WORLDWIDE wwPDB PROTEIN DATA BANK

Full wwPDB X-ray Structure Validation Report (i)

Mar 30, 2025 – 04:26 am BST

PDB ID	:	9ET8 / pdb_00009et8
Title	:	CDK2-cyclin A in complex with FragLite 5
Authors	:	Hope, I.; Martin, M.P.; Waring, M.J.; Noble, M.E.M.; Endicott, J.A.; Tatum, N.J.
Deposited on	:	2024-03-26
Resolution	:	2.31 Å(reported)

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

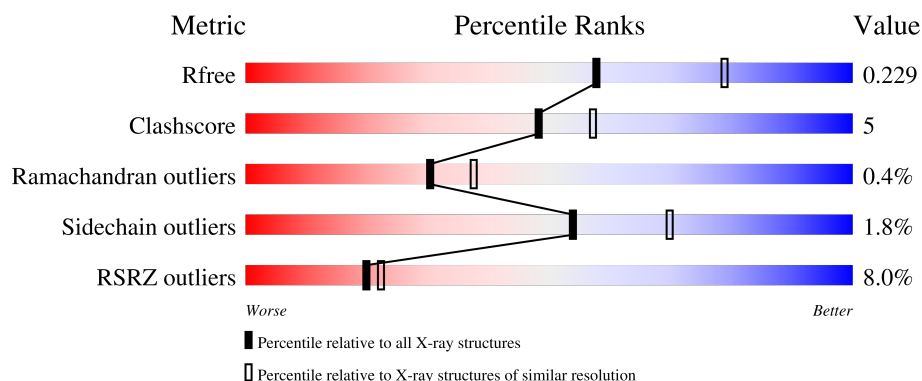|		
MolProbity	:	4.02b-467
Mogul	:	?.? (???), CSD ??CSD?? (????)
Xtriage (Phenix)	:	1.13
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.003 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.42

1 Overall quality at a glance ⓘ

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

The reported resolution of this entry is 2.31 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	Percentile Ranks	Value
Rfree		0.229
Clashscore		5
Ramachandran outliers		0.4%
Sidechain outliers		1.8%
RSRZ outliers		8.0%

Worse   *Better*

▎ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	164625	7250 (2.34-2.30)
Clashscore	180529	8063 (2.34-2.30)
Ramachandran outliers	177936	7993 (2.34-2.30)
Sidechain outliers	177891	7993 (2.34-2.30)
RSRZ outliers	164620	7250 (2.34-2.30)

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	B	268	2% 90% 7% •
1	D	268	9% 87% 11% •
2	A	302	12% 83% 16% •
2	C	302	9% 87% 10% • •

2 Entry composition ⓘ

There are 4 unique types of molecules in this entry. The entry contains 9429 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 Cyclin-A2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	D	262	Total	C	N	O	S	0	1	0
			2118	1370	345	393	10			
1	B	262	Total	C	N	O	S	0	1	0
			2116	1369	345	391	11			

There are 14 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	171	GLY	-	expression tag	UNP P30274
D	433	HIS	-	expression tag	UNP P30274
D	434	HIS	-	expression tag	UNP P30274
D	435	HIS	-	expression tag	UNP P30274
D	436	HIS	-	expression tag	UNP P30274
D	437	HIS	-	expression tag	UNP P30274
D	438	HIS	-	expression tag	UNP P30274
B	171	GLY	-	expression tag	UNP P30274
B	433	HIS	-	expression tag	UNP P30274
B	434	HIS	-	expression tag	UNP P30274
B	435	HIS	-	expression tag	UNP P30274
B	436	HIS	-	expression tag	UNP P30274
B	437	HIS	-	expression tag	UNP P30274
B	438	HIS	-	expression tag	UNP P30274

- Molecule 2 is a protein called Cyclin-dependent kinase 2.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
2	A	302	Total	C	N	O	P	S	0	4	0
			2456	1590	420	436	1	9			
2	C	297	Total	C	N	O	P	S	0	1	0
			2399	1556	408	426	1	8			

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-3	GLY	-	expression tag	UNP P24941
A	-2	PRO	-	expression tag	UNP P24941
A	-1	GLY	-	expression tag	UNP P24941
A	0	SER	-	expression tag	UNP P24941
C	-3	GLY	-	expression tag	UNP P24941
C	-2	PRO	-	expression tag	UNP P24941
C	-1	GLY	-	expression tag	UNP P24941
C	0	SER	-	expression tag	UNP P24941

- Molecule 3 is 4-iodanylpyridin-2-amine (CCD ID: IIS) (formula: $C_5H_5IN_2$) (labeled as "Ligand of Interest" by depositor).
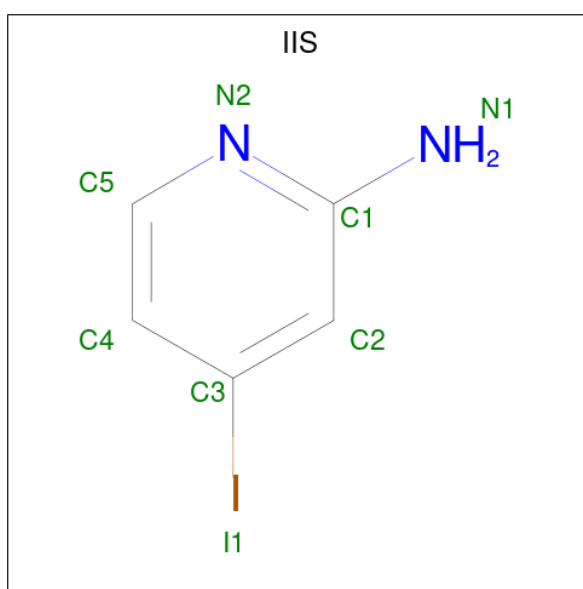
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total 8	C 5	I 1	N 2	0	0
3	A	1	Total 16	C 10	I 2	N 4	0	1
3	A	1	Total 8	C 5	I 1	N 2	0	0
3	C	1	Total 8	C 5	I 1	N 2	0	0
3	C	1	Total 8	C 5	I 1	N 2	0	0
3	C	1	Total 8	C 5	I 1	N 2	0	0

- Molecule 4 is water.

| Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	D	48	Total 48	O 48	0	0
4	A	94	Total 94	O 94	0	0
4	B	92	Total 92	O 92	0	0
4	C	50	Total 50	O 50	0	0

3 Residue-property plots ⓘ

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.
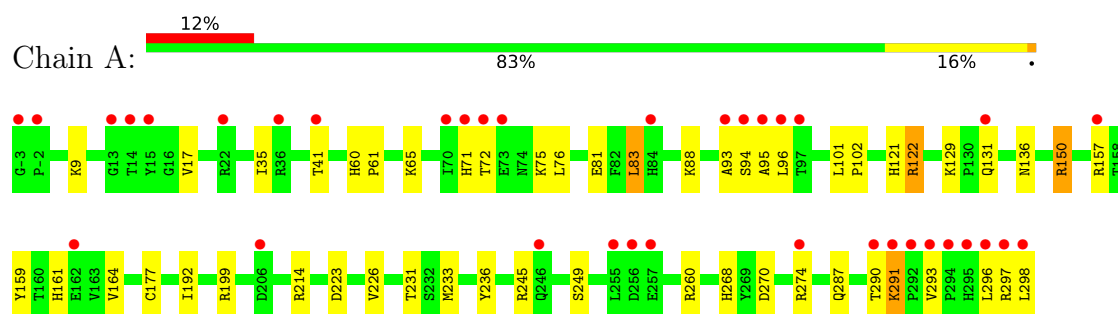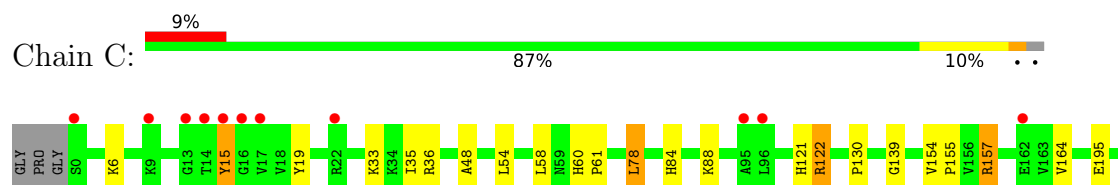
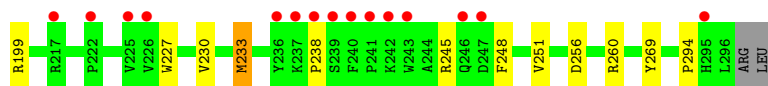- Molecule 1: Cyclin-A2
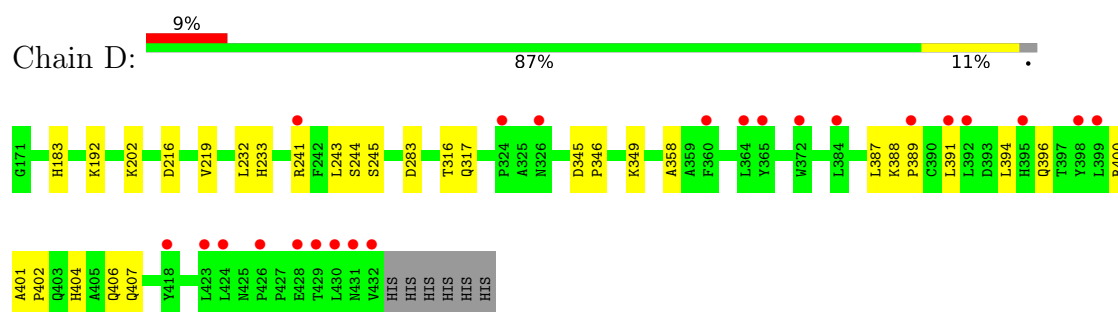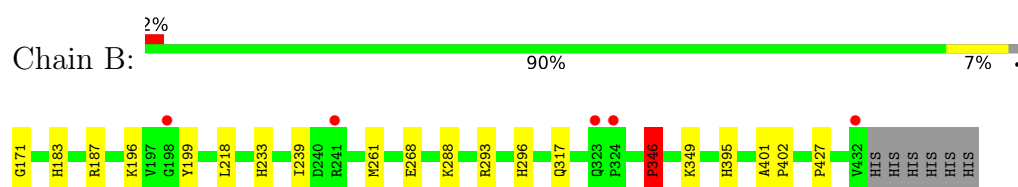
Chain D:

- Molecule 1: Cyclin-A2

Chain B:

- Molecule 2: Cyclin-dependent kinase 2

Chain A:

- Molecule 2: Cyclin-dependent kinase 2

Chain C:

4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	74.17Å 133.27Å 147.37Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	99.04 – 2.31 98.85 – 2.31	Depositor EDS
% Data completeness (in resolution range)	98.8 (99.04-2.31) 98.7 (98.85-2.31)	Depositor EDS
R_{merge}	0.14	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	0.94 (at 2.32Å)	Xtriage
Refinement program	REFMAC 5.8.0425	Depositor
R, R_{free}	0.225 , 0.242 0.209 , 0.229	Depositor DCC
R_{free} test set	3361 reflections (5.22%)	wwPDB-VP
Wilson B-factor (Å^2)	54.2	Xtriage
Anisotropy	0.450	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.36 , 37.8	EDS
L-test for twinning[2]	$< |L| > = 0.51, < L^2 > = 0.35$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	9429	wwPDB-VP
Average B, all atoms (Å^2)	58.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.42% of the height of the origin peak. No significant pseudotranslation is detected.*

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[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: TPO, IIS

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	B	0.47	0/2166	0.83	1/2945 (0.0%)
1	D	0.40	0/2168	0.78	0/2948
2	A	0.51	0/2507	0.89	0/3400
2	C	0.46	0/2449	0.82	0/3322
All	All	0.46	0/9290	0.83	1/12615 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	B	0	2
1	D	0	1
2	A	0	4
2	C	0	3
All	All	0	10

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	346	PRO	N-CA-CB	-9.82	91.52	103.30

There are no chirality outliers.

All (10) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	A	150	ARG	Sidechain

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Mol	Chain	Res	Type	Group
2	A	214	ARG	Sidechain
2	A	245	ARG	Sidechain
2	A	297	ARG	Sidechain
1	B	187	ARG	Sidechain
1	B	293	ARG	Sidechain
2	C	157	ARG	Sidechain
2	C	245	ARG	Sidechain
2	C	36	ARG	Sidechain
1	D	241	ARG	Sidechain

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	B	2116	0	2132	12	0
1	D	2118	0	2131	29	0
2	A	2456	0	2499	46	0
2	C	2399	0	2442	22	0
3	A	32	0	0	2	0
3	C	24	0	0	2	0
4	A	94	0	0	3	0
4	B	92	0	0	3	0
4	C	50	0	0	2	0
4	D	48	0	0	1	0
All	All	9429	0	9204	99	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 (99) 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)
2:A:88:LYS:HG2	2:A:131:GLN:NE2	1.56	1.18
2:A:177[A]:CYS:SG	2:A:233:MET:SD	2.47	1.12
1:D:358:ALA:HB1	1:D:391:LEU:HD23	1.22	1.09
1:D:358:ALA:HA	1:D:391:LEU:HD21	1.38	1.04

