



# Full wwPDB X-ray Structure Validation Report ⓘ

Oct 8, 2024 – 02:37 PM EDT

PDB ID : 7HII  
Title : Group deposition for combi-soaks of Chikungunya virus nsP3 macrodomain – Crystal structure of Chikungunya virus nsP3 macrodomain in complex with Z1741976468, Z3219959731 and Z19674820 (CHIKV\_MacB-x1734)  
Authors : Aschenbrenner, J.C.; Fairhead, M.; Godoy, A.S.; Balcomb, B.H.; Capkin, E.; Chandran, A.V.; Golding, M.; Koekemoer, L.; Lithgo, R.M.; Marples, P.G.; Ni, X.; Thompson, W.; Tomlinson, C.W.E.; Wild, C.; Winokan, M.; Xavier, M.-A.E.; Fearon, D.; von Delft, F.  
Deposited on : 2024-10-02  
Resolution : 1.50 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>.

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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 : 2022.3.0, CSD as543be (2022)  
Xtriage (Phenix) : 1.20.1  
EDS : 3.0  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
CCP4 : 9.0.003 (Gargrove)  
Density-Fitness : 1.0.11

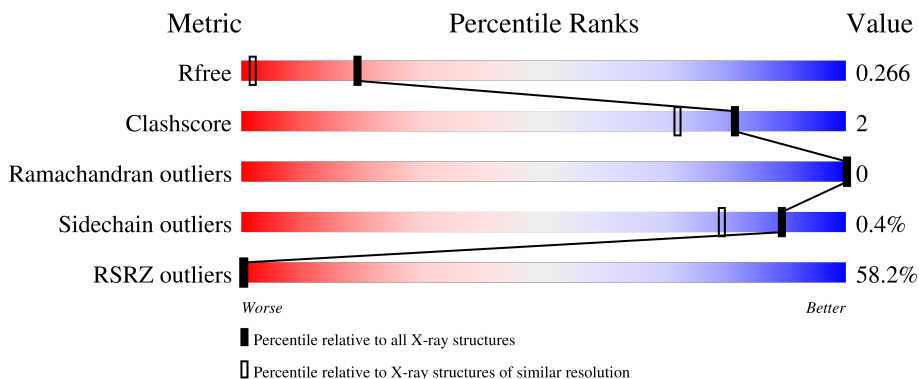
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.50 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))
$R_{free}$	164625	3717 (1.50-1.50)
Clashscore	180529	4048 (1.50-1.50)
Ramachandran outliers	177936	3970 (1.50-1.50)
Sidechain outliers	177891	3967 (1.50-1.50)
RSRZ outliers	164620	3718 (1.50-1.50)

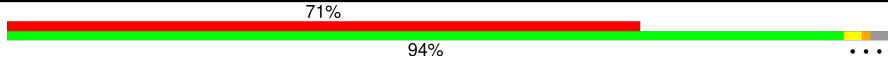
The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria 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  $\leq 5\%$ .

Mol	Chain	Length	Quality of chain
1	A	163	
1	B	163	
1	C	163	

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Ideal geometry (proteins) : Engh & Huber (2001)  
 Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
 Validation Pipeline (wwPDB-VP) : 2.39

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Mol	Chain	Length	Quality of chain
1	D	163	 <p>A horizontal bar chart showing the quality of chain. The top bar is red and labeled '71%'. The bottom bar is green and labeled '94%'. The bars extend from the left side of the cell. At the far right end of the green bar, there are three small colored squares (yellow, grey, and black) and three dots '...'. The chart is contained within a rectangular box.</p>

## 2 Entry composition [i](#)

There are 8 unique types of molecules in this entry. The entry contains 5817 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 Non-structural protein 3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	163	1293	804	229	250	10	0	5	0
1	B	163	1279	795	223	252	9	0	4	0
1	C	163	1282	799	226	247	10	0	4	0
1	D	159	1265	787	222	247	9	0	5	0

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-2	GLY	-	expression tag	UNP Q8JUX6
A	-1	ALA	-	expression tag	UNP Q8JUX6
A	0	MET	-	expression tag	UNP Q8JUX6
A	77	THR	SER	conflict	UNP Q8JUX6
B	-2	GLY	-	expression tag	UNP Q8JUX6
B	-1	ALA	-	expression tag	UNP Q8JUX6
B	0	MET	-	expression tag	UNP Q8JUX6
B	77	THR	SER	conflict	UNP Q8JUX6
C	-2	GLY	-	expression tag	UNP Q8JUX6
C	-1	ALA	-	expression tag	UNP Q8JUX6
C	0	MET	-	expression tag	UNP Q8JUX6
C	77	THR	SER	conflict	UNP Q8JUX6
D	-2	GLY	-	expression tag	UNP Q8JUX6
D	-1	ALA	-	expression tag	UNP Q8JUX6
D	0	MET	-	expression tag	UNP Q8JUX6
D	77	THR	SER	conflict	UNP Q8JUX6

- Molecule 2 is DIMETHYL SULFOXIDE (three-letter code: DMS) (formula: C<sub>2</sub>H<sub>6</sub>OS).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	O	S	0	0
			4	2	1	1		
2	A	1	Total	C	O	S	0	0
			4	2	1	1		
2	A	1	Total	C	O	S	0	0
			4	2	1	1		
2	B	1	Total	C	O	S	0	0
			4	2	1	1		
2	C	1	Total	C	O	S	0	0
			4	2	1	1		
2	C	1	Total	C	O	S	0	0
			4	2	1	1		
2	C	1	Total	C	O	S	0	0
			4	2	1	1		
2	C	1	Total	C	O	S	0	0
			4	2	1	1		
2	D	1	Total	C	O	S	0	0
			4	2	1	1		
2	D	1	Total	C	O	S	0	0
			4	2	1	1		
2	D	1	Total	C	O	S	0	0
			4	2	1	1		

- Molecule 3 is 2-AMINO-2-HYDROXYMETHYL-PROPANE-1,3-DIOL (three-letter code: TRS) (formula: C<sub>4</sub>H<sub>12</sub>NO<sub>3</sub>).

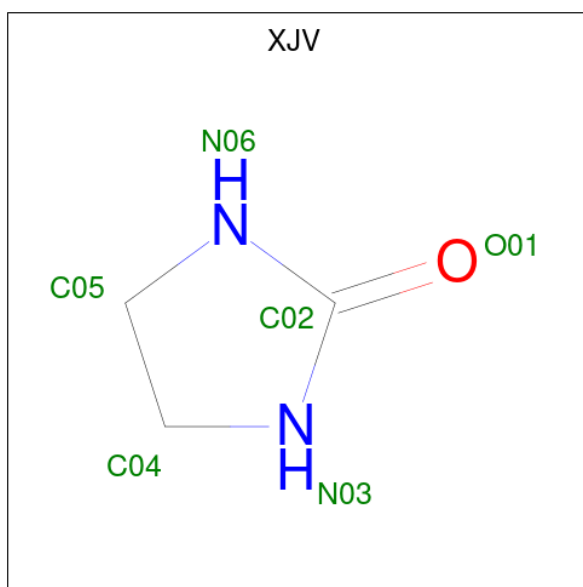


Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	0
			8	4	1	3		
3	D	1	Total	C	N	O	0	0
			8	4	1	3		

- Molecule 4 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

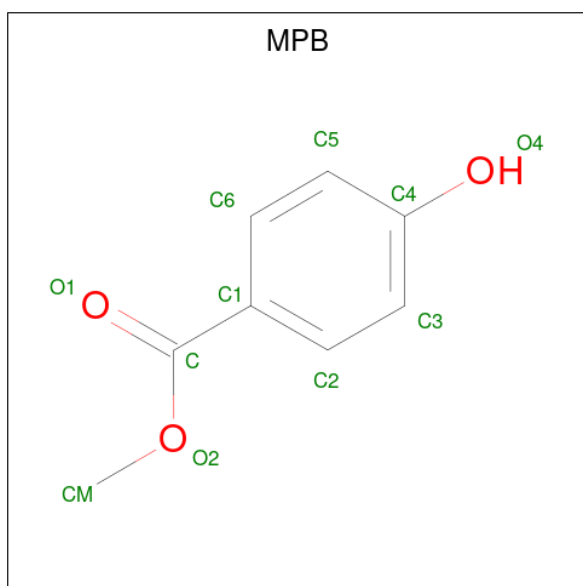
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	2	Total	Cl	0	0
			2	2		
4	B	1	Total	Cl	0	0
			1	1		
4	C	2	Total	Cl	0	0
			2	2		
4	D	1	Total	Cl	0	0
			1	1		

- Molecule 5 is imidazolidin-2-one (three-letter code: XJV) (formula: C<sub>3</sub>H<sub>6</sub>N<sub>2</sub>O) (labeled as "Ligand of Interest" by depositor).



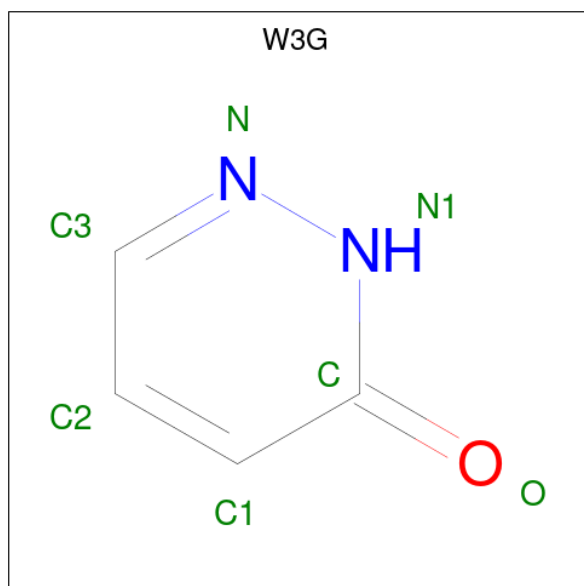
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
5	A	1	6	3	2	1	0	0
5	B	1	6	3	2	1	0	0
5	D	1	6	3	2	1	0	0

- Molecule 6 is 4-HYDROXY-BENZOIC ACID METHYL ESTER (three-letter code: MPB) (formula:  $C_8H_8O_3$ ) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	C	O	0	0
			11	8	3		

- Molecule 7 is pyridazin-3(2H)-one (three-letter code: W3G) (formula: C<sub>4</sub>H<sub>4</sub>N<sub>2</sub>O) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
7	A	1	Total	C	N	O	0	0
			7	4	2	1		
7	A	1	Total	C	N	O	0	0
			7	4	2	1		
7	B	1	Total	C	N	O	0	0
			7	4	2	1		
7	C	1	Total	C	N	O	0	0
			7	4	2	1		
7	D	1	Total	C	N	O	0	0
			7	4	2	1		

- Molecule 8 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	173	Total	O	0	0
			173	173		
8	B	113	Total	O	0	1
			114	114		
8	C	147	Total	O	0	0
			147	147		

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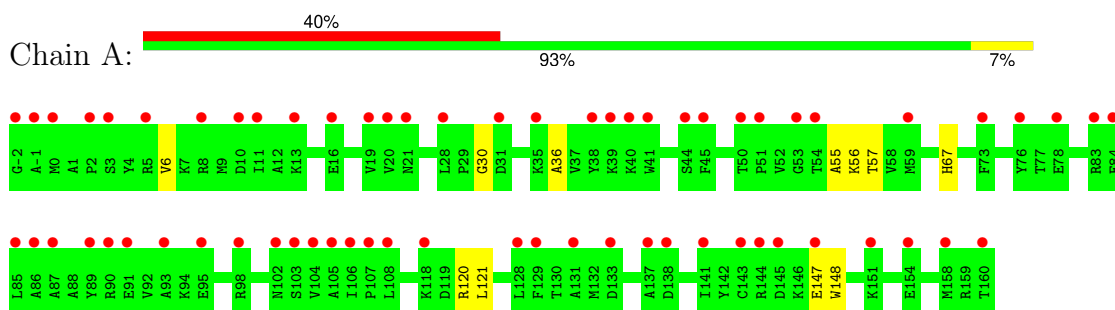
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<b>Mol</b>	<b>Chain</b>	<b>Residues</b>	<b>Atoms</b>		<b>ZeroOcc</b>	<b>AltConf</b>
8	D	130	Total 130	O 130	0	0

