



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 10, 2026 – 04:59 PM UTC

PDB ID : 3GW9 / pdb_00003gw9
Title : Crystal structure of sterol 14-alpha demethylase (CYP51) from Trypanosoma brucei bound to an inhibitor N-(1-(2,4-dichlorophenyl)-2-(1H-imidazol-1-yl)ethyl)-4-(5-phenyl-1,3,4-oxaziazol-2-yl)benzamide
Authors : Lepesheva, G.I.; Hargrove, T.Y.; Harp, J.; Wawrzak, Z.; Waterman, M.R.
Deposited on : 2009-03-31
Resolution : 1.87 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 Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

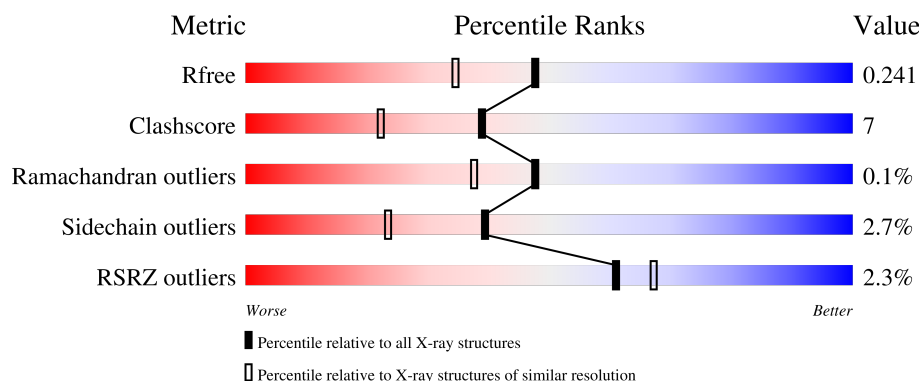
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.87 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}	180053	1220 (1.88-1.88)
Clashscore	190562	1234 (1.88-1.88)
Ramachandran outliers	187476	1222 (1.88-1.88)
Sidechain outliers	187428	1222 (1.88-1.88)
RSRZ outliers	180081	1220 (1.88-1.88)

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 $\leq 5\%$. 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	450	2% 83% 17%
1	B	450	2% 87% 12%
1	C	450	2% 87% 12%
1	D	450	4% 83% 15%

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 15276 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 STEROL 14ALPHA-DEMETHYLASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	450	Total	C	N	O	S	0	0	0
			3575	2283	625	640	27			
1	B	449	Total	C	N	O	S	0	0	0
			3566	2277	623	639	27			
1	C	449	Total	C	N	O	S	0	0	0
			3566	2277	623	639	27			
1	D	449	Total	C	N	O	S	0	0	0
			3566	2277	623	639	27			

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	28	LYS	ARG	engineered mutation	UNP Q385E8
A	29	GLY	PRO	engineered mutation	UNP Q385E8
A	30	LYS	THR	engineered mutation	UNP Q385E8
A	31	LEU	ASP	engineered mutation	UNP Q385E8
B	28	LYS	ARG	engineered mutation	UNP Q385E8
B	29	GLY	PRO	engineered mutation	UNP Q385E8
B	30	LYS	THR	engineered mutation	UNP Q385E8
B	31	LEU	ASP	engineered mutation	UNP Q385E8
C	28	LYS	ARG	engineered mutation	UNP Q385E8
C	29	GLY	PRO	engineered mutation	UNP Q385E8
C	30	LYS	THR	engineered mutation	UNP Q385E8
C	31	LEU	ASP	engineered mutation	UNP Q385E8
D	28	LYS	ARG	engineered mutation	UNP Q385E8
D	29	GLY	PRO	engineered mutation	UNP Q385E8
D	30	LYS	THR	engineered mutation	UNP Q385E8
D	31	LEU	ASP	engineered mutation	UNP Q385E8

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

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	Cl	N	O	0	0
			35	26	2	5	2		
3	B	1	Total	C	Cl	N	O	0	0
			35	26	2	5	2		
3	C	1	Total	C	Cl	N	O	0	0
			35	26	2	5	2		
3	D	1	Total	C	Cl	N	O	0	0
			35	26	2	5	2		

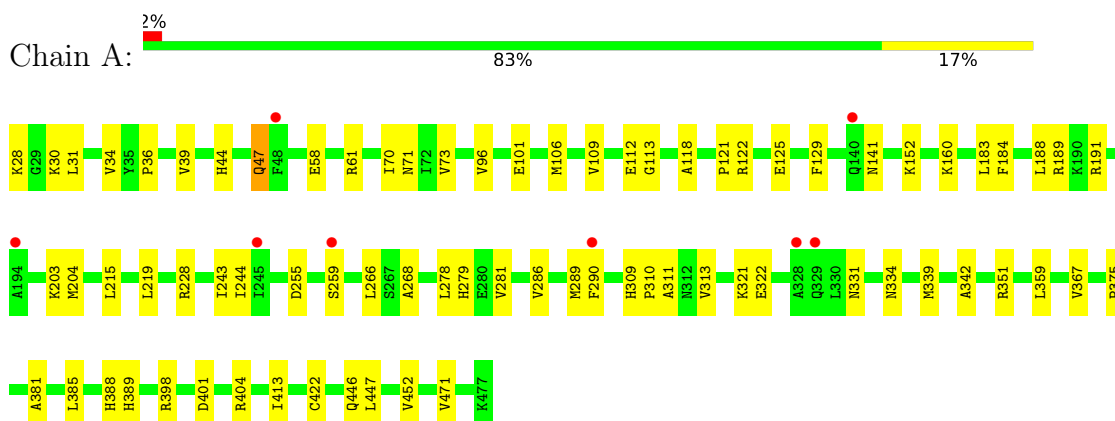
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	149	Total	O	0	0
			149	149		
4	B	195	Total	O	0	0
			195	195		
4	C	219	Total	O	0	0
			219	219		
4	D	128	Total	O	0	0
			128	128		

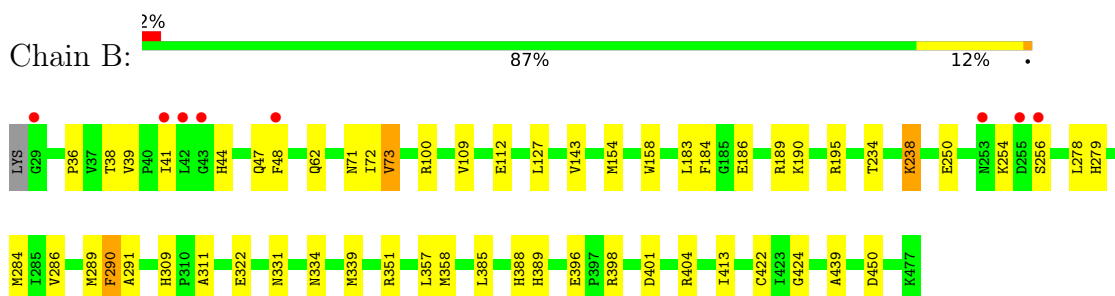
3 Residue-property plots [i](#)

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.

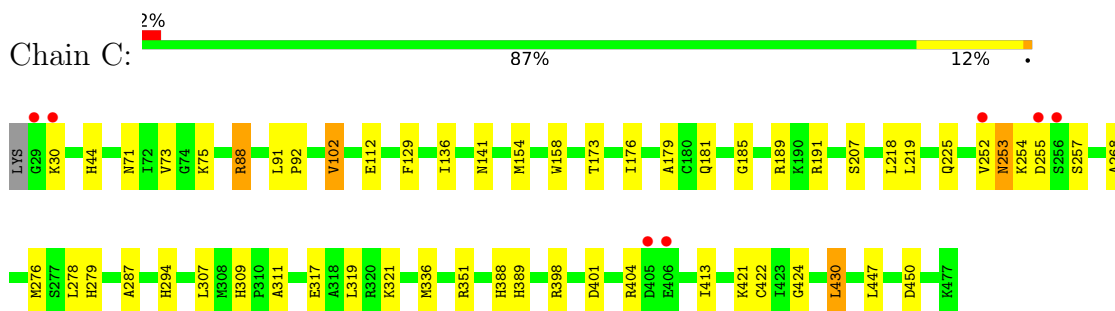
• Molecule 1: STEROL 14ALPHA-DEMETHYLASE



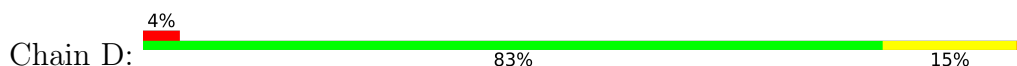
• Molecule 1: STEROL 14ALPHA-DEMETHYLASE

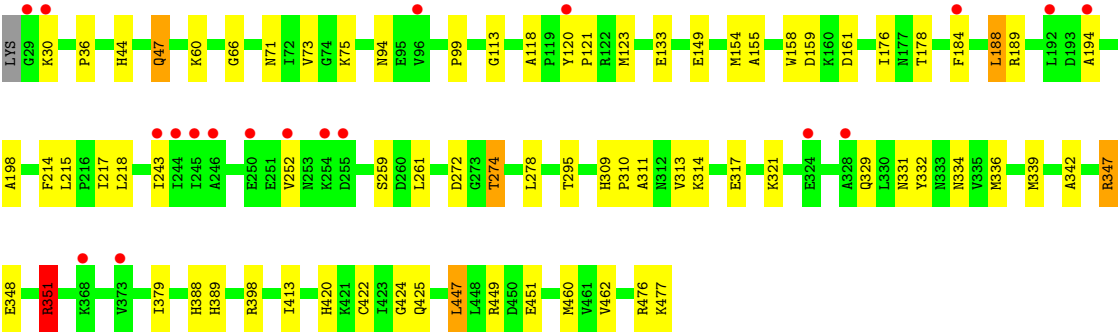


• Molecule 1: STEROL 14ALPHA-DEMETHYLASE



• Molecule 1: STEROL 14ALPHA-DEMETHYLASE





4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	60.08Å 79.11Å 116.00Å 74.74° 79.13° 68.57°	Depositor
Resolution (Å)	37.48 – 1.87 37.48 – 1.87	Depositor EDS
% Data completeness (in resolution range)	97.0 (37.48-1.87) 96.9 (37.48-1.87)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.72 (at 1.87Å)	Xtriage
Refinement program	REFMAC 5.5.0070	Depositor
R, R_{free}	0.189 , 0.238 0.193 , 0.241	Depositor DCC
R_{free} test set	7635 reflections (4.87%)	wwPDB-VP
Wilson B-factor (Å ²)	30.7	Xtriage
Anisotropy	0.288	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 44.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	15276	wwPDB-VP
Average B, all atoms (Å ²)	35.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.65% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ 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: VNI, HEM

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\# Z > 5$	RMSZ	$\# Z > 5$
1	A	1.00	3/3657 (0.1%)	0.98	1/4944 (0.0%)
1	B	0.98	1/3648 (0.0%)	0.98	0/4933
1	C	1.09	3/3648 (0.1%)	1.00	0/4933
1	D	0.91	3/3648 (0.1%)	0.94	3/4933 (0.1%)
All	All	0.99	10/14601 (0.1%)	0.98	4/19743 (0.0%)

All (10) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	351	ARG	C-O	-7.61	1.15	1.24
1	D	347	ARG	C-O	-7.35	1.15	1.24
1	A	106	MET	N-CA	6.19	1.54	1.46
1	A	351	ARG	C-O	-5.83	1.17	1.24
1	C	287	ALA	CA-CB	-5.58	1.44	1.53
1	C	179	ALA	CA-CB	5.33	1.61	1.53
1	A	281	VAL	CA-CB	5.20	1.60	1.54
1	B	143	VAL	CA-CB	-5.09	1.51	1.54
1	D	295	THR	C-O	-5.04	1.18	1.24
1	C	430	LEU	N-CA	5.03	1.52	1.46

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	252	VAL	N-CA-C	-6.67	105.22	111.48
1	A	39	VAL	N-CA-C	5.79	113.28	107.55
1	D	184	PHE	N-CA-C	5.75	118.49	108.76
1	D	462	VAL	N-CA-C	5.27	116.17	108.58

