



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 8, 2026 – 05:58 PM UTC

PDB ID : 7S0W / pdb_00007s0w
Title : Crystal structure of the T337M variant of human PGM-1
Authors : Stiers, K.M.; Beamer, L.J.
Deposited on : 2021-08-31
Resolution : 2.50 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
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

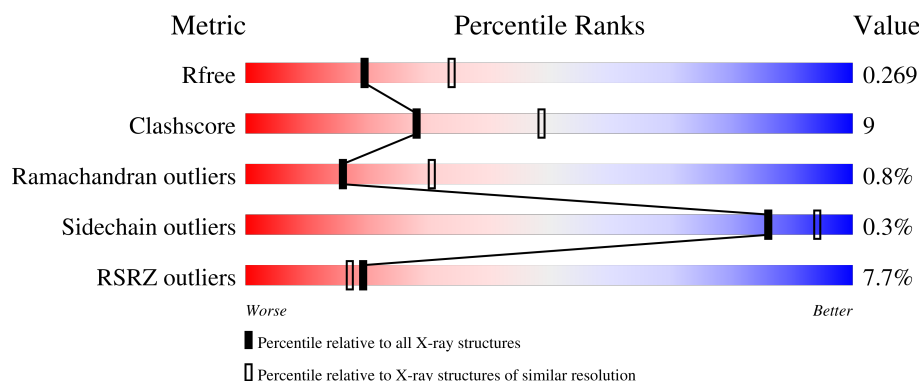
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.50 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	5829 (2.50-2.50)
Clashscore	190562	6492 (2.50-2.50)
Ramachandran outliers	187476	6378 (2.50-2.50)
Sidechain outliers	187428	6380 (2.50-2.50)
RSRZ outliers	180081	5833 (2.50-2.50)

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 $\leq 5\%$. 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	585	% 77% 18% 5%
1	B	585	13% 71% 14% • 15%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
4	GOL	A	607	-	-	X	-

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 7910 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 Phosphoglucomutase-1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	557	Total	C	N	O	S	0	5	0
			4195	2667	709	801	18			
1	B	499	Total	C	N	O	S	0	5	0
			3578	2262	617	684	15			

There are 48 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-22	MET	-	initiating methionine	UNP P36871
A	-21	HIS	-	expression tag	UNP P36871
A	-20	HIS	-	expression tag	UNP P36871
A	-19	HIS	-	expression tag	UNP P36871
A	-18	HIS	-	expression tag	UNP P36871
A	-17	HIS	-	expression tag	UNP P36871
A	-16	HIS	-	expression tag	UNP P36871
A	-15	SER	-	expression tag	UNP P36871
A	-14	SER	-	expression tag	UNP P36871
A	-13	GLY	-	expression tag	UNP P36871
A	-12	VAL	-	expression tag	UNP P36871
A	-11	ASP	-	expression tag	UNP P36871
A	-10	LEU	-	expression tag	UNP P36871
A	-9	GLY	-	expression tag	UNP P36871
A	-8	THR	-	expression tag	UNP P36871
A	-7	GLU	-	expression tag	UNP P36871
A	-6	ASN	-	expression tag	UNP P36871
A	-5	LEU	-	expression tag	UNP P36871
A	-4	TYR	-	expression tag	UNP P36871
A	-3	PHE	-	expression tag	UNP P36871
A	-2	GLN	-	expression tag	UNP P36871
A	-1	SER	-	expression tag	UNP P36871
A	0	ASN	-	expression tag	UNP P36871
A	337	MET	THR	engineered mutation	UNP P36871
B	-22	MET	-	initiating methionine	UNP P36871

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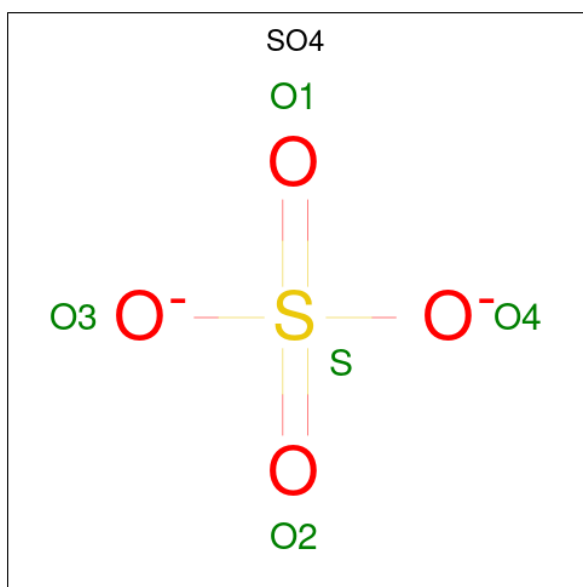
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Chain	Residue	Modelled	Actual	Comment	Reference
B	-21	HIS	-	expression tag	UNP P36871
B	-20	HIS	-	expression tag	UNP P36871
B	-19	HIS	-	expression tag	UNP P36871
B	-18	HIS	-	expression tag	UNP P36871
B	-17	HIS	-	expression tag	UNP P36871
B	-16	HIS	-	expression tag	UNP P36871
B	-15	SER	-	expression tag	UNP P36871
B	-14	SER	-	expression tag	UNP P36871
B	-13	GLY	-	expression tag	UNP P36871
B	-12	VAL	-	expression tag	UNP P36871
B	-11	ASP	-	expression tag	UNP P36871
B	-10	LEU	-	expression tag	UNP P36871
B	-9	GLY	-	expression tag	UNP P36871
B	-8	THR	-	expression tag	UNP P36871
B	-7	GLU	-	expression tag	UNP P36871
B	-6	ASN	-	expression tag	UNP P36871
B	-5	LEU	-	expression tag	UNP P36871
B	-4	TYR	-	expression tag	UNP P36871
B	-3	PHE	-	expression tag	UNP P36871
B	-2	GLN	-	expression tag	UNP P36871
B	-1	SER	-	expression tag	UNP P36871
B	0	ASN	-	expression tag	UNP P36871
B	337	MET	THR	engineered mutation	UNP P36871

