Full wwPDB X-ray Structure Validation Report ⓘ

Sep 2, 2025 – 12:59 PM EDT

PDB ID	:	9Q4G / pdb_00009q4g
Title	:	Structure of human neuronal nitric oxide synthase R354A/G357D mutant heme domain bound 6-((5-(2-(dimethylamino)ethyl)-2,3-difluorophenoxy)methyl)-4-methylpyridin-2-amine
Authors	:	Li, H.; Poulos, T.L.
Deposited on	:	2025-08-20
Resolution	:	2.30 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

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

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

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

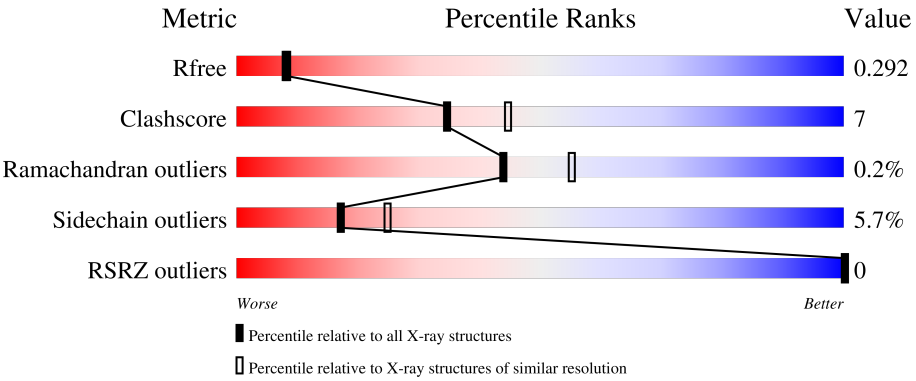
MolProbity	:	4-5-2 with Phenix2.0rc1
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0rc1
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.006 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.45.1

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 2.30 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	164625	5963 (2.30-2.30)
Clashscore	180529	6698 (2.30-2.30)
Ramachandran outliers	177936	6640 (2.30-2.30)
Sidechain outliers	177891	6640 (2.30-2.30)
RSRZ outliers	164620	5963 (2.30-2.30)

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

Mol	Chain	Length	Quality of chain
1	A	423	81% 16%
1	B	423	77% 19%
1	C	423	76% 20%
1	D	423	78% 20%

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
5	GOL	C	804	-	-	X	-

2 Entry composition (i)

There are 7 unique types of molecules in this entry. The entry contains 14509 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

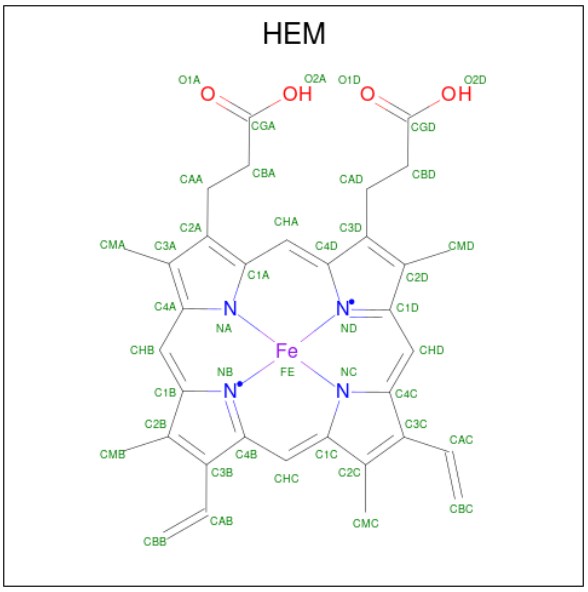
- Molecule 1 is a protein called Nitric oxide synthase, brain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	418	Total	C	N	O	S	0	3	0
			3417	2186	585	625	21			
1	B	414	Total	C	N	O	S	0	2	0
			3379	2165	575	618	21			
1	C	413	Total	C	N	O	S	0	5	0
			3387	2171	576	619	21			
1	D	418	Total	C	N	O	S	0	3	0
			3420	2188	585	626	21			

There are 16 discrepancies between the modelled and reference sequences:

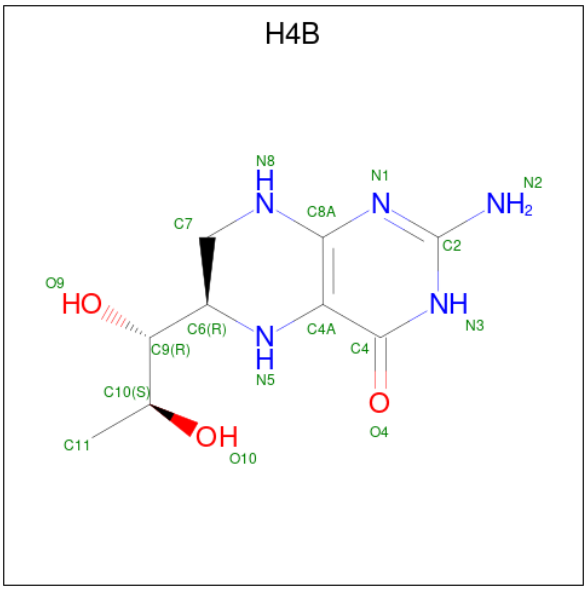
Chain	Residue	Modelled	Actual	Comment	Reference
A	354	ALA	ARG	engineered mutation	UNP P29475
A	357	ASP	GLY	engineered mutation	UNP P29475
A	723	LEU	-	expression tag	UNP P29475
A	724	VAL	-	expression tag	UNP P29475
B	354	ALA	ARG	engineered mutation	UNP P29475
B	357	ASP	GLY	engineered mutation	UNP P29475
B	723	LEU	-	expression tag	UNP P29475
B	724	VAL	-	expression tag	UNP P29475
C	354	ALA	ARG	engineered mutation	UNP P29475
C	357	ASP	GLY	engineered mutation	UNP P29475
C	723	LEU	-	expression tag	UNP P29475
C	724	VAL	-	expression tag	UNP P29475
D	354	ALA	ARG	engineered mutation	UNP P29475
D	357	ASP	GLY	engineered mutation	UNP P29475
D	723	LEU	-	expression tag	UNP P29475
D	724	VAL	-	expression tag	UNP P29475

- Molecule 2 is PROTOPORPHYRIN IX CONTAINING FE (CCD ID: HEM) (formula: $C_{34}H_{32}FeN_4O_4$).



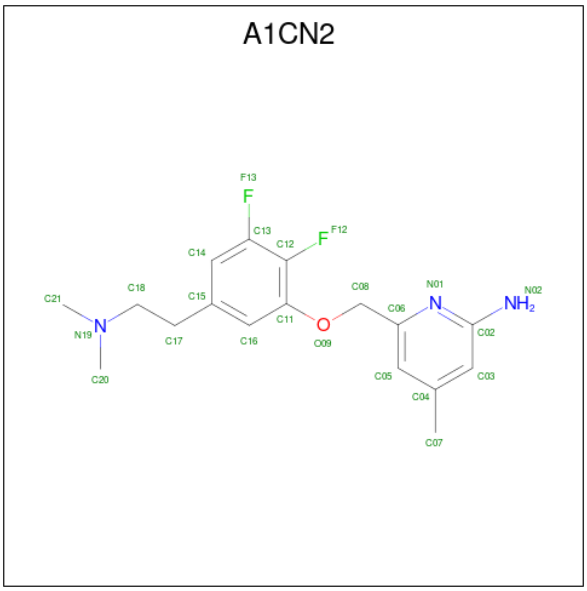
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		
2	B	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		
2	C	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		
2	D	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		

- Molecule 3 is 5,6,7,8-TETRAHYDROBIOPTERIN (CCD ID: H4B) (formula: $C_9H_{15}N_5O_3$).



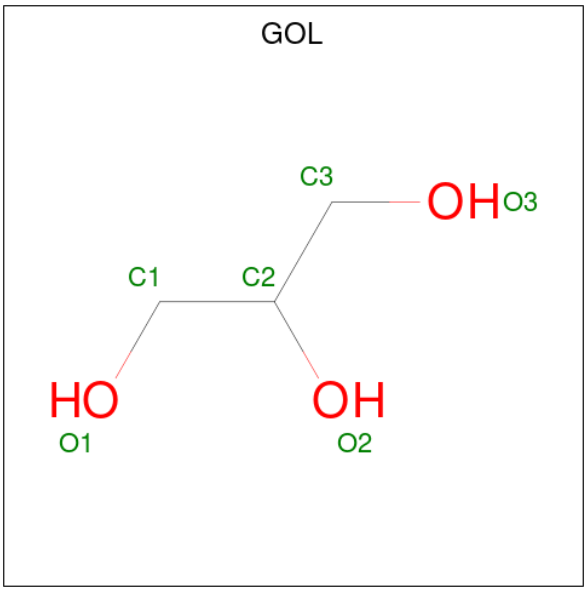
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C N O 17 9 5 3	0	0
3	B	1	Total C N O 17 9 5 3	0	0
3	C	1	Total C N O 17 9 5 3	0	0
3	C	1	Total C N O 17 9 5 3	0	0

- Molecule 4 is 6-({5-[2-(dimethylamino)ethyl]-2,3-difluorophenoxy}methyl)-4-methylpyridin-2-amine (CCD ID: A1CN2) (formula: $C_{17}H_{21}F_2N_3O$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C F N O 23 17 2 3 1	0	0
4	B	1	Total C F N O 23 17 2 3 1	0	0
4	C	1	Total C F N O 23 17 2 3 1	0	0
4	D	1	Total C F N O 23 17 2 3 1	0	0

- Molecule 5 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total C O 6 3 3	0	0
5	A	1	Total C O 6 3 3	0	0
5	B	1	Total C O 6 3 3	0	0
5	C	1	Total C O 6 3 3	0	0
5	C	1	Total C O 6 3 3	0	0
5	D	1	Total C O 6 3 3	0	0

- Molecule 6 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	1	Total Zn 1 1	0	0
6	C	1	Total Zn 1 1	0	0

- Molecule 7 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	139	Total O 139 139	0	0

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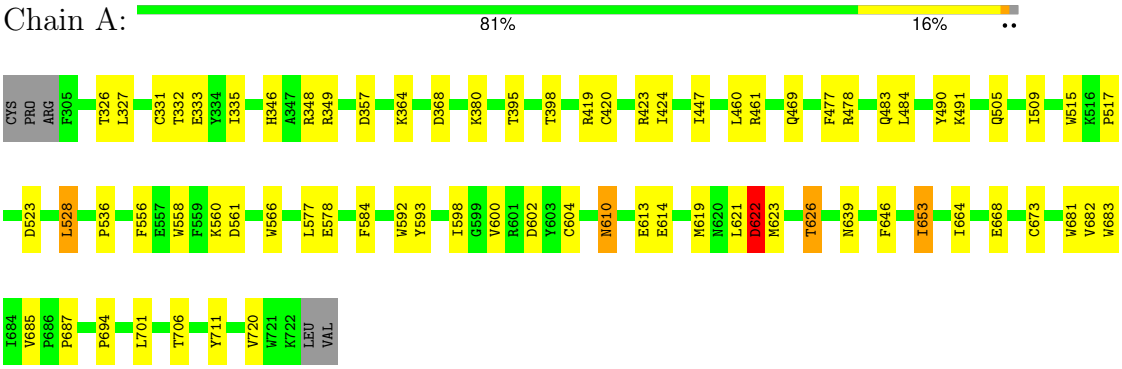
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	B	141	Total O 141 141	0	0
7	C	135	Total O 135 135	0	0
7	D	121	Total O 121 121	0	0

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 electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density (RSRZ > 2). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

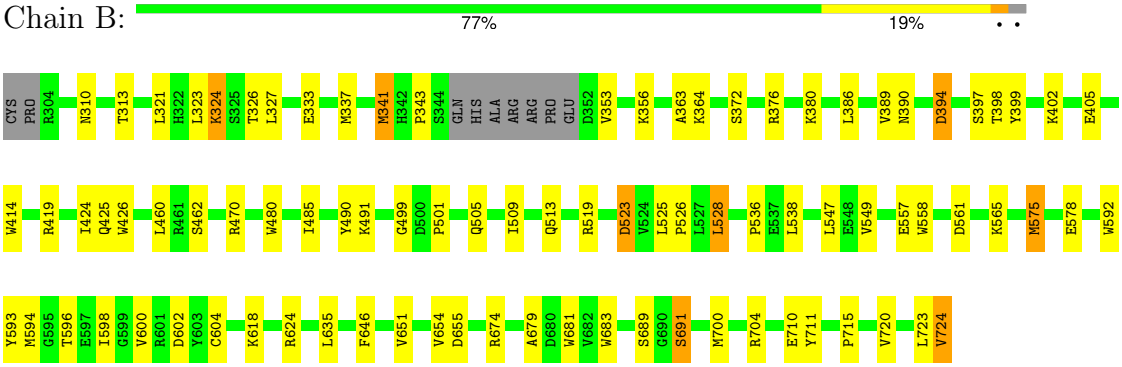
• Molecule 1: Nitric oxide synthase, brain

Chain A:



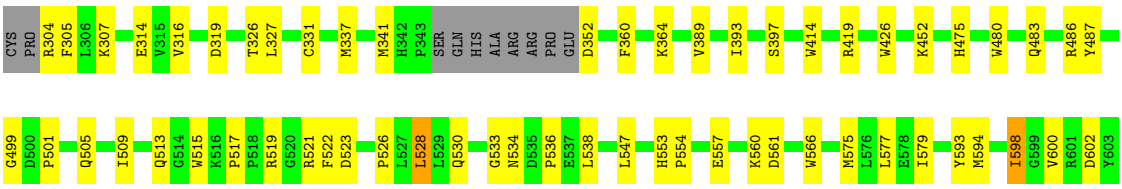
• Molecule 1: Nitric oxide synthase, brain

