wwPDB X-ray Structure Validation Summary Report (i)

Sep 10, 2026 – 02:07 am BST

PDB ID	:	4BVP / pdb_00004bvp
Title	:	Legionella pneumophila NTPDase1 crystal form II (closed) in complex with heptamolybdate and octamolybdate
Authors	:	Zebisch, M.; Schaefer, P.; Straeter, N.
Deposited on	:	2013-06-27
Resolution	:	1.49 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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:

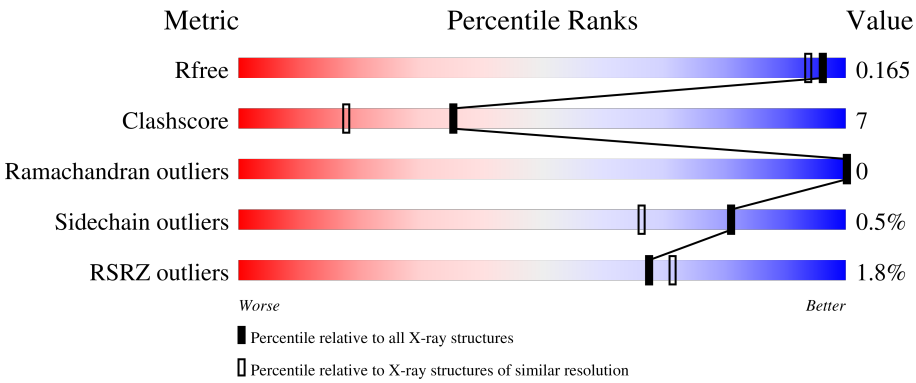
MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.015 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.50

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 1.49 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	4037 (1.50-1.50)
Clashscore	190562	4235 (1.50-1.50)
Ramachandran outliers	187476	4153 (1.50-1.50)
Sidechain outliers	187428	4150 (1.50-1.50)
RSRZ outliers	180081	4039 (1.50-1.50)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for >=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	368	.% 91% 7% •
1	B	368	2% 93% 5% •

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
12	8M0	A	1417	-	-	X	-
12	8M0	B	1403	-	-	X	-
7	M27	A	1408	-	-	X	-
9	6LL	B	1413	-	-	X	-

2 Entry composition (i)

There are 13 unique types of molecules in this entry. The entry contains 6758 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 ECTONUCLEOSIDE TRIPHOSPHATE DIPHOSPHOHYDROLASE I.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	365	3034	1931	501	586	16	0	21	0
1	B	365	2990	1902	493	578	17	0	14	0

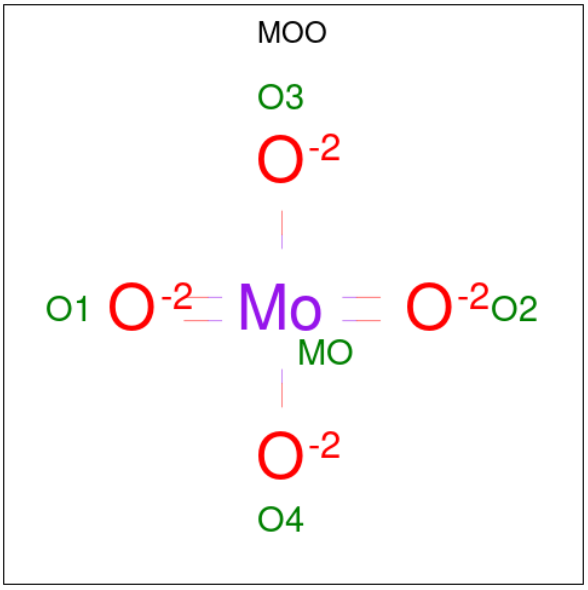
There are 22 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	34	MET	-	expression tag	UNP Q5ZUA2
A	394	LEU	-	expression tag	UNP Q5ZUA2
A	395	GLU	-	expression tag	UNP Q5ZUA2
A	396	HIS	-	expression tag	UNP Q5ZUA2
A	397	HIS	-	expression tag	UNP Q5ZUA2
A	398	HIS	-	expression tag	UNP Q5ZUA2
A	399	HIS	-	expression tag	UNP Q5ZUA2
A	400	HIS	-	expression tag	UNP Q5ZUA2
A	401	HIS	-	expression tag	UNP Q5ZUA2
A	137	ASP	GLU	conflict	UNP Q5ZUA2
A	149	VAL	ALA	conflict	UNP Q5ZUA2
B	34	MET	-	expression tag	UNP Q5ZUA2
B	394	LEU	-	expression tag	UNP Q5ZUA2
B	395	GLU	-	expression tag	UNP Q5ZUA2
B	396	HIS	-	expression tag	UNP Q5ZUA2
B	397	HIS	-	expression tag	UNP Q5ZUA2
B	398	HIS	-	expression tag	UNP Q5ZUA2
B	399	HIS	-	expression tag	UNP Q5ZUA2
B	400	HIS	-	expression tag	UNP Q5ZUA2
B	401	HIS	-	expression tag	UNP Q5ZUA2
B	137	ASP	GLU	conflict	UNP Q5ZUA2
B	149	VAL	ALA	conflict	UNP Q5ZUA2

- Molecule 2 is SODIUM ION (CCD ID: NA) (formula: Na).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Na		
2	A	1	1	1	0	0

- Molecule 3 is MOLYBDATE ION (CCD ID: MOO) (formula: MoO_4).

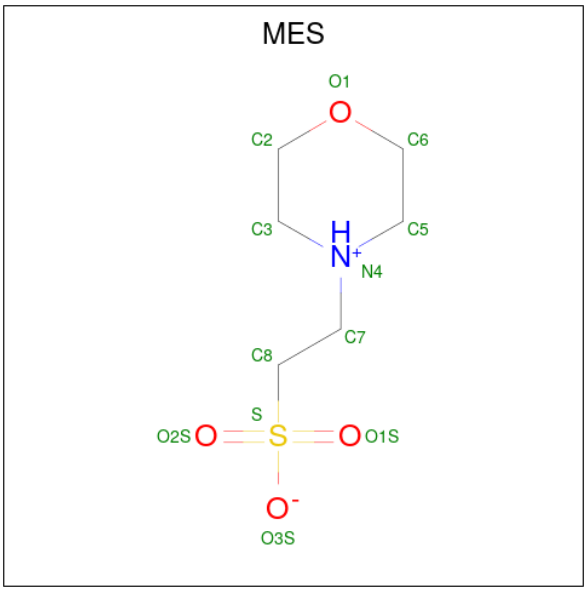


Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	Mo	O		
3	A	1	5	1	4	0	0
			Total	Mo	O		
3	B	1	5	1	4	0	0

- Molecule 4 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

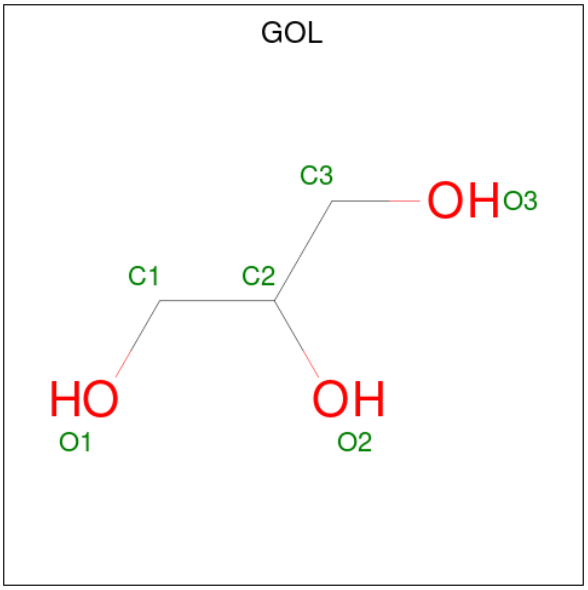
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Mg		
4	A	3	3	3	0	0
			Total	Mg		
4	B	2	2	2	0	0

