



# Full wwPDB X-ray Structure Validation Report ⓘ

Oct 17, 2021 – 08:26 AM EDT

PDB ID : 1HZV  
Title : DOMAIN SWING UPON HIS TO ALA MUTATION IN NITRITE REDUCTASE OF PSEUDOMONAS AERUGINOSA  
Authors : Brown, K.; Tegoni, M.; Cambillau, C.  
Deposited on : 2001-01-26  
Resolution : 2.83 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.

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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 : 2.23.2  
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) : 2.23.2

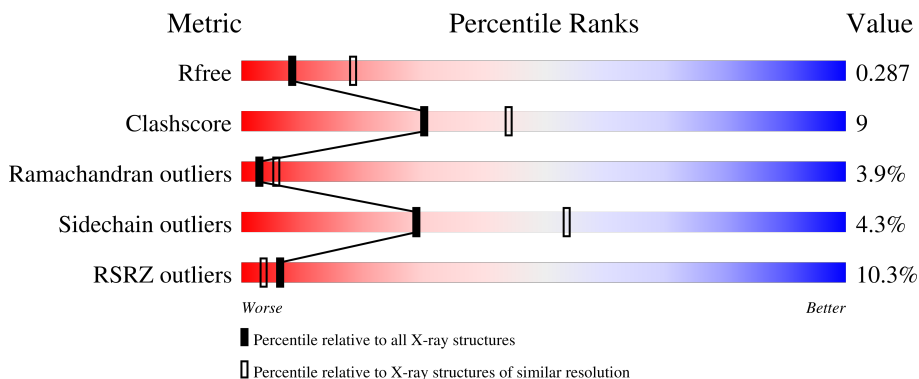
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.83 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.

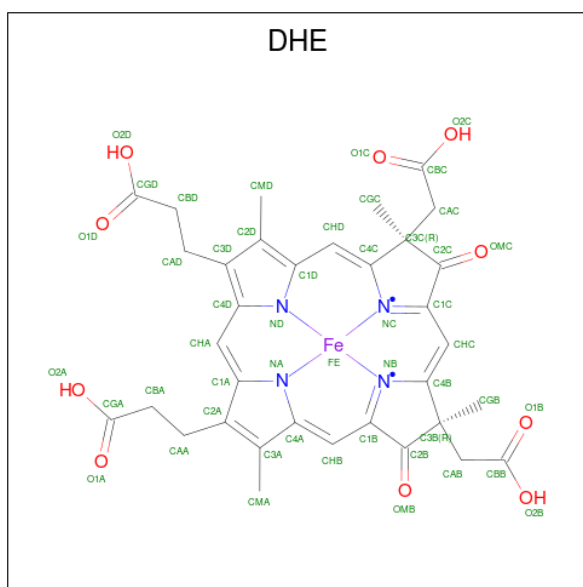


Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	1031 (2.86-2.82)
Clashscore	141614	1078 (2.86-2.82)
Ramachandran outliers	138981	1050 (2.86-2.82)
Sidechain outliers	138945	1051 (2.86-2.82)
RSRZ outliers	127900	1019 (2.86-2.82)

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.

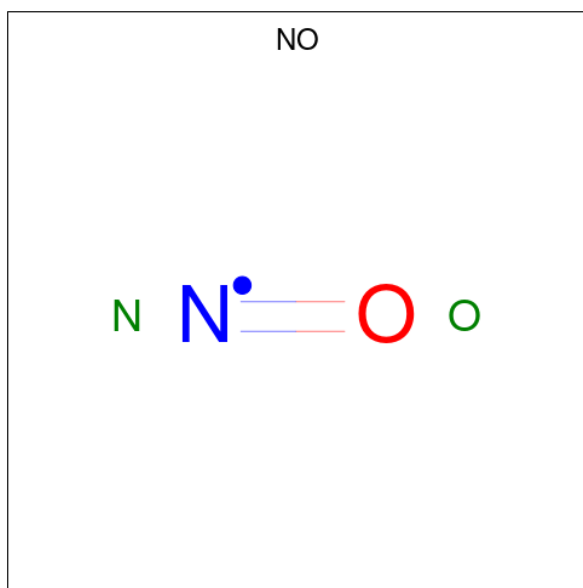
Mol	Chain	Length	Quality of chain
1	A	543	





Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	
			Total	C	Fe	N			O
3	A	1	49	34	1	4	10	0	0

- Molecule 4 is NITRIC OXIDE (three-letter code: NO) (formula: NO).



