



Full wwPDB X-ray Structure Validation Report ⓘ

Apr 10, 2025 – 04:25 pm BST

PDB ID : 9F8J / pdb_00009f8j
Title : Crystal Structure of PhzA/B from Burkholderia cepacia R18194 in complex with (3-Bromophenyl)[6-hydroxy-2-(4-hydroxyphenyl)benzo[b]thiophen-3-yl]methanone
Authors : Thiemann, M.; Zimmermann, M.; Kunick, C.; Blankenfeldt, W.
Deposited on : 2024-05-06
Resolution : 1.60 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	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.003 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.42

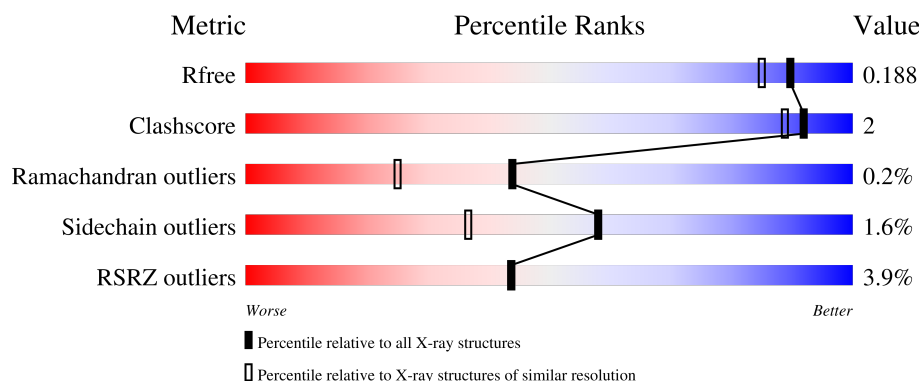
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.60 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	4274 (1.60-1.60)
Clashscore	180529	4682 (1.60-1.60)
Ramachandran outliers	177936	4583 (1.60-1.60)
Sidechain outliers	177891	4582 (1.60-1.60)
RSRZ outliers	164620	4272 (1.60-1.60)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	185	<div> <div>3%</div> <div>79%</div> <div>17%</div> </div>
1	B	185	<div> <div>3%</div> <div>83%</div> <div>16%</div> </div>
1	C	185	<div> <div>2%</div> <div>81%</div> <div>16%</div> </div>
1	D	185	<div> <div>4%</div> <div>78%</div> <div>17%</div> </div>

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 11149 atoms, of which 5109 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 Phenazine biosynthesis protein A/B.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	154	Total	C	H	N	O	S	0	6	0
			2473	809	1195	241	222	6			
1	B	156	Total	C	H	N	O	S	0	7	0
			2528	824	1229	241	229	5			
1	C	156	Total	C	H	N	O	S	0	13	0
			2626	858	1274	250	238	6			
1	D	154	Total	C	H	N	O	S	0	1	0
			2482	810	1204	238	225	5			

There are 80 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-19	MET	-	initiating methionine	UNP Q396C9
A	-18	GLY	-	expression tag	UNP Q396C9
A	-17	SER	-	expression tag	UNP Q396C9
A	-16	SER	-	expression tag	UNP Q396C9
A	-15	HIS	-	expression tag	UNP Q396C9
A	-14	HIS	-	expression tag	UNP Q396C9
A	-13	HIS	-	expression tag	UNP Q396C9
A	-12	HIS	-	expression tag	UNP Q396C9
A	-11	HIS	-	expression tag	UNP Q396C9
A	-10	HIS	-	expression tag	UNP Q396C9
A	-9	SER	-	expression tag	UNP Q396C9
A	-8	SER	-	expression tag	UNP Q396C9
A	-7	GLY	-	expression tag	UNP Q396C9
A	-6	LEU	-	expression tag	UNP Q396C9
A	-5	VAL	-	expression tag	UNP Q396C9
A	-4	PRO	-	expression tag	UNP Q396C9
A	-3	ARG	-	expression tag	UNP Q396C9
A	-2	GLY	-	expression tag	UNP Q396C9
A	-1	SER	-	expression tag	UNP Q396C9
A	0	HIS	-	expression tag	UNP Q396C9
B	-19	MET	-	initiating methionine	UNP Q396C9

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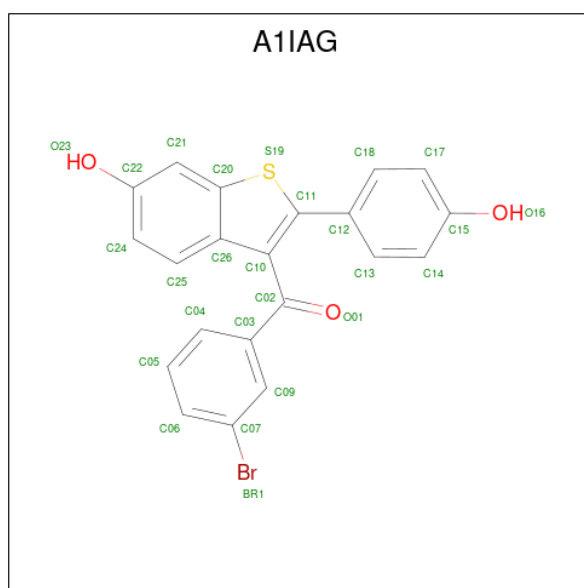
Chain	Residue	Modelled	Actual	Comment	Reference
B	-18	GLY	-	expression tag	UNP Q396C9
B	-17	SER	-	expression tag	UNP Q396C9
B	-16	SER	-	expression tag	UNP Q396C9
B	-15	HIS	-	expression tag	UNP Q396C9
B	-14	HIS	-	expression tag	UNP Q396C9
B	-13	HIS	-	expression tag	UNP Q396C9
B	-12	HIS	-	expression tag	UNP Q396C9
B	-11	HIS	-	expression tag	UNP Q396C9
B	-10	HIS	-	expression tag	UNP Q396C9
B	-9	SER	-	expression tag	UNP Q396C9
B	-8	SER	-	expression tag	UNP Q396C9
B	-7	GLY	-	expression tag	UNP Q396C9
B	-6	LEU	-	expression tag	UNP Q396C9
B	-5	VAL	-	expression tag	UNP Q396C9
B	-4	PRO	-	expression tag	UNP Q396C9
B	-3	ARG	-	expression tag	UNP Q396C9
B	-2	GLY	-	expression tag	UNP Q396C9
B	-1	SER	-	expression tag	UNP Q396C9
B	0	HIS	-	expression tag	UNP Q396C9
C	-19	MET	-	initiating methionine	UNP Q396C9
C	-18	GLY	-	expression tag	UNP Q396C9
C	-17	SER	-	expression tag	UNP Q396C9
C	-16	SER	-	expression tag	UNP Q396C9
C	-15	HIS	-	expression tag	UNP Q396C9
C	-14	HIS	-	expression tag	UNP Q396C9
C	-13	HIS	-	expression tag	UNP Q396C9
C	-12	HIS	-	expression tag	UNP Q396C9
C	-11	HIS	-	expression tag	UNP Q396C9
C	-10	HIS	-	expression tag	UNP Q396C9
C	-9	SER	-	expression tag	UNP Q396C9
C	-8	SER	-	expression tag	UNP Q396C9
C	-7	GLY	-	expression tag	UNP Q396C9
C	-6	LEU	-	expression tag	UNP Q396C9
C	-5	VAL	-	expression tag	UNP Q396C9
C	-4	PRO	-	expression tag	UNP Q396C9
C	-3	ARG	-	expression tag	UNP Q396C9
C	-2	GLY	-	expression tag	UNP Q396C9
C	-1	SER	-	expression tag	UNP Q396C9
C	0	HIS	-	expression tag	UNP Q396C9
D	-19	MET	-	initiating methionine	UNP Q396C9
D	-18	GLY	-	expression tag	UNP Q396C9
D	-17	SER	-	expression tag	UNP Q396C9

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Chain	Residue	Modelled	Actual	Comment	Reference
D	-16	SER	-	expression tag	UNP Q396C9
D	-15	HIS	-	expression tag	UNP Q396C9
D	-14	HIS	-	expression tag	UNP Q396C9
D	-13	HIS	-	expression tag	UNP Q396C9
D	-12	HIS	-	expression tag	UNP Q396C9
D	-11	HIS	-	expression tag	UNP Q396C9
D	-10	HIS	-	expression tag	UNP Q396C9
D	-9	SER	-	expression tag	UNP Q396C9
D	-8	SER	-	expression tag	UNP Q396C9
D	-7	GLY	-	expression tag	UNP Q396C9
D	-6	LEU	-	expression tag	UNP Q396C9
D	-5	VAL	-	expression tag	UNP Q396C9
D	-4	PRO	-	expression tag	UNP Q396C9
D	-3	ARG	-	expression tag	UNP Q396C9
D	-2	GLY	-	expression tag	UNP Q396C9
D	-1	SER	-	expression tag	UNP Q396C9
D	0	HIS	-	expression tag	UNP Q396C9

- Molecule 2 is (3-bromophenyl)-[2-(4-hydroxyphenyl)-6-oxidanyl-1-benzothiophen-3-yl]m ethanone (CCD ID: A1IAG) (formula: C₂₁H₁₃BrO₃S) (labeled as "Ligand of Interest" by depositor).



