Full wwPDB X-ray Structure Validation Report ⓘ

Dec 2, 2024 – 01:40 PM JST

PDB ID	:	8Z69
Title	:	Crystal Structure of the second bromodomain of human BRD2 BD2 in complex with the inhibitor Y13195
Authors	:	Li, J.; Hu, Q.; Xu, H.; Zhao, X.; Zhang, C.; Zhu, R.; Wu, X.; Zhang, Y.; Xu, Y.
Deposited on	:	2024-04-18
Resolution	:	1.77 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/XrayValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

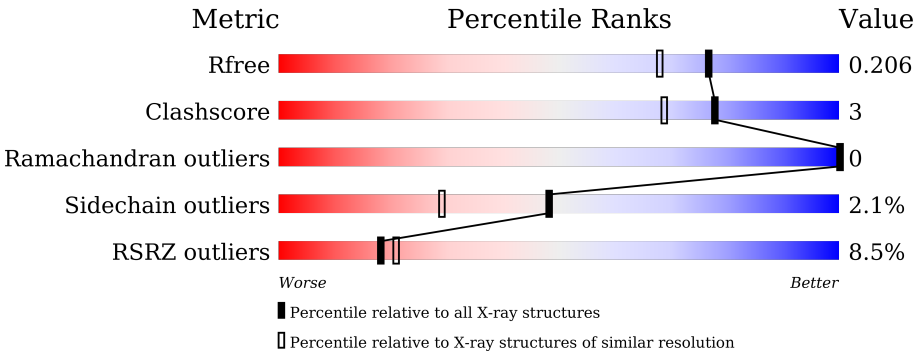
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.21
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.004 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.40

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 1.77 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}	164625	1191 (1.78-1.78)
Clashscore	180529	1282 (1.78-1.78)
Ramachandran outliers	177936	1270 (1.78-1.78)
Sidechain outliers	177891	1270 (1.78-1.78)
RSRZ outliers	164620	1191 (1.78-1.78)

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 <=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	136	7% 75% 5% 20%
1	B	136	9% 73% 7% 19%
1	C	136	7% 74% 6% 20%
1	D	136	4% 77% 20%

2 Entry composition (i)

There are 8 unique types of molecules in this entry. The entry contains 4336 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 BRD2_HUMAN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	109	Total	C	N	O	S	0	3	0
			918	590	161	160	7			
1	B	110	Total	C	N	O	S	0	3	0
			929	596	163	163	7			
1	C	109	Total	C	N	O	S	0	3	0
			918	590	161	160	7			
1	D	109	Total	C	N	O	S	0	3	0
			918	590	161	160	7			

There are 96 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	320	GLU	-	expression tag	UNP P25440
A	321	GLY	-	expression tag	UNP P25440
A	322	ASP	-	expression tag	UNP P25440
A	323	ILE	-	expression tag	UNP P25440
A	324	HIS	-	expression tag	UNP P25440
A	325	MET	-	expression tag	UNP P25440
A	326	LYS	-	expression tag	UNP P25440
A	327	LYS	-	expression tag	UNP P25440
A	328	GLY	-	expression tag	UNP P25440
A	329	HIS	-	expression tag	UNP P25440
A	330	HIS	-	expression tag	UNP P25440
A	331	HIS	-	expression tag	UNP P25440
A	332	HIS	-	expression tag	UNP P25440
A	333	HIS	-	expression tag	UNP P25440
A	334	HIS	-	expression tag	UNP P25440
A	335	GLU	-	expression tag	UNP P25440
A	336	ASN	-	expression tag	UNP P25440
A	337	LEU	-	expression tag	UNP P25440
A	338	TYR	-	expression tag	UNP P25440
A	339	PHE	-	expression tag	UNP P25440
A	340	GLN	-	expression tag	UNP P25440

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Chain	Residue	Modelled	Actual	Comment	Reference
A	341	GLY	-	expression tag	UNP P25440
A	342	GLY	-	expression tag	UNP P25440
A	343	SER	-	expression tag	UNP P25440
B	320	GLU	-	expression tag	UNP P25440
B	321	GLY	-	expression tag	UNP P25440
B	322	ASP	-	expression tag	UNP P25440
B	323	ILE	-	expression tag	UNP P25440
B	324	HIS	-	expression tag	UNP P25440
B	325	MET	-	expression tag	UNP P25440
B	326	LYS	-	expression tag	UNP P25440
B	327	LYS	-	expression tag	UNP P25440
B	328	GLY	-	expression tag	UNP P25440
B	329	HIS	-	expression tag	UNP P25440
B	330	HIS	-	expression tag	UNP P25440
B	331	HIS	-	expression tag	UNP P25440
B	332	HIS	-	expression tag	UNP P25440
B	333	HIS	-	expression tag	UNP P25440
B	334	HIS	-	expression tag	UNP P25440
B	335	GLU	-	expression tag	UNP P25440
B	336	ASN	-	expression tag	UNP P25440
B	337	LEU	-	expression tag	UNP P25440
B	338	TYR	-	expression tag	UNP P25440
B	339	PHE	-	expression tag	UNP P25440
B	340	GLN	-	expression tag	UNP P25440
B	341	GLY	-	expression tag	UNP P25440
B	342	GLY	-	expression tag	UNP P25440
B	343	SER	-	expression tag	UNP P25440
C	320	GLU	-	expression tag	UNP P25440
C	321	GLY	-	expression tag	UNP P25440
C	322	ASP	-	expression tag	UNP P25440
C	323	ILE	-	expression tag	UNP P25440
C	324	HIS	-	expression tag	UNP P25440
C	325	MET	-	expression tag	UNP P25440
C	326	LYS	-	expression tag	UNP P25440
C	327	LYS	-	expression tag	UNP P25440
C	328	GLY	-	expression tag	UNP P25440
C	329	HIS	-	expression tag	UNP P25440
C	330	HIS	-	expression tag	UNP P25440
C	331	HIS	-	expression tag	UNP P25440
C	332	HIS	-	expression tag	UNP P25440
C	333	HIS	-	expression tag	UNP P25440
C	334	HIS	-	expression tag	UNP P25440

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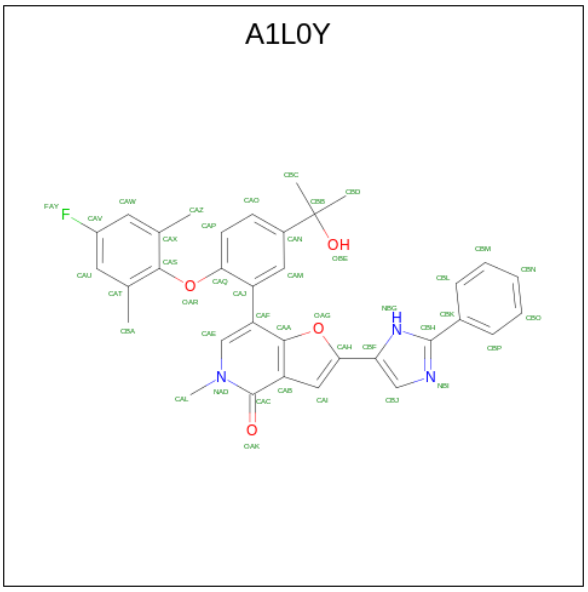
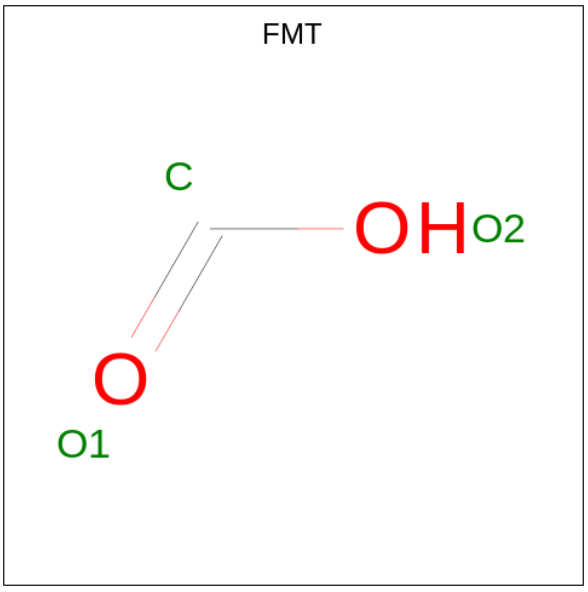
Chain	Residue	Modelled	Actual	Comment	Reference
C	335	GLU	-	expression tag	UNP P25440
C	336	ASN	-	expression tag	UNP P25440
C	337	LEU	-	expression tag	UNP P25440
C	338	TYR	-	expression tag	UNP P25440
C	339	PHE	-	expression tag	UNP P25440
C	340	GLN	-	expression tag	UNP P25440
C	341	GLY	-	expression tag	UNP P25440
C	342	GLY	-	expression tag	UNP P25440
C	343	SER	-	expression tag	UNP P25440
D	320	GLU	-	expression tag	UNP P25440
D	321	GLY	-	expression tag	UNP P25440
D	322	ASP	-	expression tag	UNP P25440
D	323	ILE	-	expression tag	UNP P25440
D	324	HIS	-	expression tag	UNP P25440
D	325	MET	-	expression tag	UNP P25440
D	326	LYS	-	expression tag	UNP P25440
D	327	LYS	-	expression tag	UNP P25440
D	328	GLY	-	expression tag	UNP P25440
D	329	HIS	-	expression tag	UNP P25440
D	330	HIS	-	expression tag	UNP P25440
D	331	HIS	-	expression tag	UNP P25440
D	332	HIS	-	expression tag	UNP P25440
D	333	HIS	-	expression tag	UNP P25440
D	334	HIS	-	expression tag	UNP P25440
D	335	GLU	-	expression tag	UNP P25440
D	336	ASN	-	expression tag	UNP P25440
D	337	LEU	-	expression tag	UNP P25440
D	338	TYR	-	expression tag	UNP P25440
D	339	PHE	-	expression tag	UNP P25440
D	340	GLN	-	expression tag	UNP P25440
D	341	GLY	-	expression tag	UNP P25440
D	342	GLY	-	expression tag	UNP P25440
D	343	SER	-	expression tag	UNP P25440