Mol	Chain	Residues	Atoms		ZeroOcc	AltConf	
			Total	N			O
4	A	1	2	1	1	0	0

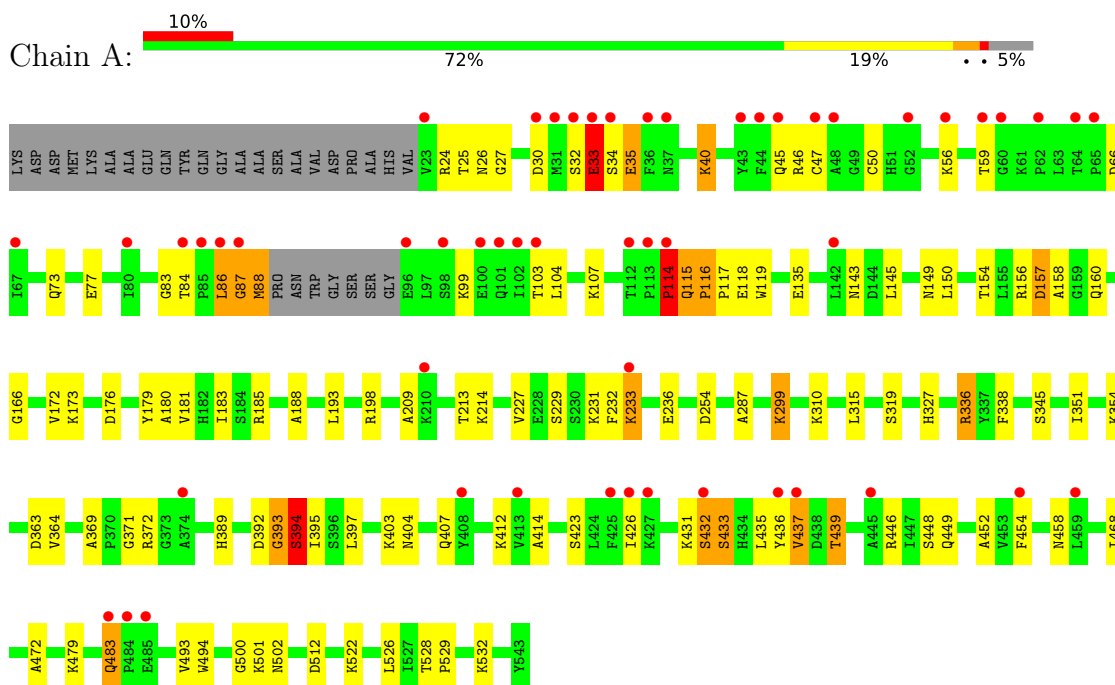
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	330	Total 330	O 330	0	0

### 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: NITRITE REDUCTASE



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 41 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	94.74Å 94.74Å 159.90Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	19.91 – 2.83 29.45 – 2.83	Depositor EDS
% Data completeness (in resolution range)	96.6 (19.91-2.83) 96.5 (29.45-2.83)	Depositor EDS
$R_{merge}$	0.04	Depositor
$R_{sym}$	0.04	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	4.88 (at 2.85Å)	Xtrriage
Refinement program	CNS 0.9	Depositor
R, $R_{free}$	0.282 , 0.296 0.278 , 0.287	Depositor DCC
$R_{free}$ test set	436 reflections (2.51%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	81.5	Xtrriage
Anisotropy	0.199	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.26 , 57.2	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.91	EDS
Total number of atoms	4456	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	106.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.42% 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: DHE, HEC, NO

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	0.81	8/4129 (0.2%)	1.02	19/5604 (0.3%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	3

All (8) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	50	CYS	CB-SG	10.62	2.00	1.82
1	A	433	SER	C-O	8.25	1.39	1.23
1	A	426	ILE	CB-CG2	-7.55	1.29	1.52
1	A	32	SER	C-O	7.45	1.37	1.23
1	A	393	GLY	C-O	6.10	1.33	1.23
1	A	86	LEU	CG-CD1	-5.75	1.30	1.51
1	A	33	GLU	CA-C	-5.60	1.38	1.52
1	A	494	TRP	NE1-CE2	-5.09	1.30	1.37

All (19) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	432	SER	C-N-CA	8.56	143.11	121.70
1	A	433	SER	N-CA-C	8.52	134.00	111.00
1	A	393	GLY	N-CA-C	-8.14	92.74	113.10
1	A	32	SER	CA-C-N	-8.02	99.55	117.20
1	A	32	SER	O-C-N	7.65	134.93	122.70

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	88	MET	N-CA-C	-6.85	92.50	111.00
1	A	371	GLY	N-CA-C	-6.57	96.69	113.10
1	A	432	SER	N-CA-CB	6.50	120.25	110.50
1	A	32	SER	N-CA-C	6.46	128.43	111.00
1	A	432	SER	O-C-N	6.26	132.71	122.70
1	A	432	SER	CA-C-N	-6.24	103.47	117.20
1	A	526	LEU	CA-CB-CG	5.71	128.44	115.30
1	A	394	SER	N-CA-CB	5.71	119.06	110.50
1	A	433	SER	CA-C-O	-5.69	108.16	120.10
1	A	114	PRO	C-N-CA	5.65	135.82	121.70
1	A	104	LEU	CB-CG-CD1	-5.36	101.89	111.00
1	A	118	GLU	N-CA-C	5.29	125.28	111.00
1	A	40	LYS	CD-CE-NZ	-5.16	99.84	111.70
1	A	394	SER	CA-C-N	-5.01	106.18	117.20

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	114	PRO	Mainchain
1	A	33	GLU	Mainchain
1	A	87	GLY	Mainchain

## 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	4032	0	4010	72	0
2	A	43	0	30	3	0
3	A	49	0	24	3	0
4	A	2	0	0	0	0
5	A	330	0	0	13	0
All	All	4456	0	4064	74	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 9.

