Full wwPDB X-ray Structure Validation Report (i)

Sep 8, 2022 – 04:14 pm BST

PDB ID	:	7ZM0
Title	:	Structure of UCHL1 in complex with GK13S inhibitor
Authors	:	Grethe, C.; Gersch, M.
Deposited on	:	2022-04-18
Resolution	:	2.24 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/XrayValidationReportHelp
with specific help available everywhere you see the (i) symbol.

The types of validation reports are described at http://www.wwpdb.org/validation/2017/FAQs#types.

The following versions of software and data (see references (i)) were used in the production of this report:

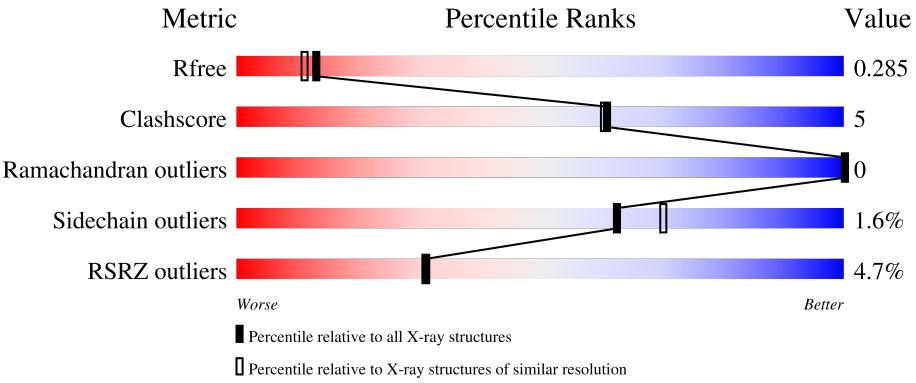
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.30
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0267
CCP4	:	7.1.010 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.30

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 2.24 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	2391 (2.26-2.22)
Clashscore	141614	2539 (2.26-2.22)
Ramachandran outliers	138981	2489 (2.26-2.22)
Sidechain outliers	138945	2490 (2.26-2.22)
RSRZ outliers	127900	2353 (2.26-2.22)

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	227	84% 10% 6%
1	B	227	4% 86% 11%
1	C	227	7% 76% 14% 10%
1	D	227	3% 82% 13%
1	E	227	% 87% 9%

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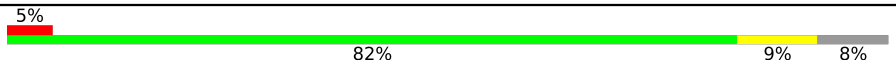
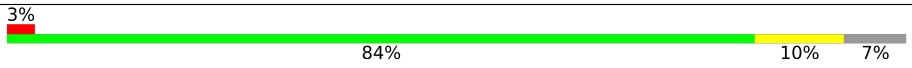
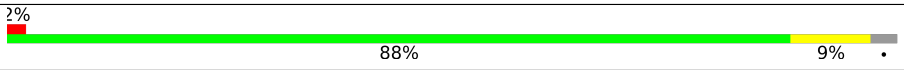
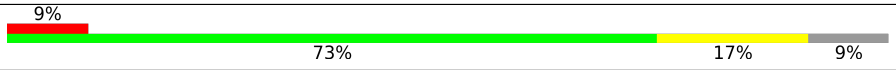
Mol	Chain	Length	Quality of chain
1	F	227	
1	G	227	
1	H	227	
1	I	227	
1	J	227	

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 16195 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 Ubiquitin carboxyl-terminal hydrolase isozyme L1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	213	Total	C	N	O	S	0	0	0
			1615	1023	280	301	11			
1	B	219	Total	C	N	O	S	0	0	0
			1599	1012	279	297	11			
1	C	204	Total	C	N	O	S	0	0	0
			1487	947	257	272	11			
1	D	217	Total	C	N	O	S	0	0	0
			1607	1020	278	298	11			
1	E	218	Total	C	N	O	S	0	0	0
			1603	1013	280	299	11			
1	F	208	Total	C	N	O	S	0	0	0
			1529	976	260	282	11			
1	G	212	Total	C	N	O	S	0	0	0
			1556	985	269	291	11			
1	H	220	Total	C	N	O	S	0	0	0
			1656	1048	291	305	12			
1	I	206	Total	C	N	O	S	0	0	0
			1466	929	251	275	11			
1	J	200	Total	C	N	O	S	0	0	0
			1456	922	251	273	10			

There are 40 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-3	GLY	-	expression tag	UNP P09936
A	-2	PRO	-	expression tag	UNP P09936
A	-1	GLY	-	expression tag	UNP P09936
A	0	SER	-	expression tag	UNP P09936
B	-3	GLY	-	expression tag	UNP P09936
B	-2	PRO	-	expression tag	UNP P09936
B	-1	GLY	-	expression tag	UNP P09936
B	0	SER	-	expression tag	UNP P09936
C	-3	GLY	-	expression tag	UNP P09936

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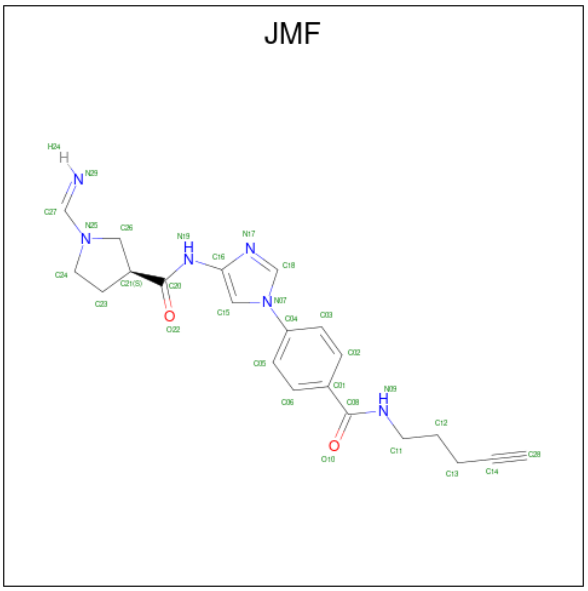
Chain	Residue	Modelled	Actual	Comment	Reference
C	-2	PRO	-	expression tag	UNP P09936
C	-1	GLY	-	expression tag	UNP P09936
C	0	SER	-	expression tag	UNP P09936
D	-3	GLY	-	expression tag	UNP P09936
D	-2	PRO	-	expression tag	UNP P09936
D	-1	GLY	-	expression tag	UNP P09936
D	0	SER	-	expression tag	UNP P09936
E	-3	GLY	-	expression tag	UNP P09936
E	-2	PRO	-	expression tag	UNP P09936
E	-1	GLY	-	expression tag	UNP P09936
E	0	SER	-	expression tag	UNP P09936
F	-3	GLY	-	expression tag	UNP P09936
F	-2	PRO	-	expression tag	UNP P09936
F	-1	GLY	-	expression tag	UNP P09936
F	0	SER	-	expression tag	UNP P09936
G	-3	GLY	-	expression tag	UNP P09936
G	-2	PRO	-	expression tag	UNP P09936
G	-1	GLY	-	expression tag	UNP P09936
G	0	SER	-	expression tag	UNP P09936
H	-3	GLY	-	expression tag	UNP P09936
H	-2	PRO	-	expression tag	UNP P09936
H	-1	GLY	-	expression tag	UNP P09936
H	0	SER	-	expression tag	UNP P09936
I	-3	GLY	-	expression tag	UNP P09936
I	-2	PRO	-	expression tag	UNP P09936
I	-1	GLY	-	expression tag	UNP P09936
I	0	SER	-	expression tag	UNP P09936
J	-3	GLY	-	expression tag	UNP P09936
J	-2	PRO	-	expression tag	UNP P09936
J	-1	GLY	-	expression tag	UNP P09936
J	0	SER	-	expression tag	UNP P09936

- Molecule 2 is (3S)-1-(iminomethyl)-N-[1-[4-(pent-4-ynylcarbamoyl)phenyl]imidazol-4-yl]pyrrolidine-3-carboxamide (three-letter code: JMF) (formula: $C_{21}H_{24}N_6O_2$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total C N O 29 21 6 2	0	0
2	B	1	Total C N O 29 21 6 2	0	0
2	C	1	Total C N O 29 21 6 2	0	0
2	D	1	Total C N O 29 21 6 2	0	0
2	E	1	Total C N O 29 21 6 2	0	0
2	F	1	Total C N O 29 21 6 2	0	0
2	G	1	Total C N O 29 21 6 2	0	0
2	H	1	Total C N O 29 21 6 2	0	0
2	I	1	Total C N O 29 21 6 2	0	0
2	J	1	Total C N O 29 21 6 2	0	0

- Molecule 3 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	47	Total O 47 47	0	0
3	B	24	Total O 24 24	0	0

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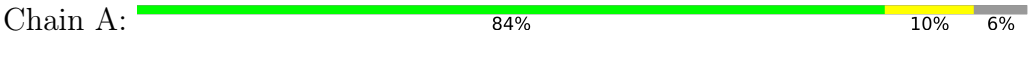
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	C	24	Total O 24 24	0	0
3	D	30	Total O 30 30	0	0
3	E	23	Total O 23 23	0	0
3	F	38	Total O 38 38	0	0
3	G	32	Total O 32 32	0	0
3	H	54	Total O 54 54	0	0
3	I	30	Total O 30 30	0	0
3	J	29	Total O 29 29	0	0

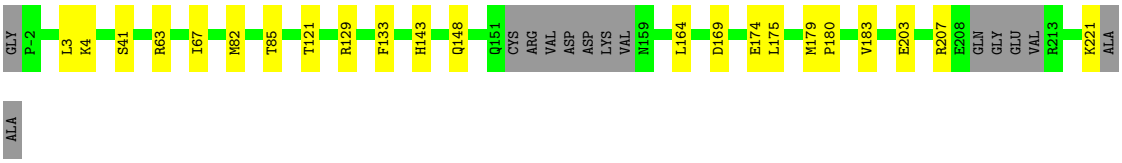
3 Residue-property plots (i)

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: Ubiquitin carboxyl-terminal hydrolase isozyme L1

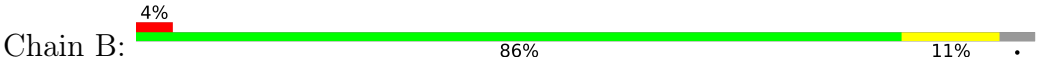
Chain A:

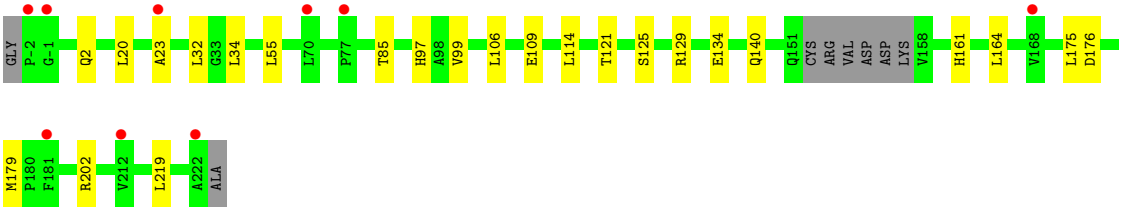




• Molecule 1: Ubiquitin carboxyl-terminal hydrolase isozyme L1

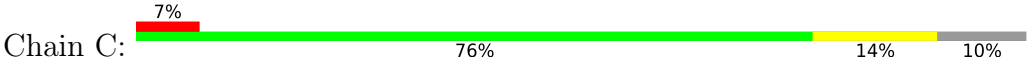
Chain B:

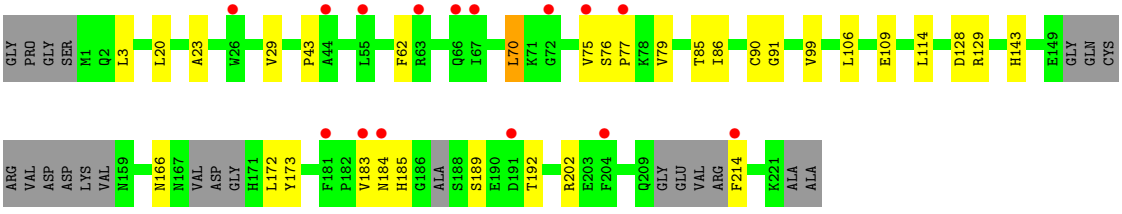




• Molecule 1: Ubiquitin carboxyl-terminal hydrolase isozyme L1

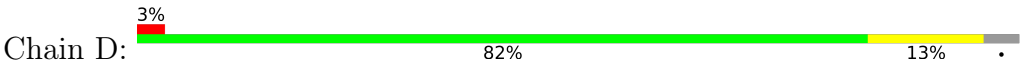
Chain C:

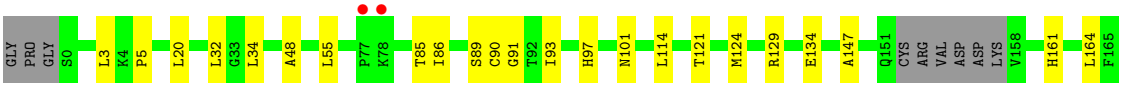


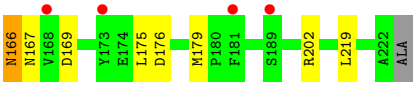


• Molecule 1: Ubiquitin carboxyl-terminal hydrolase isozyme L1

Chain D:





