



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 07:12 PM UTC

PDB ID : 4DKO / pdb_00004dko
Title : Crystal structure of clade A/E 93TH057 HIV-1 gp120 core in complex with TS-II-224
Authors : Kwon, Y.D.; LaLonde, J.M.; Jones, D.M.; Sun, A.W.; Courter, J.R.; Soeta, T.; Kobayashi, T.; Princiotto, A.M.; Wu, X.; Mascola, J.; Schon, A.; Freire, E.; Sodroski, J.; Madani, N.; Smith III, A.B.; Kwong, P.D.
Deposited on : 2012-02-03
Resolution : 1.98 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](#) ①) were used in the production of this report:

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

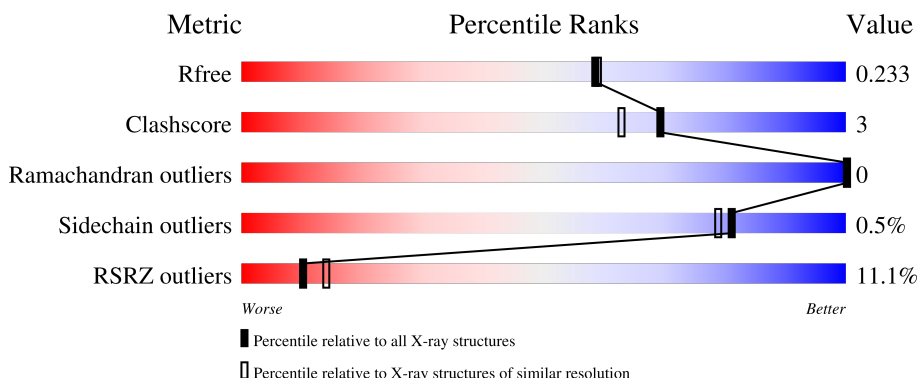
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION



The reported resolution of this entry is 1.98 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	1506 (1.98-1.98)
Clashscore	190562	1534 (1.98-1.98)
Ramachandran outliers	187476	1518 (1.98-1.98)
Sidechain outliers	187428	1518 (1.98-1.98)
RSRZ outliers	180081	1506 (1.98-1.98)

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	353	
1	C	353	

2 Entry composition [i](#)

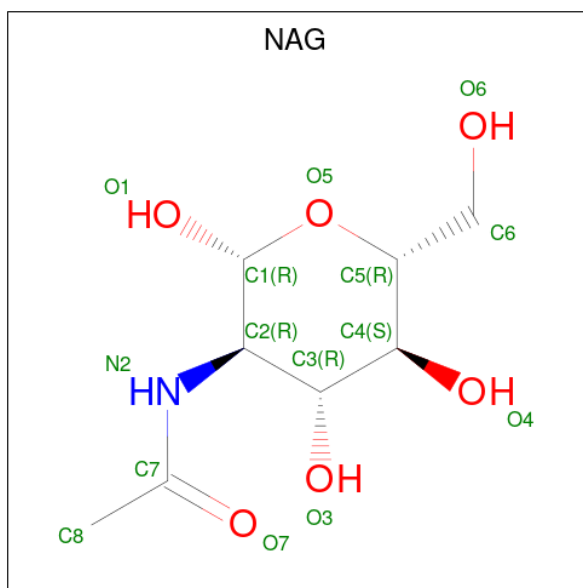
There are 5 unique types of molecules in this entry. The entry contains 6090 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 HIV-1 gp120 core.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	339	Total	C	N	O	S	0	0	0
			2654	1666	460	507	21			
1	C	339	Total	C	N	O	S	0	0	0
			2654	1666	460	507	21			

- Molecule 2 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).



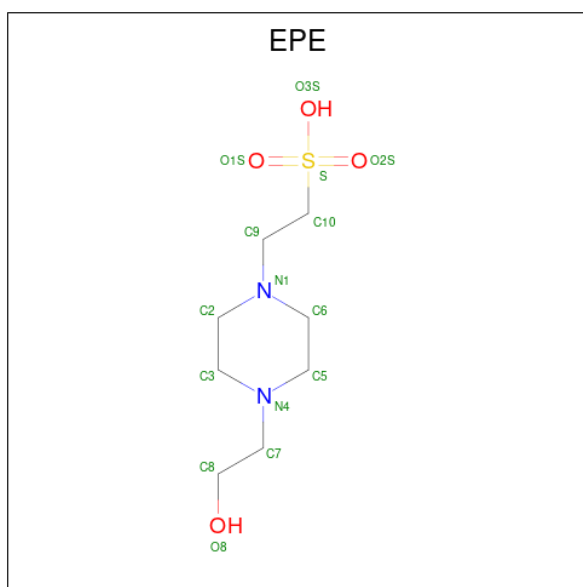
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
2	A	1	Total	C	N	O	0	0
			14	8	1	5		
2	A	1	Total	C	N	O	0	0
			14	8	1	5		
2	A	1	Total	C	N	O	0	0
			14	8	1	5		