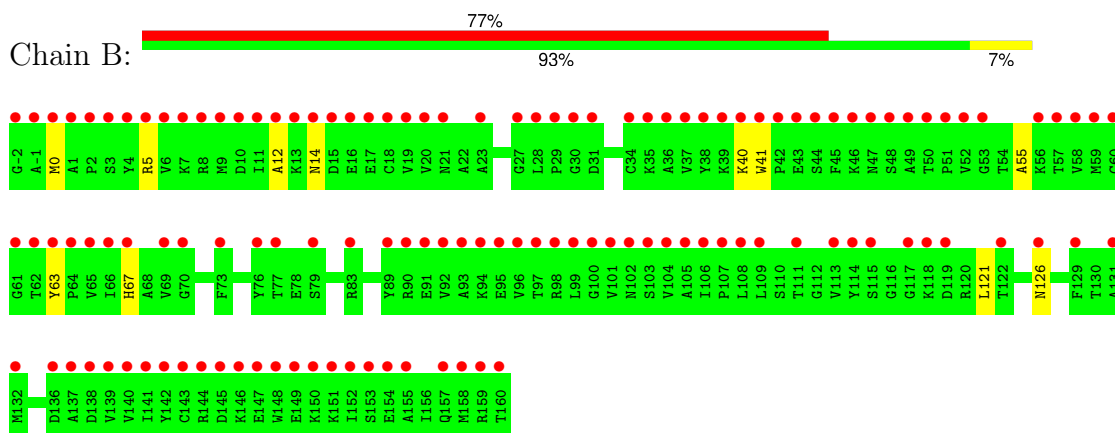
### 3 Residue-property plots [i](#)

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. 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. 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.

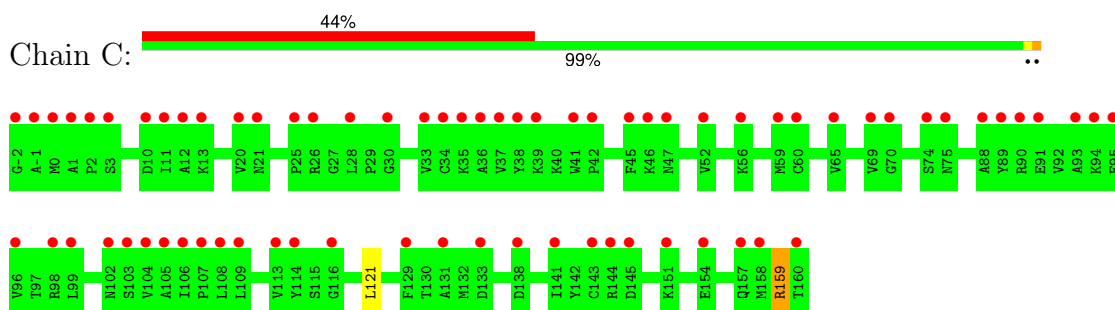
- Molecule 1: Non-structural protein 3



- Molecule 1: Non-structural protein 3

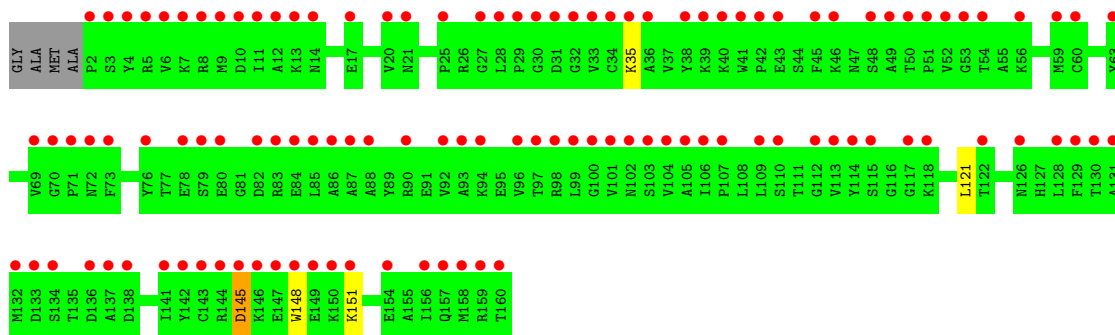


- Molecule 1: Non-structural protein 3



- Molecule 1: Non-structural protein 3





## 4 Data and refinement statistics i

Property	Value	Source
Space group	P 31	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	87.22Å 87.22Å 85.46Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	75.53 – 1.50 75.53 – 1.50	Depositor EDS
% Data completeness (in resolution range)	99.2 (75.53-1.50) 99.2 (75.53-1.50)	Depositor EDS
$R_{merge}$	0.08	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.03 (at 1.50Å)	Xtrriage
Refinement program	REFMAC 5.8.0267	Depositor
R, $R_{free}$	0.190 , 0.217 0.248 , 0.266	Depositor DCC
$R_{free}$ test set	5860 reflections (5.04%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	25.8	Xtrriage
Anisotropy	0.023	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.31 , 50.2	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.52$ , $\langle L^2 \rangle = 0.35$	Xtrriage
Estimated twinning fraction	0.000 for -h,-k,l 0.026 for h,-h-k,-l 0.000 for -k,-h,-l	Xtrriage
$F_o, F_c$ correlation	0.91	EDS
Total number of atoms	5817	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	30.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 24.47 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 3.8082e-03. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

<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: XJV, W3G, CL, TRS, DMS, MPB

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	0.78	0/1316	0.87	1/1779 (0.1%)
1	B	0.77	0/1302	0.86	0/1763
1	C	0.76	0/1305	0.85	1/1764 (0.1%)
1	D	0.76	0/1288	0.82	0/1742
All	All	0.77	0/5211	0.85	2/7048 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	120	ARG	NE-CZ-NH1	7.35	123.97	120.30
1	C	159	ARG	NE-CZ-NH2	-5.46	117.57	120.30

There are no chirality outliers.

There are no planarity outliers.

### 5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1293	0	1285	8	0
1	B	1279	0	1261	8	0
1	C	1282	0	1280	2	0
1	D	1265	0	1252	4	0
2	A	12	0	18	3	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	B	4	0	6	0	0
2	C	20	0	30	1	0
2	D	12	0	18	1	0
3	A	8	0	12	0	0
3	D	8	0	12	0	0
4	A	2	0	0	0	0
4	B	1	0	0	0	0
4	C	2	0	0	0	0
4	D	1	0	0	0	0
5	A	6	0	0	0	0
5	B	6	0	0	0	0
5	D	6	0	0	0	0
6	A	11	0	8	1	0
7	A	14	0	0	1	0
7	B	7	0	0	0	0
7	C	7	0	0	0	0
7	D	7	0	0	0	0
8	A	173	0	0	2	0
8	B	114	0	0	2	0
8	C	147	0	0	2	0
8	D	130	0	0	3	0
All	All	5817	0	5182	25	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 2.

All (25) 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:C:159:ARG:HD3	8:C:411:HOH:O	1.84	0.77
1:A:30:GLY:HA3	7:A:210:W3G:O	1.90	0.71
1:A:6:VAL:HG12	2:A:204:DMS:S	2.33	0.68
1:D:35:LYS:NZ	8:D:301:HOH:O	2.34	0.61
1:B:126[B]:ASN:ND2	8:B:302:HOH:O	2.34	0.60
1:C:121:LEU:C	1:C:121:LEU:HD23	2.25	0.56
1:B:5:ARG:HD3	8:B:352:HOH:O	2.04	0.56
2:D:203:DMS:H12	8:D:340:HOH:O	2.10	0.51
1:D:145[A]:ASP:OD1	1:D:148:TRP:N	2.37	0.50
1:B:12:ALA:HB1	1:B:40:LYS:HB2	1.94	0.49
1:A:57:THR:O	2:A:203:DMS:H12	2.11	0.49
1:D:121:LEU:C	1:D:121:LEU:HD23	2.35	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:121:LEU:C	1:A:121:LEU:HD23	2.35	0.47
2:A:201:DMS:H12	8:A:445:HOH:O	2.16	0.46
1:B:12:ALA:HA	1:B:41:TRP:CZ3	2.52	0.44
1:D:151:LYS:NZ	8:D:304:HOH:O	2.49	0.44
1:B:12:ALA:O	1:B:40:LYS:HE2	2.18	0.43
1:A:36:ALA:HB2	6:A:208:MPB:H5	2.00	0.43
1:A:147[B]:GLU:HG3	1:A:148:TRP:HD1	1.83	0.43
1:B:14:ASN:OD1	1:B:63:TYR:OH	2.36	0.42
1:A:56:LYS:HE2	8:A:359:HOH:O	2.19	0.42
1:B:121:LEU:C	1:B:121:LEU:HD23	2.40	0.41
2:C:201:DMS:H21	8:C:391:HOH:O	2.20	0.41
1:A:55:ALA:HA	1:A:67:HIS:O	2.20	0.41
1:B:55:ALA:HA	1:B:67:HIS:O	2.21	0.41

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	166/163 (102%)	166 (100%)	0	0	100	100
1	B	165/163 (101%)	164 (99%)	1 (1%)	0	100	100
1	C	165/163 (101%)	163 (99%)	2 (1%)	0	100	100
1	D	162/163 (99%)	161 (99%)	1 (1%)	0	100	100
All	All	658/652 (101%)	654 (99%)	4 (1%)	0	100	100

There are no Ramachandran outliers to report.

### 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	139/134 (104%)	139 (100%)	0	100	100
1	B	138/134 (103%)	137 (99%)	1 (1%)	81	66
1	C	138/134 (103%)	138 (100%)	0	100	100
1	D	138/134 (103%)	136 (99%)	2 (1%)	62	38
All	All	553/536 (103%)	550 (100%)	3 (0%)	89	75

All (3) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	0	MET
1	D	145[A]	ASP
1	D	145[B]	ASP

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 oligosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 29 ligands modelled in this entry, 6 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	DMS	A	204	-	3,3,3	0.42	0	3,3,3	0.40	0
3	TRS	A	202	-	7,7,7	0.20	0	9,9,9	0.33	0
2	DMS	C	204	-	3,3,3	0.42	0	3,3,3	0.15	0
7	W3G	A	209	-	7,7,7	0.53	0	8,8,8	0.69	0
5	XJV	D	206	-	6,6,6	0.13	0	7,7,7	0.29	0
3	TRS	D	201	-	7,7,7	0.19	0	9,9,9	0.32	0
2	DMS	D	203	-	3,3,3	0.21	0	3,3,3	0.04	0
2	DMS	A	203	-	3,3,3	0.18	0	3,3,3	0.16	0
2	DMS	B	201	-	3,3,3	0.29	0	3,3,3	0.77	0
2	DMS	C	201	-	3,3,3	0.25	0	3,3,3	0.25	0
7	W3G	D	207	-	7,7,7	0.53	0	8,8,8	0.64	0
2	DMS	D	202	-	3,3,3	0.28	0	3,3,3	0.06	0
7	W3G	B	204	-	7,7,7	0.51	0	8,8,8	0.64	0
2	DMS	A	201	-	3,3,3	0.41	0	3,3,3	0.34	0
5	XJV	A	207	-	6,6,6	0.13	0	7,7,7	0.29	0
2	DMS	C	205	-	3,3,3	0.23	0	3,3,3	0.05	0
2	DMS	C	206	-	3,3,3	0.20	0	3,3,3	0.10	0
2	DMS	D	204	-	3,3,3	0.23	0	3,3,3	0.06	0
7	W3G	A	210	-	7,7,7	0.61	0	8,8,8	0.62	0
7	W3G	C	207	-	7,7,7	0.54	0	8,8,8	0.68	0
2	DMS	C	208	-	3,3,3	0.26	0	3,3,3	0.06	0
6	MPB	A	208	-	11,11,11	0.29	0	14,14,14	0.18	0
5	XJV	B	203	-	6,6,6	0.14	0	7,7,7	0.29	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. <sup>1-2</sup> means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
7	W3G	B	204	-	-	-	0/1/1/1
5	XJV	A	207	-	-	-	0/1/1/1
5	XJV	D	206	-	-	-	0/1/1/1
7	W3G	D	207	-	-	-	0/1/1/1
3	TRS	D	201	-	-	3/9/9/9	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
7	W3G	A	210	-	-	-	0/1/1/1
7	W3G	C	207	-	-	-	0/1/1/1
3	TRS	A	202	-	-	0/9/9/9	-
6	MPB	A	208	-	-	2/6/6/6	0/1/1/1
5	XJV	B	203	-	-	-	0/1/1/1
7	W3G	A	209	-	-	-	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (5) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	D	201	TRS	C1-C-C3-O3
3	D	201	TRS	C2-C-C3-O3
3	D	201	TRS	N-C-C3-O3
6	A	208	MPB	C1-C-O2-CM
6	A	208	MPB	O1-C-O2-CM