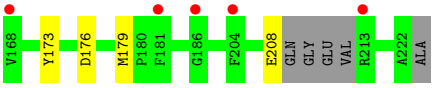


• Molecule 1: Ubiquitin carboxyl-terminal hydrolase isozyme L1

Chain E:

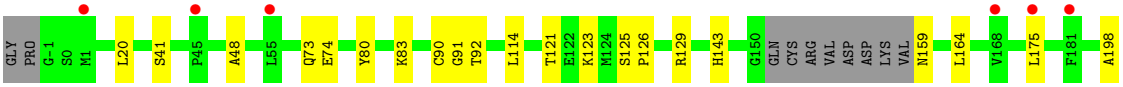
• Molecule 1: Ubiquitin carboxyl-terminal hydrolase isozyme L1

Chain F:



• Molecule 1: Ubiquitin carboxyl-terminal hydrolase isozyme L1

Chain G:

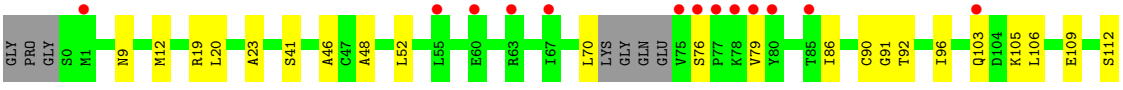


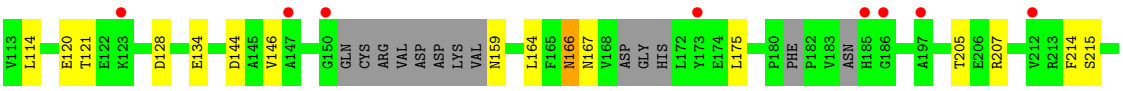
• Molecule 1: Ubiquitin carboxyl-terminal hydrolase isozyme L1

Chain H:

• Molecule 1: Ubiquitin carboxyl-terminal hydrolase isozyme L1

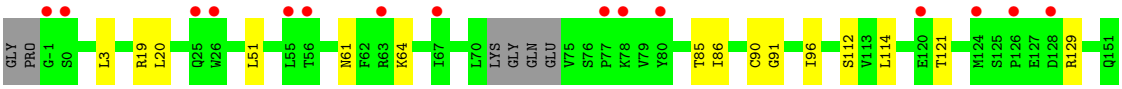
Chain I:

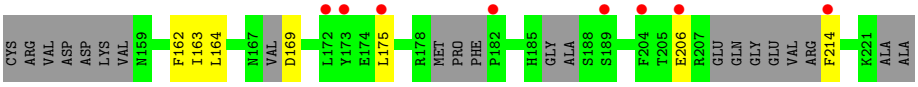




• Molecule 1: Ubiquitin carboxyl-terminal hydrolase isozyme L1

Chain J:





4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	101.93Å 144.41Å 158.25Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	62.50 – 2.24 62.50 – 2.24	Depositor EDS
% Data completeness (in resolution range)	56.3 (62.50-2.24) 56.3 (62.50-2.24)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.23 (at 2.25Å)	Xtriage
Refinement program	PHENIX 1.19.2_4158	Depositor
R, R_{free}	0.240 , 0.288 0.240 , 0.285	Depositor DCC
R_{free} test set	1633 reflections (2.57%)	wwPDB-VP
Wilson B-factor (Å^2)	46.3	Xtriage
Anisotropy	0.066	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	(Not available) , (Not available)	EDS
L-test for twinning[2]	$< \|L\| > = 0.51$, $< L^2 > = 0.34$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.92	EDS
Total number of atoms	16195	wwPDB-VP
Average B, all atoms (Å^2)	62.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.23% 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: JMF

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	0.25	0/1645	0.42	0/2219
1	B	0.26	0/1630	0.43	0/2212
1	C	0.25	0/1513	0.42	0/2051
1	D	0.26	0/1637	0.44	0/2217
1	E	0.25	0/1633	0.43	0/2212
1	F	0.26	0/1557	0.43	0/2109
1	G	0.27	0/1584	0.43	0/2146
1	H	0.25	0/1686	0.44	0/2274
1	I	0.28	0/1489	0.43	0/2016
1	J	0.25	0/1479	0.42	0/2000
All	All	0.26	0/15853	0.43	0/21456

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	1615	0	1568	15	0
1	B	1599	0	1498	13	0
1	C	1487	0	1383	18	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	D	1607	0	1529	18	0
1	E	1603	0	1500	13	0
1	F	1529	0	1450	12	0
1	G	1556	0	1467	14	0
1	H	1656	0	1610	11	0
1	I	1466	0	1327	22	0
1	J	1456	0	1337	12	0
2	A	29	0	0	0	0
2	B	29	0	0	0	0
2	C	29	0	0	0	0
2	D	29	0	0	0	0
2	E	29	0	0	0	0
2	F	29	0	0	0	0
2	G	29	0	0	0	0
2	H	29	0	0	0	0
2	I	29	0	0	0	0
2	J	29	0	0	0	0
3	A	47	0	0	1	0
3	B	24	0	0	0	0
3	C	24	0	0	2	0
3	D	30	0	0	0	0
3	E	23	0	0	1	0
3	F	38	0	0	3	0
3	G	32	0	0	1	0
3	H	54	0	0	1	0
3	I	30	0	0	2	0
3	J	29	0	0	1	0
All	All	16195	0	14669	138	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 5.

All (138) 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:F:208:GLU:CB	3:F:435:HOH:O	2.23	0.85
1:J:121:THR:HB	1:J:129:ARG:HG2	1.66	0.75
1:D:121:THR:HB	1:D:129:ARG:HG2	1.75	0.69
1:A:121:THR:HB	1:A:129:ARG:HG2	1.73	0.69
1:B:32:LEU:CB	3:F:428:HOH:O	2.44	0.65
1:F:121:THR:HB	1:F:129:ARG:HG2	1.78	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:85:THR:HG22	1:G:41:SER:HB3	1.78	0.64
1:A:85:THR:HG22	1:H:41:SER:HB3	1.80	0.63
1:H:121:THR:HB	1:H:129:ARG:HG2	1.81	0.63
1:B:176:ASP:HB3	1:B:179:MET:HE2	1.81	0.62
1:H:174:GLU:HB3	1:H:183:VAL:HB	1.83	0.60
1:B:34:LEU:O	1:B:202:ARG:NH1	2.36	0.59
1:I:90:CYS:SG	1:I:91:GLY:N	2.76	0.58
1:D:34:LEU:O	1:D:202:ARG:NH1	2.36	0.58
1:E:39:LEU:HD12	1:E:194:LEU:HB3	1.84	0.57
1:A:4:LYS:HE3	1:A:148:GLN:HE21	1.68	0.57
1:F:20:LEU:HB3	1:F:114:LEU:HB2	1.87	0.57
1:C:75:VAL:HG12	1:C:184:ASN:HB2	1.86	0.56
1:A:207:ARG:NH2	3:A:408:HOH:O	2.39	0.56
1:G:164:LEU:HD23	1:G:175:LEU:HD13	1.87	0.56
1:C:20:LEU:HB3	1:C:114:LEU:HB2	1.87	0.56
1:C:214:PHE:N	3:C:402:HOH:O	2.39	0.56
1:D:97:HIS:O	1:D:101:ASN:ND2	2.34	0.55
1:D:161:HIS:NE2	1:D:176:ASP:OD1	2.37	0.55
1:C:129:ARG:NH1	3:C:401:HOH:O	2.28	0.55
1:B:121:THR:HB	1:B:129:ARG:HG2	1.88	0.55
1:B:85:THR:HG22	1:E:41:SER:HB3	1.88	0.55
1:C:76:SER:HA	1:C:79:VAL:HB	1.89	0.54
1:G:83:LYS:HE3	1:G:126:PRO:HB2	1.89	0.54
1:B:20:LEU:HB3	1:B:114:LEU:HB2	1.90	0.54
1:B:55:LEU:HG	1:B:161:HIS:HB2	1.90	0.54
1:G:159:ASN:ND2	3:G:404:HOH:O	2.41	0.53
1:E:164:LEU:HD23	1:E:175:LEU:HD13	1.91	0.53
1:I:120:GLU:HG3	1:I:121:THR:HG23	1.91	0.53
1:J:96:ILE:HG23	1:J:114:LEU:HD11	1.91	0.52
1:I:164:LEU:HD23	1:I:175:LEU:HD12	1.91	0.52
1:C:76:SER:N	1:C:77:PRO:HD3	2.25	0.52
1:I:166:ASN:HD22	1:I:167:ASN:H	1.57	0.52
1:J:61:ASN:HA	1:J:64:LYS:HD3	1.92	0.52
1:J:164:LEU:HD23	1:J:175:LEU:HD12	1.91	0.52
1:C:99:VAL:HA	1:C:106:LEU:HD13	1.90	0.52
1:E:23:ALA:HB2	1:E:109:GLU:HG2	1.91	0.51
1:C:90:CYS:SG	1:C:91:GLY:N	2.84	0.51
1:C:85:THR:HG22	1:F:41:SER:HB3	1.92	0.51
1:C:173:TYR:HA	1:C:183:VAL:O	2.11	0.51
1:D:32:LEU:O	1:H:178:ARG:NH2	2.39	0.51
1:B:134:GLU:O	1:B:140:GLN:NE2	2.44	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:J:3:LEU:HG	1:J:86:ILE:HG21	1.93	0.50
1:F:3:LEU:HG	1:F:86:ILE:HG21	1.93	0.50
1:G:92:THR:HG1	1:G:143:HIS:HD1	1.59	0.50
1:E:0:SER:N	3:E:406:HOH:O	2.44	0.49
1:I:144:ASP:OD2	1:J:19:ARG:NH2	2.36	0.49
1:I:106:LEU:HD21	1:I:219:LEU:HD21	1.94	0.49
1:H:3:LEU:HG	1:H:86:ILE:HG21	1.93	0.49
1:I:46:ALA:HA	1:I:220:CYS:HB3	1.93	0.49
1:E:85:THR:HG23	1:I:41:SER:HB3	1.95	0.49
1:C:70:LEU:HD21	1:C:183:VAL:HG13	1.95	0.48
1:D:48:ALA:HB3	1:D:219:LEU:HB3	1.96	0.48
1:I:9:ASN:ND2	1:I:12:MET:HB2	2.28	0.48
1:C:189:SER:HB3	1:C:192:THR:HG22	1.96	0.48
1:D:86:ILE:HD11	1:D:134:GLU:HB3	1.94	0.47
1:C:23:ALA:HB2	1:C:109:GLU:HG2	1.96	0.47
1:G:90:CYS:SG	1:G:91:GLY:N	2.87	0.47
1:A:164:LEU:HD23	1:A:175:LEU:HD12	1.97	0.47
1:D:164:LEU:HD23	1:D:175:LEU:HD12	1.96	0.47
1:D:90:CYS:SG	1:D:91:GLY:N	2.88	0.47
1:F:86:ILE:HD11	1:F:134:GLU:HG2	1.97	0.47
1:I:48:ALA:HB1	1:I:164:LEU:HD11	1.96	0.47
1:B:164:LEU:HD23	1:B:175:LEU:HD13	1.96	0.47
1:H:24:GLY:O	1:H:27:ARG:NH1	2.40	0.46
1:A:41:SER:HB3	1:J:85:THR:HG22	1.96	0.46
1:I:20:LEU:HB3	1:I:114:LEU:HB2	1.98	0.45
1:I:23:ALA:HB2	1:I:109:GLU:HG2	1.97	0.45
1:E:83:LYS:HD2	1:E:127:GLU:HA	1.98	0.45
1:C:172:LEU:HB3	1:C:185:HIS:HB2	1.99	0.45
1:F:20:LEU:O	1:F:112:SER:OG	2.35	0.45
1:I:92:THR:O	1:I:96:ILE:HG12	2.17	0.45
1:D:89:SER:O	1:D:93:ILE:HG12	2.17	0.45
1:F:75:VAL:HG13	1:F:173:TYR:CE1	2.52	0.44
1:D:176:ASP:HB3	1:D:179:MET:HE2	1.99	0.44
1:D:20:LEU:HB3	1:D:114:LEU:HB2	2.00	0.44
1:D:55:LEU:HG	1:D:161:HIS:HB2	1.99	0.44
1:F:90:CYS:SG	1:F:91:GLY:N	2.90	0.44
1:A:179:MET:HA	1:A:179:MET:HE2	1.99	0.44
1:E:90:CYS:SG	1:E:91:GLY:N	2.91	0.44
1:A:82:MET:HE1	1:A:133:PHE:HB2	1.99	0.43
1:E:4:LYS:HG3	1:E:148:GLN:HE21	1.82	0.43
1:G:121:THR:HB	1:G:129:ARG:HG2	1.99	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:97:HIS:HB3	1:B:164:LEU:HD22	1.99	0.43
1:J:20:LEU:O	1:J:112:SER:OG	2.32	0.43
1:G:20:LEU:HB3	1:G:114:LEU:HB2	2.01	0.43
1:G:123:LYS:HD3	1:G:123:LYS:HA	1.85	0.43
1:J:214:PHE:N	3:J:405:HOH:O	2.51	0.43
1:A:180:PRO:HB3	1:H:37:GLU:HG3	2.01	0.43
1:C:166:ASN:O	1:C:173:TYR:N	2.52	0.43
1:E:97:HIS:HB3	1:E:164:LEU:HD22	2.01	0.43
1:I:12:MET:HG3	1:I:146:VAL:HG12	2.00	0.43
1:I:159:ASN:HA	3:I:413:HOH:O	2.17	0.43
1:C:3:LEU:HG	1:C:86:ILE:HG21	2.00	0.43
1:G:48:ALA:HB1	1:G:164:LEU:HD11	2.01	0.42
1:H:35:GLU:HB2	3:H:401:HOH:O	2.19	0.42
1:B:23:ALA:HB2	1:B:109:GLU:HG2	2.00	0.42
1:D:166:ASN:HD22	1:D:167:ASN:H	1.67	0.42
1:I:19:ARG:NH1	3:I:403:HOH:O	2.41	0.42
1:I:76:SER:HB2	1:I:79:VAL:HG23	2.00	0.42
1:J:51:LEU:HD23	1:J:163:ILE:HD11	2.01	0.42
1:G:73:GLN:HG2	1:G:74:GLU:H	1.85	0.42
1:C:3:LEU:HB3	1:C:143:HIS:CD2	2.54	0.42
1:F:135:LYS:HB3	3:F:422:HOH:O	2.18	0.42
1:I:86:ILE:HD11	1:I:134:GLU:HG2	2.02	0.42
1:A:174:GLU:HB3	1:A:183:VAL:HB	2.01	0.42
1:D:121:THR:HG22	1:D:124:MET:HE1	2.02	0.42
1:G:73:GLN:HG2	1:G:74:GLU:N	2.35	0.42
1:I:20:LEU:O	1:I:112:SER:OG	2.32	0.42
1:H:90:CYS:SG	1:H:91:GLY:N	2.93	0.42
1:B:99:VAL:HA	1:B:106:LEU:HD12	2.02	0.41
1:F:176:ASP:HB3	1:F:179:MET:HE2	2.02	0.41
1:J:20:LEU:HB3	1:J:114:LEU:HB2	2.02	0.41
1:A:221:LYS:HE2	1:A:221:LYS:HB3	1.92	0.41
1:A:3:LEU:HD13	1:A:143:HIS:ND1	2.36	0.41
1:H:26:TRP:CE2	1:H:105:LYS:HB3	2.56	0.41
1:B:106:LEU:HD11	1:B:219:LEU:HD21	2.03	0.41
1:A:63:ARG:O	1:A:67:ILE:HG13	2.21	0.41
1:E:171:HIS:HA	1:E:187:ALA:HA	2.02	0.41
1:E:24:GLY:O	1:E:27:ARG:NH1	2.52	0.41
1:A:148:GLN:OE1	1:E:148:GLN:HB2	2.21	0.40
1:A:203:GLU:O	1:A:207:ARG:HG3	2.21	0.40
1:I:52:LEU:HB3	1:I:215:SER:HB2	2.03	0.40
1:I:96:ILE:HD12	1:I:114:LEU:HD13	2.04	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:29:VAL:HG21	1:C:43:PRO:HD2	2.02	0.40
1:D:5:PRO:O	1:D:147:ALA:HB1	2.22	0.40
1:I:205:THR:HG22	1:I:214:PHE:CG	2.57	0.40
1:J:90:CYS:SG	1:J:91:GLY:N	2.95	0.40
1:D:3:LEU:HD23	1:D:3:LEU:HA	1.84	0.40
1:F:58:GLN:HG3	1:F:59:HIS:N	2.36	0.40
1:G:80:TYR:OH	1:G:121:THR:OG1	2.26	0.40
1:G:198:ALA:O	1:G:202:ARG:HG3	2.21	0.40
1:H:203:GLU:O	1:H:207:ARG:HG3	2.22	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	207/227 (91%)	206 (100%)	1 (0%)	0	100	100
1	B	215/227 (95%)	208 (97%)	7 (3%)	0	100	100
1	C	194/227 (86%)	189 (97%)	5 (3%)	0	100	100
1	D	213/227 (94%)	210 (99%)	3 (1%)	0	100	100
1	E	214/227 (94%)	210 (98%)	4 (2%)	0	100	100
1	F	200/227 (88%)	198 (99%)	2 (1%)	0	100	100
1	G	206/227 (91%)	202 (98%)	4 (2%)	0	100	100
1	H	216/227 (95%)	211 (98%)	5 (2%)	0	100	100
1	I	194/227 (86%)	192 (99%)	2 (1%)	0	100	100
1	J	186/227 (82%)	183 (98%)	3 (2%)	0	100	100
All	All	2045/2270 (90%)	2009 (98%)	36 (2%)	0	100	100