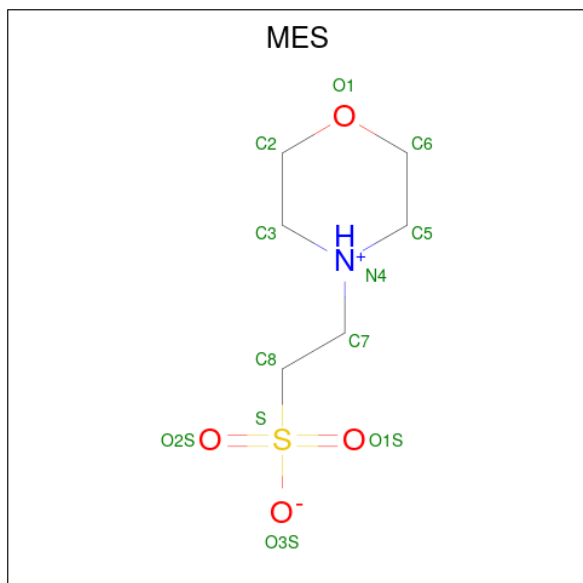
Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
2	A	1	Total	Br	C	H	O	S	0	1
			78	2	42	26	6	2		
2	B	1	Total	Br	C	H	O	S	0	1
			78	2	42	26	6	2		

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Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
2	C	1	Total	Br	C	H	O	S	0	1
			78	2	42	26	6	2		
2	D	1	Total	Br	C	H	O	S	0	1
			78	2	42	26	6	2		

- Molecule 3 is 2-(N-MORPHOLINO)-ETHANESULFONIC ACID (CCD ID: MES) (formula: $C_6H_{13}NO_4S$).



Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
3	A	1	Total	C	H	N	O	S	0	0
			25	6	13	1	4	1		
3	B	1	Total	C	H	N	O	S	0	0
			25	6	13	1	4	1		
3	C	1	Total	C	H	N	O	S	0	0
			25	6	13	1	4	1		
3	D	1	Total	C	H	N	O	S	0	0
			25	6	13	1	4	1		

- Molecule 4 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	C	H	O	0	0
			13	3	7	3		
4	A	1	Total	C	H	O	0	0
			14	3	8	3		
4	A	1	Total	C	H	O	0	0
			13	3	7	3		
4	C	1	Total	C	H	O	0	0
			14	3	8	3		
4	C	1	Total	C	H	O	0	0
			13	3	7	3		
4	C	1	Total	C	H	O	0	0
			14	3	8	3		
4	D	1	Total	C	H	O	0	0
			12	3	6	3		

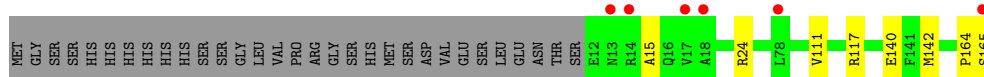
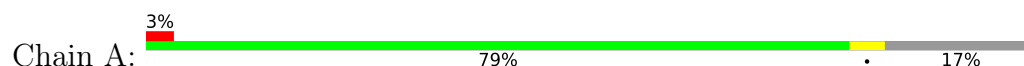
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	126	Total	O	0	0
			126	126		
5	B	124	Total	O	0	0
			124	124		
5	C	146	Total	O	0	1
			147	147		
5	D	138	Total	O	0	0
			138	138		

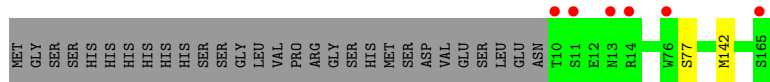
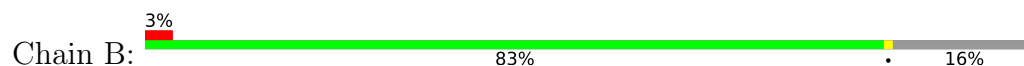
3 Residue-property plots [i](#)

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.

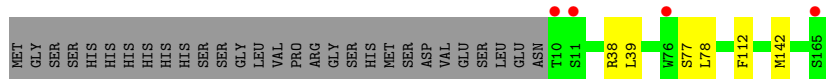
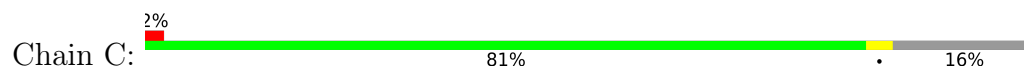
- Molecule 1: Phenazine biosynthesis protein A/B



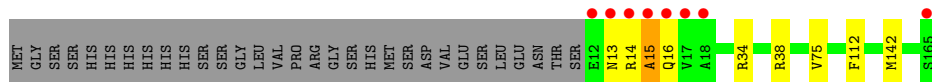
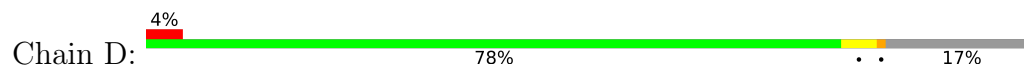
- Molecule 1: Phenazine biosynthesis protein A/B



- Molecule 1: Phenazine biosynthesis protein A/B



- Molecule 1: Phenazine biosynthesis protein A/B



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	69.36Å 69.09Å 82.99Å 90.00° 90.05° 90.00°	Depositor
Resolution (Å)	48.95 – 1.60 48.95 – 1.60	Depositor EDS
% Data completeness (in resolution range)	95.5 (48.95-1.60) 95.6 (48.95-1.60)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.35 (at 1.60Å)	Xtriage
Refinement program	PHENIX v1.20.1-4487	Depositor
R, R_{free}	0.164 , 0.187 0.165 , 0.188	Depositor DCC
R_{free} test set	5052 reflections (4.88%)	wwPDB-VP
Wilson B-factor (Å ²)	21.7	Xtriage
Anisotropy	0.396	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.44 , 51.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.51$, $\langle L^2 \rangle = 0.34$	Xtriage
Estimated twinning fraction	0.000 for k,h,-l 0.000 for -k,-h,-l 0.105 for h,-k,-l	Xtriage
F_o, F_c correlation	0.98	EDS
Total number of atoms	11149	wwPDB-VP
Average B, all atoms (Å ²)	32.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 79.01 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 6.1179e-07. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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: MES, GOL, A1IAG

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	0.46	0/1341	0.65	0/1815
1	B	0.46	0/1391	0.63	0/1886
1	C	0.45	0/1441	0.65	0/1949
1	D	0.47	0/1316	0.65	0/1780
All	All	0.46	0/5489	0.65	0/7430

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	1278	1195	1170	3	0
1	B	1299	1229	1182	1	0
1	C	1352	1274	1222	3	0
1	D	1278	1204	1203	6	0
2	A	52	26	0	1	0
2	B	52	26	0	1	0
2	C	52	26	0	1	0
2	D	52	26	0	1	0
3	A	12	13	12	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	12	13	12	2	0
3	C	12	13	12	2	0
3	D	12	13	13	2	0
4	A	18	22	24	0	0
4	C	18	23	24	0	0
4	D	6	6	8	0	0
5	A	126	0	0	0	0
5	B	124	0	0	0	0
5	C	147	0	0	0	0
5	D	138	0	0	2	0
All	All	6040	5109	4882	16	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 2.

All (16) 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:13:ASN:ND2	5:D:301:HOH:O	2.30	0.65
1:A:15:ALA:HA	1:D:75:VAL:HG11	1.86	0.57
1:D:14:ARG:O	1:D:15:ALA:HB2	2.07	0.54
1:A:164:PRO:O	1:A:165:SER:CB	2.57	0.52
1:D:38:ARG:NH2	3:D:202:MES:O2S	2.43	0.52
2:D:201[A]:A1IAG:BR1	3:D:202:MES:H51	2.66	0.51
1:C:38:ARG:HB2	1:C:78[C]:LEU:HD21	1.94	0.49
1:A:111:VAL:HG22	1:A:117[B]:ARG:HG3	1.95	0.47
2:A:601[B]:A1IAG:BR1	3:A:602:MES:H32	2.72	0.44
1:D:15:ALA:HB3	1:D:16:GLN:OE1	2.18	0.44
1:D:34:ARG:NH1	5:D:306:HOH:O	2.51	0.44
1:C:39:LEU:HG	1:C:78[C]:LEU:HD11	1.98	0.44
3:C:201:MES:H32	2:C:202[B]:A1IAG:BR1	2.74	0.43
2:B:201[A]:A1IAG:BR1	3:B:202:MES:H51	2.76	0.41
1:B:77:SER:OG	3:B:202:MES:O1S	2.28	0.41
1:C:77:SER:OG	3:C:201:MES:O3S	2.35	0.40

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

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	158/185 (85%)	156 (99%)	2 (1%)	0	100	100
1	B	161/185 (87%)	160 (99%)	1 (1%)	0	100	100
1	C	167/185 (90%)	166 (99%)	1 (1%)	0	100	100
1	D	153/185 (83%)	150 (98%)	2 (1%)	1 (1%)	19	6
All	All	639/740 (86%)	632 (99%)	6 (1%)	1 (0%)	44	25

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	15	ALA

5.3.2 Protein sidechains

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	128/161 (80%)	125 (98%)	3 (2%)	45	21
1	B	135/161 (84%)	134 (99%)	1 (1%)	81	70
1	C	142/161 (88%)	139 (98%)	3 (2%)	48	25
1	D	130/161 (81%)	128 (98%)	2 (2%)	60	39
All	All	535/644 (83%)	526 (98%)	9 (2%)	58	33

All (9) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	24	ARG
1	A	140	GLU
1	A	142	MET
1	B	142	MET
1	C	112[A]	PHE
1	C	112[B]	PHE
1	C	142	MET
1	D	112	PHE
1	D	142	MET

