



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 04:46 PM UTC

PDB ID : 6FS7 / pdb_00006fs7
Title : Influenza A/California/04/2009 (pH1N1) endonuclease with I38T mutation with bound inhibitor, baloxavir acid (BXA)
Authors : Cusack, S.; Speranzini, V.
Deposited on : 2018-02-19
Resolution : 1.96 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:

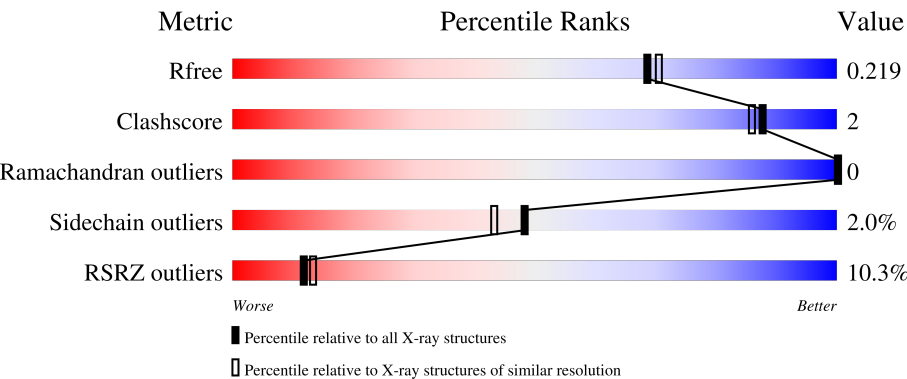
MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal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

1 Overall quality at a glance i

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

The reported resolution of this entry is 1.96 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	3494 (1.96-1.96)
Clashscore	190562	3612 (1.96-1.96)
Ramachandran outliers	187476	3587 (1.96-1.96)
Sidechain outliers	187428	3587 (1.96-1.96)
RSRZ outliers	180081	3495 (1.96-1.96)

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	193	7% 88%6%6%
1	B	193	8% 89%6%
1	C	193	12% 89%7%
1	D	193	7% 86%7%7%
1	E	193	12% 89%8%

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Mol	Chain	Length	Quality of chain
1	F	193	10% 86% 7% 7%

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 9706 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 Polymerase acidic protein, Polymerase acidic protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	182	Total	C	N	O	S	0	1	0
			1512	954	260	285	13			
1	B	182	Total	C	N	O	S	0	1	0
			1511	952	260	285	14			
1	C	179	Total	C	N	O	S	0	0	0
			1484	938	256	278	12			
1	D	180	Total	C	N	O	S	0	1	0
			1504	950	258	284	12			
1	E	177	Total	C	N	O	S	0	1	0
			1475	932	254	276	13			
1	F	179	Total	C	N	O	S	0	2	0
			1501	948	257	282	14			

There are 54 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-6	GLY	-	expression tag	UNP C3W5S0
A	-5	MET	-	expression tag	UNP C3W5S0
A	-4	GLY	-	expression tag	UNP C3W5S0
A	-3	SER	-	expression tag	UNP C3W5S0
A	-2	GLY	-	expression tag	UNP C3W5S0
A	-1	MET	-	expression tag	UNP C3W5S0
A	0	ALA	-	expression tag	UNP C3W5S0
A	38	THR	ILE	engineered mutation	UNP C3W5S0
A	64	GLY	-	linker	UNP C3W5S0
B	-6	GLY	-	expression tag	UNP C3W5S0
B	-5	MET	-	expression tag	UNP C3W5S0
B	-4	GLY	-	expression tag	UNP C3W5S0
B	-3	SER	-	expression tag	UNP C3W5S0
B	-2	GLY	-	expression tag	UNP C3W5S0
B	-1	MET	-	expression tag	UNP C3W5S0
B	0	ALA	-	expression tag	UNP C3W5S0
B	38	THR	ILE	engineered mutation	UNP C3W5S0

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Chain	Residue	Modelled	Actual	Comment	Reference
B	64	GLY	-	linker	UNP C3W5S0
C	-6	GLY	-	expression tag	UNP C3W5S0
C	-5	MET	-	expression tag	UNP C3W5S0
C	-4	GLY	-	expression tag	UNP C3W5S0
C	-3	SER	-	expression tag	UNP C3W5S0
C	-2	GLY	-	expression tag	UNP C3W5S0
C	-1	MET	-	expression tag	UNP C3W5S0
C	0	ALA	-	expression tag	UNP C3W5S0
C	38	THR	ILE	engineered mutation	UNP C3W5S0
C	64	GLY	-	linker	UNP C3W5S0
D	-6	GLY	-	expression tag	UNP C3W5S0
D	-5	MET	-	expression tag	UNP C3W5S0
D	-4	GLY	-	expression tag	UNP C3W5S0
D	-3	SER	-	expression tag	UNP C3W5S0
D	-2	GLY	-	expression tag	UNP C3W5S0
D	-1	MET	-	expression tag	UNP C3W5S0
D	0	ALA	-	expression tag	UNP C3W5S0
D	38	THR	ILE	engineered mutation	UNP C3W5S0
D	64	GLY	-	linker	UNP C3W5S0
E	-6	GLY	-	expression tag	UNP C3W5S0
E	-5	MET	-	expression tag	UNP C3W5S0
E	-4	GLY	-	expression tag	UNP C3W5S0
E	-3	SER	-	expression tag	UNP C3W5S0
E	-2	GLY	-	expression tag	UNP C3W5S0
E	-1	MET	-	expression tag	UNP C3W5S0
E	0	ALA	-	expression tag	UNP C3W5S0
E	38	THR	ILE	engineered mutation	UNP C3W5S0
E	64	GLY	-	linker	UNP C3W5S0
F	-6	GLY	-	expression tag	UNP C3W5S0
F	-5	MET	-	expression tag	UNP C3W5S0
F	-4	GLY	-	expression tag	UNP C3W5S0
F	-3	SER	-	expression tag	UNP C3W5S0
F	-2	GLY	-	expression tag	UNP C3W5S0
F	-1	MET	-	expression tag	UNP C3W5S0
F	0	ALA	-	expression tag	UNP C3W5S0
F	38	THR	ILE	engineered mutation	UNP C3W5S0
F	64	GLY	-	linker	UNP C3W5S0

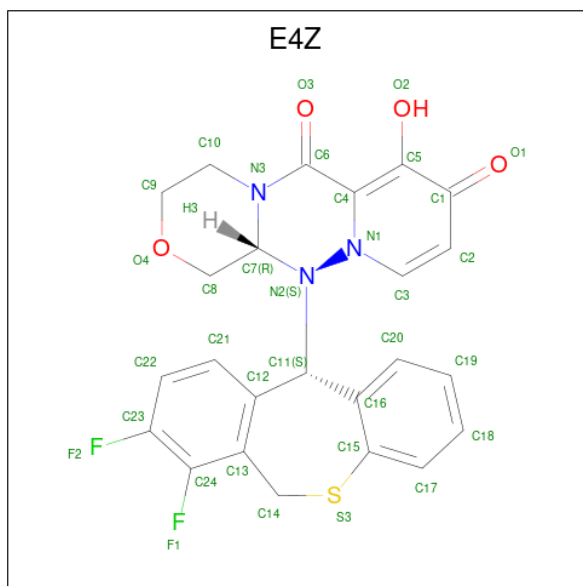
- Molecule 2 is MANGANESE (II) ION (CCD ID: MN) (formula: Mn).

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	2	Total Mn 2 2	0	0
2	B	2	Total Mn 2 2	0	0
2	C	2	Total Mn 2 2	0	0
2	D	2	Total Mn 2 2	0	0
2	E	2	Total Mn 2 2	0	0
2	F	2	Total Mn 2 2	0	0

- Molecule 3 is Baloxavir acid (CCD ID: E4Z) (formula: $C_{24}H_{19}F_2N_3O_4S$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C F N O S 34 24 2 3 4 1	0	0
3	B	1	Total C F N O S 34 24 2 3 4 1	0	0
3	C	1	Total C F N O S 34 24 2 3 4 1	0	0
3	D	1	Total C F N O S 34 24 2 3 4 1	0	0

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	E	1	Total	C	F	N	O	S	
			34	24	2	3	4	1	
3	F	1	Total	C	F	N	O	S	
			34	24	2	3	4	1	

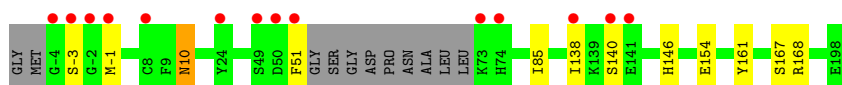
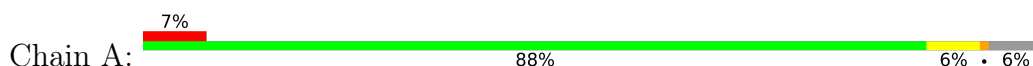
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	97	Total	O		
			97	97	0	0
4	B	92	Total	O		
			92	92	0	0
4	C	77	Total	O		
			77	77	0	0
4	D	95	Total	O		
			95	95	0	0
4	E	59	Total	O		
			59	59	0	0
4	F	83	Total	O		
			83	83	0	0

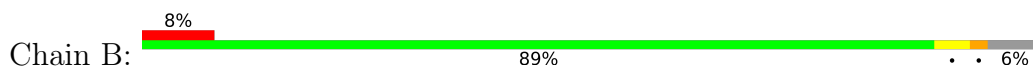
3 Residue-property plots [i](#)

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.