- Molecule 2 is 7-(2-(4-fluoro-2,6-dimethylphenoxy)-5-(2-hydroxypropan-2-yl)phenyl)-5-methyl-2-(2-phenyl-1H-imidazol-5-yl)furo[3,2-c]pyridin-4(5H)-one (three-letter code: A1L0Y) (formula: $C_{34}H_{30}FN_3O_4$) (labeled as "Ligand of Interest" by depositor).



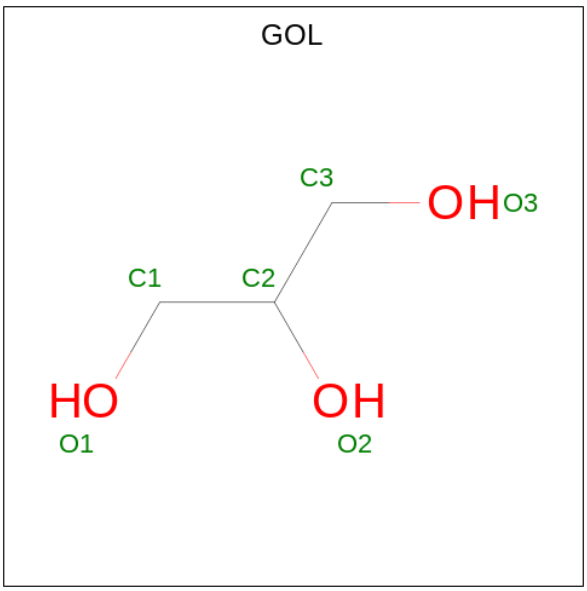
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	F	N	O	0	0
			42	34	1	3	4		
2	B	1	Total	C	F	N	O	0	0
			42	34	1	3	4		
2	C	1	Total	C	F	N	O	0	0
			42	34	1	3	4		
2	D	1	Total	C	F	N	O	0	0
			42	34	1	3	4		

- Molecule 3 is FORMIC ACID (three-letter code: FMT) (formula: CH_2O_2).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C O 3 1 2	0	0
3	A	1	Total C O 3 1 2	0	0
3	A	1	Total C O 3 1 2	0	0
3	C	1	Total C O 3 1 2	0	0
3	C	1	Total C O 3 1 2	0	0
3	D	1	Total C O 3 1 2	0	0
3	D	1	Total C O 3 1 2	0	0
3	D	1	Total C O 3 1 2	0	0
3	D	1	Total C O 3 1 2	0	0
3	D	1	Total C O 3 1 2	0	0

- Molecule 4 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).



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

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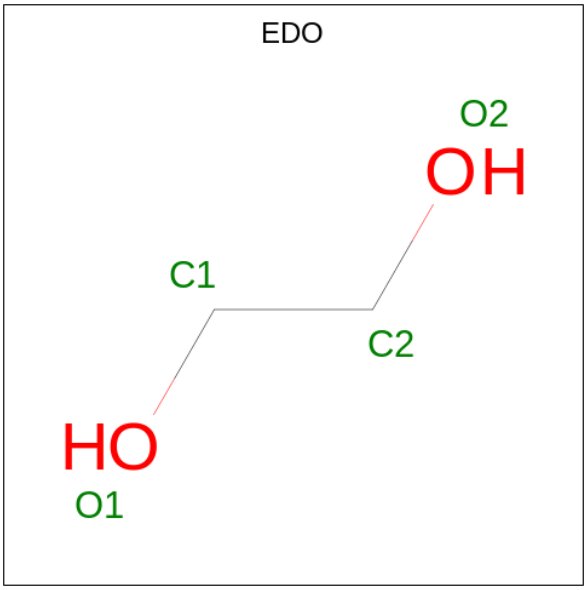
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	C	1	Total C O 6 3 3	0	0
4	C	1	Total C O 6 3 3	0	0

- Molecule 5 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: $C_2H_6O_2$).

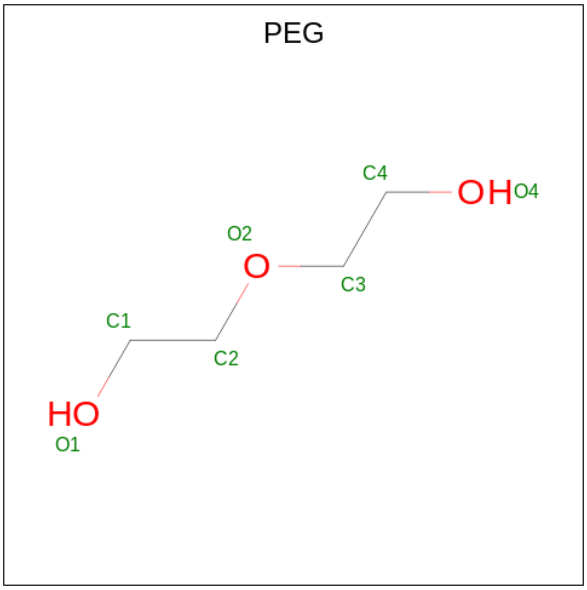


Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	B	1	Total C O 4 2 2	0	0
5	B	1	Total C O 4 2 2	0	0
5	C	1	Total C O 4 2 2	0	0
5	C	1	Total C O 4 2 2	0	0
5	D	1	Total C O 4 2 2	0	0
5	D	1	Total C O 4 2 2	0	0
5	D	1	Total C O 4 2 2	0	0

- Molecule 6 is SODIUM ION (three-letter code: NA) (formula: Na).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	C	1	Total Na 1 1	0	0
6	D	1	Total Na 1 1	0	0

- Molecule 7 is DI(HYDROXYETHYL)ETHER (three-letter code: PEG) (formula: $C_4H_{10}O_3$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	D	1	Total C O 7 4 3	0	0

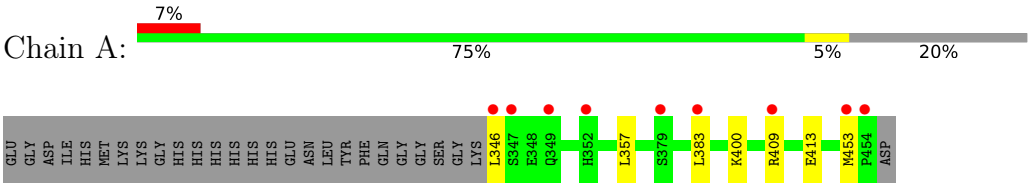
- Molecule 8 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	A	95	Total O 95 95	0	0
8	B	87	Total O 87 87	0	0
8	C	101	Total O 101 101	0	0
8	D	111	Total O 111 111	0	0

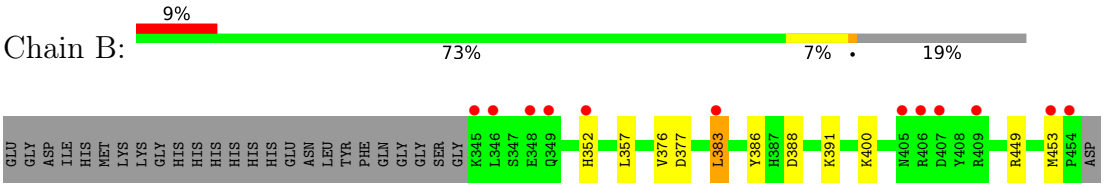
3 Residue-property plots (i)

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.

