Full wwPDB X-ray Structure Validation Report ⓘ

Jun 12, 2024 – 04:15 AM EDT

PDB ID	:	6NHG
Title	:	Rhodobacter sphaeroides Mitochondrial respiratory chain complex
Authors	:	Xia, D.; Zhou, F.; Esser, L.
Deposited on	:	2018-12-21
Resolution	:	2.80 Å(reported)

This is a Full wwPDB X-ray Structure Validation 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/XrayValidationReportHelp
with specific help available everywhere you see the ⓘ 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 ⓘ) were used in the production of this report:

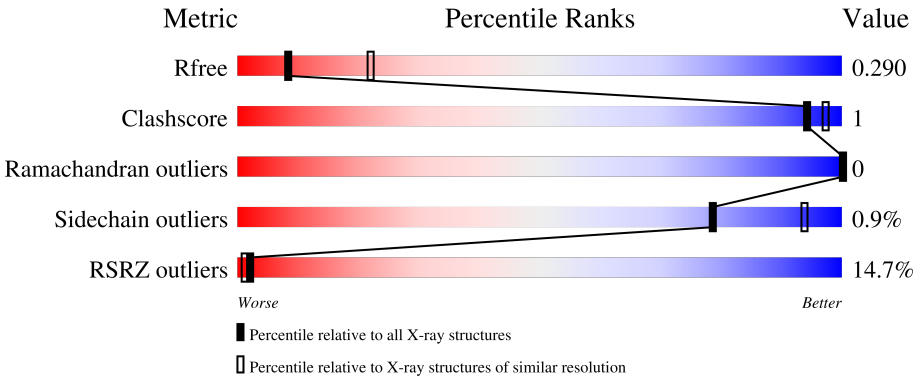
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36.2
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36.2

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.80 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)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	3140 (2.80-2.80)
Clashscore	141614	3569 (2.80-2.80)
Ramachandran outliers	138981	3498 (2.80-2.80)
Sidechain outliers	138945	3500 (2.80-2.80)
RSRZ outliers	127900	3078 (2.80-2.80)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower 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 electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	446	5% 97% .
2	B	439	4% 95% . .
3	C	379	3% 93% 7%
4	D	241	21% 98% .
5	E	196	58% 94% 6%

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Mol	Chain	Length	Quality of chain
6	F	110	7% 93% 5%
7	G	80	10% 85% 8% 6%
8	H	78	32% 81% 5% 14%
9	I	78	17% 44% 56%
10	J	63	24% 90% 6%
11	K	55	31% 84% 11% 5%

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
12	6PE	K	101	-	-	-	X

2 Entry composition

There are 20 unique types of molecules in this entry. The entry contains 33542 atoms, of which 16676 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, 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 Cytochrome b-c1 complex subunit 1, mitochondrial.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S			
1	A	446	6799	2161	3341	609	668	20	0	0	0

- Molecule 2 is a protein called Cytochrome b-c1 complex subunit 2, mitochondrial.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S			
2	B	425	6328	1998	3147	564	612	7	0	0	0

- Molecule 3 is a protein called Cytochrome b.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S			
3	C	378	6056	2013	3053	471	501	18	0	0	0

- Molecule 4 is a protein called Cytochrome c1, heme protein, mitochondrial.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S			
4	D	241	3778	1225	1859	330	349	15	0	0	0

- Molecule 5 is a protein called Cytochrome b-c1 complex subunit Rieske, mitochondrial.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S			
5	E	196	3015	957	1497	263	290	8	0	0	0

- Molecule 6 is a protein called Cytochrome b-c1 complex subunit 7.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S			
6	F	105	1816	576	905	166	167	2	0	0	0

- Molecule 7 is a protein called Cytochrome b-c1 complex subunit 8.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
7	G	75	Total	C	H	N	O	S	0	0	0
			1261	410	633	118	99	1			

- Molecule 8 is a protein called Cytochrome b-c1 complex subunit 6, mitochondrial.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
8	H	67	Total	C	H	N	O	S	0	0	0
			1075	332	527	99	112	5			

- Molecule 9 is a protein called Cytochrome b-c1 complex subunit Rieske, mitochondrial.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
9	I	34	Total	C	H	N	O	S	0	0	0
			509	149	265	51	43	1			

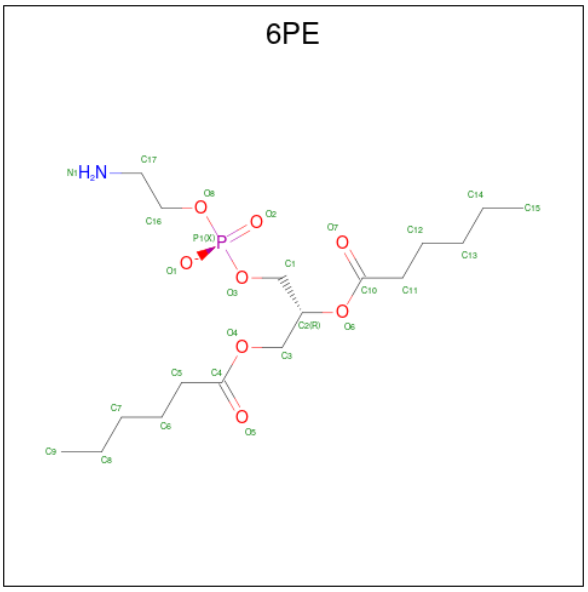
- Molecule 10 is a protein called Cytochrome b-c1 complex subunit 9.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
10	J	61	Total	C	H	N	O	0	0	0
			1004	329	502	87	86			

- Molecule 11 is a protein called Cytochrome b-c1 complex subunit 10.

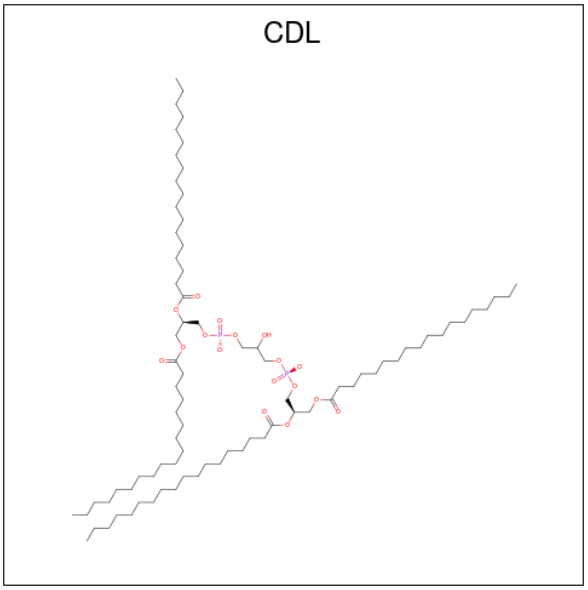
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
11	K	52	Total	C	H	N	O	0	0	0
			865	288	435	77	65			

- Molecule 12 is 1,2-DIHEXANOYL-SN-GLYCERO-3-PHOSPHOETHANOLAMINE (three-letter code: 6PE) (formula: $C_{17}H_{33}NO_8P$).



Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
12	A	1	Total	C	H	N	O	P	0	0
			60	17	33	1	8	1		
12	K	1	Total	C	H	N	O	P	0	0
			60	17	33	1	8	1		

- Molecule 13 is CARDIOLIPIN (three-letter code: CDL) (formula: $C_{81}H_{156}O_{17}P_2$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
13	A	1	Total	C	H	O	P	0	0
			124	41	64	17	2		
13	D	1	Total	C	H	O	P	0	0
			124	41	64	17	2		

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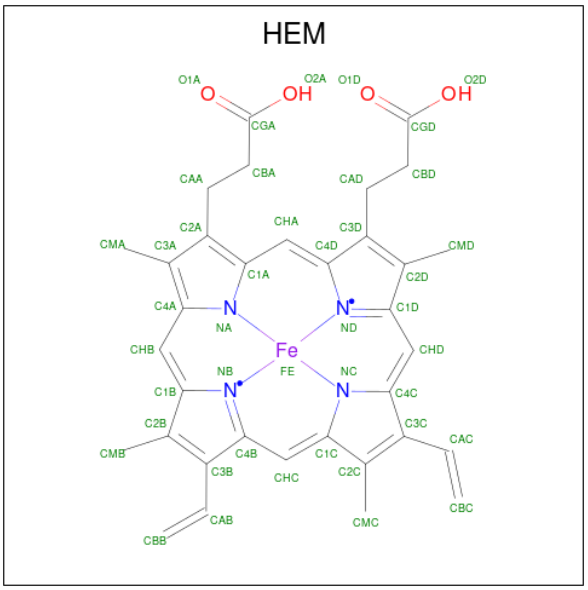
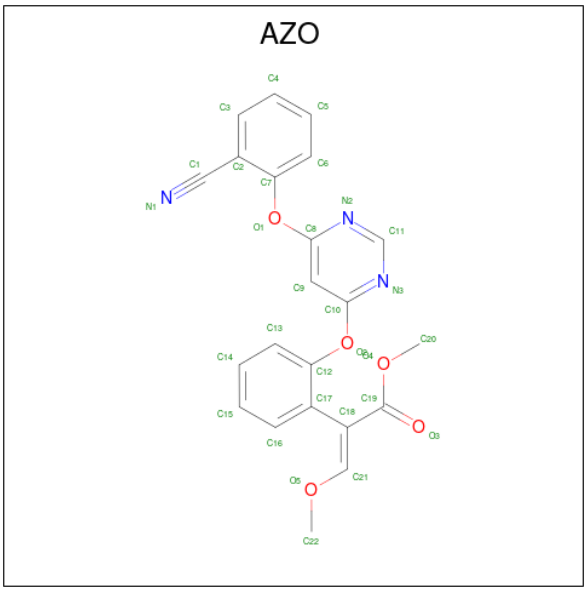
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
13	G	1	Total	C	H	O	P	0	0
			124	41	64	17	2		

- Molecule 14 is PROTOPORPHYRIN IX CONTAINING FE (three-letter code: HEM) (formula: $C_{34}H_{32}FeN_4O_4$).



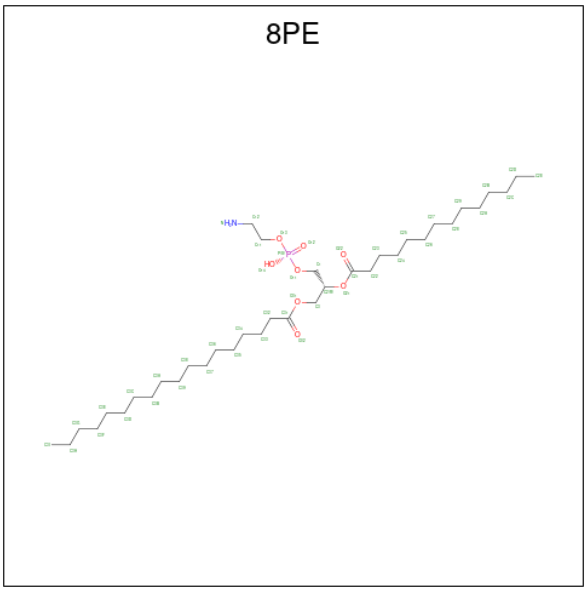
Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
14	C	1	Total	C	Fe	H	N	O	0	0
			73	34	1	30	4	4		
14	C	1	Total	C	Fe	H	N	O	0	0
			73	34	1	30	4	4		

- Molecule 15 is METHYL (2Z)-2-(2-{[6-(2-CYANOPHENOXY)PYRIMIDIN-4-YL]OXY}PHENYL)-3-METHOXYACRYLATE (three-letter code: AZO) (formula: $C_{22}H_{17}N_3O_5$).



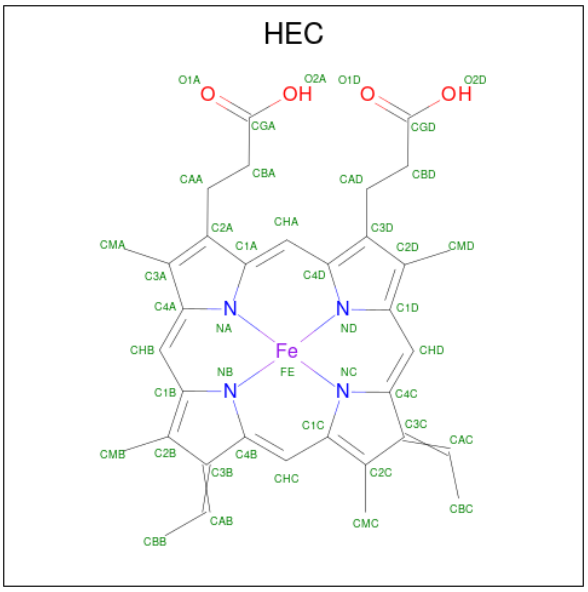
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
15	C	1	Total	C	H	N	O	0	0
			47	22	17	3	5		

- Molecule 16 is (2R)-3-{[(S)-(2-aminoethoxy)(hydroxy)phosphoryl]oxy}-2-(tetradecanoyloxy)propyl octadecanoate (three-letter code: 8PE) (formula: $C_{37}H_{74}NO_8P$).



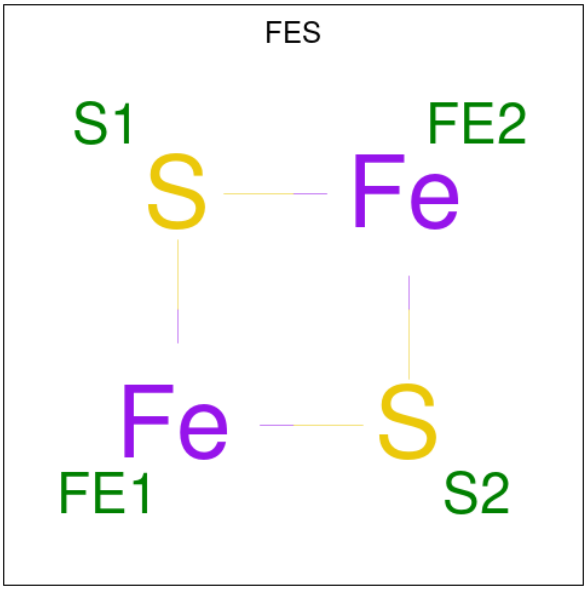
Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
16	C	1	Total	C	H	N	O	P	0	0
			120	37	73	1	8	1		

- Molecule 17 is HEME C (three-letter code: HEC) (formula: $C_{34}H_{34}FeN_4O_4$).



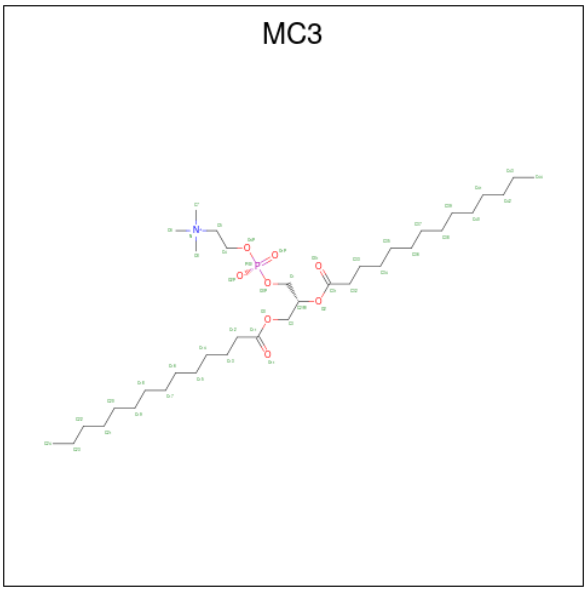
Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
17	D	1	Total	C	Fe	H	N	O	0	0
			75	34	1	32	4	4		

- Molecule 18 is FE2/S2 (INORGANIC) CLUSTER (three-letter code: FES) (formula: Fe_2S_2).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
18	E	1	Total	Fe	S		0	0
			4	2	2			

- Molecule 19 is 1,2-DIMYRISTOYL-RAC-GLYCERO-3-PHOSPHOCHOLINE (three-letter code: MC3) (formula: $C_{36}H_{72}NO_8P$).



Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
19	J	1	Total	C	H	N	O	P	0	0
			118	36	72	1	8	1		

- Molecule 20 is water.

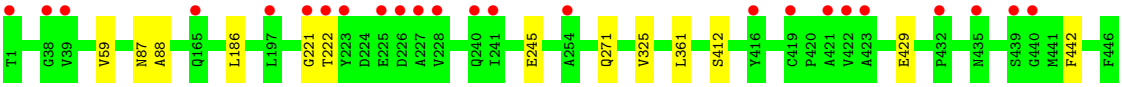
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
20	A	1	Total	O	0	0
			1	1		
20	B	23	Total	O	0	0
			23	23		
20	C	1	Total	O	0	0
			1	1		
20	F	6	Total	O	0	0
			6	6		
20	G	2	Total	O	0	0
			2	2		
20	I	1	Total	O	0	0
			1	1		

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 electron 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 dot above a residue indicates a poor fit to the electron density (RSRZ > 2). 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.

