wwPDB X-ray Structure Validation Summary Report (i)

Jun 18, 2024 – 01:41 AM EDT

PDB ID	:	5W5O
Title	:	Identification of potent and selective RIPK2 inhibitors for the treatment of inflammatory diseases.
Authors	:	Kreusch, A.; Spraggon, G.
Deposited on	:	2017-06-15
Resolution	:	2.89 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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:

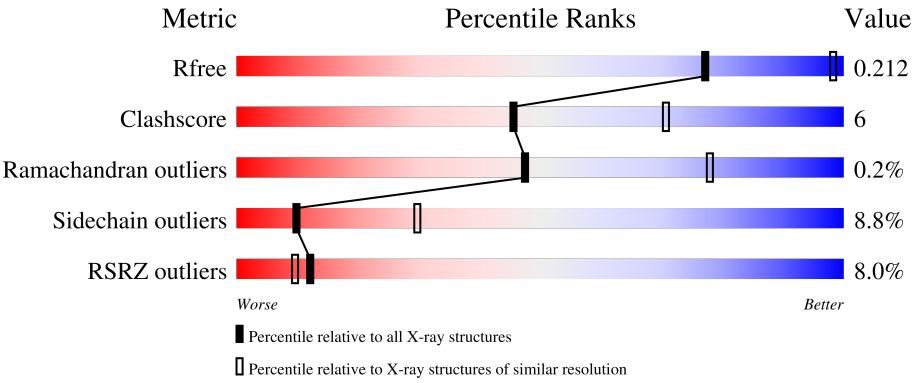
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.37.1
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & 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 2.89 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	310	6% 69% 19% 11%
1	B	310	7% 67% 20% • 11%
1	C	310	8% 64% 21% • 11%
1	D	310	8% 68% 18% • 11%
1	E	310	6% 70% 17% • 11%

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Mol	Chain	Length	Quality of chain
1	F	310	5% 69% 18% • 11%
1	G	310	5% 69% 19% • 11%
1	H	310	6% 70% 17% • 11%
1	I	310	9% 72% 16% • 11%
1	J	310	8% 70% 18% • 11%
1	K	310	7% 68% 18% • 11%
1	L	310	10% 72% 16% • 11%
1	M	310	7% 72% 17% 11%
1	N	310	6% 67% 18% • 12%
1	O	310	7% 72% 15% • 11%
1	P	310	7% 67% 22% 11%

2 Entry composition (i)

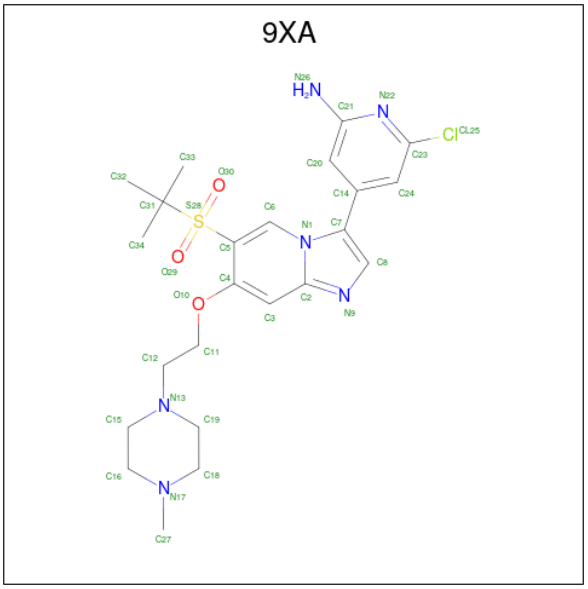
There are 3 unique types of molecules in this entry. The entry contains 35681 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Receptor-interacting serine/threonine-protein kinase 2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	275	Total	C	N	O	S	0	0	0
			2165	1401	365	391	8			
1	B	275	Total	C	N	O	S	0	0	0
			2177	1408	370	391	8			
1	C	275	Total	C	N	O	S	0	0	0
			2170	1406	368	388	8			
1	D	275	Total	C	N	O	S	0	0	0
			2174	1408	372	386	8			
1	E	275	Total	C	N	O	S	0	0	0
			2197	1422	373	394	8			
1	F	275	Total	C	N	O	S	0	0	0
			2184	1413	373	390	8			
1	G	275	Total	C	N	O	S	0	0	0
			2198	1420	374	396	8			
1	H	275	Total	C	N	O	S	0	0	0
			2188	1416	372	392	8			
1	I	275	Total	C	N	O	S	0	0	0
			2176	1410	372	386	8			
1	J	275	Total	C	N	O	S	0	0	0
			2199	1421	377	393	8			
1	K	275	Total	C	N	O	S	0	0	0
			2198	1418	373	399	8			
1	L	275	Total	C	N	O	S	0	0	0
			2182	1412	369	393	8			
1	M	276	Total	C	N	O	S	0	0	0
			2159	1398	365	388	8			
1	N	272	Total	C	N	O	S	0	0	0
			2118	1376	357	377	8			
1	O	276	Total	C	N	O	S	0	0	0
			2185	1414	369	394	8			
1	P	275	Total	C	N	O	S	0	0	0
			2163	1401	362	392	8			

- Molecule 2 is 4-{6-(tert-butylsulfonyl)-7-[2-(4-methylpiperazin-1-yl)ethoxy]imidazo[1,2-a]pyridin-3-yl}-6-chloropyridin-2-amine (three-letter code: 9XA) (formula: $C_{23}H_{31}ClN_6O_3S$).



Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
2	A	1	Total	C	Cl	N	O	S	0	0
			34	23	1	6	3	1		
2	B	1	Total	C	Cl	N	O	S	0	0
			34	23	1	6	3	1		
2	C	1	Total	C	Cl	N	O	S	0	0
			34	23	1	6	3	1		
2	D	1	Total	C	Cl	N	O	S	0	0
			34	23	1	6	3	1		
2	E	1	Total	C	Cl	N	O	S	0	0
			34	23	1	6	3	1		
2	F	1	Total	C	Cl	N	O	S	0	0
			34	23	1	6	3	1		
2	G	1	Total	C	Cl	N	O	S	0	0
			34	23	1	6	3	1		
2	H	1	Total	C	Cl	N	O	S	0	0
			34	23	1	6	3	1		
2	I	1	Total	C	Cl	N	O	S	0	0
			34	23	1	6	3	1		
2	J	1	Total	C	Cl	N	O	S	0	0
			34	23	1	6	3	1		
2	K	1	Total	C	Cl	N	O	S	0	0
			34	23	1	6	3	1		
2	L	1	Total	C	Cl	N	O	S	0	0
			34	23	1	6	3	1		

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Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
2	M	1	Total	C	Cl	N	O	S	0	0
			34	23	1	6	3	1		
2	N	1	Total	C	Cl	N	O	S	0	0
			34	23	1	6	3	1		
2	O	1	Total	C	Cl	N	O	S	0	0
			34	23	1	6	3	1		
2	P	1	Total	C	Cl	N	O	S	0	0
			34	23	1	6	3	1		

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	13	Total	O	0	0
			13	13		
3	B	20	Total	O	0	0
			20	20		
3	C	15	Total	O	0	0
			15	15		
3	D	25	Total	O	0	0
			25	25		
3	E	16	Total	O	0	0
			16	16		
3	F	20	Total	O	0	0
			20	20		
3	G	16	Total	O	0	0
			16	16		
3	H	24	Total	O	0	0
			24	24		
3	I	23	Total	O	0	0
			23	23		
3	J	19	Total	O	0	0
			19	19		
3	K	19	Total	O	0	0
			19	19		
3	L	12	Total	O	0	0
			12	12		
3	M	15	Total	O	0	0
			15	15		
3	N	25	Total	O	0	0
			25	25		
3	O	16	Total	O	0	0
			16	16		

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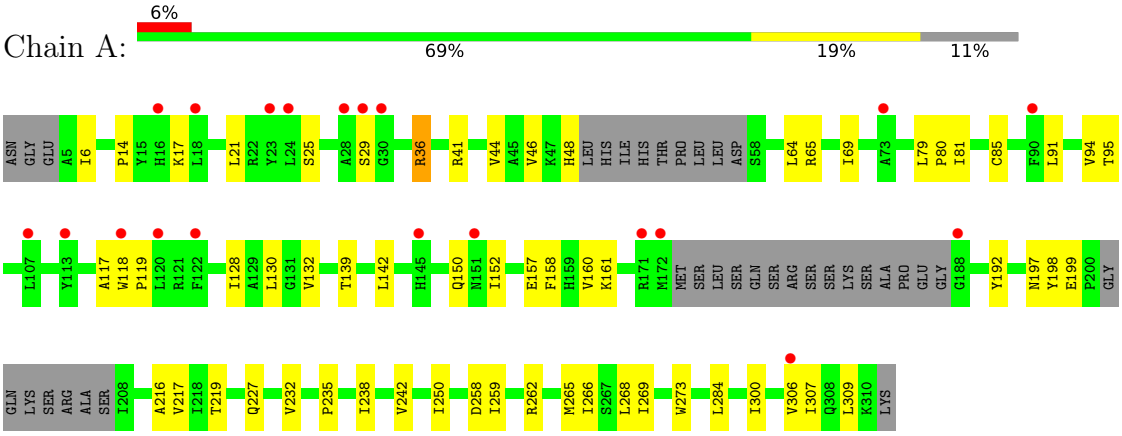
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	P	26	Total O 26 26	0	0

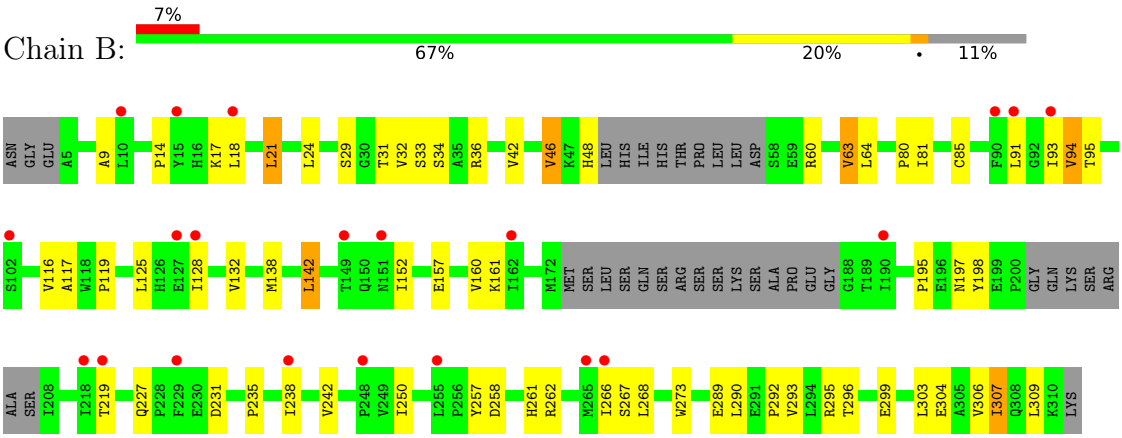
3 Residue-property plots (i)

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.

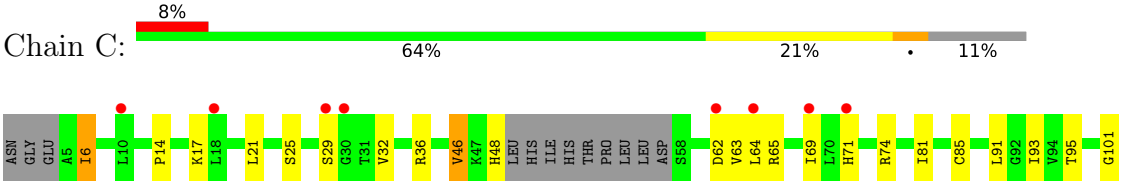
• Molecule 1: Receptor-interacting serine/threonine-protein kinase 2

