Full wwPDB EM Validation Report ⓘ

Mar 8, 2026 – 11:08 AM UTC

PDB ID	:	6LUM / pdb_00006lum
EMDB ID	:	EMD-0981
Title	:	Structure of Mycobacterium smegmatis succinate dehydrogenase 2
Authors	:	Gao, Y.; Gong, H.; Zhou, X.; Xiao, Y.; Wang, W.; Ji, W.; Wang, Q.; Rao, Z.
Deposited on	:	2020-01-29
Resolution	:	2.84 Å(reported)

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:

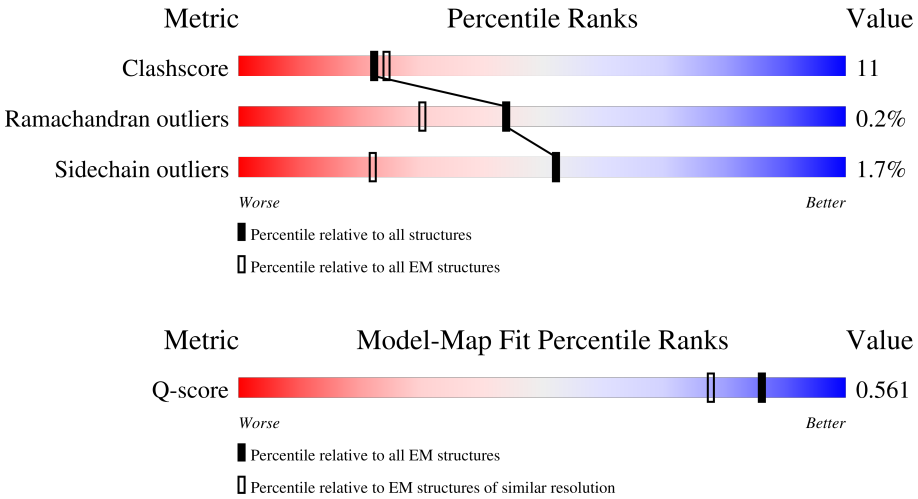
EMDB validation analysis	:	0.0.1.dev132
Mogul	:	2022.3.0, CSD as543be (2022)
MolProbity	:	4-5-2 with Phenix2.0
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics	:	202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

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 2.84 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	11884 (2.34 - 3.34)

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	C	138	75% 13% 12%
1	G	138	68% 21% 11%
1	M	138	68% 21% 11%
2	D	166	75% 13% 12%

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Mol	Chain	Length	Quality of chain
2	H	166	54% 17% 28%
2	N	166	54% 14% 30%
3	E	32	50% 28% 19%
3	I	32	53% 25% 19%
3	O	32	53% 25% 19%
4	A	584	70% 22% 8%
4	J	584	68% 23% 9%
4	P	584	6% 65% 27% 8%
5	B	261	72% 20% 9%
5	K	261	71% 23% 5%
5	Q	261	5% 69% 23% 9%

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

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
15	F3S	Q	303	-	-	X	-

2 Entry composition (i)

There are 15 unique types of molecules in this entry. The entry contains 26191 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 Succinate dehydrogenase subunit C.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	C	122	Total	C	N	O	S	0	0
			978	649	170	154	5		
1	G	123	Total	C	N	O	S	0	0
			989	658	171	155	5		
1	M	123	Total	C	N	O	S	0	0
			990	660	171	154	5		

- Molecule 2 is a protein called Succinate dehydrogenase subunit D.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	D	146	Total	C	N	O	S	0	0
			1193	793	202	191	7		
2	H	120	Total	C	N	O	S	0	0
			991	669	159	157	6		
2	N	116	Total	C	N	O	S	0	0
			961	650	152	153	6		

- Molecule 3 is a protein called Succinate dehydrogenase subunit F.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	E	31	Total	C	N	O	S	0	0
			256	179	35	41	1		
3	I	31	Total	C	N	O	S	0	0
			256	179	35	41	1		
3	O	31	Total	C	N	O	S	0	0
			256	179	35	41	1		

- Molecule 4 is a protein called Succinate dehydrogenase subunit A.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	A	539	Total	C	N	O	S	0	0
			4129	2575	748	782	24		

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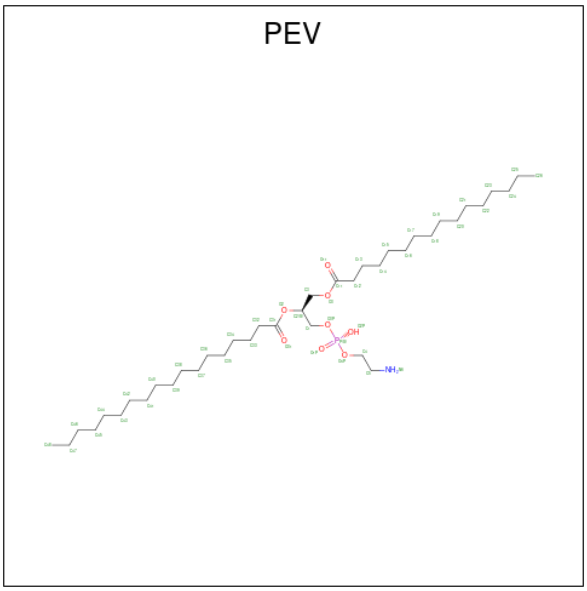
Mol	Chain	Residues	Atoms					AltConf	Trace
4	J	534	Total	C	N	O	S	0	0
			4109	2565	741	779	24		
4	P	539	Total	C	N	O	S	0	0
			4025	2513	722	767	23		

- Molecule 5 is a protein called Succinate dehydrogenase subunit B.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	B	238	Total	C	N	O	S	0	0
			1873	1182	335	338	18		
5	K	247	Total	C	N	O	S	0	0
			1938	1225	344	351	18		
5	Q	238	Total	C	N	O	S	0	0
			1849	1170	330	331	18		

- Molecule 6 is (1S)-2-{[(2-AMINOETHOXY)(HYDROXY)PHOSPHORYL]OXY}-1-[(PALMITOYLOXY)METHYL]ETHYL STEARATE (CCD ID: PEV) (formula: $C_{39}H_{78}NO_8P$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					AltConf
6	C	1	Total	C	N	O	P	0
			41	31	1	8	1	
6	C	1	Total	C	N	O	P	0
			44	34	1	8	1	
6	G	1	Total	C	N	O	P	0
			44	34	1	8	1	

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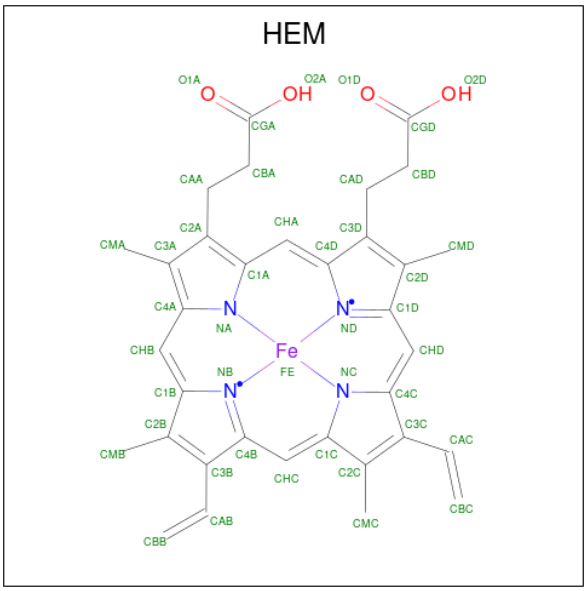
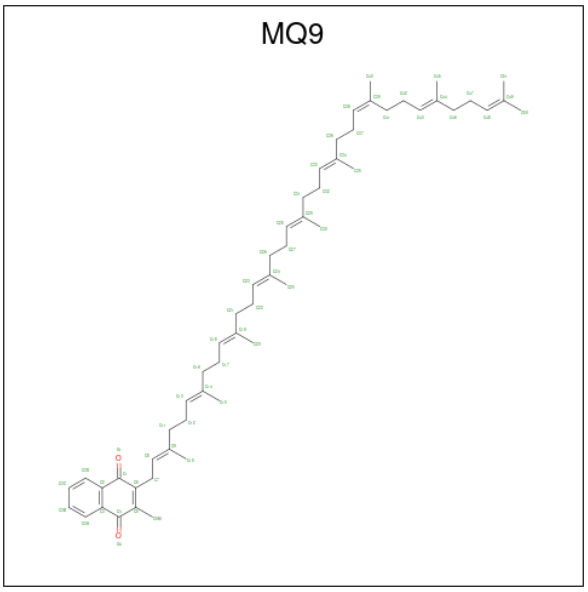
Mol	Chain	Residues	Atoms					AltConf
6	K	1	Total	C	N	O	P	0
			41	31	1	8	1	
6	M	1	Total	C	N	O	P	0
			44	34	1	8	1	
6	Q	1	Total	C	N	O	P	0
			41	31	1	8	1	

- Molecule 7 is PROTOPORPHYRIN IX CONTAINING FE (CCD ID: HEM) (formula: $C_{34}H_{32}FeN_4O_4$) (labeled as "Ligand of Interest" by depositor).



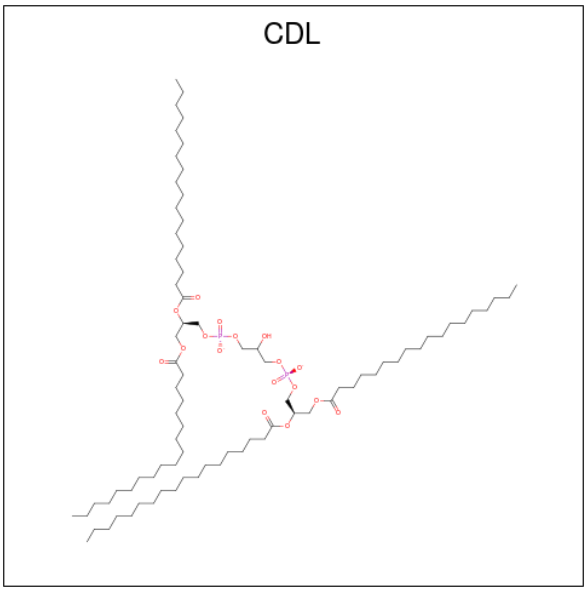
Mol	Chain	Residues	Atoms					AltConf
7	D	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
7	D	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
7	H	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
7	H	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
7	M	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
7	N	1	Total	C	Fe	N	O	0
			43	34	1	4	4	

- Molecule 8 is MENAQUINONE-9 (CCD ID: MQ9) (formula: $C_{56}H_{80}O_2$) (labeled as "Ligand of Interest" by depositor).



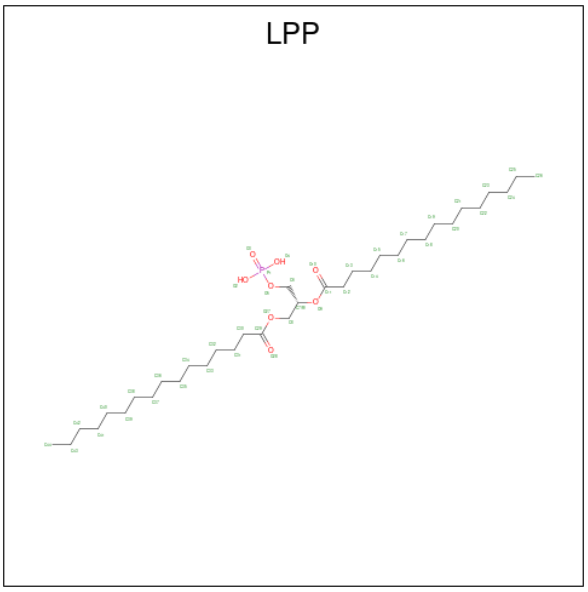
Mol	Chain	Residues	Atoms			AltConf
8	D	1	Total	C	O	0
			24	22	2	
8	D	1	Total	C	O	0
			24	22	2	
8	H	1	Total	C	O	0
			23	21	2	
8	N	1	Total	C	O	0
			23	21	2	
8	N	1	Total	C	O	0
			24	22	2	
8	N	1	Total	C	O	0
			23	21	2	

- Molecule 9 is CARDIOLIPIN (CCD ID: CDL) (formula: $C_{81}H_{156}O_{17}P_2$) (labeled as "Ligand of Interest" by depositor).



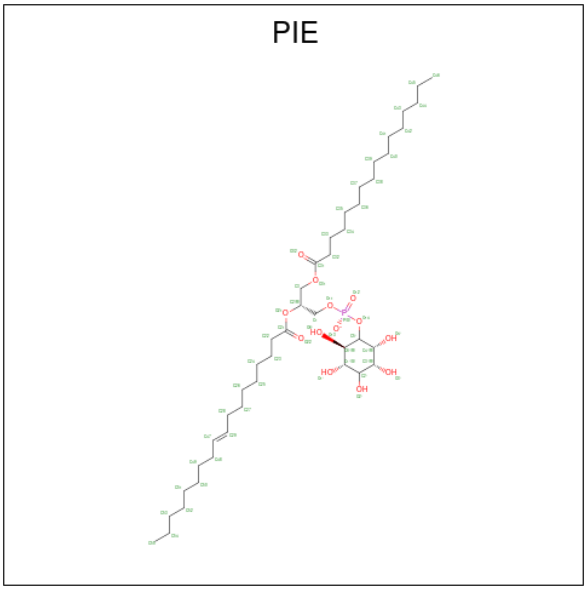
Mol	Chain	Residues	Atoms				AltConf
9	D	1	Total	C	O	P	0
			84	65	17	2	
9	H	1	Total	C	O	P	0
			84	65	17	2	
9	N	1	Total	C	O	P	0
			84	65	17	2	

- Molecule 10 is 2-(HEXADECANOYLOXY)-1-[(PHOSPHONOOXY)METHYL]ETHYL HEXADECANOATE (CCD ID: LPP) (formula: $C_{35}H_{69}O_8P$).



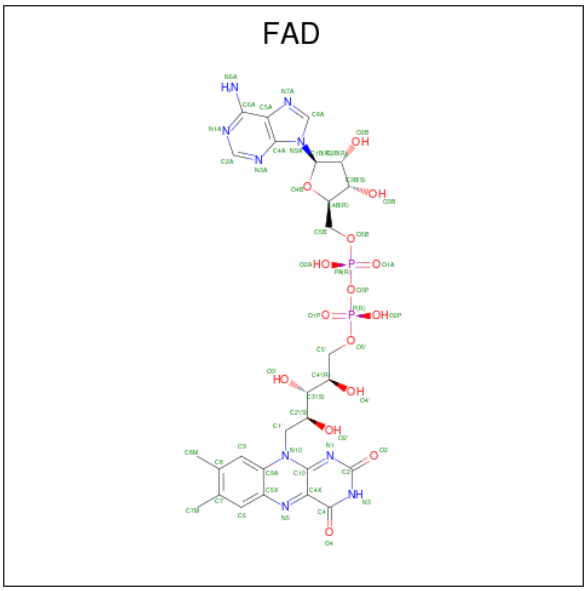
Mol	Chain	Residues	Atoms				AltConf
10	D	1	Total	C	O	P	0
			44	35	8	1	
10	H	1	Total	C	O	P	0
			44	35	8	1	
10	N	1	Total	C	O	P	0
			44	35	8	1	

- Molecule 11 is 1,2-DIACYL-SN-GLYCERO-3-PHOSPHOINOSITOL (CCD ID: PIE) (formula: $C_{43}H_{80}O_{13}P$) (labeled as "Ligand of Interest" by depositor).



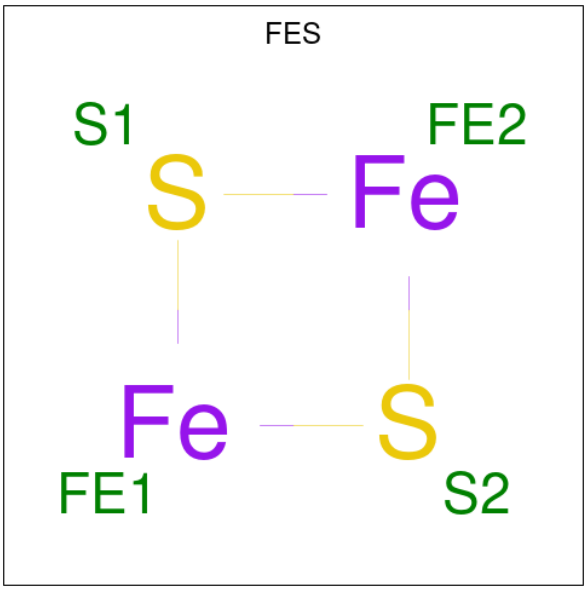
Mol	Chain	Residues	Atoms				AltConf
11	E	1	Total	C	O	P	0
			48	34	13	1	
11	H	1	Total	C	O	P	0
			48	34	13	1	
11	M	1	Total	C	O	P	0
			48	34	13	1	

- Molecule 12 is FLAVIN-ADENINE DINUCLEOTIDE (CCD ID: FAD) (formula: $C_{27}H_{33}N_9O_{15}P_2$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					AltConf
12	A	1	Total	C	N	O	P	0
			53	27	9	15	2	
12	J	1	Total	C	N	O	P	0
			53	27	9	15	2	
12	P	1	Total	C	N	O	P	0
			53	27	9	15	2	

- Molecule 13 is FE2/S2 (INORGANIC) CLUSTER (CCD ID: FES) (formula: Fe_2S_2).



Mol	Chain	Residues	Atoms			AltConf
13	B	1	Total	Fe	S	0
			4	2	2	

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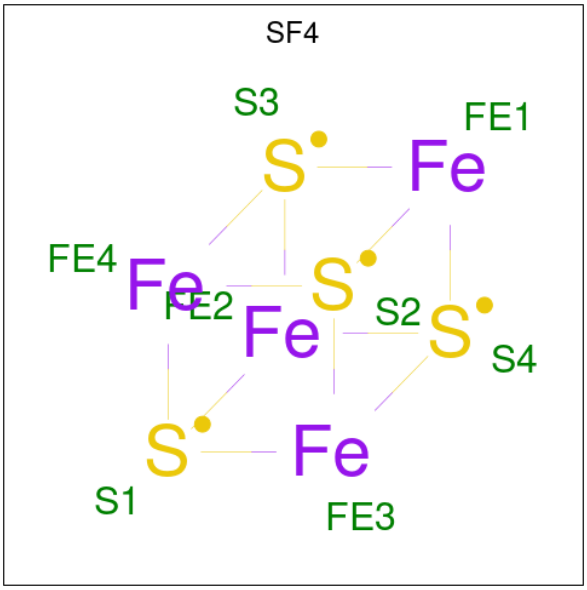
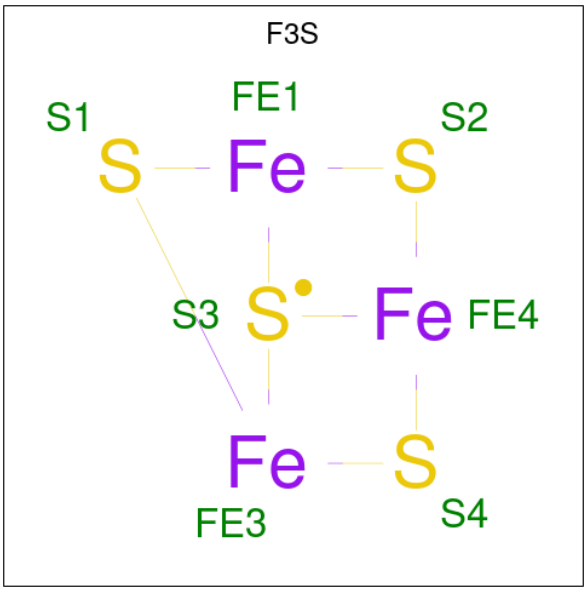
Mol	Chain	Residues	Atoms	AltConf
13	K	1	Total Fe S 4 2 2	0
13	Q	1	Total Fe S 4 2 2	0

- Molecule 14 is IRON/SULFUR CLUSTER (CCD ID: SF4) (formula: Fe_4S_4).



Mol	Chain	Residues	Atoms	AltConf
14	B	1	Total Fe S 8 4 4	0
14	K	1	Total Fe S 8 4 4	0
14	Q	1	Total Fe S 8 4 4	0

- Molecule 15 is FE3-S4 CLUSTER (CCD ID: F3S) (formula: Fe_3S_4).

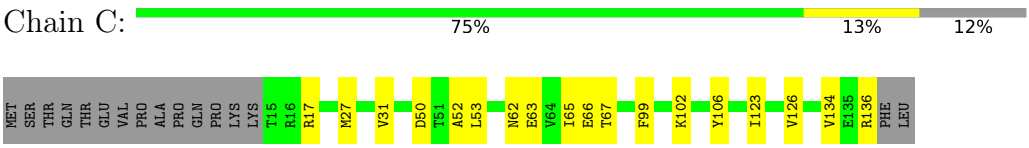


Mol	Chain	Residues	Atoms			AltConf
			Total	Fe	S	
15	B	1	7	3	4	0
			Total	Fe	S	
15	K	1	7	3	4	0
			Total	Fe	S	
15	Q	1	7	3	4	0

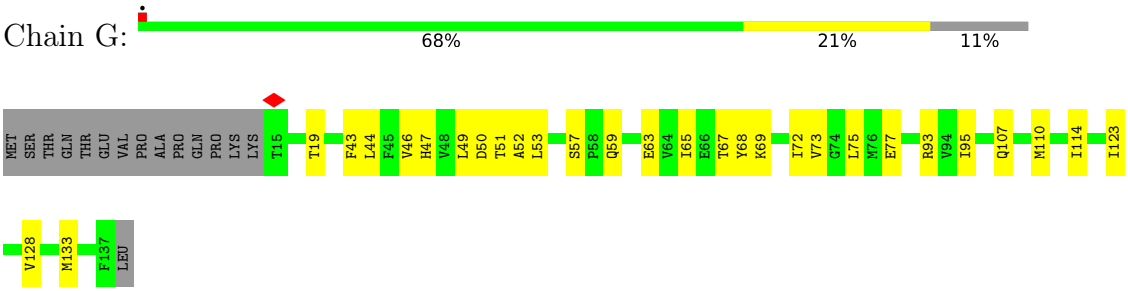
3 Residue-property plots (i)

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.

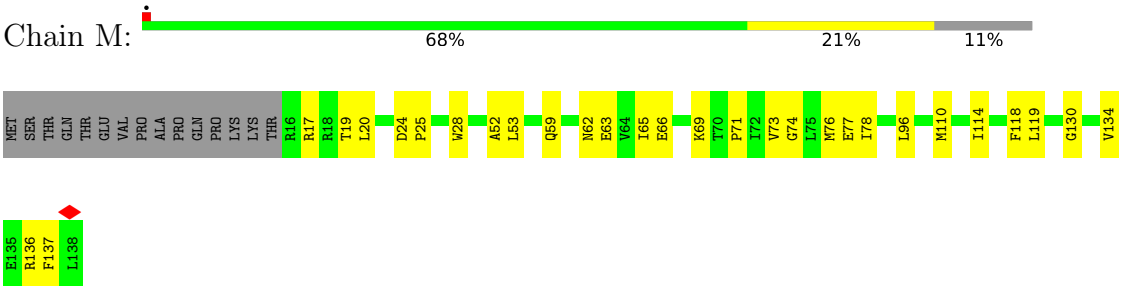
• Molecule 1: Succinate dehydrogenase subunit C



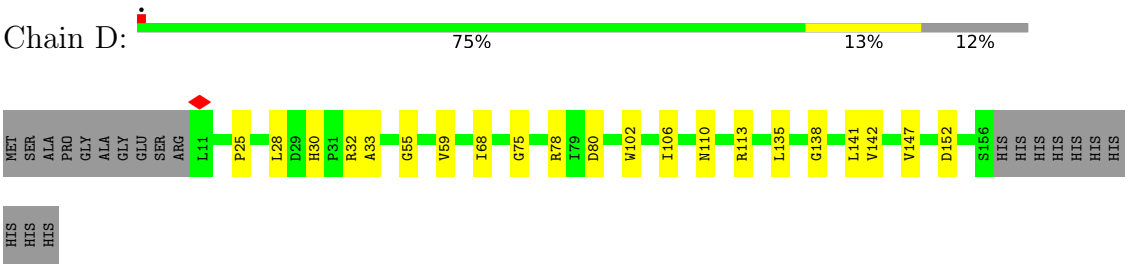
• Molecule 1: Succinate dehydrogenase subunit C



• Molecule 1: Succinate dehydrogenase subunit C

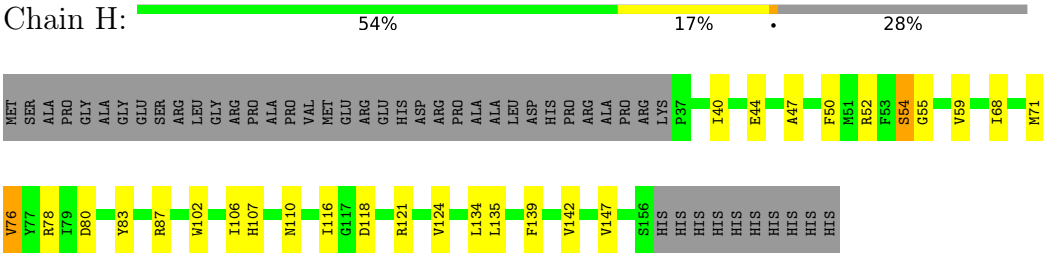


• Molecule 2: Succinate dehydrogenase subunit D



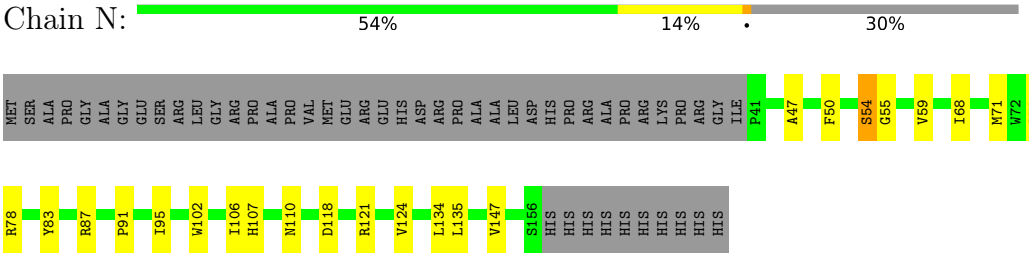
• Molecule 2: Succinate dehydrogenase subunit D

Chain H:



• Molecule 2: Succinate dehydrogenase subunit D

Chain N:



• Molecule 3: Succinate dehydrogenase subunit F

Chain E:

• Molecule 3: Succinate dehydrogenase subunit F

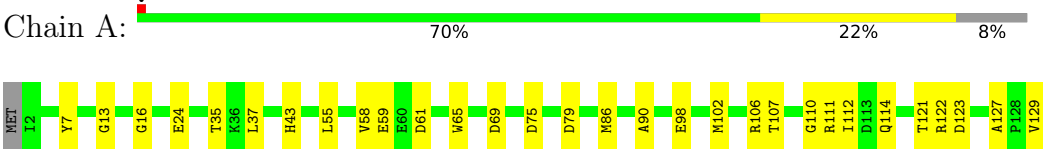
Chain I:

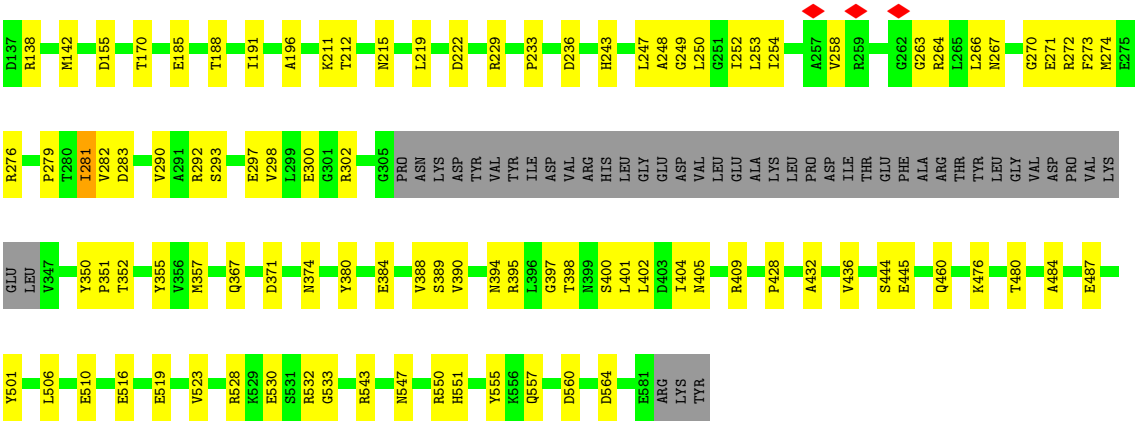
• Molecule 3: Succinate dehydrogenase subunit F

Chain O:

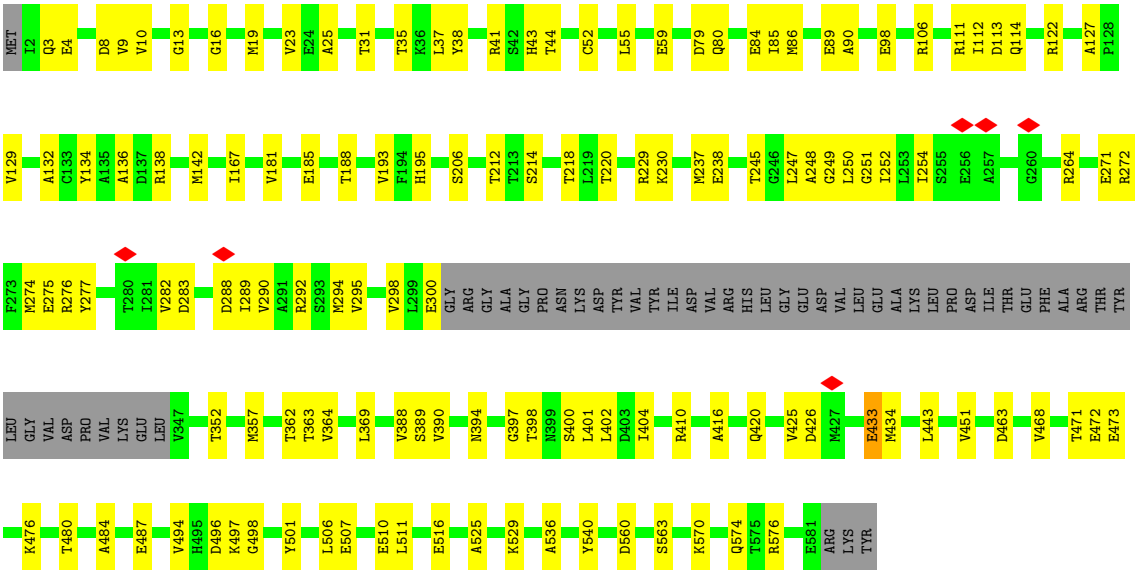
• Molecule 4: Succinate dehydrogenase subunit A

Chain A:

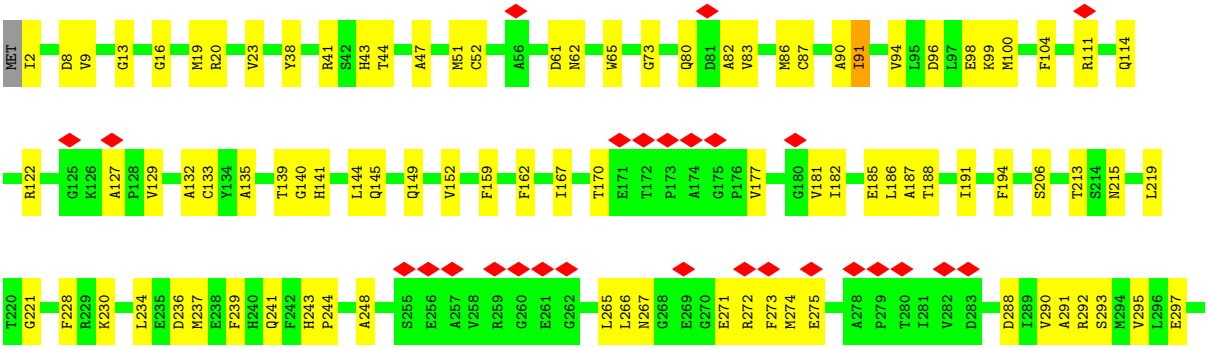


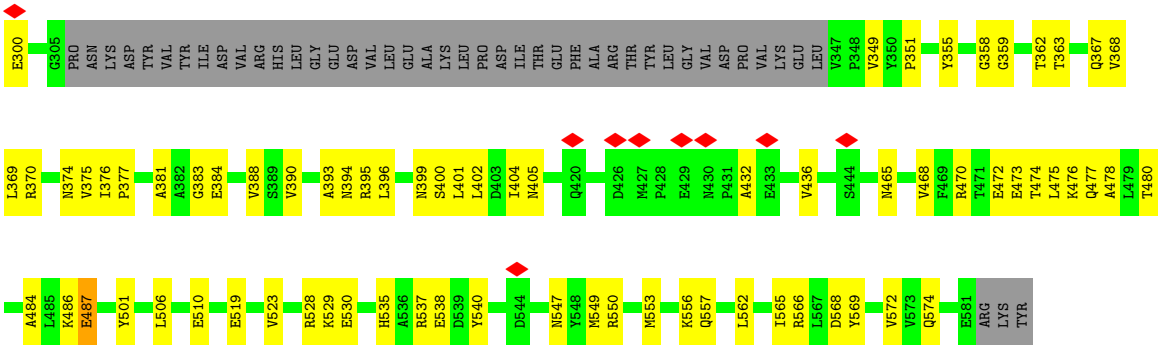


• Molecule 4: Succinate dehydrogenase subunit A

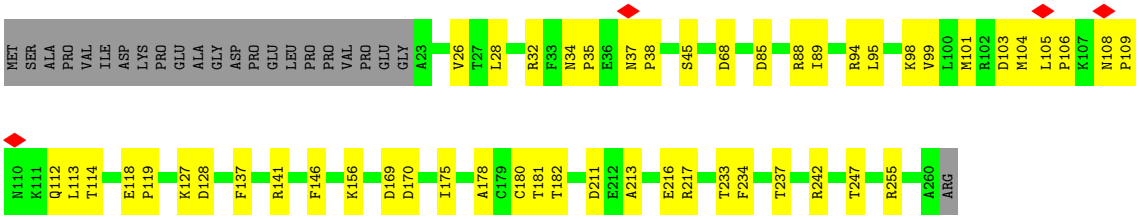


• Molecule 4: Succinate dehydrogenase subunit A

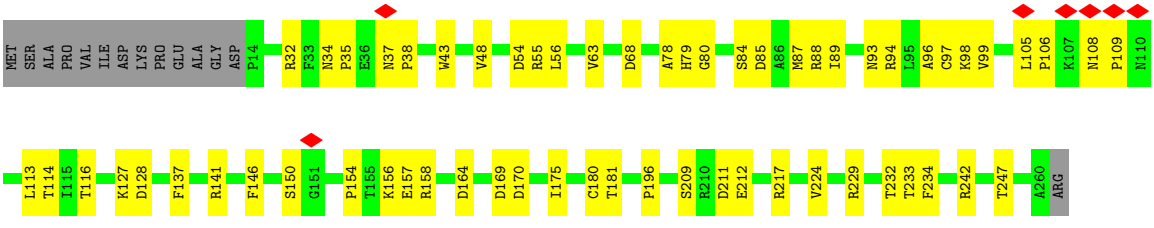




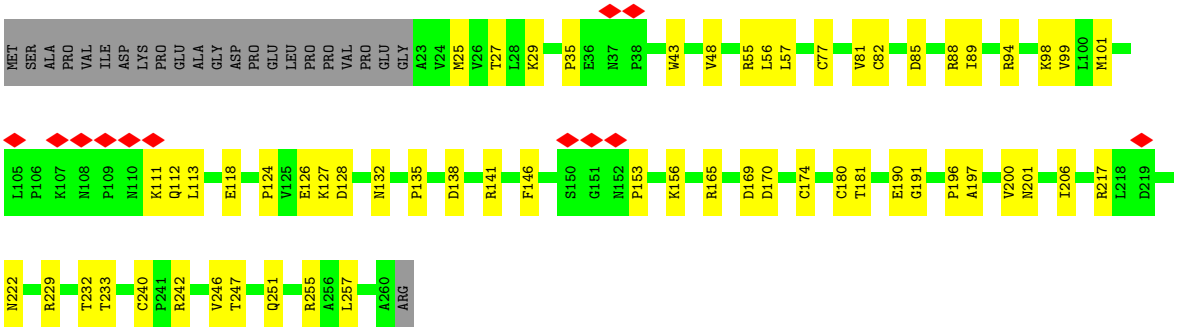
• Molecule 5: Succinate dehydrogenase subunit B



• Molecule 5: Succinate dehydrogenase subunit B



• Molecule 5: Succinate dehydrogenase subunit B



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	461385	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 ($e^-/Å^2$)	50	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	2.744	Depositor
Minimum map value	-1.845	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.056	Depositor
Recommended contour level	0.15	Depositor
Map size (Å)	314.88, 314.88, 314.88	wwPDB
Map dimensions	384, 384, 384	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.82, 0.82, 0.82	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: HEM, PIE, SF4, FAD, LPP, PEV, CDL, F3S, FES, MQ9

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	C	0.46	0/1003	0.50	0/1363
1	G	0.43	0/1015	0.50	0/1379
1	M	0.38	0/1016	0.50	0/1380
2	D	0.49	0/1234	0.45	0/1680
2	H	0.47	0/1025	0.45	0/1394
2	N	0.47	0/994	0.45	0/1352
3	E	0.39	0/262	0.57	0/359
3	I	0.39	0/262	0.57	0/359
3	O	0.39	0/262	0.57	0/359
4	A	0.39	0/4209	0.48	0/5704
4	J	0.34	0/4189	0.47	0/5677
4	P	0.24	0/4102	0.47	0/5573
5	B	0.55	0/1916	0.56	0/2605
5	K	0.50	0/1985	0.54	0/2702
5	Q	0.38	0/1891	0.51	0/2573
All	All	0.40	0/25365	0.49	0/34459

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	K	0	2

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
5	K	37	ASN	Peptide
5	K	80	GLY	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	C	978	0	1020	13	0
1	G	989	0	1029	25	0
1	M	990	0	1032	18	0
2	D	1193	0	1184	17	0
2	H	991	0	985	22	0
2	N	961	0	951	17	0
3	E	256	0	271	10	0
3	I	256	0	271	8	0
3	O	256	0	271	9	0
4	A	4129	0	4015	101	0
4	J	4109	0	4003	88	0
4	P	4025	0	3853	134	0
5	B	1873	0	1854	37	0
5	K	1938	0	1918	40	0
5	Q	1849	0	1826	44	0
6	C	85	0	116	0	0
6	G	44	0	61	3	0
6	K	41	0	55	1	0
6	M	44	0	61	2	0
6	Q	41	0	55	0	0
7	D	86	0	60	6	0
7	H	86	0	60	8	0
7	M	43	0	30	3	0
7	N	43	0	30	2	0
8	D	48	0	46	4	0
8	H	23	0	21	0	0
8	N	70	0	65	7	0
9	D	84	0	115	2	0
9	H	84	0	115	5	0
9	N	84	0	115	2	0
10	D	44	0	67	2	0
10	H	44	0	67	3	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
10	N	44	0	67	2	0
11	E	48	0	56	4	0
11	H	48	0	56	3	0
11	M	48	0	55	3	0
12	A	53	0	29	18	0
12	J	53	0	29	6	0
12	P	53	0	29	6	0
13	B	4	0	0	0	0
13	K	4	0	0	0	0
13	Q	4	0	0	0	0
14	B	8	0	0	0	0
14	K	8	0	0	0	0
14	Q	8	0	0	1	0
15	B	7	0	0	1	0
15	K	7	0	0	1	0
15	Q	7	0	0	2	0
All	All	26191	0	25943	595	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 11.

