



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 10:58 PM UTC

PDB ID : 7D30 / pdb_00007d30
Title : Structure of sybody MR17-SR31 fusion in complex with the SARS-CoV-2 S Receptor Binding domain (RBD)
Authors : Li, T.; Yao, H.; Cai, H.; Qin, W.; Li, D.
Deposited on : 2020-09-17
Resolution : 2.10 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

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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 : 4-5-2 with Phenix2.0
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 2.0
EDS : 3.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.010 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

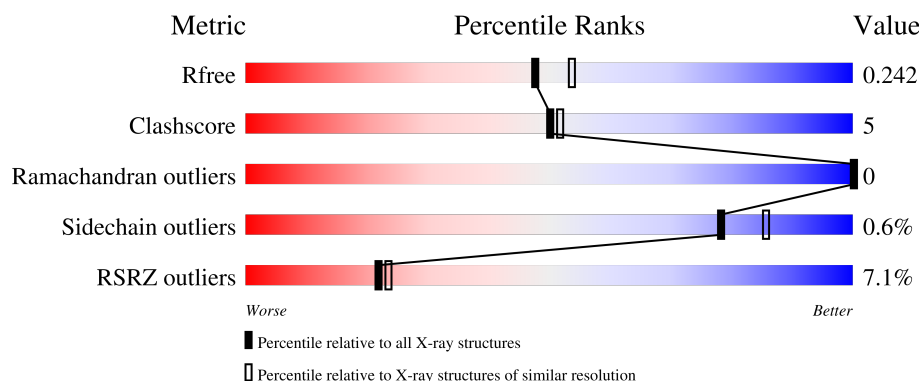
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.10 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}	180053	6658 (2.10-2.10)
Clashscore	190562	7164 (2.10-2.10)
Ramachandran outliers	187476	7099 (2.10-2.10)
Sidechain outliers	187428	7100 (2.10-2.10)
RSRZ outliers	180081	6662 (2.10-2.10)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	298	7% 71% 7% 21%
2	B	213	5% 83% 11% 6%
3	C	6	33% 67%

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
4	GOL	B	2112	-	-	X	-

2 Entry composition [i](#)

There are 9 unique types of molecules in this entry. The entry contains 3891 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 sybody fusion of MR17-SR31 with a GS linker.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	234	Total	C	N	O	S	0	8	0
			1821	1146	314	350	11			

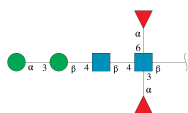
- Molecule 2 is a protein called Spike protein S1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	201	Total	C	N	O	S	0	5	0
			1616	1038	273	297	8			

There are 11 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	327	ALA	-	expression tag	UNP P0DTC2
B	328	GLY	-	expression tag	UNP P0DTC2
B	329	SER	-	expression tag	UNP P0DTC2
B	532	GLY	-	expression tag	UNP P0DTC2
B	533	THR	-	expression tag	UNP P0DTC2
B	534	LEU	-	expression tag	UNP P0DTC2
B	535	GLU	-	expression tag	UNP P0DTC2
B	536	VAL	-	expression tag	UNP P0DTC2
B	537	LEU	-	expression tag	UNP P0DTC2
B	538	PHE	-	expression tag	UNP P0DTC2
B	539	GLN	-	expression tag	UNP P0DTC2

- Molecule 3 is an oligosaccharide called alpha-D-mannopyranose-(1-3)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-L-fucopyranose-(1-3)][alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose.



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	C	6	Total	C	N	O	0	0	0
			70	40	2	28			

- Molecule 4 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



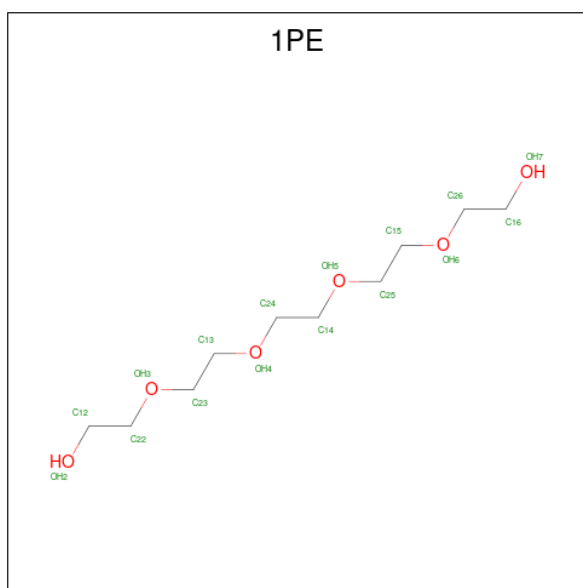
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			6	3	3		
4	A	1	Total	C	O	0	0
			6	3	3		
4	B	1	Total	C	O	0	0
			6	3	3		
4	B	1	Total	C	O	0	0
			6	3	3		
4	B	1	Total	C	O	0	0
			6	3	3		

- Molecule 5 is ACETATE ION (CCD ID: ACT) (formula: $C_2H_3O_2$).



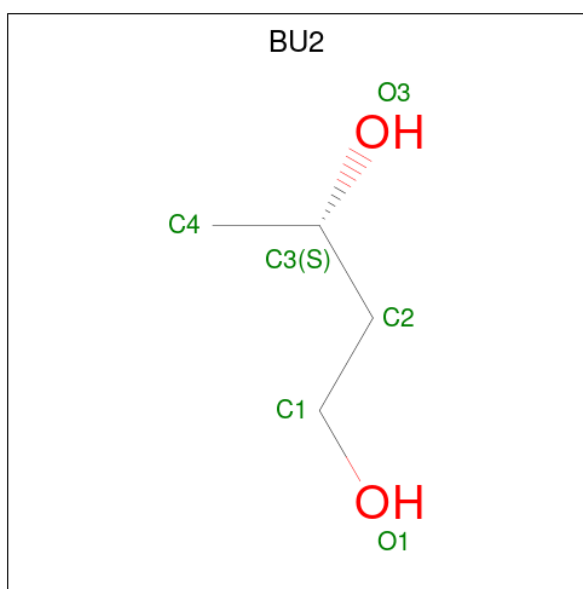
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total	C	O	0	0
			4	2	2		
5	A	1	Total	C	O	0	0
			4	2	2		
5	A	1	Total	C	O	0	0
			4	2	2		
5	A	1	Total	C	O	0	0
			4	2	2		
5	A	1	Total	C	O	0	0
			4	2	2		
5	A	1	Total	C	O	0	0
			4	2	2		
5	B	1	Total	C	O	0	0
			4	2	2		
5	B	1	Total	C	O	0	0
			4	2	2		
5	B	1	Total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

- Molecule 6 is PENTAETHYLENE GLYCOL (CCD ID: 1PE) (formula: $C_{10}H_{22}O_6$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	C	O	0	0
			16	10	6		
6	B	1	Total	C	O	0	0
			16	10	6		

- Molecule 7 is 1,3-BUTANEDIOL (CCD ID: BU2) (formula: $C_4H_{10}O_2$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	1	Total C O 6 4 2	0	0
7	A	1	Total C O 6 4 2	0	0
7	A	1	Total C O 6 4 2	0	0
7	B	1	Total C O 6 4 2	0	0
7	B	1	Total C O 6 4 2	0	0

- Molecule 8 is CADMIUM ION (CCD ID: CD) (formula: Cd).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	A	12	Total Cd 12 12	0	0
8	B	5	Total Cd 5 5	0	0

- Molecule 9 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
9	A	115	Total O 115 115	0	0
9	B	104	Total O 104 104	0	0