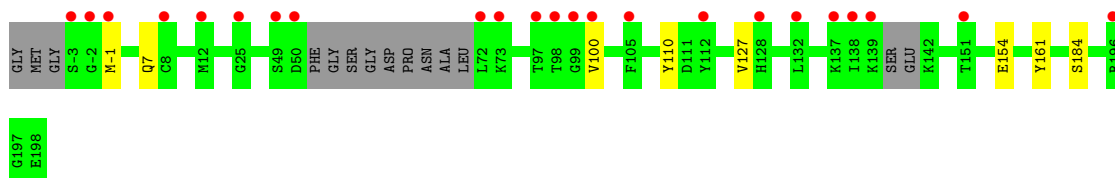
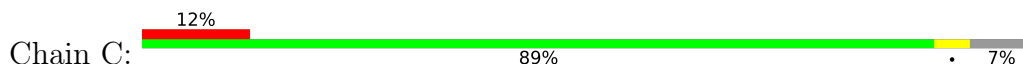
- Molecule 1: Polymerase acidic protein, Polymerase acidic protein



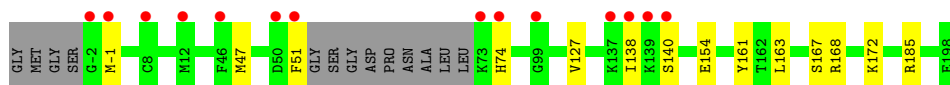
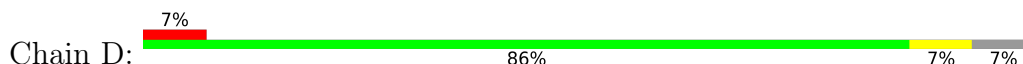
- Molecule 1: Polymerase acidic protein, Polymerase acidic protein



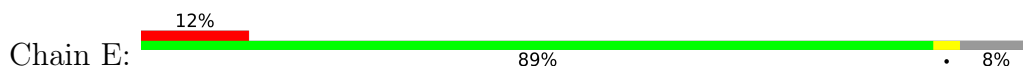
- Molecule 1: Polymerase acidic protein, Polymerase acidic protein

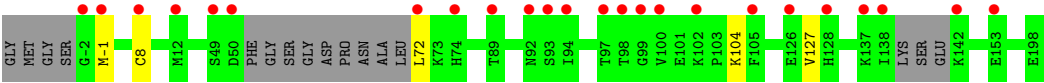


- Molecule 1: Polymerase acidic protein, Polymerase acidic protein

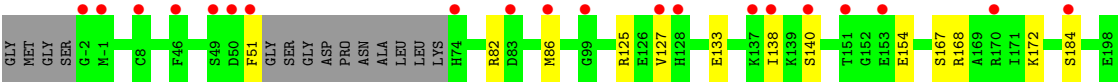
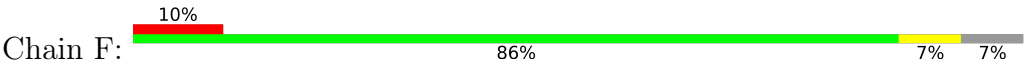


- Molecule 1: Polymerase acidic protein, Polymerase acidic protein





● Molecule 1: Polymerase acidic protein, Polymerase acidic protein



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α , β , γ	135.68Å 75.56Å 121.80Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	90.64 – 1.96 90.64 – 1.96	Depositor EDS
% Data completeness (in resolution range)	99.4 (90.64-1.96) 99.4 (90.64-1.96)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.04	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.90 (at 1.95Å)	Xtrriage
Refinement program	PHENIX (1.12_2829: ???)	Depositor
R, R_{free}	0.188 , 0.211 0.199 , 0.219	Depositor DCC
R_{free} test set	4375 reflections (4.83%)	wwPDB-VP
Wilson B-factor (Å ²)	36.3	Xtrriage
Anisotropy	0.108	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 35.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	9706	wwPDB-VP
Average B, all atoms (Å ²)	42.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 25.23 % 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 3.2957e-03. 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: E4Z, MN

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	A	0.26	0/1542	0.44	1/2065 (0.0%)
1	B	0.19	0/1540	0.41	0/2061
1	C	0.35	0/1512	0.44	0/2024
1	D	0.20	0/1534	0.40	0/2055
1	E	0.19	0/1503	0.39	0/2013
1	F	0.25	0/1531	0.39	0/2051
All	All	0.25	0/9162	0.41	1/12269 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	-3	SER	N-CA-C	5.65	119.11	110.36

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1512	0	1477	7	0
1	B	1511	0	1481	7	0
1	C	1484	0	1460	3	0
1	D	1504	0	1468	8	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	E	1475	0	1446	0	0
1	F	1501	0	1464	6	0
2	A	2	0	0	0	0
2	B	2	0	0	0	0
2	C	2	0	0	0	0
2	D	2	0	0	0	0
2	E	2	0	0	0	0
2	F	2	0	0	0	0
3	A	34	0	0	1	0
3	B	34	0	0	1	0
3	C	34	0	0	1	0
3	D	34	0	0	1	0
3	E	34	0	0	1	0
3	F	34	0	0	1	0
4	A	97	0	0	0	0
4	B	92	0	0	1	0
4	C	77	0	0	1	0
4	D	95	0	0	2	0
4	E	59	0	0	0	0
4	F	83	0	0	1	0
All	All	9706	0	8796	36	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 (36) 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:172:LYS:NZ	4:D:1003:HOH:O	2.31	0.64
1:B:101:GLU:OE1	1:B:142:LYS:NZ	2.31	0.58
1:D:185:ARG:NH1	4:D:1001:HOH:O	2.24	0.58
3:C:903:E4Z:C3	3:C:903:E4Z:C16	2.84	0.55
3:B:903:E4Z:C3	3:B:903:E4Z:C16	2.84	0.54
3:D:903:E4Z:C3	3:D:903:E4Z:C16	2.85	0.54
3:E:903:E4Z:C16	3:E:903:E4Z:C3	2.86	0.54
3:A:903:E4Z:C16	3:A:903:E4Z:C3	2.86	0.53
3:F:903:E4Z:C3	3:F:903:E4Z:C16	2.86	0.53
1:F:51:PHE:HB3	1:F:167:SER:OG	2.09	0.53
1:B:74:HIS:ND1	1:B:74:HIS:O	2.42	0.51
1:F:138:ILE:C	1:F:140:SER:H	2.20	0.50
1:D:51:PHE:HB2	1:D:163:LEU:HD22	1.94	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:51:PHE:CD2	1:D:167:SER:HB3	2.47	0.49
1:B:138:ILE:HG23	1:B:141:GLU:HB3	1.93	0.49
1:D:138:ILE:C	1:D:140:SER:H	2.21	0.48
1:B:151:THR:OG1	1:B:153:GLU:OE1	2.26	0.48
1:D:47:MET:O	1:D:51:PHE:CE2	2.67	0.47
1:A:138:ILE:C	1:A:140:SER:H	2.23	0.46
1:A:146:HIS:NE2	1:A:154:GLU:OE1	2.46	0.46
1:C:154:GLU:HG3	1:C:161:TYR:CE1	2.51	0.46
1:D:154:GLU:OE1	1:D:168:ARG:HD2	2.16	0.45
1:A:51:PHE:HB3	1:A:167:SER:OG	2.17	0.45
1:A:85:ILE:HD12	1:B:92:ASN:ND2	2.33	0.44
1:B:10:ASN:OD1	1:B:10:ASN:C	2.60	0.44
1:F:125:ARG:NH2	1:F:133:GLU:OE2	2.51	0.44
1:F:154:GLU:OE1	1:F:168:ARG:HD2	2.17	0.43
1:A:10:ASN:OD1	1:A:10:ASN:C	2.62	0.43
1:A:161:TYR:HB3	1:A:168:ARG:HD3	2.00	0.42
1:A:154:GLU:OE1	1:A:168:ARG:HD2	2.20	0.42
1:B:74:HIS:HB2	4:B:1035:HOH:O	2.19	0.42
1:C:7:GLN:OE1	4:C:1001:HOH:O	2.21	0.41
1:F:82:ARG:HH11	1:F:86[B]:MET:HE3	1.85	0.41
1:F:172:LYS:NZ	4:F:1011:HOH:O	2.53	0.40
1:C:100:VAL:HG21	1:C:110:TYR:OH	2.22	0.40
1:D:161:TYR:HB3	1:D:168:ARG:HD3	2.02	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	179/193 (93%)	174 (97%)	5 (3%)	0	100	100
1	B	179/193 (93%)	174 (97%)	5 (3%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	C	173/193 (90%)	170 (98%)	3 (2%)	0	100	100
1	D	177/193 (92%)	173 (98%)	4 (2%)	0	100	100
1	E	172/193 (89%)	169 (98%)	3 (2%)	0	100	100
1	F	177/193 (92%)	172 (97%)	5 (3%)	0	100	100
All	All	1057/1158 (91%)	1032 (98%)	25 (2%)	0	100	100

There are no Ramachandran outliers to report.

