Full wwPDB EM Validation Report ⓘ

Feb 24, 2025 – 01:02 PM JST

PDB ID	:	8YIO
EMDB ID	:	EMD-39324
Title	:	Cryo-EM structure of Saccharomyces cerevisiae bc1 complex in azoxystrobin-bound state
Authors	:	Ye, Y.; Li, Z.W.; Yang, G.F.
Deposited on	:	2024-02-29
Resolution	:	2.35 Å(reported)
Based on initial model	:	6YMX

This is a Full wwPDB EM 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/EMValidationReportHelp
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:

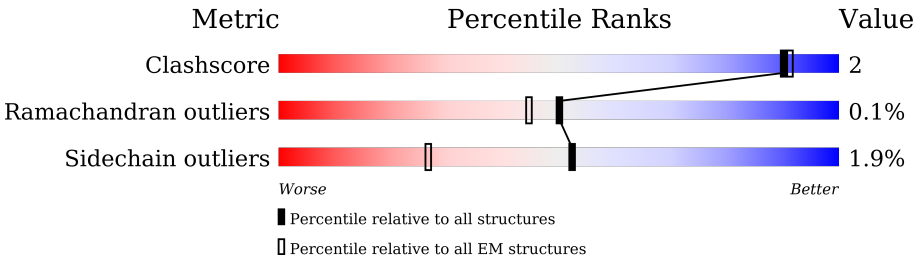
EMDB validation analysis	:	0.0.1.dev117
Mogul	:	1.8.5 (274361), CSD as541be (2020)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.41.2

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 2.35 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)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

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	A	431	99%
1	L	431	99%
2	C	385	97%
2	N	385	97%
3	B	352	99%
3	M	352	99%
4	D	248	98%
4	O	248	98%

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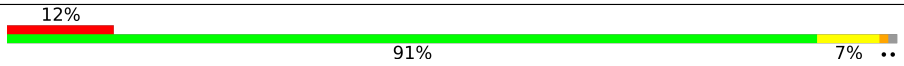
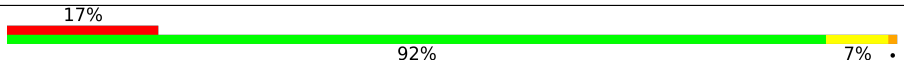
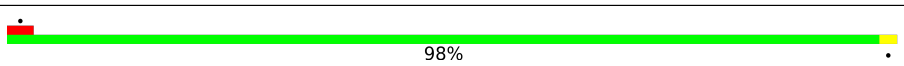
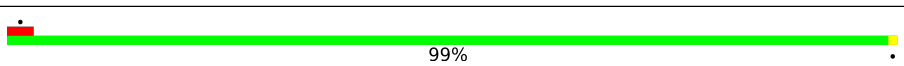
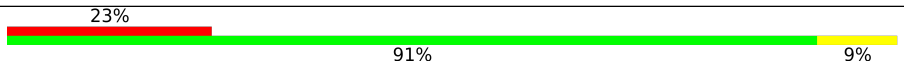
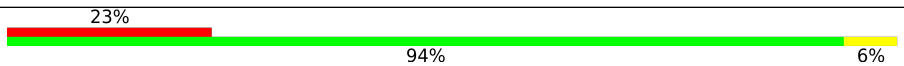
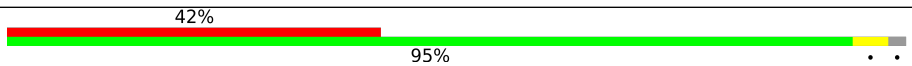
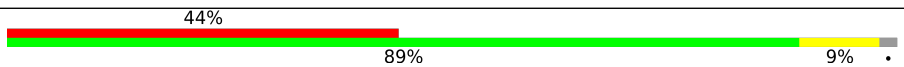
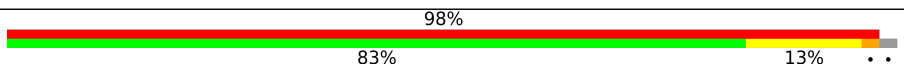
Mol	Chain	Length	Quality of chain
5	E	185	
5	P	185	
6	F	75	
6	Q	75	
7	G	126	
7	R	126	
8	H	93	
8	S	93	
9	I	55	
9	T	55	
10	U	52	
10	V	52	

2 Entry composition (i)

There are 18 unique types of molecules in this entry. The entry contains 32370 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 COR1 isoform 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	431	Total	C	N	O	S	0	0
			3344	2110	576	652	6		
1	L	431	Total	C	N	O	S	0	0
			3344	2110	576	652	6		

- Molecule 2 is a protein called Cytochrome b.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	C	385	Total	C	N	O	S	0	0
			3090	2082	484	503	21		
2	N	385	Total	C	N	O	S	0	0
			3090	2082	484	503	21		

- Molecule 3 is a protein called Cytochrome b-c1 complex subunit 2, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	B	352	Total	C	N	O	S	0	0
			2735	1747	453	534	1		
3	M	352	Total	C	N	O	S	0	0
			2735	1747	453	534	1		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
4	D	248	Total	C	N	O	S	0	0
			1961	1249	340	363	9		
4	O	248	Total	C	N	O	S	0	0
			1961	1249	340	363	9		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
5	E	185	Total	C	N	O	S	0	0
			1411	893	242	266	10		
5	P	185	Total	C	N	O	S	0	0
			1411	893	242	266	10		

- Molecule 6 is a protein called QCR6 isoform 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	F	74	Total	C	N	O	S	0	0
			624	391	108	123	2		
6	Q	75	Total	C	N	O	S	0	0
			633	396	109	126	2		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
7	G	126	Total	C	N	O	S	0	0
			1019	653	173	191	2		
7	R	126	Total	C	N	O	S	0	0
			1019	653	173	191	2		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
8	H	93	Total	C	N	O	S	0	0
			773	510	131	130	2		
8	S	93	Total	C	N	O	S	0	0
			773	510	131	130	2		

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

Mol	Chain	Residues	Atoms				AltConf	Trace
9	I	54	Total	C	N	O	0	0
			442	295	74	73		
9	T	54	Total	C	N	O	0	0
			443	295	74	74		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
10	U	44	Total	C	N	O	S	0	0
			347	230	58	57	2		

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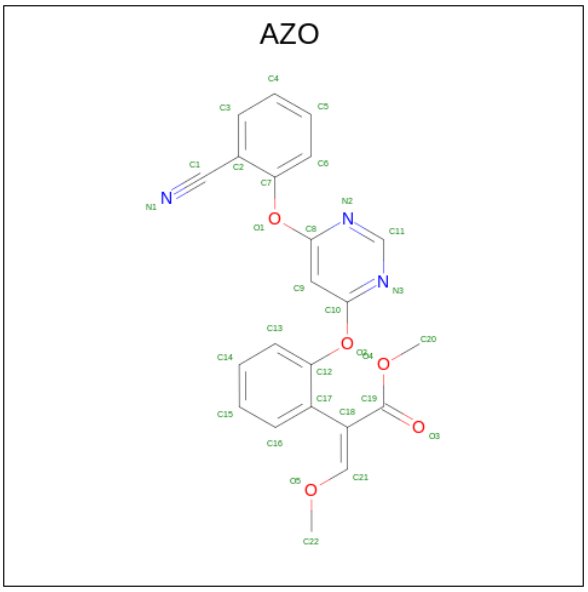
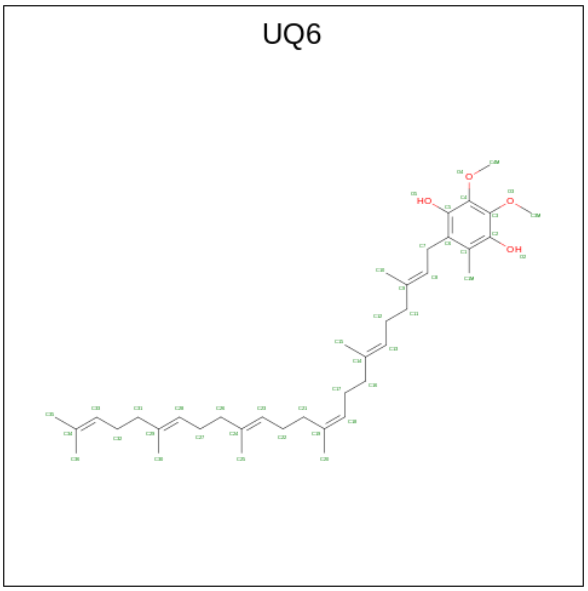
Mol	Chain	Residues	Atoms					AltConf	Trace
10	V	51	Total	C	N	O	S	0	0
			406	272	66	66	2		

- Molecule 11 is METHYL (2Z)-2-(2-{[6-(2-CYANOPHENOXY)PYRIMIDIN-4-YL]OXY }PHENYL)-3-METHOXYACRYLATE (three-letter code: AZO) (formula: $C_{22}H_{17}N_3O_5$) (labeled as "Ligand of Interest" by depositor).



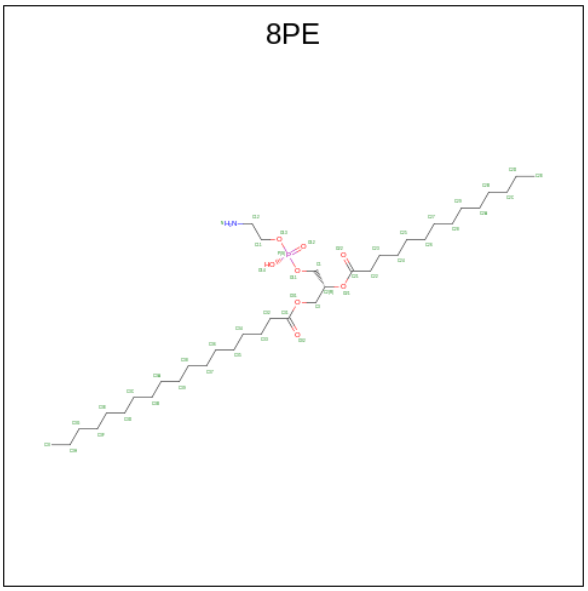
Mol	Chain	Residues	Atoms				AltConf
11	C	1	Total	C	N	O	0
			30	22	3	5	
11	N	1	Total	C	N	O	0
			30	22	3	5	

- Molecule 12 is 5-(3,7,11,15,19,23-HEXAMETHYL-TETRACOSA-2,6,10,14,18,22-HEX AENYL)-2,3-DIMETHOXY-6-METHYL-BENZENE-1,4-DIOL (three-letter code: UQ6) (formula: $C_{39}H_{60}O_4$).



Mol	Chain	Residues	Atoms			AltConf
12	C	1	Total	C	O	0
			43	39	4	
12	N	1	Total	C	O	0
			43	39	4	

- Molecule 13 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					AltConf
13	C	1	Total	C	N	O	P	0
			47	37	1	8	1	

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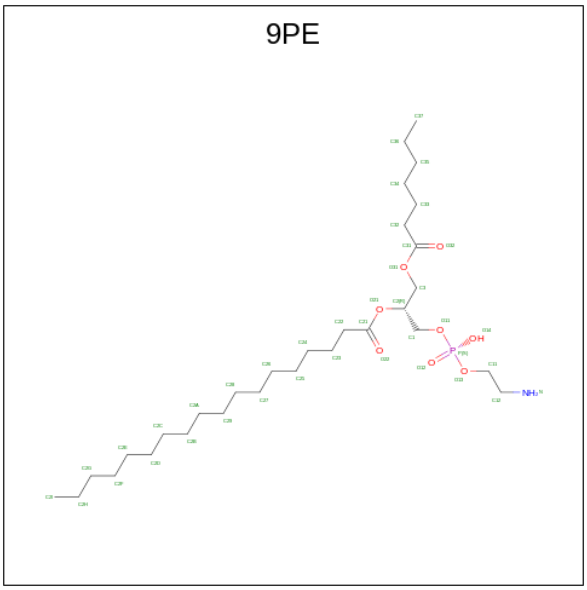
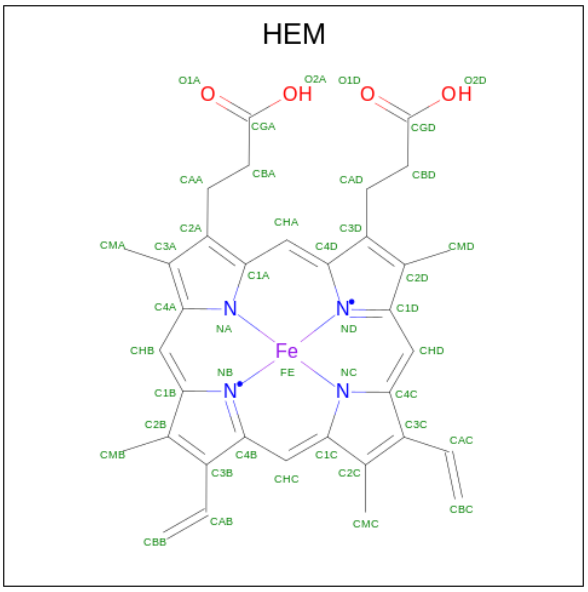
Mol	Chain	Residues	Atoms					AltConf
13	N	1	Total	C	N	O	P	0
			47	37	1	8	1	

- Molecule 14 is (1R)-2-{[(S)-(2-aminoethoxy)(hydroxy)phosphoryl]oxy}-1-[(heptanoyloxy)methyl]ethyl octadecanoate (three-letter code: 9PE) (formula: $C_{30}H_{60}NO_8P$).



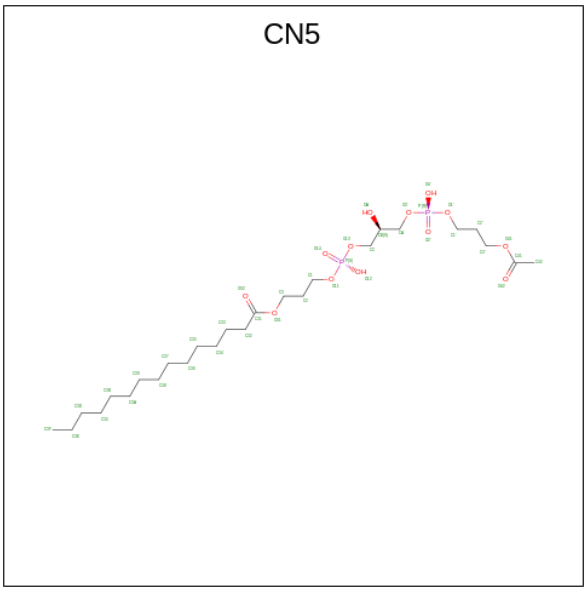
Mol	Chain	Residues	Atoms					AltConf
14	C	1	Total	C	N	O	P	0
			40	30	1	8	1	
14	N	1	Total	C	N	O	P	0
			40	30	1	8	1	

- Molecule 15 is PROTOPORPHYRIN IX CONTAINING FE (three-letter code: HEM) (formula: $C_{34}H_{32}FeN_4O_4$).



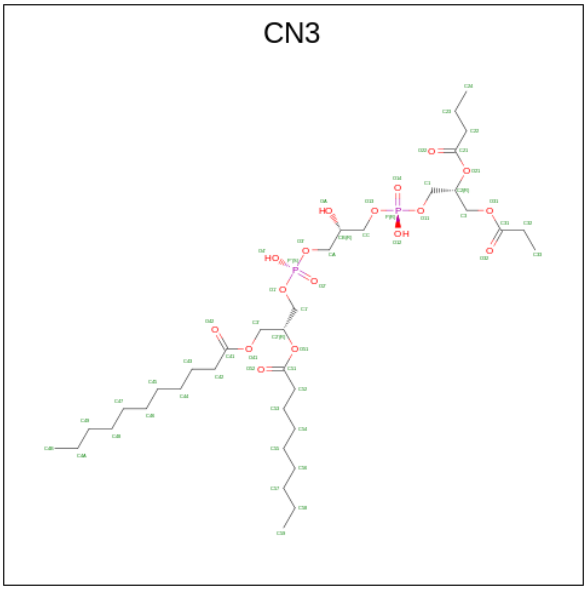
Mol	Chain	Residues	Atoms					AltConf
15	C	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
15	C	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
15	D	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
15	N	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
15	N	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
15	O	1	Total	C	Fe	N	O	0
			43	34	1	4	4	

- Molecule 16 is (5S,11R)-5,8,11-trihydroxy-5,11-dioxido-17-oxo-4,6,10,12,16-pentaoxa-5,11-diphosphaoctadec-1-yl pentadecanoate (three-letter code: CN5) (formula: $C_{26}H_{52}O_{13}P_2$).



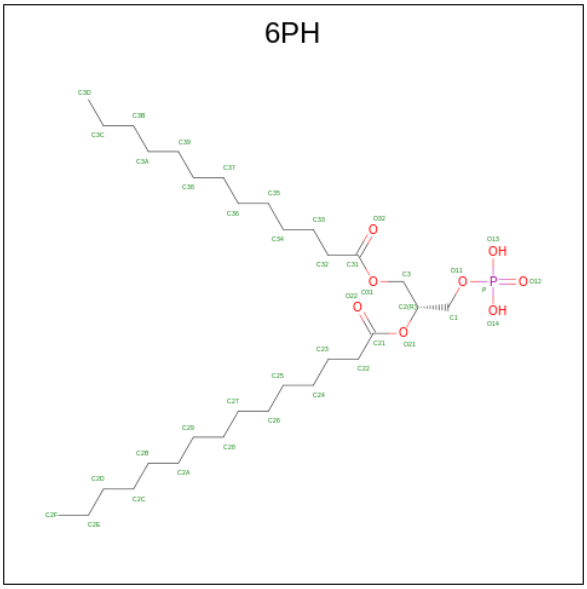
Mol	Chain	Residues	Atoms				AltConf
16	C	1	Total	C	O	P	0
			41	26	13	2	

- Molecule 17 is (2R,5S,11R,14R)-5,8,11-trihydroxy-2-(nonanoyloxy)-5,11-dioxido-16-oxo-14-[(propanoyloxy)methyl]-4,6,10,12,15-pentaoxa-5,11-diphosphanonadec-1-yl undecanoate (three-letter code: CN3) (formula: $C_{36}H_{68}O_{17}P_2$).



Mol	Chain	Residues	Atoms				AltConf
17	C	1	Total	C	O	P	0
			55	36	17	2	
17	N	1	Total	C	O	P	0
			55	36	17	2	

- Molecule 18 is (1R)-2-(phosphonooxy)-1-[(tridecanoyloxy)methyl]ethyl pentadecanoate (three-letter code: 6PH) (formula: $C_{31}H_{61}O_8P$).



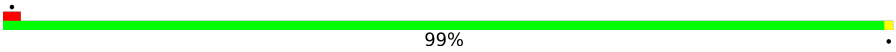
Mol	Chain	Residues	Atoms				AltConf
18	N	1	Total	C	O	P	0
			40	31	8	1	
18	O	1	Total	C	O	P	0
			40	31	8	1	

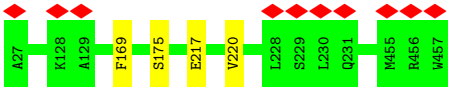
3 Residue-property plots (i)

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: COR1 isoform 1

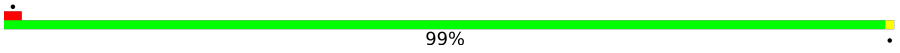
Chain A:

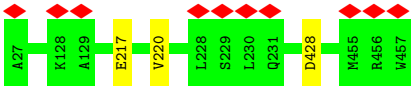




• Molecule 1: COR1 isoform 1

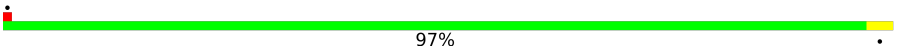
Chain L:

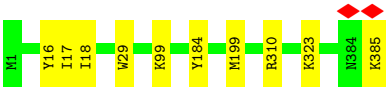




• Molecule 2: Cytochrome b

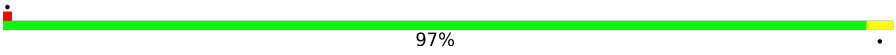
Chain C:





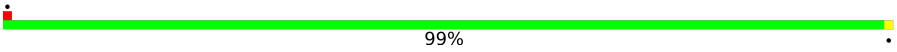
• Molecule 2: Cytochrome b

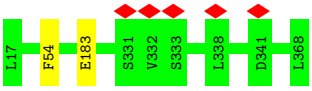
Chain N:



• Molecule 3: Cytochrome b-c1 complex subunit 2, mitochondrial

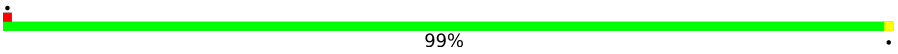
Chain B:

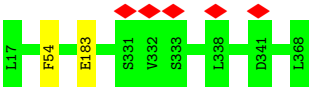




• Molecule 3: Cytochrome b-c1 complex subunit 2, mitochondrial

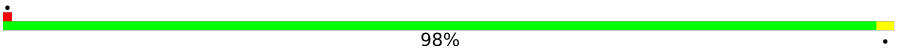
Chain M:

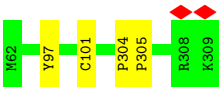




• Molecule 4: Cytochrome c1, heme protein, mitochondrial

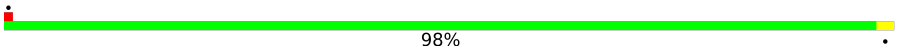
Chain D:

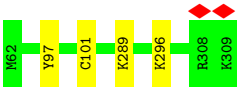




• Molecule 4: Cytochrome c1, heme protein, mitochondrial

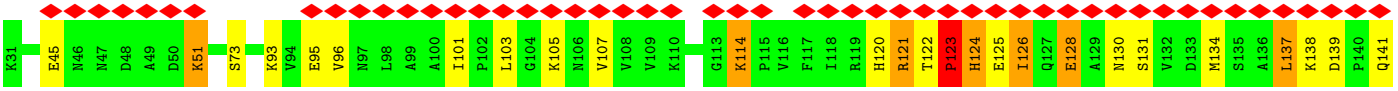
Chain O:

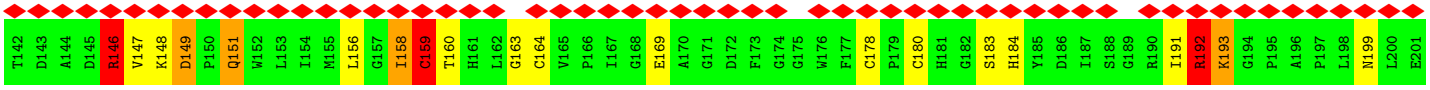


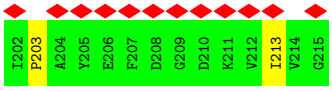


• Molecule 5: Cytochrome b-c1 complex subunit Rieske, mitochondrial

Chain E:

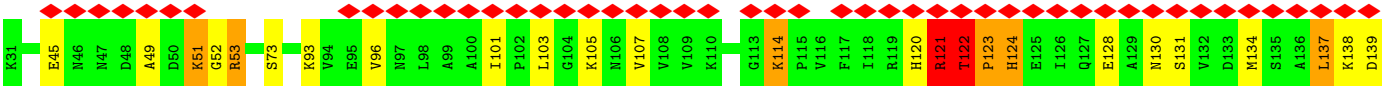


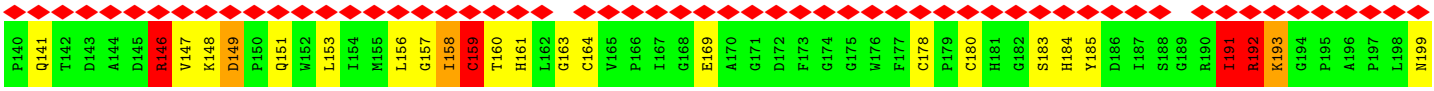


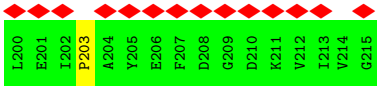


• Molecule 5: Cytochrome b-c1 complex subunit Rieske, mitochondrial

Chain P:

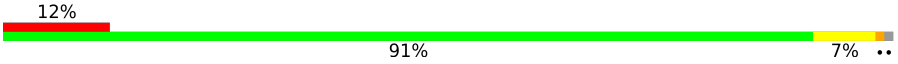


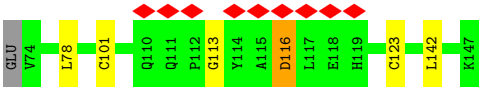




• Molecule 6: QCR6 isoform 1

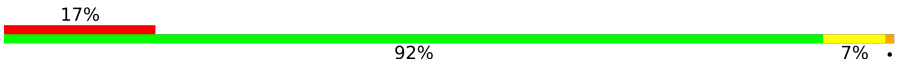
Chain F:

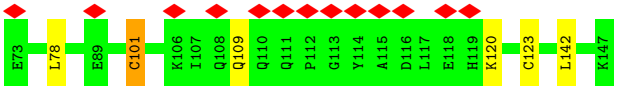




• Molecule 6: QCR6 isoform 1

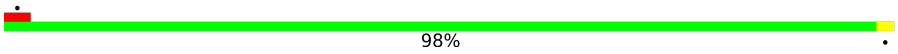
Chain Q:

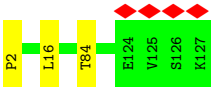




• Molecule 7: Cytochrome b-c1 complex subunit 7

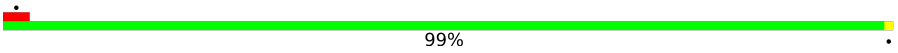
Chain G:

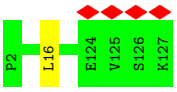




• Molecule 7: Cytochrome b-c1 complex subunit 7

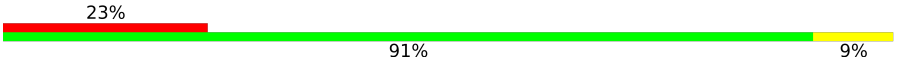
Chain R:

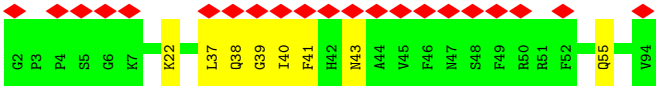




• Molecule 8: Cytochrome b-c1 complex subunit 8

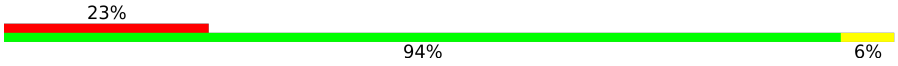
Chain H:

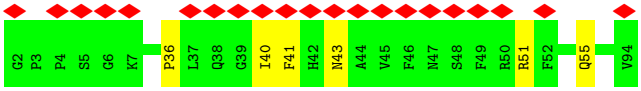




• Molecule 8: Cytochrome b-c1 complex subunit 8

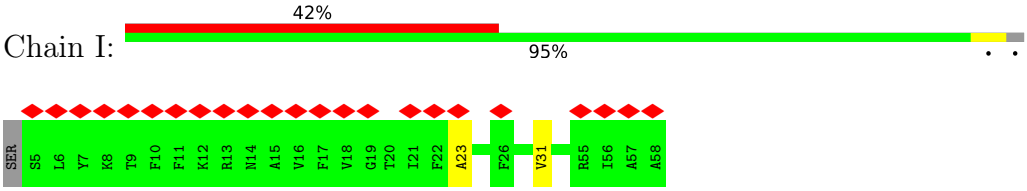
Chain S:





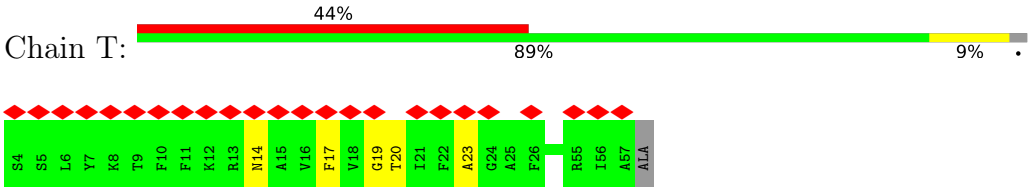
• Molecule 9: Cytochrome b-c1 complex subunit 9, mitochondrial

Chain I:



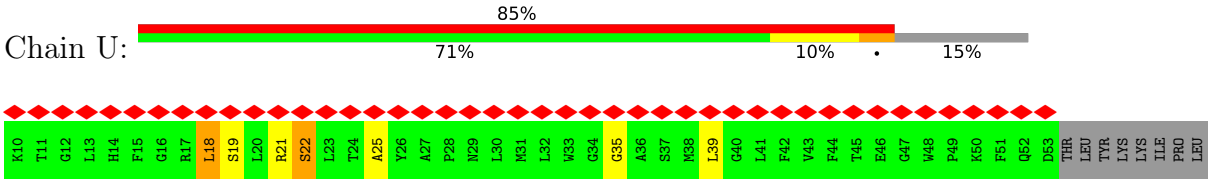
• Molecule 9: Cytochrome b-c1 complex subunit 9, mitochondrial

Chain T:



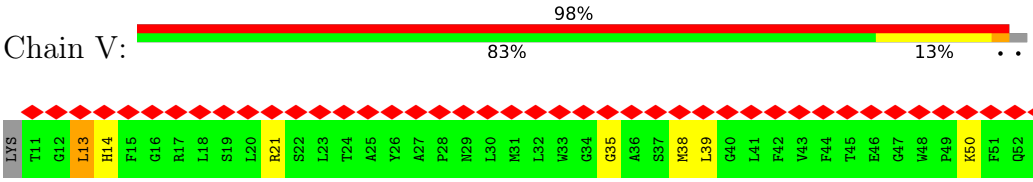
• Molecule 10: Cytochrome b-c1 complex subunit 10, mitochondrial

Chain U:



• Molecule 10: Cytochrome b-c1 complex subunit 10, mitochondrial

Chain V:



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	433970	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	48.80	Depositor
Minimum defocus (nm)	1400	Depositor
Maximum defocus (nm)	1800	Depositor
Magnification	130000	Depositor
Image detector	FEI FALCON IV (4k x 4k)	Depositor
Maximum map value	18.648	Depositor
Minimum map value	-9.340	Depositor
Average map value	-0.002	Depositor
Map value standard deviation	0.394	Depositor
Recommended contour level	1.2	Depositor
Map size (Å)	307.19998, 307.19998, 307.19998	wwPDB
Map dimensions	320, 320, 320	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.9599999, 0.9599999, 0.9599999	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: 9PE, 6PH, CN5, UQ6, CN3, 8PE, AZO, HEM

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	0.26	0/3405	0.49	0/4615
1	L	0.26	0/3405	0.49	0/4615
2	C	0.29	0/3192	0.49	0/4354
2	N	0.29	0/3192	0.50	0/4354
3	B	0.28	0/2781	0.51	0/3764
3	M	0.29	0/2781	0.51	0/3764
4	D	0.26	0/2022	0.45	0/2751
4	O	0.26	0/2022	0.45	0/2751
5	E	0.52	2/1444 (0.1%)	0.85	8/1957 (0.4%)
5	P	0.64	7/1444 (0.5%)	1.00	15/1957 (0.8%)
6	F	0.32	0/638	0.53	0/858
6	Q	0.31	0/647	0.53	0/870
7	G	0.37	1/1040 (0.1%)	0.48	0/1408
7	R	0.26	0/1040	0.47	0/1408
8	H	0.31	0/804	0.59	1/1088 (0.1%)
8	S	0.52	1/804 (0.1%)	0.52	0/1088
9	I	0.37	0/455	0.66	0/614
9	T	0.38	0/456	0.67	1/615 (0.2%)
10	U	0.53	0/358	0.92	1/483 (0.2%)
10	V	0.41	0/419	0.87	1/567 (0.2%)
All	All	0.34	11/32349 (0.0%)	0.56	27/43881 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
5	E	0	3
5	P	0	5
6	F	0	1

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Mol	Chain	#Chirality outliers	#Planarity outliers
All	All	0	9

All (11) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	S	36	PRO	C-N	11.38	1.60	1.34
7	G	84	THR	C-N	8.39	1.53	1.34
5	P	121	ARG	C-N	7.89	1.52	1.34
5	P	53	ARG	C-N	7.84	1.52	1.34
5	P	123	PRO	C-N	7.00	1.50	1.34
5	P	124	HIS	C-N	6.43	1.48	1.34
5	P	191	ILE	C-N	5.55	1.46	1.34
5	E	192	ARG	C-N	-5.37	1.21	1.34
5	P	45	GLU	CB-CG	5.19	1.62	1.52
5	E	45	GLU	CB-CG	5.14	1.61	1.52
5	P	52	GLY	C-N	5.02	1.45	1.34

All (27) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	P	122	THR	O-C-N	-13.18	96.06	121.10
5	P	122	THR	CA-C-N	9.09	142.54	117.10
5	P	157	GLY	O-C-N	-7.75	110.29	122.70
5	E	45	GLU	CA-CB-CG	7.53	129.97	113.40
5	P	45	GLU	CA-CB-CG	7.52	129.95	113.40
5	P	122	THR	C-N-CD	-7.40	104.32	120.60
10	V	13	LEU	CA-CB-CG	7.38	132.28	115.30
5	P	123	PRO	O-C-N	-7.18	111.22	122.70
5	P	123	PRO	CA-C-N	6.61	131.75	117.20
5	P	157	GLY	CA-C-N	6.58	131.68	117.20
8	H	37	LEU	O-C-N	6.27	132.73	122.70
5	P	123	PRO	C-N-CA	6.01	136.72	121.70
5	P	146	ARG	CB-CG-CD	5.88	126.88	111.60
5	P	124	HIS	C-N-CA	-5.88	107.01	121.70
5	E	146	ARG	CB-CG-CD	5.86	126.85	111.60
5	E	192	ARG	CA-CB-CG	5.60	125.72	113.40
5	P	192	ARG	CA-CB-CG	5.59	125.70	113.40
5	E	123	PRO	N-CA-CB	-5.51	96.53	102.60
5	P	114	LYS	CA-CB-CG	5.48	125.45	113.40
10	U	22	SER	O-C-N	-5.46	113.96	122.70
5	E	114	LYS	CA-CB-CG	5.46	125.40	113.40
9	T	19	GLY	O-C-N	-5.32	114.19	122.70

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	E	192	ARG	O-C-N	-5.28	114.25	122.70
5	E	146	ARG	CA-CB-CG	5.12	124.66	113.40
5	P	146	ARG	CA-CB-CG	5.11	124.64	113.40
5	P	149	ASP	CB-CG-OD1	5.08	122.87	118.30
5	E	149	ASP	CB-CG-OD1	5.05	122.84	118.30

There are no chirality outliers.

All (9) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
5	E	121	ARG	Sidechain
5	E	191	ILE	Peptide
5	E	192	ARG	Peptide
6	F	116	ASP	Peptide
5	P	121	ARG	Sidechain
5	P	122	THR	Mainchain
5	P	124	HIS	Mainchain
5	P	191	ILE	Peptide
5	P	192	ARG	Peptide

5.2 Too-close contacts (i)

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	3344	0	3323	2	0
1	L	3344	0	3323	2	0
2	C	3090	0	3129	10	0
2	N	3090	0	3129	9	0
3	B	2735	0	2774	0	0
3	M	2735	0	2774	0	0
4	D	1961	0	1890	3	0
4	O	1961	0	1890	3	0
5	E	1411	0	1389	20	0
5	P	1411	0	1390	29	0
6	F	624	0	583	3	0
6	Q	633	0	589	3	0
7	G	1019	0	1034	2	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
7	R	1019	0	1034	1	0
8	H	773	0	736	4	0
8	S	773	0	736	3	0
9	I	442	0	440	3	0
9	T	443	0	440	2	0
10	U	347	0	345	3	0
10	V	406	0	414	7	0
11	C	30	0	17	0	0
11	N	30	0	17	0	0
12	C	43	0	60	1	0
12	N	43	0	60	2	0
13	C	47	0	73	0	0
13	N	47	0	73	1	0
14	C	40	0	59	0	0
14	N	40	0	59	2	0
15	C	86	0	60	0	0
15	D	43	0	30	0	0
15	N	86	0	60	0	0
15	O	43	0	30	0	0
16	C	41	0	50	10	0
17	C	55	0	66	1	0
17	N	55	0	66	5	0
18	N	40	0	59	0	0
18	O	40	0	59	0	0
All	All	32370	0	32260	105	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 2.

All (105) 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)
5:E:178:CYS:SG	5:E:183:SER:HB2	1.85	1.15
5:P:178:CYS:SG	5:P:183:SER:HB2	1.85	1.15
9:I:23:ALA:HB2	10:V:39:LEU:HD22	1.26	1.12
5:P:178:CYS:SG	5:P:183:SER:CB	2.58	0.91
6:Q:101:CYS:HG	6:Q:123:CYS:HG	0.93	0.91
5:E:178:CYS:SG	5:E:183:SER:CB	2.58	0.90
5:E:164:CYS:SG	5:E:180:CYS:HB2	2.11	0.90
5:P:164:CYS:SG	5:P:180:CYS:HB2	2.11	0.89
5:P:159:CYS:HB2	5:P:163:GLY:CA	2.15	0.76

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:P:159:CYS:HB2	5:P:163:GLY:N	2.04	0.73
5:E:159:CYS:HB2	5:E:163:GLY:HA2	1.72	0.72
5:P:159:CYS:HB2	5:P:163:GLY:HA2	1.73	0.70
10:U:35:GLY:O	10:U:39:LEU:HD23	1.91	0.69
16:C:406:CN5:O4'	2:N:199:MET:HG2	1.92	0.68
6:F:113:GLY:HA2	6:F:116:ASP:HB2	1.77	0.67
5:P:122:THR:HG22	5:P:123:PRO:HD2	1.77	0.66
5:E:159:CYS:HB2	5:E:163:GLY:CA	2.26	0.66
5:P:137:LEU:HB2	5:P:192:ARG:HG3	1.78	0.65
16:C:406:CN5:H1'A	2:N:16:TYR:CZ	2.33	0.64
5:E:125:GLU:HA	5:E:128:GLU:HG2	1.80	0.63
2:C:199:MET:HG2	16:C:406:CN5:O12	1.98	0.63
2:N:201:LEU:HD21	12:N:408:UQ6:H3M3	1.81	0.62
1:L:428:ASP:OD2	5:P:53:ARG:HD2	1.99	0.62
6:F:101:CYS:HG	6:F:123:CYS:HG	0.65	0.62
9:I:23:ALA:HB2	10:V:39:LEU:CD2	2.18	0.61
17:N:403:CN3:H22	4:O:289:LYS:HG2	1.84	0.60
5:P:184:HIS:HB3	5:P:193:LYS:HE3	1.86	0.58
16:C:406:CN5:O2'	16:C:406:CN5:HC	2.03	0.58
5:E:184:HIS:HB3	5:E:193:LYS:HE3	1.86	0.57
17:N:403:CN3:HCA	8:S:51:ARG:HH12	1.69	0.57
5:E:123:PRO:HD3	5:E:151:GLN:HA	1.85	0.57
5:E:137:LEU:HB2	5:E:192:ARG:HG3	1.86	0.57
2:C:16:TYR:CE2	16:C:406:CN5:H2	2.40	0.56
2:C:16:TYR:CZ	16:C:406:CN5:H2	2.40	0.56
9:T:14:ASN:HA	9:T:17:PHE:HB3	1.88	0.55
5:P:159:CYS:HB2	5:P:163:GLY:H	1.71	0.54
2:C:29:TRP:HB3	2:C:99:LYS:HG3	1.90	0.54
2:N:29:TRP:HB3	2:N:99:LYS:HG3	1.90	0.54
8:H:39:GLY:O	8:H:40:ILE:C	2.44	0.53
5:P:49:ALA:HB1	5:P:53:ARG:HH22	1.75	0.52
5:P:156:LEU:HB2	5:P:203:PRO:HG3	1.92	0.52
5:E:156:LEU:HB2	5:E:203:PRO:HG3	1.92	0.52
6:Q:109:GLN:HE22	6:Q:120:LYS:HE2	1.75	0.52
5:E:146:ARG:HB3	5:E:147:VAL:HG23	1.93	0.50
5:E:124:HIS:O	5:E:126:ILE:HD13	2.11	0.50
5:P:146:ARG:HB3	5:P:147:VAL:HG23	1.93	0.50
10:V:13:LEU:HD11	10:V:21:ARG:HB2	1.92	0.50
2:N:385:LYS:HB2	7:R:16:LEU:HD13	1.93	0.49
5:P:49:ALA:HB1	5:P:53:ARG:NH2	2.28	0.49
2:C:17:ILE:HD12	16:C:406:CN5:H3AB	1.94	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:385:LYS:HB2	7:G:16:LEU:HD13	1.95	0.48
5:P:158:ILE:C	5:P:163:GLY:HA2	2.34	0.47
16:C:406:CN5:O2'	14:N:404:9PE:H2I	2.14	0.47
17:N:403:CN3:H23	4:O:296:LYS:HE3	1.96	0.47
5:P:159:CYS:O	5:P:161:HIS:N	2.48	0.46
6:Q:78:LEU:HD13	6:Q:142:LEU:HD22	1.97	0.46
2:C:18:ILE:HD11	16:C:406:CN5:H3F	1.97	0.46
5:P:159:CYS:C	5:P:161:HIS:H	2.19	0.46
12:N:408:UQ6:H72	12:N:408:UQ6:H111	1.79	0.46
2:N:27:ASN:HB2	17:N:403:CN3:HAA	1.98	0.46
5:E:147:VAL:HG12	5:E:149:ASP:H	1.81	0.46
10:U:18:LEU:H	10:U:18:LEU:HG	1.61	0.46
9:T:20:THR:HA	9:T:23:ALA:HB3	1.98	0.45
5:E:164:CYS:SG	5:E:178:CYS:HB2	2.56	0.45
6:F:78:LEU:HD13	6:F:142:LEU:HD22	1.97	0.45
5:P:164:CYS:SG	5:P:178:CYS:HB2	2.55	0.45
10:V:35:GLY:HA2	10:V:38:MET:HB2	1.99	0.45
2:C:17:ILE:HD13	16:C:406:CN5:H36A	1.99	0.45
2:N:8:VAL:H	14:N:404:9PE:H12A	1.82	0.45
5:P:147:VAL:HG12	5:P:149:ASP:H	1.81	0.45
5:E:158:ILE:O	5:E:159:CYS:HB2	2.18	0.44
5:P:159:CYS:CB	5:P:163:GLY:H	2.30	0.44
5:P:146:ARG:HA	5:P:146:ARG:HE	1.83	0.44
5:E:146:ARG:HA	5:E:146:ARG:HE	1.83	0.43
4:D:304:PRO:HA	4:D:305:PRO:HD3	1.87	0.43
2:N:323:LYS:HD3	8:S:55:GLN:HE22	1.84	0.43
5:P:121:ARG:HH22	5:P:153:LEU:HD13	1.84	0.43
2:N:157:VAL:HG12	10:V:50:LYS:HD2	2.01	0.42
2:C:323:LYS:HD3	8:H:55:GLN:HE22	1.84	0.42
5:P:159:CYS:C	5:P:161:HIS:N	2.71	0.42
17:N:403:CN3:H48	17:N:403:CN3:H45A	1.83	0.42
5:P:51:LYS:HD3	5:P:51:LYS:HA	1.72	0.42
5:P:191:ILE:HG22	5:P:192:ARG:H	1.85	0.42
10:V:13:LEU:HD23	10:V:14:HIS:H	1.84	0.42
13:N:407:8PE:H32A	13:N:407:8PE:H3A	1.71	0.42
5:E:51:LYS:HD3	5:E:51:LYS:HA	1.72	0.41
5:E:95:GLU:HG2	5:E:213:ILE:HG12	2.02	0.41
5:P:101:ILE:HG23	5:P:107:VAL:HG21	2.03	0.41
10:U:22:SER:HA	10:U:25:ALA:HB3	2.02	0.41
5:P:103:LEU:HB3	5:P:120:HIS:HD2	1.85	0.41
1:A:217:GLU:HA	1:A:220:VAL:HG22	2.03	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
12:C:402:UQ6:H301	12:C:402:UQ6:H322	1.77	0.41
17:C:407:CN3:H49A	17:C:407:CN3:H46A	1.80	0.41
8:H:40:ILE:HG23	8:H:41:PHE:CD1	2.56	0.41
1:L:217:GLU:HA	1:L:220:VAL:HG22	2.03	0.41
4:O:97:TYR:HA	4:O:101:CYS:SG	2.61	0.40
4:D:97:TYR:HA	4:D:101:CYS:SG	2.61	0.40
5:E:101:ILE:HG23	5:E:107:VAL:HG21	2.03	0.40
4:D:305:PRO:HB3	8:H:22:LYS:HE3	2.03	0.40
9:I:31:VAL:HG22	10:V:61:LEU:HG	2.02	0.40
5:P:183:SER:HB3	5:P:185:TYR:HE1	1.86	0.40
8:S:40:ILE:HG23	8:S:41:PHE:CD1	2.56	0.40
1:A:169:PHE:O	1:A:175:SER:HB3	2.22	0.40
2:C:310:ARG:HA	7:G:2:PRO:HB2	2.03	0.40
5:E:103:LEU:HB3	5:E:120:HIS:HD2	1.85	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 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	A	429/431 (100%)	417 (97%)	12 (3%)	0	100	100
1	L	429/431 (100%)	418 (97%)	11 (3%)	0	100	100
2	C	383/385 (100%)	377 (98%)	6 (2%)	0	100	100
2	N	383/385 (100%)	377 (98%)	6 (2%)	0	100	100
3	B	350/352 (99%)	342 (98%)	8 (2%)	0	100	100
3	M	350/352 (99%)	342 (98%)	8 (2%)	0	100	100
4	D	246/248 (99%)	243 (99%)	3 (1%)	0	100	100
4	O	246/248 (99%)	243 (99%)	3 (1%)	0	100	100
5	E	183/185 (99%)	152 (83%)	29 (16%)	2 (1%)	12	11

