wwPDB EM Validation Summary Report (i)

Jul 2, 2026 – 01:57 pm BST

PDB ID	:	9S6P / pdb_00009s6p
EMDB ID	:	EMD-54627
Title	:	Local refinement of a PSI monomer of A. marina NIES-2412
Authors	:	Consoli, G.; Leong, H.F.
Deposited on	:	2025-08-01
Resolution	:	2.44 Å(reported)

This is a wwPDB EM Validation Summary Report for a publicly released PDB entry.

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/EMValidationReportHelp
with specific help available everywhere you see the (i) symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

The following versions of software and data (see references (i)) were used in the production of this report:

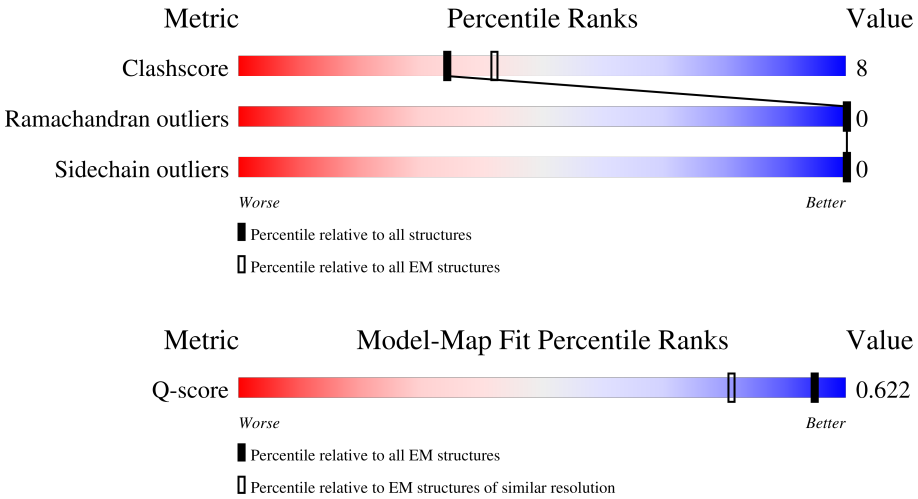
EMDB validation analysis	:	0.0.1.dev133
Mogul	:	1.8.4, CSD as541be (2020)
MolProbity	:	4-5-2 with Phenix2.0
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics	:	202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.50

1 Overall quality at a glance

The following experimental techniques were used to determine the structure:
ELECTRON MICROSCOPY

The reported resolution of this entry is 2.44 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	5856 (1.94 - 2.94)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion < 40%). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	B	733	85% 14%
2	D	139	88% 10%
3	E	86	72% 7% 21%
4	I	34	6% 74% 24%

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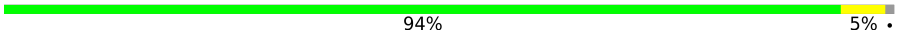
Mol	Chain	Length	Quality of chain
5	J	47	
6	K	86	
7	L	153	
8	M	31	
9	X	27	
10	A	753	
11	C	81	
12	F	167	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
13	CL7	A	1012	X	-	-	-
13	CL7	A	1101	X	-	-	-
13	CL7	A	1102	X	-	-	-
13	CL7	A	1103	X	-	-	-
13	CL7	A	1104	X	-	-	-
13	CL7	A	1105	X	-	-	-
13	CL7	A	1106	X	-	-	-
13	CL7	A	1107	X	-	-	-
13	CL7	A	1108	X	-	-	-
13	CL7	A	1109	X	-	-	-
13	CL7	A	1110	X	-	-	-
13	CL7	A	1111	X	-	-	-
13	CL7	A	1112	X	-	-	-
13	CL7	A	1113	X	-	-	-
13	CL7	A	1114	X	-	-	-
13	CL7	A	1115	X	-	-	-
13	CL7	A	1116	X	-	-	-
13	CL7	A	1117	X	-	-	-
13	CL7	A	1118	X	-	-	-
13	CL7	A	1119	X	-	-	-
13	CL7	A	1120	X	-	-	-
13	CL7	A	1121	X	-	-	-
13	CL7	A	1122	X	-	-	-

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Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
13	CL7	A	1123	X	-	-	-
13	CL7	A	1124	X	-	-	-
13	CL7	A	1125	X	-	-	-
13	CL7	A	1126	X	-	-	-
13	CL7	A	1127	X	-	-	-
13	CL7	A	1128	X	-	-	-
13	CL7	A	1129	X	-	-	-
13	CL7	A	1130	X	-	-	-
13	CL7	A	1131	X	-	-	-
13	CL7	A	1132	X	-	-	-
13	CL7	A	1133	X	-	-	-
13	CL7	A	1134	X	-	-	-
13	CL7	A	1135	X	-	-	-
13	CL7	A	1136	X	-	-	-
13	CL7	A	1137	X	-	-	-
13	CL7	A	1138	X	-	-	-
13	CL7	A	1139	X	-	-	-
13	CL7	A	1140	X	-	-	-
13	CL7	A	1141	X	-	-	-
13	CL7	B	1021	X	-	-	-
13	CL7	B	1022	X	-	-	-
13	CL7	B	1201	X	-	-	-
13	CL7	B	1202	X	-	-	-
13	CL7	B	1203	X	-	-	-
13	CL7	B	1204	X	-	-	-
13	CL7	B	1205	X	-	-	-
13	CL7	B	1206	X	-	-	-
13	CL7	B	1207	X	-	-	-
13	CL7	B	1208	X	-	-	-
13	CL7	B	1209	X	-	-	-
13	CL7	B	1210	X	-	-	-
13	CL7	B	1211	X	-	-	-
13	CL7	B	1212	X	-	-	-
13	CL7	B	1213	X	-	-	-
13	CL7	B	1214	X	-	-	-
13	CL7	B	1215	X	-	-	-
13	CL7	B	1216	X	-	-	-
13	CL7	B	1217	X	-	-	-
13	CL7	B	1218	X	-	-	-
13	CL7	B	1219	X	-	-	-
13	CL7	B	1220	X	-	-	-
13	CL7	B	1221	X	-	-	-

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Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
13	CL7	B	1222	X	-	-	-
13	CL7	B	1223	X	-	-	-
13	CL7	B	1224	X	-	-	-
13	CL7	B	1225	X	-	-	-
13	CL7	B	1226	X	-	-	-
13	CL7	B	1227	X	-	-	-
13	CL7	B	1228	X	-	-	-
13	CL7	B	1229	X	-	-	-
13	CL7	B	1230	X	-	-	-
13	CL7	B	1231	X	-	-	-
13	CL7	B	1232	X	-	-	-
13	CL7	B	1233	X	-	-	-
13	CL7	B	1234	X	-	-	-
13	CL7	B	1235	X	-	-	-
13	CL7	B	1236	X	-	-	-
13	CL7	B	1237	X	-	-	-
13	CL7	B	1238	X	-	-	-
13	CL7	B	1239	X	-	-	-
13	CL7	B	1241	X	-	-	-
13	CL7	F	1701	X	-	-	-
13	CL7	I	1601	X	-	-	-
13	CL7	J	1301	X	-	-	-
13	CL7	J	1302	X	-	-	-
13	CL7	K	1401	X	-	-	-
13	CL7	K	1402	X	-	-	-
13	CL7	L	1501	X	-	-	-
13	CL7	L	1502	X	-	-	-
13	CL7	L	1503	X	-	-	-
20	G9R	A	1011	X	-	-	-

2 Entry composition (i)

There are 21 unique types of molecules in this entry. The entry contains 23856 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called Photosystem I P700 chlorophyll a apoprotein A2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	B	730	5809	3819	965	1004	21	0	0

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	122	HIS	GLN	conflict	UNP A0AAT9GV97
B	240	THR	ALA	conflict	UNP A0AAT9GV97
B	247	SER	GLY	conflict	UNP A0AAT9GV97
B	258	VAL	MET	conflict	UNP A0AAT9GV97
B	318	GLU	GLN	conflict	UNP A0AAT9GV97
B	484	ALA	SER	conflict	UNP A0AAT9GV97
B	505	SER	ALA	conflict	UNP A0AAT9GV97
B	506	SER	ASN	conflict	UNP A0AAT9GV97

- Molecule 2 is a protein called Photosystem I reaction center subunit II.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	D	136	1039	653	180	202	4	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	76	ILE	THR	conflict	UNP A0AAT9GVK4
D	136	GLN	LYS	conflict	UNP A0AAT9GVK4

- Molecule 3 is a protein called Photosystem I reaction center subunit IV.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	E	68	535	337	95	102	1	0	0

There are 7 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
E	29	LYS	GLN	conflict	UNP A0AAT9GVJ0
E	73	ALA	GLY	conflict	UNP A0AAT9GVJ0
E	74	LYS	GLY	conflict	UNP A0AAT9GVJ0
E	75	ALA	LYS	conflict	UNP A0AAT9GVJ0
E	?	-	PRO	deletion	UNP A0AAT9GVJ0
E	?	-	ALA	deletion	UNP A0AAT9GVJ0
E	?	-	ALA	deletion	UNP A0AAT9GVJ0

- Molecule 4 is a protein called Psa27 protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	I	33	Total	C	N	O	S	0	0
			250	167	36	44	3		

- Molecule 5 is a protein called Photosystem I reaction center subunit IX.

Mol	Chain	Residues	Atoms				AltConf	Trace
5	J	35	Total	C	N	O	0	0
			291	207	40	44		

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
J	2	PRO	LEU	conflict	UNP B0C7S6
J	3	GLN	LYS	conflict	UNP B0C7S6
J	9	GLY	ASP	conflict	UNP B0C7S6
J	22	PHE	LEU	conflict	UNP B0C7S6

- Molecule 6 is a protein called Photosystem I reaction center subunit PsaK.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	K	63	Total	C	N	O	S	0	0
			459	304	73	79	3		

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
K	19	THR	ALA	conflict	UNP A0AAT9GVI7
K	30	MET	LEU	conflict	UNP A0AAT9GVI7
K	52	SER	ASN	conflict	UNP A0AAT9GVI7

- Molecule 7 is a protein called PsaL.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	L	146	Total	C	N	O	S	0	0
			1040	665	174	194	7		

- Molecule 8 is a protein called PsaM.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	M	31	Total	C	N	O	S	0	0
			223	148	34	40	1		

- Molecule 9 is a protein called PsaX2.

Mol	Chain	Residues	Atoms				AltConf	Trace
9	X	27	Total	C	N	O	0	0
			211	146	33	32		

- Molecule 10 is a protein called Photosystem I P700 chlorophyll a apoprotein A1.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	A	737	Total	C	N	O	S	0	0
			5797	3785	989	991	32		

There are 5 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	3	ASN	THR	conflict	UNP A0AAT9GVI9
A	367	CYS	VAL	conflict	UNP A0AAT9GVI9
A	516	MET	LEU	conflict	UNP A0AAT9GVI9
A	569	SER	ASN	conflict	UNP A0AAT9GVI9
A	622	THR	SER	conflict	UNP A0AAT9GVI9

- Molecule 11 is a protein called Photosystem I iron-sulfur center.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	C	80	Total	C	N	O	S	0	0
			599	367	103	118	11		

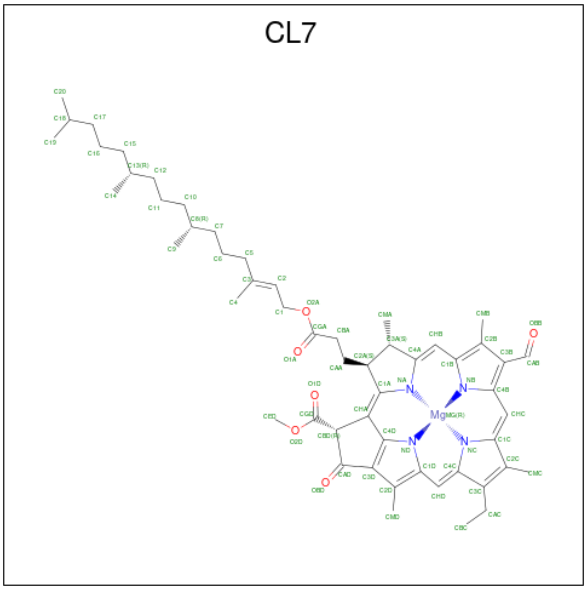
- Molecule 12 is a protein called Photosystem I reaction center subunit III.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	F	144	Total	C	N	O	S	0	0
			1067	672	189	202	4		

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
F	9	VAL	LEU	conflict	UNP A0AAT9GVR1
F	11	LEU	MET	conflict	UNP A0AAT9GVR1
F	36	GLN	LYS	conflict	UNP A0AAT9GVR1
F	52	GLU	ASN	conflict	UNP A0AAT9GVR1
F	55	ARG	GLN	conflict	UNP A0AAT9GVR1
F	68	ALA	PRO	conflict	UNP A0AAT9GVR1
F	69	ASP	GLU	conflict	UNP A0AAT9GVR1
F	144	LEU	VAL	conflict	UNP A0AAT9GVR1

- Molecule 13 is CHLOROPHYLL D (CCD ID: CL7) (formula: $C_{54}H_{70}MgN_4O_6$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					AltConf
13	B	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	B	1	Total	C	Mg	N	O	0
			54	43	1	4	6	
13	B	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	B	1	Total	C	Mg	N	O	0
			65	54	1	4	6	

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Mol	Chain	Residues	Atoms					AltConf
13	B	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	B	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	B	1	Total	C	Mg	N	O	0
			50	39	1	4	6	
13	B	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	B	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	B	1	Total	C	Mg	N	O	0
			45	34	1	4	6	
13	B	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	B	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	B	1	Total	C	Mg	N	O	0
			45	34	1	4	6	
13	B	1	Total	C	Mg	N	O	0
			45	34	1	4	6	
13	B	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	B	1	Total	C	Mg	N	O	0
			55	44	1	4	6	
13	B	1	Total	C	Mg	N	O	0
			55	44	1	4	6	
13	B	1	Total	C	Mg	N	O	0
			41	32	1	4	4	
13	B	1	Total	C	Mg	N	O	0
			41	32	1	4	4	
13	B	1	Total	C	Mg	N	O	0
			41	32	1	4	4	
13	B	1	Total	C	Mg	N	O	0
			45	34	1	4	6	
13	B	1	Total	C	Mg	N	O	0
			60	49	1	4	6	
13	B	1	Total	C	Mg	N	O	0
			50	39	1	4	6	
13	B	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	B	1	Total	C	Mg	N	O	0
			56	45	1	4	6	

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Mol	Chain	Residues	Atoms					AltConf
13	B	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	B	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	B	1	Total	C	Mg	N	O	0
			60	49	1	4	6	
13	B	1	Total	C	Mg	N	O	0
			45	34	1	4	6	
13	B	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	B	1	Total	C	Mg	N	O	0
			41	32	1	4	4	
13	B	1	Total	C	Mg	N	O	0
			60	49	1	4	6	
13	B	1	Total	C	Mg	N	O	0
			41	32	1	4	4	
13	B	1	Total	C	Mg	N	O	0
			41	32	1	4	4	
13	B	1	Total	C	Mg	N	O	0
			50	39	1	4	6	
13	B	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	B	1	Total	C	Mg	N	O	0
			45	34	1	4	6	
13	B	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	B	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	B	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	B	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	B	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	I	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	J	1	Total	C	Mg	N	O	0
			41	32	1	4	4	
13	J	1	Total	C	Mg	N	O	0
			42	33	1	4	4	
13	K	1	Total	C	Mg	N	O	0
			45	34	1	4	6	

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Mol	Chain	Residues	Atoms					AltConf
13	K	1	Total	C	Mg	N	O	0
			37	30	1	4	2	
13	L	1	Total	C	Mg	N	O	0
			60	49	1	4	6	
13	L	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	L	1	Total	C	Mg	N	O	0
			42	33	1	4	4	
13	A	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	A	1	Total	C	Mg	N	O	0
			41	32	1	4	4	
13	A	1	Total	C	Mg	N	O	0
			52	41	1	4	6	
13	A	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	A	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	A	1	Total	C	Mg	N	O	0
			45	34	1	4	6	
13	A	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	A	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	A	1	Total	C	Mg	N	O	0
			51	40	1	4	6	
13	A	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	A	1	Total	C	Mg	N	O	0
			45	34	1	4	6	
13	A	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	A	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	A	1	Total	C	Mg	N	O	0
			45	34	1	4	6	
13	A	1	Total	C	Mg	N	O	0
			45	34	1	4	6	
13	A	1	Total	C	Mg	N	O	0
			41	32	1	4	4	
13	A	1	Total	C	Mg	N	O	0
			65	54	1	4	6	

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Mol	Chain	Residues	Atoms					AltConf
13	A	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	A	1	Total	C	Mg	N	O	0
			55	44	1	4	6	
13	A	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	A	1	Total	C	Mg	N	O	0
			45	34	1	4	6	
13	A	1	Total	C	Mg	N	O	0
			55	44	1	4	6	
13	A	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	A	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	A	1	Total	C	Mg	N	O	0
			57	46	1	4	6	
13	A	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	A	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	A	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	A	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	A	1	Total	C	Mg	N	O	0
			50	39	1	4	6	
13	A	1	Total	C	Mg	N	O	0
			51	40	1	4	6	
13	A	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	A	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	A	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	A	1	Total	C	Mg	N	O	0
			44	33	1	4	6	
13	A	1	Total	C	Mg	N	O	0
			50	39	1	4	6	
13	A	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	A	1	Total	C	Mg	N	O	0
			55	44	1	4	6	

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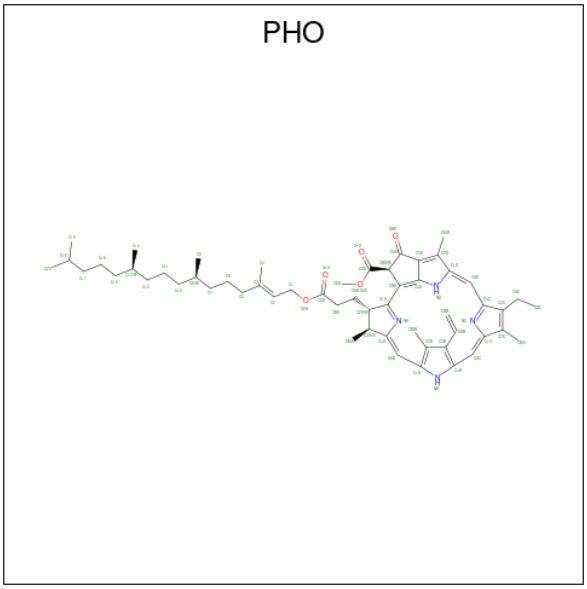
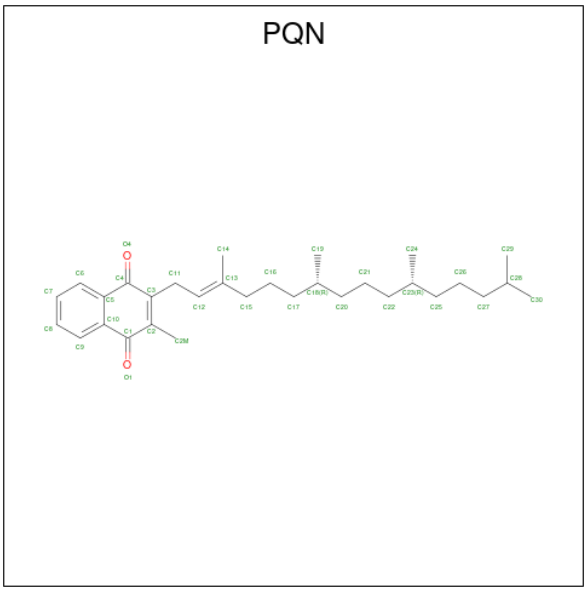
Mol	Chain	Residues	Atoms					AltConf
13	A	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	A	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	A	1	Total	C	Mg	N	O	0
			41	32	1	4	4	
13	A	1	Total	C	Mg	N	O	0
			65	54	1	4	6	
13	F	1	Total	C	Mg	N	O	0
			41	32	1	4	4	

- Molecule 14 is PHEOPHYTIN A (CCD ID: PHO) (formula: $C_{55}H_{74}N_4O_5$).



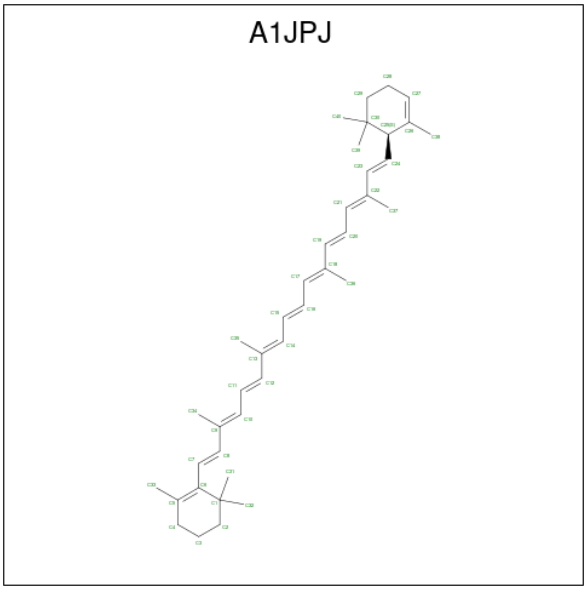
Mol	Chain	Residues	Atoms				AltConf
14	B	1	Total	C	N	O	0
			64	55	4	5	
14	A	1	Total	C	N	O	0
			64	55	4	5	

- Molecule 15 is PHYLLOQUINONE (CCD ID: PQN) (formula: $C_{31}H_{46}O_2$).



Mol	Chain	Residues	Atoms	AltConf
15	B	1	Total C O 33 31 2	0
15	A	1	Total C O 33 31 2	0

- Molecule 16 is (6'S)-beta,epsilon-carotene (CCD ID: A1JPJ) (formula: $C_{40}H_{56}$).



Mol	Chain	Residues	Atoms	AltConf
16	B	1	Total C 40 40	0
16	B	1	Total C 40 40	0

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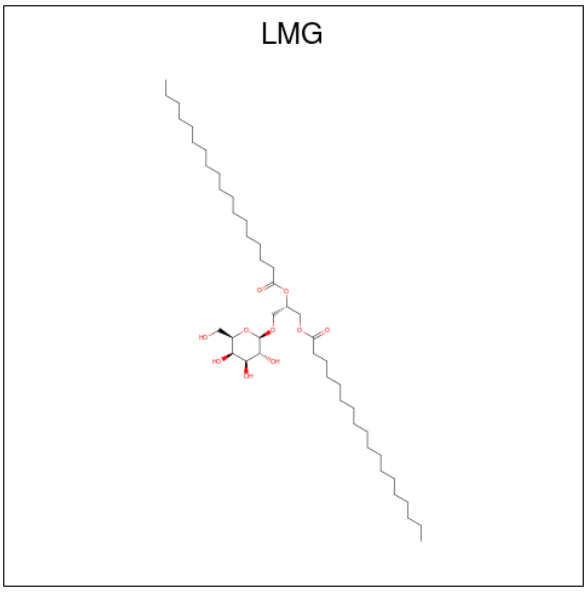
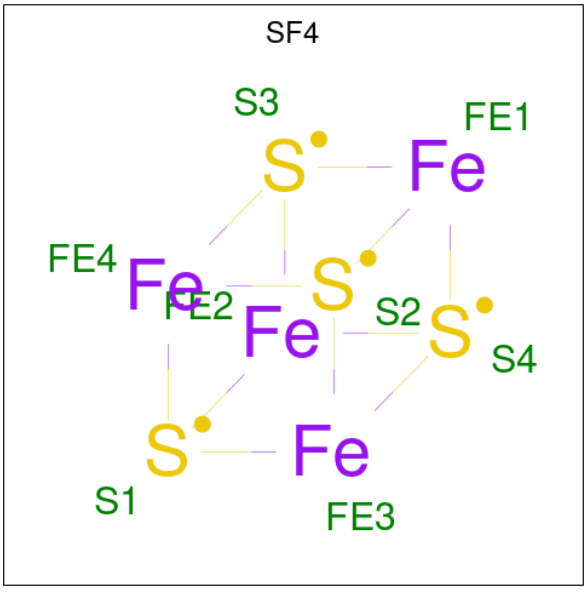
Mol	Chain	Residues	Atoms	AltConf
16	B	1	Total C 40 40	0
16	B	1	Total C 40 40	0
16	B	1	Total C 40 40	0
16	B	1	Total C 40 40	0
16	B	1	Total C 40 40	0
16	B	1	Total C 40 40	0
16	I	1	Total C 40 40	0
16	J	1	Total C 40 40	0
16	J	1	Total C 40 40	0
16	L	1	Total C 40 40	0
16	L	1	Total C 40 40	0
16	L	1	Total C 40 40	0
16	A	1	Total C 40 40	0
16	A	1	Total C 40 40	0
16	A	1	Total C 40 40	0
16	A	1	Total C 40 40	0
16	A	1	Total C 40 40	0
16	A	1	Total C 40 40	0
16	F	1	Total C 40 40	0

- Molecule 17 is 1,2-DISTEAROYL-MONOGALACTOSYL-DIGLYCERIDE (CCD ID: LMG) (formula: $C_{45}H_{86}O_{10}$).



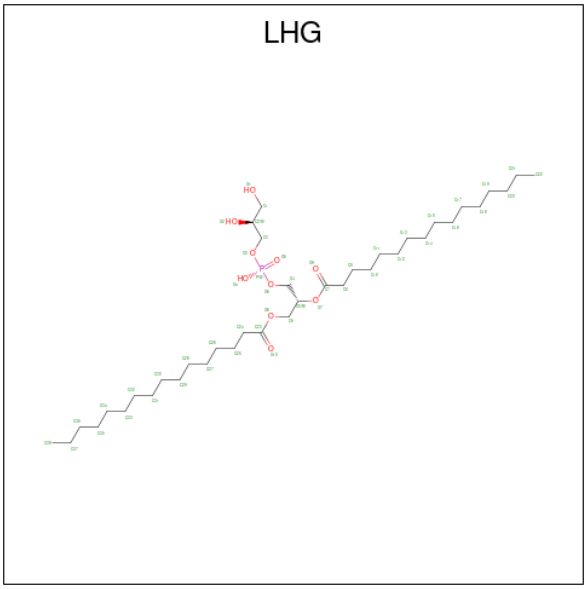
Mol	Chain	Residues	Atoms	AltConf
17	B	1	Total C O 55 45 10	0

- Molecule 18 is IRON/SULFUR CLUSTER (CCD ID: SF4) (formula: Fe_4S_4).



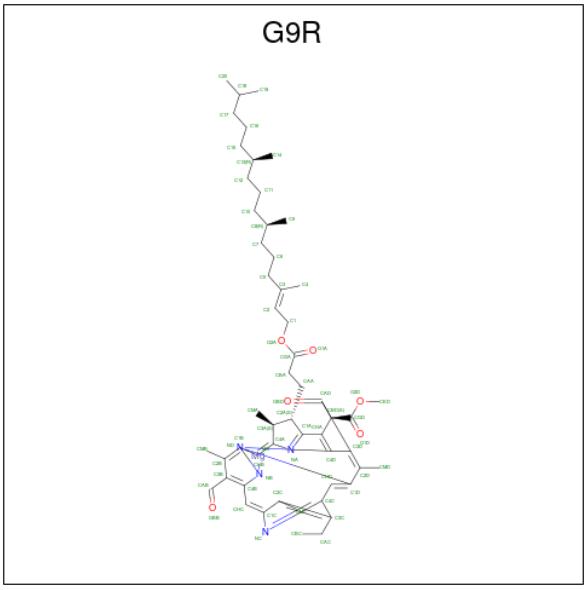
Mol	Chain	Residues	Atoms	AltConf
18	B	1	Total Fe S 8 4 4	0
18	C	1	Total Fe S 8 4 4	0
18	C	1	Total Fe S 8 4 4	0

- Molecule 19 is 1,2-DIPALMITOYL-PHOSPHATIDYL-GLYCEROLE (CCD ID: LHG) (formula: $C_{38}H_{75}O_{10}P$).



Mol	Chain	Residues	Atoms				AltConf
19	A	1	Total	C	O	P	0
			49	38	10	1	
19	A	1	Total	C	O	P	0
			38	27	10	1	

- Molecule 20 is CHLOROPHYLL D ISOMER (CCD ID: G9R) (formula: $C_{54}H_{70}MgN_4O_6$).



Mol	Chain	Residues	Atoms					AltConf
20	A	1	Total	C	Mg	N	O	0
			65	54	1	4	6	

- Molecule 21 is water.

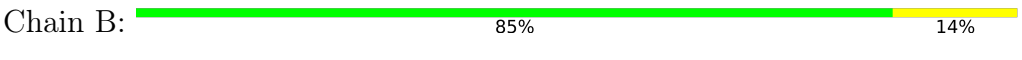
Mol	Chain	Residues	Atoms		AltConf
21	B	11	Total	O	0
			11	11	
21	B	1	Total	O	0
			1	1	
21	B	2	Total	O	0
			2	2	
21	I	2	Total	O	0
			2	2	
21	J	1	Total	O	0
			1	1	
21	L	2	Total	O	0
			2	2	
21	A	1	Total	O	0
			1	1	
21	A	18	Total	O	0
			18	18	
21	A	1	Total	O	0
			1	1	

3 Residue-property plots (i)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

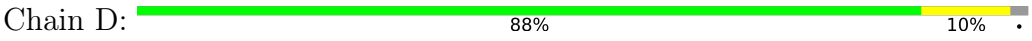
• Molecule 1: Photosystem I P700 chlorophyll a apoprotein A2

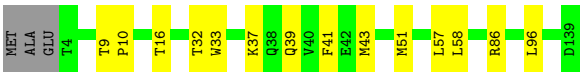
Chain B:



• Molecule 2: Photosystem I reaction center subunit II

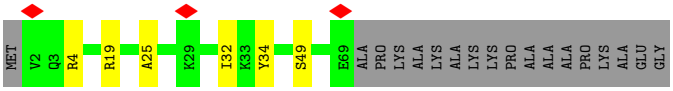
Chain D:





• Molecule 3: Photosystem I reaction center subunit IV

Chain E:

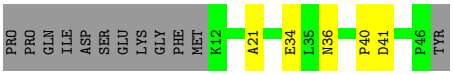


• Molecule 4: Psa27 protein

Chain I:

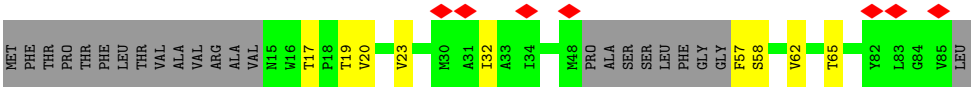
• Molecule 5: Photosystem I reaction center subunit IX

Chain J:



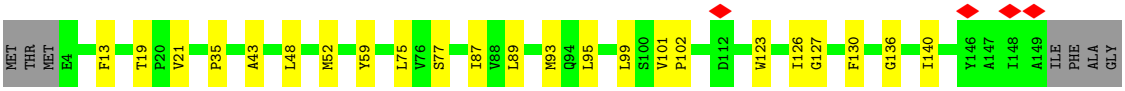
• Molecule 6: Photosystem I reaction center subunit PsaK

Chain K:



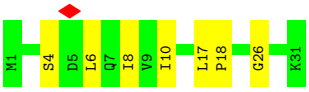
• Molecule 7: PsaL

Chain L:



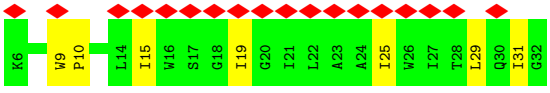
• Molecule 8: PsaM

Chain M:



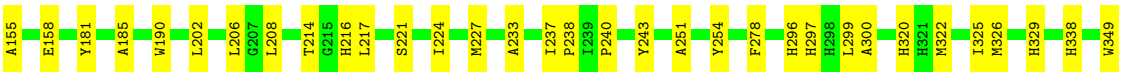
• Molecule 9: PsaX2

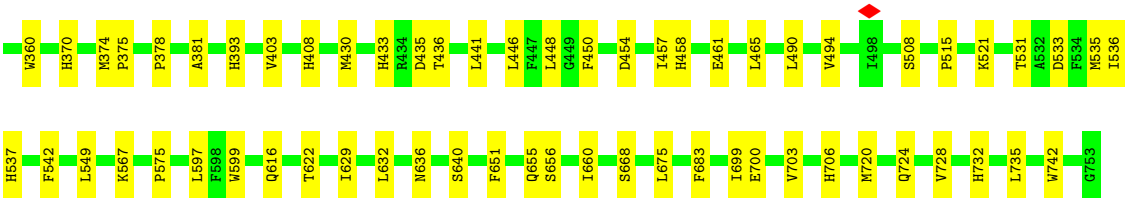
Chain X:



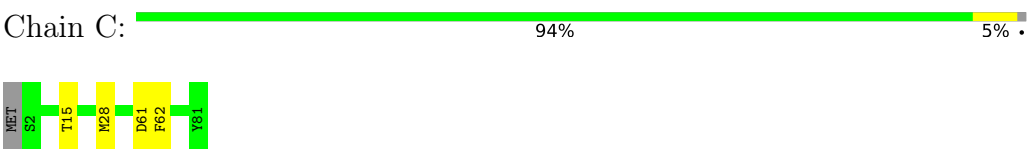
• Molecule 10: Photosystem I P700 chlorophyll a apoprotein A1

Chain A:

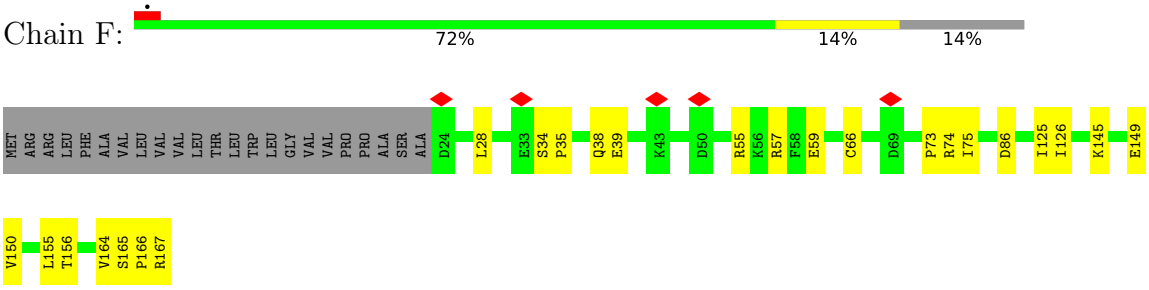




• Molecule 11: Photosystem I iron-sulfur center



• Molecule 12: Photosystem I reaction center subunit III



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	151833	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	50	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	1.634	Depositor
Minimum map value	-0.505	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.018	Depositor
Recommended contour level	0.2	Depositor
Map size (Å)	634.8, 634.8, 634.8	wwPDB
Map dimensions	600, 600, 600	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.058, 1.058, 1.058	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: G9R, LHG, SF4, PHO, PQN, CL7, A1JPJ, LMG

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\#\|Z\| > 5$	RMSZ	$\#\|Z\| > 5$
1	B	0.18	0/6025	0.33	0/8244
2	D	0.18	0/1058	0.32	0/1428
3	E	0.12	0/545	0.32	0/737
4	I	0.16	0/255	0.32	0/346
5	J	0.12	0/303	0.30	0/412
6	K	0.14	0/469	0.34	0/640
7	L	0.17	0/1064	0.34	0/1448
8	M	0.16	0/223	0.29	0/304
9	X	0.17	0/219	0.34	0/303
10	A	0.18	0/5993	0.31	0/8165
11	C	0.18	0/609	0.33	0/825
12	F	0.14	0/1089	0.33	0/1478
All	All	0.17	0/17852	0.32	0/24330

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	B	5809	0	5541	87	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	D	1039	0	1043	10	0
3	E	535	0	524	4	0
4	I	250	0	260	6	0
5	J	291	0	289	4	0
6	K	459	0	470	6	0
7	L	1040	0	1047	17	0
8	M	223	0	259	4	0
9	X	211	0	225	4	0
10	A	5797	0	5623	91	0
11	C	599	0	577	2	0
12	F	1067	0	1076	19	0
13	A	2428	0	2328	106	0
13	B	2366	0	2219	95	0
13	F	41	0	27	0	0
13	I	65	0	70	2	0
13	J	83	0	55	4	0
13	K	82	0	54	0	0
13	L	167	0	156	4	0
14	A	64	0	74	3	0
14	B	64	0	74	10	0
15	A	33	0	46	0	0
15	B	33	0	46	0	0
16	A	240	0	0	0	0
16	B	320	0	0	1	0
16	F	40	0	0	0	0
16	I	40	0	0	0	0
16	J	80	0	0	1	0
16	L	120	0	0	0	0
17	B	55	0	86	3	0
18	B	8	0	0	0	0
18	C	16	0	0	0	0
19	A	87	0	123	3	0
20	A	65	0	0	0	0
21	A	20	0	0	0	0
21	B	14	0	0	0	0
21	I	2	0	0	0	0
21	J	1	0	0	0	0
21	L	2	0	0	0	0
All	All	23856	0	22292	371	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 8.

The worst 5 of 371 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:412:HIS:NE2	13:B:1227:CL7:ND	2.34	0.75
10:A:278:PHE:HD1	13:A:1116:CL7:HMB2	1.54	0.72
1:B:257:PHE:HE2	1:B:494:TRP:HE3	1.39	0.70
2:D:39:GLN:HG3	2:D:51:MET:HE3	1.74	0.70
14:B:1023:PHO:HED3	14:B:1023:PHO:HBA2	1.75	0.68

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	B	728/733 (99%)	710 (98%)	18 (2%)	0	100	100
2	D	134/139 (96%)	128 (96%)	6 (4%)	0	100	100
3	E	66/86 (77%)	63 (96%)	3 (4%)	0	100	100
4	I	31/34 (91%)	30 (97%)	1 (3%)	0	100	100
5	J	33/47 (70%)	31 (94%)	2 (6%)	0	100	100
6	K	59/86 (69%)	57 (97%)	2 (3%)	0	100	100
7	L	144/153 (94%)	140 (97%)	4 (3%)	0	100	100
8	M	29/31 (94%)	29 (100%)	0	0	100	100
9	X	25/27 (93%)	23 (92%)	2 (8%)	0	100	100
10	A	735/753 (98%)	719 (98%)	16 (2%)	0	100	100
11	C	78/81 (96%)	73 (94%)	5 (6%)	0	100	100
12	F	142/167 (85%)	137 (96%)	5 (4%)	0	100	100
All	All	2204/2337 (94%)	2140 (97%)	64 (3%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains (i)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	B	592/593 (100%)	592 (100%)	0	100	100
2	D	110/112 (98%)	110 (100%)	0	100	100
3	E	58/68 (85%)	58 (100%)	0	100	100
4	I	26/26 (100%)	26 (100%)	0	100	100
5	J	31/42 (74%)	31 (100%)	0	100	100
6	K	47/65 (72%)	47 (100%)	0	100	100
7	L	108/113 (96%)	108 (100%)	0	100	100
8	M	25/25 (100%)	25 (100%)	0	100	100
9	X	22/22 (100%)	22 (100%)	0	100	100
10	A	590/602 (98%)	590 (100%)	0	100	100
11	C	68/69 (99%)	68 (100%)	0	100	100
12	F	112/131 (86%)	112 (100%)	0	100	100
All	All	1789/1868 (96%)	1789 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 21 such sidechains are listed below:

Mol	Chain	Res	Type
10	A	458	HIS
10	A	616	GLN
12	F	109	GLN
10	A	724	GLN
10	A	525	GLN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains (i)

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

125 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
13	CL7	A	1103	10	71,73,73	1.32	12 (16%)	80,113,113	1.29	8 (10%)
13	CL7	B	1234	1	56,58,73	1.49	11 (19%)	62,95,113	1.41	8 (12%)
13	CL7	B	1213	1	51,53,73	1.55	10 (19%)	56,89,113	1.43	6 (10%)
13	CL7	B	1238	21	71,73,73	1.31	11 (15%)	80,113,113	1.28	8 (10%)
16	A1JPJ	A	4014	-	40,41,41	1.65	8 (20%)	50,56,56	1.54	8 (16%)
13	CL7	A	1104	10	71,73,73	1.32	12 (16%)	80,113,113	1.23	5 (6%)
13	CL7	B	1210	1	71,73,73	1.33	11 (15%)	80,113,113	1.23	6 (7%)
13	CL7	B	1216	-	61,63,73	1.44	11 (18%)	68,101,113	1.32	8 (11%)
13	CL7	A	1115	10	47,49,73	1.58	12 (25%)	51,84,113	1.49	6 (11%)
13	CL7	B	1022	1	71,73,73	1.31	10 (14%)	80,113,113	1.15	5 (6%)
13	CL7	B	1236	1	51,53,73	1.57	11 (21%)	56,89,113	1.37	6 (10%)
13	CL7	B	1223	1	71,73,73	1.33	12 (16%)	80,113,113	1.21	7 (8%)
13	CL7	L	1502	7	71,73,73	1.30	11 (15%)	80,113,113	1.30	9 (11%)
13	CL7	A	1137	10	61,63,73	1.43	11 (18%)	68,101,113	1.29	7 (10%)
13	CL7	A	1102	10,13	58,60,73	1.47	11 (18%)	64,97,113	1.39	7 (10%)
13	CL7	A	1126	10	71,73,73	1.32	11 (15%)	80,113,113	1.20	5 (6%)
16	A1JPJ	A	4001	-	40,41,41	1.70	8 (20%)	50,56,56	1.81	13 (26%)
16	A1JPJ	B	4004	-	40,41,41	1.68	8 (20%)	50,56,56	1.65	11 (22%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
15	PQN	A	2001	-	34,34,34	0.36	0	42,45,45	0.59	1 (2%)
13	CL7	B	1220	-	51,53,73	1.56	10 (19%)	56,89,113	1.39	5 (8%)
13	CL7	A	1131	10	71,73,73	1.33	11 (15%)	80,113,113	1.21	6 (7%)
19	LHG	A	852	-	48,48,48	0.51	0	51,54,54	0.52	0
13	CL7	B	1201	1	60,62,73	1.44	12 (20%)	66,99,113	1.33	6 (9%)
13	CL7	B	1206	1	56,58,73	1.48	11 (19%)	62,95,113	1.38	8 (12%)
13	CL7	B	1214	1	71,73,73	1.33	11 (15%)	80,113,113	1.28	8 (10%)
13	CL7	A	1134	10	49,52,73	1.57	11 (22%)	56,87,113	1.46	6 (10%)
16	A1JPJ	A	4008	-	40,41,41	1.68	8 (20%)	50,56,56	1.63	10 (20%)
13	CL7	I	1601	21	71,73,73	1.34	11 (15%)	80,113,113	1.25	7 (8%)
13	CL7	B	1021	21	71,73,73	1.32	11 (15%)	80,113,113	1.20	8 (10%)
20	G9R	A	1011	10	54,71,71	2.33	10 (18%)	54,104,104	1.32	9 (16%)
16	A1JPJ	J	4012	-	40,41,41	1.72	7 (17%)	50,56,56	2.23	18 (36%)
17	LMG	B	8002	-	55,55,55	0.51	0	63,63,63	0.62	0
13	CL7	A	1132	10	71,73,73	1.30	11 (15%)	80,113,113	1.29	9 (11%)
13	CL7	K	1401	-	51,53,73	1.58	11 (21%)	56,89,113	1.41	5 (8%)
16	A1JPJ	B	4006	-	40,41,41	1.69	8 (20%)	50,56,56	1.73	12 (24%)
13	CL7	A	1113	10	51,53,73	1.54	12 (23%)	56,89,113	1.42	5 (8%)
16	A1JPJ	B	4011	-	40,41,41	1.63	8 (20%)	50,56,56	1.66	8 (16%)
13	CL7	A	1119	21	71,73,73	1.31	12 (16%)	80,113,113	1.25	7 (8%)
13	CL7	B	1225	1	71,73,73	1.30	12 (16%)	80,113,113	1.20	5 (6%)
13	CL7	A	1123	21	71,73,73	1.33	11 (15%)	80,113,113	1.31	9 (11%)
13	CL7	J	1302	5	47,50,73	1.62	10 (21%)	51,85,113	1.34	4 (7%)
13	CL7	A	1122	10	71,73,73	1.32	11 (15%)	80,113,113	1.24	5 (6%)
13	CL7	A	1127	10	71,73,73	1.31	11 (15%)	80,113,113	1.19	4 (5%)
13	CL7	A	1140	10	71,73,73	1.33	12 (16%)	80,113,113	1.21	6 (7%)
13	CL7	B	1202	1	71,73,73	1.31	11 (15%)	80,113,113	1.22	5 (6%)
16	A1JPJ	I	4118	-	40,41,41	1.65	8 (20%)	50,56,56	1.46	9 (18%)
16	A1JPJ	L	4019	-	40,41,41	1.64	8 (20%)	50,56,56	2.12	13 (26%)
13	CL7	F	1701	12	47,49,73	1.59	11 (23%)	51,84,113	1.46	6 (11%)
16	A1JPJ	F	4016	-	40,41,41	1.77	8 (20%)	50,56,56	2.12	12 (24%)
13	CL7	A	1111	10	71,73,73	1.31	11 (15%)	80,113,113	1.30	8 (10%)
13	CL7	A	1112	10	71,73,73	1.33	12 (16%)	80,113,113	1.27	7 (8%)
18	SF4	C	3003	11	0,12,12	-	-	-		
13	CL7	A	1106	10	71,73,73	1.30	11 (15%)	80,113,113	1.28	6 (7%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
13	CL7	A	1114	21	51,53,73	1.57	11 (21%)	56,89,113	1.40	5 (8%)
13	CL7	B	1215	1	61,63,73	1.42	11 (18%)	68,101,113	1.31	6 (8%)
13	CL7	B	1209	1	51,53,73	1.57	11 (21%)	56,89,113	1.43	7 (12%)
13	CL7	B	1230	1	47,49,73	1.58	11 (23%)	51,84,113	1.60	9 (17%)
13	CL7	A	1012	21	71,73,73	1.31	11 (15%)	80,113,113	1.21	5 (6%)
13	CL7	A	1139	21	71,73,73	1.34	11 (15%)	80,113,113	1.25	6 (7%)
18	SF4	C	3002	11	0,12,12	-	-	-		
13	CL7	B	1221	1	66,68,73	1.38	13 (19%)	74,107,113	1.31	9 (12%)
13	CL7	B	1208	1	71,73,73	1.32	12 (16%)	80,113,113	1.22	6 (7%)
13	CL7	B	1203	1	71,73,73	1.32	12 (16%)	80,113,113	1.25	6 (7%)
16	A1JPJ	B	4008	-	40,41,41	1.69	8 (20%)	50,56,56	1.84	9 (18%)
13	CL7	B	1222	21	56,58,73	1.47	11 (19%)	62,95,113	1.39	7 (11%)
13	CL7	B	1229	1	71,73,73	1.33	10 (14%)	80,113,113	1.27	7 (8%)
16	A1JPJ	J	4013	-	40,41,41	1.69	8 (20%)	50,56,56	1.66	11 (22%)
13	CL7	B	1211	1	71,73,73	1.31	12 (16%)	80,113,113	1.21	5 (6%)
14	PHO	B	1023	-	58,69,69	1.96	12 (20%)	56,99,99	1.61	8 (14%)
13	CL7	A	1118	10	61,63,73	1.43	11 (18%)	68,101,113	1.32	7 (10%)
16	A1JPJ	L	4020	-	40,41,41	1.65	8 (20%)	50,56,56	1.68	10 (20%)
13	CL7	B	1226	1	71,73,73	1.32	11 (15%)	80,113,113	1.25	7 (8%)
13	CL7	B	1218	1	47,49,73	1.60	11 (23%)	51,84,113	1.48	6 (11%)
16	A1JPJ	L	4023	-	40,41,41	1.69	8 (20%)	50,56,56	1.63	10 (20%)
13	CL7	A	1110	21	51,53,73	1.55	11 (21%)	56,89,113	1.43	7 (12%)
13	CL7	A	1121	10	61,63,73	1.43	11 (18%)	68,101,113	1.29	8 (11%)
13	CL7	A	1129	10	56,58,73	1.47	12 (21%)	62,95,113	1.40	8 (12%)
16	A1JPJ	B	4005	-	40,41,41	1.76	7 (17%)	50,56,56	2.06	14 (28%)
13	CL7	A	1130	10	57,59,73	1.48	12 (21%)	63,96,113	1.38	7 (11%)
13	CL7	A	1136	10	71,73,73	1.32	11 (15%)	80,113,113	1.26	6 (7%)
14	PHO	A	1013	-	58,69,69	1.98	12 (20%)	56,99,99	1.79	8 (14%)
13	CL7	B	1224	1	62,64,73	1.41	11 (17%)	69,102,113	1.23	5 (7%)
16	A1JPJ	B	4007	-	40,41,41	1.69	8 (20%)	50,56,56	1.69	11 (22%)
13	CL7	B	1205	1	71,73,73	1.29	12 (16%)	80,113,113	1.30	7 (8%)
13	CL7	A	1117	10	71,73,73	1.31	11 (15%)	80,113,113	1.28	7 (8%)
13	CL7	B	1241	1	71,73,73	1.33	11 (15%)	80,113,113	1.19	4 (5%)
13	CL7	A	1105	10	51,53,73	1.55	11 (21%)	56,89,113	1.43	5 (8%)
13	CL7	B	1207	1	71,73,73	1.31	11 (15%)	80,113,113	1.27	8 (10%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
13	CL7	A	1107	10	71,73,73	1.33	11 (15%)	80,113,113	1.25	7 (8%)
13	CL7	L	1501	7	66,68,73	1.39	11 (16%)	74,107,113	1.32	7 (9%)
13	CL7	L	1503	21	48,50,73	1.60	11 (22%)	51,85,113	1.43	5 (9%)
13	CL7	A	1116	10	71,73,73	1.32	12 (16%)	80,113,113	1.24	6 (7%)
13	CL7	K	1402	6	45,45,73	1.65	10 (22%)	49,78,113	1.44	5 (10%)
16	A1JPJ	A	4007	-	40,41,41	1.66	8 (20%)	50,56,56	1.67	12 (24%)
13	CL7	B	1235	1	71,73,73	1.31	11 (15%)	80,113,113	1.29	7 (8%)
16	A1JPJ	B	4021	-	40,41,41	1.77	9 (22%)	50,56,56	2.04	15 (30%)
13	CL7	B	1219	1	47,49,73	1.57	10 (21%)	51,84,113	1.47	6 (11%)
13	CL7	B	1228	1	51,53,73	1.56	11 (21%)	56,89,113	1.37	6 (10%)
13	CL7	B	1232	21	47,49,73	1.59	10 (21%)	51,84,113	1.44	6 (11%)
13	CL7	B	1237	21	71,73,73	1.31	12 (16%)	80,113,113	1.23	6 (7%)
13	CL7	B	1212	1	51,53,73	1.55	11 (21%)	56,89,113	1.40	5 (8%)
13	CL7	A	1101	10	47,49,73	1.59	11 (23%)	51,84,113	1.50	6 (11%)
18	SF4	B	3001	10,1	0,12,12	-	-	-		
13	CL7	B	1217	1	47,49,73	1.59	11 (23%)	51,84,113	1.49	6 (11%)
15	PQN	B	2002	-	34,34,34	0.37	0	42,45,45	0.53	1 (2%)
13	CL7	A	1141	19	47,49,73	1.58	11 (23%)	51,84,113	1.48	6 (11%)
13	CL7	B	1204	1	71,73,73	1.33	12 (16%)	80,113,113	1.28	7 (8%)
13	CL7	A	1128	10	71,73,73	1.31	11 (15%)	80,113,113	1.29	7 (8%)
13	CL7	B	1233	-	47,49,73	1.60	9 (19%)	51,84,113	1.47	6 (11%)
19	LHG	A	853	13	37,37,48	0.57	0	40,43,54	0.57	0
13	CL7	B	1227	1	66,68,73	1.39	10 (15%)	74,107,113	1.27	6 (8%)
13	CL7	A	1125	10	71,73,73	1.31	11 (15%)	80,113,113	1.25	7 (8%)
13	CL7	A	1133	10	71,73,73	1.32	11 (15%)	80,113,113	1.27	7 (8%)
13	CL7	A	1108	10	57,59,73	1.49	11 (19%)	63,96,113	1.30	5 (7%)
16	A1JPJ	B	4009	-	40,41,41	1.71	8 (20%)	50,56,56	1.81	10 (20%)
13	CL7	A	1124	21	63,65,73	1.39	11 (17%)	70,103,113	1.34	7 (10%)
13	CL7	J	1301	21	47,49,73	1.61	11 (23%)	51,84,113	1.48	6 (11%)
13	CL7	A	1135	10	56,58,73	1.50	11 (19%)	62,95,113	1.38	7 (11%)
16	A1JPJ	A	4003	-	40,41,41	1.79	7 (17%)	50,56,56	2.02	12 (24%)
16	A1JPJ	A	4002	-	40,41,41	1.74	6 (15%)	50,56,56	1.89	12 (24%)
13	CL7	B	1231	1	66,68,73	1.38	10 (15%)	74,107,113	1.27	7 (9%)
13	CL7	A	1120	10	51,53,73	1.56	11 (21%)	56,89,113	1.42	5 (8%)
13	CL7	A	1109	10,13	71,73,73	1.32	10 (14%)	80,113,113	1.24	6 (7%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
13	CL7	B	1239	1	71,73,73	1.32	11 (15%)	80,113,113	1.25	6 (7%)
13	CL7	A	1138	10	71,73,73	1.30	11 (15%)	80,113,113	1.24	7 (8%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
13	CL7	A	1103	10	2/2/15/20	15/39/115/115	-
13	CL7	B	1234	1	2/2/12/20	5/21/97/115	-
13	CL7	B	1213	1	2/2/11/20	8/15/91/115	-
13	CL7	B	1238	21	2/2/15/20	8/39/115/115	-
16	A1JPJ	A	4014	-	-	4/29/63/63	0/2/2/2
13	CL7	A	1104	10	2/2/15/20	9/39/115/115	-
13	CL7	B	1210	1	2/2/15/20	17/39/115/115	-
13	CL7	B	1216	-	2/2/13/20	11/27/103/115	-
13	CL7	A	1115	10	2/2/10/20	2/10/86/115	-
13	CL7	B	1022	1	2/2/15/20	7/39/115/115	-
13	CL7	B	1236	1	2/2/11/20	6/15/91/115	-
13	CL7	B	1223	1	2/2/15/20	16/39/115/115	-
13	CL7	L	1502	7	2/2/15/20	18/39/115/115	-
13	CL7	A	1137	10	2/2/13/20	10/27/103/115	-
13	CL7	A	1102	10,13	2/2/12/20	8/24/100/115	-
13	CL7	A	1126	10	2/2/15/20	15/39/115/115	-
16	A1JPJ	A	4001	-	-	6/29/63/63	0/2/2/2
16	A1JPJ	B	4004	-	-	4/29/63/63	0/2/2/2
15	PQN	A	2001	-	-	4/23/43/43	0/2/2/2
13	CL7	B	1220	-	2/2/11/20	7/15/91/115	-
13	CL7	A	1131	10	2/2/15/20	5/39/115/115	-
19	LHG	A	852	-	-	14/53/53/53	-
13	CL7	B	1201	1	2/2/12/20	7/26/102/115	-
13	CL7	B	1206	1	2/2/12/20	6/21/97/115	-
13	CL7	B	1214	1	2/2/15/20	12/39/115/115	-
13	CL7	A	1134	10	2/2/10/20	8/15/87/115	-
16	A1JPJ	A	4008	-	-	4/29/63/63	0/2/2/2

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
13	CL7	I	1601	21	2/2/15/20	15/39/115/115	-
13	CL7	B	1021	21	2/2/15/20	17/39/115/115	-
20	G9R	A	1011	10	1/1/17/22	4/37/107/107	-
16	A1JPJ	J	4012	-	-	4/29/63/63	0/2/2/2
17	LMG	B	8002	-	-	15/50/70/70	0/1/1/1
13	CL7	A	1132	10	2/2/15/20	14/39/115/115	-
13	CL7	K	1401	-	2/2/11/20	2/15/91/115	-
16	A1JPJ	B	4006	-	-	5/29/63/63	0/2/2/2
13	CL7	A	1113	10	2/2/11/20	6/15/91/115	-
16	A1JPJ	B	4011	-	-	6/29/63/63	0/2/2/2
13	CL7	A	1119	21	2/2/15/20	13/39/115/115	-
13	CL7	B	1225	1	2/2/15/20	11/39/115/115	-
13	CL7	A	1123	21	2/2/15/20	15/39/115/115	-
13	CL7	J	1302	5	2/2/10/20	4/9/85/115	-
13	CL7	A	1122	10	2/2/15/20	13/39/115/115	-
13	CL7	A	1127	10	2/2/15/20	16/39/115/115	-
13	CL7	A	1140	10	2/2/15/20	10/39/115/115	-
13	CL7	B	1202	1	2/2/15/20	16/39/115/115	-
16	A1JPJ	I	4118	-	-	2/29/63/63	0/2/2/2
16	A1JPJ	L	4019	-	-	3/29/63/63	0/2/2/2
13	CL7	F	1701	12	2/2/10/20	2/10/86/115	-
16	A1JPJ	F	4016	-	-	7/29/63/63	0/2/2/2
13	CL7	A	1111	10	2/2/15/20	10/39/115/115	-
13	CL7	A	1112	10	2/2/15/20	20/39/115/115	-
18	SF4	C	3003	11	-	-	0/6/5/5
13	CL7	A	1106	10	2/2/15/20	16/39/115/115	-
13	CL7	A	1114	21	2/2/11/20	2/15/91/115	-
13	CL7	B	1215	1	2/2/13/20	7/27/103/115	-
13	CL7	B	1209	1	2/2/11/20	6/15/91/115	-
13	CL7	B	1230	1	2/2/10/20	6/10/86/115	-
13	CL7	A	1012	21	2/2/15/20	9/39/115/115	-
13	CL7	A	1139	21	2/2/15/20	13/39/115/115	-
18	SF4	C	3002	11	-	-	0/6/5/5
13	CL7	B	1221	1	2/2/14/20	14/33/109/115	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
13	CL7	B	1208	1	2/2/15/20	10/39/115/115	-
13	CL7	B	1203	1	2/2/15/20	11/39/115/115	-
16	A1JPJ	B	4008	-	-	4/29/63/63	0/2/2/2
13	CL7	B	1222	21	2/2/12/20	6/21/97/115	-
13	CL7	B	1229	1	2/2/15/20	8/39/115/115	-
16	A1JPJ	J	4013	-	-	1/29/63/63	0/2/2/2
13	CL7	B	1211	1	2/2/15/20	6/39/115/115	-
14	PHO	B	1023	-	-	14/37/103/103	0/5/6/6
13	CL7	A	1118	10	2/2/13/20	11/27/103/115	-
16	A1JPJ	L	4020	-	-	8/29/63/63	0/2/2/2
13	CL7	B	1226	1	2/2/15/20	10/39/115/115	-
13	CL7	B	1218	1	2/2/10/20	4/10/86/115	-
16	A1JPJ	L	4023	-	-	2/29/63/63	0/2/2/2
13	CL7	A	1110	21	2/2/11/20	9/15/91/115	-
13	CL7	A	1121	10	2/2/13/20	12/27/103/115	-
13	CL7	A	1129	10	2/2/12/20	5/21/97/115	-
16	A1JPJ	B	4005	-	-	6/29/63/63	0/2/2/2
13	CL7	A	1130	10	2/2/12/20	4/23/99/115	-
13	CL7	A	1136	10	2/2/15/20	15/39/115/115	-
14	PHO	A	1013	-	-	7/37/103/103	0/5/6/6
13	CL7	B	1224	1	2/2/13/20	5/29/105/115	-
16	A1JPJ	B	4007	-	-	6/29/63/63	0/2/2/2
13	CL7	B	1205	1	2/2/15/20	13/39/115/115	-
13	CL7	A	1117	10	2/2/15/20	13/39/115/115	-
13	CL7	B	1241	1	2/2/15/20	16/39/115/115	-
13	CL7	A	1105	10	2/2/11/20	3/15/91/115	-
13	CL7	B	1207	1	2/2/15/20	7/39/115/115	-
13	CL7	A	1107	10	2/2/15/20	11/39/115/115	-
13	CL7	L	1501	7	2/2/14/20	18/33/109/115	-
13	CL7	L	1503	21	2/2/10/20	3/12/88/115	-
13	CL7	A	1116	10	2/2/15/20	12/39/115/115	-
13	CL7	K	1402	6	2/2/8/20	1/4/76/115	-
16	A1JPJ	A	4007	-	-	4/29/63/63	0/2/2/2
13	CL7	B	1235	1	2/2/15/20	16/39/115/115	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
16	A1JPJ	B	4021	-	-	3/29/63/63	0/2/2/2
13	CL7	B	1219	1	2/2/10/20	2/10/86/115	-
13	CL7	B	1228	1	2/2/11/20	1/15/91/115	-
13	CL7	B	1232	21	2/2/10/20	6/10/86/115	-
13	CL7	B	1237	21	2/2/15/20	14/39/115/115	-
13	CL7	B	1212	1	2/2/11/20	11/15/91/115	-
13	CL7	A	1101	10	2/2/10/20	4/10/86/115	-
18	SF4	B	3001	10,1	-	-	0/6/5/5
13	CL7	B	1217	1	2/2/10/20	0/10/86/115	-
15	PQN	B	2002	-	-	9/23/43/43	0/2/2/2
13	CL7	A	1141	19	2/2/10/20	5/10/86/115	-
13	CL7	B	1204	1	2/2/15/20	9/39/115/115	-
13	CL7	A	1128	10	2/2/15/20	9/39/115/115	-
13	CL7	B	1233	-	2/2/10/20	4/10/86/115	-
19	LHG	A	853	13	-	8/42/42/53	-
13	CL7	B	1227	1	2/2/14/20	17/33/109/115	-
13	CL7	A	1125	10	2/2/15/20	9/39/115/115	-
13	CL7	A	1133	10	2/2/15/20	14/39/115/115	-
13	CL7	A	1108	10	2/2/12/20	8/23/99/115	-
16	A1JPJ	B	4009	-	-	7/29/63/63	0/2/2/2
13	CL7	A	1124	21	2/2/13/20	13/30/106/115	-
13	CL7	J	1301	21	2/2/10/20	0/10/86/115	-
13	CL7	A	1135	10	2/2/12/20	8/21/97/115	-
16	A1JPJ	A	4003	-	-	5/29/63/63	0/2/2/2
16	A1JPJ	A	4002	-	-	5/29/63/63	0/2/2/2
13	CL7	B	1231	1	2/2/14/20	14/33/109/115	-
13	CL7	A	1120	10	2/2/11/20	4/15/91/115	-
13	CL7	A	1109	10,13	2/2/15/20	20/39/115/115	-
13	CL7	B	1239	1	2/2/15/20	11/39/115/115	-
13	CL7	A	1138	10	2/2/15/20	12/39/115/115	-

The worst 5 of 1229 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
20	A	1011	G9R	C3B-C4B	10.10	1.49	1.41
14	A	1013	PHO	C1B-C2B	8.75	1.49	1.39

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
14	B	1023	PHO	C1B-C2B	8.51	1.49	1.39
20	A	1011	G9R	C1B-C2B	8.01	1.49	1.39
14	A	1013	PHO	C3B-C4B	7.32	1.49	1.41

The worst 5 of 863 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
14	A	1013	PHO	C4D-CHA-CBD	-9.10	104.40	108.52
14	B	1023	PHO	C4D-CHA-CBD	-7.76	105.01	108.52
16	B	4021	A1JPJ	C15-C16-C17	6.72	137.24	123.47
16	J	4012	A1JPJ	C37-C22-C23	6.41	128.18	118.08
16	L	4019	A1JPJ	C7-C8-C9	-6.17	116.91	126.23

5 of 187 chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
13	B	1022	CL7	NC
13	B	1022	CL7	NA
13	B	1201	CL7	NC
13	B	1201	CL7	NA
13	B	1202	CL7	NC

5 of 1052 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
13	B	1022	CL7	CHA-CBD-CGD-O2D
13	B	1022	CL7	CHA-CBD-CGD-O1D
13	B	1201	CL7	C2-C3-C5-C6
13	B	1201	CL7	C4-C3-C5-C6
13	B	1201	CL7	C2B-C3B-CAB-OBB

There are no ring outliers.