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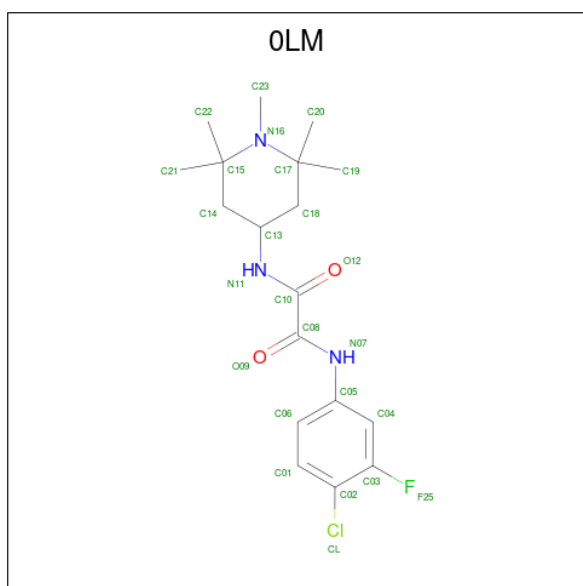
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	N	O	0	0
			14	8	1	5		
2	A	1	Total	C	N	O	0	0
			14	8	1	5		
2	A	1	Total	C	N	O	0	0
			14	8	1	5		
2	A	1	Total	C	N	O	0	0
			14	8	1	5		
2	A	1	Total	C	N	O	0	0
			14	8	1	5		
2	A	1	Total	C	N	O	0	0
			14	8	1	5		
2	C	1	Total	C	N	O	0	0
			14	8	1	5		
2	C	1	Total	C	N	O	0	0
			14	8	1	5		
2	C	1	Total	C	N	O	0	0
			14	8	1	5		
2	C	1	Total	C	N	O	0	0
			14	8	1	5		
2	C	1	Total	C	N	O	0	0
			14	8	1	5		
2	C	1	Total	C	N	O	0	0
			14	8	1	5		
2	C	1	Total	C	N	O	0	0
			14	8	1	5		
2	C	1	Total	C	N	O	0	0
			14	8	1	5		

- Molecule 3 is 4-(2-HYDROXYETHYL)-1-PIPERAZINE ETHANESULFONIC ACID (CCD ID: EPE) (formula: C₈H₁₈N₂O₄S).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	S		
3	A	1	15	8	2	4	1	0	0
3	C	1	15	8	2	4	1	0	0

- Molecule 4 is N-(4-chloro-3-fluorophenyl)-N'-(1,2,2,6,6-pentamethylpiperidin-4-yl)ethanedia mide (CCD ID: 0LM) (formula: $C_{18}H_{25}ClFN_3O_2$).



Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
			Total	C	Cl	F	N	O		
4	A	1	25	18	1	1	3	2	0	0

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	
			Total	C	Cl	F	N			O
4	C	1	25	18	1	1	3	2	0	0

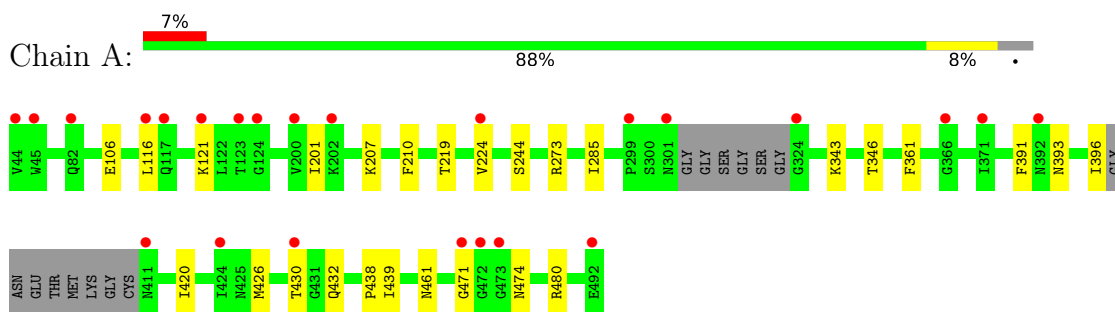
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	243	Total	O	0	0
			243	243		
5	C	151	Total	O	0	0
			151	151		

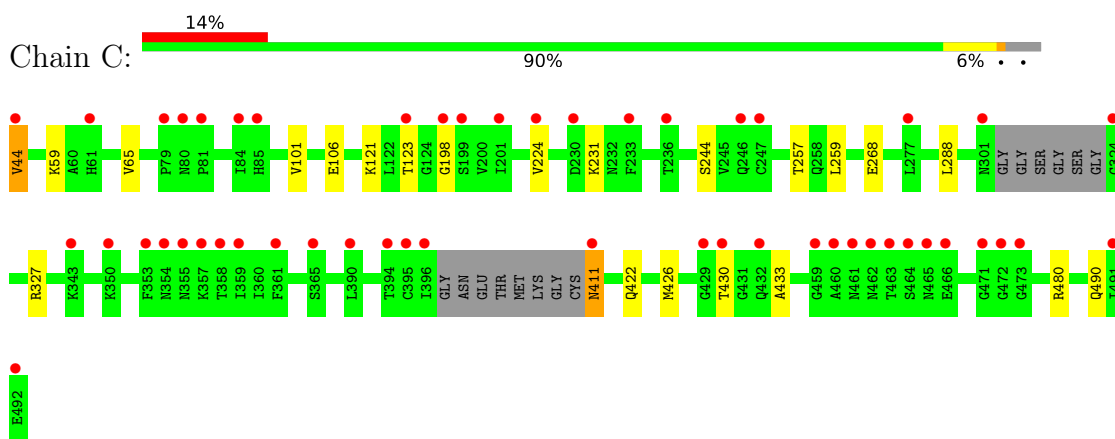
3 Residue-property plots [i](#)

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: HIV-1 gp120 core



- Molecule 1: HIV-1 gp120 core



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	64.72Å 68.90Å 94.52Å 90.00° 91.23° 90.00°	Depositor
Resolution (Å)	41.94 – 1.98 41.94 – 1.98	Depositor EDS
% Data completeness (in resolution range)	93.1 (41.94-1.98) 87.9 (41.94-1.98)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	0.10	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.12 (at 1.98Å)	Xtrriage
Refinement program	PHENIX 1.7.3_928	Depositor
R, R_{free}	0.203 , 0.239 0.202 , 0.233	Depositor DCC
R_{free} test set	2697 reflections (4.99%)	wwPDB-VP
Wilson B-factor (Å ²)	27.8	Xtrriage
Anisotropy	0.395	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 49.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	0.028 for h,-k,-l	Xtrriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	6090	wwPDB-VP
Average B, all atoms (Å ²)	43.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.21% 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 [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: EPE, NAG, OLM