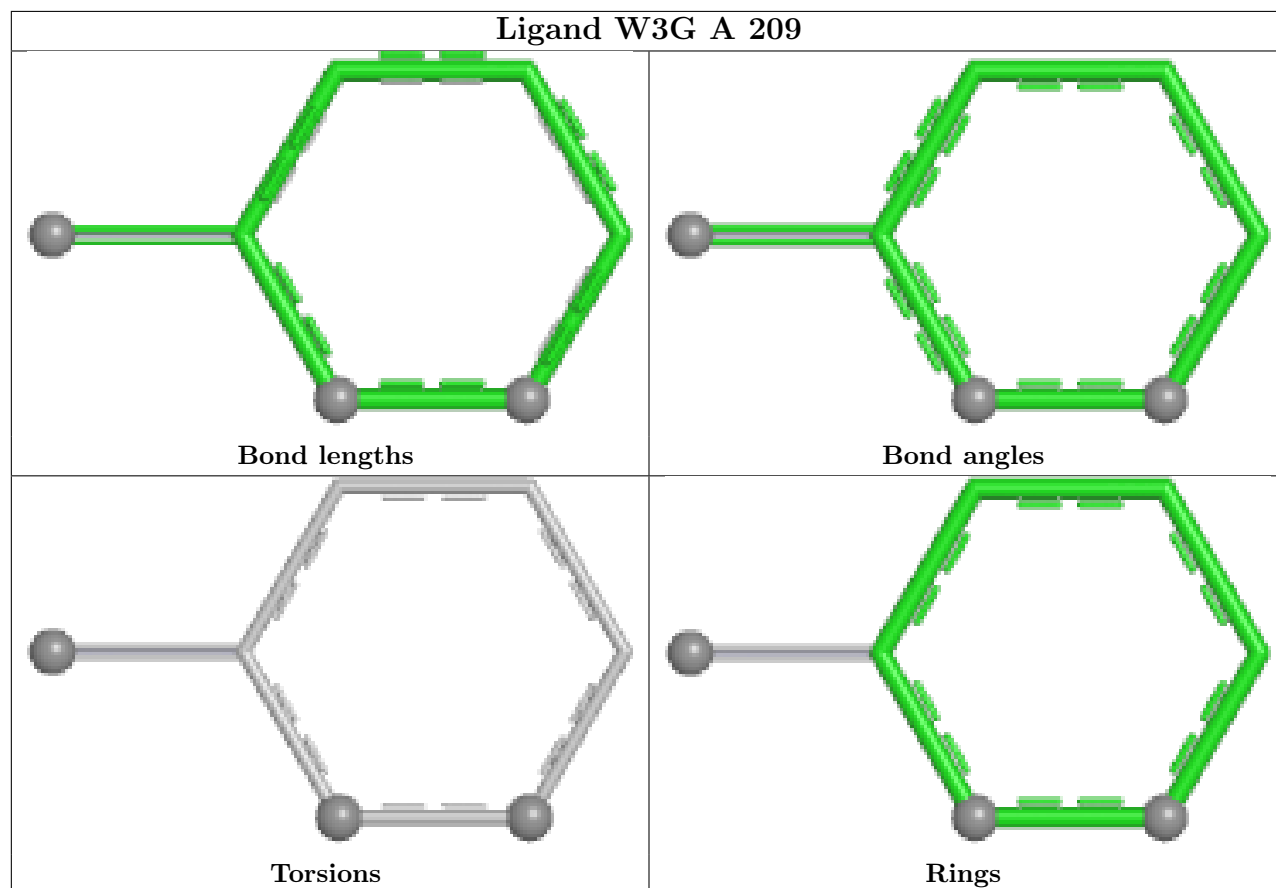
There are no ring outliers.

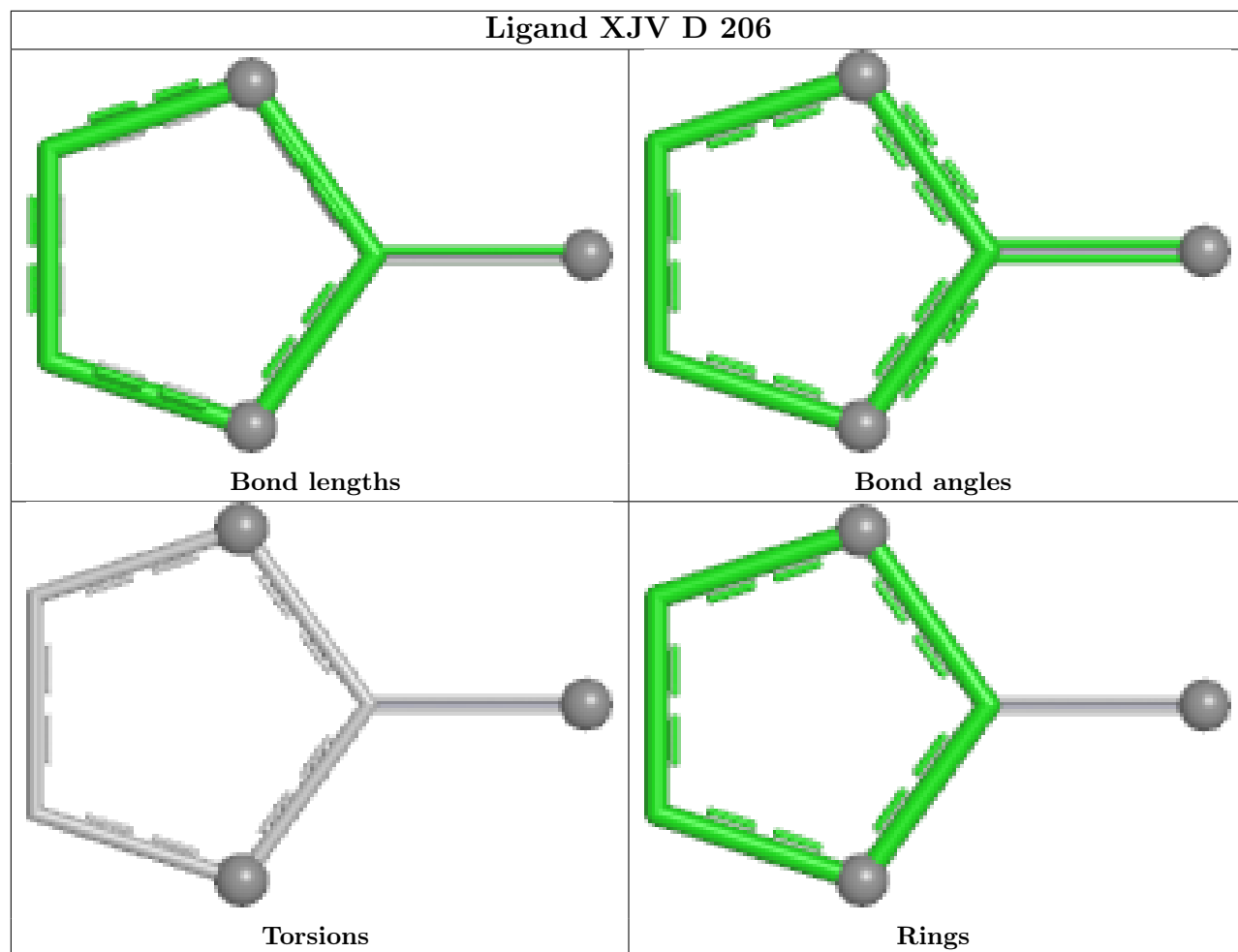
7 monomers are involved in 7 short contacts:

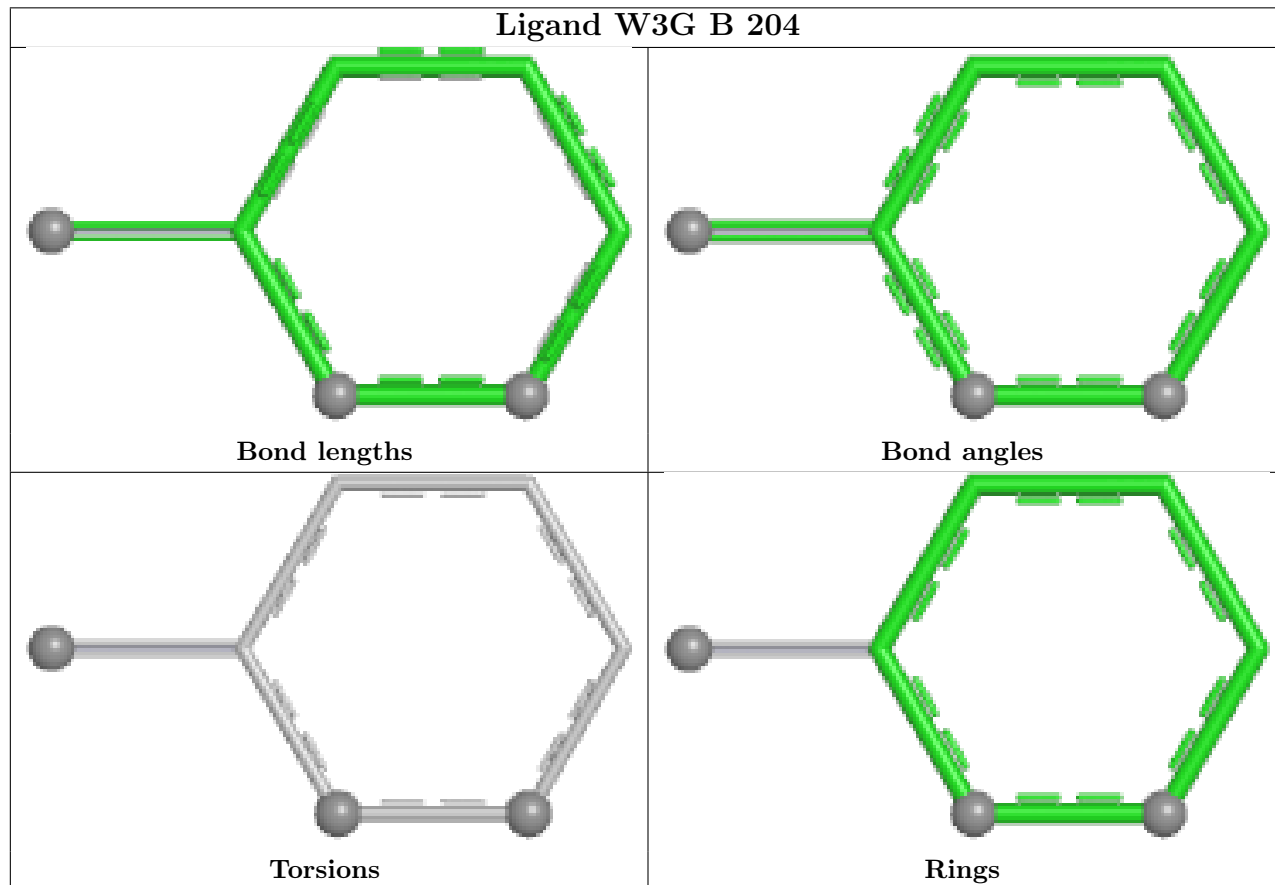
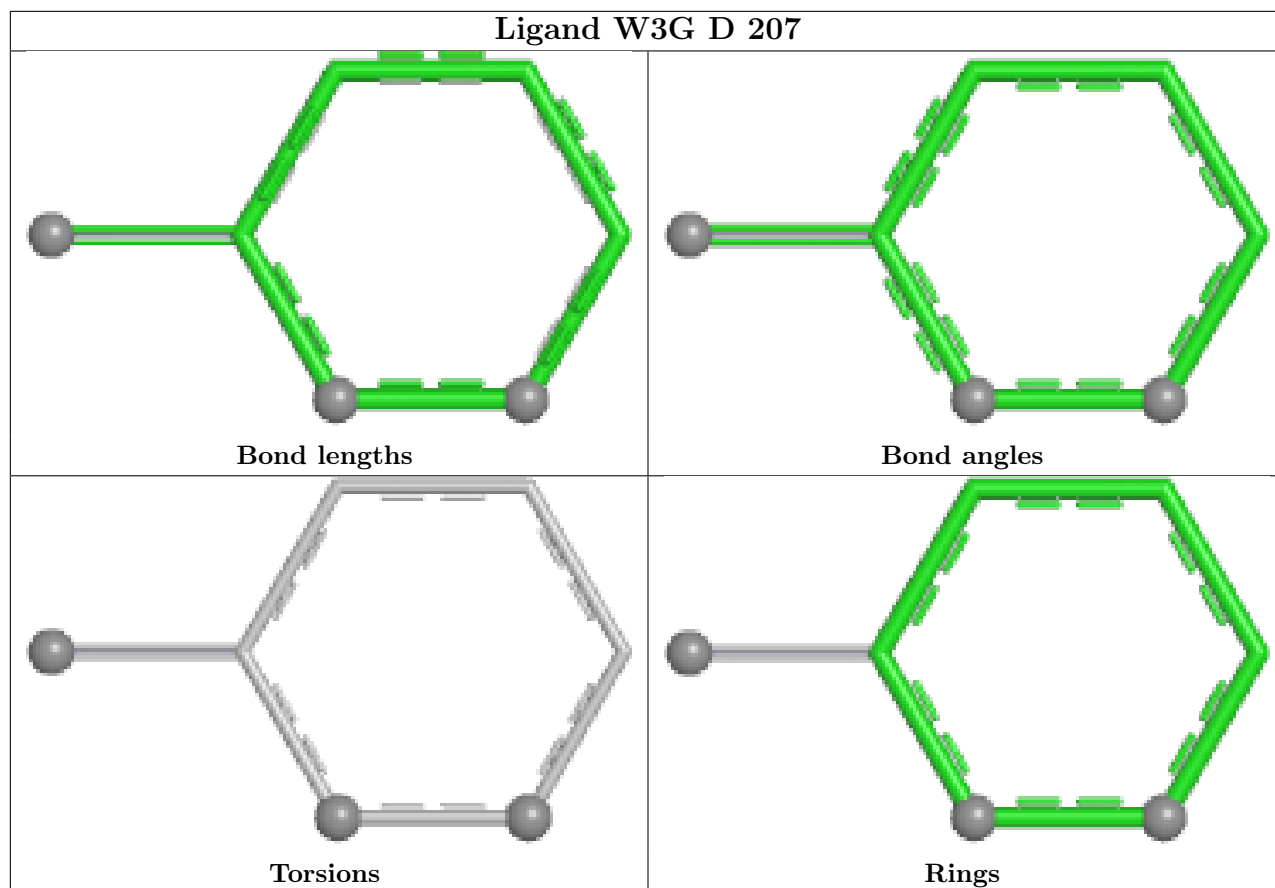
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	204	DMS	1	0
2	D	203	DMS	1	0
2	A	203	DMS	1	0
2	C	201	DMS	1	0
2	A	201	DMS	1	0
7	A	210	W3G	1	0
6	A	208	MPB	1	0

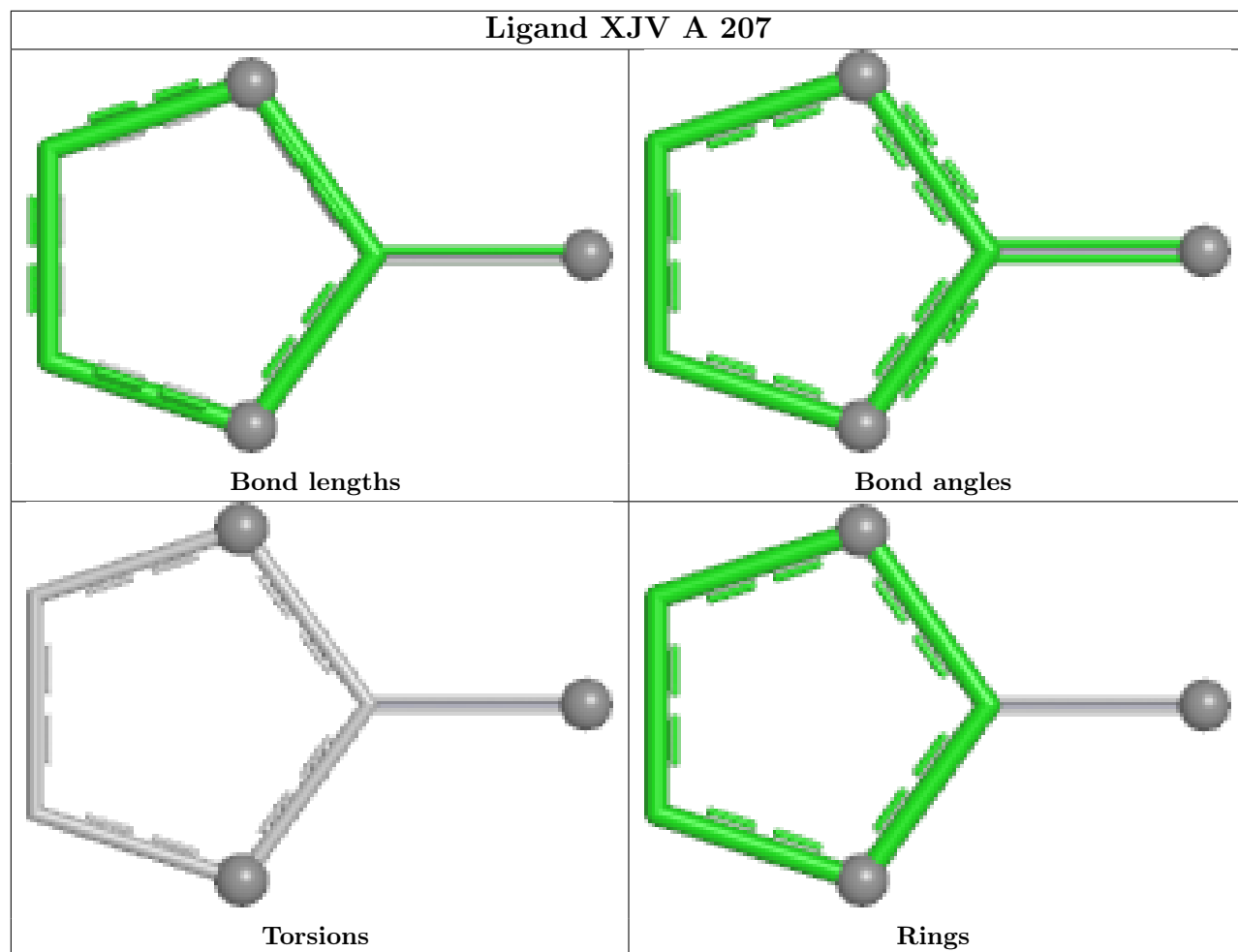
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

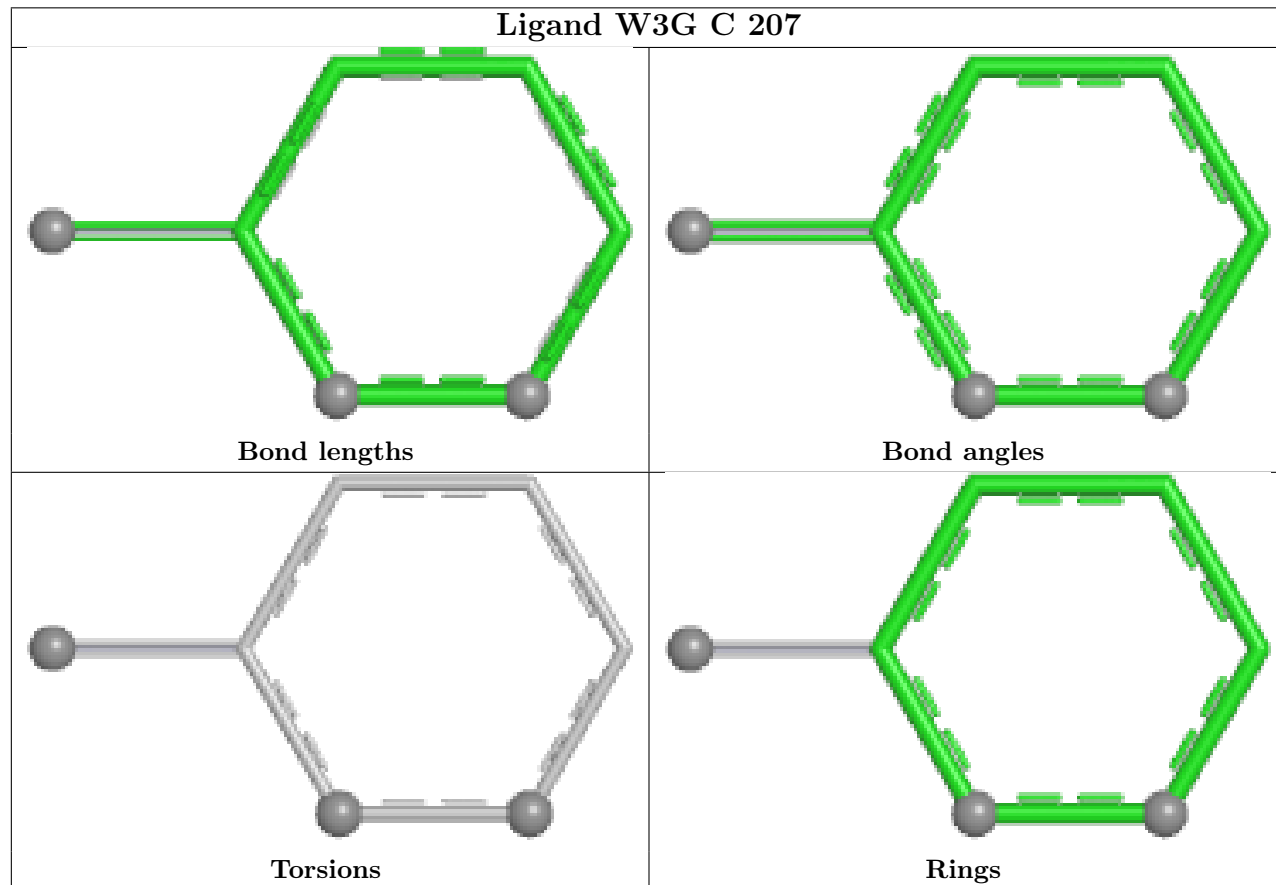
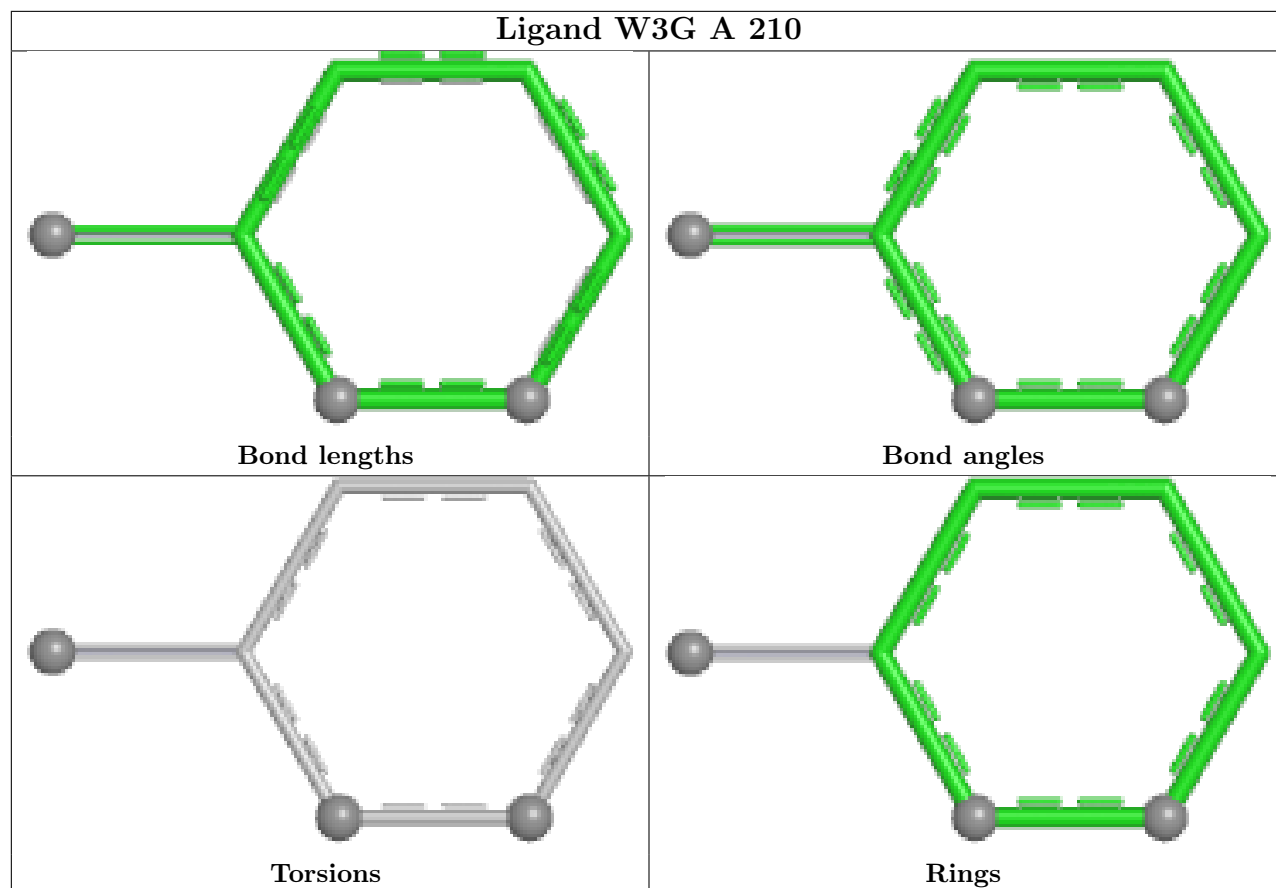
any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