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

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 ⓘ

19 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	$\# Z > 2$
3	MES	A	602	-	12,12,12	2.18	1 (8%)	14,16,16	1.80	3 (21%)
4	GOL	A	603	-	5,5,5	1.01	0	5,5,5	0.86	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
4	GOL	A	604	-	5,5,5	0.90	0	5,5,5	0.84	0
2	A1IAG	C	202[B]	-	24,29,29	1.95	3 (12%)	32,42,42	1.63	4 (12%)
4	GOL	C	204	-	5,5,5	0.94	0	5,5,5	0.70	0
4	GOL	D	203	-	5,5,5	0.84	0	5,5,5	0.97	0
2	A1IAG	D	201[B]	-	24,29,29	1.91	2 (8%)	32,42,42	1.66	5 (15%)
2	A1IAG	C	202[A]	-	24,29,29	1.91	1 (4%)	32,42,42	1.60	5 (15%)
2	A1IAG	B	201[B]	-	24,29,29	2.11	1 (4%)	32,42,42	1.79	6 (18%)
4	GOL	C	205	-	5,5,5	0.69	0	5,5,5	0.97	0
3	MES	C	201	-	12,12,12	2.22	1 (8%)	14,16,16	1.85	4 (28%)
3	MES	D	202	-	12,12,12	2.19	1 (8%)	14,16,16	1.70	3 (21%)
2	A1IAG	A	601[B]	-	24,29,29	2.00	3 (12%)	32,42,42	1.56	4 (12%)
4	GOL	C	203	-	5,5,5	0.99	0	5,5,5	0.88	0
2	A1IAG	D	201[A]	-	24,29,29	1.91	1 (4%)	32,42,42	1.58	5 (15%)
3	MES	B	202	-	12,12,12	2.24	1 (8%)	14,16,16	1.75	3 (21%)
2	A1IAG	B	201[A]	-	24,29,29	2.17	3 (12%)	32,42,42	1.70	4 (12%)
4	GOL	A	605	-	5,5,5	0.94	0	5,5,5	0.98	0
2	A1IAG	A	601[A]	-	24,29,29	1.88	1 (4%)	32,42,42	1.50	4 (12%)

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	MES	A	602	-	-	1/6/14/14	0/1/1/1
4	GOL	A	603	-	-	2/4/4/4	-
4	GOL	A	604	-	-	2/4/4/4	-
2	A1IAG	C	202[B]	-	-	0/9/12/12	0/4/4/4
4	GOL	C	204	-	-	2/4/4/4	-
4	GOL	D	203	-	-	2/4/4/4	-
2	A1IAG	D	201[B]	-	-	0/9/12/12	0/4/4/4
2	A1IAG	C	202[A]	-	-	0/9/12/12	0/4/4/4
2	A1IAG	B	201[B]	-	-	0/9/12/12	0/4/4/4
4	GOL	C	205	-	-	0/4/4/4	-
3	MES	C	201	-	-	2/6/14/14	0/1/1/1
3	MES	D	202	-	-	5/6/14/14	0/1/1/1
2	A1IAG	A	601[B]	-	-	0/9/12/12	0/4/4/4
4	GOL	C	203	-	-	2/4/4/4	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	A1IAG	D	201[A]	-	-	0/9/12/12	0/4/4/4
3	MES	B	202	-	-	2/6/14/14	0/1/1/1
2	A1IAG	B	201[A]	-	-	0/9/12/12	0/4/4/4
4	GOL	A	605	-	-	2/4/4/4	-
2	A1IAG	A	601[A]	-	-	0/9/12/12	0/4/4/4

All (19) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	201[A]	A1IAG	C12-C11	-9.67	1.38	1.48
2	B	201[B]	A1IAG	C12-C11	-9.49	1.38	1.48
2	A	601[B]	A1IAG	C12-C11	-8.43	1.39	1.48
2	D	201[B]	A1IAG	C12-C11	-8.39	1.40	1.48
2	C	202[A]	A1IAG	C12-C11	-8.31	1.40	1.48
2	C	202[B]	A1IAG	C12-C11	-8.30	1.40	1.48
2	D	201[A]	A1IAG	C12-C11	-8.25	1.40	1.48
2	A	601[A]	A1IAG	C12-C11	-8.21	1.40	1.48
3	B	202	MES	C8-S	-7.51	1.66	1.77
3	D	202	MES	C8-S	-7.42	1.67	1.77
3	C	201	MES	C8-S	-7.35	1.67	1.77
3	A	602	MES	C8-S	-7.22	1.67	1.77
2	A	601[B]	A1IAG	BR1-C07	2.60	1.95	1.90
2	A	601[B]	A1IAG	C03-C02	2.49	1.53	1.49
2	C	202[B]	A1IAG	C03-C02	2.40	1.53	1.49
2	C	202[B]	A1IAG	BR1-C07	2.25	1.94	1.90
2	B	201[A]	A1IAG	C03-C02	2.21	1.53	1.49
2	B	201[A]	A1IAG	BR1-C07	2.18	1.94	1.90
2	D	201[B]	A1IAG	O01-C02	-2.12	1.19	1.22

All (50) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	602	MES	O3S-S-C8	5.07	113.97	105.77
2	B	201[B]	A1IAG	C25-C26-C10	-5.06	125.45	135.49
2	D	201[B]	A1IAG	C25-C26-C10	-5.01	125.55	135.49
2	B	201[A]	A1IAG	C25-C26-C10	-4.86	125.83	135.49
2	B	201[B]	A1IAG	C10-C26-C20	4.85	115.40	107.77
2	D	201[A]	A1IAG	C25-C26-C10	-4.81	125.93	135.49
2	C	202[A]	A1IAG	C25-C26-C10	-4.71	126.14	135.49
2	C	202[B]	A1IAG	C25-C26-C10	-4.69	126.18	135.49
2	D	201[B]	A1IAG	C10-C26-C20	4.67	115.11	107.77
2	A	601[B]	A1IAG	C25-C26-C10	-4.64	126.27	135.49

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	202[A]	A1IAG	C10-C26-C20	4.62	115.04	107.77
2	A	601[A]	A1IAG	C25-C26-C10	-4.60	126.36	135.49
2	B	201[A]	A1IAG	C10-C26-C20	4.49	114.83	107.77
2	A	601[A]	A1IAG	C10-C26-C20	4.41	114.70	107.77
2	C	202[B]	A1IAG	C10-C26-C20	4.35	114.61	107.77
2	A	601[B]	A1IAG	C10-C26-C20	4.35	114.61	107.77
2	D	201[A]	A1IAG	C10-C26-C20	4.33	114.58	107.77
3	B	202	MES	O3S-S-C8	3.78	111.89	105.77
3	C	201	MES	O2S-S-C8	3.63	111.29	106.92
2	B	201[B]	A1IAG	C21-C20-S19	3.56	132.22	125.10
3	C	201	MES	C5-N4-C3	3.53	116.78	108.83
2	B	201[A]	A1IAG	C21-C20-S19	3.51	132.11	125.10
2	C	202[B]	A1IAG	C21-C20-S19	3.49	132.09	125.10
2	C	202[A]	A1IAG	C21-C20-S19	3.40	131.90	125.10
3	D	202	MES	O2S-S-C8	3.37	110.98	106.92
2	A	601[B]	A1IAG	C21-C20-S19	3.24	131.58	125.10
2	D	201[B]	A1IAG	C21-C20-S19	3.22	131.54	125.10
2	D	201[A]	A1IAG	C21-C20-S19	3.14	131.37	125.10
3	D	202	MES	O3S-S-C8	3.13	110.83	105.77
3	B	202	MES	C5-N4-C3	3.10	115.81	108.83
3	D	202	MES	C5-N4-C3	3.03	115.66	108.83
2	A	601[A]	A1IAG	C21-C20-S19	2.99	131.09	125.10
3	C	201	MES	O3S-S-C8	2.46	109.75	105.77
2	C	202[B]	A1IAG	C10-C11-S19	-2.38	105.86	112.06
3	A	602	MES	C7-N4-C3	2.37	117.29	111.23
2	A	601[B]	A1IAG	C10-C11-S19	-2.36	105.92	112.06
2	D	201[B]	A1IAG	C26-C10-C02	-2.31	120.05	125.12
3	A	602	MES	C7-N4-C5	-2.26	105.47	111.23
2	C	202[A]	A1IAG	C10-C11-S19	-2.25	106.20	112.06
3	B	202	MES	C7-N4-C3	2.22	116.91	111.23
3	C	201	MES	C7-N4-C5	2.22	116.91	111.23
2	D	201[A]	A1IAG	C26-C10-C02	-2.21	120.28	125.12
2	B	201[A]	A1IAG	C18-C12-C13	2.21	121.99	117.59
2	A	601[A]	A1IAG	C10-C11-S19	-2.18	106.39	112.06
2	D	201[A]	A1IAG	C10-C11-S19	-2.17	106.41	112.06
2	B	201[B]	A1IAG	O01-C02-C03	-2.17	116.67	120.12
2	C	202[A]	A1IAG	C26-C10-C02	-2.12	120.48	125.12
2	D	201[B]	A1IAG	C10-C11-S19	-2.08	106.64	112.06
2	B	201[B]	A1IAG	C26-C10-C02	-2.08	120.57	125.12
2	B	201[B]	A1IAG	C18-C12-C13	2.01	121.59	117.59

There are no chirality outliers.

