



# Full wwPDB X-ray Structure Validation Report ⓘ

Oct 15, 2023 – 02:56 AM EDT

PDB ID : 7UYY  
Title : The crystal structure of the Pseudomonas aeruginosa aldehyde dehydrogenase encoded by the PA4189 gene in complex with NADH  
Authors : Gonzalez-Segura, L.; Juarez-Vazquez, A.L.; Munoz-Clares, R.A.  
Deposited on : 2022-05-07  
Resolution : 2.70 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 : 1.8.5 (274361), 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

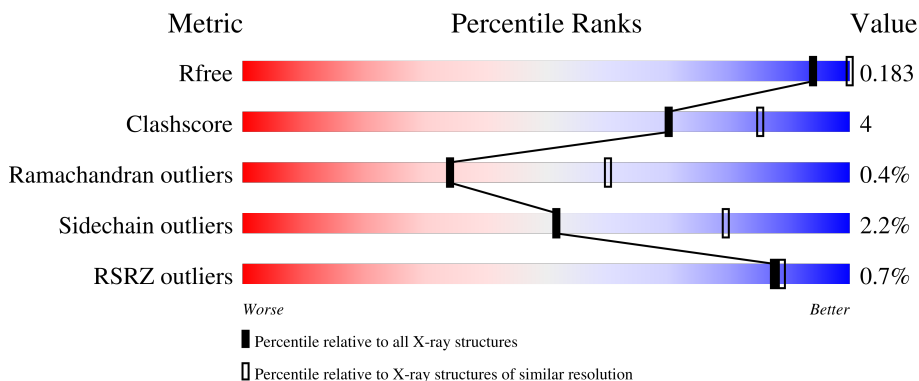
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.70 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	2808 (2.70-2.70)
Clashscore	141614	3122 (2.70-2.70)
Ramachandran outliers	138981	3069 (2.70-2.70)
Sidechain outliers	138945	3069 (2.70-2.70)
RSRZ outliers	127900	2737 (2.70-2.70)

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	514	 89% 8% .
1	B	514	 86% 10% .

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	B	506	-	-	X	-

## 2 Entry composition [i](#)

There are 8 unique types of molecules in this entry. The entry contains 8377 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 Aldehyde dehydrogenase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	496	3777	2374	673	714	16	0	3	0
1	B	496	3810	2393	685	716	16	0	6	0

There are 36 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-17	MET	-	initiating methionine	UNP Q9HWJ2
A	-16	GLY	-	expression tag	UNP Q9HWJ2
A	-15	SER	-	expression tag	UNP Q9HWJ2
A	-14	SER	-	expression tag	UNP Q9HWJ2
A	-13	HIS	-	expression tag	UNP Q9HWJ2
A	-12	HIS	-	expression tag	UNP Q9HWJ2
A	-11	HIS	-	expression tag	UNP Q9HWJ2
A	-10	HIS	-	expression tag	UNP Q9HWJ2
A	-9	HIS	-	expression tag	UNP Q9HWJ2
A	-8	HIS	-	expression tag	UNP Q9HWJ2
A	-7	SER	-	expression tag	UNP Q9HWJ2
A	-6	SER	-	expression tag	UNP Q9HWJ2
A	-5	GLY	-	expression tag	UNP Q9HWJ2
A	-4	LEU	-	expression tag	UNP Q9HWJ2
A	-3	VAL	-	expression tag	UNP Q9HWJ2
A	-2	PRO	-	expression tag	UNP Q9HWJ2
A	-1	ARG	-	expression tag	UNP Q9HWJ2
A	0	GLY	-	expression tag	UNP Q9HWJ2
B	-17	MET	-	initiating methionine	UNP Q9HWJ2
B	-16	GLY	-	expression tag	UNP Q9HWJ2
B	-15	SER	-	expression tag	UNP Q9HWJ2
B	-14	SER	-	expression tag	UNP Q9HWJ2
B	-13	HIS	-	expression tag	UNP Q9HWJ2
B	-12	HIS	-	expression tag	UNP Q9HWJ2
B	-11	HIS	-	expression tag	UNP Q9HWJ2

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
3	B	1	44	21	7	14	2	0	0

- Molecule 4 is GLYCEROL (three-letter code: GOL) (formula: C<sub>3</sub>H<sub>8</sub>O<sub>3</sub>).



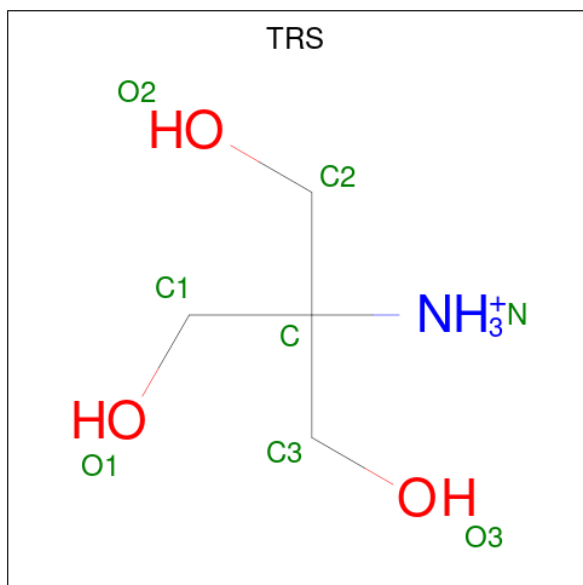
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			6	3	3		
4	A	1	Total	C	O	0	0
			6	3	3		
4	A	1	Total	C	O	0	0
			6	3	3		
4	A	1	Total	C	O	0	0
			6	3	3		
4	A	1	Total	C	O	0	0
			6	3	3		
4	A	1	Total	C	O	0	0
			6	3	3		
4	A	1	Total	C	O	0	0
			6	3	3		
4	B	1	Total	C	O	0	0
			6	3	3		
4	B	1	Total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