- Molecule 5 is 2-(N-MORPHOLINO)-ETHANESULFONIC ACID (CCD ID: MES) (formula: $C_6H_{13}NO_4S$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	S		
5	A	1	12	6	1	4	1	0	0
			Total	C	N	O	S		
5	B	1	12	6	1	4	1	0	0

- Molecule 6 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



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

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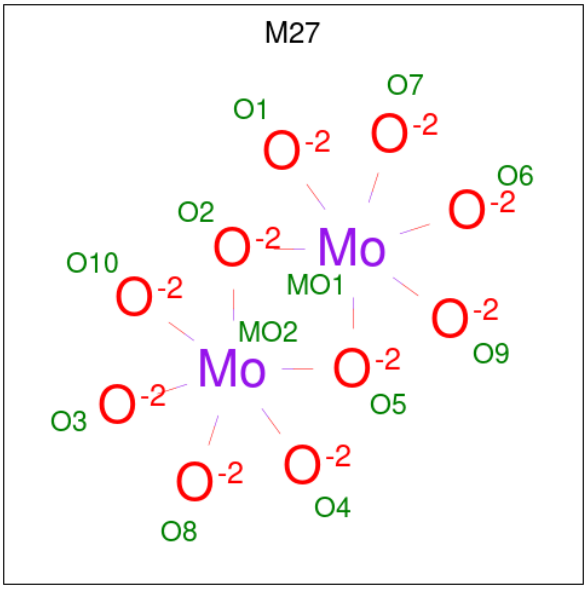
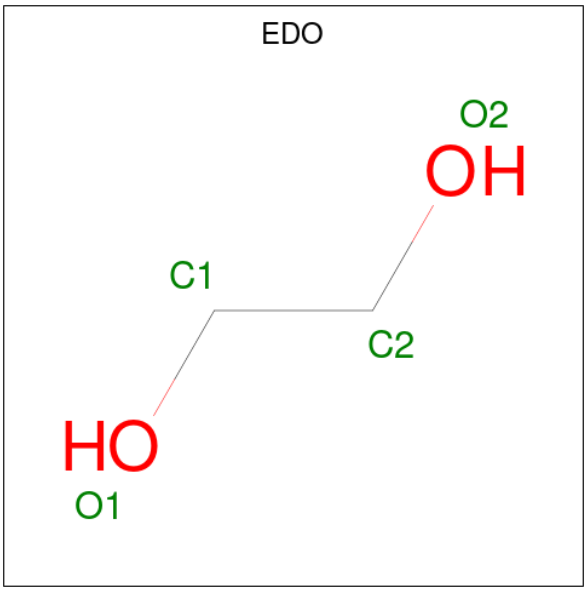
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	B	1	Total C O 6 3 3	0	0
6	B	1	Total C O 6 3 3	0	0
6	B	1	Total C O 6 3 3	0	0
6	B	1	Total C O 6 3 3	0	0
6	B	1	Total C O 6 3 3	0	0

- Molecule 7 is bis(mu2-oxo)-octaoxo-dimolybdenum (VI) (CCD ID: M27) (formula: Mo_2O_{10}).



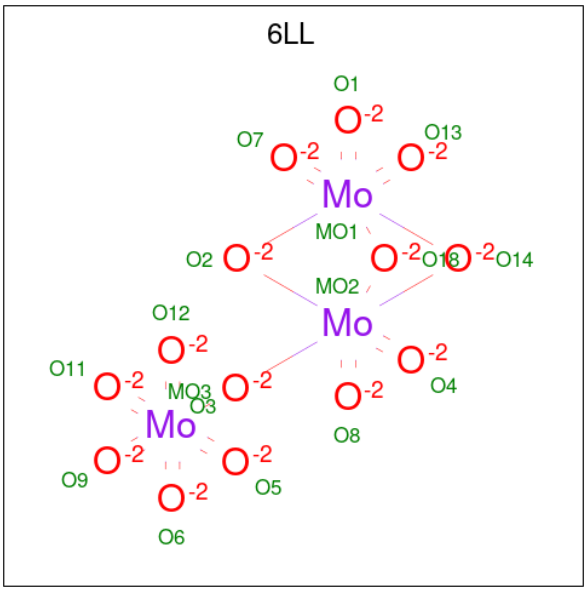
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	1	Total Mo O 7 2 5	0	0
7	A	1	Total Mo O 8 2 6	0	0
7	B	1	Total Mo O 7 2 5	0	0
7	B	1	Total Mo O 8 2 6	0	0

- Molecule 8 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: $C_2H_6O_2$).



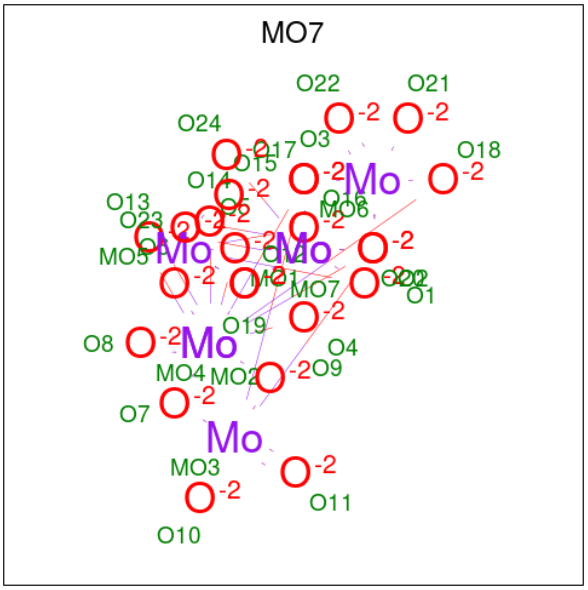
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
8	A	1	4	2	2	0	0
			Total	C	O		
8	A	1	4	2	2	0	0
			Total	C	O		
8	A	1	4	2	2	0	0
			Total	C	O		
8	B	1	4	2	2	0	0

- Molecule 9 is TETRAKIS-(MU-OXO)-DECA-OXO-TRIMOLYBDENUM (CCD ID: 6LL) (formula: Mo_3O_{14}).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	Mo	O		
9	A	1	11	3	8	0	0
			Total	Mo	O		
9	B	1	11	3	8	0	0

- Molecule 10 is bis(mu4-oxo)-bis(mu3-oxo)-octakis(mu2-oxo)-dodecaoxo-heptamolybdenum (VI) (CCD ID: MO7) (formula: Mo_7O_{24}).

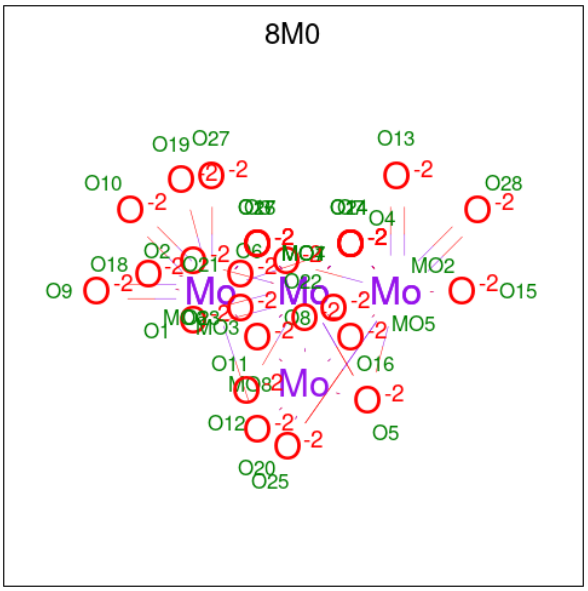


Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	Mo	O		
10	A	1	31	7	24	0	0
			Total	Mo	O		
10	B	1	31	7	24	0	0

- Molecule 11 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Cl		
11	A	1	1	1	0	0
			Total	Cl		
11	B	1	1	1	0	0

- Molecule 12 is bis(mu4-oxo)-tetrakis(mu3-oxo)-hexakis(mu2-oxo)-hexadecaoxo-octamolybdenum (VI) (CCD ID: 8M0) (formula: Mo_8O_{28}).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	Mo	O		
12	A	1	34	8	26	0	0
			Total	Mo	O		
12	B	1	34	8	26	0	0

- Molecule 13 is water.