All (74) close contacts within the same asymmetric unit are listed below, sorted by their clash

magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:299:LYS:HZ1	1:A:327:HIS:CD2	1.86	0.92
1:A:40:LYS:HD2	1:A:114:PRO:HB3	1.51	0.92
1:A:25:THR:HG22	1:A:26:ASN:H	1.37	0.90
1:A:157:ASP:OD1	5:A:906:HOH:O	1.92	0.86
3:A:602:DHE:HHC	5:A:878:HOH:O	1.74	0.85
1:A:46:ARG:HH22	1:A:179:TYR:HB2	1.44	0.81
1:A:299:LYS:NZ	1:A:327:HIS:CD2	2.53	0.77
1:A:231:LYS:HE2	5:A:890:HOH:O	1.85	0.76
1:A:114:PRO:O	1:A:116:PRO:HD3	1.88	0.74
1:A:232:PHE:CE1	1:A:233:LYS:HG2	2.23	0.74
1:A:33:GLU:O	1:A:35:GLU:N	2.23	0.71
1:A:40:LYS:HD2	1:A:114:PRO:CB	2.22	0.70
1:A:299:LYS:NZ	1:A:327:HIS:HD2	1.88	0.69
1:A:84:THR:OG1	2:A:601:HEC:O1D	2.10	0.69
1:A:299:LYS:HZ1	1:A:327:HIS:CG	2.15	0.65
1:A:395:ILE:HD11	1:A:437:VAL:HG11	1.80	0.64
1:A:83:GLY:HA2	1:A:88:MET:HG3	1.82	0.62
1:A:145:LEU:HD21	1:A:172:VAL:HG11	1.80	0.62
1:A:83:GLY:CA	1:A:88:MET:HG3	2.31	0.61
1:A:88:MET:CE	5:A:782:HOH:O	2.48	0.61
1:A:180:ALA:HB3	1:A:198:ARG:HG2	1.82	0.60
1:A:173:LYS:HD2	5:A:849:HOH:O	2.02	0.60
1:A:59:THR:HG21	5:A:667:HOH:O	2.02	0.59
1:A:431:LYS:O	1:A:432:SER:HB3	2.05	0.57
1:A:185:ARG:HD2	1:A:227:VAL:O	2.04	0.56
1:A:336:ARG:HH11	1:A:354:LYS:HB3	1.71	0.56
1:A:437:VAL:HG22	1:A:452:ALA:HB3	1.88	0.55
1:A:66:ASP:O	1:A:66:ASP:OD1	2.25	0.55
1:A:88:MET:HE3	5:A:782:HOH:O	2.05	0.54
1:A:25:THR:HG22	1:A:26:ASN:N	2.14	0.54
1:A:25:THR:CG2	1:A:26:ASN:H	2.15	0.53
1:A:46:ARG:NH2	1:A:179:TYR:HB2	2.18	0.52
1:A:185:ARG:HH21	3:A:602:DHE:CGA	2.22	0.51
1:A:87:GLY:HA2	1:A:501:LYS:NZ	2.25	0.51
1:A:395:ILE:CD1	1:A:437:VAL:HG11	2.40	0.51
1:A:24:ARG:HA	1:A:30:ASP:CG	2.32	0.51
1:A:372:ARG:NH2	5:A:877:HOH:O	2.44	0.50
1:A:46:ARG:HH22	1:A:179:TYR:CB	2.20	0.50
1:A:397:LEU:HD12	1:A:414:ALA:HB3	1.94	0.50
1:A:149:ASN:ND2	1:A:166:GLY:HA3	2.27	0.49
1:A:287:ALA:HB1	5:A:856:HOH:O	2.12	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:392:ASP:HB3	1:A:393:GLY:O	2.12	0.49
1:A:369:ALA:HB1	5:A:870:HOH:O	2.12	0.48
1:A:394:SER:OG	1:A:395:ILE:N	2.46	0.48
1:A:472:ALA:O	1:A:522:LYS:HE3	2.14	0.48
1:A:143:ASN:ND2	1:A:209:ALA:O	2.47	0.48
1:A:59:THR:O	1:A:59:THR:HG22	2.15	0.46
2:A:601:HEC:HBC3	5:A:700:HOH:O	2.15	0.45
1:A:116:PRO:HA	1:A:117:PRO:HD2	1.73	0.45
1:A:213:THR:HG22	1:A:214:LYS:H	1.81	0.45
1:A:158:ALA:HB1	1:A:160:GLN:HE21	1.82	0.44
1:A:103:THR:HG22	1:A:107:LYS:HE3	1.98	0.44
1:A:389:HIS:O	1:A:423:SER:HB3	2.17	0.44
1:A:87:GLY:HA2	1:A:501:LYS:HZ2	1.83	0.44
1:A:449:GLN:OE1	1:A:479:LYS:HE2	2.17	0.44
1:A:183:ILE:CD1	1:A:185:ARG:HE	2.31	0.44
1:A:88:MET:HE1	5:A:782:HOH:O	2.17	0.43
1:A:338:PHE:HB3	1:A:351:ILE:HB	2.00	0.43
1:A:435:LEU:HB3	1:A:454:PHE:HB2	2.00	0.43
1:A:84:THR:OG1	2:A:601:HEC:CGD	2.66	0.43
1:A:528:THR:HG21	5:A:906:HOH:O	2.18	0.43
1:A:403:LYS:HE2	1:A:404:ASN:HD21	1.82	0.43
1:A:232:PHE:CG	1:A:233:LYS:N	2.87	0.43
1:A:299:LYS:HZ3	1:A:327:HIS:HD2	1.63	0.43
1:A:432:SER:O	1:A:512:ASP:OD2	2.37	0.43
1:A:439:THR:O	1:A:448:SER:HA	2.19	0.42
1:A:73:GLN:O	1:A:77:GLU:HG3	2.18	0.42
1:A:86:LEU:HD23	1:A:502:ASN:OD1	2.19	0.42
1:A:436:TYR:CZ	1:A:493:VAL:HG21	2.55	0.41
1:A:160:GLN:HG2	1:A:176:ASP:HA	2.02	0.41
1:A:185:ARG:NH2	3:A:602:DHE:CGA	2.84	0.41
1:A:483:GLN:HB3	1:A:532:LYS:NZ	2.36	0.41
1:A:154:THR:O	1:A:529:PRO:HA	2.22	0.40
1:A:364:VAL:HA	1:A:412:LYS:HE2	2.04	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	510/543 (94%)	446 (88%)	44 (9%)	20 (4%)	<b>3</b> <b>6</b>

