



Full wwPDB X-ray Structure Validation Report ⓘ

Sep 6, 2026 – 04:25 PM EDT

PDB ID : 9Y36 / pdb_00009y36
Title : Mycobacterium tuberculosis Anthranilate phosphoribosyltransferase in complex with bi-substrate inhibitor 453e
Authors : Mittelstaedt, G.; Parker, E.J.
Deposited on : 2025-09-01
Resolution : 1.74 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	:	9.0.015 (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

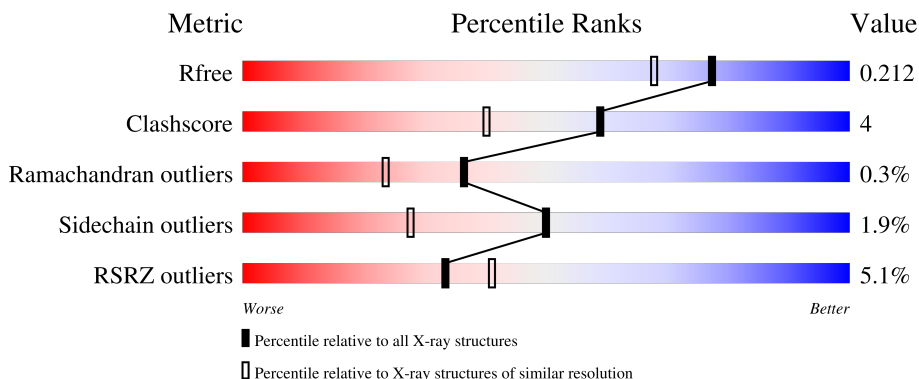
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

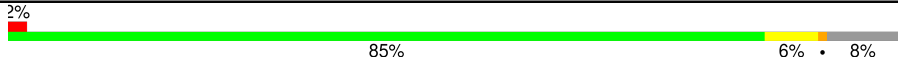
The reported resolution of this entry is 1.74 Å.

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	1187 (1.74-1.74)
Clashscore	190562	1207 (1.74-1.74)
Ramachandran outliers	187476	1200 (1.74-1.74)
Sidechain outliers	187428	1200 (1.74-1.74)
RSRZ outliers	180081	1188 (1.74-1.74)

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	378	
1	B	378	

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
5	PEG	B	405	-	-	X	-
9	PO4	B	407	-	-	X	-

2 Entry composition

There are 10 unique types of molecules in this entry. The entry contains 5558 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.

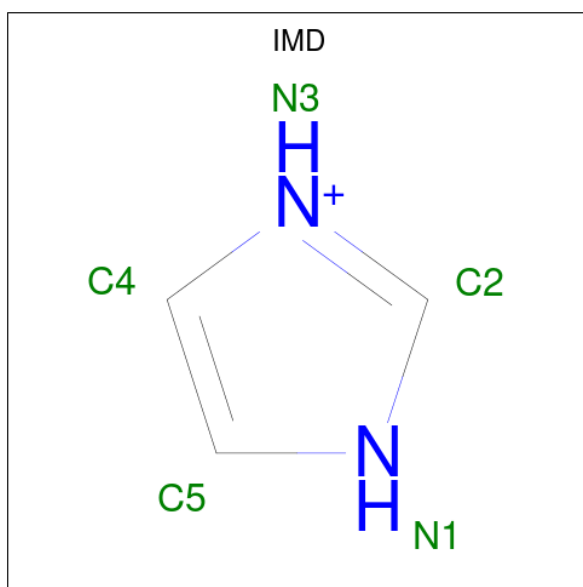
- Molecule 1 is a protein called Anthranilate phosphoribosyltransferase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	346	Total	C	N	O	S	0	3	0
			2519	1575	468	467	9			
1	B	336	Total	C	N	O	S	0	1	0
			2429	1523	451	446	9			

There are 16 discrepancies between the modelled and reference sequences:

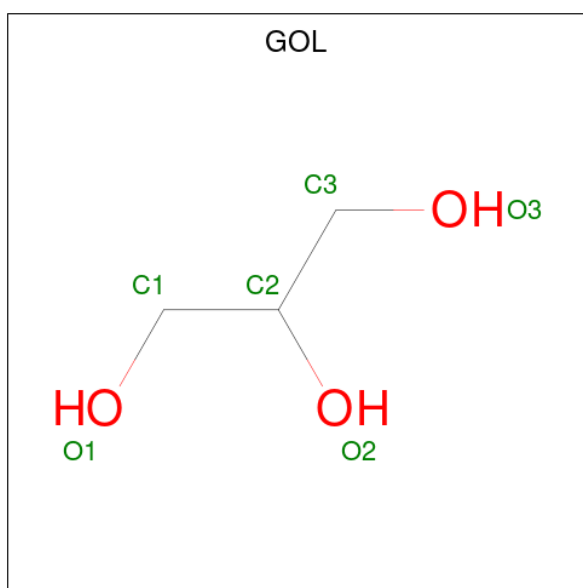
Chain	Residue	Modelled	Actual	Comment	Reference
A	371	LEU	-	expression tag	UNP P9WFX5
A	372	GLU	-	expression tag	UNP P9WFX5
A	373	HIS	-	expression tag	UNP P9WFX5
A	374	HIS	-	expression tag	UNP P9WFX5
A	375	HIS	-	expression tag	UNP P9WFX5
A	376	HIS	-	expression tag	UNP P9WFX5
A	377	HIS	-	expression tag	UNP P9WFX5
A	378	HIS	-	expression tag	UNP P9WFX5
B	371	LEU	-	expression tag	UNP P9WFX5
B	372	GLU	-	expression tag	UNP P9WFX5
B	373	HIS	-	expression tag	UNP P9WFX5
B	374	HIS	-	expression tag	UNP P9WFX5
B	375	HIS	-	expression tag	UNP P9WFX5
B	376	HIS	-	expression tag	UNP P9WFX5
B	377	HIS	-	expression tag	UNP P9WFX5
B	378	HIS	-	expression tag	UNP P9WFX5

- Molecule 2 is IMIDAZOLE (CCD ID: IMD) (formula: C₃H₅N₂).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	N	0	0
			5	3	2		
2	A	1	Total	C	N	0	0
			5	3	2		

- Molecule 3 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



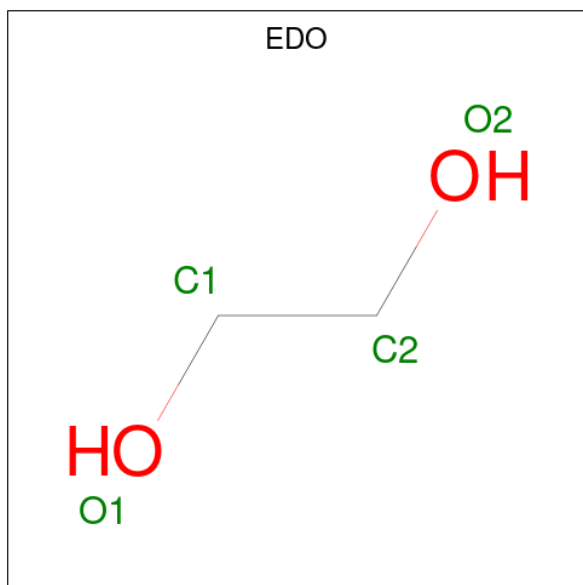
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	0
			6	3	3		
3	A	1	Total	C	O	0	0
			6	3	3		