All (595) 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)
4:J:43:HIS:NE2	12:J:700:FAD:C8M	1.70	1.54
4:A:43:HIS:NE2	12:A:700:FAD:C8M	1.71	1.51
4:P:43:HIS:NE2	12:P:700:FAD:C8M	1.70	1.50
4:J:43:HIS:CE1	12:J:700:FAD:C8M	2.27	1.16
4:A:43:HIS:CE1	12:A:700:FAD:C8M	2.30	1.14
5:K:233:THR:O	15:K:303:F3S:S4	2.06	1.13
5:B:233:THR:O	15:B:303:F3S:S4	2.09	1.10
4:A:401:LEU:HD12	12:A:700:FAD:O2	1.50	1.07
5:Q:233:THR:O	15:Q:303:F3S:S4	2.14	1.05
7:H:202:HEM:HBC1	7:H:203:HEM:HBB1	1.35	1.04
5:B:106:PRO:HG3	5:B:113:LEU:HD13	1.49	0.93
4:P:43:HIS:HE1	4:P:215:ASN:HA	1.32	0.91
4:P:43:HIS:CE1	12:P:700:FAD:C8M	2.57	0.88
4:P:13:GLY:HA2	12:P:700:FAD:H1B	1.57	0.87
2:D:68:ILE:O	2:D:78:ARG:NH1	2.09	0.86
7:H:202:HEM:HBC1	7:H:203:HEM:CBB	2.05	0.86
4:A:401:LEU:CD1	12:A:700:FAD:O2	2.24	0.85

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:A:401:LEU:HD11	12:A:700:FAD:C2	2.07	0.83
4:A:401:LEU:CD1	12:A:700:FAD:C2	2.56	0.83
2:N:68:ILE:O	2:N:78:ARG:NH1	2.13	0.82
2:H:68:ILE:O	2:H:78:ARG:NH1	2.13	0.81
2:D:110:ASN:OD1	2:D:113:ARG:NH1	2.13	0.81
4:A:395:ARG:NE	4:A:400:SER:OG	2.15	0.80
4:A:13:GLY:HA2	12:A:700:FAD:H1B	1.65	0.79
4:J:295:VAL:HG21	4:J:468:VAL:HG11	1.65	0.78
4:A:401:LEU:HD11	12:A:700:FAD:N3	1.99	0.78
4:A:98:GLU:OE2	4:A:106:ARG:NH2	2.16	0.78
4:J:98:GLU:OE1	4:J:106:ARG:NH2	2.16	0.77
5:K:89:ILE:HD12	5:K:94:ARG:HB2	1.64	0.77
4:A:55:LEU:HB2	4:A:114:GLN:HE22	1.50	0.76
5:B:88:ARG:NH1	5:B:119:PRO:O	2.17	0.76
4:P:528:ARG:NH2	4:P:550:ARG:O	2.20	0.75
4:P:187:ALA:HA	4:P:501:TYR:HE1	1.52	0.74
4:P:213:THR:HG22	4:P:215:ASN:H	1.53	0.73
2:H:118:ASP:OD1	5:K:229:ARG:NH2	2.20	0.73
4:A:292:ARG:NH1	4:A:533:GLY:O	2.21	0.72
4:P:404:ILE:HG21	12:P:700:FAD:H5'2	1.70	0.72
5:B:108:ASN:HB3	5:B:109:PRO:HD3	1.71	0.72
4:P:547:ASN:O	4:P:550:ARG:NH2	2.22	0.72
4:J:264:ARG:HE	4:J:272:ARG:HH21	1.37	0.72
4:J:272:ARG:O	4:J:276:ARG:NH2	2.22	0.71
4:P:274:MET:HE3	4:P:290:VAL:HG23	1.70	0.71
2:H:50:PHE:O	2:H:54:SER:OG	2.09	0.71
7:H:203:HEM:HBC2	7:H:203:HEM:HHD	1.74	0.70
4:P:501:TYR:OH	5:Q:126:GLU:OE1	2.09	0.70
5:B:112:GLN:NE2	5:B:114:THR:OG1	2.23	0.70
4:J:89:GLU:OE1	4:J:410:ARG:NH2	2.25	0.70
4:J:272:ARG:NH1	4:J:275:GLU:OE1	2.25	0.69
1:M:17:ARG:HH21	1:M:19:THR:HG21	1.57	0.69
4:P:370:ARG:HB3	4:P:376:ILE:HD11	1.72	0.69
4:A:212:THR:HG22	4:A:352:THR:HG22	1.75	0.69
5:B:234:PHE:CD2	5:B:247:THR:HG21	2.28	0.69
5:K:234:PHE:CD2	5:K:247:THR:HG21	2.28	0.69
5:B:169:ASP:OD1	5:B:170:ASP:N	2.25	0.68
4:J:55:LEU:HB2	4:J:114:GLN:HE22	1.58	0.68
2:N:50:PHE:O	2:N:54:SER:OG	2.09	0.68
4:P:145:GLN:NE2	5:Q:174:CYS:O	2.26	0.68
4:P:501:TYR:HB2	5:Q:127:LYS:HD2	1.75	0.68

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:N:118:ASP:OD1	5:Q:229:ARG:NH2	2.27	0.68
5:K:211:ASP:OD2	5:K:217:ARG:NH1	2.26	0.67
7:M:201:HEM:HHC	7:M:201:HEM:HBB2	1.76	0.67
4:P:465:ASN:HD22	4:P:474:THR:HG23	1.59	0.67
4:P:395:ARG:HE	4:P:400:SER:HB2	1.60	0.67
4:P:90:ALA:HB1	4:P:402:LEU:HG	1.77	0.66
7:N:202:HEM:HMC2	7:N:202:HEM:HBC2	1.76	0.66
2:N:47:ALA:HB1	2:N:110:ASN:HD21	1.59	0.66
4:P:47:ALA:HB3	4:P:140:GLY:HA3	1.77	0.66
2:H:47:ALA:HB1	2:H:110:ASN:HD21	1.59	0.66
5:K:146:PHE:O	5:K:217:ARG:NH2	2.30	0.65
4:P:185:GLU:OE1	4:P:188:THR:OG1	2.11	0.65
4:J:84:GLU:OE2	4:J:576:ARG:NH2	2.25	0.64
3:O:26:ARG:NH2	5:Q:190:GLU:OE2	2.30	0.64
4:J:443:LEU:O	4:J:497:LYS:NZ	2.28	0.64
4:P:549:MET:HG2	4:P:572:VAL:HG11	1.78	0.64
9:H:205:CDL:H142	11:H:206:PIE:H281	1.80	0.64
4:A:215:ASN:HB3	4:A:219:LEU:HD12	1.80	0.64
5:Q:128:ASP:OD1	5:Q:128:ASP:N	2.29	0.64
4:P:52:CYS:HA	4:P:132:ALA:HA	1.80	0.63
4:A:35:THR:CG2	12:A:700:FAD:O2B	2.47	0.63
1:M:53:LEU:HD21	3:O:1:MET:HE1	1.80	0.63
5:Q:29:LYS:HG2	5:Q:43:TRP:HE3	1.62	0.63
4:P:288:ASP:OD1	4:P:394:ASN:ND2	2.31	0.63
12:A:700:FAD:O2'	12:A:700:FAD:O4'	2.14	0.63
7:N:202:HEM:HMB1	7:N:202:HEM:HBB2	1.81	0.63
5:B:32:ARG:NH1	5:B:68:ASP:OD2	2.32	0.62
1:G:53:LEU:HD21	3:I:1:MET:HE1	1.81	0.62
4:A:506:LEU:O	4:A:510:GLU:HG2	1.98	0.62
2:D:30:HIS:CD2	5:K:212:GLU:HG2	2.35	0.62
4:J:4:GLU:HG2	4:J:193:VAL:HB	1.81	0.62
5:B:106:PRO:HA	5:B:109:PRO:HD2	1.81	0.62
4:P:114:GLN:NE2	4:P:133:CYS:SG	2.73	0.62
4:P:486:LYS:NZ	4:P:519:GLU:OE1	2.33	0.61
4:A:65:TRP:CE2	4:A:123:ASP:HB3	2.35	0.61
5:B:37:ASN:HB3	5:B:38:PRO:HD3	1.82	0.61
4:A:122:ARG:N	4:A:127:ALA:O	2.34	0.61
4:P:383:GLY:HA2	4:P:404:ILE:HG22	1.82	0.61
5:Q:165:ARG:NH1	5:Q:169:ASP:OD1	2.31	0.61
4:J:25:ALA:O	4:J:31:THR:OG1	2.19	0.61
4:J:13:GLY:HA2	12:J:700:FAD:H1B	1.83	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:J:90:ALA:HB1	4:J:402:LEU:HD11	1.83	0.61
5:Q:124:PRO:HG2	5:Q:132:ASN:HB3	1.83	0.61
4:A:501:TYR:HB2	5:B:127:LYS:HD3	1.82	0.61
4:P:187:ALA:HA	4:P:501:TYR:CE1	2.36	0.61
4:J:425:VAL:HG23	4:J:426:ASP:H	1.65	0.60
1:M:52:ALA:HA	2:N:147:VAL:HG21	1.83	0.60
4:J:400:SER:O	4:J:404:ILE:HG23	2.01	0.60
4:A:106:ARG:NH1	4:A:111:ARG:O	2.35	0.60
4:J:185:GLU:OE1	4:J:188:THR:OG1	2.18	0.60
5:Q:180:CYS:SG	5:Q:181:THR:N	2.75	0.60
4:J:294:MET:O	4:J:298:VAL:HG23	2.02	0.59
1:C:52:ALA:HA	2:D:147:VAL:HG21	1.84	0.59
4:A:61:ASP:HA	4:A:65:TRP:CZ3	2.37	0.59
1:G:65:ILE:HD11	2:H:80:ASP:HA	1.84	0.59
5:Q:89:ILE:HD12	5:Q:94:ARG:HB3	1.85	0.59
4:J:122:ARG:N	4:J:127:ALA:O	2.35	0.59
4:A:300:GLU:OE2	4:A:302:ARG:NH1	2.36	0.59
4:J:16:GLY:HA3	4:J:404:ILE:HD12	1.84	0.59
3:O:17:THR:O	3:O:21:VAL:HG22	2.03	0.59
5:Q:191:GLY:HA3	5:Q:229:ARG:HH12	1.67	0.59
3:E:17:THR:O	3:E:21:VAL:HG22	2.03	0.59
4:A:107:THR:HG23	4:A:110:GLY:H	1.66	0.59
4:P:506:LEU:O	4:P:510:GLU:HG2	2.02	0.59
4:A:90:ALA:HB1	4:A:402:LEU:HD11	1.85	0.58
4:A:35:THR:HG22	12:A:700:FAD:O2B	2.04	0.58
4:J:52:CYS:SG	4:J:398:THR:OG1	2.57	0.58
5:Q:169:ASP:OD2	5:Q:170:ASP:N	2.35	0.58
1:C:99:PHE:O	5:B:255:ARG:NH1	2.36	0.58
3:I:17:THR:O	3:I:21:VAL:HG22	2.03	0.58
4:J:245:THR:HB	4:J:254:ILE:HB	1.83	0.58
11:M:202:PIE:H361	3:O:21:VAL:HG21	1.85	0.58
4:A:357:MET:HE3	4:A:394:ASN:HA	1.86	0.58
1:C:53:LEU:HD21	3:E:1:MET:HE1	1.85	0.58
4:A:229:ARG:NE	4:A:516:GLU:OE2	2.37	0.58
4:A:111:ARG:O	4:A:112:ILE:HG13	2.04	0.57
4:J:55:LEU:HB2	4:J:114:GLN:NE2	2.18	0.57
1:G:46:VAL:HG21	3:I:12:ALA:HB2	1.86	0.57
7:M:201:HEM:HMC1	7:M:201:HEM:HBC2	1.86	0.57
4:P:484:ALA:HA	4:P:487:GLU:OE1	2.04	0.57
4:P:292:ARG:HD3	4:P:468:VAL:HG12	1.85	0.57
4:P:206:SER:HB3	4:P:221:GLY:HA3	1.85	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:I:6:GLU:O	3:I:10:VAL:HG22	2.05	0.57
4:P:292:ARG:NH2	4:P:538:GLU:OE2	2.37	0.57
4:P:535:HIS:HE1	4:P:537:ARG:HG2	1.69	0.57
4:P:44:THR:HB	4:P:144:LEU:HD13	1.86	0.57
4:J:98:GLU:HG3	4:J:112:ILE:HD11	1.86	0.57
4:P:248:ALA:H	4:P:349:VAL:HA	1.69	0.57
4:J:400:SER:HB2	12:J:700:FAD:O2	2.05	0.57
5:K:32:ARG:NH1	5:K:68:ASP:OD2	2.37	0.57
2:D:30:HIS:HB3	2:D:33:ALA:HB2	1.87	0.57
7:D:201:HEM:HBB2	7:D:201:HEM:HHC	1.86	0.57
5:Q:138:ASP:OD2	5:Q:141:ARG:NH2	2.37	0.57
4:P:267:ASN:N	4:P:271:GLU:O	2.33	0.56
4:A:211:LYS:NZ	4:A:460:GLN:OE1	2.37	0.56
5:B:95:LEU:HD23	5:B:98:LYS:HD2	1.87	0.56
3:O:6:GLU:O	3:O:10:VAL:HG22	2.05	0.56
3:E:6:GLU:O	3:E:10:VAL:HG22	2.05	0.56
4:J:111:ARG:O	4:J:112:ILE:HG13	2.05	0.56
4:P:535:HIS:CE1	4:P:537:ARG:HG2	2.41	0.56
4:A:75:ASP:OD1	4:A:543:ARG:NH1	2.39	0.56
5:B:146:PHE:O	5:B:217:ARG:NH2	2.39	0.56
4:A:243:HIS:O	4:A:351:PRO:HA	2.05	0.56
4:A:16:GLY:HA3	4:A:404:ILE:HD12	1.87	0.56
4:J:4:GLU:OE1	4:J:195:HIS:NE2	2.37	0.56
4:J:79:ASP:OD2	4:J:389:SER:OG	2.24	0.56
5:K:85:ASP:OD1	5:K:85:ASP:N	2.38	0.56
5:Q:25:MET:HA	5:Q:48:VAL:O	2.06	0.56
5:Q:146:PHE:O	5:Q:217:ARG:NH2	2.39	0.56
1:C:65:ILE:HD11	2:D:80:ASP:HA	1.87	0.55
5:B:178:ALA:O	5:B:182:THR:OG1	2.21	0.55
4:P:465:ASN:HD21	4:P:477:GLN:HE21	1.53	0.55
4:A:86:MET:SD	4:A:390:VAL:HG11	2.47	0.55
5:B:180:CYS:SG	5:B:181:THR:N	2.79	0.55
4:P:104:PHE:HA	4:P:135:ALA:HA	1.87	0.55
4:P:43:HIS:CE1	4:P:215:ASN:HA	2.25	0.55
4:P:523:VAL:HG11	4:P:565:ILE:HD11	1.87	0.55
4:A:298:VAL:HG11	4:A:350:TYR:HE1	1.71	0.55
4:P:241:GLN:HE22	4:P:395:ARG:HD3	1.72	0.55
5:Q:181:THR:HA	5:Q:196:PRO:HD2	1.87	0.55
4:P:38:TYR:HB2	4:P:41:ARG:HD3	1.89	0.55
5:K:56:LEU:HB2	5:K:99:VAL:HG21	1.88	0.54
1:G:52:ALA:HA	2:H:147:VAL:HG21	1.88	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:J:3:GLN:N	4:J:3:GLN:OE1	2.39	0.54
4:J:59:GLU:OE2	4:J:122:ARG:NH2	2.40	0.54
5:K:180:CYS:SG	5:K:181:THR:N	2.81	0.54
5:K:234:PHE:CE2	5:K:247:THR:HG21	2.41	0.54
4:P:465:ASN:ND2	4:P:477:GLN:HE21	2.05	0.54
5:B:34:ASN:HB3	5:B:38:PRO:HD2	1.90	0.54
4:J:35:THR:HG22	4:J:37:LEU:H	1.72	0.54
4:J:443:LEU:HD23	4:J:494:VAL:HG21	1.88	0.54
4:P:239:PHE:CE1	4:P:535:HIS:HB2	2.43	0.54
4:P:239:PHE:HE1	4:P:535:HIS:HB2	1.72	0.54
4:J:80:GLN:NE2	4:J:574:GLN:OE1	2.41	0.54
4:P:529:LYS:HB3	4:P:540:TYR:CD2	2.42	0.54
4:P:122:ARG:N	4:P:127:ALA:O	2.41	0.54
7:D:201:HEM:HBC2	7:D:201:HEM:HMC1	1.89	0.54
5:B:32:ARG:NE	5:B:128:ASP:OD2	2.41	0.54
2:H:142:VAL:HG13	8:N:204:MQ9:H72	1.89	0.54
4:P:99:LYS:HD3	5:Q:153:PRO:HB2	1.89	0.54
4:J:369:LEU:HD21	4:J:570:LYS:HZ1	1.73	0.53
5:Q:56:LEU:HB2	5:Q:99:VAL:HG21	1.88	0.53
2:N:75:GLY:O	2:N:78:ARG:HG2	2.08	0.53
4:P:234:LEU:HD13	4:P:237:MET:HE3	1.88	0.53
4:P:182:ILE:HD12	4:P:432:ALA:HB2	1.91	0.53
4:A:24:GLU:HG3	4:A:409:ARG:HG3	1.90	0.53
4:P:557:GLN:HE22	4:P:566:ARG:NH1	2.07	0.53
4:A:136:ALA:HB3	4:A:138:ARG:HG2	1.91	0.53
4:A:388:VAL:O	4:A:389:SER:OG	2.23	0.53
4:J:471:THR:HG22	4:J:472:GLU:H	1.74	0.53
4:A:297:GLU:HA	4:A:300:GLU:HG2	1.91	0.52
1:G:47:HIS:HE1	7:H:202:HEM:ND	2.07	0.52
2:H:75:GLY:O	2:H:78:ARG:HG2	2.08	0.52
5:B:89:ILE:HD13	5:B:99:VAL:HG21	1.90	0.52
4:J:238:GLU:HB2	4:J:525:ALA:HB2	1.92	0.52
1:C:102:LYS:HE2	1:C:106:TYR:HE2	1.75	0.52
4:P:80:GLN:HA	4:P:83:VAL:HG12	1.90	0.52
4:P:181:VAL:HG22	4:P:194:PHE:HB2	1.92	0.52
4:A:222:ASP:HB2	12:A:700:FAD:H61A	1.75	0.52
4:A:560:ASP:OD1	4:A:560:ASP:N	2.42	0.52
2:H:55:GLY:O	2:H:59:VAL:HG23	2.10	0.52
4:P:8:ASP:OD1	4:P:9:VAL:N	2.41	0.52
5:B:211:ASP:OD2	5:B:217:ARG:NH1	2.43	0.52
4:A:484:ALA:O	4:A:487:GLU:HG3	2.10	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
7:H:202:HEM:HBC2	7:H:202:HEM:HMC1	1.92	0.52
4:P:16:GLY:HA3	4:P:404:ILE:HD12	1.92	0.52
4:A:55:LEU:HB2	4:A:114:GLN:NE2	2.24	0.52
4:A:395:ARG:HE	4:A:400:SER:HG	1.53	0.52
4:A:532:ARG:NH1	4:A:543:ARG:HD2	2.25	0.52
4:J:292:ARG:HH21	4:J:536:ALA:HB2	1.75	0.52
2:N:55:GLY:O	2:N:59:VAL:HG23	2.10	0.52
2:N:73:GLN:OE1	2:N:78:ARG:NH2	2.43	0.52
4:J:212:THR:HG22	4:J:463:ASP:OD2	2.11	0.51
4:P:111:ARG:HH22	5:Q:156:LYS:HG2	1.75	0.51
4:P:473:GLU:HA	4:P:476:LYS:HE3	1.92	0.51
5:Q:247:THR:HG23	15:Q:303:F3S:S4	2.51	0.51
4:J:167:ILE:HG22	4:J:181:VAL:HG22	1.91	0.51
4:A:7:TYR:O	4:A:196:ALA:HA	2.10	0.51
5:B:128:ASP:OD1	5:B:128:ASP:N	2.40	0.51
5:K:78:ALA:O	5:K:79:HIS:ND1	2.44	0.51
4:P:167:ILE:O	4:P:230:LYS:NZ	2.44	0.51
2:N:73:GLN:NE2	8:N:203:MQ9:H161	2.26	0.51
4:P:186:LEU:HD13	4:P:506:LEU:HD11	1.93	0.51
4:A:13:GLY:HA2	12:A:700:FAD:C1B	2.40	0.51
1:G:57:SER:OG	1:G:59:GLN:OE1	2.28	0.51
4:J:277:TYR:OH	4:J:300:GLU:OE2	2.28	0.51
4:A:274:MET:HB3	4:A:282:VAL:O	2.10	0.51
4:J:388:VAL:O	4:J:389:SER:OG	2.25	0.51
1:M:59:GLN:O	1:M:63:GLU:HG3	2.11	0.51
2:H:73:GLN:OE1	2:H:78:ARG:NH2	2.43	0.50
4:A:43:HIS:CD2	4:A:219:LEU:HD11	2.47	0.50
4:A:519:GLU:O	4:A:523:VAL:HG22	2.11	0.50
4:A:79:ASP:OD2	4:A:389:SER:OG	2.29	0.50
1:G:19:THR:HG21	5:K:88:ARG:HH12	1.77	0.50
5:Q:206:ILE:HD11	5:Q:217:ARG:HB3	1.93	0.50
4:J:247:LEU:O	4:J:249:GLY:N	2.44	0.50
4:P:215:ASN:HD22	4:P:219:LEU:HD12	1.76	0.50
1:M:24:ASP:OD1	1:M:25:PRO:HD2	2.10	0.50
4:J:271:GLU:OE1	4:J:276:ARG:NH2	2.44	0.50
5:K:164:ASP:HB3	5:K:209:SER:OG	2.12	0.50
4:P:473:GLU:HA	4:P:476:LYS:HG2	1.94	0.50
1:M:74:GLY:O	1:M:78:ILE:HG13	2.12	0.50
1:M:136:ARG:HD2	2:N:77:TYR:CD1	2.47	0.50
4:P:291:ALA:O	4:P:295:VAL:HG23	2.11	0.50
4:A:258:VAL:HG22	4:A:263:GLY:HA3	1.93	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:P:355:TYR:CE1	4:P:384:GLU:HG3	2.47	0.49
4:A:185:GLU:OE1	4:A:188:THR:OG1	2.22	0.49
4:A:355:TYR:HE1	12:A:700:FAD:O3'	1.95	0.49
4:P:51:MET:HE2	4:P:94:VAL:HG22	1.95	0.49
9:D:204:CDL:H551	9:D:204:CDL:H752	1.93	0.49
1:M:71:PRO:HG3	1:M:137:PHE:CZ	2.47	0.49
5:B:234:PHE:CE2	5:B:247:THR:HG21	2.47	0.49
1:G:49:LEU:HD11	2:H:139:PHE:HE2	1.77	0.49
1:M:20:LEU:HD11	1:M:28:TRP:HH2	1.78	0.49
4:A:35:THR:HG23	12:A:700:FAD:O2B	2.12	0.49
5:Q:27:THR:HG22	5:Q:113:LEU:O	2.12	0.49
4:J:433:GLU:HG2	4:J:434:MET:N	2.27	0.49
4:P:87:CYS:O	4:P:91:ILE:HD12	2.12	0.49
4:J:220:THR:OG1	4:J:510:GLU:OE1	2.25	0.49
4:J:426:ASP:OD1	4:J:426:ASP:N	2.46	0.49
1:G:50:ASP:OD1	1:G:51:THR:N	2.45	0.49
11:H:206:PIE:H252	11:H:206:PIE:H11	1.95	0.49
1:G:73:VAL:O	1:G:77:GLU:HG3	2.13	0.49
4:J:416:ALA:O	4:J:420:GLN:HG2	2.13	0.49
2:N:54:SER:HB2	2:N:107:HIS:HD1	1.78	0.49
4:P:528:ARG:NH1	4:P:530:GLU:OE2	2.46	0.48
4:J:501:TYR:HB2	5:K:127:LYS:HD3	1.93	0.48
4:P:374:ASN:OD1	4:P:375:VAL:N	2.43	0.48
4:J:357:MET:HE3	4:J:394:ASN:HA	1.95	0.48
4:J:251:GLY:HA2	4:J:352:THR:HG21	1.95	0.48
5:K:35:PRO:HD3	5:K:127:LYS:HG3	1.95	0.48
5:K:113:LEU:HD12	5:K:114:THR:H	1.77	0.48
5:K:156:LYS:C	5:K:157:GLU:HG3	2.37	0.48
5:B:108:ASN:HB3	5:B:109:PRO:CD	2.42	0.48
2:H:54:SER:HB2	2:H:107:HIS:HD1	1.78	0.48
4:J:8:ASP:O	4:J:9:VAL:C	2.57	0.48
4:J:451:VAL:HG13	4:J:511:LEU:HD22	1.95	0.48
4:A:107:THR:O	4:A:110:GLY:N	2.46	0.48
4:J:38:TYR:HB2	4:J:41:ARG:HD3	1.95	0.48
4:J:282:VAL:HG23	4:J:283:ASP:H	1.79	0.48
5:Q:35:PRO:HD3	5:Q:127:LYS:HG3	1.95	0.48
2:D:152:ASP:N	2:D:152:ASP:OD1	2.45	0.48
4:A:355:TYR:CZ	4:A:384:GLU:HG3	2.48	0.48
5:K:34:ASN:HD22	5:K:38:PRO:HD2	1.79	0.48
4:A:138:ARG:HG3	4:A:142:MET:HE2	1.94	0.48
11:E:101:PIE:H271	11:E:101:PIE:H242	1.57	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:A:528:ARG:HG2	4:A:530:GLU:HG2	1.96	0.48
5:B:26:VAL:HG21	5:B:104:MET:HE1	1.96	0.48
4:P:62:ASN:HB3	4:P:65:TRP:CG	2.48	0.48
4:P:236:ASP:O	4:P:358:GLY:HA3	2.14	0.48
4:A:401:LEU:CD1	12:A:700:FAD:N3	2.74	0.47
4:J:37:LEU:HD21	4:J:218:THR:HG21	1.96	0.47
4:J:288:ASP:OD1	4:J:289:ILE:N	2.47	0.47
4:P:228:PHE:HZ	4:P:565:ILE:HG21	1.79	0.47
5:Q:200:VAL:CG2	5:Q:246:VAL:HG13	2.44	0.47
1:G:59:GLN:O	1:G:63:GLU:HG3	2.13	0.47
4:J:230:LYS:HA	4:J:230:LYS:HD2	1.69	0.47
4:P:96:ASP:O	4:P:100:MET:HG3	2.15	0.47
4:A:400:SER:O	4:A:404:ILE:HG23	2.13	0.47
10:H:201:LPP:H172	10:H:201:LPP:H201	1.50	0.47
4:P:556:LYS:HA	4:P:565:ILE:HG22	1.97	0.47
2:D:102:TRP:O	2:D:106:ILE:HG12	2.14	0.47
4:A:191:ILE:HG13	4:A:436:VAL:HG12	1.95	0.47
3:E:17:THR:HG22	11:E:101:PIE:H381	1.96	0.47
5:K:175:ILE:HG23	5:K:242:ARG:HH11	1.79	0.47
4:P:111:ARG:NH2	5:Q:156:LYS:HG2	2.30	0.47
4:P:362:THR:HG21	4:P:381:ALA:HB3	1.95	0.47
4:A:273:PHE:O	4:A:276:ARG:HG2	2.14	0.47
4:A:279:PRO:C	4:A:281:ILE:H	2.23	0.47
4:A:547:ASN:O	4:A:550:ARG:NH2	2.47	0.47
1:G:72:ILE:O	1:G:75:LEU:HG	2.14	0.47
2:H:44:GLU:HG3	5:K:224:VAL:HA	1.96	0.47
4:P:472:GLU:O	4:P:476:LYS:HG2	2.13	0.47
1:C:63:GLU:O	1:C:67:THR:HG23	2.15	0.47
2:D:32:ARG:NE	5:K:150:SER:OG	2.47	0.47
4:J:397:GLY:O	4:J:398:THR:OG1	2.32	0.47
4:P:388:VAL:HB	4:P:390:VAL:HG23	1.97	0.47
5:Q:56:LEU:HB2	5:Q:99:VAL:CG2	2.45	0.47
4:P:244:PRO:HB3	4:P:290:VAL:HG13	1.97	0.47
4:A:102:MET:HE3	4:A:142:MET:HB2	1.96	0.47
4:J:400:SER:HB2	12:J:700:FAD:N1	2.30	0.47
5:B:103:ASP:OD2	5:B:103:ASP:N	2.38	0.47
4:J:401:LEU:O	4:J:404:ILE:HG12	2.14	0.47
5:K:169:ASP:OD2	5:K:170:ASP:N	2.48	0.47
4:P:20:ARG:HD3	4:P:405:ASN:HD22	1.80	0.47
5:Q:197:ALA:O	5:Q:201:ASN:ND2	2.48	0.47
5:Q:222:ASN:ND2	5:Q:257:LEU:HD22	2.30	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:134:VAL:O	1:C:136:ARG:N	2.46	0.46
4:A:65:TRP:CD2	4:A:123:ASP:HB3	2.50	0.46
5:K:54:ASP:O	5:K:55:ARG:HG3	2.15	0.46
4:P:470:ARG:HB3	4:P:475:LEU:HD11	1.97	0.46
4:A:355:TYR:CE1	4:A:384:GLU:HG3	2.49	0.46
5:K:154:PRO:HG3	5:K:158:ARG:HB3	1.98	0.46
1:M:62:ASN:O	1:M:66:GLU:HG2	2.15	0.46
4:P:401:LEU:HG	12:P:700:FAD:C2	2.45	0.46
4:P:473:GLU:HG2	4:P:474:THR:N	2.30	0.46
8:D:205:MQ9:H103	8:D:205:MQ9:H121	1.62	0.46
1:C:17:ARG:NH2	5:B:118:GLU:OE1	2.30	0.46
4:A:267:ASN:ND2	4:A:271:GLU:O	2.49	0.46
4:P:41:ARG:HA	5:Q:82:CYS:HB2	1.97	0.46
4:P:43:HIS:ND1	4:P:219:LEU:CD1	2.79	0.46
4:P:141:HIS:CE1	4:P:145:GLN:NE2	2.84	0.46
4:P:267:ASN:ND2	4:P:273:PHE:HB2	2.31	0.46
2:D:135:LEU:HD22	9:D:204:CDL:H802	1.96	0.46
4:J:506:LEU:O	4:J:510:GLU:HG2	2.16	0.46
4:A:222:ASP:CB	12:A:700:FAD:H61A	2.28	0.46
4:A:290:VAL:O	4:A:293:SER:OG	2.30	0.46
10:H:201:LPP:H352	10:H:201:LPP:H381	1.60	0.46
9:N:206:CDL:H152	9:N:206:CDL:H182	1.70	0.46
2:D:32:ARG:NH2	4:A:155:ASP:OD1	2.49	0.46
8:D:205:MQ9:H5M2	8:D:205:MQ9:H71	1.74	0.46
4:P:73:GLY:O	4:P:394:ASN:HB3	2.16	0.45
4:P:135:ALA:H	4:P:139:THR:HG23	1.81	0.45
1:C:123:ILE:HA	1:C:126:VAL:HG12	1.99	0.45
4:P:177:VAL:HG23	4:P:377:PRO:O	2.16	0.45
4:P:404:ILE:HG13	4:P:405:ASN:N	2.30	0.45
5:B:237:THR:OG1	5:B:247:THR:HG22	2.16	0.45
4:J:113:ASP:OD2	4:J:134:TYR:OH	2.25	0.45
5:K:137:PHE:O	5:K:141:ARG:HG2	2.15	0.45
1:M:69:LYS:HE2	2:N:76:VAL:O	2.16	0.45
4:J:362:THR:HG22	4:J:363:THR:O	2.16	0.45
4:P:82:ALA:HB1	4:P:390:VAL:HG22	1.99	0.45
4:A:170:THR:HG22	4:A:428:PRO:HG3	1.99	0.45
4:A:476:LYS:O	4:A:480:THR:HG23	2.16	0.45
11:H:206:PIE:H351	11:H:206:PIE:H381	1.60	0.45
5:Q:251:GLN:O	5:Q:255:ARG:HG3	2.16	0.45
4:A:243:HIS:CG	4:A:253:LEU:HD11	2.51	0.45
4:A:247:LEU:O	4:A:249:GLY:N	2.49	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:K:304:PEV:H122	6:K:304:PEV:H152	1.78	0.45
1:C:65:ILE:CD1	2:D:80:ASP:HA	2.46	0.45
2:N:121:ARG:NH1	9:N:206:CDL:OA4	2.50	0.45
2:D:138:GLY:O	2:D:142:VAL:HG13	2.17	0.45
5:K:181:THR:HA	5:K:196:PRO:HD2	1.98	0.45
4:P:61:ASP:OD1	4:P:129:VAL:HB	2.17	0.45
4:P:401:LEU:HA	4:P:404:ILE:HG12	1.99	0.45
5:Q:85:ASP:OD1	5:Q:85:ASP:N	2.37	0.45
7:D:202:HEM:HBA1	7:D:202:HEM:CMA	2.47	0.45
3:E:3:LEU:HA	3:E:6:GLU:HG2	2.00	0.45
5:B:94:ARG:HA	5:B:94:ARG:HD3	1.64	0.45
2:H:121:ARG:NH1	9:H:205:CDL:OA4	2.49	0.45
4:J:136:ALA:C	4:J:138:ARG:H	2.24	0.45
2:N:102:TRP:O	2:N:106:ILE:HG12	2.17	0.45
5:B:156:LYS:HA	5:B:156:LYS:HD3	1.73	0.44
2:H:142:VAL:HG13	8:N:204:MQ9:C7	2.47	0.44
2:H:102:TRP:O	2:H:106:ILE:HG12	2.17	0.44
7:D:202:HEM:HMC2	7:D:202:HEM:HBC2	1.99	0.44
3:O:3:LEU:HA	3:O:6:GLU:HG2	2.00	0.44
1:G:93:ARG:NH1	1:G:107:GLN:HG2	2.31	0.44
4:J:138:ARG:HG3	4:J:142:MET:HE2	1.98	0.44
5:Q:88:ARG:HB2	5:Q:118:GLU:HG3	2.00	0.44
4:A:250:LEU:HD23	4:A:252:ILE:HD11	2.00	0.44
4:J:85:ILE:HD13	4:J:364:VAL:HG11	2.00	0.44
4:J:86:MET:SD	4:J:390:VAL:HG11	2.57	0.44
11:E:101:PIE:H11	11:E:101:PIE:H252	2.00	0.44
4:A:236:ASP:OD2	4:A:551:HIS:ND1	2.44	0.44
2:D:75:GLY:O	2:D:78:ARG:HG2	2.17	0.44
8:D:203:MQ9:H5M2	8:D:203:MQ9:H71	1.78	0.44
10:D:206:LPP:H121	10:D:206:LPP:H151	1.42	0.44
5:B:175:ILE:HG23	5:B:242:ARG:HH11	1.83	0.44
4:P:19:MET:O	4:P:23:VAL:HG13	2.18	0.44
4:J:451:VAL:HG11	4:J:507:GLU:HG2	1.98	0.43
1:M:73:VAL:O	1:M:77:GLU:HG3	2.18	0.43
4:P:272:ARG:HD2	4:P:274:MET:H	1.83	0.43
1:C:50:ASP:C	1:C:50:ASP:OD1	2.62	0.43
4:A:35:THR:HG22	4:A:37:LEU:H	1.82	0.43
5:B:105:LEU:N	5:B:106:PRO:HD2	2.34	0.43
5:K:105:LEU:N	5:K:106:PRO:HD2	2.34	0.43
4:P:43:HIS:ND1	4:P:219:LEU:HD12	2.33	0.43
4:P:248:ALA:HB2	4:P:349:VAL:C	2.43	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:J:274:MET:HG2	4:J:283:ASP:OD2	2.19	0.43
5:K:43:TRP:CZ3	5:K:116:THR:HG23	2.54	0.43
7:D:202:HEM:HBA1	7:D:202:HEM:HMA2	2.00	0.43
1:G:43:PHE:HB2	6:G:201:PEV:O2P	2.17	0.43
4:A:123:ASP:OD2	4:A:123:ASP:N	2.51	0.43
4:A:266:LEU:HD23	4:A:270:GLY:HA2	2.00	0.43
4:A:371:ASP:HB2	4:A:374:ASN:HD22	1.84	0.43
4:J:529:LYS:HB3	4:J:540:TYR:CD2	2.53	0.43
5:K:113:LEU:HD12	5:K:114:THR:N	2.34	0.43
4:P:52:CYS:O	4:P:402:LEU:HD21	2.19	0.43
4:P:86:MET:O	4:P:90:ALA:HB2	2.18	0.43
4:P:237:MET:HE1	4:P:359:GLY:HA2	1.99	0.43
4:P:272:ARG:HD2	4:P:274:MET:N	2.34	0.43
5:Q:57:LEU:HD12	5:Q:57:LEU:HA	1.90	0.43
4:A:557:GLN:HG3	4:A:564:ASP:HB3	1.99	0.43
3:I:3:LEU:HA	3:I:6:GLU:HG2	1.99	0.43
4:J:41:ARG:HG2	5:K:84:SER:HB3	2.00	0.43
4:J:237:MET:HE3	4:J:237:MET:HB3	1.85	0.43
4:J:484:ALA:O	4:J:487:GLU:HG3	2.18	0.43
10:N:205:LPP:H172	10:N:205:LPP:H201	1.54	0.43
4:P:477:GLN:HA	4:P:480:THR:HG22	2.01	0.43
4:P:556:LYS:HG3	4:P:557:GLN:N	2.34	0.43
4:A:401:LEU:HA	4:A:404:ILE:HG12	1.99	0.43
7:H:203:HEM:HBB2	7:H:203:HEM:CMB	2.49	0.43
9:H:205:CDL:H182	9:H:205:CDL:H152	1.70	0.43
3:O:25:TYR:CE1	3:O:29:THR:HG21	2.54	0.43
4:P:363:THR:HG22	4:P:367:GLN:H	1.83	0.43
5:Q:242:ARG:HG2	5:Q:242:ARG:HH11	1.84	0.43
1:C:27:MET:O	1:C:31:VAL:HG23	2.19	0.43
4:A:367:GLN:HG3	4:A:380:TYR:CE2	2.54	0.43
4:A:401:LEU:HD12	4:A:401:LEU:H	1.84	0.43
12:A:700:FAD:H1'1	12:A:700:FAD:H9	1.77	0.43
6:G:201:PEV:H322	6:G:201:PEV:H352	1.88	0.43
4:J:8:ASP:O	4:J:10:VAL:HG23	2.19	0.43
4:J:473:GLU:CD	4:J:473:GLU:H	2.27	0.43
1:M:65:ILE:HG22	1:M:69:LYS:HE3	2.01	0.43
8:N:204:MQ9:H5M3	8:N:204:MQ9:H71	1.80	0.43
3:E:18:TRP:HD1	11:E:101:PIE:H341	1.84	0.42
4:A:129:VAL:HG13	4:A:131:ARG:HG3	2.01	0.42
4:A:138:ARG:O	4:A:142:MET:HG2	2.19	0.42
4:A:298:VAL:HG11	4:A:350:TYR:CE1	2.53	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:B:85:ASP:OD1	5:B:85:ASP:N	2.28	0.42
5:B:89:ILE:HD12	5:B:94:ARG:HB2	2.01	0.42
4:J:229:ARG:HE	4:J:516:GLU:CD	2.27	0.42
4:P:170:THR:OG1	4:P:177:VAL:O	2.34	0.42
4:P:228:PHE:HB2	4:P:234:LEU:HD11	2.01	0.42
1:C:62:ASN:O	1:C:66:GLU:HG2	2.18	0.42
3:E:31:GLU:OE1	3:E:31:GLU:HA	2.19	0.42
5:K:34:ASN:OD1	5:K:35:PRO:HD2	2.19	0.42
11:M:202:PIE:H381	11:M:202:PIE:H352	1.60	0.42
10:D:206:LPP:H201	10:D:206:LPP:H152	2.01	0.42
3:E:3:LEU:O	3:E:7:ILE:HG13	2.20	0.42
1:G:47:HIS:CE1	7:H:202:HEM:NA	2.88	0.42
2:H:40:ILE:HD12	2:H:40:ILE:H	1.85	0.42
11:M:202:PIE:H242	11:M:202:PIE:H11	2.01	0.42
4:P:8:ASP:O	4:P:9:VAL:C	2.62	0.42
4:P:159:PHE:HB3	4:P:162:PHE:CD2	2.54	0.42
1:G:50:ASP:OD2	1:G:68:TYR:HE1	2.01	0.42
1:G:69:LYS:HE2	2:H:76:VAL:O	2.20	0.42
4:J:252:ILE:HG12	5:K:79:HIS:HB2	2.01	0.42
4:A:58:VAL:HG23	4:A:59:GLU:HG3	2.01	0.42
4:A:136:ALA:C	4:A:138:ARG:H	2.27	0.42
5:B:28:LEU:O	5:B:45:SER:HA	2.19	0.42
2:H:83:TYR:CZ	2:H:87:ARG:HD2	2.55	0.42
1:M:130:GLY:O	1:M:134:VAL:HG23	2.19	0.42
3:E:25:TYR:CE1	3:E:29:THR:HG21	2.54	0.42
4:A:267:ASN:HD22	4:A:273:PHE:HD1	1.68	0.42
5:B:137:PHE:O	5:B:141:ARG:HG2	2.20	0.42
10:H:201:LPP:H151	10:H:201:LPP:H121	1.52	0.42
3:I:3:LEU:O	3:I:7:ILE:HG13	2.20	0.42
6:M:203:PEV:H421	6:M:203:PEV:H452	1.60	0.42
4:P:267:ASN:HB2	4:P:271:GLU:HG2	2.01	0.42
4:A:444:SER:O	4:A:445:GLU:HB3	2.19	0.42
7:H:203:HEM:HBB2	7:H:203:HEM:HMB1	2.02	0.42
3:O:3:LEU:O	3:O:7:ILE:HG13	2.20	0.42
4:P:62:ASN:HB3	4:P:65:TRP:CD1	2.54	0.42
4:P:230:LYS:HD3	4:P:230:LYS:HA	1.93	0.42
4:P:272:ARG:HH21	4:P:275:GLU:HB3	1.84	0.42
4:P:474:THR:O	4:P:477:GLN:HG2	2.19	0.42
6:G:201:PEV:H151	6:G:201:PEV:H182	1.46	0.42
4:J:52:CYS:HA	4:J:132:ALA:HA	2.01	0.42
4:J:290:VAL:O	4:J:294:MET:HG3	2.19	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:P:98:GLU:HB3	4:P:104:PHE:CD2	2.54	0.42
4:P:465:ASN:CB	4:P:478:ALA:HB2	2.50	0.42
4:A:233:PRO:HB3	4:A:555:TYR:CE2	2.54	0.42
1:G:50:ASP:OD1	1:G:50:ASP:C	2.63	0.42
4:J:476:LYS:O	4:J:480:THR:HG23	2.20	0.42
5:K:232:THR:HG22	5:K:232:THR:O	2.20	0.42
5:Q:132:ASN:O	5:Q:135:PRO:HD2	2.20	0.42
5:K:97:CYS:SG	5:K:98:LYS:HG3	2.59	0.42
5:Q:77:CYS:SG	5:Q:81:VAL:HA	2.60	0.42
4:A:247:LEU:HD22	4:A:254:ILE:HD11	2.02	0.41
3:I:31:GLU:OE1	3:I:31:GLU:HA	2.20	0.41
1:M:76:MET:HE2	6:M:203:PEV:H41	2.02	0.41
2:N:83:TYR:CZ	2:N:87:ARG:HD2	2.55	0.41
4:P:432:ALA:O	4:P:436:VAL:HG23	2.20	0.41
5:Q:232:THR:O	5:Q:232:THR:HG22	2.21	0.41
4:A:397:GLY:O	4:A:398:THR:OG1	2.29	0.41
1:G:44:LEU:HA	1:G:44:LEU:HD12	1.84	0.41
9:H:205:CDL:H581	9:H:205:CDL:H611	1.79	0.41
4:J:214:SER:O	4:J:214:SER:OG	2.38	0.41
5:K:169:ASP:O	5:K:170:ASP:HB3	2.20	0.41
4:P:219:LEU:HD23	4:P:219:LEU:HA	1.86	0.41
4:P:273:PHE:CD2	4:P:293:SER:HB3	2.55	0.41
4:P:297:GLU:HA	4:P:300:GLU:HG2	2.01	0.41
4:P:396:LEU:HD23	4:P:399:ASN:HD21	1.85	0.41
1:M:96:LEU:HD23	1:M:96:LEU:HA	1.89	0.41
4:P:186:LEU:HD13	4:P:506:LEU:CD1	2.49	0.41
4:A:252:ILE:H	4:A:252:ILE:HD12	1.84	0.41
4:A:264:ARG:HG2	4:A:272:ARG:CZ	2.50	0.41
1:G:63:GLU:O	1:G:67:THR:HG23	2.20	0.41
3:I:25:TYR:CE1	3:I:29:THR:HG21	2.54	0.41
4:J:496:ASP:C	4:J:498:GLY:H	2.27	0.41
4:P:2:ILE:HG12	4:P:191:ILE:HB	2.03	0.41
4:P:265:LEU:O	4:P:266:LEU:HD22	2.21	0.41
4:J:19:MET:O	4:J:23:VAL:HG13	2.20	0.41
3:O:31:GLU:OE1	3:O:31:GLU:HA	2.20	0.41
4:A:404:ILE:HG13	4:A:405:ASN:N	2.35	0.41
12:J:700:FAD:N1	12:J:700:FAD:H2'	2.35	0.41
1:G:95:ILE:HG12	2:H:52:ARG:HG3	2.02	0.41
1:M:110:MET:O	1:M:114:ILE:HG23	2.21	0.41
4:P:243:HIS:O	4:P:351:PRO:HA	2.20	0.41
4:A:282:VAL:HG13	4:A:283:ASP:N	2.34	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:B:34:ASN:OD1	5:B:35:PRO:HD2	2.21	0.41
1:M:118:PHE:HD1	1:M:119:LEU:HD12	1.85	0.41
4:P:550:ARG:HB3	4:P:569:TYR:HB3	2.01	0.41
5:Q:56:LEU:HA	5:Q:56:LEU:HD12	1.88	0.41
7:D:201:HEM:HHC	7:D:201:HEM:CBB	2.51	0.41
8:D:203:MQ9:H103	8:D:203:MQ9:H121	1.71	0.41
3:E:8:LEU:HD12	3:E:8:LEU:HA	1.91	0.41
1:G:93:ARG:HH12	1:G:107:GLN:HG2	1.85	0.41
4:J:250:LEU:HB3	4:J:252:ILE:HD12	2.03	0.41
4:J:560:ASP:OD1	4:J:563:SER:OG	2.39	0.41
8:N:201:MQ9:H103	8:N:201:MQ9:H121	1.50	0.41
10:N:205:LPP:H121	10:N:205:LPP:H151	1.60	0.41
4:P:51:MET:HB2	4:P:402:LEU:CD1	2.51	0.41
4:P:149:GLN:O	4:P:152:VAL:HG12	2.21	0.41
4:P:239:PHE:CD2	4:P:393:ALA:HA	2.56	0.41
4:P:501:TYR:CD2	5:Q:127:LYS:HB2	2.56	0.41
5:Q:240:CYS:HA	14:Q:302:SF4:S4	2.61	0.41
2:D:55:GLY:O	2:D:59:VAL:HG23	2.21	0.41
4:A:432:ALA:O	4:A:436:VAL:HG13	2.21	0.41
4:P:43:HIS:HD1	4:P:219:LEU:CD1	2.33	0.41
4:P:368:VAL:O	4:P:369:LEU:HD23	2.20	0.41
4:P:562:LEU:H	4:P:562:LEU:HD23	1.85	0.41
5:K:87:MET:O	5:K:93:ASN:HA	2.21	0.40
2:D:25:PRO:O	2:D:28:LEU:HB2	2.21	0.40
2:N:91:PRO:O	2:N:95:ILE:HG13	2.21	0.40
8:N:201:MQ9:H103	8:N:201:MQ9:H152	2.03	0.40
5:Q:55:ARG:HH21	5:Q:98:LYS:HA	1.87	0.40
2:D:141:LEU:HD23	2:D:141:LEU:HA	1.96	0.40
1:G:110:MET:O	1:G:114:ILE:HG23	2.21	0.40
1:G:128:VAL:HG11	2:H:71:MET:HB2	2.02	0.40
4:J:43:HIS:O	4:J:44:THR:C	2.62	0.40
2:N:71:MET:HE2	2:N:71:MET:HB3	1.77	0.40
4:P:80:GLN:NE2	4:P:574:GLN:OE1	2.55	0.40
1:G:133:MET:HE2	1:G:133:MET:HB3	2.00	0.40
4:J:206:SER:O	4:J:206:SER:OG	2.27	0.40
5:K:48:VAL:HG11	5:K:63:VAL:HG23	2.04	0.40
5:K:108:ASN:N	5:K:109:PRO:HD2	2.36	0.40
8:N:204:MQ9:H103	8:N:204:MQ9:H121	1.62	0.40
4:P:553:MET:HB3	4:P:568:ASP:OD1	2.22	0.40
4:A:69:ASP:OD1	4:A:121:THR:HG23	2.20	0.40
5:B:213:ALA:HB1	5:B:216:GLU:HG2	2.04	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:116:ILE:HD11	9:H:205:CDL:H372	2.04	0.40
7:M:201:HEM:HHC	7:M:201:HEM:CBB	2.48	0.40
4:P:401:LEU:HG	12:P:700:FAD:O2	2.21	0.40
5:Q:111:LYS:HG2	5:Q:112:GLN:H	1.86	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	C	120/138 (87%)	115 (96%)	5 (4%)	0	100	100
1	G	121/138 (88%)	119 (98%)	2 (2%)	0	100	100
1	M	121/138 (88%)	116 (96%)	5 (4%)	0	100	100
2	D	144/166 (87%)	138 (96%)	6 (4%)	0	100	100
2	H	118/166 (71%)	115 (98%)	3 (2%)	0	100	100
2	N	114/166 (69%)	111 (97%)	3 (3%)	0	100	100
3	E	29/32 (91%)	29 (100%)	0	0	100	100
3	I	29/32 (91%)	29 (100%)	0	0	100	100
3	O	29/32 (91%)	29 (100%)	0	0	100	100
4	A	535/584 (92%)	483 (90%)	51 (10%)	1 (0%)	43	62
4	J	530/584 (91%)	462 (87%)	67 (13%)	1 (0%)	43	62
4	P	535/584 (92%)	492 (92%)	43 (8%)	0	100	100
5	B	236/261 (90%)	197 (84%)	38 (16%)	1 (0%)	30	48
5	K	245/261 (94%)	201 (82%)	43 (18%)	1 (0%)	30	48
5	Q	236/261 (90%)	194 (82%)	41 (17%)	1 (0%)	30	48
All	All	3142/3543 (89%)	2830 (90%)	307 (10%)	5 (0%)	44	62