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
5	P	183/185 (99%)	151 (82%)	30 (16%)	2 (1%)	12 11
6	F	72/75 (96%)	67 (93%)	5 (7%)	0	100 100
6	Q	73/75 (97%)	71 (97%)	2 (3%)	0	100 100
7	G	124/126 (98%)	123 (99%)	1 (1%)	0	100 100
7	R	124/126 (98%)	123 (99%)	1 (1%)	0	100 100
8	H	91/93 (98%)	85 (93%)	6 (7%)	0	100 100
8	S	91/93 (98%)	85 (93%)	6 (7%)	0	100 100
9	I	52/55 (94%)	52 (100%)	0	0	100 100
9	T	52/55 (94%)	50 (96%)	2 (4%)	0	100 100
10	U	42/52 (81%)	36 (86%)	6 (14%)	0	100 100
10	V	49/52 (94%)	43 (88%)	6 (12%)	0	100 100
All	All	3952/4004 (99%)	3797 (96%)	151 (4%)	4 (0%)	50 59

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
5	E	123	PRO
5	P	159	CYS
5	E	159	CYS
5	P	160	THR

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	A	370/370 (100%)	370 (100%)	0	100 100
1	L	370/370 (100%)	370 (100%)	0	100 100
2	C	338/338 (100%)	337 (100%)	1 (0%)	91 95
2	N	338/338 (100%)	337 (100%)	1 (0%)	91 95
3	B	301/301 (100%)	299 (99%)	2 (1%)	81 89

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
3	M	301/301 (100%)	299 (99%)	2 (1%)	81 89
4	D	206/206 (100%)	206 (100%)	0	100 100
4	O	206/206 (100%)	206 (100%)	0	100 100
5	E	151/151 (100%)	122 (81%)	29 (19%)	1 1
5	P	151/151 (100%)	127 (84%)	24 (16%)	2 1
6	F	67/68 (98%)	67 (100%)	0	100 100
6	Q	68/68 (100%)	67 (98%)	1 (2%)	60 73
7	G	110/110 (100%)	110 (100%)	0	100 100
7	R	110/110 (100%)	110 (100%)	0	100 100
8	H	77/77 (100%)	75 (97%)	2 (3%)	41 52
8	S	77/77 (100%)	76 (99%)	1 (1%)	65 77
9	I	44/45 (98%)	44 (100%)	0	100 100
9	T	45/45 (100%)	45 (100%)	0	100 100
10	U	35/43 (81%)	32 (91%)	3 (9%)	8 8
10	V	42/43 (98%)	42 (100%)	0	100 100
All	All	3407/3418 (100%)	3341 (98%)	66 (2%)	52 65

All (66) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	C	184	TYR
3	B	54	PHE
3	B	183	GLU
2	N	184	TYR
5	E	51	LYS
5	E	73	SER
5	E	93	LYS
5	E	96	VAL
5	E	105	LYS
5	E	114	LYS
5	E	121	ARG
5	E	122	THR
5	E	123	PRO
5	E	124	HIS
5	E	126	ILE
5	E	128	GLU
5	E	130	ASN

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Mol	Chain	Res	Type
5	E	131	SER
5	E	134	MET
5	E	137	LEU
5	E	138	LYS
5	E	139	ASP
5	E	141	GLN
5	E	146	ARG
5	E	148	LYS
5	E	151	GLN
5	E	158	ILE
5	E	159	CYS
5	E	160	THR
5	E	169	GLU
5	E	192	ARG
5	E	193	LYS
5	E	199	ASN
8	H	38	GLN
8	H	43	ASN
3	M	54	PHE
3	M	183	GLU
5	P	51	LYS
5	P	73	SER
5	P	93	LYS
5	P	96	VAL
5	P	105	LYS
5	P	114	LYS
5	P	121	ARG
5	P	128	GLU
5	P	130	ASN
5	P	131	SER
5	P	134	MET
5	P	137	LEU
5	P	138	LYS
5	P	139	ASP
5	P	141	GLN
5	P	146	ARG
5	P	148	LYS
5	P	151	GLN
5	P	158	ILE
5	P	159	CYS
5	P	169	GLU
5	P	192	ARG

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Mol	Chain	Res	Type
5	P	193	LYS
5	P	199	ASN
6	Q	101	CYS
8	S	43	ASN
10	U	18	LEU
10	U	19	SER
10	U	21	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (22) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	61	ASN
1	A	102	GLN
1	A	307	GLN
1	A	350	GLN
2	C	22	GLN
2	C	332	ASN
3	B	52	ASN
3	B	55	ASN
4	D	170	GLN
2	N	22	GLN
2	N	332	ASN
7	G	53	ASN
7	G	79	HIS
1	L	61	ASN
1	L	102	GLN
1	L	307	GLN
3	M	52	ASN
3	M	55	ASN
4	O	170	GLN
7	R	53	ASN
7	R	79	HIS
8	S	38	GLN

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 oligosaccharides in this entry.

5.6 Ligand geometry (i)

19 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	$\#\|Z\| > 2$
14	9PE	N	404	-	39,39,39	0.95	3 (7%)	42,44,44	1.09	2 (4%)
18	6PH	N	402	-	39,39,39	0.94	4 (10%)	43,44,44	1.15	2 (4%)
16	CN5	C	406	-	40,40,40	0.44	0	44,48,48	0.58	0
11	AZO	N	401	-	32,32,32	0.79	1 (3%)	42,42,42	1.65	4 (9%)
14	9PE	C	404	-	39,39,39	0.96	3 (7%)	42,44,44	1.07	3 (7%)
13	8PE	N	407	-	46,46,46	0.90	4 (8%)	49,51,51	1.15	2 (4%)
13	8PE	C	403	-	46,46,46	0.89	4 (8%)	49,51,51	1.11	2 (4%)
18	6PH	O	401	-	39,39,39	0.93	4 (10%)	43,44,44	1.18	2 (4%)
17	CN3	C	407	-	54,54,54	1.16	8 (14%)	60,66,66	1.13	4 (6%)
12	UQ6	N	408	-	43,43,43	1.58	9 (20%)	51,55,55	1.63	13 (25%)
15	HEM	C	405	2	41,50,50	1.46	5 (12%)	45,82,82	1.73	10 (22%)
12	UQ6	C	402	-	43,43,43	1.72	9 (20%)	51,55,55	2.04	14 (27%)
15	HEM	N	405	2	41,50,50	1.46	6 (14%)	45,82,82	1.71	9 (20%)
15	HEM	C	408	2	41,50,50	1.51	6 (14%)	45,82,82	1.64	10 (22%)
15	HEM	O	402	4	41,50,50	1.43	3 (7%)	45,82,82	1.45	8 (17%)
11	AZO	C	401	-	32,32,32	0.79	1 (3%)	42,42,42	1.65	4 (9%)
15	HEM	D	401	4	41,50,50	1.43	4 (9%)	45,82,82	1.45	8 (17%)
15	HEM	N	406	2	41,50,50	1.51	6 (14%)	45,82,82	1.61	9 (20%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
17	CN3	N	403	-	54,54,54	1.16	8 (14%)	60,66,66	1.37	6 (10%)

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
14	9PE	N	404	-	-	22/43/43/43	-
18	6PH	N	402	-	-	20/41/41/41	-
16	CN5	C	406	-	-	25/44/44/44	-
11	AZO	N	401	-	-	5/23/23/23	0/3/3/3
14	9PE	C	404	-	-	19/43/43/43	-
13	8PE	N	407	-	-	17/50/50/50	-
13	8PE	C	403	-	-	23/50/50/50	-
18	6PH	O	401	-	-	16/41/41/41	-
17	CN3	C	407	-	-	30/65/65/65	-
12	UQ6	N	408	-	-	9/39/39/39	0/1/1/1
15	HEM	C	405	2	-	5/12/54/54	-
12	UQ6	C	402	-	-	13/39/39/39	0/1/1/1
15	HEM	N	405	2	-	5/12/54/54	-
15	HEM	C	408	2	-	4/12/54/54	-
15	HEM	O	402	4	-	2/12/54/54	-
11	AZO	C	401	-	-	5/23/23/23	0/3/3/3
15	HEM	D	401	4	-	2/12/54/54	-
15	HEM	N	406	2	-	4/12/54/54	-
17	CN3	N	403	-	-	33/65/65/65	-

All (88) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
12	C	402	UQ6	C7-C6	5.58	1.57	1.51
12	N	408	UQ6	C7-C6	4.35	1.56	1.51
15	C	408	HEM	C3C-CAC	4.09	1.56	1.47
15	N	406	HEM	C3C-CAC	4.05	1.56	1.47
15	O	402	HEM	C3C-CAC	4.04	1.56	1.47
15	D	401	HEM	C3C-CAC	4.00	1.56	1.47
15	C	405	HEM	C3C-CAC	3.82	1.55	1.47

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
15	N	405	HEM	C3C-CAC	3.82	1.55	1.47
15	C	405	HEM	C3C-C2C	-3.39	1.35	1.40
15	D	401	HEM	C3C-C2C	-3.38	1.35	1.40
15	O	402	HEM	C3C-C2C	-3.38	1.35	1.40
15	N	405	HEM	C3C-C2C	-3.37	1.35	1.40
15	C	408	HEM	C3C-C2C	-3.33	1.35	1.40
15	N	406	HEM	C3C-C2C	-3.32	1.35	1.40
15	N	406	HEM	CAB-C3B	3.19	1.56	1.47
15	C	408	HEM	CAB-C3B	3.17	1.56	1.47
15	C	405	HEM	CAB-C3B	3.07	1.55	1.47
15	N	405	HEM	CAB-C3B	3.03	1.55	1.47
15	D	401	HEM	CAB-C3B	3.00	1.55	1.47
15	O	402	HEM	CAB-C3B	2.95	1.55	1.47
11	C	401	AZO	O5-C22	-2.90	1.38	1.43
11	N	401	AZO	O5-C22	-2.90	1.38	1.43
12	C	402	UQ6	O3-C3	2.80	1.43	1.38
12	N	408	UQ6	C26-C24	2.73	1.57	1.51
12	N	408	UQ6	O3-C3	2.67	1.43	1.38
12	C	402	UQ6	C26-C24	2.62	1.56	1.51
13	N	407	8PE	O21-C2	-2.62	1.40	1.46
17	C	407	CN3	O51-C2'	-2.60	1.40	1.46
14	C	404	9PE	O21-C21	2.58	1.41	1.34
18	N	402	6PH	O21-C2	-2.57	1.40	1.46
17	C	407	CN3	O21-C2	-2.55	1.40	1.46
17	N	403	CN3	O21-C21	2.52	1.41	1.34
15	N	406	HEM	FE-ND	2.52	2.09	1.96
14	N	404	9PE	O21-C21	2.52	1.41	1.34
15	C	408	HEM	FE-ND	2.51	2.09	1.96
17	N	403	CN3	O51-C2'	-2.50	1.40	1.46
13	C	403	8PE	O21-C2	-2.50	1.40	1.46
17	N	403	CN3	O41-C3'	-2.49	1.39	1.45
18	N	402	6PH	O31-C31	2.49	1.40	1.33
18	O	401	6PH	O31-C31	2.43	1.40	1.33
15	C	408	HEM	CAA-C2A	2.42	1.55	1.52
13	N	407	8PE	O31-C31	2.39	1.40	1.33
18	O	401	6PH	O21-C2	-2.39	1.40	1.46
14	C	404	9PE	O31-C31	2.38	1.40	1.33
12	C	402	UQ6	C11-C9	2.38	1.56	1.51
12	N	408	UQ6	C11-C9	2.37	1.56	1.51
13	C	403	8PE	O31-C3	-2.35	1.39	1.45
12	C	402	UQ6	C13-C14	2.34	1.38	1.33
12	C	402	UQ6	C21-C19	2.33	1.56	1.51

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
12	C	402	UQ6	C16-C14	2.31	1.56	1.51
17	C	407	CN3	O41-C41	2.30	1.40	1.33
17	C	407	CN3	O41-C3'	-2.29	1.39	1.45
17	C	407	CN3	O31-C31	2.29	1.40	1.33
14	N	404	9PE	O31-C31	2.29	1.40	1.33
17	N	403	CN3	O31-C31	2.27	1.40	1.33
17	N	403	CN3	O41-C41	2.26	1.39	1.33
13	C	403	8PE	O31-C31	2.26	1.39	1.33
17	C	407	CN3	O31-C3	-2.25	1.40	1.45
15	C	405	HEM	CMB-C2B	2.25	1.55	1.50
15	N	405	HEM	CMB-C2B	2.25	1.55	1.50
17	N	403	CN3	O21-C2	-2.24	1.41	1.46
17	C	407	CN3	O51-C51	2.23	1.40	1.34
18	N	402	6PH	O31-C3	-2.23	1.40	1.45
13	N	407	8PE	O31-C3	-2.22	1.40	1.45
15	N	406	HEM	CAA-C2A	2.20	1.55	1.52
17	N	403	CN3	O51-C51	2.19	1.40	1.34
12	N	408	UQ6	C21-C19	2.19	1.55	1.51
15	N	406	HEM	CMB-C2B	2.17	1.55	1.50
18	O	401	6PH	O31-C3	-2.16	1.40	1.45
15	C	408	HEM	CMB-C2B	2.16	1.55	1.50
14	N	404	9PE	O31-C3	-2.15	1.40	1.45
13	N	407	8PE	O21-C21	2.12	1.40	1.34
18	O	401	6PH	O21-C21	2.12	1.40	1.34
18	N	402	6PH	O21-C21	2.11	1.40	1.34
12	N	408	UQ6	C13-C14	2.10	1.38	1.33
12	C	402	UQ6	C12-C13	2.10	1.57	1.50
15	C	405	HEM	FE-NB	2.10	2.07	1.96
15	N	405	HEM	FE-NB	2.09	2.07	1.96
17	N	403	CN3	O31-C3	-2.07	1.40	1.45
12	C	402	UQ6	C7-C8	2.07	1.55	1.50
17	C	407	CN3	O21-C21	2.07	1.40	1.34
13	C	403	8PE	O21-C21	2.07	1.40	1.34
12	N	408	UQ6	C16-C14	2.05	1.55	1.51
12	N	408	UQ6	C12-C13	2.05	1.57	1.50
12	N	408	UQ6	O4-C4	2.05	1.42	1.38
15	D	401	HEM	CMB-C2B	2.03	1.55	1.50
14	C	404	9PE	O31-C3	-2.01	1.40	1.45
15	N	405	HEM	CMD-C2D	2.00	1.55	1.50

All (112) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
12	C	402	UQ6	C6-C7-C8	7.03	123.30	112.17
11	N	401	AZO	C12-O2-C10	6.94	133.19	118.47
11	C	401	AZO	C12-O2-C10	6.93	133.16	118.47
11	C	401	AZO	C7-O1-C8	5.50	130.13	118.47
11	N	401	AZO	C7-O1-C8	5.50	130.13	118.47
12	C	402	UQ6	C7-C6-C5	5.06	127.48	120.82
15	N	405	HEM	CBA-CAA-C2A	-4.91	104.24	112.62
15	C	405	HEM	CBA-CAA-C2A	-4.91	104.25	112.62
17	N	403	CN3	O51-C51-C52	4.68	121.58	111.50
17	N	403	CN3	O21-C21-C22	4.45	121.09	111.50
12	C	402	UQ6	C7-C8-C9	-4.34	120.51	127.24
13	C	403	8PE	O21-C21-C22	3.91	119.94	111.50
15	C	408	HEM	C4D-ND-C1D	3.87	109.07	105.07
12	N	408	UQ6	C10-C9-C11	3.87	121.78	115.27
18	O	401	6PH	O21-C21-C22	3.81	119.71	111.50
15	N	406	HEM	C4D-ND-C1D	3.79	108.99	105.07
17	C	407	CN3	O21-C21-C22	3.78	119.65	111.50
13	N	407	8PE	O21-C21-C22	3.76	119.60	111.50
18	N	402	6PH	O21-C21-C22	3.64	119.35	111.50
15	C	405	HEM	C4D-ND-C1D	3.61	108.80	105.07
15	N	405	HEM	C4D-ND-C1D	3.57	108.76	105.07
17	N	403	CN3	O31-C31-C32	3.52	120.62	111.38
15	N	406	HEM	C1B-NB-C4B	3.48	108.67	105.07
15	C	408	HEM	C1B-NB-C4B	3.47	108.65	105.07
17	C	407	CN3	O51-C51-C52	3.35	118.73	111.50
15	D	401	HEM	CMC-C2C-C3C	3.30	130.85	124.68
15	O	402	HEM	CMC-C2C-C3C	3.29	130.84	124.68
15	C	408	HEM	C4C-CHD-C1D	3.27	126.87	122.56
17	C	407	CN3	O31-C31-C32	3.26	119.92	111.38
14	N	404	9PE	O21-C21-C22	3.22	118.43	111.50
15	N	406	HEM	C4B-CHC-C1C	3.21	126.80	122.56
15	N	406	HEM	C4C-CHD-C1D	3.21	126.80	122.56
12	C	402	UQ6	C2-C1-C6	3.15	122.17	118.75
15	C	408	HEM	C4B-CHC-C1C	3.11	126.66	122.56
13	N	407	8PE	O31-C31-C32	3.07	121.54	111.91
12	C	402	UQ6	C20-C19-C21	3.05	120.40	115.27
12	N	408	UQ6	C25-C24-C26	3.05	120.40	115.27
15	C	405	HEM	CMC-C2C-C3C	3.05	130.38	124.68
15	N	405	HEM	CMC-C2C-C3C	3.05	130.38	124.68
12	C	402	UQ6	C30-C29-C31	3.01	120.33	115.27
15	N	405	HEM	C4B-CHC-C1C	2.99	126.51	122.56
15	N	405	HEM	C4C-CHD-C1D	2.99	126.50	122.56
15	C	405	HEM	C4C-CHD-C1D	2.97	126.48	122.56

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
15	C	405	HEM	C4B-CHC-C1C	2.96	126.46	122.56
18	O	401	6PH	O31-C31-C32	2.96	121.18	111.91
12	N	408	UQ6	C12-C13-C14	-2.92	120.62	127.66
12	C	402	UQ6	C27-C28-C29	-2.92	120.63	127.66
14	C	404	9PE	O21-C21-C22	2.85	117.64	111.50
15	N	405	HEM	C1B-NB-C4B	2.84	108.01	105.07
11	C	401	AZO	C11-N3-C10	2.83	116.61	114.48
15	C	405	HEM	C1B-NB-C4B	2.81	107.97	105.07
15	N	406	HEM	CMC-C2C-C3C	2.80	129.92	124.68
12	N	408	UQ6	C20-C19-C21	2.80	119.97	115.27
15	C	408	HEM	CMC-C2C-C3C	2.79	129.90	124.68
12	C	402	UQ6	C22-C23-C24	-2.78	120.97	127.66
15	O	402	HEM	C4B-CHC-C1C	2.78	126.22	122.56
15	D	401	HEM	C4B-CHC-C1C	2.78	126.22	122.56
12	N	408	UQ6	C15-C14-C16	2.78	119.94	115.27
11	N	401	AZO	C11-N3-C10	2.75	116.55	114.48
12	C	402	UQ6	C15-C14-C16	2.74	119.88	115.27
15	D	401	HEM	C4D-ND-C1D	2.73	107.89	105.07
15	O	402	HEM	C4D-ND-C1D	2.73	107.89	105.07
12	N	408	UQ6	C17-C18-C19	-2.71	121.14	127.66
13	C	403	8PE	O31-C31-C32	2.70	120.39	111.91
15	N	405	HEM	C3D-C4D-ND	-2.69	107.17	110.17
12	N	408	UQ6	C27-C28-C29	-2.67	121.22	127.66
15	C	405	HEM	C3D-C4D-ND	-2.66	107.20	110.17
15	C	408	HEM	C3D-C4D-ND	-2.64	107.22	110.17
12	C	402	UQ6	C1M-C1-C2	-2.63	116.04	120.50
15	C	408	HEM	CMA-C3A-C4A	-2.61	124.45	128.46
14	C	404	9PE	O31-C31-C32	2.61	120.09	111.91
12	N	408	UQ6	C30-C29-C31	2.60	119.65	115.27
17	C	407	CN3	O41-C41-C42	2.59	120.03	111.91
14	N	404	9PE	O31-C31-C32	2.58	120.00	111.91
15	O	402	HEM	C1B-NB-C4B	2.58	107.73	105.07
12	N	408	UQ6	C7-C8-C9	-2.56	123.27	127.24
15	N	406	HEM	C3D-C4D-ND	-2.56	107.31	110.17
15	D	401	HEM	C1B-NB-C4B	2.56	107.72	105.07
12	C	402	UQ6	C25-C24-C26	2.48	119.45	115.27
18	N	402	6PH	O31-C31-C32	2.47	119.65	111.91
12	N	408	UQ6	C10-C9-C8	-2.46	117.37	123.68
14	C	404	9PE	C2-O21-C21	2.45	123.83	117.79
17	N	403	CN3	O41-C41-C42	2.44	119.57	111.91
12	C	402	UQ6	C12-C13-C14	-2.42	121.84	127.66
15	O	402	HEM	C4C-CHD-C1D	2.37	125.69	122.56

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
15	N	406	HEM	CMA-C3A-C4A	-2.36	124.84	128.46
12	C	402	UQ6	C17-C18-C19	-2.34	122.02	127.66
15	C	408	HEM	C2D-C1D-ND	-2.33	107.08	109.88
15	N	406	HEM	C2D-C1D-ND	-2.32	107.10	109.88
17	N	403	CN3	CC-CB-CA	-2.31	105.98	112.79
15	D	401	HEM	C4C-CHD-C1D	2.31	125.60	122.56
12	N	408	UQ6	C22-C23-C24	-2.28	122.17	127.66
15	C	405	HEM	CMA-C3A-C4A	-2.25	125.01	128.46
12	N	408	UQ6	C1M-C1-C2	-2.25	116.69	120.50
15	N	405	HEM	CMA-C3A-C4A	-2.22	125.06	128.46
15	N	406	HEM	CMB-C2B-C1B	-2.16	121.75	125.04
15	D	401	HEM	C3D-C4D-ND	-2.15	107.77	110.17
15	D	401	HEM	CAA-CBA-CGA	-2.13	107.79	113.76
15	O	402	HEM	CAA-CBA-CGA	-2.12	107.81	113.76
15	D	401	HEM	CMB-C2B-C1B	-2.10	121.83	125.04
15	C	408	HEM	CMB-C2B-C1B	-2.10	121.83	125.04
15	O	402	HEM	C3D-C4D-ND	-2.10	107.83	110.17
15	C	408	HEM	C4A-C3A-C2A	2.08	108.44	107.00
12	C	402	UQ6	C36-C34-C35	2.07	119.18	114.60
17	N	403	CN3	O51-C51-O52	-2.06	118.71	123.70
15	O	402	HEM	CMB-C2B-C1B	-2.06	121.90	125.04
15	N	405	HEM	C4A-C3A-C2A	2.03	108.41	107.00
11	C	401	AZO	C11-N2-C8	2.03	116.01	114.48
15	C	405	HEM	C4A-C3A-C2A	2.03	108.41	107.00
11	N	401	AZO	O4-C19-C18	2.02	114.98	112.01
15	C	405	HEM	C2D-C1D-ND	-2.01	107.47	109.88
12	N	408	UQ6	C25-C24-C23	-2.01	118.53	123.68

There are no chirality outliers.