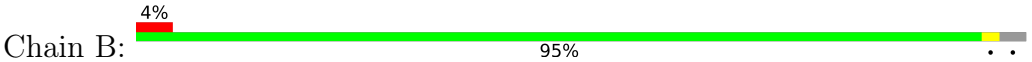
• Molecule 1: Cytochrome b-c1 complex subunit 1, mitochondrial

Chain A:



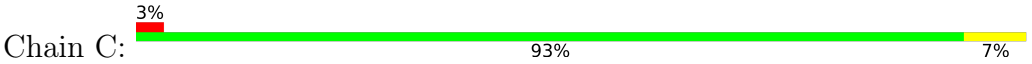
• Molecule 2: Cytochrome b-c1 complex subunit 2, mitochondrial

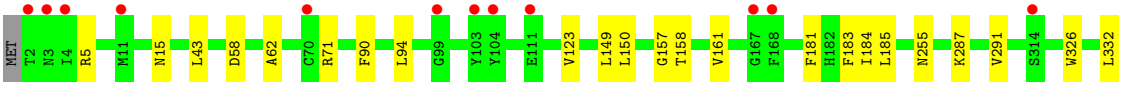
Chain B:

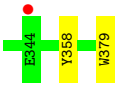


• Molecule 3: Cytochrome b

Chain C:

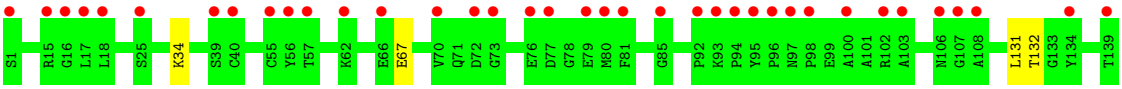






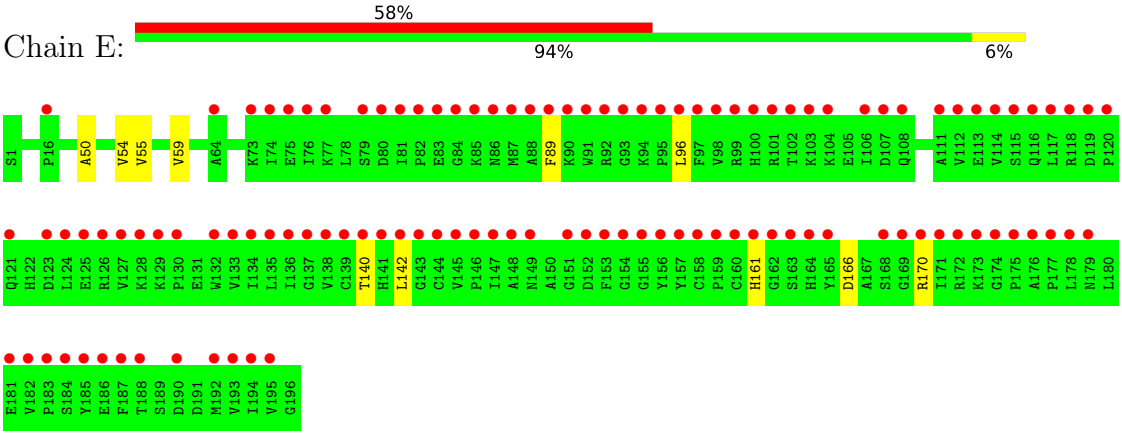
• Molecule 4: Cytochrome c1, heme protein, mitochondrial

Chain D:



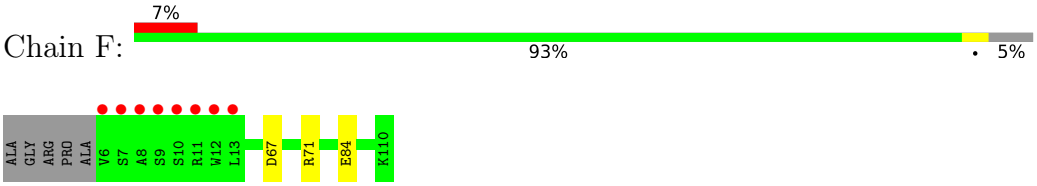
• Molecule 5: Cytochrome b-c1 complex subunit Rieske, mitochondrial

Chain E:



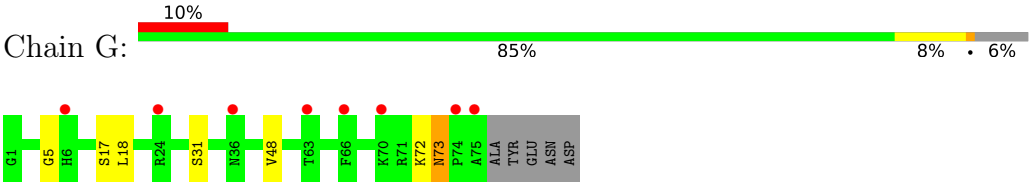
• Molecule 6: Cytochrome b-c1 complex subunit 7

Chain F:



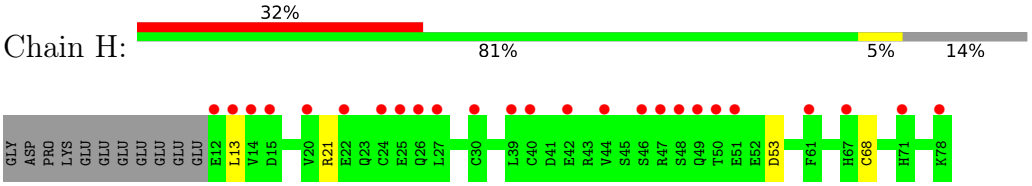
• Molecule 7: Cytochrome b-c1 complex subunit 8

Chain G:



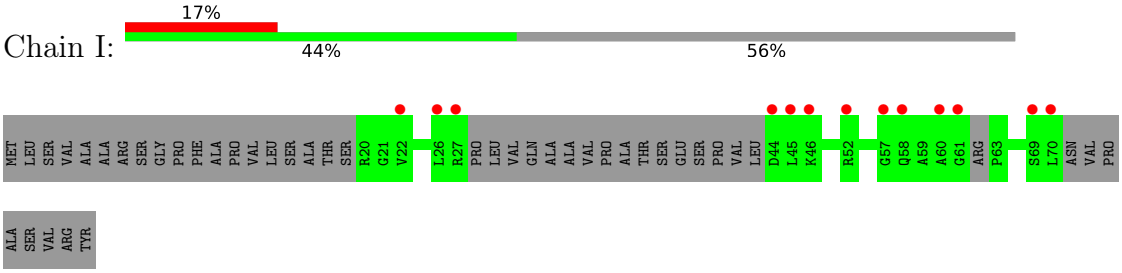
• Molecule 8: Cytochrome b-c1 complex subunit 6, mitochondrial

Chain H:



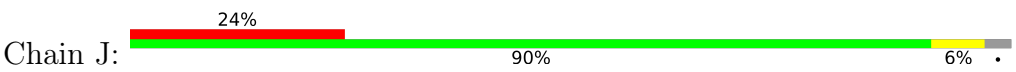
• Molecule 9: Cytochrome b-c1 complex subunit Rieske, mitochondrial

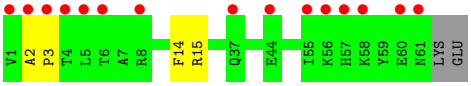
Chain I:



• Molecule 10: Cytochrome b-c1 complex subunit 9

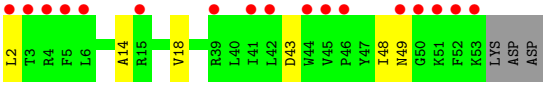
Chain J:





• Molecule 11: Cytochrome b-c1 complex subunit 10

Chain K:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	I 41 2 2	Depositor
Cell constants a, b, c, α, β, γ	154.18Å 154.18Å 598.18Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	29.87 – 2.80 29.87 – 2.79	Depositor EDS
% Data completeness (in resolution range)	98.7 (29.87-2.80) 84.6 (29.87-2.79)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.75 (at 2.80Å)	Xtriage
Refinement program	PHENIX	Depositor
R, R_{free}	0.251 , 0.289 0.252 , 0.290	Depositor DCC
R_{free} test set	1999 reflections (2.24%)	wwPDB-VP
Wilson B-factor (Å^2)	67.6	Xtriage
Anisotropy	0.243	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.36 , 56.2	EDS
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.91	EDS
Total number of atoms	33542	wwPDB-VP
Average B, all atoms (Å^2)	107.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.58% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: MC3, FES, AZO, CDL, 6PE, HEM, 8PE, HEC

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	A	0.25	0/3531	0.48	0/4792
2	B	0.26	0/3241	0.49	0/4398
3	C	0.25	0/3100	0.45	0/4242
4	D	0.28	0/1978	0.53	0/2684
5	E	0.25	0/1552	0.45	0/2100
6	F	0.25	0/930	0.46	0/1246
7	G	0.27	0/649	0.47	0/878
8	H	0.25	0/553	0.47	0/741
9	I	0.26	0/242	0.66	0/319
10	J	0.25	0/515	0.42	0/696
11	K	0.25	0/446	0.47	0/611
All	All	0.26	0/16737	0.48	0/22707

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	A	3458	3341	3356	7	0
2	B	3181	3147	3160	5	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	C	3003	3053	3065	11	0
4	D	1919	1859	1868	5	0
5	E	1518	1497	1503	6	0
6	F	911	905	906	2	0
7	G	628	633	636	4	0
8	H	548	527	530	3	0
9	I	244	265	265	0	0
10	J	502	502	505	3	0
11	K	430	435	435	3	0
12	A	27	33	33	1	0
12	K	27	33	33	0	0
13	A	60	64	64	0	0
13	D	60	64	64	0	0
13	G	60	64	64	0	0
14	C	86	60	60	1	0
15	C	30	17	17	0	0
16	C	47	73	73	0	0
17	D	43	32	30	3	0
18	E	4	0	0	0	0
19	J	46	72	72	1	0
20	A	1	0	0	0	0
20	B	23	0	0	0	0
20	C	1	0	0	0	0
20	F	6	0	0	0	0
20	G	2	0	0	0	0
20	I	1	0	0	0	0
All	All	16866	16676	16739	44	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 1.

All (44) 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)
17:D:1001:HEC:HBC3	17:D:1001:HEC:HMC1	1.67	0.77
3:C:287:LYS:NZ	5:E:140:THR:O	2.25	0.64
4:D:34:LYS:NZ	4:D:67:GLU:OE1	2.35	0.58
5:E:166:ASP:OD1	5:E:170:ARG:N	2.36	0.58
10:J:14:PHE:O	19:J:101:MC3:H71	2.04	0.58
5:E:142:LEU:HD12	5:E:161:HIS:HE1	1.70	0.56
7:G:73:ASN:N	7:G:73:ASN:OD1	2.40	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:150:LEU:HB2	3:C:161:VAL:HG22	1.88	0.54
1:A:412:SER:O	10:J:15:ARG:NH2	2.40	0.53
4:D:131:LEU:HD11	17:D:1001:HEC:HMB2	1.91	0.52
10:J:2:ALA:HB1	10:J:3:PRO:HD2	1.91	0.52
11:K:43:ASP:O	11:K:49:ASN:ND2	2.43	0.51
2:B:47:ILE:HD11	2:B:116:VAL:HG13	1.93	0.51
6:F:67:ASP:OD2	6:F:71:ARG:NH2	2.45	0.49
1:A:429:GLU:OE1	7:G:5:GLY:N	2.44	0.47
7:G:72:LYS:NZ	8:H:53:ASP:O	2.46	0.47
5:E:50:ALA:O	5:E:54:VAL:HG23	2.15	0.47
3:C:58:ASP:O	3:C:62:ALA:N	2.46	0.47
1:A:271:GLN:HB3	1:A:361:LEU:HD11	1.96	0.46
2:B:47:ILE:HD13	2:B:120:MET:CE	2.44	0.46
3:C:157:GLY:O	3:C:161:VAL:HG23	2.15	0.46
11:K:14:ALA:O	11:K:18:VAL:HG23	2.16	0.46
4:D:132:THR:O	8:H:21:ARG:NH2	2.48	0.46
11:K:48:ILE:O	11:K:48:ILE:HG22	2.15	0.46
14:C:1002:HEM:HBC2	14:C:1002:HEM:HMC2	1.98	0.46
3:C:332:LEU:HD21	3:C:358:TYR:CE1	2.50	0.46
6:F:84:GLU:OE1	6:F:84:GLU:N	2.49	0.45
3:C:94:LEU:HD11	3:C:123:VAL:HG11	1.99	0.45
3:C:326:TRP:NE1	7:G:48:VAL:HG22	2.32	0.44
3:C:181:PHE:HA	3:C:184:ILE:HG22	2.00	0.44
17:D:1001:HEC:HBB3	17:D:1001:HEC:HMB1	1.99	0.44
3:C:149:LEU:HB3	3:C:291:VAL:HG22	2.01	0.43
3:C:5:ARG:NH1	3:C:15:ASN:OD1	2.47	0.43
2:B:33:LEU:HD23	2:B:220:ALA:HB1	2.00	0.43
5:E:89:PHE:O	5:E:96:LEU:N	2.47	0.43
1:A:59:VAL:HG11	1:A:186:LEU:HD21	2.00	0.43
1:A:221:GLY:O	1:A:222:THR:OG1	2.25	0.42
4:D:167:GLU:HG3	8:H:13:LEU:HD12	2.01	0.42
2:B:109:VAL:HG22	2:B:119:LEU:HD23	2.02	0.41
2:B:344:VAL:HG11	2:B:417:PHE:CD2	2.56	0.41
3:C:71:ARG:NH2	4:D:193:ALA:O	2.50	0.41
1:A:87:ASN:OD1	1:A:88:ALA:N	2.48	0.40
5:E:55:VAL:O	5:E:59:VAL:HG23	2.21	0.40
1:A:442:PHE:O	12:A:501:6PE:N1	2.55	0.40

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 X-ray entries followed by that with respect to entries of similar resolution.

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	A	444/446 (100%)	434 (98%)	10 (2%)	0	100	100
2	B	423/439 (96%)	413 (98%)	10 (2%)	0	100	100
3	C	376/379 (99%)	367 (98%)	9 (2%)	0	100	100
4	D	239/241 (99%)	235 (98%)	4 (2%)	0	100	100
5	E	194/196 (99%)	187 (96%)	7 (4%)	0	100	100
6	F	103/110 (94%)	103 (100%)	0	0	100	100
7	G	73/80 (91%)	72 (99%)	1 (1%)	0	100	100
8	H	65/78 (83%)	64 (98%)	1 (2%)	0	100	100
9	I	28/78 (36%)	25 (89%)	3 (11%)	0	100	100
10	J	59/63 (94%)	56 (95%)	3 (5%)	0	100	100
11	K	50/55 (91%)	44 (88%)	6 (12%)	0	100	100
All	All	2054/2165 (95%)	2000 (97%)	54 (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 X-ray entries followed by that with respect to entries of similar resolution.

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	A	370/370 (100%)	368 (100%)	2 (0%)	88	96
2	B	332/343 (97%)	331 (100%)	1 (0%)	92	98
3	C	326/327 (100%)	319 (98%)	7 (2%)	53	84

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
4	D	206/206 (100%)	206 (100%)	0	100 100
5	E	168/168 (100%)	168 (100%)	0	100 100
6	F	96/98 (98%)	96 (100%)	0	100 100
7	G	66/70 (94%)	62 (94%)	4 (6%)	18 48
8	H	64/74 (86%)	63 (98%)	1 (2%)	62 88
9	I	25/60 (42%)	25 (100%)	0	100 100
10	J	51/53 (96%)	51 (100%)	0	100 100
11	K	42/45 (93%)	41 (98%)	1 (2%)	49 81
All	All	1746/1814 (96%)	1730 (99%)	16 (1%)	78 94

All (16) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	245	GLU
1	A	325	VAL
2	B	109	VAL
3	C	43	LEU
3	C	90	PHE
3	C	158	THR
3	C	183	PHE
3	C	185	LEU
3	C	255	ASN
3	C	379	TRP
7	G	17	SER
7	G	18	LEU
7	G	31	SER
7	G	73	ASN
8	H	68	CYS
11	K	2	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

5.3.3 RNA

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 monosaccharides in this entry.

