



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 18, 2026 – 03:02 AM UTC

PDB ID : 7CQQ / pdb_00007cqq
Title : GmaS in complex with AMPPNP and MetSox
Authors : Li, C.Y.; Zhang, Y.Z.
Deposited on : 2020-08-11
Resolution : 2.29 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ 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 : 4-5-2 with Phenix2.0
Mogul : ?? (??), CSD ??CSD?? (????)
Xtriage (Phenix) : 2.0
EDS : 3.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.010 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

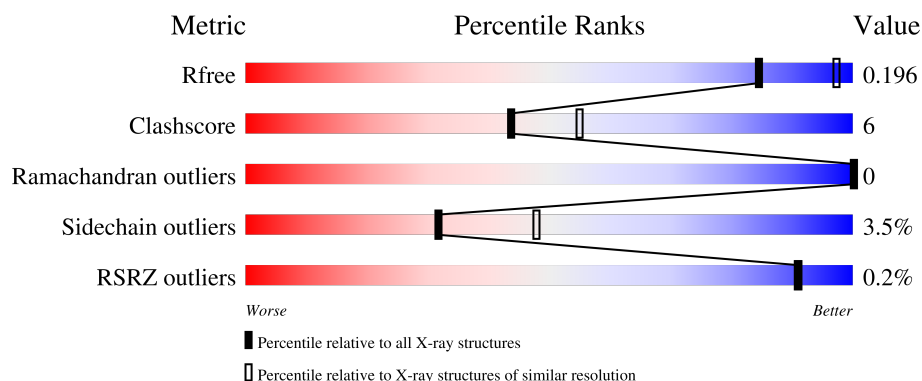
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.29 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}	180053	6319 (2.30-2.30)
Clashscore	190562	6919 (2.30-2.30)
Ramachandran outliers	187476	6854 (2.30-2.30)
Sidechain outliers	187428	6854 (2.30-2.30)
RSRZ outliers	180081	6325 (2.30-2.30)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. 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	450	
1	B	450	
1	C	450	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
4	MSL	A	505	-	-	X	-
4	MSL	B	505	-	-	X	-
4	MSL	C	505	-	-	X	-

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 10806 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 Type III glutamate–ammonia ligase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	429	Total	C	N	O	S	0	0	0
			3277	2083	566	611	17			
1	B	429	Total	C	N	O	S	0	0	0
			3277	2083	566	611	17			
1	C	429	Total	C	N	O	S	0	0	0
			3277	2083	566	611	17			

There are 60 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-19	MET	-	initiating methionine	UNP A0A369R1N0
A	-18	GLY	-	expression tag	UNP A0A369R1N0
A	-17	SER	-	expression tag	UNP A0A369R1N0
A	-16	SER	-	expression tag	UNP A0A369R1N0
A	-15	HIS	-	expression tag	UNP A0A369R1N0
A	-14	HIS	-	expression tag	UNP A0A369R1N0
A	-13	HIS	-	expression tag	UNP A0A369R1N0
A	-12	HIS	-	expression tag	UNP A0A369R1N0
A	-11	HIS	-	expression tag	UNP A0A369R1N0
A	-10	HIS	-	expression tag	UNP A0A369R1N0
A	-9	SER	-	expression tag	UNP A0A369R1N0
A	-8	SER	-	expression tag	UNP A0A369R1N0
A	-7	GLY	-	expression tag	UNP A0A369R1N0
A	-6	LEU	-	expression tag	UNP A0A369R1N0
A	-5	VAL	-	expression tag	UNP A0A369R1N0
A	-4	PRO	-	expression tag	UNP A0A369R1N0
A	-3	ARG	-	expression tag	UNP A0A369R1N0
A	-2	GLY	-	expression tag	UNP A0A369R1N0
A	-1	SER	-	expression tag	UNP A0A369R1N0
A	0	HIS	-	expression tag	UNP A0A369R1N0
B	-19	MET	-	initiating methionine	UNP A0A369R1N0
B	-18	GLY	-	expression tag	UNP A0A369R1N0
B	-17	SER	-	expression tag	UNP A0A369R1N0

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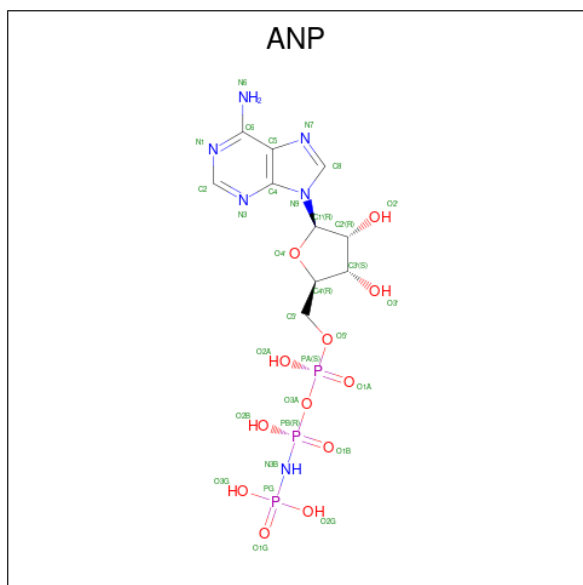
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Chain	Residue	Modelled	Actual	Comment	Reference
B	-16	SER	-	expression tag	UNP A0A369R1N0
B	-15	HIS	-	expression tag	UNP A0A369R1N0
B	-14	HIS	-	expression tag	UNP A0A369R1N0
B	-13	HIS	-	expression tag	UNP A0A369R1N0
B	-12	HIS	-	expression tag	UNP A0A369R1N0
B	-11	HIS	-	expression tag	UNP A0A369R1N0
B	-10	HIS	-	expression tag	UNP A0A369R1N0
B	-9	SER	-	expression tag	UNP A0A369R1N0
B	-8	SER	-	expression tag	UNP A0A369R1N0
B	-7	GLY	-	expression tag	UNP A0A369R1N0
B	-6	LEU	-	expression tag	UNP A0A369R1N0
B	-5	VAL	-	expression tag	UNP A0A369R1N0
B	-4	PRO	-	expression tag	UNP A0A369R1N0
B	-3	ARG	-	expression tag	UNP A0A369R1N0
B	-2	GLY	-	expression tag	UNP A0A369R1N0
B	-1	SER	-	expression tag	UNP A0A369R1N0
B	0	HIS	-	expression tag	UNP A0A369R1N0
C	-19	MET	-	initiating methionine	UNP A0A369R1N0
C	-18	GLY	-	expression tag	UNP A0A369R1N0
C	-17	SER	-	expression tag	UNP A0A369R1N0
C	-16	SER	-	expression tag	UNP A0A369R1N0
C	-15	HIS	-	expression tag	UNP A0A369R1N0
C	-14	HIS	-	expression tag	UNP A0A369R1N0
C	-13	HIS	-	expression tag	UNP A0A369R1N0
C	-12	HIS	-	expression tag	UNP A0A369R1N0
C	-11	HIS	-	expression tag	UNP A0A369R1N0
C	-10	HIS	-	expression tag	UNP A0A369R1N0
C	-9	SER	-	expression tag	UNP A0A369R1N0
C	-8	SER	-	expression tag	UNP A0A369R1N0
C	-7	GLY	-	expression tag	UNP A0A369R1N0
C	-6	LEU	-	expression tag	UNP A0A369R1N0
C	-5	VAL	-	expression tag	UNP A0A369R1N0
C	-4	PRO	-	expression tag	UNP A0A369R1N0
C	-3	ARG	-	expression tag	UNP A0A369R1N0
C	-2	GLY	-	expression tag	UNP A0A369R1N0
C	-1	SER	-	expression tag	UNP A0A369R1N0
C	0	HIS	-	expression tag	UNP A0A369R1N0

- Molecule 2 is MAGNESIUM ION (CCD ID: MG) (formula: Mg) (labeled as "Ligand of Interest" by depositor).

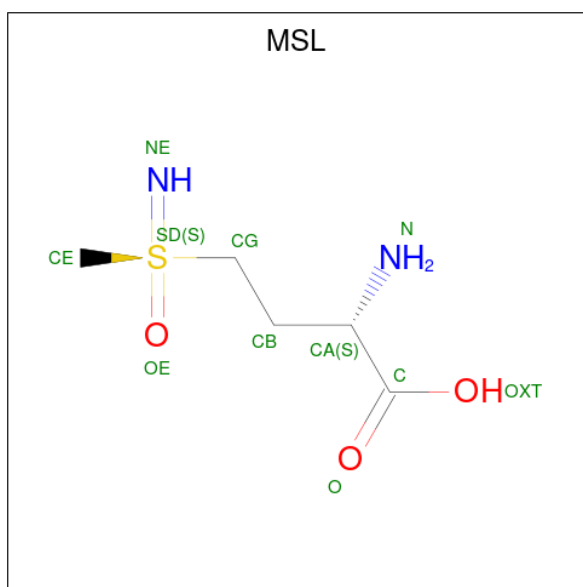
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	3	Total	Mg	0	0
			3	3		
2	B	3	Total	Mg	0	0
			3	3		
2	C	3	Total	Mg	0	0
			3	3		

- Molecule 3 is PHOSPHOAMINOPHOSPHONIC ACID-ADENYLATE ESTER (CCD ID: ANP) (formula: $C_{10}H_{17}N_6O_{12}P_3$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	N	O	P	0	0
			31	10	6	12	3		
3	B	1	Total	C	N	O	P	0	0
			31	10	6	12	3		
3	C	1	Total	C	N	O	P	0	0
			31	10	6	12	3		

- Molecule 4 is (2S)-2-AMINO-4-(METHYLSULFONIMIDOYL)BUTANOIC ACID (CCD ID: MSL) (formula: $C_5H_{12}N_2O_3S$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	A	1	Total	C	N	O	S	0	0
			11	5	2	3	1		
4	B	1	Total	C	N	O	S	0	0
			11	5	2	3	1		
4	C	1	Total	C	N	O	S	0	0
			11	5	2	3	1		

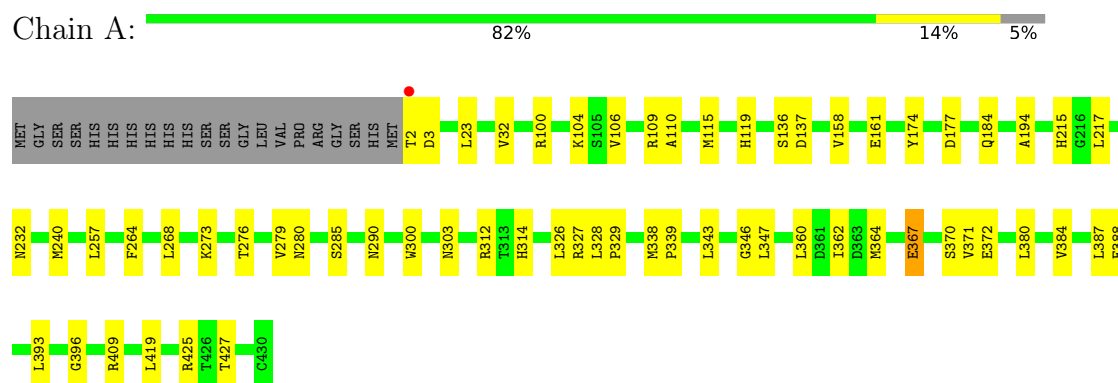
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	294	Total	O	0	0
			294	294		
5	B	269	Total	O	0	0
			269	269		
5	C	277	Total	O	0	0
			277	277		