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
5	B	101	MET
4	J	248	ALA
4	A	248	ALA
5	K	96	ALA
5	Q	101	MET

5.3.2 Protein sidechains

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	C	101/116 (87%)	101 (100%)	0	100 100
1	G	102/116 (88%)	101 (99%)	1 (1%)	68 83
1	M	102/116 (88%)	102 (100%)	0	100 100
2	D	120/137 (88%)	120 (100%)	0	100 100
2	H	100/137 (73%)	95 (95%)	5 (5%)	22 44
2	N	97/137 (71%)	92 (95%)	5 (5%)	21 43
3	E	27/28 (96%)	18 (67%)	9 (33%)	0 0
3	I	27/28 (96%)	18 (67%)	9 (33%)	0 0
3	O	27/28 (96%)	18 (67%)	9 (33%)	0 0
4	A	421/467 (90%)	420 (100%)	1 (0%)	87 95
4	J	422/467 (90%)	420 (100%)	2 (0%)	81 90
4	P	400/467 (86%)	398 (100%)	2 (0%)	81 90
5	B	205/225 (91%)	205 (100%)	0	100 100
5	K	213/225 (95%)	212 (100%)	1 (0%)	81 90
5	Q	199/225 (88%)	199 (100%)	0	100 100
All	All	2563/2919 (88%)	2519 (98%)	44 (2%)	52 75

All (44) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	E	1	MET
3	E	2	VAL
3	E	7	ILE
3	E	10	VAL
3	E	13	VAL
3	E	17	THR
3	E	21	VAL
3	E	30	ASP
3	E	31	GLU
4	A	281	ILE
1	G	123	ILE
2	H	54	SER
2	H	76	VAL
2	H	124	VAL
2	H	134	LEU
2	H	135	LEU
3	I	1	MET
3	I	2	VAL
3	I	7	ILE
3	I	10	VAL
3	I	13	VAL
3	I	17	THR
3	I	21	VAL
3	I	30	ASP
3	I	31	GLU
4	J	129	VAL
4	J	433	GLU
5	K	128	ASP
2	N	54	SER
2	N	76	VAL
2	N	124	VAL
2	N	134	LEU
2	N	135	LEU
3	O	1	MET
3	O	2	VAL
3	O	7	ILE
3	O	10	VAL
3	O	13	VAL
3	O	17	THR
3	O	21	VAL
3	O	30	ASP
3	O	31	GLU
4	P	91	ILE

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Mol	Chain	Res	Type
4	P	487	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (52) such sidechains are listed below:

Mol	Chain	Res	Type
1	C	33	HIS
1	C	87	HIS
1	C	90	ASN
2	D	30	HIS
2	D	123	ASN
4	A	48	GLN
4	A	57	ASN
4	A	114	GLN
4	A	195	HIS
4	A	215	ASN
4	A	267	ASN
4	A	374	ASN
4	A	405	ASN
4	A	459	GLN
4	A	465	ASN
5	B	112	GLN
1	G	33	HIS
1	G	47	HIS
1	G	87	HIS
1	G	90	ASN
4	J	57	ASN
4	J	66	HIS
4	J	114	GLN
4	J	145	GLN
4	J	405	ASN
4	J	459	GLN
4	J	460	GLN
4	J	464	ASN
4	J	477	GLN
4	J	551	HIS
5	K	90	ASN
5	K	245	GLN
1	M	33	HIS
1	M	87	HIS
1	M	90	ASN
1	M	132	HIS
4	P	62	ASN

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Mol	Chain	Res	Type
4	P	114	GLN
4	P	141	HIS
4	P	145	GLN
4	P	240	HIS
4	P	241	GLN
4	P	267	ASN
4	P	405	ASN
4	P	459	GLN
4	P	465	ASN
4	P	527	ASN
4	P	535	HIS
4	P	557	GLN
5	Q	37	ASN
5	Q	132	ASN
5	Q	245	GLN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

39 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#|Z| > 2	Counts	RMSZ	#|Z| > 2
13	FES	Q	301	5	0,4,4	-	-	-		
12	FAD	J	700	-	58,58,58	1.44	11 (18%)	85,89,89	1.59	20 (23%)
10	LPP	N	205	-	43,43,43	0.95	3 (6%)	46,48,48	0.96	2 (4%)
12	FAD	A	700	-	58,58,58	1.48	8 (13%)	85,89,89	1.56	15 (17%)
15	F3S	Q	303	5	0,9,9	-	-	-		
6	PEV	K	304	-	40,40,48	0.95	4 (10%)	43,45,53	0.99	2 (4%)
11	PIE	E	101	-	48,48,57	1.03	4 (8%)	57,60,69	0.93	2 (3%)
7	HEM	H	203	2	50,50,50	1.33	7 (14%)	67,82,82	1.28	8 (11%)
6	PEV	C	202	-	43,43,48	0.95	4 (9%)	46,48,53	0.98	2 (4%)
13	FES	B	301	5	0,4,4	-	-	-		
10	LPP	H	201	-	43,43,43	0.95	4 (9%)	46,48,48	0.92	2 (4%)
15	F3S	B	303	5	0,9,9	-	-	-		
14	SF4	B	302	5	0,12,12	-	-	-		
10	LPP	D	206	-	43,43,43	0.94	4 (9%)	46,48,48	0.91	2 (4%)
11	PIE	H	206	-	48,48,57	1.04	4 (8%)	57,60,69	1.00	3 (5%)
9	CDL	D	204	-	83,83,99	0.95	7 (8%)	89,95,111	1.01	4 (4%)
14	SF4	K	302	5	0,12,12	-	-	-		
6	PEV	Q	304	-	40,40,48	0.95	4 (10%)	43,45,53	0.97	2 (4%)
7	HEM	M	201	2	50,50,50	1.34	7 (14%)	67,82,82	1.16	6 (8%)
6	PEV	C	201	-	40,40,48	0.97	3 (7%)	43,45,53	0.91	2 (4%)
9	CDL	N	206	-	83,83,99	0.94	8 (9%)	89,95,111	0.99	4 (4%)
7	HEM	N	202	1	50,50,50	1.31	6 (12%)	67,82,82	1.19	4 (5%)
8	MQ9	H	204	-	24,24,59	4.80	15 (62%)	31,33,75	3.13	12 (38%)
8	MQ9	N	201	-	24,24,59	4.76	16 (66%)	31,33,75	2.32	10 (32%)
7	HEM	D	202	1	50,50,50	1.43	6 (12%)	67,82,82	1.45	11 (16%)
8	MQ9	D	205	-	25,25,59	4.68	15 (60%)	31,34,75	3.07	12 (38%)
15	F3S	K	303	5	0,9,9	-	-	-		
8	MQ9	D	203	-	25,25,59	4.83	15 (60%)	31,34,75	3.02	11 (35%)
8	MQ9	N	204	-	24,24,59	4.64	15 (62%)	31,33,75	2.86	12 (38%)
12	FAD	P	700	-	58,58,58	1.48	8 (13%)	85,89,89	1.57	15 (17%)
7	HEM	H	202	-	50,50,50	1.31	6 (12%)	67,82,82	1.20	5 (7%)
14	SF4	Q	302	5	0,12,12	-	-	-		
8	MQ9	N	203	-	25,25,59	4.82	16 (64%)	31,34,75	2.89	9 (29%)
6	PEV	M	203	-	43,43,48	0.95	4 (9%)	46,48,53	0.99	3 (6%)
9	CDL	H	205	-	83,83,99	0.94	8 (9%)	89,95,111	0.99	4 (4%)
11	PIE	M	202	-	48,48,57	1.04	4 (8%)	57,60,69	1.09	4 (7%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
6	PEV	G	201	-	43,43,48	0.96	4 (9%)	46,48,53	0.91	2 (4%)
7	HEM	D	201	2	50,50,50	1.36	9 (18%)	67,82,82	1.16	4 (5%)
13	FES	K	301	5	0,4,4	-	-	-		

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
13	FES	Q	301	5	-	-	0/1/1/1
12	FAD	J	700	-	-	14/34/50/50	0/6/6/6
10	LPP	N	205	-	-	25/45/45/45	-
12	FAD	A	700	-	-	11/34/50/50	0/6/6/6
15	F3S	Q	303	5	-	-	0/3/3/3
6	PEV	K	304	-	-	21/44/44/52	-
11	PIE	E	101	-	-	20/43/67/76	0/1/1/1
7	HEM	H	203	2	-	1/14/54/54	-
6	PEV	C	202	-	-	21/47/47/52	-
13	FES	B	301	5	-	-	0/1/1/1
10	LPP	H	201	-	-	27/45/45/45	-
15	F3S	B	303	5	-	-	0/3/3/3
14	SF4	B	302	5	-	-	0/6/5/5
10	LPP	D	206	-	-	24/45/45/45	-
11	PIE	H	206	-	-	25/43/67/76	0/1/1/1
9	CDL	D	204	-	-	54/94/94/110	-
14	SF4	K	302	5	-	-	0/6/5/5
6	PEV	Q	304	-	-	24/44/44/52	-
7	HEM	M	201	2	-	0/14/54/54	-
6	PEV	C	201	-	-	26/44/44/52	-
9	CDL	N	206	-	-	57/94/94/110	-
7	HEM	N	202	1	-	3/14/54/54	-
8	MQ9	H	204	-	-	7/11/31/73	0/2/2/2
8	MQ9	N	201	-	-	5/11/31/73	0/2/2/2
7	HEM	D	202	1	-	3/14/54/54	-
8	MQ9	D	205	-	-	9/13/33/73	0/2/2/2
15	F3S	K	303	5	-	-	0/3/3/3
8	MQ9	D	203	-	-	7/13/33/73	0/2/2/2

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
8	MQ9	N	204	-	-	8/11/31/73	0/2/2/2
12	FAD	P	700	-	-	13/34/50/50	0/6/6/6
7	HEM	H	202	-	-	3/14/54/54	-
14	SF4	Q	302	5	-	-	0/6/5/5
8	MQ9	N	203	-	-	5/13/33/73	0/2/2/2
6	PEV	M	203	-	-	26/47/47/52	-
9	CDL	H	205	-	-	57/94/94/110	-
11	PIE	M	202	-	-	24/43/67/76	0/1/1/1
6	PEV	G	201	-	-	22/47/47/52	-
7	HEM	D	201	2	-	0/14/54/54	-
13	FES	K	301	5	-	-	0/1/1/1

All (229) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	N	203	MQ9	O4-C4	10.97	1.46	1.23
8	D	203	MQ9	O4-C4	10.93	1.46	1.23
8	H	204	MQ9	O4-C4	10.92	1.46	1.23
8	N	201	MQ9	C8-C9	10.80	1.57	1.33
8	H	204	MQ9	C8-C9	10.45	1.57	1.33
8	N	204	MQ9	O4-C4	10.45	1.45	1.23
8	D	203	MQ9	C8-C9	10.44	1.57	1.33
8	D	205	MQ9	O4-C4	10.42	1.45	1.23
8	N	201	MQ9	O4-C4	10.38	1.44	1.23
8	N	203	MQ9	O1-C1	10.28	1.44	1.23
8	N	203	MQ9	C8-C9	10.25	1.56	1.33
8	N	204	MQ9	C8-C9	10.25	1.56	1.33
8	H	204	MQ9	O1-C1	10.23	1.44	1.23
8	D	205	MQ9	C8-C9	10.23	1.56	1.33
8	N	201	MQ9	O1-C1	9.97	1.44	1.23
8	D	203	MQ9	O1-C1	9.96	1.44	1.23
8	N	204	MQ9	O1-C1	9.74	1.43	1.23
8	D	205	MQ9	O1-C1	9.72	1.43	1.23
8	N	203	MQ9	C13-C14	9.30	1.54	1.33
8	D	203	MQ9	C13-C14	9.28	1.54	1.33
8	D	205	MQ9	C13-C14	9.10	1.54	1.33
8	N	201	MQ9	C13-C14	7.43	1.54	1.32
8	H	204	MQ9	C13-C14	7.38	1.54	1.32
8	N	204	MQ9	C13-C14	7.23	1.54	1.32
8	N	201	MQ9	C7-C8	6.18	1.60	1.50

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	N	204	MQ9	C7-C8	5.86	1.59	1.50
8	D	205	MQ9	C7-C8	5.84	1.59	1.50
8	D	203	MQ9	C7-C8	5.72	1.59	1.50
8	H	204	MQ9	C7-C8	5.71	1.59	1.50
8	H	204	MQ9	C3A-C3	5.70	1.48	1.39
8	D	203	MQ9	C3A-C3	5.69	1.48	1.39
8	N	203	MQ9	C3A-C3	5.67	1.48	1.39
8	N	203	MQ9	C7-C8	5.50	1.59	1.50
12	A	700	FAD	C9A-C5X	5.26	1.49	1.41
12	P	700	FAD	C9A-C5X	5.24	1.49	1.41
8	N	201	MQ9	C3A-C3	5.20	1.47	1.39
8	N	204	MQ9	C3A-C3	5.07	1.47	1.39
8	D	205	MQ9	C3A-C3	5.00	1.47	1.39
12	J	700	FAD	C9A-C5X	4.93	1.49	1.41
12	P	700	FAD	C5A-C4A	4.76	1.47	1.39
12	A	700	FAD	C5A-C4A	4.72	1.47	1.39
8	H	204	MQ9	C3C-C3D	4.37	1.46	1.38
8	D	203	MQ9	C3C-C3D	4.27	1.46	1.38
12	J	700	FAD	C5A-C4A	4.26	1.46	1.39
8	N	203	MQ9	C3C-C3D	4.16	1.46	1.38
8	N	201	MQ9	C3-C4	-3.89	1.40	1.48
8	N	201	MQ9	C3C-C3D	3.83	1.45	1.38
8	D	203	MQ9	C3D-C2	3.79	1.45	1.39
8	N	203	MQ9	C3D-C2	3.72	1.45	1.39
8	H	204	MQ9	C3D-C2	3.67	1.45	1.39
7	D	202	HEM	FE-ND	3.58	2.05	1.94
8	N	204	MQ9	C3-C4	-3.48	1.41	1.48
8	D	205	MQ9	C3-C4	-3.45	1.41	1.48
12	P	700	FAD	C8-C7	3.40	1.49	1.40
12	A	700	FAD	C8-C7	3.39	1.49	1.40
8	D	205	MQ9	C3C-C3D	3.38	1.44	1.38
8	N	204	MQ9	C3C-C3D	3.36	1.44	1.38
8	H	204	MQ9	C3-C4	-3.24	1.41	1.48
8	D	205	MQ9	C6-C1	-3.22	1.39	1.47
8	D	203	MQ9	C3-C4	-3.21	1.41	1.48
8	N	201	MQ9	C6-C1	-3.20	1.39	1.47
8	N	204	MQ9	C2-C1	-3.19	1.41	1.48
7	N	202	HEM	FE-ND	3.19	2.04	1.94
8	N	204	MQ9	C6-C1	-3.18	1.39	1.47
7	H	202	HEM	FE-ND	3.18	2.04	1.94
8	D	205	MQ9	C2-C1	-3.16	1.42	1.48
8	D	205	MQ9	C3D-C2	3.16	1.44	1.39