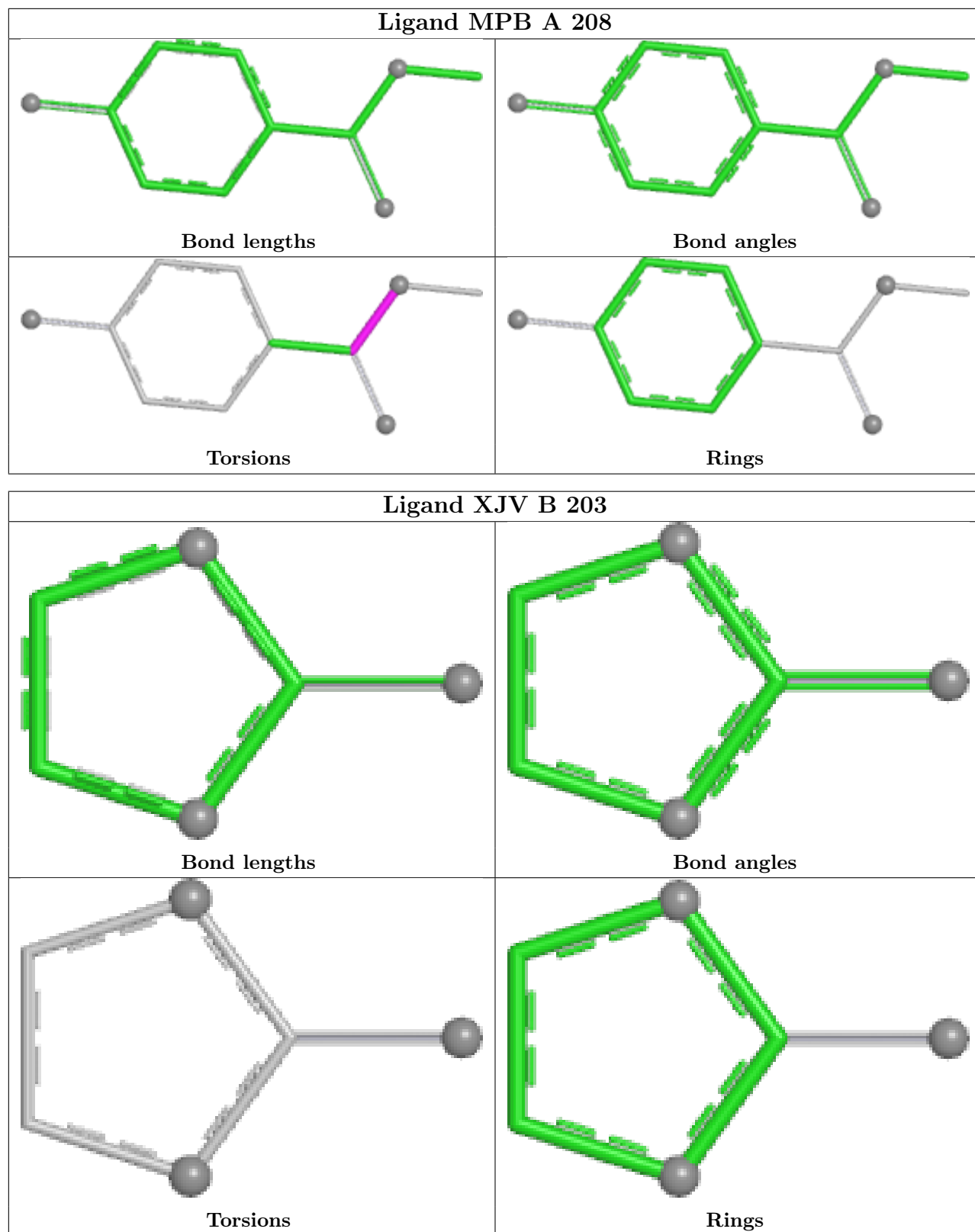












## 5.7 Other polymers [\(i\)](#)

There are no such residues in this entry.



## 5.8 Polymer linkage issues

There are no chain breaks in this entry.

## 6 Fit of model and data [i](#)

### 6.1 Protein, DNA and RNA chains [i](#)

**Warning:** The R factor obtained from EDS is 0.2785, which does not match the depositor's R factor of 0.19039. Please interpret the results in this section carefully.

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	163/163 (100%)	2.46	65 (39%) <b>1</b> <b>0</b>	5, 20, 34, 68	50 (30%)
1	B	163/163 (100%)	4.34	126 (77%) <b>0</b> <b>0</b>	6, 22, 44, 60	79 (48%)
1	C	163/163 (100%)	2.61	71 (43%) <b>1</b> <b>0</b>	6, 24, 47, 69	43 (26%)
1	D	159/163 (97%)	3.64	115 (72%) <b>0</b> <b>0</b>	7, 22, 41, 76	77 (48%)
All	All	648/652 (99%)	3.26	377 (58%) <b>0</b> <b>0</b>	5, 22, 45, 76	249 (38%)

All (377) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	-1	ALA	13.7
1	B	19	VAL	10.0
1	B	139	VAL	10.0
1	C	106[A]	ILE	9.9
1	A	86	ALA	9.7
1	B	142	TYR	9.5
1	A	141	ILE	9.5
1	B	11	ILE	9.5
1	B	106[A]	ILE	9.5
1	B	104	VAL	9.2
1	D	145[A]	ASP	9.2
1	B	12	ALA	9.1
1	B	37	VAL	8.9
1	B	36	ALA	8.8
1	B	105	ALA	8.8
1	C	93	ALA	8.7
1	B	101	VAL	8.7
1	A	87	ALA	8.6
1	B	155	ALA	8.6

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Mol	Chain	Res	Type	RSRZ
1	B	152	ILE	8.5
1	A	19	VAL	8.4
1	C	89	TYR	8.4
1	C	141	ILE	8.4
1	B	0	MET	8.3
1	D	106[A]	ILE	8.3
1	C	33	VAL	8.3
1	A	20	VAL	8.3
1	B	140	VAL	8.3
1	D	92	VAL	8.2
1	B	60	CYS	8.1
1	A	83[A]	ARG	8.1
1	A	106[A]	ILE	8.1
1	B	145[A]	ASP	8.1
1	C	99	LEU	8.0
1	C	-1	ALA	7.8
1	D	137	ALA	7.8
1	D	113	VAL	7.8
1	B	35	LYS	7.7
1	B	20	VAL	7.7
1	B	92	VAL	7.7
1	A	128	LEU	7.4
1	B	150	LYS	7.4
1	B	18	CYS	7.4
1	B	129	PHE	7.3
1	B	1	ALA	7.3
1	C	129	PHE	7.3
1	C	107	PRO	7.2
1	B	143	CYS	7.2
1	C	13[A]	LYS	7.2
1	B	99	LEU	7.2
1	A	104	VAL	7.2
1	B	93	ALA	7.2
1	C	20	VAL	7.1
1	B	141	ILE	7.1
1	C	113	VAL	7.1
1	C	11	ILE	7.1
1	D	148	TRP	7.1
1	D	104	VAL	7.0
1	A	108	LEU	7.0
1	C	108	LEU	7.0
1	D	144[A]	ARG	7.0

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Mol	Chain	Res	Type	RSRZ
1	A	131	ALA	7.0
1	D	160	THR	7.0
1	C	96	VAL	6.9
1	A	93	ALA	6.9
1	B	113	VAL	6.9
1	A	107	PRO	6.8
1	D	36	ALA	6.8
1	D	32	GLY	6.7
1	B	147	GLU	6.7
1	A	11	ILE	6.7
1	D	157	GLN	6.7
1	B	153	SER	6.7
1	C	88	ALA	6.6
1	D	107	PRO	6.6
1	B	41	TRP	6.6
1	D	128	LEU	6.6
1	D	20	VAL	6.6
1	D	33	VAL	6.6
1	B	96	VAL	6.5
1	D	96	VAL	6.5
1	B	148	TRP	6.5
1	D	97	THR	6.5
1	A	54	THR	6.5
1	D	112	GLY	6.5
1	B	64	PRO	6.5
1	D	29	PRO	6.4
1	A	105	ALA	6.4
1	A	53	GLY	6.4
1	C	143	CYS	6.4
1	A	51	PRO	6.4
1	C	90[A]	ARG	6.4
1	D	129	PHE	6.4
1	D	136	ASP	6.4
1	D	150	LYS	6.4
1	A	41	TRP	6.4
1	A	0	MET	6.4
1	C	12	ALA	6.3
1	D	156	ILE	6.3
1	B	6	VAL	6.3
1	D	131	ALA	6.3
1	B	38	TYR	6.2
1	B	10	ASP	6.1

