



# Full wwPDB X-ray Structure Validation Report ⓘ

Jun 12, 2024 – 03:57 AM EDT

PDB ID : 6NH4  
Title : Structure of human endothelial nitric oxide synthase heme domain in complex with 6-(3-fluoro-5-(2-((2R,4S)-4-fluoropyrrolidin-2-yl)ethyl)phenethyl)-4-methylpyridin-2-amine  
Authors : Chreifi, G.; Li, H.; Poulos, T.L.  
Deposited on : 2018-12-21  
Resolution : 2.27 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 : 2.36.2  
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) : 2.36.2

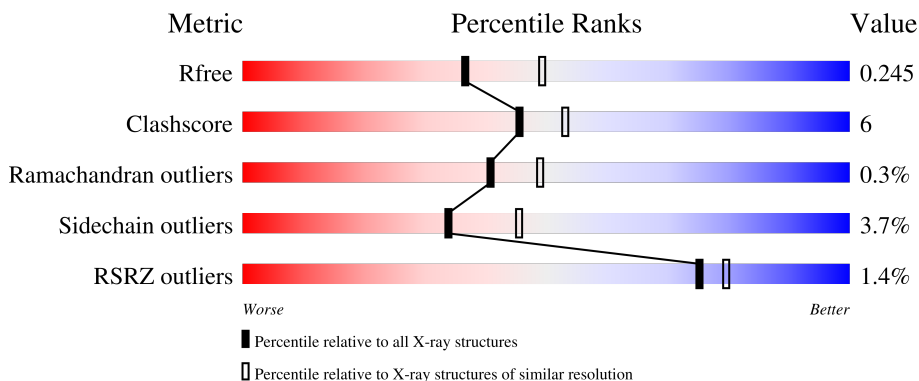
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.27 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	6980 (2.30-2.26)
Clashscore	141614	7711 (2.30-2.26)
Ramachandran outliers	138981	7597 (2.30-2.26)
Sidechain outliers	138945	7598 (2.30-2.26)
RSRZ outliers	127900	6849 (2.30-2.26)

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	 3% 73% 17% • 8%
1	B	440	 % 80% 11% 9%
1	C	440	 % 78% 12% • 9%
1	D	440	 77% 14% 8%

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
7	CL	C	511	-	-	X	-
9	GD	C	501	-	-	-	X

## 2 Entry composition [i](#)

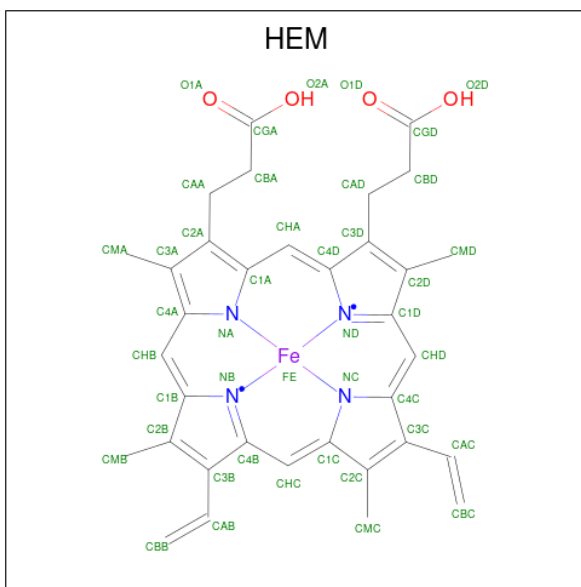
There are 10 unique types of molecules in this entry. The entry contains 14013 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Endothelial nitric oxide synthase splice variant eNOS13A.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	404	Total 3237	C 2062	N 570	O 589	S 16	0	2	0
1	B	402	Total 3221	C 2051	N 566	O 587	S 17	0	3	0
1	C	401	Total 3209	C 2044	N 563	O 586	S 16	0	2	0
1	D	404	Total 3241	C 2063	N 572	O 589	S 17	0	3	0

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



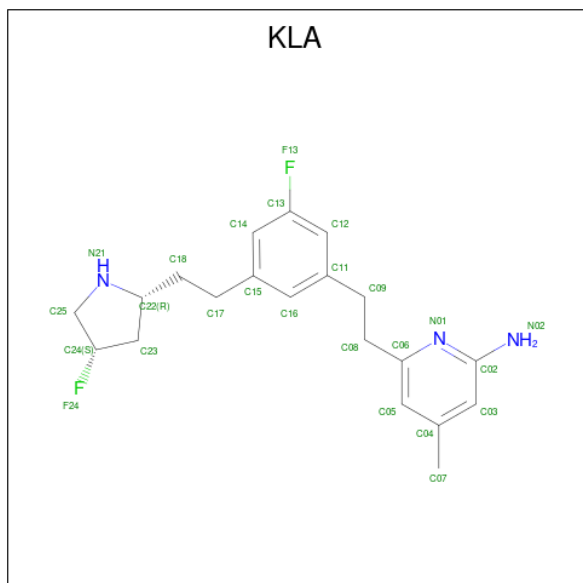
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	
			Total	C	Fe	N			O
2	A	1	Total 43	C 34	Fe 1	N 4	O 4	0	0
2	B	1	Total 43	C 34	Fe 1	N 4	O 4	0	0

*Continued on next page...*

Continued from previous page...

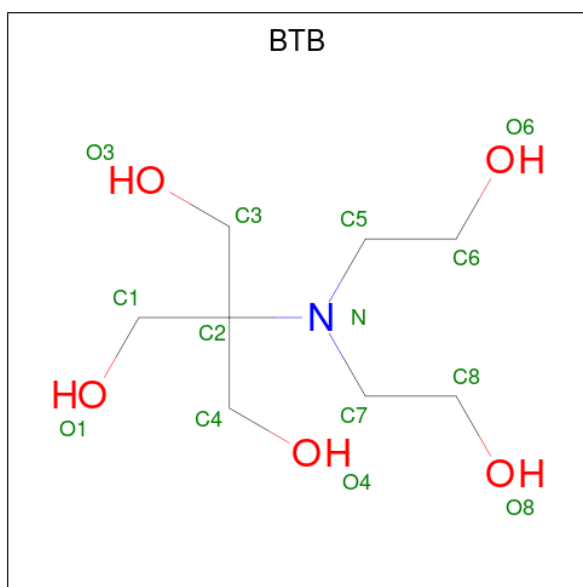
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	
2	C	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		
2	D	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		

- Molecule 3 is 6-[2-(3-fluoro-5-{2-[(2R,4S)-4-fluoropyrrolidin-2-yl]ethyl}phenyl)ethyl]-4-methylpyridin-2-amine (three-letter code: KLA) (formula: C<sub>20</sub>H<sub>25</sub>F<sub>2</sub>N<sub>3</sub>).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	F	N	0	0
			25	20	2	3		
3	A	1	Total	C	F	N	0	0
			25	20	2	3		
3	B	1	Total	C	F	N	0	0
			25	20	2	3		
3	C	1	Total	C	F	N	0	0
			25	20	2	3		
3	D	1	Total	C	F	N	0	0
			25	20	2	3		
3	D	1	Total	C	F	N	0	0
			25	20	2	3		

- Molecule 4 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
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		
4	B	1	Total	C	N	O	0	0
			14	8	1	5		
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	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 ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	3	Total	Zn	0	0
			3	3		
5	C	3	Total	Zn	0	0
			3	3		

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

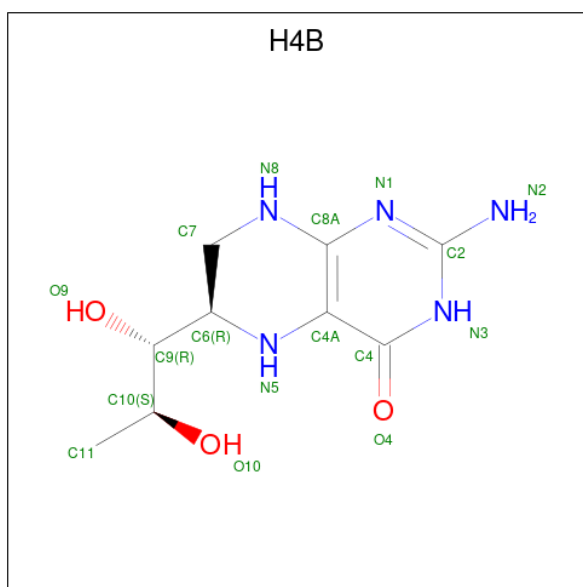


Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	1	Total C O 6 3 3	0	0
6	C	1	Total C O 6 3 3	0	0

- 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	2	Total Cl 2 2	0	0
7	C	3	Total Cl 3 3	0	0
7	D	1	Total Cl 1 1	0	0

- Molecule 8 is 5,6,7,8-TETRAHYDROBIOPTERIN (three-letter code: H4B) (formula: C<sub>9</sub>H<sub>15</sub>N<sub>5</sub>O<sub>3</sub>).



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

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

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

- Molecule 10 is water.

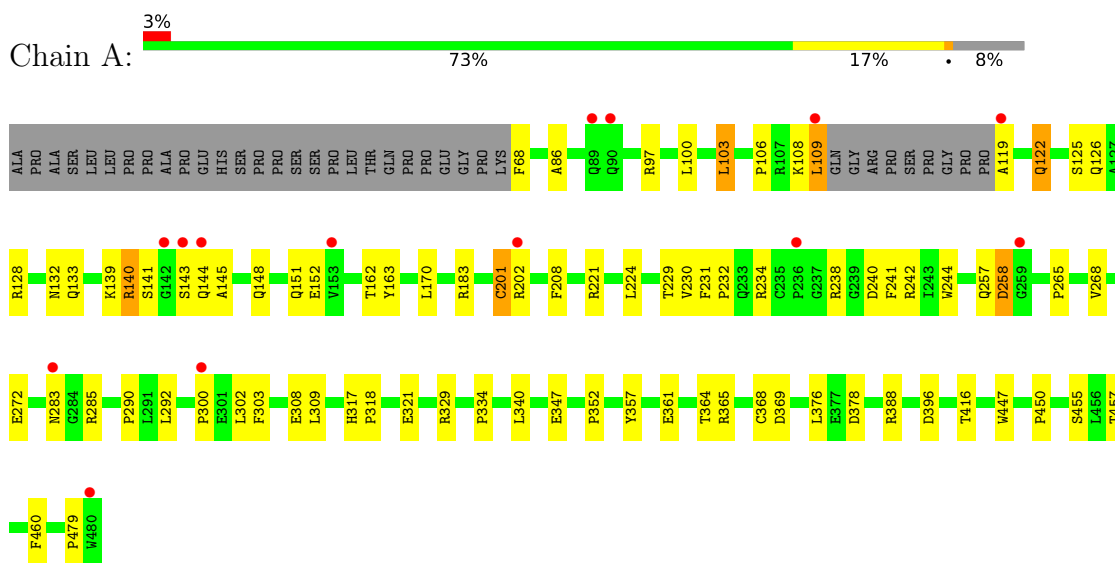
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
10	A	114	Total	O	0	0
			114	114		
10	B	174	Total	O	0	0
			174	174		
10	C	145	Total	O	0	0
			145	145		
10	D	175	Total	O	0	0
			175	175		



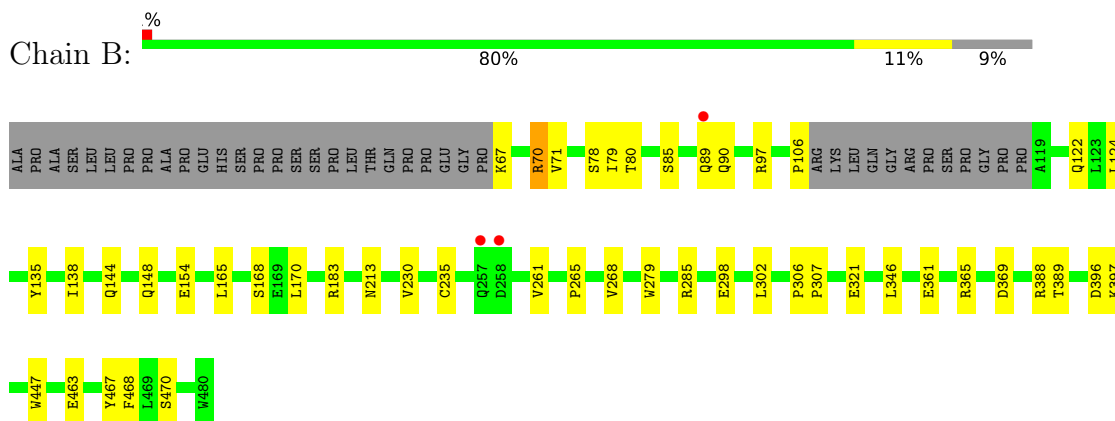
### 3 Residue-property plots

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.