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	164/170 (96%)	162 (99%)	2 (1%)	63	61
1	B	164/170 (96%)	160 (98%)	4 (2%)	43	36
1	C	161/170 (95%)	158 (98%)	3 (2%)	50	45
1	D	163/170 (96%)	160 (98%)	3 (2%)	51	47
1	E	160/170 (94%)	154 (96%)	6 (4%)	29	19
1	F	163/170 (96%)	161 (99%)	2 (1%)	63	61
All	All	975/1020 (96%)	955 (98%)	20 (2%)	48	41

All (20) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	-1	MET
1	A	10	ASN
1	B	8	CYS
1	B	10	ASN
1	B	74	HIS
1	B	138	ILE
1	C	-1	MET
1	C	127	VAL
1	C	184	SER

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Mol	Chain	Res	Type
1	D	-1	MET
1	D	74	HIS
1	D	127	VAL
1	E	-1	MET
1	E	8[A]	CYS
1	E	8[B]	CYS
1	E	72	LEU
1	E	104	LYS
1	E	127	VAL
1	F	127	VAL
1	F	184	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	C	128	HIS
1	D	128	HIS
1	E	128	HIS
1	F	128	HIS

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 18 ligands modelled in this entry, 12 are monoatomic - leaving 6 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	E4Z	D	903	2	36,39,39	1.56	7 (19%)	39,59,59	1.65	9 (23%)
3	E4Z	F	903	2	36,39,39	1.57	6 (16%)	39,59,59	1.71	9 (23%)
3	E4Z	C	903	2	36,39,39	1.58	6 (16%)	39,59,59	1.67	9 (23%)
3	E4Z	E	903	2	36,39,39	1.56	6 (16%)	39,59,59	1.62	7 (17%)
3	E4Z	B	903	2	36,39,39	1.56	6 (16%)	39,59,59	1.75	10 (25%)
3	E4Z	A	903	2	36,39,39	1.51	5 (13%)	39,59,59	1.59	7 (17%)

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	E4Z	D	903	2	-	0/0/44/44	0/4/6/6
3	E4Z	F	903	2	-	0/0/44/44	0/4/6/6
3	E4Z	C	903	2	-	0/0/44/44	0/4/6/6
3	E4Z	E	903	2	-	0/0/44/44	0/4/6/6
3	E4Z	B	903	2	-	0/0/44/44	0/4/6/6
3	E4Z	A	903	2	-	0/0/44/44	0/4/6/6

All (36) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	903	E4Z	C15-S3	-6.32	1.70	1.77
3	E	903	E4Z	C15-S3	-6.20	1.70	1.77
3	F	903	E4Z	C15-S3	-6.16	1.70	1.77
3	C	903	E4Z	C15-S3	-6.10	1.70	1.77
3	D	903	E4Z	C15-S3	-6.03	1.70	1.77
3	A	903	E4Z	C15-S3	-5.86	1.71	1.77
3	F	903	E4Z	C4-C6	3.02	1.50	1.43
3	C	903	E4Z	C4-C6	3.02	1.50	1.43
3	E	903	E4Z	C4-C6	3.01	1.50	1.43
3	B	903	E4Z	C4-C6	3.00	1.50	1.43
3	A	903	E4Z	C4-C6	2.91	1.50	1.43
3	D	903	E4Z	C4-C6	2.87	1.50	1.43
3	C	903	E4Z	C2-C1	-2.68	1.38	1.45

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	F	903	E4Z	C2-C1	-2.64	1.38	1.45
3	C	903	E4Z	C12-C11	-2.62	1.48	1.52
3	B	903	E4Z	C2-C1	-2.60	1.38	1.45
3	F	903	E4Z	C12-C11	-2.56	1.48	1.52
3	D	903	E4Z	C2-C1	-2.55	1.39	1.45
3	A	903	E4Z	C2-C1	-2.54	1.39	1.45
3	E	903	E4Z	C2-C1	-2.54	1.39	1.45
3	D	903	E4Z	C12-C11	-2.48	1.49	1.52
3	D	903	E4Z	O2-C5	-2.47	1.25	1.33
3	A	903	E4Z	C12-C11	-2.46	1.49	1.52
3	E	903	E4Z	C12-C11	-2.44	1.49	1.52
3	B	903	E4Z	O2-C5	-2.41	1.25	1.33
3	E	903	E4Z	O2-C5	-2.41	1.25	1.33
3	F	903	E4Z	O2-C5	-2.39	1.25	1.33
3	C	903	E4Z	O2-C5	-2.33	1.25	1.33
3	B	903	E4Z	C12-C11	-2.32	1.49	1.52
3	A	903	E4Z	O2-C5	-2.28	1.26	1.33
3	E	903	E4Z	C4-C5	2.19	1.39	1.36
3	C	903	E4Z	C4-C5	2.18	1.39	1.36
3	D	903	E4Z	C4-C5	2.18	1.39	1.36
3	F	903	E4Z	C4-C5	2.17	1.39	1.36
3	D	903	E4Z	C5-C1	2.08	1.49	1.45
3	B	903	E4Z	C4-C5	2.02	1.39	1.36

All (51) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	903	E4Z	C9-C10-N3	-5.82	102.30	109.34
3	F	903	E4Z	C9-C10-N3	-4.98	103.31	109.34
3	D	903	E4Z	C9-C10-N3	-4.98	103.32	109.34
3	F	903	E4Z	C2-C1-C5	4.26	119.21	115.12
3	A	903	E4Z	C2-C1-C5	4.14	119.10	115.12
3	B	903	E4Z	C2-C1-C5	4.08	119.05	115.12
3	E	903	E4Z	C9-C10-N3	-4.07	104.42	109.34
3	C	903	E4Z	C2-C1-C5	4.00	118.97	115.12
3	C	903	E4Z	C9-C10-N3	-3.94	104.58	109.34
3	E	903	E4Z	C2-C1-C5	3.93	118.89	115.12
3	A	903	E4Z	C4-C5-C1	-3.81	118.02	121.70
3	E	903	E4Z	C4-C5-C1	-3.68	118.14	121.70
3	A	903	E4Z	C9-C10-N3	-3.67	104.91	109.34
3	B	903	E4Z	C4-C5-C1	-3.63	118.19	121.70
3	F	903	E4Z	C4-C5-C1	-3.62	118.19	121.70

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	903	E4Z	C4-C5-C1	-3.62	118.20	121.70
3	D	903	E4Z	C4-C5-C1	-3.52	118.29	121.70
3	D	903	E4Z	C2-C1-C5	3.45	118.43	115.12
3	C	903	E4Z	C13-C24-C23	-2.91	119.94	121.82
3	A	903	E4Z	C14-S3-C15	2.82	114.98	105.28
3	B	903	E4Z	C14-S3-C15	2.81	114.94	105.28
3	D	903	E4Z	C20-C16-C11	-2.77	114.71	119.97
3	E	903	E4Z	C14-S3-C15	2.73	114.66	105.28
3	F	903	E4Z	C14-S3-C15	2.70	114.55	105.28
3	C	903	E4Z	C14-S3-C15	2.67	114.47	105.28
3	E	903	E4Z	C13-C24-C23	-2.65	120.10	121.82
3	F	903	E4Z	C13-C24-C23	-2.53	120.18	121.82
3	D	903	E4Z	O3-C6-C4	-2.51	121.23	126.38
3	C	903	E4Z	C20-C16-C11	-2.51	115.20	119.97
3	D	903	E4Z	C14-S3-C15	2.47	113.78	105.28
3	F	903	E4Z	C20-C16-C11	-2.47	115.27	119.97
3	A	903	E4Z	C13-C24-C23	-2.40	120.27	121.82
3	B	903	E4Z	C20-C16-C11	-2.38	115.45	119.97
3	A	903	E4Z	C20-C16-C11	-2.34	115.53	119.97
3	A	903	E4Z	O3-C6-C4	-2.31	121.66	126.38
3	E	903	E4Z	C20-C16-C11	-2.31	115.59	119.97
3	E	903	E4Z	C12-C11-N2	2.28	117.80	111.57
3	C	903	E4Z	O3-C6-C4	-2.28	121.71	126.38
3	B	903	E4Z	O3-C6-C4	-2.25	121.78	126.38
3	D	903	E4Z	C13-C24-C23	-2.24	120.37	121.82
3	C	903	E4Z	C12-C11-N2	2.22	117.62	111.57
3	B	903	E4Z	C13-C24-C23	-2.18	120.41	121.82
3	D	903	E4Z	C9-O4-C8	2.18	113.06	110.02
3	F	903	E4Z	O3-C6-C4	-2.13	122.02	126.38
3	B	903	E4Z	C9-O4-C8	2.08	112.92	110.02
3	F	903	E4Z	C3-C2-C1	-2.07	119.79	121.28
3	B	903	E4Z	C12-C11-N2	2.04	117.15	111.57
3	D	903	E4Z	C12-C11-N2	2.03	117.11	111.57
3	C	903	E4Z	C10-N3-C7	-2.02	108.98	114.21
3	F	903	E4Z	C9-O4-C8	2.01	112.82	110.02
3	B	903	E4Z	C10-N3-C7	-2.00	109.03	114.21

There are no chirality outliers.

There are no torsion outliers.

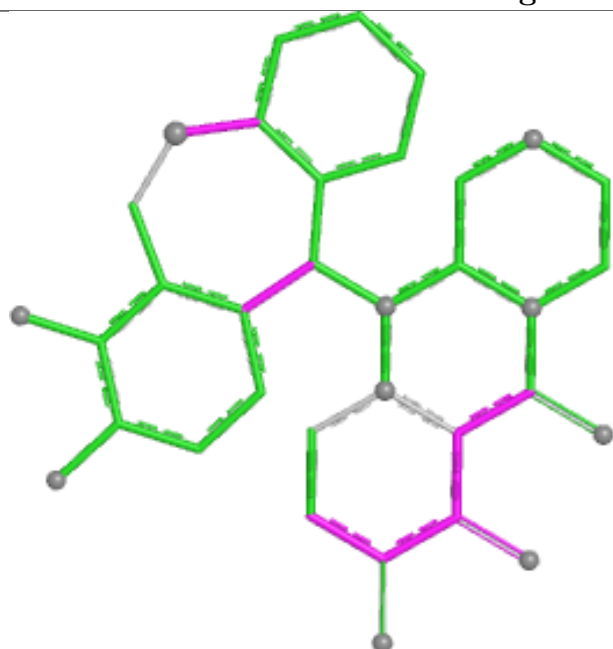
There are no ring outliers.