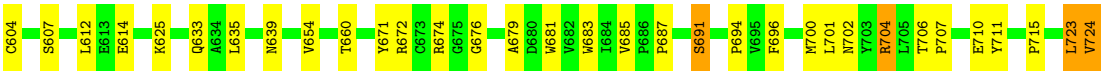
Chain B:



• Molecule 1: Nitric oxide synthase, brain

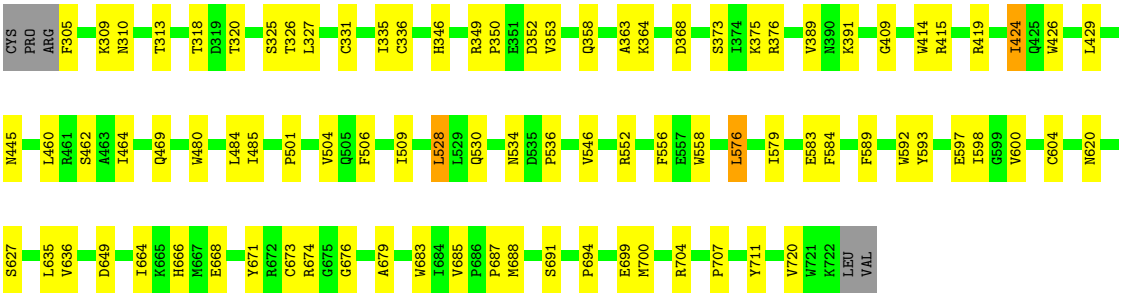
Chain C:





• Molecule 1: Nitric oxide synthase, brain

Chain D:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	52.19Å 118.35Å 164.64Å 90.00° 90.04° 90.00°	Depositor
Resolution (Å)	48.05 – 2.30 48.05 – 2.30	Depositor EDS
% Data completeness (in resolution range)	99.7 (48.05-2.30) 99.7 (48.05-2.30)	Depositor EDS
R_{merge}	0.43	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.01 (at 2.29Å)	Xtriage
Refinement program	PHENIX (1.11.1_2575: ???)	Depositor
R, R_{free}	0.222 , 0.298 0.212 , 0.292	Depositor DCC
R_{free} test set	4429 reflections (2.28%)	wwPDB-VP
Wilson B-factor (Å^2)	36.1	Xtriage
Anisotropy	0.751	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.32 , 20.9	EDS
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.34$	Xtriage
Estimated twinning fraction	0.448 for h,-k,-l	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	14509	wwPDB-VP
Average B, all atoms (Å^2)	42.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.56% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

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

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: H4B, ZN, GOL, HEM, A1CN2

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\#\|Z\| > 5$	RMSZ	$\#\|Z\| > 5$
1	A	0.35	0/3524	0.58	0/4783
1	B	0.38	0/3480	0.58	0/4721
1	C	0.36	0/3497	0.57	2/4744 (0.0%)
1	D	0.34	0/3527	0.55	0/4787
All	All	0.36	0/14028	0.57	2/19035 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	C	598	ILE	CA-C-N	5.59	126.15	120.00
1	C	598	ILE	C-N-CA	5.59	126.15	120.00

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3417	0	3327	43	0
1	B	3379	0	3295	50	0
1	C	3387	0	3309	64	0
1	D	3420	0	3328	53	0
2	A	43	0	30	6	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	B	43	0	30	3	0
2	C	43	0	30	5	0
2	D	43	0	30	7	0
3	A	17	0	15	0	0
3	B	17	0	15	0	0
3	C	34	0	30	1	0
4	A	23	0	0	0	0
4	B	23	0	0	0	0
4	C	23	0	0	0	0
4	D	23	0	0	1	0
5	A	12	0	16	0	0
5	B	6	0	8	1	0
5	C	12	0	16	4	0
5	D	6	0	8	1	0
6	A	1	0	0	0	0
6	C	1	0	0	0	0
7	A	139	0	0	3	0
7	B	141	0	0	0	0
7	C	135	0	0	3	0
7	D	121	0	0	1	0
All	All	14509	0	13487	204	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 7.

All (204) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:674:ARG:HH21	5:C:804:GOL:H32	1.45	0.81
2:A:801:HEM:HBB2	2:A:801:HEM:HHC	1.62	0.80
2:D:801:HEM:HBC2	2:D:801:HEM:HMC2	1.66	0.76
2:A:801:HEM:HMC2	2:A:801:HEM:HBC2	1.67	0.75
1:D:528:LEU:HD22	1:D:536:PRO:HB2	1.71	0.73
2:D:801:HEM:HBB2	2:D:801:HEM:HHC	1.73	0.71
1:A:461:ARG:O	7:A:901:HOH:O	2.09	0.69
1:A:528:LEU:HD22	1:A:536:PRO:HB2	1.77	0.67
1:A:687:PRO:HB2	1:B:691:SER:HB3	1.77	0.67
2:B:801:HEM:HBB2	2:B:801:HEM:HHC	1.77	0.67
1:C:702:ASN:HB3	1:D:336:CYS:HB3	1.77	0.66
1:A:419:ARG:HD3	1:A:683:TRP:CD2	2.32	0.65
1:D:364:LYS:NZ	1:D:368:ASP:OD2	2.29	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:622:ASP:N	1:A:622:ASP:OD1	2.29	0.64
1:A:364:LYS:NZ	1:A:368:ASP:OD2	2.30	0.64
2:C:801:HEM:HHC	2:C:801:HEM:HBB2	1.80	0.64
1:C:691:SER:HB3	1:D:687:PRO:HB2	1.80	0.63
1:C:723:LEU:HD23	1:C:724:VAL:HG22	1.81	0.63
1:A:613:GLU:HG3	1:A:623:MET:HE1	1.81	0.61
1:B:480:TRP:HB2	1:B:528:LEU:HB3	1.83	0.61
1:B:598:ILE:HA	1:B:602:ASP:HB2	1.82	0.60
1:B:723:LEU:HD12	1:B:724:VAL:H	1.66	0.60
1:B:547:LEU:HD21	1:B:651:VAL:HG22	1.84	0.60
1:B:419:ARG:HD3	1:B:683:TRP:CD2	2.36	0.59
1:D:485:ILE:HD13	1:D:546:VAL:HG13	1.83	0.59
1:B:402:LYS:HB2	1:B:405:GLU:HG3	1.84	0.59
1:C:528:LEU:HD22	1:C:536:PRO:HB2	1.85	0.58
1:D:664:ILE:O	1:D:668[B]:GLU:HG2	2.03	0.58
1:D:419:ARG:HB2	2:D:801:HEM:HBD2	1.85	0.58
1:C:711:TYR:OH	2:C:801:HEM:O1D	2.18	0.57
1:A:327:LEU:HD21	1:A:348:ARG:HD2	1.85	0.57
1:C:683:TRP:CZ3	2:C:801:HEM:HBA2	2.39	0.57
1:B:679:ALA:HB3	1:B:700:MET:HB3	1.86	0.56
1:C:557:GLU:OE1	1:C:560:LYS:NZ	2.39	0.56
1:B:528:LEU:HD22	1:B:536:PRO:HB2	1.87	0.56
1:D:424:ILE:HG13	1:D:666:HIS:HB2	1.88	0.56
1:B:557:GLU:OE1	1:B:557:GLU:N	2.39	0.55
1:A:505:GLN:O	1:A:509:ILE:HG13	2.07	0.55
1:A:419:ARG:HB2	2:A:801:HEM:HBD2	1.89	0.55
1:A:600:VAL:O	1:A:604:CYS:HB2	2.07	0.55
1:A:346:HIS:HE2	1:D:376:ARG:HA	1.72	0.55
1:B:364:LYS:HG3	1:B:386:LEU:HD21	1.89	0.55
1:C:331:CYS:HB3	1:D:331:CYS:HB3	1.89	0.55
1:C:414:TRP:CE3	1:C:426:TRP:HA	2.41	0.55
1:A:483:GLN:NE2	7:A:903:HOH:O	2.40	0.54
1:C:419:ARG:HD3	1:C:683:TRP:CD2	2.43	0.54
1:C:674:ARG:NH2	5:C:804:GOL:H32	2.19	0.53
1:D:409:GLY:HA3	1:D:579:ILE:HD13	1.88	0.53
1:C:513:GLN:HB2	1:C:538:LEU:HD11	1.89	0.53
1:D:460:LEU:HD12	1:D:592:TRP:HB3	1.91	0.53
1:A:664:ILE:HG13	1:A:694:PRO:HB2	1.91	0.53
1:A:556:PHE:HB3	1:A:558:TRP:CE2	2.44	0.52
1:D:530:GLN:HG3	1:D:534:ASN:O	2.10	0.52
1:B:490:TYR:OH	1:B:523:ASP:OD2	2.25	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:687:PRO:HB2	1:D:691:SER:HB3	1.91	0.52
1:D:593:TYR:CD1	1:D:598:ILE:HD11	2.46	0.51
1:B:460:LEU:HD12	1:B:592:TRP:HB3	1.92	0.51
1:C:598:ILE:O	1:C:602:ASP:HB2	2.11	0.51
1:B:414:TRP:CE3	1:B:426:TRP:HA	2.46	0.51
1:C:480:TRP:HB2	1:C:528:LEU:HB3	1.92	0.51
1:C:483:GLN:HB2	1:C:486:ARG:CG	2.41	0.51
1:C:475:HIS:HA	1:C:533:GLY:HA3	1.93	0.50
1:D:683:TRP:CZ3	2:D:801:HEM:HBA2	2.46	0.50
1:A:327:LEU:HD11	1:A:348:ARG:HG3	1.93	0.50
1:A:395:THR:HG22	1:D:318:THR:HG21	1.94	0.50
1:B:525:LEU:HD23	1:B:526:PRO:HD2	1.93	0.50
1:C:360:PHE:HA	7:C:936:HOH:O	2.10	0.50
1:C:674:ARG:HE	5:C:804:GOL:H32	1.75	0.50
1:D:600:VAL:O	1:D:604:CYS:HB2	2.12	0.49
1:B:509:ILE:O	1:B:513:GLN:HG2	2.12	0.49
1:B:558:TRP:CE3	1:B:618:LYS:HE3	2.47	0.49
1:C:414:TRP:CZ3	1:C:426:TRP:HA	2.48	0.49
1:A:566:TRP:CD1	1:A:598:ILE:HG12	2.48	0.49
1:C:480:TRP:CZ2	1:C:536:PRO:HG3	2.48	0.49
1:C:593:TYR:CD1	1:C:598:ILE:HD11	2.46	0.49
1:C:553:HIS:CG	1:C:554:PRO:HD2	2.48	0.49
1:C:600:VAL:HA	1:C:635:LEU:HD11	1.93	0.49
1:A:420:CYS:HB3	1:A:423:ARG:HG3	1.95	0.49
1:C:679:ALA:HB3	1:C:700:MET:HB3	1.95	0.49
1:A:490:TYR:OH	1:A:523:ASP:OD2	2.28	0.48
1:C:304:ARG:O	1:C:304:ARG:HG2	2.13	0.48
1:C:515:TRP:CZ3	1:C:517:PRO:HB3	2.48	0.48
1:D:419:ARG:HD3	1:D:683:TRP:CD2	2.49	0.48
1:D:679:ALA:HB3	1:D:700:MET:HB3	1.95	0.48
1:B:528:LEU:HD23	1:B:528:LEU:HA	1.75	0.48
1:B:594:MET:HA	1:B:654:VAL:O	2.13	0.48
1:D:664:ILE:HG13	1:D:694:PRO:HB2	1.95	0.48
1:B:356:LYS:HE2	1:B:397:SER:OG	2.13	0.48
1:A:419:ARG:HD2	2:A:801:HEM:CGD	2.44	0.48
1:A:331:CYS:O	1:B:333:GLU:HA	2.14	0.47
1:B:600:VAL:O	1:B:604:CYS:HB2	2.15	0.47
1:C:704:ARG:NH2	1:C:710:GLU:OE2	2.48	0.47
1:D:327:LEU:HB2	1:D:704:ARG:HD3	1.95	0.47
1:A:681:TRP:CZ2	1:A:685:VAL:HG21	2.50	0.47
1:C:530:GLN:HG3	1:C:534:ASN:O	2.15	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:337:MET:HE3	1:B:343:PRO:HB3	1.95	0.47
1:C:671:TYR:CE2	1:C:676:GLY:HA2	2.50	0.47
1:D:375:LYS:O	1:D:376:ARG:HD2	2.16	0.46
1:D:480:TRP:CZ2	1:D:536:PRO:HG3	2.50	0.46
1:A:682:VAL:HG13	1:B:681:TRP:CZ3	2.50	0.46
1:C:577:LEU:HD21	1:C:579:ILE:HD11	1.96	0.46
1:A:598:ILE:O	1:A:602:ASP:HB2	2.15	0.46
1:A:621:LEU:O	1:A:623:MET:HG3	2.16	0.46
1:C:600:VAL:O	1:C:604:CYS:HB2	2.15	0.46
1:D:597:GLU:OE2	4:D:802:A1CN2:N02	2.49	0.46
1:A:469:GLN:HB3	1:A:584:PHE:CE2	2.51	0.46
1:B:321:LEU:HD22	1:B:674:ARG:HG2	1.97	0.46
1:B:575:MET:HE2	1:B:710:GLU:O	2.16	0.46
1:C:633:GLN:HG3	1:D:636:VAL:HG11	1.98	0.46
1:B:324:LYS:HG2	5:B:804:GOL:O1	2.15	0.46
1:B:353:VAL:HG11	1:B:470:ARG:HD3	1.96	0.46
1:C:674:ARG:HH21	5:C:804:GOL:C3	2.24	0.46
1:D:711:TYR:OH	2:D:801:HEM:O1D	2.29	0.46
1:B:711:TYR:OH	2:B:801:HEM:O1D	2.17	0.46
1:B:353:VAL:HG11	1:B:470:ARG:CD	2.46	0.45
1:D:419:ARG:HD2	2:D:801:HEM:O2D	2.17	0.45
1:D:552:ARG:HH12	1:D:649:ASP:CG	2.24	0.45
1:B:505:GLN:O	1:B:509:ILE:HG13	2.16	0.45
1:D:579:ILE:HG12	1:D:707:PRO:HB3	1.98	0.45
1:B:600:VAL:HA	1:B:635:LEU:HD11	1.98	0.45
1:C:560:LYS:HG3	1:C:561:ASP:OD1	2.17	0.45
1:B:598:ILE:O	1:B:602:ASP:HB2	2.17	0.45
1:C:487:TYR:HA	1:C:523:ASP:O	2.17	0.45
1:D:327:LEU:HD23	1:D:346:HIS:O	2.17	0.45
1:B:390:ASN:O	1:B:394:ASP:HB2	2.16	0.44
1:C:452:LYS:NZ	7:C:904:HOH:O	2.35	0.44
1:D:501:PRO:HA	1:D:504:VAL:HG23	1.99	0.44
1:A:477:PHE:O	1:A:478:ARG:HD2	2.17	0.44
1:A:683:TRP:CZ3	2:A:801:HEM:HBA2	2.53	0.44
1:C:327:LEU:HD23	1:C:704:ARG:NE	2.32	0.44
1:B:549:VAL:HG11	1:B:646:PHE:CD1	2.53	0.44
1:A:687:PRO:HB2	1:B:691:SER:CB	2.46	0.44
1:C:706:THR:HA	1:C:707:PRO:C	2.42	0.44
1:A:711:TYR:OH	2:A:801:HEM:O1D	2.33	0.43
1:C:521:ARG:HD3	1:C:522:PHE:CE1	2.53	0.43
1:C:547:LEU:HD12	7:C:925:HOH:O	2.17	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:414:TRP:CE3	1:D:426:TRP:HA	2.52	0.43
1:D:429:LEU:O	5:D:803:GOL:H32	2.18	0.43
1:A:357:ASP:HB3	1:D:673:CYS:O	2.18	0.43
1:A:610:ASN:HA	7:A:991:HOH:O	2.17	0.43
1:C:704:ARG:HE	1:C:704:ARG:HB3	1.30	0.43
1:C:307:LYS:HD3	1:C:316:VAL:HG11	2.00	0.43
1:C:499:GLY:O	1:C:501:PRO:HD3	2.19	0.43
1:D:556:PHE:HB3	1:D:558:TRP:CE2	2.54	0.43
1:D:671:TYR:CD2	1:D:676:GLY:HA2	2.53	0.43
1:A:646:PHE:CG	1:A:653:ILE:HD12	2.53	0.43
1:A:701:LEU:HD23	1:A:701:LEU:HA	1.79	0.43
1:C:483:GLN:HB2	1:C:486:ARG:HG3	2.00	0.43
1:D:480:TRP:HB2	1:D:528:LEU:HB3	2.00	0.43
1:B:594:MET:HE3	1:B:596:THR:OG1	2.18	0.43
1:C:480:TRP:CE2	1:C:715:PRO:HB2	2.53	0.43
1:D:671:TYR:CE2	1:D:676:GLY:HA2	2.54	0.43
1:D:469:GLN:HB3	1:D:584:PHE:CE2	2.53	0.43
1:B:310:ASN:OD1	1:B:313:THR:HG23	2.19	0.42
1:B:327:LEU:HB2	1:B:704:ARG:HB3	2.01	0.42
1:C:515:TRP:CD1	1:C:526:PRO:HG3	2.54	0.42
1:D:310:ASN:OD1	1:D:313:THR:HG23	2.19	0.42
1:B:341:MET:HE2	1:B:341:MET:HB2	1.76	0.42
1:B:499:GLY:O	1:B:501:PRO:HD3	2.19	0.42
1:C:594:MET:HA	1:C:654:VAL:O	2.20	0.42
2:C:801:HEM:HHC	2:C:801:HEM:CBB	2.46	0.42
1:A:419:ARG:HD3	1:A:683:TRP:CE3	2.54	0.42
1:C:683:TRP:HZ3	2:C:801:HEM:HBA2	1.84	0.42
1:D:460:LEU:HD12	1:D:592:TRP:CB	2.49	0.42
1:B:398:THR:OG1	1:B:399:TYR:N	2.53	0.42
1:B:414:TRP:CH2	2:B:801:HEM:HMC3	2.55	0.42
1:A:460:LEU:HD12	1:A:592:TRP:HB3	2.02	0.42
1:A:577:LEU:HD12	1:A:578:GLU:N	2.35	0.42
1:C:575:MET:HE2	1:C:710:GLU:O	2.19	0.42
1:D:600:VAL:HG22	1:D:635:LEU:HD11	2.01	0.42
1:D:484:LEU:HA	1:D:484:LEU:HD23	1.70	0.42
1:C:701:LEU:HD23	1:C:701:LEU:HA	1.88	0.42
1:C:598:ILE:HA	1:C:602:ASP:HB2	2.01	0.41
1:C:681:TRP:CZ2	1:C:685:VAL:HG21	2.54	0.41
1:D:464:ILE:HG13	1:D:589:PHE:HB3	2.02	0.41
1:D:506:PHE:HA	1:D:509:ILE:HD12	2.02	0.41
1:A:619:MET:HE2	1:A:619:MET:HB3	1.92	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:513:GLN:HB2	1:B:538:LEU:HD11	2.03	0.41
1:C:600:VAL:HG22	1:C:639:ASN:HD21	1.85	0.41
1:D:576:LEU:HD11	1:D:583:GLU:HB3	2.01	0.41
1:A:626:THR:OG1	1:B:655:ASP:OD2	2.35	0.41
1:B:363:ALA:HB1	1:B:389:VAL:HG11	2.01	0.41
1:C:612:LEU:HD23	1:C:612:LEU:HA	1.96	0.41
1:B:356:LYS:NZ	1:B:394:ASP:O	2.54	0.41
1:B:723:LEU:HG	1:B:724:VAL:HG22	2.02	0.41
1:C:319:ASP:HB2	1:C:671:TYR:HE2	1.85	0.41
1:C:341:MET:HE2	3:C:802:H4B:H9	2.02	0.41
1:D:363:ALA:HB1	1:D:389:VAL:HG11	2.03	0.41
1:C:389:VAL:O	1:C:393:ILE:HG13	2.21	0.41
1:C:480:TRP:CE2	1:C:536:PRO:HG3	2.56	0.41
1:C:509:ILE:O	1:C:513:GLN:HG2	2.21	0.41
1:C:660:THR:OG1	1:C:694:PRO:HD2	2.21	0.41
1:C:691:SER:HA	1:C:696:PHE:CG	2.56	0.41
1:D:309:LYS:O	1:D:699:GLU:HG3	2.21	0.41
1:D:415:ARG:CZ	1:D:674:ARG:HD2	2.51	0.41
1:D:419:ARG:HD2	2:D:801:HEM:CGD	2.51	0.41
1:A:484:LEU:HD23	1:A:484:LEU:HA	1.89	0.40
1:B:558:TRP:HE3	1:B:618:LYS:HE3	1.84	0.40
1:A:515:TRP:O	1:A:517:PRO:HD3	2.20	0.40
1:D:350:PRO:HG2	1:D:358:GLN:OE1	2.21	0.40
1:D:445:ASN:ND2	7:D:901:HOH:O	2.16	0.40
1:B:480:TRP:CE2	1:B:715:PRO:HB2	2.56	0.40
1:C:566:TRP:CD1	1:C:598:ILE:HG12	2.55	0.40
1:A:593:TYR:CD1	1:A:598:ILE:HD11	2.57	0.40