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

- Molecule 5 is 2-AMINO-2-HYDROXYMETHYL-PROPANE-1,3-DIOL (three-letter code: TRS) (formula: C<sub>4</sub>H<sub>12</sub>NO<sub>3</sub>).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
5	A	1	8	4	1	3	0	0
5	B	1	8	4	1	3	0	0

- Molecule 6 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
6	A	1	Total C O 4 2 2	0	0
6	A	1	Total C O 4 2 2	0	0
6	A	1	Total C O 4 2 2	0	0
6	A	1	Total C O 4 2 2	0	0
6	A	1	Total C O 4 2 2	0	0
6	A	1	Total C O 4 2 2	0	0
6	A	1	Total C O 4 2 2	0	0
6	A	1	Total C O 4 2 2	0	0
6	A	1	Total C O 4 2 2	0	0
6	A	1	Total C O 4 2 2	0	0
6	B	1	Total C O 4 2 2	0	0
6	B	1	Total C O 4 2 2	0	0
6	B	1	Total C O 4 2 2	0	0
6	B	1	Total C O 4 2 2	0	0

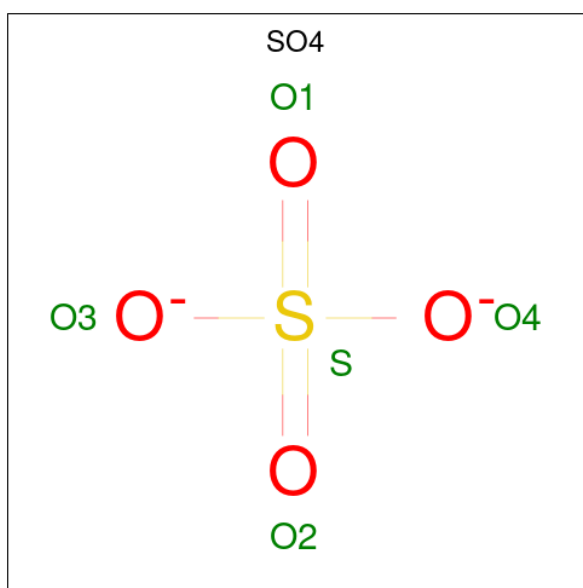
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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	B	1	Total	C	O	0	0
			4	2	2		
6	B	1	Total	C	O	0	0
			4	2	2		
6	B	1	Total	C	O	0	0
			4	2	2		
6	B	1	Total	C	O	0	0
			4	2	2		

- Molecule 7 is SULFATE ION (three-letter code: SO4) (formula: O<sub>4</sub>S).



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

- Molecule 8 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	279	Total	O	0	0
			279	279		
8	B	249	Total	O	0	0
			249	249		



## 4 Data and refinement statistics

Property	Value	Source
Space group	H 3 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	184.52Å 184.52Å 251.14Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	47.92 – 2.70 47.92 – 2.70	Depositor EDS
% Data completeness (in resolution range)	99.9 (47.92-2.70) 99.9 (47.92-2.70)	Depositor EDS
$R_{merge}$	0.11	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3.85 (at 2.69Å)	Xtrriage
Refinement program	PHENIX 1.20.1_4487	Depositor
R, $R_{free}$	0.135 , 0.181 0.136 , 0.183	Depositor DCC
$R_{free}$ test set	2271 reflections (5.05%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	30.7	Xtrriage
Anisotropy	0.156	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.37 , 60.9	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.34$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	8377	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	28.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.74% 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 [i](#)

### 5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: TRS, GOL, K, EDO, NAI, 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	0.40	0/3853	0.63	0/5237
1	B	0.37	0/3886	0.61	0/5279
All	All	0.39	0/7739	0.62	0/10516

