



wwPDB X-ray Structure Validation Summary Report ⓘ

Jun 13, 2024 – 07:24 pm BST

PDB ID : 8QZI
Title : Crystal structure of PptT-ACP from Mycobacterium tuberculosis
Authors : Gavalda, S.; Mourey, L.; Pedelacq, J.D.
Deposited on : 2023-10-27
Resolution : 2.50 Å(reported)

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

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4.02b-467
Mogul : 1.8.4, CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.36.2
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36.2

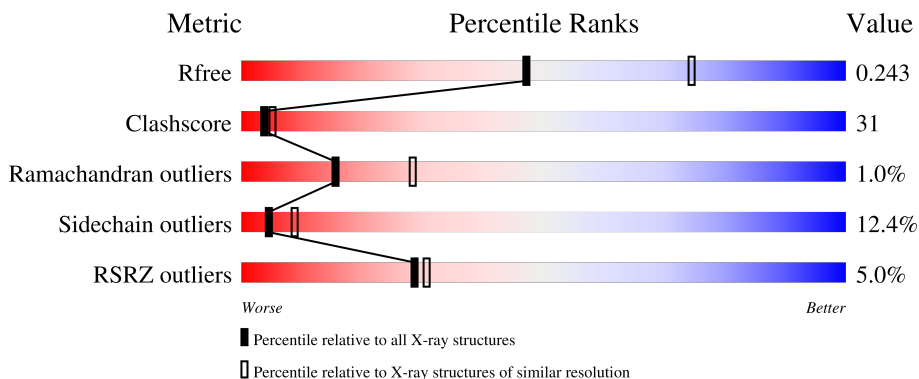
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.50 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.



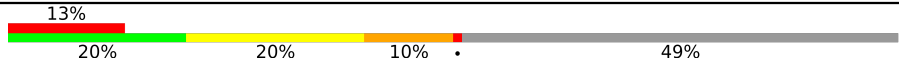
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	4661 (2.50-2.50)
Clashscore	141614	5346 (2.50-2.50)
Ramachandran outliers	138981	5231 (2.50-2.50)
Sidechain outliers	138945	5233 (2.50-2.50)
RSRZ outliers	127900	4559 (2.50-2.50)

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

Mol	Chain	Length	Quality of chain
1	A	247	
1	B	247	
1	C	247	
1	D	247	
2	E	172	

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Mol	Chain	Length	Quality of chain
2	F	172	 <p>A horizontal bar chart representing the quality of chain. The bar is divided into five segments: a red segment (13%), a green segment (20%), a yellow segment (20%), an orange segment (10%), and a grey segment (49%). The segments are stacked from left to right in the order: red, green, yellow, orange, grey.</p>

2 Entry composition [i](#)

There are 6 unique types of molecules in this entry. The entry contains 8405 atoms, of which 16 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 4'-phosphopantetheinyl transferase PptT.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	225	1720	1100	301	312	7	0	0	0
1	B	225	1720	1100	301	312	7	0	0	0
1	C	225	1720	1100	301	312	7	0	0	0
1	D	225	1732	1107	304	314	7	0	1	0

There are 80 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-19	MET	-	initiating methionine	UNP O33336
A	-18	GLY	-	expression tag	UNP O33336
A	-17	SER	-	expression tag	UNP O33336
A	-16	SER	-	expression tag	UNP O33336
A	-15	HIS	-	expression tag	UNP O33336
A	-14	HIS	-	expression tag	UNP O33336
A	-13	HIS	-	expression tag	UNP O33336
A	-12	HIS	-	expression tag	UNP O33336
A	-11	HIS	-	expression tag	UNP O33336
A	-10	HIS	-	expression tag	UNP O33336
A	-9	SER	-	expression tag	UNP O33336
A	-8	SER	-	expression tag	UNP O33336
A	-7	GLY	-	expression tag	UNP O33336
A	-6	LEU	-	expression tag	UNP O33336
A	-5	VAL	-	expression tag	UNP O33336
A	-4	PRO	-	expression tag	UNP O33336
A	-3	ARG	-	expression tag	UNP O33336
A	-2	GLY	-	expression tag	UNP O33336
A	-1	SER	-	expression tag	UNP O33336
A	0	HIS	-	expression tag	UNP O33336
B	-19	MET	-	initiating methionine	UNP O33336

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-18	GLY	-	expression tag	UNP O33336
B	-17	SER	-	expression tag	UNP O33336
B	-16	SER	-	expression tag	UNP O33336
B	-15	HIS	-	expression tag	UNP O33336
B	-14	HIS	-	expression tag	UNP O33336
B	-13	HIS	-	expression tag	UNP O33336
B	-12	HIS	-	expression tag	UNP O33336
B	-11	HIS	-	expression tag	UNP O33336
B	-10	HIS	-	expression tag	UNP O33336
B	-9	SER	-	expression tag	UNP O33336
B	-8	SER	-	expression tag	UNP O33336
B	-7	GLY	-	expression tag	UNP O33336
B	-6	LEU	-	expression tag	UNP O33336
B	-5	VAL	-	expression tag	UNP O33336
B	-4	PRO	-	expression tag	UNP O33336
B	-3	ARG	-	expression tag	UNP O33336
B	-2	GLY	-	expression tag	UNP O33336
B	-1	SER	-	expression tag	UNP O33336
B	0	HIS	-	expression tag	UNP O33336
C	-19	MET	-	initiating methionine	UNP O33336
C	-18	GLY	-	expression tag	UNP O33336
C	-17	SER	-	expression tag	UNP O33336
C	-16	SER	-	expression tag	UNP O33336
C	-15	HIS	-	expression tag	UNP O33336
C	-14	HIS	-	expression tag	UNP O33336
C	-13	HIS	-	expression tag	UNP O33336
C	-12	HIS	-	expression tag	UNP O33336
C	-11	HIS	-	expression tag	UNP O33336
C	-10	HIS	-	expression tag	UNP O33336
C	-9	SER	-	expression tag	UNP O33336
C	-8	SER	-	expression tag	UNP O33336
C	-7	GLY	-	expression tag	UNP O33336
C	-6	LEU	-	expression tag	UNP O33336
C	-5	VAL	-	expression tag	UNP O33336
C	-4	PRO	-	expression tag	UNP O33336
C	-3	ARG	-	expression tag	UNP O33336
C	-2	GLY	-	expression tag	UNP O33336
C	-1	SER	-	expression tag	UNP O33336
C	0	HIS	-	expression tag	UNP O33336
D	-19	MET	-	initiating methionine	UNP O33336
D	-18	GLY	-	expression tag	UNP O33336
D	-17	SER	-	expression tag	UNP O33336

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Chain	Residue	Modelled	Actual	Comment	Reference
D	-16	SER	-	expression tag	UNP O33336
D	-15	HIS	-	expression tag	UNP O33336
D	-14	HIS	-	expression tag	UNP O33336
D	-13	HIS	-	expression tag	UNP O33336
D	-12	HIS	-	expression tag	UNP O33336
D	-11	HIS	-	expression tag	UNP O33336
D	-10	HIS	-	expression tag	UNP O33336
D	-9	SER	-	expression tag	UNP O33336
D	-8	SER	-	expression tag	UNP O33336
D	-7	GLY	-	expression tag	UNP O33336
D	-6	LEU	-	expression tag	UNP O33336
D	-5	VAL	-	expression tag	UNP O33336
D	-4	PRO	-	expression tag	UNP O33336
D	-3	ARG	-	expression tag	UNP O33336
D	-2	GLY	-	expression tag	UNP O33336
D	-1	SER	-	expression tag	UNP O33336
D	0	HIS	-	expression tag	UNP O33336

- Molecule 2 is a protein called Phenolphthiocerol/phthiocerol polyketide synthase subunit C.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace	
2	E	86	Total	C	N	O	S	Se	0	0	0
			644	404	113	124	1	2			
2	F	88	Total	C	N	O	S	Se	0	0	0
			654	409	118	124	1	2			

There are 50 discrepancies between the modelled and reference sequences:

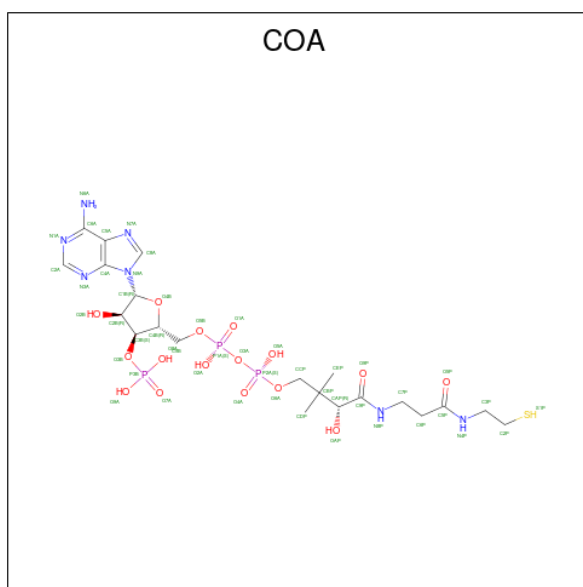
Chain	Residue	Modelled	Actual	Comment	Reference
E	2021	MSE	-	initiating methionine	UNP P96202
E	2022	GLY	-	expression tag	UNP P96202
E	2023	SER	-	expression tag	UNP P96202
E	2024	SER	-	expression tag	UNP P96202
E	2025	HIS	-	expression tag	UNP P96202
E	2026	HIS	-	expression tag	UNP P96202
E	2027	HIS	-	expression tag	UNP P96202
E	2028	HIS	-	expression tag	UNP P96202
E	2029	HIS	-	expression tag	UNP P96202
E	2030	HIS	-	expression tag	UNP P96202
E	2031	SER	-	expression tag	UNP P96202
E	2032	SER	-	expression tag	UNP P96202
E	2033	GLY	-	expression tag	UNP P96202

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Chain	Residue	Modelled	Actual	Comment	Reference
E	2034	LEU	-	expression tag	UNP P96202
E	2035	VAL	-	expression tag	UNP P96202
E	2036	PRO	-	expression tag	UNP P96202
E	2037	ARG	-	expression tag	UNP P96202
E	2038	GLY	-	expression tag	UNP P96202
E	2039	SER	-	expression tag	UNP P96202
E	2040	HIS	-	expression tag	UNP P96202
E	2041	MSE	-	expression tag	UNP P96202
E	2189	THR	-	expression tag	UNP P96202
E	2190	SER	-	expression tag	UNP P96202
E	2191	GLY	-	expression tag	UNP P96202
E	2192	SER	-	expression tag	UNP P96202
F	2021	MSE	-	initiating methionine	UNP P96202
F	2022	GLY	-	expression tag	UNP P96202
F	2023	SER	-	expression tag	UNP P96202
F	2024	SER	-	expression tag	UNP P96202
F	2025	HIS	-	expression tag	UNP P96202
F	2026	HIS	-	expression tag	UNP P96202
F	2027	HIS	-	expression tag	UNP P96202
F	2028	HIS	-	expression tag	UNP P96202
F	2029	HIS	-	expression tag	UNP P96202
F	2030	HIS	-	expression tag	UNP P96202
F	2031	SER	-	expression tag	UNP P96202
F	2032	SER	-	expression tag	UNP P96202
F	2033	GLY	-	expression tag	UNP P96202
F	2034	LEU	-	expression tag	UNP P96202
F	2035	VAL	-	expression tag	UNP P96202
F	2036	PRO	-	expression tag	UNP P96202
F	2037	ARG	-	expression tag	UNP P96202
F	2038	GLY	-	expression tag	UNP P96202
F	2039	SER	-	expression tag	UNP P96202
F	2040	HIS	-	expression tag	UNP P96202
F	2041	MSE	-	expression tag	UNP P96202
F	2189	THR	-	expression tag	UNP P96202
F	2190	SER	-	expression tag	UNP P96202
F	2191	GLY	-	expression tag	UNP P96202
F	2192	SER	-	expression tag	UNP P96202

- Molecule 3 is COENZYME A (three-letter code: COA) (formula: C₂₁H₃₆N₇O₁₆P₃S) (labeled as "Ligand of Interest" by depositor).

