Full wwPDB X-ray Structure Validation Report (i)

Sep 4, 2025 – 10:06 AM EDT

PDB ID	:	9Q3H / pdb_00009q3h
Title	:	GspB Siglec domain bound to sialyl T antigen linked to serine-FMOC
Authors	:	Morrison, K.M.; Martin, K.A.; Iverson, T.M.
Deposited on	:	2025-08-18
Resolution	:	1.89 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*
A user guide is available at
https://www.wwpdb.org/validation/2017/XrayValidationReportHelp
with specific help available everywhere you see the (i) 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 (i)) were used in the production of this report:

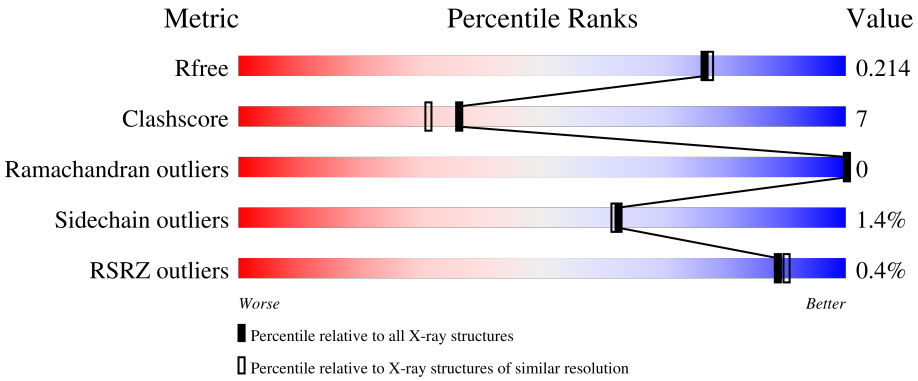
MolProbity	:	4-5-2 with Phenix2.0rc1
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0rc1
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.006 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.45.1

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 1.89 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	7293 (1.90-1.90)
Clashscore	180529	8090 (1.90-1.90)
Ramachandran outliers	177936	8022 (1.90-1.90)
Sidechain outliers	177891	8022 (1.90-1.90)
RSRZ outliers	164620	7292 (1.90-1.90)

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 <=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	127	87% 10% .
1	B	127	% 82% 16% .
2	C	3	33% 67%
2	D	3	100%

2 Entry composition (i)

There are 7 unique types of molecules in this entry. The entry contains 4117 atoms, of which 1881 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.

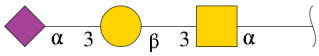
- Molecule 1 is a protein called Platelet binding protein GspB.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	123	Total	C	H	N	O	S	0	4	0
			1875	620	887	169	198	1			
1	B	124	Total	C	H	N	O	S	0	0	0
			1860	603	897	165	194	1			

There are 10 discrepancies between the modelled and reference sequences:

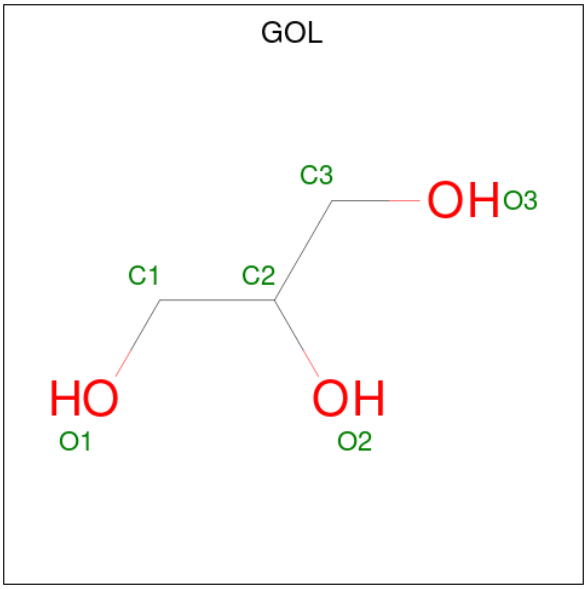
Chain	Residue	Modelled	Actual	Comment	Reference
A	395	GLY	-	expression tag	UNP Q939N5
A	396	PRO	-	expression tag	UNP Q939N5
A	397	GLY	-	expression tag	UNP Q939N5
A	398	SER	-	expression tag	UNP Q939N5
A	444	SER	ASN	conflict	UNP Q939N5
B	395	GLY	-	expression tag	UNP Q939N5
B	396	PRO	-	expression tag	UNP Q939N5
B	397	GLY	-	expression tag	UNP Q939N5
B	398	SER	-	expression tag	UNP Q939N5
B	444	SER	ASN	conflict	UNP Q939N5

- Molecule 2 is an oligosaccharide called N-acetyl-alpha-neuraminic acid-(2-3)-beta-D-galacto pyranose-(1-3)-2-acetamido-2-deoxy-alpha-D-galactopyranose.



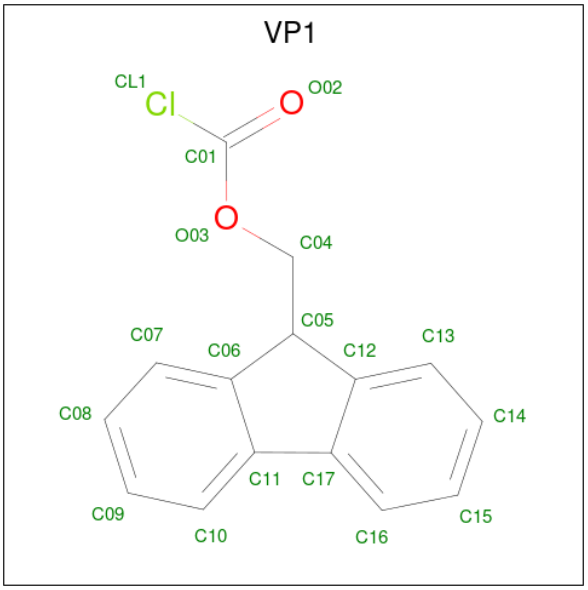
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	C	3	Total	C	H	N	O	0	0	0
			73	25	28	2	18			
2	D	3	Total	C	H	N	O	0	0	0
			72	25	27	2	18			

- Molecule 3 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$) (labeled as "Ligand of Interest" by depositor).



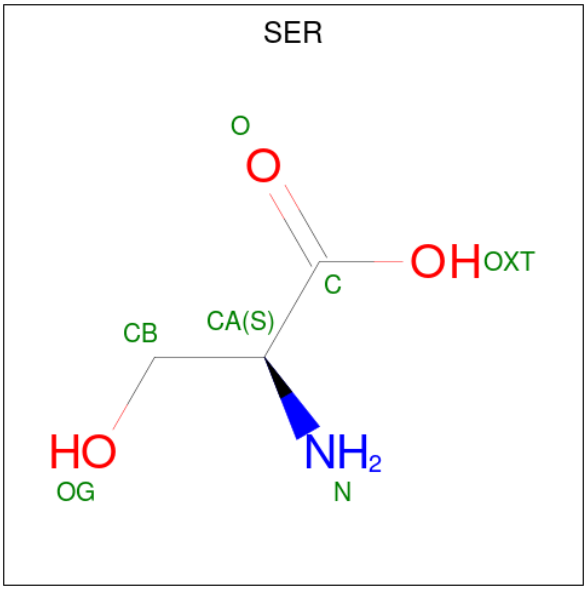
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	H	O	0	0
			14	3	8	3		
3	A	1	Total	C	H	O	0	0
			14	3	8	3		

- Molecule 4 is Fluorenylmethyloxycarbonyl chloride (CCD ID: VP1) (formula: $C_{15}H_{11}ClO_2$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C H O 28 15 11 2	0	0
4	B	1	Total C H O 28 15 11 2	0	0

- Molecule 5 is SERINE (CCD ID: SER) (formula: $C_3H_7NO_3$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total C H N O 9 3 2 1 3	0	0
5	B	1	Total C H N O 9 3 2 1 3	0	0

- Molecule 6 is CALCIUM ION (CCD ID: CA) (formula: Ca).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	1	Total Ca 1 1	0	0
6	B	1	Total Ca 1 1	0	0

- Molecule 7 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	69	Total O 69 69	0	0

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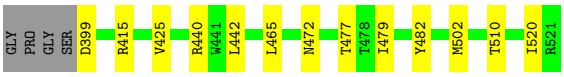
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	B	64	Total	O	0	0
			64	64		

3 Residue-property plots (i)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density (RSRZ > 2). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

• Molecule 1: Platelet binding protein GspB

Chain A:



• Molecule 1: Platelet binding protein GspB

Chain B:

• Molecule 2: N-acetyl-alpha-neuraminic acid-(2-3)-beta-D-galactopyranose-(1-3)-2-acetamido-2-deoxy-alpha-D-galactopyranose

Chain C:

• Molecule 2: N-acetyl-alpha-neuraminic acid-(2-3)-beta-D-galactopyranose-(1-3)-2-acetamido-2-deoxy-alpha-D-galactopyranose

Chain D:

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α, β, γ	37.99Å 38.11Å 47.05Å 70.20° 68.01° 62.08°	Depositor
Resolution (Å)	23.10 – 1.89 23.10 – 1.89	Depositor EDS
% Data completeness (in resolution range)	84.7 (23.10-1.89) 84.6 (23.10-1.89)	Depositor EDS
R_{merge}	0.18	Depositor
R_{sym}	0.07	Depositor
$< I/\sigma(I) >$ [1]	1.73 (at 1.89Å)	Xtriage
Refinement program	PHENIX 1.20.1_4487	Depositor
R, R_{free}	0.184 , 0.211 0.184 , 0.214	Depositor DCC
R_{free} test set	712 reflections (4.20%)	wwPDB-VP
Wilson B-factor (Å^2)	23.5	Xtriage
Anisotropy	0.480	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.36 , 55.2	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	0.032 for -k,-h,-l	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	4117	wwPDB-VP
Average B, all atoms (Å^2)	43.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 11.01% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ 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: A2G, GOL, VP1, SIA, GAL, CA

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\#\|Z\| > 5$	RMSZ	$\#\|Z\| > 5$
1	A	0.20	0/1012	0.38	0/1380
1	B	0.18	0/981	0.37	0/1340
All	All	0.19	0/1993	0.37	0/2720

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	988	887	959	9	0
1	B	963	897	920	15	0
2	C	45	28	37	3	0
2	D	45	27	37	9	0
3	A	12	16	16	0	0
4	A	17	11	0	1	0
4	B	17	11	0	0	0
5	A	7	2	3	0	0
5	B	7	2	4	3	0
6	A	1	0	0	0	0
6	B	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
7	A	69	0	0	3	0
7	B	64	0	0	3	0
All	All	2236	1881	1976	29	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 7.

