Full wwPDB X-ray Structure Validation Report ⓘ

Mar 10, 2026 – 08:56 AM UTC

PDB ID	:	7K9Q / pdb_00007k9q
Title	:	Co-crystal structure of alpha glucosidase with compound 4
Authors	:	Karade, S.S.; Mariuzza, R.A.
Deposited on	:	2020-09-29
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 types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

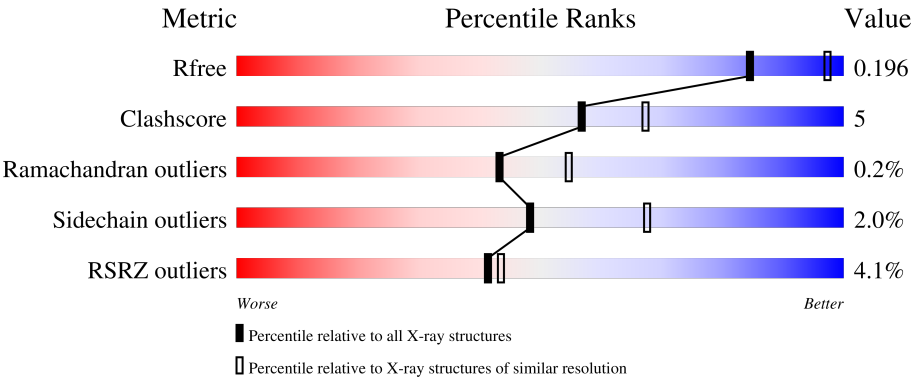
MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal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

1 Overall quality at a glance

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

The reported resolution of this entry is 2.30 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}	180053	6319 (2.30-2.30)
Clashscore	190562	6919 (2.30-2.30)
Ramachandran outliers	187476	6854 (2.30-2.30)
Sidechain outliers	187428	6854 (2.30-2.30)
RSRZ outliers	180081	6325 (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 <=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	977	2% 76% 11% 13%
1	C	977	3% 79% 8% 12%
2	B	547	2% 15% 84%
2	D	547	4% 14% 84%

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
7	SO4	A	1031	-	-	X	-

2 Entry composition (i)

There are 10 unique types of molecules in this entry. The entry contains 16268 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 Alpha glucosidase 2 alpha neutral subunit.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	853	Total	C	N	O	S	0	7	0
			6886	4412	1191	1255	28			
1	C	857	Total	C	N	O	S	0	9	0
			6941	4447	1199	1265	30			

There are 88 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	2	MET	-	initiating methionine	UNP A1A4T2
A	3	GLY	-	expression tag	UNP A1A4T2
A	4	ILE	-	expression tag	UNP A1A4T2
A	5	LEU	-	expression tag	UNP A1A4T2
A	6	PRO	-	expression tag	UNP A1A4T2
A	7	SER	-	expression tag	UNP A1A4T2
A	8	PRO	-	expression tag	UNP A1A4T2
A	9	GLY	-	expression tag	UNP A1A4T2
A	10	MET	-	expression tag	UNP A1A4T2
A	11	PRO	-	expression tag	UNP A1A4T2
A	12	ALA	-	expression tag	UNP A1A4T2
A	13	LEU	-	expression tag	UNP A1A4T2
A	14	LEU	-	expression tag	UNP A1A4T2
A	15	SER	-	expression tag	UNP A1A4T2
A	16	LEU	-	expression tag	UNP A1A4T2
A	17	VAL	-	expression tag	UNP A1A4T2
A	18	SER	-	expression tag	UNP A1A4T2
A	19	LEU	-	expression tag	UNP A1A4T2
A	20	LEU	-	expression tag	UNP A1A4T2
A	21	SER	-	expression tag	UNP A1A4T2
A	22	VAL	-	expression tag	UNP A1A4T2
A	23	LEU	-	expression tag	UNP A1A4T2
A	24	LEU	-	expression tag	UNP A1A4T2
A	25	MET	-	expression tag	UNP A1A4T2
A	26	GLY	-	expression tag	UNP A1A4T2

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Chain	Residue	Modelled	Actual	Comment	Reference
A	27	CYS	-	expression tag	UNP A1A4T2
A	28	VAL	-	expression tag	UNP A1A4T2
A	29	ALA	-	expression tag	UNP A1A4T2
A	30	GLU	-	expression tag	UNP A1A4T2
A	31	THR	-	expression tag	UNP A1A4T2
A	32	GLY	-	expression tag	UNP A1A4T2
A	97	ASP	ASN	engineered mutation	UNP A1A4T2
A	967	SER	-	expression tag	UNP A1A4T2
A	968	ALA	-	expression tag	UNP A1A4T2
A	969	TRP	-	expression tag	UNP A1A4T2
A	970	SER	-	expression tag	UNP A1A4T2
A	971	HIS	-	expression tag	UNP A1A4T2
A	972	PRO	-	expression tag	UNP A1A4T2
A	973	GLN	-	expression tag	UNP A1A4T2
A	974	PHE	-	expression tag	UNP A1A4T2
A	975	GLU	-	expression tag	UNP A1A4T2
A	976	LYS	-	expression tag	UNP A1A4T2
A	977	LEU	-	expression tag	UNP A1A4T2
A	978	GLU	-	expression tag	UNP A1A4T2
C	2	MET	-	initiating methionine	UNP A1A4T2
C	3	GLY	-	expression tag	UNP A1A4T2
C	4	ILE	-	expression tag	UNP A1A4T2
C	5	LEU	-	expression tag	UNP A1A4T2
C	6	PRO	-	expression tag	UNP A1A4T2
C	7	SER	-	expression tag	UNP A1A4T2
C	8	PRO	-	expression tag	UNP A1A4T2
C	9	GLY	-	expression tag	UNP A1A4T2
C	10	MET	-	expression tag	UNP A1A4T2
C	11	PRO	-	expression tag	UNP A1A4T2
C	12	ALA	-	expression tag	UNP A1A4T2
C	13	LEU	-	expression tag	UNP A1A4T2
C	14	LEU	-	expression tag	UNP A1A4T2
C	15	SER	-	expression tag	UNP A1A4T2
C	16	LEU	-	expression tag	UNP A1A4T2
C	17	VAL	-	expression tag	UNP A1A4T2
C	18	SER	-	expression tag	UNP A1A4T2
C	19	LEU	-	expression tag	UNP A1A4T2
C	20	LEU	-	expression tag	UNP A1A4T2
C	21	SER	-	expression tag	UNP A1A4T2
C	22	VAL	-	expression tag	UNP A1A4T2
C	23	LEU	-	expression tag	UNP A1A4T2
C	24	LEU	-	expression tag	UNP A1A4T2

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Chain	Residue	Modelled	Actual	Comment	Reference
C	25	MET	-	expression tag	UNP A1A4T2
C	26	GLY	-	expression tag	UNP A1A4T2
C	27	CYS	-	expression tag	UNP A1A4T2
C	28	VAL	-	expression tag	UNP A1A4T2
C	29	ALA	-	expression tag	UNP A1A4T2
C	30	GLU	-	expression tag	UNP A1A4T2
C	31	THR	-	expression tag	UNP A1A4T2
C	32	GLY	-	expression tag	UNP A1A4T2
C	97	ASP	ASN	engineered mutation	UNP A1A4T2
C	967	SER	-	expression tag	UNP A1A4T2
C	968	ALA	-	expression tag	UNP A1A4T2
C	969	TRP	-	expression tag	UNP A1A4T2
C	970	SER	-	expression tag	UNP A1A4T2
C	971	HIS	-	expression tag	UNP A1A4T2
C	972	PRO	-	expression tag	UNP A1A4T2
C	973	GLN	-	expression tag	UNP A1A4T2
C	974	PHE	-	expression tag	UNP A1A4T2
C	975	GLU	-	expression tag	UNP A1A4T2
C	976	LYS	-	expression tag	UNP A1A4T2
C	977	LEU	-	expression tag	UNP A1A4T2
C	978	GLU	-	expression tag	UNP A1A4T2

- Molecule 2 is a protein called Glucosidase 2 subunit beta.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	87	Total	C	N	O	S	0	0	0
			614	362	102	140	10			
2	D	88	Total	C	N	O	S	0	0	0
			641	382	105	144	10			

There are 88 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	-16	MET	-	initiating methionine	UNP O08795
B	-15	GLY	-	expression tag	UNP O08795
B	-14	ILE	-	expression tag	UNP O08795
B	-13	LEU	-	expression tag	UNP O08795
B	-12	PRO	-	expression tag	UNP O08795
B	-11	SER	-	expression tag	UNP O08795
B	-10	PRO	-	expression tag	UNP O08795
B	-9	GLY	-	expression tag	UNP O08795
B	-8	MET	-	expression tag	UNP O08795

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-7	PRO	-	expression tag	UNP O08795
B	-6	ALA	-	expression tag	UNP O08795
B	-5	LEU	-	expression tag	UNP O08795
B	-4	LEU	-	expression tag	UNP O08795
B	-3	SER	-	expression tag	UNP O08795
B	-2	LEU	-	expression tag	UNP O08795
B	-1	VAL	-	expression tag	UNP O08795
B	0	SER	-	expression tag	UNP O08795
B	1	LEU	-	expression tag	UNP O08795
B	2	LEU	-	expression tag	UNP O08795
B	3	SER	-	expression tag	UNP O08795
B	4	VAL	-	expression tag	UNP O08795
B	5	LEU	-	expression tag	UNP O08795
B	6	LEU	-	expression tag	UNP O08795
B	7	MET	-	expression tag	UNP O08795
B	8	GLY	-	expression tag	UNP O08795
B	9	CYS	-	expression tag	UNP O08795
B	10	VAL	-	expression tag	UNP O08795
B	11	ALA	-	expression tag	UNP O08795
B	12	GLU	-	expression tag	UNP O08795
B	13	THR	-	expression tag	UNP O08795
B	14	GLY	-	expression tag	UNP O08795
B	518	SER	-	expression tag	UNP O08795
B	519	ALA	-	expression tag	UNP O08795
B	520	TRP	-	expression tag	UNP O08795
B	521	LEU	-	expression tag	UNP O08795
B	522	GLU	-	expression tag	UNP O08795
B	523	THR	-	expression tag	UNP O08795
B	524	LYS	-	expression tag	UNP O08795
B	525	HIS	-	expression tag	UNP O08795
B	526	HIS	-	expression tag	UNP O08795
B	527	HIS	-	expression tag	UNP O08795
B	528	HIS	-	expression tag	UNP O08795
B	529	HIS	-	expression tag	UNP O08795
B	530	HIS	-	expression tag	UNP O08795
D	-16	MET	-	initiating methionine	UNP O08795
D	-15	GLY	-	expression tag	UNP O08795
D	-14	ILE	-	expression tag	UNP O08795
D	-13	LEU	-	expression tag	UNP O08795
D	-12	PRO	-	expression tag	UNP O08795
D	-11	SER	-	expression tag	UNP O08795
D	-10	PRO	-	expression tag	UNP O08795

