



# Full wwPDB X-ray Structure Validation Report ⓘ

Oct 6, 2023 – 01:43 AM EDT

PDB ID : 8FGP  
Title : Structure of human endothelial nitric oxide synthase heme domain in complex with 6-(5-(2-(dimethylamino)ethyl)-2,3-difluorophenethyl)-4-methoxypyridin-2-amine  
Authors : Li, H.; Poulos, T.L.  
Deposited on : 2022-12-12  
Resolution : 1.88 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](mailto: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 : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtrriage (Phenix) : 1.13  
EDS : 2.35.1  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.35.1

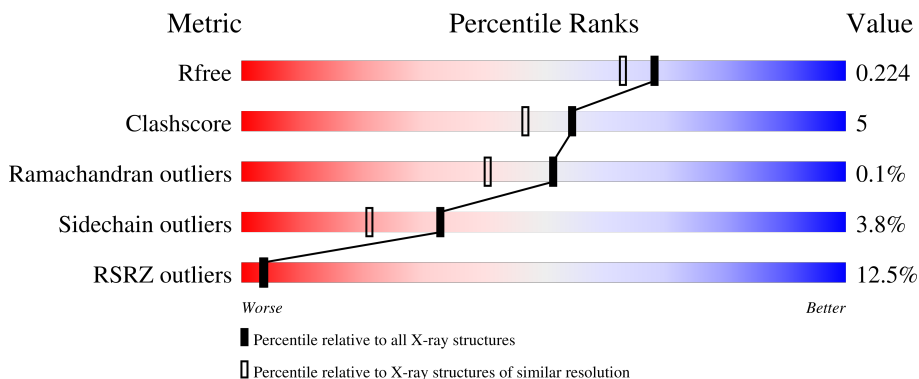
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.88 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))
$R_{free}$	130704	9470 (1.90-1.86)
Clashscore	141614	10282 (1.90-1.86)
Ramachandran outliers	138981	10152 (1.90-1.86)
Sidechain outliers	138945	10152 (1.90-1.86)
RSRZ outliers	127900	9303 (1.90-1.86)

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  $\geq 3$ , 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	440	
1	B	440	
1	C	440	
1	D	440	

## 2 Entry composition

There are 10 unique types of molecules in this entry. The entry contains 14114 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, endothelial.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	401	3207	2043	564	584	16	0	1	0
1	B	402	3222	2051	568	587	16	0	3	0
1	C	402	3212	2046	565	585	16	0	1	0
1	D	402	3214	2046	567	585	16	0	1	0

There are 4 discrepancies between the modelled and reference sequences:

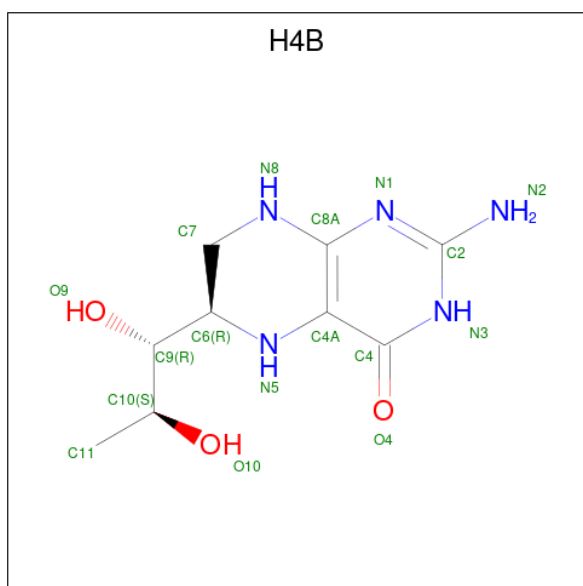
Chain	Residue	Modelled	Actual	Comment	Reference
A	298	GLU	ASP	variant	UNP P29474
B	298	GLU	ASP	variant	UNP P29474
C	298	GLU	ASP	variant	UNP P29474
D	298	GLU	ASP	variant	UNP P29474

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



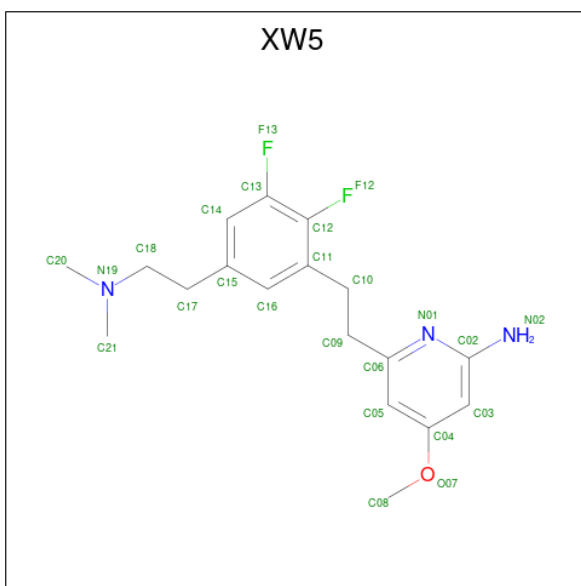
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	
			Total	C	Fe	N			O
2	A	1	Total 43	C 34	Fe 1	N 4	O 4	0	0
2	B	1	Total 43	C 34	Fe 1	N 4	O 4	0	0
2	C	1	Total 43	C 34	Fe 1	N 4	O 4	0	0
2	D	1	Total 43	C 34	Fe 1	N 4	O 4	0	0

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



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

- Molecule 4 is 6-(2-{5-[2-(dimethylamino)ethyl]-2,3-difluorophenyl}ethyl)-4-methoxypyridin-2-amine (three-letter code: XW5) (formula: C<sub>18</sub>H<sub>23</sub>F<sub>2</sub>N<sub>3</sub>O) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	A	1	Total	C	F	N	O	0	0
			24	18	2	3	1		
4	B	1	Total	C	F	N	O	0	0
			24	18	2	3	1		
4	C	1	Total	C	F	N	O	0	0
			24	18	2	3	1		
4	D	1	Total	C	F	N	O	0	0
			24	18	2	3	1		

- Molecule 5 is 2-[BIS-(2-HYDROXY-ETHYL)-AMINO]-2-HYDROXYMETHYL-PROPAN E-1,3-DIOL (three-letter code: BTB) (formula: C<sub>8</sub>H<sub>19</sub>NO<sub>5</sub>).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
5	A	1	Total 14	8	1	5	0	0
5	A	1	Total 14	8	1	5	0	0
5	A	1	Total 14	8	1	5	0	0
5	B	1	Total 14	8	1	5	0	0
5	B	1	Total 14	8	1	5	0	0
5	C	1	Total 14	8	1	5	0	0
5	C	1	Total 14	8	1	5	0	0
5	D	1	Total 14	8	1	5	0	0
5	D	1	Total 14	8	1	5	0	0

- Molecule 6 is GLYCEROL (three-letter code: GOL) (formula: C<sub>3</sub>H<sub>8</sub>O<sub>3</sub>).



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

- Molecule 7 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	1	Total Cl 1 1	0	0
7	B	1	Total Cl 1 1	0	0
7	C	1	Total Cl 1 1	0	0
7	D	1	Total Cl 1 1	0	0

- Molecule 8 is GADOLINIUM ATOM (three-letter code: GD) (formula: Gd).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	A	1	Total Gd 1 1	0	0

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	B	2	Total 2	Gd 2	0	0
8	D	1	Total 1	Gd 1	0	0

- Molecule 9 is ZINC ION (three-letter code: ZN) (formula: Zn).

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

- Molecule 10 is water.

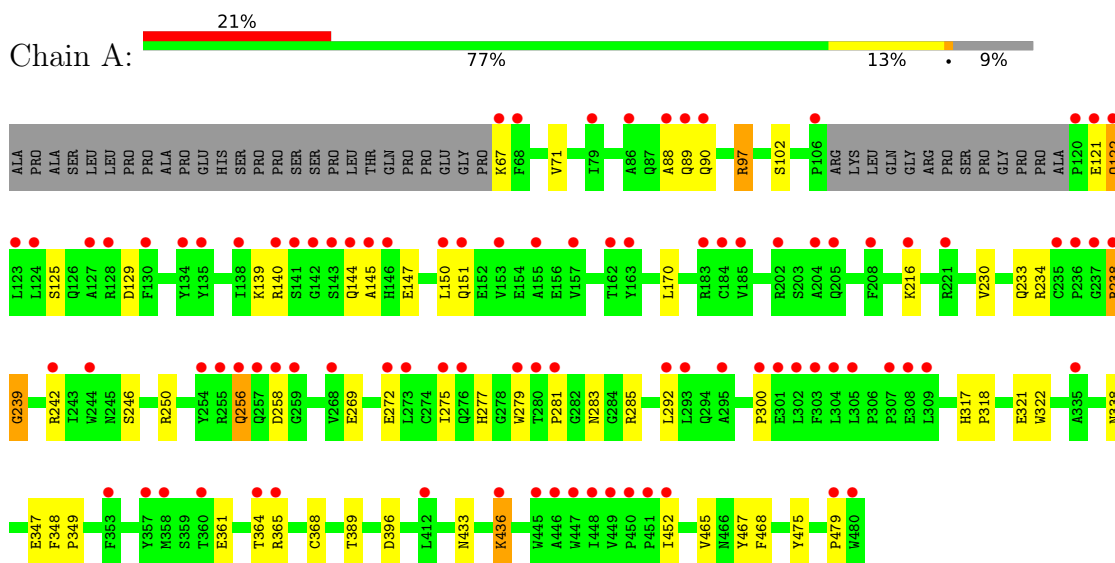
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
10	A	116	Total 116	O 116	0	0
10	B	233	Total 233	O 233	0	0
10	C	164	Total 164	O 164	0	0
10	D	250	Total 250	O 250	0	0



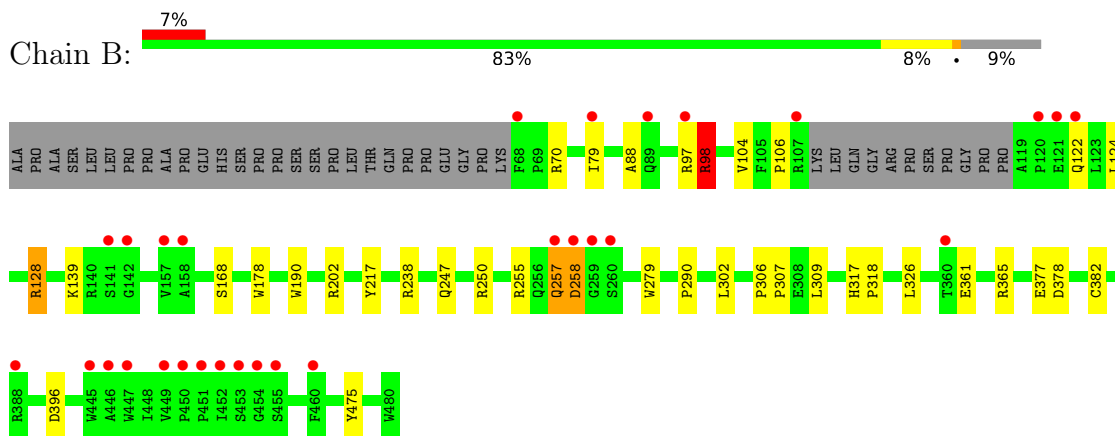
### 3 Residue-property plots i

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.

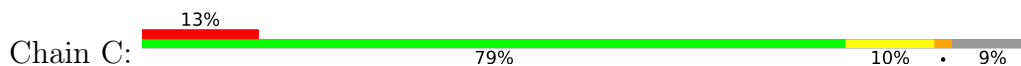
- Molecule 1: Nitric oxide synthase, endothelial

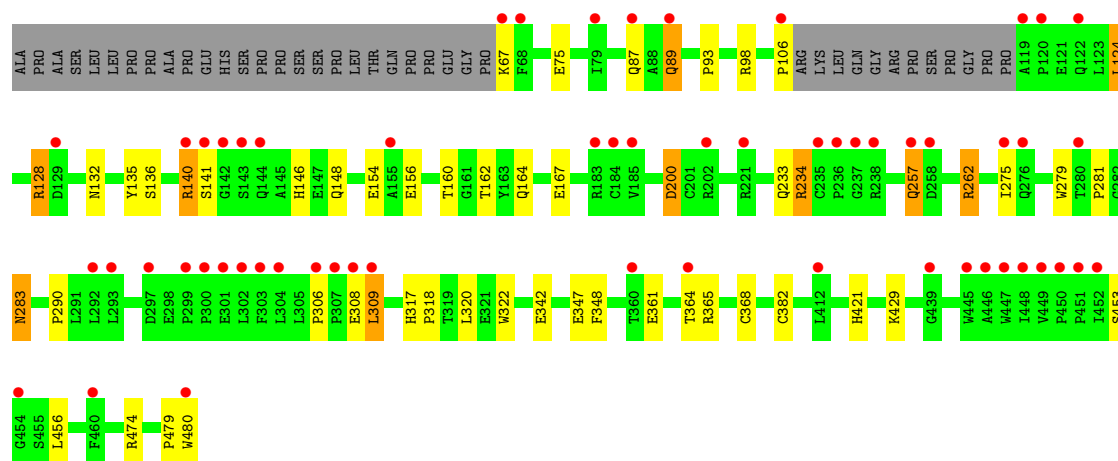


- Molecule 1: Nitric oxide synthase, endothelial

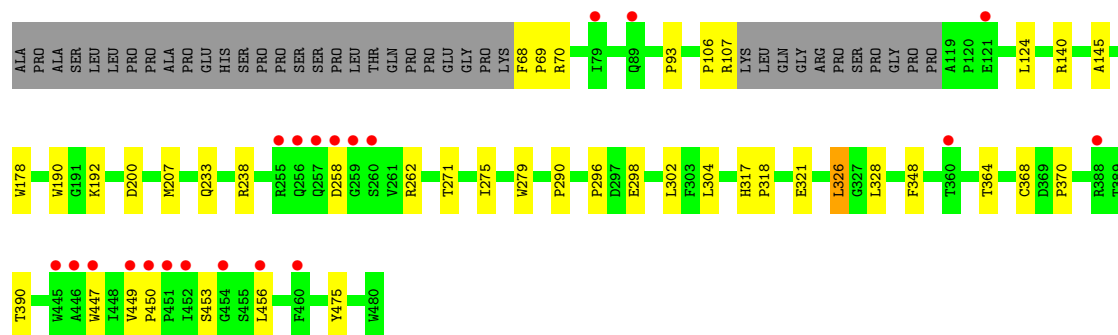
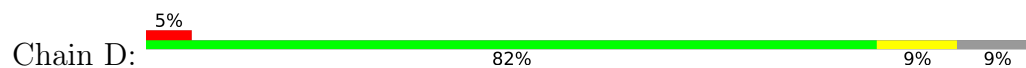


