



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 12:13 AM UTC

PDB ID : 3E4E / pdb_00003e4e
Title : Human cytochrome P450 2E1 in complex with the inhibitor 4-methylpyrazole
Authors : Meneely, K.M.; Porubsky, P.R.; Scott, E.E.
Deposited on : 2008-08-11
Resolution : 2.60 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)
Xtrriage (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

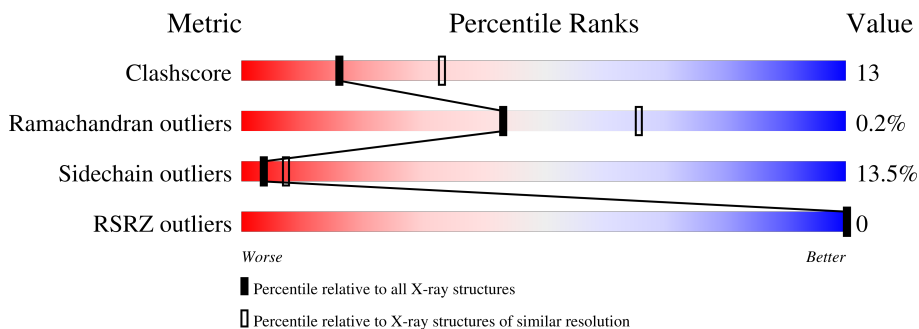
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.60 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))
Clashscore	190562	4347 (2.60-2.60)
Ramachandran outliers	187476	4277 (2.60-2.60)
Sidechain outliers	187428	4277 (2.60-2.60)
RSRZ outliers	180081	4008 (2.60-2.60)

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	476	
1	B	476	

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
3	4PZ	A	501	-	X	X	-
3	4PZ	B	501	-	X	-	-

2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 7707 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 Cytochrome P450 2E1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	461	3777	2443	651	666	17	0	1	0
1	B	461	3766	2437	647	665	17	0	0	0

There are 28 discrepancies between the modelled and reference sequences:

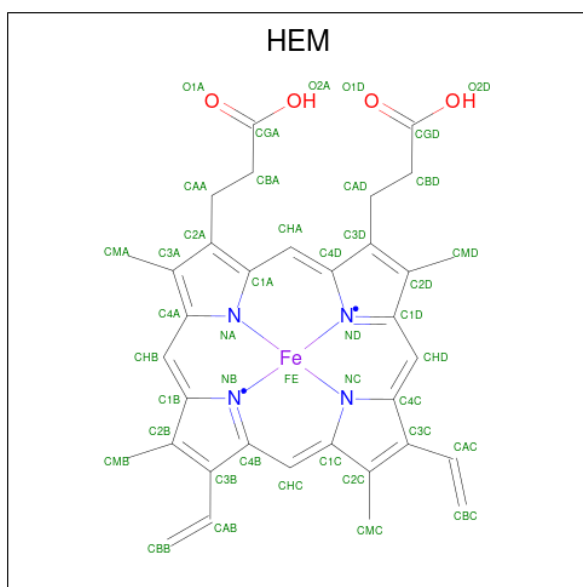
Chain	Residue	Modelled	Actual	Comment	Reference
A	22	MET	-	expression tag	UNP P05181
A	23	ALA	-	expression tag	UNP P05181
A	24	LYS	-	expression tag	UNP P05181
A	25	LYS	-	expression tag	UNP P05181
A	26	THR	-	expression tag	UNP P05181
A	27	SER	-	expression tag	UNP P05181
A	28	SER	-	expression tag	UNP P05181
A	29	LYS	-	expression tag	UNP P05181
A	30	GLY	-	expression tag	UNP P05181
A	31	LYS	-	expression tag	UNP P05181
A	494	HIS	-	expression tag	UNP P05181
A	495	HIS	-	expression tag	UNP P05181
A	496	HIS	-	expression tag	UNP P05181
A	497	HIS	-	expression tag	UNP P05181
B	22	MET	-	expression tag	UNP P05181
B	23	ALA	-	expression tag	UNP P05181
B	24	LYS	-	expression tag	UNP P05181
B	25	LYS	-	expression tag	UNP P05181
B	26	THR	-	expression tag	UNP P05181
B	27	SER	-	expression tag	UNP P05181
B	28	SER	-	expression tag	UNP P05181
B	29	LYS	-	expression tag	UNP P05181
B	30	GLY	-	expression tag	UNP P05181
B	31	LYS	-	expression tag	UNP P05181
B	494	HIS	-	expression tag	UNP P05181

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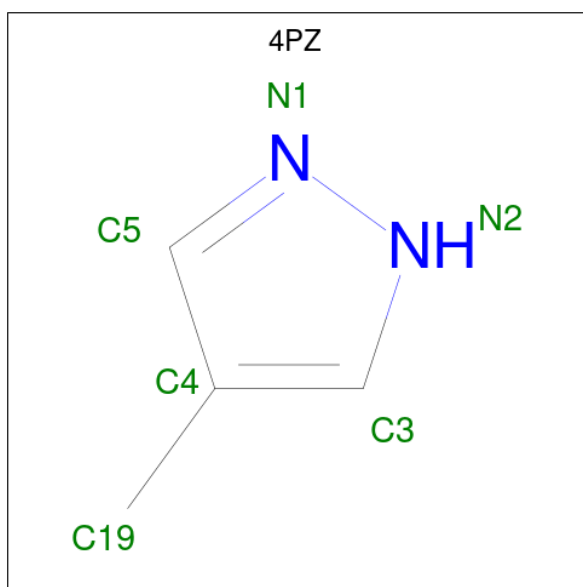
Chain	Residue	Modelled	Actual	Comment	Reference
B	495	HIS	-	expression tag	UNP P05181
B	496	HIS	-	expression tag	UNP P05181
B	497	HIS	-	expression tag	UNP P05181

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



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

- Molecule 3 is 4-methyl-1H-pyrazole (CCD ID: 4PZ) (formula: $C_4H_6N_2$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C N 6 4 2	0	0
3	B	1	Total C N 6 4 2	0	0

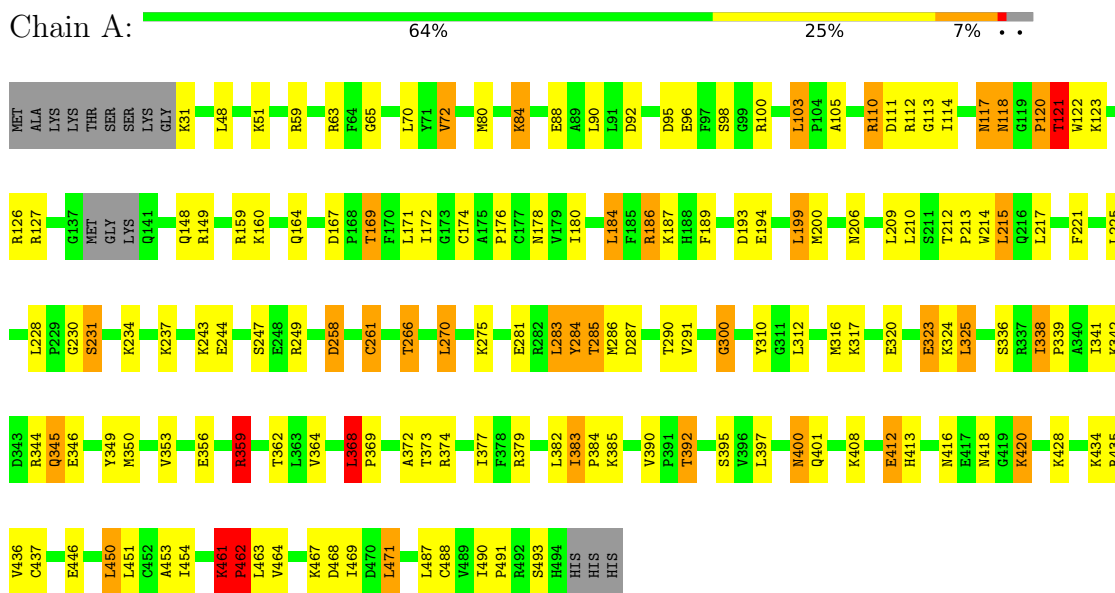
- Molecule 4 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	33	Total O 33 33	0	0
4	B	33	Total O 33 33	0	0