- Molecule 2 is COBALT (II) ION (CCD ID: CO) (formula: Co) (labeled as "Ligand of Interest" by depositor).

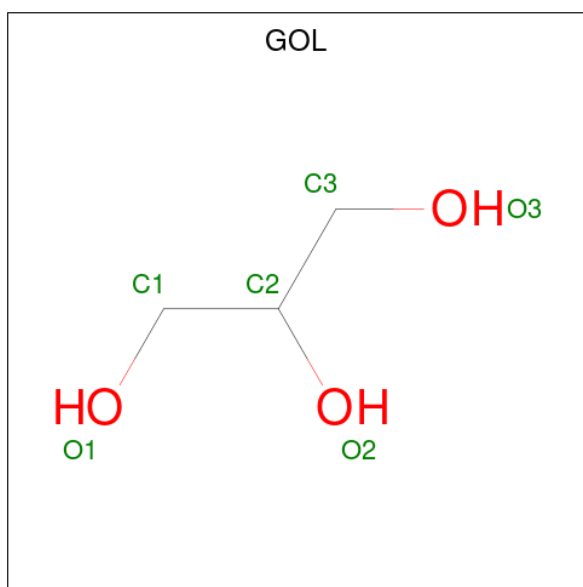
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total Co 1 1	0	0
2	B	1	Total Co 1 1	0	0

- Molecule 3 is SULFATE ION (CCD ID: SO4) (formula: O₄S).



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

- Molecule 4 is GLYCEROL (CCD ID: GOL) (formula: C₃H₈O₃).



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

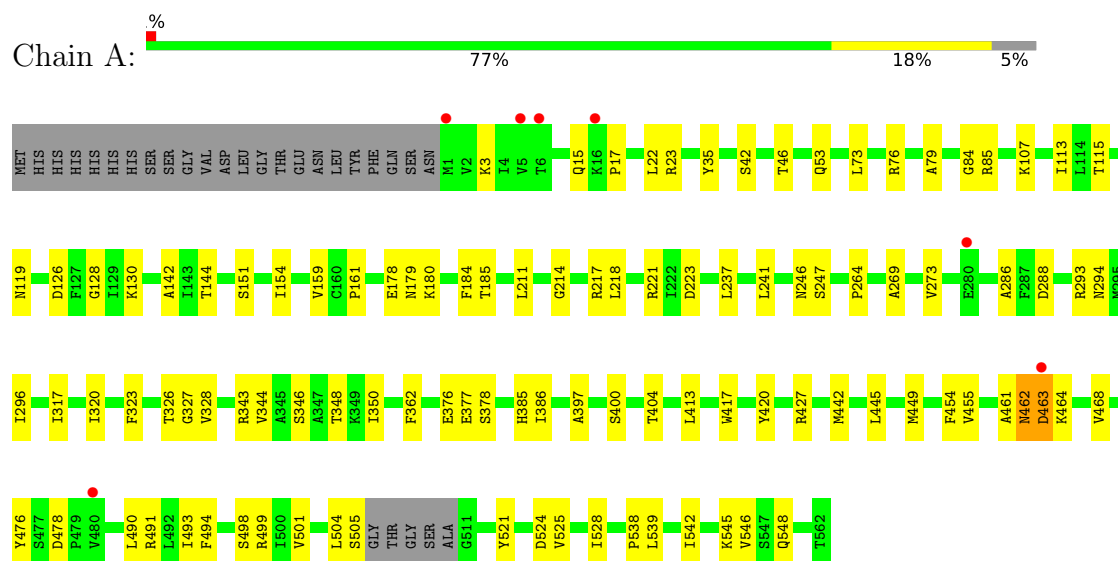
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	44	Total	O	0	0
			44	44		
5	B	20	Total	O	0	0
			20	20		