84 monomers are involved in 216 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
13	A	1103	CL7	6	0
13	B	1213	CL7	1	0
13	B	1238	CL7	4	0
13	A	1104	CL7	4	0
13	B	1210	CL7	5	0
13	B	1216	CL7	2	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
13	A	1115	CL7	2	0
13	B	1022	CL7	2	0
13	B	1236	CL7	1	0
13	B	1223	CL7	1	0
13	L	1502	CL7	3	0
13	A	1137	CL7	3	0
13	A	1102	CL7	4	0
13	A	1126	CL7	9	0
13	B	1220	CL7	3	0
13	A	1131	CL7	2	0
19	A	852	LHG	2	0
13	B	1201	CL7	6	0
13	B	1206	CL7	1	0
13	B	1214	CL7	7	0
13	A	1134	CL7	2	0
13	I	1601	CL7	2	0
13	B	1021	CL7	4	0
16	J	4012	A1JPJ	1	0
17	B	8002	LMG	3	0
13	A	1132	CL7	1	0
13	A	1119	CL7	5	0
13	B	1225	CL7	1	0
13	A	1123	CL7	4	0
13	J	1302	CL7	2	0
13	A	1127	CL7	4	0
13	A	1140	CL7	3	0
13	B	1202	CL7	3	0
13	A	1111	CL7	2	0
13	A	1112	CL7	2	0
13	A	1106	CL7	6	0
13	A	1114	CL7	1	0
13	B	1215	CL7	1	0
13	B	1209	CL7	1	0
13	B	1230	CL7	2	0
13	A	1012	CL7	2	0
13	A	1139	CL7	3	0
13	B	1221	CL7	3	0
13	B	1208	CL7	1	0
13	B	1203	CL7	4	0
13	B	1229	CL7	3	0
13	B	1211	CL7	3	0
14	B	1023	PHO	10	0

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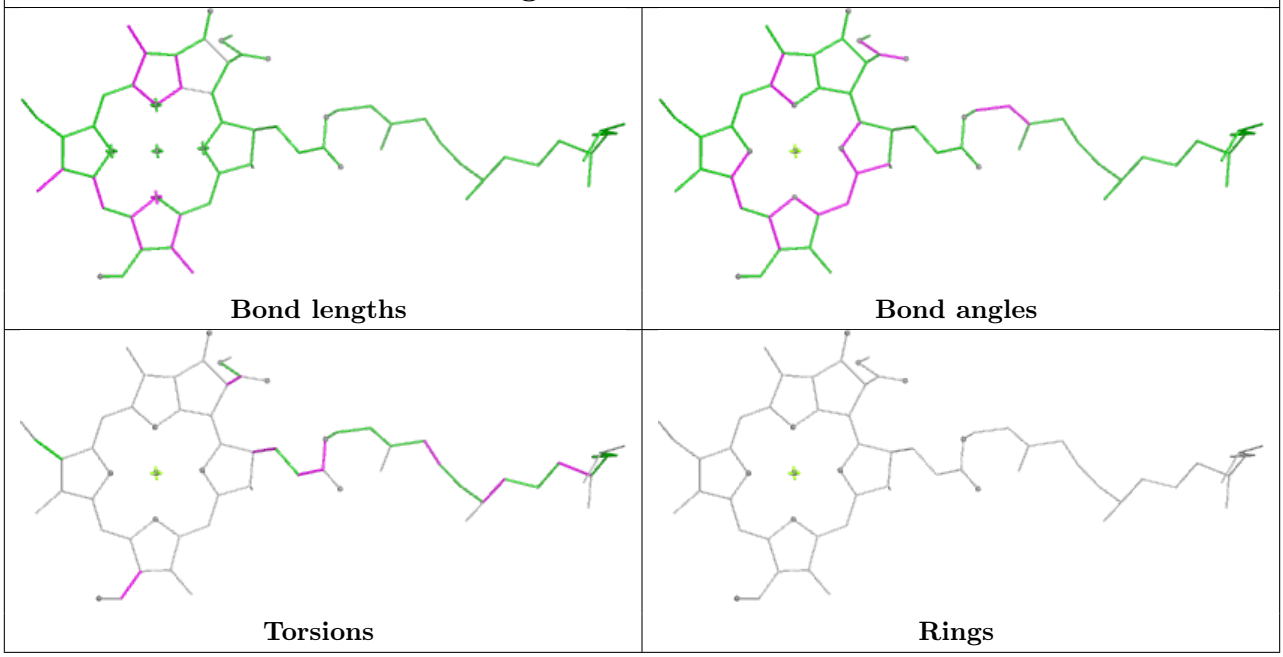
Mol	Chain	Res	Type	Clashes	Symm-Clashes
13	A	1118	CL7	1	0
13	B	1226	CL7	4	0
13	A	1110	CL7	2	0
13	A	1121	CL7	1	0
16	B	4005	A1JPJ	1	0
13	A	1130	CL7	2	0
13	A	1136	CL7	3	0
14	A	1013	PHO	3	0
13	B	1224	CL7	2	0
13	B	1205	CL7	5	0
13	B	1241	CL7	10	0
13	A	1105	CL7	1	0
13	B	1207	CL7	2	0
13	A	1107	CL7	6	0
13	L	1501	CL7	1	0
13	A	1116	CL7	6	0
13	B	1235	CL7	2	0
13	B	1228	CL7	1	0
13	B	1232	CL7	1	0
13	B	1237	CL7	3	0
13	B	1212	CL7	2	0
13	B	1204	CL7	5	0
13	A	1128	CL7	3	0
19	A	853	LHG	1	0
13	B	1227	CL7	7	0
13	A	1125	CL7	6	0
13	A	1133	CL7	3	0
13	A	1108	CL7	2	0
13	A	1124	CL7	2	0
13	J	1301	CL7	2	0
13	A	1135	CL7	1	0
13	B	1231	CL7	5	0
13	A	1120	CL7	2	0
13	A	1109	CL7	6	0
13	B	1239	CL7	5	0
13	A	1138	CL7	8	0

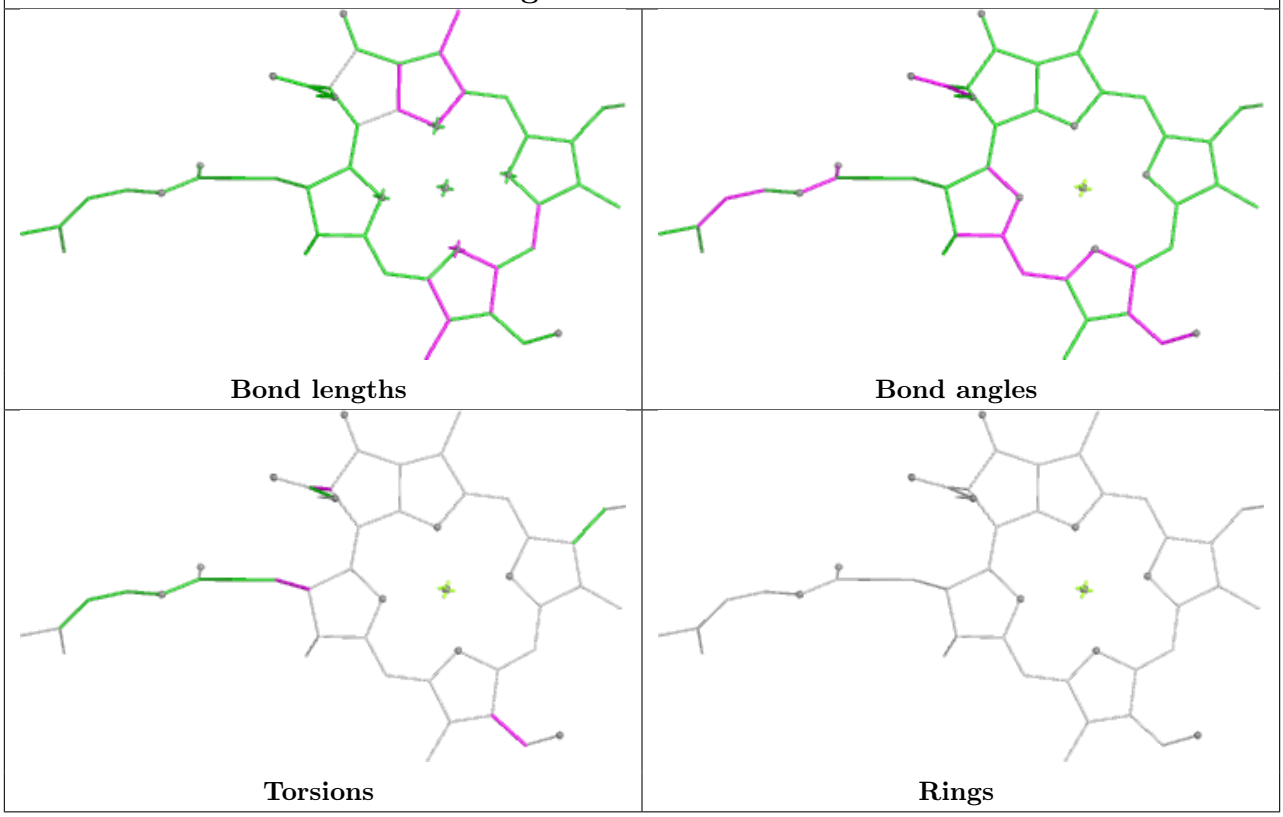
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be

highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

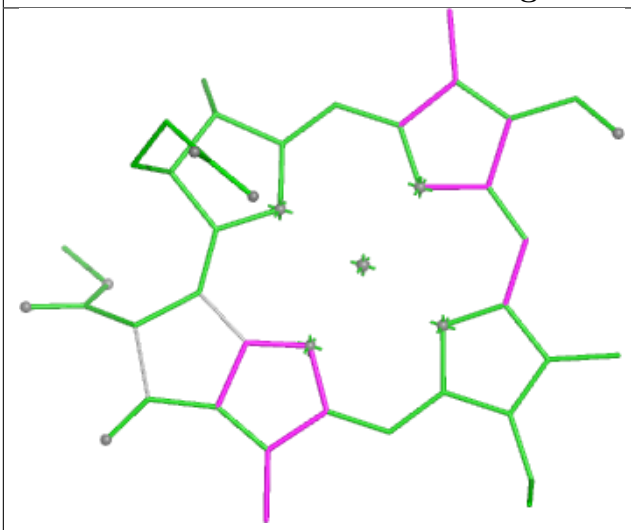
Ligand CL7 A 1103



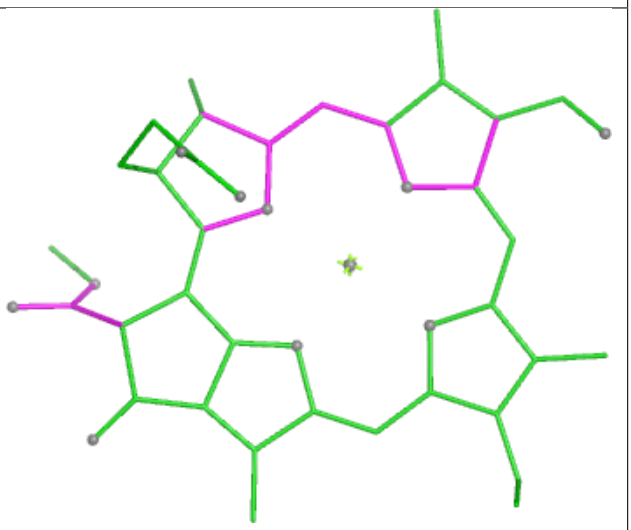
Ligand CL7 B 1234



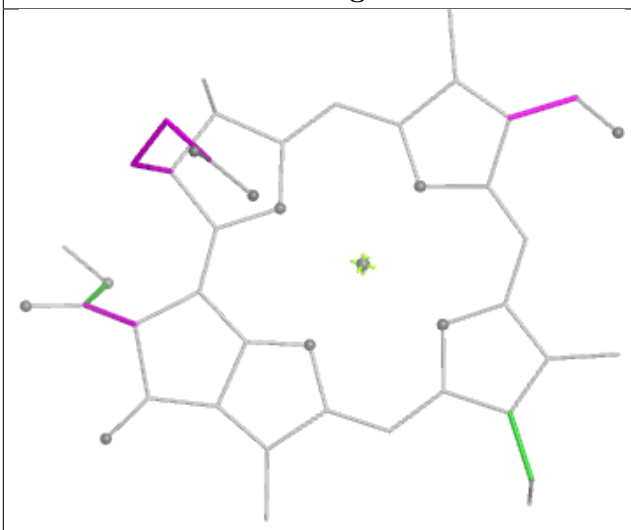
Ligand CL7 B 1213



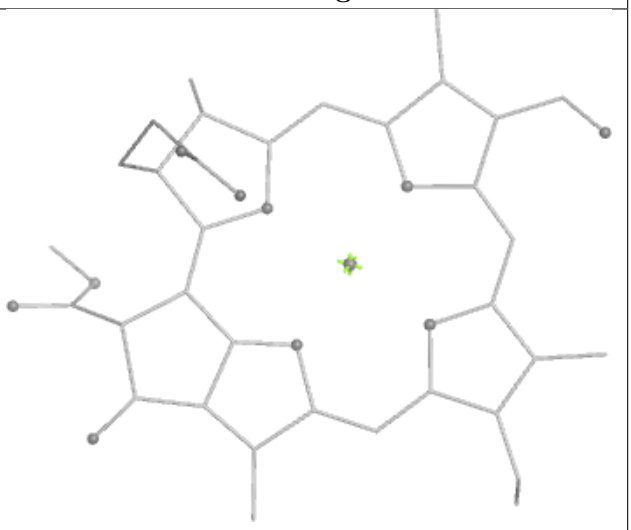
Bond lengths



Bond angles

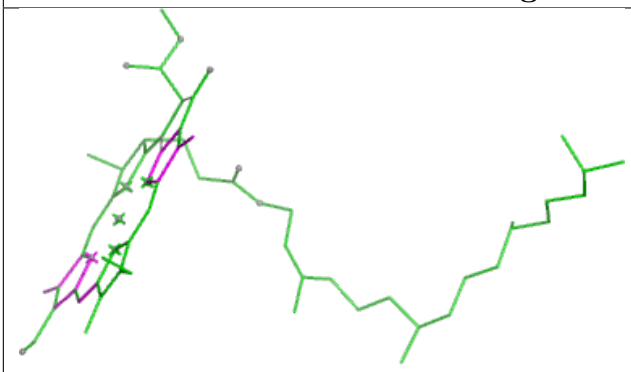


Torsions

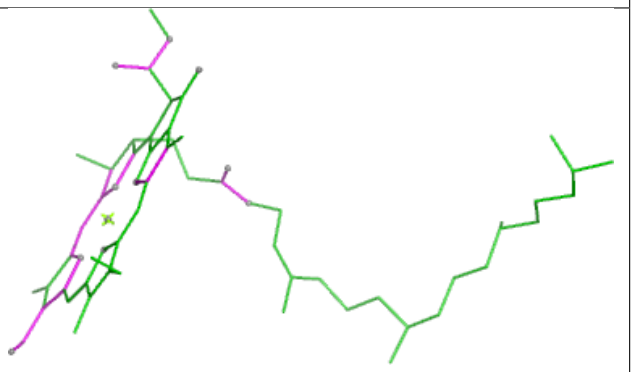


Rings

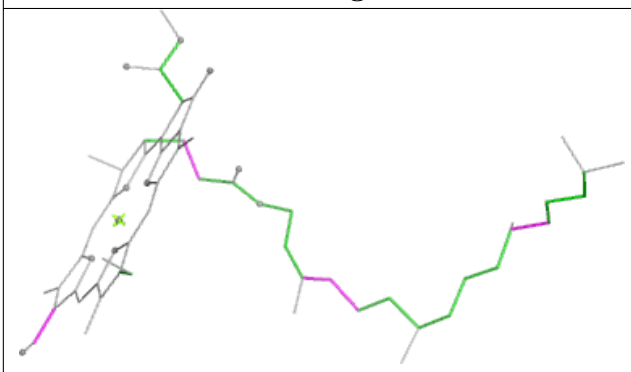
Ligand CL7 B 1238



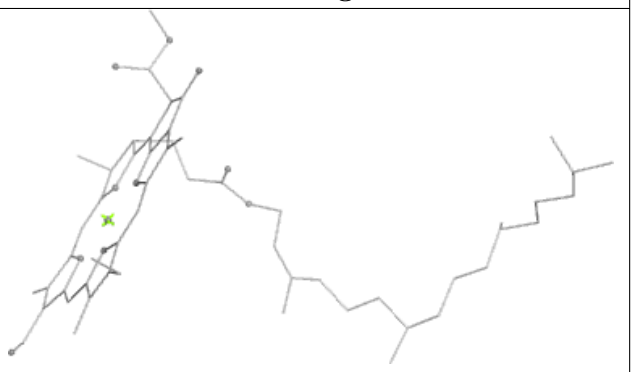
Bond lengths



Bond angles

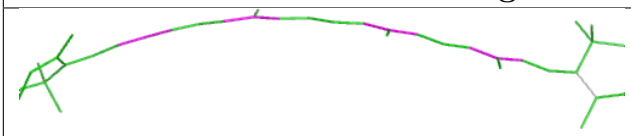


Torsions

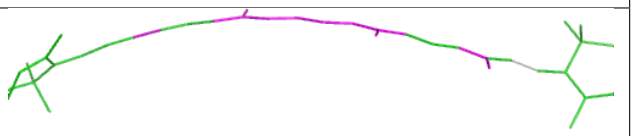


Rings

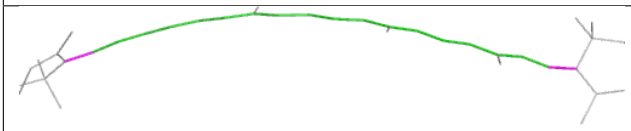
Ligand A1JPJ A 4014



Bond lengths



Bond angles



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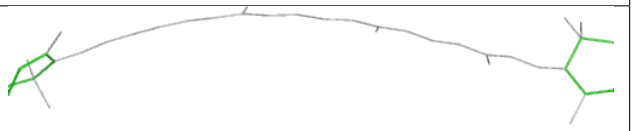
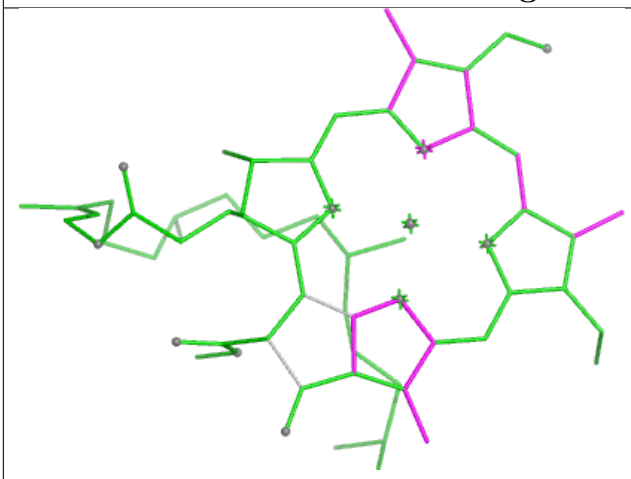
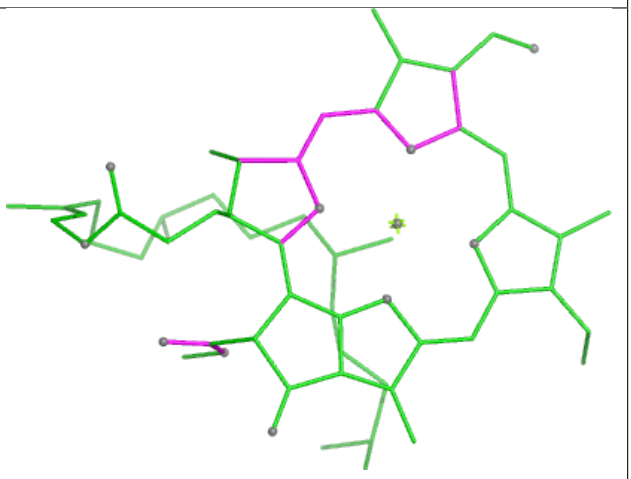


Rings

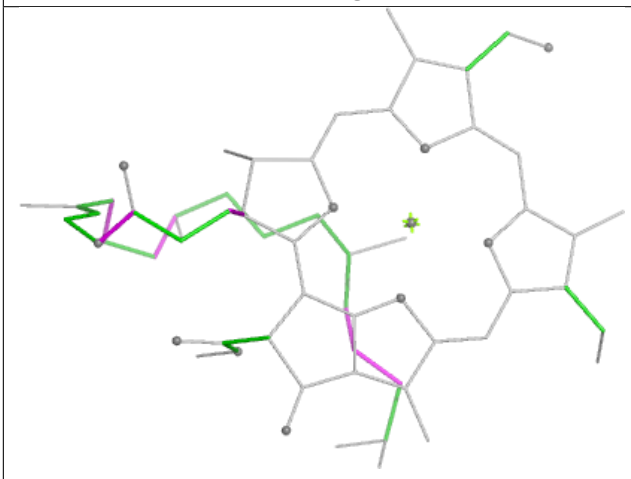
Ligand CL7 A 1104



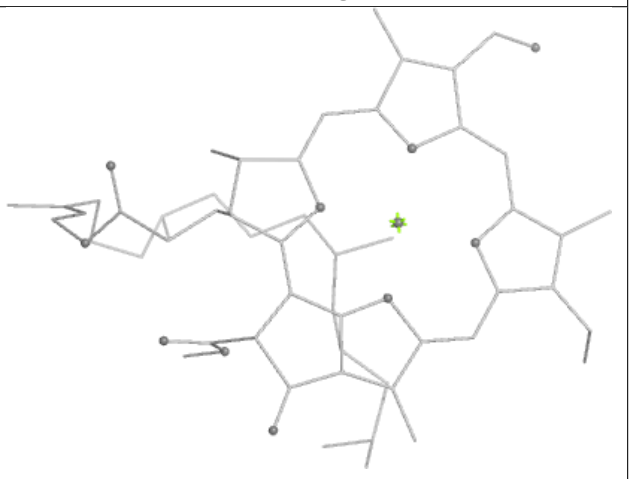
Bond lengths



Bond angles

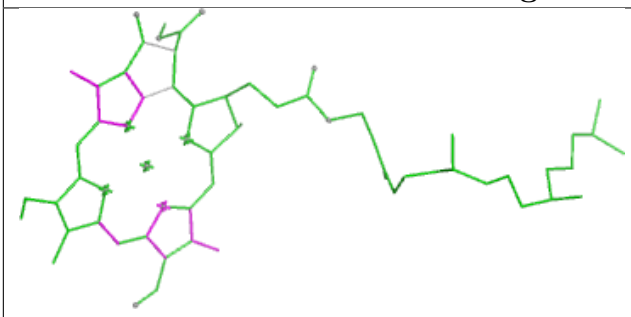


Torsions

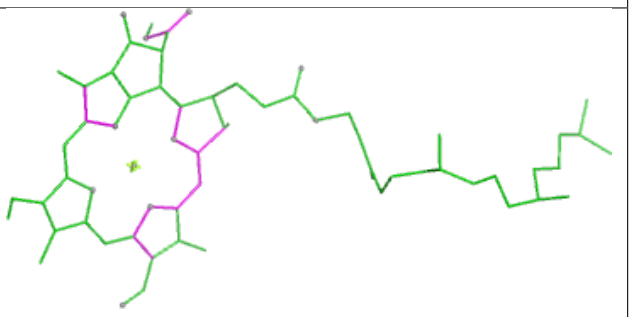


Rings

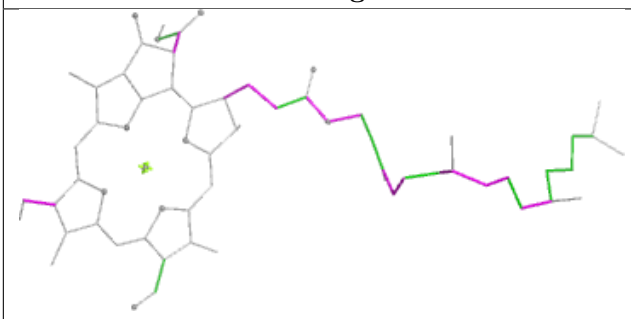
Ligand CL7 B 1210



Bond lengths



Bond angles



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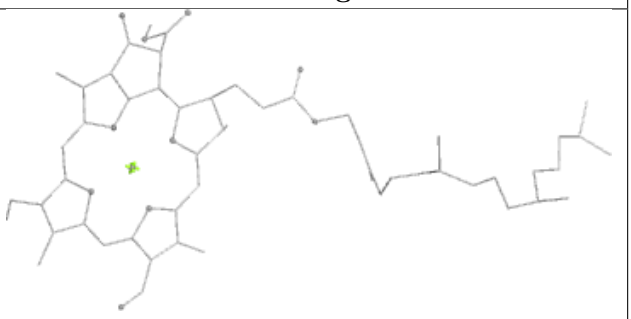
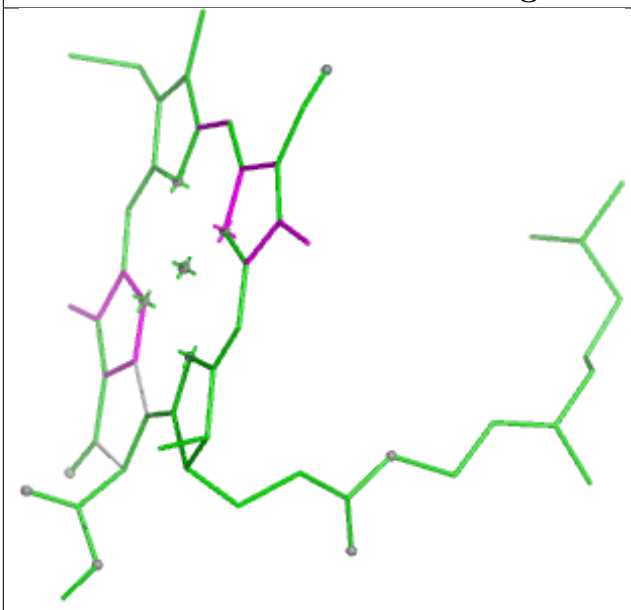
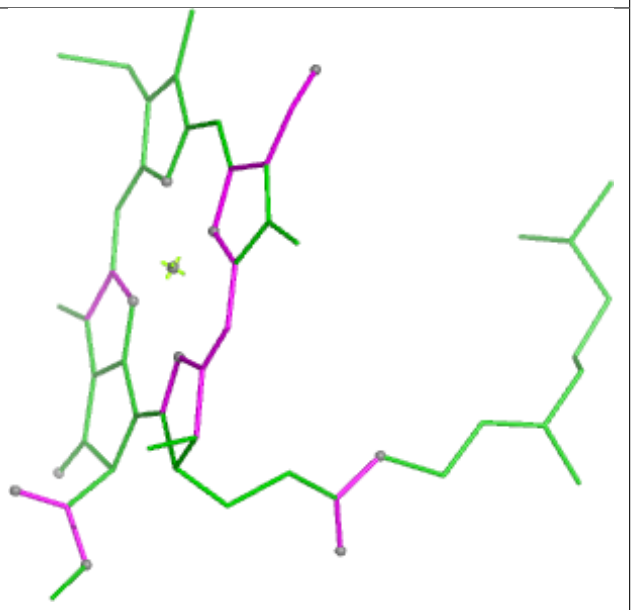


Rings

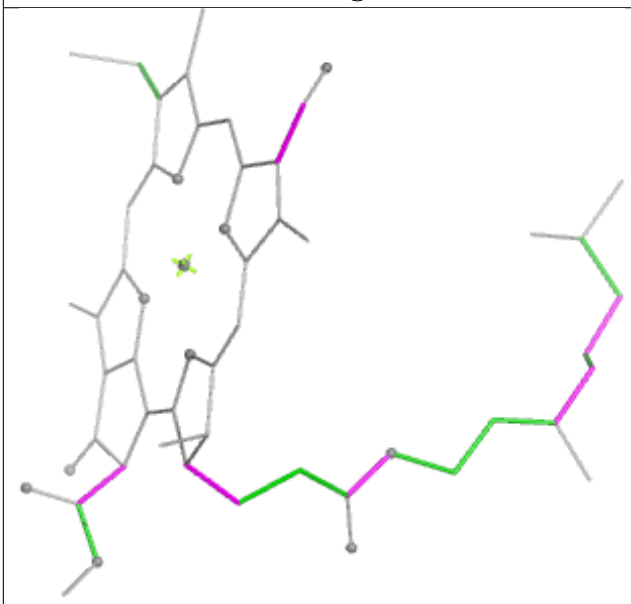
Ligand CL7 B 1216



Bond lengths



Bond angles



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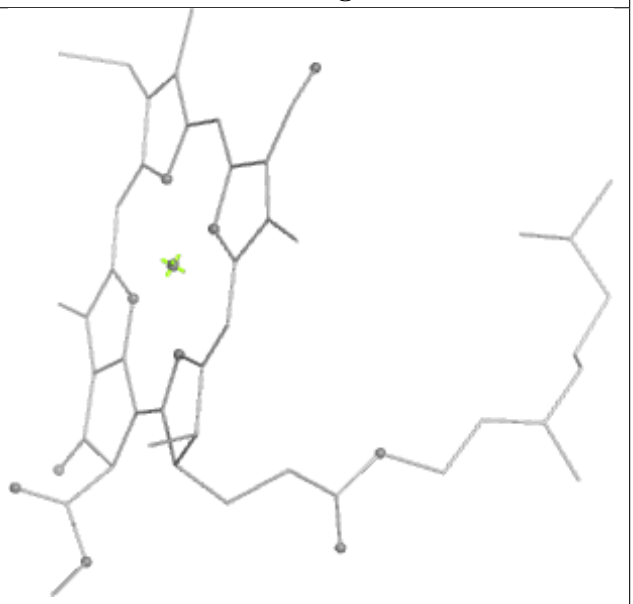
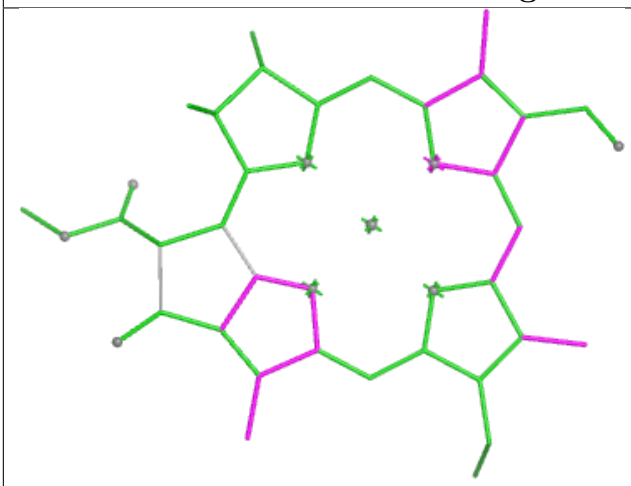
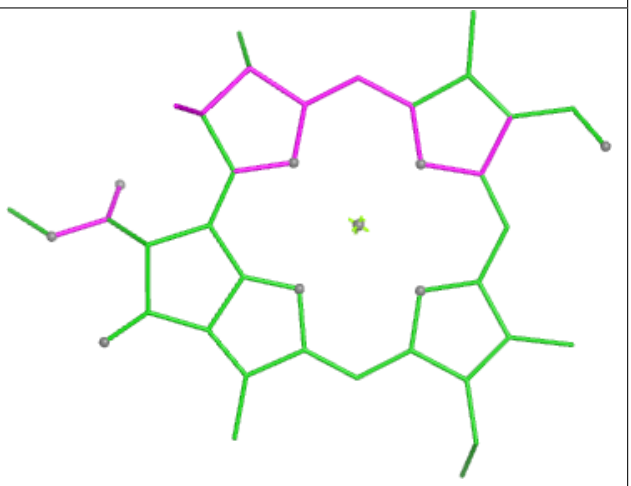