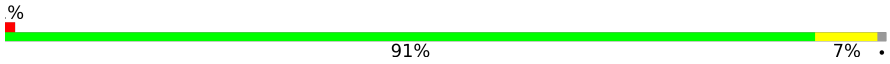
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
13	A	240	240	240	0	0
			Total	O		
13	B	211	212	212	0	1

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.

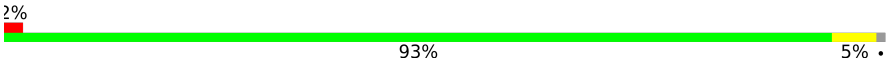
• Molecule 1: ECTONUCLEOSIDE TRIPHOSPHATE DIPHOSPHOHYDROLASE I

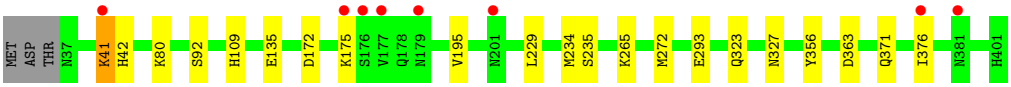
Chain A:



• Molecule 1: ECTONUCLEOSIDE TRIPHOSPHATE DIPHOSPHOHYDROLASE I

Chain B:





4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	64.56Å 85.44Å 71.78Å 90.00° 103.94° 90.00°	Depositor
Resolution (Å)	45.34 – 1.49 45.34 – 1.49	Depositor EDS
% Data completeness (in resolution range)	96.3 (45.34-1.49) 96.7 (45.34-1.49)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.49 (at 1.48Å)	Xtriage
Refinement program	REFMAC 5.7.0029	Depositor
R, R_{free}	0.126 , 0.169 0.122 , 0.165	Depositor DCC
R_{free} test set	1249 reflections (1.01%)	wwPDB-VP
Wilson B-factor (Å^2)	9.8	Xtriage
Anisotropy	0.935	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.36 , 32.8	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.97	EDS
Total number of atoms	6758	wwPDB-VP
Average B, all atoms (Å^2)	17.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 7.25% 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 (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: CL, MG, MES, 8M0, MO7, GOL, NA, MOO, M27, 6LL, EDO

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	1.07	1/3176 (0.0%)	0.93	1/4326 (0.0%)
1	B	1.07	0/3114	0.98	3/4241 (0.1%)
All	All	1.07	1/6290 (0.0%)	0.95	4/8567 (0.0%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	41	LYS	CE-NZ	14.44	1.92	1.49

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	376	ILE	N-CA-C	-6.53	103.02	108.63
1	A	234	MET	CG-SD-CE	6.51	115.22	100.90
1	B	41	LYS	CA-CB-CG	5.08	124.27	114.10
1	B	376	ILE	CB-CA-C	5.03	115.62	110.94

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts (i)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3034	0	2909	28	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	B	2990	0	2856	14	0
2	A	1	0	0	0	0
3	A	5	0	0	1	0
3	B	5	0	0	1	0
4	A	3	0	0	0	0
4	B	2	0	0	0	0
5	A	12	0	13	0	0
5	B	12	0	13	0	0
6	A	12	0	14	1	0
6	B	30	0	35	3	0
7	A	15	0	0	7	0
7	B	15	0	0	6	0
8	A	12	0	12	0	0
8	B	4	0	4	0	0
9	A	11	0	0	3	0
9	B	11	0	0	4	0
10	A	31	0	0	2	0
10	B	31	0	0	6	0
11	A	1	0	0	0	0
11	B	1	0	0	0	0
12	A	34	0	0	9	0
12	B	34	0	0	8	0
13	A	240	0	0	2	0
13	B	212	0	0	4	0
All	All	6758	0	5856	90	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.

The worst 5 of 90 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:41:LYS:NZ	1:A:41:LYS:CE	1.92	1.32
1:A:323[A]:GLN:HE21	1:A:327:ASN:HD21	1.15	0.93
1:A:180:LYS:HE2	1:A:293:GLU:HG3	1.58	0.84
1:A:310:HIS:HD2	13:A:2188:HOH:O	1.71	0.74
1:A:323[A]:GLN:HE21	1:A:327:ASN:ND2	1.86	0.72

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	384/368 (104%)	375 (98%)	9 (2%)	0	100	100
1	B	377/368 (102%)	368 (98%)	9 (2%)	0	100	100
All	All	761/736 (103%)	743 (98%)	18 (2%)	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	346/328 (106%)	344 (99%)	2 (1%)	78	62
1	B	339/328 (103%)	338 (100%)	1 (0%)	86	75
All	All	685/656 (104%)	682 (100%)	3 (0%)	81	71

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

Mol	Chain	Res	Type
1	A	41	LYS
1	A	195	VAL
1	B	195	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 16 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	313	ASN
1	B	220	ASN
1	B	89	GLN
1	B	218	ASN
1	A	391	HIS

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 33 ligands modelled in this entry, 8 are monoatomic - leaving 25 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	$\#\|Z\| > 2$
6	GOL	B	1412	7	5,5,5	0.65	0	5,5,5	0.91	0
6	GOL	A	1407	-	5,5,5	0.83	0	5,5,5	0.63	0
12	8M0	A	1417	1	24,46,48	1.58	3 (12%)	-		
7	M27	B	1411	6,1	0,7,12	-	-	-		
3	MOO	A	1403	13,4	2,4,4	2.11	1 (50%)	-		
10	MO7	A	1415	-	26,42,42	1.91	4 (15%)	-		
6	GOL	B	1408	-	5,5,5	0.83	0	5,5,5	0.40	0
5	MES	A	1405	-	12,12,12	2.48	1 (8%)	14,16,16	1.84	4 (28%)
10	MO7	B	1416	-	26,42,42	1.55	3 (11%)	-		

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
8	EDO	B	1415	9	3,3,3	0.59	0	2,2,2	0.91	0
9	6LL	A	1412	8,6,1	2,10,18	1.99	1 (50%)	-		
6	GOL	A	1413	9	5,5,5	0.42	0	5,5,5	0.82	0
8	EDO	A	1409	7	3,3,3	0.60	0	2,2,2	0.97	0
8	EDO	A	1414	9	3,3,3	0.60	0	2,2,2	0.65	0
7	M27	A	1410	8,1	0,7,12	-	-	-		
12	8M0	B	1403	1	24,46,48	1.48	2 (8%)	-		
6	GOL	B	1414	9	5,5,5	0.47	0	5,5,5	0.79	0
3	MOO	B	1404	13,4	2,4,4	3.40	1 (50%)	-		
8	EDO	A	1411	7	3,3,3	0.75	0	2,2,2	0.96	0
9	6LL	B	1413	8,6,1	2,10,18	1.50	0	-		
6	GOL	B	1417	-	5,5,5	0.31	0	5,5,5	0.57	0
5	MES	B	1406	-	12,12,12	2.09	2 (16%)	14,16,16	1.45	3 (21%)
6	GOL	B	1410	7	5,5,5	0.54	0	5,5,5	0.53	0
7	M27	A	1408	8,1	0,6,12	-	-	-		
7	M27	B	1409	6,1	0,6,12	-	-	-		

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	GOL	B	1412	7	-	0/4/4/4	-
8	EDO	A	1411	7	-	0/1/1/1	-
6	GOL	A	1407	-	-	0/4/4/4	-
6	GOL	A	1413	9	-	1/4/4/4	-
6	GOL	B	1408	-	-	0/4/4/4	-
6	GOL	B	1417	-	-	2/4/4/4	-
8	EDO	A	1409	7	-	1/1/1/1	-
8	EDO	A	1414	9	-	1/1/1/1	-
5	MES	A	1405	-	-	3/6/14/14	0/1/1/1
5	MES	B	1406	-	-	3/6/14/14	0/1/1/1
6	GOL	B	1410	7	-	2/4/4/4	-
6	GOL	B	1414	9	-	0/4/4/4	-
8	EDO	B	1415	9	-	1/1/1/1	-