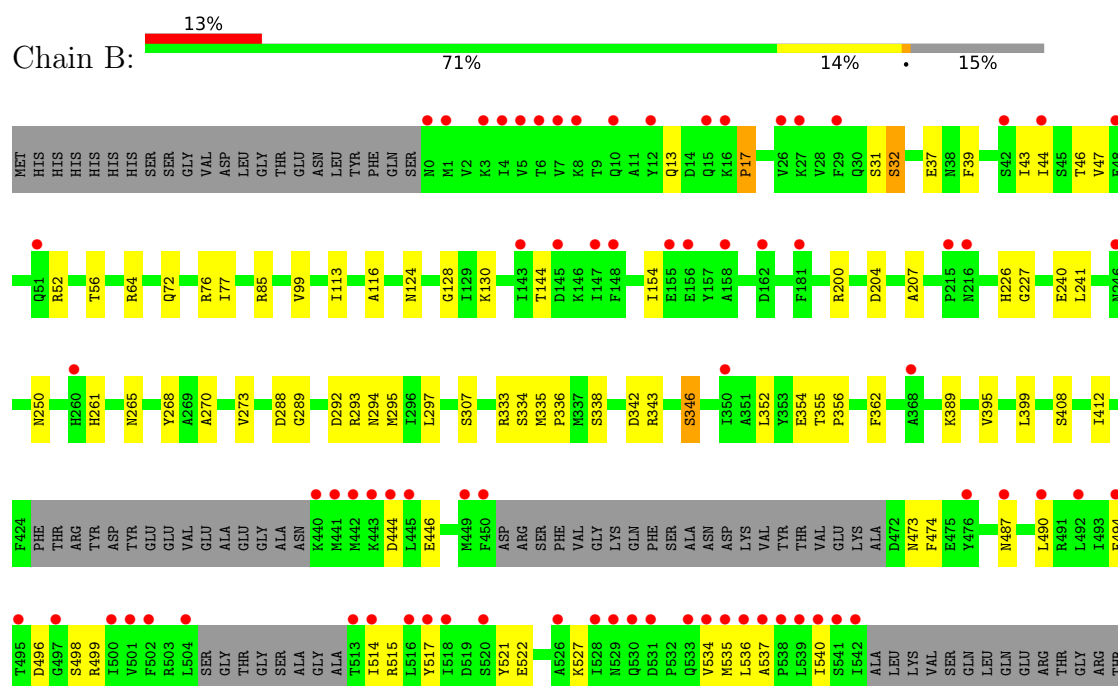
3 Residue-property plots [i](#)

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: Phosphoglucomutase-1



• Molecule 1: Phosphoglucomutase-1



ALA
PRO
THR
THR
VAL
ILE
THR

4 Data and refinement statistics

Property	Value	Source
Space group	P 41 21 2	Depositor
Cell constants a, b, c, α , β , γ	171.69Å 171.69Å 99.20Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.57 – 2.50 49.57 – 2.50	Depositor EDS
% Data completeness (in resolution range)	99.9 (49.57-2.50) 99.9 (49.57-2.50)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.38 (at 2.51Å)	Xtriage
Refinement program	PHENIX 1.13_2998	Depositor
R, R_{free}	0.214 , 0.270 0.217 , 0.269	Depositor DCC
R_{free} test set	2595 reflections (5.02%)	wwPDB-VP
Wilson B-factor (Å ²)	61.7	Xtriage
Anisotropy	0.383	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 79.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	7910	wwPDB-VP
Average B, all atoms (Å ²)	78.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.58% 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: GOL, CO, SO4

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	0.34	0/4292	0.54	0/5825
1	B	0.33	0/3663	0.56	0/4989
All	All	0.34	0/7955	0.55	0/10814

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	4195	0	4068	73	0
1	B	3578	0	3263	62	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
3	A	45	0	0	3	0
3	B	20	0	0	0	0
4	A	6	0	8	4	0
5	A	44	0	0	2	0
5	B	20	0	0	4	0
All	All	7910	0	7339	135	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 9.

