Full wwPDB X-ray Structure Validation Report (i)

Jun 17, 2024 – 07:54 AM EDT

PDB ID	:	5MYV
Title	:	Crystal structure of SRPK2 in complex with compound 1
Authors	:	Chaikuad, A.; Pike, A.C.W.; Savitsky, P.; von Delft, F.; Bountra, C.; Edwards, A.M.; Arrowsmith, C.H.; Knapp, S.; Structural Genomics Consortium (SGC)
Deposited on	:	2017-01-29
Resolution	:	2.90 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 (i) 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 (i)) were used in the production of this report:

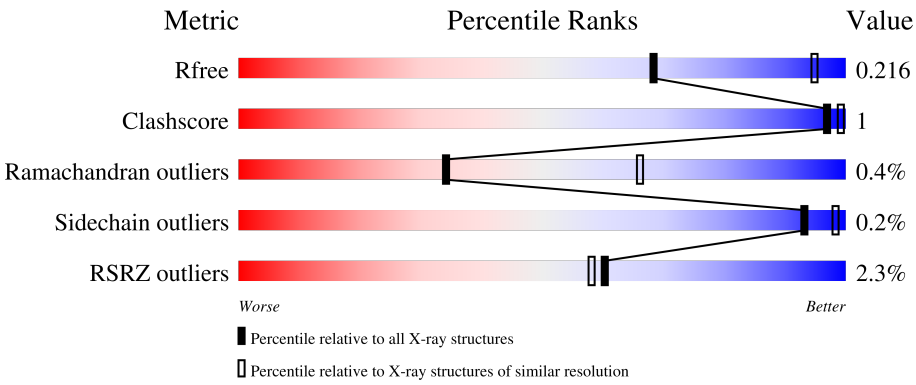
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.37.1
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.37.1

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 2.90 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	1957 (2.90-2.90)
Clashscore	141614	2172 (2.90-2.90)
Ramachandran outliers	138981	2115 (2.90-2.90)
Sidechain outliers	138945	2117 (2.90-2.90)
RSRZ outliers	127900	1906 (2.90-2.90)

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	389	2% 88% • 10%
1	B	389	2% 88% • 10%
1	C	389	% 87% • 11%
1	D	389	4% 87% • 10%

2 Entry composition (i)

There are 5 unique types of molecules in this entry. The entry contains 11780 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.

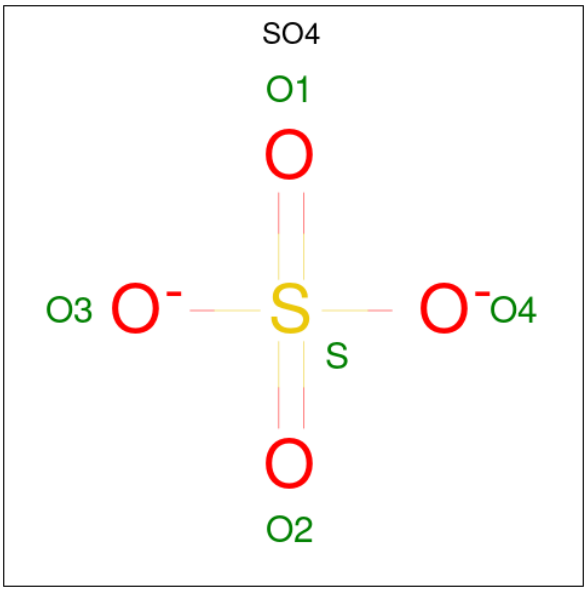
- Molecule 1 is a protein called SRSF protein kinase 2,SRSF protein kinase 2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	352	2863	1837	503	504	19	0	1	0
1	B	349	2822	1811	494	498	19	0	1	0
1	C	348	2833	1818	497	499	19	0	3	0
1	D	351	2855	1834	500	502	19	0	2	0

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	60	SER	-	expression tag	UNP P78362
A	61	MET	-	expression tag	UNP P78362
B	60	SER	-	expression tag	UNP P78362
B	61	MET	-	expression tag	UNP P78362
C	60	SER	-	expression tag	UNP P78362
C	61	MET	-	expression tag	UNP P78362
D	60	SER	-	expression tag	UNP P78362
D	61	MET	-	expression tag	UNP P78362

- Molecule 2 is SULFATE ION (three-letter code: SO4) (formula: O_4S).



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

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

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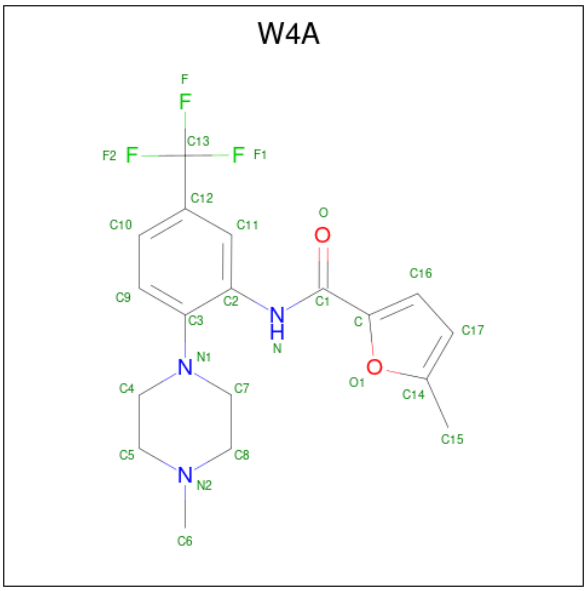
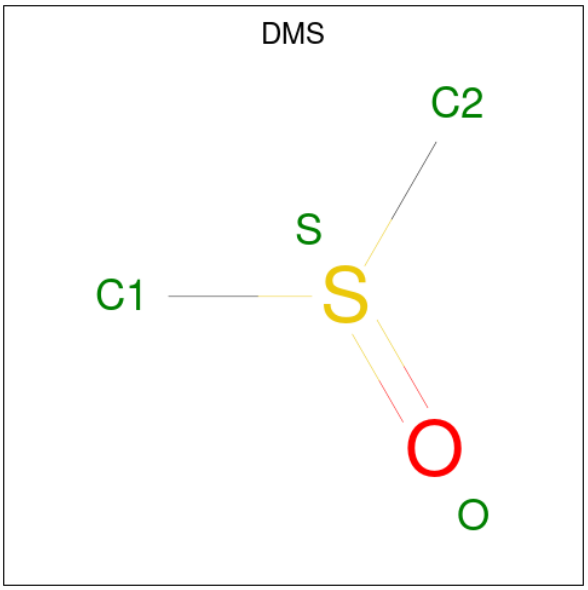
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	O	S		
2	C	1	5	4	1	0	0
			Total	O	S		
2	C	1	5	4	1	0	0
			Total	O	S		
2	C	1	5	4	1	0	0
			Total	O	S		
2	C	1	5	4	1	0	0
			Total	O	S		
2	D	1	5	4	1	0	0
			Total	O	S		
2	D	1	5	4	1	0	0
			Total	O	S		
2	D	1	5	4	1	0	0
			Total	O	S		
2	D	1	5	4	1	0	0
			Total	O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