There are no Ramachandran outliers to report.

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	168/190 (88%)	167 (99%)	1 (1%)	86	90
1	B	157/190 (83%)	155 (99%)	2 (1%)	69	76
1	C	144/190 (76%)	140 (97%)	4 (3%)	43	49
1	D	160/190 (84%)	158 (99%)	2 (1%)	69	76
1	E	156/190 (82%)	155 (99%)	1 (1%)	86	90
1	F	152/190 (80%)	149 (98%)	3 (2%)	55	62
1	G	154/190 (81%)	153 (99%)	1 (1%)	86	90
1	H	169/190 (89%)	167 (99%)	2 (1%)	71	78
1	I	136/190 (72%)	130 (96%)	6 (4%)	28	30
1	J	141/190 (74%)	138 (98%)	3 (2%)	53	60
All	All	1537/1900 (81%)	1512 (98%)	25 (2%)	62	70

All (25) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	169	ASP
1	B	2	GLN
1	B	125	SER
1	C	62	PHE
1	C	70	LEU
1	C	128	ASP
1	C	202	ARG
1	D	166	ASN
1	D	169	ASP
1	E	213	ARG
1	F	58	GLN
1	F	62	PHE
1	F	104	ASP
1	G	125	SER
1	H	151	GLN
1	H	169	ASP

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Mol	Chain	Res	Type
1	I	70	LEU
1	I	103	GLN
1	I	105	LYS
1	I	128	ASP
1	I	166	ASN
1	I	207	ARG
1	J	162	PHE
1	J	169	ASP
1	J	206	GLU

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

Mol	Chain	Res	Type
1	G	148	GLN
1	I	102	ASN
1	I	166	ASN
1	J	84	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)

10 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	JMF	G	301	1	28,31,31	5.45	19 (67%)	34,41,41	2.34	6 (17%)
2	JMF	E	301	1	28,31,31	5.47	19 (67%)	34,41,41	2.05	6 (17%)
2	JMF	A	301	1	28,31,31	5.53	19 (67%)	34,41,41	1.80	6 (17%)
2	JMF	B	301	1	28,31,31	5.46	19 (67%)	34,41,41	1.93	5 (14%)
2	JMF	D	301	1	28,31,31	5.45	19 (67%)	34,41,41	2.20	6 (17%)
2	JMF	H	301	1	28,31,31	5.45	19 (67%)	34,41,41	2.12	5 (14%)
2	JMF	J	301	1	28,31,31	5.49	19 (67%)	34,41,41	2.06	5 (14%)
2	JMF	C	301	1	28,31,31	5.47	19 (67%)	34,41,41	2.12	6 (17%)
2	JMF	F	301	1	28,31,31	5.49	19 (67%)	34,41,41	2.12	5 (14%)
2	JMF	I	301	1	28,31,31	5.45	19 (67%)	34,41,41	2.36	6 (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
2	JMF	G	301	1	-	6/19/33/33	0/3/3/3
2	JMF	E	301	1	-	5/19/33/33	0/3/3/3
2	JMF	A	301	1	-	5/19/33/33	0/3/3/3
2	JMF	B	301	1	-	5/19/33/33	0/3/3/3
2	JMF	D	301	1	-	9/19/33/33	0/3/3/3
2	JMF	H	301	1	-	5/19/33/33	0/3/3/3
2	JMF	J	301	1	-	10/19/33/33	0/3/3/3
2	JMF	C	301	1	-	5/19/33/33	0/3/3/3
2	JMF	F	301	1	-	6/19/33/33	0/3/3/3
2	JMF	I	301	1	-	6/19/33/33	0/3/3/3

All (190) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	301	JMF	C06-C05	10.52	1.57	1.38
2	J	301	JMF	C06-C05	10.51	1.57	1.38
2	F	301	JMF	C06-C05	10.46	1.57	1.38
2	C	301	JMF	C06-C05	10.46	1.57	1.38

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	H	301	JMF	C06-C05	10.43	1.57	1.38
2	D	301	JMF	C06-C05	10.43	1.57	1.38
2	B	301	JMF	C06-C05	10.42	1.57	1.38
2	E	301	JMF	C06-C05	10.38	1.57	1.38
2	G	301	JMF	C06-C05	10.38	1.57	1.38
2	I	301	JMF	C06-C05	10.37	1.57	1.38
2	A	301	JMF	C26-N25	-9.48	1.31	1.47
2	C	301	JMF	C02-C01	9.27	1.55	1.39
2	G	301	JMF	C02-C01	9.26	1.55	1.39
2	J	301	JMF	C02-C01	9.26	1.55	1.39
2	I	301	JMF	C02-C01	9.26	1.55	1.39
2	E	301	JMF	C02-C01	9.25	1.55	1.39
2	B	301	JMF	C02-C01	9.22	1.55	1.39
2	A	301	JMF	C02-C01	9.21	1.55	1.39
2	F	301	JMF	C02-C01	9.19	1.55	1.39
2	D	301	JMF	C02-C01	9.18	1.55	1.39
2	H	301	JMF	C02-C01	9.17	1.55	1.39
2	J	301	JMF	C26-N25	-9.10	1.32	1.47
2	F	301	JMF	C26-N25	-9.08	1.32	1.47
2	G	301	JMF	C03-C04	8.98	1.56	1.38
2	B	301	JMF	C03-C04	8.97	1.56	1.38
2	J	301	JMF	C03-C04	8.97	1.56	1.38
2	D	301	JMF	C26-N25	-8.95	1.32	1.47
2	C	301	JMF	C03-C04	8.93	1.56	1.38
2	F	301	JMF	C03-C04	8.93	1.56	1.38
2	A	301	JMF	C03-C04	8.92	1.56	1.38
2	I	301	JMF	C03-C04	8.92	1.56	1.38
2	A	301	JMF	C03-C02	8.92	1.55	1.38
2	E	301	JMF	C03-C02	8.91	1.55	1.38
2	G	301	JMF	C03-C02	8.91	1.55	1.38
2	E	301	JMF	C03-C04	8.90	1.56	1.38
2	A	301	JMF	C23-C24	-8.89	1.35	1.52
2	D	301	JMF	C03-C04	8.89	1.56	1.38
2	B	301	JMF	C26-N25	-8.89	1.32	1.47
2	J	301	JMF	C03-C02	8.89	1.54	1.38
2	F	301	JMF	C03-C02	8.88	1.54	1.38
2	I	301	JMF	C03-C02	8.87	1.54	1.38
2	B	301	JMF	C03-C02	8.87	1.54	1.38
2	H	301	JMF	C26-N25	-8.86	1.32	1.47
2	C	301	JMF	C03-C02	8.85	1.54	1.38
2	D	301	JMF	C03-C02	8.85	1.54	1.38
2	H	301	JMF	C03-C04	8.83	1.55	1.38

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	H	301	JMF	C03-C02	8.80	1.54	1.38
2	C	301	JMF	C26-N25	-8.76	1.32	1.47
2	G	301	JMF	C26-N25	-8.71	1.32	1.47
2	I	301	JMF	C26-N25	-8.70	1.32	1.47
2	E	301	JMF	C26-N25	-8.66	1.32	1.47
2	J	301	JMF	C23-C24	-8.43	1.36	1.52
2	E	301	JMF	C23-C24	-8.40	1.36	1.52
2	F	301	JMF	C23-C24	-8.40	1.36	1.52
2	B	301	JMF	C23-C24	-8.38	1.36	1.52
2	C	301	JMF	C23-C24	-8.25	1.36	1.52
2	D	301	JMF	C23-C24	-8.18	1.36	1.52
2	H	301	JMF	C23-C24	-8.11	1.37	1.52
2	C	301	JMF	C06-C01	7.99	1.53	1.39
2	G	301	JMF	C06-C01	7.95	1.52	1.39
2	F	301	JMF	C06-C01	7.95	1.52	1.39
2	A	301	JMF	C06-C01	7.93	1.52	1.39
2	I	301	JMF	C23-C24	-7.93	1.37	1.52
2	E	301	JMF	C06-C01	7.92	1.52	1.39
2	J	301	JMF	C06-C01	7.92	1.52	1.39
2	H	301	JMF	C06-C01	7.91	1.52	1.39
2	D	301	JMF	C06-C01	7.90	1.52	1.39
2	I	301	JMF	C06-C01	7.90	1.52	1.39
2	B	301	JMF	C06-C01	7.88	1.52	1.39
2	G	301	JMF	C23-C24	-7.69	1.37	1.52
2	J	301	JMF	C05-C04	6.79	1.51	1.38
2	F	301	JMF	C05-C04	6.79	1.51	1.38
2	C	301	JMF	C05-C04	6.77	1.51	1.38
2	H	301	JMF	C05-C04	6.77	1.51	1.38
2	E	301	JMF	C05-C04	6.76	1.51	1.38
2	D	301	JMF	C05-C04	6.76	1.51	1.38
2	G	301	JMF	C05-C04	6.74	1.51	1.38
2	A	301	JMF	C05-C04	6.73	1.51	1.38
2	I	301	JMF	C05-C04	6.70	1.51	1.38
2	B	301	JMF	C05-C04	6.66	1.51	1.38
2	H	301	JMF	C15-N07	-6.47	1.32	1.39
2	I	301	JMF	C15-N07	-6.44	1.32	1.39
2	G	301	JMF	C24-N25	6.44	1.65	1.47
2	E	301	JMF	C08-N09	6.41	1.47	1.33
2	G	301	JMF	C08-N09	6.39	1.47	1.33
2	I	301	JMF	C24-N25	6.39	1.65	1.47
2	B	301	JMF	C08-N09	6.39	1.47	1.33
2	F	301	JMF	C08-N09	6.38	1.47	1.33

