



Full wwPDB X-ray Structure Validation Report ⓘ

Jan 21, 2024 – 12:44 am GMT

PDB ID : 7NBG
Title : Crystal structure of human serine racemase in complex with DSiP fragment Z52314092, XChem fragment screen.
Authors : Koulouris, C.R.; Roe, S.M.
Deposited on : 2021-01-26
Resolution : 1.53 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 : 1.8.4, CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.36
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36

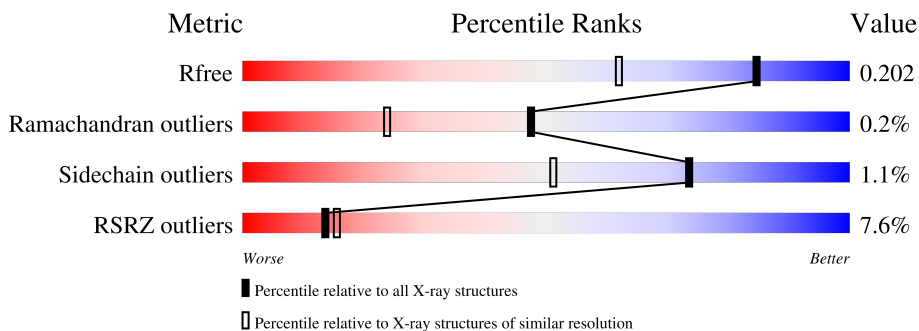
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.53 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	2556 (1.56-1.52)
Ramachandran outliers	138981	2580 (1.56-1.52)
Sidechain outliers	138945	2577 (1.56-1.52)
RSRZ outliers	127900	2524 (1.56-1.52)

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	AAA	346	
1	BBB	346	
1	CCC	346	
1	DDD	346	

2 Entry composition i

There are 12 unique types of molecules in this entry. The entry contains 11577 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 Serine racemase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	AAA	322	Total 2716	C 1725	N 461	O 518	S 12	0	36	0
1	BBB	308	Total 2437	C 1554	N 407	O 465	S 11	9	21	0
1	CCC	317	Total 2648	C 1691	N 436	O 509	S 12	0	33	0
1	DDD	310	Total 2572	C 1637	N 426	O 495	S 14	0	39	0

There are 32 discrepancies between the modelled and reference sequences:

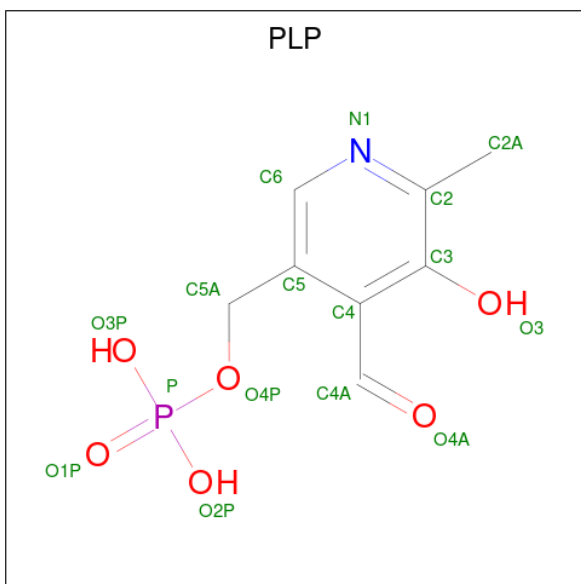
Chain	Residue	Modelled	Actual	Comment	Reference
AAA	2	ASP	CYS	engineered mutation	UNP Q9GZT4
AAA	6	ASP	CYS	engineered mutation	UNP Q9GZT4
AAA	341	HIS	-	expression tag	UNP Q9GZT4
AAA	342	HIS	-	expression tag	UNP Q9GZT4
AAA	343	HIS	-	expression tag	UNP Q9GZT4
AAA	344	HIS	-	expression tag	UNP Q9GZT4
AAA	345	HIS	-	expression tag	UNP Q9GZT4
AAA	346	HIS	-	expression tag	UNP Q9GZT4
BBB	2	ASP	CYS	engineered mutation	UNP Q9GZT4
BBB	6	ASP	CYS	engineered mutation	UNP Q9GZT4
BBB	341	HIS	-	expression tag	UNP Q9GZT4
BBB	342	HIS	-	expression tag	UNP Q9GZT4
BBB	343	HIS	-	expression tag	UNP Q9GZT4
BBB	344	HIS	-	expression tag	UNP Q9GZT4
BBB	345	HIS	-	expression tag	UNP Q9GZT4
BBB	346	HIS	-	expression tag	UNP Q9GZT4
CCC	2	ASP	CYS	engineered mutation	UNP Q9GZT4
CCC	6	ASP	CYS	engineered mutation	UNP Q9GZT4
CCC	341	HIS	-	expression tag	UNP Q9GZT4
CCC	342	HIS	-	expression tag	UNP Q9GZT4
CCC	343	HIS	-	expression tag	UNP Q9GZT4

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Chain	Residue	Modelled	Actual	Comment	Reference
CCC	344	HIS	-	expression tag	UNP Q9GZT4
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CCC	346	HIS	-	expression tag	UNP Q9GZT4
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DDD	6	ASP	CYS	engineered mutation	UNP Q9GZT4
DDD	341	HIS	-	expression tag	UNP Q9GZT4
DDD	342	HIS	-	expression tag	UNP Q9GZT4
DDD	343	HIS	-	expression tag	UNP Q9GZT4
DDD	344	HIS	-	expression tag	UNP Q9GZT4
DDD	345	HIS	-	expression tag	UNP Q9GZT4
DDD	346	HIS	-	expression tag	UNP Q9GZT4

- Molecule 2 is PYRIDOXAL-5'-PHOSPHATE (three-letter code: PLP) (formula: C₈H₁₀NO₆P).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
2	AAA	1	Total	C	N	O	P	0	1
			30	16	2	10	2		
2	BBB	1	Total	C	N	O	P	0	0
			15	8	1	5	1		
2	CCC	1	Total	C	N	O	P	0	0
			15	8	1	5	1		
2	DDD	1	Total	C	N	O	P	0	0
			15	8	1	5	1		

- Molecule 3 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: C₂H₆O₂).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	AAA	1	Total C O 4 2 2	0	0
3	AAA	1	Total C O 8 4 4	0	1
3	AAA	1	Total C O 4 2 2	0	0
3	AAA	1	Total C O 4 2 2	0	1
3	AAA	1	Total C O 4 2 2	0	0
3	BBB	1	Total C O 4 2 2	0	0
3	CCC	1	Total C O 4 2 2	0	0
3	CCC	1	Total C O 8 4 4	0	1
3	CCC	1	Total C O 4 2 2	0	0
3	CCC	1	Total C O 4 2 2	0	0
3	DDD	1	Total C O 4 2 2	0	0
3	DDD	1	Total C O 4 2 2	0	0
3	DDD	1	Total C O 4 2 2	0	0
3	DDD	1	Total C O 4 2 2	0	0