- Molecule 3 is 5-methyl- {N}-[2-(4-methylpiperazin-1-yl)-5-(trifluoromethyl)phenyl]furan-2-carboxamide (three-letter code: W4A) (formula: $C_{18}H_{20}F_3N_3O_2$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	F	N	O		
3	A	1	26	18	3	3	2	0	0
			Total	C	F	N	O		
3	B	1	26	18	3	3	2	0	0
			Total	C	F	N	O		
3	C	1	26	18	3	3	2	0	0
			Total	C	F	N	O		
3	D	1	26	18	3	3	2	0	0

- Molecule 4 is DIMETHYL SULFOXIDE (three-letter code: DMS) (formula: C_2H_6OS).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	O	S		
4	A	1	4	2	1	1	0	0
			Total	C	O	S		
4	C	1	4	2	1	1	0	0
			Total	C	O	S		
4	D	1	4	2	1	1	0	0

- Molecule 5 is water.

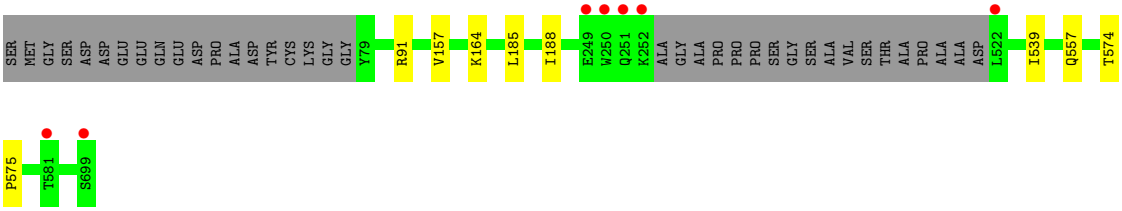
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
5	A	25	25	25	0	0
			Total	O		
5	B	9	9	9	0	0
			Total	O		
5	C	12	12	12	0	0
			Total	O		
5	D	5	5	5	0	0

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.

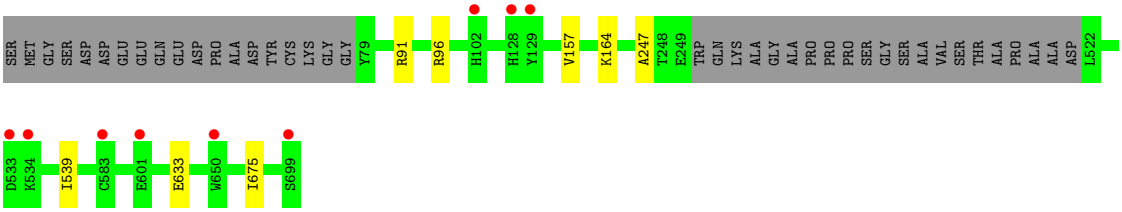
• Molecule 1: SRSF protein kinase 2,SRSF protein kinase 2

Chain A:



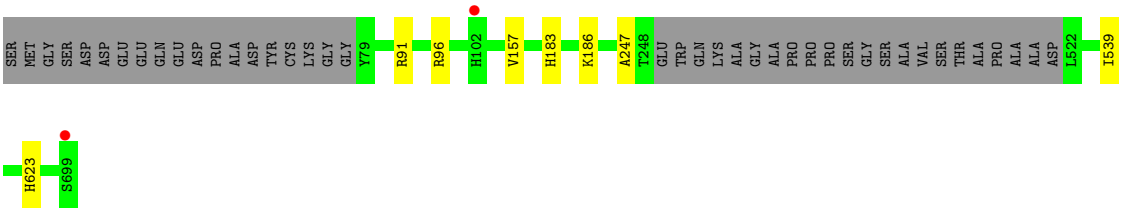
• Molecule 1: SRSF protein kinase 2,SRSF protein kinase 2

Chain B:



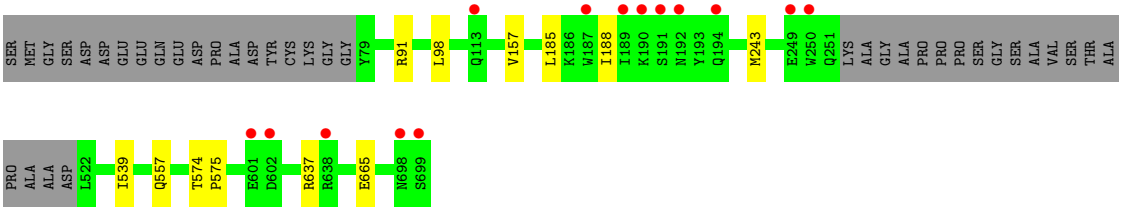
• Molecule 1: SRSF protein kinase 2,SRSF protein kinase 2

Chain C:



• Molecule 1: SRSF protein kinase 2,SRSF protein kinase 2

Chain D:


SER
MET
GLY
SER
ASP
ASP
GLU
GLU
GLN
GLU
ASP
PRO
ALA
ASP
TYR
CYS
LYS
GLY
GLY
Y79
R91
L98
Q113
V157
L185
K186
W187
I188
I189
K190
S191
N192
Y193
Q194
M243
E249
W250
Q251
LYS
ALA
GLY
ALA
PRO
PRO
PRO
SER
GLY
SER
ALA
VAL
SER
THR
ALA

PRO
ALA
ALA
ASP
L522
I539
Q557
T574
P575
E601
D602
R637
R638
E665
N698
S699

4 Data and refinement statistics (i)

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, α, β, γ	188.79Å 248.99Å 146.73Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	29.87 – 2.90 29.87 – 2.90	Depositor EDS
% Data completeness (in resolution range)	99.1 (29.87-2.90) 99.3 (29.87-2.90)	Depositor EDS
R_{merge}	0.14	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.62 (at 2.90Å)	Xtriage
Refinement program	REFMAC 5.8.0158	Depositor
R, R_{free}	0.199 , 0.217 0.202 , 0.216	Depositor DCC
R_{free} test set	3831 reflections (5.04%)	wwPDB-VP
Wilson B-factor (Å^2)	73.3	Xtriage
Anisotropy	0.209	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.32 , 38.4	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	11780	wwPDB-VP
Average B, all atoms (Å^2)	79.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.15% 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 (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: W4A, SO4, DMS

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	0.60	0/2943	0.61	0/3985
1	B	0.58	0/2900	0.61	0/3928
1	C	0.55	0/2915	0.59	0/3947
1	D	0.56	0/2939	0.61	0/3981
All	All	0.57	0/11697	0.61	0/15841

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts (i)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2863	0	2820	4	0
1	B	2822	0	2776	4	0
1	C	2833	0	2788	5	0
1	D	2855	0	2808	9	0
2	A	75	0	0	0	0
2	B	70	0	0	0	0
2	C	50	0	0	0	0
2	D	45	0	0	1	0
3	A	26	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	26	0	0	0	0
3	C	26	0	0	0	0
3	D	26	0	0	0	0
4	A	4	0	6	1	0
4	C	4	0	6	1	0
4	D	4	0	6	2	0
5	A	25	0	0	0	0
5	B	9	0	0	0	0
5	C	12	0	0	0	0
5	D	5	0	0	0	0
All	All	11780	0	11210	20	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 1.