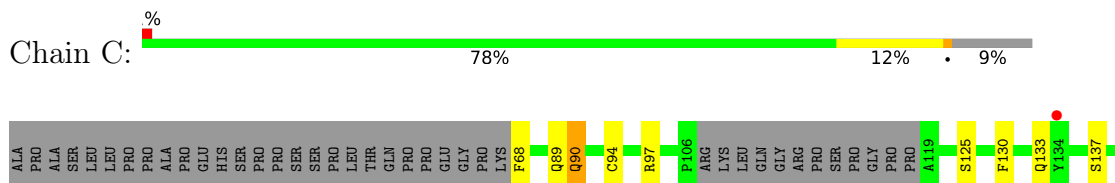
- Molecule 1: Endothelial nitric oxide synthase splice variant eNOS13A

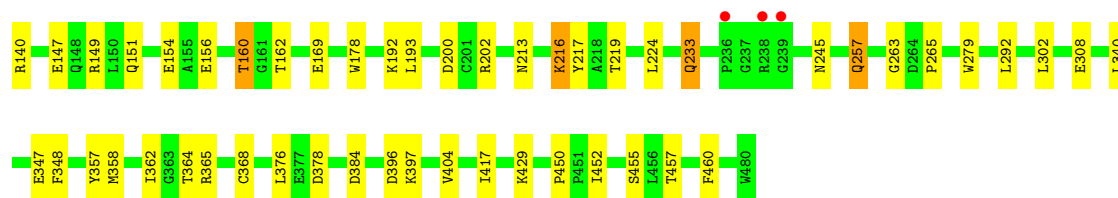


- Molecule 1: Endothelial nitric oxide synthase splice variant eNOS13A



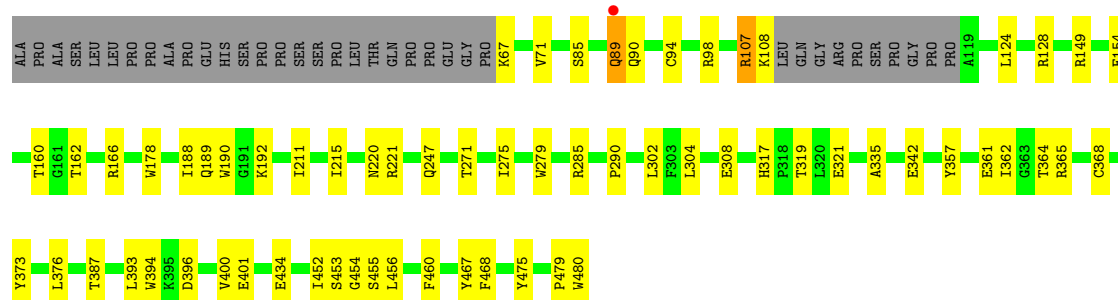
- Molecule 1: Endothelial nitric oxide synthase splice variant eNOS13A





- Molecule 1: Endothelial nitric oxide synthase splice variant eNOS13A

Chain D: 77% 14% 8%



## 4 Data and refinement statistics i

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	59.71Å 152.55Å 109.14Å 90.00° 90.87° 90.00°	Depositor
Resolution (Å)	39.98 – 2.27 55.60 – 2.27	Depositor EDS
% Data completeness (in resolution range)	93.3 (39.98-2.27) 94.3 (55.60-2.27)	Depositor EDS
$R_{merge}$	0.25	Depositor
$R_{sym}$	0.25	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.57 (at 2.27Å)	Xtrriage
Refinement program	PHENIX 1.11.1-2575_1496	Depositor
R, $R_{free}$	0.192 , 0.251 0.185 , 0.245	Depositor DCC
$R_{free}$ test set	4242 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	27.8	Xtrriage
Anisotropy	0.412	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.36 , 33.6	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.47$ , $\langle L^2 \rangle = 0.30$	Xtrriage
Estimated twinning fraction	0.186 for h,-k,-l	Xtrriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	14013	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	37.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.30% 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

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: ZN, GD, BTB, CL, H4B, GOL, KLA, 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	0.38	0/3335	0.55	1/4543 (0.0%)
1	B	0.43	0/3319	0.57	1/4523 (0.0%)
1	C	0.40	0/3307	0.54	0/4507
1	D	0.44	0/3339	0.59	0/4548
All	All	0.41	0/13300	0.56	2/18121 (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	D	0	1

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed( $^{\circ}$ )	Ideal( $^{\circ}$ )
1	A	369	ASP	CB-CG-OD1	6.31	123.98	118.30
1	B	369	ASP	CB-CG-OD1	5.20	122.98	118.30

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	D	89	GLN	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	3237	0	3146	47	1
1	B	3221	0	3126	29	0
1	C	3209	0	3108	37	0
1	D	3241	0	3152	41	0
2	A	43	0	30	3	0
2	B	43	0	30	2	0
2	C	43	0	30	3	0
2	D	43	0	30	4	0
3	A	50	0	0	1	0
3	B	25	0	0	0	0
3	C	25	0	0	0	0
3	D	50	0	0	0	0
4	A	28	0	36	5	0
4	B	42	0	56	8	0
4	C	14	0	19	0	0
4	D	28	0	36	6	1
5	A	3	0	0	0	0
5	C	3	0	0	0	0
6	A	6	0	8	0	0
6	C	6	0	8	0	0
7	A	1	0	0	0	0
7	B	2	0	0	1	0
7	C	3	0	0	2	0
7	D	1	0	0	0	0
8	B	17	0	15	1	0
8	C	17	0	15	1	0
9	B	1	0	0	0	0
9	C	2	0	0	0	0
9	D	1	0	0	0	0
10	A	114	0	0	7	0
10	B	174	0	0	6	0
10	C	145	0	0	6	0
10	D	175	0	0	4	0
All	All	14013	0	12845	168	1

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.

All (168) 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:365:ARG:NH1	2:D:501:HEM:O2A	2.09	0.85
1:D:321:GLU:OE2	4:D:504:BTB:O4	1.99	0.79
1:C:365:ARG:NH1	2:C:502:HEM:O2A	2.18	0.77
1:C:450:PRO:HG2	1:C:457:THR:HG21	1.67	0.76
1:B:397:LYS:NZ	10:B:601:HOH:O	2.18	0.76
4:A:503:BTB:O8	1:C:257:GLN:OE1	2.04	0.72
1:D:279:TRP:HB2	1:D:302:LEU:HD21	1.73	0.70
1:C:68:PHE:N	10:C:602:HOH:O	2.23	0.70
1:A:148:GLN:NE2	10:A:603:HOH:O	2.25	0.69
1:B:279:TRP:HB2	1:B:302:LEU:HD21	1.75	0.68
1:A:201:CYS:O	1:A:202:ARG:NH1	2.25	0.68
1:A:242:ARG:HD3	1:A:479:PRO:HB3	1.75	0.67
1:A:238:ARG:NH1	10:A:604:HOH:O	2.26	0.67
1:A:86:ALA:O	1:B:97:ARG:NH2	2.28	0.66
1:D:107:ARG:HH12	1:D:475:TYR:HB2	1.60	0.66
1:A:365:ARG:NH1	2:A:501:HEM:O2A	2.30	0.65
1:D:290:PRO:HB3	1:D:304:LEU:HD23	1.78	0.65
1:C:384:ASP:HB3	7:C:511:CL:CL	2.34	0.65
1:A:258:ASP:N	1:A:258:ASP:OD1	2.30	0.63
2:A:501:HEM:CGA	8:B:501:H4B:HN22	2.12	0.63
1:C:347:GLU:OE2	10:C:601:HOH:O	2.16	0.63
2:D:501:HEM:HBB2	2:D:501:HEM:HHC	1.81	0.62
1:A:361:GLU:OE2	3:A:502:KLA:N02	2.33	0.61
1:A:221:ARG:NH2	10:A:605:HOH:O	2.33	0.60
1:D:317:HIS:NE2	1:D:401:GLU:OE1	2.33	0.60
2:C:502:HEM:HBB2	2:C:502:HEM:HHC	1.84	0.60
1:B:361:GLU:HB3	1:B:365:ARG:NH2	2.18	0.59
1:C:200:ASP:OD1	1:C:200:ASP:N	2.36	0.59
1:A:128:ARG:O	1:A:132:ASN:ND2	2.36	0.58
1:B:285:ARG:NH2	10:B:608:HOH:O	2.34	0.57
2:B:502:HEM:HBC2	2:B:502:HEM:HMC2	1.85	0.57
1:C:364:THR:O	1:C:368:CYS:HB2	2.04	0.57
1:A:234:ARG:NH1	1:A:347:GLU:OE1	2.37	0.57
1:C:149:ARG:NE	1:C:169:GLU:OE2	2.37	0.57
1:B:90:GLN:HB2	1:B:468:PHE:CD1	2.40	0.56
1:A:340:LEU:HD21	1:A:347:GLU:HG2	1.86	0.56
1:D:178:TRP:CE3	1:D:190:TRP:HA	2.42	0.55
4:A:504:BTB:O3	4:A:504:BTB:O1	2.18	0.55
1:D:271:THR:O	1:D:275:ILE:HG12	2.07	0.54
1:B:388:ARG:NH2	10:B:605:HOH:O	2.30	0.54

*Continued on next page...*

*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:106:PRO:O	10:B:602:HOH:O	2.19	0.53
7:B:509:CL:CL	7:C:511:CL:CL	3.00	0.53
1:C:376:LEU:HB2	10:C:630:HOH:O	2.09	0.53
2:D:501:HEM:HMC2	2:D:501:HEM:HBC2	1.91	0.53
1:B:183:ARG:HD3	1:B:447:TRP:CD2	2.44	0.52
1:D:107:ARG:NH1	10:D:611:HOH:O	2.42	0.52
1:A:378:ASP:OD1	10:A:601:HOH:O	2.19	0.52
1:D:149:ARG:HD3	1:D:166:ARG:CZ	2.40	0.52
1:A:450:PRO:HG2	1:A:457:THR:HG21	1.92	0.52
1:B:298:GLU:HG2	10:B:709:HOH:O	2.10	0.52
1:B:70:ARG:NE	10:B:612:HOH:O	2.42	0.51
1:A:321:GLU:H	1:A:321:GLU:CD	2.14	0.51
1:B:298:GLU:OE2	4:B:505:BTB:N	2.44	0.51
1:A:292:LEU:HD22	1:A:300:PRO:HB2	1.93	0.51
1:D:211:ILE:O	1:D:215:ILE:HG13	2.11	0.51
1:A:183:ARG:HG2	1:A:447:TRP:CG	2.46	0.51
1:A:244:TRP:CH2	1:A:300:PRO:HG3	2.46	0.50
1:B:361:GLU:HB3	1:B:365:ARG:HH22	1.76	0.50
1:C:279:TRP:HB2	1:C:302:LEU:HD21	1.94	0.50
1:D:220:ASN:O	1:D:221:ARG:HG2	2.11	0.50
1:A:388:ARG:HG2	4:A:503:BTB:H82	1.93	0.50
1:C:90:GLN:NE2	10:C:610:HOH:O	2.39	0.50
1:D:434:GLU:OE1	10:D:602:HOH:O	2.20	0.50
1:C:455:SER:HA	1:C:460:PHE:CG	2.46	0.49
1:D:67:LYS:NZ	10:D:614:HOH:O	2.45	0.49
1:C:397:LYS:HG3	1:D:400:VAL:HG11	1.94	0.49
1:A:100:LEU:HB3	1:A:103:LEU:HD22	1.94	0.49
1:B:321:GLU:OE1	4:B:504:BTB:H82	2.12	0.49
1:C:257:GLN:HA	10:C:685:HOH:O	2.12	0.49
1:C:160:THR:HG23	1:C:162:THR:H	1.78	0.48
4:D:505:BTB:H32	4:D:505:BTB:H51	1.41	0.48
1:A:368:CYS:SG	1:A:376:LEU:HD13	2.53	0.48
1:B:298:GLU:OE1	4:B:505:BTB:H31	2.13	0.48
1:D:455:SER:HA	1:D:460:PHE:CG	2.49	0.48
2:A:501:HEM:HBB2	2:A:501:HEM:HHC	1.95	0.48
1:D:128:ARG:NH2	1:D:154:GLU:OE2	2.46	0.48
1:D:368:CYS:SG	1:D:376:LEU:HD13	2.54	0.47
1:C:233:GLN:HB3	1:C:348:PHE:CE2	2.49	0.47
1:B:165:LEU:HG	1:B:346:LEU:HD12	1.96	0.47
1:C:263:GLY:O	1:C:265:PRO:HD3	2.14	0.47
1:D:342:GLU:OE2	10:D:603:HOH:O	2.20	0.47