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	3575	0	3620	46	0
1	B	3566	0	3607	44	0
1	C	3566	0	3607	45	0
1	D	3566	0	3607	57	0
2	A	43	0	30	4	0
2	B	43	0	30	5	0
2	C	43	0	30	7	0
2	D	43	0	30	9	0
3	A	35	0	19	1	0
3	B	35	0	19	2	0
3	C	35	0	19	0	0
3	D	35	0	19	1	0
4	A	149	0	0	2	0
4	B	195	0	0	1	0
4	C	219	0	0	5	0
4	D	128	0	0	1	0
All	All	15276	0	14637	198	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 (198) 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)
2:D:480:HEM:HMC2	2:D:480:HEM:HBC2	1.38	1.04
1:B:183:LEU:HD12	1:B:289:MET:HE1	1.56	0.87
1:A:389:HIS:HE1	1:A:398:ARG:HH11	1.22	0.87
1:A:183:LEU:HD12	1:A:289:MET:HE1	1.59	0.85
1:C:388:HIS:HE1	1:C:413:ILE:H	1.28	0.81
1:C:268:ALA:HB3	1:C:276:MET:HE3	1.63	0.80
1:A:34:VAL:H	1:C:141:ASN:HD21	1.31	0.79
2:D:480:HEM:HBC2	2:D:480:HEM:CMC	2.11	0.78
1:A:389:HIS:CE1	1:A:398:ARG:HH11	2.02	0.78
1:B:44:HIS:HD2	1:B:71:ASN:H	1.31	0.78
1:D:75:LYS:HG2	1:D:379:ILE:HD12	1.68	0.75

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:480:HEM:HBC2	2:A:480:HEM:HMC2	1.68	0.75
1:B:388:HIS:HE1	1:B:413:ILE:H	1.32	0.74
1:A:47:GLN:HE21	1:A:47:GLN:H	1.36	0.73
2:C:480:HEM:HMC2	2:C:480:HEM:HBC2	1.70	0.73
1:D:449:ARG:HD3	1:D:451:GLU:O	1.90	0.71
1:D:347:ARG:HH22	1:D:425:GLN:NE2	1.89	0.70
1:D:388:HIS:HE1	1:D:413:ILE:H	1.40	0.70
1:D:389:HIS:CE1	1:D:398:ARG:HH11	2.09	0.70
1:D:44:HIS:HD2	1:D:71:ASN:H	1.39	0.70
1:A:388:HIS:HE1	1:A:413:ILE:H	1.37	0.69
1:A:191:ARG:HD2	1:A:243:ILE:CD1	2.22	0.69
1:B:389:HIS:CE1	1:B:398:ARG:HH11	2.14	0.66
1:D:310:PRO:O	1:D:313:VAL:HG13	1.96	0.65
2:A:480:HEM:HBC2	2:A:480:HEM:CMC	2.26	0.65
2:D:480:HEM:CMB	2:D:480:HEM:HBB2	2.26	0.65
2:D:480:HEM:HBB2	2:D:480:HEM:HMB2	1.78	0.65
1:B:389:HIS:HE1	1:B:398:ARG:HH11	1.45	0.64
1:C:44:HIS:HD2	1:C:71:ASN:H	1.46	0.64
1:C:102:VAL:HG13	4:C:628:HOH:O	1.95	0.64
1:C:253:ASN:HB3	1:C:255:ASP:O	1.98	0.64
2:C:480:HEM:HBC2	2:C:480:HEM:CMC	2.28	0.63
1:D:389:HIS:HE1	1:D:398:ARG:HD2	1.64	0.63
1:C:336:MET:HE1	1:C:430:LEU:CD1	2.29	0.62
1:B:154:MET:HE2	1:B:158:TRP:CZ3	2.35	0.62
1:D:389:HIS:HE1	1:D:398:ARG:HH11	1.46	0.62
1:B:186:GLU:OE2	1:B:189:ARG:NH2	2.33	0.62
1:A:191:ARG:HD2	1:A:243:ILE:HD11	1.82	0.61
1:D:176:ILE:HD13	1:D:198:ALA:HB2	1.82	0.61
1:A:331:ASN:H	1:A:334:ASN:HD22	1.48	0.61
1:A:401:ASP:O	1:A:404:ARG:HG2	2.00	0.61
1:C:309:HIS:CD2	1:C:311:ALA:H	2.20	0.60
1:A:58:GLU:OE1	1:A:61:ARG:NH1	2.35	0.59
1:A:30:LYS:NZ	1:C:185:GLY:HA2	2.18	0.58
1:D:347:ARG:HH22	1:D:425:GLN:HE21	1.50	0.58
1:C:389:HIS:CE1	1:C:398:ARG:HH11	2.21	0.58
1:D:94:ASN:ND2	1:D:123:MET:HE1	2.19	0.58
1:A:36:PRO:O	1:A:44:HIS:HE1	1.87	0.57
1:B:127:LEU:HD23	1:B:284:MET:HE1	1.87	0.57
1:B:385:LEU:O	1:B:389:HIS:HD2	1.89	0.56
1:B:184:PHE:CZ	1:B:289:MET:HE3	2.41	0.56
1:A:309:HIS:HD2	1:A:311:ALA:H	1.52	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:36:PRO:O	1:D:44:HIS:HE1	1.89	0.56
1:D:447:LEU:HD22	1:D:449:ARG:HG3	1.88	0.56
1:D:215:LEU:HD23	1:D:218:LEU:HD11	1.89	0.55
1:D:331:ASN:H	1:D:334:ASN:HD22	1.53	0.55
1:D:313:VAL:HG11	4:D:502:HOH:O	2.06	0.55
1:D:133:GLU:HG3	1:D:261:LEU:HD12	1.89	0.55
1:C:207:SER:O	1:C:225:GLN:HB3	2.07	0.55
1:C:424:GLY:HA3	2:C:480:HEM:C3C	2.41	0.55
1:C:112:GLU:O	1:C:279:HIS:HE1	1.89	0.54
1:C:389:HIS:HE1	1:C:398:ARG:HD2	1.72	0.54
1:A:31:LEU:HD22	1:A:375:PRO:HD3	1.90	0.54
1:D:460:MET:HG2	3:D:490:VNI:H17	1.90	0.54
1:D:339:MET:HE2	1:D:342:ALA:CB	2.37	0.54
1:B:48:PHE:CE2	3:B:490:VNI:H24	2.43	0.53
1:D:347:ARG:NH2	1:D:425:GLN:HE21	2.06	0.53
1:A:122:ARG:NH2	4:A:602:HOH:O	2.41	0.53
1:D:309:HIS:CD2	1:D:311:ALA:H	2.26	0.53
1:D:309:HIS:HD2	1:D:311:ALA:H	1.56	0.53
1:D:154:MET:HE2	1:D:158:TRP:CZ3	2.44	0.53
1:D:339:MET:HE2	1:D:342:ALA:HB3	1.90	0.53
1:B:62:GLN:HE21	1:D:161:ASP:H	1.55	0.53
1:C:351:ARG:HA	1:C:388:HIS:CD2	2.43	0.53
1:B:109:VAL:CG1	1:B:286:VAL:HG11	2.39	0.52
1:A:44:HIS:HD2	1:A:71:ASN:H	1.56	0.52
1:C:401:ASP:O	1:C:404:ARG:HG2	2.10	0.52
1:D:348:GLU:OE1	1:D:351:ARG:HD3	2.10	0.52
1:A:422:CYS:HA	2:A:480:HEM:CHA	2.39	0.52
1:B:36:PRO:O	1:B:44:HIS:HE1	1.92	0.52
1:C:389:HIS:HE1	1:C:398:ARG:HH11	1.57	0.52
1:D:214:PHE:CE2	1:D:379:ILE:HD13	2.45	0.52
1:B:250:GLU:HB3	1:B:256:SER:HB3	1.91	0.52
1:C:91:LEU:N	1:C:92:PRO:CD	2.73	0.52
1:A:109:VAL:HG13	1:A:286:VAL:HG11	1.91	0.52
1:A:183:LEU:CD1	1:A:289:MET:HE1	2.37	0.51
1:A:47:GLN:H	1:A:47:GLN:NE2	2.05	0.51
1:C:252:VAL:HG23	1:C:252:VAL:O	2.11	0.51
1:D:73:VAL:HG12	1:D:73:VAL:O	2.10	0.51
1:D:176:ILE:CD1	1:D:198:ALA:HB2	2.40	0.51
1:B:109:VAL:HG13	1:B:286:VAL:HG11	1.92	0.51
1:B:422:CYS:HA	2:B:480:HEM:CHA	2.41	0.51
1:A:446:GLN:O	1:A:471:VAL:HG13	2.10	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:424:GLY:HA3	2:B:480:HEM:C3C	2.46	0.51
1:B:286:VAL:O	1:B:290:PHE:HB2	2.09	0.50
1:D:189:ARG:NH2	1:D:194:ALA:HB2	2.26	0.50
1:B:234:THR:O	1:B:238:LYS:HD3	2.12	0.50
1:A:309:HIS:CD2	1:A:311:ALA:H	2.29	0.50
1:C:422:CYS:HB2	2:C:480:HEM:NA	2.27	0.50
1:C:309:HIS:HE1	1:C:450:ASP:O	1.94	0.50
1:B:331:ASN:H	1:B:334:ASN:HD22	1.59	0.50
1:A:244:ILE:HG12	1:A:266:LEU:HD11	1.93	0.49
1:A:101:GLU:HG3	4:A:657:HOH:O	2.11	0.49
1:A:331:ASN:H	1:A:334:ASN:ND2	2.09	0.49
1:B:183:LEU:CD1	1:B:289:MET:HE1	2.35	0.48
1:D:120:TYR:HB2	1:D:121:PRO:HD3	1.95	0.48
1:B:62:GLN:NE2	1:D:161:ASP:H	2.10	0.48
1:D:388:HIS:CE1	1:D:413:ILE:H	2.25	0.48
2:D:480:HEM:HMB2	2:D:480:HEM:CBB	2.42	0.48
1:B:39:VAL:HG23	1:B:39:VAL:O	2.13	0.48
1:C:351:ARG:O	1:C:388:HIS:CD2	2.67	0.48
1:A:30:LYS:HE2	1:C:181:GLN:O	2.14	0.48
1:B:72:ILE:HG22	1:B:73:VAL:HG23	1.96	0.48
1:D:215:LEU:HD23	1:D:218:LEU:CD1	2.44	0.48
1:D:272:ASP:CB	1:D:274:THR:OG1	2.61	0.48
2:B:480:HEM:HBC2	2:B:480:HEM:HMC2	1.96	0.48
1:C:73:VAL:HG12	1:C:73:VAL:O	2.14	0.48
1:A:310:PRO:O	1:A:313:VAL:HG13	2.13	0.48
1:C:279:HIS:HD2	4:C:550:HOH:O	1.97	0.47
1:C:421:LYS:HD3	4:C:25:HOH:O	2.14	0.47
1:B:357:LEU:HD22	1:B:385:LEU:HD22	1.97	0.47
1:D:272:ASP:HB3	1:D:274:THR:OG1	2.13	0.47
1:C:191:ARG:NH2	4:C:537:HOH:O	2.47	0.47
1:D:389:HIS:CE1	1:D:398:ARG:HD2	2.48	0.47
1:D:424:GLY:HA3	2:D:480:HEM:C3C	2.50	0.46
1:B:154:MET:HE1	1:B:439:ALA:HB2	1.96	0.46
1:D:424:GLY:HA3	2:D:480:HEM:C2C	2.50	0.46
1:C:268:ALA:HB3	1:C:276:MET:CE	2.41	0.46
1:D:60:LYS:HD3	1:D:66:GLY:HA2	1.97	0.46
1:D:476:ARG:O	1:D:477:LYS:C	2.58	0.46
1:C:173:THR:O	1:C:176:ILE:HG22	2.16	0.46
1:C:336:MET:HE1	1:C:430:LEU:HD11	1.97	0.46
1:B:331:ASN:H	1:B:334:ASN:ND2	2.15	0.45
2:C:480:HEM:HMC2	2:C:480:HEM:CBC	2.44	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:314:LYS:HA	1:D:317:GLU:HG2	1.97	0.45
1:C:422:CYS:HA	2:C:480:HEM:CHA	2.46	0.45
1:C:336:MET:HE2	1:C:336:MET:HB2	1.72	0.45
1:A:112:GLU:O	1:A:279:HIS:HE1	1.99	0.45
1:D:47:GLN:HE21	1:D:47:GLN:H	1.65	0.45
1:A:47:GLN:HE21	1:A:47:GLN:N	2.11	0.45
1:A:129:PHE:CE2	1:A:268:ALA:HB1	2.52	0.44
1:A:322:GLU:CD	1:A:339:MET:HA	2.42	0.44
1:C:336:MET:HE1	1:C:430:LEU:HD13	1.98	0.44
1:A:34:VAL:H	1:C:141:ASN:ND2	2.07	0.44
1:A:121:PRO:O	1:A:125:GLU:HG3	2.17	0.44
1:B:44:HIS:CD2	1:B:71:ASN:H	2.22	0.44
1:A:113:GLY:O	1:A:118:ALA:HB2	2.18	0.44
1:B:401:ASP:O	1:B:404:ARG:HG2	2.17	0.44
1:C:218:LEU:HD21	1:D:218:LEU:HD11	1.99	0.44
1:B:238:LYS:CD	1:B:238:LYS:N	2.81	0.44
1:C:154:MET:HE2	1:C:158:TRP:CZ3	2.52	0.44
1:D:331:ASN:H	1:D:334:ASN:ND2	2.15	0.44
1:D:422:CYS:HA	2:D:480:HEM:CHA	2.48	0.43
1:B:309:HIS:HE1	1:B:450:ASP:O	2.01	0.43
1:D:94:ASN:HD21	1:D:123:MET:HE1	1.83	0.43
1:B:112:GLU:O	1:B:279:HIS:HE1	2.01	0.43
1:B:250:GLU:O	1:B:254:LYS:N	2.49	0.43
1:B:358:MET:HE3	1:B:358:MET:HB3	1.97	0.43
1:A:96:VAL:CG1	1:A:367:VAL:CG1	2.97	0.43
1:A:385:LEU:O	1:A:389:HIS:HD2	2.01	0.43
1:B:100:ARG:HD2	4:B:514:HOH:O	2.18	0.43
1:C:88:ARG:HA	1:C:88:ARG:HD2	1.83	0.43
1:D:113:GLY:O	1:D:118:ALA:HB2	2.19	0.43
2:D:480:HEM:CMC	2:D:480:HEM:CBC	2.91	0.42
1:A:339:MET:HE2	1:A:342:ALA:CB	2.50	0.42
1:B:322:GLU:CD	1:B:339:MET:HA	2.43	0.42
1:B:351:ARG:HA	1:B:388:HIS:CD2	2.54	0.42
1:B:309:HIS:CD2	1:B:311:ALA:H	2.38	0.42
1:C:254:LYS:O	1:C:257:SER:OG	2.30	0.42
1:A:109:VAL:HG22	1:A:204:MET:HB3	2.01	0.42
1:C:44:HIS:HD2	1:C:71:ASN:N	2.14	0.42
1:D:347:ARG:NH2	1:D:425:GLN:NE2	2.61	0.42
1:A:422:CYS:HA	2:A:480:HEM:C4D	2.55	0.42
1:D:36:PRO:O	1:D:44:HIS:CE1	2.72	0.42
1:D:332:TYR:CE1	1:D:336:MET:HG3	2.55	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:389:HIS:CE1	1:C:398:ARG:HD2	2.54	0.41
2:C:480:HEM:CMB	2:C:480:HEM:HBB2	2.49	0.41
1:C:294:HIS:HB2	4:C:554:HOH:O	2.20	0.41
1:A:70:ILE:HD13	1:A:70:ILE:HG21	1.85	0.41
1:B:291:ALA:HB1	3:B:490:VNI:C5	2.50	0.41
1:B:422:CYS:HA	2:B:480:HEM:C4D	2.54	0.41
1:A:290:PHE:HB3	3:A:490:VNI:CL2	2.57	0.41
1:B:309:HIS:HD2	1:B:311:ALA:H	1.69	0.41
1:C:307:LEU:HD13	1:C:319:LEU:HD22	2.03	0.41
1:C:309:HIS:HD2	1:C:311:ALA:H	1.66	0.41
1:D:149:GLU:HB2	1:D:178:THR:HG22	2.03	0.41
1:B:186:GLU:HG2	1:B:190:LYS:HE2	2.02	0.41
1:D:99:PRO:HG3	1:D:420:HIS:CE1	2.55	0.41
1:D:188:LEU:HD13	1:D:243:ILE:HD13	2.03	0.41
1:D:94:ASN:OD1	1:D:420:HIS:NE2	2.54	0.41
1:D:155:ALA:O	1:D:159:ASP:HB3	2.21	0.41
1:A:184:PHE:CD2	1:A:188:LEU:HD23	2.57	0.40
1:A:359:LEU:O	1:A:381:ALA:HA	2.21	0.40
1:C:181:GLN:OE1	1:C:189:ARG:NH1	2.55	0.40
1:A:203:LYS:HE3	1:A:228:ARG:HG2	2.02	0.40
1:B:424:GLY:HA3	2:B:480:HEM:C2C	2.56	0.40
1:C:129:PHE:CD1	1:C:276:MET:HE2	2.56	0.40
1:A:184:PHE:O	1:A:189:ARG:NH1	2.43	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	448/450 (100%)	436 (97%)	12 (3%)	0	100	100
1	B	447/450 (99%)	432 (97%)	14 (3%)	1 (0%)	43	34

