



# Full wwPDB X-ray Structure Validation Report ⓘ

Jan 16, 2024 – 02:29 am GMT

PDB ID : 6SCZ  
Title : Mycobacterium tuberculosis alanine racemase inhibited by DCS  
Authors : de Chiara, C.; Purkiss, A.; Prosser, G.; Homsak, M.; de Carvalho, L.P.S.  
Deposited on : 2019-07-26  
Resolution : 1.57 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](mailto: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>.

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

MolProbity : 4.02b-467  
Mogul : 1.8.4, CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.36  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.36

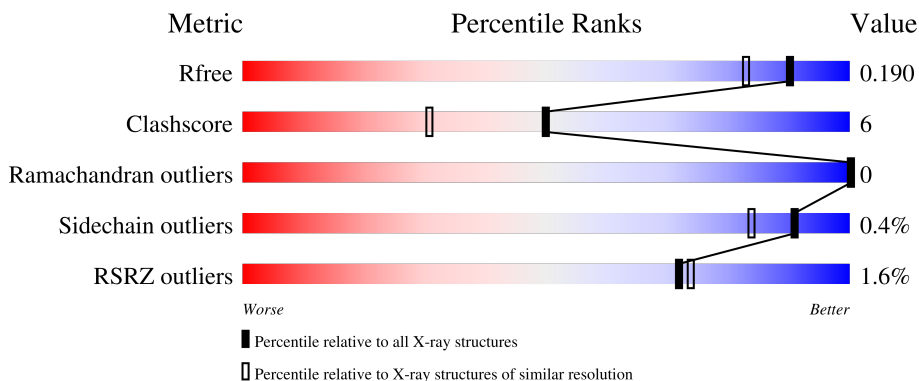
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*


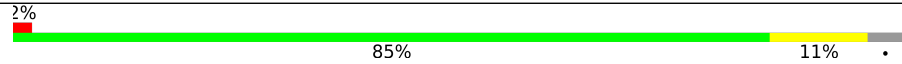
The reported resolution of this entry is 1.57 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	5534 (1.60-1.56)
Clashscore	141614	5861 (1.60-1.56)
Ramachandran outliers	138981	5708 (1.60-1.56)
Sidechain outliers	138945	5703 (1.60-1.56)
RSRZ outliers	127900	5431 (1.60-1.56)

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  $\geq 3$ , 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	387	 88% 8%
1	B	387	 85% 11%

## 2 Entry composition [i](#)

There are 11 unique types of molecules in this entry. The entry contains 12620 atoms, of which 6095 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.

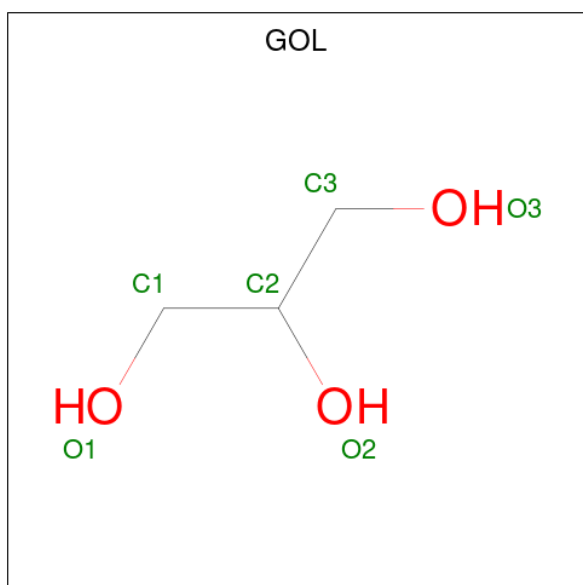
- Molecule 1 is a protein called Alanine racemase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace	
			Total	C	H	N	O				S
1	A	373	5652	1777	2841	504	511	19	0	14	0
1	B	371	5720	1819	2855	508	517	21	0	22	0

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	0	GLY	-	expression tag	UNP P9WQA9
A	1	SER	-	expression tag	UNP P9WQA9
A	2	HIS	-	expression tag	UNP P9WQA9
B	0	GLY	-	expression tag	UNP P9WQA9
B	1	SER	-	expression tag	UNP P9WQA9
B	2	HIS	-	expression tag	UNP P9WQA9

- Molecule 2 is GLYCEROL (three-letter code: GOL) (formula: C<sub>3</sub>H<sub>8</sub>O<sub>3</sub>).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	H	O	0	0
			14	3	8	3		
2	A	1	Total	C	H	O	0	0
			14	3	8	3		
2	A	1	Total	C	H	O	0	0
			14	3	8	3		
2	A	1	Total	C	H	O	0	0
			14	3	8	3		
2	B	1	Total	C	H	O	0	0
			14	3	8	3		
2	B	1	Total	C	H	O	0	0
			14	3	8	3		
2	B	1	Total	C	H	O	0	0
			14	3	8	3		

- Molecule 3 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	1	Total	Ca	0	0
			1	1		

- Molecule 4 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

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

- Molecule 5 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: C<sub>2</sub>H<sub>6</sub>O<sub>2</sub>).



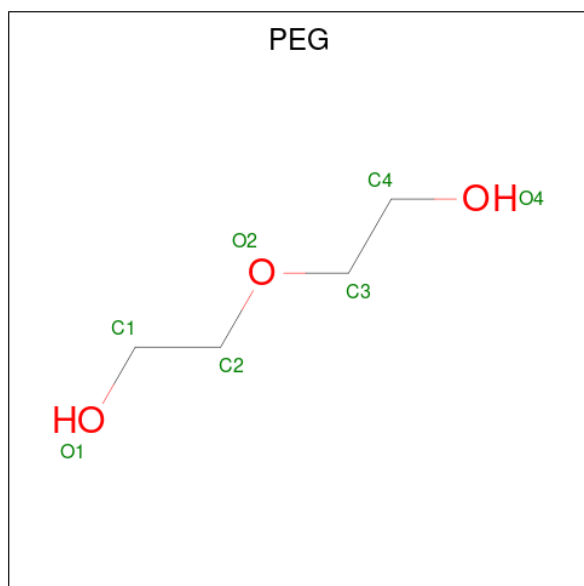
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	H	O		
5	A	1	10	2	6	2	0	0
5	A	1	10	2	6	2	0	0
5	A	1	10	2	6	2	0	0
5	A	1	10	2	6	2	0	0
5	A	1	10	2	6	2	0	0
5	A	1	10	2	6	2	0	0
5	A	1	10	2	6	2	0	0
5	A	1	10	2	6	2	0	0
5	A	1	14	2	9	3	0	1
5	A	1	10	2	6	2	0	0
5	B	1	10	2	6	2	0	0
5	B	1	10	2	6	2	0	0
5	B	1	10	2	6	2	0	0

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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	B	1	Total	C	H	O	0	0
			10	2	6	2		
5	B	1	Total	C	H	O	0	0
			10	2	6	2		
5	B	1	Total	C	H	O	0	0
			10	2	6	2		
5	B	1	Total	C	H	O	0	0
			10	2	6	2		
5	B	1	Total	C	H	O	0	0
			10	2	6	2		
5	B	1	Total	C	H	O	0	0
			10	2	6	2		
5	B	1	Total	C	H	O	0	1
			14	2	9	3		

- Molecule 6 is DI(HYDROXYETHYL)ETHER (three-letter code: PEG) (formula: C<sub>4</sub>H<sub>10</sub>O<sub>3</sub>).



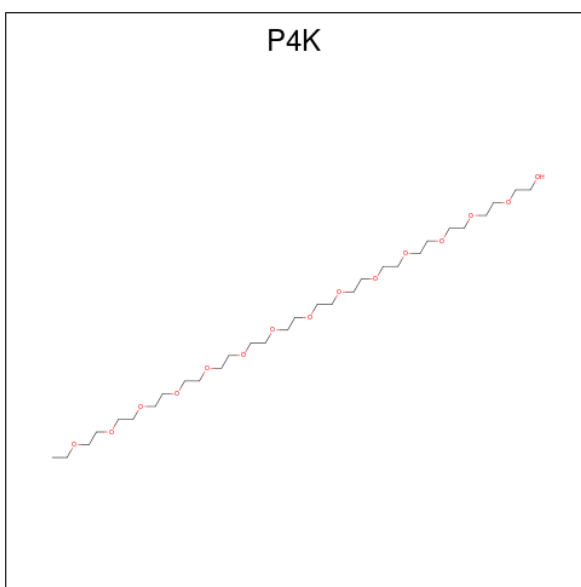
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
6	A	1	Total	C	H	O	0	0
			17	4	10	3		
6	A	1	Total	C	H	O	0	0
			17	4	10	3		
6	A	1	Total	C	H	O	0	0
			17	4	10	3		

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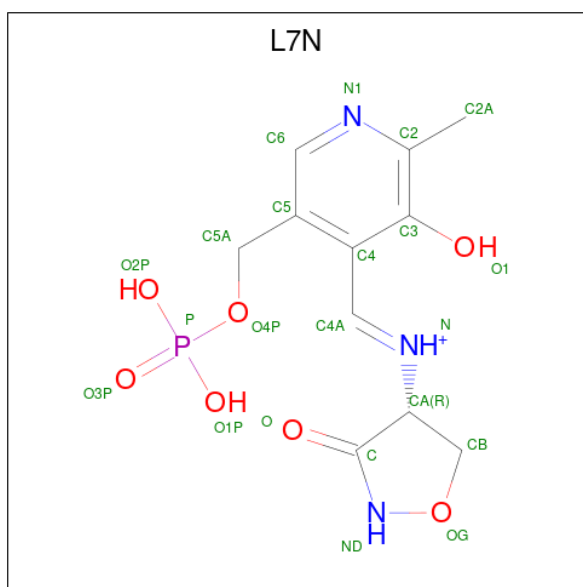
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
6	A	1	Total	C	H	O	0	0
			17	4	10	3		
6	B	1	Total	C	H	O	0	0
			17	4	10	3		
6	B	1	Total	C	H	O	0	0
			17	4	10	3		
6	B	1	Total	C	H	O	0	0
			17	4	10	3		

- Molecule 7 is polyethylene glycol (three-letter code: P4K) (formula: C<sub>30</sub>H<sub>62</sub>O<sub>15</sub>).