4 Data and refinement statistics

Property	Value	Source
Space group	P 65 2 2	Depositor
Cell constants a, b, c, α , β , γ	73.38Å 73.38Å 478.36Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	49.70 – 2.10 49.70 – 2.10	Depositor EDS
% Data completeness (in resolution range)	99.4 (49.70-2.10) 87.7 (49.70-2.10)	Depositor EDS
R_{merge}	0.14	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.21 (at 2.10Å)	Xtriage
Refinement program	PHENIX 1.17.1_3660	Depositor
R, R_{free}	0.195 , 0.236 (Not available) , 0.242	Depositor DCC
R_{free} test set	4617 reflections (9.96%)	wwPDB-VP
Wilson B-factor (Å ²)	41.6	Xtriage
Anisotropy	0.655	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 49.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	3891	wwPDB-VP
Average B, all atoms (Å ²)	50.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.17% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: MAN, NAG, CD, FUC, GOL, 1PE, BU2, ACT, BMA

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	0.32	0/1883	0.50	0/2547
2	B	0.31	0/1674	0.47	0/2273
All	All	0.32	0/3557	0.49	0/4820

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

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	1821	0	1756	17	0
2	B	1616	0	1550	21	0
3	C	70	0	61	0	0
4	A	12	0	16	0	0
4	B	18	0	24	7	0
5	A	28	0	21	0	0
5	B	28	0	21	0	0
6	A	16	0	22	2	0
6	B	16	0	22	2	0
7	A	18	0	30	3	0
7	B	12	0	20	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
8	A	12	0	0	0	0
8	B	5	0	0	0	0
9	A	115	0	0	3	0
9	B	104	0	0	2	0
All	All	3891	0	3543	38	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 5.

All (38) 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)
2:B:487:ASN:H	4:B:2112:GOL:H12	1.13	1.14
2:B:487:ASN:N	4:B:2112:GOL:H12	1.98	0.74
2:B:378:LYS:HD3	4:B:2107:GOL:H2	1.73	0.70
1:A:1:GLN:NE2	9:A:1401:HOH:O	2.23	0.70
2:B:411:ALA:HB2	4:B:2107:GOL:H31	1.77	0.67
2:B:357[B]:ARG:NH1	9:B:2201:HOH:O	2.25	0.67
1:A:1018:LEU:HB2	1:A:1083:MET:HE3	1.78	0.64
2:B:485:GLY:HA2	4:B:2112:GOL:H11	1.79	0.63
1:A:1:GLN:HE21	1:A:2:VAL:H	1.48	0.61
2:B:533:THR:HG22	2:B:535:GLU:H	1.66	0.60
1:A:1022:CYS:HB3	1:A:1079:VAL:HG13	1.83	0.60
2:B:498:GLN:NE2	9:B:2203:HOH:O	2.35	0.59
2:B:386:LYS:HZ2	6:B:2102:1PE:H221	1.68	0.58
1:A:1074:ASN:O	7:A:1310:BU2:HC22	2.04	0.57
2:B:376[B]:THR:HG23	2:B:435:ALA:HB3	1.86	0.57
1:A:1062:ASP:OD1	1:A:1065:LYS:NZ	2.39	0.55
1:A:1091[A]:THR:HG23	1:A:1112:THR:HA	1.90	0.54
6:A:1305:1PE:H221	2:B:368:LEU:H	1.73	0.53
2:B:487:ASN:H	4:B:2112:GOL:C1	2.03	0.52
1:A:1:GLN:NE2	1:A:2:VAL:H	2.07	0.52
1:A:1013:GLN:NE2	9:A:1403:HOH:O	2.41	0.51
1:A:59:ARG:HD2	2:B:488:CYS:HB2	1.93	0.50
1:A:1020:LEU:HG	1:A:1083:MET:HE2	1.95	0.49
2:B:403[A]:ARG:HG2	2:B:505:TYR:HA	1.95	0.48
1:A:1091[B]:THR:HG23	1:A:1112:THR:HA	1.95	0.47
1:A:1022:CYS:HB3	1:A:1079:VAL:CG1	2.45	0.47
9:A:1423:HOH:O	2:B:379:CYS:HB2	2.15	0.46
2:B:378:LYS:HB3	2:B:378:LYS:HE3	1.50	0.46
1:A:1077:ASN:OD1	7:A:1310:BU2:HC21	2.16	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:335:LEU:HD23	2:B:362:VAL:HG23	1.99	0.44
2:B:354:ASN:O	2:B:398:ASP:HA	2.18	0.44
6:B:2102:1PE:H122	6:B:2102:1PE:H232	1.77	0.42
1:A:1011:LEU:HD11	1:A:1114:SER:OG	2.20	0.41
2:B:443[A]:SER:OG	2:B:497:PHE:HB3	2.20	0.41
1:A:1045:ARG:HH12	6:A:1305:1PE:H122	1.85	0.41
2:B:486:PHE:N	4:B:2112:GOL:H11	2.36	0.41
1:A:1028:PRO:HB3	7:A:1310:BU2:HC12	2.02	0.40
2:B:382:VAL:HG23	2:B:386:LYS:HD2	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	236/298 (79%)	232 (98%)	4 (2%)	0	100	100
2	B	202/213 (95%)	194 (96%)	8 (4%)	0	100	100
All	All	438/511 (86%)	426 (97%)	12 (3%)	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	189/218 (87%)	185 (98%)	4 (2%)	47	54
2	B	176/183 (96%)	176 (100%)	0	100	100
All	All	365/401 (91%)	361 (99%)	4 (1%)	78	74

All (4) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	65[A]	LYS
1	A	65[B]	LYS
1	A	1099[A]	MET
1	A	1099[B]	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	1	GLN
1	A	103	GLN
1	A	107	HIS
1	A	1013	GLN
1	A	1039	GLN
2	B	439	ASN
2	B	474	GLN
2	B	498	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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

5.5 Carbohydrates ⓘ

6 monosaccharides 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	$\# Z > 2$
3	NAG	C	1	3,2	14,14,15	0.28	0	17,19,21	0.42	0
3	NAG	C	2	3	14,14,15	0.53	0	17,19,21	0.50	0
3	BMA	C	3	3	11,11,12	0.91	0	15,15,17	1.13	2 (13%)
3	MAN	C	4	3	11,11,12	0.65	0	15,15,17	0.93	2 (13%)
3	FUC	C	5	3	10,10,11	0.98	0	14,14,16	0.98	1 (7%)
3	FUC	C	6	3	10,10,11	1.29	1 (10%)	14,14,16	0.90	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NAG	C	1	3,2	-	0/6/23/26	0/1/1/1
3	NAG	C	2	3	-	0/6/23/26	0/1/1/1
3	BMA	C	3	3	-	2/2/19/22	0/1/1/1
3	MAN	C	4	3	-	0/2/19/22	0/1/1/1
3	FUC	C	5	3	-	-	0/1/1/1
3	FUC	C	6	3	-	-	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	6	FUC	C2-C3	3.31	1.57	1.52

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	3	BMA	C3-C4-C5	2.56	114.86	110.23
3	C	4	MAN	C1-O5-C5	2.35	115.33	112.19
3	C	3	BMA	C2-C3-C4	2.04	114.46	110.86
3	C	4	MAN	O2-C2-C3	-2.04	105.92	110.15
3	C	5	FUC	C1-O5-C5	2.00	117.69	112.97

There are no chirality outliers.