All (29) 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)
5:B:602:SER:OG	2:D:1:A2G:C1	1.70	1.36
1:A:440:ARG:NH2	7:A:701:HOH:O	2.03	0.91
1:B:417:GLU:OE2	7:B:701:HOH:O	1.89	0.89
1:A:399:ASP:N	7:A:702:HOH:O	2.05	0.88
5:B:602:SER:CB	2:D:1:A2G:C1	2.58	0.80
1:B:482:TYR:CZ	2:D:3:SIA:H112	2.25	0.71
1:B:437:THR:O	7:B:702:HOH:O	2.16	0.62
5:B:602:SER:OG	2:D:1:A2G:C2	2.50	0.58
1:A:472:ASN:ND2	7:A:708:HOH:O	2.36	0.58
1:B:411:ILE:HG23	1:B:421:TYR:CD1	2.39	0.57
4:A:603:VP1:O02	2:C:1:A2G:H8A	2.06	0.56
1:A:425:VAL:HB	1:A:465:LEU:HB2	1.88	0.55
1:B:507:VAL:HG13	2:D:1:A2G:H6	1.90	0.54
1:B:483:THR:OG1	1:B:517:LYS:HE2	2.10	0.51
1:A:482:TYR:CZ	2:C:3:SIA:H112	2.47	0.50
1:A:477:THR:HG21	1:A:520:ILE:HD13	1.96	0.47
1:B:402:ARG:NH2	1:B:501:GLU:OE2	2.46	0.46
1:B:442:LEU:HD22	2:D:2:GAL:H61	1.98	0.45
1:B:425:VAL:HB	1:B:465:LEU:HB2	1.97	0.45
1:B:507:VAL:CG1	2:D:1:A2G:H6	2.47	0.44
1:B:482:TYR:CE1	1:B:520:ILE:HD12	2.53	0.44
7:B:764:HOH:O	2:D:1:A2G:O4	1.98	0.44
1:A:482:TYR:CE1	1:A:520:ILE:HD12	2.54	0.43
1:B:456:TYR:HA	1:B:468:ARG:O	2.20	0.41
1:B:482:TYR:CE2	2:D:3:SIA:H112	2.55	0.41
2:C:2:GAL:H4	2:C:3:SIA:C1	2.49	0.41
1:A:510:THR:OG1	1:B:408:PRO:HG3	2.21	0.41
1:A:442:LEU:HD12	1:A:502:MET:HE2	2.03	0.41
1:B:447:PRO:HG2	1:B:452:GLU:HA	2.03	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	125/127 (98%)	125 (100%)	0	0	100	100
1	B	122/127 (96%)	121 (99%)	1 (1%)	0	100	100
All	All	247/254 (97%)	246 (100%)	1 (0%)	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	109/107 (102%)	107 (98%)	2 (2%)	54	52
1	B	104/107 (97%)	103 (99%)	1 (1%)	73	74
All	All	213/214 (100%)	210 (99%)	3 (1%)	62	62

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

Mol	Chain	Res	Type
1	A	415	ARG
1	A	479	ILE
1	B	475	ILE

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

Mol	Chain	Res	Type
1	B	472	ASN

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	$\#\|Z\| > 2$
2	A2G	C	1	2,5	14,14,15	1.82	5 (35%)	17,19,21	0.78	0
2	GAL	C	2	2	11,11,12	0.72	0	15,15,17	0.99	0
2	SIA	C	3	2	20,20,21	1.48	2 (10%)	21,28,31	1.43	4 (19%)
2	A2G	D	1	2	14,14,15	1.79	3 (21%)	17,19,21	1.12	1 (5%)
2	GAL	D	2	2	11,11,12	0.94	1 (9%)	15,15,17	1.53	4 (26%)
2	SIA	D	3	2	20,20,21	1.63	2 (10%)	21,28,31	1.54	5 (23%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	A2G	C	1	2,5	-	0/6/23/26	0/1/1/1
2	GAL	C	2	2	-	1/2/19/22	0/1/1/1
2	SIA	C	3	2	-	2/18/34/38	0/1/1/1
2	A2G	D	1	2	-	0/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	GAL	D	2	2	-	1/2/19/22	0/1/1/1
2	SIA	D	3	2	-	1/18/34/38	0/1/1/1

All (13) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	3	SIA	C2-C1	5.86	1.59	1.52
2	C	3	SIA	C2-C1	5.45	1.58	1.52
2	D	1	A2G	C7-N2	3.49	1.45	1.34
2	C	1	A2G	C7-N2	3.41	1.45	1.34
2	D	1	A2G	C3-C2	-2.59	1.47	1.52
2	C	1	A2G	C3-C2	-2.45	1.47	1.52
2	D	3	SIA	O6-C2	2.24	1.47	1.43
2	C	1	A2G	O3-C3	2.19	1.48	1.43
2	C	3	SIA	O6-C2	2.18	1.47	1.43
2	C	1	A2G	O5-C1	2.16	1.47	1.43
2	D	1	A2G	O5-C1	2.12	1.47	1.43
2	C	1	A2G	O5-C5	2.10	1.47	1.43
2	D	2	GAL	O3-C3	-2.08	1.37	1.43

All (14) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	D	3	SIA	C11-C10-N5	-3.47	110.36	116.12
2	C	3	SIA	C11-C10-N5	-3.24	110.74	116.12
2	D	2	GAL	O3-C3-C2	-3.22	103.49	110.05
2	D	2	GAL	O3-C3-C4	2.95	117.34	110.38
2	C	3	SIA	C8-C7-C6	-2.61	108.16	113.05
2	D	3	SIA	O1A-C1-C2	-2.53	117.39	122.85
2	C	3	SIA	O1B-C1-O1A	2.31	129.32	124.08
2	D	3	SIA	C8-C7-C6	-2.31	108.71	113.05
2	C	3	SIA	O10-C10-N5	2.31	126.06	121.98
2	D	2	GAL	C1-C2-C3	2.24	112.90	109.64
2	D	3	SIA	O1B-C1-O1A	2.23	129.14	124.08
2	D	3	SIA	O10-C10-N5	2.17	125.81	121.98
2	D	1	A2G	C8-C7-N2	2.07	119.55	116.12
2	D	2	GAL	O2-C2-C3	-2.05	105.90	110.15

There are no chirality outliers.

All (5) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	D	3	SIA	C6-C7-C8-O8
2	D	2	GAL	O5-C5-C6-O6
2	C	2	GAL	O5-C5-C6-O6
2	C	3	SIA	C6-C7-C8-O8
2	C	3	SIA	O7-C7-C8-O8

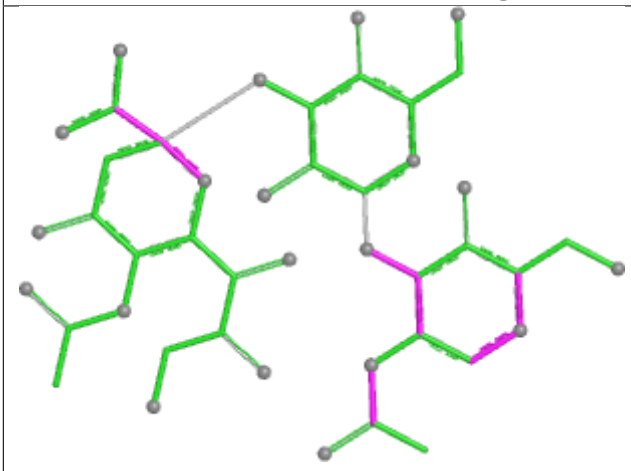
There are no ring outliers.

6 monomers are involved in 12 short contacts:

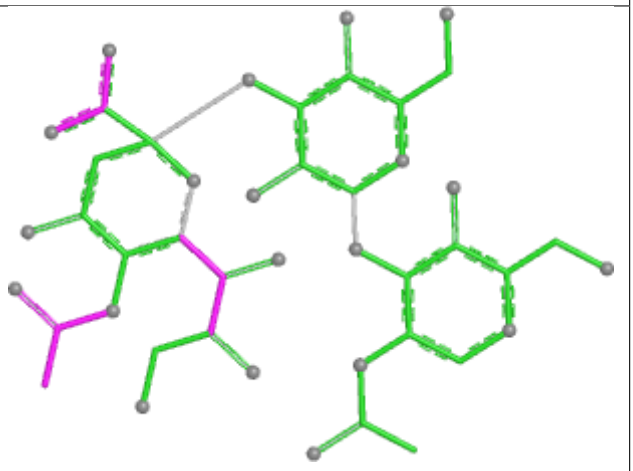
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	C	3	SIA	2	0
2	C	1	A2G	1	0
2	D	2	GAL	1	0
2	D	1	A2G	6	0
2	C	2	GAL	1	0
2	D	3	SIA	2	0

