



Full wwPDB X-ray Structure Validation Report ⓘ

Jun 28, 2021 – 01:15 PM BST

PDB ID : 7AD7
Title : Crystal structure of human complement C5 in complex with the K8 bovine knob domain peptide.
Authors : Macpherson, A.; van den Elsen, J.M.H.; Schulze, M.E.; Birtley, J.R.
Deposited on : 2020-09-14
Resolution : 2.30 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 ⓘ symbol.

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.20
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.20

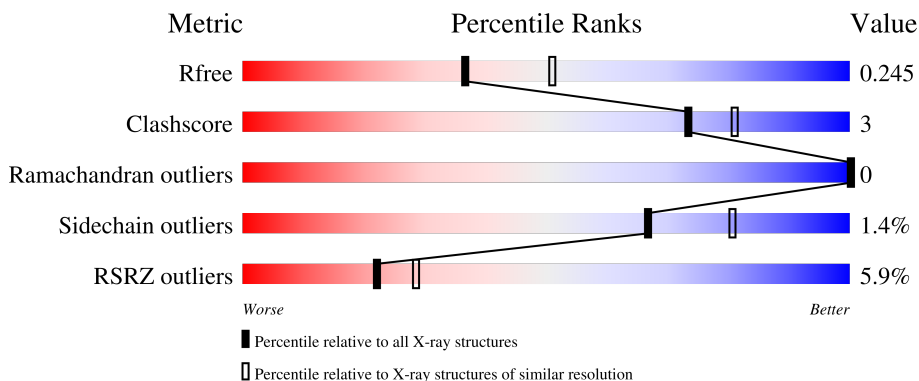
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.30 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	5042 (2.30-2.30)
Clashscore	141614	5643 (2.30-2.30)
Ramachandran outliers	138981	5575 (2.30-2.30)
Sidechain outliers	138945	5575 (2.30-2.30)
RSRZ outliers	127900	4938 (2.30-2.30)

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	1676	 2% 43% 53%
1	B	1676	 3% 34% 62%
2	C	52	 4% 90% 10%
3	D	2	 50% 50%

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
8	TAM	C	102	-	-	-	X

2 Entry composition [i](#)

There are 9 unique types of molecules in this entry. The entry contains 12100 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 Complement C5.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	B	635	4998	3211	794	980	13	0	1	0
1	A	782	6177	3958	1032	1159	28	0	2	0

- Molecule 2 is a protein called K8 peptide.

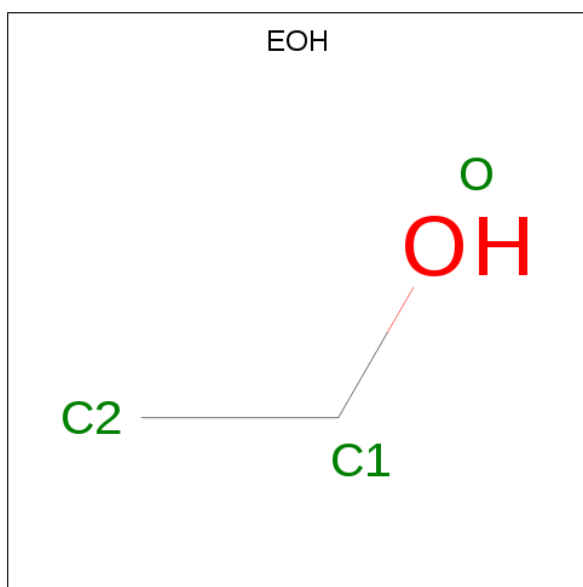
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	C	52	437	269	80	82	6	0	2	0

- Molecule 3 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



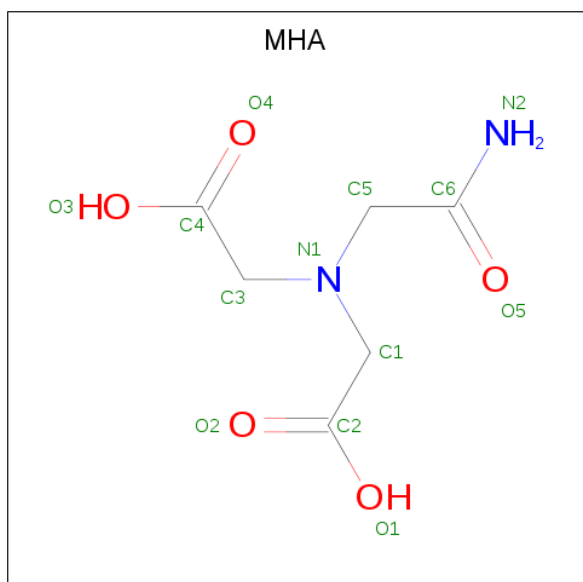
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
3	D	2	28	16	2	10	0	0	0

- Molecule 4 is ETHANOL (three-letter code: EOH) (formula: C₂H₆O) (labeled as "Ligand of Interest" by depositor).



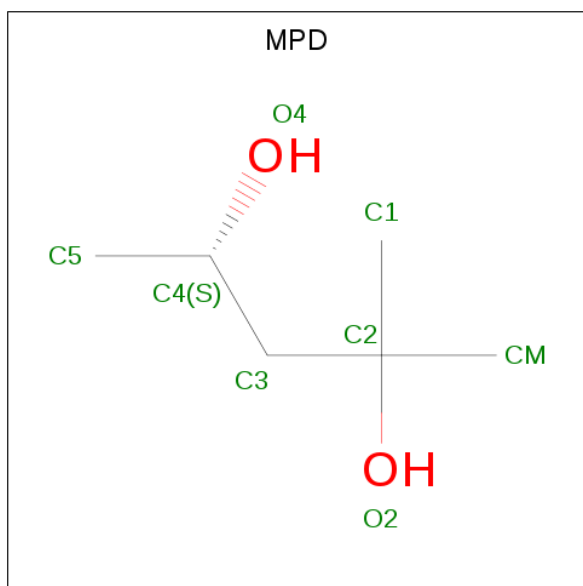
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	B	1	Total C O 3 2 1	0	0
4	B	1	Total C O 3 2 1	0	0
4	A	1	Total C O 3 2 1	0	0
4	C	1	Total C O 3 2 1	0	0

- Molecule 5 is (CARBAMOYLMETHYL-CARBOXYMETHYL-AMINO)-ACETIC ACID (three-letter code: MHA) (formula: $C_6H_{10}N_2O_5$) (labeled as "Ligand of Interest" by depositor).



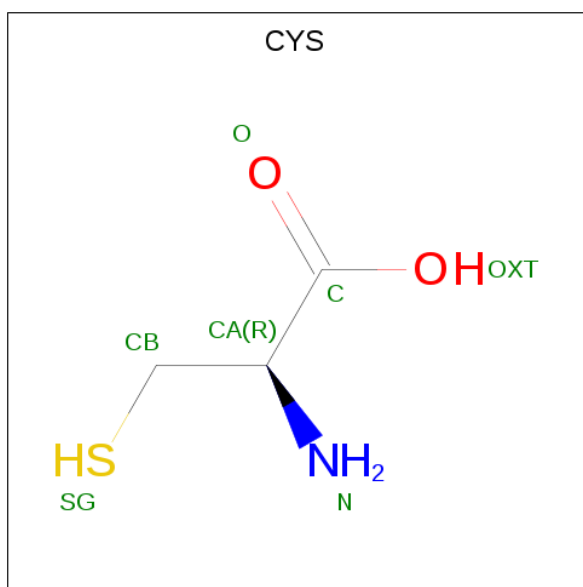
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
5	B	1	13	6	2	5	0	0

- Molecule 6 is (4S)-2-METHYL-2,4-PENTANEDIOL (three-letter code: MPD) (formula: C₆H₁₄O₂) (labeled as "Ligand of Interest" by depositor).



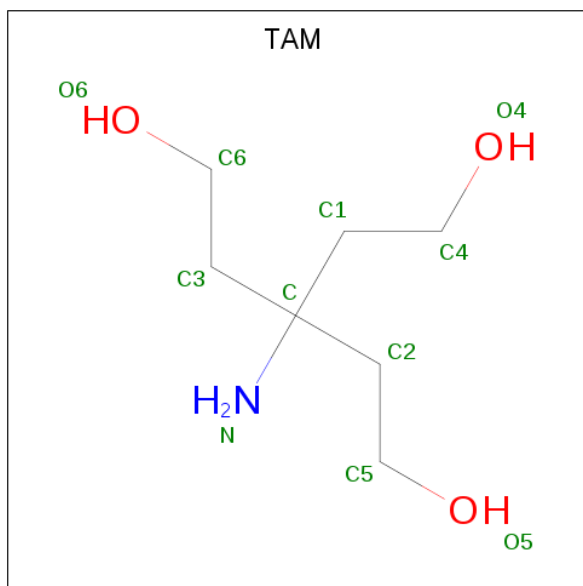
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
6	A	1	8	6	2	0	0
6	A	1	8	6	2	0	0

- Molecule 7 is CYSTEINE (three-letter code: CYS) (formula: C₃H₇NO₂S) (labeled as "Ligand of Interest" by depositor).



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

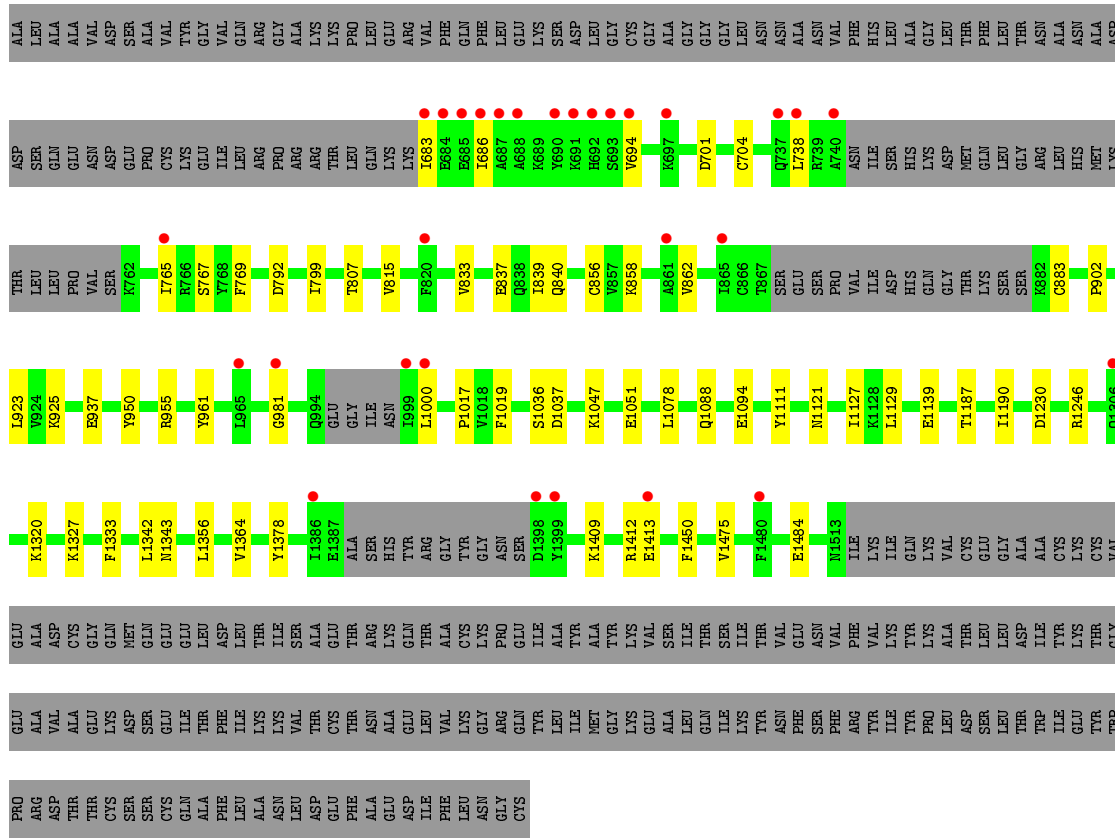
- Molecule 8 is TRIS(HYDROXYETHYL)AMINOMETHANE (three-letter code: TAM) (formula: C₇H₁₇NO₃) (labeled as "Ligand of Interest" by depositor).



