



# Full wwPDB X-ray Structure Validation Report ⓘ

Oct 14, 2021 – 07:33 am BST

PDB ID : 7AYG  
Title : oxalyl-CoA decarboxylase from *Methylobacterium extorquens* with bound TPP and ADP  
Authors : Pfister, P.; Burgener, S.; Nattermann, M.; Zarzycki, J.; Erb, T.J.  
Deposited on : 2020-11-12  
Resolution : 1.90 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](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

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

MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.23.2  
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) : 2.23.2

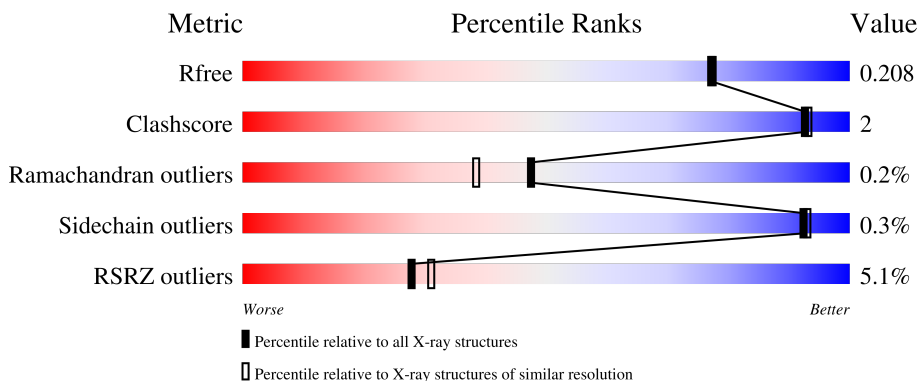
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.90 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.



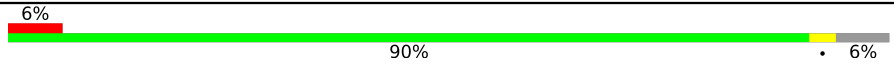
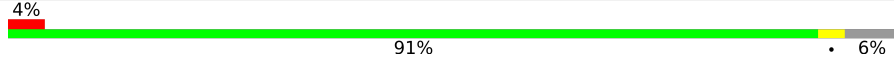
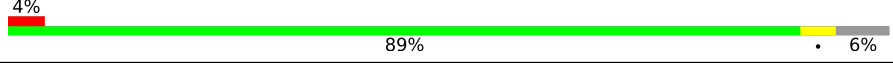
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	6207 (1.90-1.90)
Clashscore	141614	6847 (1.90-1.90)
Ramachandran outliers	138981	6760 (1.90-1.90)
Sidechain outliers	138945	6760 (1.90-1.90)
RSRZ outliers	127900	6082 (1.90-1.90)

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

Mol	Chain	Length	Quality of chain
1	A	583	 4% 90% 6%
1	B	583	 6% 89% 6%
1	C	583	 4% 90% 6%
1	D	583	 5% 91% 6%
1	E	583	 5% 89% 6%

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Mol	Chain	Length	Quality of chain
1	F	583	 6% 90% 6%
1	G	583	 4% 91% 6%
1	H	583	 4% 89% 6%

## 2 Entry composition [i](#)

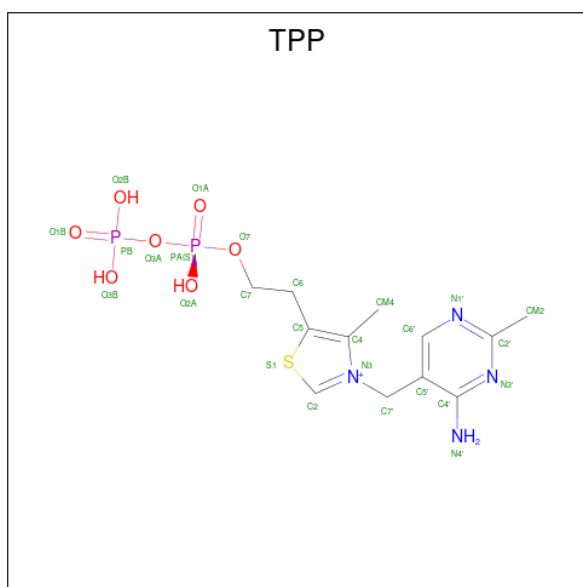
There are 5 unique types of molecules in this entry. The entry contains 36890 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Putative oxalyl-CoA decarboxylase (Oxc, yfdU).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	546	4063	2565	708	768	22	0	1	0
1	B	546	4058	2562	708	766	22	0	0	0
1	C	546	4067	2570	708	767	22	0	1	0
1	D	546	4086	2581	709	774	22	0	4	0
1	E	546	4063	2565	708	768	22	0	1	0
1	F	546	4058	2562	708	766	22	0	0	0
1	G	546	4067	2570	708	767	22	0	1	0
1	H	546	4086	2581	709	774	22	0	4	0

- Molecule 2 is THIAMINE DIPHOSPHATE (three-letter code: TPP) (formula: C<sub>12</sub>H<sub>19</sub>N<sub>4</sub>O<sub>7</sub>P<sub>2</sub>S).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	
			Total	C	N	O	P			S
2	A	1	Total	C	N	O	P	S	0	0
			26	12	4	7	2	1		
2	B	1	Total	C	N	O	P	S	0	0
			26	12	4	7	2	1		
2	C	1	Total	C	N	O	P	S	0	0
			26	12	4	7	2	1		
2	D	1	Total	C	N	O	P	S	0	0
			26	12	4	7	2	1		
2	E	1	Total	C	N	O	P	S	0	0
			26	12	4	7	2	1		
2	F	1	Total	C	N	O	P	S	0	0
			26	12	4	7	2	1		
2	G	1	Total	C	N	O	P	S	0	0
			26	12	4	7	2	1		
2	H	1	Total	C	N	O	P	S	0	0
			26	12	4	7	2	1		

- Molecule 3 is ADENOSINE-5'-DIPHOSPHATE (three-letter code: ADP) (formula:  $C_{10}H_{15}N_5O_{10}P_2$ ).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
3	A	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
3	B	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
3	C	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
3	D	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
3	E	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
3	F	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
3	G	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
3	H	1	Total	C	N	O	P	0	0
			27	10	5	10	2		

- Molecule 4 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Mg		
4	A	1	Total	Mg	0	0
			1	1		
4	B	1	Total	Mg	0	0
			1	1		
4	C	1	Total	Mg	0	0
			1	1		
4	D	1	Total	Mg	0	0
			1	1		

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	E	1	Total 1	Mg 1	0	0
4	F	1	Total 1	Mg 1	0	0
4	G	1	Total 1	Mg 1	0	0
4	H	1	Total 1	Mg 1	0	0

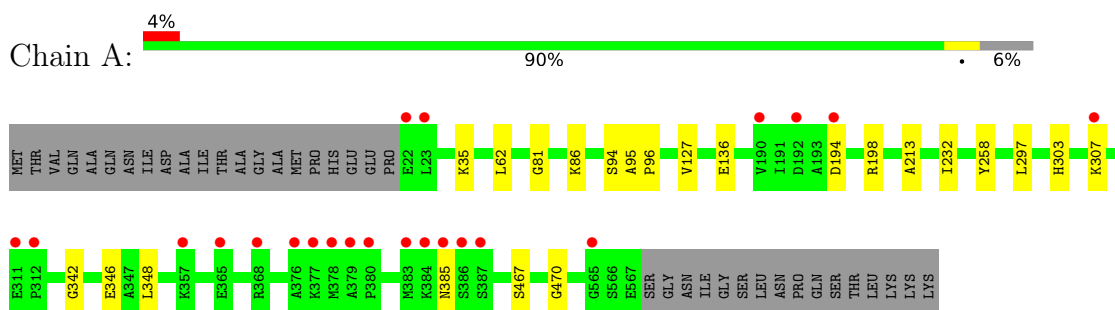
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	481	Total 481	O 481	0	0
5	B	469	Total 469	O 469	0	0
5	C	527	Total 527	O 527	0	0
5	D	495	Total 495	O 495	0	0
5	E	470	Total 470	O 470	0	0
5	F	460	Total 460	O 460	0	0
5	G	517	Total 517	O 517	0	0
5	H	491	Total 491	O 491	0	0

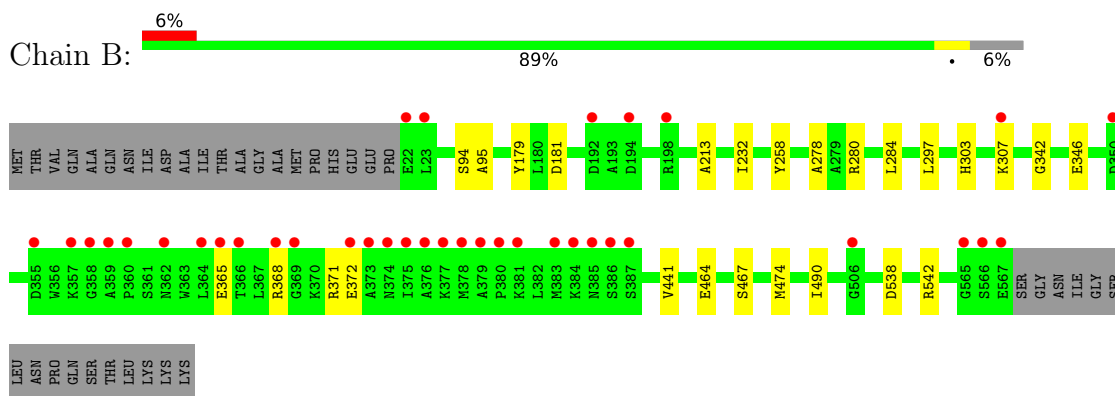
### 3 Residue-property plots [i](#)

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.

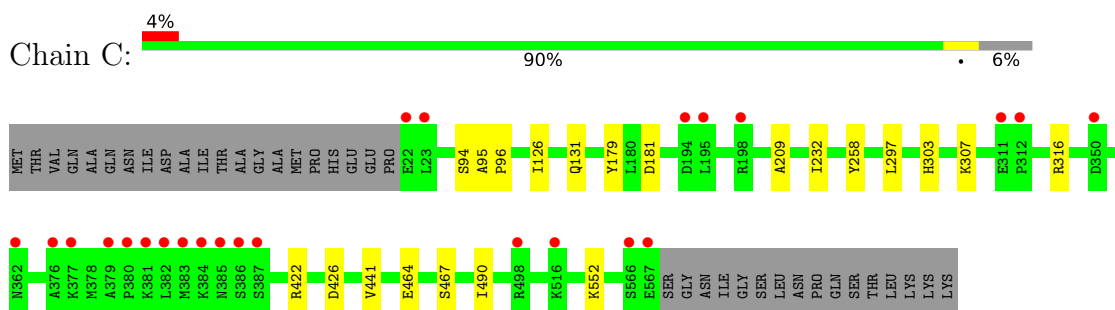
- Molecule 1: Putative oxalyl-CoA decarboxylase (Oxc, yfdU)



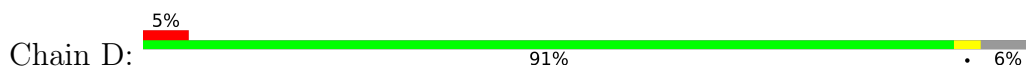
- Molecule 1: Putative oxalyl-CoA decarboxylase (Oxc, yfdU)



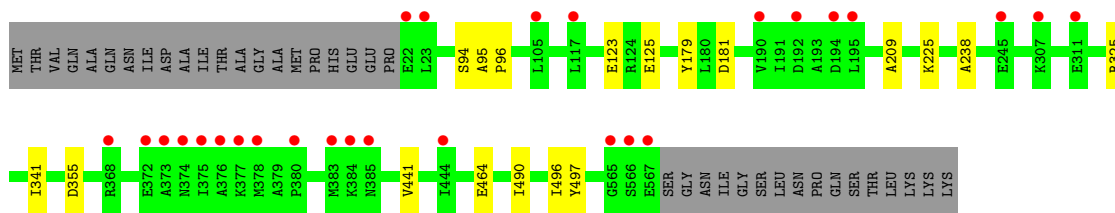
- Molecule 1: Putative oxalyl-CoA decarboxylase (Oxc, yfdU)



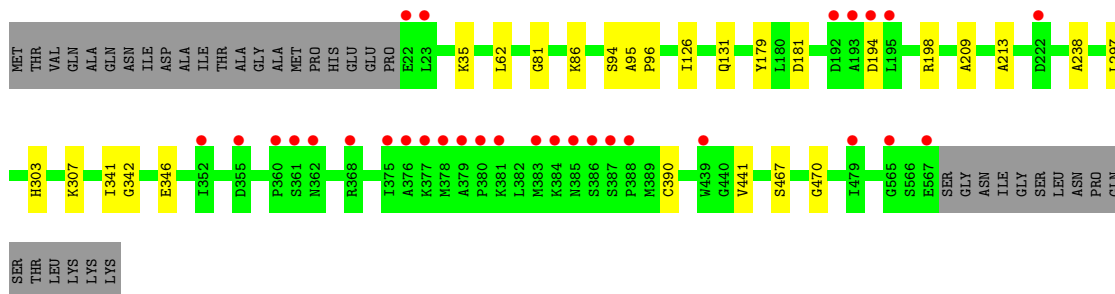
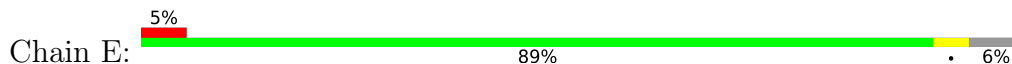
- Molecule 1: Putative oxalyl-CoA decarboxylase (Oxc, yfdU)



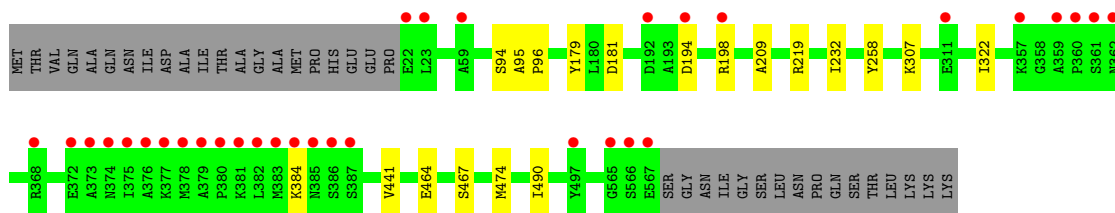
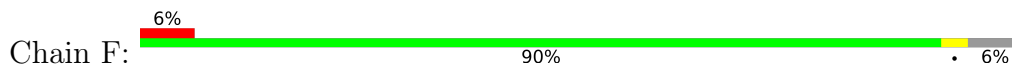




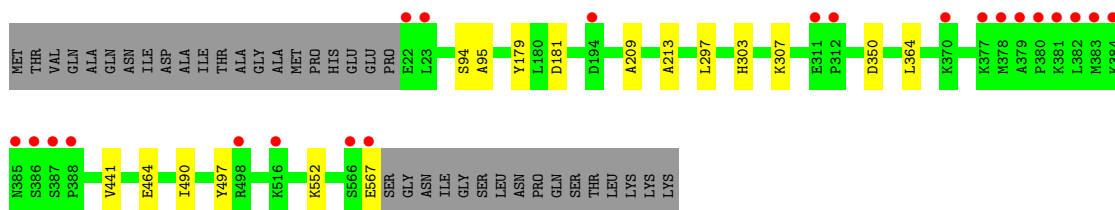
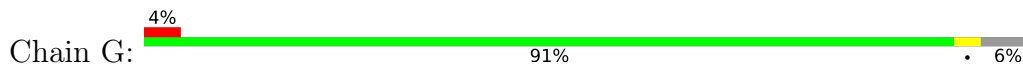
- Molecule 1: Putative oxalyl-CoA decarboxylase (Oxc, yfdU)



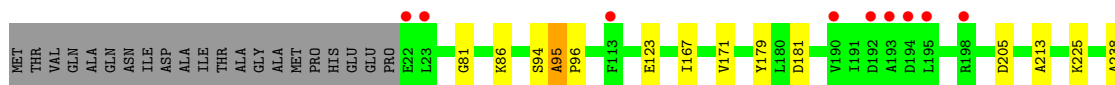
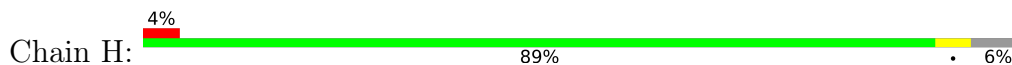
- Molecule 1: Putative oxalyl-CoA decarboxylase (Oxc, yfdU)

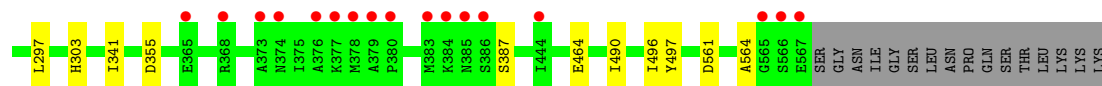


- Molecule 1: Putative oxalyl-CoA decarboxylase (Oxc, yfdU)