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	0.26	0/2709	0.66	0/3678
1	C	0.26	0/2709	0.67	1/3678 (0.0%)
All	All	0.26	0/5418	0.66	1/7356 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	65	VAL	N-CA-C	5.05	115.77	110.62

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	2654	0	2589	18	0
1	C	2654	0	2589	18	0
2	A	154	0	143	1	0
2	C	154	0	143	1	0
3	A	15	0	17	0	0
3	C	15	0	17	0	0
4	A	25	0	25	1	0
4	C	25	0	25	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	A	243	0	0	8	0
5	C	151	0	0	9	0
All	All	6090	0	5548	39	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 3.

All (39) 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:391:PHE:O	5:A:672:HOH:O	1.85	0.92
1:C:59:LYS:NZ	5:C:739:HOH:O	2.04	0.91
1:A:471:GLY:O	5:A:698:HOH:O	1.96	0.82
1:C:490:GLN:O	5:C:726:HOH:O	2.08	0.71
1:C:411:ASN:N	5:C:680:HOH:O	2.24	0.70
1:A:396:ILE:O	5:A:829:HOH:O	2.12	0.66
1:C:231:LYS:HB3	1:C:268:GLU:HG3	1.78	0.65
1:A:121:LYS:HB2	1:A:201:ILE:HB	1.80	0.63
1:C:426:MET:HE3	1:C:433:ALA:HB2	1.83	0.60
1:A:480:ARG:NH2	5:A:683:HOH:O	2.36	0.58
1:A:461:ASN:ND2	5:A:799:HOH:O	2.37	0.57
1:A:106:GLU:OE1	5:A:607:HOH:O	2.18	0.55
1:C:106:GLU:OE1	5:C:648:HOH:O	2.19	0.53
1:C:411:ASN:ND2	5:C:740:HOH:O	2.41	0.52
5:A:625:HOH:O	2:C:511:NAG:H81	2.08	0.51
1:C:426:MET:SD	1:C:430:THR:OG1	2.68	0.50
1:A:224:VAL:HG11	1:A:244:SER:HB2	1.95	0.49
1:A:426:MET:SD	1:A:430:THR:OG1	2.71	0.48
1:A:474:ASN:HA	4:A:513:OLM:H6	1.95	0.48
1:C:101:VAL:HG21	1:C:480:ARG:HG3	1.95	0.48
1:C:121:LYS:HE2	1:C:123:THR:HG21	1.94	0.48
1:C:44:VAL:HG12	5:C:741:HOH:O	2.14	0.47
1:A:343:LYS:O	1:A:346:THR:OG1	2.33	0.47
1:C:327:ARG:NH2	1:C:422:GLN:OE1	2.36	0.46
4:C:513:OLM:H3	4:C:513:OLM:H24	1.72	0.46
1:C:198:GLY:N	5:C:734:HOH:O	2.28	0.45
1:A:361:PHE:O	1:A:393:ASN:ND2	2.44	0.45
1:C:288:LEU:HB3	5:C:724:HOH:O	2.17	0.44
1:A:273:ARG:HB2	1:A:285:ILE:HB	1.99	0.43
1:A:116:LEU:HD11	1:A:210:PHE:CE2	2.54	0.42
1:A:432:GLN:NE2	5:A:749:HOH:O	2.36	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:224:VAL:HG11	1:C:244:SER:HB2	2.02	0.41
1:A:420:ILE:HG21	1:A:438:PRO:HG3	2.03	0.41
1:C:268:GLU:HB2	5:C:729:HOH:O	2.20	0.41
1:A:207:LYS:HD3	1:A:439:ILE:HG23	2.03	0.41
2:A:511:NAG:H83	2:A:511:NAG:H2	1.92	0.41
1:C:411:ASN:N	1:C:411:ASN:HD22	2.19	0.41
1:A:361:PHE:HB3	1:A:391:PHE:HB3	2.02	0.40
1:C:257:THR:O	1:C:259:LEU:N	2.52	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	333/353 (94%)	323 (97%)	10 (3%)	0	100	100
1	C	333/353 (94%)	322 (97%)	11 (3%)	0	100	100
All	All	666/706 (94%)	645 (97%)	21 (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	303/311 (97%)	302 (100%)	1 (0%)	86	86

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	C	303/311 (97%)	301 (99%)	2 (1%)	76	73
All	All	606/622 (97%)	603 (100%)	3 (0%)	81	79

All (3) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	219	THR
1	C	44	VAL
1	C	411	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	80	ASN
1	A	92	ASN
1	A	229	ASN
1	A	432	GLN
1	C	114	GLN
1	C	389	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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

26 ligands are modelled in this entry.