6 monomers are involved in 6 short contacts:

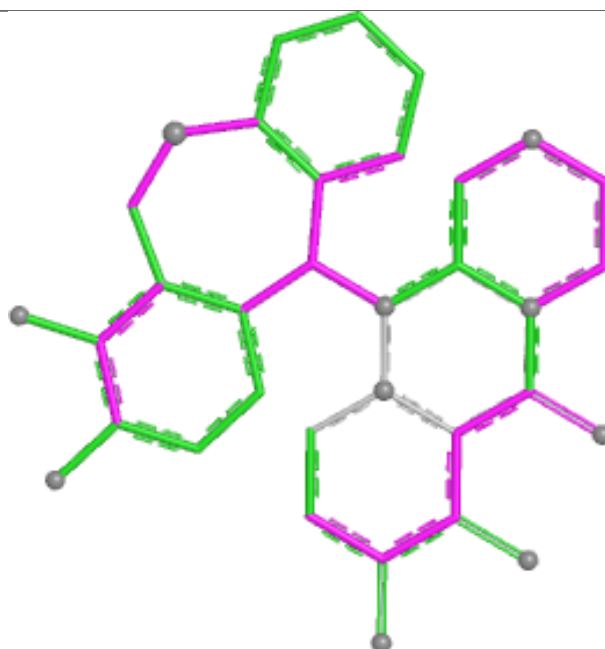
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	D	903	E4Z	1	0
3	F	903	E4Z	1	0
3	C	903	E4Z	1	0
3	E	903	E4Z	1	0
3	B	903	E4Z	1	0
3	A	903	E4Z	1	0

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.