All (22) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	602	MES	N4-C7-C8-S
3	B	202	MES	C8-C7-N4-C3
3	B	202	MES	N4-C7-C8-S
3	C	201	MES	C8-C7-N4-C5
3	C	201	MES	N4-C7-C8-S
4	A	604	GOL	O1-C1-C2-C3
4	A	605	GOL	O1-C1-C2-C3
4	C	203	GOL	O1-C1-C2-C3
4	C	204	GOL	C1-C2-C3-O3
4	C	204	GOL	O2-C2-C3-O3
4	A	603	GOL	O1-C1-C2-C3
4	D	203	GOL	O1-C1-C2-C3
4	A	604	GOL	O1-C1-C2-O2
4	A	605	GOL	O1-C1-C2-O2
4	A	603	GOL	O1-C1-C2-O2
4	C	203	GOL	O1-C1-C2-O2
4	D	203	GOL	O1-C1-C2-O2
3	D	202	MES	C8-C7-N4-C5
3	D	202	MES	C7-C8-S-O3S
3	D	202	MES	C7-C8-S-O2S
3	D	202	MES	C8-C7-N4-C3
3	D	202	MES	C7-C8-S-O1S

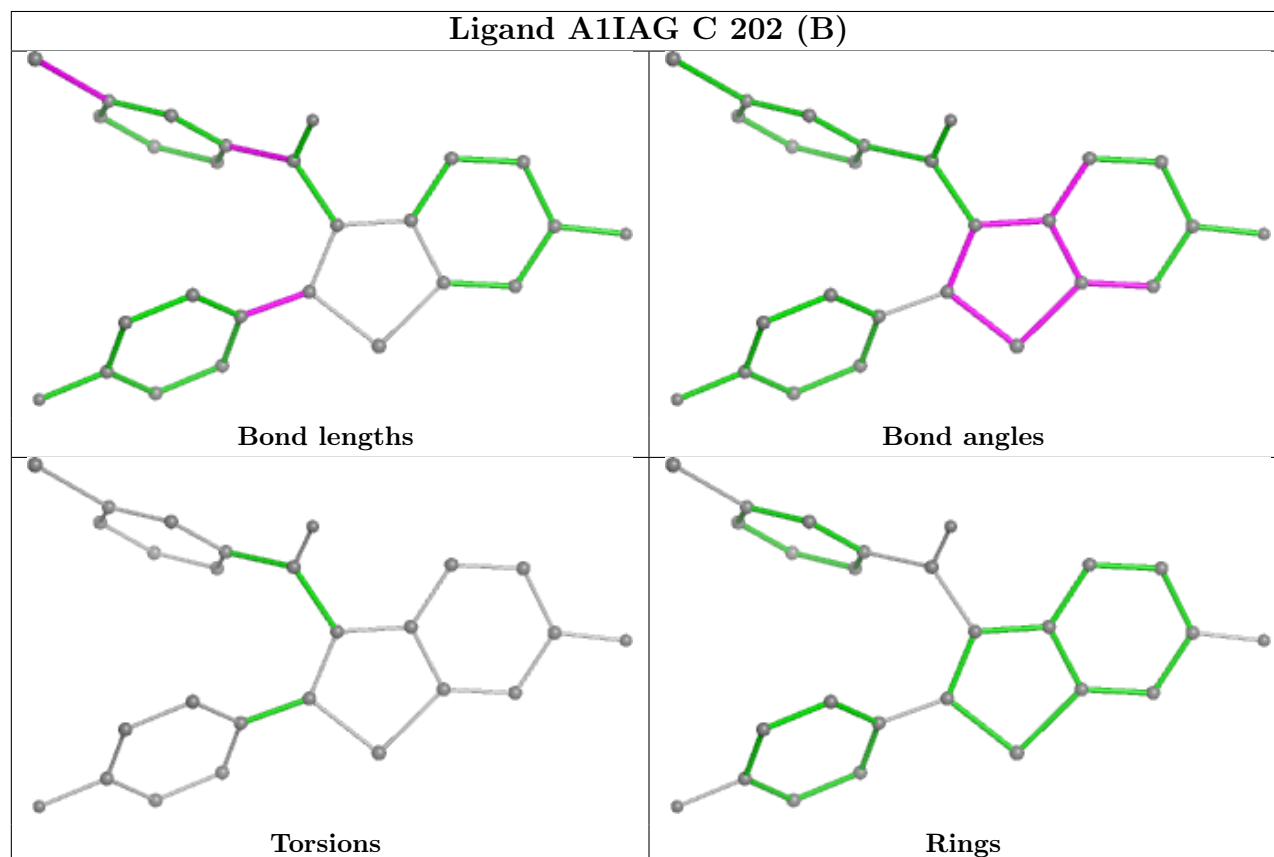
There are no ring outliers.

8 monomers are involved in 7 short contacts:

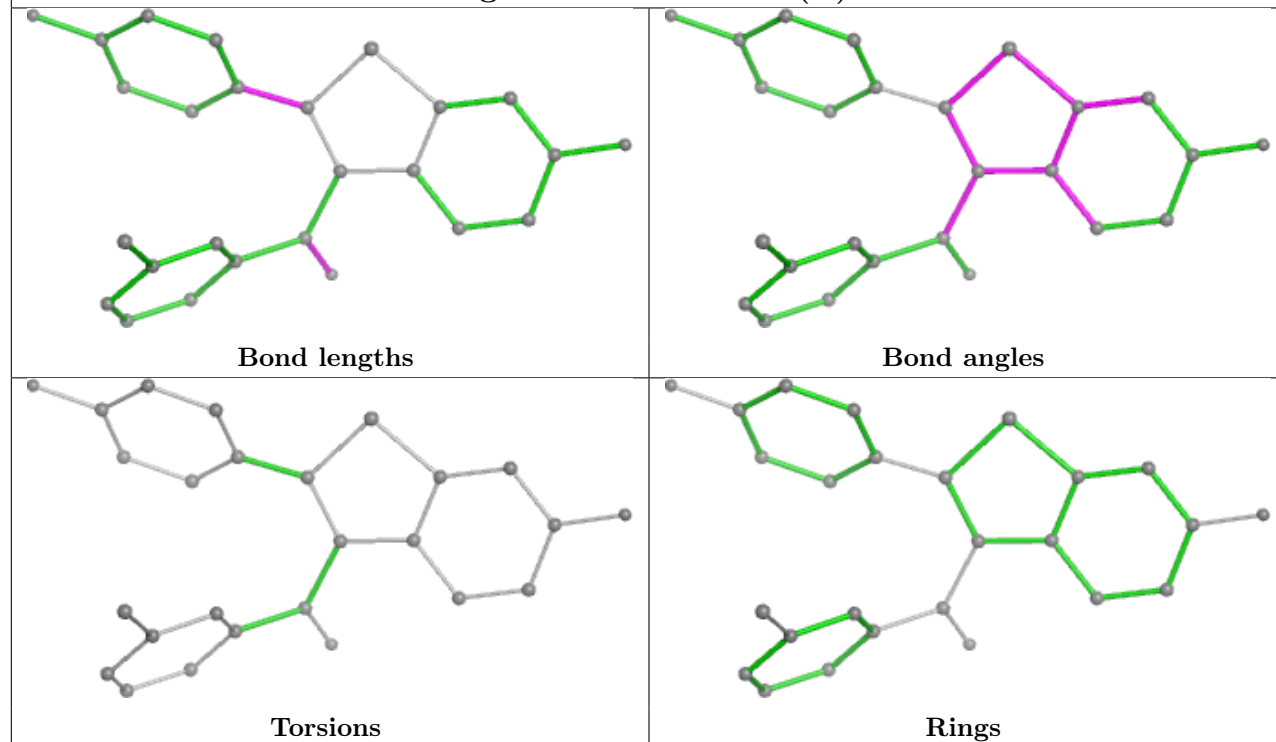
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	602	MES	1	0
2	C	202[B]	A1IAG	1	0
3	C	201	MES	2	0
3	D	202	MES	2	0
2	A	601[B]	A1IAG	1	0
2	D	201[A]	A1IAG	1	0
3	B	202	MES	2	0
2	B	201[A]	A1IAG	1	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier.

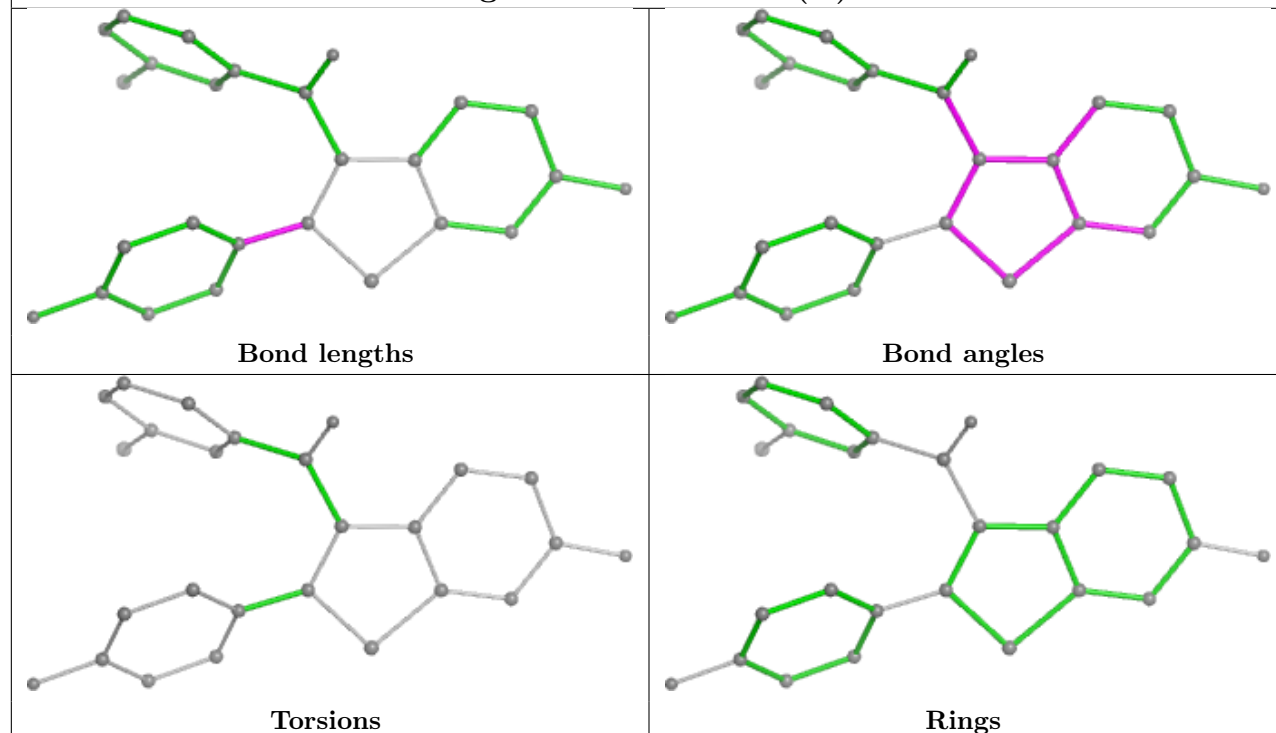
Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.