*Continued on next page...*

*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:502:HEM:HHC	2:B:502:HEM:HBB2	1.96	0.47
1:A:122:GLN:O	1:A:126:GLN:HG3	2.15	0.47
1:A:290:PRO:HB2	1:A:302:LEU:HD22	1.97	0.47
1:C:219:THR:HA	1:C:224:LEU:HD23	1.97	0.46
2:C:502:HEM:CGA	8:C:503:H4B:HN22	2.28	0.46
1:D:387:THR:HA	1:D:394:TRP:CD1	2.50	0.46
1:B:85:SER:HB3	1:B:467:TYR:CE1	2.51	0.46
1:C:94:CYS:HB3	1:D:94:CYS:HB3	1.98	0.46
4:D:504:BTB:H32	4:D:504:BTB:H51	1.61	0.46
1:A:170:LEU:HD11	1:A:230:VAL:HG11	1.97	0.46
1:D:364:THR:HG21	1:D:452:ILE:HG23	1.97	0.46
1:A:231:PHE:HB3	1:A:232:PRO:CD	2.45	0.46
1:A:361:GLU:HG2	1:A:365:ARG:HH12	1.81	0.45
1:C:429:LYS:HD2	1:C:429:LYS:HA	1.82	0.45
4:B:505:BTB:O3	4:B:505:BTB:H51	2.15	0.45
1:A:109:LEU:H	1:A:109:LEU:HG	1.25	0.45
1:A:229:THR:O	1:A:352:PRO:HD2	2.16	0.45
4:D:505:BTB:H81	4:D:505:BTB:H52	1.52	0.45
1:A:103:LEU:HD12	1:B:463:GLU:HB3	1.99	0.45
1:A:119:ALA:N	10:A:612:HOH:O	2.49	0.45
1:A:144:GLN:CG	1:A:145:ALA:H	2.30	0.45
1:A:364:THR:O	1:A:368:CYS:HB2	2.16	0.45
1:A:140:ARG:HD3	1:A:144:GLN:NE2	2.31	0.45
1:C:156:GLU:O	1:C:160:THR:HG22	2.18	0.44
1:D:357:TYR:CD2	1:D:362:ILE:HD11	2.52	0.44
1:B:135:TYR:HA	1:B:138:ILE:HG12	1.98	0.44
1:C:147:GLU:O	1:C:151:GLN:HG2	2.16	0.44
1:C:216:LYS:HG2	1:C:217:TYR:N	2.30	0.44
1:D:479:PRO:HD2	1:D:480:TRP:CE3	2.53	0.44
1:D:160:THR:OG1	1:D:162:THR:O	2.36	0.44
1:D:454:GLY:O	1:D:460:PHE:HB2	2.17	0.44
1:B:321:GLU:HB2	1:C:378:ASP:OD2	2.18	0.44
1:C:160:THR:HG21	10:C:703:HOH:O	2.18	0.43
1:A:208:PHE:CE1	1:A:303:PHE:HB3	2.54	0.43
1:B:135:TYR:CD1	1:B:138:ILE:HD11	2.54	0.43
1:B:298:GLU:CD	4:B:505:BTB:H31	2.39	0.43
1:C:97:ARG:CZ	1:C:97:ARG:HB3	2.48	0.43
1:A:162:THR:OG1	1:A:163:TYR:N	2.51	0.43
1:B:170:LEU:HD11	1:B:230:VAL:HG21	2.01	0.43
4:B:508:BTB:H41	4:B:508:BTB:O8	2.19	0.43
1:A:308:GLU:OE1	1:A:308:GLU:N	2.43	0.43

*Continued on next page...*



*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:455:SER:HA	1:A:460:PHE:CG	2.54	0.43
1:C:340:LEU:HD11	1:C:347:GLU:HB3	2.00	0.43
1:C:404:VAL:HG23	1:D:393:LEU:HD12	2.01	0.43
1:D:107:ARG:H	1:D:107:ARG:HG3	1.63	0.43
4:A:503:BTB:H41	4:A:503:BTB:H72	1.78	0.43
1:B:89:GLN:OE1	1:B:470:SER:N	2.34	0.43
1:A:143:SER:OG	1:A:144:GLN:N	2.52	0.43
1:C:213:ASN:HA	1:C:216:LYS:HD3	2.00	0.43
1:B:261:VAL:HG11	1:B:265:PRO:HA	2.01	0.42
1:C:357:TYR:CD2	1:C:362:ILE:HD11	2.54	0.42
1:A:317:HIS:CG	1:A:318:PRO:HD2	2.54	0.42
4:B:508:BTB:H52	4:B:508:BTB:H82	1.53	0.42
1:D:364:THR:O	1:D:368:CYS:HB2	2.20	0.42
1:A:68:PHE:N	10:A:620:HOH:O	2.53	0.42
4:A:504:BTB:H72	4:A:504:BTB:H11	1.59	0.42
1:B:70:ARG:HE	1:B:79:ILE:HD13	1.85	0.42
1:B:124:LEU:HD21	1:B:154:GLU:HA	2.02	0.42
1:A:125:SER:HA	1:A:128:ARG:HE	1.85	0.42
1:A:257:GLN:HA	10:A:686:HOH:O	2.18	0.42
1:C:178:TRP:HZ3	1:C:193:LEU:HB2	1.85	0.42
1:D:319:THR:HB	4:D:504:BTB:O3	2.19	0.42
1:A:224:LEU:HB2	1:A:416:THR:HB	2.02	0.41
1:D:275:ILE:HG12	1:D:275:ILE:H	1.72	0.41
1:D:361:GLU:HG2	2:D:501:HEM:O2A	2.19	0.41
1:C:358:MET:HB3	1:C:358:MET:HE2	1.93	0.41
1:D:124:LEU:HD13	1:D:128:ARG:NH2	2.36	0.41
4:B:508:BTB:O3	4:B:508:BTB:H71	2.19	0.41
1:C:130:PHE:O	1:C:133:GLN:HB2	2.21	0.41
1:C:292:LEU:HD23	1:C:292:LEU:HA	1.89	0.41
1:B:71:VAL:N	1:B:80:THR:O	2.47	0.41
1:D:188:ILE:HG23	1:D:189:GLN:HG2	2.02	0.41
4:D:505:BTB:H11	4:D:505:BTB:H71	1.32	0.41
1:A:334:PRO:HB3	1:A:357:TYR:CZ	2.55	0.41
1:D:247:GLN:HA	1:D:335:ALA:O	2.21	0.41
1:D:453:SER:HB3	1:D:456:LEU:HD12	2.02	0.41
1:B:306:PRO:HA	1:B:307:PRO:HD3	1.95	0.41
1:D:85:SER:HB3	1:D:467:TYR:CE1	2.56	0.41
1:D:90:GLN:HB3	1:D:468:PHE:CD2	2.56	0.41
1:A:308:GLU:H	1:A:308:GLU:CD	2.23	0.40
1:C:364:THR:HG21	1:C:452:ILE:HG23	2.03	0.40
1:A:265:PRO:HA	1:A:268:VAL:HG23	2.04	0.40

*Continued on next page...*

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:285:ARG:HH21	1:D:373:TYR:HD2	1.70	0.40
1:D:308:GLU:H	1:D:308:GLU:CD	2.25	0.40
1:A:232:PRO:HG2	1:A:241:PHE:CE1	2.57	0.40
1:C:368:CYS:SG	1:C:376:LEU:HD13	2.61	0.40
1:D:308:GLU:OE1	1:D:308:GLU:N	2.49	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:152:GLU:OE2	4:D:505:BTB:O4[2_851]	2.12	0.08

## 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	402/440 (91%)	374 (93%)	25 (6%)	3 (1%)	22	25
1	B	401/440 (91%)	391 (98%)	10 (2%)	0	100	100
1	C	399/440 (91%)	388 (97%)	10 (2%)	1 (0%)	41	49
1	D	403/440 (92%)	397 (98%)	6 (2%)	0	100	100
All	All	1605/1760 (91%)	1550 (97%)	51 (3%)	4 (0%)	41	57

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	106	PRO
1	A	108	LYS
1	A	283	ASN
1	C	89	GLN

### 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	345/373 (92%)	328 (95%)	17 (5%)	25	33
1	B	344/373 (92%)	330 (96%)	14 (4%)	30	41
1	C	342/373 (92%)	327 (96%)	15 (4%)	28	37
1	D	346/373 (93%)	339 (98%)	7 (2%)	55	70
All	All	1377/1492 (92%)	1324 (96%)	53 (4%)	34	44

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

Mol	Chain	Res	Type
1	A	97	ARG
1	A	103	LEU
1	A	109	LEU
1	A	122	GLN
1	A	133	GLN
1	A	139	LYS
1	A	140	ARG
1	A	141	SER
1	A	151	GLN
1	A	201	CYS
1	A	240	ASP
1	A	258	ASP
1	A	272	GLU
1	A	285	ARG
1	A	309	LEU
1	A	329	ARG
1	A	396	ASP
1	B	67	LYS
1	B	70	ARG
1	B	78	SER
1	B	122	GLN
1	B	144	GLN
1	B	148	GLN
1	B	168[A]	SER

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type
1	B	168[B]	SER
1	B	213	ASN
1	B	235[A]	CYS
1	B	235[B]	CYS
1	B	268	VAL
1	B	389	THR
1	B	396	ASP
1	C	90	GLN
1	C	125	SER
1	C	137	SER
1	C	140	ARG
1	C	154	GLU
1	C	160	THR
1	C	192	LYS
1	C	202	ARG
1	C	216	LYS
1	C	233	GLN
1	C	245	ASN
1	C	257	GLN
1	C	308	GLU
1	C	396	ASP
1	C	417	ILE
1	D	71	VAL
1	D	89	GLN
1	D	98	ARG
1	D	107	ARG
1	D	108	LYS
1	D	192	LYS
1	D	396	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	132	ASN

### 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 [i](#)

Of 39 ligands modelled in this entry, 17 are monoatomic - leaving 22 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	BTB	B	504	9	13,13,13	0.47	0	7,16,16	0.69	0
2	HEM	B	502	1	41,50,50	1.46	6 (14%)	45,82,82	1.60	10 (22%)
4	BTB	B	505	-	13,13,13	0.50	0	7,16,16	0.95	1 (14%)
3	KLA	C	504	-	26,27,27	0.46	0	31,37,37	1.51	6 (19%)
4	BTB	A	504	-	13,13,13	0.40	0	7,16,16	0.68	0
3	KLA	A	509	-	26,27,27	0.58	0	31,37,37	1.32	7 (22%)
3	KLA	B	503	-	26,27,27	0.70	0	31,37,37	1.57	7 (22%)
4	BTB	B	508	-	13,13,13	0.68	0	7,16,16	0.62	0
3	KLA	D	502	-	26,27,27	0.54	0	31,37,37	1.46	5 (16%)
2	HEM	A	501	1	41,50,50	1.53	4 (9%)	45,82,82	1.68	12 (26%)
8	H4B	B	501	-	16,18,18	0.64	0	11,26,26	2.37	5 (45%)
4	BTB	A	503	9	13,13,13	0.46	0	7,16,16	1.06	1 (14%)
3	KLA	A	502	-	26,27,27	0.52	0	31,37,37	1.86	6 (19%)
6	GOL	C	508	-	5,5,5	0.36	0	5,5,5	0.43	0
4	BTB	D	504	9	13,13,13	0.58	0	7,16,16	0.85	0
2	HEM	D	501	1	41,50,50	1.41	5 (12%)	45,82,82	1.67	11 (24%)
4	BTB	D	505	-	13,13,13	0.52	0	7,16,16	0.77	0
6	GOL	A	507	-	5,5,5	0.39	0	5,5,5	0.40	0
2	HEM	C	502	1	41,50,50	1.59	5 (12%)	45,82,82	1.76	11 (24%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
8	H4B	C	503	-	16,18,18	0.59	0	11,26,26	2.36	5 (45%)
4	BTB	C	505	-	13,13,13	0.38	0	7,16,16	0.39	0
3	KLA	D	503	-	26,27,27	0.54	0	31,37,37	1.60	6 (19%)

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	BTB	B	504	9	-	3/21/21/21	-
2	HEM	B	502	1	-	4/12/54/54	-
4	BTB	B	505	-	-	6/21/21/21	-
3	KLA	C	504	-	-	5/10/19/19	0/3/3/3
4	BTB	A	504	-	-	6/21/21/21	-
3	KLA	A	509	-	-	3/10/19/19	0/3/3/3
3	KLA	B	503	-	-	3/10/19/19	0/3/3/3
4	BTB	B	508	-	-	4/21/21/21	-
3	KLA	D	502	-	-	5/10/19/19	0/3/3/3
2	HEM	A	501	1	-	1/12/54/54	-
8	H4B	B	501	-	-	4/8/17/17	0/2/2/2
4	BTB	A	503	9	-	4/21/21/21	-
3	KLA	A	502	-	-	4/10/19/19	0/3/3/3
6	GOL	C	508	-	-	2/4/4/4	-
4	BTB	D	504	9	-	6/21/21/21	-
2	HEM	D	501	1	-	2/12/54/54	-
4	BTB	D	505	-	-	10/21/21/21	-
6	GOL	A	507	-	-	3/4/4/4	-
2	HEM	C	502	1	-	2/12/54/54	-
8	H4B	C	503	-	-	3/8/17/17	0/2/2/2
4	BTB	C	505	-	-	6/21/21/21	-
3	KLA	D	503	-	-	3/10/19/19	0/3/3/3

All (20) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	502	HEM	FE-NB	4.23	2.17	1.96

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	502	HEM	C3C-C2C	-4.03	1.34	1.40
2	A	501	HEM	FE-NB	4.02	2.16	1.96
2	A	501	HEM	C3C-C2C	-3.97	1.34	1.40
2	C	502	HEM	C3C-CAC	3.85	1.55	1.47
2	A	501	HEM	C3C-CAC	3.71	1.55	1.47
2	B	502	HEM	C3C-CAC	3.65	1.55	1.47
2	D	501	HEM	C3C-CAC	3.57	1.55	1.47
2	B	502	HEM	C3C-C2C	-3.28	1.35	1.40
2	D	501	HEM	C3C-C2C	-3.11	1.36	1.40
2	D	501	HEM	CAB-C3B	2.99	1.55	1.47
2	C	502	HEM	CAB-C3B	2.96	1.55	1.47
2	D	501	HEM	FE-NB	2.93	2.11	1.96
2	B	502	HEM	CAB-C3B	2.85	1.55	1.47
2	A	501	HEM	CAB-C3B	2.73	1.54	1.47
2	B	502	HEM	CAA-C2A	2.58	1.55	1.52
2	D	501	HEM	CAA-C2A	2.16	1.55	1.52
2	B	502	HEM	C3B-C2B	-2.16	1.32	1.37
2	C	502	HEM	CMB-C2B	2.13	1.55	1.50
2	B	502	HEM	CMB-C2B	2.01	1.55	1.50