All (259) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
11	C	401	AZO	N1-C1-C2-C7
11	C	401	AZO	C17-C18-C21-O5
11	C	401	AZO	C19-C18-C21-O5
11	N	401	AZO	N1-C1-C2-C7
11	N	401	AZO	C17-C18-C21-O5
11	N	401	AZO	C19-C18-C21-O5
12	C	402	UQ6	C1-C6-C7-C8
12	C	402	UQ6	C5-C6-C7-C8
12	C	402	UQ6	C20-C19-C21-C22
12	C	402	UQ6	C28-C29-C31-C32

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Mol	Chain	Res	Type	Atoms
12	C	402	UQ6	C30-C29-C31-C32
12	C	402	UQ6	C29-C31-C32-C33
12	N	408	UQ6	C14-C16-C17-C18
12	N	408	UQ6	C19-C21-C22-C23
12	N	408	UQ6	C24-C26-C27-C28
12	N	408	UQ6	C29-C31-C32-C33
13	C	403	8PE	C11-O13-P-O12
13	C	403	8PE	C11-O13-P-O14
13	C	403	8PE	O11-C1-C2-O21
13	C	403	8PE	C22-C21-O21-C2
13	N	407	8PE	C1-O11-P-O13
13	N	407	8PE	O32-C31-O31-C3
13	N	407	8PE	C32-C31-O31-C3
14	C	404	9PE	C1-O11-P-O12
14	C	404	9PE	C1-O11-P-O14
14	N	404	9PE	C1-O11-P-O12
14	N	404	9PE	C1-O11-P-O13
14	N	404	9PE	C11-O13-P-O11
14	N	404	9PE	C11-O13-P-O12
16	C	406	CN5	CB-CC-O13-P
17	C	407	CN3	CC-O13-P-O12
17	C	407	CN3	CC-O13-P-O14
17	C	407	CN3	CA-O3'-P'-O2'
17	C	407	CN3	CA-O3'-P'-O4'
17	N	403	CN3	O22-C21-O21-C2
17	N	403	CN3	O52-C51-O51-C2'
17	N	403	CN3	C52-C51-O51-C2'
17	C	407	CN3	O42-C41-O41-C3'
18	O	401	6PH	O32-C31-O31-C3
13	C	403	8PE	O22-C21-O21-C2
17	C	407	CN3	C42-C41-O41-C3'
17	N	403	CN3	C22-C21-O21-C2
14	C	404	9PE	C32-C31-O31-C3
18	O	401	6PH	C32-C31-O31-C3
14	N	404	9PE	O32-C31-O31-C3
16	C	406	CN5	O32-C31-O31-C3
17	N	403	CN3	O3'-CA-CB-OA
13	C	403	8PE	C32-C31-O31-C3
16	C	406	CN5	C3B-C3C-C3D-C3E
14	N	404	9PE	C32-C31-O31-C3
16	C	406	CN5	C32-C31-O31-C3
16	C	406	CN5	C39-C3A-C3B-C3C

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Mol	Chain	Res	Type	Atoms
12	C	402	UQ6	C15-C14-C16-C17
12	C	402	UQ6	C13-C14-C16-C17
12	C	402	UQ6	C18-C19-C21-C22
13	C	403	8PE	O32-C31-O31-C3
14	C	404	9PE	O32-C31-O31-C3
12	C	402	UQ6	C9-C11-C12-C13
12	C	402	UQ6	C19-C21-C22-C23
16	C	406	CN5	O42-C41-O41-C3'
16	C	406	CN5	O11-C1-C2-C3
17	N	403	CN3	C32-C31-O31-C3
13	N	407	8PE	C31-C32-C33-C34
17	C	407	CN3	C51-C52-C53-C54
17	N	403	CN3	C51-C52-C53-C54
16	C	406	CN5	C42-C41-O41-C3'
17	N	403	CN3	O32-C31-O31-C3
13	C	403	8PE	C11-O13-P-O11
14	C	404	9PE	C1-O11-P-O13
16	C	406	CN5	CC-O13-P-O11
16	C	406	CN5	C1'-O1'-P'-O3'
17	C	407	CN3	CC-O13-P-O11
17	C	407	CN3	C1'-O1'-P'-O3'
17	C	407	CN3	CA-O3'-P'-O1'
17	N	403	CN3	C1'-O1'-P'-O3'
18	N	402	6PH	C21-C22-C23-C24
17	N	403	CN3	O3'-CA-CB-CC
13	C	403	8PE	C32-C33-C34-C35
18	O	401	6PH	C26-C27-C28-C29
16	C	406	CN5	C34-C35-C36-C37
13	N	407	8PE	C33-C34-C35-C36
13	N	407	8PE	C36-C37-C38-C39
14	C	404	9PE	C32-C33-C34-C35
14	N	404	9PE	C26-C27-C28-C29
16	C	406	CN5	O3'-CA-CB-OA
14	N	404	9PE	C2E-C2F-C2G-C2H
18	N	402	6PH	C25-C26-C27-C28
13	C	403	8PE	C21-C22-C23-C24
14	C	404	9PE	C21-C22-C23-C24
13	C	403	8PE	C39-C3A-C3B-C3C
18	O	401	6PH	C27-C28-C29-C2A
18	O	401	6PH	C31-C32-C33-C34
18	N	402	6PH	C27-C28-C29-C2A
13	C	403	8PE	C3A-C3B-C3C-C3D

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Mol	Chain	Res	Type	Atoms
14	C	404	9PE	C23-C24-C25-C26
14	C	404	9PE	C29-C2A-C2B-C2C
17	C	407	CN3	C45-C46-C47-C48
16	C	406	CN5	C36-C37-C38-C39
18	N	402	6PH	C38-C39-C3A-C3B
16	C	406	CN5	O1'-C1'-C2'-C3'
13	N	407	8PE	C3C-C3D-C3E-C3F
14	C	404	9PE	C2B-C2C-C2D-C2E
14	N	404	9PE	C27-C28-C29-C2A
17	N	403	CN3	C52-C53-C54-C55
18	N	402	6PH	C22-C21-O21-C2
13	N	407	8PE	C39-C3A-C3B-C3C
18	N	402	6PH	O22-C21-O21-C2
17	C	407	CN3	C54-C55-C56-C57
17	C	407	CN3	C22-C21-O21-C2
13	N	407	8PE	C22-C23-C24-C25
18	O	401	6PH	O22-C21-O21-C2
17	N	403	CN3	C41-C42-C43-C44
18	N	402	6PH	C32-C33-C34-C35
14	C	404	9PE	C31-C32-C33-C34
18	N	402	6PH	C26-C27-C28-C29
12	N	408	UQ6	C9-C11-C12-C13
17	C	407	CN3	C41-C42-C43-C44
18	N	402	6PH	C31-C32-C33-C34
14	N	404	9PE	C22-C21-O21-C2
18	O	401	6PH	C22-C21-O21-C2
14	N	404	9PE	O22-C21-O21-C2
14	N	404	9PE	C22-C23-C24-C25
18	N	402	6PH	C39-C3A-C3B-C3C
17	C	407	CN3	O22-C21-O21-C2
13	C	403	8PE	O11-C1-C2-C3
18	O	401	6PH	O11-C1-C2-C3
17	C	407	CN3	C1'-C2'-C3'-O41
17	N	403	CN3	C1'-C2'-C3'-O41
13	C	403	8PE	C36-C37-C38-C39
18	N	402	6PH	C36-C37-C38-C39
17	C	407	CN3	C48-C49-C4A-C4B
18	O	401	6PH	C3A-C3B-C3C-C3D
18	N	402	6PH	C32-C31-O31-C3
14	N	404	9PE	O11-C1-C2-O21
17	N	403	CN3	O1'-C1'-C2'-O51
18	O	401	6PH	C39-C3A-C3B-C3C

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Mol	Chain	Res	Type	Atoms
17	N	403	CN3	O51-C2'-C3'-O41
17	N	403	CN3	C54-C55-C56-C57
18	O	401	6PH	C28-C29-C2A-C2B
17	N	403	CN3	O1'-C1'-C2'-C3'
13	C	403	8PE	O13-C11-C12-N
16	C	406	CN5	C35-C36-C37-C38
14	C	404	9PE	C25-C26-C27-C28
17	N	403	CN3	C46-C47-C48-C49
13	N	407	8PE	C35-C36-C37-C38
17	C	407	CN3	C55-C56-C57-C58
14	N	404	9PE	C1-C2-C3-O31
18	N	402	6PH	C2A-C2B-C2C-C2D
12	N	408	UQ6	C20-C19-C21-C22
17	N	403	CN3	C21-C22-C23-C24
18	N	402	6PH	O32-C31-O31-C3
14	C	404	9PE	C2-C1-O11-P
14	N	404	9PE	C2-C1-O11-P
17	N	403	CN3	C2-C1-O11-P
13	N	407	8PE	C22-C21-O21-C2
16	C	406	CN5	C3A-C3B-C3C-C3D
18	N	402	6PH	C2C-C2D-C2E-C2F
18	O	401	6PH	C2A-C2B-C2C-C2D
13	C	403	8PE	C23-C24-C25-C26
18	O	401	6PH	O11-C1-C2-O21
16	C	406	CN5	C1'-C2'-C3'-O41
17	C	407	CN3	CA-CB-CC-O13
17	C	407	CN3	C46-C47-C48-C49
14	N	404	9PE	O21-C2-C3-O31
17	N	403	CN3	C44-C45-C46-C47
13	N	407	8PE	O22-C21-O21-C2
14	C	404	9PE	O22-C21-O21-C2
18	N	402	6PH	C24-C25-C26-C27
18	N	402	6PH	O31-C31-C32-C33
18	N	402	6PH	C35-C36-C37-C38
13	C	403	8PE	C3C-C3D-C3E-C3F
13	C	403	8PE	C37-C38-C39-C3A
17	C	407	CN3	C42-C43-C44-C45
12	C	402	UQ6	C25-C24-C26-C27
16	C	406	CN5	CB-CA-O3'-P'
16	C	406	CN5	CC-O13-P-O12
16	C	406	CN5	C1'-O1'-P'-O2'
17	C	407	CN3	C1'-O1'-P'-O4'

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Mol	Chain	Res	Type	Atoms
17	N	403	CN3	C1'-O1'-P'-O2'
17	N	403	CN3	C1'-O1'-P'-O4'
15	C	405	HEM	C3D-CAD-CBD-CGD
13	C	403	8PE	C24-C25-C26-C27
13	N	407	8PE	C23-C24-C25-C26
16	C	406	CN5	O3'-CA-CB-CC
14	C	404	9PE	O11-C1-C2-O21
17	C	407	CN3	O51-C51-C52-C53
18	O	401	6PH	C37-C38-C39-C3A
17	C	407	CN3	O51-C2'-C3'-O41
14	N	404	9PE	C34-C35-C36-C37
15	N	405	HEM	C3D-CAD-CBD-CGD
13	N	407	8PE	C26-C27-C28-C29
14	C	404	9PE	C1-C2-O21-C21
14	N	404	9PE	C3-C2-O21-C21
13	C	403	8PE	C31-C32-C33-C34
14	C	404	9PE	C22-C21-O21-C2
13	N	407	8PE	C11-O13-P-O11
14	C	404	9PE	C11-O13-P-O11
16	C	406	CN5	CA-O3'-P'-O1'
17	N	403	CN3	C1-O11-P-O13
17	N	403	CN3	CC-O13-P-O11
18	O	401	6PH	C29-C2A-C2B-C2C
14	N	404	9PE	O11-C1-C2-C3
15	C	408	HEM	CAA-CBA-CGA-O1A
15	C	405	HEM	CAA-CBA-CGA-O1A
15	O	402	HEM	CAA-CBA-CGA-O1A
15	C	405	HEM	CAA-CBA-CGA-O2A
16	C	406	CN5	C32-C33-C34-C35
15	C	405	HEM	CAD-CBD-CGD-O1D
15	C	405	HEM	CAD-CBD-CGD-O2D
13	N	407	8PE	C28-C29-C2A-C2B
15	O	402	HEM	CAA-CBA-CGA-O2A
17	C	407	CN3	OA-CB-CC-O13
15	C	408	HEM	CAA-CBA-CGA-O2A
11	C	401	AZO	C13-C12-O2-C10
11	N	401	AZO	C13-C12-O2-C10
15	D	401	HEM	CAA-CBA-CGA-O2A
17	C	407	CN3	O1'-C1'-C2'-O51
17	N	403	CN3	O11-C1-C2-O21
15	N	405	HEM	CAA-CBA-CGA-O2A
15	N	405	HEM	CAA-CBA-CGA-O1A

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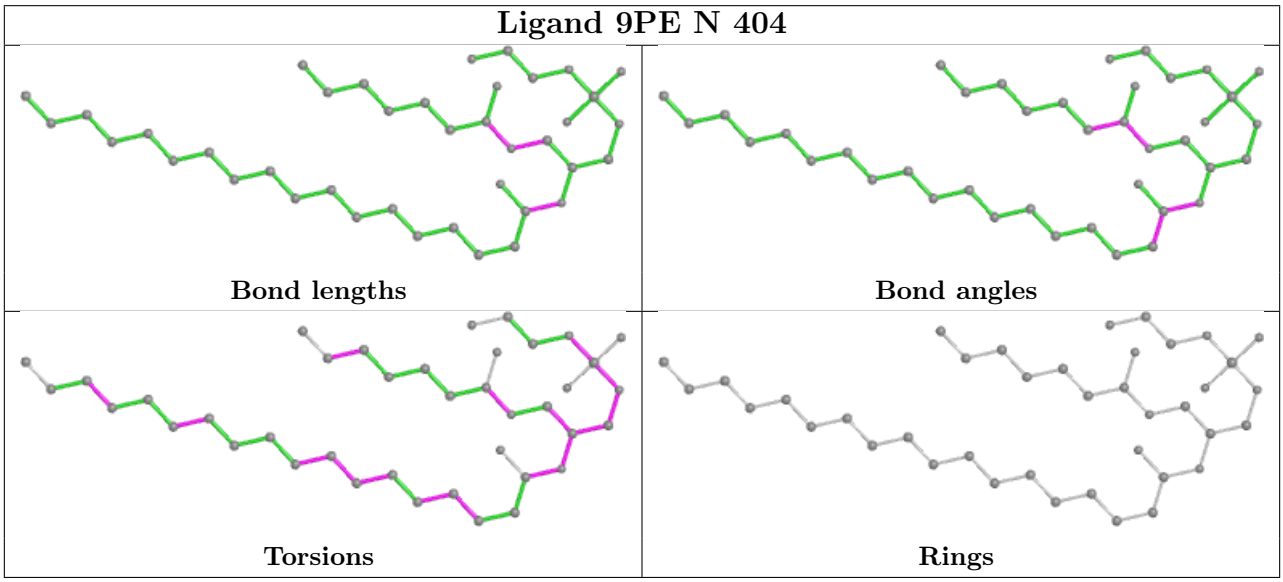
Mol	Chain	Res	Type	Atoms
15	N	405	HEM	CAD-CBD-CGD-O2D
17	C	407	CN3	O1'-C1'-C2'-C3'
12	N	408	UQ6	C18-C19-C21-C22
17	C	407	CN3	C32-C31-O31-C3
12	C	402	UQ6	C23-C24-C26-C27
16	C	406	CN5	C3C-C3D-C3E-C3F
17	N	403	CN3	O21-C21-C22-C23
17	C	407	CN3	O32-C31-O31-C3
17	N	403	CN3	C1-C2-O21-C21
15	N	406	HEM	CAA-CBA-CGA-O2A
13	C	403	8PE	C3B-C3C-C3D-C3E
14	N	404	9PE	C23-C24-C25-C26
18	N	402	6PH	O21-C21-C22-C23
18	O	401	6PH	O21-C21-C22-C23
15	D	401	HEM	CAA-CBA-CGA-O1A
15	N	406	HEM	CAA-CBA-CGA-O1A
15	N	405	HEM	CAD-CBD-CGD-O1D
17	N	403	CN3	O51-C51-C52-C53
12	N	408	UQ6	C25-C24-C26-C27
14	N	404	9PE	C25-C26-C27-C28
11	C	401	AZO	C12-C17-C18-C21
11	N	401	AZO	C12-C17-C18-C21
17	N	403	CN3	O22-C21-C22-C23
14	N	404	9PE	C2B-C2C-C2D-C2E
17	N	403	CN3	O52-C51-C52-C53
17	C	407	CN3	C1'-O1'-P'-O2'
17	N	403	CN3	C1-O11-P-O14
18	N	402	6PH	O22-C21-C22-C23
15	C	408	HEM	CAD-CBD-CGD-O2D
17	N	403	CN3	C55-C56-C57-C58
15	C	408	HEM	CAD-CBD-CGD-O1D
15	N	406	HEM	CAD-CBD-CGD-O1D
12	N	408	UQ6	C15-C14-C16-C17
13	C	403	8PE	O31-C31-C32-C33
16	C	406	CN5	C38-C39-C3A-C3B
15	N	406	HEM	CAD-CBD-CGD-O2D
13	C	403	8PE	O32-C31-C32-C33
14	C	404	9PE	C2D-C2E-C2F-C2G
13	N	407	8PE	O31-C31-C32-C33

There are no ring outliers.

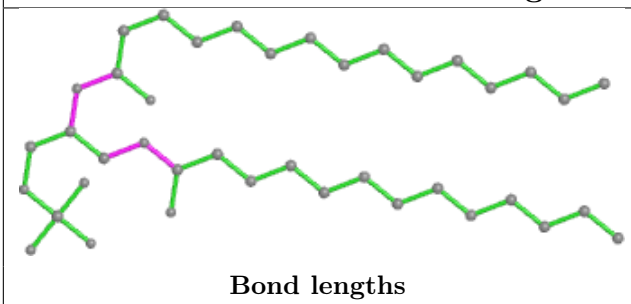
7 monomers are involved in 21 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
14	N	404	9PE	2	0
16	C	406	CN5	10	0
13	N	407	8PE	1	0
17	C	407	CN3	1	0
12	N	408	UQ6	2	0
12	C	402	UQ6	1	0
17	N	403	CN3	5	0

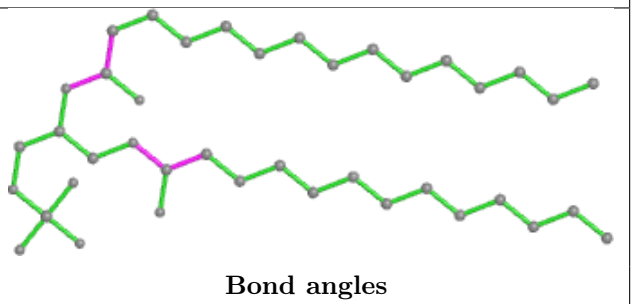
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. 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.