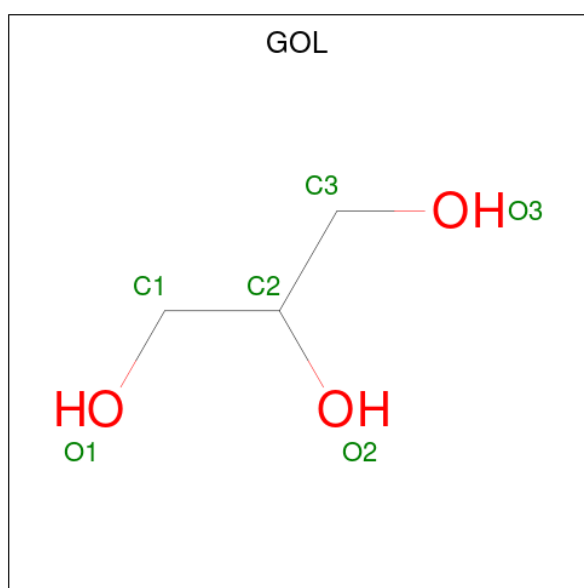
- Molecule 4 is SODIUM ION (three-letter code: NA) (formula: Na).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	AAA	4	Total	Na	0	1
			5	5		
4	BBB	2	Total	Na	0	0
			2	2		
4	CCC	2	Total	Na	0	0
			2	2		
4	DDD	1	Total	Na	0	0
			1	1		

- Molecule 5 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	AAA	1	Total	Ca	0	0
			1	1		
5	BBB	1	Total	Ca	0	0
			1	1		
5	CCC	1	Total	Ca	0	1
			2	2		
5	DDD	1	Total	Ca	0	0
			1	1		

- Molecule 6 is GLYCEROL (three-letter code: GOL) (formula: C₃H₈O₃).



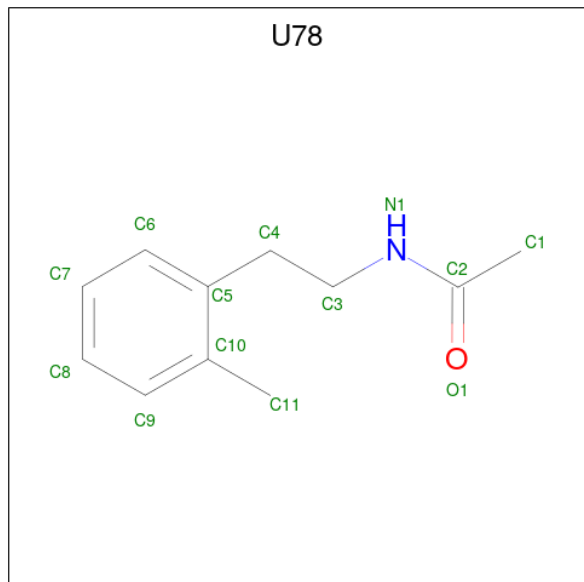
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	AAA	1	Total	C	O	0	0
			6	3	3		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	AAA	1	Total	C	O	0	1
			6	3	3		
6	CCC	1	Total	C	O	0	0
			6	3	3		
6	CCC	1	Total	C	O	0	0
			6	3	3		
6	CCC	1	Total	C	O	0	1
			12	6	6		
6	DDD	1	Total	C	O	0	1
			12	6	6		

- Molecule 7 is {N}-[2-(2-methylphenyl)ethyl]ethanamide (three-letter code: U78) (formula: C₁₁H₁₅NO) (labeled as "Ligand of Interest" by depositor).

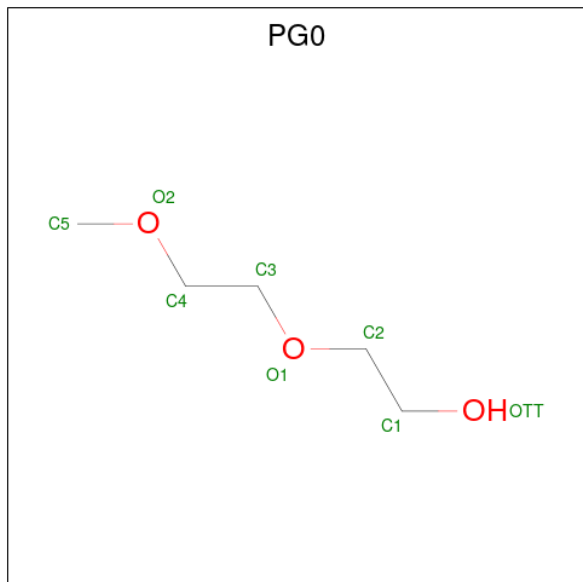


Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
7	AAA	1	Total	C	N	O	0	0
			13	11	1	1		
7	BBB	1	Total	C	N	O	0	0
			13	11	1	1		

- Molecule 8 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

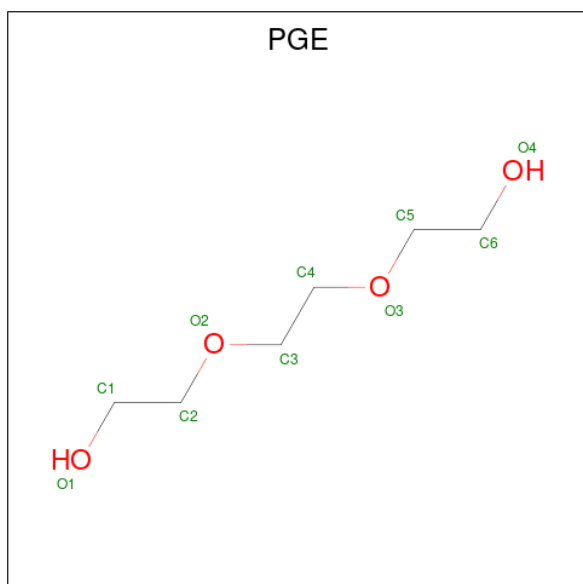
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	BBB	1	Total	Mg	0	0
			1	1		
8	DDD	1	Total	Mg	0	0
			1	1		

- Molecule 9 is 2-(2-METHOXYETHOXY)ETHANOL (three-letter code: PG0) (formula: $C_5H_{12}O_3$).