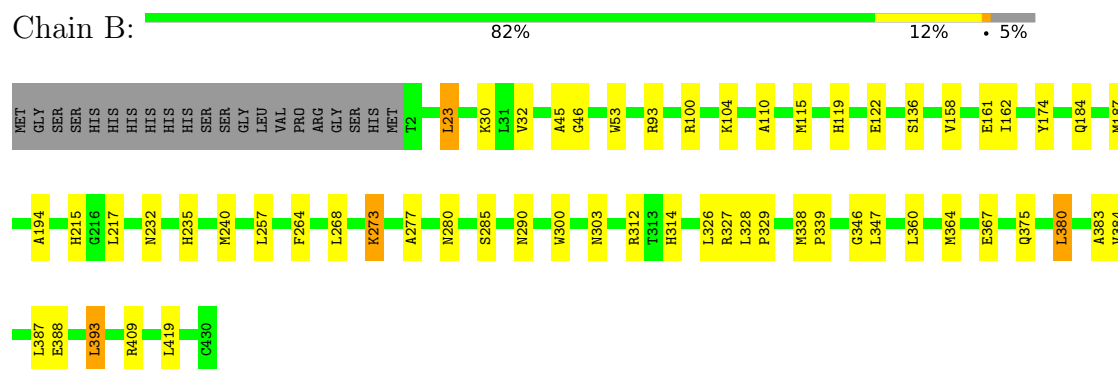
3 Residue-property plots

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

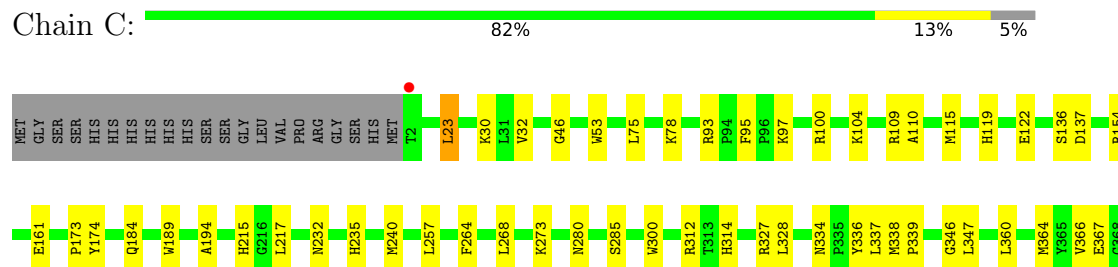
- Molecule 1: Type III glutamate–ammonia ligase



- Molecule 1: Type III glutamate–ammonia ligase



- Molecule 1: Type III glutamate–ammonia ligase





4 Data and refinement statistics

Property	Value	Source
Space group	I 2 2 2	Depositor
Cell constants a, b, c, α , β , γ	115.55Å 174.48Å 190.12Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	31.83 – 2.29 31.83 – 2.29	Depositor EDS
% Data completeness (in resolution range)	94.8 (31.83-2.29) 99.7 (31.83-2.29)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.81 (at 2.29Å)	Xtriage
Refinement program	PHENIX 1.6.4_486	Depositor
R, R_{free}	0.157 , 0.196 0.158 , 0.196	Depositor DCC
R_{free} test set	4280 reflections (4.98%)	wwPDB-VP
Wilson B-factor (Å ²)	34.1	Xtriage
Anisotropy	0.532	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 31.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.97	EDS
Total number of atoms	10806	wwPDB-VP
Average B, all atoms (Å ²)	37.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.48% 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: MG, MSL, ANP

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	0.46	0/3361	0.80	3/4574 (0.1%)
1	B	0.46	0/3361	0.78	0/4574
1	C	0.47	0/3361	0.76	0/4574
All	All	0.46	0/10083	0.78	3/13722 (0.0%)

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	137	ASP	CA-C-N	5.63	125.30	119.56
1	A	137	ASP	C-N-CA	5.63	125.30	119.56
1	A	177	ASP	N-CA-C	5.00	115.90	108.60

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	3277	0	3183	37	0
1	B	3277	0	3183	44	0
1	C	3277	0	3183	39	0
2	A	3	0	0	0	0
2	B	3	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	C	3	0	0	0	0
3	A	31	0	12	1	0
3	B	31	0	12	1	0
3	C	31	0	12	1	0
4	A	11	0	11	6	0
4	B	11	0	11	8	0
4	C	11	0	11	7	0
5	A	294	0	0	0	1
5	B	269	0	0	0	1
5	C	277	0	0	0	0
All	All	10806	0	9618	120	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 6.

All (120) 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:A:327:ARG:HH22	4:A:505:MSL:HE3	1.02	1.15
1:B:327:ARG:HH22	4:B:505:MSL:HE3	0.99	1.09
1:C:327:ARG:HH22	4:C:505:MSL:HE3	1.17	1.04
1:C:314:HIS:CE1	1:C:364:MET:HE3	1.96	1.00
1:B:327:ARG:NH2	4:B:505:MSL:HE3	1.80	0.95
1:B:314:HIS:CE1	1:B:364:MET:HE3	2.02	0.94
1:A:327:ARG:NH2	4:A:505:MSL:HE3	1.82	0.94
1:B:327:ARG:HH22	4:B:505:MSL:CE	1.86	0.84
1:C:327:ARG:NH2	4:C:505:MSL:HE3	1.94	0.82
1:C:388:GLU:CD	1:C:409:ARG:HH12	1.87	0.81
1:B:115:MET:HB3	1:B:240:MET:HE3	1.62	0.80
1:A:327:ARG:HH22	4:A:505:MSL:CE	1.92	0.78
1:C:314:HIS:HE1	1:C:364:MET:HE3	1.50	0.76
1:B:314:HIS:HE1	1:B:364:MET:HE3	1.50	0.76
1:B:388:GLU:CD	1:B:409:ARG:HH12	1.93	0.76
1:A:115:MET:HB3	1:A:240:MET:HE3	1.73	0.70
1:C:314:HIS:CE1	1:C:364:MET:CE	2.75	0.68
1:B:184:GLN:HE21	1:B:232:ASN:ND2	1.92	0.68
1:A:184:GLN:HE21	1:A:232:ASN:HD22	1.44	0.66
1:B:184:GLN:HE21	1:B:232:ASN:HD22	1.41	0.66
1:B:300:TRP:HB3	4:B:505:MSL:HE2	1.78	0.66
1:B:312:ARG:HD3	4:B:505:MSL:HE1	1.80	0.64
1:A:280:ASN:HD21	1:A:328:LEU:HG	1.63	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:314:HIS:CE1	1:B:364:MET:CE	2.80	0.63
1:C:312:ARG:HD3	4:C:505:MSL:HE1	1.80	0.62
1:C:100:ARG:O	1:C:104:LYS:HG3	1.99	0.62
1:C:300:TRP:CE3	4:C:505:MSL:HE2	2.36	0.61
1:C:184:GLN:HE21	1:C:232:ASN:ND2	2.00	0.59
1:A:276:THR:HG23	1:A:280:ASN:HD22	1.66	0.59
1:A:184:GLN:HE21	1:A:232:ASN:ND2	1.99	0.59
1:C:388:GLU:OE2	1:C:409:ARG:NH1	2.36	0.59
1:B:280:ASN:HD21	1:B:328:LEU:HG	1.67	0.58
1:C:115:MET:HB3	1:C:240:MET:HE3	1.85	0.58
1:B:314:HIS:HE1	1:B:364:MET:CE	2.16	0.57
1:C:314:HIS:HE1	1:C:364:MET:CE	2.14	0.57
1:C:280:ASN:HD21	1:C:328:LEU:HG	1.69	0.57
1:B:161:GLU:OE1	1:B:215:HIS:HE1	1.88	0.56
1:A:136:SER:HB2	1:A:217:LEU:HD22	1.88	0.55
1:B:136:SER:HB2	1:B:217:LEU:HD22	1.90	0.54
1:C:161:GLU:OE1	1:C:215:HIS:HE1	1.91	0.54
1:C:300:TRP:CD2	4:C:505:MSL:HE2	2.42	0.54
1:B:388:GLU:OE2	1:B:409:ARG:NH1	2.41	0.54
1:C:136:SER:HB2	1:C:217:LEU:HD22	1.91	0.53
1:C:184:GLN:HE21	1:C:232:ASN:HD22	1.55	0.53
1:B:115:MET:HB3	1:B:240:MET:CE	2.34	0.52
1:A:367:GLU:O	1:A:370:SER:HB3	2.11	0.51
1:A:388:GLU:OE2	1:A:409:ARG:NH1	2.43	0.51
1:B:119:HIS:HD2	1:B:194:ALA:HA	1.76	0.50
1:A:338:MET:HB3	1:A:339:PRO:HD3	1.93	0.50
1:B:110:ALA:HB2	1:B:347:LEU:HD11	1.93	0.50
1:C:119:HIS:CD2	1:C:194:ALA:HA	2.46	0.50
1:A:388:GLU:CD	1:A:409:ARG:NH1	2.70	0.50
1:C:119:HIS:HD2	1:C:194:ALA:HA	1.77	0.49
1:A:110:ALA:HB2	1:A:347:LEU:HD11	1.93	0.49
1:B:290:ASN:HA	1:B:303:ASN:OD1	2.12	0.49
1:C:327:ARG:HH22	4:C:505:MSL:CE	2.07	0.49
1:C:366:VAL:HG12	1:C:367:GLU:HG3	1.95	0.49
1:B:300:TRP:HB3	4:B:505:MSL:CE	2.43	0.48
1:B:326:LEU:HG	1:B:329:PRO:HD3	1.95	0.48
1:A:2:THR:HG22	1:A:3:ASP:N	2.29	0.48
1:B:300:TRP:CE3	4:B:505:MSL:HE2	2.49	0.48
1:B:30:LYS:CE	1:B:46:GLY:O	2.61	0.47
1:C:300:TRP:HB3	4:C:505:MSL:HE2	1.96	0.47
1:C:338:MET:HB3	1:C:339:PRO:HD3	1.97	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:312:ARG:HD3	4:A:505:MSL:HE1	1.96	0.47
1:B:119:HIS:CD2	1:B:194:ALA:HA	2.50	0.47
1:C:95:PHE:CE2	1:C:97:LYS:HB2	2.49	0.47
1:C:122:GLU:OE2	1:C:235:HIS:HB2	2.14	0.47
1:A:161:GLU:OE1	1:A:215:HIS:HE1	1.98	0.47
1:B:388:GLU:CD	1:B:409:ARG:NH1	2.67	0.47
1:A:326:LEU:HG	1:A:329:PRO:HD3	1.98	0.46
1:A:279:VAL:HG12	1:A:338:MET:HG3	1.98	0.46
1:C:110:ALA:HB2	1:C:347:LEU:HD11	1.97	0.46
1:B:273:LYS:HB2	1:B:273:LYS:HE2	1.57	0.46
1:A:290:ASN:HA	1:A:303:ASN:OD1	2.16	0.45
1:A:109:ARG:HH22	1:A:396:GLY:HA2	1.81	0.45
1:A:380:LEU:O	1:A:384:VAL:HG23	2.17	0.45
1:B:100:ARG:O	1:B:104:LYS:HG3	2.17	0.45
1:B:290:ASN:HD21	1:B:375:GLN:HE21	1.64	0.45
1:B:158:VAL:HG21	1:B:217:LEU:HD12	1.99	0.45
1:B:264:PHE:CE2	1:B:346:GLY:HA3	2.52	0.45
1:A:300:TRP:CE3	4:A:505:MSL:HE2	2.52	0.44
1:B:23:LEU:HB2	1:B:53:TRP:O	2.17	0.44
1:B:393:LEU:HD12	1:B:393:LEU:HA	1.87	0.44
1:B:338:MET:HB3	1:B:339:PRO:HD3	1.98	0.44
1:A:119:HIS:HD2	1:A:194:ALA:HA	1.83	0.44
1:B:161:GLU:OE1	1:B:215:HIS:CE1	2.70	0.44
1:B:174:TYR:OH	3:B:504:ANP:H3'	2.18	0.44
1:B:162:ILE:HB	1:B:187:MET:HE1	2.00	0.44
1:A:300:TRP:HB3	4:A:505:MSL:HE2	1.99	0.44
1:A:264:PHE:CE2	1:A:346:GLY:HA3	2.53	0.44
1:C:23:LEU:HB2	1:C:53:TRP:O	2.18	0.44
1:A:174:TYR:OH	3:A:504:ANP:H3'	2.17	0.43
1:B:380:LEU:HD22	1:B:384:VAL:HG23	2.00	0.43
1:C:75:LEU:HB2	1:C:78:LYS:O	2.18	0.43
1:C:280:ASN:HB3	1:C:285:SER:HB3	1.99	0.43
1:C:174:TYR:OH	3:C:504:ANP:H3'	2.18	0.43
1:A:119:HIS:CD2	1:A:194:ALA:HA	2.53	0.43
1:A:106:VAL:HG12	1:A:343:LEU:HD23	2.01	0.42
1:C:264:PHE:CE2	1:C:346:GLY:HA3	2.54	0.42
1:A:314:HIS:CE1	1:A:364:MET:HG2	2.54	0.42
1:A:362:ILE:HD12	1:A:367:GLU:HB3	2.01	0.42
1:C:109:ARG:HH22	1:C:396:GLY:HA2	1.84	0.42
1:A:280:ASN:HB3	1:A:285:SER:HB3	2.01	0.42
1:B:280:ASN:HB3	1:B:285:SER:HB3	2.02	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:100:ARG:HG3	1:C:336:TYR:CE1	2.55	0.42
1:B:277:ALA:HB2	1:B:383:ALA:C	2.46	0.41
1:B:122:GLU:OE2	1:B:235:HIS:HB2	2.21	0.41
1:B:300:TRP:CD2	4:B:505:MSL:HE2	2.56	0.41
1:A:100:ARG:O	1:A:104:LYS:HG3	2.20	0.41
1:A:276:THR:HG23	1:A:280:ASN:ND2	2.32	0.41
1:B:30:LYS:HD2	1:B:45:ALA:HB1	2.03	0.41
1:C:369:HIS:CD2	1:C:370:SER:N	2.89	0.41
1:A:388:GLU:OE1	1:A:409:ARG:NH1	2.46	0.41
1:C:30:LYS:CE	1:C:46:GLY:O	2.69	0.41
1:C:137:ASP:OD2	1:C:154:ARG:HD2	2.21	0.40
1:C:173:PRO:HA	1:C:189:TRP:HA	2.02	0.40
1:A:158:VAL:HG22	1:A:215:HIS:CG	2.56	0.40
1:C:334:ASN:HB3	1:C:337:LEU:HB2	2.03	0.40
1:A:371:VAL:HG22	1:A:372:GLU:H	1.86	0.40