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
2	NAG	C	504	1	14,14,15	0.53	0	17,19,21	0.67	0
2	NAG	C	509	1	14,14,15	0.49	0	17,19,21	0.74	0
2	NAG	A	504	1	14,14,15	0.50	0	17,19,21	0.61	0
2	NAG	A	509	1	14,14,15	0.51	0	17,19,21	0.59	0
2	NAG	C	508	1	14,14,15	0.53	0	17,19,21	0.75	0
2	NAG	C	510	1	14,14,15	0.48	0	17,19,21	0.71	0
2	NAG	A	501	1	14,14,15	0.54	0	17,19,21	0.59	0
2	NAG	C	502	1	14,14,15	0.51	0	17,19,21	0.68	0
2	NAG	A	502	1	14,14,15	0.52	0	17,19,21	0.56	0
3	EPE	A	512	-	15,15,15	0.80	1 (6%)	19,20,20	1.68	5 (26%)
2	NAG	C	501	1	14,14,15	0.51	0	17,19,21	0.68	0
2	NAG	A	508	1	14,14,15	0.55	0	17,19,21	0.64	0
2	NAG	A	505	1	14,14,15	0.49	0	17,19,21	0.73	0
2	NAG	C	503	1	14,14,15	0.45	0	17,19,21	0.94	1 (5%)
2	NAG	A	507	1	14,14,15	0.51	0	17,19,21	0.66	0
2	NAG	C	511	1	14,14,15	0.48	0	17,19,21	0.77	0
4	OLM	C	513	-	26,26,26	1.89	6 (23%)	39,40,40	4.20	8 (20%)
2	NAG	C	506	1	14,14,15	0.51	0	17,19,21	0.64	0
2	NAG	A	503	1	14,14,15	0.50	0	17,19,21	0.74	0
2	NAG	C	507	1	14,14,15	0.51	0	17,19,21	0.65	0
2	NAG	A	506	1	14,14,15	0.48	0	17,19,21	0.91	0
3	EPE	C	512	-	15,15,15	0.80	1 (6%)	19,20,20	1.72	5 (26%)
2	NAG	A	511	1	14,14,15	0.48	0	17,19,21	0.69	0
2	NAG	A	510	1	14,14,15	0.53	0	17,19,21	0.66	0
2	NAG	C	505	1	14,14,15	0.50	0	17,19,21	1.00	1 (5%)
4	OLM	A	513	-	26,26,26	1.90	6 (23%)	39,40,40	4.03	6 (15%)

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
2	NAG	C	504	1	-	2/6/23/26	0/1/1/1
2	NAG	C	509	1	-	0/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	NAG	A	504	1	-	0/6/23/26	0/1/1/1
2	NAG	A	509	1	-	0/6/23/26	0/1/1/1
2	NAG	C	508	1	-	2/6/23/26	0/1/1/1
2	NAG	C	510	1	-	2/6/23/26	0/1/1/1
2	NAG	A	501	1	-	0/6/23/26	0/1/1/1
2	NAG	C	502	1	-	4/6/23/26	0/1/1/1
2	NAG	A	502	1	-	2/6/23/26	0/1/1/1
3	EPE	A	512	-	-	2/9/19/19	0/1/1/1
2	NAG	C	501	1	-	4/6/23/26	0/1/1/1
2	NAG	A	508	1	-	2/6/23/26	0/1/1/1
2	NAG	A	505	1	-	0/6/23/26	0/1/1/1
2	NAG	C	503	1	-	0/6/23/26	0/1/1/1
2	NAG	A	507	1	-	0/6/23/26	0/1/1/1
2	NAG	C	511	1	-	2/6/23/26	0/1/1/1
4	OLM	C	513	-	-	0/12/34/34	0/2/2/2
2	NAG	C	506	1	-	0/6/23/26	0/1/1/1
2	NAG	A	503	1	-	0/6/23/26	0/1/1/1
2	NAG	C	507	1	-	2/6/23/26	0/1/1/1
2	NAG	A	506	1	-	0/6/23/26	0/1/1/1
3	EPE	C	512	-	-	6/9/19/19	0/1/1/1
2	NAG	A	511	1	-	2/6/23/26	0/1/1/1
2	NAG	A	510	1	-	4/6/23/26	0/1/1/1
2	NAG	C	505	1	-	0/6/23/26	0/1/1/1
4	OLM	A	513	-	-	2/12/34/34	0/2/2/2

All (14) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	513	OLM	C10-N11	4.47	1.43	1.34
4	C	513	OLM	C10-N11	4.32	1.43	1.34
4	C	513	OLM	C08-N07	3.95	1.43	1.35
4	A	513	OLM	C08-N07	3.94	1.43	1.35
4	C	513	OLM	C17-N16	-3.65	1.45	1.49
4	A	513	OLM	C17-N16	-3.48	1.45	1.49
4	A	513	OLM	C14-C13	-2.80	1.44	1.51
3	A	512	EPE	C10-S	2.77	1.81	1.77
3	C	512	EPE	C10-S	2.75	1.81	1.77
4	C	513	OLM	C14-C13	-2.68	1.44	1.51
4	A	513	OLM	C15-N16	-2.31	1.46	1.49

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	C	513	OLM	C15-N16	-2.27	1.46	1.49
4	A	513	OLM	C13-N11	2.12	1.51	1.46
4	C	513	OLM	C13-N11	2.02	1.50	1.46

All (26) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	C	513	OLM	C14-C15-N16	16.95	118.33	108.58
4	A	513	OLM	C14-C15-N16	14.63	117.00	108.58
4	A	513	OLM	C23-N16-C15	13.64	120.19	112.75
4	C	513	OLM	C23-N16-C15	13.29	120.00	112.75
4	A	513	OLM	C18-C17-N16	10.85	114.82	108.58
4	C	513	OLM	C18-C17-N16	9.97	114.31	108.58
4	C	513	OLM	C23-N16-C17	7.89	117.06	112.75
4	A	513	OLM	C23-N16-C17	7.77	116.99	112.75
3	C	512	EPE	C5-N4-C3	4.76	119.08	108.84
3	A	512	EPE	C5-N4-C3	4.60	118.75	108.84
4	A	513	OLM	C10-C08-N07	4.00	119.01	112.25
4	C	513	OLM	C10-C08-N07	3.75	118.58	112.25
2	C	505	NAG	C1-O5-C5	3.39	116.72	112.19
4	C	513	OLM	C08-C10-N11	2.88	120.64	113.73
4	A	513	OLM	C08-C10-N11	2.43	119.56	113.73
4	C	513	OLM	C15-C14-C13	2.35	118.55	113.84
4	C	513	OLM	C18-C13-C14	2.33	115.34	108.28
3	A	512	EPE	C5-C6-N1	-2.33	105.95	110.65
3	C	512	EPE	O3S-S-C10	2.32	110.54	106.00
3	C	512	EPE	C5-C6-N1	-2.32	105.97	110.65
3	C	512	EPE	C7-N4-C3	2.26	117.27	111.24
3	A	512	EPE	C7-N4-C3	2.16	117.01	111.24
3	A	512	EPE	C7-N4-C5	2.13	116.93	111.24
3	C	512	EPE	C7-N4-C5	2.12	116.89	111.24
3	A	512	EPE	O3S-S-C10	2.08	110.07	106.00
2	C	503	NAG	C1-O5-C5	2.03	114.90	112.19

There are no chirality outliers.