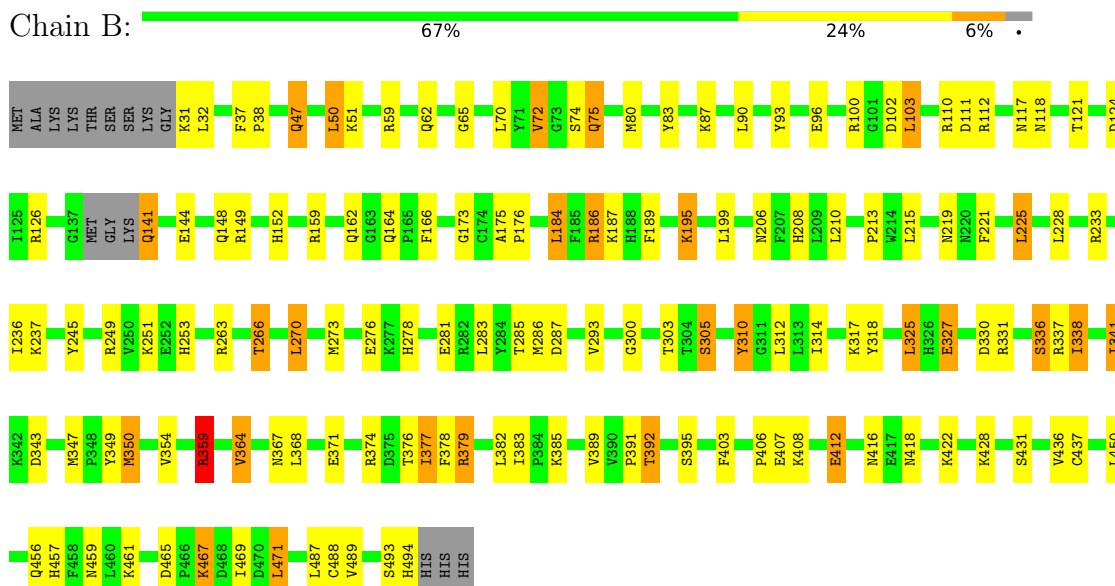
3 Residue-property plots [i](#)

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: Cytochrome P450 2E1



- Molecule 1: Cytochrome P450 2E1



4 Data and refinement statistics i

Property	Value	Source
Space group	P 43	Depositor
Cell constants a, b, c, α , β , γ	71.19Å 71.19Å 225.89Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	38.15 – 2.60 38.15 – 2.60	Depositor EDS
% Data completeness (in resolution range)	100.0 (38.15-2.60) 100.0 (38.15-2.60)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.97 (at 2.61Å)	Xtrriage
Refinement program	REFMAC 5.2.0019	Depositor
R, R_{free}	0.197 , 0.277 0.204 , (Not available)	Depositor DCC
R_{free} test set	No test flags present.	wwPDB-VP
Wilson B-factor (Å ²)	52.5	Xtrriage
Anisotropy	0.027	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 24.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	0.478 for h,-k,-l	Xtrriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	7707	wwPDB-VP
Average B, all atoms (Å ²)	50.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.25% 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 [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: 4PZ, 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	1.05	0/3882	1.26	37/5257 (0.7%)
1	B	1.08	4/3871 (0.1%)	1.19	11/5243 (0.2%)
All	All	1.07	4/7753 (0.1%)	1.23	48/10500 (0.5%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	2
1	B	0	1
All	All	0	3

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	236	ILE	CA-CB	5.34	1.60	1.54
1	B	383	ILE	CA-CB	5.26	1.59	1.53
1	B	293	VAL	N-CA	-5.16	1.40	1.46
1	B	403	PHE	C-O	-5.15	1.18	1.24

All (48) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	65	GLY	CA-C-N	13.98	133.68	119.56
1	B	65	GLY	C-N-CA	13.98	133.68	119.56
1	A	65	GLY	CA-C-N	11.34	131.67	119.87
1	A	65	GLY	C-N-CA	11.34	131.67	119.87
1	A	461	LYS	CA-C-N	9.09	131.20	119.84

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	461	LYS	C-N-CA	9.09	131.20	119.84
1	B	330	ASP	N-CA-C	9.06	121.98	111.11
1	A	285	THR	N-CA-CB	8.25	126.06	111.13
1	A	285	THR	N-CA-C	-7.77	95.46	108.75
1	A	284	TYR	N-CA-C	-7.56	97.04	108.46
1	A	121	THR	N-CA-C	-7.31	103.52	114.64
1	A	461	LYS	O-C-N	7.13	130.57	122.16
1	A	103	LEU	CA-C-N	6.88	128.44	119.84
1	A	103	LEU	C-N-CA	6.88	128.44	119.84
1	A	284	TYR	CB-CA-C	6.81	120.69	109.72
1	B	103	LEU	CA-C-N	6.70	128.21	119.84
1	B	103	LEU	C-N-CA	6.70	128.21	119.84
1	B	330	ASP	CB-CA-C	-6.47	100.45	110.81
1	A	118	ASN	N-CA-C	-6.38	104.65	112.88
1	A	72	VAL	CB-CA-C	6.12	119.70	111.19
1	A	368	LEU	CA-C-N	-5.95	113.84	119.85
1	A	368	LEU	C-N-CA	-5.95	113.84	119.85
1	A	117	ASN	N-CA-CB	5.71	119.59	110.16
1	A	418	ASN	N-CA-C	5.54	118.84	112.97
1	B	164	GLN	CA-C-N	5.53	125.80	119.83
1	B	164	GLN	C-N-CA	5.53	125.80	119.83
1	A	164	GLN	CA-C-N	5.50	125.82	119.93
1	A	164	GLN	C-N-CA	5.50	125.82	119.93
1	B	336	SER	N-CA-C	5.47	120.32	113.43
1	A	468	ASP	N-CA-C	5.37	119.83	113.28
1	A	300	GLY	N-CA-C	-5.27	108.13	114.66
1	B	364	VAL	CB-CA-C	5.26	120.93	111.36
1	A	178	ASN	N-CA-C	5.24	116.99	111.28
1	A	383	ILE	CA-C-N	5.23	125.23	119.90
1	A	383	ILE	C-N-CA	5.23	125.23	119.90
1	A	217	LEU	N-CA-C	-5.17	105.56	111.14
1	A	221	PHE	CA-C-N	5.17	124.78	119.05
1	A	221	PHE	C-N-CA	5.17	124.78	119.05
1	A	230	GLY	N-CA-C	5.16	117.10	110.96
1	A	214	TRP	N-CA-C	-5.09	105.73	111.28
1	A	231	SER	N-CA-CB	-5.08	101.91	110.49
1	A	462	PRO	CA-C-N	-5.07	115.61	123.17
1	A	462	PRO	C-N-CA	-5.07	115.61	123.17
1	A	390	VAL	N-CA-C	5.05	113.15	108.15
1	A	105	ALA	N-CA-C	-5.04	106.39	112.54
1	B	50	LEU	N-CA-C	5.03	117.49	111.71
1	A	228	LEU	CA-C-N	-5.01	114.56	119.92

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	228	LEU	C-N-CA	-5.01	114.56	119.92

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	120	PRO	Peptide
1	A	359	ARG	Sidechain
1	B	359	ARG	Sidechain

5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3777	0	3775	102	0
1	B	3766	0	3762	82	0
2	A	43	0	30	17	0
2	B	43	0	30	8	0
3	A	6	0	5	6	0
3	B	6	0	5	2	0
4	A	33	0	0	5	0
4	B	33	0	0	1	0
All	All	7707	0	7607	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 13.