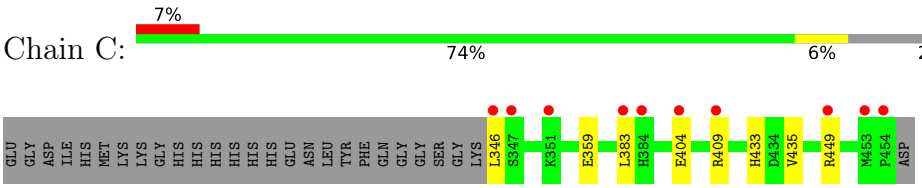
• Molecule 1: BRD2_HUMAN



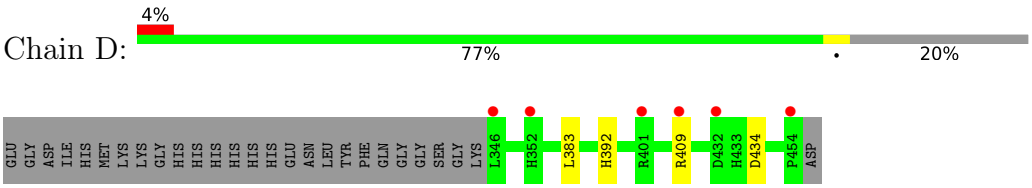
• Molecule 1: BRD2_HUMAN



• Molecule 1: BRD2_HUMAN



• Molecule 1: BRD2_HUMAN



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	89.27Å 95.53Å 110.71Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	42.24 – 1.77 42.24 – 1.77	Depositor EDS
% Data completeness (in resolution range)	98.3 (42.24-1.77) 98.3 (42.24-1.77)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.80 (at 1.77Å)	Xtriage
Refinement program	REFMAC 5.8.0258	Depositor
R, R_{free}	0.181 , 0.199 0.190 , 0.206	Depositor DCC
R_{free} test set	4512 reflections (4.87%)	wwPDB-VP
Wilson B-factor (Å^2)	32.0	Xtriage
Anisotropy	0.413	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.37 , 38.2	EDS
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	4336	wwPDB-VP
Average B, all atoms (Å^2)	36.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 10.26% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ 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: A1L0Y, NA, PEG, FMT, GOL, EDO

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	0.64	0/953	0.68	0/1283
1	B	0.64	0/961	0.69	0/1293
1	C	0.64	0/952	0.68	0/1280
1	D	0.64	0/953	0.71	0/1283
All	All	0.64	0/3819	0.69	0/5139

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	918	0	910	3	0
1	B	929	0	915	9	0
1	C	918	0	908	6	0
1	D	918	0	910	2	0
2	A	42	0	0	0	0
2	B	42	0	0	0	0
2	C	42	0	0	0	0
2	D	42	0	0	0	0
3	A	9	0	3	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	C	6	0	2	1	0
3	D	15	0	5	1	0
4	B	6	0	8	0	0
4	C	18	0	24	0	0
5	B	8	0	12	3	0
5	C	8	0	12	0	0
5	D	12	0	18	2	0
6	C	1	0	0	0	0
6	D	1	0	0	0	0
7	D	7	0	10	0	0
8	A	95	0	0	0	0
8	B	87	0	0	1	0
8	C	101	0	0	2	0
8	D	111	0	0	1	0
All	All	4336	0	3737	21	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 (21) 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:C:433:HIS:HD2	1:C:435:VAL:H	1.36	0.73
1:B:449:ARG:NH2	8:B:602:HOH:O	2.31	0.63
1:C:359[A]:GLU:OE1	1:C:449[A]:ARG:NH1	2.38	0.54
3:D:505:FMT:C	8:D:601:HOH:O	2.57	0.53
1:B:376:VAL:O	5:B:503:EDO:H22	2.14	0.48
1:B:377:ASP:HA	5:B:503:EDO:H11	1.95	0.47
1:B:357:LEU:HD21	1:B:400:LYS:HA	1.97	0.47
1:B:388:ASP:O	1:B:391:LYS:HE3	2.16	0.45
1:A:409:ARG:NH1	1:A:413:GLU:OE2	2.51	0.44
1:B:449:ARG:HD2	5:B:504:EDO:O1	2.17	0.44
1:C:433:HIS:HE1	8:C:684:HOH:O	2.00	0.43
1:D:434:ASP:H	5:D:508:EDO:H21	1.84	0.43
1:D:434:ASP:H	5:D:508:EDO:C2	2.32	0.43
1:B:383:LEU:HB3	1:B:386:TYR:HB2	2.01	0.42
1:C:346:LEU:HD12	1:C:346:LEU:HA	1.93	0.42
1:B:352[B]:HIS:HD2	1:B:453:MET:HE3	1.85	0.42
1:C:404:GLU:OE2	8:C:601:HOH:O	2.22	0.41
1:A:453:MET:HB2	1:A:453:MET:HE3	1.91	0.41
1:C:404:GLU:OE2	3:C:501:FMT:C	2.68	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:357:LEU:HD21	1:A:400:LYS:HA	2.03	0.41
1:B:453:MET:HE3	1:B:453:MET:HB2	1.90	0.41

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	110/136 (81%)	110 (100%)	0	0	100	100
1	B	111/136 (82%)	111 (100%)	0	0	100	100
1	C	110/136 (81%)	110 (100%)	0	0	100	100
1	D	110/136 (81%)	109 (99%)	1 (1%)	0	100	100
All	All	441/544 (81%)	440 (100%)	1 (0%)	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	99/118 (84%)	97 (98%)	2 (2%)	50	32
1	B	100/118 (85%)	99 (99%)	1 (1%)	73	61
1	C	97/118 (82%)	95 (98%)	2 (2%)	48	29

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	D	99/118 (84%)	96 (97%)	3 (3%)	36 15
All	All	395/472 (84%)	387 (98%)	8 (2%)	48 32

All (8) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	346	LEU
1	A	383	LEU
1	B	383	LEU
1	C	383	LEU
1	C	409	ARG
1	D	383	LEU
1	D	392	HIS
1	D	409	ARG

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	424	ASN
1	A	443	GLN
1	B	424	ASN
1	C	424	ASN
1	C	433	HIS
1	D	424	ASN