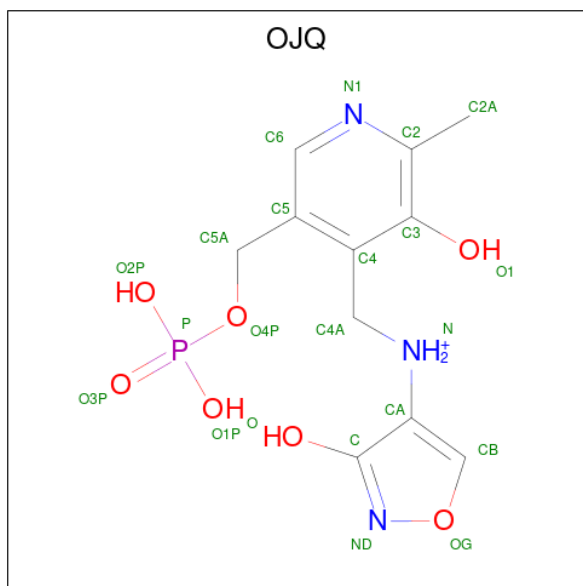
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
7	A	1	Total	C	H	O	0	0
			23	6	13	4		
7	A	1	Total	C	H	O	0	0
			23	6	13	4		
7	B	1	Total	C	H	O	0	0
			23	6	13	4		
7	B	1	Total	C	H	O	0	0
			30	8	17	5		
7	B	1	Total	C	H	O	0	0
			33	9	19	5		

- Molecule 8 is ( {E} )-[2-methyl-3-oxidanyl-5-(phosphonoxymethyl)pyridin-4-yl]methylidene-[4 {R} ]-3-oxidanylidene-1,2-oxazolidin-4-yl]azanium (three-letter code: L7N) (formula: C<sub>11</sub>H<sub>15</sub>N<sub>3</sub>O<sub>7</sub>P) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	
			Total	C	H	N	O			P
8	A	1	34	11	12	3	7	1	0	1

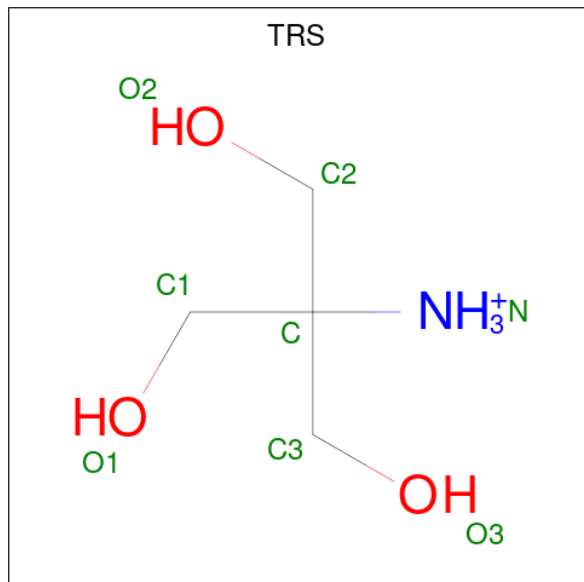
- Molecule 9 is [2-methyl-3-oxidanyl-5-(phosphonoxymethyl)pyridin-4-yl]methyl-(3-oxidanyl-1,2-oxazol-4-yl)azanium (three-letter code: OJQ) (formula:  $C_{11}H_{15}N_3O_7P$ ).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	
			Total	C	H	N	O			P
9	A	1	34	11	12	3	7	1	0	1
9	B	1	34	11	12	3	7	1	0	0



- Molecule 10 is 2-AMINO-2-HYDROXYMETHYL-PROPANE-1,3-DIOL (three-letter code: TRS) (formula:  $C_4H_{12}NO_3$ ).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	H	N	O		
10	A	1	20	4	12	1	3	0	0
10	B	1	20	4	12	1	3	0	0

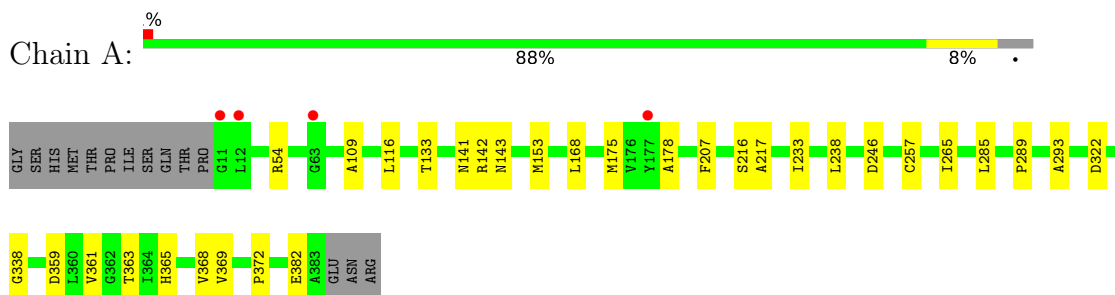
- Molecule 11 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
11	A	238	Total	O	0	1
			238	238		
11	B	287	Total	O	0	3
			287	287		

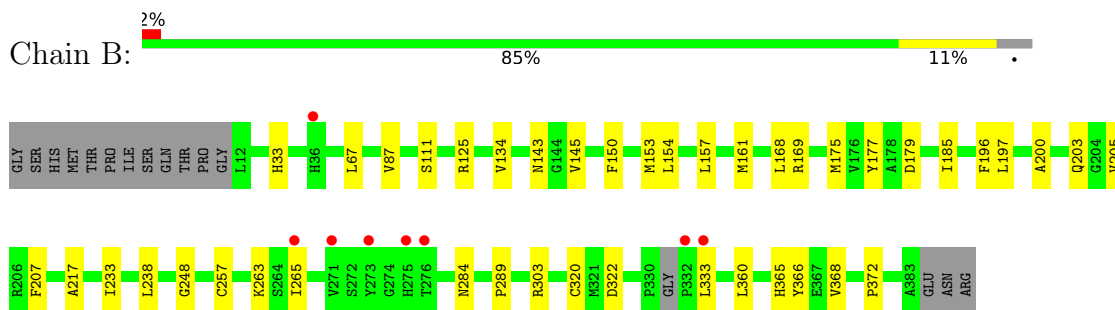
### 3 Residue-property plots [i](#)

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: Alanine racemase



- Molecule 1: Alanine racemase



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 41 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	164.18Å 164.18Å 57.74Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	82.09 – 1.57 82.09 – 1.57	Depositor EDS
% Data completeness (in resolution range)	99.9 (82.09-1.57) 99.9 (82.09-1.57)	Depositor EDS
$R_{merge}$	0.13	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.26 (at 1.57Å)	Xtrriage
Refinement program	PHENIX dev_3765	Depositor
R, $R_{free}$	0.150 , 0.190 0.150 , 0.190	Depositor DCC
$R_{free}$ test set	5447 reflections (4.96%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	22.1	Xtrriage
Anisotropy	0.234	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.43 , 50.3	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.97	EDS
Total number of atoms	12620	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	31.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.91% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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: CL, CA, GOL, OJQ, P4K, TRS, EDO, L7N, PEG

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	0.38	0/2902	0.59	0/3947
1	B	0.38	0/2978	0.58	0/4046
All	All	0.38	0/5880	0.59	0/7993

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	2811	2841	2845	22	0
1	B	2865	2855	2922	36	0
2	A	24	32	32	2	0
2	B	18	24	24	2	0
3	A	1	0	0	0	0
4	A	2	0	0	0	0
4	B	1	0	0	0	0
5	A	45	69	66	7	0
5	B	45	69	66	4	0
6	A	28	40	40	2	0
6	B	21	30	30	4	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
7	A	20	26	0	0	0
7	B	37	49	0	2	0
8	A	22	12	0	0	0
9	A	22	12	0	0	0
9	B	22	12	0	0	0
10	A	8	12	12	1	0
10	B	8	12	12	0	0
11	A	238	0	0	9	0
11	B	287	0	0	9	0
All	All	6525	6095	6049	70	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 6.