5.6 Ligand geometry (i)

12 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	CDL	D	1002	-	59,59,99	1.26	5 (8%)	65,71,111	1.18	5 (7%)
14	HEM	C	1001	3	41,50,50	1.49	6 (14%)	45,82,82	1.43	6 (13%)
18	FES	E	1001	5	0,4,4	-	-	-		
19	MC3	J	101	-	45,45,45	1.37	3 (6%)	51,53,53	0.97	5 (9%)
13	CDL	G	101	-	59,59,99	1.28	6 (10%)	65,71,111	1.00	4 (6%)
12	6PE	K	101	-	26,26,26	1.77	8 (30%)	29,31,31	1.14	2 (6%)
15	AZO	C	1003	-	32,32,32	0.66	0	42,42,42	1.63	8 (19%)
16	8PE	C	1004	-	46,46,46	1.62	6 (13%)	49,51,51	1.07	4 (8%)
14	HEM	C	1002	3	41,50,50	1.46	5 (12%)	45,82,82	1.39	6 (13%)
17	HEC	D	1001	4	32,50,50	2.15	4 (12%)	24,82,82	1.36	1 (4%)
12	6PE	A	501	-	26,26,26	1.74	8 (30%)	29,31,31	1.11	2 (6%)
13	CDL	A	502	-	59,59,99	1.26	7 (11%)	65,71,111	1.09	4 (6%)

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	CDL	D	1002	-	-	32/70/70/110	-
14	HEM	C	1001	3	-	4/12/54/54	-
19	MC3	J	101	-	-	24/49/49/49	-
18	FES	E	1001	5	-	-	0/1/1/1
13	CDL	G	101	-	-	17/70/70/110	-
12	6PE	K	101	-	-	12/30/30/30	-
15	AZO	C	1003	-	-	2/23/23/23	0/3/3/3
16	8PE	C	1004	-	-	22/50/50/50	-
14	HEM	C	1002	3	-	3/12/54/54	-
17	HEC	D	1001	4	-	3/10/54/54	-
12	6PE	A	501	-	-	13/30/30/30	-
13	CDL	A	502	-	-	25/70/70/110	-

All (58) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
17	D	1001	HEC	C2B-C3B	-6.35	1.34	1.40
17	D	1001	HEC	C3D-C2D	5.43	1.53	1.37
17	D	1001	HEC	C3C-C2C	-5.37	1.35	1.40
19	J	101	MC3	P-O4P	4.87	1.79	1.59
16	C	1004	8PE	P-O11	4.81	1.78	1.59
13	G	101	CDL	OA8-CA7	4.13	1.45	1.33
14	C	1001	HEM	C3C-C2C	-4.11	1.34	1.40
12	K	101	6PE	P1-O3	4.09	1.75	1.59
13	D	1002	CDL	OA6-CA5	4.06	1.45	1.34
13	G	101	CDL	OA6-CA5	4.02	1.45	1.34
13	A	502	CDL	OA6-CA5	4.02	1.45	1.34
13	D	1002	CDL	OA8-CA7	4.00	1.45	1.33
13	A	502	CDL	OA8-CA7	3.97	1.44	1.33
14	C	1002	HEM	C3C-C2C	-3.77	1.35	1.40
14	C	1001	HEM	C3C-CAC	3.62	1.55	1.47
12	A	501	6PE	P1-O8	3.61	1.73	1.59
14	C	1002	HEM	C3C-CAC	3.57	1.55	1.47
13	G	101	CDL	OB8-CB7	3.57	1.43	1.33
12	A	501	6PE	P1-O3	3.56	1.73	1.59
16	C	1004	8PE	C3-C2	3.48	1.61	1.50
13	D	1002	CDL	OB8-CB7	3.47	1.43	1.33
13	A	502	CDL	OB8-CB7	3.47	1.43	1.33
12	A	501	6PE	C3-C2	3.36	1.61	1.50
12	K	101	6PE	P1-O8	3.35	1.72	1.59
16	C	1004	8PE	P-O13	3.33	1.72	1.59

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
16	C	1004	8PE	C1-C2	3.28	1.60	1.50
13	D	1002	CDL	OB6-CB5	3.23	1.43	1.34
12	K	101	6PE	C3-C2	3.23	1.60	1.50
13	G	101	CDL	OB6-CB5	3.23	1.43	1.34
13	A	502	CDL	OB6-CB5	3.11	1.43	1.34
14	C	1001	HEM	CAB-C3B	2.99	1.55	1.47
14	C	1002	HEM	CAB-C3B	2.96	1.55	1.47
19	J	101	MC3	C1-C2	2.78	1.59	1.50
16	C	1004	8PE	C32-C31	2.52	1.58	1.50
12	K	101	6PE	O4-C4	2.47	1.40	1.33
12	A	501	6PE	C5-C4	2.45	1.57	1.50
16	C	1004	8PE	C33-C32	2.42	1.61	1.52
12	K	101	6PE	C5-C4	2.41	1.57	1.50
12	A	501	6PE	O4-C4	2.38	1.40	1.33
12	K	101	6PE	C1-C2	2.35	1.57	1.50
12	K	101	6PE	C11-C10	2.34	1.57	1.50
12	K	101	6PE	O6-C10	2.32	1.40	1.34
19	J	101	MC3	P-O3P	2.30	1.68	1.59
13	A	502	CDL	OA6-CA4	-2.27	1.40	1.46
13	G	101	CDL	OA6-CA4	-2.26	1.40	1.46
14	C	1002	HEM	FE-NB	2.26	2.08	1.96
12	A	501	6PE	C1-C2	2.23	1.57	1.50
12	A	501	6PE	C11-C10	2.22	1.57	1.50
14	C	1002	HEM	CMB-C2B	2.14	1.55	1.50
12	A	501	6PE	O6-C10	2.14	1.40	1.34
13	D	1002	CDL	C11-CA5	2.12	1.56	1.50
14	C	1001	HEM	CAA-C2A	2.08	1.55	1.52
13	A	502	CDL	C11-CA5	2.04	1.56	1.50
14	C	1001	HEM	CMB-C2B	2.04	1.55	1.50
17	D	1001	HEC	CAD-C3D	2.03	1.55	1.52
13	G	101	CDL	C11-CA5	2.02	1.56	1.50
13	A	502	CDL	C31-CA7	2.02	1.56	1.50
14	C	1001	HEM	CMD-C2D	2.01	1.55	1.50

All (47) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
15	C	1003	AZO	C11-N3-C10	5.83	118.86	114.48
13	D	1002	CDL	OA6-CA5-C11	4.55	121.32	111.50
13	A	502	CDL	OB6-CB5-C51	4.14	120.42	111.50
13	G	101	CDL	OB6-CB5-C51	3.88	119.87	111.50
16	C	1004	8PE	O21-C21-C22	3.82	119.72	111.50

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
13	D	1002	CDL	OB6-CB5-C51	3.65	119.36	111.50
13	A	502	CDL	OA6-CA5-C11	3.49	119.03	111.50
15	C	1003	AZO	C11-N2-C8	3.35	117.00	114.48
12	K	101	6PE	O6-C10-C11	3.32	118.65	111.50
13	G	101	CDL	OA6-CA5-C11	3.29	118.59	111.50
19	J	101	MC3	O2P-P-O1P	3.28	128.46	112.24
15	C	1003	AZO	C9-C10-N3	-3.24	120.01	124.57
17	D	1001	HEC	CMC-C2C-C1C	-3.21	123.54	128.46
14	C	1002	HEM	C4D-ND-C1D	3.10	108.27	105.07
16	C	1004	8PE	O31-C31-C32	3.05	121.48	111.91
15	C	1003	AZO	C20-O4-C19	3.00	121.53	115.86
14	C	1001	HEM	C4D-ND-C1D	2.98	108.15	105.07
14	C	1002	HEM	C4B-CHC-C1C	2.92	126.41	122.56
14	C	1001	HEM	C1B-NB-C4B	2.85	108.02	105.07
14	C	1001	HEM	C4B-CHC-C1C	2.81	126.26	122.56
16	C	1004	8PE	O31-C31-O32	-2.73	116.71	123.59
14	C	1001	HEM	C4C-CHD-C1D	2.69	126.11	122.56
15	C	1003	AZO	N2-C11-N3	-2.67	124.43	128.60
13	D	1002	CDL	OA8-CA7-C31	2.65	120.21	111.91
14	C	1001	HEM	CBA-CAA-C2A	-2.60	108.19	112.62
12	A	501	6PE	O6-C10-C11	2.56	117.02	111.50
13	A	502	CDL	OA8-CA7-C31	2.54	119.89	111.91
14	C	1002	HEM	CBD-CAD-C3D	-2.54	105.57	112.63
13	D	1002	CDL	OB8-CB7-C71	2.51	119.80	111.91
14	C	1002	HEM	C1B-NB-C4B	2.51	107.66	105.07
15	C	1003	AZO	C7-C2-C1	2.41	121.91	119.57
13	A	502	CDL	OB8-CB7-C71	2.40	119.43	111.91
13	G	101	CDL	OB8-CB7-C71	2.39	119.41	111.91
14	C	1002	HEM	C4C-CHD-C1D	2.36	125.67	122.56
15	C	1003	AZO	O2-C10-N3	2.33	123.95	118.64
13	G	101	CDL	OA8-CA7-C31	2.33	119.21	111.91
12	A	501	6PE	O4-C3-C2	2.32	115.18	108.43
12	K	101	6PE	O4-C3-C2	2.25	114.98	108.43
14	C	1001	HEM	C3D-C4D-ND	-2.21	107.71	110.17
14	C	1002	HEM	C3D-C4D-ND	-2.21	107.71	110.17
15	C	1003	AZO	C21-C18-C19	2.20	121.44	117.41
19	J	101	MC3	O2-C31-O31	-2.19	118.41	123.70
16	C	1004	8PE	O31-C3-C2	2.18	114.78	108.43
19	J	101	MC3	O3-C11-O11	-2.14	118.20	123.59
19	J	101	MC3	O4P-P-O1P	-2.12	100.79	109.07
19	J	101	MC3	O2-C31-C32	2.05	115.92	111.50
13	D	1002	CDL	OA6-CA4-CA6	2.02	115.73	108.40

There are no chirality outliers.

All (157) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
12	A	501	6PE	C1-O3-P1-O2
12	A	501	6PE	C1-O3-P1-O8
12	A	501	6PE	C11-C10-O6-C2
12	K	101	6PE	C16-O8-P1-O1
12	K	101	6PE	C16-O8-P1-O2
12	K	101	6PE	O8-C16-C17-N1
13	A	502	CDL	CB2-OB2-PB2-OB3
13	A	502	CDL	C51-CB5-OB6-CB4
13	D	1002	CDL	O1-C1-CA2-OA2
13	D	1002	CDL	CA3-OA5-PA1-OA3
13	D	1002	CDL	OA7-CA5-OA6-CA4
13	D	1002	CDL	CB2-OB2-PB2-OB3
13	D	1002	CDL	CB3-OB5-PB2-OB4
13	G	101	CDL	OA6-CA4-CA6-OA8
16	C	1004	8PE	C1-O11-P-O14
16	C	1004	8PE	O13-C11-C12-N
19	J	101	MC3	C1-O3P-P-O1P
16	C	1004	8PE	O32-C31-O31-C3
12	K	101	6PE	C5-C4-O4-C3
12	K	101	6PE	O5-C4-O4-C3
13	A	502	CDL	OB7-CB5-OB6-CB4
13	D	1002	CDL	C31-CA7-OA8-CA6
16	C	1004	8PE	C32-C31-O31-C3
13	D	1002	CDL	C11-CA5-OA6-CA4
19	J	101	MC3	C12-C11-O3-C3
12	A	501	6PE	O7-C10-O6-C2
13	D	1002	CDL	OB9-CB7-OB8-CB6
13	A	502	CDL	O1-C1-CB2-OB2
13	D	1002	CDL	O1-C1-CB2-OB2
13	D	1002	CDL	C71-CB7-OB8-CB6
13	D	1002	CDL	OA9-CA7-OA8-CA6
19	J	101	MC3	O11-C11-O3-C3
13	A	502	CDL	CA2-C1-CB2-OB2
13	D	1002	CDL	CB2-C1-CA2-OA2
13	A	502	CDL	C31-CA7-OA8-CA6
12	A	501	6PE	C10-C11-C12-C13
13	G	101	CDL	CA7-C31-C32-C33
12	A	501	6PE	O5-C4-O4-C3
13	A	502	CDL	OA9-CA7-OA8-CA6
19	J	101	MC3	C32-C31-O2-C2

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Mol	Chain	Res	Type	Atoms
12	K	101	6PE	C16-O8-P1-O3
13	D	1002	CDL	CA3-OA5-PA1-OA2
13	D	1002	CDL	CB3-OB5-PB2-OB2
13	G	101	CDL	CB2-OB2-PB2-OB5
19	J	101	MC3	C1-O3P-P-O4P
19	J	101	MC3	C13-C14-C15-C16
13	D	1002	CDL	C51-CB5-OB6-CB4
13	A	502	CDL	C12-C13-C14-C15
19	J	101	MC3	C32-C33-C34-C35
13	D	1002	CDL	OB7-CB5-OB6-CB4
19	J	101	MC3	C36-C37-C38-C39
13	G	101	CDL	O1-C1-CB2-OB2
12	A	501	6PE	C4-C5-C6-C7
13	A	502	CDL	CB7-C71-C72-C73
16	C	1004	8PE	C38-C39-C3A-C3B
16	C	1004	8PE	C3B-C3C-C3D-C3E
13	G	101	CDL	C52-C53-C54-C55
13	G	101	CDL	C12-C13-C14-C15
12	K	101	6PE	O7-C10-O6-C2
19	J	101	MC3	C35-C36-C37-C38
13	A	502	CDL	OA7-CA5-OA6-CA4
12	A	501	6PE	C5-C4-O4-C3
13	D	1002	CDL	C72-C73-C74-C75
13	D	1002	CDL	C51-C52-C53-C54
13	D	1002	CDL	CB5-C51-C52-C53
13	D	1002	CDL	C31-C32-C33-C34
12	K	101	6PE	C11-C10-O6-C2
13	A	502	CDL	C11-CA5-OA6-CA4
16	C	1004	8PE	C22-C21-O21-C2
12	A	501	6PE	O6-C2-C3-O4
16	C	1004	8PE	C2-C3-O31-C31
16	C	1004	8PE	C26-C27-C28-C29
19	J	101	MC3	O31-C31-O2-C2
13	D	1002	CDL	CB2-OB2-PB2-OB5
16	C	1004	8PE	C1-O11-P-O13
13	D	1002	CDL	C12-C13-C14-C15
13	A	502	CDL	C51-C52-C53-C54
16	C	1004	8PE	C3A-C3B-C3C-C3D
19	J	101	MC3	C41-C42-C43-C44
19	J	101	MC3	C31-C32-C33-C34
13	D	1002	CDL	CA2-C1-CB2-OB2
16	C	1004	8PE	C35-C36-C37-C38

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Mol	Chain	Res	Type	Atoms
19	J	101	MC3	C14-C15-C16-C17
13	A	502	CDL	C14-C15-C16-C17
19	J	101	MC3	C37-C38-C39-C40
16	C	1004	8PE	C3D-C3E-C3F-C3G
19	J	101	MC3	C33-C34-C35-C36
13	A	502	CDL	C74-C75-C76-C77
19	J	101	MC3	C34-C35-C36-C37
13	A	502	CDL	OB5-CB3-CB4-CB6
19	J	101	MC3	O3P-C1-C2-C3
14	C	1001	HEM	C3D-CAD-CBD-CGD
12	A	501	6PE	C1-C2-C3-O4
16	C	1004	8PE	C1-C2-C3-O31
13	A	502	CDL	CB2-OB2-PB2-OB5
19	J	101	MC3	O3P-C1-C2-O2
13	G	101	CDL	C51-CB5-OB6-CB4
13	G	101	CDL	C11-C12-C13-C14
13	G	101	CDL	C14-C15-C16-C17
16	C	1004	8PE	C25-C26-C27-C28
13	G	101	CDL	OB7-CB5-OB6-CB4
12	K	101	6PE	C2-C1-O3-P1
13	G	101	CDL	CA3-CA4-CA6-OA8
16	C	1004	8PE	C24-C25-C26-C27
12	A	501	6PE	C2-C1-O3-P1
13	A	502	CDL	CB2-OB2-PB2-OB4
13	D	1002	CDL	CA3-OA5-PA1-OA4
13	D	1002	CDL	CB2-OB2-PB2-OB4
13	G	101	CDL	CB2-OB2-PB2-OB4
16	C	1004	8PE	C1-O11-P-O12
19	J	101	MC3	C1-O3P-P-O2P
16	C	1004	8PE	C3E-C3F-C3G-C3H
13	A	502	CDL	OB5-CB3-CB4-OB6
19	J	101	MC3	C38-C39-C40-C41
19	J	101	MC3	O4P-C4-C5-N
16	C	1004	8PE	O21-C2-C3-O31
13	D	1002	CDL	CA6-CA4-OA6-CA5
13	D	1002	CDL	CB6-CB4-OB6-CB5
19	J	101	MC3	O2-C2-C3-O3
19	J	101	MC3	C1-C2-C3-O3
13	A	502	CDL	OA6-CA4-CA6-OA8
13	G	101	CDL	C73-C74-C75-C76
13	A	502	CDL	CA3-CA4-CA6-OA8
13	D	1002	CDL	CA3-CA4-CA6-OA8