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

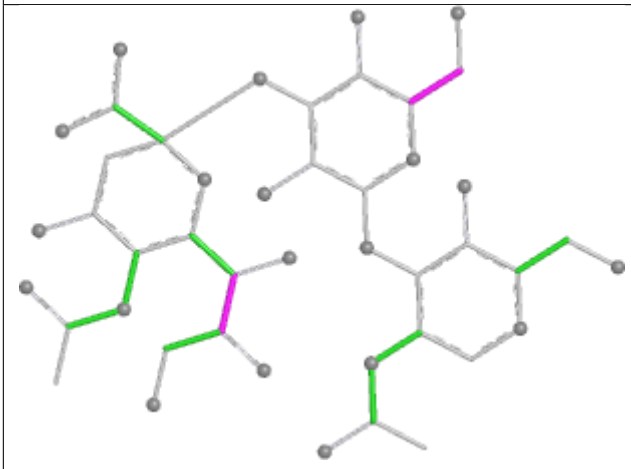
Oligosaccharide Chain C



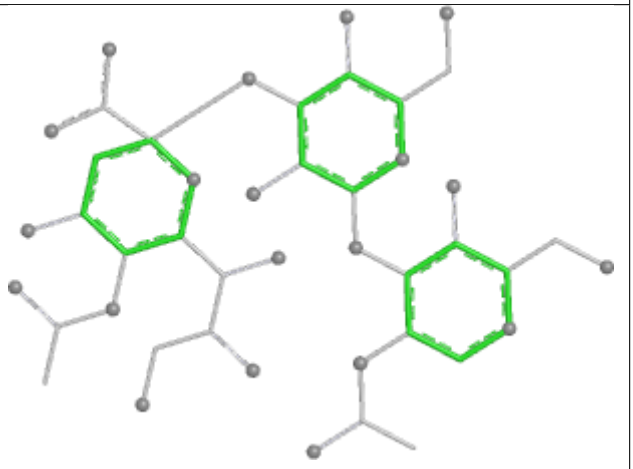
Bond lengths



Bond angles

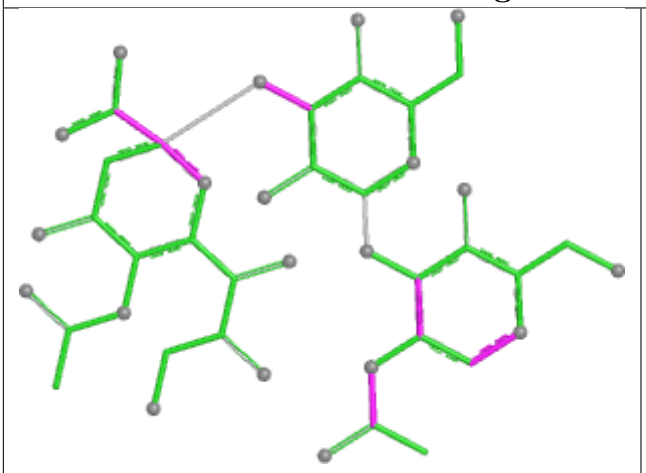


Torsions

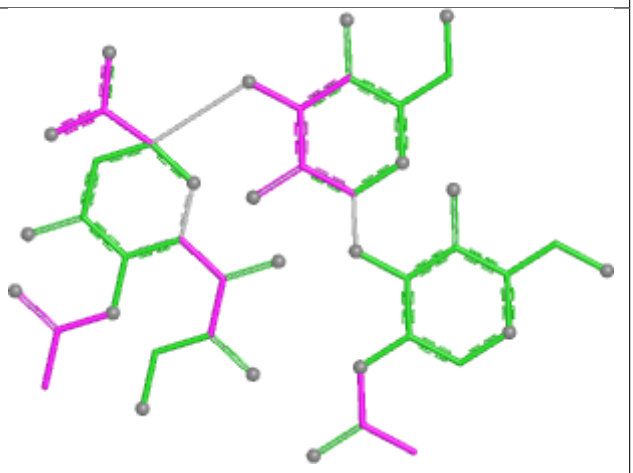


Rings

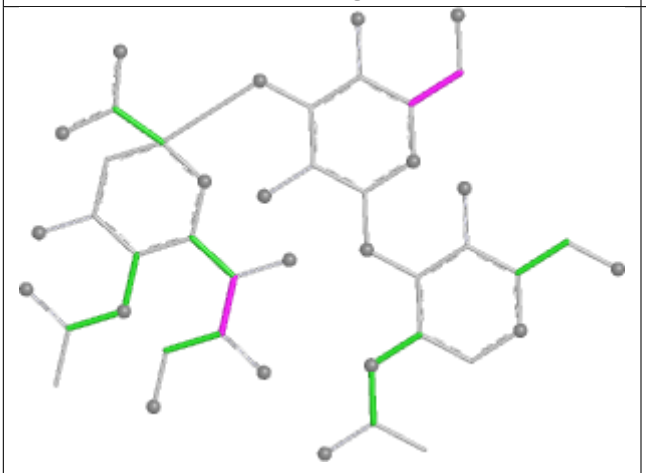
Oligosaccharide Chain D



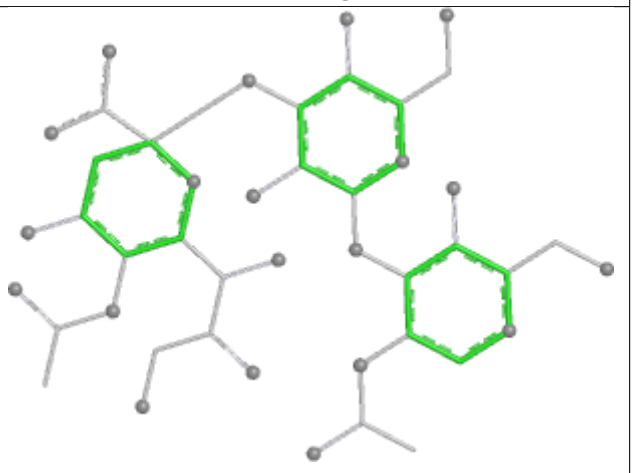
Bond lengths



Bond angles



Torsions



Rings

5.6 Ligand geometry

Of 8 ligands modelled in this entry, 2 are monoatomic - leaving 6 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
4	VP1	B	601	-	19,19,20	1.20	2 (10%)	25,26,28	1.06	2 (8%)
5	SER	A	604	2	4,6,6	1.16	1 (25%)	2,7,7	1.89	1 (50%)
3	GOL	A	601	-	5,5,5	1.00	0	5,5,5	1.30	1 (20%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
5	SER	B	602	-	4,6,6	1.21	1 (25%)	2,7,7	1.78	1 (50%)
4	VP1	A	603	-	19,19,20	1.14	2 (10%)	25,26,28	1.12	3 (12%)
3	GOL	A	602	-	5,5,5	0.20	0	5,5,5	0.56	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	VP1	B	601	-	-	1/4/16/17	0/3/3/3
5	SER	A	604	2	-	4/6/6/6	-
3	GOL	A	601	-	-	0/4/4/4	-
5	SER	B	602	-	-	0/6/6/6	-
4	VP1	A	603	-	-	0/4/16/17	0/3/3/3
3	GOL	A	602	-	-	2/4/4/4	-

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	B	601	VP1	C06-C05	-2.91	1.47	1.52
4	A	603	VP1	C06-C05	-2.65	1.47	1.52
4	A	603	VP1	C17-C11	2.42	1.51	1.46
5	B	602	SER	OXT-C	-2.29	1.23	1.30
4	B	601	VP1	C17-C11	2.28	1.51	1.46
5	A	604	SER	OXT-C	-2.21	1.23	1.30

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	A	603	VP1	C12-C05-C06	3.77	107.03	102.01
4	B	601	VP1	C12-C05-C06	3.32	106.43	102.01
5	A	604	SER	OXT-C-O	-2.64	118.10	124.08
5	B	602	SER	OXT-C-O	-2.48	118.44	124.08
3	A	601	GOL	C3-C2-C1	-2.47	102.74	111.80
4	B	601	VP1	C13-C12-C05	2.18	132.75	129.39
4	A	603	VP1	C07-C06-C05	2.04	132.53	129.39
4	A	603	VP1	C13-C12-C05	2.04	132.53	129.39

There are no chirality outliers.

All (7) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	604	SER	O-C-CA-CB
5	A	604	SER	OXT-C-CA-CB
3	A	602	GOL	C1-C2-C3-O3
3	A	602	GOL	O2-C2-C3-O3
5	A	604	SER	OXT-C-CA-N
5	A	604	SER	O-C-CA-N
4	B	601	VP1	C05-C04-O03-C01

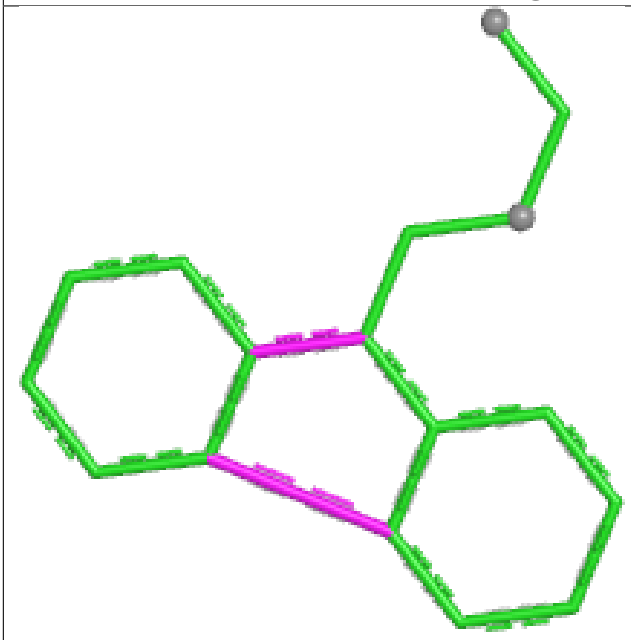
There are no ring outliers.

2 monomers are involved in 4 short contacts:

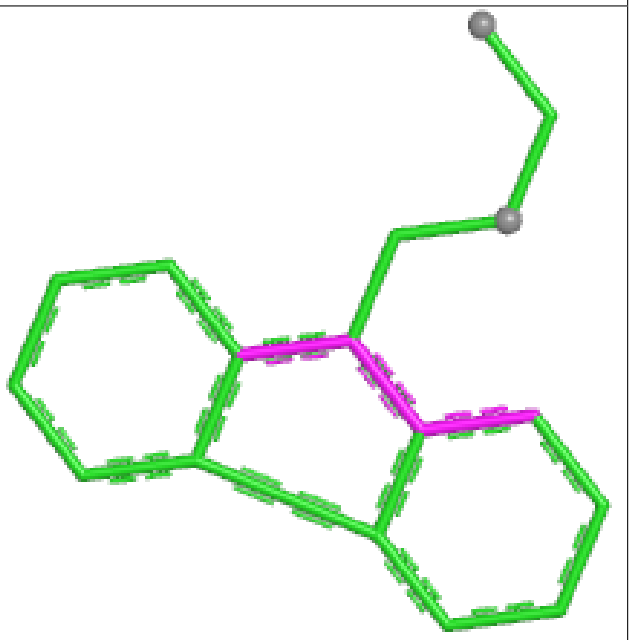
Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	B	602	SER	3	0
4	A	603	VP1	1	0

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 then 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.