- Molecule 1: Nitric oxide synthase, endothelial





- Molecule 1: Nitric oxide synthase, endothelial



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	60.09Å 152.19Å 108.69Å 90.00° 90.90° 90.00°	Depositor
Resolution (Å)	39.25 – 1.88 39.25 – 1.88	Depositor EDS
% Data completeness (in resolution range)	98.8 (39.25-1.88) 99.0 (39.25-1.88)	Depositor EDS
$R_{merge}$	0.24	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.27 (at 1.88Å)	Xtrriage
Refinement program	PHENIX 1.11.1_2575	Depositor
R, $R_{free}$	0.191 , 0.229 0.186 , 0.224	Depositor DCC
$R_{free}$ test set	7860 reflections (5.02%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	31.2	Xtrriage
Anisotropy	0.954	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.35 , 59.4	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	0.084 for h,-k,-l	Xtrriage
$F_o, F_c$ correlation	0.97	EDS
Total number of atoms	14114	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	54.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.35% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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: H4B, XW5, GD, HEM, CL, BTB, ZN, GOL

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	0.34	0/3302	0.50	0/4498
1	B	0.39	0/3323	0.54	2/4528 (0.0%)
1	C	0.34	0/3307	0.50	0/4506
1	D	0.41	0/3309	0.54	0/4509
All	All	0.37	0/13241	0.52	2/18041 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	98	ARG	NE-CZ-NH1	8.20	124.40	120.30
1	B	98	ARG	NE-CZ-NH2	-6.01	117.30	120.30

There are no chirality outliers.

There are no planarity outliers.

### 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	3207	0	3112	37	0
1	B	3222	0	3127	27	0
1	C	3212	0	3116	29	0
1	D	3214	0	3116	21	0
2	A	43	0	30	3	0

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	B	43	0	30	3	0
2	C	43	0	30	2	0
2	D	43	0	30	4	0
3	A	17	0	15	2	0
3	B	17	0	15	1	0
3	C	17	0	15	1	0
3	D	17	0	15	1	0
4	A	24	0	0	2	0
4	B	24	0	0	1	0
4	C	24	0	0	1	0
4	D	24	0	0	1	0
5	A	42	0	57	6	0
5	B	28	0	37	2	0
5	C	28	0	37	3	0
5	D	28	0	37	10	0
6	A	12	0	16	0	0
6	B	6	0	8	0	0
6	C	6	0	8	0	0
7	A	1	0	0	0	0
7	B	1	0	0	0	0
7	C	1	0	0	0	0
7	D	1	0	0	0	0
8	A	1	0	0	0	0
8	B	2	0	0	0	0
8	D	1	0	0	0	0
9	A	1	0	0	0	0
9	C	1	0	0	0	0
10	A	116	0	0	2	0
10	B	233	0	0	6	0
10	C	164	0	0	2	0
10	D	250	0	0	1	0
All	All	14114	0	12851	135	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 5.

All (135) 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:B:98:ARG:HH11	1:B:98:ARG:HG3	1.32	0.94
1:B:247:GLN:HB2	1:B:250:ARG:HD3	1.60	0.81

*Continued on next page...*

*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:501:HEM:HBB2	2:C:501:HEM:HHC	1.69	0.74
1:C:257:GLN:NE2	10:C:602:HOH:O	2.20	0.74
5:D:504:BTB:O4	5:D:504:BTB:H82	1.91	0.70
1:C:382:CYS:HA	5:C:504:BTB:H12	1.73	0.70
1:D:321:GLU:OE2	5:D:504:BTB:O4	2.08	0.70
1:A:147:GLU:HA	1:A:150:LEU:HD12	1.75	0.69
1:A:321:GLU:H	1:A:321:GLU:CD	1.94	0.69
2:A:501:HEM:HBB2	2:A:501:HEM:HHC	1.75	0.69
1:A:322:TRP:CD1	5:A:504:BTB:H61	2.27	0.68
1:A:238:ARG:NH2	1:A:239:GLY:O	2.26	0.68
1:C:365:ARG:HH12	3:C:502:H4B:C4	2.06	0.67
1:D:70:ARG:NH2	10:D:601:HOH:O	2.25	0.65
1:C:200:ASP:OD1	1:C:200:ASP:N	2.28	0.65
2:D:501:HEM:HMC2	2:D:501:HEM:HBC2	1.78	0.65
1:B:217:TYR:OH	10:B:601:HOH:O	2.12	0.64
1:A:234:ARG:NH1	1:A:347:GLU:OE1	2.30	0.63
2:D:501:HEM:HBB2	2:D:501:HEM:HHC	1.80	0.62
5:B:505:BTB:O3	5:B:505:BTB:O1	2.16	0.62
1:B:139:LYS:NZ	10:B:604:HOH:O	2.34	0.61
1:D:475:TYR:OH	2:D:501:HEM:O1D	2.17	0.60
1:A:365:ARG:HH12	3:A:502:H4B:C4	2.15	0.60
1:C:361:GLU:OE2	4:C:503:XW5:N02	2.34	0.60
1:C:453:SER:HB3	1:C:456:LEU:HD12	1.83	0.60
1:C:234:ARG:NH1	1:C:347:GLU:OE1	2.35	0.60
1:D:453:SER:HB3	1:D:456:LEU:HD12	1.83	0.60
1:A:102:SER:O	3:A:502:H4B:O10	2.21	0.59
5:A:506:BTB:O4	5:A:506:BTB:O3	2.10	0.59
2:B:501:HEM:HHC	2:B:501:HEM:HBB2	1.85	0.59
1:C:160:THR:HG23	1:C:162:THR:H	1.67	0.59
2:C:501:HEM:HBC2	2:C:501:HEM:HMC2	1.86	0.58
1:C:262:ARG:NH1	1:C:283:ASN:O	2.36	0.58
1:A:90:GLN:HB3	1:A:468:PHE:CD1	2.39	0.58
1:A:233:GLN:HB3	1:A:348:PHE:CE2	2.39	0.57
1:B:378:ASP:OD1	10:B:602:HOH:O	2.17	0.57
1:C:342:GLU:HG3	1:C:474:ARG:NH2	2.20	0.57
1:B:279:TRP:HB2	1:B:302:LEU:HD21	1.87	0.56
1:A:475:TYR:OH	2:A:501:HEM:O1D	2.16	0.56
2:B:501:HEM:HBC2	2:B:501:HEM:HMC2	1.87	0.56
1:C:156:GLU:O	1:C:160:THR:HG22	2.05	0.56
1:D:279:TRP:HB2	1:D:302:LEU:HD21	1.88	0.55
5:D:505:BTB:O4	5:D:505:BTB:O3	2.24	0.55

*Continued on next page...*

*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:277:HIS:CD2	1:A:300:PRO:HG2	2.42	0.55
1:B:382:CYS:SG	5:C:504:BTB:H42	2.47	0.55
1:C:75:GLU:HG3	1:D:370:PRO:HG2	1.88	0.54
1:B:258:ASP:OD1	1:B:258:ASP:N	2.34	0.54
1:C:167:GLU:OE1	10:C:601:HOH:O	2.18	0.54
1:D:140:ARG:HH12	1:D:145:ALA:HB3	1.72	0.54
1:B:475:TYR:OH	2:B:501:HEM:O1D	2.23	0.53
1:A:361:GLU:OE2	4:A:503:XW5:N02	2.42	0.53
1:A:242:ARG:HD2	1:A:349:PRO:HB2	1.91	0.52
1:C:233:GLN:HB3	1:C:348:PHE:CE2	2.45	0.51
1:D:290:PRO:HB3	1:D:304:LEU:HD23	1.93	0.51
1:A:97:ARG:HG3	1:B:88:ALA:HB3	1.92	0.50
1:A:144:GLN:HG3	1:A:145:ALA:H	1.77	0.49
1:A:433:ASN:HA	1:A:436:LYS:HE3	1.95	0.49
1:B:70:ARG:HD2	1:B:79:ILE:HD13	1.93	0.49
1:C:132:ASN:O	1:C:136:SER:OG	2.28	0.49
1:D:271:THR:O	1:D:275:ILE:HG12	2.13	0.49
1:A:275:ILE:HD11	1:A:281:PRO:HB3	1.94	0.49
1:A:88:ALA:O	1:B:97:ARG:NH1	2.47	0.48
1:D:178:TRP:CE3	1:D:190:TRP:HA	2.49	0.48
1:C:124:LEU:O	1:C:128:ARG:HG3	2.13	0.48
2:A:501:HEM:O2D	4:A:503:XW5:F13	2.22	0.47
1:A:147:GLU:O	1:A:151:GLN:NE2	2.46	0.47
1:D:93:PRO:HG3	1:D:106:PRO:HB3	1.96	0.47
5:A:505:BTB:H62	5:A:505:BTB:H71	1.57	0.47
1:B:317:HIS:CG	1:B:318:PRO:HD2	2.50	0.47
1:D:298:GLU:OE2	5:D:505:BTB:H41	2.15	0.47
1:D:317:HIS:CG	1:D:318:PRO:HD2	2.50	0.47
1:D:326:LEU:HB3	1:D:328:LEU:HG	1.97	0.47
1:D:238:ARG:HG2	1:D:296:PRO:HB3	1.97	0.47
1:A:233:GLN:HG2	10:A:603:HOH:O	2.14	0.47
1:B:98:ARG:HG3	1:B:98:ARG:NH1	2.07	0.46
1:C:156:GLU:OE2	1:C:164:GLN:HG2	2.16	0.46
1:C:479:PRO:HD2	1:C:480:TRP:CZ3	2.51	0.46
1:A:122:GLN:H	1:A:122:GLN:HG3	1.56	0.46
1:B:106:PRO:HB3	10:B:684:HOH:O	2.14	0.46
1:A:246:SER:HA	1:A:338:ASN:HB3	1.97	0.46
1:A:465:VAL:HG12	1:A:467:TYR:HD2	1.81	0.46
5:A:505:BTB:H72	5:A:505:BTB:H41	1.29	0.46
1:A:242:ARG:NH2	1:A:479:PRO:HD3	2.31	0.46
1:A:364:THR:O	1:A:368:CYS:HB2	2.17	0.46

*Continued on next page...*

*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:A:506:BTB:H12	5:A:506:BTB:H51	1.29	0.46
1:B:365:ARG:HH12	3:B:502:H4B:C4	2.29	0.46
5:C:505:BTB:H51	5:C:505:BTB:H32	1.50	0.46
1:A:71:VAL:HG12	10:A:634:HOH:O	2.16	0.45
5:D:504:BTB:H72	5:D:504:BTB:H11	1.51	0.45
1:C:364:THR:O	1:C:368:CYS:HB2	2.16	0.45
1:B:124:LEU:HB3	1:B:128:ARG:HH12	1.80	0.45
5:D:505:BTB:H62	5:D:505:BTB:H71	1.70	0.45
1:B:178:TRP:CE3	1:B:190:TRP:HA	2.52	0.45
1:A:364:THR:HG21	1:A:452:ILE:HG23	1.99	0.45
1:C:275:ILE:HD11	1:C:281:PRO:HB3	1.99	0.44
1:C:317:HIS:CG	1:C:318:PRO:HD2	2.52	0.44
5:D:504:BTB:H32	5:D:504:BTB:H51	1.61	0.44
1:B:361:GLU:OE2	4:B:503:XW5:N02	2.51	0.44
1:D:364:THR:O	1:D:368:CYS:HB2	2.18	0.44
1:B:250:ARG:NH2	10:B:609:HOH:O	2.45	0.44
1:C:132:ASN:HD22	1:C:146:HIS:CE1	2.36	0.43
1:A:317:HIS:CG	1:A:318:PRO:HD2	2.53	0.43
5:D:504:BTB:O4	5:D:504:BTB:C8	2.63	0.43
1:A:292:LEU:HD22	1:A:300:PRO:HB2	2.00	0.43
1:D:447:TRP:HA	3:D:502:H4B:N1	2.34	0.43
5:D:505:BTB:H62	5:D:505:BTB:H32	1.99	0.43
5:B:505:BTB:H72	5:B:505:BTB:H42	1.50	0.43
5:D:505:BTB:O4	5:D:505:BTB:H52	2.18	0.43
1:B:238:ARG:NH2	10:B:613:HOH:O	2.51	0.43
1:D:233:GLN:HB3	1:D:348:PHE:CE2	2.54	0.42
1:C:93:PRO:HG3	1:C:106:PRO:HB3	2.00	0.42
1:A:139:LYS:HE3	1:A:139:LYS:HB2	1.84	0.42
1:B:257:GLN:HG3	1:B:258:ASP:N	2.35	0.42
1:A:147:GLU:OE1	1:A:147:GLU:N	2.33	0.42
1:A:140:ARG:HD3	1:A:140:ARG:HA	1.93	0.41
1:A:250:ARG:HE	1:A:250:ARG:HA	1.85	0.41
1:C:135:TYR:HD1	1:C:140:ARG:HB2	1.86	0.41
1:B:279:TRP:CD1	1:B:290:PRO:HG3	2.55	0.41
1:D:449:VAL:HA	1:D:450:PRO:HD3	1.95	0.41
2:D:501:HEM:O2D	4:D:503:XW5:F13	2.29	0.41
1:A:170:LEU:HD11	1:A:230:VAL:HG21	2.02	0.41
5:A:504:BTB:H41	5:A:504:BTB:H72	1.96	0.41
1:B:250:ARG:HA	1:B:250:ARG:HD2	1.76	0.41
1:A:256:GLN:HB3	1:A:258:ASP:OD1	2.21	0.41
1:B:104:VAL:O	1:B:106:PRO:HD3	2.20	0.41

