



# Full wwPDB X-ray Structure Validation Report ⓘ

Feb 24, 2026 – 05:34 PM JST

PDB ID : 9M2T / pdb\_00009m2t  
Title : Crystal structure of glycerol kinase from Entamoeba histolytica complexed with AMP-PNP and glycerol.  
Authors : Balogun, E.O.; Jeelani, G.; Hane, E.; Kondo, H.; Hasegawa, Y.; Kojima, C.; Chishima, T.; Harada, S.; Kishikawa, J.; Nozaki, T.; Shiba, T.  
Deposited on : 2025-02-28  
Resolution : 1.79 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.

The types of validation reports are described at

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

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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 : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 2.0  
EDS : 3.0  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
CCP4 : 9.0.010 (Gargrove)  
Density-Fitness : 1.0.12  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.48.1

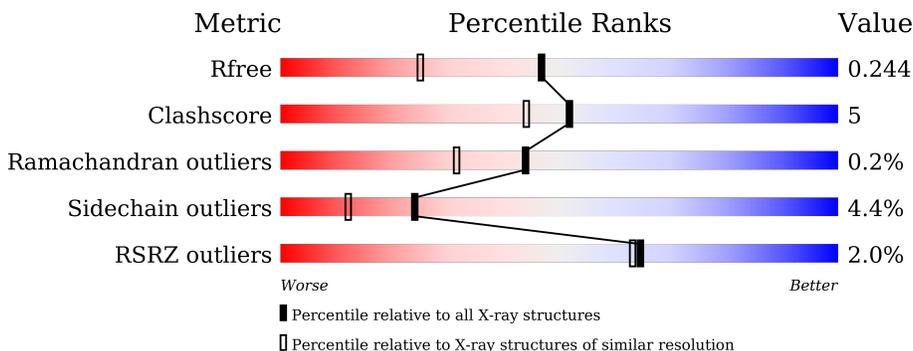
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.79 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))
$R_{free}$	164625	7108 (1.80-1.80)
Clashscore	180529	8162 (1.80-1.80)
Ramachandran outliers	177936	8077 (1.80-1.80)
Sidechain outliers	177891	8076 (1.80-1.80)
RSRZ outliers	164620	7108 (1.80-1.80)

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	487	
1	B	487	

## 2 Entry composition [i](#)

There are 8 unique types of molecules in this entry. The entry contains 7922 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.

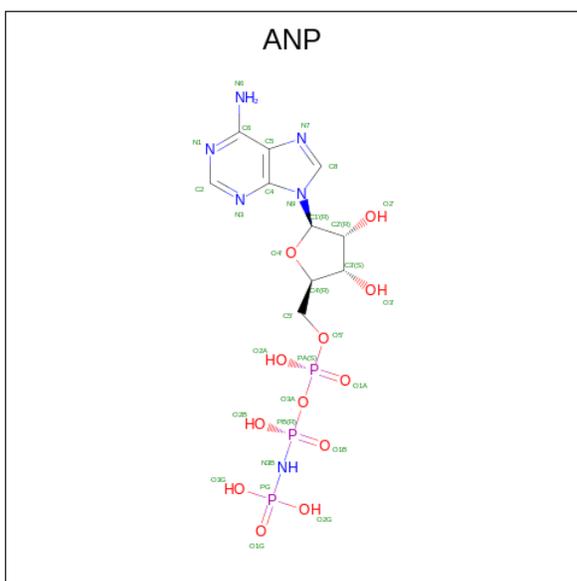
- Molecule 1 is a protein called glycerol kinase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	485	Total 3775	C 2408	N 623	O 724	S 20	0	0	0
1	B	487	Total 3793	C 2419	N 626	O 728	S 20	0	1	0

There are 4 discrepancies between the modelled and reference sequences:

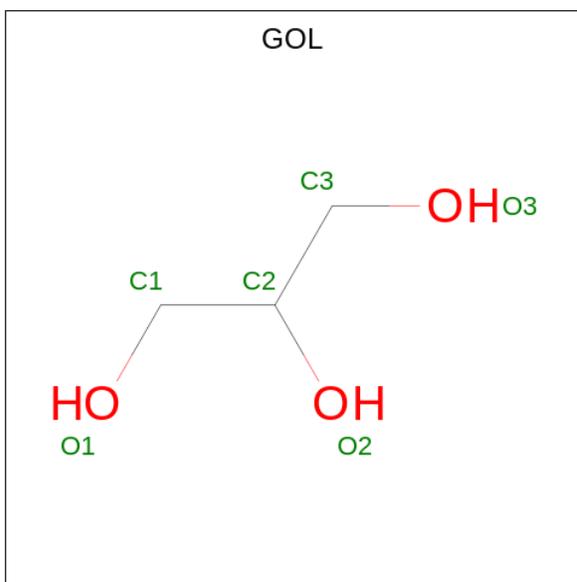
Chain	Residue	Modelled	Actual	Comment	Reference
A	-1	GLY	-	expression tag	UNP A0A5K1V6Z1
A	0	SER	-	expression tag	UNP A0A5K1V6Z1
B	-1	GLY	-	expression tag	UNP A0A5K1V6Z1
B	0	SER	-	expression tag	UNP A0A5K1V6Z1

- Molecule 2 is PHOSPHOAMINOPHOSPHONIC ACID-ADENYLATE ESTER (CCD ID: ANP) (formula: C<sub>10</sub>H<sub>17</sub>N<sub>6</sub>O<sub>12</sub>P<sub>3</sub>) (labeled as "Ligand of Interest" by depositor).



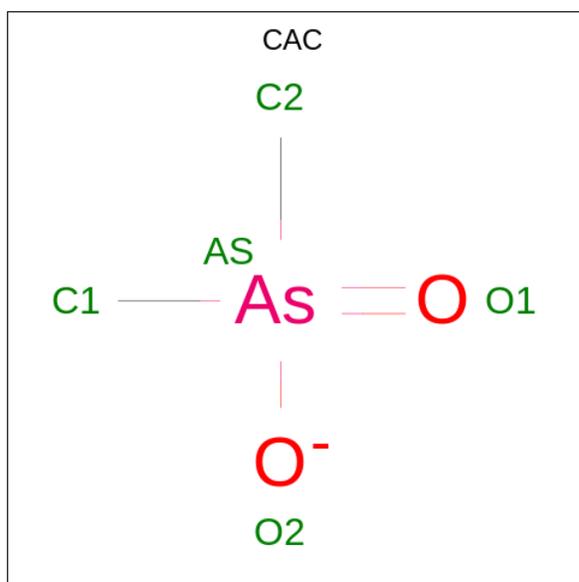
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
2	A	1	31	10	6	12	3	0	0
2	B	1	31	10	6	12	3	0	0

- Molecule 3 is GLYCEROL (CCD ID: GOL) (formula: C<sub>3</sub>H<sub>8</sub>O<sub>3</sub>) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
3	A	1	6	3	3	0	0
3	A	1	6	3	3	0	0
3	A	1	6	3	3	0	0
3	B	1	6	3	3	0	0
3	B	1	6	3	3	0	0

- Molecule 4 is CACODYLATE ION (CCD ID: CAC) (formula: C<sub>2</sub>H<sub>6</sub>AsO<sub>2</sub>) (labeled as "Ligand of Interest" by depositor).

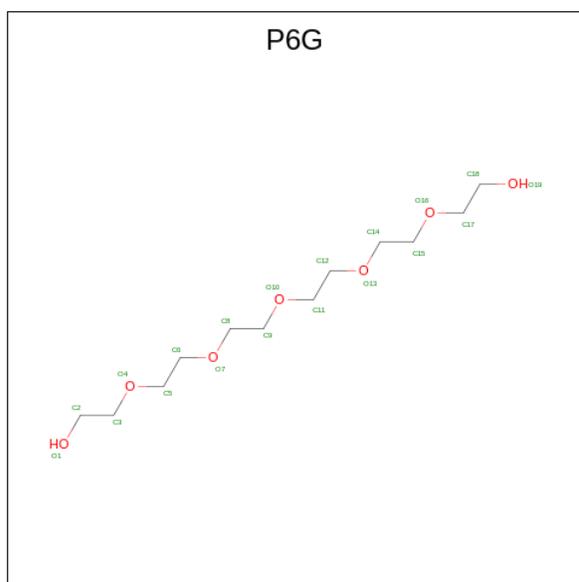


Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	As	C	O		
4	A	1	5	1	2	2	0	0

- Molecule 5 is MAGNESIUM ION (CCD ID: MG) (formula: Mg) (labeled as "Ligand of Interest" by depositor).

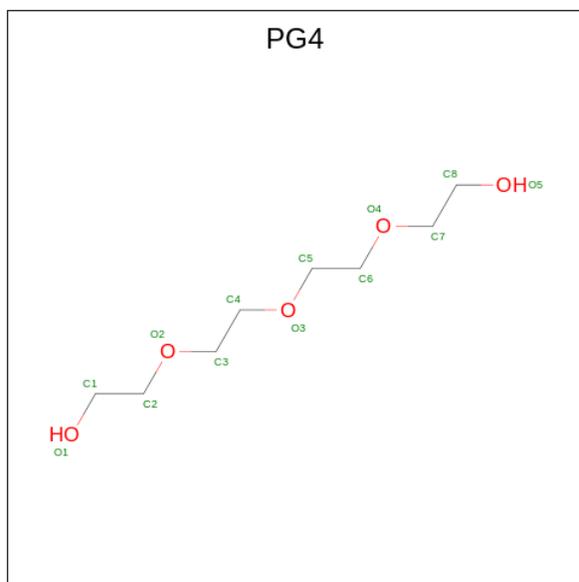
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Mg		
5	A	2	2	2	0	0
5	B	1	1	1	0	0

- Molecule 6 is HEXAETHYLENE GLYCOL (CCD ID: P6G) (formula: C<sub>12</sub>H<sub>26</sub>O<sub>7</sub>) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	C	O	0	0
			19	12	7		

- Molecule 7 is TETRAETHYLENE GLYCOL (CCD ID: PG4) (formula:  $C_8H_{18}O_5$ ) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
7	A	1	Total	C	O	0	0
			13	8	5		

- Molecule 8 is water.