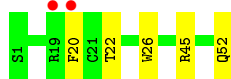
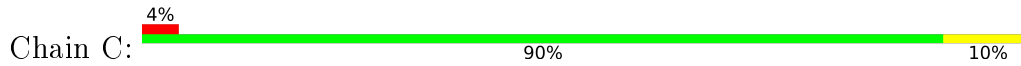
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
8	C	1	11	7	1	3	0	0

- Molecule 9 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	B	160	Total 160	O 160	0	0
9	A	223	Total 223	O 223	0	0
9	C	19	Total 19	O 19	0	0



• Molecule 2: K8 peptide



• Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	81.56Å 161.69Å 187.38Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	93.69 – 2.30 122.42 – 2.30	Depositor EDS
% Data completeness (in resolution range)	99.8 (93.69-2.30) 99.9 (122.42-2.30)	Depositor EDS
R_{merge}	0.04	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.30 (at 2.29Å)	Xtrriage
Refinement program	REFMAC 5.5, PHENIX 1.18_3845	Depositor
R, R_{free}	0.202 , 0.234 0.216 , 0.245	Depositor DCC
R_{free} test set	5591 reflections (5.06%)	wwPDB-VP
Wilson B-factor (Å ²)	46.3	Xtrriage
Anisotropy	0.539	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 44.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	12100	wwPDB-VP
Average B, all atoms (Å ²)	65.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.18% 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: EOH, NAG, MPD, MHA, TAM

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	0.27	0/6309	0.46	0/8554
1	B	0.27	0/5117	0.48	0/6962
2	C	0.28	0/452	0.50	0/611
All	All	0.27	0/11878	0.47	0/16127

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	6177	0	6167	31	1
1	B	4998	0	4888	41	1
2	C	437	0	364	2	0
3	D	28	0	25	1	0
4	A	3	0	6	0	0
4	B	6	0	12	0	0
4	C	3	0	6	0	0
5	B	13	0	8	1	0
6	A	16	0	28	1	0
7	A	6	0	3	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
8	C	11	0	17	3	0
9	A	223	0	0	2	0
9	B	160	0	0	1	0
9	C	19	0	0	0	0
All	All	12100	0	11524	77	1

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 3.

All (77) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:856:CYS:SG	9:A:2012:HOH:O	2.42	0.78
1:B:307:VAL:HB	1:B:312:TYR:HB2	1.70	0.72
1:A:833:VAL:HG11	1:A:839:ILE:HD13	1.75	0.68
1:A:981:GLY:HA3	1:A:1333:PHE:HB2	1.76	0.67
1:A:799:ILE:HB	1:A:815:VAL:HG23	1.76	0.67
1:B:484:ILE:HD13	1:B:540:LEU:HD21	1.78	0.64
1:A:1094:GLU:HB2	6:A:1703:MPD:H51	1.82	0.62
1:B:412:ARG:HB2	1:B:415:ASP:HB2	1.81	0.61
1:A:683:ILE:HA	1:A:686:ILE:HD12	1.87	0.57
1:A:858:LYS:NZ	9:A:1804:HOH:O	2.38	0.56
1:B:545:ILE:HG12	1:B:554:LEU:HD23	1.87	0.56
1:A:1230:ASP:HB3	1:A:1246:ARG:HG3	1.87	0.56
1:B:465:LEU:HD11	1:B:486:VAL:HG13	1.90	0.53
1:B:577:PRO:HD2	1:B:588:VAL:HG23	1.90	0.53
1:B:307:VAL:HG11	1:B:318:LEU:HD11	1.89	0.53
1:A:1047:LYS:HG2	1:A:1051:GLU:OE2	2.09	0.52
1:A:1378:TYR:CZ	1:A:1409:LYS:HD2	2.44	0.52
1:B:115:LYS:HE2	1:B:652:THR:OG1	2.10	0.51
1:B:503:ILE:HB	1:B:511:HIS:HB2	1.93	0.51
1:B:373:VAL:HG21	1:B:435:VAL:HG11	1.93	0.51
1:A:1187:THR:HA	1:A:1190:ILE:HG22	1.93	0.50
1:B:469:TRP:HB3	1:B:484:ILE:HG22	1.93	0.49
1:B:415:ASP:HB3	1:B:417:VAL:HB	1.93	0.49
1:A:1000:LEU:HD11	1:A:1017:PRO:HG3	1.94	0.49
1:B:25:ILE:O	1:B:653:PHE:HA	2.12	0.48
1:B:151:ASP:OD1	1:B:508:LYS:HE3	2.13	0.48
1:A:937:GLU:HG2	1:A:1364:VAL:HG22	1.95	0.48
5:B:1703:MHA:O1	5:B:1703:MHA:HC31	2.13	0.48
1:A:923:LEU:HD21	1:A:925:LYS:HE2	1.97	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:D:1:NAG:H62	3:D:2:NAG:H82	1.96	0.47
1:A:765:ILE:HG12	1:A:767:SER:H	1.79	0.47
1:B:363:LEU:HB2	1:B:456:ALA:HA	1.97	0.47
1:B:504:LEU:HD11	1:B:651:LEU:HD11	1.96	0.47
2:C:26:TRP:CZ3	8:C:102:TAM:H22	2.50	0.47
2:C:20:PHE:CE2	2:C:22:THR:HG22	2.51	0.46
1:B:264:ASP:OD2	1:B:266:TYR:HE1	1.99	0.46
1:A:1450:PHE:CZ	1:A:1475:VAL:HB	2.50	0.46
1:A:1412:ARG:O	1:A:1413[A]:GLU:HB2	2.16	0.46
1:B:626:PHE:HD1	1:B:629:LYS:HD3	1.81	0.46
1:B:263:ALA:O	1:B:291:MET:HG2	2.16	0.46
1:A:1111:TYR:CE1	1:A:1121:ASN:HB2	2.51	0.46
1:B:267:ILE:HG12	1:B:327:VAL:HG22	1.98	0.45
1:A:840:GLN:HG2	1:A:1484:GLU:HG2	1.98	0.45
1:B:609:VAL:HG12	1:A:769:PHE:CG	2.52	0.45
1:A:858:LYS:HE3	1:A:883:CYS:HB2	1.98	0.45
1:A:701:ASP:HA	1:A:704:CYS:SG	2.58	0.44
1:A:1111:TYR:CZ	1:A:1121:ASN:HB2	2.52	0.44
1:A:1036:SER:OG	1:A:1037:ASP:N	2.50	0.44
1:A:1129:LEU:HD13	1:A:1139:GLU:HB3	2.00	0.44
1:A:1320:LYS:HG2	1:A:1342:LEU:HD13	2.00	0.43
1:B:76:GLU:N	1:B:76:GLU:OE1	2.51	0.43
1:A:950:TYR:HE1	1:A:1356:LEU:HD11	1.83	0.43
1:A:1019:PHE:CZ	1:A:1088:GLN:HB3	2.54	0.43
1:B:276:LYS:HA	1:B:276:LYS:HD3	1.84	0.43
1:B:292:LEU:HD21	1:B:295:GLY:HA2	1.99	0.43
1:B:546:VAL:HG23	1:B:553:GLU:HB3	2.01	0.43
1:B:263:ALA:HB3	1:B:292:LEU:HD22	2.01	0.43
1:B:272:ARG:HG3	1:B:324:TYR:HB2	2.01	0.43
8:C:102:TAM:O5	8:C:102:TAM:N	2.52	0.43
1:B:414:ASP:OD1	1:B:415:ASP:N	2.52	0.42
1:B:503:ILE:HD11	1:B:528:ILE:HG21	2.01	0.42
1:B:308:LYS:HE2	1:B:309:GLU:N	2.34	0.42
1:B:251:LYS:HG2	1:B:296:ILE:HD13	2.01	0.42
1:A:837:GLU:O	1:A:902:PRO:HD2	2.20	0.42
1:B:259:VAL:HB	1:B:295:GLY:HA3	2.00	0.42
1:B:549:GLU:CD	1:B:549:GLU:H	2.23	0.42
1:B:232:GLU:HB2	1:B:249:THR:OG1	2.20	0.41
1:B:393:GLN:NE2	9:B:1811:HOH:O	2.52	0.41
1:B:395:ILE:HG12	1:B:401:THR:HG22	2.03	0.41
1:B:268:THR:OG1	1:B:326:ALA:HB3	2.21	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:266:TYR:HB2	1:B:328:THR:OG1	2.21	0.40
1:A:961:TYR:CZ	1:A:1343:ASN:HB3	2.56	0.40
8:C:102:TAM:H21	8:C:102:TAM:H61	1.50	0.40
1:B:312:TYR:HD1	1:B:317:ASP:HB3	1.87	0.40
1:B:482:LEU:HD21	1:B:484:ILE:HG23	2.03	0.40
1:A:1127:ILE:HD13	1:A:1129:LEU:HG	2.03	0.40
1:B:331:GLU:OE2	1:B:333:THR:OG1	2.38	0.40

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

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:434:ASN:OD1	1:A:955:ARG:NH2[3_655]	2.04	0.16

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	774/1676 (46%)	753 (97%)	21 (3%)	0	100	100
1	B	630/1676 (38%)	612 (97%)	18 (3%)	0	100	100
2	C	52/52 (100%)	52 (100%)	0	0	100	100
All	All	1456/3404 (43%)	1417 (97%)	39 (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	689/1484 (46%)	682 (99%)	7 (1%)	76	87
1	B	558/1484 (38%)	549 (98%)	9 (2%)	62	78
2	C	45/43 (105%)	43 (96%)	2 (4%)	28	39
All	All	1292/3011 (43%)	1274 (99%)	18 (1%)	67	81

All (18) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	61	ASP
1	B	393	GLN
1	B	471	ASP
1	B	482	LEU
1	B	546	VAL
1	B	550	GLN
1	B	624	PHE
1	B	625	GLN
1	B	626	PHE
1	A	694	VAL
1	A	738	LEU
1	A	792	ASP
1	A	807	THR
1	A	862	VAL
1	A	1078	LEU
1	A	1327	LYS
2	C	45	ARG
2	C	52	GLN

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

2 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	D	1	1,3	14,14,15	0.24	0	17,19,21	0.57	0
3	NAG	D	2	3	14,14,15	0.32	0	17,19,21	1.14	2 (11%)

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	D	1	1,3	-	4/6/23/26	0/1/1/1
3	NAG	D	2	3	-	2/6/23/26	0/1/1/1

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	2	NAG	C1-O5-C5	3.31	116.68	112.19
3	D	2	NAG	C3-C4-C5	2.63	114.93	110.24

There are no chirality outliers.