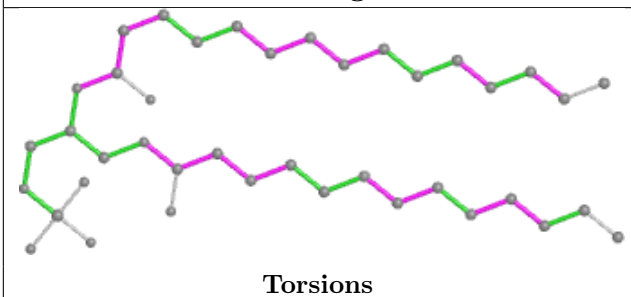
Ligand 6PH N 402



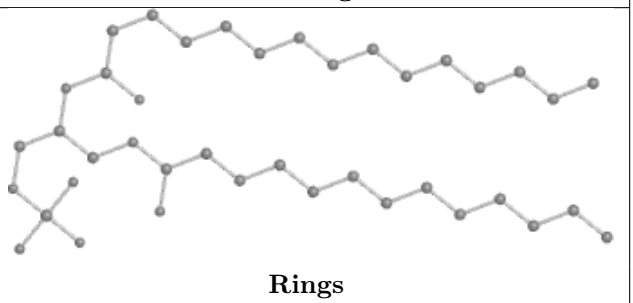
Bond lengths



Bond angles

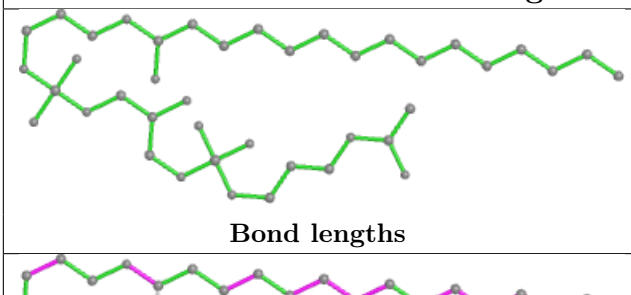


Torsions

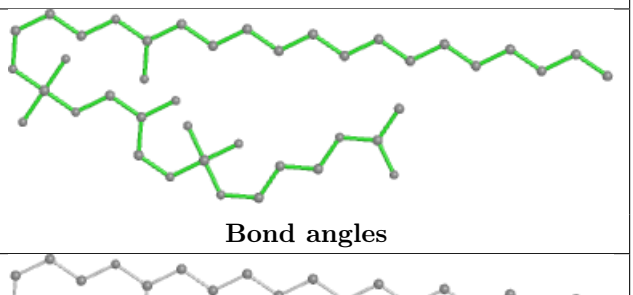


Rings

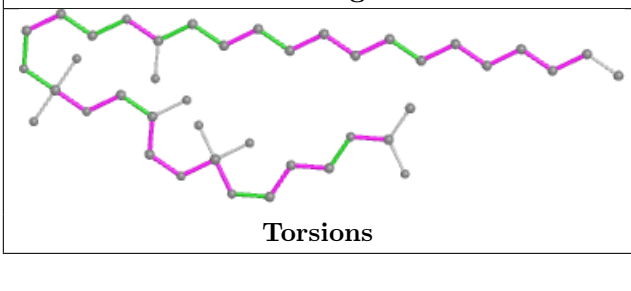
Ligand CN5 C 406



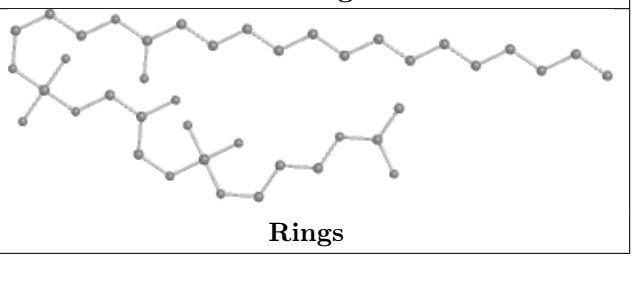
Bond lengths



Bond angles

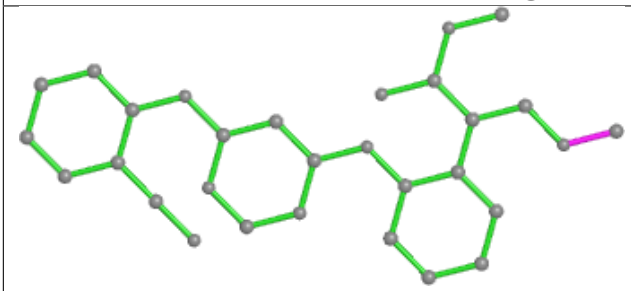


Torsions

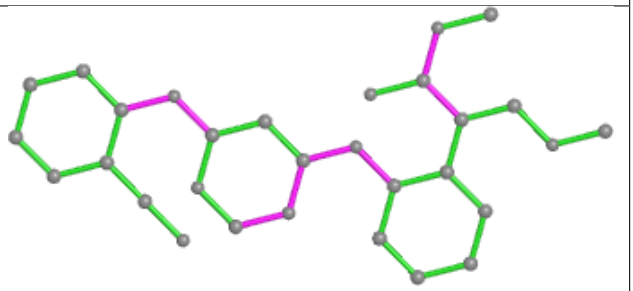


Rings

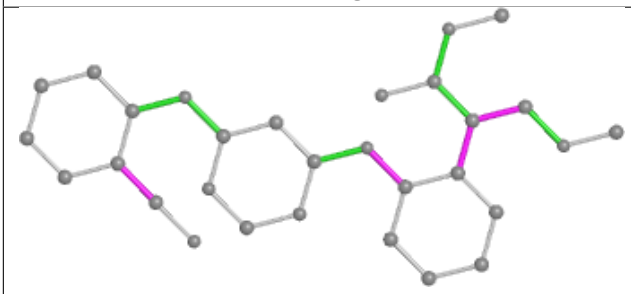
Ligand AZO N 401



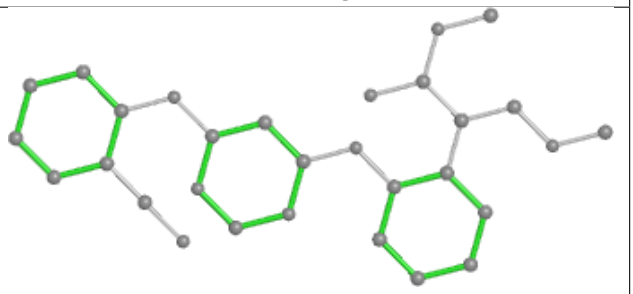
Bond lengths



Bond angles

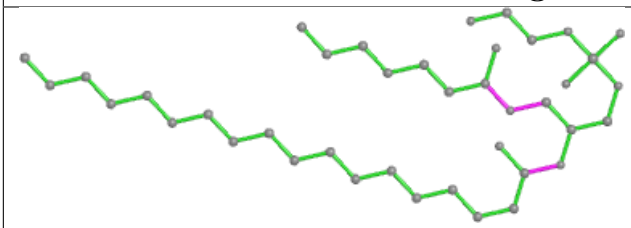


Torsions

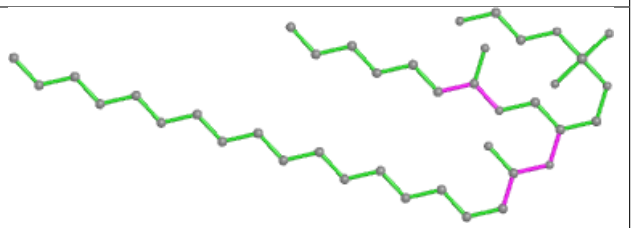


Rings

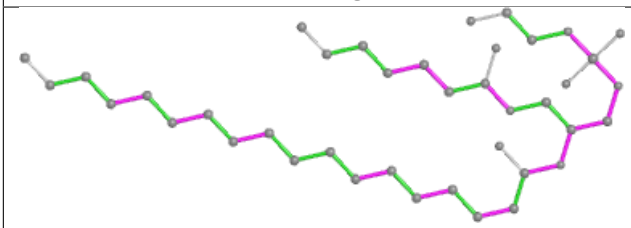
Ligand 9PE C 404



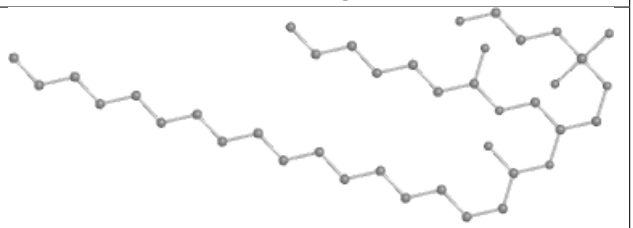
Bond lengths



Bond angles

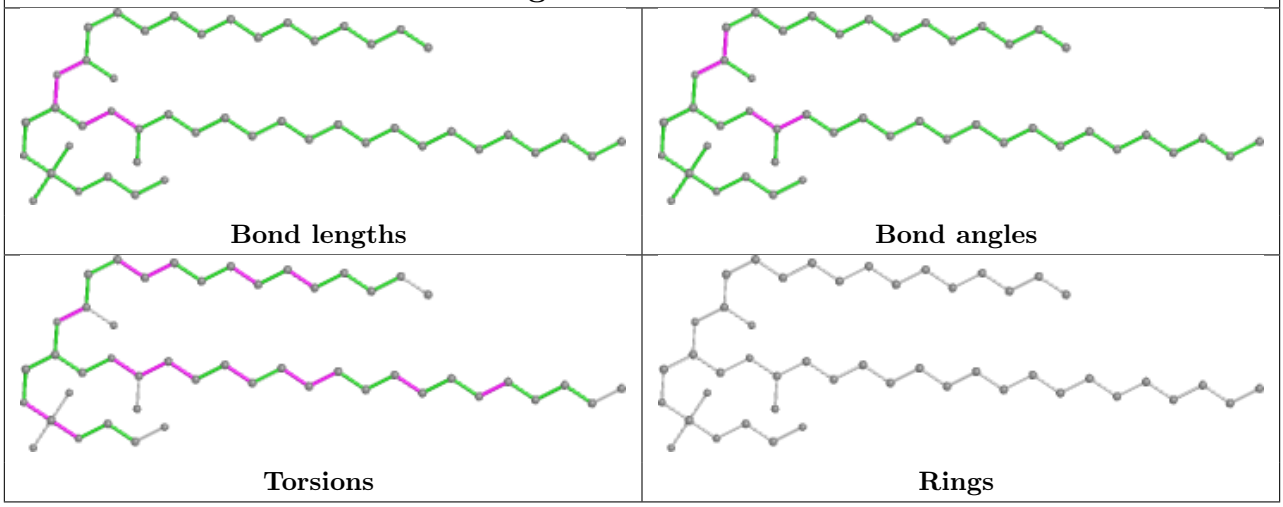


Torsions

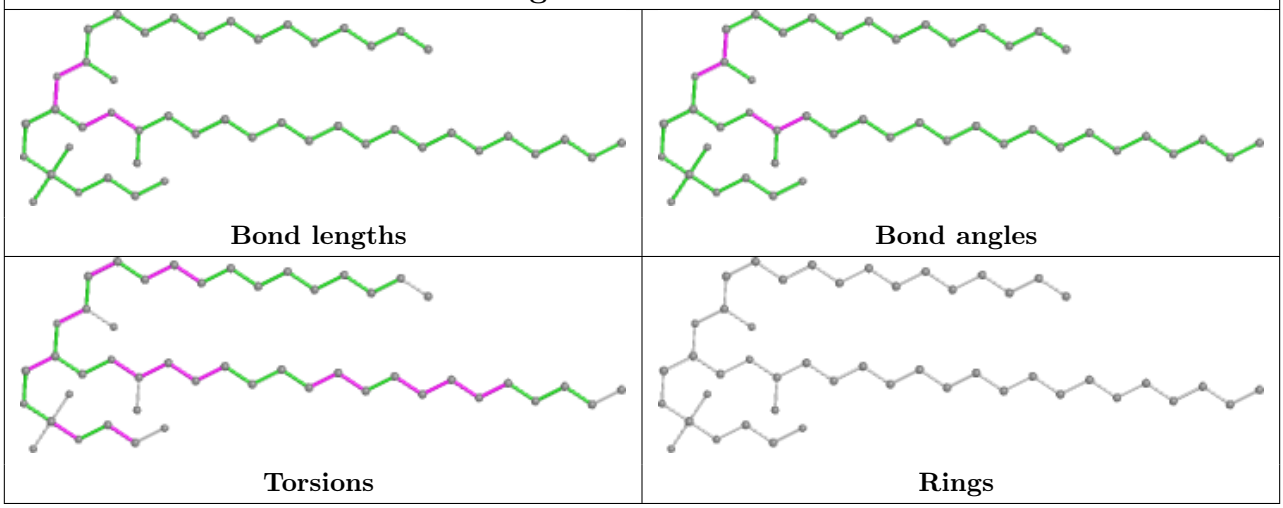


Rings

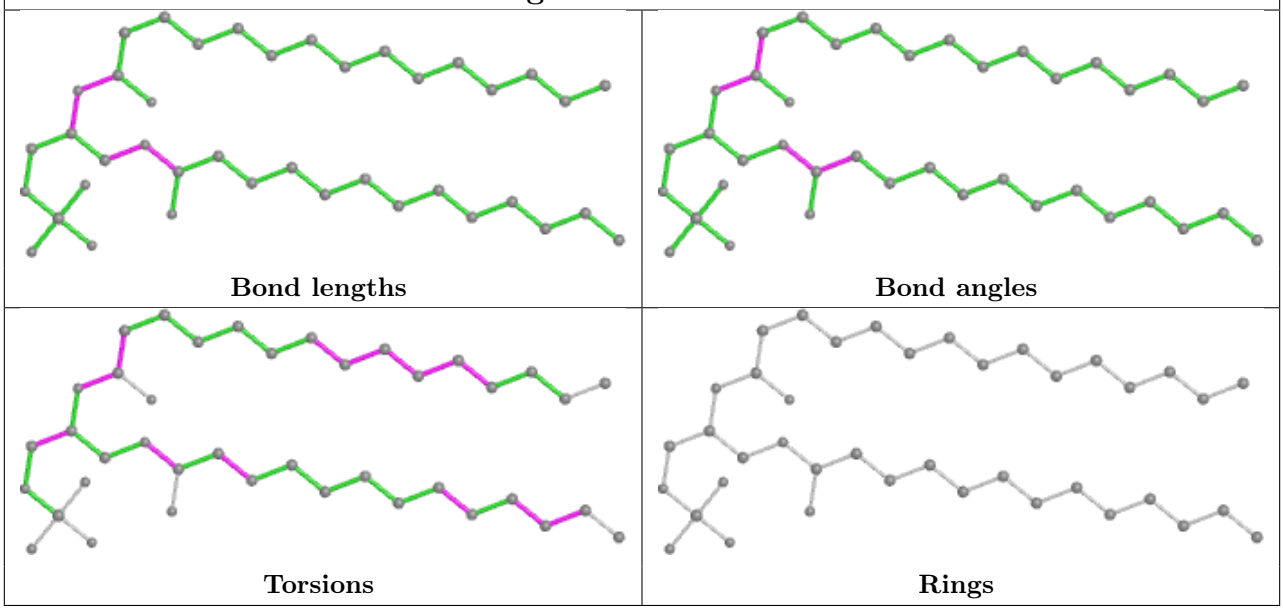
Ligand 8PE N 407



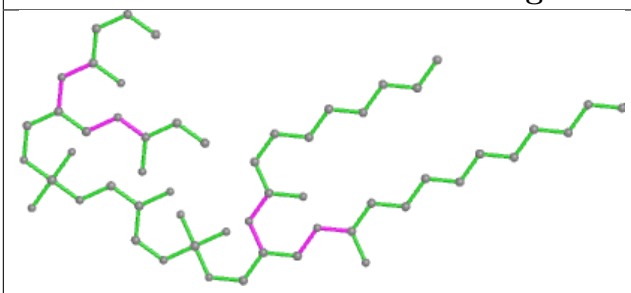
Ligand 8PE C 403



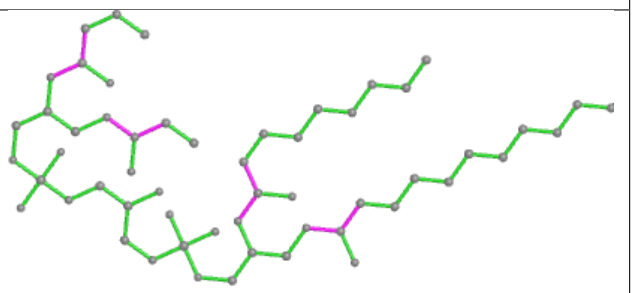
Ligand 6PH O 401



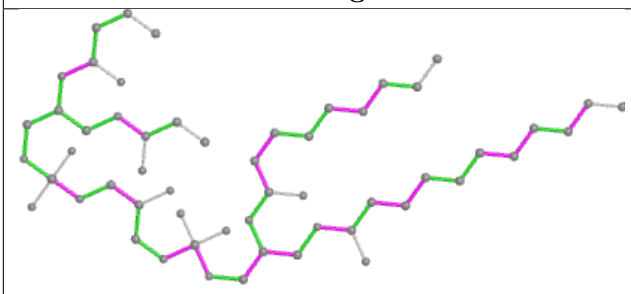
Ligand CN3 C 407



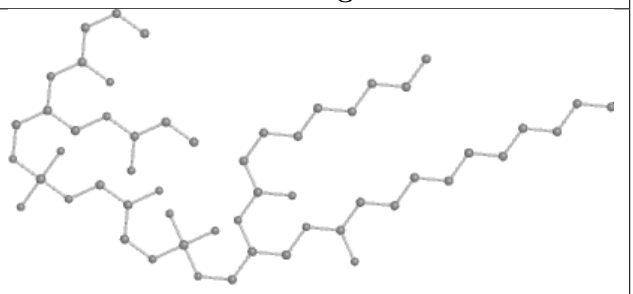
Bond lengths



Bond angles

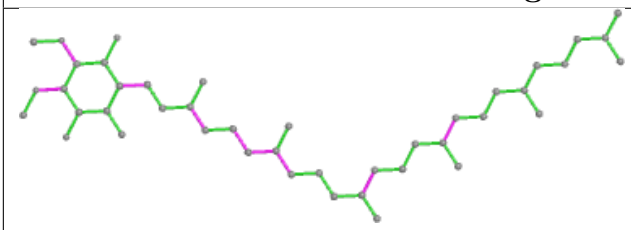


Torsions



Rings

Ligand UQ6 N 408



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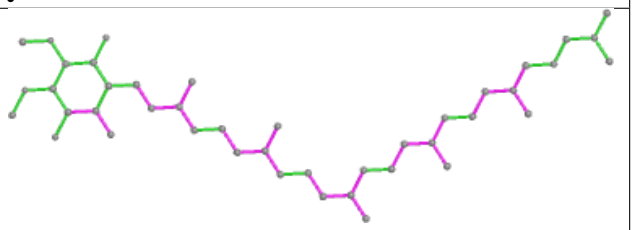
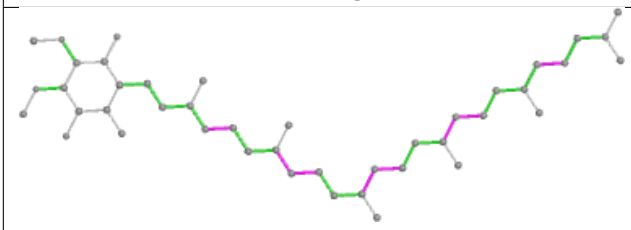
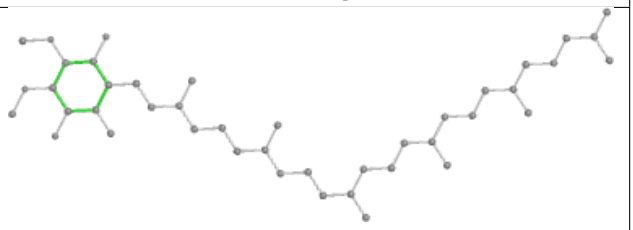


Bond angles

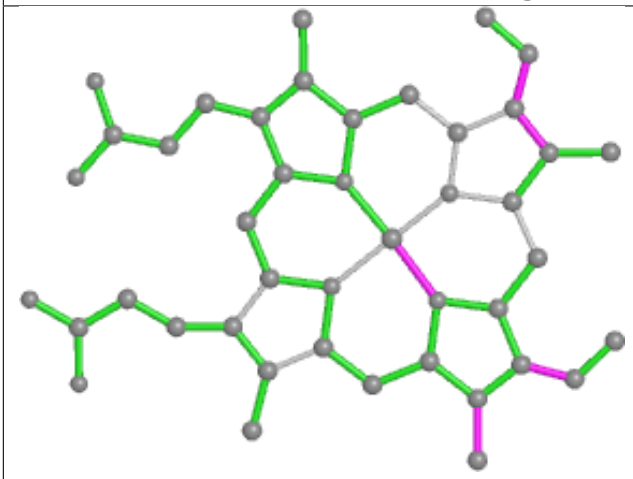


Torsions

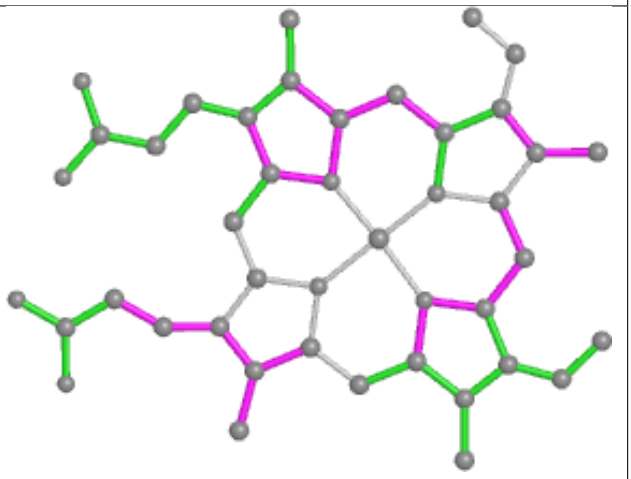


Rings

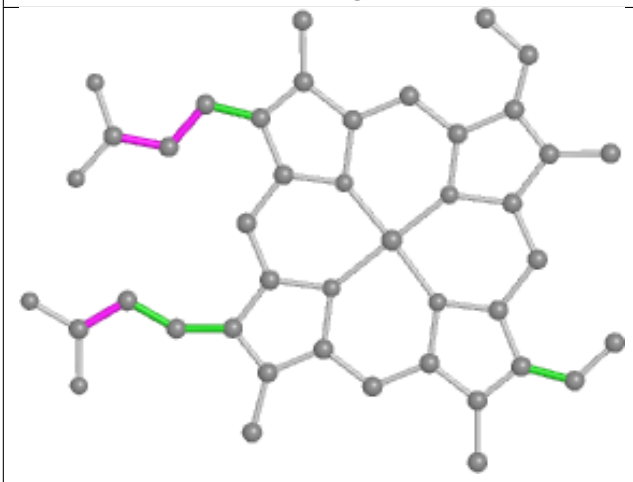
Ligand HEM C 405



Bond lengths



Bond angles



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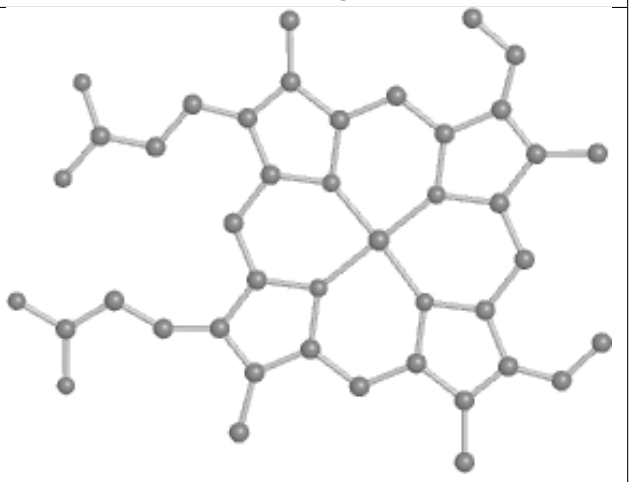
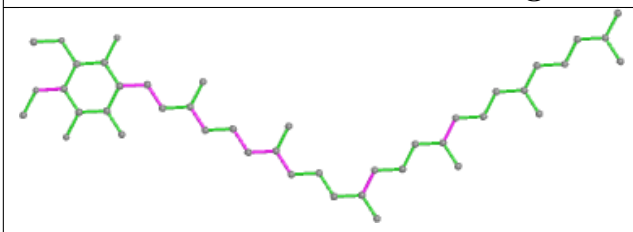
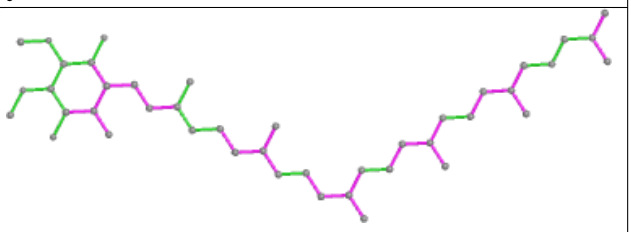