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)
5:A:786:HOH:O	5:B:824:HOH:O[6_544]	1.79	0.41

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	427/450 (95%)	421 (99%)	6 (1%)	0	100	100
1	B	427/450 (95%)	418 (98%)	9 (2%)	0	100	100
1	C	427/450 (95%)	419 (98%)	8 (2%)	0	100	100
All	All	1281/1350 (95%)	1258 (98%)	23 (2%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	330/348 (95%)	318 (96%)	12 (4%)	31	47
1	B	330/348 (95%)	318 (96%)	12 (4%)	31	47
1	C	330/348 (95%)	319 (97%)	11 (3%)	33	50
All	All	990/1044 (95%)	955 (96%)	35 (4%)	32	48

All (35) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	23	LEU
1	A	32	VAL
1	A	257	LEU
1	A	268	LEU
1	A	273	LYS
1	A	360	LEU
1	A	367	GLU
1	A	387	LEU
1	A	393	LEU
1	A	419	LEU
1	A	425	ARG
1	A	427	THR
1	B	23	LEU
1	B	32	VAL
1	B	93	ARG
1	B	257	LEU
1	B	268	LEU
1	B	273	LYS
1	B	360	LEU
1	B	367	GLU
1	B	380	LEU
1	B	387	LEU
1	B	393	LEU

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Mol	Chain	Res	Type
1	B	419	LEU
1	C	23	LEU
1	C	32	VAL
1	C	93	ARG
1	C	257	LEU
1	C	268	LEU
1	C	273	LYS
1	C	360	LEU
1	C	370	SER
1	C	387	LEU
1	C	393	LEU
1	C	419	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (27) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	119	HIS
1	A	149	GLN
1	A	182	ASN
1	A	215	HIS
1	A	232	ASN
1	A	280	ASN
1	A	369	HIS
1	B	43	ASN
1	B	89	HIS
1	B	119	HIS
1	B	182	ASN
1	B	215	HIS
1	B	232	ASN
1	B	280	ASN
1	B	290	ASN
1	B	369	HIS
1	B	375	GLN
1	C	43	ASN
1	C	89	HIS
1	C	119	HIS
1	C	182	ASN
1	C	215	HIS
1	C	232	ASN
1	C	280	ASN
1	C	290	ASN
1	C	369	HIS

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Mol	Chain	Res	Type
1	C	375	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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 15 ligands modelled in this entry, 9 are monoatomic - leaving 6 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

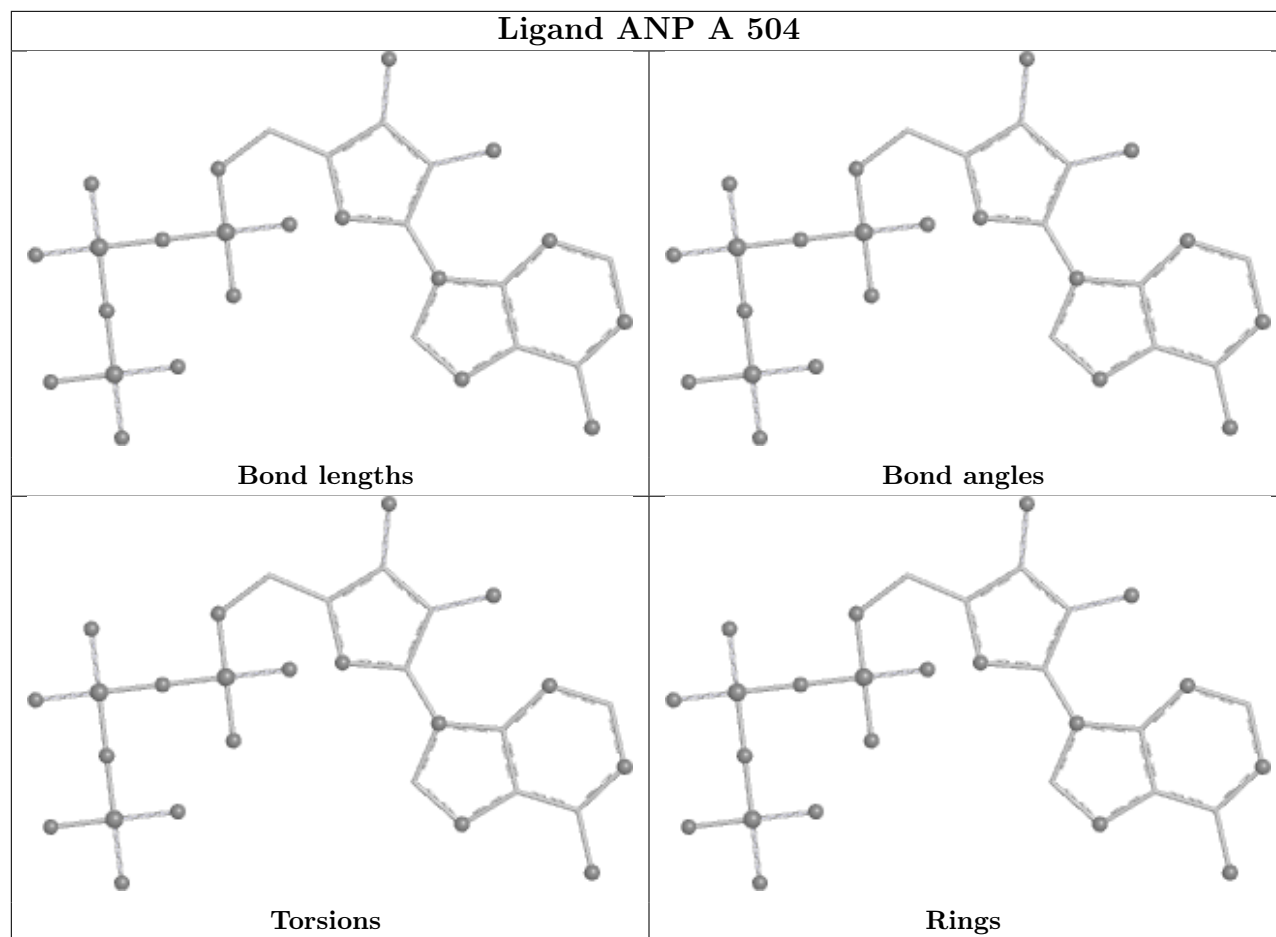
There are no chirality outliers.