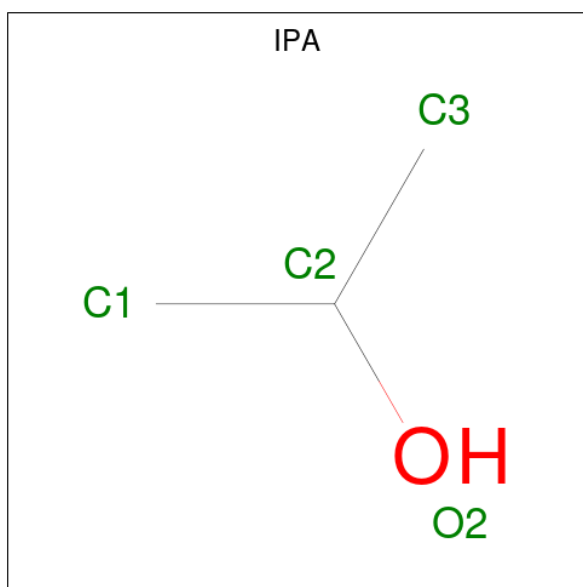


Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	
			Total	C	N	O	P			
3	A	1	Total	C	N	O	P	0	0	
			27	10	5	10	2			
3	B	1	Total	C	N	O	P	0	0	
			27	10	5	10	2			
3	C	1	Total	C	N	O	P	S	0	0
			48	21	7	16	3	1		
3	D	1	Total	C	N	O	P	0	0	
			31	10	5	13	3			

- Molecule 4 is MANGANESE (II) ION (three-letter code: MN) (formula: Mn) (labeled as "Ligand of Interest" by depositor).

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

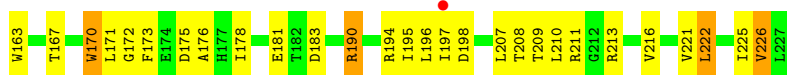
- Molecule 5 is ISOPROPYL ALCOHOL (three-letter code: IPA) (formula: C₃H₈O) (labeled as "Ligand of Interest" by depositor).



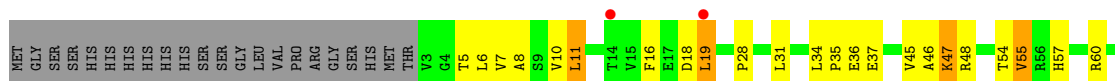
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	C	1	Total	C	H	O	0	0
			12	3	8	1		
5	E	1	Total	C	H	O	0	0
			12	3	8	1		

- Molecule 6 is water.

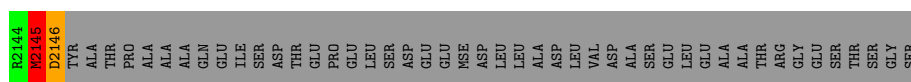
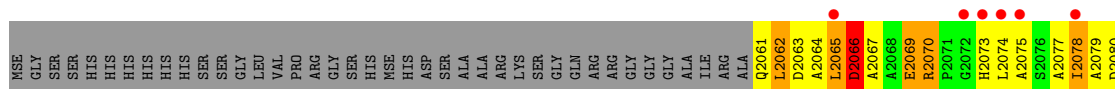
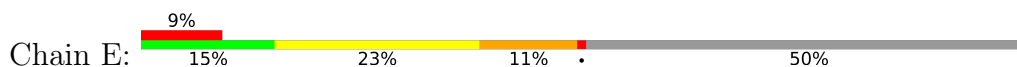
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	9	Total	O	0	0
			9	9		
6	B	8	Total	O	0	0
			8	8		
6	C	15	Total	O	0	0
			15	15		
6	D	12	Total	O	0	0
			12	12		
6	E	4	Total	O	0	0
			4	4		
6	F	2	Total	O	0	0
			2	2		



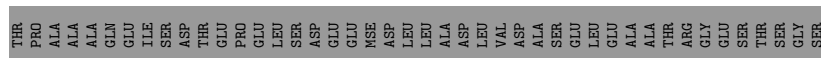
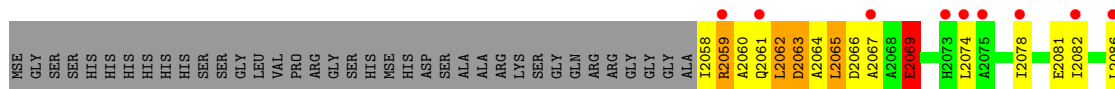
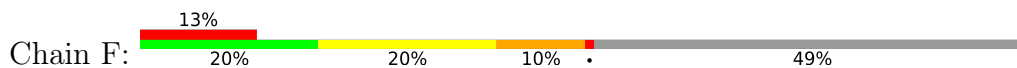
• Molecule 1: 4'-phosphopantetheinyl transferase PptT



• Molecule 2: Phenolphthiocerol/phthiocerol polyketide synthase subunit C



• Molecule 2: Phenolphthiocerol/phthiocerol polyketide synthase subunit C



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	47.34Å 280.84Å 47.34Å 90.00° 92.83° 90.00°	Depositor
Resolution (Å)	47.28 – 2.50 47.28 – 2.50	Depositor EDS
% Data completeness (in resolution range)	97.1 (47.28-2.50) 91.0 (47.28-2.50)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	0.75 (at 2.51Å)	Xtrriage
Refinement program	PHENIX 1.17.1-3660	Depositor
R, R_{free}	0.196 , 0.241 0.195 , 0.243	Depositor DCC
R_{free} test set	1984 reflections (4.69%)	wwPDB-VP
Wilson B-factor (Å ²)	52.6	Xtrriage
Anisotropy	0.182	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.29 , 56.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.30$	Xtrriage
Estimated twinning fraction	0.050 for l,k,-h 0.066 for h,-k,-l 0.449 for l,-k,h	Xtrriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	8405	wwPDB-VP
Average B, all atoms (Å ²)	89.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.10% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

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

5 Model quality i

5.1 Standard geometry i

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

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	A	0.44	0/1766	0.62	0/2414
1	B	0.42	0/1766	0.60	0/2414
1	C	0.45	1/1766 (0.1%)	0.58	0/2414
1	D	0.46	0/1781	0.62	0/2433
2	E	0.36	0/652	0.58	0/887
2	F	0.33	0/661	0.57	0/898
All	All	0.43	1/8392 (0.0%)	0.60	0/11460

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	A	0	1
2	F	0	2
All	All	0	3

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	94	CYS	CB-SG	-5.22	1.73	1.81

There are no bond angle outliers.

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	122	PRO	Peptide

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Mol	Chain	Res	Type	Group
2	F	2069	GLU	Peptide
2	F	2136	ASP	Peptide

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	1720	0	1724	92	1
1	B	1720	0	1724	79	0
1	C	1720	0	1724	81	0
1	D	1732	0	1741	92	1
2	E	644	0	639	95	0
2	F	654	0	660	89	0
3	A	27	0	11	3	0
3	B	27	0	11	3	0
3	C	48	0	32	9	0
3	D	31	0	10	4	0
4	A	2	0	0	0	0
4	B	2	0	0	0	0
4	C	2	0	0	0	0
4	D	2	0	0	0	0
5	C	4	8	8	0	0
5	E	4	8	8	0	0
6	A	9	0	0	6	0
6	B	8	0	0	2	0
6	C	15	0	0	5	0
6	D	12	0	0	5	0
6	E	4	0	0	1	0
6	F	2	0	0	0	0
All	All	8389	16	8292	517	1

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 31.

The worst 5 of 517 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:F:2063:ASP:HB2	2:F:2066:ASP:HB3	1.27	1.07
1:A:125:VAL:O	6:A:401:HOH:O	1.73	1.03
1:A:138:MET:HE1	1:A:148:TRP:HB2	1.36	1.02
1:C:18:ASP:HB3	1:C:104:ARG:HB2	1.42	1.00
1:D:18:ASP:OD2	1:D:104:ARG:NH1	1.96	0.98

All (1) 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)
1:A:190:ARG:NH1	1:D:64:ASP:O[2_455]	1.88	0.32

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	223/247 (90%)	203 (91%)	18 (8%)	2 (1%)	17	31
1	B	223/247 (90%)	208 (93%)	14 (6%)	1 (0%)	34	54
1	C	223/247 (90%)	205 (92%)	17 (8%)	1 (0%)	34	54
1	D	224/247 (91%)	211 (94%)	12 (5%)	1 (0%)	34	54
2	E	84/172 (49%)	68 (81%)	12 (14%)	4 (5%)	2	2
2	F	86/172 (50%)	70 (81%)	14 (16%)	2 (2%)	6	10
All	All	1063/1332 (80%)	965 (91%)	87 (8%)	11 (1%)	15	28

5 of 11 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	E	2066	ASP
1	A	33	PRO
2	E	2064	ALA
2	E	2145	MSE

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Mol	Chain	Res	Type
1	A	78	LYS

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	181/201 (90%)	166 (92%)	15 (8%)	11	22
1	B	181/201 (90%)	166 (92%)	15 (8%)	11	22
1	C	181/201 (90%)	170 (94%)	11 (6%)	18	36
1	D	183/201 (91%)	161 (88%)	22 (12%)	5	9
2	E	66/129 (51%)	41 (62%)	25 (38%)	0	0
2	F	67/129 (52%)	49 (73%)	18 (27%)	0	0
All	All	859/1062 (81%)	753 (88%)	106 (12%)	4	9

5 of 106 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	146	LEU
2	E	2082	ILE
2	F	2128	VAL
1	D	182	THR
2	E	2066	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	C	50	ASN
1	C	65	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 14 ligands modelled in this entry, 8 are monoatomic - leaving 6 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	COA	B	301	4	26,29,50	3.16	4 (15%)	31,45,75	1.64	10 (32%)
5	IPA	C	304	-	3,3,3	0.62	0	3,3,3	0.55	0
3	COA	C	301	4	41,50,50	2.65	7 (17%)	52,75,75	1.74	13 (25%)
5	IPA	E	2201	-	3,3,3	0.63	0	3,3,3	0.38	0
3	COA	A	301	4	26,29,50	3.28	6 (23%)	31,45,75	1.64	9 (29%)
3	COA	D	301	4	28,33,50	3.42	8 (28%)	35,52,75	1.91	8 (22%)

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	COA	D	301	4	-	7/17/37/64	0/3/3/3
3	COA	A	301	4	-	1/11/31/64	0/3/3/3
3	COA	B	301	4	-	3/11/31/64	0/3/3/3
3	COA	C	301	4	-	13/44/64/64	0/3/3/3

The worst 5 of 25 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	D	301	COA	P3B-O3B	15.75	1.89	1.59
3	B	301	COA	P3B-O3B	14.42	1.86	1.59
3	A	301	COA	P3B-O3B	14.24	1.86	1.59
3	C	301	COA	P3B-O3B	14.22	1.86	1.59
3	A	301	COA	P1A-O1A	5.52	1.68	1.50

The worst 5 of 40 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	301	COA	P1A-O3A-P2A	-7.43	107.32	132.83
3	C	301	COA	P2A-O3A-P1A	-6.06	112.03	132.83
3	B	301	COA	P1A-O5B-C5B	-4.19	106.76	118.30
3	A	301	COA	P1A-O5B-C5B	-3.79	107.86	118.30
3	C	301	COA	O3B-P3B-O7A	-3.57	95.62	109.39

There are no chirality outliers.