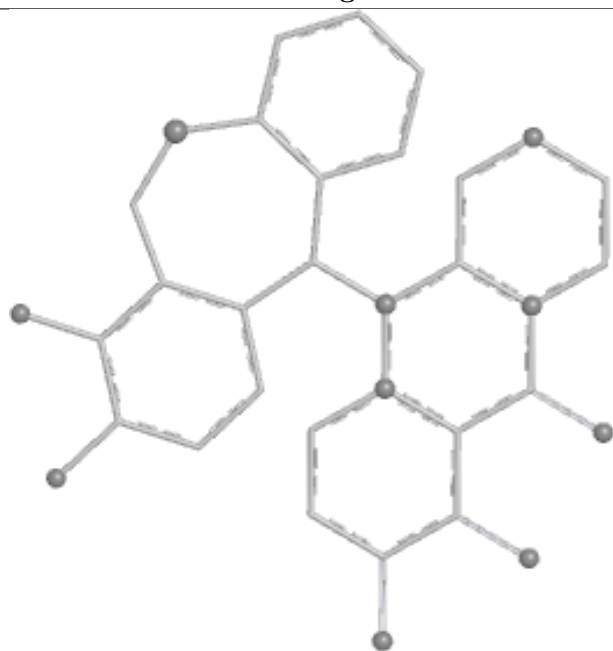
Ligand E4Z D 903



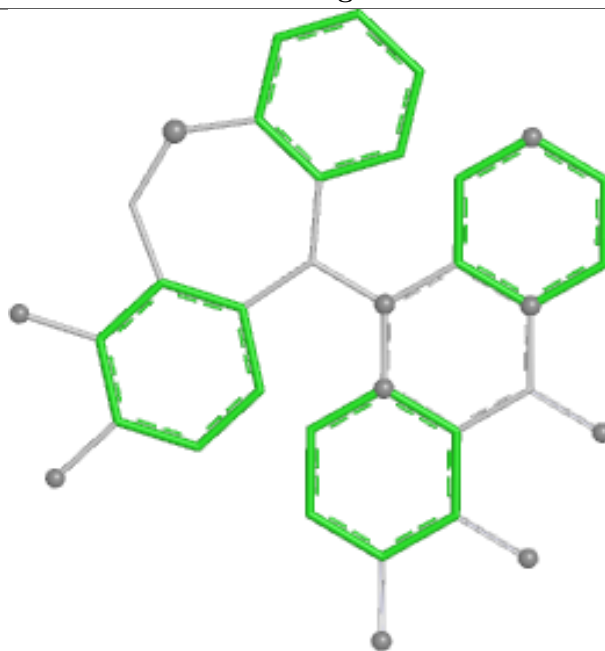
Bond lengths



Bond angles

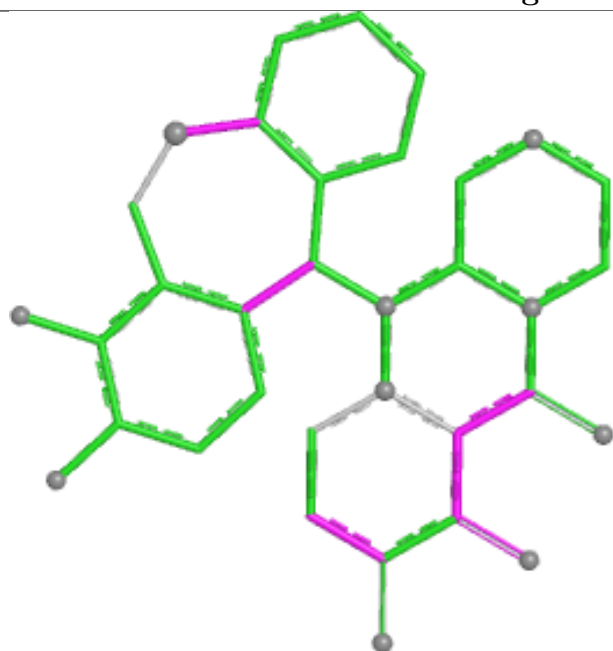


Torsions

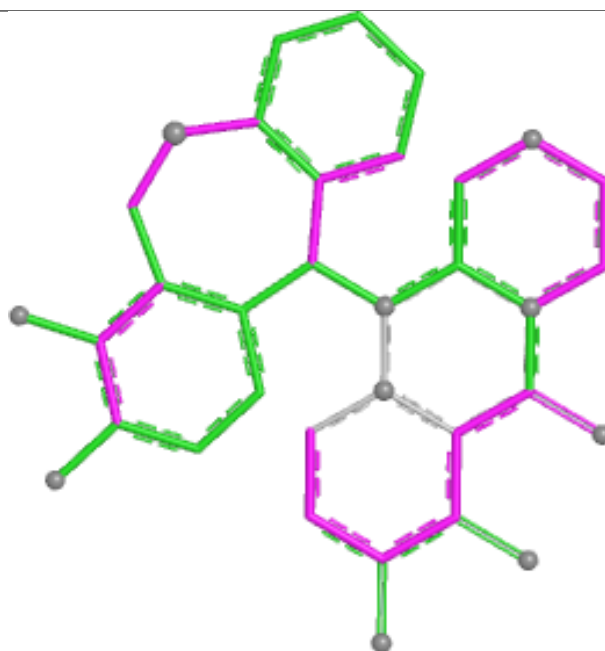


Rings

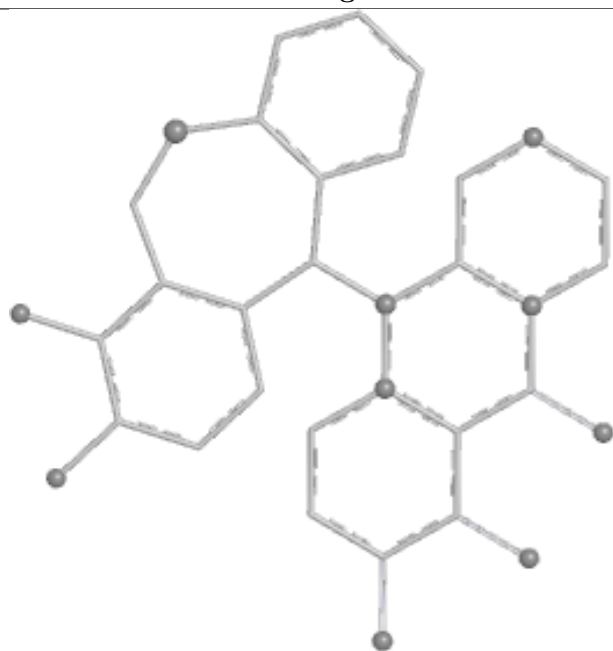
Ligand E4Z F 903



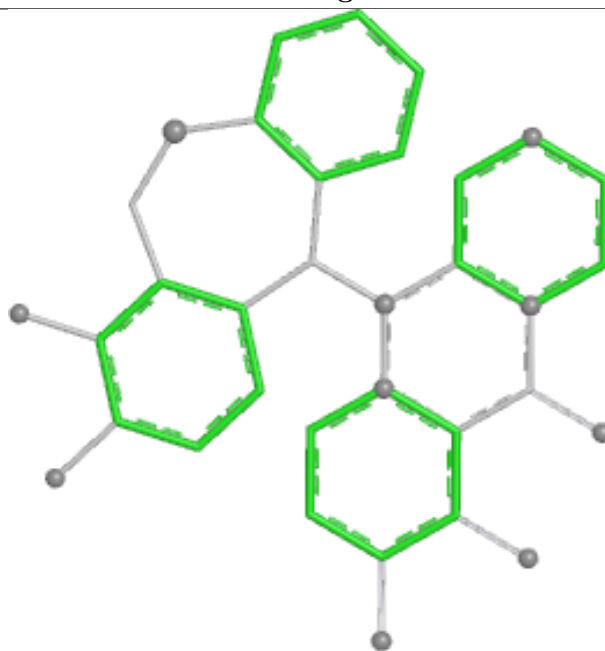
Bond lengths



Bond angles

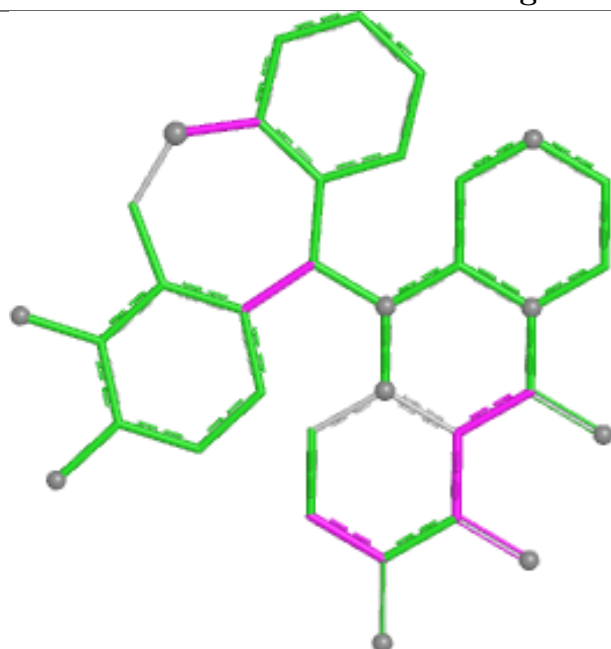


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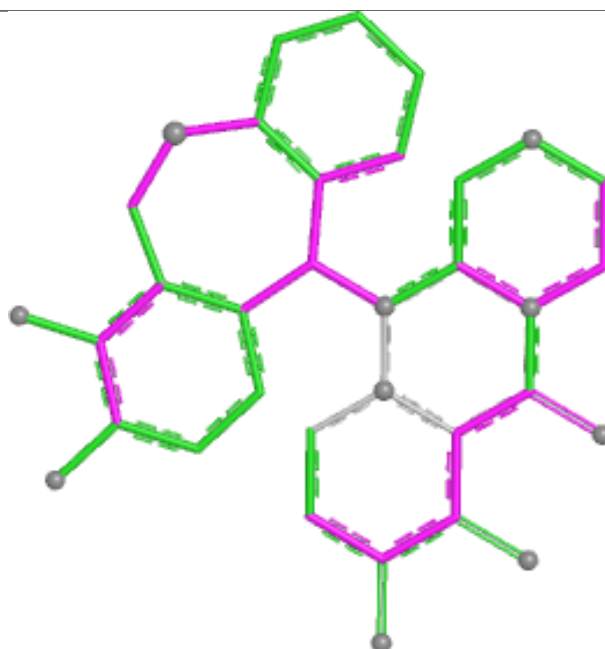