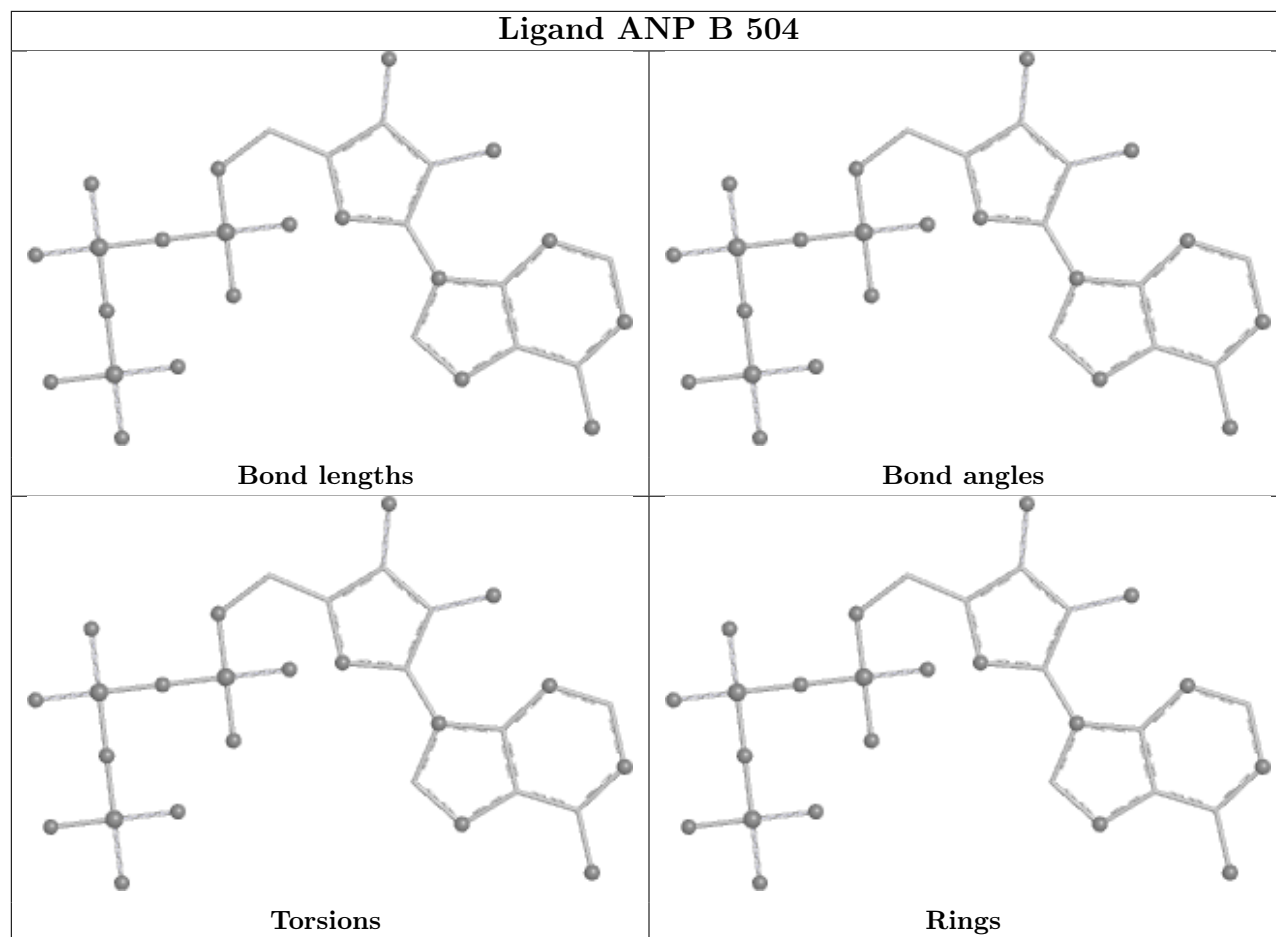
There are no torsion outliers.

There are no ring outliers.

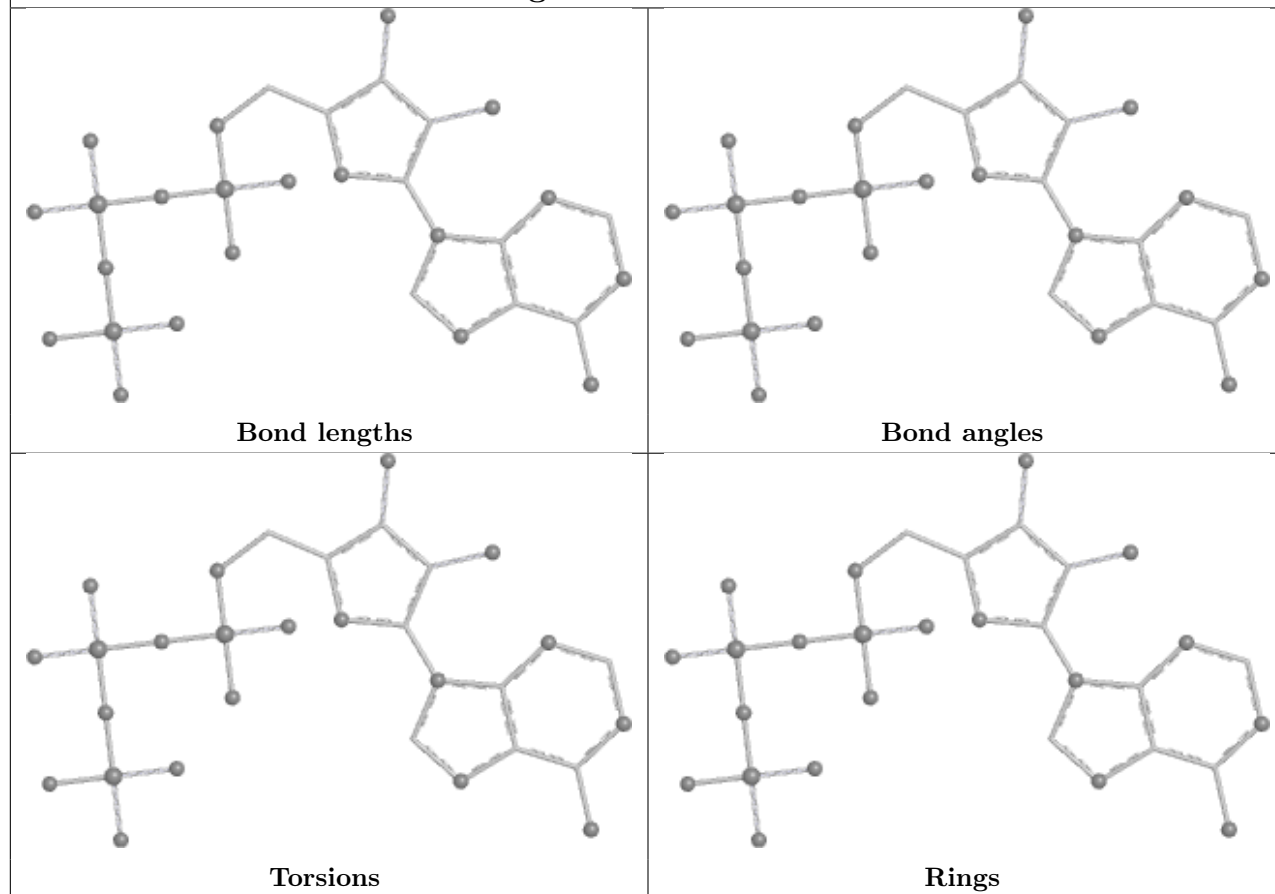
No monomer is involved in short contacts.