*Continued on next page...*



Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:306:PRO:HA	1:B:307:PRO:HD3	2.00	0.41
1:B:309:LEU:HD12	1:B:309:LEU:HA	1.85	0.41
1:C:320:LEU:HD13	1:C:322:TRP:CZ2	2.56	0.41
1:D:68:PHE:HA	1:D:69:PRO:HD3	1.99	0.41
1:A:269:GLU:O	1:A:272:GLU:HG2	2.20	0.40
1:C:279:TRP:CG	1:C:290:PRO:HG3	2.56	0.40
1:C:306:PRO:HD2	1:C:309:LEU:HD12	2.02	0.40
1:A:465:VAL:HG12	1:A:467:TYR:CD2	2.56	0.40
1:C:421:HIS:HB2	1:D:390:THR:HB	2.03	0.40
1:C:89:GLN:H	1:C:89:GLN:HG2	1.61	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	398/440 (90%)	377 (95%)	19 (5%)	2 (0%)	29	17
1	B	401/440 (91%)	392 (98%)	9 (2%)	0	100	100
1	C	399/440 (91%)	390 (98%)	9 (2%)	0	100	100
1	D	399/440 (91%)	395 (99%)	4 (1%)	0	100	100
All	All	1597/1760 (91%)	1554 (97%)	41 (3%)	2 (0%)	51	41

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	279	TRP
1	A	239	GLY

### 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	342/373 (92%)	327 (96%)	15 (4%)	28	16
1	B	344/373 (92%)	332 (96%)	12 (4%)	36	24
1	C	342/373 (92%)	324 (95%)	18 (5%)	22	11
1	D	342/373 (92%)	334 (98%)	8 (2%)	50	41
All	All	1370/1492 (92%)	1317 (96%)	53 (4%)	33	20

All (53) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	67	LYS
1	A	89	GLN
1	A	97	ARG
1	A	121	GLU
1	A	122	GLN
1	A	125	SER
1	A	129	ASP
1	A	216	LYS
1	A	238	ARG
1	A	256	GLN
1	A	283	ASN
1	A	285	ARG
1	A	389	THR
1	A	396	ASP
1	A	436	LYS
1	B	98	ARG
1	B	122	GLN
1	B	128	ARG
1	B	168[A]	SER
1	B	168[B]	SER
1	B	202	ARG
1	B	255	ARG
1	B	257	GLN
1	B	258	ASP

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type
1	B	326	LEU
1	B	377	GLU
1	B	396	ASP
1	C	67	LYS
1	C	87	GLN
1	C	89	GLN
1	C	98	ARG
1	C	124	LEU
1	C	128	ARG
1	C	140	ARG
1	C	141	SER
1	C	148	GLN
1	C	154	GLU
1	C	200	ASP
1	C	234	ARG
1	C	257	GLN
1	C	262	ARG
1	C	283	ASN
1	C	308	GLU
1	C	309	LEU
1	C	429	LYS
1	D	107	ARG
1	D	124	LEU
1	D	192	LYS
1	D	200	ASP
1	D	207	MET
1	D	258	ASP
1	D	262	ARG
1	D	326	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	276	GLN
1	A	277	HIS
1	C	89	GLN
1	C	132	ASN

### 5.3.3 RNA

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 35 ligands modelled in this entry, 10 are monoatomic - leaving 25 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
4	XW5	B	503	-	25,25,25	0.50	0	32,34,34	1.72	6 (18%)
5	BTB	C	505	-	13,13,13	0.92	1 (7%)	7,16,16	1.30	1 (14%)
3	H4B	C	502	-	16,18,18	1.06	1 (6%)	11,26,26	2.70	5 (45%)
5	BTB	A	506	-	13,13,13	0.87	0	7,16,16	1.26	1 (14%)
6	GOL	A	507	-	5,5,5	0.35	0	5,5,5	0.28	0
6	GOL	A	508	-	5,5,5	0.88	0	5,5,5	0.32	0
4	XW5	A	503	-	25,25,25	0.43	0	32,34,34	1.64	7 (21%)
5	BTB	B	505	-	13,13,13	0.34	0	7,16,16	0.47	0
3	H4B	A	502	-	16,18,18	1.09	1 (6%)	11,26,26	2.65	4 (36%)
3	H4B	B	502	-	16,18,18	1.14	1 (6%)	11,26,26	2.82	4 (36%)
2	HEM	A	501	1	41,50,50	1.51	4 (9%)	45,82,82	1.79	11 (24%)
4	XW5	C	503	-	25,25,25	0.54	0	32,34,34	1.87	6 (18%)
6	GOL	C	506	-	5,5,5	0.36	0	5,5,5	0.29	0
4	XW5	D	503	-	25,25,25	0.52	0	32,34,34	1.61	5 (15%)
2	HEM	C	501	1	41,50,50	1.50	4 (9%)	45,82,82	2.01	9 (20%)
5	BTB	C	504	8	13,13,13	0.47	0	7,16,16	1.12	1 (14%)
2	HEM	D	501	1	41,50,50	1.55	5 (12%)	45,82,82	1.71	11 (24%)
6	GOL	B	506	-	5,5,5	0.37	0	5,5,5	0.33	0
5	BTB	D	504	8	13,13,13	0.42	0	7,16,16	0.53	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
5	BTB	D	505	-	13,13,13	0.36	0	7,16,16	0.55	0
5	BTB	B	504	8	13,13,13	0.42	0	7,16,16	0.58	0
5	BTB	A	504	8	13,13,13	0.36	0	7,16,16	0.59	0
2	HEM	B	501	1	41,50,50	1.45	6 (14%)	45,82,82	1.50	8 (17%)
3	H4B	D	502	-	16,18,18	1.13	1 (6%)	11,26,26	2.72	5 (45%)
5	BTB	A	505	-	13,13,13	0.48	0	7,16,16	0.70	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
4	XW5	B	503	-	-	3/12/12/12	0/2/2/2
5	BTB	C	505	-	-	4/21/21/21	-
3	H4B	C	502	-	-	0/8/17/17	0/2/2/2
5	BTB	A	506	-	-	13/21/21/21	-
6	GOL	A	507	-	-	4/4/4/4	-
6	GOL	A	508	-	-	4/4/4/4	-
4	XW5	A	503	-	-	4/12/12/12	0/2/2/2
5	BTB	B	505	-	-	13/21/21/21	-
3	H4B	A	502	-	-	0/8/17/17	0/2/2/2
3	H4B	B	502	-	-	0/8/17/17	0/2/2/2
2	HEM	A	501	1	-	3/12/54/54	-
4	XW5	C	503	-	-	6/12/12/12	0/2/2/2
6	GOL	C	506	-	-	3/4/4/4	-
4	XW5	D	503	-	-	2/12/12/12	0/2/2/2
2	HEM	C	501	1	-	4/12/54/54	-
5	BTB	C	504	8	-	0/21/21/21	-
2	HEM	D	501	1	-	2/12/54/54	-
6	GOL	B	506	-	-	2/4/4/4	-
5	BTB	D	504	8	-	8/21/21/21	-
5	BTB	D	505	-	-	11/21/21/21	-
5	BTB	B	504	8	-	1/21/21/21	-
5	BTB	A	504	8	-	4/21/21/21	-
2	HEM	B	501	1	-	3/12/54/54	-
3	H4B	D	502	-	-	0/8/17/17	0/2/2/2
5	BTB	A	505	-	-	8/21/21/21	-

All (24) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	501	HEM	C3C-C2C	-3.89	1.35	1.40
2	D	501	HEM	C3C-CAC	3.86	1.55	1.47
2	A	501	HEM	C3C-C2C	-3.76	1.35	1.40
2	C	501	HEM	C3C-CAC	3.70	1.55	1.47
2	B	501	HEM	C3C-C2C	-3.66	1.35	1.40
2	C	501	HEM	C3C-C2C	-3.48	1.35	1.40
2	A	501	HEM	C3C-CAC	3.46	1.54	1.47
2	B	501	HEM	C3C-CAC	3.41	1.54	1.47
2	A	501	HEM	FE-NB	3.21	2.12	1.96
2	B	501	HEM	CAB-C3B	3.11	1.55	1.47
2	C	501	HEM	FE-NB	3.09	2.12	1.96
2	C	501	HEM	CAB-C3B	3.03	1.55	1.47
2	A	501	HEM	CAB-C3B	3.01	1.55	1.47
2	D	501	HEM	CAB-C3B	2.97	1.55	1.47
2	D	501	HEM	FE-NB	2.96	2.11	1.96
3	D	502	H4B	C4A-C4	-2.82	1.37	1.41
3	B	502	H4B	C4A-C4	-2.63	1.38	1.41
3	A	502	H4B	C4A-C4	-2.62	1.38	1.41
2	B	501	HEM	FE-NB	2.45	2.09	1.96
3	C	502	H4B	C4A-C4	-2.45	1.38	1.41
2	B	501	HEM	CMB-C2B	2.25	1.55	1.50
5	C	505	BTB	C2-N	-2.24	1.44	1.48
2	B	501	HEM	CMD-C2D	2.15	1.55	1.50
2	D	501	HEM	CMB-C2B	2.10	1.55	1.50

All (84) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	501	HEM	CBA-CAA-C2A	-7.43	99.94	112.62
3	B	502	H4B	C8A-C4A-C4	6.18	120.06	114.57
3	C	502	H4B	C8A-C4A-C4	6.09	119.98	114.57
3	A	502	H4B	C8A-C4A-C4	6.07	119.97	114.57
4	B	503	XW5	C02-N01-C06	6.06	122.69	118.10
3	D	502	H4B	C8A-C4A-C4	5.76	119.69	114.57
4	D	503	XW5	C02-N01-C06	5.65	122.38	118.10
4	C	503	XW5	C02-N01-C06	5.42	122.20	118.10
4	A	503	XW5	C02-N01-C06	4.75	121.70	118.10
4	C	503	XW5	F12-C12-C11	4.73	122.85	117.85
2	A	501	HEM	C4B-CHC-C1C	4.56	128.58	122.56
2	C	501	HEM	C4B-CHC-C1C	4.47	128.46	122.56
2	D	501	HEM	C4D-ND-C1D	4.08	109.28	105.07
4	A	503	XW5	F12-C12-C11	3.93	122.01	117.85

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	502	H4B	N1-C2-N3	-3.80	119.47	125.42
2	D	501	HEM	C3D-C4D-ND	-3.75	105.99	110.17
2	A	501	HEM	C4D-ND-C1D	3.71	108.90	105.07
3	D	502	H4B	C2-N3-C4	3.69	121.79	115.93
2	A	501	HEM	C1B-NB-C4B	3.64	108.84	105.07
3	D	502	H4B	N1-C2-N3	-3.63	119.73	125.42
4	D	503	XW5	F12-C12-C11	3.60	121.66	117.85
4	C	503	XW5	C05-C06-N01	-3.57	119.12	122.90
3	A	502	H4B	C2-N3-C4	3.55	121.56	115.93
3	B	502	H4B	C2-N3-C4	3.46	121.42	115.93
2	B	501	HEM	CAD-CBD-CGD	-3.45	106.17	113.60
3	C	502	H4B	C2-N3-C4	3.43	121.38	115.93
2	B	501	HEM	CBA-CAA-C2A	-3.40	106.81	112.62
4	B	503	XW5	C05-C06-N01	-3.39	119.31	122.90
4	B	503	XW5	F12-C12-C11	3.39	121.43	117.85
2	A	501	HEM	CBA-CAA-C2A	-3.38	106.85	112.62
2	D	501	HEM	CBA-CAA-C2A	-3.37	106.87	112.62
2	C	501	HEM	C4D-ND-C1D	3.37	108.55	105.07
4	B	503	XW5	N02-C02-N01	3.36	121.80	116.49
3	A	502	H4B	N1-C2-N3	-3.35	120.17	125.42
3	C	502	H4B	N1-C2-N3	-3.34	120.18	125.42
4	C	503	XW5	C09-C06-N01	3.33	120.91	115.95
2	D	501	HEM	CAD-CBD-CGD	-3.24	106.62	113.60
4	A	503	XW5	C05-C06-N01	-3.19	119.52	122.90
2	C	501	HEM	C1B-NB-C4B	3.19	108.36	105.07
4	A	503	XW5	C09-C06-N01	3.08	120.54	115.95
4	C	503	XW5	N02-C02-N01	3.02	121.27	116.49
4	C	503	XW5	C10-C11-C12	3.00	123.14	120.73
4	D	503	XW5	C05-C06-N01	-2.97	119.75	122.90
2	D	501	HEM	C4B-CHC-C1C	2.85	126.31	122.56
2	C	501	HEM	C3B-C2B-C1B	2.84	108.59	106.49
3	B	502	H4B	C2-N1-C8A	2.83	120.88	114.54
2	D	501	HEM	CMC-C2C-C3C	2.81	129.94	124.68
2	A	501	HEM	C3B-C2B-C1B	2.81	108.57	106.49
2	C	501	HEM	CMA-C3A-C4A	-2.80	124.16	128.46
2	D	501	HEM	C4C-CHD-C1D	2.77	126.22	122.56
2	A	501	HEM	C3D-C4D-ND	-2.74	107.12	110.17
4	B	503	XW5	C09-C06-N01	2.73	120.02	115.95
4	A	503	XW5	C16-C11-C12	2.66	119.19	116.76
2	C	501	HEM	C3D-C4D-ND	-2.59	107.29	110.17
4	D	503	XW5	C16-C11-C12	2.53	119.08	116.76
3	D	502	H4B	C2-N1-C8A	2.51	120.17	114.54