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	N	203	MQ9	C12-C13	3.15	1.60	1.50
8	N	201	MQ9	C12-C13	3.14	1.60	1.50
8	N	204	MQ9	C3D-C2	3.12	1.44	1.39
8	H	204	MQ9	C12-C13	3.11	1.59	1.50
8	D	205	MQ9	C2-C3	-3.11	1.35	1.40
12	J	700	FAD	C8-C7	3.10	1.48	1.40
8	N	204	MQ9	C2-C3	-3.07	1.35	1.40
8	N	203	MQ9	C3-C4	-3.06	1.42	1.48
8	D	203	MQ9	C12-C13	3.05	1.59	1.50
8	N	203	MQ9	C6-C1	-3.01	1.39	1.47
8	N	201	MQ9	C3D-C2	2.97	1.44	1.39
8	D	203	MQ9	C6-C1	-2.97	1.39	1.47
8	N	201	MQ9	C2-C3	-2.95	1.35	1.40
6	C	201	PEV	O2-C2	-2.95	1.39	1.46
7	D	202	HEM	FE-NB	2.89	2.03	1.94
7	M	201	HEM	FE-NA	2.87	2.04	1.95
8	D	205	MQ9	C12-C13	2.87	1.59	1.50
12	J	700	FAD	C4-N3	-2.86	1.33	1.38
8	N	204	MQ9	C12-C13	2.86	1.59	1.50
9	N	206	CDL	OB6-CB4	-2.78	1.40	1.46
12	P	700	FAD	C5A-C6A	2.77	1.48	1.41
10	D	206	LPP	O9-C7	-2.77	1.40	1.46
8	H	204	MQ9	C6-C1	-2.76	1.40	1.47
7	M	201	HEM	FE-ND	2.75	2.03	1.94
12	A	700	FAD	C5A-C6A	2.75	1.48	1.41
6	G	201	PEV	O2-C2	-2.74	1.40	1.46
8	N	201	MQ9	C5-C4	-2.74	1.41	1.47
8	D	203	MQ9	C2-C3	-2.73	1.36	1.40
11	H	206	PIE	O21-C21	2.73	1.42	1.34
9	H	205	CDL	OB6-CB4	-2.73	1.40	1.46
10	H	201	LPP	O9-C7	-2.72	1.40	1.46
11	E	101	PIE	O21-C21	2.71	1.41	1.34
11	M	202	PIE	O21-C21	2.71	1.41	1.34
10	N	205	LPP	O9-C7	-2.69	1.40	1.46
9	D	204	CDL	OB6-CB4	-2.68	1.40	1.46
8	N	201	MQ9	C2-C1	-2.68	1.42	1.48
7	H	202	HEM	CAB-C3B	2.68	1.54	1.47
7	N	202	HEM	CAB-C3B	2.67	1.54	1.47
9	D	204	CDL	OA8-CA6	-2.65	1.39	1.45
8	D	203	MQ9	C3B-C3A	2.65	1.43	1.38
6	Q	304	PEV	O2-C2	-2.64	1.40	1.46
7	H	203	HEM	FE-NC	2.63	2.03	1.95

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	H	204	MQ9	C3B-C3A	2.63	1.43	1.38
7	D	201	HEM	C2A-C3A	-2.63	1.32	1.38
8	N	204	MQ9	C5-C4	-2.62	1.41	1.47
11	H	206	PIE	O31-C31	2.62	1.41	1.33
8	H	204	MQ9	C2-C3	-2.62	1.36	1.40
10	H	201	LPP	O27-C29	2.61	1.41	1.33
8	D	205	MQ9	C5-C4	-2.60	1.41	1.47
8	D	203	MQ9	C2-C1	-2.60	1.43	1.48
7	D	202	HEM	CAC-C3C	2.59	1.54	1.47
7	D	201	HEM	CAC-C3C	2.58	1.54	1.47
8	N	203	MQ9	C3B-C3A	2.58	1.43	1.38
6	C	202	PEV	O2-C2	-2.58	1.40	1.46
8	N	203	MQ9	C2-C3	-2.57	1.36	1.40
10	N	205	LPP	O27-C29	2.57	1.40	1.33
11	M	202	PIE	O31-C31	2.57	1.40	1.33
10	D	206	LPP	O27-C29	2.57	1.40	1.33
7	D	202	HEM	CAB-C3B	2.57	1.54	1.47
7	H	203	HEM	C2A-C3A	-2.57	1.32	1.38
7	D	202	HEM	C2A-C3A	-2.56	1.32	1.38
6	K	304	PEV	O2-C2	-2.56	1.40	1.46
7	D	201	HEM	FE-NA	2.55	2.03	1.95
7	M	201	HEM	CAC-C3C	2.55	1.54	1.47
11	M	202	PIE	P-O14	2.55	1.67	1.59
11	E	101	PIE	O31-C31	2.54	1.40	1.33
11	H	206	PIE	P-O14	2.54	1.67	1.59
12	J	700	FAD	C5A-C6A	2.52	1.48	1.41
9	D	204	CDL	OA6-CA4	-2.52	1.40	1.46
9	H	205	CDL	OA6-CA4	-2.49	1.40	1.46
11	E	101	PIE	P-O14	2.49	1.66	1.59
12	J	700	FAD	C5A-N7A	-2.49	1.34	1.39
7	M	201	HEM	CAB-C3B	2.49	1.54	1.47
7	H	202	HEM	CAC-C3C	2.48	1.54	1.47
7	N	202	HEM	CAC-C3C	2.47	1.54	1.47
6	M	203	PEV	O2-C2	-2.47	1.40	1.46
7	M	201	HEM	FE-NB	2.46	2.02	1.94
6	M	203	PEV	O3-C11	2.46	1.40	1.33
9	H	205	CDL	OA8-CA6	-2.45	1.39	1.45
9	N	206	CDL	OA8-CA6	-2.44	1.39	1.45
7	H	203	HEM	C3C-C2C	-2.44	1.32	1.37
7	D	201	HEM	FE-NB	2.43	2.02	1.94
8	N	204	MQ9	C3B-C3A	2.43	1.43	1.38
9	N	206	CDL	OA6-CA4	-2.42	1.40	1.46

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
12	P	700	FAD	C4-N3	-2.42	1.34	1.38
7	M	201	HEM	C2A-C3A	-2.42	1.32	1.38
10	N	205	LPP	O9-C11	2.41	1.41	1.34
6	C	202	PEV	O3-C11	2.41	1.40	1.33
7	H	203	HEM	FE-NA	2.40	2.03	1.95
12	A	700	FAD	C4-N3	-2.40	1.34	1.38
8	D	205	MQ9	C3B-C3A	2.39	1.43	1.38
6	K	304	PEV	O3-C11	2.38	1.40	1.33
12	P	700	FAD	C8A-N7A	2.38	1.36	1.31
6	C	201	PEV	O3-C3	-2.36	1.39	1.45
8	H	204	MQ9	C5-C4	-2.36	1.42	1.47
9	D	204	CDL	OB8-CB6	-2.36	1.39	1.45
10	D	206	LPP	O9-C11	2.35	1.40	1.34
12	A	700	FAD	C8A-N7A	2.34	1.36	1.31
7	H	203	HEM	CAC-C3C	2.33	1.53	1.47
9	N	206	CDL	OB8-CB6	-2.33	1.40	1.45
6	G	201	PEV	O3-C3	-2.33	1.40	1.45
10	H	201	LPP	O9-C11	2.32	1.40	1.34
7	D	201	HEM	CAB-C3B	2.32	1.53	1.47
9	D	204	CDL	OB8-CB7	2.32	1.40	1.33
6	K	304	PEV	O3-C3	-2.32	1.40	1.45
6	C	202	PEV	O2-C31	2.31	1.40	1.34
6	G	201	PEV	O3-C11	2.31	1.40	1.33
7	D	201	HEM	C3B-C2B	-2.30	1.32	1.37
8	H	204	MQ9	C2-C1	-2.29	1.43	1.48
9	H	205	CDL	OB8-CB6	-2.29	1.40	1.45
6	G	201	PEV	O2-C31	2.28	1.40	1.34
12	P	700	FAD	C5A-N7A	-2.28	1.34	1.39
9	D	204	CDL	OA6-CA5	2.27	1.40	1.34
9	H	205	CDL	OB8-CB7	2.27	1.40	1.33
6	C	201	PEV	O3-C11	2.26	1.40	1.33
6	M	203	PEV	O3-C3	-2.25	1.40	1.45
7	D	201	HEM	FE-NC	2.25	2.02	1.95
12	P	700	FAD	C4X-N5	2.24	1.35	1.30
12	A	700	FAD	C4X-N5	2.24	1.35	1.30
9	N	206	CDL	OB8-CB7	2.23	1.39	1.33
6	C	202	PEV	O3-C3	-2.23	1.40	1.45
6	Q	304	PEV	O3-C11	2.22	1.39	1.33
7	N	202	HEM	C2A-C3A	-2.22	1.33	1.38
7	H	202	HEM	C2A-C3A	-2.22	1.33	1.38
8	N	203	MQ9	C2-C1	-2.21	1.43	1.48
12	A	700	FAD	C5A-N7A	-2.20	1.35	1.39

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	Q	304	PEV	O3-C3	-2.20	1.40	1.45
8	N	203	MQ9	C5-C4	-2.19	1.42	1.47
6	M	203	PEV	O2-C31	2.19	1.40	1.34
9	H	205	CDL	OA6-CA5	2.18	1.40	1.34
8	D	203	MQ9	C5-C4	-2.18	1.42	1.47
7	M	201	HEM	C3B-C2B	-2.18	1.32	1.37
9	H	205	CDL	OB6-CB5	2.18	1.40	1.34
9	N	206	CDL	OA6-CA5	2.17	1.40	1.34
11	H	206	PIE	O21-C2	-2.17	1.41	1.46
9	N	206	CDL	OB6-CB5	2.17	1.40	1.34
12	J	700	FAD	C2-N3	-2.15	1.34	1.39
7	H	202	HEM	FE-NB	2.15	2.01	1.94
8	N	201	MQ9	C11-C9	2.15	1.55	1.51
12	J	700	FAD	C4A-N9A	-2.15	1.33	1.37
11	M	202	PIE	O21-C2	-2.14	1.41	1.46
6	K	304	PEV	O2-C31	2.14	1.40	1.34
11	E	101	PIE	O21-C2	-2.14	1.41	1.46
9	D	204	CDL	OB6-CB5	2.14	1.40	1.34
12	J	700	FAD	C5X-N5	-2.13	1.35	1.39
10	H	201	LPP	O27-C8	-2.13	1.40	1.45
7	N	202	HEM	FE-NB	2.12	2.01	1.94
7	H	202	HEM	C3D-C2D	-2.10	1.32	1.36
9	H	205	CDL	OA8-CA7	2.10	1.39	1.33
7	N	202	HEM	C3D-C2D	-2.09	1.32	1.36
7	H	203	HEM	FE-ND	2.09	2.01	1.94
7	D	201	HEM	FE-ND	2.08	2.01	1.94
7	D	201	HEM	C3D-C2D	-2.08	1.32	1.36
12	J	700	FAD	C8A-N7A	2.07	1.35	1.31
7	D	202	HEM	C3D-C2D	-2.07	1.32	1.36
9	N	206	CDL	OA8-CA7	2.06	1.39	1.33
8	N	201	MQ9	C3B-C3A	2.06	1.42	1.38
6	Q	304	PEV	O2-C31	2.05	1.40	1.34
12	J	700	FAD	C4X-N5	2.04	1.35	1.30
7	H	203	HEM	CAB-C3B	2.03	1.52	1.47
8	N	203	MQ9	C5M-C5	2.03	1.54	1.50
10	D	206	LPP	O27-C8	-2.02	1.40	1.45

All (194) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
8	H	204	MQ9	C7-C8-C9	-10.55	108.66	126.83
8	N	204	MQ9	C7-C8-C9	-8.17	112.75	126.83

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
8	D	205	MQ9	C7-C8-C9	-8.16	112.78	126.83
8	N	203	MQ9	C7-C8-C9	-7.87	113.27	126.83
8	D	203	MQ9	C7-C8-C9	-7.86	113.29	126.83
8	D	205	MQ9	C12-C13-C14	-7.35	110.81	127.62
8	N	203	MQ9	C12-C13-C14	-6.83	111.99	127.62
8	D	203	MQ9	C12-C13-C14	-6.47	112.81	127.62
8	N	201	MQ9	C10-C9-C8	-5.90	108.49	123.63
12	A	700	FAD	C5A-C4A-N3A	-5.85	118.66	126.72
12	P	700	FAD	C5A-C4A-N3A	-5.84	118.68	126.72
8	D	203	MQ9	C10-C9-C8	-5.83	108.66	123.63
12	J	700	FAD	C5A-C4A-N3A	-5.74	118.81	126.72
8	D	203	MQ9	C15-C14-C13	-5.73	108.91	123.63
8	H	204	MQ9	C10-C9-C8	-5.72	108.92	123.63
8	D	203	MQ9	C15-C14-C16	-5.64	109.48	116.13
8	D	205	MQ9	C15-C14-C13	-5.56	109.34	123.63
8	N	203	MQ9	C10-C9-C8	-5.40	109.75	123.63
8	N	203	MQ9	C15-C14-C13	-5.37	109.83	123.63
8	N	203	MQ9	C11-C9-C8	-5.31	109.24	121.17
8	D	205	MQ9	C11-C9-C8	-5.29	109.30	121.17
8	N	204	MQ9	C10-C9-C8	-5.28	110.07	123.63
8	N	204	MQ9	C11-C9-C8	-5.28	109.31	121.17
8	D	205	MQ9	C10-C9-C8	-5.27	110.08	123.63
8	N	203	MQ9	C15-C14-C16	-5.22	109.99	116.13
8	D	205	MQ9	C15-C14-C16	-5.16	110.06	116.13
8	N	204	MQ9	C12-C13-C14	-5.05	110.81	127.64
8	D	203	MQ9	C11-C9-C8	-4.95	110.05	121.17
8	N	204	MQ9	C16-C14-C13	-4.73	108.46	122.66
12	P	700	FAD	N3A-C4A-N9A	4.62	135.02	127.17
8	H	204	MQ9	C12-C13-C14	-4.61	112.28	127.64
6	C	202	PEV	O2-C31-C32	4.60	121.44	111.48
6	M	203	PEV	O2-C31-C32	4.58	121.39	111.48
12	A	700	FAD	N3A-C4A-N9A	4.57	134.94	127.17
8	N	201	MQ9	C7-C8-C9	-4.57	118.96	126.83
8	N	201	MQ9	C16-C14-C13	-4.52	109.08	122.66
8	H	204	MQ9	C16-C14-C13	-4.51	109.12	122.66
12	J	700	FAD	N3A-C4A-N9A	4.49	134.80	127.17
8	N	204	MQ9	C15-C14-C13	-4.44	109.34	122.66
8	H	204	MQ9	C11-C9-C8	-4.40	111.28	121.17
9	H	205	CDL	OA6-CA5-C11	4.26	120.70	111.48
9	N	206	CDL	OA6-CA5-C11	4.26	120.69	111.48
8	H	204	MQ9	C7-C6-C5	-4.23	117.63	124.89
8	H	204	MQ9	C15-C14-C13	-4.21	110.02	122.66

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
8	H	204	MQ9	C7-C6-C1	4.18	122.99	118.58
9	D	204	CDL	OA6-CA5-C11	4.13	120.42	111.48
6	Q	304	PEV	O2-C31-C32	4.13	120.42	111.48
11	E	101	PIE	O21-C21-C22	4.11	120.38	111.48
8	N	201	MQ9	C12-C13-C14	-4.10	113.98	127.64
9	D	204	CDL	OB6-CB5-C51	4.07	120.28	111.48
6	G	201	PEV	O2-C31-C32	4.02	120.17	111.48
9	N	206	CDL	OB6-CB5-C51	3.98	120.10	111.48
9	H	205	CDL	OB6-CB5-C51	3.98	120.09	111.48
11	H	206	PIE	O21-C21-C22	3.94	120.00	111.48
10	N	205	LPP	O9-C11-C12	3.93	119.98	111.48
11	M	202	PIE	O21-C21-C22	3.92	119.97	111.48
6	K	304	PEV	O2-C31-C32	3.89	119.90	111.48
8	N	201	MQ9	C15-C14-C13	-3.81	111.22	122.66
10	H	201	LPP	O9-C11-C12	3.80	119.70	111.48
12	J	700	FAD	C2A-N3A-C4A	3.77	121.03	111.83
6	C	201	PEV	O2-C31-C32	3.75	119.60	111.48
8	N	201	MQ9	C10-C9-C11	-3.71	108.78	115.23
10	D	206	LPP	O9-C11-C12	3.69	119.47	111.48
12	P	700	FAD	C2A-N3A-C4A	3.69	120.83	111.83
12	A	700	FAD	C2A-N3A-C4A	3.68	120.82	111.83
8	H	204	MQ9	C10-C9-C11	-3.62	108.94	115.23
12	A	700	FAD	C4A-C5A-N7A	-3.56	106.51	110.58
12	J	700	FAD	C4A-C5A-N7A	-3.56	106.52	110.58
8	N	201	MQ9	C11-C9-C8	-3.53	113.23	121.17
12	P	700	FAD	C4A-C5A-N7A	-3.49	106.59	110.58
12	J	700	FAD	N3A-C2A-N1A	-3.47	123.33	128.58
8	N	203	MQ9	C10-C9-C11	-3.43	109.27	115.23
8	D	205	MQ9	C7-C6-C5	-3.39	119.08	124.89
8	N	204	MQ9	C7-C6-C5	-3.38	119.09	124.89
7	D	202	HEM	C4A-NA-C1A	-3.35	100.35	105.82
7	H	203	HEM	CHC-C4B-NB	3.34	128.02	124.42
8	D	203	MQ9	C5M-C5-C6	-3.34	118.96	124.45
8	D	203	MQ9	C10-C9-C11	-3.28	109.54	115.23
8	N	204	MQ9	C10-C9-C11	-3.25	109.58	115.23
8	D	205	MQ9	C10-C9-C11	-3.25	109.59	115.23
8	D	203	MQ9	C7-C6-C5	-3.23	119.35	124.89
9	D	204	CDL	OA8-CA7-C31	3.19	121.57	111.83
12	A	700	FAD	N3A-C2A-N1A	-3.19	123.75	128.58
12	P	700	FAD	N3A-C2A-N1A	-3.18	123.77	128.58
8	H	204	MQ9	C5M-C5-C6	-3.13	119.30	124.45
7	D	202	HEM	CHA-C1A-C2A	-3.08	118.56	125.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
7	D	201	HEM	CBA-CAA-C2A	-3.05	104.09	112.53
7	D	202	HEM	C4A-CHB-C1B	-3.01	119.17	126.25
9	D	204	CDL	OB8-CB7-C71	3.00	120.99	111.83
10	N	205	LPP	O27-C29-C30	2.93	120.77	111.83
12	J	700	FAD	C4-C4X-N5	2.88	122.19	118.21
11	M	202	PIE	C3'-C2'-C1'	2.88	115.88	110.83
8	N	204	MQ9	C5M-C5-C6	-2.87	119.73	124.45
8	D	205	MQ9	C5M-C5-C6	-2.87	119.73	124.45
6	K	304	PEV	O3-C11-C12	2.86	120.55	111.83
9	H	205	CDL	OA8-CA7-C31	2.85	120.52	111.83
9	N	206	CDL	OA8-CA7-C31	2.84	120.48	111.83
12	A	700	FAD	C4-C4X-N5	2.83	122.11	118.21
12	P	700	FAD	C4-C4X-N5	2.82	122.10	118.21
9	N	206	CDL	OB8-CB7-C71	2.82	120.43	111.83
9	H	205	CDL	OB8-CB7-C71	2.80	120.37	111.83
7	D	202	HEM	C2A-C1A-NA	2.77	113.23	110.15
6	Q	304	PEV	O3-C11-C12	2.76	120.26	111.83
10	D	206	LPP	O27-C29-C30	2.73	120.15	111.83
12	J	700	FAD	C4A-N9A-C8A	2.72	108.59	105.74
6	C	202	PEV	O3-C11-C12	2.72	120.11	111.83
8	N	204	MQ9	C7-C6-C1	2.69	121.42	118.58
10	H	201	LPP	O27-C29-C30	2.69	120.05	111.83
11	H	206	PIE	O31-C31-C32	2.69	120.04	111.83
11	E	101	PIE	O31-C31-C32	2.68	120.02	111.83
6	M	203	PEV	O3-C11-C12	2.68	120.01	111.83
8	D	205	MQ9	C7-C6-C1	2.67	121.39	118.58
11	M	202	PIE	C4'-C3'-C2'	2.66	115.50	110.83
11	M	202	PIE	O31-C31-C32	2.65	119.92	111.83
8	H	204	MQ9	C8-C7-C6	2.65	118.60	112.08
12	P	700	FAD	C4A-N9A-C8A	2.64	108.51	105.74
8	D	203	MQ9	C7-C6-C1	2.64	121.36	118.58
8	N	203	MQ9	C5M-C5-C6	-2.62	120.14	124.45
7	D	202	HEM	CHD-C4C-NC	2.60	127.28	124.45
7	D	202	HEM	CHB-C4A-C3A	-2.60	119.89	127.43
7	M	201	HEM	CAA-CBA-CGA	-2.59	106.79	113.67
12	A	700	FAD	C4A-N9A-C8A	2.59	108.46	105.74
12	A	700	FAD	C5A-N7A-C8A	2.59	107.52	103.45
12	J	700	FAD	C5A-N7A-C8A	2.57	107.49	103.45
6	G	201	PEV	O3-C11-C12	2.56	119.64	111.83
12	P	700	FAD	C5A-N7A-C8A	2.56	107.47	103.45
8	N	203	MQ9	C7-C6-C5	-2.52	120.57	124.89
6	C	201	PEV	O3-C11-C12	2.51	119.48	111.83

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
8	N	201	MQ9	C16-C14-C15	-2.51	108.82	114.59
7	M	201	HEM	C3B-C2B-C1B	2.50	108.29	106.41
12	P	700	FAD	C3B-C2B-C1B	2.48	106.15	101.46
12	J	700	FAD	C4X-C10-N1	-2.47	118.53	124.59
12	A	700	FAD	C4X-C10-N1	-2.47	118.54	124.59
12	A	700	FAD	C3B-C2B-C1B	2.46	106.12	101.46
7	D	201	HEM	C3B-C2B-C1B	2.45	108.25	106.41
12	P	700	FAD	C4X-C10-N1	-2.45	118.59	124.59
7	D	201	HEM	C3B-C4B-NB	-2.43	107.72	109.47
7	D	202	HEM	CAA-C2A-C3A	2.43	132.51	127.07
11	H	206	PIE	C3'-C2'-C1'	2.42	115.08	110.83
7	D	202	HEM	CHA-C1A-NA	2.39	128.20	123.86
7	H	203	HEM	C3D-C4D-ND	-2.38	107.56	110.17
7	H	203	HEM	CHA-C4D-ND	2.31	127.23	124.37
7	M	201	HEM	C3B-C4B-NB	-2.29	107.83	109.47
8	D	203	MQ9	C5M-C5-C4	2.28	120.87	116.68
8	D	205	MQ9	O1-C1-C2	-2.28	117.93	121.57
7	H	203	HEM	CAA-CBA-CGA	-2.27	107.66	113.67
12	J	700	FAD	C4X-C10-N10	2.26	119.72	116.48
7	M	201	HEM	C2A-C1A-NA	-2.26	107.65	110.15
8	N	204	MQ9	O1-C1-C2	-2.24	117.99	121.57
12	J	700	FAD	C6A-C5A-N7A	2.23	136.38	132.09
12	J	700	FAD	O4-C4-C4X	-2.20	120.73	126.53
12	P	700	FAD	O4-C4-C4X	-2.18	120.78	126.53
12	A	700	FAD	O4-C4-C4X	-2.17	120.79	126.53
8	N	201	MQ9	C5M-C5-C6	-2.16	120.90	124.45
7	N	202	HEM	CHD-C4C-NC	2.16	126.80	124.45
6	M	203	PEV	O2-C31-O31	-2.16	118.67	123.70
7	H	203	HEM	CBD-CAD-C3D	-2.15	106.58	112.53
7	H	203	HEM	C4D-ND-C1D	2.15	107.76	105.21
7	H	202	HEM	CAA-C2A-C3A	2.15	131.90	127.07
12	J	700	FAD	C4X-C4-N3	2.15	118.73	113.25
7	N	202	HEM	CAA-C2A-C3A	2.14	131.88	127.07
7	H	202	HEM	CHD-C4C-NC	2.14	126.79	124.45
7	H	203	HEM	CAD-CBD-CGD	-2.13	108.00	113.67
7	H	202	HEM	CHA-C1A-NA	2.13	127.73	123.86
7	M	201	HEM	CAD-CBD-CGD	-2.12	108.04	113.67
8	H	204	MQ9	C16-C14-C15	-2.11	109.72	114.59
7	N	202	HEM	CHA-C1A-NA	2.11	127.69	123.86
12	A	700	FAD	C10-N1-C2	2.11	121.41	116.85
12	A	700	FAD	C6A-C5A-N7A	2.11	136.15	132.09
12	J	700	FAD	C4-N3-C2	-2.10	121.91	125.64

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
12	J	700	FAD	O2-C2-N1	-2.10	118.31	121.80
12	A	700	FAD	C4X-C10-N10	2.10	119.49	116.48
12	P	700	FAD	C6A-C5A-N7A	2.10	136.13	132.09
12	P	700	FAD	C4X-C10-N10	2.09	119.48	116.48
8	N	201	MQ9	C7-C6-C5	-2.09	121.30	124.89
12	P	700	FAD	C10-N1-C2	2.08	121.36	116.85
7	D	202	HEM	CHB-C4A-NA	2.08	127.63	123.86
7	H	203	HEM	C4B-C3B-C2B	2.07	109.19	107.28
12	J	700	FAD	N9A-C8A-N7A	-2.07	111.00	113.94
12	J	700	FAD	C3B-C2B-C1B	2.06	105.37	101.46
7	D	202	HEM	CHC-C1C-NC	2.06	126.69	124.45
7	D	201	HEM	C2A-C1A-NA	-2.05	107.87	110.15
12	P	700	FAD	C4X-C4-N3	2.05	118.46	113.25
12	J	700	FAD	C10-N1-C2	2.05	121.28	116.85
12	J	700	FAD	C2A-N1A-C6A	2.04	122.08	118.73
12	A	700	FAD	C4X-C4-N3	2.04	118.44	113.25
7	M	201	HEM	C1B-NB-C4B	2.03	107.61	105.21
7	H	202	HEM	C1D-C2D-C3D	2.03	109.12	106.98
8	N	204	MQ9	C5M-C5-C4	2.03	120.41	116.68
12	J	700	FAD	C5X-C9A-N10	2.03	119.80	117.97
8	D	205	MQ9	C5M-C5-C4	2.02	120.39	116.68
7	D	202	HEM	CMA-C3A-C2A	2.02	129.91	125.62
7	N	202	HEM	C1D-C2D-C3D	2.02	109.10	106.98
7	H	202	HEM	CHA-C1A-C2A	-2.02	120.88	125.30

There are no chirality outliers.

All (542) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	C	201	PEV	C32-C31-O2-C2
6	C	201	PEV	C4-O4P-P-O3P
6	C	201	PEV	C4-O4P-P-O2P
6	C	201	PEV	O4P-C4-C5-N6
6	C	202	PEV	C32-C31-O2-C2
6	C	202	PEV	C4-O4P-P-O3P
6	G	201	PEV	C4-O4P-P-O3P
6	G	201	PEV	C4-O4P-P-O1P
6	G	201	PEV	C4-O4P-P-O2P
6	K	304	PEV	O4P-C4-C5-N6
6	M	203	PEV	C32-C31-O2-C2
6	M	203	PEV	O3P-C1-C2-O2
6	M	203	PEV	C1-O3P-P-O1P

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Mol	Chain	Res	Type	Atoms
6	M	203	PEV	C1-O3P-P-O2P
6	M	203	PEV	C1-O3P-P-O4P
6	M	203	PEV	C4-O4P-P-O3P
6	M	203	PEV	C4-O4P-P-O1P
6	M	203	PEV	C4-O4P-P-O2P
6	Q	304	PEV	C1-O3P-P-O1P
6	Q	304	PEV	C1-O3P-P-O2P
6	Q	304	PEV	C1-O3P-P-O4P
6	Q	304	PEV	C4-O4P-P-O3P
6	Q	304	PEV	O4P-C4-C5-N6
7	D	202	HEM	C3A-C2A-CAA-CBA
7	H	202	HEM	C1A-C2A-CAA-CBA
7	H	202	HEM	C3A-C2A-CAA-CBA
7	N	202	HEM	C1A-C2A-CAA-CBA
7	N	202	HEM	C3A-C2A-CAA-CBA
8	D	203	MQ9	C7-C8-C9-C11
8	D	203	MQ9	C12-C13-C14-C16
8	D	203	MQ9	C13-C14-C16-C17
8	D	205	MQ9	C7-C8-C9-C10
8	D	205	MQ9	C12-C13-C14-C15
8	N	201	MQ9	C7-C8-C9-C11
8	N	203	MQ9	C7-C8-C9-C11
8	N	203	MQ9	C12-C13-C14-C16
8	N	203	MQ9	C15-C14-C16-C17
8	N	204	MQ9	C7-C8-C9-C10
8	N	204	MQ9	C12-C13-C14-C16
9	D	204	CDL	O1-C1-CA2-OA2
9	D	204	CDL	CA3-OA5-PA1-OA3
9	D	204	CDL	C11-CA5-OA6-CA4
9	D	204	CDL	CB2-OB2-PB2-OB3
9	D	204	CDL	CB2-OB2-PB2-OB4
9	D	204	CDL	CB2-OB2-PB2-OB5
9	D	204	CDL	CB3-OB5-PB2-OB3
9	D	204	CDL	CB3-OB5-PB2-OB4
9	D	204	CDL	C51-CB5-OB6-CB4
9	H	205	CDL	CB2-C1-CA2-OA2
9	H	205	CDL	CA2-C1-CB2-OB2
9	H	205	CDL	CA3-OA5-PA1-OA2
9	H	205	CDL	CA3-OA5-PA1-OA3
9	H	205	CDL	CA3-OA5-PA1-OA4
9	H	205	CDL	C11-CA5-OA6-CA4
9	H	205	CDL	CB2-OB2-PB2-OB4

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Mol	Chain	Res	Type	Atoms
9	H	205	CDL	CB2-OB2-PB2-OB5
9	H	205	CDL	CB3-OB5-PB2-OB2
9	H	205	CDL	CB3-OB5-PB2-OB3
9	H	205	CDL	CB3-OB5-PB2-OB4
9	N	206	CDL	CB2-C1-CA2-OA2
9	N	206	CDL	CA2-C1-CB2-OB2
9	N	206	CDL	CA3-OA5-PA1-OA2
9	N	206	CDL	CA3-OA5-PA1-OA3
9	N	206	CDL	CA3-OA5-PA1-OA4
9	N	206	CDL	C11-CA5-OA6-CA4
9	N	206	CDL	CB2-OB2-PB2-OB4
9	N	206	CDL	CB2-OB2-PB2-OB5
9	N	206	CDL	CB3-OB5-PB2-OB2
9	N	206	CDL	CB3-OB5-PB2-OB3
9	N	206	CDL	CB3-OB5-PB2-OB4
10	D	206	LPP	C6-O5-P1-O3
10	D	206	LPP	C6-O5-P1-O4
10	D	206	LPP	O9-C7-C8-O27
10	D	206	LPP	C12-C11-O9-C7
10	H	201	LPP	C6-O5-P1-O2
10	H	201	LPP	C6-O5-P1-O4
10	H	201	LPP	O10-C11-O9-C7
10	H	201	LPP	C12-C11-O9-C7
10	N	205	LPP	C6-O5-P1-O2
10	N	205	LPP	C6-O5-P1-O4
10	N	205	LPP	C12-C11-O9-C7
11	E	101	PIE	C5'-O14-P-O11
11	E	101	PIE	C22-C21-O21-C2
11	H	206	PIE	C1-O11-P-O13
11	H	206	PIE	C1-O11-P-O14
11	H	206	PIE	C5'-O14-P-O11
11	M	202	PIE	C1-O11-P-O13
11	M	202	PIE	C1-O11-P-O14
11	M	202	PIE	C5'-O14-P-O11
11	M	202	PIE	C5'-O14-P-O12
12	A	700	FAD	C5B-O5B-PA-O1A
12	A	700	FAD	C5B-O5B-PA-O2A
12	A	700	FAD	C5'-O5'-P-O1P
12	A	700	FAD	C5'-O5'-P-O2P
12	A	700	FAD	C5'-O5'-P-O3P
12	J	700	FAD	C5B-O5B-PA-O1A
12	J	700	FAD	C5B-O5B-PA-O2A

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Mol	Chain	Res	Type	Atoms
12	J	700	FAD	C2'-C1'-N10-C10
12	J	700	FAD	C1'-C2'-C3'-O3'
12	J	700	FAD	C1'-C2'-C3'-C4'
12	J	700	FAD	O4'-C4'-C5'-O5'
12	J	700	FAD	C5'-O5'-P-O3P
12	J	700	FAD	PA-O3P-P-O5'
12	P	700	FAD	C5B-O5B-PA-O3P
12	P	700	FAD	C1'-C2'-C3'-O3'
12	P	700	FAD	C1'-C2'-C3'-C4'
12	P	700	FAD	O2'-C2'-C3'-O3'
12	P	700	FAD	O2'-C2'-C3'-C4'
12	P	700	FAD	C3'-C4'-C5'-O5'
12	P	700	FAD	O4'-C4'-C5'-O5'
6	G	201	PEV	O11-C11-O3-C3
6	K	304	PEV	O11-C11-O3-C3
6	M	203	PEV	O11-C11-O3-C3
8	H	204	MQ9	C12-C13-C14-C15
8	N	201	MQ9	C12-C13-C14-C16
8	N	204	MQ9	C12-C13-C14-C15
6	K	304	PEV	C12-C11-O3-C3
6	M	203	PEV	C12-C11-O3-C3
9	D	204	CDL	OB9-CB7-OB8-CB6
6	C	202	PEV	O31-C31-O2-C2
6	M	203	PEV	O31-C31-O2-C2
9	D	204	CDL	OA7-CA5-OA6-CA4
9	H	205	CDL	OA7-CA5-OA6-CA4
9	N	206	CDL	OA7-CA5-OA6-CA4
10	D	206	LPP	O10-C11-O9-C7
10	N	205	LPP	O10-C11-O9-C7
11	E	101	PIE	O22-C21-O21-C2
8	H	204	MQ9	C12-C13-C14-C16
6	G	201	PEV	C12-C11-O3-C3
9	D	204	CDL	C71-CB7-OB8-CB6
10	N	205	LPP	O28-C29-O27-C8
8	D	203	MQ9	C12-C11-C9-C10
8	D	205	MQ9	C12-C11-C9-C10
8	N	204	MQ9	C12-C11-C9-C10
8	H	204	MQ9	C12-C11-C9-C8
8	N	201	MQ9	C12-C11-C9-C8
8	H	204	MQ9	C7-C8-C9-C10
8	N	203	MQ9	C7-C8-C9-C10
8	D	205	MQ9	C12-C13-C14-C16