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

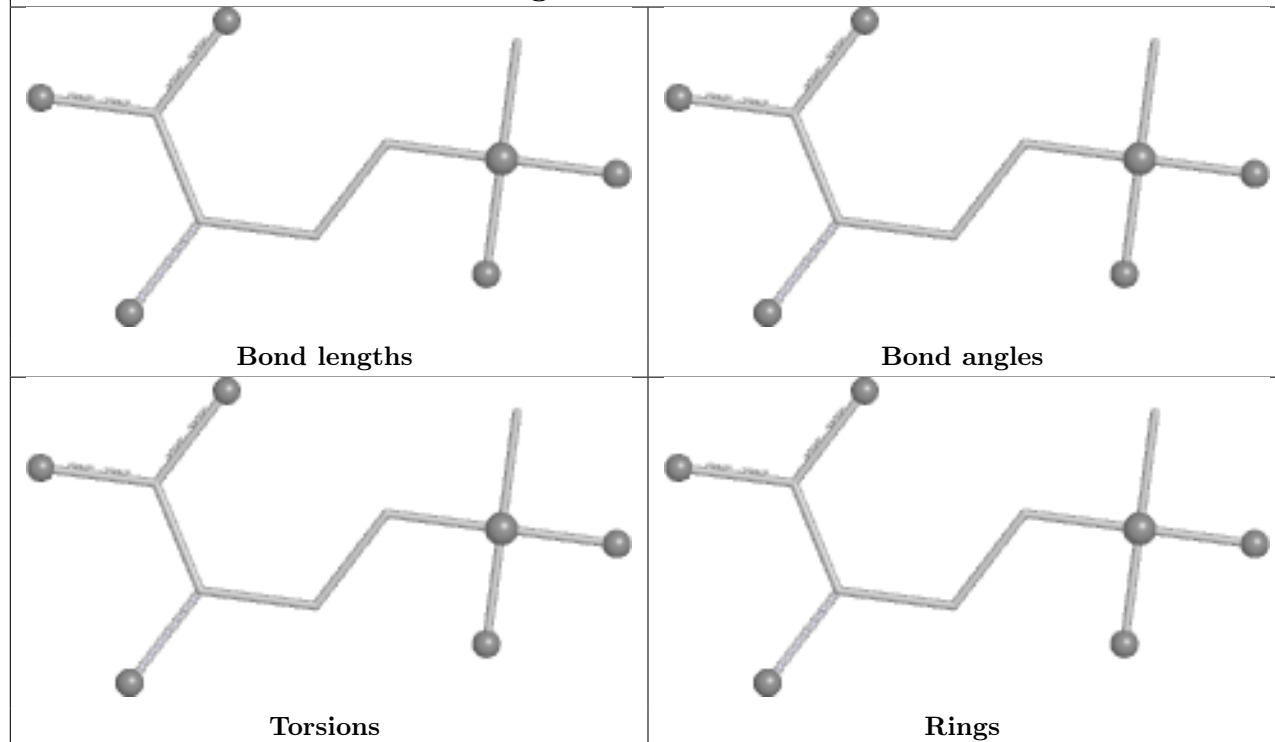


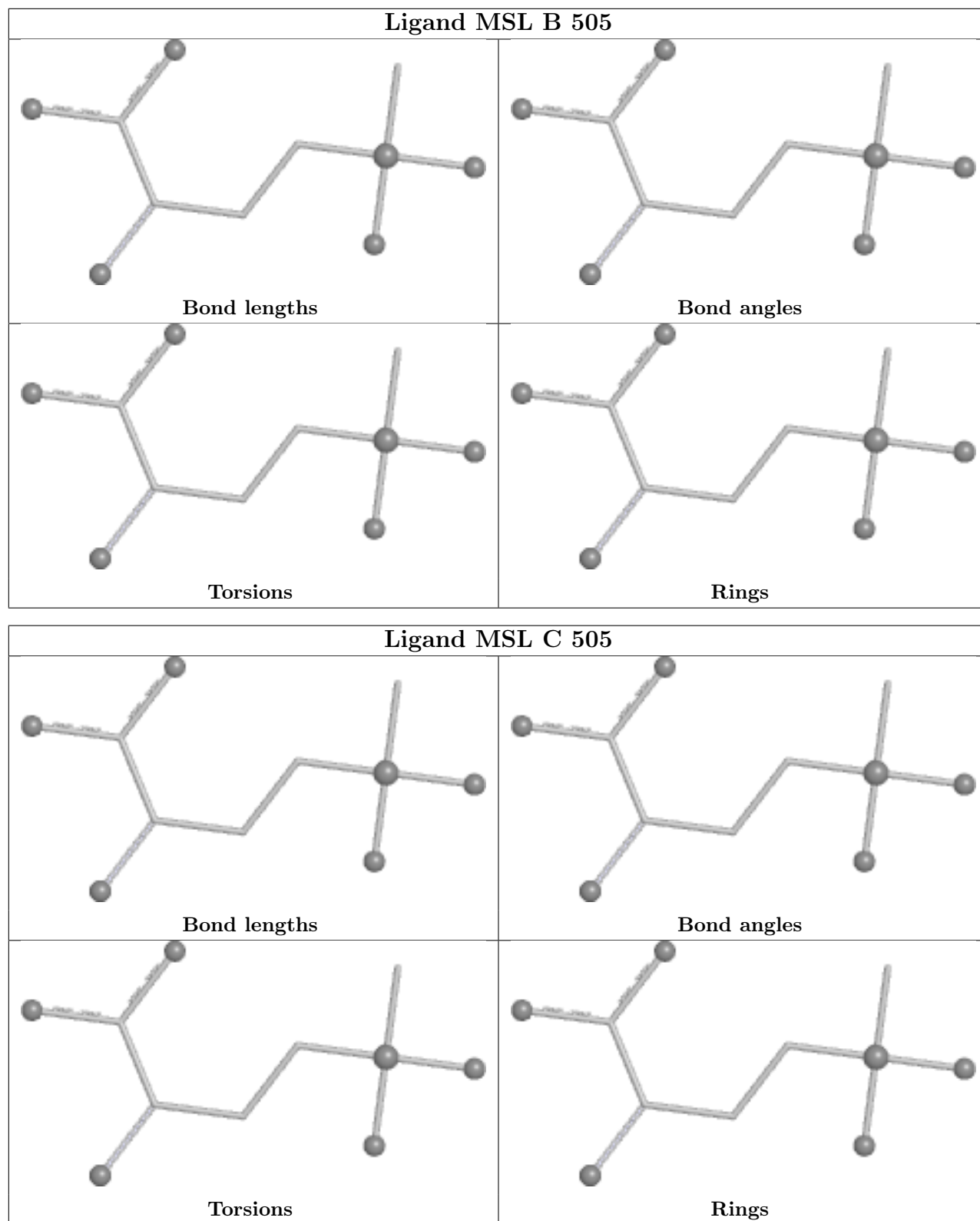


Ligand ANP C 504



Ligand MSL A 505





5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

6 Fit of model and data [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	429/450 (95%)	-0.56	1 (0%) 91 91	26, 34, 50, 86	0
1	B	429/450 (95%)	-0.49	0 100 100	27, 35, 53, 91	0
1	C	429/450 (95%)	-0.51	2 (0%) 87 87	27, 35, 52, 85	0
All	All	1287/1350 (95%)	-0.52	3 (0%) 91 91	26, 34, 53, 91	0

All (3) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	2	THR	2.9
1	C	370	SER	2.4
1	C	2	THR	2.3

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 oligosaccharides in this entry.

6.4 Ligands [i](#)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q < 0.9
2	MG	A	503	1/1	0.98	0.05	33,33,33,33	0

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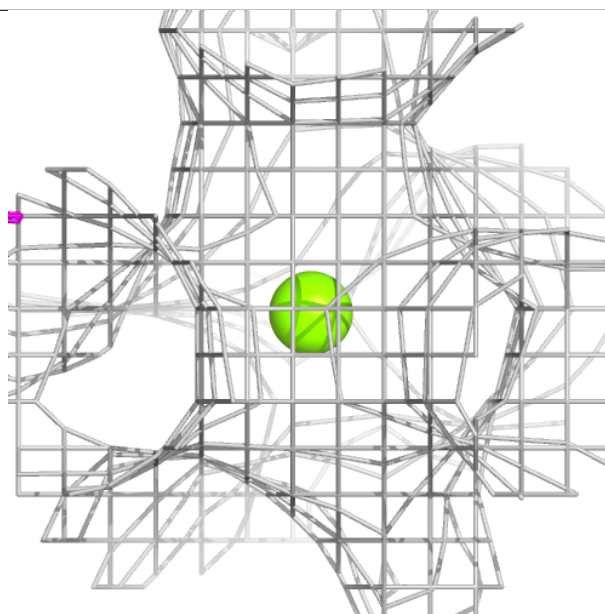
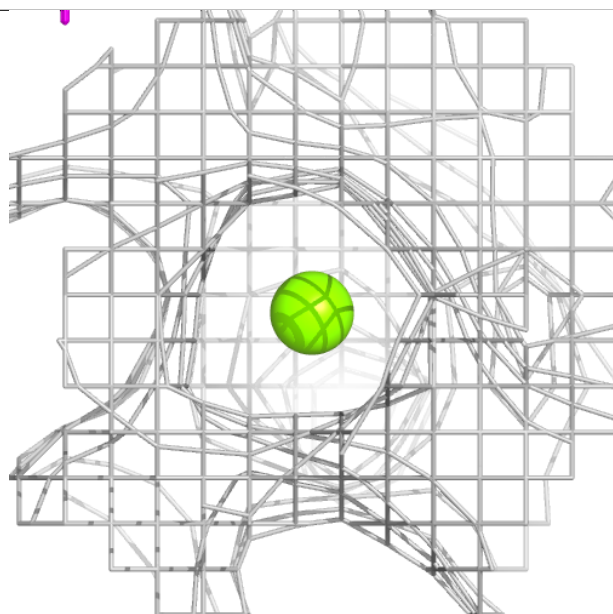
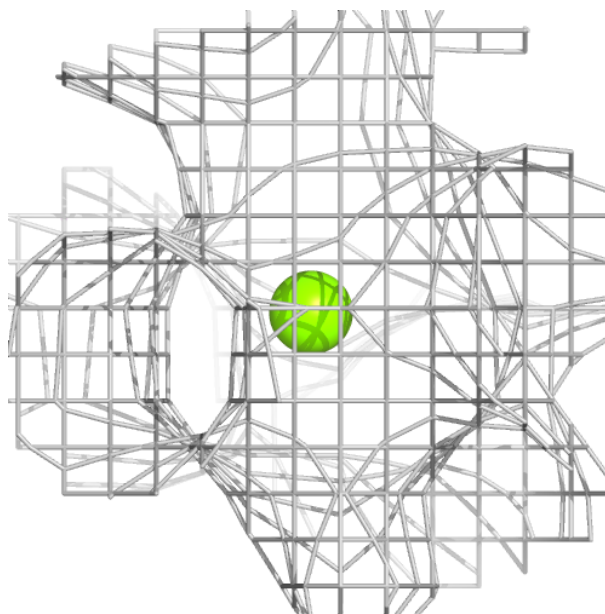
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
2	MG	B	503	1/1	0.98	0.04	31,31,31,31	0
3	ANP	A	504	31/31	0.98	0.05	30,34,36,41	0
3	ANP	B	504	31/31	0.98	0.05	31,38,40,43	0
3	ANP	C	504	31/31	0.98	0.05	30,35,39,40	0
4	MSL	A	505	11/11	0.98	0.06	22,29,30,35	0
4	MSL	B	505	11/11	0.98	0.07	22,30,33,35	0
4	MSL	C	505	11/11	0.98	0.07	24,29,33,33	0
2	MG	C	503	1/1	0.99	0.02	30,30,30,30	0
2	MG	A	501	1/1	0.99	0.03	36,36,36,36	0
2	MG	B	501	1/1	0.99	0.03	36,36,36,36	0
2	MG	B	502	1/1	0.99	0.02	34,34,34,34	0
2	MG	A	502	1/1	0.99	0.02	32,32,32,32	0
2	MG	C	501	1/1	0.99	0.03	33,33,33,33	0
2	MG	C	502	1/1	0.99	0.04	29,29,29,29	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.

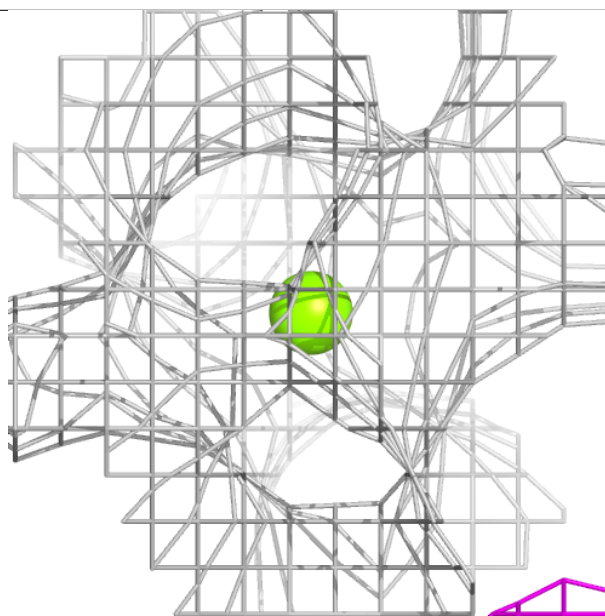
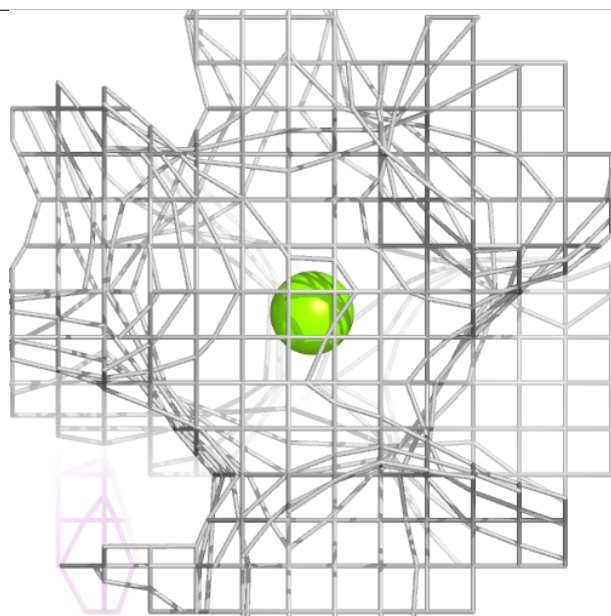
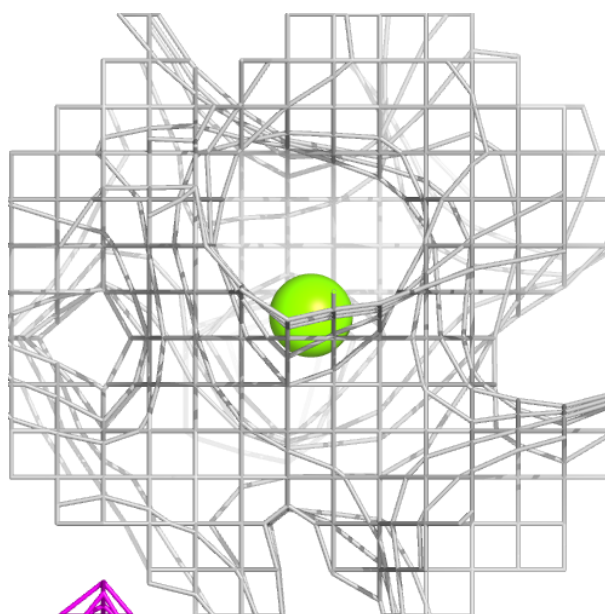
Electron density around MG A 503:

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



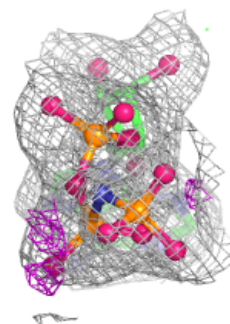
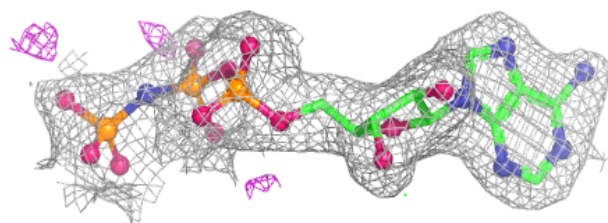
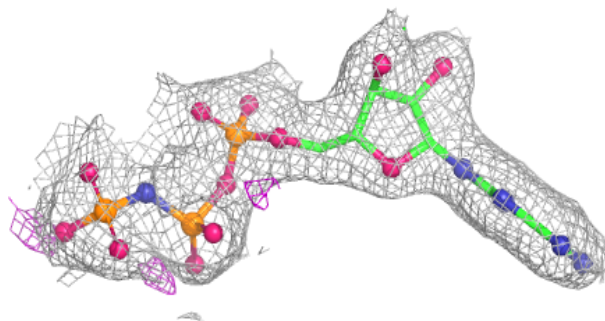
Electron density around MG B 503:

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

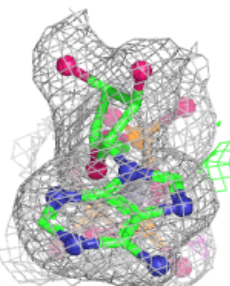
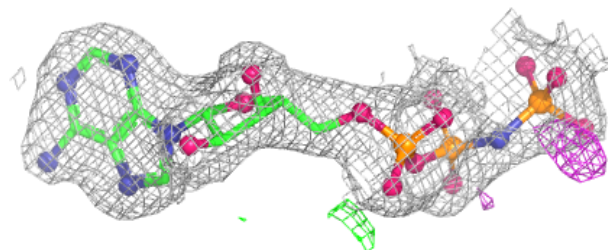
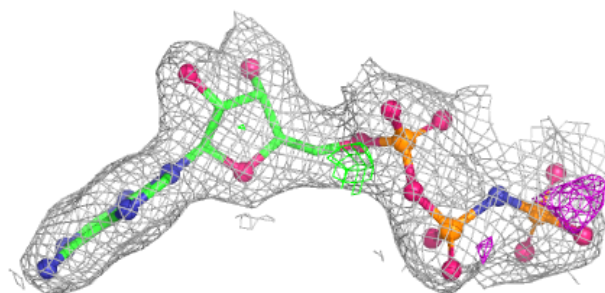


Electron density around ANP A 504:

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

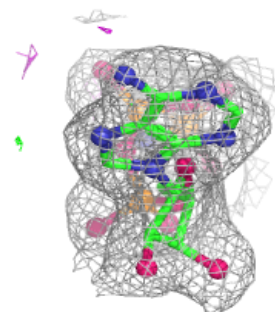
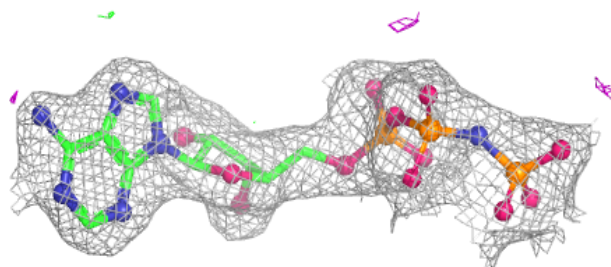
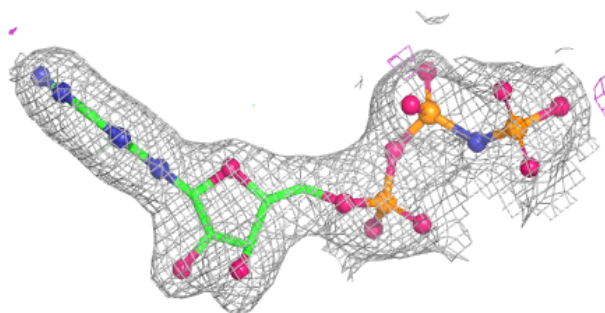
**Electron density around ANP B 504:**

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

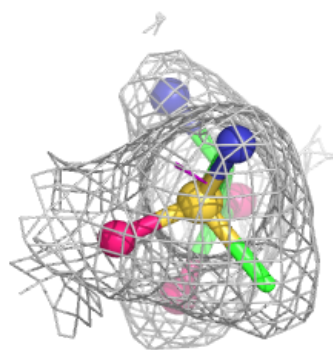
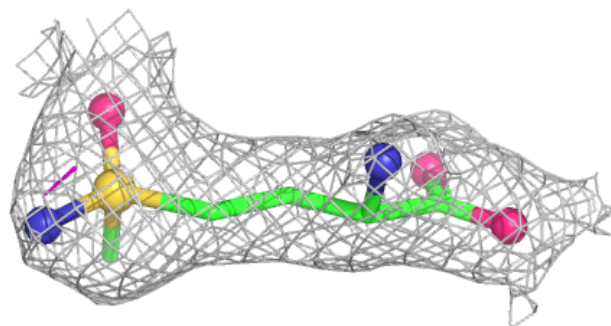
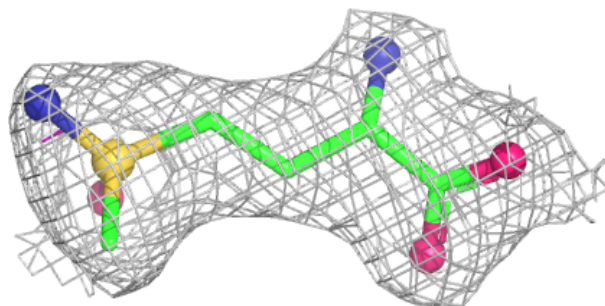


Electron density around ANP C 504:

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

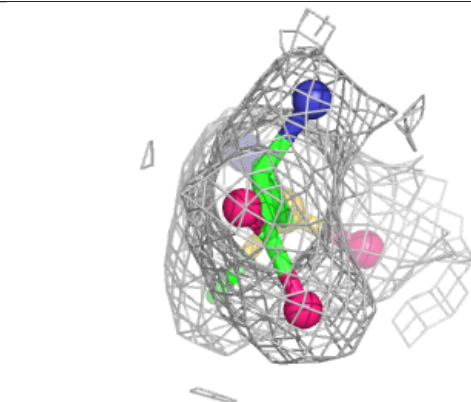
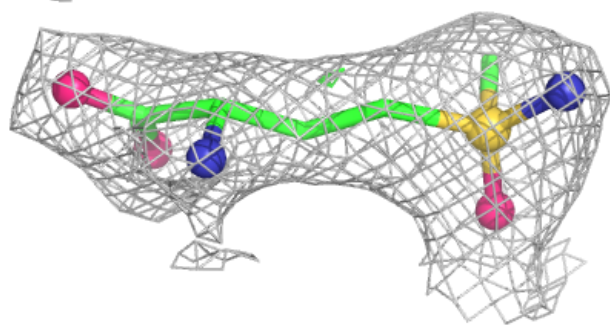
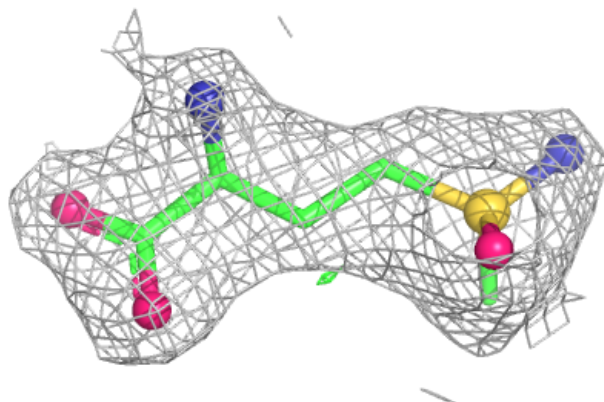
**Electron density around MSL A 505:**

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

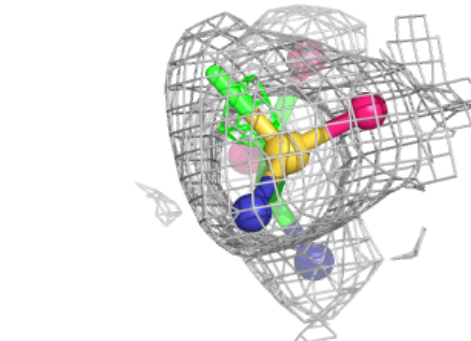
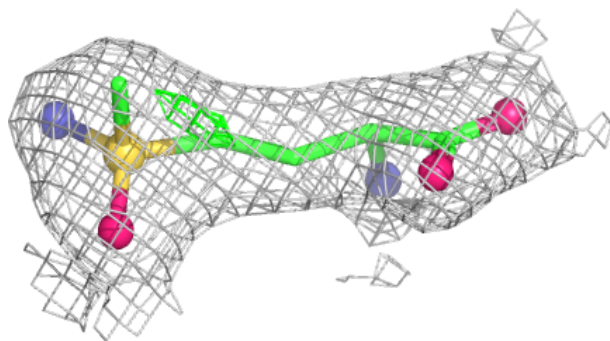
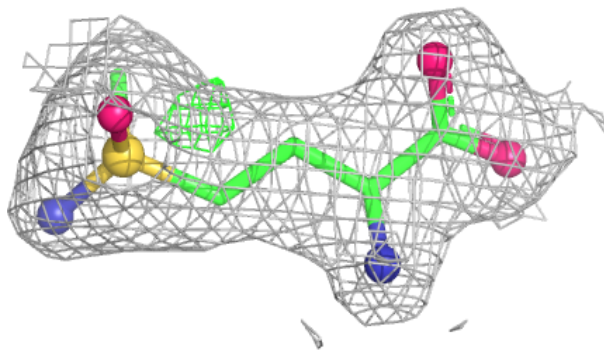