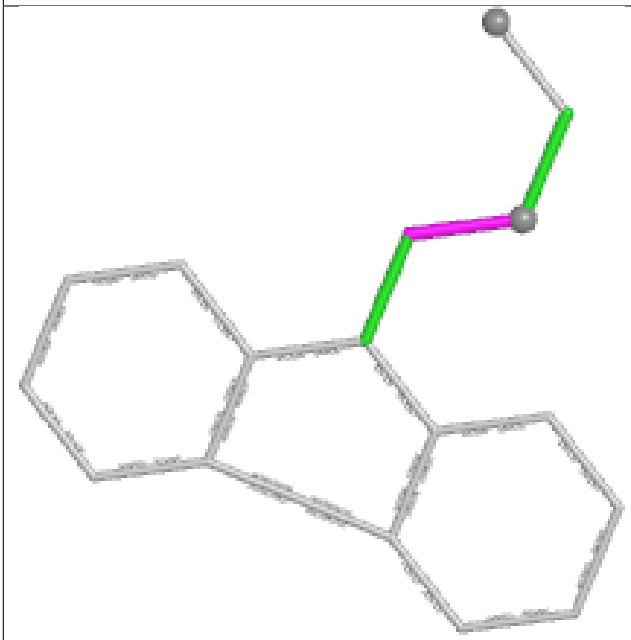
Ligand VP1 B 601



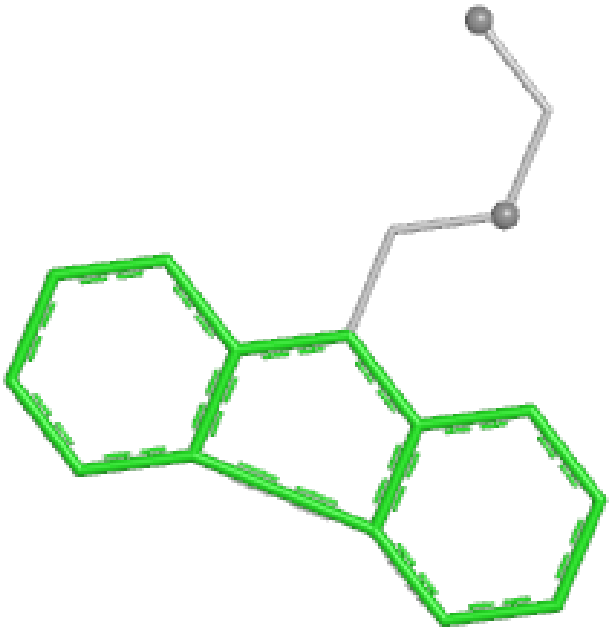
Bond lengths



Bond angles

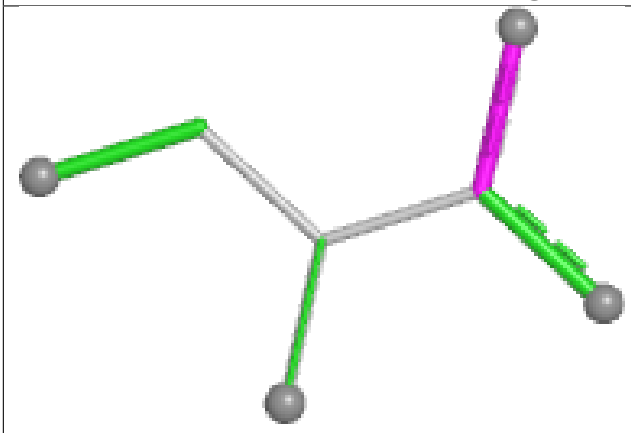


Torsions

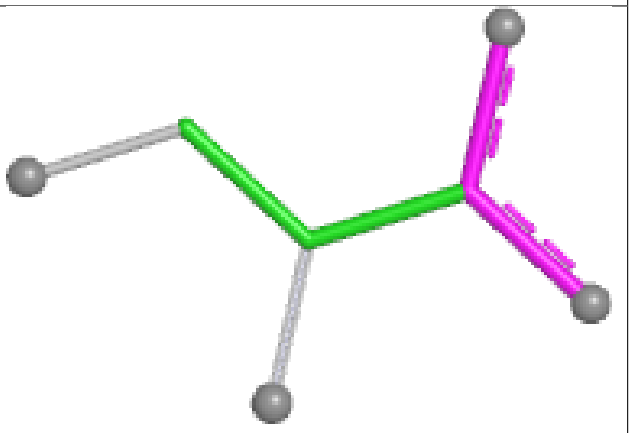


Rings

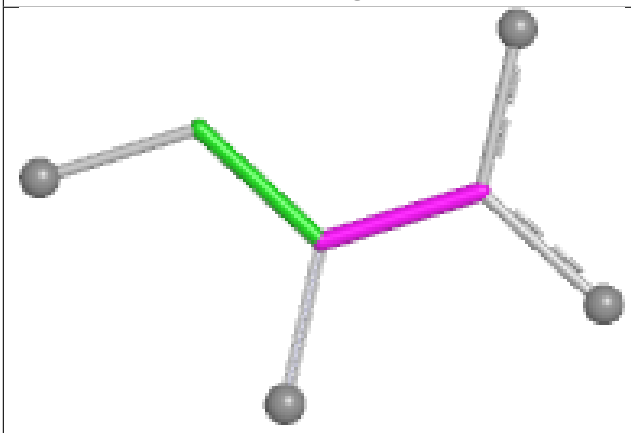
Ligand SER A 604



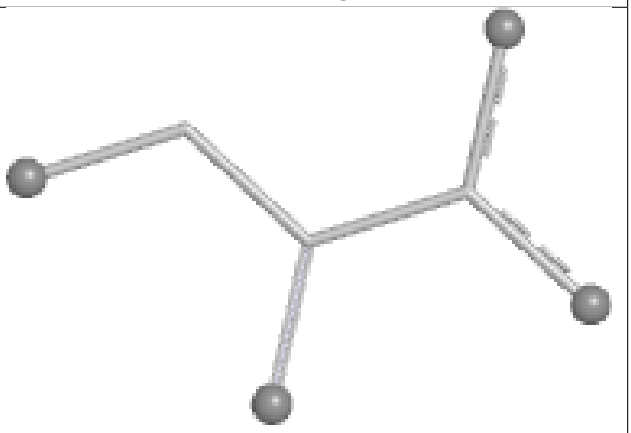
Bond lengths



Bond angles

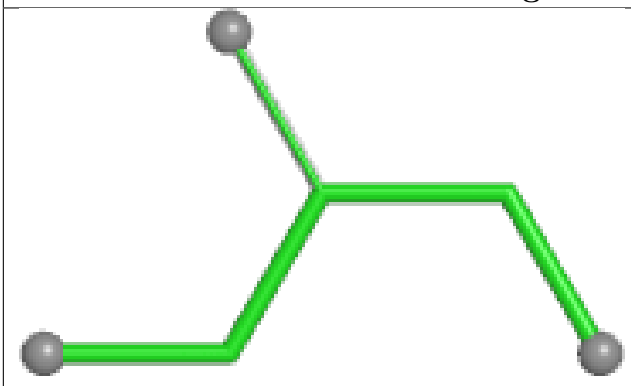


Torsions

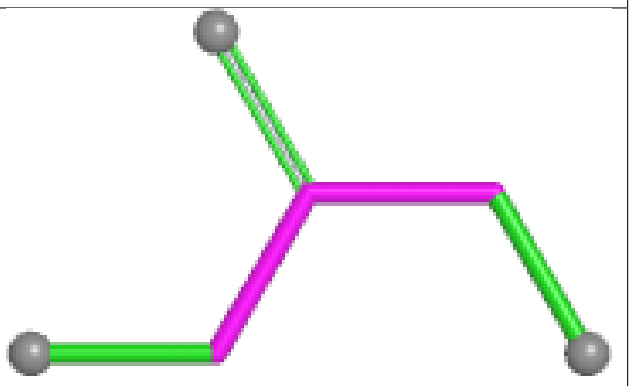


Rings

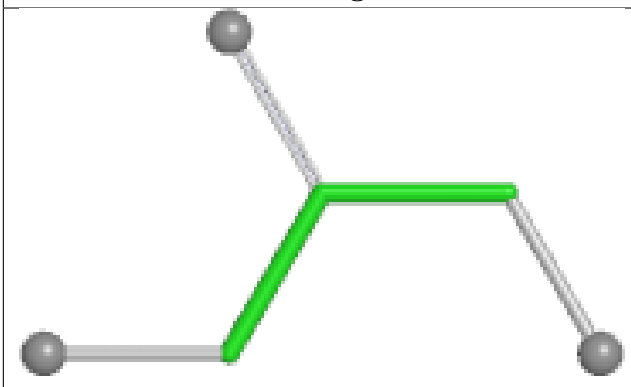
Ligand GOL A 601



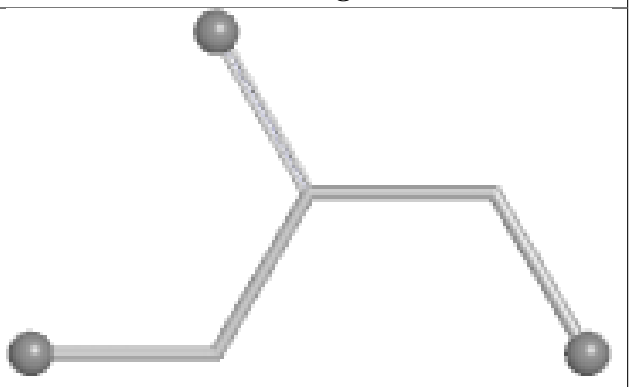
Bond lengths



Bond angles

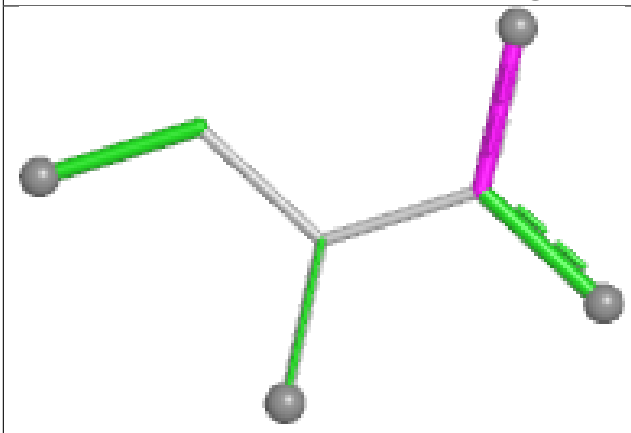


Torsions

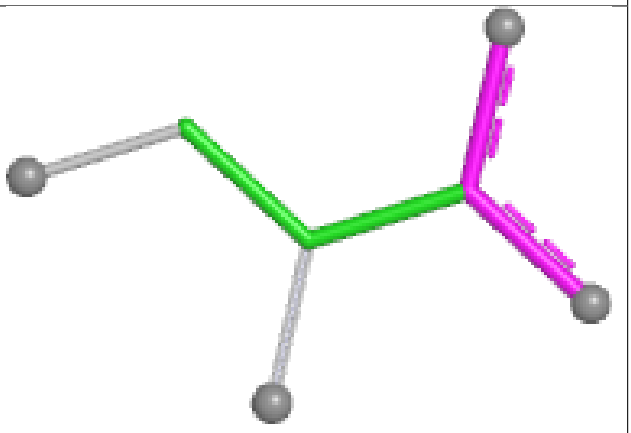


Rings

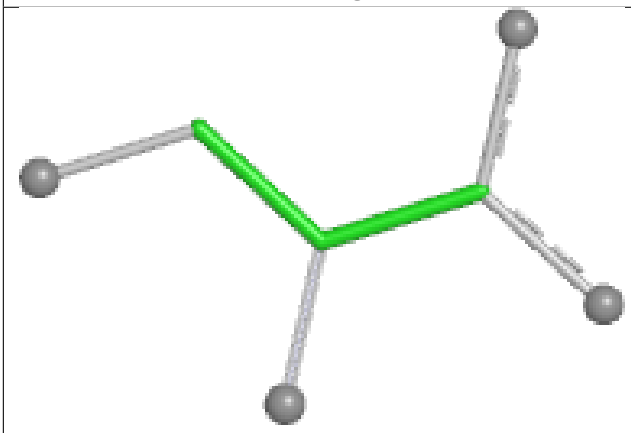
Ligand SER B 602