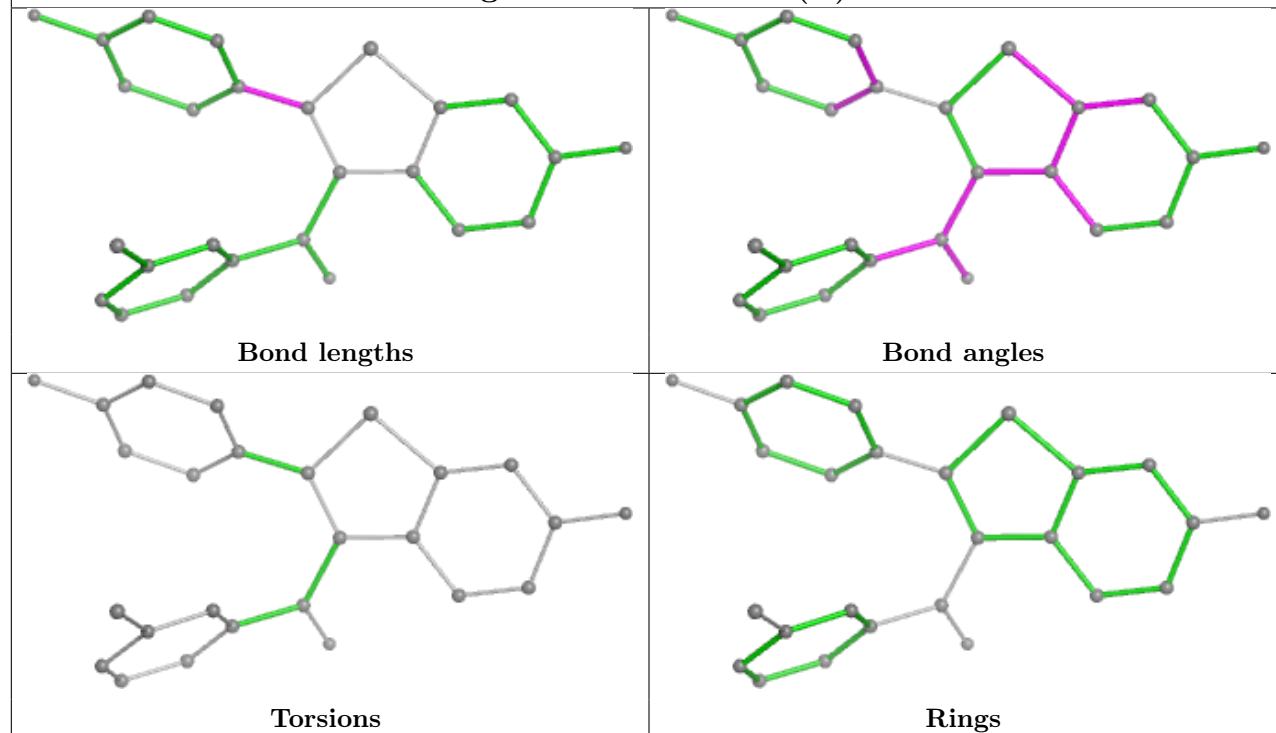
Ligand A1IAG D 201 (B)



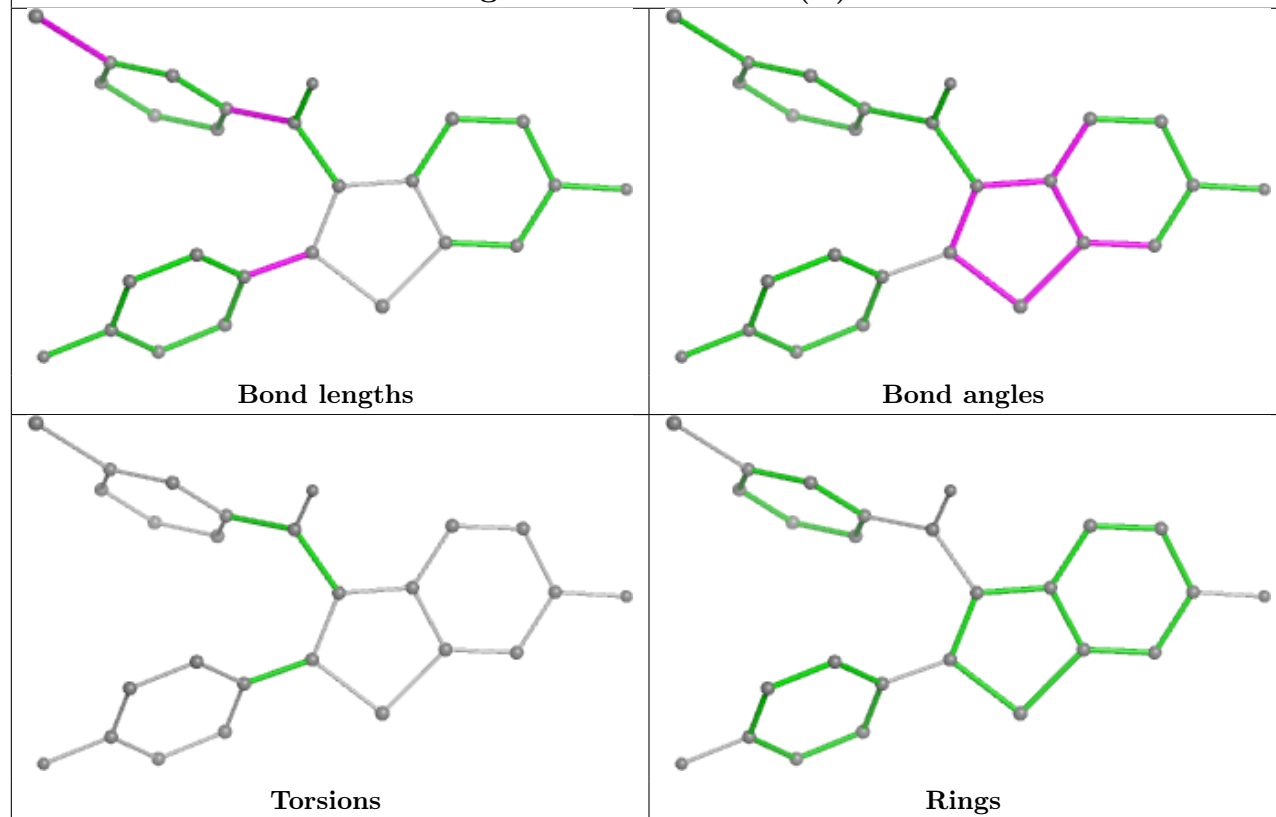
Ligand A1IAG C 202 (A)



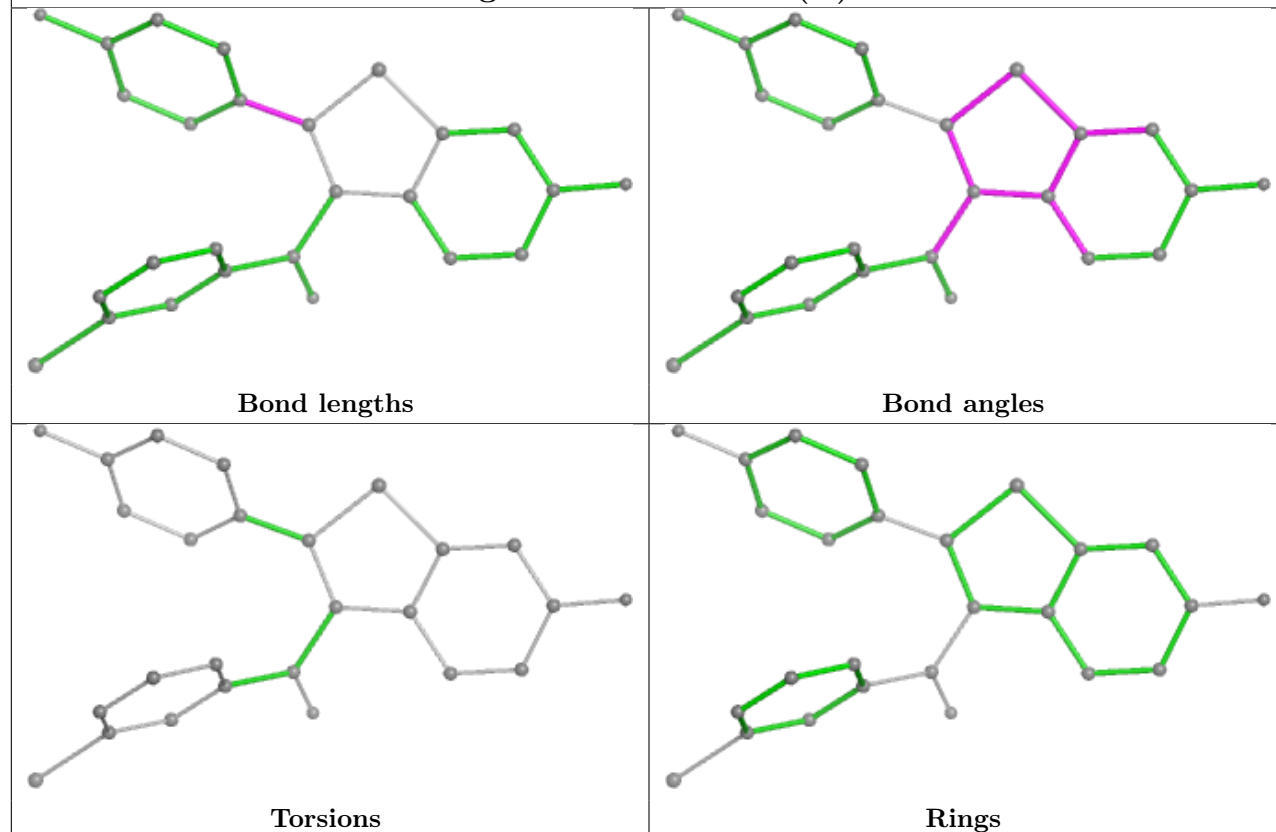
Ligand A1IAG B 201 (B)