5.3.3 RNA

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains

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

5.5 Carbohydrates

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 28 ligands modelled in this entry, 2 are monoatomic - leaving 26 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	B	503	-	3,3,3	0.76	0	2,2,2	0.70	0
2	A1L0Y	D	501	-	41,47,47	2.83	12 (29%)	53,71,71	1.23	7 (13%)
3	FMT	D	502	-	2,2,2	0.37	0	1,1,1	0.14	0
3	FMT	A	504	-	2,2,2	0.28	0	1,1,1	0.17	0
3	FMT	D	505	-	2,2,2	0.34	0	1,1,1	0.04	0
4	GOL	C	506	-	5,5,5	0.08	0	5,5,5	0.24	0
3	FMT	C	508	-	2,2,2	0.44	0	1,1,1	0.14	0
5	EDO	D	508	-	3,3,3	0.26	0	2,2,2	0.36	0
4	GOL	C	504	-	5,5,5	0.08	0	5,5,5	0.25	0
5	EDO	D	509	-	3,3,3	0.06	0	2,2,2	0.14	0
7	PEG	D	506	-	6,6,6	0.21	0	5,5,5	0.12	0
5	EDO	C	502	-	3,3,3	0.20	0	2,2,2	0.33	0
4	GOL	C	505	-	5,5,5	0.08	0	5,5,5	0.32	0
4	GOL	B	502	-	5,5,5	0.09	0	5,5,5	0.25	0
3	FMT	C	501	-	2,2,2	0.43	0	1,1,1	0.11	0
5	EDO	D	507	-	3,3,3	0.18	0	2,2,2	0.28	0
3	FMT	D	510	-	2,2,2	0.28	0	1,1,1	0.18	0
2	A1L0Y	A	501	-	41,47,47	3.20	11 (26%)	53,71,71	1.36	7 (13%)
3	FMT	A	503	-	2,2,2	0.48	0	1,1,1	0.12	0
3	FMT	A	502	-	2,2,2	0.43	0	1,1,1	0.13	0
5	EDO	B	504	-	3,3,3	0.09	0	2,2,2	0.24	0
2	A1L0Y	B	501	-	41,47,47	3.07	10 (24%)	53,71,71	1.11	4 (7%)
2	A1L0Y	C	503	-	41,47,47	2.68	10 (24%)	53,71,71	1.27	9 (16%)
3	FMT	D	504	-	2,2,2	0.45	0	1,1,1	0.07	0
3	FMT	D	503	-	2,2,2	0.50	0	1,1,1	0.04	0
5	EDO	C	507	-	3,3,3	0.06	0	2,2,2	0.14	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	D	507	-	-	1/1/1/1	-
5	EDO	D	508	-	-	0/1/1/1	-
5	EDO	D	509	-	-	0/1/1/1	-
5	EDO	B	503	-	-	0/1/1/1	-
2	A1L0Y	A	501	-	-	0/18/22/22	0/6/6/6
5	EDO	C	502	-	-	1/1/1/1	-
7	PEG	D	506	-	-	2/4/4/4	-
4	GOL	C	505	-	-	2/4/4/4	-
5	EDO	B	504	-	-	1/1/1/1	-
2	A1L0Y	B	501	-	-	4/18/22/22	0/6/6/6
2	A1L0Y	D	501	-	-	0/18/22/22	0/6/6/6
4	GOL	B	502	-	-	0/4/4/4	-
2	A1L0Y	C	503	-	-	4/18/22/22	0/6/6/6
4	GOL	C	504	-	-	0/4/4/4	-
4	GOL	C	506	-	-	2/4/4/4	-
5	EDO	C	507	-	-	0/1/1/1	-

All (43) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	501	A1L0Y	CBB-CAN	-14.57	1.43	1.53
2	B	501	A1L0Y	CBB-CAN	-14.28	1.43	1.53
2	D	501	A1L0Y	CBB-CAN	-11.43	1.45	1.53
2	C	503	A1L0Y	CBB-CAN	-9.97	1.46	1.53
2	A	501	A1L0Y	CBF-CAH	-5.98	1.35	1.49
2	C	503	A1L0Y	CAA-CAF	-5.64	1.34	1.47
2	D	501	A1L0Y	CBF-CAH	-5.64	1.36	1.49
2	C	503	A1L0Y	CBF-CAH	-5.34	1.37	1.49
2	D	501	A1L0Y	CAB-CAC	-5.31	1.36	1.47
2	C	503	A1L0Y	CBA-CAT	-5.25	1.40	1.51
2	B	501	A1L0Y	CAB-CAC	-5.21	1.37	1.47
2	D	501	A1L0Y	CAA-CAF	-5.17	1.35	1.47
2	A	501	A1L0Y	CAB-CAC	-5.17	1.37	1.47
2	A	501	A1L0Y	CAA-CAF	-5.15	1.35	1.47
2	A	501	A1L0Y	CAZ-CAX	-5.15	1.40	1.51
2	C	503	A1L0Y	CAB-CAC	-5.09	1.37	1.47
2	B	501	A1L0Y	CAA-CAF	-4.97	1.35	1.47
2	A	501	A1L0Y	CBK-CBH	-4.81	1.36	1.48
2	B	501	A1L0Y	CBF-CAH	-4.68	1.38	1.49
2	C	503	A1L0Y	CBK-CBH	-4.65	1.36	1.48
2	D	501	A1L0Y	CAZ-CAX	-4.53	1.41	1.51
2	B	501	A1L0Y	CAZ-CAX	-4.36	1.42	1.51

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	501	A1L0Y	CBA-CAT	-4.34	1.42	1.51
2	B	501	A1L0Y	CBK-CBH	-4.30	1.37	1.48
2	B	501	A1L0Y	CBA-CAT	-4.28	1.42	1.51
2	D	501	A1L0Y	CBA-CAT	-4.28	1.42	1.51
2	D	501	A1L0Y	CBK-CBH	-4.03	1.38	1.48
2	A	501	A1L0Y	CBC-CBB	3.63	1.57	1.52
2	B	501	A1L0Y	CBC-CBB	3.34	1.56	1.52
2	C	503	A1L0Y	CAE-NAD	3.28	1.44	1.36
2	C	503	A1L0Y	CAZ-CAX	-3.06	1.44	1.51
2	D	501	A1L0Y	CAJ-CAF	-2.93	1.44	1.49
2	B	501	A1L0Y	CAJ-CAF	-2.89	1.44	1.49
2	C	503	A1L0Y	CAJ-CAF	-2.65	1.44	1.49
2	A	501	A1L0Y	CAJ-CAF	-2.47	1.45	1.49
2	B	501	A1L0Y	CBD-CBB	-2.43	1.50	1.52
2	C	503	A1L0Y	OAK-CAC	2.37	1.27	1.22
2	A	501	A1L0Y	CAE-NAD	2.25	1.42	1.36
2	D	501	A1L0Y	CAI-CAB	-2.22	1.35	1.40
2	A	501	A1L0Y	CAM-CAN	2.18	1.43	1.39
2	D	501	A1L0Y	CBH-NBG	-2.12	1.33	1.35
2	D	501	A1L0Y	CAE-NAD	2.04	1.41	1.36
2	D	501	A1L0Y	OAR-CAS	-2.04	1.35	1.39

All (27) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	501	A1L0Y	CAM-CAN-CBB	3.62	124.95	120.43
2	C	503	A1L0Y	CAF-CAE-NAD	-3.45	118.54	122.96
2	D	501	A1L0Y	CAF-CAE-NAD	-3.41	118.59	122.96
2	C	503	A1L0Y	OBE-CBB-CAN	3.37	114.64	109.13
2	A	501	A1L0Y	CAQ-OAR-CAS	3.27	125.04	117.79
2	D	501	A1L0Y	CBK-CBH-NBI	3.24	127.76	123.71
2	A	501	A1L0Y	OBE-CBB-CAN	3.03	114.08	109.13
2	C	503	A1L0Y	CAQ-OAR-CAS	2.91	124.26	117.79
2	A	501	A1L0Y	CAF-CAE-NAD	-2.77	119.42	122.96
2	A	501	A1L0Y	CBD-CBB-CBC	-2.71	107.17	110.49
2	C	503	A1L0Y	CAL-NAD-CAE	-2.67	115.28	120.61
2	D	501	A1L0Y	CAQ-OAR-CAS	2.64	123.66	117.79
2	B	501	A1L0Y	OBE-CBB-CAN	2.64	113.44	109.13
2	B	501	A1L0Y	CAM-CAN-CBB	2.57	123.64	120.43
2	A	501	A1L0Y	CAU-CAV-CAW	-2.57	120.28	123.52
2	D	501	A1L0Y	OBE-CBB-CAN	2.56	113.32	109.13
2	C	503	A1L0Y	CAQ-CAJ-CAF	2.48	124.60	121.57

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	C	503	A1L0Y	CBK-CBH-NBI	2.35	126.65	123.71
2	D	501	A1L0Y	CAX-CAW-CAV	2.30	120.92	119.26
2	D	501	A1L0Y	CAU-CAV-CAW	-2.24	120.69	123.52
2	B	501	A1L0Y	CAQ-OAR-CAS	2.13	122.52	117.79
2	C	503	A1L0Y	FAY-CAV-CAW	2.08	121.23	118.25
2	A	501	A1L0Y	CAO-CAN-CBB	-2.08	118.89	121.55
2	C	503	A1L0Y	CAM-CAN-CBB	2.07	123.02	120.43
2	D	501	A1L0Y	CAM-CAN-CBB	2.07	123.02	120.43
2	B	501	A1L0Y	CBK-CBH-NBI	2.04	126.25	123.71
2	C	503	A1L0Y	CAU-CAV-CAW	-2.02	120.96	123.52

There are no chirality outliers.