The worst 5 of 18 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	1405	MES	C8-S	-8.18	1.65	1.77

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	B	1406	MES	C8-S	-6.53	1.68	1.77
10	A	1415	MO7	O15-MO5	5.99	1.78	1.68
10	B	1416	MO7	O15-MO5	5.77	1.78	1.68
10	A	1415	MO7	O4-MO1	5.76	1.80	1.74

The worst 5 of 7 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	A	1405	MES	C6-C5-N4	-2.96	105.61	110.10
5	A	1405	MES	O1-C2-C3	-2.91	105.40	111.80
5	B	1406	MES	C5-N4-C3	2.84	115.21	108.83
5	A	1405	MES	C6-O1-C2	2.77	119.15	109.89
5	B	1406	MES	C6-O1-C2	2.58	118.52	109.89

There are no chirality outliers.

5 of 14 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	B	1406	MES	C8-C7-N4-C5
6	B	1410	GOL	C1-C2-C3-O3
6	B	1417	GOL	C1-C2-C3-O3
5	B	1406	MES	C8-C7-N4-C3
6	B	1417	GOL	O2-C2-C3-O3

There are no ring outliers.

14 monomers are involved in 51 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
12	A	1417	8M0	9	0
7	B	1411	M27	3	0
3	A	1403	MOO	1	0
10	A	1415	MO7	2	0
10	B	1416	MO7	6	0
9	A	1412	6LL	3	0
6	A	1413	GOL	1	0
7	A	1410	M27	3	0
12	B	1403	8M0	8	0
3	B	1404	MOO	1	0
9	B	1413	6LL	4	0
6	B	1417	GOL	3	0
7	A	1408	M27	4	0

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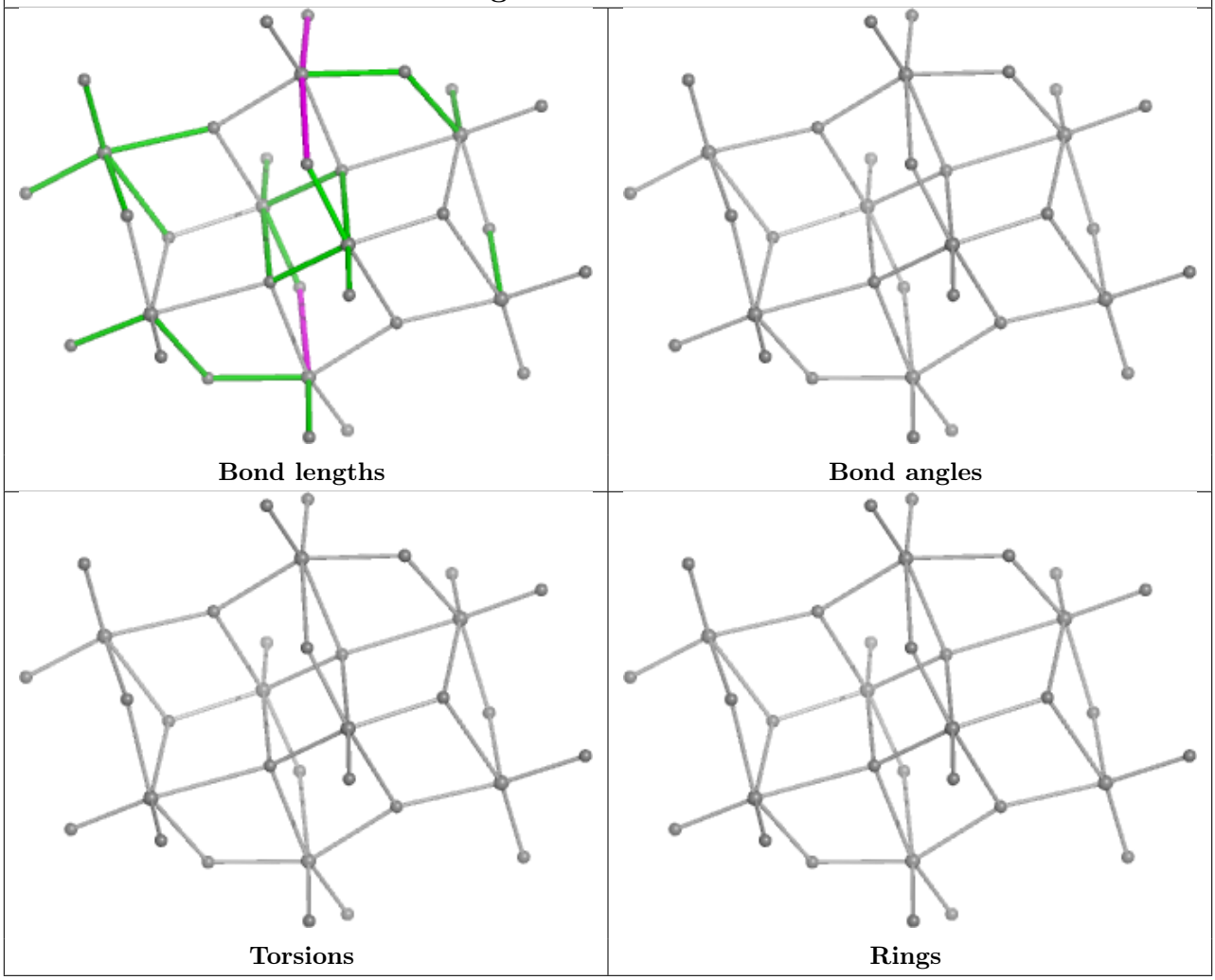
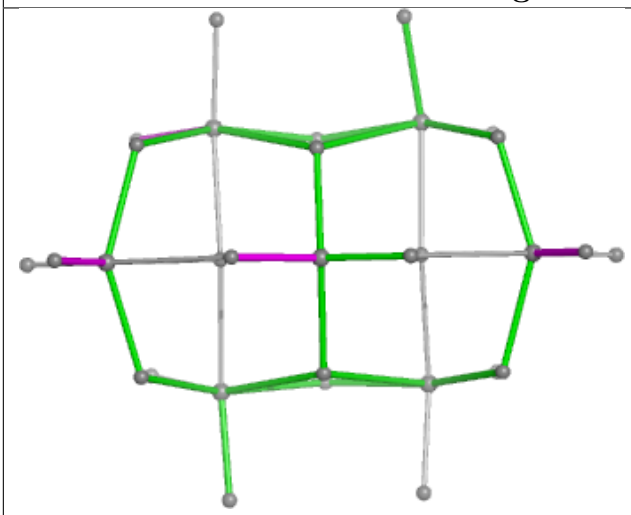
Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	B	1409	M27	3	0