Rings

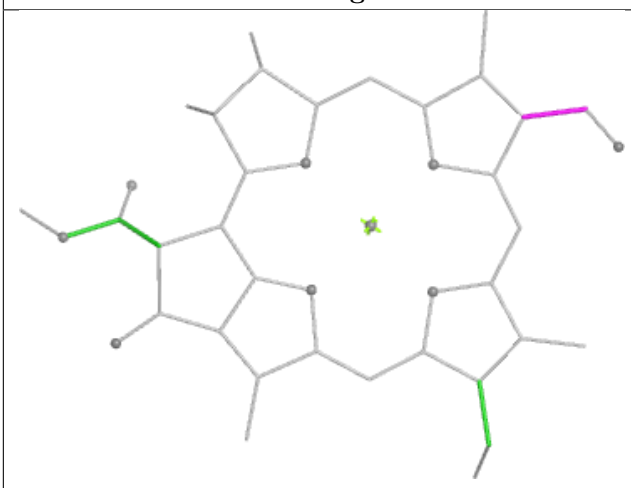
Ligand CL7 A 1115



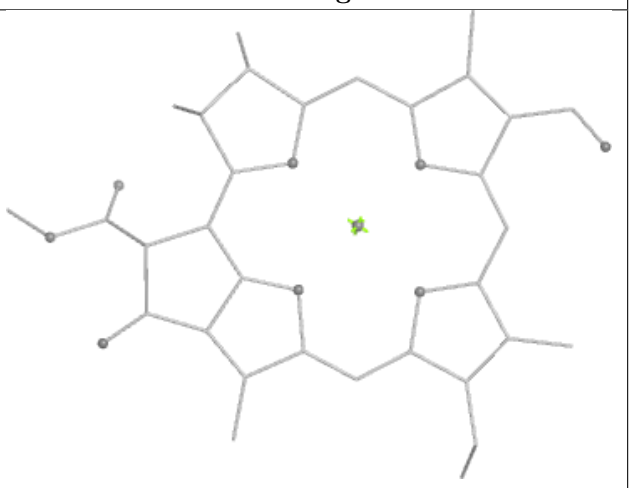
Bond lengths



Bond angles

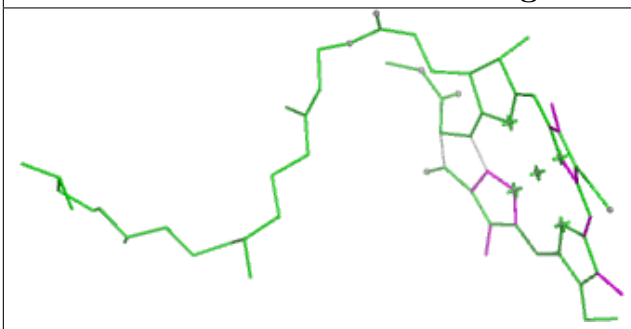


Torsions

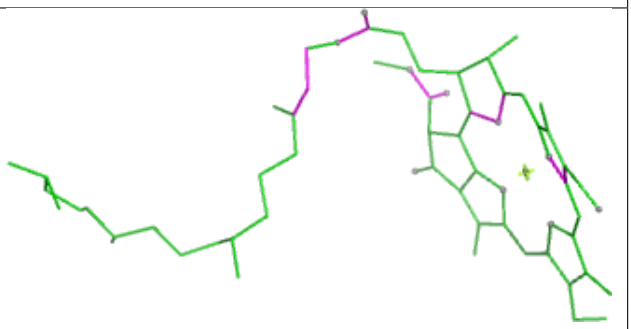


Rings

Ligand CL7 B 1022

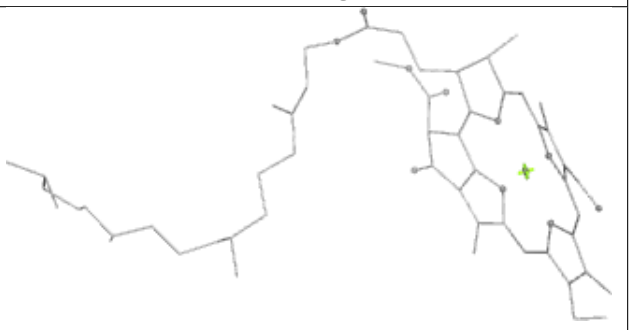


Bond lengths



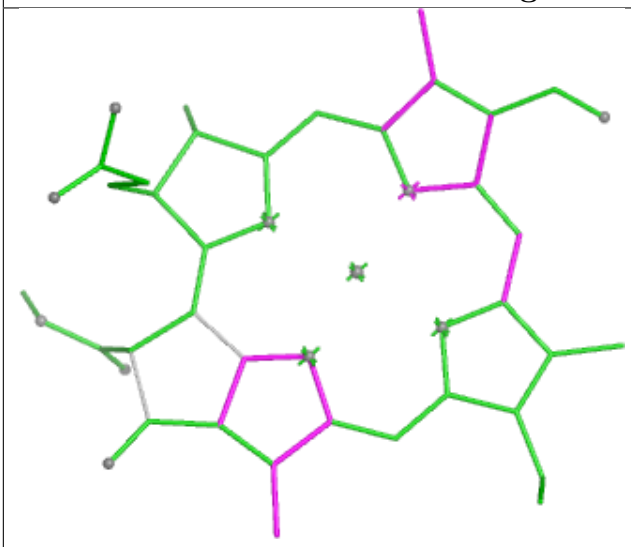
Bond angles

Torsions

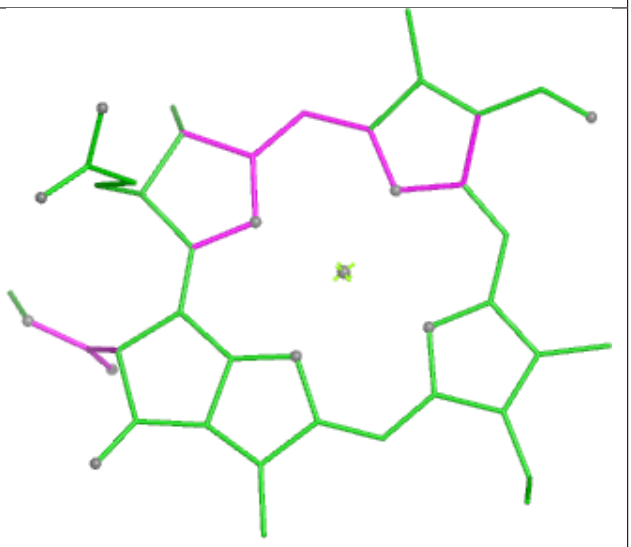


Rings

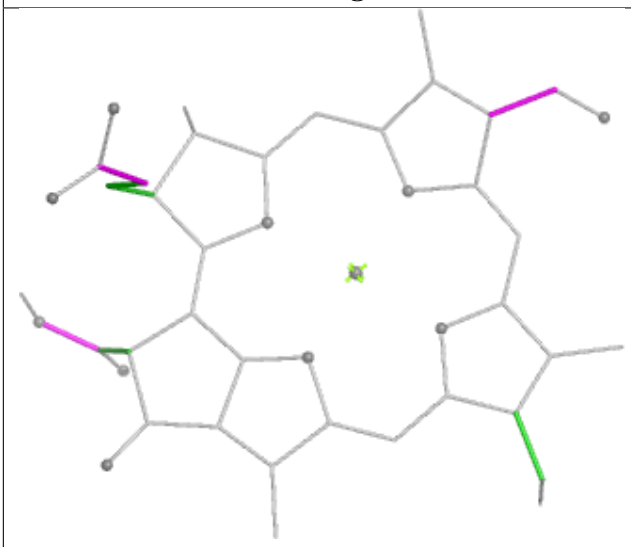
Ligand CL7 B 1236



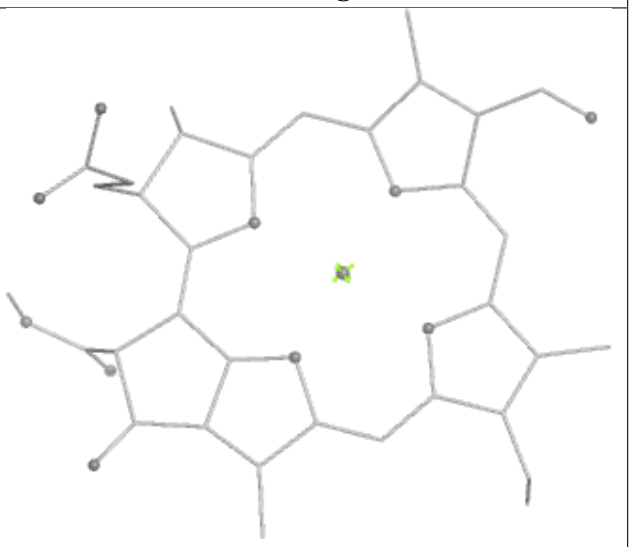
Bond lengths



Bond angles

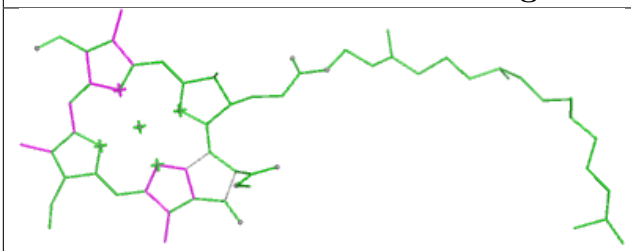


Torsions

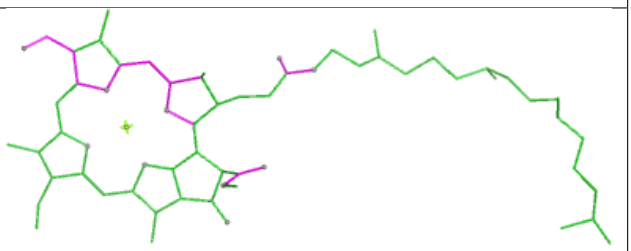


Rings

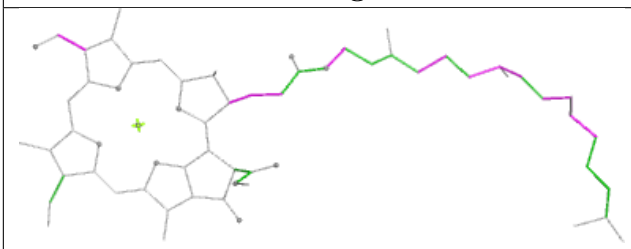
Ligand CL7 B 1223



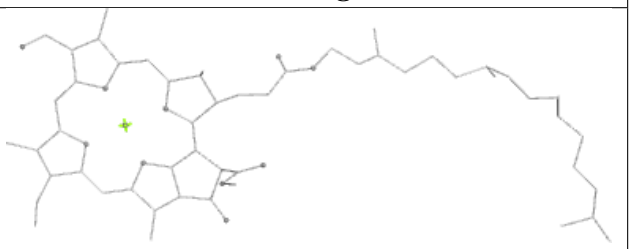
Bond lengths



Bond angles

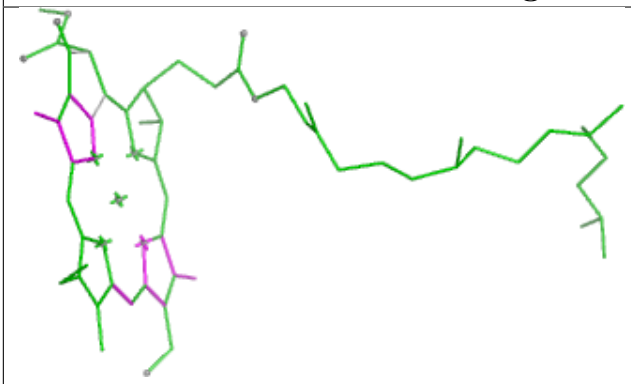


Torsions

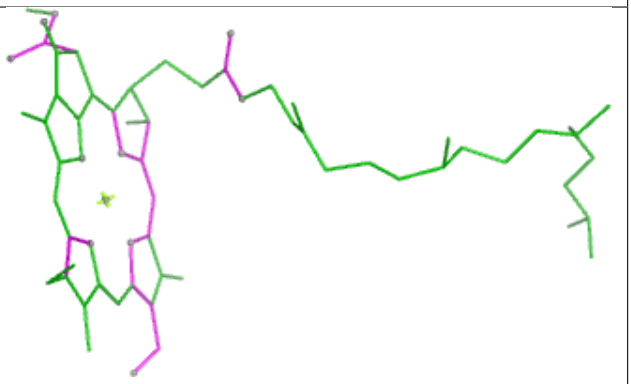


Rings

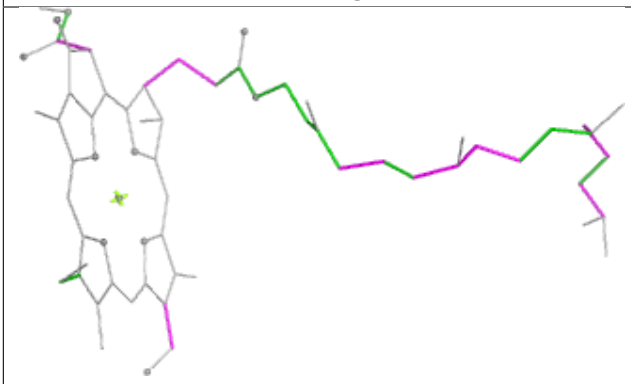
Ligand CL7 L 1502



Bond lengths



Bond angles

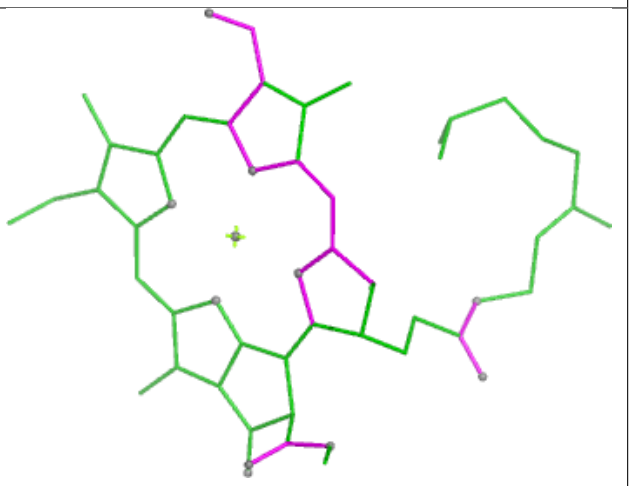


Torsions

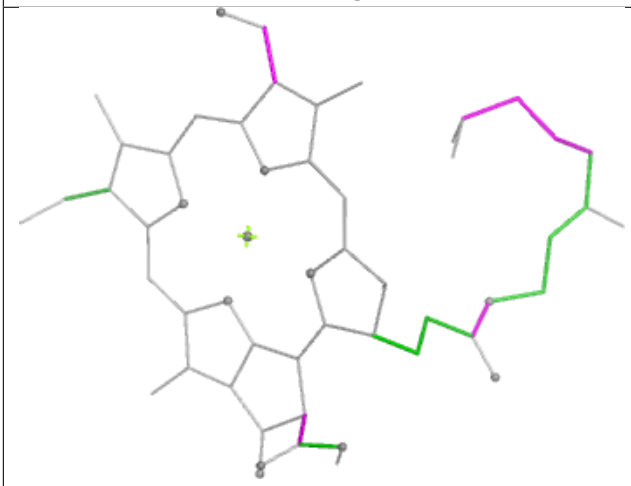
Rings

Ligand CL7 A 1137

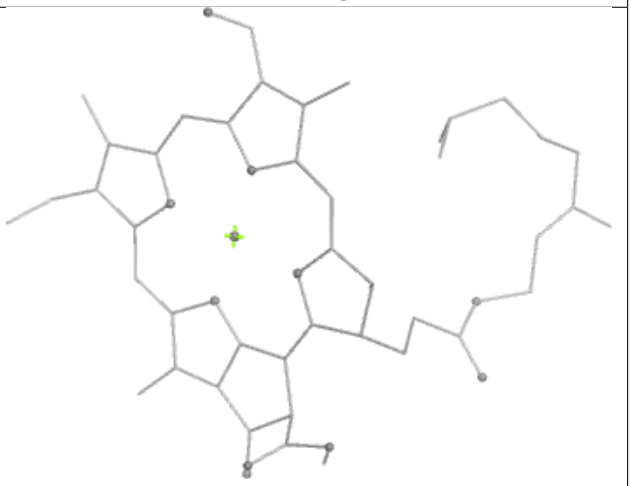
Bond lengths



Bond angles

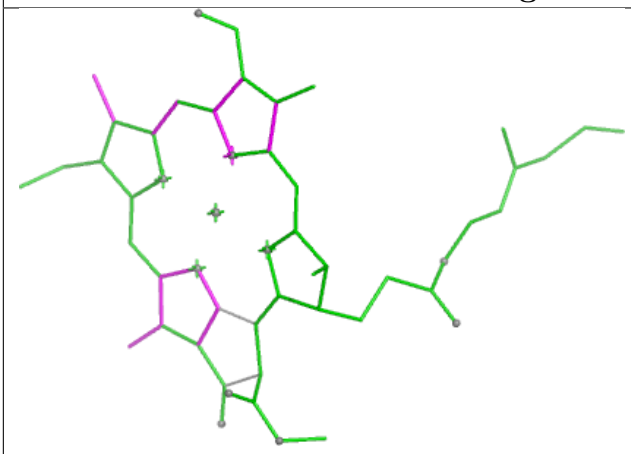


Torsions

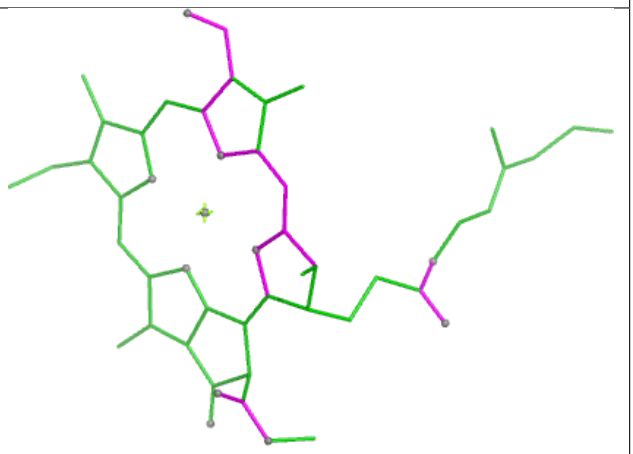


Rings

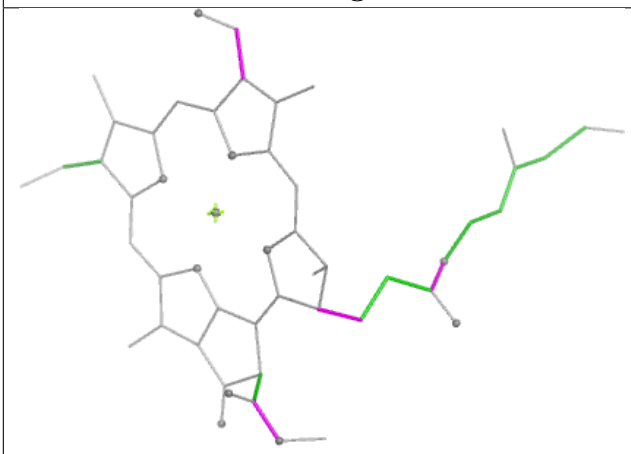
Ligand CL7 A 1102



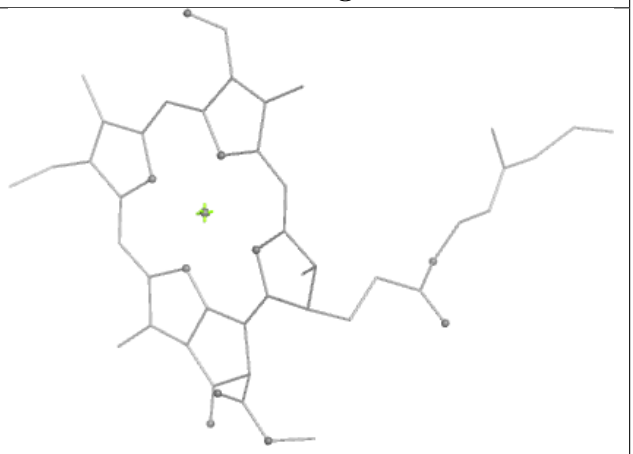
Bond lengths



Bond angles

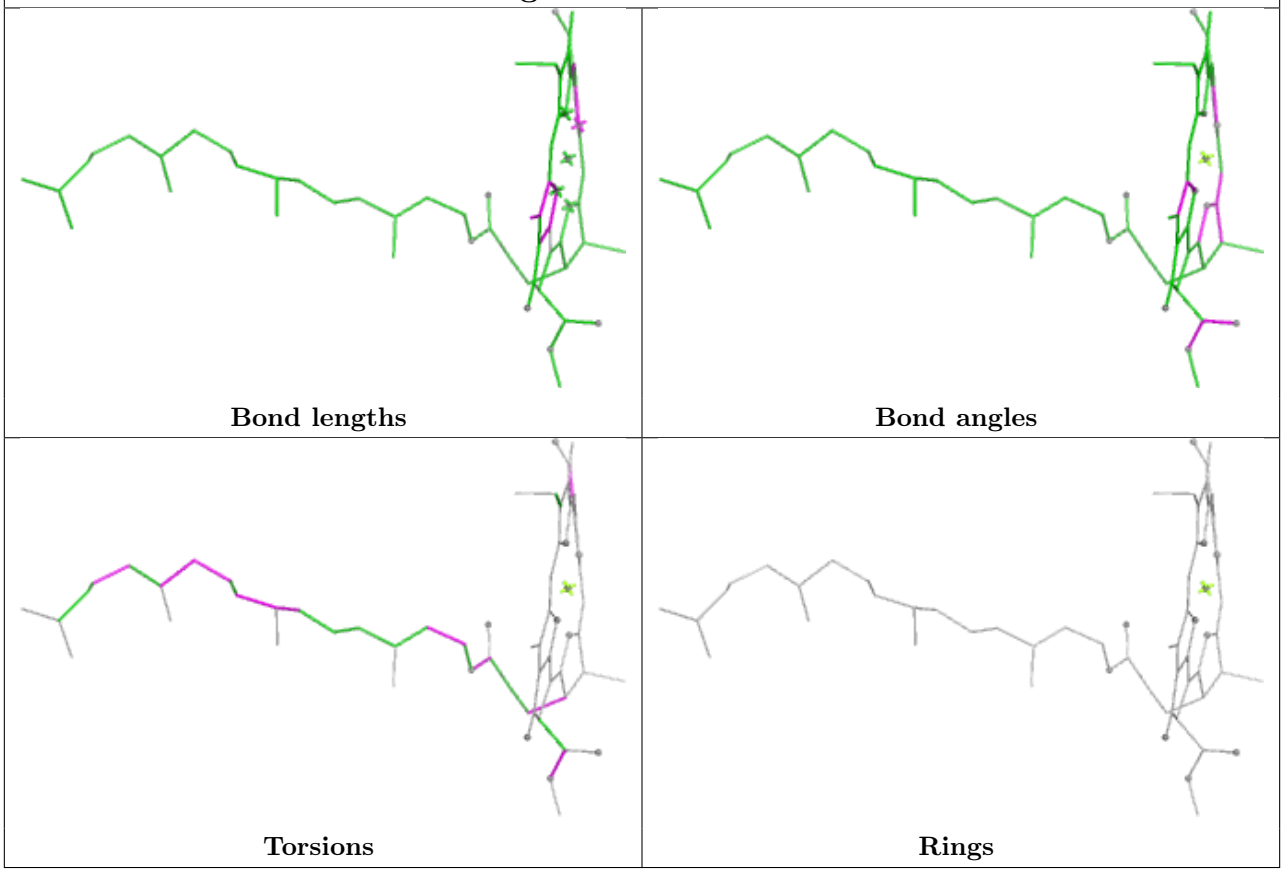


Torsions

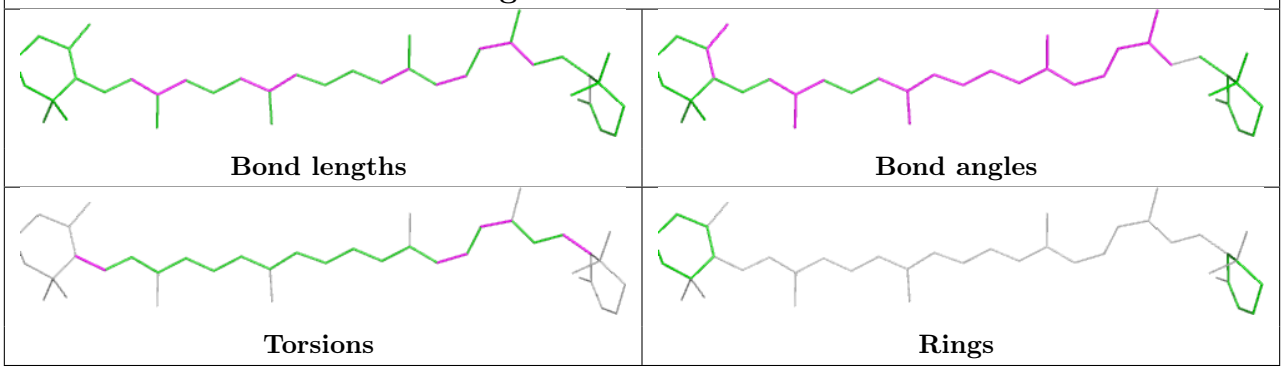


Rings

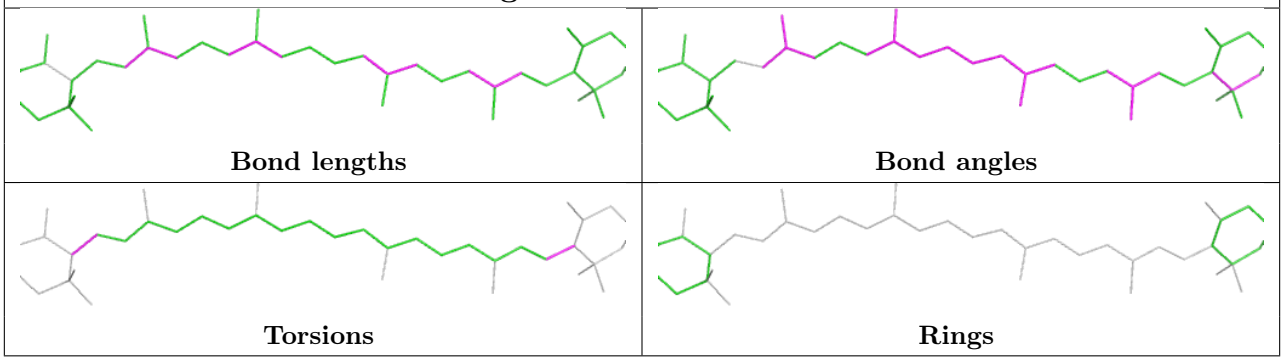
Ligand CL7 A 1126



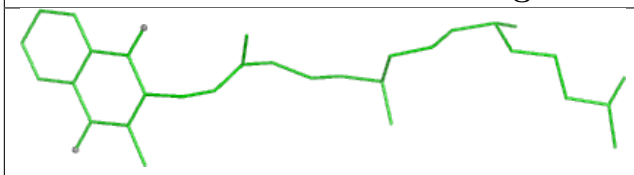
Ligand A1JPJ A 4001



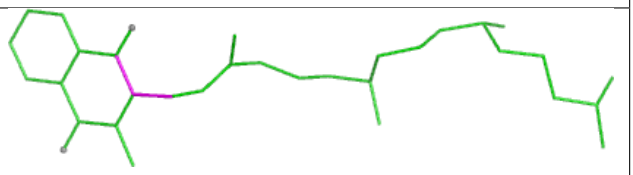
Ligand A1JPJ B 4004



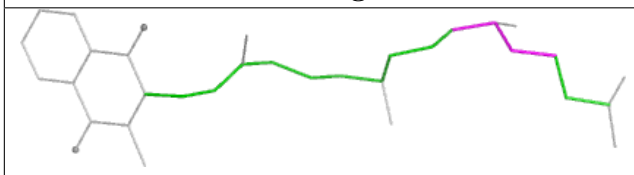
Ligand PQN A 2001



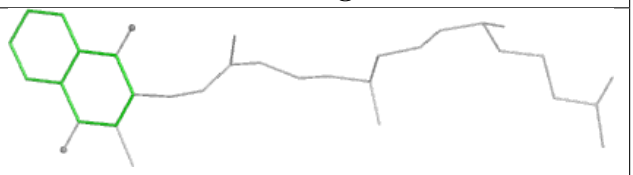
Bond lengths



Bond angles

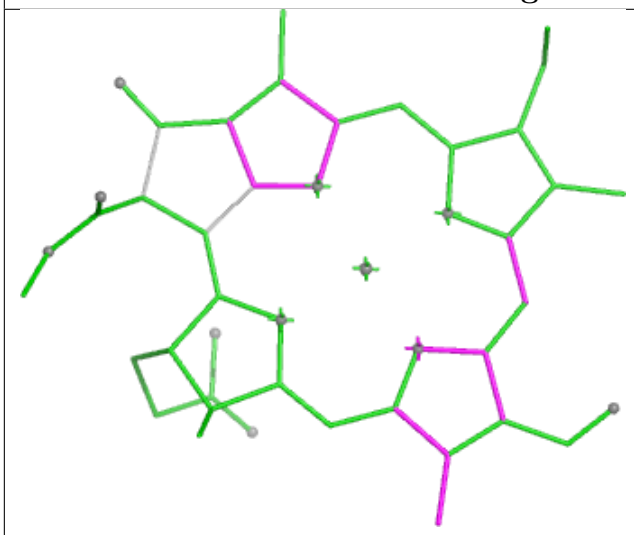


Torsions

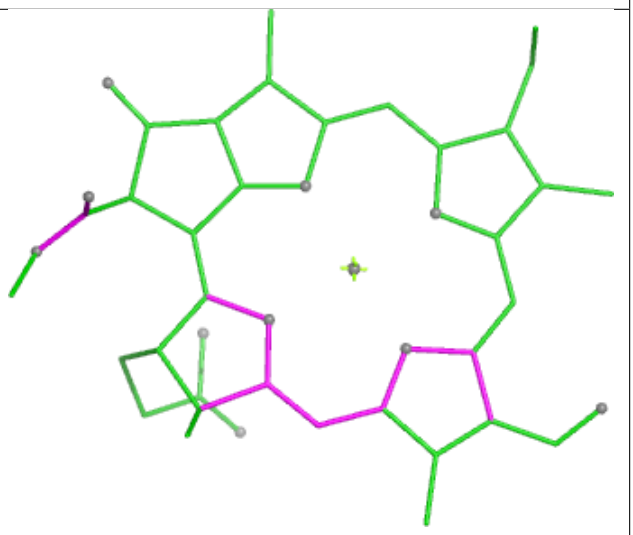


Rings

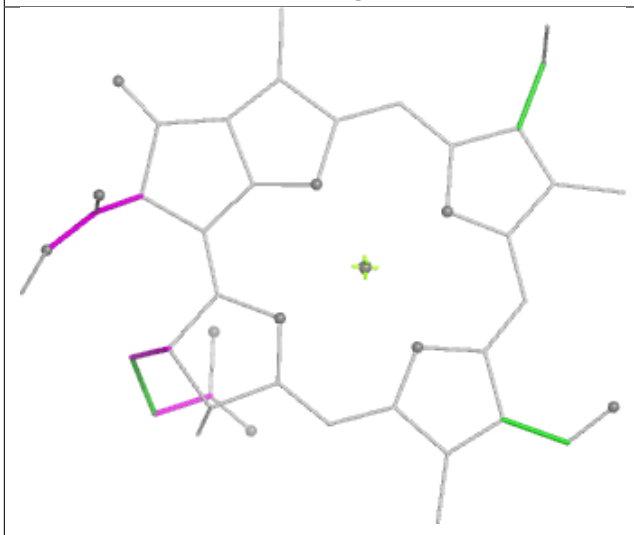
Ligand CL7 B 1220



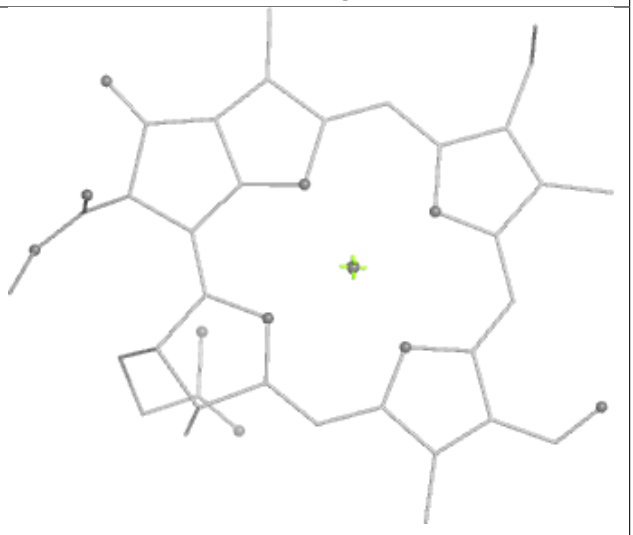
Bond lengths



Bond angles

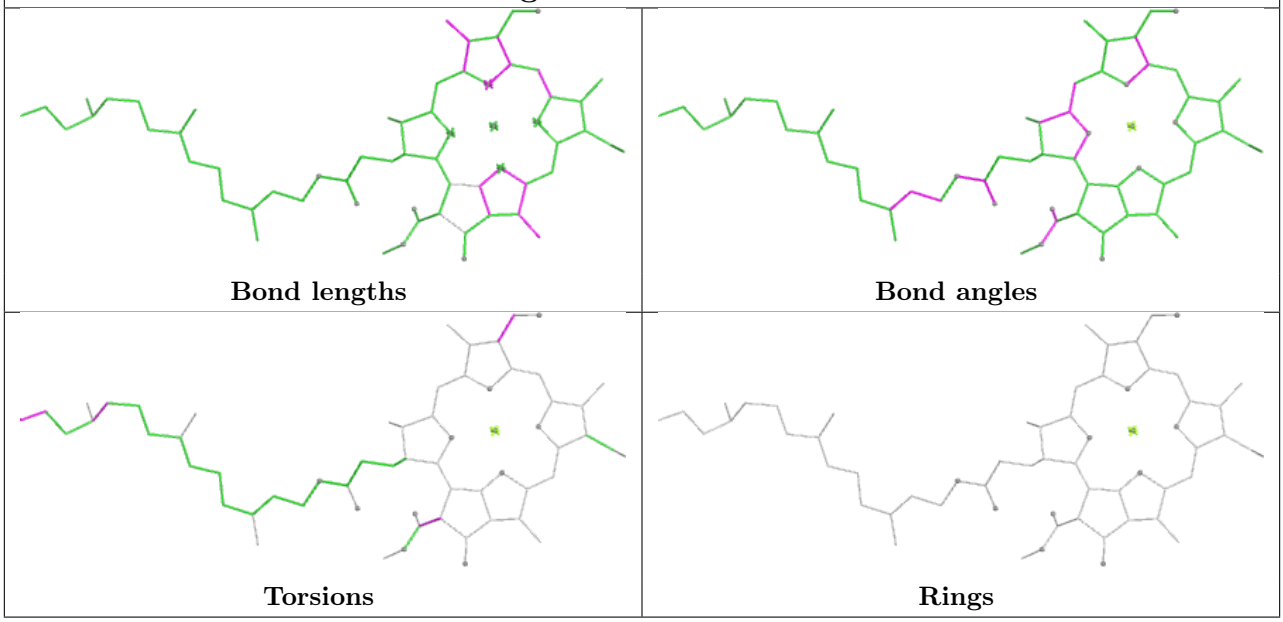


Torsions



Rings

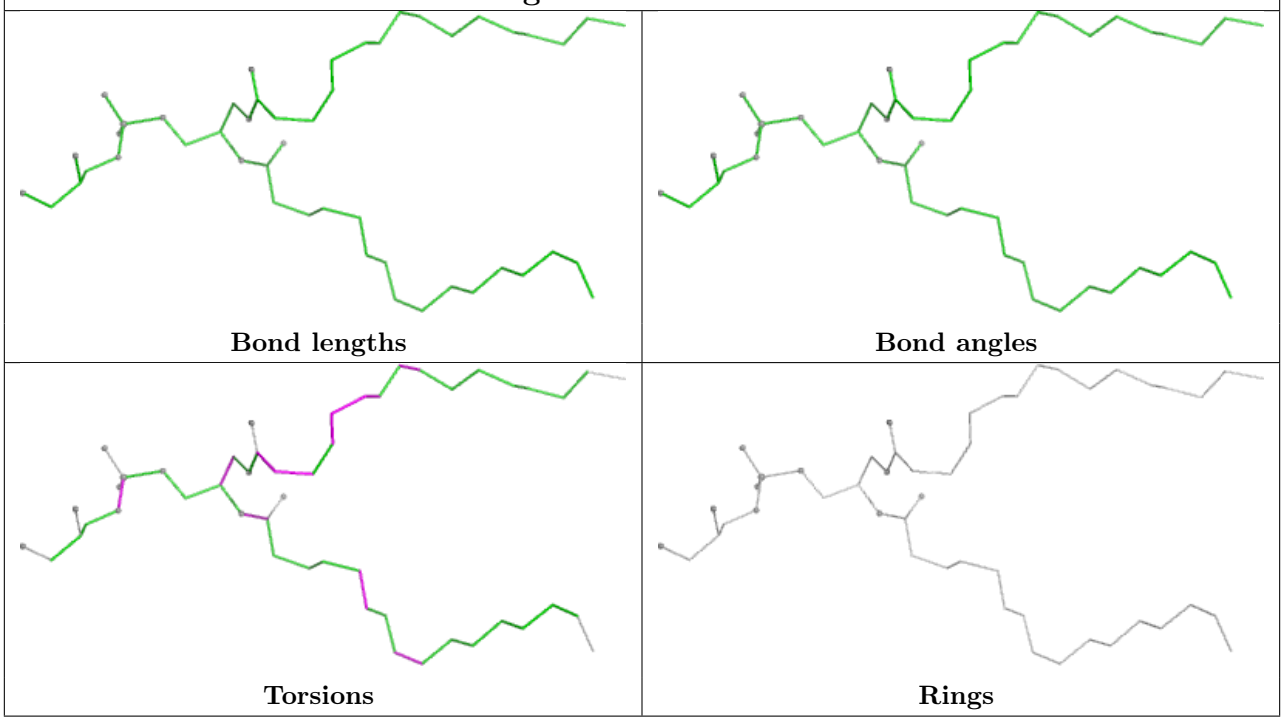
Ligand CL7 A 1131



Bond lengths | Bond angles

Torsions | Rings

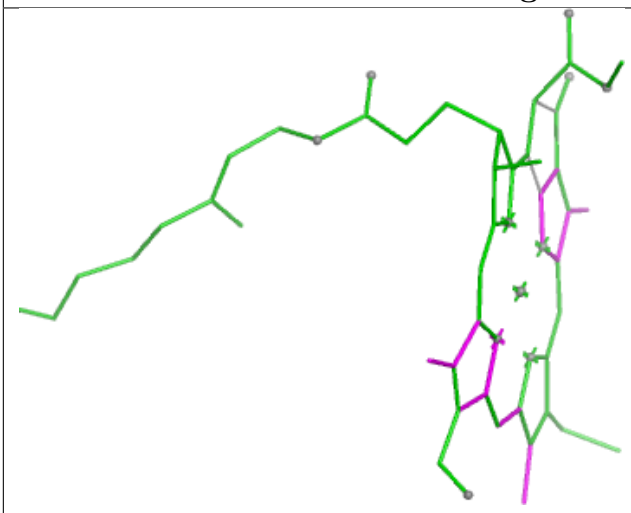
Ligand LHG A 852



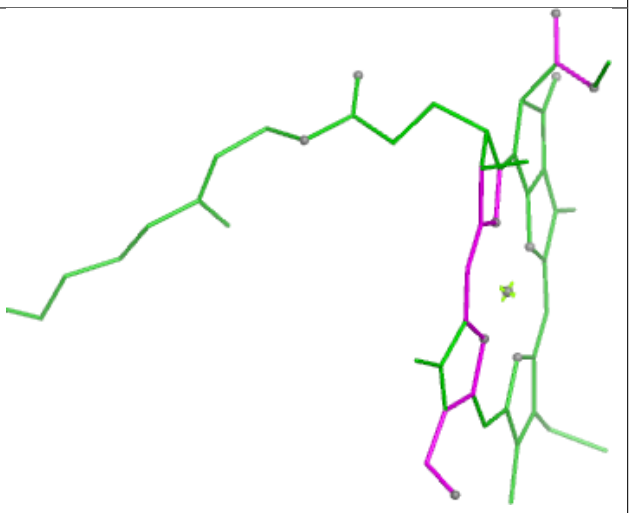
Bond lengths | Bond angles

Torsions | Rings

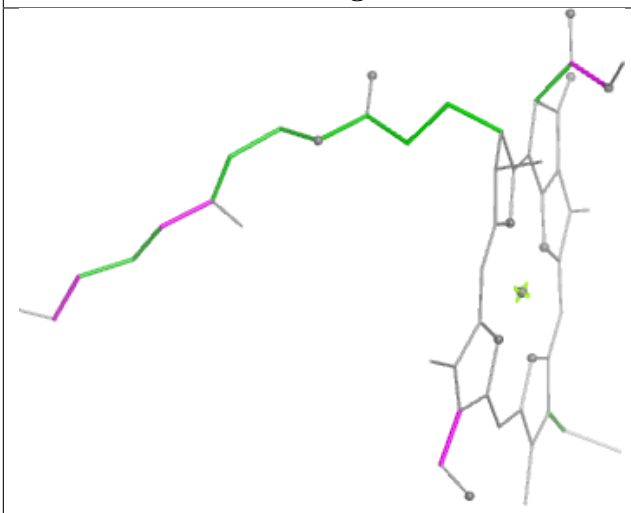
Ligand CL7 B 1201



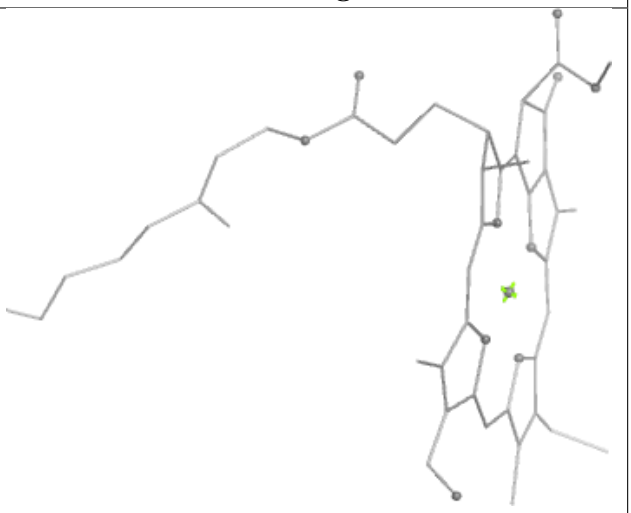
Bond lengths



Bond angles

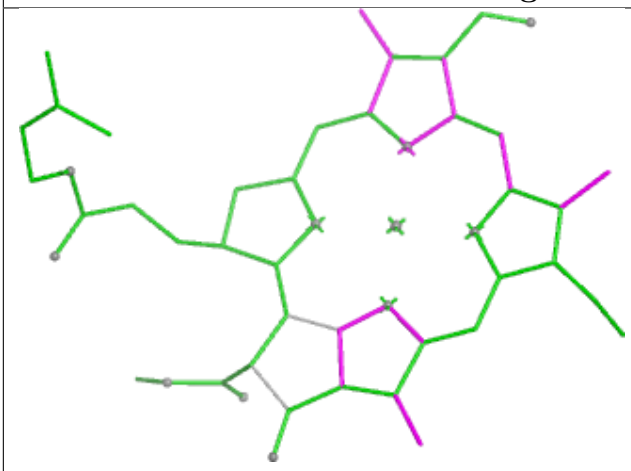


Torsions

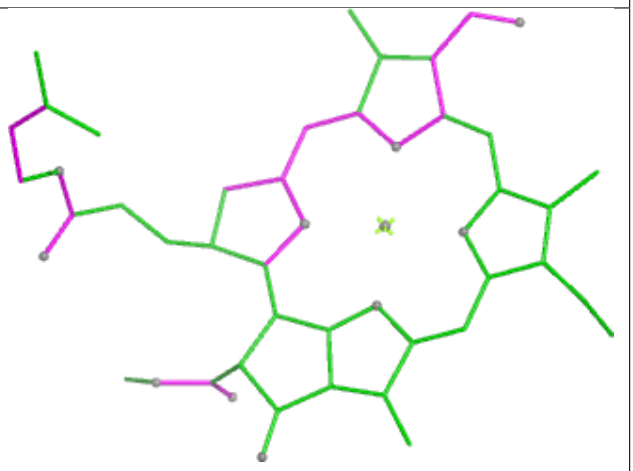


Rings

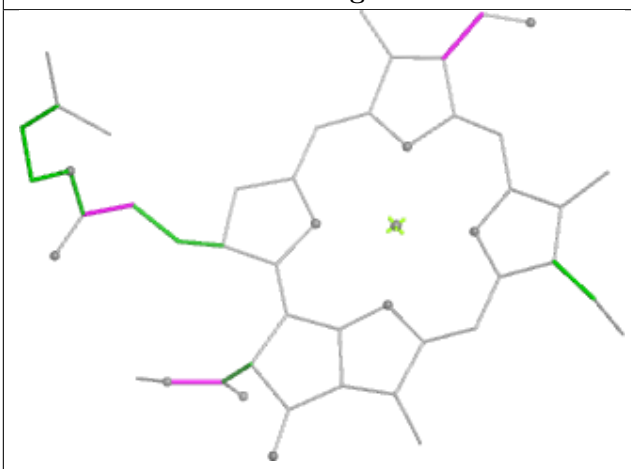
Ligand CL7 B 1206



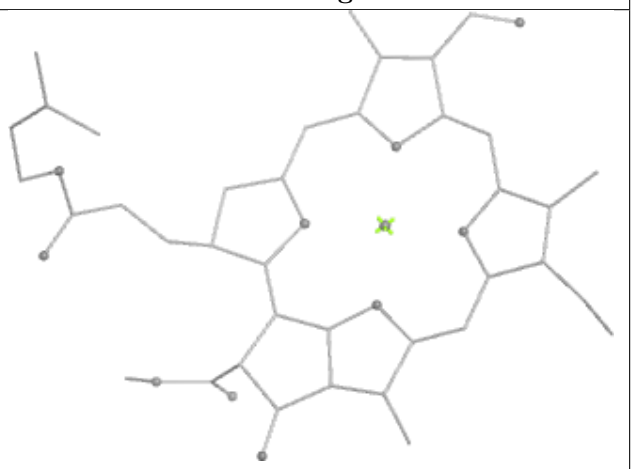
Bond lengths



Bond angles

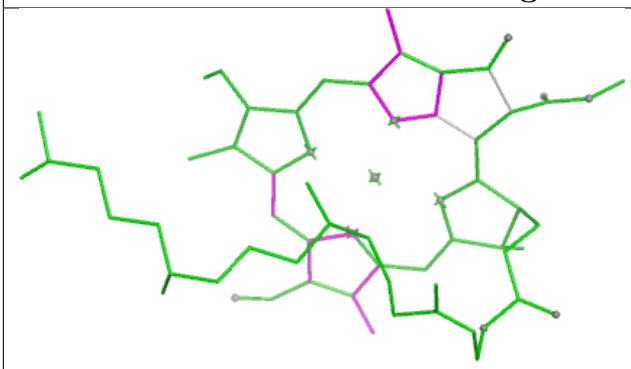


Torsions

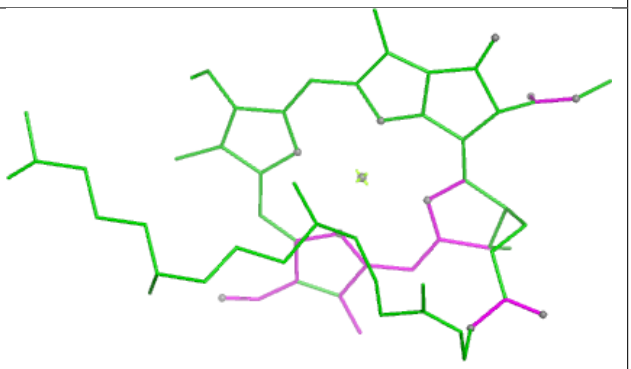


Rings

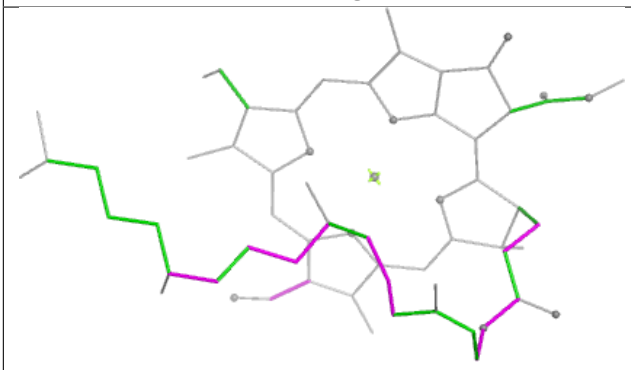
Ligand CL7 B 1214



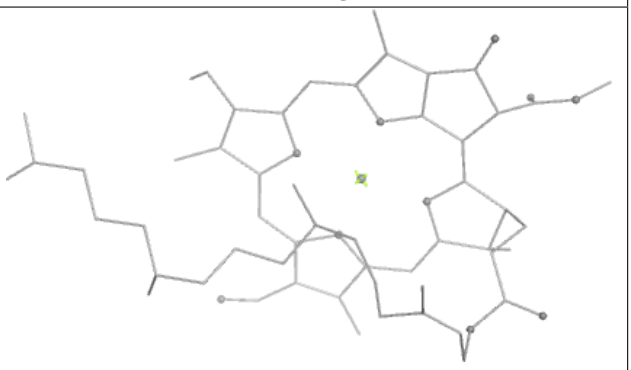
Bond lengths



Bond angles



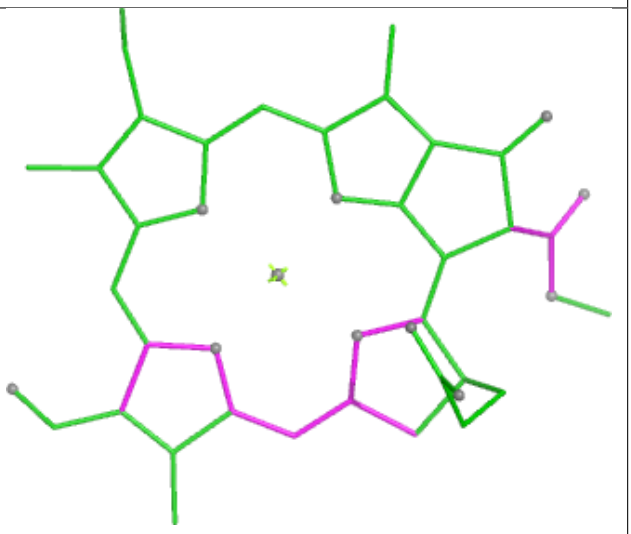
Torsions



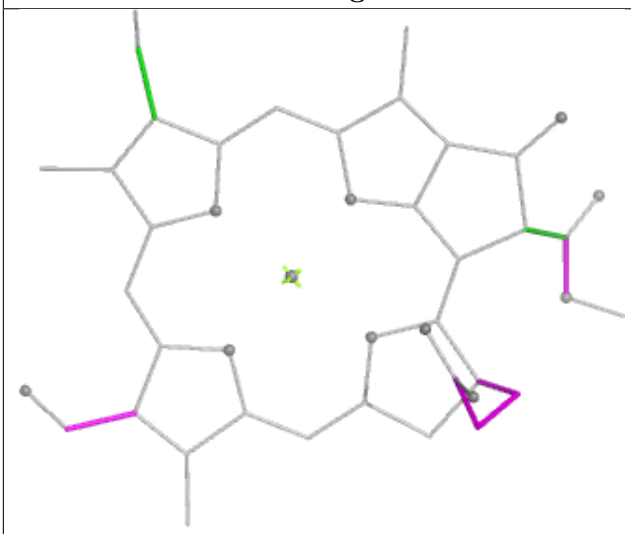
Rings

Ligand CL7 A 1134

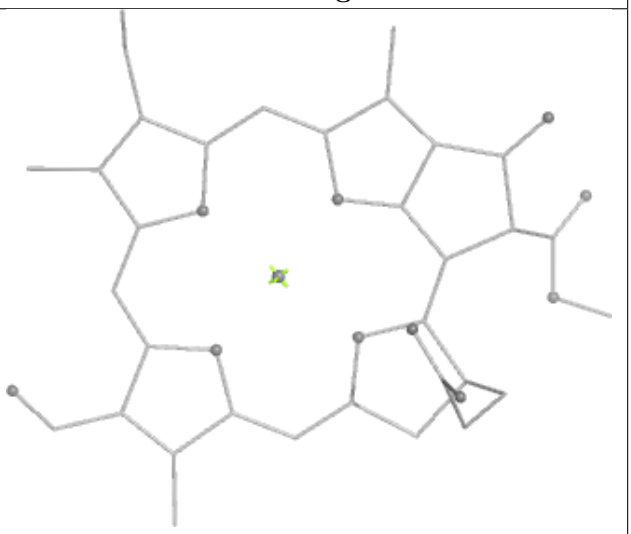
Bond lengths



Bond angles

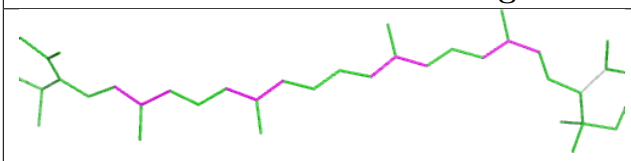


Torsions

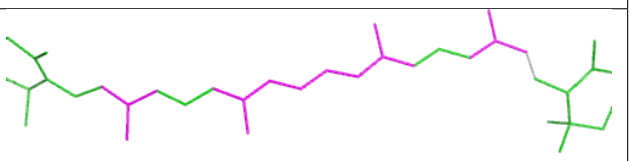


Rings

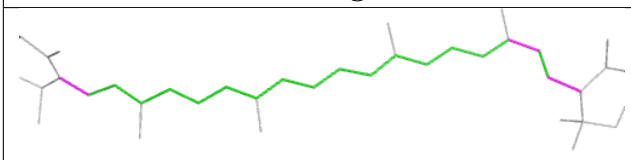
Ligand A1JPJ A 4008



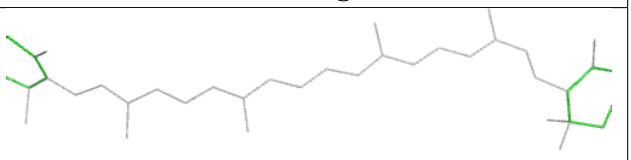
Bond lengths



Bond angles

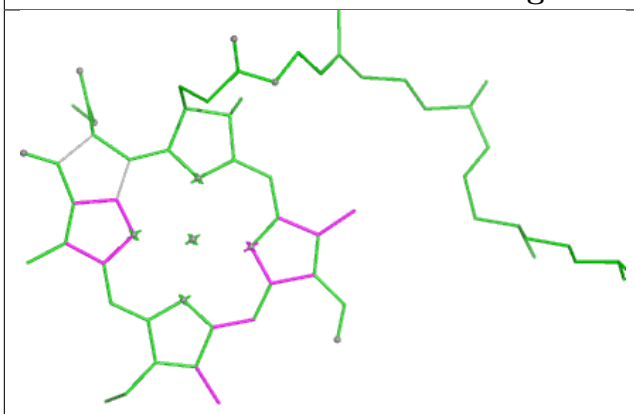


Torsions

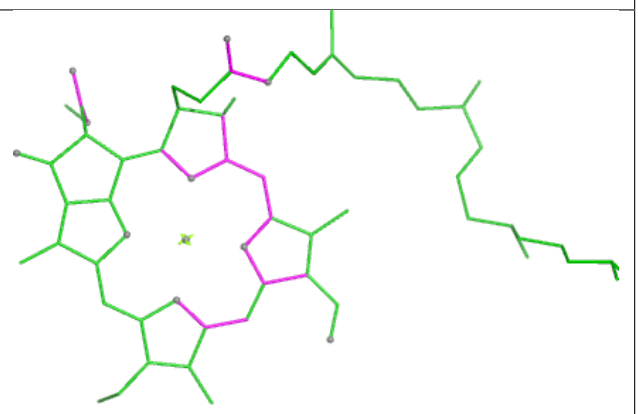


Rings

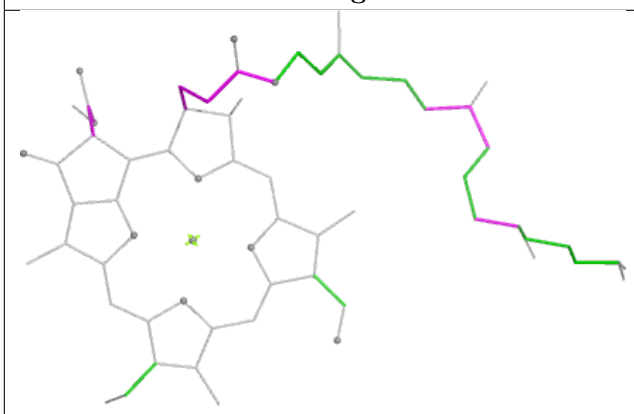
Ligand CL7 I 1601



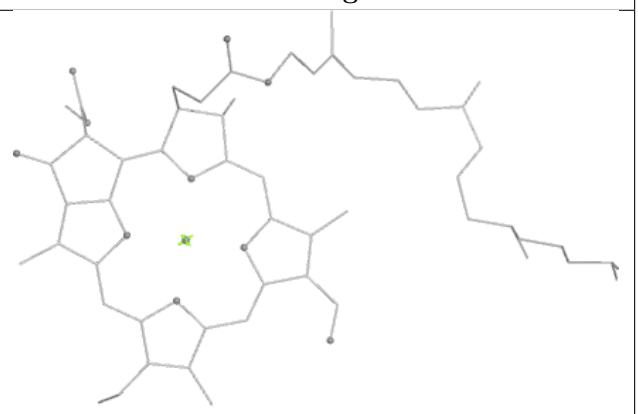
Bond lengths



Bond angles

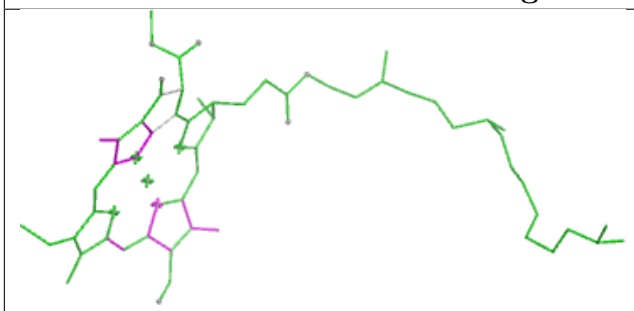


Torsions

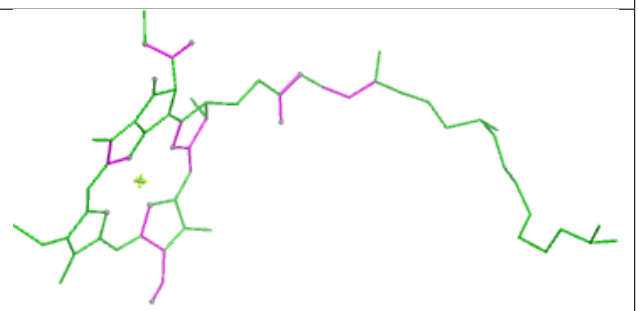


Rings

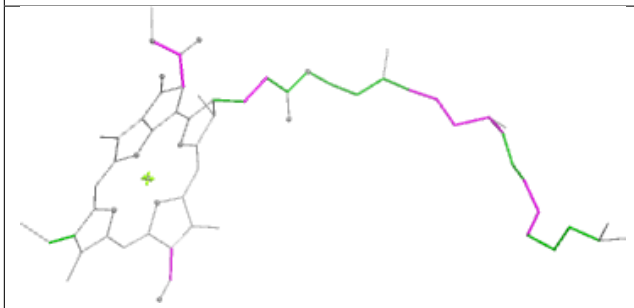
Ligand CL7 B 1021



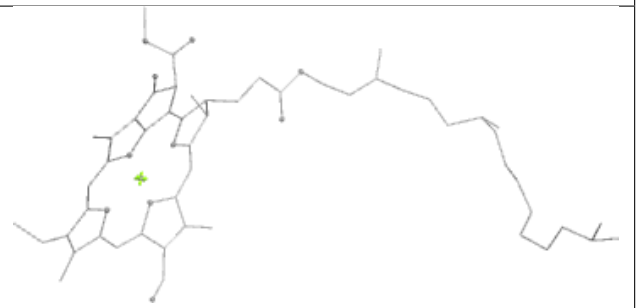
Bond lengths



Bond angles

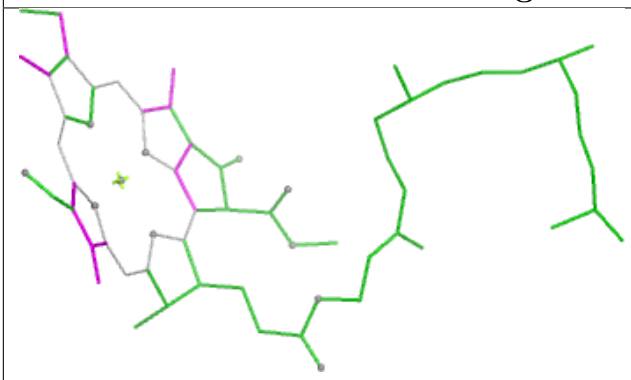


Torsions

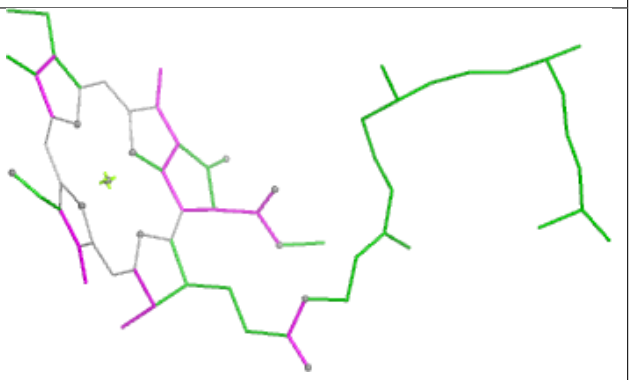


Rings

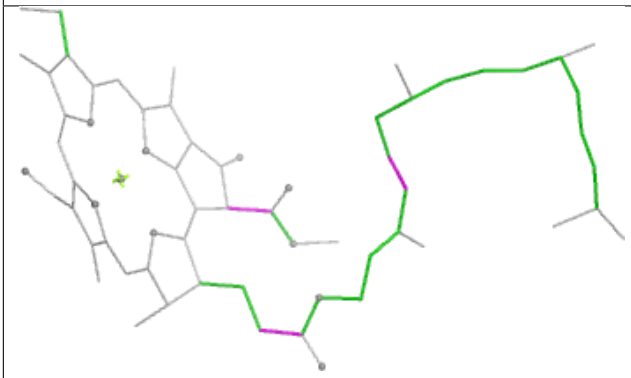
Ligand G9R A 1011



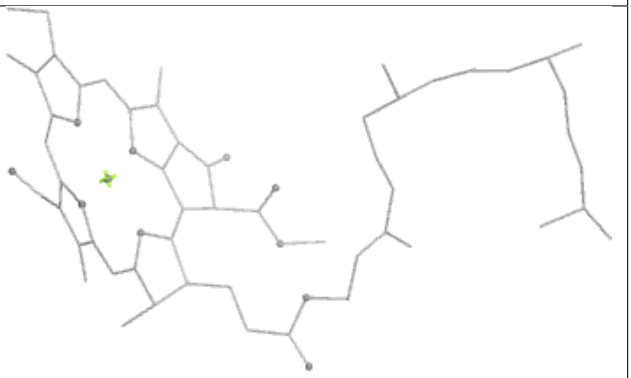
Bond lengths



Bond angles

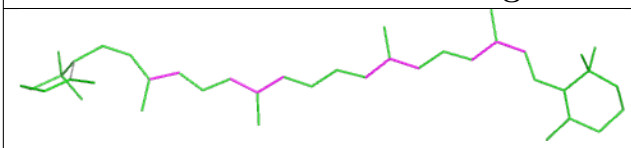


Torsions

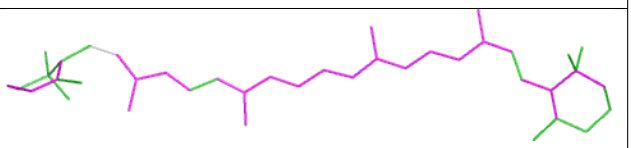


Rings

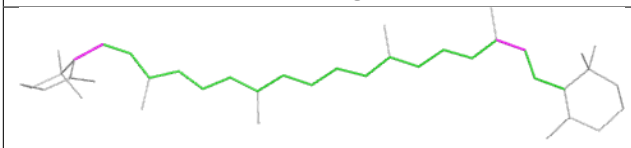
Ligand A1JPJ J 4012



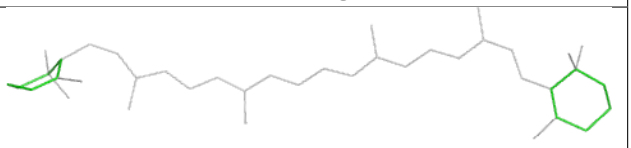
Bond lengths



Bond angles

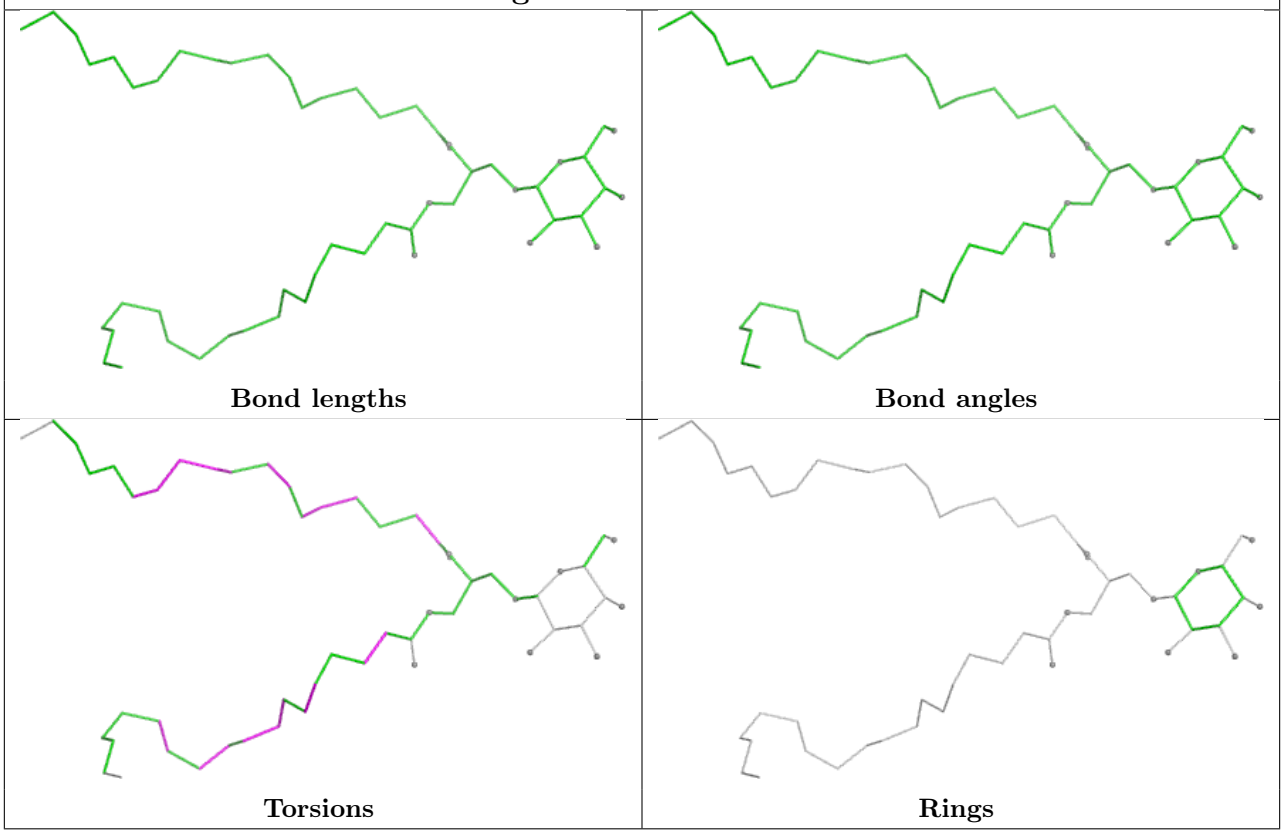


Torsions

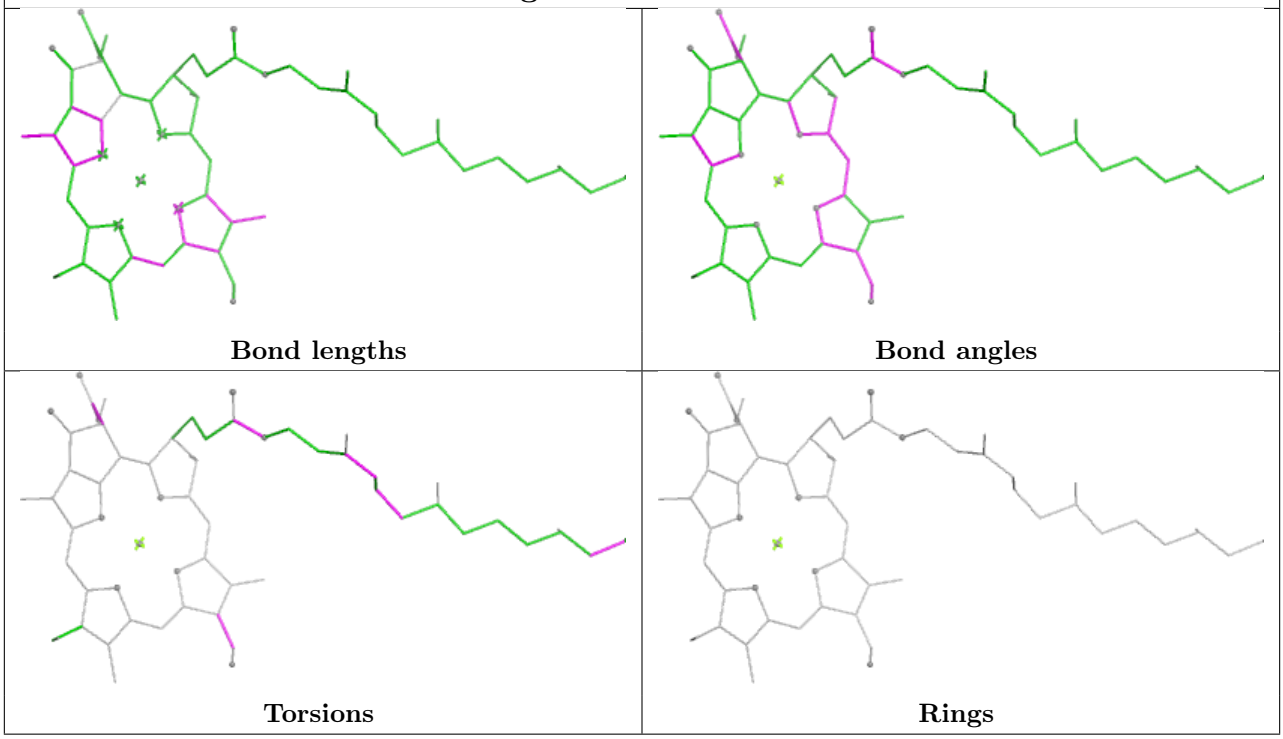


Rings

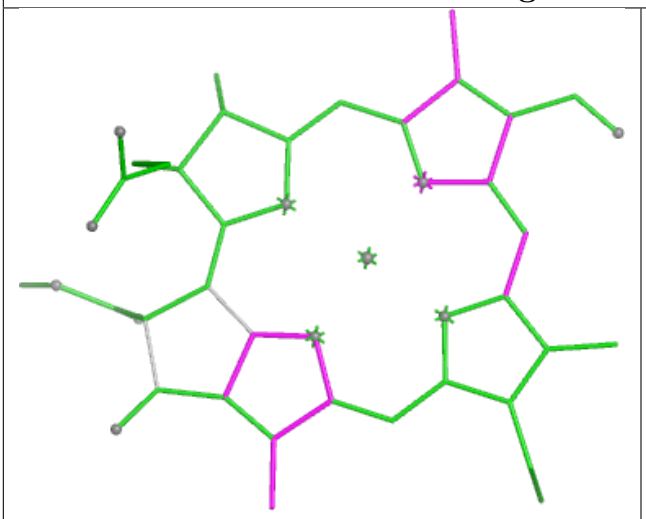
Ligand LMG B 8002



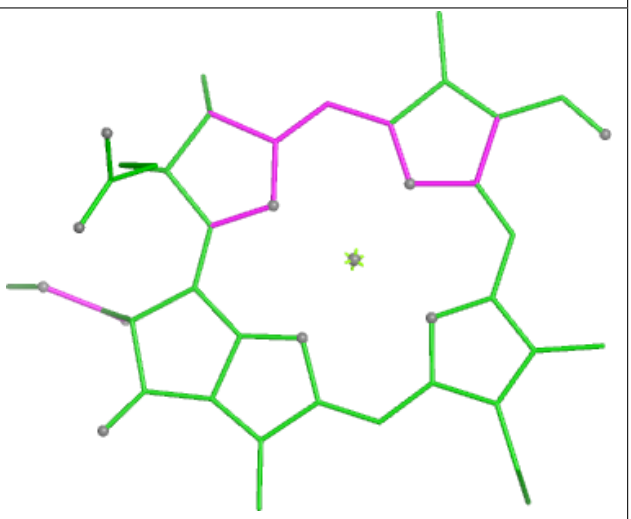
Ligand CL7 A 1132



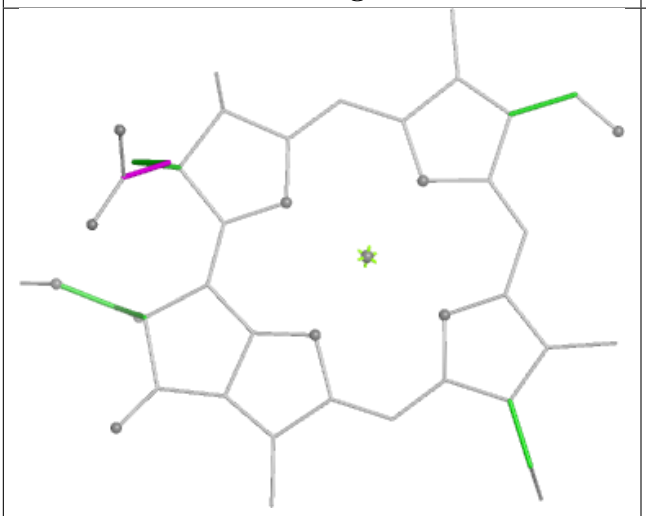
Ligand CL7 K 1401



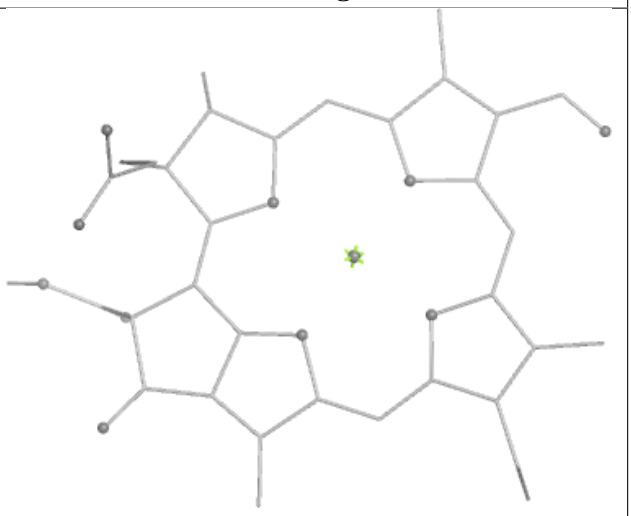
Bond lengths



Bond angles

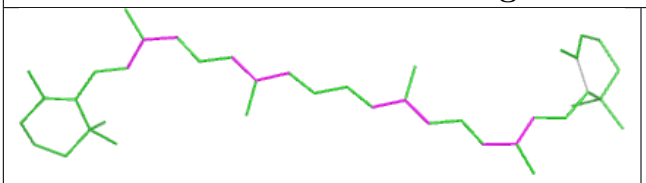


Torsions



Rings

Ligand A1JPJ B 4006



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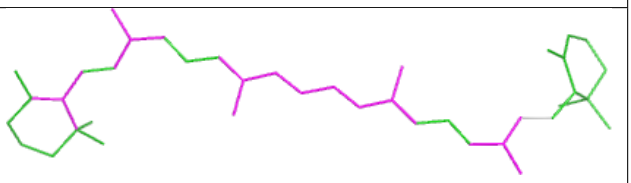
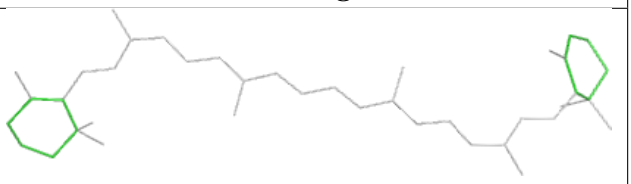


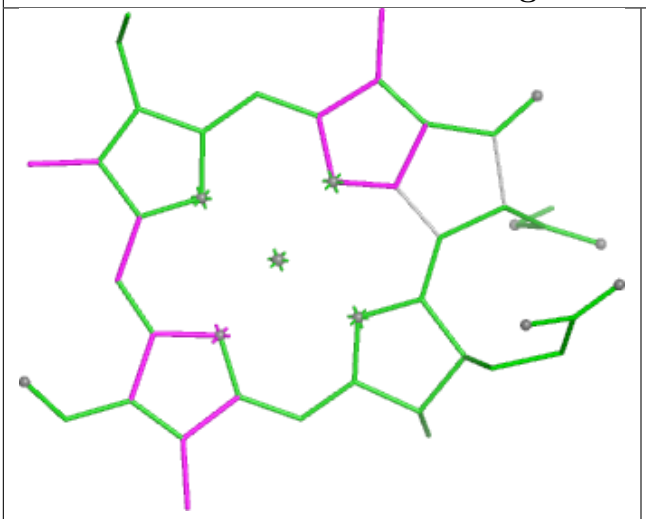
Bond angles

Torsions



Rings

Ligand CL7 A 1113



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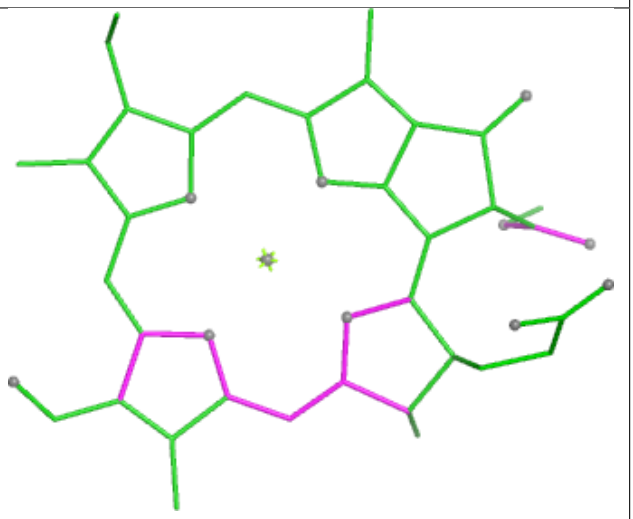
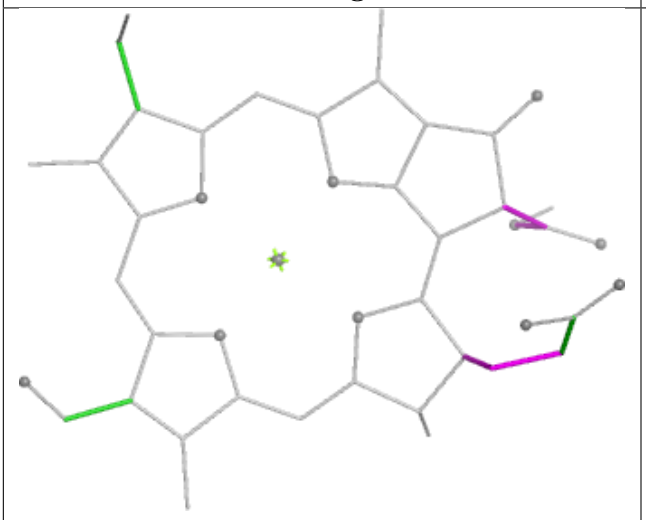


Bond angles



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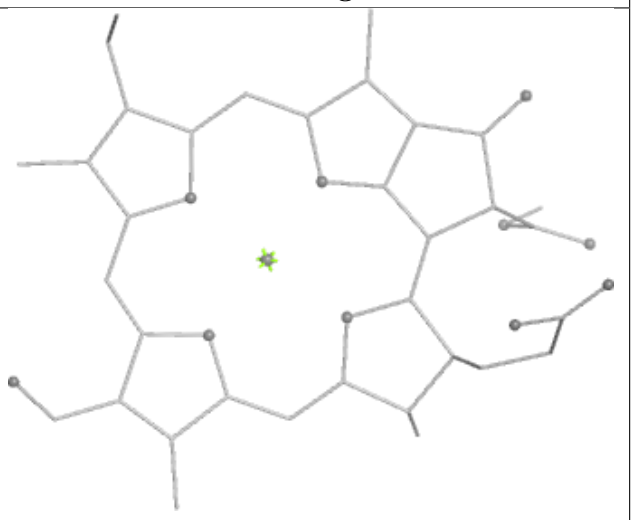
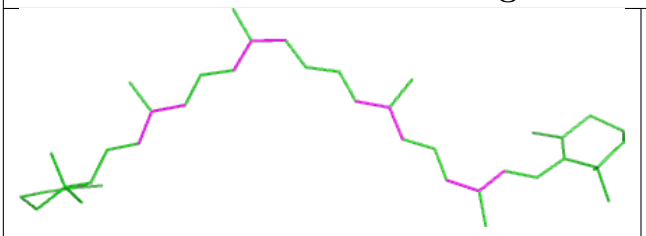
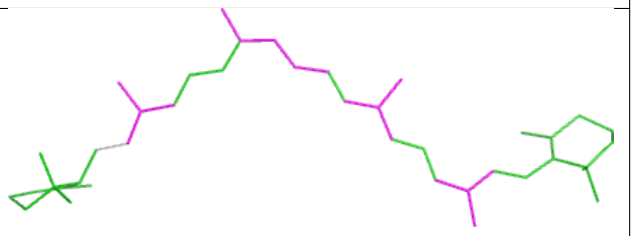