All (6) torsion outliers are listed below:

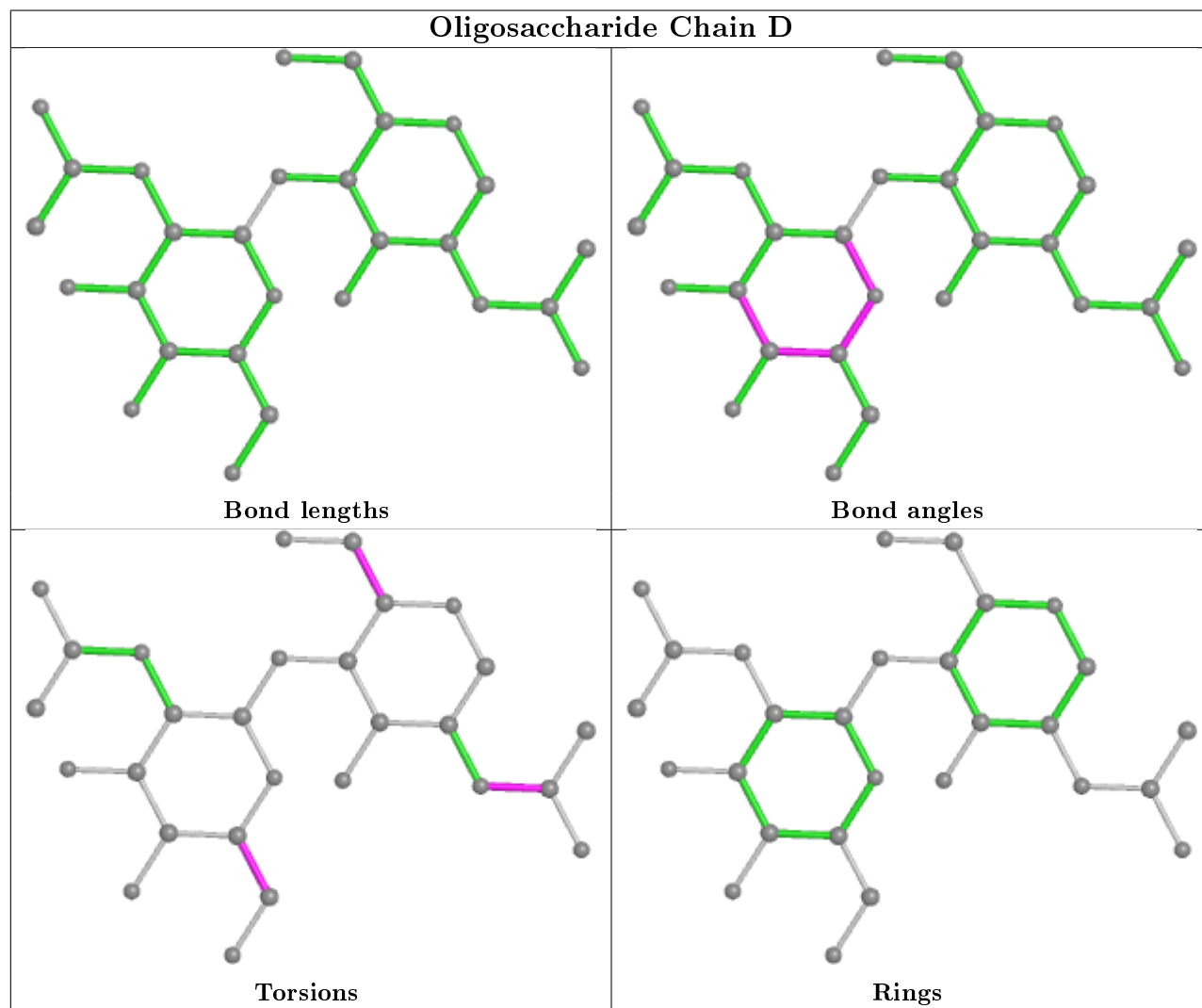
Mol	Chain	Res	Type	Atoms
3	D	2	NAG	C4-C5-C6-O6
3	D	2	NAG	O5-C5-C6-O6
3	D	1	NAG	O5-C5-C6-O6
3	D	1	NAG	C8-C7-N2-C2
3	D	1	NAG	O7-C7-N2-C2
3	D	1	NAG	C4-C5-C6-O6

There are no ring outliers.

2 monomers are involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	D	2	NAG	1	0
3	D	1	NAG	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 oligosaccharide.



5.6 Ligand geometry [i](#)

9 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The

Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
4	EOH	B	1701	-	2,2,2	0.48	0	1,1,1	0.14	0
6	MPD	A	1702	-	7,7,7	0.32	0	9,10,10	0.33	0
4	EOH	C	101	-	2,2,2	0.47	0	1,1,1	0.20	0
7	CYS	A	1704	1	4,5,6	0.58	0	1,5,7	0.07	0
5	MHA	B	1703	-	6,12,12	1.81	1 (16%)	9,15,15	2.12	4 (44%)
4	EOH	A	1701	-	2,2,2	0.47	0	1,1,1	0.17	0
4	EOH	B	1702	-	2,2,2	0.46	0	1,1,1	0.18	0
8	TAM	C	102	-	7,10,10	0.62	0	9,12,12	0.59	0
6	MPD	A	1703	-	7,7,7	0.25	0	9,10,10	0.43	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
6	MPD	A	1702	-	-	4/5/5/5	-
7	CYS	A	1704	1	-	0/1/4/6	-
5	MHA	B	1703	-	-	2/8/12/12	-
8	TAM	C	102	-	-	9/12/12/12	-
6	MPD	A	1703	-	-	5/5/5/5	-

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	B	1703	MHA	C6-N2	3.90	1.45	1.32

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	B	1703	MHA	C2-C1-N1	4.09	119.31	113.48
5	B	1703	MHA	C3-N1-C1	2.79	115.61	110.72
5	B	1703	MHA	C5-C6-N2	2.17	119.29	115.86
5	B	1703	MHA	C1-N1-C5	-2.11	107.50	112.02

There are no chirality outliers.

All (20) torsion outliers are listed below:

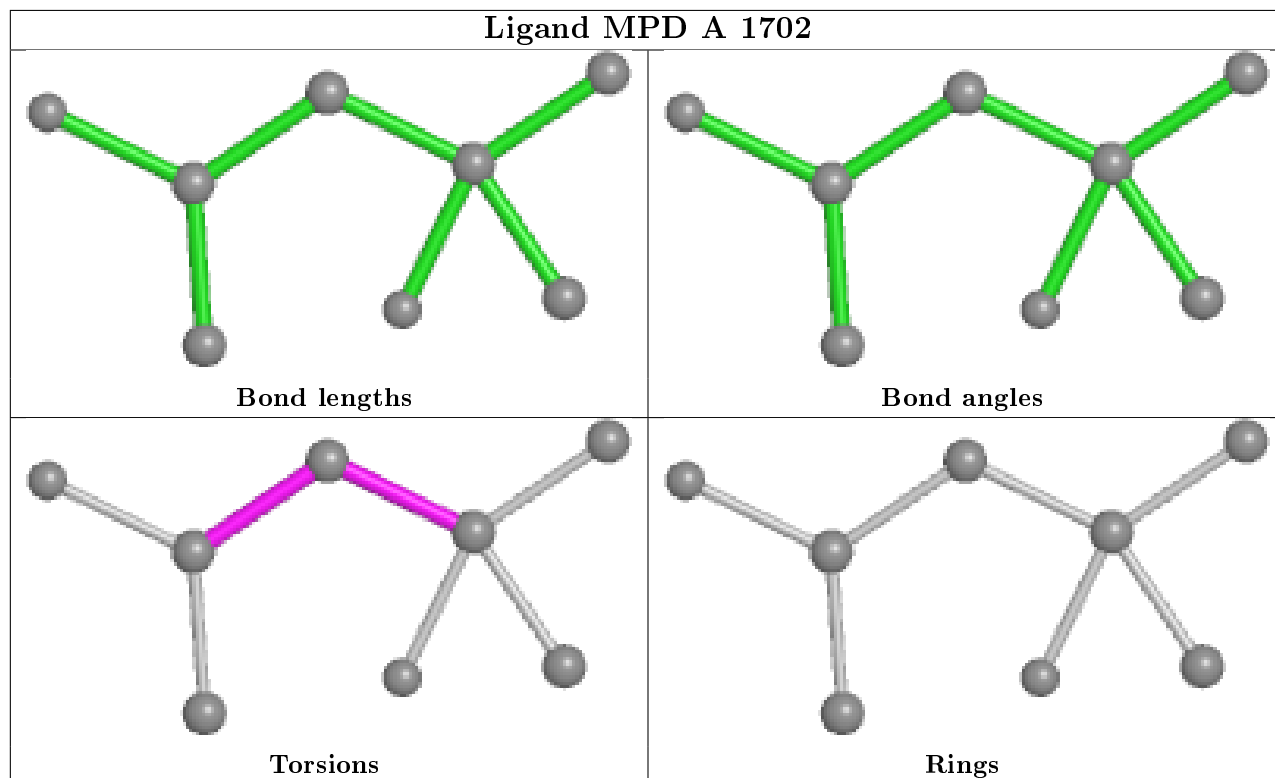
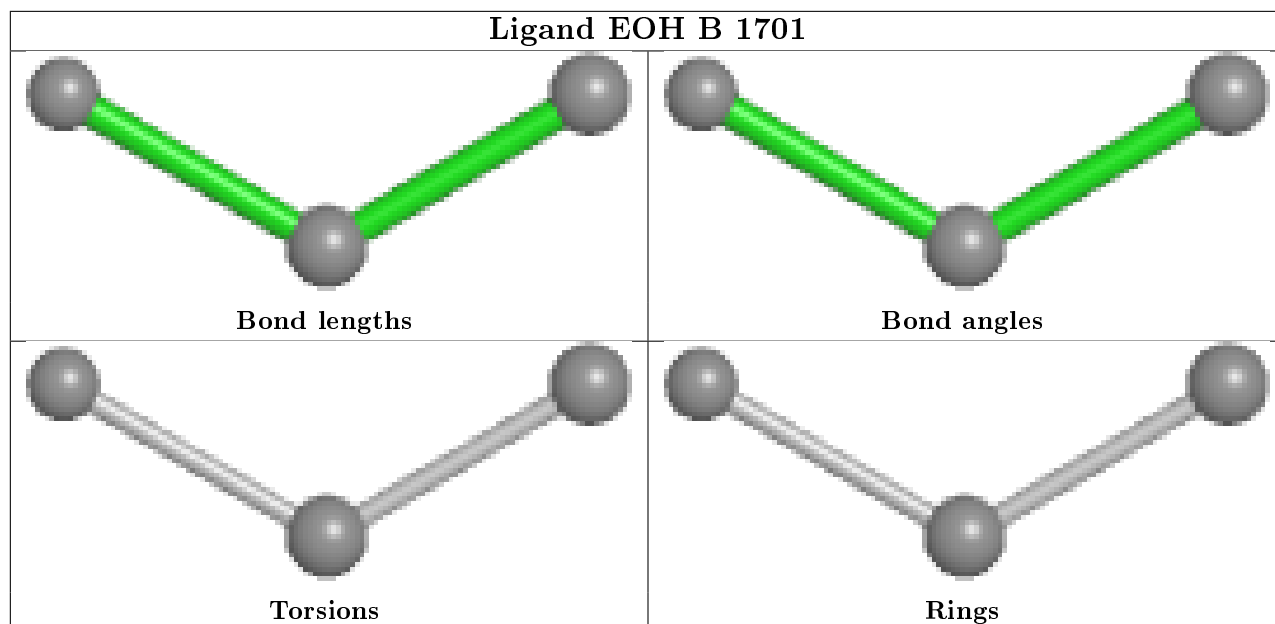
Mol	Chain	Res	Type	Atoms
6	A	1702	MPD	C2-C3-C4-O4
6	A	1703	MPD	C1-C2-C3-C4
6	A	1703	MPD	O2-C2-C3-C4
6	A	1703	MPD	C2-C3-C4-O4
8	C	102	TAM	C3-C-C1-C4
8	C	102	TAM	N-C-C1-C4
8	C	102	TAM	C1-C-C2-C5
8	C	102	TAM	C3-C-C2-C5
8	C	102	TAM	N-C-C2-C5
8	C	102	TAM	C1-C-C3-C6
8	C	102	TAM	C2-C-C3-C6
8	C	102	TAM	N-C-C3-C6
8	C	102	TAM	C2-C-C1-C4
6	A	1702	MPD	O2-C2-C3-C4
5	B	1703	MHA	C4-C3-N1-C5
6	A	1703	MPD	C2-C3-C4-C5
6	A	1702	MPD	C1-C2-C3-C4
6	A	1702	MPD	CM-C2-C3-C4
6	A	1703	MPD	CM-C2-C3-C4
5	B	1703	MHA	C2-C1-N1-C3