All (38) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	502	NAG	C8-C7-N2-C2
2	A	502	NAG	O7-C7-N2-C2
2	A	510	NAG	C8-C7-N2-C2
2	A	510	NAG	O7-C7-N2-C2

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Mol	Chain	Res	Type	Atoms
2	A	511	NAG	C8-C7-N2-C2
2	A	511	NAG	O7-C7-N2-C2
2	C	510	NAG	C8-C7-N2-C2
2	C	510	NAG	O7-C7-N2-C2
3	A	512	EPE	C10-C9-N1-C2
3	C	512	EPE	C10-C9-N1-C2
2	A	510	NAG	C4-C5-C6-O6
2	C	507	NAG	O5-C5-C6-O6
2	C	507	NAG	C4-C5-C6-O6
2	C	504	NAG	C8-C7-N2-C2
2	C	501	NAG	O5-C5-C6-O6
2	C	501	NAG	C4-C5-C6-O6
2	C	502	NAG	C8-C7-N2-C2
2	C	504	NAG	O7-C7-N2-C2
2	C	511	NAG	C8-C7-N2-C2
2	C	511	NAG	O7-C7-N2-C2
2	A	510	NAG	O5-C5-C6-O6
2	C	502	NAG	O7-C7-N2-C2
2	A	508	NAG	C4-C5-C6-O6
2	C	508	NAG	C8-C7-N2-C2
4	A	513	OLM	C18-C13-N11-C10
2	A	508	NAG	O5-C5-C6-O6
2	C	502	NAG	C4-C5-C6-O6
3	C	512	EPE	C9-C10-S-O1S
3	C	512	EPE	C9-C10-S-O2S
2	C	508	NAG	O7-C7-N2-C2
3	C	512	EPE	N4-C7-C8-O8
2	C	502	NAG	O5-C5-C6-O6
3	C	512	EPE	C9-C10-S-O3S
2	C	501	NAG	C8-C7-N2-C2
4	A	513	OLM	C14-C13-N11-C10
3	A	512	EPE	N4-C7-C8-O8
3	C	512	EPE	C8-C7-N4-C5
2	C	501	NAG	O7-C7-N2-C2

There are no ring outliers.

4 monomers are involved in 4 short contacts:

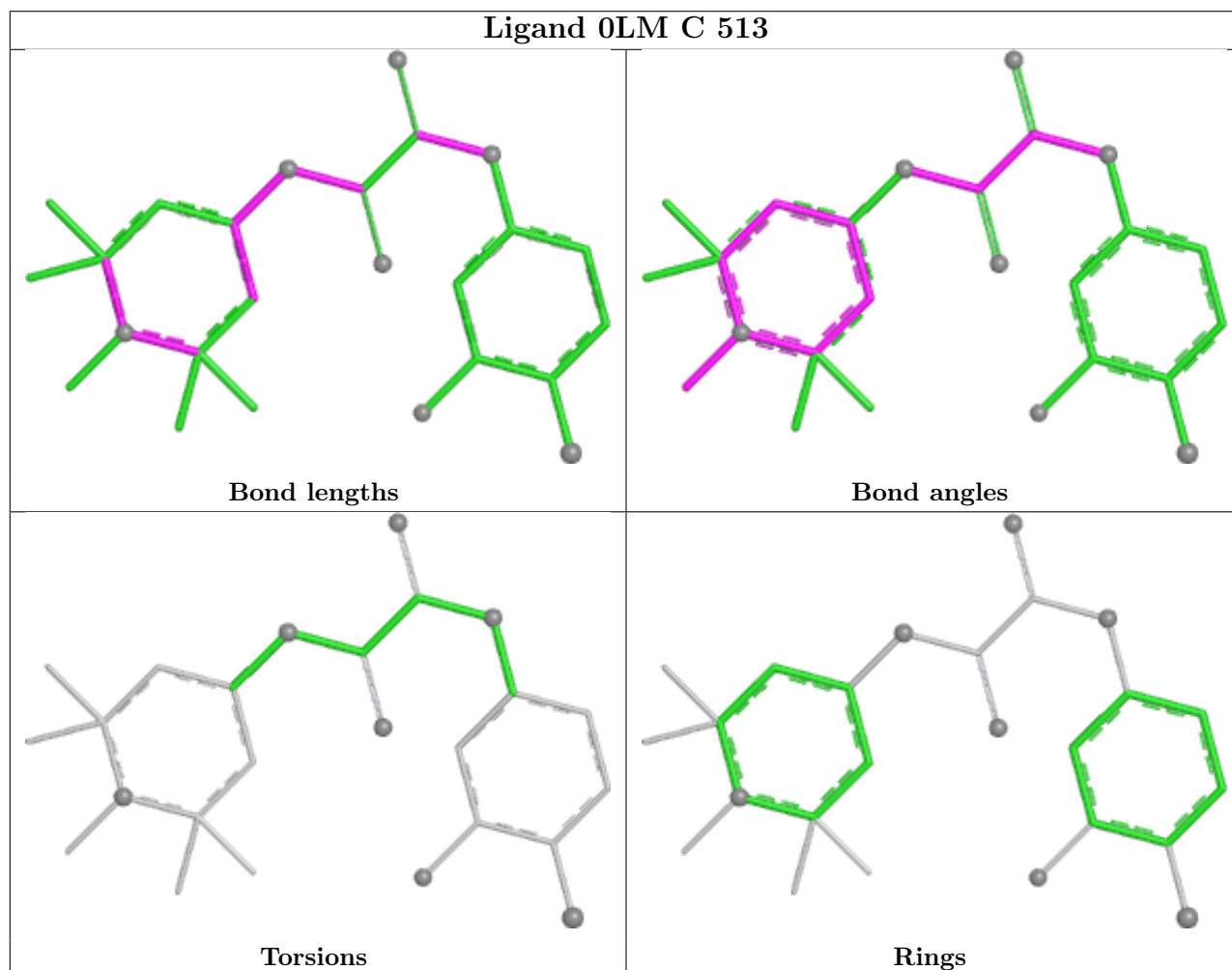
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	C	511	NAG	1	0
4	C	513	OLM	1	0
2	A	511	NAG	1	0