Rings

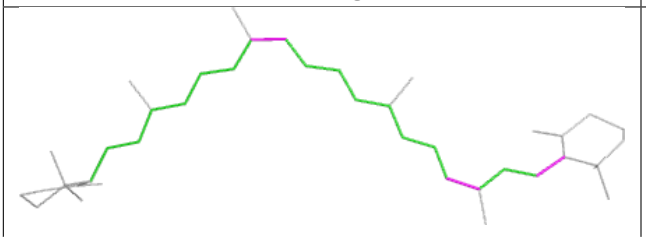
Ligand A1JPJ B 4011



Bond lengths



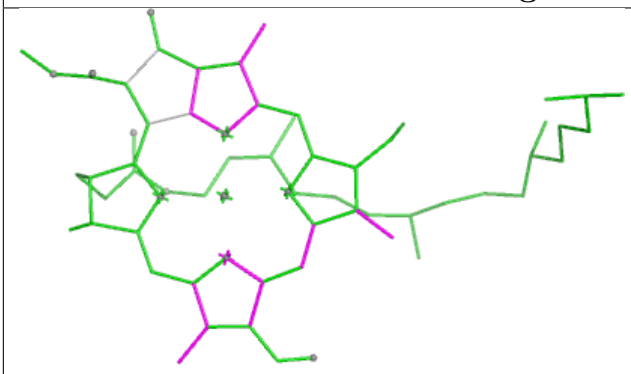
Bond angles



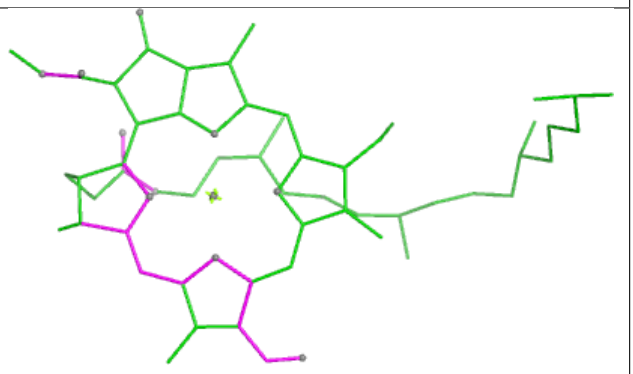
Torsions

Rings

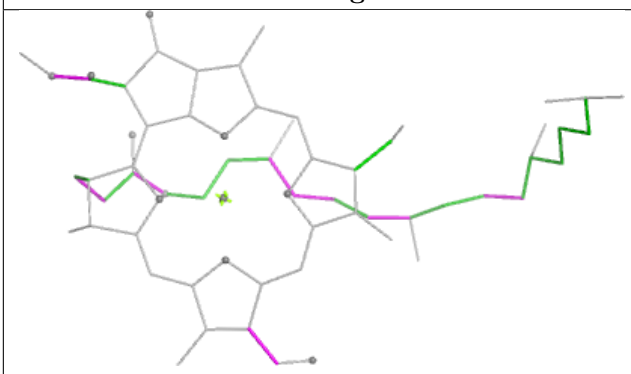
Ligand CL7 A 1119



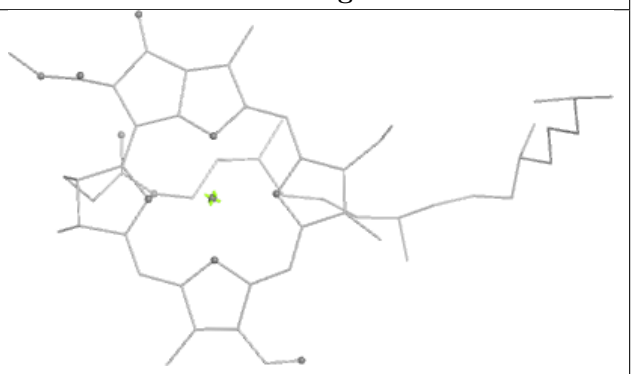
Bond lengths



Bond angles



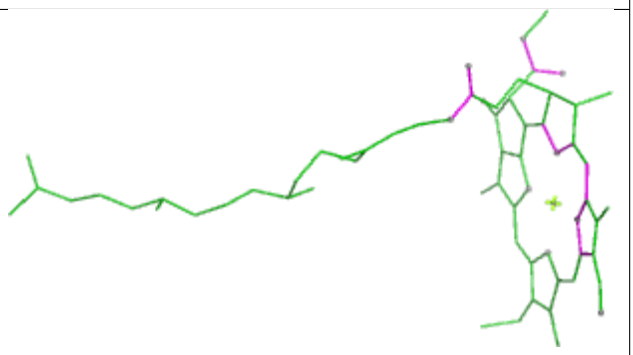
Torsions



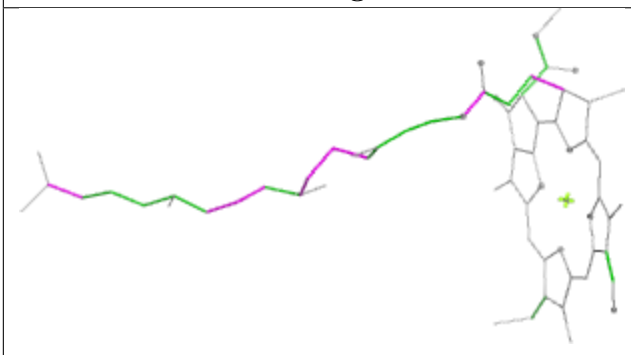
Rings

Ligand CL7 B 1225

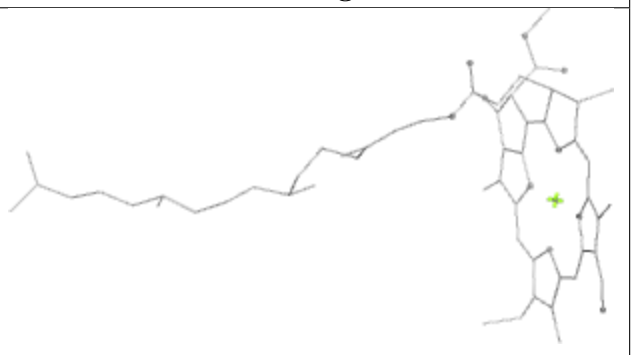
Bond lengths



Bond angles

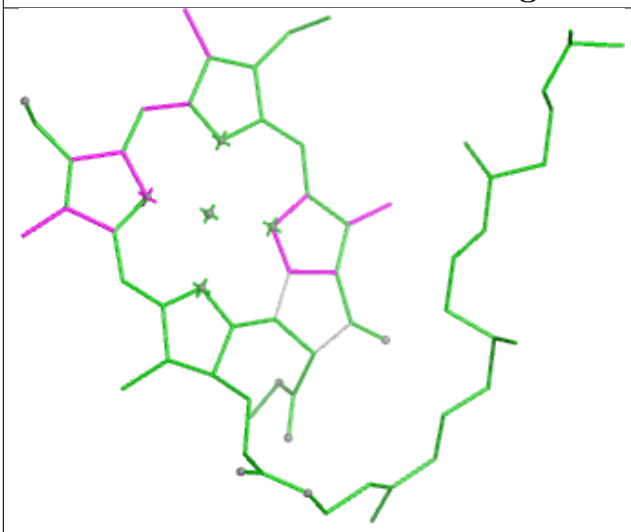


Torsions

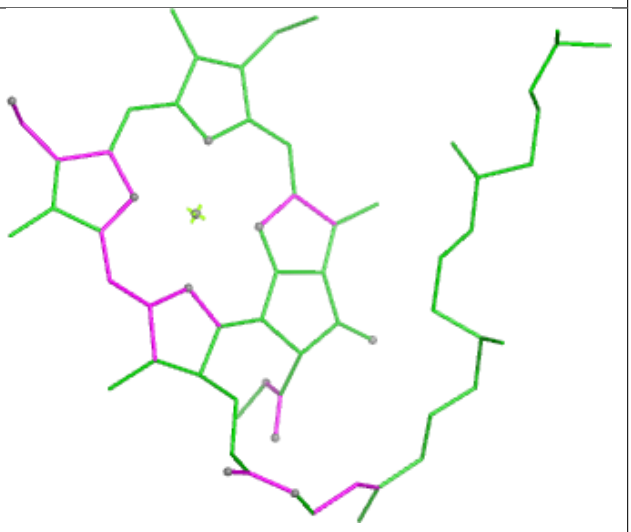


Rings

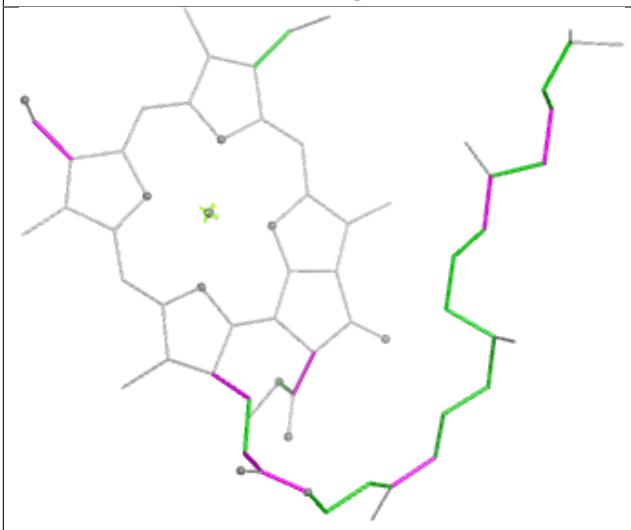
Ligand CL7 A 1123



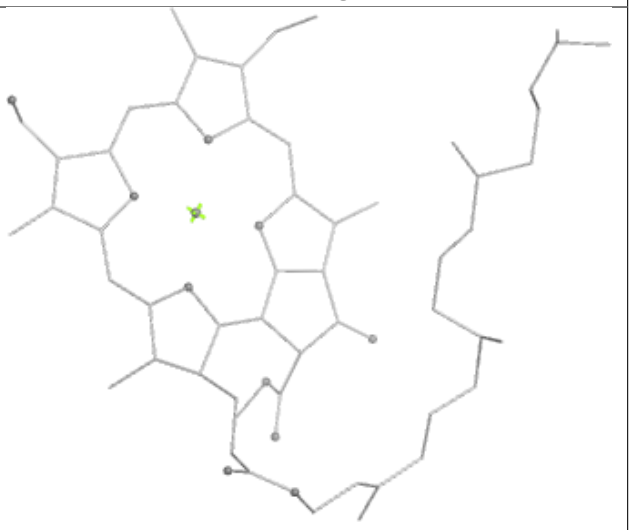
Bond lengths



Bond angles

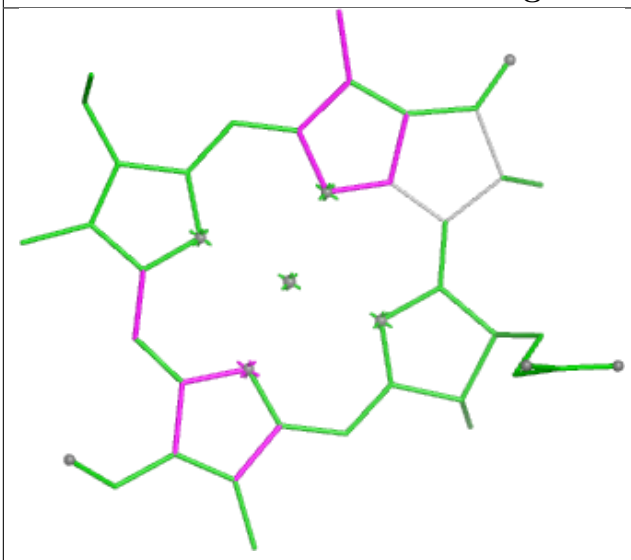


Torsions

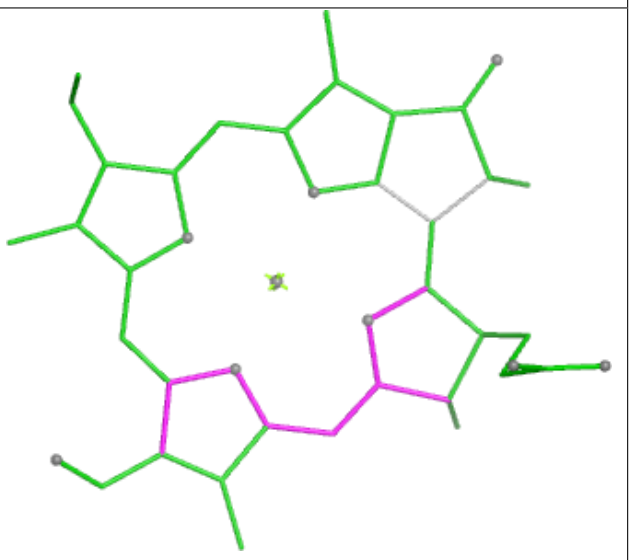


Rings

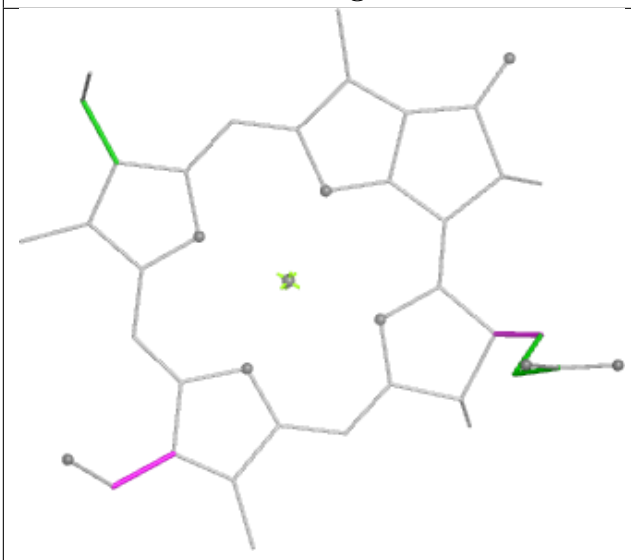
Ligand CL7 J 1302



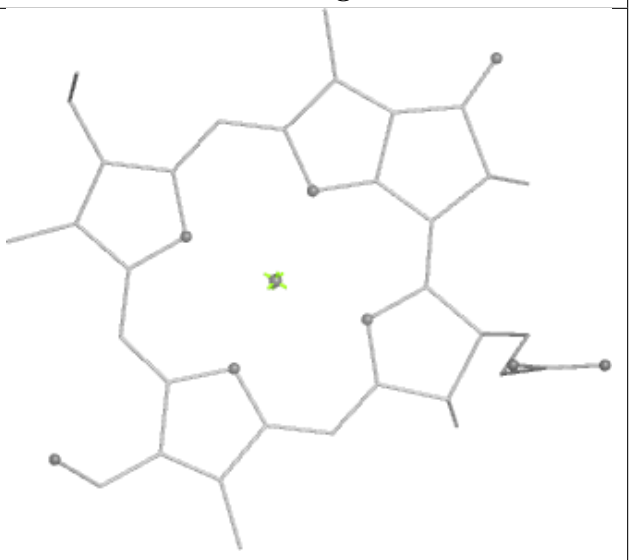
Bond lengths



Bond angles

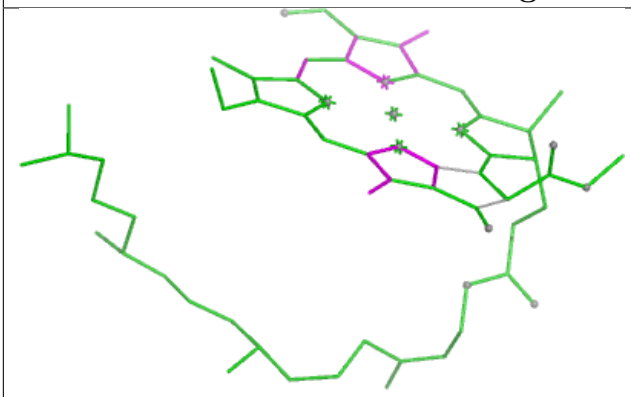


Torsions

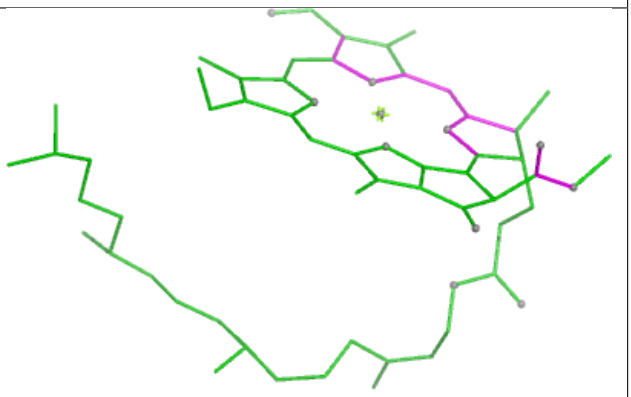


Rings

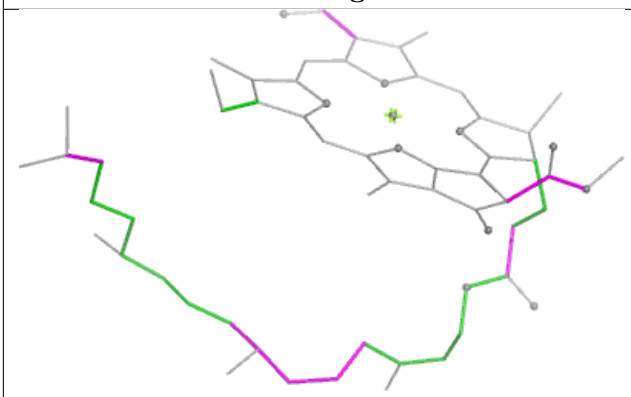
Ligand CL7 A 1122



Bond lengths



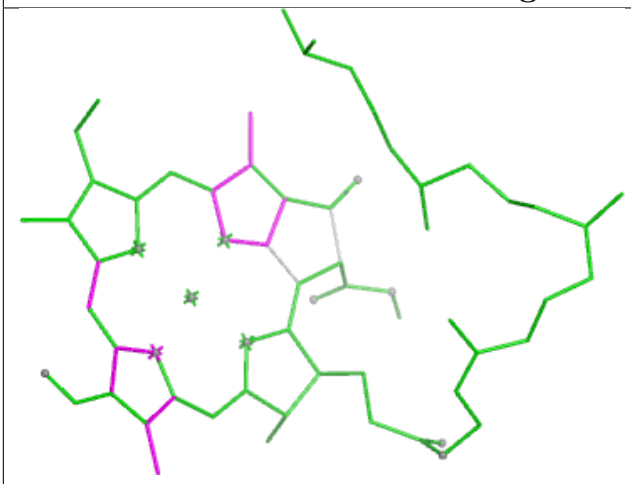
Bond angles



Torsions

Rings

Ligand CL7 A 1127



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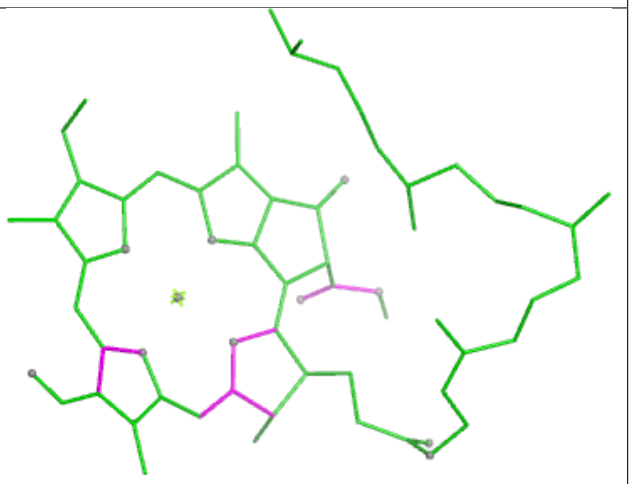
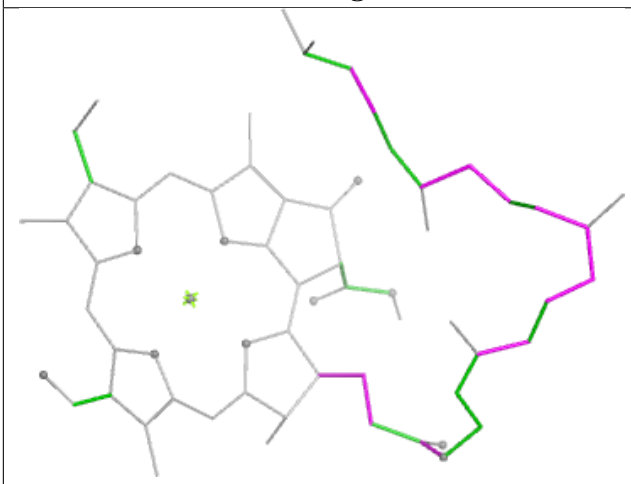
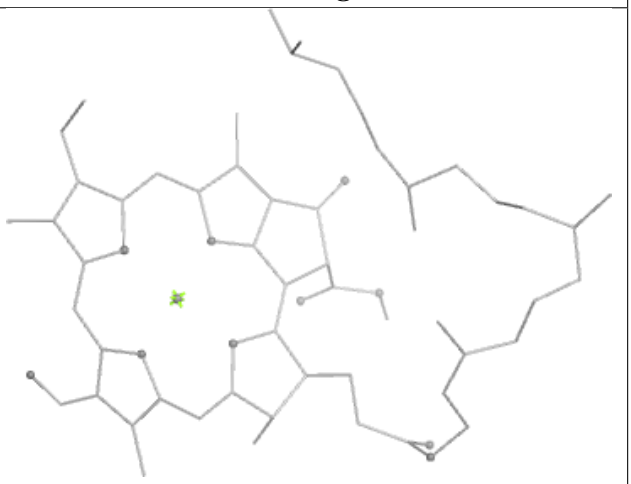


Bond angles

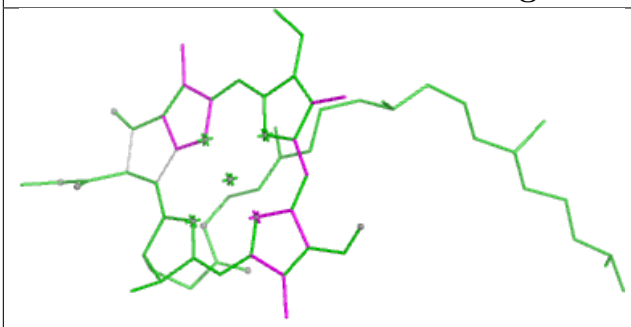


Torsions



Rings

Ligand CL7 A 1140



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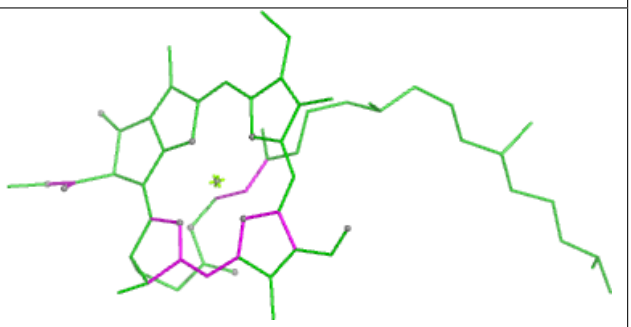
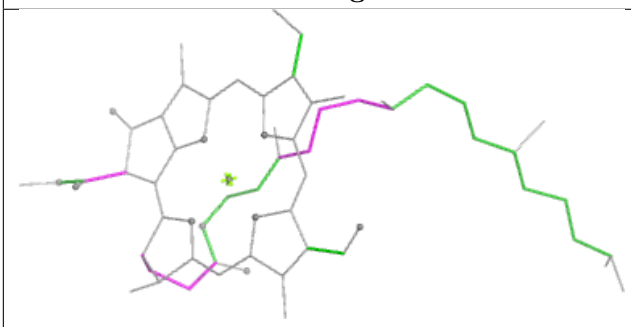
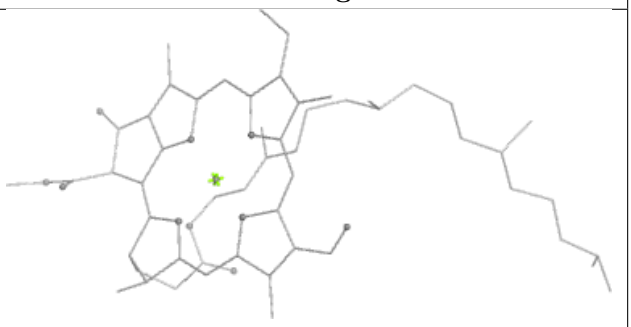


Bond angles

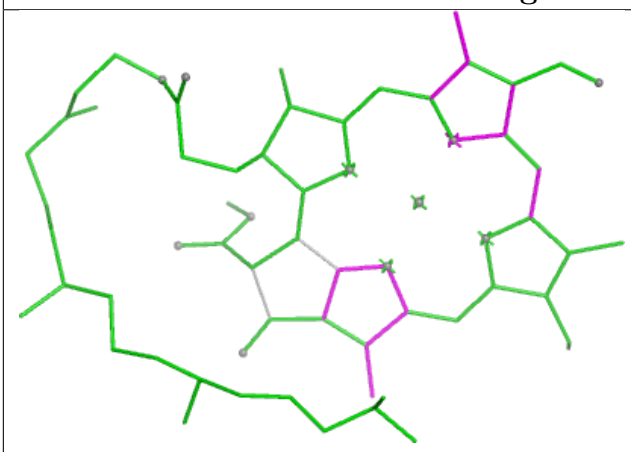


Torsions

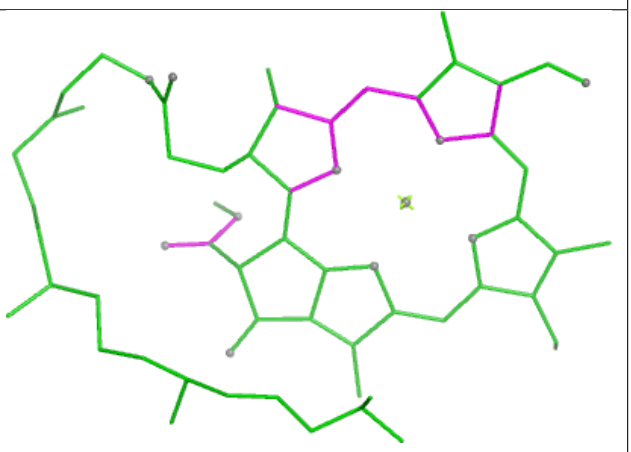


Rings

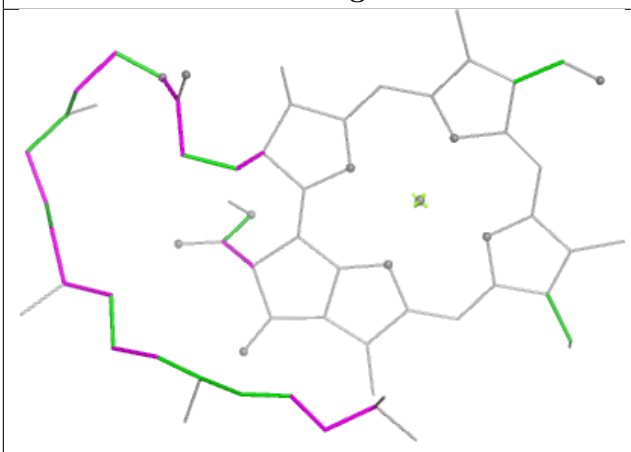
Ligand CL7 B 1202



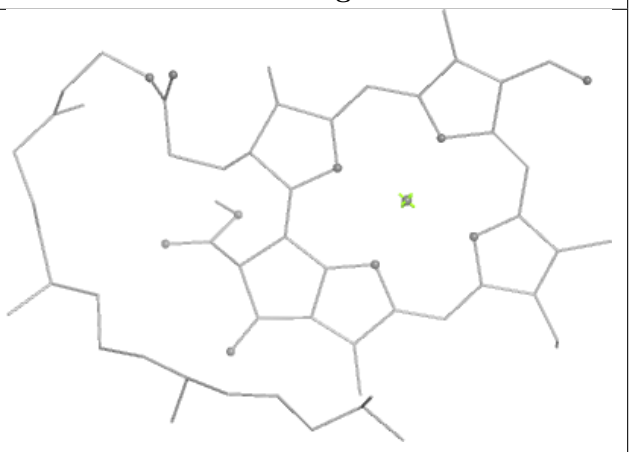
Bond lengths



Bond angles

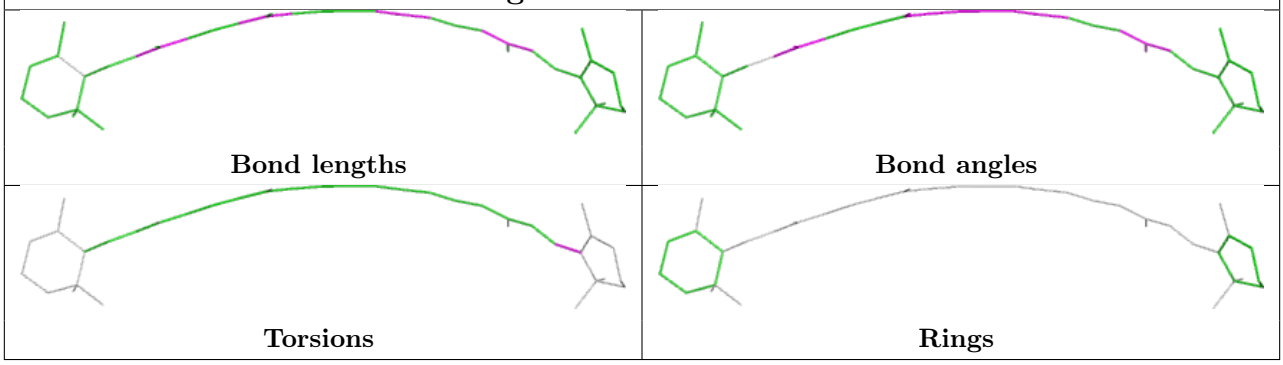


Torsions

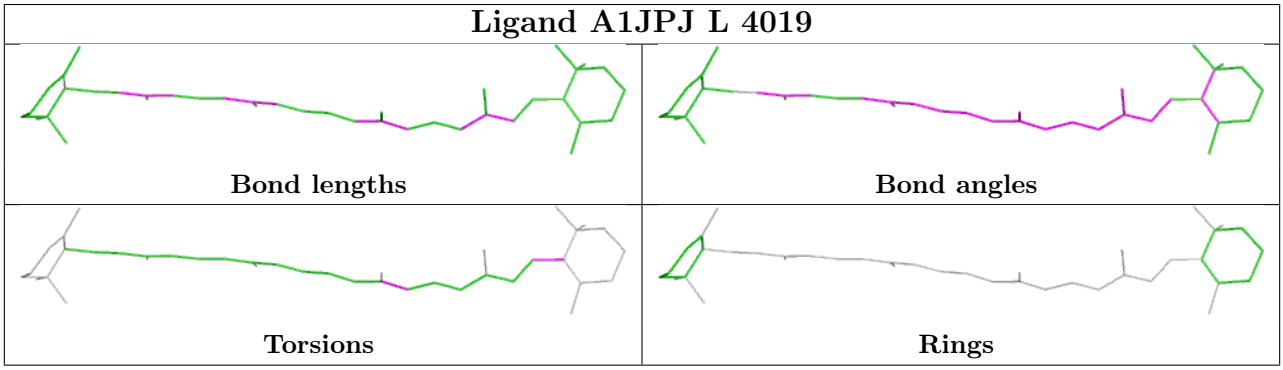


Rings

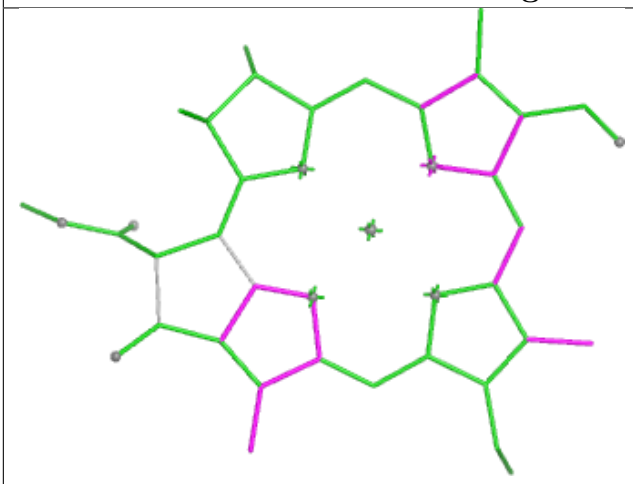
Ligand A1JPJ I 4118



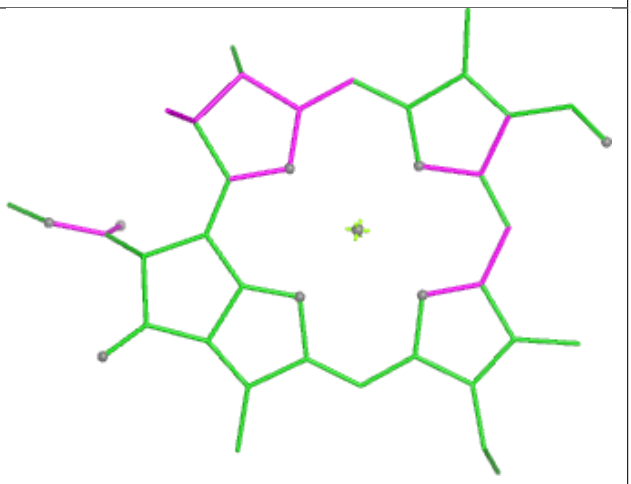
Ligand A1JPJ L 4019



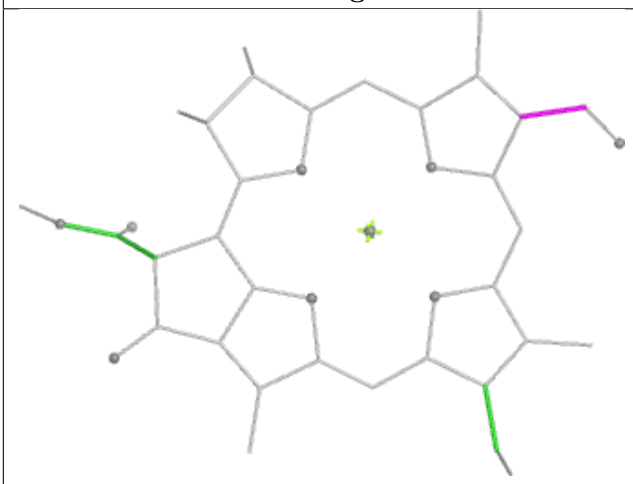
Ligand CL7 F 1701



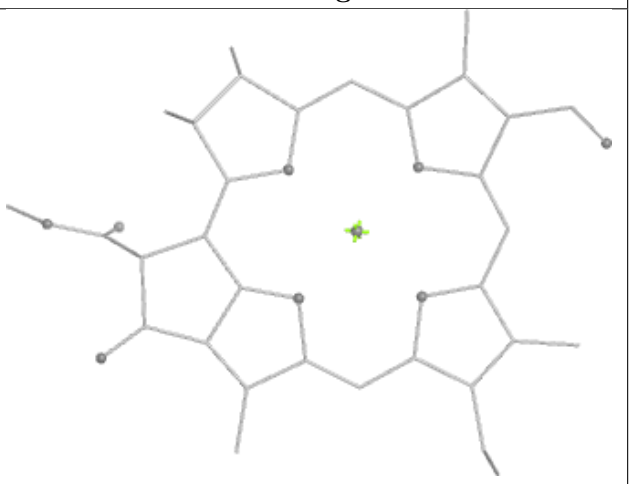
Bond lengths



Bond angles

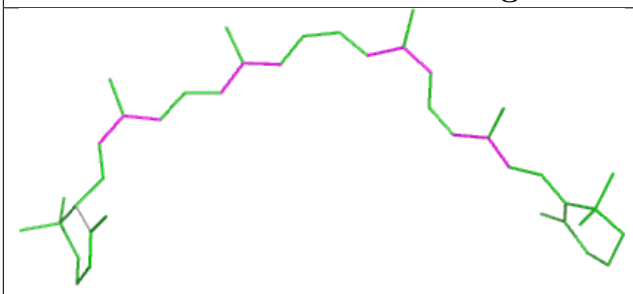


Torsions

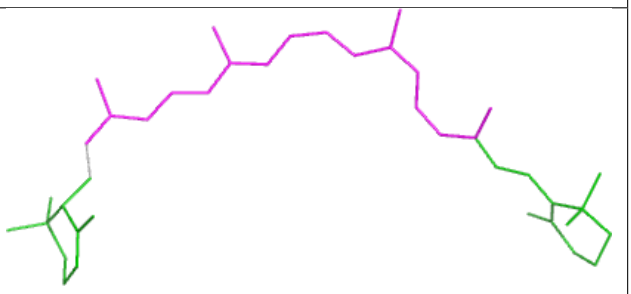


Rings

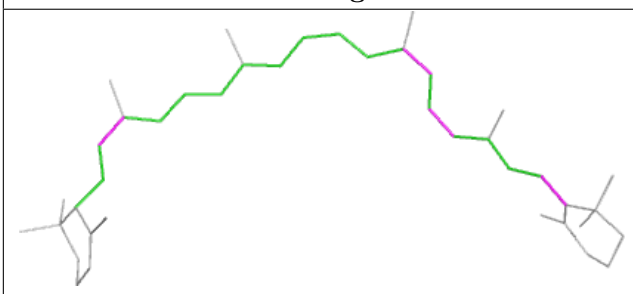
Ligand A1JPJ F 4016



Bond lengths



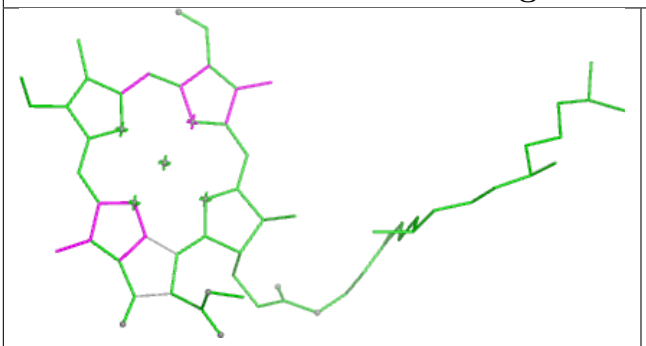
Bond angles



Torsions

Rings

Ligand CL7 A 1111



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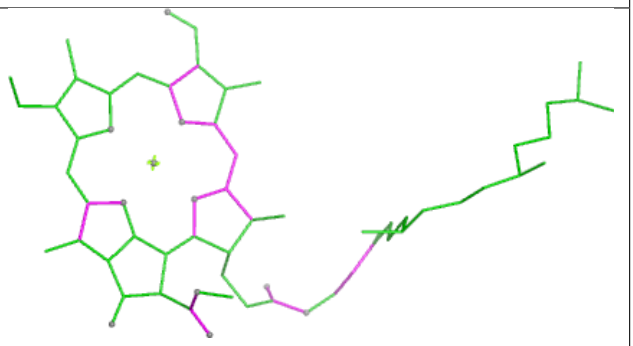
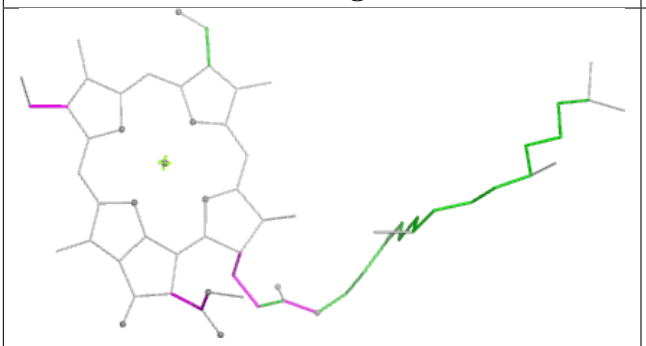
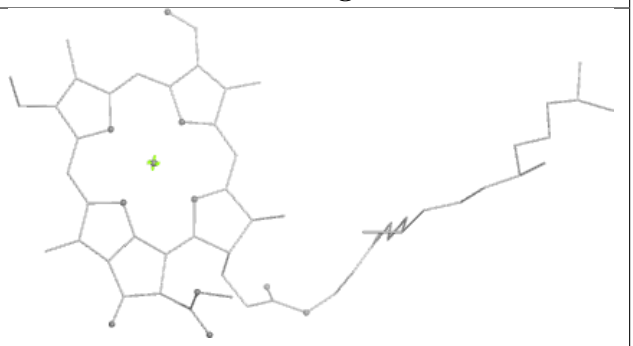


Bond angles

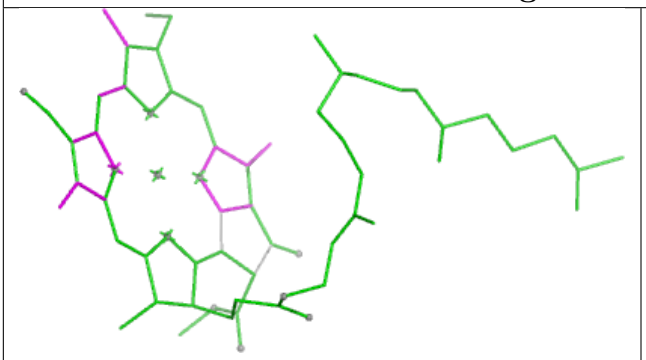


Torsions

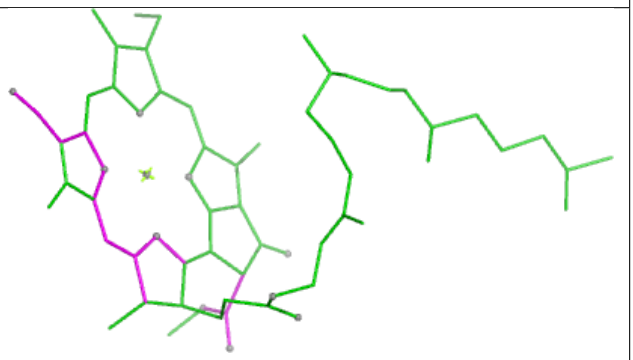


Rings

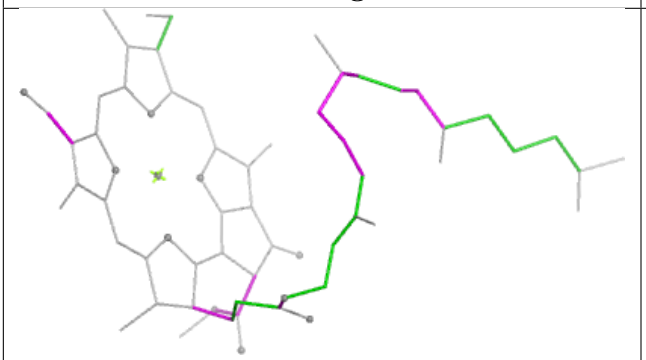
Ligand CL7 A 1112



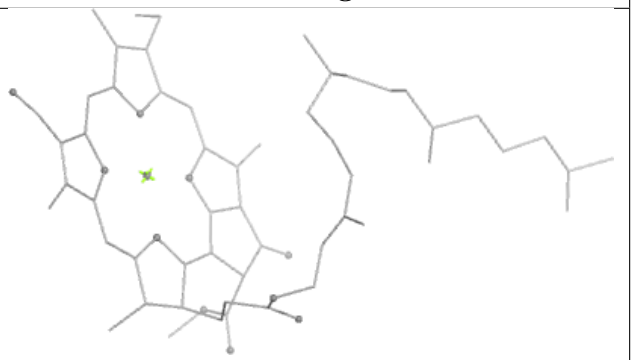
Bond lengths



Bond angles

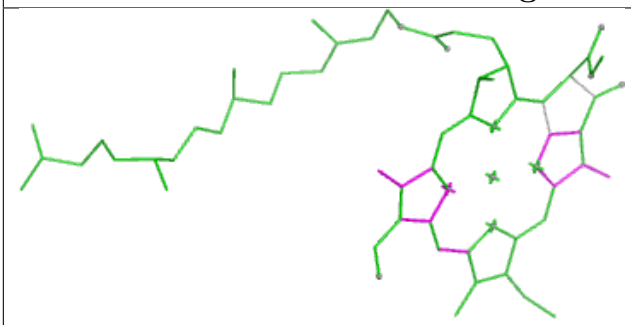


Torsions



Rings

Ligand CL7 A 1106



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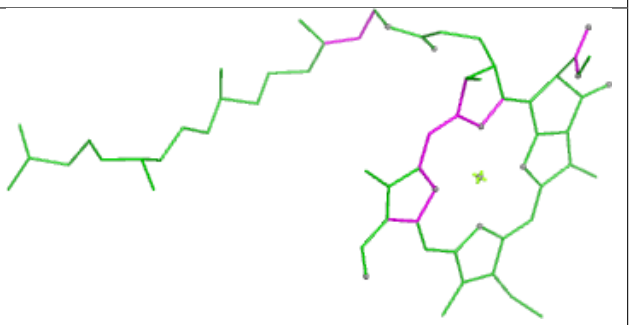
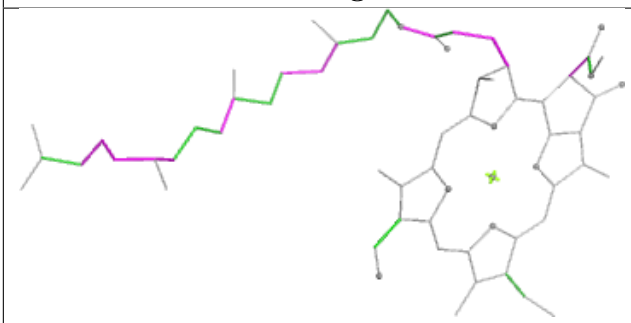


Bond angles



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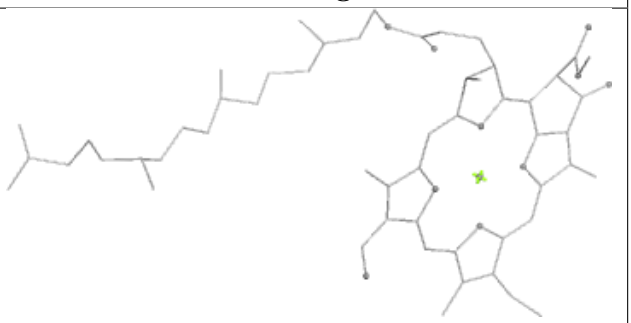
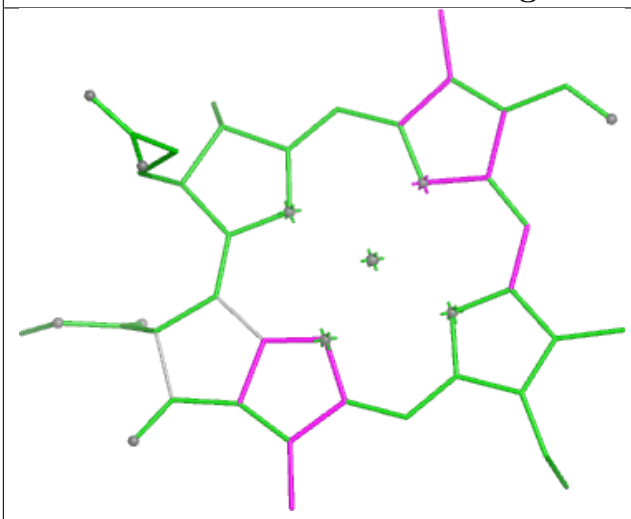
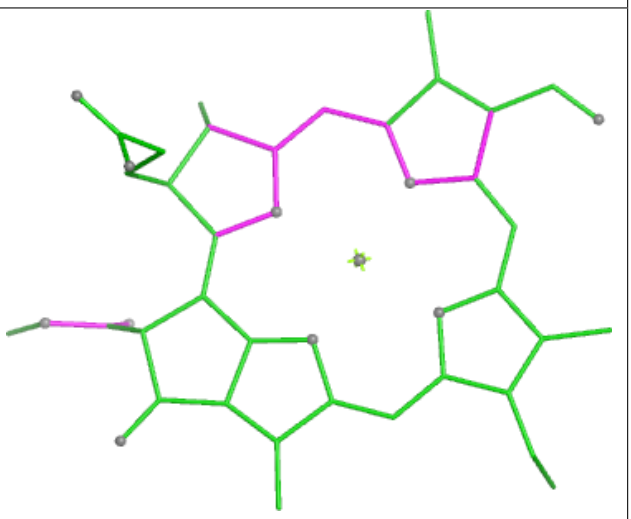


Rings

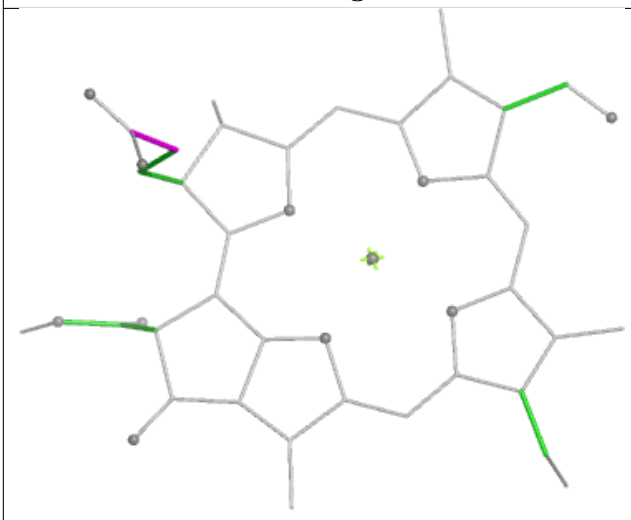
Ligand CL7 A 1114



Bond lengths



Bond angles



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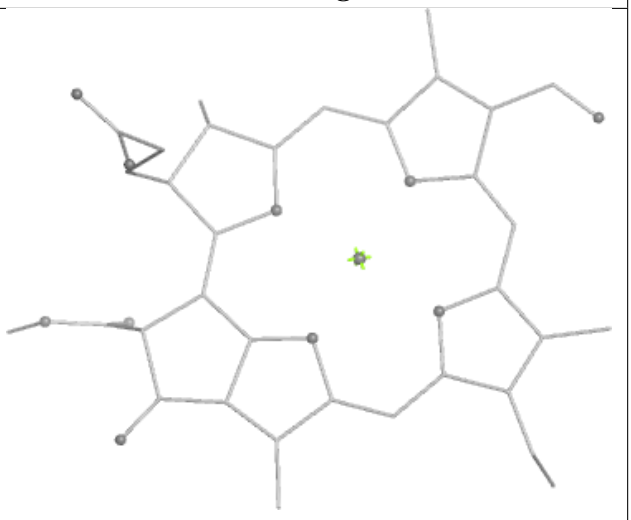
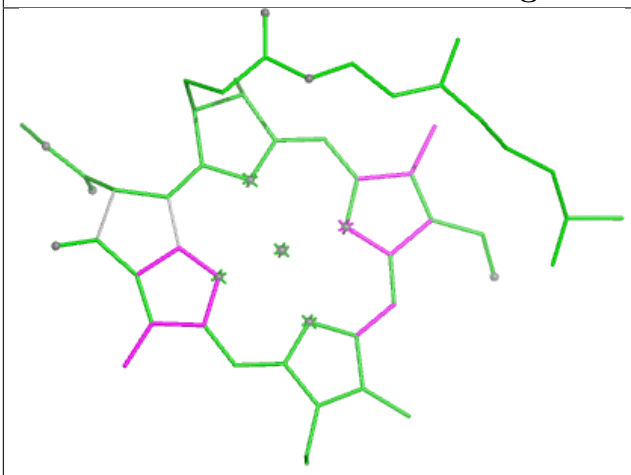


Rings

Ligand CL7 B 1215



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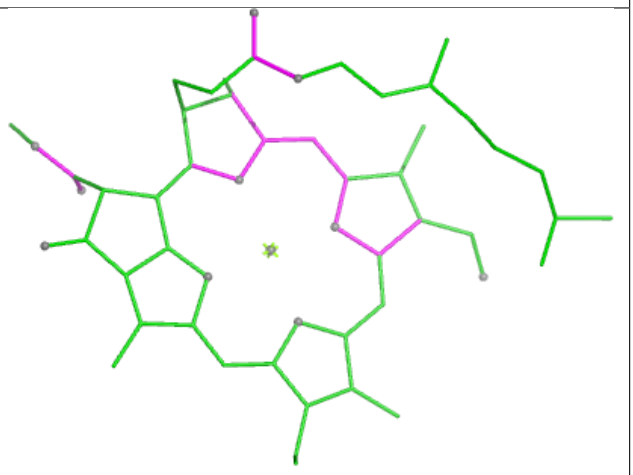
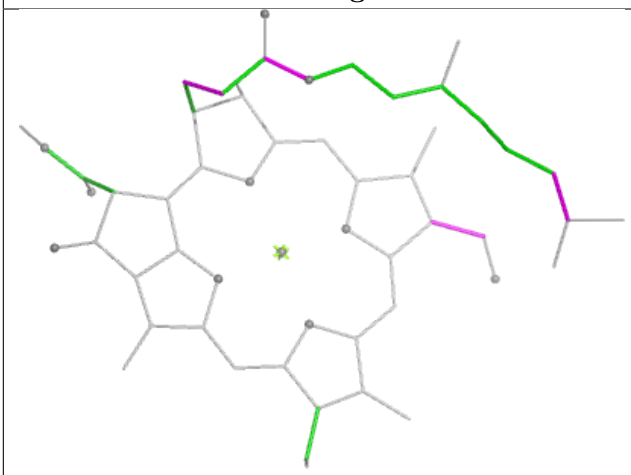


Bond angles



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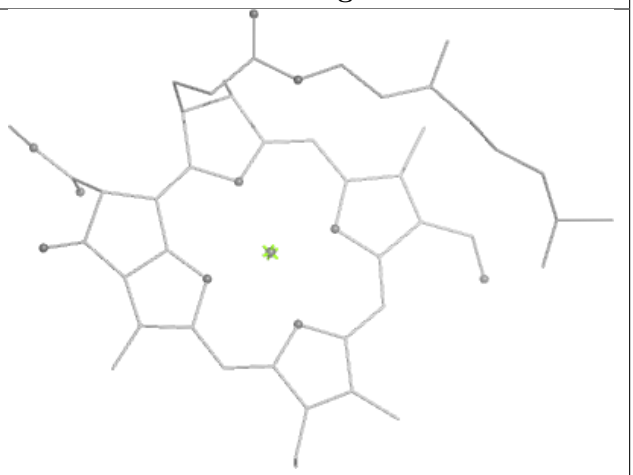
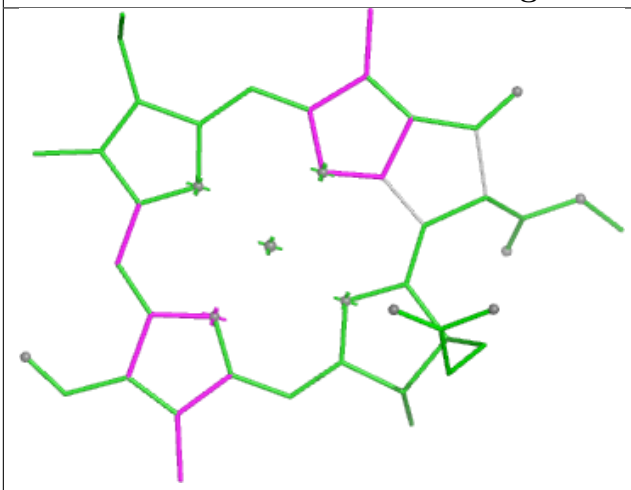
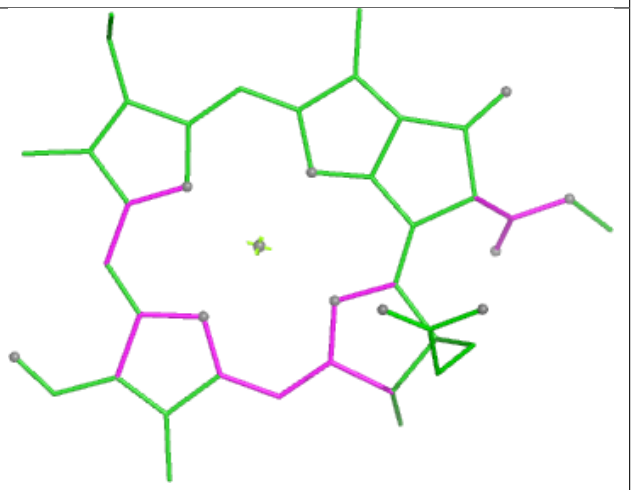


Rings

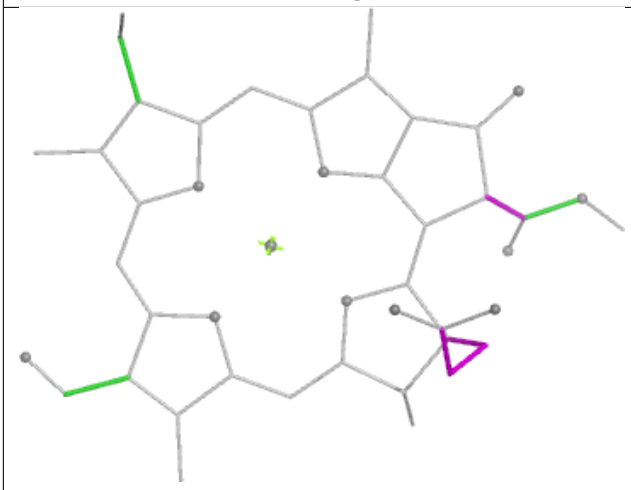
Ligand CL7 B 1209



Bond lengths



Bond angles



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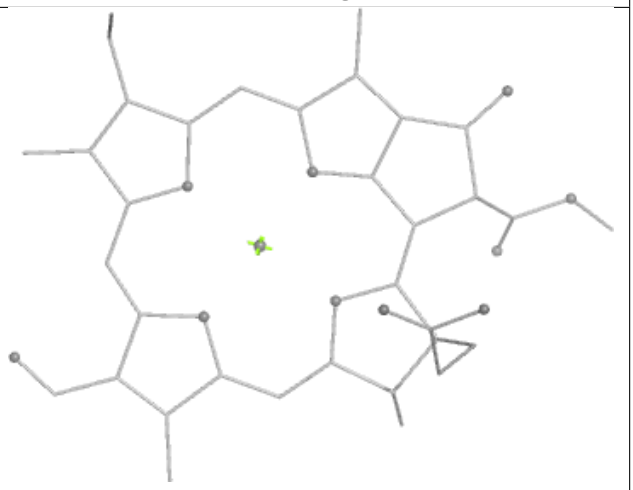
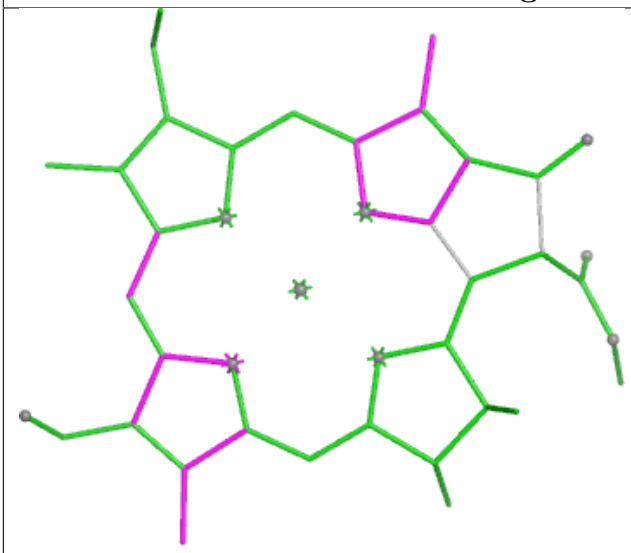
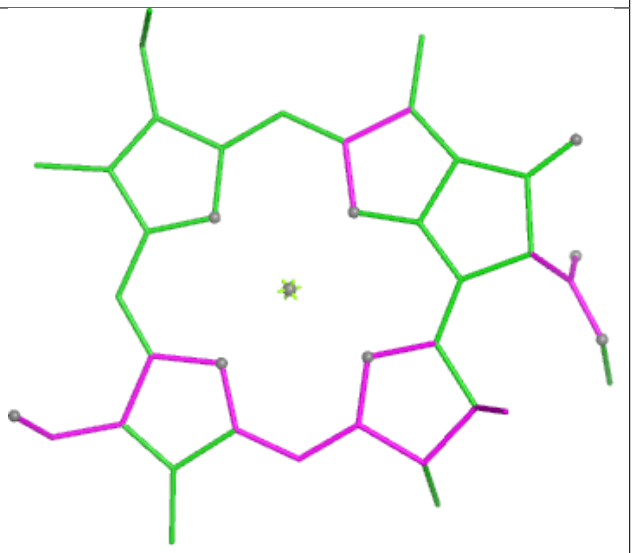