All (17) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
7	D	506	PEG	O1-C1-C2-O2
4	C	505	GOL	O1-C1-C2-C3
4	C	506	GOL	C1-C2-C3-O3
4	C	506	GOL	O2-C2-C3-O3
5	B	504	EDO	O1-C1-C2-O2
7	D	506	PEG	C1-C2-O2-C3
2	C	503	A1L0Y	NBI-CBH-CBK-CBP
2	B	501	A1L0Y	NBG-CBH-CBK-CBP
2	B	501	A1L0Y	NBI-CBH-CBK-CBL
2	C	503	A1L0Y	NBG-CBH-CBK-CBL
2	C	503	A1L0Y	NBI-CBH-CBK-CBL
4	C	505	GOL	O1-C1-C2-O2
5	C	502	EDO	O1-C1-C2-O2
5	D	507	EDO	O1-C1-C2-O2
2	B	501	A1L0Y	NBG-CBH-CBK-CBL
2	B	501	A1L0Y	NBI-CBH-CBK-CBP
2	C	503	A1L0Y	NBG-CBH-CBK-CBP

There are no ring outliers.

5 monomers are involved in 7 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	B	503	EDO	2	0
3	D	505	FMT	1	0
5	D	508	EDO	2	0
3	C	501	FMT	1	0

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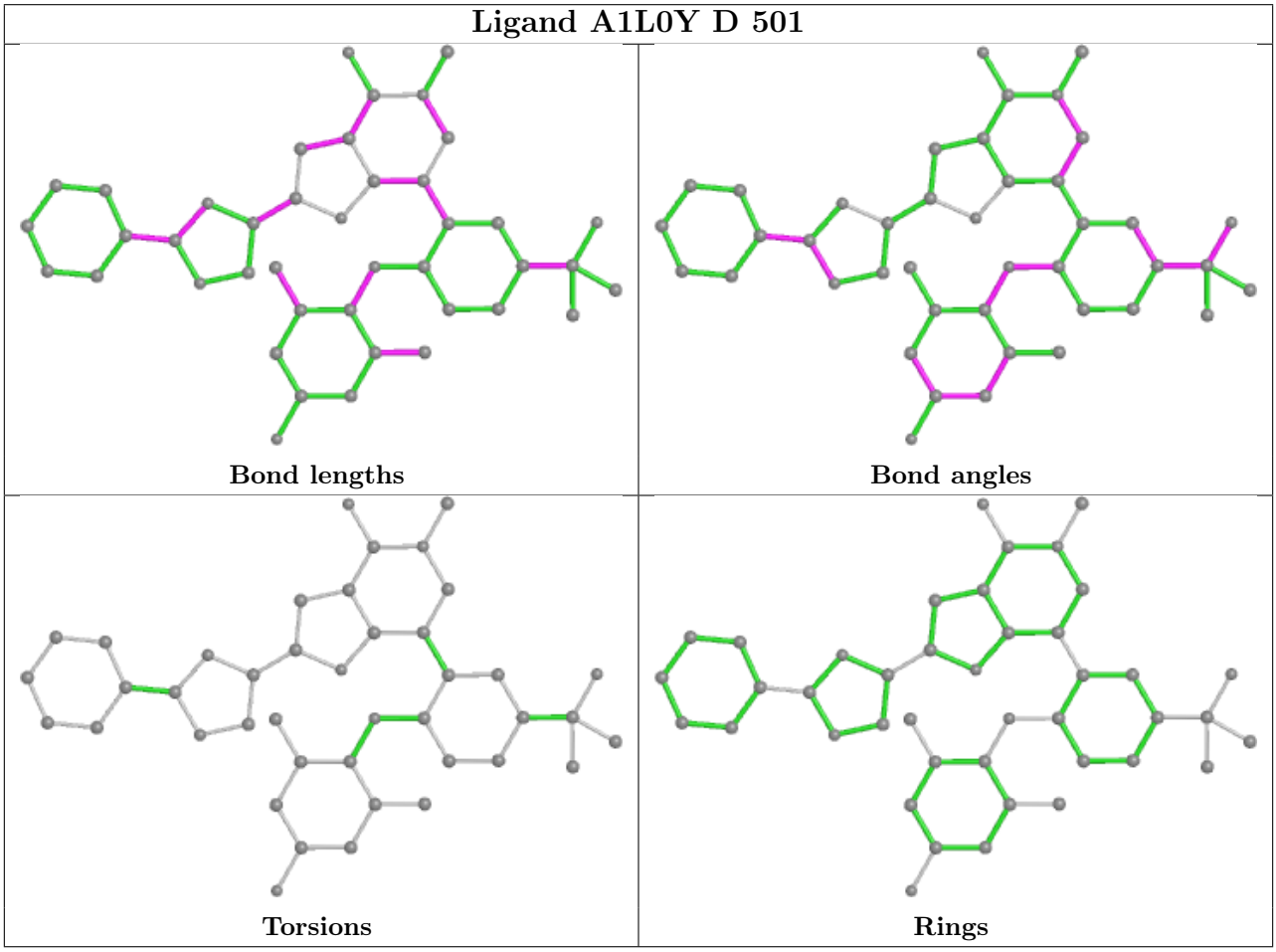
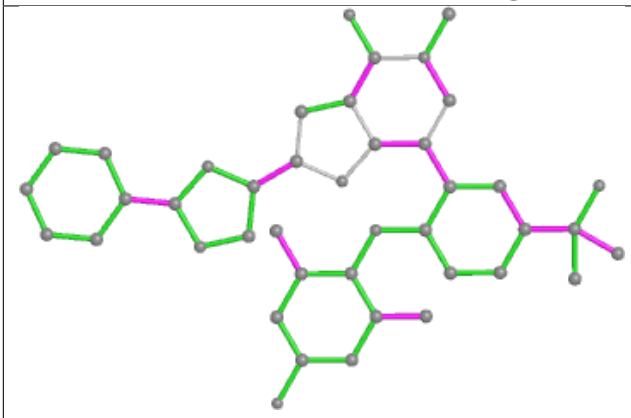
Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	B	504	EDO	1	0

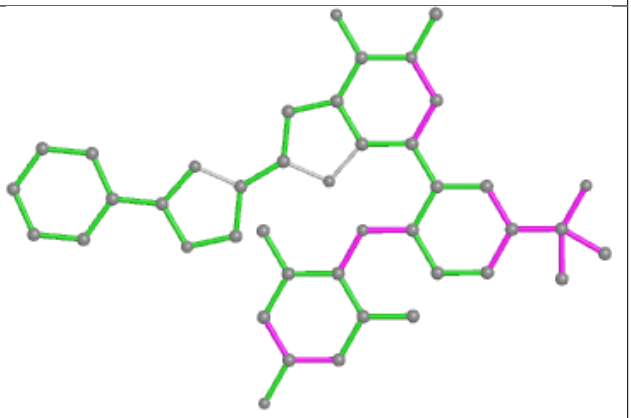
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 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.