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

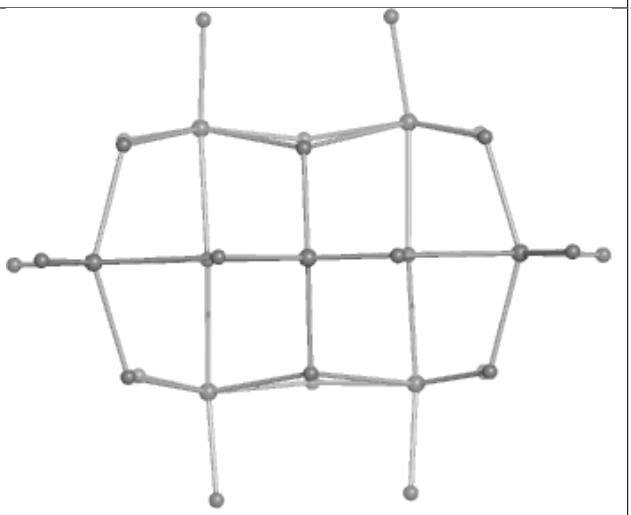
Ligand 8M0 A 1417



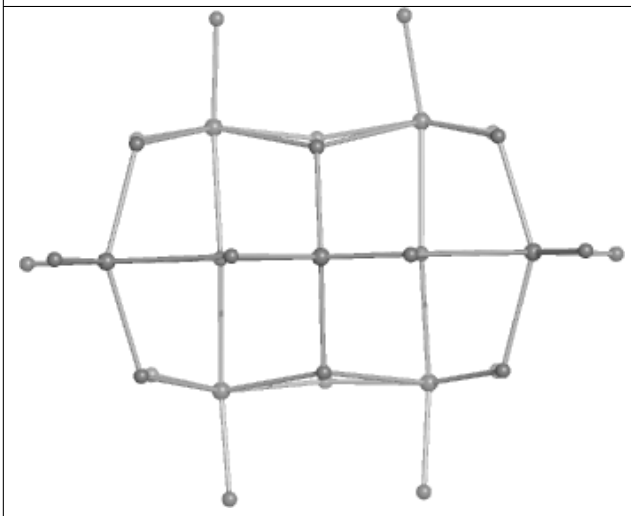
Ligand MO7 A 1415



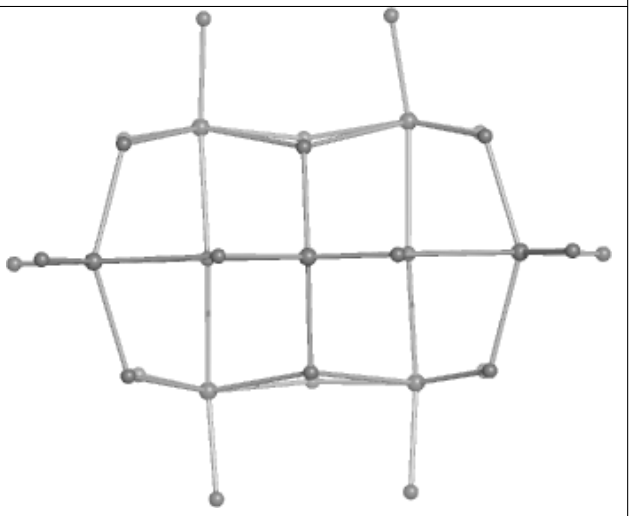
Bond lengths



Bond angles

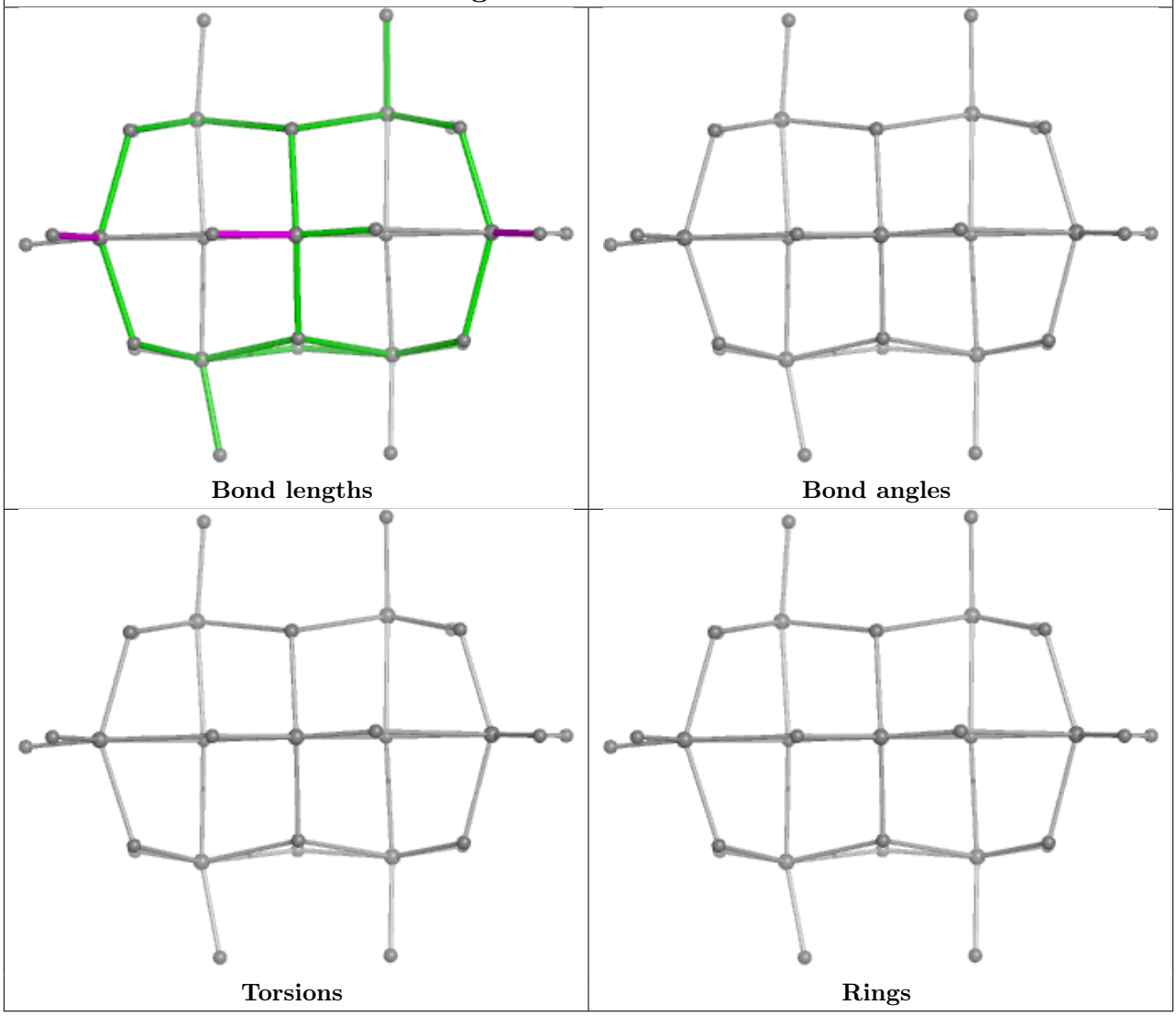


Torsions

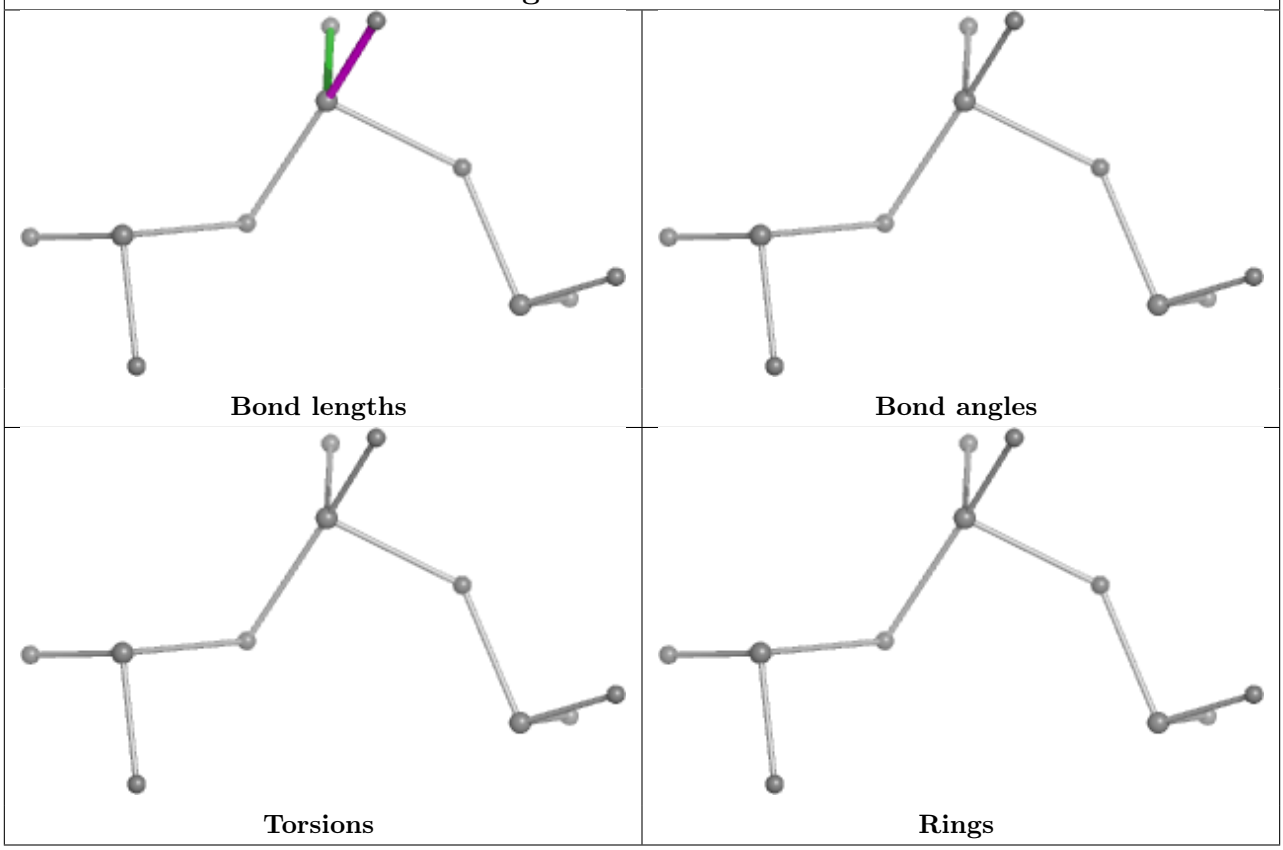


Rings

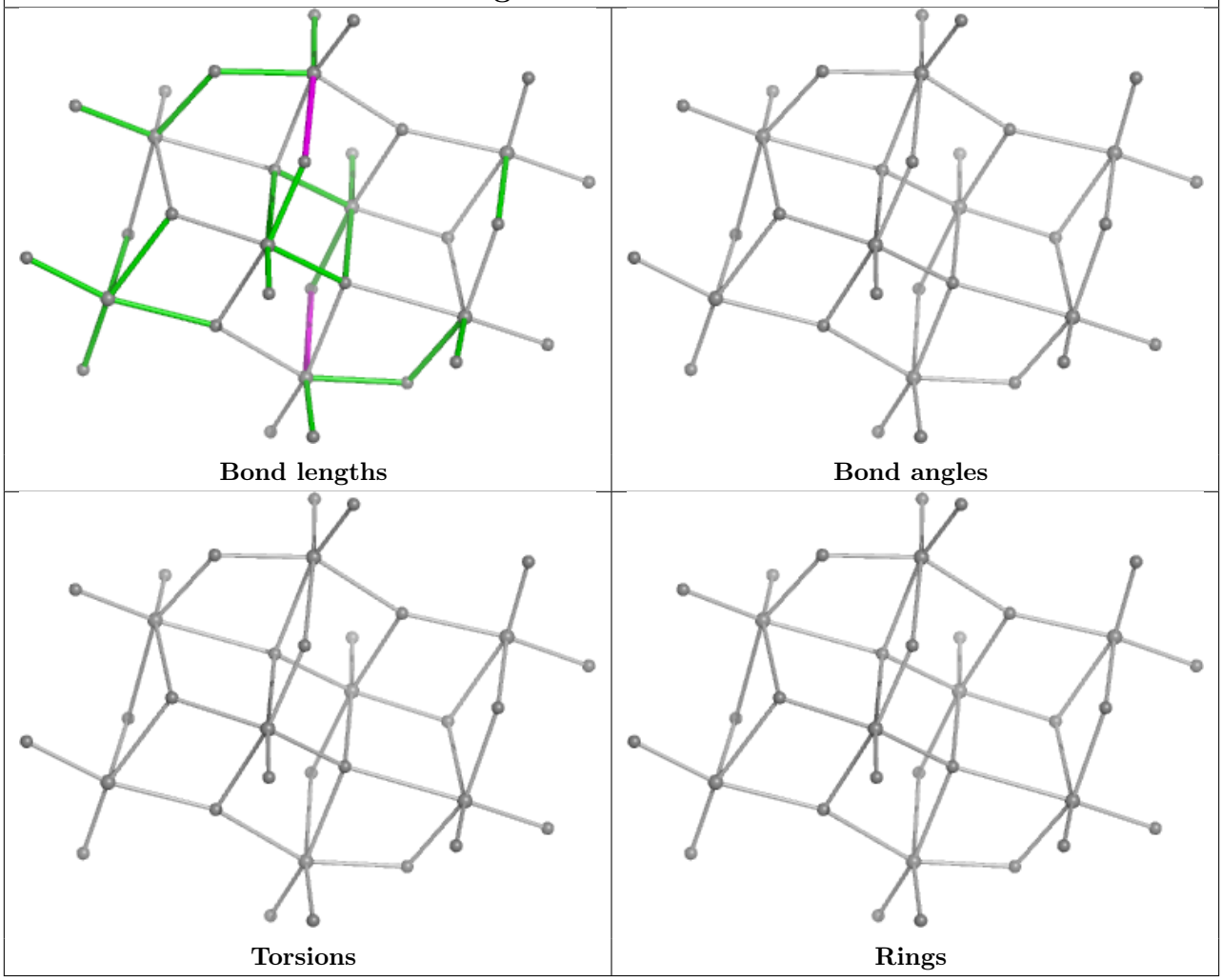
Ligand MO7 B 1416



Ligand 6LL A 1412



Ligand 8M0 B 1403



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	365/368 (99%)	-0.47	5 (1%)	73	77	6, 13, 32, 63	21 (5%)