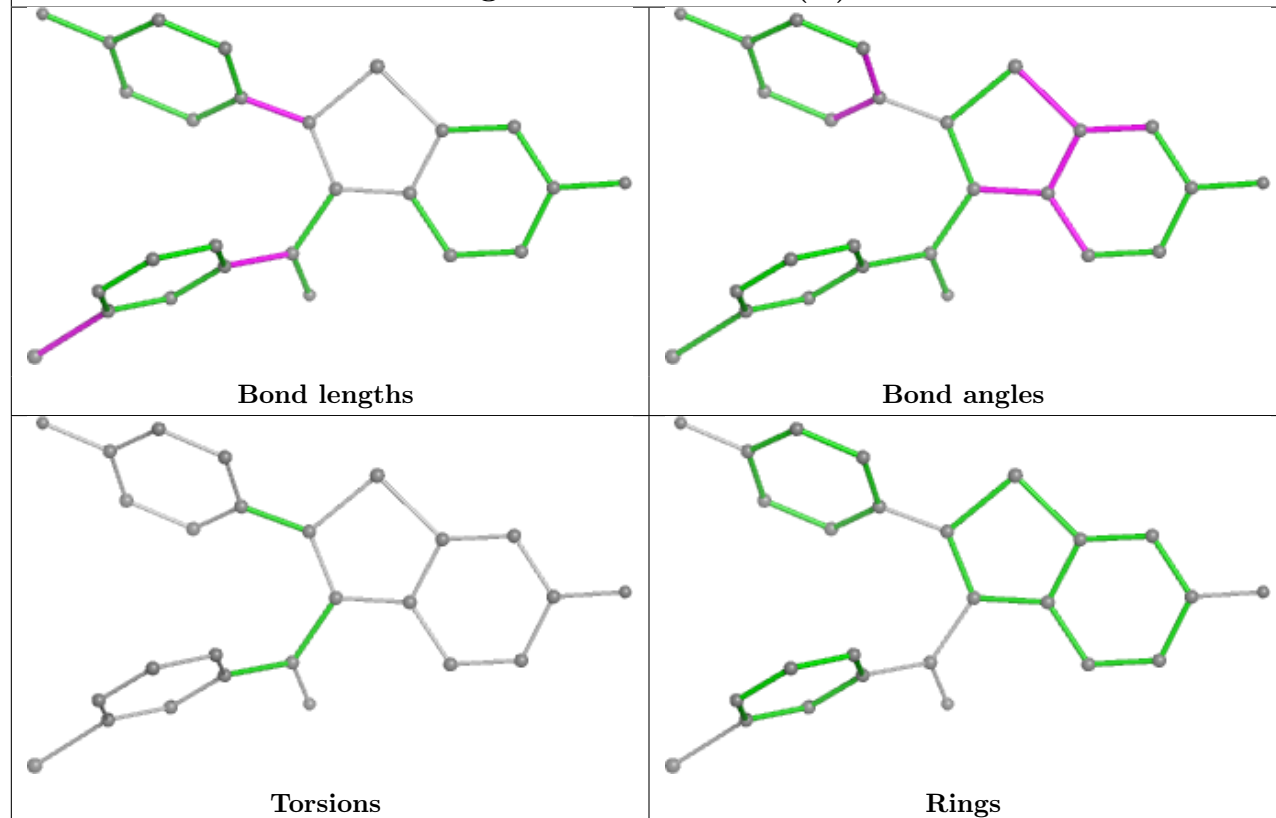
Ligand A1IAG A 601 (B)

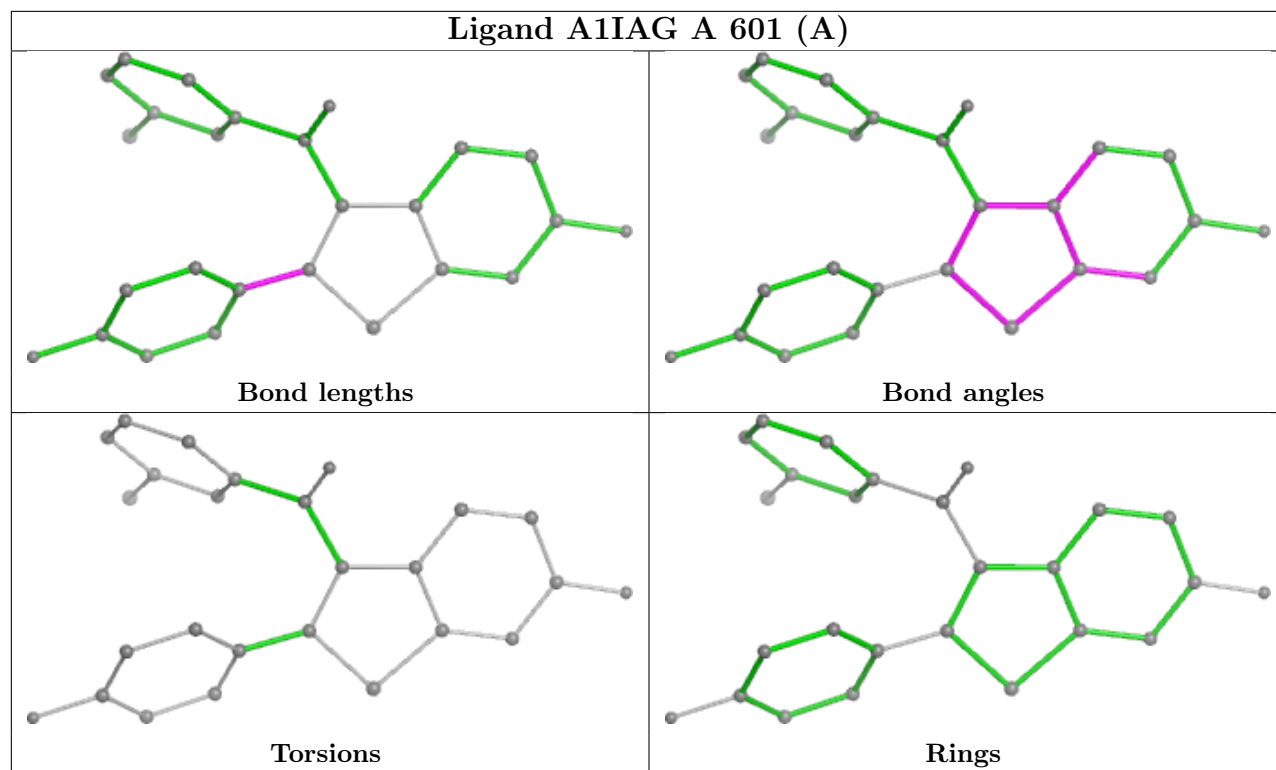


Ligand A1IAG D 201 (A)



Ligand A1IAG B 201 (A)





5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	154/185 (83%)	-0.08	6 (3%) 44 44	15, 29, 54, 82	3 (1%)
1	B	156/185 (84%)	-0.17	6 (3%) 44 44	16, 29, 52, 86	3 (1%)
1	C	156/185 (84%)	-0.18	4 (2%) 57 59	13, 27, 50, 75	7 (4%)
1	D	154/185 (83%)	-0.03	8 (5%) 34 33	15, 29, 56, 82	1 (0%)
All	All	620/740 (83%)	-0.12	24 (3%) 44 44	13, 29, 54, 86	14 (2%)

All (24) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	165	SER	5.9
1	D	15	ALA	5.5
1	D	17	VAL	4.9
1	D	13	ASN	4.9
1	D	14	ARG	4.9
1	C	10	THR	4.9
1	A	14	ARG	4.4
1	C	165	SER	4.2
1	B	76	TRP	4.2
1	A	13	ASN	3.8
1	A	17	VAL	3.7
1	B	165	SER	3.7
1	D	12	GLU	3.4
1	C	76[A]	TRP	3.3
1	B	10	THR	3.0
1	B	11	SER	3.0
1	A	78	LEU	2.6
1	A	18	ALA	2.6
1	C	11	SER	2.4
1	D	16	GLN	2.3
1	B	13	ASN	2.3

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Mol	Chain	Res	Type	RSRZ
1	D	18	ALA	2.3
1	D	165	SER	2.1
1	B	14	ARG	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](#)