- Molecule 1: Putative oxalyl-CoA decarboxylase (Oxc, yfdU)





## 4 Data and refinement statistics i

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	160.18Å 181.80Å 202.37Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	39.30 – 1.90 39.11 – 1.90	Depositor EDS
% Data completeness (in resolution range)	98.7 (39.30-1.90) 98.7 (39.11-1.90)	Depositor EDS
$R_{merge}$	0.11	Depositor
$R_{sym}$	0.11	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.97 (at 1.89Å)	Xtrriage
Refinement program	PHENIX 1.18.2_3874	Depositor
R, $R_{free}$	0.176 , 0.208 0.176 , 0.208	Depositor DCC
$R_{free}$ test set	1987 reflections (0.44%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	24.0	Xtrriage
Anisotropy	0.792	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	(Not available) , (Not available)	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.56$ , $\langle L^2 \rangle = 0.40$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.97	EDS
Total number of atoms	36890	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	27.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 50.72 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 6.2151e-05. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: TPP, ADP, MG

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	0.36	0/4136	0.56	0/5612
1	B	0.37	0/4128	0.56	0/5601
1	C	0.38	0/4141	0.57	0/5619
1	D	0.37	0/4166	0.57	0/5653
1	E	0.36	0/4136	0.56	0/5612
1	F	0.36	0/4128	0.55	0/5601
1	G	0.38	0/4141	0.57	0/5619
1	H	0.37	0/4166	0.56	0/5653
All	All	0.37	0/33142	0.56	0/44970

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

### 5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	4063	0	4137	15	0
1	B	4058	0	4133	16	0
1	C	4067	0	4142	14	0
1	D	4086	0	4155	12	0
1	E	4063	0	4137	17	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	F	4058	0	4133	13	0
1	G	4067	0	4142	11	0
1	H	4086	0	4155	16	0
2	A	26	0	16	1	0
2	B	26	0	16	1	0
2	C	26	0	16	1	0
2	D	26	0	16	0	0
2	E	26	0	16	1	0
2	F	26	0	16	1	0
2	G	26	0	16	0	0
2	H	26	0	16	0	0
3	A	27	0	12	0	0
3	B	27	0	12	0	0
3	C	27	0	12	0	0
3	D	27	0	12	0	0
3	E	27	0	12	0	0
3	F	27	0	12	1	0
3	G	27	0	12	0	0
3	H	27	0	12	0	0
4	A	1	0	0	0	0
4	B	1	0	0	0	0
4	C	1	0	0	0	0
4	D	1	0	0	0	0
4	E	1	0	0	0	0
4	F	1	0	0	0	0
4	G	1	0	0	0	0
4	H	1	0	0	0	0
5	A	481	0	0	1	0
5	B	469	0	0	1	1
5	C	527	0	0	3	1
5	D	495	0	0	2	0
5	E	470	0	0	2	0
5	F	460	0	0	0	1
5	G	517	0	0	2	1
5	H	491	0	0	1	0
All	All	36890	0	33358	100	2

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 2.

All (100) 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:E:35:LYS:HG2	1:E:62:LEU:HD11	1.82	0.61
1:E:390:CYS:SG	5:E:1007:HOH:O	2.56	0.59
1:B:342:GLY:O	1:B:346:GLU:HG3	2.03	0.58
1:E:441:VAL:HG22	1:F:96:PRO:HB3	1.86	0.58
1:D:123:GLU:HG2	5:D:999:HOH:O	2.05	0.56
1:H:225:LYS:NZ	1:H:355:ASP:OD2	2.34	0.55
1:D:225:LYS:NZ	1:D:355:ASP:OD2	2.36	0.55
1:G:464:GLU:HB2	1:G:490:ILE:HD13	1.90	0.54
1:A:96:PRO:HB3	1:B:441:VAL:HG22	1.91	0.52
1:E:307:LYS:HG2	5:E:992:HOH:O	2.09	0.52
1:E:213:ALA:HB2	1:G:209:ALA:HB3	1.93	0.51
1:D:179:TYR:CE2	1:D:181:ASP:HB2	2.46	0.50
1:A:213:ALA:HB2	1:C:209:ALA:HB3	1.93	0.49
1:E:96:PRO:HB3	1:F:441:VAL:HG22	1.95	0.48
1:D:225:LYS:HE2	1:D:355:ASP:O	2.14	0.48
1:A:470:GLY:O	1:B:474:MET:HG2	2.15	0.47
1:A:385:ASN:ND2	5:A:708:HOH:O	2.47	0.47
1:E:470:GLY:O	1:F:474:MET:HG2	2.14	0.47
1:C:464:GLU:HB2	1:C:490:ILE:HD13	1.96	0.47
1:G:552:LYS:HD3	5:G:1140:HOH:O	2.14	0.47
1:B:307:LYS:H	1:B:307:LYS:CE	2.27	0.47
1:G:297:LEU:O	1:G:303:HIS:HA	2.15	0.47
1:A:297:LEU:O	1:A:303:HIS:HA	2.15	0.47
1:C:316:ARG:HD3	5:C:890:HOH:O	2.14	0.46
1:F:179:TYR:CE2	1:F:181:ASP:HB2	2.50	0.46
1:B:464:GLU:HB2	1:B:490:ILE:HD13	1.98	0.46
1:E:297:LEU:O	1:E:303:HIS:HA	2.16	0.46
1:F:219:ARG:NH2	1:H:205[B]:ASP:OD2	2.45	0.46
1:B:307:LYS:H	1:B:307:LYS:HE2	1.80	0.46
1:H:123:GLU:HG2	5:H:1006:HOH:O	2.15	0.46
1:D:325:ARG:NH1	5:D:718:HOH:O	2.49	0.46
1:H:464:GLU:HB2	1:H:490:ILE:HD13	1.98	0.46
1:B:280:ARG:NH1	5:B:714:HOH:O	2.48	0.46
1:C:179:TYR:CE2	1:C:181:ASP:HB2	2.51	0.45
1:D:464:GLU:HB2	1:D:490:ILE:HD13	1.98	0.45
1:E:342:GLY:O	1:E:346:GLU:HG3	2.17	0.45
1:A:194:ASP:O	1:A:198:ARG:HG3	2.17	0.45
1:C:552:LYS:HB3	1:C:552:LYS:HE2	1.73	0.45
1:G:497[B]:TYR:CD1	1:G:567:GLU:HB3	2.51	0.45
1:H:179:TYR:CE2	1:H:181:ASP:HB2	2.51	0.45
1:E:467:SER:HB3	2:E:601:TPP:PA	2.57	0.44
1:A:35:LYS:CG	1:A:62:LEU:HD11	2.48	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:464:GLU:HB2	1:F:490:ILE:HD13	2.00	0.44
1:B:179:TYR:CE2	1:B:181:ASP:HB2	2.52	0.44
1:C:441:VAL:HG22	1:D:96:PRO:HB3	2.00	0.44
1:G:350:ASP:HB2	5:G:1095:HOH:O	2.18	0.44
1:B:297:LEU:O	1:B:303:HIS:HA	2.17	0.43
1:G:552:LYS:HB3	1:G:552:LYS:HE2	1.64	0.43
1:D:238:ALA:HA	1:D:341:ILE:HD13	2.00	0.43
1:B:538:ASP:OD2	1:B:542:ARG:NH1	2.51	0.43
1:H:167:ILE:O	1:H:171:VAL:HG22	2.18	0.43
1:F:322:ILE:HB	3:F:602:ADP:C2	2.54	0.43
1:D:123:GLU:HG3	1:D:125:GLU:OE1	2.19	0.43
1:B:368:ARG:NH2	1:B:372:GLU:OE2	2.52	0.43
1:C:426:ASP:OD2	5:C:701:HOH:O	2.22	0.43
1:A:35:LYS:HG2	1:A:62:LEU:HD11	2.01	0.42
1:C:422:ARG:NH1	5:C:713:HOH:O	2.49	0.42
1:E:238:ALA:HA	1:E:341:ILE:HD13	2.00	0.42
1:G:307:LYS:H	1:G:307:LYS:NZ	2.17	0.42
1:F:194:ASP:O	1:F:198:ARG:HG3	2.19	0.42
1:F:307:LYS:H	1:F:307:LYS:NZ	2.17	0.42
1:C:307:LYS:H	1:C:307:LYS:NZ	2.17	0.42
1:E:179:TYR:CE2	1:E:181:ASP:HB2	2.54	0.42
1:A:342:GLY:O	1:A:346:GLU:HG3	2.19	0.42
1:H:95:ALA:HB3	1:H:96:PRO:CD	2.50	0.42
1:H:95:ALA:HB3	1:H:96:PRO:HD3	2.02	0.42
1:E:35:LYS:CG	1:E:62:LEU:HD11	2.47	0.42
1:A:467:SER:HB3	2:A:601:TPP:PA	2.60	0.42
1:C:297:LEU:O	1:C:303:HIS:HA	2.20	0.42
1:E:194:ASP:O	1:E:198:ARG:HG3	2.20	0.42
1:F:232:ILE:O	1:F:258:TYR:HA	2.20	0.42
1:H:81:GLY:HA2	1:H:86:LYS:O	2.20	0.42
1:G:179:TYR:CE2	1:G:181:ASP:HB2	2.55	0.41
1:C:126:ILE:HG23	1:C:131:GLN:HB2	2.02	0.41
1:F:384:LYS:HB3	1:F:384:LYS:HE2	1.81	0.41
1:D:496:ILE:HG22	1:D:497[B]:TYR:CD2	2.54	0.41
1:F:209:ALA:HB3	1:H:213:ALA:HB2	2.03	0.41
1:C:96:PRO:HB3	1:D:441:VAL:HG22	2.02	0.41
1:C:467:SER:HB3	2:C:601:TPP:PA	2.60	0.41
1:A:127:VAL:HG22	1:A:136:GLU:HG3	2.02	0.41
1:A:348:LEU:HD23	1:A:348:LEU:HA	1.94	0.41
1:B:365:GLU:OE2	1:B:368:ARG:NH1	2.52	0.41
1:E:126:ILE:HG23	1:E:131:GLN:HB2	2.03	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:209:ALA:HB3	1:G:213:ALA:HB2	2.02	0.41
1:B:232:ILE:O	1:B:258:TYR:HA	2.21	0.41
1:F:467:SER:HB3	2:F:601:TPP:PA	2.60	0.41
1:B:278:ALA:HB3	1:B:371:ARG:HG3	2.03	0.41
1:A:307:LYS:HD3	1:A:307:LYS:HA	1.89	0.41
1:B:213:ALA:HB2	1:D:209:ALA:HB3	2.03	0.41
1:B:467:SER:HB3	2:B:601:TPP:PA	2.60	0.41
1:C:232:ILE:O	1:C:258:TYR:HA	2.21	0.41
1:H:238:ALA:HA	1:H:341:ILE:HD13	2.03	0.41
1:A:232:ILE:O	1:A:258:TYR:HA	2.21	0.40
1:A:81:GLY:HA2	1:A:86:LYS:O	2.21	0.40
1:H:297:LEU:O	1:H:303:HIS:HA	2.20	0.40
1:E:81:GLY:HA2	1:E:86:LYS:O	2.22	0.40
1:H:225:LYS:HE2	1:H:355:ASP:O	2.21	0.40
1:H:496:ILE:HG22	1:H:497[B]:TYR:CD2	2.56	0.40
1:H:561:ASP:HB3	1:H:564:ALA:HB2	2.04	0.40
1:G:441:VAL:HG22	1:H:96:PRO:HB3	2.04	0.40

All (2) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:F:773:HOH:O	5:G:1026:HOH:O[4_565]	2.17	0.03
5:B:792:HOH:O	5:C:1041:HOH:O[4_555]	2.19	0.01

## 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	545/583 (94%)	533 (98%)	11 (2%)	1 (0%)	47 38
1	B	544/583 (93%)	531 (98%)	12 (2%)	1 (0%)	47 38

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	C	545/583 (94%)	531 (97%)	13 (2%)	1 (0%)	47	38
1	D	548/583 (94%)	533 (97%)	14 (3%)	1 (0%)	47	38
1	E	545/583 (94%)	532 (98%)	12 (2%)	1 (0%)	47	38
1	F	544/583 (93%)	531 (98%)	12 (2%)	1 (0%)	47	38
1	G	545/583 (94%)	531 (97%)	13 (2%)	1 (0%)	47	38
1	H	548/583 (94%)	531 (97%)	16 (3%)	1 (0%)	47	38
All	All	4364/4664 (94%)	4253 (98%)	103 (2%)	8 (0%)	47	38

All (8) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	95	ALA
1	B	95	ALA
1	C	95	ALA
1	D	95	ALA
1	E	95	ALA
1	F	95	ALA
1	G	95	ALA
1	H	95	ALA

### 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	424/453 (94%)	423 (100%)	1 (0%)	93	94
1	B	423/453 (93%)	421 (100%)	2 (0%)	88	89
1	C	424/453 (94%)	423 (100%)	1 (0%)	93	94
1	D	427/453 (94%)	426 (100%)	1 (0%)	93	94
1	E	424/453 (94%)	423 (100%)	1 (0%)	93	94
1	F	423/453 (93%)	422 (100%)	1 (0%)	93	94
1	G	424/453 (94%)	422 (100%)	2 (0%)	88	89

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	H	427/453 (94%)	425 (100%)	2 (0%)	88	89
All	All	3396/3624 (94%)	3385 (100%)	11 (0%)	92	93

All (11) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	94	SER
1	B	94	SER
1	B	284	LEU
1	C	94	SER
1	D	94	SER
1	E	94	SER
1	F	94	SER
1	G	94	SER
1	G	364	LEU
1	H	94	SER
1	H	387	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	44	ASN
1	B	44	ASN
1	C	44	ASN
1	D	44	ASN
1	E	44	ASN
1	F	44	ASN
1	G	44	ASN
1	H	44	ASN

### 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](#)

Of 24 ligands modelled in this entry, 8 are monoatomic - leaving 16 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
3	ADP	D	602	-	24,29,29	1.42	3 (12%)	29,45,45	1.85	4 (13%)
2	TPP	D	601	4	22,27,27	2.13	5 (22%)	29,40,40	1.71	8 (27%)
3	ADP	B	602	-	24,29,29	1.52	6 (25%)	29,45,45	1.83	5 (17%)
3	ADP	G	602	-	24,29,29	1.54	6 (25%)	29,45,45	1.83	6 (20%)
2	TPP	E	601	4	22,27,27	2.00	4 (18%)	29,40,40	1.78	8 (27%)
2	TPP	C	601	4	22,27,27	2.00	4 (18%)	29,40,40	1.70	8 (27%)
2	TPP	G	601	4	22,27,27	2.08	5 (22%)	29,40,40	1.68	9 (31%)
3	ADP	A	602	-	24,29,29	1.59	5 (20%)	29,45,45	1.85	6 (20%)
3	ADP	C	602	-	24,29,29	1.66	7 (29%)	29,45,45	1.86	4 (13%)
3	ADP	H	602	-	24,29,29	1.53	4 (16%)	29,45,45	1.86	5 (17%)
2	TPP	F	601	4	22,27,27	2.04	4 (18%)	29,40,40	1.73	6 (20%)
2	TPP	B	601	4	22,27,27	2.01	4 (18%)	29,40,40	1.69	8 (27%)
2	TPP	H	601	4	22,27,27	2.21	4 (18%)	29,40,40	1.76	8 (27%)
3	ADP	E	602	-	24,29,29	1.50	5 (20%)	29,45,45	1.80	4 (13%)
3	ADP	F	602	-	24,29,29	1.55	5 (20%)	29,45,45	1.84	7 (24%)
2	TPP	A	601	4	22,27,27	2.08	3 (13%)	29,40,40	1.69	7 (24%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	ADP	D	602	-	-	2/12/32/32	0/3/3/3
2	TPP	D	601	4	-	2/16/17/17	0/2/2/2
3	ADP	B	602	-	-	3/12/32/32	0/3/3/3
3	ADP	G	602	-	-	1/12/32/32	0/3/3/3
2	TPP	E	601	4	-	4/16/17/17	0/2/2/2
2	TPP	C	601	4	-	3/16/17/17	0/2/2/2
2	TPP	G	601	4	-	4/16/17/17	0/2/2/2
3	ADP	A	602	-	-	1/12/32/32	0/3/3/3
3	ADP	C	602	-	-	1/12/32/32	0/3/3/3
3	ADP	H	602	-	-	2/12/32/32	0/3/3/3
2	TPP	F	601	4	-	4/16/17/17	0/2/2/2
2	TPP	B	601	4	-	4/16/17/17	0/2/2/2
2	TPP	H	601	4	-	4/16/17/17	0/2/2/2
3	ADP	E	602	-	-	2/12/32/32	0/3/3/3
3	ADP	F	602	-	-	2/12/32/32	0/3/3/3
2	TPP	A	601	4	-	4/16/17/17	0/2/2/2