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	502	H4B	C2-N1-C8A	2.49	120.13	114.54
2	B	501	HEM	C3B-C2B-C1B	2.49	108.33	106.49
2	B	501	HEM	C4D-ND-C1D	2.47	107.62	105.07
4	D	503	XW5	N02-C02-N01	2.45	120.36	116.49
2	D	501	HEM	C1B-NB-C4B	2.43	107.59	105.07
4	A	503	XW5	C10-C11-C12	2.43	122.69	120.73
3	A	502	H4B	C2-N1-C8A	2.39	119.89	114.54
2	D	501	HEM	C3B-C2B-C1B	2.38	108.25	106.49
2	B	501	HEM	CMA-C3A-C4A	-2.36	124.83	128.46
4	A	503	XW5	N02-C02-N01	2.36	120.22	116.49
5	C	505	BTB	O4-C4-C2	-2.35	105.00	111.44
2	D	501	HEM	CBD-CAD-C3D	-2.32	106.19	112.63
4	B	503	XW5	C16-C11-C12	2.31	118.87	116.76
2	A	501	HEM	CHC-C4B-C3B	2.29	128.08	124.57
2	B	501	HEM	C3D-C4D-ND	-2.22	107.69	110.17
5	C	504	BTB	O3-C3-C2	2.18	117.40	111.44
2	B	501	HEM	C4B-CHC-C1C	2.17	125.43	122.56
5	A	506	BTB	O4-C4-C2	-2.14	105.58	111.44
3	C	502	H4B	N2-C2-N3	2.13	120.57	117.25
3	D	502	H4B	N2-C2-N1	2.13	120.56	117.25
2	A	501	HEM	CBD-CAD-C3D	-2.09	106.82	112.63
2	C	501	HEM	CHC-C4B-C3B	2.09	127.76	124.57
2	A	501	HEM	C2D-C1D-ND	-2.08	107.39	109.88
2	A	501	HEM	CMC-C2C-C3C	2.07	128.56	124.68
2	D	501	HEM	CHC-C4B-C3B	2.05	127.71	124.57
2	A	501	HEM	O1A-CGA-CBA	-2.04	116.53	123.08
2	B	501	HEM	CMC-C2C-C3C	2.02	128.46	124.68
2	C	501	HEM	C2D-C1D-ND	-2.01	107.47	109.88

There are no chirality outliers.

All (102) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	C	503	XW5	C09-C10-C11-C12
5	A	504	BTB	C1-C2-C3-O3
5	A	504	BTB	N-C2-C3-O3
5	A	505	BTB	C4-C2-N-C7
5	A	506	BTB	O1-C1-C2-C3
5	A	506	BTB	O1-C1-C2-C4
5	A	506	BTB	C1-C2-C3-O3
5	A	506	BTB	C4-C2-C3-O3
5	A	506	BTB	N-C2-C3-O3

*Continued on next page...*



*Continued from previous page...*

Mol	Chain	Res	Type	Atoms
5	A	506	BTB	C1-C2-N-C5
5	A	506	BTB	C1-C2-N-C7
5	A	506	BTB	C3-C2-N-C5
5	A	506	BTB	C3-C2-N-C7
5	A	506	BTB	C4-C2-N-C5
5	A	506	BTB	C4-C2-N-C7
5	B	505	BTB	O1-C1-C2-C3
5	B	505	BTB	O1-C1-C2-C4
5	B	505	BTB	O1-C1-C2-N
5	B	505	BTB	C1-C2-C4-O4
5	B	505	BTB	C3-C2-C4-O4
5	B	505	BTB	N-C2-C4-O4
5	C	505	BTB	C1-C2-C3-O3
5	C	505	BTB	C4-C2-C3-O3
5	C	505	BTB	N-C2-C3-O3
5	D	504	BTB	O1-C1-C2-C3
5	D	504	BTB	O1-C1-C2-C4
5	D	504	BTB	O1-C1-C2-N
5	D	504	BTB	C1-C2-C4-O4
5	D	504	BTB	C3-C2-C4-O4
5	D	504	BTB	N-C2-C4-O4
5	D	505	BTB	O1-C1-C2-C3
5	D	505	BTB	O1-C1-C2-C4
5	D	505	BTB	O1-C1-C2-N
5	D	505	BTB	C1-C2-C3-O3
5	D	505	BTB	C4-C2-C3-O3
5	D	505	BTB	N-C2-C3-O3
5	D	505	BTB	C6-C5-N-C7
5	D	505	BTB	N-C7-C8-O8
6	A	507	GOL	O1-C1-C2-C3
6	A	507	GOL	C1-C2-C3-O3
6	A	507	GOL	O2-C2-C3-O3
6	A	508	GOL	C1-C2-C3-O3
6	B	506	GOL	O1-C1-C2-C3
6	C	506	GOL	C1-C2-C3-O3
4	C	503	XW5	C09-C10-C11-C16
2	C	501	HEM	C3D-CAD-CBD-CGD
4	A	503	XW5	C17-C18-N19-C20
6	A	508	GOL	O2-C2-C3-O3
6	B	506	GOL	O1-C1-C2-O2
4	A	503	XW5	C17-C18-N19-C21
4	A	503	XW5	C09-C10-C11-C16

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	Atoms
5	C	505	BTB	N-C7-C8-O8
4	A	503	XW5	C15-C17-C18-N19
4	C	503	XW5	C15-C17-C18-N19
4	D	503	XW5	C15-C17-C18-N19
6	A	508	GOL	O1-C1-C2-C3
6	C	506	GOL	O1-C1-C2-C3
4	B	503	XW5	C15-C17-C18-N19
6	A	507	GOL	O1-C1-C2-O2
6	A	508	GOL	O1-C1-C2-O2
6	C	506	GOL	O2-C2-C3-O3
5	A	504	BTB	N-C7-C8-O8
5	B	505	BTB	N-C7-C8-O8
5	D	505	BTB	N-C5-C6-O6
4	C	503	XW5	C16-C15-C17-C18
4	C	503	XW5	C14-C15-C17-C18
4	B	503	XW5	C09-C10-C11-C16
4	D	503	XW5	C09-C10-C11-C16
2	A	501	HEM	C4B-C3B-CAB-CBB
2	B	501	HEM	C4B-C3B-CAB-CBB
2	C	501	HEM	C4B-C3B-CAB-CBB
2	D	501	HEM	C4B-C3B-CAB-CBB
5	A	505	BTB	C1-C2-C3-O3
5	A	505	BTB	N-C2-C4-O4
5	A	505	BTB	C1-C2-N-C5
5	A	505	BTB	C1-C2-N-C7
5	A	505	BTB	C3-C2-N-C7
5	A	505	BTB	C4-C2-N-C5
5	A	506	BTB	O1-C1-C2-N
5	B	504	BTB	O1-C1-C2-N
5	B	505	BTB	C1-C2-N-C5
5	B	505	BTB	C1-C2-N-C7
5	B	505	BTB	C3-C2-N-C5
5	B	505	BTB	C3-C2-N-C7
5	B	505	BTB	C4-C2-N-C7
5	D	504	BTB	C1-C2-N-C5
5	D	504	BTB	C3-C2-N-C5
5	A	506	BTB	N-C7-C8-O8
2	D	501	HEM	C2A-CAA-CBA-CGA
5	B	505	BTB	N-C5-C6-O6
2	B	501	HEM	CAA-CBA-CGA-O2A
2	B	501	HEM	CAA-CBA-CGA-O1A
2	A	501	HEM	CAA-CBA-CGA-O1A

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	Atoms
2	A	501	HEM	CAA-CBA-CGA-O2A
4	B	503	XW5	C17-C18-N19-C21
4	C	503	XW5	C17-C18-N19-C21
2	C	501	HEM	CAD-CBD-CGD-O2D
5	A	504	BTB	C4-C2-C3-O3
5	A	505	BTB	C4-C2-C3-O3
5	D	505	BTB	C1-C2-C4-O4
5	D	505	BTB	C3-C2-C4-O4
2	C	501	HEM	CAD-CBD-CGD-O1D

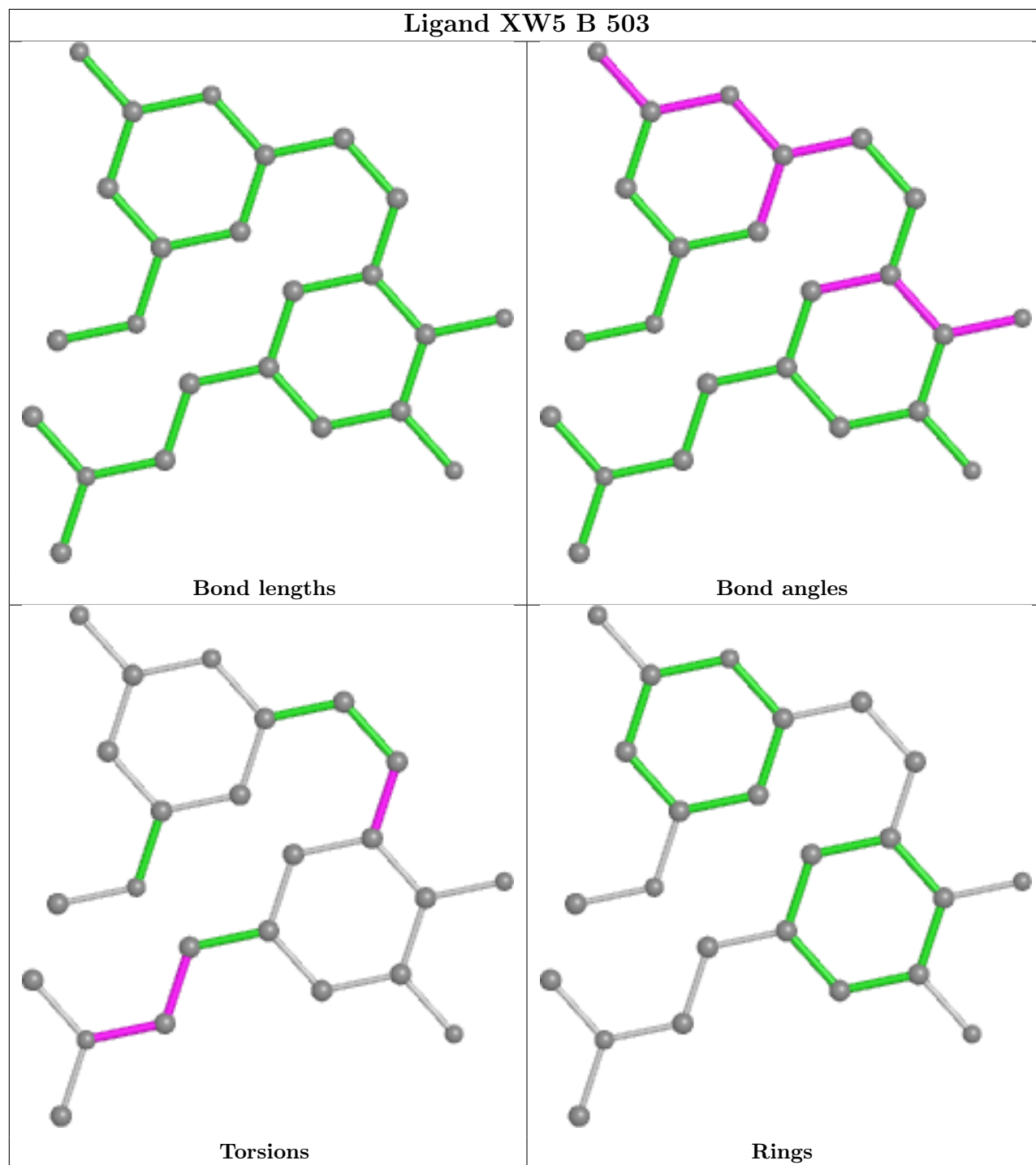
There are no ring outliers.