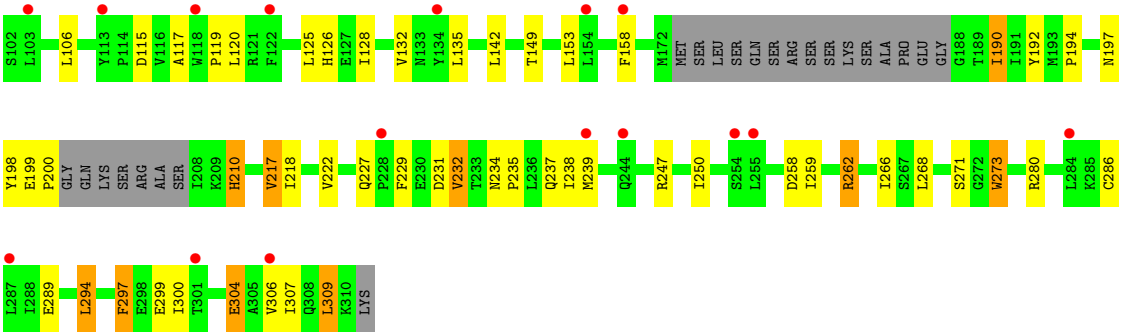


• Molecule 1: Receptor-interacting serine/threonine-protein kinase 2

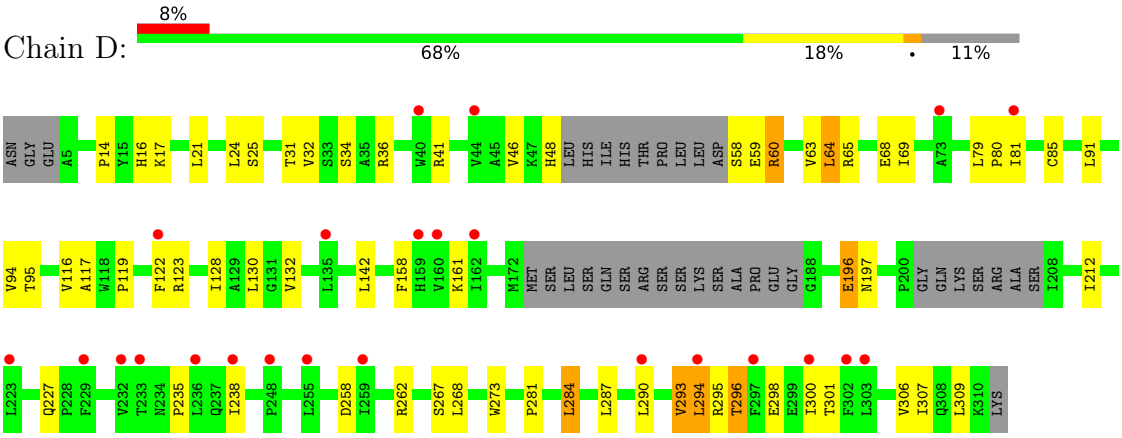


• Molecule 1: Receptor-interacting serine/threonine-protein kinase 2

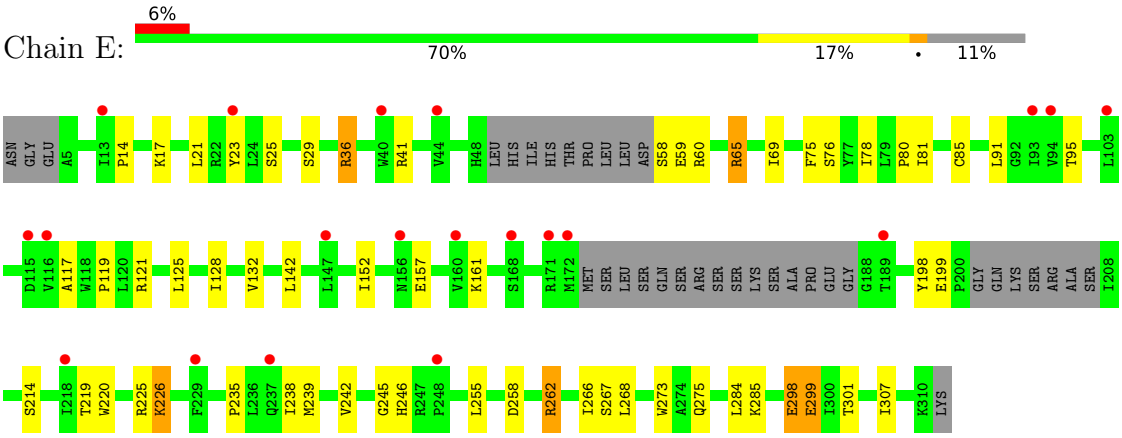




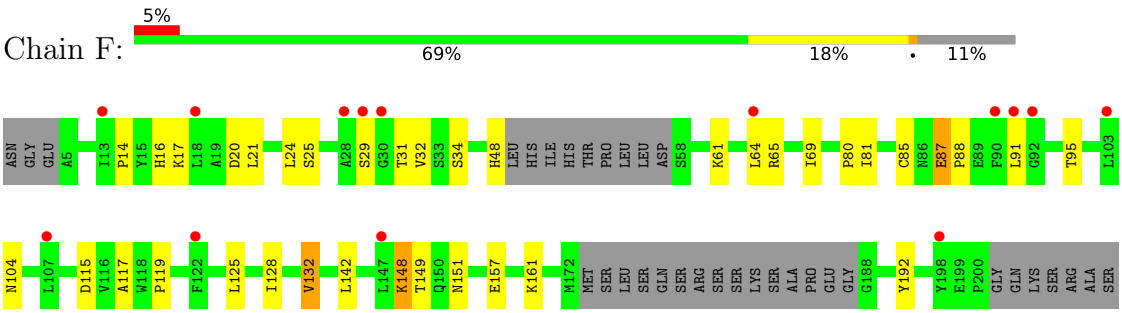
• Molecule 1: Receptor-interacting serine/threonine-protein kinase 2



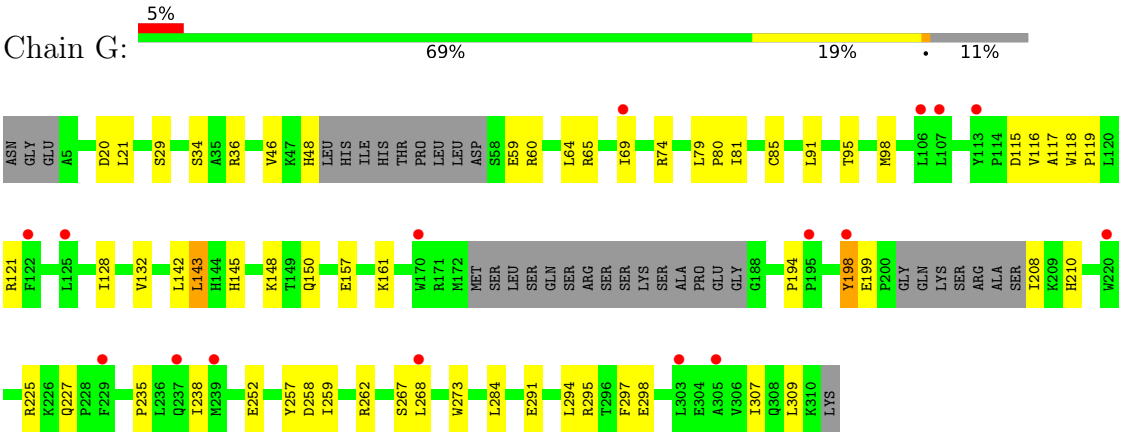
• Molecule 1: Receptor-interacting serine/threonine-protein kinase 2



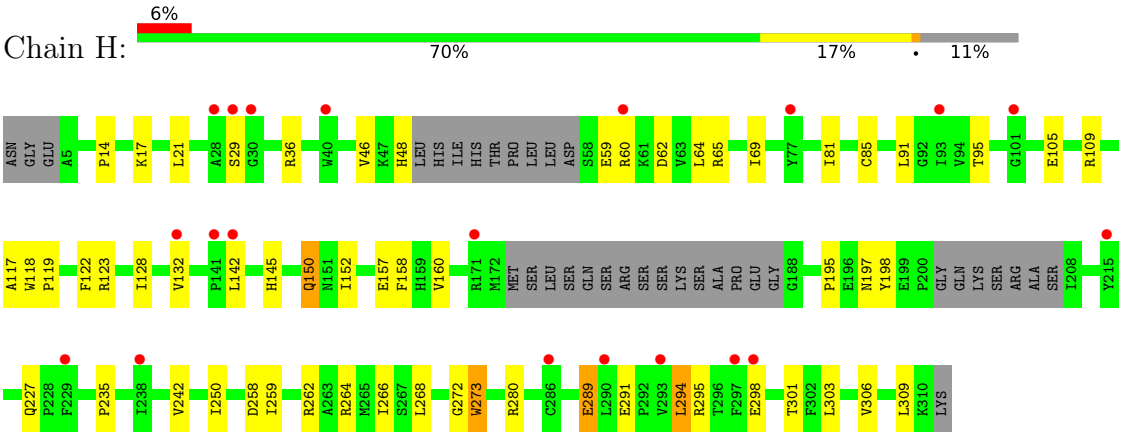
• Molecule 1: Receptor-interacting serine/threonine-protein kinase 2



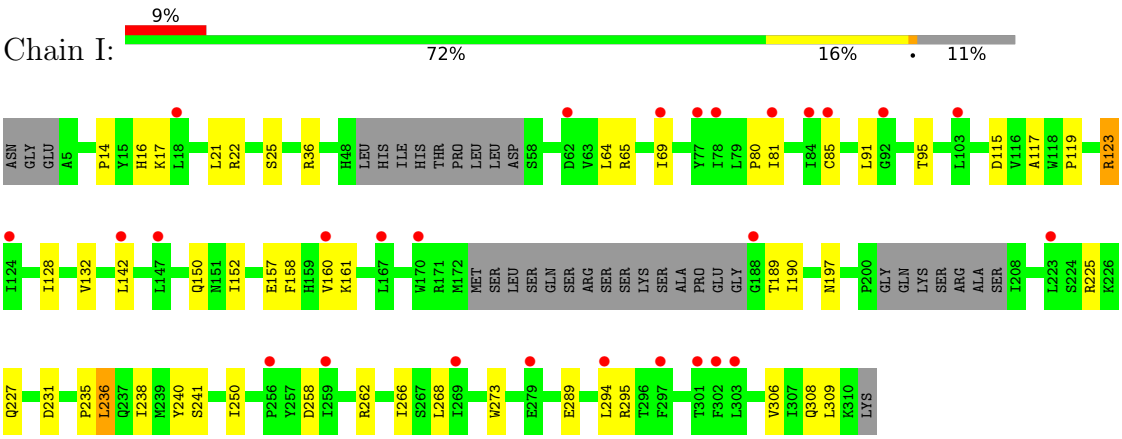
• Molecule 1: Receptor-interacting serine/threonine-protein kinase 2



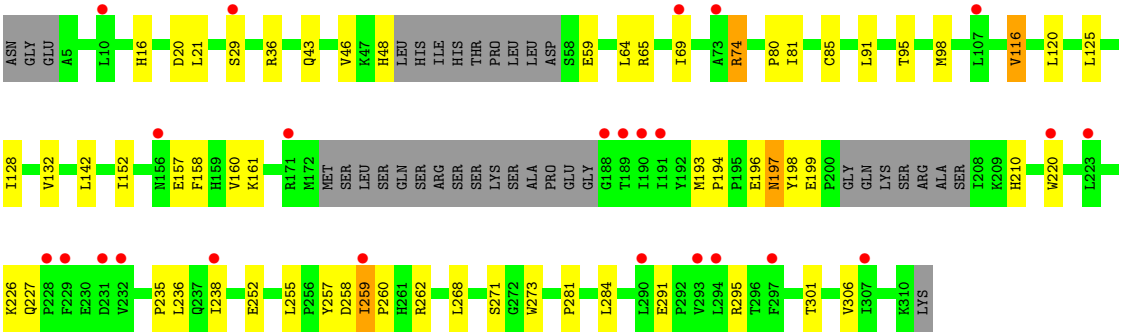
• Molecule 1: Receptor-interacting serine/threonine-protein kinase 2



• Molecule 1: Receptor-interacting serine/threonine-protein kinase 2

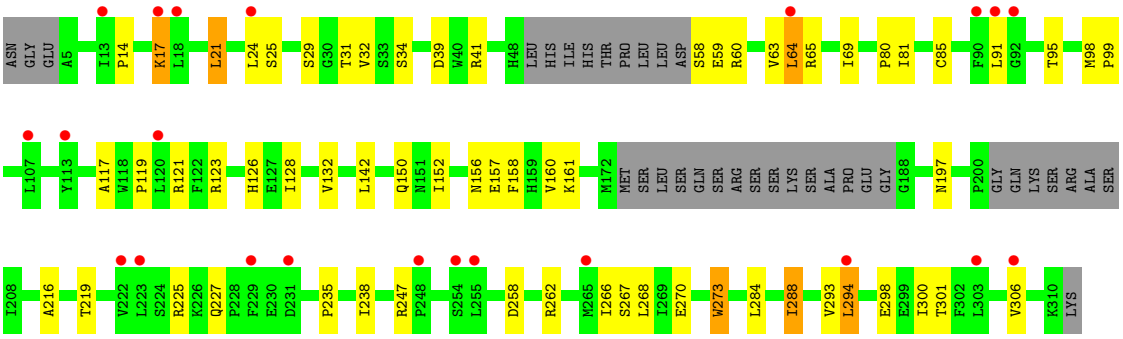


• Molecule 1: Receptor-interacting serine/threonine-protein kinase 2



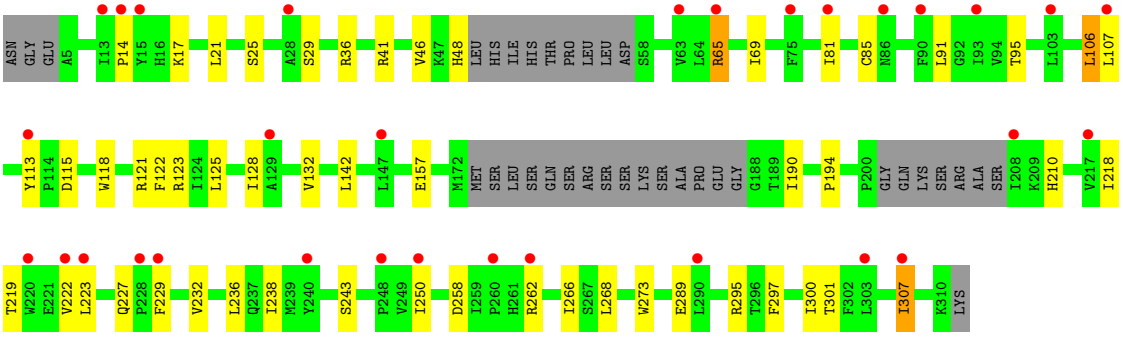
• Molecule 1: Receptor-interacting serine/threonine-protein kinase 2

Chain K:



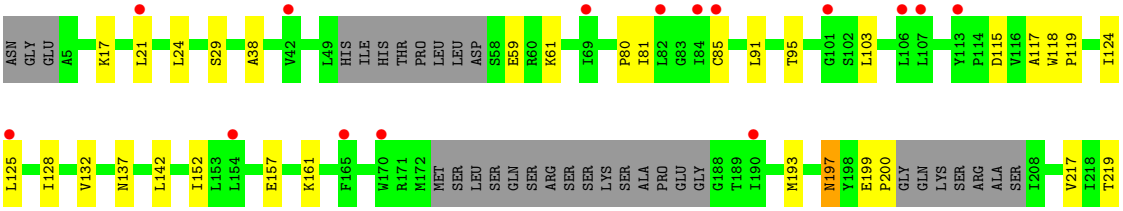
• Molecule 1: Receptor-interacting serine/threonine-protein kinase 2

Chain L:



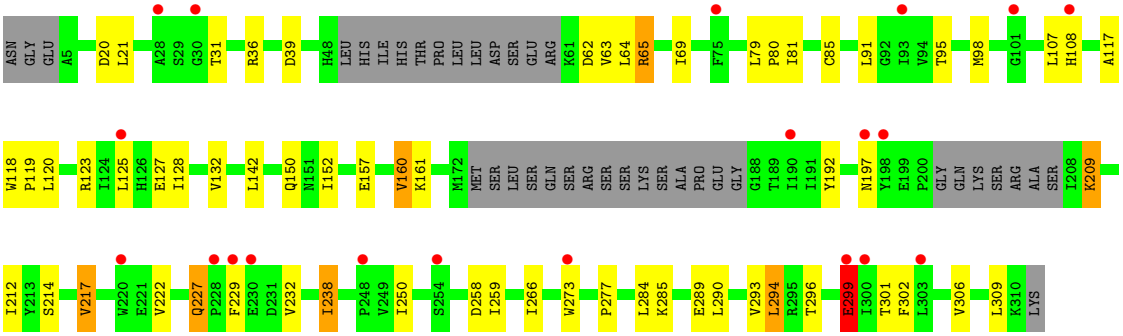
• Molecule 1: Receptor-interacting serine/threonine-protein kinase 2

Chain M:



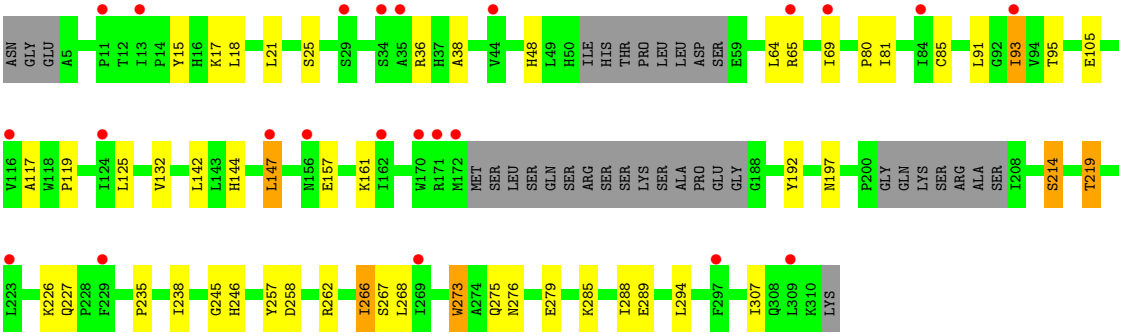
• Molecule 1: Receptor-interacting serine/threonine-protein kinase 2