All (70) 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)
5:A:415:EDO:O2	11:A:501:HOH:O	1.91	0.87
1:B:322:ASP:OD1	11:B:501:HOH:O	1.98	0.79
5:A:409:EDO:O2	11:A:502:HOH:O	2.01	0.77
1:A:54[B]:ARG:NH2	1:A:382:GLU:OE2	2.21	0.74
1:B:175[B]:MET:CE	1:B:217:ALA:HB2	2.25	0.67
5:A:410:EDO:O2	11:A:503:HOH:O	2.13	0.67
1:B:203[B]:GLN:OE1	11:B:502[B]:HOH:O	2.13	0.66
1:B:303[B]:ARG:NH2	1:B:360:LEU:O	2.29	0.66
1:A:246:ASP:OD2	2:A:402:GOL:O3	2.11	0.65
1:A:142:ARG:NH2	1:B:320:CYS:SG	2.70	0.65
1:B:145:VAL:HG21	1:B:153[A]:MET:SD	2.37	0.64
1:B:284:ASN:HB3	1:B:333:LEU:HD11	1.79	0.64
1:B:161[A]:MET:HE1	1:B:168[A]:LEU:HD22	1.83	0.61
5:A:416:EDO:O2	11:A:504:HOH:O	2.16	0.60
1:B:284:ASN:CB	1:B:333:LEU:HD11	2.31	0.59
1:A:141:ASN:O	1:B:263:LYS:HE2	2.03	0.59
1:B:179:ASP:HB3	5:B:405:EDO:H22	1.85	0.59
1:A:322:ASP:OD1	11:A:505:HOH:O	2.17	0.57
1:A:175[B]:MET:HE1	1:A:217:ALA:HB2	1.86	0.56
1:B:366:TYR:HE1	5:B:405:EDO:H12	1.69	0.56
1:A:257[B]:CYS:SG	1:A:289:PRO:HD2	2.46	0.56
1:B:197:LEU:HD22	2:B:402:GOL:H31	1.88	0.55
1:B:175[B]:MET:SD	1:B:217:ALA:HB2	2.46	0.55
1:B:161[A]:MET:CE	1:B:168[A]:LEU:HD13	2.37	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:177:TYR:CE2	1:B:185:ILE:HG21	2.43	0.54
2:B:402:GOL:O1	11:B:503:HOH:O	2.18	0.54
1:B:161[A]:MET:HE1	1:B:168[A]:LEU:HD13	1.91	0.53
11:A:684:HOH:O	6:B:416:PEG:H11	2.08	0.52
6:A:421:PEG:H12	11:A:593:HOH:O	2.09	0.52
1:A:293:ALA:HB3	5:A:417[B]:EDO:O2	2.09	0.52
1:A:168:LEU:HD11	1:A:207:PHE:CE1	2.45	0.52
1:B:263:LYS:HE3	1:B:265:ILE:HD11	1.91	0.51
1:B:168[A]:LEU:HD22	1:B:205:VAL:CG1	2.42	0.50
1:B:67:LEU:HB2	1:B:87[B]:VAL:HG12	1.93	0.48
1:A:116:LEU:HD22	1:A:153[A]:MET:SD	2.52	0.48
1:A:175[B]:MET:CE	1:A:217:ALA:HB2	2.44	0.48
1:A:175[B]:MET:SD	1:A:217:ALA:HB2	2.54	0.48
1:A:109:ALA:HA	1:A:133:THR:O	2.14	0.47
1:B:134:VAL:HG21	1:B:157:LEU:HD11	1.95	0.47
1:B:111:SER:HB2	1:B:143:ASN:O	2.14	0.47
1:B:177:TYR:CD2	1:B:185:ILE:HG21	2.50	0.47
1:A:238:LEU:HD11	1:A:369:VAL:HG11	1.97	0.46
7:B:419:P4K:C6	11:B:512:HOH:O	2.64	0.46
1:B:157:LEU:HB3	1:B:161[A]:MET:CE	2.46	0.45
1:A:368:VAL:O	1:A:372:PRO:HD3	2.16	0.45
6:B:416:PEG:O2	11:B:504:HOH:O	2.21	0.44
1:A:233:ILE:HG13	1:A:238:LEU:HB2	1.99	0.44
1:B:169:ARG:HH12	7:B:421:P4K:C4	2.31	0.43
5:B:405:EDO:H12	11:B:573:HOH:O	2.17	0.43
1:B:257[B]:CYS:SG	1:B:289:PRO:HD2	2.58	0.43
5:A:411:EDO:C1	11:A:543:HOH:O	2.67	0.43
1:B:233:ILE:HG13	1:B:238:LEU:HB2	2.01	0.42
1:B:125:ARG:HD3	11:B:510:HOH:O	2.20	0.42
1:B:157:LEU:HB3	1:B:161[A]:MET:HE2	1.99	0.42
1:A:338:GLY:O	10:A:427:TRS:N	2.52	0.42
1:A:265:ILE:HD13	1:A:285:LEU:HD11	2.01	0.42
1:B:168[A]:LEU:HD11	1:B:207:PHE:CE2	2.55	0.42
1:B:368:VAL:O	1:B:372:PRO:HD3	2.20	0.42
5:B:406:EDO:C1	11:B:631:HOH:O	2.68	0.41
1:A:359:ASP:OD2	2:A:404:GOL:H32	2.20	0.41
1:B:248:GLY:HA3	6:B:417:PEG:H11	2.03	0.41
5:A:417[B]:EDO:H21	11:B:646:HOH:O	2.19	0.41
1:A:178:ALA:O	1:A:216:SER:HB2	2.20	0.41
1:B:33:HIS:NE2	6:B:417:PEG:H41	2.36	0.41
1:A:361:VAL:CG2	1:A:363:THR:HG22	2.51	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:177:TYR:CD2	1:B:185:ILE:CG2	3.04	0.41
1:A:143:ASN:OD1	1:A:143:ASN:C	2.59	0.40
6:A:419:PEG:H42	11:A:527:HOH:O	2.21	0.40
1:B:150:PHE:CD2	1:B:196[A]:PHE:HD1	2.40	0.40
1:B:154:LEU:HD13	1:B:200:ALA:HA	2.03	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	385/387 (100%)	375 (97%)	10 (3%)	0	100	100
1	B	389/387 (100%)	377 (97%)	12 (3%)	0	100	100
All	All	774/774 (100%)	752 (97%)	22 (3%)	0	100	100

There are no Ramachandran outliers to report.

#### 5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	284/294 (97%)	282 (99%)	2 (1%)	84	72
1	B	295/294 (100%)	293 (99%)	2 (1%)	84	72
All	All	579/588 (98%)	575 (99%)	4 (1%)	91	72

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

Mol	Chain	Res	Type
1	A	365[A]	HIS
1	A	365[B]	HIS
1	B	365[A]	HIS
1	B	365[B]	HIS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	159	GLN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 52 ligands modelled in this entry, 4 are monoatomic - leaving 48 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	$\# Z  > 2$
5	EDO	A	412	-	3,3,3	0.10	0	2,2,2	0.05	0
6	PEG	A	419	-	6,6,6	0.13	0	5,5,5	0.18	0
7	P4K	A	424	-	9,9,44	0.19	0	8,8,43	0.21	0



Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	GOL	B	401	-	5,5,5	0.09	0	5,5,5	0.27	0
6	PEG	A	422	-	6,6,6	0.17	0	5,5,5	0.15	0
5	EDO	B	412	-	3,3,3	0.10	0	2,2,2	0.36	0
9	OJQ	A	426[A]	-	18,23,23	1.32	2 (11%)	22,33,33	1.24	4 (18%)
5	EDO	B	405	-	3,3,3	0.29	0	2,2,2	0.47	0
5	EDO	B	409	-	3,3,3	0.09	0	2,2,2	0.11	0
2	GOL	A	402	-	5,5,5	0.09	0	5,5,5	0.31	0
5	EDO	A	415	-	3,3,3	0.07	0	2,2,2	0.20	0
2	GOL	A	403	-	5,5,5	0.10	0	5,5,5	0.25	0
5	EDO	B	406	-	3,3,3	0.09	0	2,2,2	0.25	0
8	L7N	A	425[B]	-	21,23,23	1.26	3 (14%)	25,33,33	1.01	1 (4%)
5	EDO	A	417[A]	-	3,3,3	0.18	0	2,2,2	0.44	0
7	P4K	B	421	-	13,13,44	0.22	0	12,12,43	0.13	0
6	PEG	A	421	-	6,6,6	0.24	0	5,5,5	0.32	0
2	GOL	B	402	-	5,5,5	0.09	0	5,5,5	0.30	0
6	PEG	B	418	-	6,6,6	0.14	0	5,5,5	0.10	0
6	PEG	B	417	-	6,6,6	0.15	0	5,5,5	0.11	0
7	P4K	B	419	-	9,9,44	0.17	0	8,8,43	0.09	0
2	GOL	B	403	-	5,5,5	0.08	0	5,5,5	0.15	0
5	EDO	A	417[B]	-	3,3,3	0.23	0	2,2,2	0.44	0
7	P4K	B	420	-	12,12,44	0.20	0	11,11,43	0.18	0
5	EDO	A	418	-	3,3,3	0.11	0	2,2,2	0.37	0
9	OJQ	B	422	-	18,23,23	1.28	2 (11%)	22,33,33	1.00	2 (9%)
5	EDO	A	408	-	3,3,3	0.06	0	2,2,2	0.20	0
5	EDO	A	410	-	3,3,3	0.10	0	2,2,2	0.31	0
5	EDO	B	407	-	3,3,3	0.07	0	2,2,2	0.15	0
5	EDO	A	411	-	3,3,3	0.10	0	2,2,2	0.29	0
5	EDO	A	416	-	3,3,3	0.09	0	2,2,2	0.17	0
5	EDO	A	409	-	3,3,3	0.10	0	2,2,2	0.11	0
5	EDO	A	414	-	3,3,3	0.11	0	2,2,2	0.34	0
5	EDO	B	408	-	3,3,3	0.08	0	2,2,2	0.23	0
5	EDO	B	411	-	3,3,3	0.13	0	2,2,2	0.29	0
5	EDO	B	410	-	3,3,3	0.12	0	2,2,2	0.15	0
5	EDO	B	413	-	3,3,3	0.08	0	2,2,2	0.15	0
5	EDO	B	415[A]	-	3,3,3	0.08	0	2,2,2	0.03	0
10	TRS	A	427	-	7,7,7	0.11	0	9,9,9	0.60	0
10	TRS	B	423	-	7,7,7	0.17	0	9,9,9	0.29	0
5	EDO	A	413	-	3,3,3	0.06	0	2,2,2	0.18	0
7	P4K	A	423	-	9,9,44	0.18	0	8,8,43	0.23	0
6	PEG	A	420	-	6,6,6	0.11	0	5,5,5	0.07	0
2	GOL	A	404	-	5,5,5	0.09	0	5,5,5	0.29	0
5	EDO	B	414	-	3,3,3	0.07	0	2,2,2	0.18	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
6	PEG	B	416	-	6,6,6	0.13	0	5,5,5	0.08	0
5	EDO	B	415[B]	-	3,3,3	0.07	0	2,2,2	0.22	0
2	GOL	A	401	-	5,5,5	0.11	0	5,5,5	0.28	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
5	EDO	A	412	-	-	0/1/1/1	-
6	PEG	A	419	-	-	0/4/4/4	-
7	P4K	A	424	-	-	3/7/7/42	-
2	GOL	B	401	-	-	0/4/4/4	-
6	PEG	A	422	-	-	0/4/4/4	-
5	EDO	B	412	-	-	0/1/1/1	-
9	OJQ	A	426[A]	-	-	0/9/11/11	0/2/2/2
5	EDO	B	405	-	-	1/1/1/1	-
5	EDO	B	409	-	-	0/1/1/1	-
2	GOL	A	402	-	-	2/4/4/4	-
5	EDO	A	415	-	-	0/1/1/1	-
2	GOL	A	403	-	-	0/4/4/4	-
5	EDO	B	406	-	-	1/1/1/1	-
8	L7N	A	425[B]	-	-	3/10/21/21	0/2/2/2
5	EDO	A	417[A]	-	-	0/1/1/1	-
7	P4K	B	421	-	-	4/11/11/42	-
6	PEG	A	421	-	-	0/4/4/4	-
2	GOL	B	402	-	-	0/4/4/4	-
6	PEG	B	418	-	-	2/4/4/4	-
6	PEG	B	417	-	-	2/4/4/4	-
7	P4K	B	419	-	-	0/7/7/42	-
2	GOL	B	403	-	-	0/4/4/4	-
5	EDO	A	417[B]	-	-	0/1/1/1	-
7	P4K	B	420	-	-	3/10/10/42	-
5	EDO	A	418	-	-	1/1/1/1	-
9	OJQ	B	422	-	-	2/9/11/11	0/2/2/2
5	EDO	A	408	-	-	0/1/1/1	-
5	EDO	A	410	-	-	0/1/1/1	-
5	EDO	B	407	-	-	0/1/1/1	-
5	EDO	A	411	-	-	1/1/1/1	-
5	EDO	A	416	-	-	0/1/1/1	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	EDO	A	409	-	-	0/1/1/1	-
5	EDO	A	414	-	-	0/1/1/1	-
5	EDO	B	408	-	-	0/1/1/1	-
5	EDO	B	411	-	-	0/1/1/1	-
5	EDO	B	410	-	-	0/1/1/1	-
5	EDO	B	413	-	-	0/1/1/1	-
5	EDO	B	415[A]	-	-	0/1/1/1	-
10	TRS	A	427	-	-	6/9/9/9	-
10	TRS	B	423	-	-	3/9/9/9	-
5	EDO	A	413	-	-	0/1/1/1	-
7	P4K	A	423	-	-	2/7/7/42	-
6	PEG	A	420	-	-	0/4/4/4	-
2	GOL	A	404	-	-	4/4/4/4	-
5	EDO	B	414	-	-	0/1/1/1	-
6	PEG	B	416	-	-	1/4/4/4	-
5	EDO	B	415[B]	-	-	0/1/1/1	-
2	GOL	A	401	-	-	0/4/4/4	-

All (7) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
9	A	426[A]	OJQ	O-C	3.69	1.46	1.29
9	B	422	OJQ	O-C	3.46	1.45	1.29
8	A	425[B]	L7N	C4A-N	3.38	1.33	1.27
9	B	422	OJQ	C3-C2	-2.87	1.38	1.40
8	A	425[B]	L7N	C4-C5	-2.45	1.38	1.42
8	A	425[B]	L7N	C3-C2	-2.09	1.38	1.40
9	A	426[A]	OJQ	CA-N	2.05	1.43	1.37

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
9	A	426[A]	OJQ	C5-C6-N1	-2.38	119.86	123.82
9	B	422	OJQ	C4A-N-CA	-2.30	116.08	121.97
9	A	426[A]	OJQ	C4A-N-CA	-2.30	116.10	121.97
8	A	425[B]	L7N	CA-N-C4A	2.29	120.62	117.31
9	A	426[A]	OJQ	C6-C5-C4	2.25	119.71	118.12
9	A	426[A]	OJQ	C4A-C4-C5	2.13	122.08	119.71
9	B	422	OJQ	C5-C6-N1	-2.10	120.33	123.82

There are no chirality outliers.

All (41) torsion outliers are listed below:

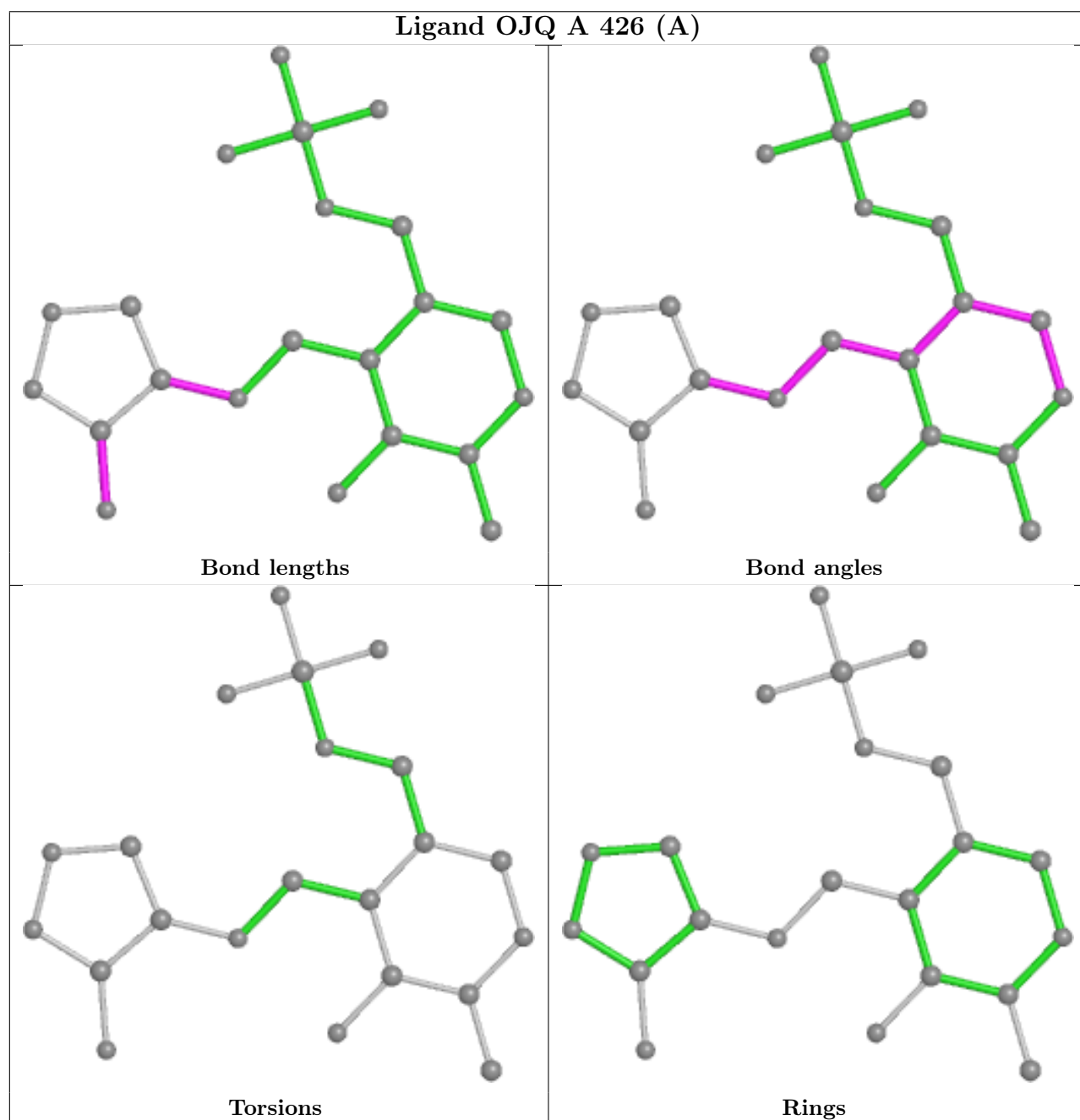
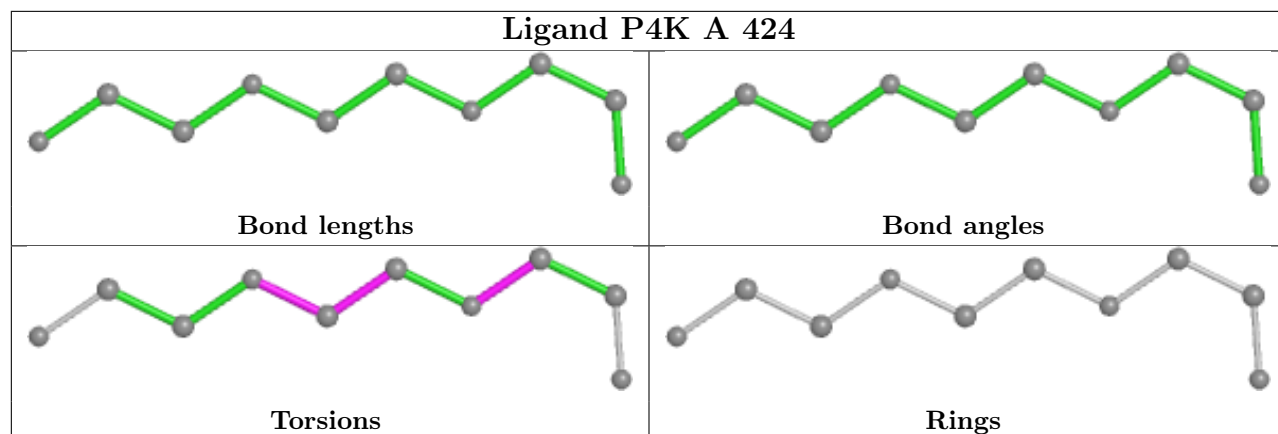
Mol	Chain	Res	Type	Atoms
8	A	425[B]	L7N	CB-CA-N-C4A
9	B	422	OJQ	C3-C4-C4A-N
9	B	422	OJQ	C5-C4-C4A-N
10	A	427	TRS	C2-C-C1-O1
10	A	427	TRS	N-C-C1-O1
10	B	423	TRS	C1-C-C2-O2
10	B	423	TRS	C3-C-C2-O2
10	B	423	TRS	N-C-C2-O2
7	B	420	P4K	O2-C3-C4-O3
7	B	420	P4K	O3-C5-C6-O4
6	B	418	PEG	C1-C2-O2-C3
2	A	402	GOL	O1-C1-C2-C3
2	A	404	GOL	O1-C1-C2-C3
2	A	404	GOL	C1-C2-C3-O3
10	A	427	TRS	C3-C-C1-O1
10	A	427	TRS	C1-C-C3-O3
7	A	424	P4K	O2-C3-C4-O3
7	A	424	P4K	C3-C4-O3-C5
2	A	402	GOL	O1-C1-C2-O2
8	A	425[B]	L7N	C3-C4-C4A-N
5	A	411	EDO	O1-C1-C2-O2
5	B	405	EDO	O1-C1-C2-O2
7	A	424	P4K	C1-C2-O2-C3
6	B	416	PEG	C1-C2-O2-C3
7	B	421	P4K	C3-C4-O3-C5
2	A	404	GOL	O1-C1-C2-O2
10	A	427	TRS	N-C-C3-O3
6	B	418	PEG	O2-C3-C4-O4
6	B	417	PEG	C1-C2-O2-C3
2	A	404	GOL	O2-C2-C3-O3
5	B	406	EDO	O1-C1-C2-O2
7	B	421	P4K	O3-C5-C6-O4
10	A	427	TRS	C2-C-C3-O3
7	B	420	P4K	C3-C4-O3-C5
5	A	418	EDO	O1-C1-C2-O2
7	B	421	P4K	C6-C5-O3-C4
8	A	425[B]	L7N	C5-C4-C4A-N
7	A	423	P4K	C3-C4-O3-C5
7	B	421	P4K	O2-C3-C4-O3
6	B	417	PEG	O2-C3-C4-O4
7	A	423	P4K	O2-C3-C4-O3

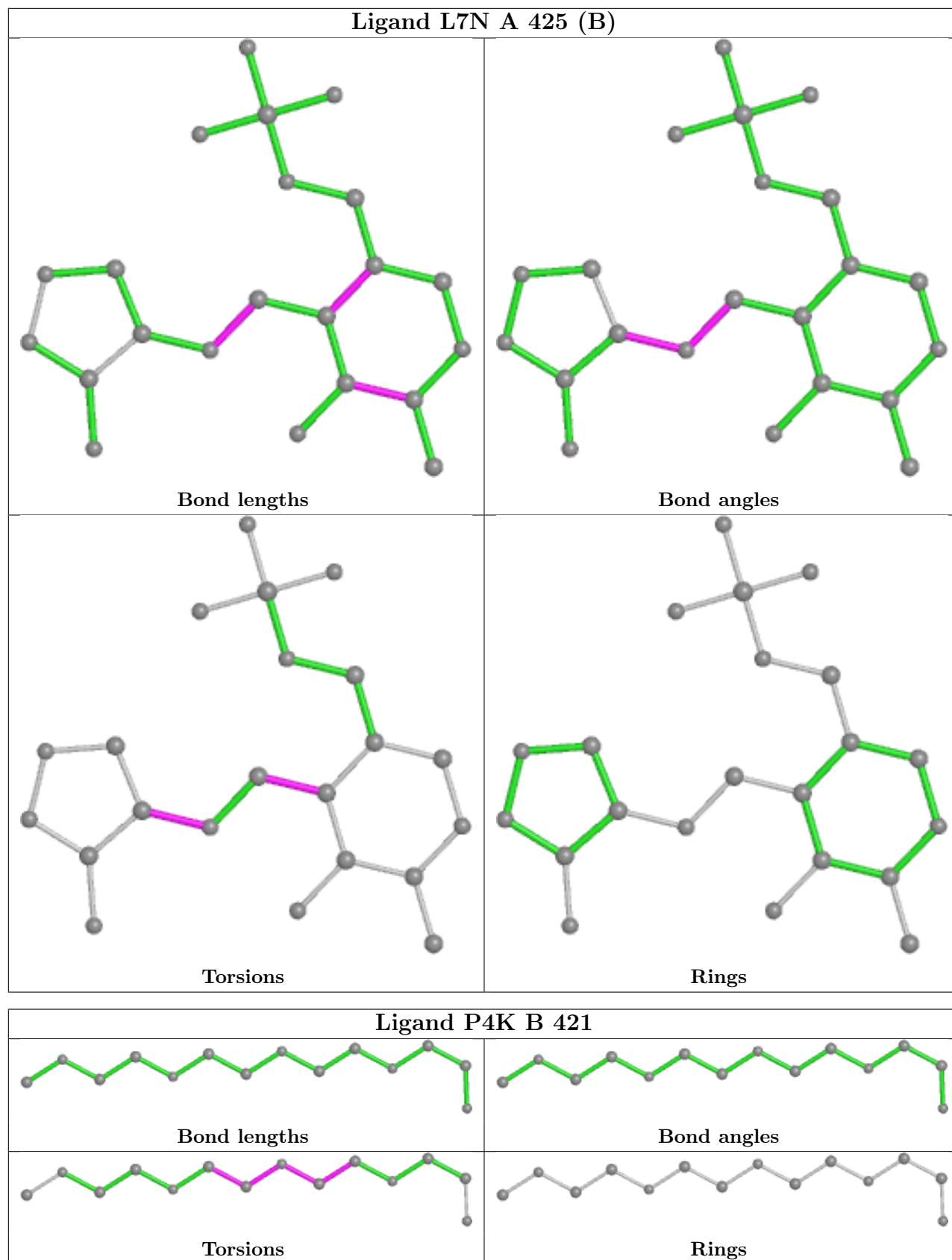
There are no ring outliers.