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 [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3777	0	3742	27	0
1	B	3810	0	3780	30	0
2	A	3	0	0	0	0
2	B	3	0	0	0	0
3	A	44	0	27	1	0
3	B	44	0	27	1	0
4	A	48	0	64	5	0
4	B	18	0	24	6	0
5	A	8	0	12	0	0
5	B	8	0	12	0	0
6	A	40	0	60	4	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	B	36	0	54	4	0
7	A	5	0	0	0	0
7	B	5	0	0	0	0
8	A	279	0	0	3	0
8	B	249	0	0	3	0
All	All	8377	0	7802	57	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 (57) 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:B:226:ARG:H	4:B:506:GOL:H11	1.51	0.76
1:A:30:ARG:HH21	6:A:515:EDO:H21	1.53	0.73
1:A:156:ARG:HE	4:A:510:GOL:H31	1.57	0.69
1:B:2:THR:HG23	1:B:118:GLN:HE21	1.55	0.69
1:B:226:ARG:HH21	4:B:506:GOL:H2	1.56	0.69
1:A:141:ASP:OD1	4:A:510:GOL:H32	1.97	0.63
1:B:226:ARG:N	4:B:506:GOL:H11	2.15	0.62
1:A:302:ASN:HB3	1:A:305:ALA:HB2	1.83	0.59
1:B:393:ARG:HD2	1:B:397:GLU:OE1	2.04	0.57
1:A:362:ARG:NH1	8:A:602:HOH:O	2.35	0.57
1:A:156:ARG:NE	4:A:510:GOL:H31	2.20	0.55
1:A:371:GLY:HA2	1:A:381:GLU:OE2	2.05	0.55
1:A:495:ALA:HA	8:A:828:HOH:O	2.07	0.55
1:B:495:ALA:HA	4:B:507:GOL:O3	2.08	0.54
1:B:226:ARG:HE	4:B:506:GOL:H12	1.71	0.54
1:A:30:ARG:HH21	6:A:515:EDO:C2	2.20	0.52
1:B:246:SER:HB3	3:B:504:NAI:O4D	2.09	0.52
1:B:21:GLN:HG2	1:B:50:ALA:HB1	1.91	0.52
1:A:225:GLY:H	4:A:507:GOL:H2	1.75	0.52
1:B:477:LYS:HD2	6:B:511:EDO:H12	1.90	0.52
1:B:128:THR:HG23	6:B:511:EDO:H22	1.92	0.51
1:B:30:ARG:HH12	4:B:505:GOL:H32	1.74	0.51
1:B:465:GLY:HA3	1:B:475:ARG:HD3	1.91	0.51
1:B:390:PRO:HA	1:B:395:PHE:CD2	2.45	0.51
1:B:310:ILE:HD13	1:B:418:LEU:HB3	1.94	0.48
1:A:353:LYS:NZ	3:A:504:NAI:O2D	2.47	0.47
1:A:30:ARG:HE	6:A:515:EDO:H11	1.80	0.47
1:B:302:ASN:HB3	1:B:305:ALA:HB2	1.97	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:457:GLU:OE2	6:A:519:EDO:H21	2.15	0.47
1:B:7:ARG:NE	1:B:334:ASP:OD2	2.47	0.46
1:B:47:GLU:HG2	8:B:788:HOH:O	2.14	0.46
1:B:221:VAL:HG12	1:B:221:VAL:O	2.15	0.46
1:B:90:ARG:NH1	1:B:211:ALA:O	2.44	0.46
1:A:440:ARG:HD2	1:A:444:GLU:OE2	2.16	0.46
1:B:446:ARG:NH1	8:B:605:HOH:O	2.45	0.46
1:B:369:ARG:NH1	8:B:602:HOH:O	2.38	0.45
4:A:509:GOL:H11	1:B:492:TRP:CE2	2.52	0.45
1:B:245:GLY:O	1:B:269:CYS:HA	2.17	0.44
1:A:358:LEU:HB3	1:A:362:ARG:NH1	2.32	0.44
1:A:245:GLY:O	1:A:269:CYS:HA	2.18	0.44
1:B:386:ASP:OD1	1:B:387:GLY:N	2.47	0.44
1:A:7:ARG:NH1	1:A:11:ALA:HB2	2.33	0.43
1:B:234:ARG:HD2	6:B:512:EDO:H22	2.00	0.43
1:A:227:GLU:HB2	8:A:734:HOH:O	2.18	0.43
1:B:164:LEU:HD22	1:B:178:LYS:HB3	2.00	0.43
1:B:457:GLU:OE2	6:B:515:EDO:H11	2.19	0.42
1:A:7:ARG:HH11	1:A:11:ALA:HB2	1.84	0.42
1:B:244:THR:HA	1:B:268:GLU:O	2.19	0.42
1:A:94:LEU:HD23	1:A:94:LEU:HA	1.84	0.42
1:A:442:SER:HA	1:A:450:VAL:HG11	2.02	0.42
1:A:5:LEU:HD11	1:A:100:LEU:HD13	2.02	0.42
1:A:329:GLU:OE1	1:A:329:GLU:HA	2.21	0.41
1:A:393:ARG:HG2	1:A:397:GLU:OE2	2.21	0.41
1:A:2[A]:THR:HG22	1:A:118:GLN:NE2	2.36	0.41
1:A:177:TRP:CZ2	1:A:477:LYS:HD3	2.56	0.40
1:A:390:PRO:HA	1:A:395:PHE:CD1	2.56	0.40
1:B:55:CYS:HB3	1:B:59:ASP:HB2	2.04	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	497/514 (97%)	480 (97%)	15 (3%)	2 (0%)	34	60
1	B	500/514 (97%)	479 (96%)	19 (4%)	2 (0%)	34	60
All	All	997/1028 (97%)	959 (96%)	34 (3%)	4 (0%)	34	60

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	378	ILE
1	B	378	ILE
1	B	425	GLY
1	A	425	GLY

### 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	389/401 (97%)	383 (98%)	6 (2%)	65	86
1	B	392/401 (98%)	378 (96%)	14 (4%)	35	64
All	All	781/802 (97%)	761 (97%)	20 (3%)	52	75

All (20) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	7	ARG
1	A	192	LYS
1	A	218	PHE
1	A	365	ARG
1	A	389	SER
1	A	400	PHE
1	B	7	ARG
1	B	18	ASP
1	B	189[A]	VAL
1	B	189[B]	VAL
1	B	192	LYS
1	B	209	SER

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Mol	Chain	Res	Type
1	B	218	PHE
1	B	303[A]	CYS
1	B	303[B]	CYS
1	B	316[A]	ARG
1	B	316[B]	ARG
1	B	400	PHE
1	B	408	SER
1	B	442	SER