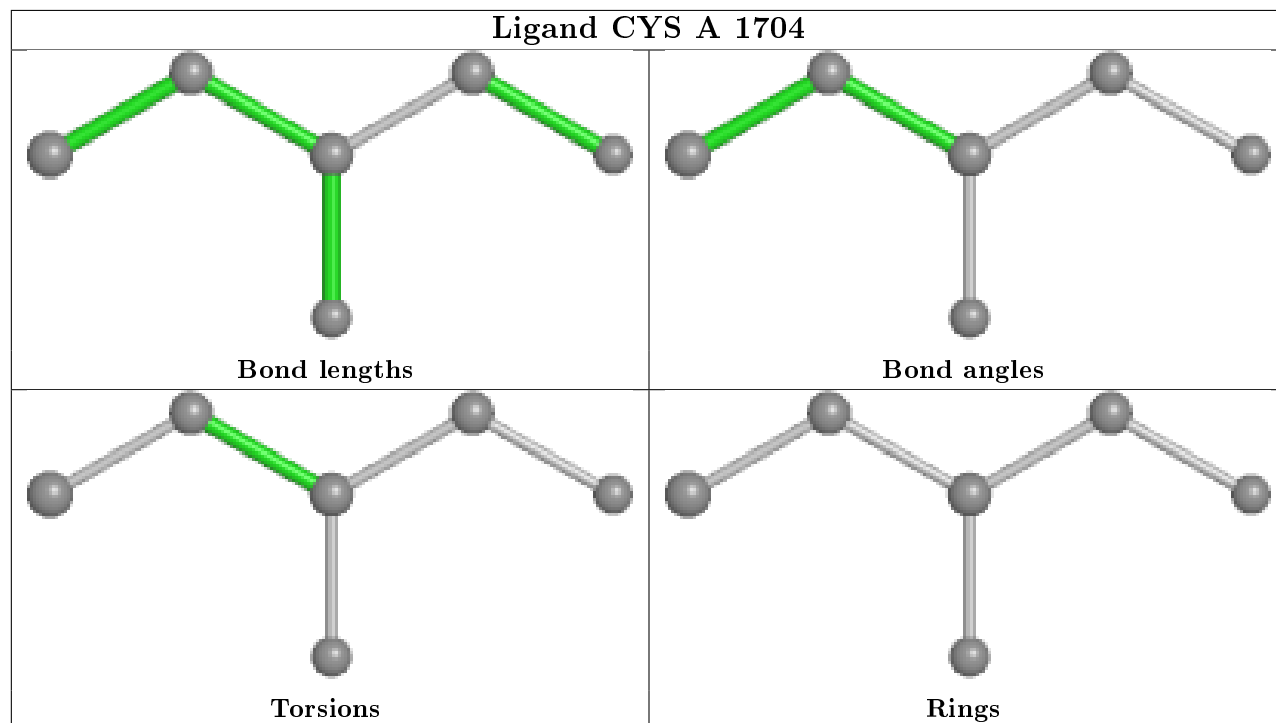
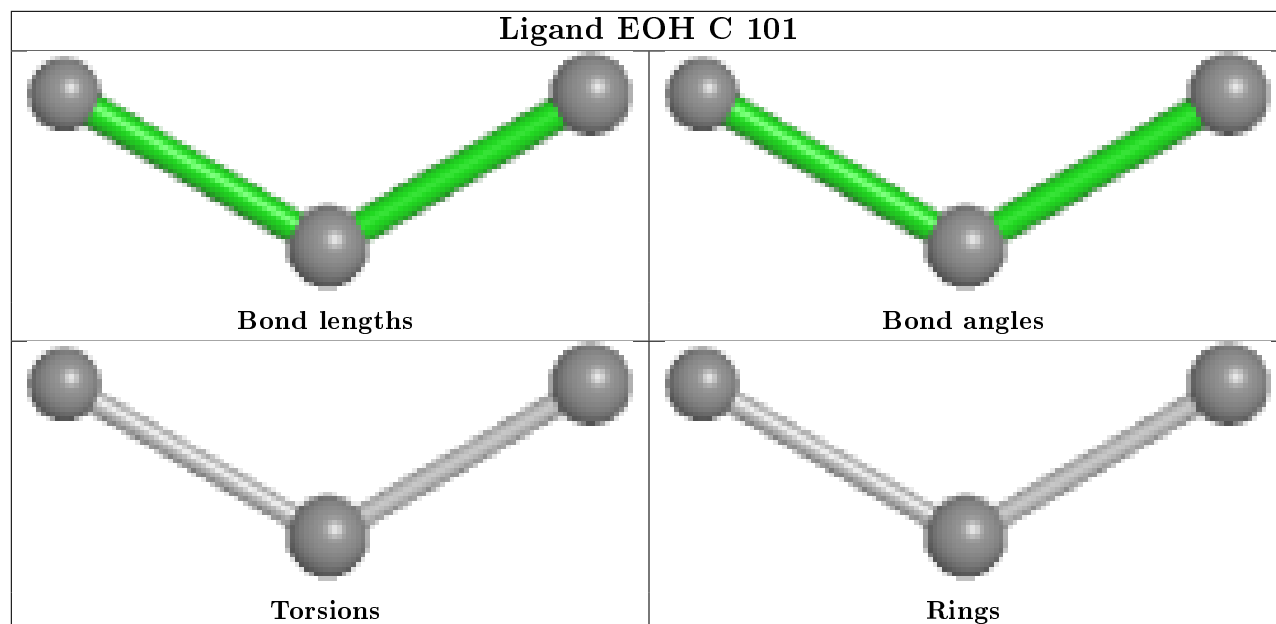
There are no ring outliers.

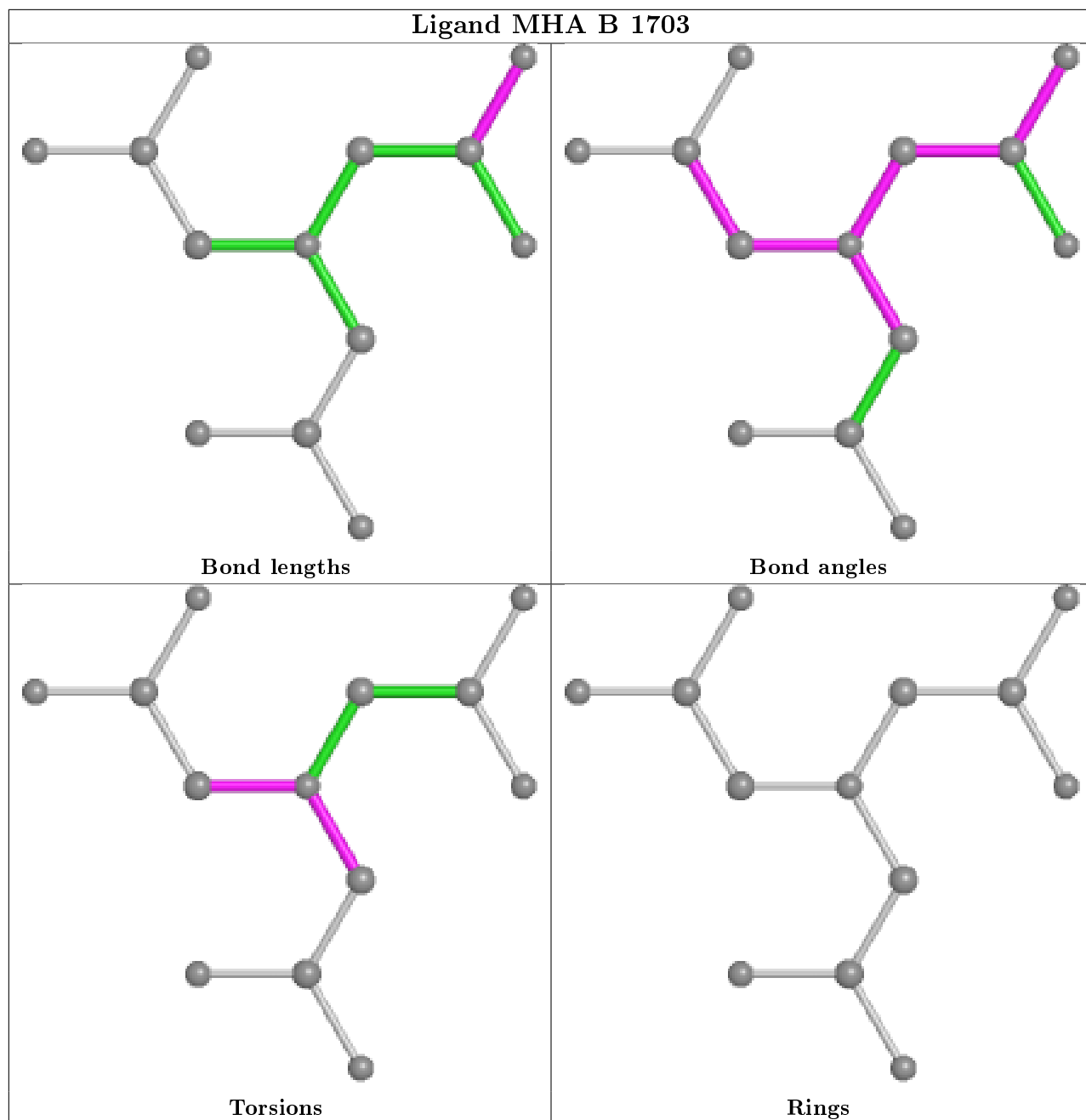
3 monomers are involved in 5 short contacts:

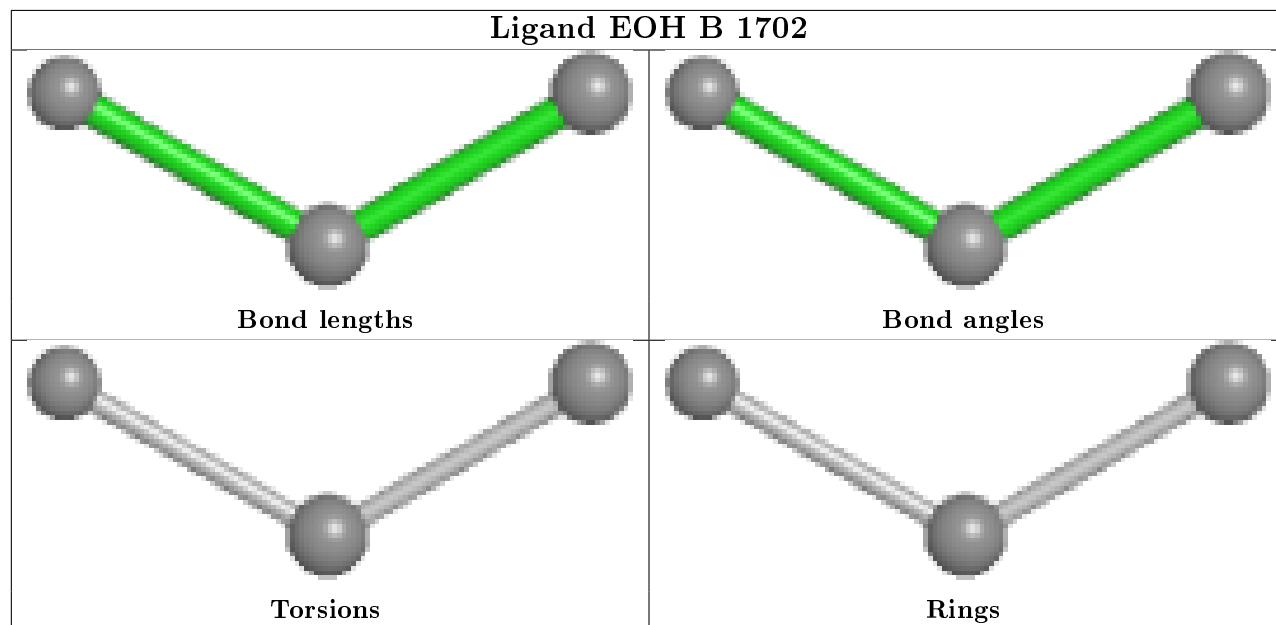
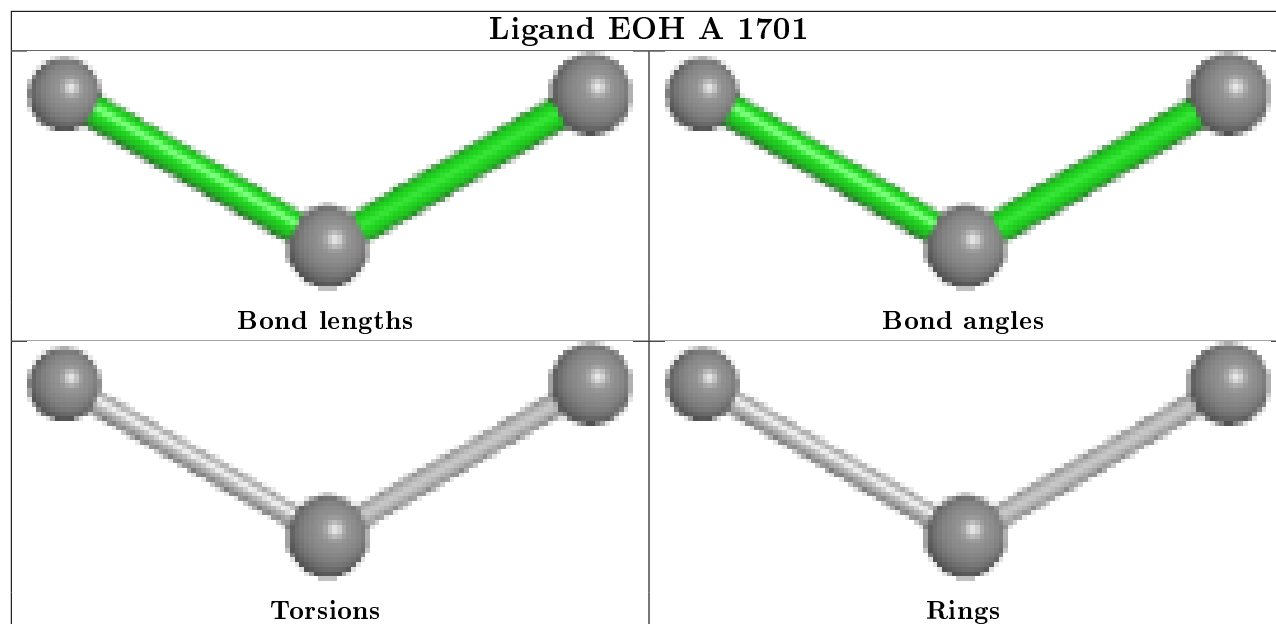
Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	B	1703	MHA	1	0
8	C	102	TAM	3	0
6	A	1703	MPD	1	0

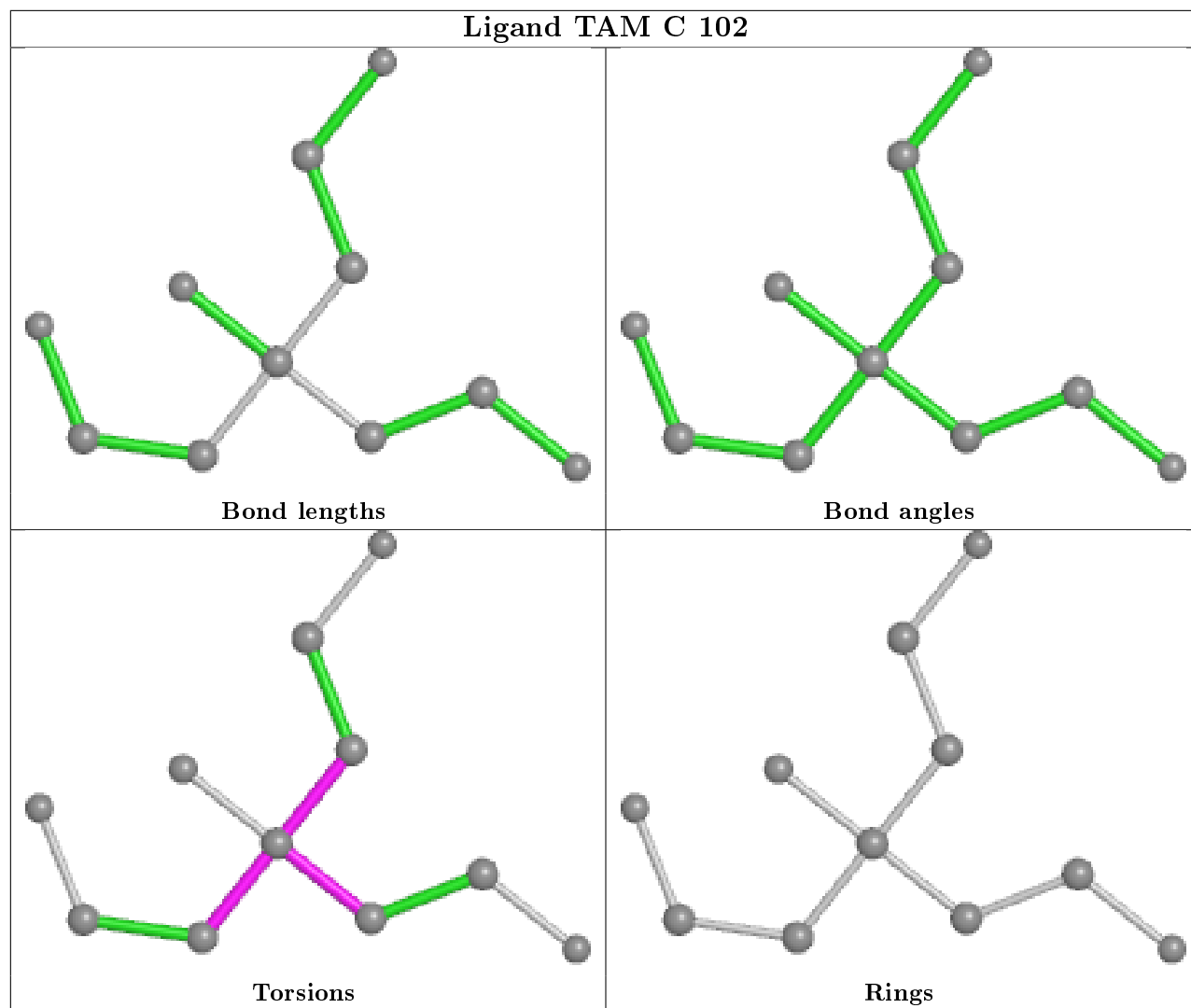
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

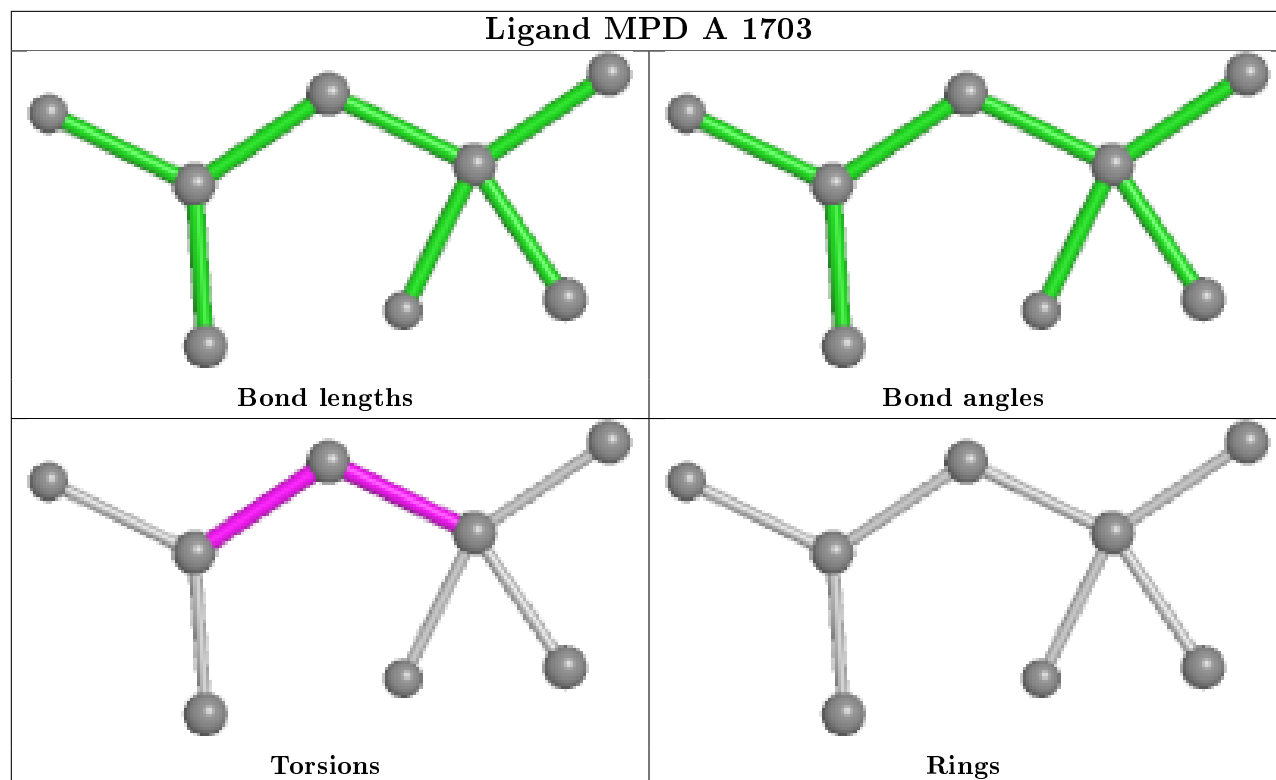












5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data i

6.1 Protein, DNA and RNA chains i

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	782/1676 (46%)	0.55	29 (3%) 41 48	31, 57, 108, 171	0
1	B	635/1676 (37%)	0.64	55 (8%) 10 14	38, 59, 131, 153	0
2	C	52/52 (100%)	0.80	2 (3%) 40 47	36, 48, 80, 108	0
All	All	1469/3404 (43%)	0.60	86 (5%) 22 28	31, 58, 120, 171	0