All (20) 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:D:637:ARG:HG3	2:D:709:SO4:O2	2.06	0.56
1:C:183:HIS:CE1	1:C:186:LYS:HG2	2.46	0.50
1:B:96:ARG:HD2	1:B:247:ALA:HB2	1.96	0.48
1:D:157:VAL:HG11	4:D:711:DMS:C2	2.44	0.47
1:D:98:LEU:CD2	1:D:243:MET:HE1	2.46	0.46
1:A:185:LEU:HA	1:A:188:ILE:HD12	1.97	0.45
1:D:157:VAL:HG11	4:D:711:DMS:H21	2.00	0.44
1:A:157:VAL:HG11	4:A:717:DMS:C1	2.49	0.43
1:C:96:ARG:HD2	1:C:247:ALA:HB2	2.00	0.43
1:C:157:VAL:HG11	4:C:712:DMS:H13	1.99	0.43
1:B:675:ILE:HG13	1:D:665:GLU:HG3	2.02	0.42
1:D:157:VAL:HG23	1:D:539:ILE:O	2.20	0.42
1:D:98:LEU:CD2	1:D:243:MET:CE	2.98	0.42
1:B:633:GLU:OE1	1:C:623:HIS:ND1	2.49	0.42
1:A:157:VAL:HG23	1:A:539:ILE:O	2.20	0.41
1:C:157:VAL:HG23	1:C:539:ILE:O	2.20	0.41
1:D:574:THR:N	1:D:575:PRO:CD	2.84	0.41
1:D:185:LEU:HA	1:D:188:ILE:HD12	2.01	0.41
1:A:574:THR:N	1:A:575:PRO:CD	2.84	0.41
1:B:157:VAL:HG23	1:B:539:ILE:O	2.20	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	349/389 (90%)	339 (97%)	8 (2%)	2 (1%)	25	58
1	B	346/389 (89%)	337 (97%)	8 (2%)	1 (0%)	41	71
1	C	347/389 (89%)	337 (97%)	9 (3%)	1 (0%)	41	71
1	D	349/389 (90%)	341 (98%)	6 (2%)	2 (1%)	25	58
All	All	1391/1556 (89%)	1354 (97%)	31 (2%)	6 (0%)	34	66

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	91	ARG
1	B	91	ARG
1	C	91	ARG
1	D	91	ARG
1	A	557	GLN
1	D	557	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	A	308/336 (92%)	307 (100%)	1 (0%)	92	98
1	B	303/336 (90%)	302 (100%)	1 (0%)	92	98
1	C	305/336 (91%)	305 (100%)	0	100	100
1	D	307/336 (91%)	307 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
All	All	1223/1344 (91%)	1221 (100%)	2 (0%)	93 98

All (2) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	164	LYS
1	B	164	LYS

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)

55 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	SO4	B	702	-	4,4,4	0.35	0	6,6,6	0.43	0
2	SO4	C	701	-	4,4,4	0.37	0	6,6,6	0.06	0
2	SO4	C	702	-	4,4,4	0.32	0	6,6,6	0.23	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
2	SO4	D	708	-	4,4,4	0.34	0	6,6,6	0.21	0
2	SO4	D	709	-	4,4,4	0.26	0	6,6,6	0.13	0
2	SO4	C	709	-	4,4,4	0.28	0	6,6,6	0.22	0
4	DMS	A	717	-	3,3,3	0.51	0	3,3,3	0.75	0
3	W4A	B	715	-	25,28,28	1.01	1 (4%)	33,41,41	1.18	4 (12%)
2	SO4	B	712	-	4,4,4	0.34	0	6,6,6	0.10	0
2	SO4	B	713	-	4,4,4	0.37	0	6,6,6	0.06	0
2	SO4	A	705	-	4,4,4	0.29	0	6,6,6	0.09	0
2	SO4	B	705	-	4,4,4	0.36	0	6,6,6	0.09	0
2	SO4	B	707	-	4,4,4	0.38	0	6,6,6	0.11	0
2	SO4	A	706	-	4,4,4	0.27	0	6,6,6	0.36	0
2	SO4	B	710	-	4,4,4	0.36	0	6,6,6	0.09	0
2	SO4	C	705	-	4,4,4	0.37	0	6,6,6	0.09	0
2	SO4	D	706	-	4,4,4	0.40	0	6,6,6	0.13	0
2	SO4	D	705	-	4,4,4	0.31	0	6,6,6	0.14	0
2	SO4	A	708	-	4,4,4	0.38	0	6,6,6	0.22	0
2	SO4	A	709	-	4,4,4	0.35	0	6,6,6	0.09	0
2	SO4	C	708	-	4,4,4	0.35	0	6,6,6	0.08	0
2	SO4	B	709	-	4,4,4	0.32	0	6,6,6	0.20	0
2	SO4	D	707	-	4,4,4	0.35	0	6,6,6	0.07	0
2	SO4	B	714	-	4,4,4	0.28	0	6,6,6	0.25	0
2	SO4	D	704	-	4,4,4	0.37	0	6,6,6	0.12	0
2	SO4	C	704	-	4,4,4	0.34	0	6,6,6	0.11	0
4	DMS	D	711	-	3,3,3	0.59	0	3,3,3	0.86	0
2	SO4	A	711	-	4,4,4	0.33	0	6,6,6	0.15	0
2	SO4	B	708	-	4,4,4	0.30	0	6,6,6	0.34	0
2	SO4	A	715	-	4,4,4	0.37	0	6,6,6	0.28	0
2	SO4	B	703	-	4,4,4	0.32	0	6,6,6	0.34	0
2	SO4	D	703	-	4,4,4	0.34	0	6,6,6	0.15	0
2	SO4	C	706	-	4,4,4	0.30	0	6,6,6	0.09	0
2	SO4	C	703	-	4,4,4	0.36	0	6,6,6	0.42	0
2	SO4	A	712	-	4,4,4	0.35	0	6,6,6	0.16	0
2	SO4	D	701	-	4,4,4	0.32	0	6,6,6	0.17	0
2	SO4	D	702	-	4,4,4	0.33	0	6,6,6	0.26	0
3	W4A	D	710	-	25,28,28	0.92	1 (4%)	33,41,41	1.19	3 (9%)
2	SO4	B	711	-	4,4,4	0.31	0	6,6,6	0.15	0
2	SO4	A	707	-	4,4,4	0.38	0	6,6,6	0.17	0
2	SO4	B	706	-	4,4,4	0.37	0	6,6,6	0.24	0
4	DMS	C	712	-	3,3,3	0.58	0	3,3,3	0.89	0
3	W4A	A	716	-	25,28,28	1.08	2 (8%)	33,41,41	1.21	4 (12%)
2	SO4	A	704	-	4,4,4	0.34	0	6,6,6	0.24	0
2	SO4	A	710	-	4,4,4	0.34	0	6,6,6	0.11	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
2	SO4	C	707	-	4,4,4	0.33	0	6,6,6	0.11	0
2	SO4	A	714	-	4,4,4	0.33	0	6,6,6	0.12	0
2	SO4	C	710	-	4,4,4	0.38	0	6,6,6	0.18	0
3	W4A	C	711	-	25,28,28	1.02	1 (4%)	33,41,41	1.19	4 (12%)
2	SO4	A	703	-	4,4,4	0.21	0	6,6,6	0.32	0
2	SO4	A	713	-	4,4,4	0.19	0	6,6,6	0.27	0
2	SO4	A	701	-	4,4,4	0.32	0	6,6,6	0.26	0
2	SO4	A	702	-	4,4,4	0.33	0	6,6,6	0.25	0
2	SO4	B	701	-	4,4,4	0.35	0	6,6,6	0.17	0
2	SO4	B	704	-	4,4,4	0.33	0	6,6,6	0.22	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	W4A	C	711	-	-	3/15/28/28	0/3/3/3
3	W4A	B	715	-	-	2/15/28/28	0/3/3/3
3	W4A	A	716	-	-	1/15/28/28	0/3/3/3
3	W4A	D	710	-	-	3/15/28/28	0/3/3/3