Rings

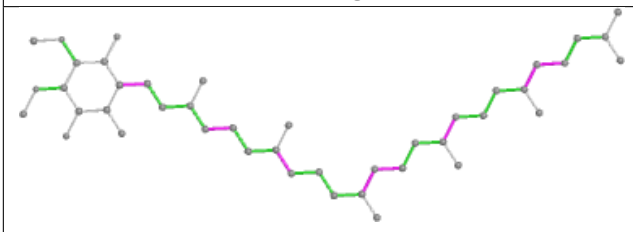
Ligand UQ6 C 402



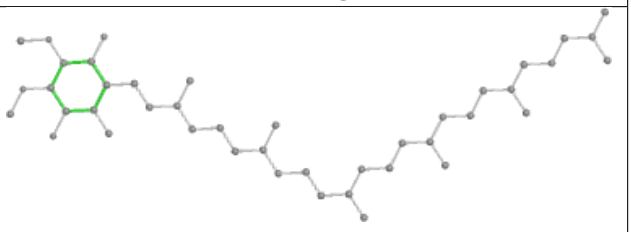
Bond lengths



Bond angles

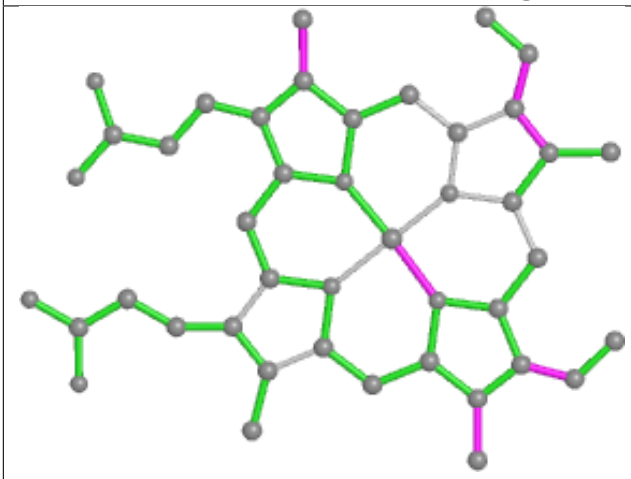


Torsions

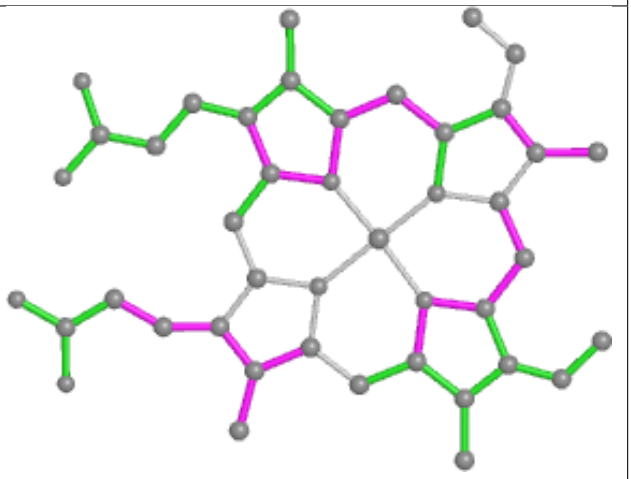


Rings

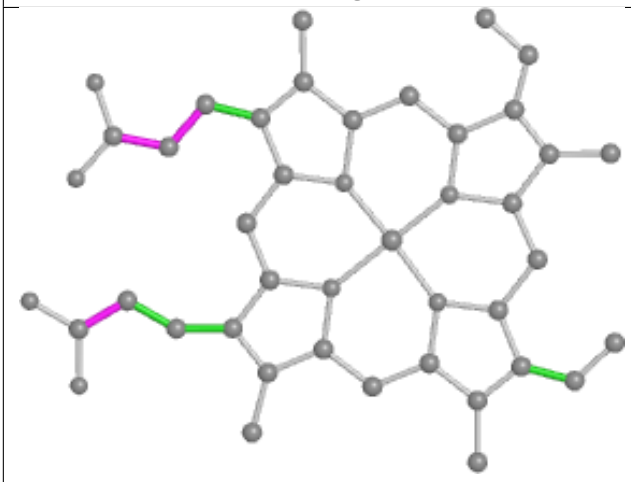
Ligand HEM N 405



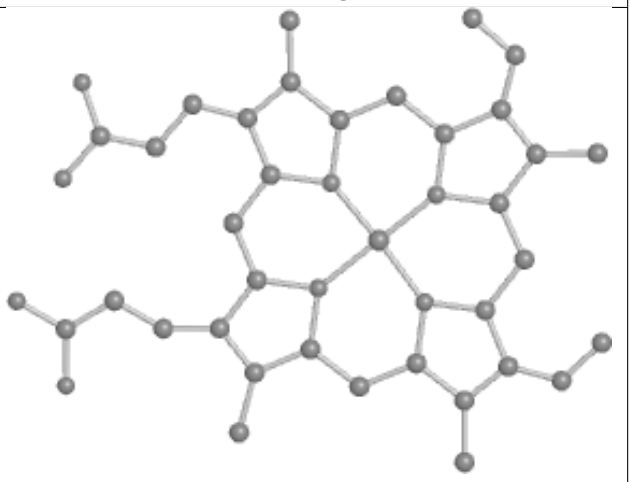
Bond lengths



Bond angles

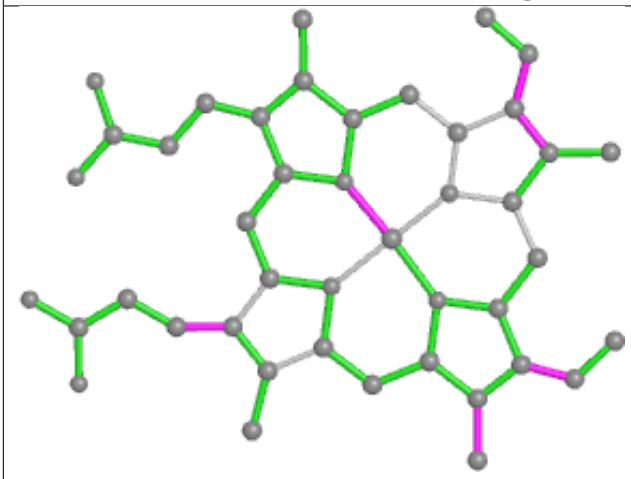


Torsions

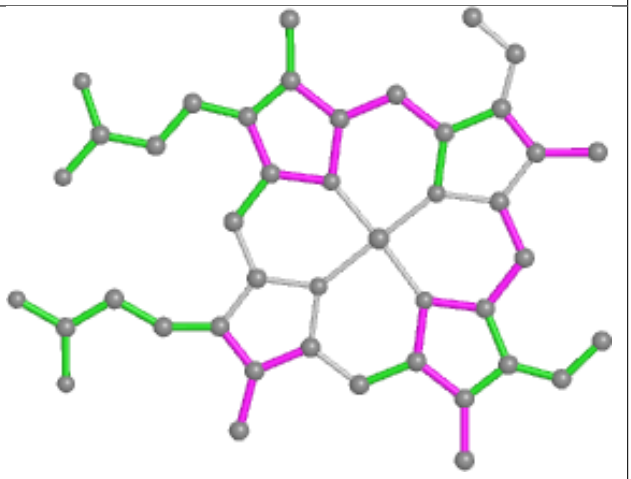


Rings

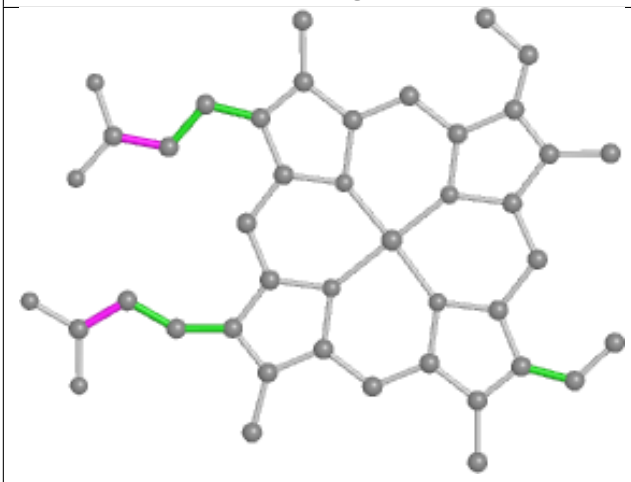
Ligand HEM C 408



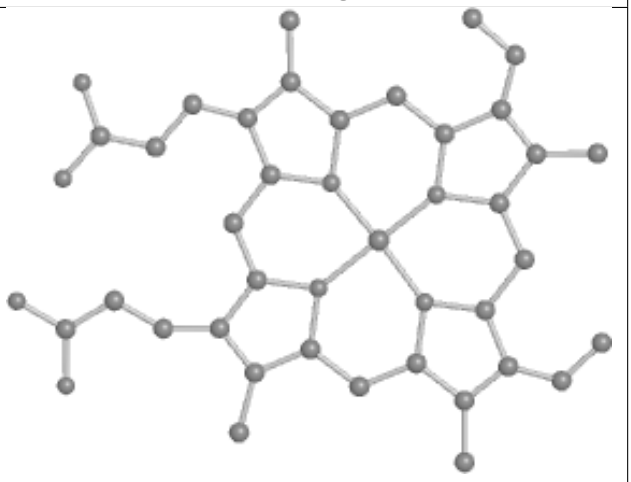
Bond lengths



Bond angles

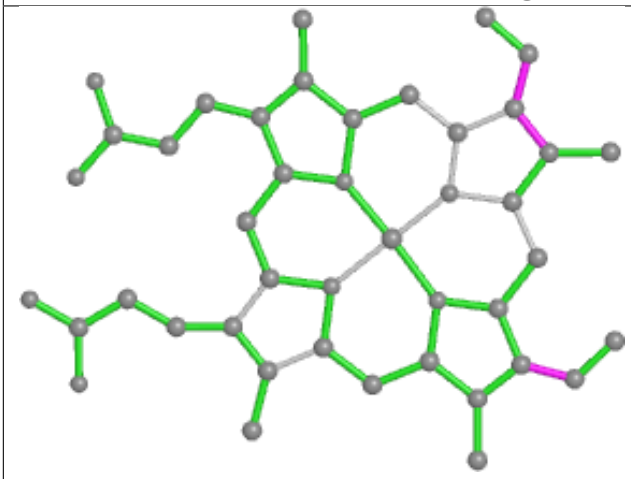


Torsions

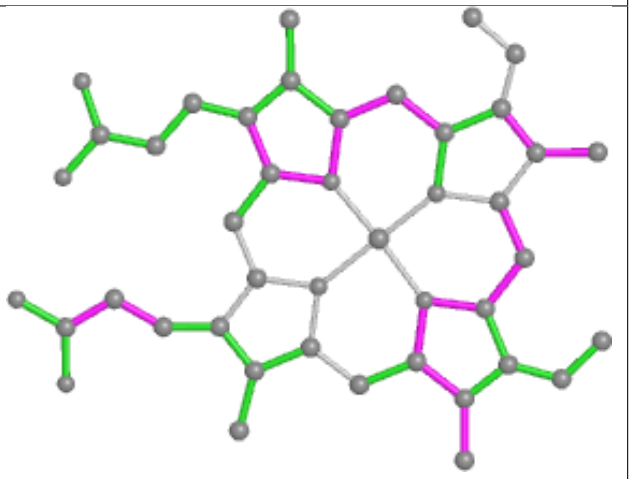


Rings

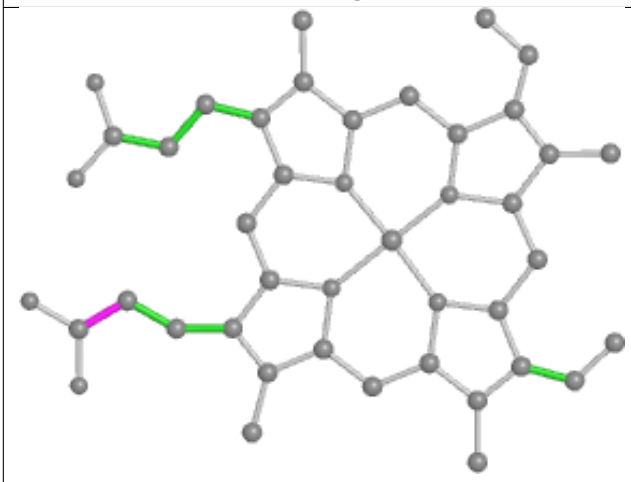
Ligand HEM O 402



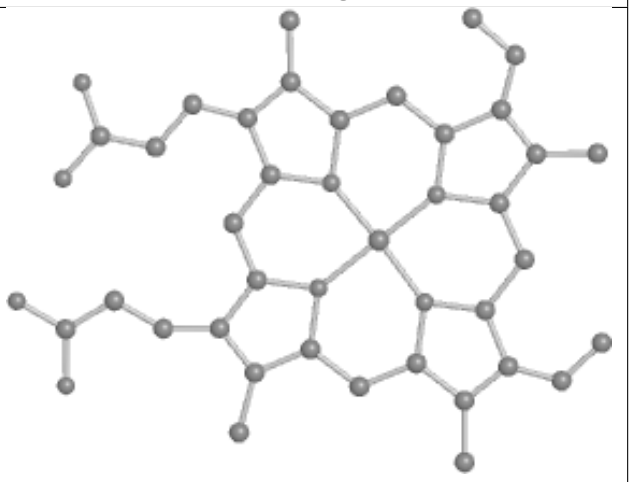
Bond lengths



Bond angles

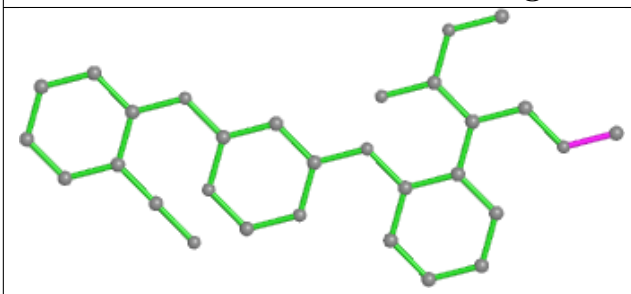


Torsions

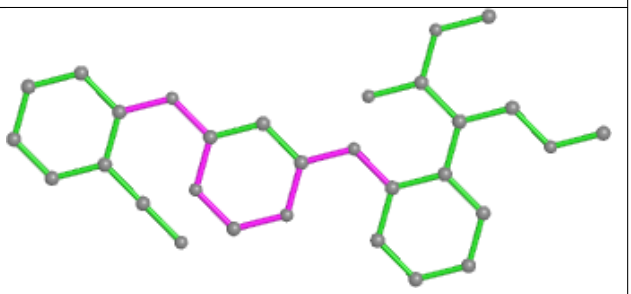


Rings

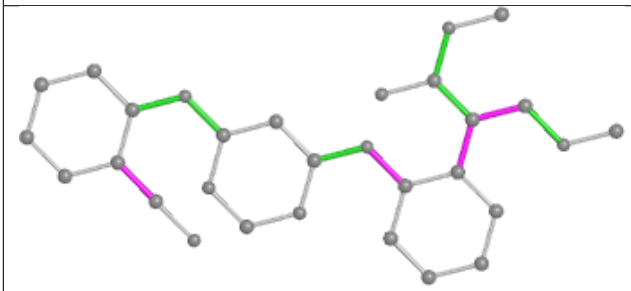
Ligand AZO C 401



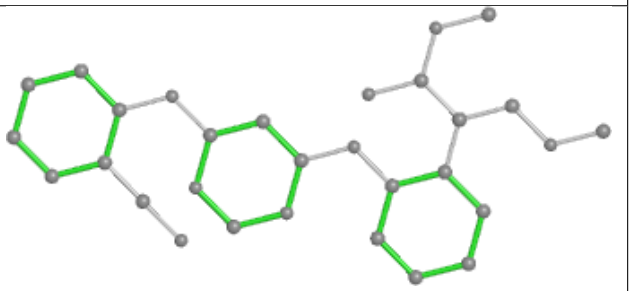
Bond lengths



Bond angles

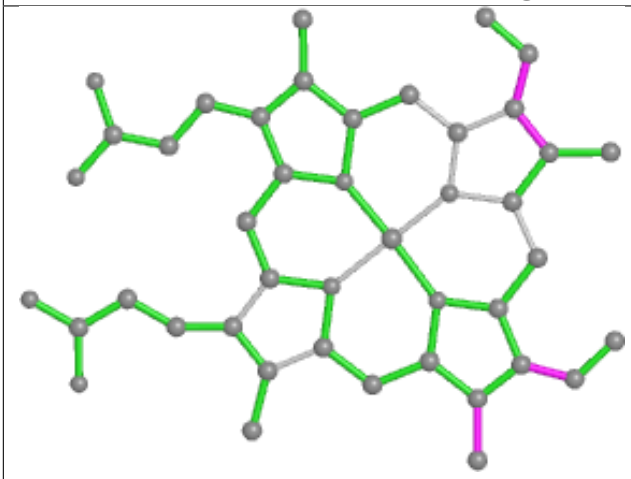


Torsions

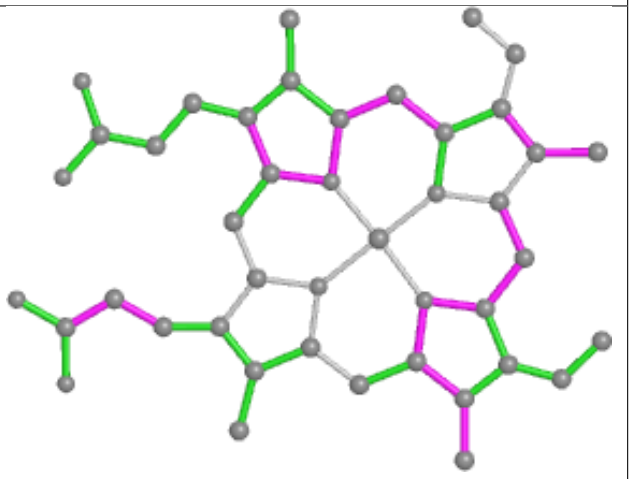


Rings

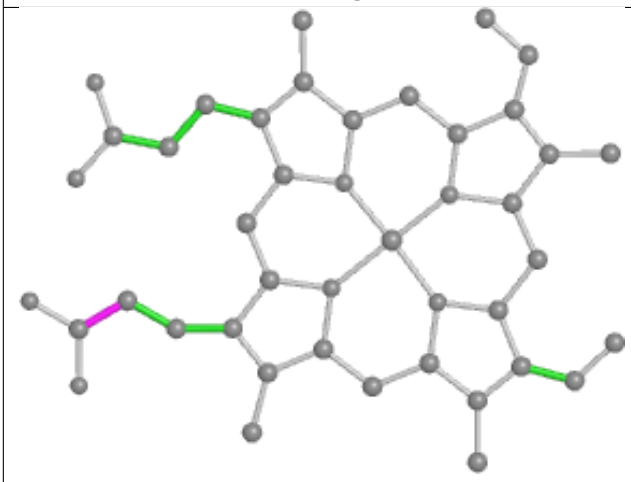
Ligand HEM D 401



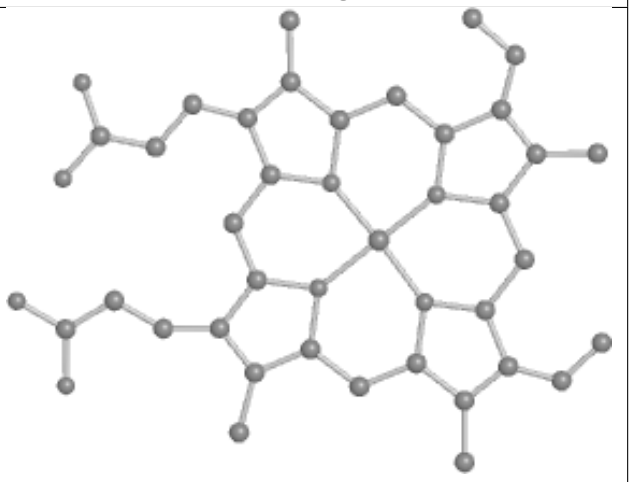
Bond lengths



Bond angles

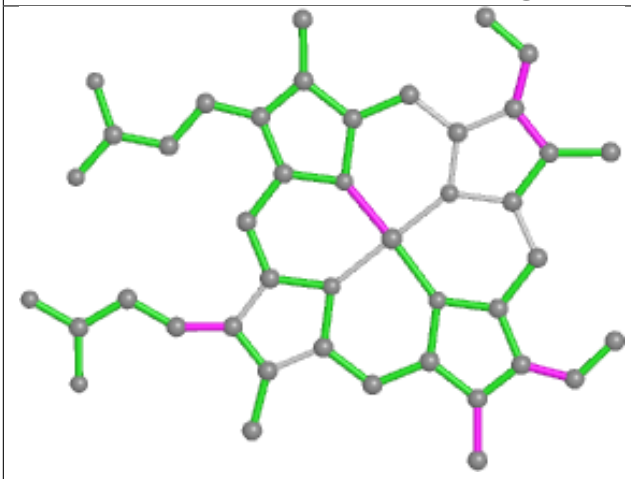


Torsions

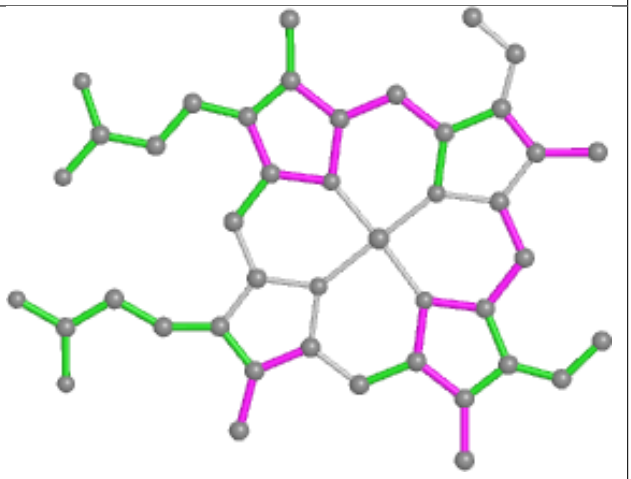


Rings

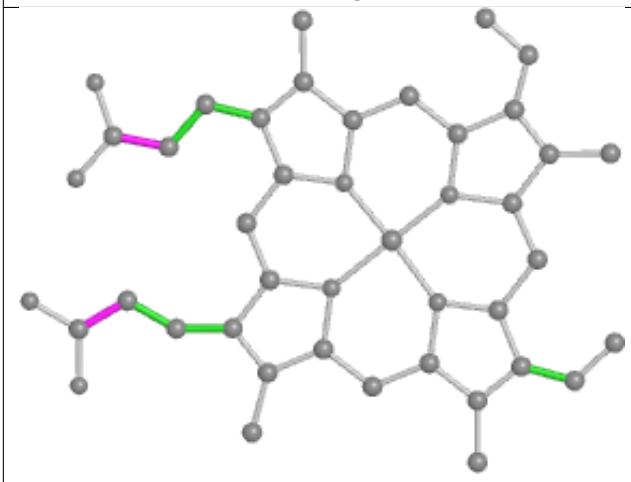
Ligand HEM N 406



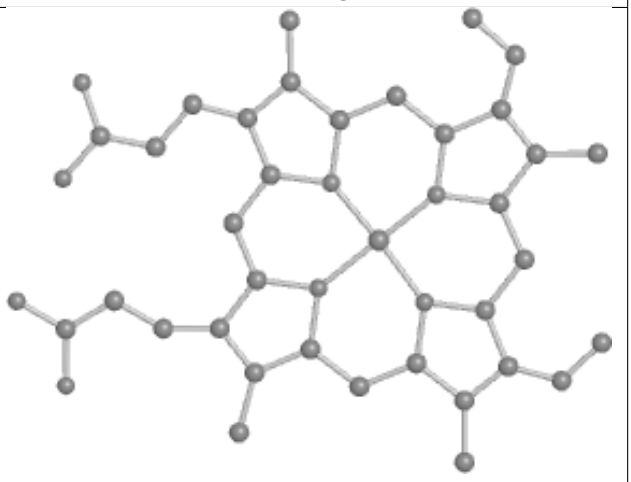
Bond lengths



Bond angles

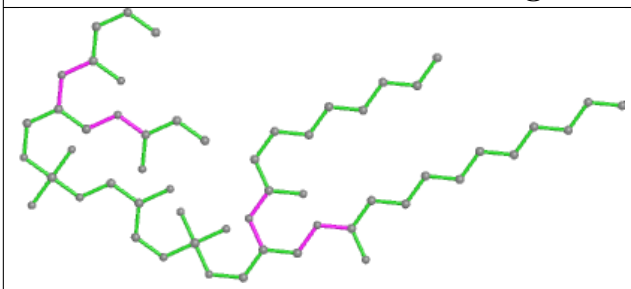


Torsions

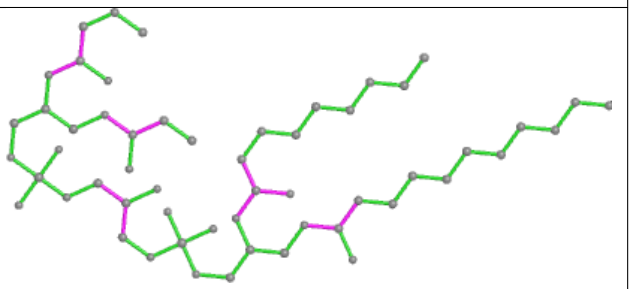


Rings

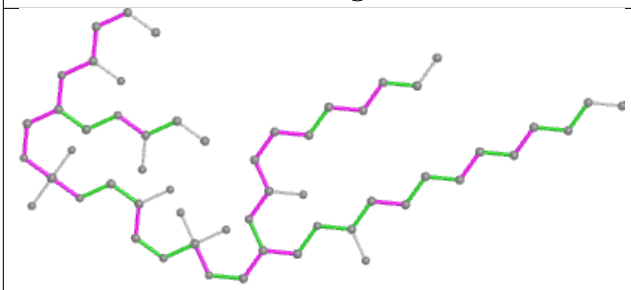
Ligand CN3 N 403



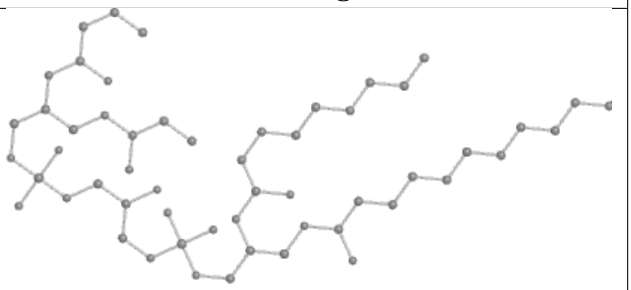
Bond lengths



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.

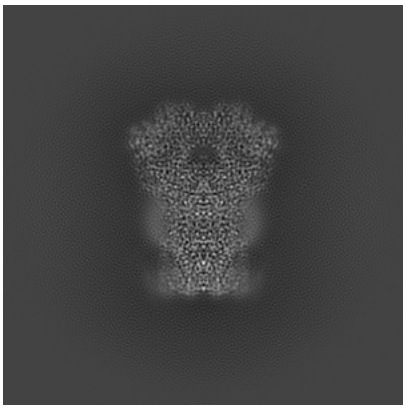
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-39324. These allow visual inspection of the internal detail of the map and identification of artifacts.