<b>Mol</b>	<b>Chain</b>	<b>Residues</b>	<b>Atoms</b>		<b>ZeroOcc</b>	<b>AltConf</b>
8	A	104	Total 104	O 104	0	0
8	B	118	Total 118	O 118	0	0



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	57.55Å 79.67Å 204.28Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	19.92 – 1.79 19.92 – 1.79	Depositor EDS
% Data completeness (in resolution range)	99.3 (19.92-1.79) 99.3 (19.92-1.79)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.32 (at 1.79Å)	Xtrriage
Refinement program	REFMAC 5.8.0103	Depositor
R, $R_{free}$	0.196 , 0.237 0.205 , 0.244	Depositor DCC
$R_{free}$ test set	4329 reflections (4.87%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	30.8	Xtrriage
Anisotropy	0.080	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.38 , 32.3	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.34$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	7922	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	37.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.72% of the height of the origin peak. No significant pseudotranslation is detected.*

<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: GOL, MG, CAC, PG4, ANP, P6G

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	0.96	3/3847 (0.1%)	1.01	10/5203 (0.2%)
1	B	0.89	4/3865 (0.1%)	0.92	5/5227 (0.1%)
All	All	0.92	7/7712 (0.1%)	0.97	15/10430 (0.1%)

All (7) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	77	ILE	C-O	-7.35	1.16	1.24
1	A	423	GLU	C-O	-6.24	1.16	1.24
1	A	165	THR	C-O	-5.81	1.17	1.24
1	B	308	ALA	C-O	-5.67	1.17	1.24
1	B	159	LEU	C-O	-5.56	1.16	1.24
1	B	311	TRP	C-O	-5.40	1.17	1.24
1	B	77	ILE	C-O	-5.26	1.18	1.24

All (15) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	443	LYS	N-CA-C	-8.04	97.15	109.85
1	A	303	MET	N-CA-C	7.77	119.75	111.28
1	A	30	GLN	N-CA-C	7.09	119.64	108.79
1	A	444	GLU	N-CA-C	6.92	118.82	111.28
1	A	79	ASN	N-CA-C	6.55	118.82	108.79
1	B	162	THR	N-CA-C	-6.40	101.52	110.35
1	A	21	GLU	N-CA-C	6.38	120.16	112.38
1	B	79	ASN	N-CA-C	6.35	118.50	108.79
1	A	162	THR	N-CA-C	-6.24	101.74	110.35
1	A	121	ILE	N-CA-CB	6.23	117.84	110.55
1	B	241	GLY	N-CA-C	-5.93	105.11	111.93
1	A	121	ILE	CB-CA-C	-5.47	104.97	111.97

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	163	ILE	N-CA-C	5.15	115.88	110.62
1	A	163	ILE	N-CA-C	5.04	115.76	110.62
1	B	80	GLN	N-CA-C	-5.01	102.63	110.10

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	3775	0	3779	49	0
1	B	3793	0	3797	30	0
2	A	31	0	13	0	0
2	B	31	0	13	0	0
3	A	18	0	24	0	0
3	B	12	0	16	0	0
4	A	5	0	0	0	0
5	A	2	0	0	0	0
5	B	1	0	0	0	0
6	A	19	0	26	0	0
7	A	13	0	18	0	0
8	A	104	0	0	3	0
8	B	118	0	0	1	0
All	All	7922	0	7686	77	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 5.

All (77) 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:24:GLN:HB2	1:A:450:MET:SD	1.95	1.07
1:A:444:GLU:HA	1:A:447:LEU:HD22	1.65	0.79
1:B:217:GLN:HE22	1:B:292:GLY:H	1.35	0.75
1:A:45:GLN:HE22	1:A:80:GLN:HE22	1.35	0.74

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:24:GLN:CB	1:A:450:MET:SD	2.75	0.74
1:B:433:MET:HE2	1:B:450:MET:CE	2.22	0.70
1:A:378:ALA:HB2	1:A:406:MET:HE3	1.75	0.69
1:B:433:MET:HE2	1:B:450:MET:HE3	1.76	0.68
1:A:425:GLU:OE2	8:A:601:HOH:O	2.13	0.67
1:A:110:THR:HG22	1:A:114:MET:HE2	1.75	0.66
1:B:290[A]:ILE:HD11	1:B:434:LEU:CD2	2.26	0.64
1:A:27:HIS:ND1	1:A:65:THR:HG23	2.14	0.63
1:A:304:THR:HG23	1:A:307:ALA:HB3	1.82	0.62
1:B:45:GLN:HE22	1:B:80:GLN:HE22	1.46	0.62
1:A:429:MET:HE3	1:A:433:MET:CE	2.30	0.61
1:A:442:PHE:O	1:A:443:LYS:HD3	2.01	0.61
1:A:22:LYS:O	1:A:23:CYS:HB2	1.99	0.60
1:A:4:ILE:HD11	1:A:441:LEU:CD2	2.32	0.60
1:A:4:ILE:HD11	1:A:441:LEU:HD23	1.87	0.56
1:A:217:GLN:HE22	1:A:292:GLY:H	1.51	0.56
1:A:358:VAL:HG21	1:B:483:PHE:CZ	2.40	0.56
1:A:11:THR:O	1:A:45:GLN:OE1	2.24	0.55
1:B:290[A]:ILE:HD11	1:B:434:LEU:HD22	1.86	0.55
1:B:379:LEU:O	1:B:383:GLN:HG3	2.07	0.54
1:A:444:GLU:O	1:A:447:LEU:HB2	2.08	0.53
1:A:444:GLU:CA	1:A:447:LEU:HD22	2.38	0.53
1:B:389:GLY:O	1:B:390:LYS:HB2	2.07	0.52
1:A:121:ILE:HG12	8:A:643:HOH:O	2.10	0.52
1:A:354:ARG:HD2	1:B:361:THR:HG22	1.92	0.52
1:A:442:PHE:C	1:A:443:LYS:HD3	2.35	0.51
1:B:385:ILE:HD13	1:B:394:ILE:HD11	1.92	0.51
1:A:429:MET:HE3	1:A:433:MET:HE1	1.92	0.51
1:B:217:GLN:NE2	1:B:292:GLY:H	2.05	0.50
1:A:15:ARG:HG2	1:A:30:GLN:HB3	1.93	0.50
1:B:220:ASP:O	1:B:237:THR:HA	2.11	0.50
1:A:17:ILE:HD13	1:A:428:ALA:CB	2.42	0.50
1:A:450:MET:O	1:A:450:MET:HG3	2.11	0.50
1:A:167:ILE:HG22	1:A:171:LEU:HD22	1.95	0.49
1:A:220:ASP:O	1:A:237:THR:HA	2.12	0.49
1:B:275:ILE:HD13	1:B:284:ALA:HB1	1.95	0.48
1:A:27:HIS:ND1	1:A:65:THR:CG2	2.77	0.47
1:A:24:GLN:HG3	1:A:450:MET:SD	2.54	0.47
1:B:15:ARG:HD3	1:B:17:ILE:HD11	1.97	0.47
1:A:267:VAL:HB	1:A:384:VAL:HG11	1.95	0.47
1:B:332:ASN:C	1:B:332:ASN:HD22	2.23	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:429:MET:HE3	1:A:433:MET:HE3	1.96	0.46
1:A:4:ILE:HG21	1:A:432:ALA:HA	1.97	0.46
1:B:111:SER:O	1:B:115:GLU:HG2	2.16	0.46
1:B:327:ILE:HD11	1:B:370:VAL:HG21	1.97	0.45
1:A:217:GLN:NE2	1:A:292:GLY:H	2.12	0.45
1:B:385:ILE:HD13	1:B:394:ILE:CD1	2.47	0.45
1:A:406:MET:HE2	1:A:410:GLN:HB2	1.97	0.44
1:A:78:THR:HG21	1:A:427:THR:HG22	2.00	0.44
1:A:342:GLN:HG3	8:A:670:HOH:O	2.16	0.44
1:B:45:GLN:NE2	1:B:50:ILE:HD11	2.33	0.44
1:A:26:ILE:O	1:A:26:ILE:HG12	2.17	0.44
1:B:425:GLU:OE2	8:B:601:HOH:O	2.21	0.44
1:B:390:LYS:HB2	1:B:390:LYS:HE3	1.63	0.43
1:B:258:LYS:HD2	1:B:258:LYS:C	2.43	0.43
1:B:447:LEU:HA	1:B:450:MET:HE2	2.00	0.43
1:A:378:ALA:HB2	1:A:406:MET:CE	2.45	0.43
1:A:444:GLU:HG2	1:A:447:LEU:CD2	2.49	0.43
1:B:11:THR:O	1:B:45:GLN:OE1	2.37	0.43
1:A:444:GLU:HG2	1:A:447:LEU:HD23	2.01	0.42
1:B:271:ILE:HD11	1:B:275:ILE:HG12	2.01	0.42
1:A:2:LYS:O	1:A:21:GLU:HG3	2.20	0.42
1:A:433:MET:O	1:A:437:LEU:HB2	2.19	0.42
1:B:315:ILE:HD11	1:B:317:ILE:HD12	2.01	0.41
1:B:392:ASN:C	1:B:416:CYS:HB2	2.45	0.41
1:B:4:ILE:HG21	1:B:432:ALA:HA	2.02	0.41
1:A:425:GLU:OE2	1:A:425:GLU:HA	2.20	0.41
1:A:315:ILE:HD11	1:A:317:ILE:HD12	2.02	0.41
1:A:444:GLU:CG	1:A:447:LEU:CD2	2.99	0.41
1:A:290:ILE:HD11	1:A:434:LEU:CD2	2.51	0.41
1:A:450:MET:O	1:A:450:MET:CG	2.70	0.40
1:A:90:ARG:HG3	1:A:157:VAL:CG2	2.52	0.40
1:B:290[A]:ILE:HD12	1:B:290[A]:ILE:HG23	1.79	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

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

of similar resolution.

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	483/487 (99%)	472 (98%)	9 (2%)	2 (0%)	30	19
1	B	486/487 (100%)	476 (98%)	10 (2%)	0	100	100
All	All	969/974 (100%)	948 (98%)	19 (2%)	2 (0%)	44	31

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	389	GLY
1	A	23	CYS

### 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	412/413 (100%)	387 (94%)	25 (6%)	15	6
1	B	414/413 (100%)	403 (97%)	11 (3%)	40	28
All	All	826/826 (100%)	790 (96%)	36 (4%)	24	12

All (36) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	24	GLN
1	A	26	ILE
1	A	61	CYS
1	A	62	LEU
1	A	63	VAL
1	A	157	VAL
1	A	162	THR
1	A	171	LEU
1	A	180	ASP
1	A	254	ILE

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Mol	Chain	Res	Type
1	A	332	ASN
1	A	393	GLU
1	A	394	ILE
1	A	406	MET
1	A	417	THR
1	A	422	LYS
1	A	424	LYS
1	A	437	LEU
1	A	443	LYS
1	A	445	ASP
1	A	447	LEU
1	A	449	SER
1	A	450	MET
1	A	454	GLU
1	A	468	GLN
1	B	93	LYS
1	B	119	GLU
1	B	121	ILE
1	B	171	LEU
1	B	180	ASP
1	B	327	ILE
1	B	332	ASN
1	B	391	ILE
1	B	400	VAL
1	B	422	LYS
1	B	464	GLU

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

Mol	Chain	Res	Type
1	A	45	GLN
1	A	64	ASN
1	A	170	ASN
1	A	217	GLN
1	A	232	ASN
1	A	322	ASN
1	A	332	ASN
1	A	342	GLN
1	A	455	HIS
1	A	468	GLN
1	B	27	HIS
1	B	45	GLN

*Continued on next page...*

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Mol	Chain	Res	Type
1	B	170	ASN
1	B	217	GLN
1	B	229	GLN
1	B	232	ASN
1	B	322	ASN
1	B	332	ASN
1	B	455	HIS

### 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 13 ligands modelled in this entry, 3 are monoatomic - leaving 10 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
2	ANP	A	501	5	29,33,33	2.01	7 (24%)	31,52,52	2.64	10 (32%)
3	GOL	A	504	-	5,5,5	0.51	0	5,5,5	0.48	0
6	P6G	A	507	5	18,18,18	0.58	0	17,17,17	0.49	0
3	GOL	A	503	-	5,5,5	0.20	0	5,5,5	0.61	0
3	GOL	B	502	-	5,5,5	0.52	0	5,5,5	0.75	0
4	CAC	A	505	-	0,4,4	-	-	0,6,6	-	-
3	GOL	A	502	-	5,5,5	0.44	0	5,5,5	0.46	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	ANP	B	501	5	29,33,33	1.93	7 (24%)	31,52,52	2.09	9 (29%)
3	GOL	B	503	-	5,5,5	0.19	0	5,5,5	0.30	0
7	PG4	A	509	-	12,12,12	0.49	0	11,11,11	0.29	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	ANP	A	501	5	-	2/14/38/38	0/3/3/3
3	GOL	A	504	-	-	1/4/4/4	-
6	P6G	A	507	5	-	1/16/16/16	-
3	GOL	A	503	-	-	0/4/4/4	-
3	GOL	B	502	-	-	0/4/4/4	-
3	GOL	A	502	-	-	0/4/4/4	-
2	ANP	B	501	5	-	1/14/38/38	0/3/3/3
3	GOL	B	503	-	-	0/4/4/4	-
7	PG4	A	509	-	-	6/10/10/10	-