All (86) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	688	ALA	11.6
1	B	624	PHE	11.5
1	A	692	HIS	8.9
1	B	256	TYR	8.2
1	A	690	TYR	7.6
1	A	1399	TYR	6.8
1	B	669	CYS	6.4
1	B	266	TYR	5.8
1	B	254	TYR	5.8
1	A	686	ILE	5.1
1	B	473	HIS	5.0
1	A	684	GLU	5.0
1	B	255	PHE	4.9
1	B	261	THR	4.7
1	B	262	GLU	4.7
1	B	627	LEU	4.7
1	B	336	PHE	4.7
1	A	691	LYS	4.7
1	A	687	ALA	4.4
1	B	276	LYS	4.4
2	C	20	PHE	4.2
1	B	296	ILE	4.1
1	A	1386	ILE	4.1

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Mol	Chain	Res	Type	RSRZ
1	B	259	VAL	4.0
1	A	685	GLU	4.0
1	B	263	ALA	3.9
1	B	94	GLY	3.9
1	A	1480	PHE	3.8
1	B	625	GLN	3.8
1	A	697	LYS	3.8
1	B	332	SER	3.8
1	B	267	ILE	3.8
1	B	329	VAL	3.7
1	B	265	VAL	3.7
1	A	683	ILE	3.7
1	A	965	LEU	3.6
1	A	738	LEU	3.4
1	B	287	MET	3.3
1	A	999	ILE	3.2
1	B	283	MET	3.1
1	B	258	LYS	3.0
1	B	290	THR	3.0
1	B	269	PHE	2.9
1	B	628	GLU	2.9
1	B	253	ARG	2.9
1	A	694	VAL	2.8
1	B	295	GLY	2.8
1	B	310	LEU	2.8
1	B	330	ILE	2.8
1	B	286	ALA	2.8
1	B	289	ASN	2.8
1	A	693	SER	2.7
1	A	1000	LEU	2.7
1	B	327	VAL	2.7
1	B	257	ASN	2.6
1	B	328	THR	2.6
1	B	469	TRP	2.6
1	B	482	LEU	2.6
1	B	227	PHE	2.6
1	A	1306	GLN	2.5
1	B	97	ASN	2.5
1	B	308	LYS	2.5
1	A	737	GLN	2.5
1	B	264	ASP	2.4
1	B	64	PHE	2.4

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Mol	Chain	Res	Type	RSRZ
1	A	1398	ASP	2.4
1	B	293	ILE	2.4
2	C	19[A]	ARG	2.4
1	A	861	ALA	2.4
1	B	243	PHE	2.4
1	B	486	VAL	2.4
1	B	271	ILE	2.3
1	B	282	MET	2.3
1	B	249	THR	2.2
1	B	252	ALA	2.2
1	A	981	GLY	2.2
1	A	1413[A]	GLU	2.2
1	B	379	LEU	2.2
1	B	301	PHE	2.2
1	A	740	ALA	2.2
1	B	224	LEU	2.2
1	A	765	ILE	2.1
1	B	319	ASN	2.1
1	A	820	PHE	2.1
1	B	96	GLN	2.0
1	A	865	ILE	2.0

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

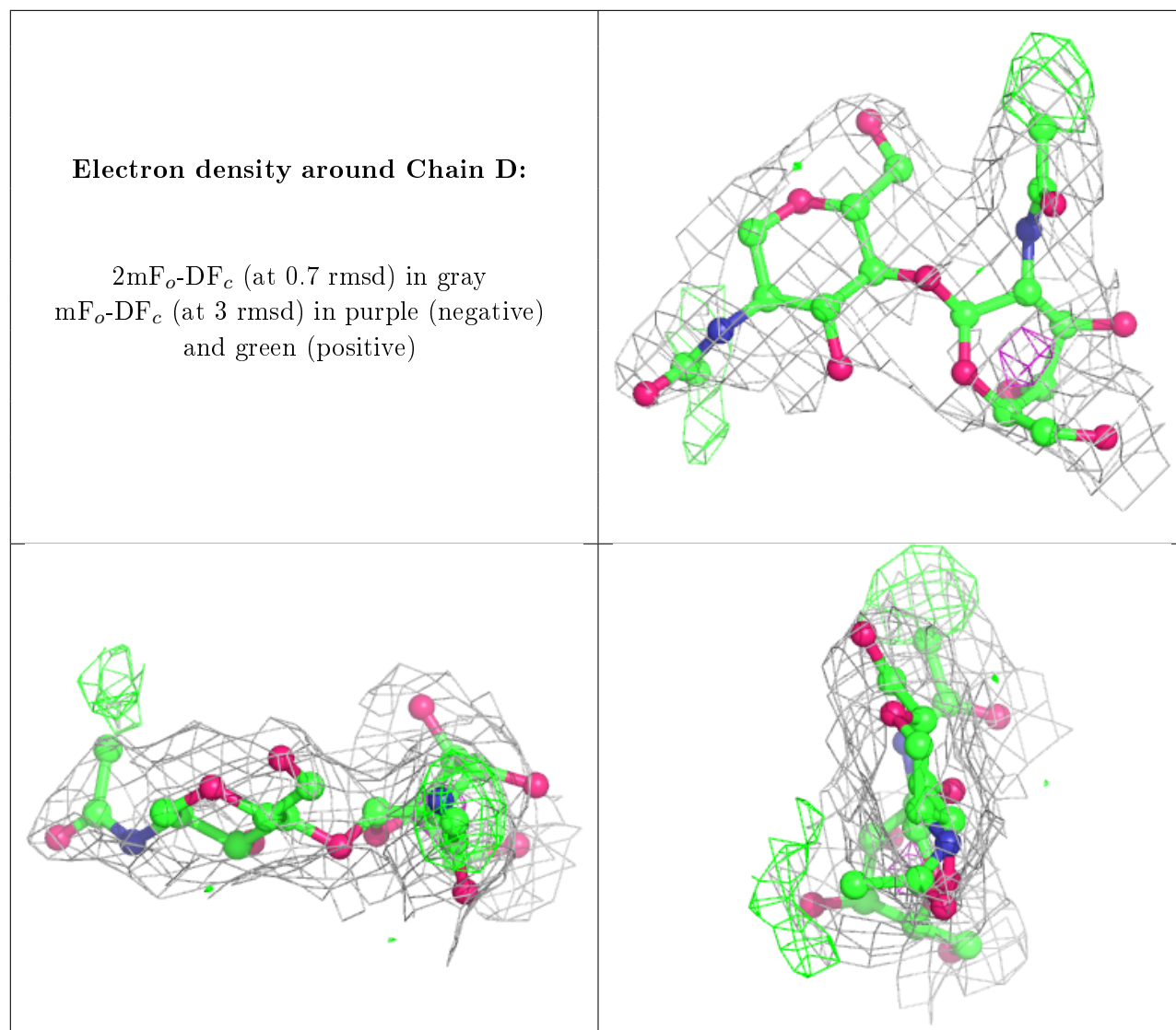
There are no non-standard protein/DNA/RNA residues in this entry.

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	NAG	D	2	14/15	0.63	0.18	96,123,129,130	0
3	NAG	D	1	14/15	0.81	0.19	96,104,116,122	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 [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.

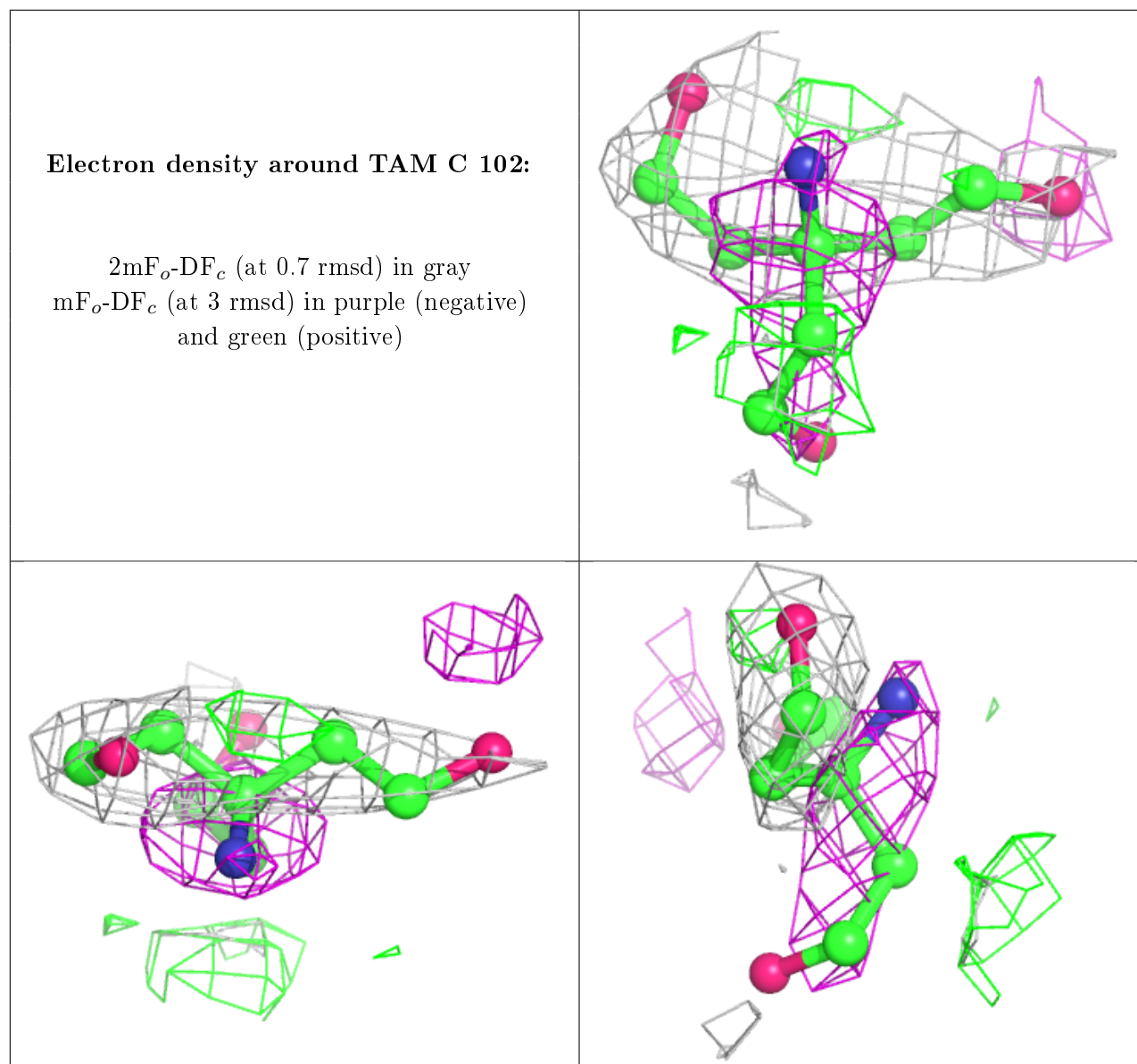
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
8	TAM	C	102	11/11	0.65	0.62	77,84,105,110	0
4	EOH	B	1701	3/3	0.69	0.17	55,55,66,68	0
6	MPD	A	1703	8/8	0.72	0.27	74,82,91,91	0
7	CYS	A	1704	6/7	0.79	0.18	121,123,125,134	0
4	EOH	A	1701	3/3	0.85	0.24	65,65,66,68	0
4	EOH	B	1702	3/3	0.86	0.22	69,69,70,74	0
4	EOH	C	101	3/3	0.86	0.16	49,49,60,74	0

