



wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 5, 2024 – 03:01 AM EST

PDB ID : 8UFU
Title : Structure of human endothelial nitric oxide synthase heme domain in complex with 7-(9-amino-6,7,8,9-tetrahydro-5H-benzo[7]annulen-2-yl)-4-methylquinolin-2-amine
Authors : Li, H.; Poulos, T.L.
Deposited on : 2023-10-04
Resolution : 2.05 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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 : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.36
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) : 2.36

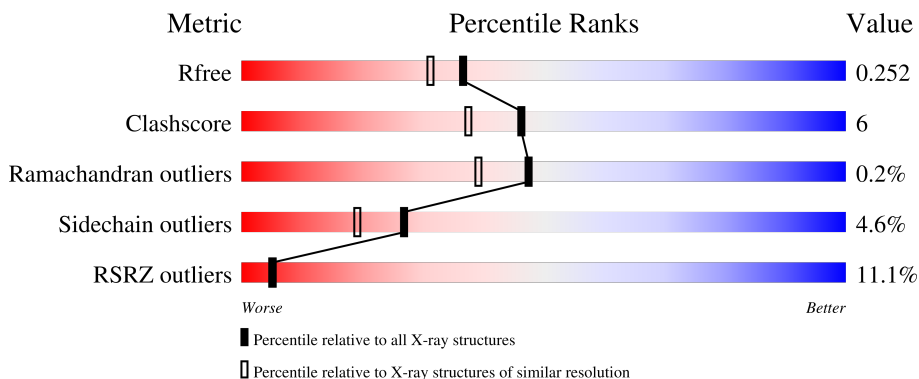
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.05 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	1692 (2.04-2.04)
Clashscore	141614	1773 (2.04-2.04)
Ramachandran outliers	138981	1752 (2.04-2.04)
Sidechain outliers	138945	1752 (2.04-2.04)
RSRZ outliers	127900	1672 (2.04-2.04)

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	440	 17% 74% 15% 9%
1	B	440	 7% 78% 12% 9%
1	C	440	 11% 73% 17% 9%
1	D	440	 6% 79% 12% 9%

2 Entry composition

There are 10 unique types of molecules in this entry. The entry contains 13720 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	3215	2047	566	586	16	0	2	0
1	B	401	3211	2045	564	586	16	0	3	0
1	C	402	3218	2050	565	587	16	0	2	0
1	D	401	3206	2042	563	585	16	0	2	0

There are 4 discrepancies between the modelled and reference sequences:

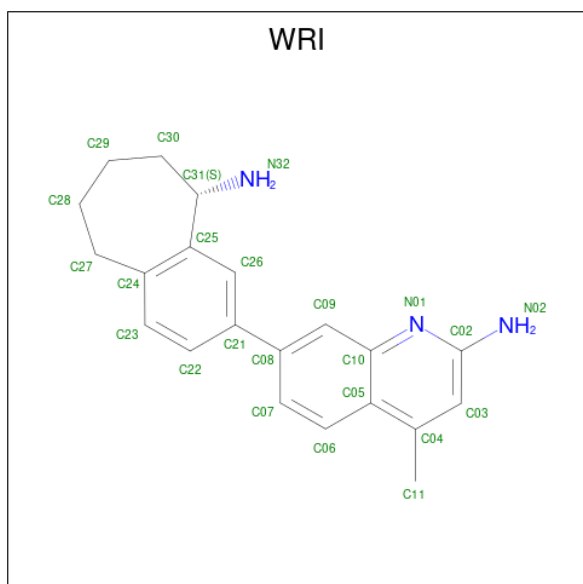
Chain	Residue	Modelled	Actual	Comment	Reference
A	298	GLU	ASP	variant	UNP P29474
B	298	GLU	ASP	variant	UNP P29474
C	298	GLU	ASP	variant	UNP P29474
D	298	GLU	ASP	variant	UNP P29474

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



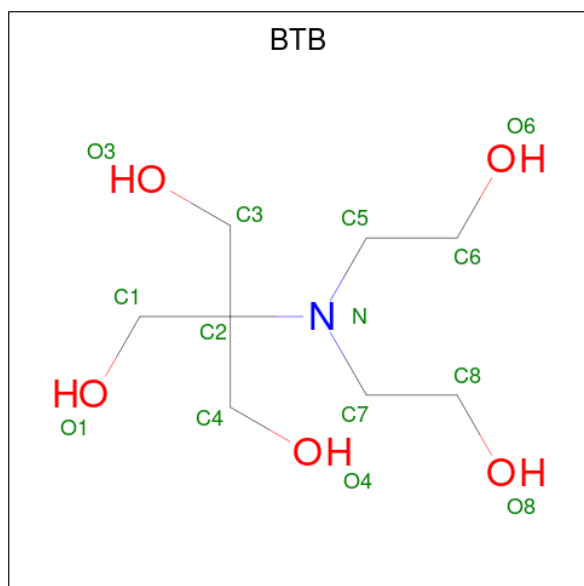
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	
			Total	C	Fe	N			O
2	A	1	Total 43	C 34	Fe 1	N 4	O 4	0	0
2	B	1	Total 43	C 34	Fe 1	N 4	O 4	0	0
2	C	1	Total 43	C 34	Fe 1	N 4	O 4	0	0
2	D	1	Total 43	C 34	Fe 1	N 4	O 4	0	0

- Molecule 3 is (7M)-7-[(9S)-9-amino-6,7,8,9-tetrahydro-5H-benzo[7]annulen-2-yl]-4-methylquinolin-2-amine (three-letter code: WRI) (formula: $C_{21}H_{23}N_3$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	N	0	0
			24	21	3		
3	A	1	Total	C	N	0	0
			24	21	3		
3	B	1	Total	C	N	0	0
			24	21	3		
3	B	1	Total	C	N	0	0
			24	21	3		
3	C	1	Total	C	N	0	0
			24	21	3		
3	C	1	Total	C	N	0	0
			24	21	3		
3	C	1	Total	C	N	0	0
			24	21	3		
3	D	1	Total	C	N	0	0
			24	21	3		

- Molecule 4 is 2-[BIS-(2-HYDROXY-ETHYL)-AMINO]-2-HYDROXYMETHYL-PROPAN E-1,3-DIOL (three-letter code: BTB) (formula: C₈H₁₉NO₅).



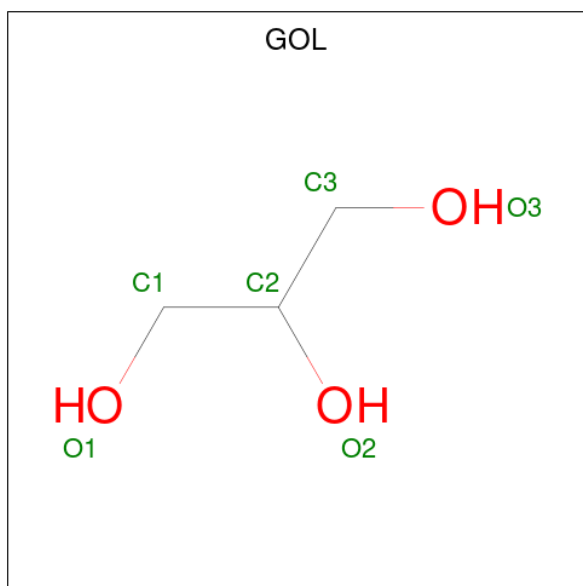
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	C	N	O	0	0
			14	8	1	5		
4	A	1	Total	C	N	O	0	0
			14	8	1	5		
4	B	1	Total	C	N	O	0	0
			14	8	1	5		

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

- Molecule 5 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).



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

- Molecule 6 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	1	Total	Cl	0	0
			1	1		

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

- Molecule 7 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	2	Total Zn 2 2	0	0
7	B	1	Total Zn 1 1	0	0
7	C	3	Total Zn 3 3	0	0

- Molecule 8 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	A	1	Total Ca 1 1	0	0
8	C	1	Total Ca 1 1	0	0

- Molecule 9 is GADOLINIUM ATOM (three-letter code: GD) (formula: Gd).

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

- Molecule 10 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
10	A	50	Total O 50 50	0	0
10	B	118	Total O 118 118	0	0
10	C	75	Total O 75 75	0	0

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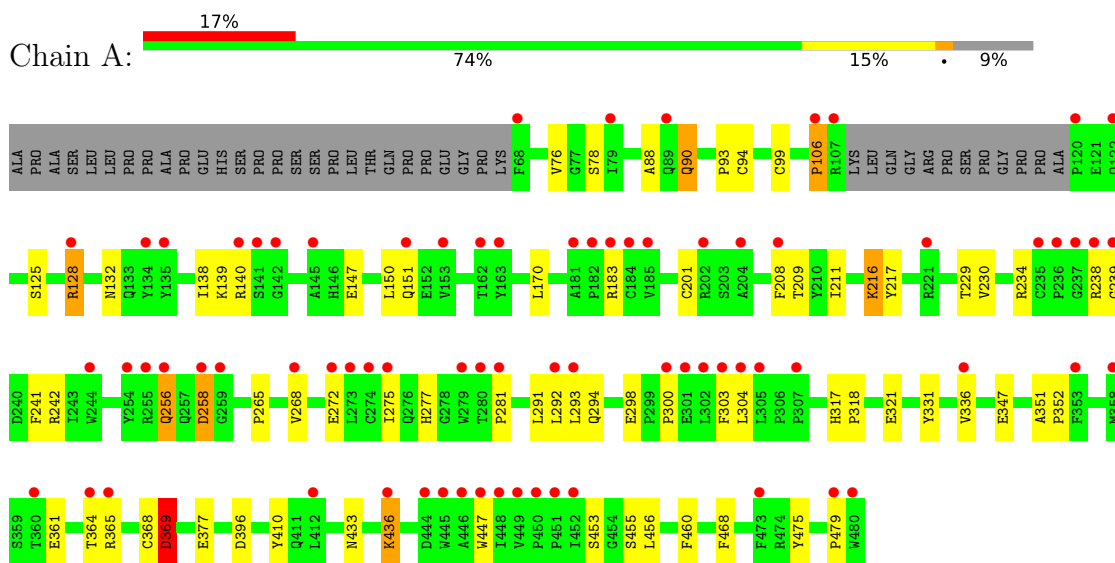
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
10	D	119	Total 119	O 119	0	0