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	B	9	MET	6.1
1	D	142	TYR	6.1
1	C	-2	GLY	6.1
1	B	8	ARG	6.0
1	B	103	SER	6.0
1	A	89	TYR	6.0
1	A	13	LYS	6.0
1	A	129	PHE	6.0
1	A	85	LEU	5.9
1	D	34	CYS	5.9
1	C	105	ALA	5.9
1	A	5[A]	ARG	5.8
1	C	75	ASN	5.8
1	C	38	TYR	5.8
1	B	154	GLU	5.8
1	B	63	TYR	5.8
1	D	30	GLY	5.8
1	C	0	MET	5.8
1	D	11	ILE	5.7
1	B	16	GLU	5.7
1	B	137	ALA	5.7
1	B	62	THR	5.7
1	C	3	SER	5.6
1	B	107	PRO	5.6
1	D	93	ALA	5.6
1	D	101	VAL	5.6
1	B	17	GLU	5.6
1	D	6	VAL	5.6
1	B	89	TYR	5.6
1	A	3	SER	5.5
1	B	69	VAL	5.5
1	B	126[A]	ASN	5.5
1	A	151	LYS	5.5
1	D	130	THR	5.5
1	D	28	LEU	5.5
1	B	13	LYS	5.4
1	C	104	VAL	5.4
1	B	108	LEU	5.4
1	B	151	LYS	5.4
1	D	100	GLY	5.4
1	B	59	MET	5.4
1	D	141	ILE	5.4

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Mol	Chain	Res	Type	RSRZ
1	D	12	ALA	5.3
1	B	3	SER	5.3
1	D	38	TYR	5.3
1	D	52	VAL	5.3
1	A	137	ALA	5.3
1	B	131	ALA	5.3
1	B	118	LYS	5.3
1	C	10	ASP	5.3
1	B	146	LYS	5.3
1	D	3[A]	SER	5.2
1	C	131	ALA	5.2
1	D	99	LEU	5.2
1	C	102	ASN	5.2
1	A	147[A]	GLU	5.2
1	B	144	ARG	5.1
1	A	40	LYS	5.1
1	B	117	GLY	5.1
1	D	31	ASP	5.1
1	A	59[A]	MET	5.0
1	D	73	PHE	5.0
1	B	15	ASP	5.0
1	C	56	LYS	5.0
1	C	59[A]	MET	5.0
1	B	-2	GLY	5.0
1	B	45	PHE	4.9
1	C	109	LEU	4.9
1	D	88	ALA	4.9
1	B	97	THR	4.9
1	B	39	LYS	4.9
1	D	9	MET	4.9
1	A	91	GLU	4.9
1	A	103	SER	4.8
1	D	8	ARG	4.8
1	C	95	GLU	4.8
1	D	133	ASP	4.8
1	D	83	ARG	4.8
1	D	143	CYS	4.8
1	B	49	ALA	4.8
1	C	138	ASP	4.8
1	C	103	SER	4.8
1	D	49	ALA	4.7
1	B	94	LYS	4.7

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	A	160	THR	4.7
1	B	77	THR	4.7
1	D	59[A]	MET	4.7
1	C	46	LYS	4.7
1	C	2	PRO	4.7
1	C	28	LEU	4.7
1	D	71	PRO	4.7
1	B	61	GLY	4.7
1	A	90	ARG	4.7
1	B	48	SER	4.7
1	B	91[A]	GLU	4.7
1	D	158	MET	4.6
1	A	73	PHE	4.6
1	A	145	ASP	4.6
1	C	98	ARG	4.6
1	D	147	GLU	4.6
1	B	102	ASN	4.6
1	D	149	GLU	4.6
1	B	43	GLU	4.6
1	B	138	ASP	4.6
1	A	39	LYS	4.6
1	B	21	ASN	4.5
1	B	73	PHE	4.5
1	B	2	PRO	4.5
1	A	144	ARG	4.5
1	B	98	ARG	4.5
1	D	10	ASP	4.5
1	B	7	LYS	4.5
1	B	44	SER	4.5
1	D	98	ARG	4.5
1	B	132	MET	4.4
1	C	94	LYS	4.4
1	A	50	THR	4.4
1	A	2	PRO	4.4
1	A	133	ASP	4.3
1	B	31	ASP	4.3
1	D	13	LYS	4.3
1	A	-2	GLY	4.3
1	D	7	LYS	4.3
1	D	94	LYS	4.3
1	A	-1	ALA	4.3
1	B	28	LEU	4.3

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	B	109	LEU	4.3
1	A	138	ASP	4.3
1	D	138	ASP	4.2
1	A	95	GLU	4.2
1	B	30	GLY	4.2
1	A	21	ASN	4.2
1	D	103	SER	4.1
1	C	25	PRO	4.1
1	D	60	CYS	4.1
1	B	90	ARG	4.1
1	D	114	TYR	4.1
1	D	45	PHE	4.1
1	D	117	GLY	4.1
1	B	40	LYS	4.0
1	B	160	THR	4.0
1	B	95	GLU	4.0
1	A	118	LYS	4.0
1	B	136	ASP	4.0
1	B	27	GLY	4.0
1	B	46	LYS	4.0
1	D	51	PRO	3.9
1	C	70	GLY	3.9
1	D	87	ALA	3.9
1	D	21	ASN	3.9
1	D	102	ASN	3.9
1	D	105	ALA	3.9
1	A	98	ARG	3.9
1	C	160	THR	3.9
1	C	47	ASN	3.8
1	C	21	ASN	3.8
1	D	90	ARG	3.8
1	A	44	SER	3.8
1	D	35	LYS	3.8
1	D	54	THR	3.8
1	C	74	SER	3.7
1	D	109	LEU	3.7
1	C	133	ASP	3.7
1	A	84	GLU	3.6
1	C	37	VAL	3.6
1	D	5	ARG	3.6
1	D	154	GLU	3.6
1	A	102	ASN	3.6

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Mol	Chain	Res	Type	RSRZ
1	D	2	PRO	3.6
1	C	41	TRP	3.5
1	D	86	ALA	3.5
1	D	76	TYR	3.5
1	D	85	LEU	3.5
1	D	40	LYS	3.5
1	D	146	LYS	3.4
1	D	53	GLY	3.4
1	B	158	MET	3.4
1	D	70	GLY	3.4
1	A	31	ASP	3.4
1	A	158	MET	3.3
1	C	145	ASP	3.3
1	D	126	ASN	3.3
1	A	16	GLU	3.3
1	A	38	TYR	3.3
1	D	50	THR	3.3
1	B	159	ARG	3.3
1	D	41	TRP	3.3
1	A	10	ASP	3.2
1	A	45	PHE	3.2
1	B	50	THR	3.2
1	D	63	TYR	3.2
1	D	27	GLY	3.2
1	D	151	LYS	3.2
1	C	158	MET	3.2
1	D	69	VAL	3.2
1	C	116	GLY	3.2
1	B	42	PRO	3.1
1	C	30	GLY	3.1
1	C	91	GLU	3.1
1	B	14	ASN	3.1
1	C	69	VAL	3.1
1	D	14	ASN	3.0
1	B	149	GLU	3.0
1	A	8	ARG	3.0
1	B	119	ASP	3.0
1	B	53	GLY	3.0
1	D	39	LYS	3.0
1	B	29	PRO	3.0
1	B	58	VAL	3.0
1	D	42	PRO	3.0

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	C	34	CYS	2.9
1	B	122	THR	2.9
1	B	47	ASN	2.9
1	C	26	ARG	2.9
1	B	65	VAL	2.9
1	D	48	SER	2.8
1	C	144	ARG	2.8
1	B	111	THR	2.8
1	B	114	TYR	2.8
1	C	114	TYR	2.8
1	B	157	GLN	2.8
1	B	57	THR	2.7
1	C	45	PHE	2.7
1	B	83	ARG	2.7
1	D	132	MET	2.7
1	C	154	GLU	2.7
1	C	52	VAL	2.7
1	C	151	LYS	2.6
1	D	72	ASN	2.6
1	C	36	ALA	2.6
1	A	76	TYR	2.5
1	B	52	VAL	2.5
1	C	42	PRO	2.5
1	D	110	SER	2.5
1	D	115	SER	2.5
1	D	134	SER	2.5
1	D	159	ARG	2.5
1	B	23	ALA	2.5
1	C	60	CYS	2.5
1	D	122	THR	2.5
1	D	84	GLU	2.5
1	D	4	TYR	2.5
1	A	28	LEU	2.5
1	D	56	LYS	2.5
1	D	79	SER	2.4
1	B	100	GLY	2.4
1	D	25	PRO	2.4
1	D	80	GLU	2.4
1	B	66	ILE	2.3
1	A	78	GLU	2.3
1	C	1	ALA	2.3
1	B	67	HIS	2.3

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Mol	Chain	Res	Type	RSRZ
1	B	70	GLY	2.3
1	D	17	GLU	2.3
1	B	51	PRO	2.3
1	B	76	TYR	2.3
1	B	34	CYS	2.3
1	B	5	ARG	2.2
1	C	157	GLN	2.2
1	B	79	SER	2.2
1	B	4	TYR	2.2
1	B	56	LYS	2.2
1	D	78	GLU	2.2
1	A	35	LYS	2.2
1	D	46	LYS	2.2
1	D	118	LYS	2.2
1	C	65	VAL	2.1
1	C	35	LYS	2.1
1	B	115	SER	2.1
1	C	39	LYS	2.0
1	D	82	ASP	2.0
1	A	143	CYS	2.0
1	A	154	GLU	2.0
1	D	43	GLU	2.0

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

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

## 6.3 Carbohydrates [\(i\)](#)

There are no monosaccharides in this entry.

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

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
6	MPB	A	208	11/11	0.64	0.28	27,33,36,39	11

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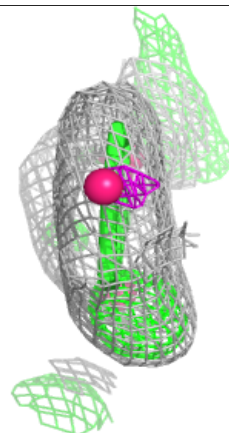
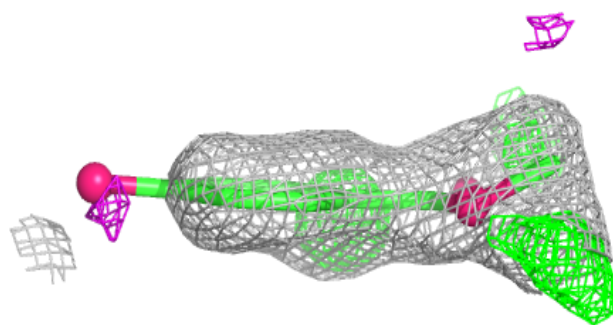
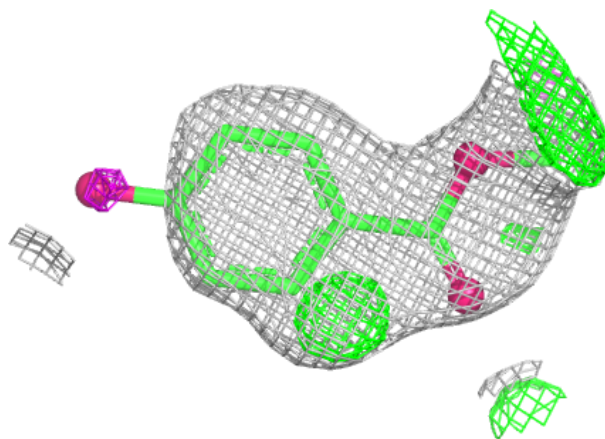
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
2	DMS	C	204	4/4	0.65	0.24	55,60,65,69	0
2	DMS	A	204	4/4	0.65	0.27	30,58,60,75	0
7	W3G	A	209	7/7	0.65	0.29	22,23,25,26	7
2	DMS	C	208	4/4	0.70	0.26	73,74,78,83	0
5	XJV	A	207	6/6	0.70	0.21	22,23,24,25	6
7	W3G	A	210	7/7	0.72	0.23	24,28,30,31	7
2	DMS	D	202	4/4	0.74	0.35	48,48,52,52	4
2	DMS	C	206	4/4	0.76	0.60	116,118,118,119	4
2	DMS	D	204	4/4	0.76	0.26	38,47,50,52	4
7	W3G	C	207	7/7	0.77	0.16	22,23,24,25	7
2	DMS	A	201	4/4	0.78	0.21	49,50,61,65	0
2	DMS	C	201	4/4	0.78	0.21	55,70,72,83	0
3	TRS	D	201	8/8	0.79	0.23	42,45,47,47	8
2	DMS	C	205	4/4	0.79	0.46	71,72,76,78	4
7	W3G	B	204	7/7	0.83	0.22	29,33,34,34	7
7	W3G	D	207	7/7	0.83	0.19	28,29,30,30	7
3	TRS	A	202	8/8	0.85	0.25	35,39,42,43	8
2	DMS	A	203	4/4	0.86	0.26	43,48,49,52	4
2	DMS	D	203	4/4	0.86	0.35	49,52,57,59	4
5	XJV	B	203	6/6	0.87	0.19	27,28,30,30	6
2	DMS	B	201	4/4	0.88	0.17	37,45,50,50	0
5	XJV	D	206	6/6	0.88	0.12	25,26,27,27	6
4	CL	C	202	1/1	0.90	0.23	52,52,52,52	0
4	CL	A	206	1/1	0.95	0.15	46,46,46,46	0
4	CL	A	205	1/1	0.98	0.04	19,19,19,19	0
4	CL	B	202	1/1	0.98	0.06	20,20,20,20	0
4	CL	D	205	1/1	0.99	0.04	22,22,22,22	0
4	CL	C	203	1/1	0.99	0.07	25,25,25,25	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.