All (14) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	501	ANP	PG-O1G	4.62	1.53	1.46
2	A	501	ANP	PB-O1B	4.53	1.53	1.46
2	B	501	ANP	PB-O1B	4.39	1.53	1.46
2	A	501	ANP	PB-N3B	4.39	1.74	1.63
2	B	501	ANP	PG-O1G	4.16	1.52	1.46
2	B	501	ANP	PG-N3B	4.07	1.74	1.63
2	B	501	ANP	PB-N3B	3.49	1.72	1.63
2	A	501	ANP	PG-N3B	3.35	1.72	1.63
2	B	501	ANP	PG-O2G	-3.33	1.47	1.56
2	A	501	ANP	C5-C4	2.48	1.47	1.40
2	A	501	ANP	PB-O2B	-2.47	1.50	1.56
2	A	501	ANP	O4'-C1'	2.33	1.44	1.41
2	B	501	ANP	C2-N3	2.19	1.35	1.32
2	B	501	ANP	C5-C4	2.08	1.46	1.40

All (19) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	501	ANP	O1G-PG-N3B	-8.65	99.03	111.77
2	B	501	ANP	O1G-PG-N3B	-6.99	101.48	111.77
2	A	501	ANP	O2B-PB-O1B	6.72	124.01	109.92
2	A	501	ANP	N3-C2-N1	-4.37	121.85	128.68
2	B	501	ANP	N3-C2-N1	-4.27	122.00	128.68
2	B	501	ANP	O1B-PB-N3B	-4.05	105.81	111.77
2	A	501	ANP	O2A-PA-O1A	3.50	129.54	112.24
2	A	501	ANP	PB-O3A-PA	-3.23	121.25	132.62
2	B	501	ANP	O2G-PG-O3G	3.21	116.19	107.64
2	A	501	ANP	O5'-PA-O1A	-2.76	98.29	109.07
2	A	501	ANP	C3'-C2'-C1'	2.74	105.10	100.98
2	B	501	ANP	C1'-N9-C4	-2.68	121.93	126.64
2	A	501	ANP	O1B-PB-N3B	-2.56	107.99	111.77
2	B	501	ANP	PB-O3A-PA	-2.53	123.71	132.62
2	A	501	ANP	C2-N1-C6	2.24	122.58	118.75
2	B	501	ANP	O2B-PB-O1B	2.22	114.57	109.92
2	A	501	ANP	O3A-PB-N3B	-2.18	100.55	106.59
2	B	501	ANP	C2-N1-C6	2.13	122.40	118.75
2	B	501	ANP	N6-C6-N1	2.13	122.99	118.57

There are no chirality outliers.

All (11) torsion outliers are listed below:

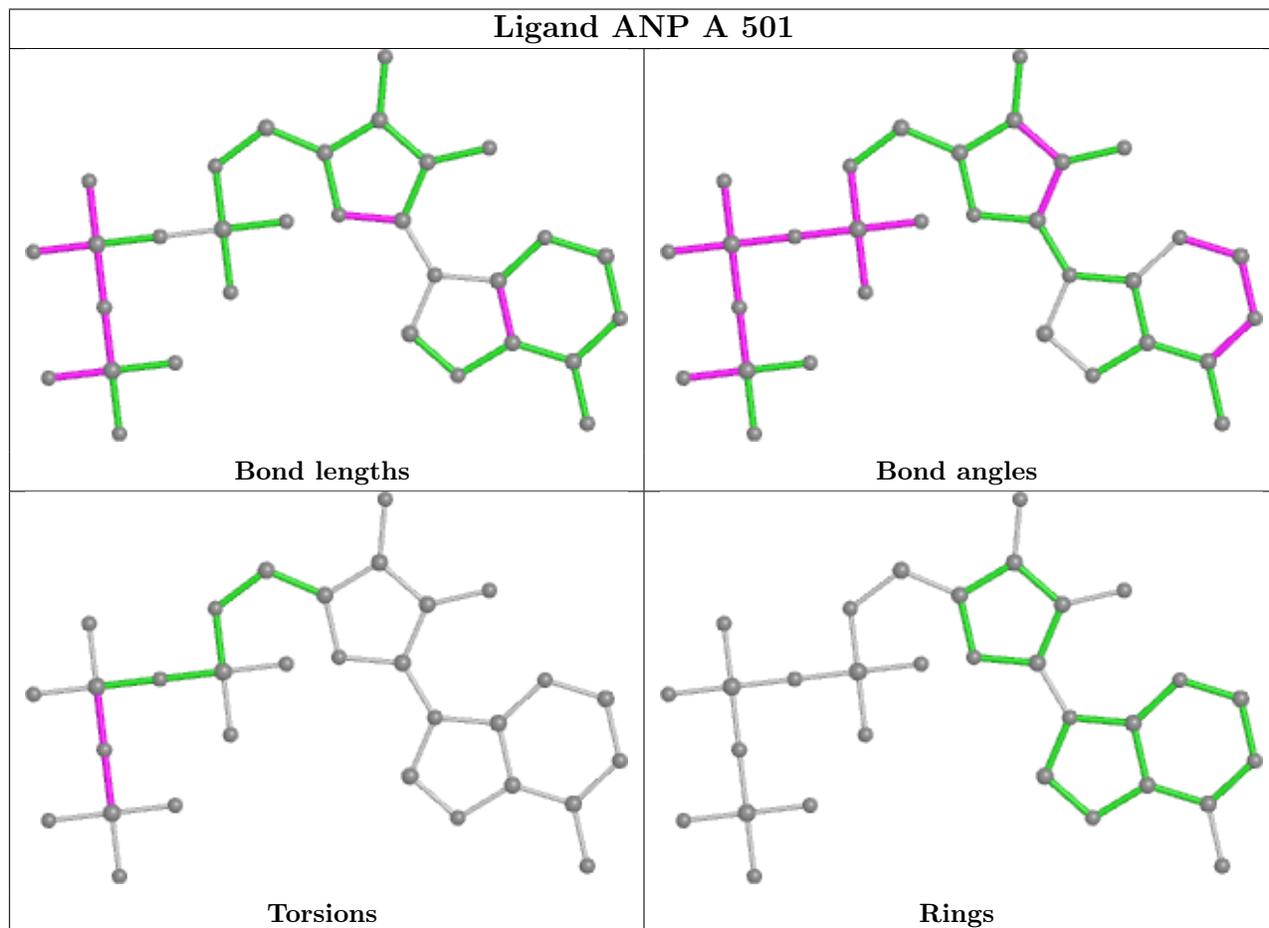
Mol	Chain	Res	Type	Atoms
2	A	501	ANP	PB-N3B-PG-O1G
2	A	501	ANP	PG-N3B-PB-O1B
7	A	509	PG4	O3-C5-C6-O4
7	A	509	PG4	O4-C7-C8-O5
7	A	509	PG4	O1-C1-C2-O2
7	A	509	PG4	C1-C2-O2-C3
6	A	507	P6G	O16-C17-C18-O19
7	A	509	PG4	C8-C7-O4-C6
7	A	509	PG4	C3-C4-O3-C5
3	A	504	GOL	O1-C1-C2-O2
2	B	501	ANP	PB-N3B-PG-O1G

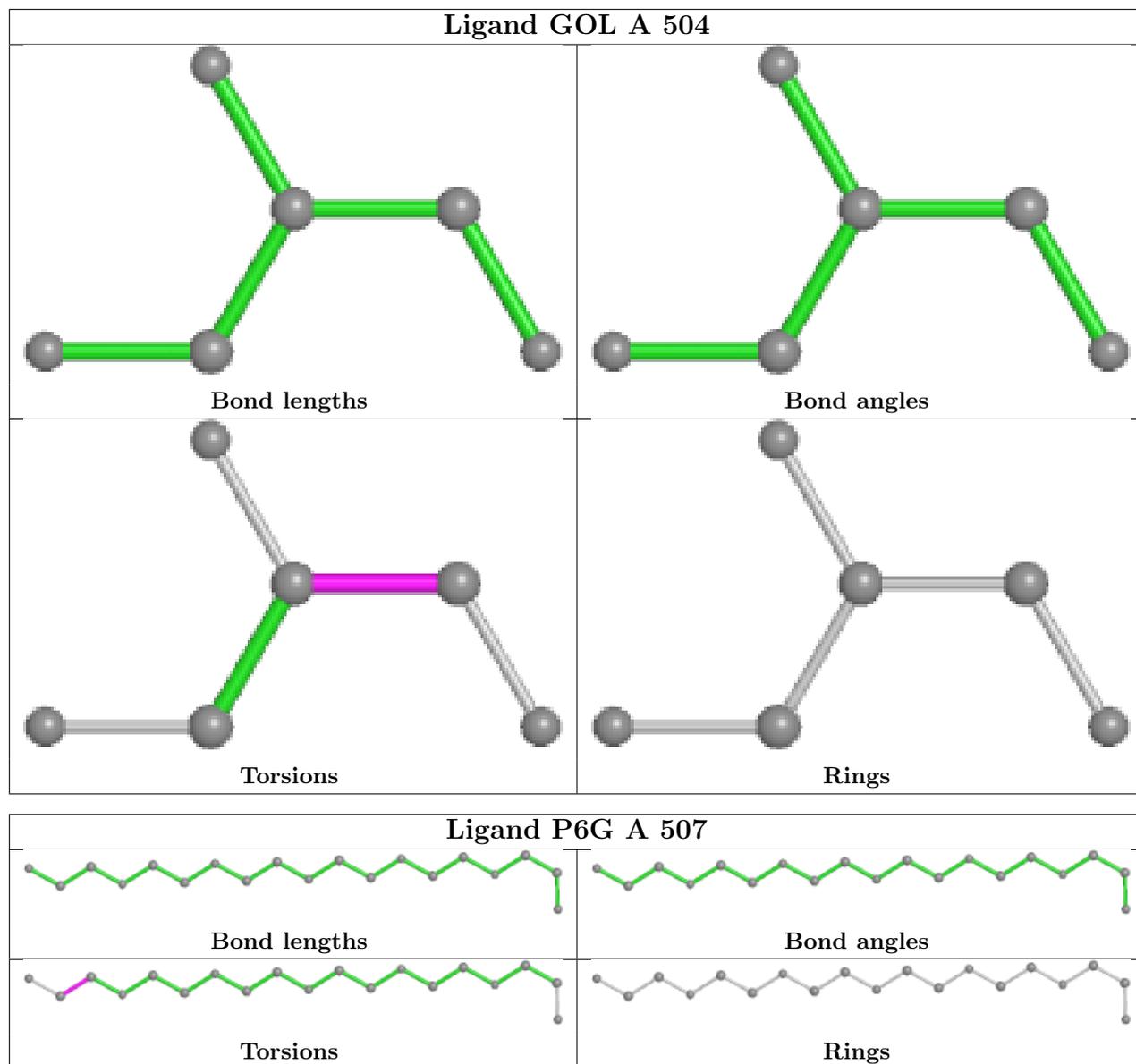
There are no ring outliers.