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	A	419/423 (99%)	382 (91%)	35 (8%)	2 (0%)	25 32
1	B	412/423 (97%)	394 (96%)	17 (4%)	1 (0%)	44 55
1	C	414/423 (98%)	397 (96%)	17 (4%)	0	100 100
1	D	419/423 (99%)	396 (94%)	23 (6%)	0	100 100
All	All	1664/1692 (98%)	1569 (94%)	92 (6%)	3 (0%)	44 55

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	624	ARG
1	A	622	ASP
1	A	668	GLU

5.3.2 Protein sidechains (i)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	A	376/378 (100%)	354 (94%)	22 (6%)	16 23
1	B	372/378 (98%)	347 (93%)	25 (7%)	13 19
1	C	374/378 (99%)	356 (95%)	18 (5%)	21 32
1	D	376/378 (100%)	357 (95%)	19 (5%)	20 29
All	All	1498/1512 (99%)	1414 (94%)	84 (6%)	17 26

All (84) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	326	THR
1	A	332	THR
1	A	333	GLU
1	A	335	ILE
1	A	349	ARG
1	A	380	LYS
1	A	398	THR
1	A	424	ILE

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Mol	Chain	Res	Type
1	A	447	ILE
1	A	491	LYS
1	A	528	LEU
1	A	560	LYS
1	A	561	ASP
1	A	610	ASN
1	A	614	GLU
1	A	622	ASP
1	A	626	THR
1	A	639	ASN
1	A	653	ILE
1	A	673	CYS
1	A	706	THR
1	A	720	VAL
1	B	323	LEU
1	B	324	LYS
1	B	326	THR
1	B	341	MET
1	B	372	SER
1	B	376	ARG
1	B	380	LYS
1	B	394	ASP
1	B	424	ILE
1	B	425	GLN
1	B	462	SER
1	B	485	ILE
1	B	491	LYS
1	B	519	ARG
1	B	523	ASP
1	B	528	LEU
1	B	561	ASP
1	B	565	LYS
1	B	575	MET
1	B	578	GLU
1	B	593	TYR
1	B	689	SER
1	B	691	SER
1	B	720	VAL
1	B	724	VAL
1	C	305	PHE
1	C	314	GLU
1	C	326	THR

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Mol	Chain	Res	Type
1	C	337	MET
1	C	352	ASP
1	C	364	LYS
1	C	397	SER
1	C	505	GLN
1	C	519	ARG
1	C	528	LEU
1	C	607	SER
1	C	614	GLU
1	C	625	LYS
1	C	672	ARG
1	C	691	SER
1	C	704	ARG
1	C	723	LEU
1	C	724	VAL
1	D	305	PHE
1	D	320	THR
1	D	325	SER
1	D	326	THR
1	D	335	ILE
1	D	349	ARG
1	D	352	ASP
1	D	353	VAL
1	D	373	SER
1	D	391	LYS
1	D	424	ILE
1	D	462	SER
1	D	528	LEU
1	D	576	LEU
1	D	620	ASN
1	D	627	SER
1	D	685	VAL
1	D	688	MET
1	D	720	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (10) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	400	GLN
1	A	512	GLN
1	A	719	HIS
1	B	342	HIS

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Mol	Chain	Res	Type
1	B	412	HIS
1	C	412	HIS
1	C	441	HIS
1	C	492	GLN
1	D	369	GLN
1	D	475	HIS

5.3.3 RNA

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains

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

5.5 Carbohydrates

There are no oligosaccharides in this entry.

5.6 Ligand geometry

Of 20 ligands modelled in this entry, 2 are monoatomic - leaving 18 for Mogul analysis.

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	$\#\|Z\| > 2$
5	GOL	D	803	-	5,5,5	0.37	0	5,5,5	0.35	0
3	H4B	C	802	-	16,18,18	0.91	0	14,26,26	2.41	5 (35%)
2	HEM	D	801	1	42,50,50	1.53	6 (14%)	46,82,82	1.49	7 (15%)
4	A1CN2	A	803	-	24,24,24	0.48	0	31,33,33	1.36	6 (19%)
4	A1CN2	D	802	-	24,24,24	0.52	0	31,33,33	1.65	8 (25%)
5	GOL	A	804	-	5,5,5	0.30	0	5,5,5	0.32	0
3	H4B	A	802	-	16,18,18	0.77	0	14,26,26	2.21	5 (35%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
5	GOL	C	804	-	5,5,5	0.29	0	5,5,5	0.42	0
5	GOL	B	804	-	5,5,5	0.41	0	5,5,5	0.35	0
2	HEM	C	801	1	42,50,50	1.49	6 (14%)	46,82,82	1.55	7 (15%)
2	HEM	A	801	1	42,50,50	1.59	7 (16%)	46,82,82	1.51	8 (17%)
5	GOL	A	806	-	5,5,5	0.41	0	5,5,5	0.22	0
4	A1CN2	B	803	-	24,24,24	0.54	0	31,33,33	1.44	3 (9%)
3	H4B	B	802	-	16,18,18	0.76	0	14,26,26	2.29	5 (35%)
2	HEM	B	801	1	42,50,50	1.54	6 (14%)	46,82,82	1.56	7 (15%)
4	A1CN2	C	803	-	24,24,24	0.48	0	31,33,33	1.29	2 (6%)
3	H4B	C	807	-	16,18,18	0.75	0	14,26,26	2.34	6 (42%)
5	GOL	C	805	-	5,5,5	0.38	0	5,5,5	0.28	0

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
5	GOL	D	803	-	-	4/4/4/4	-
3	H4B	C	802	-	-	0/8/17/17	0/2/2/2
2	HEM	D	801	1	-	3/12/54/54	-
4	A1CN2	A	803	-	-	4/10/10/10	0/2/2/2
4	A1CN2	D	802	-	-	4/10/10/10	0/2/2/2
5	GOL	A	804	-	-	2/4/4/4	-
3	H4B	A	802	-	-	0/8/17/17	0/2/2/2
5	GOL	C	804	-	-	0/4/4/4	-
5	GOL	B	804	-	-	0/4/4/4	-
2	HEM	C	801	1	-	5/12/54/54	-
2	HEM	A	801	1	-	4/12/54/54	-
5	GOL	A	806	-	-	4/4/4/4	-
4	A1CN2	B	803	-	-	3/10/10/10	0/2/2/2
3	H4B	B	802	-	-	0/8/17/17	0/2/2/2
2	HEM	B	801	1	-	4/12/54/54	-
4	A1CN2	C	803	-	-	3/10/10/10	0/2/2/2
3	H4B	C	807	-	-	0/8/17/17	0/2/2/2
5	GOL	C	805	-	-	1/4/4/4	-