All (74) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	F	601	TPP	C4-N3	-6.56	1.34	1.39
2	C	601	TPP	C4-N3	-6.49	1.34	1.39
2	B	601	TPP	C4-N3	-6.43	1.34	1.39
2	G	601	TPP	C4-N3	-6.13	1.34	1.39
2	A	601	TPP	C4-N3	-5.92	1.34	1.39
2	H	601	TPP	C4-N3	-5.86	1.34	1.39
2	D	601	TPP	C4-N3	-5.63	1.34	1.39
2	E	601	TPP	C4-N3	-5.60	1.34	1.39
2	H	601	TPP	C6-C5	5.54	1.53	1.50
3	F	602	ADP	PA-O5'	5.08	1.79	1.59
2	D	601	TPP	C6-C5	4.82	1.53	1.50
2	A	601	TPP	C6-C5	4.70	1.53	1.50
3	D	602	ADP	PA-O5'	4.69	1.78	1.59
3	H	602	ADP	PA-O5'	4.67	1.78	1.59
3	A	602	ADP	PA-O5'	4.49	1.77	1.59
3	C	602	ADP	PA-O5'	4.32	1.76	1.59
2	B	601	TPP	C4'-N4'	4.29	1.44	1.34
2	G	601	TPP	C4'-N4'	4.24	1.44	1.34
2	F	601	TPP	C4'-N4'	4.23	1.44	1.34
2	A	601	TPP	C4'-N4'	4.18	1.44	1.34

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	602	ADP	PA-O5'	4.11	1.75	1.59
3	E	602	ADP	PA-O5'	4.11	1.75	1.59
2	E	601	TPP	C6-C5	4.08	1.52	1.50
2	E	601	TPP	C4'-N4'	4.06	1.44	1.34
2	H	601	TPP	C4'-N4'	4.01	1.44	1.34
2	C	601	TPP	C4'-N4'	3.96	1.44	1.34
2	D	601	TPP	C4'-N4'	3.93	1.44	1.34
2	G	601	TPP	C6-C5	3.78	1.52	1.50
3	G	602	ADP	PA-O5'	3.71	1.74	1.59
3	A	602	ADP	C2-N1	3.13	1.39	1.33
3	E	602	ADP	C2-N1	2.81	1.39	1.33
3	B	602	ADP	O4'-C1'	2.78	1.45	1.41
3	C	602	ADP	C2-N1	2.74	1.39	1.33
2	F	601	TPP	C6-C5	2.71	1.52	1.50
3	G	602	ADP	C3'-C4'	2.59	1.59	1.53
3	C	602	ADP	C2-N3	2.59	1.36	1.32
3	C	602	ADP	C3'-C4'	2.57	1.59	1.53
3	A	602	ADP	C2-N3	2.54	1.36	1.32
3	H	602	ADP	C5'-C4'	2.50	1.59	1.51
2	C	601	TPP	C6-C5	2.50	1.52	1.50
3	B	602	ADP	C2-N3	2.49	1.36	1.32
3	E	602	ADP	C2-N3	2.42	1.36	1.32
2	G	601	TPP	CM4-C4	2.40	1.54	1.49
3	G	602	ADP	C2-N1	2.38	1.38	1.33
3	H	602	ADP	O5'-C5'	-2.35	1.35	1.44
3	G	602	ADP	C5'-C4'	2.33	1.58	1.51
3	D	602	ADP	O5'-C5'	-2.26	1.36	1.44
3	C	602	ADP	O4'-C1'	2.25	1.44	1.41
3	G	602	ADP	O5'-C5'	-2.24	1.36	1.44
2	D	601	TPP	C5'-C4'	-2.23	1.39	1.42
3	C	602	ADP	O5'-C5'	-2.23	1.36	1.44
3	F	602	ADP	C3'-C4'	2.22	1.58	1.53
3	E	602	ADP	C5'-C4'	2.20	1.58	1.51
3	B	602	ADP	C5'-C4'	2.18	1.58	1.51
3	F	602	ADP	C2-N3	2.17	1.35	1.32
3	G	602	ADP	C2-N3	2.15	1.35	1.32
2	B	601	TPP	CM4-C4	2.15	1.54	1.49
3	A	602	ADP	C5'-C4'	2.13	1.58	1.51
2	F	601	TPP	CM4-C4	2.13	1.54	1.49
3	B	602	ADP	C3'-C4'	2.12	1.58	1.53
3	C	602	ADP	C5'-C4'	2.12	1.58	1.51
3	H	602	ADP	C2-N1	2.12	1.37	1.33

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	H	601	TPP	C4'-N3'	-2.09	1.32	1.35
3	B	602	ADP	C2-N1	2.09	1.37	1.33
2	C	601	TPP	CM4-C4	2.08	1.54	1.49
3	F	602	ADP	C2-N1	2.08	1.37	1.33
2	B	601	TPP	C6-C5	2.08	1.51	1.50
2	E	601	TPP	CM4-C4	2.07	1.54	1.49
2	D	601	TPP	CM4-C4	2.06	1.54	1.49
3	A	602	ADP	C4-N3	2.06	1.38	1.35
3	E	602	ADP	C3'-C4'	2.04	1.58	1.53
3	D	602	ADP	C5'-C4'	2.03	1.57	1.51
3	F	602	ADP	C5'-C4'	2.02	1.57	1.51
2	G	601	TPP	C5'-C4'	-2.01	1.39	1.42

All (103) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	602	ADP	PA-O3A-PB	-5.89	112.61	132.83
3	H	602	ADP	PA-O3A-PB	-5.79	112.97	132.83
3	C	602	ADP	PA-O3A-PB	-5.78	113.00	132.83
3	B	602	ADP	PA-O3A-PB	-5.77	113.03	132.83
3	F	602	ADP	PA-O3A-PB	-5.74	113.12	132.83
3	G	602	ADP	PA-O3A-PB	-5.69	113.29	132.83
3	E	602	ADP	PA-O3A-PB	-5.60	113.61	132.83
3	A	602	ADP	PA-O3A-PB	-5.55	113.79	132.83
2	H	601	TPP	C5-C4-N3	4.66	116.91	107.57
2	A	601	TPP	C5-C4-N3	4.59	116.77	107.57
2	E	601	TPP	C5-C4-N3	4.50	116.59	107.57
2	C	601	TPP	C5-C4-N3	4.41	116.39	107.57
2	D	601	TPP	C5-C4-N3	4.35	116.27	107.57
2	F	601	TPP	C5-C4-N3	4.30	116.17	107.57
2	G	601	TPP	C5-C4-N3	4.28	116.13	107.57
2	B	601	TPP	C5-C4-N3	4.19	115.95	107.57
3	G	602	ADP	O3B-PB-O2B	4.12	123.38	107.64
3	A	602	ADP	O3B-PB-O2B	4.10	123.30	107.64
3	H	602	ADP	O3B-PB-O2B	4.06	123.14	107.64
3	E	602	ADP	O5'-PA-O1A	-4.00	93.43	109.07
3	B	602	ADP	O3B-PB-O2B	3.98	122.86	107.64
3	C	602	ADP	O5'-PA-O1A	-3.95	93.62	109.07
2	H	601	TPP	CM2-C2'-N1'	3.80	121.31	117.14
2	D	601	TPP	CM2-C2'-N1'	3.79	121.31	117.14
2	E	601	TPP	CM4-C4-C5	-3.71	119.48	127.60
3	F	602	ADP	O5'-PA-O1A	-3.62	94.93	109.07

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	601	TPP	CM4-C4-C5	-3.55	119.84	127.60
2	F	601	TPP	CM4-C4-C5	-3.47	120.01	127.60
2	A	601	TPP	CM4-C4-C5	-3.47	120.01	127.60
2	G	601	TPP	CM4-C4-C5	-3.30	120.38	127.60
3	C	602	ADP	O2B-PB-O1B	3.29	123.54	110.68
3	A	602	ADP	O2A-PA-O5'	-3.28	92.52	107.75
3	D	602	ADP	O2B-PB-O1B	3.27	123.49	110.68
3	D	602	ADP	O5'-PA-O1A	-3.25	96.37	109.07
2	H	601	TPP	CM4-C4-C5	-3.23	120.53	127.60
2	B	601	TPP	C7'-N3-C2	-3.22	119.54	125.35
2	D	601	TPP	CM4-C4-C5	-3.21	120.57	127.60
3	F	602	ADP	O2B-PB-O1B	3.21	123.25	110.68
2	F	601	TPP	C6'-N1'-C2'	3.20	121.41	115.96
2	A	601	TPP	C6'-N1'-C2'	3.19	121.39	115.96
3	E	602	ADP	O2B-PB-O1B	3.19	123.16	110.68
2	C	601	TPP	C6'-N1'-C2'	3.18	121.38	115.96
2	C	601	TPP	CM4-C4-C5	-3.17	120.68	127.60
2	D	601	TPP	C6'-N1'-C2'	2.97	121.02	115.96
2	H	601	TPP	C6'-N1'-C2'	2.92	120.93	115.96
2	G	601	TPP	C6'-N1'-C2'	2.92	120.93	115.96
2	G	601	TPP	CM2-C2'-N1'	2.89	120.31	117.14
3	G	602	ADP	O2A-PA-O5'	-2.86	94.48	107.75
2	F	601	TPP	N1'-C2'-N3'	-2.85	120.63	125.54
2	E	601	TPP	C6'-N1'-C2'	2.83	120.77	115.96
3	H	602	ADP	O2A-PA-O5'	-2.81	94.69	107.75
2	F	601	TPP	C7'-N3-C2	-2.80	120.29	125.35
2	B	601	TPP	C6-C5-C4	2.79	129.67	127.43
2	B	601	TPP	C6'-N1'-C2'	2.76	120.66	115.96
2	E	601	TPP	C6-C5-C4	2.72	129.61	127.43
3	H	602	ADP	O3A-PB-O1B	-2.71	96.15	111.19
2	D	601	TPP	N1'-C2'-N3'	-2.70	120.89	125.54
3	C	602	ADP	O3B-PB-O3A	-2.70	95.59	104.64
3	A	602	ADP	O3A-PB-O1B	-2.66	96.45	111.19
3	G	602	ADP	O3A-PB-O1B	-2.65	96.50	111.19
3	B	602	ADP	O2A-PA-O5'	-2.64	95.51	107.75
2	E	601	TPP	C7'-N3-C2	-2.58	120.69	125.35
2	C	601	TPP	N1'-C2'-N3'	-2.57	121.11	125.54
2	G	601	TPP	N1'-C2'-N3'	-2.56	121.13	125.54
3	D	602	ADP	O3B-PB-O3A	-2.55	96.09	104.64
2	H	601	TPP	N1'-C2'-N3'	-2.54	121.16	125.54
3	A	602	ADP	O5'-C5'-C4'	-2.53	100.30	108.99
3	H	602	ADP	O5'-PA-O1A	-2.51	99.27	109.07

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	601	TPP	N1'-C2'-N3'	-2.44	121.33	125.54
3	B	602	ADP	O5'-PA-O1A	-2.40	99.70	109.07
2	A	601	TPP	C5'-C6'-N1'	-2.38	119.86	123.82
2	C	601	TPP	C5'-C6'-N1'	-2.37	119.88	123.82
2	H	601	TPP	C7'-N3-C2	-2.35	121.11	125.35
2	C	601	TPP	C7'-N3-C2	-2.35	121.11	125.35
3	B	602	ADP	O3A-PB-O1B	-2.35	98.18	111.19
3	A	602	ADP	O5'-PA-O1A	-2.32	100.00	109.07
2	F	601	TPP	PA-O3A-PB	-2.32	124.88	132.83
2	A	601	TPP	C7'-N3-C2	-2.31	121.18	125.35
2	G	601	TPP	C7'-N3-C2	-2.30	121.19	125.35
2	D	601	TPP	PA-O3A-PB	-2.27	125.05	132.83
2	C	601	TPP	CM2-C2'-N1'	2.26	119.62	117.14
2	H	601	TPP	PA-O3A-PB	-2.25	125.11	132.83
2	E	601	TPP	C5'-C6'-N1'	-2.24	120.09	123.82
3	F	602	ADP	C2-N1-C6	-2.24	114.93	118.75
3	F	602	ADP	O5'-C5'-C4'	-2.23	101.30	108.99
3	E	602	ADP	O5'-C5'-C4'	-2.21	101.39	108.99
2	G	601	TPP	C5'-C6'-N1'	-2.19	120.18	123.82
2	A	601	TPP	PA-O3A-PB	-2.18	125.35	132.83
2	H	601	TPP	C5'-C6'-N1'	-2.18	120.19	123.82
2	D	601	TPP	C7'-N3-C2	-2.17	121.42	125.35
2	E	601	TPP	N1'-C2'-N3'	-2.17	121.81	125.54
2	C	601	TPP	PA-O3A-PB	-2.17	125.38	132.83
2	B	601	TPP	C5'-C6'-N1'	-2.17	120.20	123.82
3	F	602	ADP	O3B-PB-O3A	-2.16	97.39	104.64
2	B	601	TPP	N1'-C2'-N3'	-2.11	121.91	125.54
2	G	601	TPP	O3B-PB-O3A	2.09	111.63	104.64
3	G	602	ADP	O5'-PA-O1A	-2.08	100.95	109.07
2	D	601	TPP	C5'-C6'-N1'	-2.07	120.37	123.82
2	B	601	TPP	PA-O3A-PB	-2.05	125.80	132.83
2	G	601	TPP	PA-O3A-PB	-2.04	125.81	132.83
2	E	601	TPP	PA-O3A-PB	-2.04	125.83	132.83
3	F	602	ADP	O2A-PA-O5'	-2.03	98.33	107.75
3	G	602	ADP	C2-N1-C6	-2.02	115.30	118.75

There are no chirality outliers.

All (43) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	601	TPP	C4-C5-C6-C7
2	A	601	TPP	PA-O3A-PB-O3B

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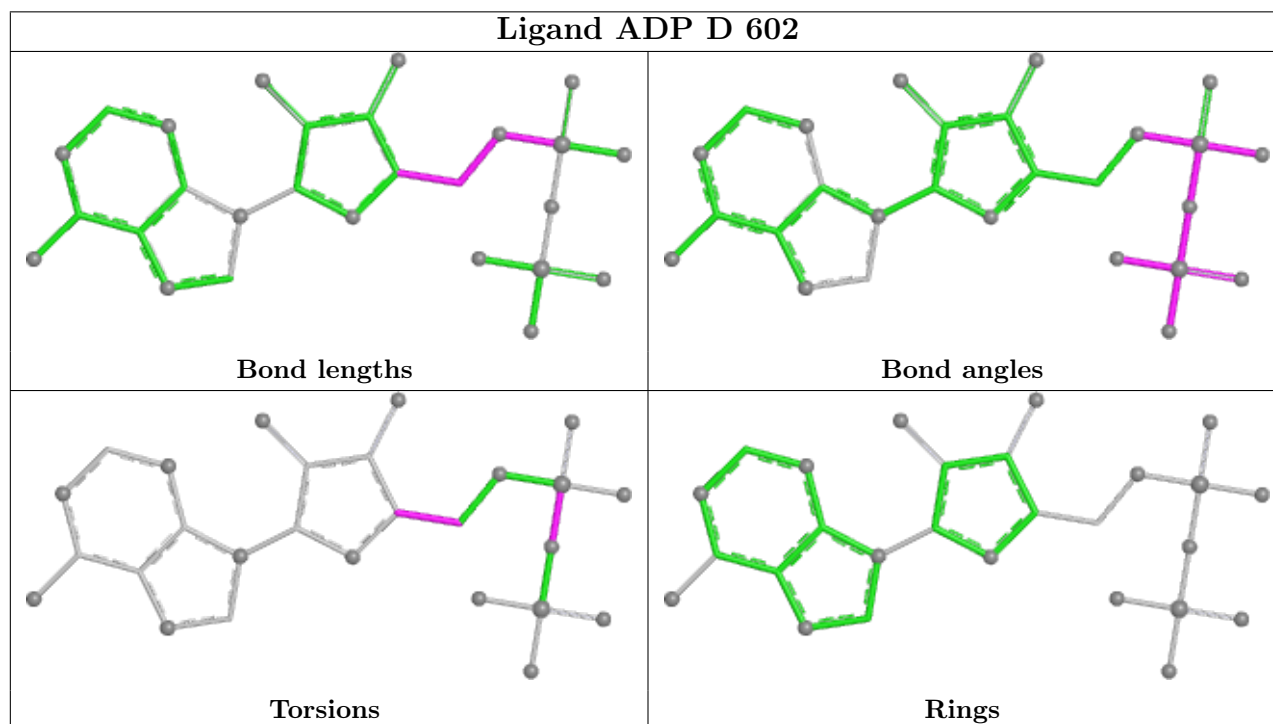
Mol	Chain	Res	Type	Atoms
2	B	601	TPP	C4-C5-C6-C7
2	B	601	TPP	PA-O3A-PB-O3B
2	C	601	TPP	C4-C5-C6-C7
2	C	601	TPP	PA-O3A-PB-O3B
2	D	601	TPP	C4-C5-C6-C7
2	E	601	TPP	C4-C5-C6-C7
2	E	601	TPP	PA-O3A-PB-O3B
2	F	601	TPP	C4-C5-C6-C7
2	F	601	TPP	PA-O3A-PB-O3B
2	G	601	TPP	C4-C5-C6-C7
2	G	601	TPP	PA-O3A-PB-O3B
2	H	601	TPP	C4-C5-C6-C7
2	H	601	TPP	PA-O3A-PB-O3B
3	B	602	ADP	O4'-C4'-C5'-O5'
3	F	602	ADP	O4'-C4'-C5'-O5'
3	E	602	ADP	O4'-C4'-C5'-O5'
2	D	601	TPP	PA-O3A-PB-O3B
3	B	602	ADP	C3'-C4'-C5'-O5'
3	G	602	ADP	O4'-C4'-C5'-O5'
3	A	602	ADP	O4'-C4'-C5'-O5'
3	D	602	ADP	O4'-C4'-C5'-O5'
3	H	602	ADP	O4'-C4'-C5'-O5'
2	B	601	TPP	PA-O3A-PB-O1B
3	F	602	ADP	C3'-C4'-C5'-O5'
2	C	601	TPP	PA-O3A-PB-O1B
2	F	601	TPP	PA-O3A-PB-O1B
2	G	601	TPP	PA-O3A-PB-O1B
2	H	601	TPP	PA-O3A-PB-O1B
2	E	601	TPP	C5-C6-C7-O7
2	A	601	TPP	PA-O3A-PB-O2B
2	B	601	TPP	PA-O3A-PB-O2B
2	F	601	TPP	PA-O3A-PB-O2B
2	G	601	TPP	PA-O3A-PB-O2B
2	H	601	TPP	PA-O3A-PB-O2B
3	C	602	ADP	O4'-C4'-C5'-O5'
3	E	602	ADP	C3'-C4'-C5'-O5'
3	B	602	ADP	PB-O3A-PA-O2A
3	D	602	ADP	PB-O3A-PA-O1A
3	H	602	ADP	PB-O3A-PA-O2A
2	A	601	TPP	PA-O3A-PB-O1B
2	E	601	TPP	PA-O3A-PB-O1B

