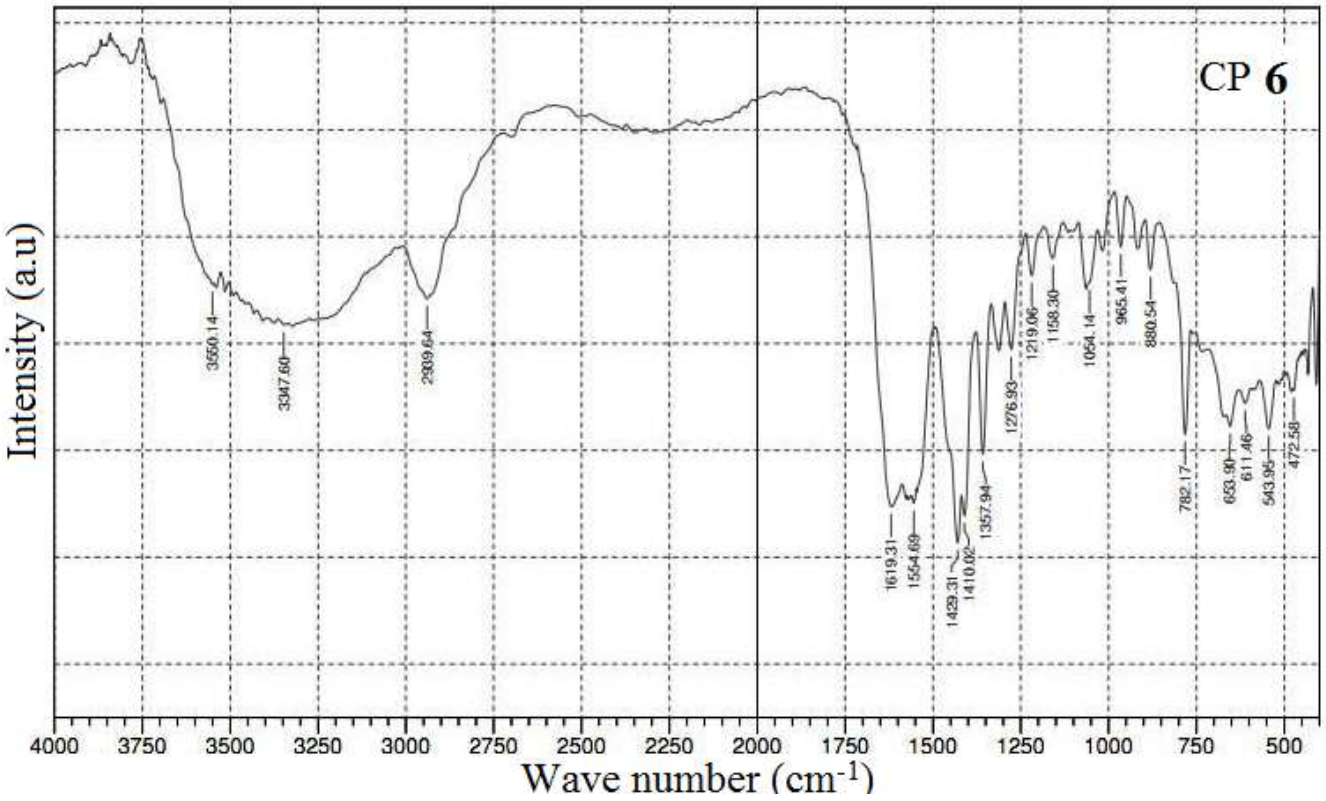


Figure S30. FTIR spectrum of CP **6.**

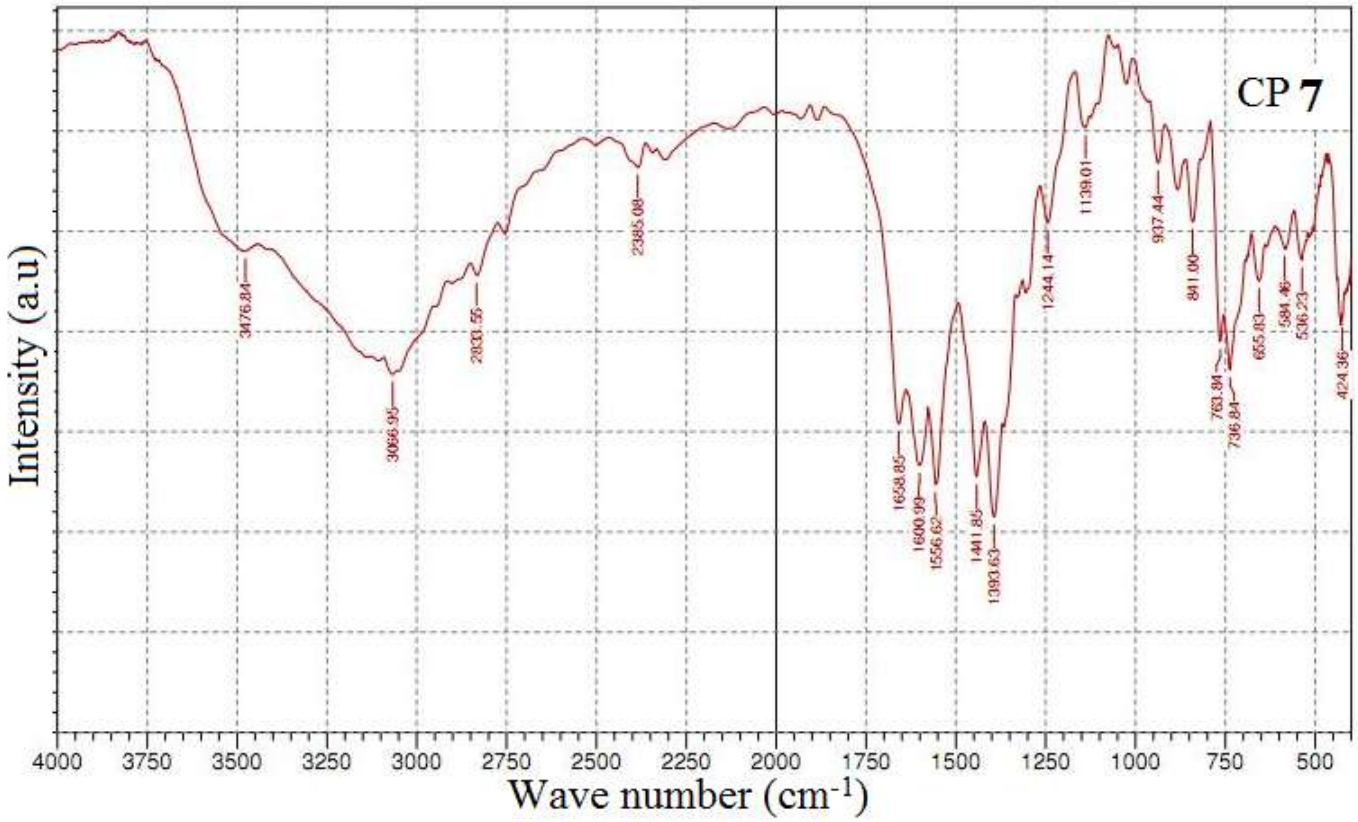


Figure S31. FTIR spectrum of CP **7.**

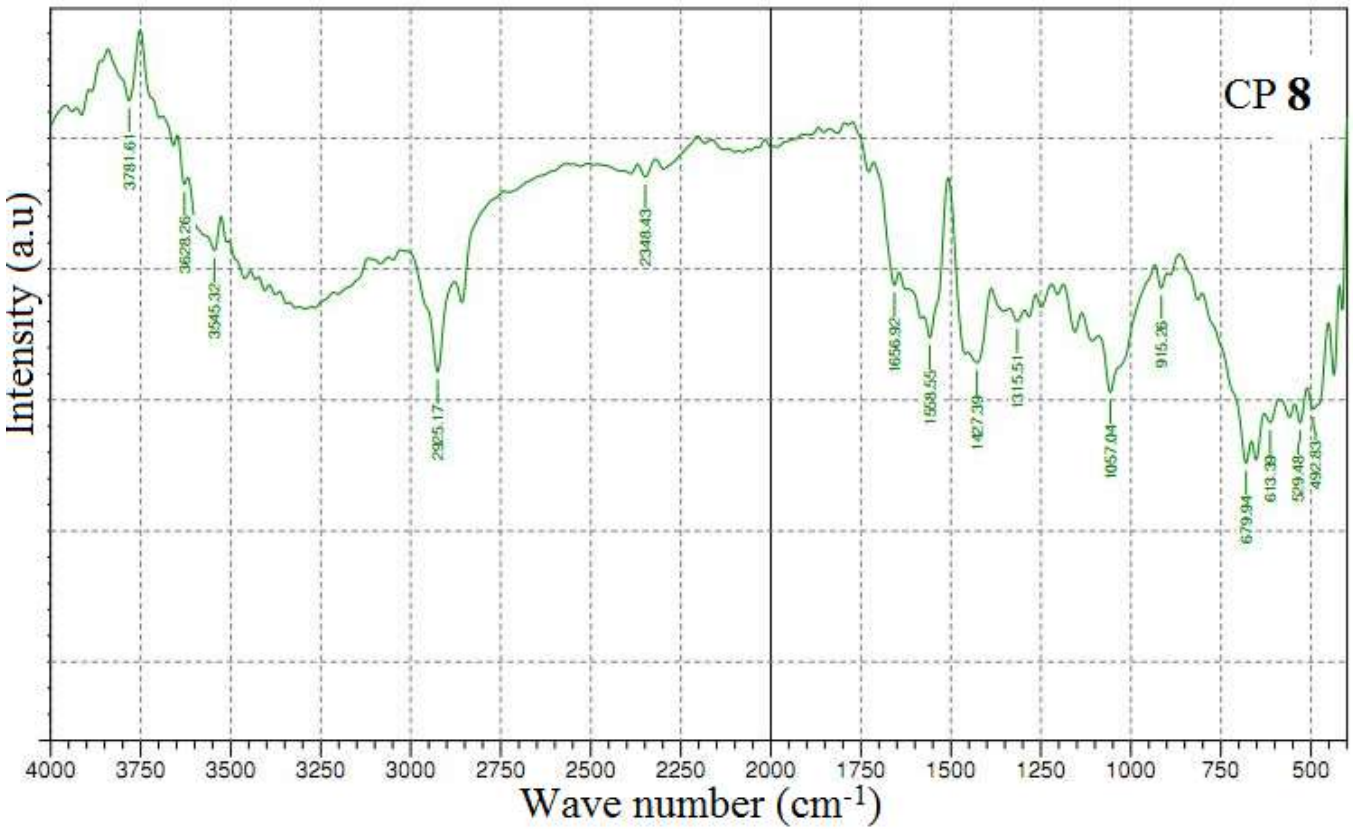


Figure S32. FTIR spectrum of CP **8.**

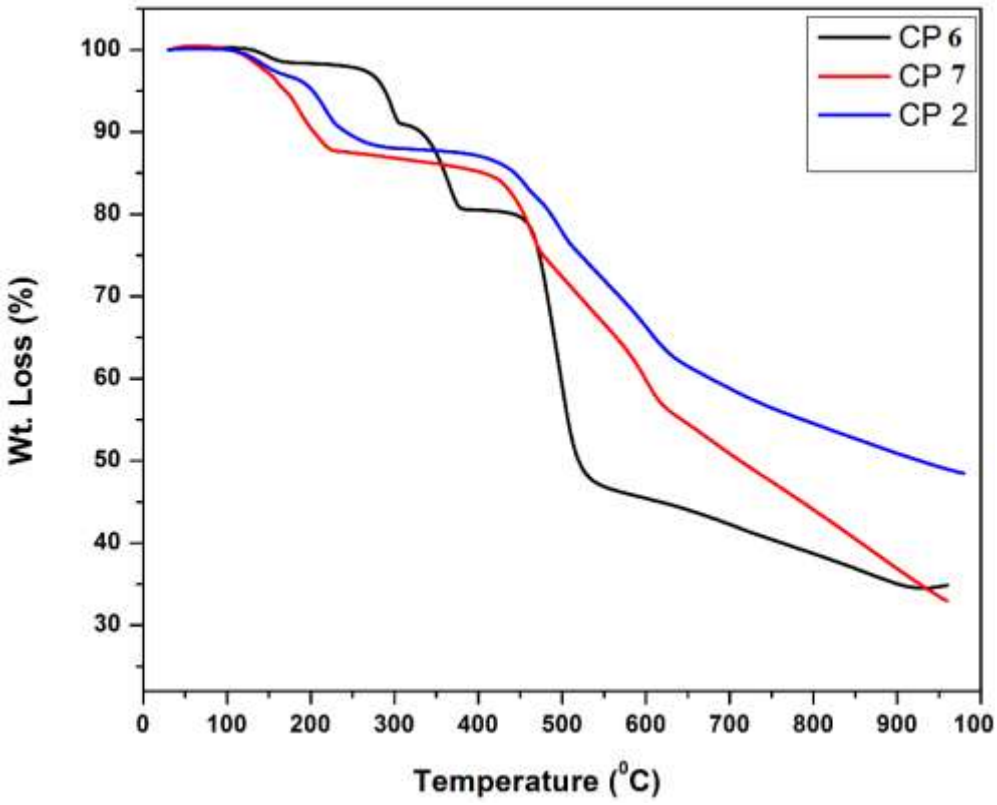


Figure S33. TGA Curves for (a) CP **2**: blue line (b) CP **6**: Black line (c) CP **7**: red line.

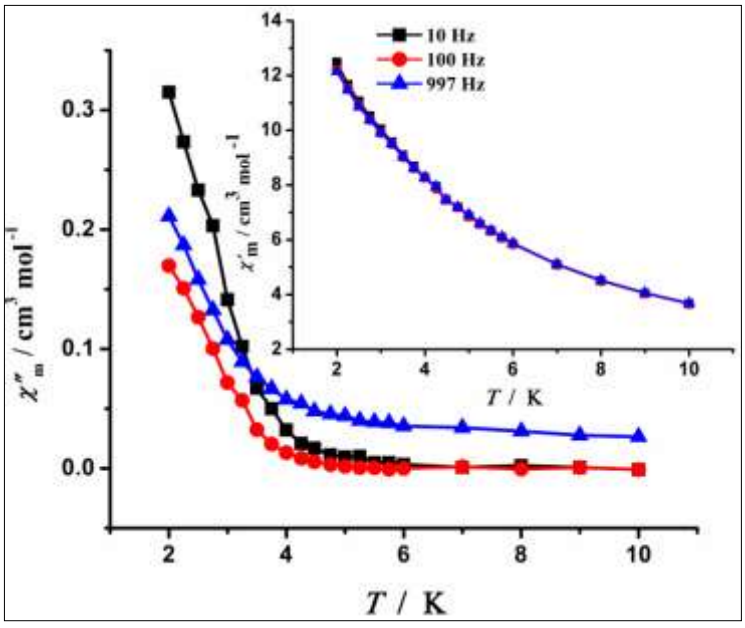


Figure S34. Ac signals for CP **5** with 400 Oe dc field.

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

Tb1—O3	2.450 (3)	Tb1—O5^{ii}	2.359 (3)
Tb1—O1	2.357 (3)	Tb1—O5^{iii}	2.531 (3)
Tb1—O1^{i}	2.666 (4)	Tb1—O7	2.367 (3)
Tb1—O4	2.405 (4)	Tb1—O6^{iii}	2.440 (3)
Tb1—O2^{i}	2.396 (4)		

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

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