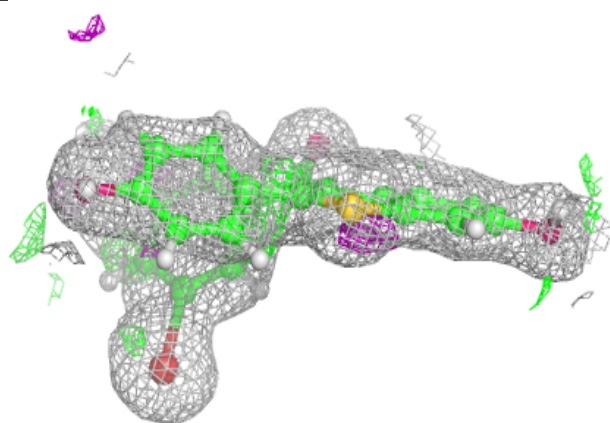
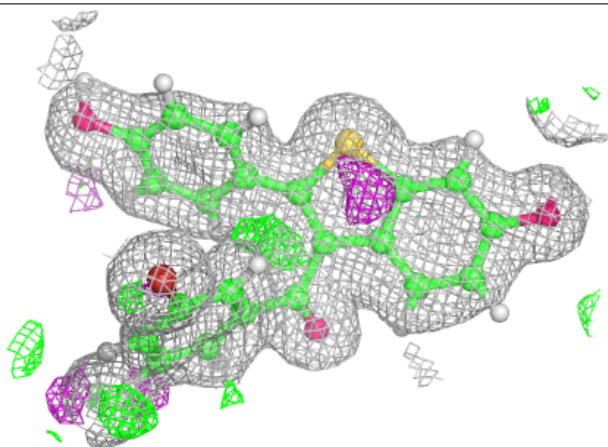
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
4	GOL	D	203	6/6	0.72	0.29	40,65,81,81	0
4	GOL	A	603	6/6	0.79	0.23	41,58,78,79	0
4	GOL	A	605	6/6	0.82	0.18	47,61,73,74	0
4	GOL	C	204	6/6	0.83	0.21	36,61,76,85	0
4	GOL	C	205	6/6	0.87	0.13	46,58,70,71	0
4	GOL	C	203	6/6	0.88	0.13	32,48,66,79	0
3	MES	A	602	12/12	0.90	0.14	26,41,62,72	0
3	MES	B	202	12/12	0.90	0.14	31,46,63,65	0
3	MES	C	201	12/12	0.90	0.13	29,43,56,65	0
3	MES	D	202	12/12	0.91	0.13	32,42,52,64	0
4	GOL	A	604	6/6	0.92	0.10	30,47,66,76	0
2	A1IAG	D	201[B]	26/26	0.95	0.09	19,24,40,42	39
2	A1IAG	D	201[A]	26/26	0.95	0.09	19,25,40,41	39
2	A1IAG	B	201[B]	26/26	0.96	0.08	19,26,42,51	39
2	A1IAG	B	201[A]	26/26	0.96	0.08	19,27,42,51	39
2	A1IAG	C	202[B]	26/26	0.98	0.09	20,28,43,47	39
2	A1IAG	C	202[A]	26/26	0.98	0.09	20,28,43,49	39
2	A1IAG	A	601[B]	26/26	0.99	0.06	18,23,36,42	39
2	A1IAG	A	601[A]	26/26	0.99	0.06	17,22,34,41	39

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.

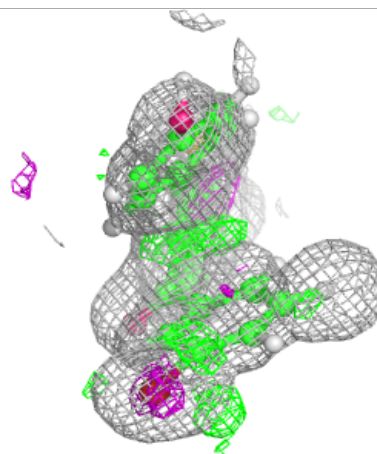
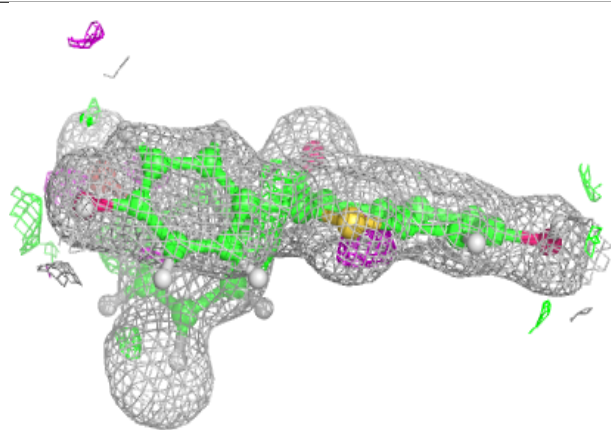
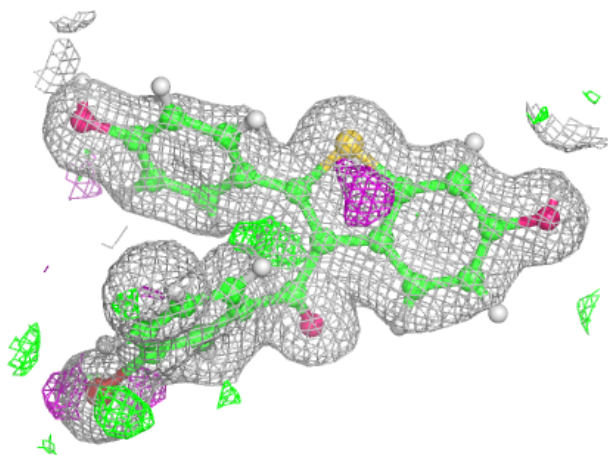
Electron density around A1IAG D 201 (B):

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



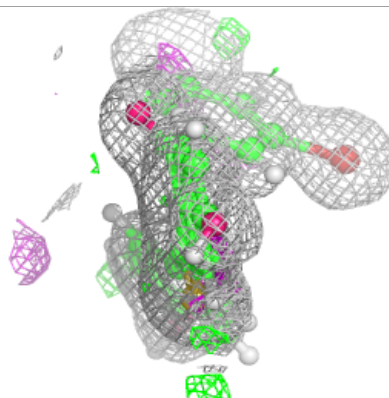
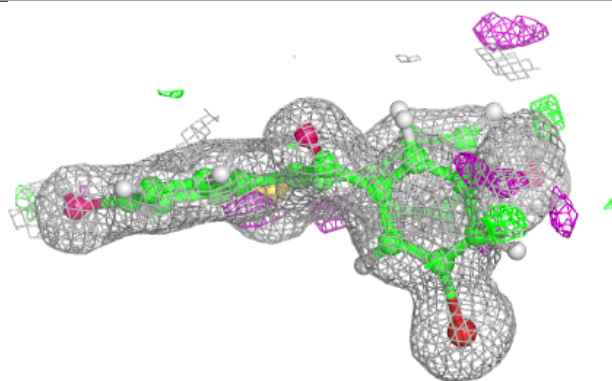
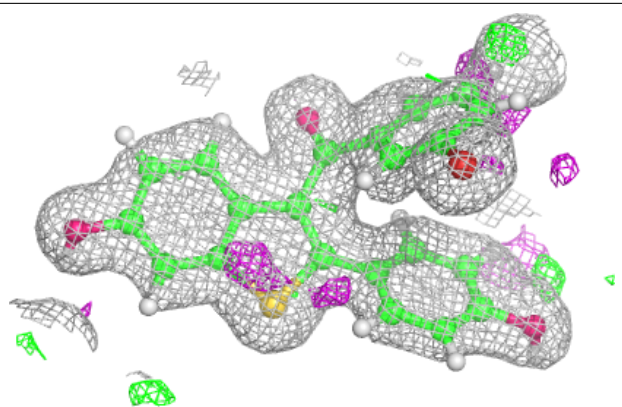
Electron density around A1IAG D 201 (A):

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

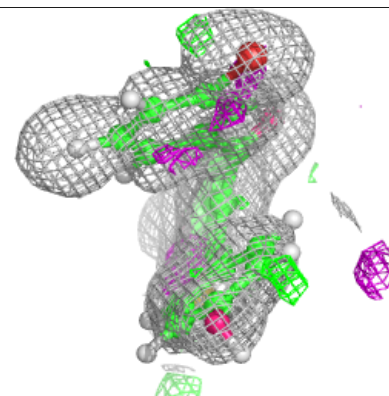
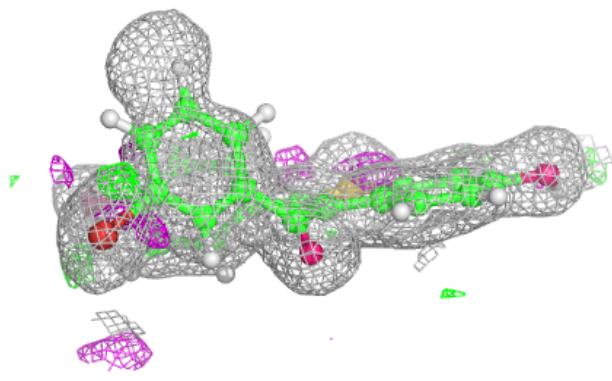
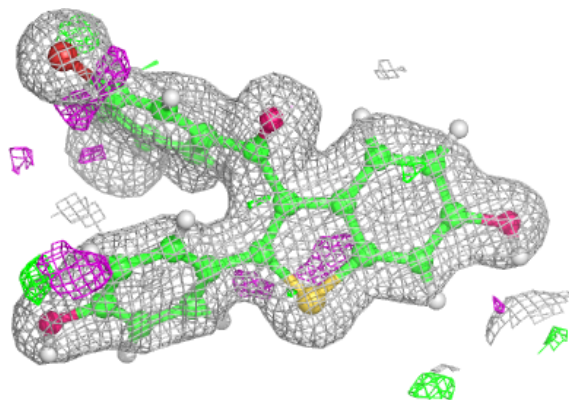


Electron density around A1IAG B 201 (B):