All (25) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	801	HEM	C3C-C2C	-4.92	1.33	1.40
2	B	801	HEM	C3C-C2C	-4.61	1.34	1.40
2	A	801	HEM	C3C-C2C	-4.31	1.34	1.40
2	D	801	HEM	C3C-C2C	-4.12	1.34	1.40
2	B	801	HEM	C3C-CAC	3.35	1.55	1.47
2	B	801	HEM	CAB-C3B	3.34	1.56	1.47
2	A	801	HEM	C3C-C4C	3.33	1.46	1.41
2	C	801	HEM	CAB-C3B	3.10	1.55	1.47
2	D	801	HEM	CAB-C3B	3.09	1.55	1.47
2	A	801	HEM	C3C-CAC	3.09	1.54	1.47
2	D	801	HEM	C3C-C4C	3.04	1.45	1.41
2	A	801	HEM	CAB-C3B	2.95	1.55	1.47
2	C	801	HEM	C3C-CAC	2.85	1.54	1.47
2	B	801	HEM	C3C-C4C	2.84	1.45	1.41
2	D	801	HEM	C3C-CAC	2.75	1.53	1.47
2	C	801	HEM	C3C-C4C	2.58	1.45	1.41
2	D	801	HEM	FE-ND	2.37	2.11	1.98
2	A	801	HEM	CMD-C2D	2.37	1.55	1.50
2	C	801	HEM	CMD-C2D	2.35	1.55	1.50
2	C	801	HEM	CMB-C2B	2.24	1.55	1.50
2	B	801	HEM	CMD-C2D	2.22	1.55	1.50
2	A	801	HEM	CMB-C2B	2.14	1.55	1.50
2	B	801	HEM	FE-NB	2.10	2.09	1.98
2	A	801	HEM	CAD-C3D	2.09	1.56	1.51
2	D	801	HEM	CMD-C2D	2.05	1.55	1.50

All (69) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	B	802	H4B	C8A-C4A-C4	5.84	119.81	114.50
3	C	802	H4B	C8A-C4A-C4	5.46	119.47	114.50
3	A	802	H4B	C8A-C4A-C4	5.45	119.46	114.50
4	B	803	A1CN2	C02-N01-C06	5.39	122.10	118.07
2	B	801	HEM	C4B-CHC-C1C	4.96	129.10	122.56
3	C	807	H4B	C8A-C4A-C4	4.80	118.87	114.50
4	D	802	A1CN2	O09-C11-C12	4.52	122.75	115.92
2	C	801	HEM	C4B-CHC-C1C	3.97	127.80	122.56
3	C	802	H4B	N1-C2-N3	-3.74	119.75	125.48
2	A	801	HEM	C4B-CHC-C1C	3.70	127.44	122.56
3	C	802	H4B	C2-N3-C4	3.67	121.06	115.96
3	C	807	H4B	N1-C2-N3	-3.59	119.97	125.48
4	D	802	A1CN2	C02-N01-C06	3.41	120.62	118.07
3	C	807	H4B	C2-N3-C4	3.40	120.68	115.96

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	C	803	A1CN2	C02-N01-C06	3.38	120.60	118.07
2	D	801	HEM	C4B-CHC-C1C	3.28	126.88	122.56
3	A	802	H4B	C2-N3-C4	3.21	120.42	115.96
2	B	801	HEM	C3B-C2B-C1B	3.20	108.82	106.41
3	B	802	H4B	C2-N3-C4	3.04	120.19	115.96
4	D	802	A1CN2	C08-O09-C11	3.03	123.75	117.76
4	A	803	A1CN2	C02-N01-C06	2.96	120.29	118.07
4	C	803	A1CN2	O09-C11-C12	2.89	120.28	115.92
2	A	801	HEM	C4C-CHD-C1D	2.86	126.33	122.56
2	C	801	HEM	CHB-C1B-NB	2.82	127.86	124.37
3	B	802	H4B	N1-C2-N3	-2.81	121.18	125.48
4	A	803	A1CN2	N02-C02-N01	2.80	121.08	116.59
2	D	801	HEM	CMC-C2C-C3C	2.77	130.23	124.68
3	A	802	H4B	N1-C2-N3	-2.77	121.24	125.48
2	C	801	HEM	CAD-C3D-C4D	-2.76	119.89	124.70
2	C	801	HEM	CHA-C4D-ND	2.73	127.75	124.37
3	C	802	H4B	N2-C2-N1	2.67	121.22	117.22
3	C	807	H4B	C4-C4A-N5	2.64	122.34	118.57
3	C	807	H4B	C2-N1-C8A	2.61	120.80	114.59
2	D	801	HEM	C2C-C3C-C4C	2.58	108.70	106.90
3	C	802	H4B	C2-N1-C8A	2.57	120.70	114.59
4	D	802	A1CN2	C05-C06-N01	-2.56	119.81	122.73
2	B	801	HEM	CBD-CAD-C3D	2.54	119.55	112.53
2	C	801	HEM	CAD-C3D-C2D	2.52	132.59	127.87
2	A	801	HEM	C3B-C2B-C1B	2.52	108.30	106.41
2	A	801	HEM	C4D-ND-C1D	2.50	108.17	105.21
2	B	801	HEM	CAD-CBD-CGD	-2.50	107.04	113.67
4	B	803	A1CN2	O09-C11-C12	2.48	119.66	115.92
2	D	801	HEM	C3B-C2B-C1B	2.46	108.26	106.41
2	C	801	HEM	CMD-C2D-C1D	-2.44	121.22	125.03
4	D	802	A1CN2	F12-C12-C11	2.43	122.54	119.22
4	A	803	A1CN2	C05-C06-N01	-2.35	120.06	122.73
4	D	802	A1CN2	C08-C06-N01	2.35	120.42	115.69
3	C	807	H4B	N2-C2-N3	2.34	120.73	117.22
2	A	801	HEM	CMC-C2C-C3C	2.33	129.34	124.68
4	A	803	A1CN2	O09-C11-C12	2.32	119.42	115.92
2	B	801	HEM	CHD-C1D-ND	2.31	126.92	124.44
4	A	803	A1CN2	C08-O09-C11	2.30	122.31	117.76
4	A	803	A1CN2	C08-C06-N01	2.28	120.30	115.69
3	B	802	H4B	C2-N1-C8A	2.28	120.00	114.59
2	B	801	HEM	O2D-CGD-CBD	2.22	121.01	114.00
3	A	802	H4B	C2-N1-C8A	2.22	119.86	114.59

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	801	HEM	C1B-NB-C4B	2.20	107.81	105.21
2	C	801	HEM	C3B-C2B-C1B	2.20	108.06	106.41
2	D	801	HEM	C3C-C4C-NC	-2.18	106.82	110.94
2	A	801	HEM	C2D-C1D-ND	-2.16	107.40	109.90
3	B	802	H4B	C11-C10-C9	-2.14	109.49	112.11
4	D	802	A1CN2	N02-C02-N01	2.12	120.00	116.59
4	B	803	A1CN2	F13-C13-C14	2.12	122.87	118.64
2	A	801	HEM	C3B-C4B-NB	-2.06	107.99	109.47
2	D	801	HEM	CBD-CAD-C3D	2.05	118.21	112.53
2	D	801	HEM	C4C-CHD-C1D	2.04	125.26	122.56
2	B	801	HEM	C3B-C4B-NB	-2.04	108.00	109.47
4	D	802	A1CN2	O09-C11-C16	-2.02	119.12	123.49
3	A	802	H4B	C4-C4A-N5	2.01	121.44	118.57

There are no chirality outliers.

All (41) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	C	801	HEM	C2D-C3D-CAD-CBD
2	C	801	HEM	C4D-C3D-CAD-CBD
2	D	801	HEM	C2D-C3D-CAD-CBD
2	D	801	HEM	C4D-C3D-CAD-CBD
5	A	804	GOL	O1-C1-C2-O2
5	A	806	GOL	O1-C1-C2-C3
5	D	803	GOL	O1-C1-C2-C3
4	C	803	A1CN2	C15-C17-C18-N19
2	A	801	HEM	C4D-C3D-CAD-CBD
2	A	801	HEM	C2D-C3D-CAD-CBD
4	C	803	A1CN2	C17-C18-N19-C20
4	C	803	A1CN2	C17-C18-N19-C21
4	D	802	A1CN2	C17-C18-N19-C20
2	B	801	HEM	C2A-CAA-CBA-CGA
2	C	801	HEM	C2A-CAA-CBA-CGA
4	A	803	A1CN2	C17-C18-N19-C20
4	B	803	A1CN2	C17-C18-N19-C20
5	A	804	GOL	O1-C1-C2-C3
5	A	806	GOL	C1-C2-C3-O3
5	C	805	GOL	O1-C1-C2-C3
5	D	803	GOL	C1-C2-C3-O3
2	D	801	HEM	C2A-CAA-CBA-CGA
5	D	803	GOL	O2-C2-C3-O3
4	D	802	A1CN2	C17-C18-N19-C21

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Mol	Chain	Res	Type	Atoms
5	A	806	GOL	O1-C1-C2-O2
5	D	803	GOL	O1-C1-C2-O2
4	A	803	A1CN2	C14-C15-C17-C18
4	B	803	A1CN2	C14-C15-C17-C18
4	A	803	A1CN2	C16-C15-C17-C18
4	D	802	A1CN2	C16-C15-C17-C18
4	B	803	A1CN2	C16-C15-C17-C18
4	D	802	A1CN2	C14-C15-C17-C18
4	A	803	A1CN2	C12-C11-O09-C08
2	A	801	HEM	C4B-C3B-CAB-CBB
2	B	801	HEM	C4B-C3B-CAB-CBB
2	A	801	HEM	C2A-CAA-CBA-CGA
5	A	806	GOL	O2-C2-C3-O3
2	C	801	HEM	CAD-CBD-CGD-O1D
2	C	801	HEM	CAD-CBD-CGD-O2D
2	B	801	HEM	CAD-CBD-CGD-O2D
2	B	801	HEM	CAD-CBD-CGD-O1D

There are no ring outliers.

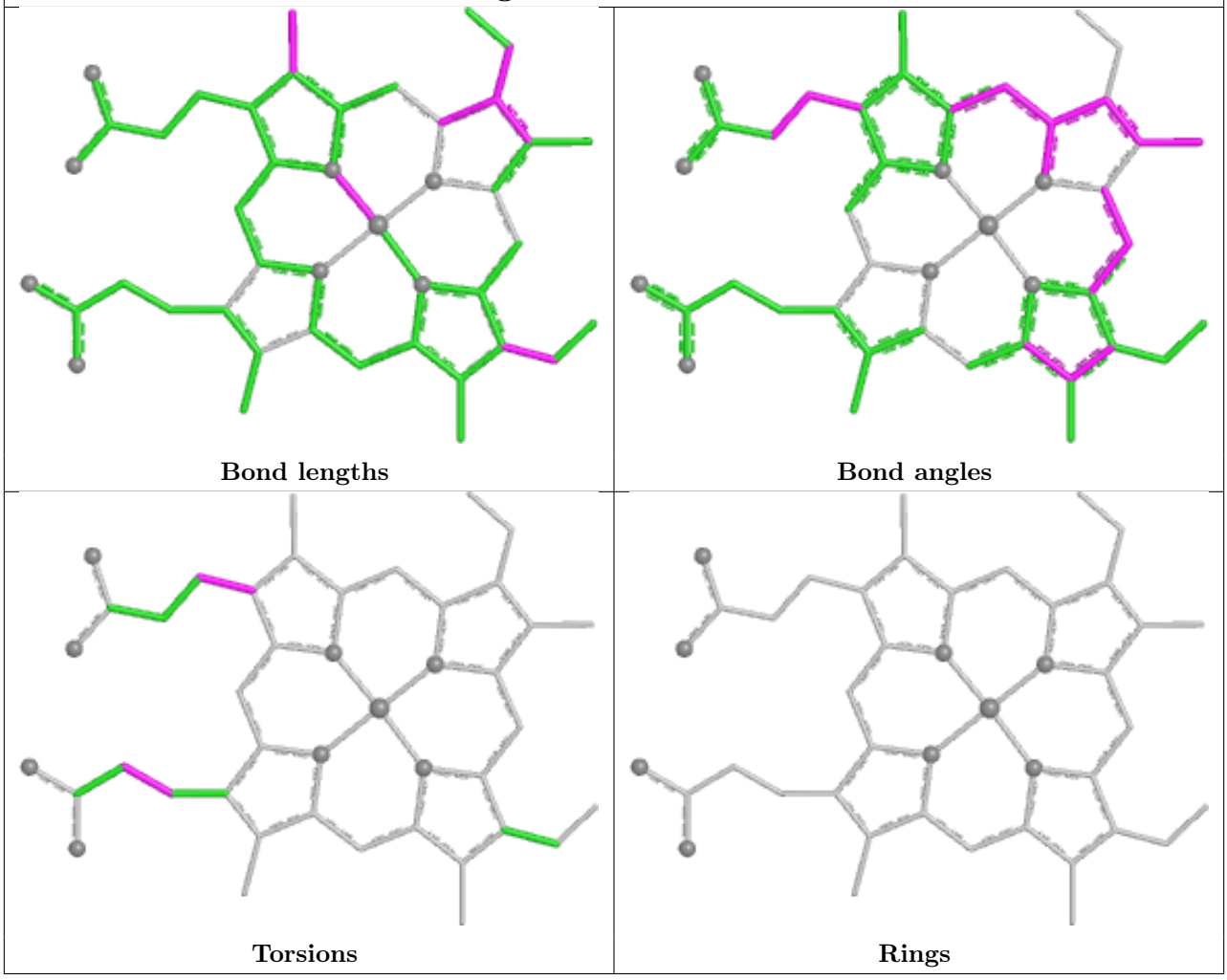
9 monomers are involved in 29 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	D	803	GOL	1	0
3	C	802	H4B	1	0
2	D	801	HEM	7	0
4	D	802	A1CN2	1	0
5	C	804	GOL	4	0
5	B	804	GOL	1	0
2	C	801	HEM	5	0
2	A	801	HEM	6	0
2	B	801	HEM	3	0