All (93) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	502	KLA	C02-N01-C06	5.62	122.36	118.10
8	B	501	H4B	C8A-C4A-C4	4.72	118.77	114.57
8	C	503	H4B	C8A-C4A-C4	4.70	118.74	114.57
3	C	504	KLA	C02-N01-C06	4.45	121.47	118.10
3	D	503	KLA	C02-N01-C06	4.03	121.16	118.10
3	A	502	KLA	C05-C06-N01	-3.93	118.73	122.90
2	B	502	HEM	CMA-C3A-C4A	-3.74	122.71	128.46
2	C	502	HEM	C4B-CHC-C1C	3.70	127.44	122.56
2	C	502	HEM	CBA-CAA-C2A	-3.68	106.35	112.62
3	B	503	KLA	C14-C13-C12	-3.61	118.95	123.52
8	C	503	H4B	C4-C4A-N5	3.54	122.09	119.12
2	C	502	HEM	C4D-ND-C1D	3.39	108.58	105.07
2	A	501	HEM	C4B-CHC-C1C	3.39	127.03	122.56
8	B	501	H4B	C4-C4A-N5	3.34	121.93	119.12
2	C	502	HEM	C1B-NB-C4B	3.32	108.50	105.07
3	D	502	KLA	C11-C12-C13	3.31	121.82	118.81
2	D	501	HEM	CMC-C2C-C3C	3.28	130.82	124.68
3	D	503	KLA	C09-C08-C06	-3.28	105.65	112.99
3	A	502	KLA	C08-C06-N01	3.27	120.82	115.95

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	502	HEM	CBD-CAD-C3D	-3.25	103.59	112.63
2	A	501	HEM	CMA-C3A-C4A	-3.23	123.50	128.46
2	C	502	HEM	CHC-C4B-C3B	3.16	129.41	124.57
3	D	502	KLA	C14-C13-C12	-3.15	119.53	123.52
2	D	501	HEM	C1B-NB-C4B	3.10	108.28	105.07
2	D	501	HEM	C4D-ND-C1D	3.09	108.27	105.07
2	C	502	HEM	C3D-C4D-ND	-3.08	106.73	110.17
2	D	501	HEM	CBD-CAD-C3D	-3.05	104.14	112.63
3	A	502	KLA	C14-C13-C12	-3.02	119.70	123.52
2	A	501	HEM	C1B-NB-C4B	3.00	108.17	105.07
3	B	503	KLA	C08-C06-N01	2.99	120.41	115.95
3	C	504	KLA	C14-C13-C12	-2.99	119.75	123.52
2	B	502	HEM	CMA-C3A-C2A	2.98	130.56	124.94
2	D	501	HEM	C4B-CHC-C1C	2.94	126.44	122.56
2	A	501	HEM	C3B-C2B-C1B	2.88	108.62	106.49
3	D	503	KLA	C04-C05-C06	-2.81	118.48	120.32
3	D	503	KLA	C14-C13-C12	-2.81	119.97	123.52
2	A	501	HEM	CBD-CAD-C3D	-2.79	104.88	112.63
2	D	501	HEM	C3B-C2B-C1B	2.79	108.56	106.49
8	B	501	H4B	C2-N3-C4	2.79	120.36	115.93
2	B	502	HEM	CAB-C3B-C2B	-2.70	119.72	128.60
2	A	501	HEM	C4D-ND-C1D	2.64	107.80	105.07
3	B	503	KLA	C11-C12-C13	2.61	121.19	118.81
3	A	509	KLA	C14-C13-C12	-2.60	120.23	123.52
8	C	503	H4B	C2-N3-C4	2.60	120.06	115.93
8	C	503	H4B	C2-N1-C8A	2.57	120.31	114.54
3	B	503	KLA	C02-N01-C06	2.57	120.05	118.10
2	D	501	HEM	C3D-C4D-ND	-2.54	107.34	110.17
2	A	501	HEM	CAA-CBA-CGA	-2.52	106.68	113.76
2	B	502	HEM	CHA-C4D-ND	2.52	127.49	124.38
2	B	502	HEM	CMC-C2C-C3C	2.51	129.38	124.68
2	B	502	HEM	C4D-ND-C1D	2.51	107.67	105.07
3	D	503	KLA	C18-C22-C23	-2.49	109.26	113.50
3	C	504	KLA	C05-C06-N01	-2.49	120.26	122.90
2	D	501	HEM	CMA-C3A-C4A	-2.49	124.64	128.46
3	A	502	KLA	C11-C12-C13	2.46	121.04	118.81
2	A	501	HEM	C3D-C4D-ND	-2.41	107.49	110.17
2	A	501	HEM	CHA-C4D-ND	2.41	127.35	124.38
3	A	509	KLA	C02-N01-C06	2.41	119.92	118.10
3	B	503	KLA	F13-C13-C12	2.40	121.67	118.25
2	B	502	HEM	CBD-CAD-C3D	-2.39	105.98	112.63
8	C	503	H4B	N1-C2-N3	-2.39	121.67	125.42

*Continued on next page...*



Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	502	KLA	C02-N01-C06	2.39	119.91	118.10
8	B	501	H4B	C2-N1-C8A	2.39	119.89	114.54
8	B	501	H4B	N1-C2-N3	-2.36	121.71	125.42
2	C	502	HEM	C3B-C2B-C1B	2.34	108.22	106.49
2	B	502	HEM	C3B-C2B-C1B	2.33	108.21	106.49
3	D	503	KLA	C08-C06-N01	2.32	119.40	115.95
2	C	502	HEM	CHD-C1D-ND	2.31	126.94	124.43
2	D	501	HEM	CAB-C3B-C2B	-2.30	121.03	128.60
3	A	509	KLA	C08-C06-N01	2.29	119.37	115.95
3	B	503	KLA	C05-C06-N01	-2.29	120.47	122.90
3	A	509	KLA	C18-C22-C23	-2.25	109.67	113.50
3	D	502	KLA	C08-C09-C11	-2.25	105.38	113.28
3	C	504	KLA	C08-C06-N01	2.24	119.29	115.95
2	B	502	HEM	C4B-CHC-C1C	2.23	125.51	122.56
2	C	502	HEM	CHA-C4D-ND	2.21	127.11	124.38
2	A	501	HEM	CHC-C4B-C3B	2.14	127.84	124.57
2	D	501	HEM	CHA-C4D-ND	2.14	127.02	124.38
3	A	509	KLA	C09-C08-C06	-2.10	108.29	112.99
2	B	502	HEM	CAA-CBA-CGA	-2.10	107.88	113.76
2	A	501	HEM	CBA-CAA-C2A	-2.09	109.06	112.62
2	A	501	HEM	CMA-C3A-C2A	2.08	128.86	124.94
2	C	502	HEM	CMA-C3A-C4A	-2.08	125.27	128.46
3	A	509	KLA	F13-C13-C12	2.08	121.22	118.25
3	A	502	KLA	N02-C02-N01	2.07	119.76	116.49
4	A	503	BTB	O3-C3-C2	-2.06	105.80	111.44
3	D	502	KLA	C16-C15-C14	2.06	121.81	118.98
3	C	504	KLA	C11-C12-C13	2.05	120.67	118.81
2	D	501	HEM	C2B-C1B-NB	-2.03	107.43	109.84
3	C	504	KLA	F13-C13-C12	2.03	121.16	118.25
3	B	503	KLA	C18-C22-C23	-2.03	110.04	113.50
3	A	509	KLA	N02-C02-N01	2.01	119.67	116.49
4	B	505	BTB	O4-C4-C2	-2.01	105.95	111.44

There are no chirality outliers.

All (89) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	502	HEM	C1A-C2A-CAA-CBA
2	B	502	HEM	C3A-C2A-CAA-CBA
3	A	502	KLA	C17-C18-C22-C23
3	A	502	KLA	C17-C18-C22-N21
3	A	509	KLA	C15-C17-C18-C22

Continued on next page...

*Continued from previous page...*

Mol	Chain	Res	Type	Atoms
3	A	509	KLA	C17-C18-C22-C23
3	A	509	KLA	C17-C18-C22-N21
3	B	503	KLA	C15-C17-C18-C22
3	C	504	KLA	C15-C17-C18-C22
3	D	502	KLA	C15-C17-C18-C22
3	D	503	KLA	C15-C17-C18-C22
4	A	503	BTB	O1-C1-C2-C3
4	A	503	BTB	O1-C1-C2-C4
4	A	504	BTB	C1-C2-C3-O3
4	A	504	BTB	C4-C2-C3-O3
4	A	504	BTB	N-C2-C3-O3
4	B	504	BTB	O1-C1-C2-C3
4	B	504	BTB	O1-C1-C2-C4
4	B	504	BTB	O1-C1-C2-N
4	B	505	BTB	C1-C2-C4-O4
4	B	505	BTB	C3-C2-C4-O4
4	B	508	BTB	C1-C2-C3-O3
4	B	508	BTB	C4-C2-C3-O3
4	B	508	BTB	N-C2-C3-O3
4	B	508	BTB	C8-C7-N-C5
4	C	505	BTB	C1-C2-C3-O3
4	C	505	BTB	C4-C2-C3-O3
4	C	505	BTB	N-C2-C3-O3
4	C	505	BTB	C1-C2-C4-O4
4	C	505	BTB	C3-C2-C4-O4
4	D	504	BTB	O1-C1-C2-C3
4	D	504	BTB	O1-C1-C2-N
4	D	505	BTB	O1-C1-C2-C4
4	D	505	BTB	C1-C2-N-C7
4	D	505	BTB	C8-C7-N-C5
6	A	507	GOL	O1-C1-C2-C3
6	C	508	GOL	O1-C1-C2-O2
6	C	508	GOL	O1-C1-C2-C3
8	B	501	H4B	N5-C6-C9-O9
8	B	501	H4B	C7-C6-C9-O9
8	B	501	H4B	C7-C6-C9-C10
8	C	503	H4B	C7-C6-C9-O9
8	C	503	H4B	C7-C6-C9-C10
4	A	504	BTB	N-C7-C8-O8
2	A	501	HEM	C2A-CAA-CBA-CGA
2	B	502	HEM	C2A-CAA-CBA-CGA
2	C	502	HEM	C2A-CAA-CBA-CGA

*Continued on next page...*

*Continued from previous page...*

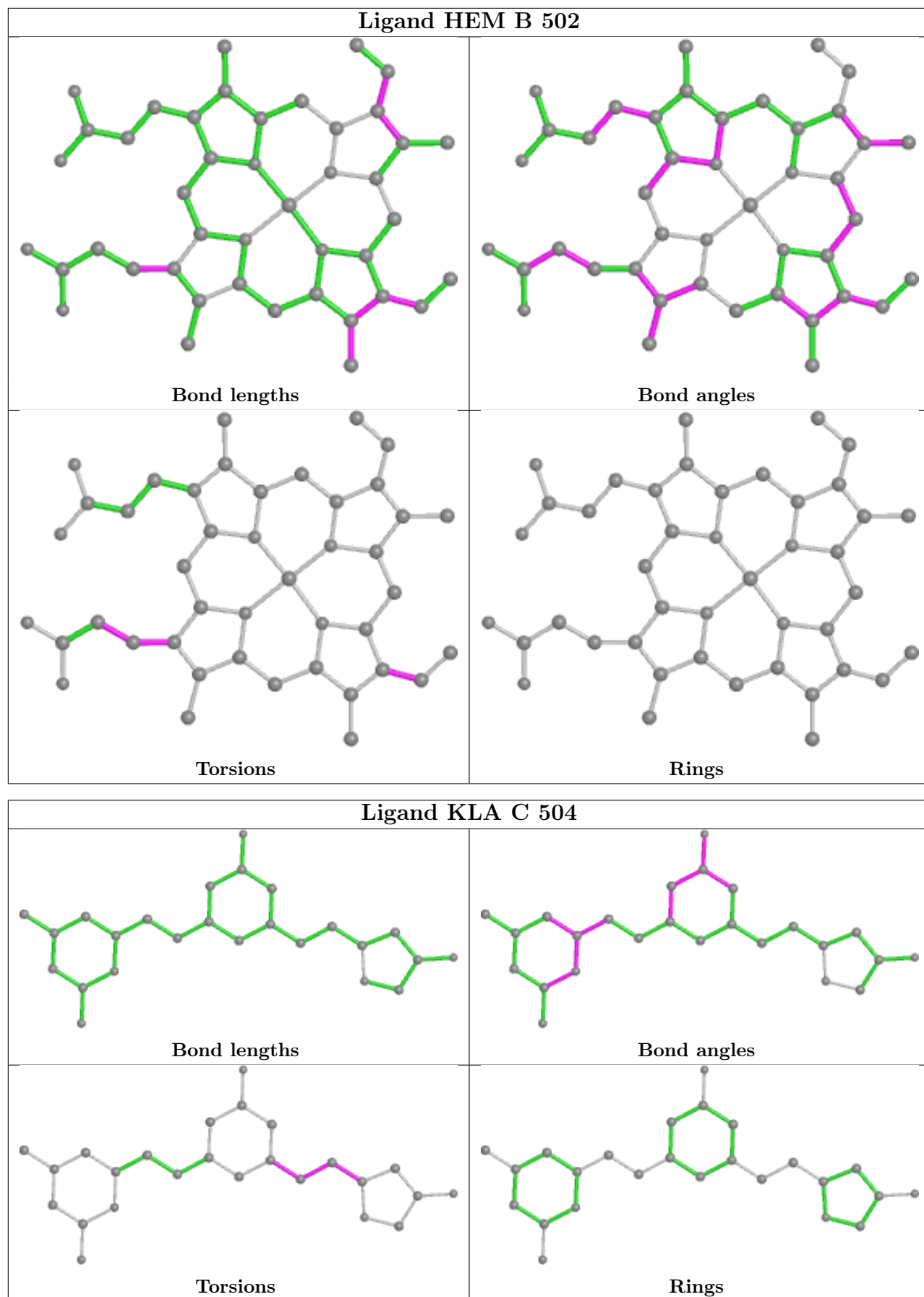
Mol	Chain	Res	Type	Atoms
2	D	501	HEM	C2A-CAA-CBA-CGA
4	D	504	BTB	N-C5-C6-O6
6	A	507	GOL	O1-C1-C2-O2
2	B	502	HEM	C4B-C3B-CAB-CBB
2	D	501	HEM	C4B-C3B-CAB-CBB
4	D	505	BTB	N-C7-C8-O8
2	C	502	HEM	C4B-C3B-CAB-CBB
3	D	503	KLA	C17-C18-C22-N21
8	C	503	H4B	N5-C6-C9-O9
3	C	504	KLA	C17-C18-C22-C23
3	D	502	KLA	C17-C18-C22-C23
3	D	503	KLA	C17-C18-C22-C23
4	D	504	BTB	O1-C1-C2-C4
4	D	504	BTB	C1-C2-C3-O3
4	D	504	BTB	C4-C2-C3-O3
4	D	505	BTB	O1-C1-C2-C3
4	A	503	BTB	O1-C1-C2-N
4	B	505	BTB	N-C2-C4-O4
4	C	505	BTB	N-C2-C4-O4
4	D	505	BTB	O1-C1-C2-N
4	D	505	BTB	C3-C2-N-C5
4	D	505	BTB	C3-C2-N-C7
4	D	505	BTB	C4-C2-N-C5
4	D	505	BTB	C4-C2-N-C7
4	B	505	BTB	N-C5-C6-O6
8	B	501	H4B	N5-C6-C9-C10
3	A	502	KLA	C14-C15-C17-C18
3	A	502	KLA	C16-C15-C17-C18
3	B	503	KLA	C14-C15-C17-C18
3	B	503	KLA	C16-C15-C17-C18
3	D	502	KLA	C14-C15-C17-C18
3	D	502	KLA	C16-C15-C17-C18
3	C	504	KLA	C14-C15-C17-C18
3	C	504	KLA	C16-C15-C17-C18
6	A	507	GOL	O2-C2-C3-O3
3	C	504	KLA	C17-C18-C22-N21
3	D	502	KLA	C17-C18-C22-N21
4	A	503	BTB	N-C7-C8-O8
4	A	504	BTB	C1-C2-C4-O4
4	A	504	BTB	C3-C2-C4-O4
4	B	505	BTB	C1-C2-C3-O3
4	B	505	BTB	C4-C2-C3-O3