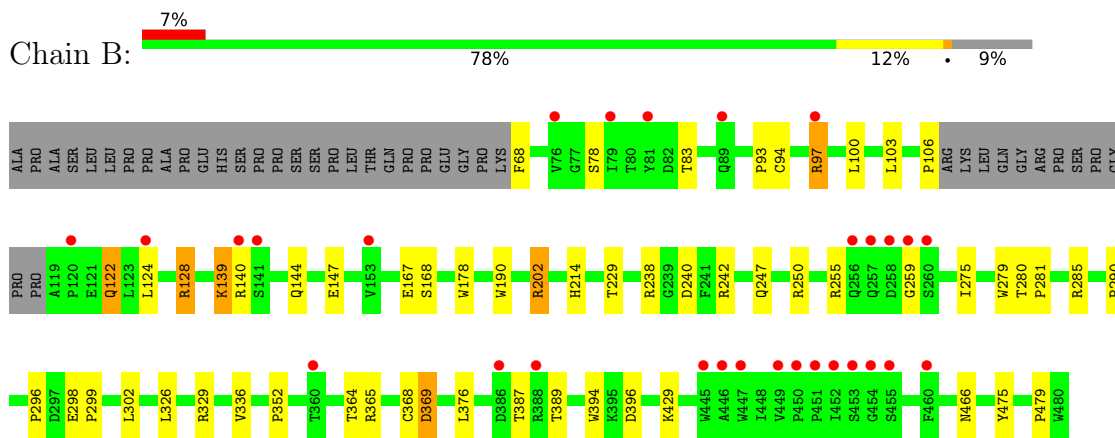
3 Residue-property plots [i](#)

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



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	59.67Å 152.83Å 109.16Å 90.00° 90.82° 90.00°	Depositor
Resolution (Å)	38.74 – 2.05 38.74 – 2.05	Depositor EDS
% Data completeness (in resolution range)	94.2 (38.74-2.05) 94.7 (38.74-2.05)	Depositor EDS
R_{merge}	0.16	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.40 (at 2.05Å)	Xtrriage
Refinement program	PHENIX (1.11.1_2575: ???)	Depositor
R, R_{free}	0.205 , 0.256 0.199 , 0.252	Depositor DCC
R_{free} test set	5867 reflections (5.06%)	wwPDB-VP
Wilson B-factor (Å ²)	42.0	Xtrriage
Anisotropy	0.551	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 50.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	0.108 for h,-k,-l	Xtrriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	13720	wwPDB-VP
Average B, all atoms (Å ²)	63.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.81% 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: ZN, WRI, GOL, BTB, CL, HEM, GD, CA

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	0.36	0/3313	0.53	1/4513 (0.0%)
1	B	0.40	0/3312	0.56	1/4514 (0.0%)
1	C	0.39	0/3316	0.55	1/4518 (0.0%)
1	D	0.43	0/3304	0.59	1/4503 (0.0%)
All	All	0.40	0/13245	0.56	4/18048 (0.0%)

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	B	0	1

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed($^{\circ}$)	Ideal($^{\circ}$)
1	D	369	ASP	CB-CG-OD1	6.83	124.45	118.30
1	C	369	ASP	CB-CG-OD1	6.41	124.07	118.30
1	B	369	ASP	CB-CG-OD2	5.79	123.51	118.30
1	A	369	ASP	CB-CG-OD2	5.15	122.93	118.30

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	240	ASP	Peptide

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	3215	0	3118	42	0
1	B	3211	0	3114	33	0
1	C	3218	0	3122	43	0
1	D	3206	0	3108	29	0
2	A	43	0	30	4	0
2	B	43	0	30	2	0
2	C	43	0	30	3	0
2	D	43	0	30	2	0
3	A	48	0	0	3	0
3	B	48	0	0	1	0
3	C	72	0	0	1	0
3	D	24	0	0	2	0
4	A	28	0	38	6	0
4	B	28	0	36	5	0
4	C	28	0	38	7	0
4	D	28	0	36	5	0
5	A	6	0	8	0	0
5	C	6	0	8	0	0
5	D	6	0	8	0	0
6	A	1	0	0	0	0
6	B	1	0	0	0	0
6	C	1	0	0	1	0
6	D	1	0	0	0	0
7	A	2	0	0	0	0
7	B	1	0	0	0	0
7	C	3	0	0	0	0
8	A	1	0	0	0	0
8	C	1	0	0	0	0
9	B	1	0	0	0	0
9	D	1	0	0	0	0
10	A	50	0	0	1	0
10	B	118	0	0	1	0
10	C	75	0	0	2	0
10	D	119	0	0	2	0
All	All	13720	0	12754	164	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 6.

The worst 5 of 164 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:D:321:GLU:OE2	4:D:503:BTB:O4	2.04	0.76
1:C:234:ARG:NH1	1:C:347:GLU:OE1	2.20	0.75
2:D:501:HEM:HBB2	2:D:501:HEM:HHC	1.69	0.74
1:D:475:TYR:OH	2:D:501:HEM:O2D	2.06	0.73
1:B:124:LEU:HB3	1:B:128:ARG:HH12	1.52	0.73

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	399/440 (91%)	381 (96%)	16 (4%)	2 (0%)	29	18
1	B	400/440 (91%)	388 (97%)	11 (3%)	1 (0%)	41	31
1	C	400/440 (91%)	392 (98%)	8 (2%)	0	100	100
1	D	399/440 (91%)	389 (98%)	10 (2%)	0	100	100
All	All	1598/1760 (91%)	1550 (97%)	45 (3%)	3 (0%)	47	39

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	106	PRO
1	A	239	GLY
1	B	259	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	343/373 (92%)	328 (96%)	15 (4%)	28	21
1	B	343/373 (92%)	326 (95%)	17 (5%)	24	16
1	C	343/373 (92%)	323 (94%)	20 (6%)	20	11
1	D	342/373 (92%)	330 (96%)	12 (4%)	36	29
All	All	1371/1492 (92%)	1307 (95%)	64 (5%)	27	18

5 of 64 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	245	ASN
1	D	258	ASP
1	B	168[B]	SER
1	B	168[A]	SER
1	D	262	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

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 monosaccharides in this entry.

5.6 Ligand geometry

Of 37 ligands modelled in this entry, 14 are monoatomic - leaving 23 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
2	HEM	A	501	1	41,50,50	1.46	5 (12%)	45,82,82	1.80	13 (28%)
4	BTB	C	505	-	13,13,13	0.37	0	7,16,16	0.67	0
4	BTB	A	505	-	13,13,13	0.37	0	7,16,16	0.45	0
2	HEM	B	501	1	41,50,50	1.55	5 (12%)	45,82,82	1.86	13 (28%)
4	BTB	D	504	-	13,13,13	0.52	0	7,16,16	0.92	0
4	BTB	D	503	9	13,13,13	0.42	0	7,16,16	0.95	0
3	WRI	B	502	-	26,27,27	1.04	3 (11%)	34,39,39	2.34	14 (41%)
4	BTB	B	504	9	13,13,13	0.55	0	7,16,16	0.60	0
4	BTB	B	505	-	13,13,13	0.52	0	7,16,16	0.94	0
4	BTB	C	504	-	13,13,13	0.68	0	7,16,16	1.53	2 (28%)
2	HEM	D	501	1	41,50,50	1.57	7 (17%)	45,82,82	1.73	14 (31%)
3	WRI	C	510	-	26,27,27	0.93	1 (3%)	34,39,39	1.58	10 (29%)
5	GOL	C	506	-	5,5,5	0.42	0	5,5,5	0.39	0
3	WRI	C	502	-	26,27,27	0.90	2 (7%)	34,39,39	1.61	8 (23%)
3	WRI	A	503	-	26,27,27	0.91	0	34,39,39	1.38	5 (14%)
3	WRI	B	503	-	26,27,27	0.89	1 (3%)	34,39,39	1.30	4 (11%)
5	GOL	A	506	-	5,5,5	0.33	0	5,5,5	0.38	0
2	HEM	C	501	1	41,50,50	1.49	6 (14%)	45,82,82	1.86	13 (28%)
3	WRI	C	503	-	26,27,27	0.95	2 (7%)	34,39,39	1.26	5 (14%)
3	WRI	D	502	-	26,27,27	0.80	0	34,39,39	1.58	7 (20%)
4	BTB	A	504	-	13,13,13	0.52	0	7,16,16	0.76	0
3	WRI	A	502	-	26,27,27	0.87	1 (3%)	34,39,39	1.87	9 (26%)
5	GOL	D	505	-	5,5,5	0.36	0	5,5,5	0.25	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
2	HEM	A	501	1	-	1/12/54/54	-
4	BTB	C	505	-	-	11/21/21/21	-
4	BTB	A	505	-	-	3/21/21/21	-
2	HEM	B	501	1	-	2/12/54/54	-
4	BTB	D	504	-	-	13/21/21/21	-
4	BTB	D	503	9	-	2/21/21/21	-
3	WRI	B	502	-	-	0/4/15/15	0/4/4/4
4	BTB	B	504	9	-	4/21/21/21	-
4	BTB	B	505	-	-	3/21/21/21	-
4	BTB	C	504	-	-	10/21/21/21	-
2	HEM	D	501	1	-	2/12/54/54	-
3	WRI	C	510	-	-	4/4/15/15	0/4/4/4
5	GOL	C	506	-	-	4/4/4/4	-
3	WRI	C	502	-	-	0/4/15/15	0/4/4/4
3	WRI	A	503	-	-	4/4/15/15	1/4/4/4
3	WRI	B	503	-	-	4/4/15/15	0/4/4/4
5	GOL	A	506	-	-	4/4/4/4	-
2	HEM	C	501	1	-	3/12/54/54	-
3	WRI	C	503	-	-	4/4/15/15	0/4/4/4
3	WRI	D	502	-	-	0/4/15/15	0/4/4/4
4	BTB	A	504	-	-	4/21/21/21	-
3	WRI	A	502	-	-	0/4/15/15	0/4/4/4
5	GOL	D	505	-	-	2/4/4/4	-

The worst 5 of 33 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	501	HEM	C3C-C2C	-4.05	1.34	1.40
2	B	501	HEM	C3C-CAC	3.69	1.55	1.47
2	A	501	HEM	C3C-CAC	3.67	1.55	1.47
2	B	501	HEM	C3C-C2C	-3.62	1.35	1.40
2	D	501	HEM	C3C-CAC	3.56	1.55	1.47

The worst 5 of 117 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	502	WRI	C22-C21-C08	-4.98	112.73	121.36
3	B	502	WRI	N02-C02-N01	4.85	122.27	118.26
3	A	502	WRI	C04-C05-C10	4.77	120.59	118.01

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	501	HEM	C4B-CHC-C1C	4.51	128.51	122.56
3	B	502	WRI	C29-C28-C27	-4.46	107.06	114.23

There are no chirality outliers.