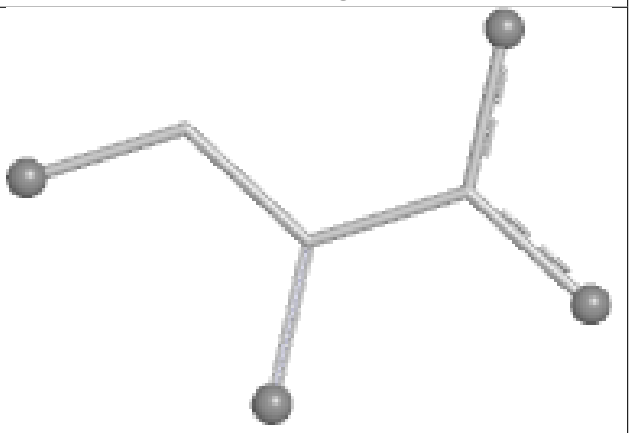
Bond lengths



Bond angles

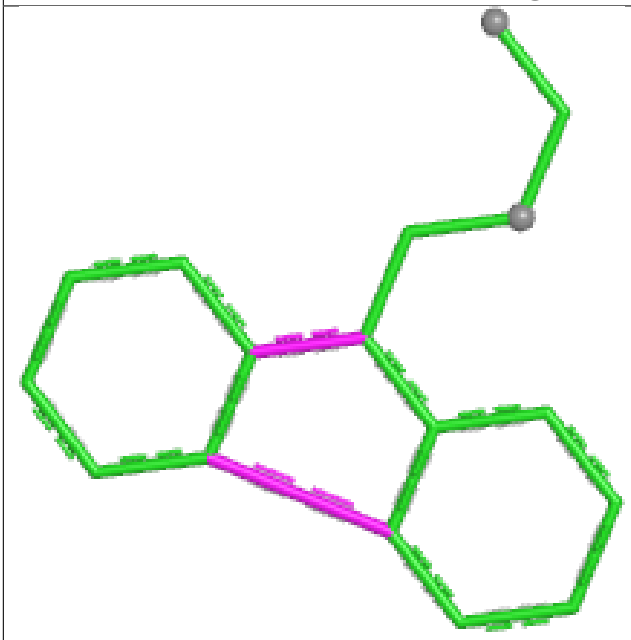


Torsions

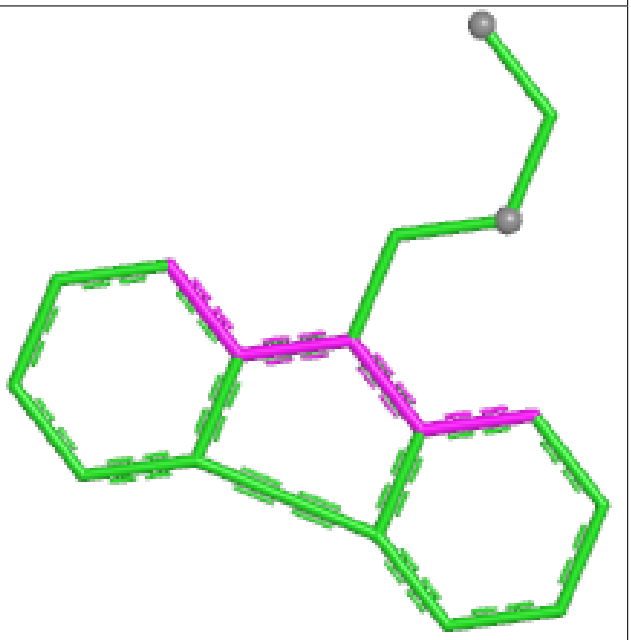


Rings

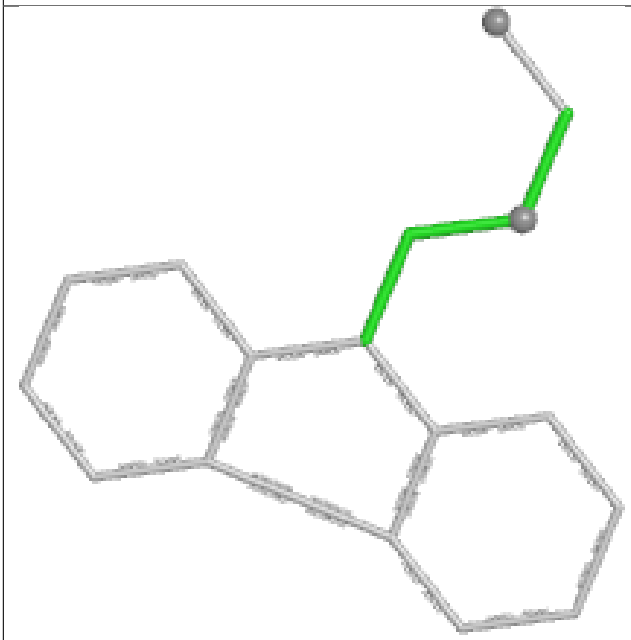
Ligand VP1 A 603



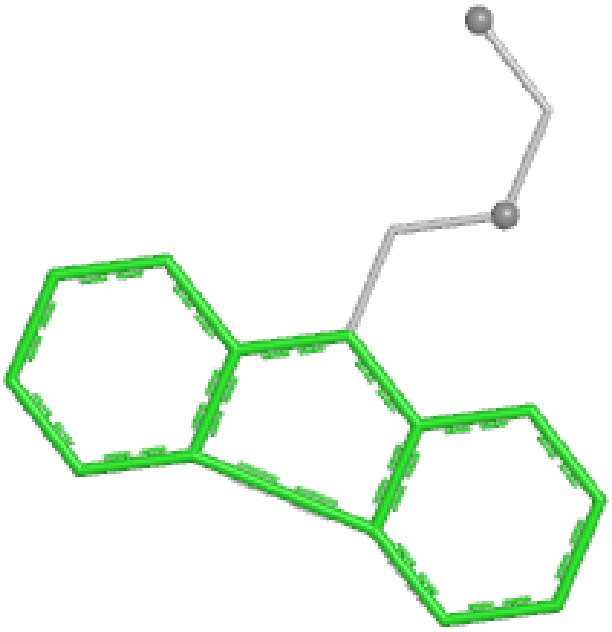
Bond lengths



Bond angles

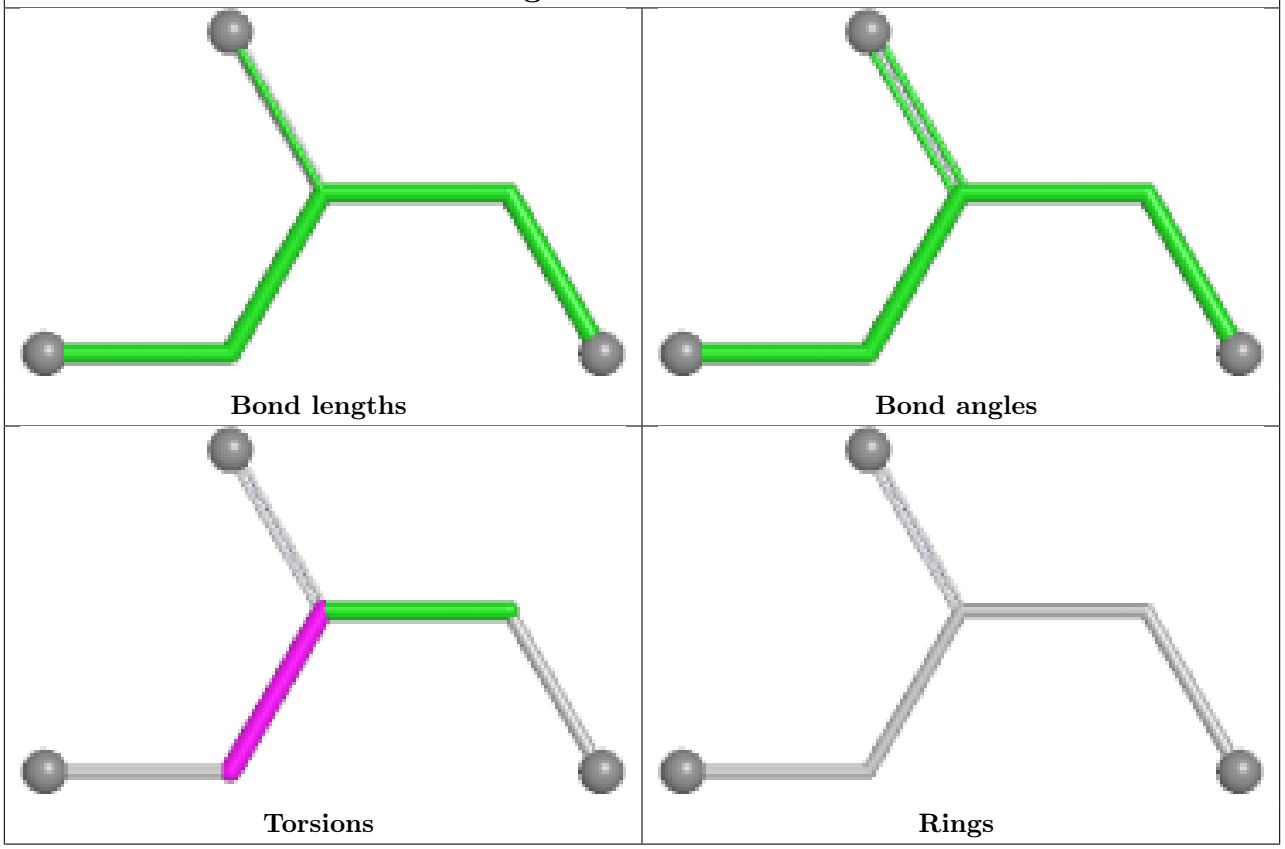


Torsions



Rings

Ligand GOL A 602



5.7 Other polymers

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

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^{th} 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	123/127 (96%)	-0.04	0 100 100	20, 41, 55, 63	4 (3%)
1	B	124/127 (97%)	0.00	1 (0%) 82 84	35, 44, 54, 65	0
All	All	247/254 (97%)	-0.02	1 (0%) 89 90	20, 42, 55, 65	4 (1%)

All (1) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	398	SER	2.0