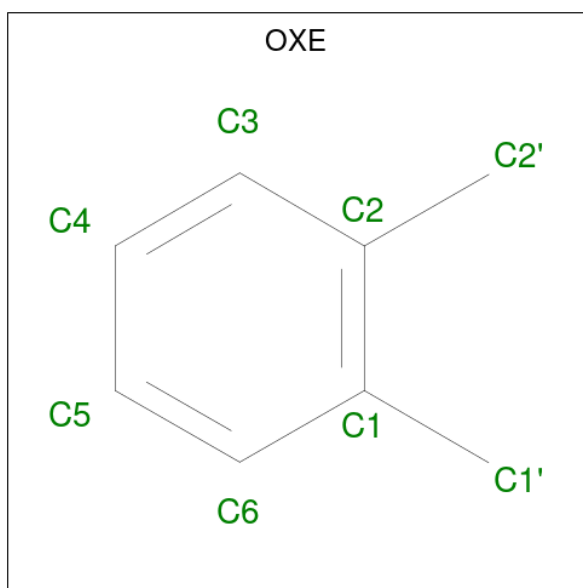
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
9	DDD	1	8	5	3	0	0

- Molecule 10 is TRIETHYLENE GLYCOL (three-letter code: PGE) (formula: $C_6H_{14}O_4$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
10	DDD	1	10	6	4	0	0

- Molecule 11 is ORTHO-XYLENE (three-letter code: OXE) (formula: C₈H₁₀).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
11	DDD	1	Total C 8 8	0	1

- Molecule 12 is water.

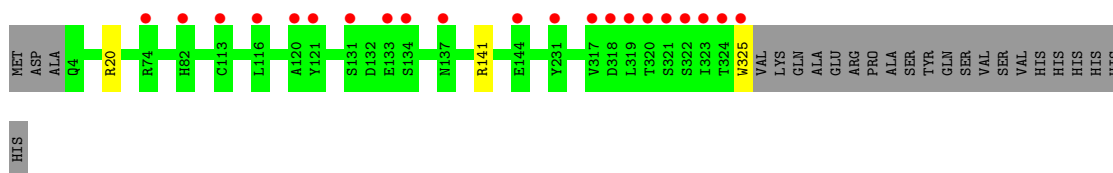
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
12	AAA	295	Total O 299 299	0	6
12	BBB	157	Total O 158 158	0	1
12	CCC	236	Total O 237 237	0	2
12	DDD	253	Total O 254 254	0	5

3 Residue-property plots [i](#)

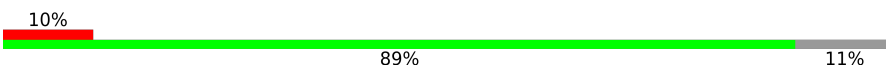
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. 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.

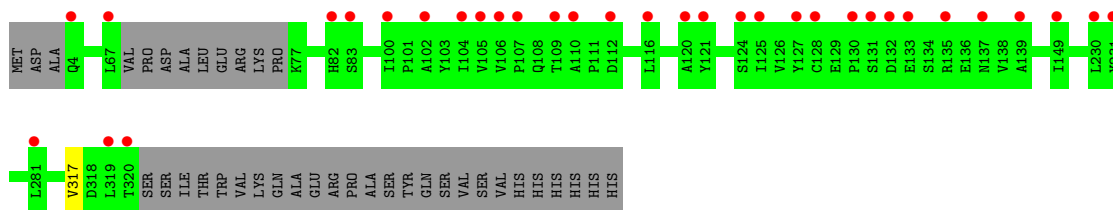
- Molecule 1: Serine racemase

Chain AAA: 



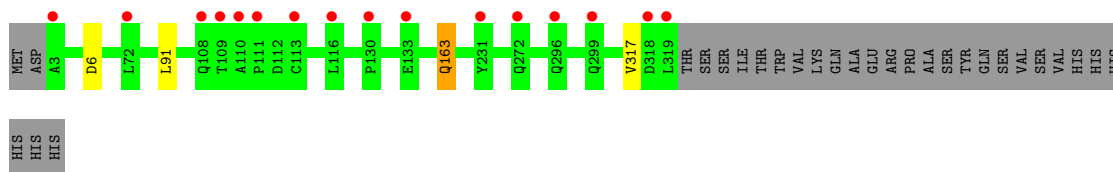
- Molecule 1: Serine racemase

Chain BBB: 



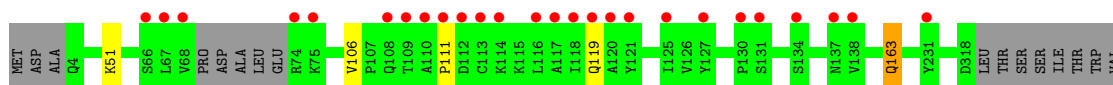
- Molecule 1: Serine racemase

Chain CCC: 



- Molecule 1: Serine racemase

Chain DDD: 



LYS
GLN
ALA
GLU
ARG
PRO
ALA
SER
TYR
GLN
SER
VAL
SER
VAL
HIS
HIS
HIS
HIS
HIS

4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	48.11Å 154.76Å 85.40Å 90.00° 98.14° 90.00°	Depositor
Resolution (Å)	77.38 – 1.53 77.38 – 1.53	Depositor EDS
% Data completeness (in resolution range)	95.8 (77.38-1.53) 95.8 (77.38-1.53)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.36 (at 1.53Å)	Xtrriage
Refinement program	REFMAC 5.8.0267	Depositor
R, R_{free}	0.182 , 0.202 0.182 , 0.202	Depositor DCC
R_{free} test set	8706 reflections (4.90%)	wwPDB-VP
Wilson B-factor (Å ²)	21.5	Xtrriage
Anisotropy	0.063	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 53.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.51$, $\langle L^2 \rangle = 0.35$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.97	EDS
Total number of atoms	11577	wwPDB-VP
Average B, all atoms (Å ²)	28.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 13.23% 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: PG0, U78, CA, OXE, PGE, MG, EDO, GOL, PLP, NA

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	AAA	0.30	0/2765	0.60	0/3761
1	BBB	0.29	0/2479	0.57	0/3382
1	CCC	0.28	0/2694	0.58	1/3681 (0.0%)
1	DDD	0.31	0/2616	0.58	1/3571 (0.0%)
All	All	0.30	0/10554	0.59	2/14395 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	CCC	163	GLN	CB-CG-CD	5.51	125.92	111.60
1	DDD	163	GLN	CB-CG-CD	5.27	125.31	111.60

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	AAA	2716	0	2714	0	0
1	BBB	2437	0	2410	0	0
1	CCC	2648	0	2622	0	0
1	DDD	2572	0	2520	0	0
2	AAA	30	0	12	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	BBB	15	0	6	0	0
2	CCC	15	0	6	0	0
2	DDD	15	0	6	0	0
3	AAA	24	0	36	0	0
3	BBB	4	0	6	0	0
3	CCC	20	0	30	0	0
3	DDD	16	0	24	0	0
4	AAA	5	0	0	0	0
4	BBB	2	0	0	0	0
4	CCC	2	0	0	0	0
4	DDD	1	0	0	0	0
5	AAA	1	0	0	0	0
5	BBB	1	0	0	0	0
5	CCC	2	0	0	0	0
5	DDD	1	0	0	0	0
6	AAA	12	0	16	0	0
6	CCC	24	0	32	0	0
6	DDD	12	0	16	0	0
7	AAA	13	0	0	0	0
7	BBB	13	0	0	0	0
8	BBB	1	0	0	0	0
8	DDD	1	0	0	0	0
9	DDD	8	0	12	0	0
10	DDD	10	0	14	0	0
11	DDD	8	0	10	0	0
12	AAA	299	0	0	0	0
12	BBB	158	0	0	0	0
12	CCC	237	0	0	0	0
12	DDD	254	0	0	0	1
All	All	11577	0	10492	0	1

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). Clashscore could not be calculated for this entry.