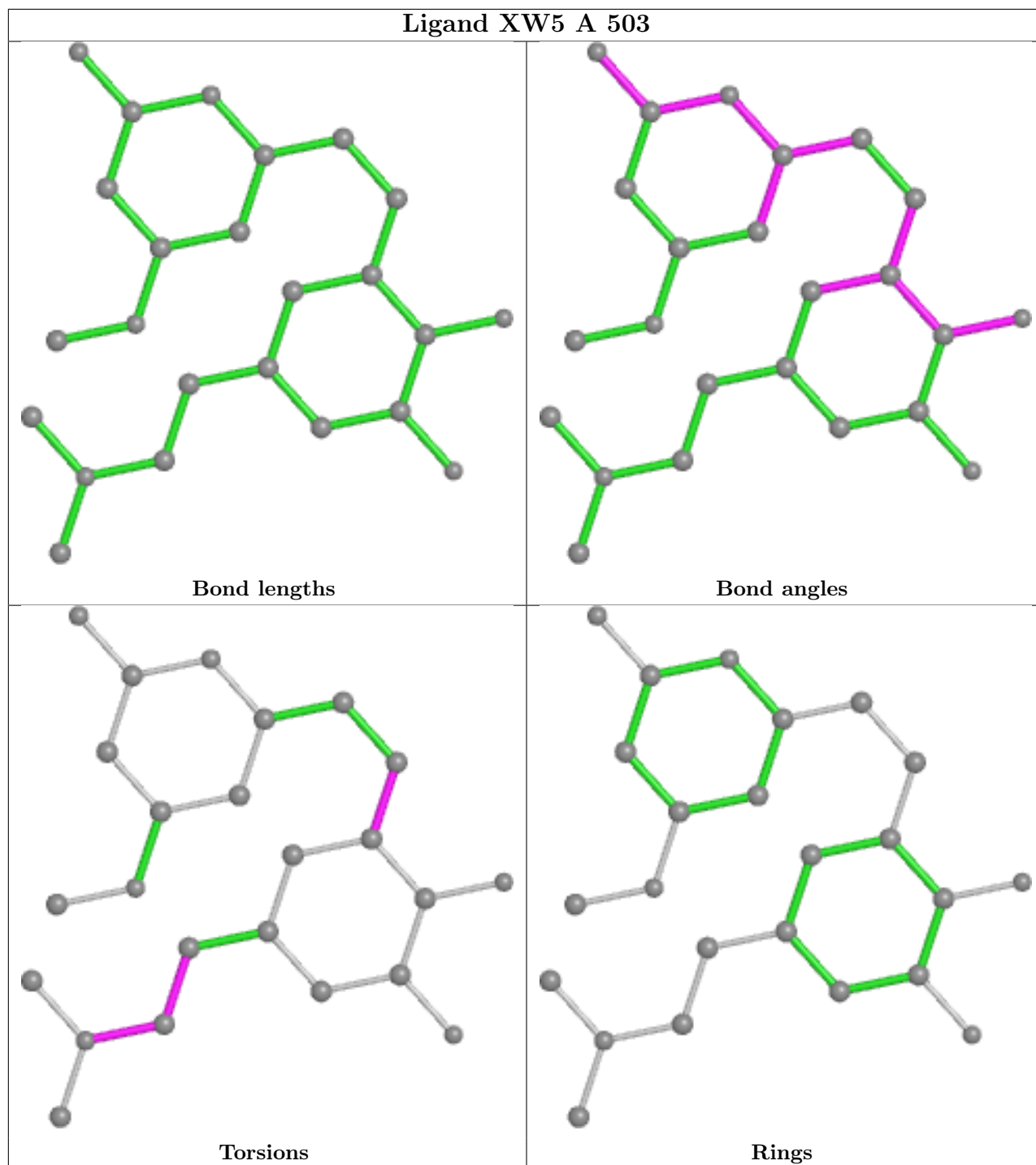
20 monomers are involved in 41 short contacts:

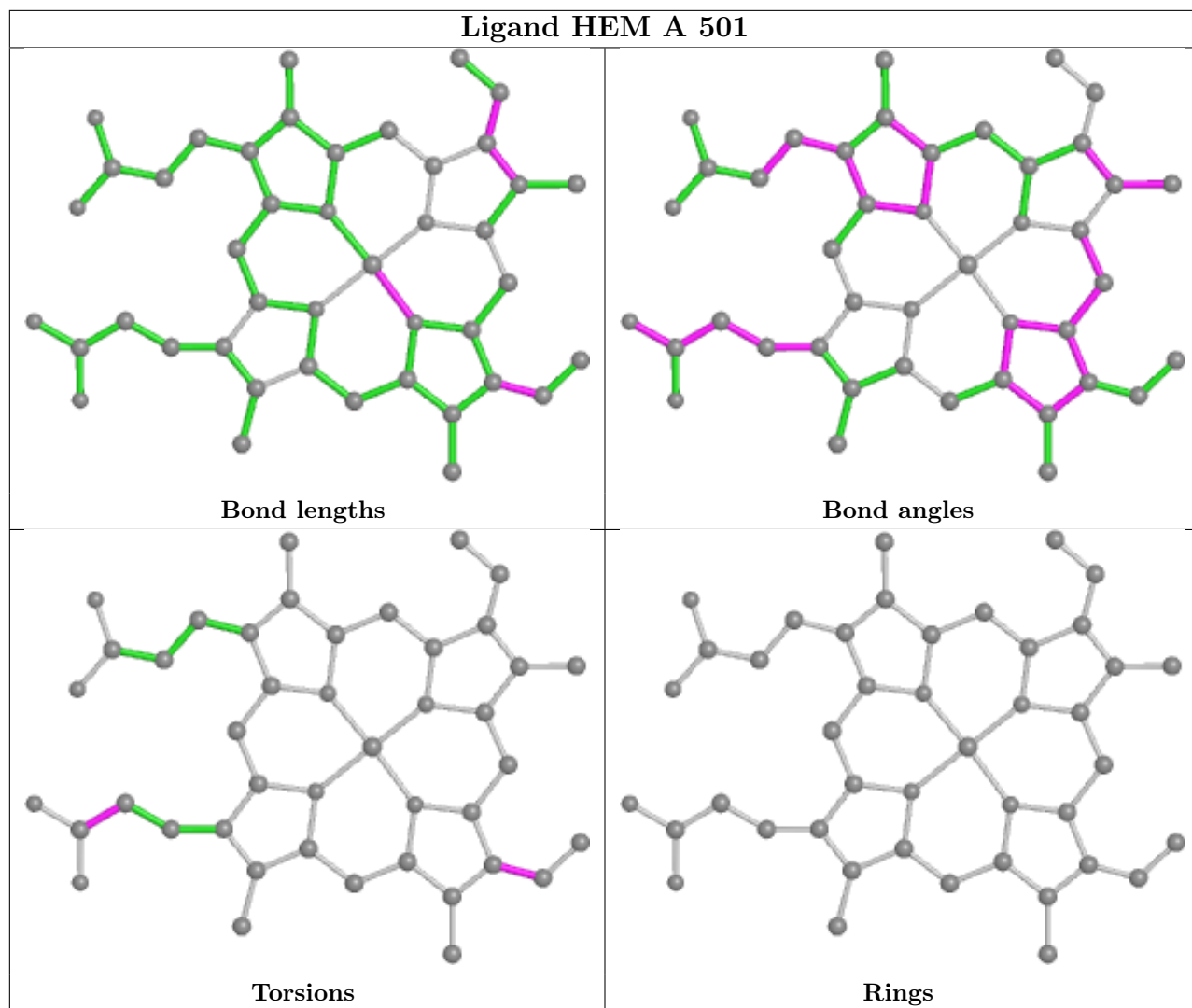
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	B	503	XW5	1	0
5	C	505	BTB	1	0
3	C	502	H4B	1	0
5	A	506	BTB	2	0
4	A	503	XW5	2	0
5	B	505	BTB	2	0
3	A	502	H4B	2	0
3	B	502	H4B	1	0
2	A	501	HEM	3	0
4	C	503	XW5	1	0
4	D	503	XW5	1	0
2	C	501	HEM	2	0
5	C	504	BTB	2	0
2	D	501	HEM	4	0
5	D	504	BTB	5	0
5	D	505	BTB	5	0
5	A	504	BTB	2	0
2	B	501	HEM	3	0
3	D	502	H4B	1	0
5	A	505	BTB	2	0

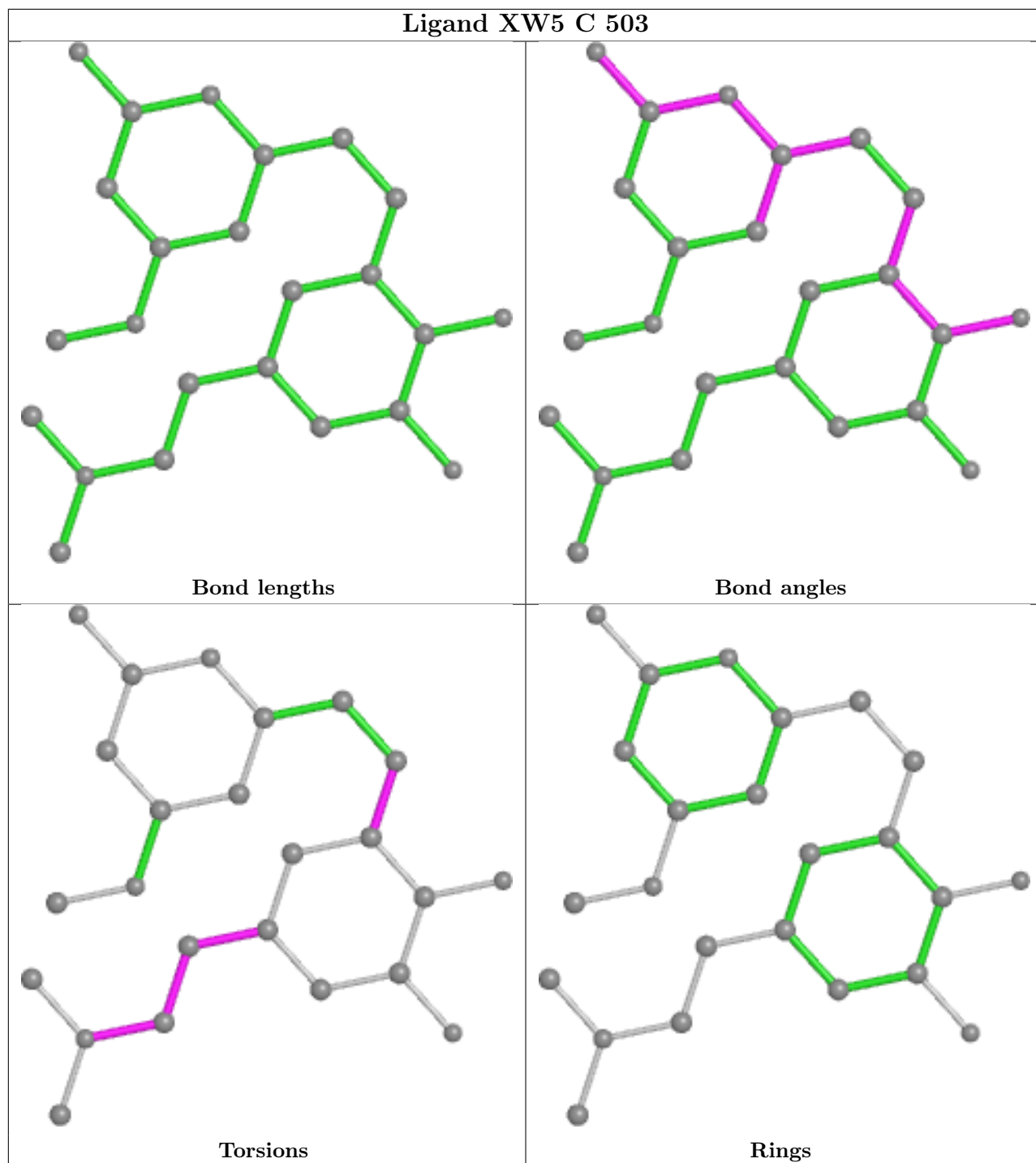
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

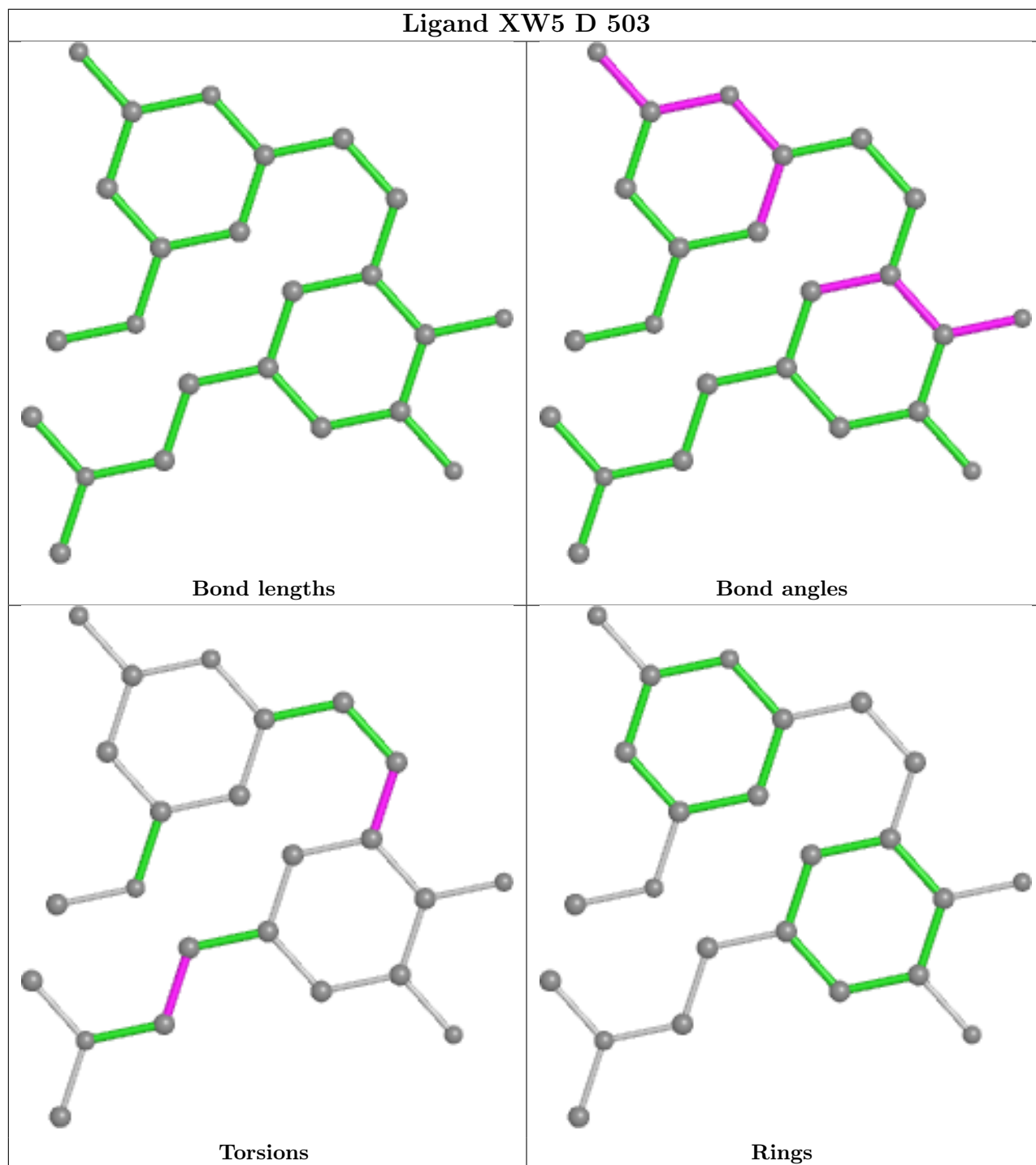
in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.