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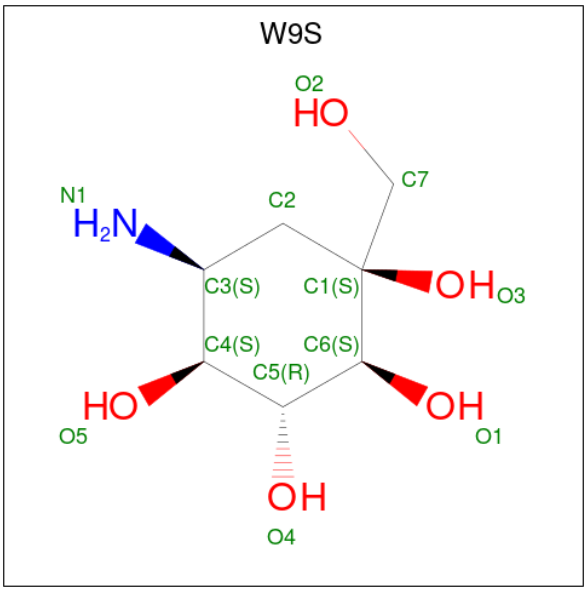
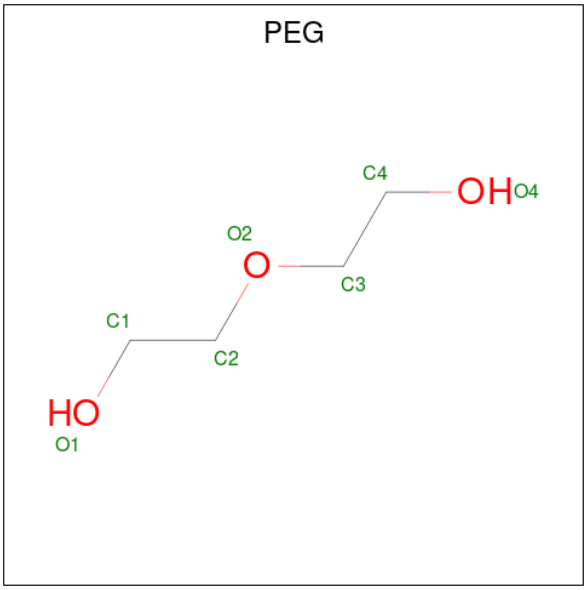
Chain	Residue	Modelled	Actual	Comment	Reference
D	-9	GLY	-	expression tag	UNP O08795
D	-8	MET	-	expression tag	UNP O08795
D	-7	PRO	-	expression tag	UNP O08795
D	-6	ALA	-	expression tag	UNP O08795
D	-5	LEU	-	expression tag	UNP O08795
D	-4	LEU	-	expression tag	UNP O08795
D	-3	SER	-	expression tag	UNP O08795
D	-2	LEU	-	expression tag	UNP O08795
D	-1	VAL	-	expression tag	UNP O08795
D	0	SER	-	expression tag	UNP O08795
D	1	LEU	-	expression tag	UNP O08795
D	2	LEU	-	expression tag	UNP O08795
D	3	SER	-	expression tag	UNP O08795
D	4	VAL	-	expression tag	UNP O08795
D	5	LEU	-	expression tag	UNP O08795
D	6	LEU	-	expression tag	UNP O08795
D	7	MET	-	expression tag	UNP O08795
D	8	GLY	-	expression tag	UNP O08795
D	9	CYS	-	expression tag	UNP O08795
D	10	VAL	-	expression tag	UNP O08795
D	11	ALA	-	expression tag	UNP O08795
D	12	GLU	-	expression tag	UNP O08795
D	13	THR	-	expression tag	UNP O08795
D	14	GLY	-	expression tag	UNP O08795
D	518	SER	-	expression tag	UNP O08795
D	519	ALA	-	expression tag	UNP O08795
D	520	TRP	-	expression tag	UNP O08795
D	521	LEU	-	expression tag	UNP O08795
D	522	GLU	-	expression tag	UNP O08795
D	523	THR	-	expression tag	UNP O08795
D	524	LYS	-	expression tag	UNP O08795
D	525	HIS	-	expression tag	UNP O08795
D	526	HIS	-	expression tag	UNP O08795
D	527	HIS	-	expression tag	UNP O08795
D	528	HIS	-	expression tag	UNP O08795
D	529	HIS	-	expression tag	UNP O08795
D	530	HIS	-	expression tag	UNP O08795

- Molecule 3 is (1S,2S,3R,4S,5S)-5-amino-1-(hydroxymethyl)cyclohexane-1,2,3,4-tetrol (CCD ID: W9S) (formula: $C_7H_{15}NO_5$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C N O 13 7 1 5	0	0
3	C	1	Total C N O 13 7 1 5	0	0

- Molecule 4 is DI(HYDROXYETHYL)ETHER (CCD ID: PEG) (formula: $C_4H_{10}O_3$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C O 7 4 3	0	0
4	A	1	Total C O 7 4 3	0	0

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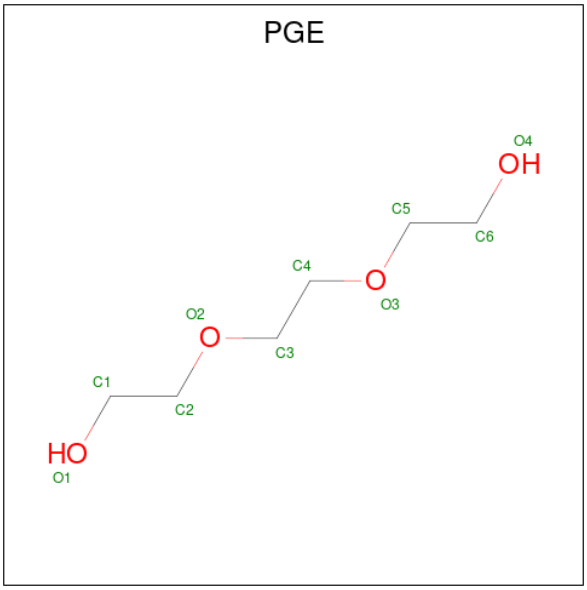
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C O 7 4 3	0	0
4	A	1	Total C O 7 4 3	0	0
4	A	1	Total C O 7 4 3	0	0
4	A	1	Total C O 7 4 3	0	0
4	C	1	Total C O 7 4 3	0	0
4	C	1	Total C O 7 4 3	0	0
4	C	1	Total C O 7 4 3	0	0
4	D	1	Total C O 7 4 3	0	0

- Molecule 5 is TRIETHYLENE GLYCOL (CCD ID: PGE) (formula: $C_6H_{14}O_4$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total C O 10 6 4	0	0
5	A	1	Total C O 10 6 4	0	0
5	B	1	Total C O 10 6 4	0	0

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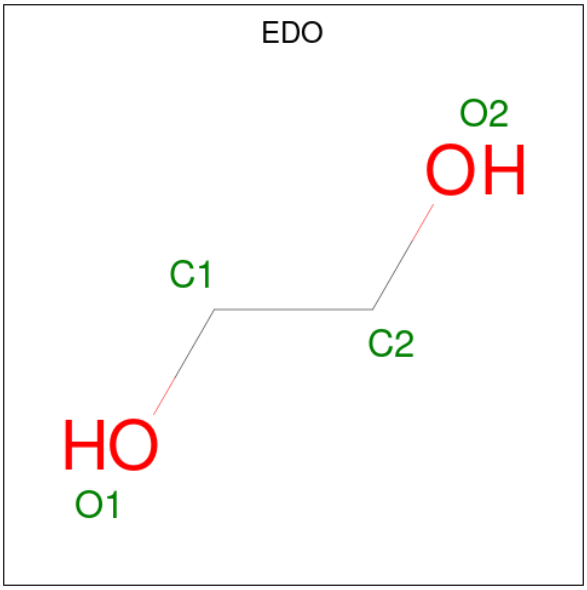
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	C	1	Total C O 10 6 4	0	0

- Molecule 6 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: $C_2H_6O_2$).



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

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

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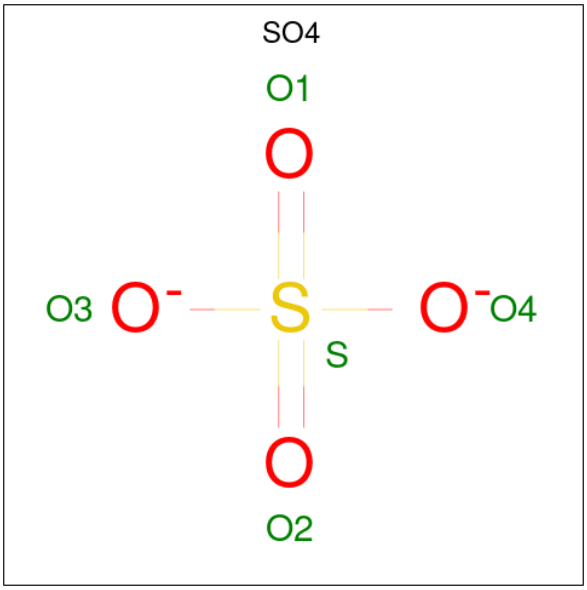
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	C	1	Total C O 4 2 2	0	0
6	D	1	Total C O 4 2 2	0	0

- Molecule 7 is SULFATE ION (CCD ID: SO4) (formula: O_4S).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	1	Total O S 5 4 1	0	0
7	A	1	Total O S 5 4 1	0	0
7	A	1	Total O S 5 4 1	0	0
7	A	1	Total O S 5 4 1	0	0
7	C	1	Total O S 5 4 1	0	0
7	C	1	Total O S 5 4 1	0	0

- Molecule 8 is CALCIUM ION (CCD ID: CA) (formula: Ca).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	B	2	Total Ca 2 2	0	0

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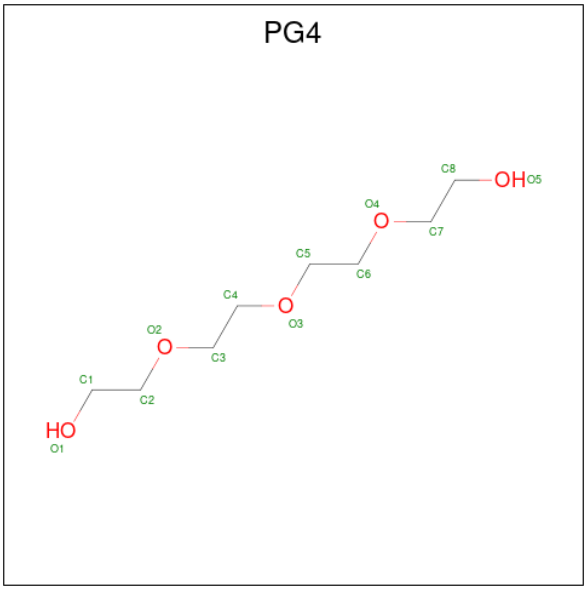
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	D	2	Total Ca 2 2	0	0

- Molecule 9 is TETRAETHYLENE GLYCOL (CCD ID: PG4) (formula: $C_8H_{18}O_5$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
9	D	1	Total C O 13 8 5	0	0

- Molecule 10 is water.