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	716	W4A	C17-C14	-3.99	1.34	1.39
3	C	711	W4A	C17-C14	-3.79	1.34	1.39
3	B	715	W4A	C17-C14	-3.75	1.34	1.39
3	D	710	W4A	C17-C14	-3.61	1.34	1.39
3	A	716	W4A	C-C1	-2.18	1.46	1.49

All (15) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	C	711	W4A	C15-C14-C17	4.00	134.29	128.25
3	A	716	W4A	C15-C14-C17	3.99	134.28	128.25
3	D	710	W4A	C15-C14-C17	3.97	134.25	128.25
3	B	715	W4A	C15-C14-C17	3.87	134.09	128.25
3	D	710	W4A	C7-N1-C3	3.31	124.11	116.27
3	C	711	W4A	C9-C3-N1	-2.93	117.64	122.30
3	D	710	W4A	C4-N1-C3	2.73	122.75	116.27

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	A	716	W4A	C9-C3-N1	-2.72	117.97	122.30
3	A	716	W4A	C7-N1-C4	2.60	117.26	111.52
3	B	715	W4A	C9-C3-N1	-2.57	118.20	122.30
3	C	711	W4A	C7-N1-C3	2.38	121.91	116.27
3	B	715	W4A	C4-N1-C3	2.30	121.73	116.27
3	C	711	W4A	C4-N1-C3	2.27	121.65	116.27
3	A	716	W4A	C4-N1-C3	2.13	121.33	116.27
3	B	715	W4A	C7-N1-C3	2.13	121.31	116.27

There are no chirality outliers.

All (9) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	716	W4A	C9-C3-N1-C4
3	C	711	W4A	C9-C3-N1-C4
3	B	715	W4A	C9-C3-N1-C4
3	D	710	W4A	C9-C3-N1-C4
3	B	715	W4A	C2-C3-N1-C4
3	D	710	W4A	C2-C3-N1-C7
3	C	711	W4A	C2-C3-N1-C4
3	D	710	W4A	C2-C3-N1-C4
3	C	711	W4A	C9-C3-N1-C7

There are no ring outliers.

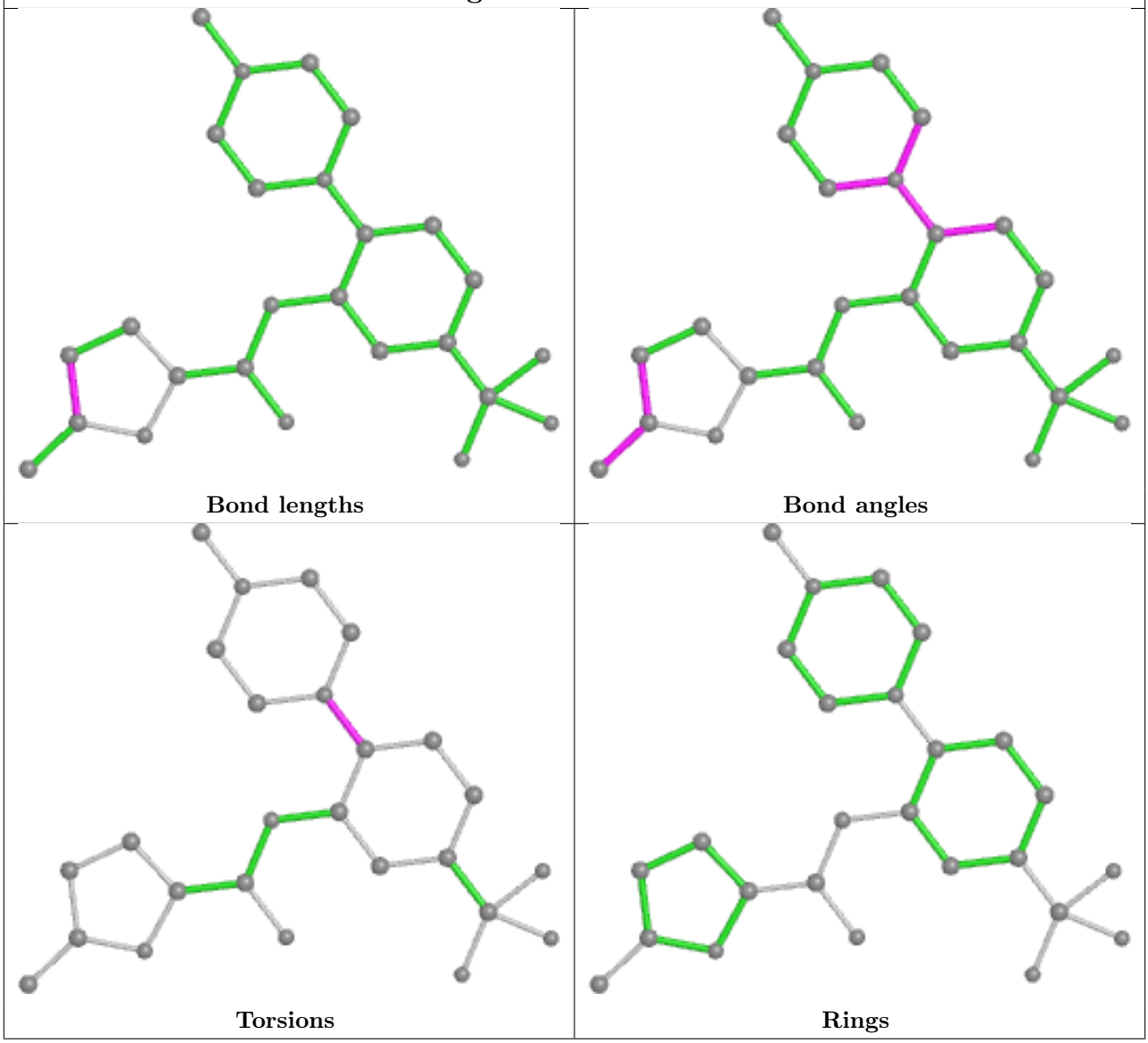
4 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	D	709	SO4	1	0
4	A	717	DMS	1	0
4	D	711	DMS	2	0
4	C	712	DMS	1	0