There are no clashes within the asymmetric unit.

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
12:DDD:516:HOH:O	12:DDD:596:HOH:O[1_655]	1.99	0.21

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	AAA	357/346 (103%)	350 (98%)	7 (2%)	0	100	100
1	BBB	325/346 (94%)	320 (98%)	5 (2%)	0	100	100
1	CCC	351/346 (101%)	346 (99%)	5 (1%)	0	100	100
1	DDD	343/346 (99%)	331 (96%)	8 (2%)	4 (1%)	13	2
All	All	1376/1384 (99%)	1347 (98%)	25 (2%)	4 (0%)	47	19

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	DDD	111[A]	PRO
1	DDD	111[B]	PRO
1	DDD	119[A]	GLN
1	DDD	119[B]	GLN

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	AAA	296/291 (102%)	292 (99%)	4 (1%)	67	39
1	BBB	258/291 (89%)	257 (100%)	1 (0%)	91	82
1	CCC	284/291 (98%)	280 (99%)	4 (1%)	67	39
1	DDD	272/291 (94%)	268 (98%)	4 (2%)	65	36
All	All	1110/1164 (95%)	1097 (99%)	13 (1%)	73	47

All (13) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	AAA	20[A]	ARG
1	AAA	20[B]	ARG
1	AAA	141	ARG
1	AAA	325	TRP
1	BBB	317	VAL
1	CCC	6	ASP
1	CCC	91	LEU
1	CCC	163	GLN
1	CCC	317	VAL
1	DDD	51[A]	LYS
1	DDD	51[B]	LYS
1	DDD	106	VAL
1	DDD	163	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

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 51 ligands modelled in this entry, 17 are monoatomic - leaving 34 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	EDO	AAA	406[A]	-	3,3,3	0.11	0	2,2,2	0.18	0
3	EDO	BBB	402	-	3,3,3	0.04	0	2,2,2	0.18	0
2	PLP	CCC	401	1	15,15,16	0.76	1 (6%)	20,22,23	1.14	2 (10%)
7	U78	BBB	406	-	13,13,13	0.29	0	16,16,16	0.30	0
10	PGE	DDD	409	-	9,9,9	0.17	0	8,8,8	0.12	0
3	EDO	DDD	407	-	3,3,3	0.04	0	2,2,2	0.16	0
6	GOL	DDD	411[B]	-	5,5,5	0.11	0	5,5,5	0.30	0
3	EDO	CCC	404	4	3,3,3	0.05	0	2,2,2	0.34	0
3	EDO	CCC	406	-	3,3,3	0.04	0	2,2,2	0.09	0
2	PLP	AAA	401[A]	1	15,15,16	0.83	1 (6%)	20,22,23	1.02	2 (10%)
3	EDO	AAA	407	-	3,3,3	0.12	0	2,2,2	0.18	0
3	EDO	CCC	405[B]	-	3,3,3	0.07	0	2,2,2	0.25	0
6	GOL	CCC	407	-	5,5,5	0.09	0	5,5,5	0.37	0
6	GOL	CCC	409[A]	-	5,5,5	0.07	0	5,5,5	0.28	0
3	EDO	DDD	408	-	3,3,3	0.04	0	2,2,2	0.25	0
7	U78	AAA	412	-	13,13,13	0.29	0	16,16,16	0.28	0
3	EDO	AAA	406[B]	-	3,3,3	0.05	0	2,2,2	0.16	0
3	EDO	AAA	408[A]	-	3,3,3	0.03	0	2,2,2	0.13	0
3	EDO	DDD	406	-	3,3,3	0.11	0	2,2,2	0.33	0
2	PLP	DDD	401	1	15,15,16	0.72	1 (6%)	20,22,23	0.98	1 (5%)
9	PG0	DDD	404	-	7,7,7	0.23	0	6,6,6	0.10	0
3	EDO	AAA	402	-	3,3,3	0.16	0	2,2,2	0.20	0
6	GOL	AAA	410	-	5,5,5	0.07	0	5,5,5	0.31	0
11	OXE	DDD	410[A]	-	8,8,8	0.24	0	10,10,10	0.29	0
2	PLP	AAA	401[B]	1	15,15,16	0.77	1 (6%)	20,22,23	0.98	1 (5%)
6	GOL	DDD	411[A]	-	5,5,5	0.09	0	5,5,5	0.40	0
6	GOL	AAA	413[A]	-	5,5,5	0.06	0	5,5,5	0.28	0
3	EDO	AAA	409	-	3,3,3	0.05	0	2,2,2	0.23	0
6	GOL	CCC	409[B]	-	5,5,5	0.08	0	5,5,5	0.30	0
3	EDO	CCC	408	-	3,3,3	0.03	0	2,2,2	0.17	0
3	EDO	DDD	405	-	3,3,3	0.16	0	2,2,2	0.10	0
2	PLP	BBB	401	1	15,15,16	0.75	1 (6%)	20,22,23	0.96	2 (10%)
3	EDO	CCC	405[A]	-	3,3,3	0.08	0	2,2,2	0.22	0
6	GOL	CCC	402	-	5,5,5	0.09	0	5,5,5	0.32	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
3	EDO	AAA	406[A]	-	-	0/1/1/1	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	EDO	BBB	402	-	-	1/1/1/1	-
2	PLP	CCC	401	1	-	0/6/6/8	0/1/1/1
7	U78	BBB	406	-	-	0/6/6/6	0/1/1/1
10	PGE	DDD	409	-	-	4/7/7/7	-
3	EDO	DDD	407	-	-	1/1/1/1	-
6	GOL	DDD	411[B]	-	-	4/4/4/4	-
3	EDO	CCC	404	4	-	1/1/1/1	-
3	EDO	CCC	406	-	-	0/1/1/1	-
2	PLP	AAA	401[A]	1	-	1/6/6/8	0/1/1/1
3	EDO	AAA	407	-	-	1/1/1/1	-
3	EDO	CCC	405[B]	-	-	1/1/1/1	-
6	GOL	CCC	407	-	-	4/4/4/4	-
6	GOL	CCC	409[A]	-	-	2/4/4/4	-
3	EDO	DDD	408	-	-	1/1/1/1	-
7	U78	AAA	412	-	-	0/6/6/6	0/1/1/1
3	EDO	AAA	406[B]	-	-	1/1/1/1	-
3	EDO	AAA	408[A]	-	-	1/1/1/1	-
3	EDO	DDD	406	-	-	0/1/1/1	-
2	PLP	DDD	401	1	-	0/6/6/8	0/1/1/1
9	PG0	DDD	404	-	-	2/5/5/5	-
3	EDO	AAA	402	-	-	1/1/1/1	-
6	GOL	AAA	410	-	-	2/4/4/4	-
11	OXE	DDD	410[A]	-	-	-	0/1/1/1
2	PLP	AAA	401[B]	1	-	0/6/6/8	0/1/1/1
6	GOL	DDD	411[A]	-	-	2/4/4/4	-
6	GOL	AAA	413[A]	-	-	0/4/4/4	-
3	EDO	AAA	409	-	-	1/1/1/1	-
6	GOL	CCC	409[B]	-	-	4/4/4/4	-
3	EDO	CCC	408	-	-	1/1/1/1	-
3	EDO	DDD	405	-	-	1/1/1/1	-
2	PLP	BBB	401	1	-	0/6/6/8	0/1/1/1
3	EDO	CCC	405[A]	-	-	0/1/1/1	-
6	GOL	CCC	402	-	-	2/4/4/4	-