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Mol	Chain	Res	Type	Atoms
6	C	202	PEV	O11-C11-O3-C3
10	H	201	LPP	O28-C29-O27-C8
6	C	201	PEV	O31-C31-O2-C2
9	D	204	CDL	OB7-CB5-OB6-CB4
6	G	201	PEV	C32-C33-C34-C35
9	D	204	CDL	O1-C1-CB2-OB2
9	H	205	CDL	O1-C1-CB2-OB2
9	N	206	CDL	O1-C1-CB2-OB2
10	N	205	LPP	C30-C29-O27-C8
6	K	304	PEV	C32-C31-O2-C2
6	G	201	PEV	C15-C16-C17-C18
10	D	206	LPP	C12-C13-C14-C15
6	C	202	PEV	C12-C11-O3-C3
10	H	201	LPP	C30-C29-O27-C8
8	D	203	MQ9	C12-C11-C9-C8
8	N	203	MQ9	C12-C11-C9-C8
8	D	205	MQ9	C9-C11-C12-C13
8	H	204	MQ9	C9-C11-C12-C13
8	N	201	MQ9	C9-C11-C12-C13
8	N	204	MQ9	C9-C11-C12-C13
7	D	202	HEM	C1A-C2A-CAA-CBA
11	H	206	PIE	C35-C36-C37-C38
11	M	202	PIE	C21-C22-C23-C24
10	D	206	LPP	C31-C32-C33-C34
6	K	304	PEV	O31-C31-O2-C2
9	D	204	CDL	CB2-C1-CA2-OA2
6	C	201	PEV	C12-C11-O3-C3
10	N	205	LPP	C12-C13-C14-C15
6	C	202	PEV	C41-C42-C43-C44
10	H	201	LPP	C12-C13-C14-C15
11	M	202	PIE	C35-C36-C37-C38
6	G	201	PEV	C41-C42-C43-C44
9	H	205	CDL	O1-C1-CA2-OA2
9	N	206	CDL	O1-C1-CA2-OA2
10	H	201	LPP	C17-C18-C19-C20
12	J	700	FAD	O2'-C2'-C3'-O3'
6	M	203	PEV	C11-C12-C13-C14
11	H	206	PIE	C31-C32-C33-C34
12	J	700	FAD	O2'-C2'-C3'-C4'
9	H	205	CDL	C71-CB7-OB8-CB6
9	N	206	CDL	C71-CB7-OB8-CB6
10	N	205	LPP	C17-C18-C19-C20

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Mol	Chain	Res	Type	Atoms
11	E	101	PIE	C21-C22-C23-C24
9	D	204	CDL	CA7-C31-C32-C33
9	D	204	CDL	CB5-C51-C52-C53
6	C	201	PEV	O11-C11-O3-C3
6	C	201	PEV	C11-C12-C13-C14
9	D	204	CDL	CA5-C11-C12-C13
10	N	205	LPP	C11-C12-C13-C14
6	C	201	PEV	C12-C13-C14-C15
11	E	101	PIE	C24-C25-C26-C27
11	E	101	PIE	C31-C32-C33-C34
8	D	203	MQ9	C12-C13-C14-C15
6	C	202	PEV	C11-C12-C13-C14
6	K	304	PEV	C31-C32-C33-C34
9	H	205	CDL	C34-C35-C36-C37
9	N	206	CDL	C34-C35-C36-C37
9	D	204	CDL	C31-C32-C33-C34
11	E	101	PIE	C32-C31-O31-C3
11	M	202	PIE	C32-C31-O31-C3
10	H	201	LPP	C11-C12-C13-C14
10	D	206	LPP	C29-C30-C31-C32
6	K	304	PEV	C12-C13-C14-C15
6	M	203	PEV	C42-C43-C44-C45
6	G	201	PEV	C17-C18-C19-C20
6	K	304	PEV	C3-C2-O2-C31
6	M	203	PEV	C3-C2-O2-C31
9	H	205	CDL	CA6-CA4-OA6-CA5
9	N	206	CDL	CA6-CA4-OA6-CA5
9	H	205	CDL	OB9-CB7-OB8-CB6
9	N	206	CDL	OB9-CB7-OB8-CB6
10	H	201	LPP	C35-C36-C37-C38
9	D	204	CDL	C58-C59-C60-C61
9	H	205	CDL	C32-C33-C34-C35
9	H	205	CDL	C72-C73-C74-C75
9	N	206	CDL	C72-C73-C74-C75
6	C	202	PEV	C36-C37-C38-C39
6	C	202	PEV	C17-C18-C19-C20
6	Q	304	PEV	C32-C33-C34-C35
9	H	205	CDL	C51-C52-C53-C54
9	N	206	CDL	C32-C33-C34-C35
9	N	206	CDL	C51-C52-C53-C54
11	H	206	PIE	C22-C23-C24-C25
6	G	201	PEV	C37-C38-C39-C40

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Mol	Chain	Res	Type	Atoms
11	E	101	PIE	C33-C34-C35-C36
11	E	101	PIE	C36-C37-C38-C39
6	C	201	PEV	C15-C16-C17-C18
6	K	304	PEV	C13-C14-C15-C16
6	M	203	PEV	C17-C18-C19-C20
6	Q	304	PEV	C37-C38-C39-C40
9	H	205	CDL	C43-C44-C45-C46
9	N	206	CDL	C43-C44-C45-C46
6	C	201	PEV	C17-C18-C19-C20
6	C	202	PEV	C37-C38-C39-C40
6	K	304	PEV	C36-C37-C38-C39
6	C	201	PEV	C36-C37-C38-C39
6	K	304	PEV	C15-C16-C17-C18
11	E	101	PIE	C35-C36-C37-C38
6	C	201	PEV	C13-C14-C15-C16
10	N	205	LPP	C21-C22-C23-C24
11	M	202	PIE	O32-C31-O31-C3
10	D	206	LPP	C16-C17-C18-C19
10	N	205	LPP	C18-C19-C20-C21
10	D	206	LPP	C38-C39-C40-C41
11	E	101	PIE	O32-C31-O31-C3
9	D	204	CDL	C51-C52-C53-C54
9	D	204	CDL	C40-C41-C42-C43
9	D	204	CDL	CA2-C1-CB2-OB2
10	D	206	LPP	C19-C20-C21-C22
10	D	206	LPP	C35-C36-C37-C38
10	H	201	LPP	C18-C19-C20-C21
11	H	206	PIE	C36-C37-C38-C39
11	M	202	PIE	C24-C25-C26-C27
6	G	201	PEV	C11-C12-C13-C14
9	H	205	CDL	CA7-C31-C32-C33
9	H	205	CDL	CB5-C51-C52-C53
9	N	206	CDL	CA7-C31-C32-C33
9	N	206	CDL	CB5-C51-C52-C53
9	H	205	CDL	C73-C74-C75-C76
9	N	206	CDL	C73-C74-C75-C76
6	C	201	PEV	C18-C19-C20-C21
9	H	205	CDL	C58-C59-C60-C61
10	N	205	LPP	C38-C39-C40-C41
11	M	202	PIE	C33-C34-C35-C36
9	N	206	CDL	C58-C59-C60-C61
6	C	202	PEV	C38-C39-C40-C41

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Mol	Chain	Res	Type	Atoms
6	C	202	PEV	C15-C16-C17-C18
9	D	204	CDL	C72-C73-C74-C75
9	H	205	CDL	C31-CA7-OA8-CA6
9	N	206	CDL	C31-CA7-OA8-CA6
6	G	201	PEV	C14-C15-C16-C17
6	Q	304	PEV	C19-C20-C21-C22
9	H	205	CDL	CA5-C11-C12-C13
9	N	206	CDL	CA5-C11-C12-C13
10	N	205	LPP	C29-C30-C31-C32
9	D	204	CDL	C11-C12-C13-C14
6	C	202	PEV	C13-C14-C15-C16
9	D	204	CDL	C43-C44-C45-C46
9	D	204	CDL	C55-C56-C57-C58
10	D	206	LPP	C17-C18-C19-C20
6	Q	304	PEV	C38-C39-C40-C41
6	C	201	PEV	C38-C39-C40-C41
6	C	201	PEV	C32-C33-C34-C35
6	K	304	PEV	C35-C36-C37-C38
6	M	203	PEV	C41-C42-C43-C44
6	Q	304	PEV	C15-C16-C17-C18
10	H	201	LPP	C31-C32-C33-C34
10	D	206	LPP	C11-C12-C13-C14
9	D	204	CDL	C73-C74-C75-C76
6	G	201	PEV	C16-C17-C18-C19
10	H	201	LPP	C21-C22-C23-C24
10	N	205	LPP	C34-C35-C36-C37
6	K	304	PEV	C38-C39-C40-C41
9	N	206	CDL	C13-C14-C15-C16
10	D	206	LPP	C13-C14-C15-C16
9	D	204	CDL	C56-C57-C58-C59
10	H	201	LPP	C29-C30-C31-C32
9	H	205	CDL	C13-C14-C15-C16
9	H	205	CDL	C15-C16-C17-C18
9	N	206	CDL	C15-C16-C17-C18
6	G	201	PEV	C42-C43-C44-C45
8	N	201	MQ9	C12-C11-C9-C10
11	M	202	PIE	C36-C37-C38-C39
10	H	201	LPP	C38-C39-C40-C41
6	M	203	PEV	C37-C38-C39-C40
11	E	101	PIE	C27-C28-C29-C47
11	H	206	PIE	C27-C28-C29-C47
6	M	203	PEV	C12-C13-C14-C15

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Mol	Chain	Res	Type	Atoms
9	D	204	CDL	C37-C38-C39-C40
12	J	700	FAD	C3'-C4'-C5'-O5'
10	N	205	LPP	C39-C40-C41-C42
7	D	202	HEM	C2A-CAA-CBA-CGA
10	N	205	LPP	C31-C32-C33-C34
9	D	204	CDL	C35-C36-C37-C38
9	H	205	CDL	C57-C58-C59-C60
9	N	206	CDL	C57-C58-C59-C60
10	H	201	LPP	C20-C21-C22-C23
9	H	205	CDL	OA9-CA7-OA8-CA6
9	N	206	CDL	OA9-CA7-OA8-CA6
6	M	203	PEV	C32-C33-C34-C35
11	H	206	PIE	C47-C48-C49-C50
9	H	205	CDL	C11-C12-C13-C14
9	N	206	CDL	C11-C12-C13-C14
6	K	304	PEV	O3P-C1-C2-C3
6	M	203	PEV	O3P-C1-C2-C3
9	H	205	CDL	OB5-CB3-CB4-CB6
9	N	206	CDL	OB5-CB3-CB4-CB6
6	C	201	PEV	C37-C38-C39-C40
9	D	204	CDL	C57-C58-C59-C60
11	H	206	PIE	C25-C26-C27-C28
9	H	205	CDL	C55-C56-C57-C58
9	N	206	CDL	C55-C56-C57-C58
6	G	201	PEV	C38-C39-C40-C41
11	E	101	PIE	C47-C48-C49-C50
10	H	201	LPP	C34-C35-C36-C37
6	G	201	PEV	C35-C36-C37-C38
9	H	205	CDL	C54-C55-C56-C57
9	N	206	CDL	C54-C55-C56-C57
10	H	201	LPP	C6-O5-P1-O3
6	M	203	PEV	C14-C15-C16-C17
9	D	204	CDL	CA6-CA4-OA6-CA5
11	M	202	PIE	C47-C48-C49-C50
11	E	101	PIE	C22-C23-C24-C25
6	K	304	PEV	C17-C18-C19-C20
9	D	204	CDL	OB5-CB3-CB4-OB6
6	Q	304	PEV	C12-C11-O3-C3
10	D	206	LPP	C34-C35-C36-C37
6	M	203	PEV	C13-C14-C15-C16
10	H	201	LPP	C16-C17-C18-C19
8	D	205	MQ9	C12-C11-C9-C8

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Mol	Chain	Res	Type	Atoms
8	N	204	MQ9	C12-C11-C9-C8
6	M	203	PEV	C36-C37-C38-C39
9	D	204	CDL	C16-C17-C18-C19
9	D	204	CDL	C17-C18-C19-C20
9	H	205	CDL	C44-C45-C46-C47
9	N	206	CDL	C44-C45-C46-C47
6	G	201	PEV	C43-C44-C45-C46
6	Q	304	PEV	C17-C18-C19-C20
11	H	206	PIE	C48-C49-C50-C51
9	H	205	CDL	C12-C13-C14-C15
10	D	206	LPP	C21-C22-C23-C24
9	D	204	CDL	C1-CB2-OB2-PB2
6	C	202	PEV	C14-C15-C16-C17
9	N	206	CDL	C12-C13-C14-C15
11	H	206	PIE	C32-C33-C34-C35
6	Q	304	PEV	O3P-C1-C2-C3
9	D	204	CDL	OB5-CB3-CB4-CB6
9	H	205	CDL	C17-C18-C19-C20
9	N	206	CDL	C17-C18-C19-C20
11	E	101	PIE	C48-C49-C50-C51
6	C	201	PEV	C20-C21-C22-C23
11	H	206	PIE	C32-C31-O31-C3
11	M	202	PIE	C27-C28-C29-C47
9	D	204	CDL	C44-C45-C46-C47
11	H	206	PIE	C24-C25-C26-C27
10	D	206	LPP	C39-C40-C41-C42
8	D	205	MQ9	C15-C14-C16-C17
6	Q	304	PEV	C14-C15-C16-C17
10	H	201	LPP	C39-C40-C41-C42
6	C	202	PEV	C1-C2-C3-O3
10	N	205	LPP	C6-C7-C8-O27
6	K	304	PEV	O3P-C1-C2-O2
9	D	204	CDL	OA5-CA3-CA4-OA6
10	D	206	LPP	O5-C6-C7-O9
10	D	206	LPP	C36-C37-C38-C39
9	H	205	CDL	OB6-CB4-CB6-OB8
9	N	206	CDL	OB6-CB4-CB6-OB8
10	N	205	LPP	O9-C7-C8-O27
6	Q	304	PEV	O11-C11-O3-C3
11	E	101	PIE	C25-C26-C27-C28
10	H	201	LPP	C15-C16-C17-C18
12	A	700	FAD	PA-O3P-P-O5'

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Mol	Chain	Res	Type	Atoms
12	P	700	FAD	PA-O3P-P-O5'
10	N	205	LPP	C13-C14-C15-C16
6	C	202	PEV	C43-C44-C45-C46
8	D	203	MQ9	C9-C11-C12-C13
12	A	700	FAD	O2'-C2'-C3'-C4'
11	M	202	PIE	C25-C26-C27-C28
12	A	700	FAD	C1'-C2'-C3'-O3'
6	M	203	PEV	C20-C21-C22-C23
6	C	201	PEV	C31-C32-C33-C34
10	N	205	LPP	C15-C16-C17-C18
8	H	204	MQ9	C5-C6-C7-C8
10	D	206	LPP	C6-O5-P1-O2
11	M	202	PIE	C22-C21-O21-C2
9	D	204	CDL	C36-C37-C38-C39
11	H	206	PIE	O32-C31-O31-C3
6	C	201	PEV	O3P-C1-C2-O2
6	Q	304	PEV	O3P-C1-C2-O2
9	H	205	CDL	OB5-CB3-CB4-OB6
9	N	206	CDL	OB5-CB3-CB4-OB6
10	H	201	LPP	O5-C6-C7-O9
11	H	206	PIE	O11-C1-C2-O21
11	M	202	PIE	O11-C1-C2-O21
9	H	205	CDL	CA3-CA4-CA6-OA8
9	N	206	CDL	CA3-CA4-CA6-OA8
10	D	206	LPP	C6-C7-C8-O27
7	H	203	HEM	C4C-C3C-CAC-CBC
9	D	204	CDL	C78-C79-C80-C81
6	Q	304	PEV	C5-C4-O4P-P
8	D	205	MQ9	C1-C6-C7-C8
8	H	204	MQ9	C1-C6-C7-C8
8	N	204	MQ9	C1-C6-C7-C8
11	M	202	PIE	C31-C32-C33-C34
6	K	304	PEV	C33-C34-C35-C36
6	Q	304	PEV	C33-C34-C35-C36
10	H	201	LPP	C30-C31-C32-C33
6	K	304	PEV	O2-C2-C3-O3
6	C	201	PEV	C39-C40-C41-C42
9	H	205	CDL	C36-C37-C38-C39
9	N	206	CDL	C36-C37-C38-C39
11	E	101	PIE	C5'-O14-P-O12
11	H	206	PIE	C5'-O14-P-O12
11	M	202	PIE	O22-C21-O21-C2

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Mol	Chain	Res	Type	Atoms
6	G	201	PEV	C13-C14-C15-C16
12	A	700	FAD	O4'-C4'-C5'-O5'
6	C	201	PEV	O3P-C1-C2-C3
10	H	201	LPP	O5-C6-C7-C8
11	H	206	PIE	O11-C1-C2-C3
11	M	202	PIE	O11-C1-C2-C3
6	C	201	PEV	C35-C36-C37-C38
6	Q	304	PEV	C2-C1-O3P-P
9	D	204	CDL	C60-C61-C62-C63
10	N	205	LPP	C30-C31-C32-C33
6	C	202	PEV	O2-C2-C3-O3
6	M	203	PEV	O2-C2-C3-O3
6	C	202	PEV	C12-C13-C14-C15
6	G	201	PEV	C33-C34-C35-C36
6	C	201	PEV	C1-C2-C3-O3
6	G	201	PEV	C1-C2-C3-O3
6	K	304	PEV	C1-C2-C3-O3
6	M	203	PEV	C1-C2-C3-O3
6	C	202	PEV	O4P-C4-C5-N6
6	Q	304	PEV	C4-O4P-P-O2P
9	D	204	CDL	CA3-OA5-PA1-OA2
9	D	204	CDL	CA3-OA5-PA1-OA4
9	D	204	CDL	CB3-OB5-PB2-OB2
9	H	205	CDL	CB2-OB2-PB2-OB3
9	N	206	CDL	CB2-OB2-PB2-OB3
11	H	206	PIE	C1-O11-P-O12
11	M	202	PIE	C1-O11-P-O12
12	A	700	FAD	C5B-O5B-PA-O3P
12	J	700	FAD	C5B-O5B-PA-O3P
12	J	700	FAD	C5'-O5'-P-O1P
9	H	205	CDL	CB4-CB3-OB5-PB2
9	N	206	CDL	CB4-CB3-OB5-PB2
9	D	204	CDL	C34-C35-C36-C37
11	H	206	PIE	C33-C34-C35-C36
10	D	206	LPP	O5-C6-C7-C8
6	C	201	PEV	C19-C20-C21-C22
6	Q	304	PEV	O2-C2-C3-O3
9	H	205	CDL	OA6-CA4-CA6-OA8
9	N	206	CDL	OA6-CA4-CA6-OA8
11	H	206	PIE	O21-C2-C3-O31
12	P	700	FAD	O3'-C3'-C4'-C5'
9	H	205	CDL	CB3-CB4-CB6-OB8

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Mol	Chain	Res	Type	Atoms
9	N	206	CDL	CB3-CB4-CB6-OB8
9	H	205	CDL	C60-C61-C62-C63
9	N	206	CDL	C60-C61-C62-C63
10	H	201	LPP	C40-C41-C42-C43
9	N	206	CDL	C71-C72-C73-C74
9	H	205	CDL	C71-C72-C73-C74
9	N	206	CDL	C31-C32-C33-C34
9	H	205	CDL	C31-C32-C33-C34
10	N	205	LPP	C16-C17-C18-C19
6	K	304	PEV	C34-C35-C36-C37
6	Q	304	PEV	C13-C14-C15-C16
6	G	201	PEV	C36-C37-C38-C39
11	M	202	PIE	C38-C39-C40-C41
10	H	201	LPP	C13-C14-C15-C16
10	N	205	LPP	C7-C6-O5-P1
6	Q	304	PEV	C16-C17-C18-C19
6	C	201	PEV	O2-C2-C3-O3
6	G	201	PEV	O2-C2-C3-O3
10	N	205	LPP	C35-C36-C37-C38
9	H	205	CDL	C78-C79-C80-C81
9	N	206	CDL	C78-C79-C80-C81
12	P	700	FAD	O3'-C3'-C4'-O4'
9	H	205	CDL	C35-C36-C37-C38
9	N	206	CDL	C35-C36-C37-C38
7	H	202	HEM	C2A-CAA-CBA-CGA
7	N	202	HEM	C2A-CAA-CBA-CGA
6	Q	304	PEV	C1-C2-C3-O3
12	A	700	FAD	O2'-C2'-C3'-O3'
9	D	204	CDL	OA5-CA3-CA4-CA6
9	H	205	CDL	C42-C43-C44-C45
9	N	206	CDL	C42-C43-C44-C45
10	N	205	LPP	C40-C41-C42-C43
11	M	202	PIE	C32-C33-C34-C35
10	H	201	LPP	C6-C7-C8-O27
6	K	304	PEV	C20-C21-C22-C23
9	N	206	CDL	OB7-CB5-OB6-CB4
11	M	202	PIE	C23-C24-C25-C26
9	H	205	CDL	OB7-CB5-OB6-CB4
10	D	206	LPP	C41-C42-C43-C44
12	P	700	FAD	PA-O3P-P-O2P
9	H	205	CDL	C51-CB5-OB6-CB4
11	H	206	PIE	O21-C21-C22-C23

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Mol	Chain	Res	Type	Atoms
11	E	101	PIE	O21-C21-C22-C23
9	D	204	CDL	C74-C75-C76-C77
9	N	206	CDL	C51-CB5-OB6-CB4
12	P	700	FAD	C2'-C3'-C4'-O4'
9	D	204	CDL	C52-C51-CB5-OB6
9	D	204	CDL	C18-C19-C20-C21
11	H	206	PIE	C1-C2-C3-O31
9	H	205	CDL	C52-C51-CB5-OB6
9	N	206	CDL	C52-C51-CB5-OB6
12	P	700	FAD	C2'-C3'-C4'-C5'
9	D	204	CDL	C31-CA7-OA8-CA6
11	H	206	PIE	O22-C21-C22-C23
11	H	206	PIE	C38-C39-C40-C41
9	D	204	CDL	OA9-CA7-OA8-CA6
9	H	205	CDL	C52-C51-CB5-OB7
8	D	205	MQ9	C5-C6-C7-C8
8	N	204	MQ9	C5-C6-C7-C8
9	N	206	CDL	C52-C51-CB5-OB7
11	E	101	PIE	O22-C21-C22-C23
9	D	204	CDL	C52-C51-CB5-OB7
11	M	202	PIE	O21-C21-C22-C23
6	C	202	PEV	C32-C33-C34-C35
6	C	202	PEV	O2-C31-C32-C33
12	J	700	FAD	PA-O3P-P-O2P
11	E	101	PIE	O31-C31-C32-C33

There are no ring outliers.

30 monomers are involved in 96 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
12	J	700	FAD	6	0
10	N	205	LPP	2	0
12	A	700	FAD	18	0
15	Q	303	F3S	2	0
6	K	304	PEV	1	0
11	E	101	PIE	4	0
7	H	203	HEM	5	0
10	H	201	LPP	3	0
15	B	303	F3S	1	0
10	D	206	LPP	2	0
11	H	206	PIE	3	0
9	D	204	CDL	2	0

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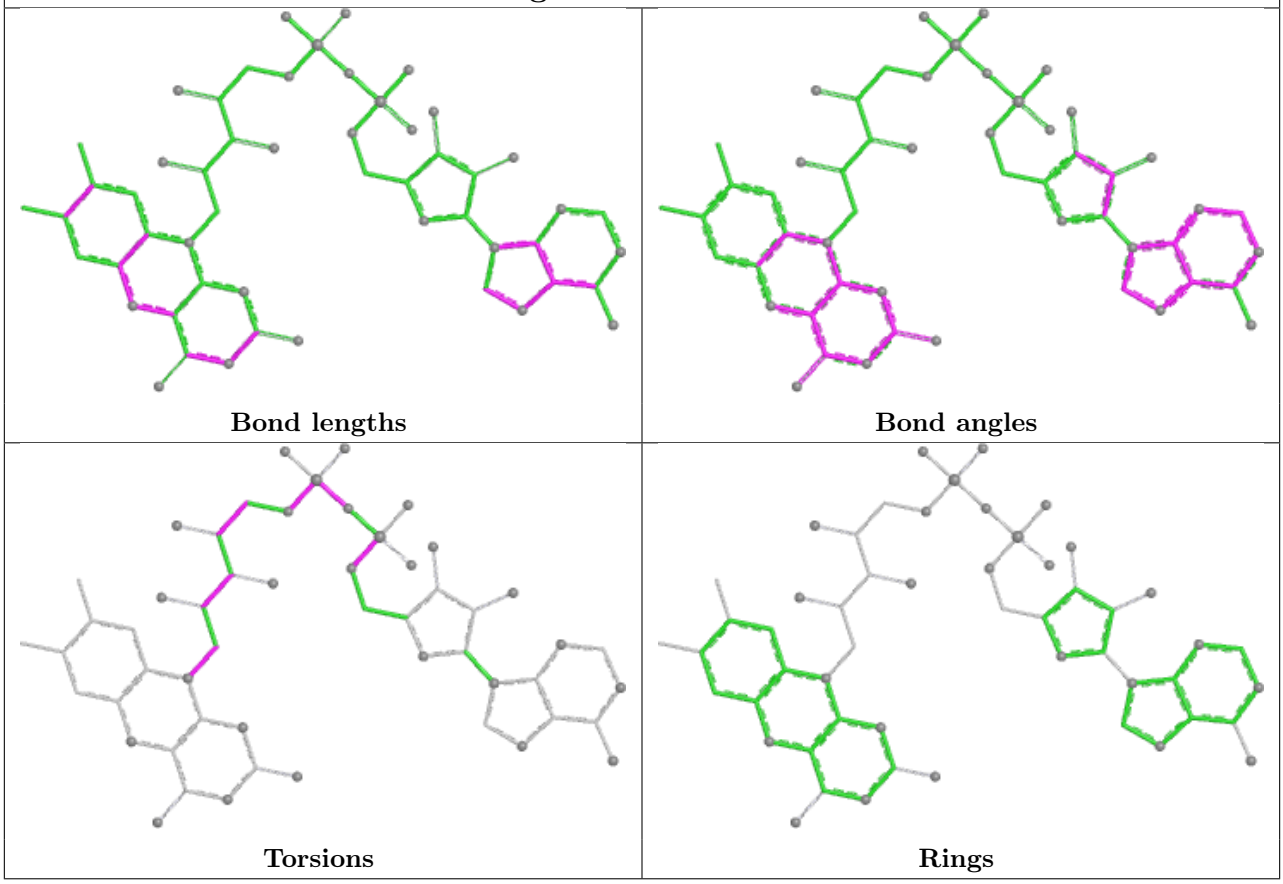
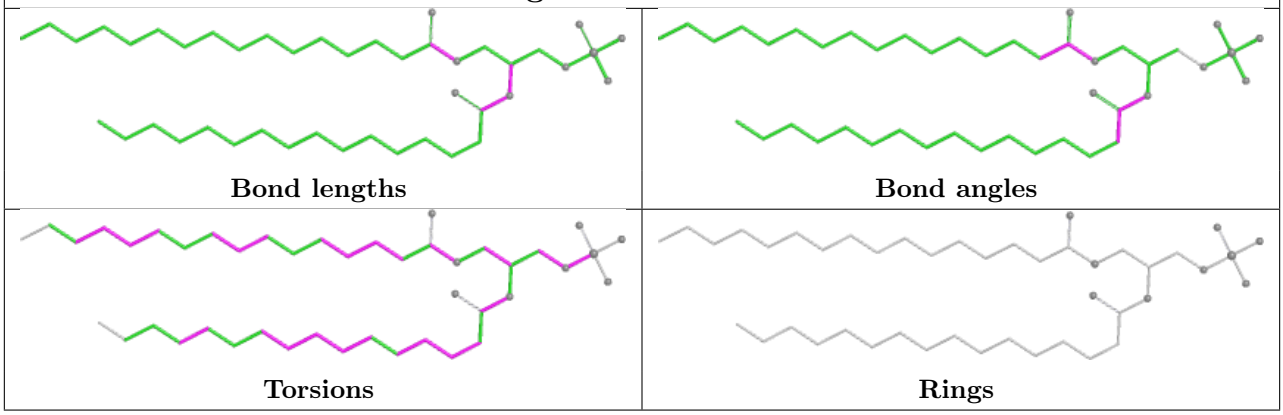
Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	M	201	HEM	3	0
9	N	206	CDL	2	0
7	N	202	HEM	2	0
8	N	201	MQ9	2	0
7	D	202	HEM	3	0
8	D	205	MQ9	2	0
15	K	303	F3S	1	0
8	D	203	MQ9	2	0
8	N	204	MQ9	4	0
12	P	700	FAD	6	0
7	H	202	HEM	5	0
14	Q	302	SF4	1	0
8	N	203	MQ9	1	0
6	M	203	PEV	2	0
9	H	205	CDL	5	0
11	M	202	PIE	3	0
6	G	201	PEV	3	0
7	D	201	HEM	3	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.