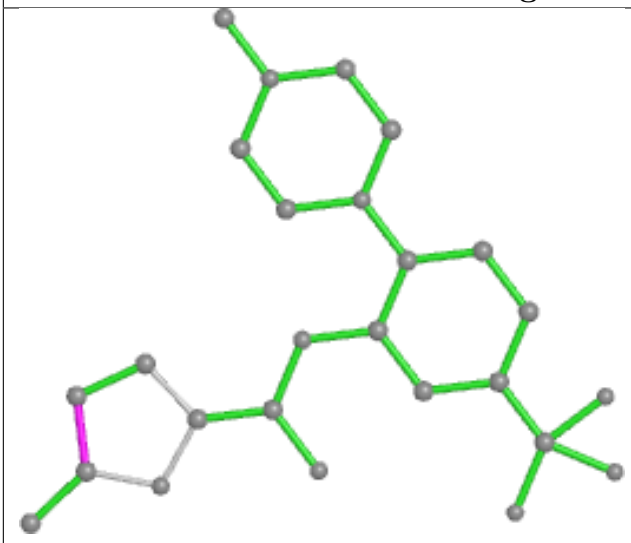
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

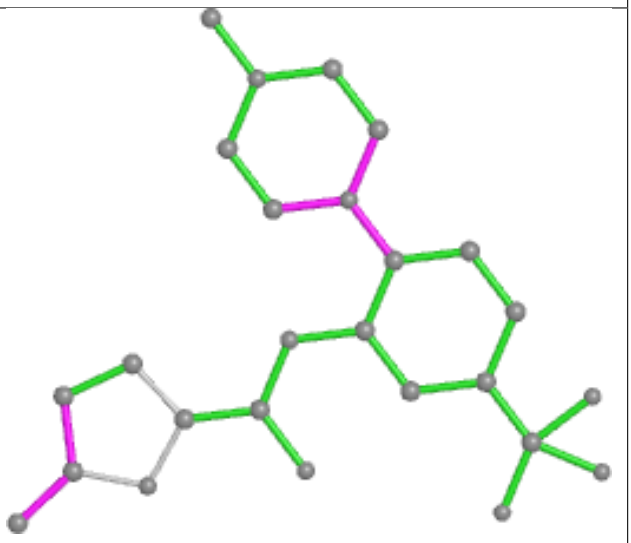
Ligand W4A B 715



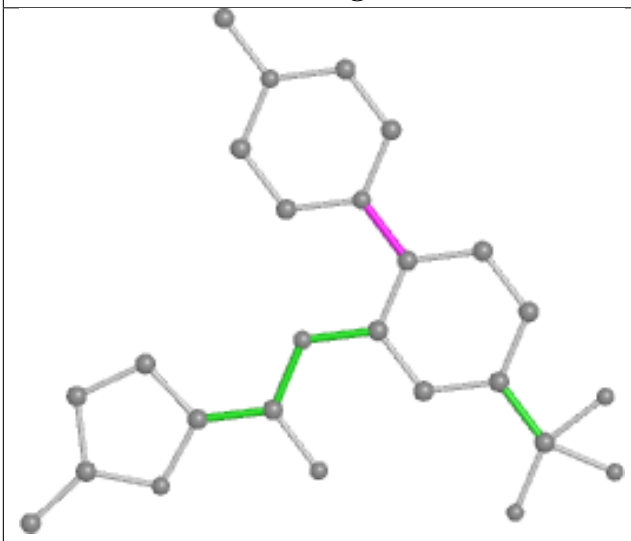
Ligand W4A D 710



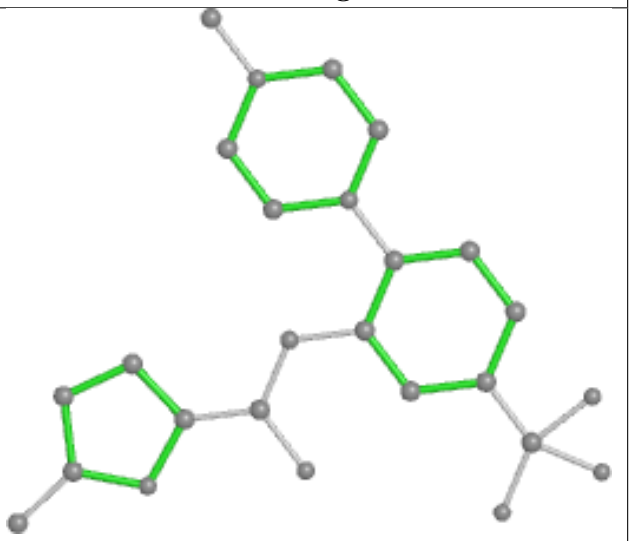
Bond lengths



Bond angles

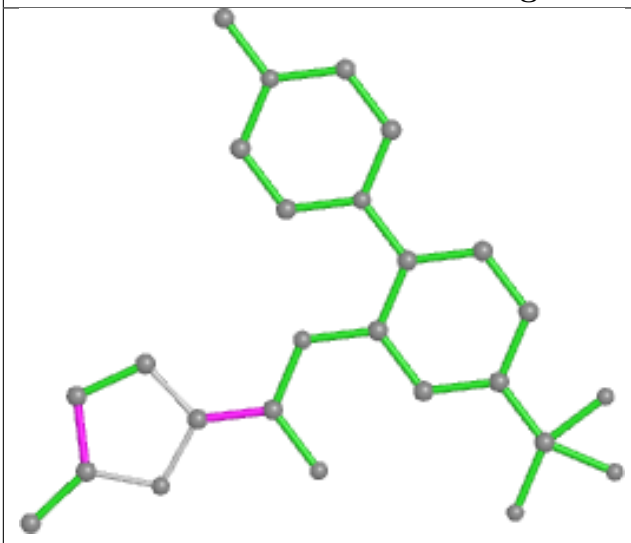


Torsions