6.2 Non-standard residues in protein, DNA, RNA chains

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

6.3 Carbohydrates

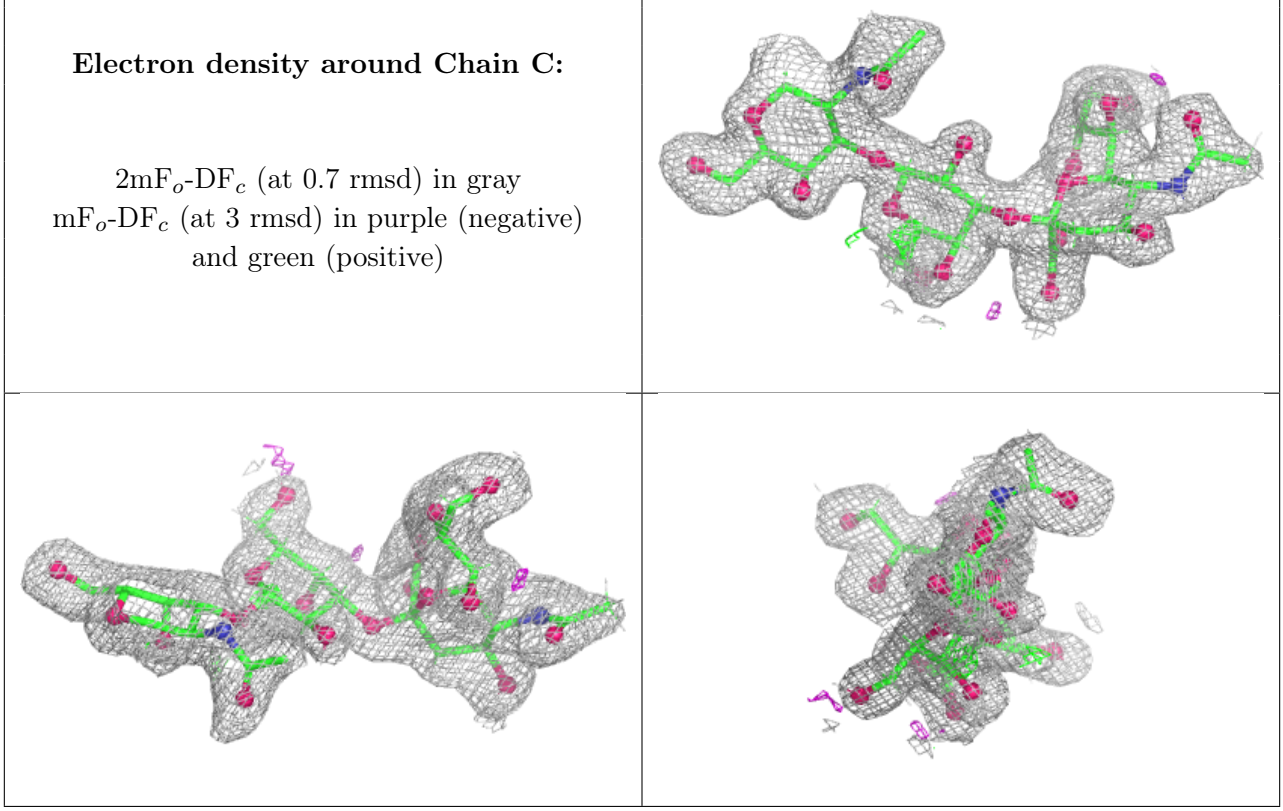
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' 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
2	A2G	D	1	14/15	0.91	0.11	36,42,46,47	0
2	GAL	D	2	11/12	0.91	0.10	36,44,54,57	0
2	SIA	D	3	20/21	0.92	0.07	32,42,50,51	0
2	GAL	C	2	11/12	0.93	0.08	0,36,43,45	0
2	A2G	C	1	14/15	0.94	0.07	30,35,40,40	0
2	SIA	C	3	20/21	0.96	0.06	30,36,50,50	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.

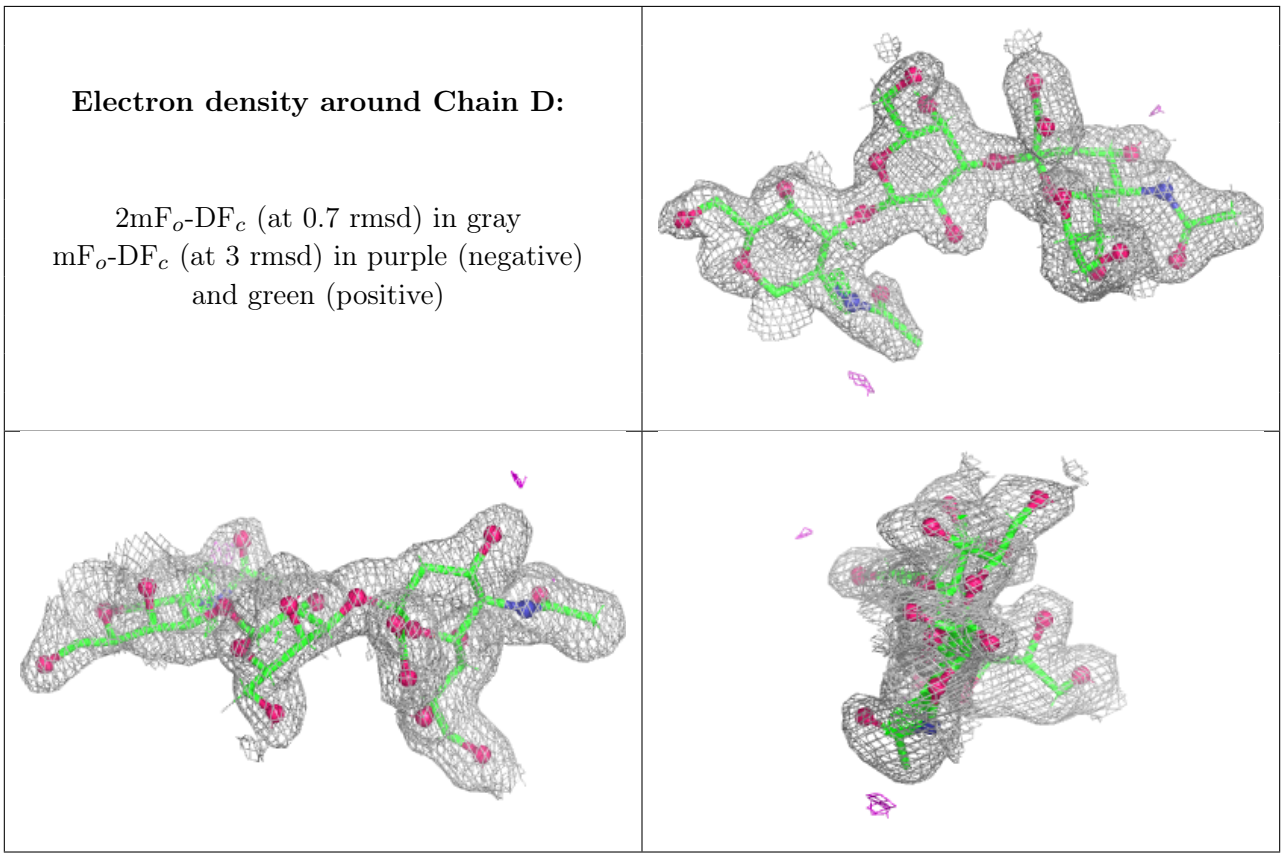
Electron density around Chain C:

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



Electron density around Chain D:

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



6.4 Ligands (i)

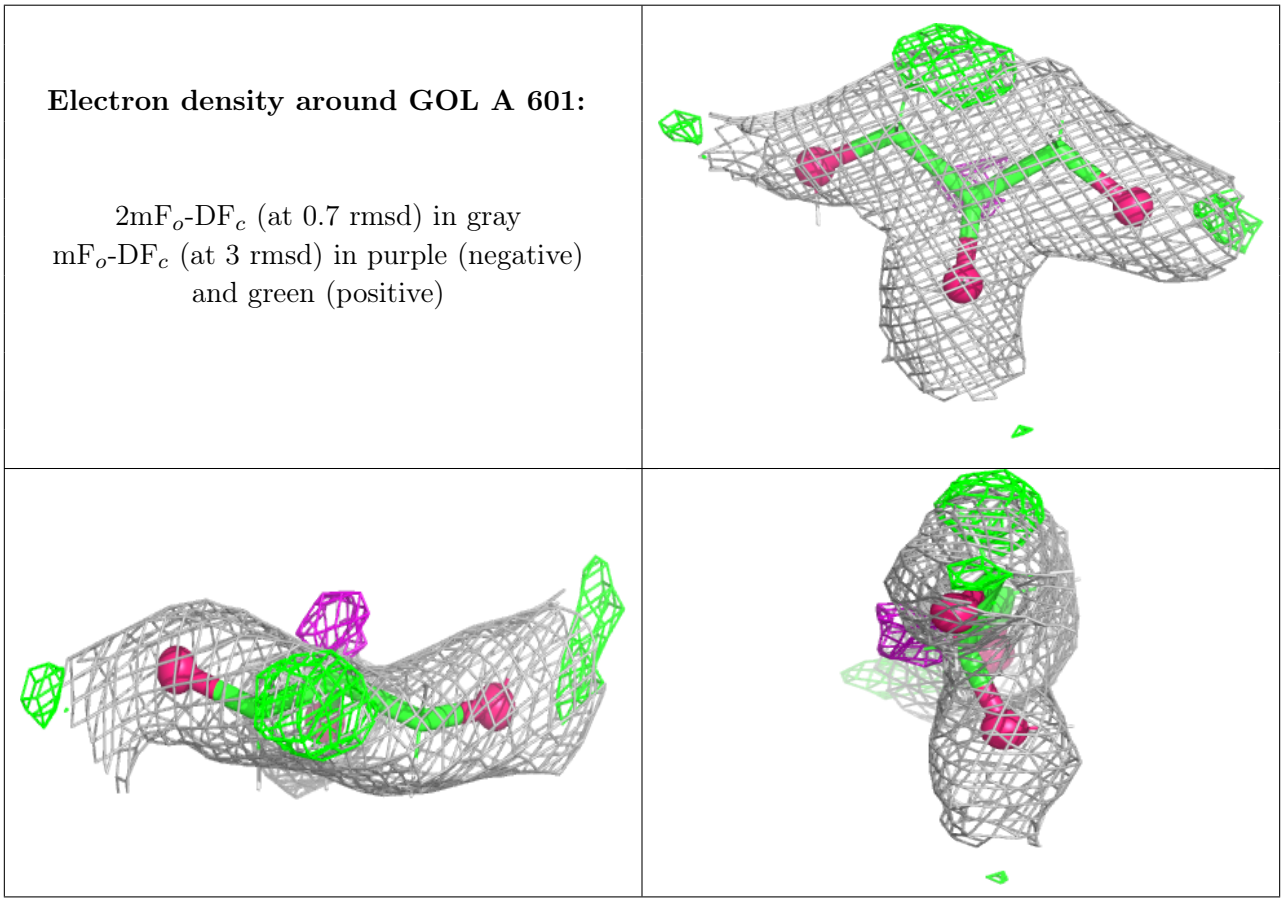
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' 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	GOL	A	601	6/6	0.75	0.15	41,57,69,74	0
3	GOL	A	602	6/6	0.80	0.19	48,62,81,97	0
5	SER	A	604	7/7	0.88	0.11	36,42,55,60	0
4	VP1	A	603	17/18	0.89	0.09	41,53,63,71	0
4	VP1	B	601	17/18	0.92	0.08	33,40,47,48	0
5	SER	B	602	7/7	0.95	0.07	33,38,49,50	0
6	CA	B	603	1/1	0.99	0.09	35,35,35,35	0
6	CA	A	605	1/1	1.00	0.06	29,29,29,29	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 GOL A 601:

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



Electron density around GOL A 602:

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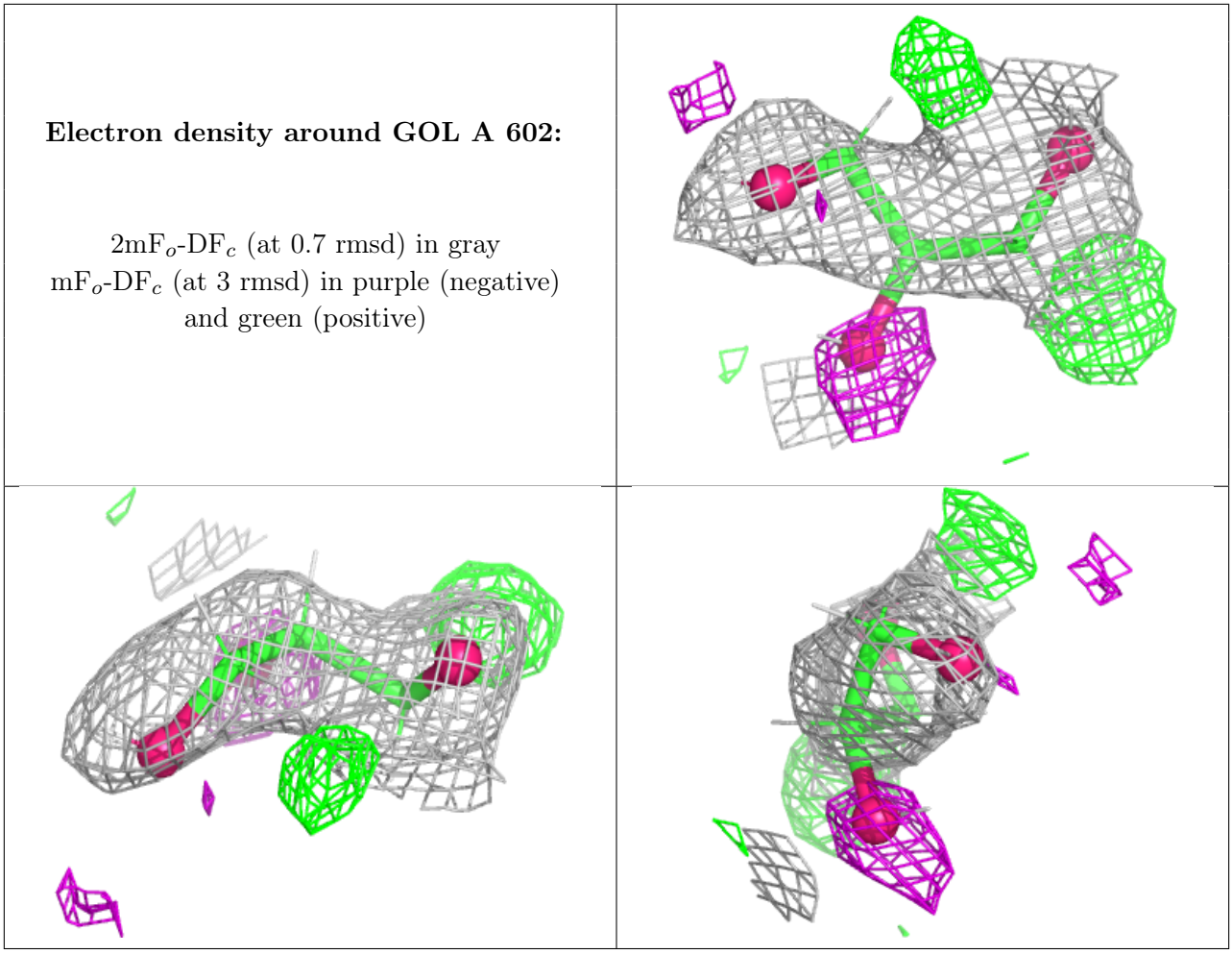
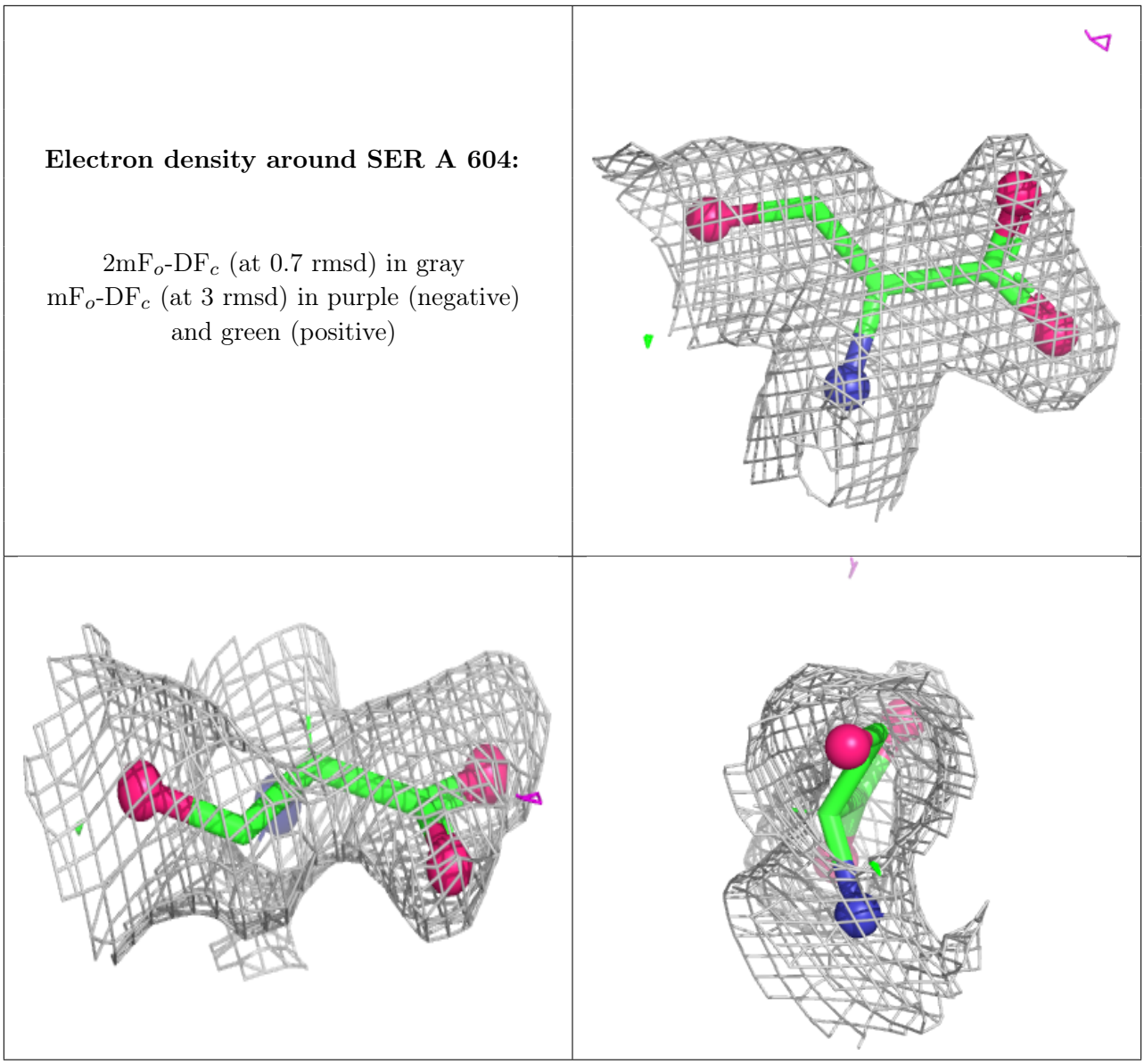
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)