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	J	301	JMF	C08-N09	6.37	1.47	1.33
2	D	301	JMF	C15-N07	-6.36	1.32	1.39
2	C	301	JMF	C08-N09	6.35	1.47	1.33
2	I	301	JMF	C08-N09	6.35	1.47	1.33
2	A	301	JMF	C08-N09	6.34	1.47	1.33
2	C	301	JMF	C24-N25	6.33	1.64	1.47
2	D	301	JMF	C08-N09	6.32	1.47	1.33
2	G	301	JMF	C15-N07	-6.29	1.32	1.39
2	H	301	JMF	C08-N09	6.28	1.47	1.33
2	E	301	JMF	C24-N25	6.27	1.64	1.47
2	B	301	JMF	C24-N25	6.26	1.64	1.47
2	H	301	JMF	C24-N25	6.26	1.64	1.47
2	F	301	JMF	C15-N07	-6.25	1.32	1.39
2	C	301	JMF	C15-N07	-6.24	1.32	1.39
2	B	301	JMF	C15-N07	-6.24	1.32	1.39
2	E	301	JMF	C15-N07	-6.22	1.32	1.39
2	J	301	JMF	C15-N07	-6.19	1.32	1.39
2	D	301	JMF	C24-N25	6.10	1.64	1.47
2	A	301	JMF	C15-N07	-6.08	1.32	1.39
2	F	301	JMF	C24-N25	6.05	1.64	1.47
2	J	301	JMF	C24-N25	6.04	1.64	1.47
2	A	301	JMF	C24-N25	5.86	1.63	1.47
2	A	301	JMF	C20-N19	5.03	1.47	1.35
2	F	301	JMF	C20-N19	5.01	1.46	1.35
2	E	301	JMF	C20-N19	5.00	1.46	1.35
2	H	301	JMF	C20-N19	4.97	1.46	1.35
2	G	301	JMF	C20-N19	4.95	1.46	1.35
2	C	301	JMF	C20-N19	4.94	1.46	1.35
2	D	301	JMF	C20-N19	4.93	1.46	1.35
2	J	301	JMF	C20-N19	4.92	1.46	1.35
2	I	301	JMF	C20-N19	4.89	1.46	1.35
2	B	301	JMF	C20-N19	4.89	1.46	1.35
2	A	301	JMF	O22-C20	-3.81	1.15	1.23
2	H	301	JMF	O22-C20	-3.78	1.15	1.23
2	C	301	JMF	O22-C20	-3.77	1.15	1.23
2	F	301	JMF	C16-N19	3.77	1.48	1.40
2	A	301	JMF	C16-N19	3.77	1.48	1.40
2	E	301	JMF	O22-C20	-3.75	1.15	1.23
2	F	301	JMF	O22-C20	-3.75	1.15	1.23
2	B	301	JMF	O22-C20	-3.74	1.16	1.23
2	E	301	JMF	C16-N19	3.73	1.48	1.40
2	G	301	JMF	C16-N19	3.72	1.48	1.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	I	301	JMF	O22-C20	-3.72	1.16	1.23
2	C	301	JMF	C16-N19	3.72	1.48	1.40
2	D	301	JMF	O22-C20	-3.72	1.16	1.23
2	J	301	JMF	C16-N19	3.72	1.48	1.40
2	G	301	JMF	O22-C20	-3.72	1.16	1.23
2	I	301	JMF	C16-N19	3.71	1.48	1.40
2	I	301	JMF	O10-C08	-3.68	1.15	1.23
2	D	301	JMF	C16-N19	3.68	1.48	1.40
2	H	301	JMF	C16-N19	3.67	1.48	1.40
2	A	301	JMF	O10-C08	-3.66	1.15	1.23
2	J	301	JMF	O22-C20	-3.65	1.16	1.23
2	J	301	JMF	O10-C08	-3.64	1.15	1.23
2	G	301	JMF	O10-C08	-3.64	1.15	1.23
2	F	301	JMF	O10-C08	-3.64	1.15	1.23
2	H	301	JMF	O10-C08	-3.63	1.15	1.23
2	C	301	JMF	O10-C08	-3.63	1.15	1.23
2	B	301	JMF	O10-C08	-3.63	1.15	1.23
2	D	301	JMF	O10-C08	-3.60	1.16	1.23
2	B	301	JMF	C16-N19	3.58	1.48	1.40
2	E	301	JMF	O10-C08	-3.58	1.16	1.23
2	J	301	JMF	C13-C14	2.99	1.54	1.47
2	F	301	JMF	C13-C14	2.98	1.54	1.47
2	A	301	JMF	C13-C14	2.97	1.54	1.47
2	H	301	JMF	C13-C14	2.96	1.54	1.47
2	E	301	JMF	C13-C14	2.96	1.54	1.47
2	C	301	JMF	C13-C14	2.95	1.54	1.47
2	G	301	JMF	C13-C14	2.95	1.54	1.47
2	D	301	JMF	C13-C14	2.95	1.54	1.47
2	B	301	JMF	C13-C14	2.94	1.54	1.47
2	I	301	JMF	C13-C14	2.93	1.54	1.47
2	G	301	JMF	C27-N25	2.84	1.44	1.33
2	C	301	JMF	C27-N25	2.80	1.43	1.33
2	I	301	JMF	C27-N25	2.79	1.43	1.33
2	H	301	JMF	C27-N25	2.77	1.43	1.33
2	E	301	JMF	C27-N25	2.76	1.43	1.33
2	D	301	JMF	C27-N25	2.68	1.43	1.33
2	J	301	JMF	C27-N25	2.66	1.43	1.33
2	B	301	JMF	C27-N25	2.65	1.43	1.33
2	F	301	JMF	C27-N25	2.65	1.43	1.33
2	A	301	JMF	C04-N07	2.63	1.50	1.45
2	F	301	JMF	C04-N07	2.62	1.50	1.45
2	C	301	JMF	C04-N07	2.58	1.49	1.45

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	301	JMF	C27-N25	2.57	1.43	1.33
2	G	301	JMF	C04-N07	2.56	1.49	1.45
2	C	301	JMF	C21-C20	-2.50	1.47	1.51
2	D	301	JMF	C21-C20	-2.49	1.47	1.51
2	J	301	JMF	C04-N07	2.49	1.49	1.45
2	D	301	JMF	C04-N07	2.48	1.49	1.45
2	B	301	JMF	C04-N07	2.48	1.49	1.45
2	E	301	JMF	C04-N07	2.46	1.49	1.45
2	H	301	JMF	C21-C20	-2.45	1.47	1.51
2	I	301	JMF	C04-N07	2.45	1.49	1.45
2	F	301	JMF	C21-C20	-2.43	1.47	1.51
2	I	301	JMF	C21-C20	-2.41	1.47	1.51
2	B	301	JMF	C21-C20	-2.40	1.47	1.51
2	H	301	JMF	C04-N07	2.40	1.49	1.45
2	G	301	JMF	C21-C20	-2.38	1.47	1.51
2	J	301	JMF	C21-C20	-2.36	1.47	1.51
2	E	301	JMF	C21-C20	-2.35	1.47	1.51
2	A	301	JMF	C21-C20	-2.27	1.47	1.51

All (56) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	I	301	JMF	C24-N25-C27	9.62	130.47	123.90
2	G	301	JMF	C24-N25-C27	9.04	130.08	123.90
2	D	301	JMF	C24-N25-C27	8.31	129.57	123.90
2	C	301	JMF	C24-N25-C27	7.89	129.29	123.90
2	H	301	JMF	C24-N25-C27	7.83	129.24	123.90
2	E	301	JMF	C24-N25-C27	7.67	129.14	123.90
2	F	301	JMF	C24-N25-C27	7.58	129.08	123.90
2	J	301	JMF	C24-N25-C27	7.33	128.90	123.90
2	G	301	JMF	C24-N25-C26	-7.05	105.83	111.64
2	I	301	JMF	C24-N25-C26	-6.72	106.11	111.64
2	F	301	JMF	C24-N25-C26	-6.43	106.34	111.64
2	D	301	JMF	C24-N25-C26	-6.20	106.53	111.64
2	C	301	JMF	C24-N25-C26	-6.19	106.54	111.64
2	H	301	JMF	C24-N25-C26	-6.18	106.55	111.64
2	B	301	JMF	C24-N25-C27	6.17	128.11	123.90
2	J	301	JMF	C24-N25-C26	-5.88	106.80	111.64
2	B	301	JMF	C24-N25-C26	-5.85	106.82	111.64
2	E	301	JMF	C24-N25-C26	-5.63	107.00	111.64
2	A	301	JMF	C24-N25-C26	-5.17	107.38	111.64
2	A	301	JMF	C24-N25-C27	4.93	127.26	123.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	301	JMF	C23-C24-N25	3.59	107.53	103.28
2	G	301	JMF	C23-C24-N25	3.31	107.19	103.28
2	B	301	JMF	N25-C27-N29	-3.24	119.05	122.88
2	F	301	JMF	C23-C24-N25	3.23	107.10	103.28
2	J	301	JMF	C23-C24-N25	3.23	107.10	103.28
2	H	301	JMF	C23-C24-N25	3.23	107.09	103.28
2	J	301	JMF	N25-C27-N29	-3.16	119.15	122.88
2	C	301	JMF	C23-C24-N25	3.08	106.92	103.28
2	B	301	JMF	C16-N19-C20	-3.07	123.19	127.55
2	J	301	JMF	C16-N19-C20	-3.01	123.28	127.55
2	D	301	JMF	C16-N19-C20	-3.01	123.28	127.55
2	B	301	JMF	C23-C24-N25	3.00	106.83	103.28
2	D	301	JMF	C23-C24-N25	3.00	106.82	103.28
2	H	301	JMF	C16-N19-C20	-2.96	123.35	127.55
2	D	301	JMF	N25-C27-N29	-2.95	119.40	122.88
2	C	301	JMF	C16-N19-C20	-2.93	123.39	127.55
2	G	301	JMF	C16-N19-C20	-2.90	123.43	127.55
2	F	301	JMF	C16-N19-C20	-2.82	123.54	127.55
2	H	301	JMF	N25-C27-N29	-2.79	119.58	122.88
2	A	301	JMF	C16-N19-C20	-2.79	123.59	127.55
2	I	301	JMF	C16-N19-C20	-2.77	123.62	127.55
2	E	301	JMF	C16-N19-C20	-2.75	123.65	127.55
2	F	301	JMF	N25-C27-N29	-2.74	119.65	122.88
2	A	301	JMF	N25-C27-N29	-2.70	119.69	122.88
2	E	301	JMF	C23-C24-N25	2.62	106.37	103.28
2	E	301	JMF	N25-C27-N29	-2.60	119.81	122.88
2	G	301	JMF	N25-C27-N29	-2.54	119.88	122.88
2	I	301	JMF	C24-C23-C21	-2.52	101.73	105.83
2	I	301	JMF	N25-C27-N29	-2.39	120.06	122.88
2	I	301	JMF	C23-C24-N25	2.30	106.00	103.28
2	E	301	JMF	C21-C26-N25	2.14	105.44	102.82
2	A	301	JMF	C26-N25-C27	2.13	125.36	123.90
2	G	301	JMF	C21-C20-N19	2.06	118.04	115.02
2	D	301	JMF	C24-C23-C21	-2.06	102.48	105.83
2	C	301	JMF	C21-C26-N25	2.05	105.33	102.82
2	C	301	JMF	N25-C27-N29	-2.00	120.51	122.88

There are no chirality outliers.