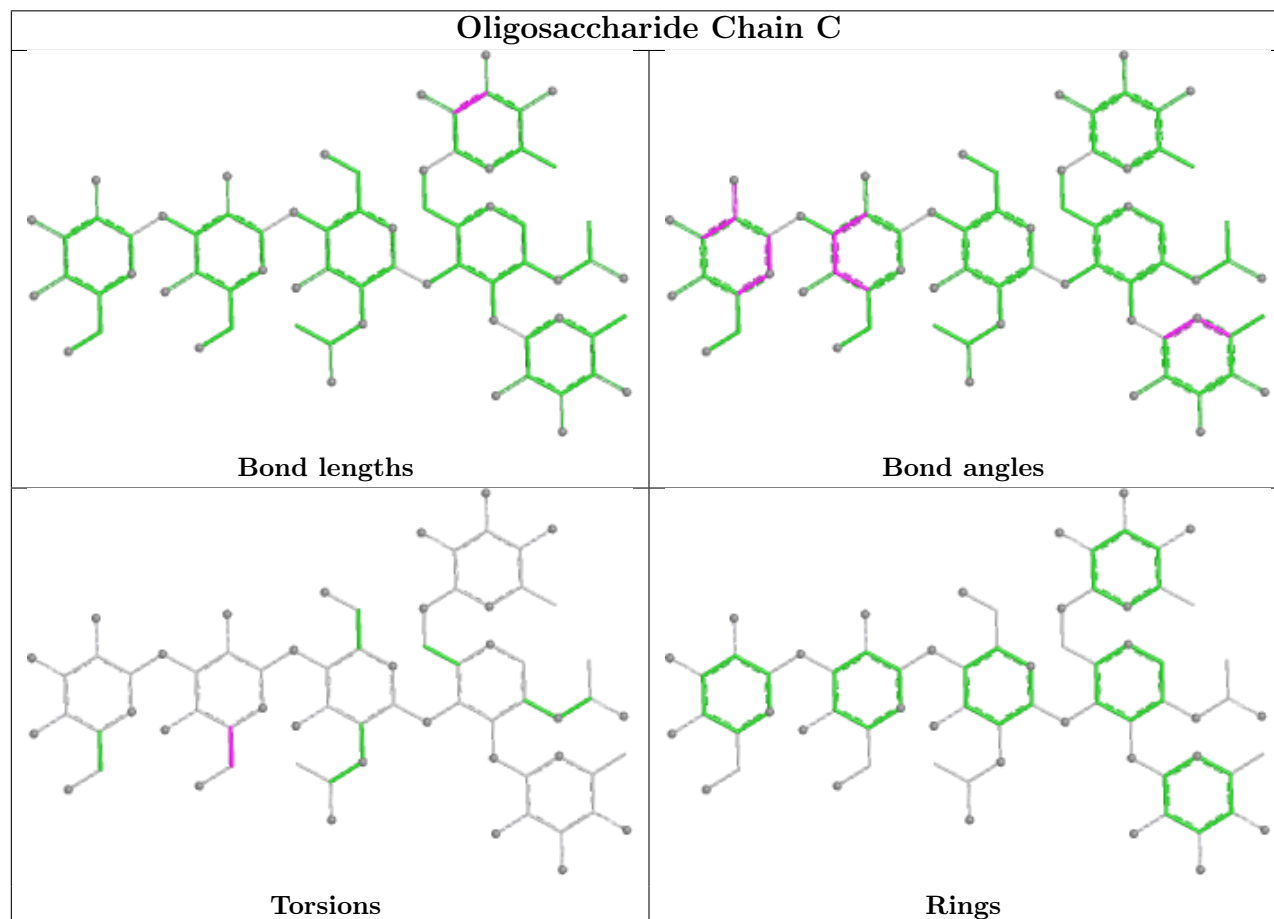
All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	C	3	BMA	C4-C5-C6-O6
3	C	3	BMA	O5-C5-C6-O6

There are no ring outliers.

No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.



5.6 Ligand geometry [i](#)

Of 43 ligands modelled in this entry, 17 are monoatomic - leaving 26 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
7	BU2	B	2110	-	5,5,5	0.48	0	5,5,5	0.67	0
4	GOL	A	1301	-	5,5,5	0.62	0	5,5,5	1.12	1 (20%)
5	ACT	A	1313	-	3,3,3	1.30	0	3,3,3	1.56	0
5	ACT	B	2104	8	3,3,3	1.52	1 (33%)	3,3,3	1.45	0
7	BU2	A	1311	-	5,5,5	0.48	0	5,5,5	0.89	0
7	BU2	A	1309	-	5,5,5	0.49	0	5,5,5	0.82	0
5	ACT	A	1302	8	3,3,3	1.56	1 (33%)	3,3,3	1.55	0
5	ACT	B	2108	8	3,3,3	1.70	1 (33%)	3,3,3	1.21	0
4	GOL	B	2112	-	5,5,5	0.93	0	5,5,5	1.37	1 (20%)
5	ACT	A	1306	8	3,3,3	1.68	1 (33%)	3,3,3	1.23	0
4	GOL	A	1308	-	5,5,5	1.11	0	5,5,5	0.68	0
7	BU2	A	1310	-	5,5,5	0.50	0	5,5,5	0.33	0
5	ACT	A	1307	8	3,3,3	1.73	1 (33%)	3,3,3	1.44	0
7	BU2	B	2111	-	5,5,5	0.49	0	5,5,5	0.61	0
5	ACT	B	2101	-	3,3,3	1.50	1 (33%)	3,3,3	1.47	0
6	1PE	A	1305	-	15,15,15	0.55	0	14,14,14	0.30	0
5	ACT	A	1303	8	3,3,3	1.43	1 (33%)	3,3,3	1.41	0
4	GOL	B	2107	-	5,5,5	0.91	0	5,5,5	0.81	0
6	1PE	B	2102	-	15,15,15	0.55	0	14,14,14	0.32	0
5	ACT	B	2109	-	3,3,3	1.57	1 (33%)	3,3,3	1.46	0
5	ACT	B	2113	-	3,3,3	1.64	1 (33%)	3,3,3	1.45	0
5	ACT	A	1304	-	3,3,3	1.52	1 (33%)	3,3,3	1.46	0
4	GOL	B	2106	-	5,5,5	0.97	0	5,5,5	0.98	0
5	ACT	A	1312	-	3,3,3	1.62	1 (33%)	3,3,3	1.43	0
5	ACT	B	2105	-	3,3,3	1.55	1 (33%)	3,3,3	1.49	0
5	ACT	B	2103	-	3,3,3	1.31	0	3,3,3	1.59	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	GOL	B	2106	-	-	0/4/4/4	-
7	BU2	B	2110	-	-	2/3/3/3	-
6	1PE	A	1305	-	-	8/13/13/13	-
4	GOL	B	2112	-	-	2/4/4/4	-
4	GOL	B	2107	-	-	2/4/4/4	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	GOL	A	1301	-	-	2/4/4/4	-
7	BU2	A	1310	-	-	0/3/3/3	-
4	GOL	A	1308	-	-	4/4/4/4	-
7	BU2	A	1311	-	-	1/3/3/3	-
6	1PE	B	2102	-	-	7/13/13/13	-
7	BU2	A	1309	-	-	0/3/3/3	-
7	BU2	B	2111	-	-	0/3/3/3	-

All (12) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	1307	ACT	CH3-C	2.68	1.59	1.49
5	A	1306	ACT	CH3-C	2.60	1.59	1.49
5	B	2113	ACT	CH3-C	2.48	1.58	1.49
5	B	2108	ACT	CH3-C	2.46	1.58	1.49
5	A	1312	ACT	CH3-C	2.42	1.58	1.49
5	B	2109	ACT	CH3-C	2.39	1.58	1.49
5	A	1302	ACT	CH3-C	2.37	1.58	1.49
5	B	2105	ACT	CH3-C	2.31	1.58	1.49
5	A	1304	ACT	CH3-C	2.26	1.58	1.49
5	B	2104	ACT	CH3-C	2.16	1.57	1.49
5	B	2101	ACT	CH3-C	2.11	1.57	1.49
5	A	1303	ACT	CH3-C	2.01	1.57	1.49

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	B	2112	GOL	C3-C2-C1	-2.39	103.03	111.80
4	A	1301	GOL	C3-C2-C1	-2.14	103.94	111.80

There are no chirality outliers.

