



Full wwPDB X-ray Structure Validation Report ⓘ

Oct 1, 2022 – 01:09 pm BST

PDB ID : 7QSX
Title : Non-obligately L8S8-complex forming RubisCO derived from ancestral sequence reconstruction and rational engineering in L8 complex
Authors : Zarzycki, J.; Schulz, L.; Erb, T.J.; Hochberg, G.K.A.
Deposited on : 2022-01-14
Resolution : 2.70 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 : 4.02b-467
Mogul : 1.8.4, CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.31.2
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0267
CCP4 : 7.1.010 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.31.2

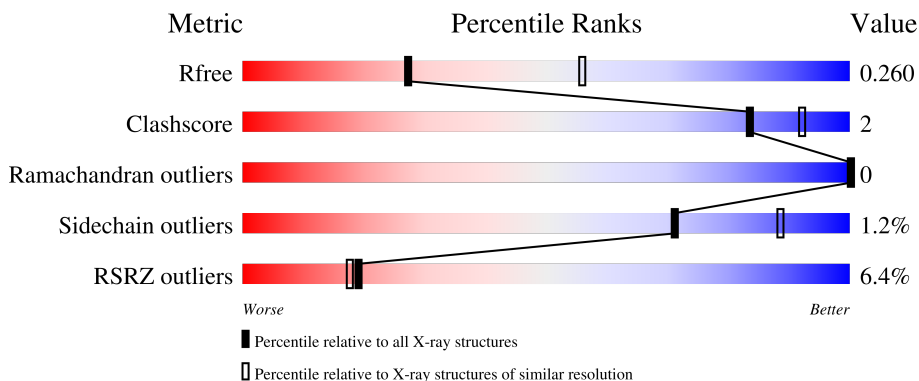
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.70 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.



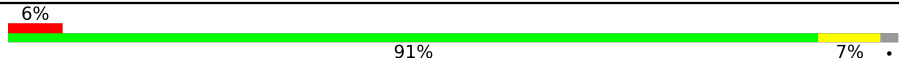
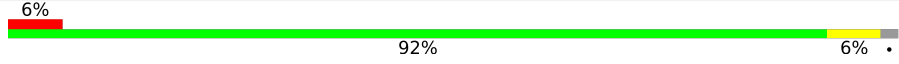
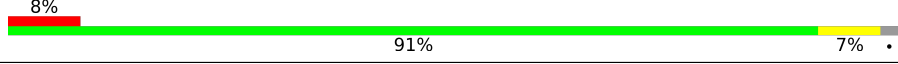
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	2808 (2.70-2.70)
Clashscore	141614	3122 (2.70-2.70)
Ramachandran outliers	138981	3069 (2.70-2.70)
Sidechain outliers	138945	3069 (2.70-2.70)
RSRZ outliers	127900	2737 (2.70-2.70)

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	457	 7% 90% 8% .
1	B	457	 6% 92% 7% .
1	C	457	 4% 91% 7% .
1	D	457	 7% 91% 7% .
1	E	457	 6% 91% 7% .

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Mol	Chain	Length	Quality of chain
1	F	457	 6% 91% 7%
1	G	457	 6% 92% 6%
1	H	457	 8% 91% 7%

2 Entry composition

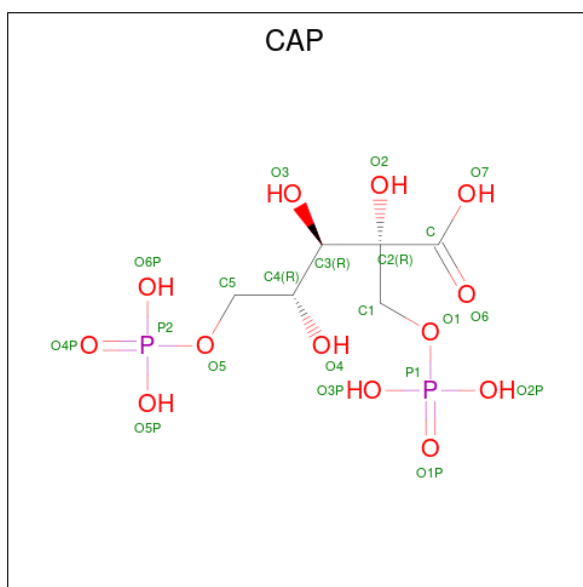
There are 4 unique types of molecules in this entry. The entry contains 29228 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 RubisCO large subunit.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	450	3546	2248	630	653	15	0	0	0
1	B	450	3546	2248	630	653	15	0	0	0
1	C	450	3546	2248	630	653	15	0	0	0
1	D	450	3546	2248	630	653	15	0	0	0
1	E	449	3539	2243	629	652	15	0	0	0
1	F	449	3539	2243	629	652	15	0	0	0
1	G	450	3546	2248	630	653	15	0	0	0
1	H	449	3539	2243	629	652	15	0	0	0

- Molecule 2 is 2-CARBOXYARABINITOL-1,5-DIPHOSPHATE (three-letter code: CAP) (formula: C₆H₁₄O₁₃P₂) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	
2	A	1	Total	C	O	P	0	0
			21	6	13	2		
2	B	1	Total	C	O	P	0	0
			21	6	13	2		
2	C	1	Total	C	O	P	0	0
			21	6	13	2		
2	D	1	Total	C	O	P	0	0
			21	6	13	2		
2	E	1	Total	C	O	P	0	0
			21	6	13	2		
2	F	1	Total	C	O	P	0	0
			21	6	13	2		
2	G	1	Total	C	O	P	0	0
			21	6	13	2		
2	H	1	Total	C	O	P	0	0
			21	6	13	2		

- Molecule 3 is MAGNESIUM ION (three-letter code: MG) (formula: Mg) (labeled as "Ligand of Interest" by depositor).

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

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

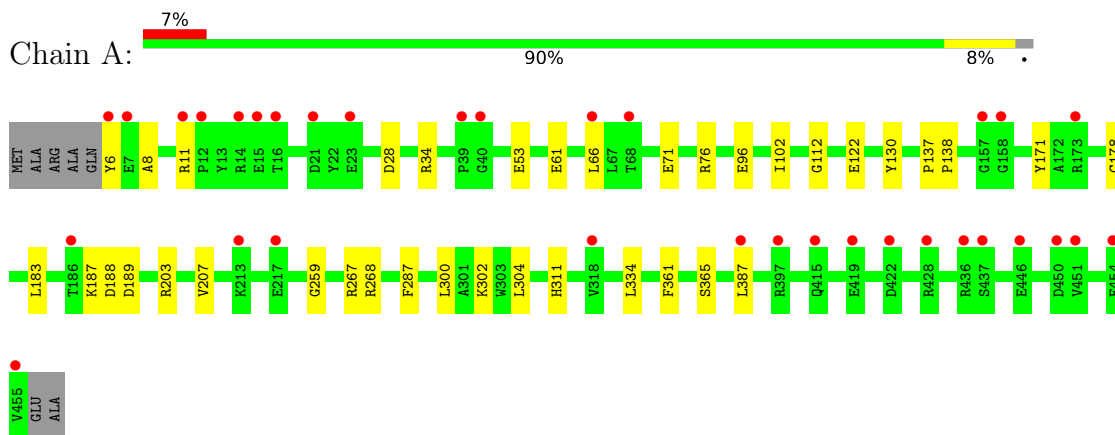
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	81	Total 81	O 81	0	0
4	B	98	Total 98	O 98	0	0
4	C	104	Total 104	O 104	0	0
4	D	90	Total 90	O 90	0	0
4	E	95	Total 95	O 95	0	0
4	F	75	Total 75	O 75	0	0
4	G	92	Total 92	O 92	0	0
4	H	70	Total 70	O 70	0	0

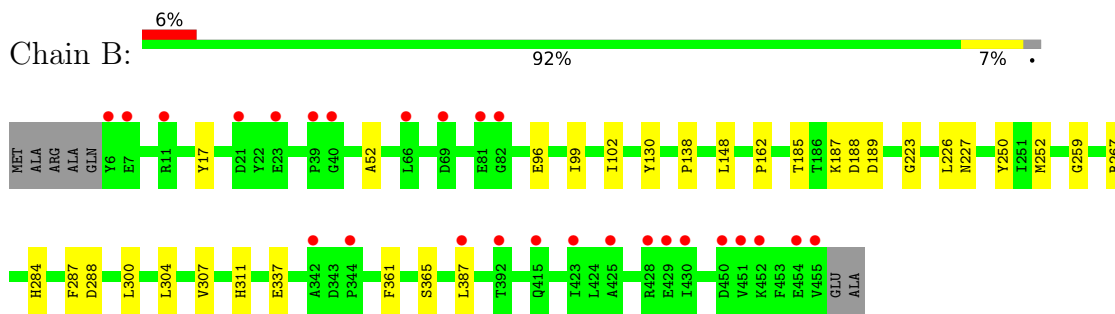
3 Residue-property plots [i](#)

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

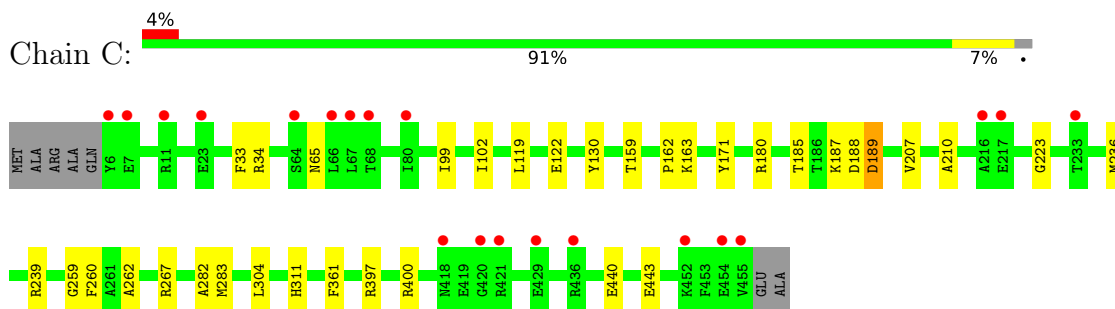
- Molecule 1: RubisCO large subunit



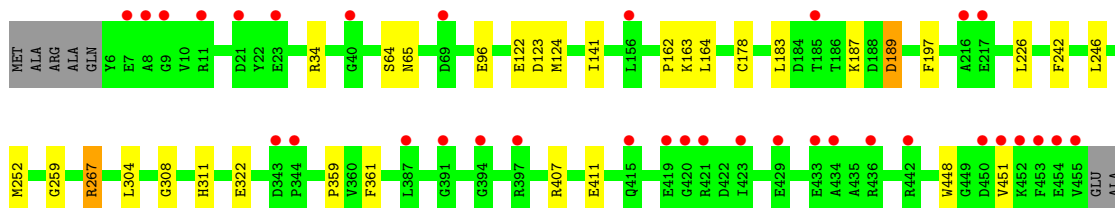
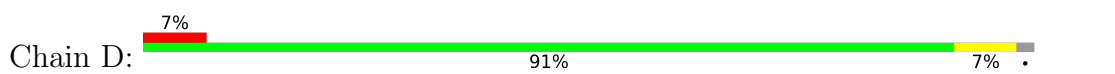
- Molecule 1: RubisCO large subunit



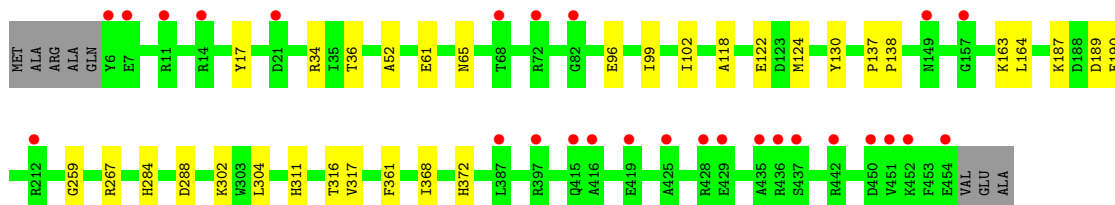
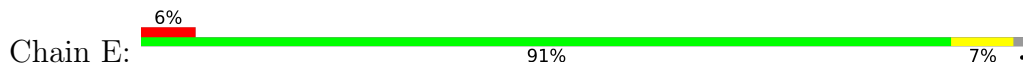
- Molecule 1: RubisCO large subunit



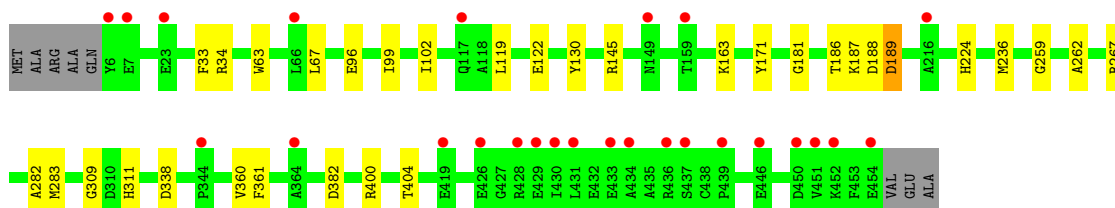
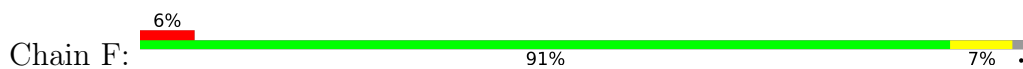
- Molecule 1: RubisCO large subunit