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:88:LYS:HG2	2:A:131:GLN:HE21	0.86	1.01
2:A:88:LYS:CG	2:A:131:GLN:HE21	1.78	0.96
1:D:244:SER:O	2:A:298:LEU:HD22	1.72	0.90
2:A:177[A]:CYS:SG	2:A:233:MET:CE	2.63	0.87
1:D:358:ALA:CB	1:D:391:LEU:HD23	2.03	0.86
1:D:358:ALA:HB1	1:D:391:LEU:CD2	2.03	0.85
2:A:88:LYS:CG	2:A:131:GLN:NE2	2.37	0.84
3:A:602[B]:IIS:I1	4:A:791:HOH:O	2.65	0.83
1:D:358:ALA:CA	1:D:391:LEU:HD21	2.13	0.79
2:A:72:THR:OG1	2:A:75:LYS:HB2	1.82	0.79
1:D:358:ALA:CB	1:D:391:LEU:CD2	2.61	0.78
2:A:88:LYS:HB3	2:A:131:GLN:HG3	1.68	0.75
1:D:202:LYS:HE2	2:A:296:LEU:HD12	1.71	0.71
1:B:233:HIS:HD2	4:B:548:HOH:O	1.73	0.70
1:D:233:HIS:HD2	4:D:524:HOH:O	1.76	0.68
2:A:121:HIS:O	2:A:122:ARG:HG3	1.98	0.63
1:D:358:ALA:CA	1:D:391:LEU:CD2	2.76	0.63
1:B:346:PRO:O	1:B:349:LYS:HG2	1.98	0.63
1:D:358:ALA:HA	1:D:391:LEU:CD2	2.22	0.63
1:D:404:HIS:O	1:D:407:GLN:NE2	2.31	0.61
2:C:121:HIS:O	2:C:122:ARG:HG3	1.99	0.61
2:C:88:LYS:HB2	2:C:130:PRO:HB2	1.81	0.61
1:D:243:LEU:O	2:A:298:LEU:HD13	2.01	0.61
2:C:121:HIS:C	2:C:122:ARG:HG3	2.22	0.59
2:C:33:LYS:NZ	4:C:402:HOH:O	2.34	0.59
2:A:61:PRO:HD3	2:A:296:LEU:HD23	1.83	0.59
2:A:249:SER:HA	2:A:260:ARG:HD3	1.84	0.59
2:A:65:LYS:H	2:A:81:GLU:HG2	1.69	0.58
2:C:230:VAL:O	2:C:233:MET:HB2	2.05	0.57
2:A:101:LEU:HB3	2:A:102:PRO:HD3	1.86	0.56
2:A:121:HIS:C	2:A:122:ARG:HG3	2.27	0.55
2:A:290:THR:O	2:A:291[A]:LYS:HB2	2.07	0.55
2:A:290:THR:O	2:A:291[B]:LYS:HB2	2.05	0.55
2:C:227:TRP:CE3	2:C:269:TYR:HB3	2.42	0.54
1:D:387:LEU:O	1:D:391:LEU:HG	2.08	0.54
1:D:243:LEU:O	2:A:298:LEU:CD1	2.56	0.54
2:A:88:LYS:HE3	2:A:131:GLN:HE22	1.74	0.53
2:A:88:LYS:CB	2:A:131:GLN:HG3	2.38	0.52
2:A:88:LYS:HE3	2:A:131:GLN:NE2	2.24	0.52
2:C:6:LYS:HG3	3:C:302:IIS:C4	2.40	0.51
1:D:316:THR:HB	2:C:155:PRO:HD2	1.91	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:396:GLN:HE21	1:D:400:ARG:CZ	2.24	0.51
2:A:177[A]:CYS:SG	2:A:233:MET:HE2	2.49	0.49
1:B:183:HIS:HB2	1:B:317:GLN:HE22	1.77	0.49
2:C:60:HIS:CG	2:C:61:PRO:HD2	2.48	0.49
1:D:202:LYS:HE2	2:A:296:LEU:CD1	2.42	0.49
1:D:346:PRO:O	1:D:349:LYS:HG2	2.13	0.48
2:A:161:HIS:HD2	4:A:789:HOH:O	1.96	0.47
2:A:35:ILE:HB	2:A:76:LEU:HB3	1.96	0.47
2:C:15:TYR:CE1	2:C:33:LYS:HE2	2.50	0.47
2:A:93:ALA:O	2:A:94:SER:CB	2.62	0.47
2:A:161:HIS:CD2	4:A:789:HOH:O	2.68	0.47
2:A:60:HIS:CG	2:A:61:PRO:HD2	2.51	0.46
2:C:19:TYR:CD1	3:C:302:IIS:I1	3.39	0.46
2:A:129:LYS:HA	2:A:192:ILE:HD11	1.97	0.46
1:B:395:HIS:HE1	1:B:427:PRO:O	1.98	0.46
1:D:396:GLN:HE21	1:D:400:ARG:NH1	2.14	0.46
2:A:9:LYS:HE3	2:A:17:VAL:HG23	1.97	0.46
2:A:157:ARG:HH11	1:B:268:GLU:HG3	1.80	0.46
2:A:95:ALA:O	2:A:199:ARG:HD3	2.16	0.45
1:D:183:HIS:HB2	1:D:317:GLN:HE22	1.81	0.45
1:D:388:LYS:HB3	1:D:389:PRO:HD3	1.97	0.45
2:C:15:TYR:HE2	2:C:48:ALA:HB2	1.81	0.45
1:D:202:LYS:HE2	2:A:296:LEU:HB2	1.99	0.45
2:A:291[A]:LYS:HE2	2:A:291[A]:LYS:HA	1.99	0.44
2:A:231:THR:HA	2:A:236:TYR:CD2	2.53	0.43
1:D:216:ASP:HB2	1:D:406:GLN:HG2	2.01	0.43
2:C:15:TYR:CE2	2:C:35:ILE:HG12	2.53	0.43
1:D:345:ASP:HA	1:D:346:PRO:HA	1.78	0.43
1:D:401:ALA:HB3	1:D:402:PRO:HD3	2.00	0.43
2:A:177[A]:CYS:SG	2:A:233:MET:HE1	2.56	0.43
2:C:256:ASP:O	2:C:260:ARG:HG3	2.18	0.43
2:A:157:ARG:NH1	1:B:268:GLU:O	2.52	0.42
2:A:83:LEU:HD23	2:A:136:ASN:HB3	2.01	0.42
2:C:195:GLU:O	2:C:199:ARG:N	2.51	0.42
2:A:157:ARG:HG2	2:A:159:TYR:CE1	2.55	0.42
1:B:183:HIS:HE1	4:B:528:HOH:O	2.02	0.42
2:C:60:HIS:CD2	2:C:61:PRO:HD2	2.55	0.42
2:C:78:LEU:HD23	2:C:78:LEU:N	2.35	0.42
1:B:171:GLY:N	4:B:505:HOH:O	2.52	0.41
1:B:218:LEU:HD11	1:B:239:ILE:HD11	2.03	0.41
1:D:394:LEU:HD12	1:D:394:LEU:HA	1.89	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:268:HIS:HD2	2:A:270:ASP:H	1.68	0.41
1:D:219:VAL:HG22	1:D:232:LEU:HD21	2.01	0.41
1:D:317:GLN:HG2	2:C:154:VAL:HB	2.02	0.41
1:B:401:ALA:N	1:B:402:PRO:CD	2.83	0.41
2:C:54:LEU:O	2:C:58:LEU:HG	2.20	0.41
2:A:223:ASP:H	2:A:226:VAL:HG12	1.85	0.41
2:A:287:GLN:HA	3:A:601:IIS:C5	2.51	0.41
2:C:248:PHE:HA	2:C:251:VAL:HB	2.02	0.41
2:A:274:ARG:HE	2:A:274:ARG:HB2	1.74	0.41
1:B:196:LYS:HB3	1:B:196:LYS:HE2	1.76	0.41
2:C:139:GLY:HA2	2:C:294:PRO:HD3	2.03	0.40
2:A:41:THR:O	1:B:288:LYS:NZ	2.48	0.40
2:C:84:HIS:HB2	4:C:447:HOH:O	2.21	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	B	261/268 (97%)	258 (99%)	3 (1%)	0	100	100
1	D	261/268 (97%)	259 (99%)	2 (1%)	0	100	100
2	A	303/302 (100%)	291 (96%)	9 (3%)	3 (1%)	13	14
2	C	295/302 (98%)	282 (96%)	11 (4%)	2 (1%)	19	23
All	All	1120/1140 (98%)	1090 (97%)	25 (2%)	5 (0%)	30	37

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	A	291[A]	LYS
2	A	291[B]	LYS

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Mol	Chain	Res	Type
2	A	164	VAL
2	C	164	VAL
2	C	238	PRO

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	B	235/240 (98%)	231 (98%)	4 (2%)	56	71
1	D	235/240 (98%)	232 (99%)	3 (1%)	65	78
2	A	268/264 (102%)	262 (98%)	6 (2%)	47	63
2	C	262/264 (99%)	257 (98%)	5 (2%)	52	68
All	All	1000/1008 (99%)	982 (98%)	18 (2%)	54	70

All (18) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	192	LYS
1	D	245	SER
1	D	283	ASP
2	A	71	HIS
2	A	83	LEU
2	A	96	LEU
2	A	122	ARG
2	A	150	ARG
2	A	293	VAL
1	B	199	TYR
1	B	261	MET
1	B	296	HIS
1	B	346	PRO
2	C	15	TYR
2	C	78	LEU
2	C	122	ARG
2	C	157	ARG
2	C	233	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (19) such sidechains are listed below:

Mol	Chain	Res	Type
1	D	254	GLN
1	D	317	GLN
1	D	323	GLN
1	D	395	HIS
1	D	396	GLN
1	D	431	ASN
2	A	84	HIS
2	A	85	GLN
2	A	131	GLN
2	A	268	HIS
1	B	183	HIS
1	B	233	HIS
1	B	312	ASN
1	B	317	GLN
1	B	378	GLN
1	B	395	HIS
1	B	396	GLN
1	B	425	ASN
2	C	161	HIS

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

2 non-standard protein/DNA/RNA residues are modelled in this entry.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

7 ligands are modelled in this entry.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