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Mol	Chain	Res	Type	Atoms
13	D	1002	CDL	OA5-CA3-CA4-OA6
13	A	502	CDL	OA5-CA3-CA4-CA6
12	K	101	6PE	O6-C2-C3-O4
13	G	101	CDL	OB9-CB7-OB8-CB6
14	C	1002	HEM	CAA-CBA-CGA-O1A
12	K	101	6PE	C1-C2-C3-O4
13	A	502	CDL	C71-C72-C73-C74
17	D	1001	HEC	CAA-CBA-CGA-O2A
13	G	101	CDL	C71-CB7-OB8-CB6
16	C	1004	8PE	C11-O13-P-O11
17	D	1001	HEC	CAA-CBA-CGA-O1A
12	A	501	6PE	O3-C1-C2-C3
14	C	1001	HEM	CAD-CBD-CGD-O1D
13	A	502	CDL	C52-C51-CB5-OB6
15	C	1003	AZO	N1-C1-C2-C7
14	C	1002	HEM	CAA-CBA-CGA-O2A
15	C	1003	AZO	C12-C17-C18-C21
13	D	1002	CDL	C14-C15-C16-C17
13	G	101	CDL	OA7-CA5-OA6-CA4
14	C	1001	HEM	CAA-CBA-CGA-O2A
16	C	1004	8PE	C29-C2A-C2B-C2C
13	D	1002	CDL	CB3-OB5-PB2-OB3
13	G	101	CDL	CB2-OB2-PB2-OB3
16	C	1004	8PE	C11-O13-P-O12
12	A	501	6PE	O7-C10-C11-C12
13	A	502	CDL	C52-C51-CB5-OB7
19	J	101	MC3	O2-C31-C32-C33
14	C	1001	HEM	CAD-CBD-CGD-O2D
13	D	1002	CDL	C52-C51-CB5-OB6
14	C	1002	HEM	CAD-CBD-CGD-O2D
17	D	1001	HEC	CAD-CBD-CGD-O1D
12	K	101	6PE	C4-C5-C6-C7
13	A	502	CDL	C11-C12-C13-C14

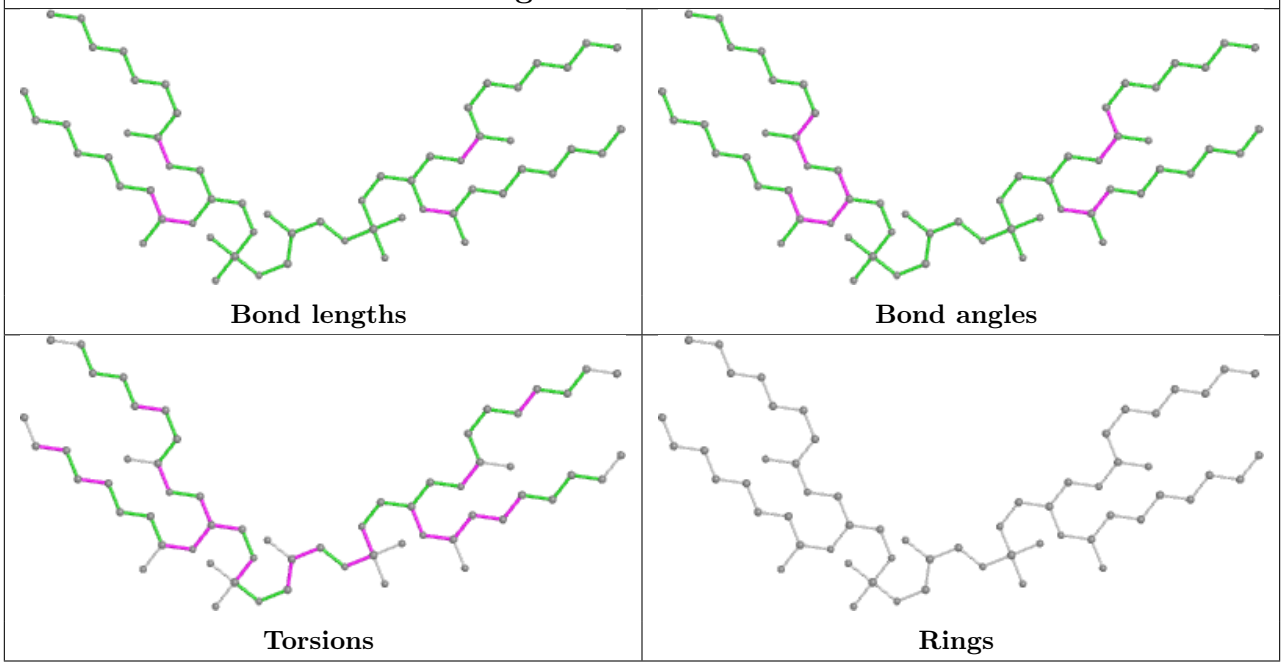
There are no ring outliers.

4 monomers are involved in 6 short contacts:

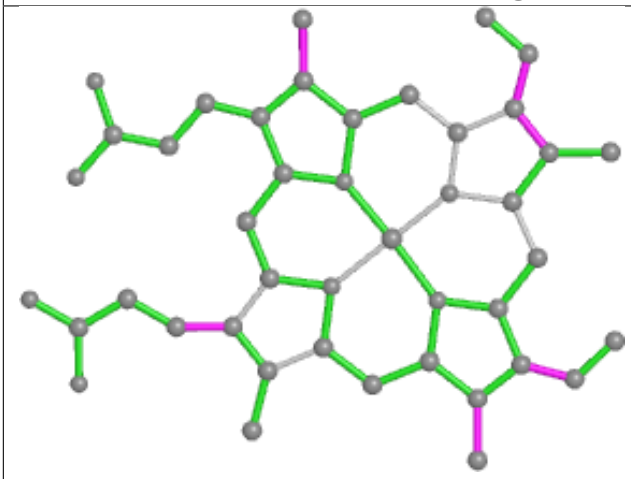
Mol	Chain	Res	Type	Clashes	Symm-Clashes
19	J	101	MC3	1	0
14	C	1002	HEM	1	0
17	D	1001	HEC	3	0
12	A	501	6PE	1	0

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.