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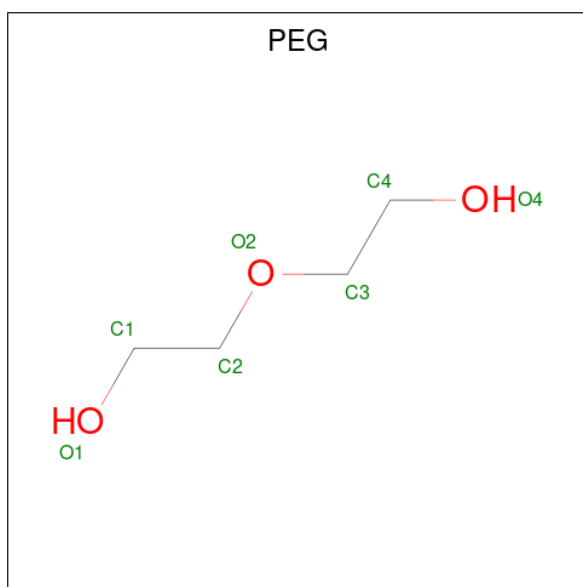
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	B	1	Total	C	O	0	0
			6	3	3		
3	B	1	Total	C	O	0	0
			6	3	3		
3	B	1	Total	C	O	0	0
			6	3	3		

- Molecule 4 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: $C_2H_6O_2$).



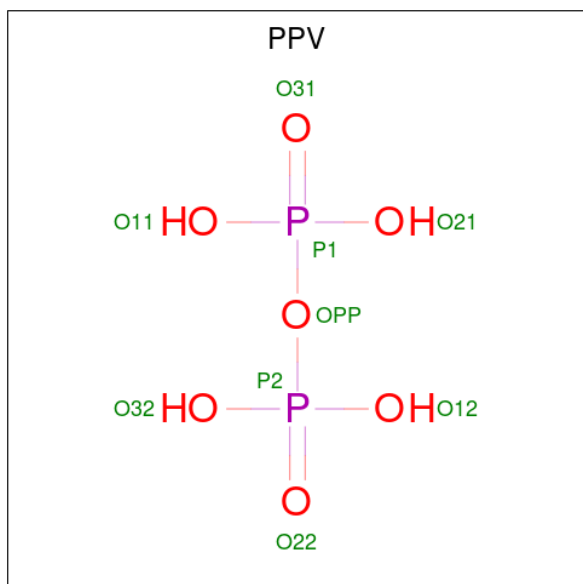
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			4	2	2		
4	A	1	Total	C	O	0	0
			4	2	2		
4	A	1	Total	C	O	0	0
			4	2	2		
4	A	1	Total	C	O	0	0
			4	2	2		
4	A	1	Total	C	O	0	0
			4	2	2		
4	B	1	Total	C	O	0	0
			4	2	2		

- Molecule 5 is DI(HYDROXYETHYL)ETHER (CCD ID: PEG) (formula: $C_4H_{10}O_3$).



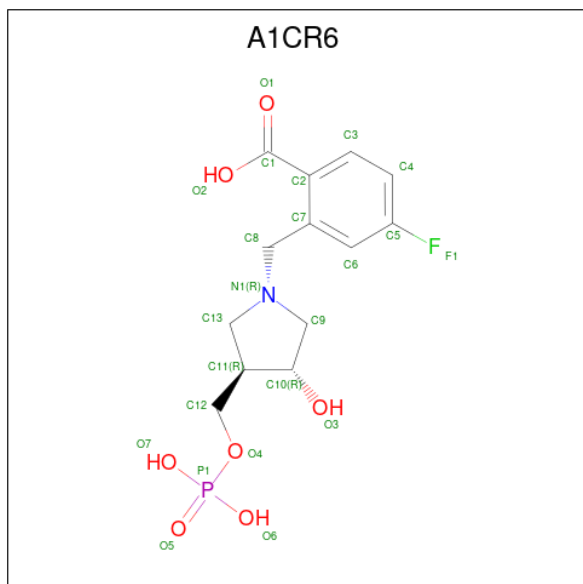
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total	C	O	0	0
			7	4	3		
5	B	1	Total	C	O	0	0
			7	4	3		

- Molecule 6 is PYROPHOSPHATE (CCD ID: PPV) (formula: $\text{H}_4\text{O}_7\text{P}_2$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	O	P	0	0
			9	7	2		

- Molecule 7 is 4-fluoro-2-((3R,4R)-3-hydroxy-4-[(phosphonooxy)methyl]pyrrolidin-1-yl)methyl)benzoic acid (CCD ID: A1CR6) (formula: $C_{13}H_{17}FNO_7P$) (labeled as "Ligand of Interest" by depositor).

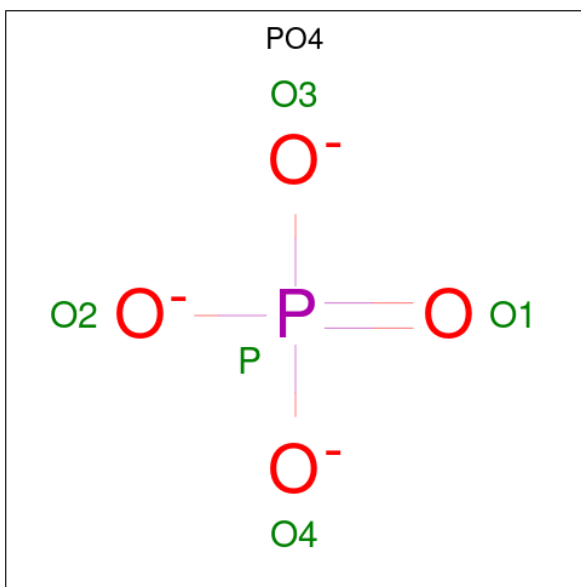


Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
7	A	1	Total	C	F	N	O	P	0	0
			23	13	1	1	7	1		

- Molecule 8 is MAGNESIUM ION (CCD ID: MG) (formula: Mg) (labeled as "Ligand of Interest" by depositor).