All (20) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	34	SER
1	A	56	LYS
1	A	115	GLN
1	A	116	PRO
1	A	188	ALA
1	A	233	LYS
1	A	299	LYS
1	A	394	SER
1	A	433	SER
1	A	119	TRP
1	A	156	ARG
1	A	181	VAL
1	A	458	ASN
1	A	236	GLU
1	A	483	GLN
1	A	27	GLY
1	A	345	SER
1	A	468	ILE
1	A	310	LYS
1	A	500	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	437/457 (96%)	418 (96%)	19 (4%)	29 54

All (19) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	35	GLU
1	A	45	GLN
1	A	47	CYS
1	A	99	LYS
1	A	115	GLN
1	A	135	GLU
1	A	150	LEU
1	A	157	ASP
1	A	193	LEU
1	A	229	SER
1	A	254	ASP
1	A	315	LEU
1	A	319	SER
1	A	336	ARG
1	A	363	ASP
1	A	407	GLN
1	A	437	VAL
1	A	439	THR
1	A	446	ARG

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	160	GLN
1	A	327	HIS
1	A	344	ASN
1	A	404	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](#)

3 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	HEC	A	601	1	26,50,50	1.86	6 (23%)	18,82,82	2.40	9 (50%)
4	NO	A	603	-	0,1,1	-	-	-	-	-
3	DHE	A	602	1	38,56,56	5.23	23 (60%)	37,94,94	4.07	13 (35%)

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. '2' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	HEC	A	601	1	-	0/6/54/54	-
3	DHE	A	602	1	-	2/12/108/108	-

All (29) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	602	DHE	C4B-NB	-13.51	1.36	1.49
3	A	602	DHE	C4C-NC	-12.35	1.37	1.49
3	A	602	DHE	CHA-C1A	-10.06	1.40	1.51
3	A	602	DHE	C1C-NC	-9.65	1.36	1.49
3	A	602	DHE	CHA-C4D	-9.62	1.41	1.51

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	602	DHE	CHB-C1B	-8.67	1.38	1.53
3	A	602	DHE	C1B-NB	-7.59	1.39	1.49
2	A	601	HEC	CBC-CAC	6.10	1.72	1.49
3	A	602	DHE	CHC-C4B	-5.43	1.39	1.52
3	A	602	DHE	CHD-C4C	-5.05	1.40	1.54
3	A	602	DHE	C1D-C2D	4.72	1.44	1.38
3	A	602	DHE	C1A-C2A	4.69	1.44	1.38
3	A	602	DHE	CGB-C3B	4.69	1.62	1.54
3	A	602	DHE	CAC-C3C	-4.61	1.48	1.56
3	A	602	DHE	C4D-C3D	4.50	1.44	1.38
3	A	602	DHE	C4A-C3A	4.34	1.44	1.38
3	A	602	DHE	CHC-C1C	-3.94	1.38	1.53
3	A	602	DHE	CGC-C3C	3.89	1.61	1.54
3	A	602	DHE	CBD-CAD	-3.75	1.27	1.53
3	A	602	DHE	CHB-C4A	-3.61	1.42	1.51
3	A	602	DHE	CHD-C1D	-3.23	1.43	1.51
3	A	602	DHE	CAD-C3D	-2.95	1.47	1.52
2	A	601	HEC	C3B-C4B	2.80	1.48	1.43
3	A	602	DHE	CAB-C3B	-2.67	1.51	1.56
2	A	601	HEC	C3C-C4C	-2.50	1.38	1.43
2	A	601	HEC	C1D-CHD	-2.48	1.34	1.41
2	A	601	HEC	C3C-C2C	-2.41	1.38	1.40
3	A	602	DHE	FE-NA	2.33	2.12	1.95
2	A	601	HEC	C1A-C2A	2.17	1.47	1.42