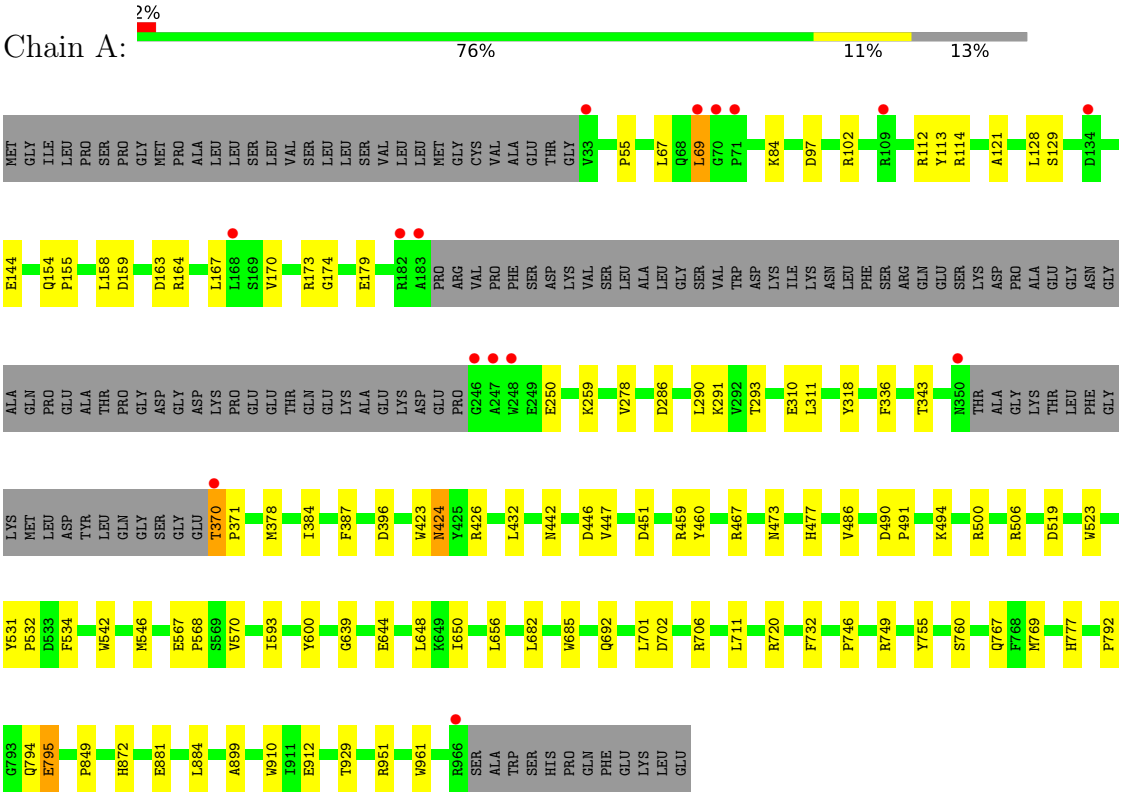
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
10	A	428	Total O 428 428	0	0
10	B	24	Total O 24 24	0	0
10	C	384	Total O 384 384	0	0
10	D	35	Total O 35 35	0	0

3 Residue-property plots (i)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry 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.

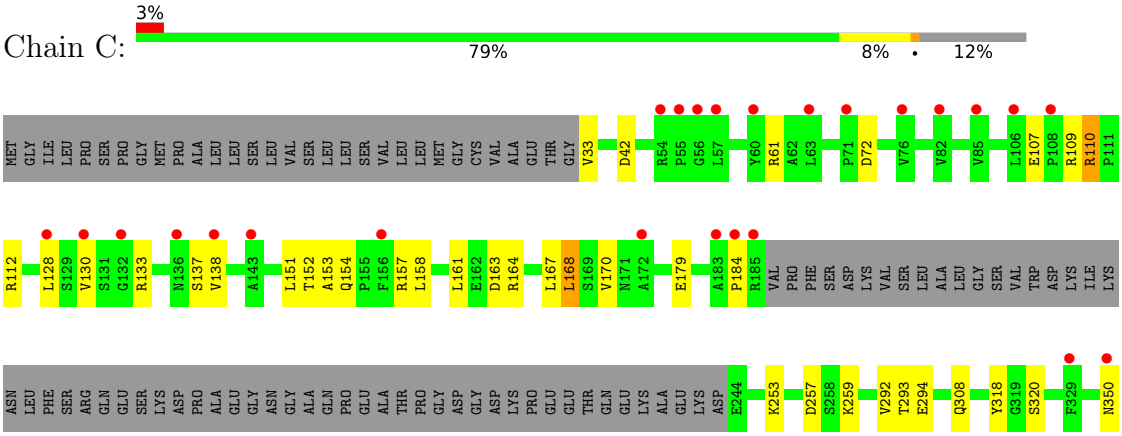
• Molecule 1: Alpha glucosidase 2 alpha neutral subunit

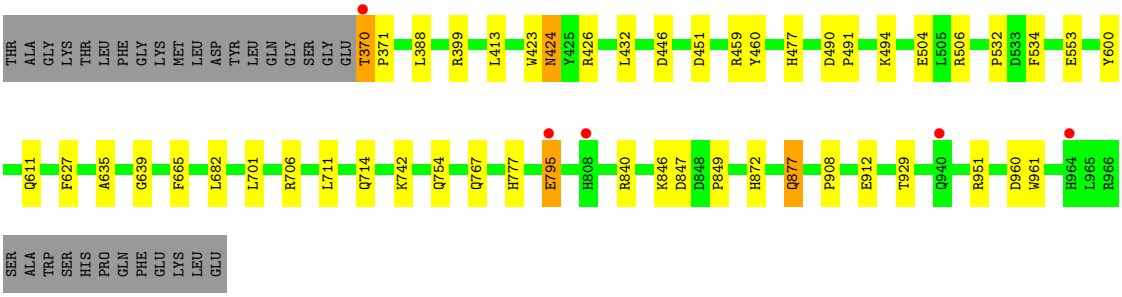
Chain A:



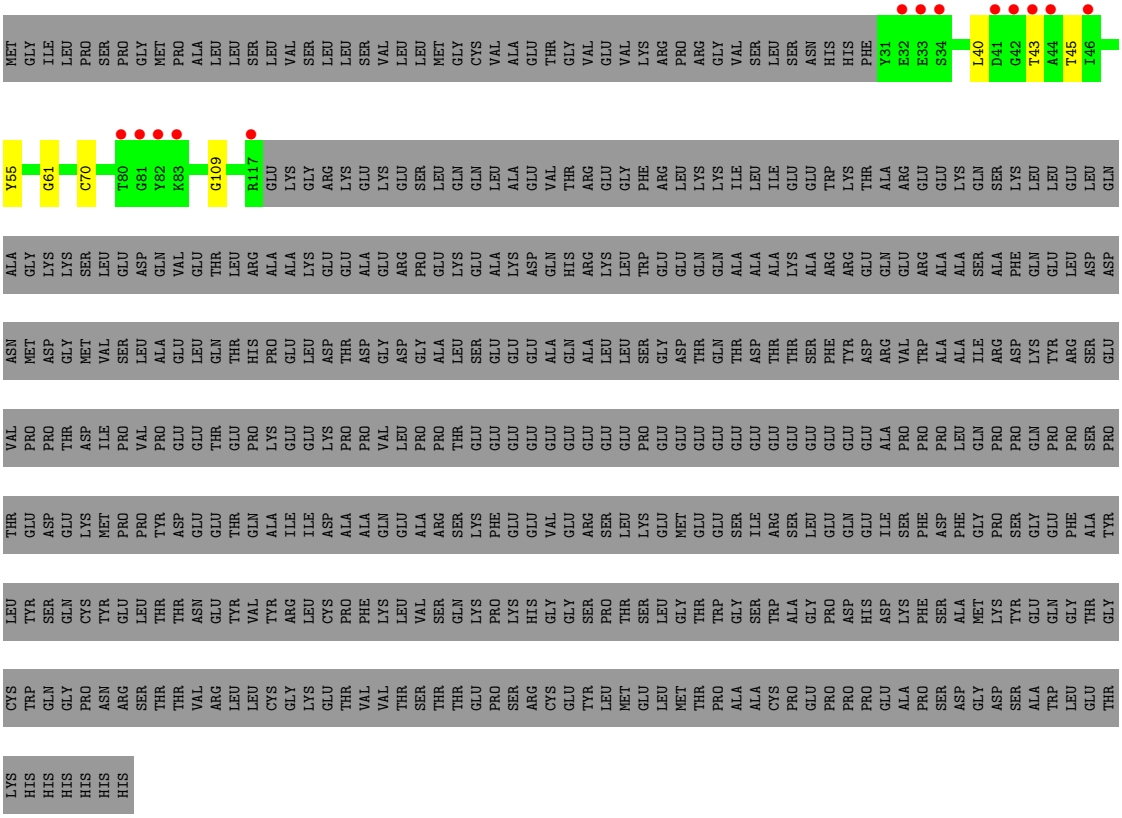
• Molecule 1: Alpha glucosidase 2 alpha neutral subunit

Chain C:

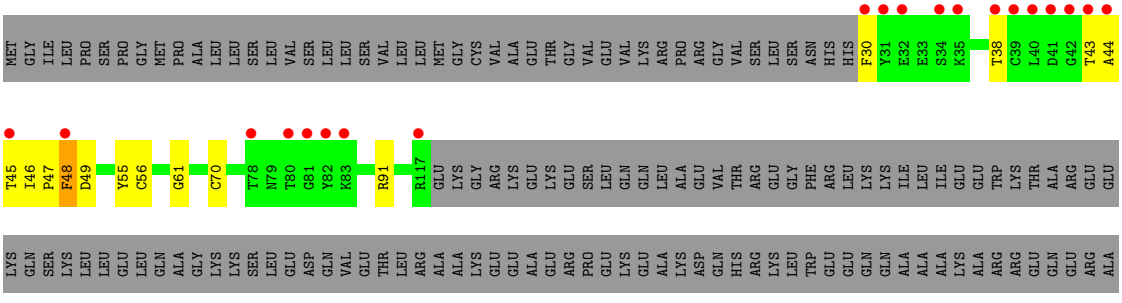




• Molecule 2: Glucosidase 2 subunit beta



• Molecule 2: Glucosidase 2 subunit beta



ALA SER ALA PHE GLN GLU LEU ASP ASP ASN MET ASP GLY MET VAL SER LEU ALA GLU LEU GLN THR HIS PRO GLU LEU ASP THR ASP GLY ASP GLY ALA LEU SER GLU GLU GLU ALA GLN ALA LEU LEU SER GLY ASP THR GLN THR ASP THR THR SER PHE TYR ASP ARG VAL TRP ALA

ALA ILE ARG ASP LYS TYR ARG SER GLU VAL PRO PRO THR ASP ILE PRO VAL PRO GLU GLU THR GLU PRO LYS GLU GLU LYS PRO PRO VAL LEU PRO PRO THR GLU GLU GLU GLU GLU GLU GLU GLU PRO GLU GLU GLU GLU GLU GLU GLU GLU GLU GLU GLU GLU ALA PRO PRO PRO