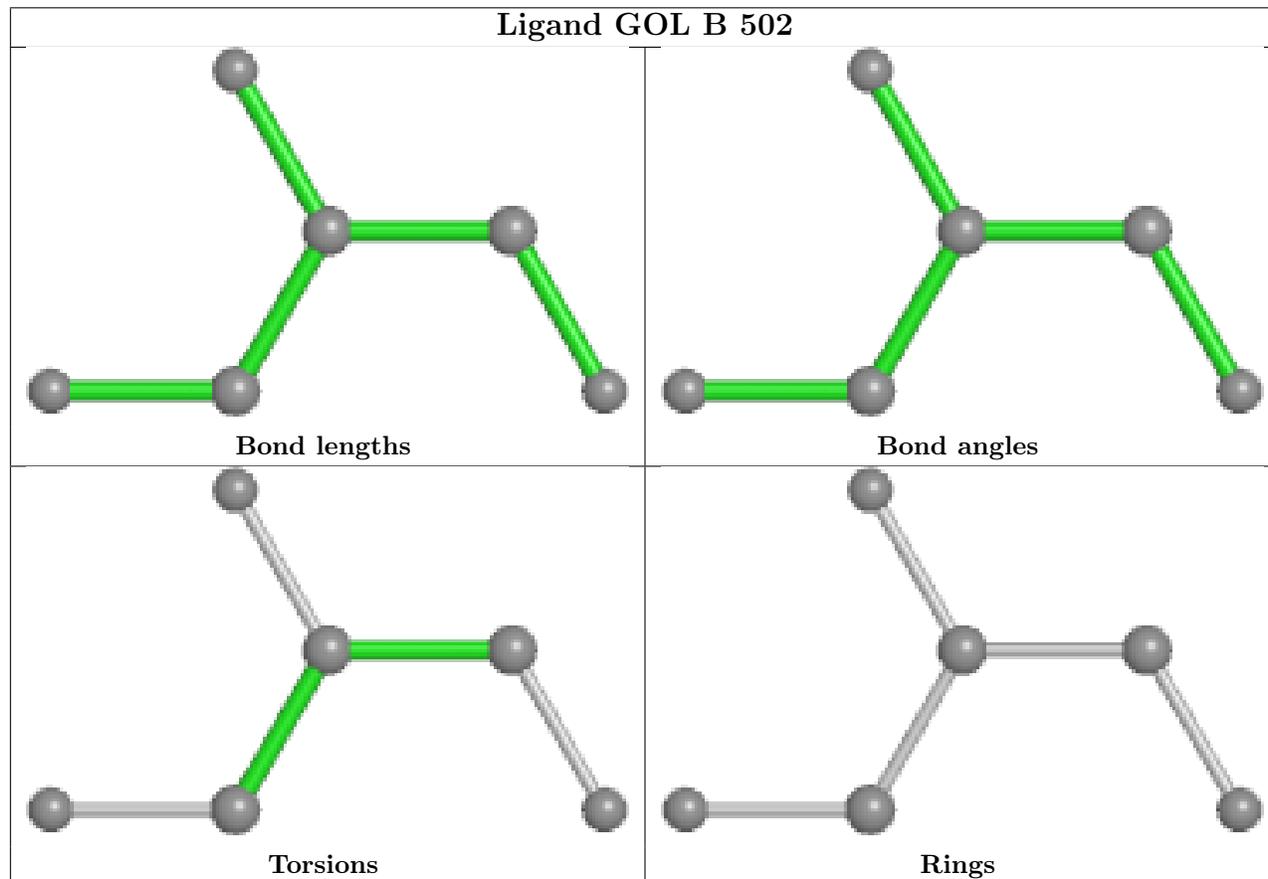
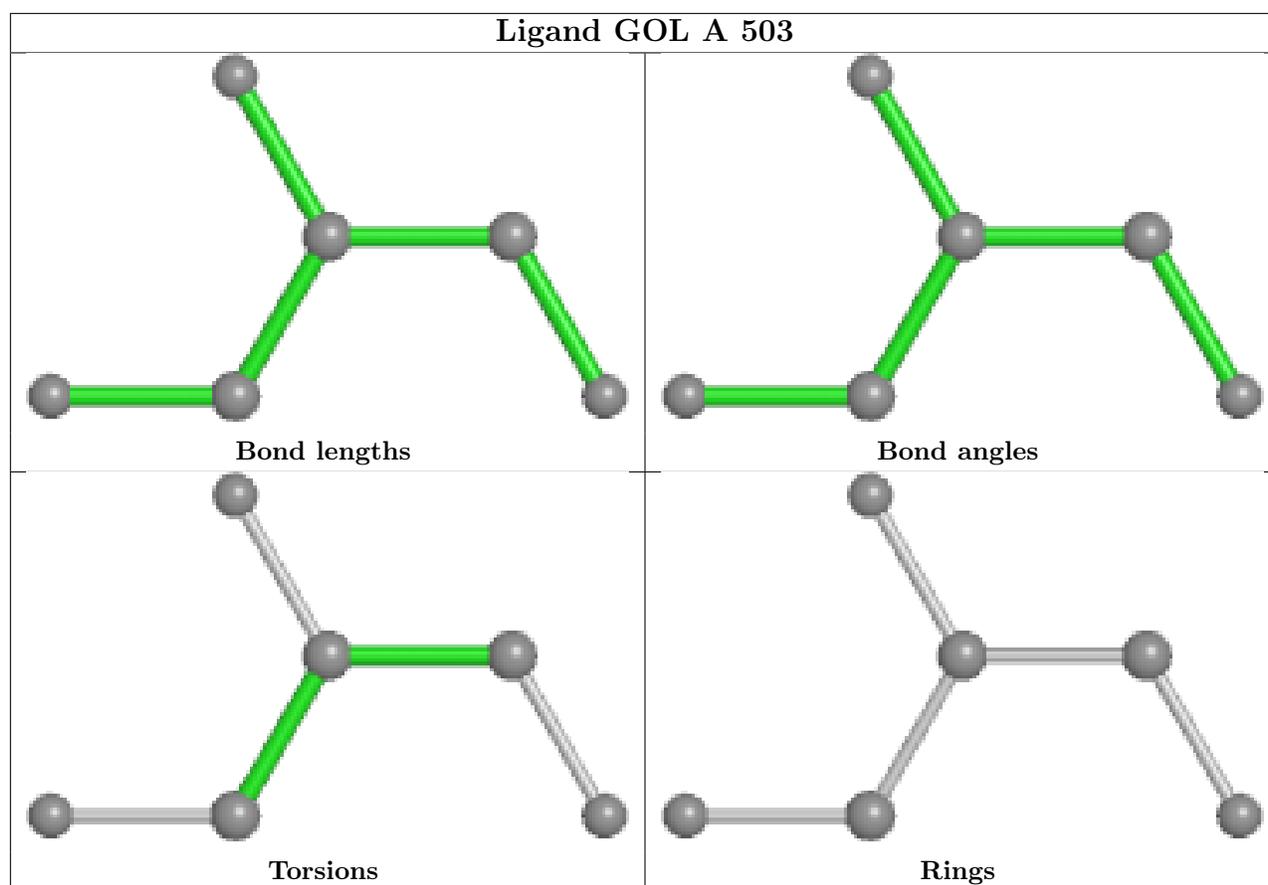
No monomer is involved in short contacts.

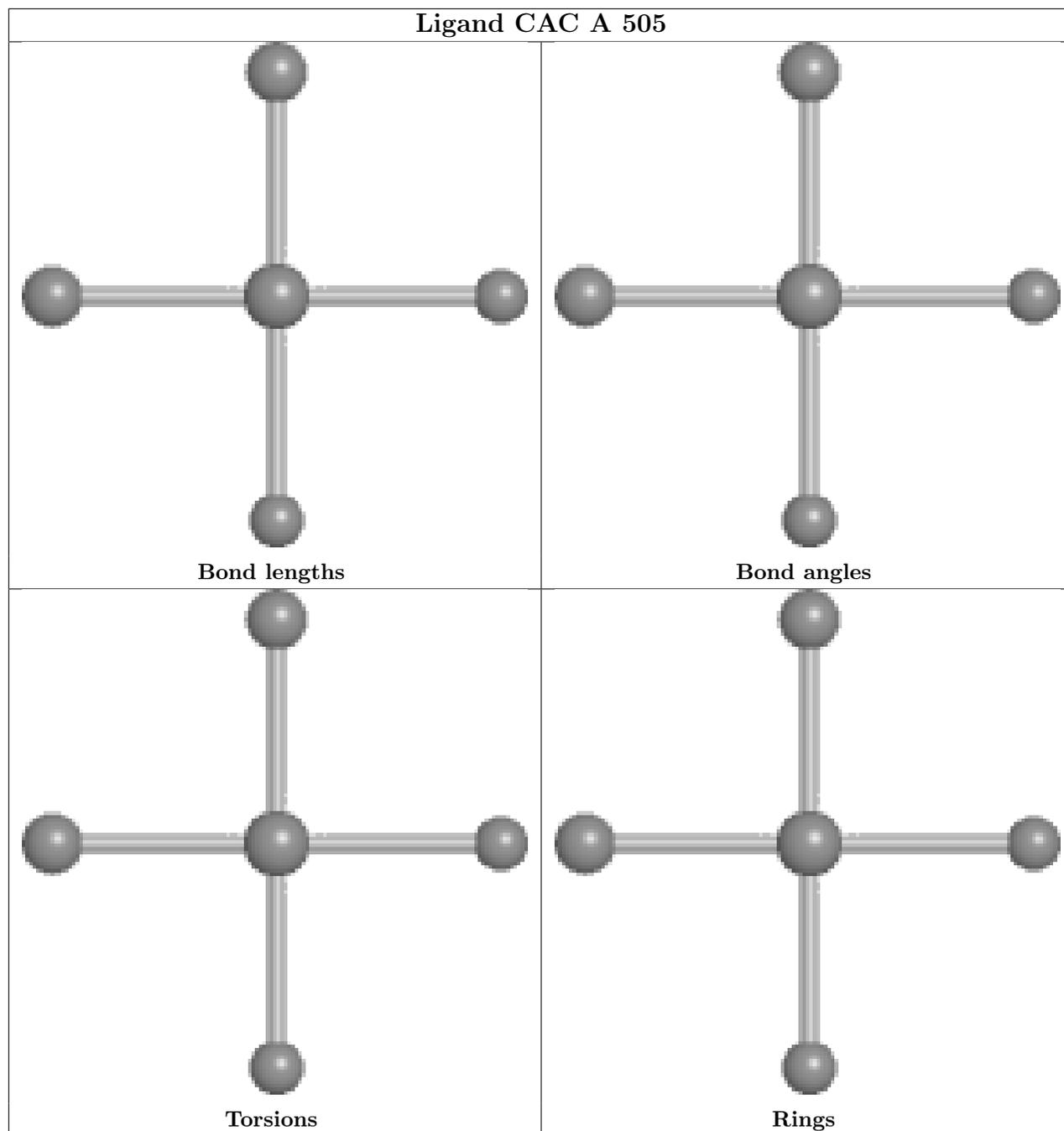
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is