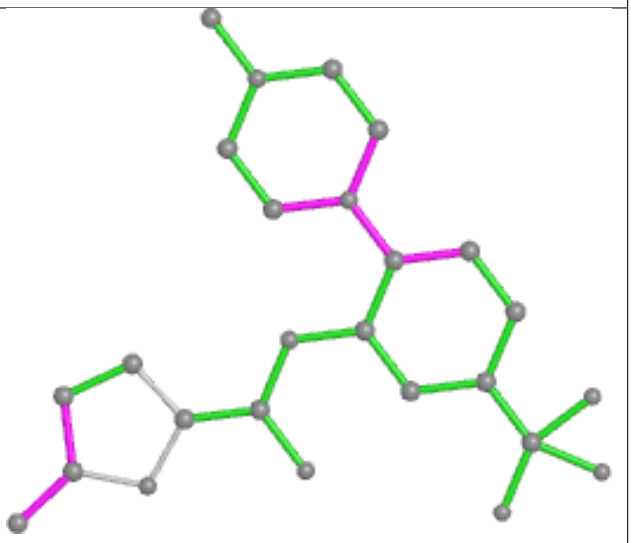


Rings

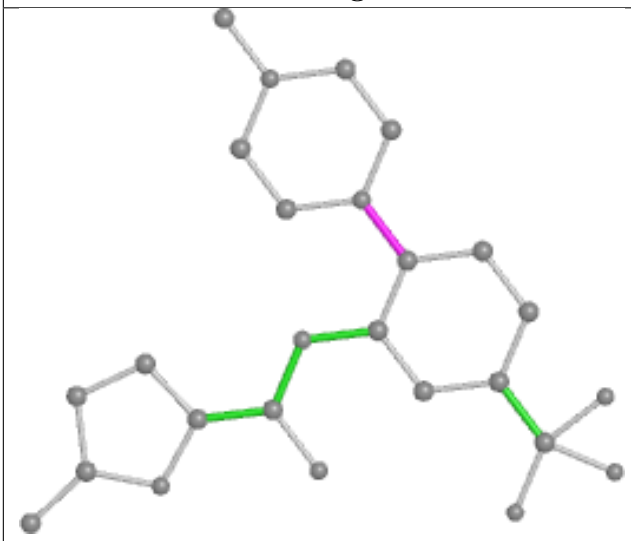
Ligand W4A A 716



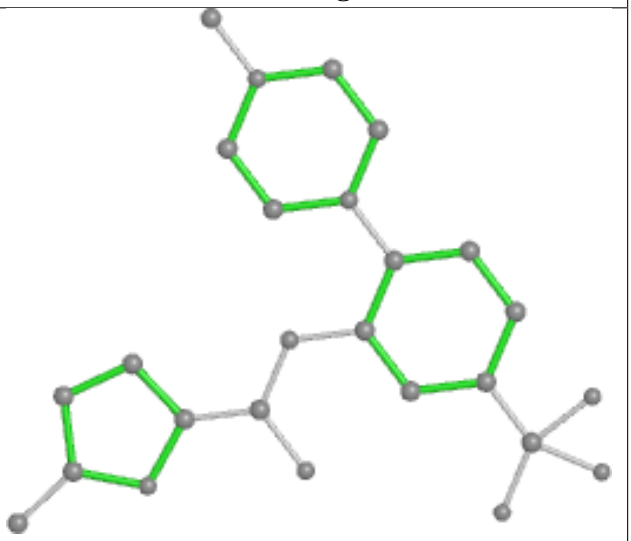
Bond lengths



Bond angles

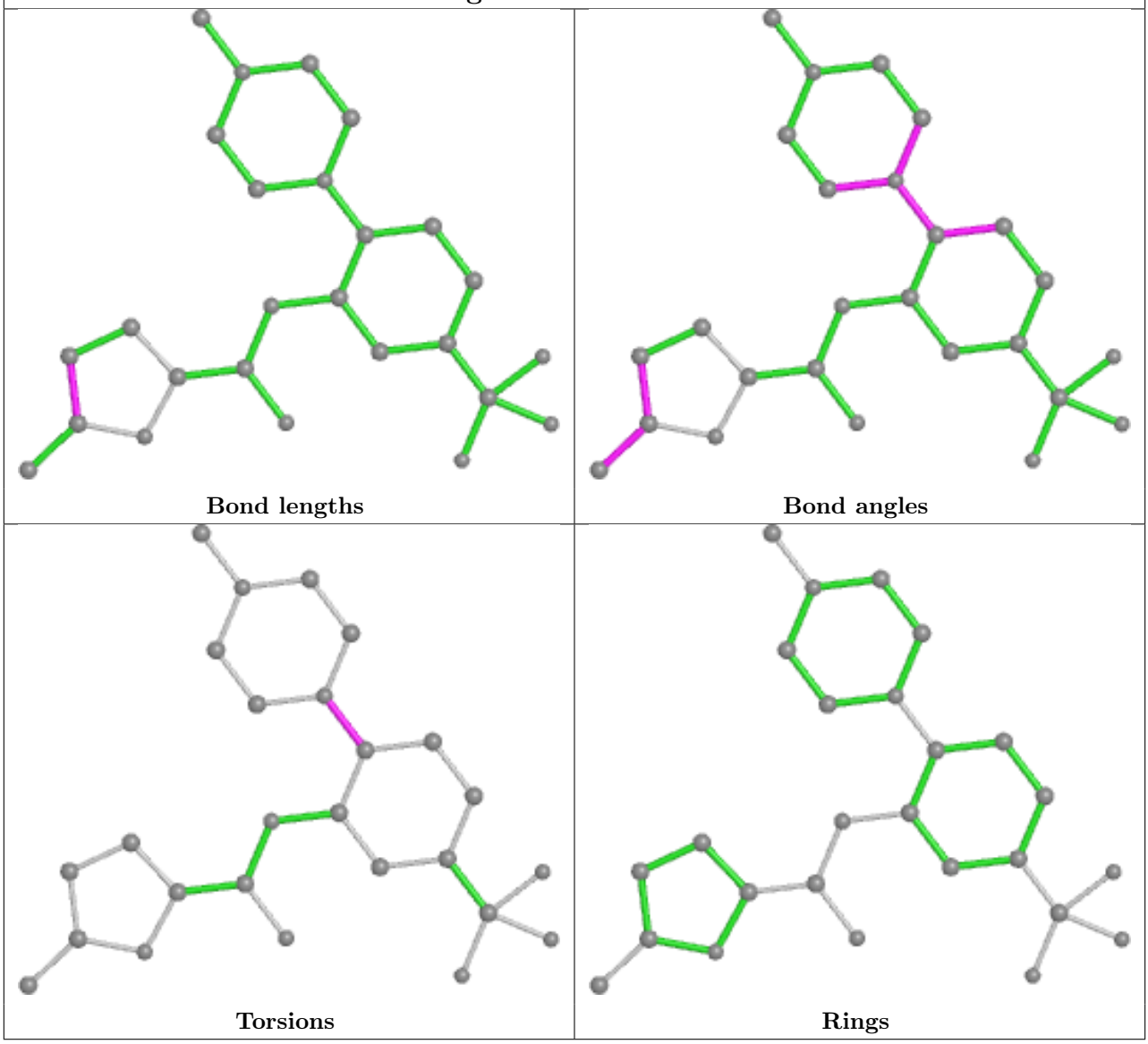


Torsions



Rings

Ligand W4A C 711



5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Fit of model and data (i)