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)
1:A:184:LEU:O	1:A:266:THR:HG22	1.55	1.07
1:B:184:LEU:O	1:B:266:THR:HG22	1.63	0.97
1:A:283:LEU:O	1:A:283:LEU:HD12	1.63	0.97
1:A:123:LYS:HE2	1:A:127:ARG:HH22	1.28	0.96
1:A:416:ASN:HD21	1:A:420:LYS:HB2	1.29	0.95

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:437:CYS:SG	2:A:500:HEM:NC	2.39	0.95
1:A:285:THR:HG22	1:A:287:ASP:H	1.29	0.95
1:A:437:CYS:SG	2:A:500:HEM:NB	2.44	0.91
1:A:283:LEU:O	1:A:284:TYR:CD2	2.25	0.89
1:B:285:THR:HG22	1:B:287:ASP:H	1.37	0.89
2:B:500:HEM:HMB1	2:B:500:HEM:HBB2	1.56	0.86
1:A:111:ASP:HA	1:A:117:ASN:HB3	1.57	0.84
2:B:500:HEM:HMC2	2:B:500:HEM:HBC2	1.60	0.83
1:A:416:ASN:ND2	1:A:420:LYS:HB2	1.94	0.83
1:B:392:THR:HG22	1:B:395:SER:OG	1.78	0.82
1:A:283:LEU:O	1:A:283:LEU:CD1	2.29	0.80
1:A:111:ASP:C	1:A:117:ASN:HB3	2.08	0.79
1:A:437:CYS:SG	2:A:500:HEM:NA	2.58	0.77
1:A:186:ARG:HG2	1:A:186:ARG:O	1.85	0.77
1:A:111:ASP:HA	1:A:117:ASN:CB	2.15	0.76
1:A:437:CYS:SG	2:A:500:HEM:ND	2.58	0.75
1:A:342:LYS:HD3	4:A:523:HOH:O	1.87	0.73
1:A:110:ARG:HD3	4:A:521:HOH:O	1.88	0.73
1:A:111:ASP:CA	1:A:117:ASN:HB3	2.18	0.73
1:A:283:LEU:O	1:A:284:TYR:CG	2.43	0.72
1:B:285:THR:HG22	1:B:287:ASP:N	2.05	0.71
2:B:500:HEM:HBC2	2:B:500:HEM:CMC	2.19	0.70
1:A:323:GLU:HA	1:A:323:GLU:OE1	1.90	0.70
1:B:392:THR:CG2	1:B:395:SER:OG	2.40	0.70
1:A:184:LEU:O	1:A:266:THR:CG2	2.36	0.69
1:B:72:VAL:O	1:B:75:GLN:HG2	1.93	0.69
1:A:461:LYS:HG3	1:A:488:CYS:HB2	1.75	0.68
1:B:186:ARG:HD3	1:B:263:ARG:O	1.92	0.68
1:A:285:THR:HG22	1:A:287:ASP:N	2.07	0.67
1:A:283:LEU:HD12	1:A:284:TYR:CD2	2.30	0.66
1:B:359:ARG:NH2	1:B:406:PRO:HA	2.11	0.66
1:A:123:LYS:HE2	1:A:127:ARG:NH2	2.06	0.66
1:A:167:ASP:OD1	1:A:169:THR:CG2	2.45	0.65
1:B:359:ARG:HH21	1:B:406:PRO:HA	1.62	0.65
1:B:184:LEU:O	1:B:266:THR:CG2	2.43	0.64
1:A:206:ASN:O	1:A:210:LEU:HD12	1.99	0.63
1:A:167:ASP:OD1	1:A:169:THR:HG22	1.99	0.63
1:A:350:MET:HE1	1:A:451:LEU:HG	1.81	0.63
1:A:338:ILE:HG13	1:A:339:PRO:HD2	1.82	0.62
1:A:359:ARG:NH1	1:A:413:HIS:ND1	2.47	0.62
1:A:356:GLU:OE2	1:A:359:ARG:NH1	2.31	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:51:LYS:HG3	1:B:213:PRO:HG3	1.80	0.61
1:B:350:MET:HE2	1:B:354:VAL:HG23	1.83	0.61
2:A:500:HEM:NA	3:A:501:4PZ:N2	2.48	0.60
1:B:310:TYR:O	1:B:314:ILE:HG13	2.01	0.60
2:B:500:HEM:HBB2	2:B:500:HEM:CMB	2.31	0.60
1:B:493:SER:O	1:B:494:HIS:HB2	2.02	0.60
1:A:113:GLY:HA3	1:A:291:VAL:HG12	1.84	0.60
1:B:233:ARG:O	1:B:237:LYS:HG3	2.02	0.60
1:B:37:PHE:HD1	1:B:38:PRO:HD2	1.67	0.59
1:A:392:THR:HG22	1:A:395:SER:OG	2.02	0.59
1:A:300:GLY:HA2	2:A:500:HEM:HMC2	1.83	0.59
1:B:80:MET:O	1:B:392:THR:HB	2.03	0.58
1:B:327:GLU:OE1	1:B:331:ARG:NH2	2.36	0.58
1:B:124:ASP:HB2	1:B:283:LEU:HD21	1.84	0.58
1:A:96:GLU:N	1:A:96:GLU:OE1	2.35	0.58
1:A:98:SER:O	1:A:435:ARG:HD2	2.04	0.58
2:A:500:HEM:NB	3:A:501:4PZ:N2	2.52	0.57
2:A:500:HEM:NC	3:A:501:4PZ:N2	2.53	0.57
1:B:31:LYS:HG3	1:B:32:LEU:N	2.19	0.57
1:B:208:HIS:HE1	4:B:519:HOH:O	1.87	0.56
1:A:400:ASN:HD22	1:A:400:ASN:H	1.53	0.56
1:B:436:VAL:O	1:B:437:CYS:C	2.49	0.56
2:A:500:HEM:ND	3:A:501:4PZ:N2	2.54	0.56
1:A:281:GLU:O	1:A:281:GLU:HG2	2.06	0.55
1:A:283:LEU:HD12	1:A:284:TYR:CE2	2.41	0.55
1:A:80:MET:O	1:A:392:THR:HB	2.06	0.55
1:A:316:MET:SD	1:A:462:PRO:HB3	2.46	0.55
2:A:500:HEM:C4D	3:A:501:4PZ:H3	2.42	0.55
1:A:247:SER:HA	1:A:290:THR:HG21	1.88	0.54
1:A:148:GLN:HG2	1:A:338:ILE:HG12	1.88	0.54
1:B:173:GLY:O	1:B:176:PRO:HD2	2.07	0.54
1:A:374[A]:ARG:NH1	4:A:524:HOH:O	2.34	0.53
1:B:285:THR:HG22	1:B:286:MET:N	2.23	0.53
1:A:247:SER:HA	1:A:290:THR:CG2	2.38	0.53
1:B:493:SER:O	1:B:494:HIS:CB	2.57	0.52
1:A:174:CYS:SG	1:A:200:MET:HE1	2.50	0.52
1:A:48:LEU:HD21	1:A:70:LEU:HD21	1.92	0.52
1:B:359:ARG:NH2	1:B:406:PRO:O	2.43	0.52
1:B:100:ARG:O	1:B:110:ARG:NH2	2.42	0.52
1:B:456:GLN:HB3	1:B:457:HIS:HD2	1.75	0.51
2:A:500:HEM:HBB2	2:A:500:HEM:HMB2	1.93	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:93:TYR:HB3	1:B:96:GLU:HB2	1.92	0.51
1:A:120:PRO:N	1:A:121:THR:HG22	2.26	0.51
1:A:359:ARG:NH1	1:A:413:HIS:CE1	2.79	0.50
1:B:273:MET:HE1	1:B:286:MET:HG2	1.92	0.50
1:B:389:VAL:O	1:B:391:PRO:HD3	2.11	0.50
1:A:373:THR:O	1:A:385:LYS:HD2	2.12	0.50
1:B:300:GLY:HA2	2:B:500:HEM:HMC2	1.94	0.49
1:A:123:LYS:CE	1:A:127:ARG:HH22	2.14	0.49
1:A:209:LEU:HB3	1:A:215:LEU:HD13	1.93	0.49
1:B:303:THR:HG23	3:B:501:4PZ:H5	1.94	0.49
1:A:167:ASP:OD1	1:A:169:THR:HG23	2.12	0.49
1:B:175:ALA:HB3	1:B:176:PRO:HD3	1.95	0.49
1:B:461:LYS:HB3	1:B:488:CYS:HB2	1.95	0.49