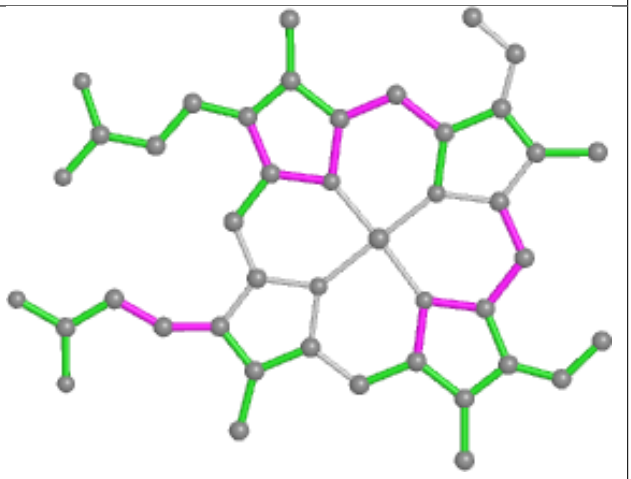
Ligand CDL D 1002



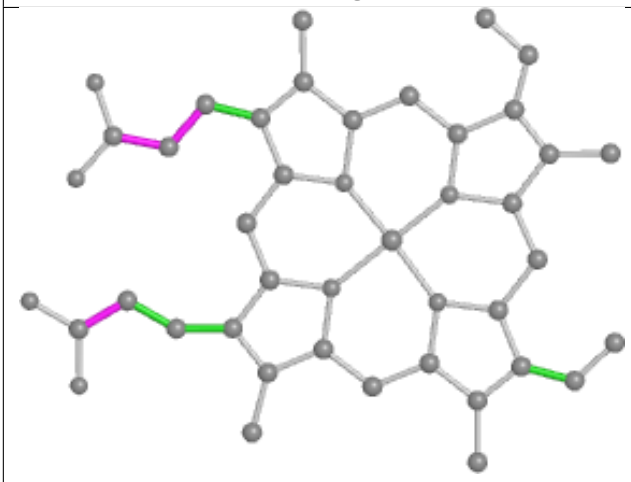
Ligand HEM C 1001



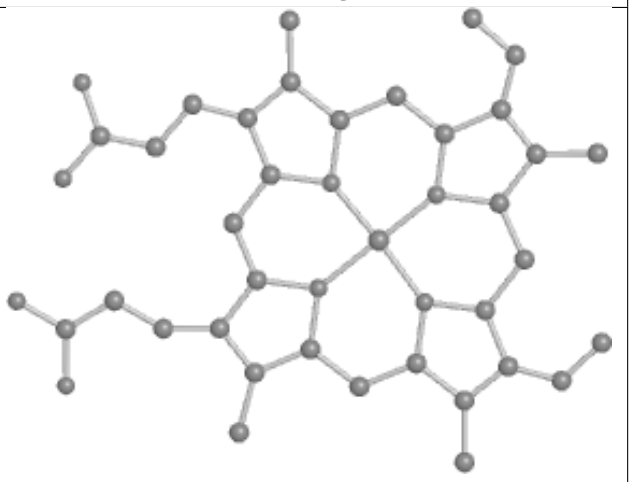
Bond lengths



Bond angles

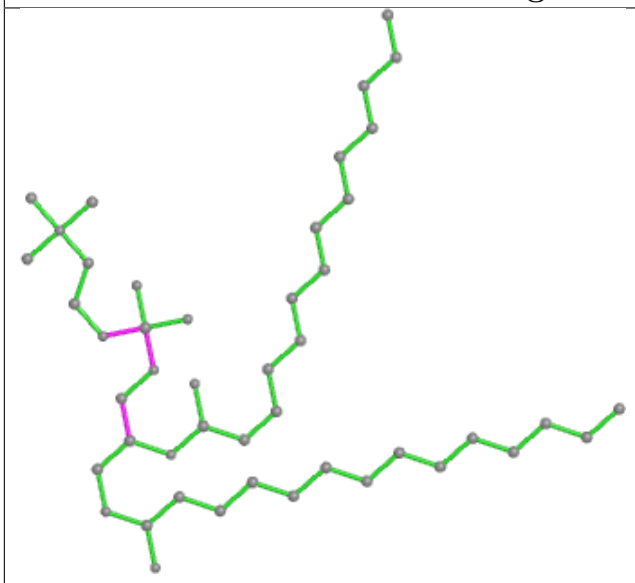


Torsions

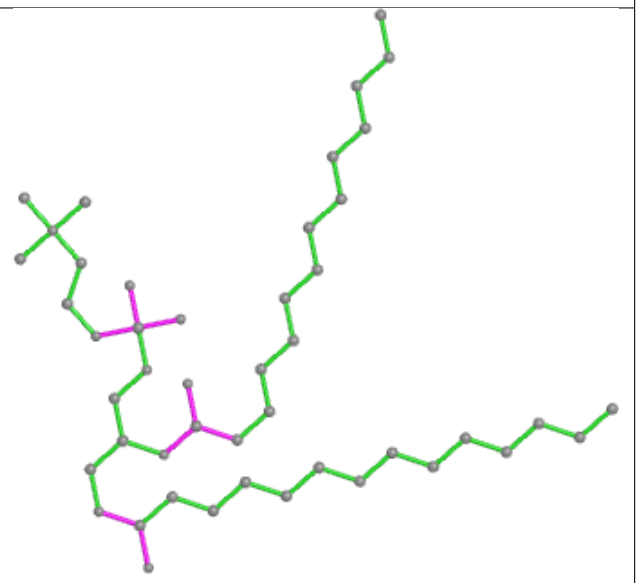


Rings

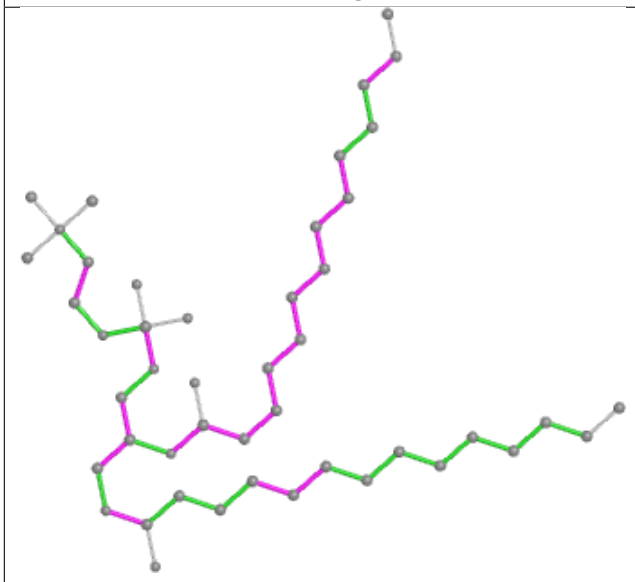
Ligand MC3 J 101



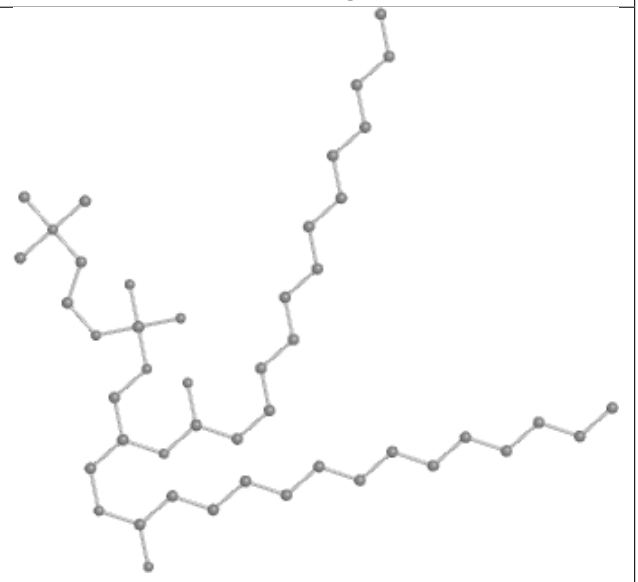
Bond lengths



Bond angles

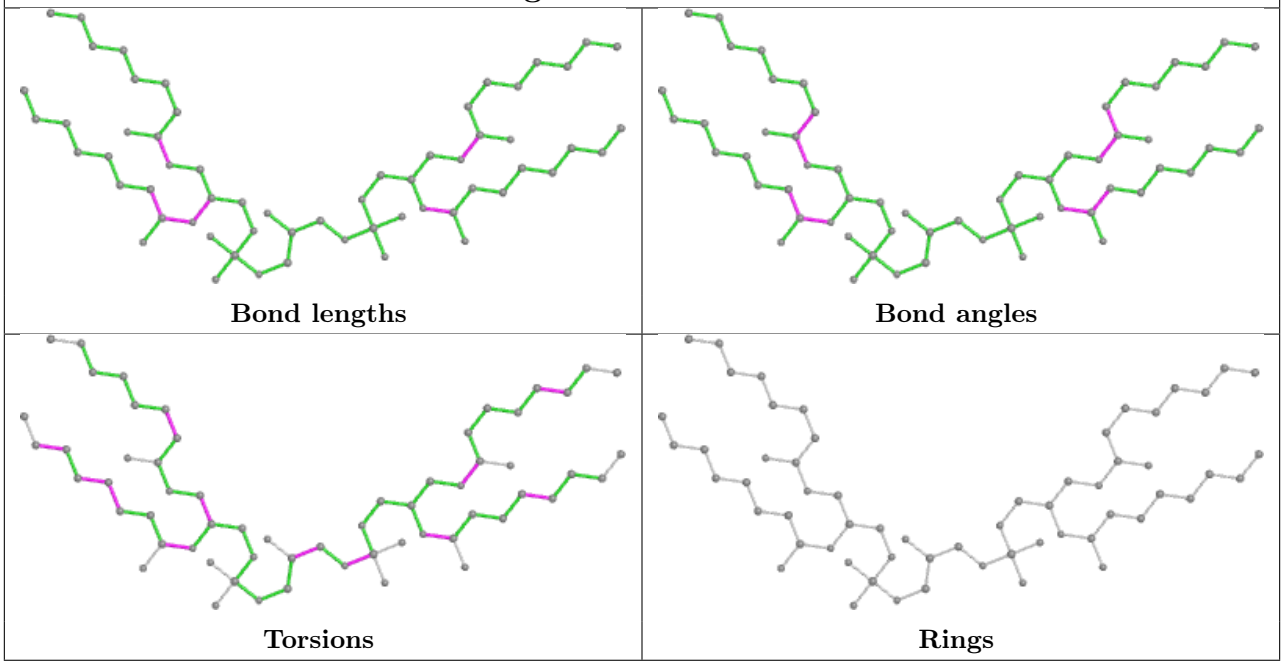


Torsions

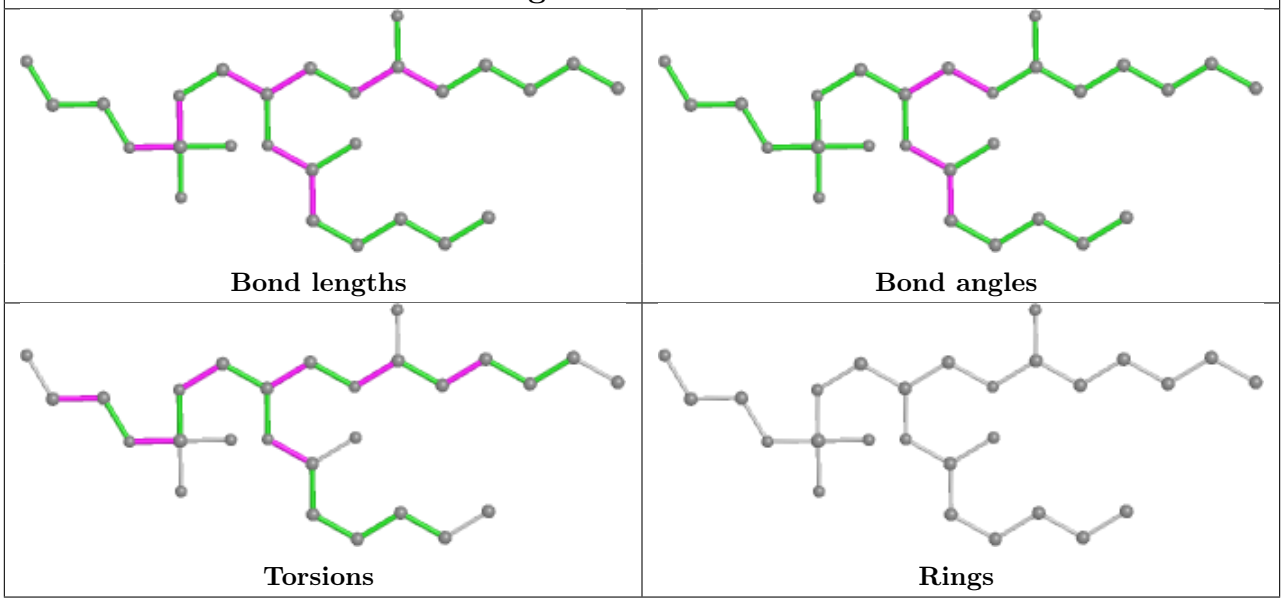


Rings

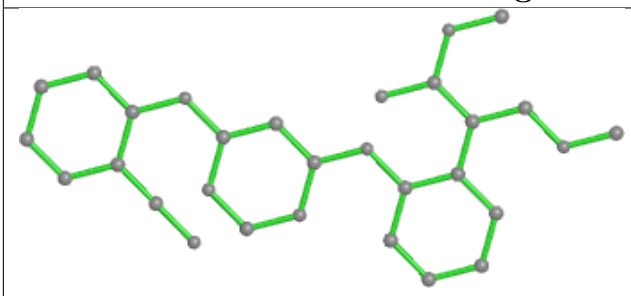
Ligand CDL G 101



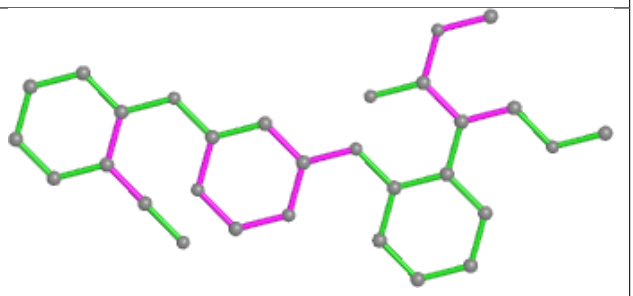
Ligand 6PE K 101



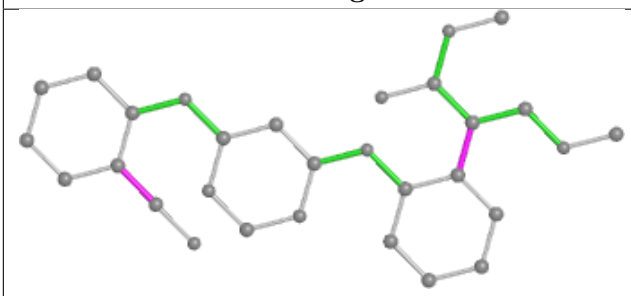
Ligand AZO C 1003



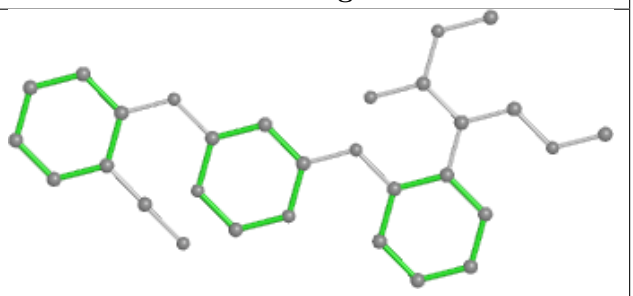
Bond lengths



Bond angles

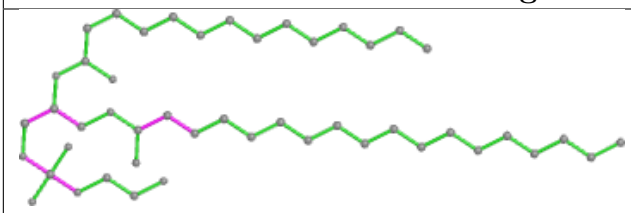


Torsions

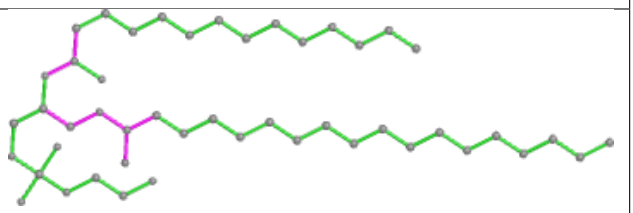


Rings

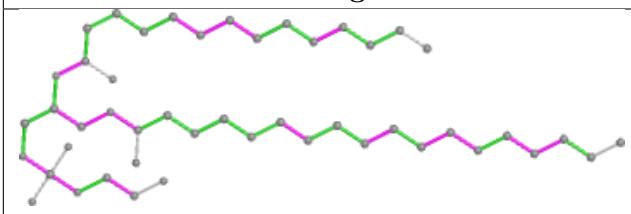
Ligand 8PE C 1004



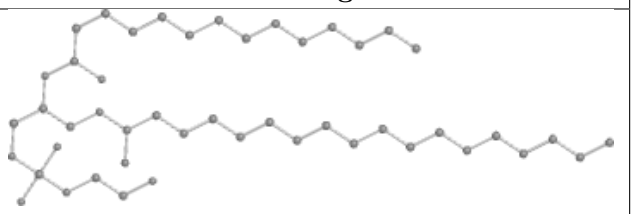
Bond lengths



Bond angles

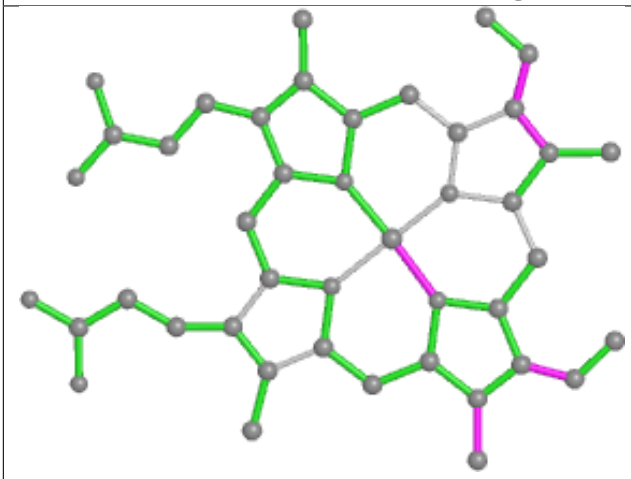


Torsions

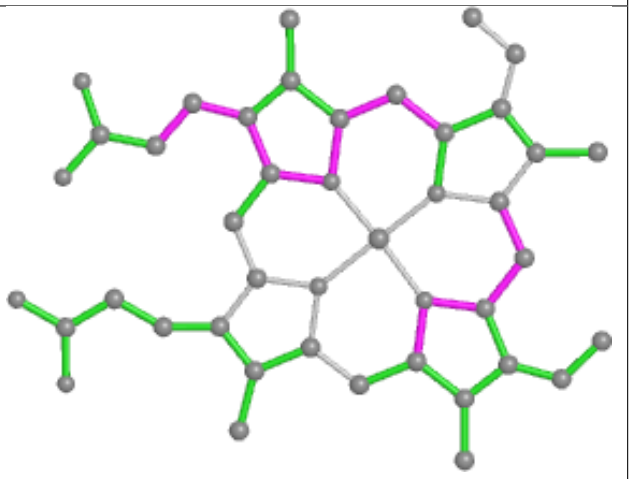


Rings

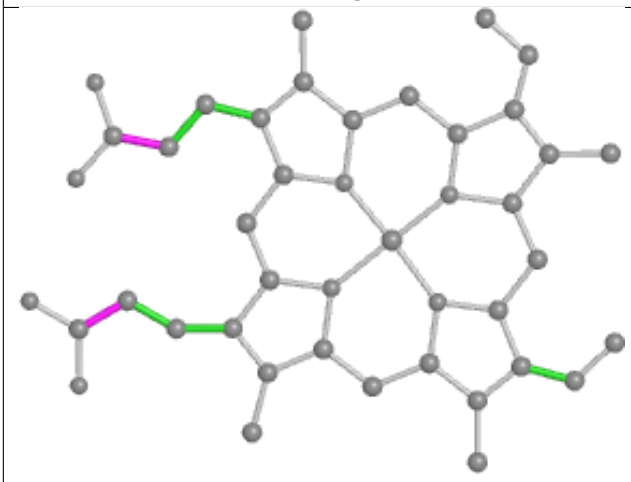
Ligand HEM C 1002



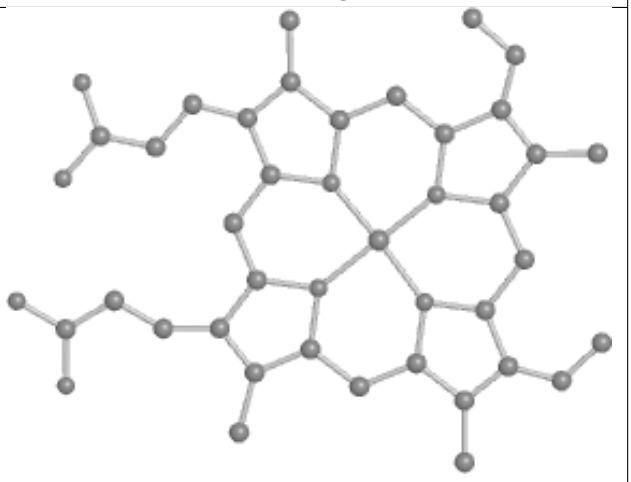
Bond lengths



Bond angles

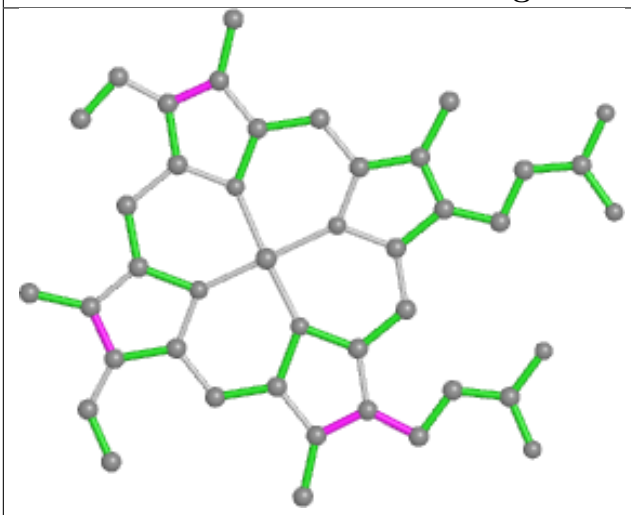


Torsions

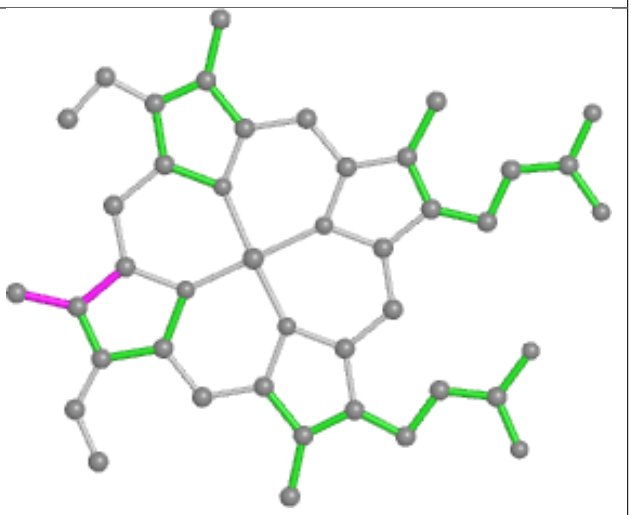


Rings

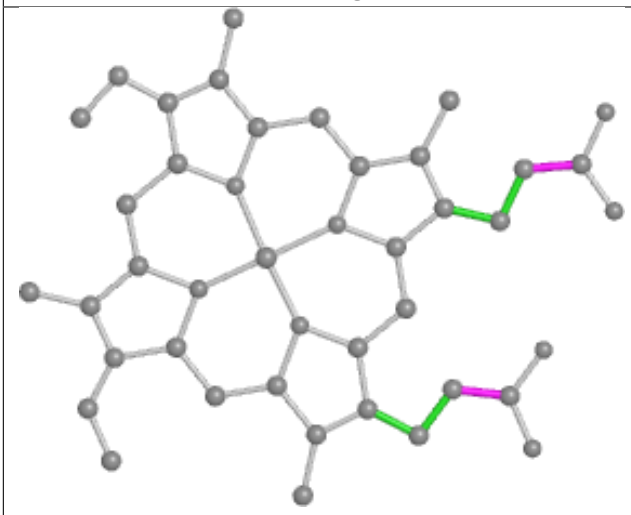
Ligand HEC D 1001



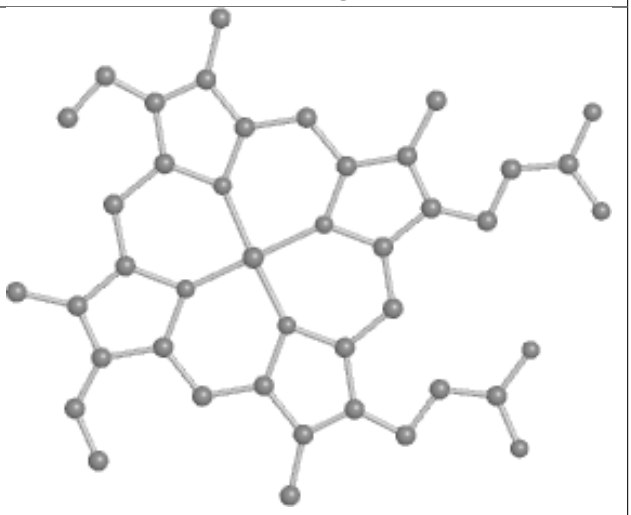
Bond lengths



Bond angles

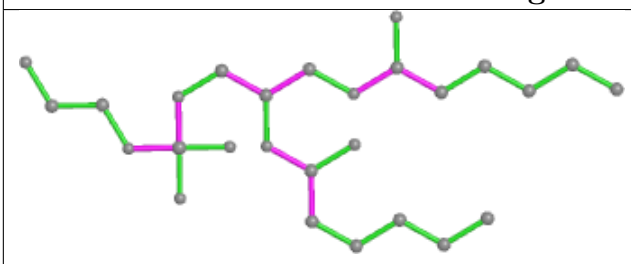


Torsions

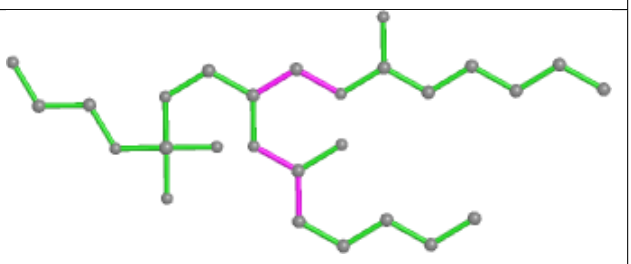


Rings

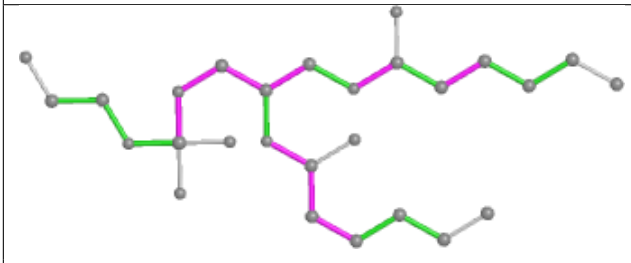
Ligand 6PE A 501



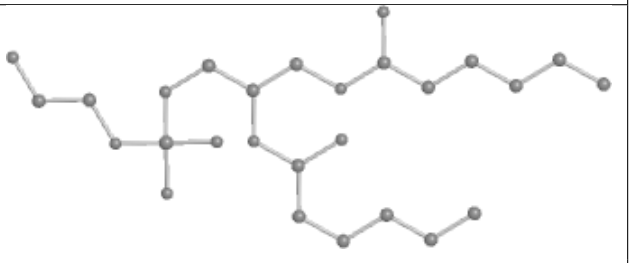
Bond lengths



Bond angles

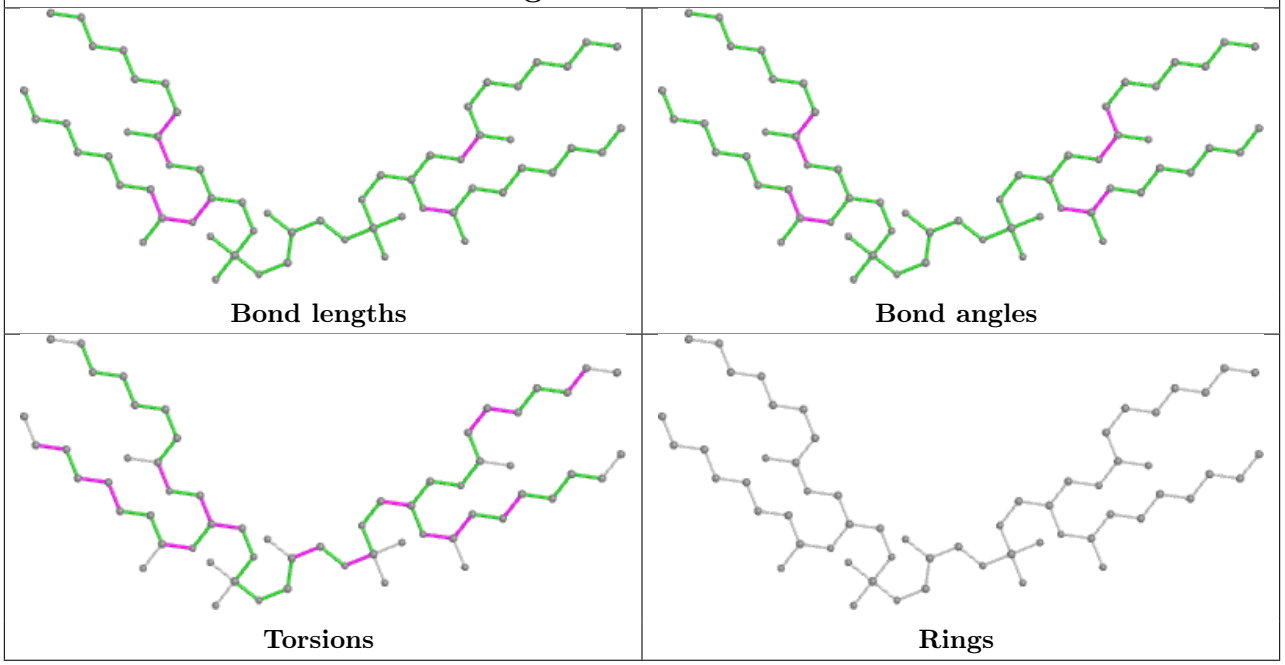


Torsions



Rings

Ligand CDL A 502



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 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95^{th} percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q< 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å^2)	Q<0.9
1	A	446/446 (100%)	0.31	24 (5%) 25 17	58, 83, 109, 183	0
2	B	425/439 (96%)	0.20	18 (4%) 36 26	51, 66, 93, 163	0
3	C	378/379 (99%)	0.33	13 (3%) 45 35	68, 99, 132, 151	0
4	D	241/241 (100%)	1.02	51 (21%) 0 0	72, 147, 168, 182	0
5	E	196/196 (100%)	3.07	113 (57%) 0 0	63, 71, 128, 158	124 (63%)
6	F	105/110 (95%)	0.35	8 (7%) 13 7	65, 85, 126, 141	0
7	G	75/80 (93%)	0.64	8 (10%) 6 3	67, 102, 138, 166	0
8	H	67/78 (85%)	1.82	25 (37%) 0 0	145, 159, 177, 181	0
9	I	34/78 (43%)	1.72	13 (38%) 0 0	75, 120, 148, 170	0
10	J	61/63 (96%)	1.25	15 (24%) 0 0	97, 128, 153, 172	0
11	K	52/55 (94%)	1.27	17 (32%) 0 0	95, 121, 153, 162	0
All	All	2080/2165 (96%)	0.77	305 (14%) 2 1	51, 89, 158, 183	124 (5%)

All (305) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
5	E	102	THR	14.5
5	E	114	VAL	12.9
10	J	1	VAL	11.3
5	E	144	CYS	10.2
5	E	154	GLY	9.7
5	E	88	ALA	9.7
5	E	119	ASP	9.6
1	A	222	THR	9.3
5	E	117	LEU	9.2
5	E	124	LEU	9.0
5	E	93	GLY	9.0
5	E	115	SER	8.8

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Mol	Chain	Res	Type	RSRZ
5	E	186	GLU	8.7
5	E	79	SER	8.4
2	B	17	VAL	8.2
5	E	143	GLY	8.2
5	E	151	GLY	8.2
9	I	70	LEU	7.7
5	E	164	HIS	7.5
4	D	1	SER	7.4
5	E	179	ASN	7.2
5	E	153	PHE	7.0
5	E	156	TYR	7.0
5	E	83	GLU	7.0
4	D	143	LEU	7.0
5	E	87	MET	6.9
5	E	185	TYR	6.9
8	H	12	GLU	6.9
5	E	160	CYS	6.8
1	A	223	TYR	6.8
5	E	101	ARG	6.8
10	J	2	ALA	6.8
2	B	16	GLY	6.7
5	E	89	PHE	6.7
8	H	13	LEU	6.7
5	E	76	ILE	6.7
5	E	96	LEU	6.6
5	E	172	ARG	6.6
5	E	106	ILE	6.5
5	E	173	LYS	6.4
5	E	120	PRO	6.2
5	E	75	GLU	6.2
5	E	171	ILE	6.2
8	H	26	GLN	6.2
7	G	75	ALA	6.2
5	E	116	GLN	6.1
5	E	91	TRP	6.0
5	E	139	CYS	6.0
5	E	152	ASP	5.9
5	E	126	ARG	5.8
5	E	98	VAL	5.8
8	H	50	THR	5.6
5	E	145	VAL	5.5
5	E	174	GLY	5.5

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Mol	Chain	Res	Type	RSRZ
5	E	175	PRO	5.5
10	J	5	LEU	5.4
5	E	157	TYR	5.4
6	F	10	SER	5.4
8	H	51	GLU	5.3
8	H	78	LYS	5.3
8	H	14	VAL	5.2
5	E	86	ASN	5.2
5	E	107	ASP	5.2
5	E	95	PRO	5.1
5	E	74	ILE	5.1
5	E	141	HIS	5.1
5	E	193	VAL	5.0
5	E	135	LEU	5.0
5	E	190	ASP	5.0
5	E	187	PHE	4.9
9	I	69	SER	4.9
5	E	97	PHE	4.9
5	E	134	ILE	4.8
5	E	82	PRO	4.8
8	H	44	VAL	4.7
6	F	7	SER	4.7