Electron density around MSL B 505:

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

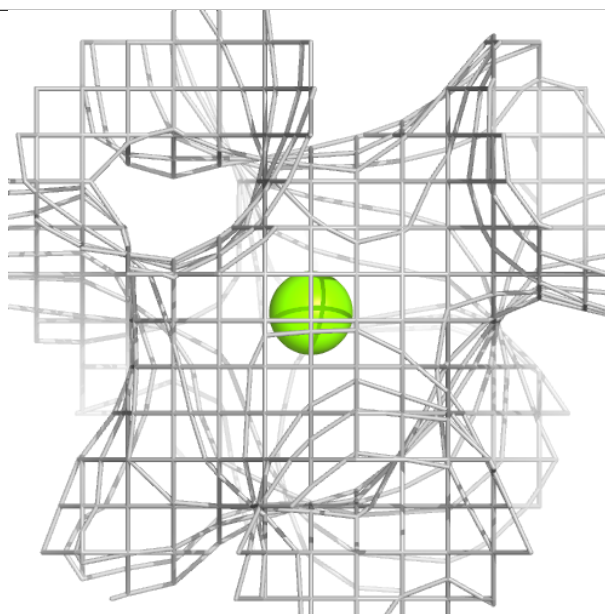
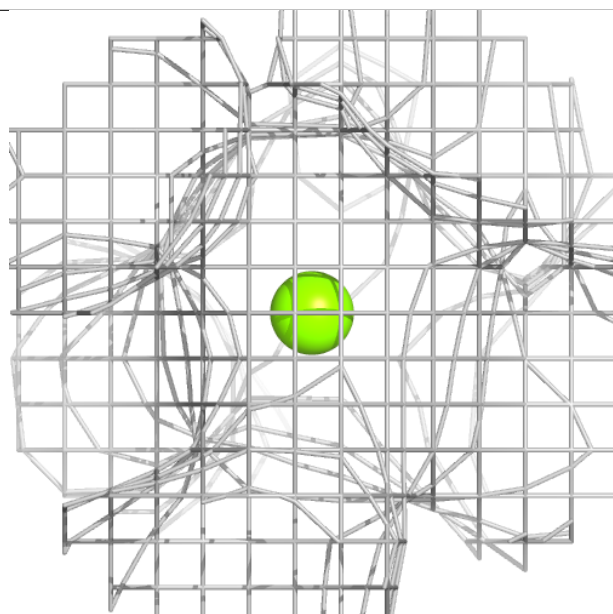
**Electron density around MSL C 505:**

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



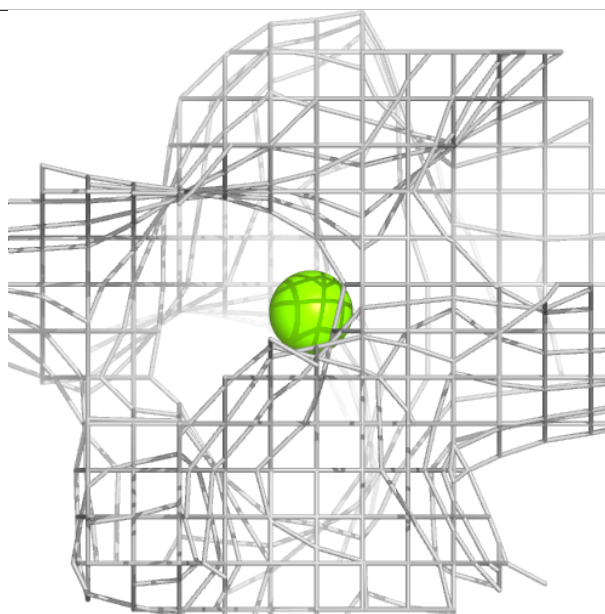
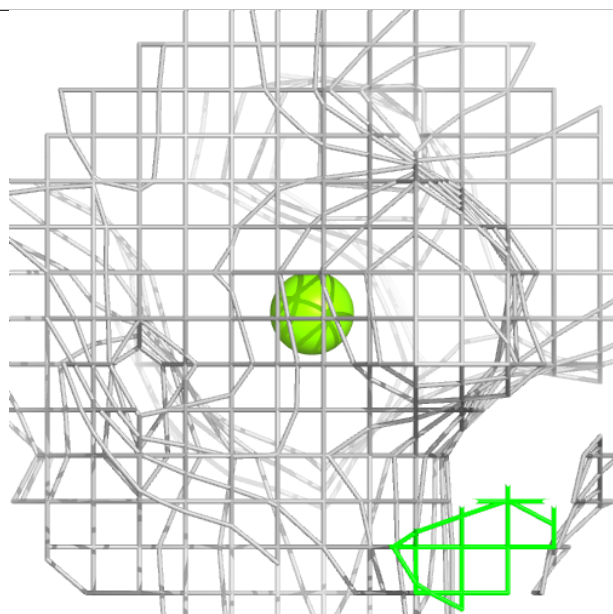
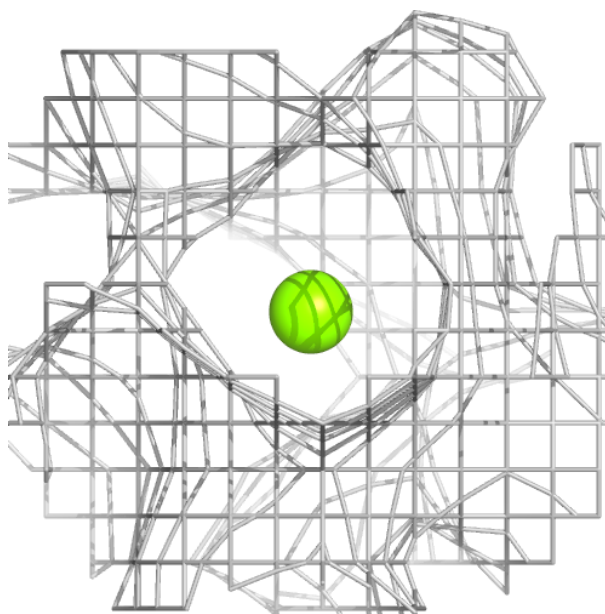
Electron density around MG C 503:

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



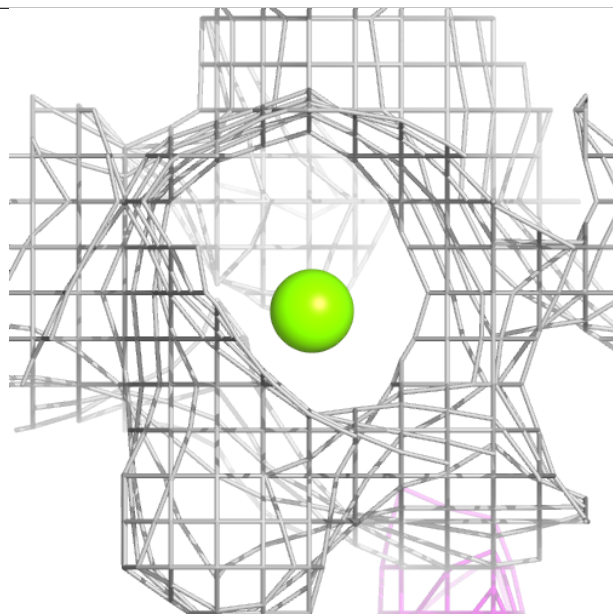
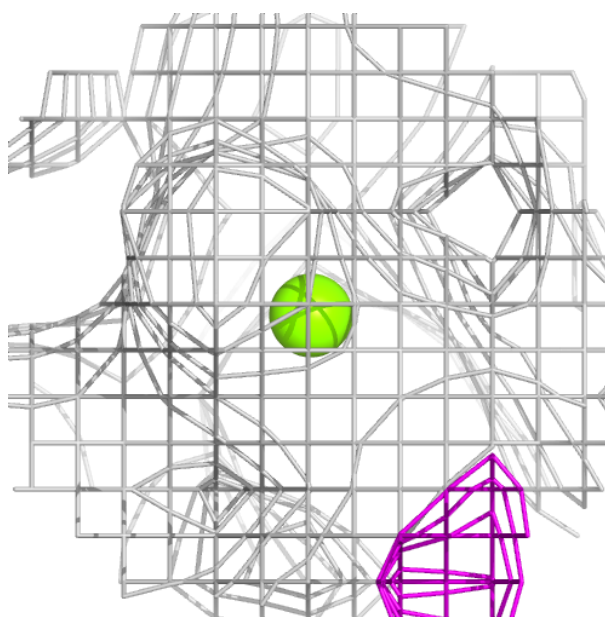
Electron density around MG A 501:

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and green (positive)