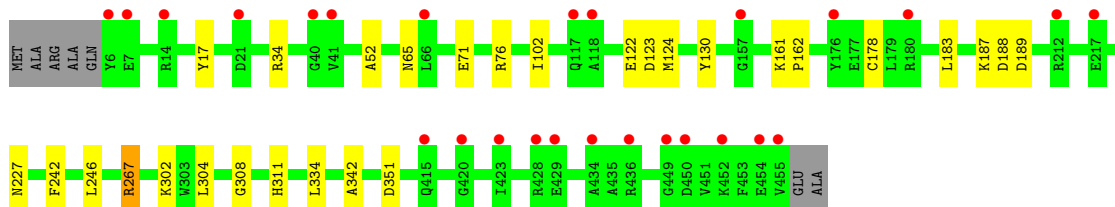
- Molecule 1: RubisCO large subunit



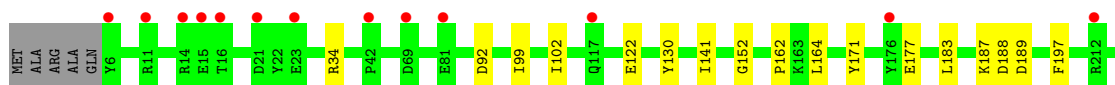
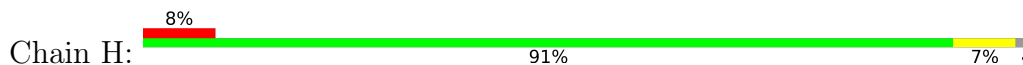
- Molecule 1: RubisCO large subunit

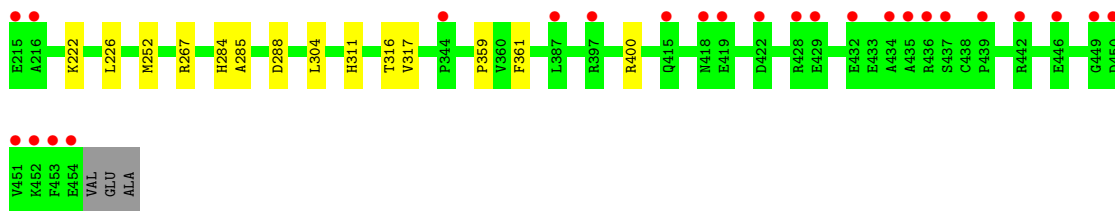


- Molecule 1: RubisCO large subunit



- Molecule 1: RubisCO large subunit





4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	113.60Å 159.20Å 127.91Å 90.00° 107.90° 90.00°	Depositor
Resolution (Å)	29.89 – 2.70 29.89 – 2.70	Depositor EDS
% Data completeness (in resolution range)	99.6 (29.89-2.70) 99.6 (29.89-2.70)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.27	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.00 (at 2.68Å)	Xtriage
Refinement program	PHENIX 1.18.2_3874	Depositor
R, R_{free}	0.218 , 0.260 0.218 , 0.260	Depositor DCC
R_{free} test set	1981 reflections (1.68%)	wwPDB-VP
Wilson B-factor (Å ²)	33.2	Xtriage
Anisotropy	0.196	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	(Not available) , (Not available)	EDS
L-test for twinning ²	$\langle L \rangle = 0.45$, $\langle L^2 \rangle = 0.28$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.88	EDS
Total number of atoms	29228	wwPDB-VP
Average B, all atoms (Å ²)	32.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 12.65% 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: KCX, CAP, MG

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	A	0.25	0/3619	0.43	0/4902
1	B	0.25	0/3619	0.44	0/4902
1	C	0.26	0/3619	0.45	0/4902
1	D	0.26	0/3619	0.45	0/4902
1	E	0.25	0/3612	0.44	0/4892
1	F	0.25	0/3612	0.45	0/4892
1	G	0.25	0/3619	0.44	0/4902
1	H	0.26	0/3612	0.43	0/4892
All	All	0.26	0/28931	0.44	0/39186

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3546	0	3459	22	0
1	B	3546	0	3459	15	0
1	C	3546	0	3459	20	0
1	D	3546	0	3459	19	0
1	E	3539	0	3450	17	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	F	3539	0	3450	17	0
1	G	3546	0	3459	14	0
1	H	3539	0	3450	17	0
2	A	21	0	8	0	0
2	B	21	0	8	0	0
2	C	21	0	7	0	0
2	D	21	0	7	2	0
2	E	21	0	8	0	0
2	F	21	0	7	0	0
2	G	21	0	7	1	0
2	H	21	0	7	0	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
3	C	1	0	0	0	0
3	D	1	0	0	0	0
3	E	1	0	0	0	0
3	F	1	0	0	0	0
3	G	1	0	0	0	0
3	H	1	0	0	0	0
4	A	81	0	0	5	0
4	B	98	0	0	1	0
4	C	104	0	0	1	0
4	D	90	0	0	3	0
4	E	95	0	0	1	0
4	F	75	0	0	2	0
4	G	92	0	0	1	0
4	H	70	0	0	3	0
All	All	29228	0	27704	136	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 2.

All (136) 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:D:34:ARG:NH2	1:D:122:GLU:OE2	2.24	0.71
1:F:34:ARG:NH2	1:F:122:GLU:OE2	2.24	0.70
2:D:501:CAP:O6P	4:D:601:HOH:O	2.10	0.69
1:F:145:ARG:NH2	1:F:382:ASP:O	2.28	0.67
1:H:183:LEU:O	1:H:222:LYS:NZ	2.26	0.67
1:A:28:ASP:OD1	4:A:601:HOH:O	2.12	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:338:ASP:OD1	4:F:601:HOH:O	2.13	0.66
1:G:34:ARG:NH2	1:G:122:GLU:OE2	2.28	0.66
1:E:102:ILE:HD11	1:E:130:TYR:HE2	1.60	0.65
1:F:400:ARG:NH1	4:F:603:HOH:O	2.29	0.65
1:E:61:GLU:OE2	4:E:601:HOH:O	2.15	0.64
1:F:102:ILE:HD11	1:F:130:TYR:HE2	1.62	0.64
1:A:61:GLU:O	4:A:602:HOH:O	2.15	0.63
1:H:92:ASP:OD1	4:H:601:HOH:O	2.16	0.61
1:F:163:LYS:HG2	1:F:189:ASP:OD2	2.00	0.61
1:D:322:GLU:O	4:D:602:HOH:O	2.16	0.60
1:C:99:ILE:HD13	1:C:102:ILE:HD12	1.83	0.59
1:H:99:ILE:HD13	1:H:102:ILE:HD12	1.84	0.59
1:A:34:ARG:NH2	1:A:122:GLU:OE2	2.35	0.59
1:B:259:GLY:HA3	1:E:259:GLY:HA3	1.84	0.58
1:G:342:ALA:N	1:G:351:ASP:OD1	2.35	0.57
1:A:268:ARG:NH2	4:A:609:HOH:O	2.38	0.57
1:B:284:HIS:ND1	1:B:288:ASP:OD2	2.38	0.56
1:G:178:CYS:HB3	1:G:183:LEU:HD12	1.88	0.56
1:H:102:ILE:HD11	1:H:130:TYR:HE2	1.70	0.55
1:A:102:ILE:HD11	1:A:130:TYR:HE2	1.72	0.54
1:D:163:LYS:HG2	1:D:189:ASP:OD2	2.07	0.54
1:G:102:ILE:HD11	1:G:130:TYR:HE2	1.72	0.54
1:C:163:LYS:HG2	1:C:189:ASP:OD2	2.07	0.54
1:F:186:THR:OG1	1:F:224:HIS:ND1	2.34	0.54
1:E:96:GLU:OE1	1:E:96:GLU:N	2.37	0.53
1:B:96:GLU:OE1	1:B:96:GLU:N	2.40	0.53
1:D:123:ASP:OD1	1:D:124:MET:N	2.39	0.53
1:E:34:ARG:NH2	1:E:122:GLU:OE2	2.42	0.53
1:D:407:ARG:NE	1:D:411:GLU:OE2	2.39	0.52
1:B:337:GLU:OE2	4:B:601:HOH:O	2.19	0.52
1:A:53:GLU:O	4:A:603:HOH:O	2.18	0.51
1:H:316:THR:N	4:H:605:HOH:O	2.41	0.51
1:F:63:TRP:CH2	1:F:67:LEU:HD11	2.46	0.50
1:G:71:GLU:O	1:G:76:ARG:NH1	2.43	0.50
1:H:34:ARG:NH2	1:H:122:GLU:OE2	2.45	0.50
1:A:302:LYS:HE2	1:A:334:LEU:HD22	1.95	0.49
1:H:152:GLY:N	4:H:604:HOH:O	2.39	0.49
1:C:440:GLU:OE1	1:C:440:GLU:N	2.44	0.49
1:C:239:ARG:NH1	4:C:602:HOH:O	2.30	0.48
1:E:124:MET:O	1:E:302:LYS:NZ	2.34	0.48
1:A:365:SER:HB2	1:A:387:LEU:HD12	1.96	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:178:CYS:HB3	1:A:183:LEU:HD12	1.95	0.47
1:C:397:ARG:NH2	1:C:443:GLU:OE1	2.47	0.47
1:D:226:LEU:O	1:D:252:MET:N	2.47	0.47
1:E:17:TYR:CD2	1:E:52:ALA:HB2	2.49	0.47
1:E:102:ILE:HD11	1:E:130:TYR:CE2	2.44	0.47
1:A:6:TYR:HB2	1:A:66:LEU:CD1	2.45	0.47
1:H:284:HIS:ND1	1:H:288:ASP:OD2	2.41	0.47
1:A:259:GLY:HA3	1:F:259:GLY:HA3	1.97	0.46
1:H:171:TYR:OH	1:H:188:ASP:HA	2.15	0.46
1:B:148:LEU:HD11	1:B:250:TYR:OH	2.16	0.46
1:F:99:ILE:HD13	1:F:102:ILE:HD12	1.97	0.45
1:A:71:GLU:O	1:A:76:ARG:NH1	2.49	0.45
1:C:236:MET:CE	1:C:262:ALA:HB1	2.46	0.45
1:E:99:ILE:HD13	1:E:102:ILE:HD12	1.99	0.45
1:E:304:LEU:C	1:E:304:LEU:HD13	2.36	0.45
1:H:316:THR:O	1:H:317:VAL:HB	2.17	0.45
1:A:304:LEU:C	1:A:304:LEU:HD13	2.37	0.45
1:E:36:THR:HB	1:E:118:ALA:HB3	1.98	0.45
2:G:501:CAP:C	4:G:604:HOH:O	2.64	0.45
1:A:8:ALA:O	1:A:11:ARG:NH2	2.50	0.45
1:B:17:TYR:CD2	1:B:52:ALA:HB2	2.52	0.44
1:D:96:GLU:O	4:D:603:HOH:O	2.21	0.44
1:E:163:LYS:O	1:E:164:LEU:HD23	2.17	0.44
1:F:181:GLY:O	1:F:404:THR:OG1	2.29	0.44
1:C:65:ASN:OD1	1:D:162:PRO:HG3	2.17	0.44
1:C:33:PHE:CD1	1:C:119:LEU:HD11	2.53	0.44
1:C:259:GLY:HA3	1:D:259:GLY:HA3	1.99	0.44
1:D:163:LYS:NZ	2:D:501:CAP:O7	2.51	0.44
1:E:316:THR:O	1:E:317:VAL:HB	2.18	0.44
1:A:171:TYR:OH	1:A:188:ASP:HA	2.18	0.43
1:B:102:ILE:HD11	1:B:130:TYR:HE2	1.82	0.43
1:D:163:LYS:HA	1:D:189:ASP:OD2	2.18	0.43
1:C:171:TYR:OH	1:C:188:ASP:HA	2.18	0.43
1:E:284:HIS:ND1	1:E:288:ASP:OD2	2.44	0.43
1:G:123:ASP:OD1	1:G:124:MET:N	2.50	0.43
1:C:180:ARG:HG2	1:C:400:ARG:CZ	2.49	0.43
1:C:185:THR:HA	1:C:223:GLY:O	2.18	0.43
1:D:448:TRP:HD1	1:D:451:VAL:HG21	1.84	0.43
1:F:171:TYR:OH	1:F:188:ASP:HA	2.19	0.43
1:F:236:MET:CE	1:F:262:ALA:HB1	2.49	0.43
1:B:188:ASP:HB2	1:B:227:ASN:HB2	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:207:VAL:O	1:C:210:ALA:N	2.52	0.43
1:G:188:ASP:HB2	1:G:227:ASN:HB2	2.00	0.43
1:G:65:ASN:OD1	1:H:162:PRO:HG3	2.19	0.43
1:D:178:CYS:HB3	1:D:183:LEU:HD12	2.01	0.42
1:F:282:ALA:O	1:F:283:MET:CB	2.66	0.42
1:H:226:LEU:O	1:H:252:MET:N	2.45	0.42
1:G:267:ARG:HG3	1:G:308:GLY:O	2.19	0.42
1:D:242:PHE:CE2	1:D:246:LEU:HD11	2.54	0.42
1:G:17:TYR:CD2	1:G:52:ALA:HB2	2.54	0.42
1:F:33:PHE:CD1	1:F:119:LEU:HD11	2.55	0.42
1:G:242:PHE:CE2	1:G:246:LEU:HD11	2.54	0.42
1:D:304:LEU:C	1:D:304:LEU:HD13	2.39	0.42
1:H:304:LEU:C	1:H:304:LEU:HD13	2.40	0.42
1:C:282:ALA:O	1:C:283:MET:CB	2.67	0.42
1:F:309:GLY:O	1:F:360:VAL:HG13	2.19	0.42
1:C:34:ARG:NH2	1:C:122:GLU:OE2	2.52	0.42
1:A:112:GLY:N	4:A:607:HOH:O	2.54	0.41
1:B:226:LEU:O	1:B:252:MET:N	2.51	0.41
1:C:162:PRO:HG3	1:D:65:ASN:OD1	2.20	0.41
1:D:141:ILE:HD12	1:D:359:PRO:HB2	2.02	0.41
1:A:287:PHE:CE1	1:A:300:LEU:HD11	2.55	0.41
1:C:159:THR:HG21	1:C:189:ASP:OD1	2.20	0.41
1:G:304:LEU:C	1:G:304:LEU:HD13	2.40	0.41
1:D:267:ARG:HG3	1:D:308:GLY:O	2.20	0.41
1:E:368:ILE:HA	1:E:372:HIS:ND1	2.35	0.41
1:H:164:LEU:HB3	1:H:197:PHE:CZ	2.56	0.41
1:B:162:PRO:HG3	1:E:65:ASN:OD1	2.21	0.41
1:B:287:PHE:CE2	1:B:300:LEU:HD11	2.56	0.41
1:C:102:ILE:HD11	1:C:130:TYR:HE2	1.86	0.41
1:H:141:ILE:HD12	1:H:359:PRO:HB2	2.03	0.41
1:A:96:GLU:OE1	1:A:96:GLU:N	2.45	0.41
1:B:99:ILE:HG13	1:B:307:VAL:HG23	2.02	0.41
1:B:185:THR:HA	1:B:223:GLY:O	2.21	0.41
1:C:304:LEU:C	1:C:304:LEU:HD13	2.41	0.41
1:B:365:SER:HB2	1:B:387:LEU:HD12	2.03	0.41
1:D:164:LEU:HB3	1:D:197:PHE:CZ	2.56	0.41
1:F:96:GLU:OE1	1:F:96:GLU:N	2.49	0.41
1:G:302:LYS:HE2	1:G:334:LEU:HD22	2.03	0.41
1:A:6:TYR:HB2	1:A:66:LEU:HD11	2.03	0.41
1:C:99:ILE:HG21	1:C:260:PHE:CE1	2.56	0.41
1:A:203:ARG:O	1:A:207:VAL:HG23	2.21	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:137:PRO:HA	1:E:138:PRO:HD3	1.97	0.40
1:G:161:LYS:HA	1:G:162:PRO:C	2.42	0.40
1:H:284:HIS:CG	1:H:285:ALA:N	2.89	0.40
1:A:102:ILE:HD11	1:A:130:TYR:CE2	2.55	0.40
1:B:304:LEU:C	1:B:304:LEU:HD13	2.41	0.40
1:A:137:PRO:HA	1:A:138:PRO:HD3	1.97	0.40
1:H:177:GLU:O	1:H:400:ARG:HA	2.21	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	447/457 (98%)	431 (96%)	16 (4%)	0	100	100
1	B	447/457 (98%)	426 (95%)	21 (5%)	0	100	100
1	C	447/457 (98%)	428 (96%)	19 (4%)	0	100	100
1	D	447/457 (98%)	426 (95%)	21 (5%)	0	100	100
1	E	446/457 (98%)	428 (96%)	18 (4%)	0	100	100
1	F	446/457 (98%)	429 (96%)	17 (4%)	0	100	100
1	G	447/457 (98%)	426 (95%)	21 (5%)	0	100	100
1	H	446/457 (98%)	431 (97%)	15 (3%)	0	100	100
All	All	3573/3656 (98%)	3425 (96%)	148 (4%)	0	100	100