All (28) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	1308	GOL	O1-C1-C2-O2
4	B	2112	GOL	O1-C1-C2-C3
7	A	1311	BU2	O1-C1-C2-C3
7	B	2110	BU2	O1-C1-C2-C3
6	B	2102	1PE	OH6-C15-C25-OH5
6	A	1305	1PE	OH4-C13-C23-OH3

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Mol	Chain	Res	Type	Atoms
6	B	2102	1PE	OH4-C13-C23-OH3
6	B	2102	1PE	OH5-C14-C24-OH4
4	B	2107	GOL	O2-C2-C3-O3
6	A	1305	1PE	OH2-C12-C22-OH3
4	A	1301	GOL	O1-C1-C2-C3
4	A	1308	GOL	O1-C1-C2-C3
4	A	1308	GOL	C1-C2-C3-O3
4	B	2107	GOL	C1-C2-C3-O3
6	A	1305	1PE	OH7-C16-C26-OH6
4	A	1308	GOL	O2-C2-C3-O3
4	B	2112	GOL	O1-C1-C2-O2
6	B	2102	1PE	OH7-C16-C26-OH6
6	B	2102	1PE	C12-C22-OH3-C23
6	B	2102	1PE	C24-C14-OH5-C25
6	A	1305	1PE	C24-C14-OH5-C25
6	A	1305	1PE	OH6-C15-C25-OH5
7	B	2110	BU2	C1-C2-C3-O3
4	A	1301	GOL	O1-C1-C2-O2
6	A	1305	1PE	C14-C24-OH4-C13
6	A	1305	1PE	C12-C22-OH3-C23
6	A	1305	1PE	C13-C23-OH3-C22
6	B	2102	1PE	OH2-C12-C22-OH3

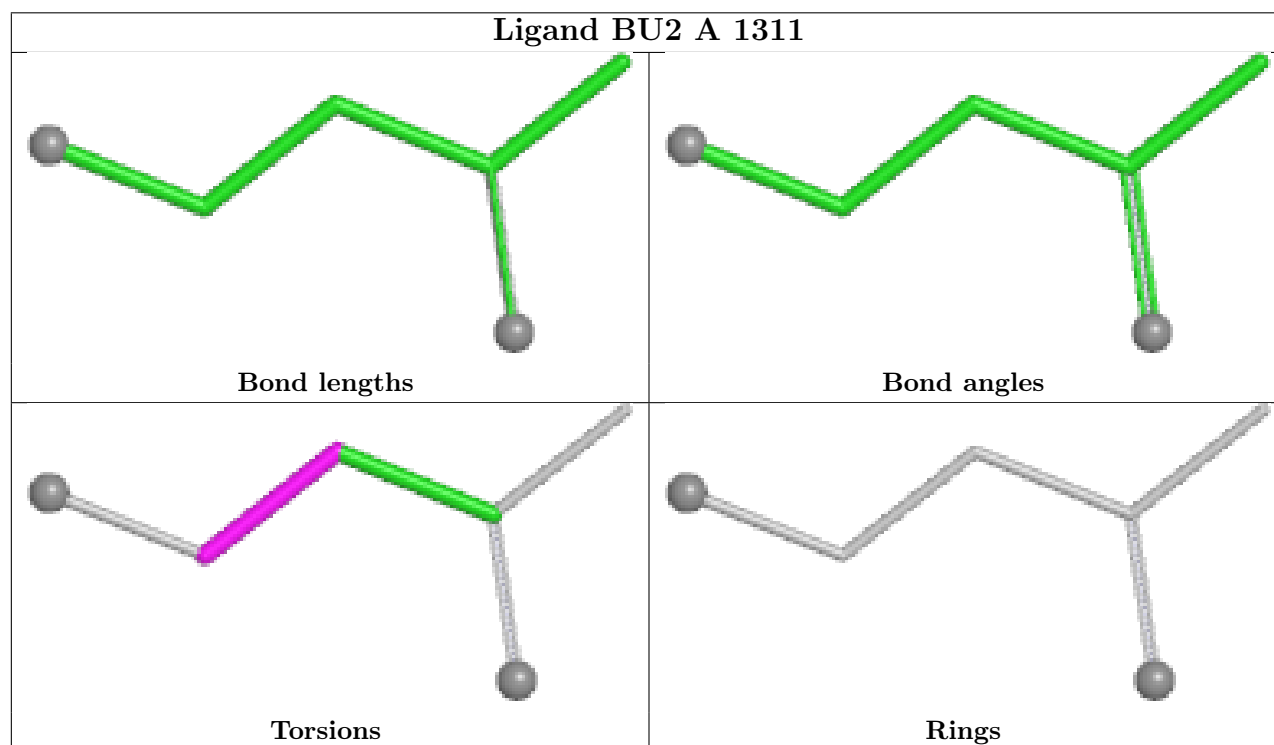
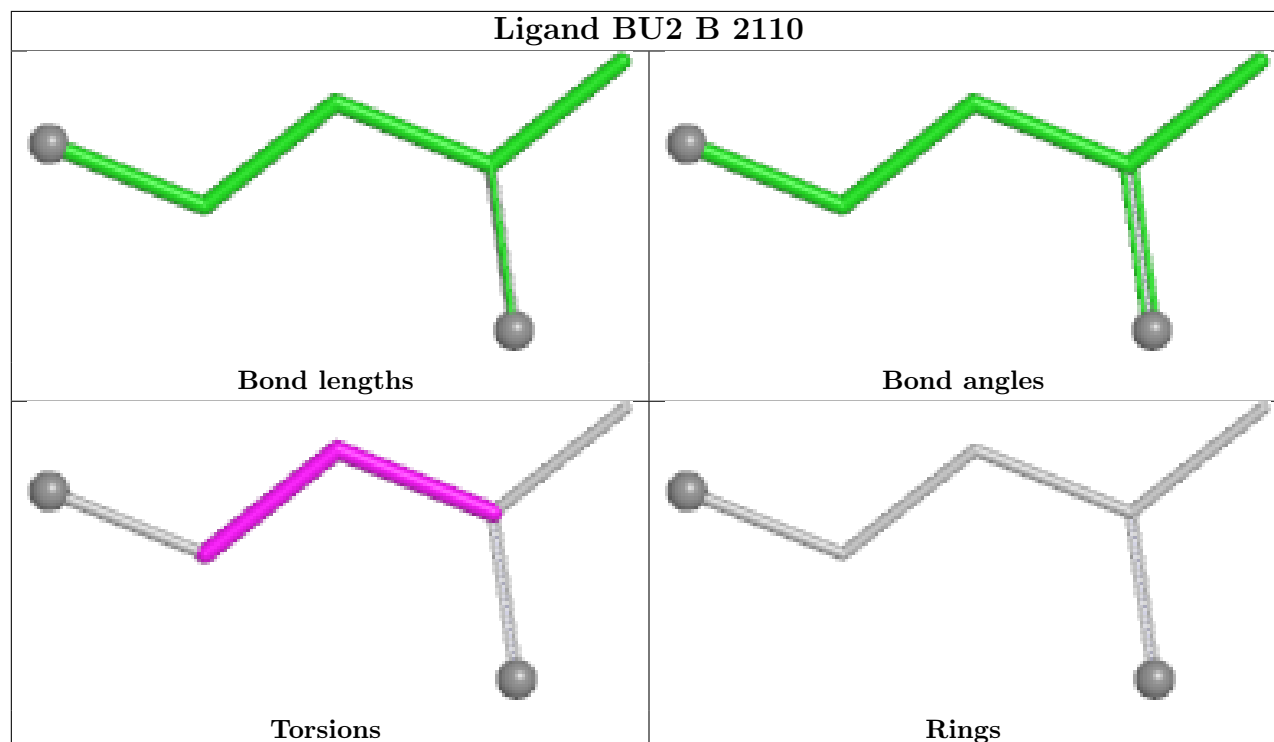
There are no ring outliers.