LEU GLN PRO PRO GLN PRO PRO SER PRO THR GLU ASP GLU LYS MET PRO PRO TYR ASP GLU GLU THR GLN ALA ILE ILE ASP ALA ALA GLN GLU ALA ARG SER LYS PHE GLU GLU VAL GLU ARG SER LEU LYS GLU MET GLU GLU SER ILE ARG SER LEU GLU GLN GLU ILE SER PHE ASP

PHE GLY PRO SER GLY GLU PHE ALA TYR LEU TYR SER GLN CYS TYR GLU LEU THR THR ASN GLU TYR VAL TYR ARG LEU CYS PRO PHE LYS LEU VAL SER GLN LYS PRO LYS HIS GLY GLY SER PRO THR SER LEU GLY THR TRP GLY SER TRP ALA GLY PRO ASP HIS ASP LYS PHE SER

ALA MET LYS TYR GLU GLN GLY THR GLY CYS TRP GLN GLY PRO ASN ARG SER THR THR VAL ARG LEU LEU CYS GLY LYS GLU THR VAL VAL THR SER THR THR GLU PRO SER ARG CYS GLU TYR LEU MET GLU LEU MET THR PRO ALA ALA CYS PRO GLU PRO PRO PRO GLU ALA PRO SER

ASP GLY ASP SER ALA TRP LEU GLU THR LYS HIS HIS HIS HIS HIS HIS

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 32	Depositor
Cell constants a, b, c, α, β, γ	102.88Å 102.88Å 241.70Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	42.49 – 2.30 42.49 – 2.30	Depositor EDS
% Data completeness (in resolution range)	99.9 (42.49-2.30) 94.6 (42.49-2.30)	Depositor EDS
R_{merge}	0.13	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	0.65 (at 2.29Å)	Xtriage
Refinement program	PHENIX 1.18.2_3874	Depositor
R, R_{free}	0.172 , 0.197 0.173 , 0.196	Depositor DCC
R_{free} test set	1995 reflections (1.58%)	wwPDB-VP
Wilson B-factor (Å^2)	36.5	Xtriage
Anisotropy	0.171	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.32 , 34.1	EDS
L-test for twinning[2]	$< \|L\| > = 0.46$, $< L^2 > = 0.29$	Xtriage
Estimated twinning fraction	0.018 for -h,-k,l 0.064 for h,-h-k,-l 0.033 for -k,-h,-l	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	16268	wwPDB-VP
Average B, all atoms (Å^2)	45.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.55% 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: PGE, SO4, CA, W9S, PG4, PEG, 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	0.18	0/7118	0.42	0/9694
1	C	0.17	0/7180	0.42	0/9773
2	B	0.23	0/625	0.46	0/856
2	D	0.21	0/653	0.48	0/891
All	All	0.18	0/15576	0.43	0/21214

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	6886	0	6613	68	0
1	C	6941	0	6685	52	0
2	B	614	0	492	3	0
2	D	641	0	539	10	0
3	A	13	0	0	0	0
3	C	13	0	0	0	0
4	A	42	0	60	5	0
4	C	21	0	30	1	0
4	D	7	0	10	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	A	20	0	28	2	0
5	B	10	0	14	0	0
5	C	10	0	14	3	0
6	A	72	0	108	7	0
6	B	16	0	24	1	0
6	C	40	0	60	5	0
6	D	4	0	6	0	0
7	A	20	0	0	4	0
7	C	10	0	0	0	0
8	B	2	0	0	0	0
8	D	2	0	0	0	0
9	D	13	0	18	2	0
10	A	428	0	0	16	0
10	B	24	0	0	0	0
10	C	384	0	0	20	0
10	D	35	0	0	4	0
All	All	16268	0	14701	138	0

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

All (138) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:72:ASP:O	10:C:1101:HOH:O	1.93	0.86
2:B:109:GLY:H	6:B:1906:EDO:H12	1.43	0.84
1:A:519:ASP:H	6:A:1022:EDO:H11	1.43	0.84
1:A:97:ASP:OD2	10:A:1101:HOH:O	1.97	0.83
1:C:167:LEU:O	10:C:1102:HOH:O	1.99	0.78
1:A:121:ALA:O	10:A:1102:HOH:O	2.01	0.77
7:A:1031:SO4:O3	10:A:1104:HOH:O	2.04	0.75
1:C:33:VAL:N	10:C:1107:HOH:O	2.19	0.75
1:C:308:GLN:OE1	10:C:1104:HOH:O	2.05	0.75
1:A:442:ASN:ND2	7:A:1031:SO4:O2	2.19	0.74
5:C:1003:PGE:O1	10:C:1103:HOH:O	2.04	0.73
1:C:413:LEU:HD22	6:C:1013:EDO:H12	1.71	0.72
2:D:48:PHE:O	10:D:1301:HOH:O	2.07	0.72
1:A:159:ASP:OD2	10:A:1106:HOH:O	2.08	0.71
1:C:960:ASP:HB3	4:C:1010:PEG:H41	1.73	0.71
1:C:350:ASN:OD1	10:C:1105:HOH:O	2.08	0.70
1:A:167:LEU:O	10:A:1107:HOH:O	2.11	0.69

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:44:ALA:O	10:D:1302:HOH:O	2.10	0.69
1:C:110:ARG:HH12	1:C:184:PRO:HG3	1.58	0.69
1:A:114:ARG:H	4:A:1011:PEG:H42	1.59	0.67
1:A:174:GLY:O	10:A:1108:HOH:O	2.12	0.66
5:C:1003:PGE:O4	10:C:1106:HOH:O	2.11	0.66
1:A:760:SER:HB2	4:A:1002:PEG:H41	1.76	0.66
1:C:110:ARG:NH1	10:C:1113:HOH:O	2.26	0.66
1:A:795:GLU:HB3	10:A:1130:HOH:O	1.97	0.64
1:C:553:GLU:HB3	6:C:1004:EDO:H22	1.78	0.64
1:A:692:GLN:OE1	10:A:1110:HOH:O	2.16	0.63
1:C:506:ARG:HD3	10:C:1138:HOH:O	1.99	0.63
1:C:293:THR:HG22	6:C:1015:EDO:H11	1.80	0.62
1:C:61:ARG:HD2	1:C:154:GLN:HB2	1.80	0.61
1:A:682:LEU:HD23	1:A:711:LEU:HD11	1.83	0.61
1:C:754:GLN:HB3	10:C:1182:HOH:O	2.00	0.61
1:C:112:ARG:NH2	1:C:179:GLU:O	2.34	0.61
5:A:1003:PGE:O4	10:A:1111:HOH:O	2.16	0.60
1:A:542:TRP:CH2	1:A:546:MET:HE3	2.36	0.60
7:A:1031:SO4:O1	10:A:1109:HOH:O	2.15	0.59
1:C:795:GLU:HB3	10:C:1244:HOH:O	2.03	0.58
2:D:56:CYS:SG	9:D:1204:PG4:H42	2.44	0.57
1:A:112:ARG:NH2	1:A:179:GLU:O	2.37	0.57
1:A:250:GLU:OE1	1:A:259:LYS:NZ	2.32	0.57
1:A:310:GLU:HG2	4:A:1025:PEG:H32	1.88	0.56
2:D:47:PRO:HB2	2:D:49:ASP:OD1	2.06	0.56
1:C:168:LEU:HD21	1:C:388:LEU:HD13	1.88	0.54
1:A:426:ARG:NH2	10:A:1103:HOH:O	2.03	0.54
1:C:423:TRP:O	1:C:701:LEU:HA	2.08	0.53
1:C:506:ARG:HG3	10:C:1217:HOH:O	2.07	0.53
4:A:1025:PEG:O1	10:A:1113:HOH:O	2.18	0.53
1:A:293:THR:HG22	6:A:1023:EDO:H12	1.90	0.53
1:C:682:LEU:HD23	1:C:711:LEU:HD11	1.90	0.53
1:C:426:ARG:NH2	10:C:1125:HOH:O	2.40	0.53
2:D:38:THR:HG22	2:D:45:THR:HG23	1.89	0.53
1:A:459:ARG:NH1	1:A:494:LYS:HE2	2.24	0.52
1:A:423:TRP:O	1:A:701:LEU:HA	2.09	0.52
1:A:473:ASN:HB3	10:A:1368:HOH:O	2.09	0.52
1:C:370:THR:N	1:C:371:PRO:HD2	2.25	0.52
1:A:286:ASP:OD1	1:A:291:LYS:NZ	2.44	0.51
2:D:30:PHE:N	10:D:1305:HOH:O	2.43	0.51
1:C:491:PRO:O	1:C:532:PRO:HD2	2.10	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:C:1003:PGE:H42	10:C:1103:HOH:O	2.12	0.50
1:A:311:LEU:HD22	1:A:650:ILE:HD13	1.93	0.50
1:A:370:THR:N	1:A:371:PRO:HD2	2.27	0.50
1:A:55:PRO:HB3	1:A:173:ARG:HB3	1.94	0.49
1:C:61:ARG:HG3	1:C:153:ALA:O	2.12	0.49
2:B:61:GLY:HA2	2:B:70:CYS:SG	2.53	0.49
2:D:61:GLY:HA2	2:D:70:CYS:SG	2.52	0.49
1:A:460:TYR:CE2	1:A:490:ASP:HB2	2.47	0.49
1:A:794:GLN:C	1:A:795:GLU:HG2	2.37	0.49
1:A:506:ARG:O	10:A:1114:HOH:O	2.19	0.49
1:C:951:ARG:HG3	2:D:55:TYR:CE2	2.48	0.49
9:D:1204:PG4:H41	10:D:1313:HOH:O	2.13	0.49
1:C:259:LYS:HD2	10:C:1421:HOH:O	2.13	0.48
1:A:523:TRP:CD2	4:A:1014:PEG:H12	2.48	0.48
1:C:257:ASP:OD2	10:C:1108:HOH:O	2.20	0.48
1:A:951:ARG:HG3	2:B:55:TYR:CE2	2.49	0.47
1:C:929:THR:HB	1:C:961:TRP:HB3	1.96	0.47
1:A:491:PRO:O	1:A:532:PRO:HD2	2.14	0.47
1:C:320:SER:O	1:C:627:PHE:HA	2.15	0.47
1:C:42:ASP:N	10:C:1116:HOH:O	2.29	0.46
1:C:877:GLN:NE2	6:C:1009:EDO:H21	2.30	0.46
1:A:336:PHE:HB3	1:A:387:PHE:HB2	1.96	0.46
1:A:644:GLU:OE1	10:A:1115:HOH:O	2.21	0.46
2:D:43:THR:OG1	2:D:44:ALA:N	2.47	0.46
1:C:292:VAL:HG12	1:C:294:GLU:H	1.81	0.46
1:A:519:ASP:N	6:A:1022:EDO:H11	2.23	0.45
1:A:542:TRP:CZ2	1:A:546:MET:HE3	2.51	0.45
1:A:849:PRO:HB2	1:A:912:GLU:HB3	1.98	0.45
1:A:424:ASN:OD1	1:A:451:ASP:HB3	2.17	0.45
1:C:399:ARG:NH1	10:C:1140:HOH:O	2.50	0.45
1:C:432:LEU:HD22	1:C:477[A]:HIS:ND1	2.32	0.44
1:C:460:TYR:CE2	1:C:490:ASP:HB2	2.52	0.44
1:A:396:ASP:OD1	6:A:1008:EDO:O2	2.36	0.44
1:C:158:LEU:HB2	1:C:170:VAL:HB	1.99	0.44
1:A:154:GLN:HA	1:A:155:PRO:HA	1.89	0.44
1:A:732:PHE:HE1	6:A:1021:EDO:H22	1.83	0.44
1:C:133:ARG:HG3	1:C:138:VAL:HG22	2.00	0.43
1:A:69:LEU:HD11	1:A:128:LEU:HB2	2.01	0.43
1:A:158:LEU:HB2	1:A:170:VAL:HB	2.00	0.43
1:C:163:ASP:HB3	1:C:164:ARG:H	1.69	0.43
1:A:426:ARG:HB3	7:A:1028:SO4:O3	2.19	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:424:ASN:OD1	1:C:451:ASP:HB3	2.19	0.43
1:A:447:VAL:HG11	1:A:486:VAL:HG23	2.00	0.43
1:A:767:GLN:HG3	1:A:777:HIS:ND1	2.34	0.42
1:C:767:GLN:HG3	1:C:777:HIS:ND1	2.35	0.42
1:C:846:LYS:HB2	6:C:1013:EDO:O1	2.18	0.42
1:A:929:THR:HB	1:A:961:TRP:HB3	2.01	0.42
1:C:635:ALA:HB2	1:C:665:PHE:CD2	2.54	0.42
1:A:343:THR:HA	1:A:378:MET:O	2.19	0.42
1:A:432:LEU:HD22	1:A:477[A]:HIS:ND1	2.34	0.42
1:A:534:PHE:HB3	1:A:600:TYR:HB3	2.01	0.42
1:A:720:ARG:CZ	6:A:1005:EDO:H12	2.50	0.42
1:A:746:PRO:HG2	1:A:749:ARG:HG2	2.00	0.42
1:C:847:ASP:HB3	1:C:908:PRO:HG2	2.02	0.42
1:A:426:ARG:O	1:A:467:ARG:HD2	2.20	0.42
1:A:656:LEU:HD23	1:A:656:LEU:HA	1.89	0.42
1:A:278:VAL:HG23	1:A:290:LEU:HB2	2.02	0.41
1:A:500:ARG:NH2	10:A:1136:HOH:O	2.39	0.41
1:A:531:TYR:CZ	1:A:570:VAL:HG22	2.55	0.41
1:A:567:GLU:N	1:A:568:PRO:HA	2.35	0.41
1:C:504:GLU:OE2	10:C:1109:HOH:O	2.21	0.41
1:C:849:PRO:HB2	1:C:912:GLU:HB3	2.02	0.41
1:A:113:TYR:CZ	1:A:593:ILE:HG22	2.56	0.41
1:A:163:ASP:HB3	1:A:164:ARG:H	1.63	0.41
1:A:318:TYR:CE2	1:A:639:GLY:HA3	2.56	0.41
1:A:884:LEU:HG	1:A:899:ALA:HB3	2.03	0.41
1:A:910:TRP:CG	5:A:1009:PGE:H2	2.56	0.41
1:C:426:ARG:NH2	10:C:1151:HOH:O	2.54	0.41
1:A:702:ASP:OD2	6:A:1017:EDO:O2	2.36	0.41
1:A:755:TYR:CE2	1:A:792:PRO:HG2	2.56	0.40
1:C:840:ARG:HH21	2:D:91:ARG:HG2	1.86	0.40
1:A:102:ARG:HA	1:A:384:ILE:O	2.21	0.40
1:C:318:TYR:CE2	1:C:639:GLY:HA3	2.56	0.40
1:C:152:THR:HB	1:C:157:ARG:HB3	2.04	0.40
1:C:534:PHE:HB3	1:C:600:TYR:HB3	2.03	0.40
1:C:459:ARG:NH1	1:C:494:LYS:HE2	2.36	0.40
1:A:648:LEU:HD13	1:A:685:TRP:CG	2.56	0.40
1:A:769:MET:HE2	1:A:769:MET:HB3	1.95	0.40