1:B:392:THR:HG22	1:B:395:SER:HG	1.77	0.48
1:B:456:GLN:HB3	1:B:457:HIS:CD2	2.48	0.48
1:A:167:ASP:CG	1:A:169:THR:HG23	2.39	0.48
1:B:206:ASN:O	1:B:210:LEU:HD12	2.12	0.48
1:A:122:TRP:HH2	1:A:434:LYS:HD2	1.78	0.48
1:A:187:LYS:HD3	1:A:189:PHE:CZ	2.48	0.48
1:B:112:ARG:O	1:B:117:ASN:HB2	2.14	0.48
1:A:186:ARG:O	1:A:186:ARG:CG	2.61	0.47
1:A:342:LYS:O	1:A:345:GLN:HG3	2.14	0.47
1:A:469:ILE:HG22	1:A:471:LEU:HD13	1.96	0.47
2:A:500:HEM:ND	3:A:501:4PZ:C3	2.77	0.47
1:B:245:TYR:CD2	1:B:245:TYR:C	2.91	0.47
1:B:317:LYS:HD3	1:B:471:LEU:HD22	1.97	0.47
1:A:362:THR:HG22	1:A:397:LEU:HD12	1.96	0.47
1:A:126:ARG:NH1	2:A:500:HEM:O1D	2.47	0.47
1:A:400:ASN:OD1	1:A:401:GLN:NE2	2.48	0.47
1:B:469:ILE:HG22	1:B:471:LEU:HD13	1.96	0.47
1:B:285:THR:CG2	1:B:286:MET:N	2.77	0.47
1:B:378:PHE:O	1:B:379:ARG:C	2.58	0.47
1:B:416:ASN:OD1	1:B:418:ASN:HB2	2.15	0.47
1:B:412:GLU:H	1:B:412:GLU:CD	2.23	0.46
1:A:112:ARG:N	1:A:117:ASN:HB3	2.30	0.46
1:B:118:ASN:ND2	1:B:371:GLU:OE2	2.44	0.45
1:B:149:ARG:HH21	1:B:152:HIS:CG	2.35	0.45
1:A:392:THR:HG22	1:A:395:SER:HG	1.80	0.45
1:A:446:GLU:O	1:A:450:LEU:HB2	2.16	0.45
1:B:32:LEU:HD23	1:B:382:LEU:O	2.17	0.45
1:A:400:ASN:ND2	4:A:510:HOH:O	2.44	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:173:GLY:HA2	1:B:305:SER:HB2	1.99	0.45
1:A:412:GLU:H	1:A:412:GLU:CD	2.25	0.45
2:A:500:HEM:HBD1	2:A:500:HEM:HHA	1.99	0.45
1:B:124:ASP:CB	1:B:283:LEU:HD21	2.46	0.44
1:A:283:LEU:CD1	1:A:284:TYR:CE2	3.00	0.44
1:A:325:LEU:HD11	1:A:350:MET:HA	1.99	0.44
1:A:325:LEU:HD13	1:A:349:TYR:HD2	1.83	0.44
1:A:317:LYS:CD	1:A:471:LEU:HD22	2.47	0.44
2:A:500:HEM:HBB2	2:A:500:HEM:CMB	2.48	0.44
1:A:300:GLY:HA2	2:A:500:HEM:CMC	2.47	0.44
1:B:110:ARG:NH2	1:B:118:ASN:HB2	2.33	0.44
2:B:500:HEM:HMC2	2:B:500:HEM:CBC	2.41	0.44
1:A:176:PRO:O	1:A:180:ILE:HG22	2.18	0.44
1:B:325:LEU:HD13	1:B:349:TYR:CD2	2.52	0.44
1:B:337:ARG:HH22	1:B:343:ASP:CG	2.25	0.44
1:A:110:ARG:NH2	1:A:118:ASN:HB2	2.33	0.43
1:A:258:ASP:OD1	1:A:261:CYS:HB2	2.18	0.43
1:B:325:LEU:HD13	1:B:349:TYR:HD2	1.82	0.43
1:A:59:ARG:HH12	1:A:63:ARG:NH2	2.16	0.43
1:A:88:GLU:O	1:A:92:ASP:HB2	2.18	0.43
1:A:199:LEU:HD12	1:A:199:LEU:HA	1.90	0.43
1:A:266:THR:O	1:A:270:LEU:HD22	2.18	0.43
1:A:453:ALA:O	1:A:454:ILE:C	2.60	0.43
1:A:463:LEU:O	1:A:464:VAL:HG13	2.18	0.43
1:A:243:LYS:O	1:A:244:GLU:C	2.61	0.43
1:A:368:LEU:HB2	2:A:500:HEM:HAA2	2.01	0.43
1:A:51:LYS:HG2	1:A:213:PRO:HG3	2.01	0.43
1:B:47:GLN:HE21	1:B:47:GLN:HB2	1.60	0.43
1:B:111:ASP:O	1:B:112:ARG:HG3	2.19	0.43
1:B:148:GLN:CD	1:B:338:ILE:HD13	2.44	0.43
1:B:343:ASP:O	1:B:347:MET:HG3	2.19	0.43
1:B:350:MET:HE3	1:B:350:MET:HA	2.01	0.43
1:A:59:ARG:HH12	1:A:63:ARG:HH21	1.66	0.43
1:B:126:ARG:NH1	2:B:500:HEM:O1D	2.45	0.43
1:B:221:PHE:HB2	1:B:225:LEU:HD22	2.00	0.42
1:A:359:ARG:NH1	1:A:413:HIS:HD1	2.17	0.42
1:A:285:THR:HG22	1:A:286:MET:N	2.35	0.42
1:B:317:LYS:HG2	1:B:318:TYR:CZ	2.54	0.42
1:A:382:LEU:HG	1:A:384:PRO:HD3	2.02	0.42
1:A:490:ILE:HA	1:A:491:PRO:HD3	1.86	0.42
1:B:431:SER:CB	2:B:500:HEM:HBA1	2.50	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:110:ARG:HH21	1:B:118:ASN:HB2	1.85	0.42
1:B:374:ARG:O	1:B:376:THR:OG1	2.34	0.42
1:A:212:THR:O	1:A:213:PRO:C	2.61	0.42
1:A:160:LYS:HE3	1:A:160:LYS:HB2	1.81	0.42
1:A:400:ASN:H	1:A:400:ASN:ND2	2.17	0.42
1:B:62:GLN:HA	1:B:62:GLN:OE1	2.20	0.41
1:A:338:ILE:HG13	1:A:339:PRO:CD	2.46	0.41
1:A:436:VAL:O	1:A:437:CYS:C	2.63	0.41
1:B:102:ASP:OD1	1:B:110:ARG:HD3	2.20	0.41
1:B:141:GLN:HE21	1:B:141:GLN:HA	1.85	0.41
1:B:303:THR:CG2	3:B:501:4PZ:H5	2.50	0.41
1:B:467:LYS:HA	1:B:467:LYS:HE3	2.03	0.41
1:A:84:LYS:HG2	1:A:379:ARG:NH1	2.36	0.41
1:A:100:ARG:HD3	1:A:369:PRO:O	2.21	0.41
1:A:171:LEU:C	1:A:171:LEU:HD23	2.46	0.41
1:B:195:LYS:HD3	1:B:195:LYS:HA	1.88	0.41
1:B:144:GLU:OE1	1:B:341:ILE:HG13	2.20	0.41
1:A:325:LEU:HD21	1:A:353:VAL:HG11	2.02	0.41
1:B:187:LYS:HD3	1:B:189:PHE:CZ	2.55	0.41
1:B:96:GLU:OE1	1:B:96:GLU:N	2.52	0.40
1:B:166:PHE:CE2	1:B:489:VAL:HG22	2.57	0.40
1:B:367:ASN:HB2	1:B:391:PRO:O	2.22	0.40
1:A:96:GLU:O	1:A:372:ALA:HA	2.21	0.40
1:A:435:ARG:N	4:A:531:HOH:O	2.40	0.40
1:B:83:TYR:OH	1:B:87:LYS:HE2	2.21	0.40
1:B:377:ILE:O	1:B:377:ILE:CG2	2.70	0.40
1:B:266:THR:O	1:B:270:LEU:HD22	2.22	0.40
1:B:281:GLU:CD	1:B:281:GLU:H	2.29	0.40
1:B:407:GLU:OE1	1:B:407:GLU:N	2.42	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	458/476 (96%)	421 (92%)	36 (8%)	1 (0%)	43	66
1	B	457/476 (96%)	427 (93%)	29 (6%)	1 (0%)	43	66
All	All	915/952 (96%)	848 (93%)	65 (7%)	2 (0%)	43	66