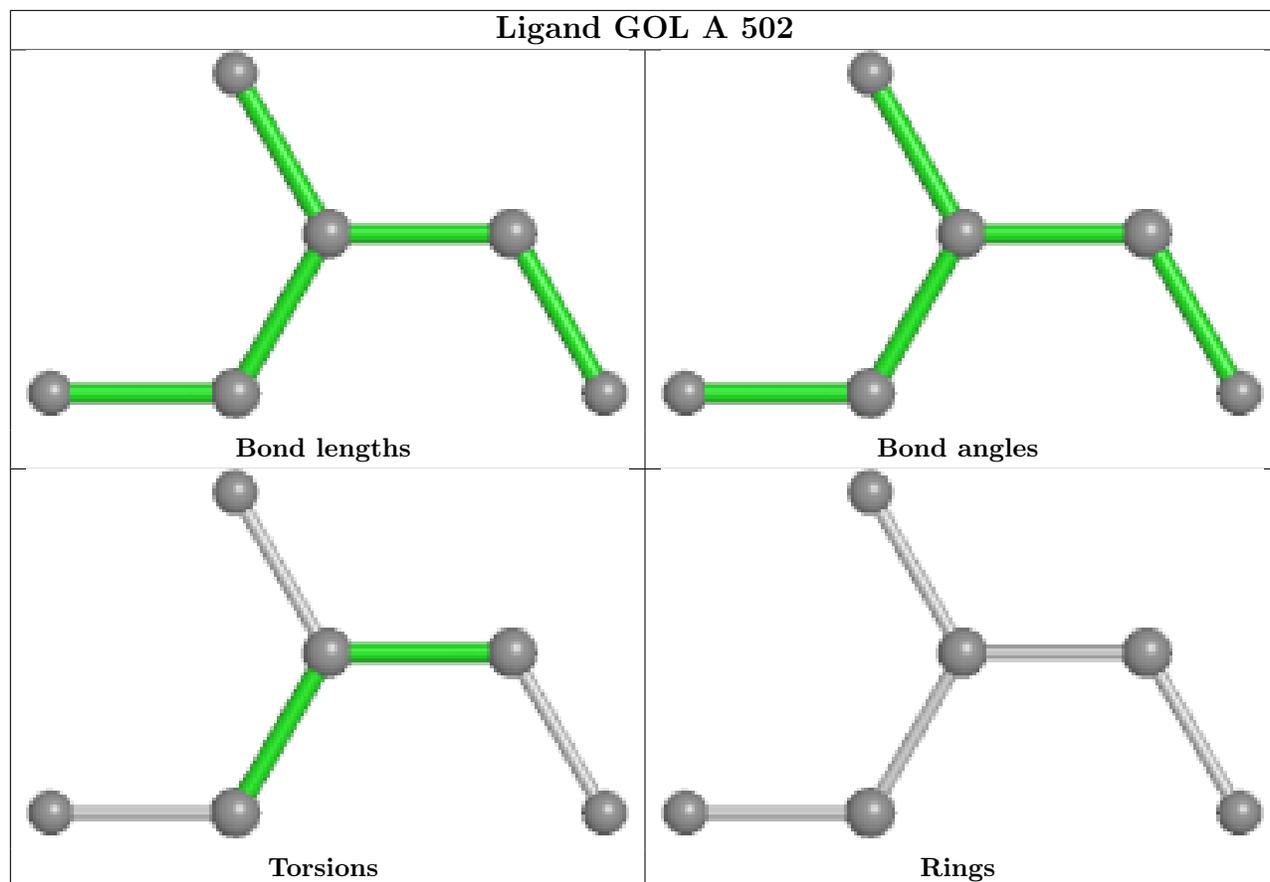
within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question 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.

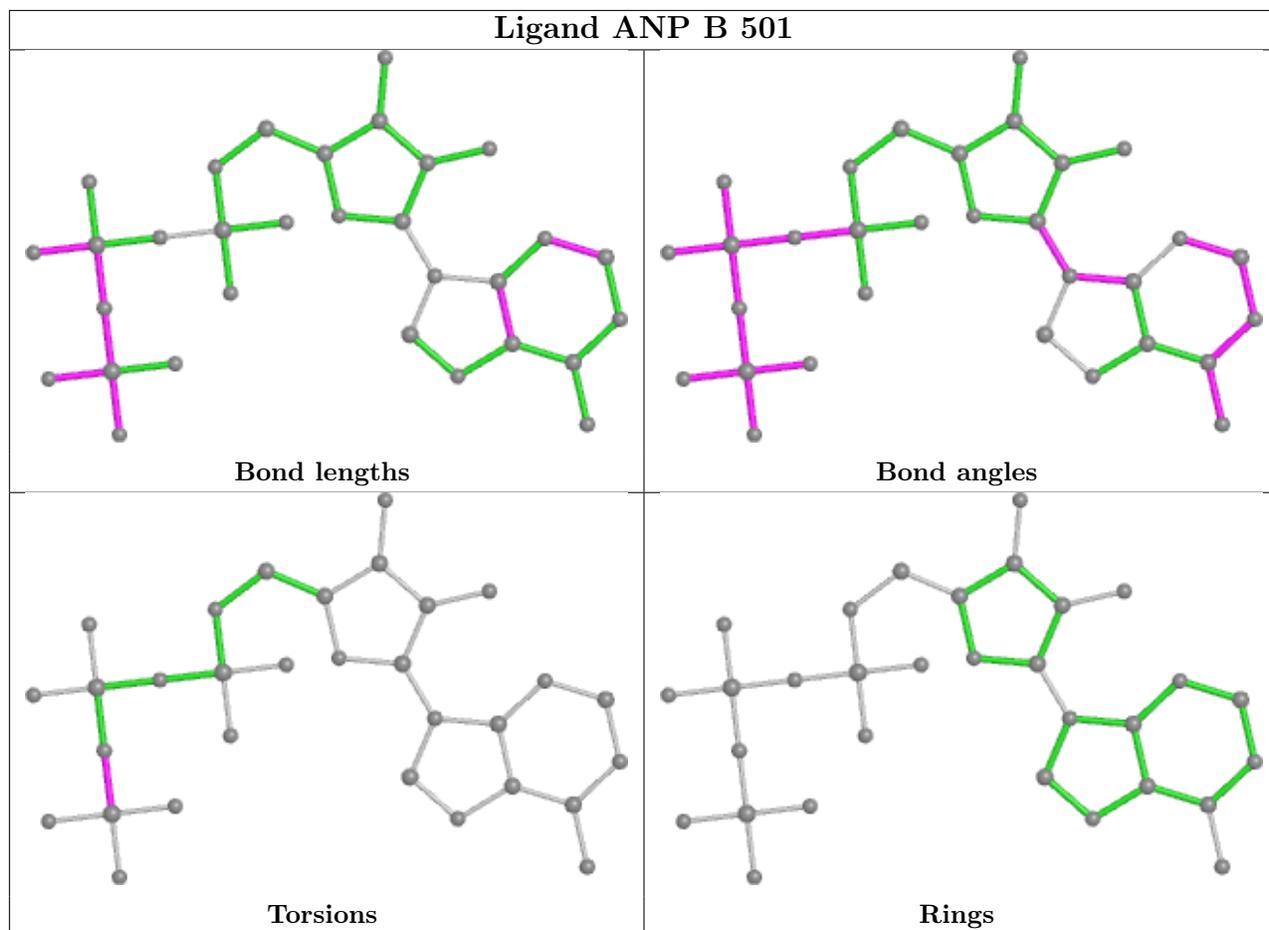


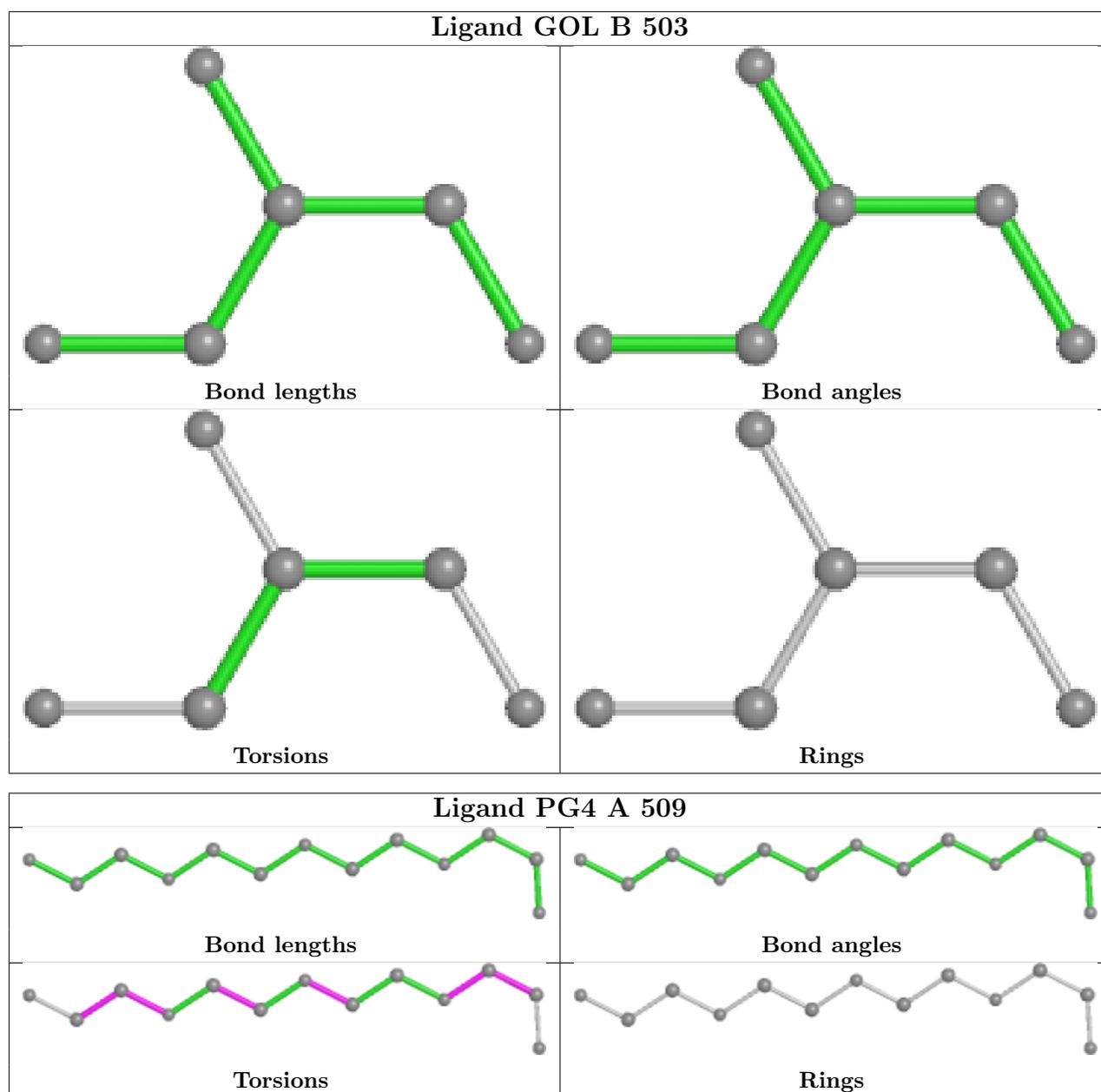












## 5.7 Other polymers [i](#)

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, 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	485/487 (99%)	0.34	17 (3%) 47 45	21, 35, 60, 80	0
1	B	487/487 (100%)	0.07	2 (0%) 89 88	13, 33, 52, 70	1 (0%)
All	All	972/974 (99%)	0.21	19 (1%) 64 63	13, 34, 57, 80	1 (0%)