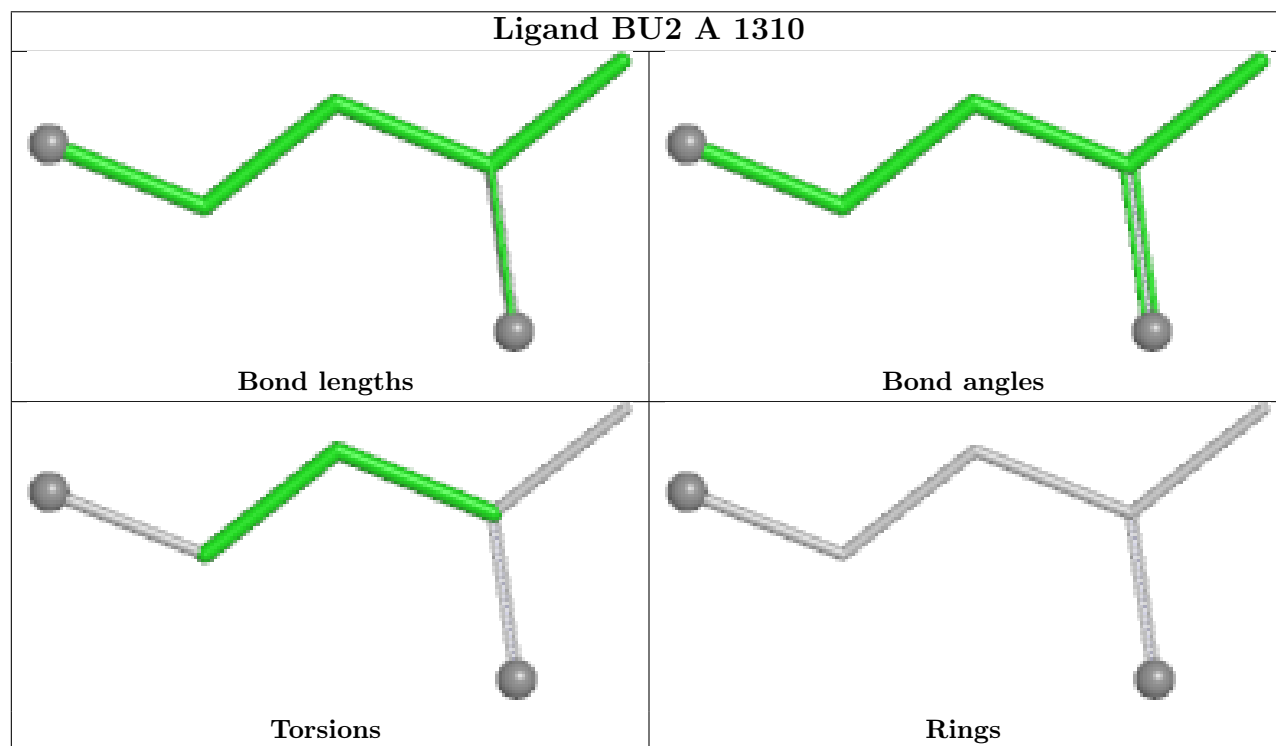
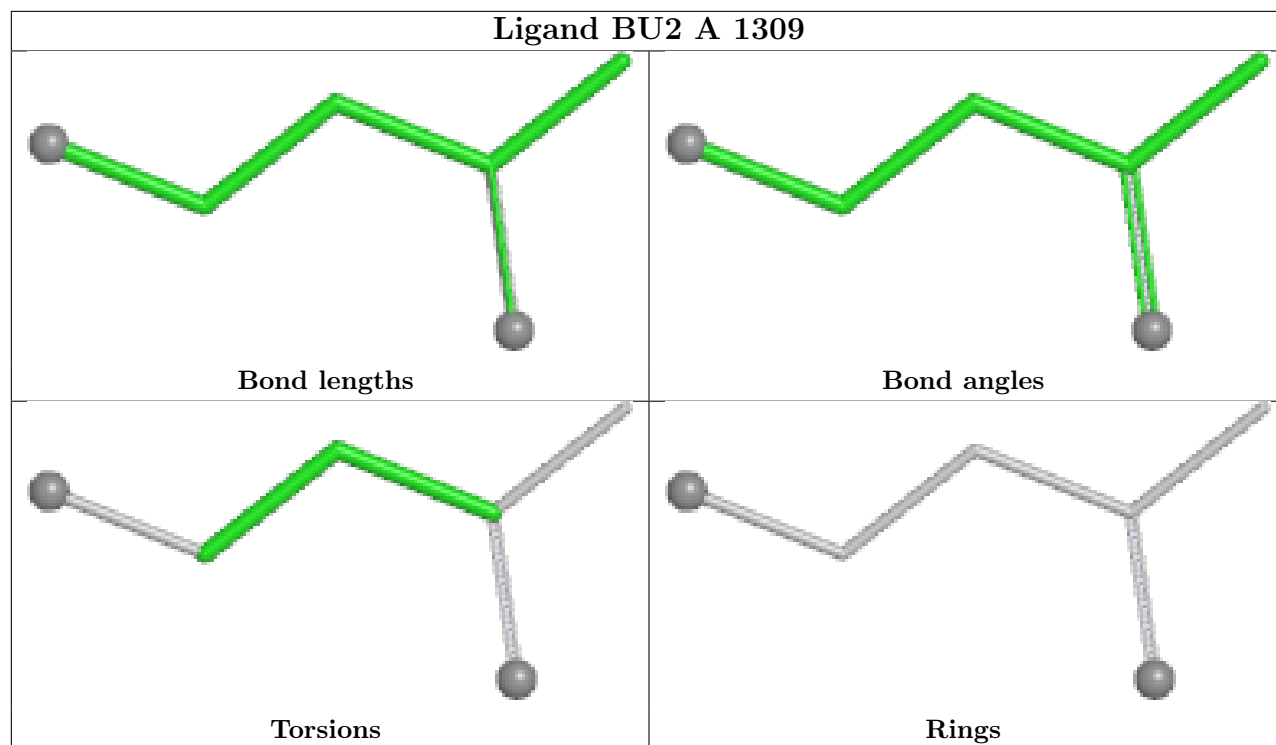
5 monomers are involved in 14 short contacts:

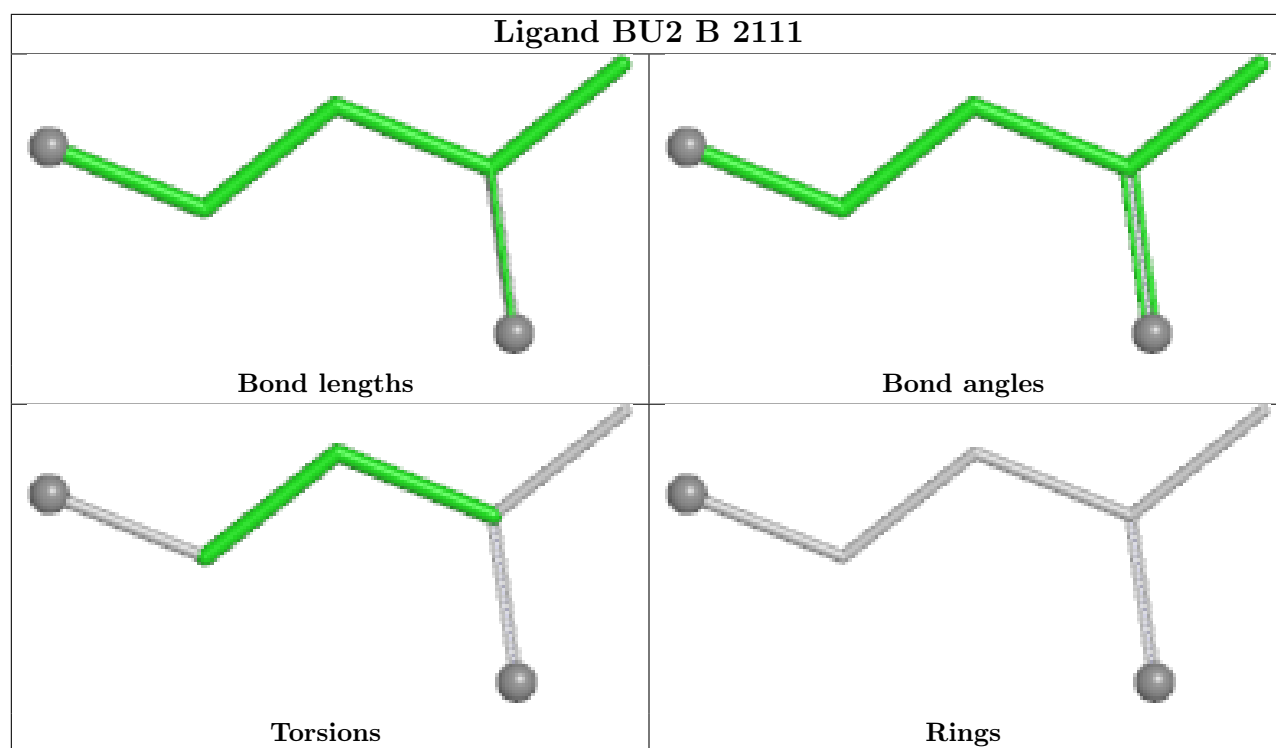
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	B	2112	GOL	5	0
7	A	1310	BU2	3	0
6	A	1305	1PE	2	0
4	B	2107	GOL	2	0
6	B	2102	1PE	2	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and