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.
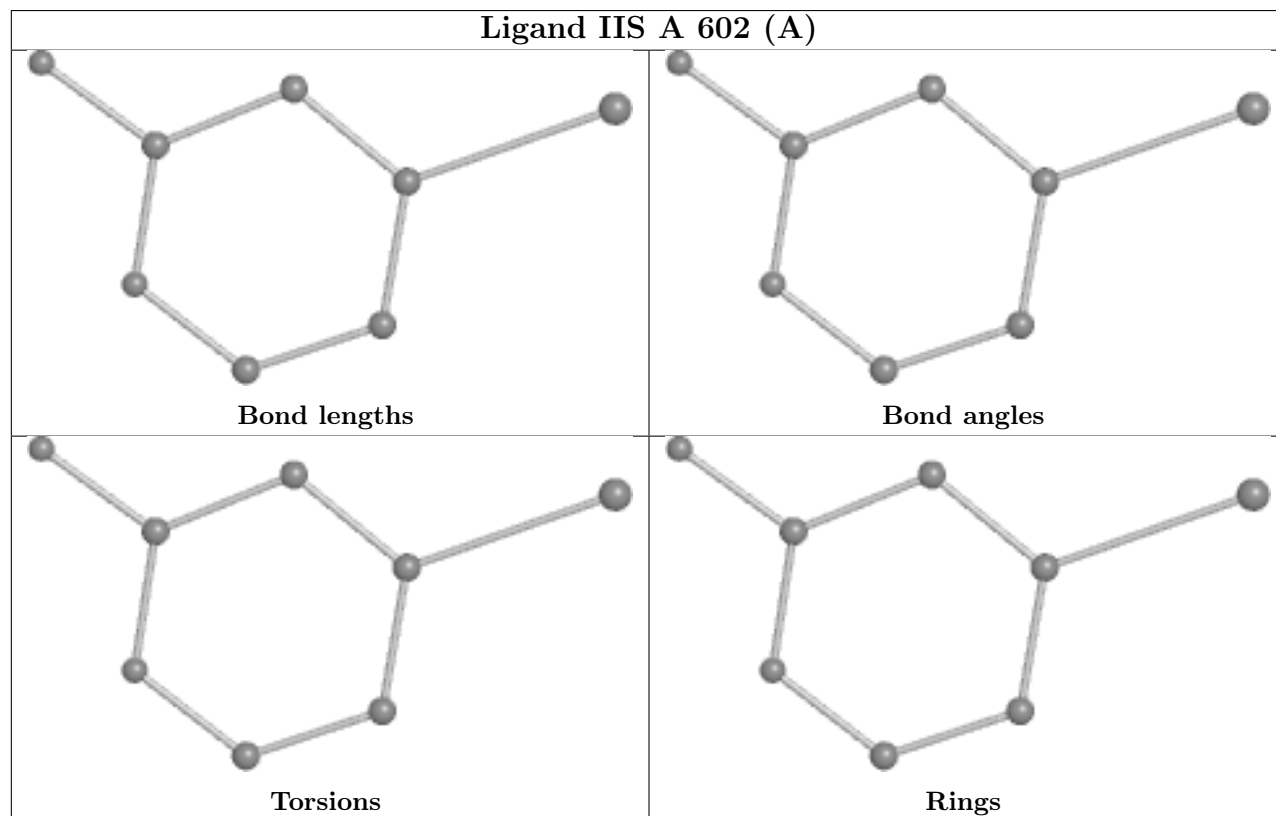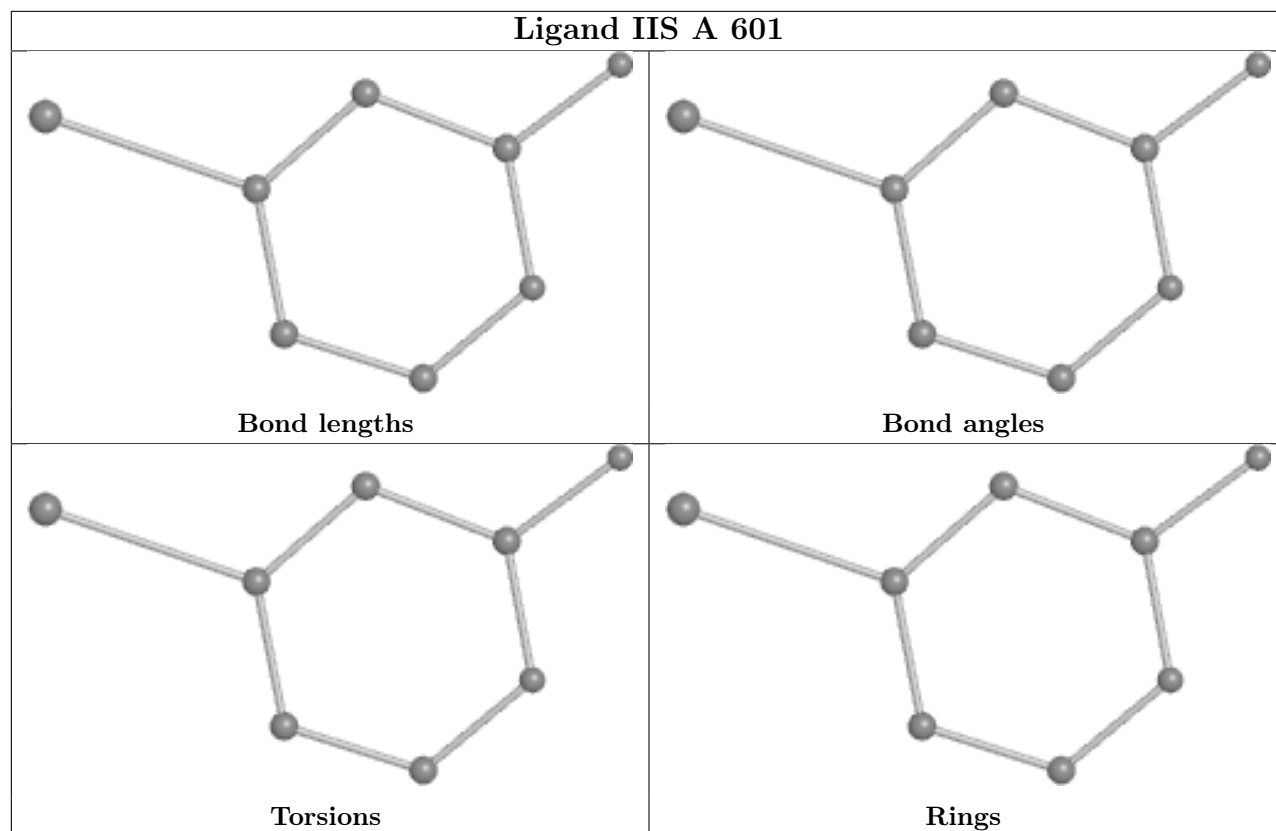
Ligand IIS A 601

Bond lengths

Bond angles

Torsions

Rings

Ligand IIS A 602 (A)

Bond lengths

Bond angles

Torsions

Rings

Ligand IIS A 602 (B)