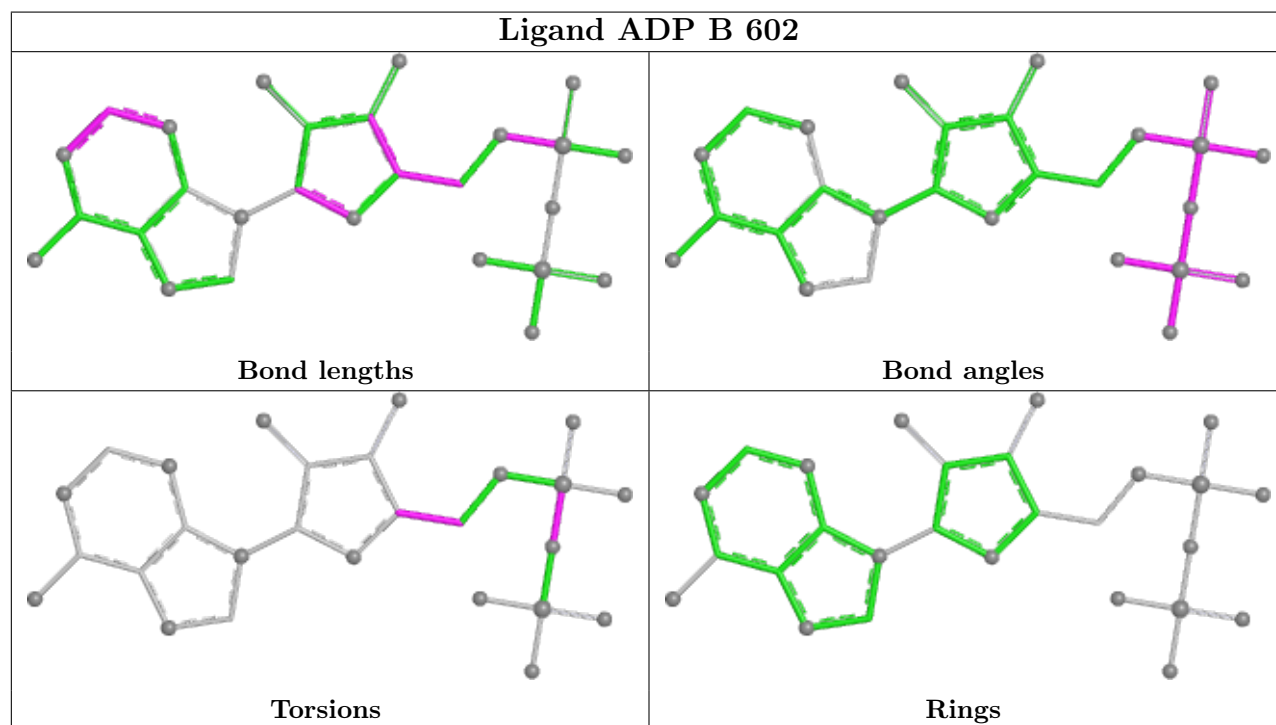
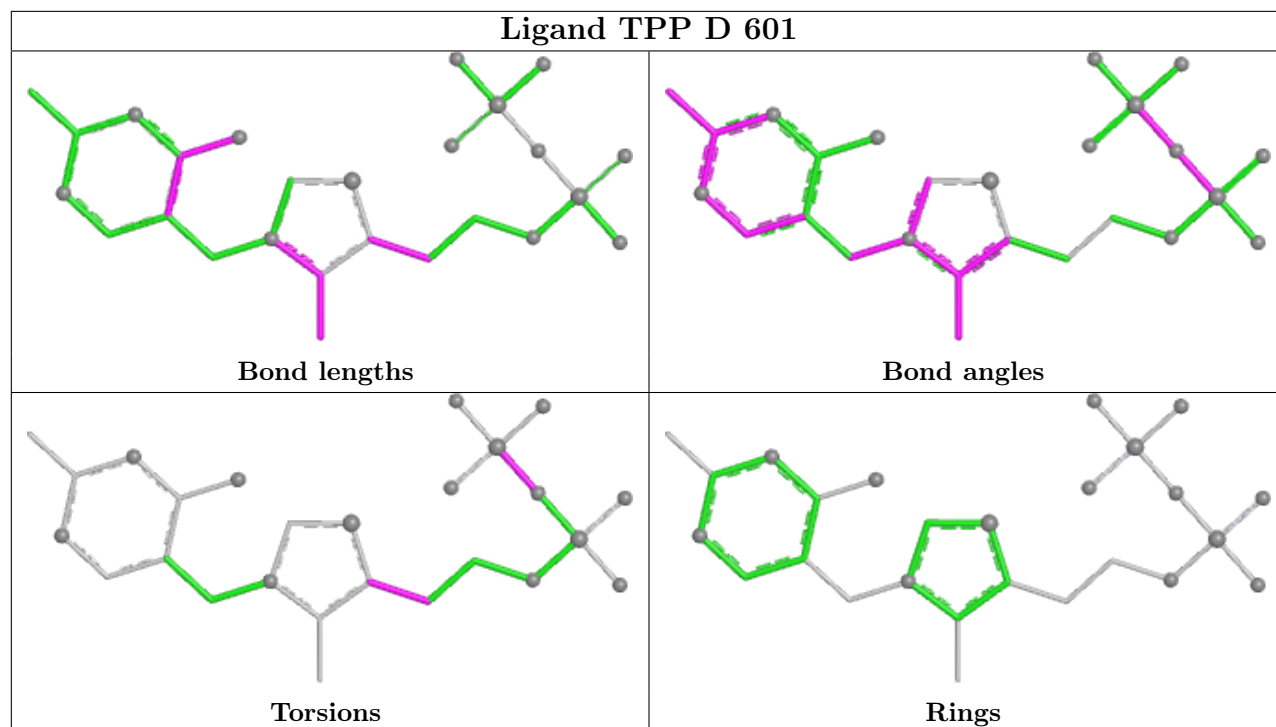
There are no ring outliers.

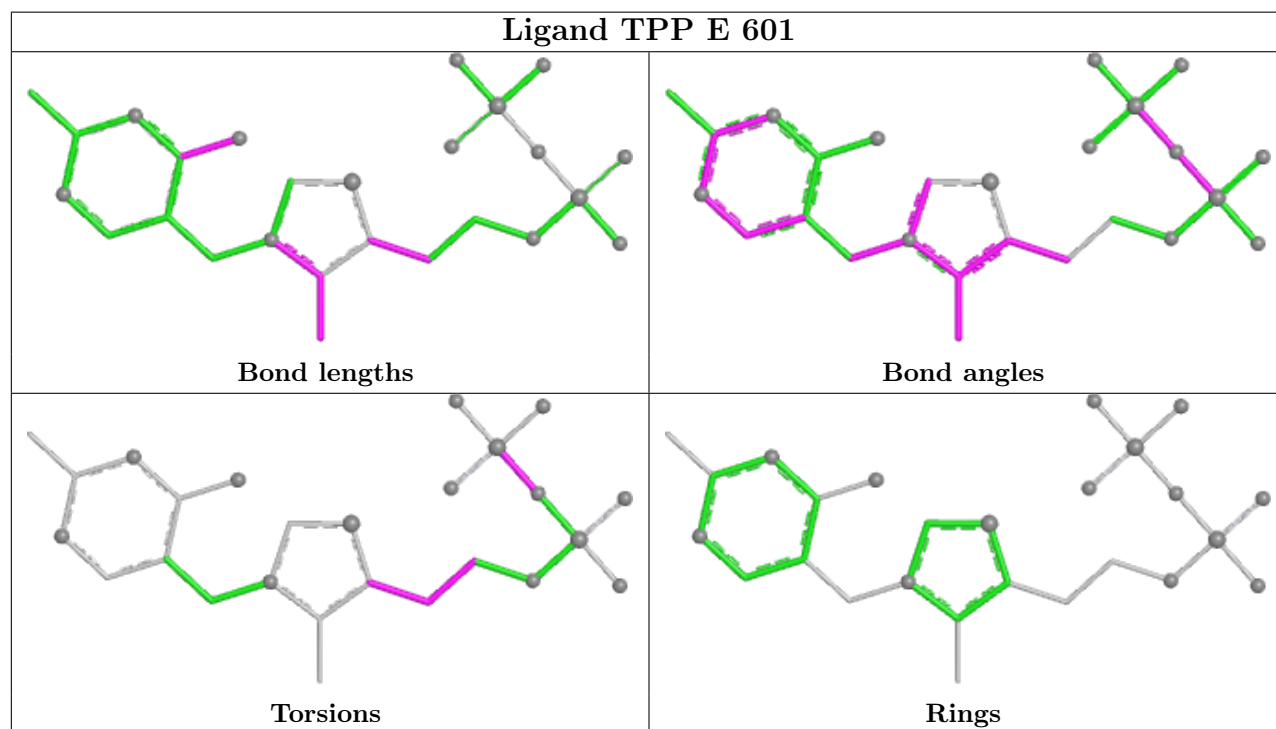
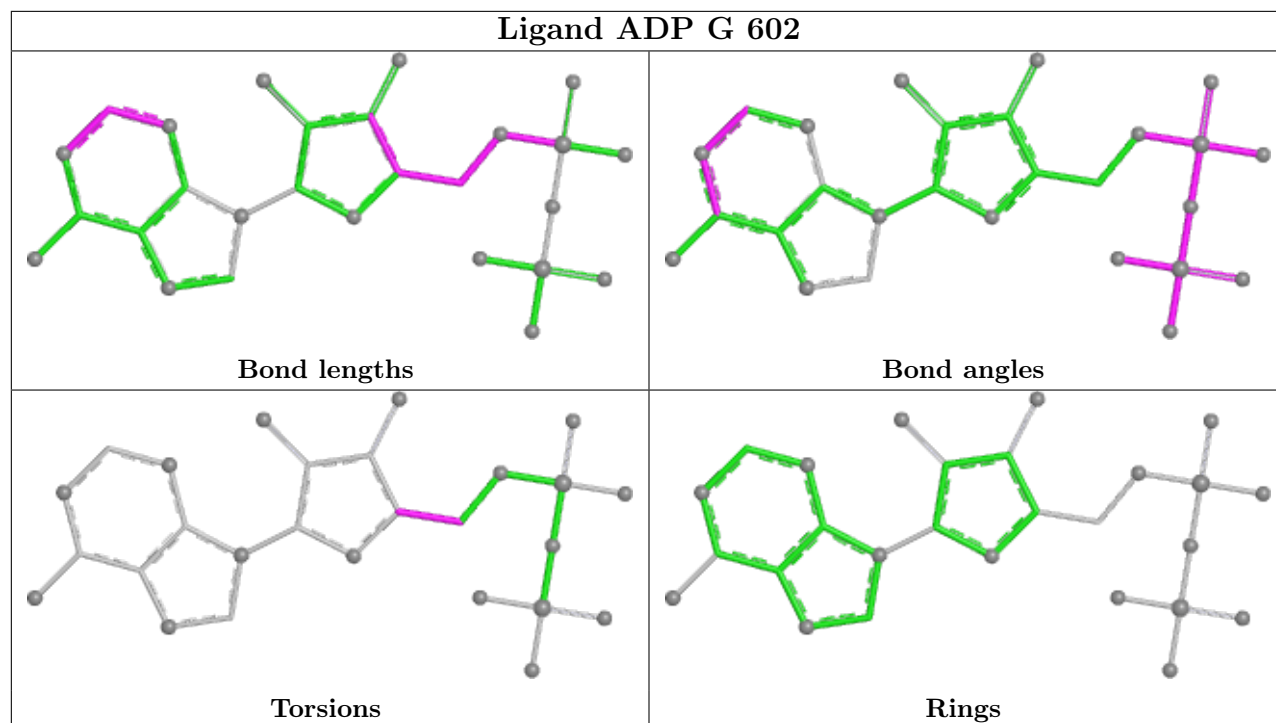
6 monomers are involved in 6 short contacts:

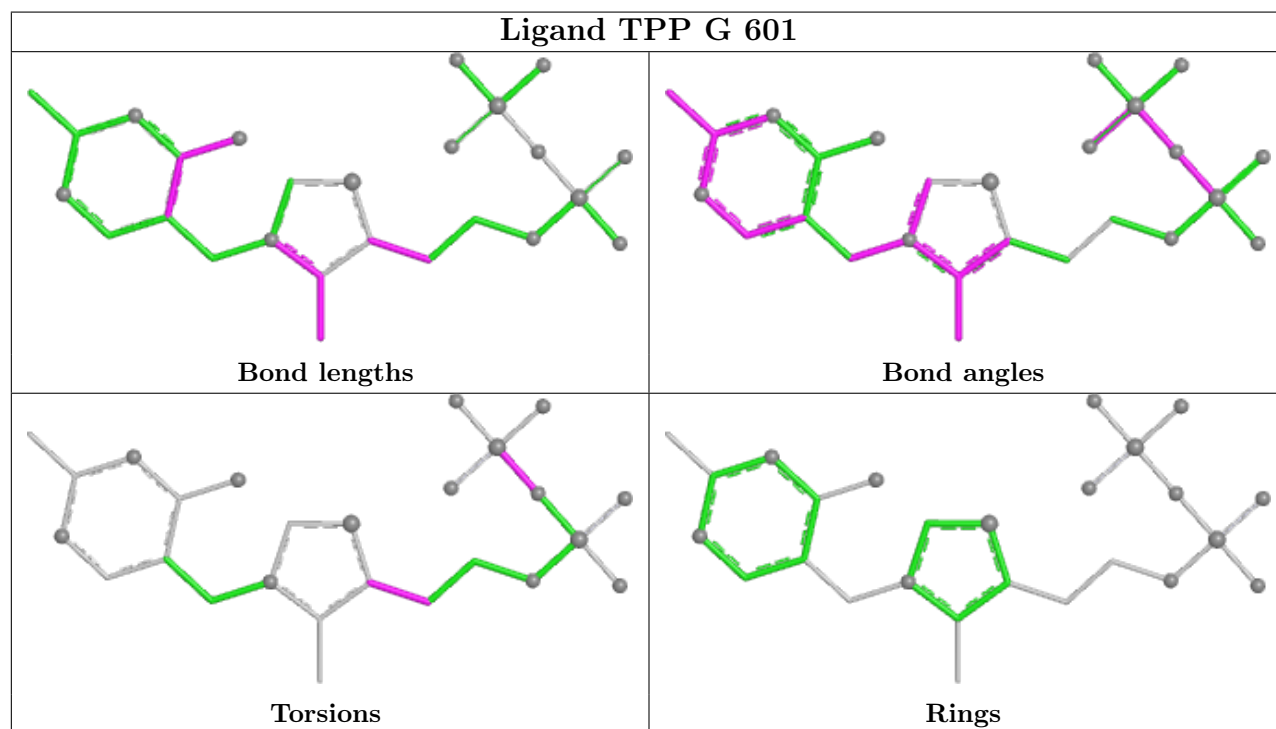
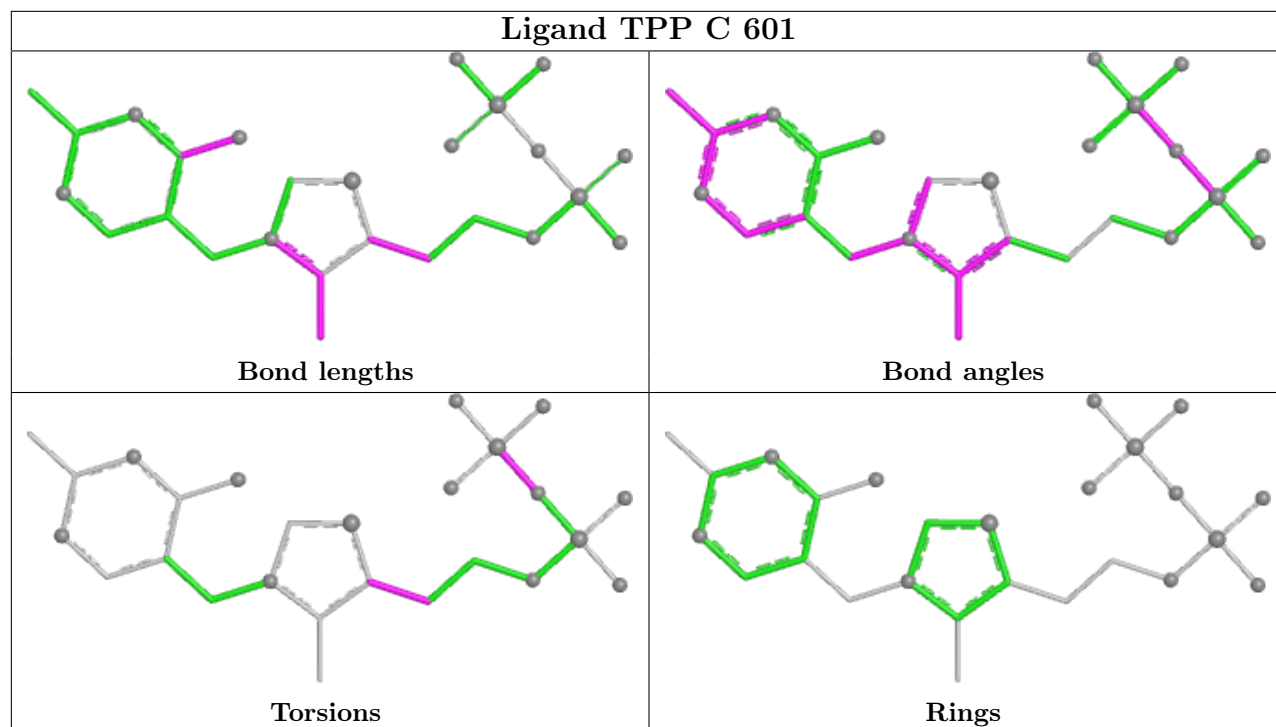
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	E	601	TPP	1	0
2	C	601	TPP	1	0
2	F	601	TPP	1	0
2	B	601	TPP	1	0
3	F	602	ADP	1	0
2	A	601	TPP	1	0