5 of 24 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	C	301	COA	CCP-O6A-P2A-O4A
3	C	301	COA	O9P-C9P-CAP-OAP
3	C	301	COA	S1P-C2P-C3P-N4P
3	D	301	COA	C3B-C4B-C5B-O5B
3	D	301	COA	C5B-O5B-P1A-O1A

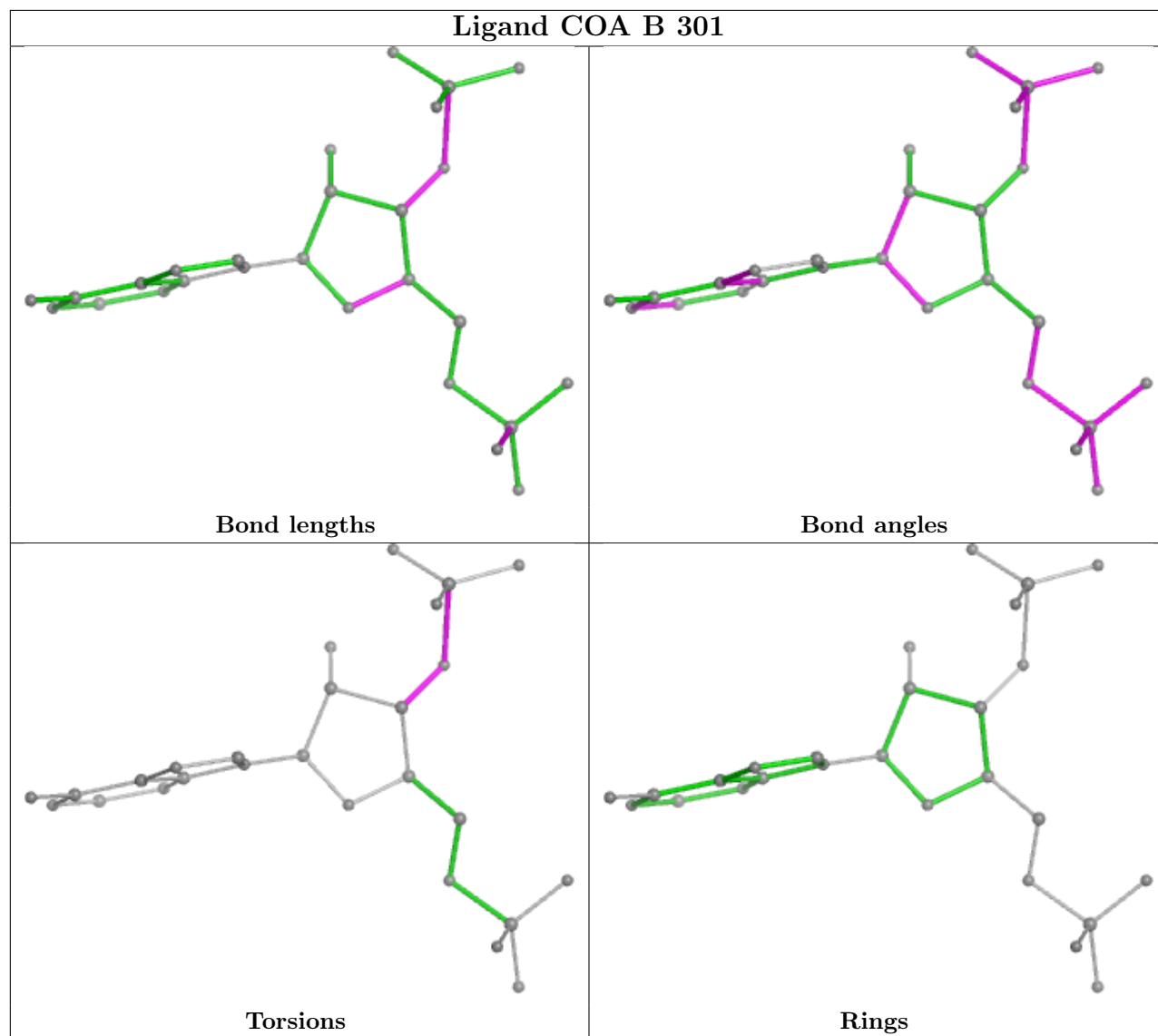
There are no ring outliers.

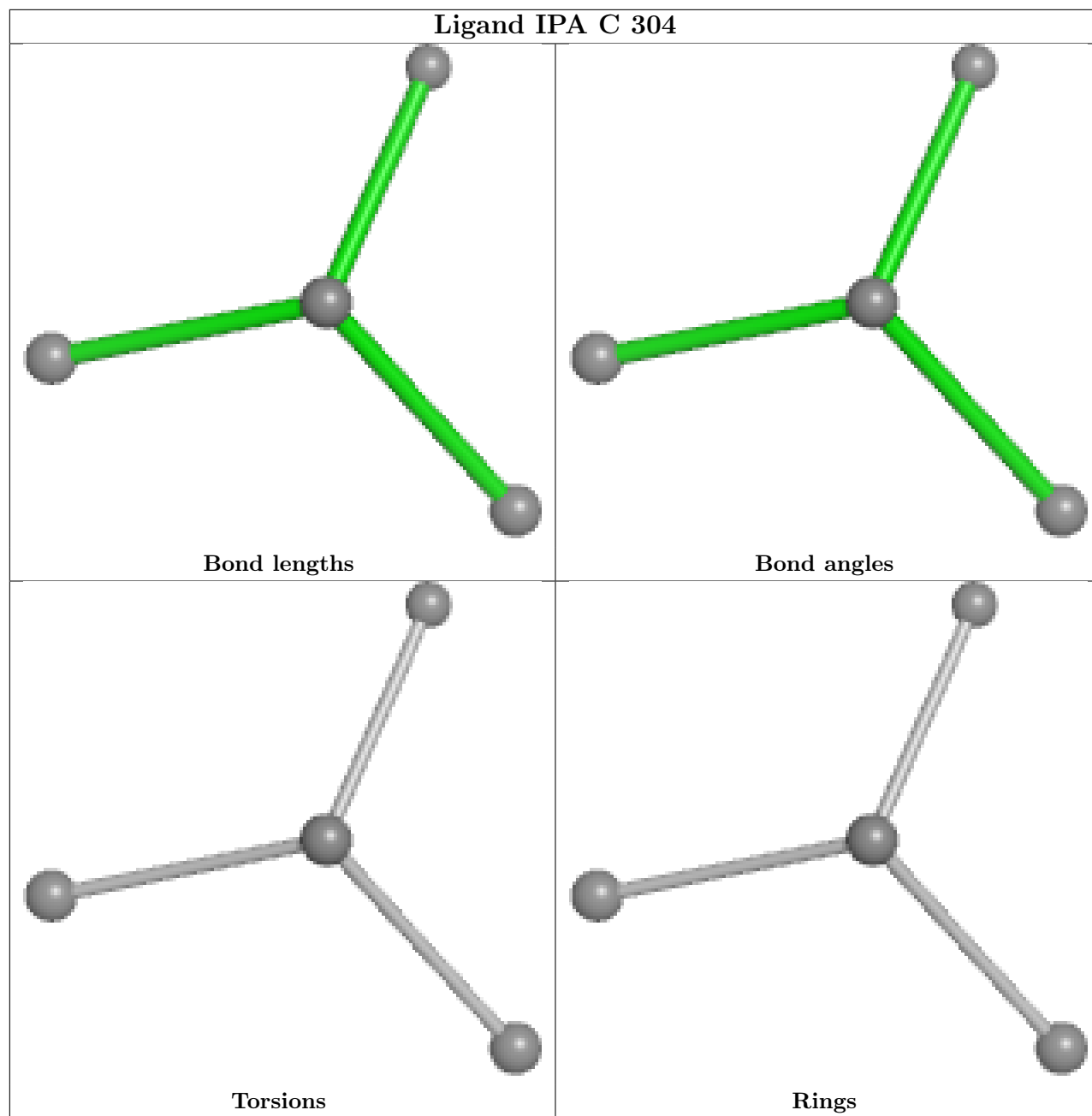
4 monomers are involved in 19 short contacts:

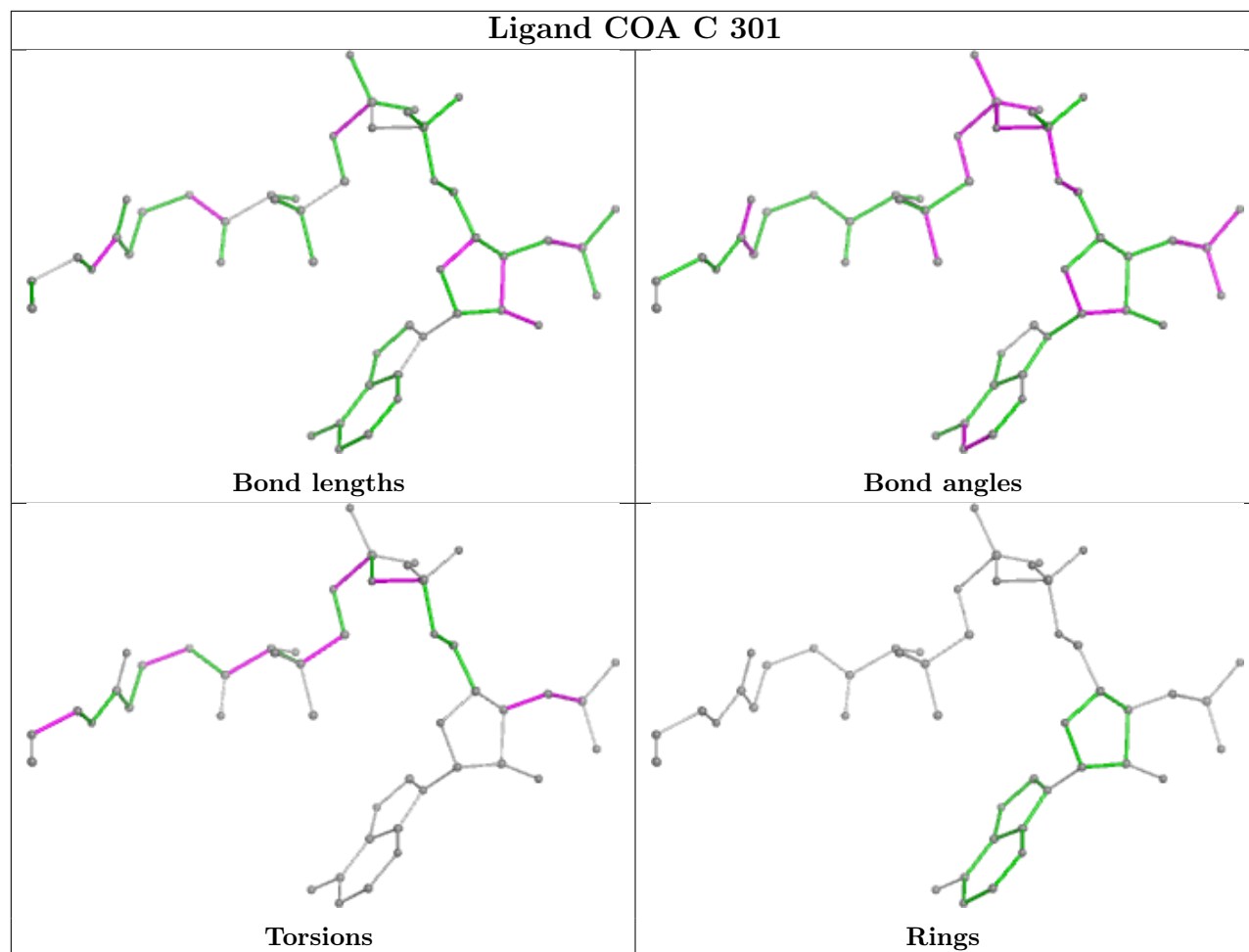
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	301	COA	3	0
3	C	301	COA	9	0
3	A	301	COA	3	0
3	D	301	COA	4	0