All (135) 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:442:MET:HG3	1:A:504:LEU:HD11	1.45	0.99
1:B:473:ASN:HD21	1:B:487[A]:ASN:HA	1.45	0.82
1:B:473:ASN:HD21	1:B:487[B]:ASN:HA	1.46	0.80
1:A:159:VAL:HG13	1:A:161:PRO:HD3	1.71	0.72
1:B:334:SER:HA	1:B:355:THR:HG22	1.73	0.71
1:A:449:MET:HE1	1:A:490:LEU:HB3	1.72	0.70
1:B:288:ASP:HB2	1:B:293:ARG:HB2	1.72	0.69
1:B:44:ILE:HD12	1:B:77:ILE:HG22	1.76	0.68
1:A:15:GLN:OE1	1:A:151:SER:HB2	1.94	0.67
1:B:408:SER:O	1:B:412:ILE:HG12	1.94	0.67
1:B:294:ASN:O	5:B:702:HOH:O	2.14	0.66
1:B:128:GLY:O	5:B:701:HOH:O	2.13	0.65
1:A:328:VAL:CG2	1:A:350:ILE:HD13	2.28	0.64
1:B:43:ILE:O	1:B:46:THR:HG22	1.99	0.62
1:A:326:THR:HG23	1:A:327:GLY:O	2.00	0.61
1:B:521:TYR:HD1	1:B:522:GLU:N	1.98	0.60
1:B:17:PRO:HG2	1:B:144:THR:HB	1.82	0.60
1:A:3:LYS:HA	1:A:178:GLU:HB2	1.84	0.60
1:B:39:PHE:O	1:B:43:ILE:HG13	2.00	0.60
1:B:342:ASP:HA	1:B:352:LEU:HD13	1.84	0.60
1:A:462:ASN:C	1:A:464:LYS:H	2.10	0.59
1:A:22:LEU:O	1:A:128:GLY:HA2	2.03	0.59
1:A:246:ASN:ND2	3:A:606:SO4:O1	2.37	0.58
1:A:23:ARG:CD	4:A:607:GOL:H2	2.34	0.58
1:B:226:HIS:NE2	1:B:250:ASN:OD1	2.36	0.58
1:A:142:ALA:N	5:A:701:HOH:O	2.08	0.57
1:A:344:VAL:O	1:A:348:THR:HG23	2.06	0.56
1:B:113:ILE:HD12	1:B:130:LYS:HE3	1.88	0.56
1:A:524:ASP:O	1:A:528:ILE:HG12	2.07	0.55
1:A:385:HIS:CD2	1:A:386:ILE:HG12	2.41	0.55
1:B:355:THR:HG21	1:B:362:PHE:CE1	2.41	0.55
1:A:237:LEU:HD23	1:A:241:LEU:HD12	1.88	0.55
1:A:269:ALA:O	1:A:273:VAL:HG23	2.06	0.55
1:A:15:GLN:HG2	1:A:35:TYR:HE1	1.72	0.54
1:A:15:GLN:CG	1:A:35:TYR:HE1	2.21	0.54
1:A:461:ALA:HB3	1:A:538:PRO:HB3	1.90	0.54
1:A:449:MET:HE2	1:A:490:LEU:HD22	1.90	0.53
1:A:113:ILE:HG22	1:A:115:THR:HG22	1.90	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:23:ARG:HD3	4:A:607:GOL:H2	1.91	0.53
1:A:442:MET:HG3	1:A:504:LEU:CD1	2.31	0.53
1:A:498:SER:HB3	1:A:539:LEU:HD11	1.90	0.53
1:A:525:VAL:HA	1:A:528:ILE:HG12	1.91	0.53
1:B:342:ASP:O	1:B:346[A]:SER:OG	2.24	0.53
1:A:400:SER:O	1:A:404:THR:HG23	2.09	0.52
1:A:23:ARG:HH11	4:A:607:GOL:H2	1.75	0.52
1:A:461:ALA:O	1:A:463:ASP:N	2.42	0.51
1:B:226:HIS:CD2	1:B:250:ASN:HB3	2.46	0.51
1:B:37:GLU:OE1	1:B:37:GLU:N	2.43	0.51
1:B:498:SER:C	1:B:499:ARG:HG2	2.36	0.51
1:B:265:ASN:HD21	1:B:268:TYR:HD2	1.60	0.50
1:A:17:PRO:HB2	1:A:144:THR:HG23	1.93	0.50
1:A:455:VAL:HA	1:A:468:VAL:HG23	1.91	0.50
1:B:514:ILE:O	1:B:515:ARG:HD2	2.11	0.50
1:B:494:PHE:C	1:B:496:ASP:H	2.20	0.50
1:B:515:ARG:HA	1:B:515:ARG:NE	2.26	0.50
1:B:335:MET:N	1:B:355:THR:O	2.30	0.50
1:A:214:GLY:O	1:A:217:ARG:HB3	2.12	0.50
1:B:292:ASP:HB2	1:B:389:LYS:HB2	1.93	0.50
1:B:336:PRO:HB3	1:B:517:TYR:CE1	2.47	0.49
1:B:227:GLY:O	5:B:703:HOH:O	2.20	0.49
1:B:295:MET:HE3	1:B:297:LEU:HD11	1.93	0.49
1:A:320:ILE:HD11	1:A:397:ALA:HB1	1.94	0.49
1:A:445:LEU:O	1:A:449:MET:HG2	2.13	0.49
1:B:204:ASP:OD1	1:B:207:ALA:N	2.43	0.49
1:A:468:VAL:HG12	1:A:494:PHE:CE1	2.47	0.49
1:A:343:ARG:HD2	1:A:521:TYR:CE1	2.48	0.48
1:A:343:ARG:HD3	1:A:420:TYR:O	2.13	0.48