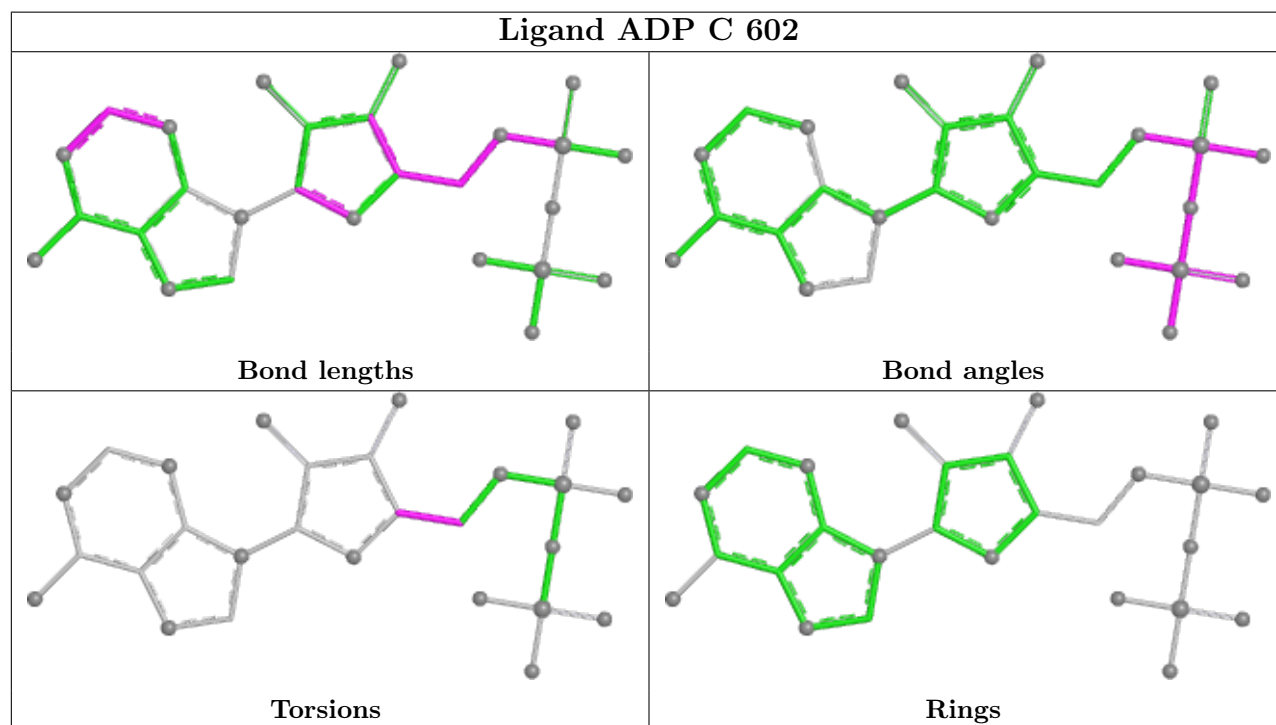
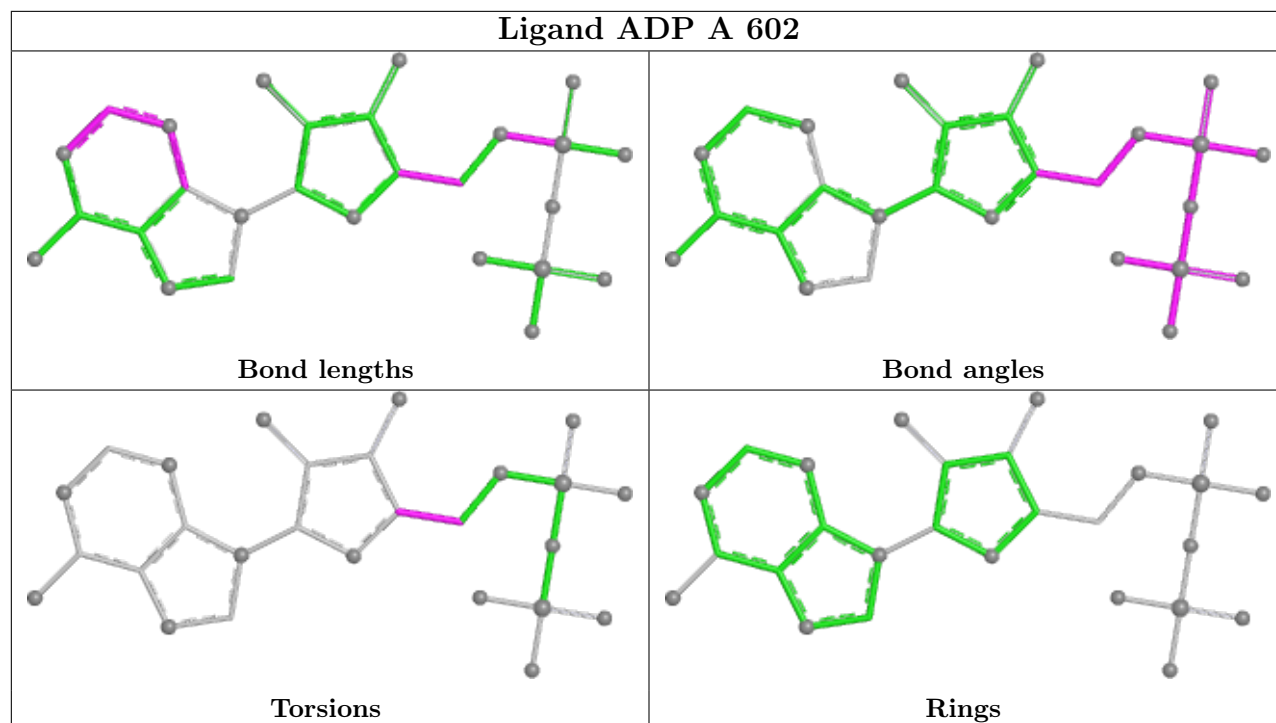
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

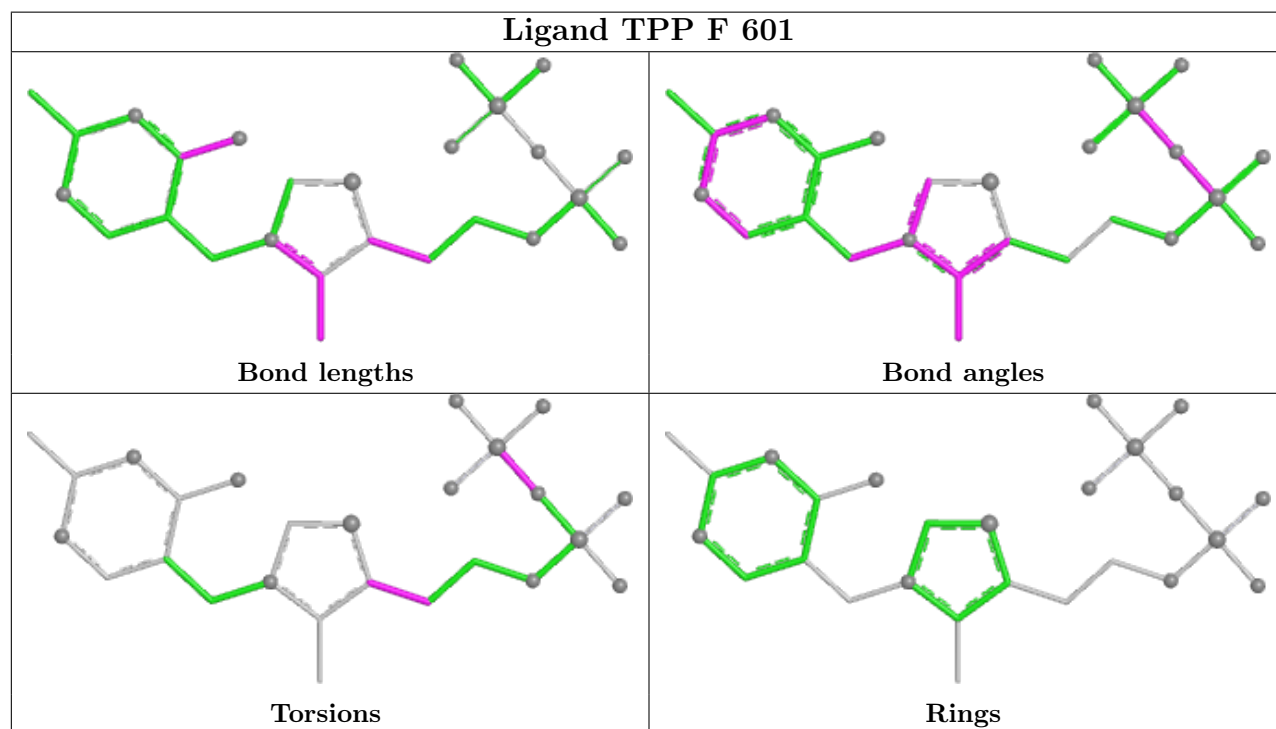
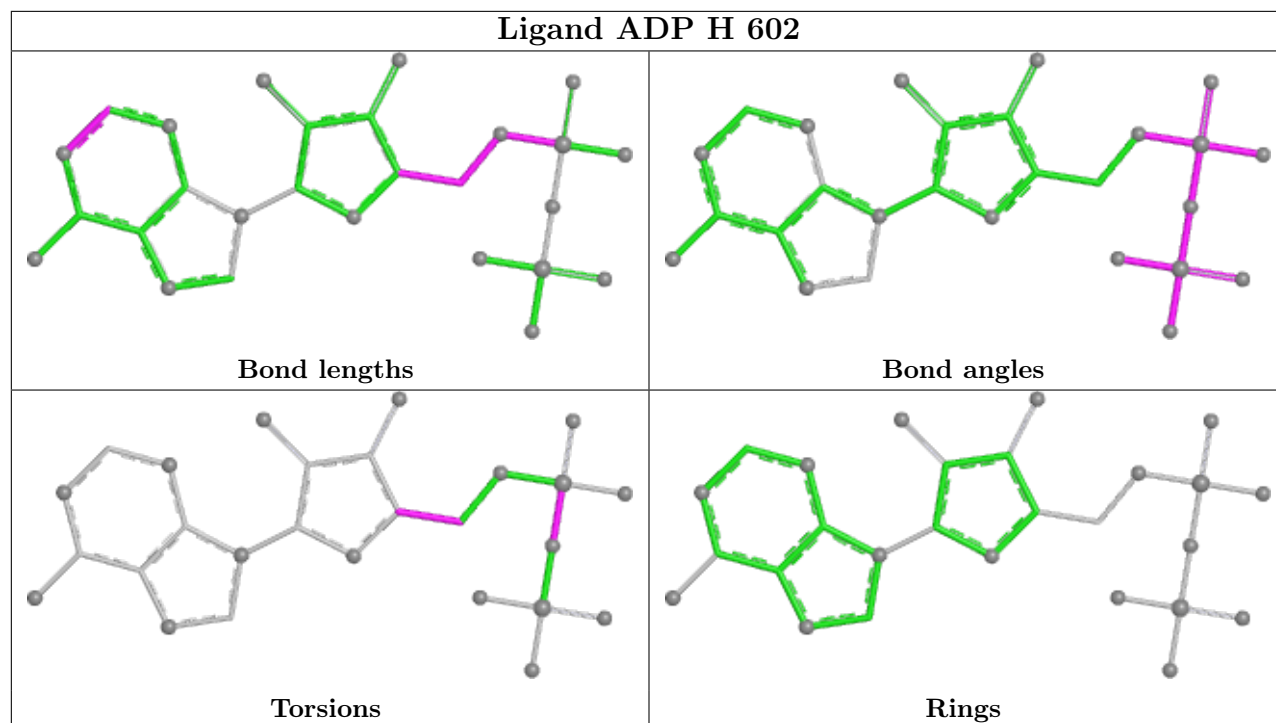