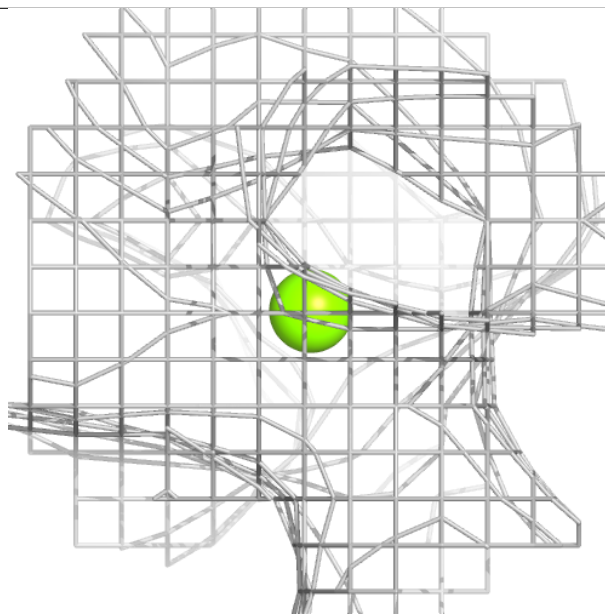
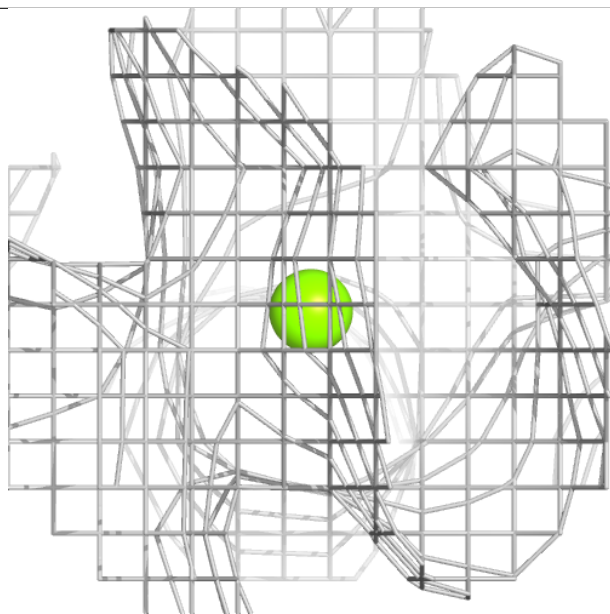
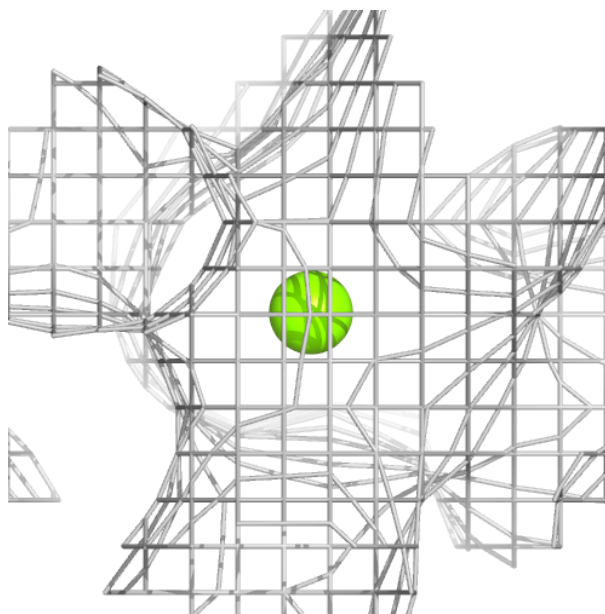
Electron density around MG B 501:

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



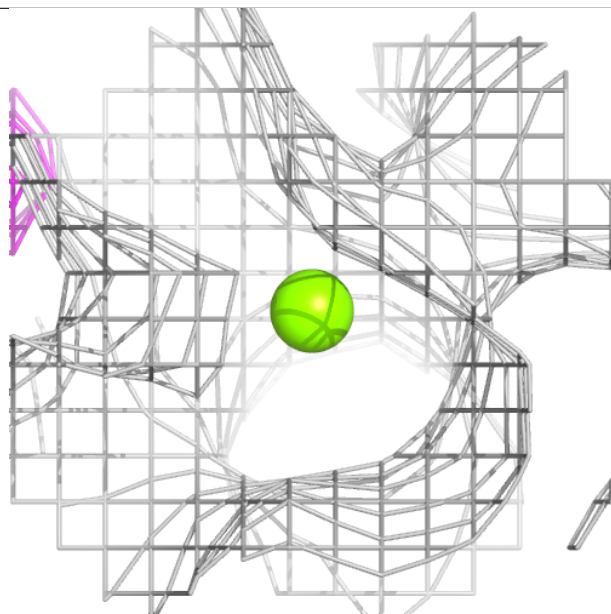
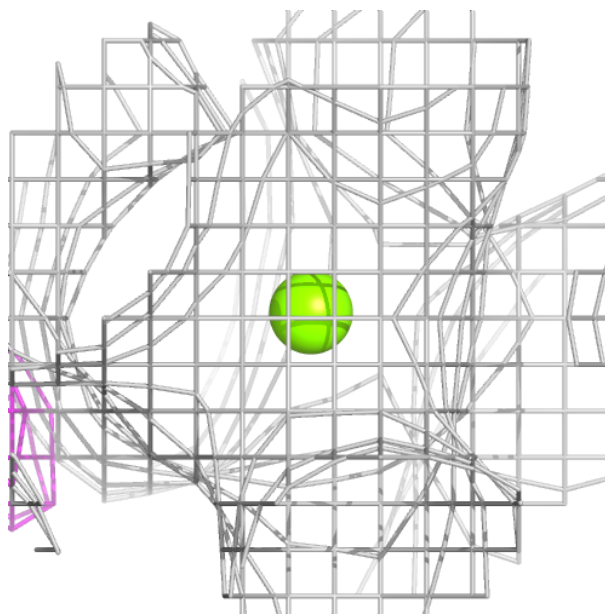
Electron density around MG B 502:

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



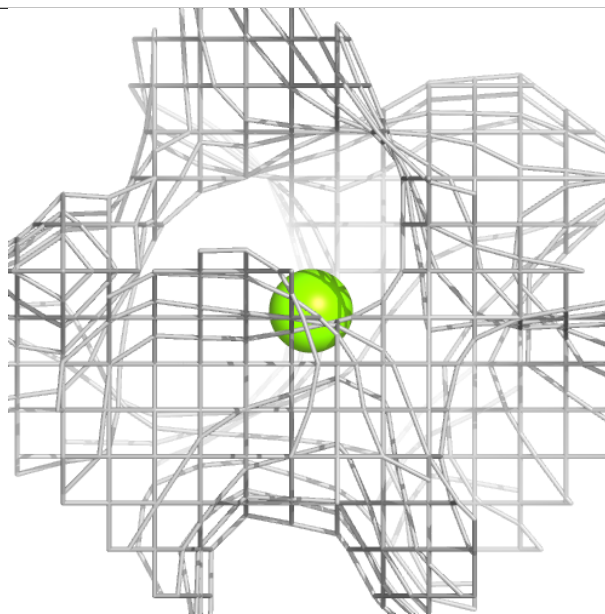
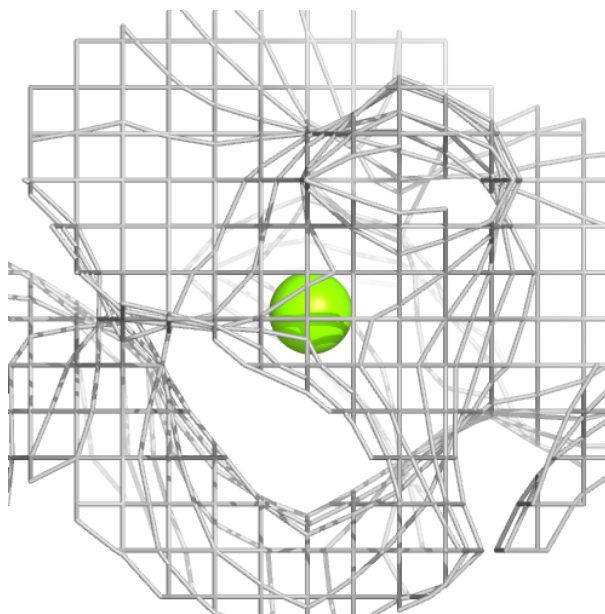
Electron density around MG A 502:

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



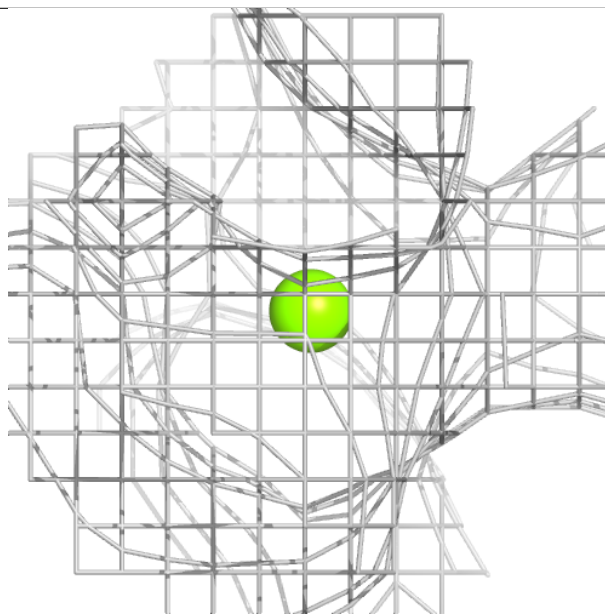
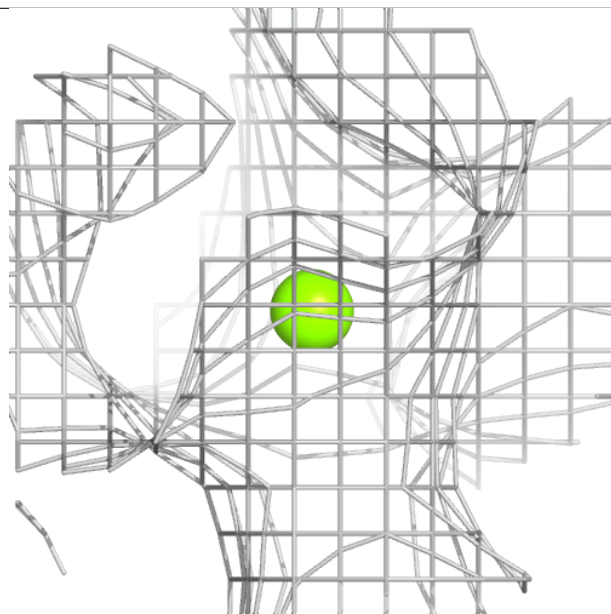
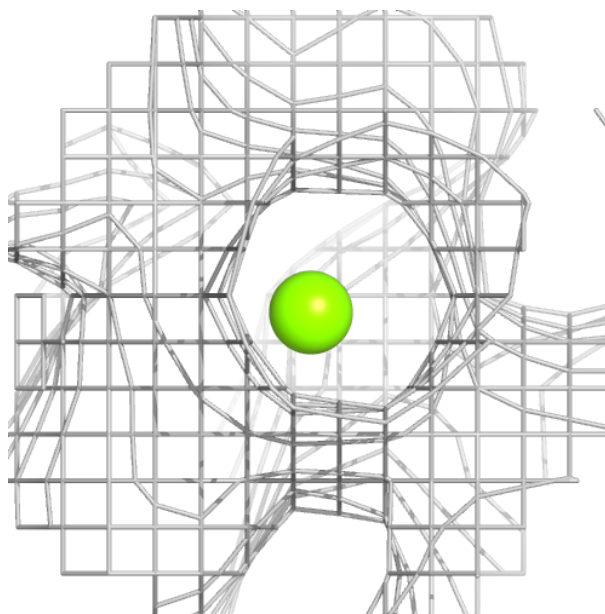
Electron density around MG C 501:

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



Electron density around MG C 502:

$2mF_o-DF_c$ (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.