1:B:47:VAL:O	1:B:52:ARG:NH2	2.43	0.48
1:B:534:VAL:O	1:B:537:ALA:N	2.47	0.48
1:B:307:SER:HB3	1:B:338:SER:HB3	1.95	0.48
1:B:307:SER:CB	1:B:338:SER:HB3	2.43	0.48
1:A:317:ILE:HD13	1:A:328:VAL:HG11	1.95	0.48
1:B:261:HIS:HB2	1:B:268:TYR:CD1	2.49	0.48
1:A:328:VAL:HG23	1:A:350:ILE:HD13	1.96	0.48
1:A:545:LYS:O	1:A:548:GLN:HG2	2.14	0.47
1:A:476:TYR:CE2	1:A:478:ASP:HA	2.49	0.47
1:B:64:ARG:NH1	1:B:116:ALA:HB3	2.29	0.47
1:A:223:ASP:O	1:A:286:ALA:HA	2.15	0.47
1:A:328:VAL:HG21	1:A:350:ILE:HD13	1.97	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:241:LEU:HD23	1:B:241:LEU:HA	1.79	0.46
1:A:15:GLN:HE21	1:A:35:TYR:HD1	1.61	0.46
1:B:270:ALA:HA	1:B:273:VAL:HG22	1.97	0.46
1:A:23:ARG:HD2	4:A:607:GOL:H2	1.96	0.46
1:A:221:ARG:HH11	1:A:247:SER:HA	1.80	0.46
1:A:264:PRO:HD3	1:A:288:ASP:HB3	1.97	0.46
1:B:534:VAL:O	1:B:536:LEU:N	2.49	0.46
1:A:294:ASN:OD1	1:A:296:ILE:HD11	2.15	0.45
1:B:446:GLU:HB2	1:B:490:LEU:HD13	1.99	0.45
1:B:444:ASP:OD1	1:B:444:ASP:C	2.59	0.45
1:A:113:ILE:HB	1:A:130:LYS:HB3	1.99	0.45
1:A:79:ALA:HB2	1:A:184:PHE:CD2	2.51	0.45
1:B:273:VAL:HG12	1:B:297:LEU:HD11	1.99	0.44
1:B:521:TYR:C	1:B:521:TYR:CD1	2.94	0.44
1:A:542:ILE:O	1:A:546:VAL:HG12	2.17	0.44
1:A:362:PHE:HE2	1:A:376:GLU:HG2	1.83	0.44
1:B:473:ASN:ND2	1:B:487[A]:ASN:HA	2.24	0.44
1:A:53:GLN:O	1:A:84:GLY:HA3	2.17	0.43
1:A:85:ARG:HA	1:A:185:THR:O	2.17	0.43
1:A:211:LEU:HD21	1:A:218:LEU:HD22	2.00	0.43
1:B:395:VAL:O	1:B:399:LEU:HG	2.17	0.43
1:B:355:THR:HG23	1:B:356:PRO:O	2.19	0.43
1:A:42:SER:O	1:A:46:THR:HG23	2.18	0.43
1:A:377:GLU:OE2	1:A:427:ARG:NH1	2.52	0.43
1:A:491:ARG:NH2	3:A:603:SO4:O3	2.36	0.43
1:B:333:ARG:NH1	1:B:354:GLU:HG3	2.33	0.43
1:B:343:ARG:CZ	1:B:521:TYR:HE2	2.31	0.43
1:B:536:LEU:O	1:B:540:ILE:HB	2.19	0.43
1:B:72:GLN:O	1:B:76:ARG:HG3	2.19	0.43
1:B:473:ASN:ND2	1:B:487[B]:ASN:HA	2.25	0.43
1:A:449:MET:CE	1:A:490:LEU:HB3	2.45	0.42
1:A:73:LEU:HD12	1:A:76:ARG:NH1	2.34	0.42
1:B:56:THR:HA	1:B:85:ARG:O	2.19	0.42
1:A:130:LYS:HB2	1:A:130:LYS:HE2	1.81	0.42
1:A:293:ARG:HG2	1:A:378:SER:O	2.19	0.42
1:B:200:ARG:NE	1:B:240:GLU:OE2	2.43	0.42
1:B:124:ASN:OD1	5:B:704:HOH:O	2.21	0.42
1:A:462:ASN:C	1:A:464:LYS:N	2.77	0.42
1:A:505:SER:HB2	3:A:602:SO4:O3	2.19	0.42
1:A:449:MET:HA	1:A:454:PHE:CG	2.54	0.41
1:A:119:ASN:HB3	1:A:126:ASP:OD2	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:13:GLN:N	1:B:13:GLN:CD	2.77	0.41
1:A:107:LYS:HA	5:A:713:HOH:O	2.21	0.41
1:A:317:ILE:HG12	1:A:323:PHE:CD2	2.56	0.41
1:B:99:VAL:HG11	1:B:113:ILE:HG12	2.03	0.41
1:B:295:MET:HE3	1:B:297:LEU:HD21	2.02	0.41
1:A:179:ASN:O	1:A:180:LYS:NZ	2.51	0.41
1:A:317:ILE:HD13	1:A:328:VAL:CG1	2.51	0.41
1:A:413:LEU:HD12	1:A:417:TRP:CZ2	2.56	0.41
1:B:44:ILE:O	1:B:47:VAL:HG22	2.21	0.41
1:A:493:ILE:HG12	1:A:499:ARG:HG2	2.03	0.41
1:B:334:SER:HA	1:B:355:THR:CG2	2.46	0.41
1:A:490:LEU:O	1:A:501:VAL:HA	2.21	0.40
1:B:31:SER:OG	1:B:32:SER:N	2.54	0.40
1:B:335:MET:HE2	1:B:474:PHE:HB2	2.03	0.40
1:B:288:ASP:OD1	1:B:289:GLY:N	2.54	0.40