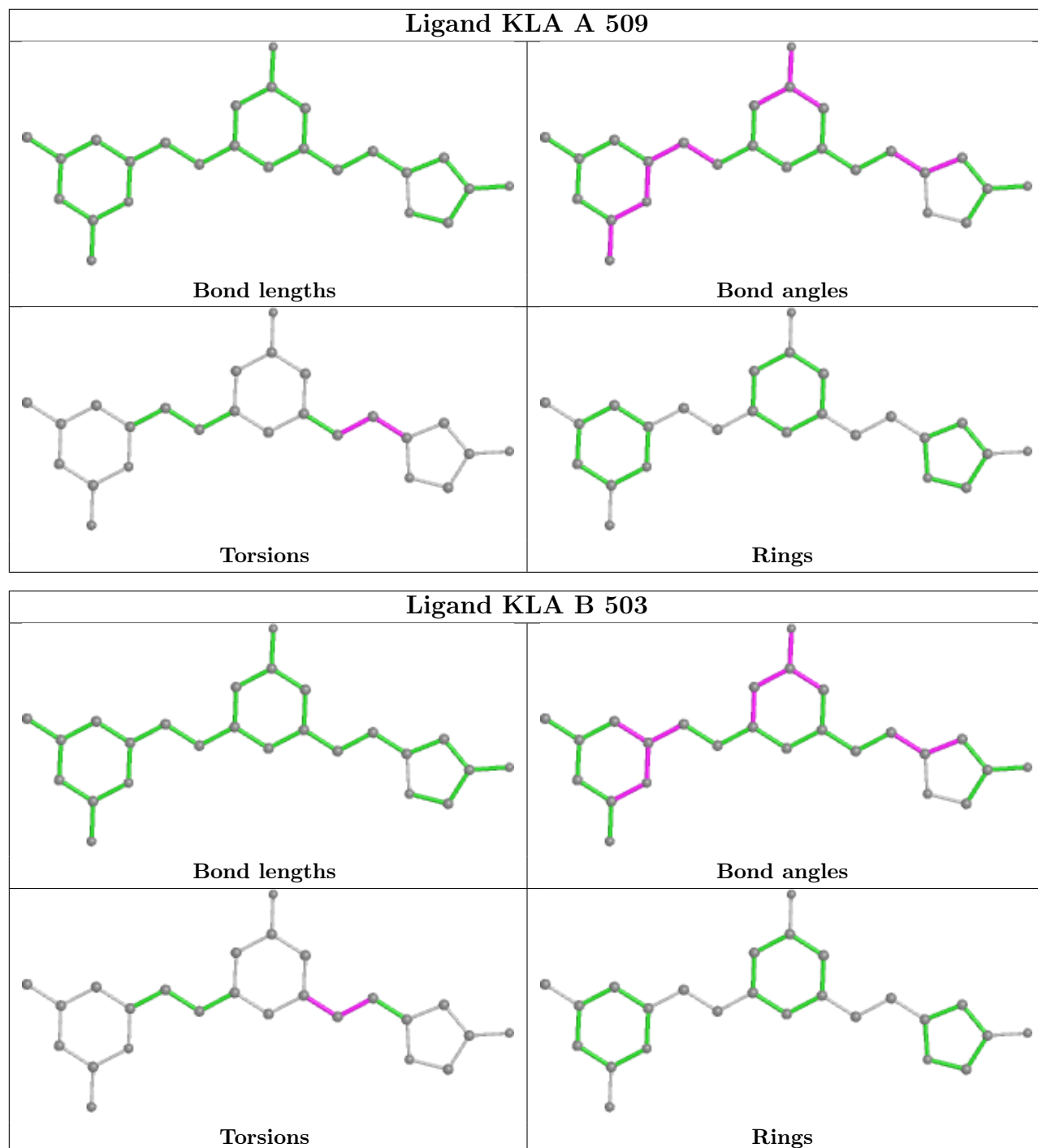
There are no ring outliers.

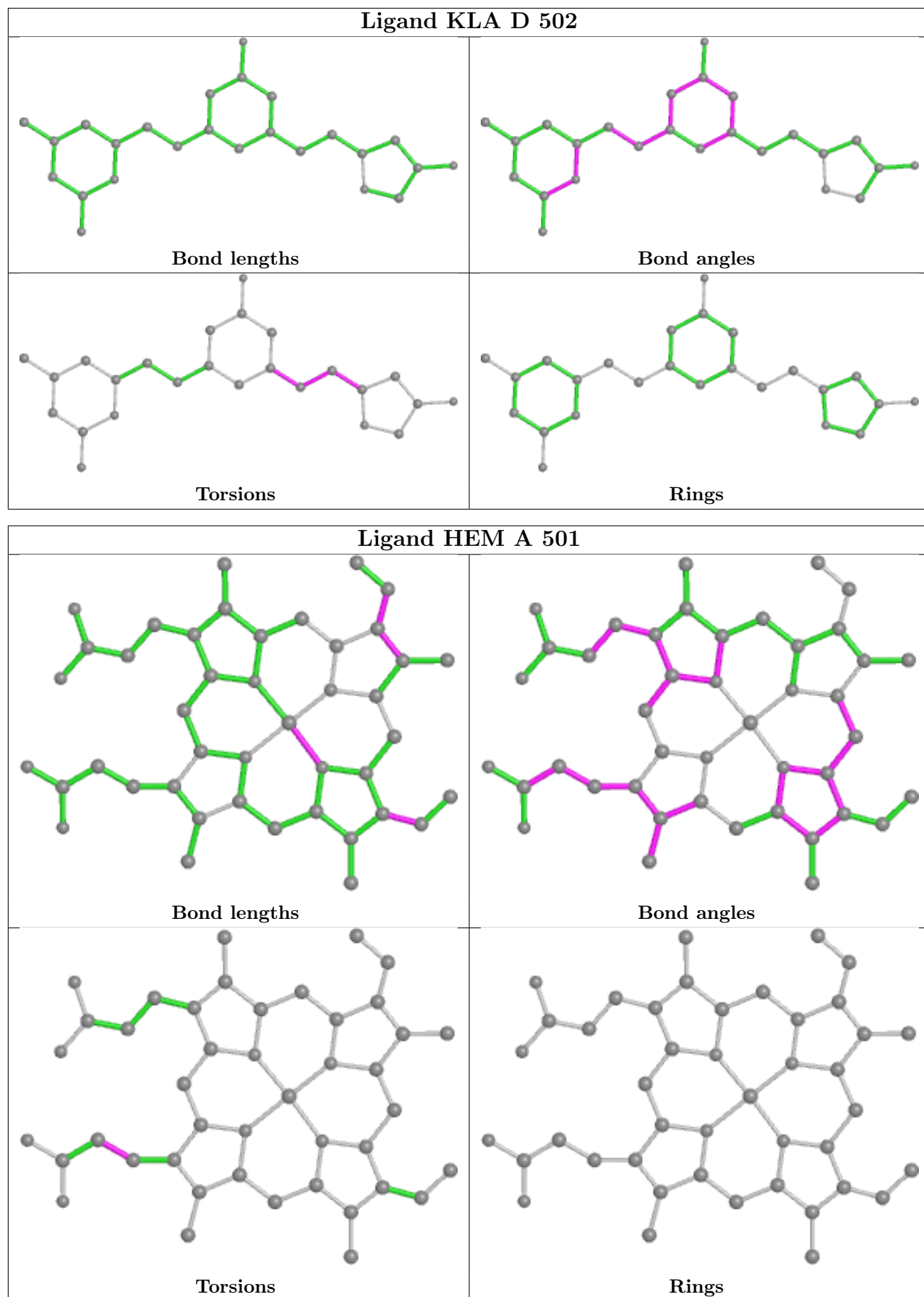
14 monomers are involved in 33 short contacts:

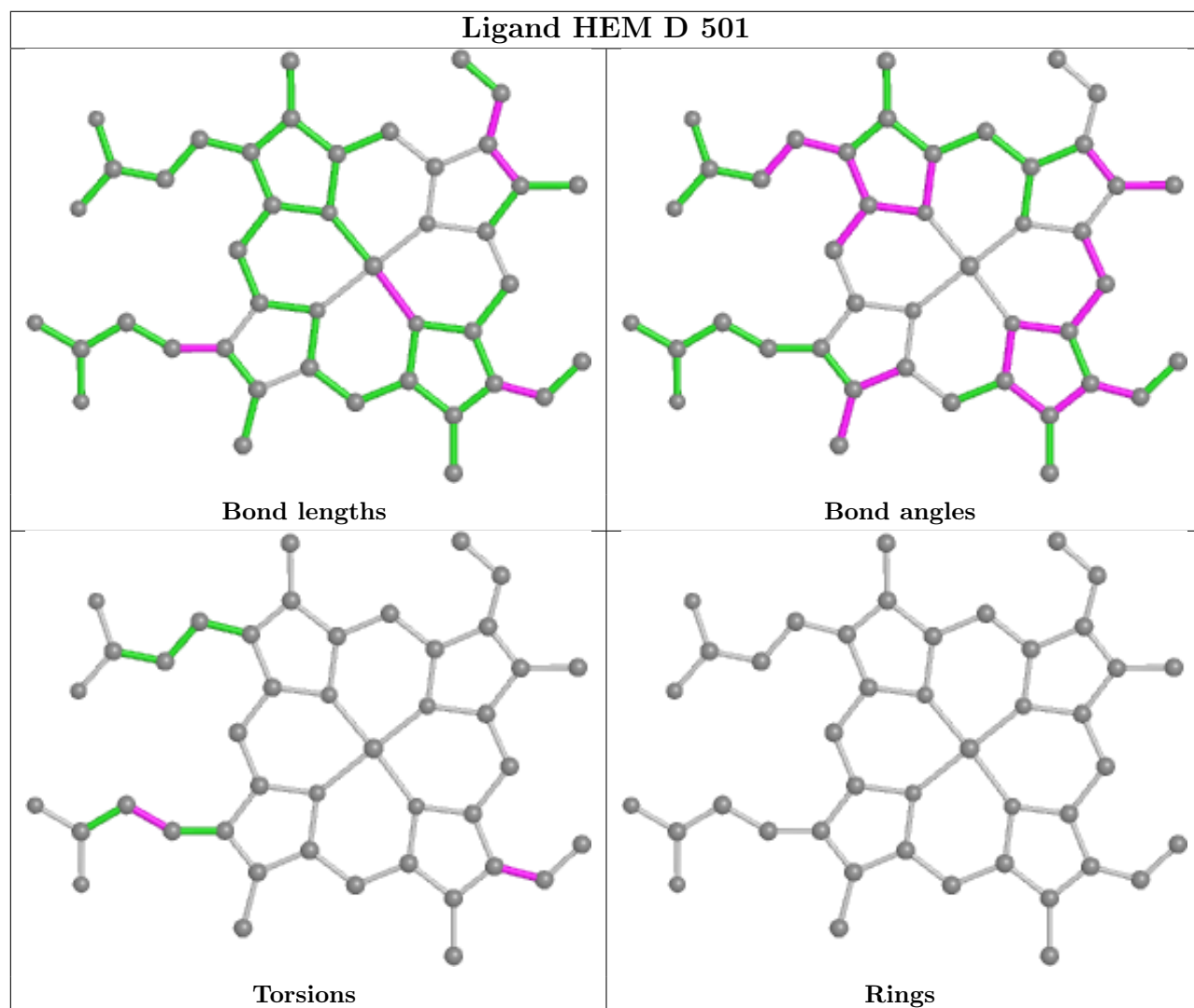
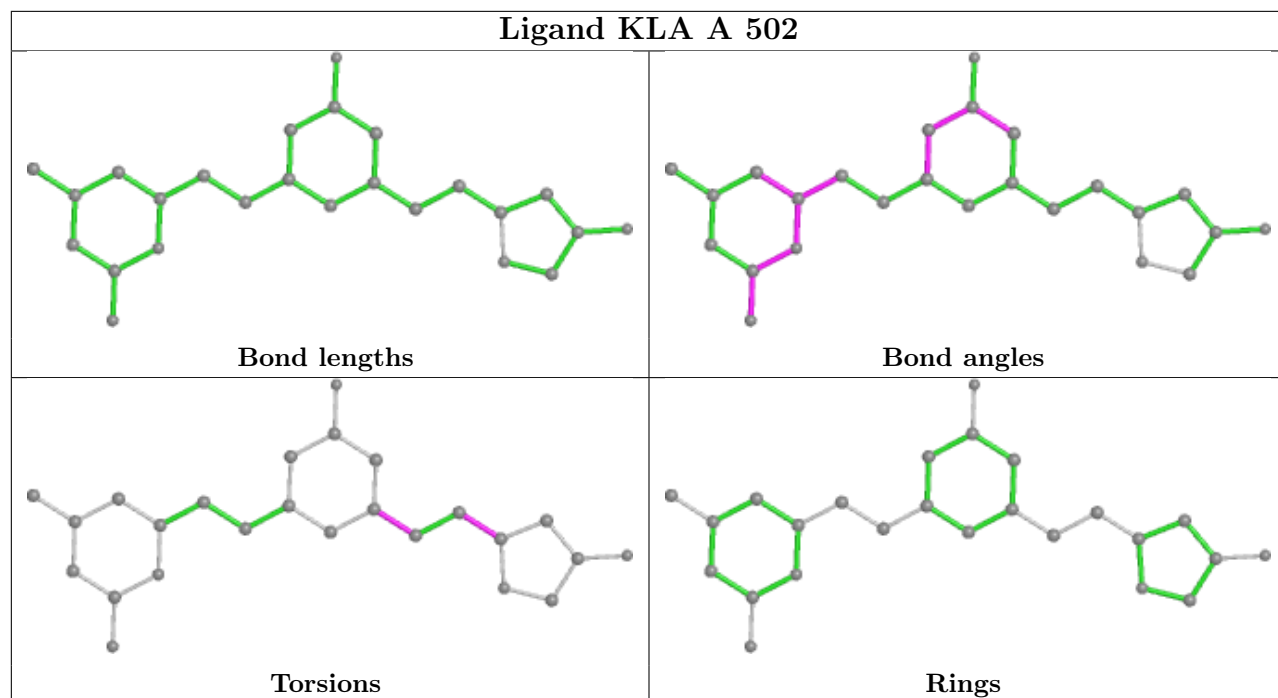
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	B	504	BTB	1	0
2	B	502	HEM	2	0
4	B	505	BTB	4	0
4	A	504	BTB	2	0
4	B	508	BTB	3	0
2	A	501	HEM	3	0
8	B	501	H4B	1	0
4	A	503	BTB	3	0
3	A	502	KLA	1	0
4	D	504	BTB	3	0
2	D	501	HEM	4	0
4	D	505	BTB	3	1
2	C	502	HEM	3	0
8	C	503	H4B	1	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

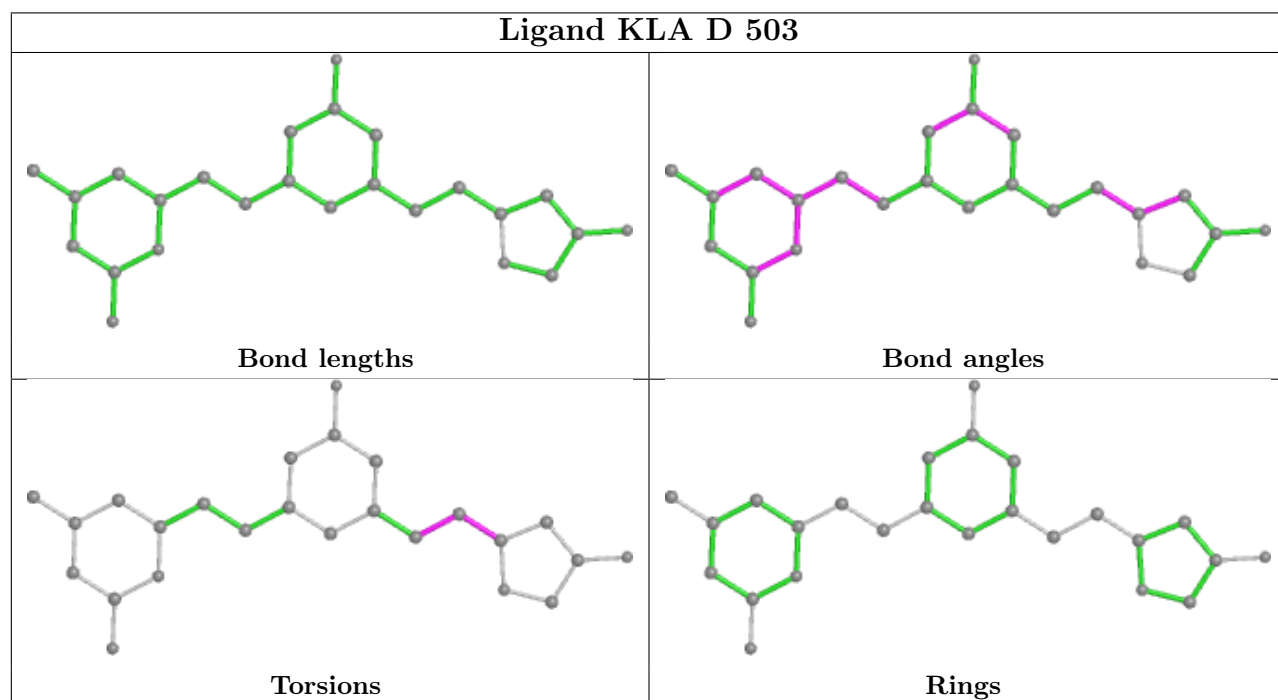
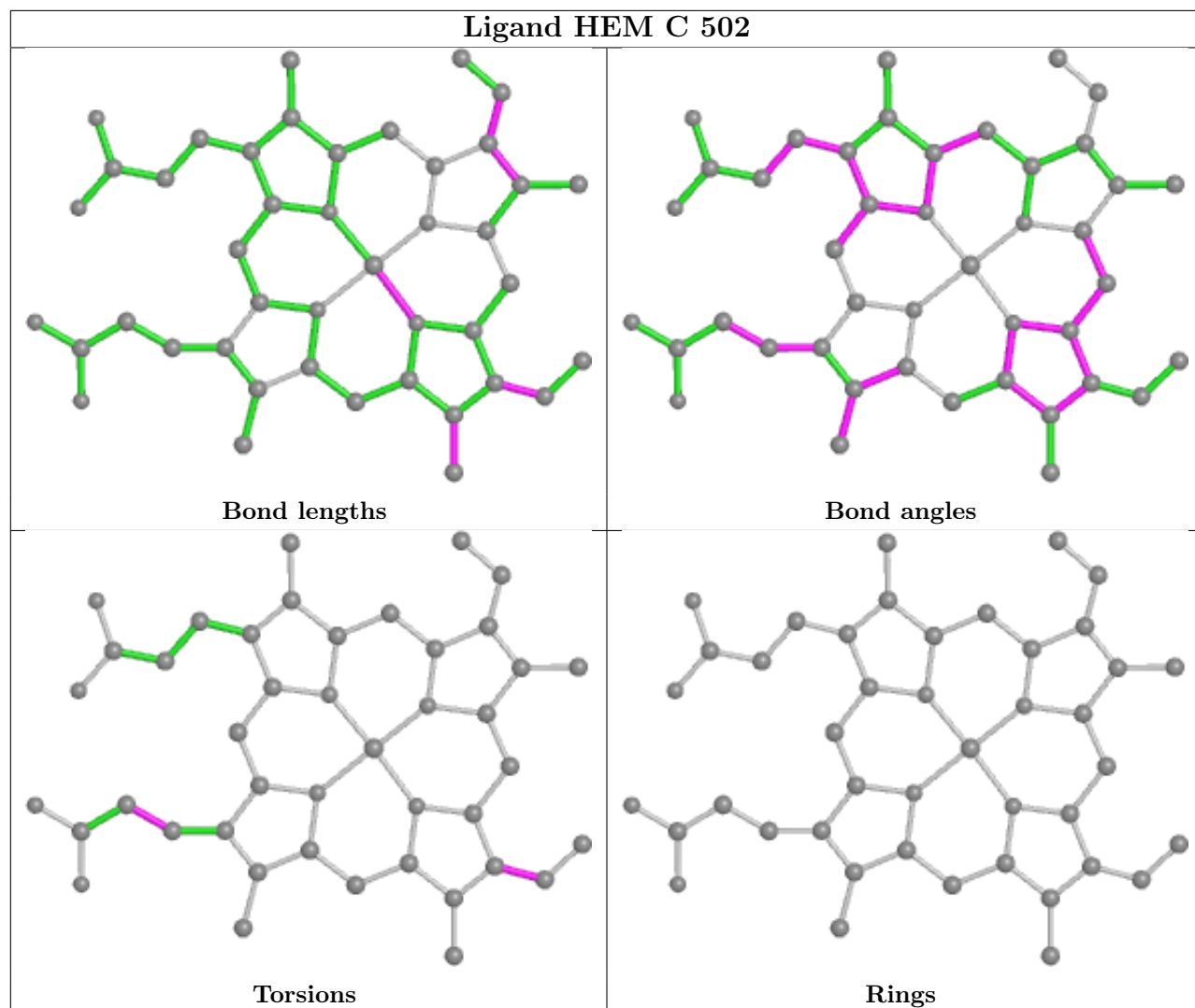












## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

## 6 Fit of model and data

### 6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95<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	404/440 (91%)	-0.00	14 (3%) 44 49	18, 40, 88, 121	0
1	B	402/440 (91%)	-0.32	3 (0%) 87 90	14, 28, 63, 103	0
1	C	401/440 (91%)	-0.17	4 (0%) 82 86	16, 36, 72, 111	0
1	D	404/440 (91%)	-0.39	1 (0%) 95 96	12, 27, 53, 107	0
All	All	1611/1760 (91%)	-0.22	22 (1%) 75 79	12, 32, 72, 121	0

All (22) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	90	GLN	5.5
1	C	238	ARG	5.0
1	A	480	TRP	4.5
1	A	109	LEU	4.1
1	A	144	GLN	3.8
1	A	119	ALA	3.8
1	C	239	GLY	3.6
1	B	258	ASP	3.5
1	A	202	ARG	3.4
1	D	89	GLN	3.4
1	A	236	PRO	3.2
1	A	89	GLN	3.2
1	B	257	GLN	3.2
1	A	142	GLY	3.0
1	A	259	GLY	2.9
1	A	283	ASN	2.5
1	A	300	PRO	2.5
1	A	153	VAL	2.4
1	B	89	GLN	2.3
1	C	134	TYR	2.3
1	C	236	PRO	2.2
1	A	143	SER	2.1