Rings

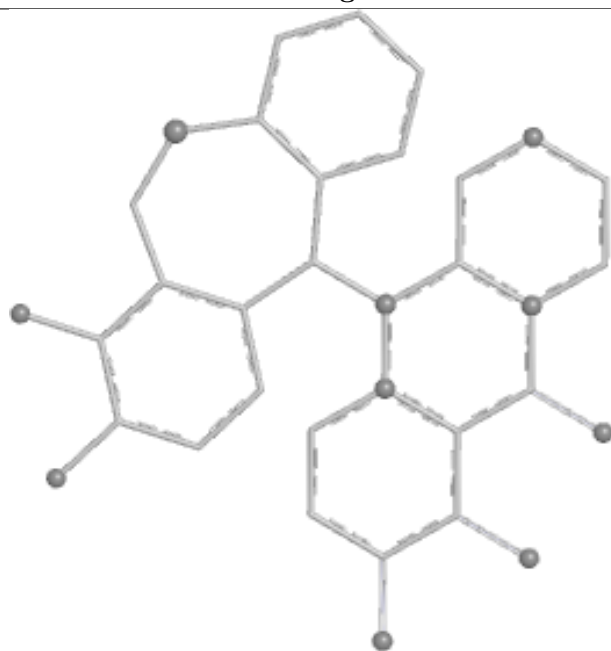
Ligand E4Z C 903



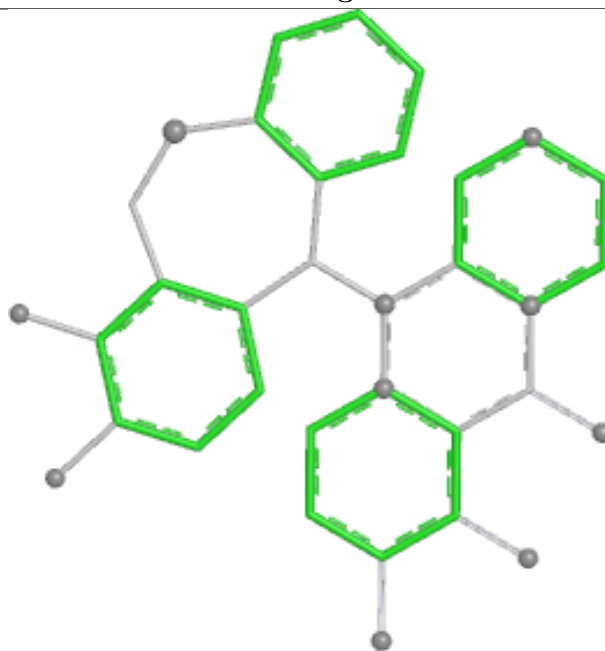
Bond lengths



Bond angles

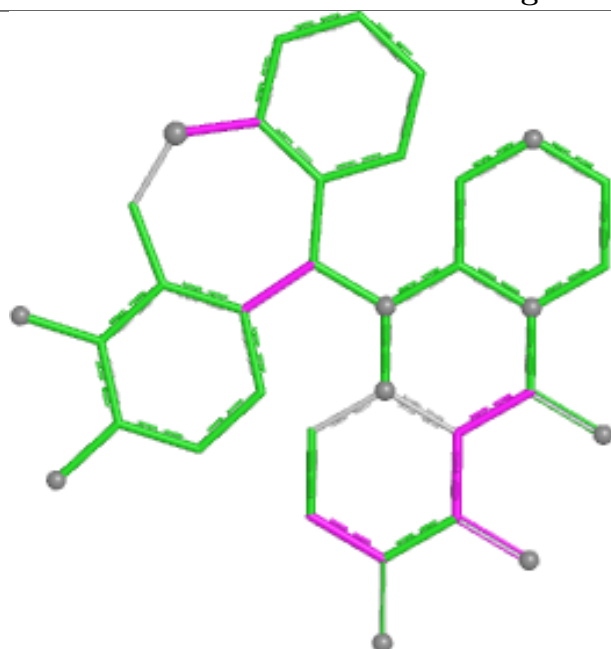


Torsions

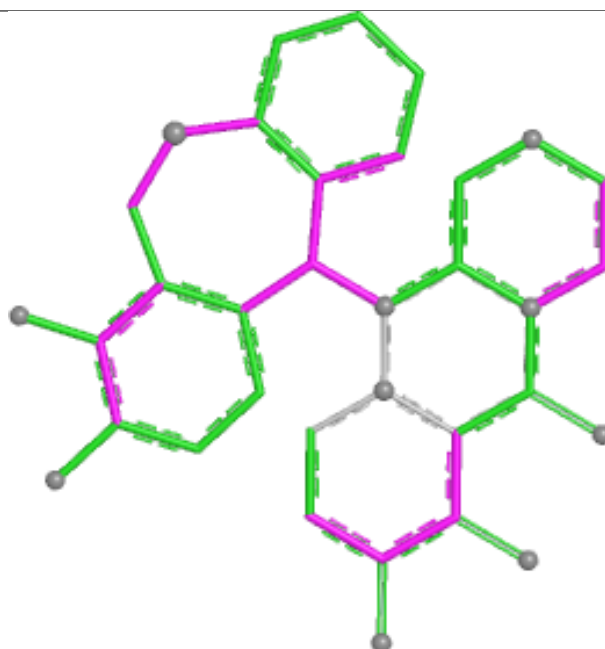


Rings

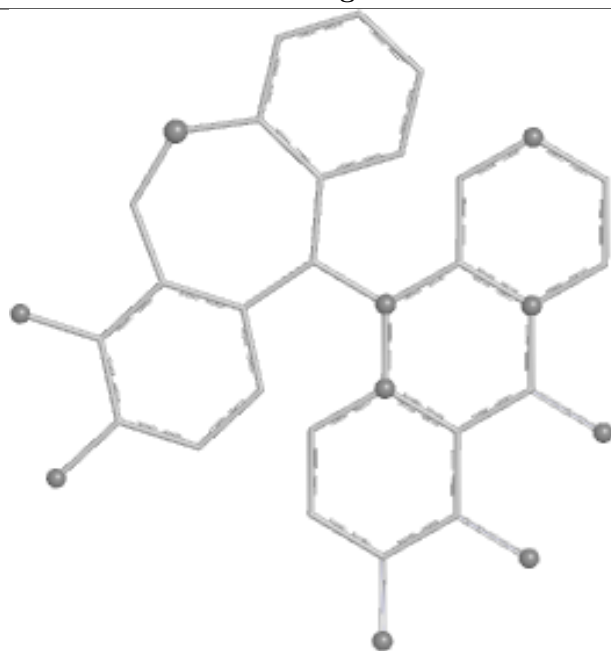
Ligand E4Z E 903



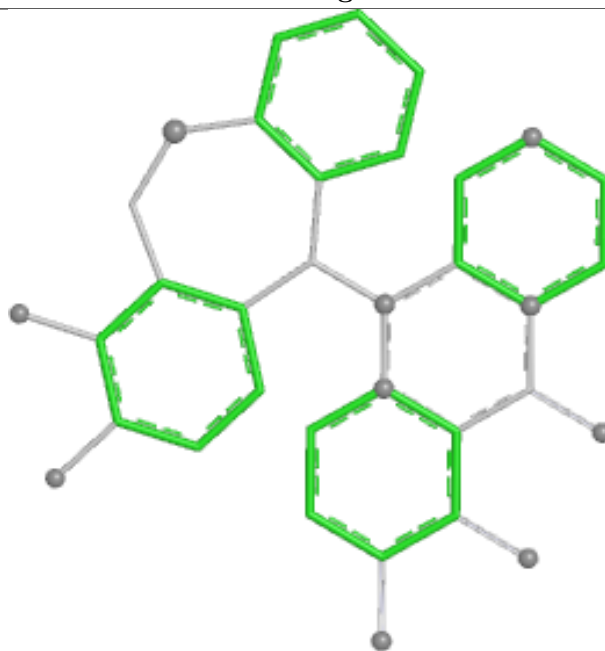
Bond lengths



Bond angles

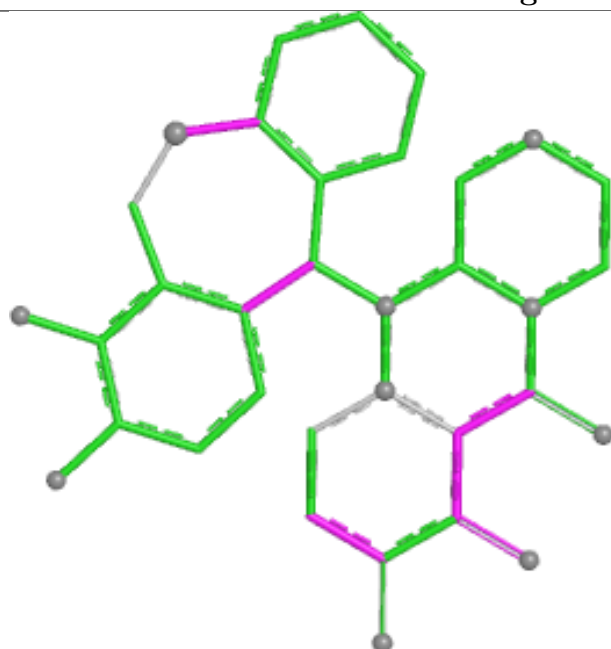


Torsions

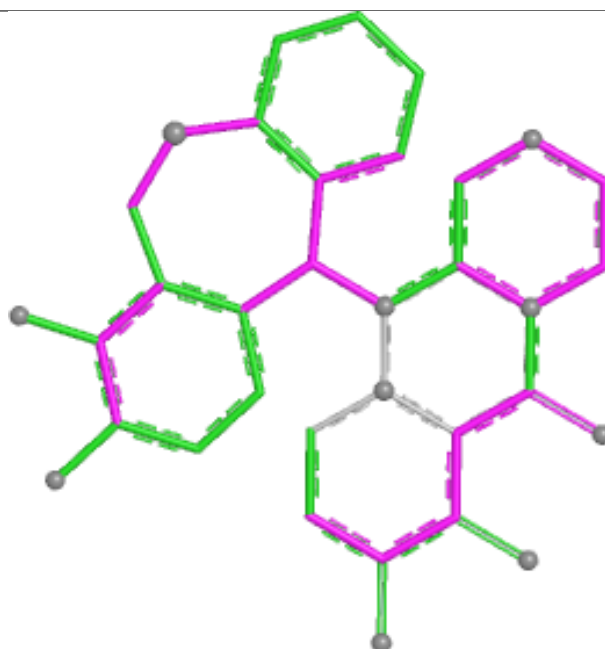


Rings

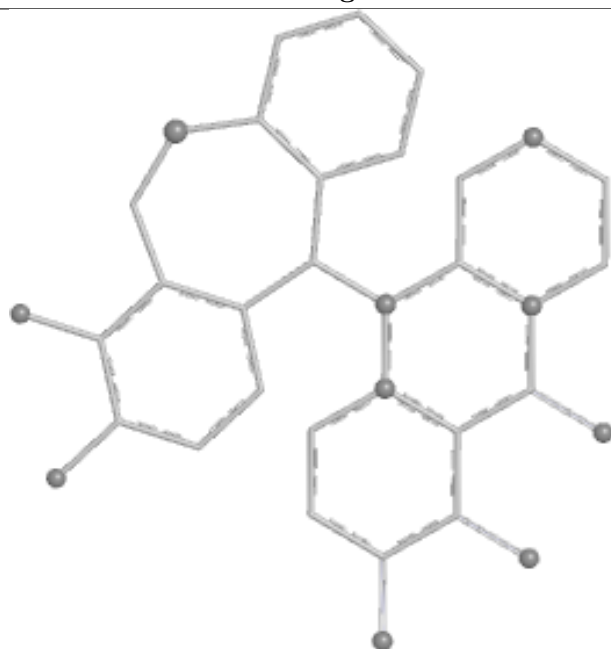
Ligand E4Z B 903



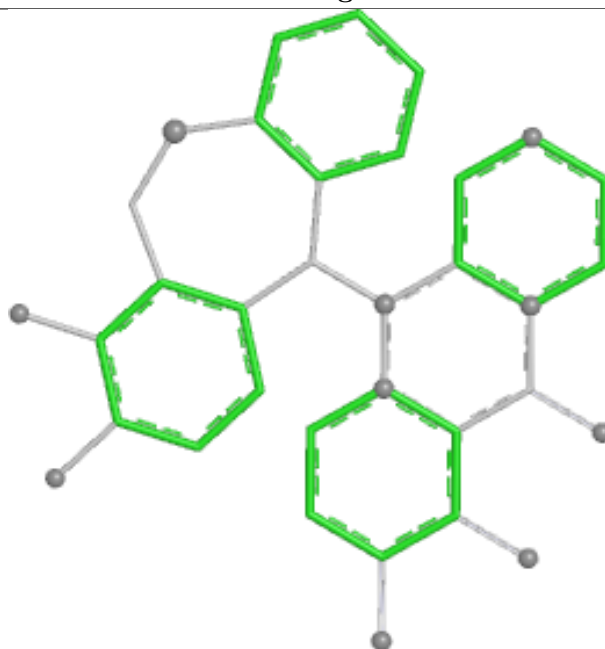
Bond lengths



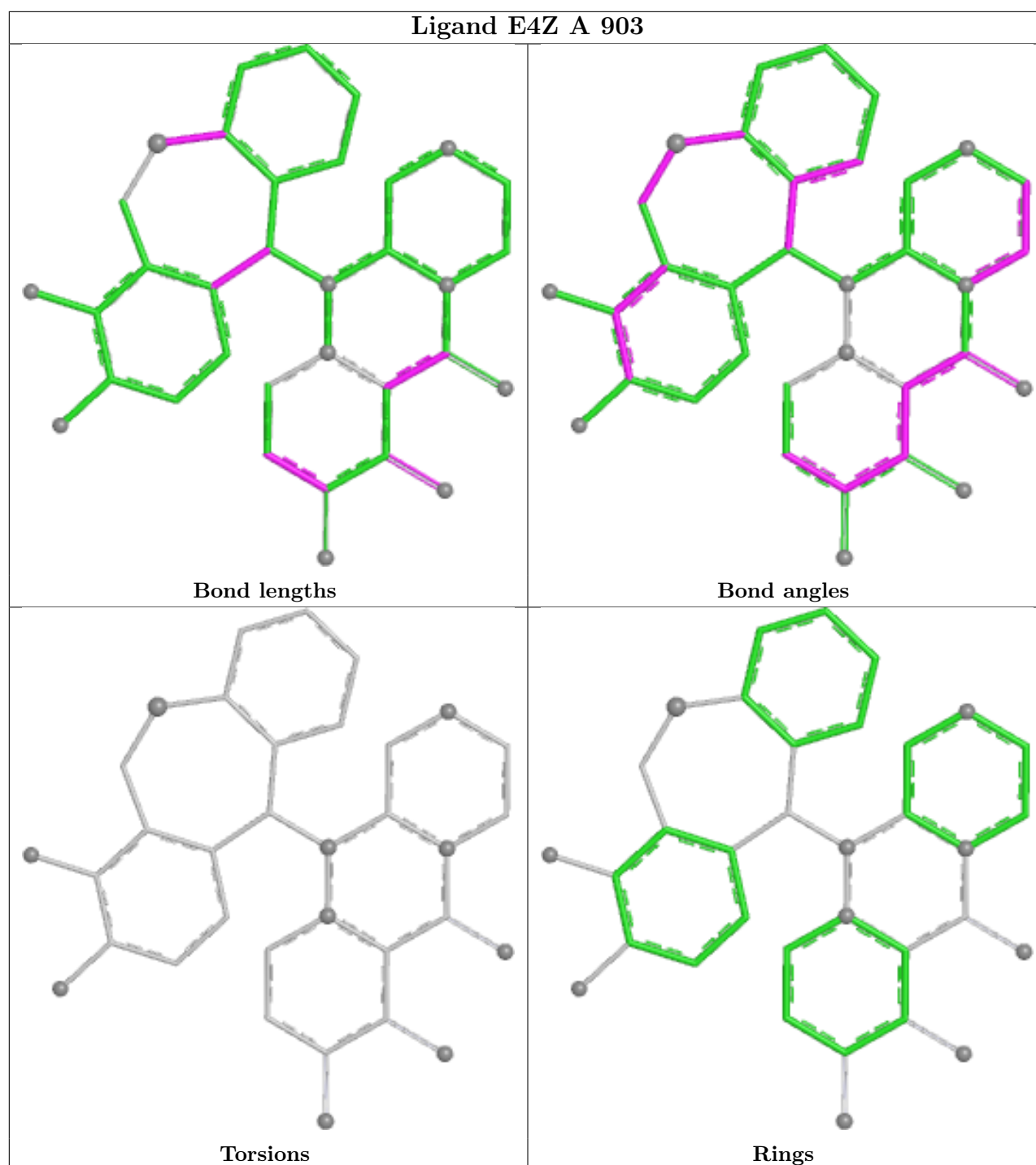
Bond angles



Torsions



Rings



5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data ⓘ

6.1 Protein, DNA and RNA chains ⓘ

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 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	182/193 (94%)	0.60	14 (7%)	19 22	24, 39, 69, 99	1 (0%)
1	B	182/193 (94%)	0.46	16 (8%)	15 18	17, 35, 60, 85	1 (0%)
1	C	179/193 (92%)	0.82	23 (12%)	7 9	28, 42, 69, 88	0
1	D	180/193 (93%)	0.50	14 (7%)	19 22	18, 38, 71, 86	1 (0%)
1	E	177/193 (91%)	0.83	24 (13%)	7 7	23, 43, 71, 83	1 (0%)
1	F	179/193 (92%)	0.65	20 (11%)	10 12	22, 41, 69, 94	2 (1%)
All	All	1079/1158 (93%)	0.64	111 (10%)	12 13	17, 40, 70, 99	6 (0%)