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

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	558/585 (95%)	539 (97%)	16 (3%)	3 (0%)	24	43
1	B	496/585 (85%)	456 (92%)	35 (7%)	5 (1%)	12	24
All	All	1054/1170 (90%)	995 (94%)	51 (5%)	8 (1%)	16	31

All (8) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	32	SER
1	B	154	ILE
1	B	527	LYS

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Mol	Chain	Res	Type
1	A	462	ASN
1	A	463	ASP
1	B	535	MET
1	A	154	ILE
1	B	17	PRO

5.3.2 Protein sidechains ⓘ

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	433/483 (90%)	431 (100%)	2 (0%)	81	92
1	B	335/483 (69%)	333 (99%)	2 (1%)	78	91
All	All	768/966 (80%)	764 (100%)	4 (0%)	86	92

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

Mol	Chain	Res	Type
1	A	346[A]	SER
1	A	346[B]	SER
1	B	346[A]	SER
1	B	346[B]	SER

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	30	GLN
1	A	119	ASN
1	A	488	GLN
1	B	473	ASN

5.3.3 RNA ⓘ

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 16 ligands modelled in this entry, 2 are monoatomic - leaving 14 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	$\# Z > 2$
3	SO4	A	605	-	4,4,4	0.27	0	6,6,6	0.21	0
3	SO4	A	611	-	4,4,4	0.25	0	6,6,6	0.06	0
3	SO4	B	604	-	4,4,4	0.22	0	6,6,6	0.12	0
3	SO4	A	609	-	4,4,4	0.23	0	6,6,6	0.09	0
4	GOL	A	607	-	5,5,5	1.00	0	5,5,5	1.11	0
3	SO4	A	603	-	4,4,4	0.23	0	6,6,6	0.24	0
3	SO4	A	602	-	4,4,4	0.21	0	6,6,6	0.22	0
3	SO4	A	606	-	4,4,4	0.22	0	6,6,6	0.16	0
3	SO4	A	608	-	4,4,4	0.24	0	6,6,6	0.17	0
3	SO4	A	610	-	4,4,4	0.28	0	6,6,6	0.33	0
3	SO4	B	602	-	4,4,4	0.23	0	6,6,6	0.09	0
3	SO4	A	604	-	4,4,4	0.27	0	6,6,6	0.15	0
3	SO4	B	605	-	4,4,4	0.23	0	6,6,6	0.17	0
3	SO4	B	603	-	4,4,4	0.27	0	6,6,6	0.20	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	GOL	A	607	-	-	2/4/4/4	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	607	GOL	C1-C2-C3-O3
4	A	607	GOL	O2-C2-C3-O3

There are no ring outliers.

4 monomers are involved in 7 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	607	GOL	4	0
3	A	603	SO4	1	0
3	A	602	SO4	1	0
3	A	606	SO4	1	0

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	557/585 (95%)	0.12	7 (1%) 75 71	31, 68, 106, 135	5 (0%)
1	B	499/585 (85%)	0.71	74 (14%) 5 4	37, 83, 131, 162	5 (1%)
All	All	1056/1170 (90%)	0.40	81 (7%) 19 17	31, 73, 124, 162	10 (0%)

All (81) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	504	LEU	4.9
1	A	1	MET	4.6
1	B	539	LEU	4.4
1	B	10	GLN	4.1
1	B	514	ILE	4.1
1	B	440	LYS	4.1
1	B	538	PRO	3.8
1	B	450	PHE	3.8
1	B	502	PHE	3.7
1	B	541	SER	3.7
1	B	1	MET	3.6
1	B	528	ILE	3.6
1	B	536	LEU	3.4
1	A	463	ASP	3.3
1	B	518	ILE	3.2
1	B	16	LYS	3.1
1	B	540	ILE	3.1
1	B	533	GLN	3.1
1	B	156	GLU	3.1
1	B	42	SER	3.1
1	B	500	ILE	3.1
1	B	0	ASN	3.1
1	B	497	GLY	3.0
1	B	3	LYS	3.0

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Mol	Chain	Res	Type	RSRZ
1	B	501	VAL	3.0
1	B	445	LEU	3.0
1	B	535	MET	2.9
1	A	5	VAL	2.9
1	B	4	ILE	2.9
1	B	148	PHE	2.9
1	B	449	MET	2.8
1	B	530	GLN	2.8
1	B	526	ALA	2.8
1	B	27	LYS	2.7
1	B	51	GLN	2.7
1	B	537	ALA	2.7
1	B	531	ASP	2.6
1	B	12	TYR	2.6
1	B	145	ASP	2.5
1	B	441	MET	2.5
1	A	280	GLU	2.5
1	B	15	GLN	2.5
1	B	6	THR	2.5
1	B	516	LEU	2.5
1	A	16	LYS	2.5
1	B	350	ILE	2.5
1	B	181	PHE	2.5
1	B	215	PRO	2.5
1	B	542	ILE	2.5
1	B	490	LEU	2.5
1	B	158	ALA	2.5
1	B	442	MET	2.5
1	B	216	ASN	2.4
1	B	162	ASP	2.4
1	A	480	VAL	2.4
1	B	495	THR	2.4
1	B	143	ILE	2.4
1	B	492[A]	LEU	2.4
1	B	147	ILE	2.3
1	B	260	HIS	2.3
1	B	7	VAL	2.3
1	B	494	PHE	2.3
1	B	534	VAL	2.3
1	B	48	GLU	2.3
1	B	443	LYS	2.2
1	A	6	THR	2.2