6.1 Protein, DNA and RNA chains (i)

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 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	352/389 (90%)	-0.19	7 (1%)	65	63	46, 63, 103, 162	0
1	B	349/389 (89%)	-0.09	9 (2%)	56	52	49, 76, 118, 129	0
1	C	348/389 (89%)	-0.17	2 (0%)	89	89	48, 74, 112, 131	0
1	D	351/389 (90%)	-0.00	14 (3%)	38	33	58, 81, 137, 172	0
All	All	1400/1556 (89%)	-0.11	32 (2%)	60	58	46, 74, 119, 172	0

All (32) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	699	SER	8.8
1	A	699	SER	7.6
1	B	699	SER	6.4
1	D	192	ASN	6.1
1	D	250	TRP	4.7
1	C	699	SER	4.5
1	A	250	TRP	4.3
1	D	249	GLU	3.8
1	D	191	SER	3.6
1	A	251	GLN	3.6
1	A	252	LYS	3.5
1	A	249	GLU	3.3
1	B	102	HIS	3.2
1	D	602	ASP	3.0
1	D	638	ARG	2.9
1	B	583	CYS	2.8
1	B	601	GLU	2.7
1	B	650	TRP	2.6
1	B	128	HIS	2.5
1	D	698	ASN	2.5
1	D	194	GLN	2.5

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Mol	Chain	Res	Type	RSRZ
1	D	187	TRP	2.5
1	B	534	LYS	2.5
1	D	189	ILE	2.3
1	C	102	HIS	2.2
1	A	522	LEU	2.2
1	A	581	THR	2.2
1	B	533	ASP	2.1
1	D	190	LYS	2.1
1	B	129	TYR	2.1
1	D	601	GLU	2.1
1	D	113	GLN	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
2	SO4	C	710	5/5	0.74	0.38	125,134,139,140	0
2	SO4	B	705	5/5	0.76	0.22	135,138,141,143	0
2	SO4	A	710	5/5	0.77	0.30	136,137,146,146	0
2	SO4	B	707	5/5	0.78	0.34	121,123,130,140	0
2	SO4	C	707	5/5	0.79	0.19	140,141,144,147	0
2	SO4	A	715	5/5	0.79	0.24	128,129,133,135	0
2	SO4	B	711	5/5	0.80	0.37	152,154,154,154	0
2	SO4	A	707	5/5	0.82	0.22	121,133,136,138	0
2	SO4	B	712	5/5	0.82	0.44	147,147,150,155	0
2	SO4	A	711	5/5	0.84	0.26	118,125,127,131	0
2	SO4	C	708	5/5	0.85	0.32	136,141,151,155	0
2	SO4	B	701	5/5	0.87	0.13	128,131,138,138	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
4	DMS	D	711	4/4	0.87	0.35	103,104,114,118	0
2	SO4	B	710	5/5	0.88	0.14	126,132,136,138	0
2	SO4	B	713	5/5	0.88	0.53	129,131,133,137	0
2	SO4	D	706	5/5	0.88	0.17	116,118,121,123	0
2	SO4	D	707	5/5	0.88	0.23	133,135,136,137	0
2	SO4	A	714	5/5	0.88	0.35	133,136,137,138	0
3	W4A	B	715	26/26	0.89	0.22	92,117,128,135	0
2	SO4	D	708	5/5	0.89	0.19	101,111,113,120	0
2	SO4	D	709	5/5	0.90	0.17	114,126,131,133	0
2	SO4	D	702	5/5	0.90	0.15	94,98,102,105	0
2	SO4	A	702	5/5	0.90	0.14	100,100,107,110	0
2	SO4	A	712	5/5	0.92	0.32	96,100,106,107	0
2	SO4	C	705	5/5	0.92	0.13	112,113,119,120	0
4	DMS	A	717	4/4	0.92	0.23	95,98,104,107	0
2	SO4	B	706	5/5	0.92	0.25	101,102,103,107	0
2	SO4	D	701	5/5	0.93	0.14	97,103,111,112	0
3	W4A	C	711	26/26	0.93	0.20	77,91,103,109	0
3	W4A	D	710	26/26	0.94	0.18	74,82,90,92	0
2	SO4	C	706	5/5	0.94	0.09	99,100,106,113	0
2	SO4	C	704	5/5	0.94	0.20	105,105,108,110	0
2	SO4	A	708	5/5	0.95	0.24	104,110,112,118	0
2	SO4	C	701	5/5	0.95	0.13	113,114,119,125	0
2	SO4	D	704	5/5	0.95	0.24	101,101,103,109	0
2	SO4	A	705	5/5	0.95	0.22	95,96,97,98	0
2	SO4	C	709	5/5	0.95	0.14	114,116,117,119	0
2	SO4	B	709	5/5	0.95	0.13	105,106,107,109	0
2	SO4	D	705	5/5	0.96	0.20	106,111,113,113	0
2	SO4	B	704	5/5	0.96	0.22	86,95,98,99	0
2	SO4	C	702	5/5	0.96	0.11	69,77,79,80	0
2	SO4	A	703	5/5	0.96	0.13	66,69,72,74	0
4	DMS	C	712	4/4	0.96	0.18	104,110,112,113	0
2	SO4	B	703	5/5	0.96	0.19	72,78,79,81	0
2	SO4	D	703	5/5	0.97	0.08	89,91,94,94	0
2	SO4	A	704	5/5	0.97	0.14	71,76,78,87	0
2	SO4	A	709	5/5	0.97	0.18	85,87,88,89	5
3	W4A	A	716	26/26	0.97	0.16	57,61,67,70	0
2	SO4	C	703	5/5	0.97	0.10	82,86,90,92	0
2	SO4	B	702	5/5	0.98	0.09	62,64,66,66	0
2	SO4	A	701	5/5	0.98	0.10	59,66,73,74	0
2	SO4	B	708	5/5	0.98	0.14	60,61,63,64	0
2	SO4	B	714	5/5	0.98	0.11	105,108,108,108	0
2	SO4	A	706	5/5	0.98	0.15	72,75,82,87	0