All (62) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	D	301	JMF	C03-C04-N07-C15

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Mol	Chain	Res	Type	Atoms
2	D	301	JMF	C03-C04-N07-C18
2	D	301	JMF	C05-C04-N07-C15
2	D	301	JMF	C05-C04-N07-C18
2	J	301	JMF	C03-C04-N07-C15
2	J	301	JMF	C03-C04-N07-C18
2	J	301	JMF	C05-C04-N07-C15
2	J	301	JMF	C05-C04-N07-C18
2	H	301	JMF	N09-C11-C12-C13
2	B	301	JMF	C11-C12-C13-C14
2	C	301	JMF	C11-C12-C13-C14
2	G	301	JMF	C11-C12-C13-C14
2	I	301	JMF	C11-C12-C13-C14
2	I	301	JMF	N09-C11-C12-C13
2	G	301	JMF	N09-C11-C12-C13
2	A	301	JMF	C11-C12-C13-C14
2	F	301	JMF	C11-C12-C13-C14
2	B	301	JMF	O22-C20-C21-C26
2	C	301	JMF	N19-C20-C21-C26
2	C	301	JMF	O22-C20-C21-C26
2	G	301	JMF	O22-C20-C21-C26
2	J	301	JMF	N09-C11-C12-C13
2	A	301	JMF	O22-C20-C21-C23
2	B	301	JMF	O22-C20-C21-C23
2	D	301	JMF	N19-C20-C21-C23
2	D	301	JMF	O22-C20-C21-C23
2	E	301	JMF	O22-C20-C21-C23
2	F	301	JMF	O22-C20-C21-C23
2	I	301	JMF	O22-C20-C21-C23
2	J	301	JMF	O22-C20-C21-C23
2	F	301	JMF	N09-C11-C12-C13
2	H	301	JMF	C11-C12-C13-C14
2	J	301	JMF	C11-C12-C13-C14
2	D	301	JMF	N09-C11-C12-C13
2	E	301	JMF	N09-C11-C12-C13
2	A	301	JMF	N19-C20-C21-C26
2	A	301	JMF	O22-C20-C21-C26
2	B	301	JMF	N19-C20-C21-C26
2	D	301	JMF	N19-C20-C21-C26
2	D	301	JMF	O22-C20-C21-C26
2	E	301	JMF	N19-C20-C21-C26
2	E	301	JMF	O22-C20-C21-C26
2	F	301	JMF	N19-C20-C21-C26

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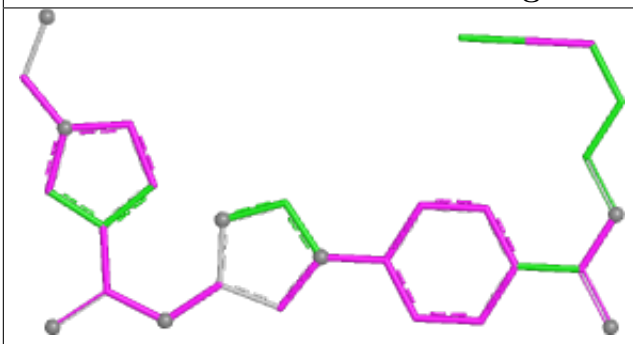
Mol	Chain	Res	Type	Atoms
2	F	301	JMF	O22-C20-C21-C26
2	G	301	JMF	N19-C20-C21-C26
2	H	301	JMF	O22-C20-C21-C26
2	I	301	JMF	N19-C20-C21-C26
2	I	301	JMF	O22-C20-C21-C26
2	J	301	JMF	N19-C20-C21-C26
2	J	301	JMF	O22-C20-C21-C26
2	A	301	JMF	N19-C20-C21-C23
2	B	301	JMF	N19-C20-C21-C23
2	C	301	JMF	N19-C20-C21-C23
2	C	301	JMF	O22-C20-C21-C23
2	E	301	JMF	N19-C20-C21-C23
2	F	301	JMF	N19-C20-C21-C23
2	G	301	JMF	N19-C20-C21-C23
2	G	301	JMF	O22-C20-C21-C23
2	H	301	JMF	N19-C20-C21-C23
2	H	301	JMF	O22-C20-C21-C23
2	I	301	JMF	N19-C20-C21-C23
2	J	301	JMF	N19-C20-C21-C23

There are no ring outliers.

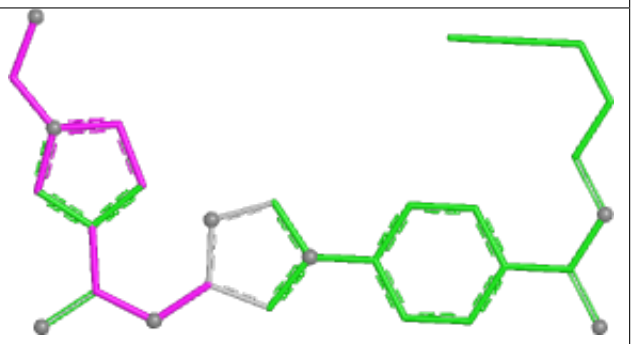
No monomer is involved in short contacts.