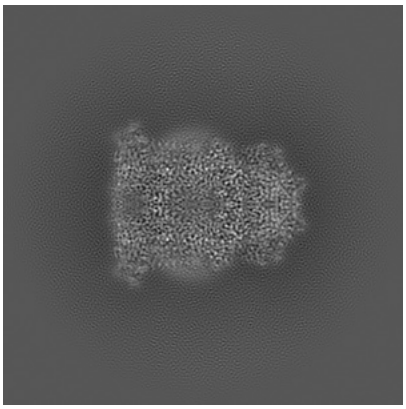
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

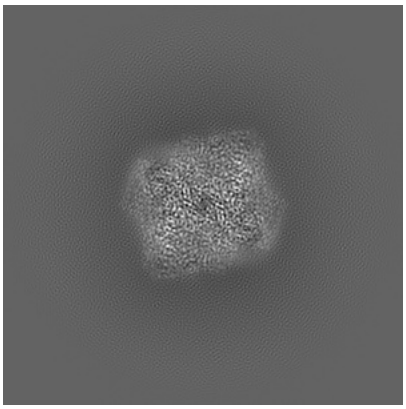
6.1.1 Primary map



X

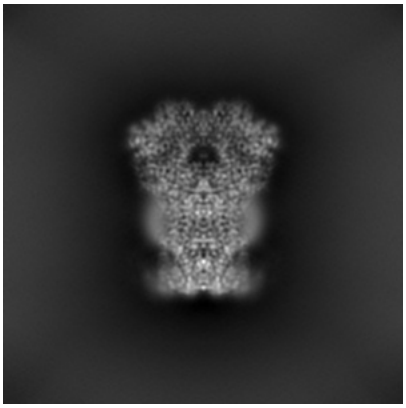


Y

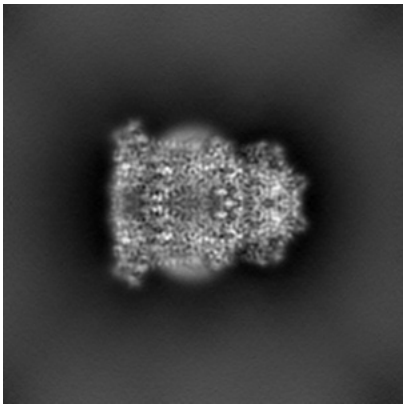


Z

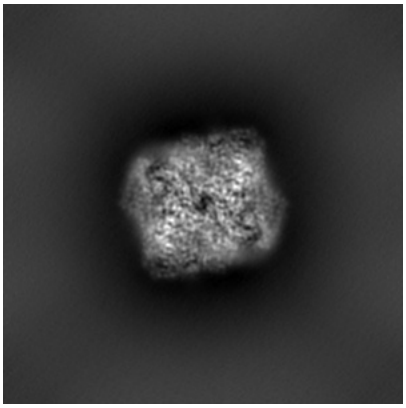
6.1.2 Raw map



X



Y

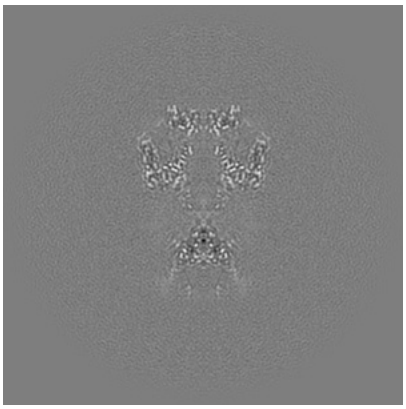


Z

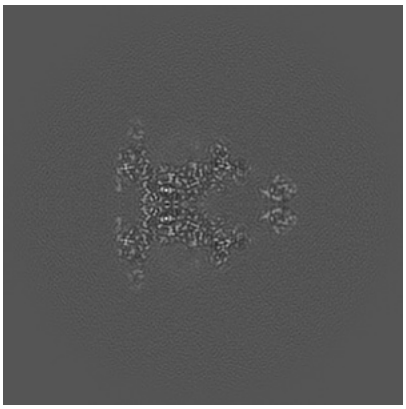
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

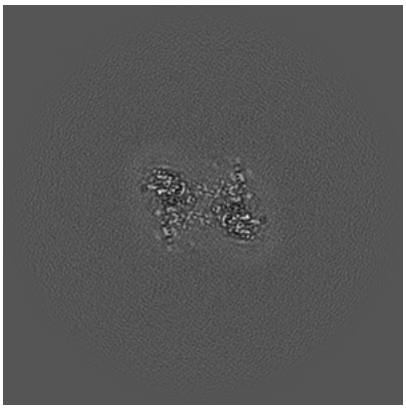
6.2.1 Primary map



X Index: 160

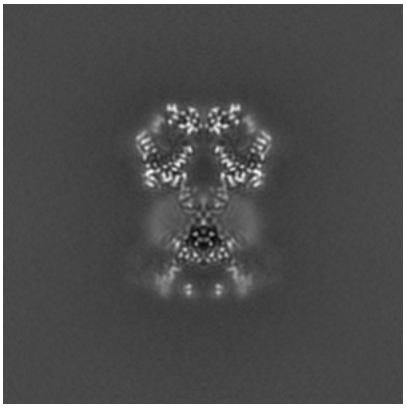


Y Index: 160

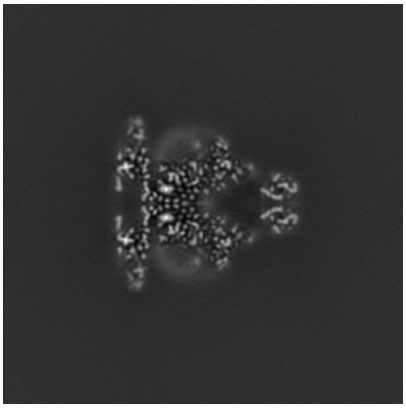


Z Index: 160

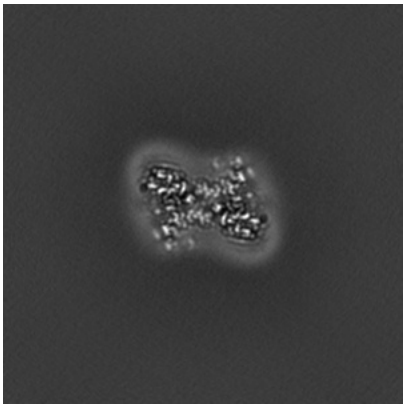
6.2.2 Raw map



X Index: 160



Y Index: 160

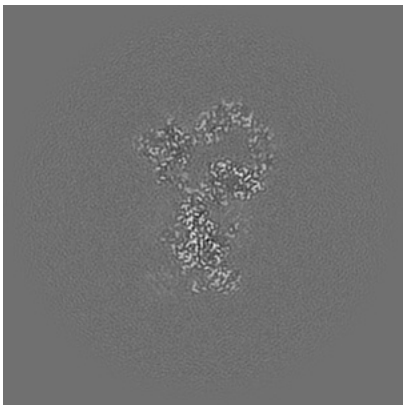


Z Index: 160

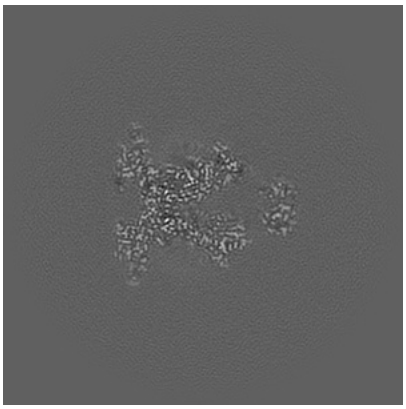
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

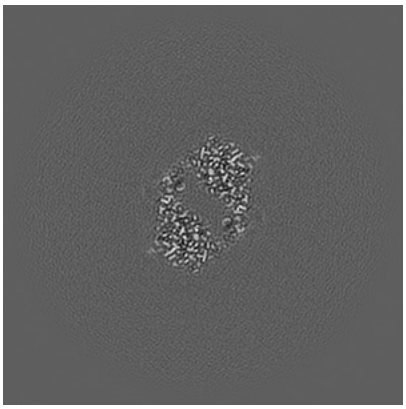
6.3.1 Primary map



X Index: 175

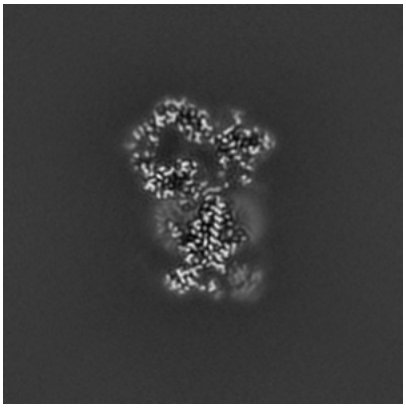


Y Index: 157

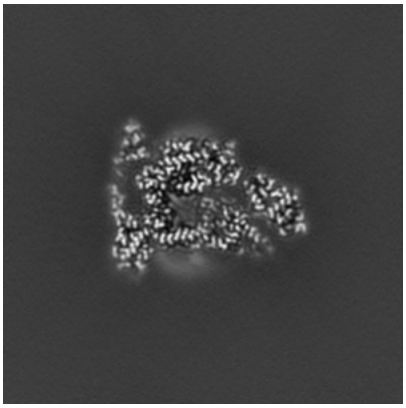


Z Index: 185

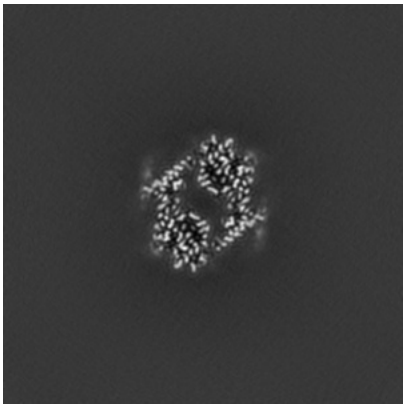
6.3.2 Raw map



X Index: 145



Y Index: 147

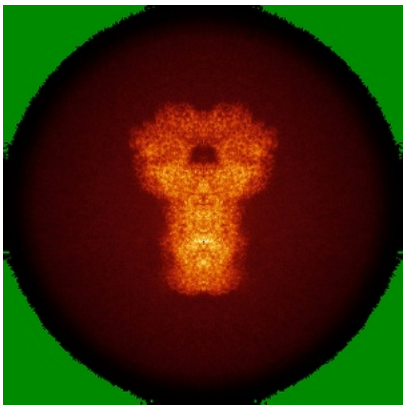


Z Index: 182

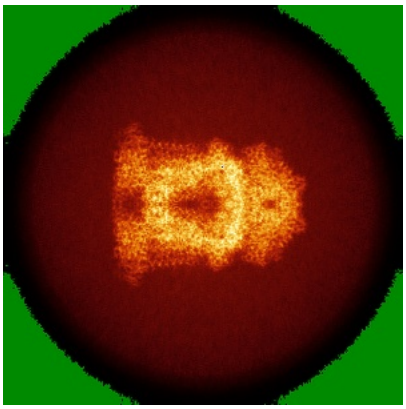
The images above show the largest variance slices of the map in three orthogonal directions.

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

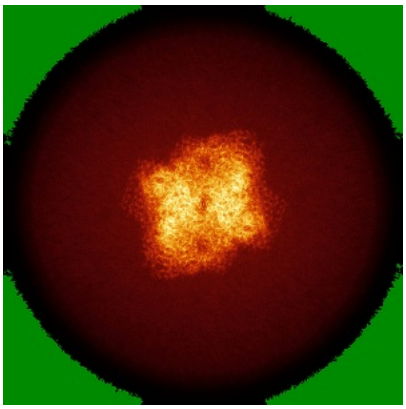
6.4.1 Primary map



X

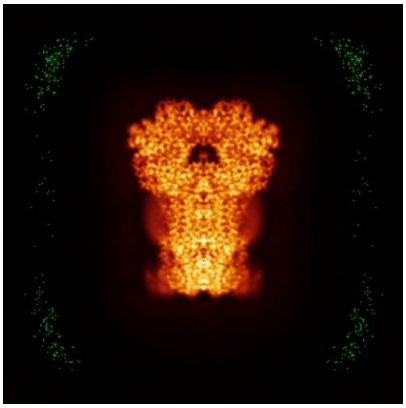


Y

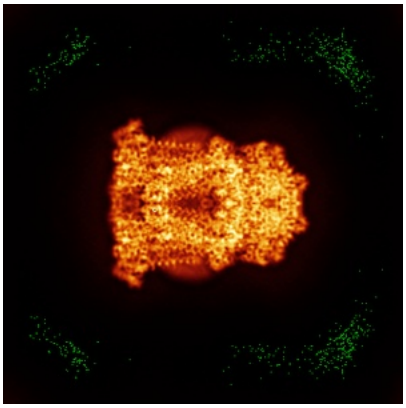


Z

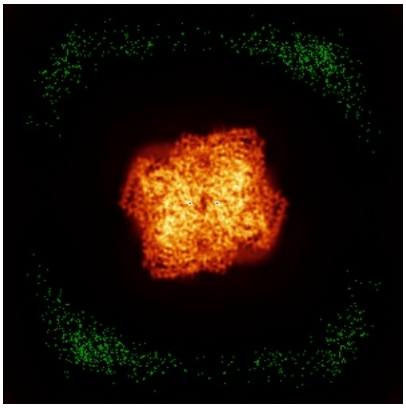
6.4.2 Raw map



X



Y

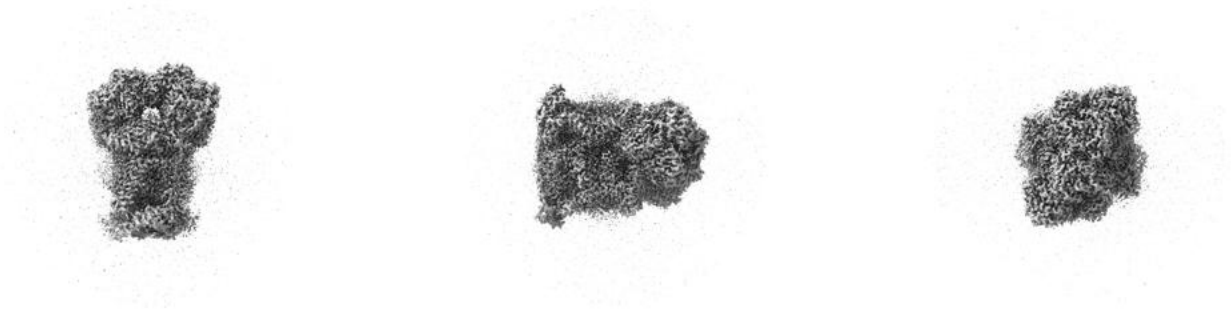


Z

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)

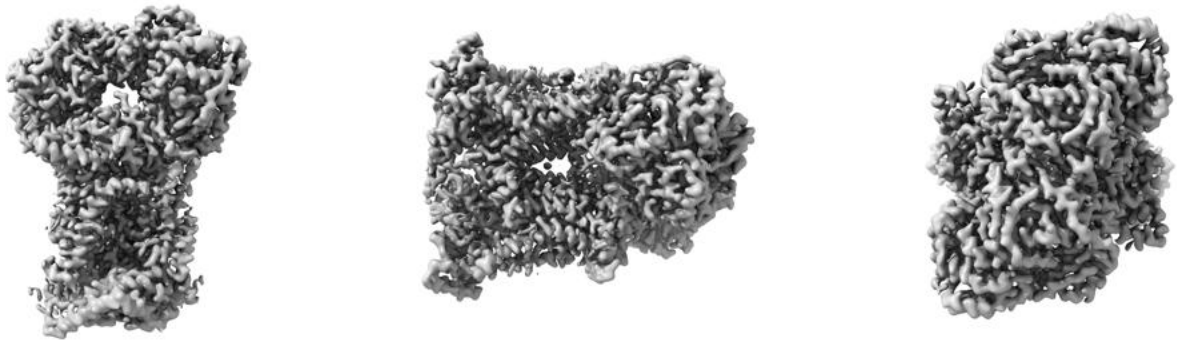
6.5.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 1.2. 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.