5 of 84 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	504	BTB	O1-C1-C2-C3
4	A	504	BTB	O1-C1-C2-C4
4	A	504	BTB	O1-C1-C2-N
4	A	505	BTB	C1-C2-C4-O4
4	A	505	BTB	C3-C2-C4-O4

All (1) ring outliers are listed below:

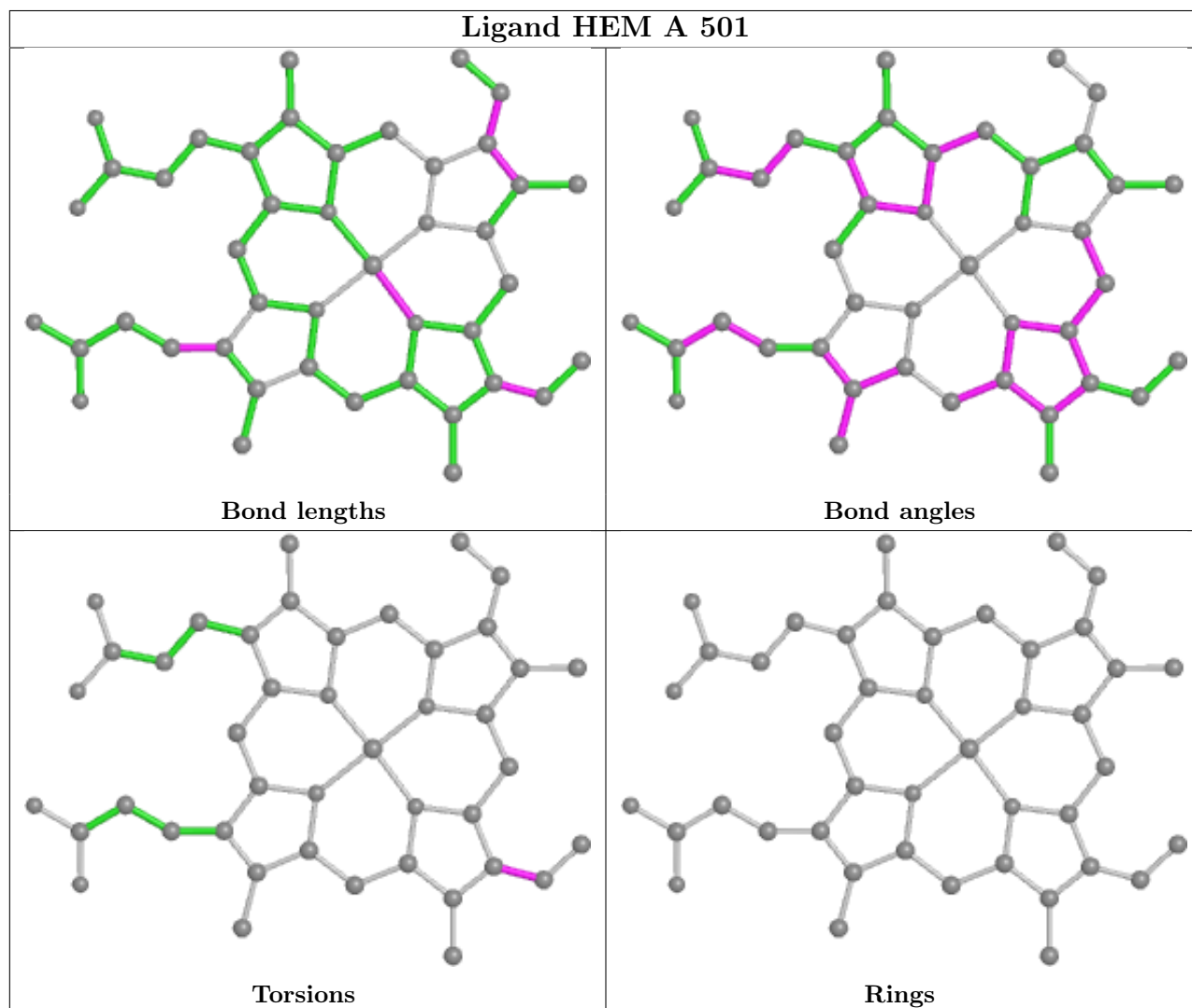
Mol	Chain	Res	Type	Atoms
3	A	503	WRI	C24-C25-C27-C28-C29-C30-C31

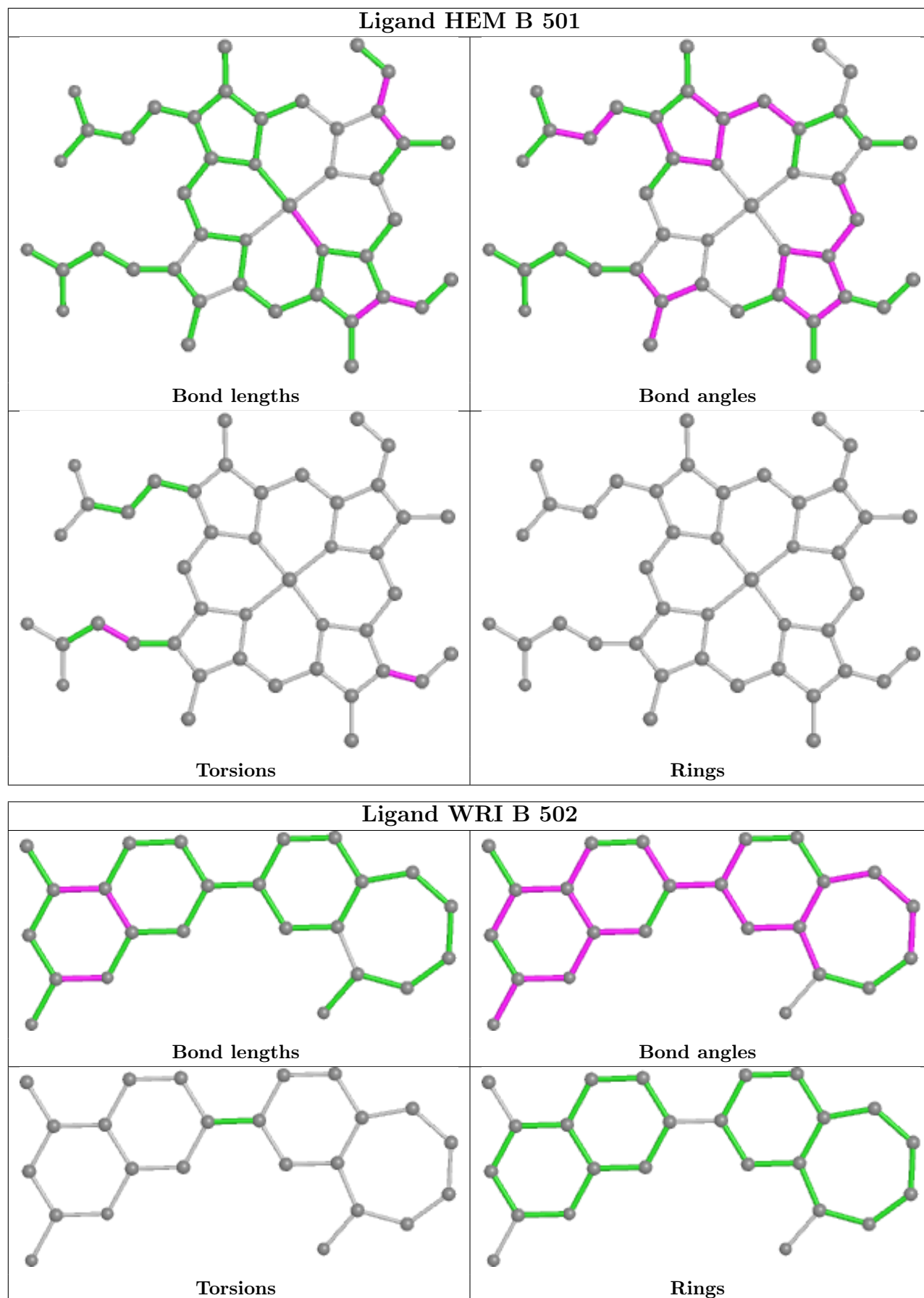
15 monomers are involved in 40 short contacts:

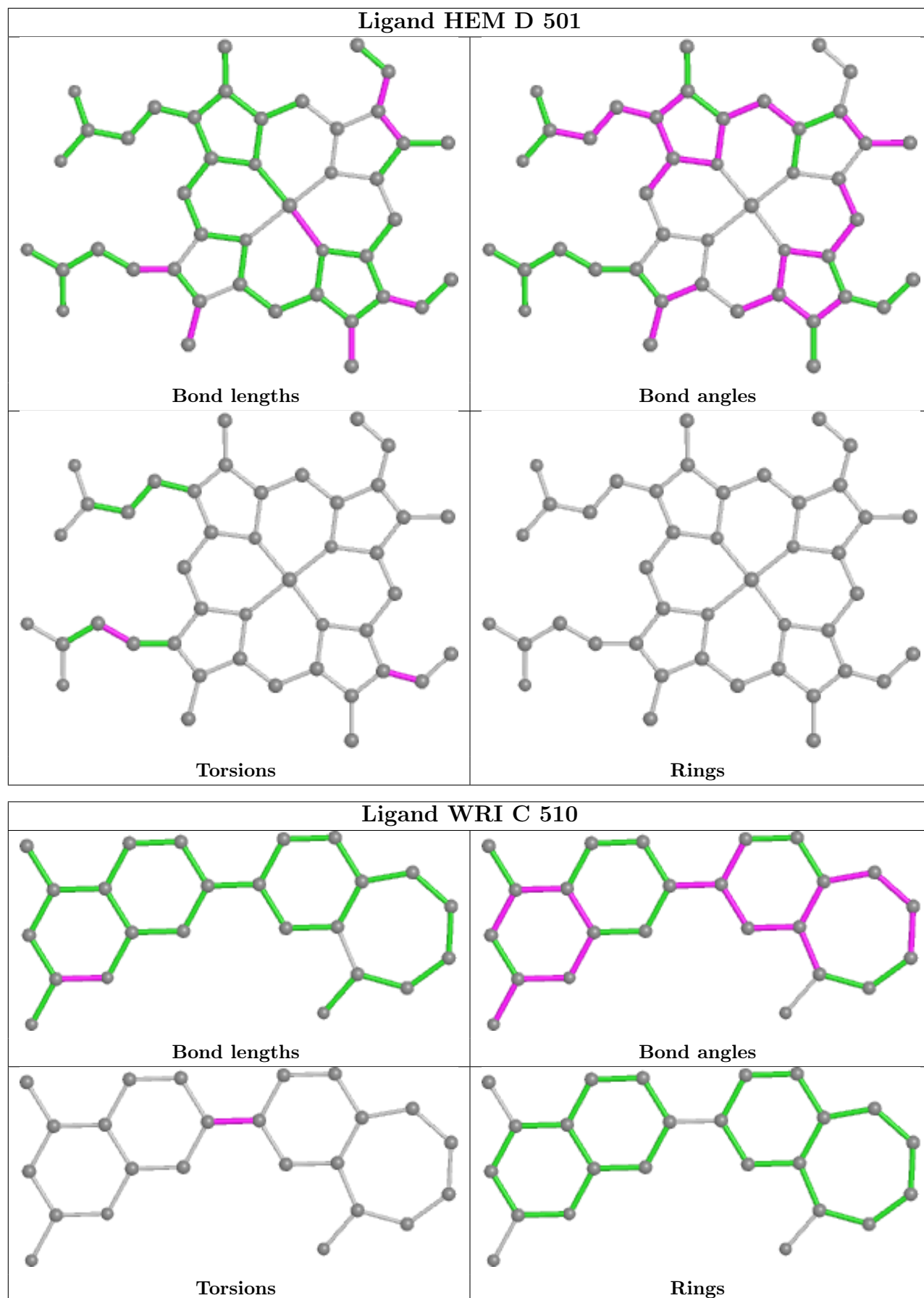
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	501	HEM	4	0
4	C	505	BTB	3	0
4	A	505	BTB	2	0
2	B	501	HEM	2	0
4	D	504	BTB	3	0
4	D	503	BTB	2	0
3	B	502	WRI	1	0
4	B	505	BTB	5	0
4	C	504	BTB	4	0
2	D	501	HEM	2	0
3	C	502	WRI	1	0
2	C	501	HEM	3	0
3	D	502	WRI	2	0
4	A	504	BTB	4	0
3	A	502	WRI	3	0