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	379	ARG
1	A	462	PRO

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	417/428 (97%)	358 (86%)	59 (14%)	3	6
1	B	416/428 (97%)	363 (87%)	53 (13%)	4	9
All	All	833/856 (97%)	721 (87%)	112 (13%)	4	7

All (112) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	31	LYS
1	A	72	VAL
1	A	84	LYS
1	A	90	LEU
1	A	95	ASP
1	A	103	LEU
1	A	110	ARG
1	A	114	ILE
1	A	121	THR
1	A	149	ARG
1	A	159	ARG
1	A	169	THR
1	A	172	ILE
1	A	184	LEU

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Mol	Chain	Res	Type
1	A	186	ARG
1	A	193	ASP
1	A	194	GLU
1	A	199	LEU
1	A	215	LEU
1	A	225	LEU
1	A	231	SER
1	A	234	LYS
1	A	237	LYS
1	A	249	ARG
1	A	258	ASP
1	A	261	CYS
1	A	266	THR
1	A	270	LEU
1	A	275	LYS
1	A	283	LEU
1	A	310	TYR
1	A	312	LEU
1	A	320	GLU
1	A	323	GLU
1	A	324	LYS
1	A	325	LEU
1	A	336	SER
1	A	338	ILE
1	A	341	ILE
1	A	344	ARG
1	A	345	GLN
1	A	346	GLU
1	A	359	ARG
1	A	364	VAL
1	A	368	LEU
1	A	377	ILE
1	A	383	ILE
1	A	392	THR
1	A	400	ASN
1	A	408	LYS
1	A	412	GLU
1	A	420	LYS
1	A	428	LYS
1	A	450	LEU
1	A	461	LYS
1	A	467	LYS

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Mol	Chain	Res	Type
1	A	471	LEU
1	A	487	LEU
1	A	493	SER
1	B	47	GLN
1	B	50	LEU
1	B	59	ARG
1	B	70	LEU
1	B	72	VAL
1	B	74	SER
1	B	75	GLN
1	B	90	LEU
1	B	103	LEU
1	B	121	THR
1	B	141	GLN
1	B	159	ARG
1	B	162	GLN
1	B	184	LEU
1	B	186	ARG
1	B	195	LYS
1	B	199	LEU
1	B	215	LEU
1	B	219	ASN
1	B	225	LEU
1	B	228	LEU
1	B	249	ARG
1	B	251	LYS
1	B	253	HIS
1	B	266	THR
1	B	270	LEU
1	B	276	GLU
1	B	278	HIS
1	B	305	SER
1	B	310	TYR
1	B	312	LEU
1	B	325	LEU
1	B	327	GLU
1	B	336	SER
1	B	338	ILE
1	B	341	ILE
1	B	350	MET
1	B	359	ARG
1	B	364	VAL

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Mol	Chain	Res	Type
1	B	368	LEU
1	B	377	ILE
1	B	385	LYS
1	B	392	THR
1	B	408	LYS
1	B	412	GLU
1	B	422	LYS
1	B	428	LYS
1	B	450	LEU
1	B	459	ASN
1	B	465	ASP
1	B	467	LYS
1	B	471	LEU
1	B	487	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (12) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	135	ASN
1	A	141	GLN
1	A	192	ASN
1	A	220	ASN
1	A	278	HIS
1	A	326	HIS
1	B	107	HIS
1	B	141	GLN
1	B	216	GLN
1	B	220	ASN
1	B	459	ASN
1	B	494	HIS

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

4 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	4PZ	A	501	2	6,6,6	1.70	1 (16%)	7,7,7	5.68	6 (85%)
2	HEM	B	500	1,3	50,50,50	1.76	14 (28%)	67,82,82	1.81	18 (26%)
2	HEM	A	500	1,3	50,50,50	1.64	11 (22%)	67,82,82	1.55	16 (23%)
3	4PZ	B	501	2	6,6,6	1.54	2 (33%)	7,7,7	6.03	5 (71%)

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	4PZ	A	501	2	-	-	0/1/1/1
2	HEM	B	500	1,3	-	1/14/54/54	-
2	HEM	A	500	1,3	-	6/14/54/54	-
3	4PZ	B	501	2	-	-	0/1/1/1

All (28) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	500	HEM	C3D-C2D	5.81	1.49	1.36
2	B	500	HEM	C3D-C2D	5.44	1.48	1.36
2	A	500	HEM	FE-NA	-3.34	1.84	1.95
2	B	500	HEM	FE-NA	-3.19	1.84	1.95
3	A	501	4PZ	N2-N1	3.19	1.43	1.35
2	B	500	HEM	FE-NC	-3.03	1.85	1.95