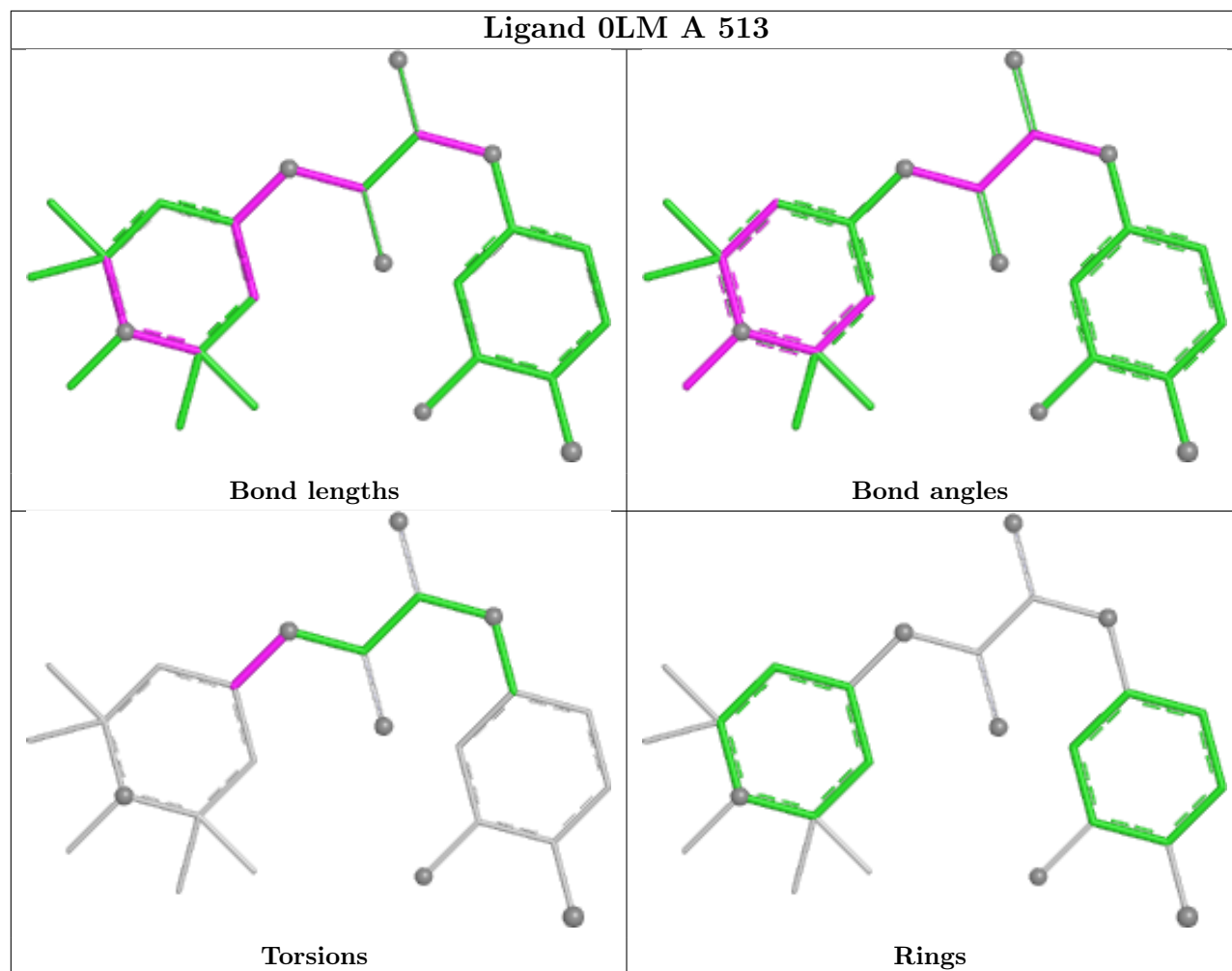
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Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	513	OLM	1	0

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	339/353 (96%)	0.37	24 (7%) 22 29	17, 30, 63, 95	0
1	C	339/353 (96%)	0.94	51 (15%) 5 7	23, 45, 89, 123	0
All	All	678/706 (96%)	0.65	75 (11%) 10 14	17, 37, 79, 123	0