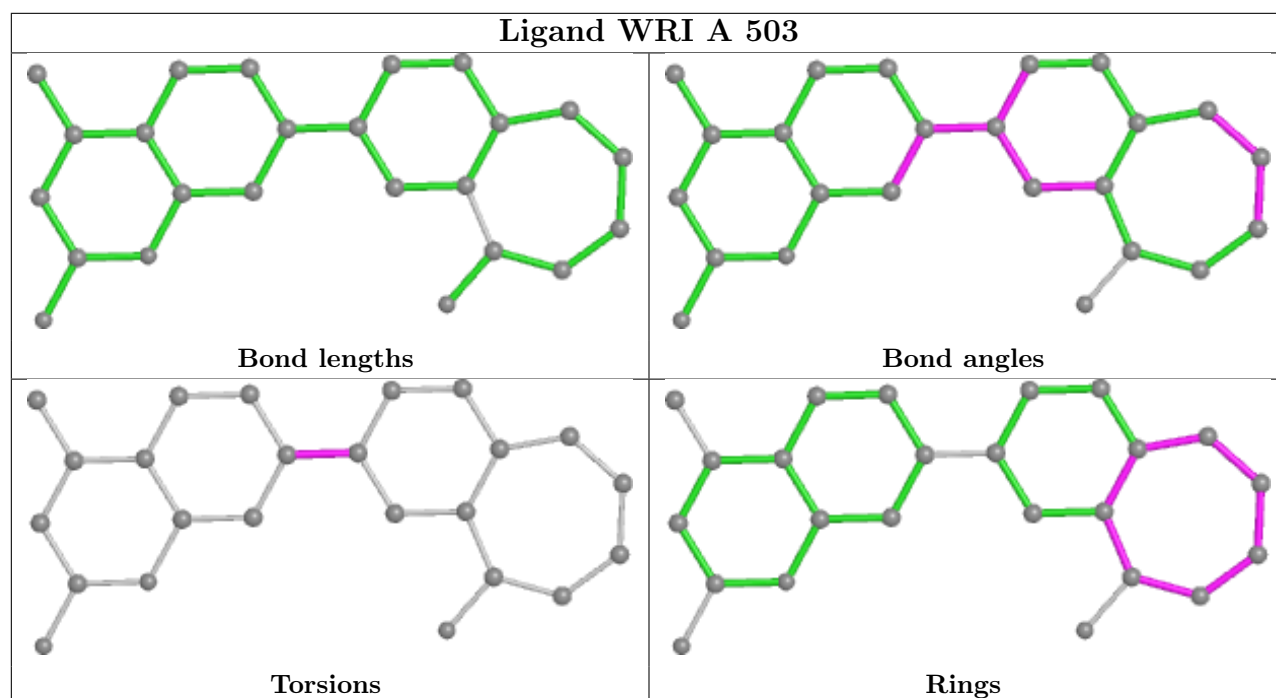
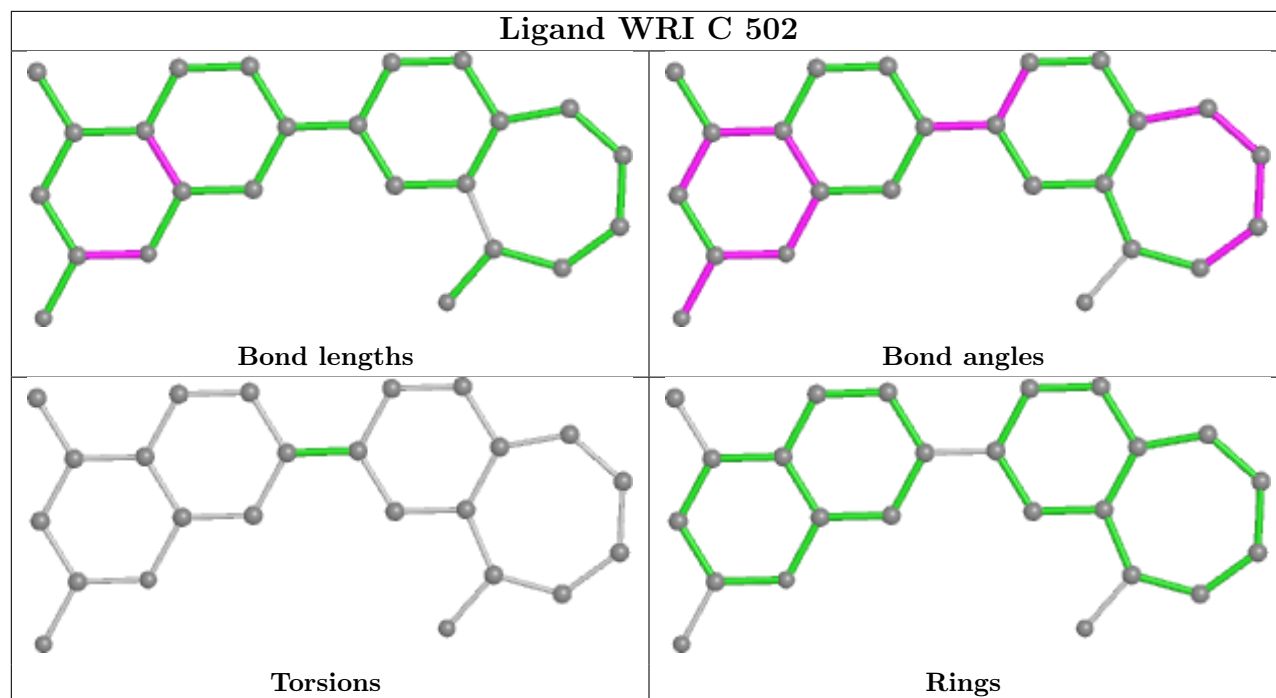
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