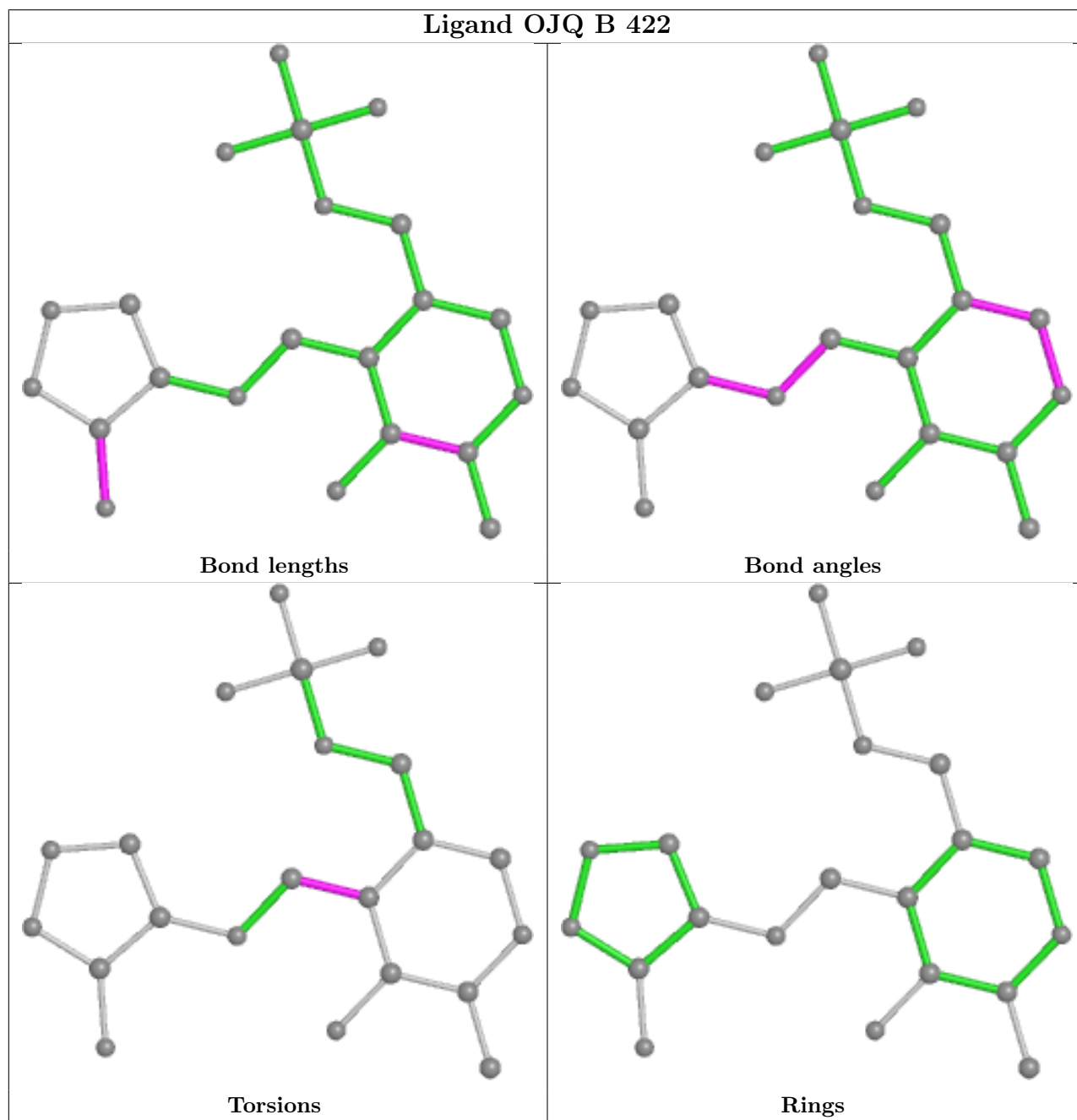
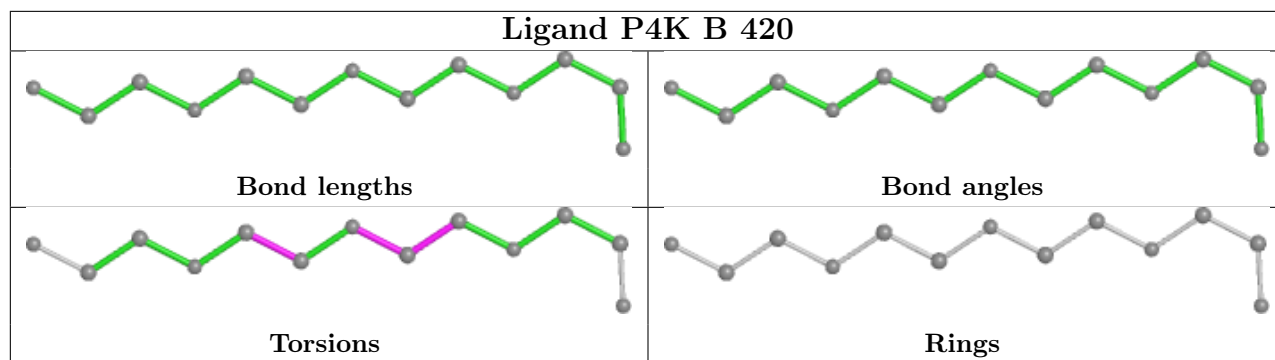
18 monomers are involved in 24 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	A	419	PEG	1	0
5	B	405	EDO	3	0
2	A	402	GOL	1	0
5	A	415	EDO	1	0
5	B	406	EDO	1	0
7	B	421	P4K	1	0
6	A	421	PEG	1	0
2	B	402	GOL	2	0
6	B	417	PEG	2	0
7	B	419	P4K	1	0
5	A	417[B]	EDO	2	0
5	A	410	EDO	1	0
5	A	411	EDO	1	0
5	A	416	EDO	1	0
5	A	409	EDO	1	0
10	A	427	TRS	1	0
2	A	404	GOL	1	0
6	B	416	PEG	2	0

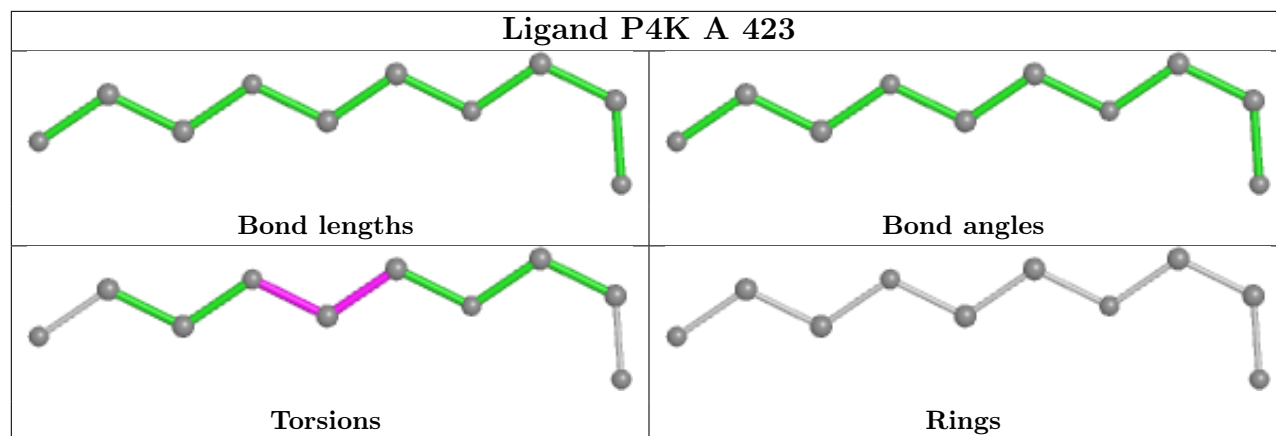
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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











## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

## 6 Fit of model and data [i](#)

### 6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	373/387 (96%)	-0.20	4 (1%) 80 82	17, 26, 40, 57	1 (0%)
1	B	371/387 (95%)	-0.30	8 (2%) 62 63	16, 25, 43, 49	2 (0%)
All	All	744/774 (96%)	-0.25	12 (1%) 72 74	16, 25, 40, 57	3 (0%)

All (12) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	12	LEU	3.5
1	A	63	GLY	3.4
1	B	273	TYR	3.2
1	B	271	VAL	2.9
1	B	332	PRO	2.9
1	A	11	GLY	2.9
1	B	275	HIS	2.9
1	B	265	ILE	2.7
1	B	333	LEU	2.7
1	A	177	TYR	2.4
1	B	276	THR	2.4
1	B	36[A]	HIS	2.1

### 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 monosaccharides 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<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
7	P4K	B	421	14/45	0.32	0.36	65,78,80,80	0
5	EDO	A	414	4/4	0.50	0.17	60,72,75,75	0
7	P4K	A	423	10/45	0.58	0.27	80,97,98,98	0
10	TRS	B	423	8/8	0.59	0.22	39,50,55,57	20
5	EDO	A	418	4/4	0.63	0.18	46,55,56,56	10
7	P4K	B	420	13/45	0.63	0.28	43,53,57,57	30
5	EDO	A	408	4/4	0.65	0.15	62,75,80,80	0
7	P4K	A	424	10/45	0.66	0.30	64,77,84,85	0
6	PEG	B	416	7/7	0.66	0.27	68,82,82,83	0
2	GOL	B	402	6/6	0.70	0.17	47,57,59,60	14
10	TRS	A	427	8/8	0.71	0.22	32,41,47,49	20
5	EDO	A	415	4/4	0.73	0.17	64,77,77,78	0
7	P4K	B	419	10/45	0.74	0.36	51,63,65,65	0
6	PEG	A	422	7/7	0.75	0.17	61,73,78,79	0
2	GOL	B	403	6/6	0.77	0.20	41,49,53,55	14
5	EDO	B	413	4/4	0.78	0.22	56,67,68,69	0
6	PEG	B	417	7/7	0.78	0.29	54,65,67,67	17
5	EDO	A	413	4/4	0.78	0.18	67,81,81,81	0
5	EDO	B	414	4/4	0.80	0.22	63,76,79,81	0
5	EDO	B	415[A]	4/4	0.81	0.14	31,42,47,50	4
5	EDO	B	415[B]	4/4	0.81	0.14	29,42,47,50	4
2	GOL	A	403	6/6	0.81	0.21	63,75,79,79	14
2	GOL	A	402	6/6	0.81	0.12	61,73,73,74	0
5	EDO	A	411	4/4	0.82	0.15	42,50,56,58	10
6	PEG	A	419	7/7	0.82	0.27	57,69,75,76	17
5	EDO	A	409	4/4	0.83	0.15	46,55,56,58	10
6	PEG	A	420	7/7	0.83	0.17	68,81,83,83	0
6	PEG	A	421	7/7	0.83	0.15	26,40,49,49	17
5	EDO	B	408	4/4	0.83	0.11	48,58,59,60	0
5	EDO	B	409	4/4	0.83	0.34	56,68,69,70	10
5	EDO	B	412	4/4	0.83	0.24	44,52,53,55	10
6	PEG	B	418	7/7	0.83	0.27	51,61,62,62	17
5	EDO	B	411	4/4	0.84	0.21	33,41,47,50	10
5	EDO	B	405	4/4	0.84	0.23	26,32,34,38	10
5	EDO	A	410	4/4	0.85	0.32	50,60,62,62	10
2	GOL	A	401	6/6	0.86	0.13	30,39,47,51	0
5	EDO	B	407	4/4	0.86	0.09	63,75,76,77	0