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







5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

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, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	234/298 (78%)	0.36	20 (8%) 16 17	25, 45, 68, 91	8 (3%)
2	B	201/213 (94%)	0.29	11 (5%) 30 32	21, 45, 79, 98	5 (2%)
All	All	435/511 (85%)	0.33	31 (7%) 22 23	21, 45, 73, 98	13 (2%)

All (31) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	526	GLY	4.5
1	A	108	TYR	4.2
1	A	113	GLN	3.4
2	B	477	SER	3.4
1	A	1114	SER	3.3
1	A	96	CYS	3.2
1	A	1115	ALA	3.1
2	B	532	GLY	3.0
2	B	533	THR	3.0
2	B	525	CYS	2.8
1	A	8	GLY	2.8
1	A	1041	PRO	2.8
1	A	999	SER	2.7
2	B	345	THR	2.6
1	A	106	TYR	2.6
1	A	1040	ALA	2.5
1	A	1013	GLN	2.4
1	A	95	TYR	2.3
2	B	481	ASN	2.2
2	B	524	VAL	2.2
1	A	105	ALA	2.2
1	A	1096	CYS	2.2
2	B	483	VAL	2.2
1	A	107	HIS	2.1

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Mol	Chain	Res	Type	RSRZ
2	B	476	GLY	2.1
1	A	65[A]	LYS	2.1
1	A	45	ARG	2.1
1	A	1045	ARG	2.0
2	B	478	THR	2.0
1	A	1044	GLU	2.0
1	A	1	GLN	2.0

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

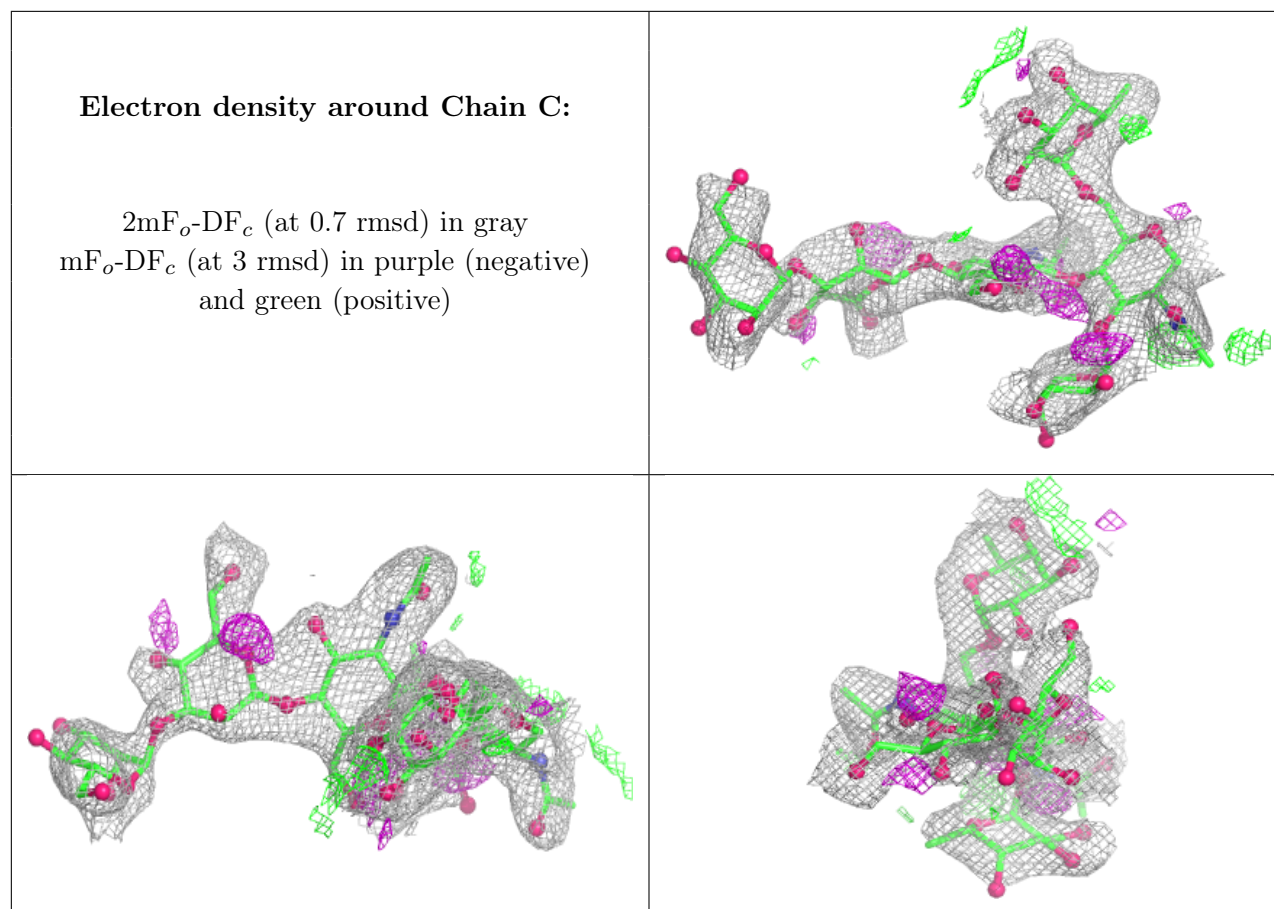
There are no non-standard protein/DNA/RNA residues in this entry.

6.3 Carbohydrates [i](#)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
3	BMA	C	3	11/12	0.61	0.15	77,94,102,110	0
3	MAN	C	4	11/12	0.61	0.14	104,111,115,119	0
3	FUC	C	5	10/11	0.76	0.15	80,85,89,94	0
3	NAG	C	1	14/15	0.81	0.14	60,70,85,89	0
3	NAG	C	2	14/15	0.86	0.12	55,68,78,81	0
3	FUC	C	6	10/11	0.89	0.11	42,49,53,60	0

The following is a graphical depiction of the model fit to experimental electron density for oligosaccharide. Each fit is shown from different orientation to approximate a three-dimensional view.