All (75) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	472	GLY	6.6
1	A	473	GLY	5.4
1	C	44	VAL	4.7
1	C	236	THR	4.4
1	C	430	THR	4.4
1	C	396	ILE	4.0
1	C	464	SER	3.8
1	C	460	ALA	3.6
1	C	324	GLY	3.5
1	C	472	GLY	3.4
1	A	116	LEU	3.3
1	C	395	CYS	3.3
1	A	430	THR	3.2
1	C	224	VAL	3.2
1	C	358	THR	3.2
1	A	324	GLY	3.2
1	C	61	HIS	3.2
1	C	79	PRO	3.2
1	C	471	GLY	3.1
1	C	123	THR	3.0
1	C	429	GLY	3.0
1	C	394	THR	3.0
1	C	463	THR	3.0
1	A	124	GLY	3.0

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Mol	Chain	Res	Type	RSRZ
1	C	465	ASN	3.0
1	C	355	ASN	2.9
1	C	85	HIS	2.9
1	A	224	VAL	2.8
1	C	473	GLY	2.8
1	C	491	ILE	2.8
1	C	411	ASN	2.8
1	A	123	THR	2.8
1	C	365	SER	2.7
1	C	301	ASN	2.7
1	A	471	GLY	2.7
1	A	117	GLN	2.6
1	C	466	GLU	2.6
1	C	350	LYS	2.6
1	C	359	ILE	2.6
1	A	45	TRP	2.6
1	C	462	ASN	2.6
1	C	84	ILE	2.5
1	A	392	ASN	2.5
1	C	201	ILE	2.5
1	A	366	GLY	2.5
1	C	361	PHE	2.5
1	C	461	ASN	2.4
1	C	277	LEU	2.4
1	C	353	PHE	2.4
1	A	371	ILE	2.4
1	A	200	VAL	2.4
1	A	492	GLU	2.4
1	C	247	CYS	2.4
1	C	246	GLN	2.4
1	A	411	ASN	2.4
1	C	80	ASN	2.4
1	C	459	GLY	2.4
1	A	202	LYS	2.3
1	A	44	VAL	2.3
1	A	299	PRO	2.3
1	C	81	PRO	2.3
1	C	432	GLN	2.3
1	C	198	GLY	2.2
1	C	199	SER	2.2
1	C	233	PHE	2.2
1	C	230	ASP	2.2

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Mol	Chain	Res	Type	RSRZ
1	A	121	LYS	2.2
1	A	301	ASN	2.1
1	C	492	GLU	2.1
1	C	390	LEU	2.1
1	C	354	ASN	2.1
1	A	82	GLN	2.1
1	A	424	ILE	2.1
1	C	343	LYS	2.1
1	C	357	LYS	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 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.

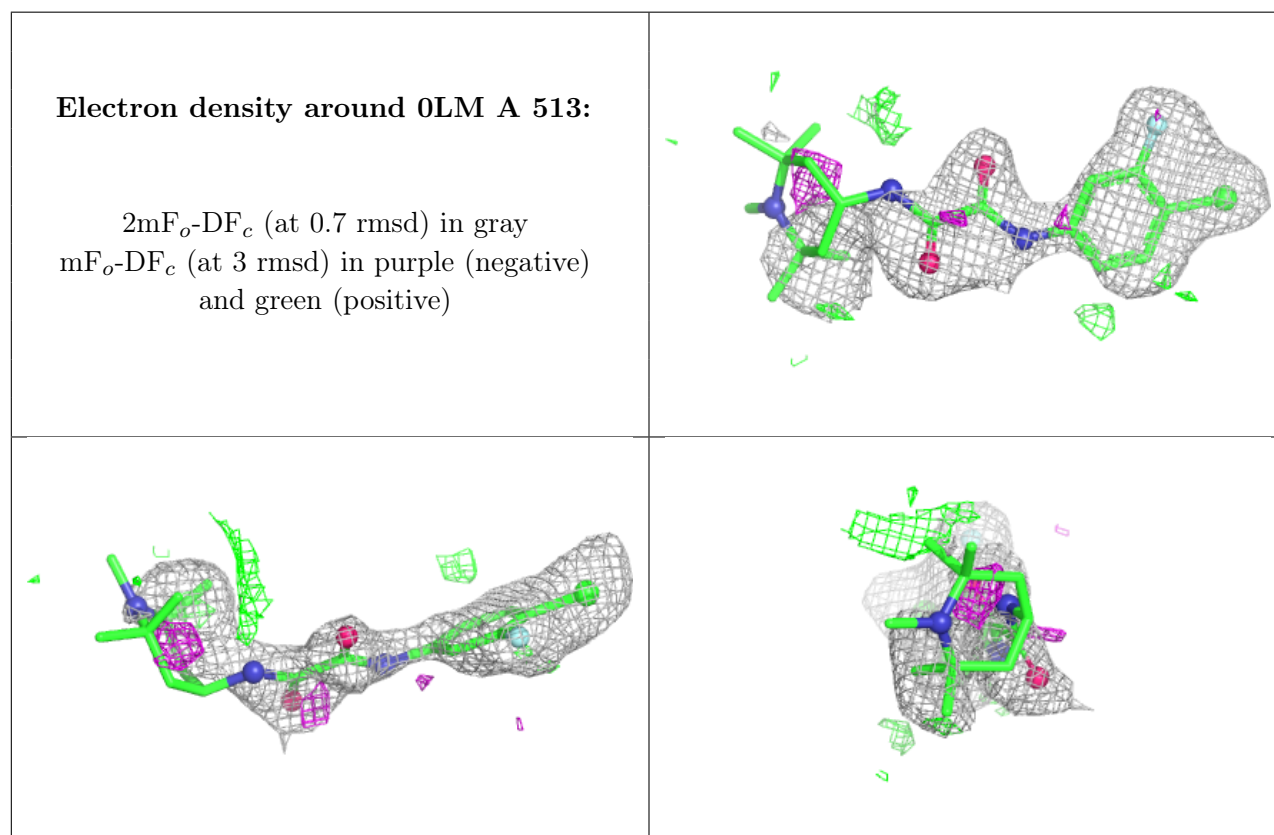
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	NAG	A	502	14/15	0.24	0.22	79,88,96,99	0
2	NAG	C	508	14/15	0.45	0.15	100,109,117,118	0
2	NAG	C	502	14/15	0.51	0.19	83,101,107,107	0
2	NAG	C	510	14/15	0.52	0.20	71,80,91,98	0
2	NAG	A	511	14/15	0.54	0.18	79,88,96,98	0
2	NAG	C	507	14/15	0.63	0.17	57,72,79,81	0
2	NAG	C	504	14/15	0.68	0.16	66,84,88,89	0
2	NAG	A	510	14/15	0.72	0.15	72,86,94,94	0
2	NAG	C	506	14/15	0.75	0.15	39,52,64,72	0
2	NAG	C	511	14/15	0.75	0.15	43,64,74,77	0
4	OLM	A	513	25/25	0.76	0.25	46,83,125,128	0
4	OLM	C	513	25/25	0.76	0.26	49,105,133,133	0
2	NAG	A	507	14/15	0.77	0.17	44,53,65,69	0
2	NAG	C	509	14/15	0.78	0.12	47,58,65,66	0