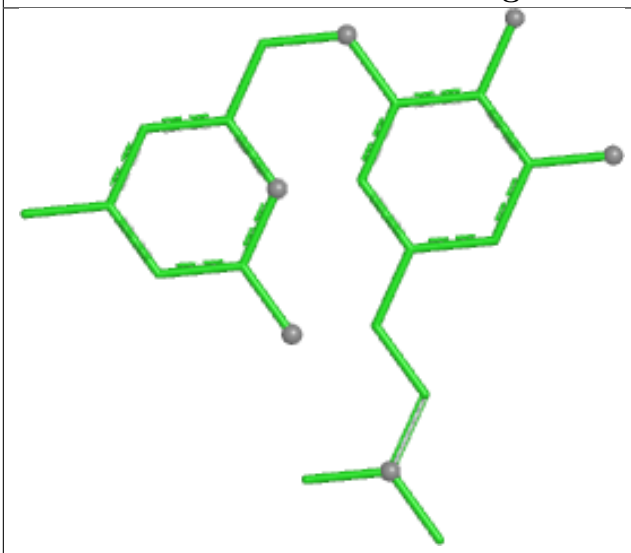
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

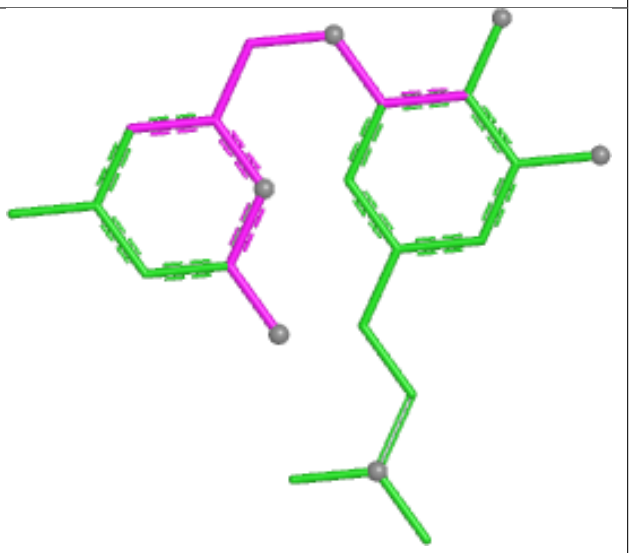
Ligand HEM D 801



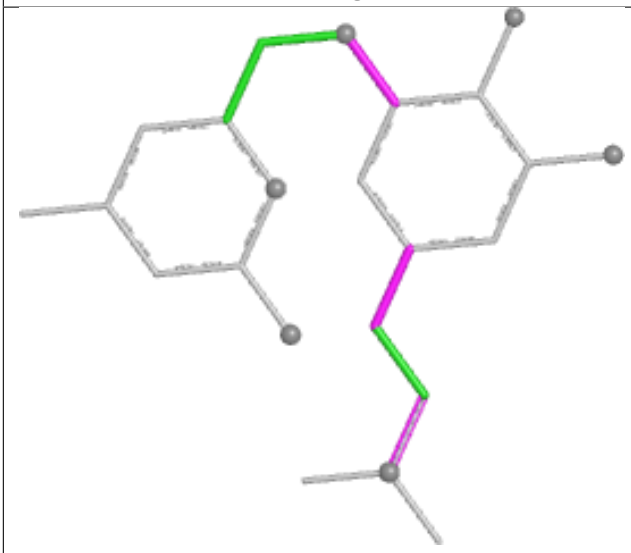
Ligand A1CN2 A 803



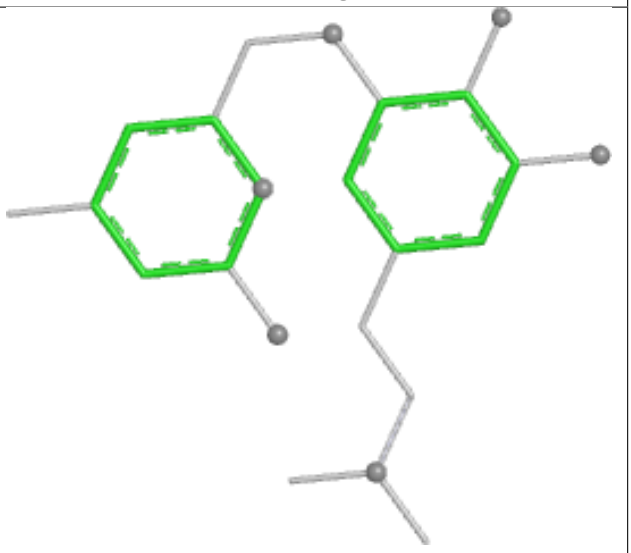
Bond lengths



Bond angles

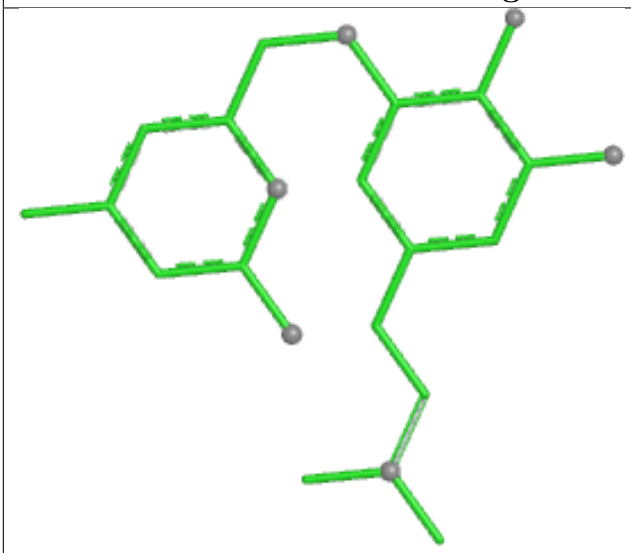


Torsions

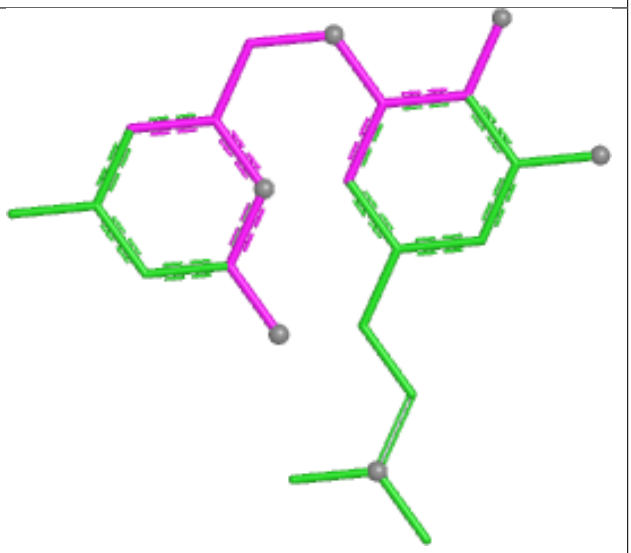


Rings

Ligand A1CN2 D 802



Bond lengths



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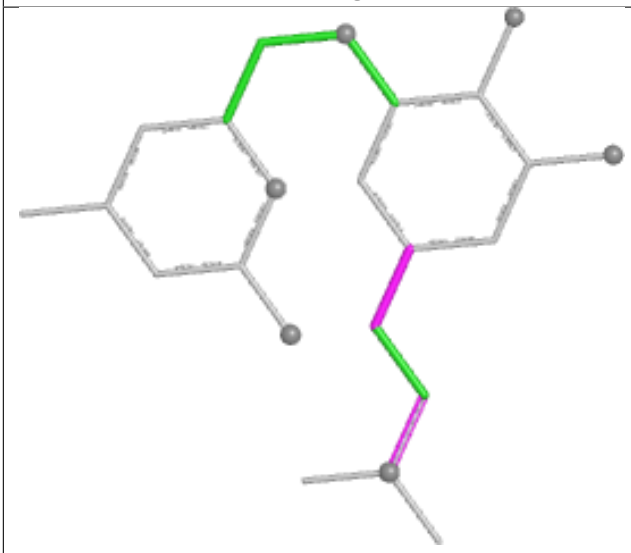
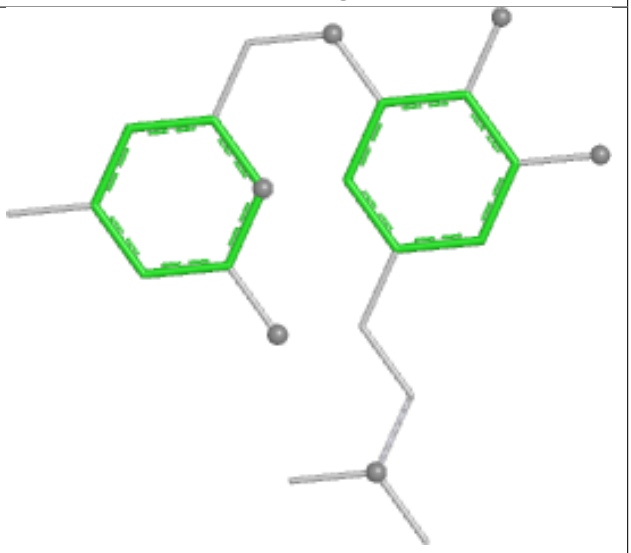
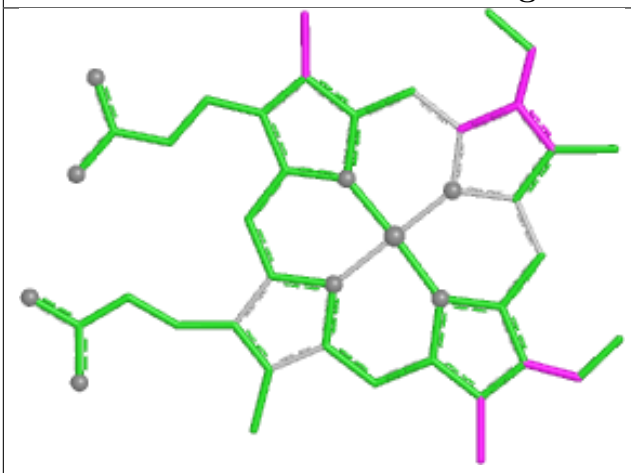


Torsions

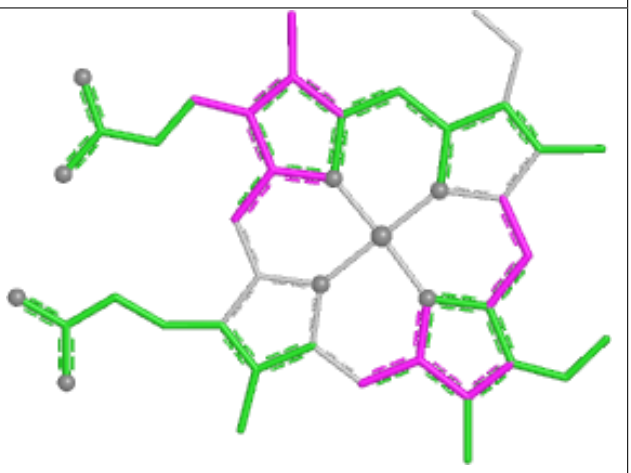


Rings

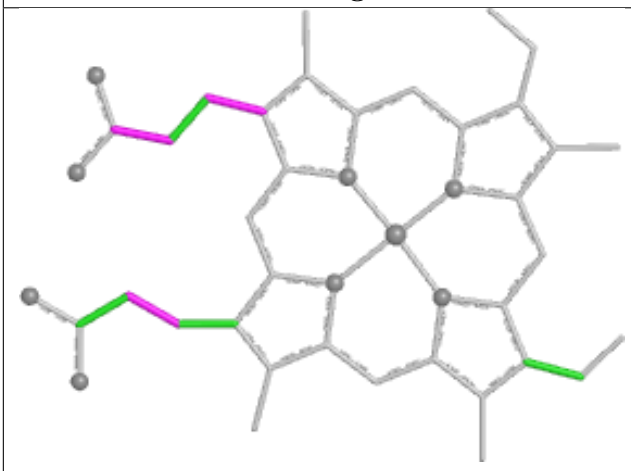
Ligand HEM C 801



Bond lengths



Bond angles



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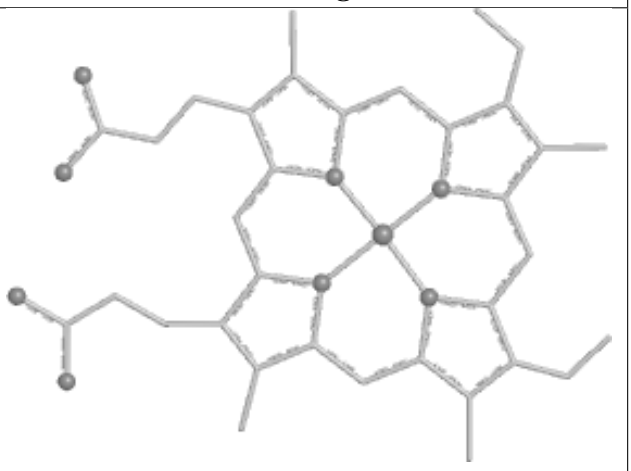
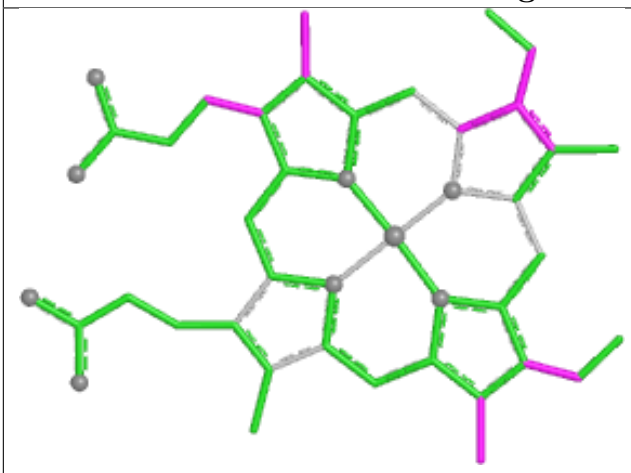
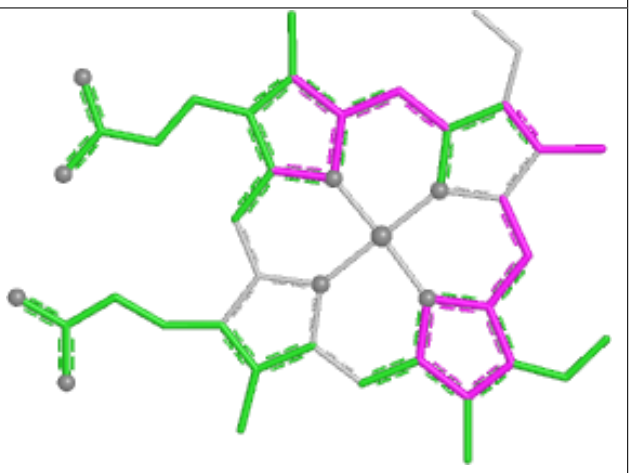