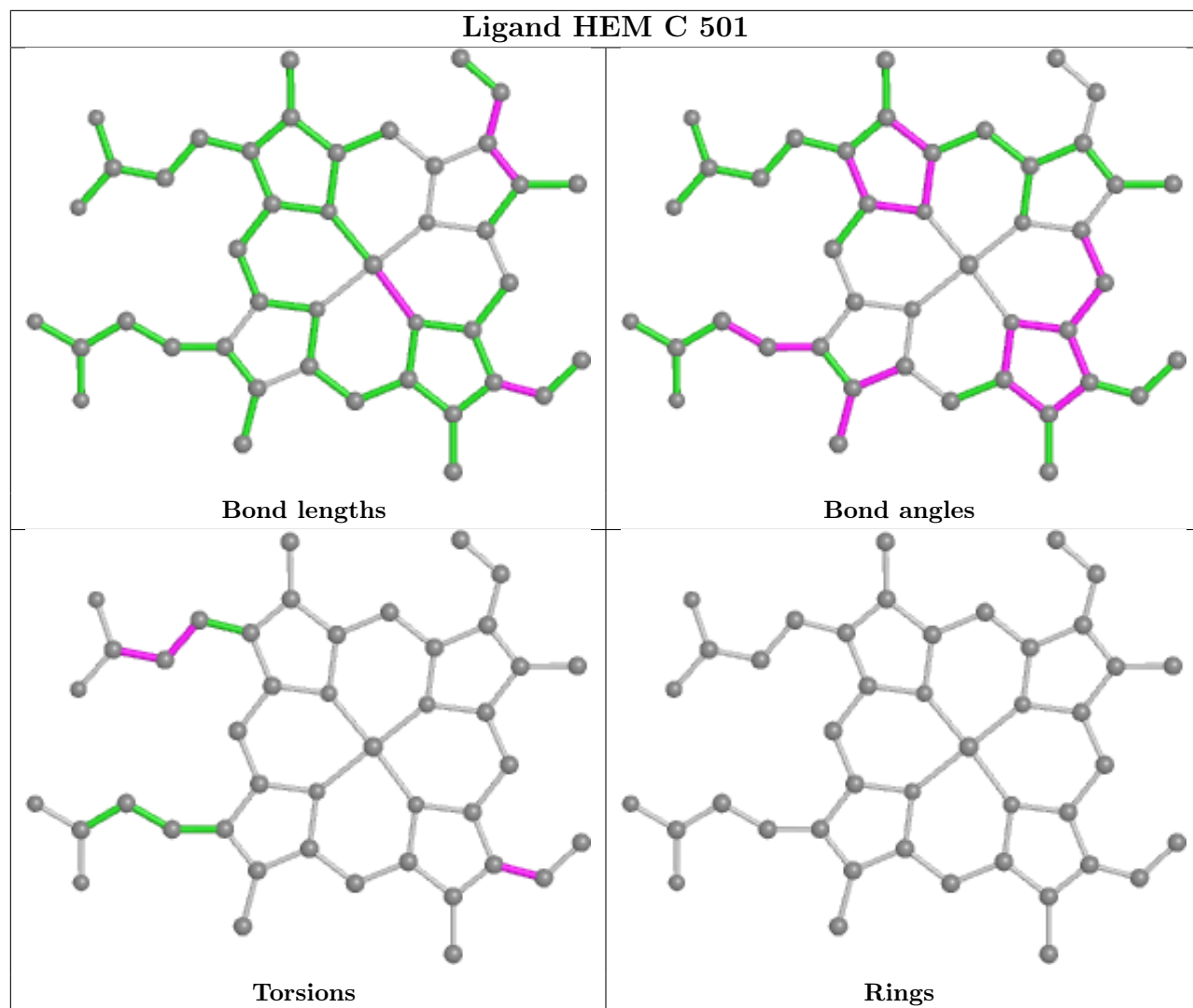


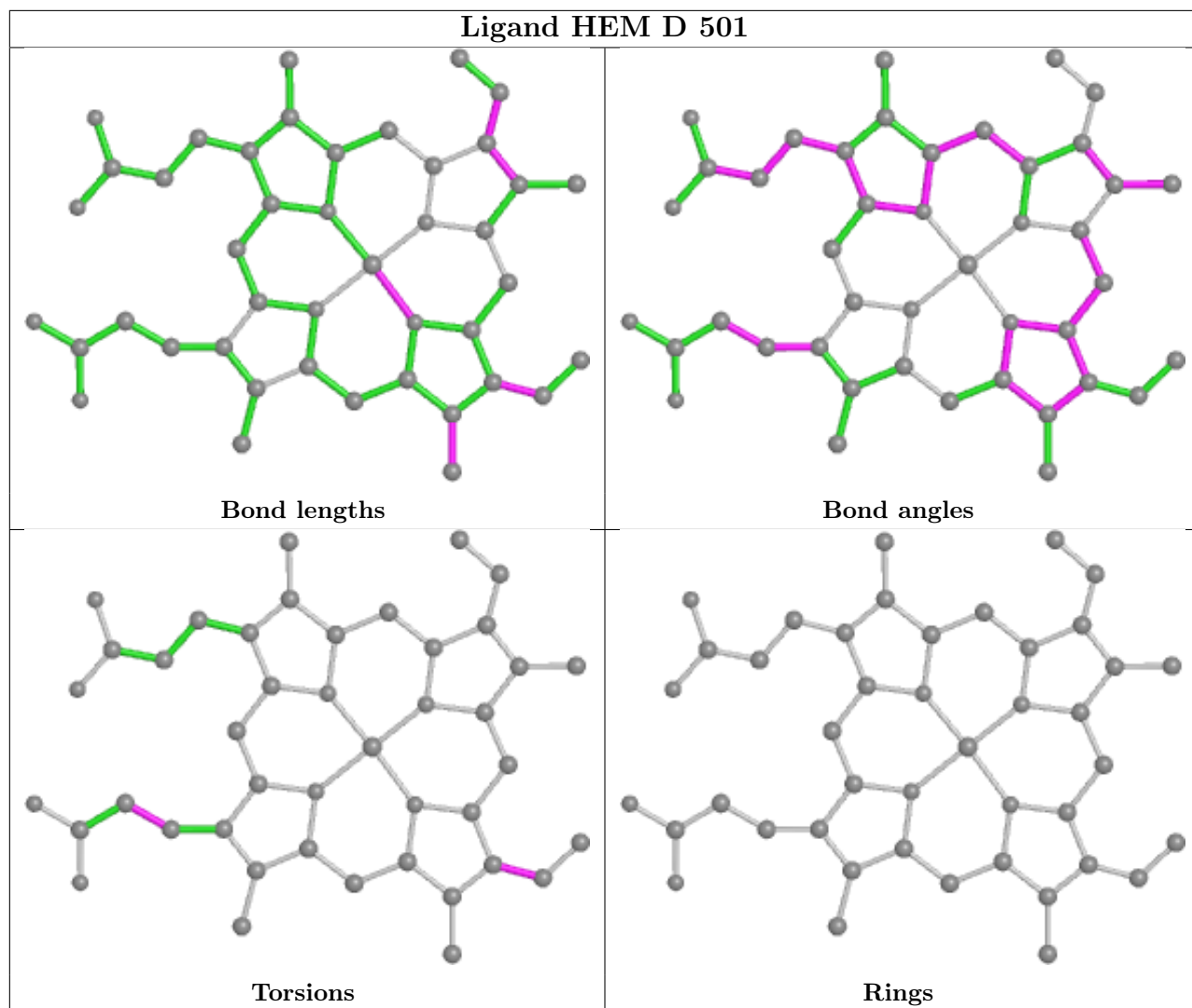


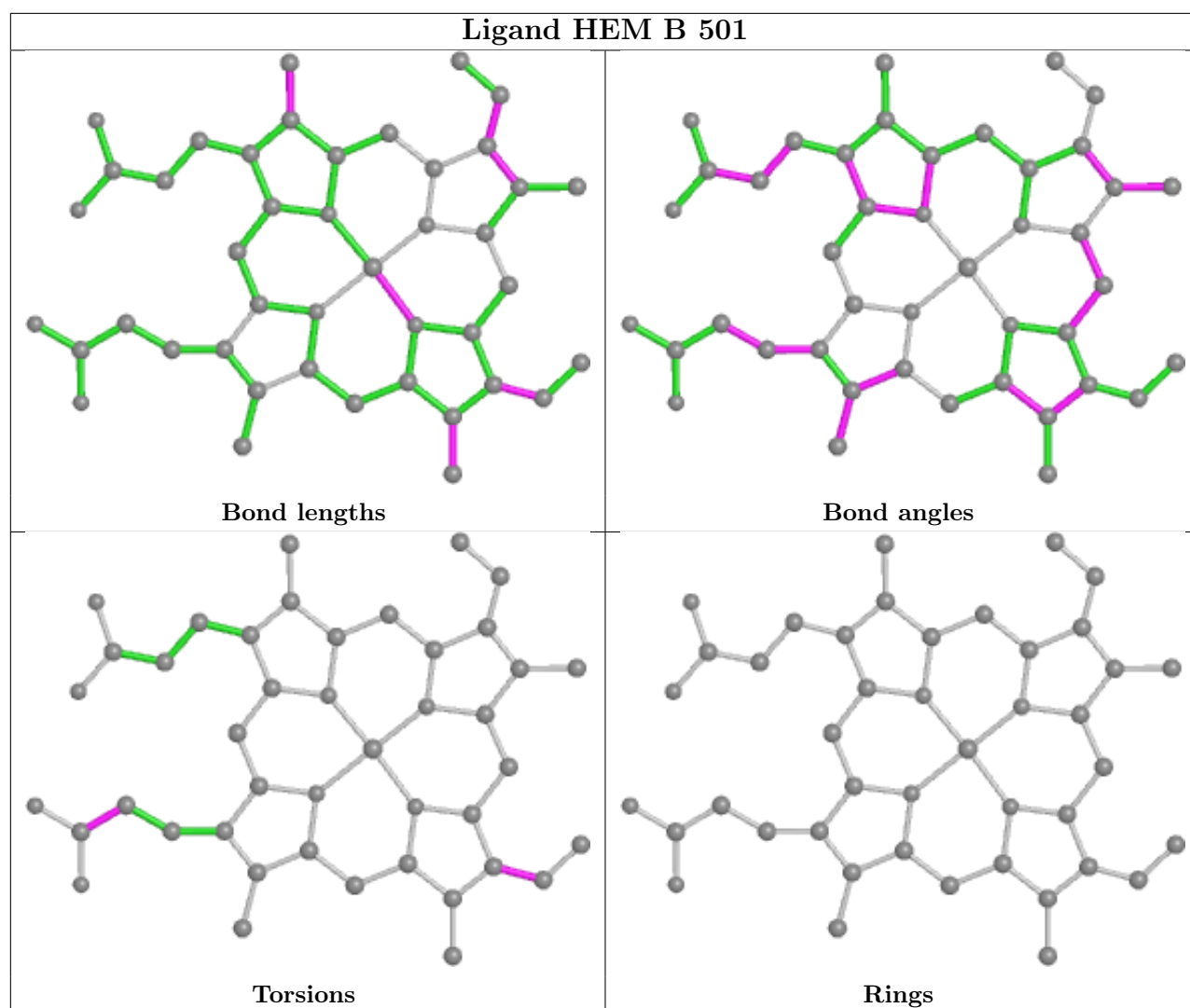












## 5.7 Other polymers [i](#)

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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	401/440 (91%)	1.13	93 (23%) <b>0</b> <b>0</b>	30, 62, 121, 141	0
1	B	402/440 (91%)	0.21	29 (7%) <b>15</b> <b>16</b>	26, 40, 77, 139	0
1	C	402/440 (91%)	0.73	58 (14%) <b>2</b> <b>2</b>	29, 54, 100, 127	0
1	D	402/440 (91%)	0.10	21 (5%) <b>27</b> <b>28</b>	26, 40, 71, 138	0
All	All	1607/1760 (91%)	0.54	201 (12%) <b>3</b> <b>4</b>	26, 47, 101, 141	0