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

- Molecule 9 is PHOSPHATE ION (CCD ID: PO4) (formula: O_4P).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
9	B	1	Total	O	P	0	0
			5	4	1		

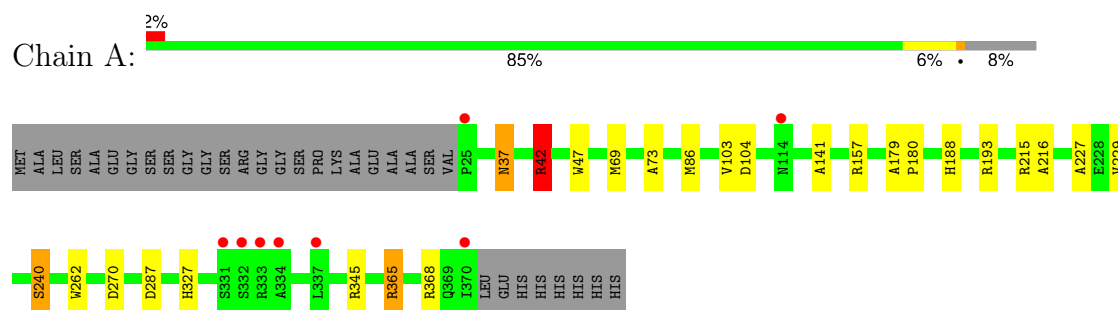
- Molecule 10 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
10	A	299	Total	O	0	0
			299	299		
10	B	193	Total	O	0	0
			193	193		

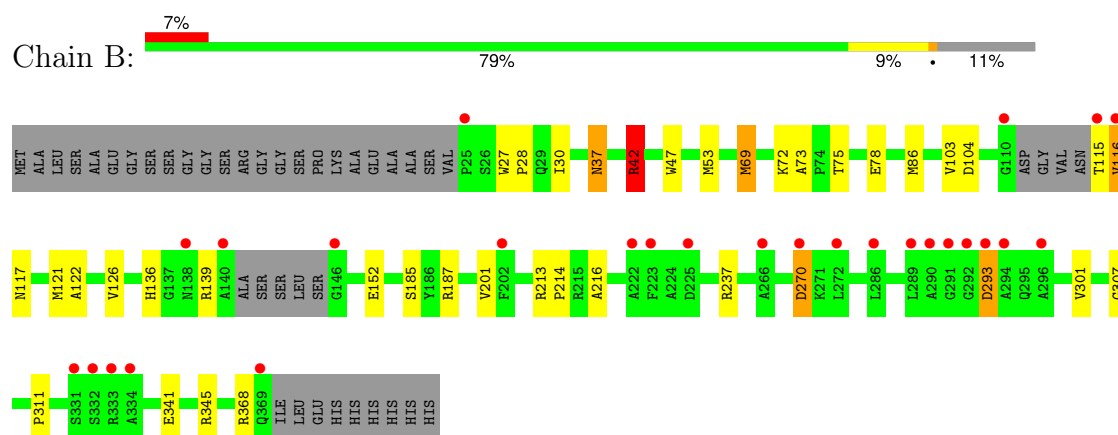
3 Residue-property plots [i](#)

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: Anthranilate phosphoribosyltransferase



- Molecule 1: Anthranilate phosphoribosyltransferase



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	94.93Å 78.31Å 101.69Å 90.00° 111.18° 90.00°	Depositor
Resolution (Å)	47.41 – 1.74 47.41 – 1.74	Depositor EDS
% Data completeness (in resolution range)	99.4 (47.41-1.74) 99.9 (47.41-1.74)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.51 (at 1.74Å)	Xtriage
Refinement program	REFMAC 5.8.0425	Depositor
R, R_{free}	0.169 , 0.200 0.182 , 0.212	Depositor DCC
R_{free} test set	3622 reflections (5.04%)	wwPDB-VP
Wilson B-factor (Å ²)	21.3	Xtriage
Anisotropy	0.023	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 31.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.34$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	5558	wwPDB-VP
Average B, all atoms (Å ²)	25.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 7.82% 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: PO4, A1CR6, GOL, IMD, PEG, MG, EDO, PPV

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	0.70	1/2567 (0.0%)	1.11	7/3503 (0.2%)
1	B	0.66	0/2475	1.11	11/3376 (0.3%)
All	All	0.68	1/5042 (0.0%)	1.11	18/6879 (0.3%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	2
1	B	0	2
All	All	0	4

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	240	SER	CA-CB	-5.28	1.46	1.53

All (18) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	37	ASN	CA-CB-CG	-7.47	105.12	112.60
1	B	37	ASN	CA-CB-CG	-7.45	105.15	112.60
1	A	270	ASP	CA-CB-CG	6.32	118.92	112.60
1	A	365	ARG	CD-NE-CZ	6.21	133.10	124.40
1	B	341	GLU	CB-CG-CD	5.75	122.38	112.60
1	B	104	ASP	CA-CB-CG	5.67	118.27	112.60
1	B	72	LYS	CB-CA-C	5.61	120.38	110.85
1	A	104	ASP	CA-CB-CG	5.54	118.14	112.60

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	117	ASN	CB-CA-C	5.54	119.72	110.92
1	B	270	ASP	CB-CA-C	5.37	118.72	110.14
1	A	157	ARG	CD-NE-CZ	-5.36	116.90	124.40
1	A	287	ASP	CA-CB-CG	5.24	117.84	112.60
1	B	86	MET	CG-SD-CE	5.22	112.39	100.90
1	B	237	ARG	CB-CA-C	5.15	119.54	110.37
1	B	115	THR	CA-CB-OG1	-5.12	101.91	109.60
1	A	69	MET	CG-SD-CE	-5.06	89.77	100.90
1	B	345	ARG	N-CA-CB	5.04	117.32	110.01
1	B	293	ASP	CA-CB-CG	5.03	117.63	112.60

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	368	ARG	Sidechain
1	A	42[A]	ARG	Sidechain
1	B	187	ARG	Sidechain
1	B	42[A]	ARG	Sidechain

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	2519	0	2500	18	0
1	B	2429	0	2412	24	0
2	A	10	0	10	1	0
3	A	12	0	16	2	0
3	B	18	0	24	1	0
4	A	20	0	30	0	0
4	B	4	0	6	0	0
5	A	7	0	10	0	0
5	B	7	0	10	4	0
6	A	9	0	0	0	0
7	A	23	0	0	1	0
8	A	2	0	0	0	0
8	B	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
9	B	5	0	0	2	0
10	A	299	0	0	3	0
10	B	193	0	0	4	0
All	All	5558	0	5018	44	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 4.