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	500	HEM	FE-ND	2.96	2.04	1.94
2	B	500	HEM	CAC-C3C	2.95	1.55	1.47
2	A	500	HEM	CAC-C3C	2.94	1.55	1.47
2	B	500	HEM	CAB-C3B	2.92	1.55	1.47
2	A	500	HEM	CAB-C3B	2.86	1.55	1.47
2	B	500	HEM	CMA-C3A	2.80	1.56	1.50
3	B	501	4PZ	N2-N1	2.73	1.41	1.35
2	B	500	HEM	FE-NB	-2.62	1.86	1.94
2	B	500	HEM	CMC-C2C	2.46	1.55	1.50
2	A	500	HEM	C3C-C2C	-2.40	1.32	1.37
2	A	500	HEM	C4B-NB	2.34	1.43	1.38
2	A	500	HEM	CMD-C2D	2.32	1.55	1.50
2	A	500	HEM	CMC-C2C	2.23	1.55	1.50
2	B	500	HEM	CAA-C2A	2.22	1.57	1.51
2	A	500	HEM	CMB-C2B	2.19	1.55	1.50
2	B	500	HEM	C3C-C2C	-2.15	1.32	1.37
2	B	500	HEM	C4B-NB	2.11	1.43	1.38
2	B	500	HEM	C2A-C3A	-2.06	1.33	1.38
2	A	500	HEM	CAA-C2A	2.05	1.56	1.51
2	B	500	HEM	CMD-C2D	2.05	1.55	1.50
3	B	501	4PZ	C3-N2	2.04	1.37	1.34
2	A	500	HEM	C2A-C3A	-2.03	1.33	1.38

All (45) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	501	4PZ	C4-C5-N1	-12.46	102.22	112.88
3	A	501	4PZ	C4-C5-N1	-12.17	102.47	112.88
3	B	501	4PZ	C3-C4-C5	5.97	115.58	103.17
3	A	501	4PZ	C3-C4-C5	5.73	115.08	103.17
3	B	501	4PZ	C19-C4-C5	-5.51	122.32	127.85
3	B	501	4PZ	C4-C3-N2	-4.69	103.38	107.57
2	B	500	HEM	C2A-C1A-NA	4.64	115.30	110.15
3	A	501	4PZ	C19-C4-C5	-4.39	123.45	127.85
2	B	500	HEM	C4A-NA-C1A	-3.79	99.65	105.82
3	A	501	4PZ	C4-C3-N2	-3.44	104.50	107.57
2	B	500	HEM	C3D-C4D-ND	3.23	113.72	110.17
2	B	500	HEM	CHA-C1A-C2A	-3.07	118.58	125.30
2	A	500	HEM	CAD-CBD-CGD	-3.05	105.59	113.67
2	B	500	HEM	C3B-C4B-NB	2.99	111.62	109.47
2	A	500	HEM	C2A-C1A-NA	2.91	113.39	110.15
2	A	500	HEM	C4A-NA-C1A	-2.90	101.10	105.82

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	500	HEM	C1C-CHC-C4B	-2.89	119.88	126.02
2	B	500	HEM	CMD-C2D-C1D	2.82	129.43	125.03
2	B	500	HEM	C1D-C2D-C3D	-2.80	104.03	106.98
2	B	500	HEM	CBD-CAD-C3D	-2.80	104.78	112.53
2	B	500	HEM	C1B-NB-C4B	-2.76	101.94	105.21
2	A	500	HEM	C1D-C2D-C3D	-2.75	104.09	106.98
2	B	500	HEM	C2D-C1D-ND	2.70	113.02	109.90
2	B	500	HEM	O2A-CGA-CBA	2.66	122.42	114.00
2	B	500	HEM	C1A-CHA-C4D	-2.66	119.98	126.25
3	A	501	4PZ	C5-N1-N2	2.63	110.88	105.75
2	A	500	HEM	C1C-CHC-C4B	-2.62	120.44	126.02
3	B	501	4PZ	C5-N1-N2	2.54	110.72	105.75
2	A	500	HEM	C2D-C1D-ND	2.48	112.77	109.90
2	A	500	HEM	C1A-CHA-C4D	-2.45	120.48	126.25
2	A	500	HEM	CMD-C2D-C1D	2.45	128.86	125.03
2	A	500	HEM	CHA-C4D-C3D	-2.44	120.73	125.23
2	A	500	HEM	C3B-C4B-NB	2.43	111.21	109.47
2	A	500	HEM	CHA-C1A-C2A	-2.38	120.09	125.30
2	B	500	HEM	CHA-C4D-C3D	-2.36	120.87	125.23
2	B	500	HEM	CHC-C1C-C2C	-2.34	120.63	125.49
2	B	500	HEM	C4C-NC-C1C	-2.27	102.12	105.82
2	A	500	HEM	O2A-CGA-CBA	2.26	121.14	114.00
2	A	500	HEM	C4A-CHB-C1B	-2.22	121.03	126.25
2	A	500	HEM	C1B-NB-C4B	-2.22	102.58	105.21
2	A	500	HEM	CHC-C4B-NB	2.19	126.78	124.42
2	B	500	HEM	CHC-C1C-NC	2.11	126.75	124.45
2	A	500	HEM	CHA-C4D-ND	2.08	126.94	124.37
2	B	500	HEM	O2D-CGD-CBD	2.03	120.42	114.00
3	A	501	4PZ	C3-N2-N1	-2.03	107.08	111.25

There are no chirality outliers.

All (7) torsion outliers are listed below:

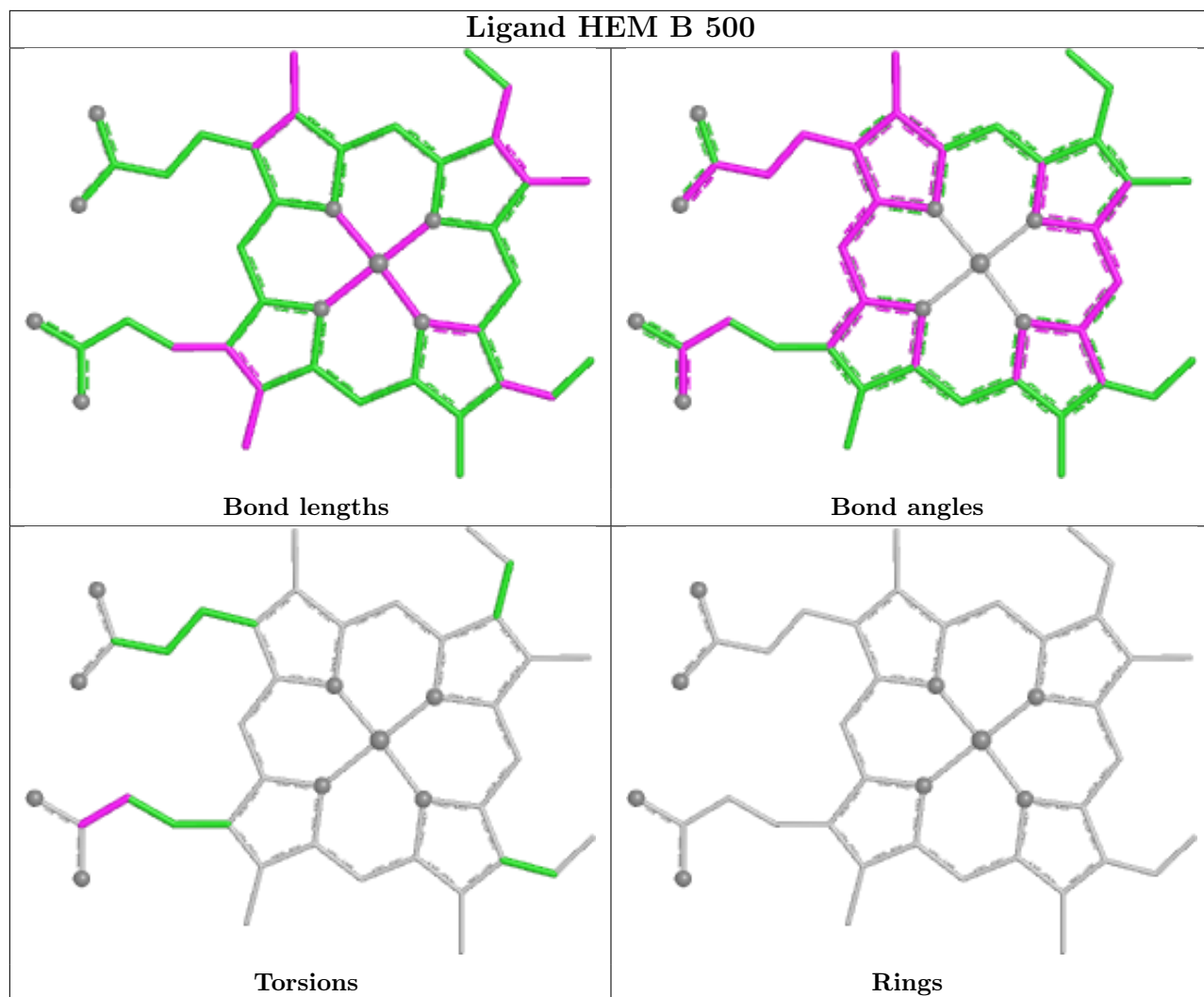
Mol	Chain	Res	Type	Atoms
2	A	500	HEM	C2C-C3C-CAC-CBC
2	A	500	HEM	CAD-CBD-CGD-O1D
2	A	500	HEM	CAD-CBD-CGD-O2D
2	A	500	HEM	C4C-C3C-CAC-CBC
2	A	500	HEM	CAA-CBA-CGA-O2A
2	A	500	HEM	C4D-C3D-CAD-CBD
2	B	500	HEM	CAA-CBA-CGA-O2A

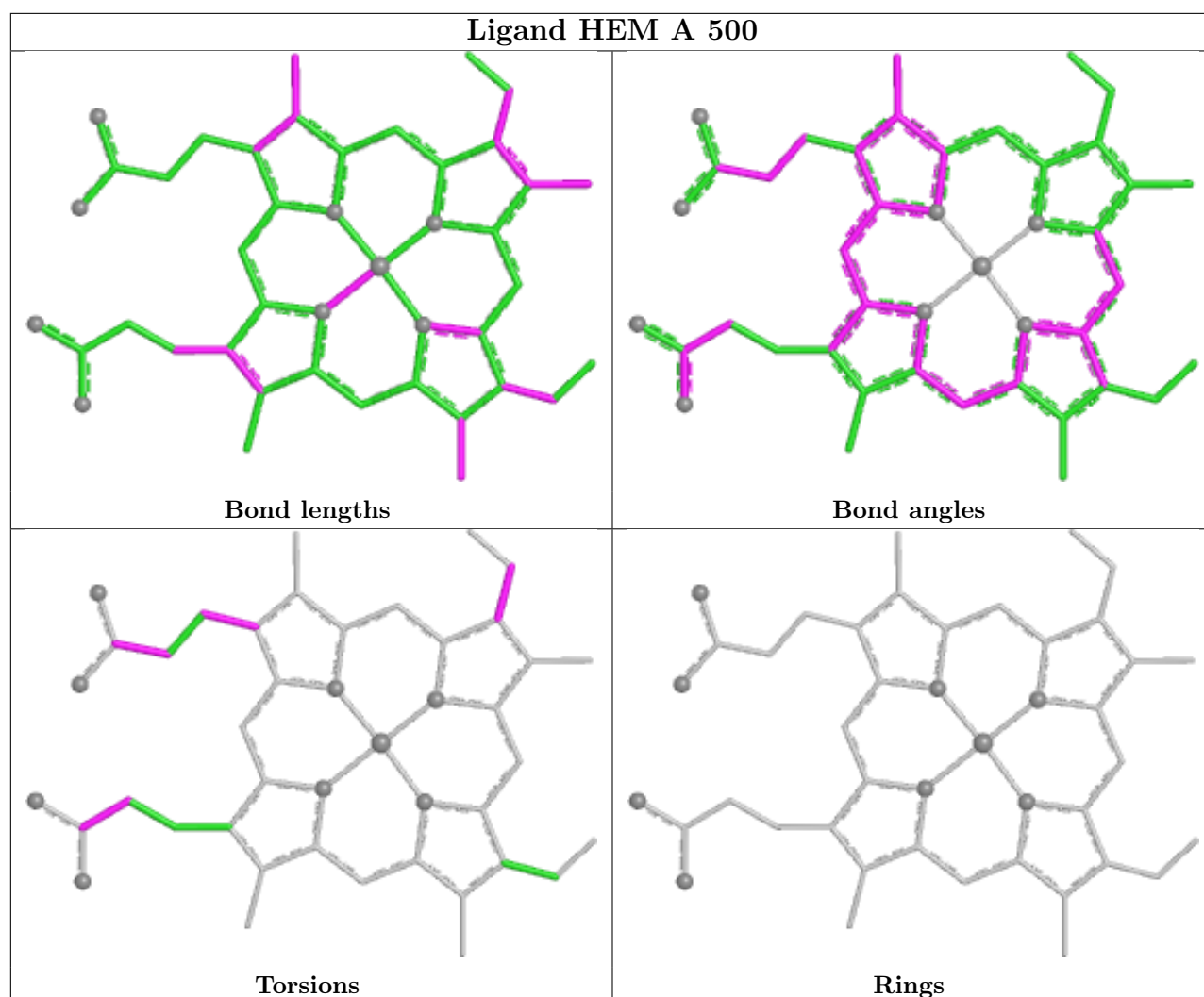
There are no ring outliers.

4 monomers are involved in 27 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	501	4PZ	6	0
2	B	500	HEM	8	0
2	A	500	HEM	17	0
3	B	501	4PZ	2	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.





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	461/476 (96%)	-1.49	0 100 100	27, 49, 73, 95	1 (0%)
1	B	461/476 (96%)	-1.49	0 100 100	31, 49, 72, 92	0
All	All	922/952 (96%)	-1.49	0 100 100	27, 49, 72, 95	1 (0%)

There are no RSRZ outliers to report.

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.