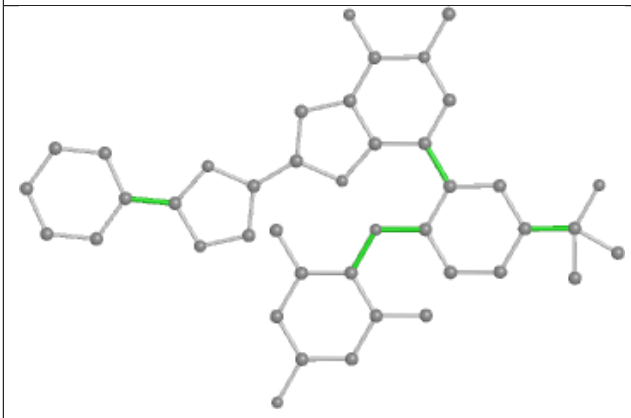
Ligand A1L0Y A 501



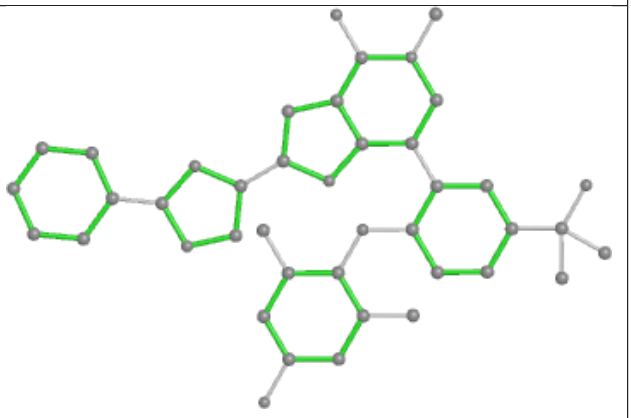
Bond lengths



Bond angles

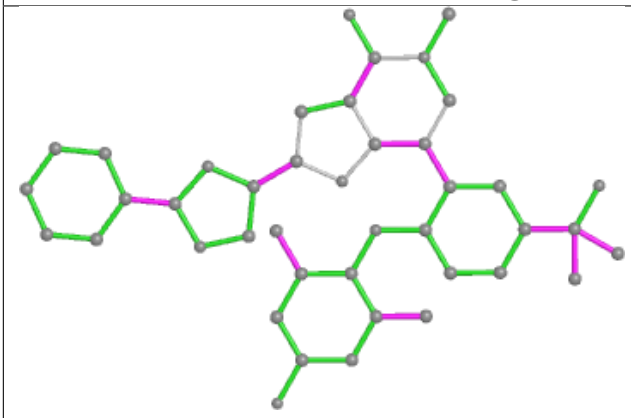


Torsions

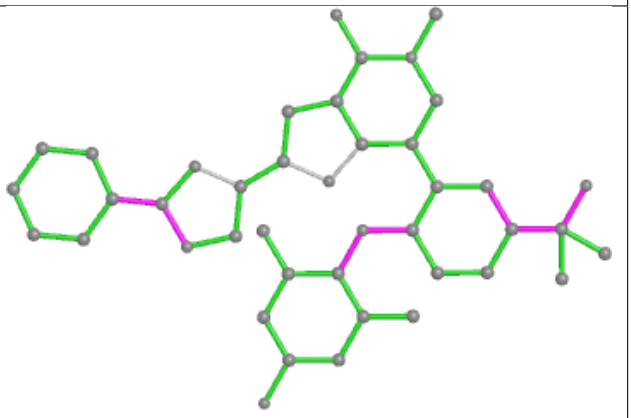


Rings

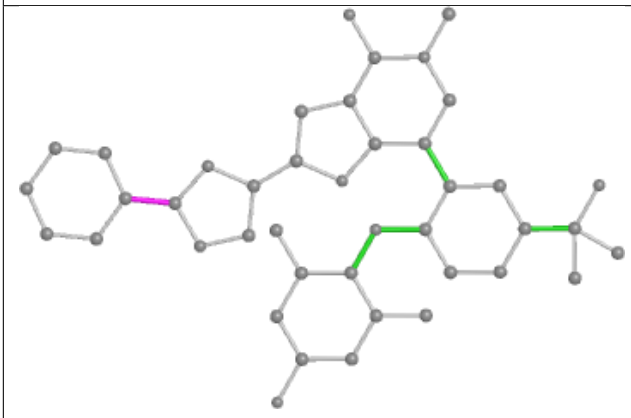
Ligand A1L0Y B 501



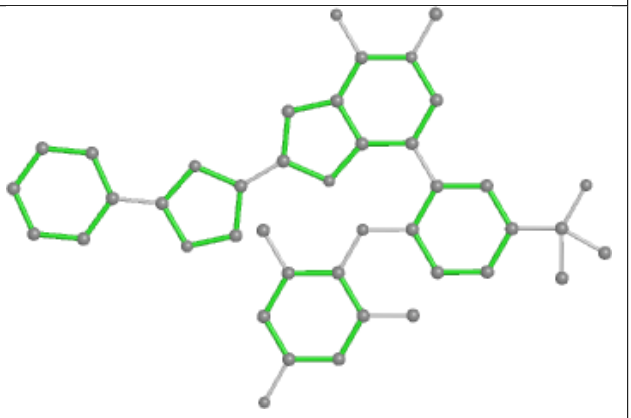
Bond lengths



Bond angles

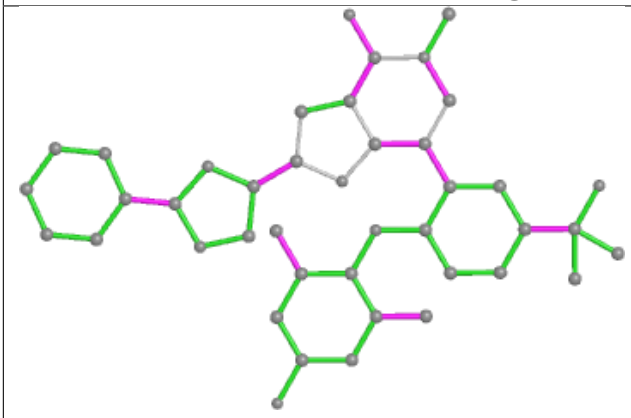


Torsions

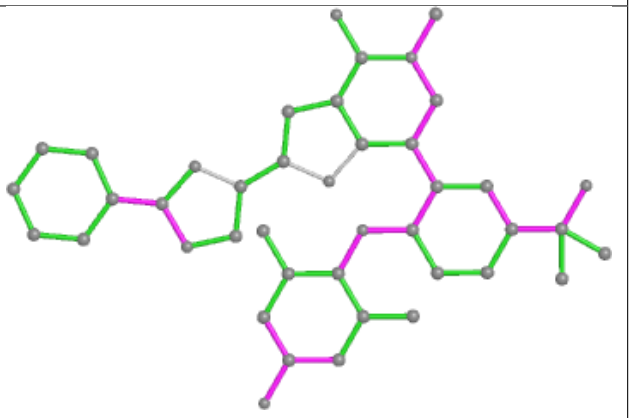


Rings

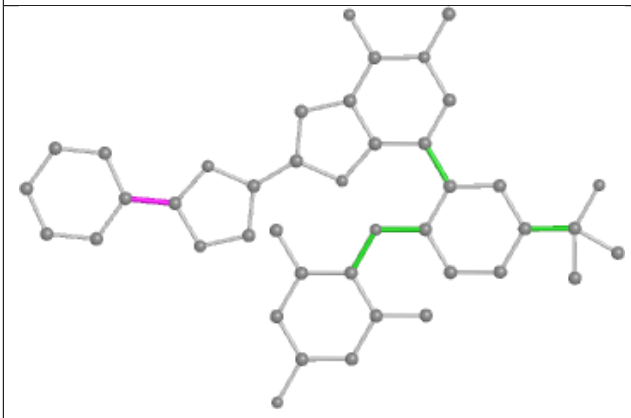
Ligand A1L0Y C 503



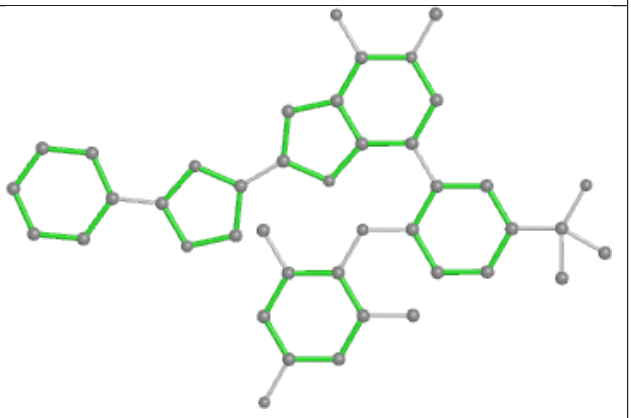
Bond lengths



Bond angles



Torsions



Rings

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, 95^{th} 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	109/136 (80%)	0.73	9 (8%) 19 22	19, 34, 57, 85	3 (2%)
1	B	110/136 (80%)	0.53	12 (10%) 12 14	13, 32, 59, 92	3 (2%)
1	C	109/136 (80%)	0.44	10 (9%) 16 19	17, 31, 53, 81	3 (2%)
1	D	109/136 (80%)	0.29	6 (5%) 32 38	17, 31, 50, 67	3 (2%)
All	All	437/544 (80%)	0.50	37 (8%) 18 21	13, 32, 57, 92	12 (2%)

All (37) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	346	LEU	11.2
1	A	346	LEU	11.2
1	A	454	PRO	5.4
1	C	454	PRO	5.0
1	B	345	LYS	4.3
1	B	405	ASN	4.1
1	C	384	HIS	4.1
1	B	454	PRO	3.9
1	C	383	LEU	3.7
1	D	454	PRO	3.6
1	C	347	SER	3.5
1	D	352[A]	HIS	3.3
1	B	346	LEU	3.2
1	C	409	ARG	3.0
1	B	348	GLU	2.9
1	B	352[A]	HIS	2.9
1	C	404	GLU	2.9
1	A	383	LEU	2.8
1	A	347	SER	2.7
1	A	409	ARG	2.7
1	B	407	ASP	2.6