Chain N:



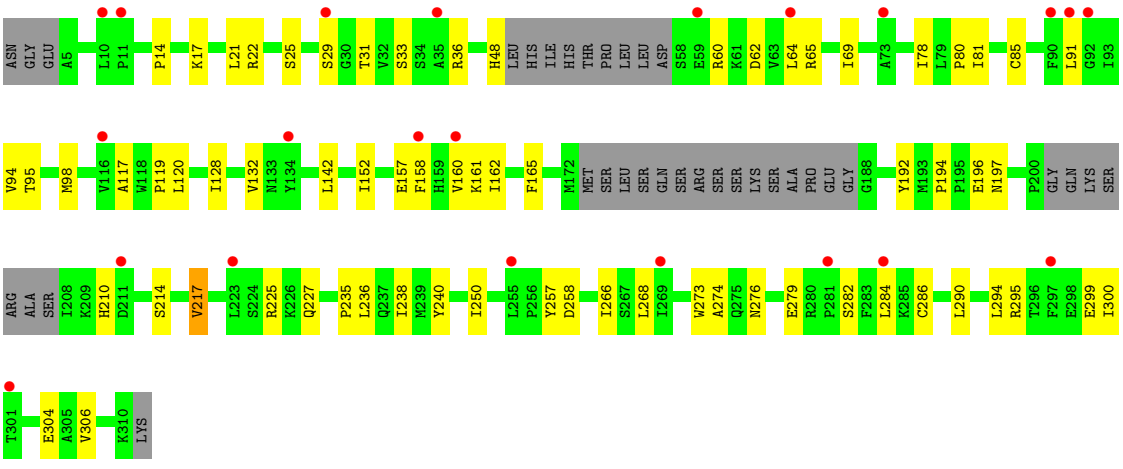
• Molecule 1: Receptor-interacting serine/threonine-protein kinase 2

Chain O:



• Molecule 1: Receptor-interacting serine/threonine-protein kinase 2

Chain P:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α, β, γ	80.31Å 107.47Å 210.19Å 90.15° 89.77° 89.96°	Depositor
Resolution (Å)	47.90 – 2.89 47.90 – 2.89	Depositor EDS
% Data completeness (in resolution range)	88.4 (47.90-2.89) 87.8 (47.90-2.89)	Depositor EDS
R_{merge}	0.11	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.15 (at 2.91Å)	Xtriage
Refinement program	BUSTER 2.11.5	Depositor
R, R_{free}	0.217 , 0.252 0.184 , 0.212	Depositor DCC
R_{free} test set	6905 reflections (4.97%)	wwPDB-VP
Wilson B-factor (Å^2)	73.9	Xtriage
Anisotropy	0.370	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.32 , 55.3	EDS
L-test for twinning[2]	$< \|L\| > = 0.43$, $< L^2 > = 0.25$	Xtriage
Estimated twinning fraction	0.366 for h,-k,-l 0.370 for -h,k,-l 0.417 for -h,-k,l	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	35681	wwPDB-VP
Average B, all atoms (Å^2)	84.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.60% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: 9XA

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	0.53	0/2224	0.69	0/3040
1	B	0.51	0/2237	0.67	0/3056
1	C	0.52	0/2230	0.71	0/3048
1	D	0.53	0/2234	0.68	0/3052
1	E	0.54	0/2257	0.69	0/3079
1	F	0.52	0/2244	0.67	0/3063
1	G	0.51	0/2258	0.69	0/3082
1	H	0.50	0/2248	0.65	0/3069
1	I	0.52	0/2236	0.67	0/3054
1	J	0.51	0/2259	0.68	0/3081
1	K	0.52	0/2258	0.69	0/3081
1	L	0.51	0/2242	0.67	0/3063
1	M	0.51	0/2218	0.68	0/3033
1	N	0.51	0/2177	0.69	0/2981
1	O	0.52	0/2244	0.69	0/3064
1	P	0.52	0/2223	0.70	0/3040
All	All	0.52	0/35789	0.68	0/48886

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2165	0	2091	34	0
1	B	2177	0	2105	38	0
1	C	2170	0	2101	40	0
1	D	2174	0	2111	31	0
1	E	2197	0	2148	25	0
1	F	2184	0	2123	27	0
1	G	2198	0	2139	30	0
1	H	2188	0	2131	30	0
1	I	2176	0	2119	18	0
1	J	2199	0	2150	31	0
1	K	2198	0	2131	34	0
1	L	2182	0	2115	19	0
1	M	2159	0	2073	27	0
1	N	2118	0	2035	34	0
1	O	2185	0	2122	27	0
1	P	2163	0	2078	27	0
2	A	34	0	0	0	0
2	B	34	0	0	2	0
2	C	34	0	0	5	0
2	D	34	0	0	2	0
2	E	34	0	0	0	0
2	F	34	0	0	1	0
2	G	34	0	0	0	0
2	H	34	0	0	0	0
2	I	34	0	0	0	0
2	J	34	0	0	0	0
2	K	34	0	0	1	0
2	L	34	0	0	0	0
2	M	34	0	0	1	0
2	N	34	0	0	0	0
2	O	34	0	0	0	0
2	P	34	0	0	0	0
3	A	13	0	0	0	0
3	B	20	0	0	1	0
3	C	15	0	0	0	0
3	D	25	0	0	0	0
3	E	16	0	0	0	0
3	F	20	0	0	0	0
3	G	16	0	0	0	0
3	H	24	0	0	3	0
3	I	23	0	0	0	0
3	J	19	0	0	0	0
3	K	19	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	L	12	0	0	0	0
3	M	15	0	0	1	0
3	N	25	0	0	1	0
3	O	16	0	0	3	0
3	P	26	0	0	0	0
All	All	35681	0	33772	444	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 6.

The worst 5 of 444 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:M:125:LEU:HD22	1:M:219:THR:HG22	1.47	0.95
1:J:236:LEU:HD21	1:M:235:PRO:HB2	1.50	0.93
1:N:290:LEU:O	1:N:293:VAL:HG12	1.77	0.85
1:A:157:GLU:HG2	1:B:157:GLU:HG2	1.56	0.85
1:M:157:GLU:HG2	1:N:157:GLU:HG2	1.61	0.83

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	267/310 (86%)	255 (96%)	12 (4%)	0	100	100
1	B	267/310 (86%)	255 (96%)	12 (4%)	0	100	100
1	C	267/310 (86%)	256 (96%)	9 (3%)	2 (1%)	22	54
1	D	267/310 (86%)	260 (97%)	7 (3%)	0	100	100
1	E	267/310 (86%)	255 (96%)	11 (4%)	1 (0%)	34	66

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	F	267/310 (86%)	254 (95%)	12 (4%)	1 (0%)	34 66
1	G	267/310 (86%)	258 (97%)	9 (3%)	0	100 100
1	H	267/310 (86%)	257 (96%)	10 (4%)	0	100 100
1	I	267/310 (86%)	255 (96%)	12 (4%)	0	100 100
1	J	267/310 (86%)	258 (97%)	9 (3%)	0	100 100
1	K	267/310 (86%)	256 (96%)	11 (4%)	0	100 100
1	L	267/310 (86%)	259 (97%)	8 (3%)	0	100 100
1	M	268/310 (86%)	257 (96%)	10 (4%)	1 (0%)	34 66
1	N	264/310 (85%)	252 (96%)	10 (4%)	2 (1%)	19 51
1	O	268/310 (86%)	259 (97%)	9 (3%)	0	100 100
1	P	267/310 (86%)	255 (96%)	10 (4%)	2 (1%)	22 54
All	All	4271/4960 (86%)	4101 (96%)	161 (4%)	9 (0%)	47 78

5 of 9 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	M	61	LYS
1	P	299	GLU
1	N	209	LYS
1	C	198	TYR
1	C	299	GLU

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	231/279 (83%)	212 (92%)	19 (8%)	11 32
1	B	232/279 (83%)	215 (93%)	17 (7%)	14 38
1	C	231/279 (83%)	202 (87%)	29 (13%)	4 13
1	D	231/279 (83%)	206 (89%)	25 (11%)	6 20
1	E	237/279 (85%)	217 (92%)	20 (8%)	11 31

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	F	233/279 (84%)	216 (93%)	17 (7%)	14 38
1	G	237/279 (85%)	220 (93%)	17 (7%)	14 39
1	H	235/279 (84%)	220 (94%)	15 (6%)	17 45
1	I	232/279 (83%)	210 (90%)	22 (10%)	8 26
1	J	237/279 (85%)	220 (93%)	17 (7%)	14 39
1	K	237/279 (85%)	214 (90%)	23 (10%)	8 25
1	L	234/279 (84%)	210 (90%)	24 (10%)	7 22
1	M	227/279 (81%)	211 (93%)	16 (7%)	15 41
1	N	222/279 (80%)	202 (91%)	20 (9%)	9 29
1	O	234/279 (84%)	213 (91%)	21 (9%)	9 29
1	P	230/279 (82%)	204 (89%)	26 (11%)	6 18
All	All	3720/4464 (83%)	3392 (91%)	328 (9%)	10 30

5 of 328 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	L	223	LEU
1	O	105	GLU
1	L	273	TRP
1	M	299	GLU
1	O	289	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 30 such sidechains are listed below:

Mol	Chain	Res	Type
1	I	104	ASN
1	P	137	ASN
1	K	150	GLN
1	P	261	HIS
1	N	150	GLN

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)

16 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	9XA	B	401	-	35,37,37	2.64	9 (25%)	45,56,56	2.60	18 (40%)
2	9XA	A	401	-	35,37,37	2.66	9 (25%)	45,56,56	2.79	20 (44%)
2	9XA	L	401	-	35,37,37	2.54	8 (22%)	45,56,56	2.53	15 (33%)
2	9XA	H	401	-	35,37,37	2.69	11 (31%)	45,56,56	2.51	16 (35%)
2	9XA	C	401	-	35,37,37	2.82	13 (37%)	45,56,56	3.71	19 (42%)
2	9XA	K	401	-	35,37,37	2.52	7 (20%)	45,56,56	2.35	18 (40%)
2	9XA	N	401	-	35,37,37	2.61	9 (25%)	45,56,56	2.59	18 (40%)
2	9XA	I	401	-	35,37,37	2.66	10 (28%)	45,56,56	2.60	19 (42%)
2	9XA	J	401	-	35,37,37	2.71	10 (28%)	45,56,56	2.97	18 (40%)
2	9XA	G	401	-	35,37,37	2.67	8 (22%)	45,56,56	2.88	17 (37%)
2	9XA	E	401	-	35,37,37	2.70	9 (25%)	45,56,56	2.50	19 (42%)
2	9XA	F	401	-	35,37,37	2.60	9 (25%)	45,56,56	2.85	20 (44%)
2	9XA	O	401	-	35,37,37	2.59	9 (25%)	45,56,56	2.68	21 (46%)
2	9XA	D	401	-	35,37,37	2.53	9 (25%)	45,56,56	2.43	18 (40%)
2	9XA	M	401	-	35,37,37	2.61	8 (22%)	45,56,56	2.69	20 (44%)
2	9XA	P	401	-	35,37,37	2.67	10 (28%)	45,56,56	2.56	18 (40%)

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
2	9XA	B	401	-	-	4/25/35/35	0/4/4/4
2	9XA	A	401	-	-	2/25/35/35	0/4/4/4
2	9XA	L	401	-	-	3/25/35/35	0/4/4/4
2	9XA	H	401	-	-	3/25/35/35	0/4/4/4
2	9XA	C	401	-	-	15/25/35/35	0/4/4/4
2	9XA	K	401	-	-	3/25/35/35	0/4/4/4
2	9XA	N	401	-	-	3/25/35/35	0/4/4/4
2	9XA	I	401	-	-	3/25/35/35	0/4/4/4
2	9XA	J	401	-	-	3/25/35/35	0/4/4/4
2	9XA	G	401	-	-	3/25/35/35	0/4/4/4
2	9XA	E	401	-	-	3/25/35/35	0/4/4/4
2	9XA	F	401	-	-	8/25/35/35	0/4/4/4
2	9XA	O	401	-	-	4/25/35/35	0/4/4/4
2	9XA	D	401	-	-	3/25/35/35	0/4/4/4
2	9XA	M	401	-	-	3/25/35/35	0/4/4/4
2	9XA	P	401	-	-	1/25/35/35	0/4/4/4

The worst 5 of 148 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	401	9XA	C2-N9	-11.05	1.23	1.33
2	H	401	9XA	C2-N9	-9.86	1.24	1.33
2	P	401	9XA	C2-N9	-9.68	1.24	1.33
2	I	401	9XA	C2-N9	-9.48	1.24	1.33
2	J	401	9XA	C2-N9	-9.40	1.25	1.33

The worst 5 of 294 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	C	401	9XA	C31-S28-C5	-14.24	98.47	107.78
2	C	401	9XA	C24-C23-CL25	9.50	130.73	118.88
2	J	401	9XA	C18-N17-C16	8.50	121.42	109.52
2	A	401	9XA	C23-N22-C21	8.45	122.58	116.72
2	M	401	9XA	C23-N22-C21	8.26	122.45	116.72

There are no chirality outliers.

5 of 64 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	401	9XA	C4-C5-S28-O29
2	B	401	9XA	C5-C4-O10-C11
2	C	401	9XA	C32-C31-S28-C5
2	C	401	9XA	C33-C31-S28-C5
2	C	401	9XA	C34-C31-S28-C5

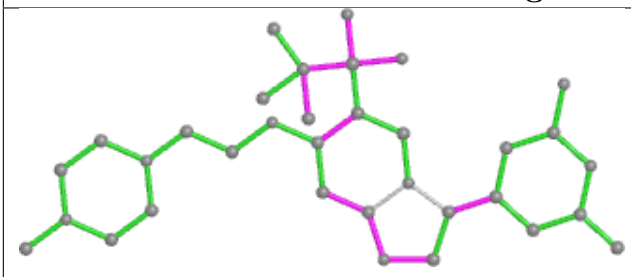
There are no ring outliers.

6 monomers are involved in 12 short contacts:

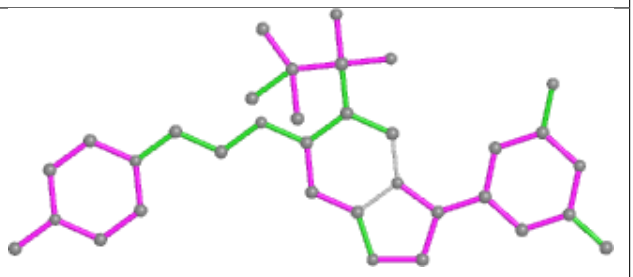
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	401	9XA	2	0
2	C	401	9XA	5	0
2	K	401	9XA	1	0
2	F	401	9XA	1	0
2	D	401	9XA	2	0
2	M	401	9XA	1	0

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.