Bond lengths

Bond angles

Torsions

Rings

Ligand IIS A 603

Bond lengths

Bond angles

Torsions

Rings

Ligand IIS C 301

Bond lengths

Bond angles

Torsions

Rings

Ligand IIS C 302

Bond lengths

Bond angles

Torsions

Rings

Ligand IIS C 303

Bond lengths

Bond angles

Torsions

Rings
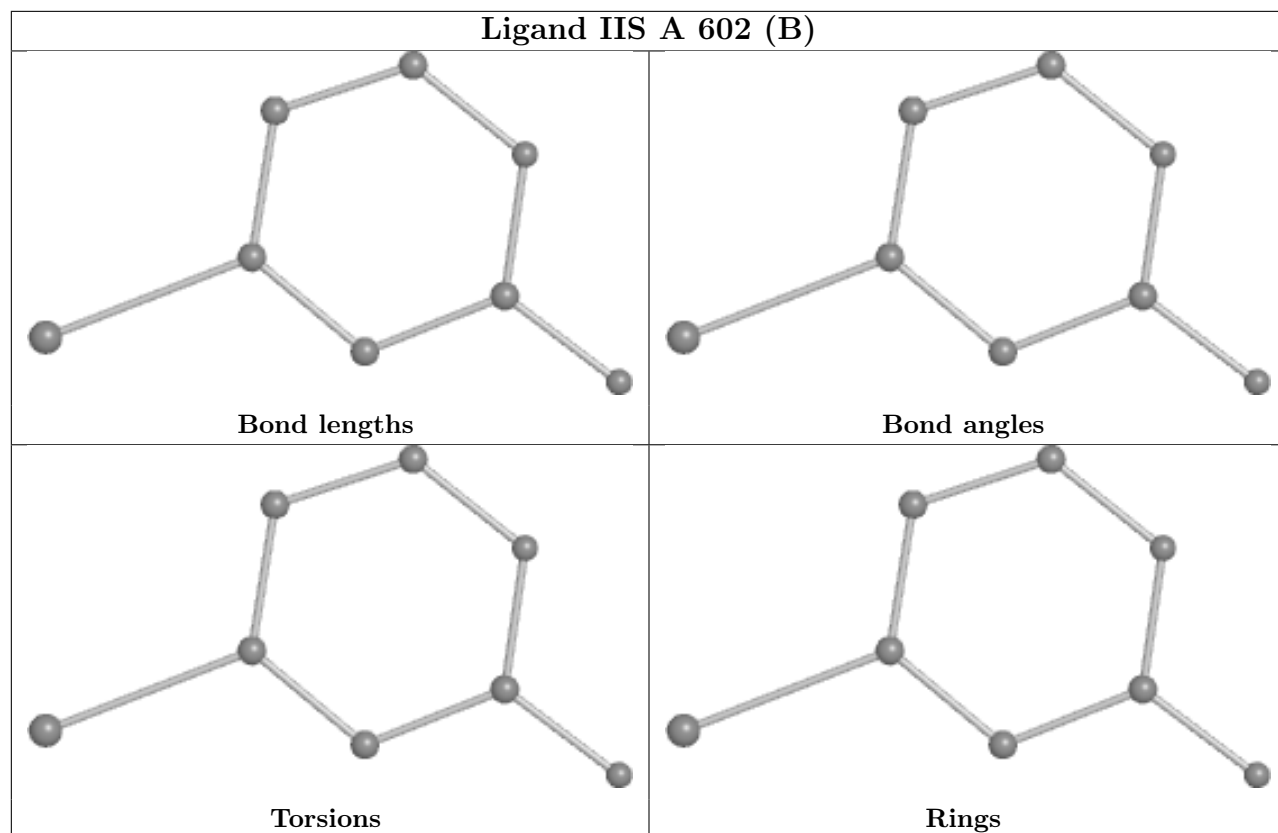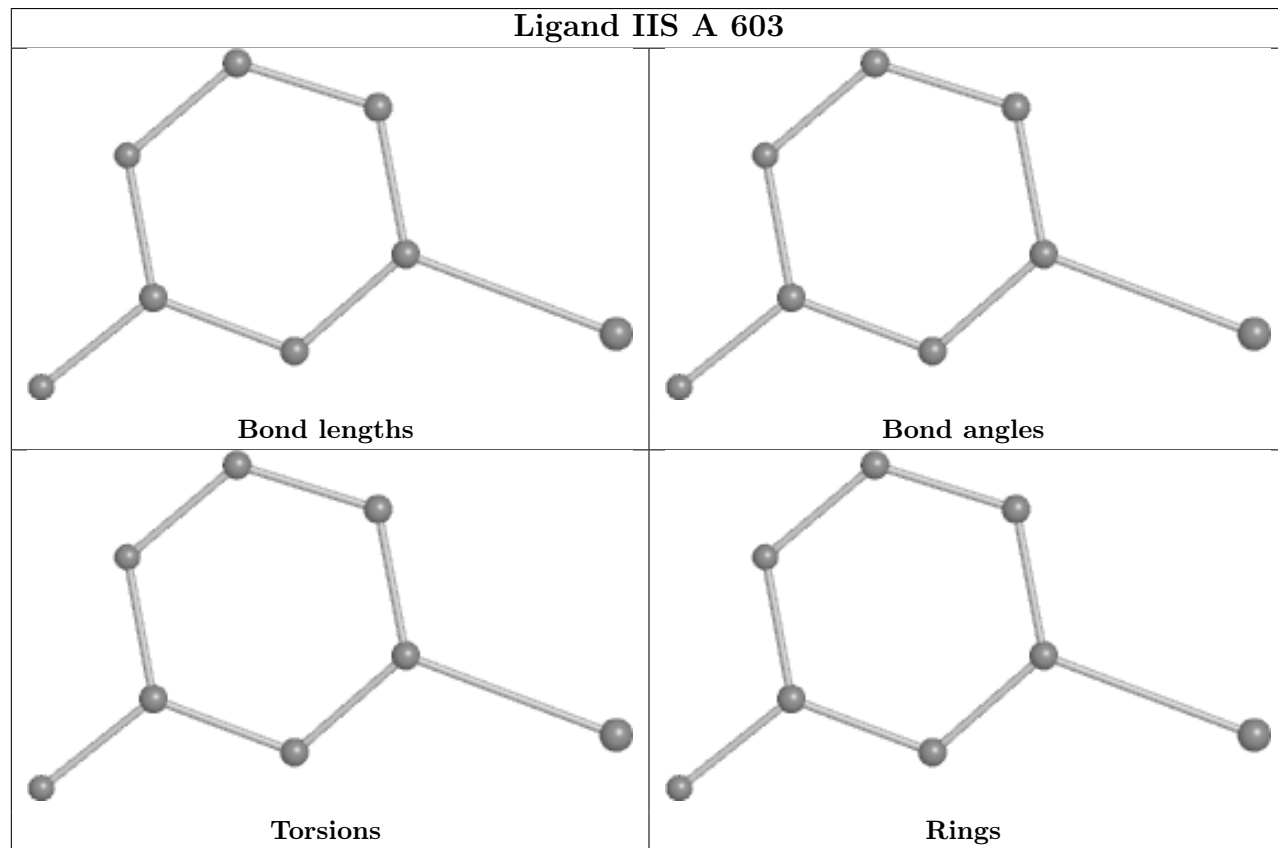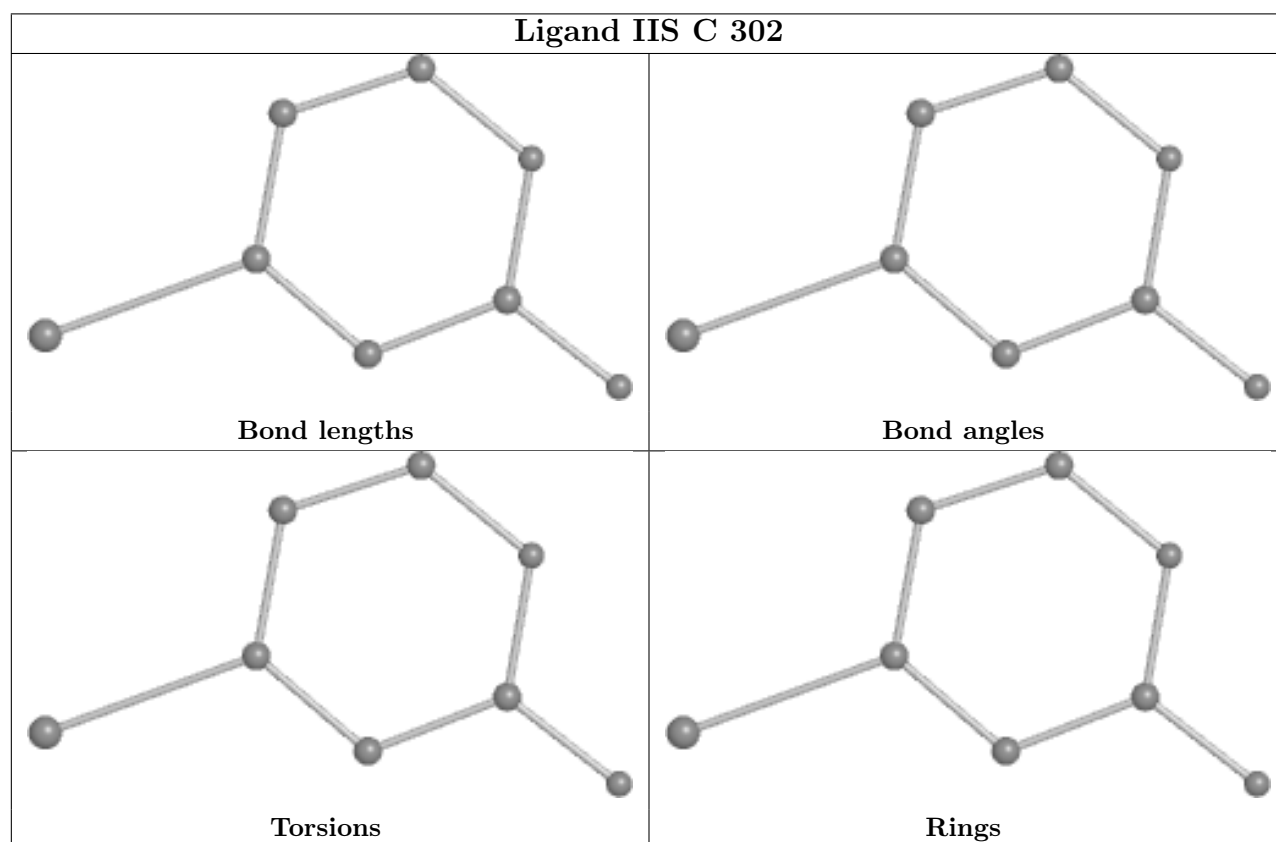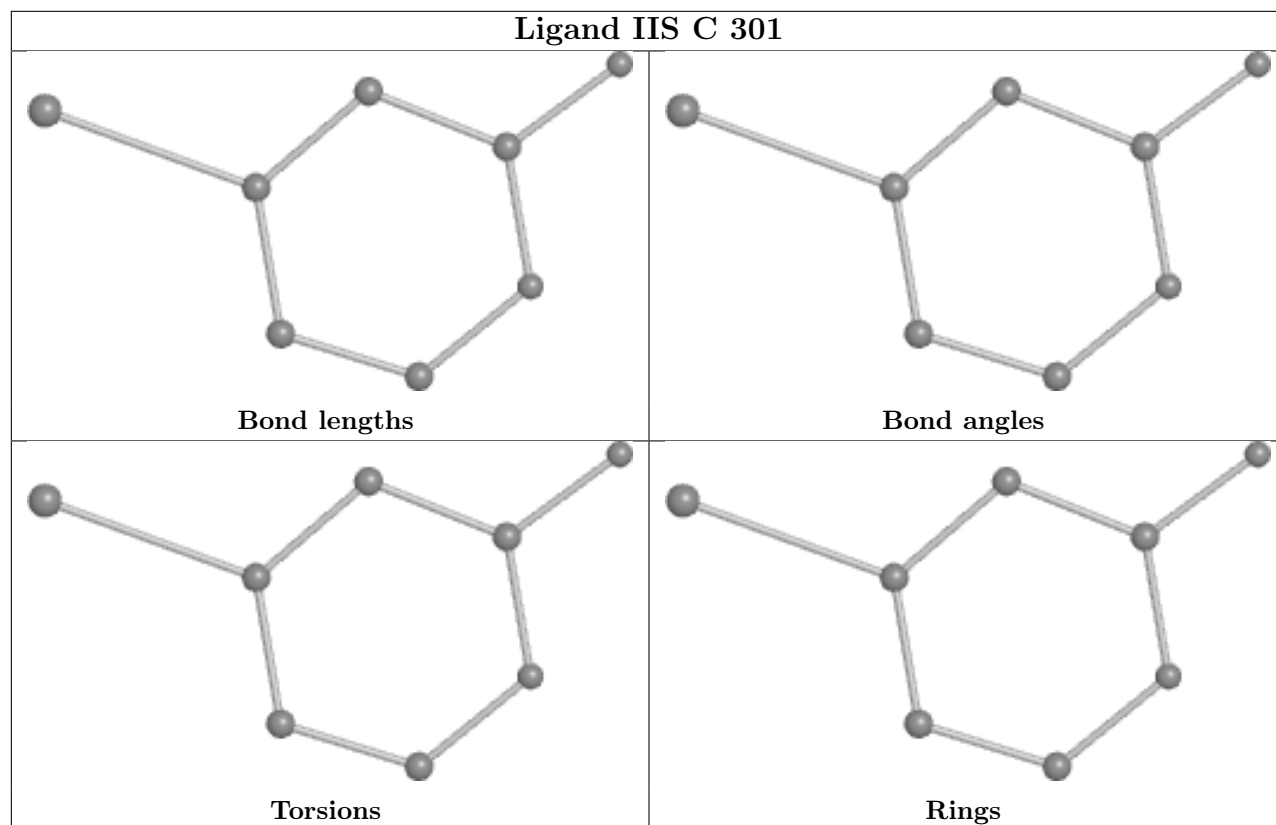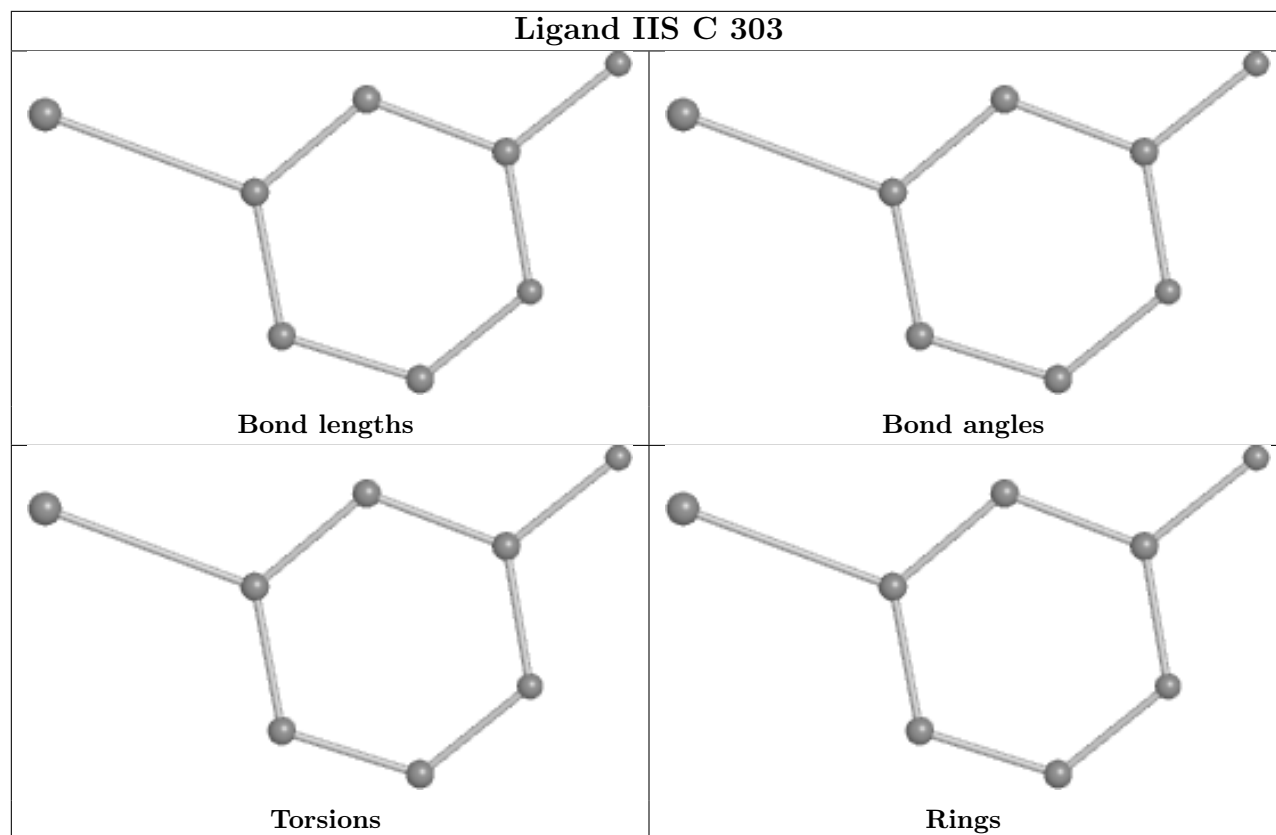
5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Fit of model and data ⓘ