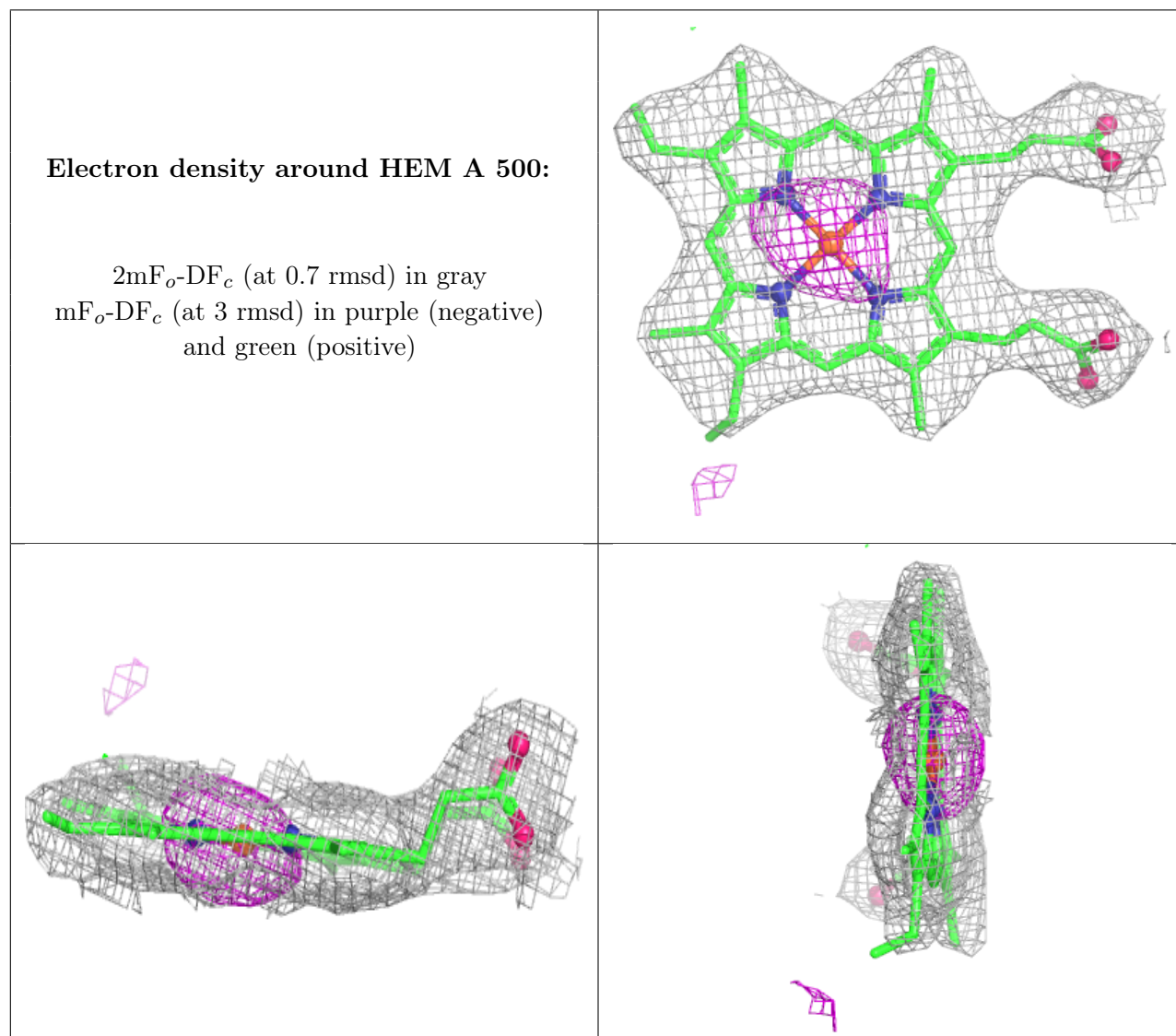
6.4 Ligands [i](#)

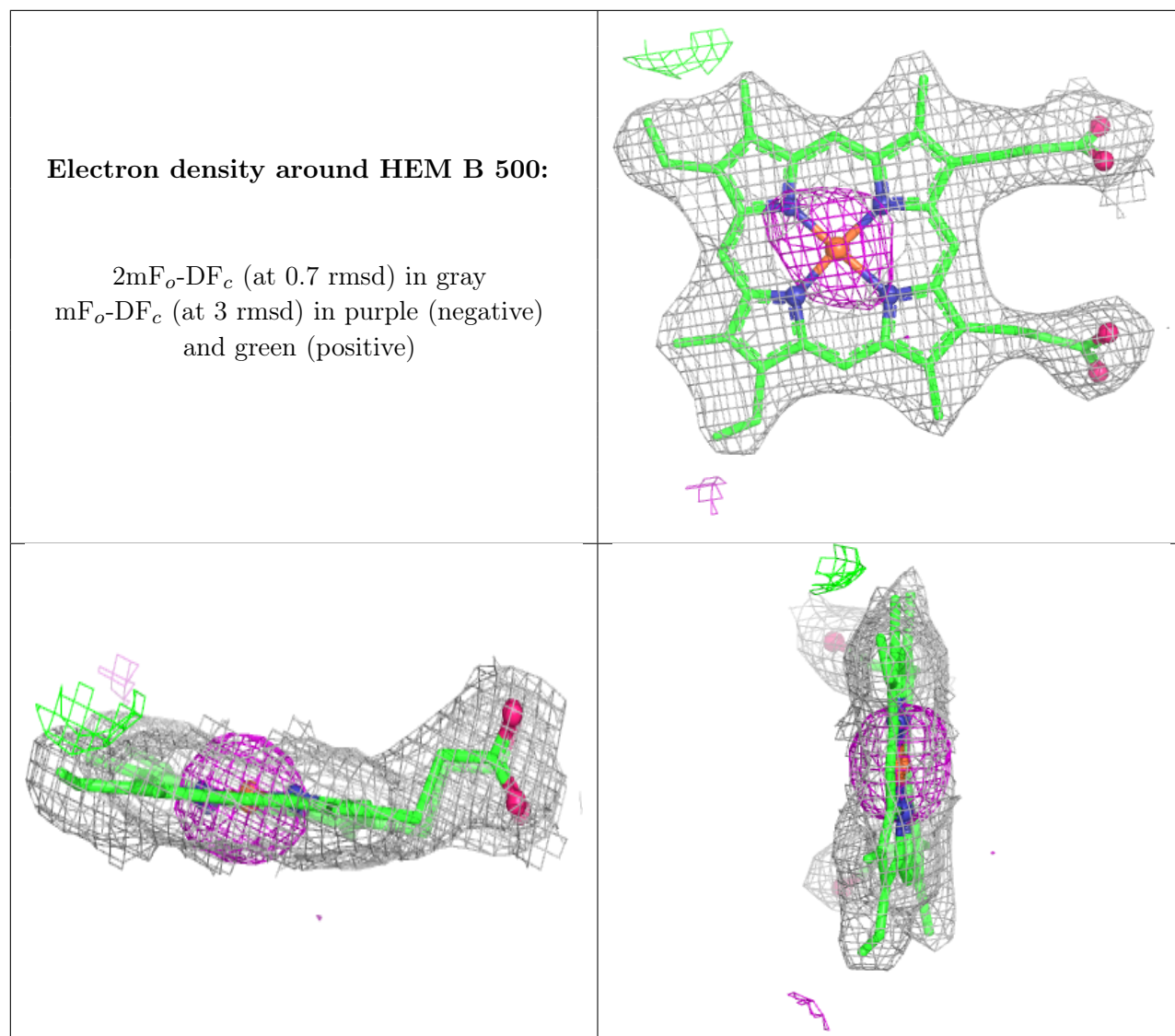
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled ‘Q< 0.9’ lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	HEM	A	500	43/43	0.99	0.04	13,33,44,45	0
2	HEM	B	500	43/43	0.99	0.04	13,32,42,43	0
3	4PZ	A	501	6/6	0.99	0.06	54,56,58,59	0
3	4PZ	B	501	6/6	0.99	0.06	53,54,55,57	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.





6.5 Other polymers [i](#)

There are no such residues in this entry.