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	854/977 (87%)	828 (97%)	25 (3%)	1 (0%)	48	60
1	C	860/977 (88%)	833 (97%)	26 (3%)	1 (0%)	48	60
2	B	85/547 (16%)	79 (93%)	5 (6%)	1 (1%)	10	12
2	D	86/547 (16%)	80 (93%)	6 (7%)	0	100	100
All	All	1885/3048 (62%)	1820 (97%)	62 (3%)	3 (0%)	43	55

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	43	THR
1	A	872	HIS
1	C	872	HIS

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	743/846 (88%)	733 (99%)	10 (1%)	61	77
1	C	751/846 (89%)	733 (98%)	18 (2%)	43	62
2	B	67/478 (14%)	65 (97%)	2 (3%)	36	53
2	D	73/478 (15%)	71 (97%)	2 (3%)	39	58
All	All	1634/2648 (62%)	1602 (98%)	32 (2%)	48	67

All (32) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	67	LEU
1	A	69	LEU
1	A	84	LYS
1	A	129	SER
1	A	144	GLU
1	A	370	THR
1	A	424	ASN
1	A	446	ASP
1	A	706	ARG
1	A	795	GLU
2	B	40	LEU
2	B	45	THR
1	C	107	GLU
1	C	109	ARG
1	C	110	ARG
1	C	128	LEU
1	C	130	VAL
1	C	137	SER
1	C	151	LEU
1	C	161	LEU
1	C	168	LEU
1	C	253	LYS
1	C	370	THR
1	C	424	ASN
1	C	446	ASP
1	C	706	ARG
1	C	714	GLN
1	C	742	LYS
1	C	795	GLU
1	C	877	GLN
2	D	46	ILE
2	D	48	PHE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	330	HIS
1	A	692	GLN
1	C	77	HIS
1	C	877	GLN

5.3.3 RNA

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates

There are no oligosaccharides in this entry.

5.6 Ligand geometry

Of 60 ligands modelled in this entry, 4 are monoatomic - leaving 56 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	EDO	C	1012	-	3,3,3	0.39	0	2,2,2	0.48	0
6	EDO	A	1005	-	3,3,3	0.44	0	2,2,2	0.36	0
6	EDO	A	1022	-	3,3,3	0.45	0	2,2,2	0.35	0
4	PEG	A	1014	-	6,6,6	0.49	0	5,5,5	0.44	0
7	SO4	C	1016	-	4,4,4	0.24	0	6,6,6	0.08	0
6	EDO	C	1004	-	3,3,3	0.45	0	2,2,2	0.32	0
7	SO4	A	1031	-	4,4,4	0.25	0	6,6,6	0.21	0
6	EDO	C	1009	-	3,3,3	0.44	0	2,2,2	0.35	0
6	EDO	A	1006	-	3,3,3	0.39	0	2,2,2	0.52	0
6	EDO	A	1019	-	3,3,3	0.42	0	2,2,2	0.50	0
6	EDO	A	1013	-	3,3,3	0.45	0	2,2,2	0.32	0
5	PGE	C	1003	-	9,9,9	0.35	0	8,8,8	0.30	0
6	EDO	C	1013	-	3,3,3	0.38	0	2,2,2	0.64	0
5	PGE	B	1904	-	9,9,9	0.33	0	8,8,8	0.32	0
4	PEG	C	1011	-	6,6,6	0.49	0	5,5,5	0.26	0
6	EDO	A	1008	-	3,3,3	0.38	0	2,2,2	0.60	0
6	EDO	A	1020	-	3,3,3	0.47	0	2,2,2	0.32	0
6	EDO	C	1005	-	3,3,3	0.42	0	2,2,2	0.45	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
6	EDO	C	1014	-	3,3,3	0.42	0	2,2,2	0.48	0
6	EDO	A	1004	-	3,3,3	0.38	0	2,2,2	0.45	0
4	PEG	A	1011	-	6,6,6	0.53	0	5,5,5	0.28	0
6	EDO	A	1016	-	3,3,3	0.42	0	2,2,2	0.35	0
7	SO4	C	1017	-	4,4,4	0.26	0	6,6,6	0.04	0
4	PEG	A	1007	-	6,6,6	0.49	0	5,5,5	0.35	0
6	EDO	A	1021	-	3,3,3	0.48	0	2,2,2	0.32	0
4	PEG	D	1201	-	6,6,6	0.49	0	5,5,5	0.38	0
6	EDO	A	1018	-	3,3,3	0.44	0	2,2,2	0.45	0
6	EDO	C	1007	-	3,3,3	0.46	0	2,2,2	0.33	0
7	SO4	A	1030	-	4,4,4	0.27	0	6,6,6	0.15	0
3	W9S	A	1001	-	13,13,13	0.80	1 (7%)	17,20,20	0.92	1 (5%)
6	EDO	B	1905	-	3,3,3	0.42	0	2,2,2	0.43	0
6	EDO	C	1006	-	3,3,3	0.51	0	2,2,2	0.21	0
6	EDO	A	1026	-	3,3,3	0.40	0	2,2,2	0.43	0
4	PEG	A	1002	-	6,6,6	0.48	0	5,5,5	0.35	0
6	EDO	D	1205	-	3,3,3	0.45	0	2,2,2	0.34	0
7	SO4	A	1028	-	4,4,4	0.25	0	6,6,6	0.10	0
6	EDO	B	1907	-	3,3,3	0.44	0	2,2,2	0.39	0
7	SO4	A	1029	-	4,4,4	0.27	0	6,6,6	0.14	0
6	EDO	A	1027	-	3,3,3	0.47	0	2,2,2	0.32	0
4	PEG	C	1010	-	6,6,6	0.49	0	5,5,5	0.25	0
6	EDO	C	1015	-	3,3,3	0.41	0	2,2,2	0.31	0
6	EDO	B	1906	-	3,3,3	0.40	0	2,2,2	0.48	0
6	EDO	B	1901	-	3,3,3	0.46	0	2,2,2	0.38	0
6	EDO	C	1002	-	3,3,3	0.40	0	2,2,2	0.49	0
3	W9S	C	1001	-	13,13,13	0.78	0	17,20,20	0.93	1 (5%)
5	PGE	A	1009	-	9,9,9	0.34	0	8,8,8	0.28	0
6	EDO	A	1015	-	3,3,3	0.43	0	2,2,2	0.44	0
6	EDO	A	1017	-	3,3,3	0.46	0	2,2,2	0.46	0
6	EDO	A	1023	-	3,3,3	0.45	0	2,2,2	0.47	0
6	EDO	A	1024	-	3,3,3	0.42	0	2,2,2	0.48	0
9	PG4	D	1204	-	12,12,12	0.54	0	11,11,11	0.35	0
5	PGE	A	1003	-	9,9,9	0.32	0	8,8,8	0.28	0
4	PEG	C	1008	-	6,6,6	0.51	0	5,5,5	0.27	0
6	EDO	A	1010	-	3,3,3	0.44	0	2,2,2	0.36	0
4	PEG	A	1012	-	6,6,6	0.49	0	5,5,5	0.27	0
4	PEG	A	1025	-	6,6,6	0.54	0	5,5,5	0.40	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	EDO	C	1012	-	-	1/1/1/1	-
6	EDO	A	1005	-	-	0/1/1/1	-
6	EDO	A	1022	-	-	0/1/1/1	-
4	PEG	A	1014	-	-	2/4/4/4	-
6	EDO	C	1004	-	-	1/1/1/1	-
6	EDO	C	1009	-	-	0/1/1/1	-
6	EDO	A	1006	-	-	1/1/1/1	-
6	EDO	A	1019	-	-	1/1/1/1	-
6	EDO	A	1013	-	-	1/1/1/1	-
5	PGE	C	1003	-	-	5/7/7/7	-
6	EDO	C	1013	-	-	0/1/1/1	-
5	PGE	B	1904	-	-	5/7/7/7	-
4	PEG	C	1011	-	-	3/4/4/4	-
6	EDO	A	1008	-	-	0/1/1/1	-
6	EDO	A	1020	-	-	0/1/1/1	-
6	EDO	C	1005	-	-	0/1/1/1	-
6	EDO	C	1014	-	-	1/1/1/1	-
6	EDO	A	1004	-	-	1/1/1/1	-
4	PEG	A	1011	-	-	2/4/4/4	-
6	EDO	A	1016	-	-	1/1/1/1	-
4	PEG	A	1007	-	-	2/4/4/4	-
6	EDO	A	1021	-	-	0/1/1/1	-
4	PEG	D	1201	-	-	3/4/4/4	-
6	EDO	A	1018	-	-	0/1/1/1	-
6	EDO	C	1007	-	-	0/1/1/1	-
3	W9S	A	1001	-	-	2/3/26/26	0/1/1/1
6	EDO	B	1905	-	-	0/1/1/1	-
6	EDO	C	1006	-	-	1/1/1/1	-
6	EDO	A	1026	-	-	1/1/1/1	-
4	PEG	A	1002	-	-	4/4/4/4	-
6	EDO	D	1205	-	-	0/1/1/1	-
6	EDO	B	1907	-	-	0/1/1/1	-
6	EDO	A	1027	-	-	0/1/1/1	-
4	PEG	C	1010	-	-	3/4/4/4	-
6	EDO	C	1015	-	-	0/1/1/1	-
6	EDO	B	1906	-	-	0/1/1/1	-
6	EDO	B	1901	-	-	1/1/1/1	-
6	EDO	C	1002	-	-	0/1/1/1	-
3	W9S	C	1001	-	-	0/3/26/26	0/1/1/1
5	PGE	A	1009	-	-	6/7/7/7	-
6	EDO	A	1015	-	-	1/1/1/1	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	EDO	A	1017	-	-	0/1/1/1	-
6	EDO	A	1023	-	-	0/1/1/1	-
6	EDO	A	1024	-	-	1/1/1/1	-
9	PG4	D	1204	-	-	6/10/10/10	-
5	PGE	A	1003	-	-	1/7/7/7	-
4	PEG	C	1008	-	-	2/4/4/4	-
6	EDO	A	1010	-	-	1/1/1/1	-
4	PEG	A	1012	-	-	4/4/4/4	-
4	PEG	A	1025	-	-	2/4/4/4	-