O3—Tb1—O1^{i}	142.91 (10)	O2^{i}—Tb1—O3	146.23 (11)
O3—Tb1—O5^{iii}	110.78 (10)	O2^{i}—Tb1—O1^{i}	50.72 (10)
O3—Tb1—C1^{i}	155.81 (10)	O2^{i}—Tb1—O4	148.07 (11)
O3—Tb1—C5^{iii}	123.62 (11)	O2^{i}—Tb1—O5^{iii}	73.49 (11)
O3—Tb1—C6	26.74 (11)	O2^{i}—Tb1—O6^{iii}	80.57 (11)
O1—Tb1—O3	87.54 (10)	O2^{i}—Tb1—C1^{i}	24.83 (11)
O1—Tb1—O1^{i}	66.23 (14)	O2^{i}—Tb1—C5^{iii}	75.56 (12)
O1—Tb1—O4	79.94 (13)	O2^{i}—Tb1—C6	159.58 (11)
O1—Tb1—O2^{i}	116.89 (12)	O5^{ii}—Tb1—O3	76.76 (10)
O1—Tb1—O5^{ii}	162.15 (10)	O5^{ii}—Tb1—O1^{i}	122.95 (11)
O1—Tb1—O5^{iii}	128.19 (10)	O5^{iii}—Tb1—O1^{i}	106.11 (9)
O1—Tb1—O7	79.77 (12)	O5^{ii}—Tb1—O4	96.92 (11)
O1—Tb1—O6^{iii}	78.42 (10)	O5^{ii}—Tb1—O2^{i}	74.68 (10)
O1—Tb1—C1^{i}	92.06 (12)	O5^{ii}—Tb1—O5^{iii}	66.64 (11)
O1^{i}—Tb1—C1^{i}	25.96 (10)	O5^{ii}—Tb1—O7	88.60 (11)
O1—Tb1—C5^{iii}	103.23 (11)	O5^{ii}—Tb1—O6^{iii}	118.18 (10)