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	AAA	401[A]	PLP	C4A-C4	-2.63	1.46	1.51
2	AAA	401[B]	PLP	C4A-C4	-2.39	1.46	1.51
2	DDD	401	PLP	C4A-C4	-2.38	1.46	1.51

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	BBB	401	PLP	C4A-C4	-2.29	1.46	1.51
2	CCC	401	PLP	C4A-C4	-2.16	1.47	1.51

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	DDD	401	PLP	O4P-C5A-C5	3.22	115.49	109.35
2	CCC	401	PLP	C4A-C4-C5	3.12	124.14	120.94
2	AAA	401[B]	PLP	O4P-C5A-C5	2.89	114.86	109.35
2	AAA	401[A]	PLP	O4P-C5A-C5	2.85	114.78	109.35
2	CCC	401	PLP	O4P-C5A-C5	2.40	113.92	109.35
2	BBB	401	PLP	O4P-C5A-C5	2.23	113.61	109.35
2	AAA	401[A]	PLP	C4A-C4-C5	2.17	123.17	120.94
2	BBB	401	PLP	C4A-C4-C5	2.04	123.03	120.94

There are no chirality outliers.

All (39) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	AAA	410	GOL	C1-C2-C3-O3
6	CCC	402	GOL	O1-C1-C2-C3
6	CCC	407	GOL	C1-C2-C3-O3
6	CCC	409[A]	GOL	O2-C2-C3-O3
6	CCC	409[B]	GOL	O2-C2-C3-O3
3	AAA	402	EDO	O1-C1-C2-O2
6	CCC	407	GOL	O1-C1-C2-C3
6	CCC	409[A]	GOL	C1-C2-C3-O3
6	CCC	409[B]	GOL	C1-C2-C3-O3
6	DDD	411[A]	GOL	C1-C2-C3-O3
6	DDD	411[B]	GOL	O1-C1-C2-C3
6	DDD	411[B]	GOL	C1-C2-C3-O3
6	CCC	407	GOL	O2-C2-C3-O3
3	CCC	404	EDO	O1-C1-C2-O2
3	DDD	405	EDO	O1-C1-C2-O2
10	DDD	409	PGE	O3-C5-C6-O4
6	CCC	402	GOL	O1-C1-C2-O2
6	CCC	407	GOL	O1-C1-C2-O2
6	AAA	410	GOL	O2-C2-C3-O3
6	DDD	411[B]	GOL	O2-C2-C3-O3
2	AAA	401[A]	PLP	C6-C5-C5A-O4P
10	DDD	409	PGE	C6-C5-O3-C4
6	DDD	411[B]	GOL	O1-C1-C2-O2