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	1001	W9S	O3-C1	-2.05	1.41	1.44

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	C	1001	W9S	C2-C3-C4	2.72	114.55	110.58
3	A	1001	W9S	C2-C3-C4	2.44	114.15	110.58

There are no chirality outliers.

All (66) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	C	1003	PGE	O1-C1-C2-O2
5	C	1003	PGE	O2-C3-C4-O3
4	A	1025	PEG	O1-C1-C2-O2
4	C	1010	PEG	O1-C1-C2-O2
4	C	1010	PEG	O2-C3-C4-O4
5	B	1904	PGE	O3-C5-C6-O4
9	D	1204	PG4	O3-C5-C6-O4
4	A	1002	PEG	O1-C1-C2-O2
4	A	1011	PEG	O1-C1-C2-O2
4	D	1201	PEG	C4-C3-O2-C2
4	A	1002	PEG	C4-C3-O2-C2
5	C	1003	PGE	C4-C3-O2-C2
4	C	1011	PEG	O1-C1-C2-O2
4	C	1011	PEG	O2-C3-C4-O4
4	A	1007	PEG	O2-C3-C4-O4

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Mol	Chain	Res	Type	Atoms
6	A	1010	EDO	O1-C1-C2-O2
4	A	1014	PEG	O2-C3-C4-O4
4	D	1201	PEG	O2-C3-C4-O4
9	D	1204	PG4	O4-C7-C8-O5
9	D	1204	PG4	O2-C3-C4-O3
4	A	1007	PEG	O1-C1-C2-O2
5	A	1009	PGE	O3-C5-C6-O4
5	A	1009	PGE	C4-C3-O2-C2
3	A	1001	W9S	C6-C1-C7-O2
5	A	1009	PGE	O2-C3-C4-O3
5	C	1003	PGE	C1-C2-O2-C3
5	B	1904	PGE	O1-C1-C2-O2
4	D	1201	PEG	C1-C2-O2-C3
5	A	1009	PGE	C6-C5-O3-C4
4	A	1002	PEG	C1-C2-O2-C3
4	C	1008	PEG	C1-C2-O2-C3
4	C	1010	PEG	C4-C3-O2-C2
3	A	1001	W9S	O3-C1-C7-O2
4	A	1002	PEG	O2-C3-C4-O4
9	D	1204	PG4	O1-C1-C2-O2
6	A	1026	EDO	O1-C1-C2-O2
5	A	1009	PGE	O1-C1-C2-O2
4	A	1012	PEG	C1-C2-O2-C3
5	C	1003	PGE	C6-C5-O3-C4
4	A	1012	PEG	O2-C3-C4-O4
5	B	1904	PGE	C3-C4-O3-C5
9	D	1204	PG4	C1-C2-O2-C3
6	A	1013	EDO	O1-C1-C2-O2
6	C	1014	EDO	O1-C1-C2-O2
5	A	1009	PGE	C3-C4-O3-C5
4	A	1012	PEG	C4-C3-O2-C2
6	A	1006	EDO	O1-C1-C2-O2
6	C	1006	EDO	O1-C1-C2-O2
5	B	1904	PGE	C4-C3-O2-C2
9	D	1204	PG4	C4-C3-O2-C2
4	A	1014	PEG	C4-C3-O2-C2
4	A	1011	PEG	C4-C3-O2-C2
6	A	1016	EDO	O1-C1-C2-O2
6	A	1024	EDO	O1-C1-C2-O2
6	C	1004	EDO	O1-C1-C2-O2
6	C	1012	EDO	O1-C1-C2-O2
4	A	1025	PEG	C4-C3-O2-C2

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Mol	Chain	Res	Type	Atoms
5	B	1904	PGE	O2-C3-C4-O3
6	A	1004	EDO	O1-C1-C2-O2
6	B	1901	EDO	O1-C1-C2-O2
4	C	1008	PEG	O2-C3-C4-O4
6	A	1019	EDO	O1-C1-C2-O2
5	A	1003	PGE	O3-C5-C6-O4
6	A	1015	EDO	O1-C1-C2-O2
4	C	1011	PEG	C4-C3-O2-C2
4	A	1012	PEG	O1-C1-C2-O2

There are no ring outliers.

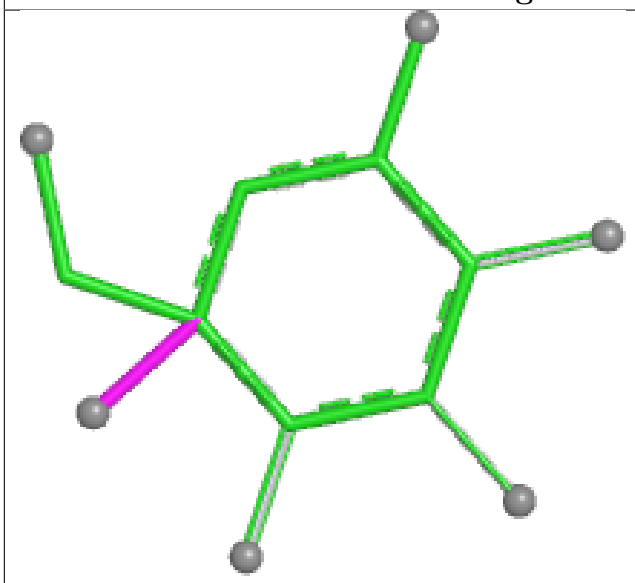
22 monomers are involved in 30 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	A	1005	EDO	1	0
6	A	1022	EDO	2	0
4	A	1014	PEG	1	0
6	C	1004	EDO	1	0
7	A	1031	SO4	3	0
6	C	1009	EDO	1	0
5	C	1003	PGE	3	0
6	C	1013	EDO	2	0
6	A	1008	EDO	1	0
4	A	1011	PEG	1	0
6	A	1021	EDO	1	0
4	A	1002	PEG	1	0
7	A	1028	SO4	1	0
4	C	1010	PEG	1	0
6	C	1015	EDO	1	0
6	B	1906	EDO	1	0
5	A	1009	PGE	1	0
6	A	1017	EDO	1	0
6	A	1023	EDO	1	0
9	D	1204	PG4	2	0
5	A	1003	PGE	1	0
4	A	1025	PEG	2	0

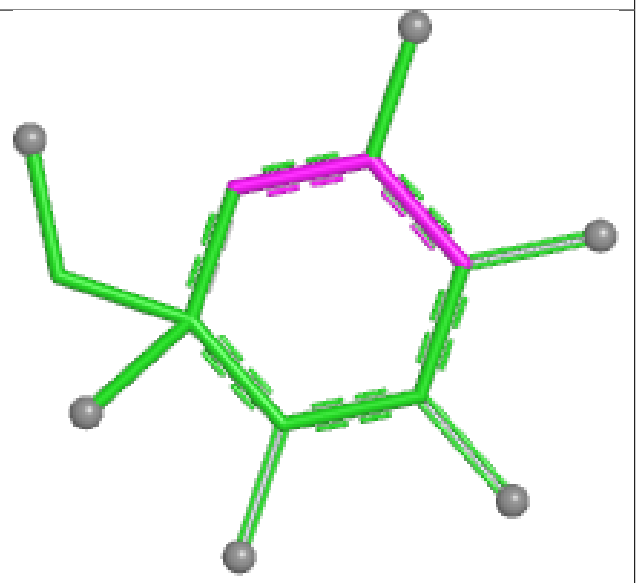
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