Rings

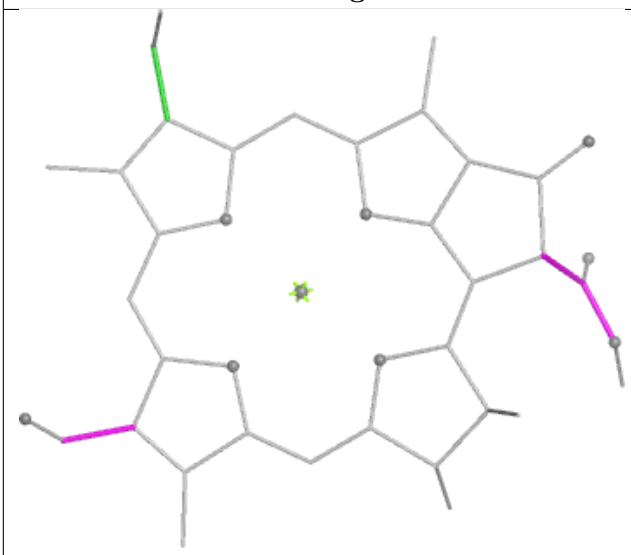
Ligand CL7 B 1230



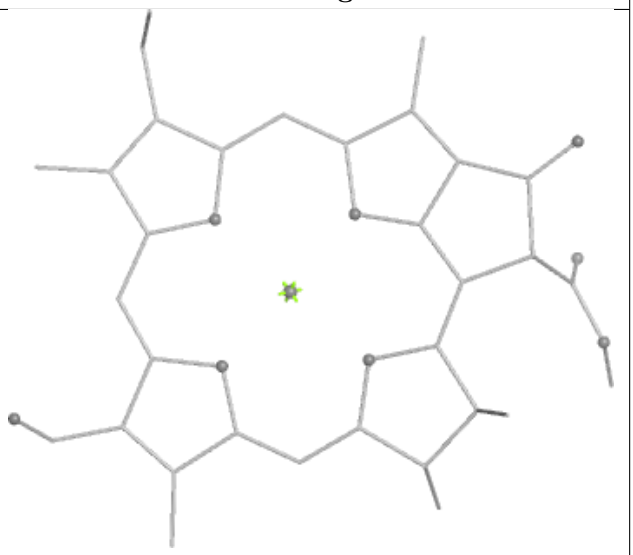
Bond lengths



Bond angles

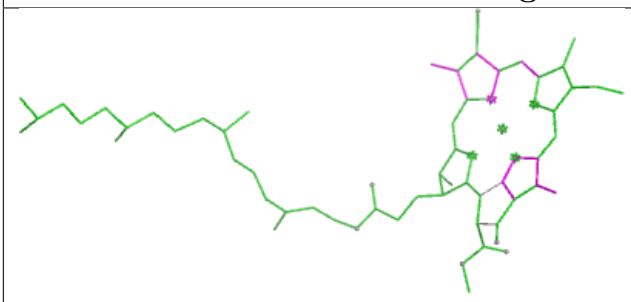


Torsions

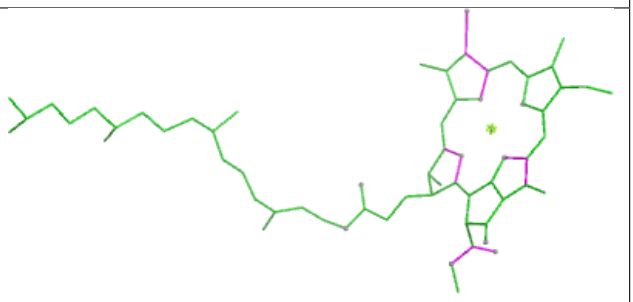


Rings

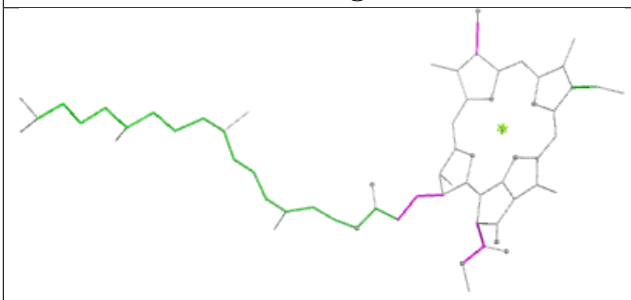
Ligand CL7 A 1012



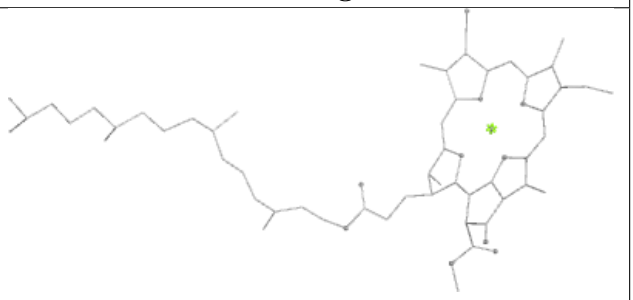
Bond lengths



Bond angles

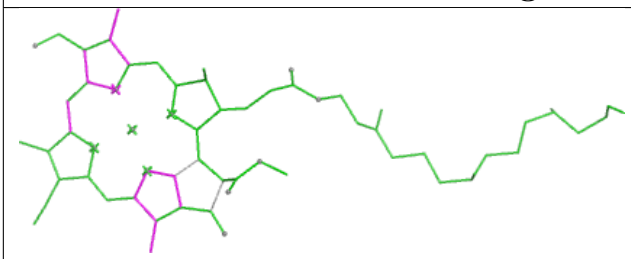


Torsions



Rings

Ligand CL7 A 1139



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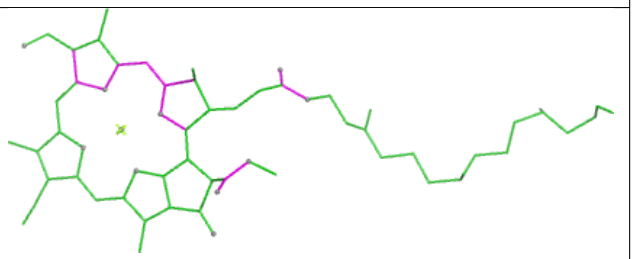
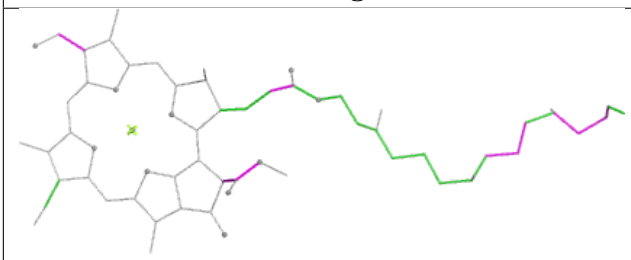


Bond angles



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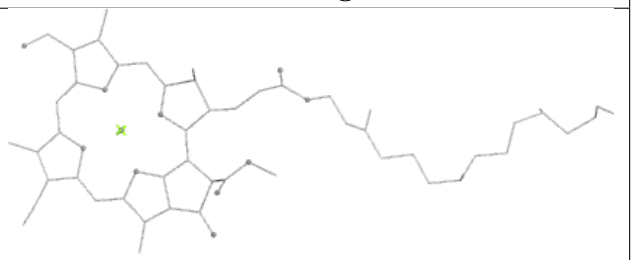
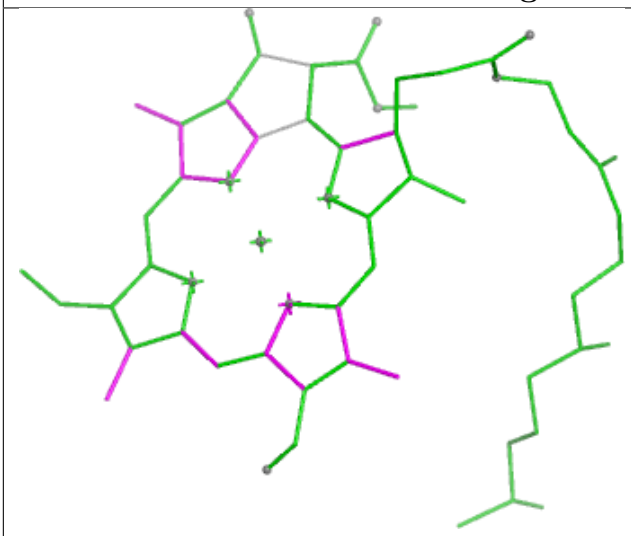


Rings

Ligand CL7 B 1221



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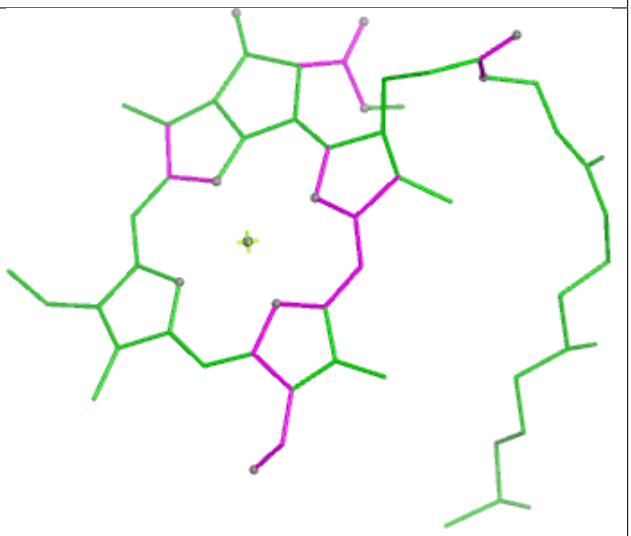
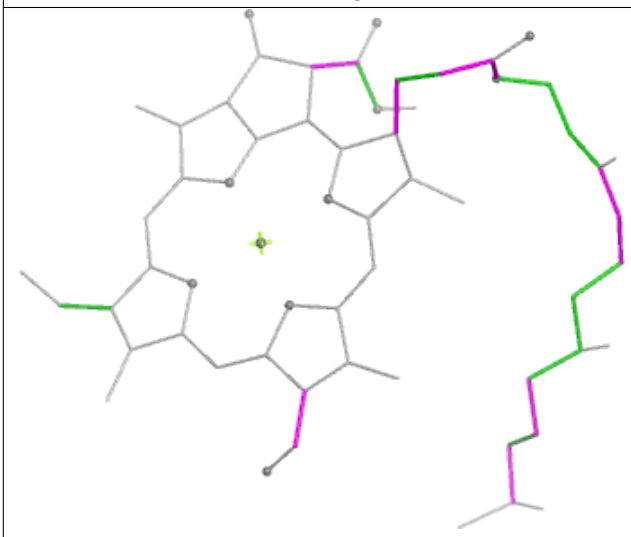
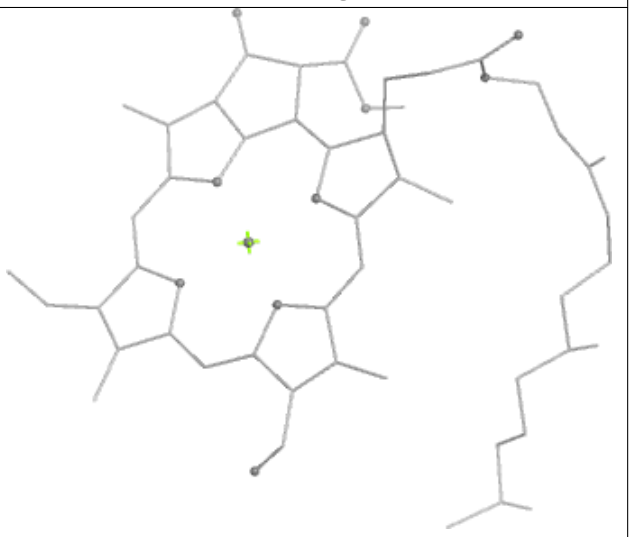


Bond angles

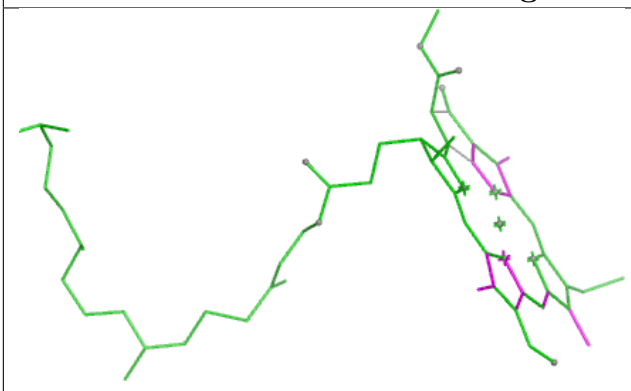


Torsions

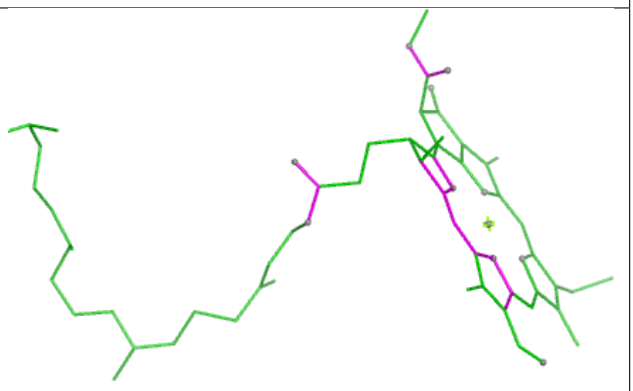


Rings

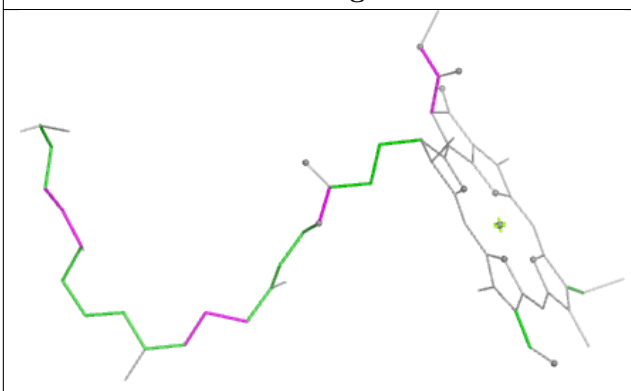
Ligand CL7 B 1208



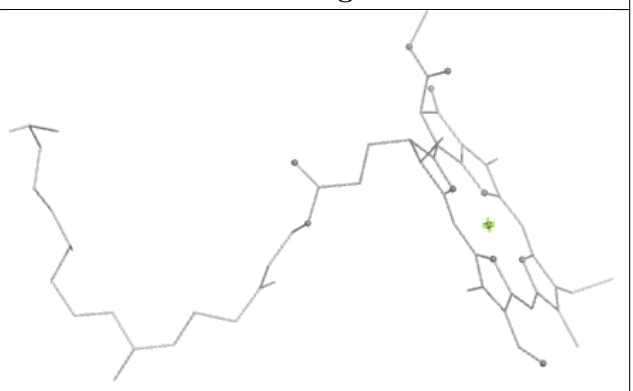
Bond lengths



Bond angles

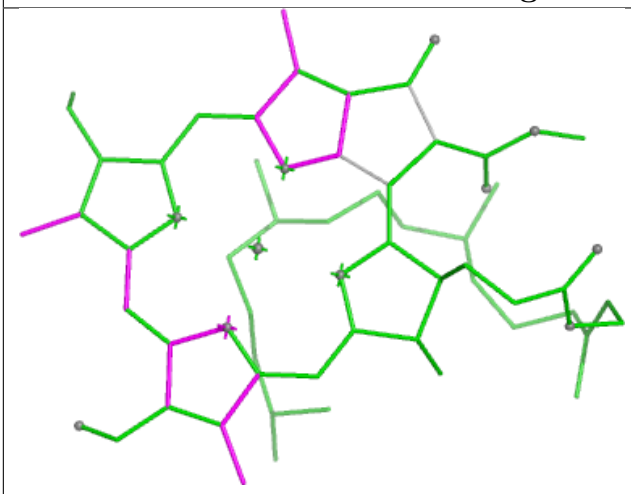


Torsions

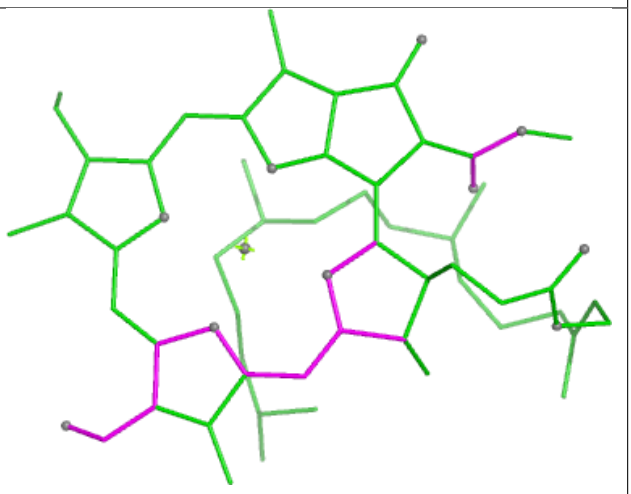


Rings

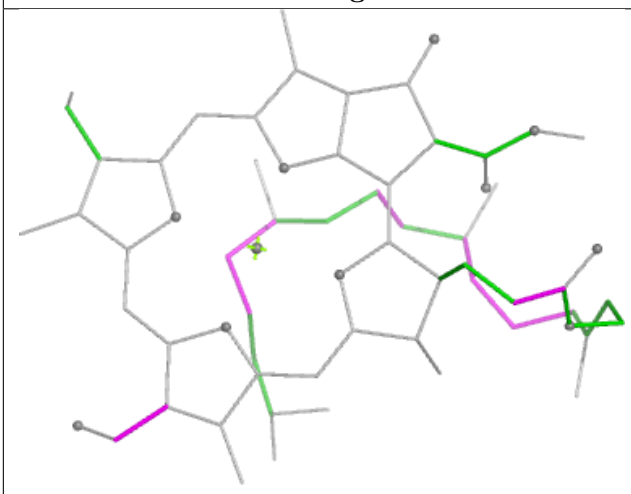
Ligand CL7 B 1203



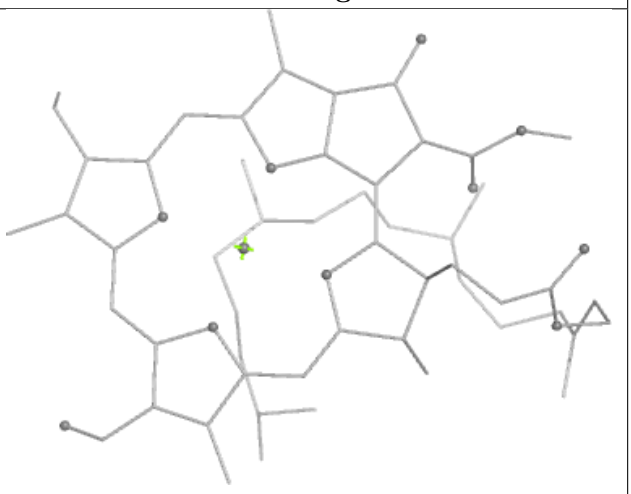
Bond lengths



Bond angles

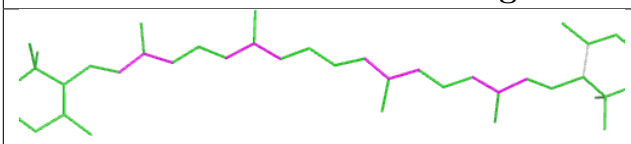


Torsions

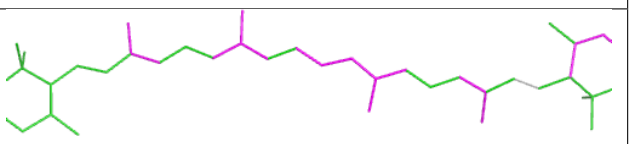


Rings

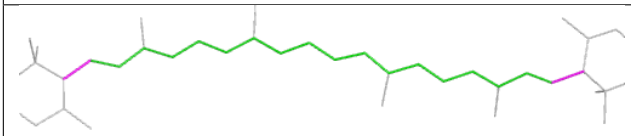
Ligand A1JPJ B 4008



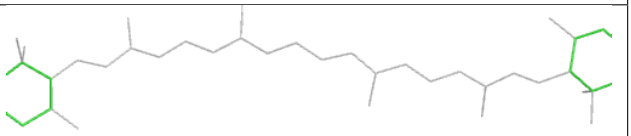
Bond lengths



Bond angles

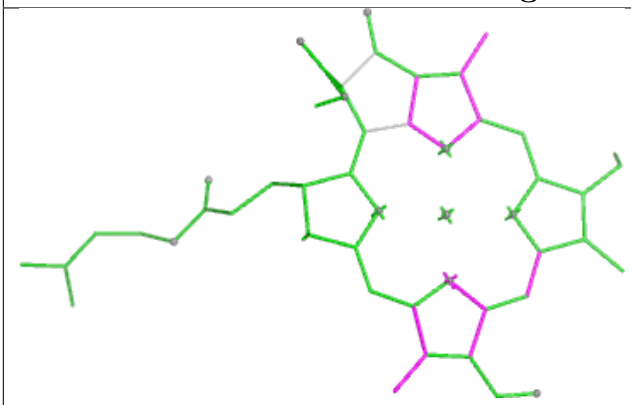


Torsions

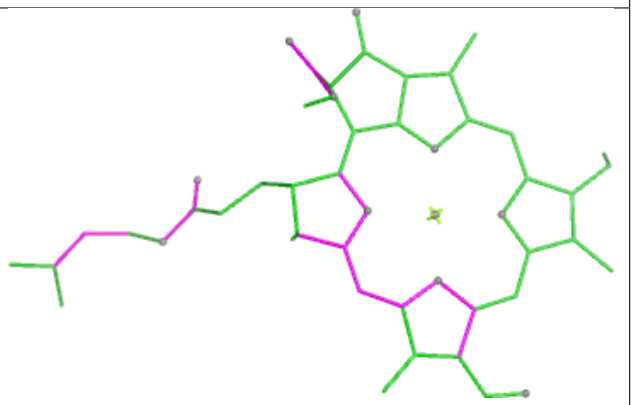


Rings

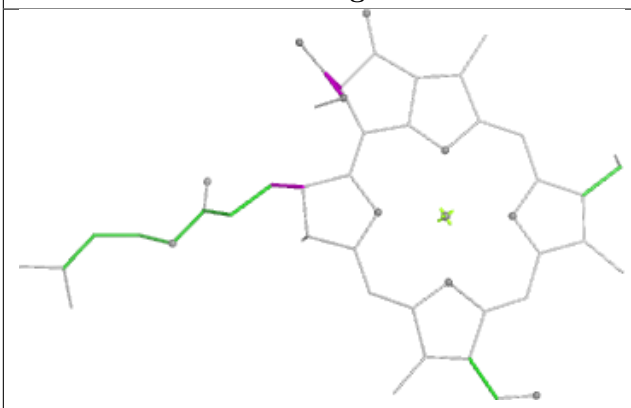
Ligand CL7 B 1222



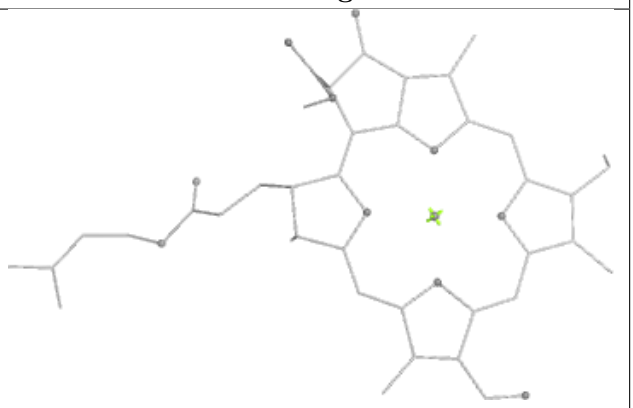
Bond lengths



Bond angles

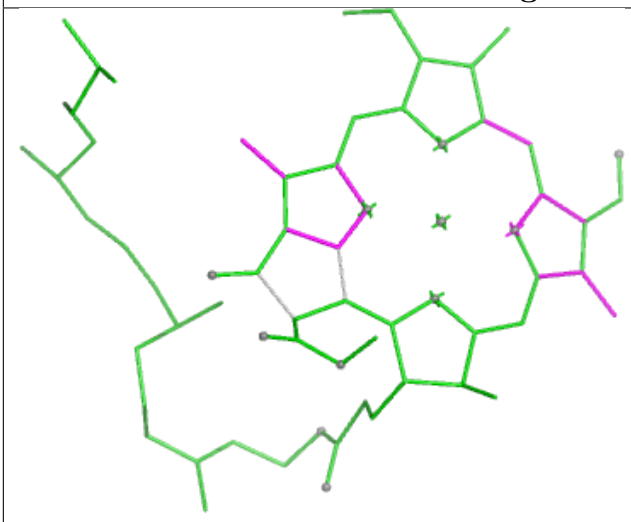


Torsions

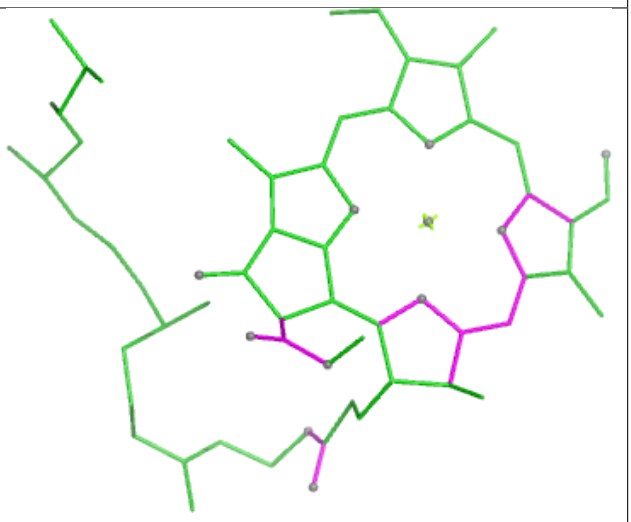


Rings

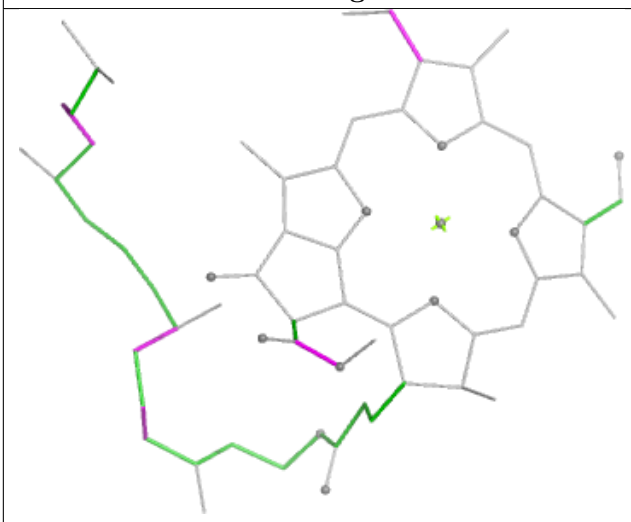
Ligand CL7 B 1229



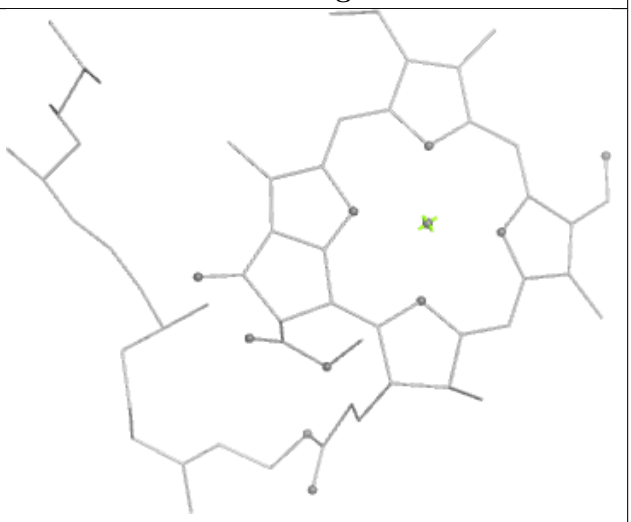
Bond lengths



Bond angles

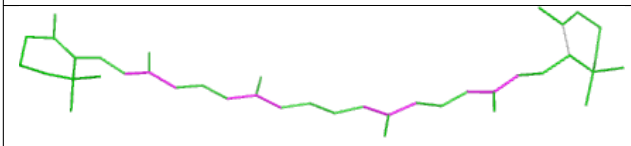


Torsions

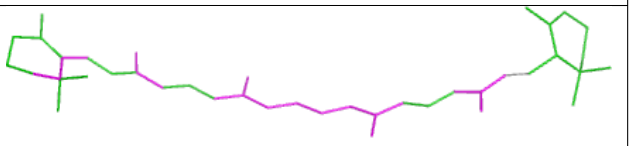


Rings

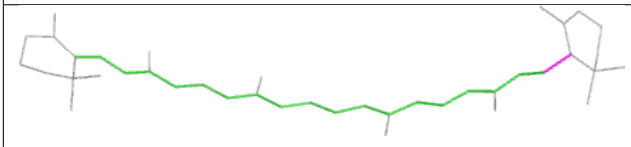
Ligand A1JPJ J 4013



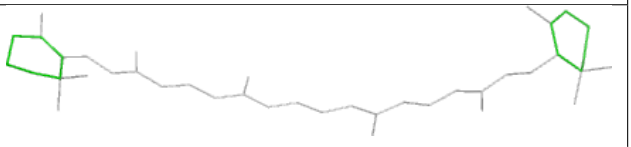
Bond lengths



Bond angles



Torsions



Rings

Ligand CL7 B 1211

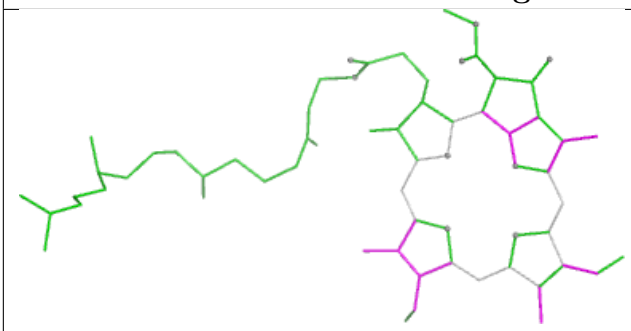
Bond lengths

Bond angles

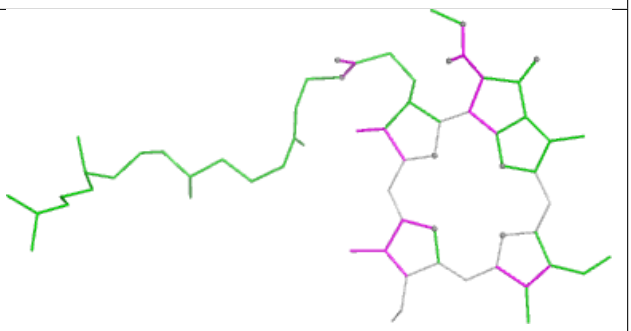
Torsions

Rings

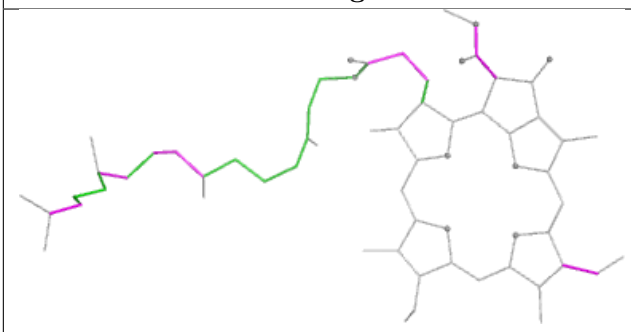
Ligand PHO B 1023



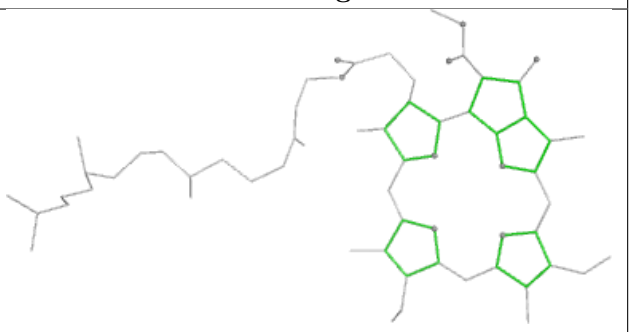
Bond lengths



Bond angles

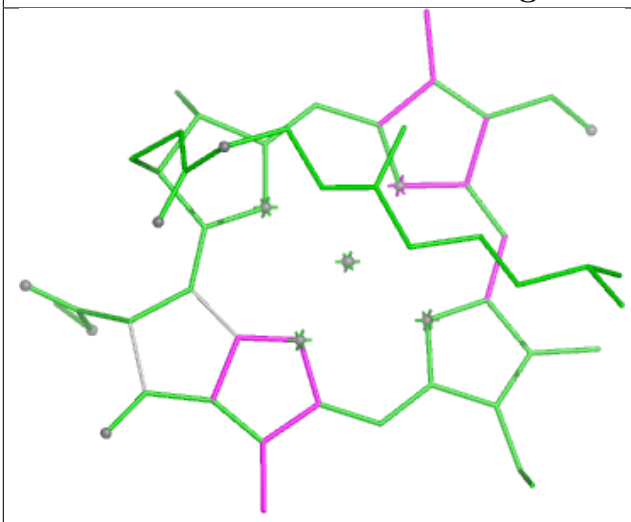


Torsions

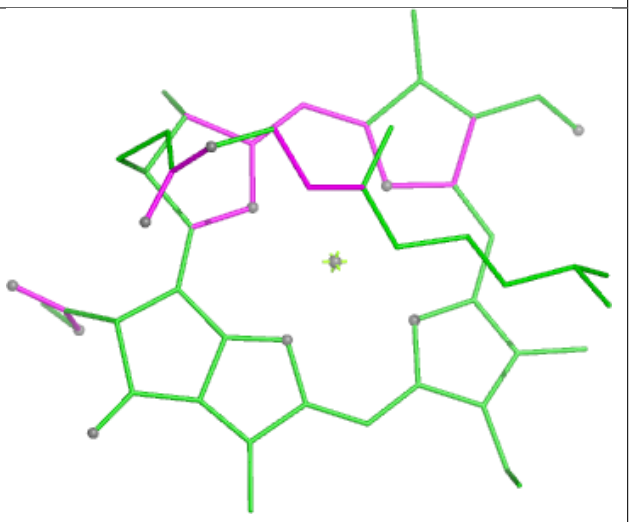


Rings

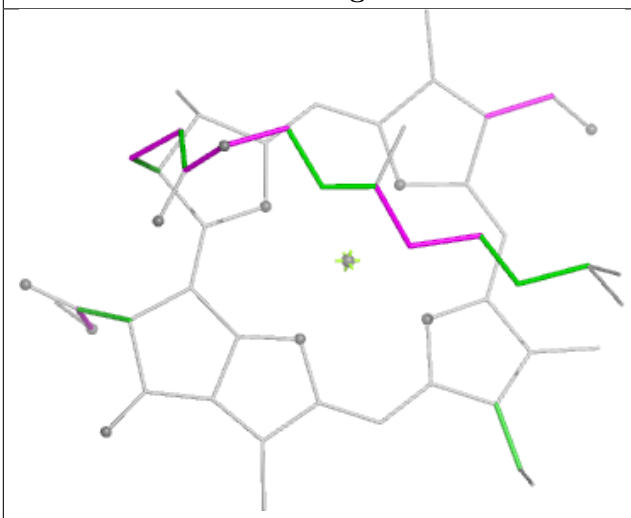
Ligand CL7 A 1118



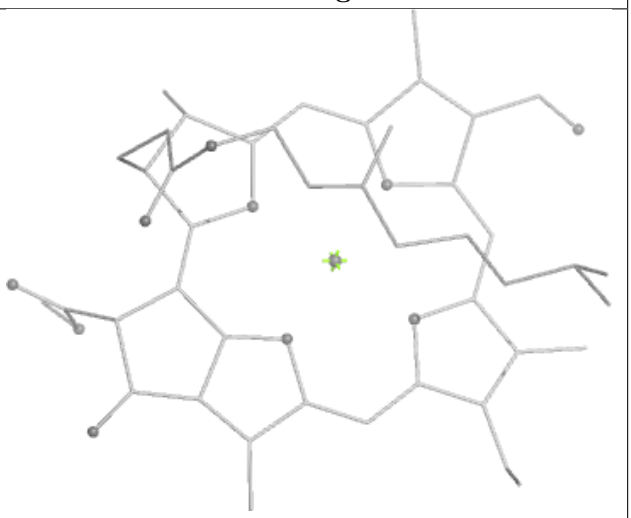
Bond lengths



Bond angles

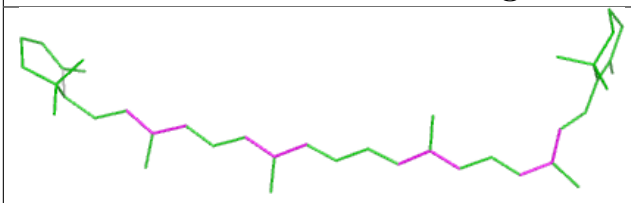


Torsions

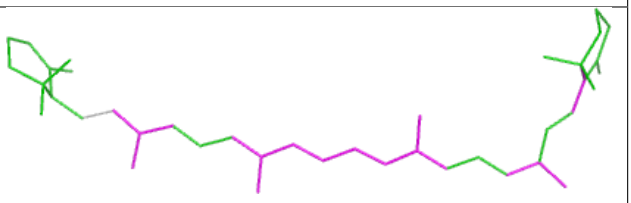


Rings

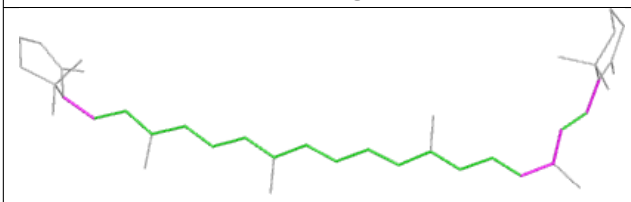
Ligand A1JPJ L 4020



Bond lengths



Bond angles



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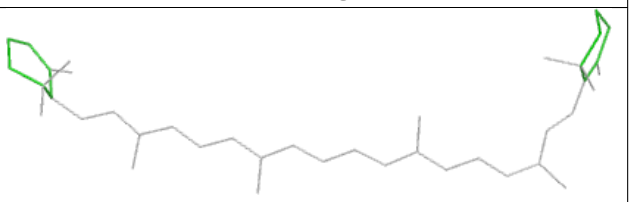
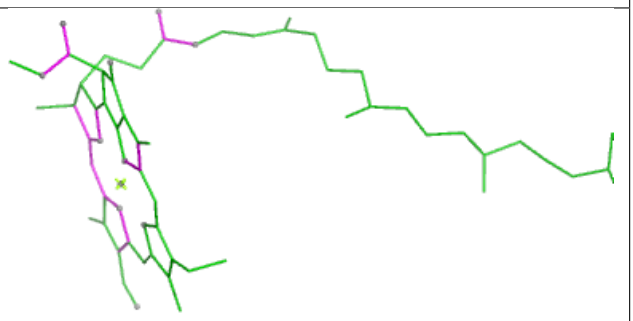