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

Mol	Chain	Res	Type
1	B	289	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 42 ligands modelled in this entry, 6 are monoatomic - leaving 36 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
4	GOL	A	506	-	5,5,5	1.09	0	5,5,5	1.04	0
4	GOL	A	510	-	5,5,5	0.74	0	5,5,5	0.98	0
5	TRS	A	513	-	7,7,7	0.35	0	9,9,9	0.57	0
6	EDO	B	517	-	3,3,3	0.48	0	2,2,2	0.37	0
6	EDO	A	515	-	3,3,3	0.56	0	2,2,2	0.10	0
6	EDO	B	514	-	3,3,3	0.40	0	2,2,2	0.60	0
6	EDO	B	516	-	3,3,3	0.48	0	2,2,2	0.49	0
6	EDO	B	513	-	3,3,3	0.49	0	2,2,2	0.33	0
6	EDO	B	509	-	3,3,3	0.34	0	2,2,2	0.70	0
6	EDO	A	523	-	3,3,3	0.43	0	2,2,2	0.39	0
6	EDO	B	512	-	3,3,3	0.43	0	2,2,2	0.39	0
7	SO4	A	524	-	4,4,4	0.13	0	6,6,6	0.09	0
5	TRS	B	508	-	7,7,7	0.25	0	9,9,9	0.44	0
4	GOL	B	507	-	5,5,5	0.89	0	5,5,5	1.07	0
4	GOL	A	511	-	5,5,5	0.86	0	5,5,5	0.93	0
4	GOL	B	506	-	5,5,5	1.14	1 (20%)	5,5,5	0.81	0
6	EDO	B	515	-	3,3,3	0.47	0	2,2,2	0.23	0
6	EDO	A	520	-	3,3,3	0.39	0	2,2,2	0.51	0
7	SO4	B	518	-	4,4,4	0.19	0	6,6,6	0.27	0
6	EDO	A	518	-	3,3,3	0.40	0	2,2,2	0.50	0
3	NAI	B	504	-	42,48,48	0.50	0	47,73,73	0.68	2 (4%)
4	GOL	A	507	-	5,5,5	1.03	0	5,5,5	1.17	0
4	GOL	A	509	-	5,5,5	0.87	0	5,5,5	0.82	0
4	GOL	A	512	-	5,5,5	1.11	0	5,5,5	0.94	0
6	EDO	A	514	-	3,3,3	0.44	0	2,2,2	0.44	0
4	GOL	A	508	-	5,5,5	0.71	0	5,5,5	1.23	1 (20%)
6	EDO	A	521	-	3,3,3	0.55	0	2,2,2	0.06	0
4	GOL	B	505	-	5,5,5	0.92	0	5,5,5	1.11	0
6	EDO	A	522	-	3,3,3	0.44	0	2,2,2	0.54	0
6	EDO	B	510	-	3,3,3	0.43	0	2,2,2	0.52	0
3	NAI	A	504	-	42,48,48	0.48	0	47,73,73	0.65	1 (2%)
6	EDO	B	511	-	3,3,3	0.50	0	2,2,2	0.18	0
6	EDO	A	517	-	3,3,3	0.45	0	2,2,2	0.42	0
6	EDO	A	516	-	3,3,3	0.41	0	2,2,2	0.43	0
6	EDO	A	519	-	3,3,3	0.52	0	2,2,2	0.11	0
4	GOL	A	505	-	5,5,5	0.92	0	5,5,5	1.03	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	506	-	-	2/4/4/4	-
4	GOL	A	510	-	-	4/4/4/4	-
5	TRS	A	513	-	-	2/9/9/9	-
6	EDO	B	517	-	-	0/1/1/1	-
6	EDO	A	515	-	-	1/1/1/1	-
6	EDO	B	514	-	-	1/1/1/1	-
6	EDO	B	516	-	-	0/1/1/1	-
6	EDO	B	513	-	-	1/1/1/1	-
6	EDO	B	509	-	-	1/1/1/1	-
6	EDO	A	523	-	-	0/1/1/1	-
6	EDO	B	512	-	-	0/1/1/1	-
5	TRS	B	508	-	-	3/9/9/9	-
4	GOL	B	507	-	-	2/4/4/4	-
4	GOL	A	511	-	-	2/4/4/4	-
4	GOL	B	506	-	-	2/4/4/4	-
6	EDO	B	515	-	-	0/1/1/1	-
6	EDO	A	520	-	-	0/1/1/1	-
6	EDO	A	518	-	-	0/1/1/1	-
3	NAI	B	504	-	-	7/25/72/72	0/5/5/5
4	GOL	A	507	-	-	0/4/4/4	-
4	GOL	A	509	-	-	3/4/4/4	-
4	GOL	A	512	-	-	3/4/4/4	-
6	EDO	A	514	-	-	0/1/1/1	-
4	GOL	A	508	-	-	0/4/4/4	-
6	EDO	A	521	-	-	0/1/1/1	-
4	GOL	B	505	-	-	2/4/4/4	-
6	EDO	A	522	-	-	1/1/1/1	-
6	EDO	B	510	-	-	0/1/1/1	-
3	NAI	A	504	-	-	9/25/72/72	0/5/5/5
6	EDO	B	511	-	-	1/1/1/1	-
6	EDO	A	517	-	-	1/1/1/1	-
6	EDO	A	516	-	-	1/1/1/1	-
6	EDO	A	519	-	-	1/1/1/1	-
4	GOL	A	505	-	-	4/4/4/4	-

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	B	506	GOL	C1-C2	2.07	1.60	1.51

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	504	NAI	C5A-C6A-N6A	2.28	123.81	120.35
3	B	504	NAI	O5B-PA-O1A	2.20	117.68	109.07
3	B	504	NAI	C5A-C6A-N6A	2.18	123.67	120.35
4	A	508	GOL	C3-C2-C1	-2.11	103.50	111.70

There are no chirality outliers.