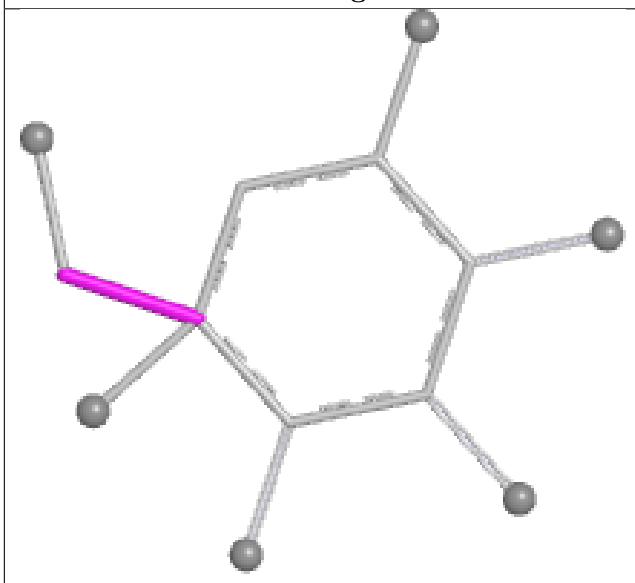
Ligand W9S A 1001



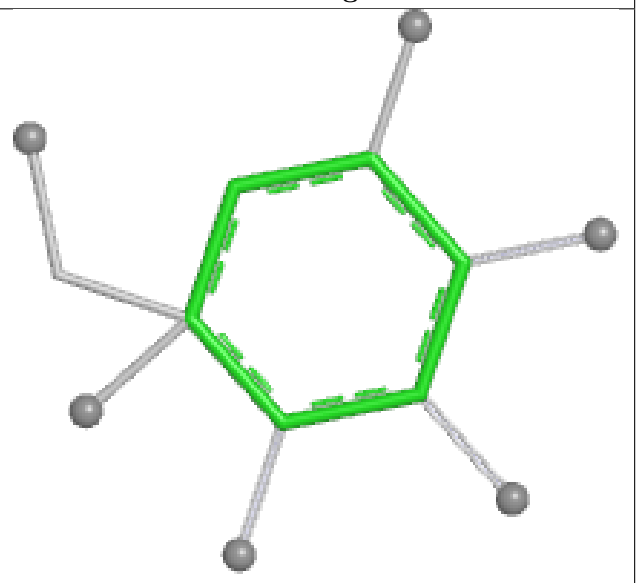
Bond lengths



Bond angles

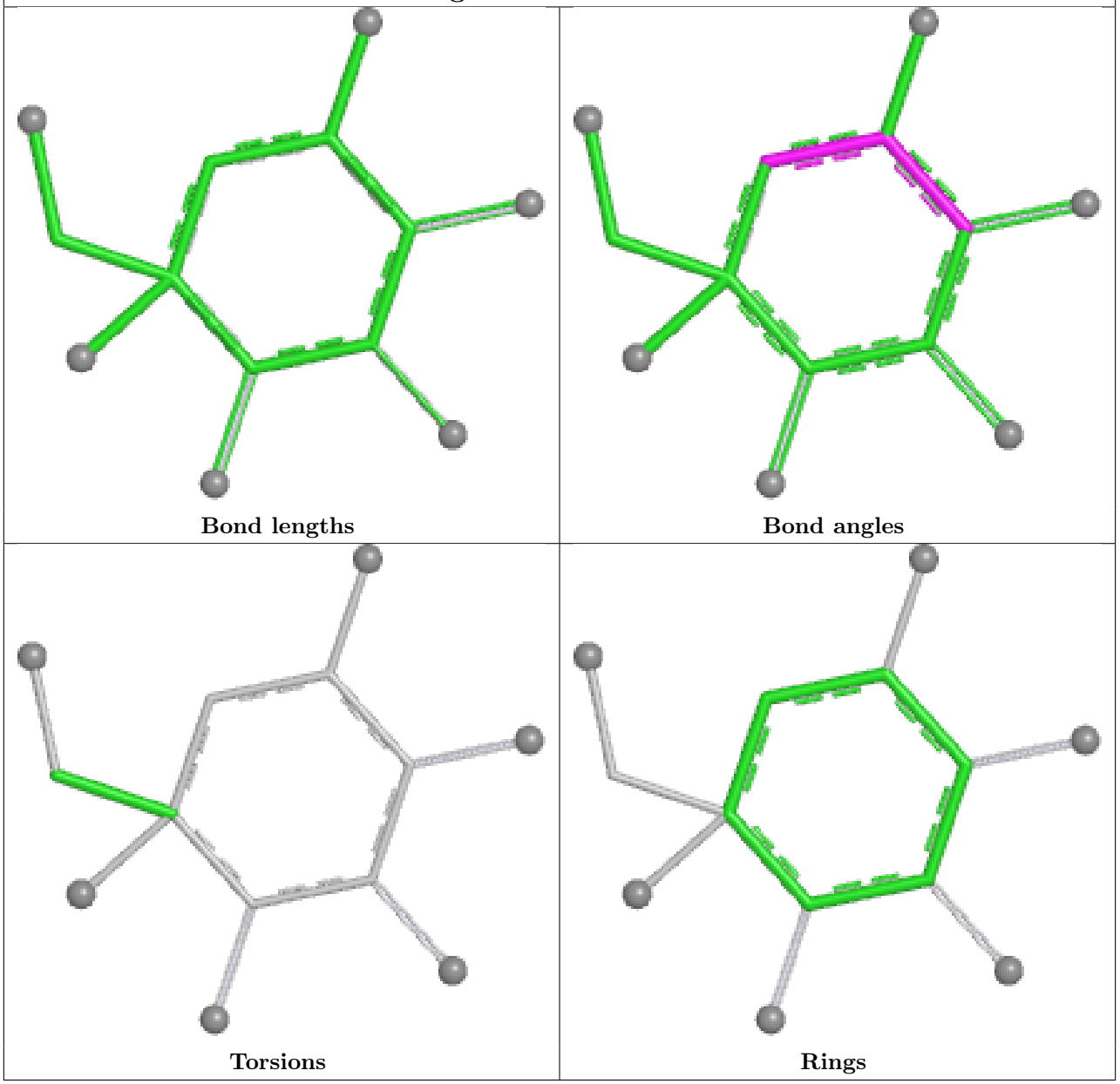


Torsions



Rings

Ligand W9S C 1001



5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 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	853/977 (87%)	-0.20	15 (1%)	67	69	20, 38, 61, 80	7 (0%)
1	C	857/977 (87%)	0.07	30 (3%)	47	49	20, 43, 77, 100	9 (1%)
2	B	87/547 (15%)	0.62	13 (14%)	5	6	33, 54, 87, 95	0
2	D	88/547 (16%)	0.82	20 (22%)	2	2	35, 55, 93, 100	0
All	All	1885/3048 (61%)	0.01	78 (4%)	41	43	20, 42, 75, 100	16 (0%)

All (78) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	D	43	THR	5.2
1	A	247	ALA	4.3
2	D	48	PHE	4.1
2	B	32	GLU	4.1
2	D	44	ALA	4.0
1	C	185	ARG	4.0
1	A	183	ALA	4.0
1	C	184	PRO	3.9
1	C	156	PHE	3.8
2	D	30	PHE	3.7
2	B	82	TYR	3.7
1	C	183	ALA	3.4
1	C	808	HIS	3.3
1	C	130	VAL	3.3
2	B	43	THR	3.2
1	A	370	THR	3.2
2	D	42	GLY	3.1
1	C	85	VAL	3.1
1	C	172	ALA	3.0
2	B	44	ALA	3.0
2	D	31	TYR	3.0

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Mol	Chain	Res	Type	RSRZ
2	D	117	ARG	3.0
2	B	117	ARG	2.9
2	D	80	THR	2.9
1	A	350	ASN	2.9
2	B	42	GLY	2.9
2	D	39	CYS	2.9
1	A	246	GLY	2.9
1	C	60	TYR	2.9
1	C	54	ARG	2.8
1	A	33	VAL	2.8
1	A	248	TRP	2.8
2	B	80	THR	2.8
1	A	182	ARG	2.8
1	C	138	VAL	2.7
1	C	143	ALA	2.7
1	A	69	LEU	2.7
1	C	370	THR	2.6
2	B	41	ASP	2.6
1	C	55	PRO	2.6
1	A	134	ASP	2.5
1	A	71	PRO	2.5
2	D	81	GLY	2.5
1	C	76	VAL	2.5
1	C	56	GLY	2.5
2	B	33	GLU	2.5
2	D	82	TYR	2.5
2	D	40	LEU	2.5
1	C	350	ASN	2.5
2	B	34	SER	2.4
2	D	83	LYS	2.4
2	D	78	THR	2.4
1	C	329	PHE	2.4
2	D	32	GLU	2.4
2	D	35	LYS	2.3
2	D	45	THR	2.3
1	A	966	ARG	2.3
2	D	34	SER	2.3
2	D	41	ASP	2.3
2	B	81	GLY	2.3
1	C	108	PRO	2.3
1	A	70	GLY	2.3
2	D	38	THR	2.2

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Mol	Chain	Res	Type	RSRZ
1	C	136	ASN	2.2
1	A	168	LEU	2.2
1	C	57	LEU	2.2
1	C	132	GLY	2.1
1	C	63	LEU	2.1
1	C	940	GLN	2.1
2	B	83	LYS	2.1
1	C	106	LEU	2.1
1	C	82	VAL	2.1
1	A	109	ARG	2.1
1	C	128	LEU	2.0
2	B	46	ILE	2.0
1	C	795	GLU	2.0
1	C	964[A]	HIS	2.0
1	C	71	PRO	2.0