6.1 Protein, DNA and RNA chains ⓘ

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å^2)	Q<0.9
1	B	262/268 (97%)	-0.01	5 (1%)	66	68	26, 49, 73, 104	1 (0%)
1	D	262/268 (97%)	0.57	23 (8%)	17	19	26, 62, 99, 130	1 (0%)
2	A	301/302 (99%)	0.34	36 (11%)	10	12	18, 45, 101, 143	4 (1%)
2	C	296/302 (98%)	0.49	26 (8%)	17	19	26, 58, 100, 141	1 (0%)
All	All	1121/1140 (98%)	0.35	90 (8%)	20	22	18, 53, 98, 143	7 (0%)

All (90) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	A	294	PRO	6.2
1	D	432	VAL	5.8
2	A	72	THR	5.1
2	A	71	HIS	5.0
2	A	15	TYR	4.9
2	A	291[A]	LYS	4.8
2	A	256	ASP	4.8
2	A	296	LEU	4.6
2	A	257	GLU	4.5
1	B	432	VAL	4.1
2	A	96	LEU	4.0
2	C	14	THR	3.9
2	C	241	PRO	3.9
2	A	290	THR	3.7
2	C	13	GLY	3.7
2	A	298	LEU	3.6
2	C	246	GLN	3.6
2	A	22[A]	ARG	3.5
2	C	243	TRP	3.5
2	C	242	LYS	3.5
2	C	238	PRO	3.4

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Mol	Chain	Res	Type	RSRZ
1	D	429	THR	3.4
2	C	96	LEU	3.4
1	D	391	LEU	3.3
2	C	17	VAL	3.3
2	A	131	GLN	3.1
2	C	247	ASP	3.1
2	C	236	TYR	3.1
2	C	9	LYS	3.0
2	C	15	TYR	3.0
1	D	426	PRO	3.0
1	D	398	TYR	3.0
2	A	162	GLU	3.0
2	C	237	LYS	2.9
2	A	292	PRO	2.9
2	A	14	THR	2.9
2	A	41	THR	2.9
2	A	73	GLU	2.9
1	B	324	PRO	2.9
2	A	-2	PRO	2.9
1	D	424	LEU	2.8
2	A	295	HIS	2.8
2	A	93	ALA	2.7
2	C	217	ARG	2.7
1	D	364	LEU	2.7
1	D	423	LEU	2.7
1	D	365	TYR	2.7
2	A	293	VAL	2.7
1	D	241	ARG	2.6
1	D	430	LEU	2.6
2	A	36	ARG	2.6
2	A	97	THR	2.6
2	A	206	ASP	2.6
2	C	226	VAL	2.5
1	D	392	LEU	2.5
1	D	399	LEU	2.5
2	A	84	HIS	2.5
2	C	222	PRO	2.5
2	C	239	SER	2.5
2	C	225	VAL	2.5
2	A	13	GLY	2.5
1	D	372	TRP	2.4
1	B	241	ARG	2.4