All (22) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	602	DHE	CHC-C1C-NC	13.00	127.10	110.94
3	A	602	DHE	CHB-C1B-NB	8.34	126.48	110.75
3	A	602	DHE	CBD-CAD-C3D	8.12	127.47	112.49
3	A	602	DHE	CAD-CBD-CGD	7.65	125.50	112.67
3	A	602	DHE	C3B-C4B-NB	7.50	111.27	104.67
3	A	602	DHE	C4D-CHA-C1A	6.35	128.36	112.87
3	A	602	DHE	C3C-C4C-NC	6.20	110.12	104.67
3	A	602	DHE	C1C-CHC-C4B	5.40	132.00	116.16
2	A	601	HEC	CMB-C2B-C3B	4.63	131.27	125.82
2	A	601	HEC	CMB-C2B-C1B	-4.12	122.14	128.46
3	A	602	DHE	CAD-C3D-C4D	-4.02	124.47	127.30
3	A	602	DHE	CHC-C4B-C3B	3.97	126.13	118.34
2	A	601	HEC	CBA-CAA-C2A	3.91	119.68	112.48
3	A	602	DHE	CHB-C1B-C2B	3.41	124.51	114.47

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	601	HEC	CMD-C2D-C1D	-3.31	123.38	128.46
2	A	601	HEC	CBD-CAD-C3D	3.12	118.24	112.49
2	A	601	HEC	CMC-C2C-C3C	2.91	129.24	125.82
3	A	602	DHE	CAA-C2A-C1A	-2.88	125.28	127.30
3	A	602	DHE	CHC-C1C-C2C	2.69	123.11	114.70
2	A	601	HEC	C3C-C4C-NC	2.37	115.42	110.94
2	A	601	HEC	CMD-C2D-C3D	2.35	129.38	124.94
2	A	601	HEC	CMC-C2C-C1C	-2.32	124.90	128.46

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	602	DHE	C4B-C3B-CAB-CBB
3	A	602	DHE	C4C-C3C-CAC-CBC

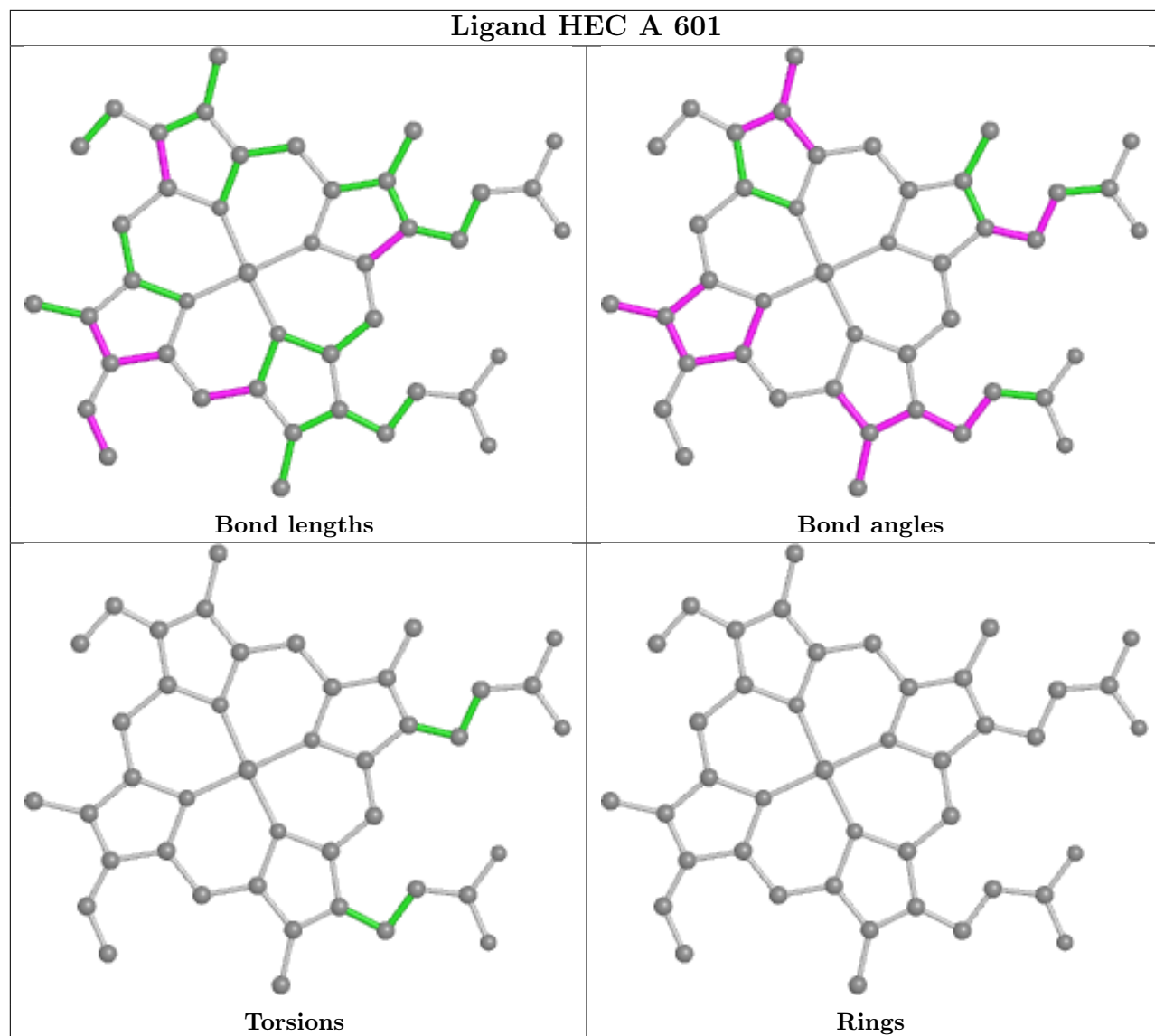
There are no ring outliers.