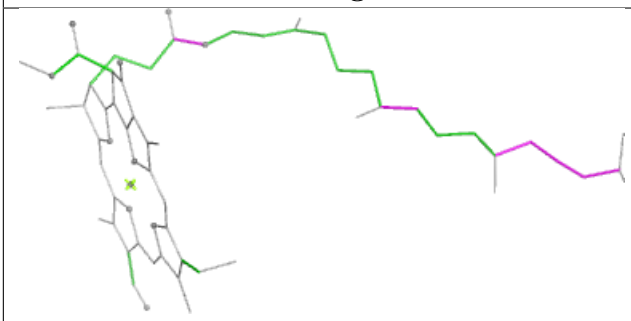
Rings

Ligand CL7 B 1226

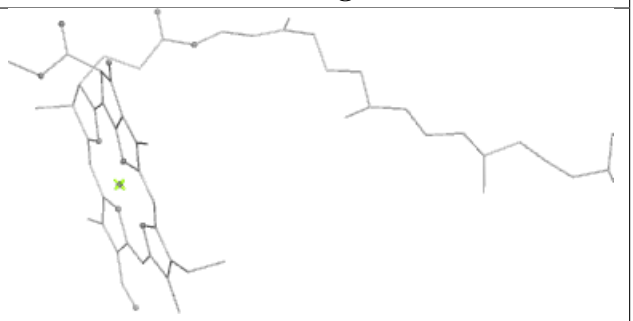
Bond lengths



Bond angles

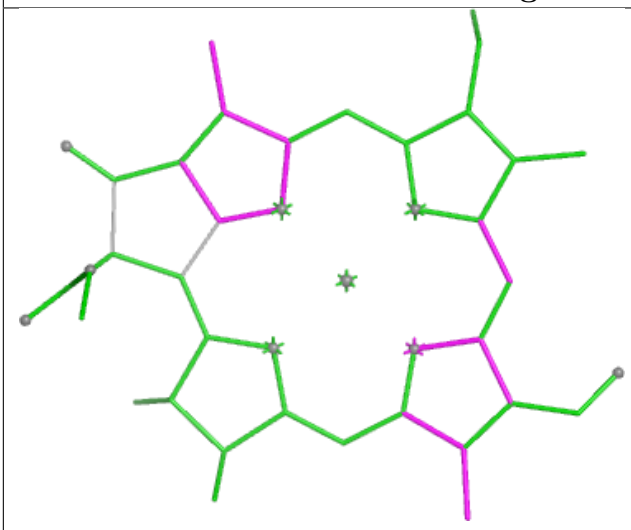


Torsions

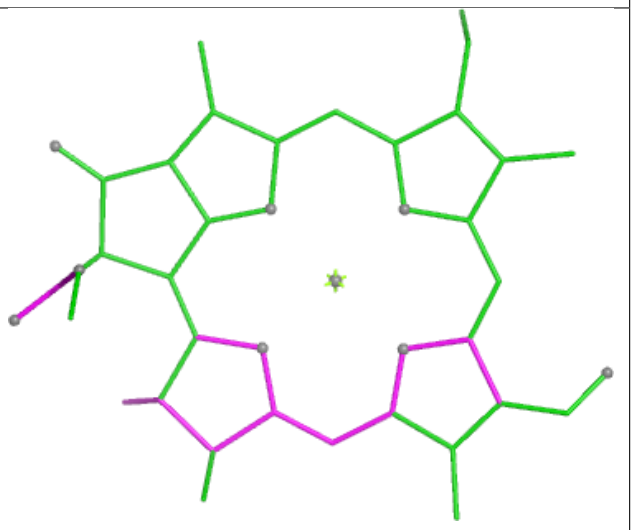


Rings

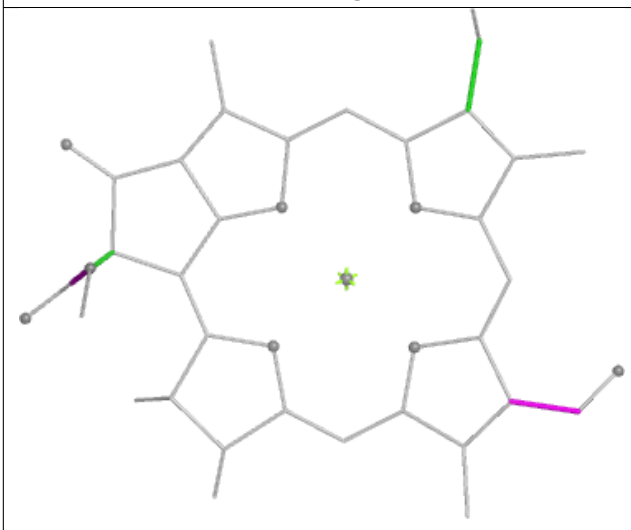
Ligand CL7 B 1218



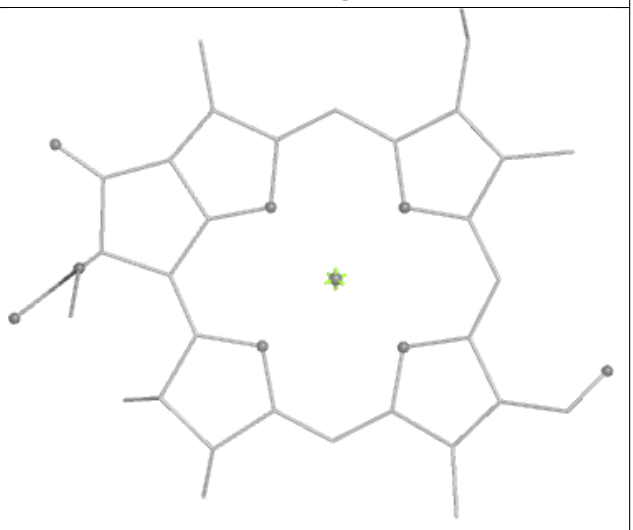
Bond lengths



Bond angles

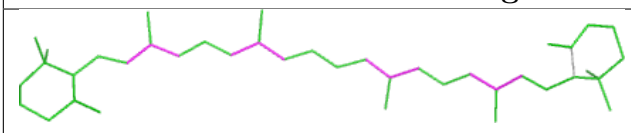


Torsions



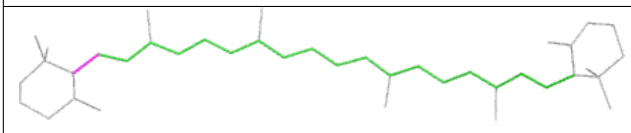
Rings

Ligand A1JPJ L 4023

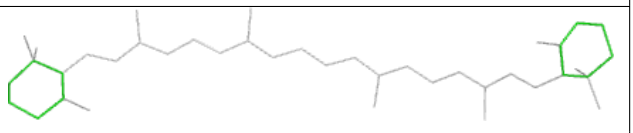


Bond lengths

Bond angles

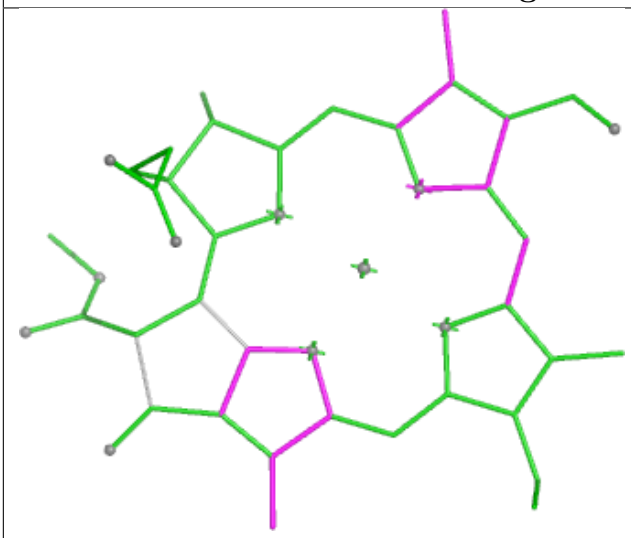


Torsions

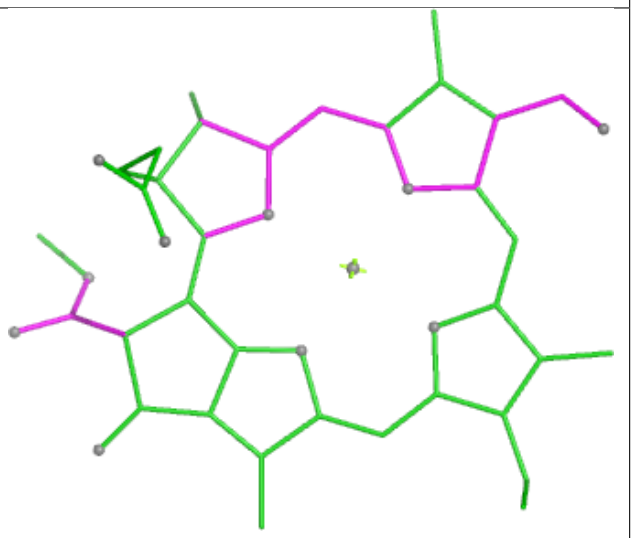


Rings

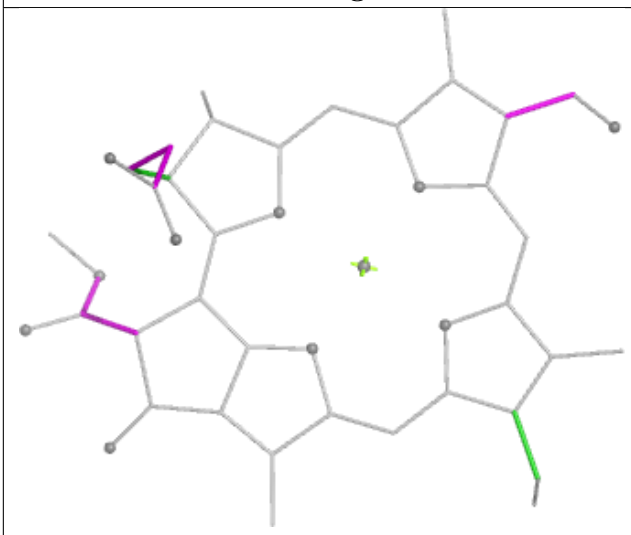
Ligand CL7 A 1110



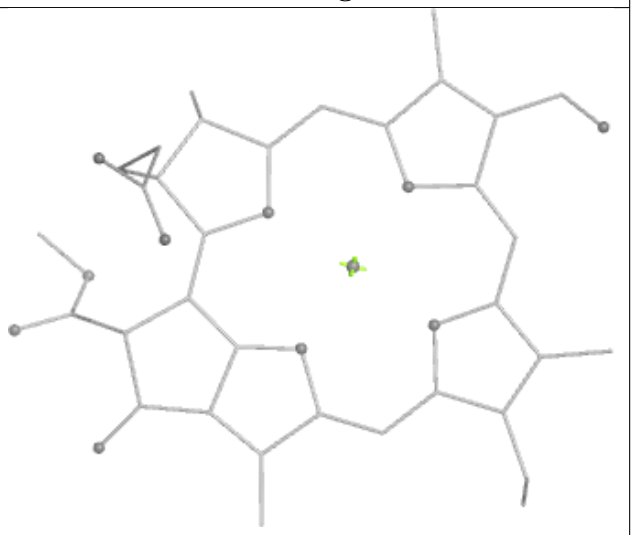
Bond lengths



Bond angles

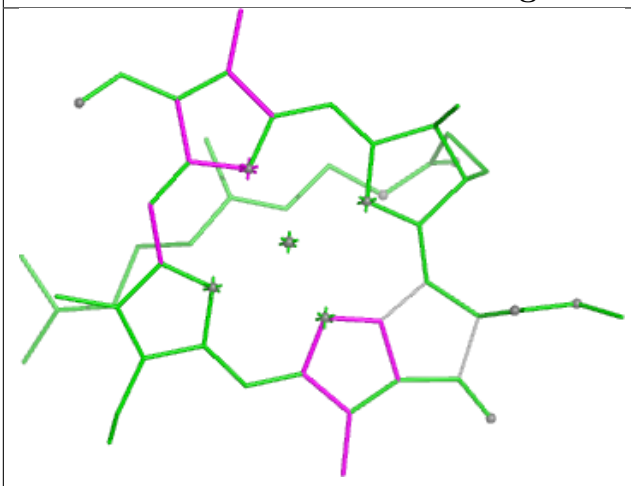


Torsions

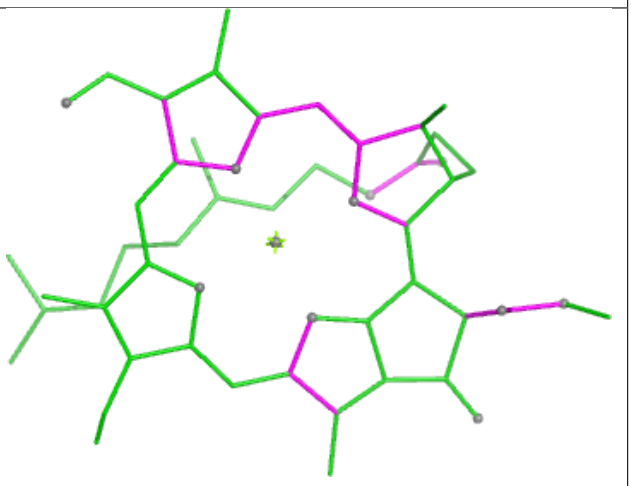


Rings

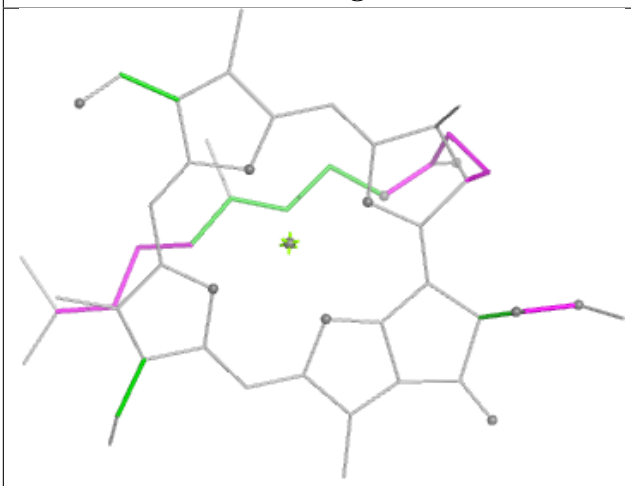
Ligand CL7 A 1121



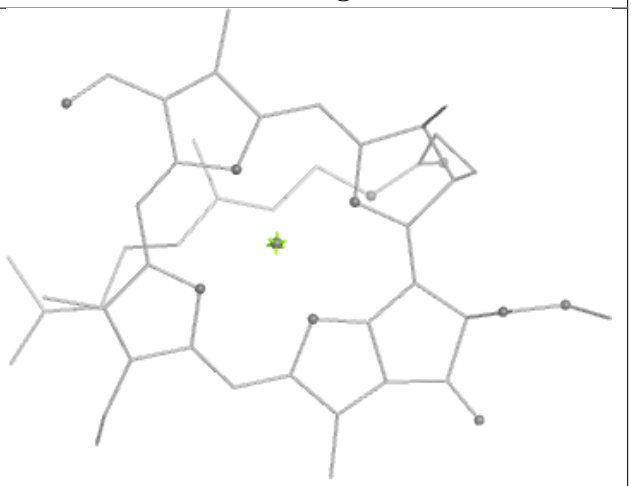
Bond lengths



Bond angles

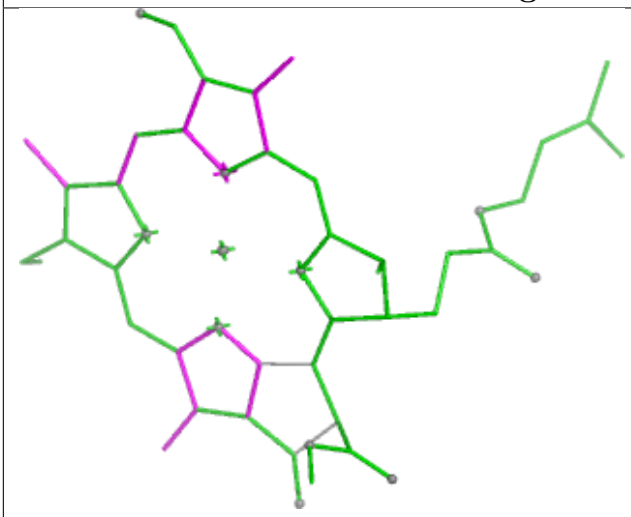


Torsions

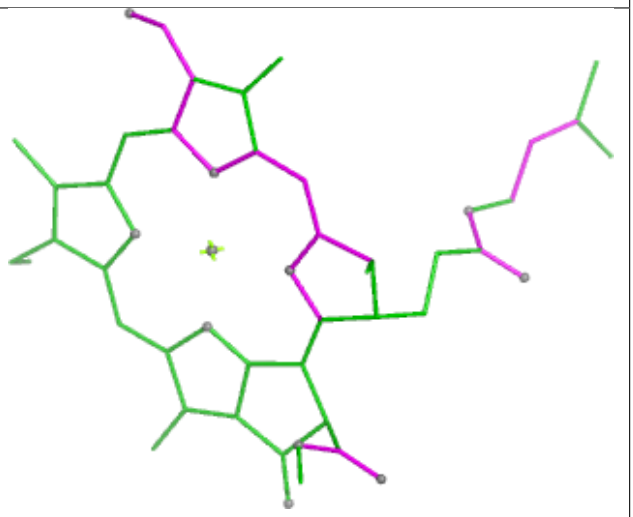


Rings

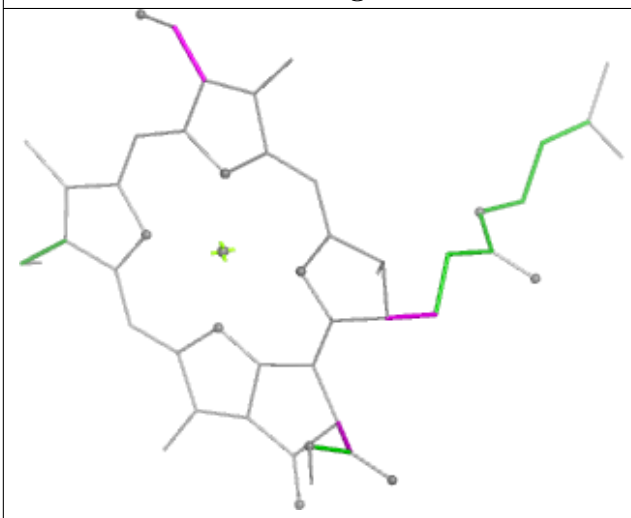
Ligand CL7 A 1129



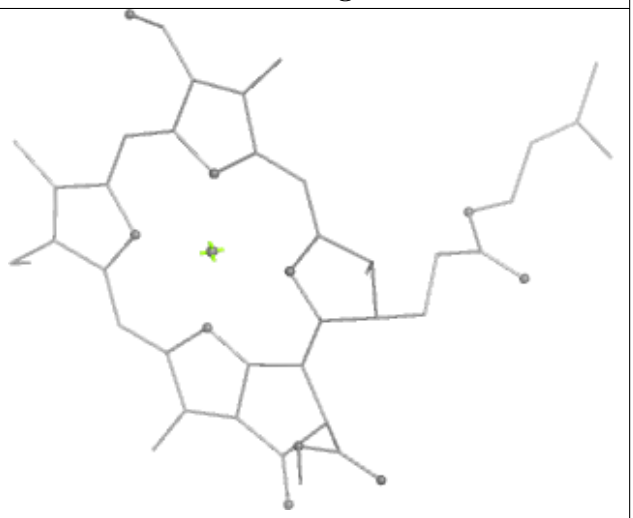
Bond lengths



Bond angles

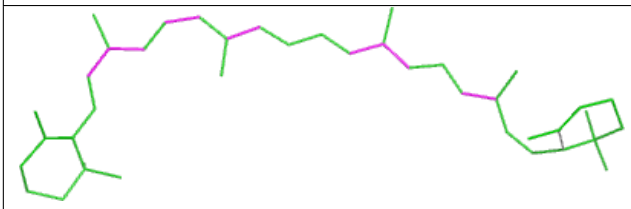


Torsions

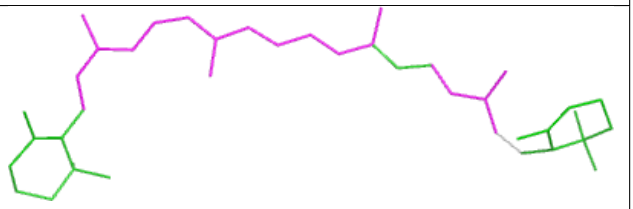


Rings

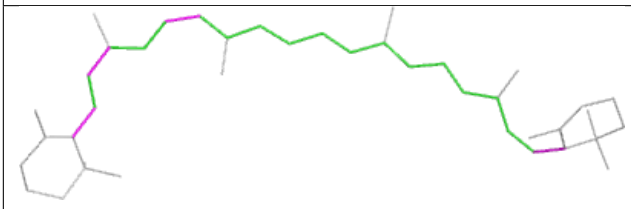
Ligand A1JPJ B 4005



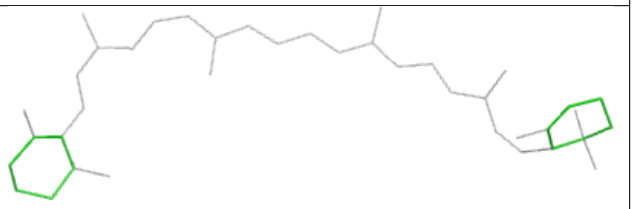
Bond lengths



Bond angles

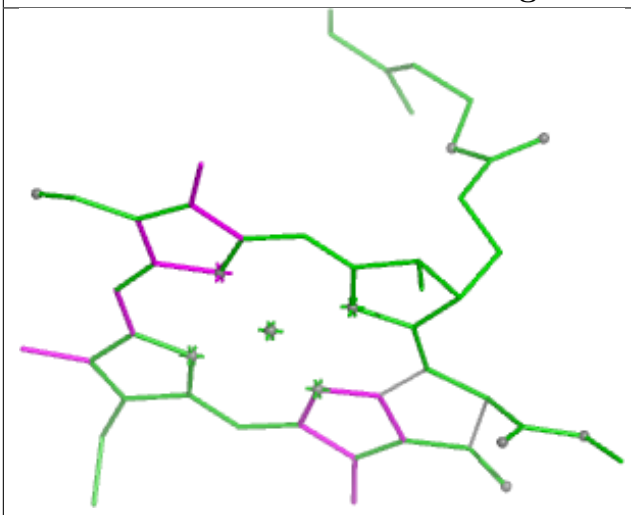


Torsions

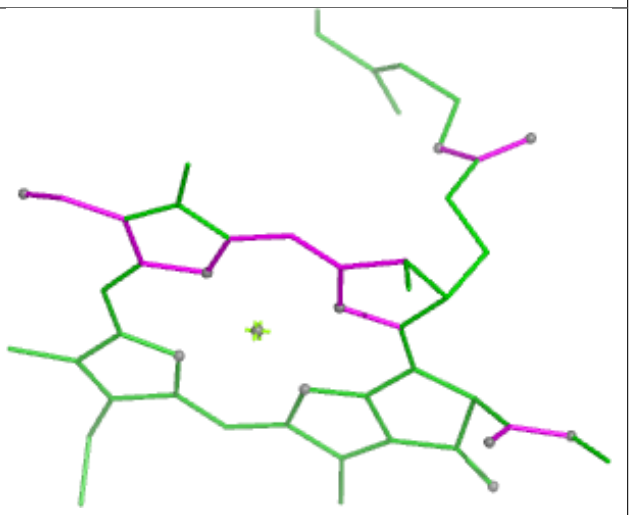


Rings

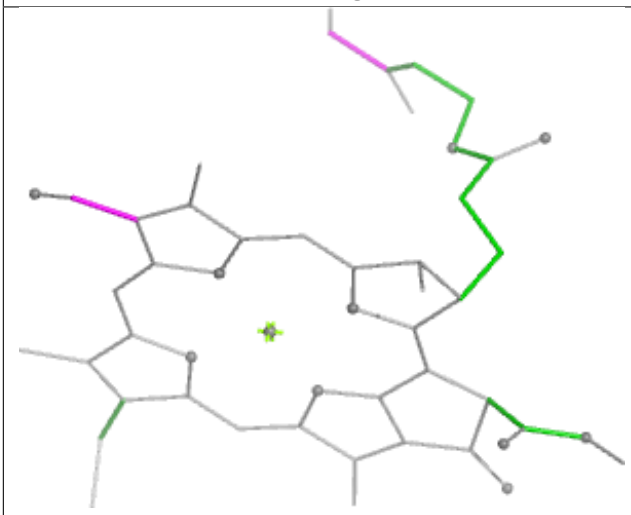
Ligand CL7 A 1130



Bond lengths



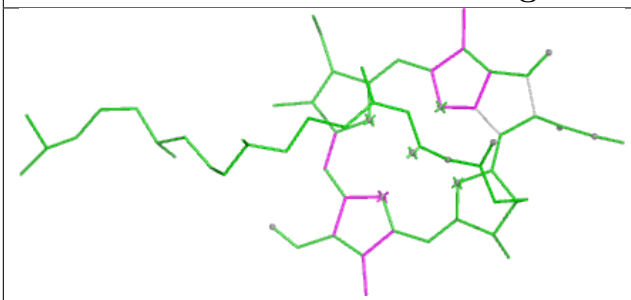
Bond angles



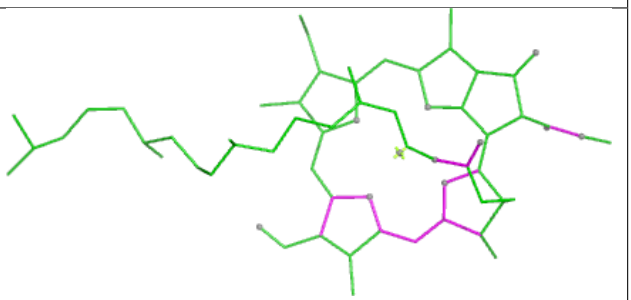
Torsions

Rings

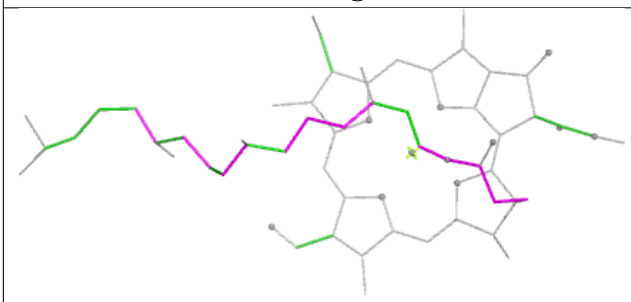
Ligand CL7 A 1136



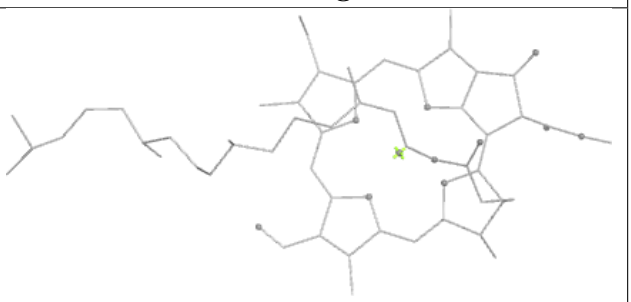
Bond lengths



Bond angles

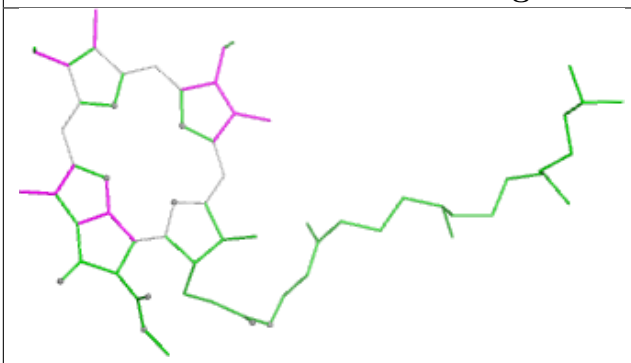


Torsions

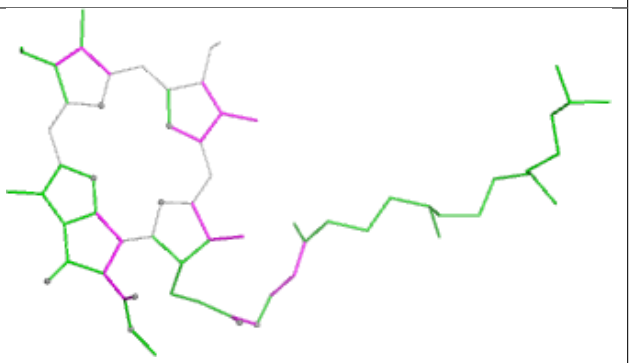


Rings

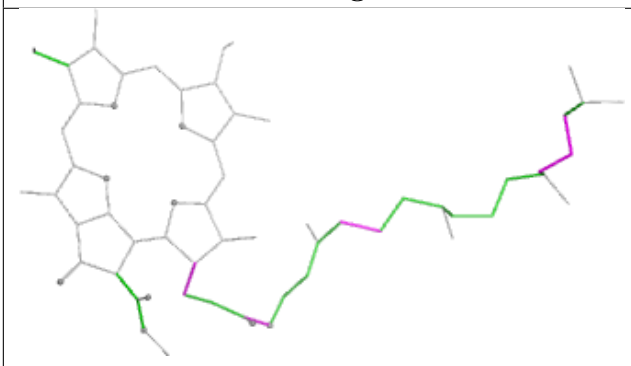
Ligand PHO A 1013



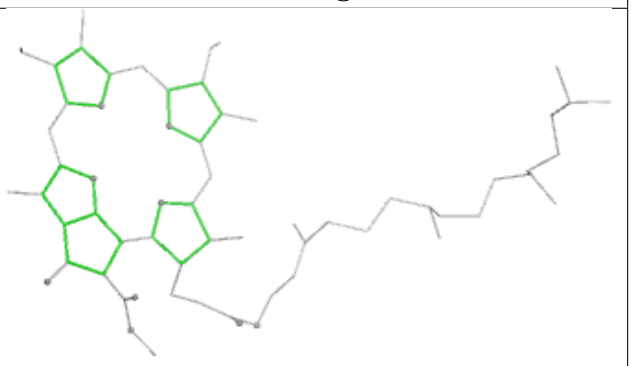
Bond lengths



Bond angles

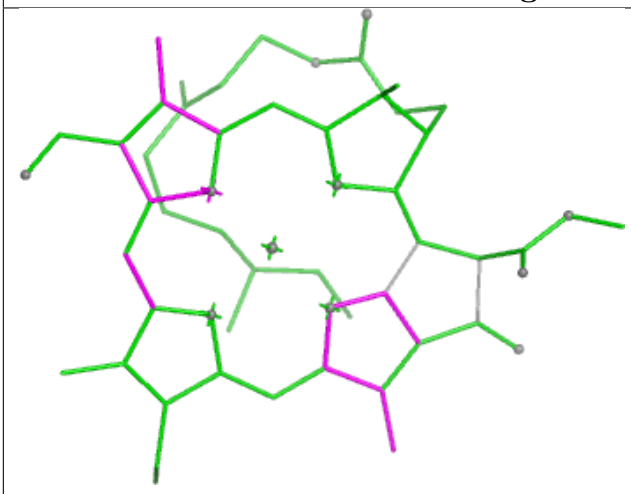


Torsions

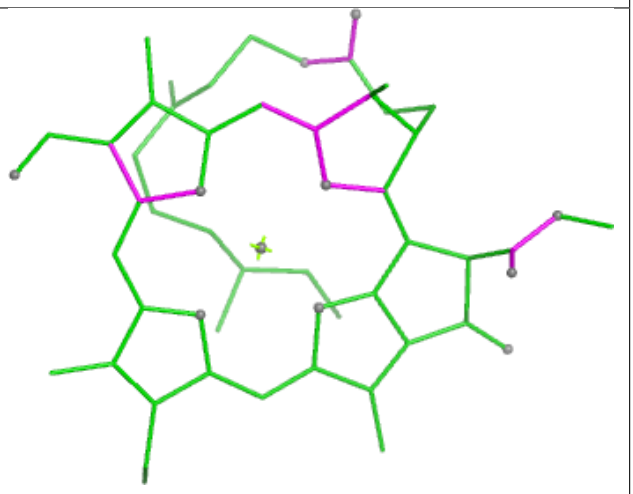


Rings

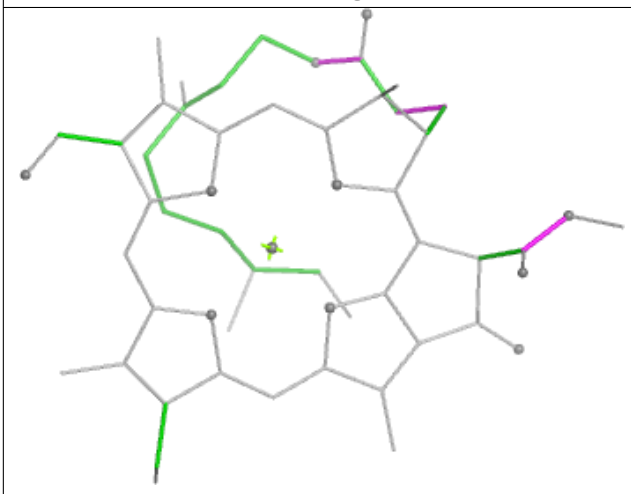
Ligand CL7 B 1224



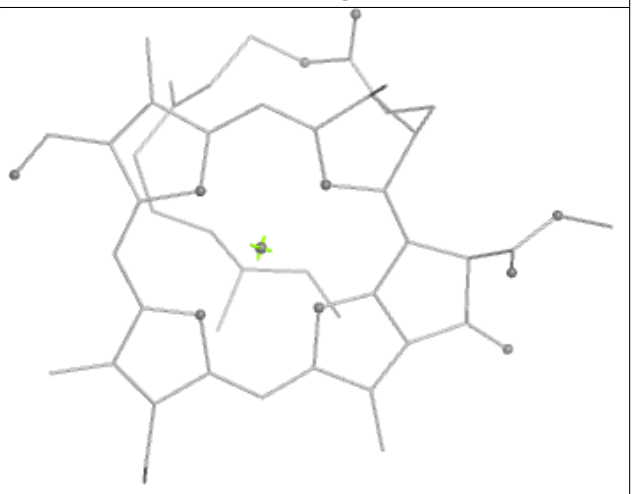
Bond lengths



Bond angles

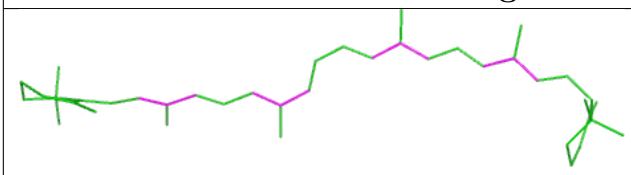


Torsions

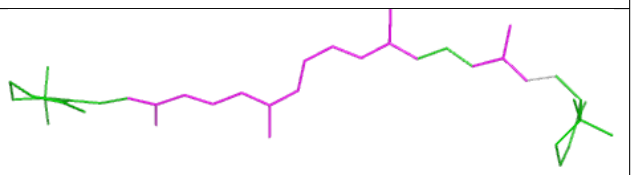


Rings

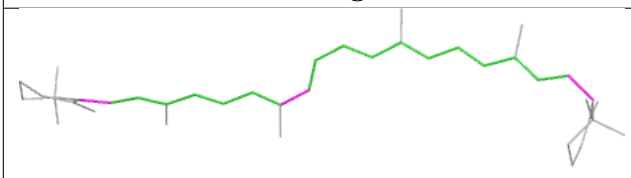
Ligand A1JPJ B 4007



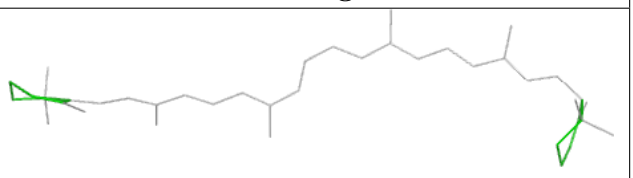
Bond lengths



Bond angles



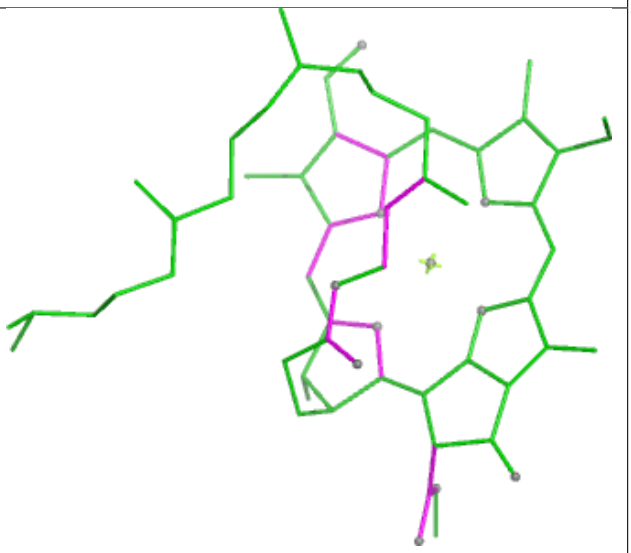
Torsions



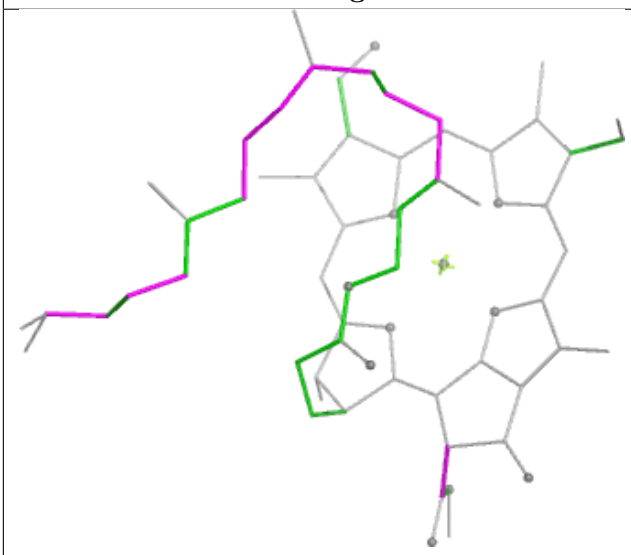
Rings

Ligand CL7 B 1205

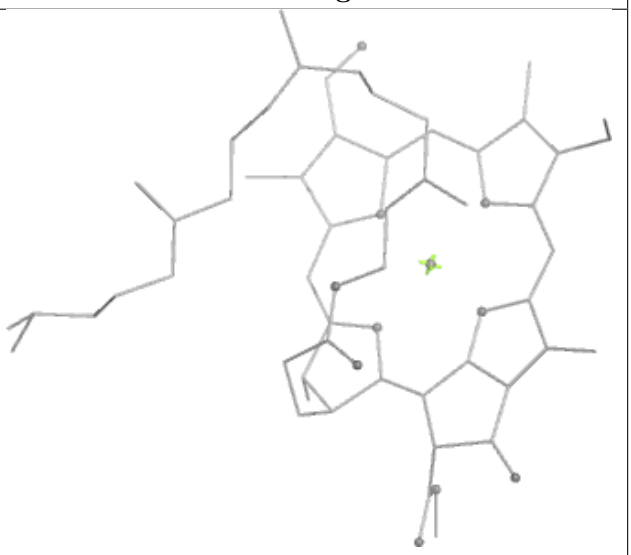
Bond lengths



Bond angles

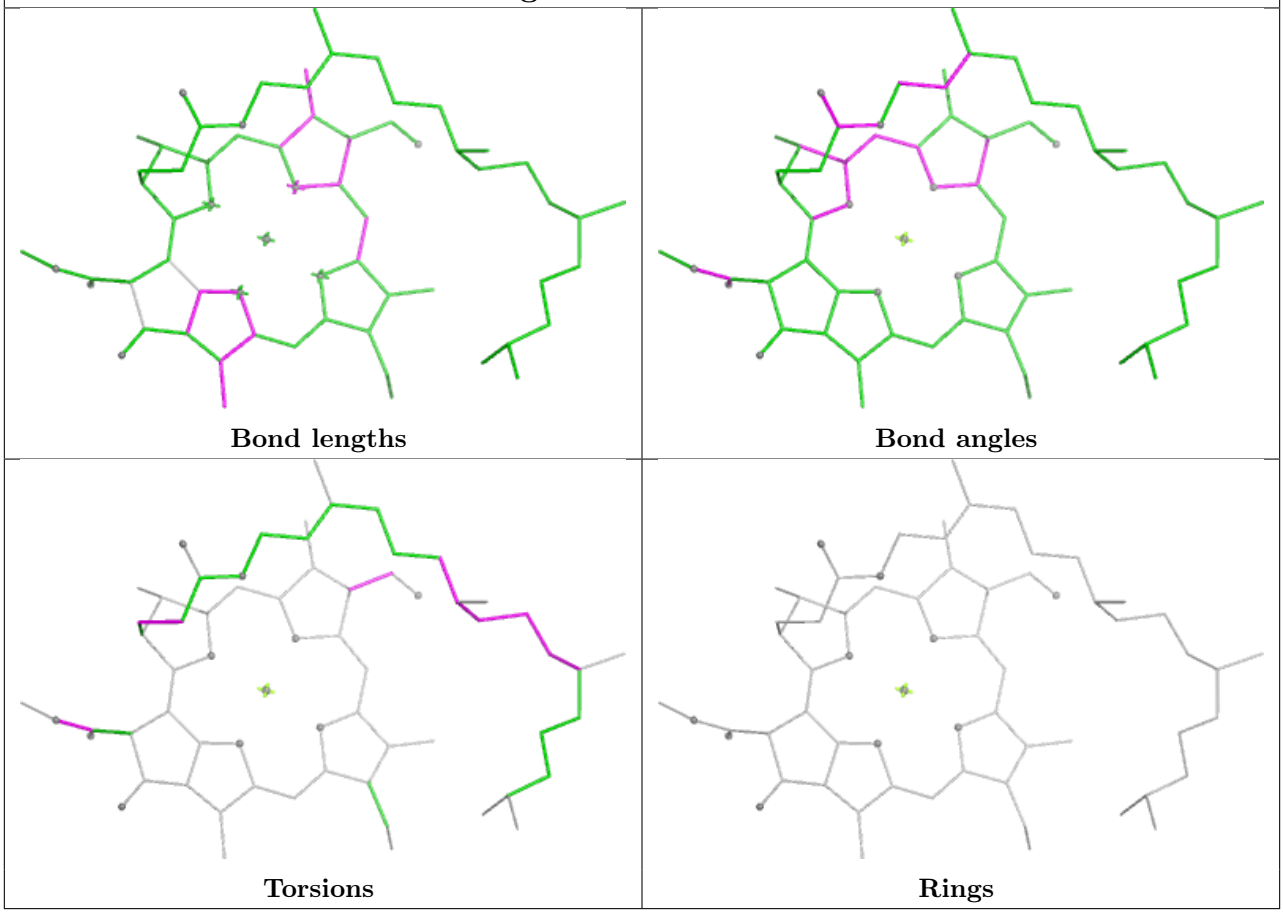


Torsions



Rings

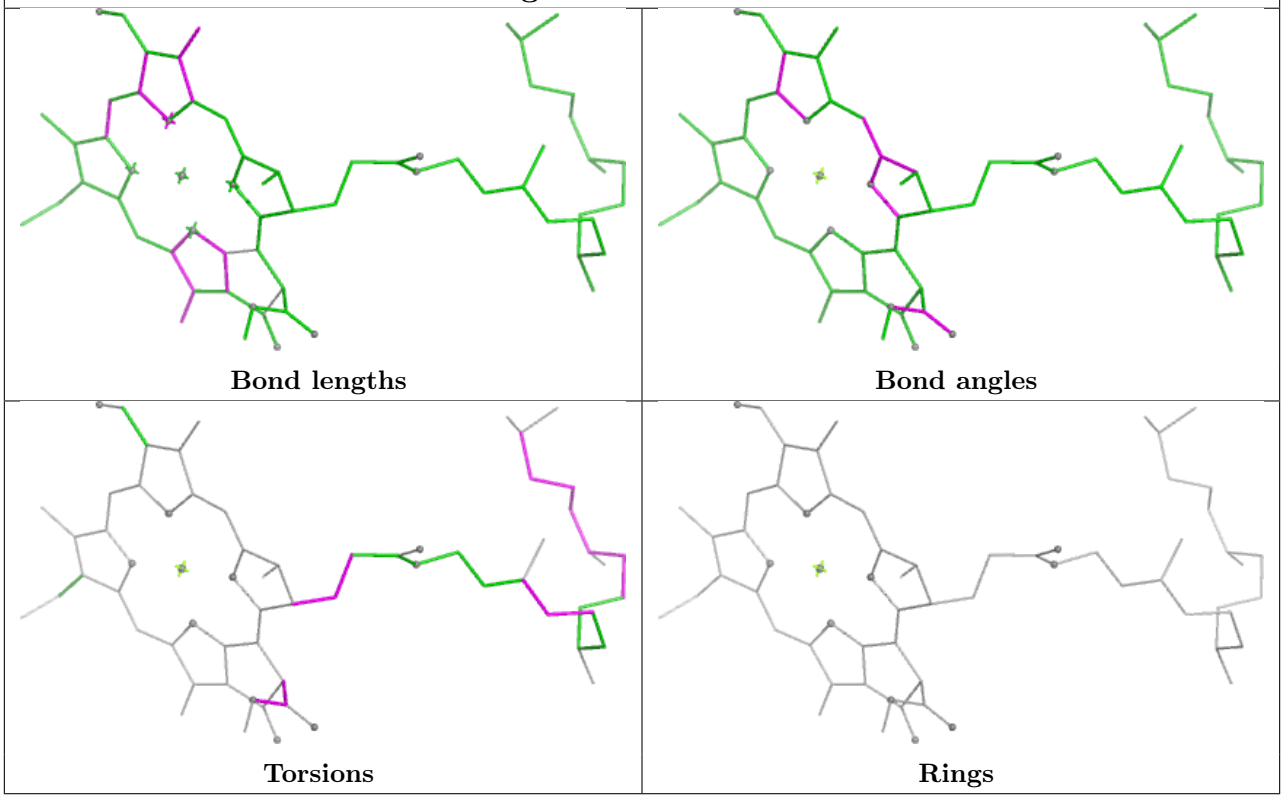
Ligand CL7 A 1117



Bond lengths | Bond angles

Torsions | Rings

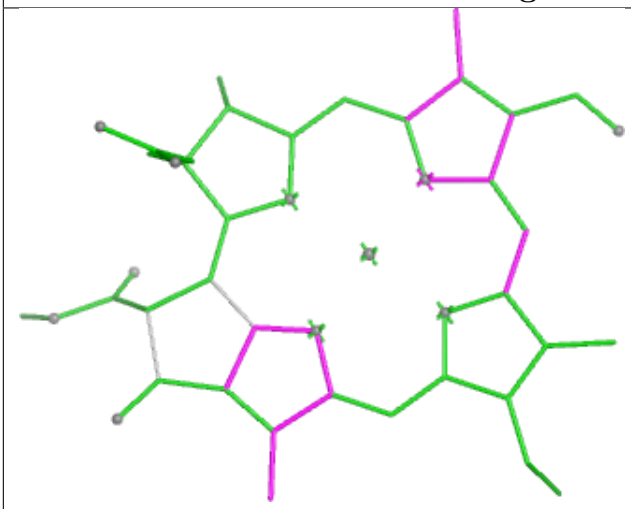
Ligand CL7 B 1241



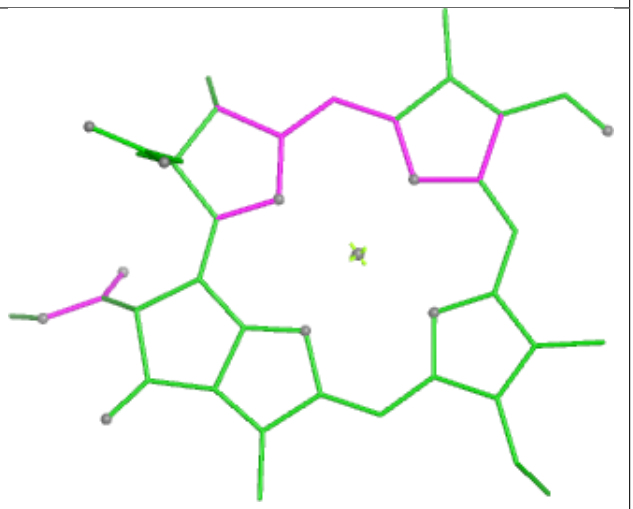
Bond lengths | Bond angles

Torsions | Rings

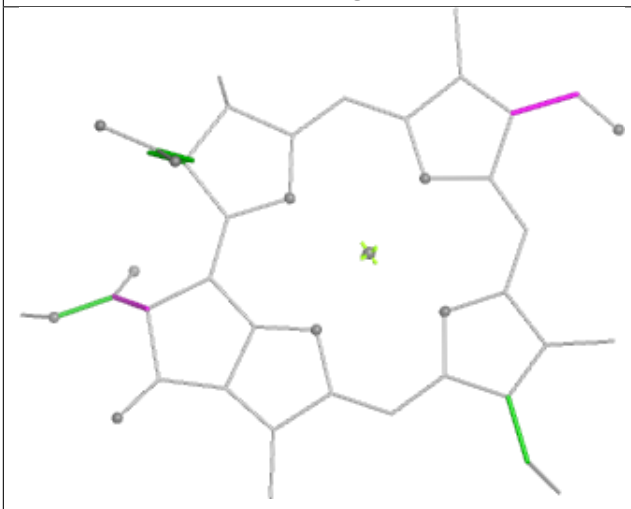
Ligand CL7 A 1105



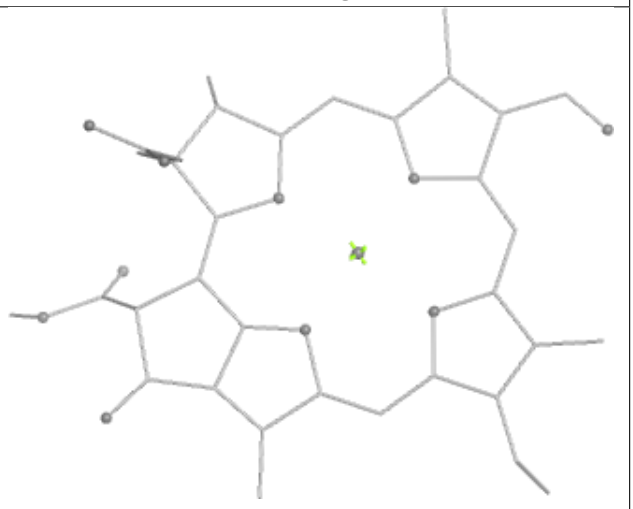
Bond lengths



Bond angles

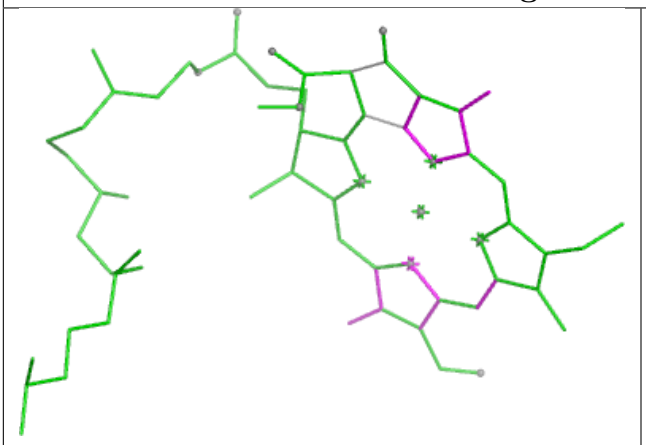


Torsions

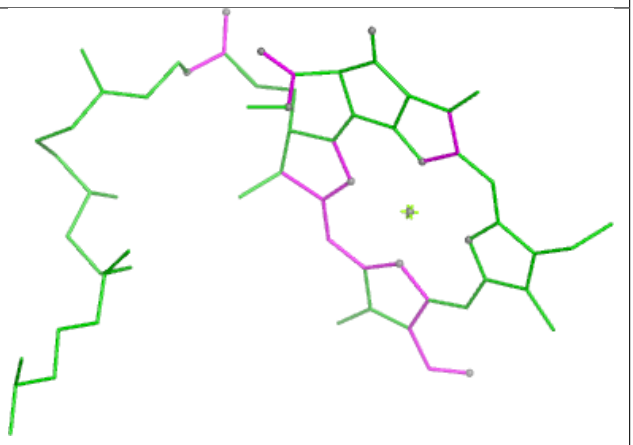


Rings

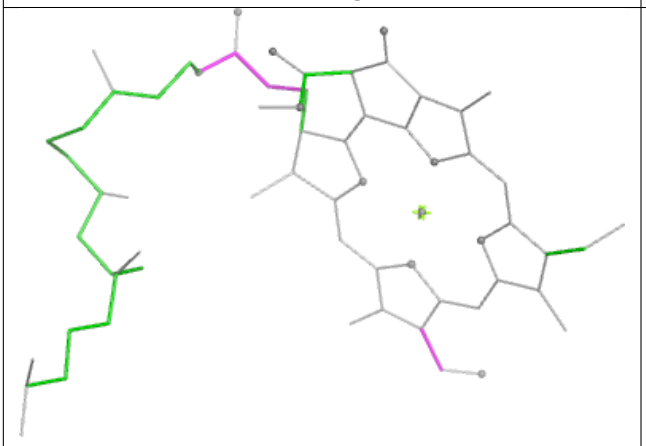
Ligand CL7 B 1207



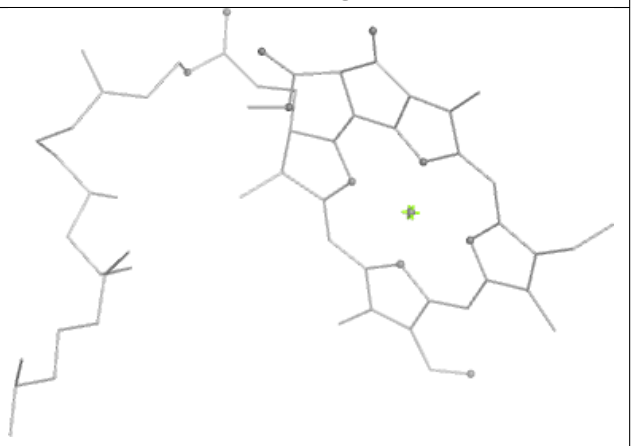
Bond lengths



Bond angles

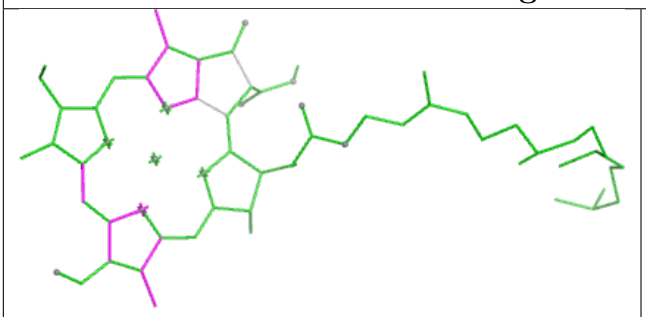


Torsions

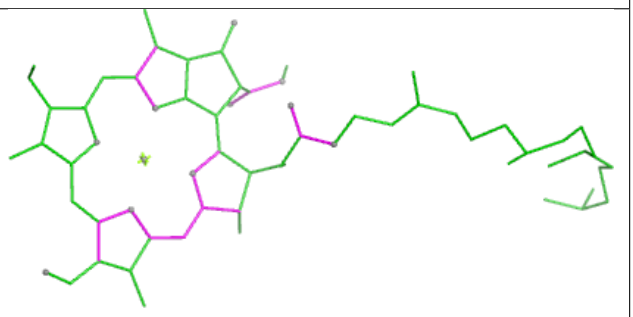


Rings

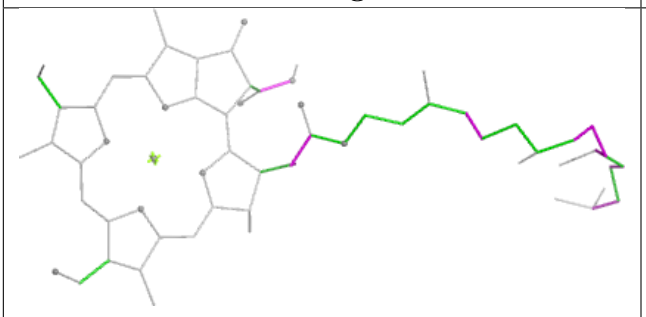
Ligand CL7 A 1107



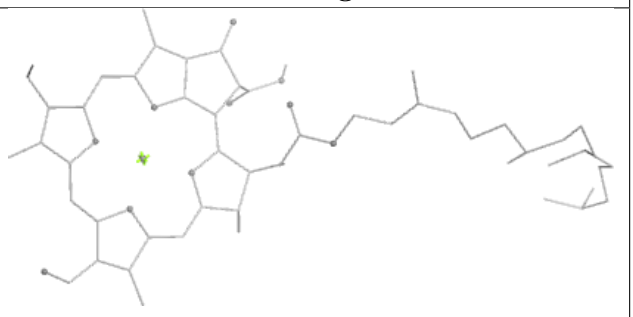
Bond lengths



Bond angles

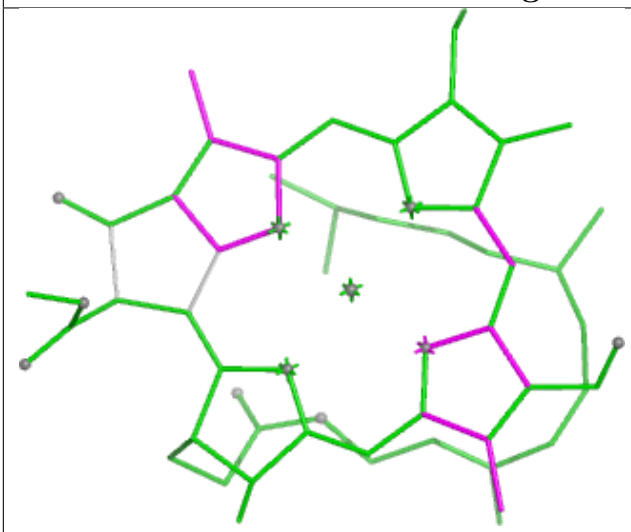


Torsions

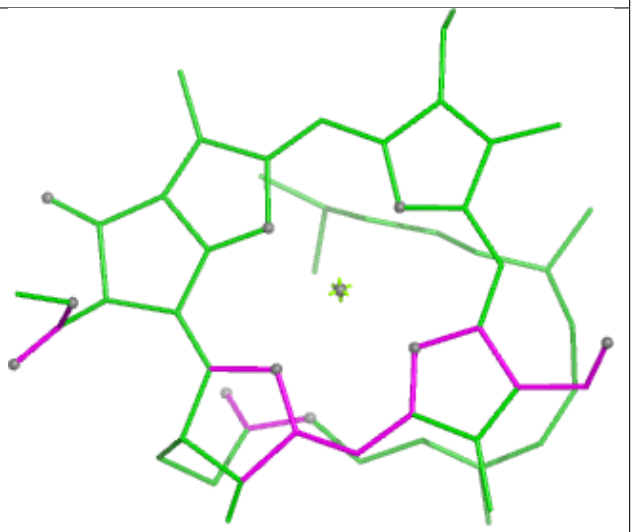


Rings

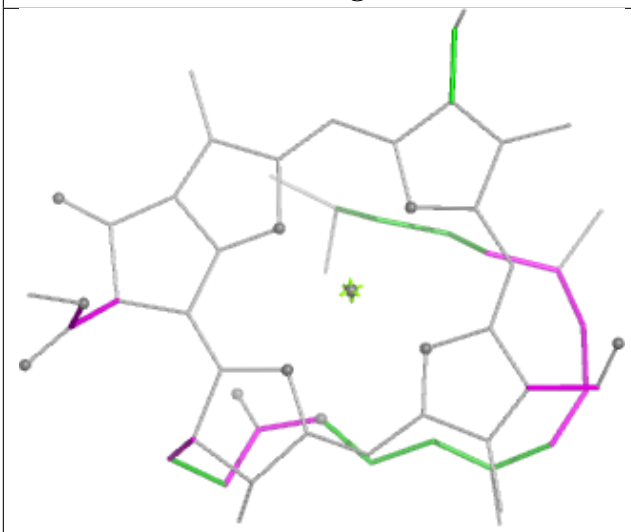
Ligand CL7 L 1501



Bond lengths



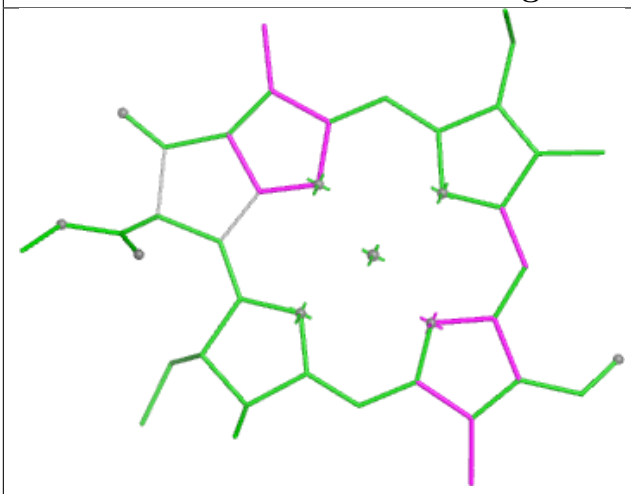
Bond angles



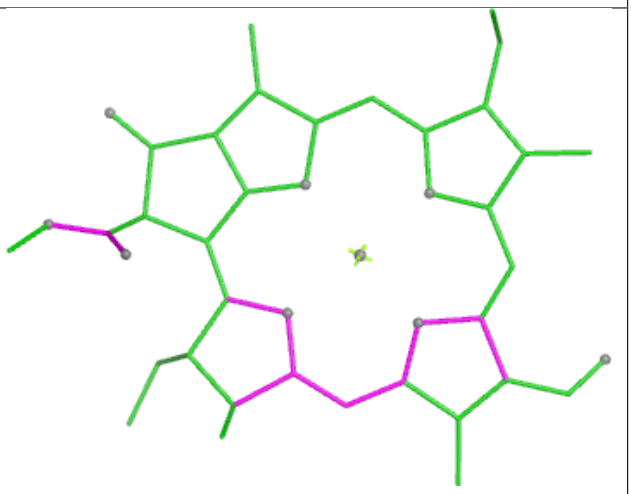
Torsions

Rings

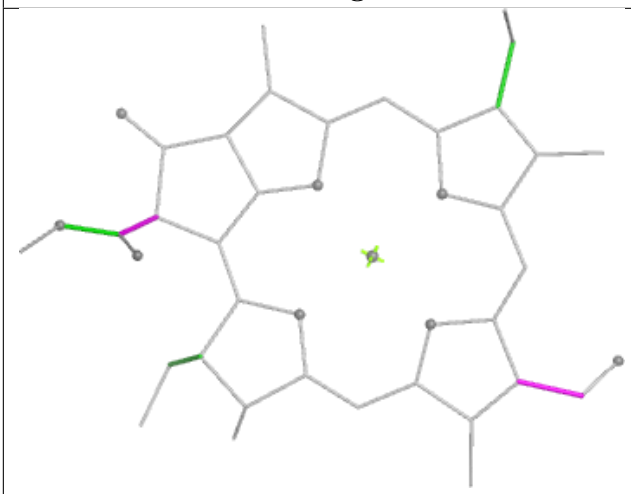
Ligand CL7 L 1503



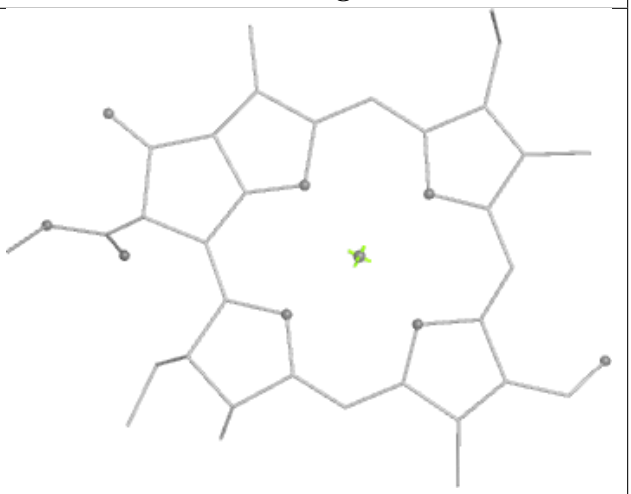
Bond lengths



Bond angles

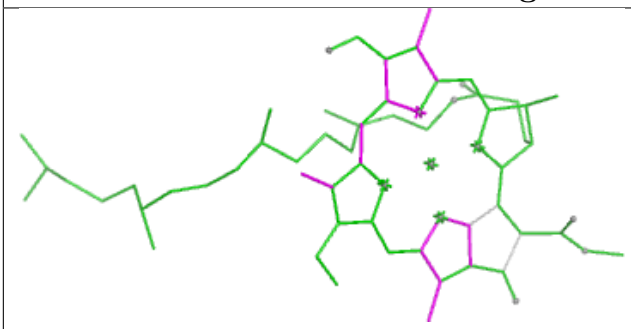


Torsions

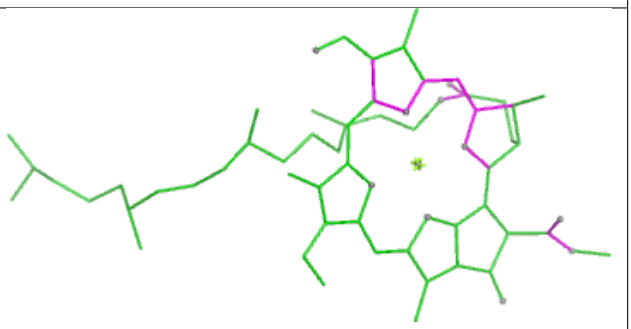


Rings

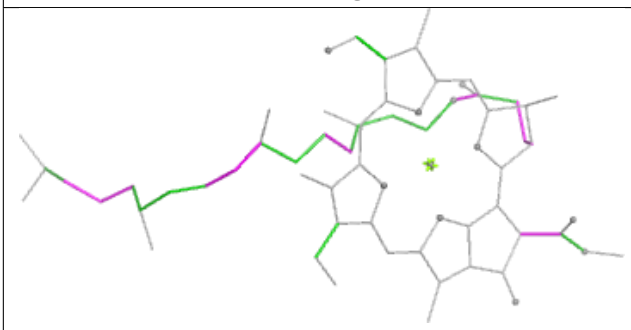
Ligand CL7 A 1116



Bond lengths



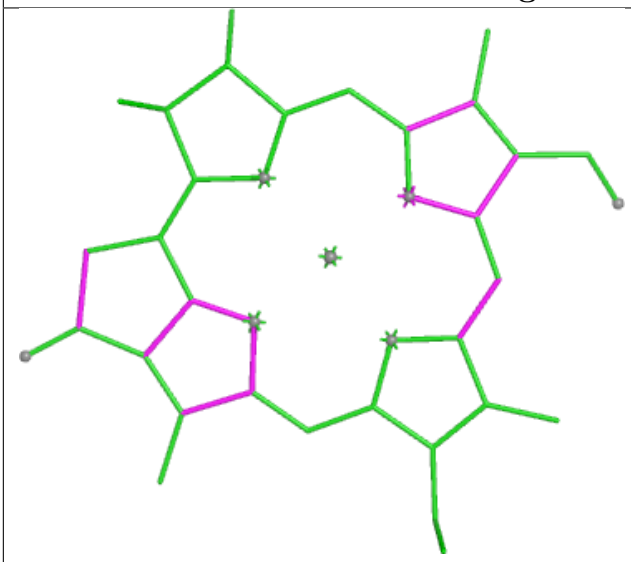
Bond angles



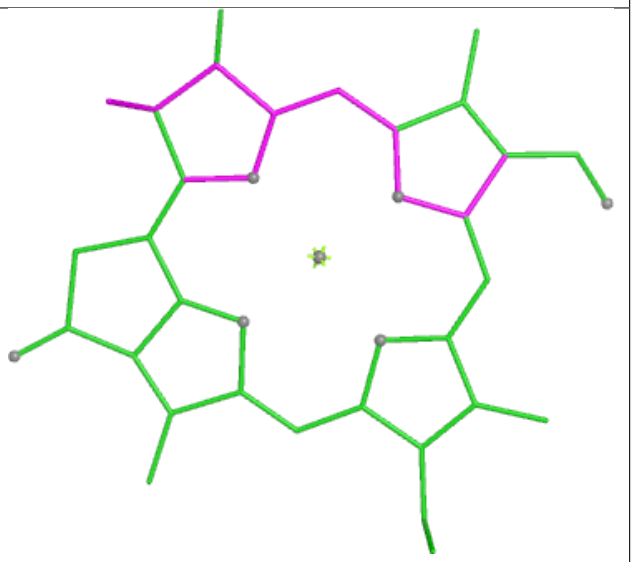
Torsions

Rings

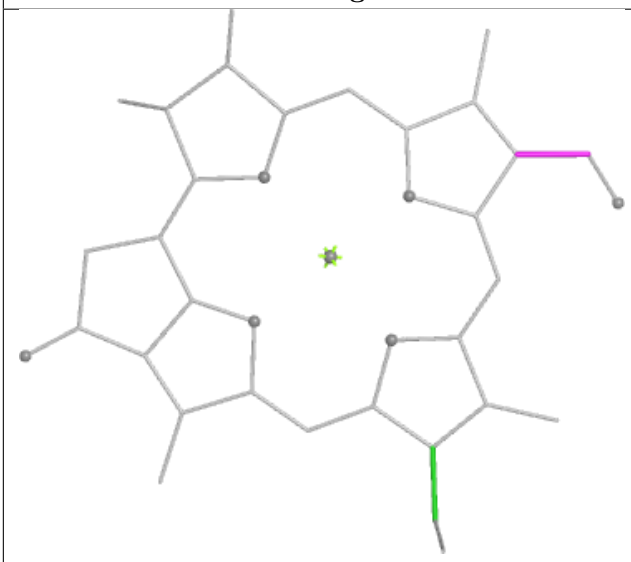