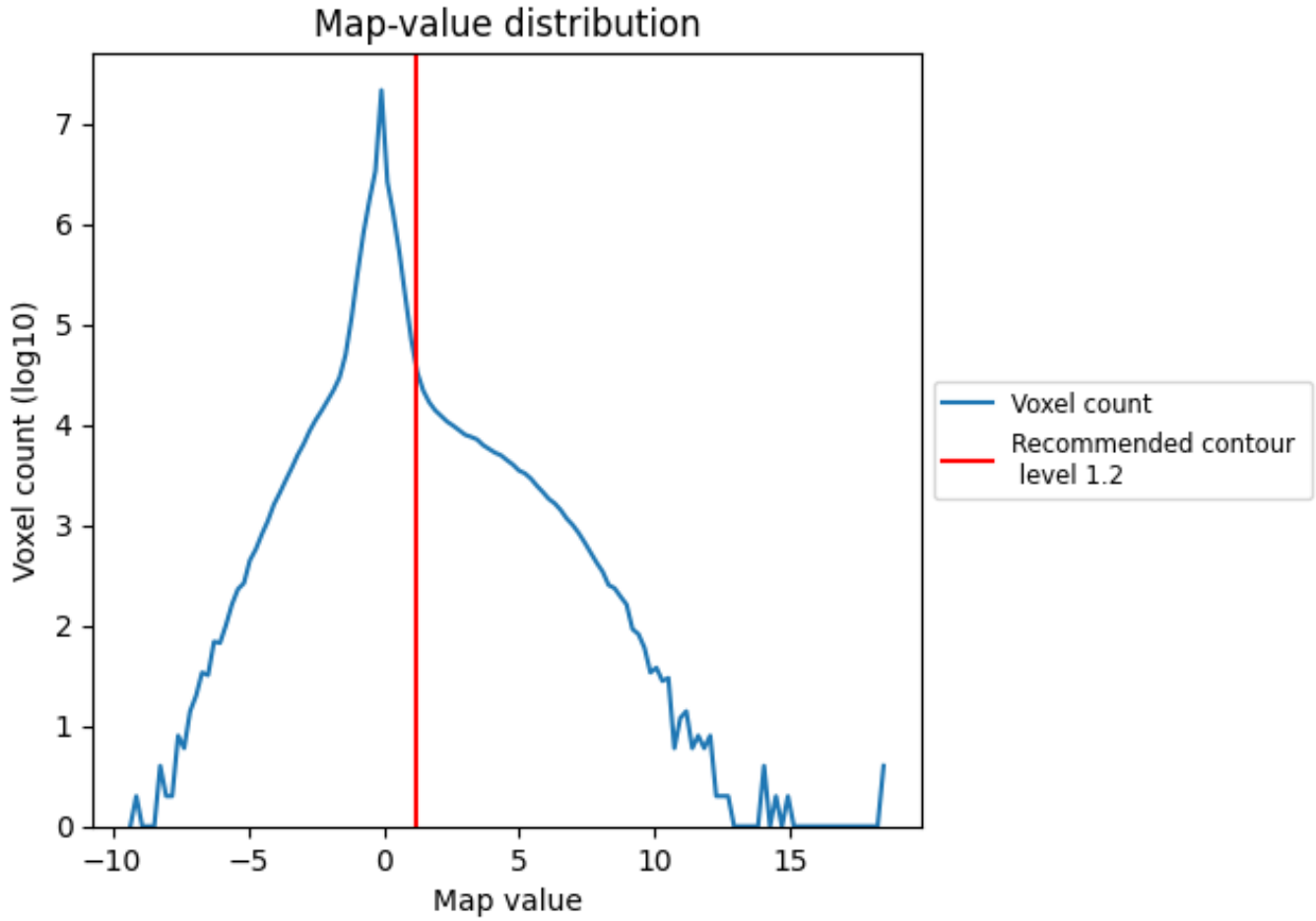
6.6 Mask visualisation (i)

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

7 Map analysis

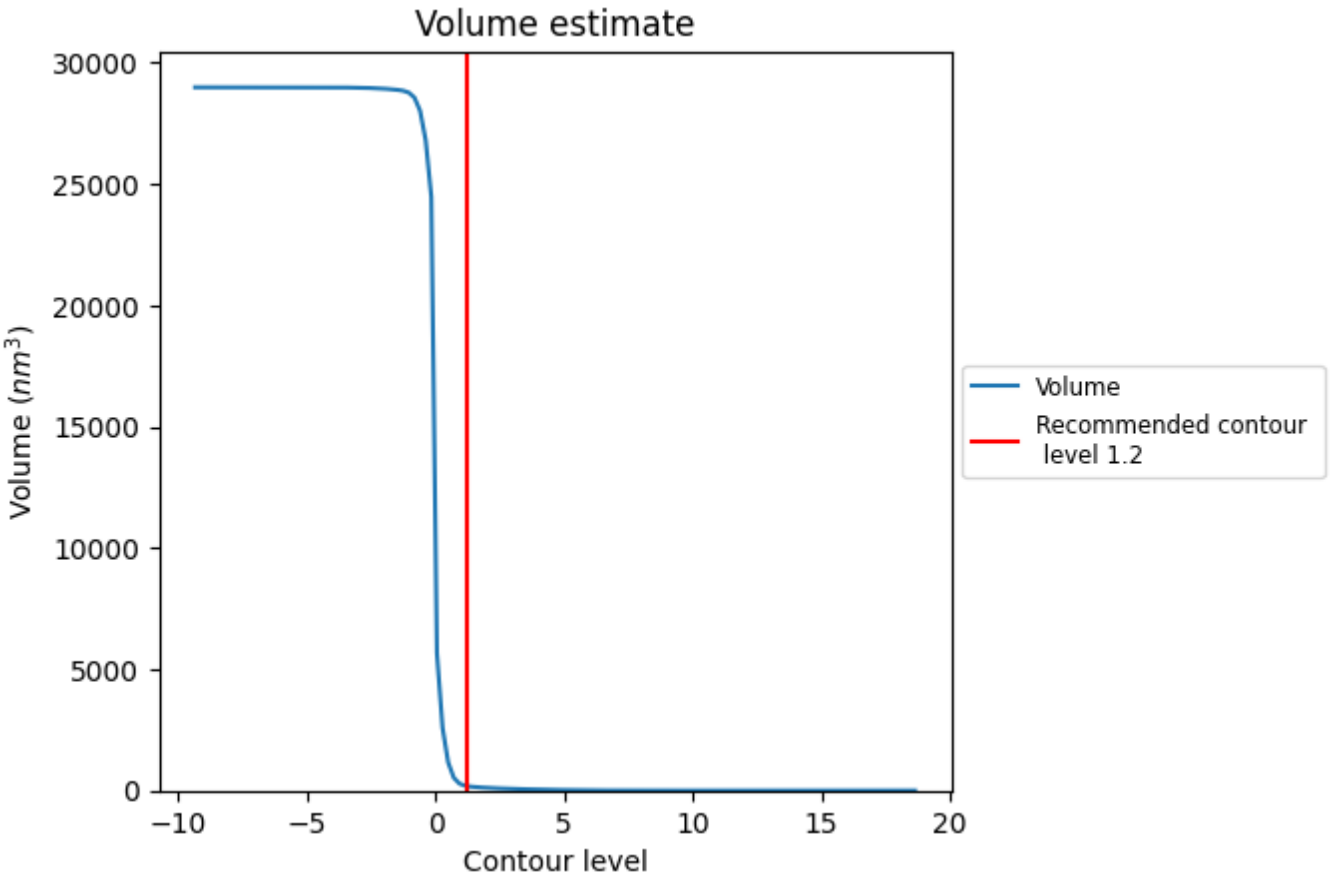
This section contains the results of statistical analysis of the map.

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.

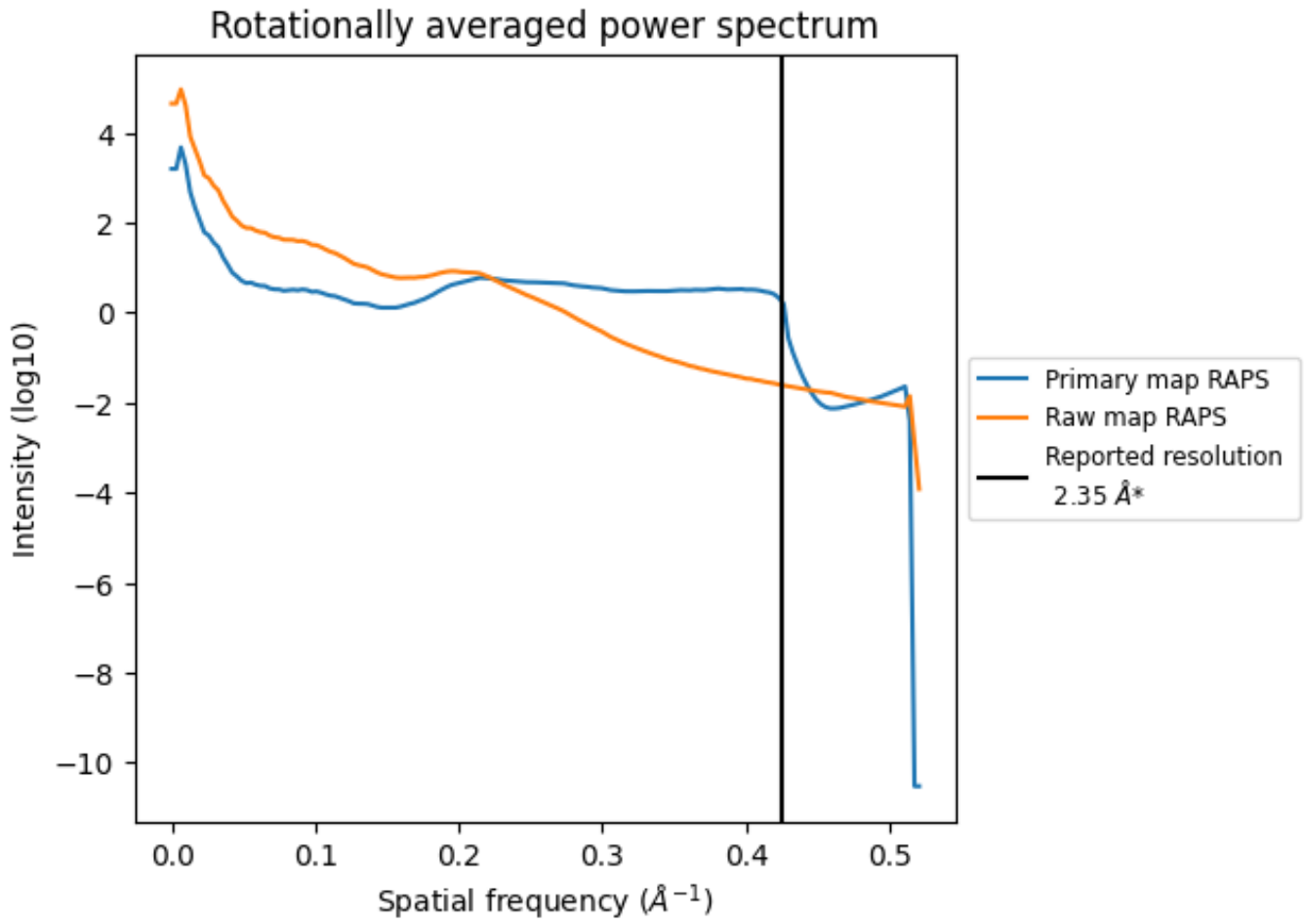
7.2 Volume estimate



The volume at the recommended contour level is 191 nm^3; this corresponds to an approximate mass of 173 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)

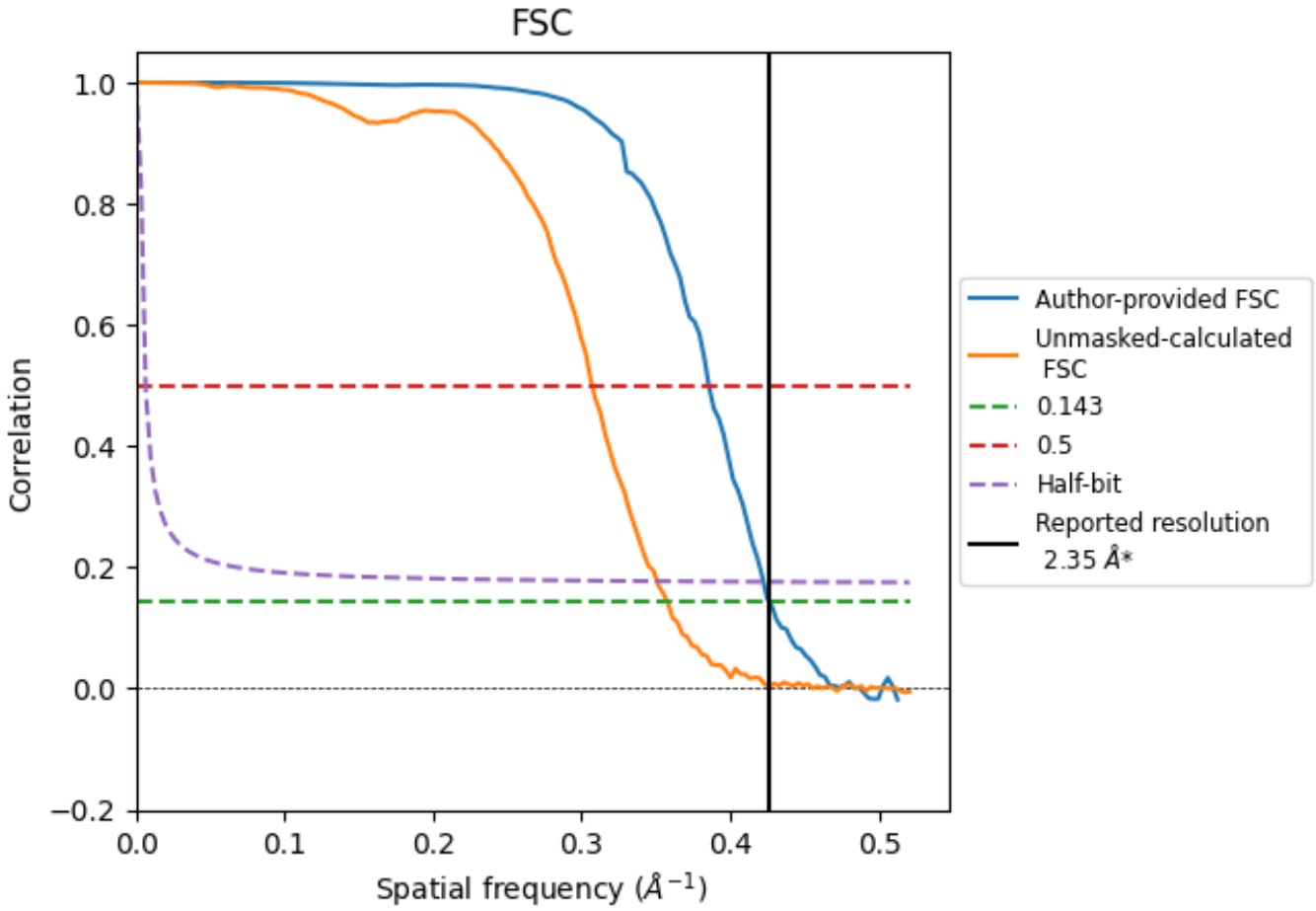


*Reported resolution corresponds to spatial frequency of 0.426 Å^{-1}

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 0.426 Å^{-1}

8.2 Resolution estimates (i)

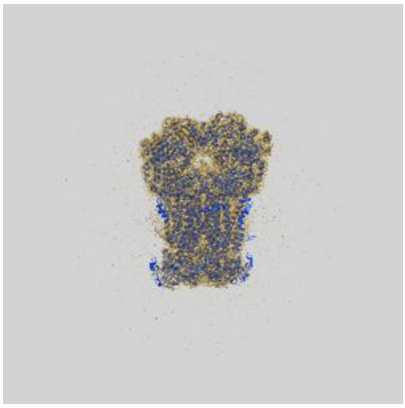
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.35	-	-
Author-provided FSC curve	2.35	2.59	2.37
Unmasked-calculated*	2.80	3.26	2.85

*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 2.80 differs from the reported value 2.35 by more than 10 %

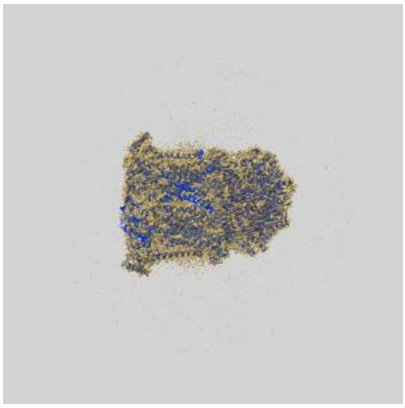
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-39324 and PDB model 8YIO. Per-residue inclusion information can be found in section 3 on page 12.

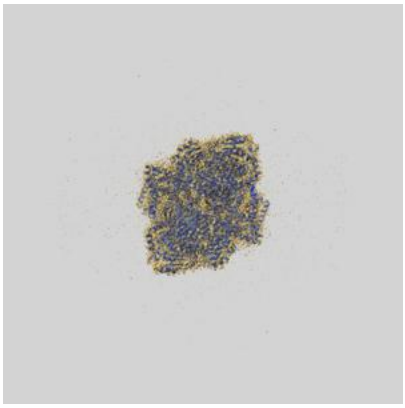
9.1 Map-model overlay



X



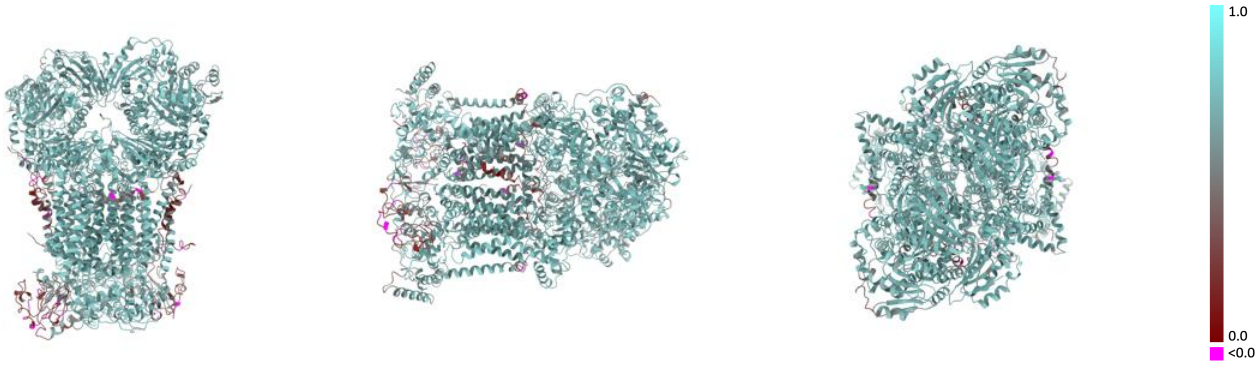
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 1.2 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.

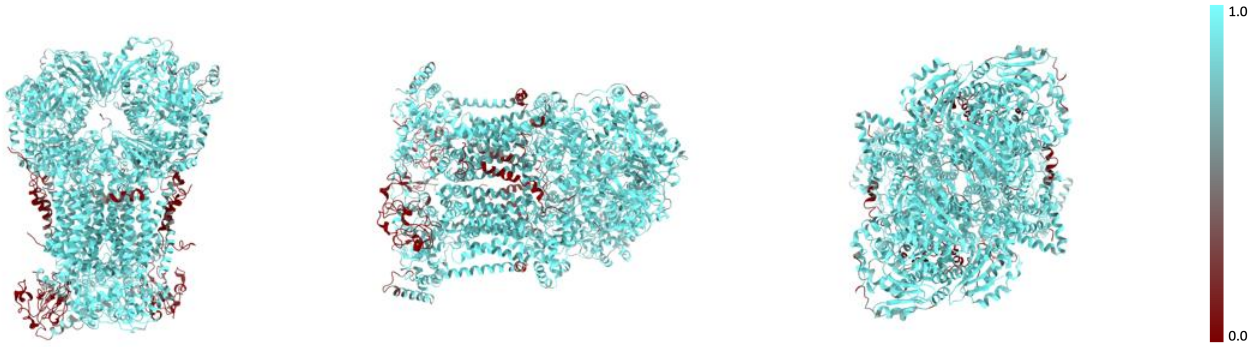
9.2 Q-score mapped to coordinate model (i)



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.

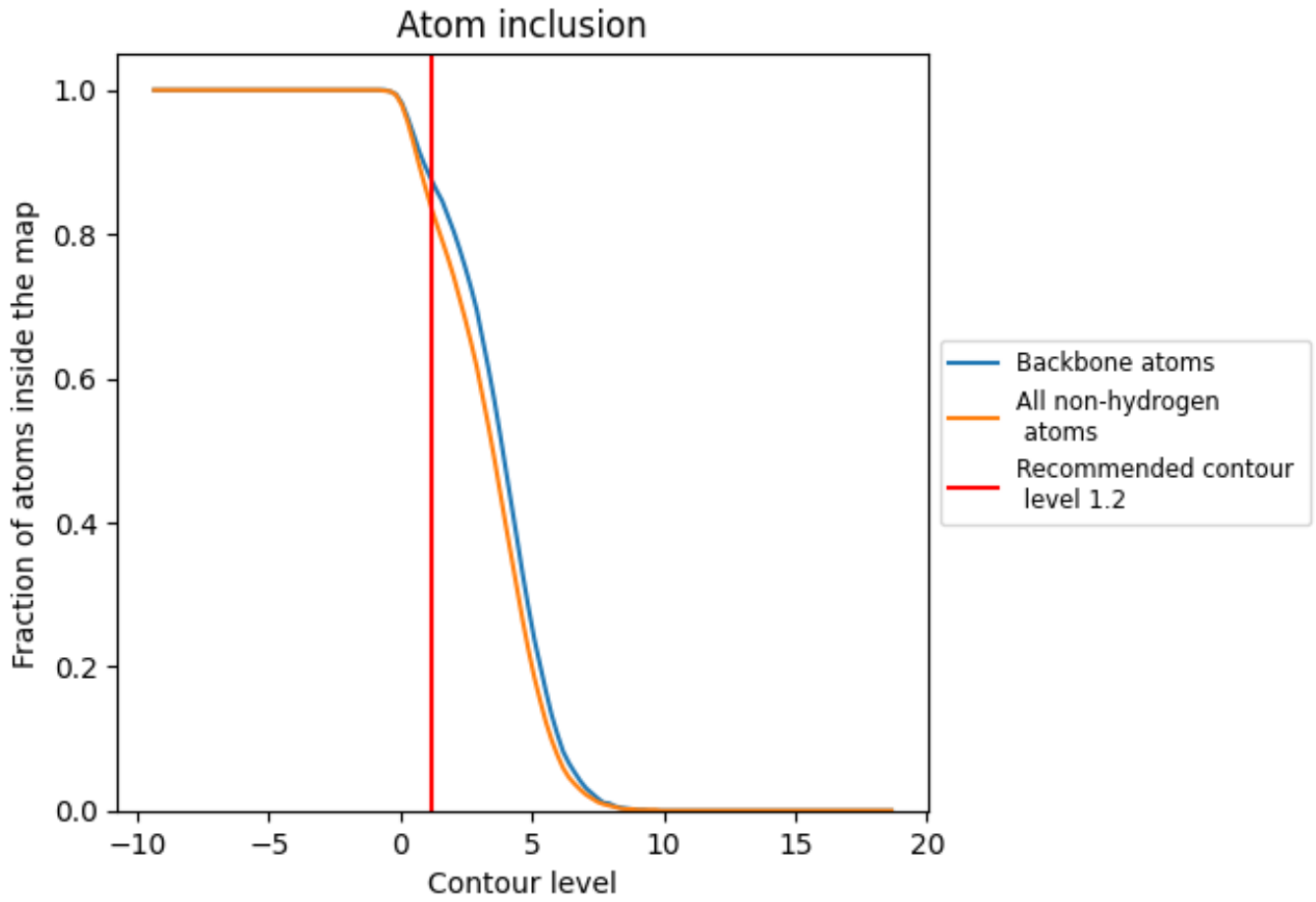
9.3 Atom inclusion mapped to coordinate model (i)



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 (1.2).

9.4 Atom inclusion (i)



At the recommended contour level, 87% of all backbone atoms, 83% 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 (1.2) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8340	0.6400
A	0.9200	0.6820
B	0.9360	0.6870
C	0.9580	0.7080
D	0.9470	0.6900
E	0.3460	0.3900
F	0.7270	0.5780
G	0.9180	0.6880
H	0.7270	0.5910
I	0.5300	0.5150
L	0.9200	0.6810
M	0.9370	0.6860
N	0.9560	0.7060
O	0.9410	0.6860
P	0.3410	0.3790
Q	0.7130	0.5850
R	0.9180	0.6860
S	0.7270	0.5880
T	0.5240	0.4970
U	0.0180	0.2440
V	0.0100	0.2390