There are no Ramachandran outliers to report.

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	359/363 (99%)	355 (99%)	4 (1%)	73	90
1	B	359/363 (99%)	354 (99%)	5 (1%)	67	86
1	C	359/363 (99%)	355 (99%)	4 (1%)	73	90
1	D	359/363 (99%)	354 (99%)	5 (1%)	67	86
1	E	358/363 (99%)	353 (99%)	5 (1%)	67	86
1	F	358/363 (99%)	354 (99%)	4 (1%)	73	90
1	G	359/363 (99%)	356 (99%)	3 (1%)	81	93
1	H	358/363 (99%)	354 (99%)	4 (1%)	73	90
All	All	2869/2904 (99%)	2835 (99%)	34 (1%)	71	88

All (34) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	189	ASP
1	A	267	ARG
1	A	311	HIS
1	A	361	PHE
1	B	138	PRO
1	B	189	ASP
1	B	267	ARG
1	B	311	HIS
1	B	361	PHE
1	C	189	ASP
1	C	267	ARG
1	C	311	HIS
1	C	361	PHE
1	D	64	SER
1	D	189	ASP
1	D	267	ARG
1	D	311	HIS
1	D	361	PHE
1	E	189	ASP
1	E	190	GLU
1	E	267	ARG
1	E	311	HIS
1	E	361	PHE

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Mol	Chain	Res	Type
1	F	189	ASP
1	F	267	ARG
1	F	311	HIS
1	F	361	PHE
1	G	189	ASP
1	G	267	ARG
1	G	311	HIS
1	H	189	ASP
1	H	267	ARG
1	H	311	HIS
1	H	361	PHE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

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
1	KCX	H	187	1,3	9,11,12	1.98	3 (33%)	5,12,14	3.56	1 (20%)
1	KCX	F	187	1,3	9,11,12	1.96	3 (33%)	5,12,14	3.61	1 (20%)
1	KCX	C	187	1,3	9,11,12	1.51	2 (22%)	5,12,14	1.37	1 (20%)
1	KCX	B	187	1,3	9,11,12	1.41	2 (22%)	5,12,14	1.18	1 (20%)
1	KCX	E	187	1,3	9,11,12	2.03	3 (33%)	5,12,14	3.81	1 (20%)
1	KCX	A	187	1,3	9,11,12	1.97	3 (33%)	5,12,14	3.85	1 (20%)
1	KCX	D	187	1,3	9,11,12	2.00	3 (33%)	5,12,14	3.52	1 (20%)
1	KCX	G	187	1,3	9,11,12	1.60	2 (22%)	5,12,14	1.37	1 (20%)

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
1	KCX	H	187	1,3	-	0/9/10/12	-
1	KCX	F	187	1,3	-	0/9/10/12	-
1	KCX	C	187	1,3	-	0/9/10/12	-
1	KCX	B	187	1,3	-	0/9/10/12	-
1	KCX	E	187	1,3	-	0/9/10/12	-
1	KCX	A	187	1,3	-	0/9/10/12	-
1	KCX	D	187	1,3	-	0/9/10/12	-
1	KCX	G	187	1,3	-	0/9/10/12	-

All (21) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	F	187	KCX	OQ1-CX	4.16	1.29	1.21
1	A	187	KCX	OQ1-CX	4.12	1.29	1.21
1	D	187	KCX	OQ1-CX	4.12	1.29	1.21
1	H	187	KCX	OQ1-CX	4.11	1.29	1.21
1	E	187	KCX	OQ1-CX	4.10	1.29	1.21
1	G	187	KCX	CX-NZ	3.79	1.41	1.35
1	H	187	KCX	CX-NZ	3.34	1.41	1.35
1	C	187	KCX	CX-NZ	3.33	1.41	1.35
1	D	187	KCX	CX-NZ	3.33	1.41	1.35
1	B	187	KCX	CX-NZ	3.26	1.40	1.35
1	A	187	KCX	CX-NZ	3.26	1.40	1.35
1	E	187	KCX	CX-NZ	3.22	1.40	1.35
1	F	187	KCX	CX-NZ	3.11	1.40	1.35
1	F	187	KCX	O-C	2.17	1.28	1.19
1	B	187	KCX	O-C	2.16	1.28	1.19
1	A	187	KCX	O-C	2.15	1.28	1.19
1	D	187	KCX	O-C	2.15	1.28	1.19
1	C	187	KCX	O-C	2.14	1.28	1.19
1	G	187	KCX	O-C	2.14	1.28	1.19
1	H	187	KCX	O-C	2.13	1.28	1.19
1	E	187	KCX	O-C	2.12	1.28	1.19

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	187	KCX	OQ1-CX-NZ	-8.54	111.72	124.96

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	E	187	KCX	OQ1-CX-NZ	-8.42	111.90	124.96
1	F	187	KCX	OQ1-CX-NZ	-7.99	112.58	124.96
1	H	187	KCX	OQ1-CX-NZ	-7.91	112.70	124.96
1	D	187	KCX	OQ1-CX-NZ	-7.81	112.86	124.96
1	G	187	KCX	OQ1-CX-NZ	-2.95	120.39	124.96
1	C	187	KCX	OQ1-CX-NZ	-2.88	120.49	124.96
1	B	187	KCX	OQ1-CX-NZ	-2.37	121.28	124.96

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 16 ligands modelled in this entry, 8 are monoatomic - leaving 8 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	CAP	E	501	3	17,20,20	2.09	3 (17%)	22,31,31	1.61	6 (27%)
2	CAP	C	501	3	17,20,20	1.04	0	22,31,31	1.13	1 (4%)
2	CAP	F	501	3	17,20,20	2.18	3 (17%)	22,31,31	1.54	6 (27%)
2	CAP	B	501	3	17,20,20	2.01	2 (11%)	22,31,31	1.49	4 (18%)
2	CAP	G	501	3	17,20,20	1.26	2 (11%)	22,31,31	1.09	0
2	CAP	H	501	3	17,20,20	1.04	0	22,31,31	1.25	2 (9%)
2	CAP	A	501	3	17,20,20	2.20	4 (23%)	22,31,31	1.53	6 (27%)
2	CAP	D	501	3	17,20,20	2.15	2 (11%)	22,31,31	1.55	6 (27%)

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	CAP	E	501	3	-	9/29/29/29	-
2	CAP	C	501	3	-	8/29/29/29	-
2	CAP	F	501	3	-	7/29/29/29	-
2	CAP	B	501	3	-	6/29/29/29	-
2	CAP	G	501	3	-	7/29/29/29	-
2	CAP	H	501	3	-	7/29/29/29	-
2	CAP	A	501	3	-	7/29/29/29	-
2	CAP	D	501	3	-	8/29/29/29	-

All (16) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	501	CAP	P2-O5	5.53	1.78	1.60
2	D	501	CAP	P2-O5	5.48	1.77	1.60
2	F	501	CAP	P2-O5	5.43	1.77	1.60
2	F	501	CAP	P1-O1	5.40	1.77	1.60
2	E	501	CAP	P2-O5	5.28	1.77	1.60
2	D	501	CAP	P1-O1	5.24	1.77	1.60
2	B	501	CAP	P2-O5	5.14	1.76	1.60
2	A	501	CAP	P1-O1	4.92	1.76	1.60
2	E	501	CAP	P1-O1	4.88	1.75	1.60
2	B	501	CAP	P1-O1	4.78	1.75	1.60
2	A	501	CAP	C4-C3	2.48	1.56	1.54
2	G	501	CAP	O6-C	2.33	1.29	1.22
2	F	501	CAP	C4-C3	2.24	1.56	1.54
2	A	501	CAP	C5-C4	2.22	1.54	1.51
2	G	501	CAP	C4-C3	-2.17	1.51	1.54
2	E	501	CAP	C4-C3	2.01	1.55	1.54

All (31) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	E	501	CAP	O6P-P2-O5	-3.21	98.19	106.73
2	F	501	CAP	O6P-P2-O5	-3.02	98.71	106.73
2	A	501	CAP	O2P-P1-O1	-2.95	98.88	106.73
2	D	501	CAP	O5-P2-O4P	-2.91	98.30	106.47
2	E	501	CAP	O2P-P1-O1	-2.83	99.19	106.73

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	F	501	CAP	O1-P1-O1P	-2.81	98.58	106.47
2	D	501	CAP	O2P-P1-O1	-2.80	99.28	106.73
2	B	501	CAP	O1-P1-O1P	-2.76	98.72	106.47
2	A	501	CAP	O5-P2-O4P	-2.74	98.78	106.47
2	D	501	CAP	O4-C4-C3	2.56	113.90	108.78
2	E	501	CAP	P2-O5-C5	-2.51	111.38	118.30
2	H	501	CAP	O5P-P2-O5	-2.50	100.08	106.73
2	B	501	CAP	O5-P2-O4P	-2.46	99.57	106.47
2	D	501	CAP	P2-O5-C5	-2.44	111.57	118.30
2	B	501	CAP	O4-C4-C3	2.39	113.55	108.78
2	E	501	CAP	P1-O1-C1	-2.37	111.76	118.30
2	E	501	CAP	O4-C4-C3	2.35	113.48	108.78
2	F	501	CAP	O4-C4-C3	2.35	113.47	108.78
2	F	501	CAP	P2-O5-C5	-2.31	111.93	118.30
2	A	501	CAP	O4-C4-C3	2.27	113.31	108.78
2	A	501	CAP	O6P-P2-O5P	2.21	116.08	107.64
2	B	501	CAP	O6P-P2-O5P	2.19	115.99	107.64
2	D	501	CAP	O6P-P2-O5P	2.17	115.92	107.64
2	E	501	CAP	O6P-P2-O5P	2.14	115.83	107.64
2	H	501	CAP	O3P-P1-O2P	2.12	115.74	107.64
2	F	501	CAP	O6P-P2-O5P	2.10	115.68	107.64
2	F	501	CAP	P1-O1-C1	-2.09	112.53	118.30
2	A	501	CAP	P1-O1-C1	-2.09	112.54	118.30
2	D	501	CAP	P1-O1-C1	-2.09	112.55	118.30
2	A	501	CAP	P2-O5-C5	-2.05	112.65	118.30
2	C	501	CAP	C2-C3-C4	2.02	118.12	114.00

There are no chirality outliers.