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	C	447/450 (99%)	435 (97%)	11 (2%)	1 (0%)	43	34
1	D	447/450 (99%)	438 (98%)	9 (2%)	0	100	100
All	All	1789/1800 (99%)	1741 (97%)	46 (3%)	2 (0%)	48	37

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	253	ASN
1	B	41	ILE

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 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	392/392 (100%)	378 (96%)	14 (4%)	31	14
1	B	391/392 (100%)	383 (98%)	8 (2%)	48	33
1	C	391/392 (100%)	381 (97%)	10 (3%)	40	24
1	D	391/392 (100%)	380 (97%)	11 (3%)	38	22
All	All	1565/1568 (100%)	1522 (97%)	43 (3%)	39	23

All (43) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	28	LYS
1	A	47	GLN
1	A	73	VAL
1	A	141	ASN
1	A	152	LYS
1	A	160	LYS
1	A	215	LEU
1	A	219	LEU
1	A	255	ASP
1	A	259	SER

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Mol	Chain	Res	Type
1	A	278	LEU
1	A	321	LYS
1	A	447	LEU
1	A	452	VAL
1	B	38	THR
1	B	47	GLN
1	B	73	VAL
1	B	195	ARG
1	B	238	LYS
1	B	278	LEU
1	B	290	PHE
1	B	396	GLU
1	C	30	LYS
1	C	75	LYS
1	C	88	ARG
1	C	102	VAL
1	C	136	ILE
1	C	219	LEU
1	C	278	LEU
1	C	317	GLU
1	C	321	LYS
1	C	447	LEU
1	D	30	LYS
1	D	47	GLN
1	D	188	LEU
1	D	217	ILE
1	D	259	SER
1	D	274	THR
1	D	278	LEU
1	D	321	LYS
1	D	329	GLN
1	D	351	ARG
1	D	447	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (39) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	44	HIS
1	A	47	GLN
1	A	181	GLN
1	A	294	HIS
1	A	309	HIS

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Mol	Chain	Res	Type
1	A	312	ASN
1	A	334	ASN
1	A	388	HIS
1	A	389	HIS
1	A	446	GLN
1	B	44	HIS
1	B	47	GLN
1	B	62	GLN
1	B	94	ASN
1	B	279	HIS
1	B	309	HIS
1	B	334	ASN
1	B	388	HIS
1	B	389	HIS
1	C	44	HIS
1	C	47	GLN
1	C	141	ASN
1	C	279	HIS
1	C	309	HIS
1	C	329	GLN
1	C	333	ASN
1	C	334	ASN
1	C	388	HIS
1	C	389	HIS
1	D	44	HIS
1	D	47	GLN
1	D	279	HIS
1	D	309	HIS
1	D	333	ASN
1	D	334	ASN
1	D	388	HIS
1	D	389	HIS
1	D	425	GLN
1	D	446	GLN

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 [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

8 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
3	VNI	A	490	2	39,39,39	1.66	6 (15%)	53,54,54	1.98	11 (20%)
3	VNI	C	490	2	39,39,39	1.70	9 (23%)	53,54,54	2.13	17 (32%)
2	HEM	B	480	1,3	50,50,50	1.70	13 (26%)	67,82,82	1.54	9 (13%)
2	HEM	C	480	1,3	50,50,50	1.70	15 (30%)	67,82,82	1.56	12 (17%)
2	HEM	A	480	1,3	50,50,50	1.88	13 (26%)	67,82,82	1.74	16 (23%)
2	HEM	D	480	1,3	50,50,50	2.10	16 (32%)	67,82,82	1.40	12 (17%)
3	VNI	B	490	2	39,39,39	1.65	5 (12%)	53,54,54	2.02	9 (16%)
3	VNI	D	490	2	39,39,39	1.56	6 (15%)	53,54,54	1.94	10 (18%)

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
3	VNI	A	490	2	-	5/24/24/24	0/5/5/5
3	VNI	C	490	2	-	2/24/24/24	0/5/5/5
2	HEM	B	480	1,3	-	0/14/54/54	-
2	HEM	C	480	1,3	-	0/14/54/54	-
2	HEM	A	480	1,3	-	0/14/54/54	-
2	HEM	D	480	1,3	-	2/14/54/54	-
3	VNI	B	490	2	-	3/24/24/24	0/5/5/5
3	VNI	D	490	2	-	2/24/24/24	0/5/5/5

All (83) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	480	HEM	C3D-C2D	6.40	1.50	1.36
2	A	480	HEM	C3D-C2D	6.36	1.50	1.36
2	D	480	HEM	C3D-C2D	5.73	1.49	1.36
2	C	480	HEM	C3D-C2D	5.66	1.49	1.36
3	B	490	VNI	C20-N5	5.35	1.37	1.29
3	A	490	VNI	C19-N4	4.61	1.36	1.29
3	D	490	VNI	C19-N4	4.46	1.36	1.29
2	D	480	HEM	FE-NB	-4.46	1.81	1.94
3	C	490	VNI	C21-C20	-4.43	1.38	1.47
3	C	490	VNI	C16-C19	-4.39	1.38	1.47
3	B	490	VNI	C19-N4	4.37	1.35	1.29
3	A	490	VNI	C20-N5	4.28	1.35	1.29
2	D	480	HEM	C4A-NA	-4.10	1.31	1.39
2	D	480	HEM	C4C-NC	-4.07	1.32	1.39
2	A	480	HEM	CMC-C2C	3.98	1.58	1.50
3	D	490	VNI	C16-C19	-3.93	1.39	1.47
3	A	490	VNI	C7-C2	-3.81	1.46	1.52
3	D	490	VNI	C20-N5	3.80	1.35	1.29
3	B	490	VNI	C16-C19	-3.74	1.39	1.47
2	D	480	HEM	C1C-NC	-3.72	1.32	1.39
3	B	490	VNI	C21-C20	-3.64	1.40	1.47
2	B	480	HEM	CMC-C2C	3.62	1.58	1.50
2	A	480	HEM	CMD-C2D	3.50	1.58	1.50
3	A	490	VNI	C21-C20	-3.50	1.40	1.47
3	A	490	VNI	C16-C19	-3.49	1.40	1.47
3	D	490	VNI	C21-C20	-3.43	1.40	1.47
2	D	480	HEM	C3B-C2B	-3.38	1.30	1.37
2	C	480	HEM	C4C-NC	-3.31	1.33	1.39
2	A	480	HEM	CAC-C3C	3.25	1.56	1.47
3	D	490	VNI	C7-C2	-3.25	1.47	1.52
3	C	490	VNI	C20-N5	3.24	1.34	1.29
2	D	480	HEM	C3C-C2C	-3.19	1.30	1.37
2	D	480	HEM	C2A-C3A	-3.15	1.30	1.38
3	B	490	VNI	C7-C2	-3.09	1.47	1.52
3	C	490	VNI	C19-N4	2.96	1.33	1.29
2	D	480	HEM	C1A-NA	-2.95	1.34	1.39
2	D	480	HEM	O2D-CGD	-2.92	1.21	1.30
2	C	480	HEM	CMC-C2C	2.85	1.56	1.50
2	A	480	HEM	CMA-C3A	2.83	1.56	1.50
2	B	480	HEM	C4C-NC	-2.76	1.34	1.39
2	A	480	HEM	FE-NA	2.72	2.04	1.95
2	A	480	HEM	C2A-C3A	-2.67	1.31	1.38