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

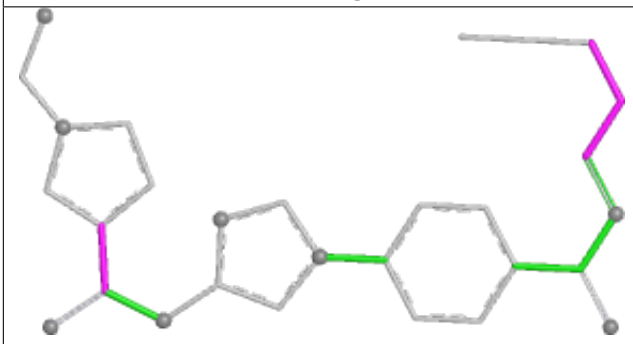
Ligand JMF G 301



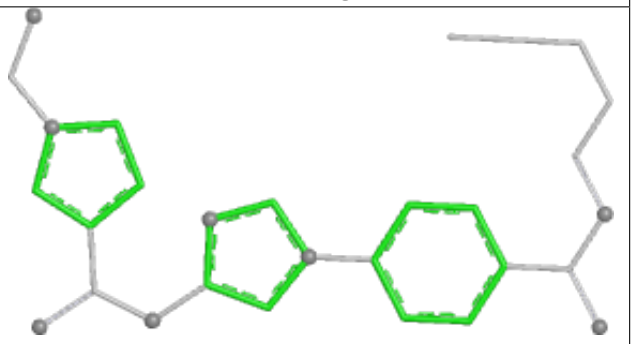
Bond lengths



Bond angles



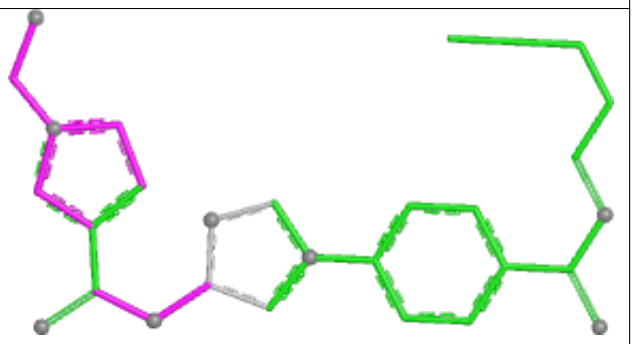
Torsions



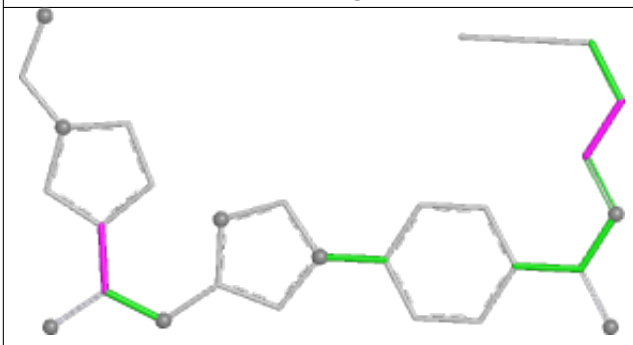
Rings

Ligand JMF E 301

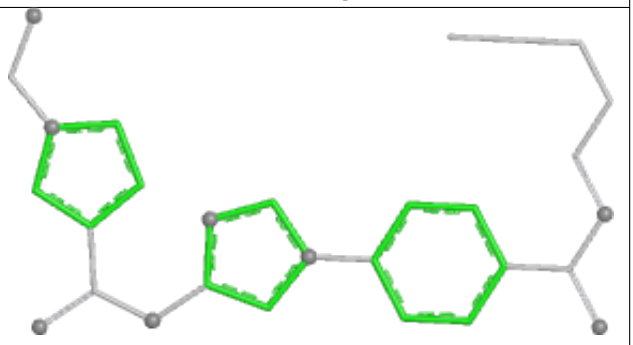
Bond lengths



Bond angles

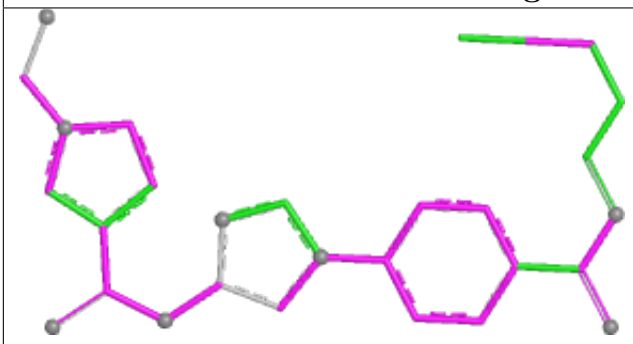


Torsions

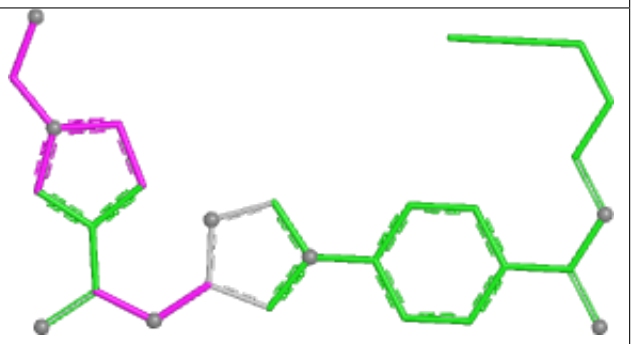


Rings

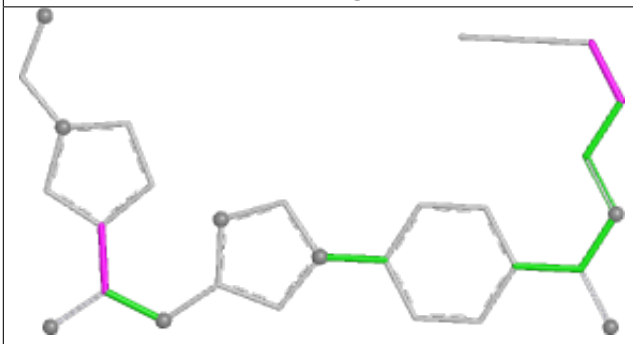
Ligand JMF A 301



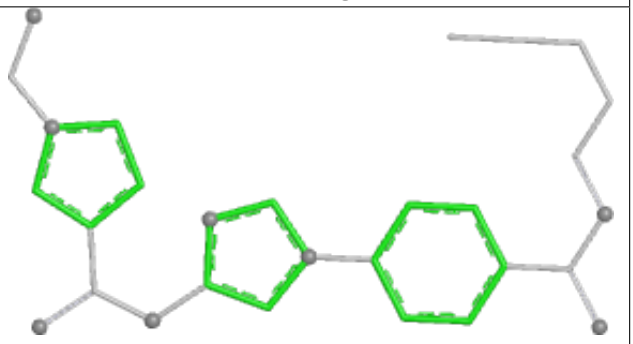
Bond lengths



Bond angles



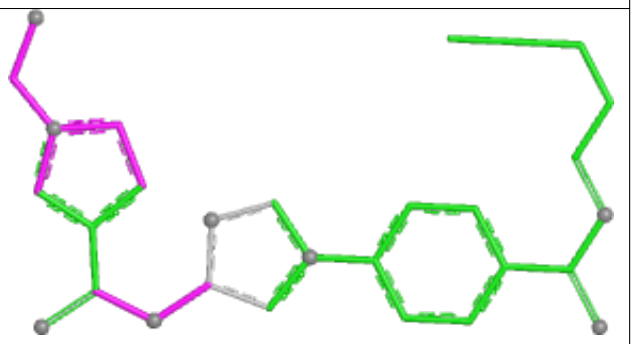
Torsions



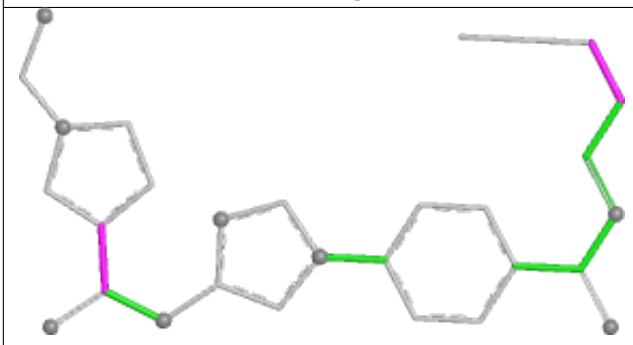
Rings

Ligand JMF B 301

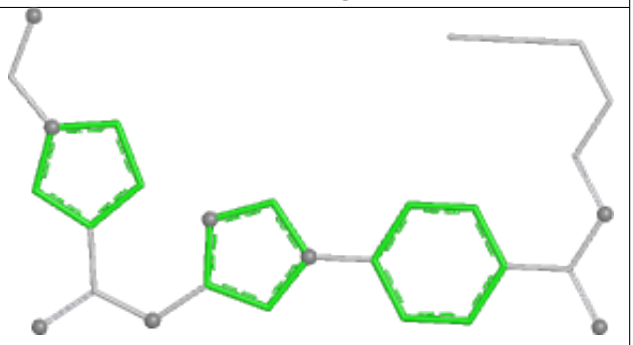
Bond lengths



Bond angles

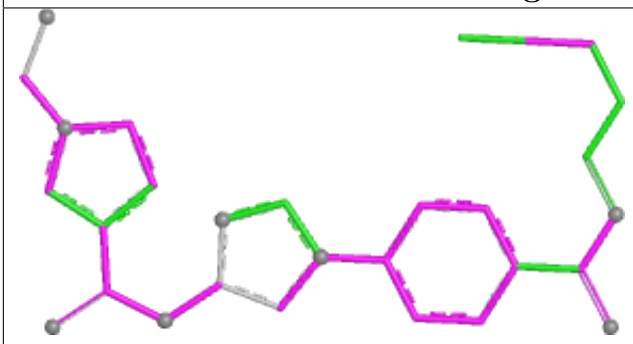


Torsions

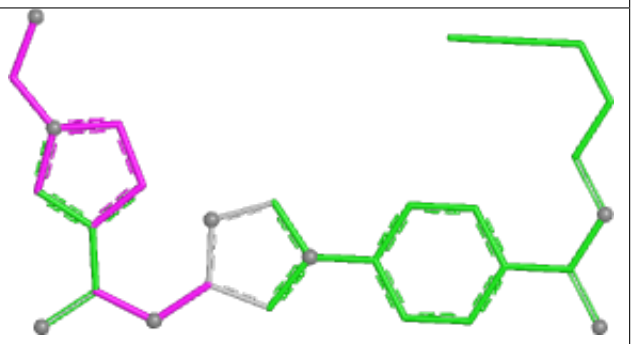


Rings

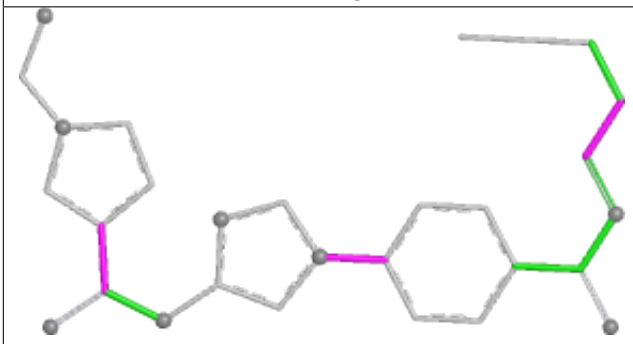
Ligand JMF D 301



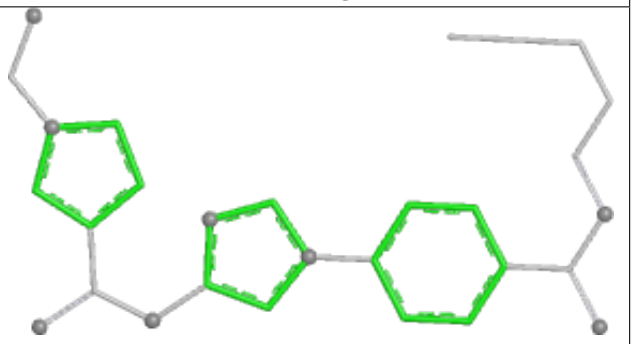
Bond lengths



Bond angles



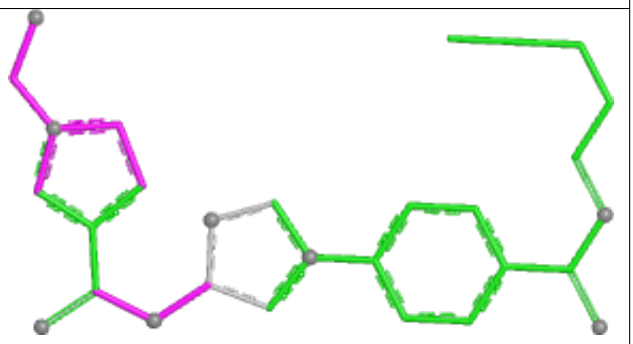
Torsions



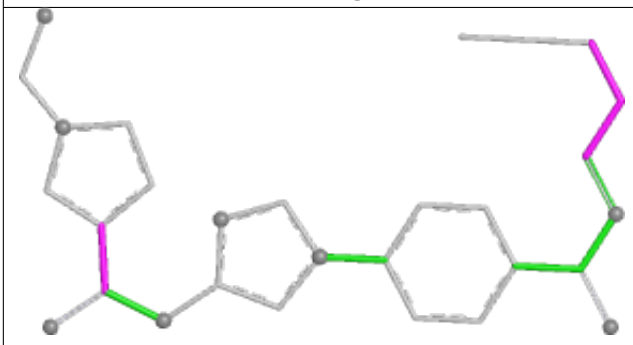
Rings

Ligand JMF H 301

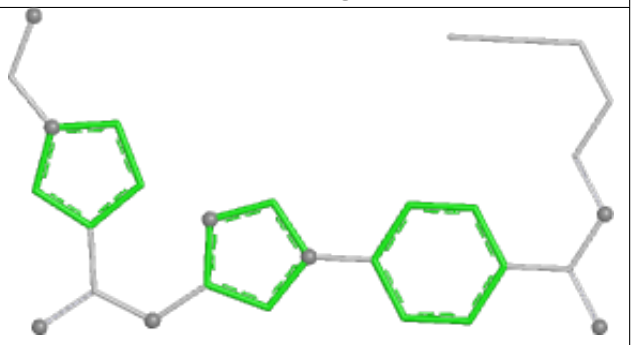
Bond lengths



Bond angles

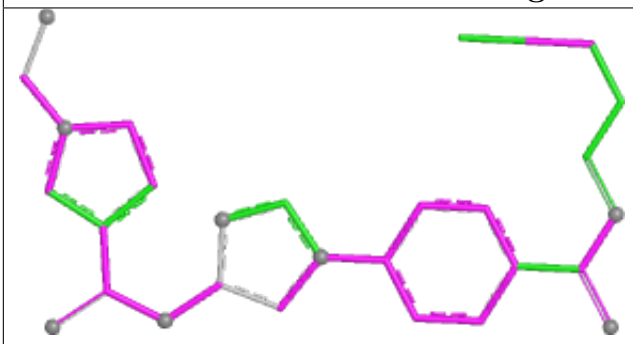


Torsions

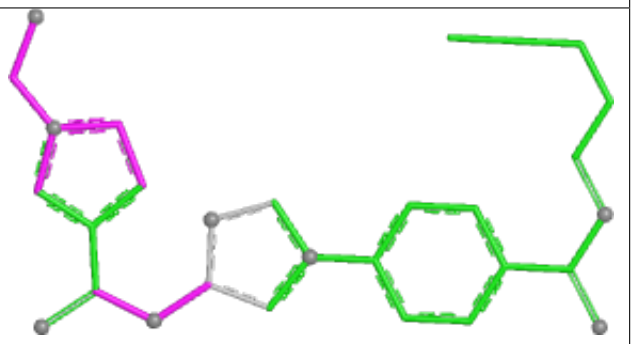


Rings

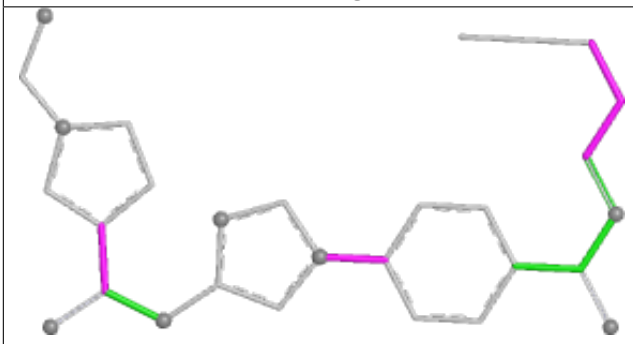
Ligand JMF J 301



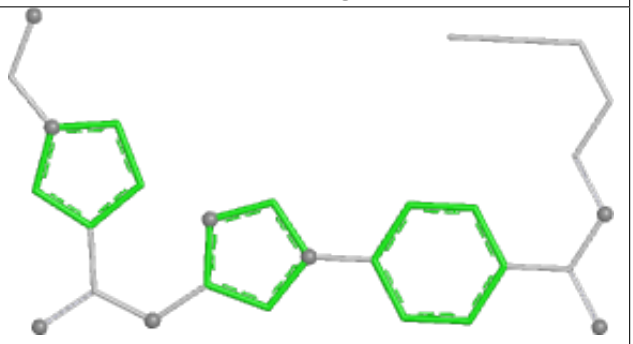
Bond lengths



Bond angles



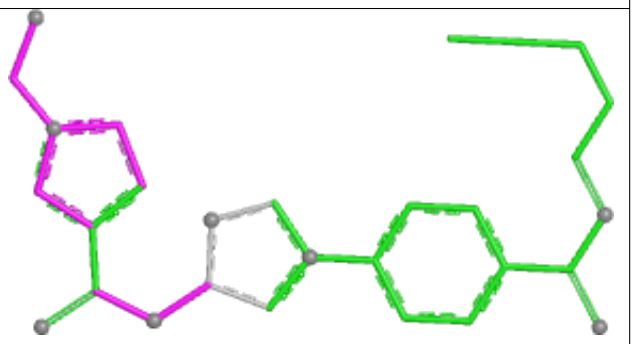
Torsions



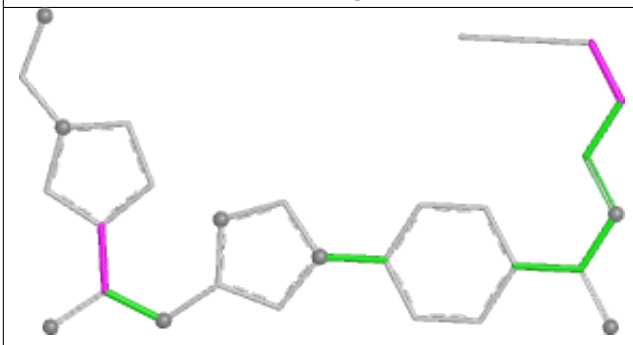
Rings

Ligand JMF C 301

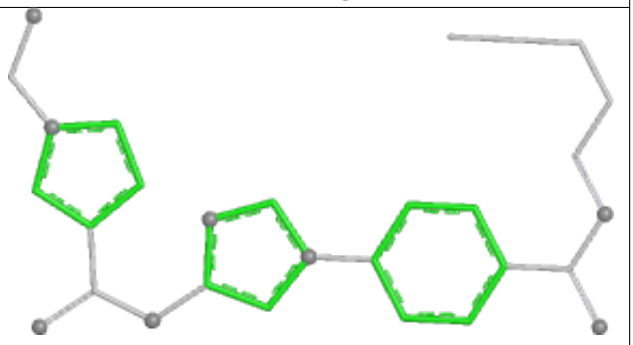
Bond lengths



Bond angles

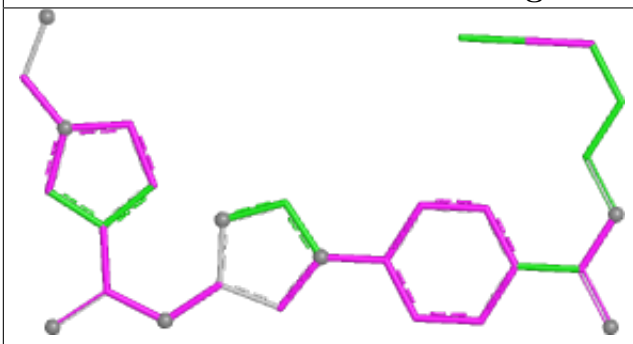


Torsions

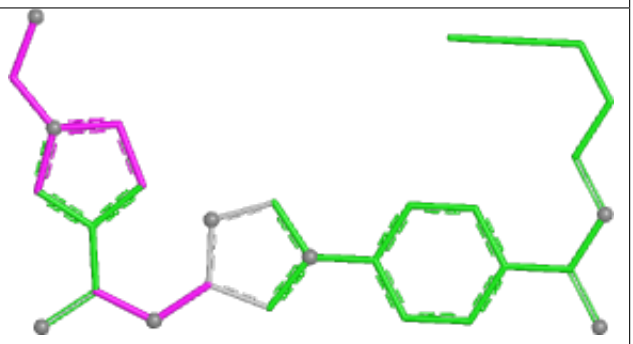


Rings

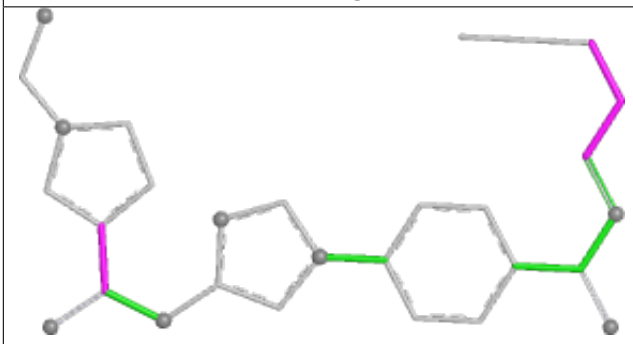
Ligand JMF F 301



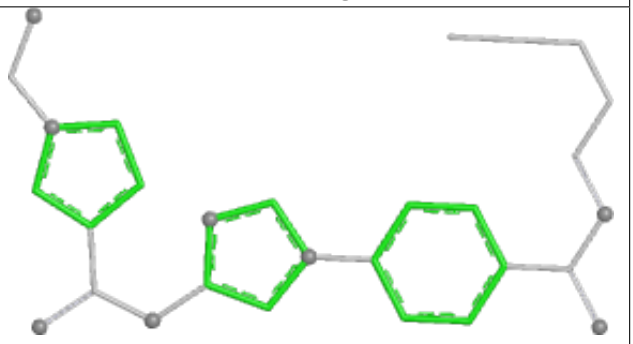
Bond lengths



Bond angles



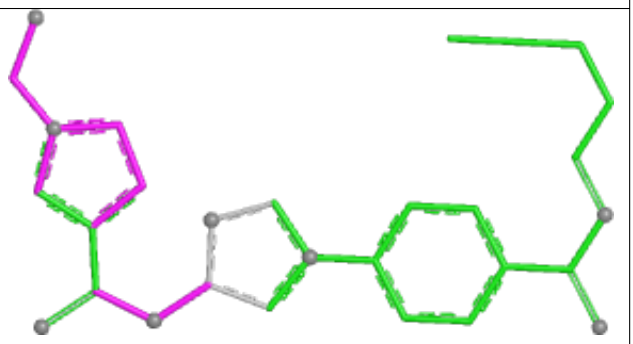
Torsions



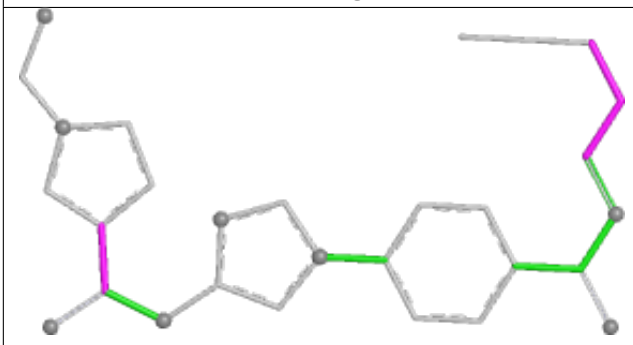
Rings

Ligand JMF I 301

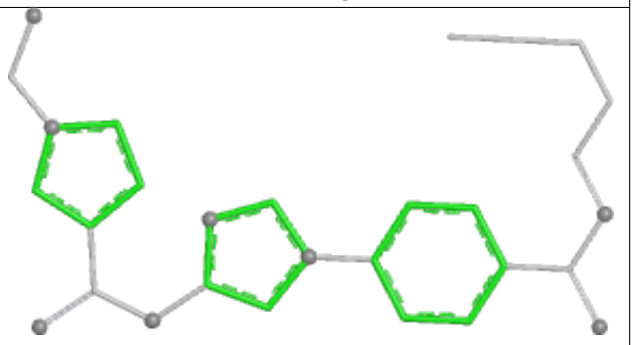
Bond lengths



Bond angles



Torsions



Rings

5.7 Other polymers

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	213/227 (93%)	-0.05	0 100 100	25, 47, 89, 100	0
1	B	219/227 (96%)	0.16	9 (4%) 37 37	27, 56, 89, 102	0
1	C	204/227 (89%)	0.49	15 (7%) 14 14	27, 68, 111, 124	0
1	D	217/227 (95%)	0.16	6 (2%) 53 53	24, 59, 85, 101	0
1	E	218/227 (96%)	0.23	3 (1%) 75 76	32, 64, 96, 115	0
1	F	208/227 (91%)	0.30	12 (5%) 23 22	30, 66, 95, 105	0
1	G	212/227 (93%)	0.31	6 (2%) 53 53	35, 68, 97, 102	0
1	H	220/227 (96%)	-0.03	4 (1%) 68 69	18, 44, 82, 99	0
1	I	206/227 (90%)	0.58	21 (10%) 6 6	35, 78, 112, 128	0
1	J	200/227 (88%)	0.66	23 (11%) 4 4	32, 75, 104, 121	0
All	All	2117/2270 (93%)	0.28	99 (4%) 31 31	18, 63, 100, 128	0

All (99) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	I	67	ILE	4.8