All (19) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	450	MET	4.1
1	A	447	LEU	3.9
1	A	63	VAL	3.5
1	A	254	ILE	3.4
1	A	394	ILE	3.0
1	A	26	ILE	2.9
1	A	64	ASN	2.7
1	A	417	THR	2.6
1	B	389	GLY	2.5
1	A	61	CYS	2.4
1	A	456	VAL	2.4
1	A	414	CYS	2.3
1	A	416	CYS	2.2
1	B	121	ILE	2.2
1	A	484	VAL	2.2
1	A	413	ILE	2.2
1	A	409	PHE	2.1
1	A	470	PHE	2.1
1	A	257	CYS	2.1

### 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](#)

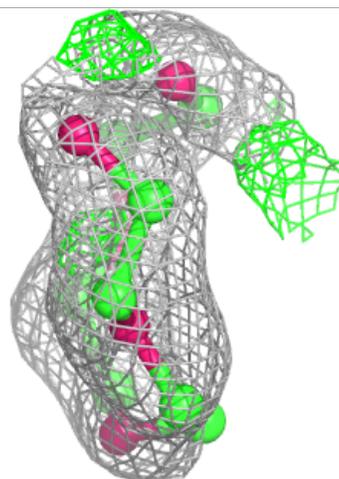
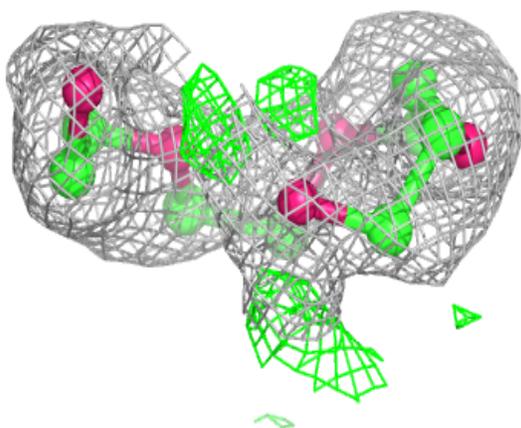
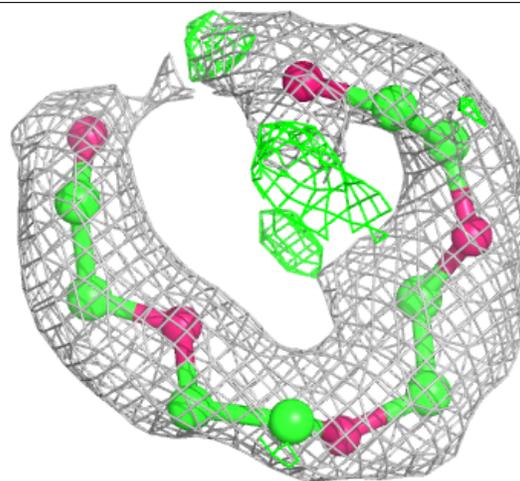
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 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
7	PG4	A	509	13/13	0.76	0.17	54,66,71,72	0
3	GOL	B	503	6/6	0.86	0.12	61,63,65,66	0
6	P6G	A	507	19/19	0.86	0.12	38,43,50,51	0
3	GOL	A	504	6/6	0.86	0.11	52,54,55,55	0
3	GOL	A	503	6/6	0.88	0.10	49,53,55,57	0
2	ANP	A	501	31/31	0.94	0.08	31,38,46,49	0
4	CAC	A	505	5/5	0.95	0.15	56,59,60,68	0
3	GOL	A	502	6/6	0.97	0.05	23,26,28,29	0
5	MG	A	508	1/1	0.97	0.18	36,36,36,36	0
3	GOL	B	502	6/6	0.97	0.04	22,24,24,25	0
2	ANP	B	501	31/31	0.97	0.06	26,33,41,42	0
5	MG	A	506	1/1	0.98	0.07	30,30,30,30	0
5	MG	B	504	1/1	0.98	0.02	30,30,30,30	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.

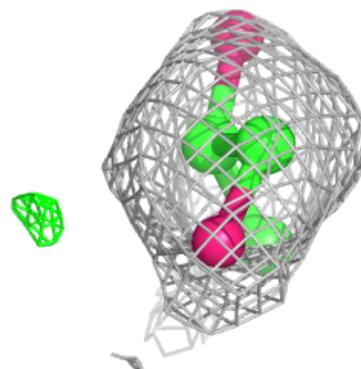
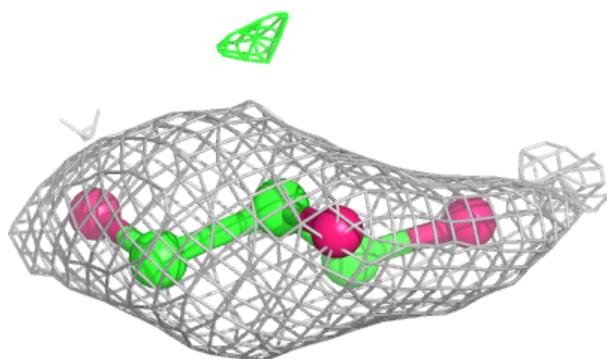
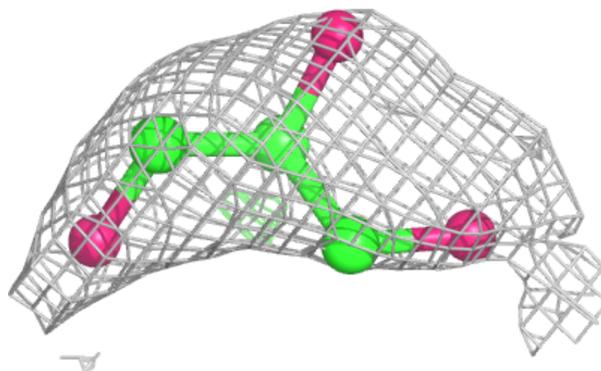
**Electron density around PG4 A 509:**

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

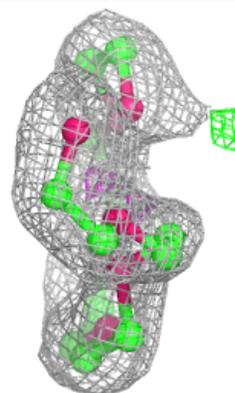
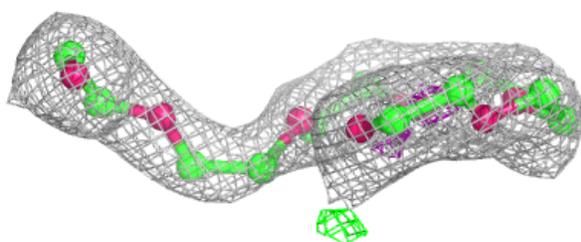
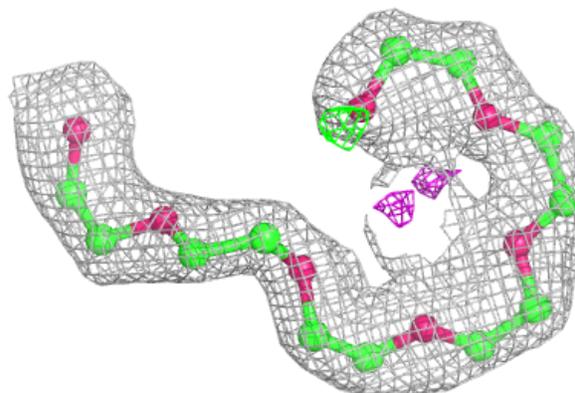