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	480	HEM	CHA-C1A	-2.64	1.33	1.39
2	C	480	HEM	CMB-C2B	2.62	1.56	1.50
2	B	480	HEM	FE-NC	2.57	2.03	1.95
2	C	480	HEM	CAA-C2A	2.55	1.57	1.51
2	B	480	HEM	FE-ND	2.50	2.02	1.94
2	A	480	HEM	C3C-C2C	-2.49	1.32	1.37
3	C	490	VNI	C6-N3	2.49	1.38	1.32
2	B	480	HEM	C1B-NB	-2.48	1.35	1.40
2	D	480	HEM	O2A-CGA	-2.47	1.22	1.30
2	C	480	HEM	FE-NC	2.47	2.03	1.95
3	C	490	VNI	C4-C5	2.44	1.40	1.35
2	D	480	HEM	CHC-C1C	-2.44	1.33	1.38
2	C	480	HEM	CAB-C3B	2.42	1.53	1.47
2	A	480	HEM	O2A-CGA	-2.41	1.22	1.30
2	C	480	HEM	C3C-C2C	-2.39	1.32	1.37
3	D	490	VNI	C3-C2	2.37	1.56	1.53
2	B	480	HEM	CAC-C3C	2.36	1.53	1.47
2	A	480	HEM	CMB-C2B	2.33	1.55	1.50
2	D	480	HEM	CHB-C4A	-2.31	1.34	1.39
3	C	490	VNI	C7-C2	-2.31	1.48	1.52
2	C	480	HEM	C4A-NA	-2.27	1.35	1.39
2	B	480	HEM	CAB-C3B	2.25	1.53	1.47
2	B	480	HEM	C4A-NA	-2.23	1.35	1.39
2	C	480	HEM	C2A-C3A	-2.21	1.33	1.38
3	C	490	VNI	C12-CL2	2.21	1.78	1.73
2	D	480	HEM	CHD-C1D	-2.20	1.34	1.39
2	C	480	HEM	CHC-C1C	-2.20	1.34	1.38
2	B	480	HEM	CAA-C2A	2.18	1.57	1.51
2	A	480	HEM	C1C-NC	-2.16	1.35	1.39
2	C	480	HEM	C3B-C2B	-2.16	1.32	1.37
2	C	480	HEM	FE-NB	-2.15	1.88	1.94
2	A	480	HEM	C3B-C4B	-2.14	1.40	1.44
3	A	490	VNI	C12-CL2	2.13	1.78	1.73
2	B	480	HEM	CMD-C2D	2.10	1.55	1.50
2	C	480	HEM	FE-NA	2.08	2.02	1.95
2	C	480	HEM	FE-ND	2.07	2.01	1.94
2	A	480	HEM	CAB-C3B	2.07	1.52	1.47
2	D	480	HEM	CHB-C1B	-2.06	1.34	1.38
2	B	480	HEM	CHC-C1C	-2.04	1.34	1.38
3	C	490	VNI	C15-C16	-2.04	1.36	1.39
2	B	480	HEM	C3B-C4B	-2.03	1.41	1.44

All (96) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	490	VNI	C20-O2-C19	7.25	109.63	102.64
3	B	490	VNI	C20-O2-C19	6.83	109.23	102.64
3	A	490	VNI	C20-O2-C19	6.42	108.83	102.64
3	D	490	VNI	O2-C20-N5	-5.75	107.15	112.34
3	B	490	VNI	C3-C2-N1	-5.69	96.18	110.71
2	C	480	HEM	CHC-C4B-NB	5.53	130.37	124.42
3	D	490	VNI	O2-C19-N4	-5.34	107.52	112.34
3	C	490	VNI	C20-O2-C19	5.31	107.76	102.64
3	B	490	VNI	O2-C20-N5	-5.28	107.57	112.34
2	A	480	HEM	CAD-C3D-C4D	5.12	133.62	124.70
3	A	490	VNI	O2-C20-N5	-5.08	107.75	112.34
3	C	490	VNI	C3-C2-N1	-4.72	98.67	110.71
3	A	490	VNI	O2-C19-N4	-4.62	108.17	112.34
3	A	490	VNI	C3-C2-N1	-4.46	99.32	110.71
3	C	490	VNI	O2-C20-C21	4.42	126.43	118.73
2	B	480	HEM	CHC-C4B-NB	4.41	129.17	124.42
3	C	490	VNI	O2-C20-N5	-4.41	108.36	112.34
3	B	490	VNI	O2-C19-N4	-4.20	108.55	112.34
2	B	480	HEM	C4D-ND-C1D	4.13	110.09	105.21
2	D	480	HEM	CAD-C3D-C4D	4.08	131.81	124.70
2	A	480	HEM	CHD-C1D-ND	3.90	128.62	124.42
2	A	480	HEM	CAD-C3D-C2D	-3.87	120.61	127.87
3	D	490	VNI	C3-C2-N1	-3.78	101.05	110.71
2	A	480	HEM	CMD-C2D-C1D	3.78	130.94	125.03
3	C	490	VNI	O2-C19-C16	3.71	125.19	118.73
3	C	490	VNI	O2-C19-N4	-3.69	109.01	112.34
3	C	490	VNI	C11-C10-CL1	-3.67	114.57	119.17
2	B	480	HEM	C4C-C3C-C2C	3.65	109.98	106.81
2	C	480	HEM	C4D-ND-C1D	3.59	109.46	105.21
3	C	490	VNI	C12-C7-C2	-3.47	117.18	121.82
3	D	490	VNI	O2-C20-C21	3.46	124.76	118.73
2	B	480	HEM	C3C-C2C-C1C	-3.23	103.99	107.05
2	C	480	HEM	C4C-C3C-C2C	3.21	109.60	106.81
3	C	490	VNI	C8-C7-C12	3.15	119.98	116.82
3	C	490	VNI	C7-C2-N1	3.13	117.63	111.44
3	B	490	VNI	C2-N1-C1	-3.12	118.63	122.34
3	C	490	VNI	C13-C1-N1	-3.09	111.31	117.04
2	B	480	HEM	CAD-C3D-C4D	3.06	130.03	124.70
3	A	490	VNI	O2-C19-C16	3.04	124.03	118.73
3	A	490	VNI	O2-C20-C21	3.04	124.02	118.73
2	A	480	HEM	C4B-C3B-C2B	3.03	110.06	107.28
2	D	480	HEM	C1B-NB-C4B	-3.01	101.64	105.21
2	C	480	HEM	C3C-C2C-C1C	-2.96	104.24	107.05

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	480	HEM	CHC-C4B-NB	2.91	127.56	124.42
3	B	490	VNI	C4-N2-C6	2.83	110.24	106.71
2	D	480	HEM	C3B-C4B-NB	2.82	111.50	109.47
2	D	480	HEM	O2D-CGD-CBD	2.80	122.85	114.00
2	C	480	HEM	CAD-C3D-C4D	2.77	129.53	124.70
3	C	490	VNI	C9-C10-CL1	2.75	123.41	119.36
2	C	480	HEM	CMC-C2C-C1C	2.74	129.56	124.73
2	A	480	HEM	C4C-C3C-C2C	2.74	109.19	106.81
3	A	490	VNI	C13-C1-N1	-2.73	111.97	117.04
2	D	480	HEM	CBC-CAC-C3C	-2.73	113.90	127.53
2	A	480	HEM	CAA-C2A-C1A	-2.71	119.65	124.94
2	A	480	HEM	O2D-CGD-CBD	2.69	122.51	114.00
3	A	490	VNI	C12-C7-C2	-2.64	118.28	121.82
3	D	490	VNI	O2-C19-C16	2.63	123.31	118.73
2	A	480	HEM	CHD-C1D-C2D	-2.61	120.90	125.03
2	B	480	HEM	CMD-C2D-C1D	2.59	129.08	125.03
2	B	480	HEM	CAC-C3C-C4C	-2.59	118.64	124.82
2	C	480	HEM	O2D-CGD-CBD	2.57	122.12	114.00
2	A	480	HEM	CBC-CAC-C3C	-2.57	114.70	127.53
3	C	490	VNI	C7-C12-CL2	2.55	123.02	120.41
3	D	490	VNI	C7-C12-CL2	-2.53	117.83	120.41
3	C	490	VNI	C15-C14-C13	-2.44	118.19	120.80
2	D	480	HEM	C4D-C3D-C2D	-2.41	103.38	106.89
2	D	480	HEM	C3C-C2C-C1C	-2.40	104.78	107.05
3	C	490	VNI	C18-C17-C16	-2.39	118.25	120.80
3	A	490	VNI	C18-C13-C1	-2.38	112.90	120.60
2	C	480	HEM	CHC-C4B-C3B	-2.37	120.35	125.07
2	A	480	HEM	O1D-CGD-CBD	-2.36	115.61	123.09
2	A	480	HEM	CAA-C2A-C3A	2.35	132.33	127.07
3	B	490	VNI	C18-C13-C14	2.33	121.53	118.57
2	A	480	HEM	C4D-ND-C1D	2.32	107.95	105.21
2	B	480	HEM	CHD-C4C-NC	2.30	126.96	124.45
2	A	480	HEM	CMB-C2B-C1B	2.27	128.58	125.03
2	C	480	HEM	C4B-C3B-C2B	2.26	109.36	107.28
3	B	490	VNI	C15-C14-C13	-2.25	118.40	120.80
2	D	480	HEM	C2B-C1B-NB	2.24	112.41	109.84
2	B	480	HEM	CMA-C3A-C4A	-2.22	122.03	125.42
2	D	480	HEM	C4C-C3C-C2C	2.20	108.73	106.81
2	D	480	HEM	CMD-C2D-C1D	2.20	128.48	125.03
3	D	490	VNI	C20-N5-N4	2.20	108.41	106.33
3	D	490	VNI	C12-C7-C2	-2.18	118.90	121.82
2	C	480	HEM	CHD-C1D-ND	2.14	126.73	124.42

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	490	VNI	C20-N5-N4	2.13	108.34	106.33
2	D	480	HEM	C3D-C4D-ND	2.13	112.50	110.17
3	C	490	VNI	O1-C1-N1	2.12	126.50	122.47
2	C	480	HEM	O1D-CGD-CBD	-2.12	116.38	123.09
3	B	490	VNI	C12-C7-C2	-2.12	118.99	121.82
2	C	480	HEM	CMA-C3A-C4A	-2.11	122.20	125.42
3	D	490	VNI	C8-C7-C12	2.11	118.94	116.82
2	D	480	HEM	CHD-C1D-ND	2.09	126.67	124.42
2	A	480	HEM	CMC-C2C-C1C	-2.07	121.09	124.73
3	C	490	VNI	C21-C20-N5	-2.03	125.20	128.36
3	A	490	VNI	C4-N2-C6	2.02	109.23	106.71

There are no chirality outliers.