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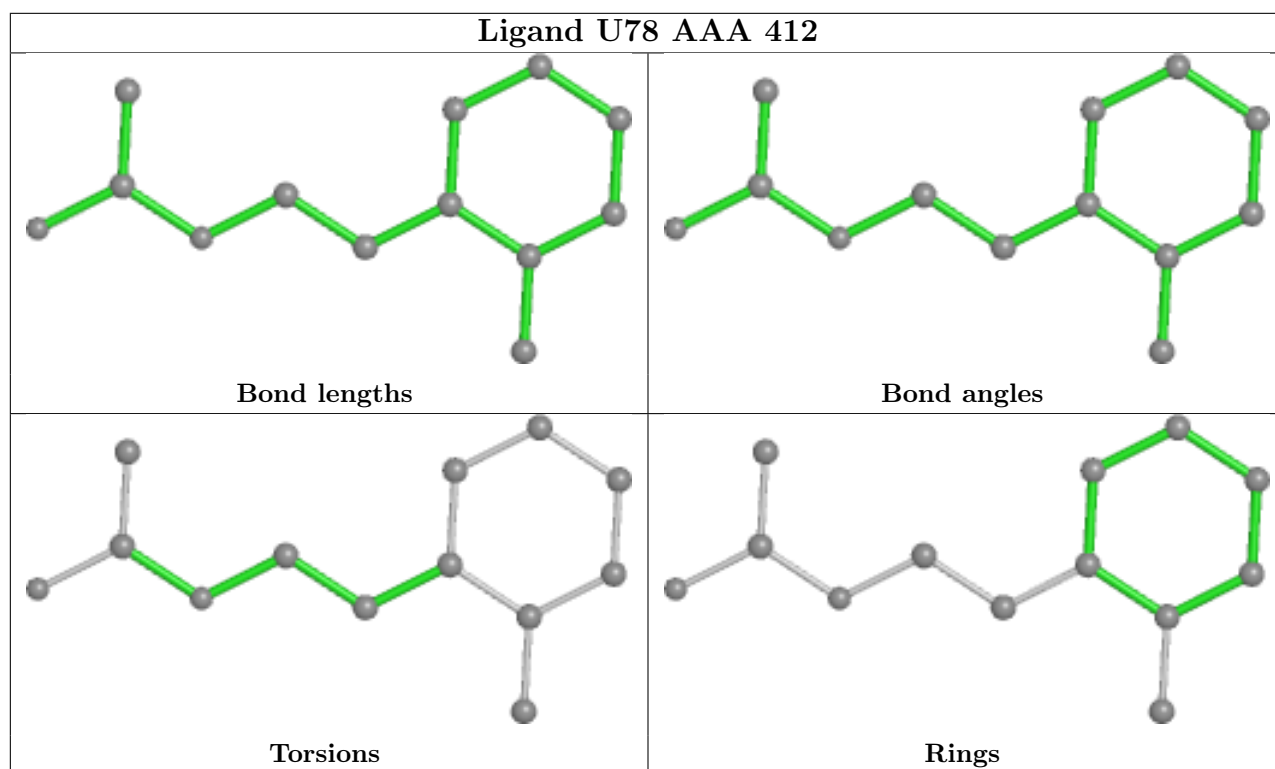
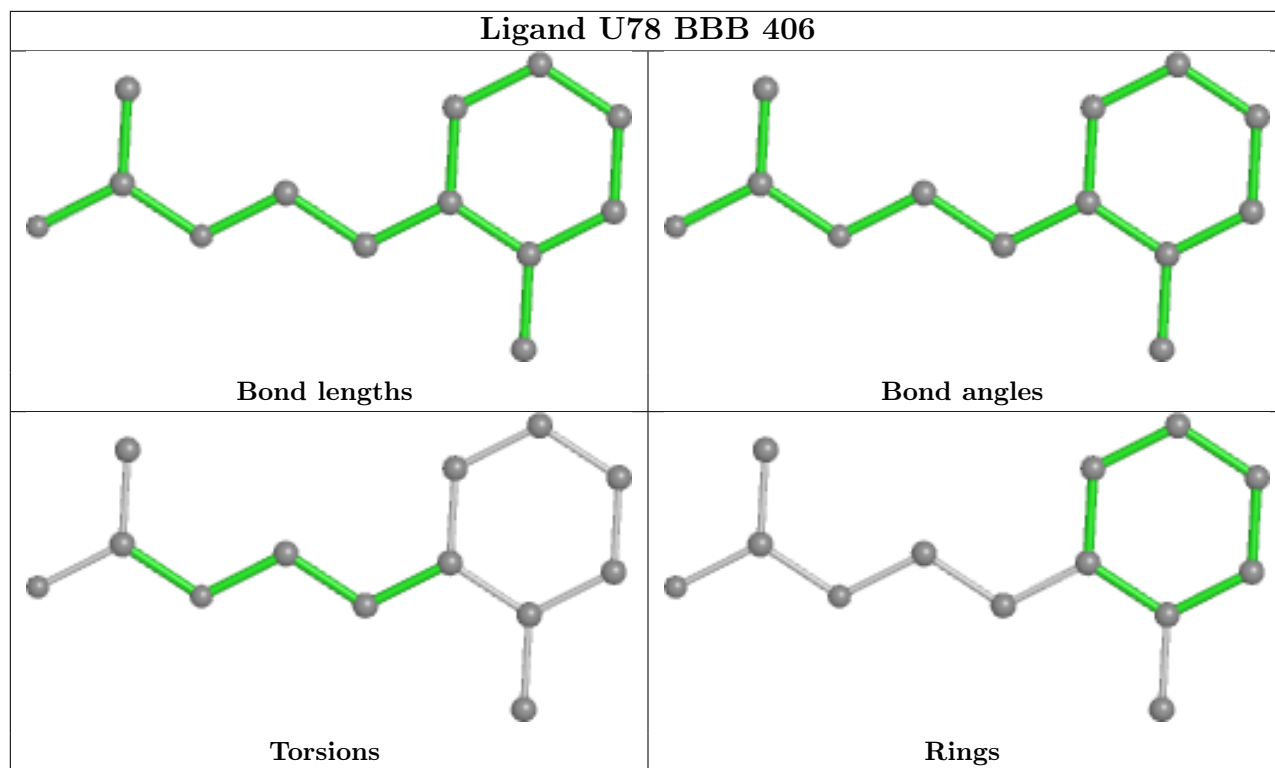
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Mol	Chain	Res	Type	Atoms
3	AAA	406[B]	EDO	O1-C1-C2-O2
3	AAA	407	EDO	O1-C1-C2-O2
3	DDD	408	EDO	O1-C1-C2-O2
6	CCC	409[B]	GOL	O1-C1-C2-C3
6	DDD	411[A]	GOL	O2-C2-C3-O3
3	DDD	407	EDO	O1-C1-C2-O2
10	DDD	409	PGE	C1-C2-O2-C3
6	CCC	409[B]	GOL	O1-C1-C2-O2
9	DDD	404	PG0	O1-C3-C4-O2
3	AAA	408[A]	EDO	O1-C1-C2-O2
3	CCC	405[B]	EDO	O1-C1-C2-O2
3	CCC	408	EDO	O1-C1-C2-O2
10	DDD	409	PGE	O2-C3-C4-O3
9	DDD	404	PG0	OTT-C1-C2-O1
3	AAA	409	EDO	O1-C1-C2-O2
3	BBB	402	EDO	O1-C1-C2-O2

There are no ring outliers.

No monomer is involved in short contacts.

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

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, 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	AAA	322/346 (93%)	0.37	21 (6%) 18 21	13, 20, 48, 104	0
1	BBB	308/346 (89%)	0.28	33 (10%) 6 6	18, 27, 51, 80	0
1	CCC	317/346 (91%)	0.17	16 (5%) 28 32	16, 24, 46, 62	0
1	DDD	310/346 (89%)	0.19	26 (8%) 11 12	14, 22, 58, 78	0
All	All	1257/1384 (90%)	0.25	96 (7%) 13 15	13, 23, 51, 104	0

All (96) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	AAA	323	ILE	30.4
1	AAA	320	THR	10.8
1	AAA	325	TRP	8.7
1	BBB	320	THR	8.5
1	CCC	231[A]	TYR	8.0
1	CCC	113	CYS	7.4
1	AAA	319	LEU	7.3
1	BBB	319	LEU	7.2
1	AAA	321	SER	6.9
1	DDD	68[A]	VAL	6.8
1	AAA	322	SER	6.7
1	AAA	324	THR	6.0
1	CCC	110	ALA	6.0
1	BBB	105	VAL	5.4
1	BBB	106	VAL	5.3
1	DDD	117[A]	ALA	5.3
1	DDD	113[A]	CYS	5.2
1	DDD	120[A]	ALA	5.2
1	DDD	67[A]	LEU	5.1
1	BBB	109	THR	5.0
1	CCC	116	LEU	4.5

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Mol	Chain	Res	Type	RSRZ
1	DDD	118[A]	ILE	4.4
1	DDD	111[A]	PRO	4.3
1	CCC	109	THR	4.3
1	BBB	125	ILE	4.3
1	DDD	125	ILE	4.3
1	DDD	116[A]	LEU	4.1
1	AAA	131[A]	SER	4.0
1	DDD	231	TYR	4.0
1	BBB	116	LEU	4.0
1	DDD	109[A]	THR	3.9
1	AAA	137	ASN	3.8
1	CCC	319	LEU	3.6
1	BBB	132	ASP	3.6
1	DDD	110[A]	ALA	3.5
1	BBB	133	GLU	3.4
1	BBB	230	LEU	3.4
1	DDD	137	ASN	3.3
1	AAA	121	TYR	3.3
1	AAA	318	ASP	3.2
1	BBB	4	GLN	3.2
1	BBB	137	ASN	3.2
1	BBB	131	SER	3.2
1	BBB	67	LEU	3.1
1	AAA	133	GLU	3.1
1	AAA	74[A]	ARG	3.0
1	CCC	111	PRO	3.0
1	BBB	83	SER	3.0
1	BBB	82	HIS	3.0
1	BBB	130	PRO	2.8
1	BBB	102	ALA	2.8
1	DDD	66	SER	2.8
1	BBB	135	ARG	2.8
1	DDD	130	PRO	2.8
1	CCC	108[A]	GLN	2.8
1	DDD	121[A]	TYR	2.8
1	CCC	72	LEU	2.8
1	BBB	127	TYR	2.8
1	AAA	120	ALA	2.8
1	BBB	231[A]	TYR	2.7
1	CCC	299[A]	GLN	2.7
1	BBB	107	PRO	2.7
1	BBB	104	ILE	2.6