All (201) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	257	GLN	9.1
1	A	153	VAL	7.7
1	A	204	ALA	7.5
1	A	237	GLY	7.2
1	A	480	TRP	7.1
1	A	259	GLY	6.6
1	A	280	THR	6.5
1	A	447	TRP	6.1
1	D	257	GLN	5.2
1	A	142	GLY	5.2
1	C	480	TRP	5.1
1	C	236	PRO	5.1
1	C	447	TRP	5.1
1	A	448	ILE	4.9
1	C	275	ILE	4.9
1	C	448	ILE	4.8
1	A	300	PRO	4.8
1	C	68	PHE	4.7
1	A	304	LEU	4.6
1	A	275	ILE	4.6
1	B	258	ASP	4.6

*Continued on next page...*

*Continued from previous page...*

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	A	141	SER	4.5
1	B	449	VAL	4.4
1	D	452	ILE	4.3
1	A	302	LEU	4.3
1	C	141	SER	4.2
1	B	454	GLY	4.2
1	A	446	ALA	4.2
1	A	120	PRO	4.2
1	C	300	PRO	4.1
1	D	89	GLN	4.1
1	A	106	PRO	4.1
1	A	479	PRO	4.1
1	C	142	GLY	4.1
1	A	257	GLN	4.0
1	B	460	PHE	4.0
1	B	259	GLY	3.9
1	A	238	ARG	3.9
1	A	268	VAL	3.9
1	A	281	PRO	3.9
1	C	89	GLN	3.9
1	B	452	ILE	3.8
1	A	122	GLN	3.8
1	A	445	TRP	3.8
1	C	238	ARG	3.8
1	A	272	GLU	3.7
1	B	141[A]	SER	3.7
1	B	142	GLY	3.7
1	A	143	SER	3.7
1	D	449	VAL	3.6
1	A	451	PRO	3.6
1	C	304	LEU	3.6
1	C	449	VAL	3.6
1	A	68	PHE	3.6
1	A	303	PHE	3.6
1	B	89	GLN	3.6
1	A	452	ILE	3.5
1	A	360	THR	3.5
1	C	237	GLY	3.5
1	C	445	TRP	3.5
1	C	106	PRO	3.5
1	A	449	VAL	3.5
1	A	273	LEU	3.4

*Continued on next page...*

*Continued from previous page...*

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	C	184	CYS	3.4
1	A	145	ALA	3.4
1	A	146	HIS	3.4
1	A	184	CYS	3.4
1	A	124	LEU	3.4
1	A	244	TRP	3.3
1	C	221	ARG	3.3
1	B	260	SER	3.3
1	C	451	PRO	3.3
1	A	89	GLN	3.3
1	C	185	VAL	3.3
1	C	257	GLN	3.3
1	C	452	ILE	3.2
1	A	256	GLN	3.2
1	A	162	THR	3.2
1	C	280	THR	3.2
1	A	307	PRO	3.2
1	C	144	GLN	3.2
1	C	303	PHE	3.2
1	A	185	VAL	3.1
1	A	221	ARG	3.1
1	A	279	TRP	3.1
1	B	453	SER	3.1
1	A	235	CYS	3.1
1	A	90	GLN	3.1
1	A	412	LEU	3.0
1	A	151	GLN	3.0
1	A	295	ALA	3.0
1	D	258	ASP	3.0
1	A	255	ARG	3.0
1	A	276	GLN	3.0
1	A	308	GLU	3.0
1	B	446	ALA	3.0
1	D	446	ALA	3.0
1	A	301	GLU	3.0
1	C	450	PRO	3.0
1	A	353	PHE	3.0
1	A	130	PHE	2.9
1	A	140	ARG	2.9
1	B	388	ARG	2.9
1	D	447	TRP	2.9
1	C	202	ARG	2.9

*Continued on next page...*

*Continued from previous page...*

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	D	121	GLU	2.9
1	D	454	GLY	2.9
1	C	122	GLN	2.8
1	C	446	ALA	2.8
1	C	412	LEU	2.8
1	B	158	ALA	2.8
1	C	299	PRO	2.8
1	A	135	TYR	2.8
1	D	255	ARG	2.8
1	A	205	GLN	2.8
1	C	301	GLU	2.8
1	A	254	TYR	2.7
1	C	360	THR	2.7
1	A	144	GLN	2.7
1	A	450	PRO	2.7
1	D	260	SER	2.7
1	D	259	GLY	2.7
1	A	236	PRO	2.7
1	D	360	THR	2.7
1	C	119	ALA	2.6
1	A	358	MET	2.6
1	C	306	PRO	2.6
1	C	307	PRO	2.6
1	A	183	ARG	2.6
1	C	140	ARG	2.6
1	B	447	TRP	2.6
1	B	360	THR	2.6
1	A	305	LEU	2.6
1	C	293	LEU	2.6
1	A	309	LEU	2.6
1	A	258	ASP	2.6
1	A	163	TYR	2.5
1	A	364	THR	2.5
1	A	128	ARG	2.5
1	A	365	ARG	2.5
1	D	388	ARG	2.5
1	A	292	LEU	2.5
1	A	293	LEU	2.5
1	C	308	GLU	2.5
1	C	302	LEU	2.5
1	B	79	ILE	2.4
1	C	297	ASP	2.4

*Continued on next page...*

*Continued from previous page...*

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	B	122	GLN	2.4
1	A	123	LEU	2.4
1	C	183	ARG	2.4
1	D	451	PRO	2.4
1	D	256	GLN	2.4
1	B	68	PHE	2.4
1	D	460	PHE	2.4
1	A	202	ARG	2.4
1	C	454	GLY	2.3
1	D	445	TRP	2.3
1	A	216	LYS	2.3
1	B	97	ARG	2.3
1	B	450	PRO	2.3
1	C	120	PRO	2.3
1	A	134	TYR	2.3
1	A	157	VAL	2.2
1	B	107	ARG	2.2
1	A	67	LYS	2.2
1	A	436	LYS	2.2
1	C	276	GLN	2.2
1	C	67	LYS	2.2
1	C	129	ASP	2.2
1	B	120	PRO	2.2
1	B	455	SER	2.2
1	C	87	GLN	2.2
1	B	451	PRO	2.2
1	A	127	ALA	2.2
1	A	242	ARG	2.2
1	A	357	TYR	2.2
1	C	439	GLY	2.2
1	B	121	GLU	2.2
1	C	235	CYS	2.2
1	C	155	ALA	2.1
1	B	157	VAL	2.1
1	C	79	ILE	2.1
1	A	86	ALA	2.1
1	C	258	ASP	2.1
1	A	335	ALA	2.1
1	C	309	LEU	2.1
1	A	208	PHE	2.1
1	A	138	ILE	2.1
1	C	143	SER	2.1

*Continued on next page...*



*Continued from previous page...*

Mol	Chain	Res	Type	RSRZ
1	D	456	LEU	2.1
1	A	121	GLU	2.1
1	C	364	THR	2.1
1	A	155	ALA	2.0
1	B	445	TRP	2.0
1	D	450	PRO	2.0
1	C	292	LEU	2.0
1	D	79	ILE	2.0
1	A	88	ALA	2.0
1	C	460	PHE	2.0
1	A	79	ILE	2.0
1	A	150	LEU	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 monosaccharides 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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
5	BTB	A	504	14/14	0.68	0.39	88,102,108,112	0
5	BTB	C	504	14/14	0.70	0.32	46,81,96,100	0
6	GOL	A	507	6/6	0.72	0.18	87,88,89,92	0
5	BTB	D	504	14/14	0.79	0.22	46,72,84,85	0
5	BTB	A	506	14/14	0.79	0.28	80,91,100,101	0
5	BTB	B	505	14/14	0.81	0.21	57,83,91,95	0
6	GOL	C	506	6/6	0.83	0.12	92,95,97,99	0
3	H4B	A	502	17/17	0.86	0.24	55,67,78,80	0
5	BTB	B	504	14/14	0.87	0.14	42,58,76,83	0
5	BTB	D	505	14/14	0.87	0.17	70,86,98,100	0
6	GOL	B	506	6/6	0.88	0.09	83,85,87,90	0

*Continued on next page...*

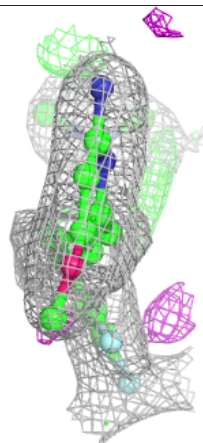
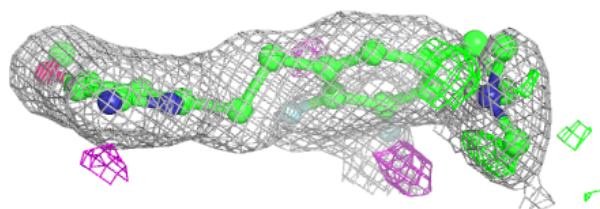
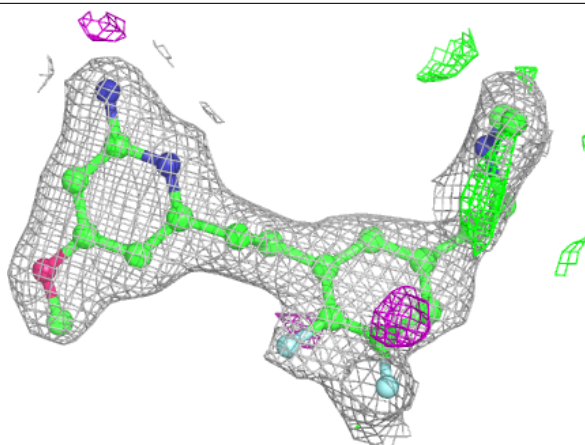
*Continued from previous page...*

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
3	H4B	C	502	17/17	0.89	0.22	54,62,71,73	0
6	GOL	A	508	6/6	0.89	0.26	45,63,70,85	0
4	XW5	D	503	24/24	0.90	0.20	32,65,91,93	0
3	H4B	B	502	17/17	0.92	0.17	36,48,61,64	0
5	BTB	C	505	14/14	0.92	0.17	14,65,78,80	0
4	XW5	A	503	24/24	0.92	0.29	43,83,91,93	0
5	BTB	A	505	14/14	0.92	0.14	46,75,89,91	0
4	XW5	C	503	24/24	0.93	0.28	35,74,87,88	0
4	XW5	B	503	24/24	0.94	0.17	32,52,80,84	0
3	H4B	D	502	17/17	0.94	0.15	37,43,55,57	0
8	GD	A	510	1/1	0.94	0.08	115,115,115,115	1
2	HEM	A	501	43/43	0.95	0.21	42,57,71,81	0
8	GD	B	509	1/1	0.95	0.05	72,72,72,72	1
2	HEM	D	501	43/43	0.97	0.12	26,31,61,73	0
7	CL	A	509	1/1	0.97	0.26	42,42,42,42	0
8	GD	D	507	1/1	0.97	0.11	48,48,48,48	0
9	ZN	A	511	1/1	0.97	0.09	41,41,41,41	0
2	HEM	C	501	43/43	0.98	0.18	32,41,73,88	0
2	HEM	B	501	43/43	0.98	0.12	25,30,66,71	0
8	GD	B	508	1/1	0.99	0.10	42,42,42,42	0
7	CL	C	507	1/1	0.99	0.26	36,36,36,36	0
7	CL	D	506	1/1	0.99	0.19	34,34,34,34	0
7	CL	B	507	1/1	0.99	0.20	30,30,30,30	0
9	ZN	C	508	1/1	1.00	0.09	36,36,36,36	0

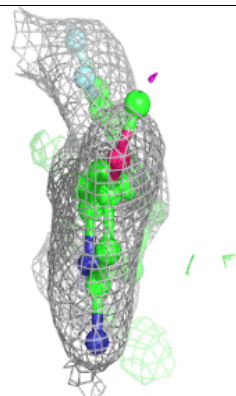
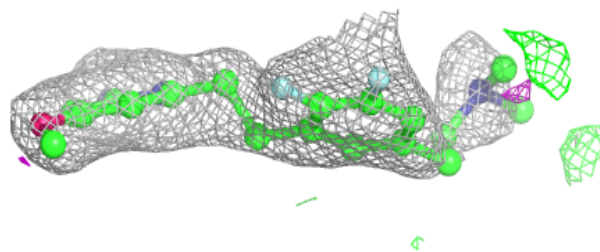
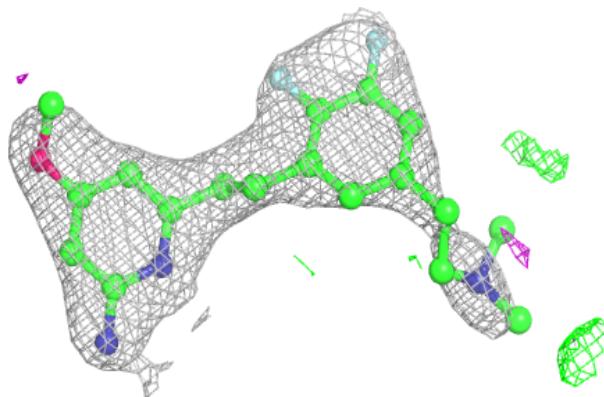
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