All (54) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	504	NAI	C5B-O5B-PA-O1A
3	A	504	NAI	C5D-O5D-PN-O1N
3	B	504	NAI	C5B-O5B-PA-O1A
4	A	505	GOL	O1-C1-C2-C3
4	A	511	GOL	O1-C1-C2-C3
4	A	512	GOL	C1-C2-C3-O3
4	B	506	GOL	C1-C2-C3-O3
4	B	507	GOL	O1-C1-C2-O2
4	B	507	GOL	O1-C1-C2-C3
5	A	513	TRS	N-C-C3-O3
5	B	508	TRS	N-C-C1-O1
3	A	504	NAI	O4D-C1D-N1N-C2N
4	A	505	GOL	O1-C1-C2-O2
4	A	511	GOL	O1-C1-C2-O2
4	B	506	GOL	O2-C2-C3-O3
4	A	505	GOL	C1-C2-C3-O3
4	A	506	GOL	O1-C1-C2-C3
4	A	506	GOL	C1-C2-C3-O3
4	A	509	GOL	O1-C1-C2-C3
4	A	510	GOL	O1-C1-C2-C3
4	A	512	GOL	O1-C1-C2-C3
4	A	505	GOL	O2-C2-C3-O3
4	A	510	GOL	O1-C1-C2-O2
4	A	512	GOL	O2-C2-C3-O3
6	A	516	EDO	O1-C1-C2-O2
6	B	511	EDO	O1-C1-C2-O2
5	A	513	TRS	C2-C-C3-O3
5	B	508	TRS	C2-C-C1-O1
4	A	509	GOL	O1-C1-C2-O2
6	A	519	EDO	O1-C1-C2-O2
6	B	513	EDO	O1-C1-C2-O2
3	B	504	NAI	O4D-C1D-N1N-C2N

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Mol	Chain	Res	Type	Atoms
3	A	504	NAI	PN-O3-PA-O1A
3	A	504	NAI	C5B-O5B-PA-O2A
3	A	504	NAI	C5D-O5D-PN-O2N
3	B	504	NAI	C5B-O5B-PA-O2A
6	A	515	EDO	O1-C1-C2-O2
6	A	517	EDO	O1-C1-C2-O2
6	B	509	EDO	O1-C1-C2-O2
3	B	504	NAI	PN-O3-PA-O2A
4	B	505	GOL	O1-C1-C2-C3
5	B	508	TRS	C3-C-C1-O1
3	B	504	NAI	PN-O3-PA-O1A
4	A	510	GOL	C1-C2-C3-O3
6	A	522	EDO	O1-C1-C2-O2
6	B	514	EDO	O1-C1-C2-O2
3	A	504	NAI	C5B-O5B-PA-O3
3	A	504	NAI	C5D-O5D-PN-O3
3	B	504	NAI	C5B-O5B-PA-O3
4	A	510	GOL	O2-C2-C3-O3
4	B	505	GOL	O1-C1-C2-O2
3	A	504	NAI	PN-O3-PA-O2A
3	B	504	NAI	PA-O3-PN-O1N
4	A	509	GOL	C1-C2-C3-O3

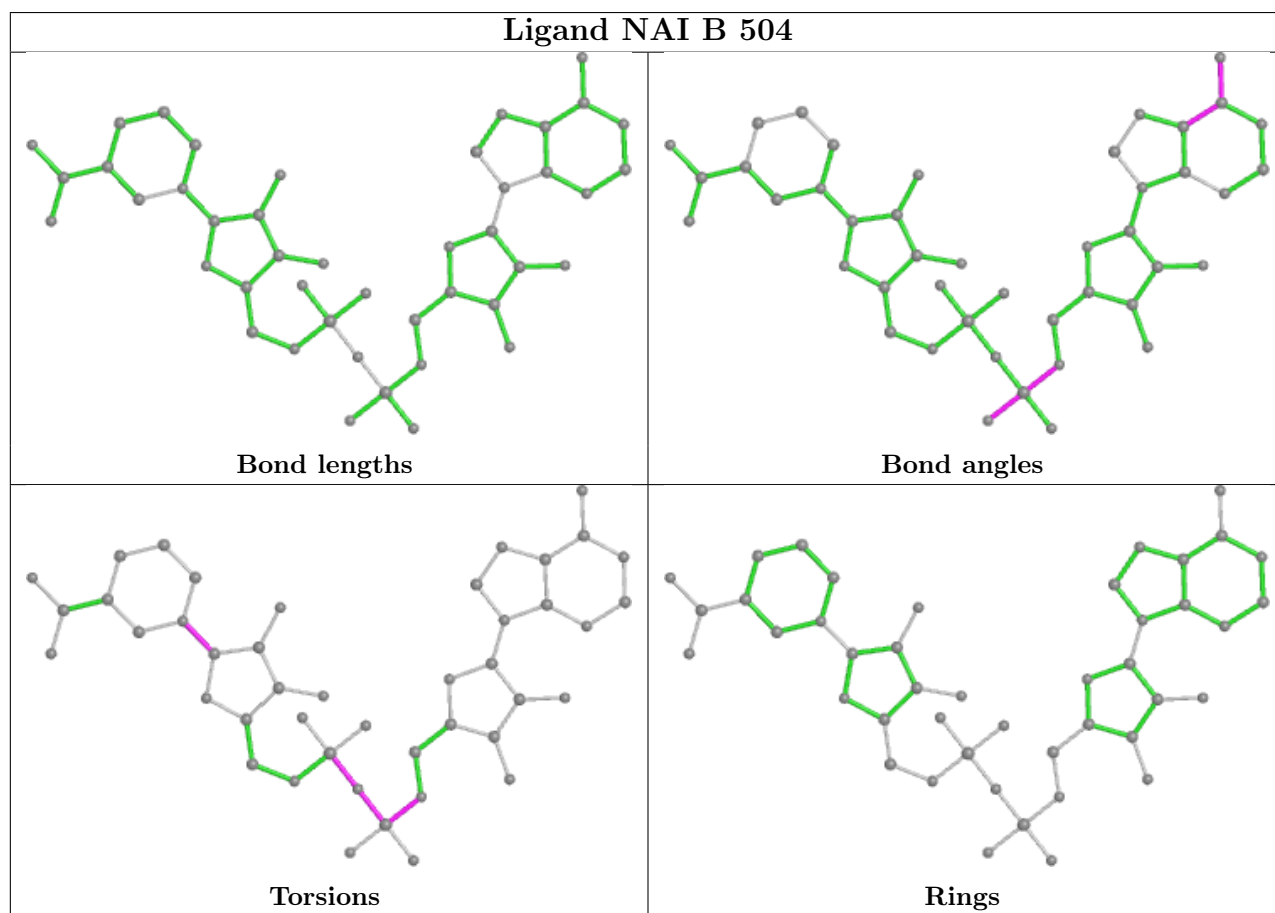
There are no ring outliers.