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Mol	Chain	Res	Type	RSRZ
1	BBB	139	ALA	2.6
1	AAA	134	SER	2.6
1	AAA	116	LEU	2.6
1	CCC	318	ASP	2.6
1	CCC	3[A]	ALA	2.6
1	BBB	100	ILE	2.5
1	CCC	272[A]	GLN	2.5
1	DDD	75	LYS	2.5
1	BBB	124	SER	2.5
1	BBB	149	ILE	2.5
1	BBB	110	ALA	2.4
1	DDD	112[A]	ASP	2.4
1	BBB	121	TYR	2.4
1	BBB	128	CYS	2.4
1	BBB	120	ALA	2.4
1	DDD	114[A]	LYS	2.3
1	DDD	134	SER	2.3
1	AAA	113	CYS	2.2
1	DDD	108[A]	GLN	2.2
1	DDD	127	TYR	2.2
1	DDD	138	VAL	2.2
1	CCC	296[A]	GLN	2.2
1	AAA	144	GLU	2.2
1	AAA	317	VAL	2.1
1	AAA	82[A]	HIS	2.1
1	DDD	131	SER	2.1
1	DDD	74	ARG	2.1
1	CCC	130	PRO	2.1
1	CCC	133	GLU	2.1
1	DDD	119[A]	GLN	2.1
1	BBB	281[A]	LEU	2.1
1	AAA	231[A]	TYR	2.0
1	BBB	112	ASP	2.0

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

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

6.3 Carbohydrates [i](#)

There are no 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, 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.

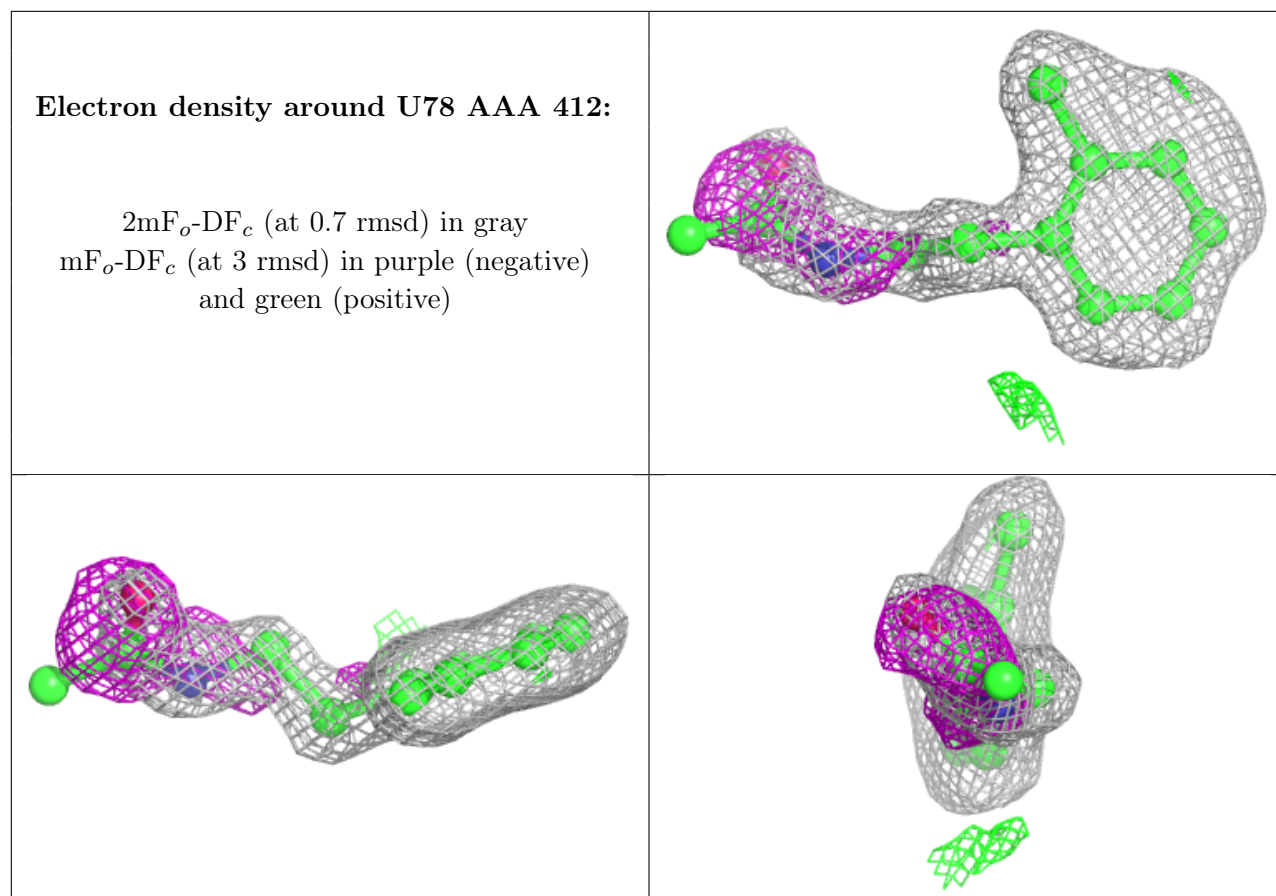
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
10	PGE	DDD	409	10/10	0.55	0.32	57,60,62,63	0
8	MG	BBB	407	1/1	0.57	0.30	79,79,79,79	0
3	EDO	BBB	402	4/4	0.68	0.19	50,53,55,56	0
4	NA	BBB	405	1/1	0.74	0.18	53,53,53,53	0
3	EDO	DDD	407	4/4	0.76	0.16	57,58,59,61	0
7	U78	AAA	412	13/13	0.77	0.21	26,29,40,40	0
6	GOL	DDD	411[A]	6/6	0.77	0.28	42,43,44,44	6
6	GOL	DDD	411[B]	6/6	0.77	0.28	16,18,18,18	6
6	GOL	CCC	407	6/6	0.78	0.17	54,55,56,59	0
6	GOL	CCC	409[B]	6/6	0.79	0.20	52,53,53,53	6
3	EDO	AAA	407	4/4	0.79	0.16	35,37,38,40	0
6	GOL	CCC	409[A]	6/6	0.79	0.20	36,37,37,38	6
3	EDO	AAA	409	4/4	0.81	0.19	62,63,63,66	0
3	EDO	CCC	408	4/4	0.81	0.14	48,50,51,53	0
3	EDO	CCC	404	4/4	0.82	0.16	51,51,52,57	0
9	PG0	DDD	404	8/8	0.83	0.23	28,47,49,50	0
6	GOL	AAA	410	6/6	0.83	0.19	46,47,51,53	0
8	MG	DDD	412	1/1	0.84	0.18	49,49,49,49	0
6	GOL	CCC	402	6/6	0.84	0.23	43,45,47,47	0
3	EDO	DDD	406	4/4	0.84	0.14	36,40,43,45	0
4	NA	AAA	414[A]	1/1	0.85	0.28	80,80,80,80	1
4	NA	AAA	414[B]	1/1	0.85	0.28	46,46,46,46	1
3	EDO	AAA	402	4/4	0.85	0.14	40,42,43,46	0
4	NA	AAA	403	1/1	0.86	0.14	60,60,60,60	0
3	EDO	CCC	406	4/4	0.87	0.10	46,46,48,51	0
3	EDO	DDD	405	4/4	0.87	0.17	36,38,43,47	0
3	EDO	AAA	406[B]	4/4	0.88	0.28	27,29,29,30	4
3	EDO	AAA	406[A]	4/4	0.88	0.28	35,40,42,42	4
7	U78	BBB	406	13/13	0.89	0.16	34,35,44,47	0
11	OXE	DDD	410[A]	8/8	0.89	0.11	22,23,23,24	8
3	EDO	CCC	405[B]	4/4	0.90	0.12	30,31,31,31	4
6	GOL	AAA	413[A]	6/6	0.90	0.16	25,27,27,29	6
3	EDO	CCC	405[A]	4/4	0.90	0.12	35,36,37,37	4
4	NA	DDD	402	1/1	0.91	0.16	33,33,33,33	0
3	EDO	DDD	408	4/4	0.91	0.13	47,47,48,48	0
4	NA	CCC	410	1/1	0.93	0.08	59,59,59,59	0
3	EDO	AAA	408[A]	4/4	0.95	0.14	40,40,40,41	4