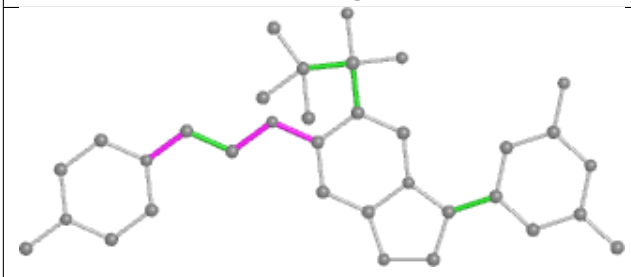
Ligand 9XA B 401



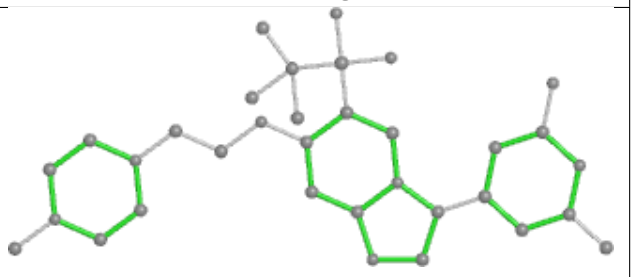
Bond lengths



Bond angles

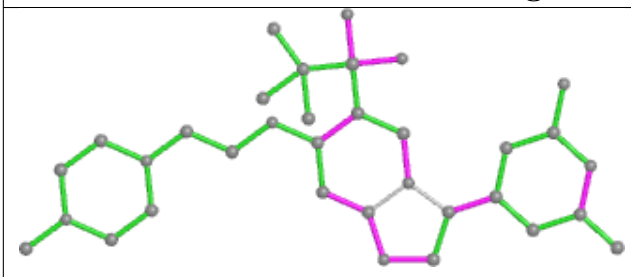


Torsions



Rings

Ligand 9XA A 401



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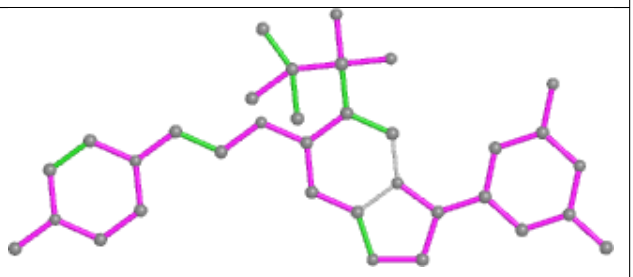

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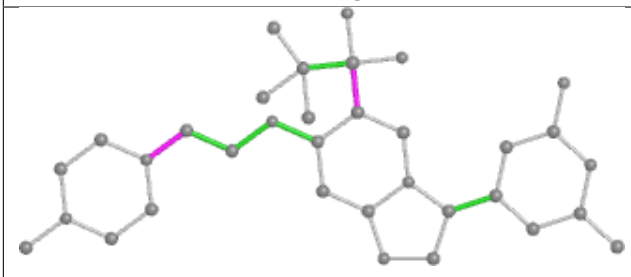

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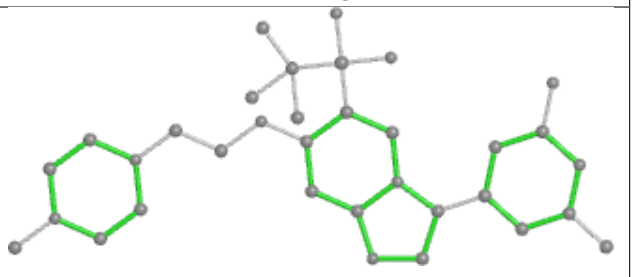
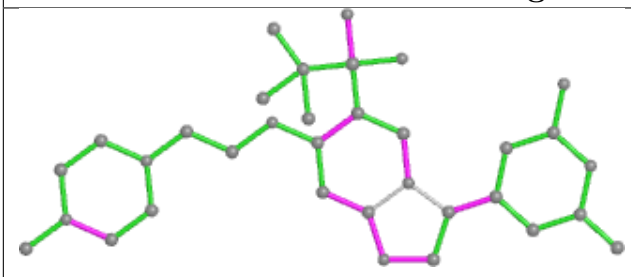


Rings

Ligand 9XA L 401



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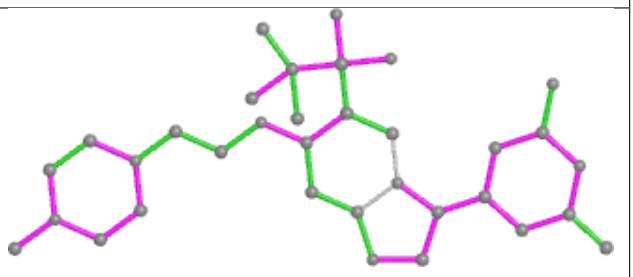

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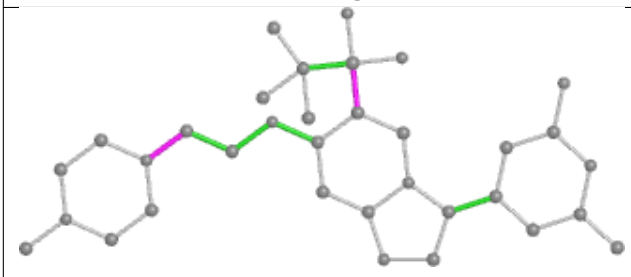

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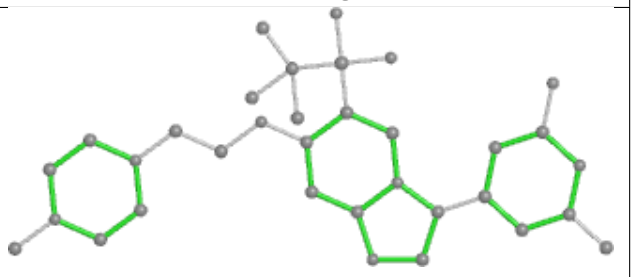
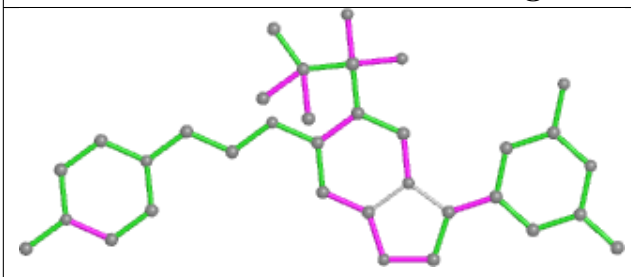


Rings

Ligand 9XA H 401



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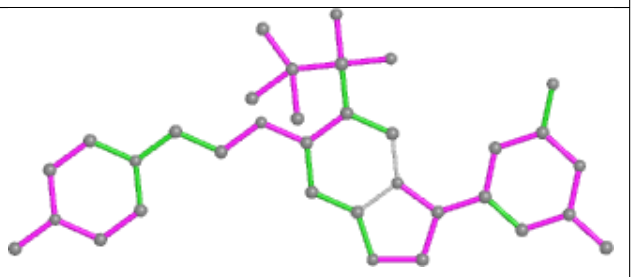

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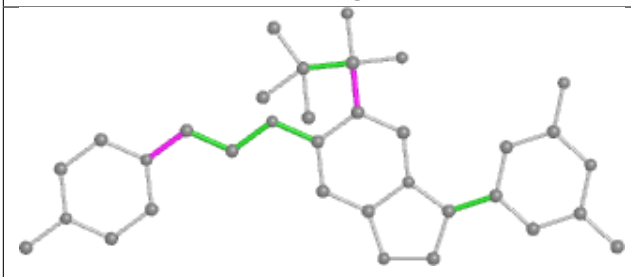

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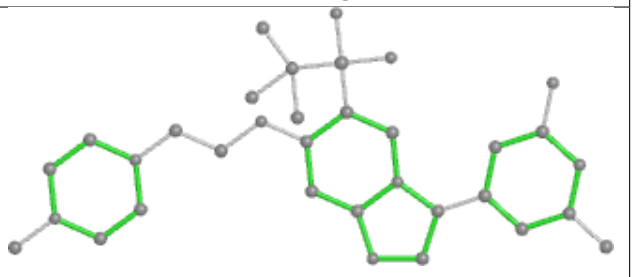
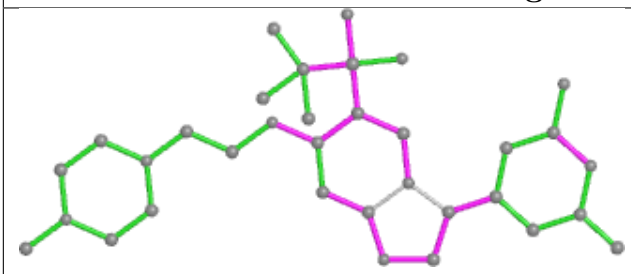


Rings

Ligand 9XA C 401



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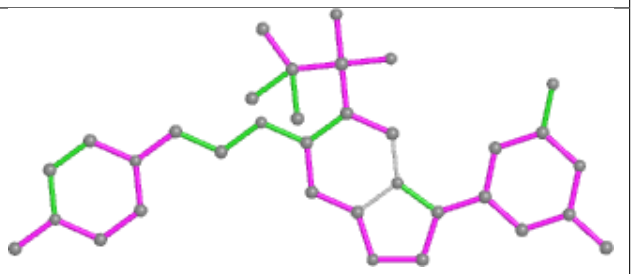

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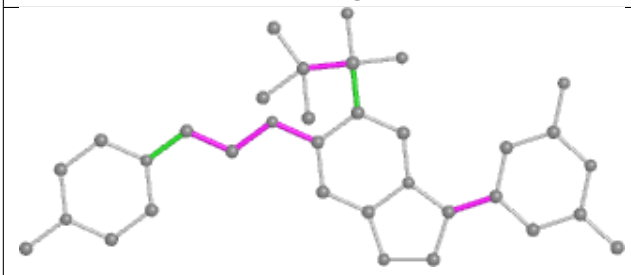

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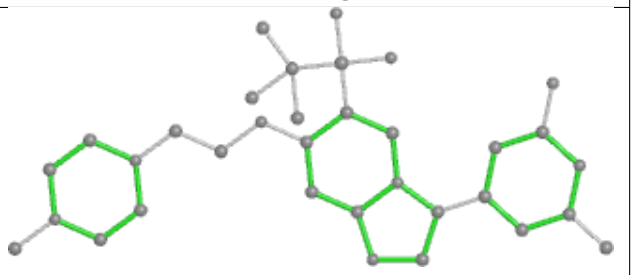
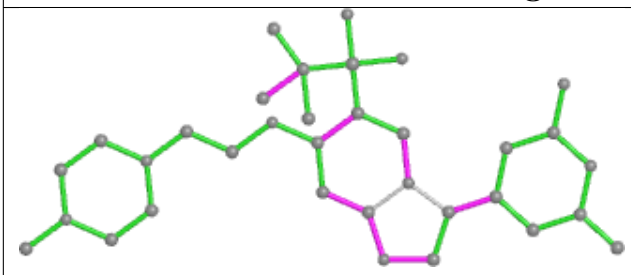


Rings

Ligand 9XA K 401



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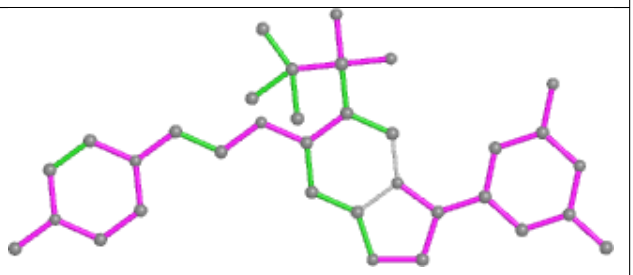

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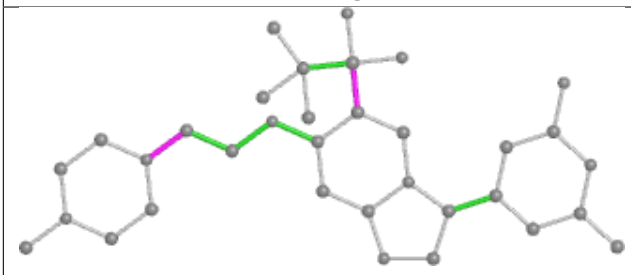

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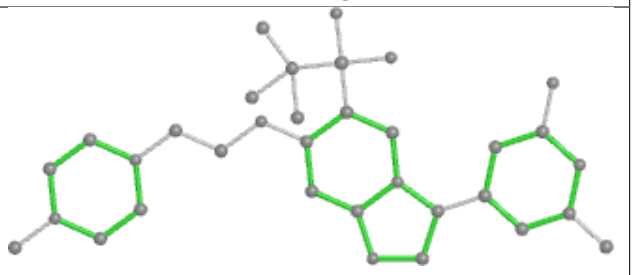
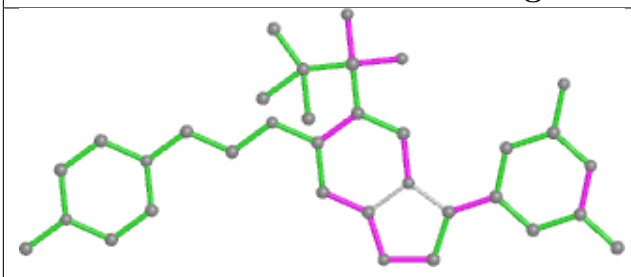
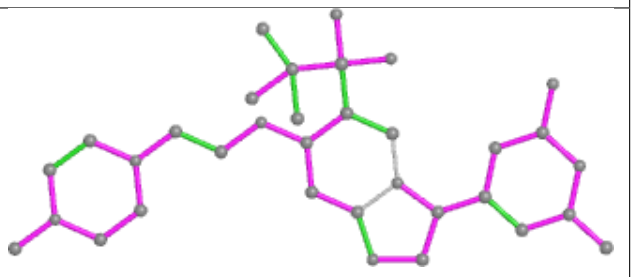