1	B	365/368 (99%)	-0.43	8 (2%)	62	66	5, 13, 32, 65	14 (3%)
All	All	730/736 (99%)	-0.45	13 (1%)	67	71	5, 13, 32, 65	35 (4%)

The worst 5 of 13 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	177	VAL	6.7
1	A	177	VAL	4.5
1	B	179	ASN	3.1
1	A	41	LYS	2.8
1	A	179	ASN	2.7

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

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

6.3 Carbohydrates (i)

There are no oligosaccharides in this entry.

6.4 Ligands (i)

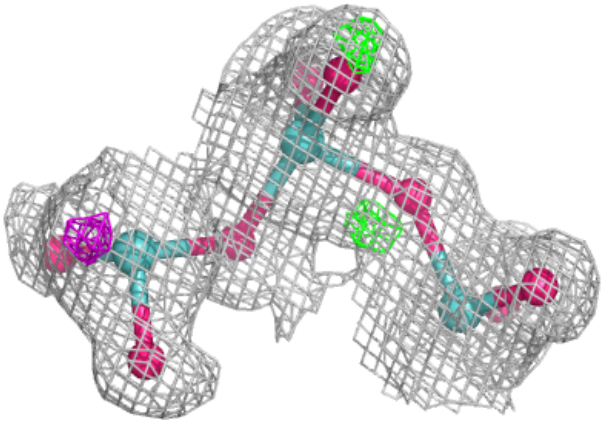
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