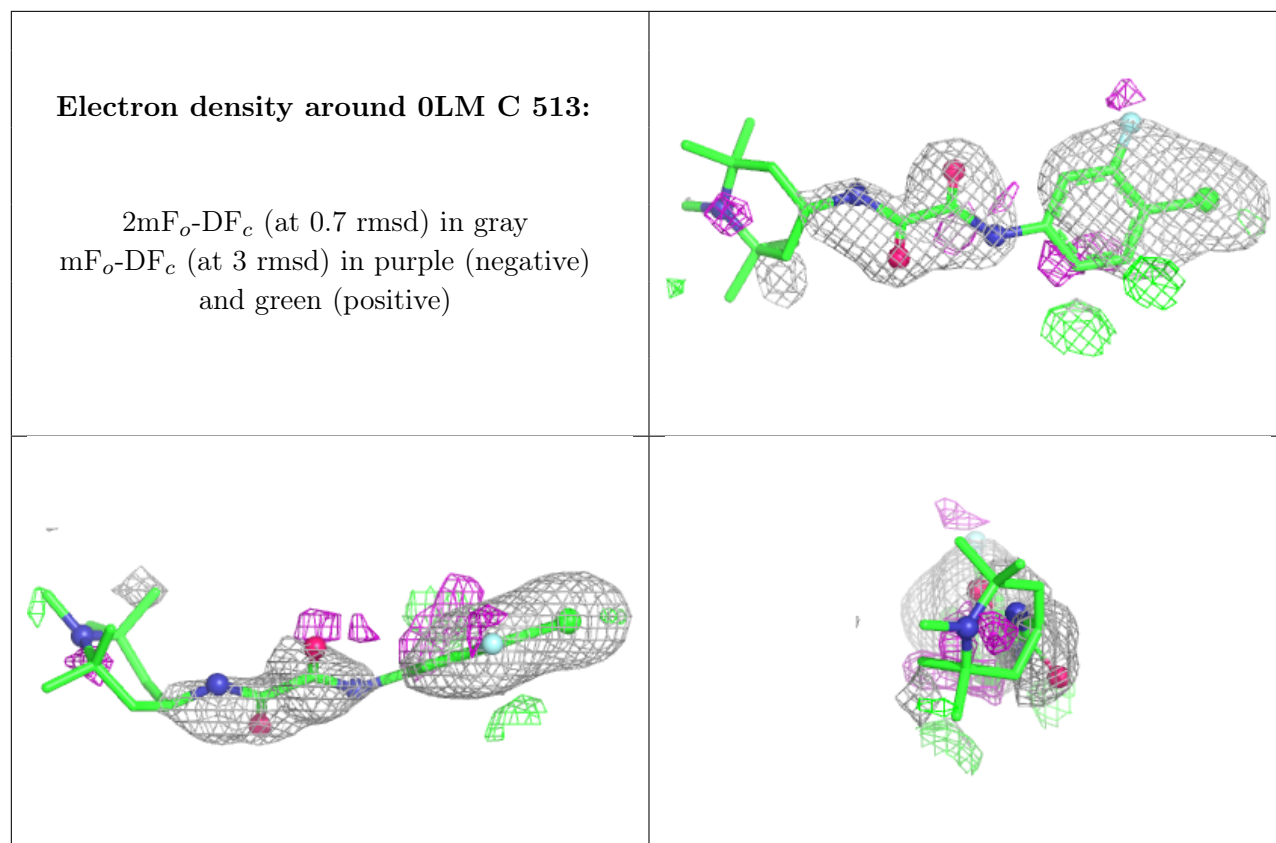
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
2	NAG	C	505	14/15	0.79	0.14	42,56,64,65	0
2	NAG	C	501	14/15	0.80	0.13	54,64,76,77	0
2	NAG	A	506	14/15	0.85	0.14	32,56,68,72	0
2	NAG	A	501	14/15	0.85	0.11	35,50,58,65	0
2	NAG	A	508	14/15	0.86	0.12	25,42,67,77	0
2	NAG	A	504	14/15	0.87	0.10	32,41,49,54	0
2	NAG	A	505	14/15	0.89	0.12	29,42,53,65	0
2	NAG	A	503	14/15	0.93	0.07	16,24,37,38	0
2	NAG	A	509	14/15	0.93	0.09	31,44,53,64	0
2	NAG	C	503	14/15	0.96	0.06	16,23,27,29	0
3	EPE	C	512	15/15	0.96	0.09	22,31,44,45	0
3	EPE	A	512	15/15	0.97	0.07	20,25,33,34	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.