All (59) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	501	CAP	O1-C1-C2-O2
2	A	501	CAP	O6-C-C2-C1
2	A	501	CAP	O7-C-C2-C1
2	A	501	CAP	O6-C-C2-O2
2	A	501	CAP	O7-C-C2-O2
2	A	501	CAP	O3-C3-C4-O4
2	B	501	CAP	O6-C-C2-C1
2	B	501	CAP	O7-C-C2-C1
2	B	501	CAP	O6-C-C2-O2
2	B	501	CAP	O7-C-C2-O2
2	B	501	CAP	O3-C3-C4-O4

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Mol	Chain	Res	Type	Atoms
2	C	501	CAP	O6-C-C2-C3
2	C	501	CAP	O7-C-C2-C3
2	C	501	CAP	O6-C-C2-O2
2	C	501	CAP	O7-C-C2-O2
2	D	501	CAP	O6-C-C2-C1
2	D	501	CAP	O6-C-C2-C3
2	D	501	CAP	O6-C-C2-O2
2	D	501	CAP	O7-C-C2-O2
2	D	501	CAP	O3-C3-C4-O4
2	E	501	CAP	O1-C1-C2-C
2	E	501	CAP	O1-C1-C2-O2
2	E	501	CAP	O6-C-C2-C1
2	E	501	CAP	O7-C-C2-C1
2	E	501	CAP	O6-C-C2-O2
2	E	501	CAP	O7-C-C2-O2
2	E	501	CAP	O3-C3-C4-O4
2	F	501	CAP	O6-C-C2-C1
2	F	501	CAP	O7-C-C2-C1
2	F	501	CAP	O6-C-C2-O2
2	F	501	CAP	O7-C-C2-O2
2	F	501	CAP	O3-C3-C4-O4
2	G	501	CAP	O6-C-C2-C1
2	G	501	CAP	O7-C-C2-C1
2	G	501	CAP	O6-C-C2-O2
2	G	501	CAP	O7-C-C2-O2
2	G	501	CAP	O3-C3-C4-O4
2	H	501	CAP	O6-C-C2-C1
2	H	501	CAP	O7-C-C2-C1
2	H	501	CAP	O6-C-C2-O2
2	H	501	CAP	O7-C-C2-O2
2	H	501	CAP	O3-C3-C4-O4
2	C	501	CAP	O6-C-C2-C1
2	C	501	CAP	O7-C-C2-C1
2	D	501	CAP	O7-C-C2-C1
2	A	501	CAP	O2-C2-C3-C4
2	B	501	CAP	O2-C2-C3-C4
2	C	501	CAP	O2-C2-C3-C4
2	D	501	CAP	O2-C2-C3-C4
2	E	501	CAP	O2-C2-C3-C4
2	F	501	CAP	O2-C2-C3-C4
2	G	501	CAP	O2-C2-C3-C4
2	H	501	CAP	O2-C2-C3-C4

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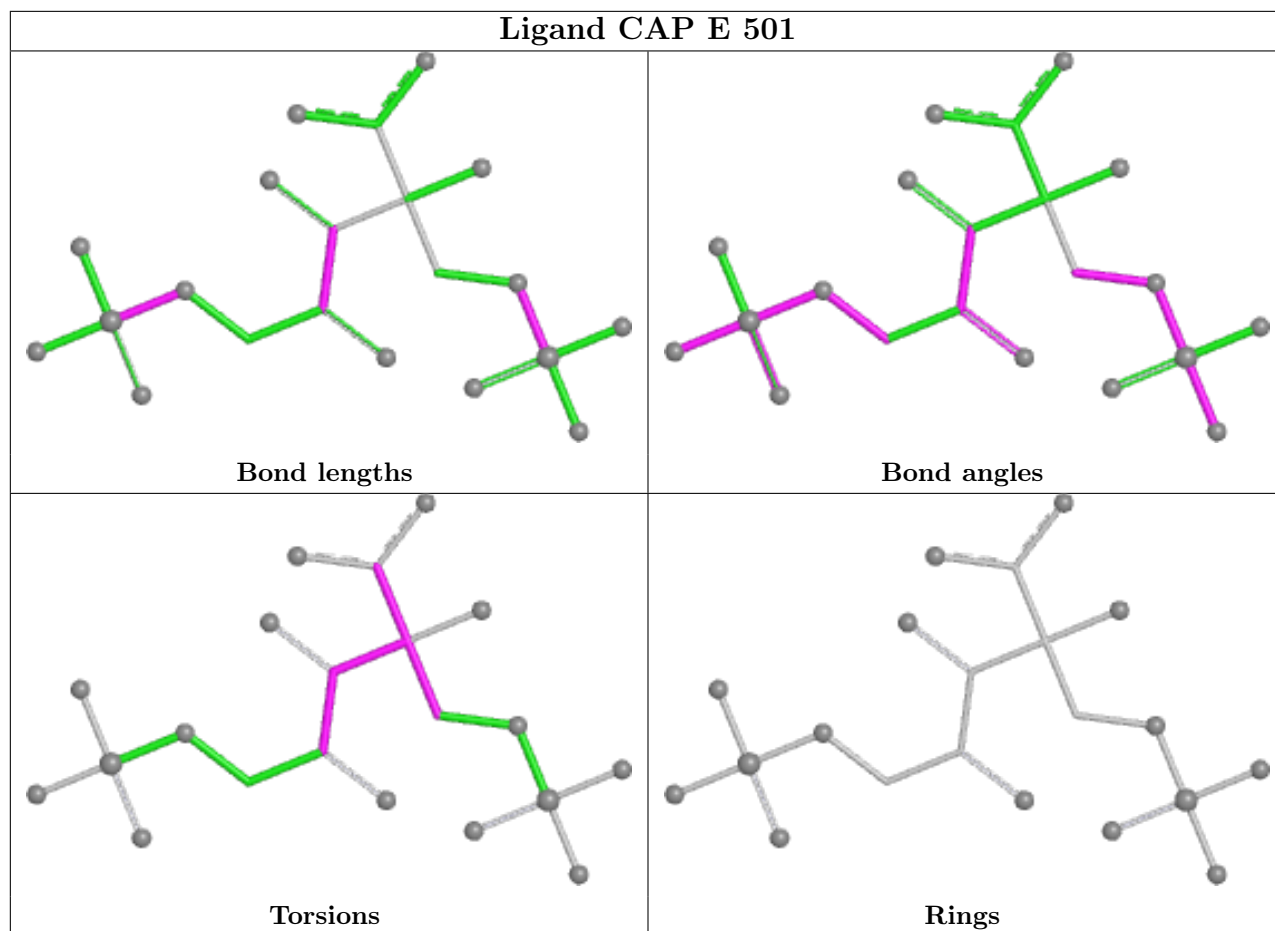
Mol	Chain	Res	Type	Atoms
2	H	501	CAP	C2-C3-C4-O4
2	F	501	CAP	C2-C3-C4-O4
2	G	501	CAP	C2-C3-C4-O4
2	D	501	CAP	O7-C-C2-C3
2	C	501	CAP	O3-C3-C4-O4
2	E	501	CAP	C2-C3-C4-O4

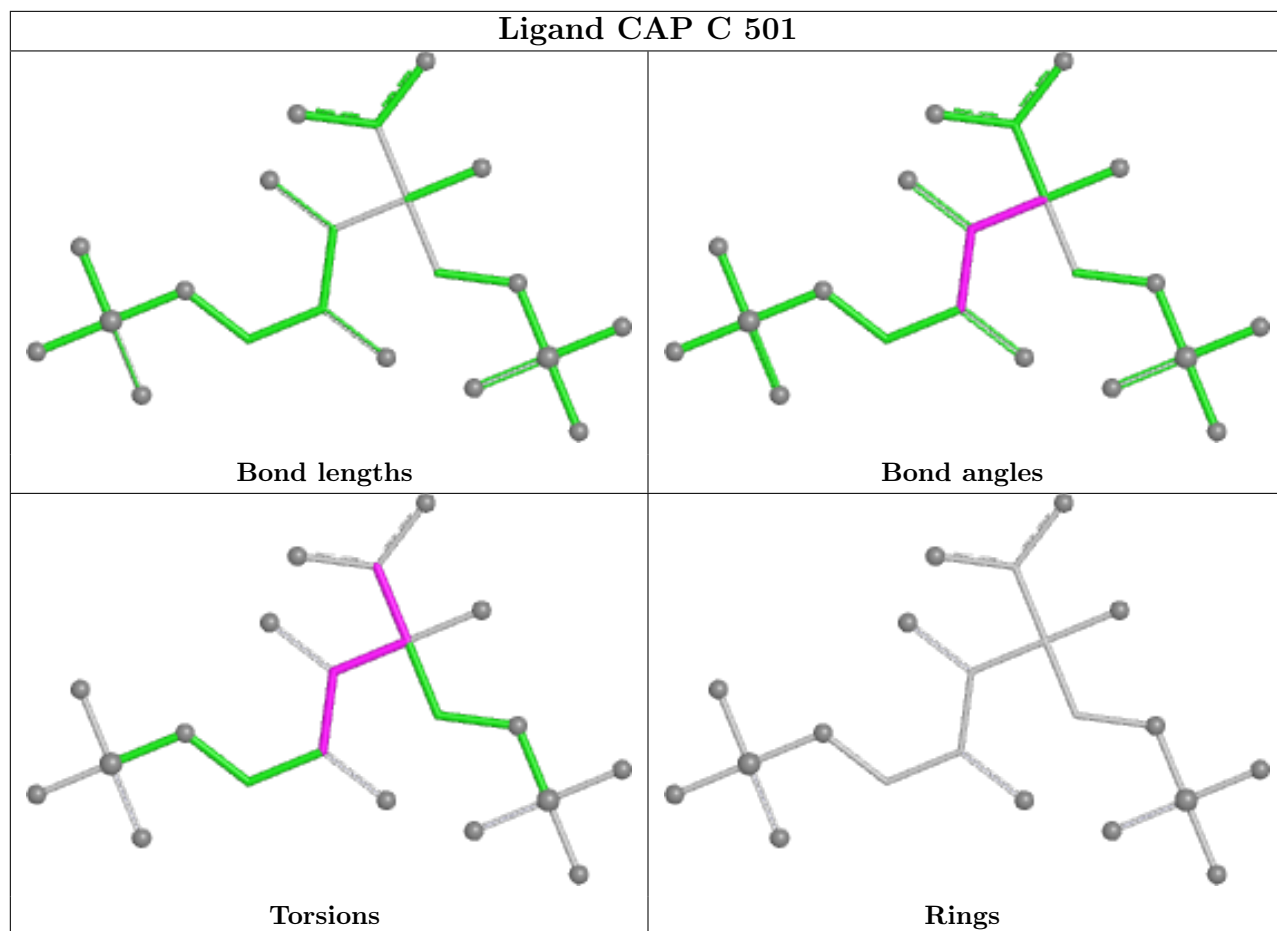
There are no ring outliers.

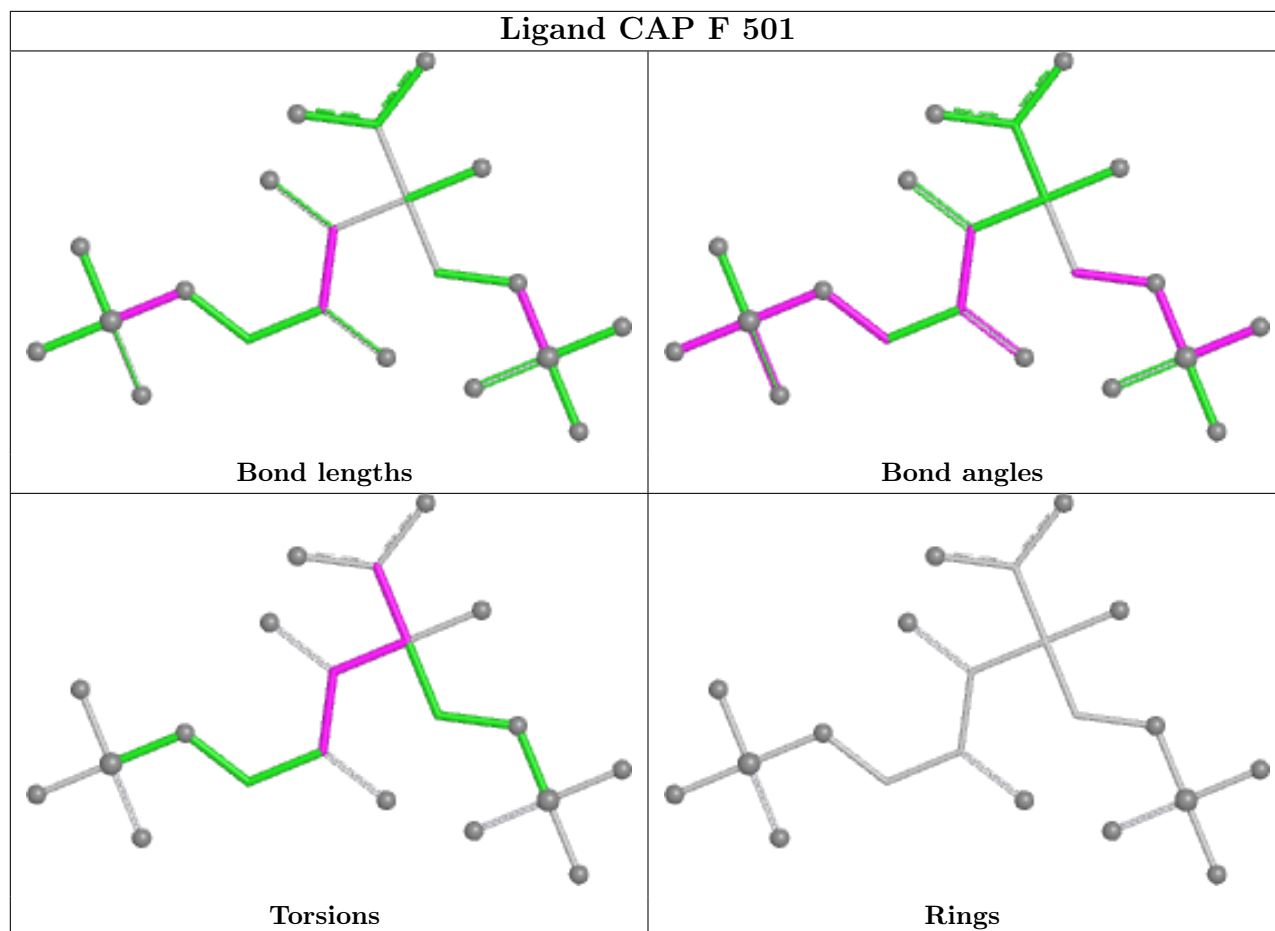
2 monomers are involved in 3 short contacts:

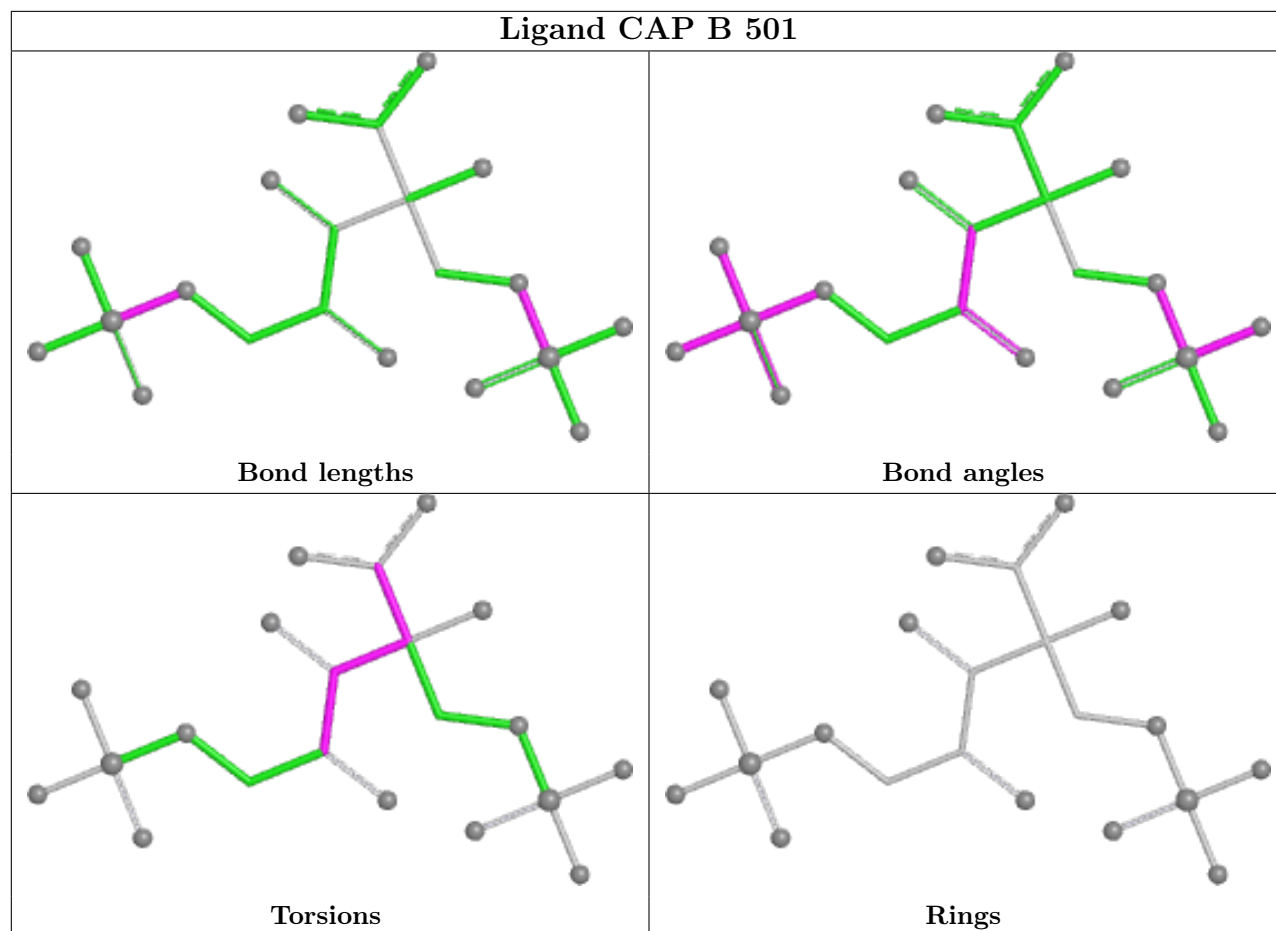
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	G	501	CAP	1	0
2	D	501	CAP	2	0

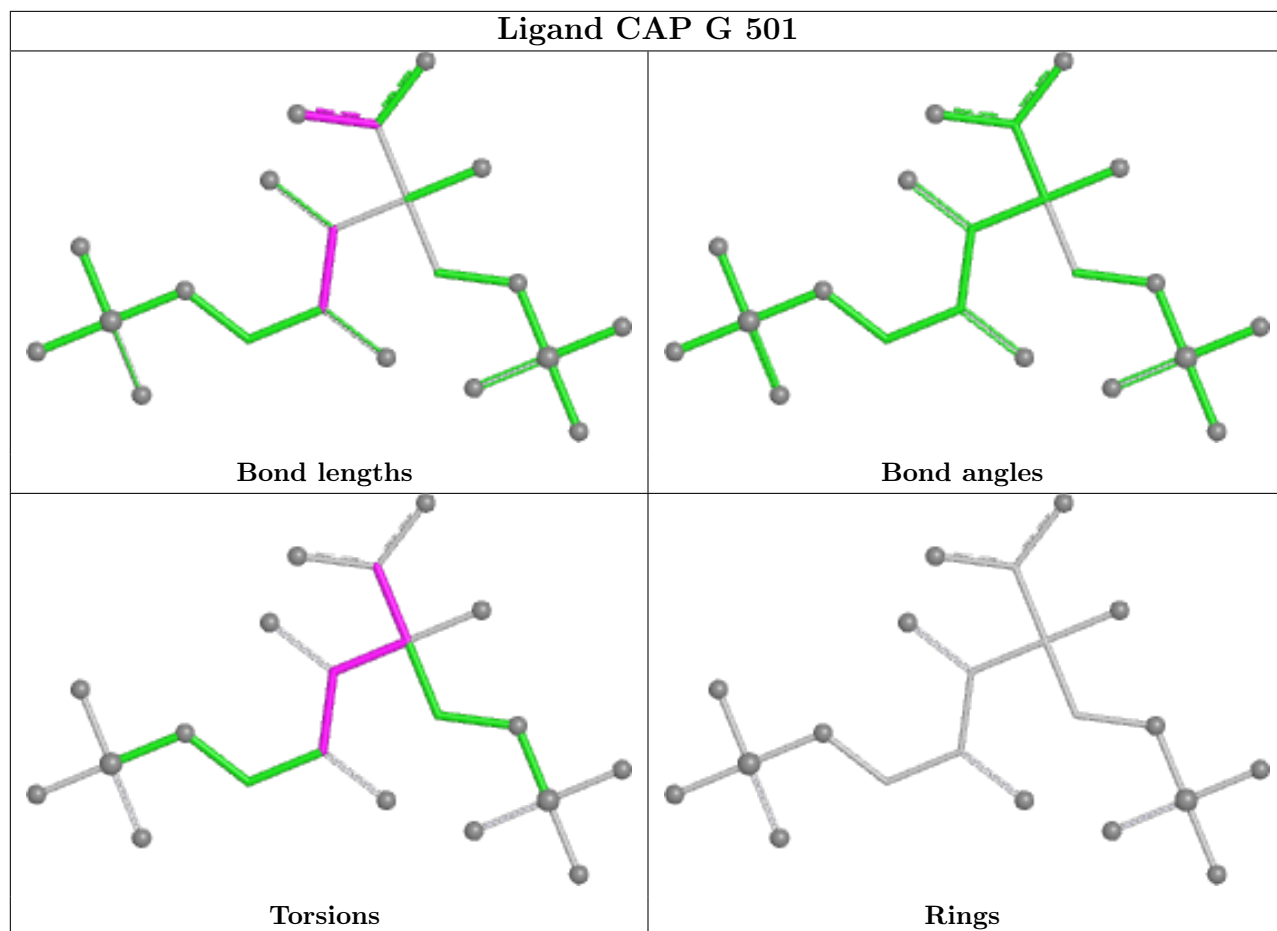
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