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Mol	Chain	Res	Type	RSRZ
1	D	389	PRO	2.4
2	C	16	GLY	2.4
2	A	157	ARG	2.4
2	A	297	ARG	2.4
2	A	95	ALA	2.4
1	D	324	PRO	2.3
2	C	295	HIS	2.2
1	D	395	HIS	2.2
2	A	-3	GLY	2.2
1	D	384	LEU	2.2
2	A	274	ARG	2.2
1	D	418	TYR	2.2
2	C	162	GLU	2.2
1	D	431	ASN	2.2
2	C	240	PHE	2.2
2	C	0	SER	2.1
1	D	326	ASN	2.1
1	B	198	GLY	2.1
2	A	246	GLN	2.1
1	D	428	GLU	2.0
2	C	22[A]	ARG	2.0
2	A	70	ILE	2.0
1	B	323	GLN	2.0
2	C	95	ALA	2.0
1	D	360	PHE	2.0
2	A	94	SER	2.0
2	A	255	LEU	2.0

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

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($Å^2$)	Q<0.9
2	TPO	A	160	11/12	0.98	0.06	38,41,44,44	0
2	TPO	C	160	11/12	0.98	0.06	49,53,58,59	0

6.3 Carbohydrates (i)

There are no monosaccharides in this entry.

6.4 Ligands (i)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	IIS	A	603	8/8	0.81	0.22	124,131,136,153	0
3	IIS	A	602[B]	8/8	0.86	0.23	40,41,45,52	8
3	IIS	A	602[A]	8/8	0.86	0.23	64,71,91,129	8
3	IIS	C	303	8/8	0.89	0.21	76,85,96,111	0
3	IIS	C	302	8/8	0.97	0.13	78,81,87,96	0
3	IIS	A	601	8/8	0.99	0.08	47,52,56,61	0
3	IIS	C	301	8/8	0.99	0.07	46,47,54,80	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.
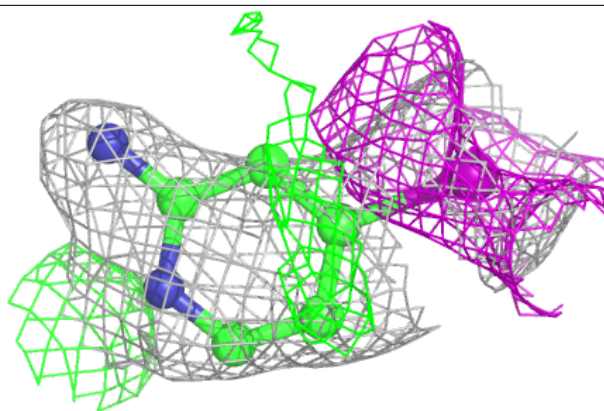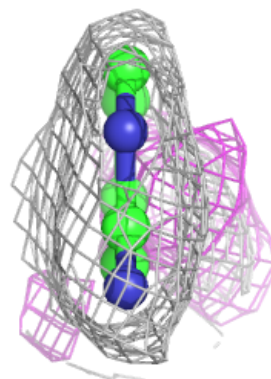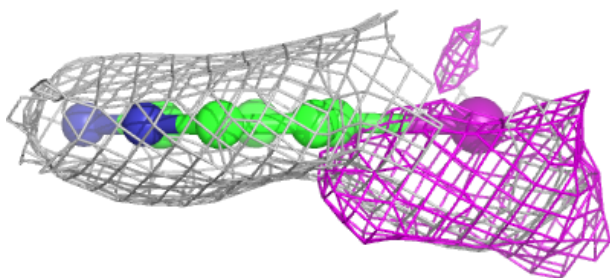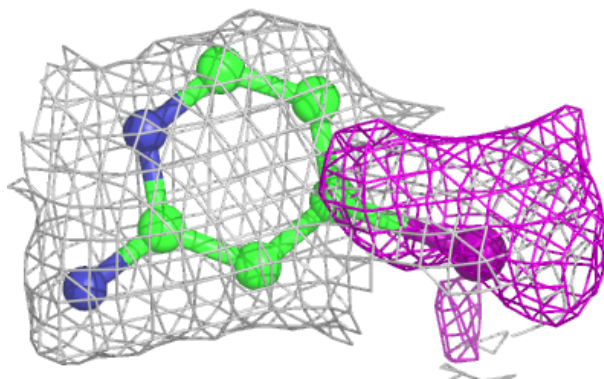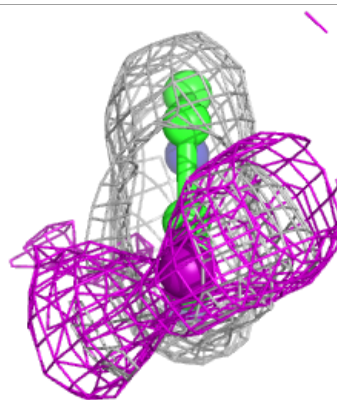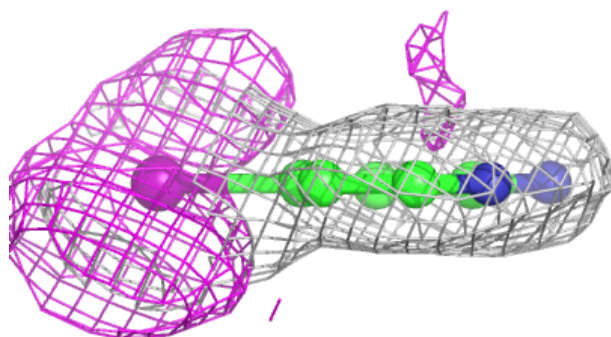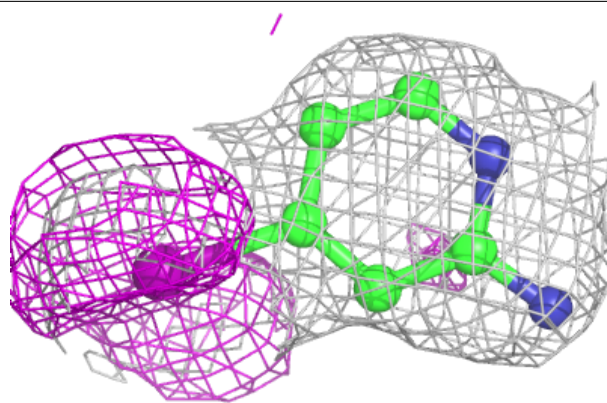
Electron density around IIS A 603:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
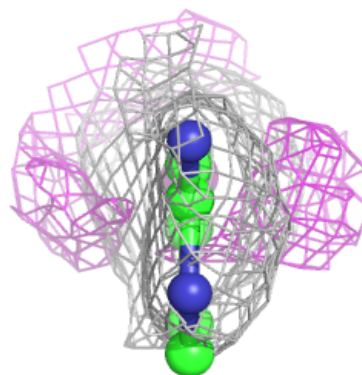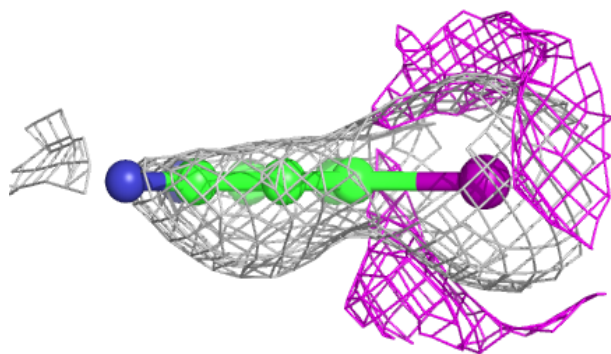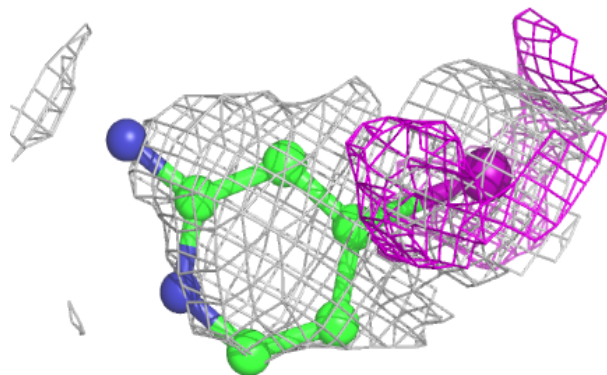
Electron density around IIS A 602 (B):