All (14) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	B	490	VNI	N1-C1-C13-C18
3	A	490	VNI	N1-C1-C13-C18
3	C	490	VNI	N1-C1-C13-C18
3	B	490	VNI	O1-C1-C13-C18
3	B	490	VNI	N1-C1-C13-C14
2	D	480	HEM	CAD-CBD-CGD-O2D
3	C	490	VNI	O1-C1-C13-C18
2	D	480	HEM	CAD-CBD-CGD-O1D
3	A	490	VNI	O1-C1-C13-C18
3	A	490	VNI	C7-C2-N1-C1
3	D	490	VNI	C7-C2-N1-C1
3	A	490	VNI	C3-C2-C7-C8
3	D	490	VNI	C3-C2-C7-C8
3	A	490	VNI	N1-C1-C13-C14

There are no ring outliers.

7 monomers are involved in 29 short contacts:

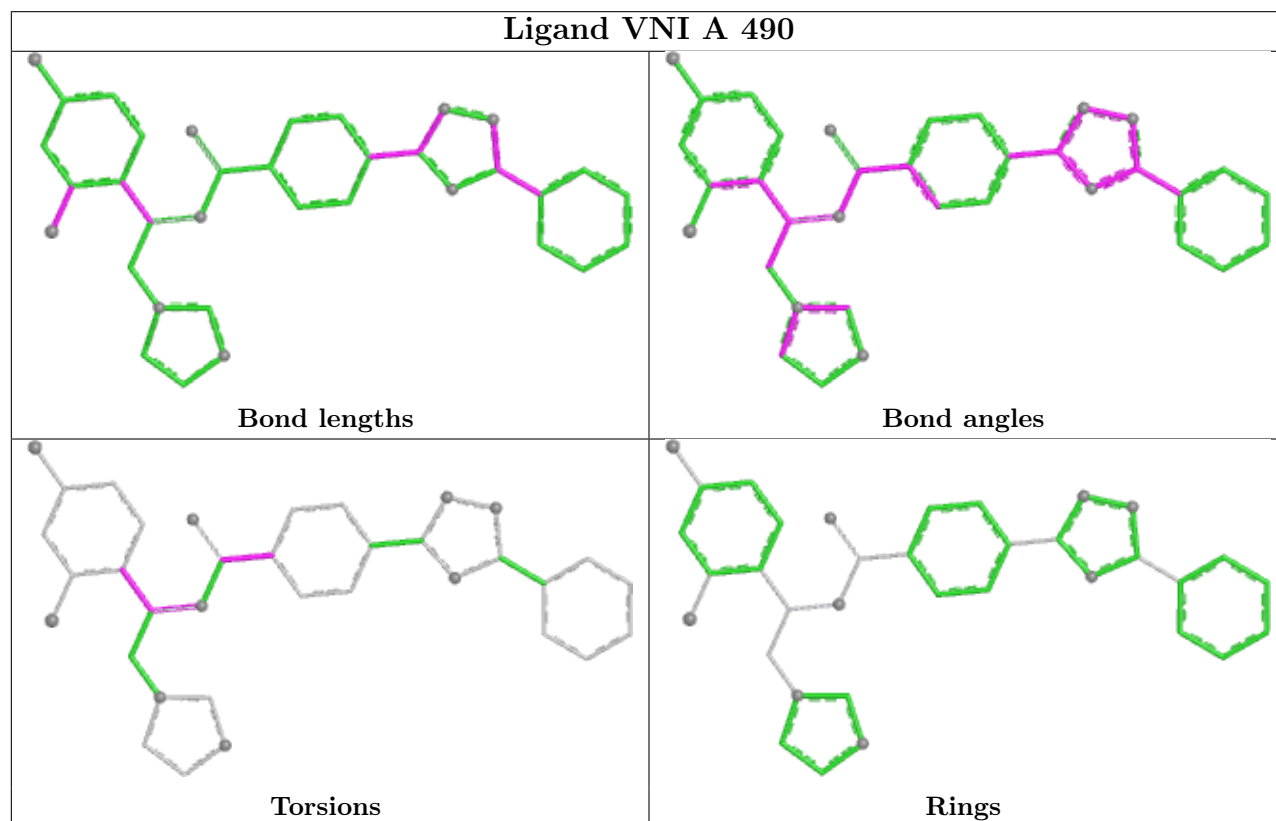
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	490	VNI	1	0
2	B	480	HEM	5	0
2	C	480	HEM	7	0
2	A	480	HEM	4	0
2	D	480	HEM	9	0
3	B	490	VNI	2	0

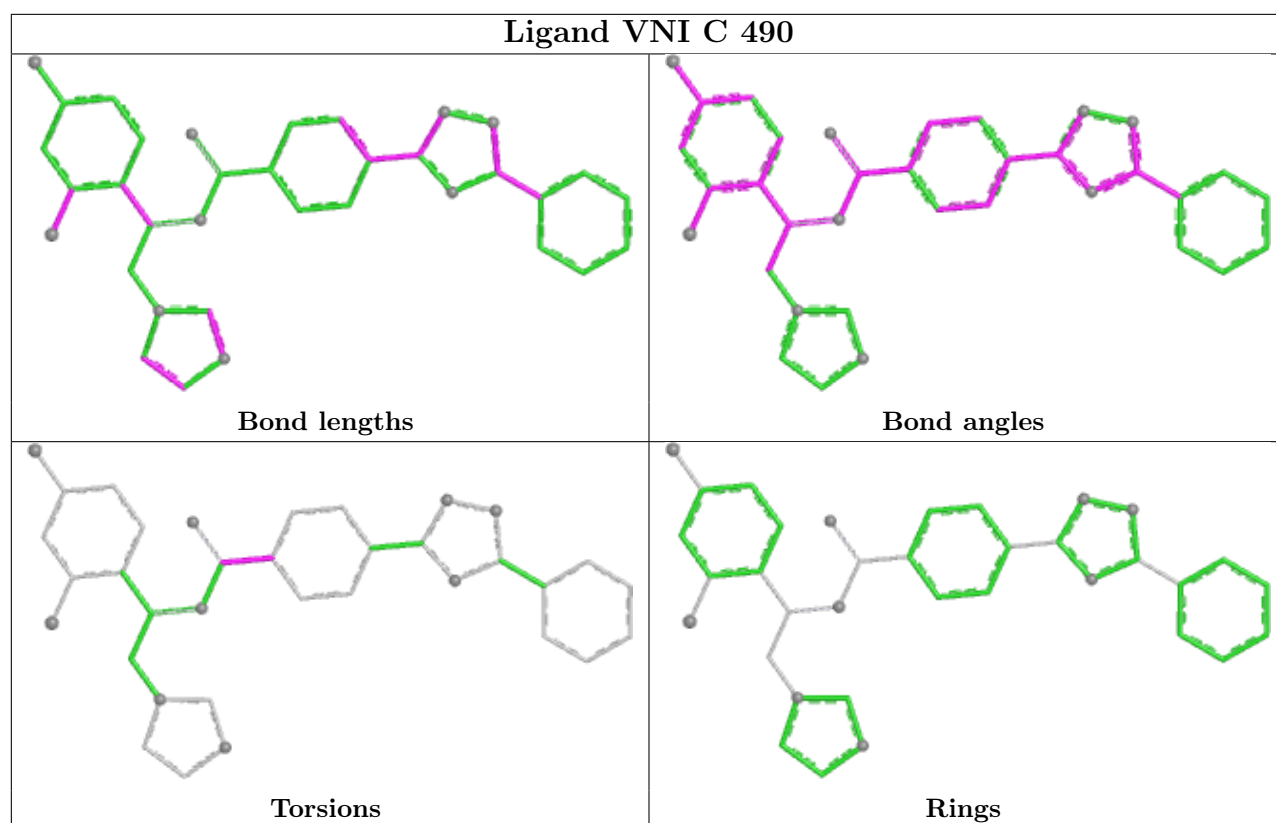
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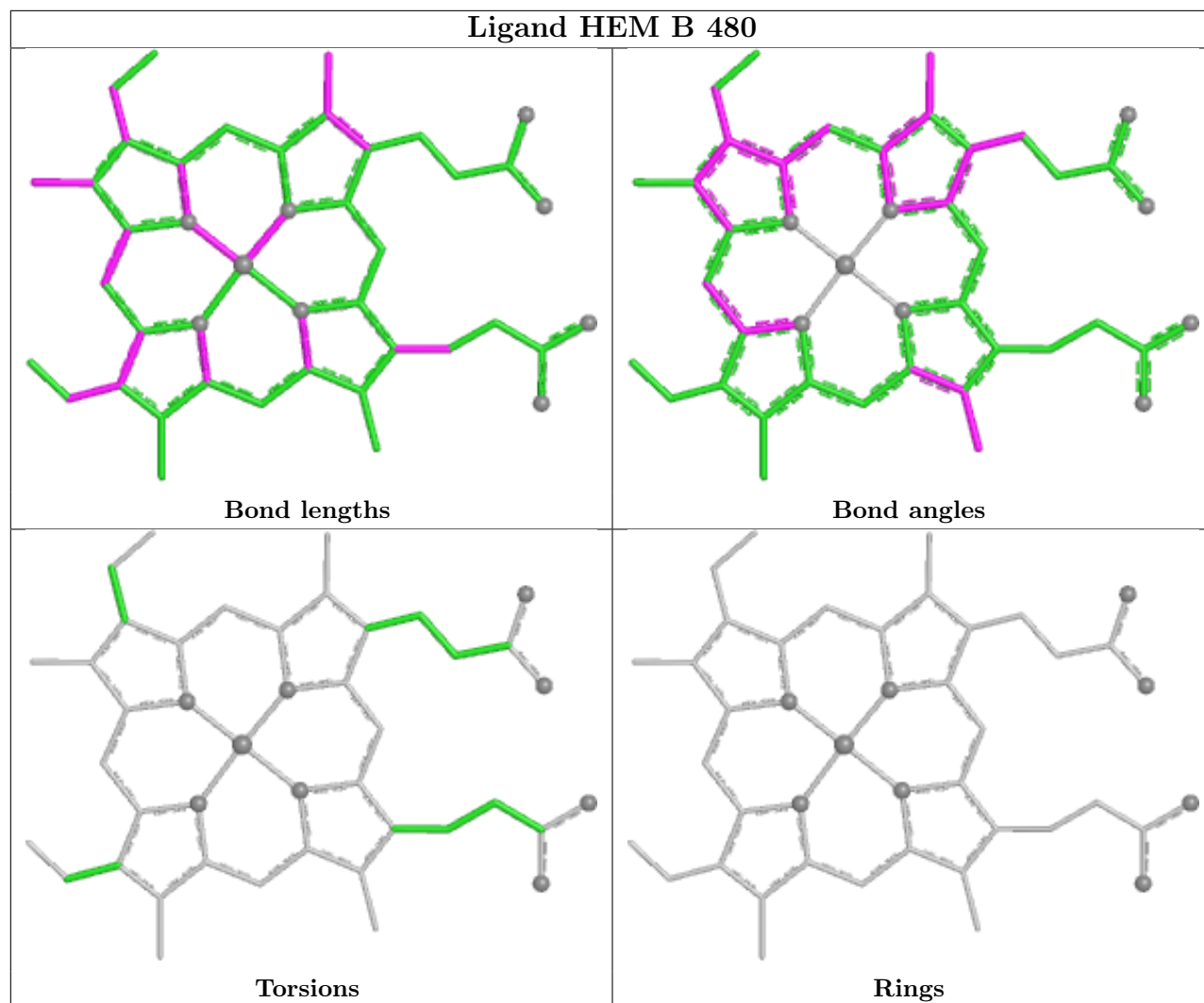
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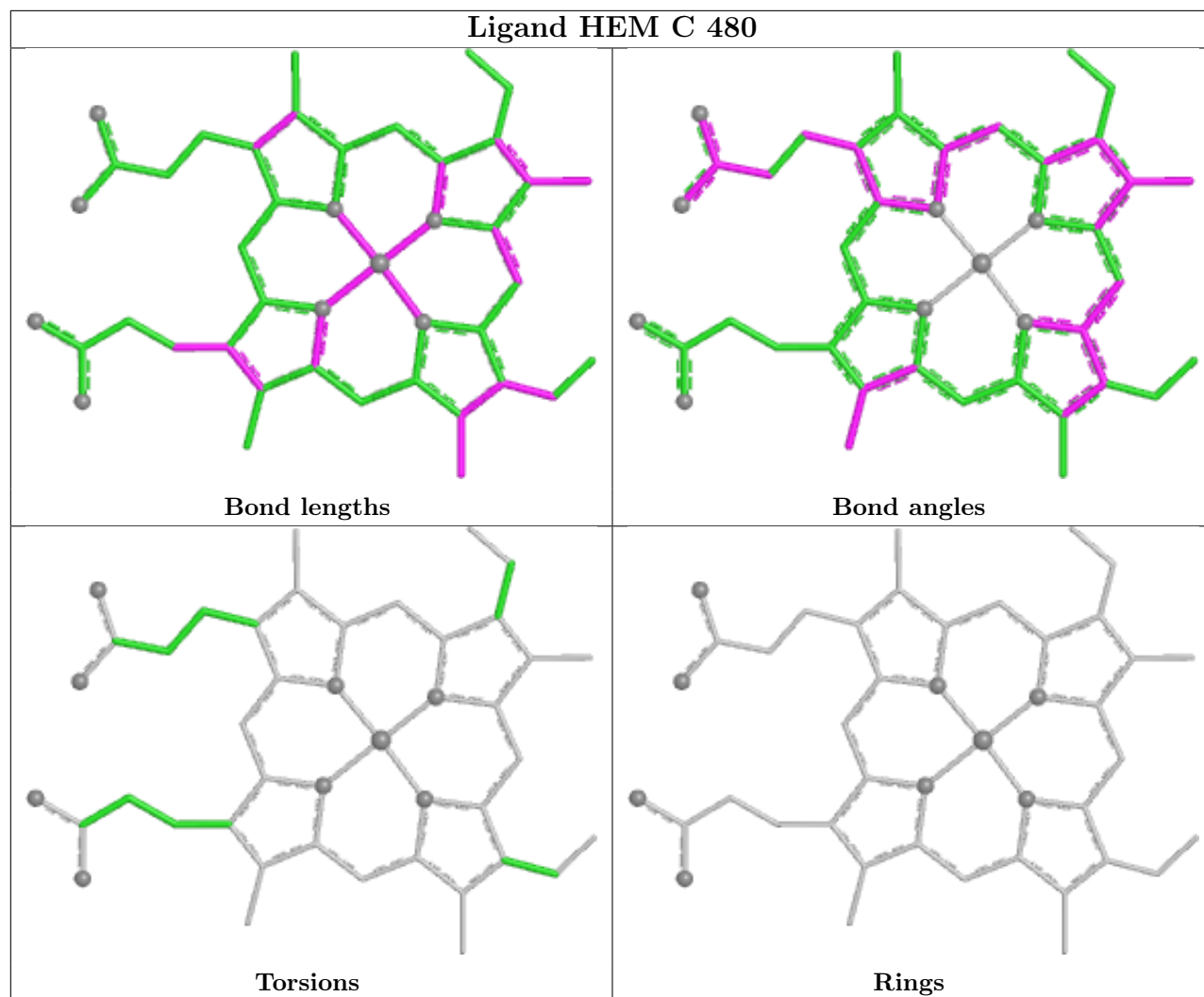
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	D	490	VNI	1	0