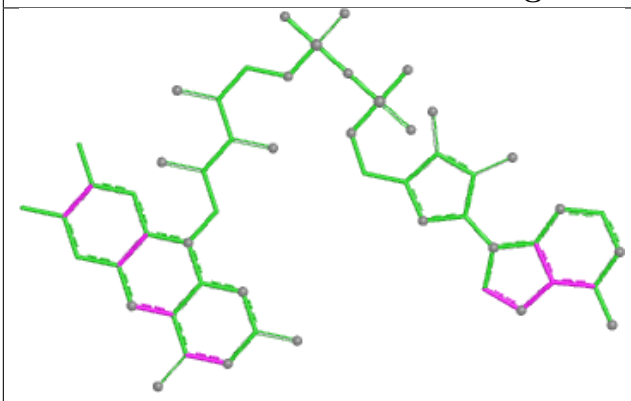
Ligand FAD J 700



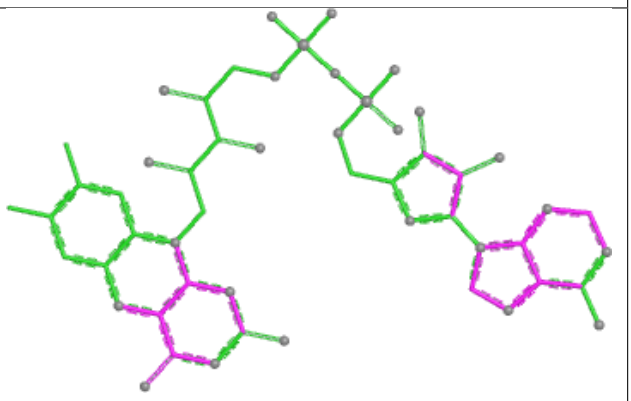
Ligand LPP N 205



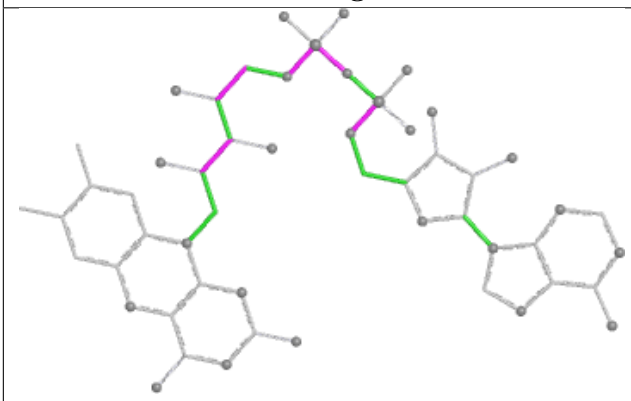
Ligand FAD A 700



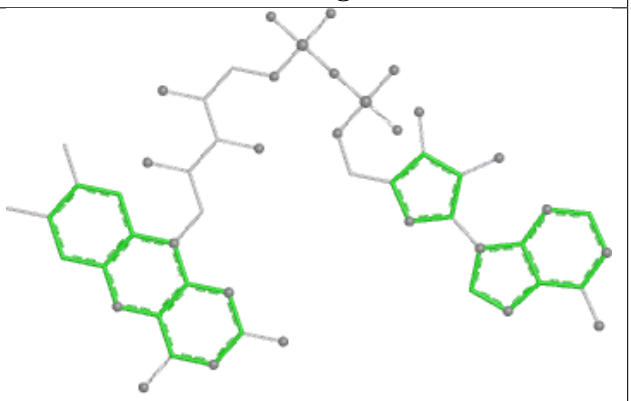
Bond lengths



Bond angles

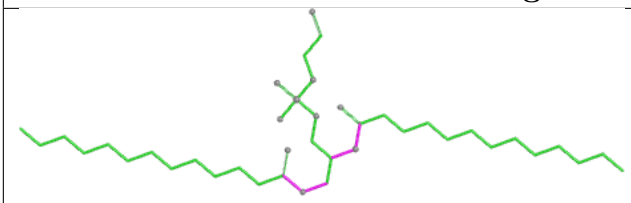


Torsions

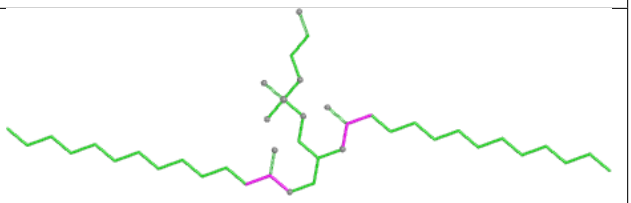


Rings

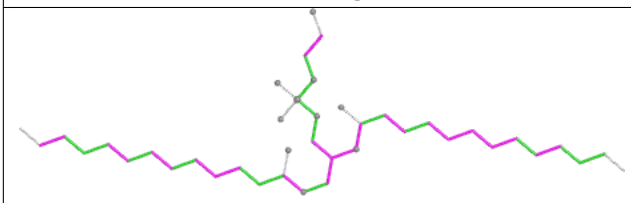
Ligand PEV K 304



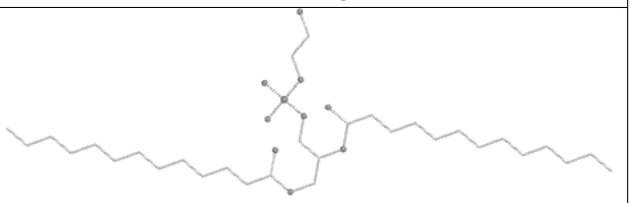
Bond lengths



Bond angles

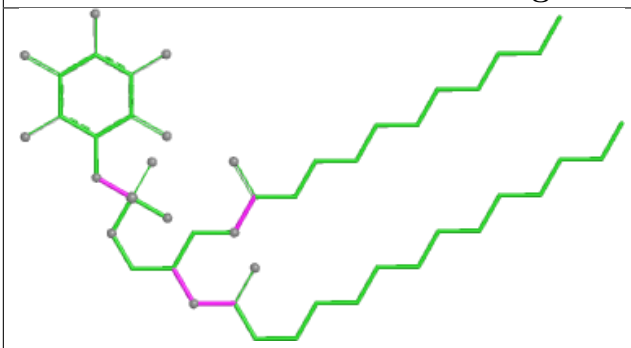


Torsions

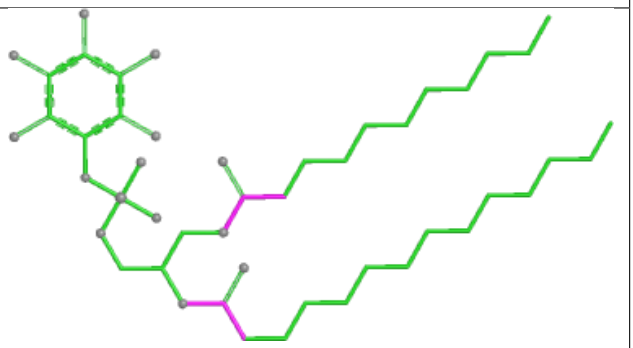


Rings

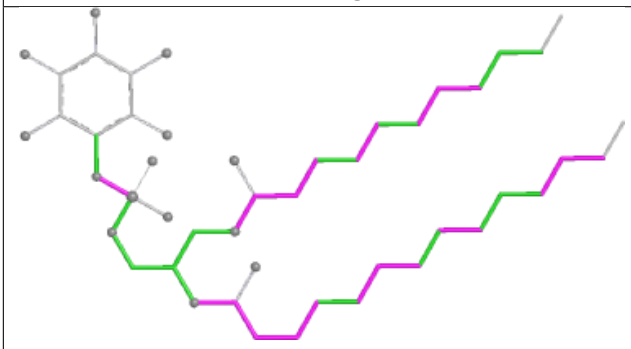
Ligand PIE E 101



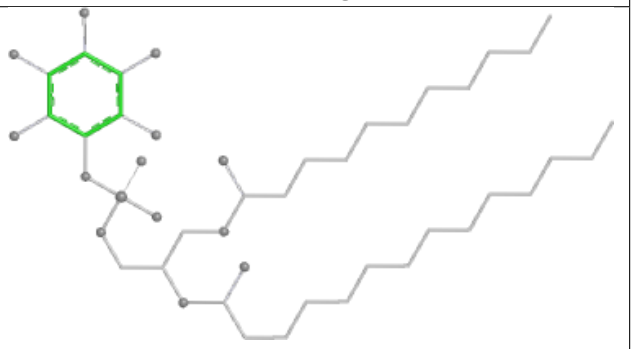
Bond lengths



Bond angles

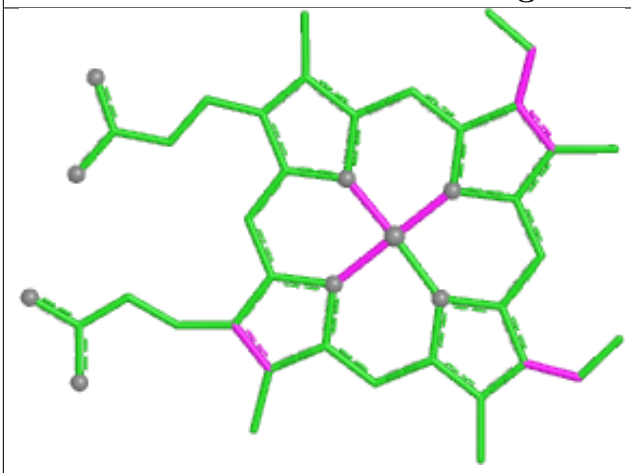


Torsions

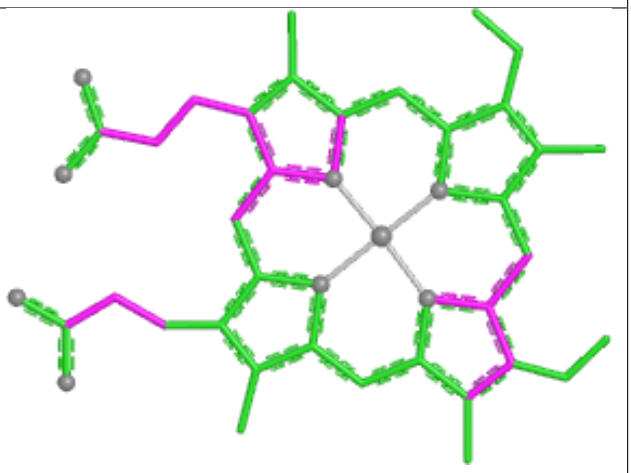


Rings

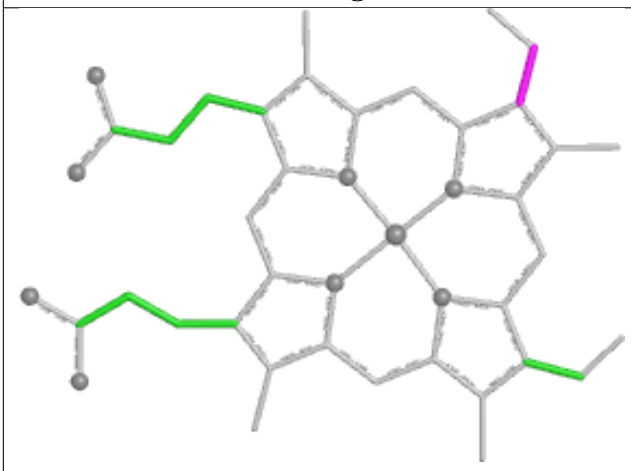
Ligand HEM H 203



Bond lengths



Bond angles



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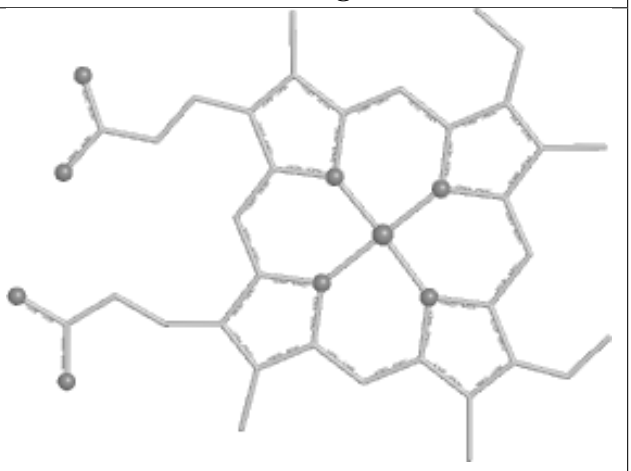
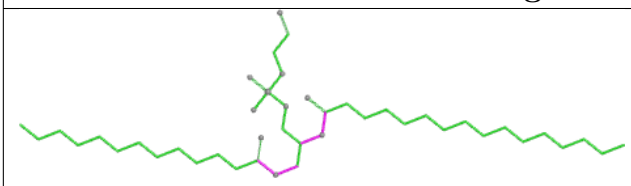
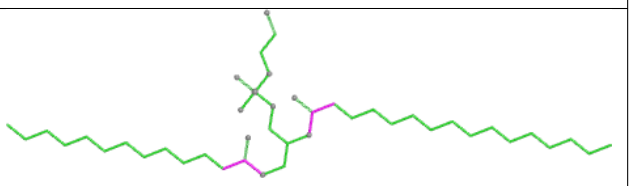


Rings

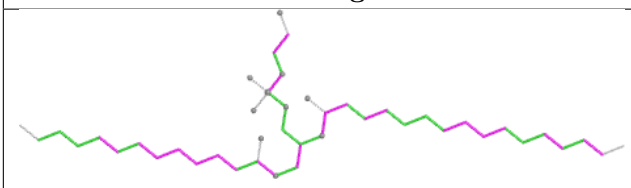
Ligand PEV C 202



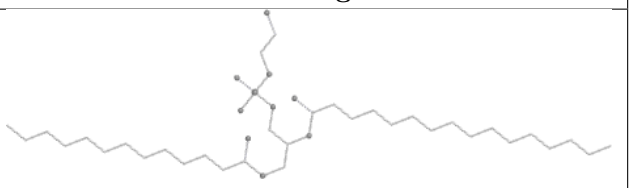
Bond lengths



Bond angles

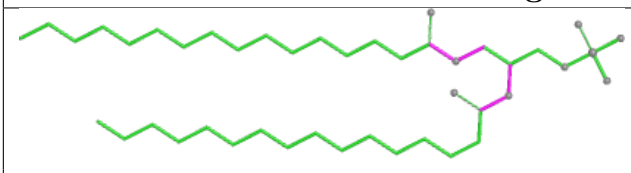


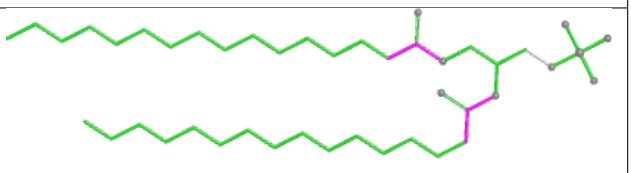
Torsions

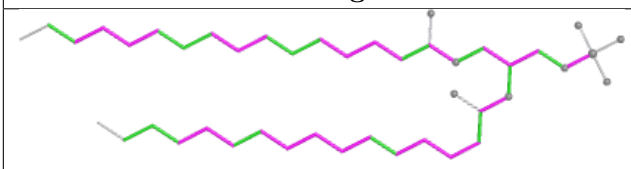


Rings

Ligand LPP H 201


Bond lengths


Bond angles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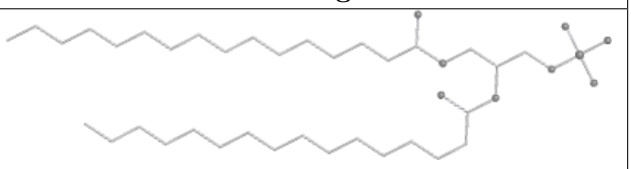
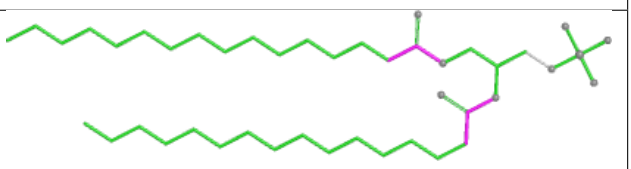
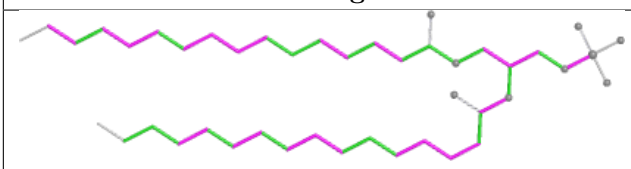
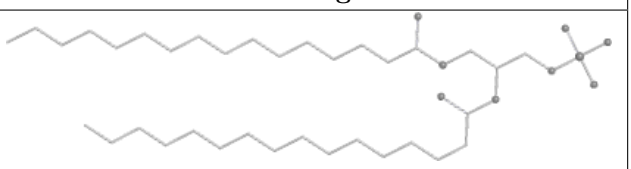

Rings

Ligand LPP D 206

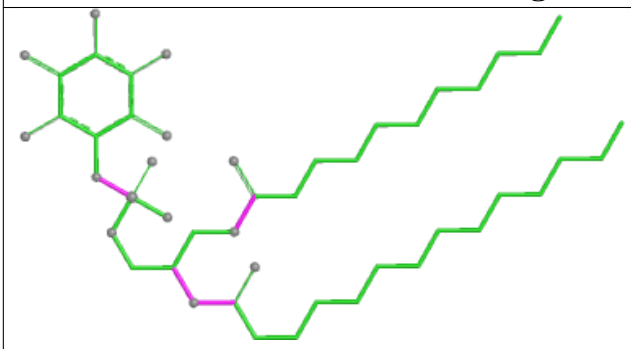
Bond lengths


Bond angles


Torsions


Rings

Ligand PIE H 206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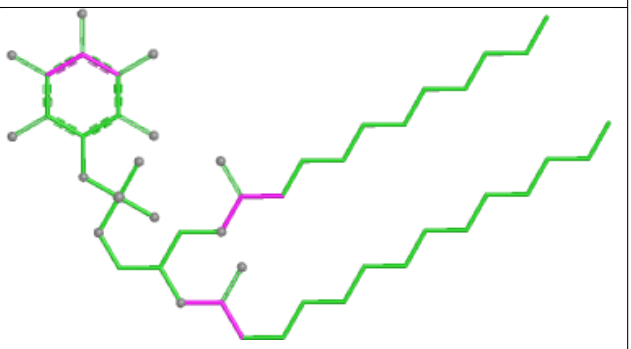
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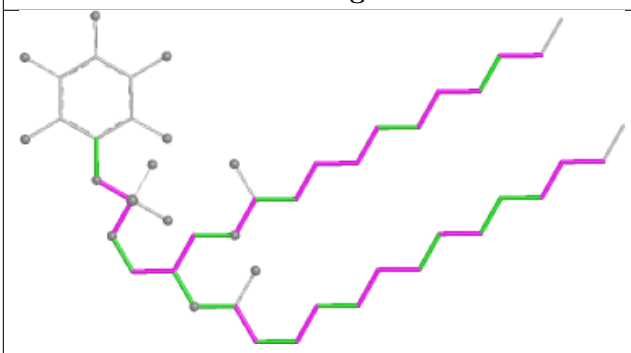
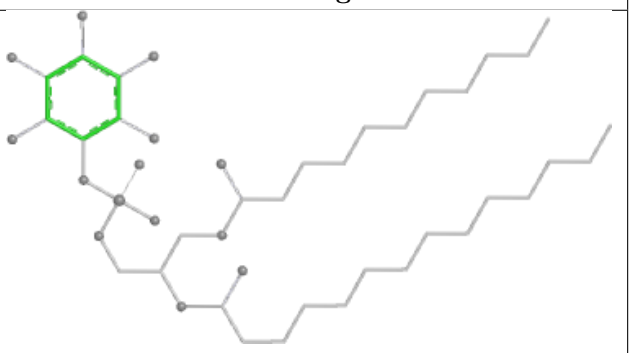
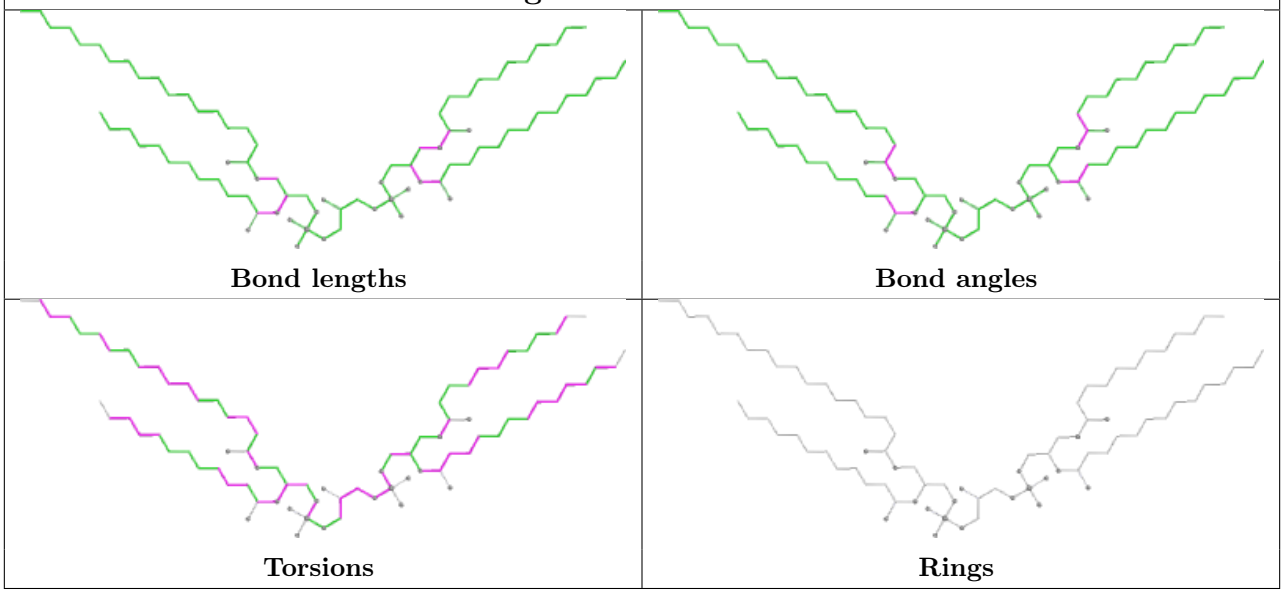
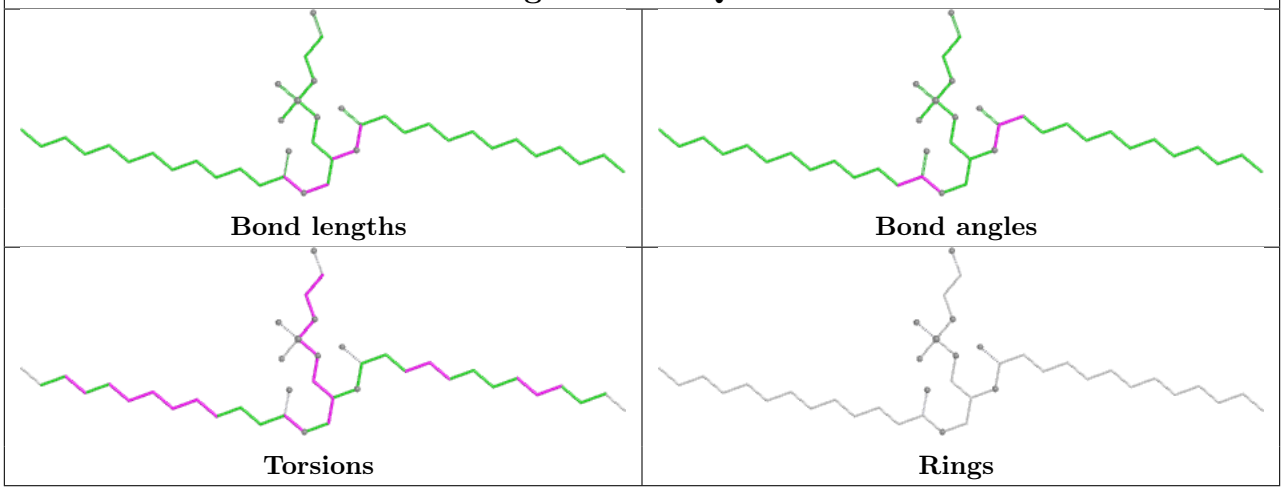

Torsions


Rings

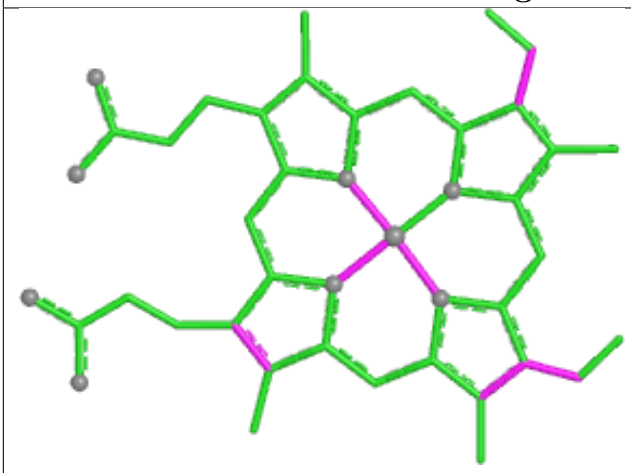
Ligand CDL D 204



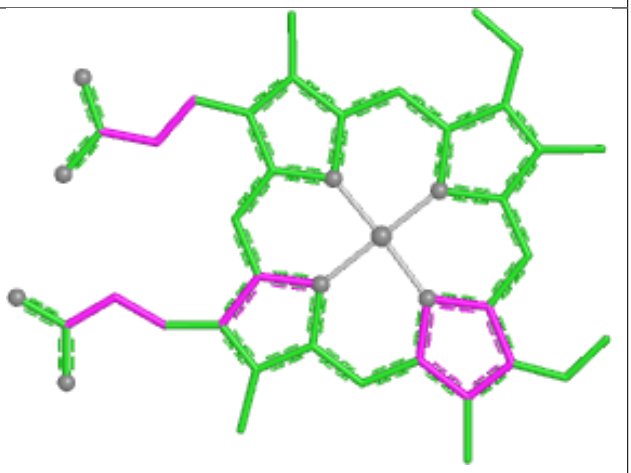
Ligand PEV Q 304



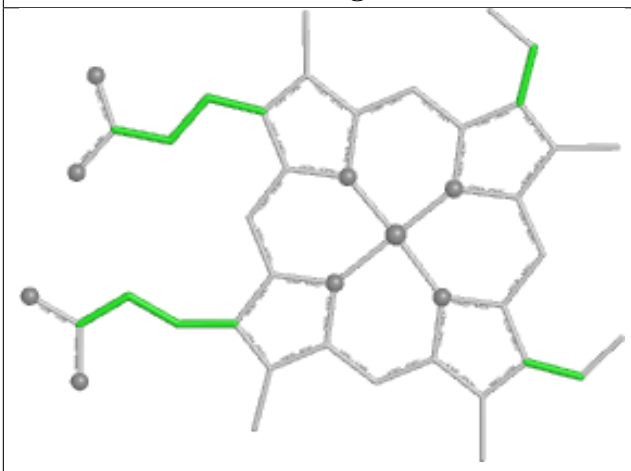
Ligand HEM M 201



Bond lengths



Bond angles



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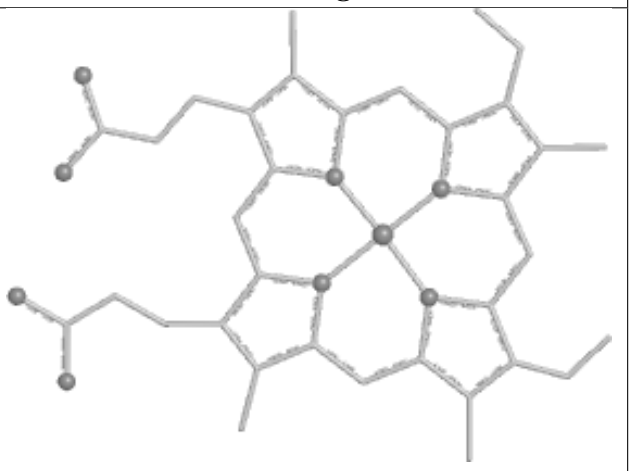
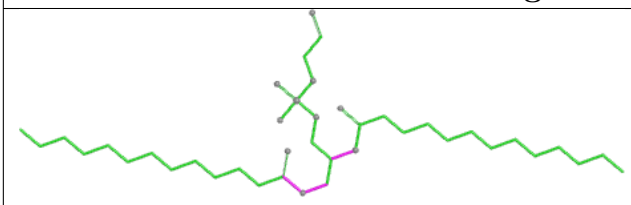
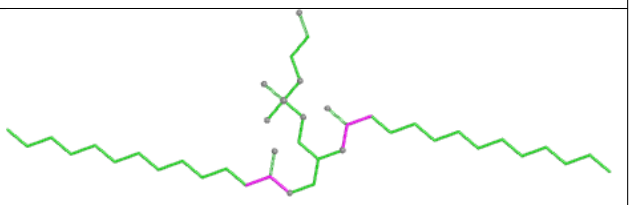


Rings

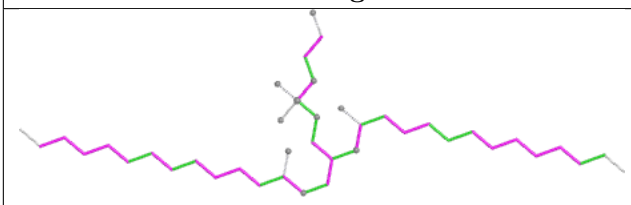
Ligand PEV C 201



Bond lengths



Bond angles



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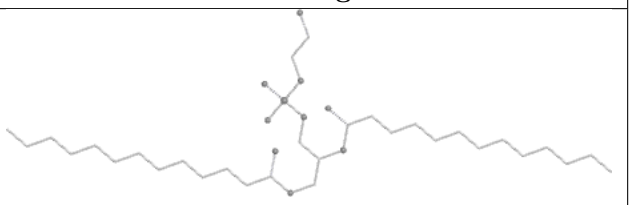
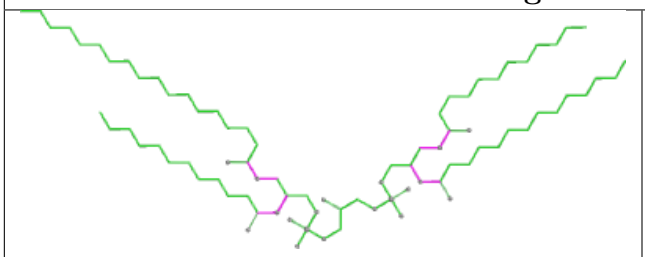


Rings

Ligand CDL N 206



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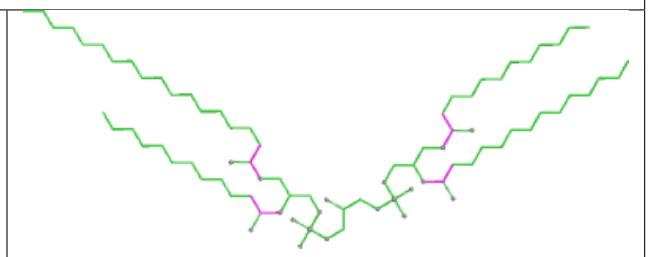
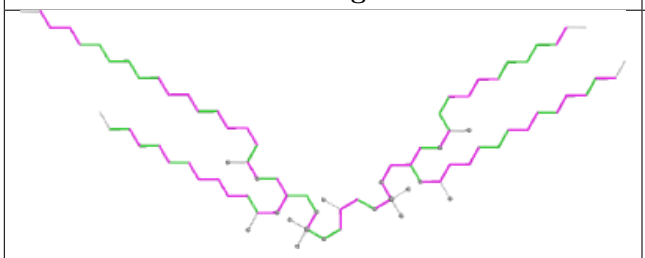


Bond angles



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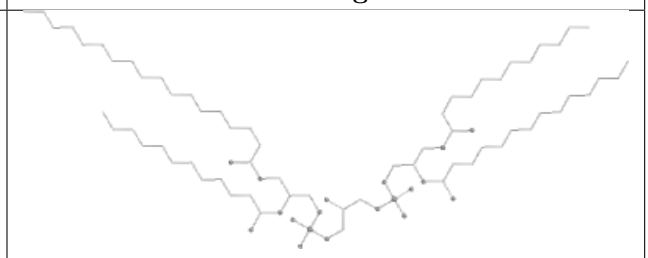
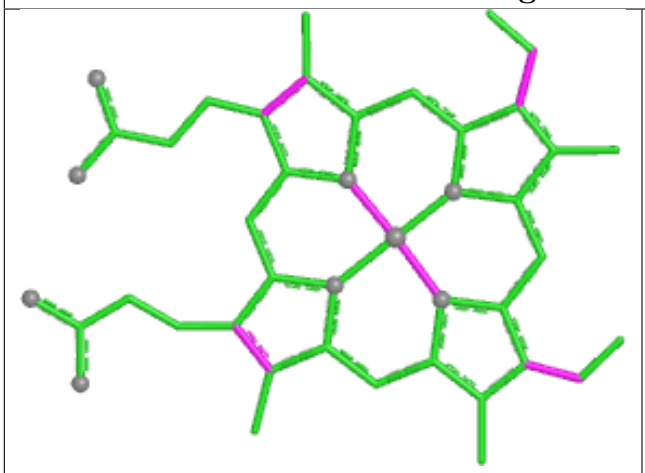


Rings

Ligand HEM N 202



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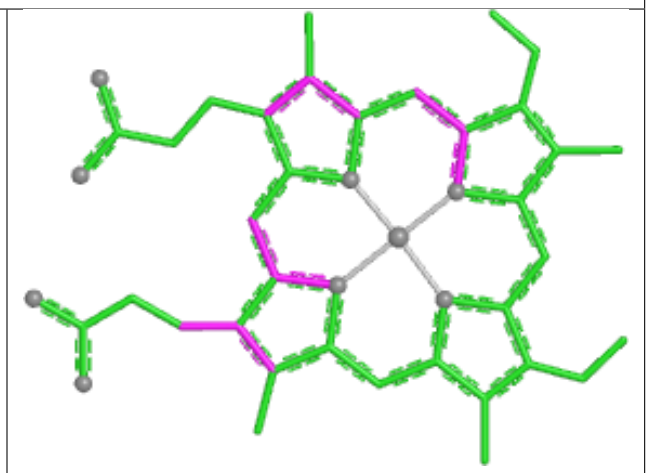
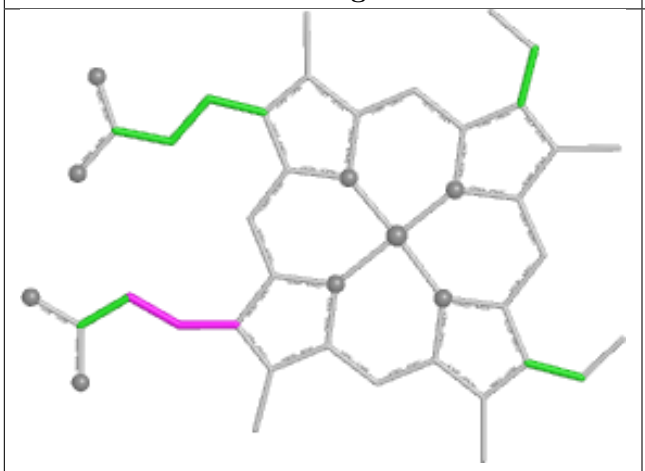
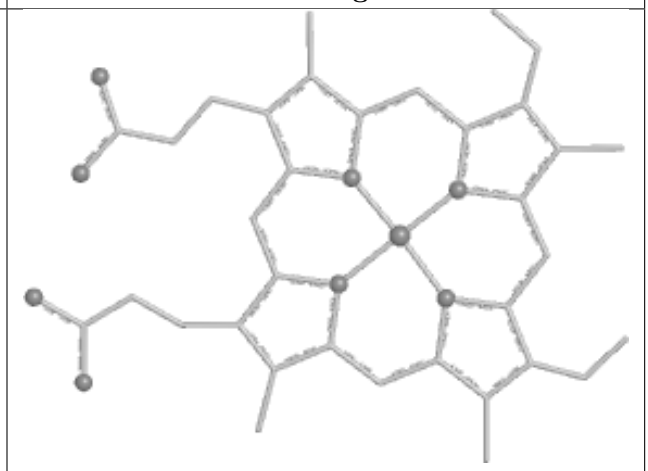


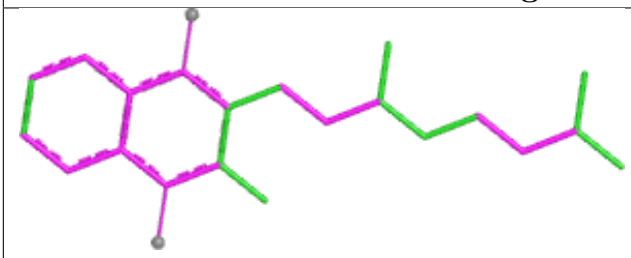
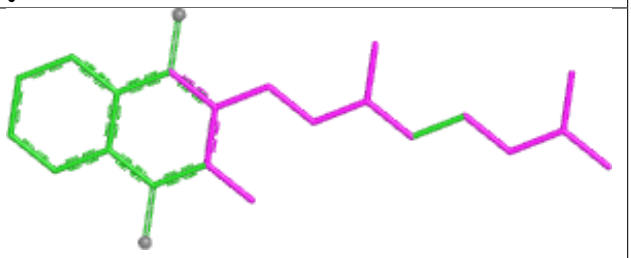
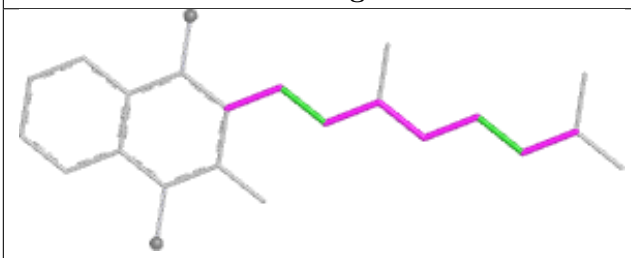
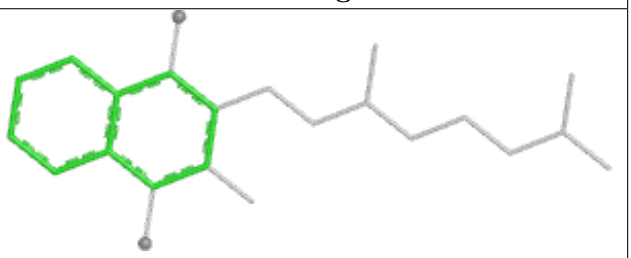
Bond angles

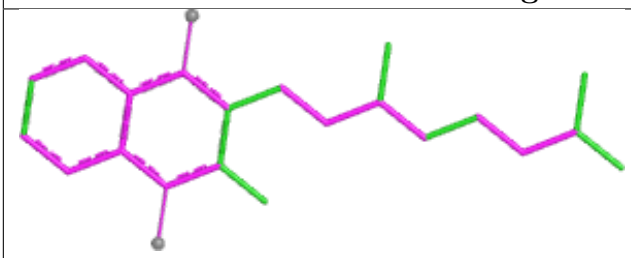
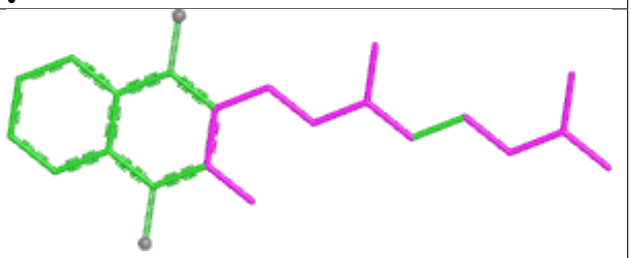
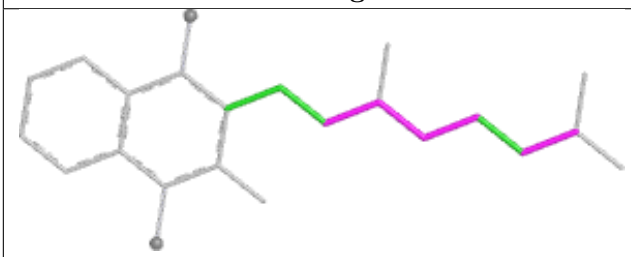
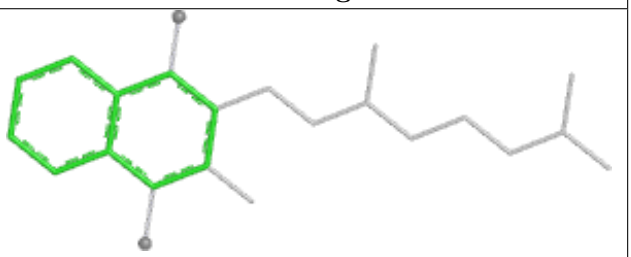


Torsions

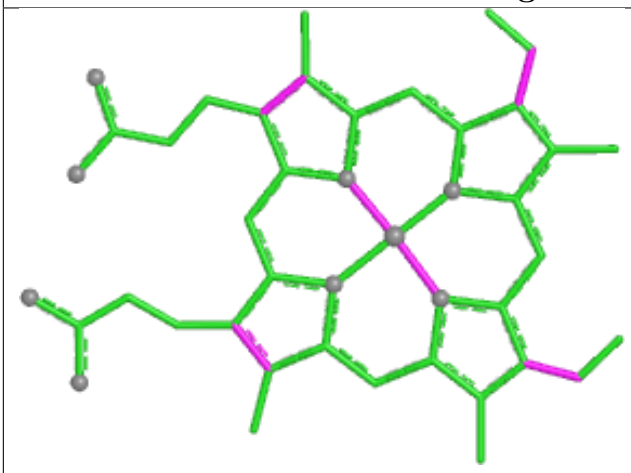


Rings

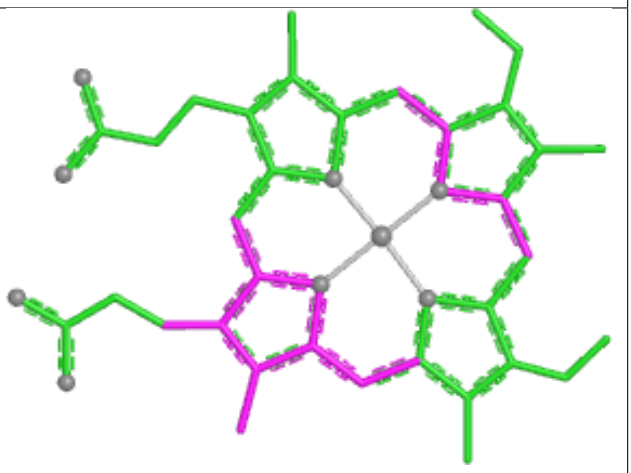
Ligand MQ9 H 204	
 Bond lengths	 Bond angles
 Torsions	 Rings