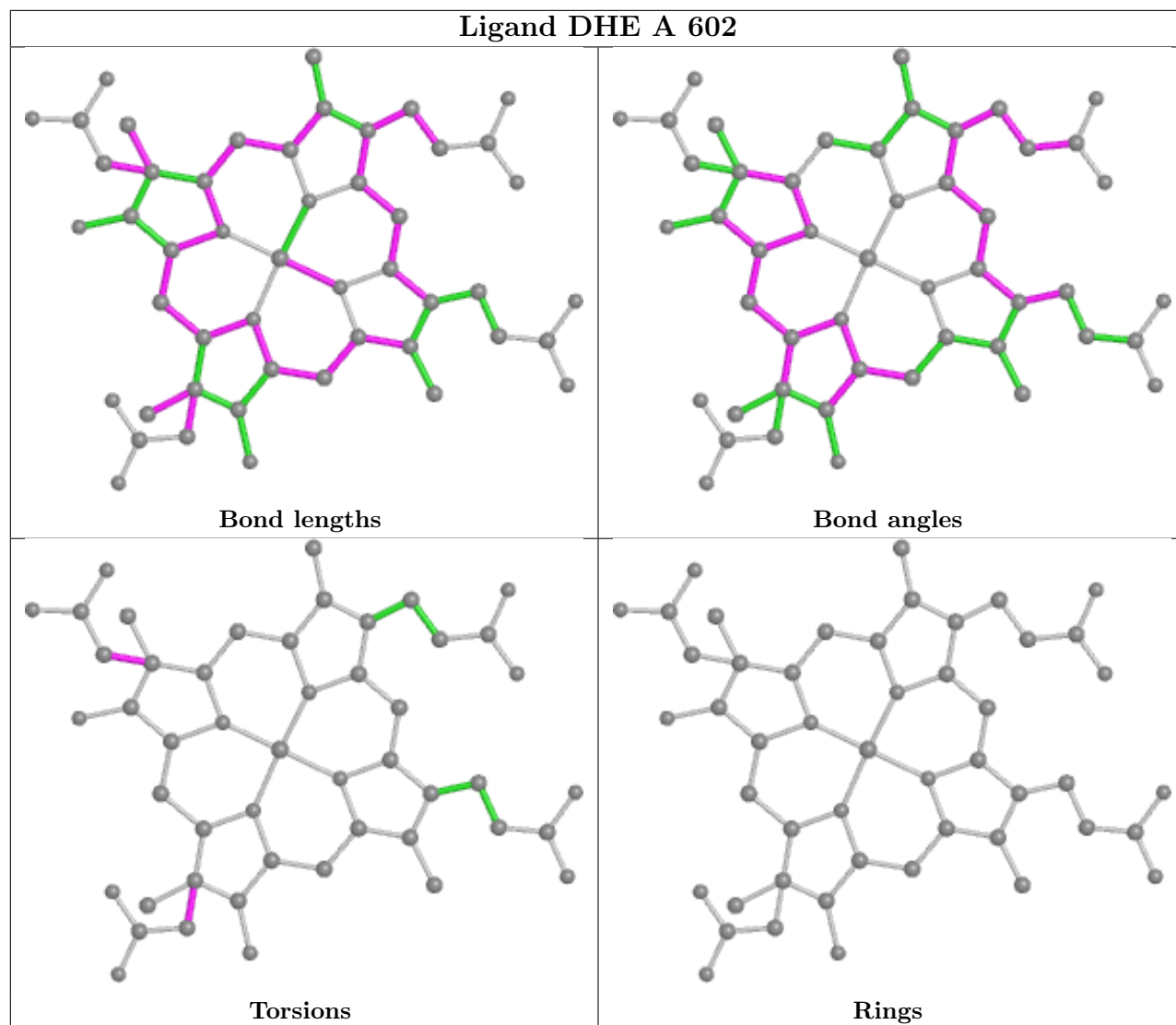
2 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	601	HEC	3	0
3	A	602	DHE	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