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Mol	Chain	Res	Type	RSRZ
1	B	520	SER	2.2
1	B	155	GLU	2.2
1	B	5	VAL	2.2
1	B	26	VAL	2.2
1	B	246	ASN	2.2
1	B	529	ASN	2.2
1	B	513	THR	2.2
1	B	444	ASP	2.1
1	B	29	PHE	2.1
1	B	487[A]	ASN	2.1
1	B	8	LYS	2.0
1	B	517	TYR	2.0
1	B	368	ALA	2.0
1	B	44	ILE	2.0
1	B	476	TYR	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, 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	SO4	B	602	5/5	0.50	0.12	135,136,136,136	5
3	SO4	A	609	5/5	0.68	0.14	132,132,133,134	5
3	SO4	B	604	5/5	0.68	0.13	138,138,140,141	0
3	SO4	A	611	5/5	0.71	0.14	120,120,121,121	5
3	SO4	B	605	5/5	0.74	0.14	106,106,108,109	5
3	SO4	A	610	5/5	0.77	0.14	104,108,110,117	0
3	SO4	A	608	5/5	0.78	0.18	117,119,121,124	5
3	SO4	A	605	5/5	0.81	0.15	99,102,104,106	5

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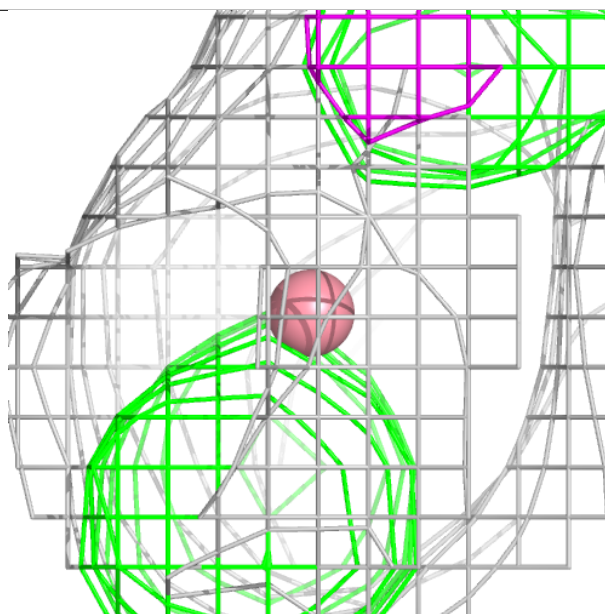