Rings

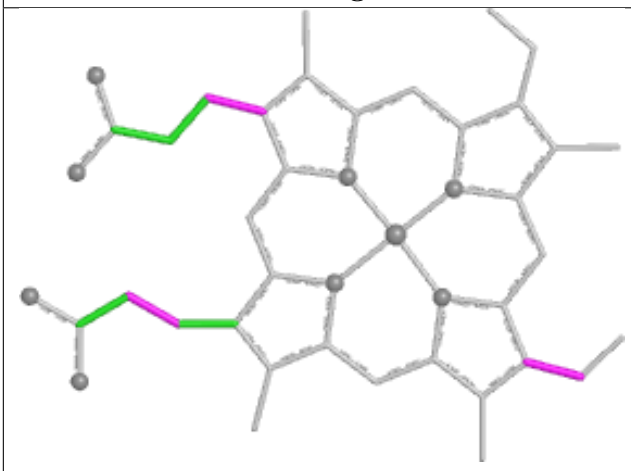
Ligand HEM A 801



Bond lengths



Bond angles



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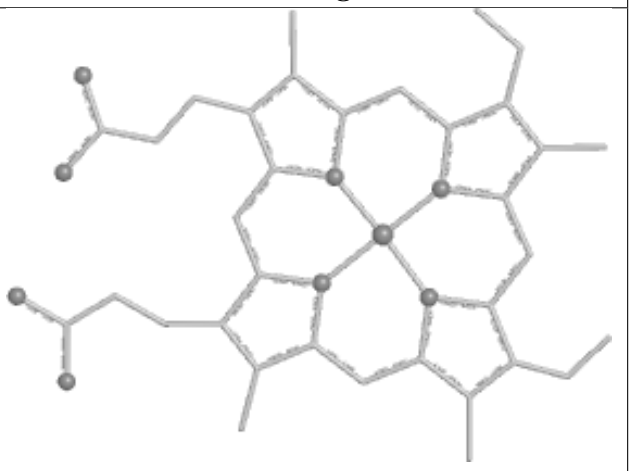
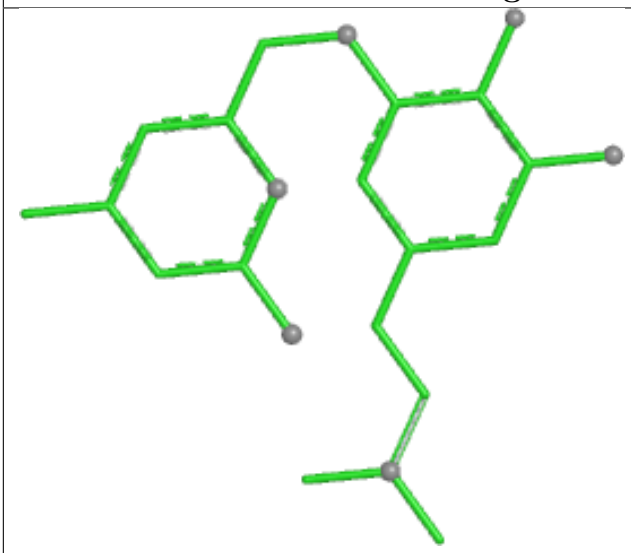
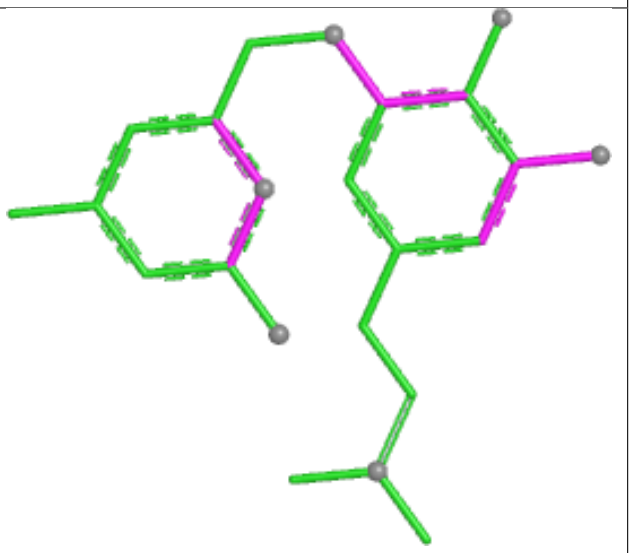


Rings

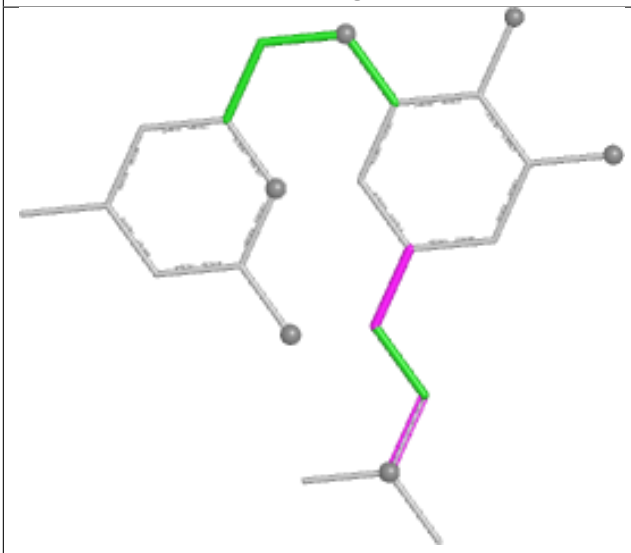
Ligand A1CN2 B 803



Bond lengths



Bond angles



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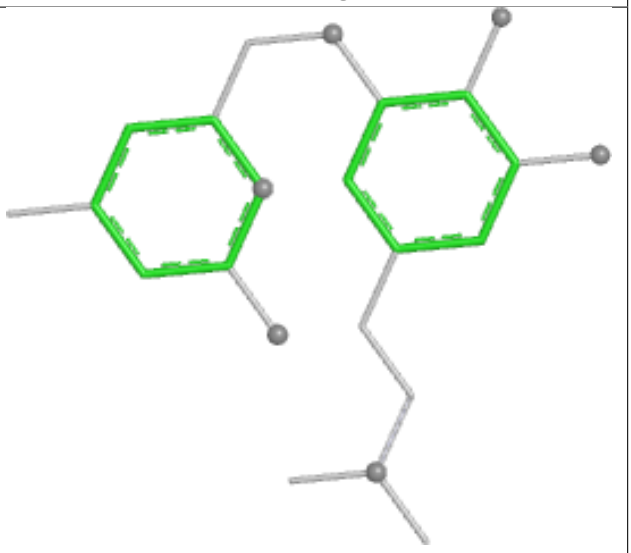
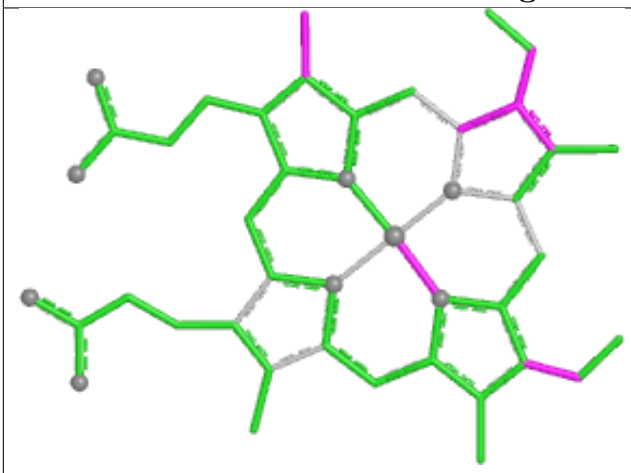
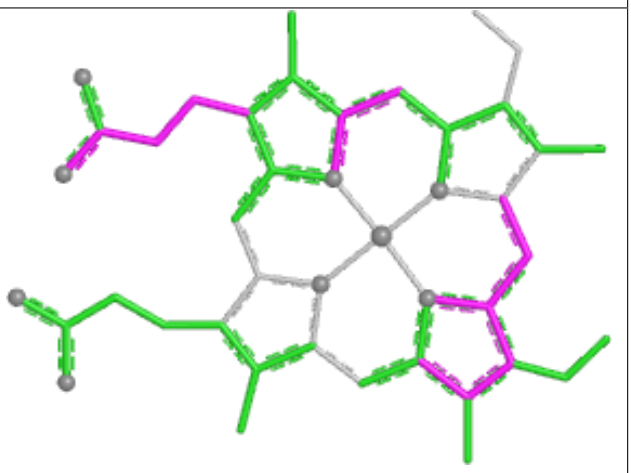


Rings

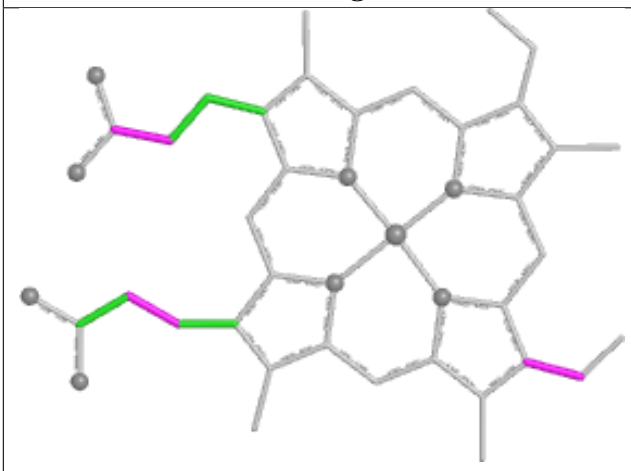
Ligand HEM B 801



Bond lengths



Bond angles



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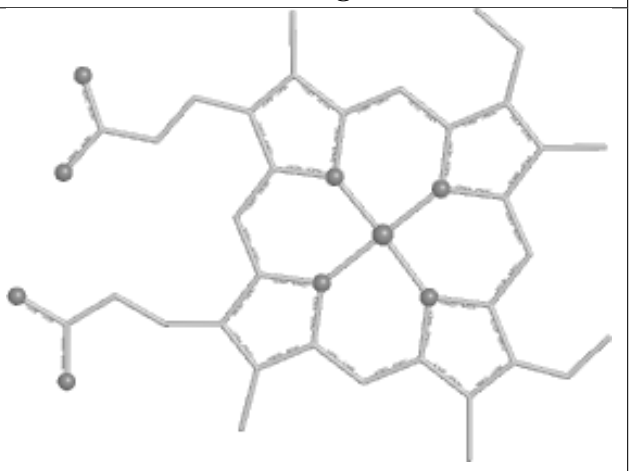
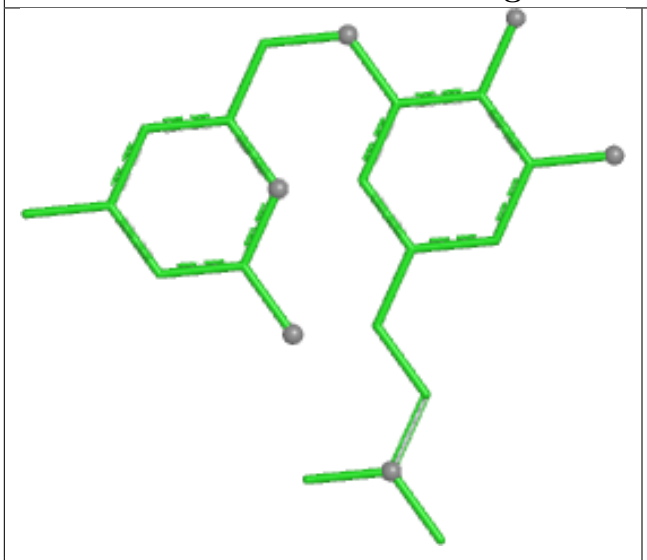
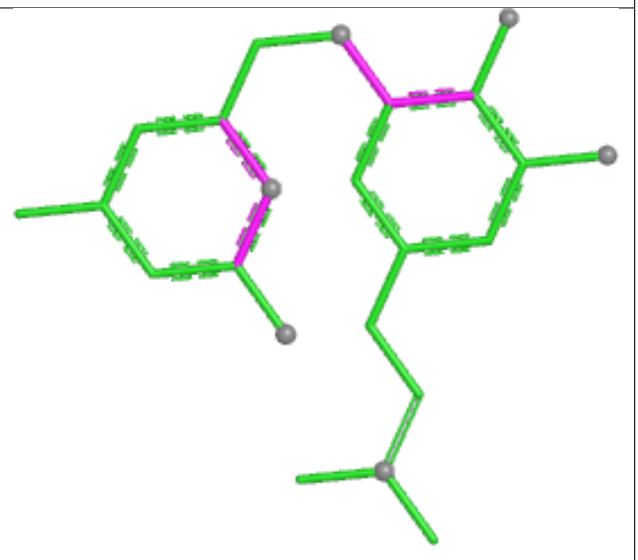