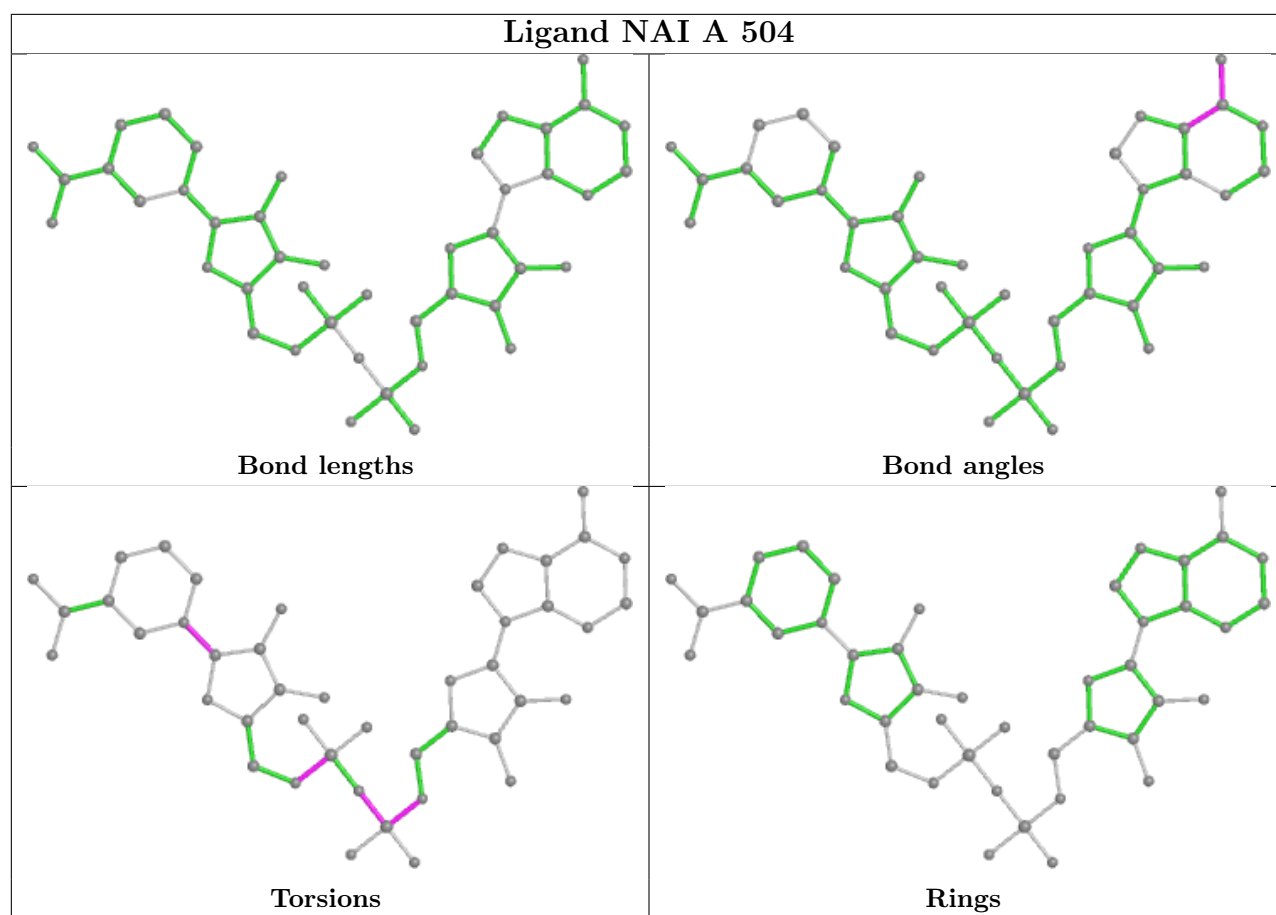
13 monomers are involved in 21 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	510	GOL	3	0
6	A	515	EDO	3	0
6	B	512	EDO	1	0
4	B	507	GOL	1	0
4	B	506	GOL	4	0
6	B	515	EDO	1	0
3	B	504	NAI	1	0
4	A	507	GOL	1	0
4	A	509	GOL	1	0
4	B	505	GOL	1	0
3	A	504	NAI	1	0
6	B	511	EDO	2	0
6	A	519	EDO	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 [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	496/514 (96%)	-0.68	1 (0%) 95 96	13, 24, 39, 76	0
1	B	496/514 (96%)	-0.51	6 (1%) 79 80	12, 26, 50, 73	0
All	All	992/1028 (96%)	-0.60	7 (0%) 87 89	12, 25, 47, 76	0