*Continued on next page...*

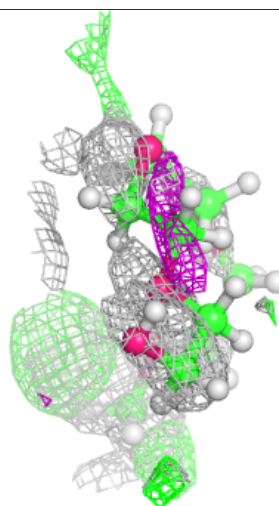
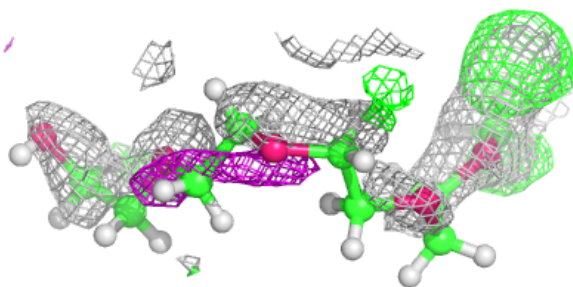
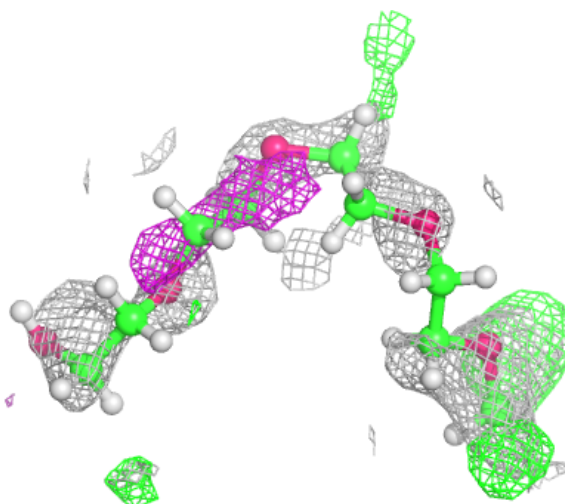
*Continued from previous page...*

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
2	GOL	B	401	6/6	0.87	0.10	50,60,64,66	0
5	EDO	A	412	4/4	0.87	0.23	53,63,64,65	0
2	GOL	A	404	6/6	0.87	0.21	61,73,74,74	0
5	EDO	A	416	4/4	0.90	0.14	43,52,58,62	10
5	EDO	B	410	4/4	0.91	0.12	46,56,58,59	10
5	EDO	A	417[A]	4/4	0.93	0.18	28,34,38,38	4
5	EDO	A	417[B]	4/4	0.93	0.18	27,33,38,38	4
5	EDO	B	406	4/4	0.95	0.20	36,43,44,44	10
8	L7N	A	425[B]	22/22	0.97	0.11	27,28,34,34	34
9	OJQ	A	426[A]	22/22	0.97	0.11	21,26,38,44	0
9	OJQ	B	422	22/22	0.98	0.08	18,23,29,31	0
4	CL	B	404	1/1	0.99	0.05	31,31,31,31	0
3	CA	A	405	1/1	1.00	0.03	31,31,31,31	1
4	CL	A	406	1/1	1.00	0.07	27,27,27,27	0
4	CL	A	407	1/1	1.00	0.07	28,28,28,28	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.

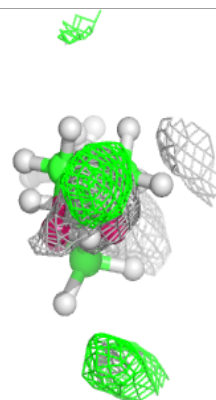
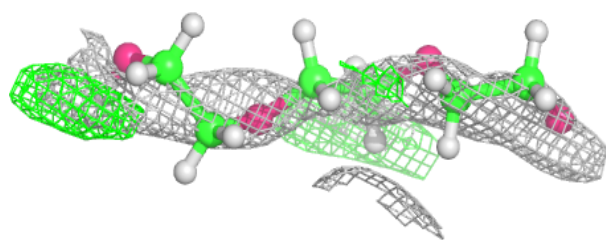
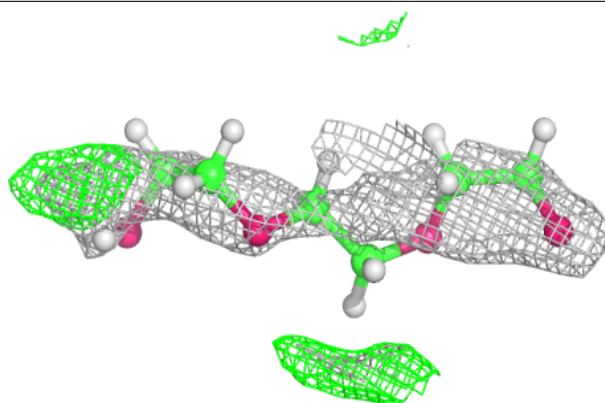
**Electron density around P4K B 421:**

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

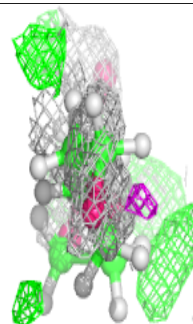
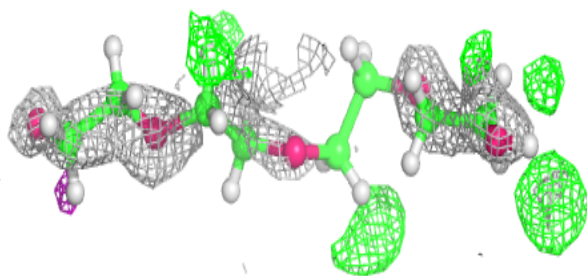
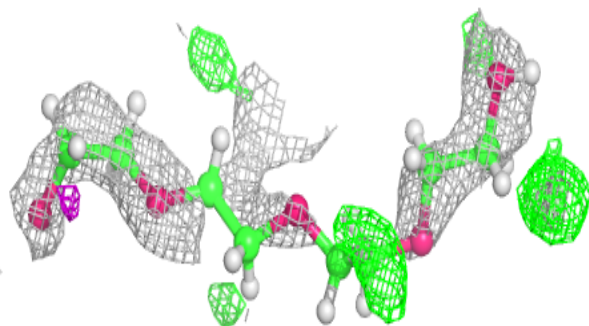


**Electron density around P4K A 423:**

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

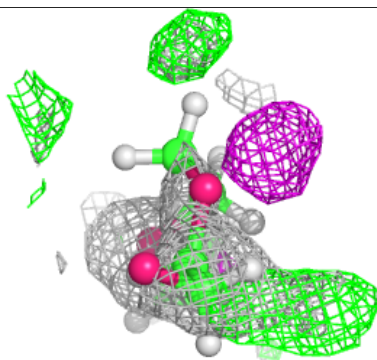
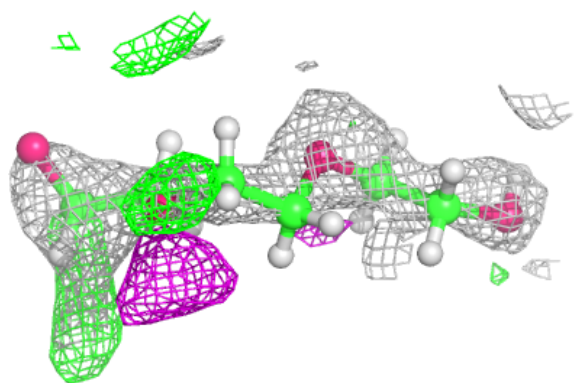
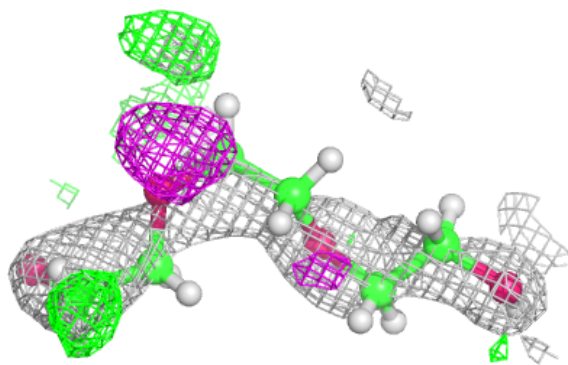
**Electron density around P4K B 420:**