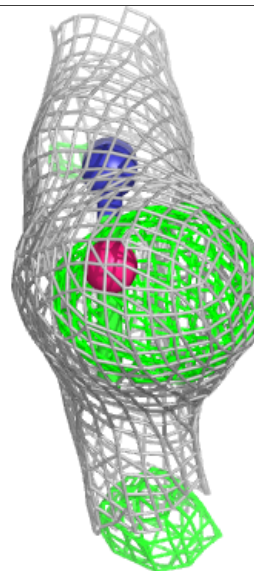
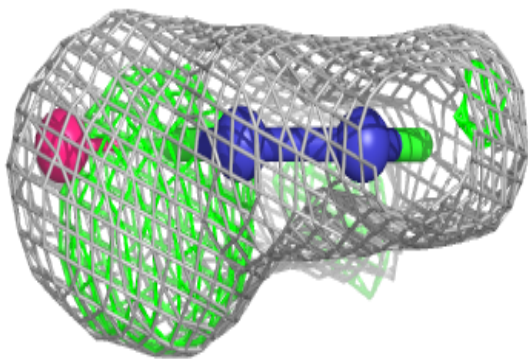
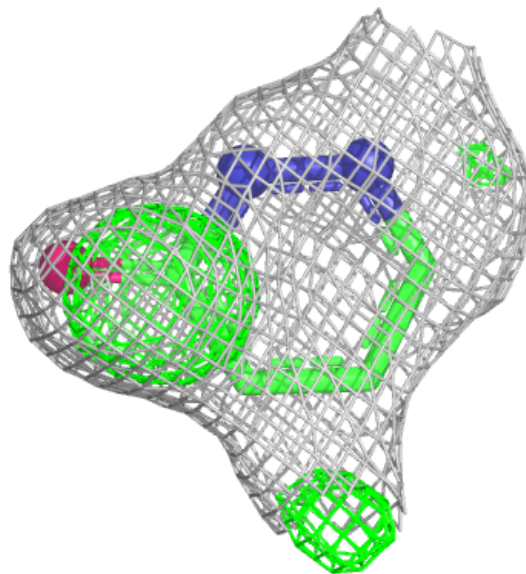
**Electron density around MPB A 208:**

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



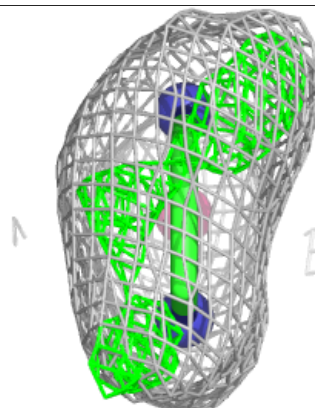
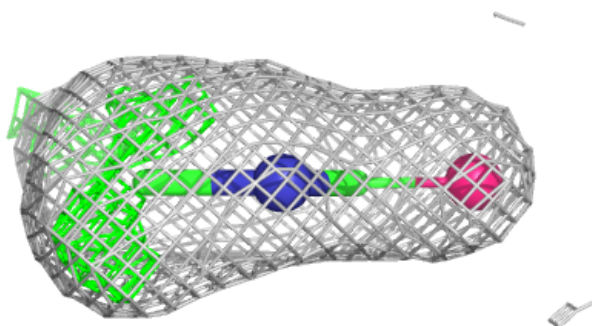
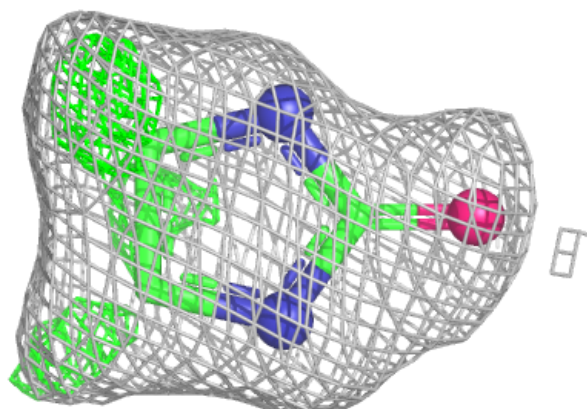
**Electron density around W3G A 209:**

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

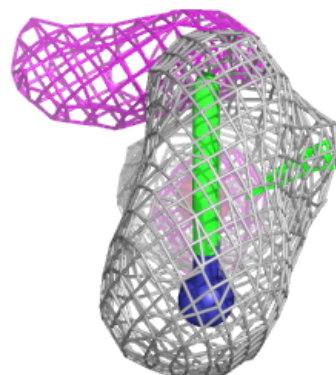
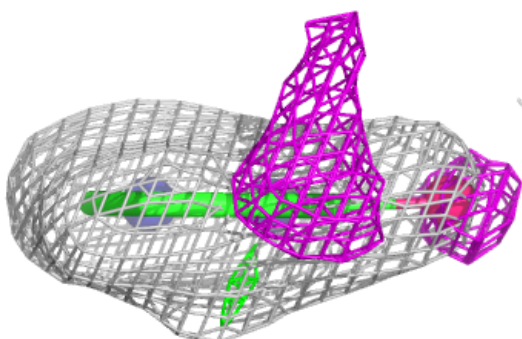
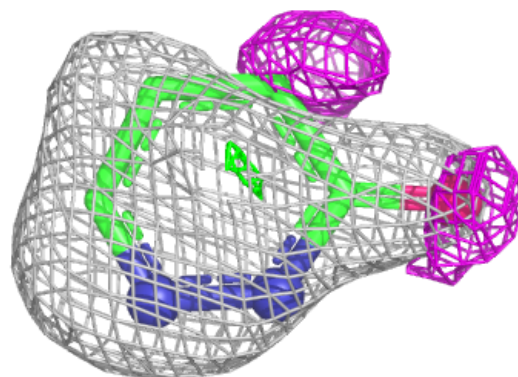


**Electron density around XJV A 207:**

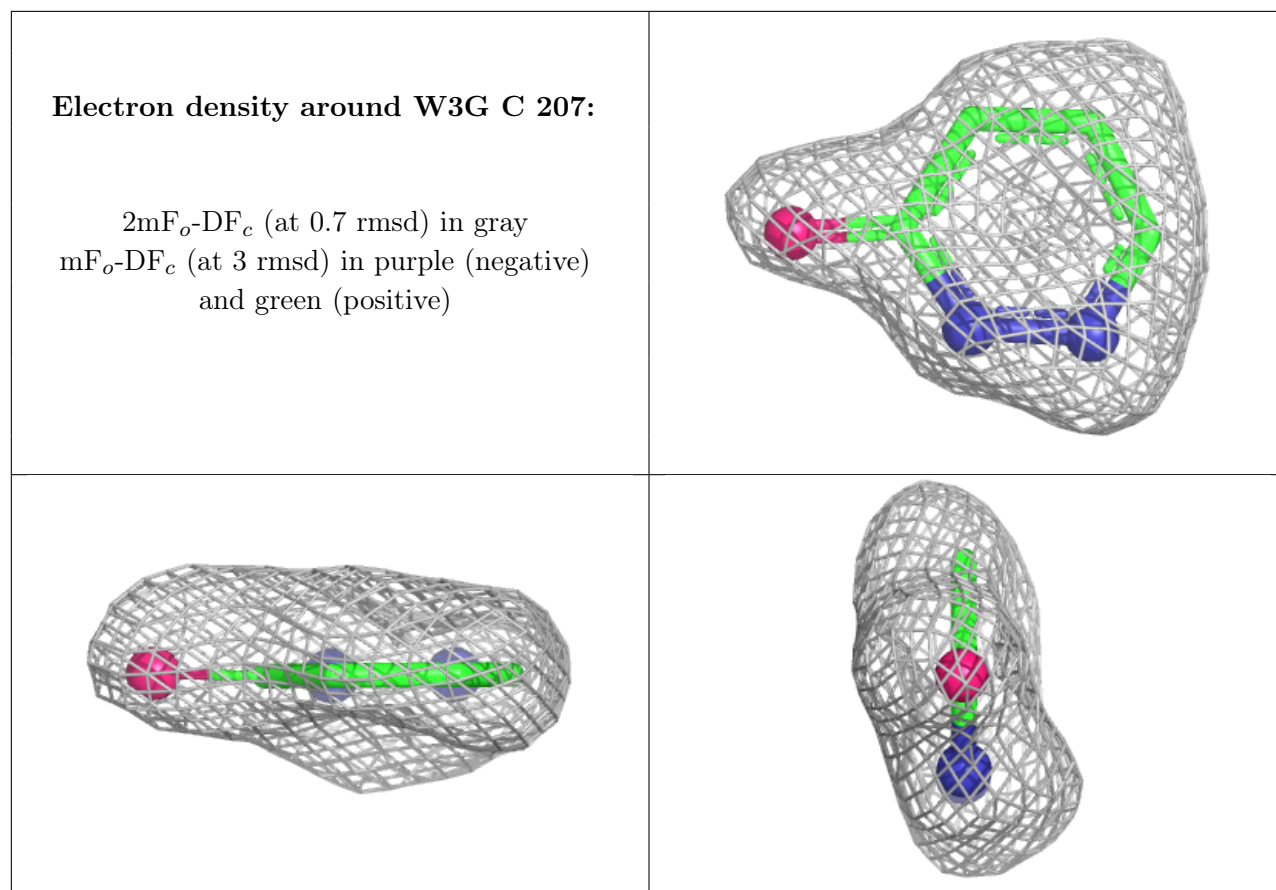
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