All (7) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	365	ARG	3.2
1	B	328	ARG	2.7
1	A	2[A]	THR	2.7
1	B	3	GLU	2.6
1	B	362	ARG	2.5
1	B	1	MET	2.4
1	B	370	PHE	2.2

### 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](#)

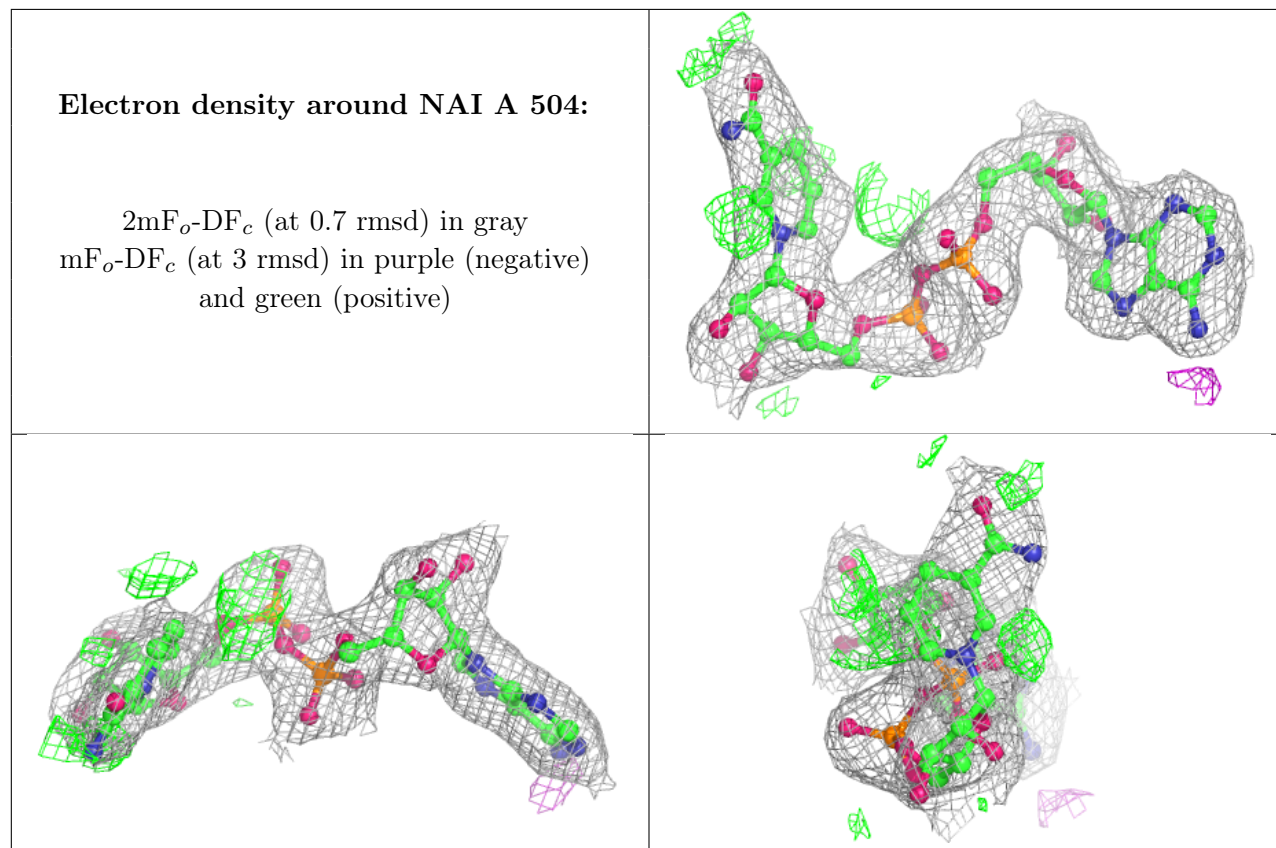
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled ‘Q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