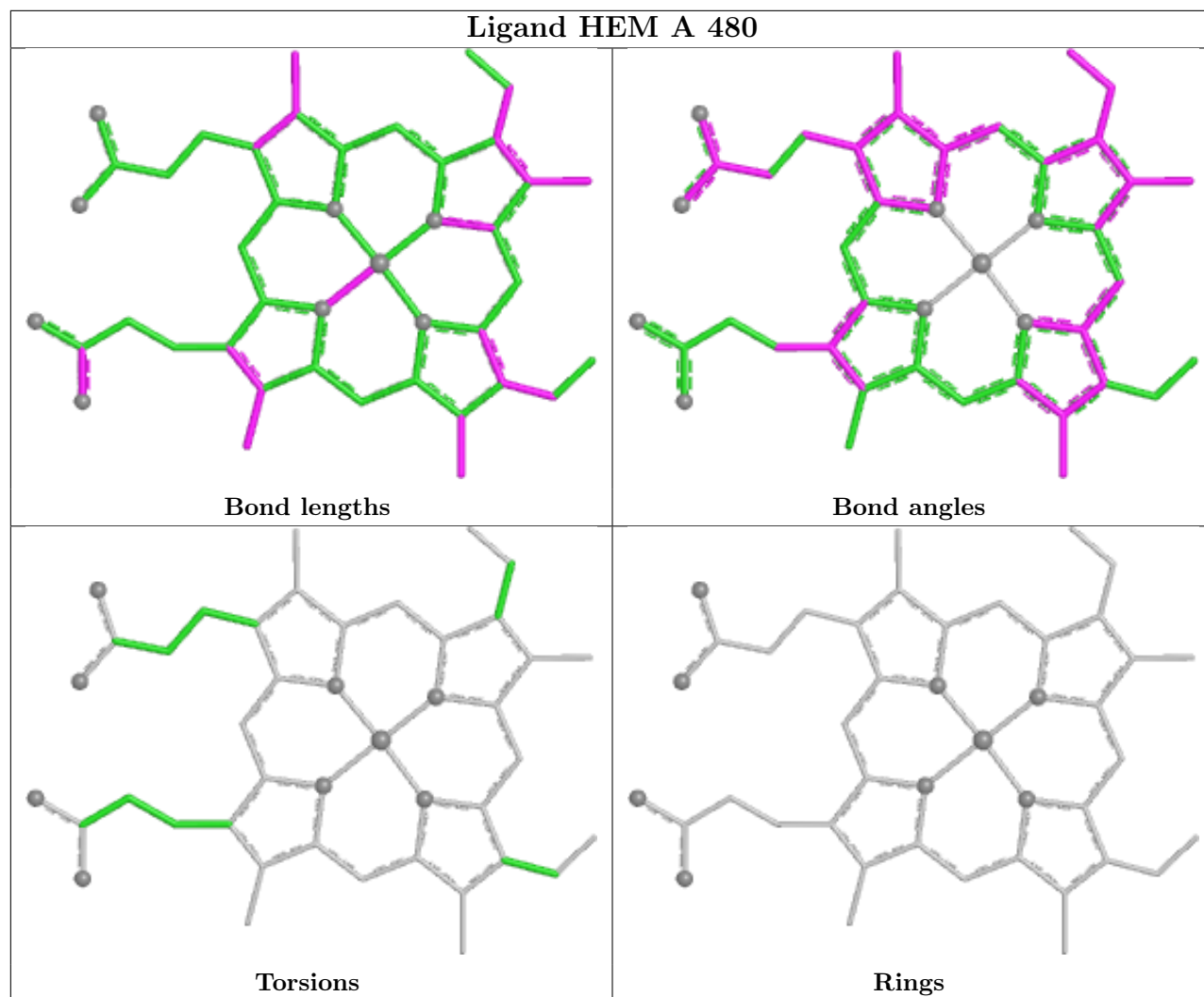
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