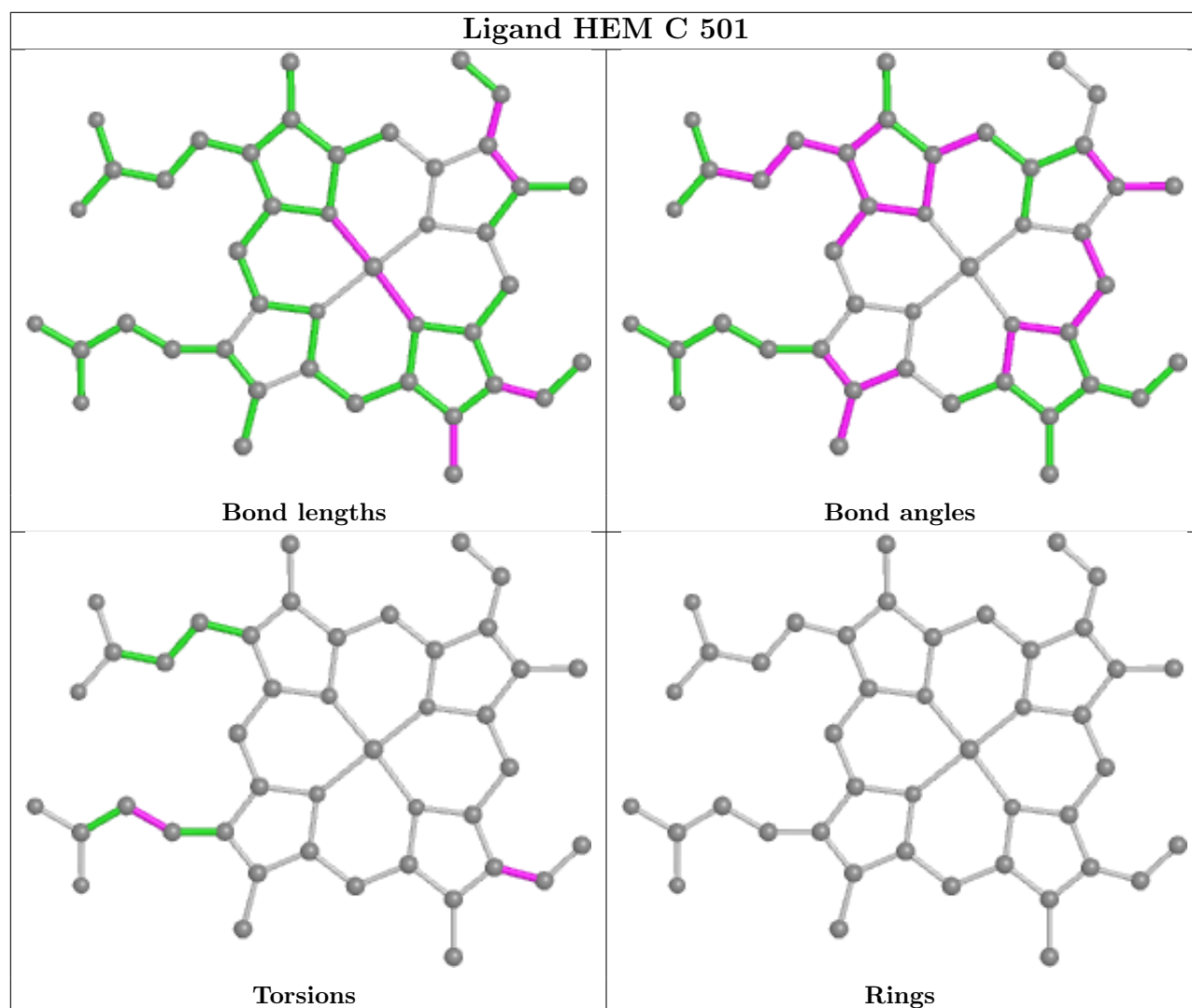
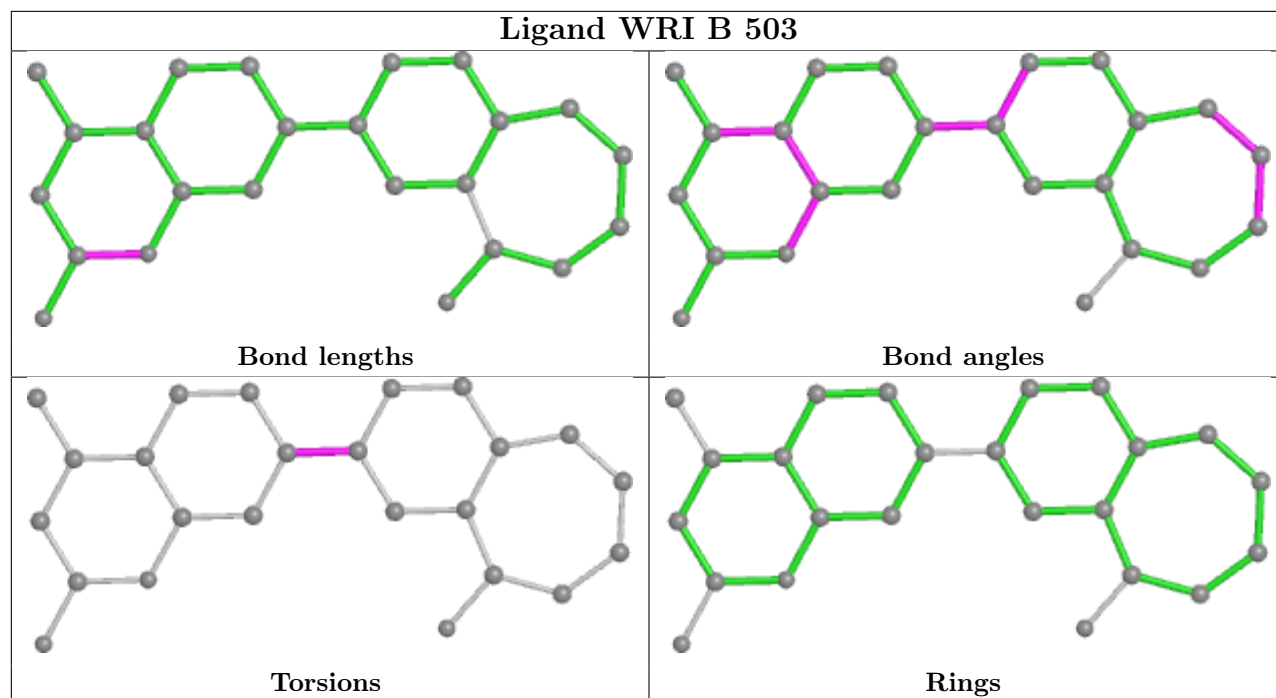
Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD 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.

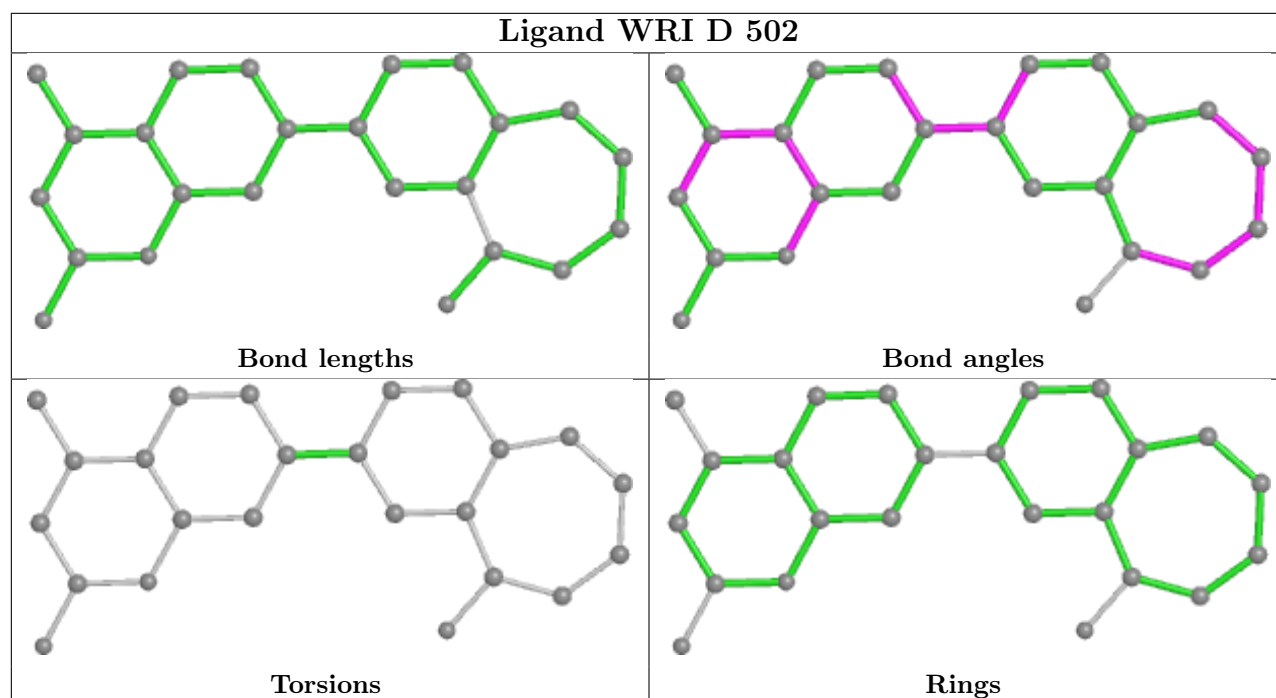
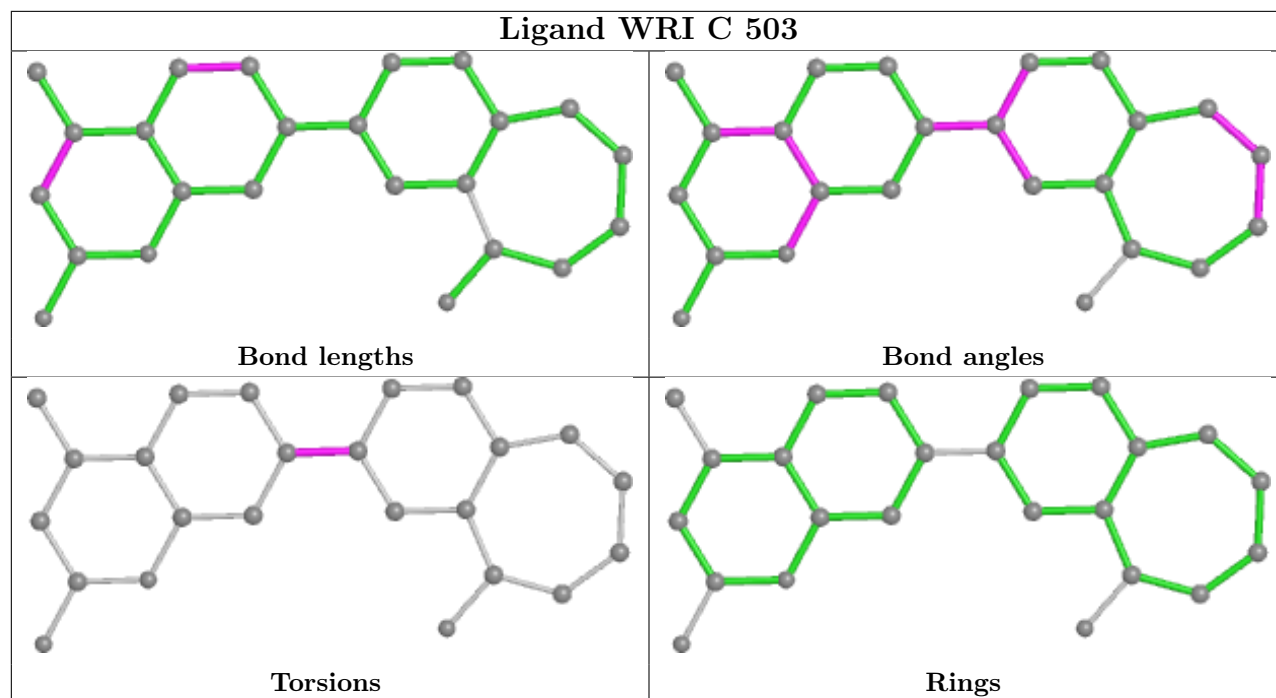