### 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	514/543 (94%)	0.54	53 (10%) <b>6</b> <b>4</b>	38, 101, 182, 192	37 (7%)

All (53) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	86	LEU	7.9
1	A	96	GLU	7.4
1	A	59	THR	7.3
1	A	85	PRO	7.1
1	A	67	ILE	4.7
1	A	408	TYR	4.5
1	A	65	PRO	4.3
1	A	100	GLU	4.2
1	A	80	ILE	4.0
1	A	47	CYS	4.0
1	A	33	GLU	4.0
1	A	37	ASN	3.9
1	A	426	ILE	3.8
1	A	142	LEU	3.7
1	A	84	THR	3.6
1	A	98	SER	3.6
1	A	23	VAL	3.6
1	A	427	LYS	3.6
1	A	31	MET	3.5
1	A	102	ILE	3.4
1	A	32	SER	3.3
1	A	44	PHE	3.2
1	A	87	GLY	3.2
1	A	30	ASP	3.1
1	A	52	GLY	3.0
1	A	36	PHE	2.8
1	A	114	PRO	2.8

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Mol	Chain	Res	Type	RSRZ
1	A	112	THR	2.7
1	A	103	THR	2.7
1	A	459	LEU	2.7
1	A	34	SER	2.6
1	A	485	GLU	2.5
1	A	64	THR	2.5
1	A	432	SER	2.4
1	A	48	ALA	2.4
1	A	101	GLN	2.4
1	A	374	ALA	2.4
1	A	210	LYS	2.3
1	A	233	LYS	2.3
1	A	483	GLN	2.3
1	A	445	ALA	2.3
1	A	413	VAL	2.3
1	A	60	GLY	2.3
1	A	43	TYR	2.2
1	A	45	GLN	2.2
1	A	454	PHE	2.1
1	A	62	PRO	2.1
1	A	113	PRO	2.1
1	A	436	TYR	2.1
1	A	56	LYS	2.1
1	A	437	VAL	2.0
1	A	425	PHE	2.0
1	A	484	PRO	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 [\(i\)](#)

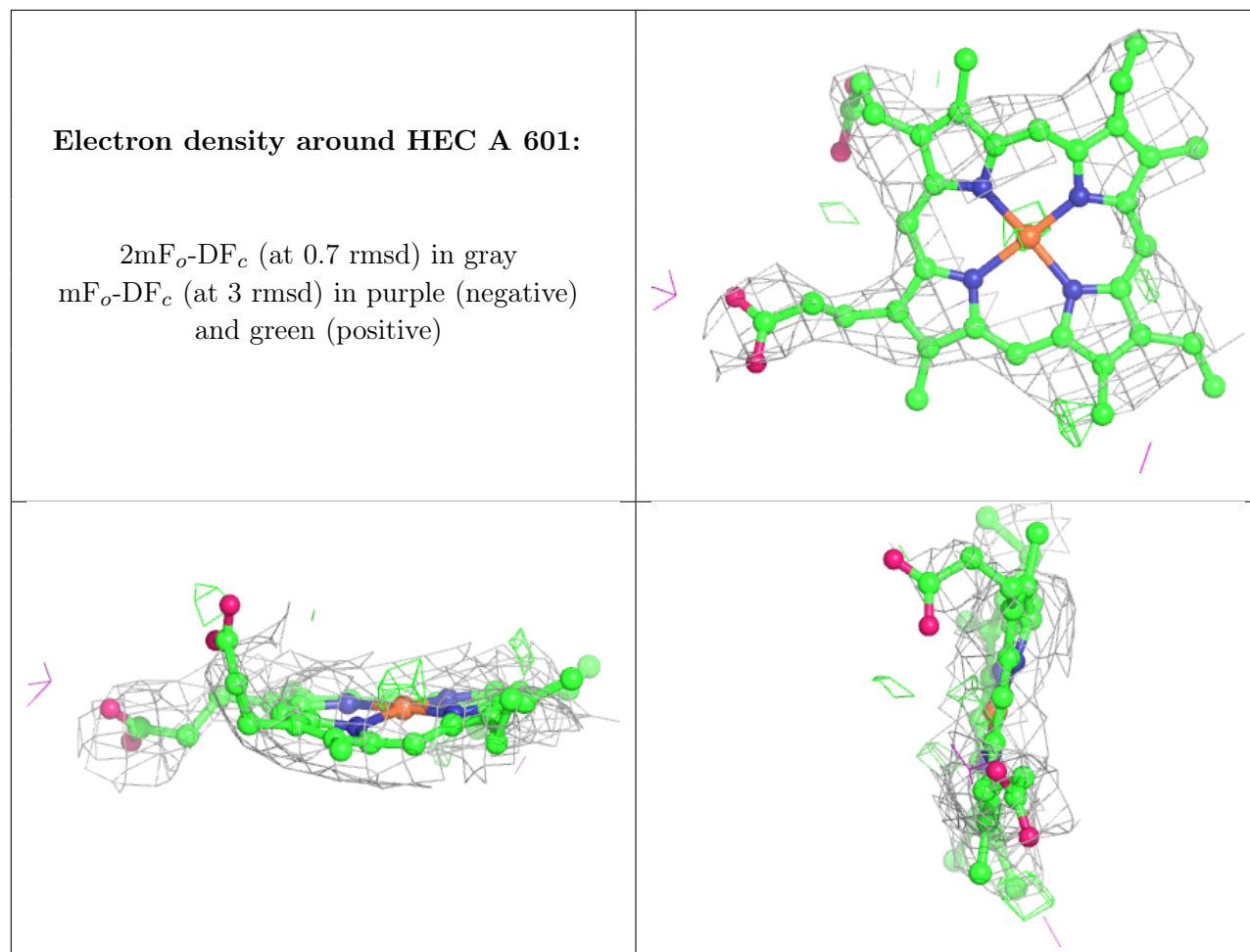
There are no monosaccharides in this entry.