1	F	67	ILE	4.7
1	I	76	SER	4.5
1	C	67	ILE	4.5
1	J	25	GLN	4.4
1	B	70	LEU	4.4
1	J	173	TYR	4.4
1	C	72	GLY	4.0
1	J	172	LEU	3.9
1	I	55	LEU	3.9
1	F	181	PHE	3.7
1	I	80	TYR	3.7
1	I	212	VAL	3.5

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Mol	Chain	Res	Type	RSRZ
1	I	77	PRO	3.4
1	G	55	LEU	3.4
1	H	152	CYS	3.4
1	J	189	SER	3.4
1	F	204	PHE	3.4
1	I	123	LYS	3.4
1	J	78	LYS	3.3
1	H	77	PRO	3.2
1	J	126	PRO	3.2
1	C	181	PHE	3.2
1	H	158	VAL	3.2
1	J	77	PRO	3.2
1	G	45	PRO	3.1
1	G	1	MET	3.1
1	B	77	PRO	3.1
1	J	67	ILE	3.1
1	J	120	GLU	3.0
1	E	168	VAL	3.0
1	F	168	VAL	3.0
1	I	173	TYR	3.0
1	J	80	TYR	2.9
1	D	168	VAL	2.9
1	C	26	TRP	2.9
1	J	128	ASP	2.9
1	B	181	PHE	2.9
1	I	79	VAL	2.9
1	I	147	ALA	2.9
1	C	55	LEU	2.8
1	F	57	ALA	2.8
1	D	181	PHE	2.8
1	C	204	PHE	2.7
1	G	181	PHE	2.7
1	J	124	MET	2.7
1	G	168	VAL	2.7
1	I	60	GLU	2.7
1	C	44	ALA	2.6
1	B	23	ALA	2.6
1	J	214	PHE	2.6
1	F	63	ARG	2.6
1	I	197	ALA	2.6
1	D	173	TYR	2.5
1	H	72	GLY	2.5

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Mol	Chain	Res	Type	RSRZ
1	D	78	LYS	2.5
1	I	63	ARG	2.5
1	E	223	ALA	2.5
1	I	75	VAL	2.5
1	I	186	GLY	2.5
1	J	56	THR	2.5
1	J	175	LEU	2.5
1	J	26	TRP	2.4
1	I	1	MET	2.4
1	D	77	PRO	2.4
1	I	150	GLY	2.4
1	F	60	GLU	2.4
1	C	214	PHE	2.4
1	C	66	GLN	2.4
1	J	0	SER	2.4
1	F	56	THR	2.4
1	B	-2	PRO	2.3
1	F	70	LEU	2.3
1	C	75	VAL	2.3
1	J	204	PHE	2.3
1	J	182	PRO	2.3
1	C	184	ASN	2.2
1	B	168	VAL	2.2
1	I	78	LYS	2.2
1	F	186	GLY	2.2
1	I	185	HIS	2.2
1	J	206	GLU	2.2
1	C	77	PRO	2.2
1	J	-1	GLY	2.1
1	B	212	VAL	2.1
1	E	74	GLU	2.1
1	J	63	ARG	2.1
1	C	191	ASP	2.1
1	I	103	GLN	2.1
1	F	54	PRO	2.1
1	I	85	THR	2.1
1	G	175	LEU	2.1
1	F	213	ARG	2.1
1	B	222	ALA	2.1
1	C	183	VAL	2.0
1	C	63	ARG	2.0
1	D	189	SER	2.0

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Mol	Chain	Res	Type	RSRZ
1	J	55	LEU	2.0
1	B	-1	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 monosaccharides in this entry.

6.4 Ligands (i)

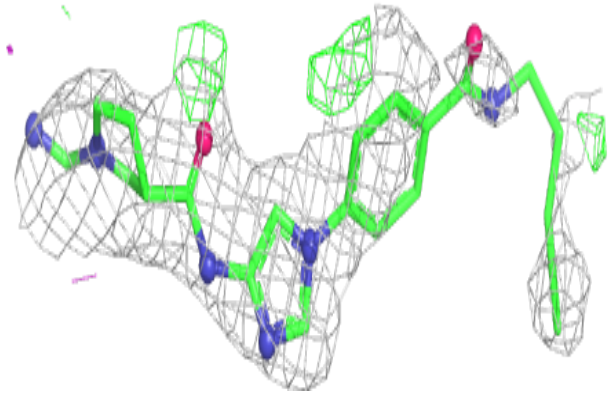
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9'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

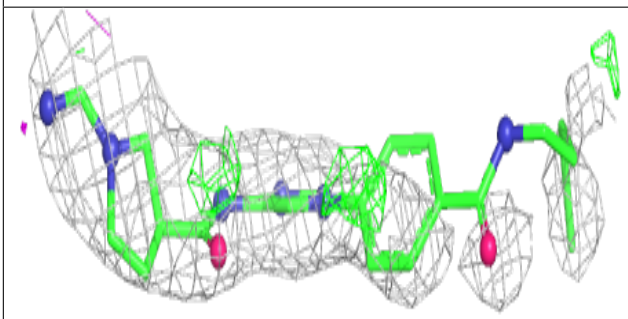
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	JMF	G	301	29/29	0.88	0.20	48,70,98,101	0
2	JMF	D	301	29/29	0.89	0.23	43,63,90,98	0
2	JMF	C	301	29/29	0.89	0.27	48,72,108,114	0
2	JMF	J	301	29/29	0.89	0.26	41,77,106,114	0
2	JMF	E	301	29/29	0.91	0.21	39,62,88,96	0
2	JMF	F	301	29/29	0.91	0.29	43,64,109,112	0
2	JMF	A	301	29/29	0.93	0.17	37,59,87,91	0
2	JMF	I	301	29/29	0.93	0.22	45,65,100,115	0
2	JMF	B	301	29/29	0.93	0.20	37,60,83,87	0
2	JMF	H	301	29/29	0.95	0.16	25,47,88,97	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 JMF G 301:

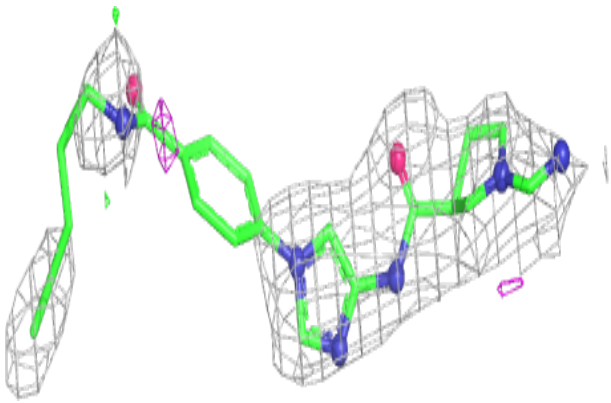
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

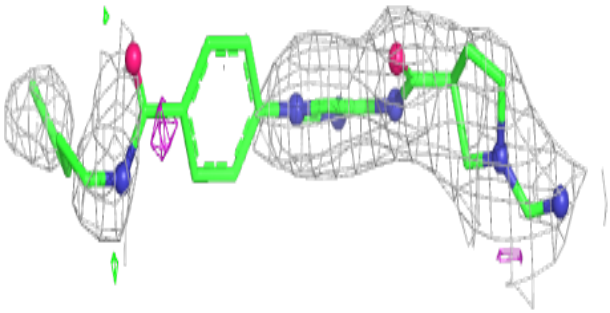


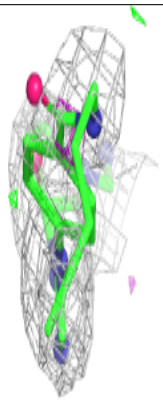


Electron density around JMF D 301:

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

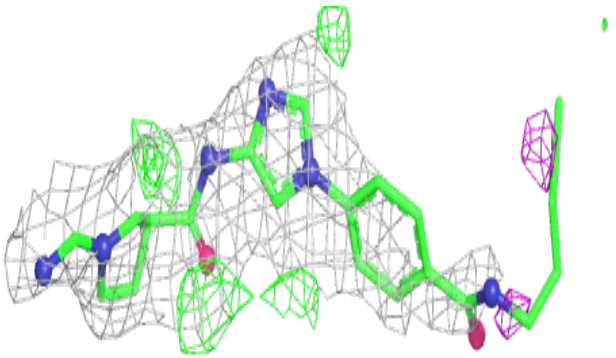


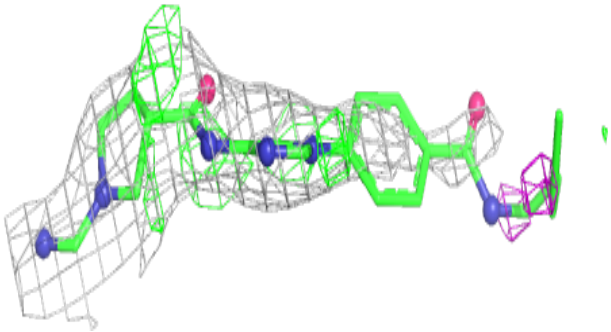


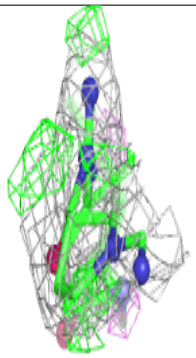


Electron density around JMF C 301:

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

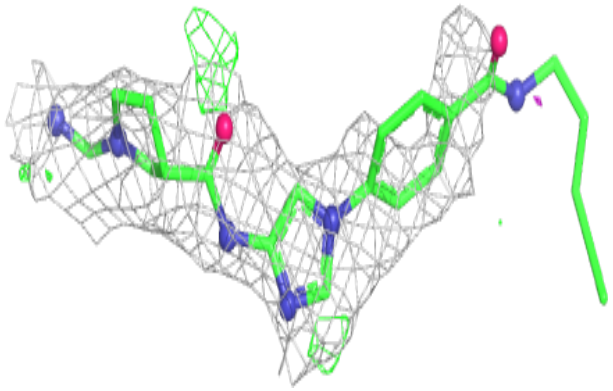


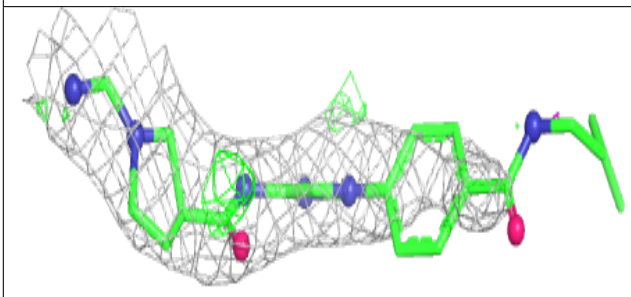


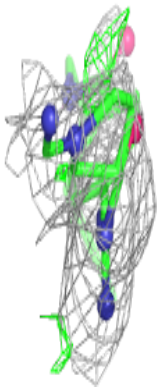


Electron density around JMF J 301:

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

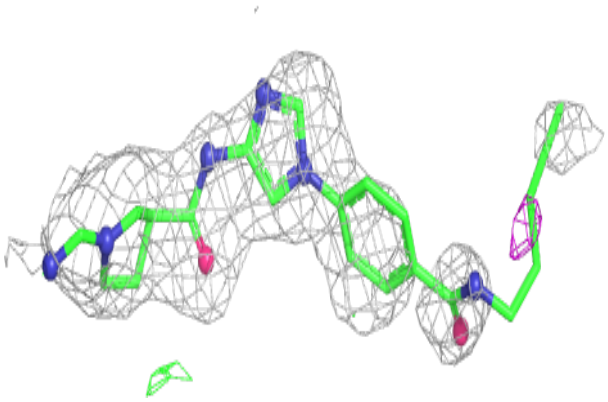


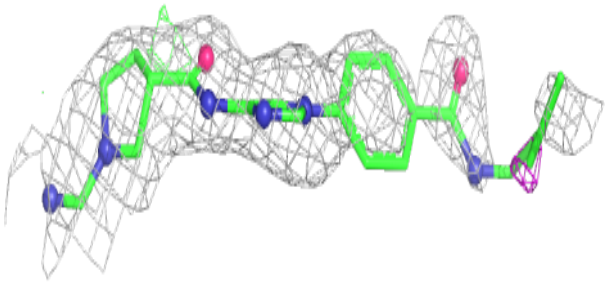


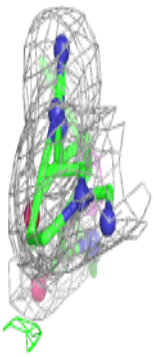


Electron density around JMF E 301:

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

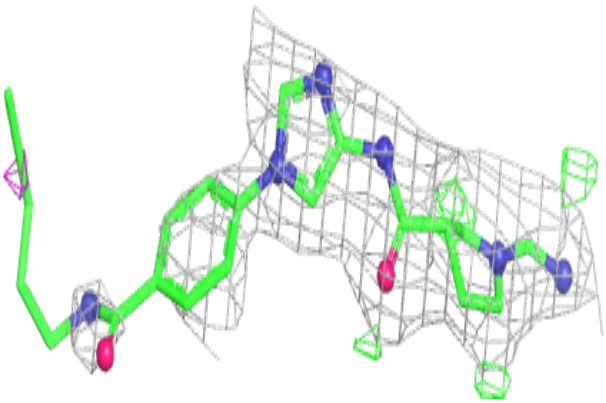


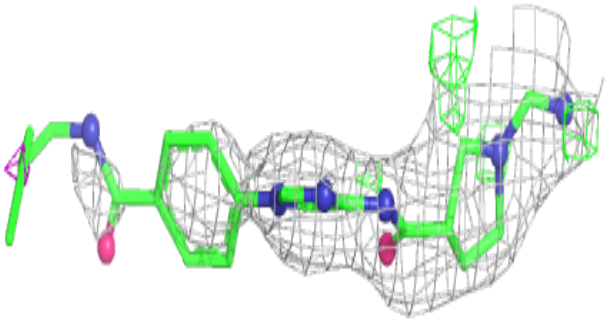


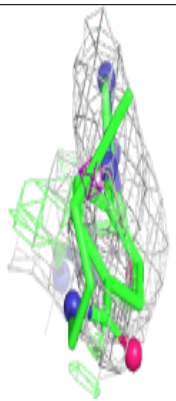


Electron density around JMF F 301:

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

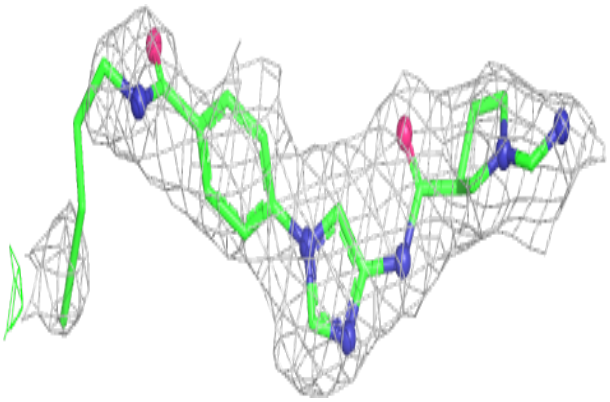


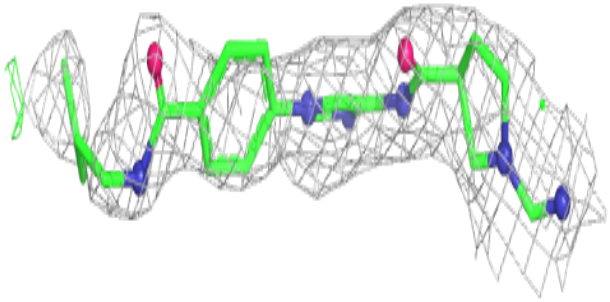


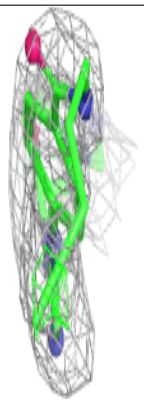


Electron density around JMF A 301:

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

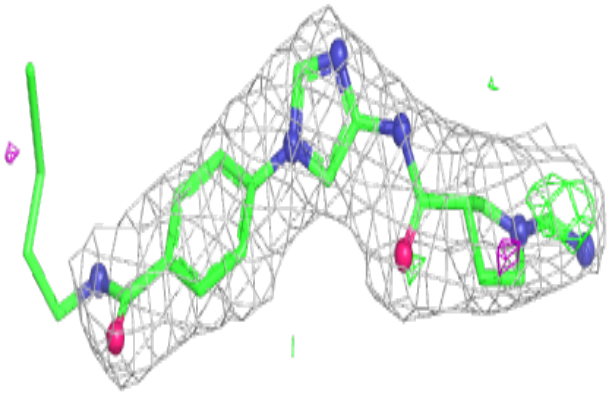


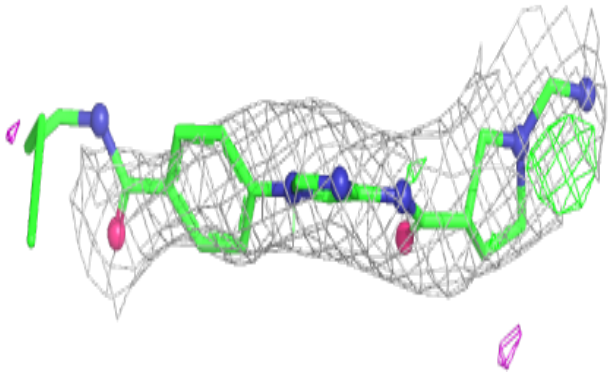


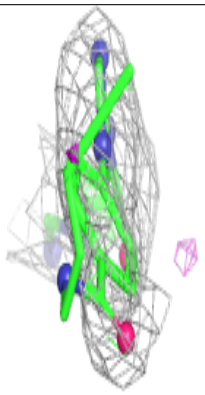


Electron density around JMF I 301:

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

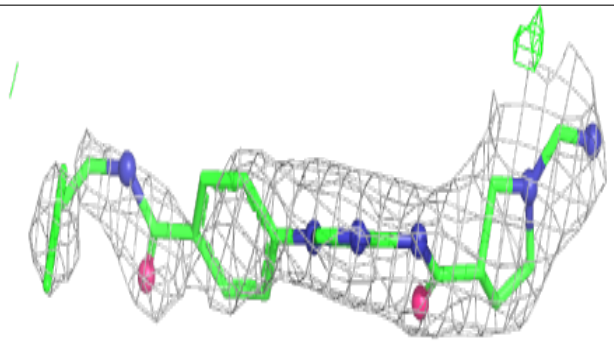


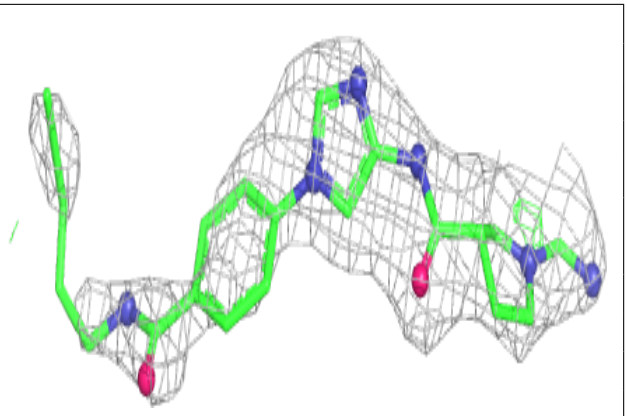


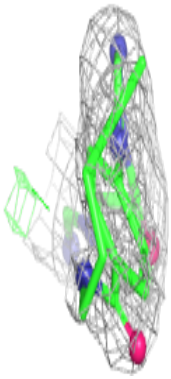


Electron density around JMF B 301:

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

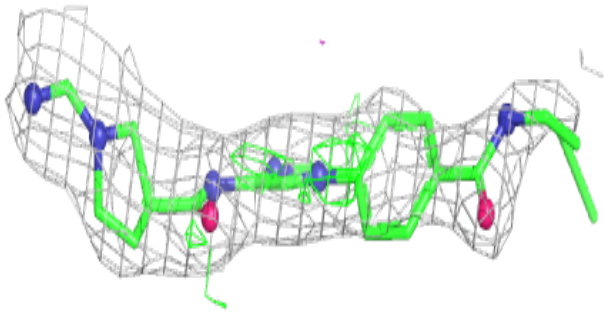


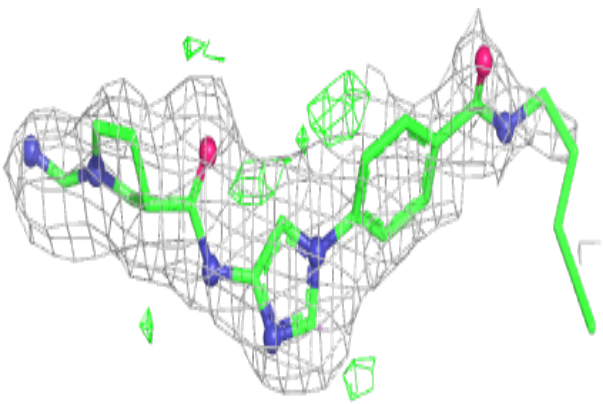


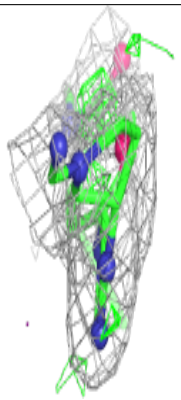


Electron density around JMF H 301:

$2mF_o$-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.