O1^{i}—Tb1—C5^{iii}	89.03 (10)	O7—Tb1—O3	77.99 (10)
O1^{i}—Tb1—C6	149.65 (11)	O7—Tb1—O1^{i}	72.08 (10)
O1—Tb1—C6	83.42 (12)	O7—Tb1—O4	127.53 (11)
O4—Tb1—O3	53.27 (10)	O7—Tb1—O2^{i}	83.65 (12)
O4—Tb1—O1^{i}	137.61 (11)	O7—Tb1—O5^{iii}	149.73 (11)
O4—Tb1—O5^{iii}	74.92 (10)	O7—Tb1—O6^{iii}	143.44 (10)
O4—Tb1—O6^{iii}	76.54 (11)	O6^{iii}—Tb1—O3	129.57 (11)
O4—Tb1—C1^{i}	150.20 (10)	O6^{iii}—Tb1—O1^{i}	72.39 (10)
O4—Tb1—C5^{iii}	74.11 (11)	O6^{iii}—Tb1—O5^{iii}	52.13 (9)
O4—Tb1—C6	26.53 (11)		

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

Table S3. Selected Hydrogen bonding geometries for CP **1**.

D*—H···*A	***D*—H (Å)**	**H···*A* (Å)**	***D*···*A* (Å)**	***D*—H···*A* (°)**
O7—H7A···O3^{i}	0.85	1.94	2.700 (4)	148.3
O8—H8D···O9	0.85	2.04	2.645 (17)	127.7

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

Table S4. Selected Bond lenghts (Å) for CP **2**.

O1—Sm1	2.406 (3)	O3—Sm1^{iii}	2.560 (2)
O1—Sm1^{i}	2.648 (3)	O4—Sm1^{iii}	2.483 (2)
O2—Sm1^{i}	2.448 (3)	O5—Sm1	2.445 (3)
O1W—Sm1	2.408 (2)	O6—Sm1	2.481 (2)
O3—Sm1^{ii}	2.401 (2)		

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

Table S5. Selected Bond angles (°) for CP **2**.

$O3^{ii}$—Sm1—O1	162.05 (8)	O5—Sm1—$O4^{iv}$	76.05 (9)
$O3^{ii}$—Sm1—O1W	88.43 (9)	$O2^{i}$—Sm1—$O4^{iv}$	80.69 (10)
O1—Sm1—O1W	79.73 (10)	O6—Sm1—$O4^{iv}$	128.64 (9)
$O3^{ii}$—Sm1—O5	97.08 (10)	$O3^{ii}$—Sm1—$O3^{iv}$	67.06 (9)
O1—Sm1—O5	79.86 (10)	O1—Sm1—$O3^{iv}$	127.93 (8)
O1W—Sm1—O5	127.27 (9)	O1W—Sm1—$O3^{iv}$	150.05 (10)
$O3^{ii}$—Sm1—$O2^{i}$	74.61 (9)	O5—Sm1—$O3^{iv}$	74.91 (9)
O1—Sm1—$O2^{i}$	117.03 (9)	$O2^{i}$—Sm1—$O3^{iv}$	73.24 (10)
O1W—Sm1—$O2^{i}$	84.15 (11)	O6—Sm1—$O3^{iv}$	110.20 (8)
O5—Sm1—$O2^{i}$	147.82 (10)	$O4^{iv}$—Sm1—$O3^{iv}$	51.51 (8)
$O3^{ii}$—Sm1—O6	76.46 (9)	$O3^{ii}$—Sm1—$O1^{i}$	122.63 (9)
O1—Sm1—O6	87.89 (9)	O1—Sm1—$O1^{i}$	66.59 (10)
O1W—Sm1—O6	78.43 (9)	O1W—Sm1—$O1^{i}$	72.51 (8)
O5—Sm1—O6	52.74 (8)	O5—Sm1—$O1^{i}$	137.67 (9)
$O2^{i}$—Sm1—O6	146.46 (9)	$O2^{i}$—Sm1—$O1^{i}$	50.51 (9)
$O3^{ii}$—Sm1—$O4^{iv}$	118.03 (8)	O6—Sm1—$O1^{i}$	143.99 (8)
O1—Sm1—$O4^{iv}$	78.64 (8)	$O4^{iv}$—Sm1—$O1^{i}$	72.75 (8)
O1W—Sm1—$O4^{iv}$	144.15 (9)	$O3^{iv}$—Sm1—$O1^{i}$	105.59 (8)

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

Table S6. Selected Hydrogen bonding geometries for CP **2**.

D	H	A	d(D-H)/Å	d(H-A)/Å	d(D-A)/Å	D-H-A/°
O1W	H1WA	O6[1]	0.814(18)	1.872(19)	2.683(3)	174(5)
O1W	H1WB	O4[2]	0.816(18)	2.06(3)	2.826(4)	157(5)
O3W	H3WB	O2W	0.81(2)	1.90(5)	2.688(18)	164(16)

Symmetry code(s): [1]3/2-X,1/2-Y,1-Z; [2]1/2-X,1/2-Y,1-Z

Table S7. Selected Bond lenghts (Å) for CP **3**.

Eu1—O1	2.395 (5)	C1—C2	1.495 (9)
Eu1—O1^{i}	2.642 (5)	C5—C4	1.492 (9)
Eu1—O3^{ii}	2.559 (5)	C6—C7	1.507 (9)
Eu1—O3^{iii}	2.390 (4)	C2—H2a	0.9700
Eu1—O6	2.440 (5)	C2—H2b	0.9700
Eu1—O5	2.477 (5)	C2—C3	1.537 (9)
Eu1—O2^{i}	2.429 (5)	C4—H4a	0.9700
Eu1—O7	2.400 (5)	C4—H4b	0.9700
Eu1—O4^{ii}	2.469 (5)	C4—C3	1.516 (10)
Eu1—C1^{i}	2.932 (6)	C7—H7c	0.9700
Eu1—C5^{ii}	2.900 (7)	C7—H7d	0.9700
Eu1—C6	2.841 (6)	C7—C8	1.530 (8)
O1—C1	1.283 (8)	C8—H8a	0.9700
O3—C5	1.268 (8)	C8—H8a^{iv}	0.9700
O6—C6	1.261 (8)	C8—H8b^{iv}	0.9700
O5—C6	1.275 (8)	C8—H8b	0.9700

O2—C1	1.255 (8)	H8a—H8b^{iv}	0.0000
O7—H7a	0.8618	C3—H3a	0.9700
O7—H7b	0.8612	C3—H3b	0.9700
O4—C5	1.262 (8)		

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

Table S8. Selected Bond angles (°) for CP **3**.