**Electron density around W3G A 210:**

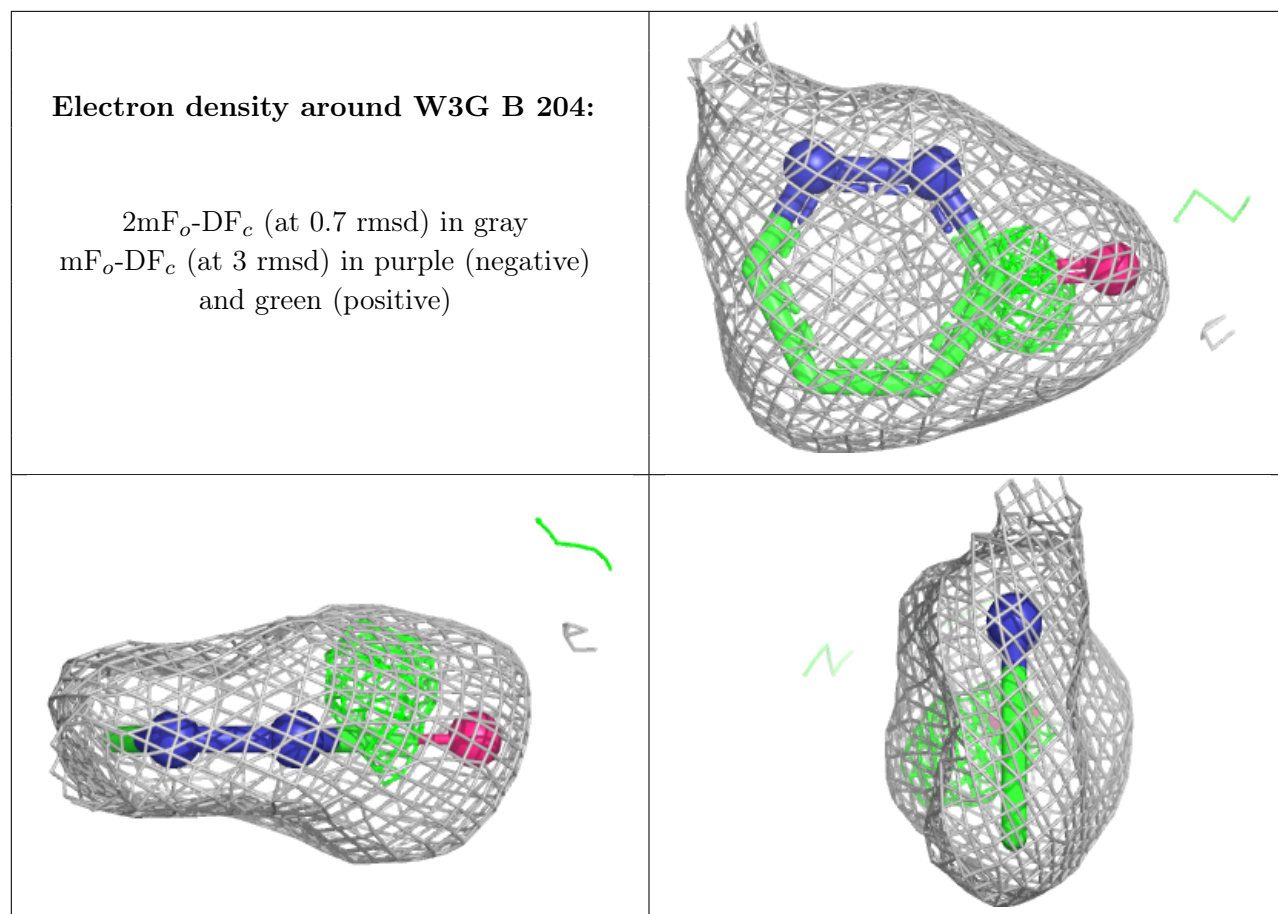
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

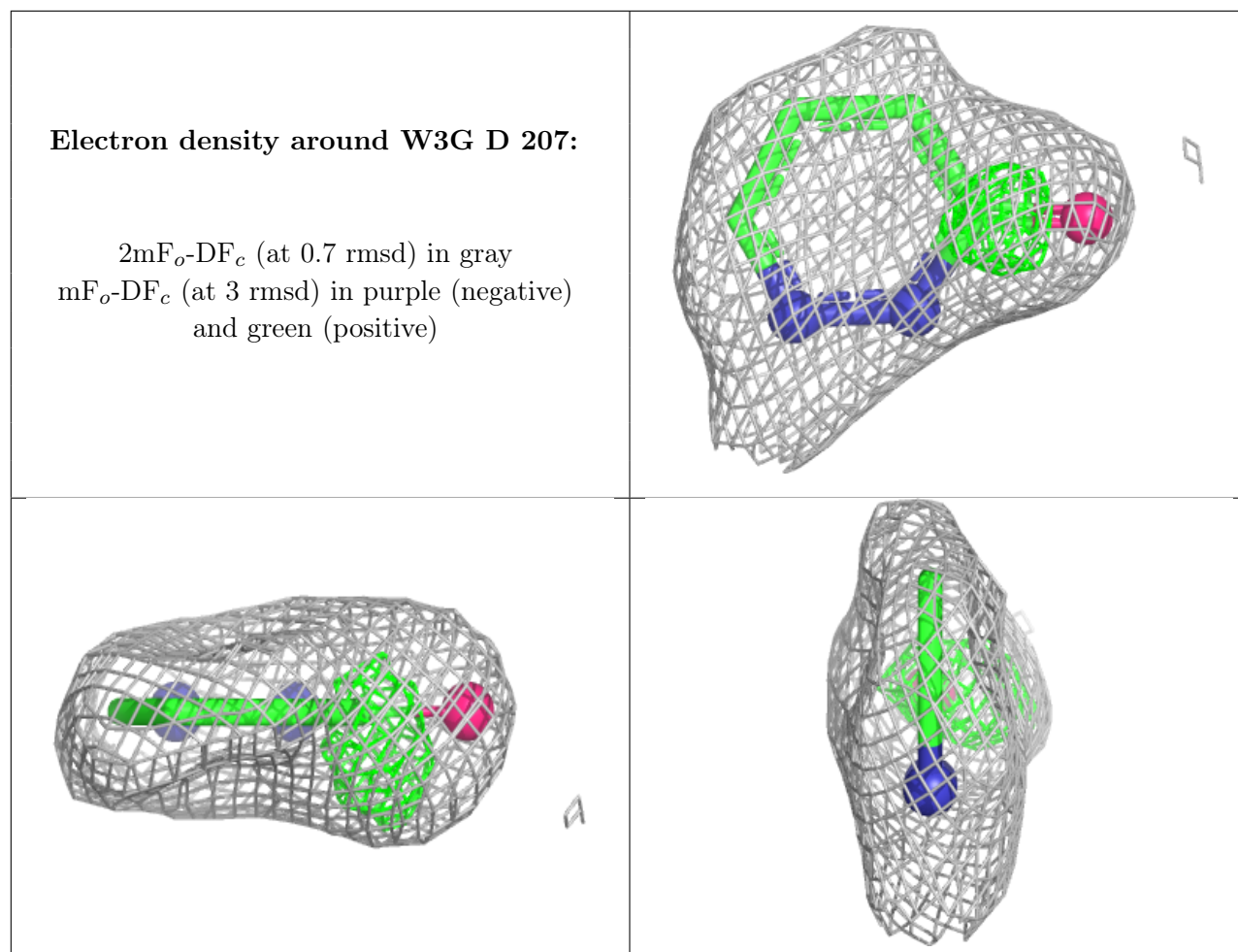






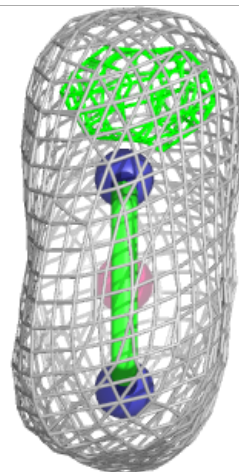
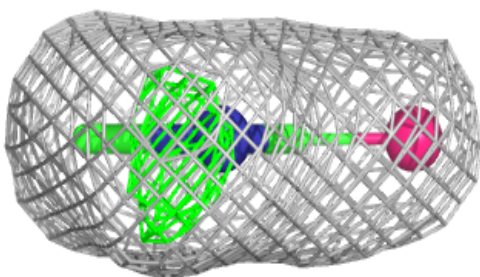
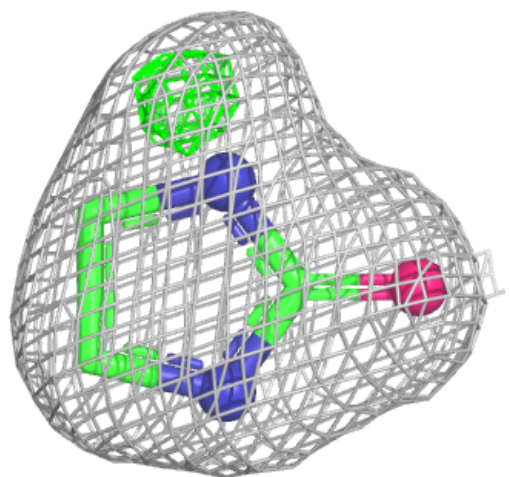


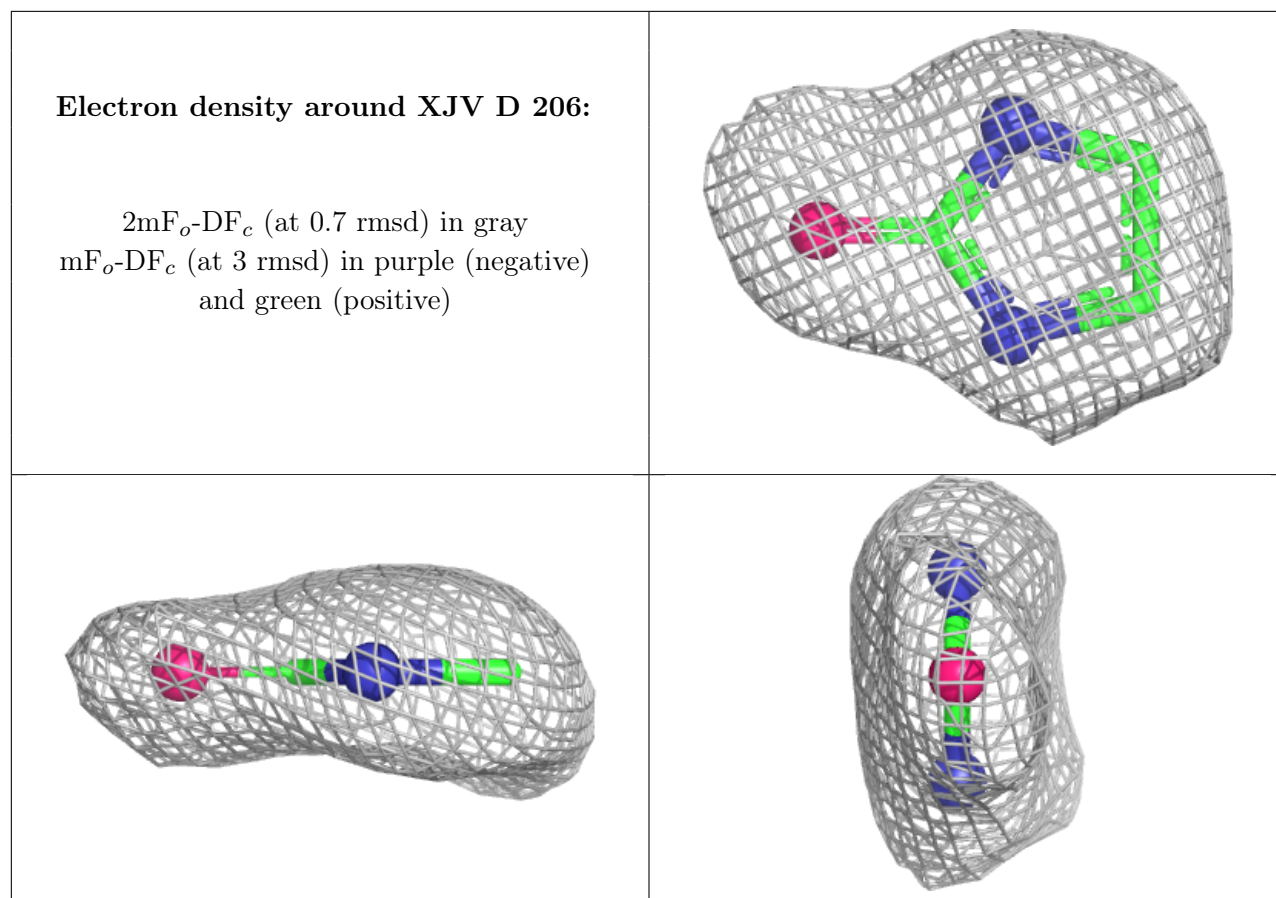




**Electron density around XJV B 203:**

$2mF_o-DF_c$  (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.