Ligand MQ9 N 201	
 Bond lengths	 Bond angles
 Torsions	 Rings

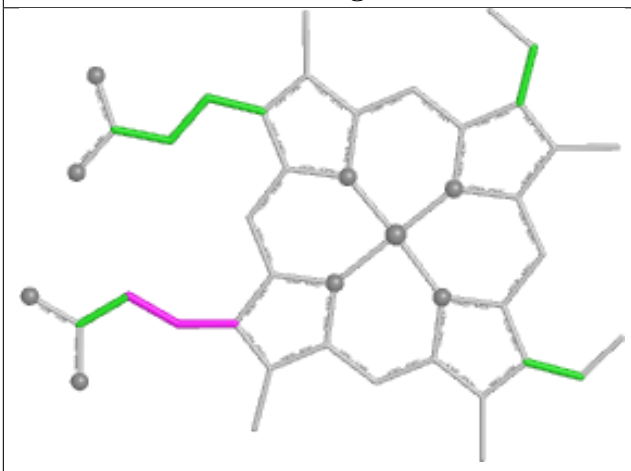
Ligand HEM D 202



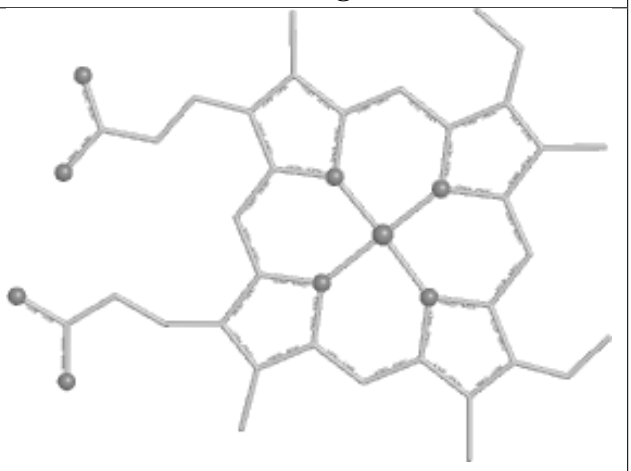
Bond lengths



Bond angles

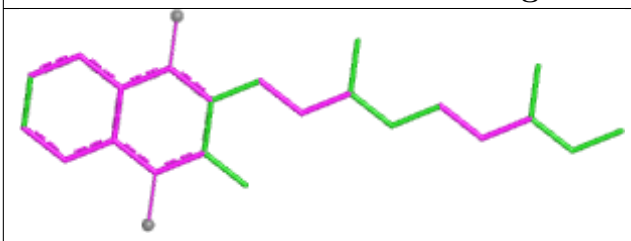


Torsions



Rings

Ligand MQ9 D 205



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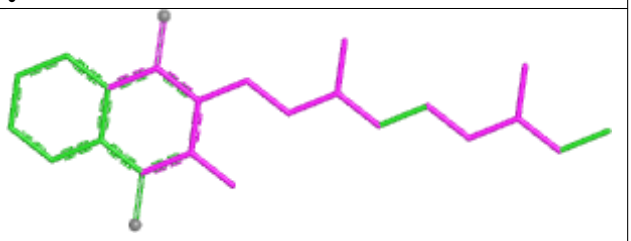

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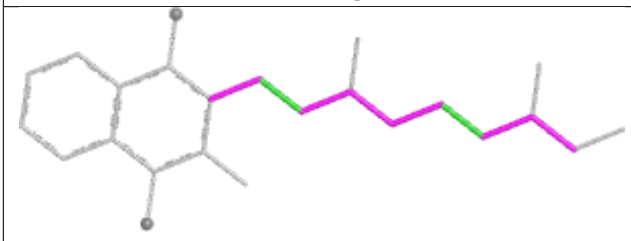

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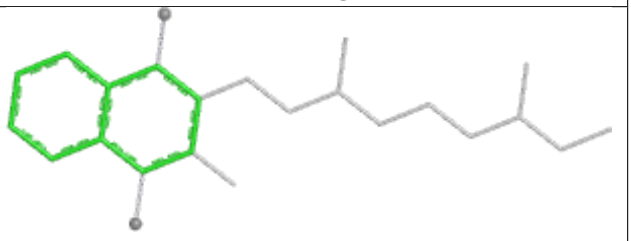
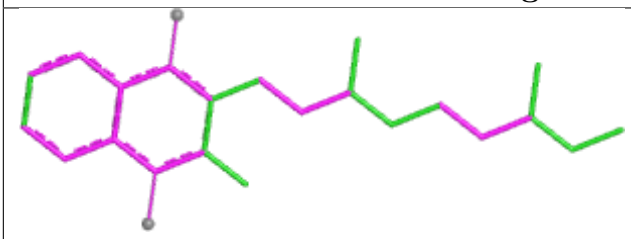


Rings

Ligand MQ9 D 203



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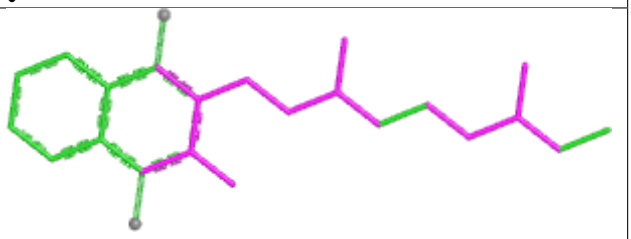
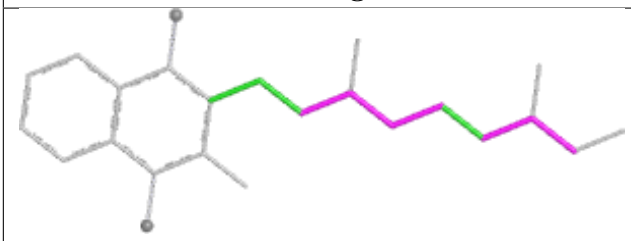


Bond angles



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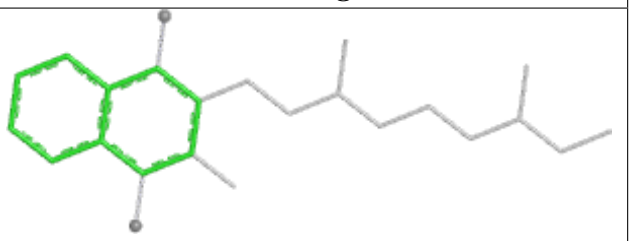
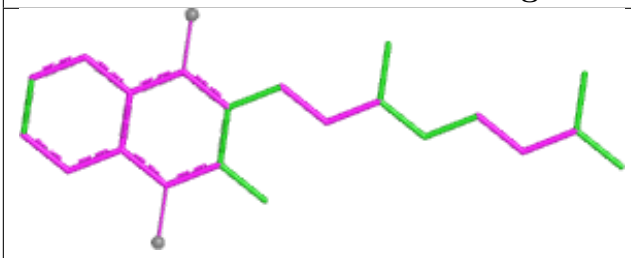
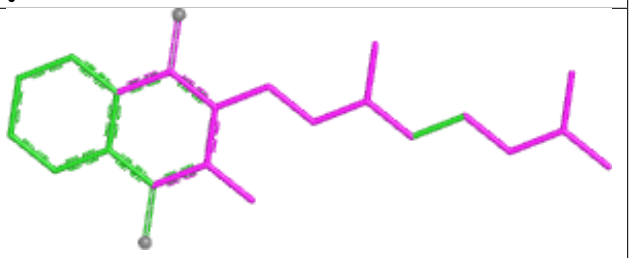


Rings

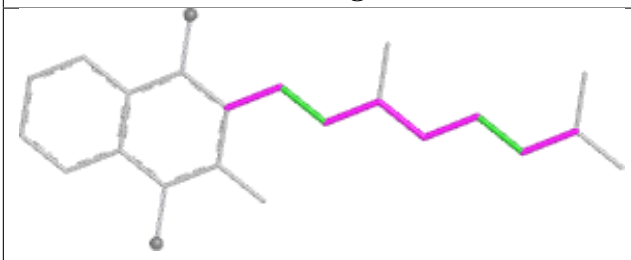
Ligand MQ9 N 204



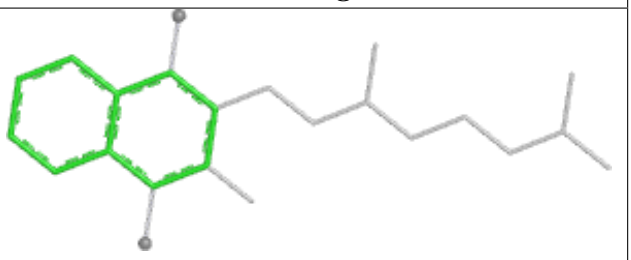
Bond lengths



Bond angles

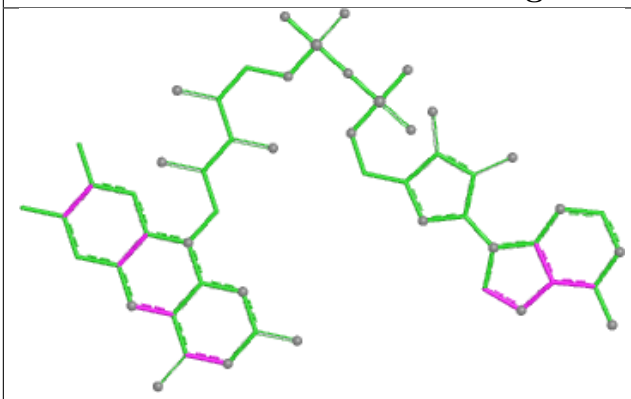


Torsions

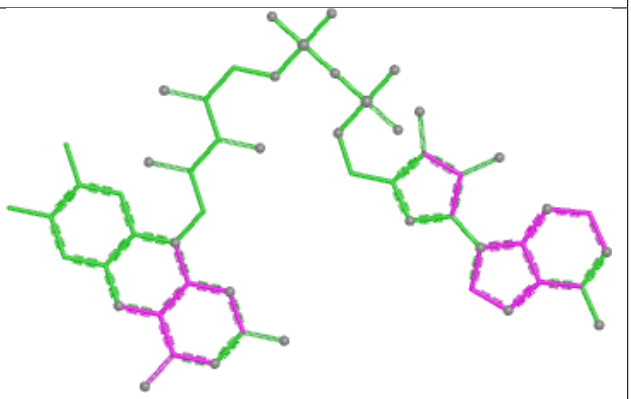


Rings

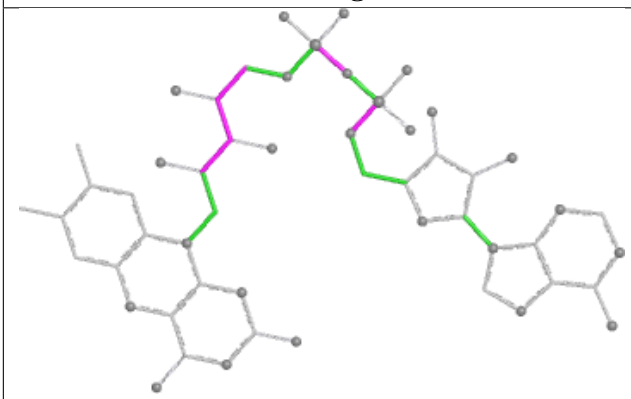
Ligand FAD P 700



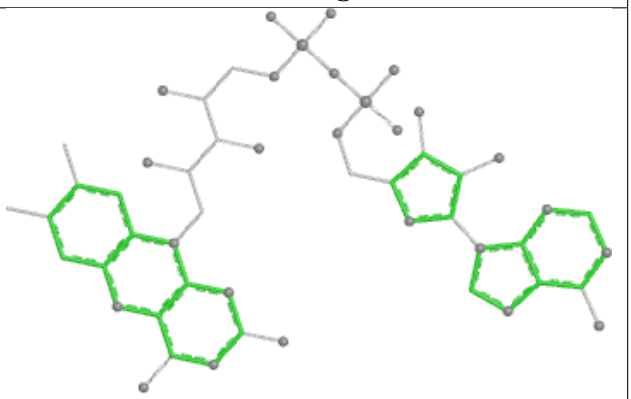
Bond lengths



Bond angles

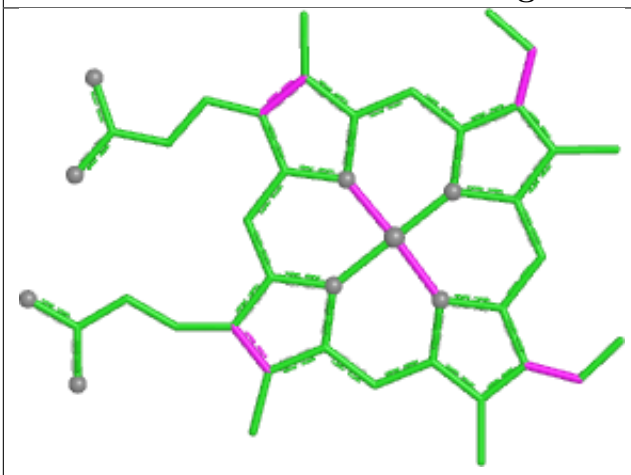


Torsions

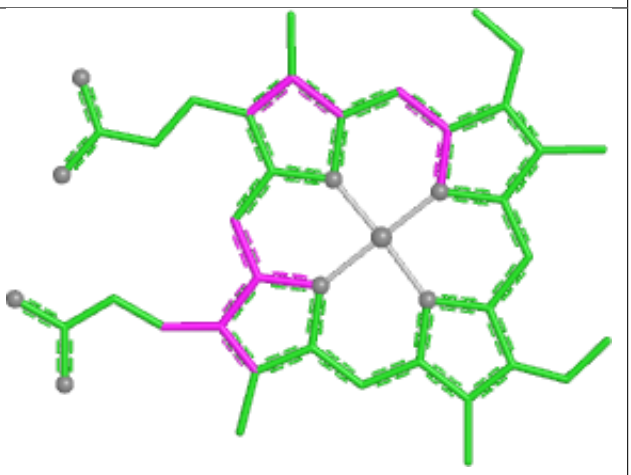


Rings

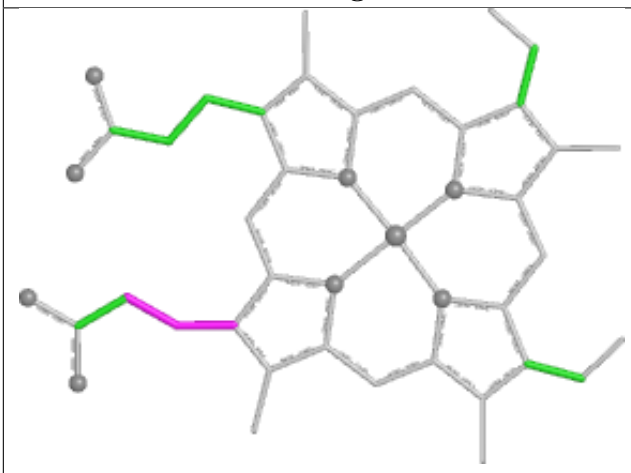
Ligand HEM H 202



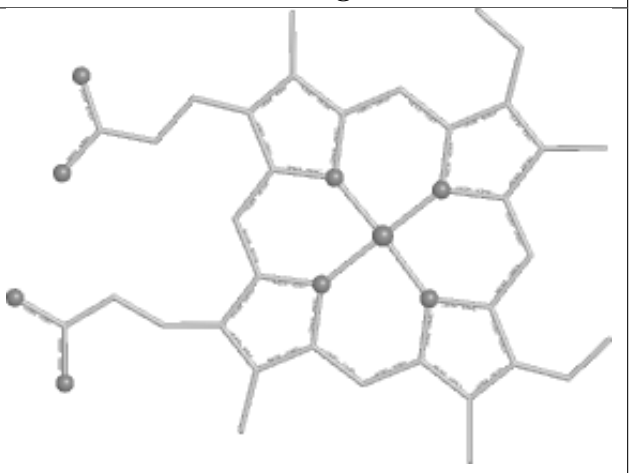
Bond lengths



Bond angles

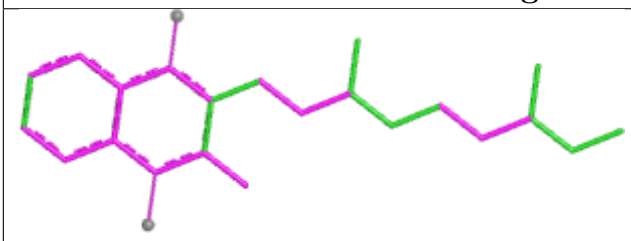


Torsions

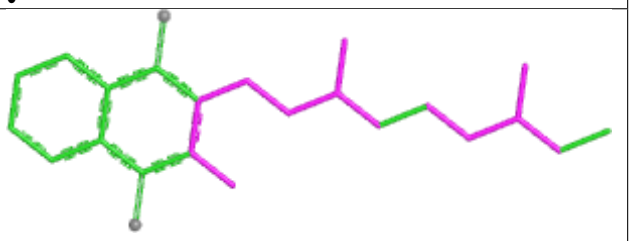


Rings

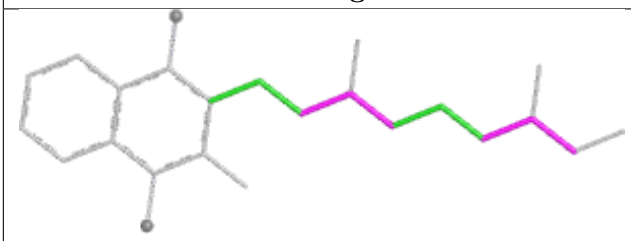
Ligand MQ9 N 203



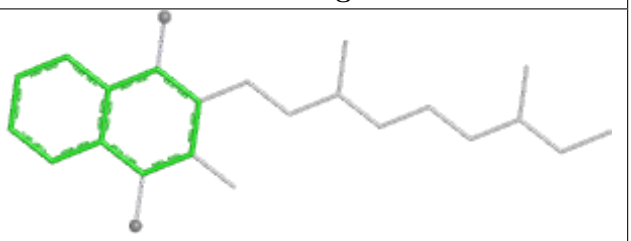
Bond lengths



Bond angles

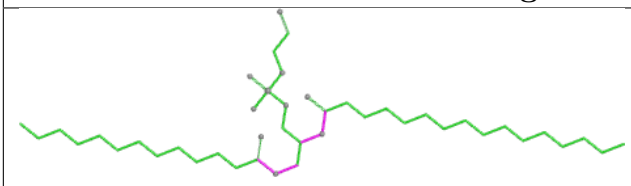


Torsions

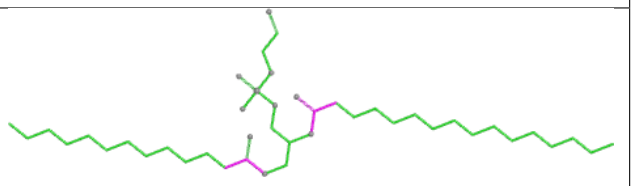


Rings

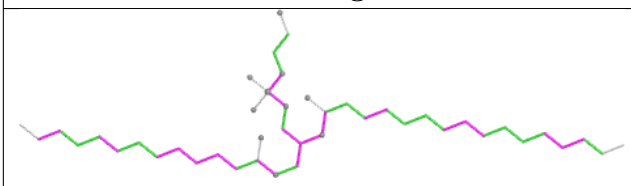
Ligand PEV M 203



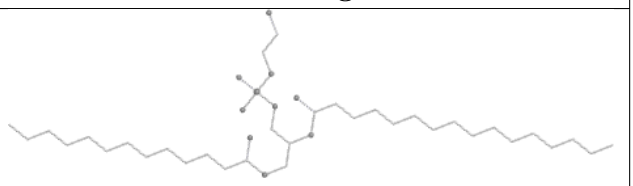
Bond lengths



Bond angles

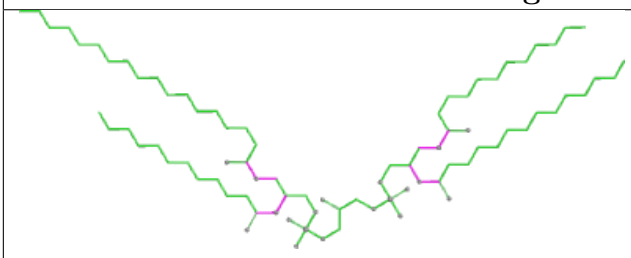


Torsions

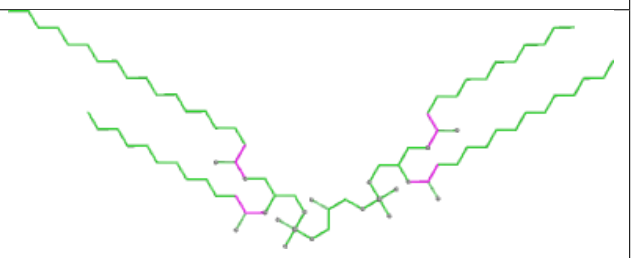


Rings

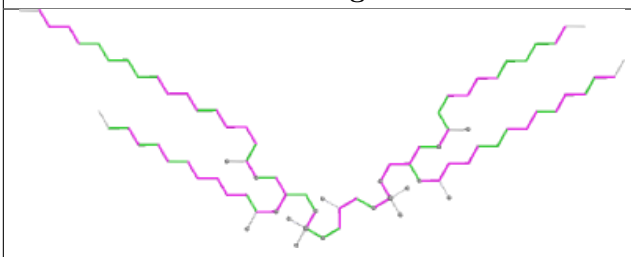
Ligand CDL H 205



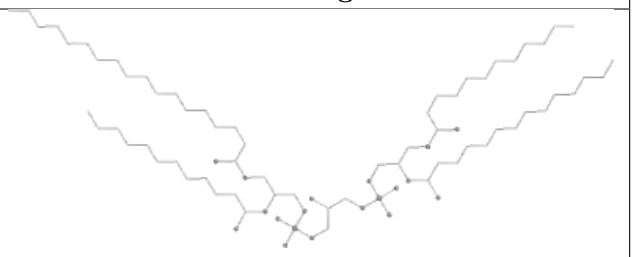
Bond lengths



Bond angles

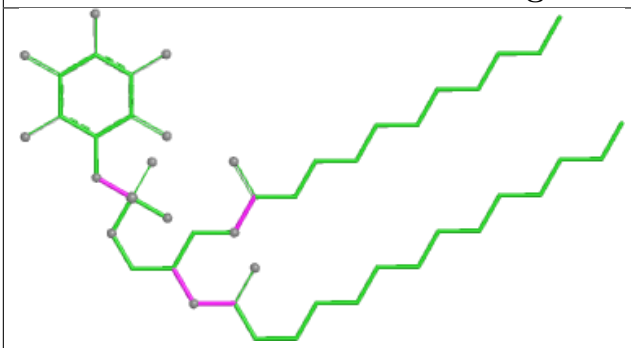


Torsions

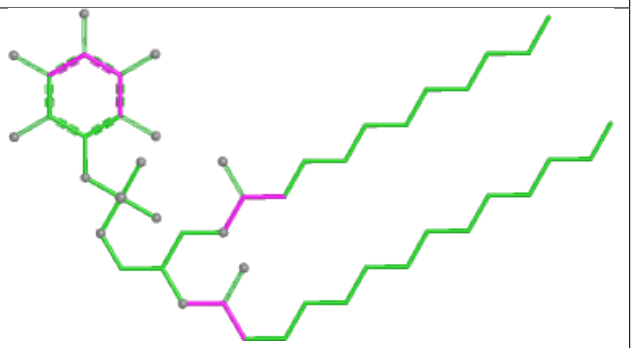


Rings

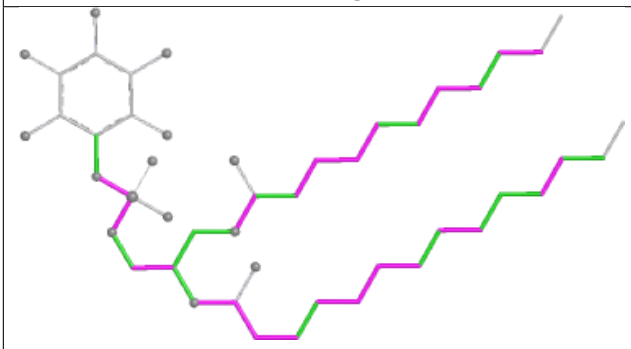
Ligand PIE M 202



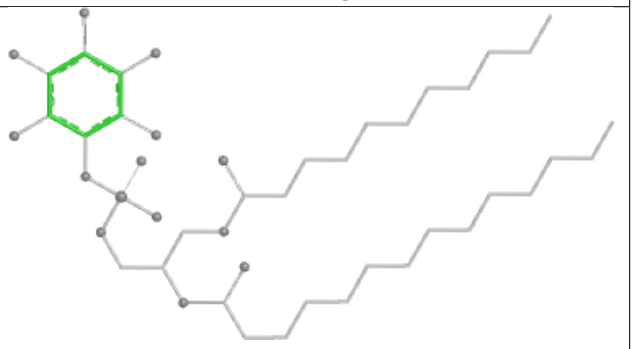
Bond lengths



Bond angles

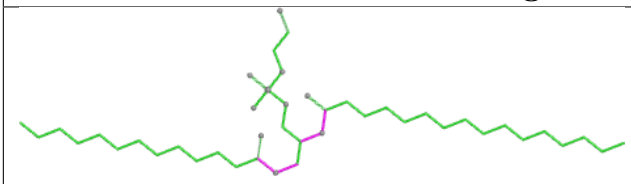


Torsions

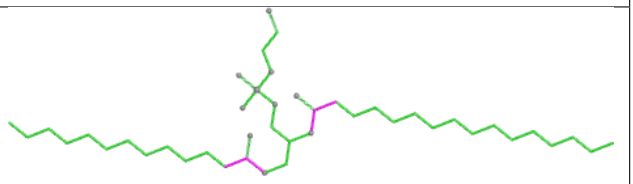


Rings

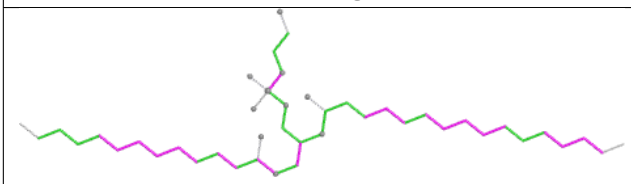
Ligand PEV G 201



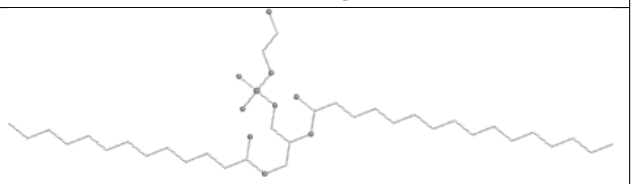
Bond lengths



Bond angles

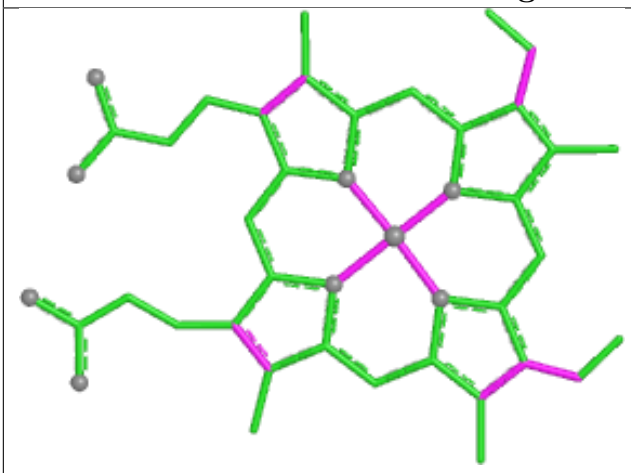


Torsions

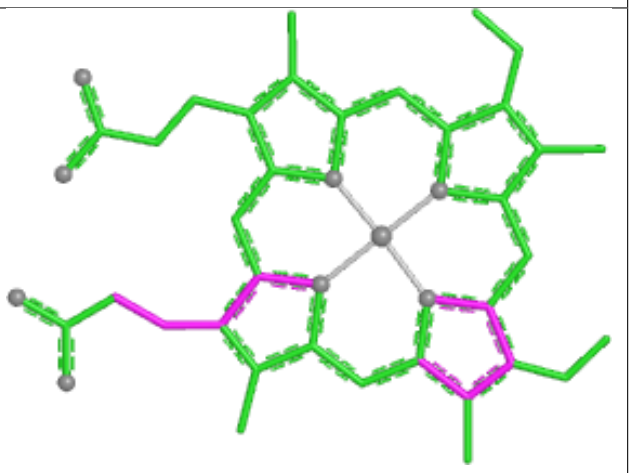


Rings

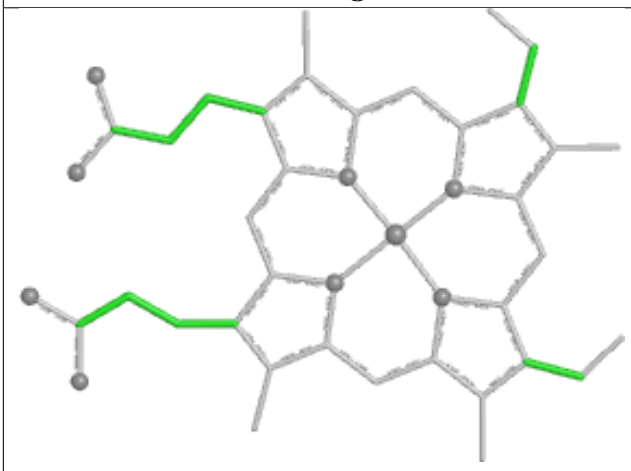
Ligand HEM D 201



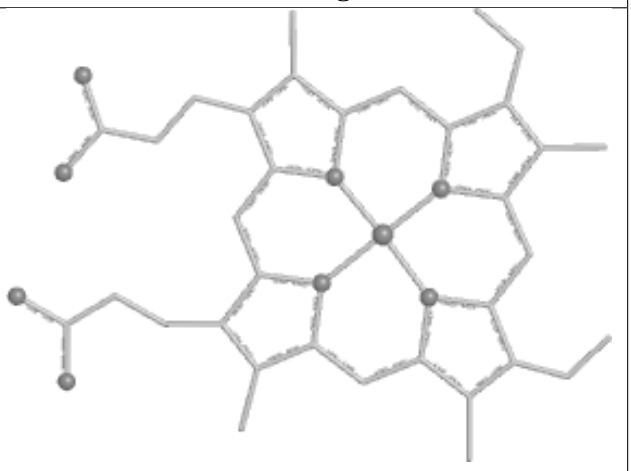
Bond lengths



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.

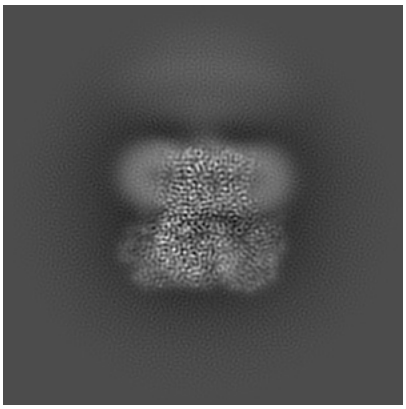
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-0981. These allow visual inspection of the internal detail of the map and identification of artifacts.