All (44) 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:188:HIS:HD2	10:A:741:HOH:O	1.56	0.88
1:A:42[A]:ARG:HH11	1:A:42[A]:ARG:CG	1.96	0.76
1:B:139:ARG:NH1	1:B:152:GLU:OE1	2.23	0.72
1:A:47:TRP:HA	3:A:402:GOL:H2	1.72	0.72
1:A:229:VAL:HG23	10:A:614:HOH:O	1.98	0.63
1:A:193:ARG:NH2	10:A:504:HOH:O	2.33	0.60
1:B:307:GLY:HA3	3:B:401:GOL:H31	1.84	0.60
1:B:69:MET:O	1:B:69:MET:HG3	2.02	0.60
1:B:42[A]:ARG:HH11	1:B:42[A]:ARG:CG	2.18	0.56
1:B:53:MET:O	1:B:185:SER:HB3	2.04	0.56
1:B:368:ARG:HG2	1:B:368:ARG:HH11	1.71	0.54
1:A:42[A]:ARG:CG	1:A:42[A]:ARG:NH1	2.66	0.50
1:B:78:GLU:HG3	5:B:405:PEG:H32	1.93	0.50
1:B:69:MET:HG2	1:B:201:VAL:HG11	1.93	0.49
1:B:368:ARG:HH11	1:B:368:ARG:CG	2.25	0.49
1:B:136:HIS:HB3	10:B:608:HOH:O	2.13	0.48
1:A:42[A]:ARG:HH11	1:A:42[A]:ARG:HG3	1.74	0.48
1:B:75:THR:OG1	5:B:405:PEG:H32	2.13	0.48
1:A:179:ALA:HB3	1:A:180:PRO:HD3	1.96	0.48
1:B:42[A]:ARG:NH1	10:B:504:HOH:O	2.46	0.47
1:A:42[A]:ARG:NH1	1:A:42[A]:ARG:HG3	2.29	0.47
1:A:103:VAL:HG12	1:A:216:ALA:HB3	1.97	0.47
1:B:139:ARG:NH1	1:B:152:GLU:CD	2.72	0.47
1:B:69:MET:HE3	1:B:69:MET:HB2	1.69	0.46
1:A:227:ALA:CB	1:A:262:TRP:CZ3	2.99	0.45
1:B:103:VAL:HG12	1:B:216:ALA:HB3	2.00	0.44
1:A:141:ALA:HB3	7:A:412:A1CR6:O7	2.17	0.44
5:B:405:PEG:H21	10:B:568:HOH:O	2.18	0.44
1:B:30:ILE:HD12	1:B:47:TRP:CE3	2.53	0.44
1:B:121:MET:CG	1:B:301:VAL:HG22	2.47	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:345[B]:ARG:NH1	1:A:345[B]:ARG:HG2	2.32	0.43
1:B:311:PRO:HD2	10:B:585:HOH:O	2.18	0.43
1:B:116:VAL:HA	9:B:407:PO4:O3	2.18	0.42
1:B:27:TRP:N	1:B:28:PRO:CD	2.82	0.42
1:B:122:ALA:O	1:B:126:VAL:HG23	2.19	0.42
1:A:103:VAL:HG11	1:A:327:HIS:HB2	2.02	0.42
1:A:227:ALA:HB3	1:A:262:TRP:CH2	2.55	0.42
1:A:216:ALA:HA	1:A:240:SER:O	2.20	0.42
1:B:213:ARG:N	1:B:214:PRO:CD	2.83	0.41
1:A:86:MET:HE1	2:A:401:IMD:C4	2.51	0.41
1:B:116:VAL:HG12	9:B:407:PO4:O1	2.21	0.41
1:B:27:TRP:HB2	1:B:28:PRO:HD3	2.02	0.41
5:B:405:PEG:H21	5:B:405:PEG:H42	1.88	0.40
1:A:215:ARG:NH2	3:A:404:GOL:O1	2.54	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	347/378 (92%)	340 (98%)	6 (2%)	1 (0%)	36	23
1	B	331/378 (88%)	324 (98%)	6 (2%)	1 (0%)	36	23
All	All	678/756 (90%)	664 (98%)	12 (2%)	2 (0%)	36	23

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	73	ALA
1	B	73	ALA

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	242/265 (91%)	238 (98%)	4 (2%)	53	32
1	B	231/265 (87%)	224 (97%)	7 (3%)	36	12
All	All	473/530 (89%)	462 (98%)	11 (2%)	50	20

All (11) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	37	ASN
1	A	42[A]	ARG
1	A	42[B]	ARG
1	A	365	ARG
1	B	37	ASN
1	B	42[A]	ARG
1	B	42[B]	ARG
1	B	69	MET
1	B	116	VAL
1	B	270	ASP
1	B	293	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	56	ASN
1	A	114	ASN
1	A	188	HIS
1	A	285	GLN
1	A	295	GLN
1	A	369	GLN
1	B	188	HIS
1	B	295	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 21 ligands modelled in this entry, 3 are monoatomic - leaving 18 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	GOL	B	403	-	5,5,5	0.10	0	5,5,5	0.23	0
4	EDO	A	406	-	3,3,3	0.24	0	2,2,2	0.37	0
2	IMD	A	403	-	5,5,5	0.47	0	5,5,5	0.39	0
5	PEG	A	409	-	6,6,6	0.24	0	5,5,5	0.17	0
6	PPV	A	410	8	6,8,8	0.80	0	12,13,13	0.78	0
4	EDO	A	407	-	3,3,3	0.13	0	2,2,2	0.27	0
4	EDO	A	408	-	3,3,3	0.40	0	2,2,2	0.13	0
3	GOL	A	404	-	5,5,5	0.07	0	5,5,5	0.19	0
4	EDO	A	405	-	3,3,3	0.07	0	2,2,2	0.03	0
5	PEG	B	405	-	6,6,6	0.49	0	5,5,5	0.69	0
3	GOL	A	402	-	5,5,5	0.12	0	5,5,5	0.56	0
7	A1CR6	A	412	-	24,24,24	1.11	2 (8%)	29,35,35	2.16	11 (37%)
4	EDO	B	404	-	3,3,3	0.28	0	2,2,2	0.27	0
9	PO4	B	407	8	4,4,4	1.47	1 (25%)	6,6,6	0.40	0
2	IMD	A	401	-	5,5,5	0.31	0	5,5,5	0.56	0
4	EDO	A	411	-	3,3,3	0.24	0	2,2,2	0.25	0
3	GOL	B	402	-	5,5,5	0.09	0	5,5,5	0.55	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	GOL	B	401	-	5,5,5	0.13	0	5,5,5	0.52	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	EDO	A	406	-	-	1/1/1/1	-
5	PEG	A	409	-	-	3/4/4/4	-
6	PPV	A	410	8	-	0/6/6/6	-
2	IMD	A	403	-	-	-	0/1/1/1
4	EDO	A	407	-	-	1/1/1/1	-
4	EDO	A	408	-	-	1/1/1/1	-
3	GOL	A	404	-	-	0/4/4/4	-
4	EDO	A	405	-	-	0/1/1/1	-
5	PEG	B	405	-	-	2/4/4/4	-
3	GOL	A	402	-	-	1/4/4/4	-
7	A1CR6	A	412	-	-	1/14/26/26	0/2/2/2
4	EDO	B	404	-	-	0/1/1/1	-
2	IMD	A	401	-	-	-	0/1/1/1
4	EDO	A	411	-	-	1/1/1/1	-
3	GOL	B	401	-	-	4/4/4/4	-
3	GOL	B	402	-	-	2/4/4/4	-
3	GOL	B	403	-	-	0/4/4/4	-

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
9	B	407	PO4	P-O1	2.63	1.56	1.50
7	A	412	A1CR6	C9-N1	2.42	1.50	1.47
7	A	412	A1CR6	O1-C1	2.16	1.29	1.22

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	A	412	A1CR6	C8-N1-C9	5.68	124.32	113.39
7	A	412	A1CR6	O3-C10-C9	4.68	121.90	110.94
7	A	412	A1CR6	C13-N1-C9	-3.30	99.31	104.12
7	A	412	A1CR6	C8-C7-C6	-3.27	114.58	120.37
7	A	412	A1CR6	O6-P1-O4	-2.85	99.24	106.67

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	A	412	A1CR6	O1-C1-C2	-2.64	115.67	121.97
7	A	412	A1CR6	O6-P1-O5	2.57	120.85	110.83
7	A	412	A1CR6	C7-C2-C1	2.53	126.39	122.47
7	A	412	A1CR6	O3-C10-C11	-2.46	104.58	111.76
7	A	412	A1CR6	C8-C7-C2	2.44	126.89	122.03
7	A	412	A1CR6	C3-C2-C1	-2.11	113.78	118.64

There are no chirality outliers.