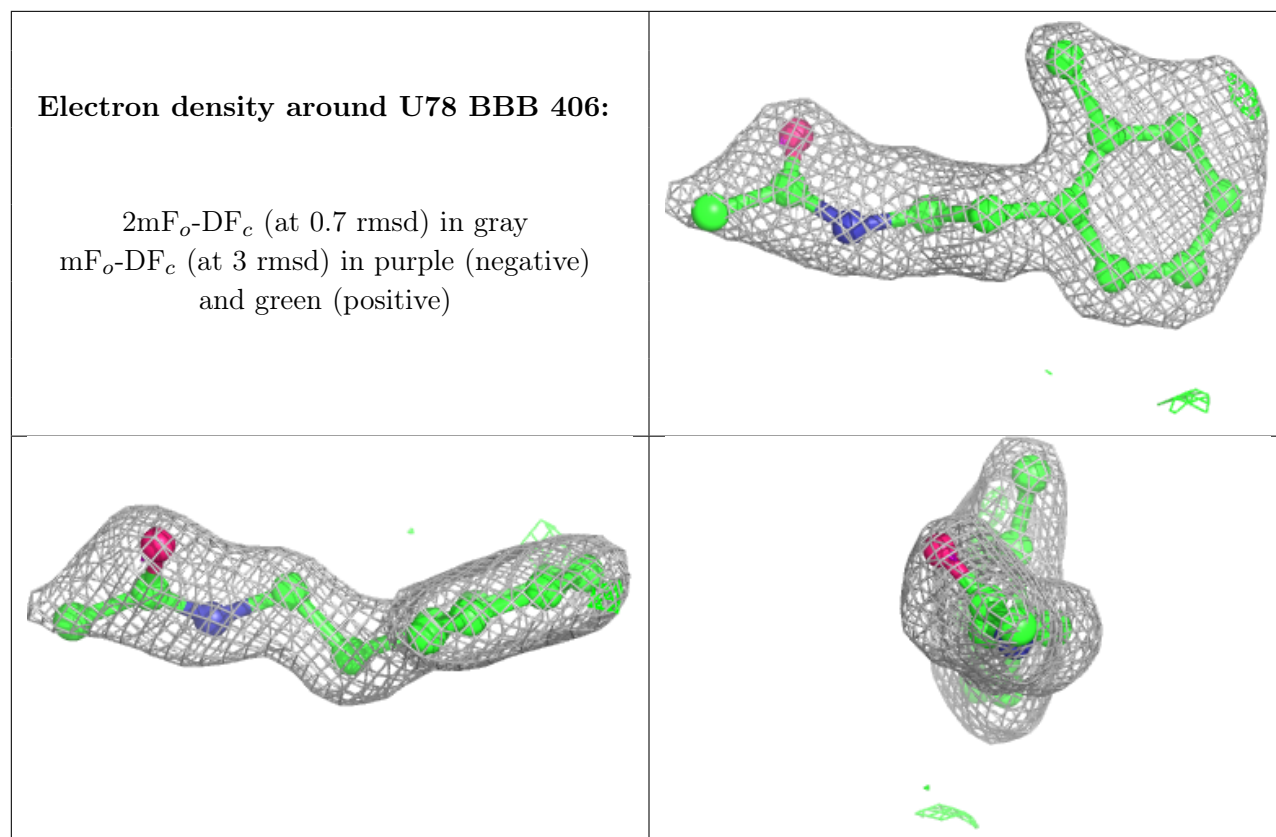
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
4	NA	CCC	411	1/1	0.96	0.09	57,57,57,57	0
2	PLP	CCC	401	15/16	0.98	0.07	17,17,19,20	0
2	PLP	DDD	401	15/16	0.98	0.07	15,15,17,17	0
2	PLP	AAA	401[A]	15/16	0.98	0.08	13,14,15,15	15
4	NA	AAA	405	1/1	0.98	0.07	28,28,28,28	0
2	PLP	AAA	401[B]	15/16	0.98	0.08	13,14,16,16	15
4	NA	AAA	411	1/1	0.99	0.08	22,22,22,22	0
4	NA	BBB	404	1/1	0.99	0.10	20,20,20,20	0
2	PLP	BBB	401	15/16	0.99	0.06	18,19,21,21	0
5	CA	BBB	403	1/1	0.99	0.07	24,24,24,24	0
5	CA	DDD	403	1/1	0.99	0.06	17,17,17,17	0
5	CA	CCC	403[A]	1/1	1.00	0.09	17,17,17,17	1
5	CA	CCC	403[B]	1/1	1.00	0.09	20,20,20,20	1
5	CA	AAA	404	1/1	1.00	0.09	15,15,15,15	0

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





6.5 Other polymers [i](#)

There are no such residues in this entry.