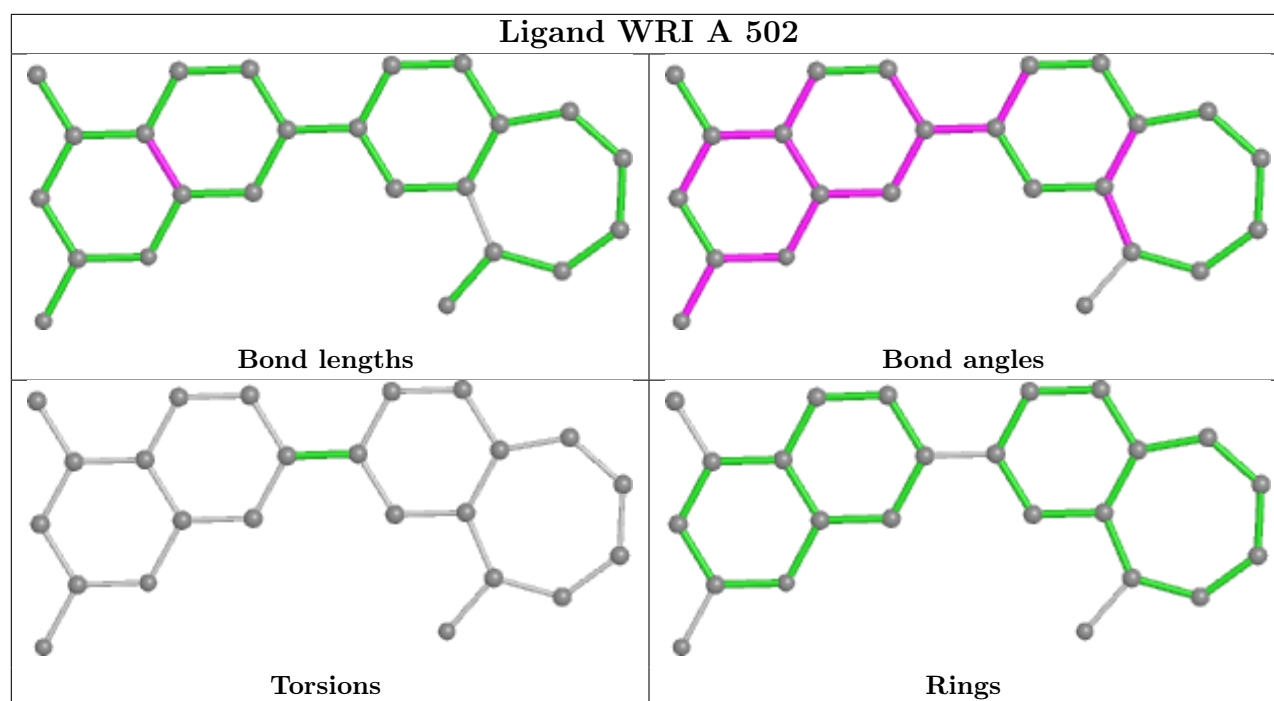












5.7 Other polymers [i](#)

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	401/440 (91%)	1.00	75 (18%) 1 1	38, 71, 120, 154	0
1	B	401/440 (91%)	0.36	29 (7%) 15 17	31, 50, 90, 135	0
1	C	402/440 (91%)	0.70	48 (11%) 4 4	37, 61, 101, 130	0
1	D	401/440 (91%)	0.36	26 (6%) 18 20	29, 50, 84, 141	0
All	All	1605/1760 (91%)	0.60	178 (11%) 5 5	29, 57, 106, 154	0

The worst 5 of 178 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	153	VAL	7.6
1	A	259	GLY	7.1
1	A	447	TRP	6.3
1	B	257	GLN	6.2
1	D	258	ASP	5.9

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](#)

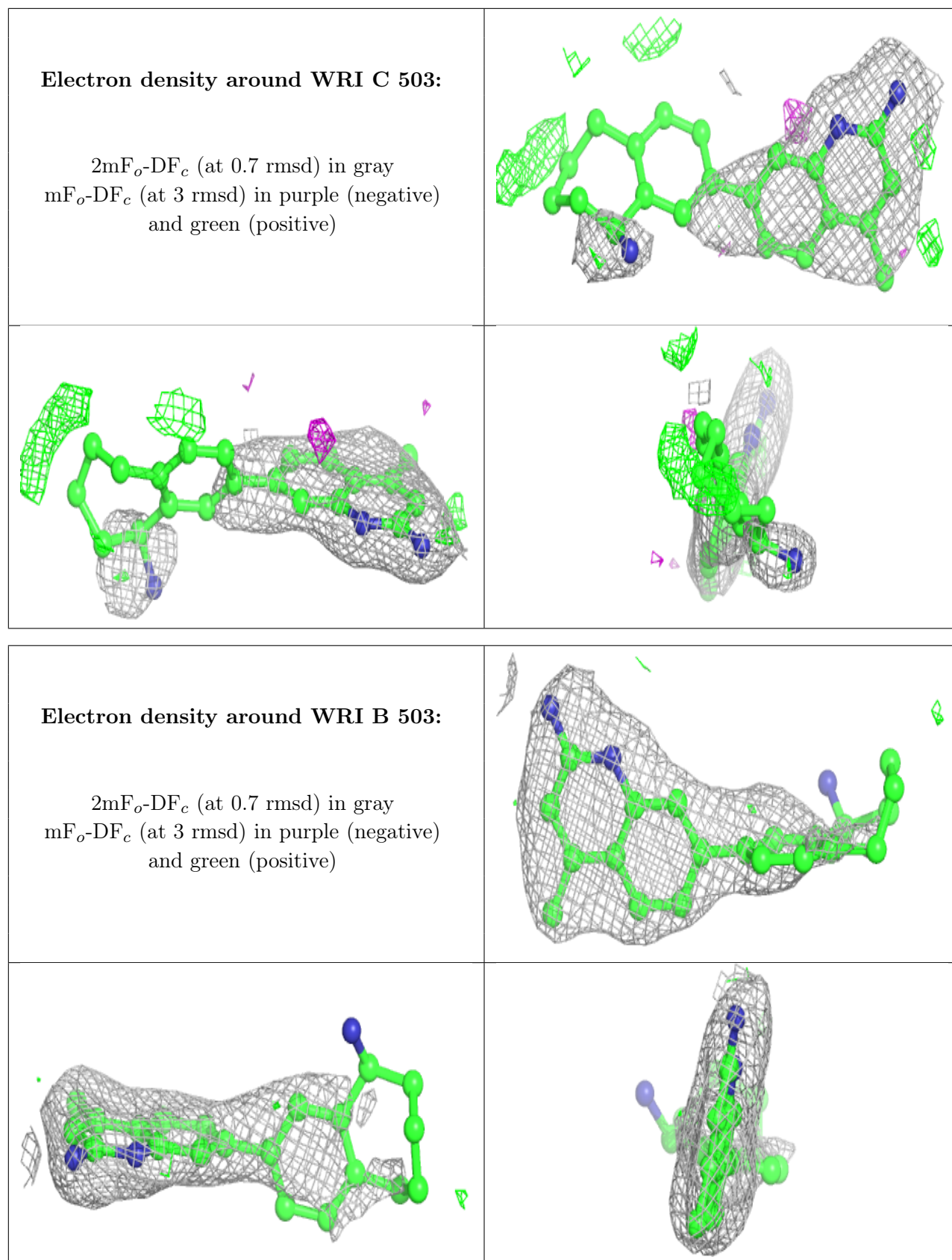
There are no monosaccharides in this entry.

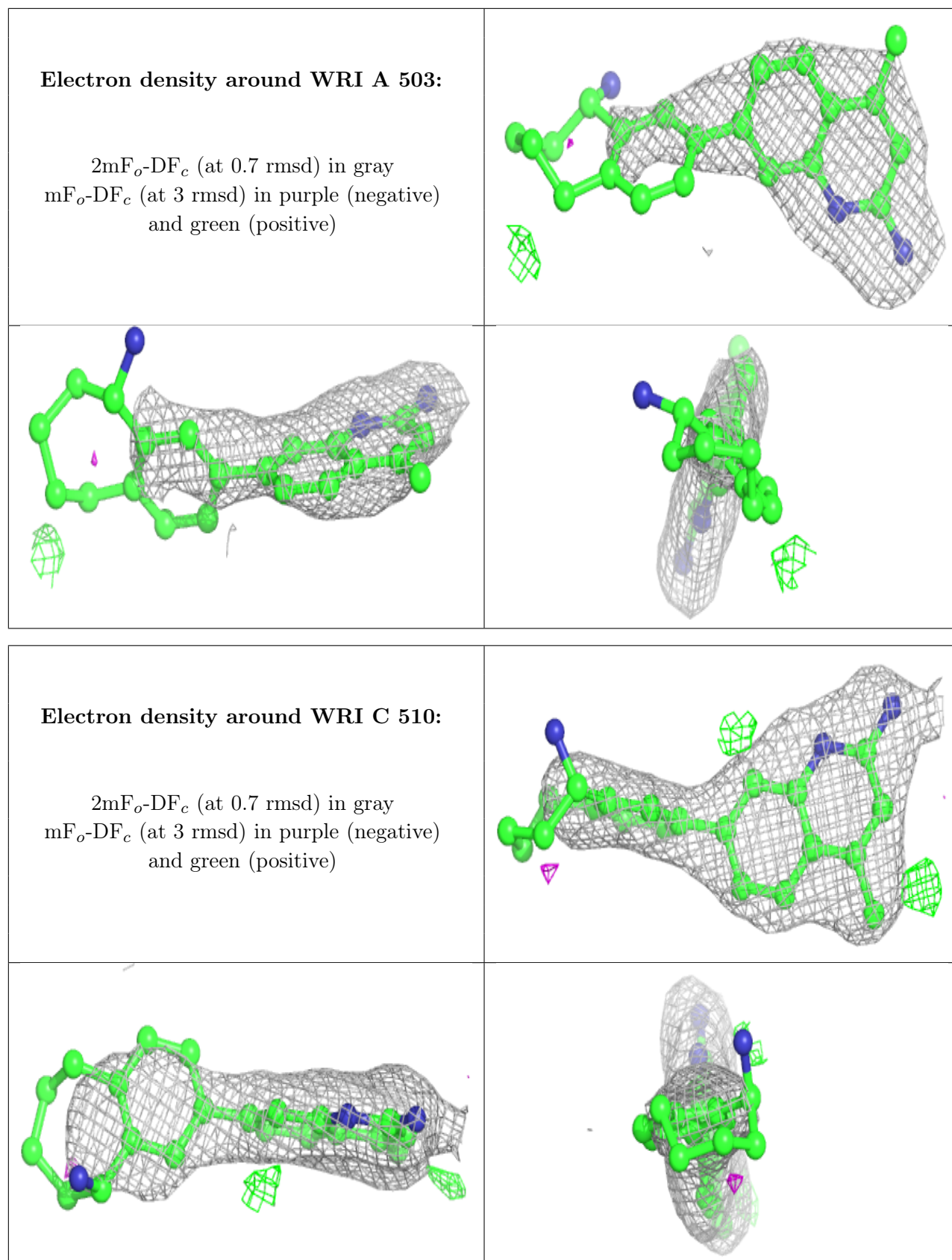
6.4 Ligands [i](#)