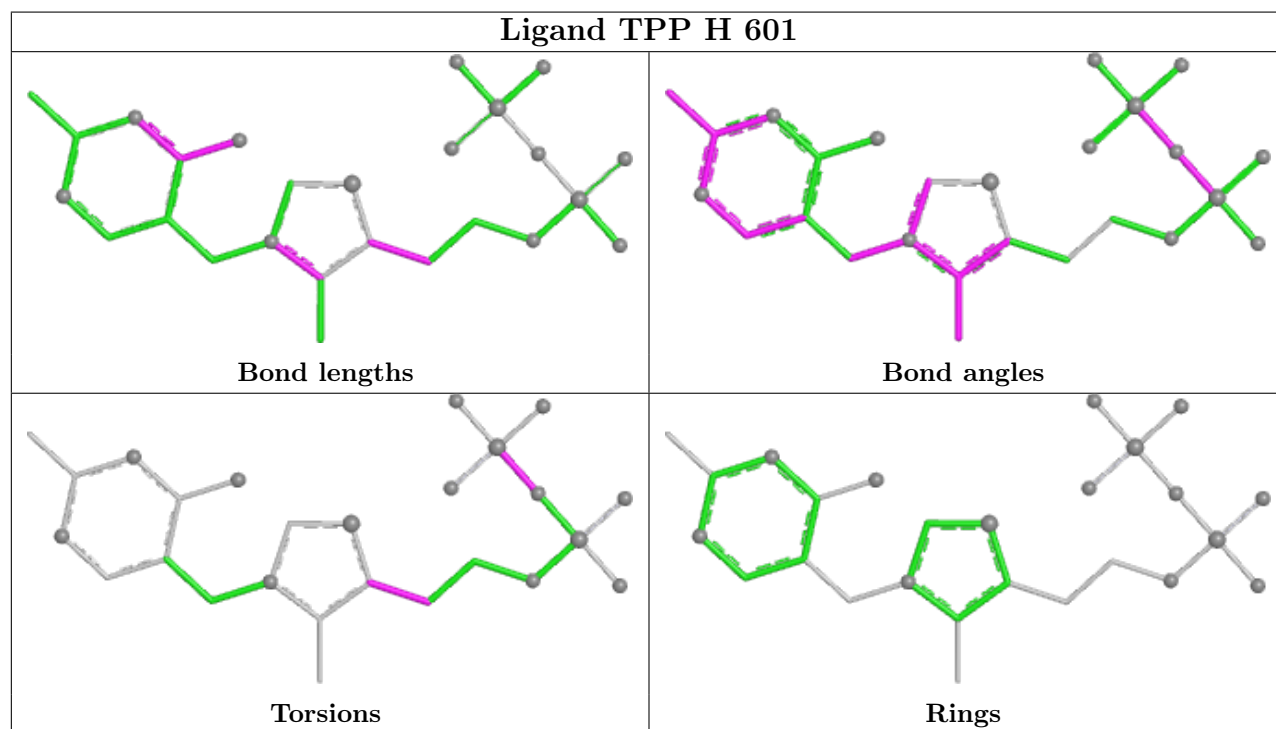
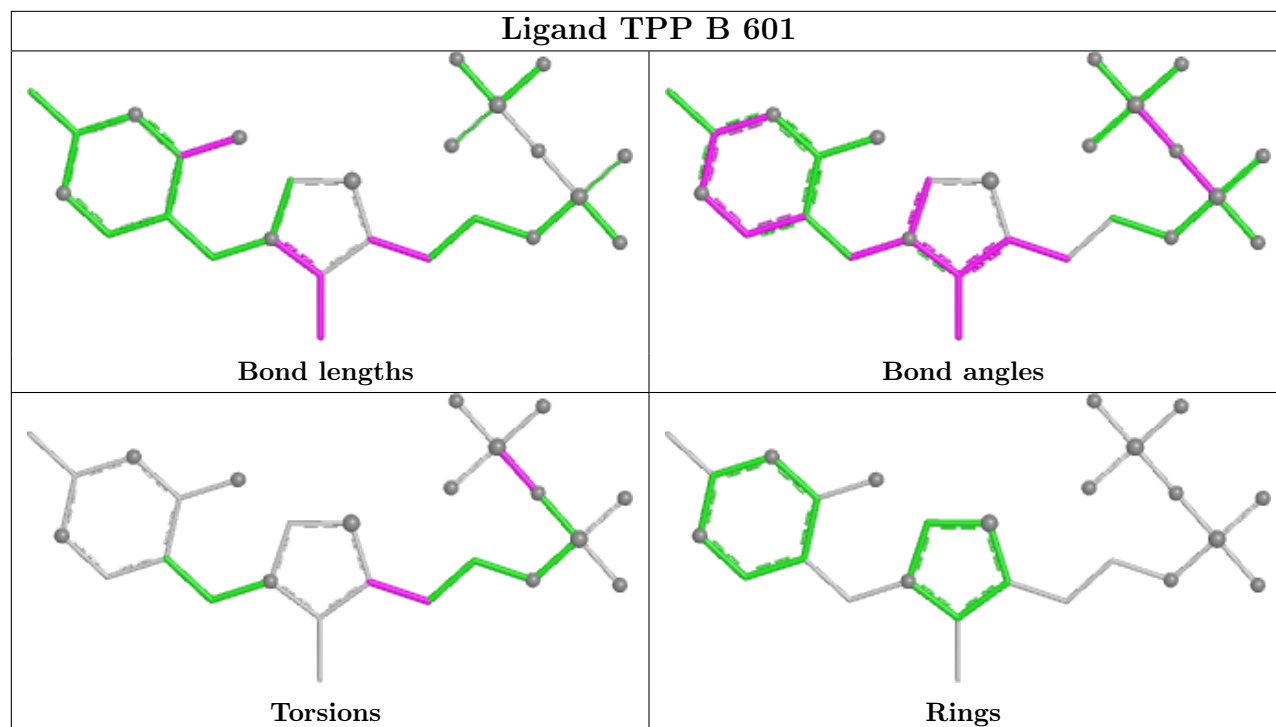




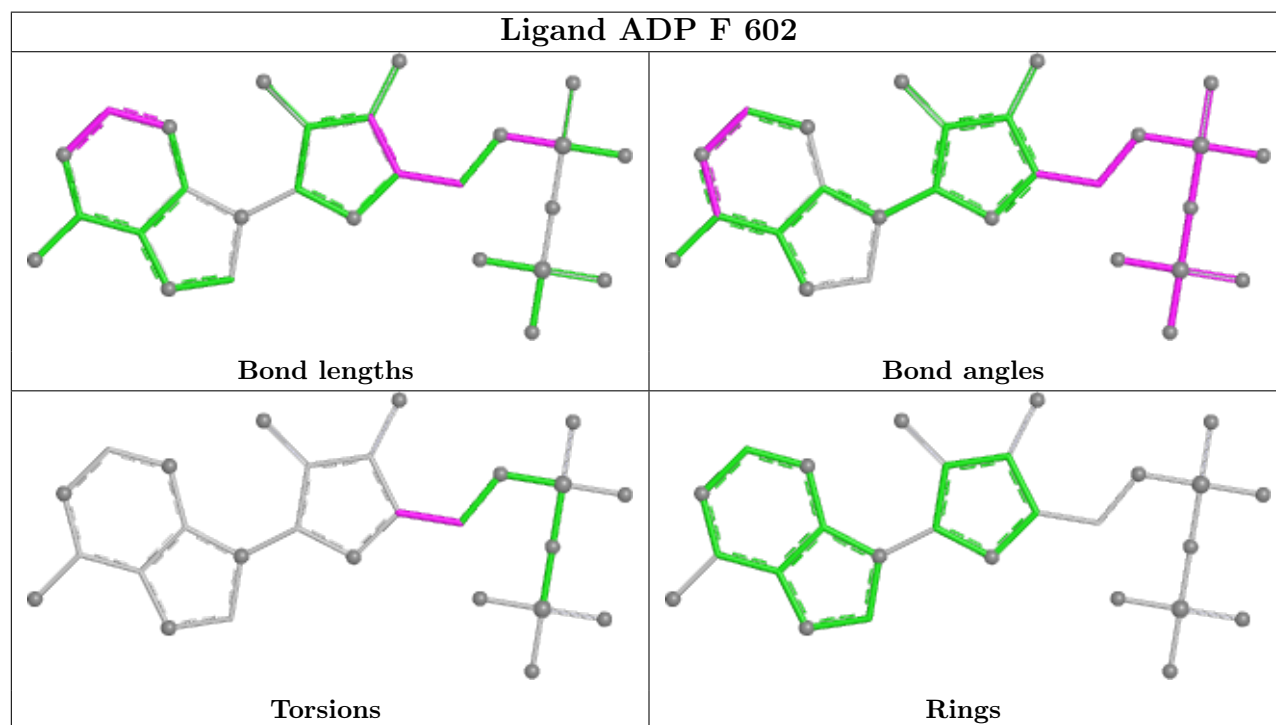
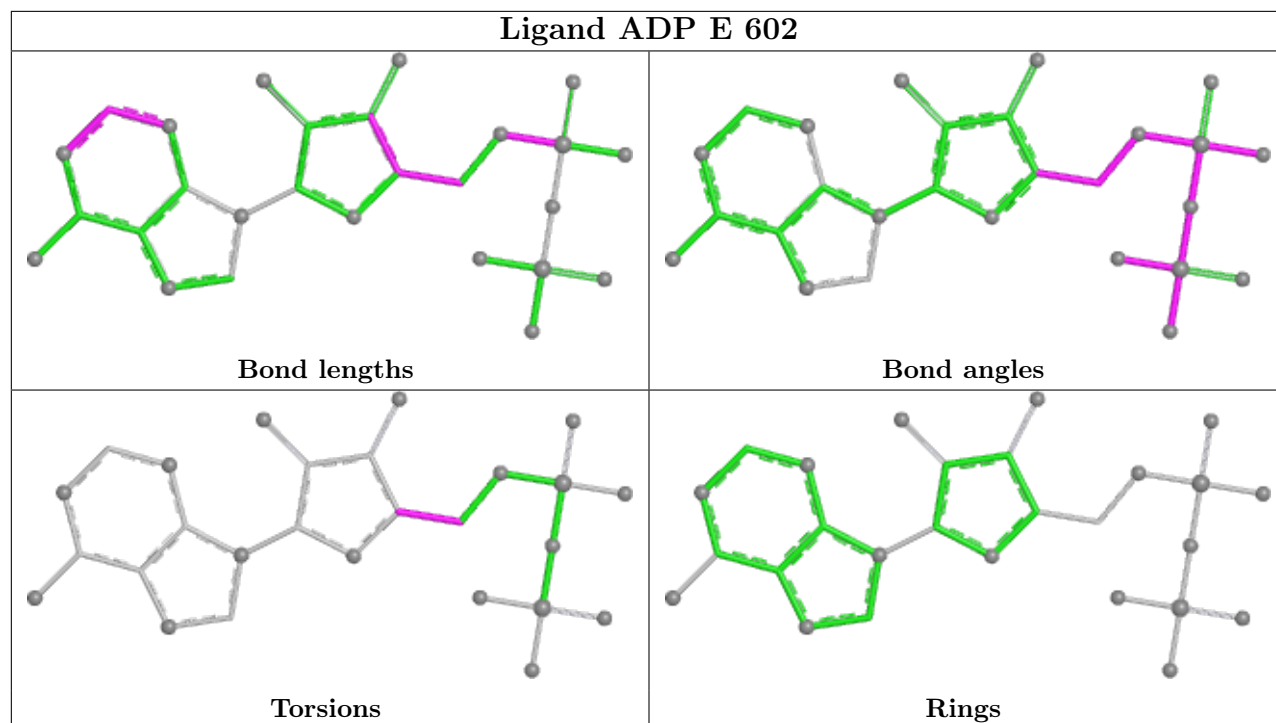


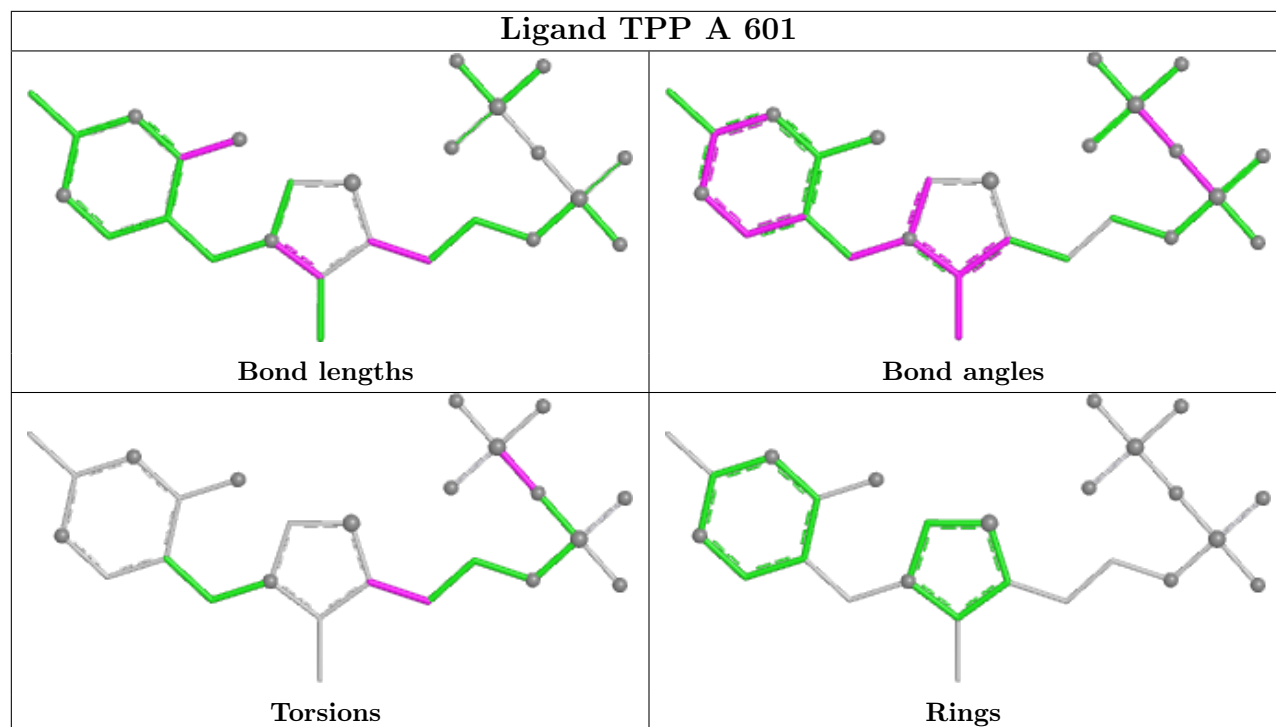












## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

## 6 Fit of model and data

### 6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	546/583 (93%)	0.20	22 (4%) 38 41	18, 24, 41, 83	0
1	B	546/583 (93%)	0.26	37 (6%) 17 19	19, 25, 47, 88	0
1	C	546/583 (93%)	0.18	24 (4%) 34 37	19, 24, 36, 95	0
1	D	546/583 (93%)	0.22	27 (4%) 29 33	19, 25, 39, 88	0
1	E	546/583 (93%)	0.26	30 (5%) 25 28	19, 25, 43, 83	0
1	F	546/583 (93%)	0.27	33 (6%) 21 24	19, 26, 50, 92	0
1	G	546/583 (93%)	0.17	22 (4%) 38 41	18, 23, 37, 86	0
1	H	546/583 (93%)	0.26	26 (4%) 30 33	19, 24, 39, 84	0
All	All	4368/4664 (93%)	0.23	221 (5%) 28 31	18, 24, 42, 95	0

All (221) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	F	386	SER	8.1
1	A	383	MET	7.7
1	E	383	MET	6.8
1	B	386	SER	6.6
1	G	386	SER	6.3
1	E	385	ASN	6.1
1	D	383	MET	6.1
1	C	386	SER	6.1
1	F	379	ALA	5.8
1	G	385	ASN	5.7
1	G	379	ALA	5.5
1	G	387	SER	5.5
1	E	384	LYS	5.4
1	A	384	LYS	5.4
1	E	386	SER	5.4
1	A	385	ASN	5.3

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	H	383	MET	5.3
1	C	383	MET	5.3
1	C	385	ASN	5.2
1	G	383	MET	5.2
1	C	379	ALA	5.1
1	F	387	SER	5.1
1	F	384	LYS	4.9
1	B	383	MET	4.9
1	F	385	ASN	4.7
1	G	382	LEU	4.7
1	C	380	PRO	4.7
1	B	385	ASN	4.7
1	A	386	SER	4.7
1	H	195	LEU	4.6
1	B	379	ALA	4.4
1	B	376	ALA	4.4
1	F	383	MET	4.3
1	E	387	SER	4.3
1	H	384	LYS	4.3
1	G	566	SER	4.3
1	F	376	ALA	4.3
1	B	368	ARG	4.3
1	B	359	ALA	4.3
1	B	23	LEU	4.3
1	D	384	LYS	4.3
1	C	384	LYS	4.2
1	F	378	MET	4.2
1	H	385	ASN	4.2
1	F	565	GLY	4.1
1	G	384	LYS	4.1
1	B	380	PRO	4.1
1	F	380	PRO	4.1
1	B	387	SER	4.0
1	E	23	LEU	4.0
1	E	380	PRO	4.0
1	G	378	MET	3.9
1	F	22	GLU	3.9
1	B	566	SER	3.9
1	B	360	PRO	3.8
1	H	194	ASP	3.8
1	H	567	GLU	3.8
1	D	23	LEU	3.8

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	F	23	LEU	3.8
1	B	375	ILE	3.7
1	C	387	SER	3.7
1	H	23	LEU	3.7
1	E	194	ASP	3.7
1	C	22	GLU	3.6
1	B	357	LYS	3.6
1	B	377	LYS	3.6
1	H	565	GLY	3.6
1	F	377	LYS	3.6
1	G	194	ASP	3.6
1	H	376	ALA	3.5
1	H	22	GLU	3.5
1	B	194	ASP	3.5
1	C	377	LYS	3.5
1	B	384	LYS	3.4
1	F	194	ASP	3.4
1	F	567	GLU	3.4
1	F	375	ILE	3.4
1	E	377	LYS	3.4
1	C	194	ASP	3.4
1	G	377	LYS	3.4
1	D	22	GLU	3.4
1	A	22	GLU	3.4
1	H	368	ARG	3.3
1	D	380	PRO	3.3
1	A	194	ASP	3.3
1	A	23	LEU	3.3
1	B	565	GLY	3.3
1	C	382	LEU	3.3
1	F	368	ARG	3.3
1	C	350	ASP	3.3
1	A	380	PRO	3.2
1	D	378	MET	3.2
1	A	565	GLY	3.2
1	G	23	LEU	3.1
1	E	193	ALA	3.1
1	D	190	VAL	3.1
1	H	380	PRO	3.1
1	F	374	ASN	3.1
1	B	350	ASP	3.1
1	A	368	ARG	3.1