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

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

6.3 Carbohydrates (i)

There are no 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, 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
7	SO4	A	1029	5/5	0.69	0.19	73,79,86,92	0
4	PEG	D	1201	7/7	0.70	0.21	54,63,65,65	0
6	EDO	C	1009	4/4	0.75	0.19	57,62,62,67	0
6	EDO	A	1024	4/4	0.75	0.20	64,67,68,70	0
7	SO4	A	1028	5/5	0.76	0.17	61,75,87,91	0
6	EDO	A	1015	4/4	0.76	0.18	63,65,66,66	0
5	PGE	C	1003	10/10	0.77	0.19	60,67,70,78	0
4	PEG	A	1025	7/7	0.80	0.16	50,53,57,59	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
5	PGE	A	1009	10/10	0.81	0.19	50,59,64,68	0
6	EDO	C	1014	4/4	0.81	0.17	55,59,63,72	0
4	PEG	A	1007	7/7	0.81	0.15	58,62,67,68	0
6	EDO	B	1907	4/4	0.81	0.15	53,58,60,61	0
6	EDO	B	1901	4/4	0.82	0.16	49,52,56,56	0
6	EDO	A	1017	4/4	0.83	0.21	44,48,52,54	0
5	PGE	B	1904	10/10	0.83	0.18	53,66,71,74	0
7	SO4	A	1030	5/5	0.83	0.12	63,69,79,98	0
6	EDO	C	1005	4/4	0.84	0.17	47,51,52,55	0
6	EDO	A	1020	4/4	0.84	0.15	54,59,61,62	0
4	PEG	A	1011	7/7	0.84	0.14	48,58,59,68	0
9	PG4	D	1204	13/13	0.84	0.17	54,59,69,71	0
7	SO4	A	1031	5/5	0.85	0.38	49,56,68,85	0
6	EDO	B	1905	4/4	0.85	0.15	60,65,66,70	0
6	EDO	A	1013	4/4	0.86	0.16	54,58,62,64	0
4	PEG	C	1010	7/7	0.86	0.14	49,58,65,67	0
4	PEG	A	1014	7/7	0.87	0.15	56,57,64,67	0
6	EDO	C	1004	4/4	0.88	0.16	51,52,57,64	0
4	PEG	C	1008	7/7	0.88	0.16	47,50,53,55	0
6	EDO	C	1006	4/4	0.88	0.18	43,49,51,52	0
6	EDO	B	1906	4/4	0.88	0.13	48,50,52,60	0
7	SO4	C	1016	5/5	0.88	0.21	65,66,70,91	0
7	SO4	C	1017	5/5	0.88	0.08	69,74,83,92	0
4	PEG	A	1012	7/7	0.88	0.16	47,59,64,69	0
6	EDO	A	1010	4/4	0.89	0.12	61,62,64,65	0
4	PEG	A	1002	7/7	0.89	0.12	53,55,62,63	0
6	EDO	A	1022	4/4	0.89	0.12	48,54,55,60	0
4	PEG	C	1011	7/7	0.89	0.12	58,61,65,66	0
5	PGE	A	1003	10/10	0.90	0.12	49,57,60,64	0
6	EDO	A	1005	4/4	0.90	0.12	50,53,53,61	0
6	EDO	C	1007	4/4	0.90	0.16	52,56,59,59	0
6	EDO	C	1012	4/4	0.91	0.14	45,46,51,51	0
6	EDO	A	1006	4/4	0.91	0.12	45,48,52,64	0
6	EDO	A	1018	4/4	0.91	0.17	48,51,55,57	0
6	EDO	A	1004	4/4	0.92	0.15	44,47,47,54	0
6	EDO	A	1019	4/4	0.93	0.10	51,53,55,56	0
6	EDO	C	1002	4/4	0.93	0.11	40,44,50,55	0
6	EDO	A	1021	4/4	0.93	0.14	44,45,46,49	0
6	EDO	A	1026	4/4	0.93	0.11	49,52,54,64	0
6	EDO	A	1008	4/4	0.94	0.14	42,42,47,49	0
6	EDO	C	1013	4/4	0.94	0.11	41,41,47,55	0
6	EDO	D	1205	4/4	0.95	0.09	52,56,56,57	0

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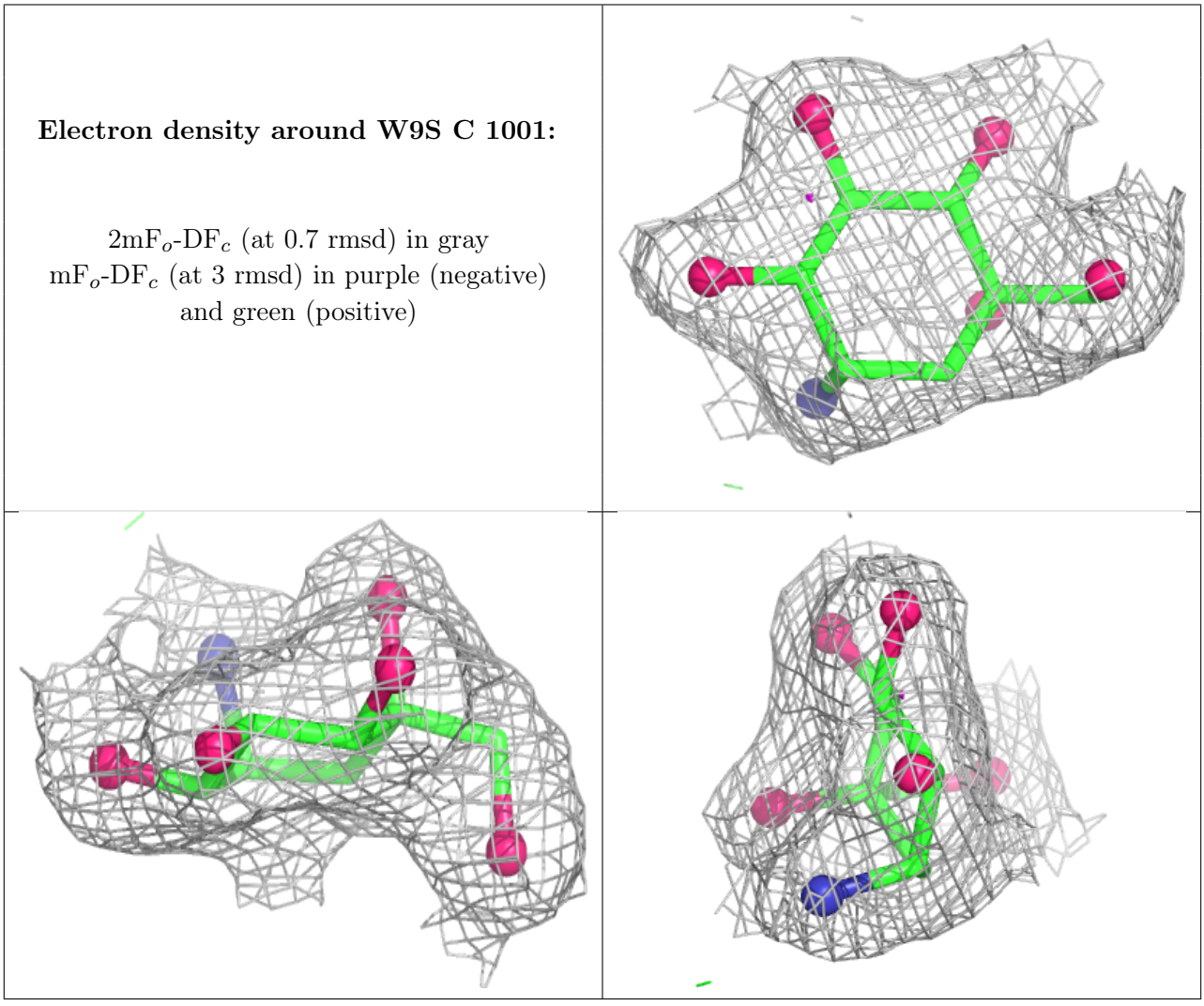
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
6	EDO	A	1027	4/4	0.95	0.16	39,45,52,53	0
6	EDO	A	1016	4/4	0.95	0.09	40,41,46,48	0
6	EDO	C	1015	4/4	0.95	0.10	57,57,57,61	0
3	W9S	C	1001	13/13	0.96	0.06	29,34,38,38	0
3	W9S	A	1001	13/13	0.96	0.06	28,33,38,44	0
6	EDO	A	1023	4/4	0.97	0.06	41,41,44,54	0
8	CA	B	1903	1/1	0.99	0.02	38,38,38,38	0
8	CA	D	1202	1/1	0.99	0.03	42,42,42,42	0
8	CA	D	1203	1/1	0.99	0.03	40,40,40,40	0
8	CA	B	1902	1/1	0.99	0.03	48,48,48,48	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.

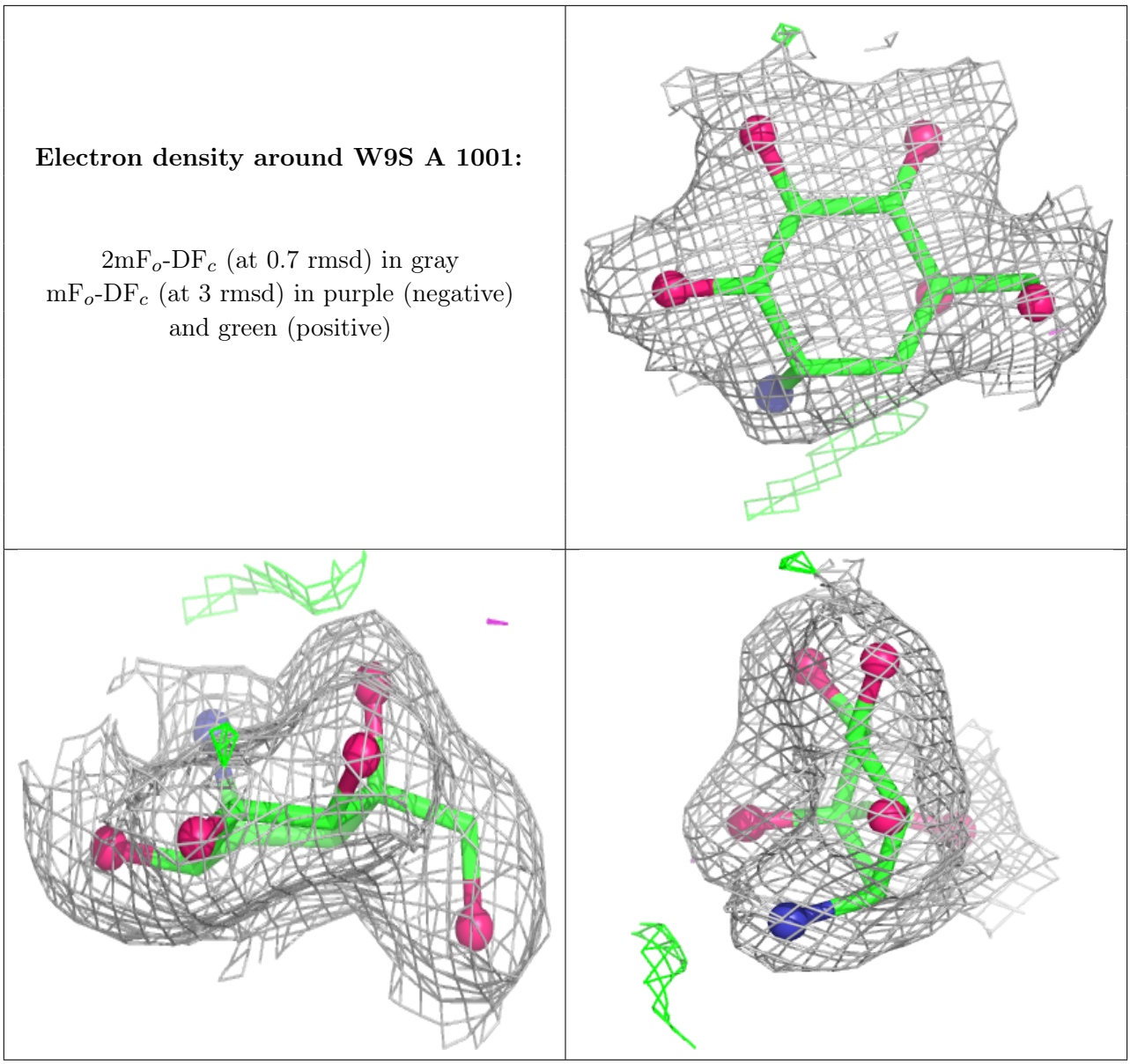
Electron density around W9S C 1001:

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



Electron density around W9S A 1001:

$2mF_o$-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

There are no such residues in this entry.