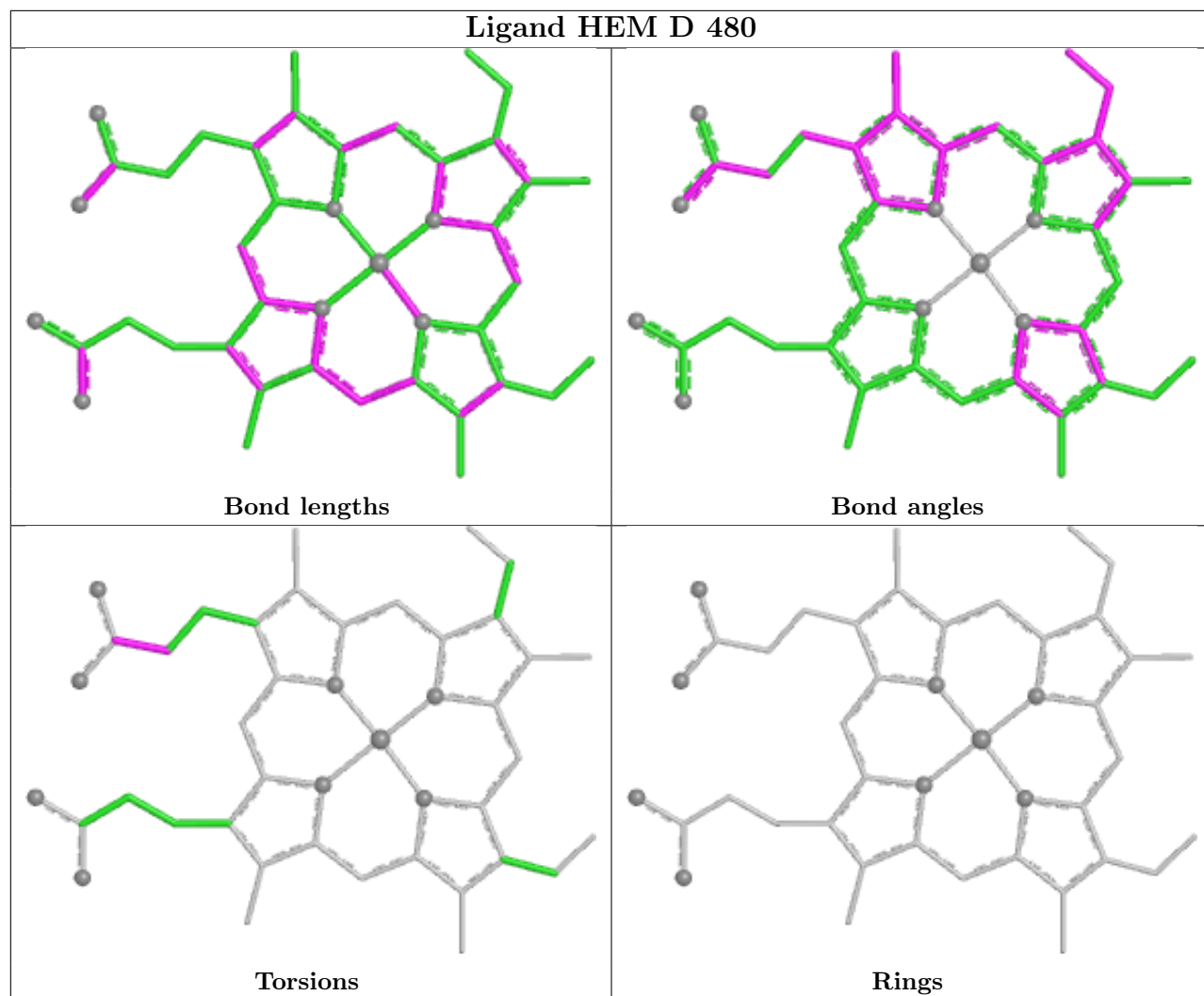




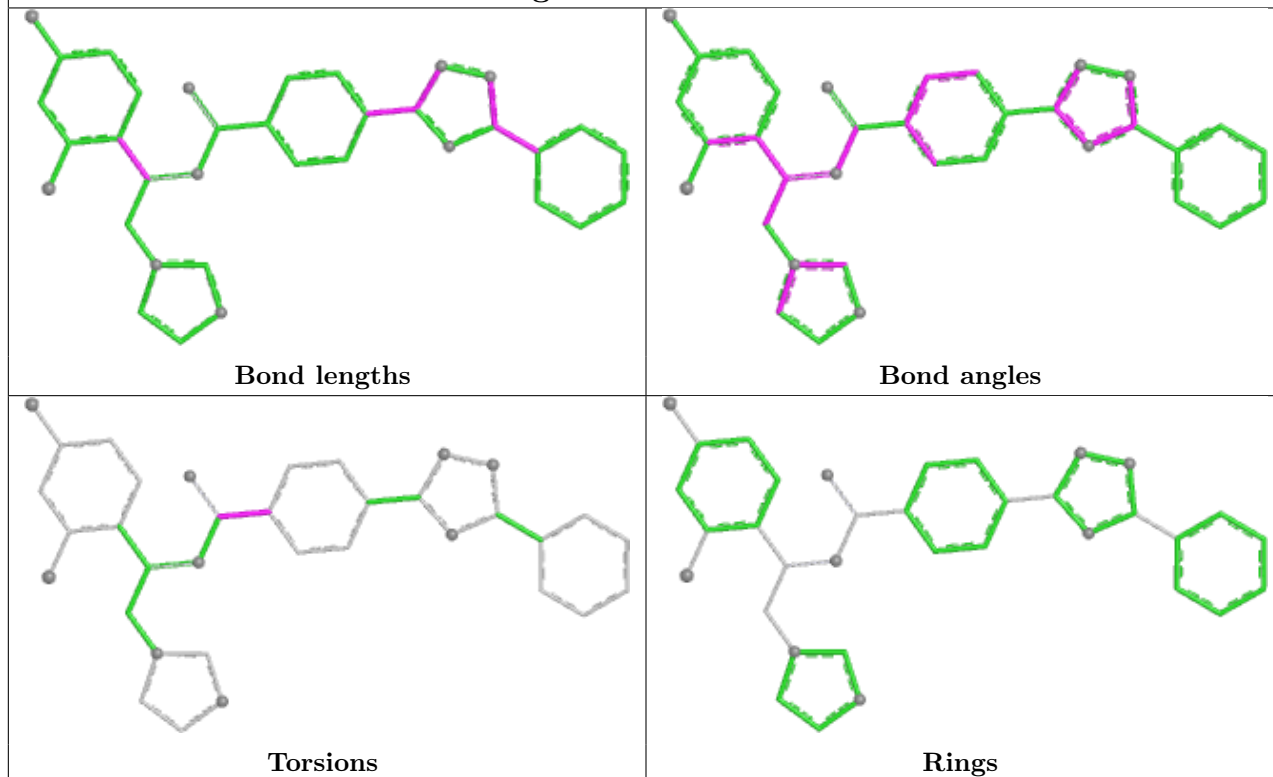




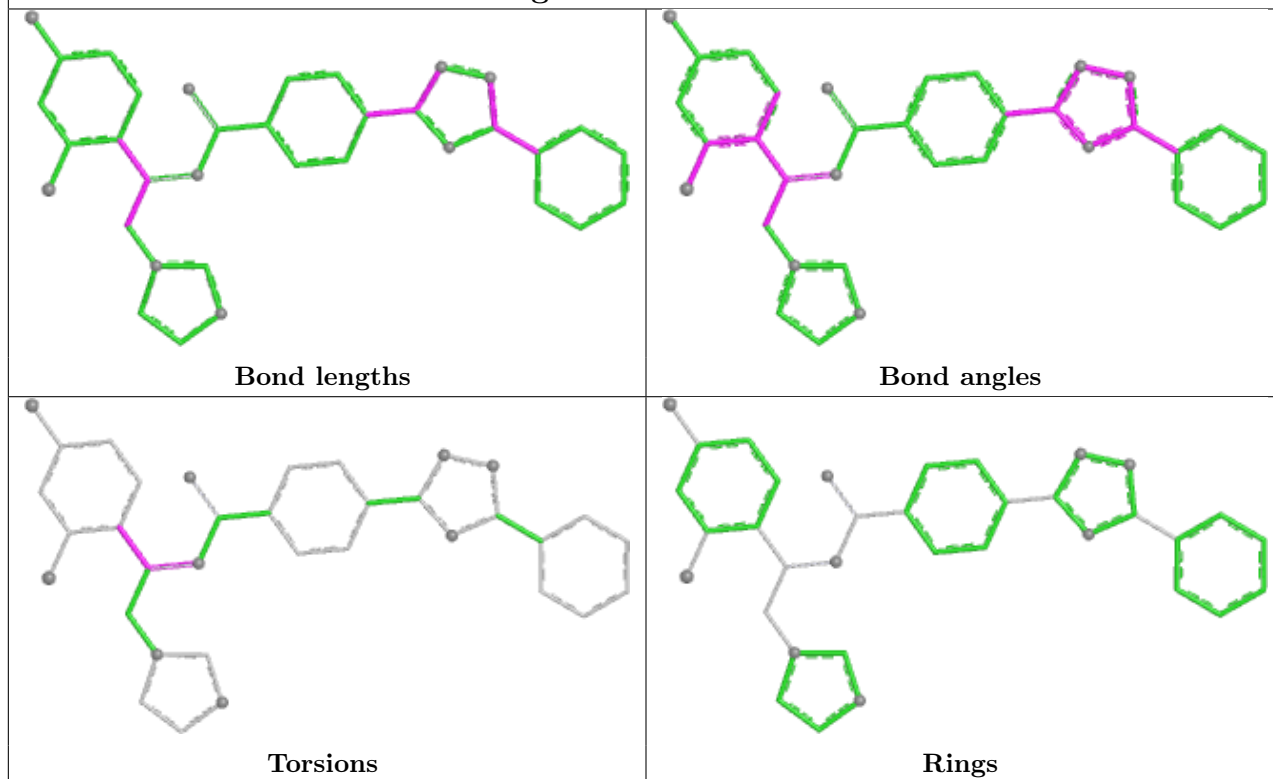




Ligand VNI B 490



Ligand VNI D 490



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 [i](#)

6.1 Protein, DNA and RNA chains [i](#)

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, 95th 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	450/450 (100%)	0.40	8 (1%) 67 73	22, 35, 51, 61	0
1	B	449/450 (99%)	0.17	8 (1%) 67 73	21, 32, 45, 57	0
1	C	449/450 (99%)	0.13	7 (1%) 70 75	20, 30, 42, 61	0
1	D	449/450 (99%)	0.56	19 (4%) 40 44	23, 38, 61, 71	0
All	All	1797/1800 (99%)	0.31	42 (2%) 61 67	20, 33, 52, 71	0

All (42) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	29	GLY	6.7
1	B	255	ASP	5.1
1	D	243	ILE	4.9
1	B	256	SER	4.7
1	D	254	LYS	3.8
1	C	406	GLU	3.6
1	D	252	VAL	3.6
1	B	41	ILE	3.3
1	A	290	PHE	3.1
1	C	405	ASP	3.0
1	C	29	GLY	3.0
1	A	48	PHE	2.9
1	B	48	PHE	2.9
1	D	328	ALA	2.7
1	B	43	GLY	2.7
1	B	253	ASN	2.6
1	D	194	ALA	2.6
1	C	256	SER	2.6
1	D	192	LEU	2.6
1	B	42	LEU	2.5
1	D	184	PHE	2.4

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Mol	Chain	Res	Type	RSRZ
1	D	373	VAL	2.4
1	D	255	ASP	2.3
1	D	246	ALA	2.3
1	D	244	ILE	2.3
1	C	252	VAL	2.3
1	A	329	GLN	2.2
1	D	96	VAL	2.2
1	C	255	ASP	2.2
1	D	120	TYR	2.2
1	D	368	LYS	2.2
1	D	324	GLU	2.2
1	C	30	LYS	2.2
1	D	30	LYS	2.1
1	A	194	ALA	2.1
1	A	245	ILE	2.1
1	D	245	ILE	2.1
1	B	29	GLY	2.1
1	A	328	ALA	2.1
1	A	259	SER	2.0
1	D	250	GLU	2.0
1	A	140	GLN	2.0

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

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

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th 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($\text{\AA}^2$)	Q<0.9
3	VNI	A	490	35/35	0.95	0.10	21,31,50,50	0
3	VNI	B	490	35/35	0.95	0.09	23,32,53,53	0

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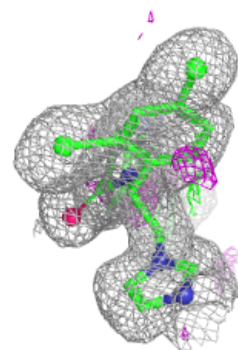
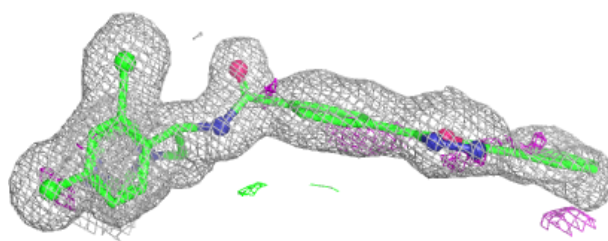
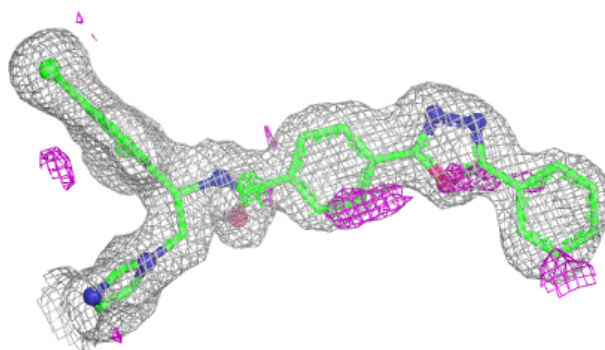
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
3	VNI	D	490	35/35	0.95	0.08	23,31,45,45	0
3	VNI	C	490	35/35	0.97	0.07	20,25,40,43	0
2	HEM	D	480	43/43	0.97	0.07	24,28,37,42	0
2	HEM	C	480	43/43	0.98	0.06	16,20,26,30	0
2	HEM	A	480	43/43	0.98	0.06	16,22,28,33	0
2	HEM	B	480	43/43	0.98	0.06	19,22,25,30	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.

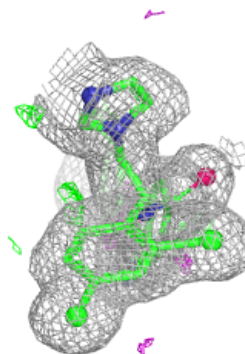
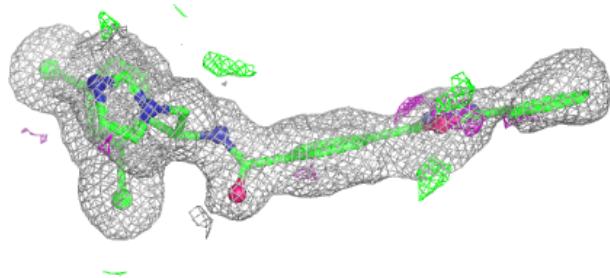
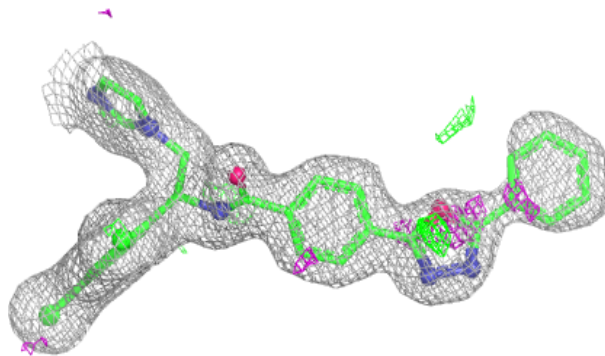
Electron density around VNI A 490:

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

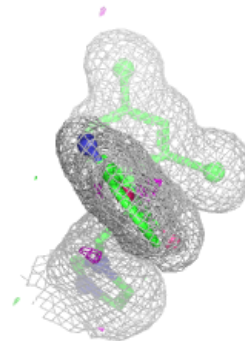
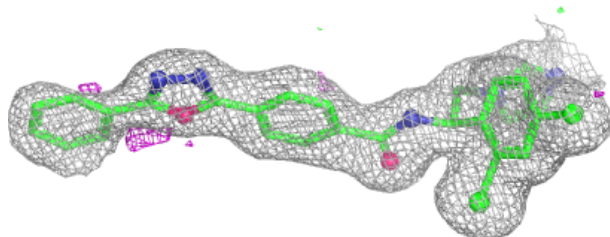
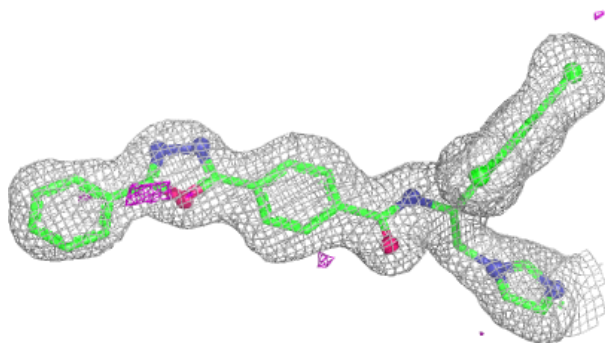