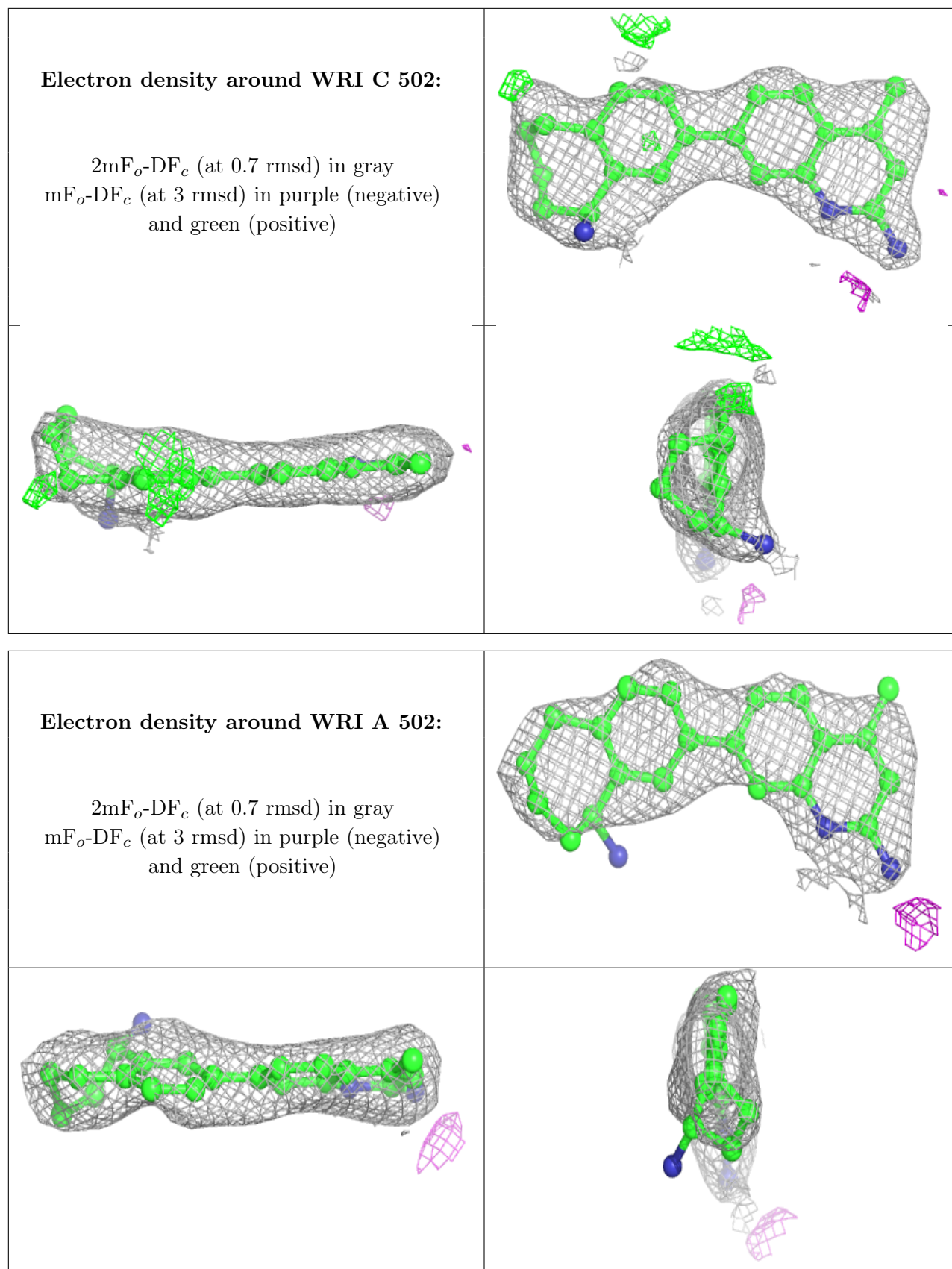
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled ‘Q < 0.9’ lists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

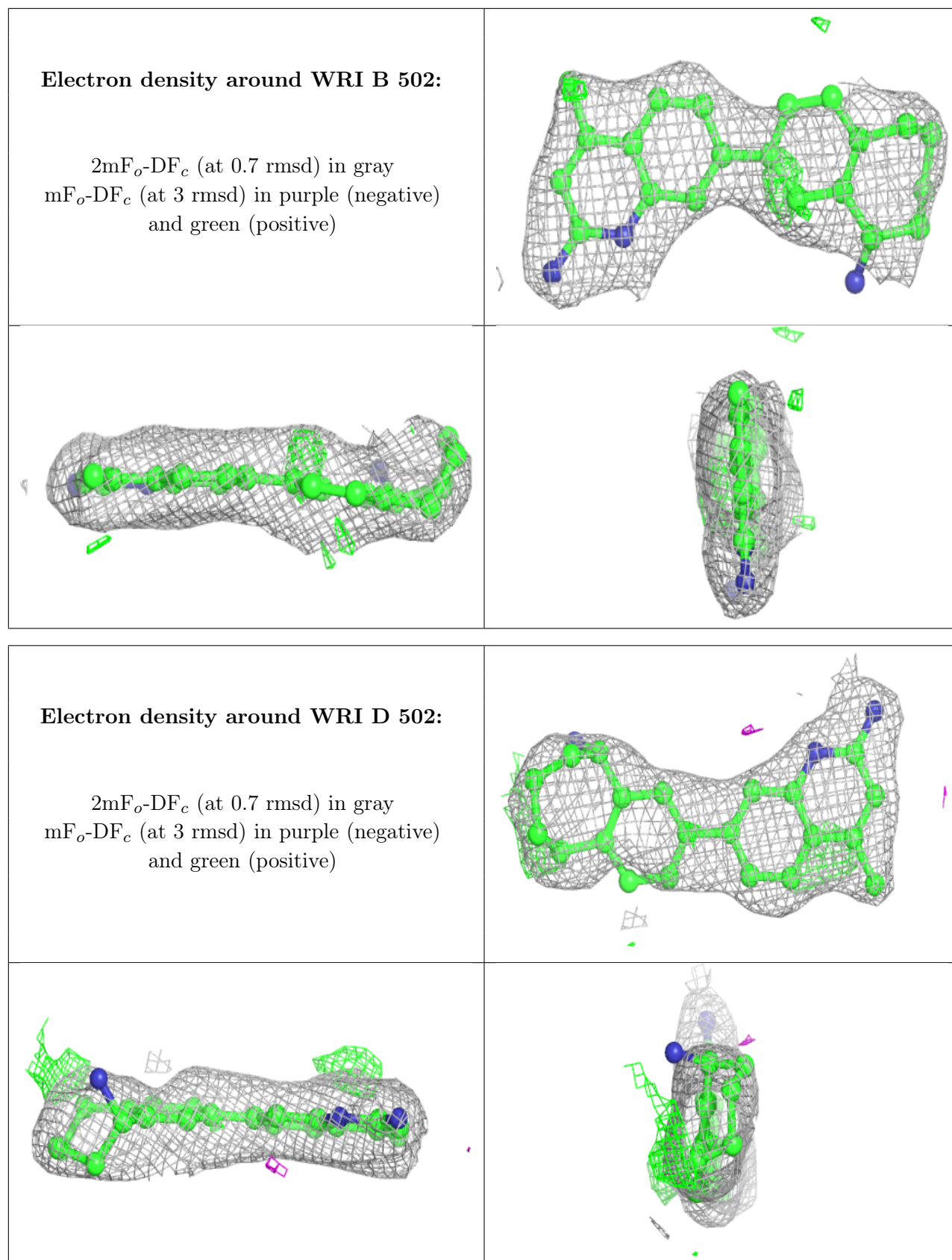
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
4	BTB	C	505	14/14	0.72	0.21	81,111,118,119	0
3	WRI	C	503	24/24	0.79	0.35	45,94,129,131	0
3	WRI	B	503	24/24	0.80	0.30	40,85,128,133	0
4	BTB	A	505	14/14	0.81	0.20	103,119,123,125	0
3	WRI	A	503	24/24	0.84	0.35	53,96,136,139	0
4	BTB	D	504	14/14	0.86	0.20	76,83,91,93	0
5	GOL	D	505	6/6	0.86	0.10	80,81,90,92	0
3	WRI	C	510	24/24	0.87	0.32	38,78,126,126	0
6	CL	A	507	1/1	0.87	0.28	70,70,70,70	0
4	BTB	D	503	14/14	0.89	0.20	42,72,84,87	0
4	BTB	C	504	14/14	0.90	0.14	56,79,88,90	0
4	BTB	A	504	14/14	0.90	0.13	81,91,100,100	0
3	WRI	C	502	24/24	0.90	0.30	53,67,85,87	0
5	GOL	C	506	6/6	0.91	0.24	58,65,83,88	0
3	WRI	A	502	24/24	0.91	0.37	64,77,99,107	0
4	BTB	B	505	14/14	0.91	0.21	55,69,79,80	0
7	ZN	C	509	1/1	0.91	0.07	61,61,61,61	0
7	ZN	C	511	1/1	0.91	0.08	68,68,68,68	0
4	BTB	B	504	14/14	0.92	0.14	46,64,79,82	0
7	ZN	B	508	1/1	0.92	0.08	64,64,64,64	0
6	CL	C	507	1/1	0.93	0.29	60,60,60,60	0
3	WRI	B	502	24/24	0.93	0.21	41,53,97,104	0
3	WRI	D	502	24/24	0.93	0.26	36,55,93,99	0
5	GOL	A	506	6/6	0.93	0.14	64,77,80,84	0
7	ZN	A	509	1/1	0.95	0.08	65,65,65,65	0
2	HEM	A	501	43/43	0.96	0.25	44,65,86,89	0
6	CL	D	506	1/1	0.97	0.13	53,53,53,53	0
2	HEM	B	501	43/43	0.97	0.14	24,41,70,74	0
2	HEM	C	501	43/43	0.97	0.20	36,49,86,98	0
6	CL	B	506	1/1	0.97	0.18	55,55,55,55	0
2	HEM	D	501	43/43	0.97	0.16	26,39,77,90	0
7	ZN	A	508	1/1	0.98	0.08	52,52,52,52	0
8	CA	A	510	1/1	0.98	0.18	48,48,48,48	0
8	CA	C	512	1/1	0.98	0.08	56,56,56,56	0
9	GD	D	507	1/1	0.98	0.10	54,54,54,54	0
9	GD	B	507	1/1	0.99	0.12	55,55,55,55	0
7	ZN	C	508	1/1	0.99	0.10	45,45,45,45	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.