O3^{iii}—Eu1—O1	162.00 (16)	C5—O3—Eu1^{v}	92.3 (4)
O3^{iii}—Eu1—O1^{i}	122.99 (16)	C6—O6—Eu1	94.9 (4)
O3^{ii}—Eu1—O1	127.82 (16)	C6—O5—Eu1	92.8 (4)
O3^{ii}—Eu1—O1^{i}	105.63 (15)	C1—O2—Eu1^{i}	100.6 (4)
O6—Eu1—O1	79.98 (18)	H7a—O7—Eu1	110.1
O6—Eu1—O1^{i}	137.73 (16)	H7b—O7—Eu1	109.7
O6—Eu1—O3^{iii}	96.79 (18)	H7b—O7—H7a	108.8
O6—Eu1—O3^{ii}	75.07 (17)	C5—O4—Eu1^{v}	96.7 (4)
O5—Eu1—O1	88.13 (17)	O1—C1—Eu1^{i}	64.3 (3)
O5—Eu1—O1^{i}	143.71 (15)	O2—C1—Eu1^{i}	54.5 (3)
O5—Eu1—O3^{iii}	76.08 (16)	O2—C1—O1	118.6 (6)
O5—Eu1—O3^{ii}	110.46 (16)	C2—C1—Eu1^{i}	170.3 (5)
O5—Eu1—O6	52.88 (16)	C2—C1—O1	121.9 (6)
O2^{i}—Eu1—O1	117.01 (17)	C2—C1—O2	119.4 (6)
O2^{i}—Eu1—O1^{i}	50.78 (15)	O3—C5—Eu1^{v}	61.8 (3)
O2^{i}—Eu1—O3^{iii}	74.75 (17)	O4—C5—Eu1^{v}	57.7 (3)

O2^{i}—Eu1—O3^{ii}	73.10 (18)	O4—C5—O3	119.6 (6)
O2^{i}—Eu1—O6	147.88 (19)	C4—C5—Eu1^{v}	178.5 (5)
O2^{i}—Eu1—O5	146.13 (17)	C4—C5—O3	118.9 (6)
O7—Eu1—O1	79.54 (18)	C4—C5—O4	121.5 (6)
O7—Eu1—O1^{i}	72.13 (16)	O6—C6—Eu1	58.8 (4)
O7—Eu1—O3^{iii}	88.72 (17)	O5—C6—Eu1	60.5 (3)
O7—Eu1—O3^{ii}	150.18 (18)	O5—C6—O6	119.3 (6)
O7—Eu1—O6	127.27 (18)	C7—C6—Eu1	178.8 (5)
O7—Eu1—O5	78.41 (16)	C7—C6—O6	121.3 (6)
O7—Eu1—O2^{i}	84.09 (19)	C7—C6—O5	119.3 (6)
O4^{ii}—Eu1—O1	78.45 (16)	H2a—C2—C1	109.6 (4)
O4^{ii}—Eu1—O1^{i}	72.87 (16)	H2b—C2—C1	109.6 (4)
O4^{ii}—Eu1—O3^{iii}	118.20 (15)	H2b—C2—H2a	108.1
O4^{ii}—Eu1—O3^{ii}	51.50 (15)	C3—C2—C1	110.4 (6)
O4^{ii}—Eu1—O6	76.10 (17)	C3—C2—H2a	109.6 (4)
O4^{ii}—Eu1—O5	128.82 (17)	C3—C2—H2b	109.6 (4)
O4^{ii}—Eu1—O2^{i}	80.85 (19)	H4a—C4—C5	108.6 (4)
O4^{ii}—Eu1—O7	143.85 (17)	H4b—C4—C5	108.6 (4)
C1^{i}—Eu1—O1	92.13 (17)	H4b—C4—H4a	107.6
C1^{i}—Eu1—O1^{i}	25.95 (16)	C3—C4—C5	114.6 (6)
C1^{i}—Eu1—O3^{iii}	98.84 (17)	C3—C4—H4a	108.6 (4)
C1^{i}—Eu1—O3^{ii}	87.99 (17)	C3—C4—H4b	108.6 (5)
C1^{i}—Eu1—O6	150.30 (17)	H7c—C7—C6	109.0 (4)

C1^{i}—Eu1—O5	156.24 (16)	H7d—C7—C6	109.0 (4)
C1^{i}—Eu1—O2^{i}	24.88 (17)	H7d—C7—H7c	107.8
C1^{i}—Eu1—O7	78.29 (18)	C8—C7—C6	112.9 (6)
C1^{i}—Eu1—O4^{ii}	74.27 (18)	C8—C7—H7c	109.0 (3)
C5^{ii}—Eu1—O1	103.09 (17)	C8—C7—H7d	109.0 (3)
C5^{ii}—Eu1—O1^{i}	89.14 (17)	C7^{iv}—C8—C7	110.9 (8)
C5^{ii}—Eu1—O3^{iii}	92.85 (17)	H8a^{iv}—C8—C7	109.5 (3)
C5^{ii}—Eu1—O3^{ii}	25.90 (17)	H8a—C8—C7	109.5 (3)
C5^{ii}—Eu1—O6	73.91 (17)	H8a—C8—C7^{iv}	109.5 (3)
C5^{ii}—Eu1—O5	122.83 (17)	H8a^{iv}—C8—C7^{iv}	109.5 (3)
C5^{ii}—Eu1—O2^{i}	75.62 (19)	H8a^{iv}—C8—H8a	108.0
C5^{ii}—Eu1—O7	158.43 (19)	H8b^{iv}—C8—C7^{iv}	109.5 (3)
C5^{ii}—Eu1—O4^{ii}	25.60 (17)	H8b^{iv}—C8—C7	109.5 (3)
C5^{ii}—Eu1—C1^{i}	80.22 (18)	H8b—C8—C7^{iv}	109.5 (3)
C6—Eu1—O1	83.70 (17)	H8b—C8—C7	109.5 (3)
C6—Eu1—O1^{i}	150.02 (16)	H8b^{iv}—C8—H8a	0.0
C6—Eu1—O3^{iii}	85.83 (18)	H8b—C8—H8a^{iv}	0.0
C6—Eu1—O3^{ii}	92.54 (17)	H8b^{iv}—C8—H8a^{iv}	108.0
C6—Eu1—O6	26.24 (18)	H8b—C8—H8a	108.0
C6—Eu1—O5	26.64 (17)	H8b—C8—H8b^{iv}	108.0
C6—Eu1—O2^{i}	159.13 (17)	H8b^{iv}—H8a—C8	0 (50000)
C6—Eu1—O7	103.38 (18)	H8a^{iv}—H8b—C8^{iv}	0 (2100000)
C6—Eu1—O4^{ii}	102.30 (19)	C4—C3—C2	113.2 (6)

C6—Eu1—C1^{i}	175.11 (18)	H3a—C3—C2	108.9 (4)
C6—Eu1—C5^{ii}	98.19 (19)	H3a—C3—C4	108.9 (5)
C1—O1—Eu1	155.8 (4)	H3b—C3—C2	108.9 (4)
C1—O1—Eu1^{i}	89.7 (4)	H3b—C3—C4	108.9 (4)
C5—O3—Eu1^{iii}	153.7 (4)	H3b—C3—H3a	107.8

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

Table S9. Selected Hydrogen bonding geometries for CP **3**.

D*—H···*A	***D*—H (Å)**	**H···*A* (Å)**	***D*···*A* (Å)**	***D*—H···*A* (°)**
O7—H7b···O5^{i}	0.8612	2.04 (4)	2.690 (7)	131 (4)

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

Table S10. Selected Bond lenghts (Å) for CP **4**.

Gd1—O1^{i}	2.385 (6)	C4—C3	1.504 (14)
Gd1—O1	2.649 (6)	C6—C7	1.516 (12)
Gd1—O2	2.426 (7)	C7—C8	1.513 (11)
Gd1—O5	2.465 (6)	C2—C3	1.541 (13)
Gd1—O7	2.381 (6)	O7—H7B	0.8574
Gd1—O3^{ii}	2.541 (6)	O7—H7A	0.8572
Gd1—O3^{iii}	2.390 (6)	O8—H8D	0.8503
Gd1—O6	2.426 (7)	O8—H8C	0.8489
Gd1—O4^{ii}	2.460 (6)	O9—H9B	0.8512
Gd1—C5^{ii}	2.884 (8)	O9—H9A	0.8496
Gd1—C1	2.920 (9)	C2—H2B	0.9700
Gd1—C6	2.822 (9)	C2—H2A	0.9700

O1—C1	1.278 (10)	C3—H3B	0.9700
O2—C1	1.249 (11)	C3—H3A	0.9700
O5—C6	1.273 (11)	C4—H4B	0.9700
O3—C5	1.255 (10)	C4—H4A	0.9700
O6—C6	1.257 (11)	C7—H7D	0.9700
O4—C5	1.261 (10)	C7—H7C	0.9700
C5—C4	1.495 (12)	C8—H8B	0.9700
C1—C2	1.491 (12)	C8—H8A	0.9700

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

Table S11. Selected Bond angles (°) for CP **4**.