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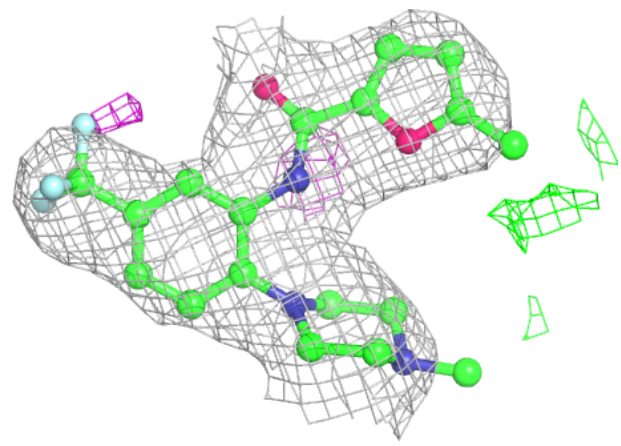
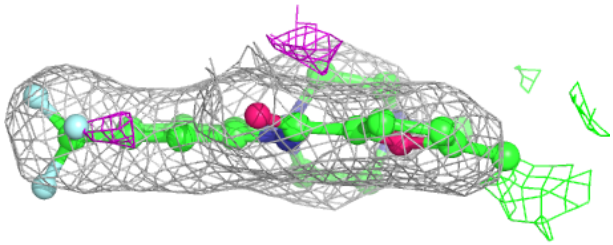
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	SO4	A	713	5/5	0.98	0.17	52,53,56,60	0

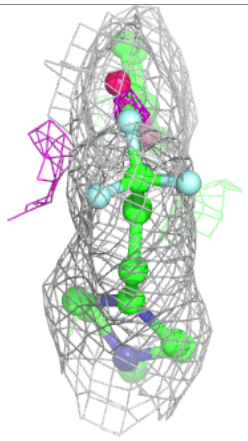
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around W4A B 715:

2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative) and green (positive)

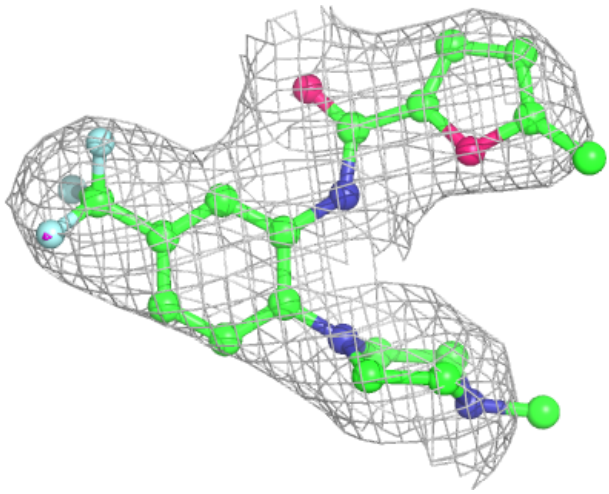


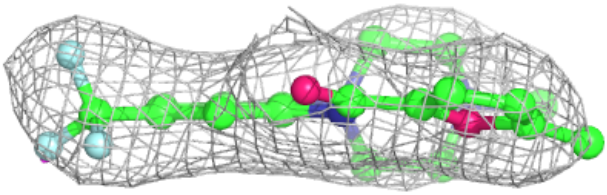


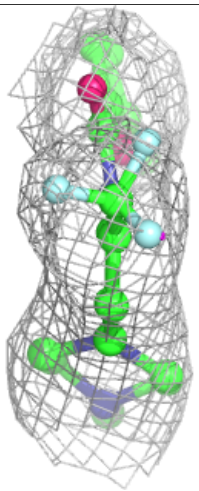


Electron density around W4A C 711:

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

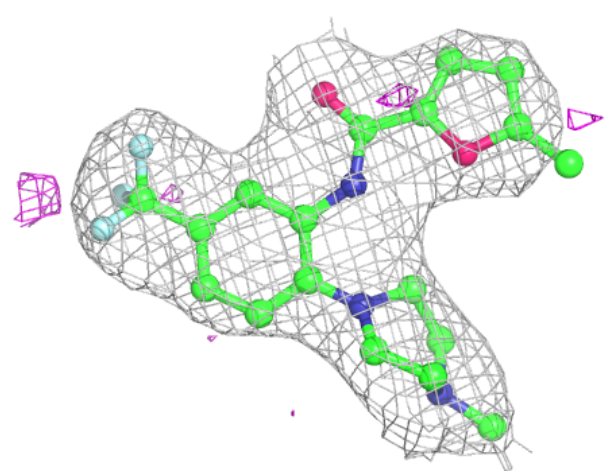


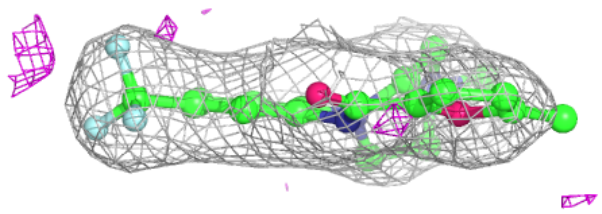


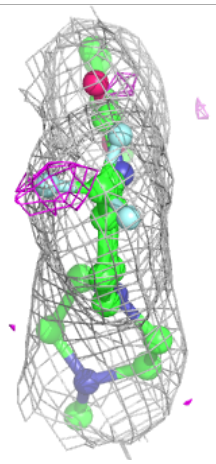


Electron density around W4A D 710:

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

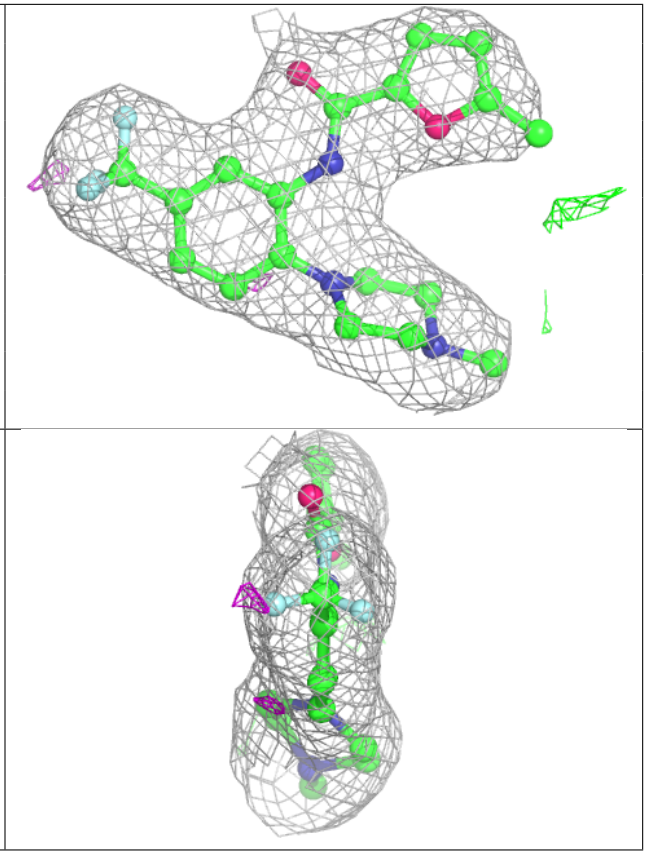






Electron density around W4A A 716:

$2mF_o$-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.