Ligand CL7 K 1402



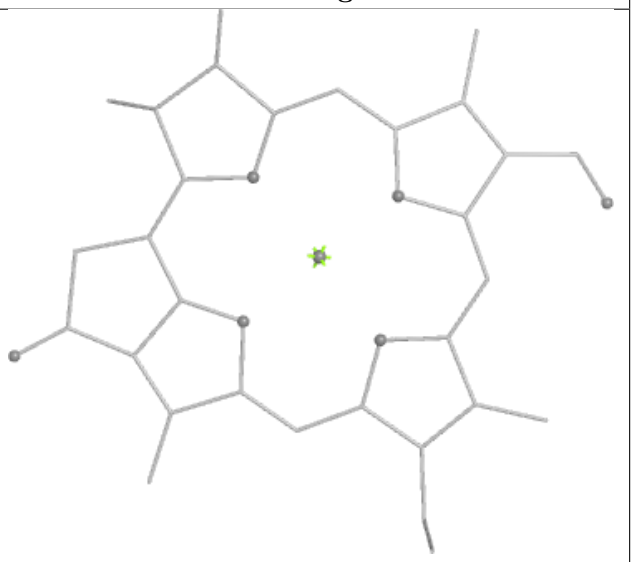
Bond lengths



Bond angles



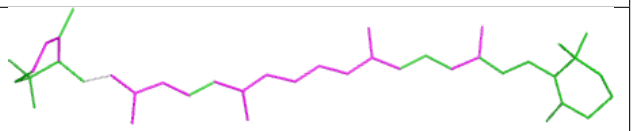
Torsions



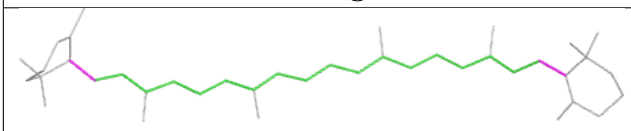
Rings

Ligand A1JPJ A 4007

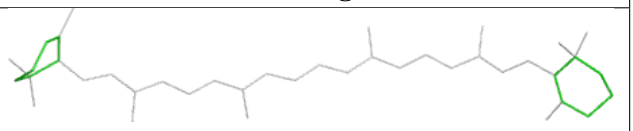
Bond lengths



Bond angles

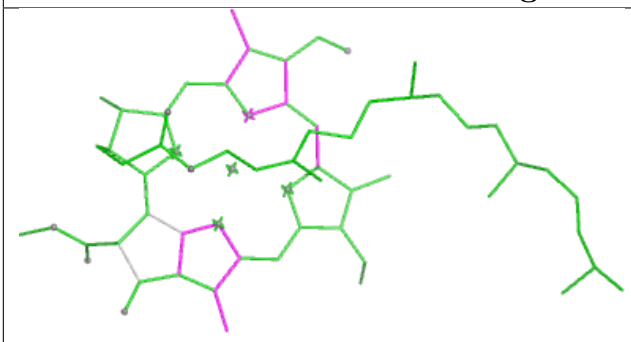


Torsions

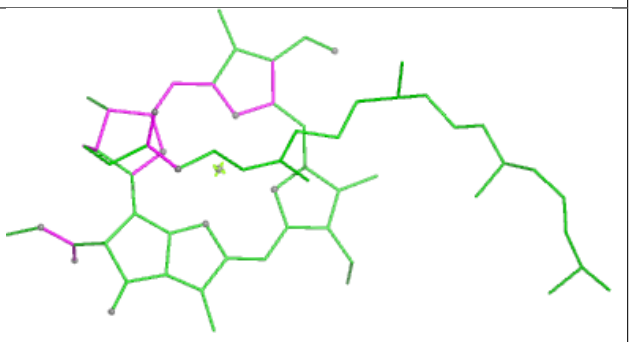


Rings

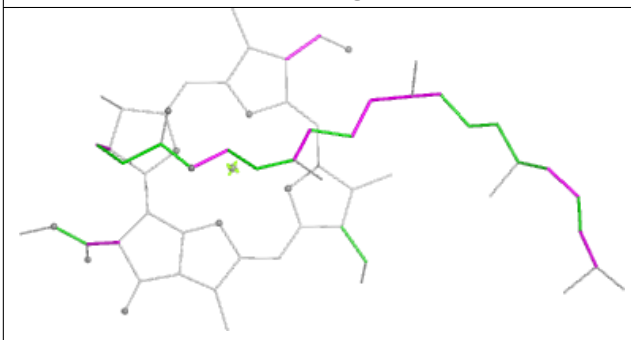
Ligand CL7 B 1235



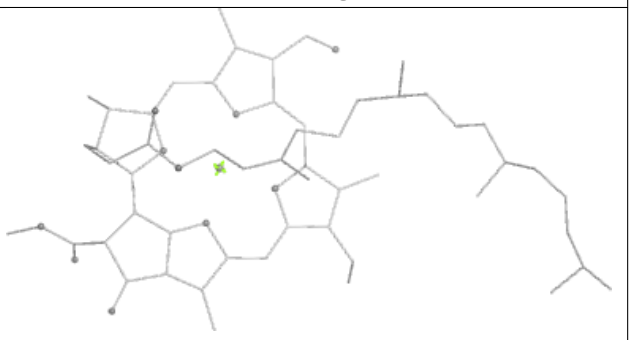
Bond lengths



Bond angles

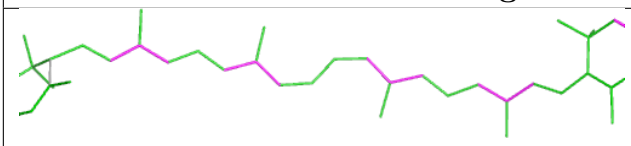


Torsions

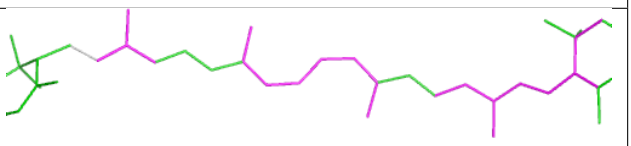


Rings

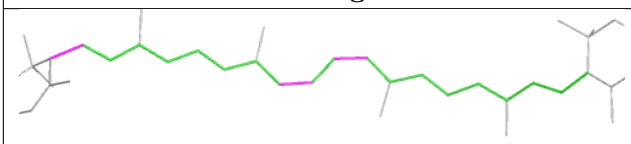
Ligand A1JPJ B 4021



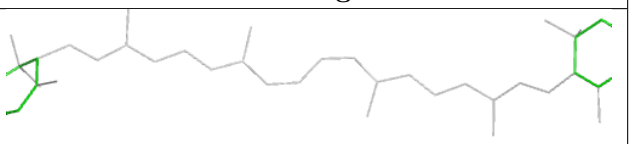
Bond lengths



Bond angles

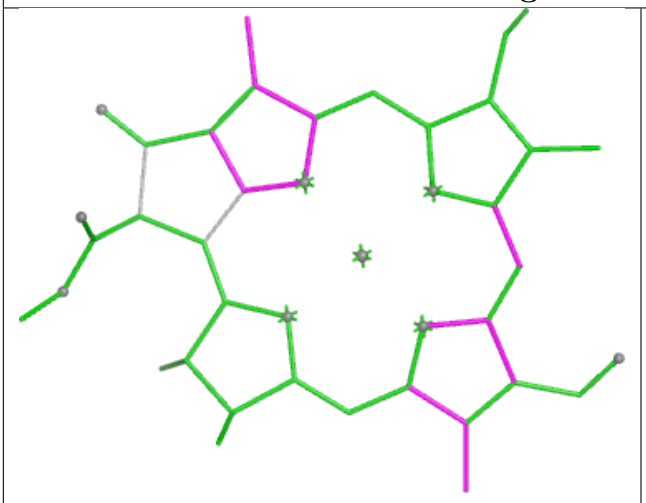


Torsions

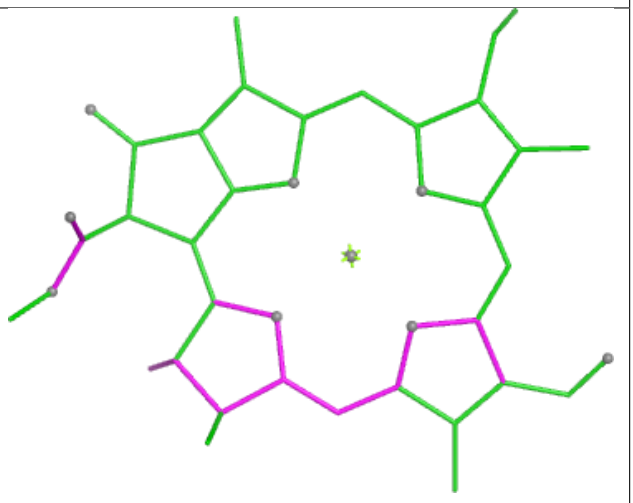


Rings

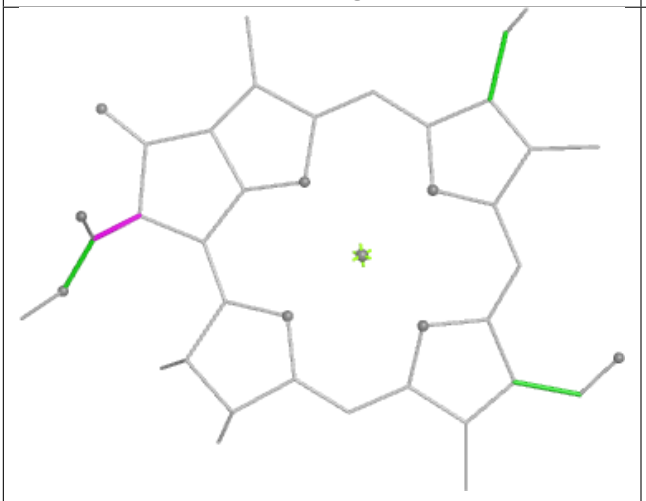
Ligand CL7 B 1219



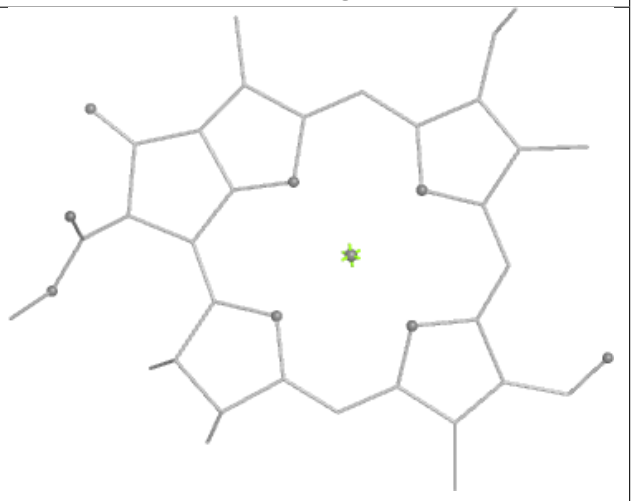
Bond lengths



Bond angles

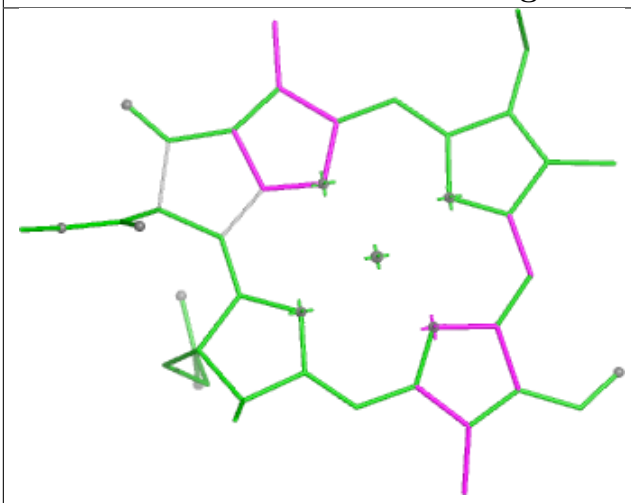


Torsions

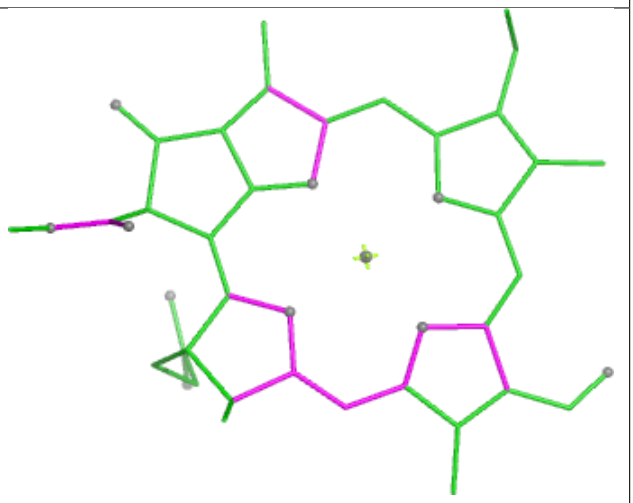


Rings

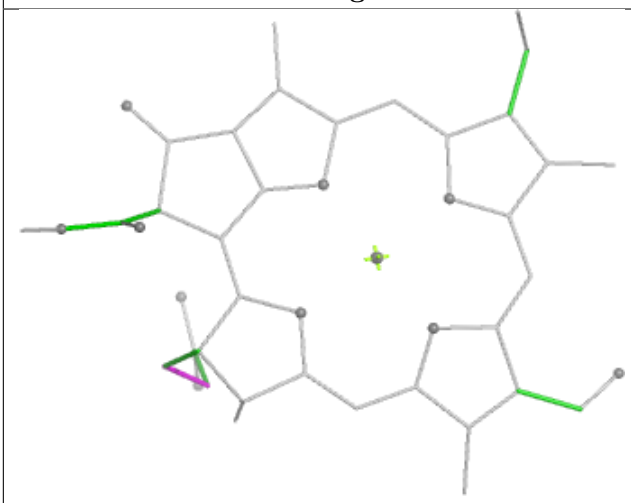
Ligand CL7 B 1228



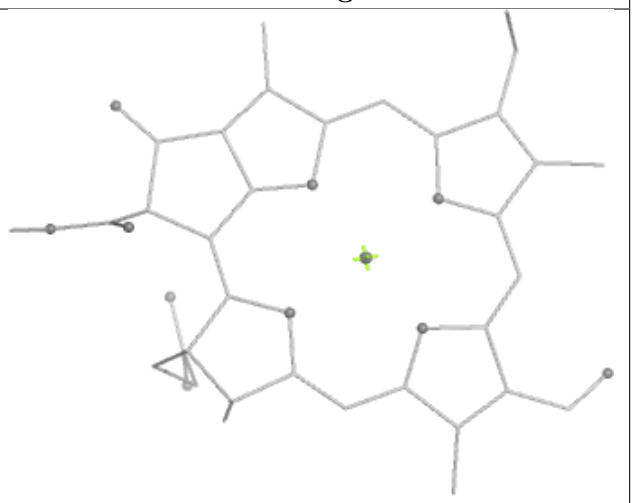
Bond lengths



Bond angles

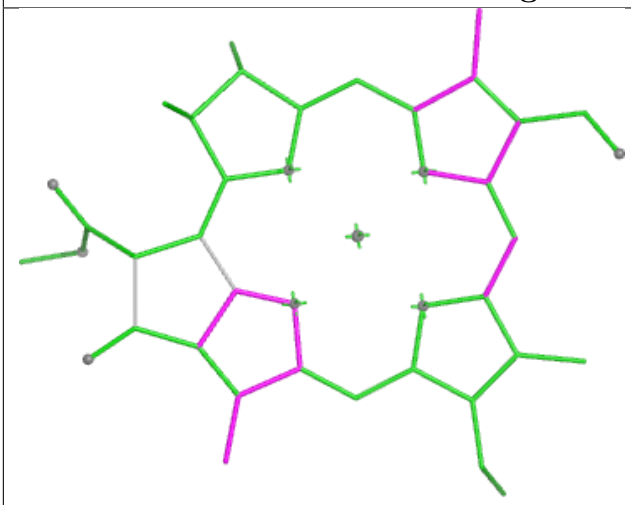


Torsions

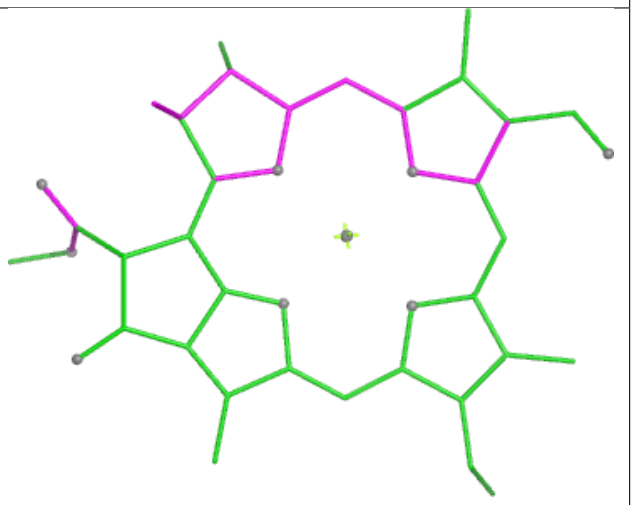


Rings

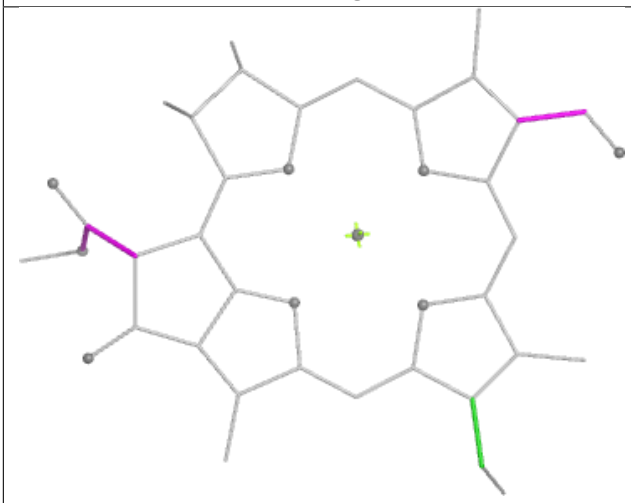
Ligand CL7 B 1232



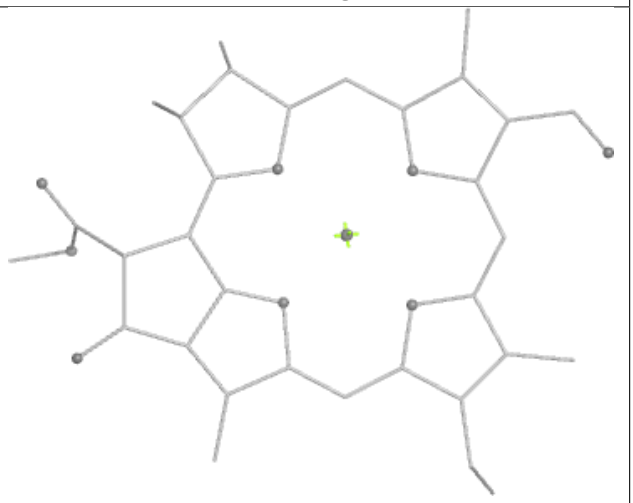
Bond lengths



Bond angles

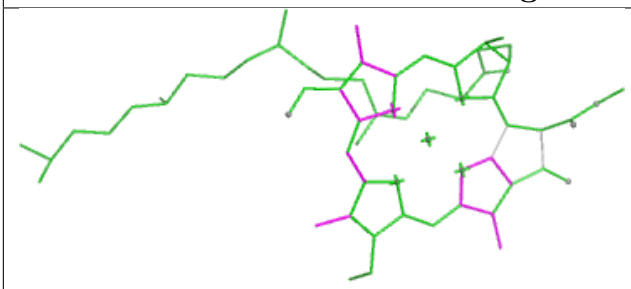


Torsions

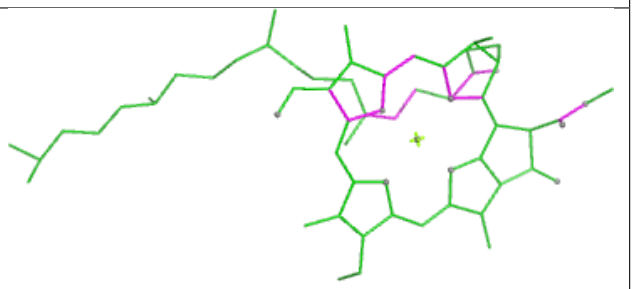


Rings

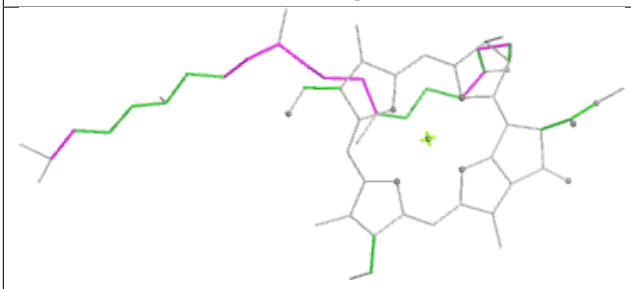
Ligand CL7 B 1237



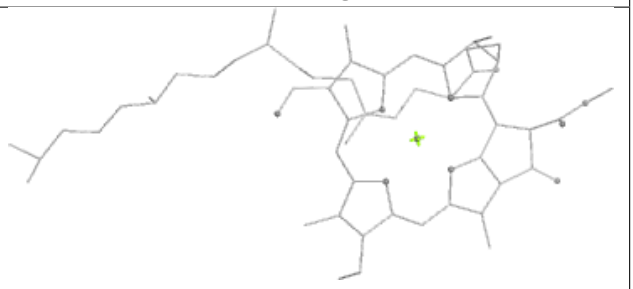
Bond lengths



Bond angles

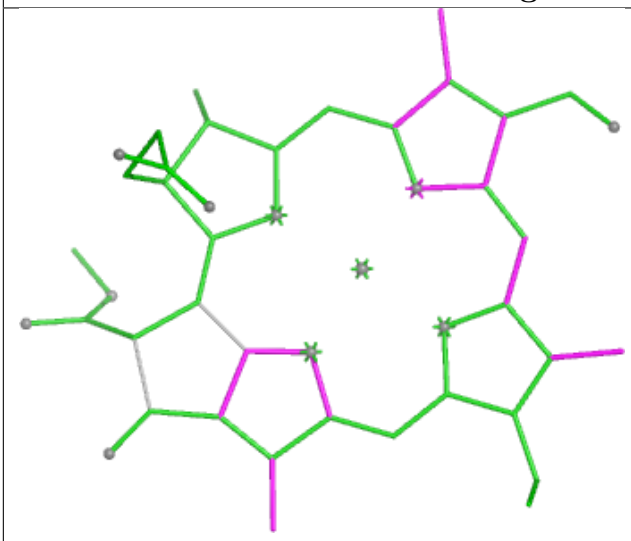


Torsions

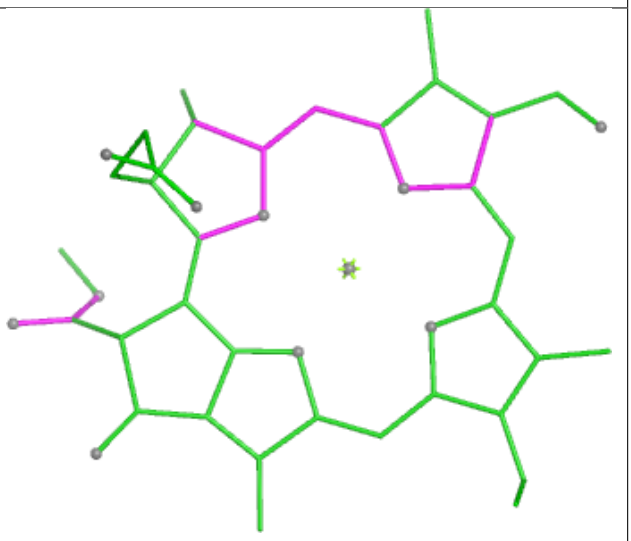


Rings

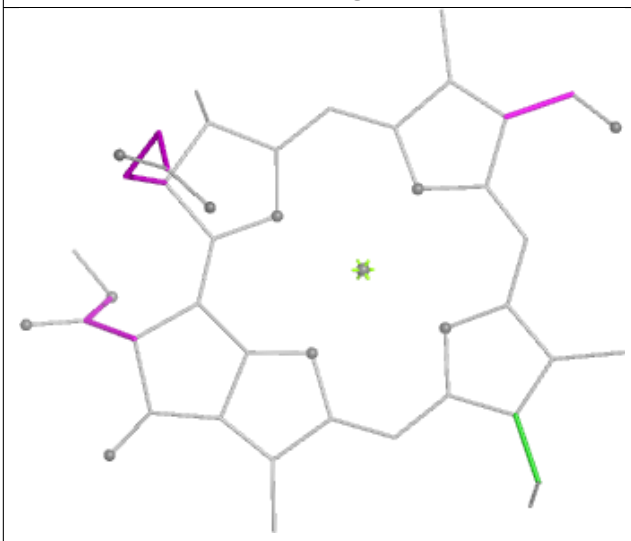
Ligand CL7 B 1212



Bond lengths



Bond angles



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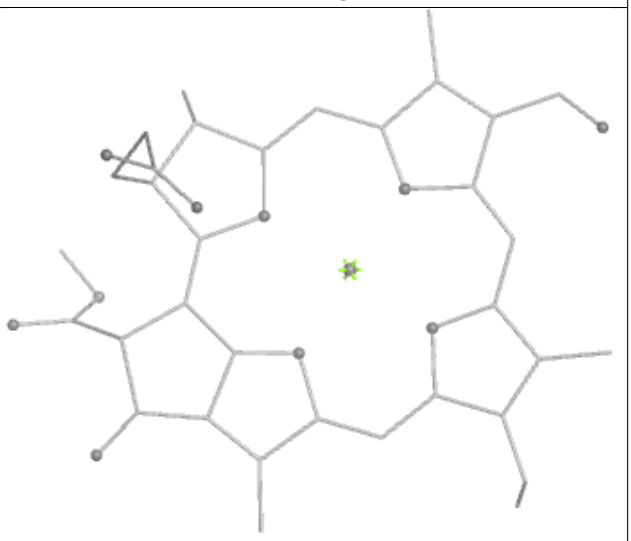
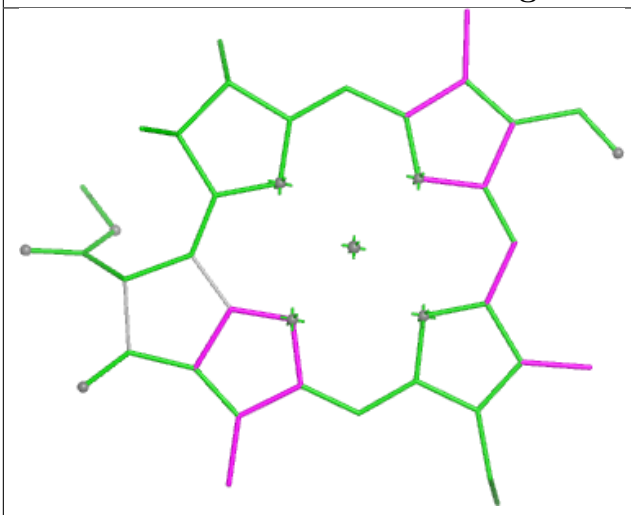


Rings

Ligand CL7 A 1101



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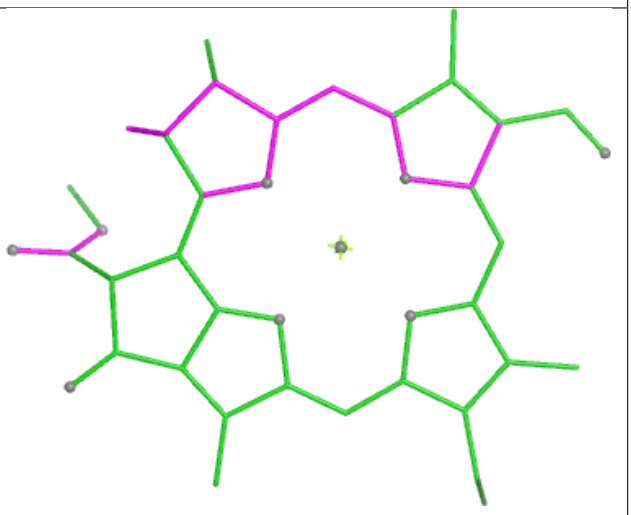
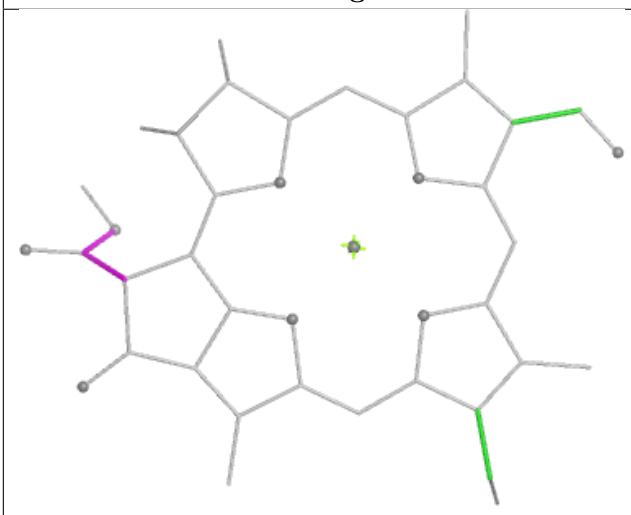
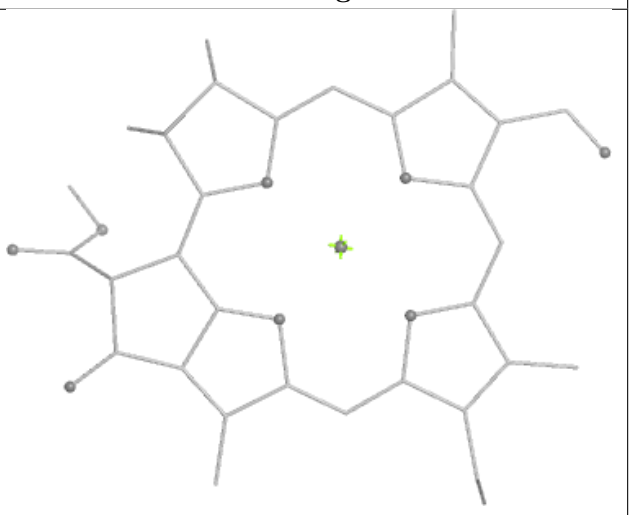


Bond angles

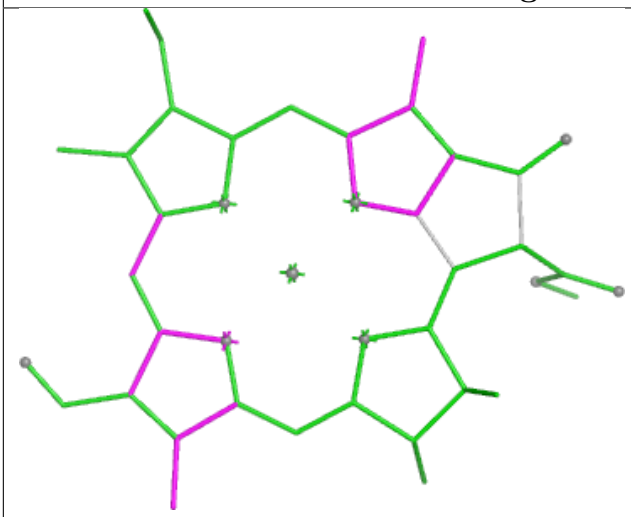


Torsions



Rings

Ligand CL7 B 1217



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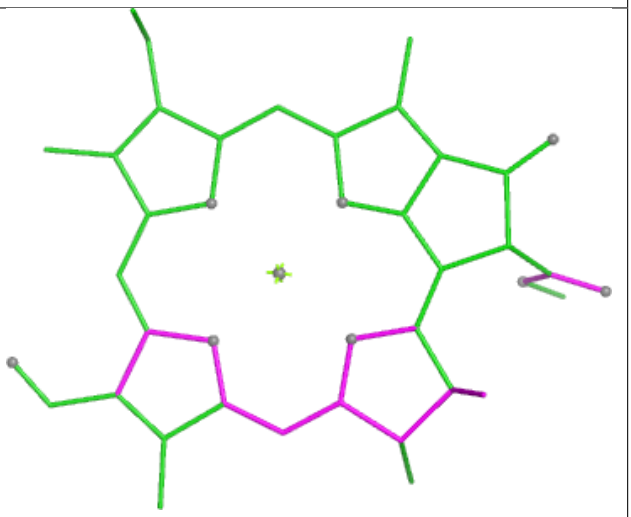
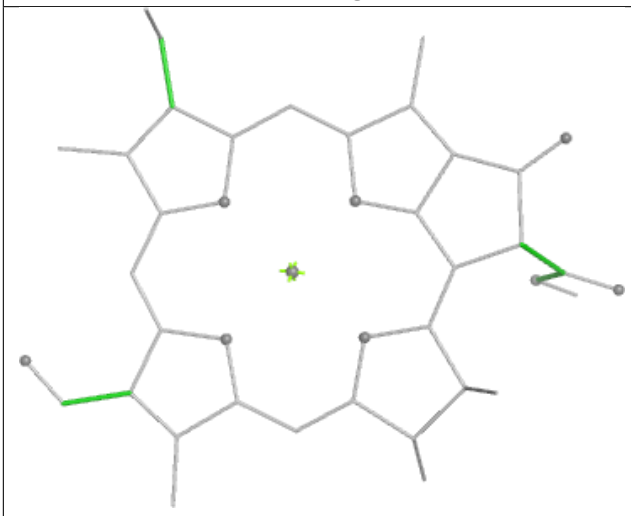


Bond angles



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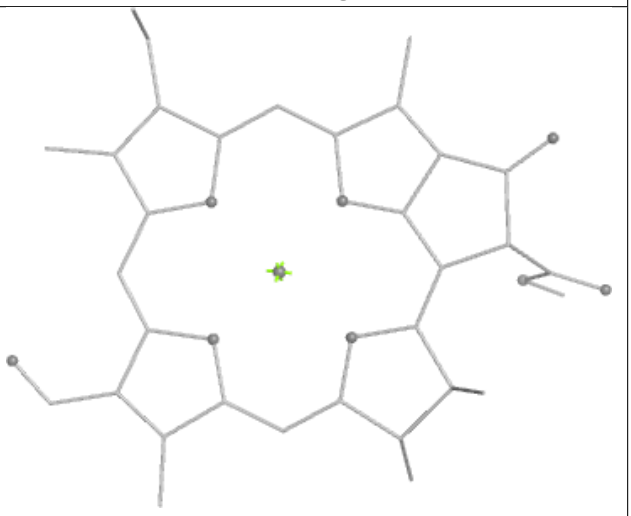
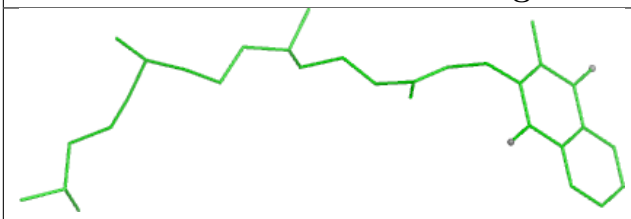


Rings

Ligand PQN B 2002



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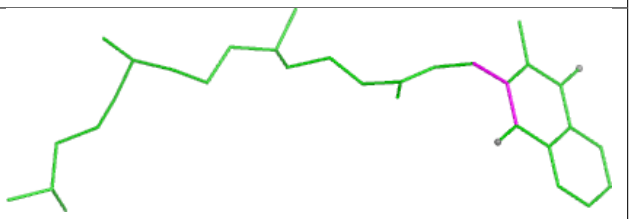
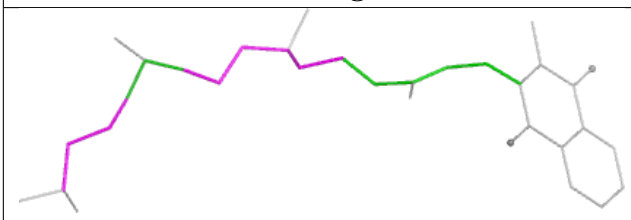
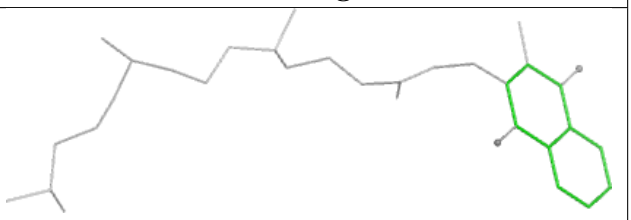


Bond angles

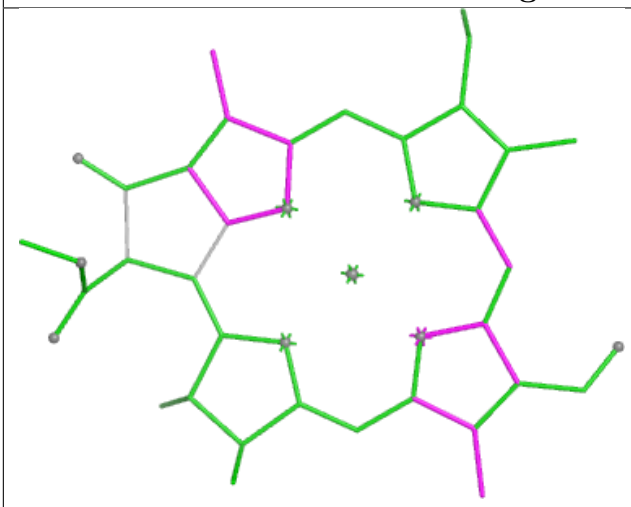


Torsions

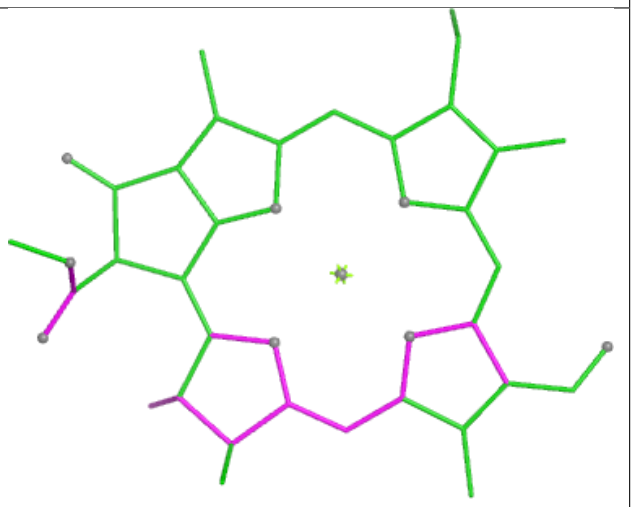


Rings

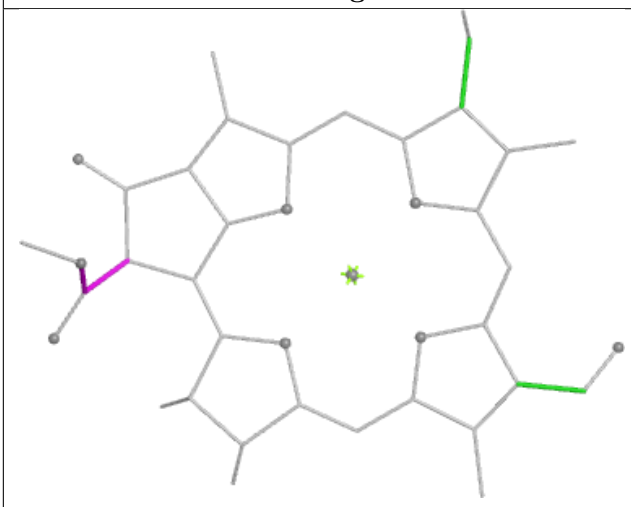
Ligand CL7 A 1141



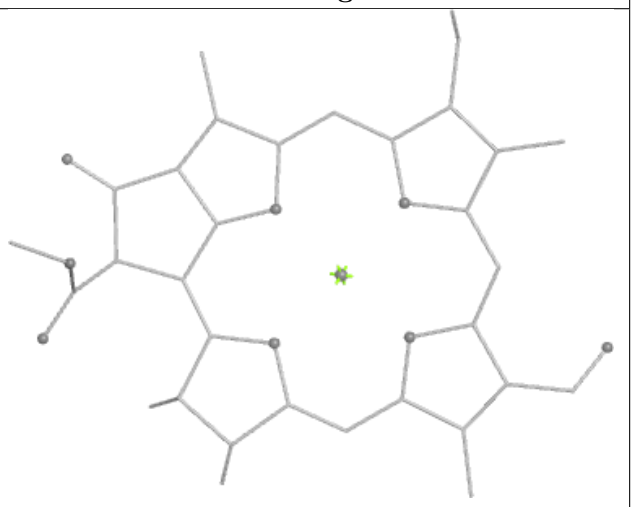
Bond lengths



Bond angles

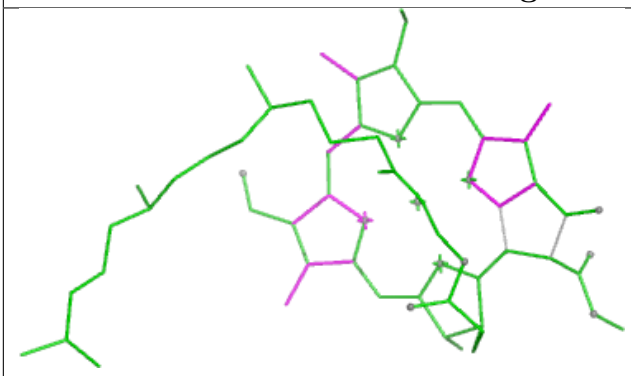


Torsions

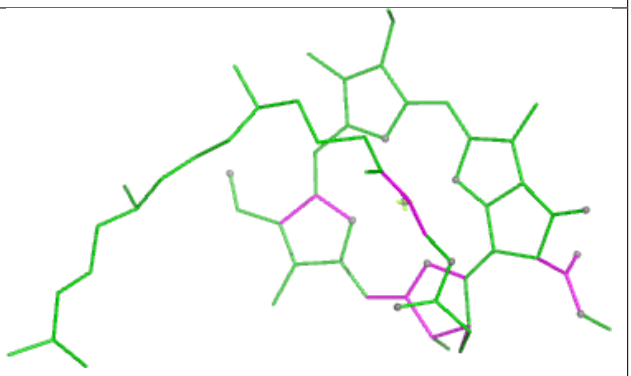


Rings

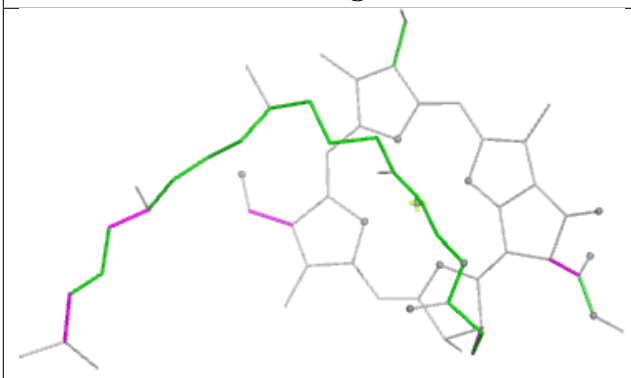
Ligand CL7 B 1204



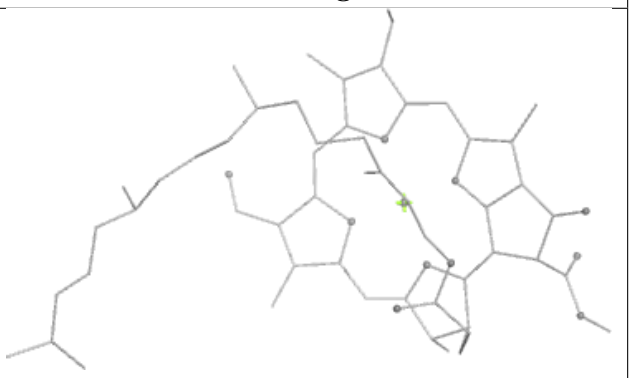
Bond lengths



Bond angles

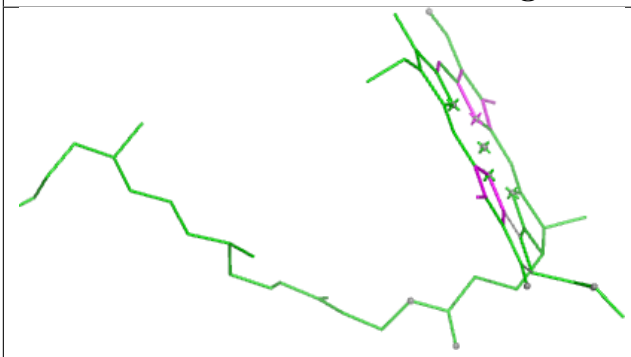


Torsions



Rings

Ligand CL7 A 1128



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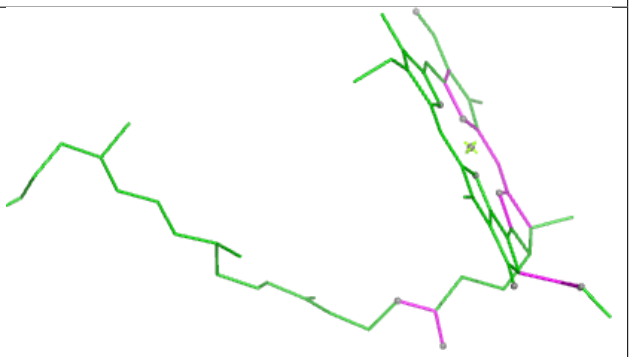
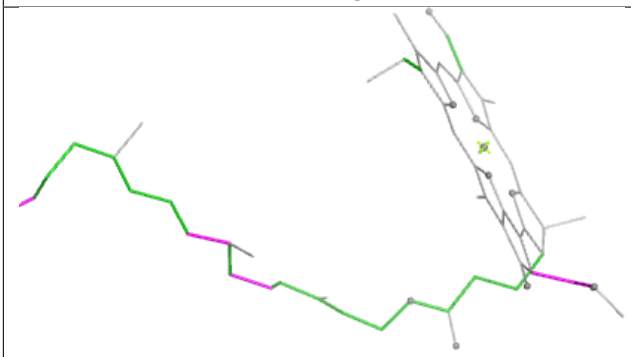


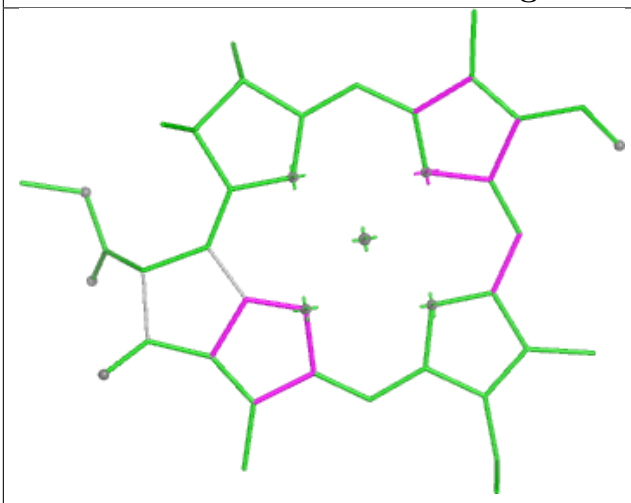
Bond angles



Torsions

Rings

Ligand CL7 B 1233



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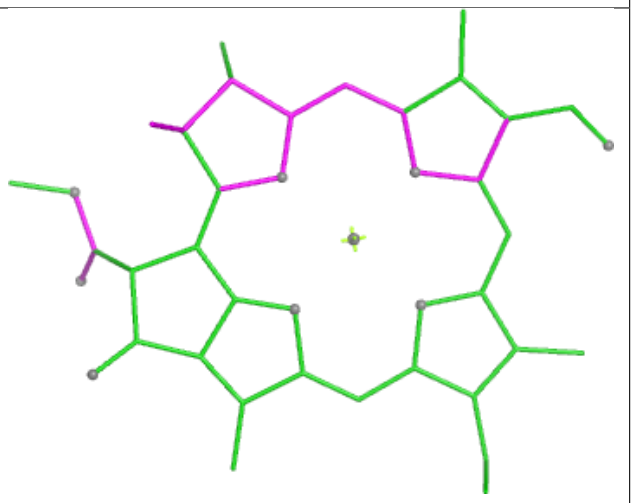
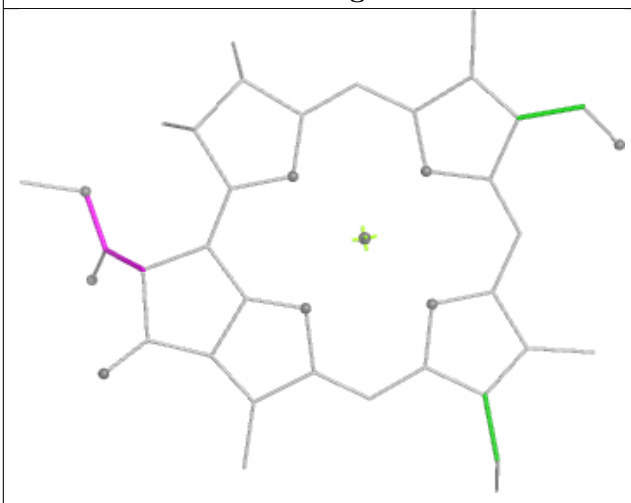


Bond angles



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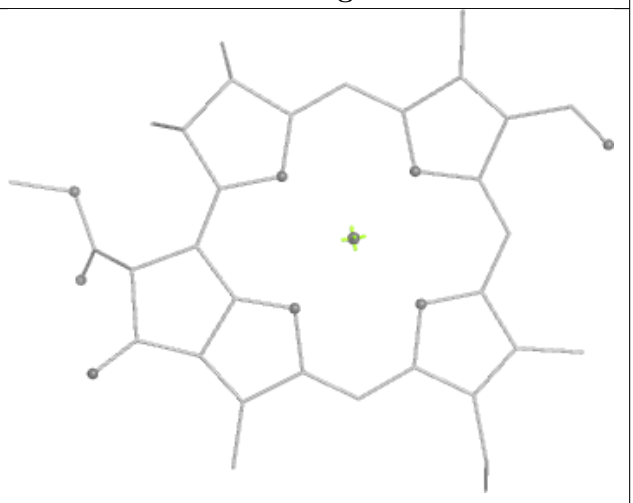
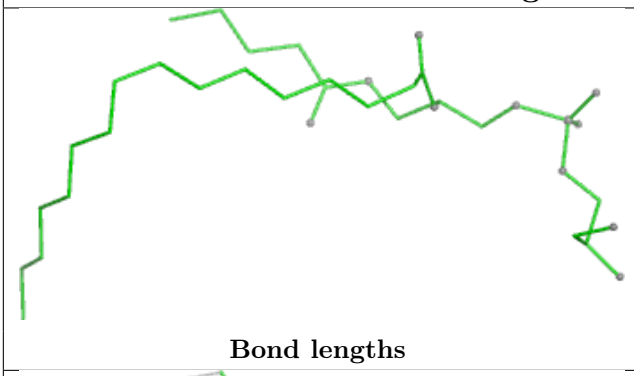
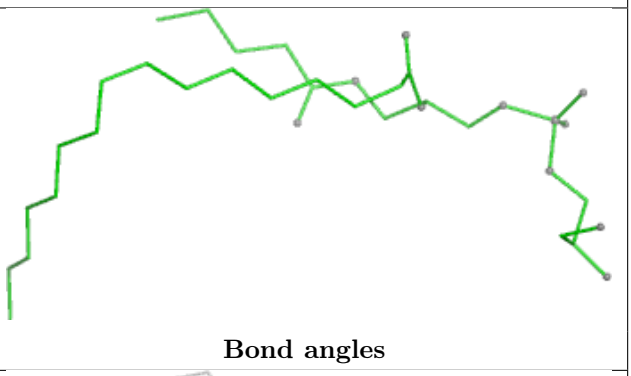


Rings

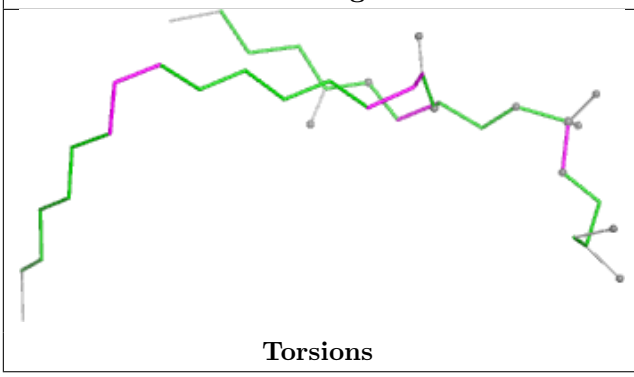
Ligand LHG A 853



Bond lengths



Bond angles



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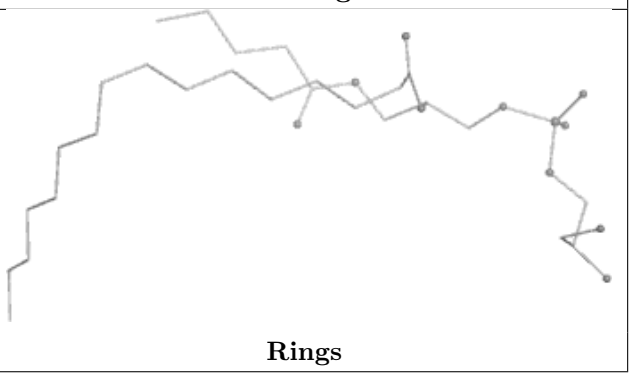
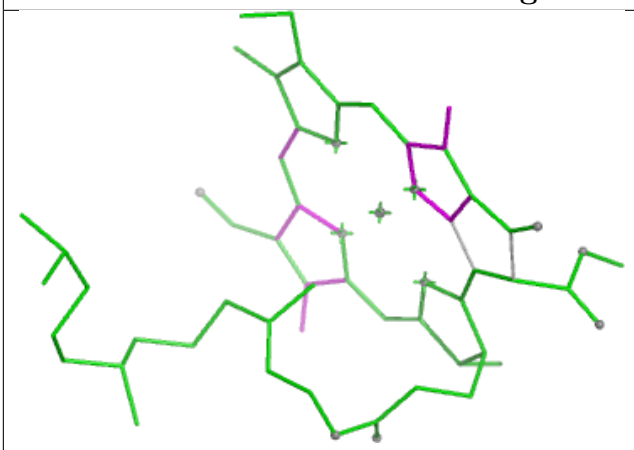
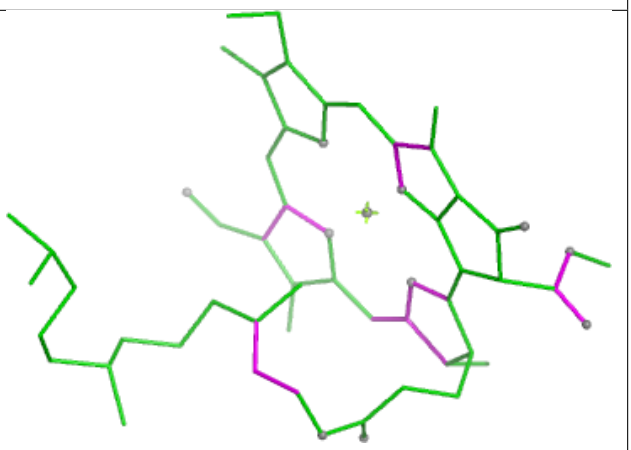


Rings

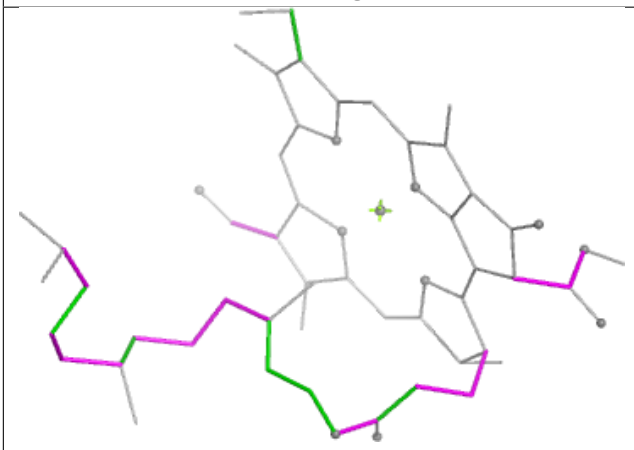
Ligand CL7 B 1227



Bond lengths



Bond angles



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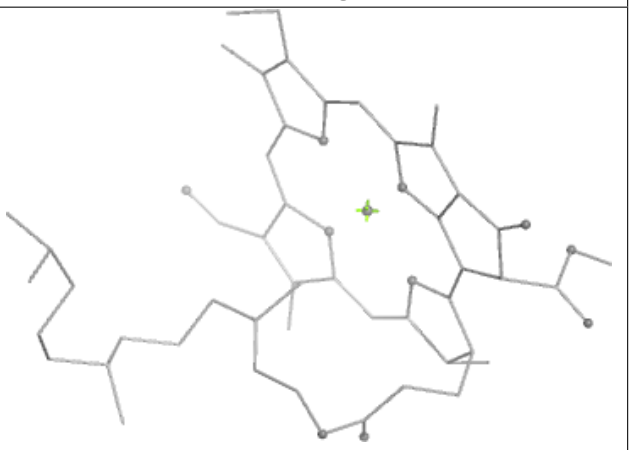
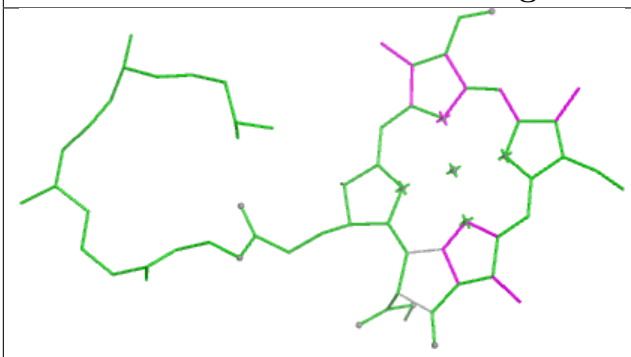
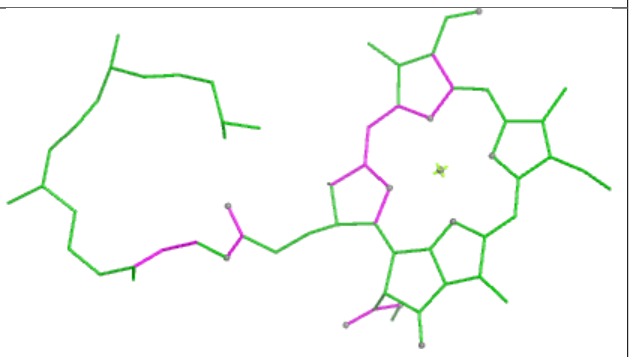