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



**Electron density around P4K A 424:**

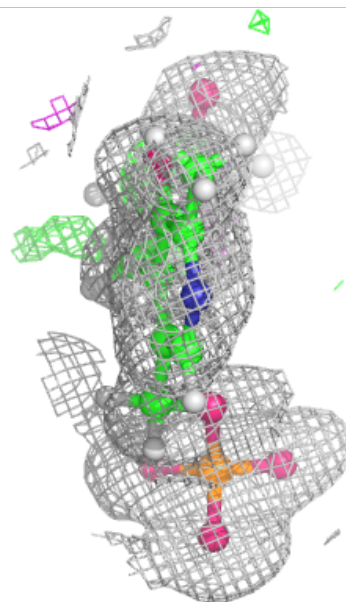
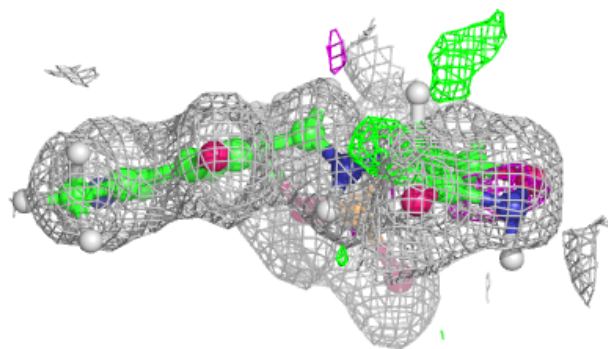
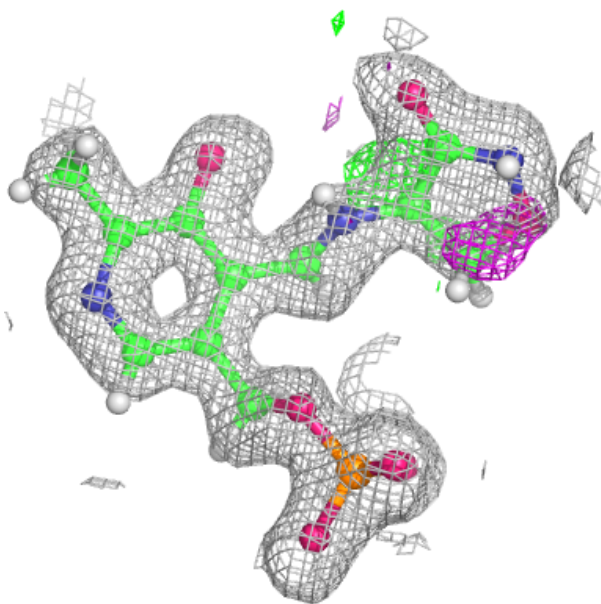
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)





**Electron density around L7N A 425 (B):**

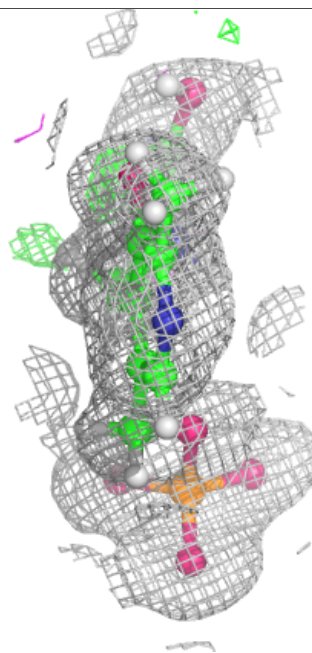
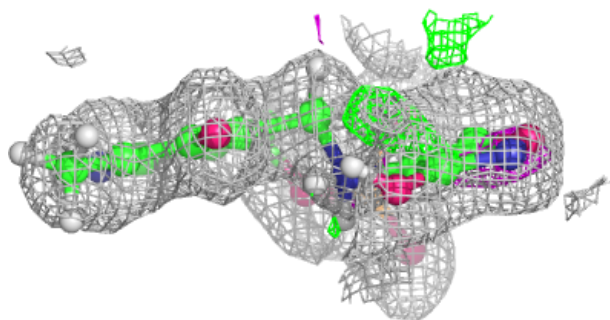
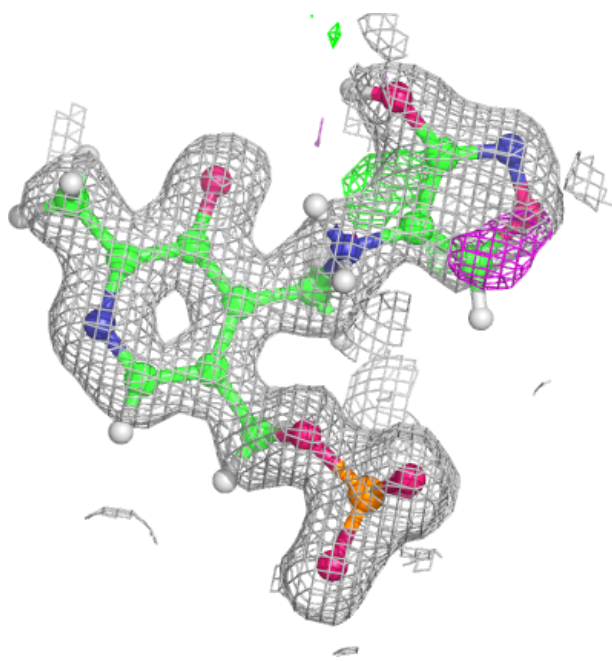
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

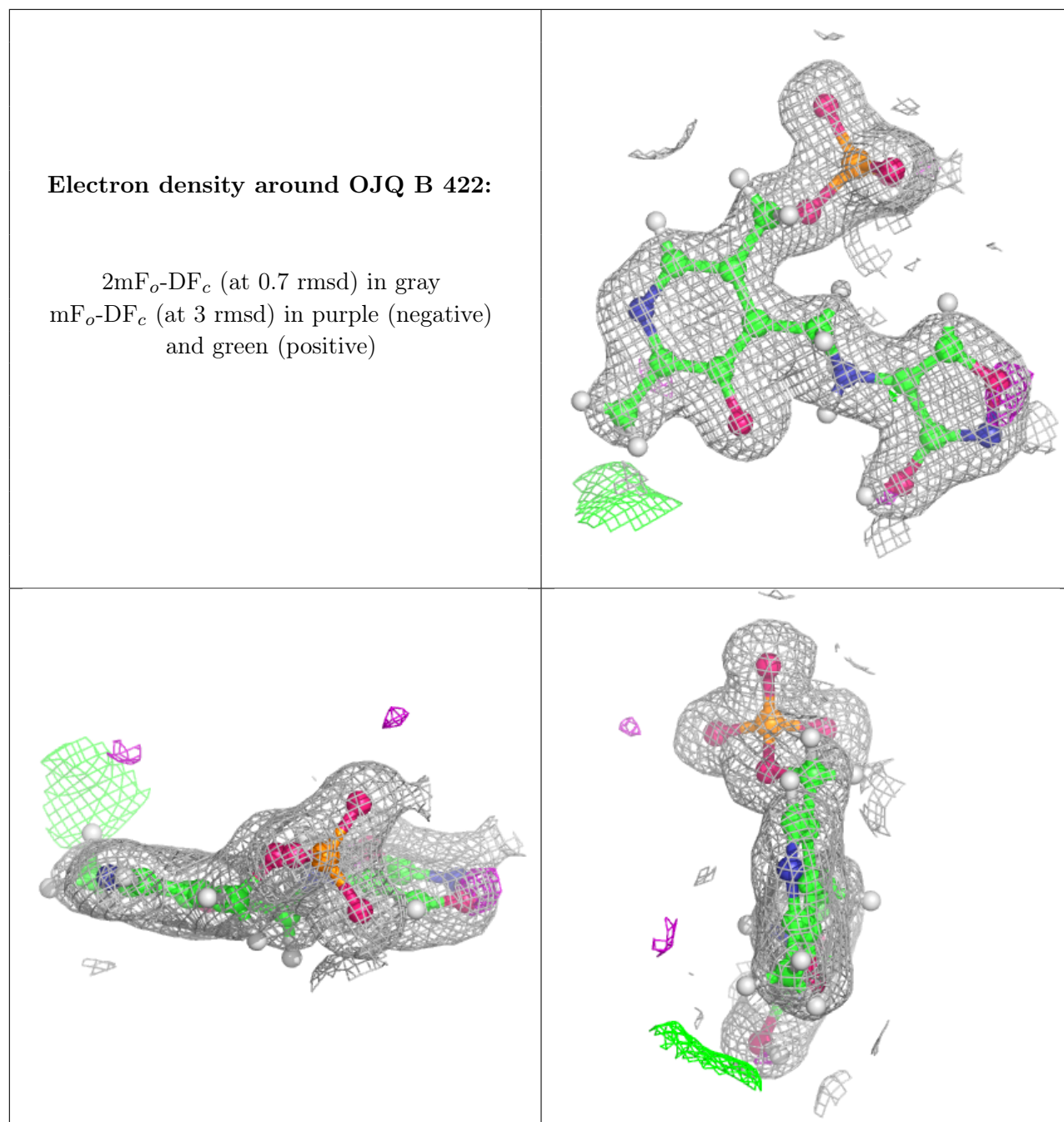




**Electron density around OJQ A 426 (A):**

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





## 6.5 Other polymers [i](#)

There are no such residues in this entry.