Rings

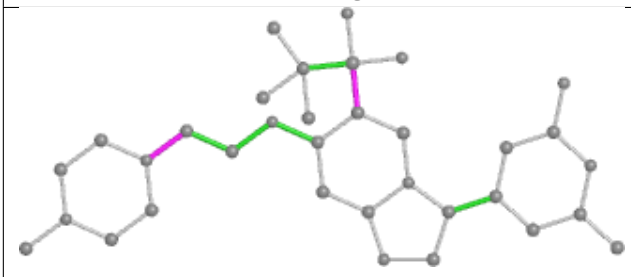
Ligand 9XA N 401



Bond lengths



Bond angles



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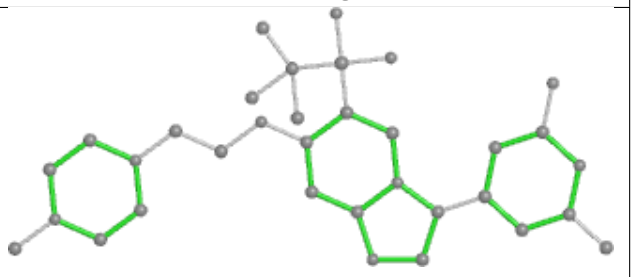
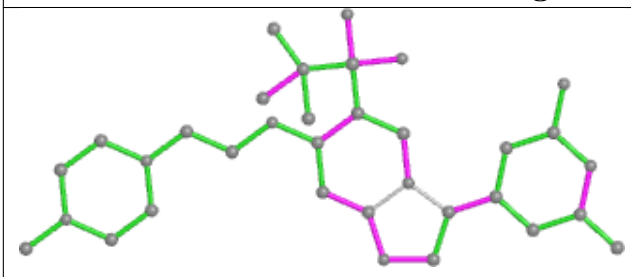
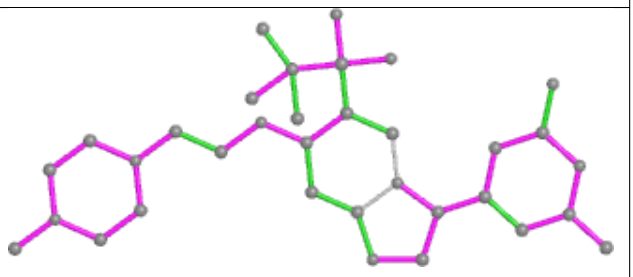