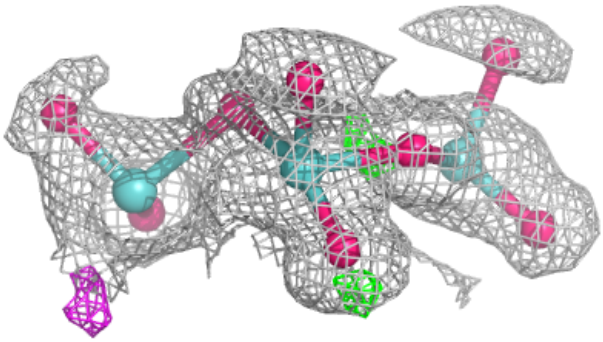
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
6	GOL	B	1417	6/6	0.92	0.10	22,35,38,51	0
8	EDO	B	1415	4/4	0.93	0.10	19,20,24,26	0
8	EDO	A	1414	4/4	0.95	0.09	20,20,25,26	0
5	MES	B	1406	12/12	0.95	0.12	21,30,35,38	12
5	MES	A	1405	12/12	0.96	0.11	19,28,33,39	12
8	EDO	A	1411	4/4	0.96	0.07	17,18,19,19	0
6	GOL	A	1413	6/6	0.96	0.09	20,20,22,22	0
6	GOL	B	1414	6/6	0.96	0.06	20,20,21,24	0
6	GOL	A	1407	6/6	0.97	0.08	13,14,16,18	0
6	GOL	B	1410	6/6	0.98	0.07	14,17,28,34	0
6	GOL	B	1412	6/6	0.98	0.06	16,24,28,29	0
8	EDO	A	1409	4/4	0.98	0.06	13,16,17,19	0
4	MG	A	1418	1/1	0.99	0.14	26,26,26,26	0
4	MG	B	1407	1/1	0.99	0.13	20,20,20,20	1
2	NA	A	1402	1/1	0.99	0.17	32,32,32,32	0
6	GOL	B	1408	6/6	0.99	0.06	13,15,16,16	0
4	MG	B	1405	1/1	1.00	0.01	9,9,9,9	0
7	M27	A	1408	7/12	1.00	0.02	10,11,15,17	0
7	M27	A	1410	8/12	1.00	0.02	15,16,18,19	0
7	M27	B	1409	7/12	1.00	0.02	10,12,15,18	0
7	M27	B	1411	8/12	1.00	0.04	17,19,25,26	8
3	MOO	B	1404	5/5	1.00	0.02	7,7,9,9	0
4	MG	A	1404	1/1	1.00	0.02	10,10,10,10	0
4	MG	A	1406	1/1	1.00	0.09	18,18,18,18	1
3	MOO	A	1403	5/5	1.00	0.02	8,8,8,9	0
9	6LL	A	1412	11/17	1.00	0.03	12,15,18,21	11
9	6LL	B	1413	11/17	1.00	0.03	13,15,19,21	11
10	MO7	A	1415	31/31	1.00	0.03	14,18,25,26	0
10	MO7	B	1416	31/31	1.00	0.03	14,17,27,29	0
11	CL	A	1416	1/1	1.00	0.02	12,12,12,12	0
11	CL	B	1402	1/1	1.00	0.01	13,13,13,13	0
12	8M0	A	1417	34/36	1.00	0.03	10,12,16,17	0
12	8M0	B	1403	34/36	1.00	0.03	10,12,17,17	0

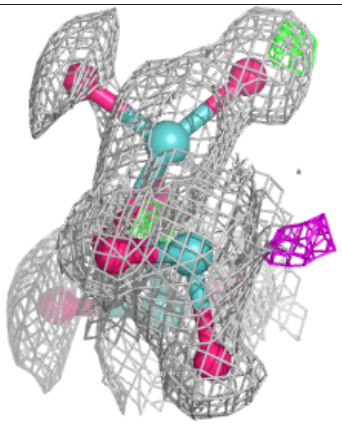
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around 6LL A 1412:

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







Electron density around MO7 A 1415:

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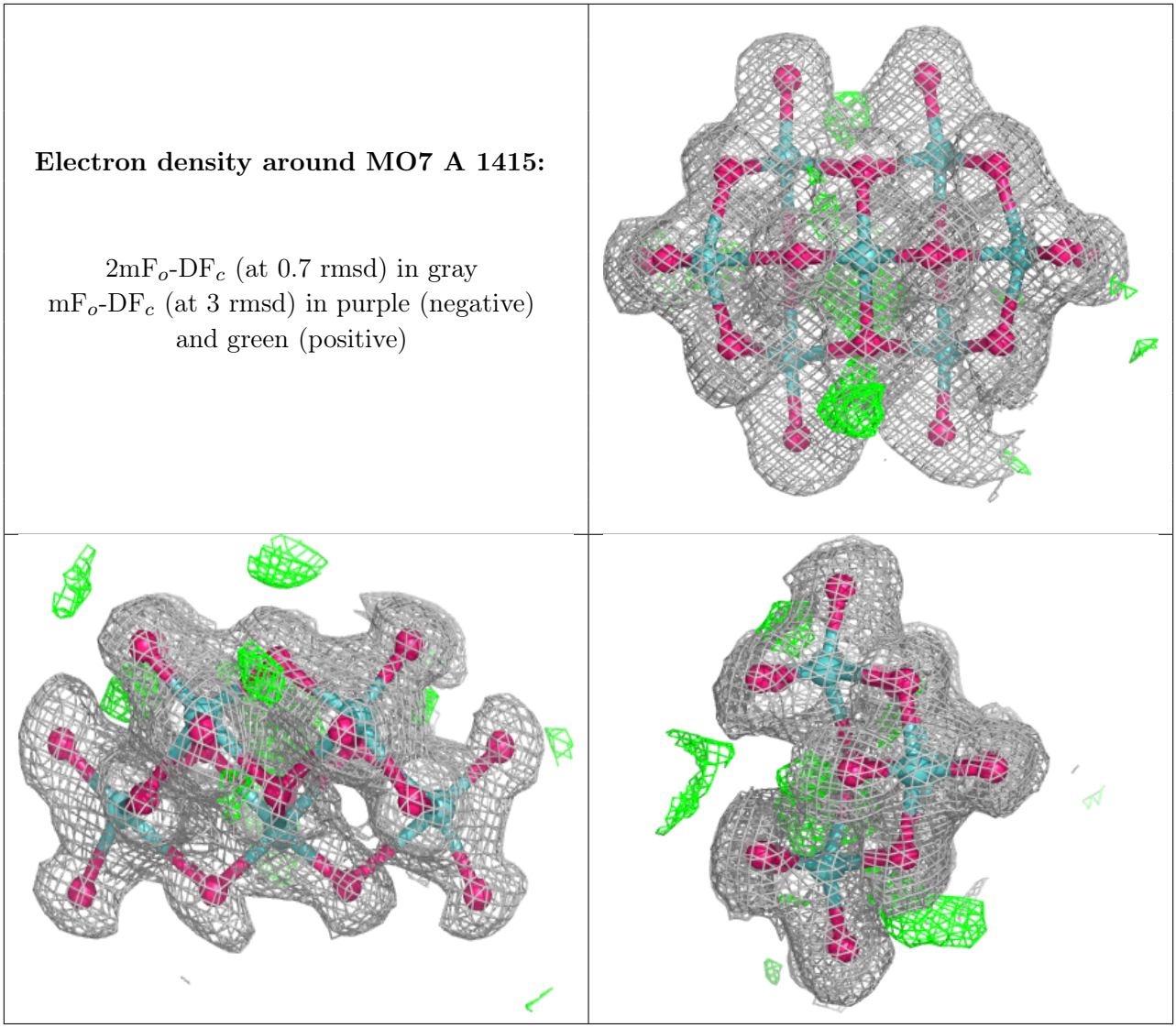
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around MO7 B 1416:

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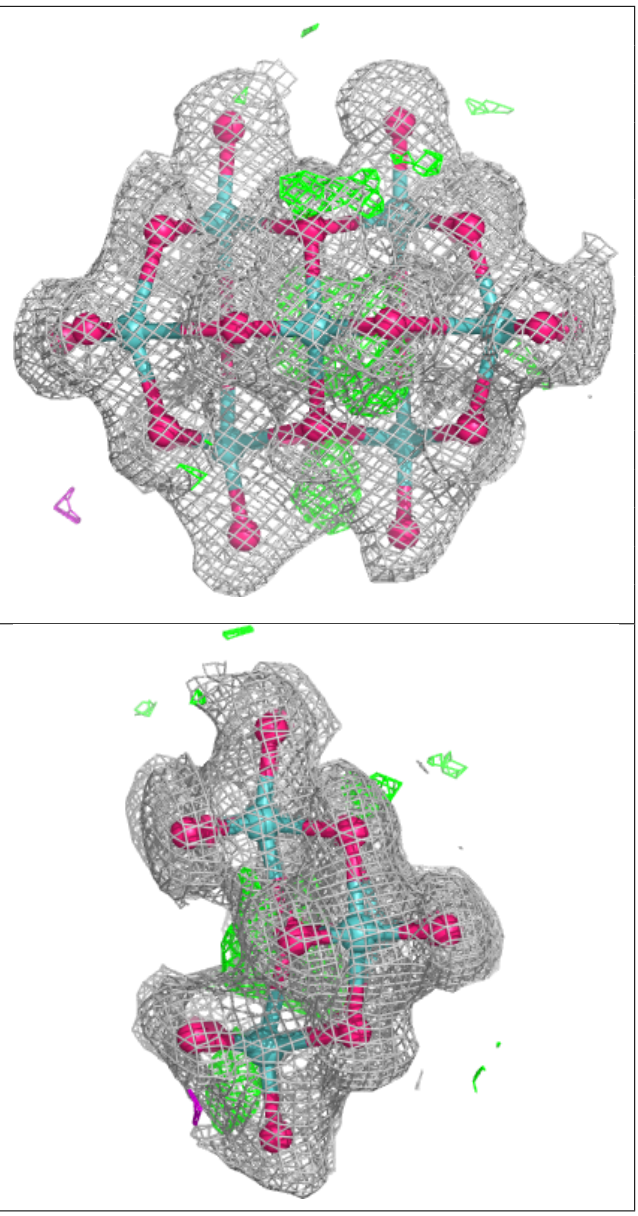
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around 8M0 A 1417:

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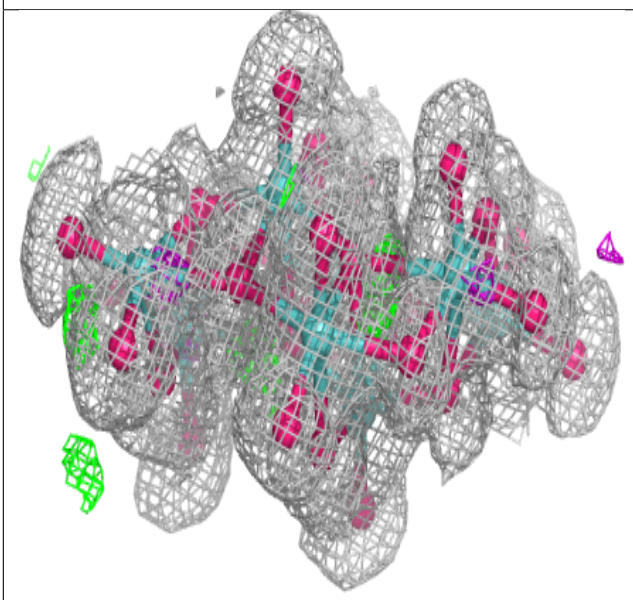
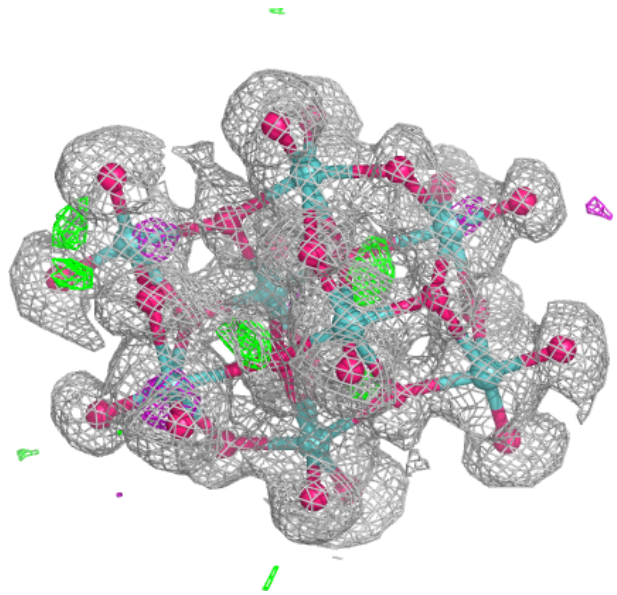
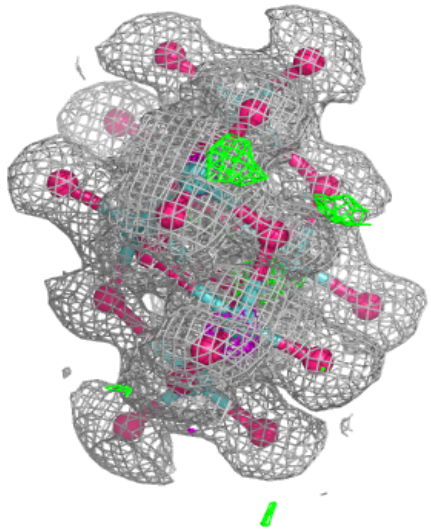
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)







Electron density around 8M0 B 1403:

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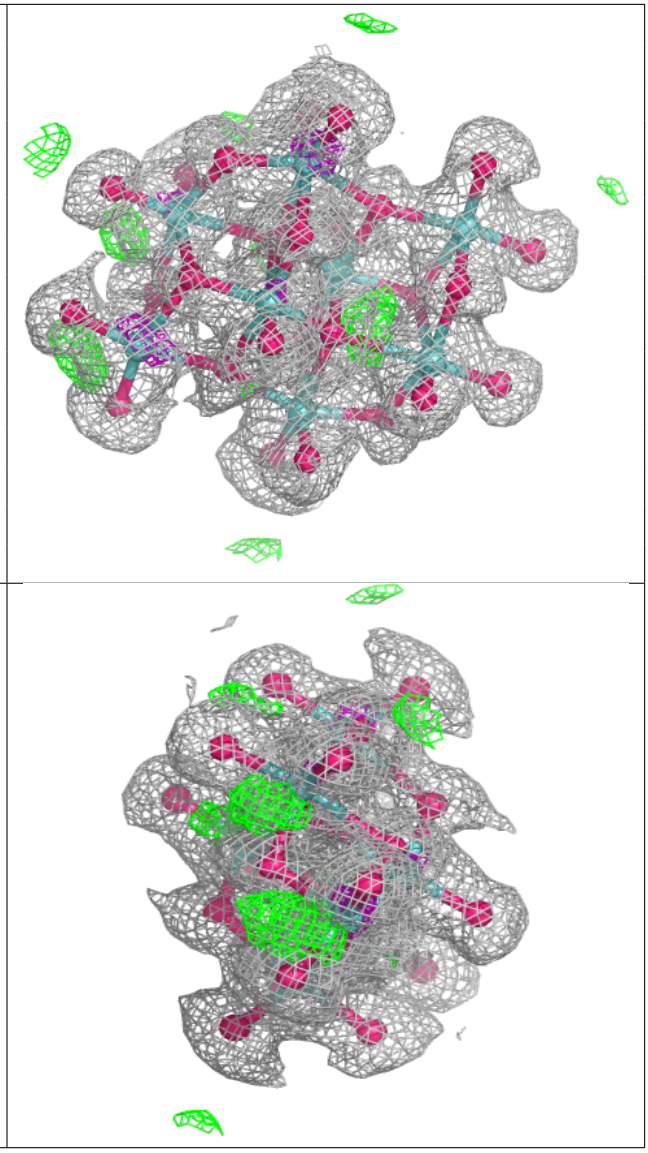
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



6.5 Other polymers (i)

There are no such residues in this entry.