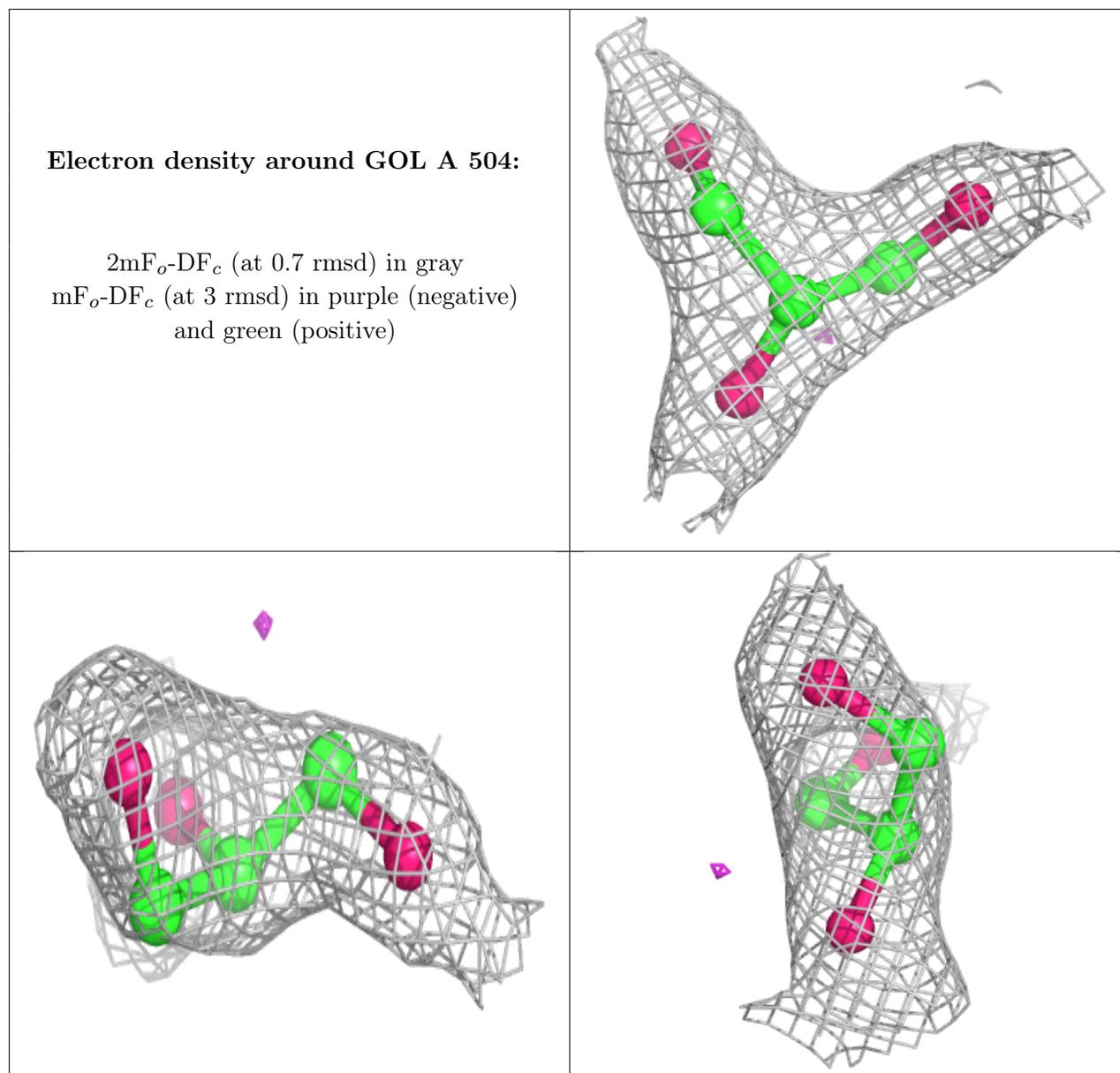
**Electron density around GOL B 503:**

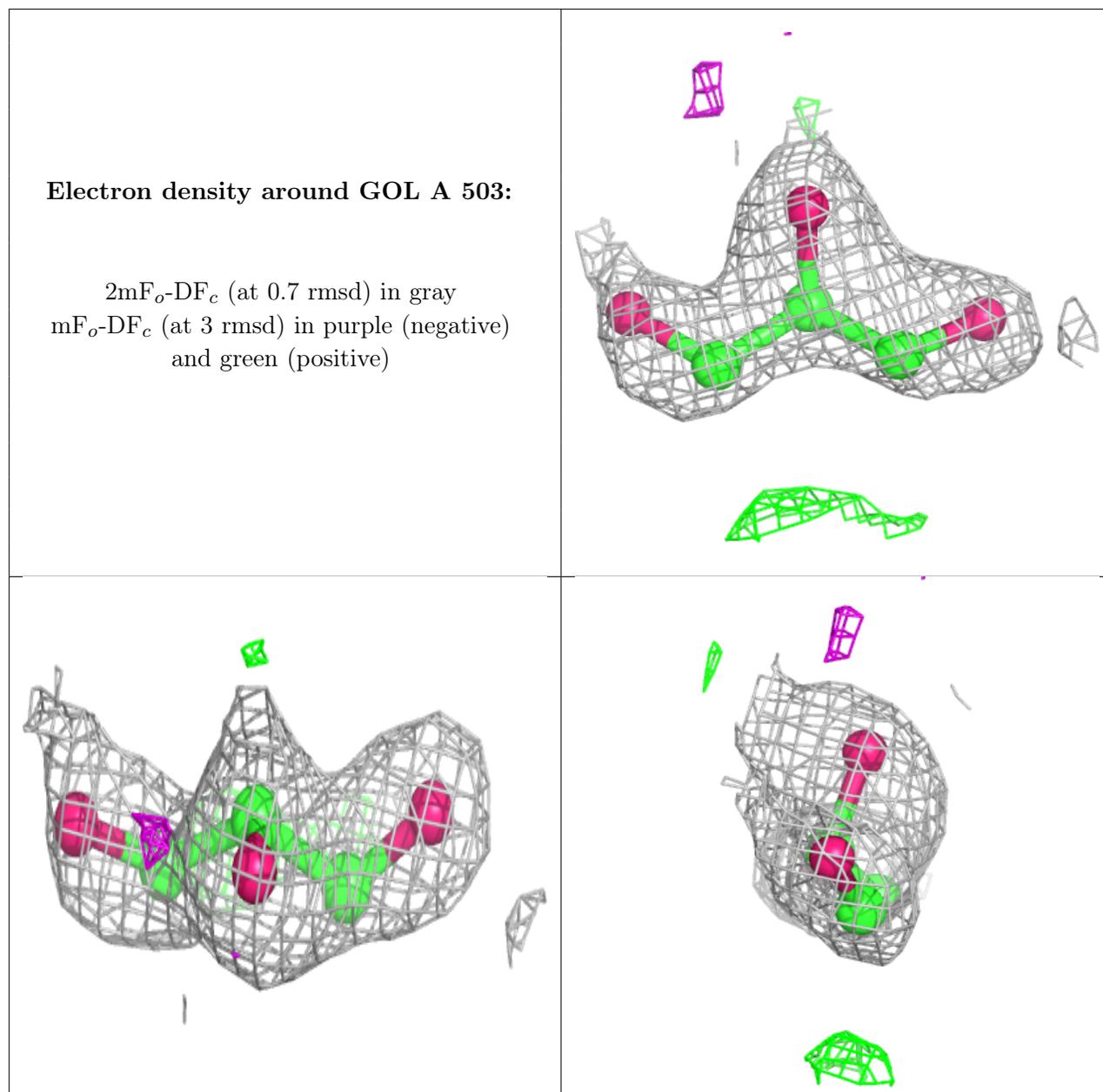
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and green (positive)

**Electron density around P6G A 507:**

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and green (positive)

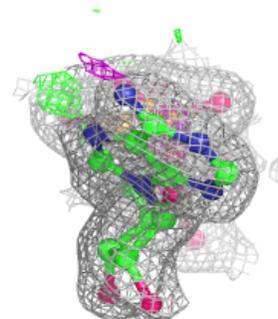
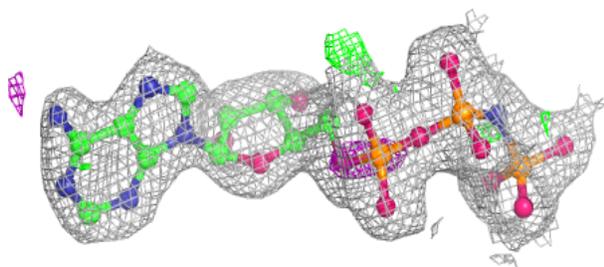
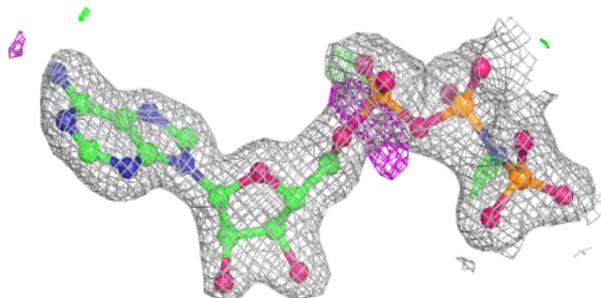




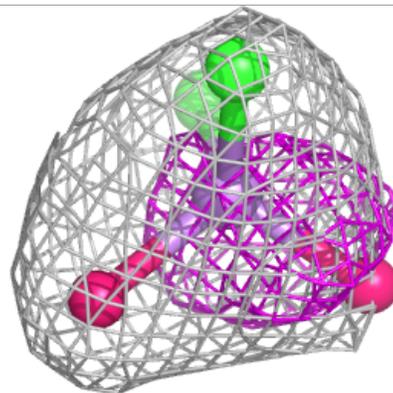
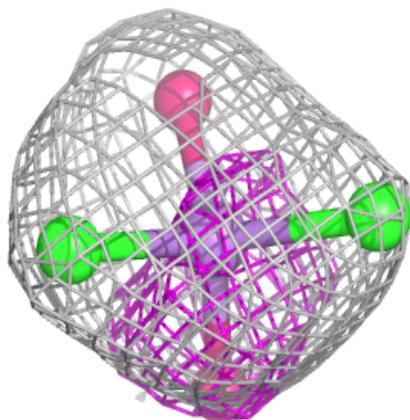
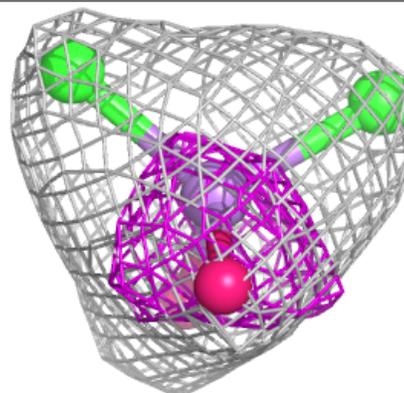


**Electron density around ANP A 501:**

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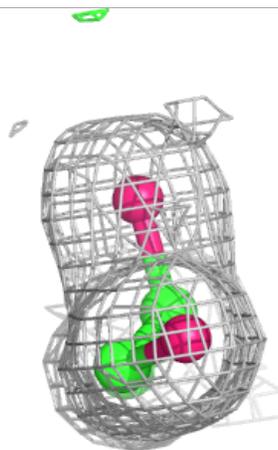
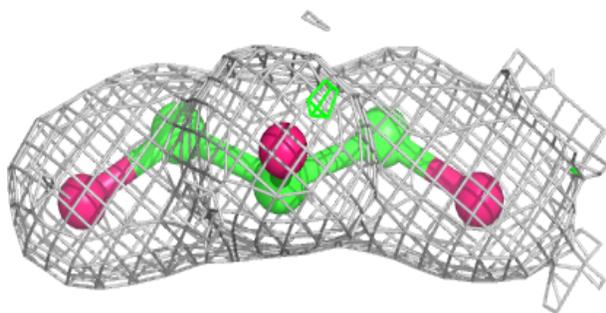
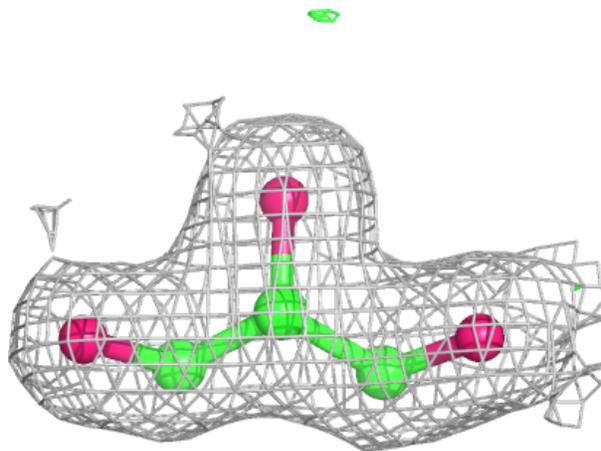
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and green (positive)



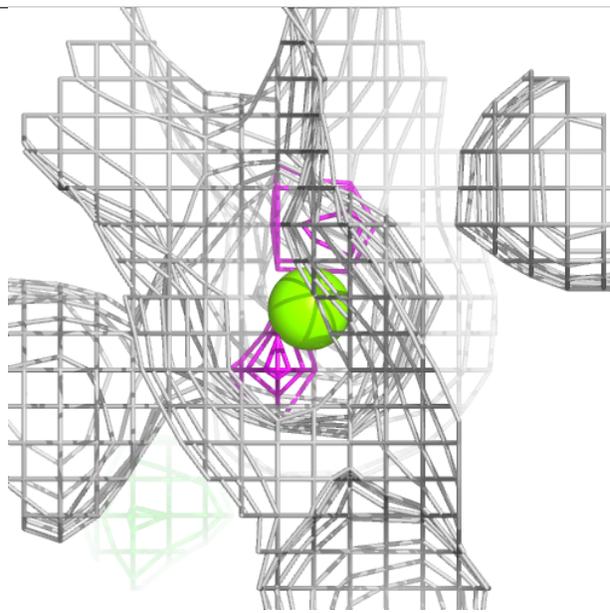
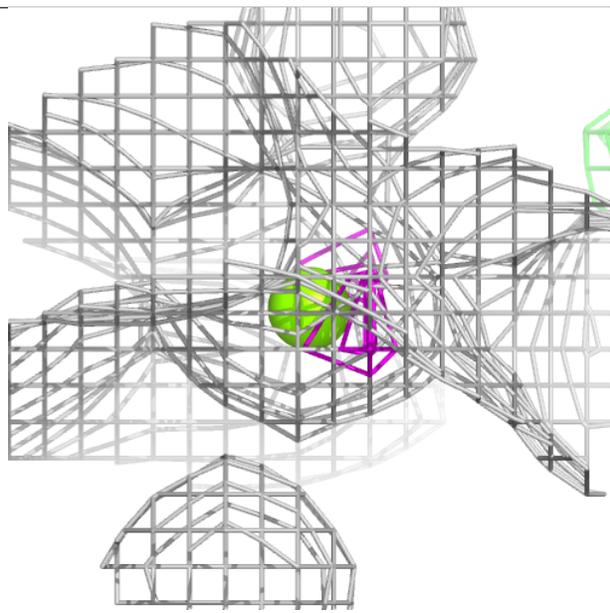
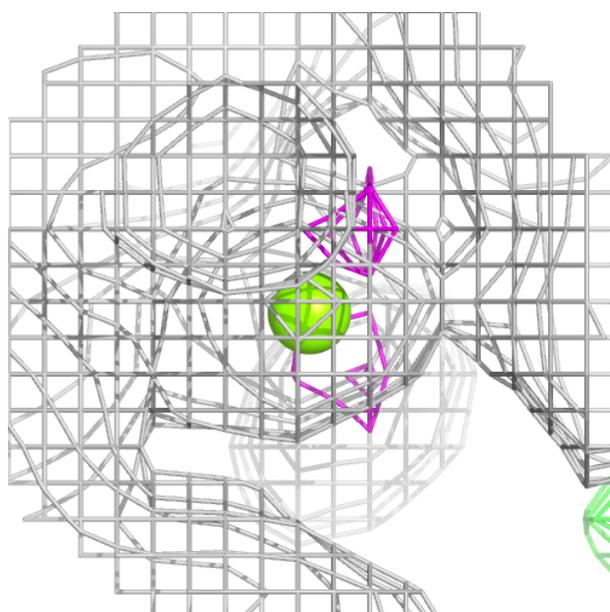
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and green (positive)