Rings

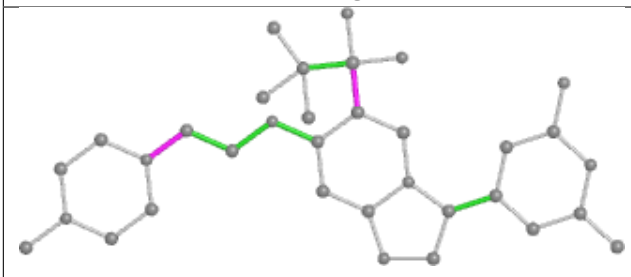
Ligand 9XA I 401



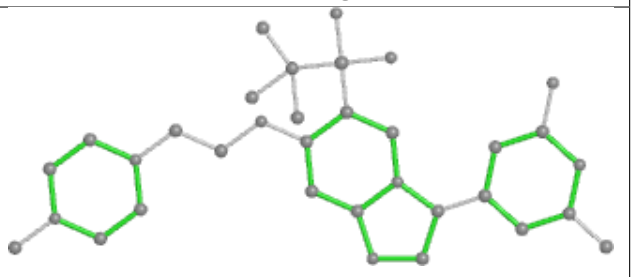
Bond lengths



Bond angles

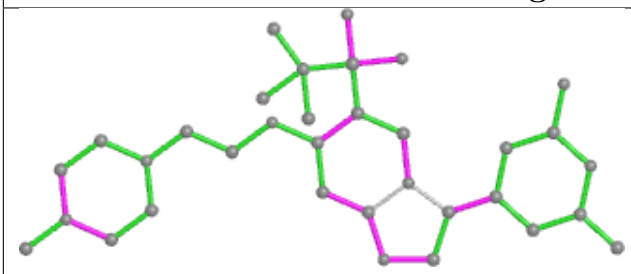


Torsions

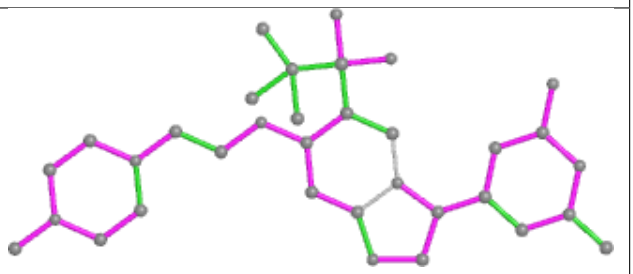


Rings

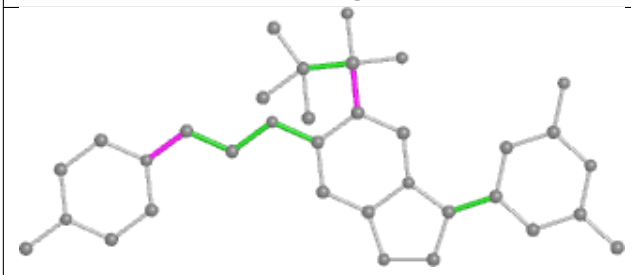
Ligand 9XA J 401



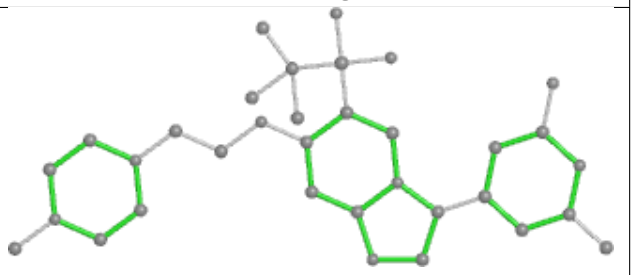
Bond lengths



Bond angles

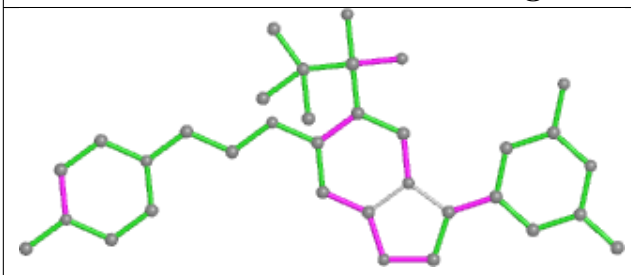


Torsions

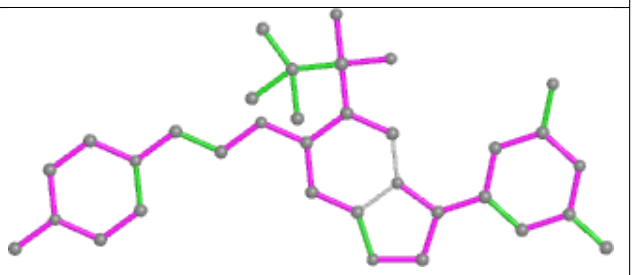


Rings

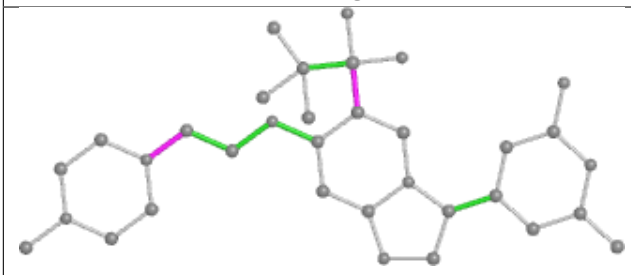
Ligand 9XA G 401



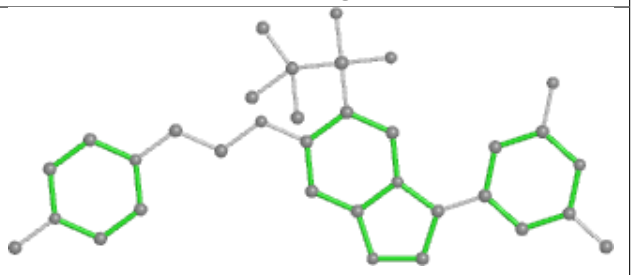
Bond lengths



Bond angles

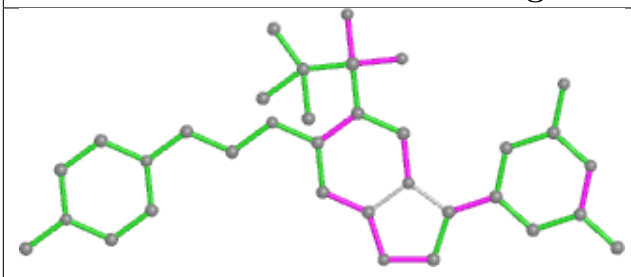


Torsions

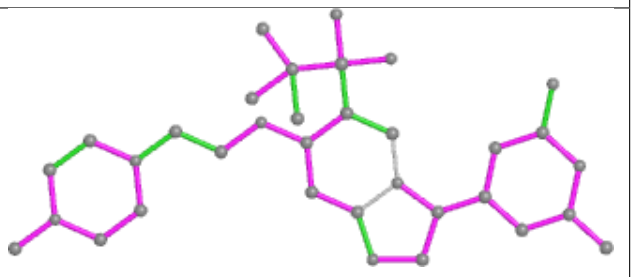


Rings

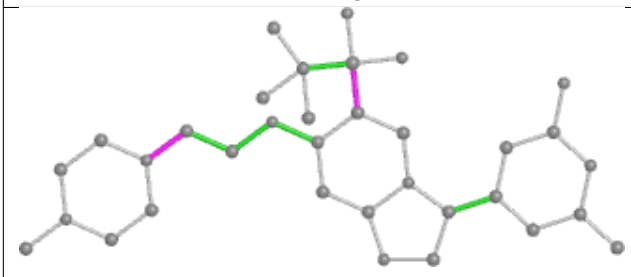
Ligand 9XA E 401



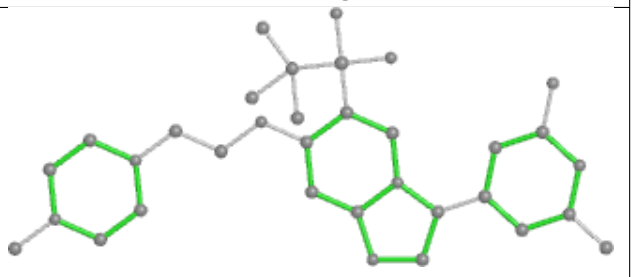
Bond lengths



Bond angles

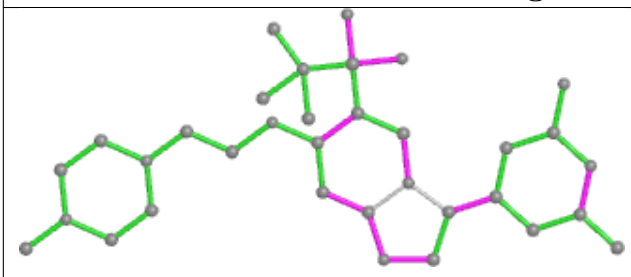


Torsions

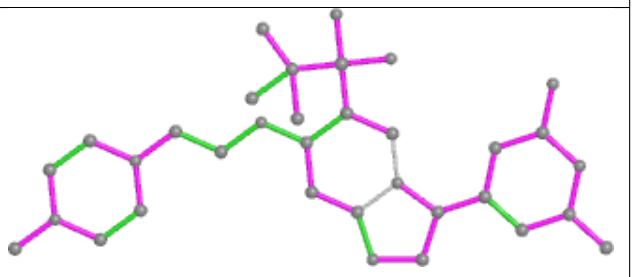


Rings

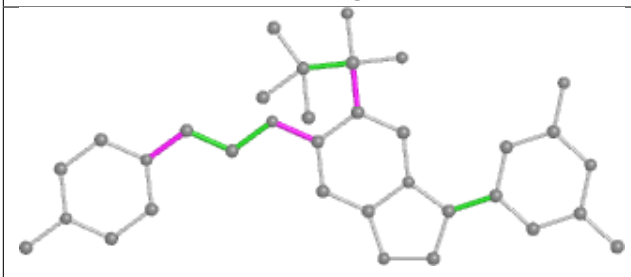
Ligand 9XA F 401



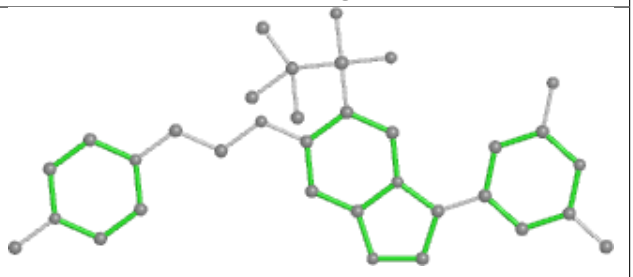
Bond lengths



Bond angles

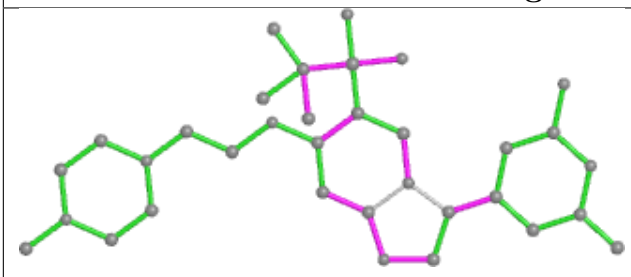


Torsions

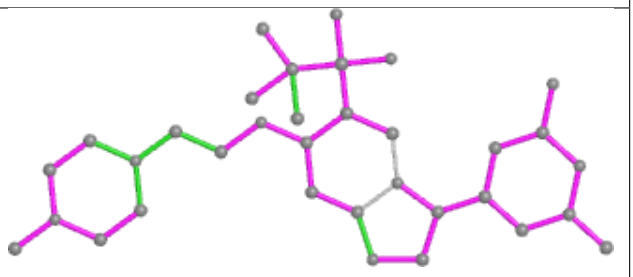


Rings

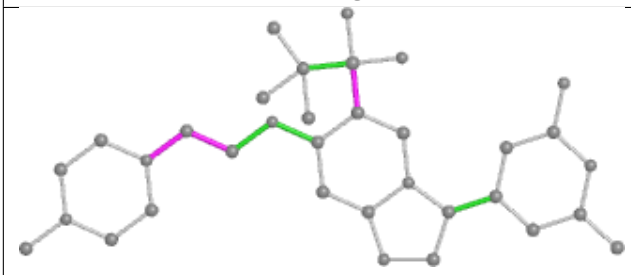
Ligand 9XA O 401



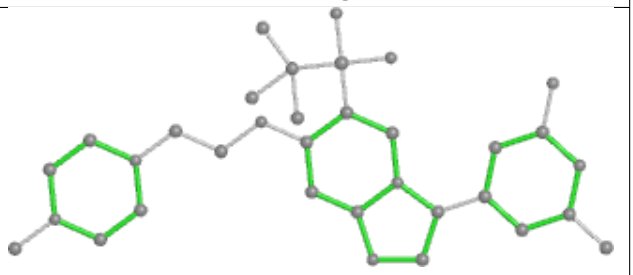
Bond lengths



Bond angles

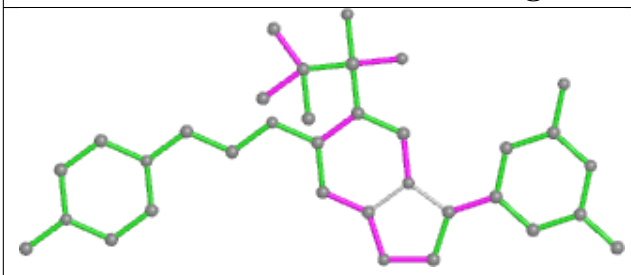


Torsions

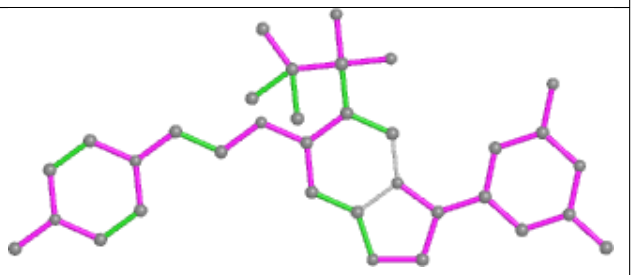


Rings

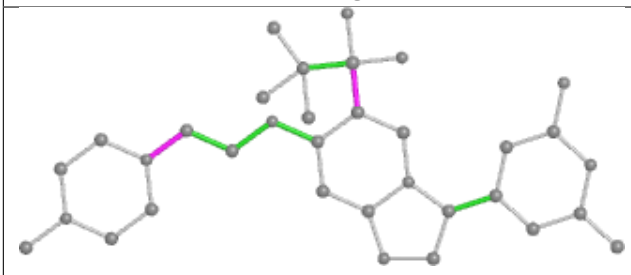
Ligand 9XA D 401



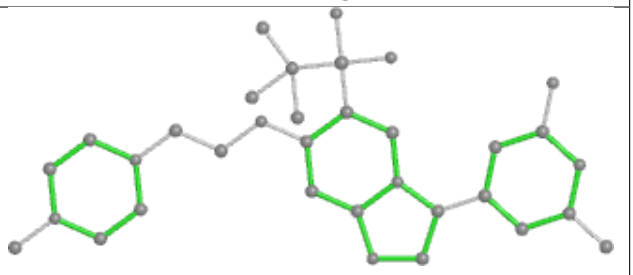
Bond lengths



Bond angles

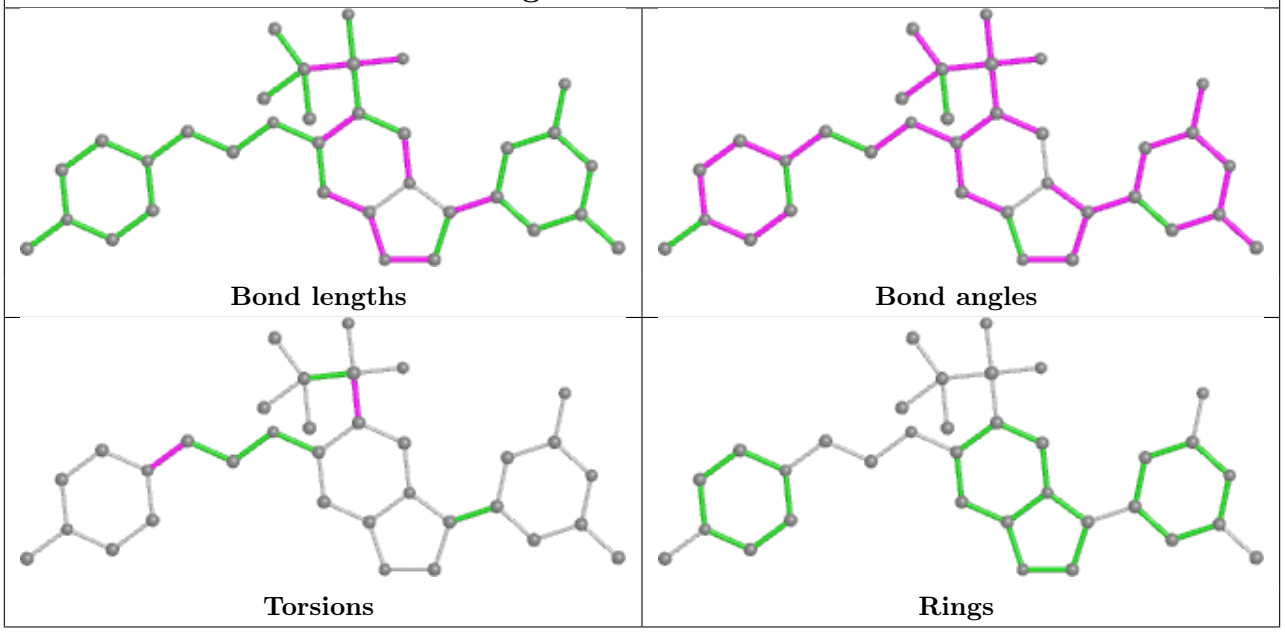


Torsions

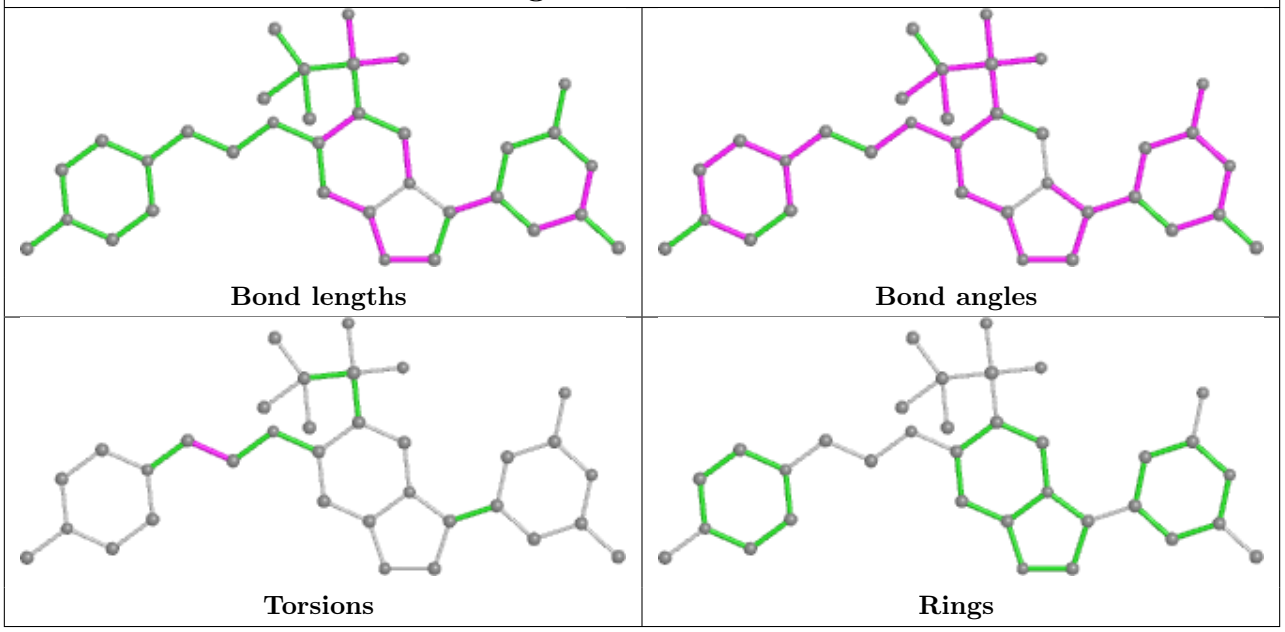


Rings

Ligand 9XA M 401



Ligand 9XA P 401



5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å^2)	Q<0.9
1	A	275/310 (88%)	0.50	20 (7%) 15 11	48, 78, 106, 141	0
1	B	275/310 (88%)	0.53	21 (7%) 13 10	51, 82, 109, 128	0
1	C	275/310 (88%)	0.64	24 (8%) 10 7	59, 91, 121, 133	0
1	D	275/310 (88%)	0.60	24 (8%) 10 7	47, 83, 110, 126	0
1	E	275/310 (88%)	0.56	20 (7%) 15 11	51, 78, 106, 121	0
1	F	275/310 (88%)	0.49	17 (6%) 20 16	54, 81, 107, 132	0
1	G	275/310 (88%)	0.47	16 (5%) 23 19	51, 77, 107, 125	0
1	H	275/310 (88%)	0.55	20 (7%) 15 11	50, 82, 114, 139	0
1	I	275/310 (88%)	0.56	27 (9%) 7 5	53, 82, 110, 127	0
1	J	275/310 (88%)	0.56	24 (8%) 10 7	53, 80, 106, 130	0
1	K	275/310 (88%)	0.54	22 (8%) 12 9	54, 83, 109, 121	0
1	L	275/310 (88%)	0.55	31 (11%) 5 4	62, 92, 123, 140	0
1	M	276/310 (89%)	0.51	23 (8%) 11 8	55, 85, 112, 128	0
1	N	272/310 (87%)	0.52	20 (7%) 14 11	62, 91, 117, 129	0
1	O	276/310 (89%)	0.60	23 (8%) 11 8	56, 85, 111, 131	0
1	P	275/310 (88%)	0.54	22 (8%) 12 9	59, 91, 111, 138	0
All	All	4399/4960 (88%)	0.55	354 (8%) 12 9	47, 84, 112, 141	0

The worst 5 of 354 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	O	172	MET	10.6
1	E	172	MET	9.0
1	O	171	ARG	8.4
1	A	172	MET	6.7
1	D	229	PHE	5.8

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

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

6.3 Carbohydrates (i)

There are no monosaccharides in this entry.

6.4 Ligands (i)

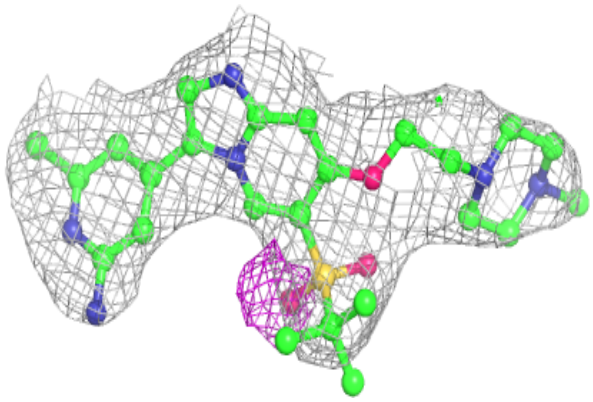
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9'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

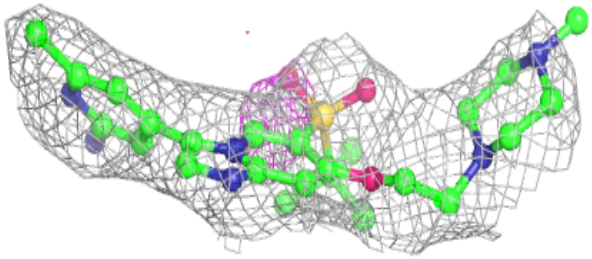
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	9XA	P	401	34/34	0.85	0.28	99,110,123,125	0
2	9XA	K	401	34/34	0.89	0.34	85,93,109,112	0
2	9XA	N	401	34/34	0.90	0.28	107,113,115,115	0
2	9XA	M	401	34/34	0.90	0.25	80,93,114,115	0
2	9XA	E	401	34/34	0.91	0.29	73,88,117,117	0
2	9XA	B	401	34/34	0.92	0.27	68,80,89,97	0
2	9XA	L	401	34/34	0.92	0.23	87,97,111,120	0
2	9XA	A	401	34/34	0.92	0.31	78,87,115,117	0
2	9XA	F	401	34/34	0.92	0.25	71,86,96,98	0
2	9XA	G	401	34/34	0.92	0.27	74,81,89,100	0
2	9XA	C	401	34/34	0.93	0.20	87,97,112,117	0
2	9XA	H	401	34/34	0.93	0.28	60,75,107,108	0
2	9XA	I	401	34/34	0.93	0.25	66,81,98,99	0
2	9XA	O	401	34/34	0.93	0.26	83,98,118,119	0
2	9XA	D	401	34/34	0.93	0.23	74,88,113,114	0
2	9XA	J	401	34/34	0.94	0.25	76,83,98,100	0

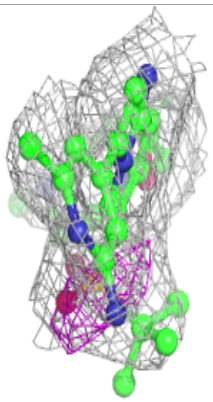
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around 9XA P 401:

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

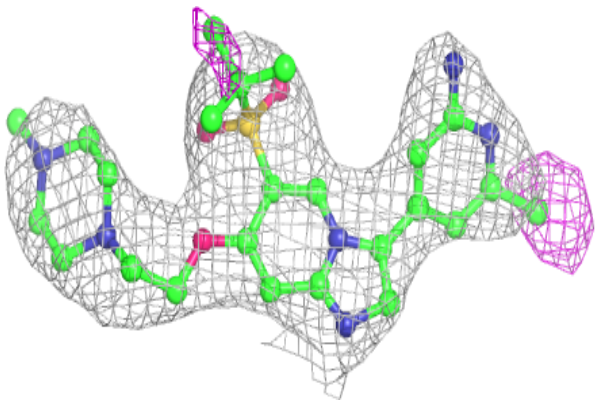


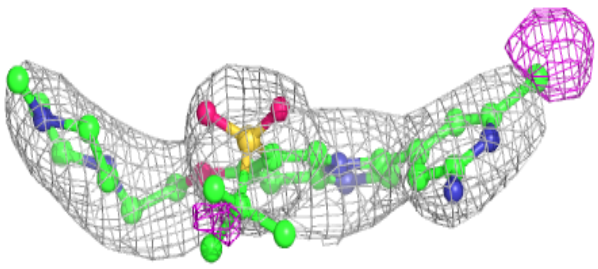


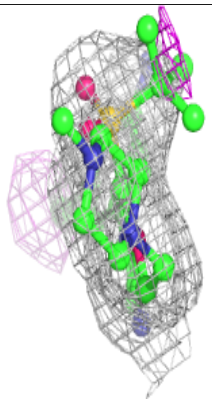


Electron density around 9XA K 401:

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

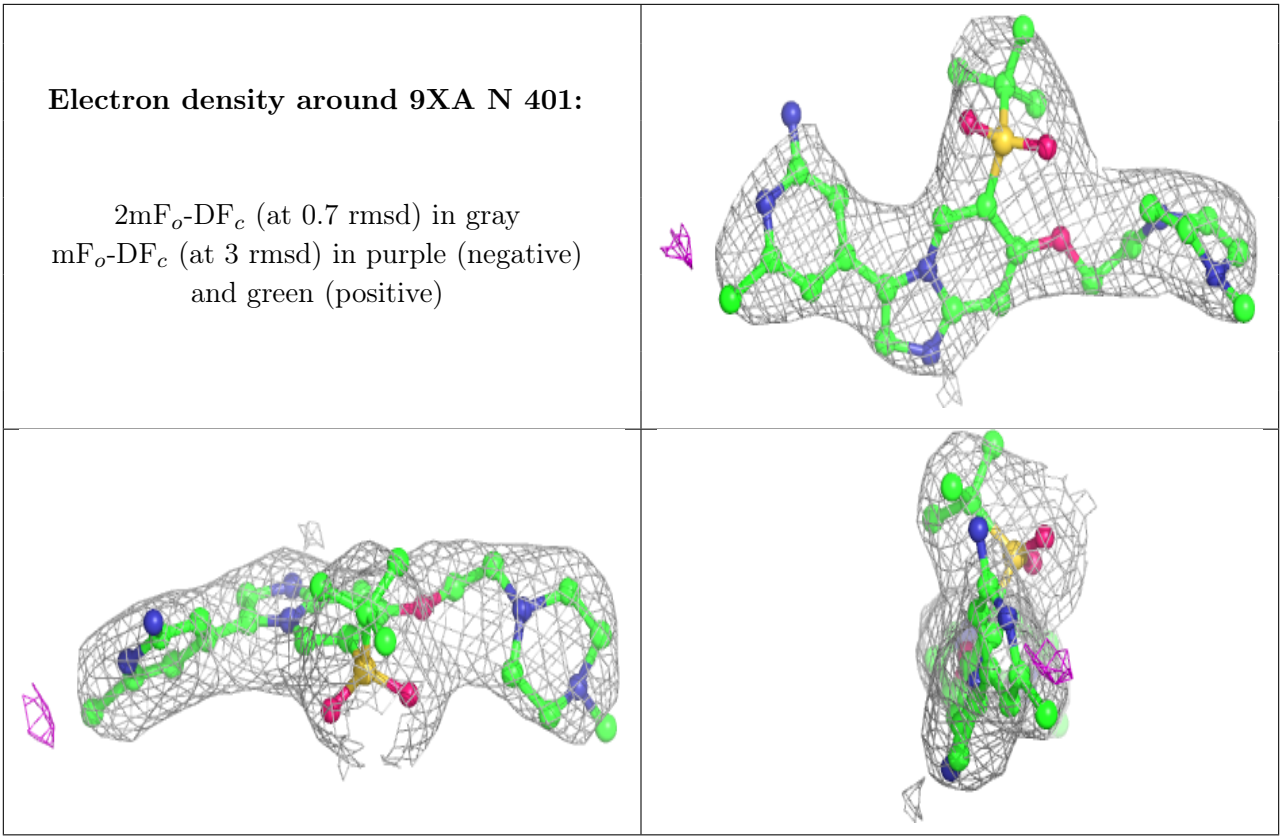






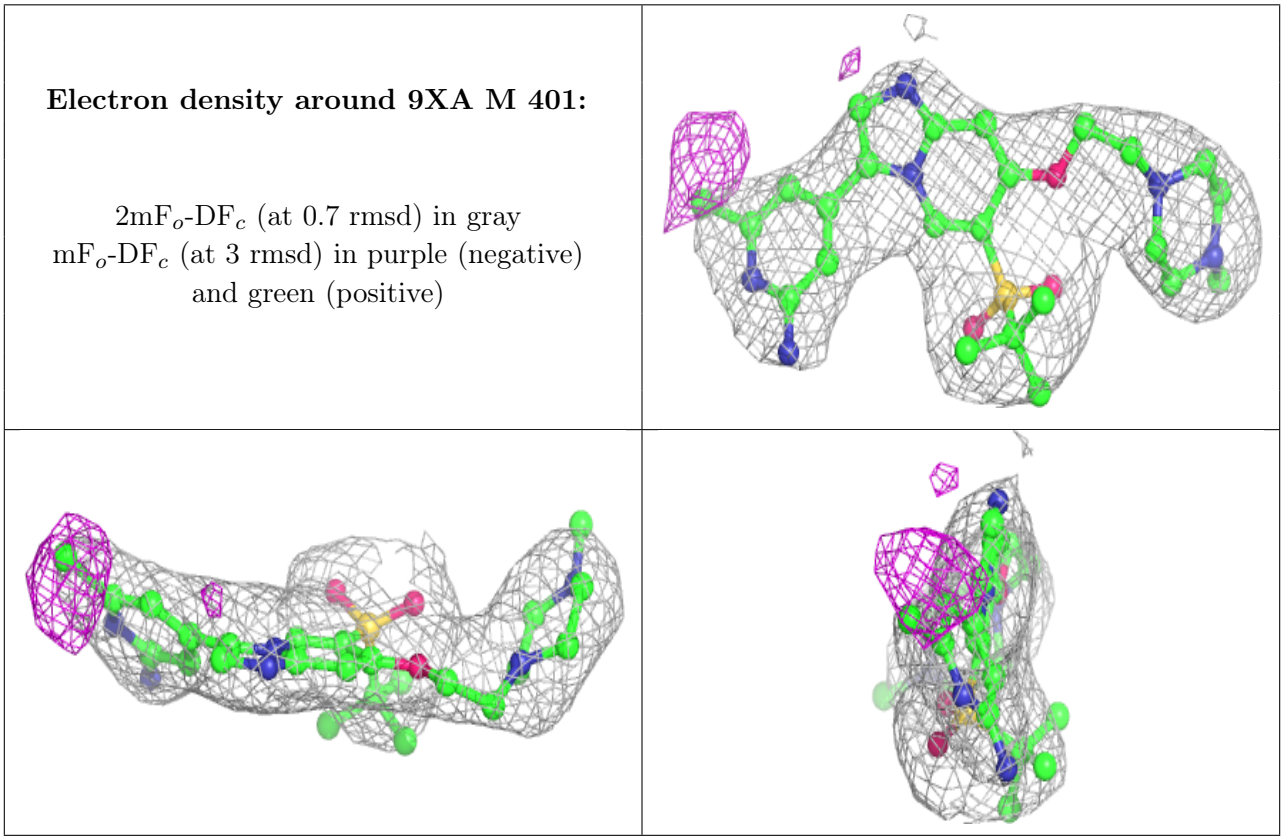
Electron density around 9XA N 401:

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



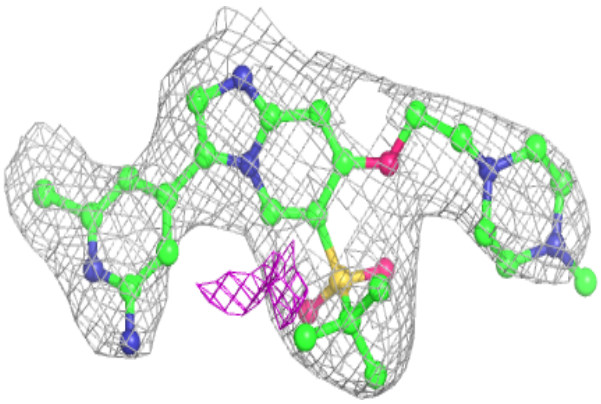
Electron density around 9XA M 401:

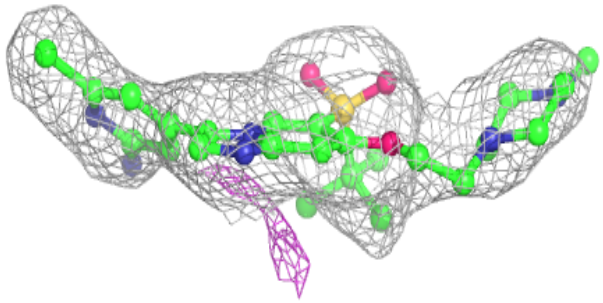
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

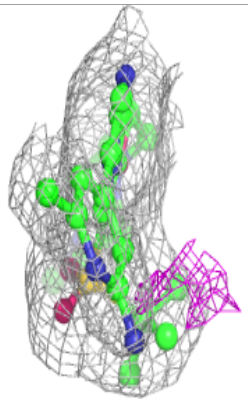


Electron density around 9XA E 401:

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

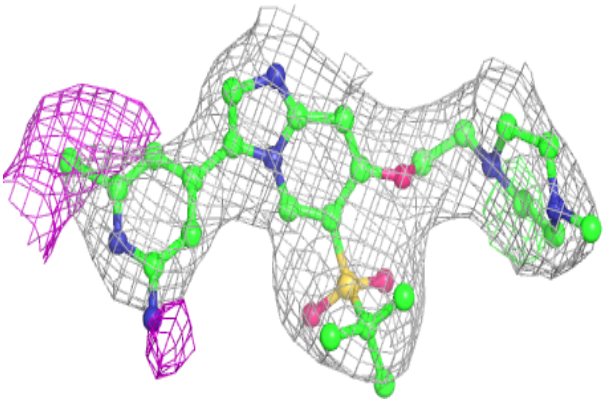


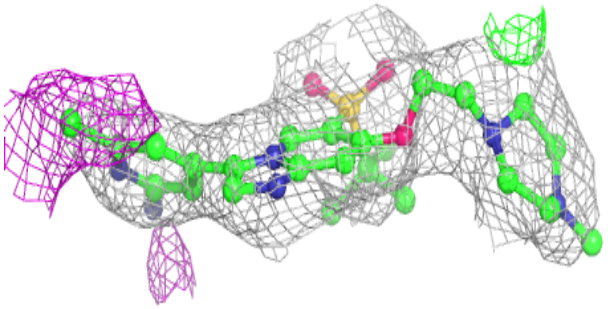


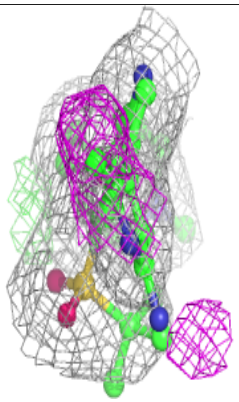


Electron density around 9XA B 401:

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

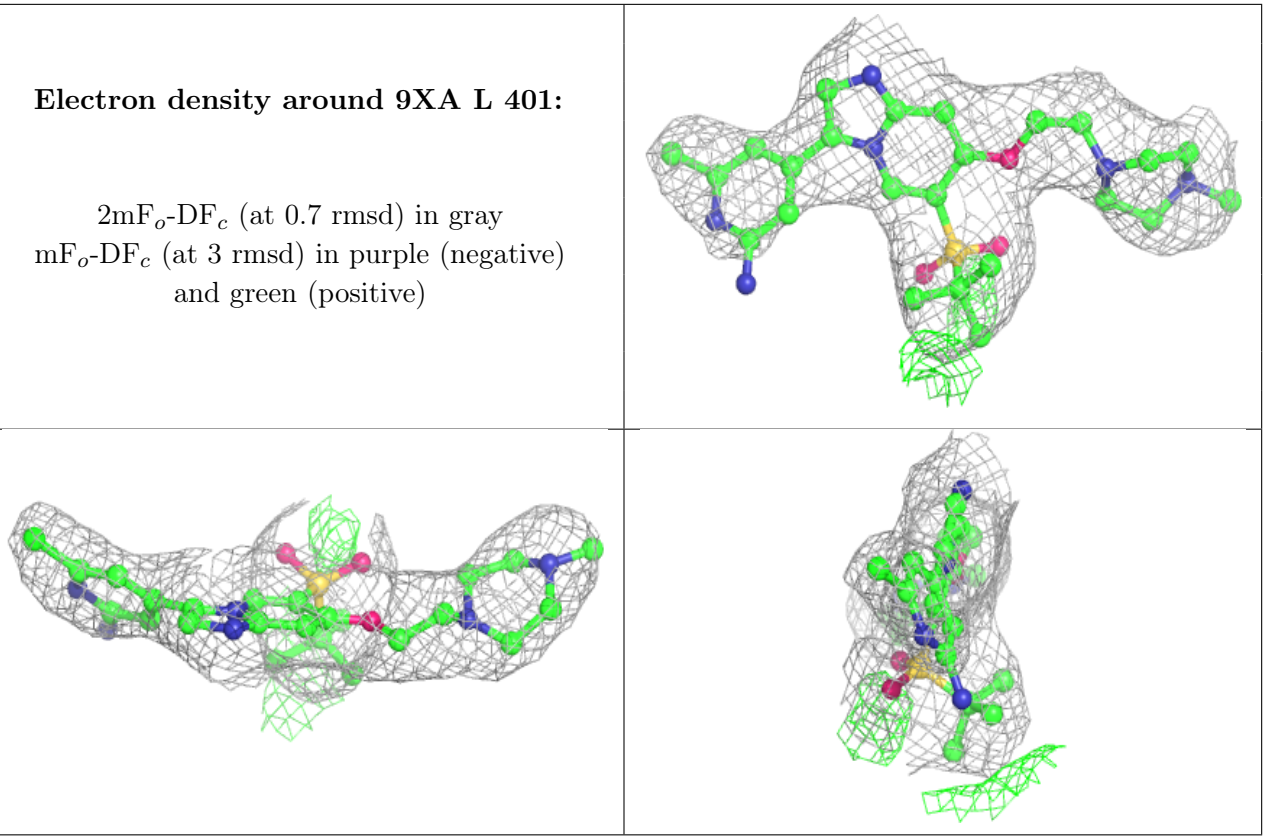






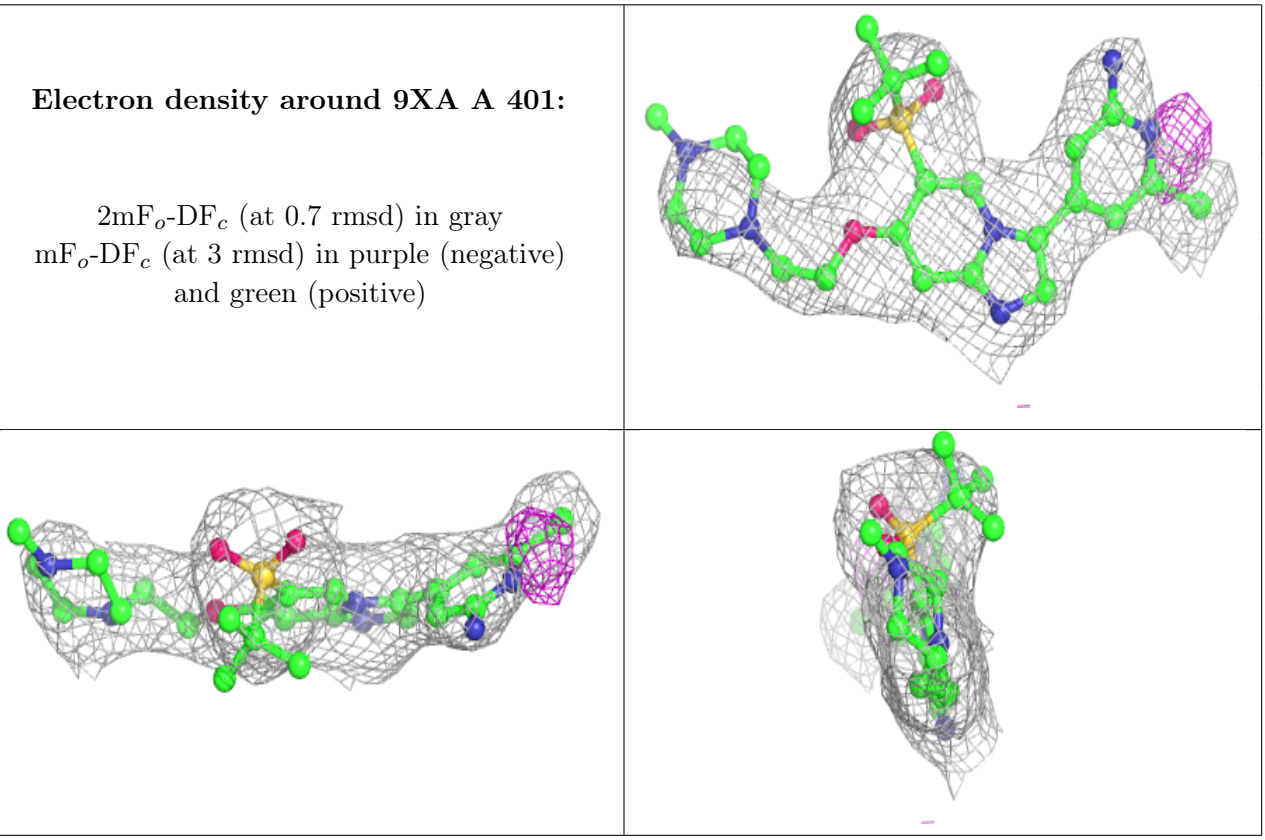
Electron density around 9XA L 401:

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



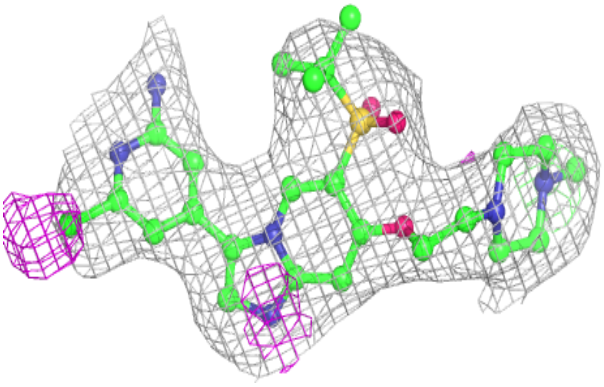
Electron density around 9XA A 401:

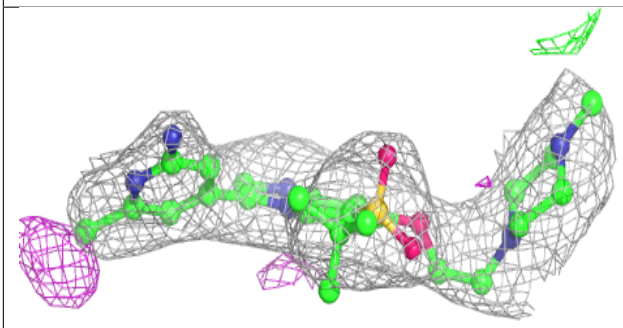
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

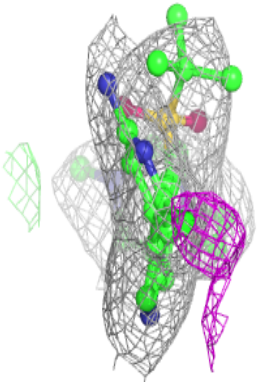


Electron density around 9XA F 401:

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

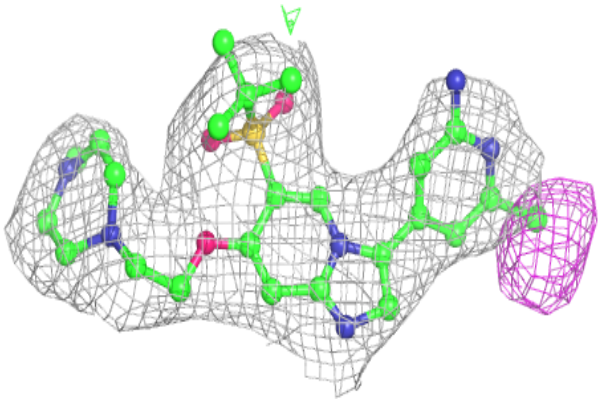


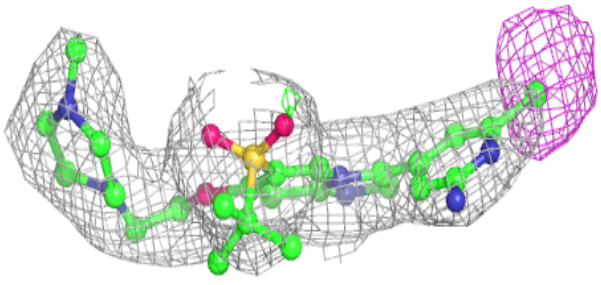


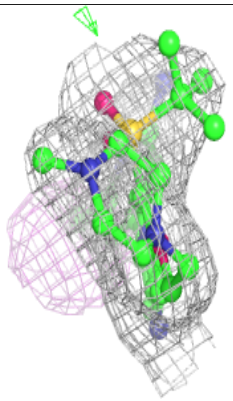


Electron density around 9XA G 401:

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

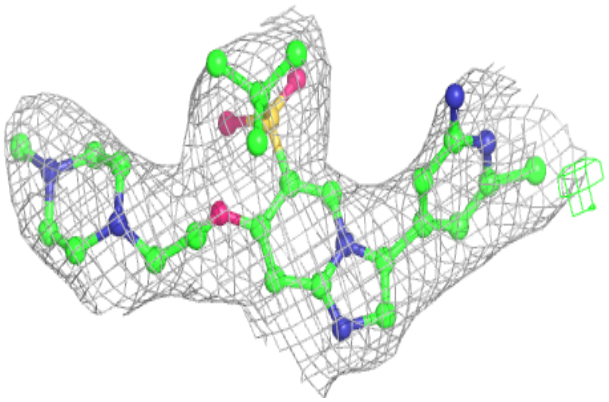


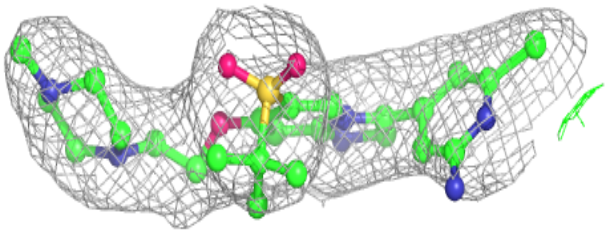


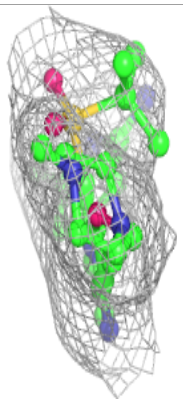


Electron density around 9XA C 401:

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

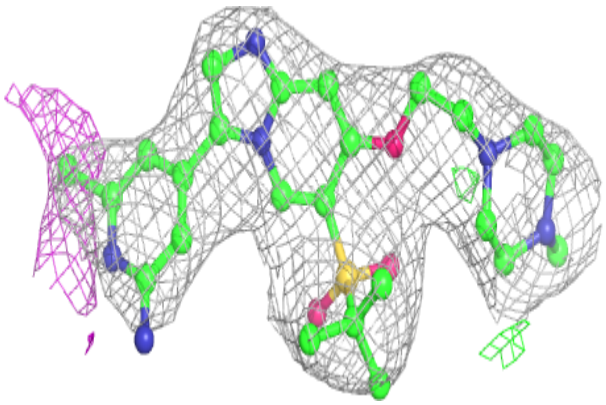


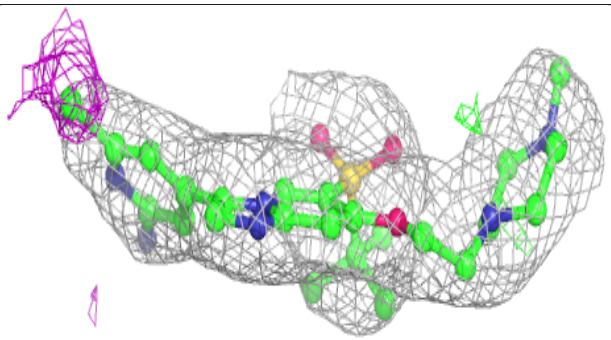


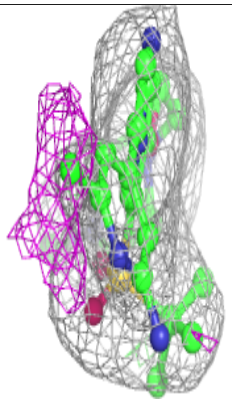


Electron density around 9XA H 401:

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

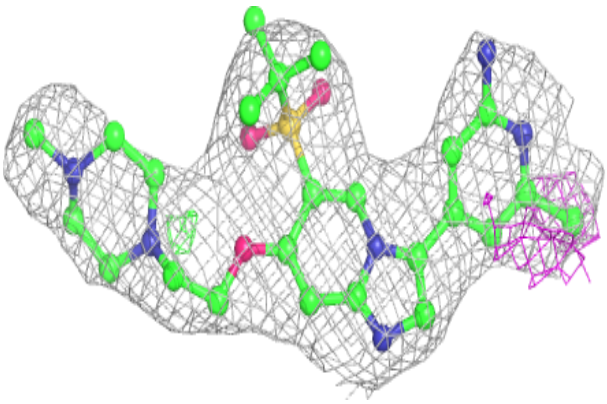


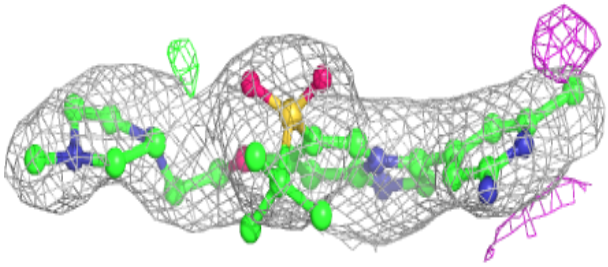




Electron density around 9XA I 401:

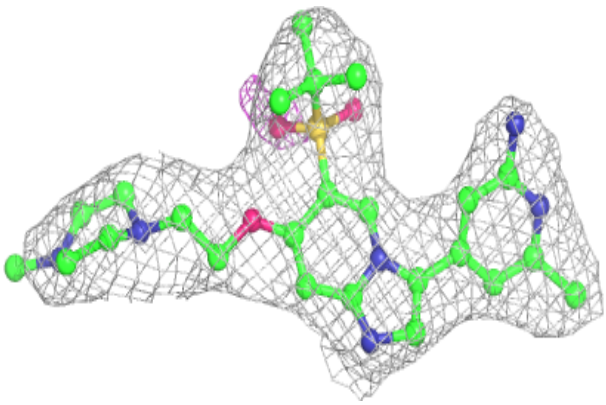
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

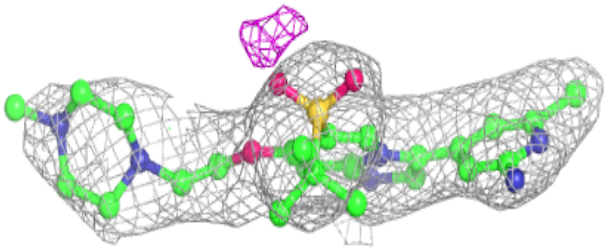


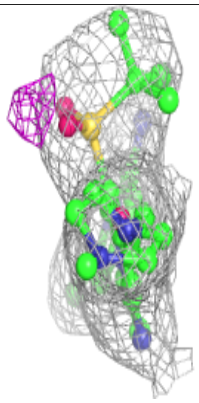


Electron density around 9XA O 401:

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

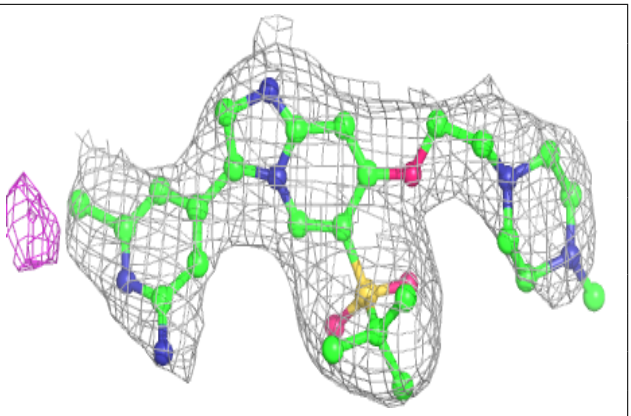


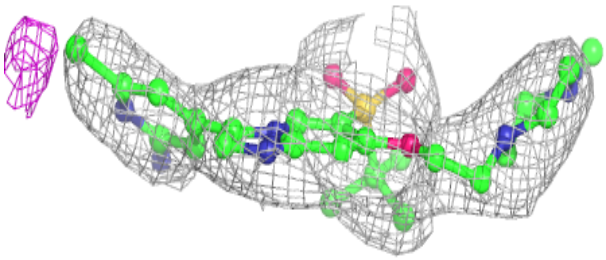


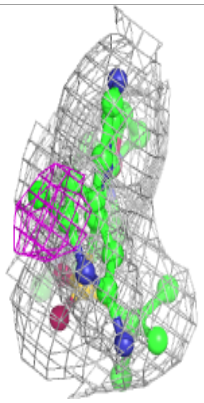


Electron density around 9XA D 401:

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

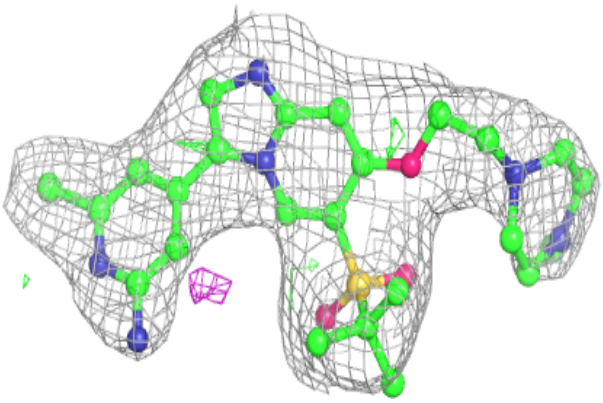


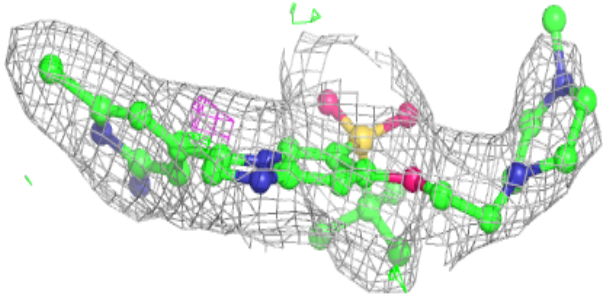


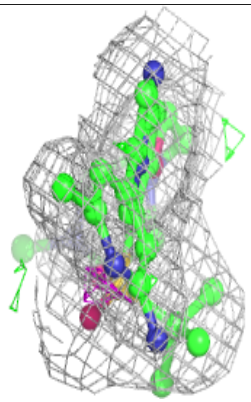


Electron density around 9XA J 401:

$2mF_o$-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.