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	C	23	LEU	3.1
1	G	380	PRO	3.1
1	G	388	PRO	3.1
1	E	355	ASP	3.0
1	E	22	GLU	3.0
1	F	382	LEU	3.0
1	A	378	MET	3.0
1	F	372	GLU	3.0
1	A	387	SER	3.0
1	D	194	ASP	3.0
1	B	365	GLU	3.0
1	B	355	ASP	3.0
1	H	566	SER	3.0
1	E	378	MET	3.0
1	C	567	GLU	2.9
1	B	378	MET	2.9
1	E	379	ALA	2.9
1	F	357	LYS	2.9
1	B	192	ASP	2.9
1	D	565	GLY	2.9
1	F	361	SER	2.8
1	A	311	GLU	2.8
1	B	372	GLU	2.8
1	A	379	ALA	2.8
1	C	362	ASN	2.8
1	D	372	GLU	2.8
1	H	379	ALA	2.8
1	E	352	ILE	2.8
1	A	377	LYS	2.7
1	C	376	ALA	2.7
1	G	381	LYS	2.7
1	H	377	LYS	2.7
1	D	375	ILE	2.7
1	B	362	ASN	2.7
1	B	567	GLU	2.7
1	D	566	SER	2.7
1	B	22	GLU	2.7
1	F	381	LYS	2.7
1	G	567	GLU	2.7
1	D	195	LEU	2.6
1	F	373	ALA	2.6
1	H	373	ALA	2.6

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	G	22	GLU	2.6
1	E	222	ASP	2.6
1	H	198	ARG	2.6
1	E	375	ILE	2.6
1	E	192	ASP	2.6
1	H	113	PHE	2.5
1	A	307	LYS	2.5
1	D	368	ARG	2.5
1	F	359	ALA	2.5
1	H	192	ASP	2.5
1	G	498	ARG	2.5
1	A	376	ALA	2.5
1	C	312	PRO	2.5
1	F	362	ASN	2.5
1	G	311	GLU	2.5
1	D	385	ASN	2.5
1	C	381	LYS	2.5
1	E	376	ALA	2.5
1	E	381	LYS	2.5
1	D	374	ASN	2.5
1	C	311	GLU	2.4
1	E	479	ILE	2.4
1	A	192	ASP	2.4
1	G	312	PRO	2.4
1	F	497	TYR	2.4
1	E	362	ASN	2.4
1	F	566	SER	2.4
1	D	376	ALA	2.4
1	B	198	ARG	2.4
1	D	567	GLU	2.4
1	C	498	ARG	2.3
1	D	377	LYS	2.3
1	B	374	ASN	2.3
1	E	565	GLY	2.3
1	D	105	LEU	2.3
1	C	198	ARG	2.3
1	H	365	GLU	2.3
1	B	366	THR	2.3
1	A	357	LYS	2.3
1	D	192	ASP	2.3
1	A	312	PRO	2.3
1	B	373	ALA	2.3

*Continued on next page...*

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Mol	Chain	Res	Type	RSRZ
1	D	307	LYS	2.3
1	D	311	GLU	2.3
1	F	198	ARG	2.3
1	B	369	GLY	2.2
1	E	360	PRO	2.2
1	H	190	VAL	2.2
1	E	368	ARG	2.2
1	C	566	SER	2.2
1	F	59	ALA	2.2
1	E	388	PRO	2.2
1	B	364	LEU	2.2
1	E	195	LEU	2.2
1	D	373	ALA	2.2
1	B	358	GLY	2.1
1	H	374	ASN	2.1
1	H	444	ILE	2.1
1	H	193	ALA	2.1
1	E	439	TRP	2.1
1	F	311	GLU	2.1
1	F	360	PRO	2.1
1	D	245	GLU	2.1
1	G	516	LYS	2.1
1	C	195	LEU	2.1
1	D	117	LEU	2.1
1	B	381	LYS	2.1
1	G	370	LYS	2.1
1	E	567	GLU	2.0
1	F	192	ASP	2.0
1	E	361	SER	2.0
1	C	516	LYS	2.0
1	B	506	GLY	2.0
1	A	365	GLU	2.0
1	H	378	MET	2.0
1	A	190	VAL	2.0
1	D	444	ILE	2.0
1	B	307	LYS	2.0
1	H	386	SER	2.0

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

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](#)

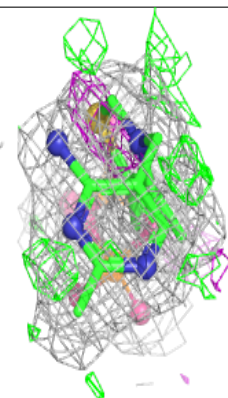
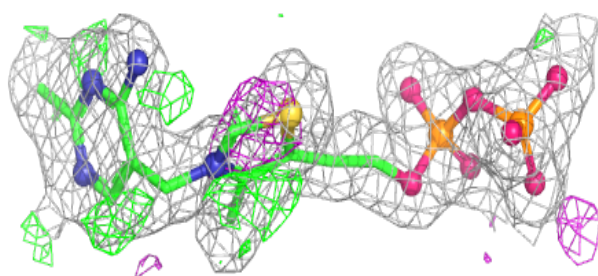
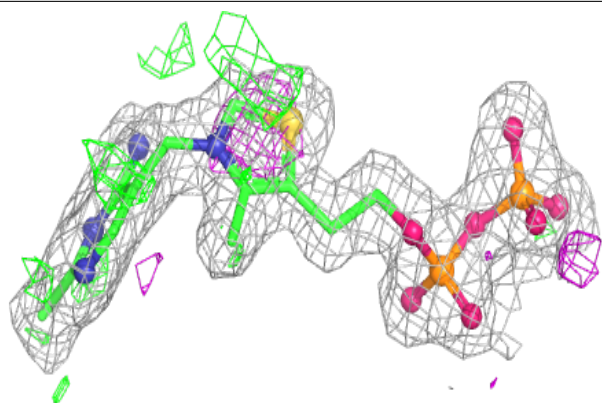
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
2	TPP	H	601	26/26	0.95	0.12	19,21,22,24	0
2	TPP	D	601	26/26	0.96	0.10	19,21,24,25	0
2	TPP	G	601	26/26	0.96	0.10	19,21,23,24	0
2	TPP	C	601	26/26	0.96	0.11	20,22,23,24	0
3	ADP	A	602	27/27	0.96	0.10	20,22,23,25	0
3	ADP	B	602	27/27	0.96	0.13	20,23,25,27	0
3	ADP	C	602	27/27	0.96	0.10	19,21,23,23	0
3	ADP	E	602	27/27	0.96	0.11	20,22,25,25	0
3	ADP	H	602	27/27	0.96	0.12	19,22,26,29	0
2	TPP	F	601	26/26	0.97	0.10	19,22,25,27	0
2	TPP	A	601	26/26	0.97	0.10	20,21,24,25	0
3	ADP	D	602	27/27	0.97	0.10	20,22,25,26	0
2	TPP	B	601	26/26	0.97	0.09	20,22,25,28	0
3	ADP	F	602	27/27	0.97	0.11	20,24,25,27	0
3	ADP	G	602	27/27	0.97	0.10	19,21,23,24	0
2	TPP	E	601	26/26	0.97	0.11	21,22,25,26	0
4	MG	A	603	1/1	0.98	0.08	21,21,21,21	0
4	MG	B	603	1/1	0.98	0.06	19,19,19,19	0
4	MG	C	603	1/1	0.98	0.04	22,22,22,22	0
4	MG	H	603	1/1	0.98	0.08	21,21,21,21	0
4	MG	E	603	1/1	0.99	0.05	22,22,22,22	0
4	MG	F	603	1/1	0.99	0.06	19,19,19,19	0
4	MG	G	603	1/1	0.99	0.05	21,21,21,21	0
4	MG	D	603	1/1	0.99	0.08	21,21,21,21	0

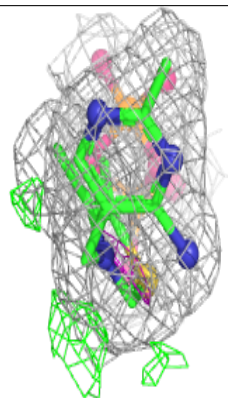
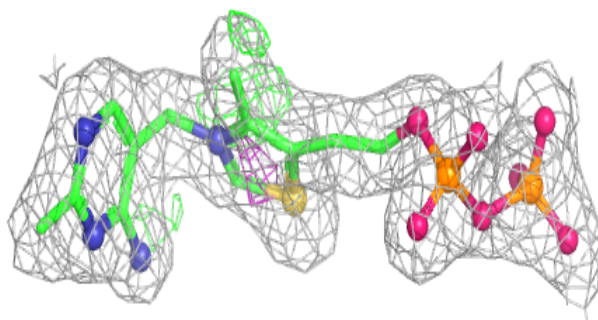
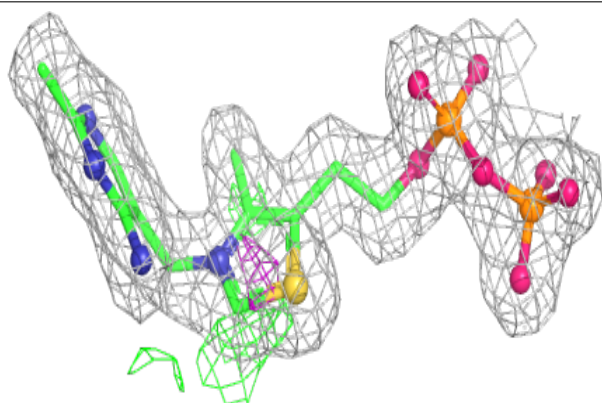
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

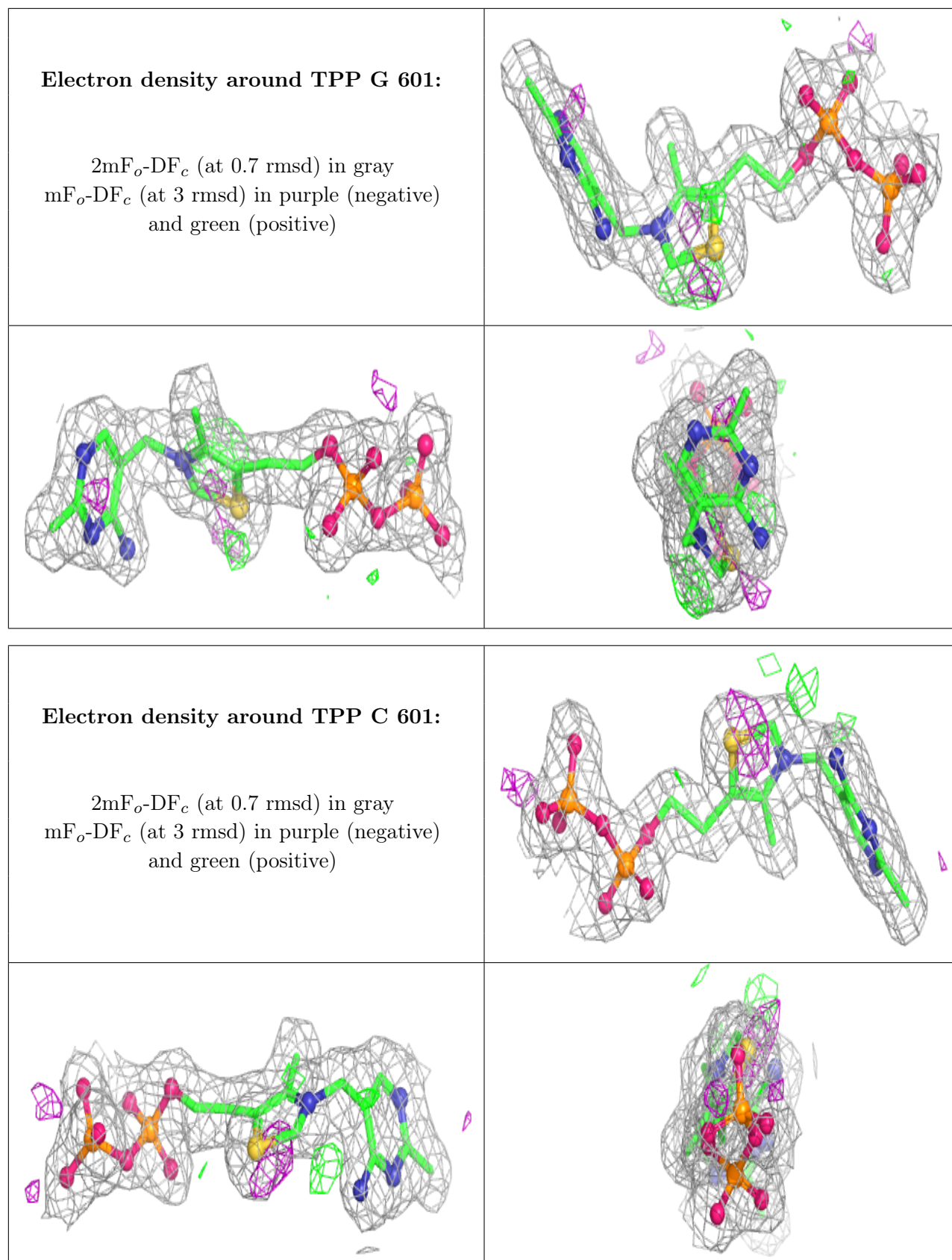
**Electron density around TPP H 601:**

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

**Electron density around TPP D 601:**

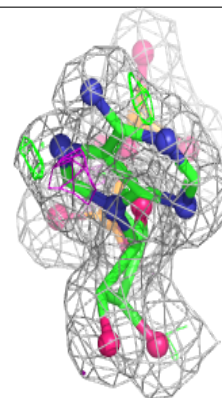
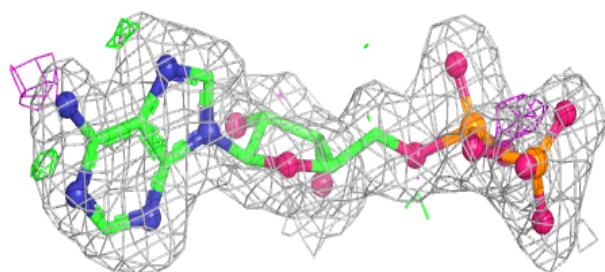
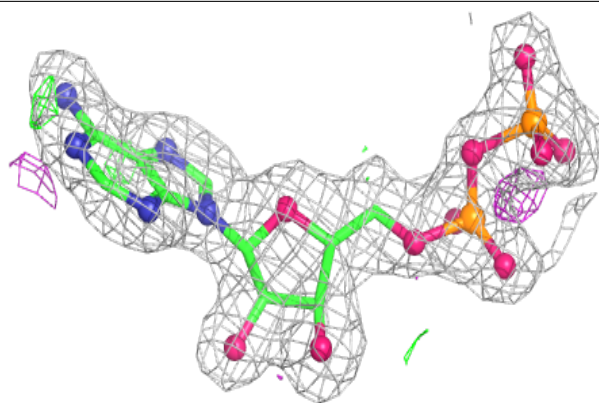
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



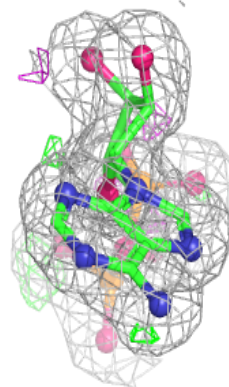
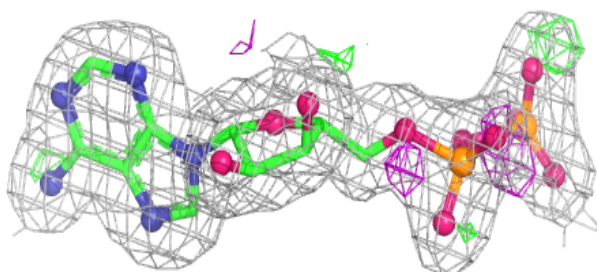
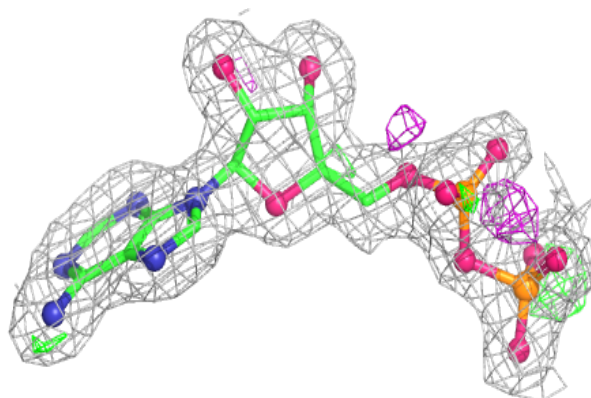