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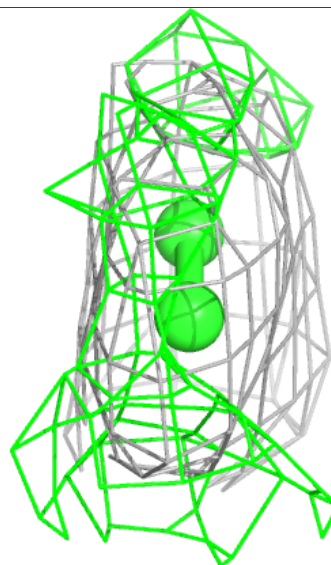
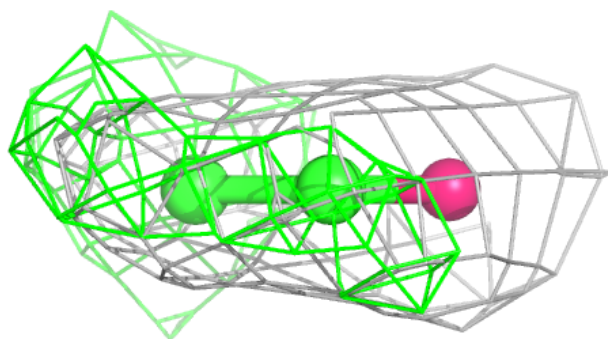
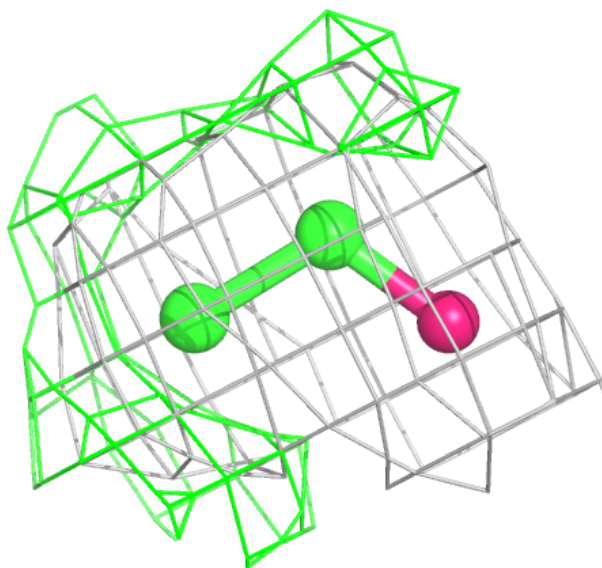
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
6	MPD	A	1702	8/8	0.86	0.32	58,63,72,84	0
5	MHA	B	1703	13/13	0.90	0.18	53,59,82,89	0

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.



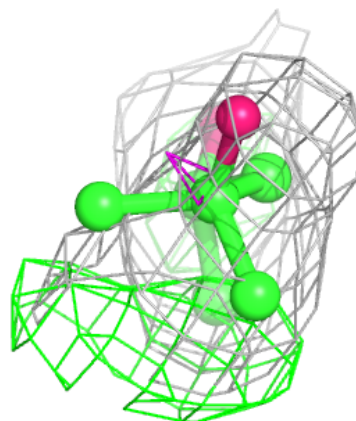
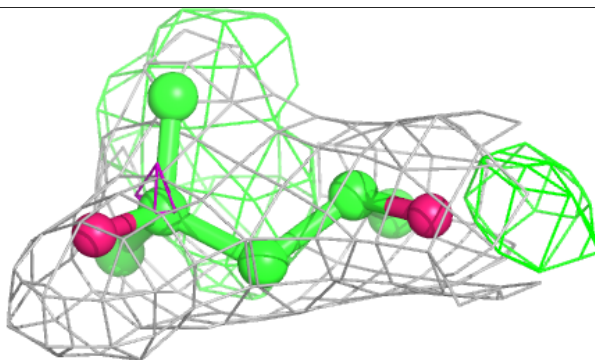
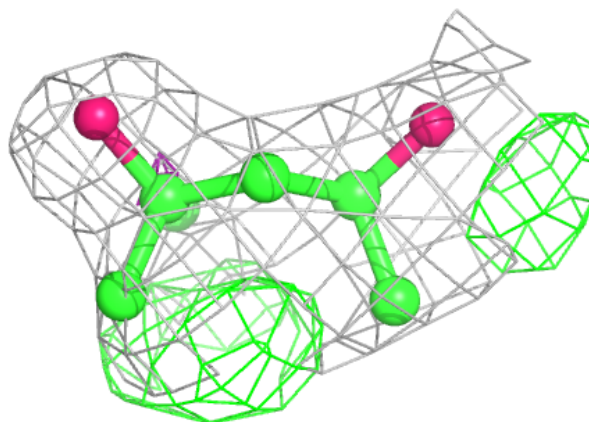
Electron density around EOH B 1701:

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

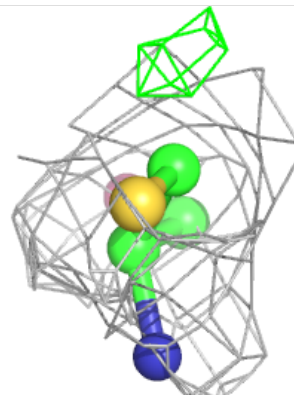
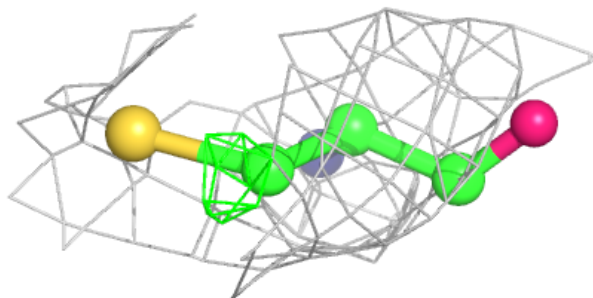
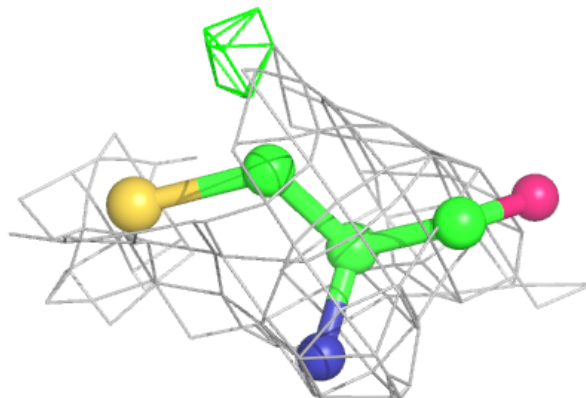


Electron density around MPD A 1703:

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

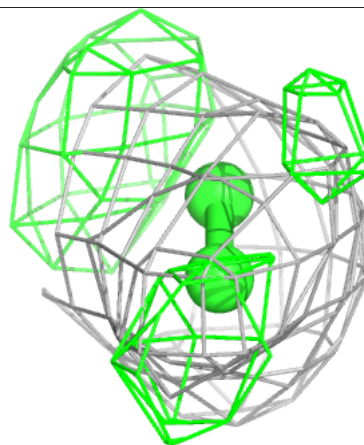
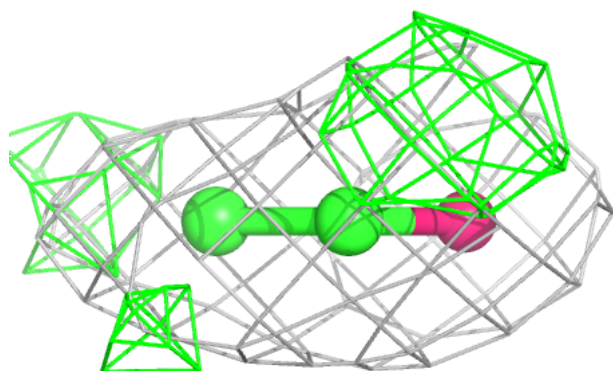
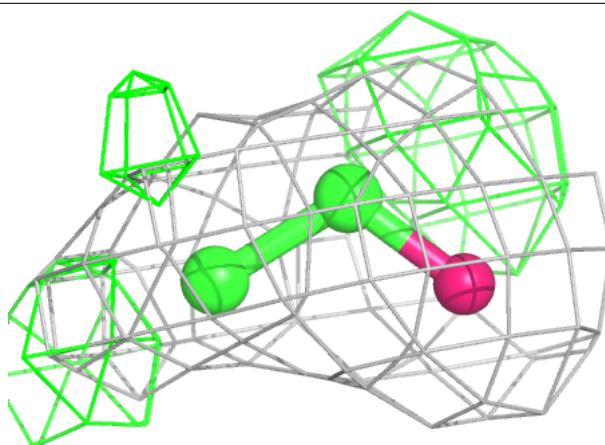
**Electron density around CYS A 1704:**