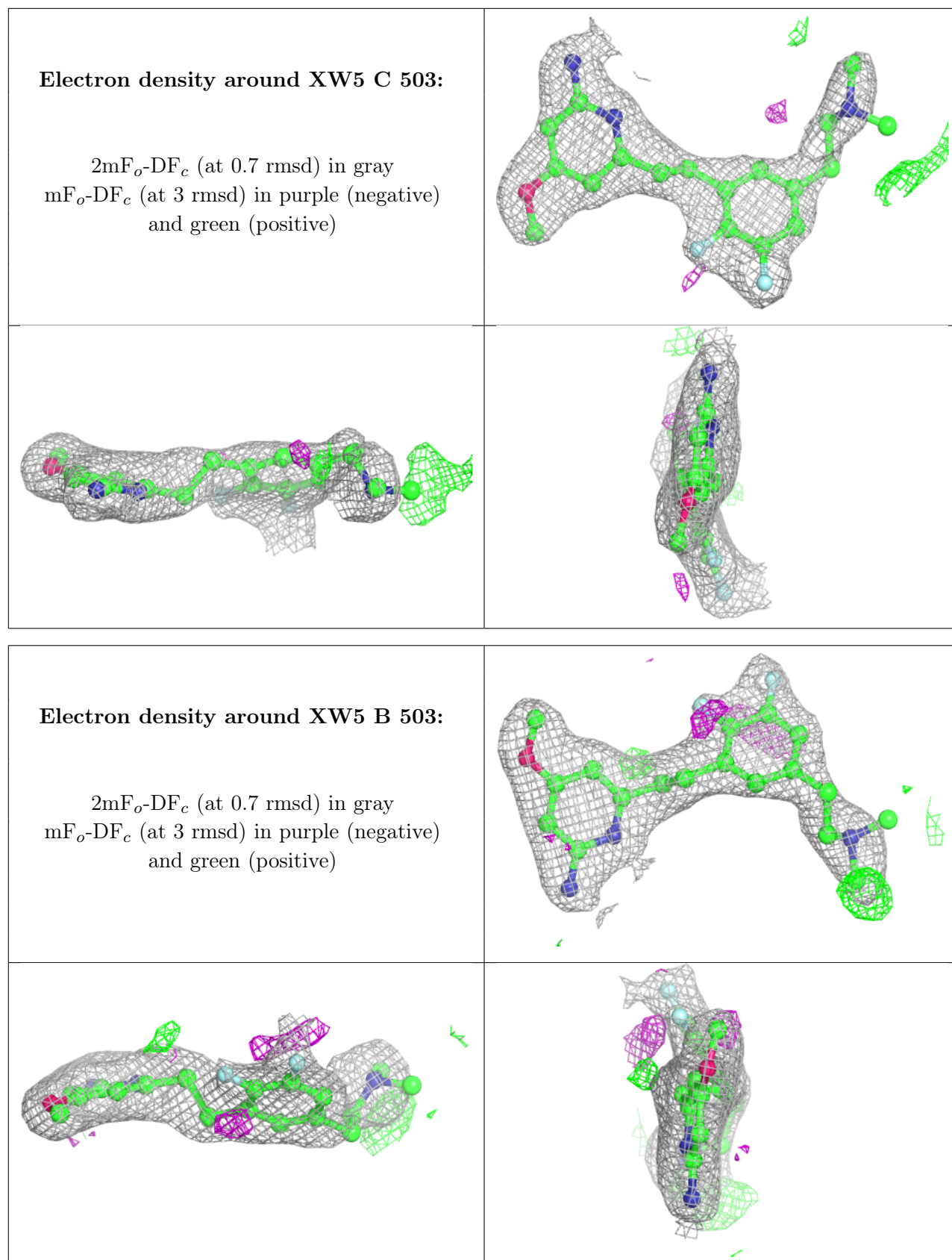
**Electron density around XW5 D 503:**

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

**Electron density around XW5 A 503:**

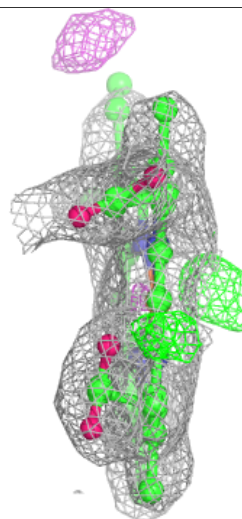
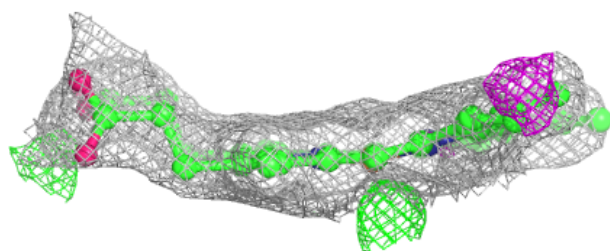
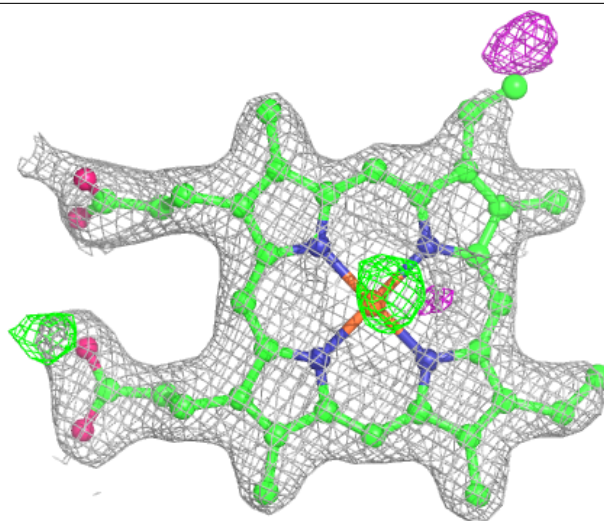
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)





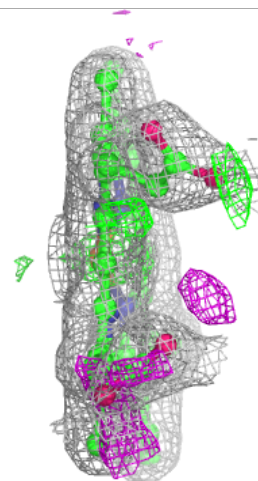
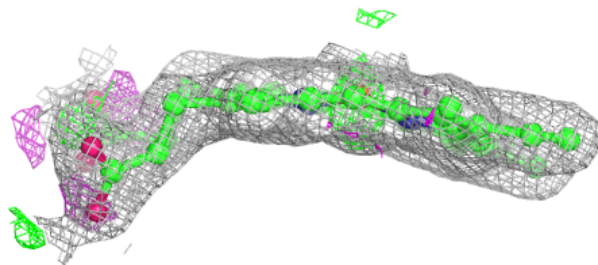
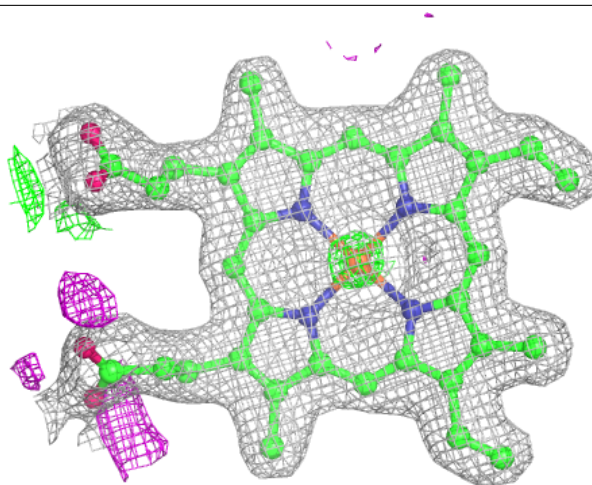
**Electron density around HEM A 501:**

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



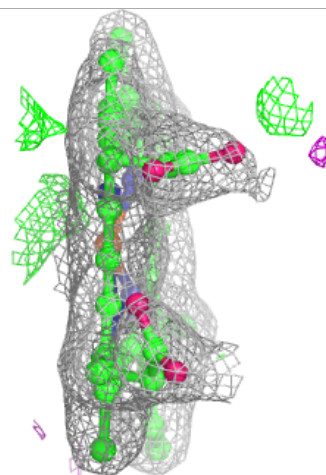
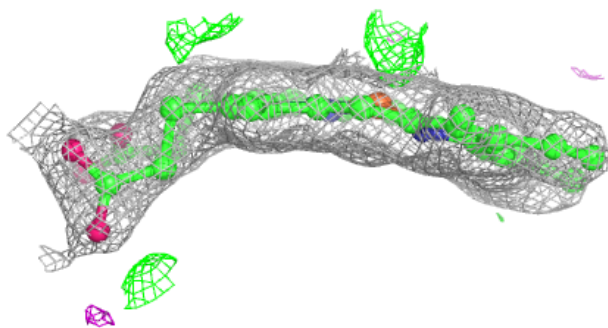
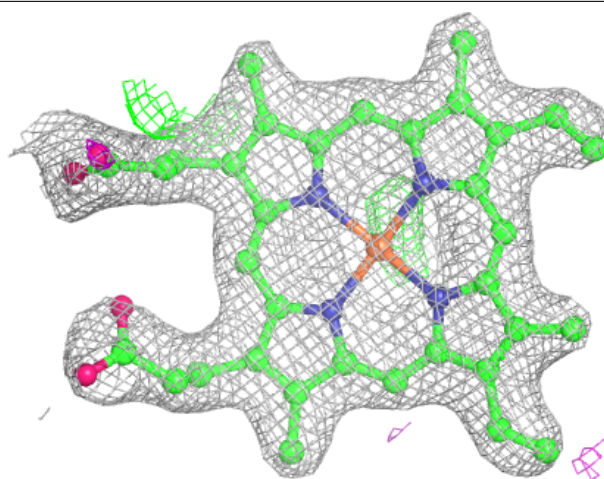
**Electron density around HEM D 501:**

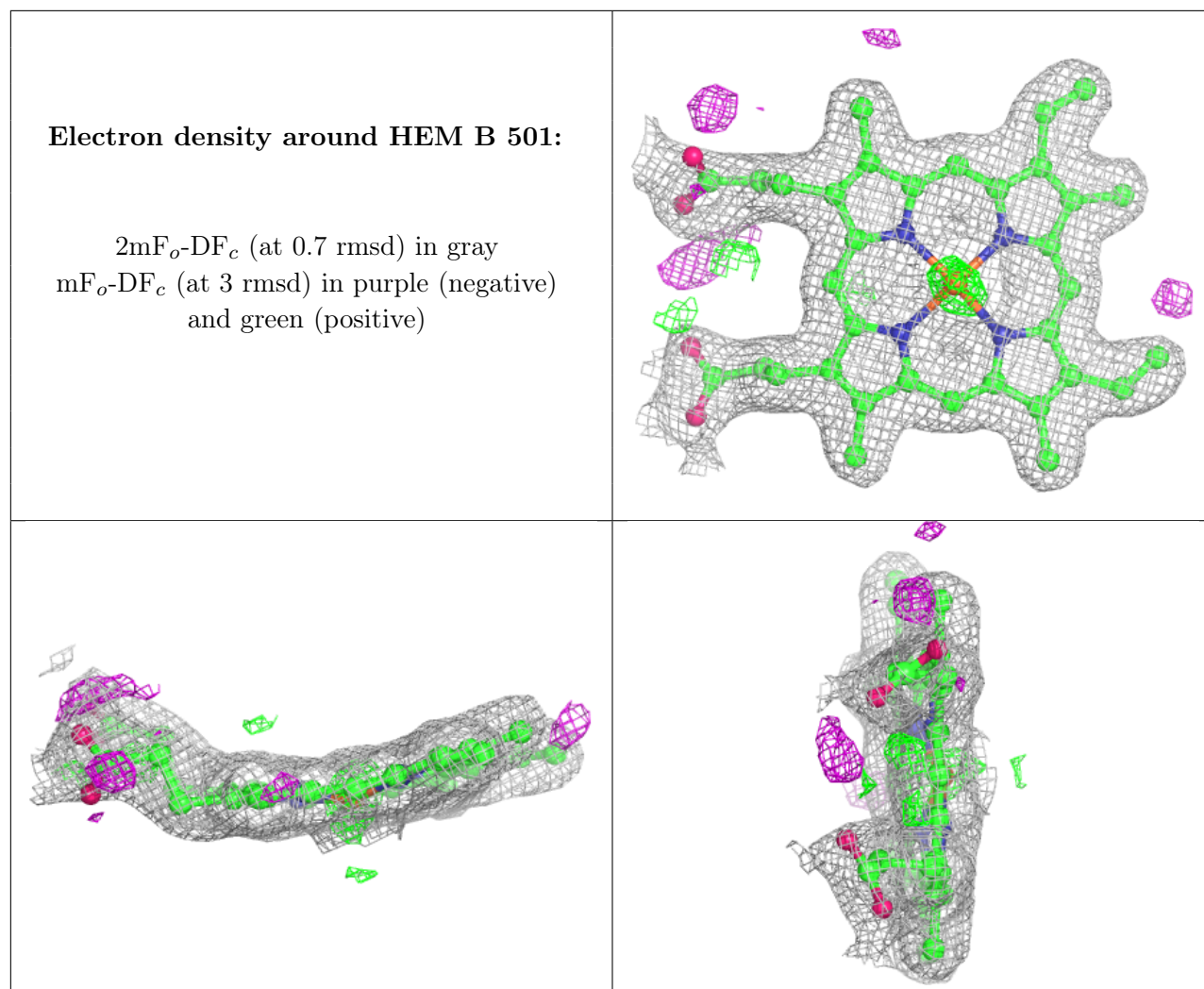
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



**Electron density around HEM C 501:**

$2mF_o-DF_c$  (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.