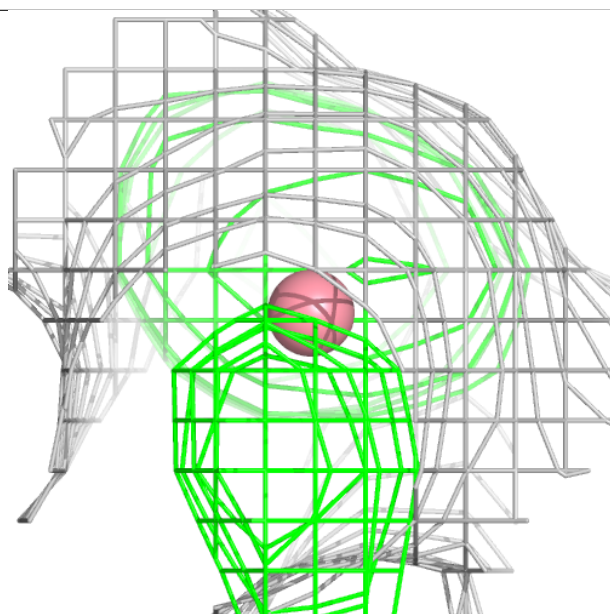
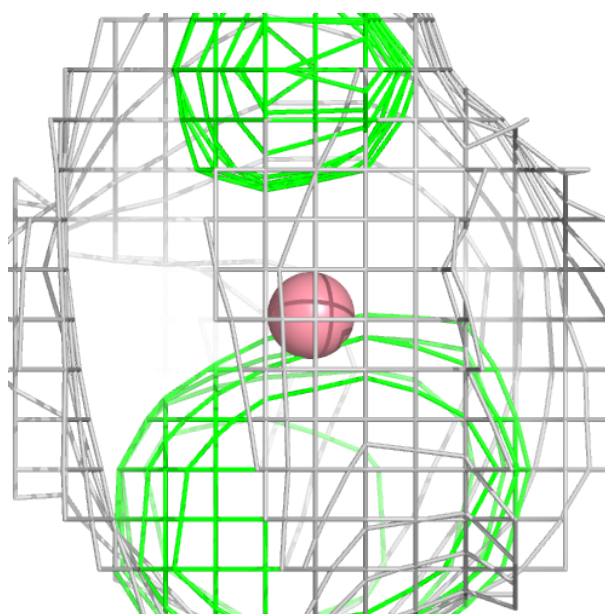
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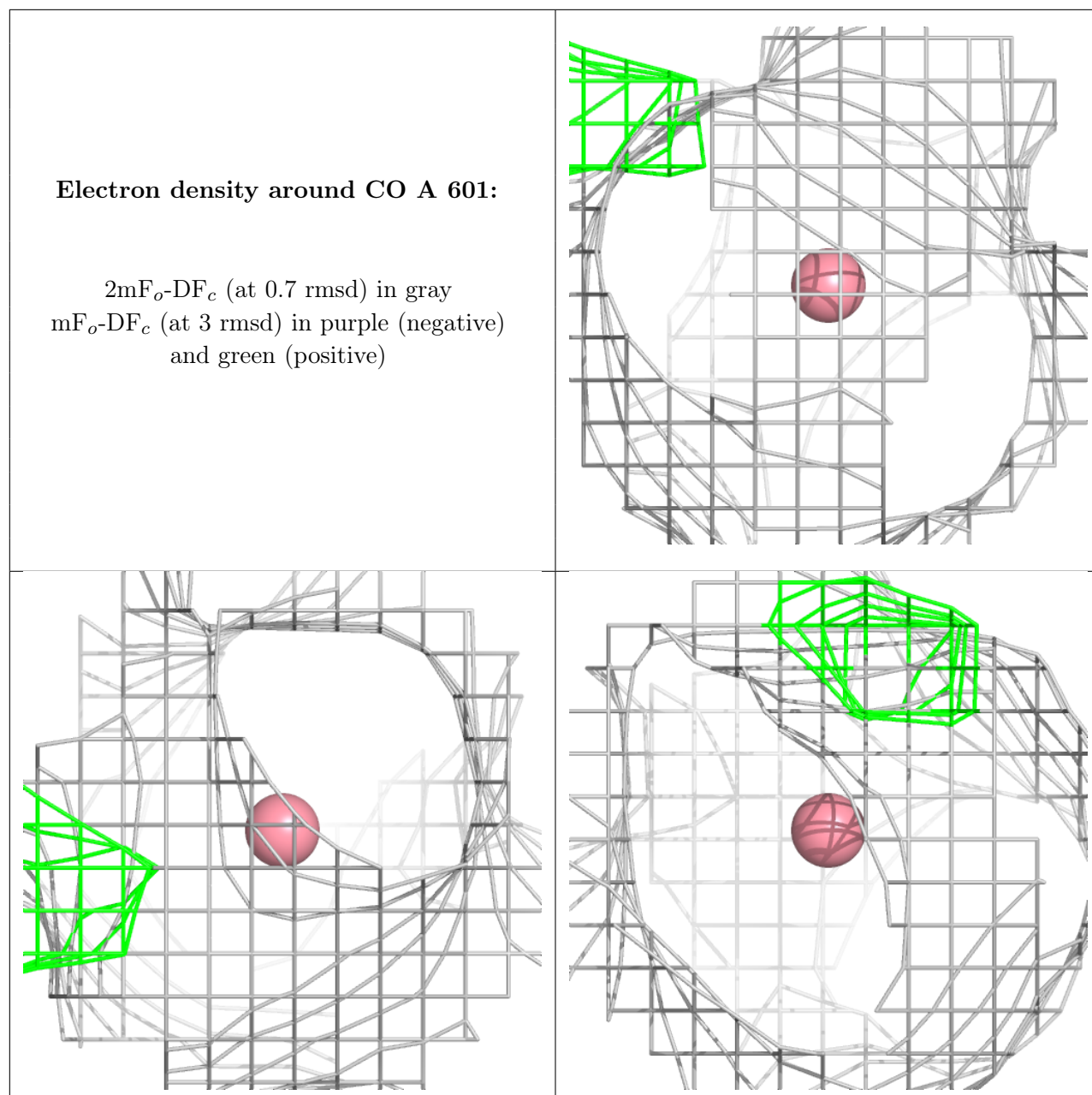
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
3	SO4	A	603	5/5	0.82	0.11	96,101,103,105	5
4	GOL	A	607	6/6	0.85	0.13	79,89,95,101	0
3	SO4	A	604	5/5	0.86	0.09	114,114,117,117	0
3	SO4	B	603	5/5	0.87	0.12	80,83,86,89	5
3	SO4	A	602	5/5	0.92	0.07	100,101,105,106	0
3	SO4	A	606	5/5	0.93	0.07	74,75,78,79	5
2	CO	B	601	1/1	0.93	0.08	55,55,55,55	1
2	CO	A	601	1/1	1.00	0.03	35,35,35,35	1

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

Electron density around CO B 601:

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





6.5 Other polymers ⓘ

There are no such residues in this entry.