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



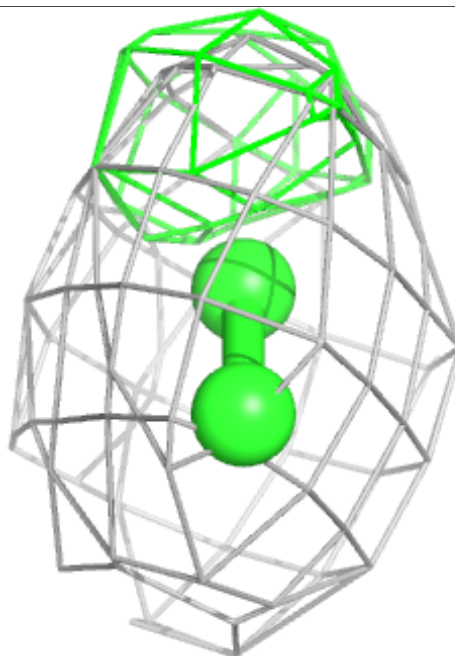
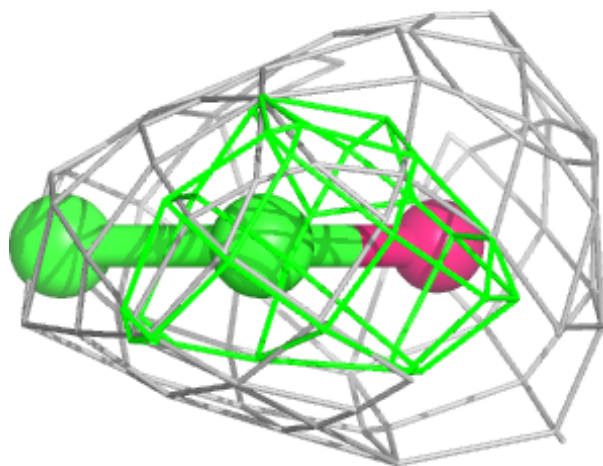
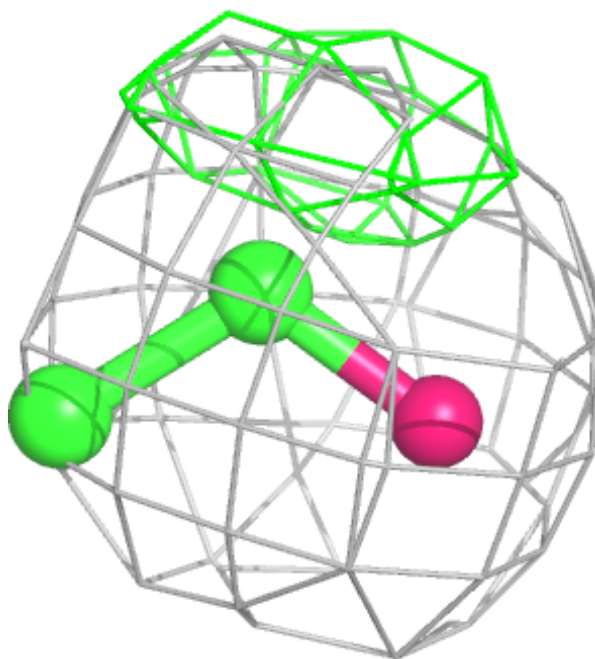
Electron density around EOH A 1701:

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



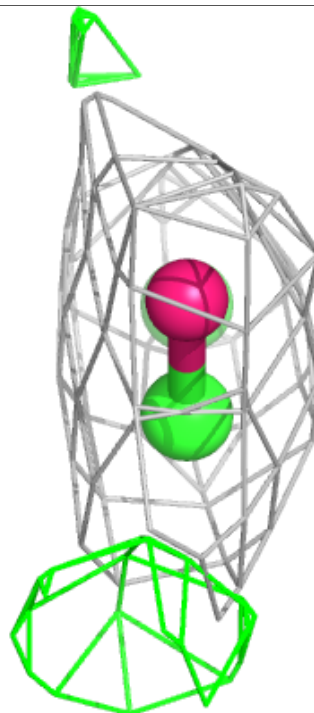
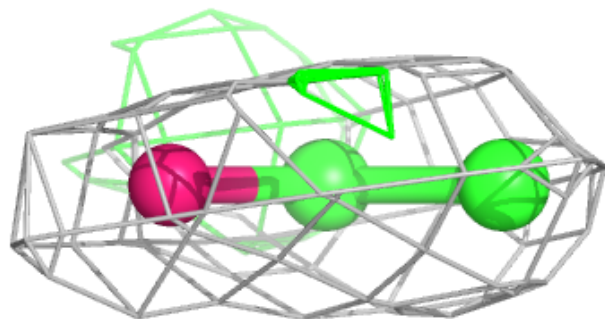
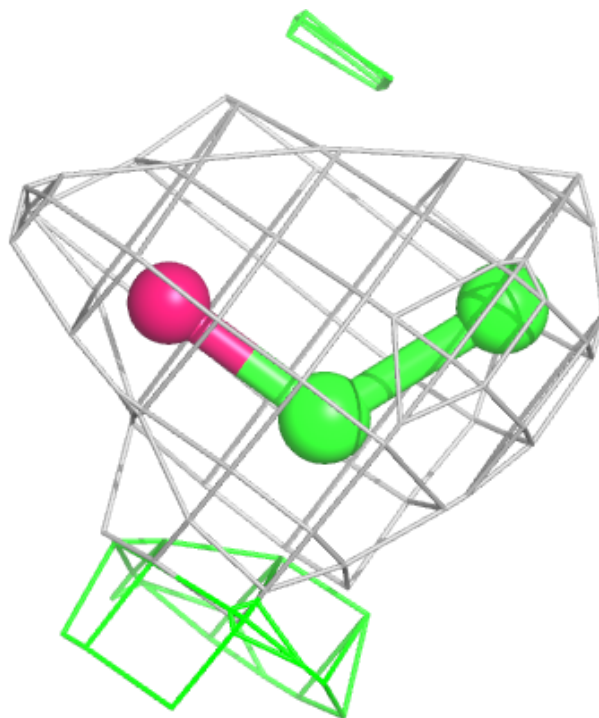
Electron density around EOH B 1702:

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



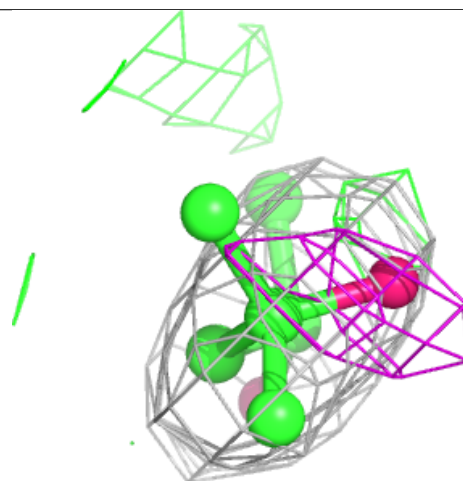
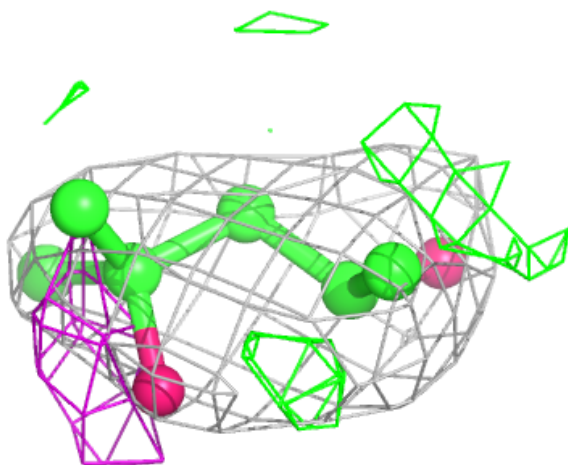
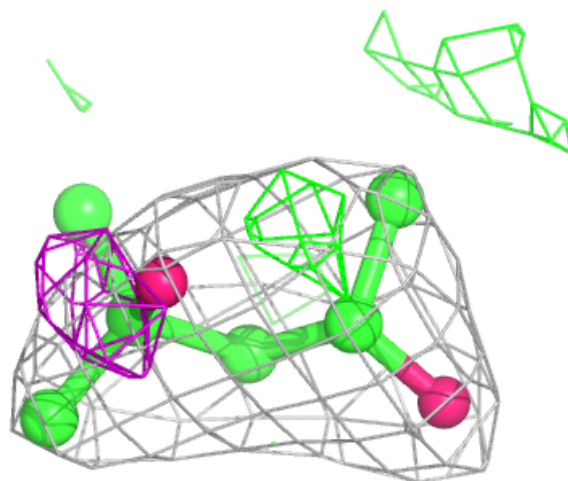
Electron density around EOH C 101:

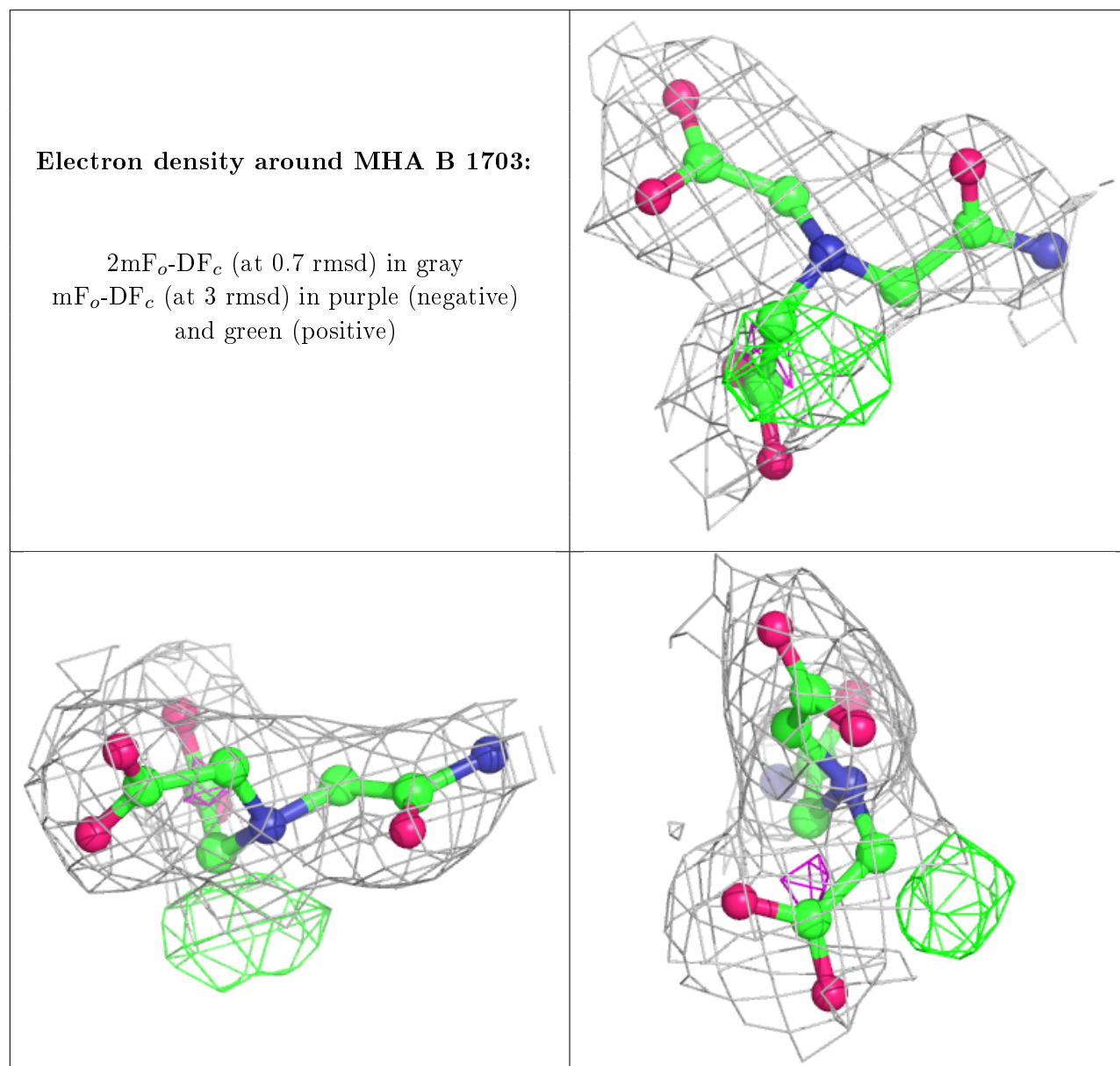
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around MPD A 1702:

$2mF_o-DF_c$ (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.