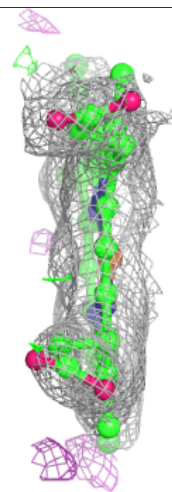
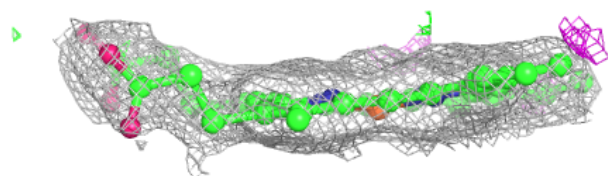
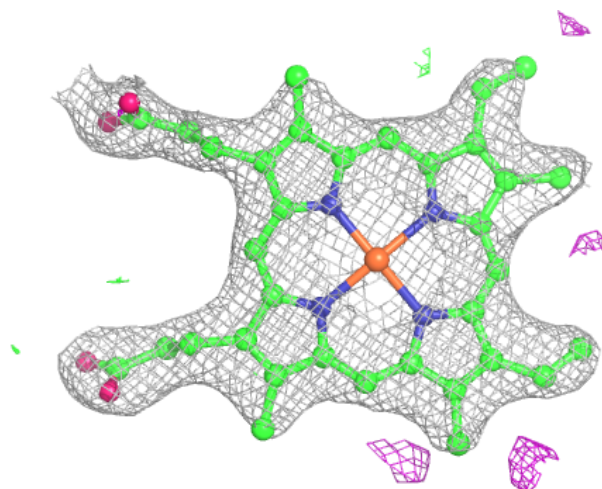






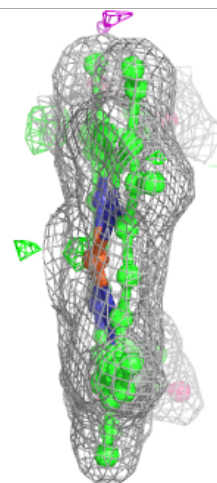
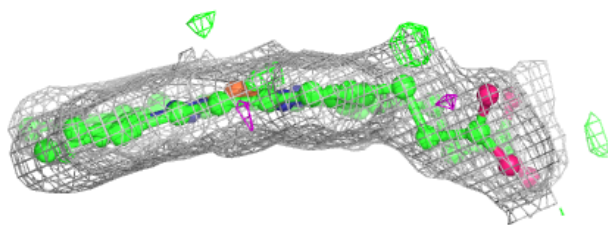
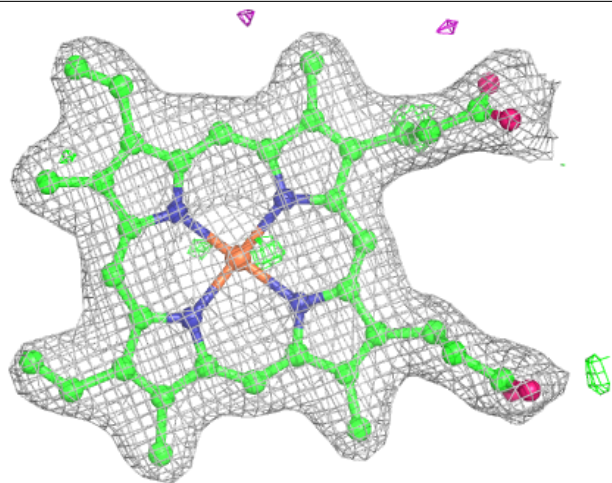
Electron density around HEM A 501:

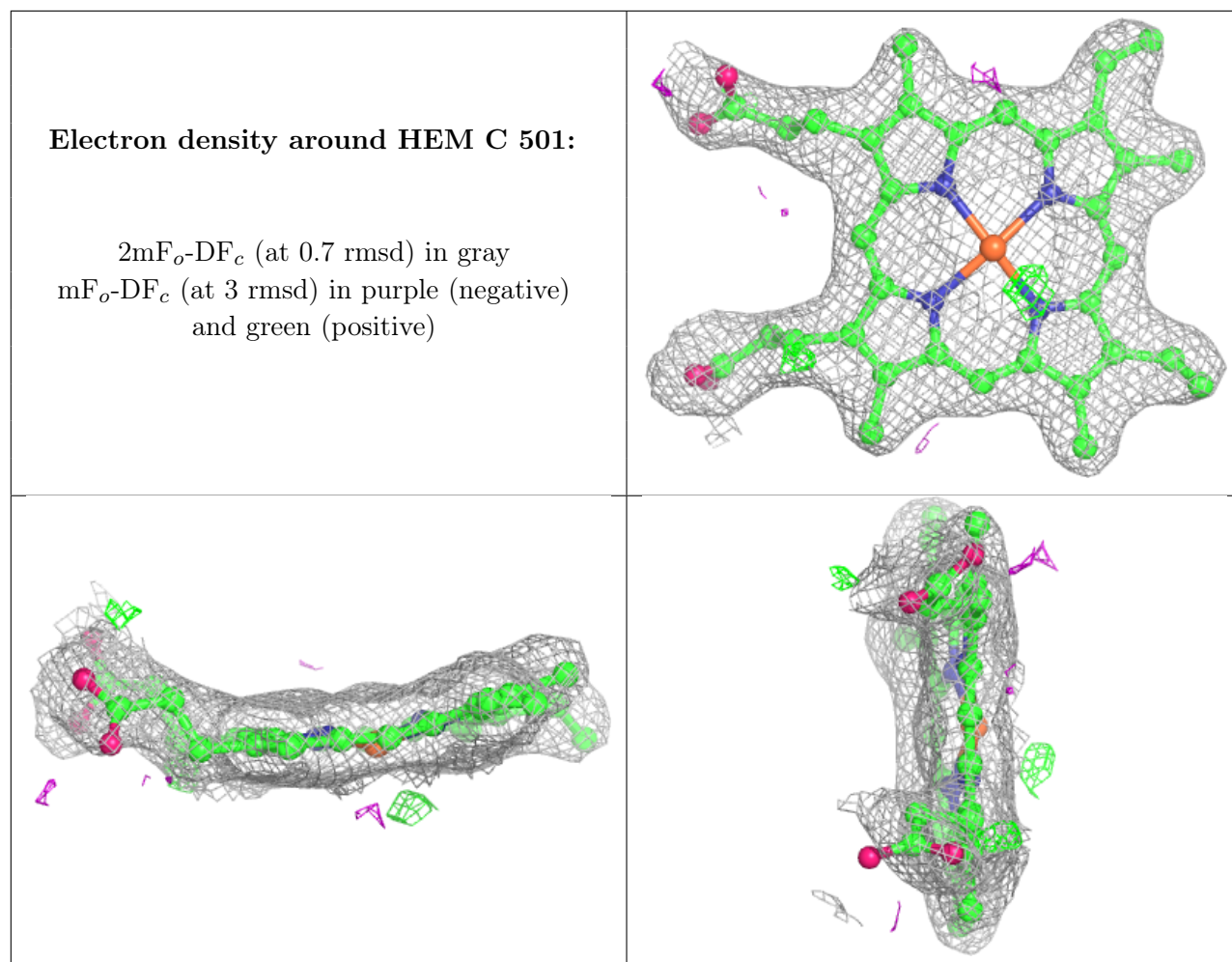
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

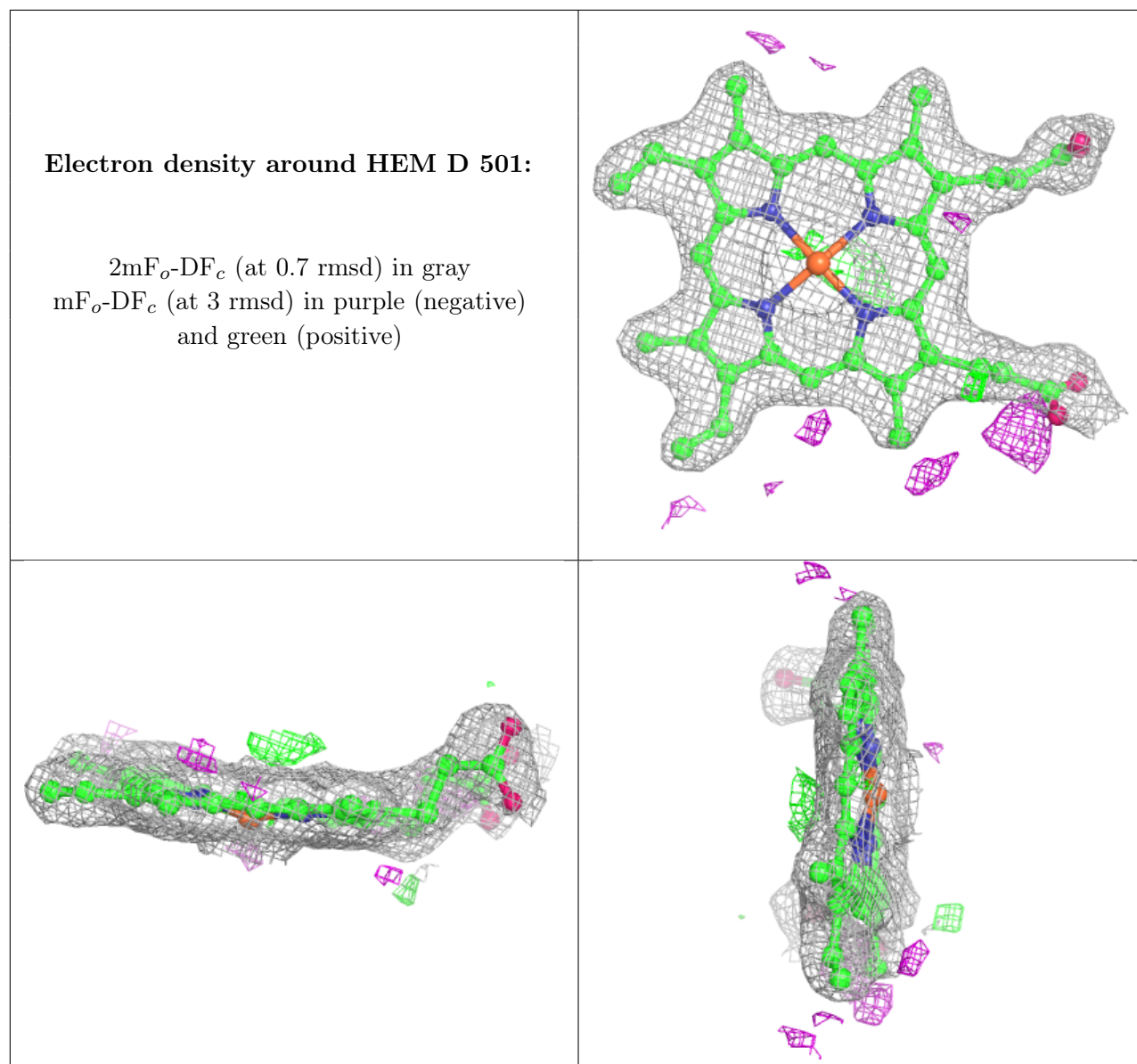


Electron density around HEM B 501:

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







6.5 Other polymers [i](#)

There are no such residues in this entry.