All (17) torsion outliers are listed below:

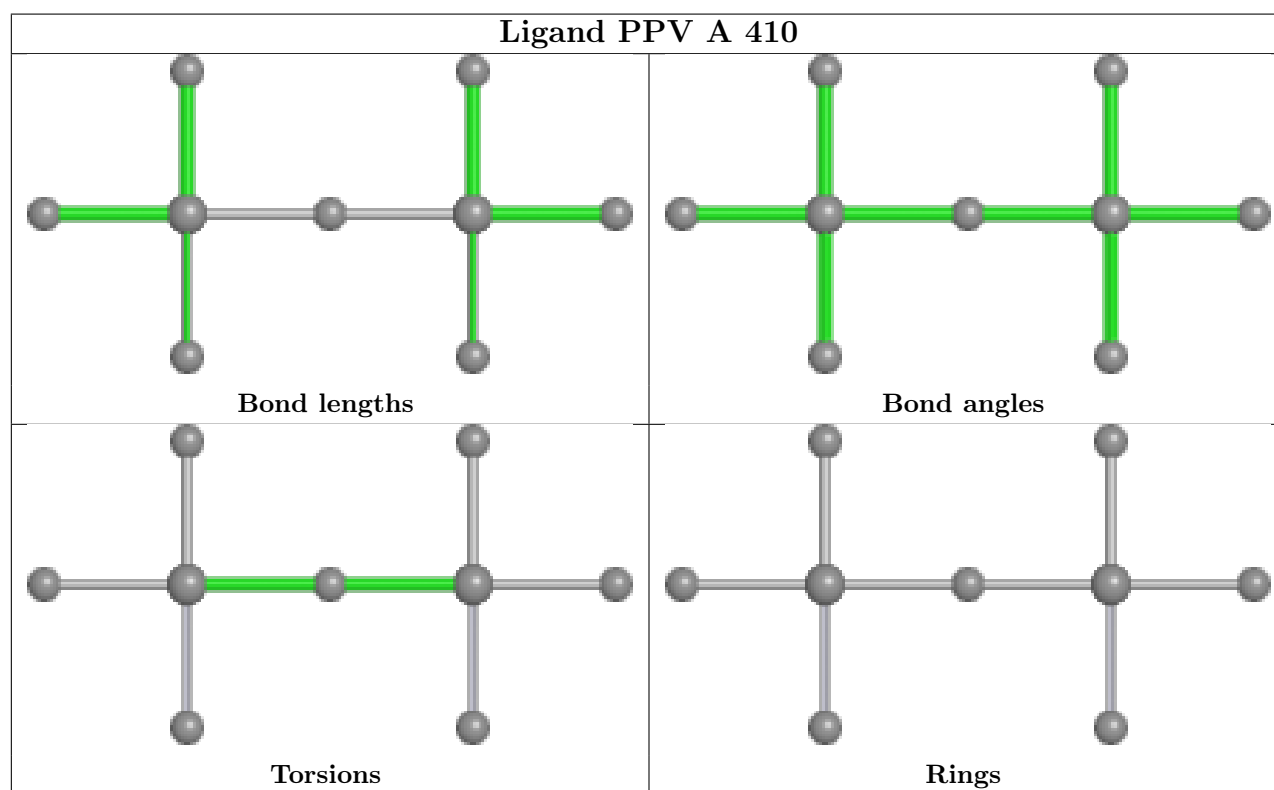
Mol	Chain	Res	Type	Atoms
3	B	401	GOL	O1-C1-C2-C3
5	B	405	PEG	O2-C3-C4-O4
3	B	401	GOL	C1-C2-C3-O3
3	B	402	GOL	O1-C1-C2-C3
5	B	405	PEG	C4-C3-O2-C2
4	A	406	EDO	O1-C1-C2-O2
4	A	411	EDO	O1-C1-C2-O2
3	B	401	GOL	O1-C1-C2-O2
4	A	408	EDO	O1-C1-C2-O2
5	A	409	PEG	O1-C1-C2-O2
3	A	402	GOL	O2-C2-C3-O3
3	B	402	GOL	O2-C2-C3-O3
5	A	409	PEG	C1-C2-O2-C3
5	A	409	PEG	O2-C3-C4-O4
4	A	407	EDO	O1-C1-C2-O2
3	B	401	GOL	O2-C2-C3-O3
7	A	412	A1CR6	C12-O4-P1-O6

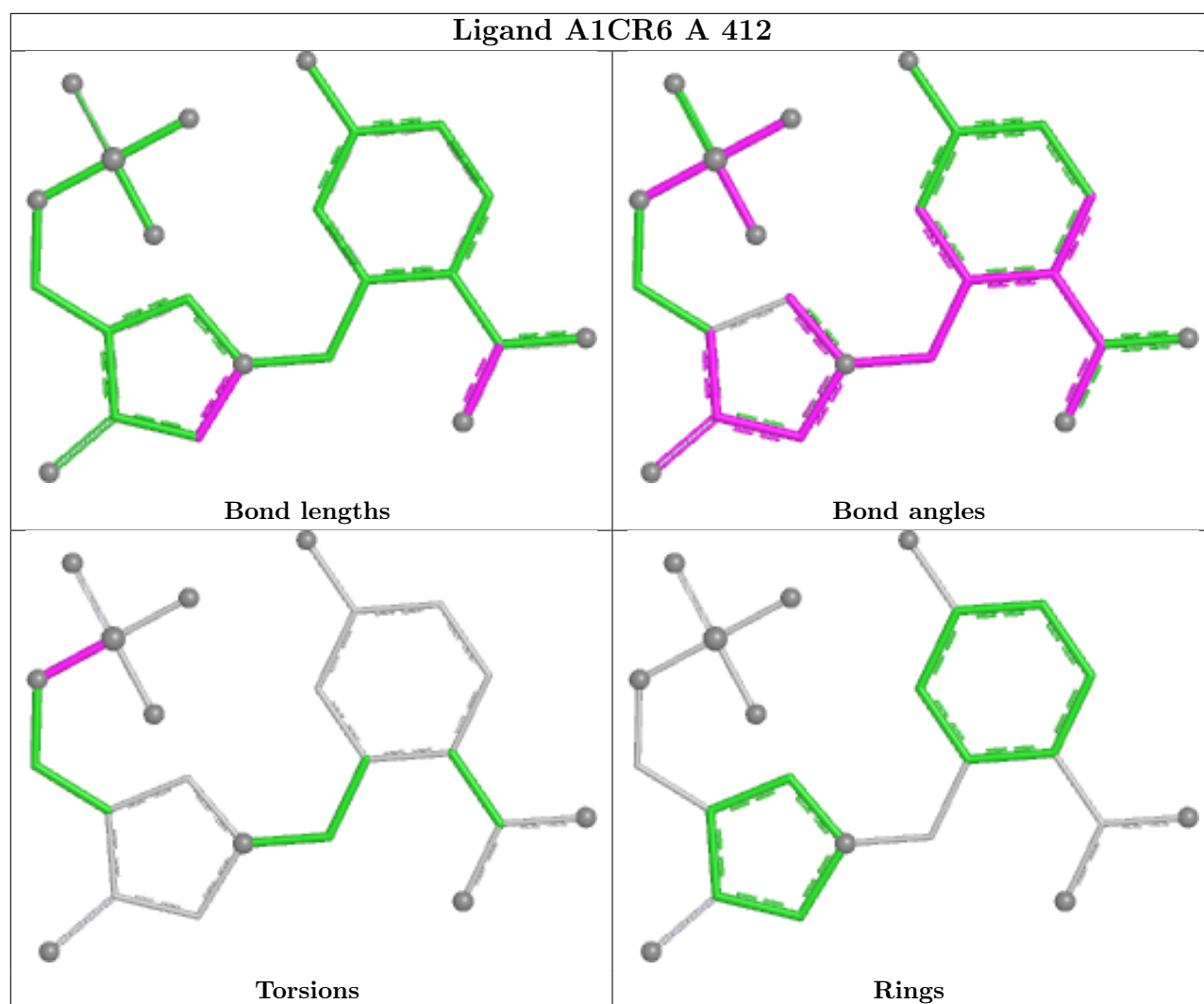
There are no ring outliers.