$O1^{i}$—Gd1—O1	66.6 (2)	C6—Gd1—C1	174.9 (2)
$O1^{i}$—Gd1—O2	117.3 (2)	$Gd1^{i}$—O1—Gd1	113.4 (2)
$O1^{i}$—Gd1—O5	87.9 (2)	C1—O1—Gd1	88.9 (5)
$O1^{i}$—Gd1—$O3^{ii}$	127.5 (2)	C1—O1—$Gd1^{i}$	156.6 (6)
$O1^{i}$—Gd1—$O3^{iii}$	162.0 (2)	C1—O2—Gd1	100.3 (5)
$O1^{i}$—Gd1—O6	79.8 (2)	C6—O5—Gd1	92.4 (5)
$O1^{i}$—Gd1—$O4^{ii}$	78.2 (2)	Gd1—O7—H7A	110.0
O1—Gd1—$C5^{ii}$	89.2 (2)	Gd1—O7—H7B	109.5
$O1^{i}$—Gd1—$C5^{ii}$	103.0 (2)	H7A—O7—H7B	109.1
$O1^{i}$—Gd1—C1	92.4 (2)	$Gd1^{iv}$—O3—$Gd1^{ii}$	112.8 (2)
O1—Gd1—C1	25.9 (2)	C5—O3—$Gd1^{iv}$	153.4 (6)
O1—Gd1—C6	149.9 (2)	C5—O3—$Gd1^{ii}$	92.6 (5)

O1^{i}—Gd1—C6	83.3 (2)	C6—O6—Gd1	94.7 (6)
O2—Gd1—O1	50.7 (2)	C5—O4—Gd1^{ii}	96.2 (5)
O2—Gd1—O5	146.0 (2)	O3—C5—Gd1^{ii}	61.7 (4)
O2—Gd1—O3^{ii}	73.1 (2)	O3—C5—O4	119.7 (8)
O2—Gd1—O6	147.9 (2)	O3—C5—C4	119.2 (8)
O2—Gd1—O4^{ii}	80.9 (2)	O4—C5—Gd1^{ii}	58.0 (4)
O2—Gd1—C5^{ii}	75.5 (2)	O4—C5—C4	121.1 (8)
O2—Gd1—C1	24.9 (2)	C4—C5—Gd1^{ii}	178.9 (7)
O2—Gd1—C6	159.4 (2)	O1—C1—Gd1	65.1 (5)
O5—Gd1—O1	143.3 (2)	O1—C1—C2	121.2 (8)
O5—Gd1—O3^{ii}	110.9 (2)	O2—C1—Gd1	54.8 (5)
O5—Gd1—C5^{ii}	123.3 (2)	O2—C1—O1	119.5 (8)
O5—Gd1—C1	156.2 (2)	O2—C1—C2	119.3 (8)
O5—Gd1—C6	26.8 (2)	C2—C1—Gd1	170.9 (6)
O7—Gd1—O1	71.9 (2)	C5—C4—H4A	108.5
O7—Gd1—O1^{i}	80.0 (2)	C5—C4—H4B	108.5
O7—Gd1—O2	83.8 (2)	C5—C4—C3	115.1 (8)
O7—Gd1—O5	78.2 (2)	H4A—C4—H4B	107.5
O7—Gd1—O3^{iii}	88.7 (2)	C3—C4—H4A	108.5
O7—Gd1—O3^{ii}	150.0 (2)	C3—C4—H4B	108.5
O7—Gd1—O6	127.5 (2)	O5—C6—Gd1	60.8 (5)
O7—Gd1—O4^{ii}	143.7 (2)	O5—C6—C7	119.2 (8)
O7—Gd1—C5^{ii}	158.1 (2)	O6—C6—Gd1	58.9 (5)

O7—Gd1—C1	78.4 (2)	O6—C6—O5	119.7 (8)
O7—Gd1—C6	103.4 (2)	O6—C6—C7	121.0 (8)
O3^{ii}—Gd1—O1	105.6 (2)	C7—C6—Gd1	179.1 (6)
O3^{iii}—Gd1—O1	123.1 (2)	C6—C7—H7C	108.9
O3^{iii}—Gd1—O2	74.9 (2)	C6—C7—H7D	108.9
O3^{iii}—Gd1—O5	76.1 (2)	H7C—C7—H7D	107.7
O3^{iii}—Gd1—O3^{ii}	67.2 (2)	C8—C7—C6	113.5 (8)
O3^{iii}—Gd1—O6	96.5 (2)	C8—C7—H7C	108.9
O3^{iii}—Gd1—O4^{ii}	118.3 (2)	C8—C7—H7D	108.9
O3^{iii}—Gd1—C5^{ii}	92.7 (2)	C7—C8—C7^{v}	111.8 (11)
O3^{ii}—Gd1—C5^{ii}	25.8 (2)	C7—C8—H8A	109.3
O3^{ii}—Gd1—C1	87.7 (2)	C7^{v}—C8—H8A	109.3
O3^{iii}—Gd1—C1	99.1 (2)	C7—C8—H8B	109.3
O3^{ii}—Gd1—C6	92.9 (2)	C7^{v}—C8—H8B	109.3
O3^{iii}—Gd1—C6	85.8 (2)	H8A—C8—H8B	107.9
O6—Gd1—O1	138.0 (2)	C1—C2—H2A	109.8
O6—Gd1—O5	53.1 (2)	C1—C2—H2B	109.8
O6—Gd1—O3^{ii}	75.0 (2)	C1—C2—C3	109.6 (8)
O6—Gd1—O4^{ii}	76.2 (2)	H2A—C2—H2B	108.2
O6—Gd1—C5^{ii}	74.0 (2)	C3—C2—H2A	109.8
O6—Gd1—C1	150.1 (2)	C3—C2—H2B	109.8
O6—Gd1—C6	26.3 (2)	C4—C3—C2	113.6 (8)
O4^{ii}—Gd1—O1	72.9 (2)	C4—C3—H3A	108.8

O4^{ii}—Gd1—O5	129.1 (2)	C4—C3—H3B	108.8
O4^{ii}—Gd1—O3^{ii}	51.53 (19)	C2—C3—H3A	108.8
O4^{ii}—Gd1—C5^{ii}	25.8 (2)	C2—C3—H3B	108.8
O4^{ii}—Gd1—C1	74.0 (2)	H3A—C3—H3B	107.7
O4^{ii}—Gd1—C6	102.5 (2)	H8C—O8—H8D	109.5
C5^{ii}—Gd1—C1	79.9 (2)	H9A—O9—H9B	109.4
C6—Gd1—C5^{ii}	98.5 (2)		

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

Table S12. Selected Hydrogen bonding geometries for CP **4**.

D—H···*A*	*D*—H (Å)	H···*A* (Å)	*D*···*A* (Å)	*D*—H···*A* (°)
O7—H7B···O5^{i}	0.86	1.95	2.694 (9)	143.6
O8—H8C···O9	0.85	2.08	2.67 (4)	125.3
O9—H9B···O8	0.85	1.89	2.67 (4)	151.3

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

Table S13. Selected Bond lenghts (Å) for CP **5**.

Dy1—Dy2^{i}	3.9970 (4)	Dy2—Dy2^{iv}	3.9693 (5)
Dy1—O1	2.564 (3)	Dy2—O1^{v}	2.695 (3)
Dy1—O1W	2.468 (3)	Dy2—O2^{v}	2.531 (4)
Dy1—O5	2.413 (3)	Dy2—O3	2.451 (3)
Dy1—O6^{ii}	2.506 (4)	Dy2—O4^{iv}	2.446 (3)
Dy1—O7^{i}	2.530 (4)	Dy2—O8	2.434 (3)
Dy1—O8^{i}	2.657 (3)	Dy2—O9^{iv}	2.562 (3)

Dy1—O11^{iii}	2.579 (3)	Dy2—O9	2.483 (3)
Dy1—O12^{iii}	2.677 (3)	Dy2—O10^{iv}	2.567 (3)
Dy1—O13	2.484 (3)	Dy2—O12^{vi}	2.473 (3)

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

Table S14. Selected Bond angles (°) for CP **5**.