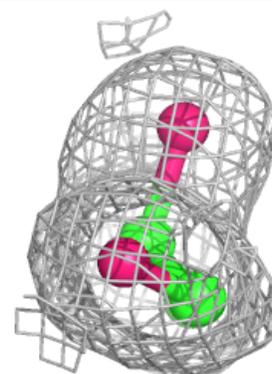
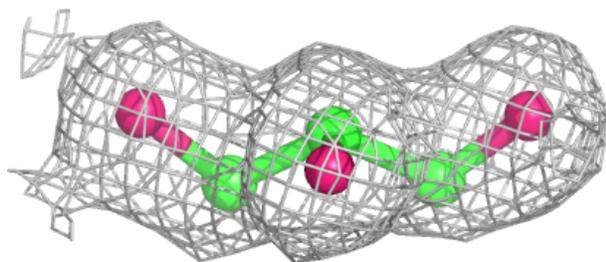
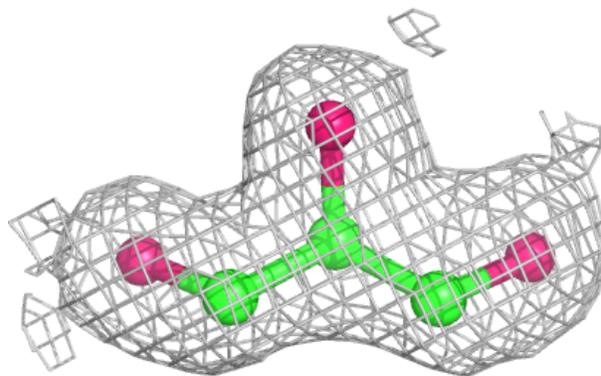
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and green (positive)

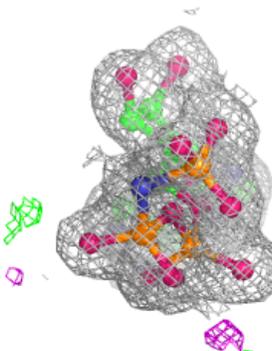
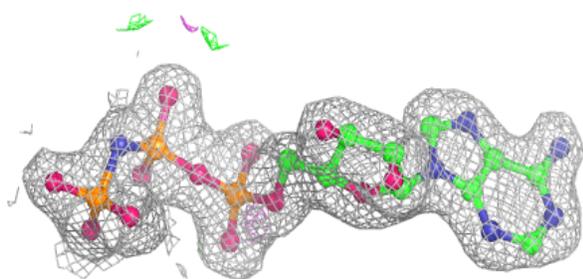
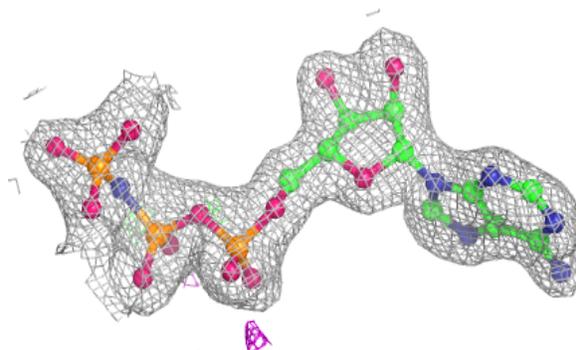


**Electron density around GOL B 502:**

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

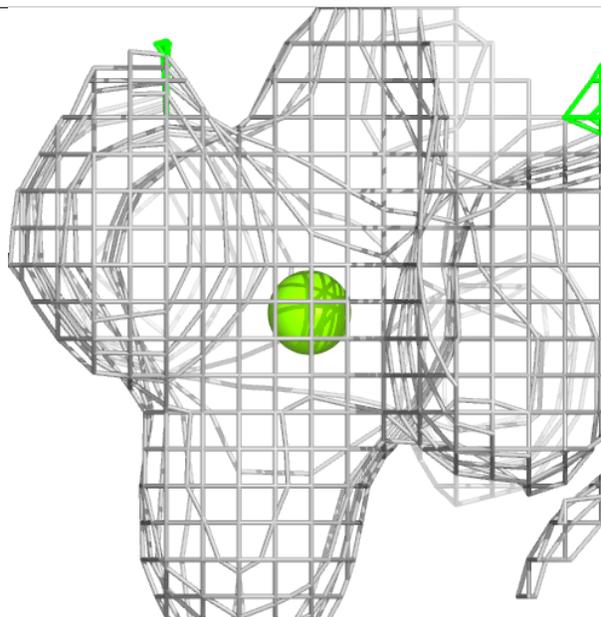
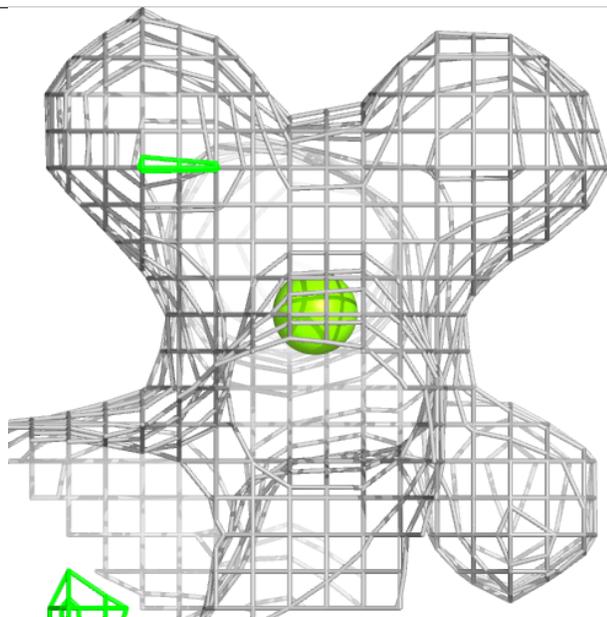
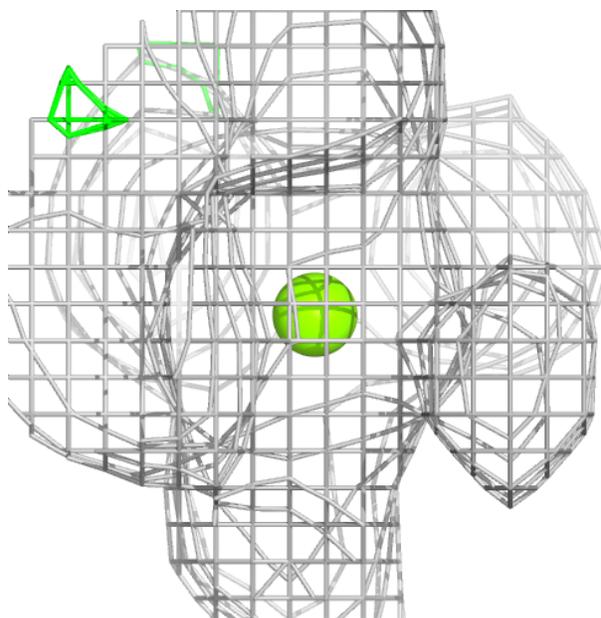
**Electron density around ANP B 501:**

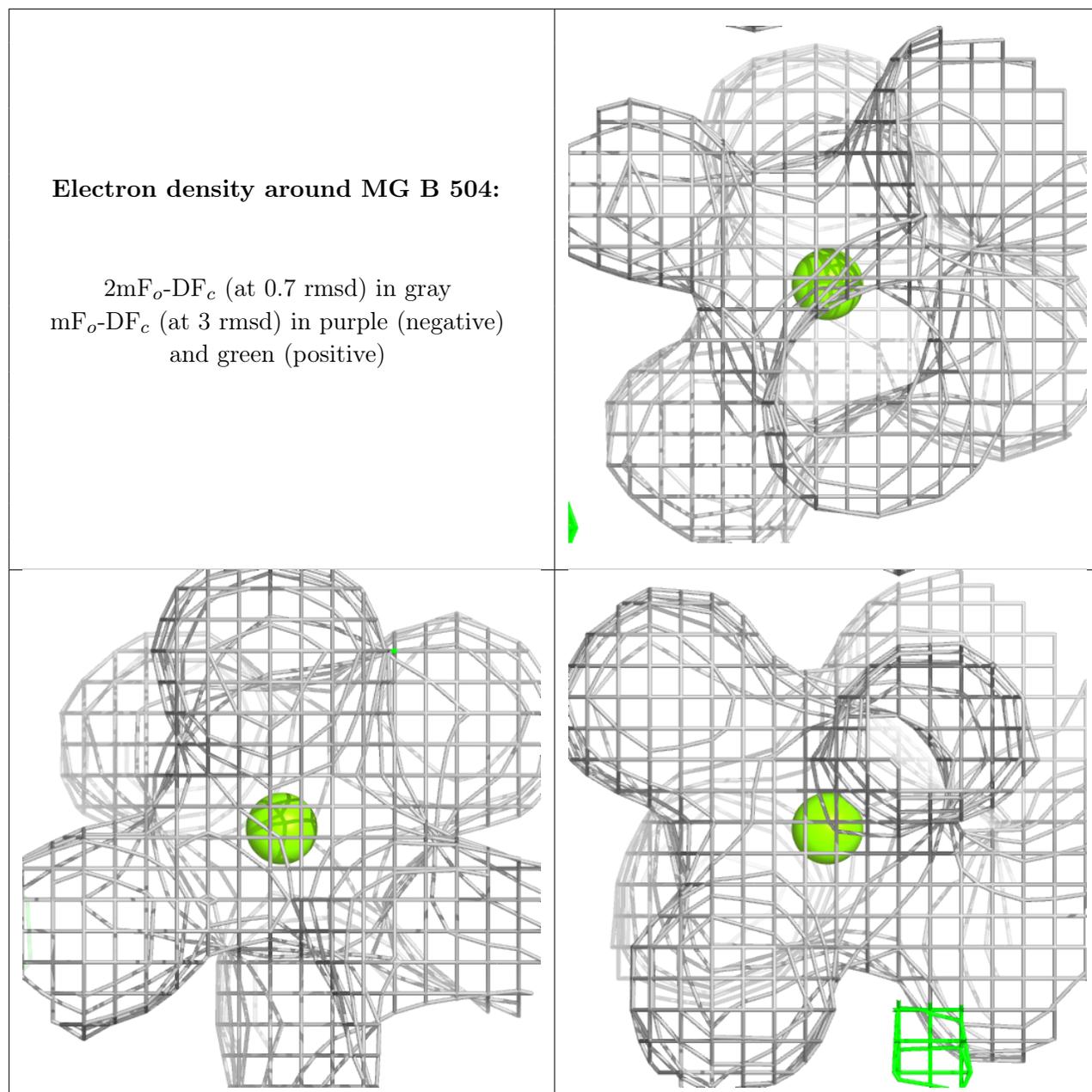
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



**Electron density around MG A 506:**

$2mF_o-DF_c$  (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.