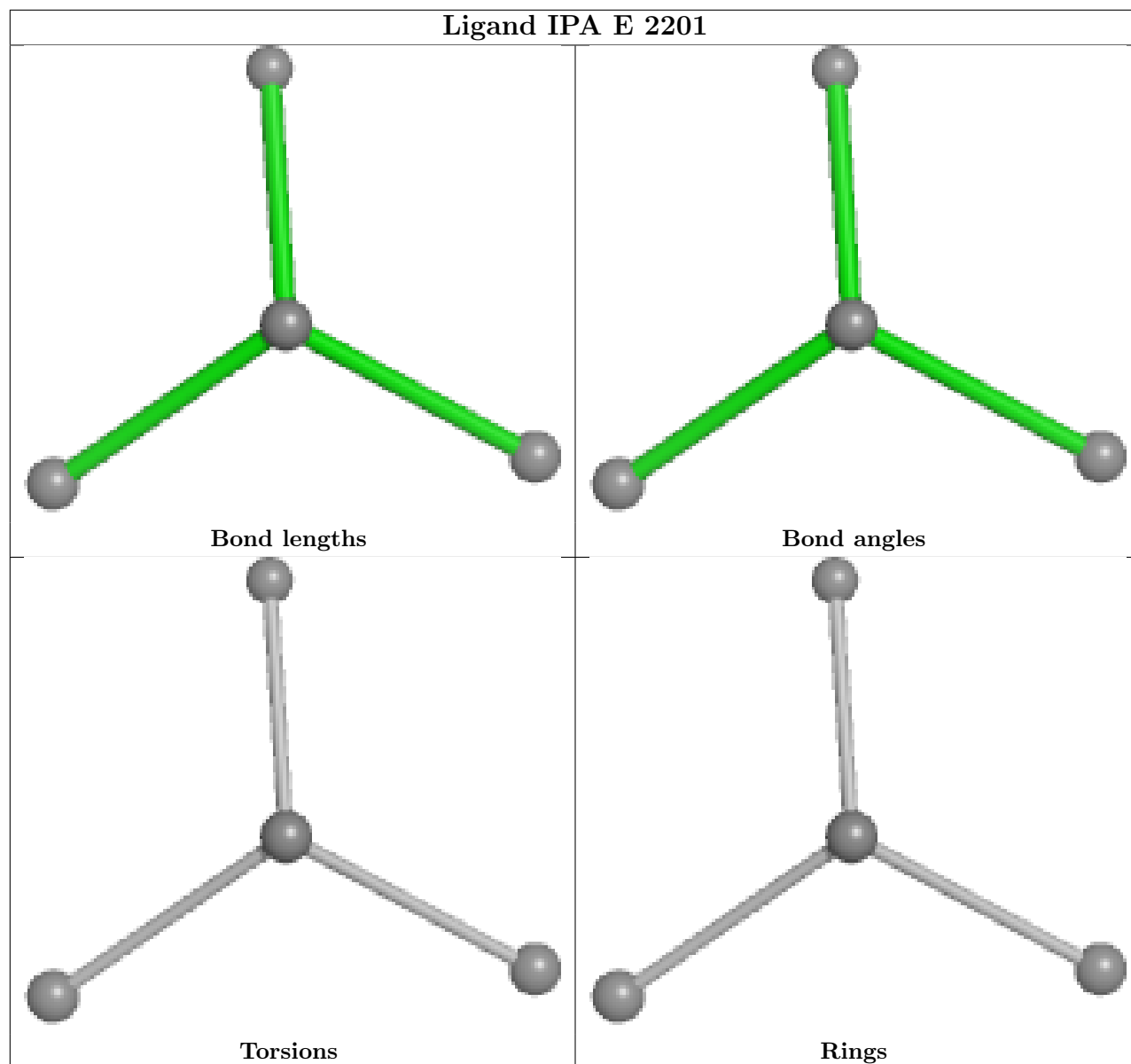
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

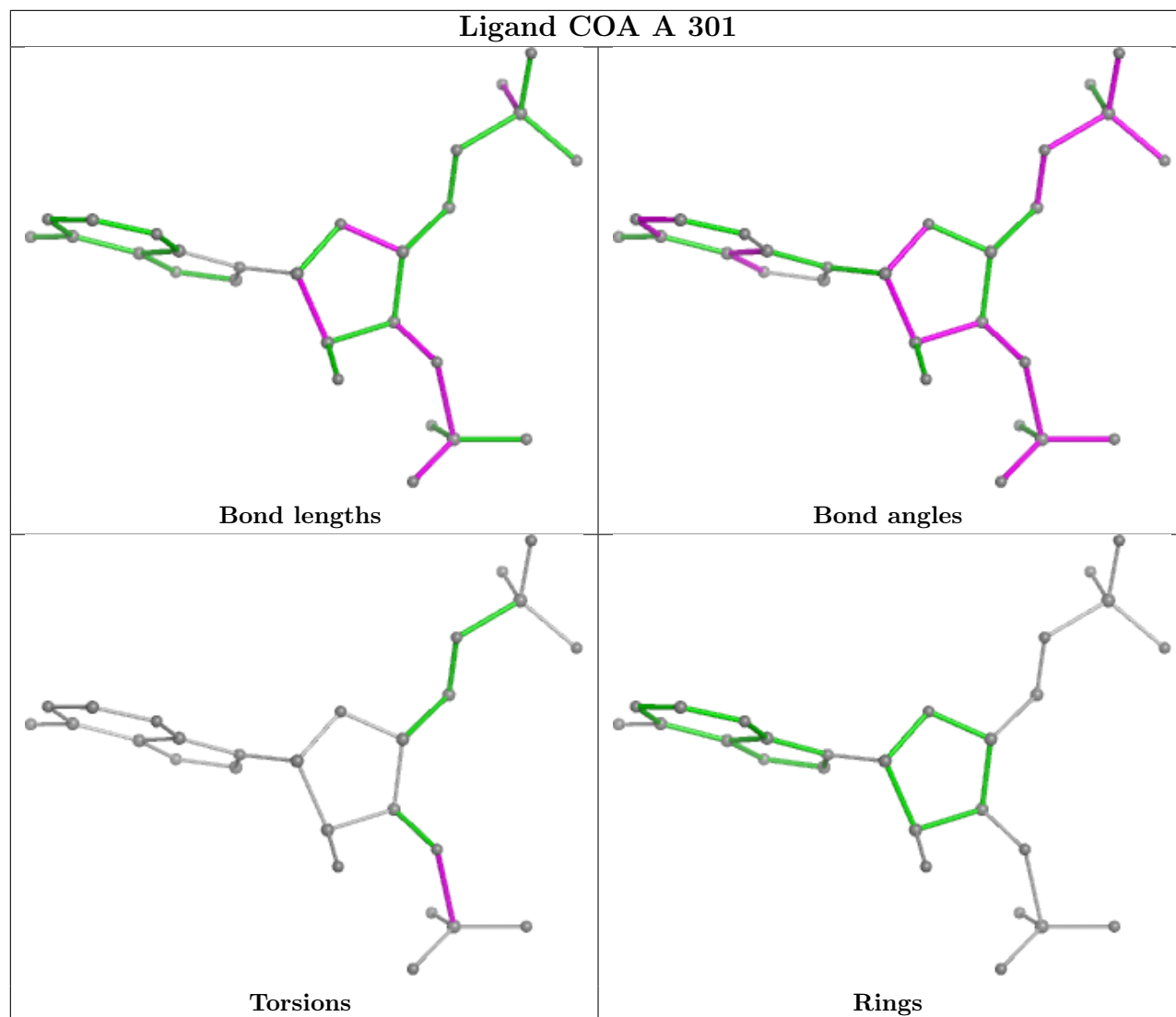
any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

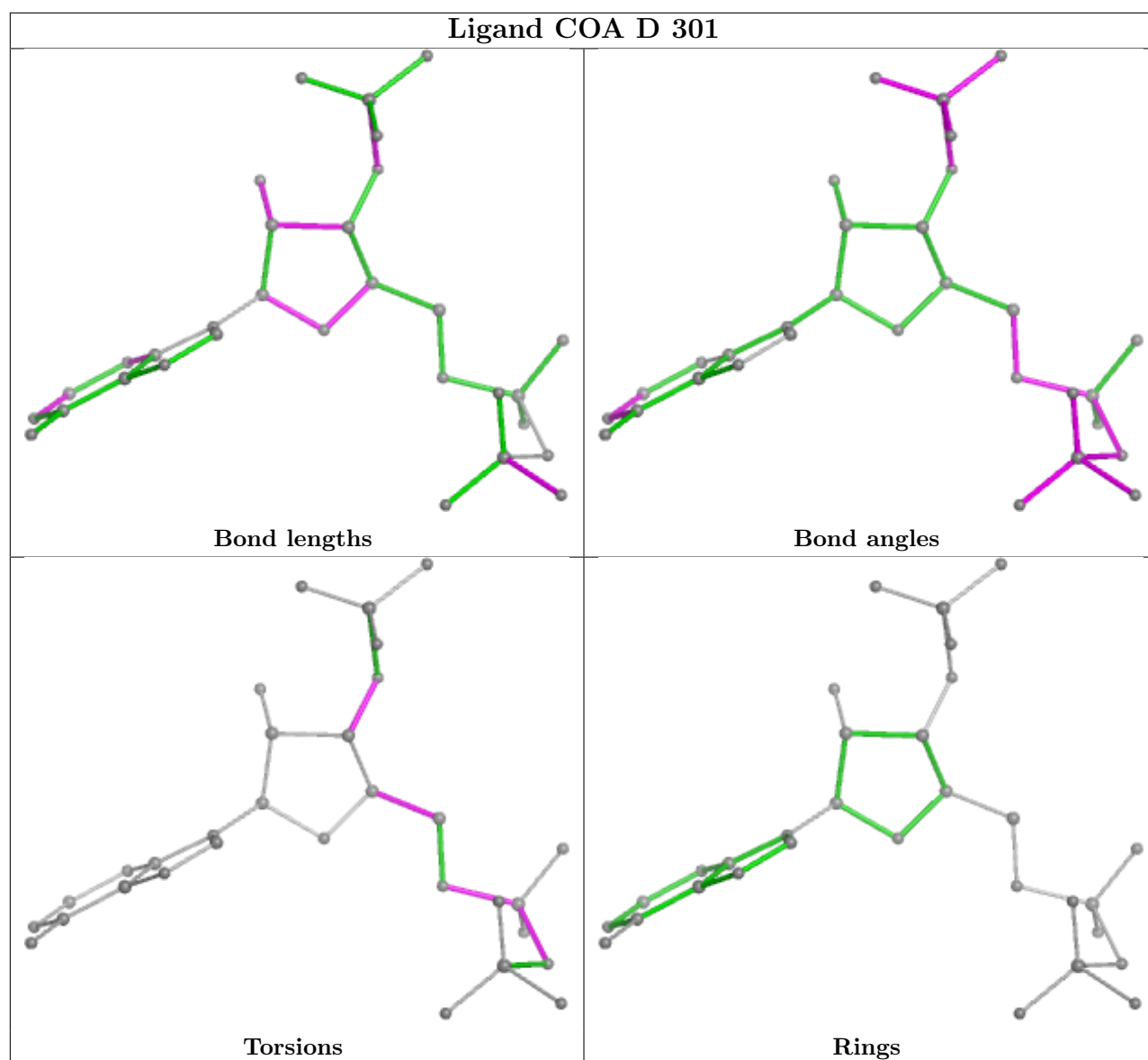












5.7 Other polymers [i](#)

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 [i](#)

6.1 Protein, DNA and RNA chains [i](#)

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	225/247 (91%)	-0.10	2 (0%) 84 86	44, 78, 123, 168	0
1	B	225/247 (91%)	-0.22	5 (2%) 62 65	47, 79, 125, 153	0
1	C	225/247 (91%)	-0.20	4 (1%) 68 71	44, 79, 132, 154	0
1	D	225/247 (91%)	-0.03	3 (1%) 77 79	44, 79, 132, 188	0
2	E	84/172 (48%)	0.84	16 (19%) 1 1	86, 118, 158, 176	0
2	F	86/172 (50%)	1.30	23 (26%) 0 0	88, 127, 176, 206	0
All	All	1070/1332 (80%)	0.06	53 (4%) 28 30	44, 83, 144, 206	0