5	E	181	GLU	4.7
5	E	90	LYS	4.6
5	E	138	VAL	4.6
5	E	133	VAL	4.6
5	E	136	ILE	4.5
4	D	98	PRO	4.5
5	E	94	LYS	4.5
4	D	145	GLU	4.5
5	E	112	VAL	4.4
5	E	100	HIS	4.4
1	A	221	GLY	4.4
5	E	137	GLY	4.4
2	B	232	LEU	4.4
4	D	187	CYS	4.4
5	E	194	ILE	4.3
5	E	158	CYS	4.3
4	D	15	ARG	4.3
11	K	2	LEU	4.3
10	J	56	LYS	4.3
2	B	233	SER	4.3

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Mol	Chain	Res	Type	RSRZ
4	D	146	GLY	4.2
4	D	106	ASN	4.2
10	J	61	ASN	4.2
6	F	6	VAL	4.2
9	I	45	LEU	4.2
5	E	85	LYS	4.1
5	E	161	HIS	4.1
2	B	15	ALA	4.1
5	E	77	LYS	4.1
4	D	17	LEU	4.1
4	D	142	SER	4.1
4	D	76	GLU	4.1
5	E	149	ASN	4.1
11	K	52	PHE	4.0
3	C	167	GLY	4.0
9	I	26	LEU	4.0
5	E	73	LYS	4.0
5	E	162	GLY	4.0
5	E	92	ARG	4.0
5	E	125	GLU	3.9
4	D	79	GLU	3.9
3	C	99	GLY	3.9
5	E	159	PRO	3.9
8	H	27	LEU	3.8
5	E	99	ARG	3.8
5	E	113	GLU	3.8
8	H	49	GLN	3.8
11	K	53	LYS	3.8
4	D	139	THR	3.8
8	H	22	GLU	3.8
2	B	234	GLY	3.8
11	K	15	ARG	3.8
1	A	1	THR	3.8
5	E	163	SER	3.8
4	D	70	VAL	3.7
8	H	30	CYS	3.7
8	H	71	HIS	3.6
11	K	46	PRO	3.6
7	G	70	LYS	3.6
3	C	2	THR	3.6
2	B	72	ALA	3.5
6	F	9	SER	3.5

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Mol	Chain	Res	Type	RSRZ
11	K	3	THR	3.5
5	E	108	GLN	3.5
5	E	128	LYS	3.5
10	J	57	HIS	3.5
5	E	165	TYR	3.4
8	H	67	HIS	3.4
5	E	118	ARG	3.4
5	E	147	ILE	3.4
11	K	44	TRP	3.4
8	H	42	GLU	3.3
8	H	39	LEU	3.3
4	D	77	ASP	3.3
5	E	80	ASP	3.3
8	H	25	GLU	3.3
10	J	58	LYS	3.3
2	B	228	GLY	3.3
4	D	108	ALA	3.3
1	A	226	ASP	3.3
5	E	103	LYS	3.3
11	K	51	LYS	3.3
2	B	73	SER	3.2
8	H	46	SER	3.2
4	D	107	GLY	3.2
11	K	5	PHE	3.2
6	F	12	TRP	3.2
5	E	16	PRO	3.2
5	E	129	LYS	3.2
5	E	169	GLY	3.1
4	D	56	TYR	3.1
4	D	93	LYS	3.1
11	K	4	ARG	3.1
4	D	188	THR	3.1
5	E	142	LEU	3.1
9	I	22	VAL	3.1
4	D	100	ALA	3.0
5	E	195	VAL	3.0
5	E	111	ALA	3.0
2	B	18	PRO	3.0
6	F	8	ALA	3.0
5	E	176	ALA	3.0
4	D	81	PHE	3.0
5	E	146	PRO	3.0

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Mol	Chain	Res	Type	RSRZ
4	D	18	LEU	3.0
4	D	96	PRO	3.0
4	D	25	SER	3.0
8	H	61	PHE	2.9
3	C	3	ASN	2.9
5	E	192	MET	2.9
3	C	168	PHE	2.9
4	D	80	MET	2.9
2	B	19	PRO	2.9
4	D	66	GLU	2.9
4	D	144	ARG	2.9
5	E	64	ALA	2.9
5	E	104	LYS	2.9
5	E	121	GLN	2.9
8	H	24	CYS	2.9
8	H	48	SER	2.9
10	J	6	THR	2.9
11	K	39	ARG	2.9
7	G	74	PRO	2.8
4	D	94	PRO	2.8
11	K	41	ILE	2.8
9	I	46	LYS	2.8
7	G	36	ASN	2.8
4	D	92	PRO	2.8
10	J	60	GLU	2.8
1	A	419	CYS	2.8
1	A	421	ALA	2.8
9	I	27	ARG	2.7
1	A	228	VAL	2.7
11	K	42	LEU	2.7
5	E	123	ASP	2.7
5	E	140	THR	2.7
5	E	155	GLY	2.7
4	D	62	LYS	2.7
4	D	97	ASN	2.7
10	J	3	PRO	2.7
1	A	440	GLY	2.7
4	D	103	ALA	2.7
9	I	57	GLY	2.7
4	D	186	VAL	2.6
1	A	435	ASN	2.6
10	J	4	THR	2.6

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Mol	Chain	Res	Type	RSRZ
3	C	314	SER	2.6
1	A	38	GLY	2.6
1	A	165	GLN	2.6
11	K	6	LEU	2.6
1	A	422	VAL	2.6
1	A	254	ALA	2.6
3	C	70	CYS	2.5
5	E	188	THR	2.5
5	E	127	VAL	2.5
10	J	55	ILE	2.5
5	E	177	PRO	2.5
8	H	47	ARG	2.5
3	C	344	GLU	2.5
5	E	130	PRO	2.5
3	C	111	GLU	2.5
5	E	170	ARG	2.5
10	J	8	ARG	2.5
11	K	49	ASN	2.5
6	F	13	LEU	2.5
7	G	24	ARG	2.4
4	D	241	LYS	2.4
8	H	40	CYS	2.4
3	C	11	MET	2.4
1	A	227	ALA	2.4
1	A	225	GLU	2.4
4	D	167	GLU	2.4
9	I	52	ARG	2.4
9	I	44	ASP	2.4
9	I	60	ALA	2.4
1	A	241	ILE	2.4
6	F	11	ARG	2.4
5	E	168	SER	2.4
3	C	4	ILE	2.4
9	I	58	GLN	2.4
5	E	148	ALA	2.4
4	D	57	THR	2.4
4	D	39	SER	2.4
5	E	183	PRO	2.3
11	K	50	GLY	2.3
11	K	45	VAL	2.3
2	B	126	VAL	2.3
4	D	102	ARG	2.3

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Mol	Chain	Res	Type	RSRZ
4	D	170	GLU	2.3
2	B	323	GLY	2.3
4	D	192	TRP	2.3
8	H	20	VAL	2.3
2	B	231	GLY	2.3
5	E	132	TRP	2.3
10	J	44	GLU	2.3
7	G	63	THR	2.3
4	D	95	TYR	2.3
5	E	182	VAL	2.2
9	I	61	GLY	2.2
4	D	165	TYR	2.2
3	C	103	TYR	2.2
5	E	84	GLY	2.2
1	A	423	ALA	2.2
4	D	55	CYS	2.2
8	H	15	ASP	2.2
4	D	40	CYS	2.2
4	D	73	GLY	2.1
4	D	134	TYR	2.2
3	C	104	TYR	2.1
4	D	85	GLY	2.1
5	E	184	SER	2.1
7	G	66	PHE	2.1
5	E	81	ILE	2.1
1	A	432	PRO	2.1
1	A	439	SER	2.1
7	G	6	HIS	2.1
2	B	161	GLU	2.1
4	D	16	GLY	2.1
1	A	39	VAL	2.1
1	A	240	GLN	2.1
1	A	416	TYR	2.1
10	J	37	GLN	2.0
1	A	197	LEU	2.0
2	B	74	SER	2.0
4	D	166	ASN	2.0
5	E	178	LEU	2.0
4	D	72	ASP	2.0
2	B	227	ARG	2.0
2	B	421	ARG	2.0

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

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

6.3 Carbohydrates (i)

There are no monosaccharides in this entry.