7 monomers are involved in 11 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	404	GOL	1	0
5	B	405	PEG	4	0
3	A	402	GOL	1	0
7	A	412	A1CR6	1	0
9	B	407	PO4	2	0
2	A	401	IMD	1	0
3	B	401	GOL	1	0

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





5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data ⓘ

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	346/378 (91%)	-0.11	8 (2%) 61 69	8, 19, 36, 70	3 (0%)
1	B	336/378 (88%)	0.45	27 (8%) 18 23	12, 27, 50, 81	1 (0%)
All	All	682/756 (90%)	0.16	35 (5%) 33 41	8, 22, 44, 81	4 (0%)

All (35) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	290	ALA	5.4
1	B	291	GLY	5.0
1	B	140	ALA	4.7
1	A	334	ALA	4.7
1	B	116	VAL	4.5
1	B	292	GLY	4.3
1	B	334	ALA	4.2
1	B	110	GLY	4.1
1	B	332	SER	4.0
1	A	370	ILE	3.9
1	A	332	SER	3.9
1	B	294	ALA	3.6
1	B	286	LEU	3.6
1	A	333	ARG	3.3
1	B	115	THR	3.2
1	B	272	LEU	3.2
1	B	333	ARG	3.0
1	B	369	GLN	3.0
1	B	146	GLY	2.9
1	B	296	ALA	2.8
1	B	223	PHE	2.8
1	A	331	SER	2.6
1	B	225	ASP	2.4
1	A	25	PRO	2.4

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Mol	Chain	Res	Type	RSRZ
1	B	222	ALA	2.4
1	B	270	ASP	2.4
1	B	202	PHE	2.3
1	B	266	ALA	2.3
1	A	337	LEU	2.2
1	B	331	SER	2.2
1	B	138	ASN	2.1
1	A	114	ASN	2.1
1	B	289	LEU	2.1
1	B	25	PRO	2.0
1	B	293	ASP	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
9	PO4	B	407	5/5	0.68	0.16	39,45,48,54	0
5	PEG	A	409	7/7	0.76	0.18	50,52,55,56	0
4	EDO	A	407	4/4	0.80	0.17	45,57,57,59	0
3	GOL	A	404	6/6	0.80	0.20	48,50,66,70	0
4	EDO	A	405	4/4	0.80	0.17	42,52,53,57	0
3	GOL	B	402	6/6	0.81	0.17	42,44,48,49	0
4	EDO	B	404	4/4	0.81	0.15	44,46,49,54	0
5	PEG	B	405	7/7	0.82	0.16	39,40,51,53	0
3	GOL	B	401	6/6	0.83	0.17	48,49,53,55	0
2	IMD	A	403	5/5	0.83	0.14	37,38,43,43	0
3	GOL	A	402	6/6	0.84	0.15	34,36,39,40	0
3	GOL	B	403	6/6	0.84	0.15	38,46,51,55	0

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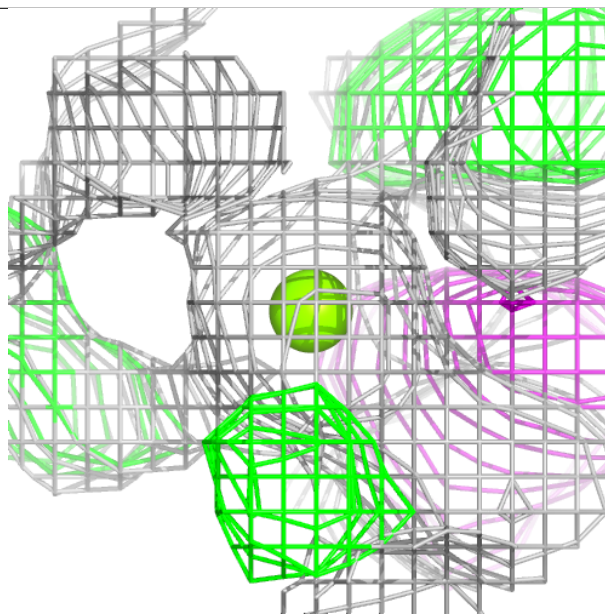
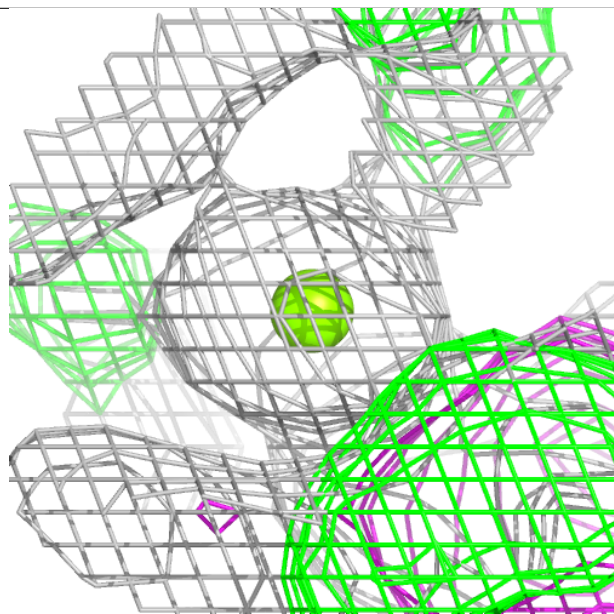
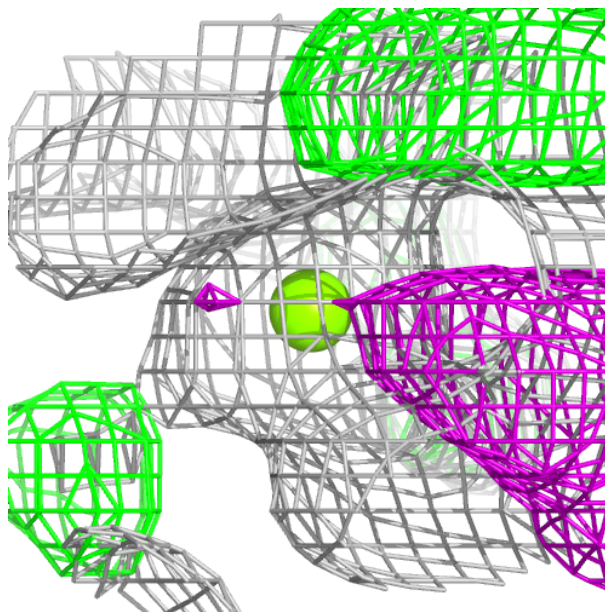
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
4	EDO	A	408	4/4	0.85	0.18	32,33,37,47	0
4	EDO	A	406	4/4	0.87	0.17	34,40,44,45	0
4	EDO	A	411	4/4	0.87	0.21	39,39,41,45	0
8	MG	B	406	1/1	0.90	0.11	43,43,43,43	0
7	A1CR6	A	412	23/23	0.90	0.11	21,28,33,37	0
2	IMD	A	401	5/5	0.94	0.13	25,26,27,28	0
8	MG	A	414	1/1	0.99	0.06	15,15,15,15	0
6	PPV	A	410	9/9	0.99	0.06	16,17,18,19	0
8	MG	A	413	1/1	0.99	0.04	15,15,15,15	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.