The worst 5 of 53 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	F	2092	ILE	11.8
2	F	2061	GLN	7.6
2	E	2075	ALA	7.5
2	F	2125	VAL	6.4
2	F	2086	LEU	6.2

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

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

6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

6.4 Ligands

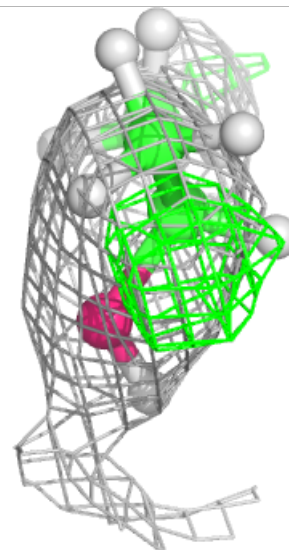
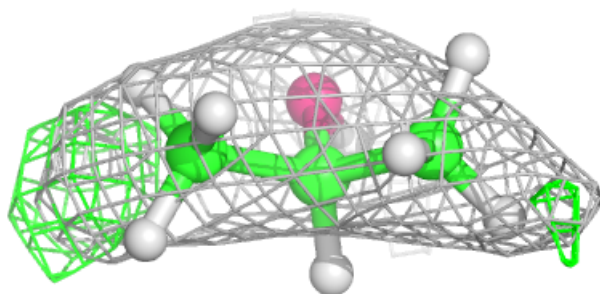
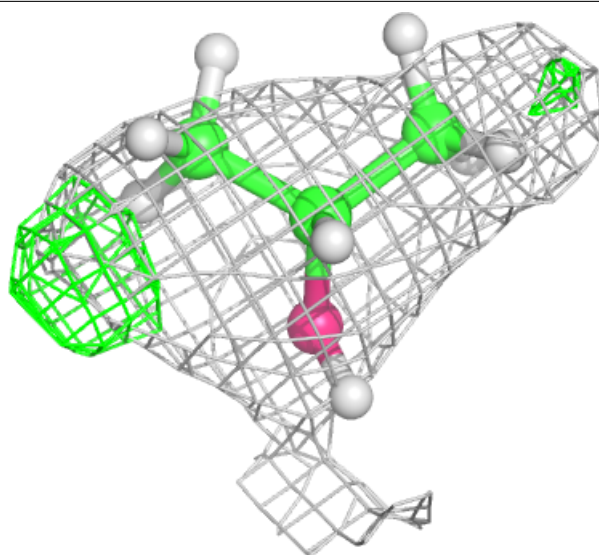
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

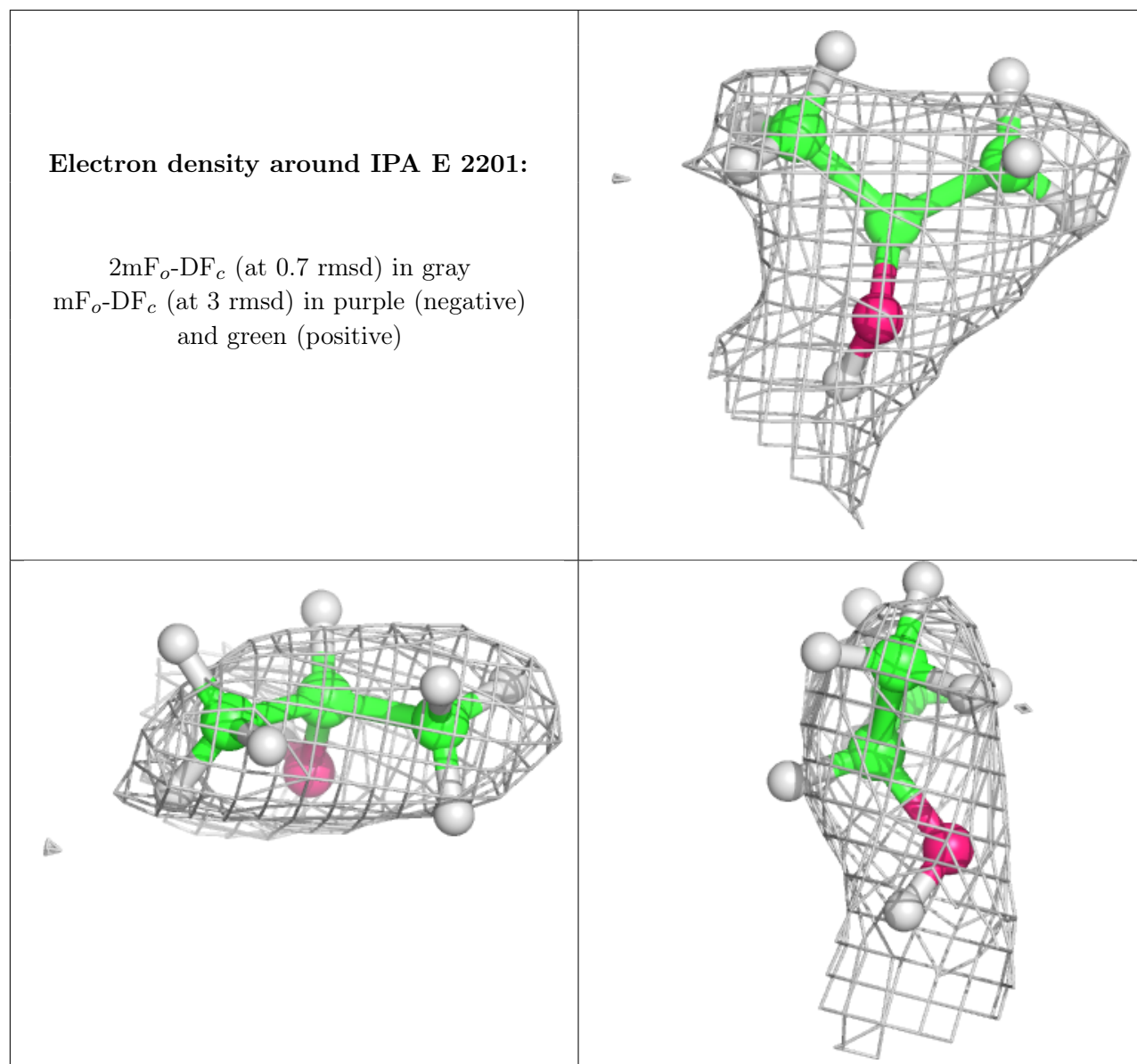
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
5	IPA	C	304	4/4	0.81	0.13	82,99,104,104	0
5	IPA	E	2201	4/4	0.84	0.11	86,104,116,121	0
4	MN	C	302	1/1	0.95	0.10	67,67,67,67	0
3	COA	A	301	27/48	0.96	0.14	28,49,73,73	0
3	COA	D	301	31/48	0.96	0.15	31,58,95,105	0
4	MN	B	302	1/1	0.96	0.10	66,66,66,66	0
3	COA	B	301	27/48	0.97	0.14	32,53,65,69	0
4	MN	A	302	1/1	0.97	0.08	59,59,59,59	0
3	COA	C	301	48/48	0.97	0.16	36,72,138,140	0
4	MN	D	302	1/1	0.98	0.07	62,62,62,62	0
4	MN	D	303	1/1	0.99	0.08	43,43,43,43	0
4	MN	C	303	1/1	0.99	0.14	47,47,47,47	0
4	MN	B	303	1/1	0.99	0.13	54,54,54,54	0
4	MN	A	303	1/1	1.00	0.12	61,61,61,61	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 IPA C 304:

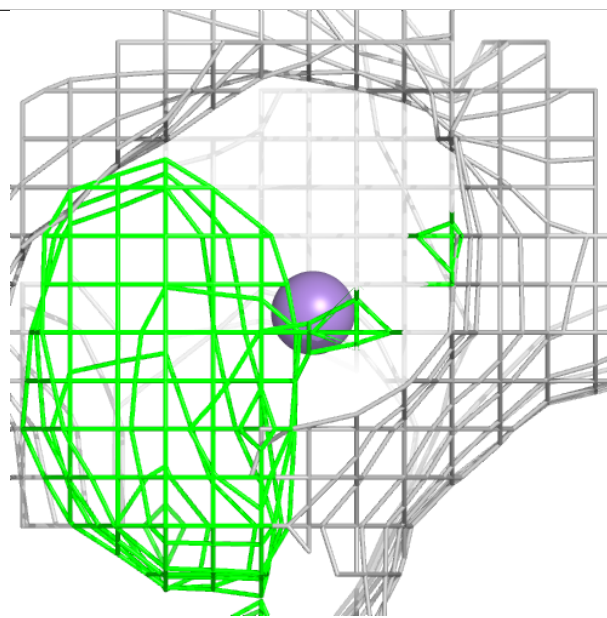
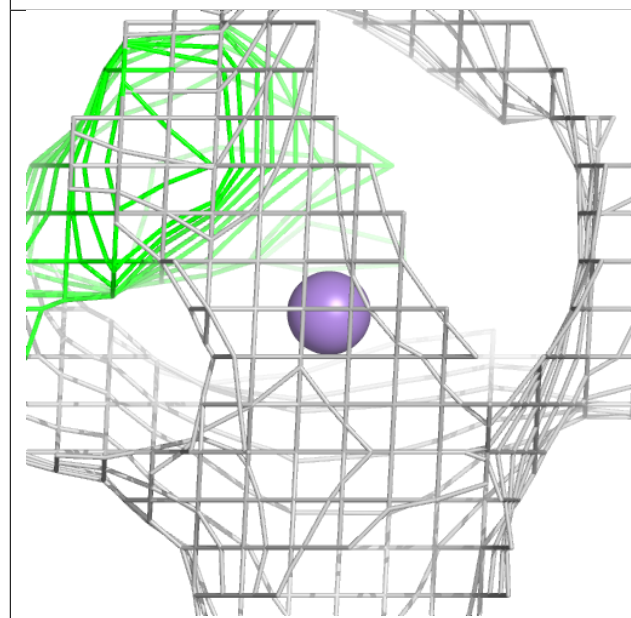
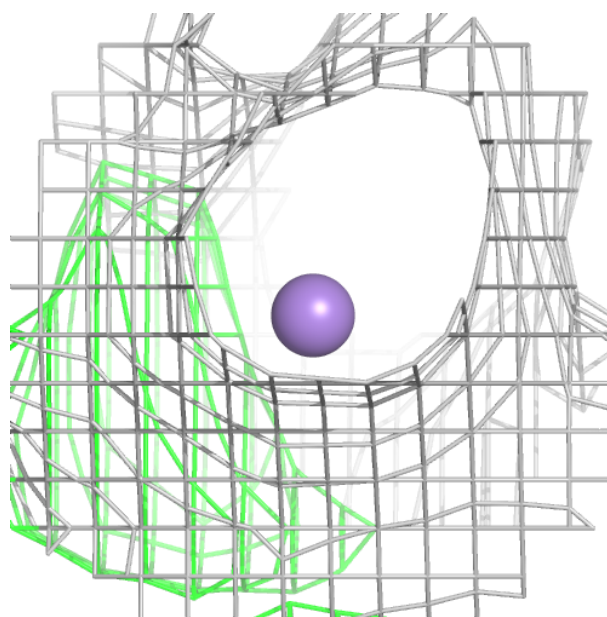
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)