## 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.

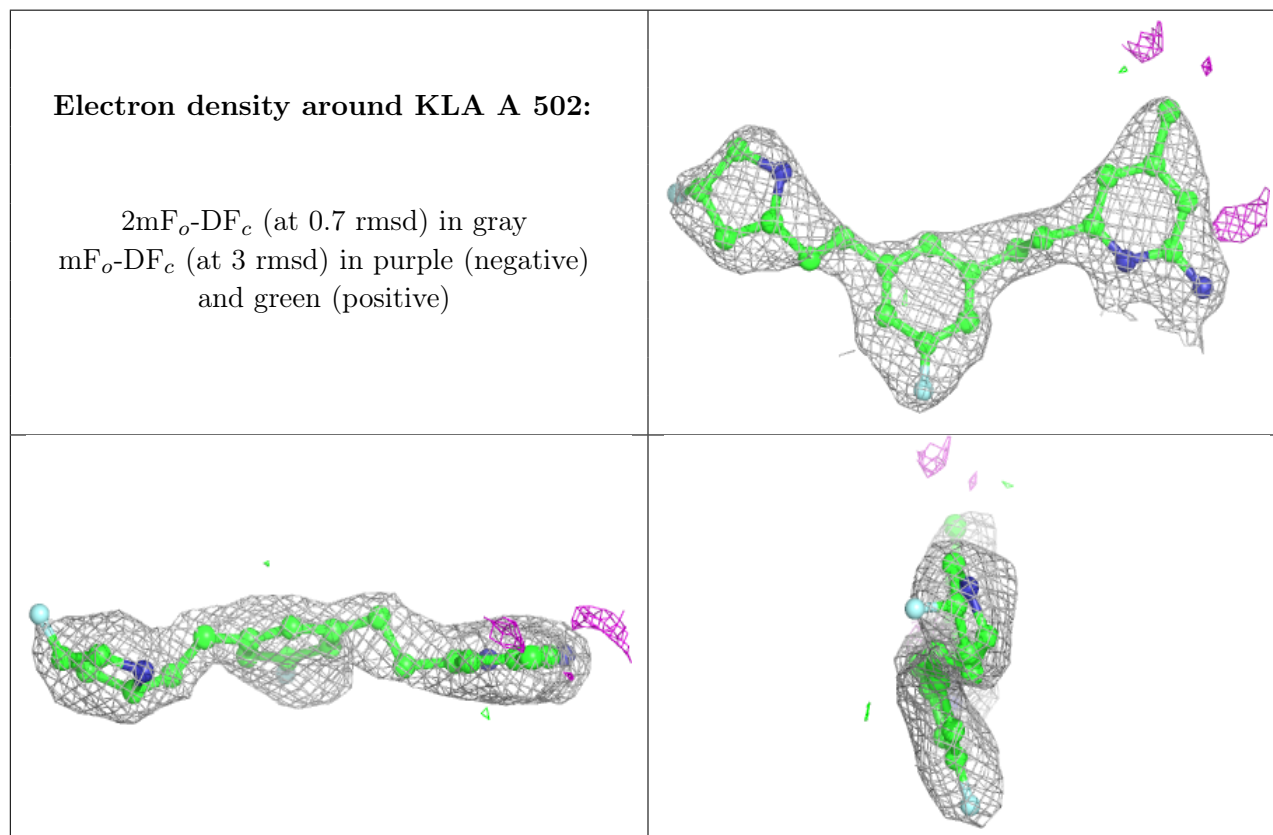
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
9	GD	C	501	1/1	0.75	0.49	222,222,222,222	0
4	BTB	A	503	14/14	0.77	0.18	69,78,88,92	0
7	CL	C	511	1/1	0.78	0.20	244,244,244,244	0
7	CL	B	509	1/1	0.81	0.32	178,178,178,178	0
4	BTB	C	505	14/14	0.82	0.15	53,69,82,82	0
4	BTB	D	504	14/14	0.83	0.26	31,57,71,74	0
7	CL	C	510	1/1	0.83	0.19	210,210,210,210	0
6	GOL	C	508	6/6	0.85	0.14	49,51,59,60	0
4	BTB	D	505	14/14	0.86	0.16	49,59,74,75	0
4	BTB	B	504	14/14	0.86	0.17	32,47,59,62	0
4	BTB	A	504	14/14	0.87	0.15	58,62,68,71	0
6	GOL	A	507	6/6	0.90	0.16	48,59,64,65	0
4	BTB	B	505	14/14	0.90	0.18	45,60,70,73	0
4	BTB	B	508	14/14	0.91	0.16	35,54,71,74	0
8	H4B	B	501	17/17	0.91	0.26	32,59,74,80	0
3	KLA	A	502	25/25	0.91	0.19	28,58,74,87	0
8	H4B	C	503	17/17	0.92	0.27	26,51,77,79	0
9	GD	C	512	1/1	0.92	0.43	174,174,174,174	0
3	KLA	A	509	25/25	0.94	0.14	23,44,62,69	0
3	KLA	D	503	25/25	0.94	0.15	17,38,57,61	0
5	ZN	A	506	1/1	0.94	0.04	39,39,39,39	0
3	KLA	D	502	25/25	0.95	0.14	2,34,48,49	0
3	KLA	B	503	25/25	0.96	0.15	3,38,58,65	0
7	CL	A	508	1/1	0.96	0.12	54,54,54,54	0
3	KLA	C	504	25/25	0.96	0.15	22,52,61,69	0
2	HEM	C	502	43/43	0.97	0.12	19,31,42,58	0
5	ZN	C	513	1/1	0.98	0.09	27,27,27,27	0

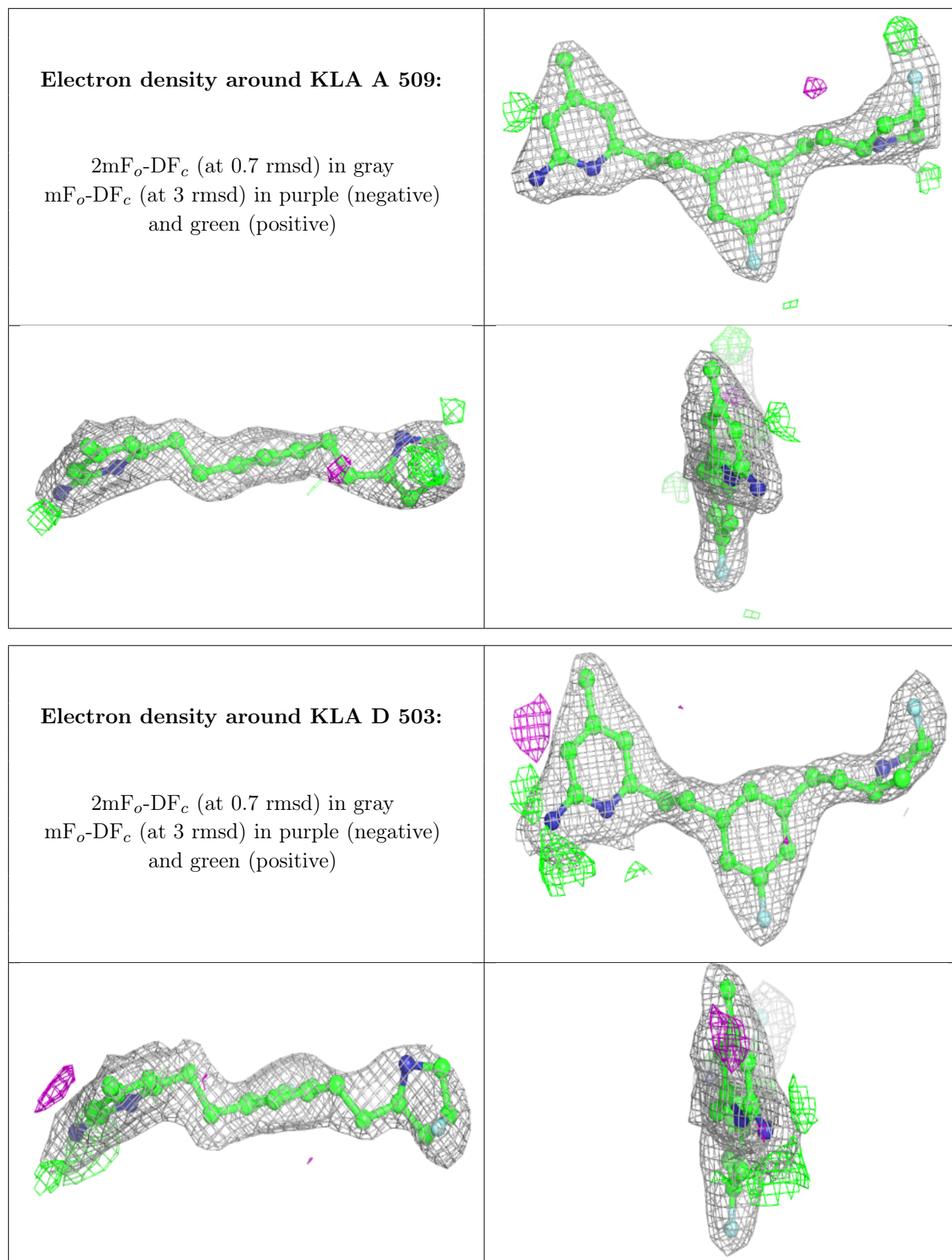
*Continued on next page...*

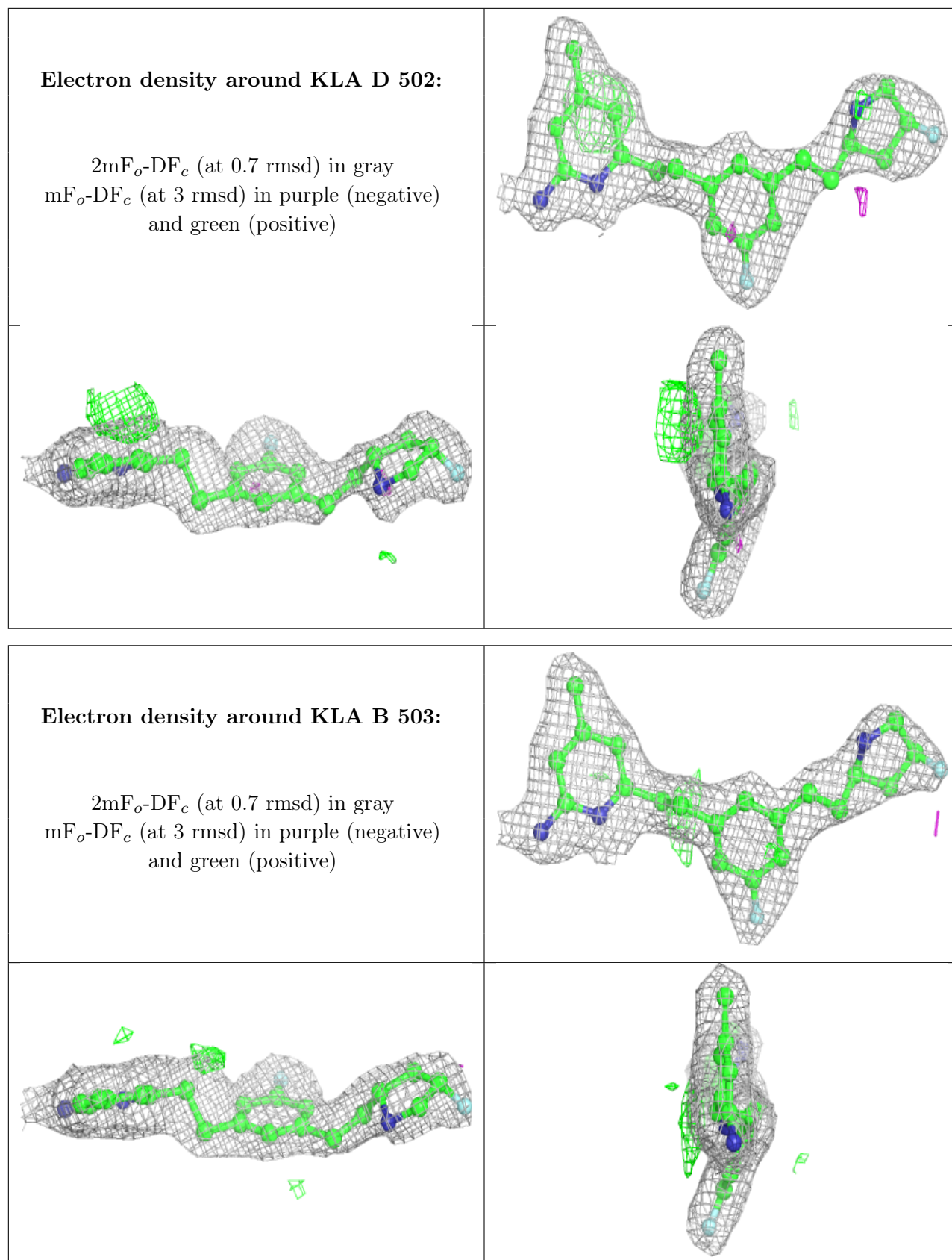
Continued from previous page...

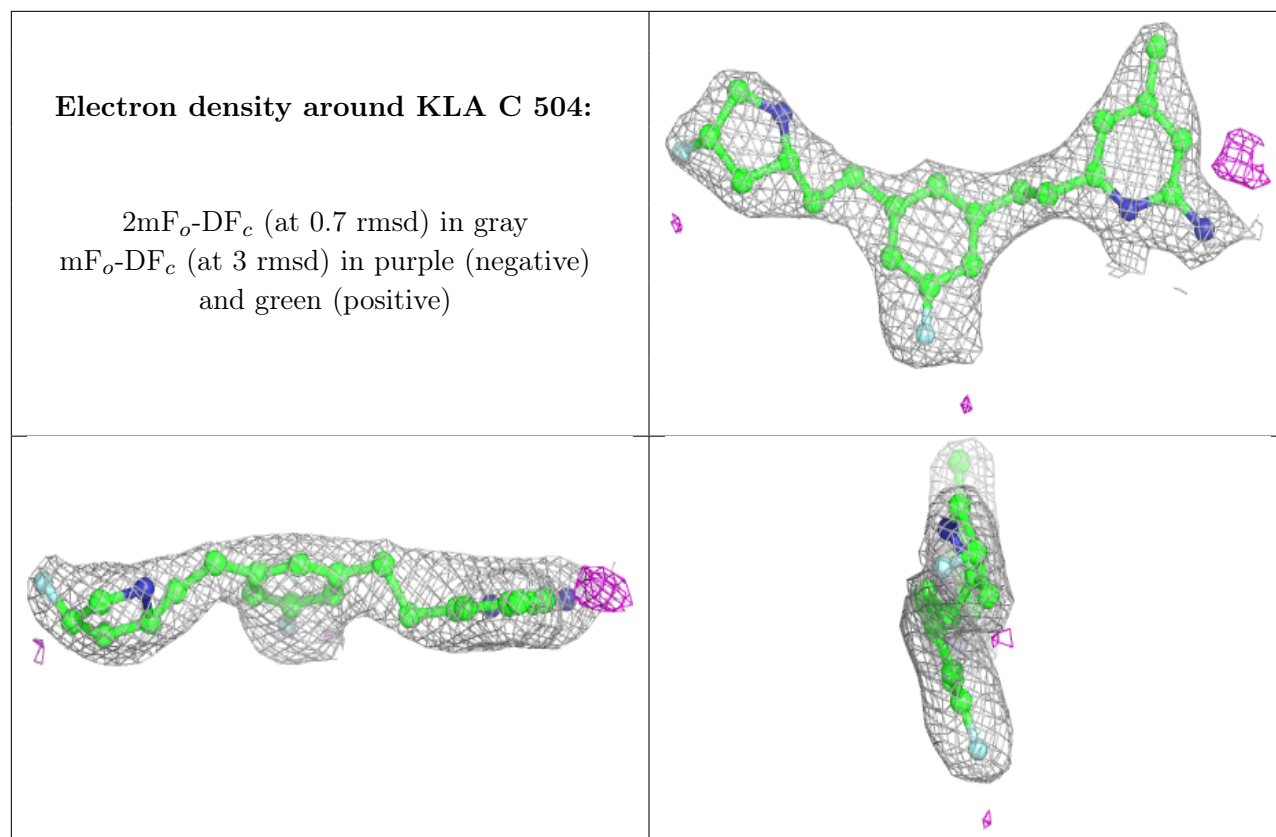
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
2	HEM	B	502	43/43	0.98	0.12	3,12,42,73	0
2	HEM	A	501	43/43	0.98	0.12	13,34,44,62	0
2	HEM	D	501	43/43	0.98	0.13	3,12,45,63	0
5	ZN	A	510	1/1	0.98	0.12	33,33,33,33	0
7	CL	C	509	1/1	0.98	0.09	49,49,49,49	0
7	CL	B	506	1/1	0.99	0.08	24,24,24,24	0
9	GD	B	507	1/1	0.99	0.14	34,34,34,34	0
7	CL	D	507	1/1	0.99	0.08	29,29,29,29	0
5	ZN	C	507	1/1	0.99	0.09	35,35,35,35	0
5	ZN	A	505	1/1	1.00	0.10	28,28,28,28	0
5	ZN	C	506	1/1	1.00	0.10	26,26,26,26	0
9	GD	D	506	1/1	1.00	0.17	43,43,43,43	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.