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Mol	Chain	Res	Type	RSRZ
1	A	352[A]	HIS	2.6
1	D	409	ARG	2.5
1	C	351	LYS	2.4
1	D	346	LEU	2.4
1	A	349	GLN	2.4
1	D	432	ASP	2.3
1	B	349	GLN	2.3
1	C	453	MET	2.2
1	B	409	ARG	2.2
1	B	453	MET	2.2
1	B	406	ARG	2.2
1	B	383	LEU	2.2
1	C	449[A]	ARG	2.1
1	D	401	ARG	2.1
1	A	453	MET	2.1
1	A	379	SER	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^{th} 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
5	EDO	B	504	4/4	0.59	0.31	78,80,81,82	0
3	FMT	D	510	3/3	0.61	0.19	82,82,82,83	0
7	PEG	D	506	7/7	0.66	0.28	66,73,84,86	0
5	EDO	D	507	4/4	0.70	0.24	57,59,59,60	0
3	FMT	A	504	3/3	0.72	0.18	82,82,83,84	0
5	EDO	D	509	4/4	0.73	0.22	89,89,91,92	0
3	FMT	C	508	3/3	0.77	0.19	53,53,59,61	0

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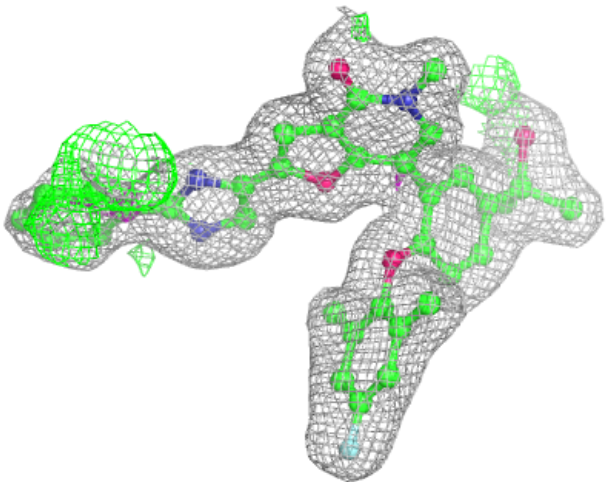
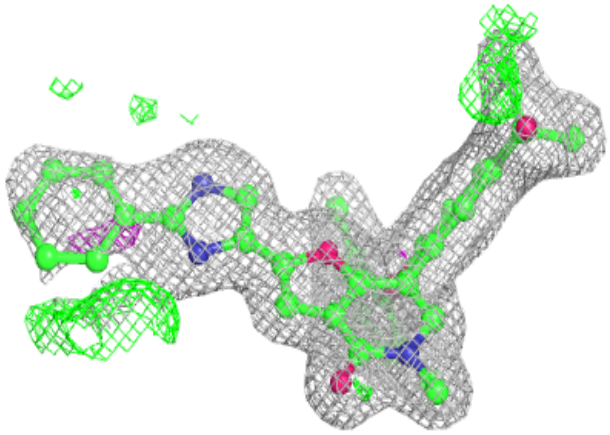
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	FMT	C	501	3/3	0.77	0.26	63,63,65,68	0
3	FMT	D	502	3/3	0.80	0.23	65,65,66,70	0
5	EDO	D	508	4/4	0.80	0.22	41,49,54,57	0
3	FMT	D	504	3/3	0.81	0.31	54,54,54,59	0
5	EDO	C	502	4/4	0.81	0.27	62,65,65,68	0
3	FMT	D	503	3/3	0.84	0.23	52,52,55,61	0
4	GOL	C	506	6/6	0.85	0.20	47,59,63,63	0
6	NA	C	509	1/1	0.86	0.25	56,56,56,56	0
4	GOL	C	504	6/6	0.87	0.19	51,60,64,65	0
4	GOL	B	502	6/6	0.88	0.17	40,61,67,70	0
5	EDO	C	507	4/4	0.89	0.20	41,55,57,66	0
6	NA	D	511	1/1	0.89	0.20	47,47,47,47	0
3	FMT	A	503	3/3	0.89	0.30	51,51,51,55	0
4	GOL	C	505	6/6	0.90	0.17	62,66,70,70	0
3	FMT	D	505	3/3	0.90	0.23	44,44,52,55	0
5	EDO	B	503	4/4	0.90	0.16	30,34,36,48	0
3	FMT	A	502	3/3	0.90	0.17	47,47,57,58	0
2	A1L0Y	A	501	42/42	0.95	0.10	27,34,69,73	0
2	A1L0Y	B	501	42/42	0.97	0.06	22,25,39,41	0
2	A1L0Y	C	503	42/42	0.97	0.06	24,26,41,44	0
2	A1L0Y	D	501	42/42	0.97	0.07	24,29,43,45	0

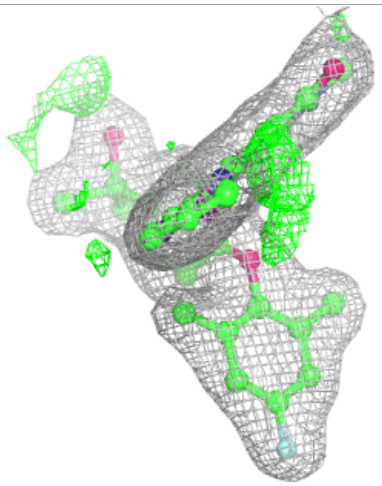
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around A1L0Y A 501:

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

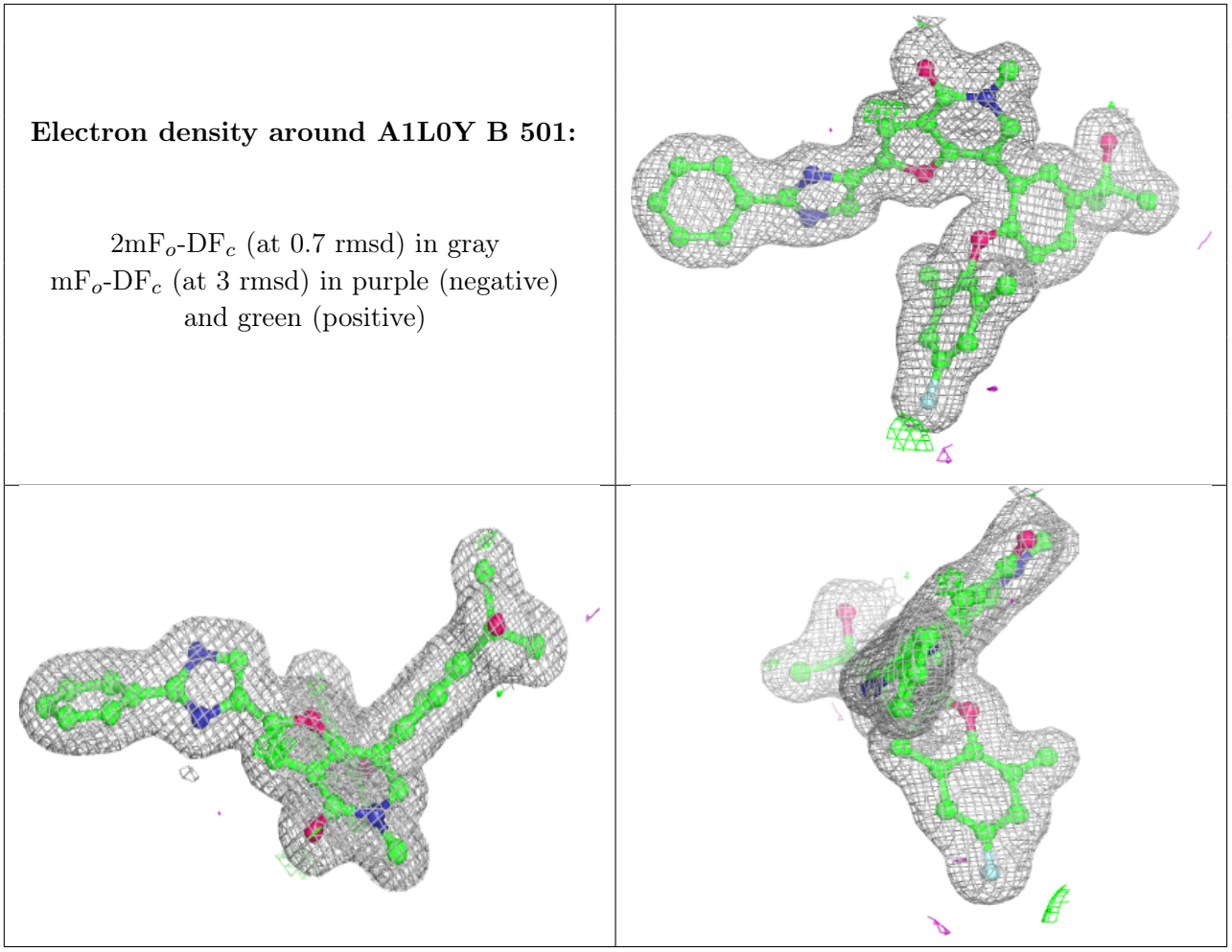






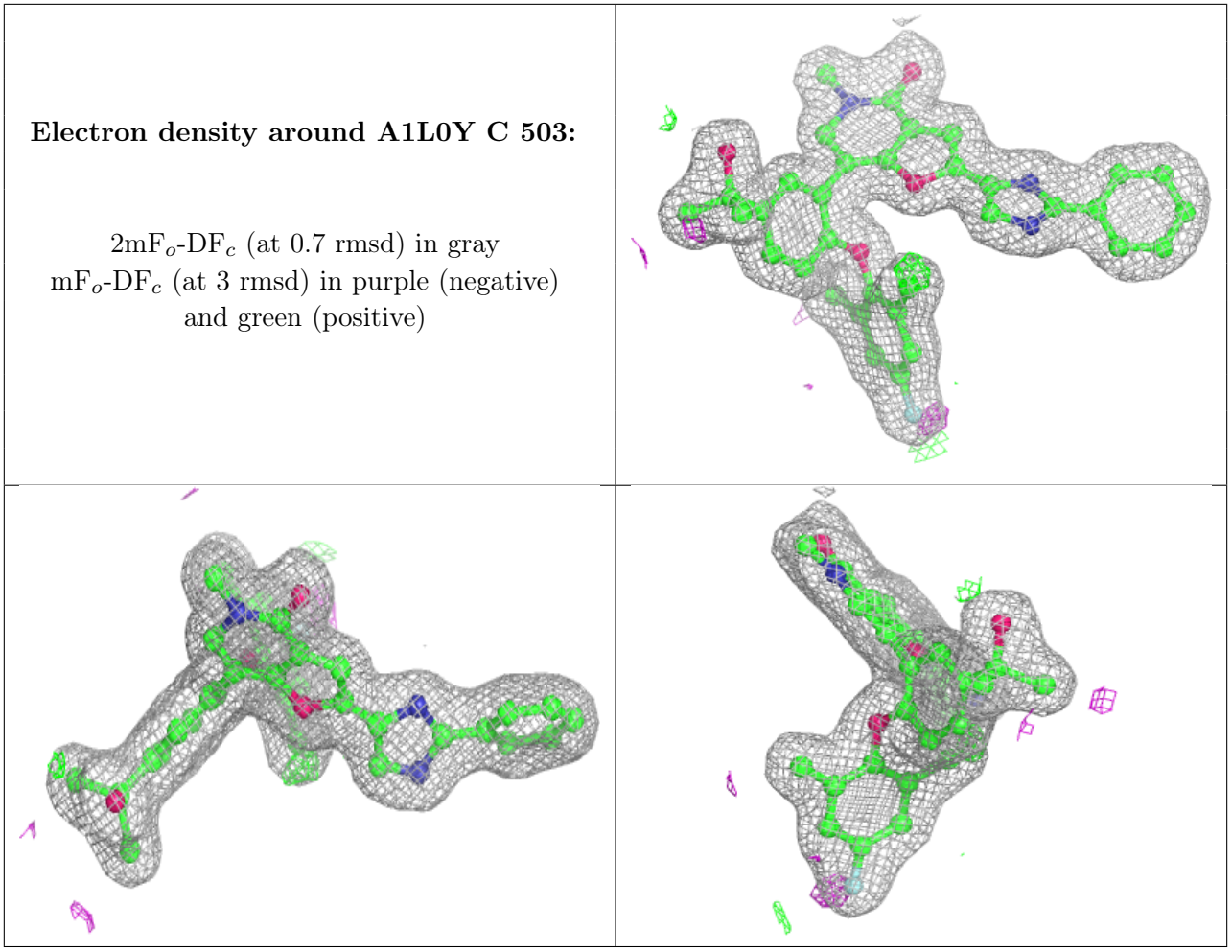
Electron density around A1L0Y B 501:

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



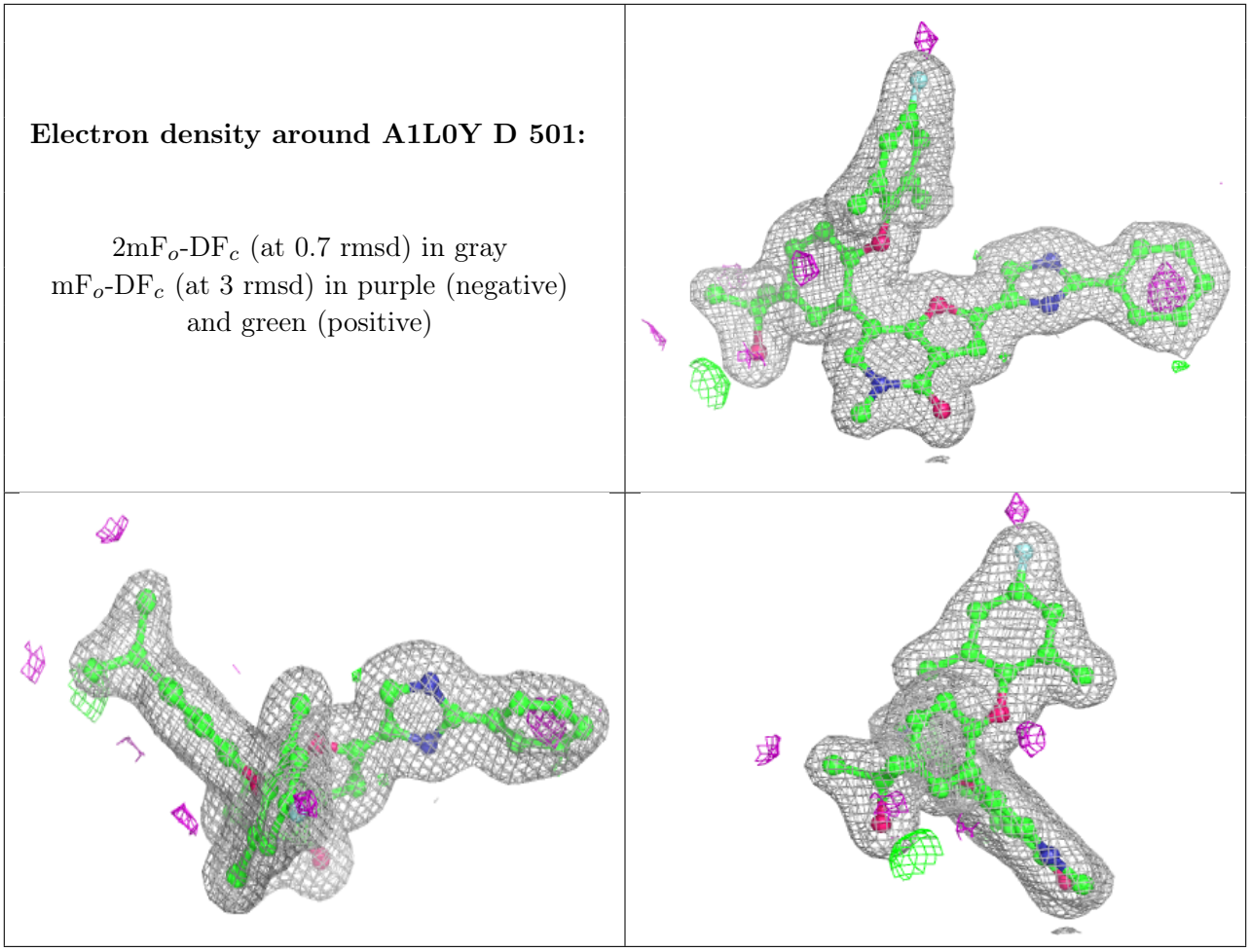
Electron density around A1L0Y C 503:

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



Electron density around A1L0Y D 501:

$2mF_o$-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.