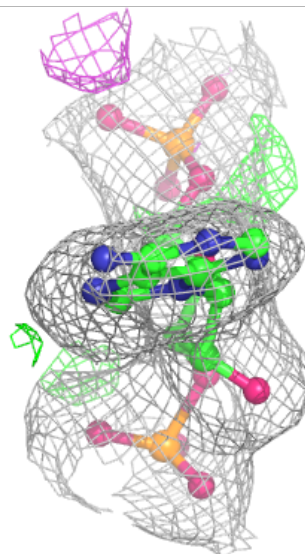
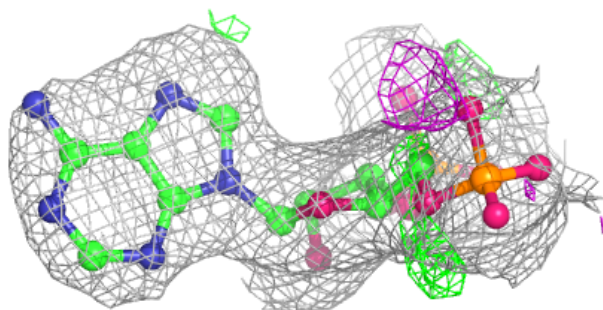
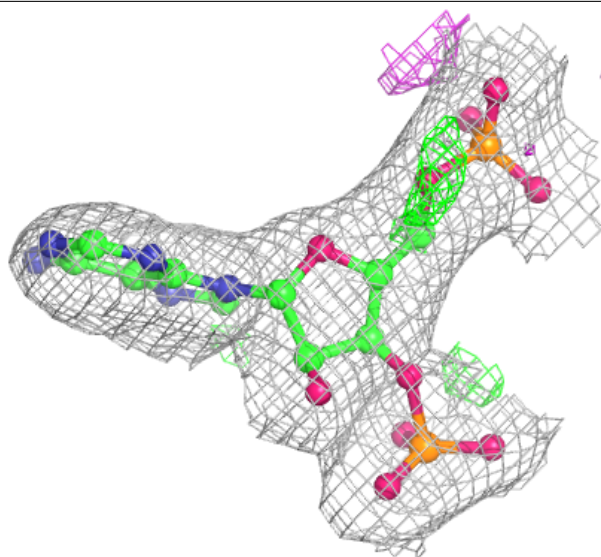
Electron density around MN C 302:

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



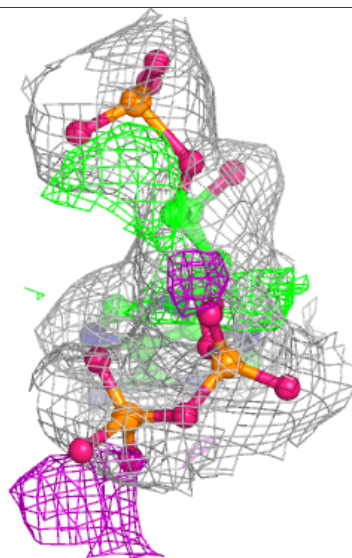
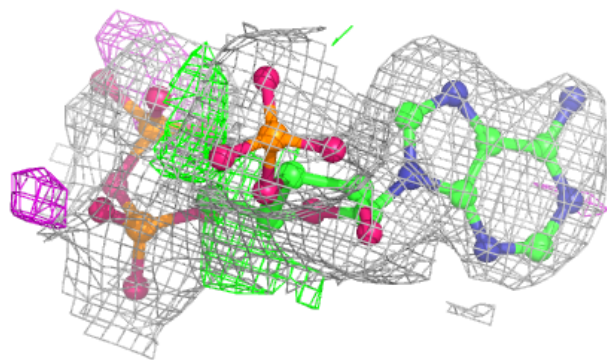
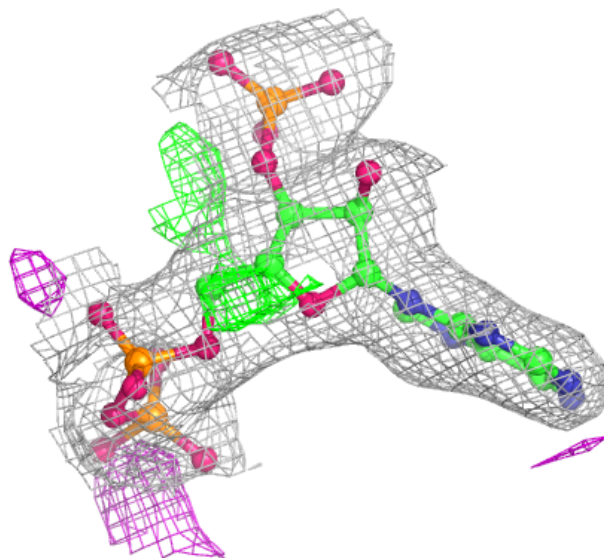
Electron density around COA A 301:

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



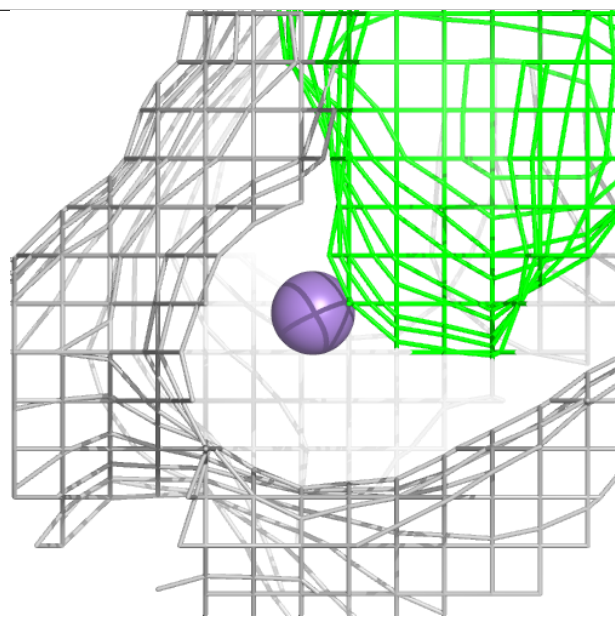
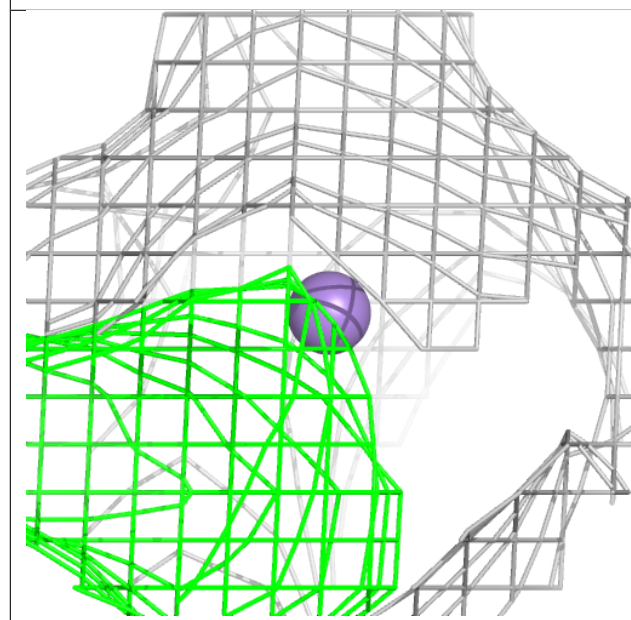
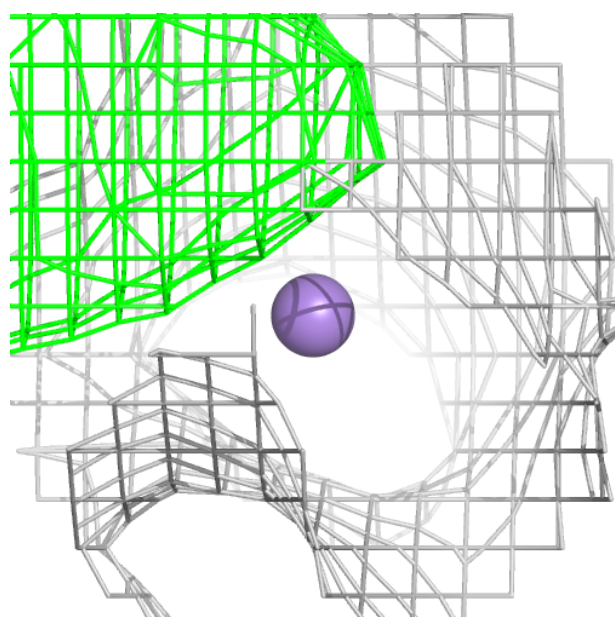
Electron density around COA D 301:

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and green (positive)



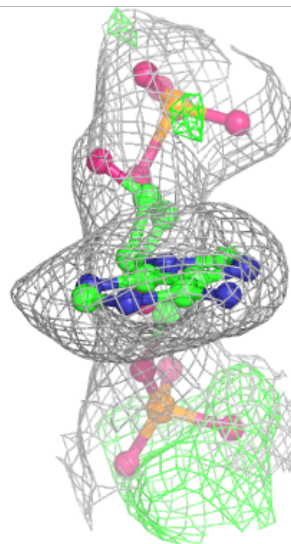
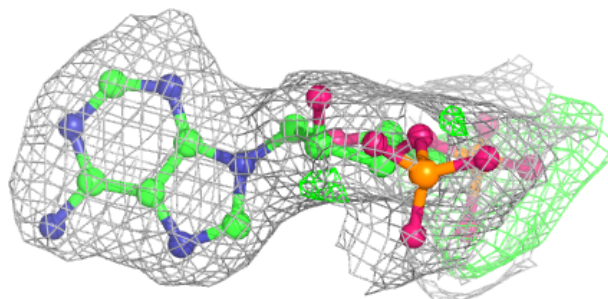
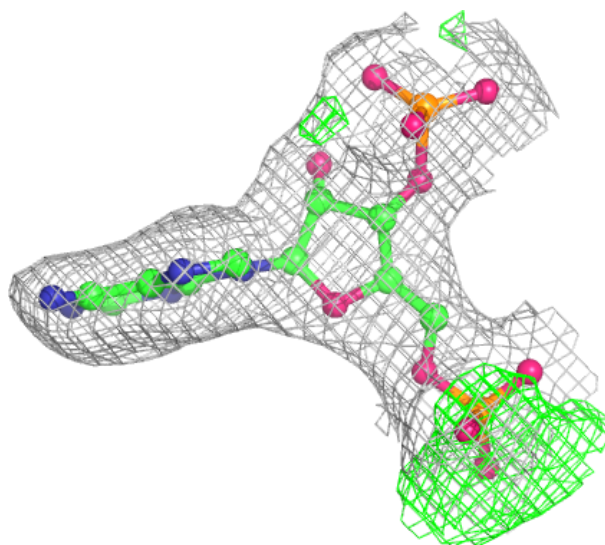
Electron density around MN B 302:

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and green (positive)