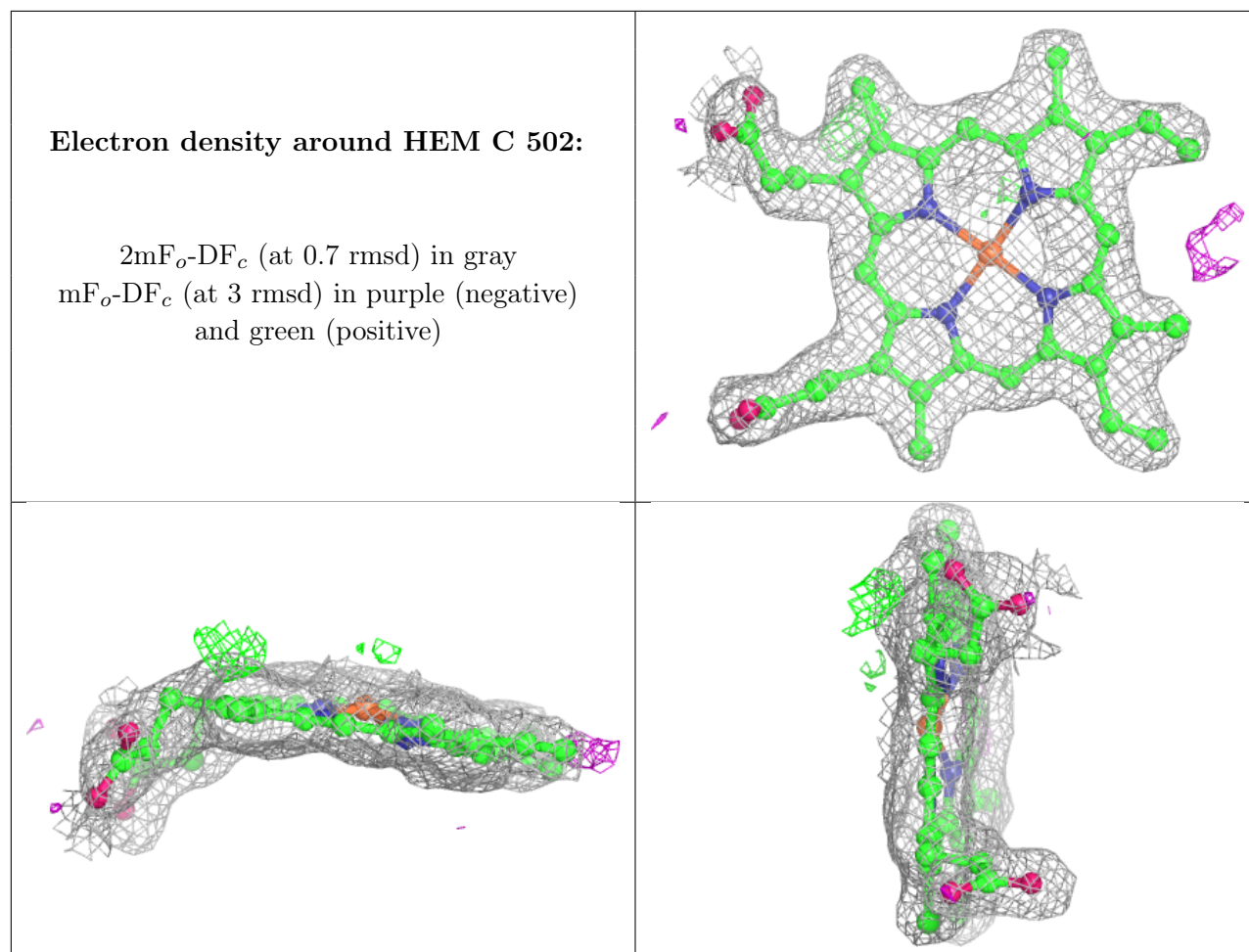






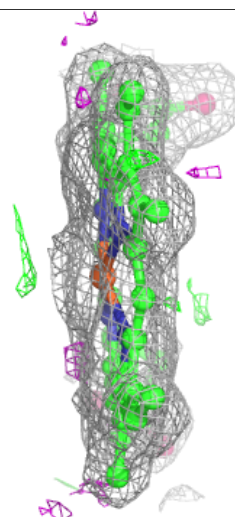
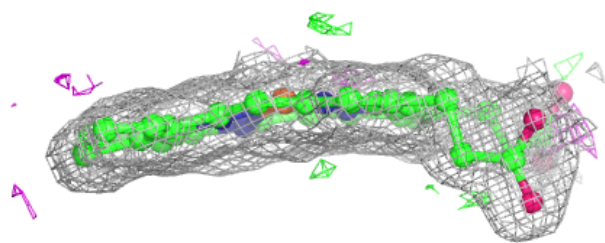
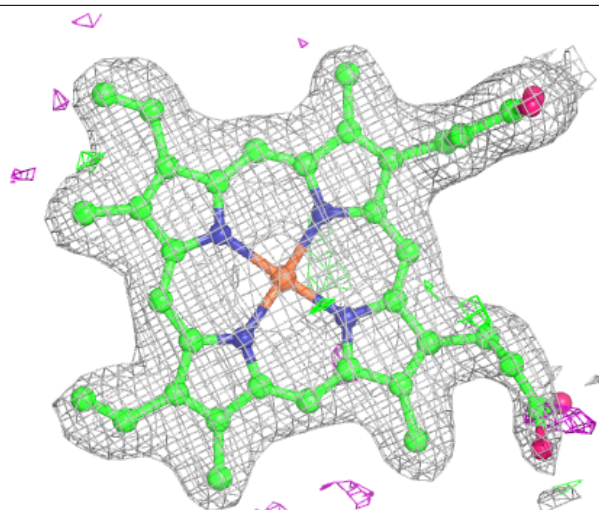






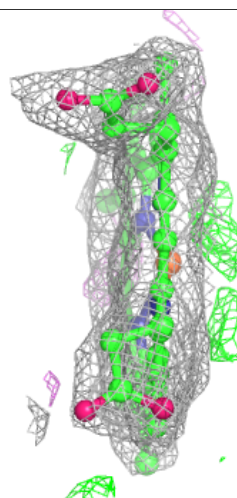
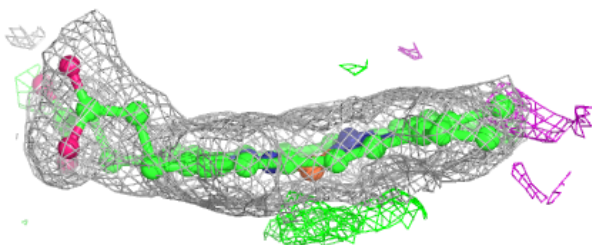
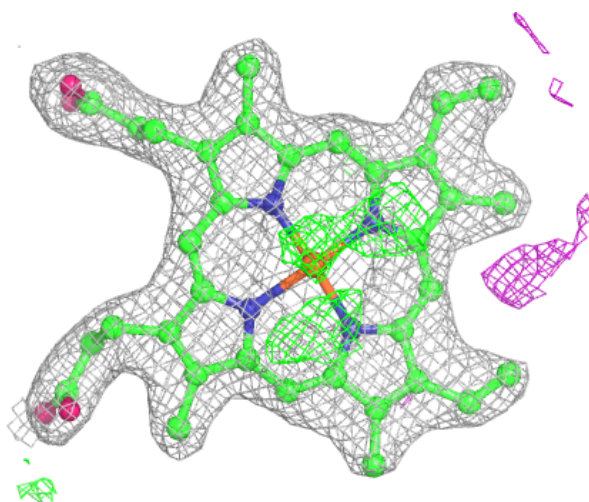
**Electron density around HEM B 502:**

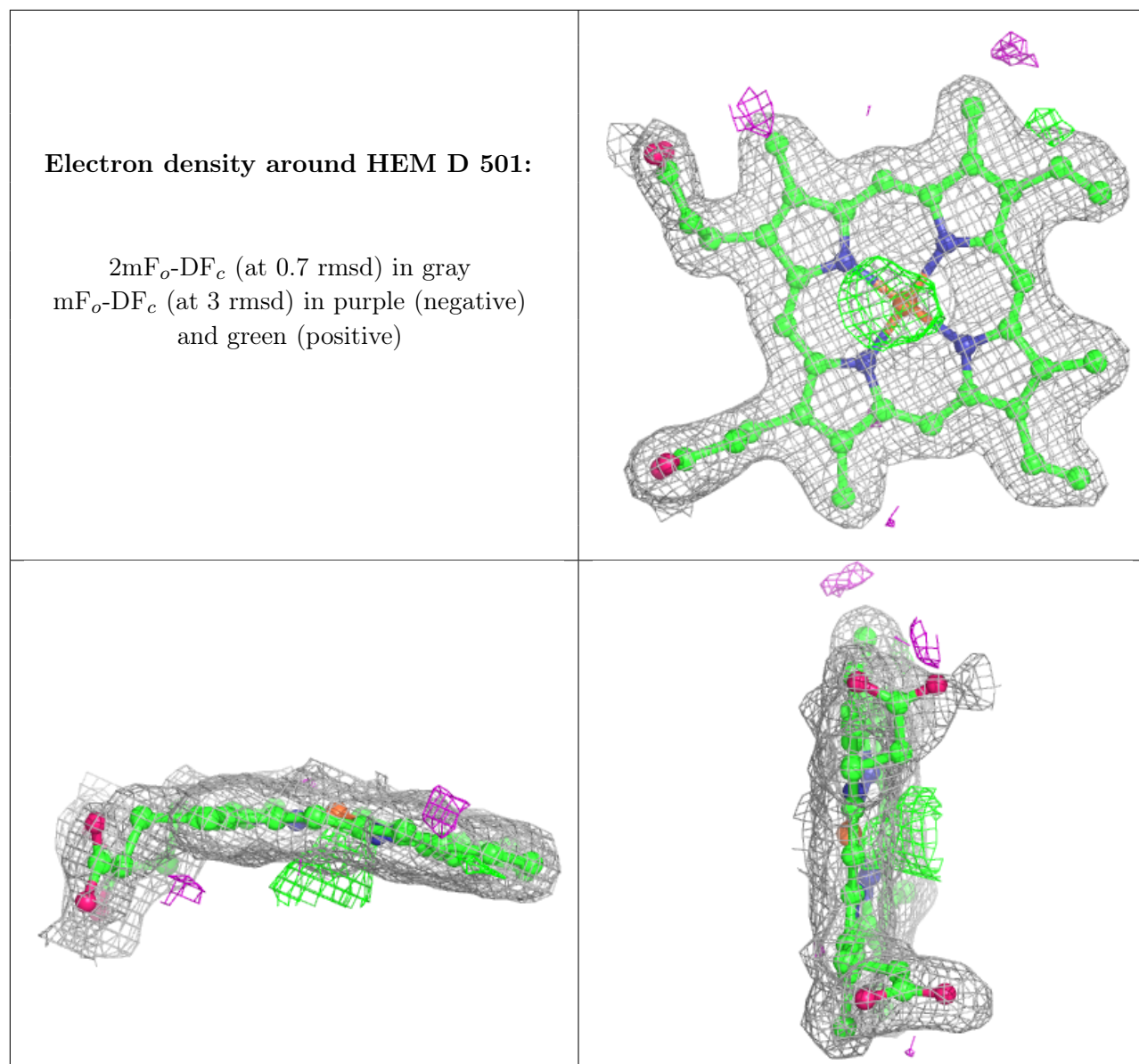
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



**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)





## 6.5 Other polymers [\(i\)](#)

There are no such residues in this entry.