Electron density around VNI B 490:

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

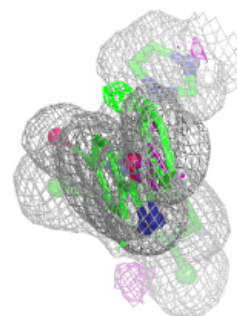
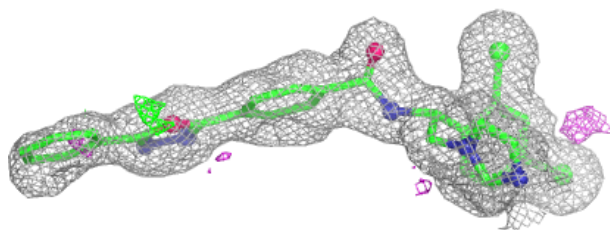
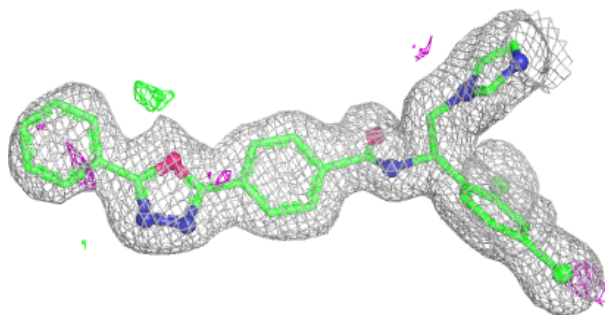
**Electron density around VNI D 490:**

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



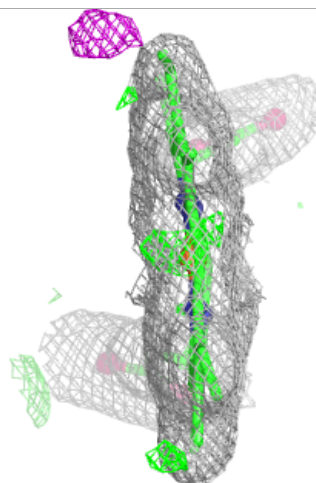
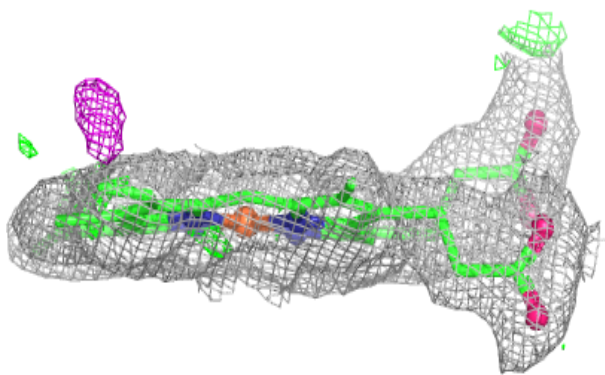
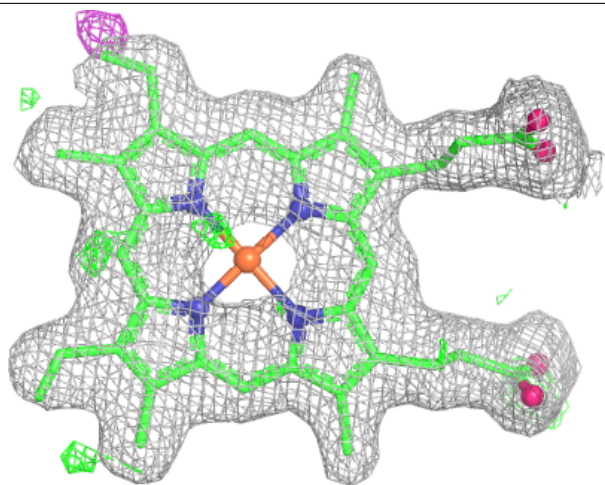
Electron density around VNI C 490:

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 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



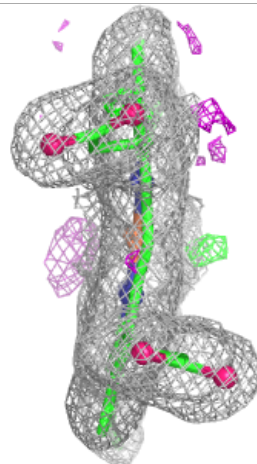
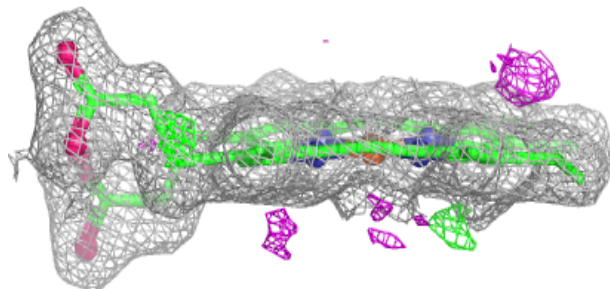
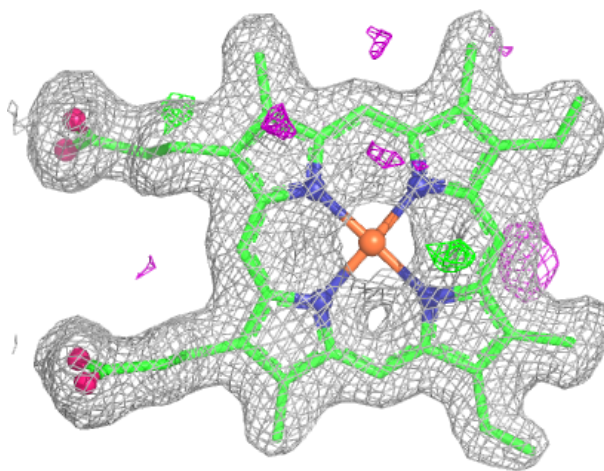
Electron density around HEM D 480:

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 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



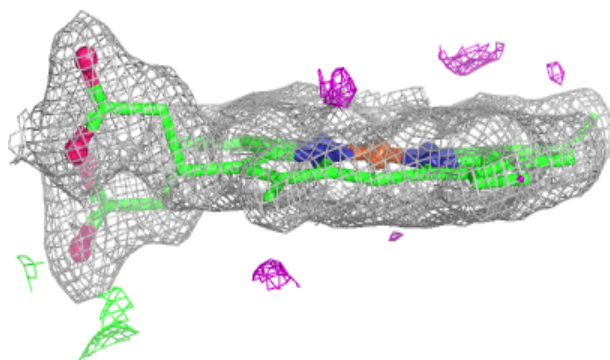
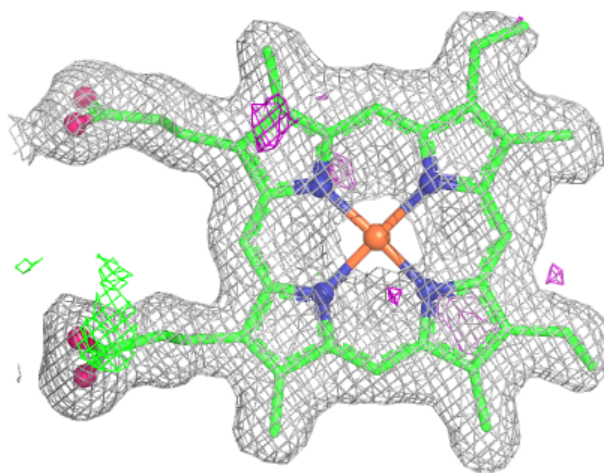
Electron density around HEM C 480:

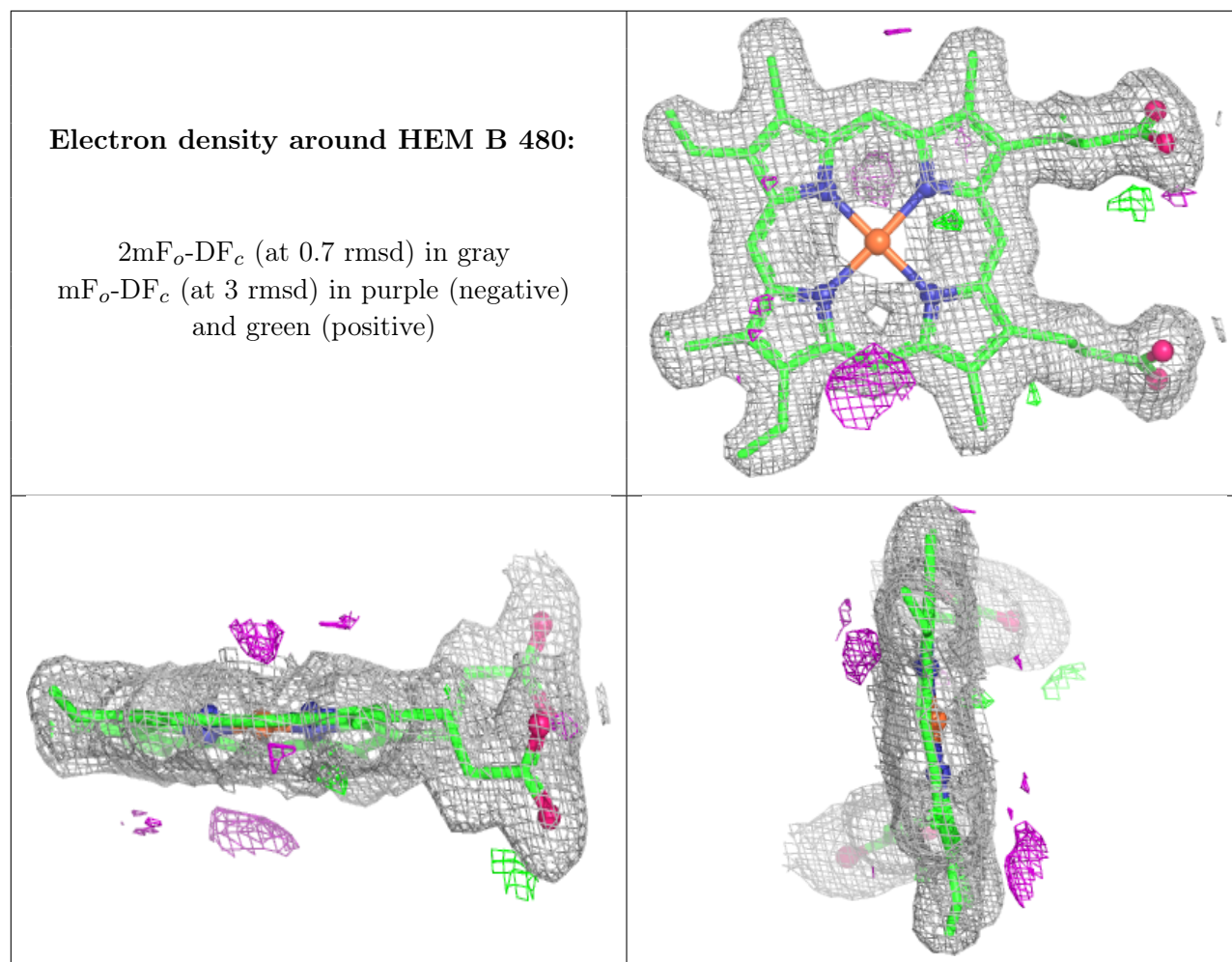
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around HEM A 480:

$2mF_o-DF_c$ (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.