6.4 Ligands ⓘ

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
5	ACT	B	2109	4/4	0.46	0.20	68,79,82,93	0
5	ACT	A	1303	4/4	0.51	0.21	84,94,94,114	0
5	ACT	B	2108	4/4	0.52	0.25	60,75,86,86	0
7	BU2	B	2110	6/6	0.66	0.20	69,78,81,83	0
5	ACT	A	1306	4/4	0.67	0.25	64,91,96,99	0
4	GOL	B	2112	6/6	0.68	0.20	53,72,79,91	0
5	ACT	A	1304	4/4	0.68	0.18	71,81,85,87	0
5	ACT	A	1307	4/4	0.72	0.16	48,64,84,92	0
5	ACT	B	2113	4/4	0.73	0.20	54,63,74,76	0
7	BU2	B	2111	6/6	0.73	0.25	72,79,81,81	0
5	ACT	A	1312	4/4	0.75	0.19	51,67,68,73	0
4	GOL	A	1308	6/6	0.76	0.19	58,67,73,83	0
7	BU2	A	1309	6/6	0.76	0.22	61,68,73,78	0

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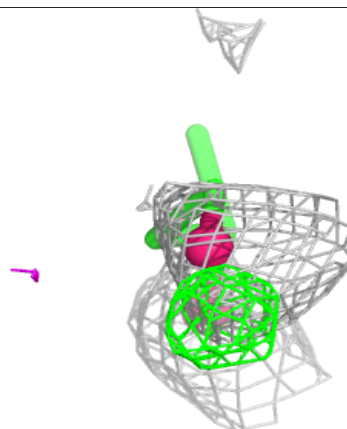
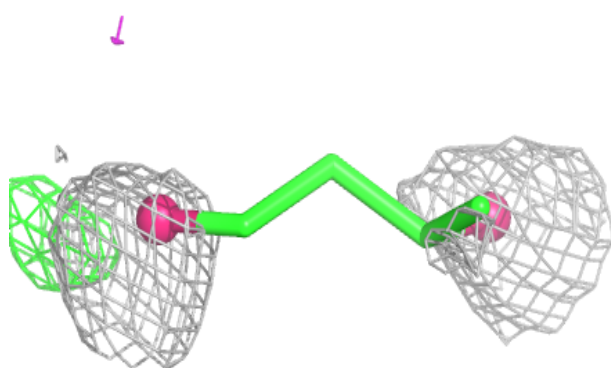
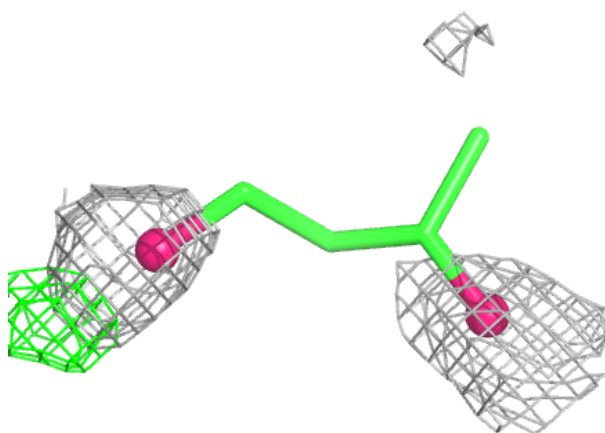
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
8	CD	A	1320	1/1	0.76	0.16	143,143,143,143	1
7	BU2	A	1310	6/6	0.77	0.23	53,67,74,80	0
8	CD	B	2116	1/1	0.77	0.13	141,141,141,141	1
8	CD	A	1321	1/1	0.78	0.13	135,135,135,135	1
5	ACT	B	2101	4/4	0.78	0.21	69,71,74,78	0
5	ACT	B	2104	4/4	0.79	0.16	84,92,94,95	0
8	CD	A	1322	1/1	0.81	0.13	106,106,106,106	1
6	1PE	A	1305	16/16	0.81	0.20	65,78,86,89	0
8	CD	A	1317	1/1	0.82	0.20	150,150,150,150	1
7	BU2	A	1311	6/6	0.83	0.18	68,70,75,76	0
8	CD	A	1318	1/1	0.83	0.13	129,129,129,129	1
8	CD	B	2118	1/1	0.83	0.12	94,94,94,94	1
5	ACT	A	1313	4/4	0.85	0.20	72,81,84,85	0
8	CD	B	2117	1/1	0.85	0.13	127,127,127,127	1
5	ACT	B	2105	4/4	0.85	0.21	74,76,83,84	0
4	GOL	B	2106	6/6	0.86	0.16	60,69,73,81	0
5	ACT	B	2103	4/4	0.87	0.20	73,75,76,76	0
4	GOL	A	1301	6/6	0.88	0.12	49,55,62,64	0
5	ACT	A	1302	4/4	0.89	0.12	85,87,87,95	0
8	CD	B	2114	1/1	0.90	0.08	112,112,112,112	1
8	CD	A	1319	1/1	0.91	0.09	102,102,102,102	1
8	CD	A	1315	1/1	0.91	0.14	129,129,129,129	1
6	1PE	B	2102	16/16	0.92	0.13	47,70,83,88	0
8	CD	A	1323	1/1	0.92	0.17	123,123,123,123	1
4	GOL	B	2107	6/6	0.92	0.12	43,64,72,76	0
8	CD	A	1325	1/1	0.95	0.12	65,65,65,65	1
8	CD	A	1316	1/1	0.96	0.06	107,107,107,107	1
8	CD	A	1314	1/1	0.98	0.04	69,69,69,69	1
8	CD	B	2115	1/1	0.99	0.03	67,67,67,67	1
8	CD	A	1324	1/1	0.99	0.06	39,39,39,39	1

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.

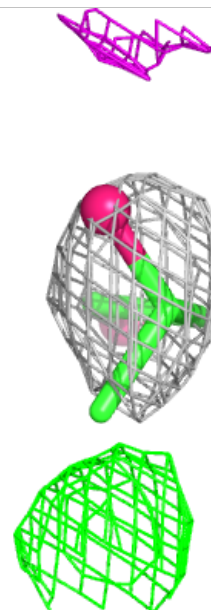
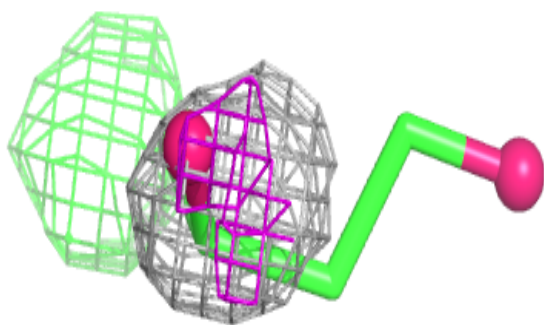
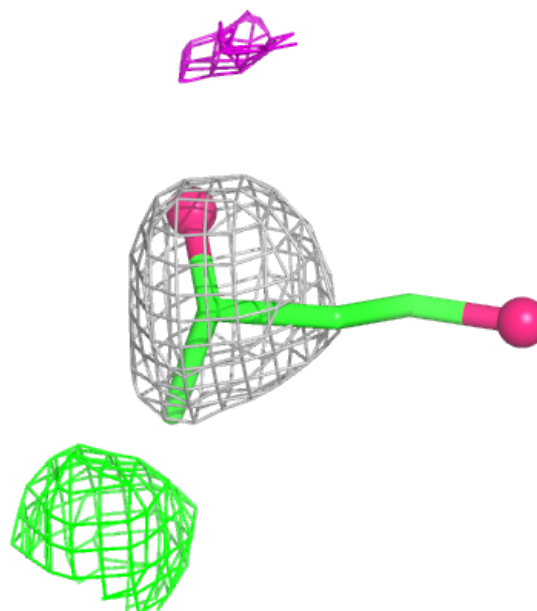
Electron density around BU2 B 2110:

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



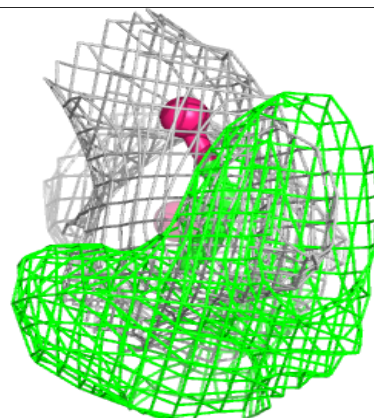
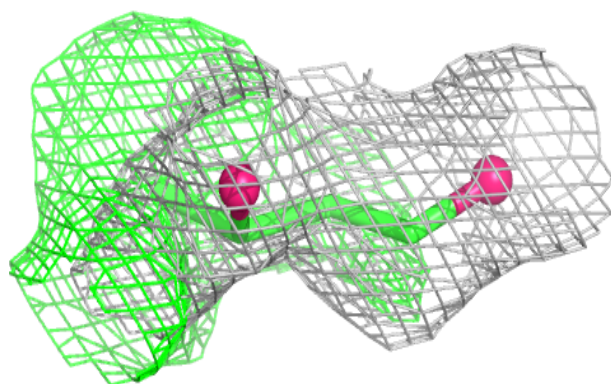
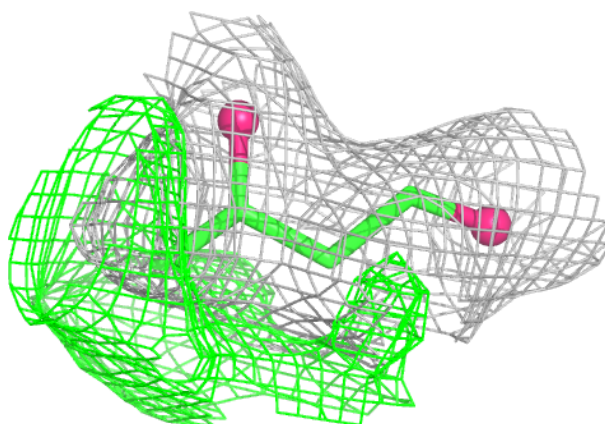
Electron density around BU2 B 2111:

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

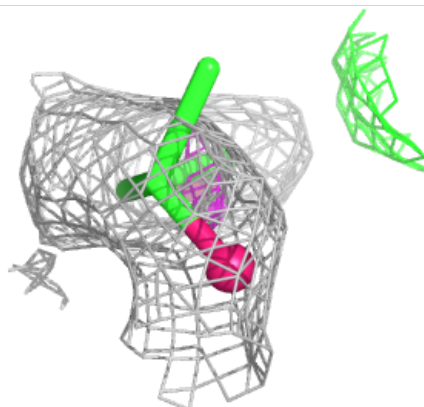
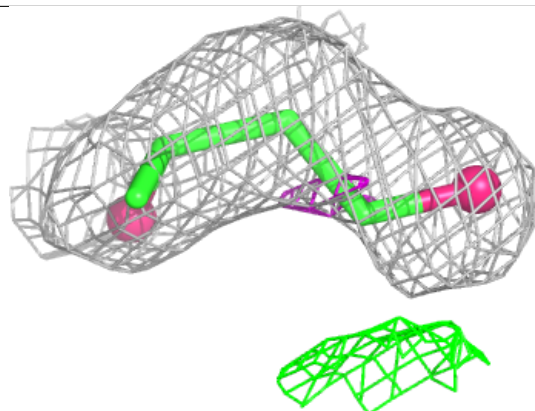
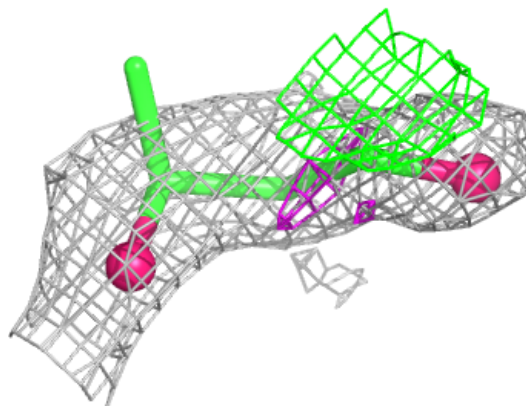


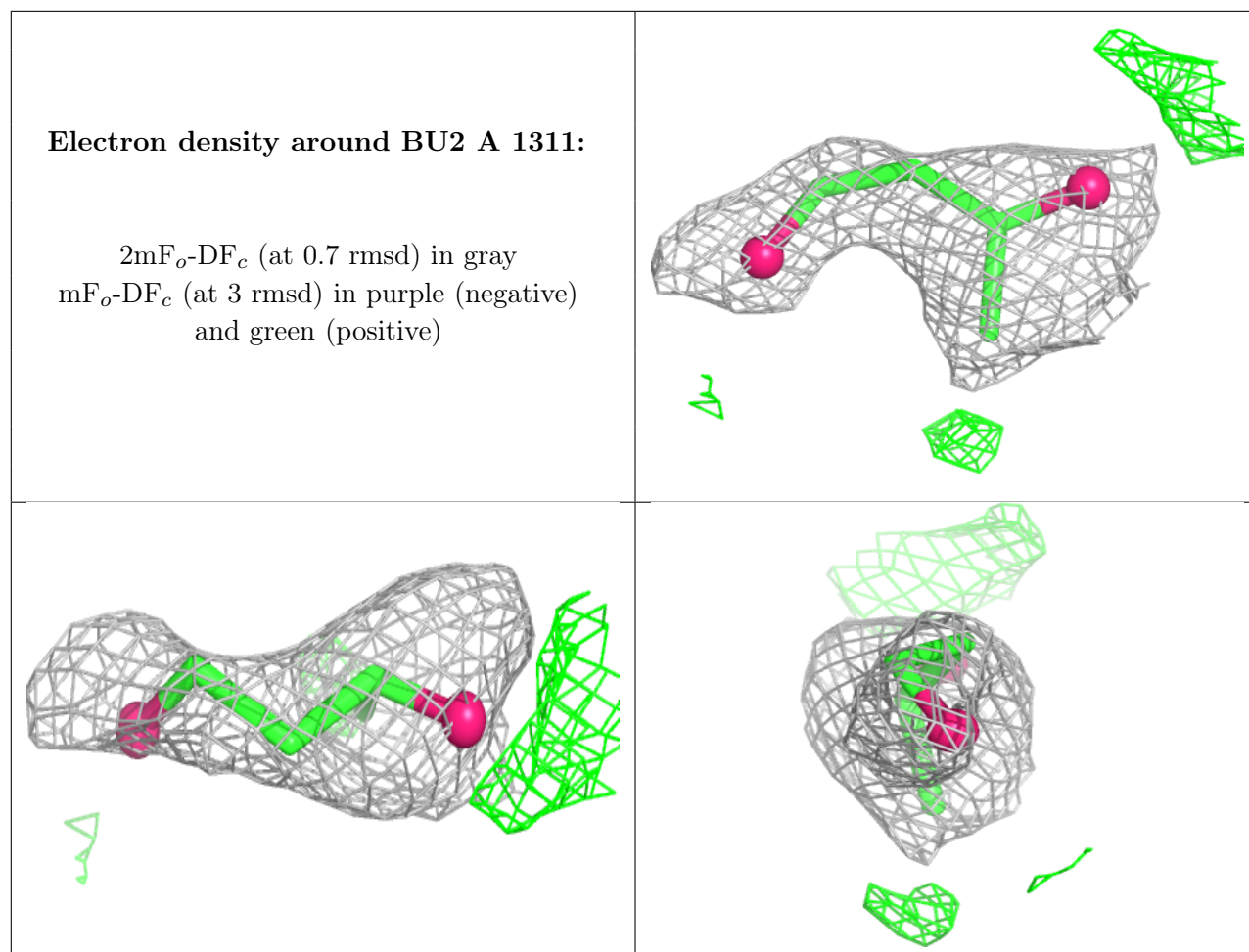
Electron density around BU2 A 1309:

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

**Electron density around BU2 A 1310:**

$2mF_o-DF_c$ (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.