O1—Dy1—O8^{i}	67.45 (10)	O13—Dy1—O11^{iii}	138.23 (13)
O1—Dy1—O11^{iii}	72.08 (10)	O13—Dy1—O12^{iii}	126.55 (11)
O1—Dy1—O12^{iii}	64.67 (9)	O2^{v}—Dy2—O1^{v}	49.49 (10)
O1W—Dy1—O1	144.33 (14)	O2^{v}—Dy2—O9^{iv}	151.73 (11)
O1W—Dy1—O6^{ii}	83.02 (15)	O2^{v}—Dy2—O10^{iv}	141.05 (12)
O1W—Dy1—O7^{i}	68.51 (13)	O3—Dy2—O1^{v}	84.00 (10)
O1W—Dy1—O8^{i}	112.93 (11)	O3—Dy2—O2^{v}	104.80 (13)
O1W—Dy1—O11^{iii}	131.97 (11)	O3—Dy2—O9	70.21 (11)
O1W—Dy1—O12^{iii}	149.75 (13)	O3—Dy2—O9^{iv}	75.08 (10)
O1W—Dy1—O13	74.71 (15)	O3—Dy2—O10^{iv}	114.02 (12)
O5—Dy1—C10^{i}	159.32 (11)	O3—Dy2—O12^{vi}	139.48 (10)
O5—Dy1—C15^{iii}	98.19 (11)	O4^{iv}—Dy2—O1^{v}	128.06 (10)
O5—Dy1—Dy2^{i}	128.65 (10)	O4^{iv}—Dy2—O2^{v}	83.57 (12)
O5—Dy1—O1	88.76 (12)	O4^{iv}—Dy2—O3	135.82 (11)
O5—Dy1—O1W	76.83 (13)	O4^{iv}—Dy2—O9^{iv}	78.18 (10)
O5—Dy1—O6^{ii}	109.06 (12)	O4^{iv}—Dy2—O9	69.66 (10)
O5—Dy1—O7^{i}	144.82 (13)	O4^{iv}—Dy2—O10^{iv}	71.08 (12)

O5—Dy1—O8^{i}	151.25 (12)	O4^{iv}—Dy2—O12^{vi}	84.69 (10)
O5—Dy1—O11^{iii}	74.32 (11)	O8—Dy2—O1^{v}	68.63 (10)
O5—Dy1—O12^{iii}	121.89 (11)	O8—Dy2—O2^{v}	117.22 (11)
O5—Dy1—O13	84.95 (13)	O8—Dy2—O3	74.86 (12)
O6^{ii}—Dy1—O1	132.66 (11)	O8—Dy2—O4^{iv}	139.92 (12)
O6^{ii}—Dy1—O7^{i}	73.12 (14)	O8—Dy2—O9^{iv}	90.36 (10)
O6^{ii}—Dy1—O8^{i}	99.15 (11)	O8—Dy2—O9	144.72 (10)
O6^{ii}—Dy1—O11^{iii}	71.45 (12)	O8—Dy2—O10^{iv}	72.17 (11)
O6^{ii}—Dy1—O12^{iii}	68.79 (10)	O8—Dy2—O12^{vi}	69.57 (10)
O7^{i}—Dy1—O1	116.15 (11)	O9^{iv}—Dy2—O1^{v}	153.73 (9)
O7^{i}—Dy1—O8^{i}	49.52 (11)	O9—Dy2—O1^{v}	111.61 (10)
O7^{i}—Dy1—O11^{iii}	134.91 (13)	O9—Dy2—O2^{v}	77.24 (11)
O7^{i}—Dy1—O12^{iii}	92.18 (12)	O9—Dy2—O9^{iv}	76.25 (11)
O8^{i}—Dy1—O12^{iii}	63.34 (9)	O9—Dy2—O10^{iv}	118.17 (10)
O11^{iii}—Dy1—C10^{i}	125.49 (10)	O9^{iv}—Dy2—O10^{iv}	50.19 (9)
O11^{iii}—Dy1—O8^{i}	110.86 (9)	O10^{iv}—Dy2—O1^{v}	130.17 (10)
O11^{iii}—Dy1—O12^{iii}	49.15 (9)	O12^{vi}—Dy2—O1^{v}	65.58 (9)
O13—Dy1—O1	71.60 (12)	O12^{vi}—Dy2—O2^{v}	75.96 (11)
O13—Dy1—O6^{ii}	150.32 (14)	O12^{vi}—Dy2—O9	144.60 (9)
O13—Dy1—O7^{i}	80.51 (15)	O12^{vi}—Dy2—O9^{iv}	122.95 (9)
O13—Dy1—O8^{i}	72.66 (12)	O12^{vi}—Dy2—O10^{iv}	72.76 (9)

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

Table S15. Selected Hydrogen bonding geometries for CP **5**.

D	H	A	d(D-H)/Å	d(H-A)/Å	d(D-A)/Å	D-H-A/°
O1W	H1WA	O11[1]	0.85	1.87	2.715(5)	169.9

Symmetry code(s): [1]-1+X,+Y,+Z

Table S16. Selected Bond lenghts (Å) for CP **6.**

O1—Pr1	2.4727 (17)	O7—Pr2	2.416 (2)
O1—Pr2^{i}	2.6775 (18)	O8—Pr2^{iv}	2.499 (2)
O2—Pr2^{i}	2.5768 (19)	O9—Pr1	2.445 (2)
O1W—Pr2	2.467 (2)	O10—Pr1^{v}	2.441 (2)
O3—Pr1^{ii}	2.479 (2)	O11—Pr1^{vi}	2.698 (2)
O3—Pr1^{iii}	2.566 (2)	O11—Pr2	2.556 (2)
O4—Pr1^{iii}	2.568 (2)	O12—Pr1^{vi}	2.528 (2)
O5—Pr1	2.438 (2)	O13—Pr2	2.480 (2)
O5—Pr2^{i}	2.660 (2)	Pr1—Pr1^{v}	3.9725 (13)
O6—Pr2^{i}	2.528 (2)		

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

Table S17. Selected Bond angles (°) for CP **6**.

O1—Pr1—O3^{vii}	123.06 (6)	O12^{i}—Pr1—Pr1^{v}	115.58 (6)
O1—Pr1—O3^{viii}	144.59 (6)	O2^{vi}—Pr2—O1^{vi}	49.30 (6)
O1—Pr1—O4^{vii}	72.66 (6)	O2^{vi}—Pr2—O5^{vi}	111.02 (6)
O1—Pr1—O11^{i}	65.47 (6)	O1W—Pr2—O1^{vi}	149.25 (8)
O1—Pr1—O12^{i}	75.91 (7)	O1W—Pr2—O2^{vi}	131.64 (7)

O1—Pr1—Pr1^{v}	149.42 (4)	O1W—Pr2—O5^{vi}	112.91 (7)
O3^{viii}—Pr1—O3^{vii}	76.12 (7)	O1W—Pr2—O6^{vi}	68.62 (8)
O3^{vii}—Pr1—O4^{vii}	50.40 (6)	O1W—Pr2—O8^{iv}	82.65 (9)
O3^{viii}—Pr1—O4^{vii}	118.04 (6)	O1W—Pr2—O11	144.81 (8)
O3^{vii}—Pr1—O11^{i}	153.68 (6)	O1W—Pr2—O13	75.10 (9)
O3^{viii}—Pr1—O11^{i}	111.80 (6)	O5^{vi}—Pr2—O1^{vi}	63.35 (6)
O3^{viii}—Pr1—O12^{i}	77.32 (7)	O6^{vi}—Pr2—O1^{vi}	91.90 (8)
O4^{vii}—Pr1—O11^{i}	130.09 (6)	O6^{vi}—Pr2—O2^{vi}	134.85 (8)
O4^{vii}—Pr1—Pr1^{v}	83.20 (5)	O6^{vi}—Pr2—O5^{vi}	49.23 (7)
O5—Pr1—O1	69.60 (7)	O6^{vi}—Pr2—O11	115.96 (7)
O5—Pr1—O3^{viii}	144.73 (7)	O7—Pr2—O1^{vi}	121.97 (7)
O5—Pr1—O3^{vii}	90.39 (6)	O7—Pr2—O2^{vi}	74.22 (7)
O5—Pr1—O4^{vii}	72.39 (7)	O7—Pr2—O1W	76.94 (8)
O5—Pr1—O9	74.82 (7)	O7—Pr2—O5^{vi}	151.38 (8)
O5—Pr1—O10^{v}	140.07 (7)	O7—Pr2—O6^{vi}	145.01 (8)
O5—Pr1—O11^{i}	68.54 (6)	O7—Pr2—O8^{iv}	108.98 (7)
O5—Pr1—O12^{i}	117.21 (7)	O7—Pr2—O11	88.85 (7)
O9—Pr1—O1	139.53 (6)	O7—Pr2—O13	84.95 (8)
O9—Pr1—O3^{viii}	70.26 (7)	O7—Pr2—Pr1^{vi}	128.75 (6)
O9—Pr1—O3^{vii}	74.88 (6)	O8^{iv}—Pr2—O1^{vi}	68.66 (7)
O9—Pr1—O4^{vii}	114.15 (7)	O8^{iv}—Pr2—O2^{vi}	71.38 (8)
O9—Pr1—O11^{i}	84.16 (7)	O8^{iv}—Pr2—O5^{vi}	99.11 (7)
O9—Pr1—O12^{i}	104.97 (8)	O8^{iv}—Pr2—O6^{vi}	73.19 (8)