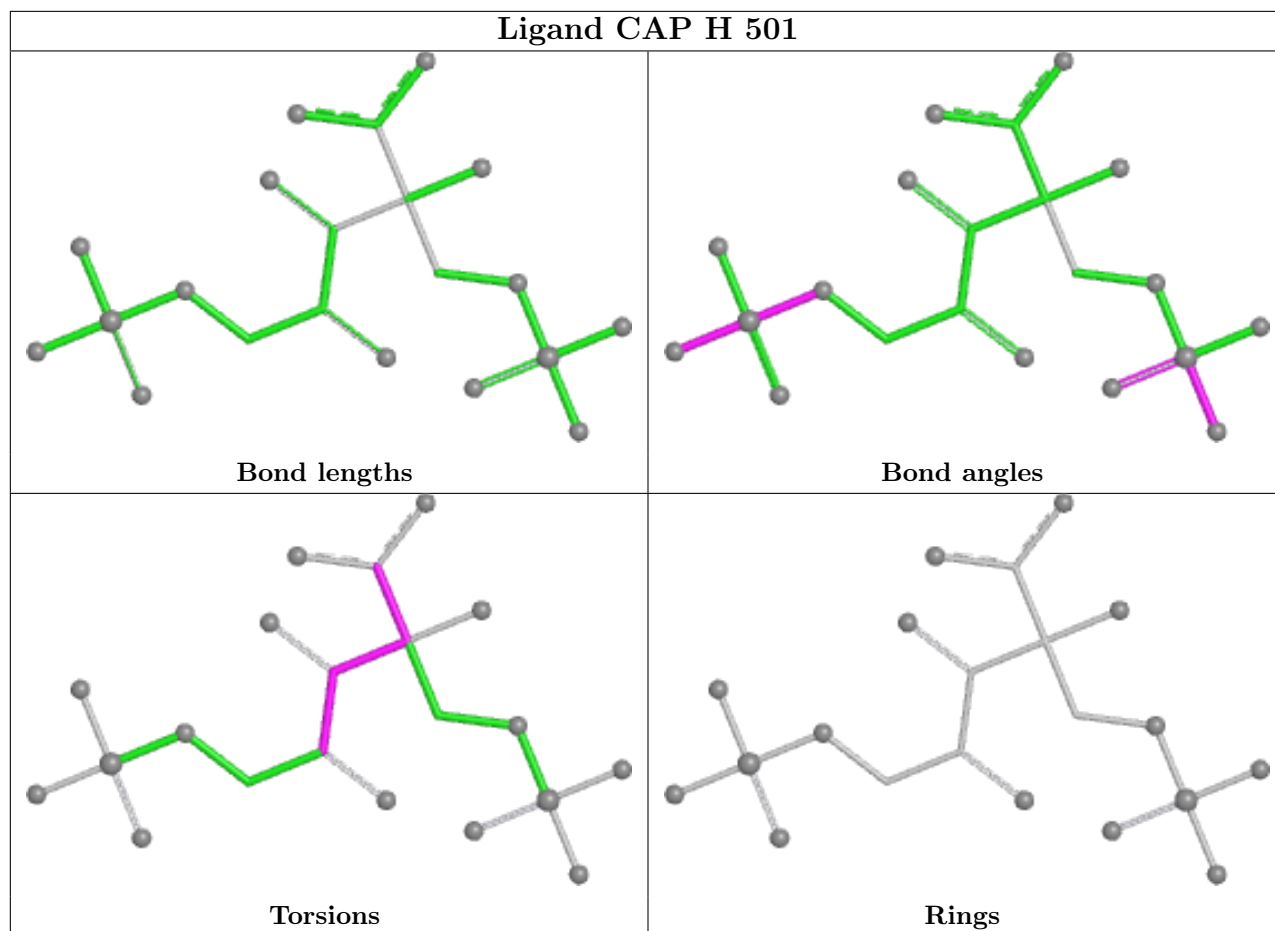


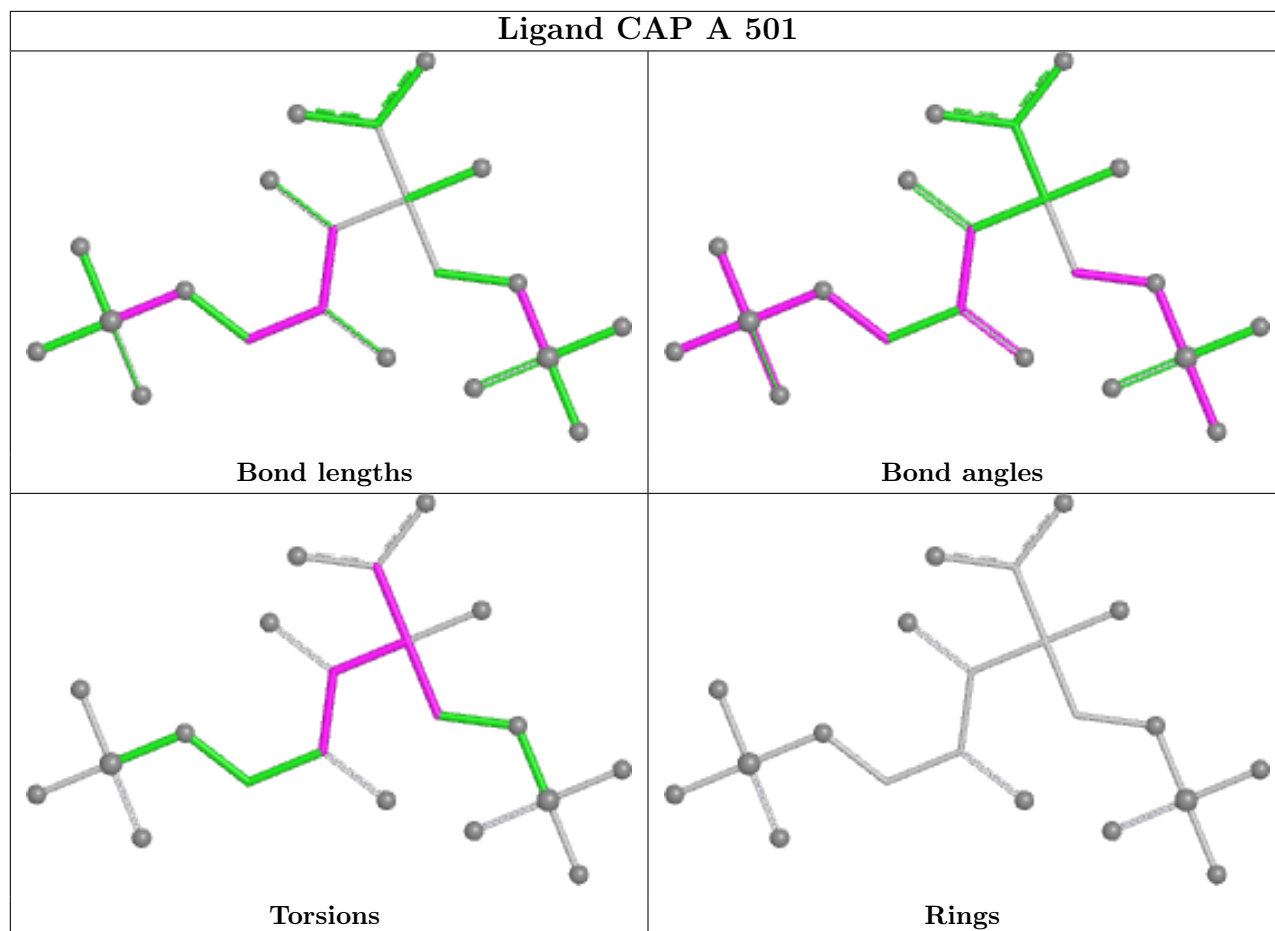


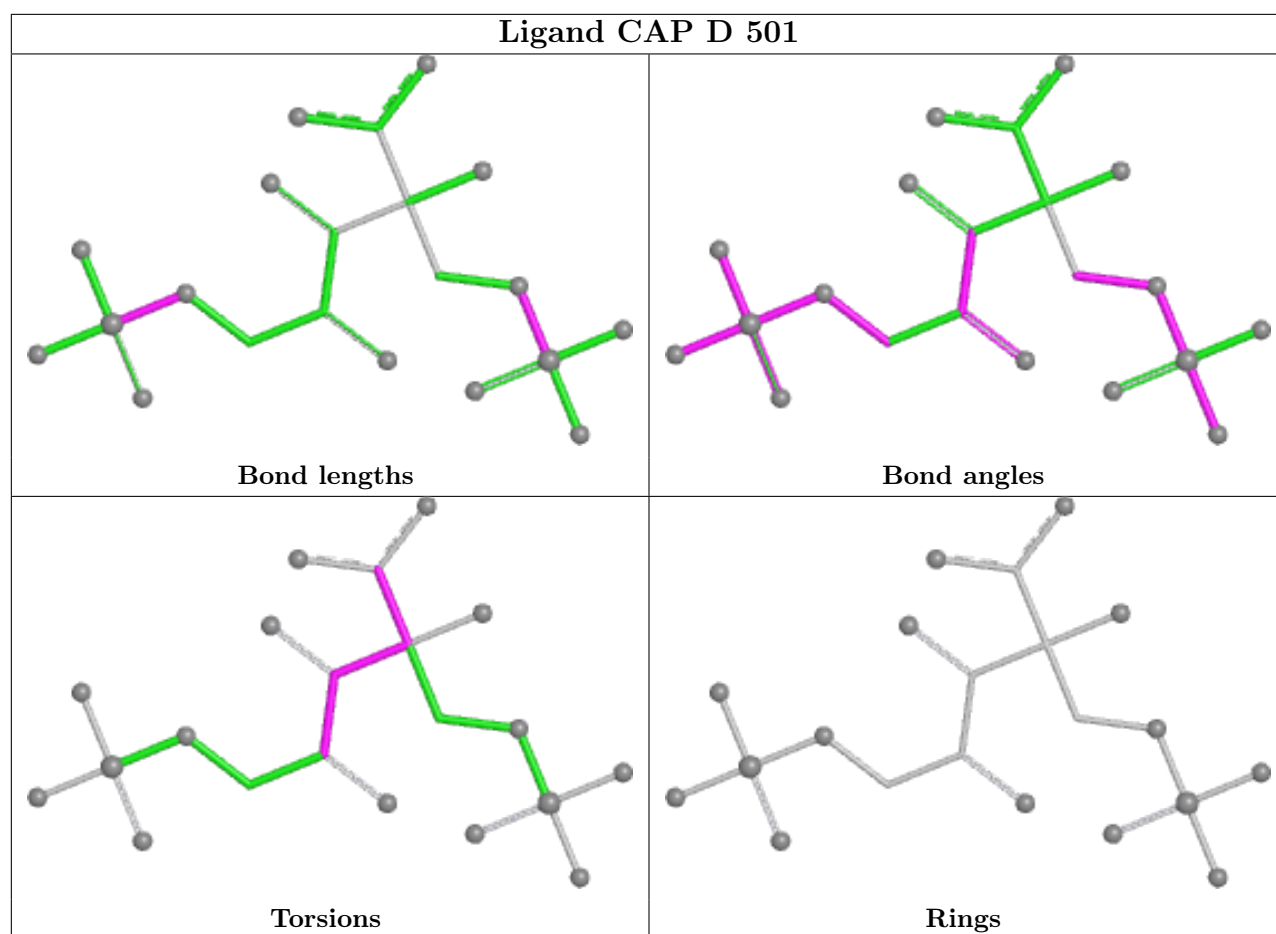












5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 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	449/457 (98%)	0.38	33 (7%) 15 13	19, 29, 49, 91	0
1	B	449/457 (98%)	0.34	26 (5%) 23 22	20, 27, 46, 101	0
1	C	449/457 (98%)	0.30	20 (4%) 33 31	20, 27, 46, 96	0
1	D	449/457 (98%)	0.50	34 (7%) 13 12	20, 29, 52, 106	0
1	E	448/457 (98%)	0.33	27 (6%) 21 20	19, 28, 49, 86	0
1	F	448/457 (98%)	0.43	26 (5%) 23 22	20, 30, 55, 108	0
1	G	449/457 (98%)	0.44	26 (5%) 23 22	20, 32, 55, 84	0
1	H	448/457 (98%)	0.45	38 (8%) 10 9	20, 33, 59, 105	0
All	All	3589/3656 (98%)	0.40	230 (6%) 19 18	19, 29, 52, 108	0

All (230) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	455	VAL	8.0
1	F	452	LYS	7.7
1	G	455	VAL	6.6
1	D	450	ASP	6.5
1	F	436	ARG	5.9
1	A	40	GLY	5.7
1	H	436	ARG	5.7
1	A	455	VAL	5.3
1	C	454	GLU	4.8
1	D	436	ARG	4.8
1	F	428	ARG	4.7
1	H	452	LYS	4.7
1	E	436	ARG	4.6
1	F	450	ASP	4.5
1	A	450	ASP	4.4
1	D	455	VAL	4.4

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Mol	Chain	Res	Type	RSRZ
1	F	6	TYR	4.4
1	A	6	TYR	4.3
1	G	436	ARG	4.3
1	H	450	ASP	4.3
1	C	216	ALA	4.2
1	H	454	GLU	4.1
1	G	450	ASP	4.1
1	D	434	ALA	4.0
1	B	452	LYS	3.9
1	F	446	GLU	3.9
1	D	11	ARG	3.8
1	A	428	ARG	3.7
1	D	429	GLU	3.7
1	F	437	SER	3.7
1	C	217	GLU	3.7
1	H	14	ARG	3.6
1	B	454	GLU	3.6
1	D	454	GLU	3.6
1	B	450	ASP	3.6
1	H	451	VAL	3.6
1	H	453	PHE	3.5
1	E	68	THR	3.4
1	D	415	GLN	3.4
1	A	436	ARG	3.3
1	G	66	LEU	3.3
1	A	7	GLU	3.3
1	E	437	SER	3.3
1	A	451	VAL	3.3
1	E	428	ARG	3.3
1	E	14	ARG	3.2
1	B	415	GLN	3.2
1	F	454	GLU	3.2
1	A	397	ARG	3.2
1	E	7	GLU	3.2
1	D	394	GLY	3.2
1	B	7	GLU	3.1
1	D	217	GLU	3.1
1	B	451	VAL	3.1
1	G	14	ARG	3.1
1	H	216	ALA	3.1
1	E	452	LYS	3.1
1	G	41	VAL	3.1

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Mol	Chain	Res	Type	RSRZ
1	B	429	GLU	3.1
1	E	454	GLU	3.1
1	A	437	SER	3.1
1	A	217	GLU	3.1
1	F	430	ILE	3.1
1	A	173	ARG	3.1
1	F	344	PRO	3.1
1	B	344	PRO	3.0
1	C	455	VAL	3.0
1	G	449	GLY	3.0
1	B	69	ASP	2.9
1	E	442	ARG	2.9
1	A	454	GLU	2.9
1	F	419	GLU	2.9
1	D	452	LYS	2.9
1	G	180	ARG	2.9
1	E	149	ASN	2.9
1	H	415	GLN	2.9
1	E	21	ASP	2.8
1	G	415	GLN	2.8
1	E	6	TYR	2.8
1	C	420	GLY	2.8
1	G	429	GLU	2.8
1	C	66	LEU	2.8
1	B	425	ALA	2.8
1	B	23	GLU	2.7
1	C	23	GLU	2.7
1	E	450	ASP	2.7
1	G	420	GLY	2.7
1	D	453	PHE	2.7
1	A	23	GLU	2.7
1	H	387	LEU	2.7
1	C	11	ARG	2.7
1	F	216	ALA	2.7
1	B	82	GLY	2.7
1	G	117	GLN	2.7
1	E	429	GLU	2.7
1	G	428	ARG	2.7
1	D	423	ILE	2.6
1	E	72	ARG	2.6
1	E	11	ARG	2.6
1	G	40	GLY	2.6

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Mol	Chain	Res	Type	RSRZ
1	D	23	GLU	2.6
1	D	185	THR	2.6
1	F	434	ALA	2.6
1	A	158	GLY	2.6
1	H	23	GLU	2.6
1	C	421	ARG	2.6
1	G	6	TYR	2.6
1	D	397	ARG	2.6
1	D	419	GLU	2.5
1	F	433	GLU	2.5
1	D	40	GLY	2.5
1	C	64	SER	2.5
1	H	437	SER	2.5
1	D	433	GLU	2.5
1	F	429	GLU	2.5
1	A	66	LEU	2.5
1	C	67	LEU	2.5
1	C	436	ARG	2.5
1	H	439	PRO	2.5
1	E	416	ALA	2.5
1	H	16	THR	2.5
1	C	429	GLU	2.5
1	A	387	LEU	2.5
1	D	451	VAL	2.5
1	D	21	ASP	2.5
1	G	7	GLU	2.4
1	H	419	GLU	2.4
1	B	342	ALA	2.4
1	C	68	THR	2.4
1	E	419	GLU	2.4
1	B	40	GLY	2.4
1	B	11	ARG	2.4
1	B	21	ASP	2.4
1	D	216	ALA	2.4
1	C	80	ILE	2.4
1	D	420	GLY	2.4
1	H	449	GLY	2.4
1	F	159	THR	2.4
1	D	9	GLY	2.4
1	E	451	VAL	2.4
1	E	415	GLN	2.4
1	A	16	THR	2.4

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Mol	Chain	Res	Type	RSRZ
1	B	66	LEU	2.4
1	A	15	GLU	2.4
1	H	422	ASP	2.3
1	D	442	ARG	2.3
1	H	435	ALA	2.3
1	F	426	GLU	2.3
1	A	415	GLN	2.3
1	H	6	TYR	2.3
1	H	42	PRO	2.3
1	D	7	GLU	2.3
1	D	156	LEU	2.3
1	F	431	LEU	2.3
1	G	21	ASP	2.3
1	A	12	PRO	2.3
1	F	364	ALA	2.3
1	B	81	GLU	2.3
1	H	442	ARG	2.3
1	G	118	ALA	2.3
1	E	435	ALA	2.2
1	D	387	LEU	2.2
1	H	418	ASN	2.2
1	B	6	TYR	2.2
1	E	157	GLY	2.2
1	F	451	VAL	2.2
1	H	69	ASP	2.2
1	H	429	GLU	2.2
1	A	11	ARG	2.2
1	G	176	TYR	2.2
1	B	428	ARG	2.2
1	F	7	GLU	2.2
1	F	23	GLU	2.2
1	D	391	GLY	2.2
1	H	176	TYR	2.2
1	C	7	GLU	2.2
1	E	387	LEU	2.2
1	G	454	GLU	2.2
1	H	117	GLN	2.2
1	D	343	ASP	2.2
1	C	233	THR	2.2
1	D	421	ARG	2.2
1	E	212	ARG	2.2
1	H	446	GLU	2.1