**Electron density around ADP A 602:**

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

**Electron density around ADP B 602:**

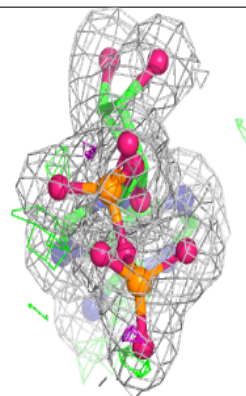
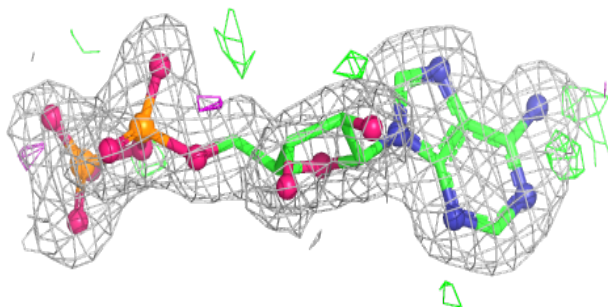
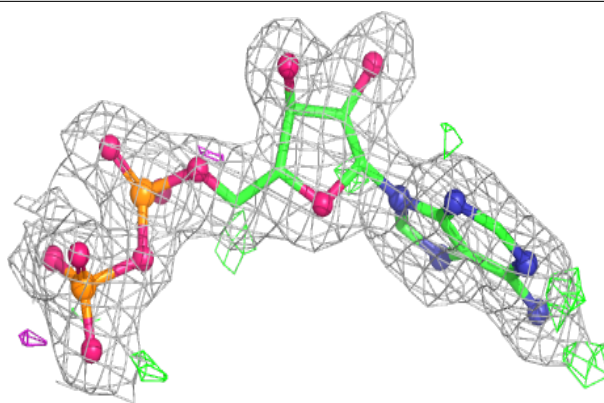
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



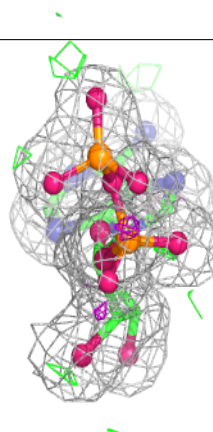
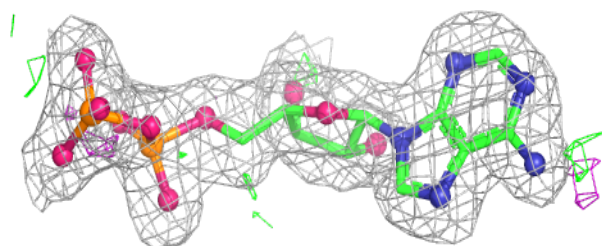
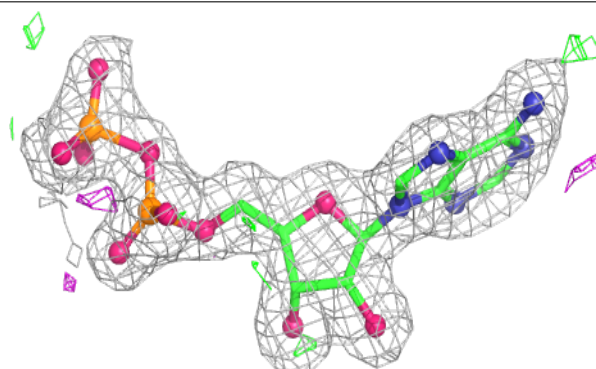


**Electron density around ADP C 602:**

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

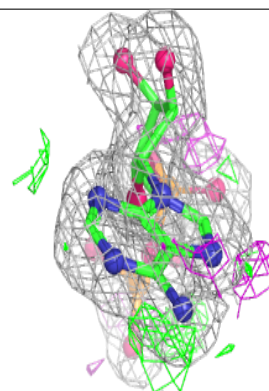
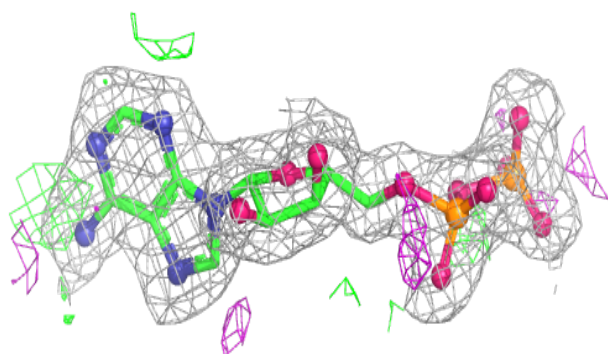
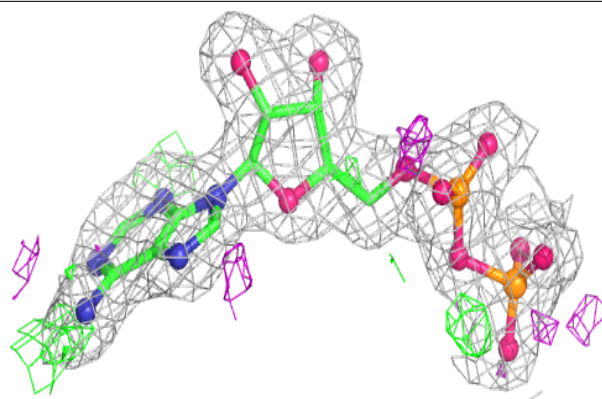
**Electron density around ADP E 602:**

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

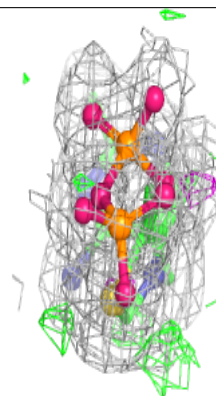
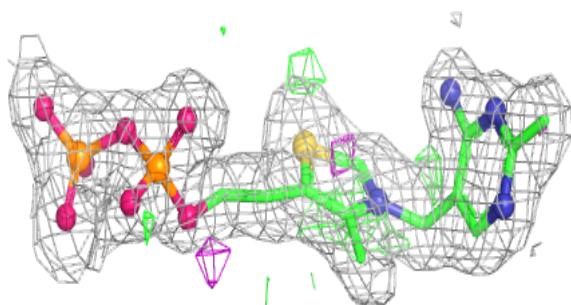
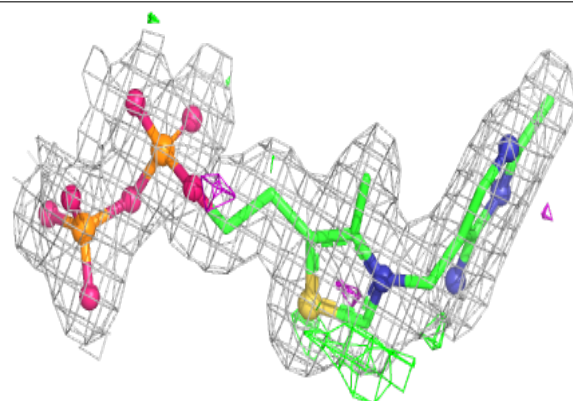


**Electron density around ADP H 602:**

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

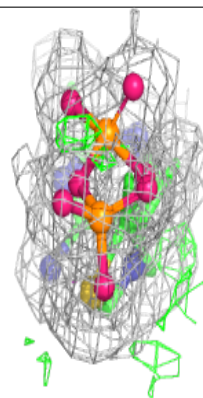
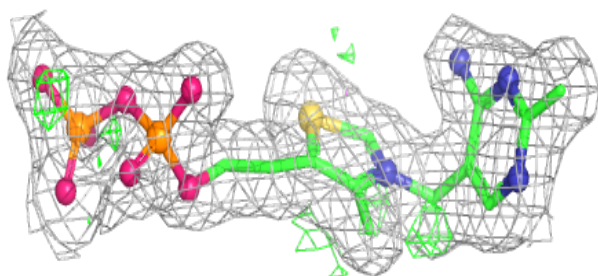
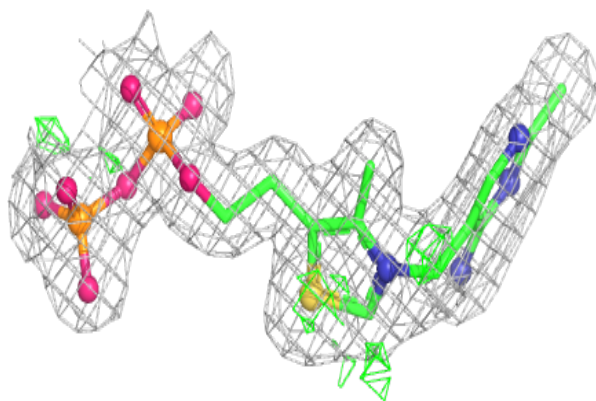
**Electron density around TPP F 601:**

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

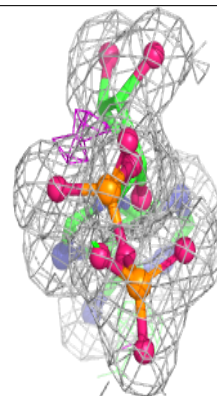
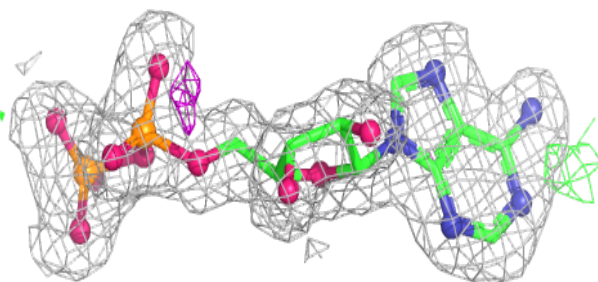
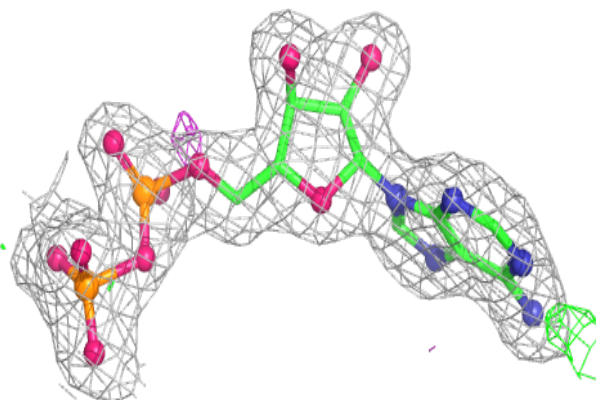


**Electron density around TPP A 601:**

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

**Electron density around ADP D 602:**

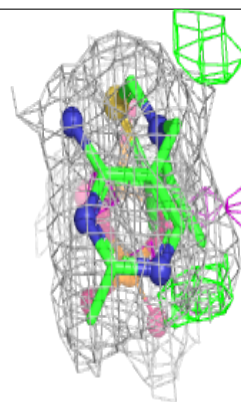
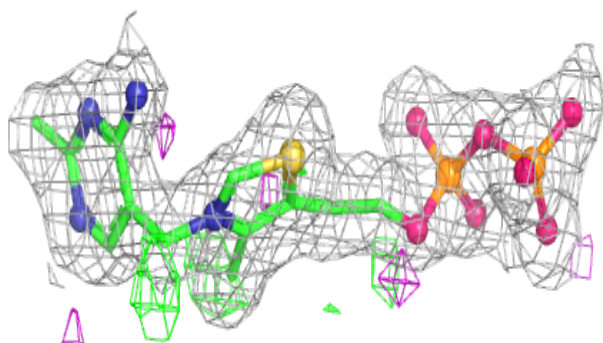
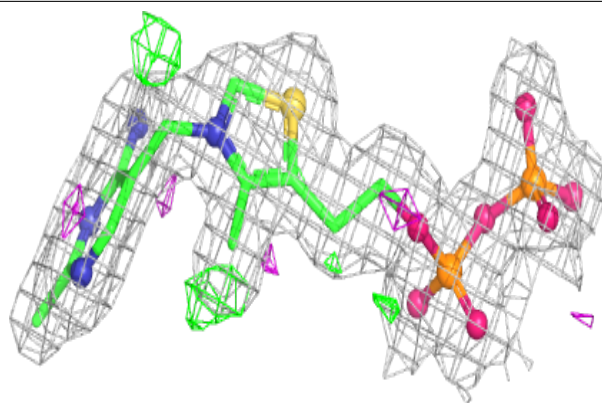
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



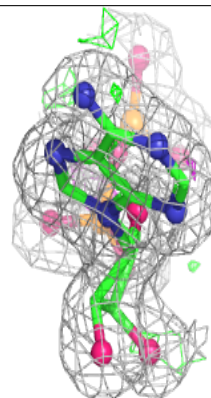
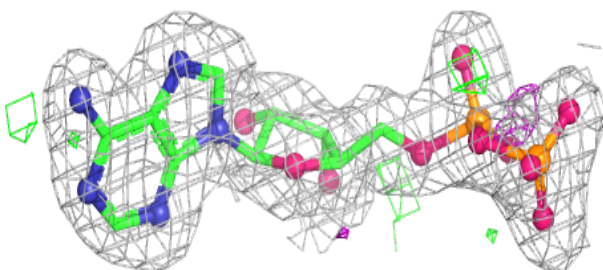
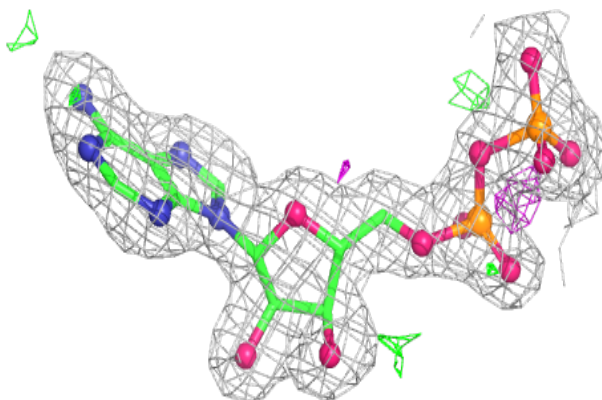


**Electron density around TPP B 601:**

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

**Electron density around ADP F 602:**

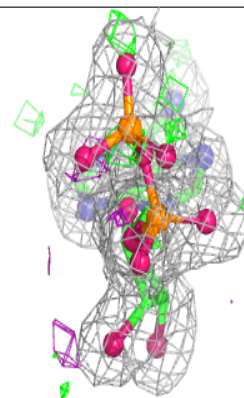
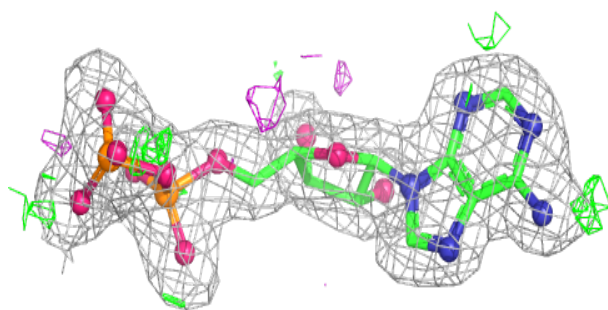
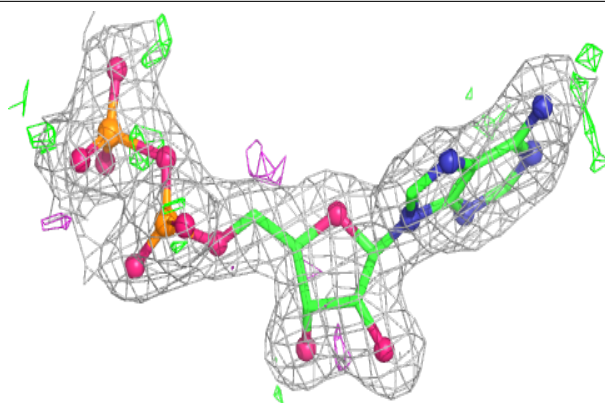
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



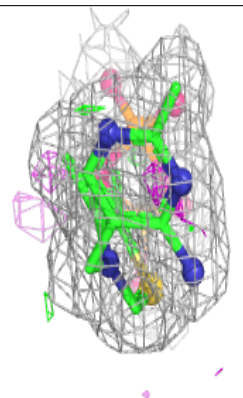
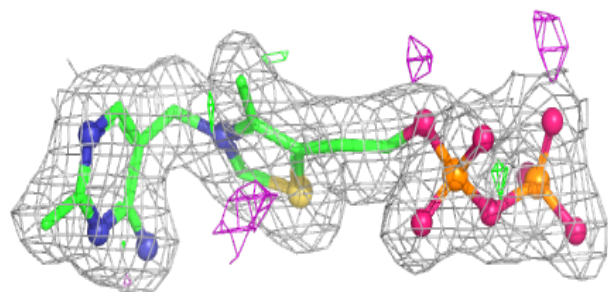
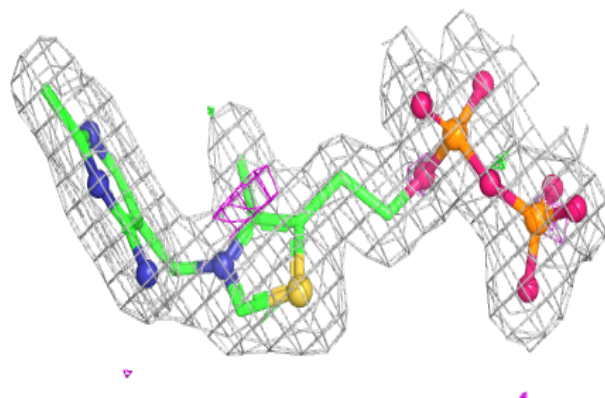


**Electron density around ADP G 602:**

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

**Electron density around TPP E 601:**

$2mF_o-DF_c$  (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.