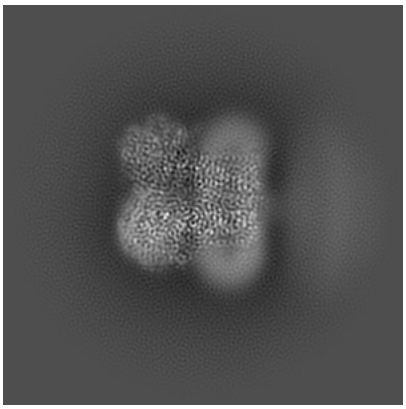
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

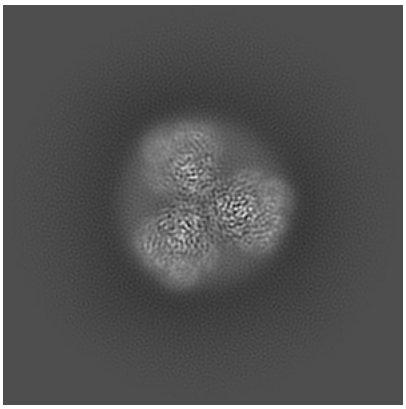
6.1.1 Primary map



X

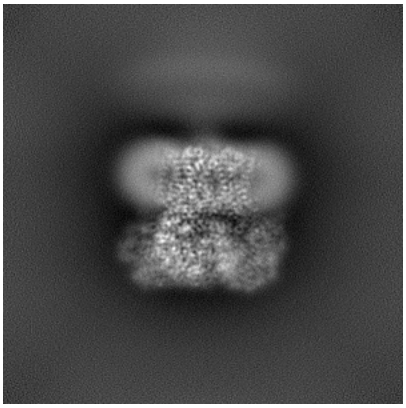


Y

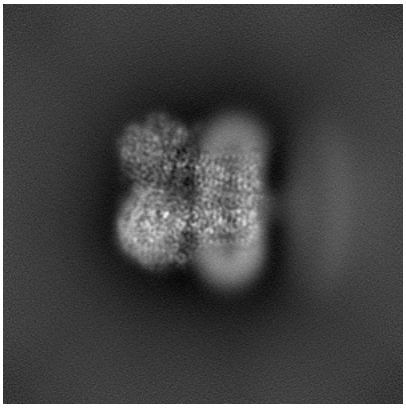


Z

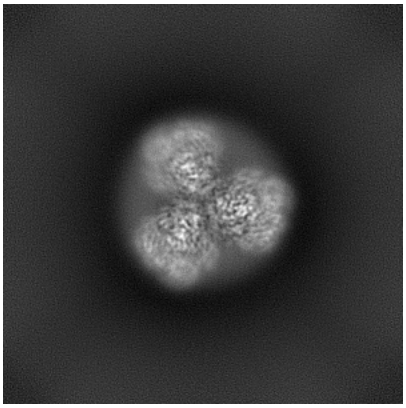
6.1.2 Raw map



X



Y

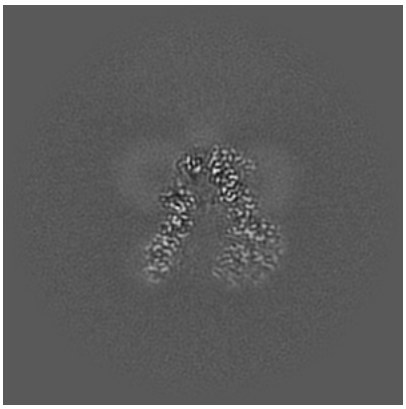


Z

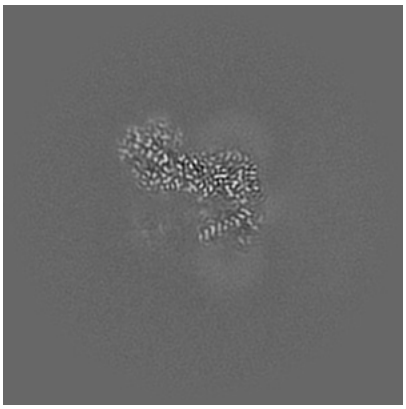
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

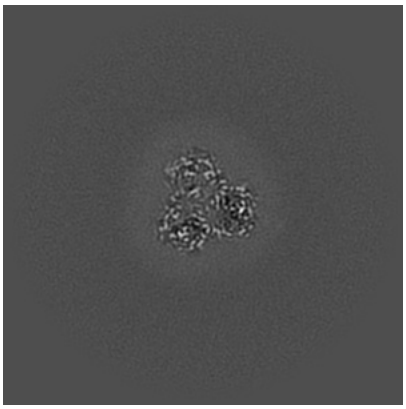
6.2.1 Primary map



X Index: 192

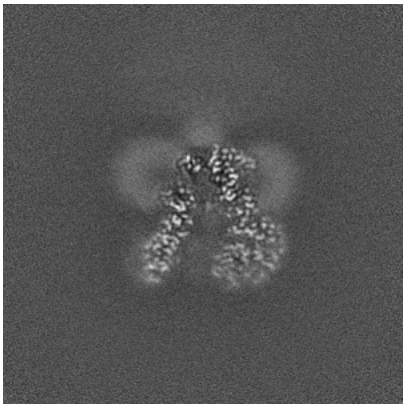


Y Index: 192

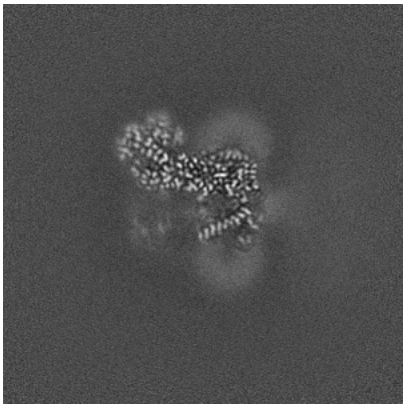


Z Index: 192

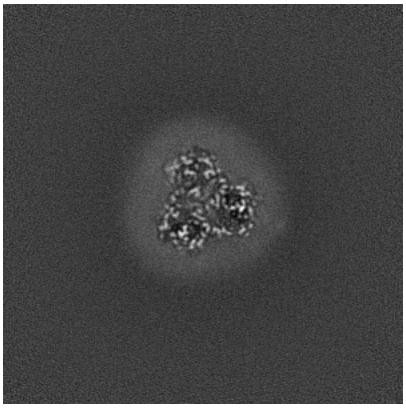
6.2.2 Raw map



X Index: 192



Y Index: 192

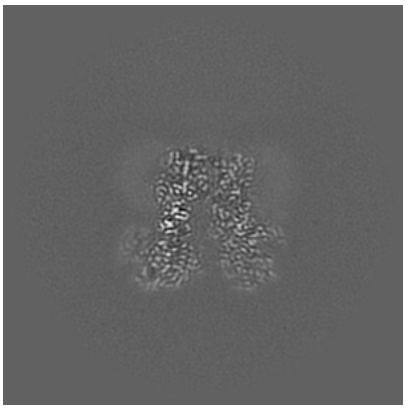


Z Index: 192

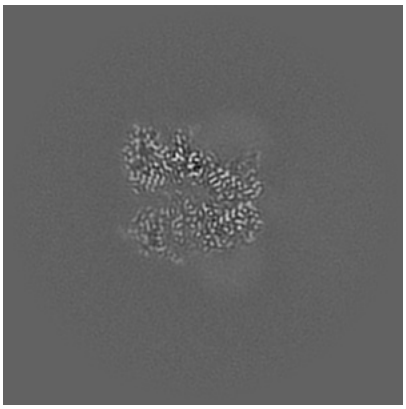
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

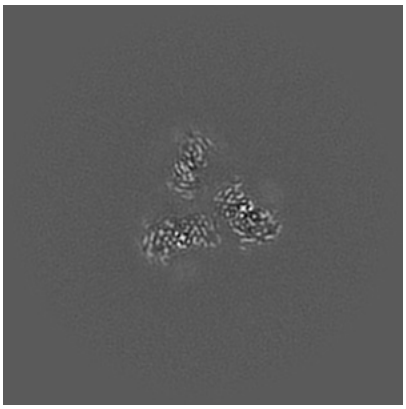
6.3.1 Primary map



X Index: 173

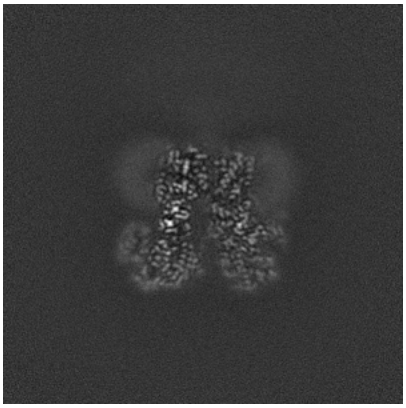


Y Index: 178

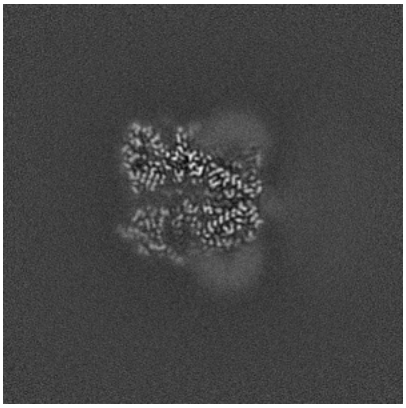


Z Index: 173

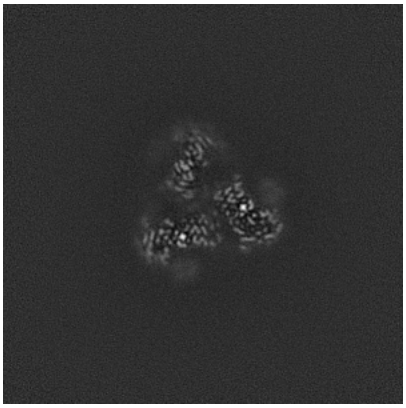
6.3.2 Raw map



X Index: 173



Y Index: 179

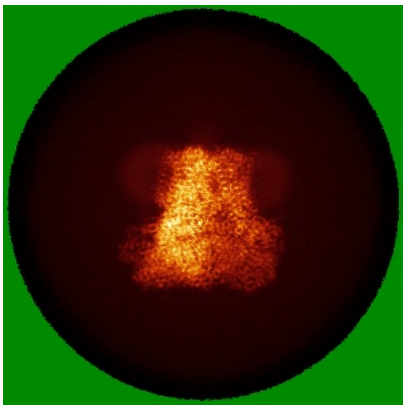


Z Index: 173

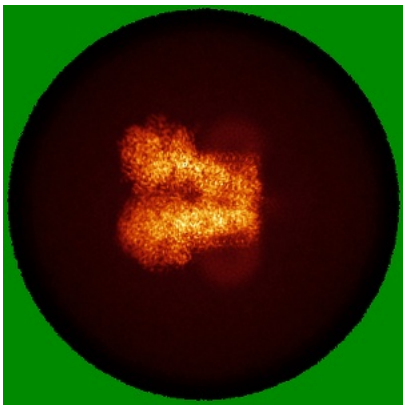
The images above show the largest variance slices of the map in three orthogonal directions.

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

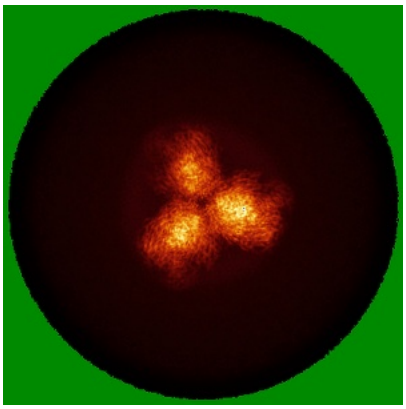
6.4.1 Primary map



X

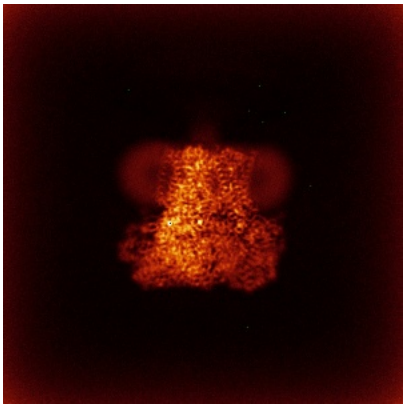


Y

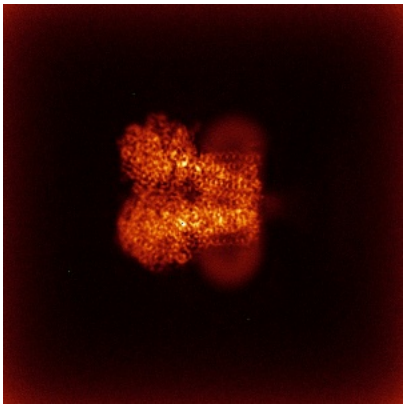


Z

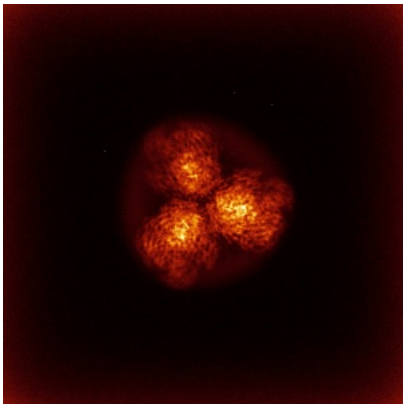
6.4.2 Raw map



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)

This section was not generated.

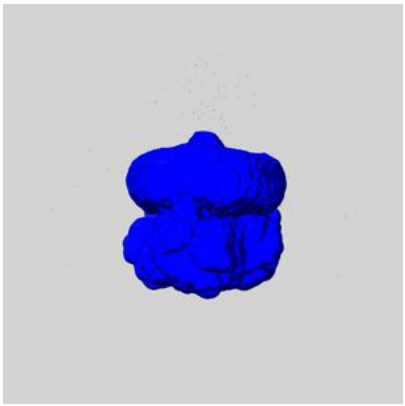
6.6 Mask visualisation (i)

This section shows the 3D surface view of the primary map at 50% transparency overlaid with the specified mask at 0% transparency

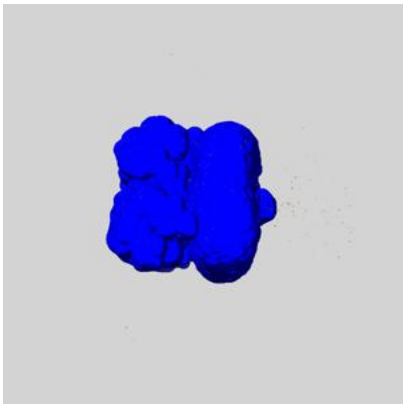
A mask typically either:

- Encompasses the whole structure
- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure

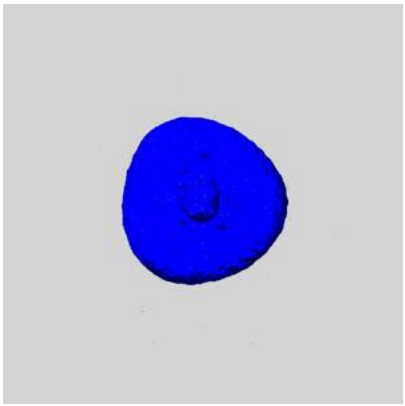
6.6.1 emd_0981_msk_1.map (i)



X



Y

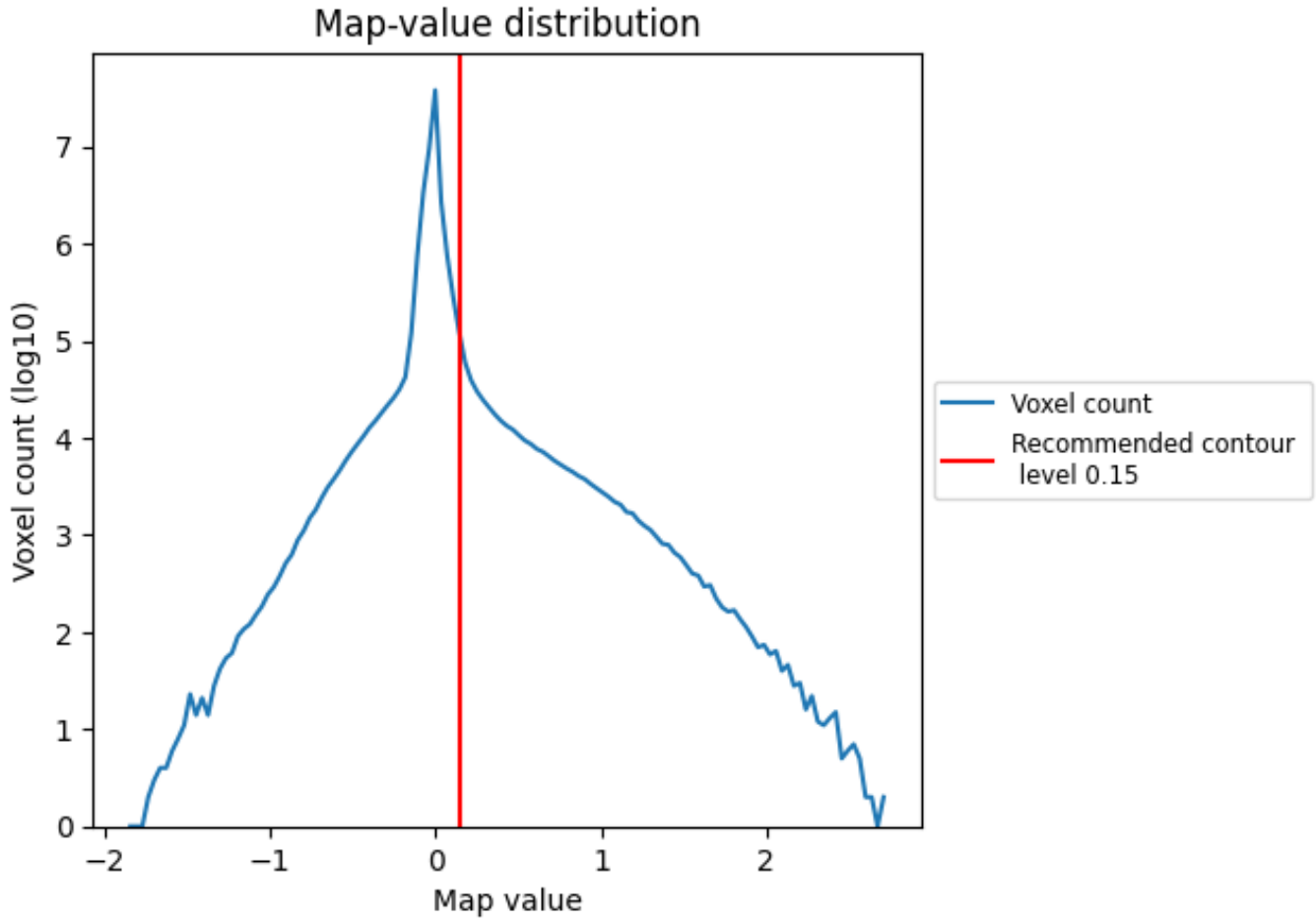


Z

7 Map analysis

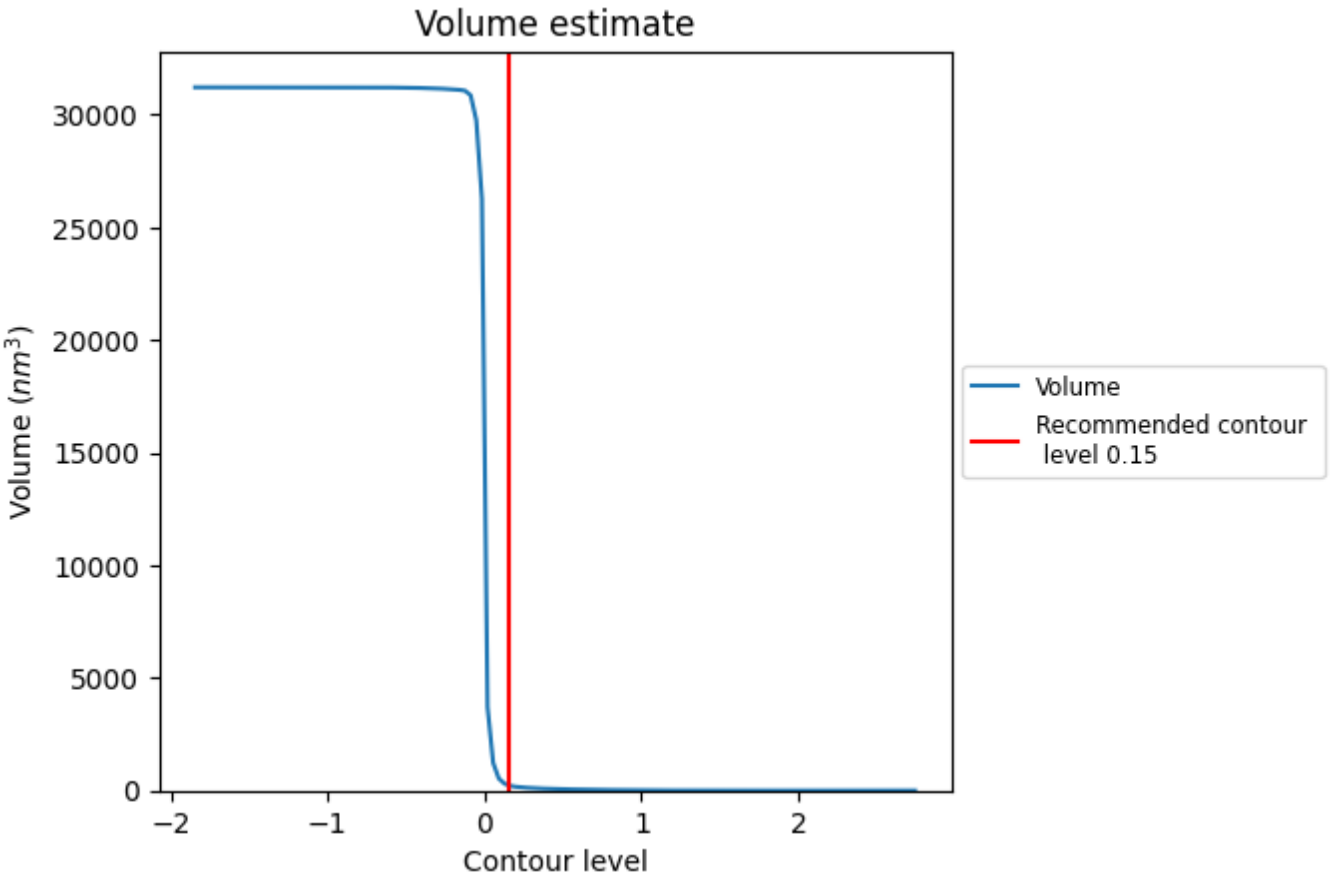
This section contains the results of statistical analysis of the map.

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.

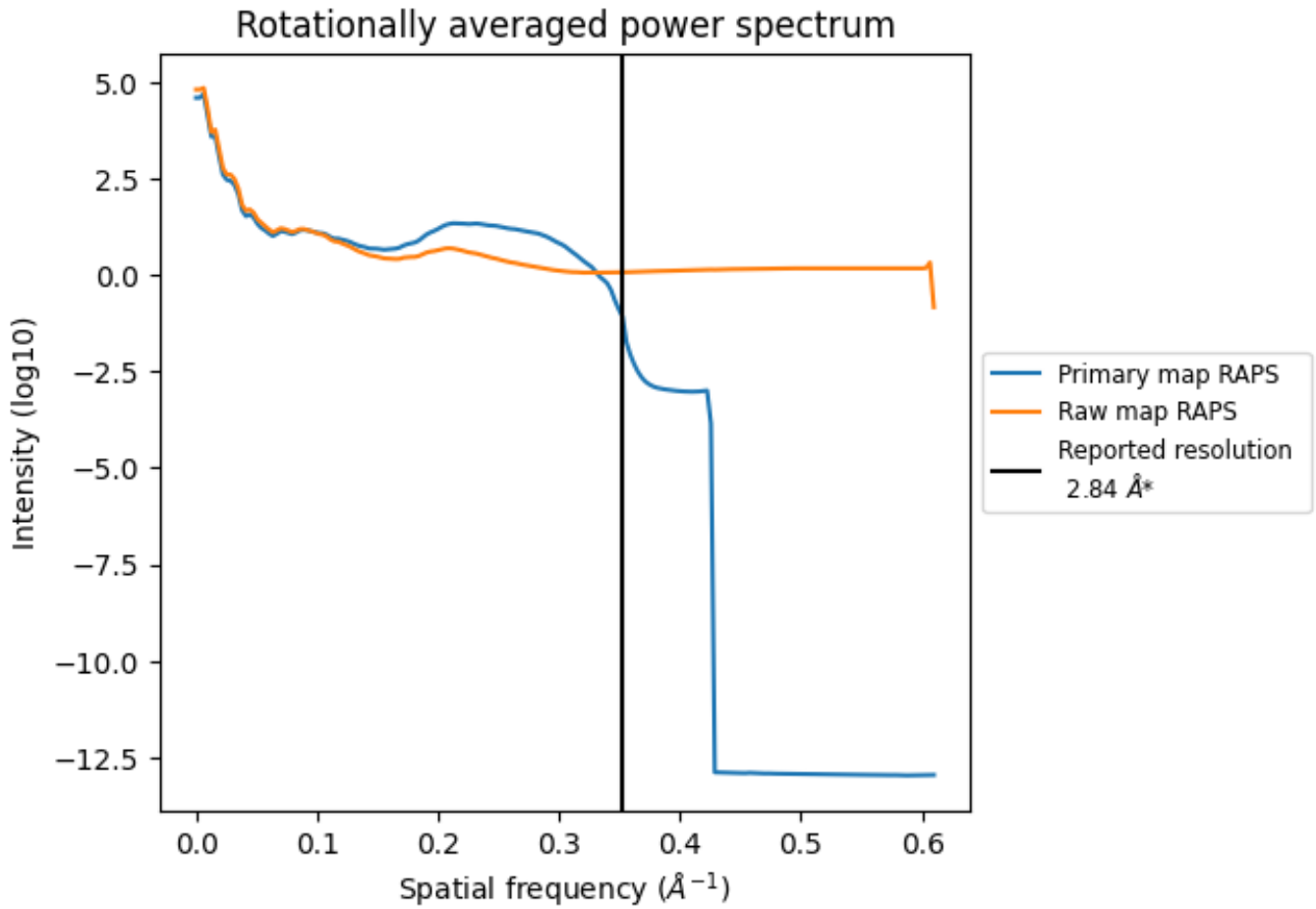
7.2 Volume estimate



The volume at the recommended contour level is 246 nm^3; this corresponds to an approximate mass of 222 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)

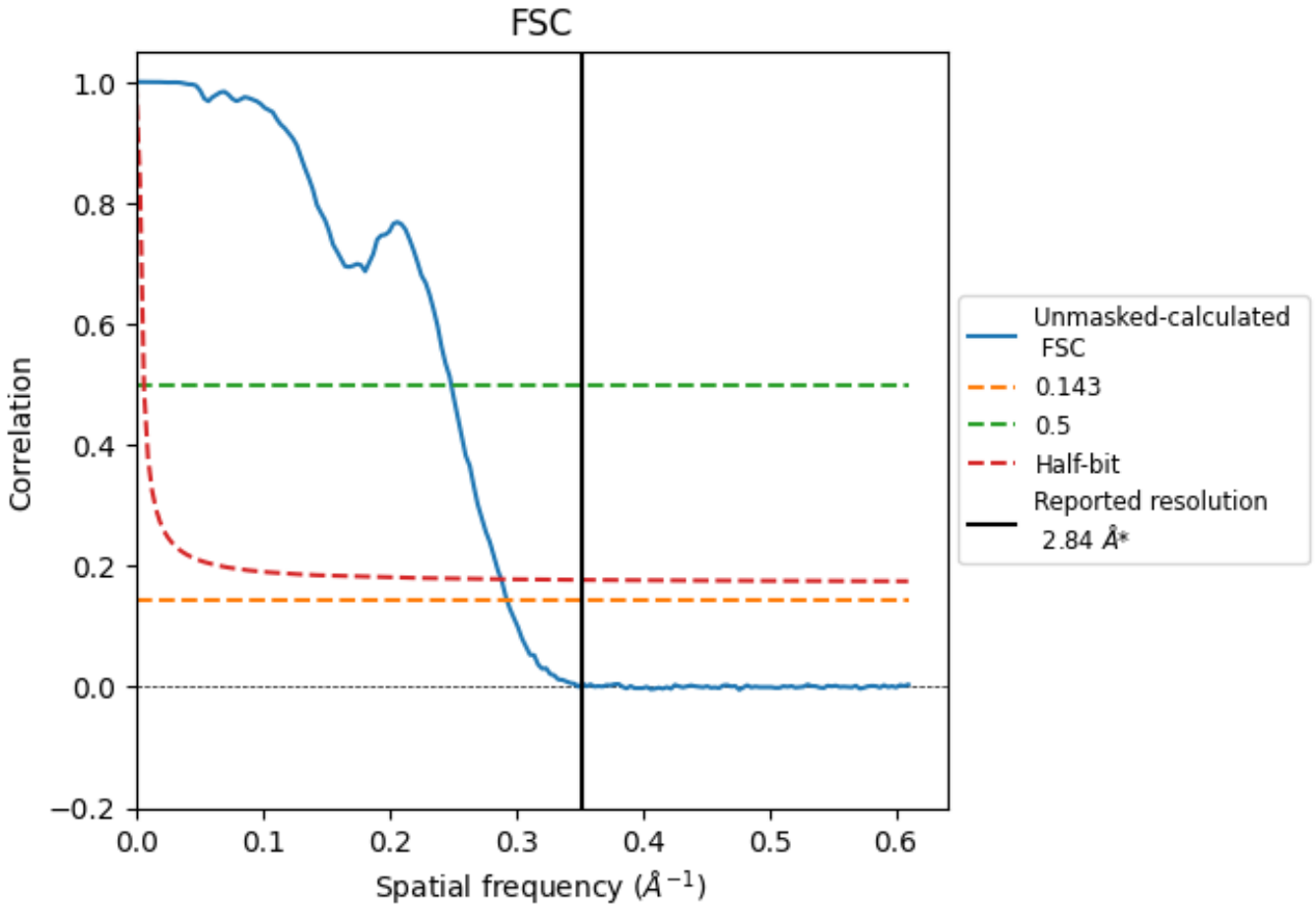


*Reported resolution corresponds to spatial frequency of 0.352 $Å^{-1}$

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 0.352 Å^{-1}

8.2 Resolution estimates (i)

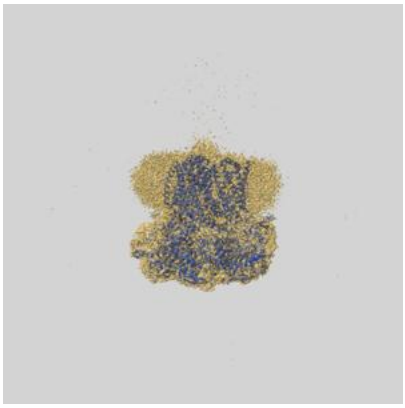
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.84	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	3.41	4.02	3.47

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 3.41 differs from the reported value 2.84 by more than 10 %

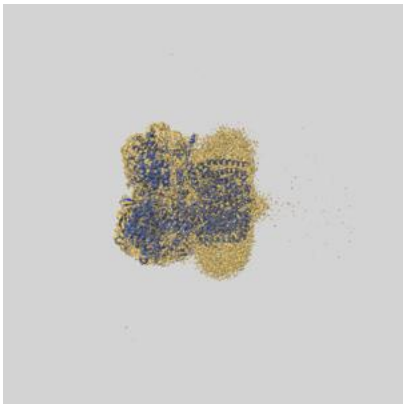
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-0981 and PDB model 6LUM. Per-residue inclusion information can be found in section 3 on page 13.

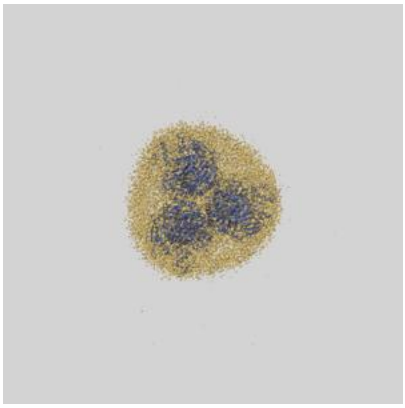
9.1 Map-model overlay



X



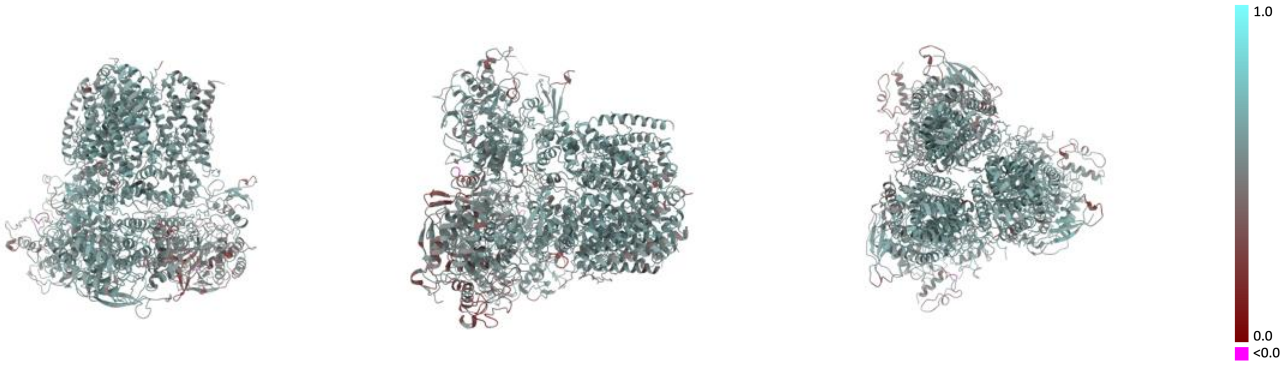
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.15 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

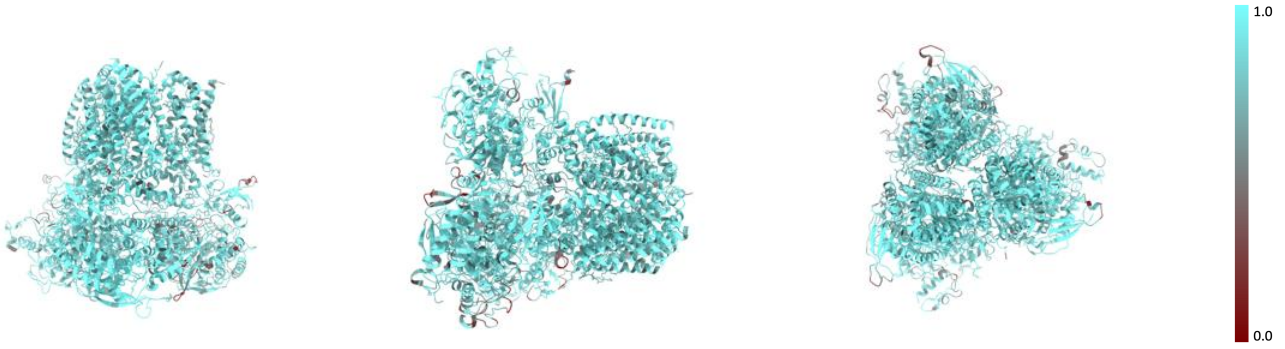
9.2 Q-score mapped to coordinate model



X Y Z

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

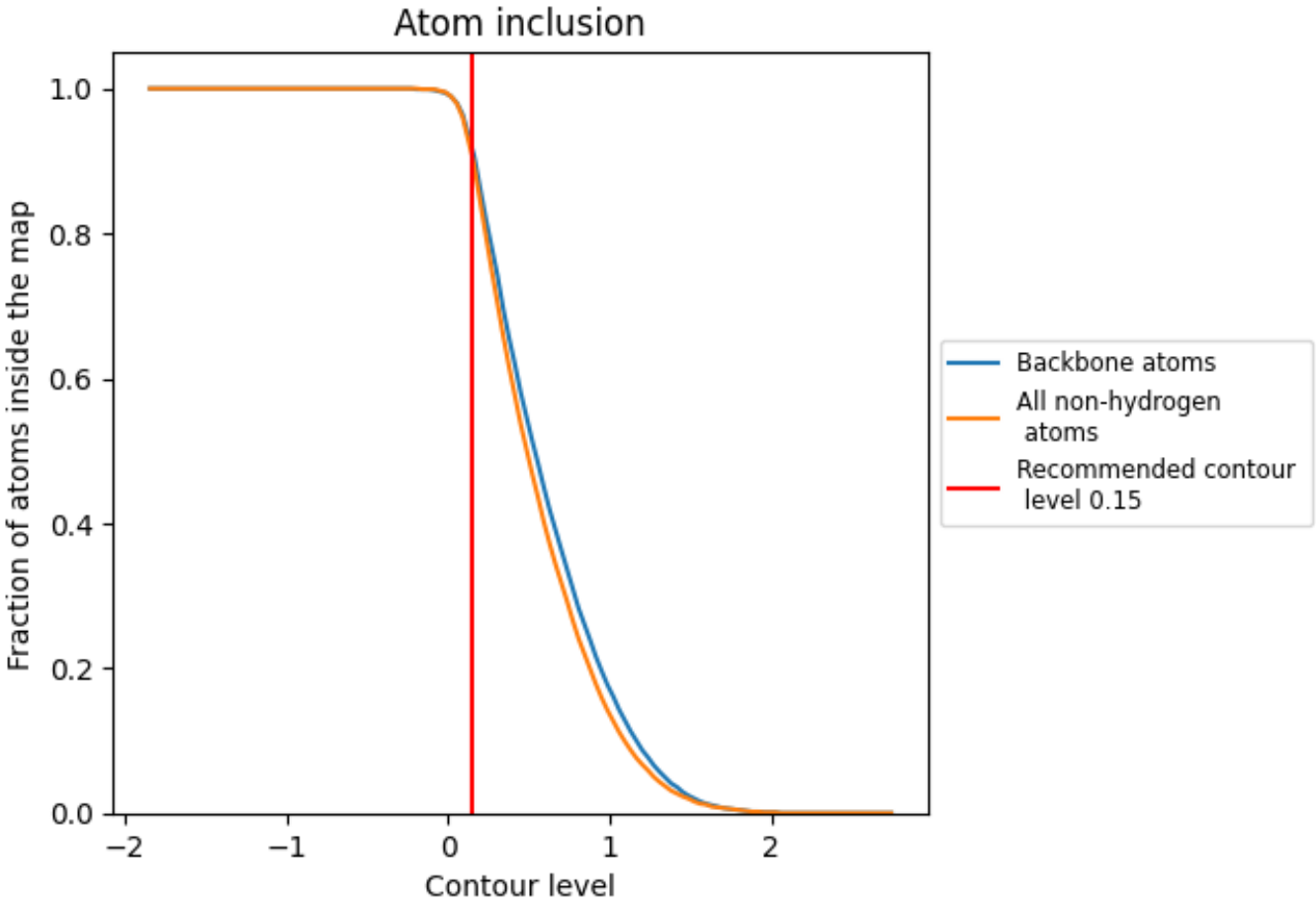
9.3 Atom inclusion mapped to coordinate model



X Y Z

The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.15).

9.4 Atom inclusion (i)



At the recommended contour level, 92% of all backbone atoms, 91% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (0.15) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.9060	0.5610
A	0.9360	0.5720
B	0.9340	0.5900
C	0.9290	0.5920
D	0.9450	0.6110
E	0.8700	0.5610
G	0.9090	0.5830
H	0.9380	0.5990
I	0.8650	0.5420
J	0.9180	0.5550
K	0.9230	0.5810
M	0.8840	0.5660
N	0.9530	0.5980
O	0.8530	0.5510
P	0.8200	0.4780
Q	0.8890	0.5580