O10^{v}—Pr1—O1	84.79 (6)	O8^{iv}—Pr2—O11	132.54 (7)
O10^{v}—Pr1—O3^{vii}	78.22 (6)	O11—Pr2—O1^{vi}	64.71 (6)
O10^{v}—Pr1—O3^{viii}	69.47 (6)	O11—Pr2—O2^{vi}	72.11 (7)
O10^{v}—Pr1—O4^{vii}	70.95 (8)	O11—Pr2—O5^{vi}	67.52 (6)
O10^{v}—Pr1—O9	135.67 (7)	O13—Pr2—O1^{vi}	126.63 (7)
O10^{v}—Pr1—O11^{i}	128.06 (6)	O13—Pr2—O2^{vi}	138.22 (8)
O10^{v}—Pr1—O12^{i}	83.48 (7)	O13—Pr2—O5^{vi}	72.71 (7)
O12^{i}—Pr1—O3^{vii}	151.69 (6)	O13—Pr2—O6^{vi}	80.58 (9)
O12^{i}—Pr1—O4^{vii}	140.77 (7)	O13—Pr2—O8^{iv}	150.40 (9)
O12^{i}—Pr1—O11^{i}	49.57 (7)	O13—Pr2—O11	71.66 (8)

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

Table S18. Selected Hydrogen bonding geometries for CP **6**.

D	**H**	**A**	**d(D-H)/Å**	**d(H-A)/Å**	**d(D-A)/Å**	**D-H-A/°**
O1W	H1WA	O2W	0.88	1.84	2.694(4)	164.1
O1W	H1WB	O2^{1}	0.88	1.88	2.720(3)	159.8
O2W	H2WA	O4^{1}	0.85	1.96	2.797(4)	167.9

Symmetry code(s): ^{1}1-X,1/2+Y,3/2-Z

Table S19. Selected Bond lenghts (Å) for CP **7**.

O1—Eu1	2.392 (7)	O4W—Eu2	2.389 (7)
O1—Eu2^{i}	2.586 (8)	O6—Eu1	2.457 (9)
O2—Eu2^{i}	2.485 (9)	O7—Eu2	2.446 (8)
O1W—Eu1	2.371 (9)	O8—Eu2	2.424 (8)

O3—Eu1^{ii}	2.538 (9)	O9—Eu1^{iii}	2.583 (8)
O2W—Eu1	2.379 (7)	O9—Eu2	2.382 (7)
O4—Eu1^{ii}	2.444 (8)	O10—Eu1^{iii}	2.487 (9)
O3W—Eu2	2.380 (9)	O11—Eu2^{ii}	2.517 (8)
O5—Eu1	2.477 (8)	O12—Eu2^{ii}	2.464 (8)

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

Table S20. Selected Bond angles (°) for CP **7**.

O1—Eu1—O3^{iv}	126.4 (3)	O3W—Eu2—O1^{iii}	73.3 (3)
O1—Eu1—O4^{iv}	75.4 (3)	O3W—Eu2—O2^{iii}	77.8 (3)
O1—Eu1—O5	80.6 (3)	O3W—Eu2—O4W	80.8 (3)
O1—Eu1—O6	93.1 (3)	O3W—Eu2—O7	128.6 (3)
O1—Eu1—O9^{i}	67.5 (2)	O3W—Eu2—O8	75.3 (3)
O1—Eu1—O10^{i}	118.1 (3)	O3W—Eu2—O9	79.3 (3)
O1W—Eu1—O1	78.7 (3)	O3W—Eu2—O11^{iv}	146.0 (3)
O1W—Eu1—O3^{iv}	147.2 (4)	O3W—Eu2—O12^{iv}	145.2 (3)
O1W—Eu1—O2W	81.0 (3)	O4W—Eu2—O1^{iii}	125.7 (3)
O1W—Eu1—O4^{iv}	144.8 (3)	O4W—Eu2—O2^{iii}	78.0 (3)
O1W—Eu1—O5	76.2 (3)	O4W—Eu2—O7	82.4 (3)
O1W—Eu1—O6	129.4 (3)	O4W—Eu2—O8	73.2 (3)
O1W—Eu1—O9^{i}	73.7 (3)	O4W—Eu2—O11^{iv}	80.5 (3)
O1W—Eu1—O10^{i}	78.0 (3)	O4W—Eu2—O12^{iv}	131.5 (3)
O3^{iv}—Eu1—O9^{i}	95.5 (3)	O7—Eu2—O1^{iii}	149.5 (3)

O2W—Eu1—O1	150.6 (3)	O7—Eu2—O2^{iii}	143.9 (3)
O2W—Eu1—O3^{iv}	81.1 (3)	O7—Eu2—O11^{iv}	76.4 (3)
O2W—Eu1—O4^{iv}	131.0 (3)	O7—Eu2—O12^{iv}	75.9 (3)
O2W—Eu1—O5	73.9 (3)	O8—Eu2—O1^{iii}	139.1 (3)
O2W—Eu1—O6	83.5 (4)	O8—Eu2—O2^{iii}	143.0 (3)
O2W—Eu1—O9^{i}	126.1 (3)	O8—Eu2—O7	53.3 (3)
O2W—Eu1—O10^{i}	77.7 (3)	O8—Eu2—O11^{iv}	125.1 (3)
O4^{iv}—Eu1—O3^{iv}	51.0 (3)	O8—Eu2—O12^{iv}	121.4 (3)
O4^{iv}—Eu1—O5	121.7 (3)	O9—Eu2—O1^{iii}	67.6 (2)
O4^{iv}—Eu1—O6	75.8 (4)	O9—Eu2—O2^{iii}	117.8 (3)
O4^{iv}—Eu1—O9^{i}	74.6 (3)	O9—Eu2—O7	93.6 (3)
O4^{iv}—Eu1—O10^{i}	93.6 (4)	O9—Eu2—O8	81.3 (3)
O5—Eu1—O3^{iv}	124.0 (3)	O9—Eu2—O11^{iv}	126.7 (3)
O5—Eu1—O9^{i}	139.5 (3)	O9—Eu2—O12^{iv}	74.1 (3)
O5—Eu1—O10^{i}	144.1 (3)	O11^{iv}—Eu2—C1^{iii}	82.0 (3)
O6—Eu1—O3^{iv}	75.1 (4)	O11^{iv}—Eu2—C10	99.9 (4)
O6—Eu1—O5	53.2 (3)	O11^{iv}—Eu2—C15^{iv}	26.5 (3)
O6—Eu1—O9^{i}	147.8 (3)	O11^{iv}—Eu2—O1^{iii}	95.3 (3)
O6—Eu1—O10^{i}	143.7 (4)	O12^{iv}—Eu2—O1^{iii}	75.9 (3)
O10^{i}—Eu1—O3^{iv}	71.5 (3)	O12^{iv}—Eu2—O2^{iii}	95.0 (4)
O10^{i}—Eu1—O9^{i}	51.1 (2)	O12^{iv}—Eu2—O11^{iv}	52.6 (3)
O2^{iii}—Eu2—O1^{iii}	50.6 (2)		

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

Table S21. Selected Hydrogen bonding geometries for CP **7.**

D	H	A	d(D-H)/Å	d(H-A)/Å	d(D-A)/Å	D-H-A/°
O1W	H1WA	O12[1]	0.86	1.98	2.678(12)	137.1
O1W	H1WB	O2[2]	0.86	2.04	2.693(12)	131.9
O2W	H2WB	O8[3]	0.89	1.77	2.619(12)	159.0
O3W	H3WA	O10[4]	0.85	1.87	2.678(12)	157.1
O4W	H4WB	O5[3]	0.89	1.80	2.645(12)	156.2

Symmetry code(s): [1]1/2-X,1-Y,1/2+Z; [2]1-X,-1/2+Y,3/2-Z; [3]1/2+X,1/2-Y,1-Z; [4]1-X,-1/2+Y,1/2-Z

Table S22. Selected Bond lenghts (Å) for CP **8**.