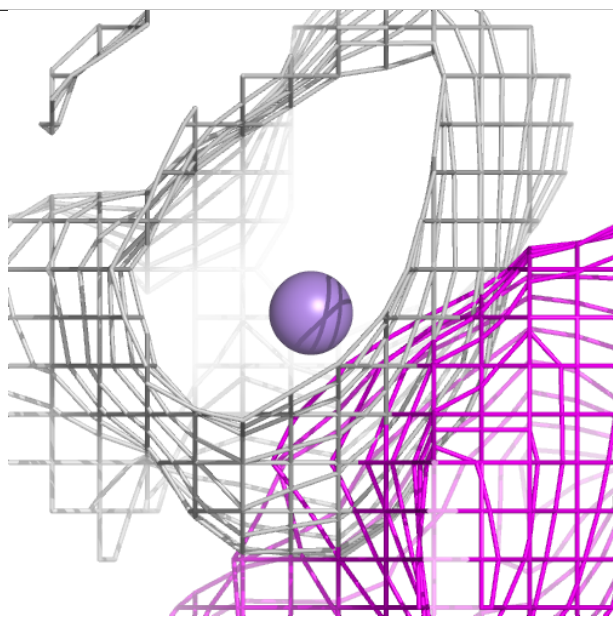
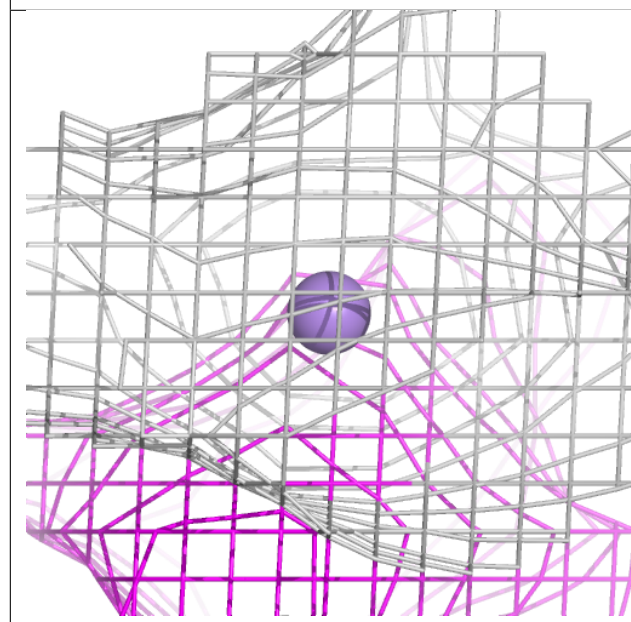
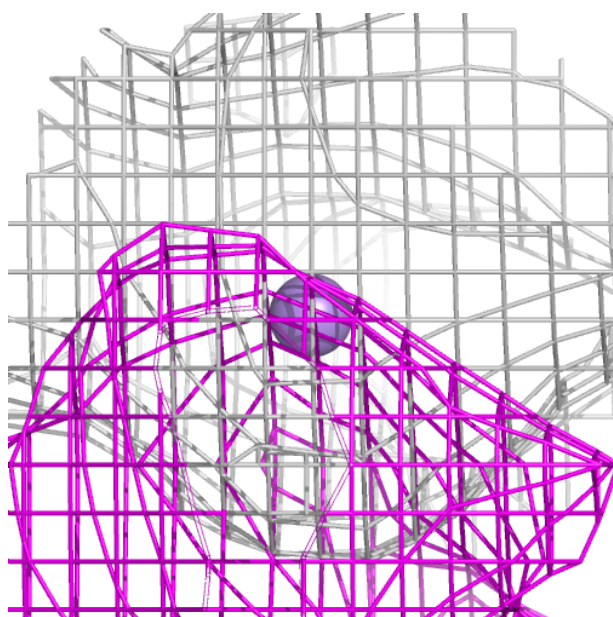
Electron density around COA B 301:

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and green (positive)



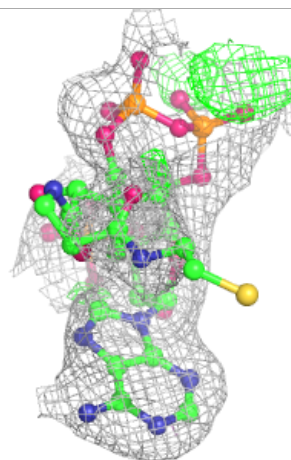
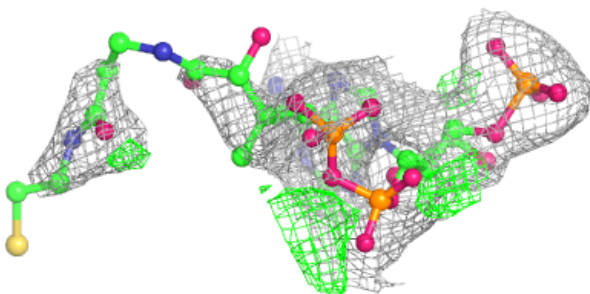
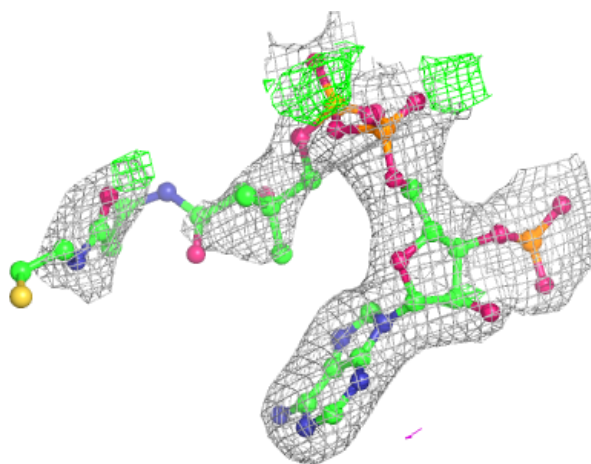
Electron density around MN A 302:

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



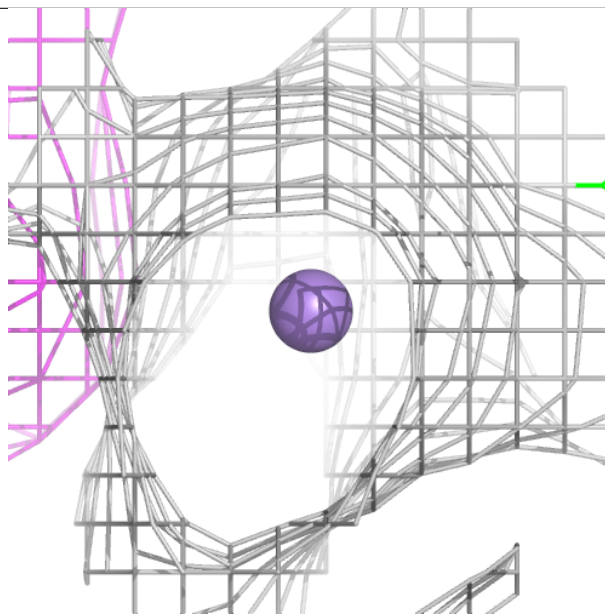
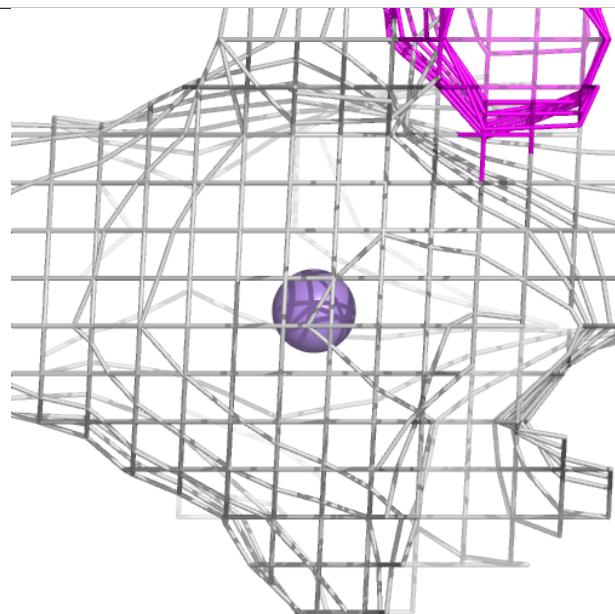
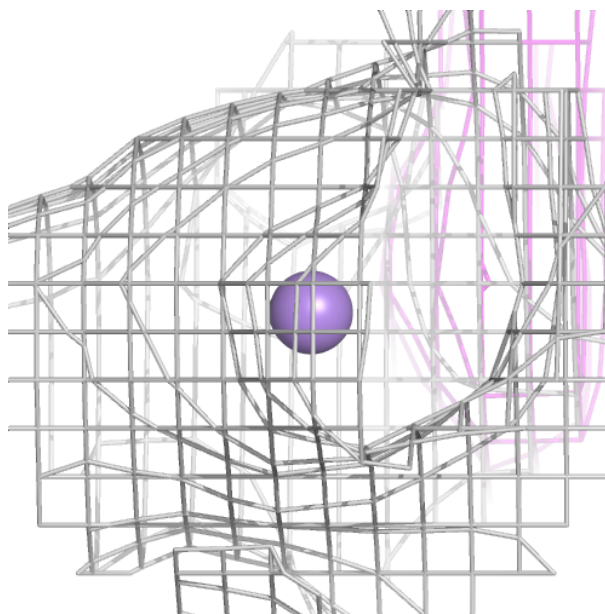
Electron density around COA C 301:

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and green (positive)



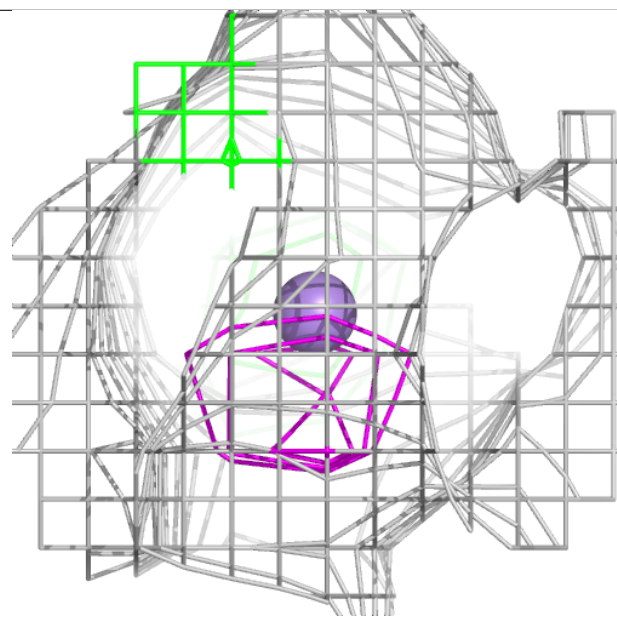
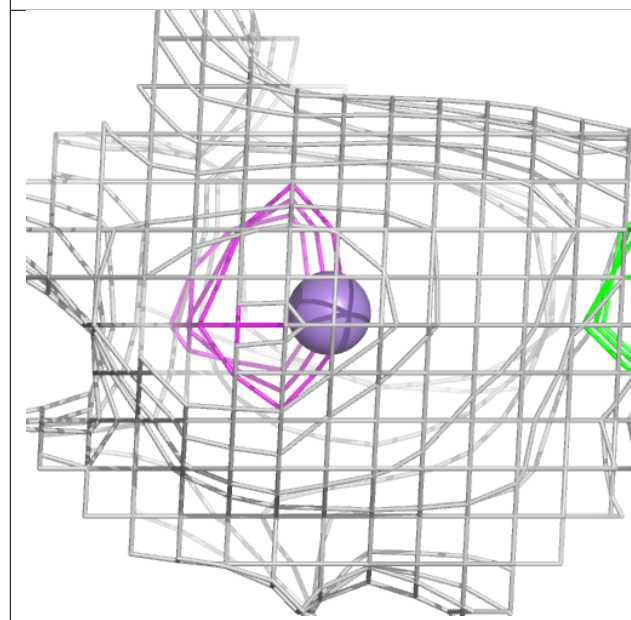
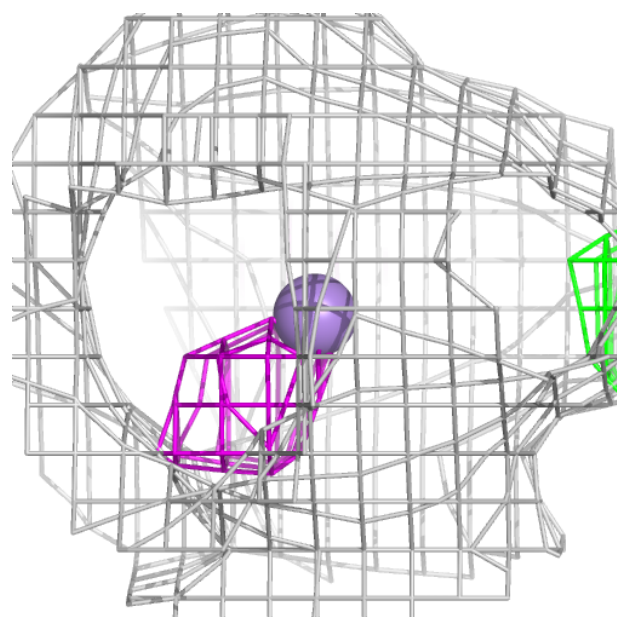
Electron density around MN D 302:

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



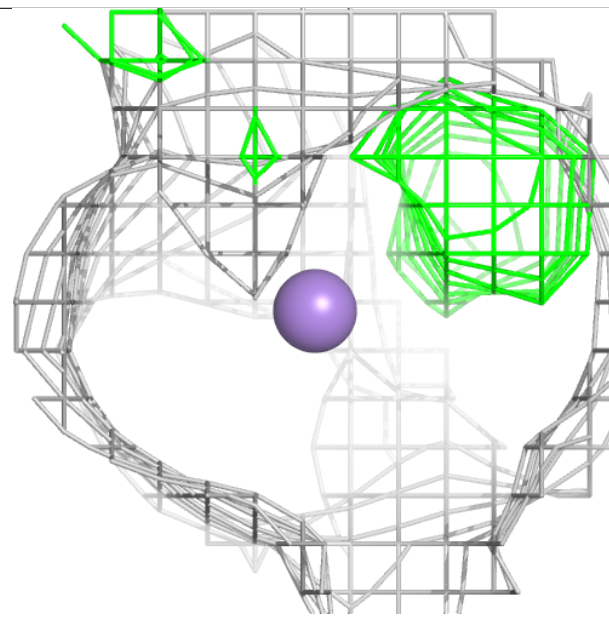
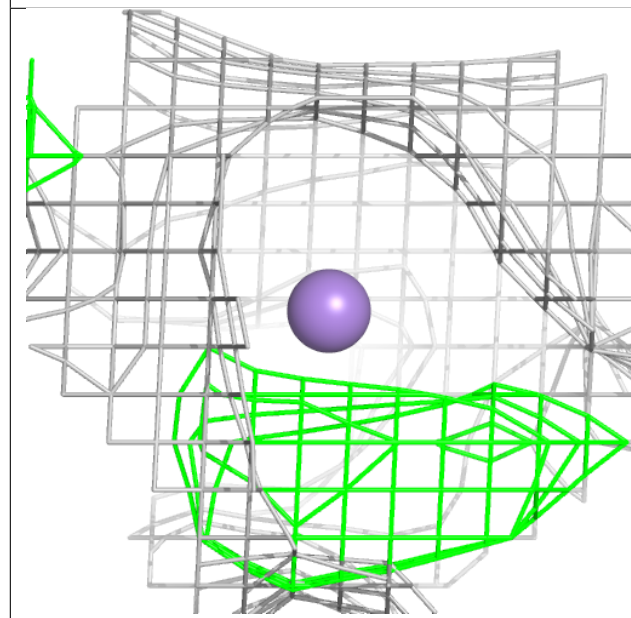
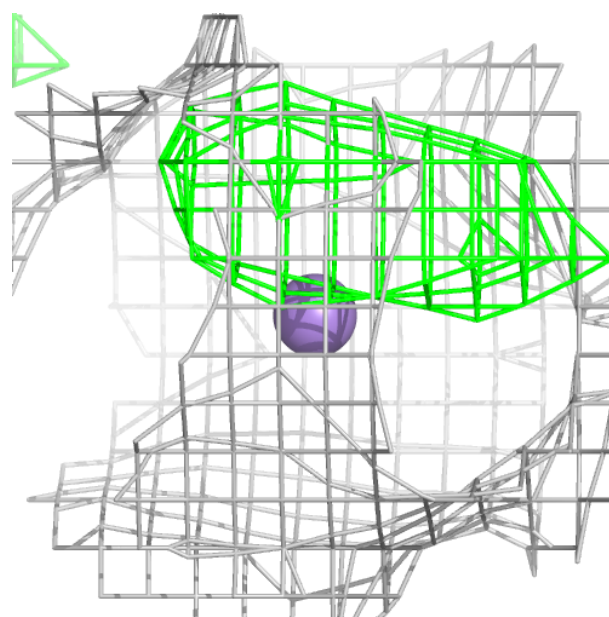
Electron density around MN D 303:

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and green (positive)



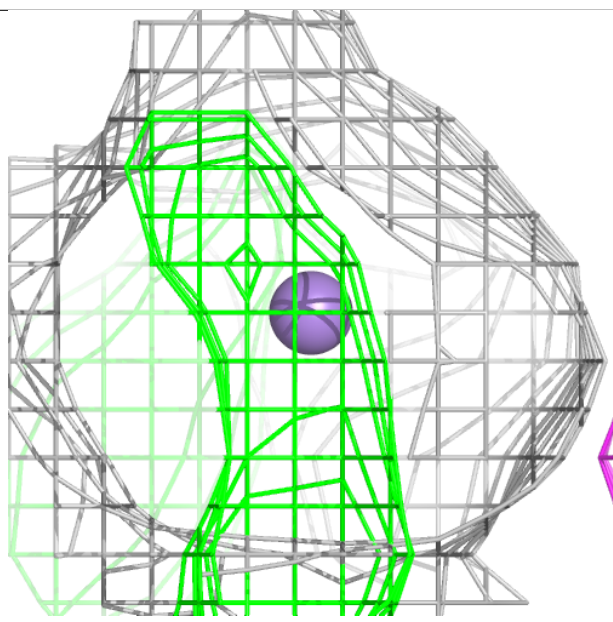
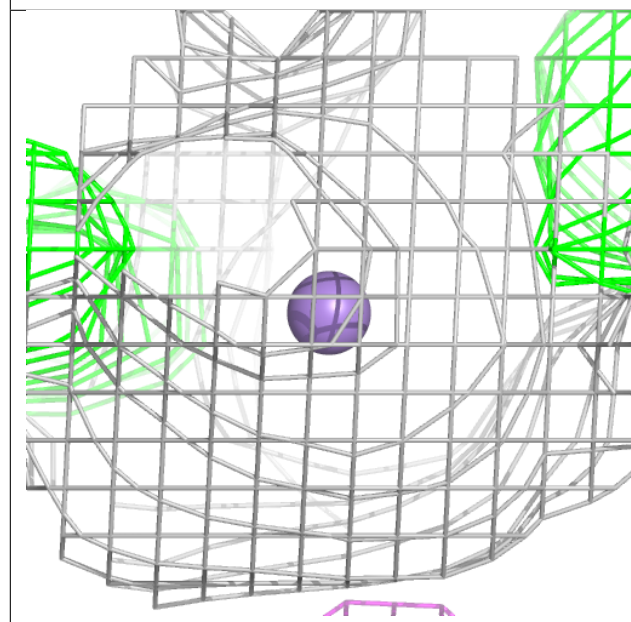
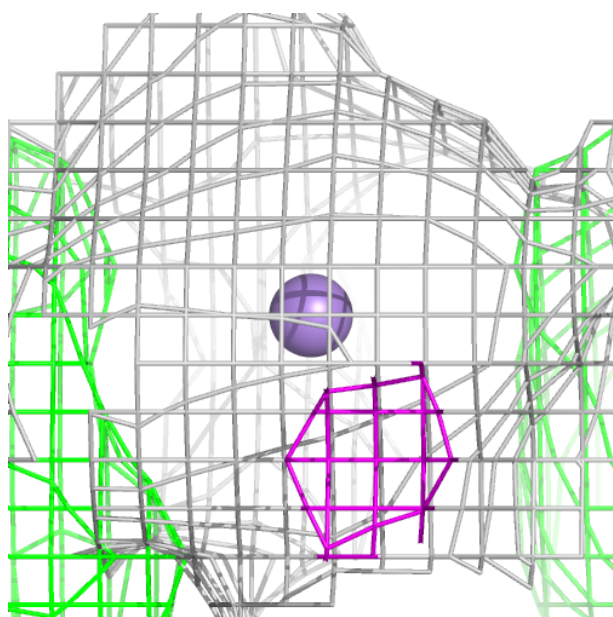
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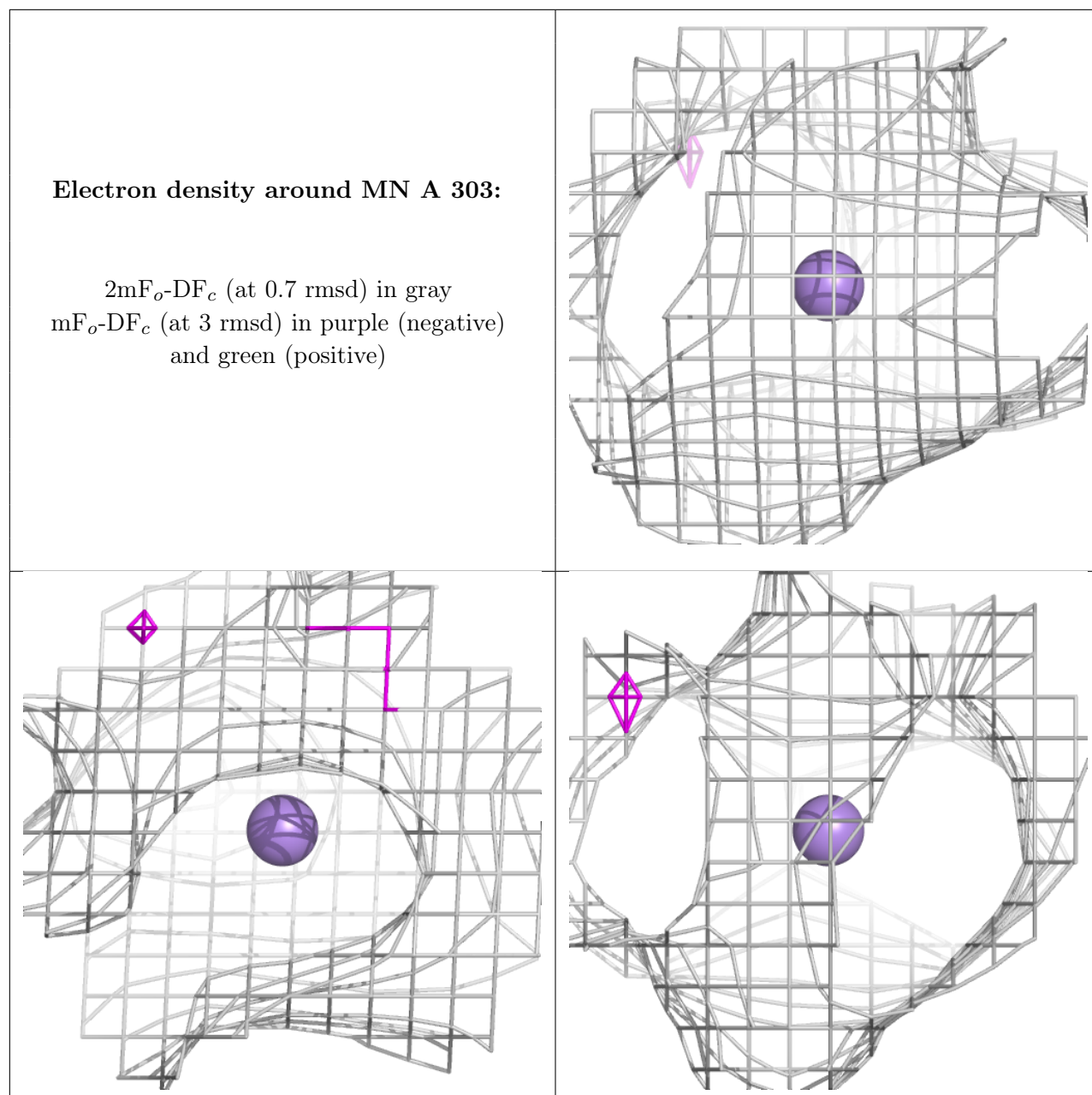
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around MN B 303:

$2mF_o-DF_c$ (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.