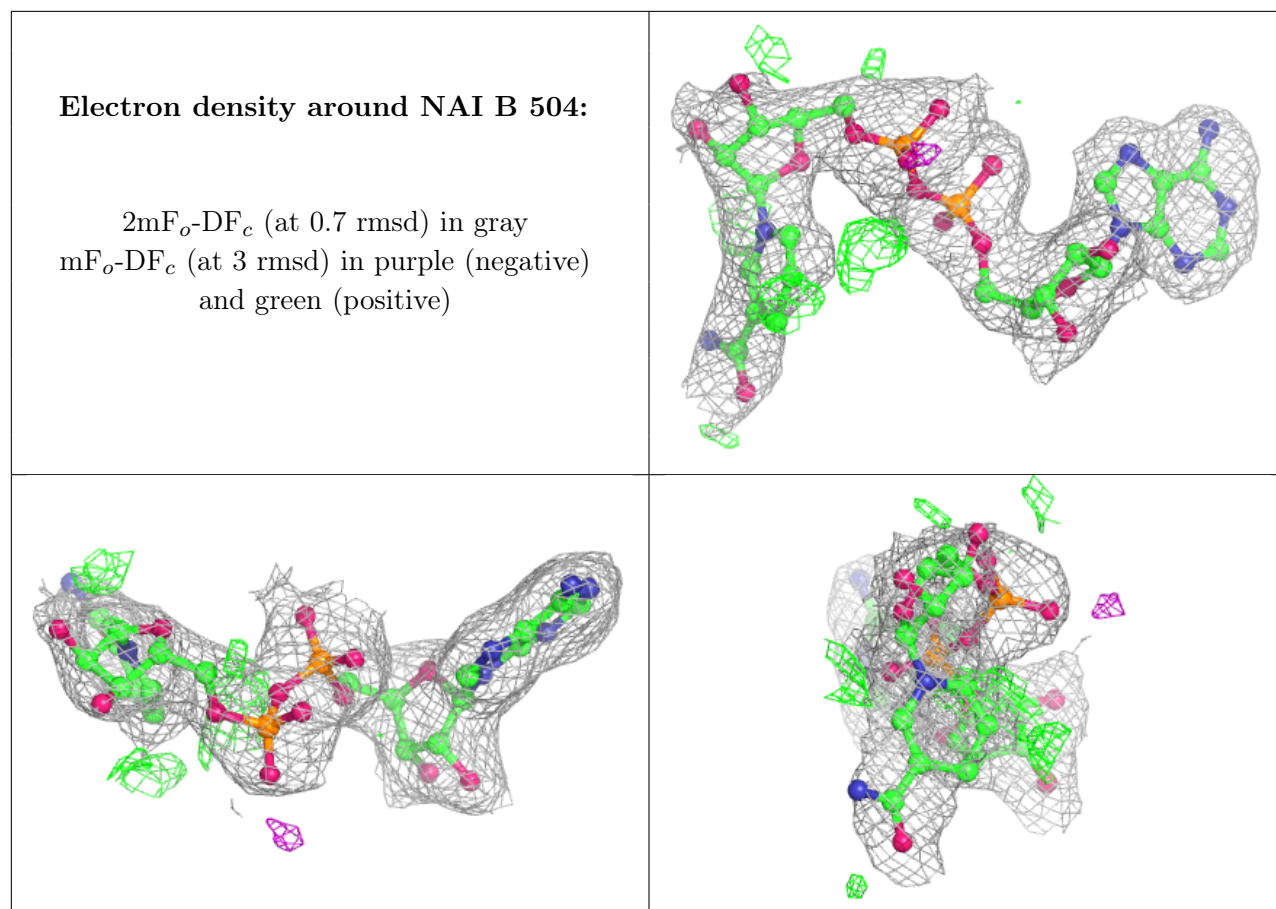
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
6	EDO	A	514	4/4	0.84	0.40	50,51,54,61	0
6	EDO	B	513	4/4	0.84	0.15	54,55,57,61	0
4	GOL	A	512	6/6	0.85	0.18	49,60,66,75	0
6	EDO	A	515	4/4	0.86	0.32	43,43,48,52	0
6	EDO	A	519	4/4	0.86	0.25	54,60,60,61	0
4	GOL	A	511	6/6	0.86	0.27	39,68,75,78	0
6	EDO	A	522	4/4	0.88	0.57	55,58,60,69	0
6	EDO	A	518	4/4	0.88	0.20	40,52,65,71	0
6	EDO	A	523	4/4	0.90	0.24	52,52,54,57	0
6	EDO	A	521	4/4	0.90	0.22	41,57,62,66	0
4	GOL	B	506	6/6	0.91	0.15	24,39,47,51	0
4	GOL	A	510	6/6	0.92	0.26	40,42,50,53	0
4	GOL	A	507	6/6	0.92	0.17	33,41,53,69	0
6	EDO	B	515	4/4	0.92	0.16	53,58,61,62	0
6	EDO	B	514	4/4	0.93	0.19	47,47,51,62	0
6	EDO	B	509	4/4	0.93	0.14	34,38,49,63	0
6	EDO	B	517	4/4	0.93	0.16	46,50,51,61	0
6	EDO	B	510	4/4	0.94	0.18	38,43,48,50	0
4	GOL	A	508	6/6	0.95	0.20	46,56,57,59	0
2	K	B	501	1/1	0.95	0.08	63,63,63,63	0
6	EDO	A	520	4/4	0.95	0.12	46,49,54,56	0
4	GOL	B	505	6/6	0.95	0.17	33,49,54,61	0
6	EDO	A	516	4/4	0.95	0.39	48,57,59,63	0
6	EDO	A	517	4/4	0.95	0.15	36,43,46,46	0
4	GOL	B	507	6/6	0.96	0.25	34,46,62,74	0
6	EDO	B	511	4/4	0.96	0.24	30,39,39,43	0
6	EDO	B	516	4/4	0.96	0.12	29,50,55,58	0
2	K	B	502	1/1	0.96	0.28	63,63,63,63	0
2	K	A	502	1/1	0.97	0.14	52,52,52,52	0
4	GOL	A	509	6/6	0.97	0.15	46,49,53,61	0
6	EDO	B	512	4/4	0.97	0.41	47,47,49,59	0
5	TRS	A	513	8/8	0.97	0.16	20,25,28,28	0
2	K	B	503	1/1	0.97	0.09	52,52,52,52	0
3	NAI	A	504	44/44	0.97	0.10	16,33,53,65	0
4	GOL	A	505	6/6	0.97	0.24	24,33,47,51	0
2	K	A	501	1/1	0.97	0.07	50,50,50,50	0
2	K	A	503	1/1	0.98	0.05	48,48,48,48	0
5	TRS	B	508	8/8	0.98	0.13	16,18,24,26	0
3	NAI	B	504	44/44	0.98	0.11	13,33,59,63	0
4	GOL	A	506	6/6	0.99	0.11	20,27,31,36	0
7	SO4	B	518	5/5	0.99	0.09	17,23,27,29	0
7	SO4	A	524	5/5	1.00	0.11	29,30,32,35	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.





## 6.5 Other polymers [i](#)

There are no such residues in this entry.