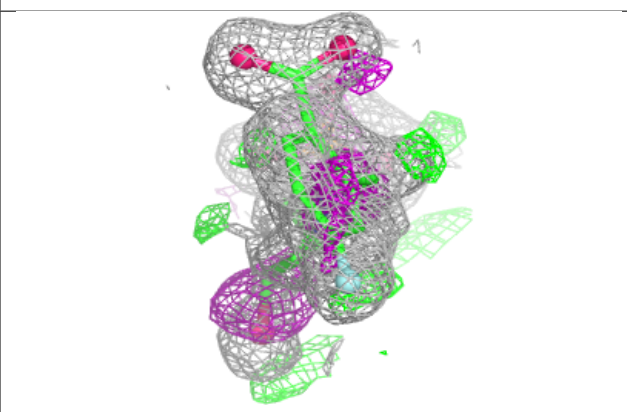
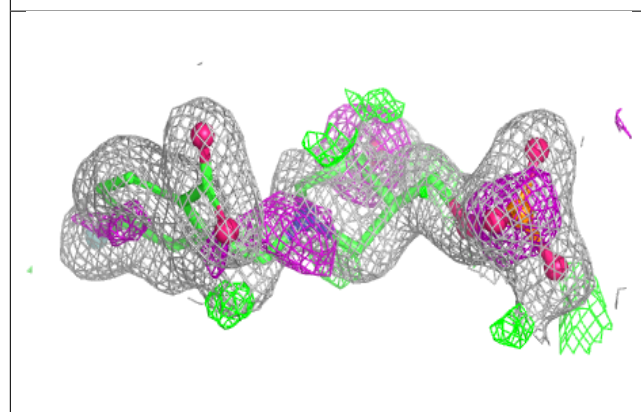
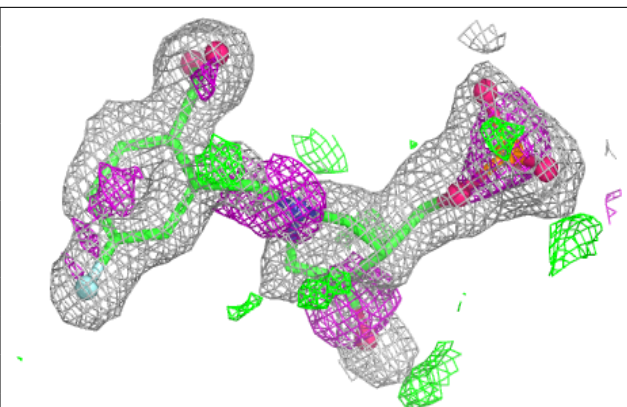
Electron density around MG B 406:

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



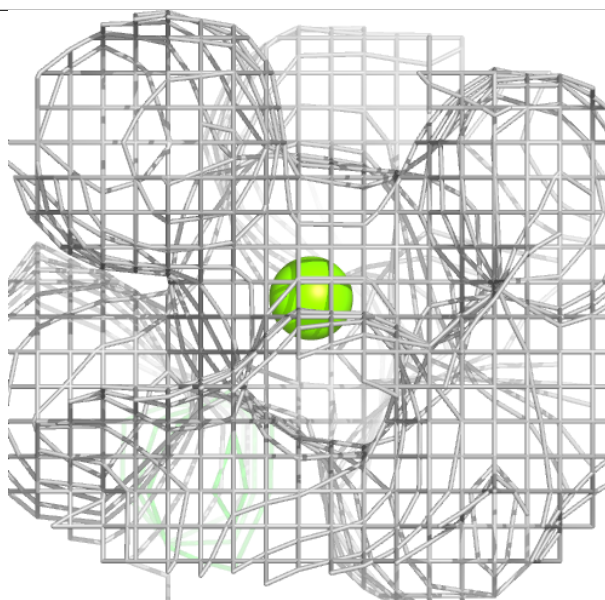
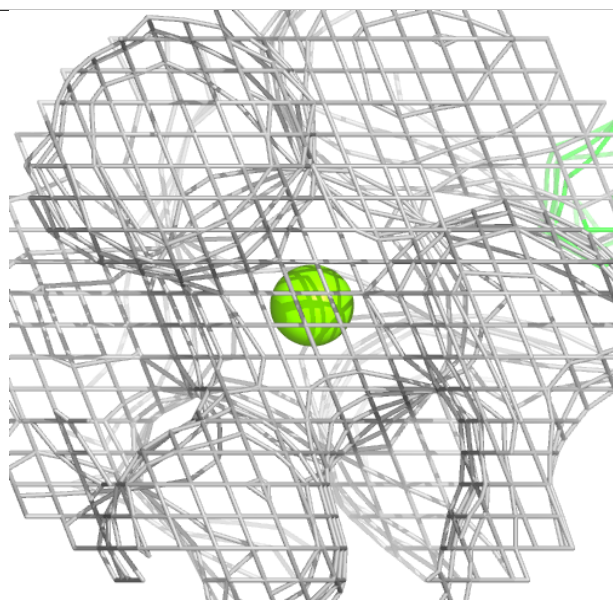
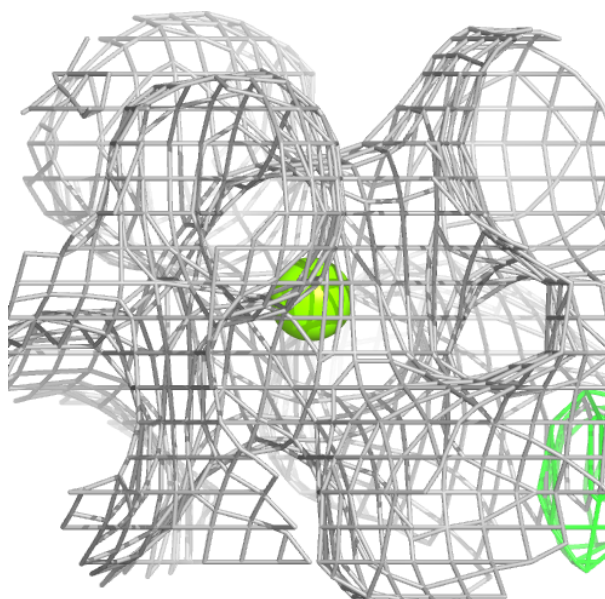
Electron density around A1CR6 A 412:

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



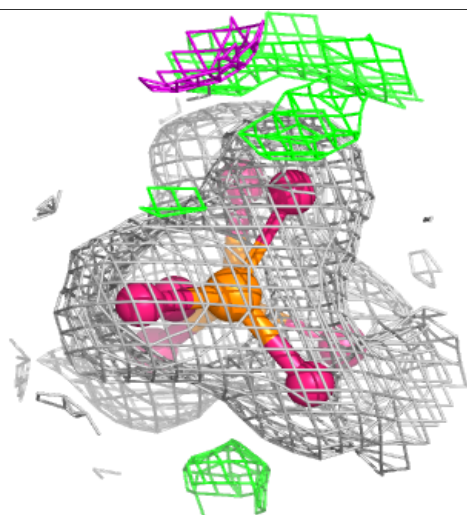
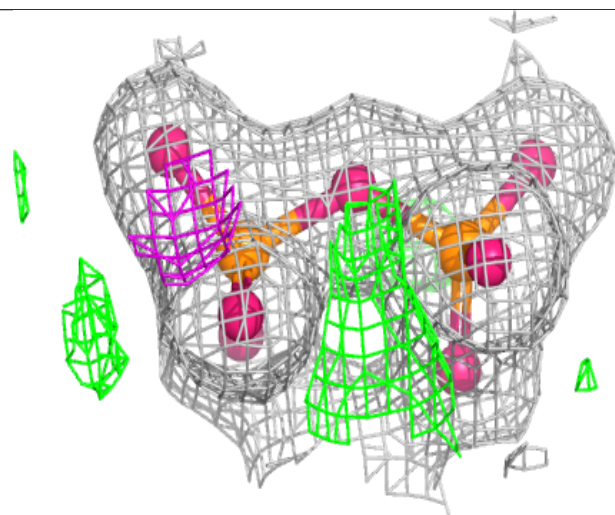
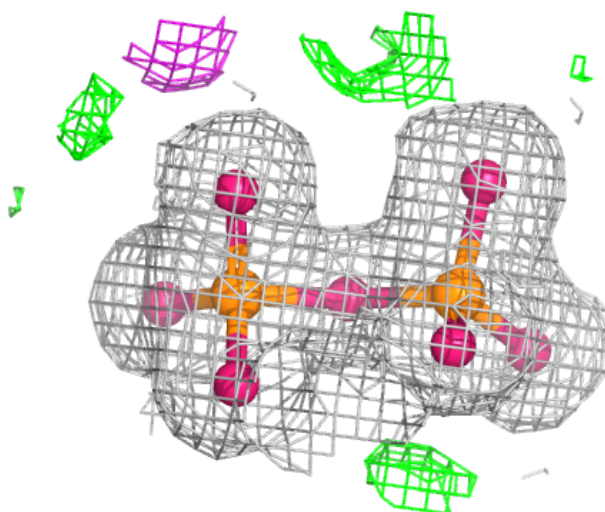
Electron density around MG A 414:

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



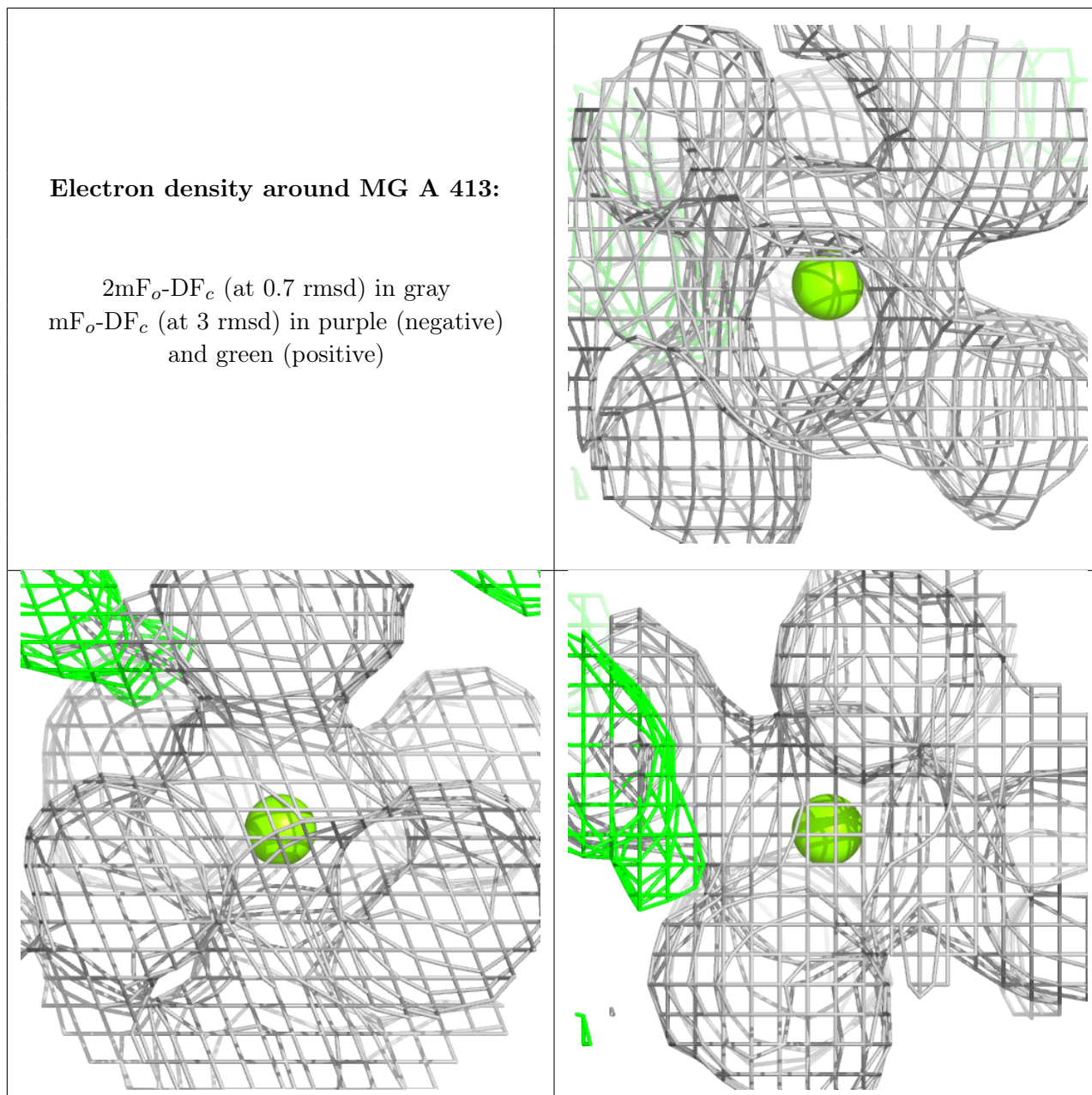
Electron density around PPV A 410:

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



Electron density around MG A 413:

$2mF_o-DF_c$ (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.