O1—Gd1	2.573 (9)	O7—Gd1	2.389 (11)
O1—Gd2	2.390 (11)	O7—Gd2	2.564 (10)
O2—Gd1	2.502 (10)	O8—Gd2	2.481 (13)
O1W—Gd1	2.392 (11)	O9—Gd1	2.426 (14)
O3—Gd2	2.460 (13)	O10—Gd1	2.453 (10)
O4—Gd2	2.516 (11)	O11—Gd2	2.450 (10)
O5—Gd1	2.430 (13)	O12—Gd2	2.465 (11)
O4W—Gd2	2.393 (12)	Gd1—O2W	2.371 (12)
O6—Gd1	2.496 (9)		

Symmetry code(s): (i) $x-1$, y, z.

Table S23. Selected Bond angles (°) for CP **8**.

O1—Gd2—O4	127.3 (4)	O1—Gd2—O3	75.3 (4)
O2—Gd1—O1	51.2 (3)	O1—Gd2—O4W	150.5 (4)
O1W—Gd1—O1	73.0 (4)	O1—Gd2—O7	67.3 (3)
O1W—Gd1—O2	77.0 (4)	O1—Gd2—O8	118.3 (4)
O1W—Gd1—O5	144.4 (4)	O1—Gd2—O11	92.9 (4)
O1W—Gd1—O6	145.9 (4)	O1—Gd2—O12	82.3 (4)
O1W—Gd1—O9	76.3 (5)	O3—Gd2—O4	52.0 (4)
O1W—Gd1—O10	129.6 (4)	O3—Gd2—O7	74.4 (4)
O5—Gd1—O1	75.1 (4)	O3—Gd2—O8	93.8 (5)
O5—Gd1—O2	94.9 (5)	O3—Gd2—O12	122.1 (4)
O5—Gd1—O6	52.9 (4)	O4—Gd2—O7	96.3 (4)
O5—Gd1—O10	76.4 (4)	O3W—Gd2—C5	156.5 (4)
O6—Gd1—O1	96.2 (3)	O3W—Gd2—O1	79.3 (4)
O6—Gd1—O2	71.4 (3)	O3W—Gd2—O3	145.0 (4)
O7—Gd1—O1	67.2 (3)	O3W—Gd2—O4	146.4 (5)
O7—Gd1—O2	117.9 (3)	O3W—Gd2—O4W	80.9 (4)
O7—Gd1—O1W	79.1 (4)	O3W—Gd2—O7	73.8 (4)
O7—Gd1—O5	74.4 (4)	O3W—Gd2—O8	77.5 (4)

O7—Gd1—O6	127.3 (4)	O3W—Gd2—O11	130.4 (4)
O7—Gd1—O9	82.1 (4)	O3W—Gd2—O12	76.9 (4)
O7—Gd1—O10	94.6 (4)	O4W—Gd2—O3	130.9 (4)
O9—Gd1—O1	139.8 (4)	O4W—Gd2—O4	80.0 (5)
O9—Gd1—O2	142.4 (5)	O4W—Gd2—O7	126.8 (4)
O9—Gd1—O5	122.1 (4)	O4W—Gd2—O8	77.9 (5)
O9—Gd1—O6	123.6 (4)	O4W—Gd2—O11	83.5 (4)
O9—Gd1—O10	53.4 (4)	O4W—Gd2—O12	72.0 (4)
O10—Gd1—O1	149.4 (4)	O8—Gd2—O4	71.6 (4)
O10—Gd1—O2	143.0 (4)	O8—Gd2—O7	51.5 (4)
O10—Gd1—O6	75.0 (4)	O11—Gd2—O3	75.0 (4)
O2W—Gd1—O1	126.2 (4)	O11—Gd2—O4	74.2 (4)
O2W—Gd1—O2	77.4 (4)	O11—Gd2—O7	146.9 (4)
O2W—Gd1—O1W	81.9 (4)	O11—Gd2—O8	143.3 (4)
O2W—Gd1—O5	130.7 (4)	O11—Gd2—O12	53.5 (4)
O2W—Gd1—O6	79.0 (4)	O12—Gd2—O4	122.2 (4)
O2W—Gd1—O7	151.7 (4)	O12—Gd2—O7	140.8 (4)
O2W—Gd1—O9	73.1 (4)	O12—Gd2—O8	143.0 (5)
O2W—Gd1—O10	81.6 (5)		

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

Table S24. Selected Hydrogen bonding geometries for CP **8**.

D	H	A	d(D-H)/Å	d(H-A)/Å	d(D-A)/Å	D-H-A/°
O1W	H1WA	O8[1]	0.86	1.85	2.67(2)	158.4
O1W	H1WB	O3	0.86	2.07	2.688(17)	128.4
O2W	H2WA	O4[1]	0.91	2.19	2.849(19)	128.3

Symmetry code(s): [1]1-X,1/2+Y,1/2-Z

Table S25. Continuous shape measures analysis of lanthanide coordination spheres in compounds **1-8**. Lowest CShM values are highlighted in orange.

Entry	Continuous shape measure (S)												
	EP	**OPY**	**HBPY**	**JTC**	**JCCU**	**CCU**	**JCSAPR**	**CSAPR**	**JTCTPR**	**TCTPR**	**JTDIC**	**HH**	**MFF**
Ideal polyhedra	0	0	0	0	0	0	0	0	0	0	0	0	0
1, **Sm**	32.74	22.41	15.99	13.30	8.243	7.486	3.279	2.745	3.943	3.537	10.53	8.604	2.642
2, **Tb**	32.56	22.45	16.07	13.23	8.017	7.423	3.092	2.708	3.687	3.459	10.60	8.795	2.644
3, **Eu**	32.68	22.48	16.04	13.20	8.182	7.459	3.263	2.762	3.882	3.528	10.49	8.625	2.656
4, **Gd**	32.72	22.53	16.01	13.16	8.13	7.435	3.211	2.737	3.805	3.451	10.47	8.720	2.638
5, **Dy1**	33.72	23.33	17.38	15.22	9.874	8.092	3.870	3.259	4.598	3.995	12.18	6.223	2.415
5, **Dy2**	33.57	19.39	16.91	14.07	10.50	8.718	2.804	2.095	3.956	2.916	10.69	9.149	2.304
6, **Pr1**	33.58	19.40	16.96	14.04	10.52	8.744	2.805	2.091	3.949	2.906	10.63	9.186	2.320
6, **Pr2**	33.79	23.37	17.33	15.20	9.868	8.093	3.864	3.267	4.595	3.996	12.19	6.210	2.409
7, **Eu1**	33.66	22.40	18.21	14.68	10.84	9.224	3.045	2.007	4.231	3.175	11.60	9.385	1.986
7, **Eu2**	33.59	22.68	18.00	14.69	10.67	9.011	3.073	1.957	4.387	2.946	11.02	9.263	1.919
8, **Gd1**	33.51	22.72	18.13	14.87	10.52	8.869	3.080	1.917	4.281	2.976	11.17	9.255	1.867
8, **Gd2**	33.69	22.59	18.61	14.76	10.95	9.369	2.887	1.915	4.133	2.990	11.37	9.487	1.986

Abbreviations: **EP**-Enneagon, **OPY**-Octagonal pyramid, **HBPY**-Heptagonal bipyramid, **JTC**-Johnson triangular cupola J3, **JCCU**-Capped cube J8, **CCU**-Spherical-relaxed capped cube, **JCSAPR**-Capped square antiprism J10, **CSAPR**-Spherical capped square antiprism, **JCSAPR**-Capped square antiprism J10, **JTCTPR**-Tricapped trigonal prism J51, **TCTPR**-Spherical tricapped trigonal prism, **JTDIC**- Tridiminished icosahedron J63, **HH**-Hula-hoop, **MFF**-Muffin.