Rings

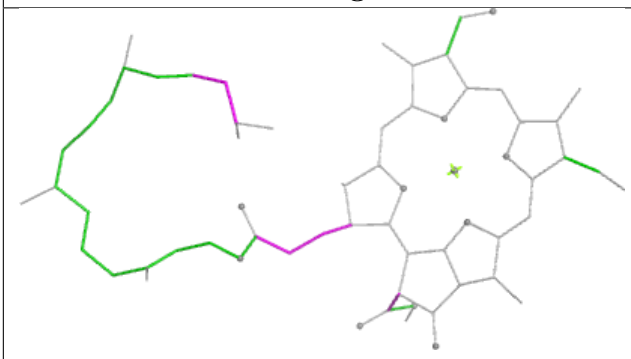
Ligand CL7 A 1125



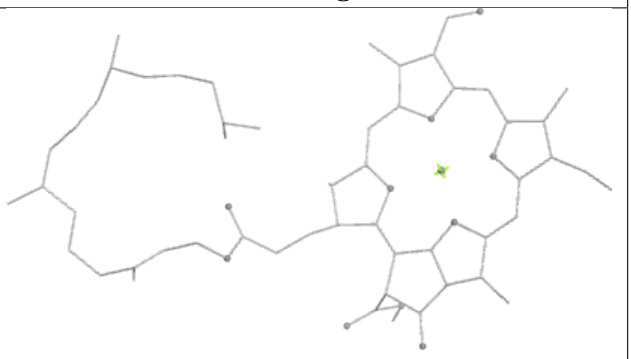
Bond lengths



Bond angles

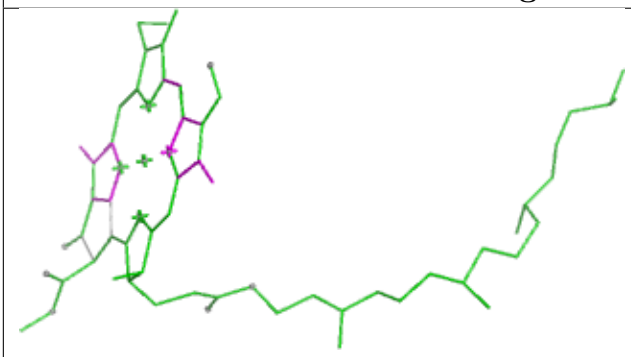


Torsions

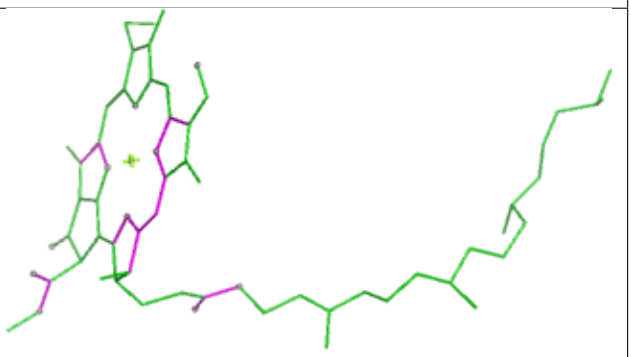


Rings

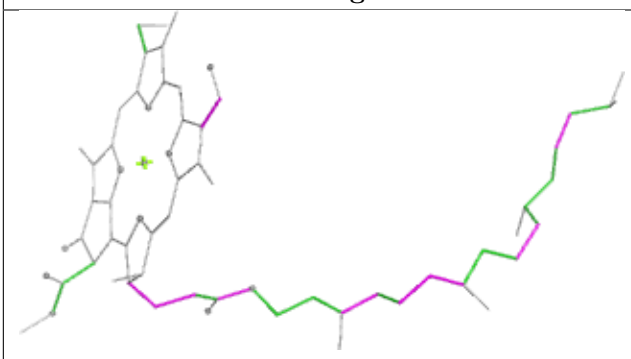
Ligand CL7 A 1133



Bond lengths



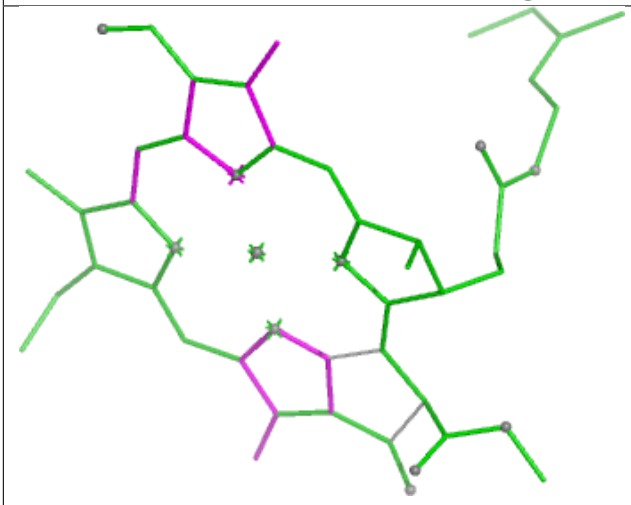
Bond angles



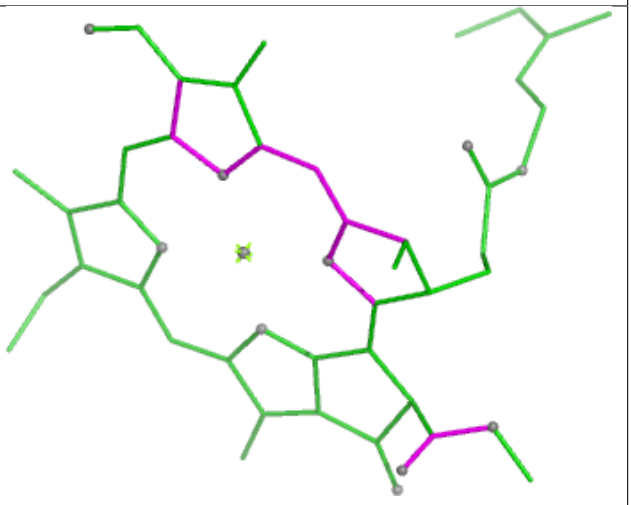
Torsions

Rings

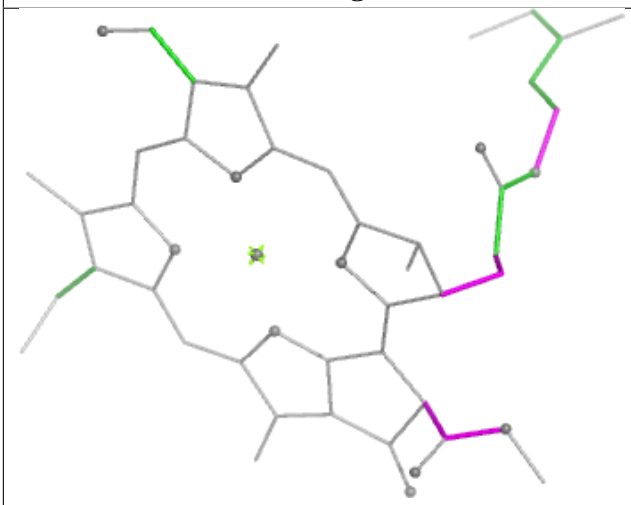
Ligand CL7 A 1108



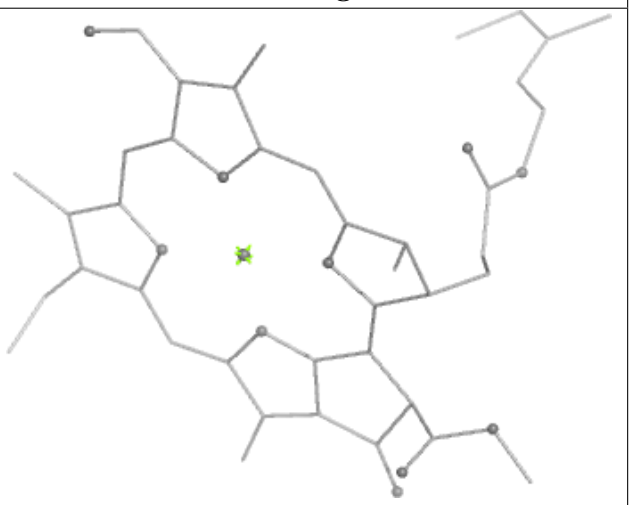
Bond lengths



Bond angles

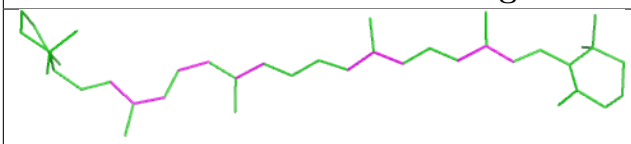


Torsions

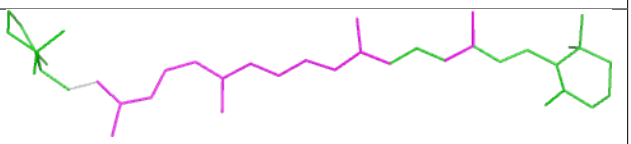


Rings

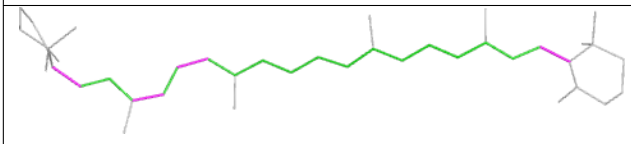
Ligand A1JPJ B 4009



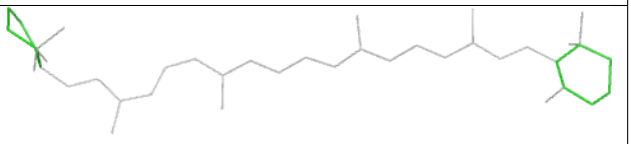
Bond lengths



Bond angles

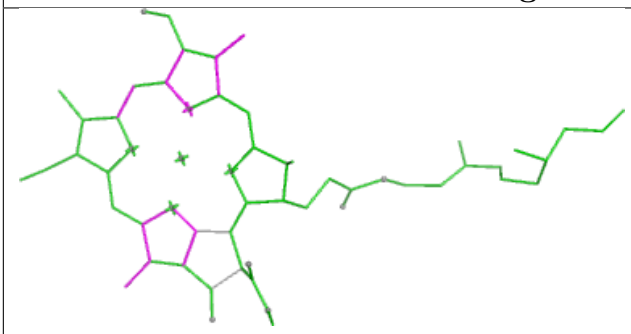


Torsions

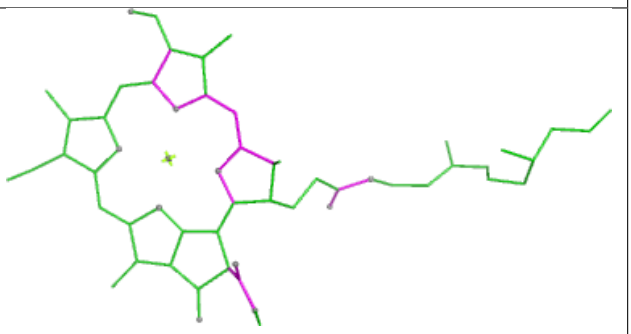


Rings

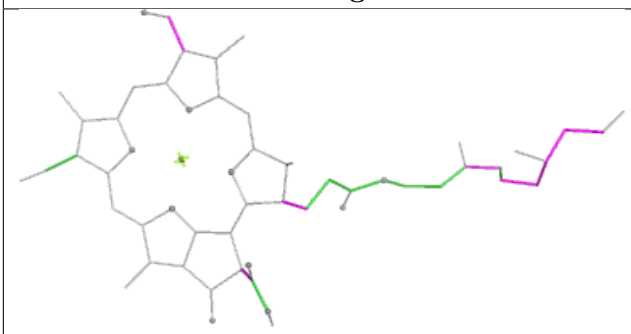
Ligand CL7 A 1124



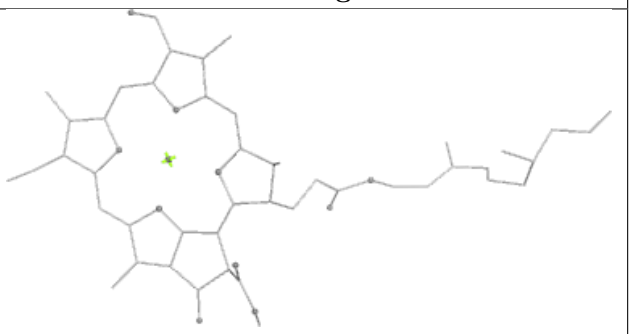
Bond lengths



Bond angles

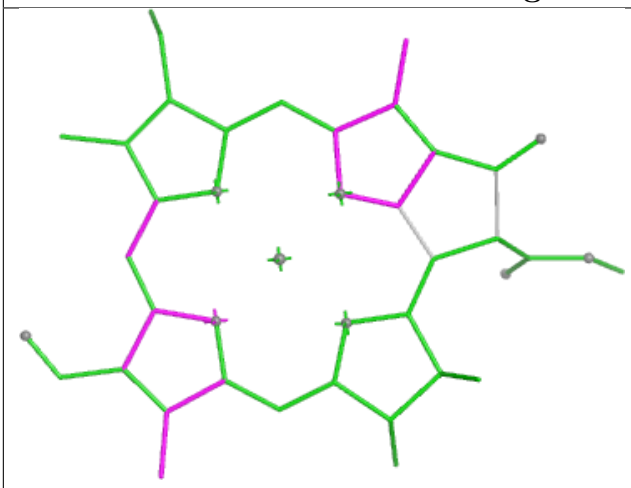


Torsions

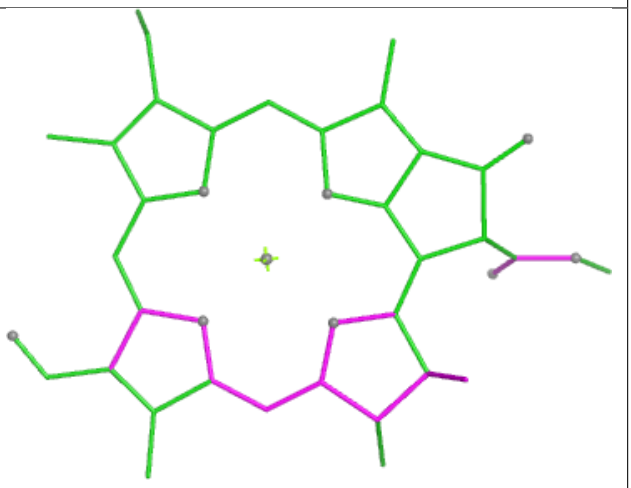


Rings

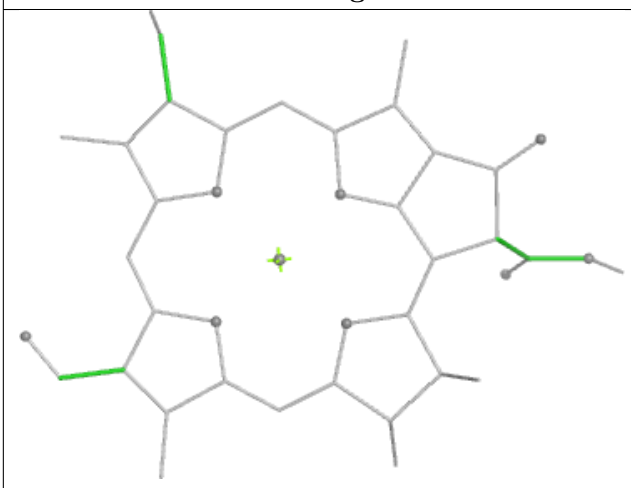
Ligand CL7 J 1301



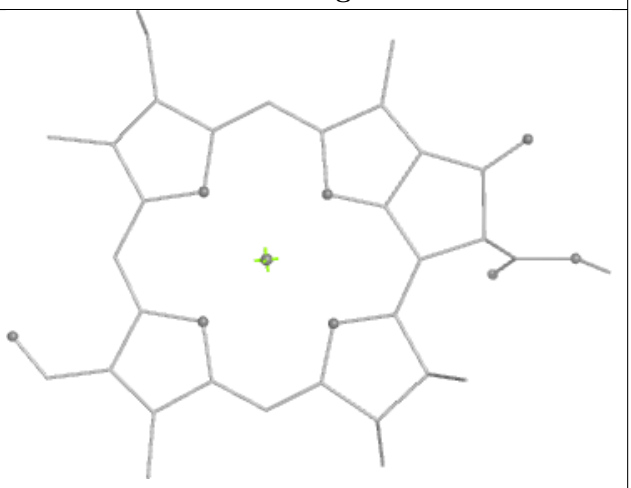
Bond lengths



Bond angles

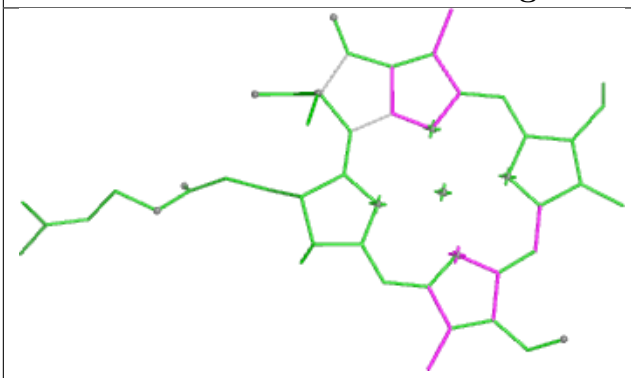


Torsions

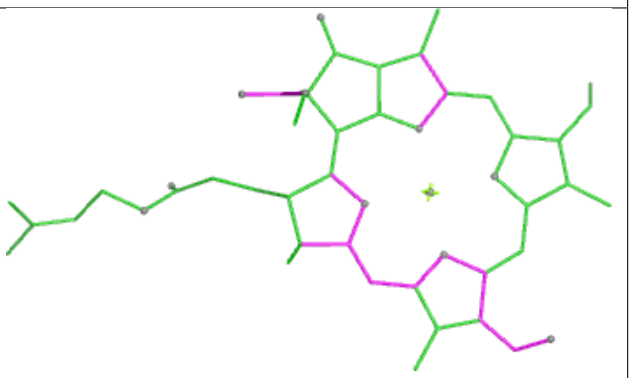


Rings

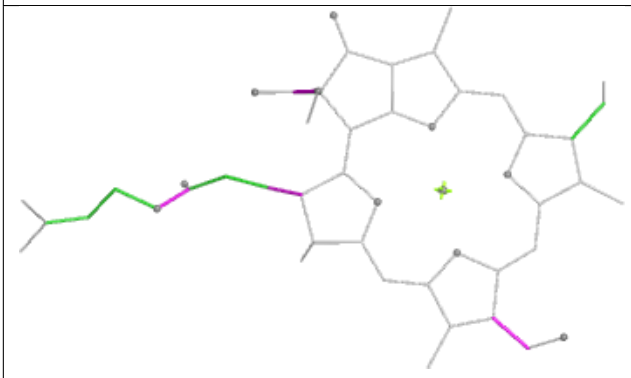
Ligand CL7 A 1135



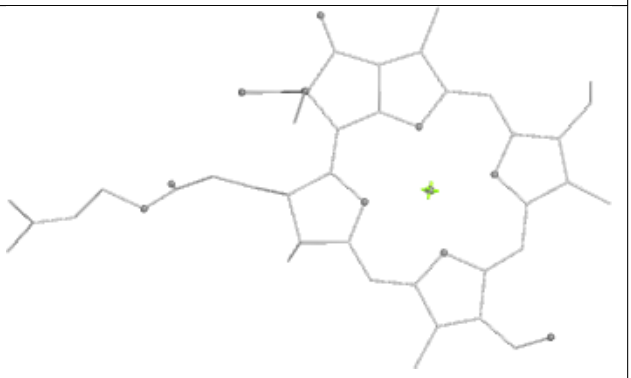
Bond lengths



Bond angles

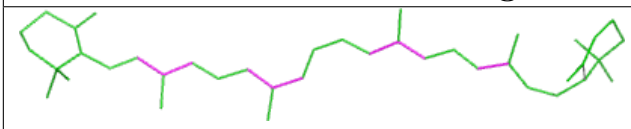


Torsions

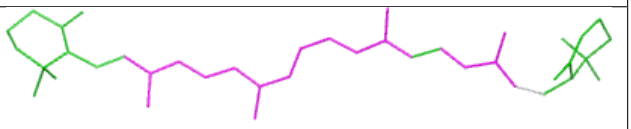


Rings

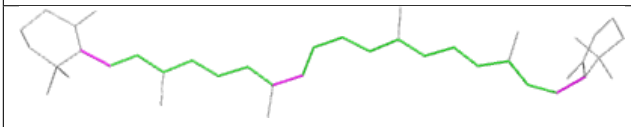
Ligand A1JPJ A 4003



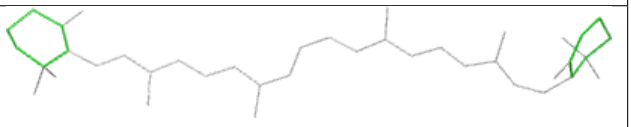
Bond lengths



Bond angles

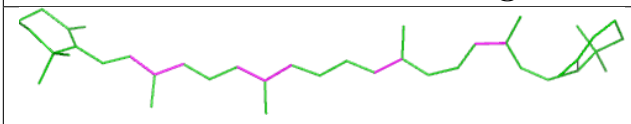


Torsions

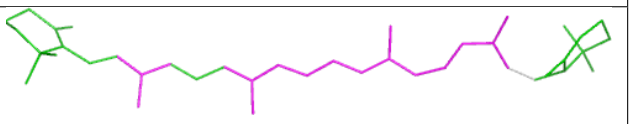


Rings

Ligand A1JPJ A 4002

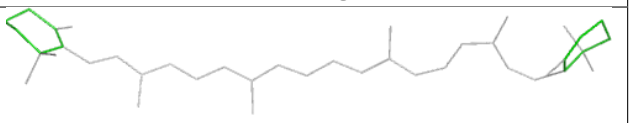


Bond lengths



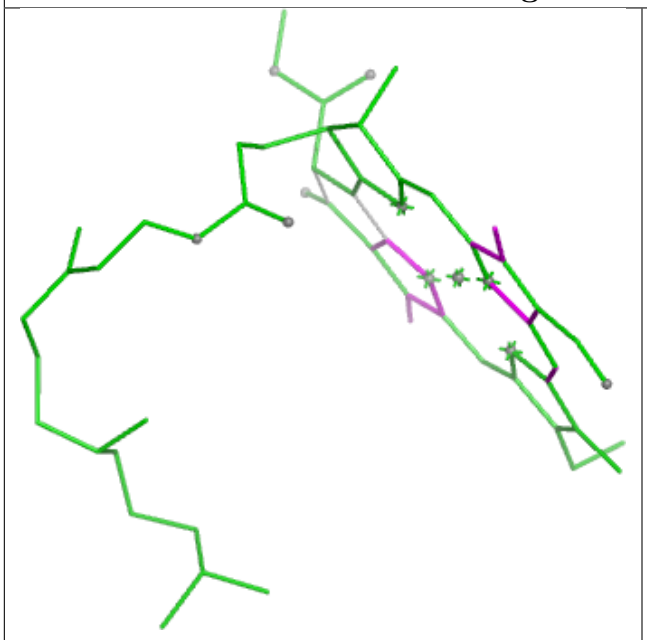
Bond angles

Torsions

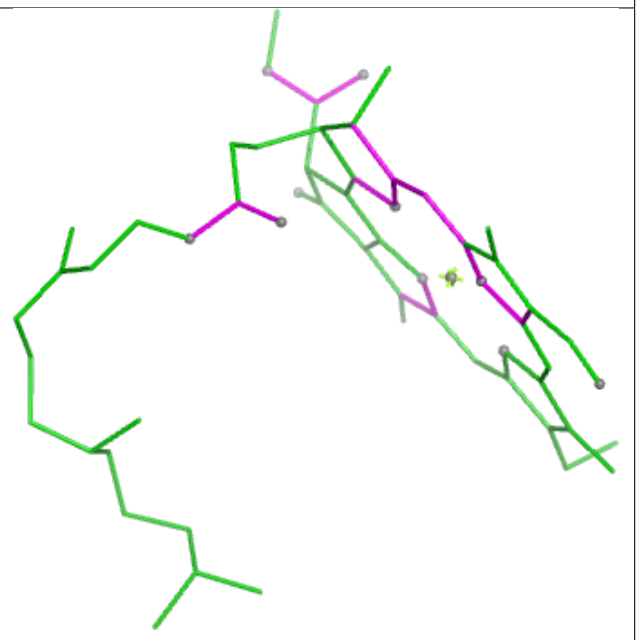


Rings

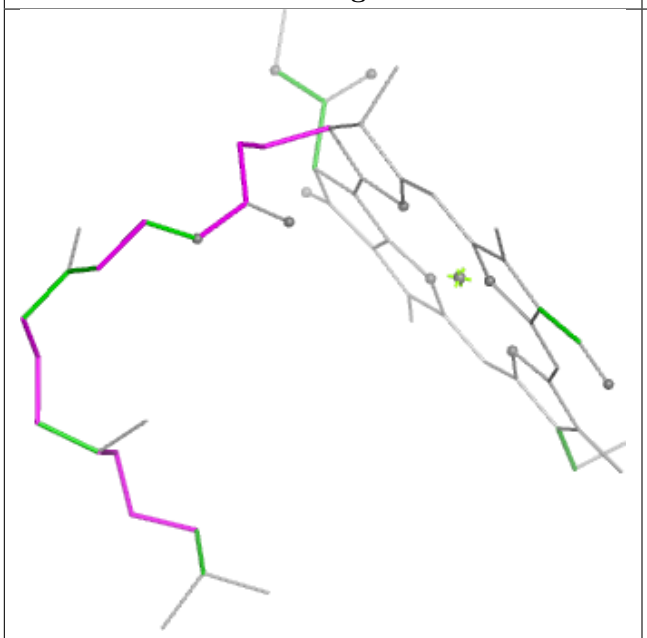
Ligand CL7 B 1231



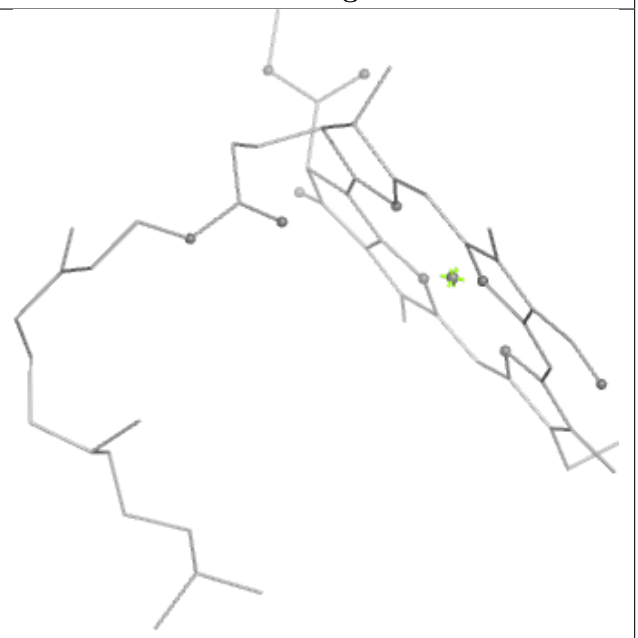
Bond lengths



Bond angles

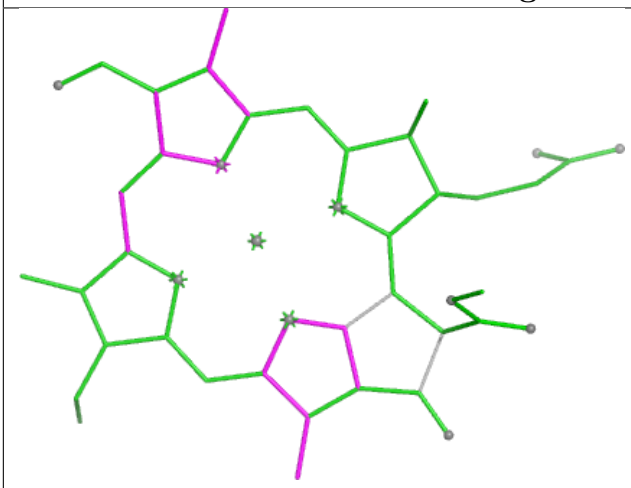


Torsions

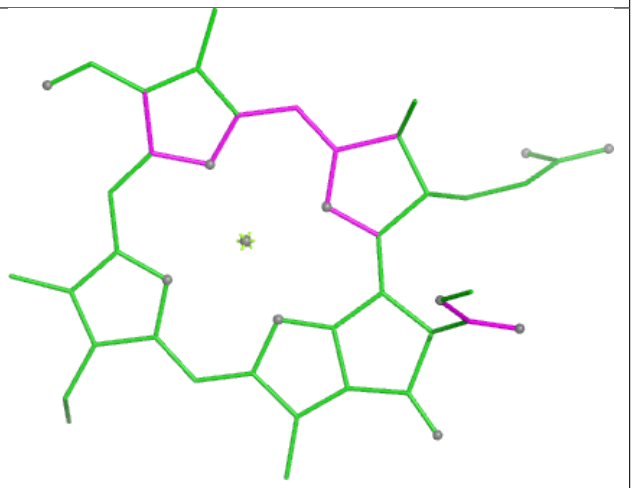


Rings

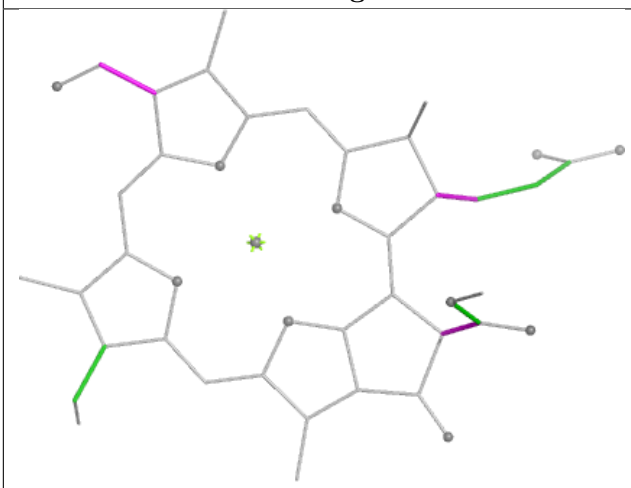
Ligand CL7 A 1120



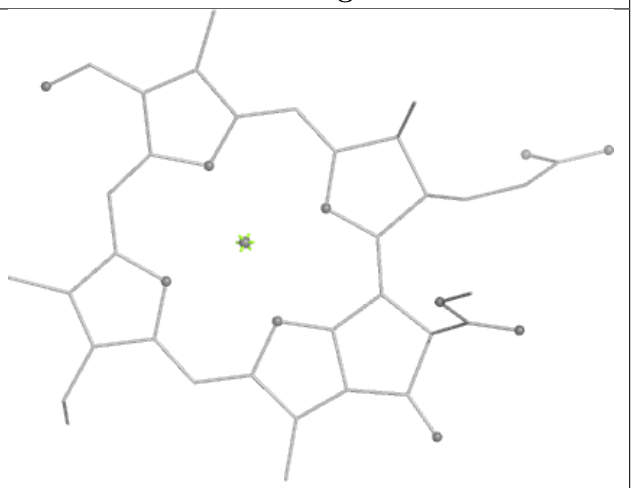
Bond lengths



Bond angles

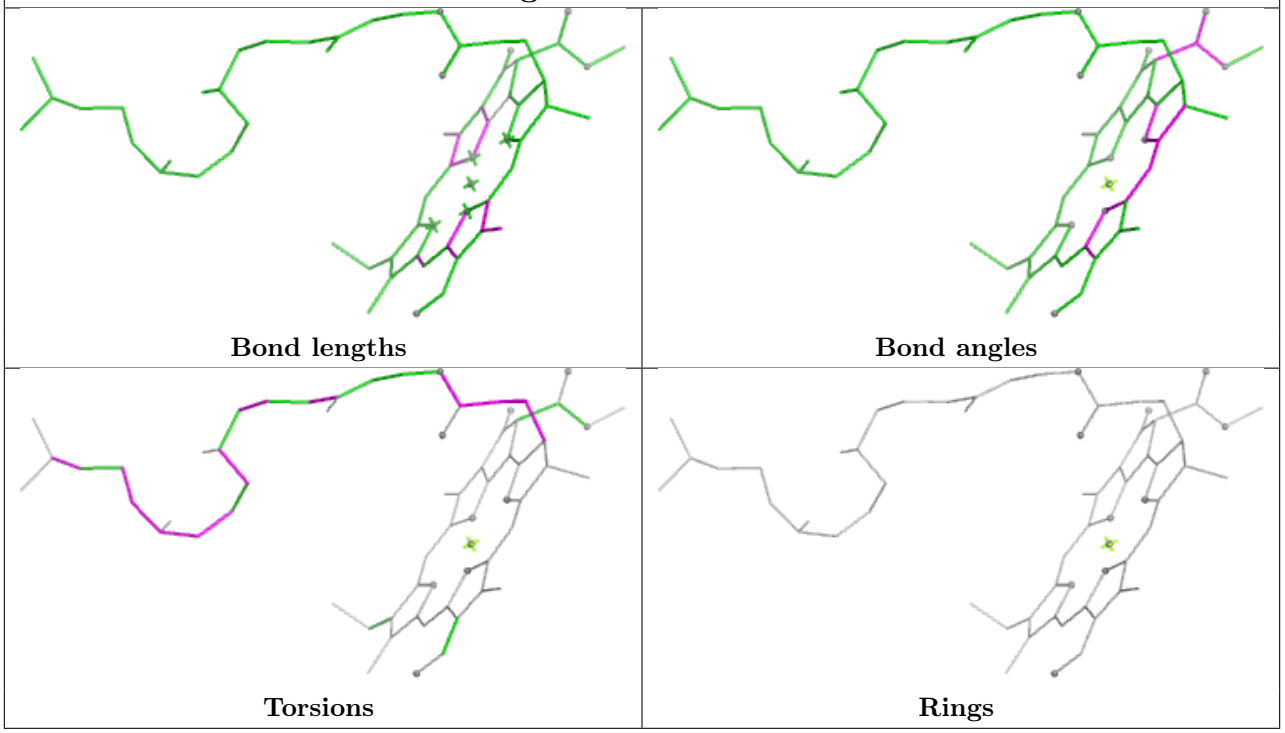


Torsions

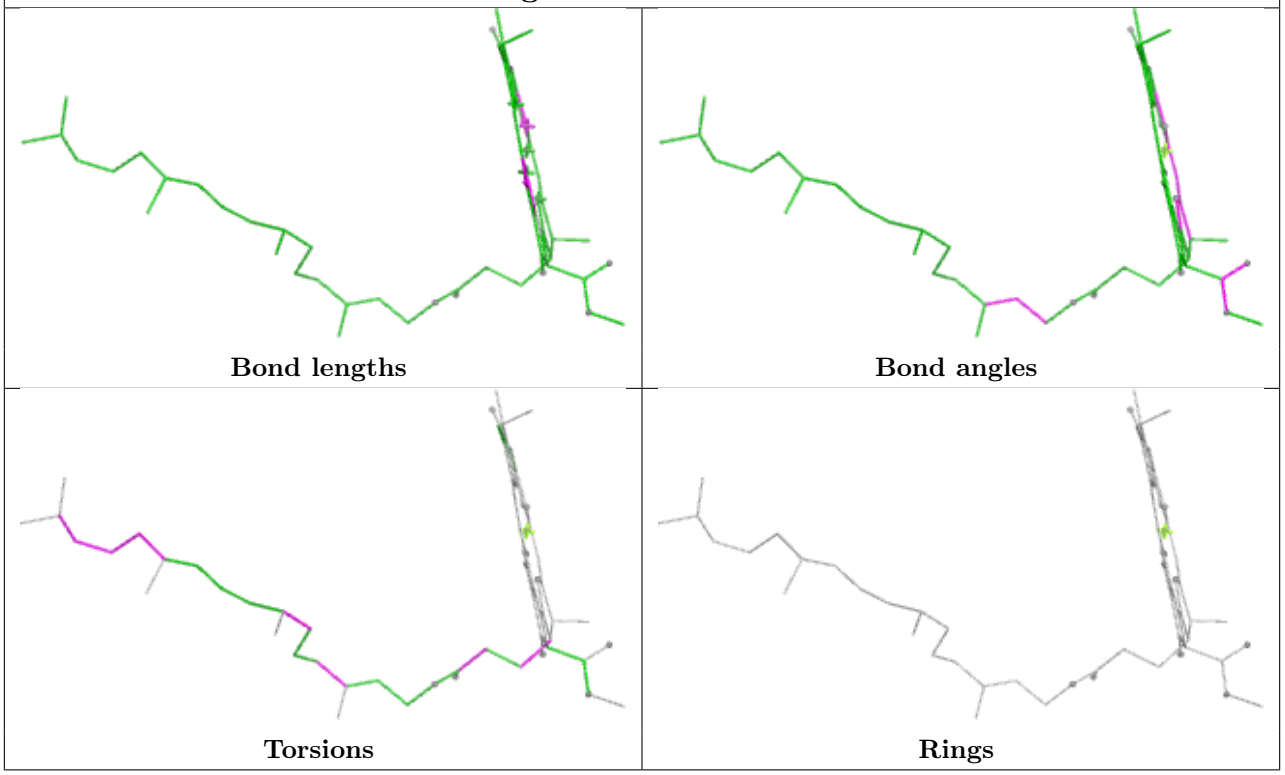


Rings

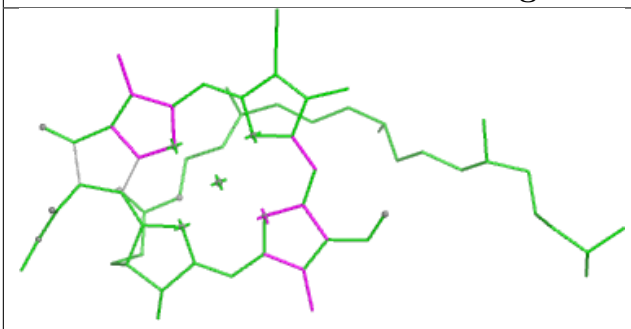
Ligand CL7 A 1109



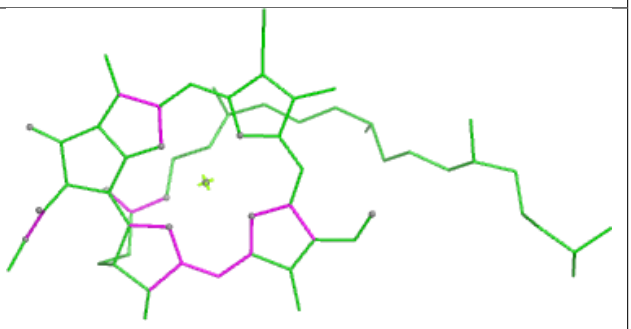
Ligand CL7 B 1239



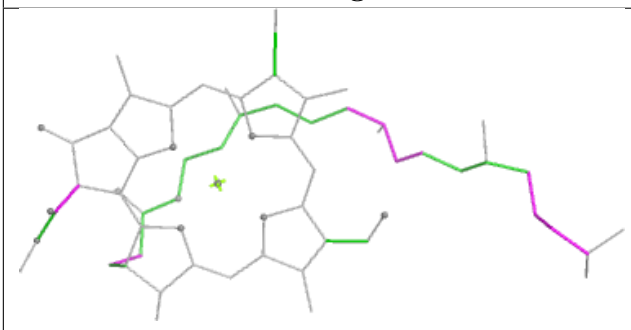
Ligand CL7 A 1138



Bond lengths



Bond angles



Torsions

Rings

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

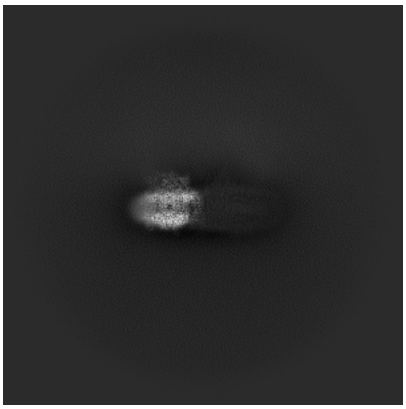
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-54627. These allow visual inspection of the internal detail of the map and identification of artifacts.

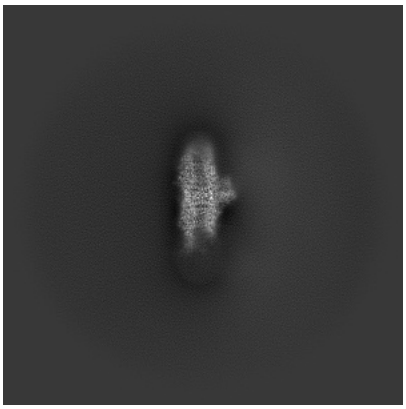
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

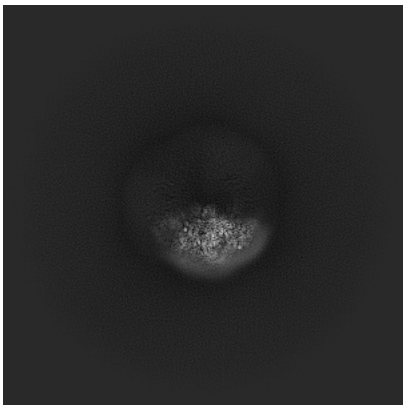
6.1.1 Primary map



X

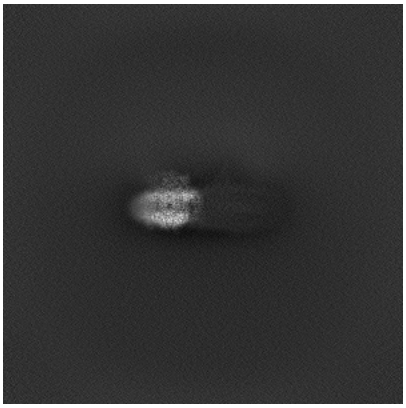


Y

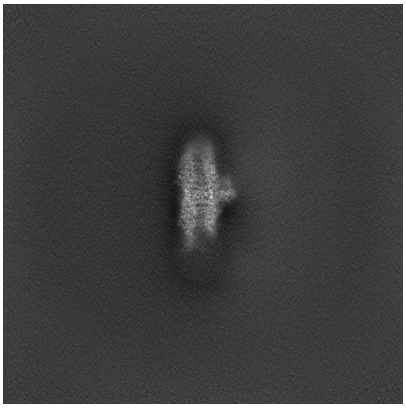


Z

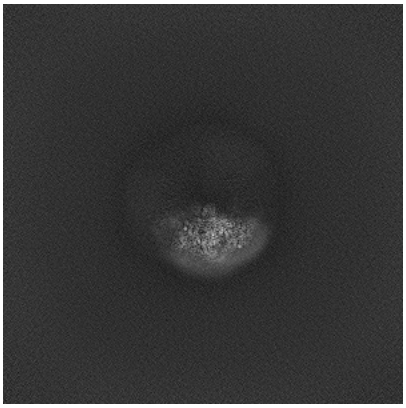
6.1.2 Raw map



X



Y

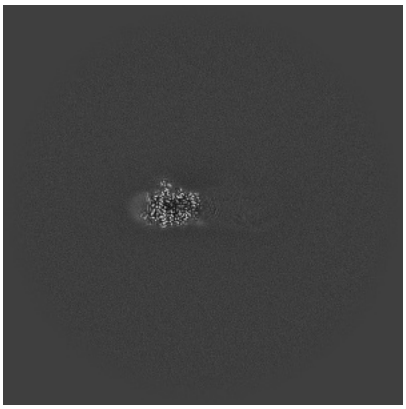


Z

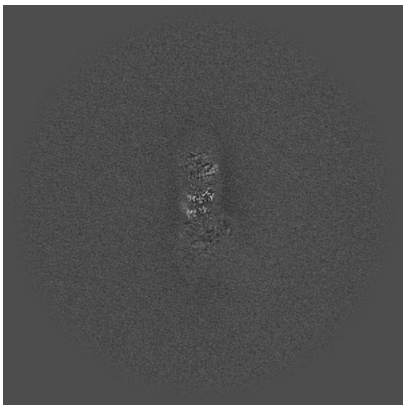
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

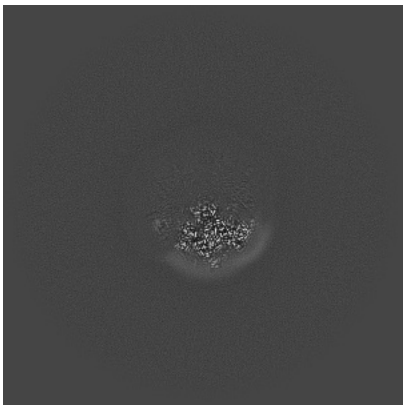
6.2.1 Primary map



X Index: 300

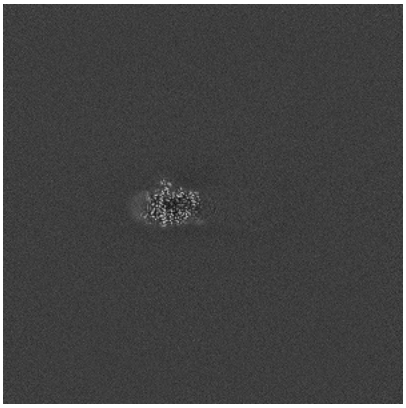


Y Index: 300

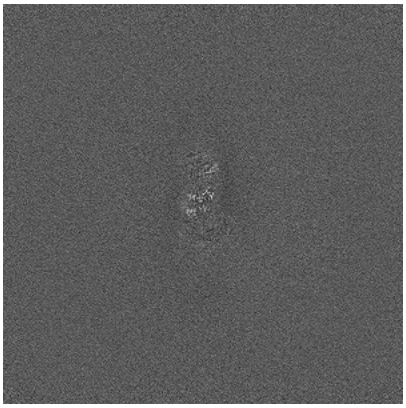


Z Index: 300

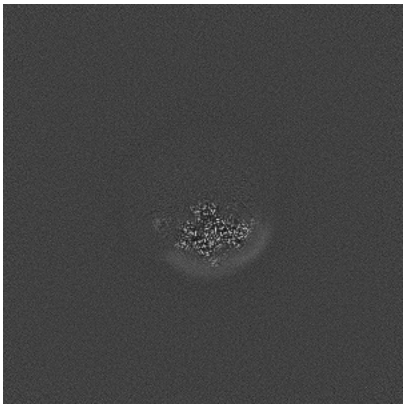
6.2.2 Raw map



X Index: 300



Y Index: 300

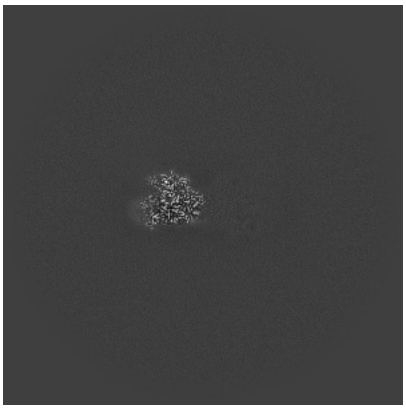


Z Index: 300

The images above show central slices of the map in three orthogonal directions.

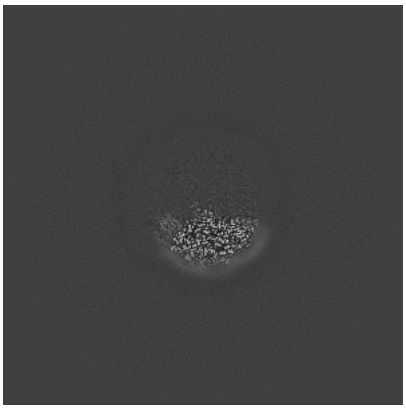
6.3 Largest variance slices (i)

6.3.1 Primary map



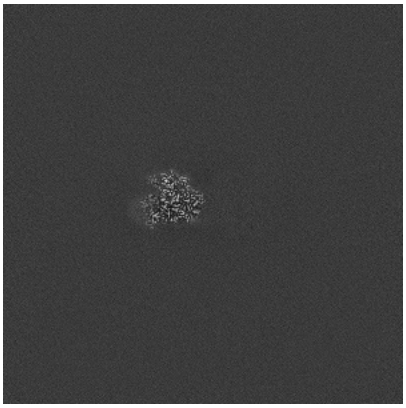
X Index: 316

Y Index: 252

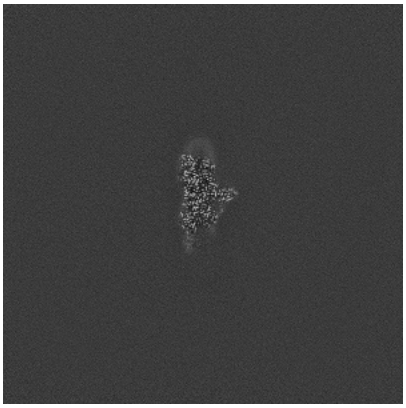


Z Index: 284

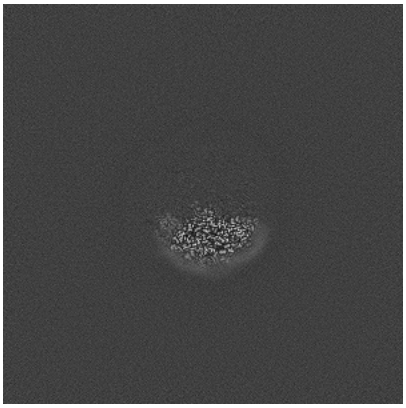
6.3.2 Raw map



X Index: 316



Y Index: 252

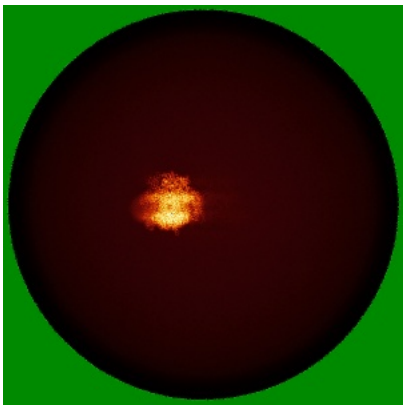


Z Index: 284

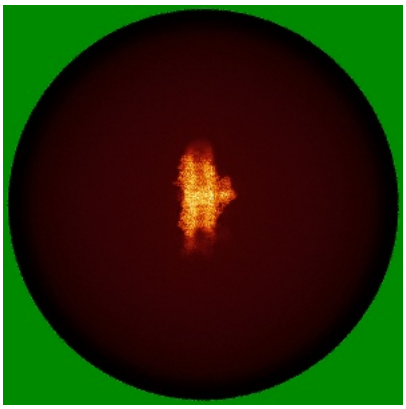
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) (i)

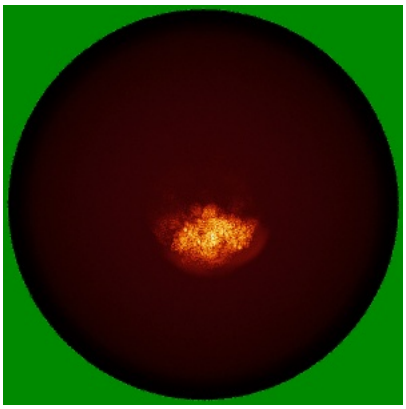
6.4.1 Primary map



X

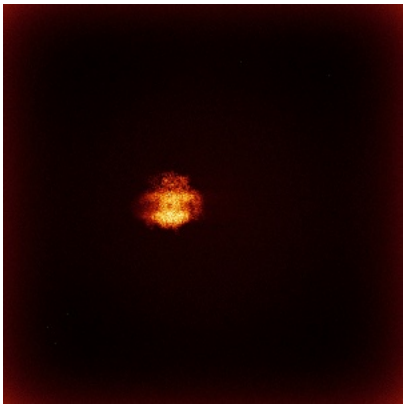


Y

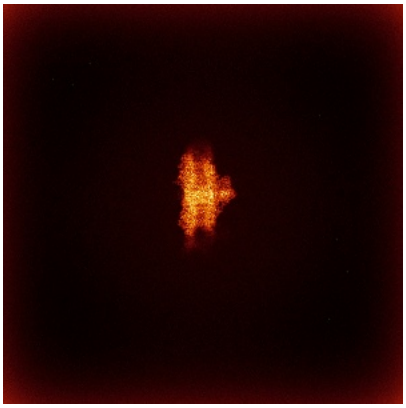


Z

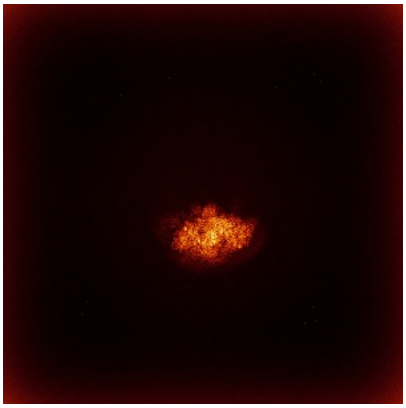
6.4.2 Raw map



X



Y



Z

The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5 Orthogonal surface views (i)

6.5.1 Primary map

X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.2. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map

X Y Z

These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

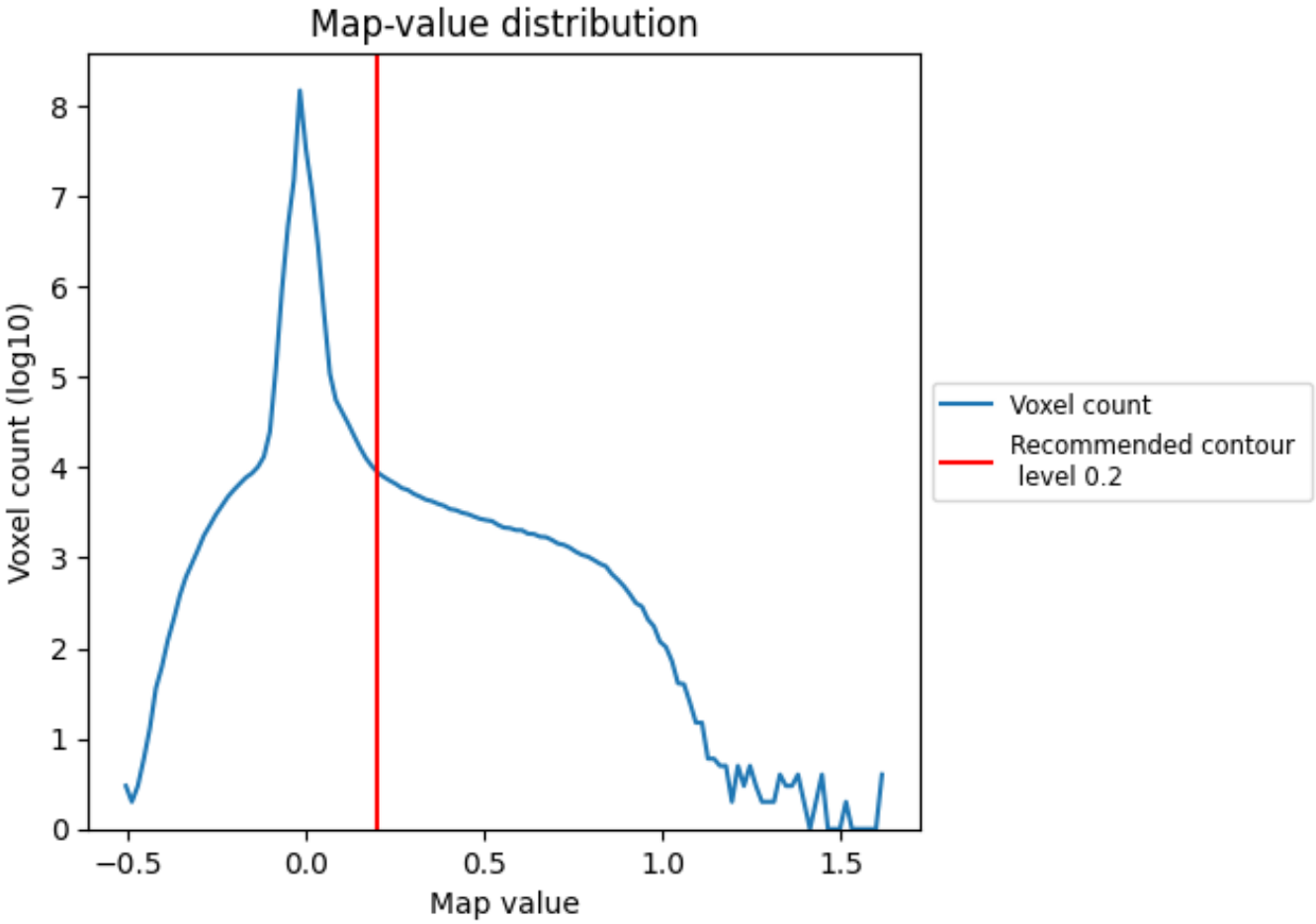
6.6 Mask visualisation (i)

This section was not generated. No masks/segmentation were deposited.

7 Map analysis

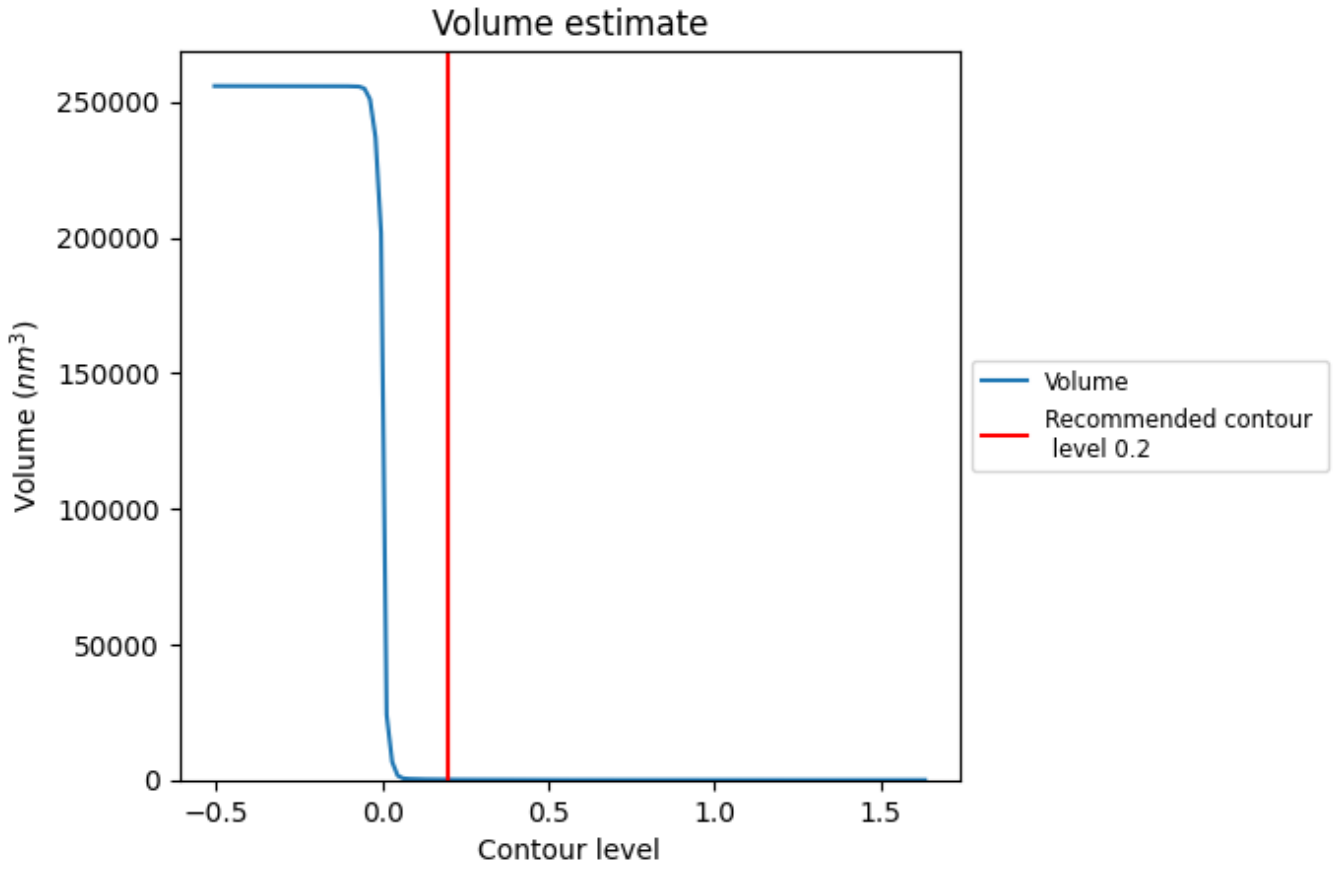
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

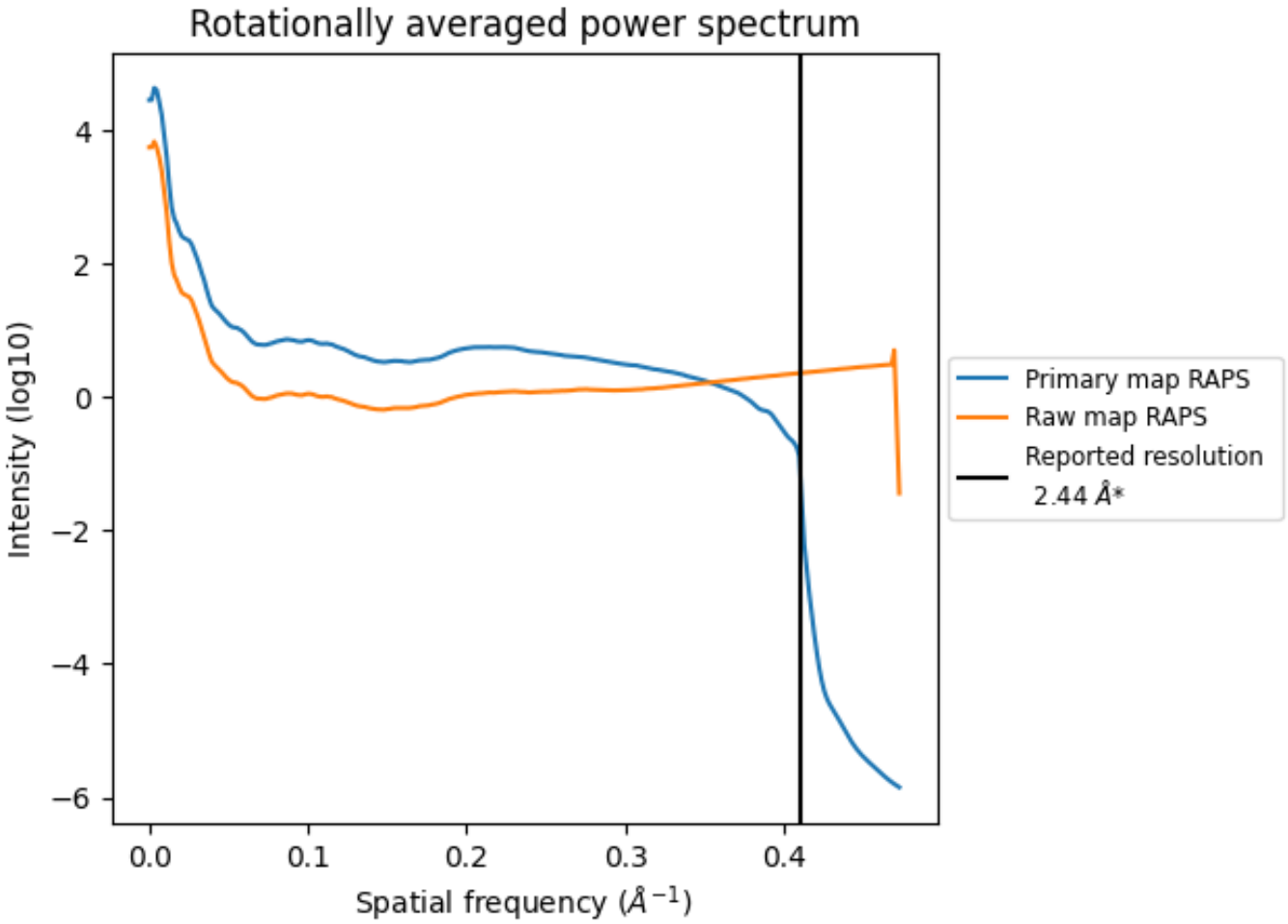
7.2 Volume estimate



The volume at the recommended contour level is 149 nm^3; this corresponds to an approximate mass of 135 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

7.3 Rotationally averaged power spectrum (i)

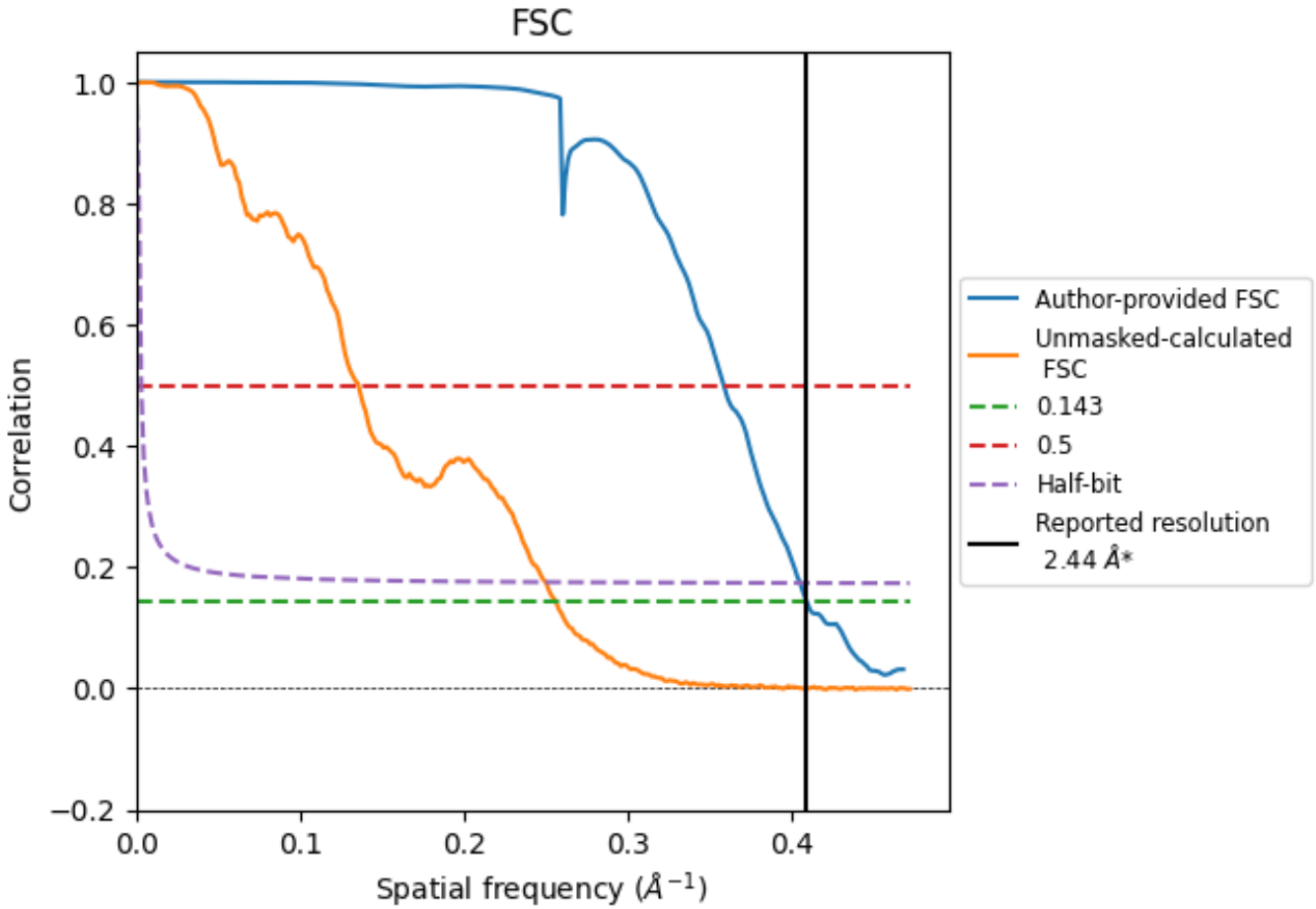


*Reported resolution corresponds to spatial frequency of 0.410 Å^{-1}

8 Fourier-Shell correlation

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

8.1 FSC



*Reported resolution corresponds to spatial frequency of 0.410 Å^{-1}

8.2 Resolution estimates (i)

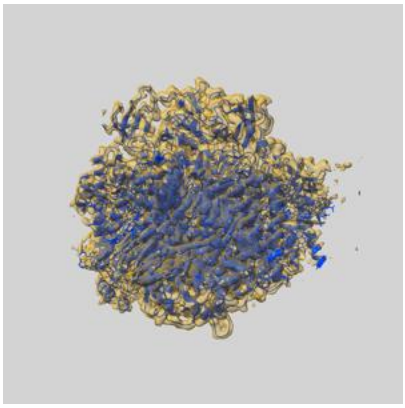
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.44	-	-
Author-provided FSC curve	2.44	2.79	2.46
Unmasked-calculated*	3.90	7.37	4.00

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 3.90 differs from the reported value 2.44 by more than 10 %

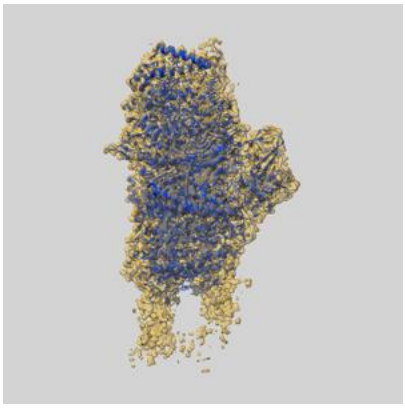
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-54627 and PDB model 9S6P. Per-residue inclusion information can be found in section 3 on page 20.

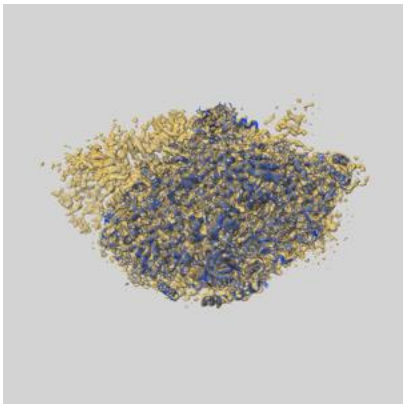
9.1 Map-model overlay



X



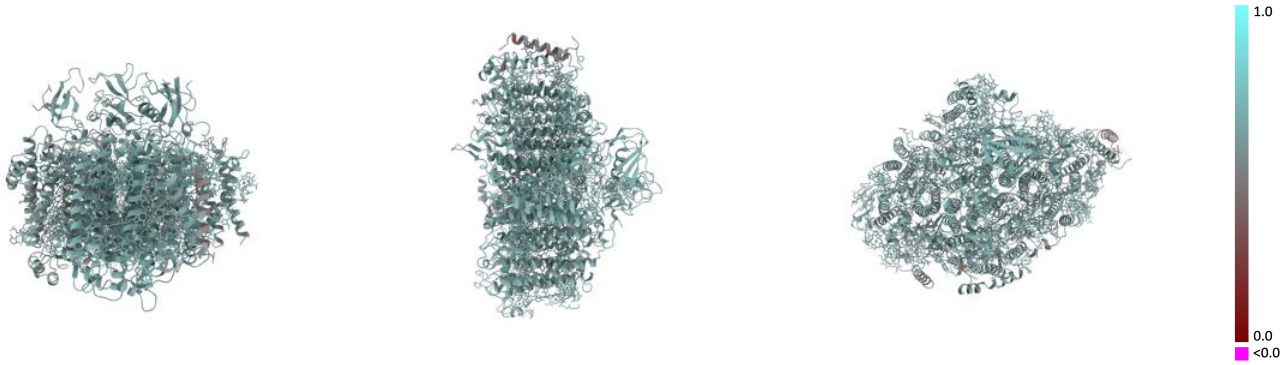
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.2 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

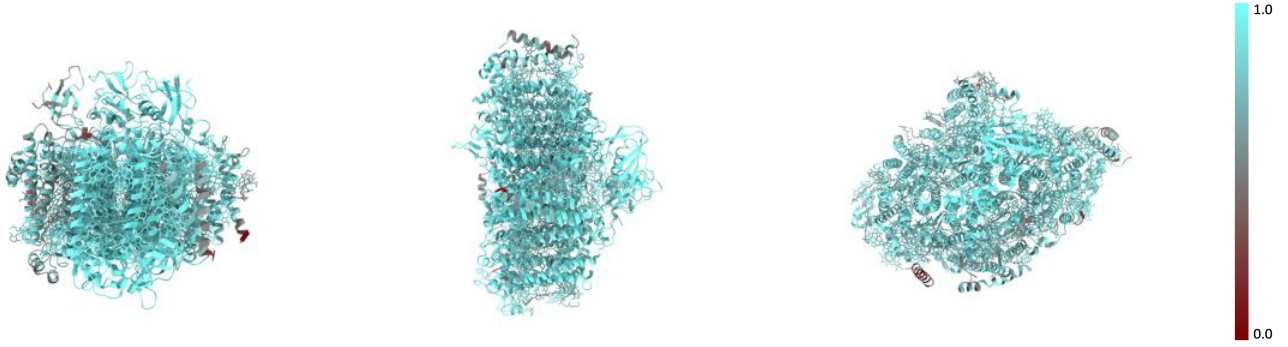
9.2 Q-score mapped to coordinate model



X Y Z

The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

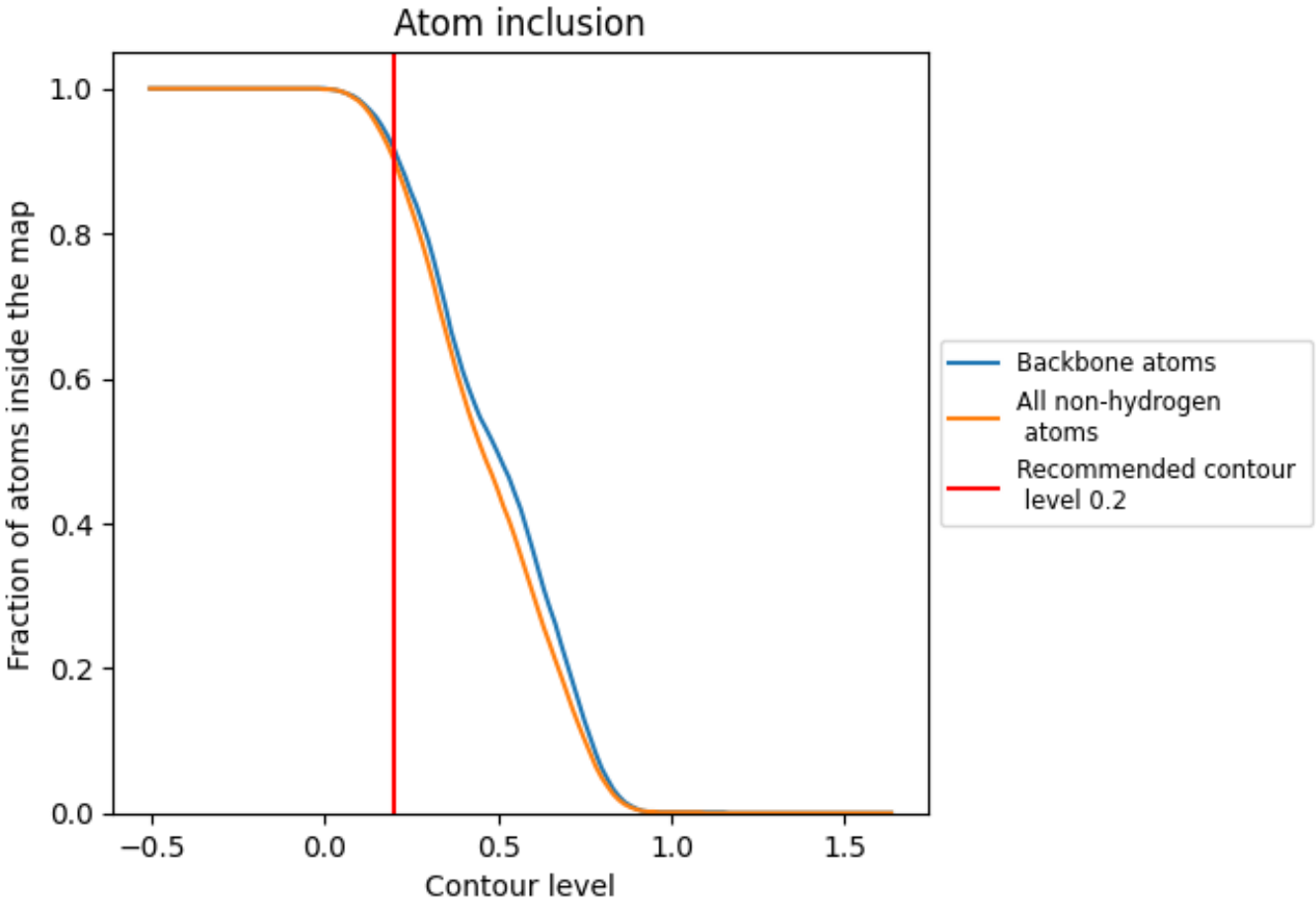
9.3 Atom inclusion mapped to coordinate model



X Y Z

The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.2).

9.4 Atom inclusion (i)



At the recommended contour level, 92% of all backbone atoms, 90% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (0.2) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.9010	0.6220
A	0.9370	0.6330
B	0.9360	0.6300
C	0.9830	0.6360
D	0.9460	0.6230
E	0.7450	0.5970
F	0.7490	0.5880
I	0.8130	0.6040
J	0.7050	0.5750
K	0.6370	0.5240
L	0.8420	0.6160
M	0.8340	0.6020
X	0.2790	0.4850