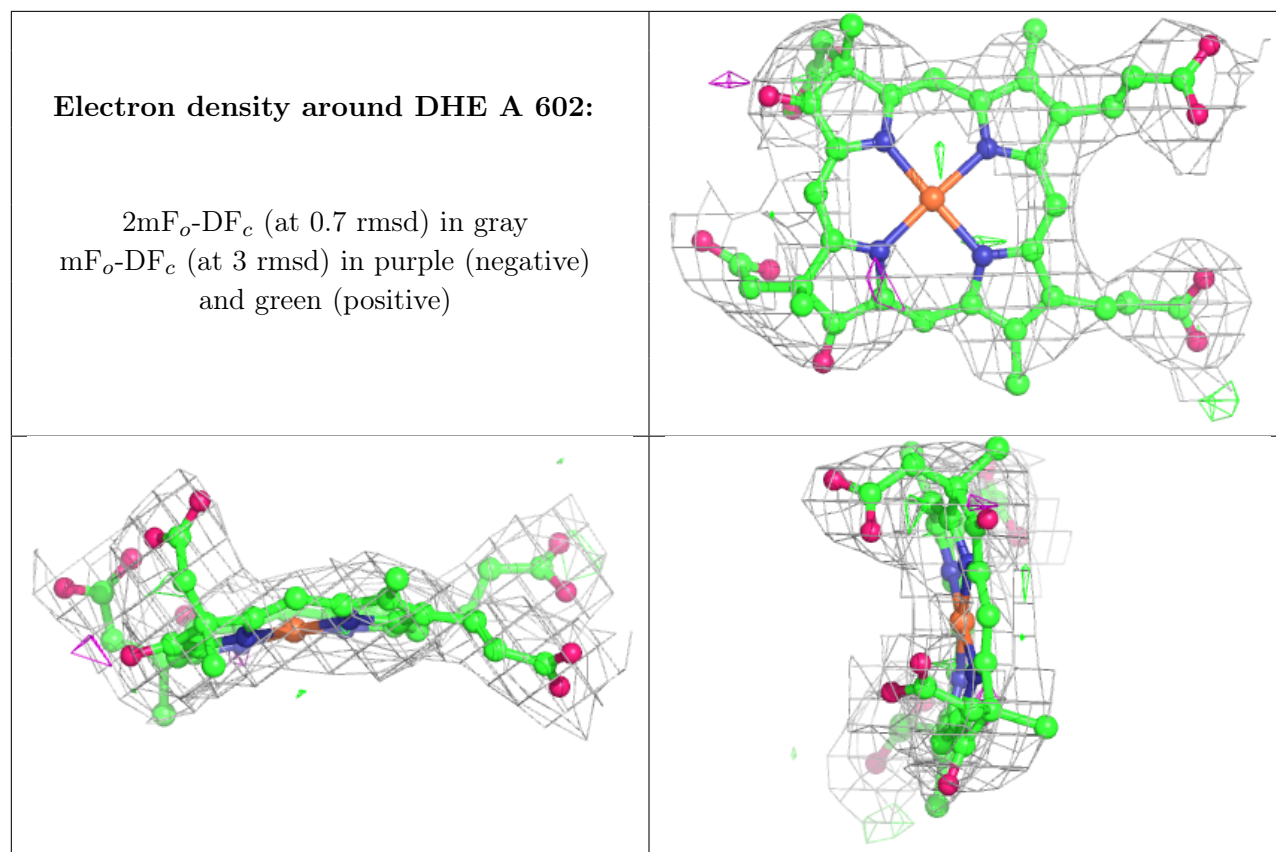
## 6.4 Ligands [\(i\)](#)

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( $\text{\AA}^2$ )	Q<0.9
2	HEC	A	601	43/43	0.91	0.25	144,147,150,152	16
3	DHE	A	602	49/49	0.93	0.21	66,74,79,81	0
4	NO	A	603	2/2	0.96	0.41	60,60,60,63	0

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





## 6.5 Other polymers [i](#)

There are no such residues in this entry.