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

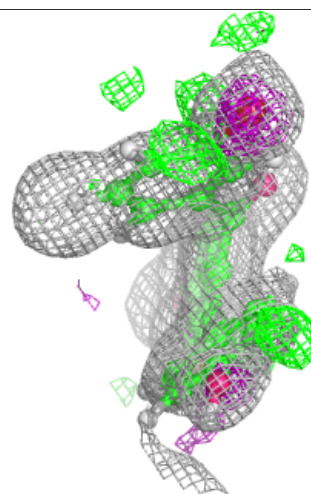
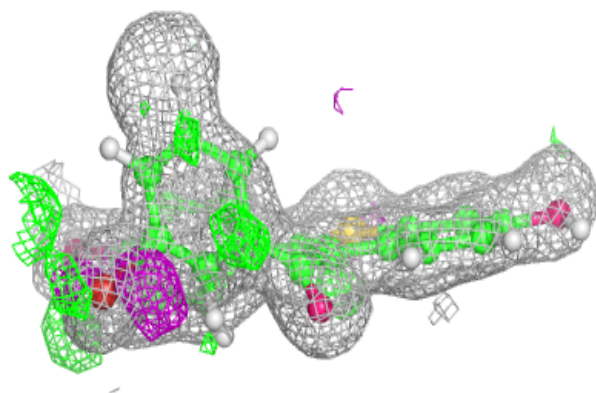
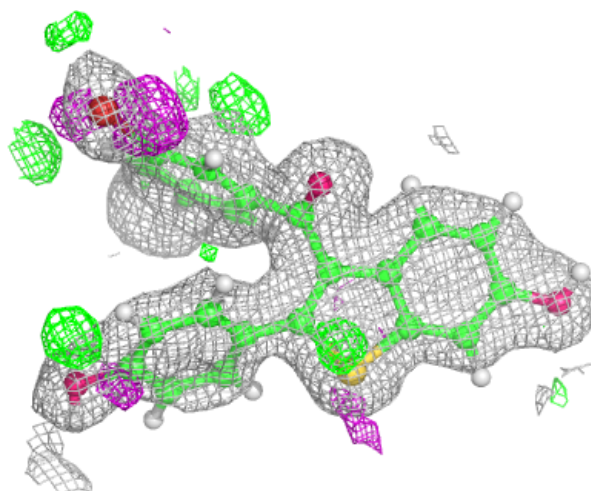
**Electron density around A1IAG B 201 (A):**

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



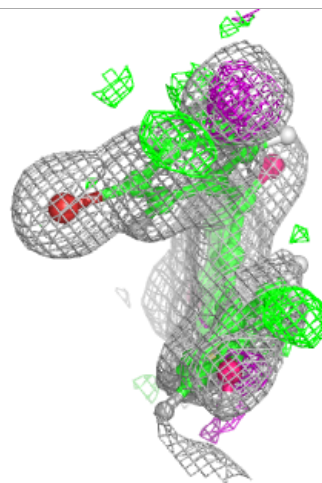
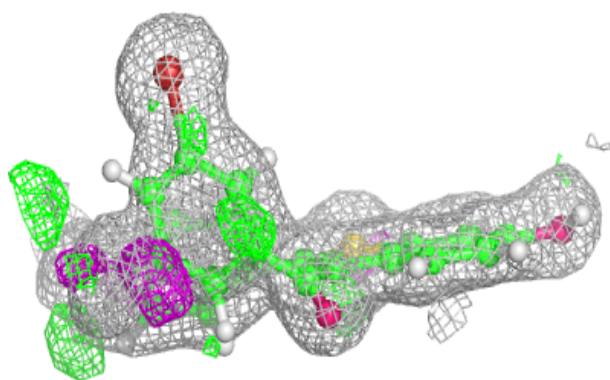
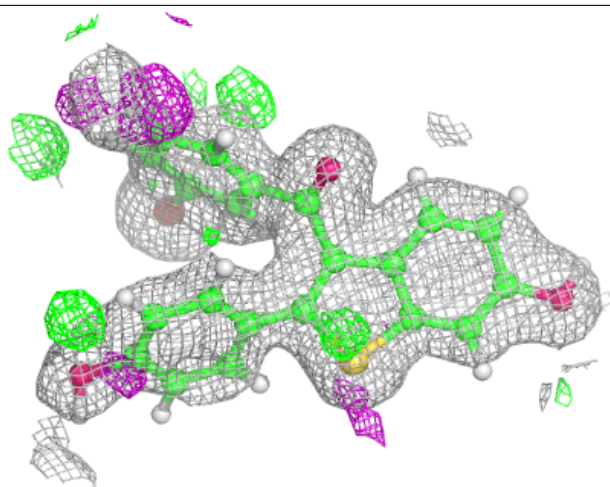
Electron density around A1IAG C 202 (B):

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



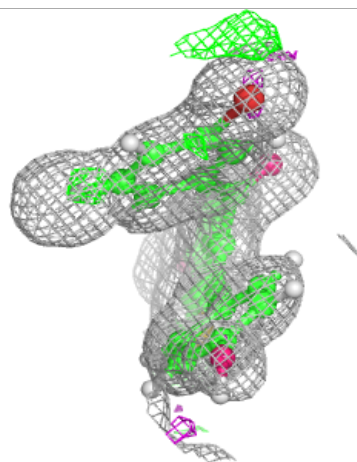
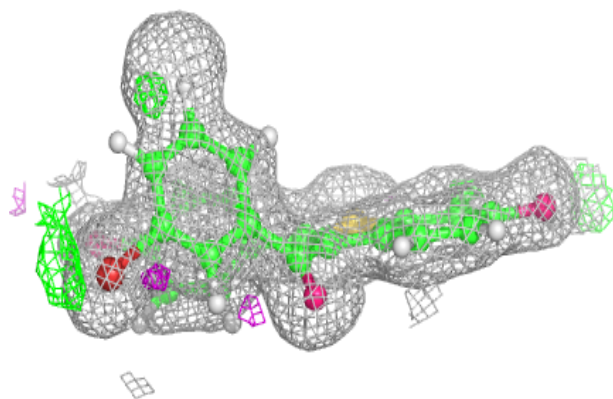
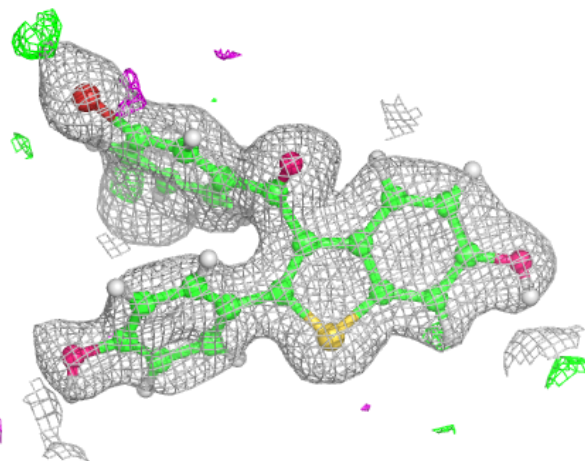
Electron density around A1IAG C 202 (A):

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



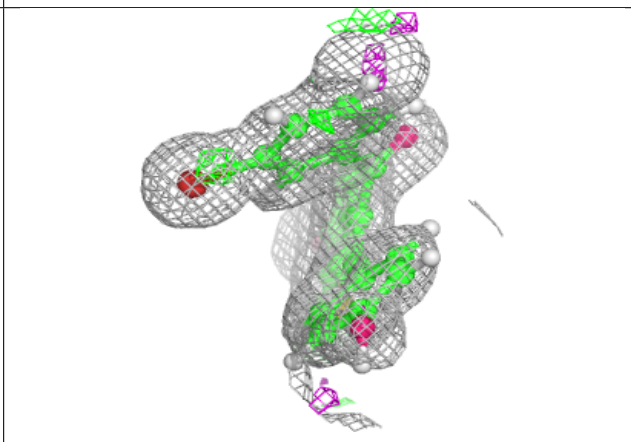
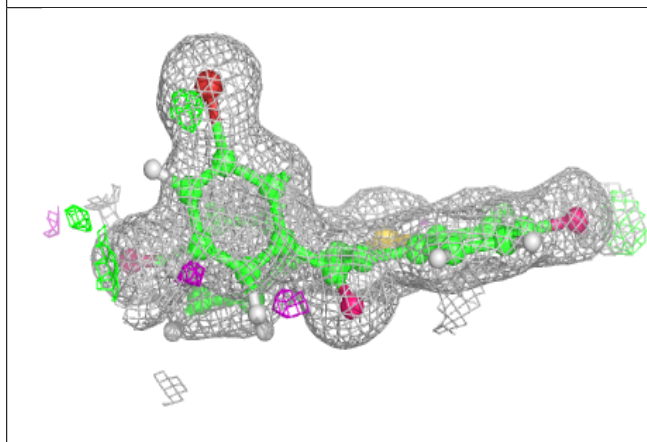
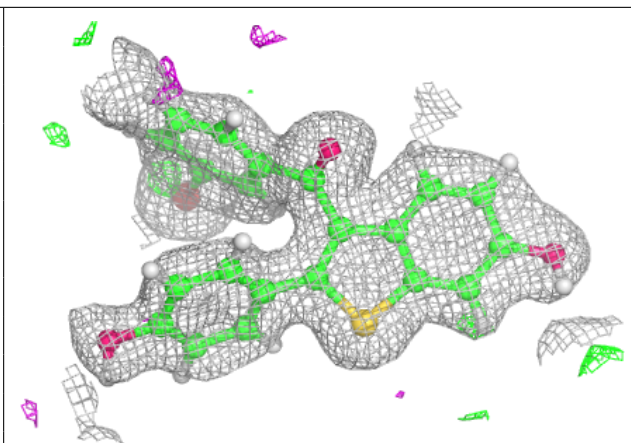
Electron density around A1IAG A 601 (B):

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



Electron density around A1IAG A 601 (A):

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



6.5 Other polymers ⓘ

There are no such residues in this entry.