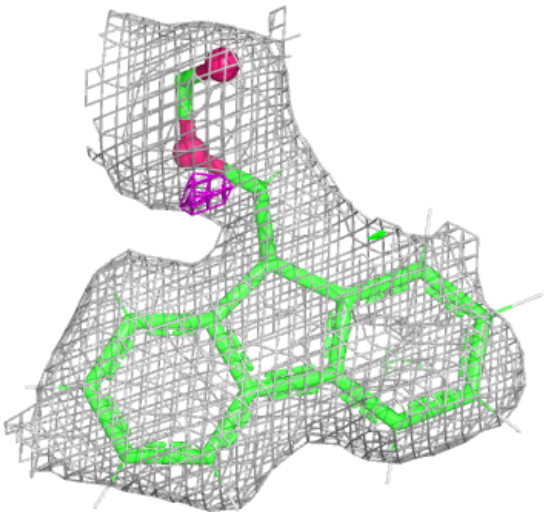
Electron density around SER A 604:

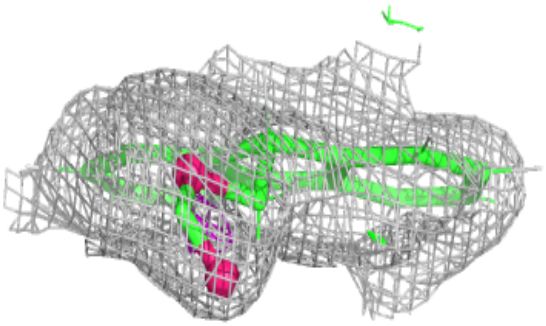
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

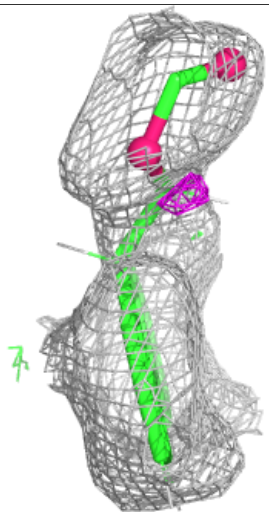


Electron density around VP1 A 603:

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

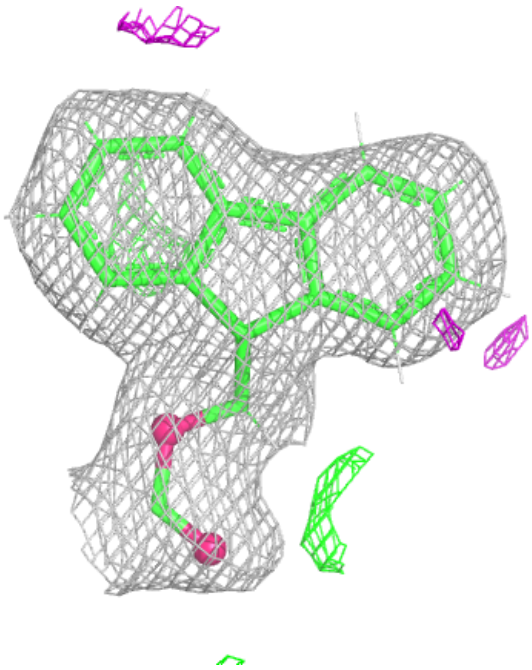


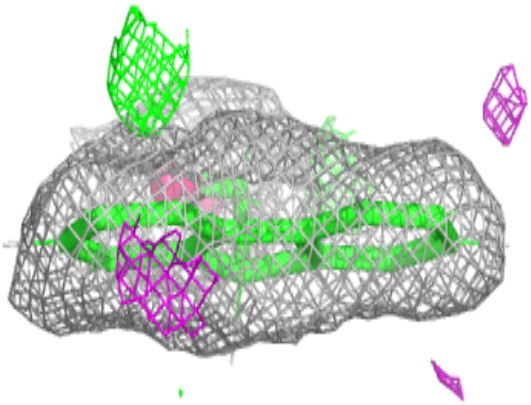


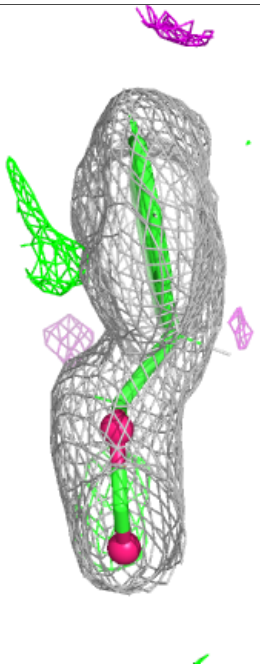


Electron density around VP1 B 601:

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

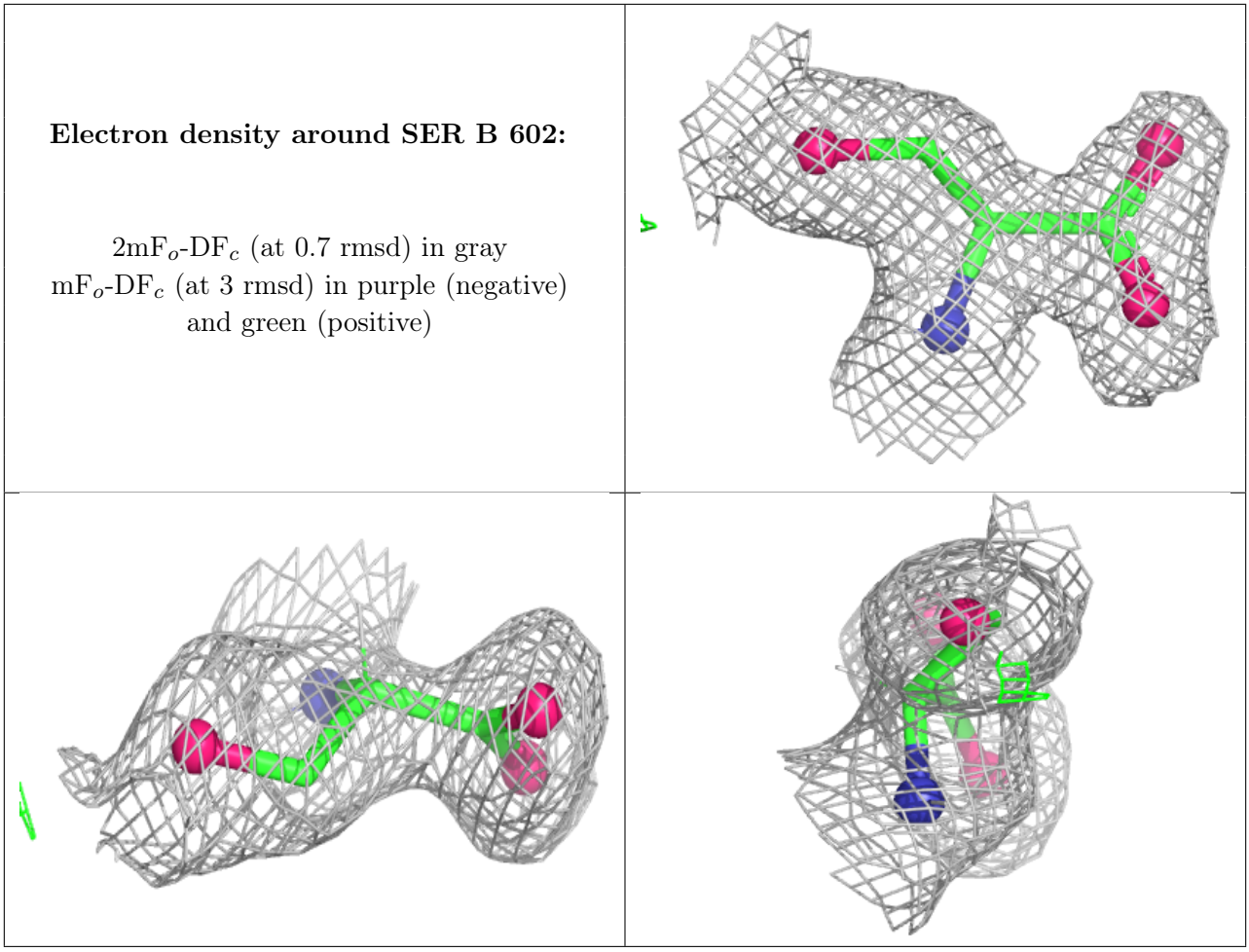






Electron density around SER B 602:

$2mF_o$-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.