Rings

Ligand A1CN2 C 803



Bond lengths



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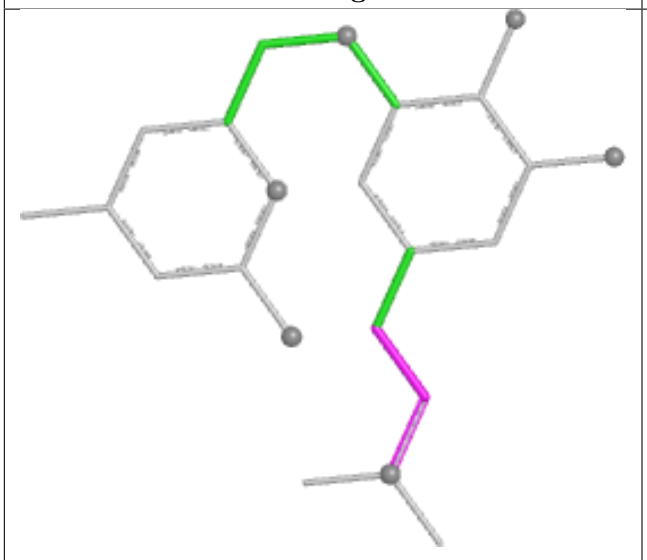

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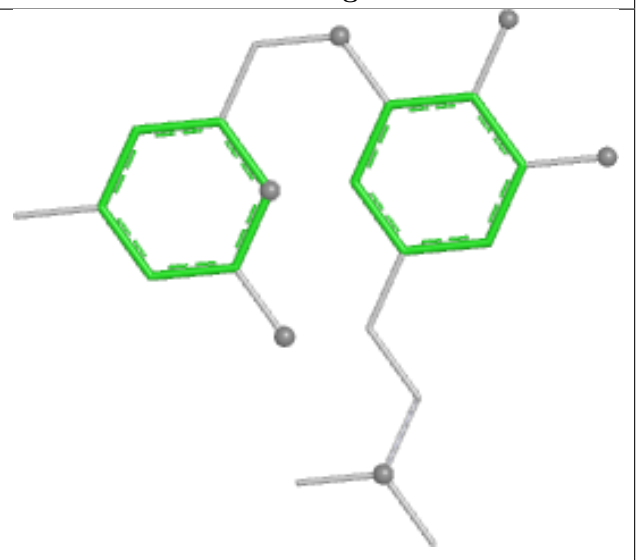

Rings

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 Fit of model and data

6.1 Protein, DNA and RNA chains

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å^2)	Q<0.9
1	A	418/423 (98%)	-1.43	0	100	100	19, 41, 74, 117	3 (0%)
1	B	414/423 (97%)	-1.46	0	100	100	20, 38, 64, 98	2 (0%)
1	C	413/423 (97%)	-1.47	0	100	100	16, 37, 66, 105	5 (1%)
1	D	418/423 (98%)	-1.43	0	100	100	20, 41, 75, 108	3 (0%)
All	All	1663/1692 (98%)	-1.45	0	100	100	16, 39, 70, 117	13 (0%)

There are no RSRZ outliers to report.

6.2 Non-standard residues in protein, DNA, RNA chains

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

6.3 Carbohydrates

There are no oligosaccharides in this entry.

6.4 Ligands

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
5	GOL	B	804	6/6	0.98	0.06	50,67,69,71	0
5	GOL	C	804	6/6	0.98	0.07	58,69,73,79	0
3	H4B	B	802	17/17	0.99	0.03	20,45,51,53	0
3	H4B	C	802	17/17	0.99	0.03	35,48,53,55	0

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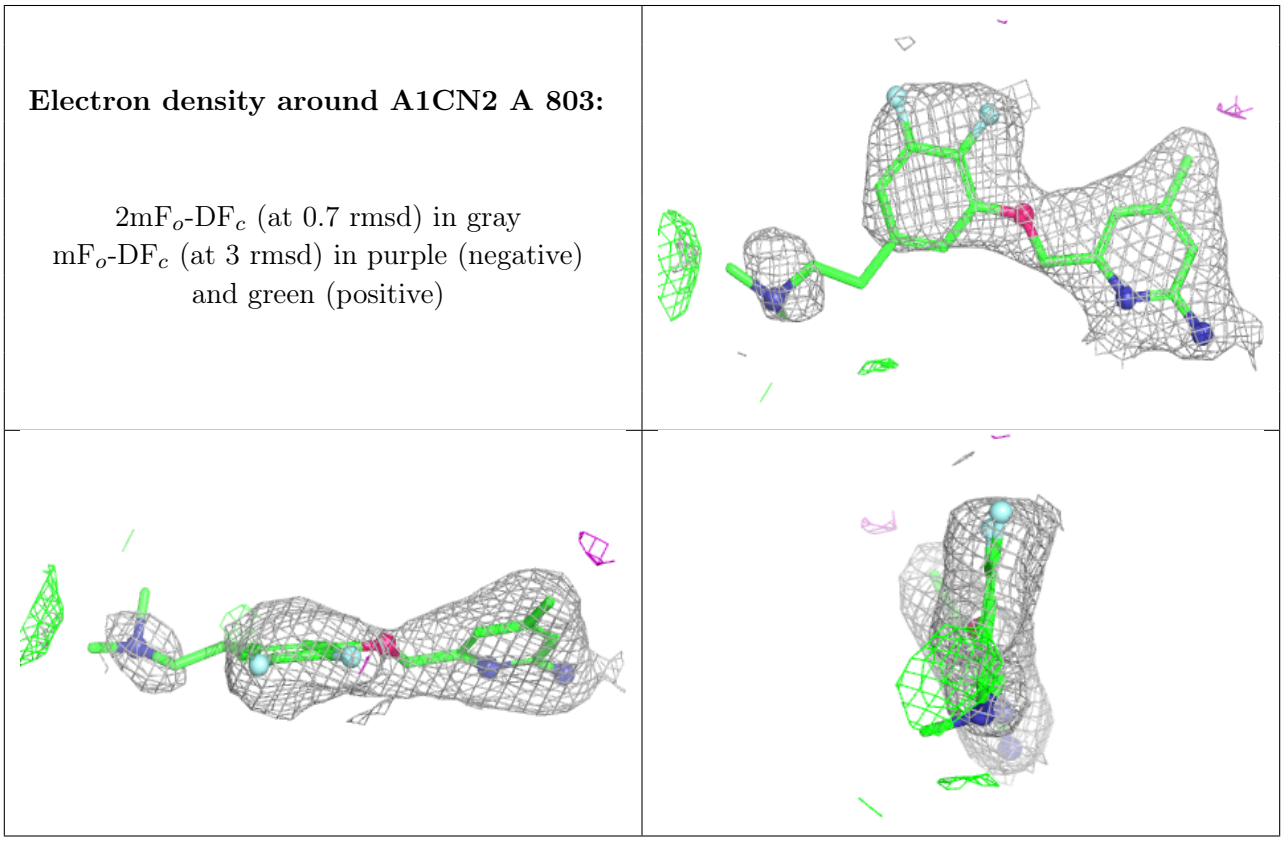
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	H4B	C	807	17/17	0.99	0.04	25,38,58,63	0
4	A1CN2	A	803	23/23	0.99	0.06	13,66,93,94	0
4	A1CN2	B	803	23/23	0.99	0.06	21,44,94,95	0
4	A1CN2	C	803	23/23	0.99	0.06	24,59,83,87	0
4	A1CN2	D	802	23/23	0.99	0.06	17,60,94,98	0
5	GOL	A	804	6/6	0.99	0.03	37,40,42,49	0
5	GOL	A	806	6/6	0.99	0.06	56,62,62,65	0
2	HEM	A	801	43/43	0.99	0.04	19,40,48,51	0
3	H4B	A	802	17/17	0.99	0.04	36,48,55,57	0
5	GOL	C	805	6/6	0.99	0.06	34,50,57,58	0
5	GOL	D	803	6/6	0.99	0.04	32,37,49,62	0
2	HEM	D	801	43/43	1.00	0.03	15,35,43,49	0
2	HEM	B	801	43/43	1.00	0.03	22,37,48,50	0
2	HEM	C	801	43/43	1.00	0.03	18,33,44,51	0
6	ZN	A	805	1/1	1.00	0.01	40,40,40,40	0
6	ZN	C	806	1/1	1.00	0.04	78,78,78,78	0

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

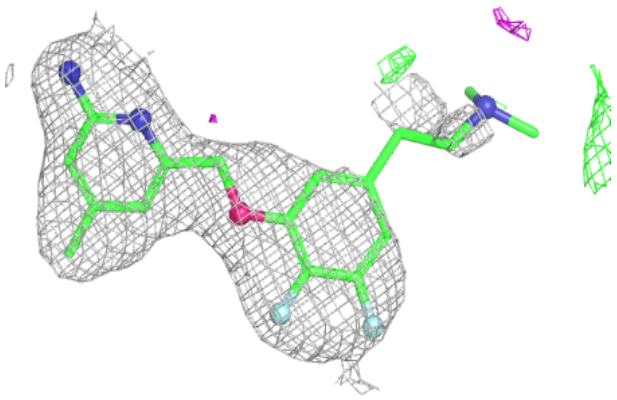
Electron density around A1CN2 A 803:

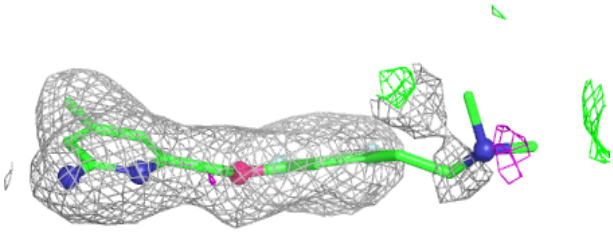
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

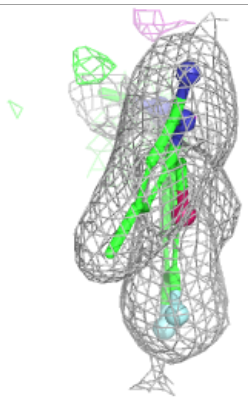


Electron density around A1CN2 B 803:

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

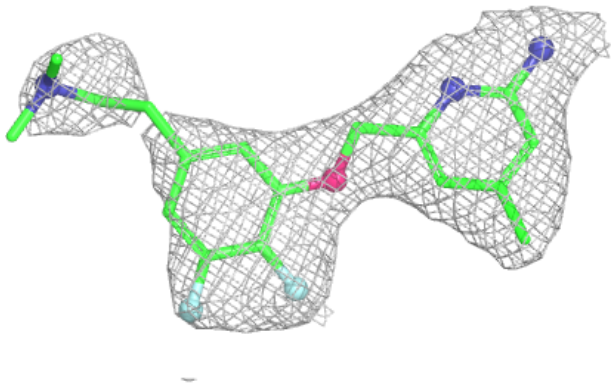


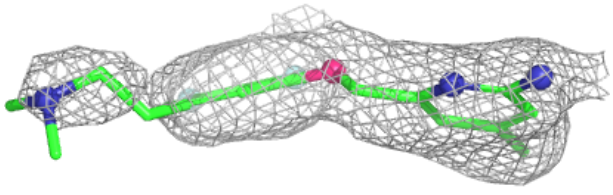


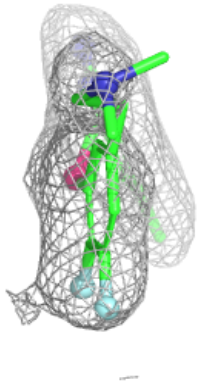


Electron density around A1CN2 C 803:

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

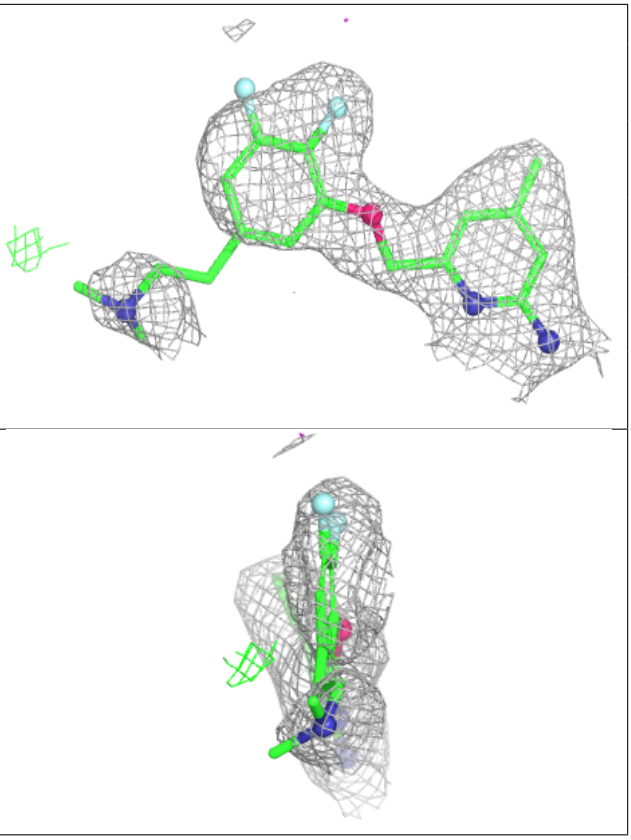


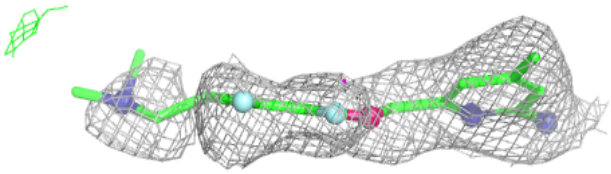




Electron density around A1CN2 D 802:

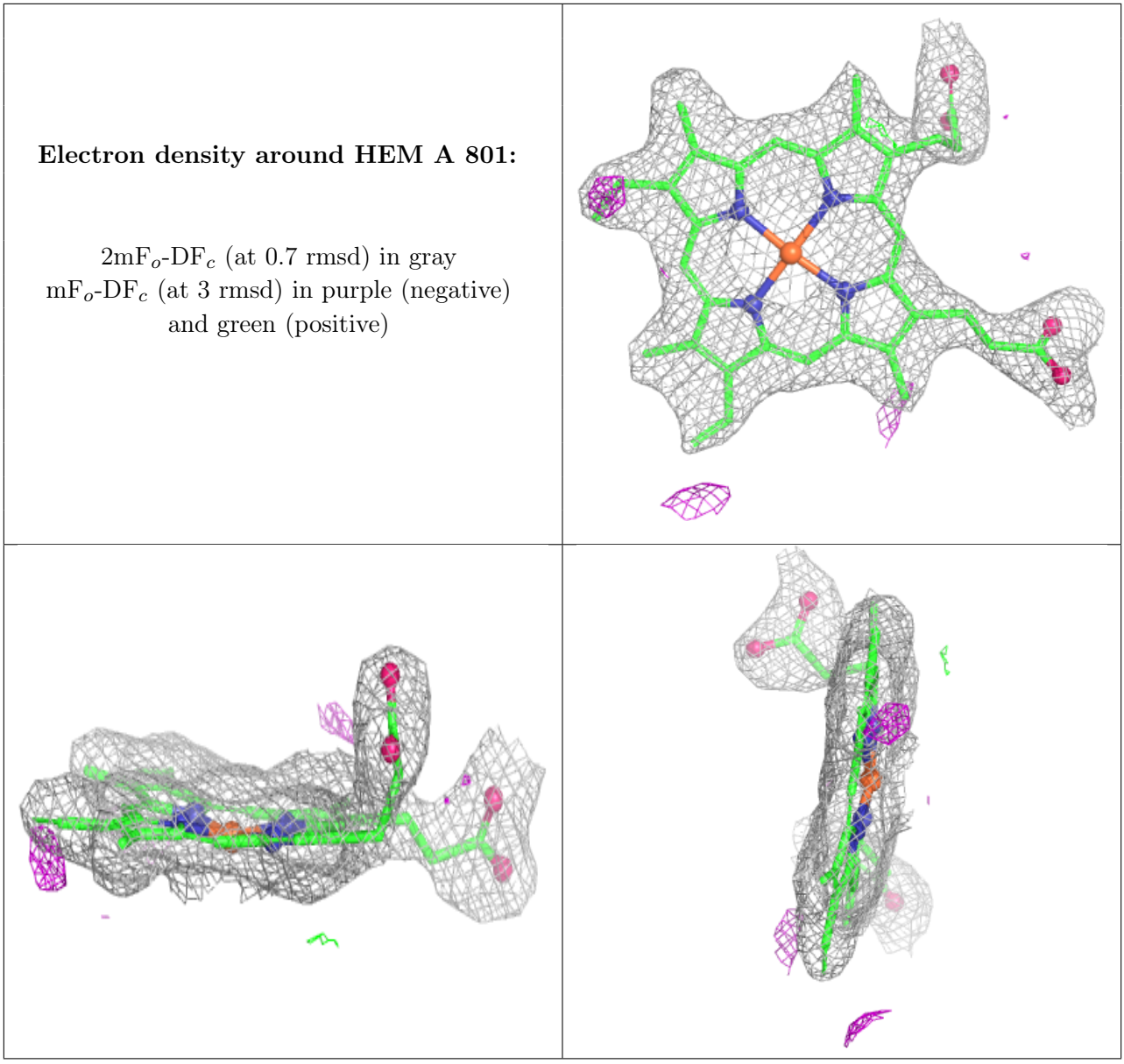
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)





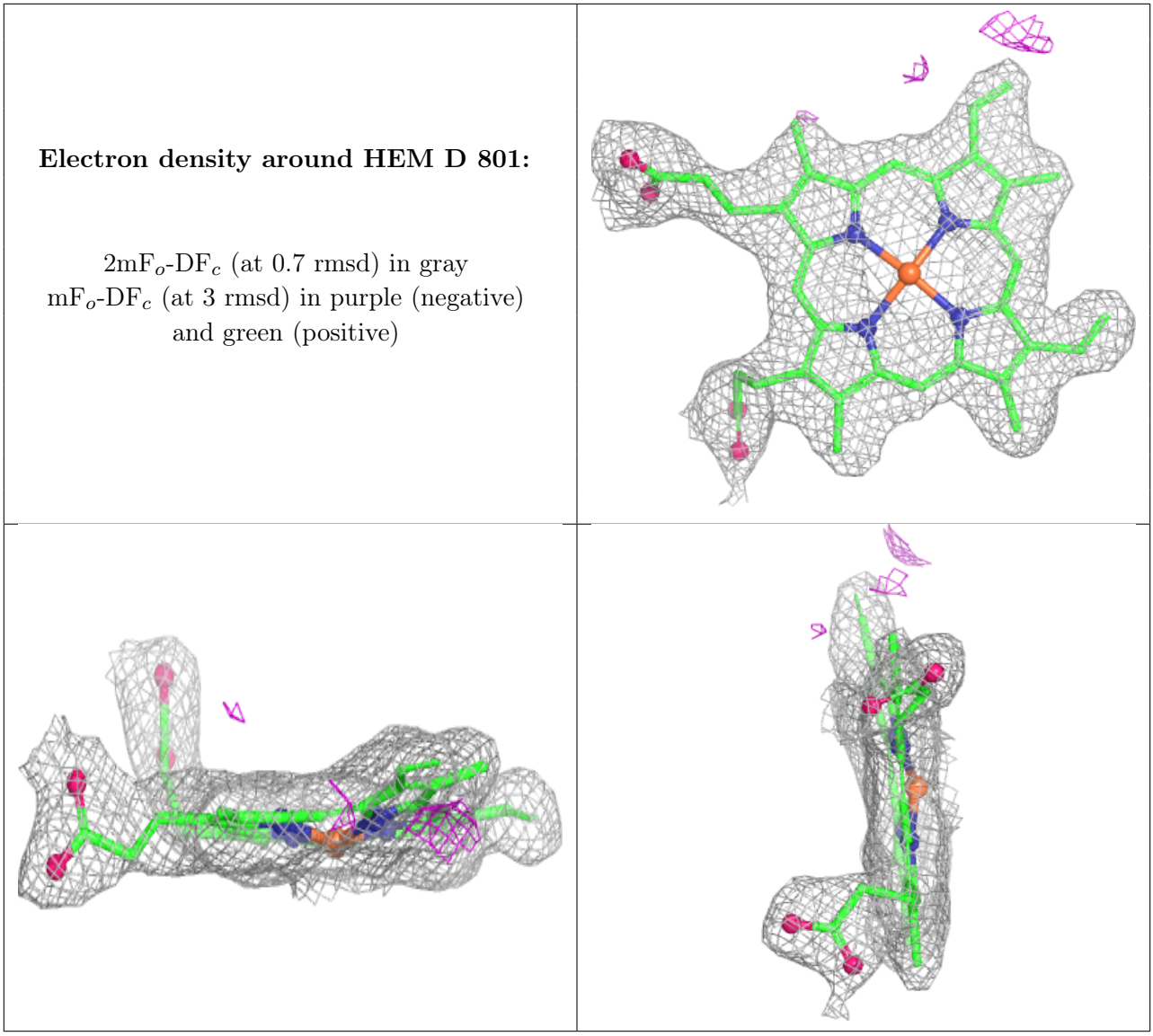
Electron density around HEM A 801:

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



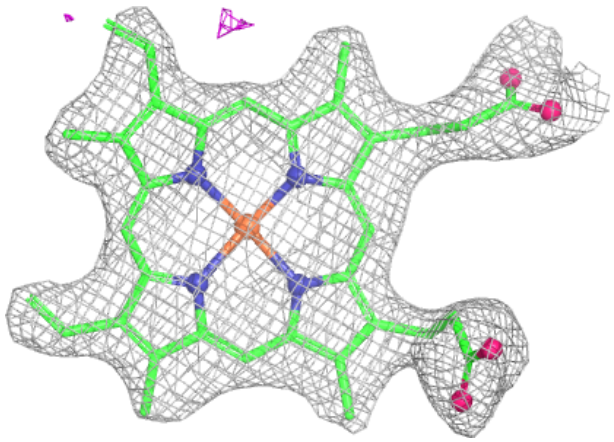
Electron density around HEM D 801:

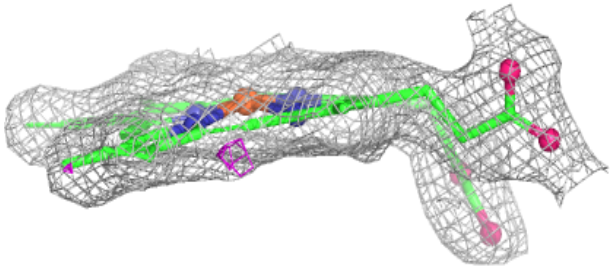
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

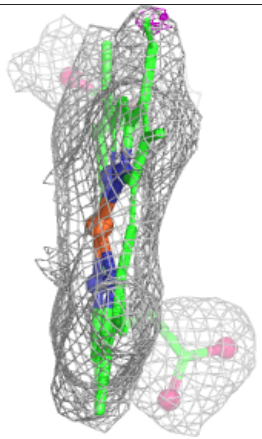


Electron density around HEM B 801:

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

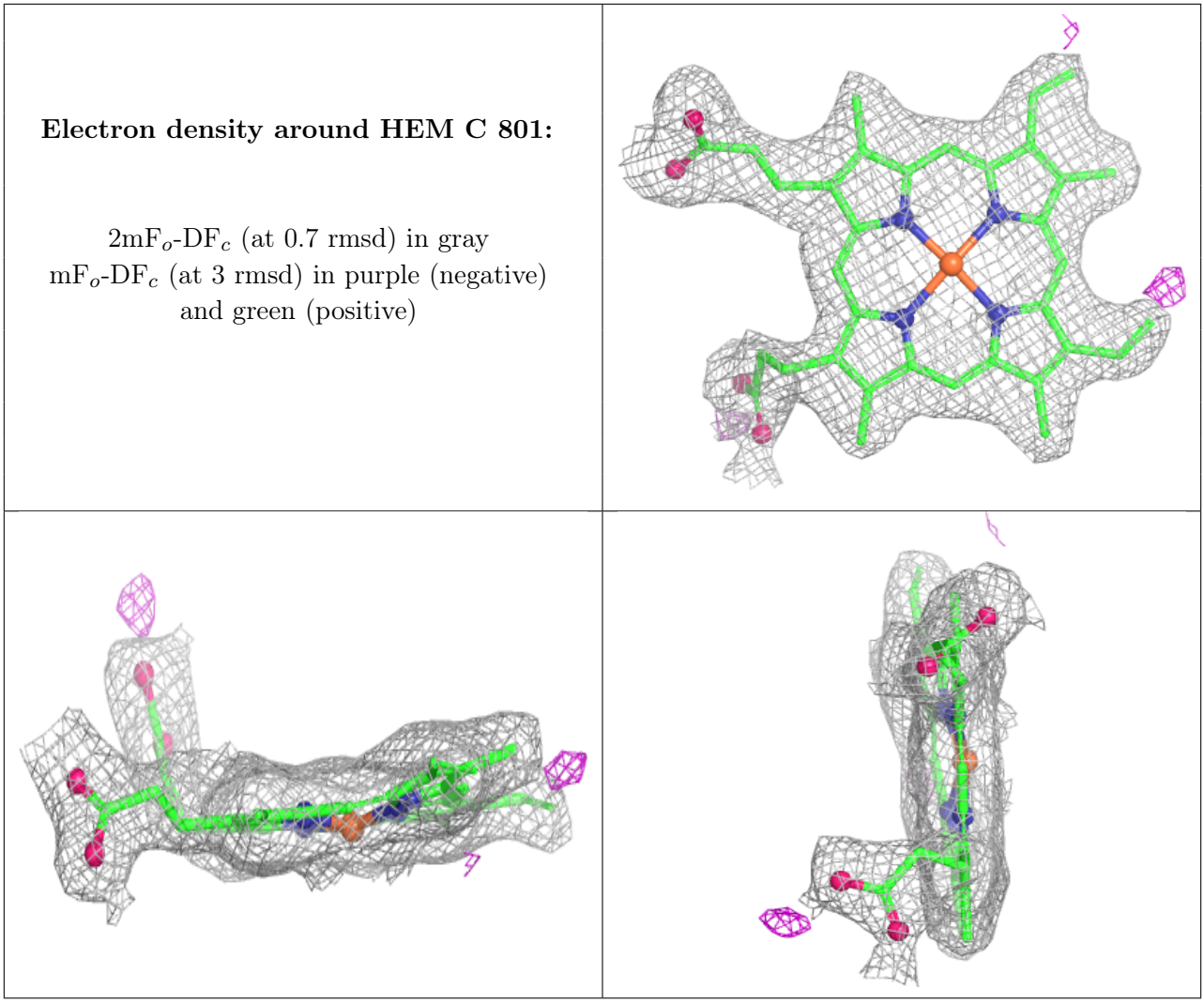






Electron density around HEM C 801:

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



6.5 Other polymers

There are no such residues in this entry.