6.4 Ligands (i)

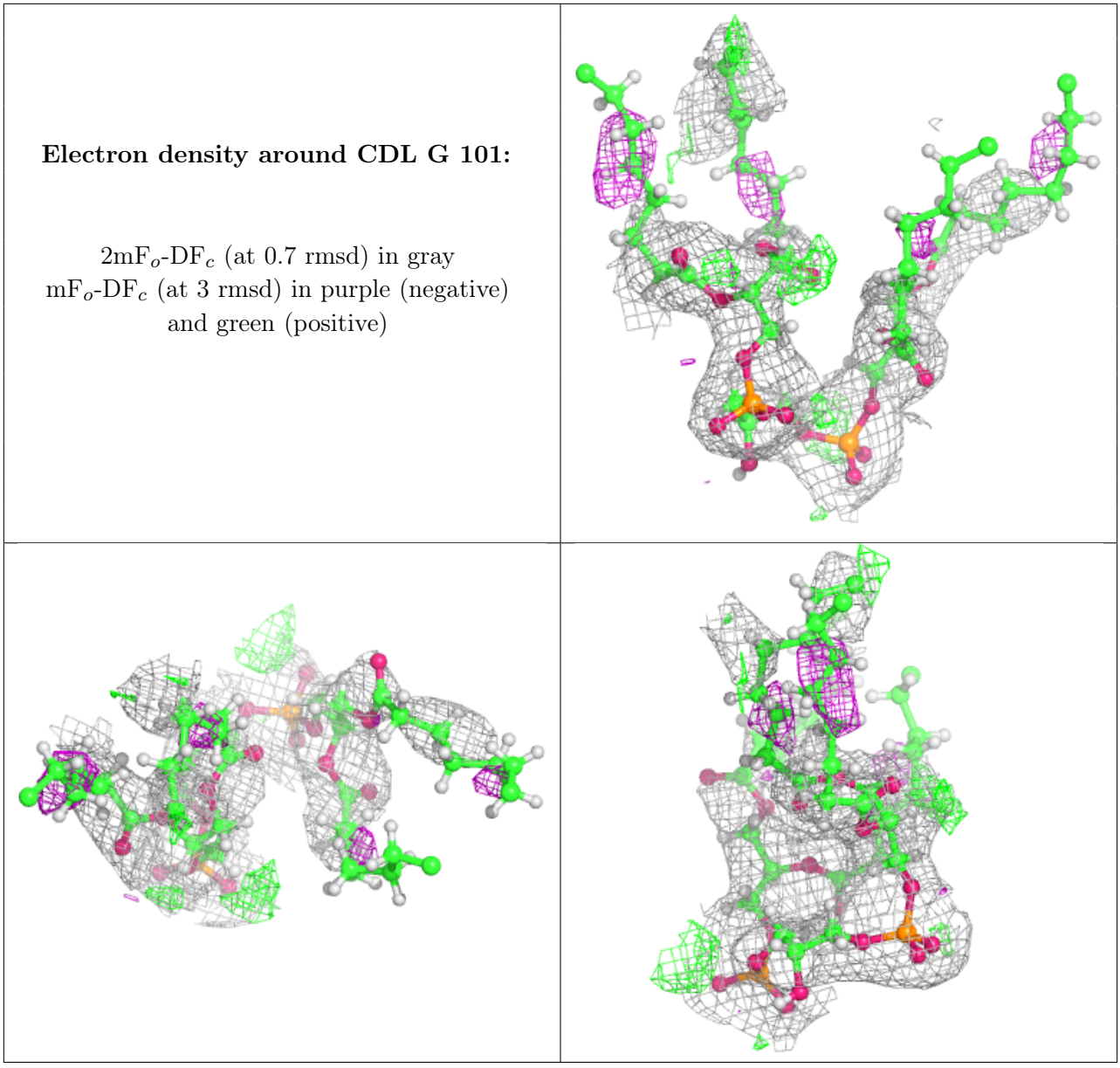
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
13	CDL	G	101	60/100	0.71	0.38	94,115,138,139	0
12	6PE	K	101	27/27	0.73	0.42	132,162,168,168	0
19	MC3	J	101	46/46	0.75	0.40	96,119,143,144	0
13	CDL	D	1002	60/100	0.76	0.37	96,117,139,142	0
18	FES	E	1001	4/4	0.77	0.24	75,76,76,76	4
12	6PE	A	501	27/27	0.79	0.30	91,114,138,138	0
13	CDL	A	502	60/100	0.83	0.41	96,117,140,143	0
16	8PE	C	1004	47/47	0.85	0.38	74,98,129,132	0
17	HEC	D	1001	43/43	0.91	0.24	135,156,179,191	0
15	AZO	C	1003	30/30	0.92	0.31	99,113,137,157	0
14	HEM	C	1001	43/43	0.95	0.27	105,115,130,147	0
14	HEM	C	1002	43/43	0.96	0.20	70,86,111,117	0

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

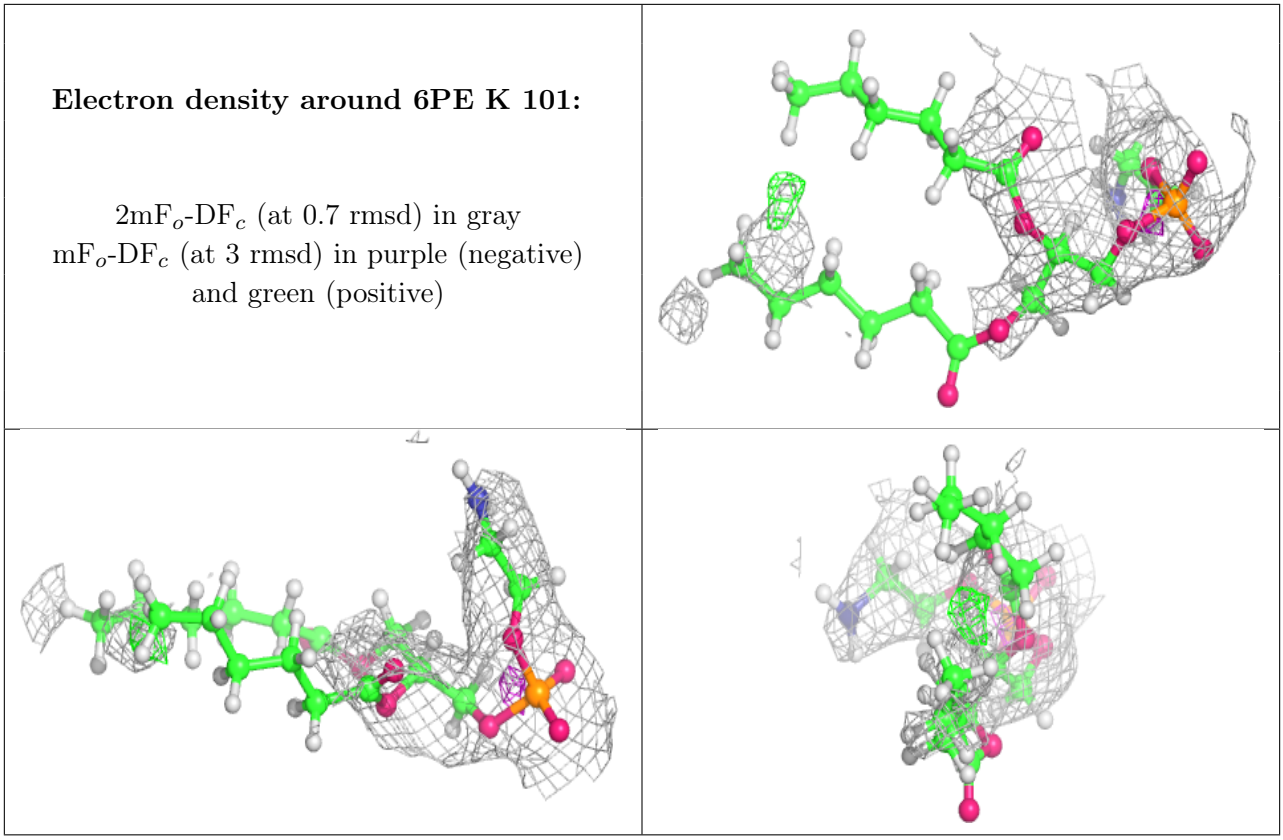
Electron density around CDL G 101:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)



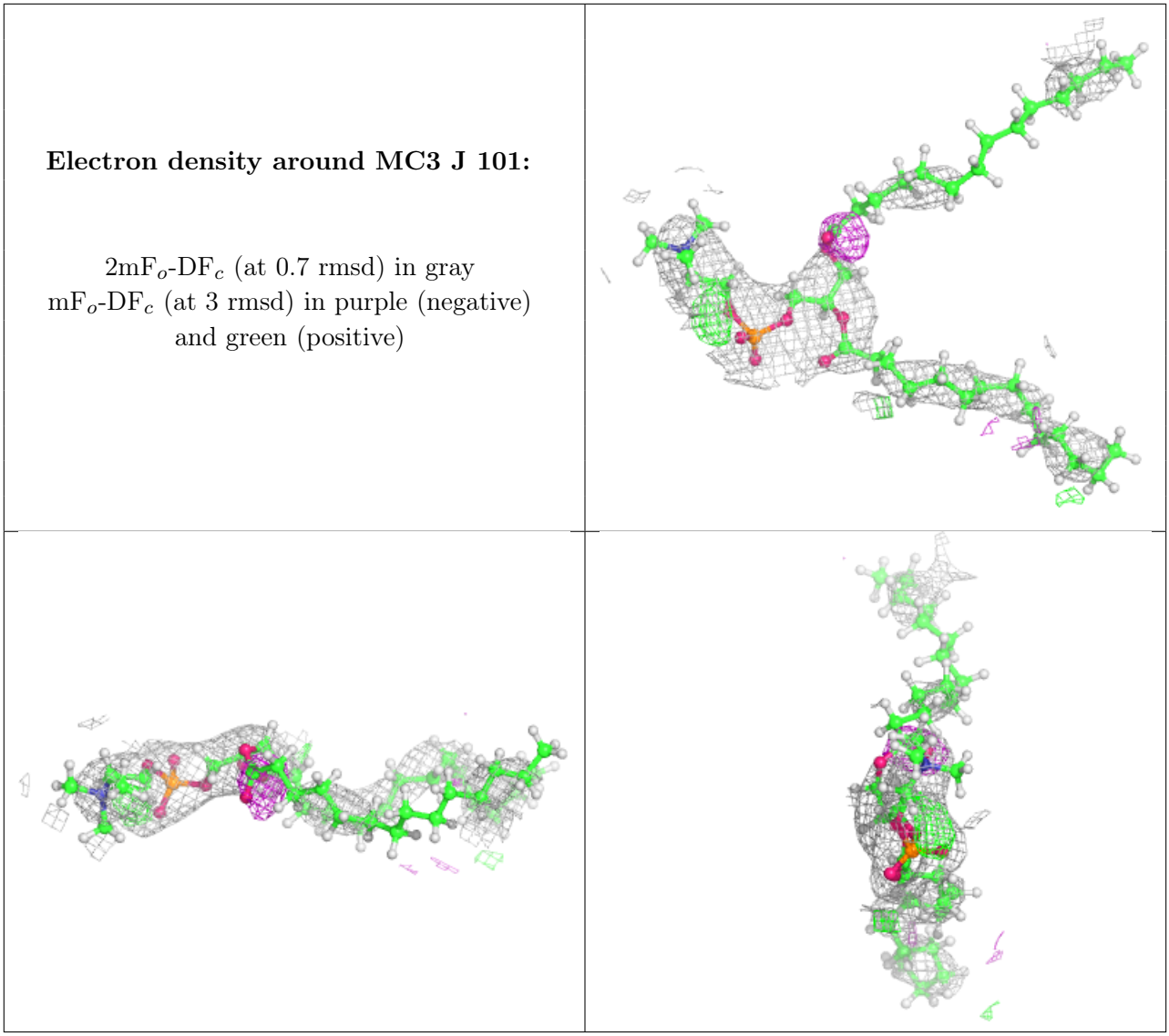
Electron density around 6PE K 101:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)



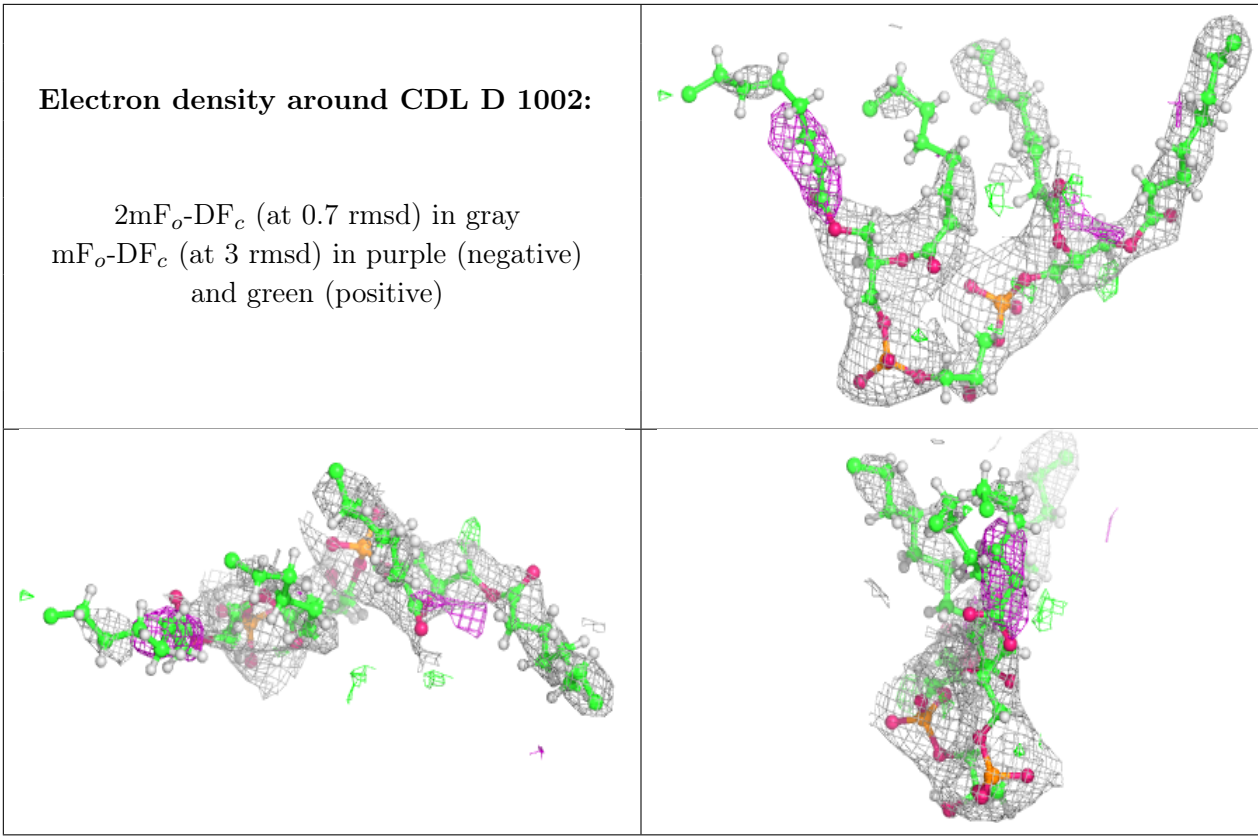
Electron density around MC3 J 101:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)



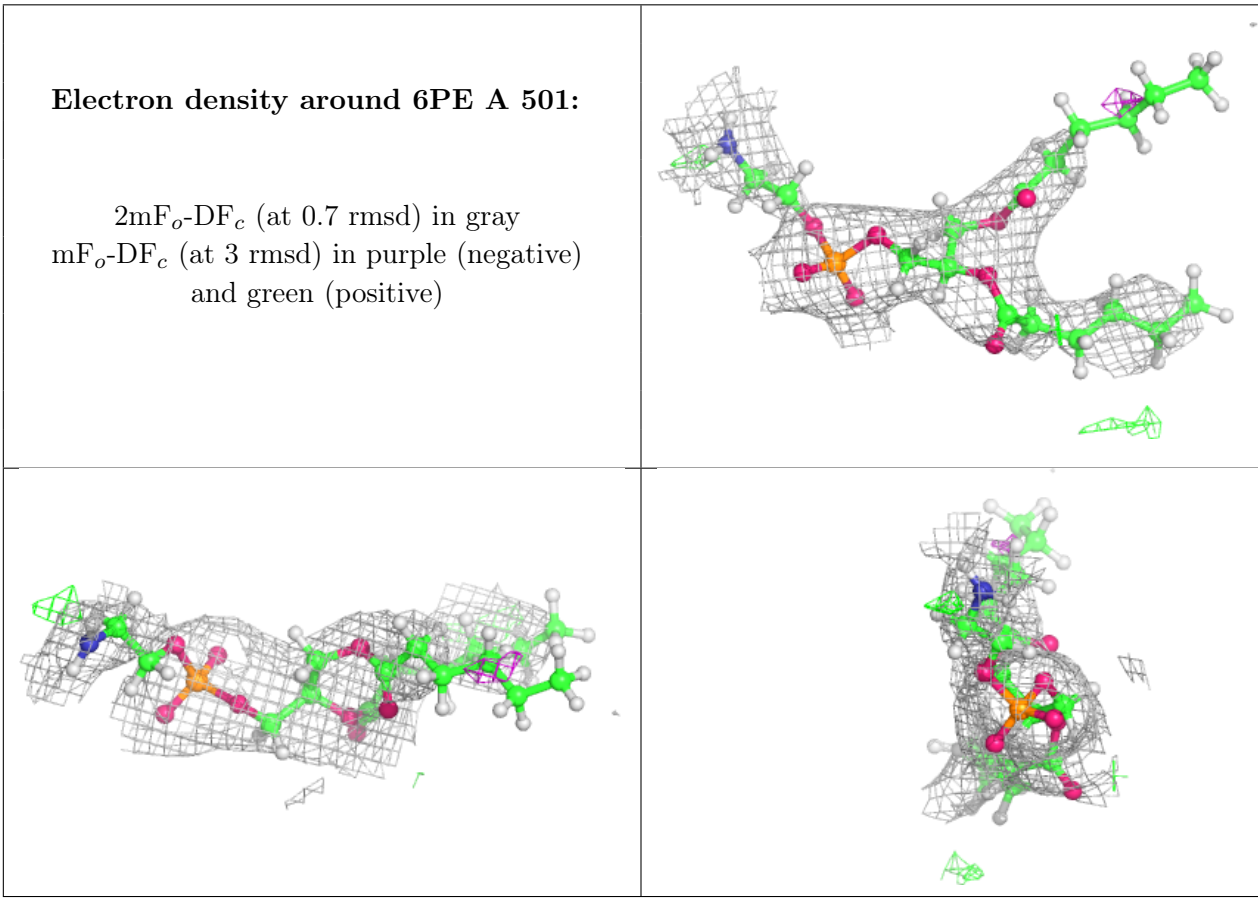
Electron density around CDL D 1002:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)