All (111) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	E	138	ILE	6.5
1	D	51	PHE	6.3
1	C	138	ILE	5.3
1	F	51	PHE	5.2
1	C	-2	GLY	4.8
1	F	-2	GLY	4.7
1	A	-2	GLY	4.6
1	A	51	PHE	4.5
1	D	138	ILE	4.2
1	C	100	VAL	4.1
1	F	99	GLY	4.0
1	B	73	LYS	4.0
1	B	138	ILE	3.9
1	A	-4	GLY	3.9
1	C	99	GLY	3.9
1	D	50	ASP	3.8
1	E	-2	GLY	3.7
1	E	92	ASN	3.6
1	B	-5	MET	3.6

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Mol	Chain	Res	Type	RSRZ
1	E	72	LEU	3.5
1	C	196	ARG	3.4
1	A	8[A]	CYS	3.3
1	A	-3	SER	3.3
1	E	-1	MET	3.3
1	E	97	THR	3.1
1	B	-3	SER	3.1
1	C	97	THR	3.1
1	B	99	GLY	3.1
1	B	50	ASP	3.1
1	F	50	ASP	3.1
1	F	49	SER	3.1
1	A	73	LYS	3.1
1	E	49	SER	3.1
1	C	49	SER	3.0
1	E	100	VAL	3.0
1	B	-2	GLY	3.0
1	D	12	MET	3.0
1	C	72	LEU	3.0
1	A	-1	MET	2.9
1	C	139	LYS	2.9
1	F	138	ILE	2.9
1	B	196	ARG	2.8
1	B	126	GLU	2.8
1	C	-3	SER	2.8
1	B	74	HIS	2.8
1	D	-2	GLY	2.8
1	A	140	SER	2.8
1	B	128	HIS	2.7
1	C	-1	MET	2.7
1	A	138	ILE	2.7
1	C	8	CYS	2.7
1	E	12	MET	2.7
1	E	93	SER	2.7
1	D	-1	MET	2.6
1	F	127	VAL	2.6
1	E	74	HIS	2.6
1	C	105	PHE	2.6
1	C	128	HIS	2.5
1	E	8[A]	CYS	2.5
1	F	140	SER	2.5
1	F	74	HIS	2.5

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Mol	Chain	Res	Type	RSRZ
1	C	50	ASP	2.5
1	B	8	CYS	2.5
1	A	24	TYR	2.5
1	E	153	GLU	2.5
1	C	98	THR	2.5
1	C	151	THR	2.5
1	E	50	ASP	2.5
1	E	102	LYS	2.5
1	D	74	HIS	2.4
1	F	184	SER	2.4
1	A	74	HIS	2.4
1	B	184	SER	2.4
1	C	73	LYS	2.4
1	C	137	LYS	2.4
1	B	140	SER	2.4
1	E	137	LYS	2.4
1	E	126	GLU	2.3
1	C	12	MET	2.3
1	D	99	GLY	2.3
1	B	24	TYR	2.3
1	F	46	PHE	2.3
1	D	73	LYS	2.3
1	C	132	LEU	2.3
1	E	98	THR	2.3
1	F	-1	MET	2.3
1	E	94	ILE	2.3
1	A	50	ASP	2.3
1	F	128	HIS	2.3
1	D	46	PHE	2.2
1	B	-1	MET	2.2
1	D	8	CYS	2.2
1	F	151	THR	2.2
1	F	86[A]	MET	2.2
1	C	112	TYR	2.2
1	E	105	PHE	2.2
1	F	137	LYS	2.2
1	A	141	GLU	2.2
1	D	140	SER	2.2
1	D	139	LYS	2.2
1	F	153	GLU	2.1
1	E	89	THR	2.1
1	F	170	ARG	2.1

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Mol	Chain	Res	Type	RSRZ
1	D	137	LYS	2.1
1	F	8[A]	CYS	2.1
1	E	99	GLY	2.0
1	E	128	HIS	2.0
1	F	83	ASP	2.0
1	E	142	LYS	2.0
1	A	49	SER	2.0
1	C	25	GLY	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 oligosaccharides in this entry.

6.4 Ligands [i](#)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
3	E4Z	C	903	34/34	0.94	0.09	26,34,39,43	0
3	E4Z	D	903	34/34	0.94	0.07	23,30,36,38	0
3	E4Z	F	903	34/34	0.94	0.09	26,33,39,42	0
3	E4Z	B	903	34/34	0.95	0.08	20,29,36,40	0
3	E4Z	E	903	34/34	0.95	0.07	29,35,40,41	0
3	E4Z	A	903	34/34	0.95	0.07	25,33,39,41	0
2	MN	A	902	1/1	0.99	0.07	39,39,39,39	0
2	MN	B	902	1/1	0.99	0.09	38,38,38,38	0
2	MN	C	902	1/1	0.99	0.06	44,44,44,44	0
2	MN	D	901	1/1	0.99	0.03	26,26,26,26	0
2	MN	E	901	1/1	0.99	0.02	31,31,31,31	0
2	MN	F	902	1/1	0.99	0.10	41,41,41,41	0
2	MN	A	901	1/1	1.00	0.02	28,28,28,28	0
2	MN	D	902	1/1	1.00	0.07	38,38,38,38	0
2	MN	C	901	1/1	1.00	0.02	30,30,30,30	0

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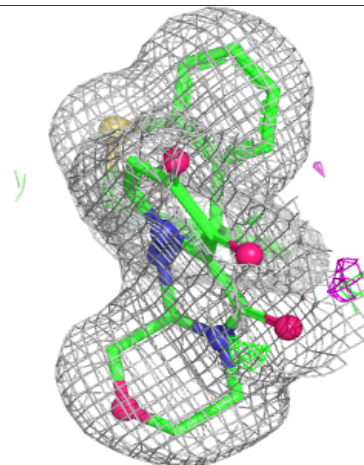
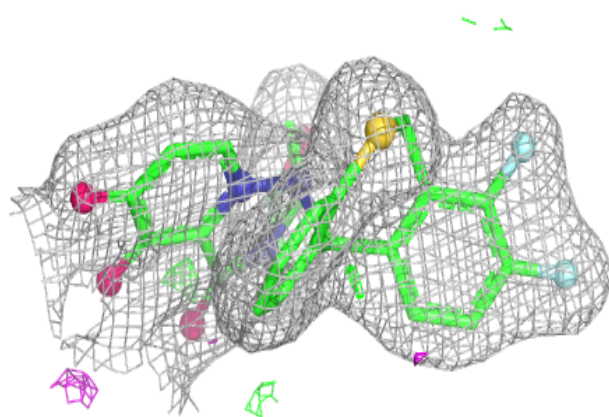
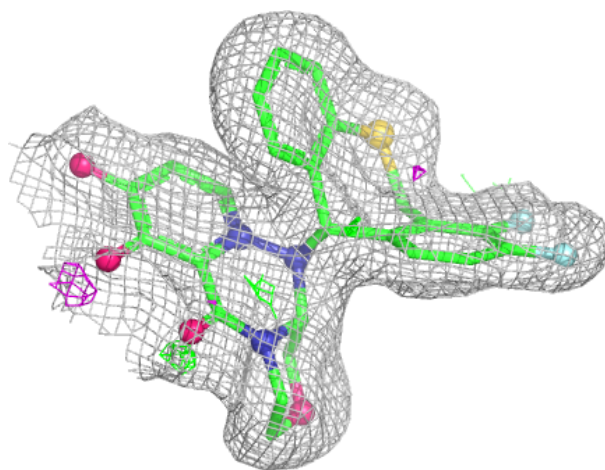
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
2	MN	E	902	1/1	1.00	0.06	41,41,41,41	0
2	MN	F	901	1/1	1.00	0.01	28,28,28,28	0
2	MN	B	901	1/1	1.00	0.01	26,26,26,26	0

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.

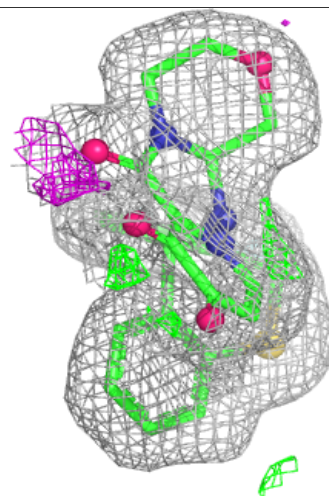
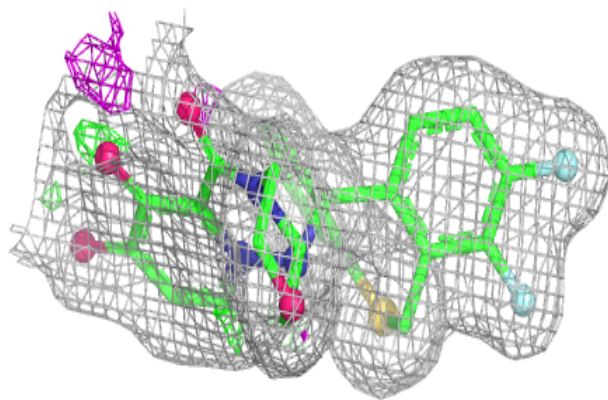
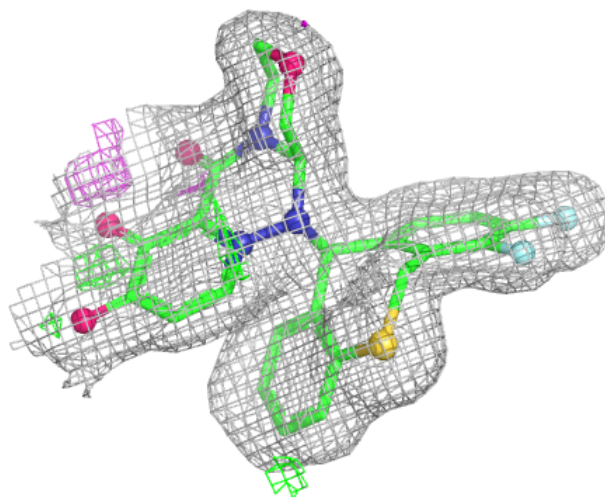
Electron density around E4Z C 903:

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



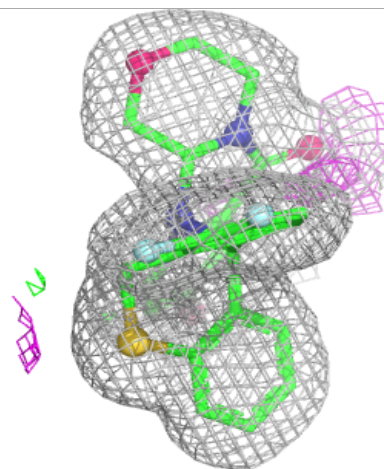
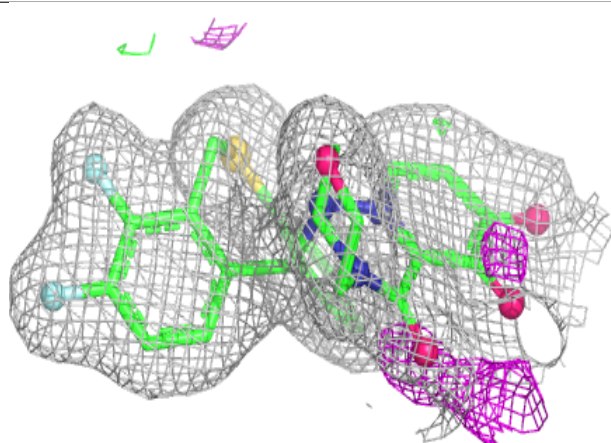
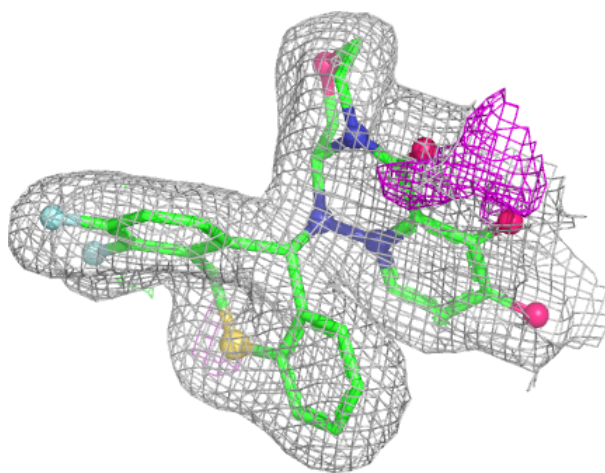
Electron density around E4Z D 903:

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



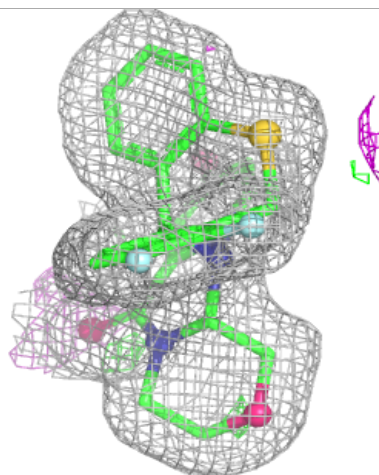
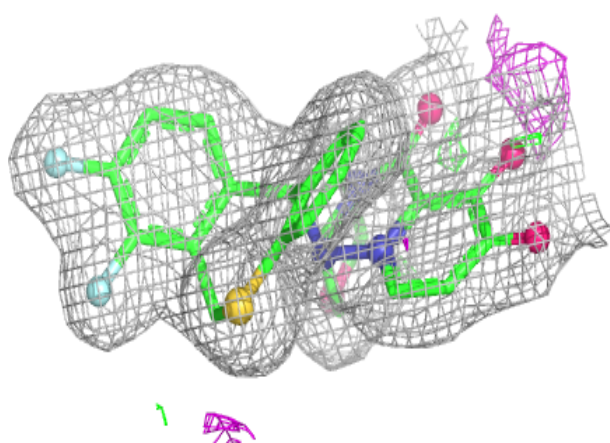
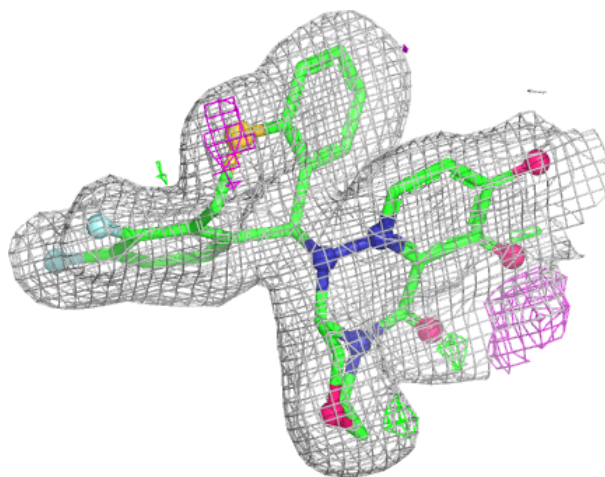
Electron density around E4Z F 903:

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



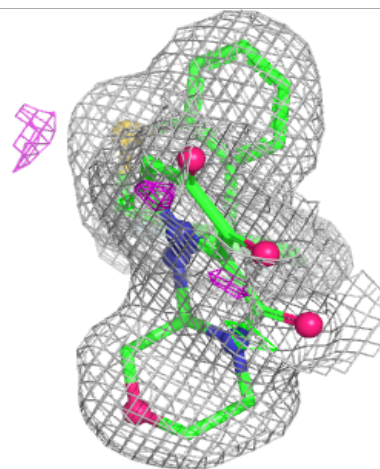
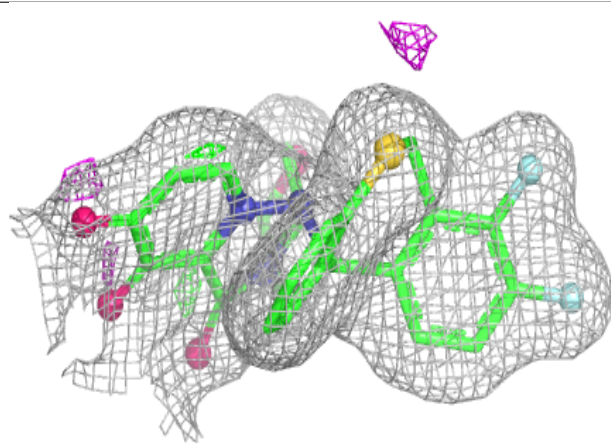
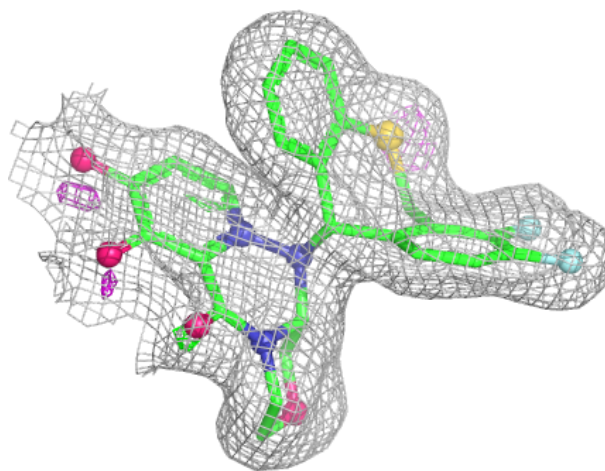
Electron density around E4Z B 903:

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 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



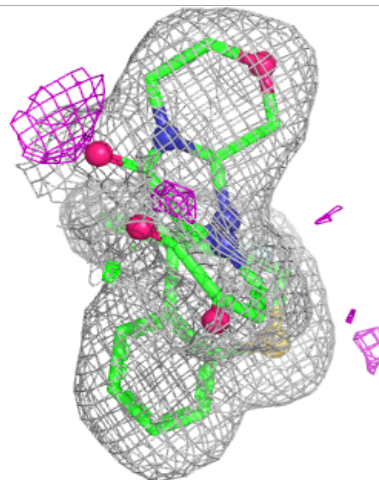
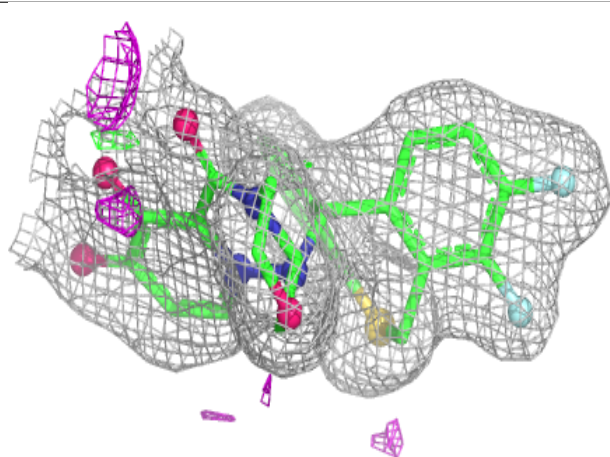
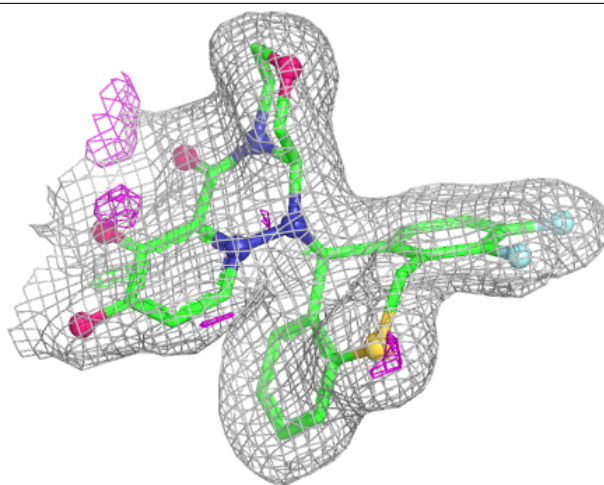
Electron density around E4Z E 903:

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 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around E4Z A 903:

$2mF_o-DF_c$ (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.