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)
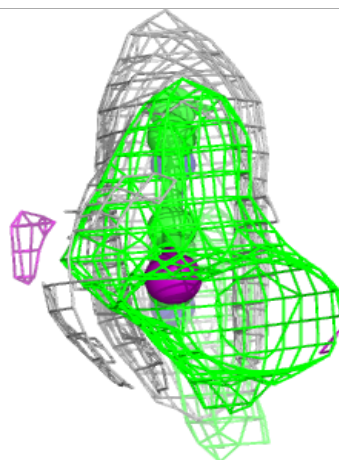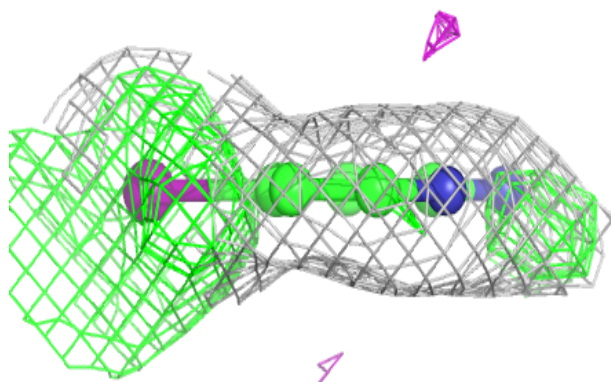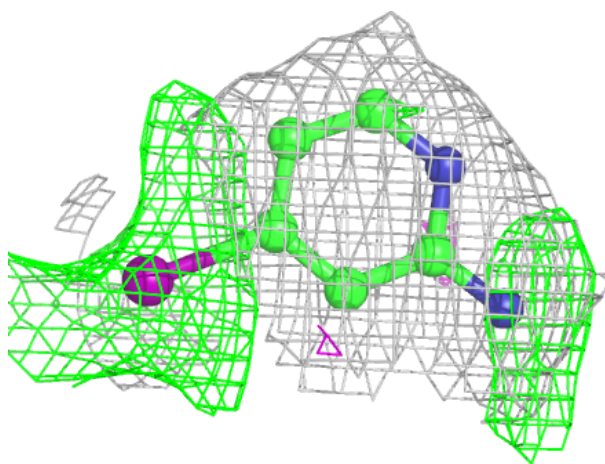
Electron density around IIS A 602 (A):

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
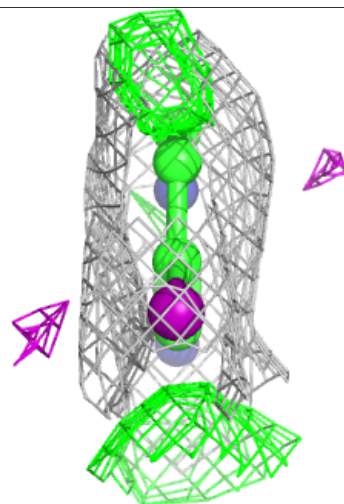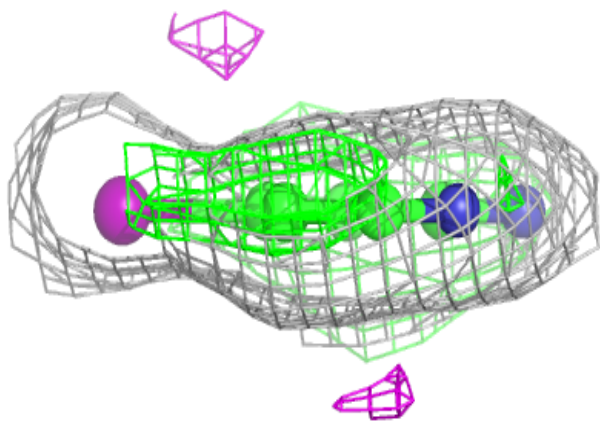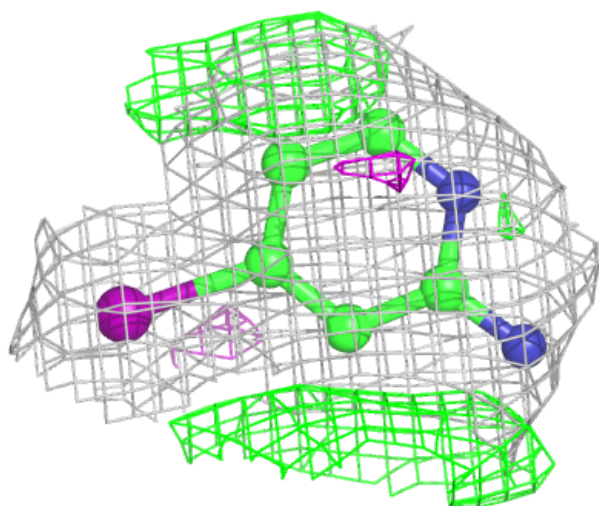
Electron density around IIS C 303:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
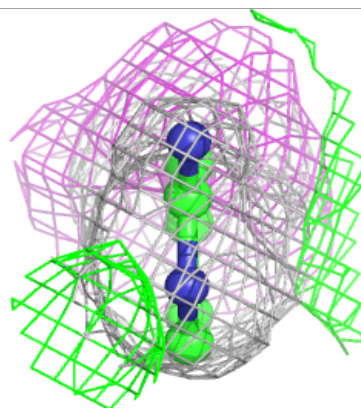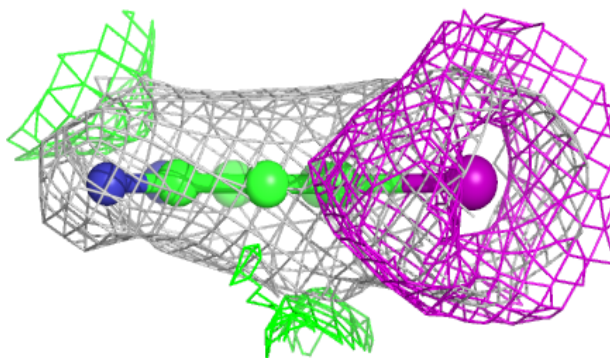
Electron density around IIS C 302:

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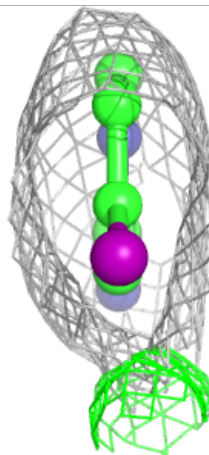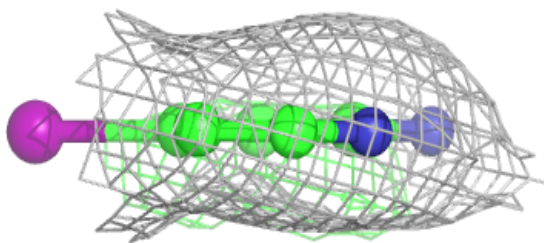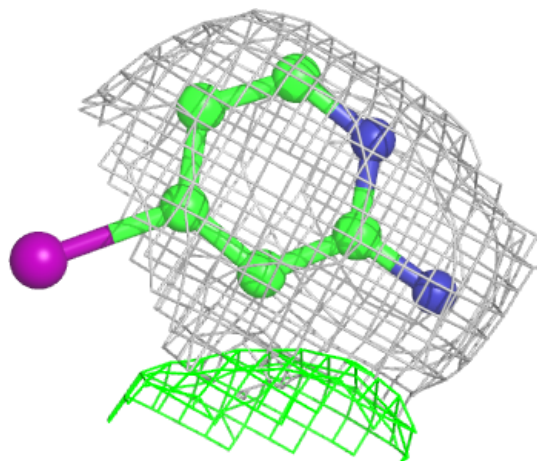mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

Electron density around IIS A 601:

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

Electron density around IIS C 301:

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

6.5 Other polymers ⓘ

There are no such residues in this entry.