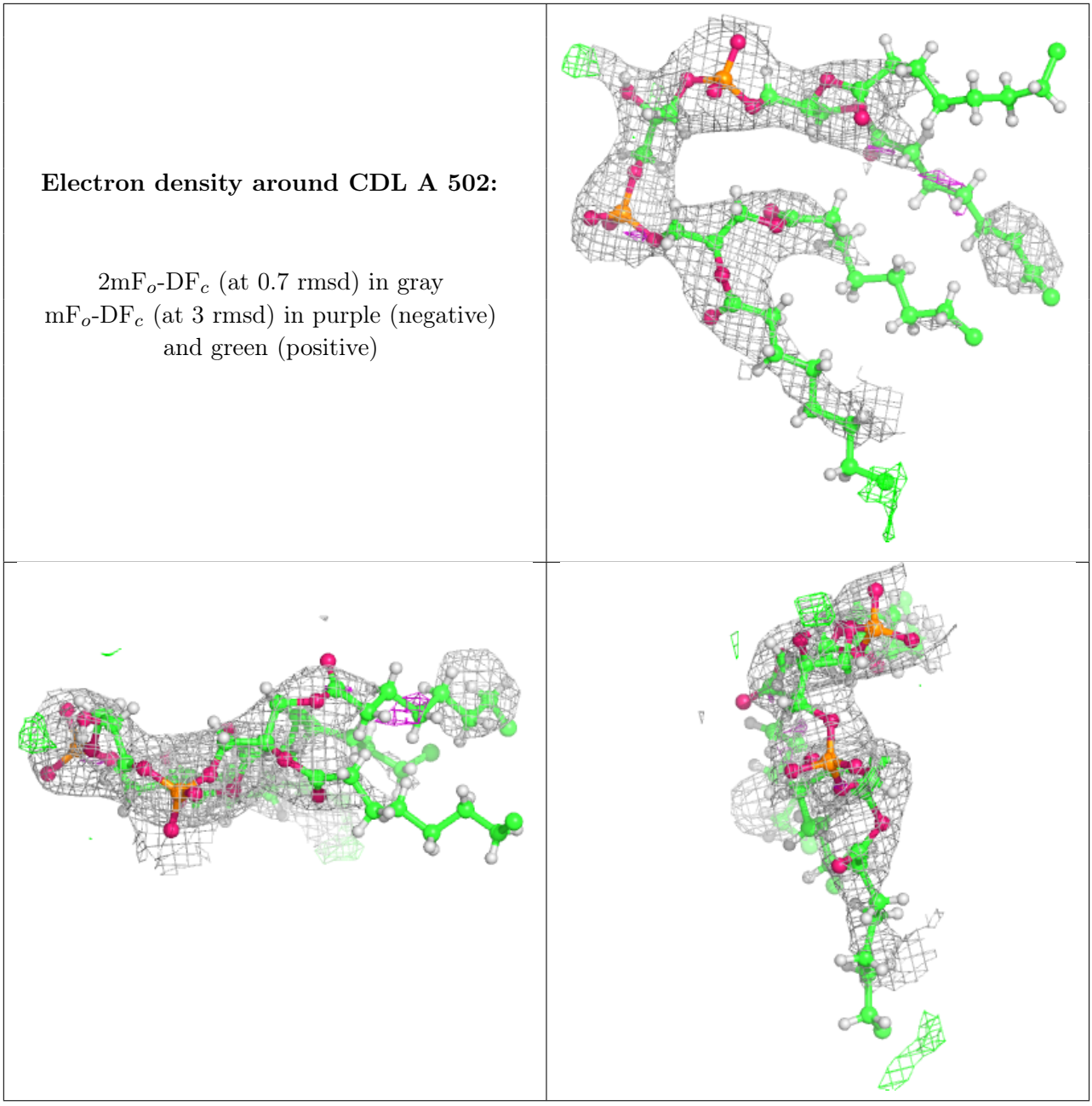
Electron density around 6PE A 501:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)



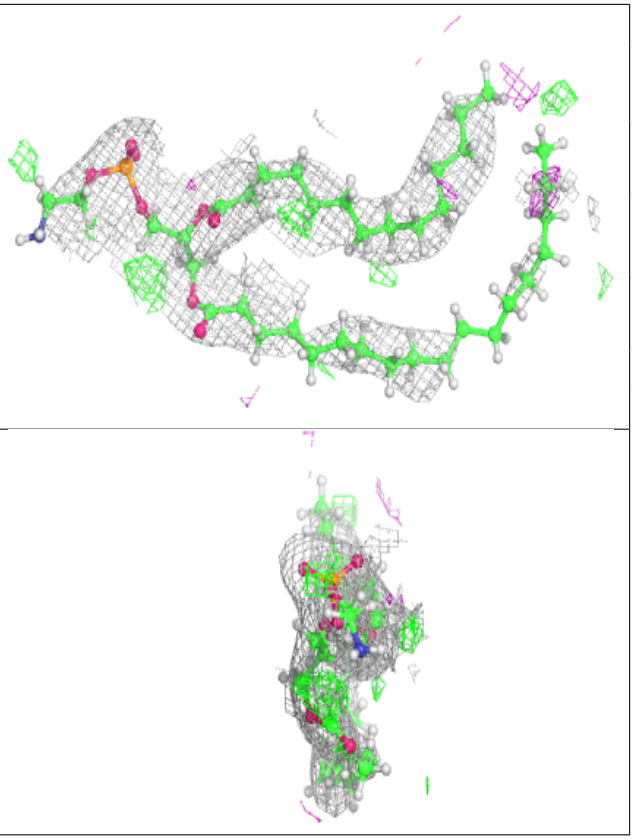
Electron density around CDL A 502:

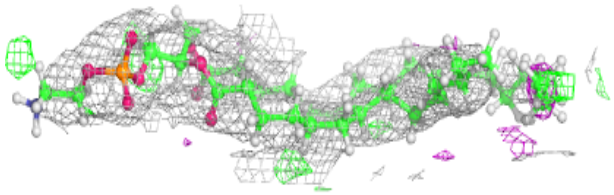
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)



Electron density around 8PE C 1004:

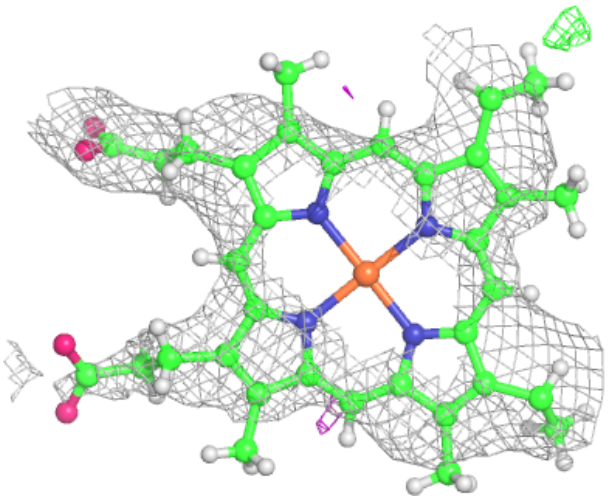
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

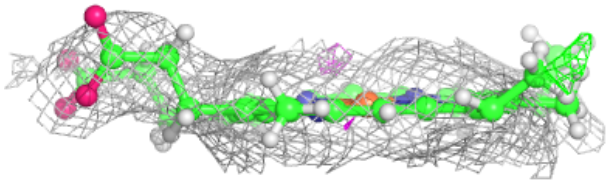


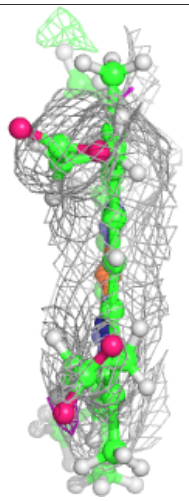


Electron density around HEC D 1001:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

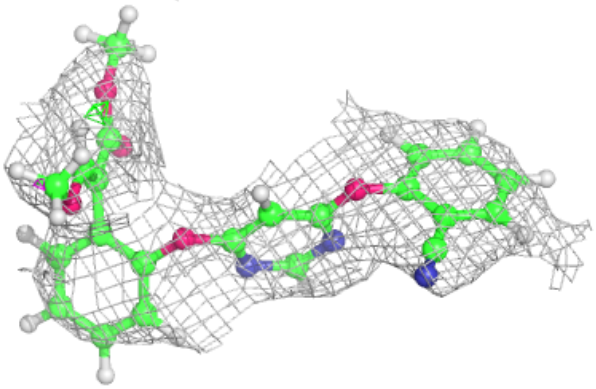


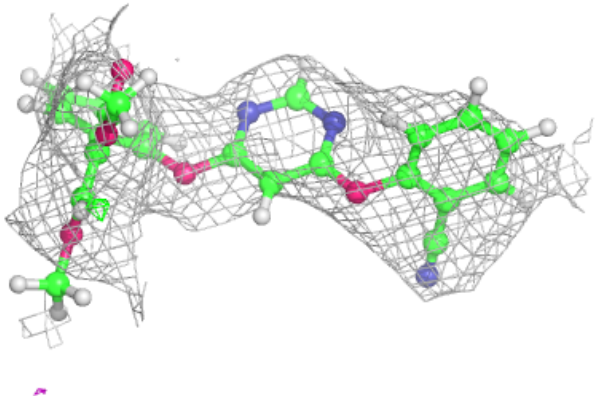


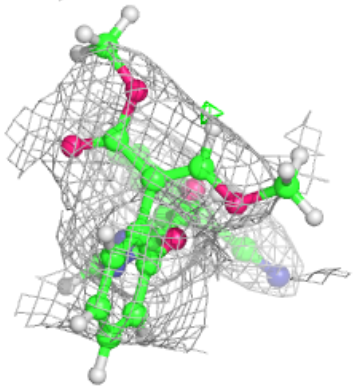


Electron density around AZO C 1003:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

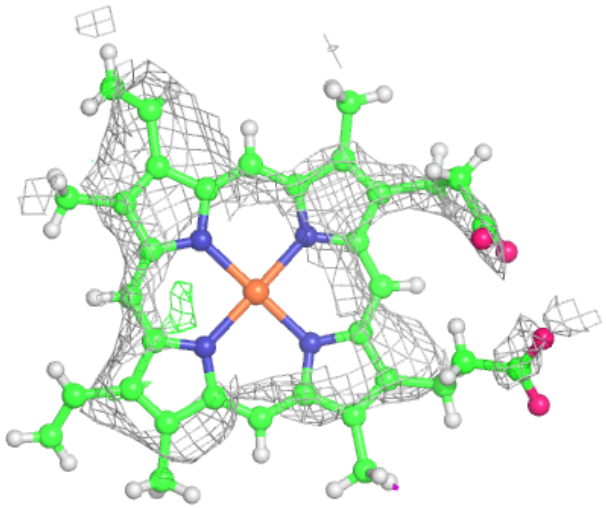


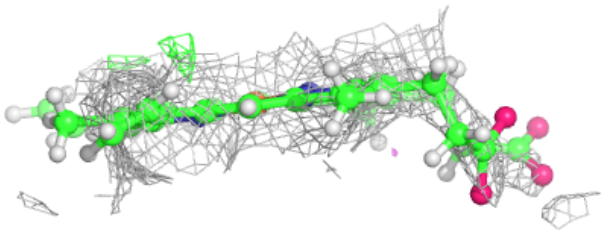


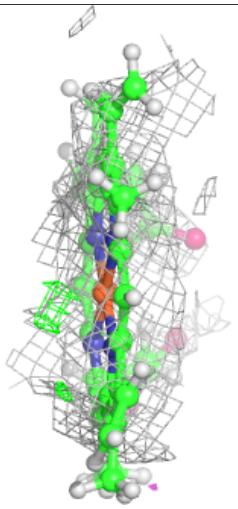


Electron density around HEM C 1001:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

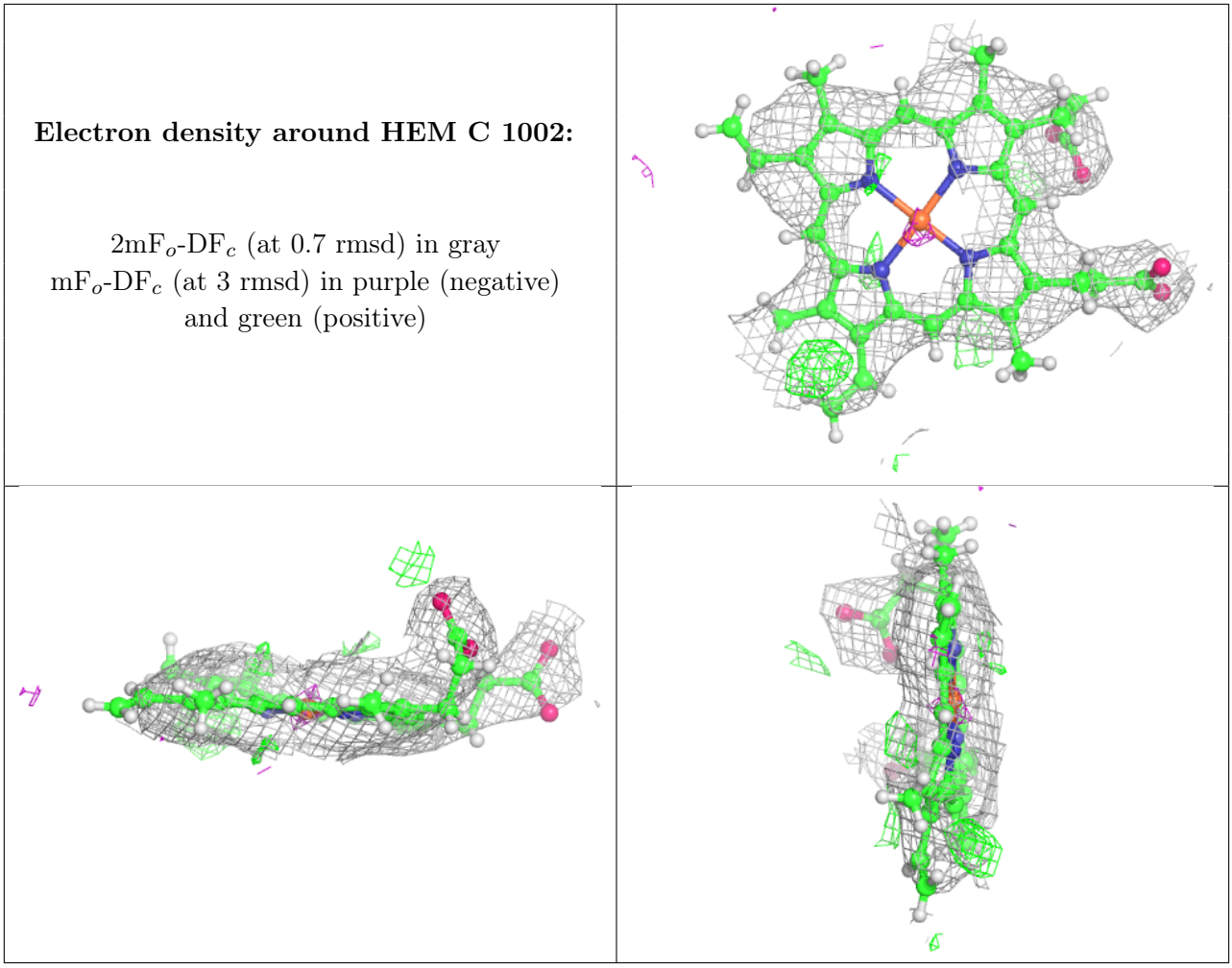






Electron density around HEM C 1002:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



6.5 Other polymers (i)

There are no such residues in this entry.