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Mol	Chain	Res	Type	RSRZ
1	D	344	PRO	2.1
1	D	8	ALA	2.1
1	H	15	GLU	2.1
1	H	432	GLU	2.1
1	A	21	ASP	2.1
1	A	39	PRO	2.1
1	E	82	GLY	2.1
1	H	11	ARG	2.1
1	H	212	ARG	2.1
1	A	419	GLU	2.1
1	H	81	GLU	2.1
1	B	387	LEU	2.1
1	A	14	ARG	2.1
1	B	39	PRO	2.1
1	H	344	PRO	2.1
1	H	397	ARG	2.1
1	A	68	THR	2.1
1	A	186	THR	2.1
1	A	157	GLY	2.1
1	H	428	ARG	2.1
1	A	446	GLU	2.1
1	G	452	LYS	2.1
1	F	439	PRO	2.1
1	H	215	GLU	2.1
1	F	149	ASN	2.1
1	E	397	ARG	2.1
1	G	217	GLU	2.1
1	C	6	TYR	2.1
1	G	423	ILE	2.1
1	E	425	ALA	2.1
1	C	418	ASN	2.1
1	G	157	GLY	2.1
1	H	21	ASP	2.1
1	B	423	ILE	2.1
1	C	452	LYS	2.1
1	A	422	ASP	2.1
1	A	318	VAL	2.0
1	B	430	ILE	2.0
1	G	212	ARG	2.0
1	H	434	ALA	2.0
1	B	392	THR	2.0
1	A	213	LYS	2.0

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Mol	Chain	Res	Type	RSRZ
1	D	69	ASP	2.0
1	F	117	GLN	2.0
1	G	434	ALA	2.0
1	F	66	LEU	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [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
1	KCX	B	187	12/13	0.89	0.25	18,21,24,27	0
1	KCX	G	187	12/13	0.90	0.23	19,22,28,33	0
1	KCX	H	187	12/13	0.91	0.25	23,25,29,31	0
1	KCX	D	187	12/13	0.92	0.22	18,22,25,28	0
1	KCX	F	187	12/13	0.93	0.21	20,23,27,28	0
1	KCX	C	187	12/13	0.95	0.24	19,23,27,28	0
1	KCX	A	187	12/13	0.95	0.30	22,24,25,25	0
1	KCX	E	187	12/13	0.95	0.24	20,22,24,26	0

6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

6.4 Ligands [i](#)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
3	MG	D	502	1/1	0.79	0.12	24,24,24,24	0
3	MG	C	502	1/1	0.80	0.08	26,26,26,26	0
3	MG	G	502	1/1	0.80	0.13	43,43,43,43	0
3	MG	H	502	1/1	0.85	0.10	29,29,29,29	0
3	MG	E	502	1/1	0.88	0.13	26,26,26,26	0
3	MG	A	502	1/1	0.92	0.09	34,34,34,34	0

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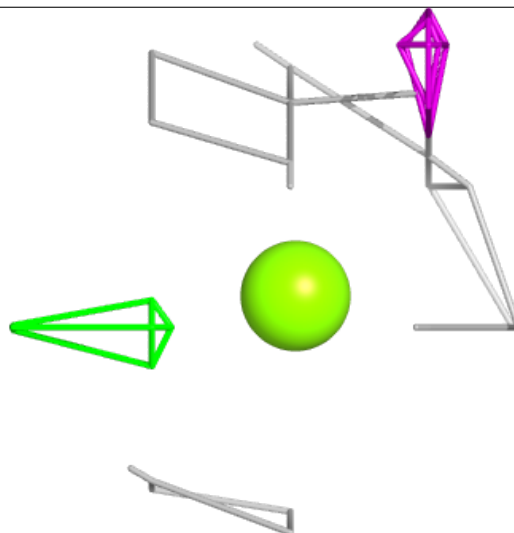
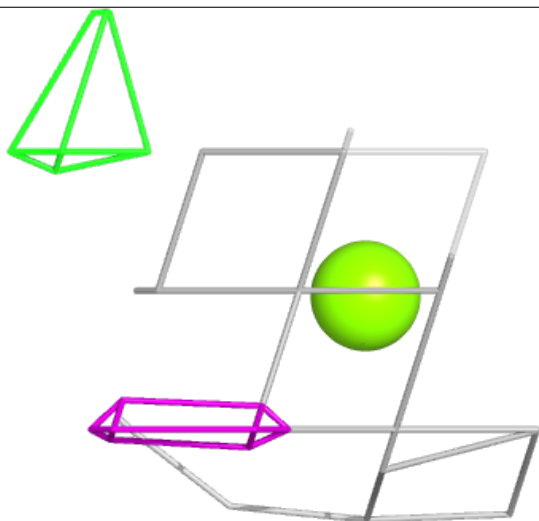
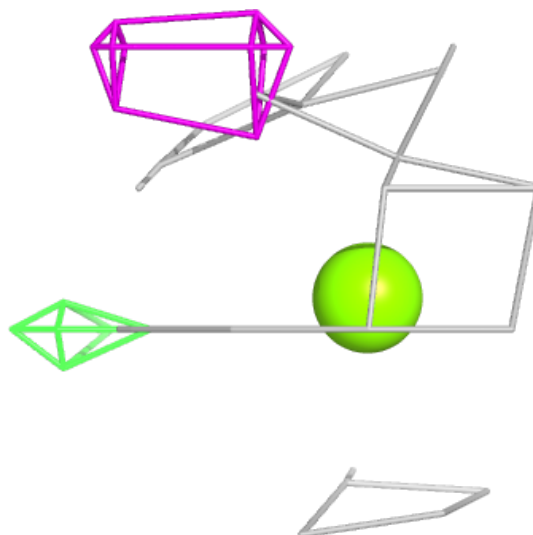
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
2	CAP	C	501	21/21	0.92	0.18	21,25,30,32	0
2	CAP	G	501	21/21	0.92	0.18	25,29,34,36	0
2	CAP	F	501	21/21	0.93	0.21	23,28,32,33	0
3	MG	B	502	1/1	0.94	0.12	21,21,21,21	0
2	CAP	E	501	21/21	0.95	0.17	23,27,32,38	0
2	CAP	H	501	21/21	0.95	0.15	27,32,38,41	0
2	CAP	A	501	21/21	0.95	0.16	21,25,29,33	0
2	CAP	B	501	21/21	0.96	0.19	21,23,25,31	0
2	CAP	D	501	21/21	0.97	0.15	20,24,30,36	0
3	MG	F	502	1/1	0.97	0.15	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.

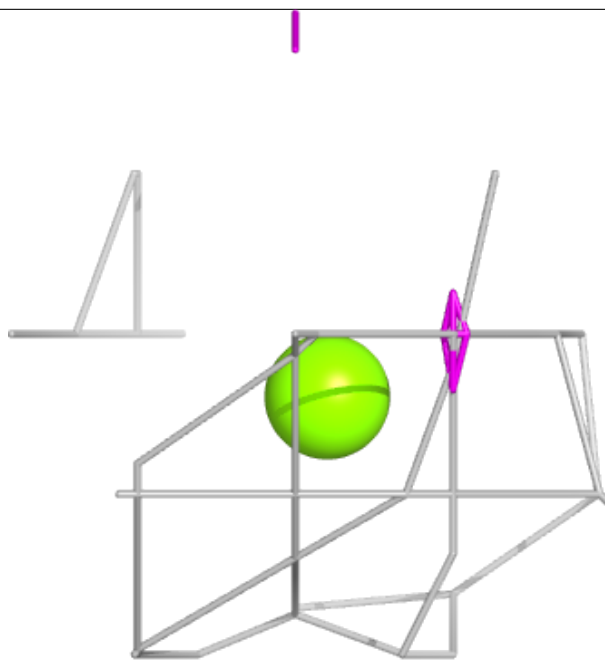
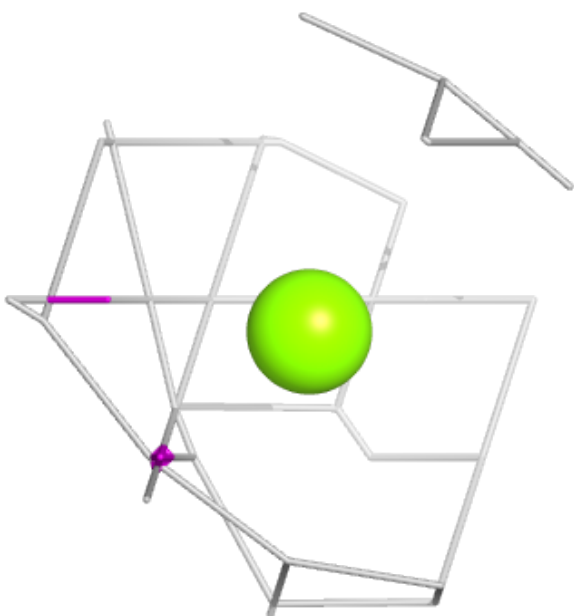
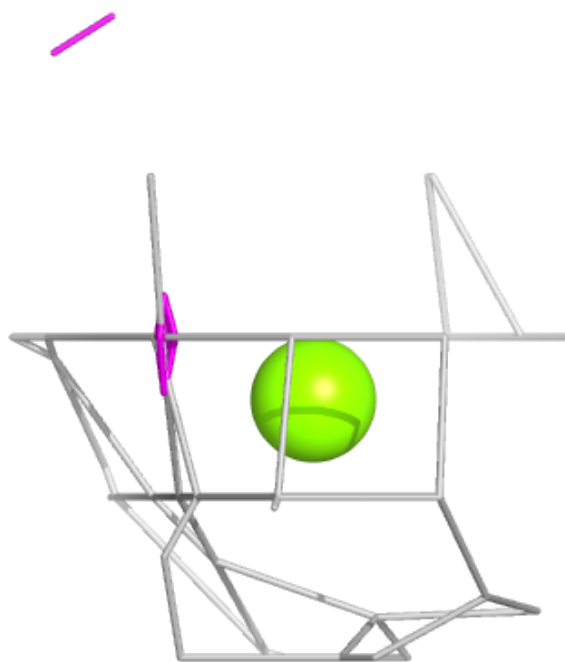
Electron density around MG D 502:

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



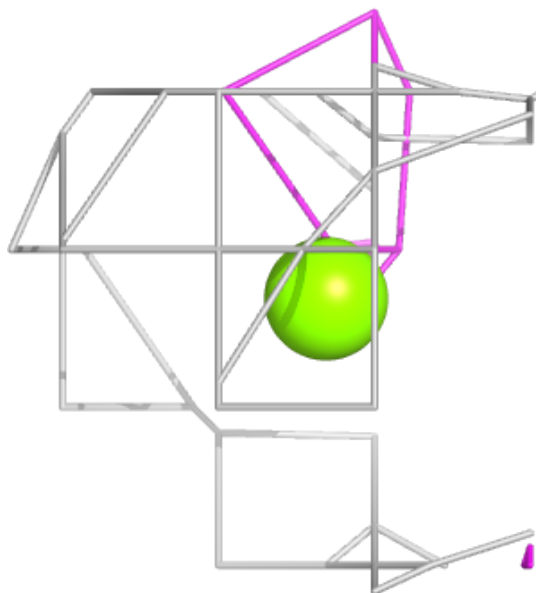
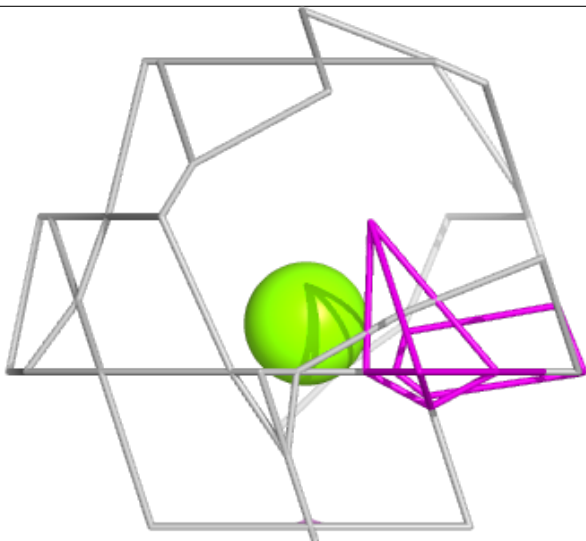
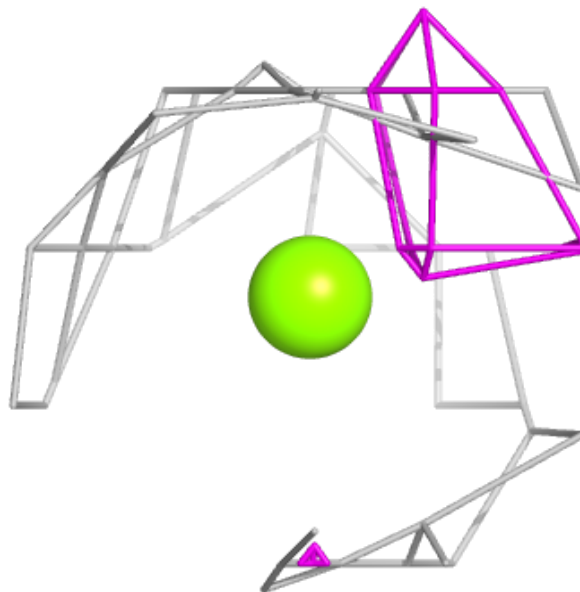
Electron density around MG C 502:

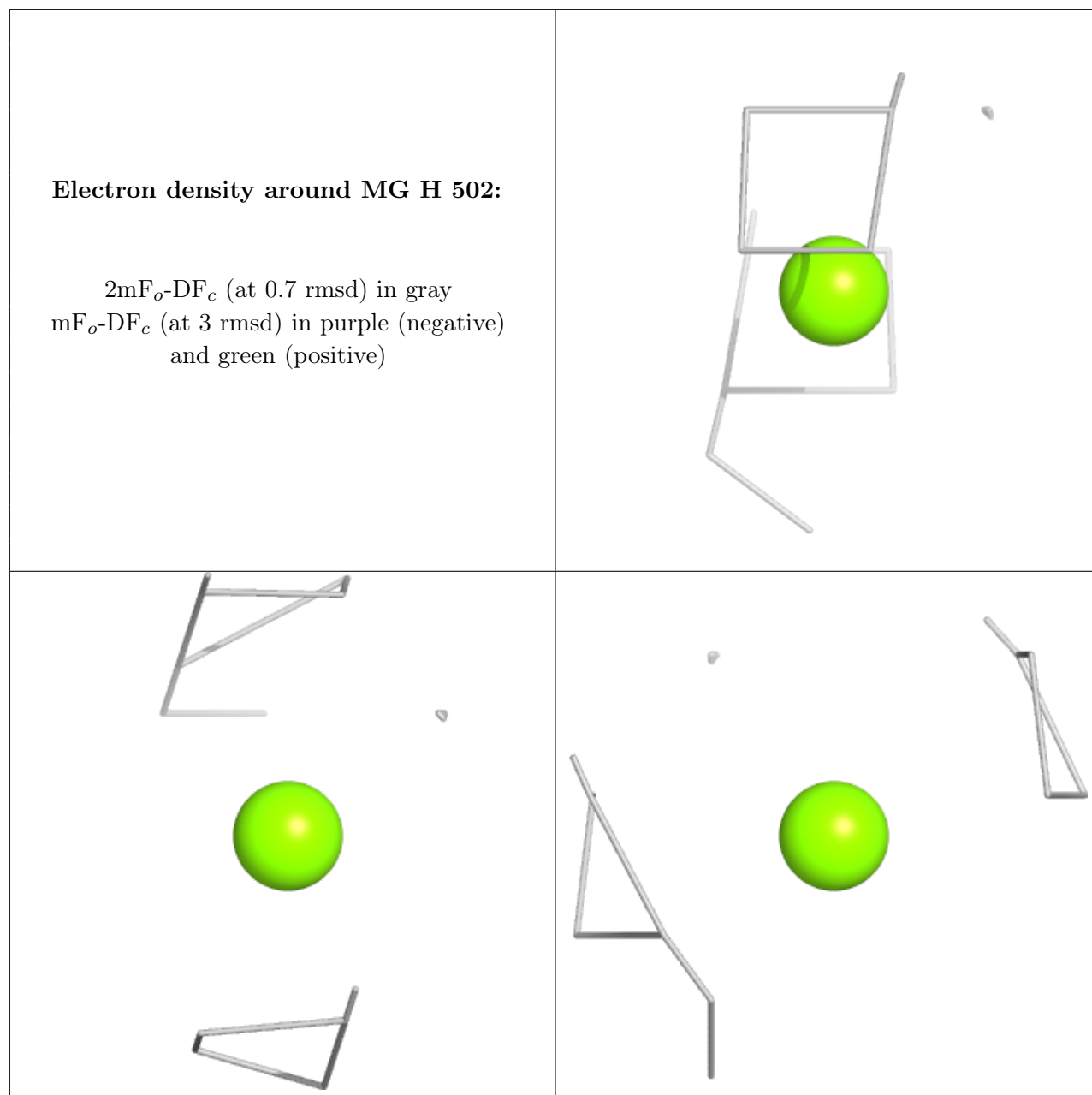
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around MG G 502:

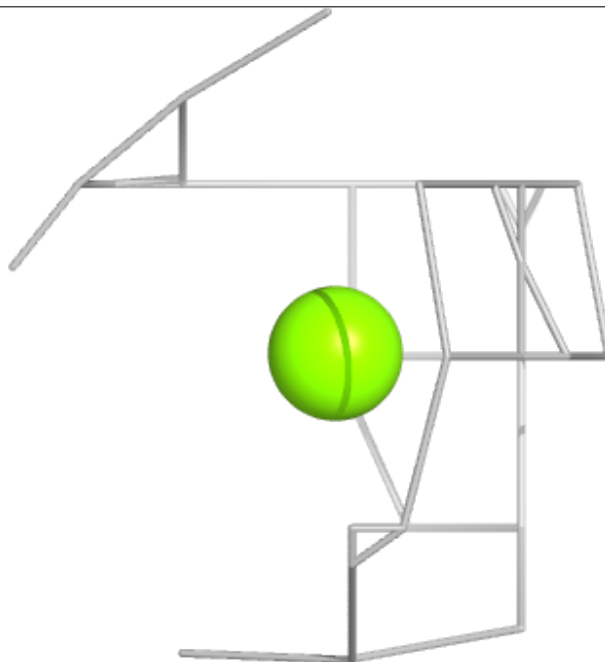
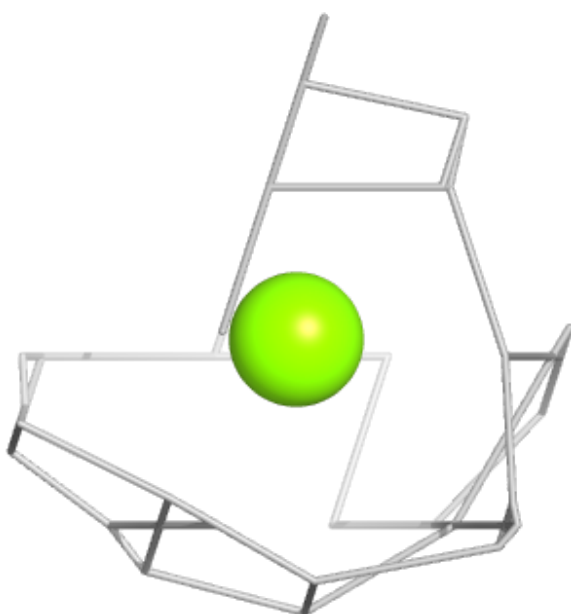
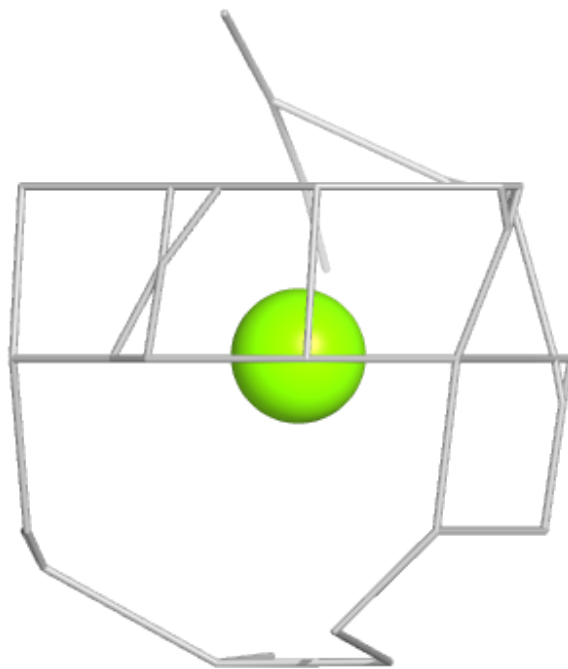
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)





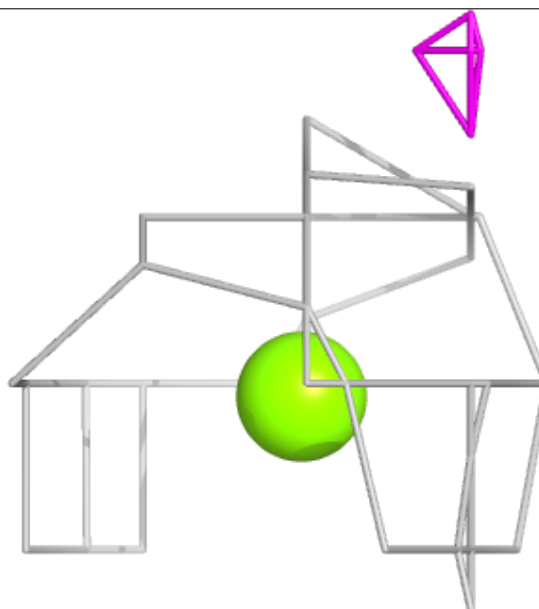
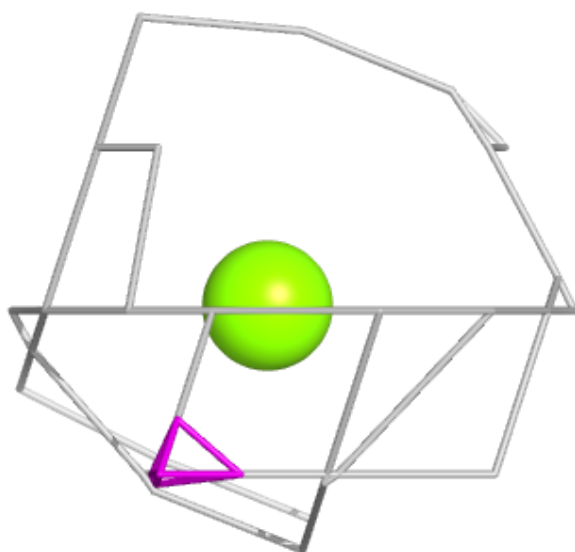
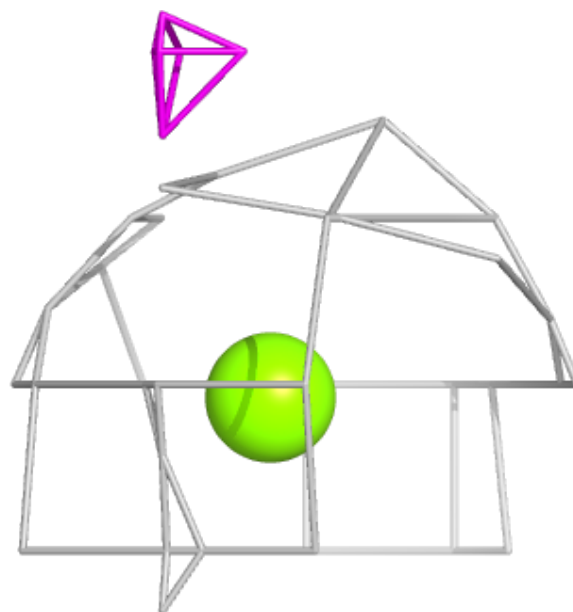
Electron density around MG E 502:

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



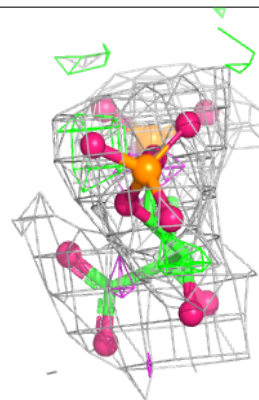
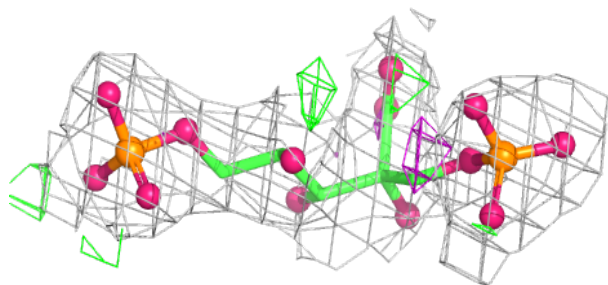
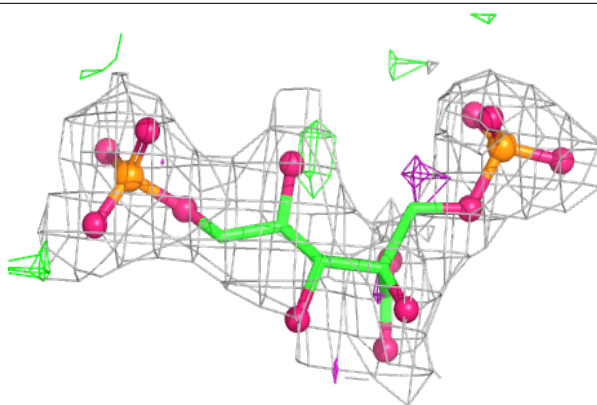
Electron density around MG A 502:

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

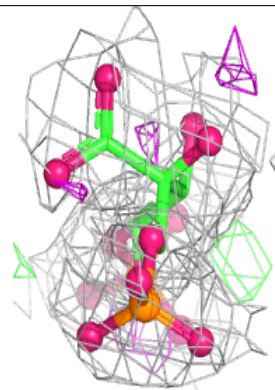
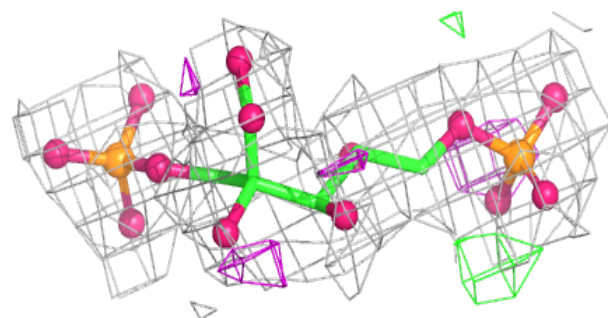
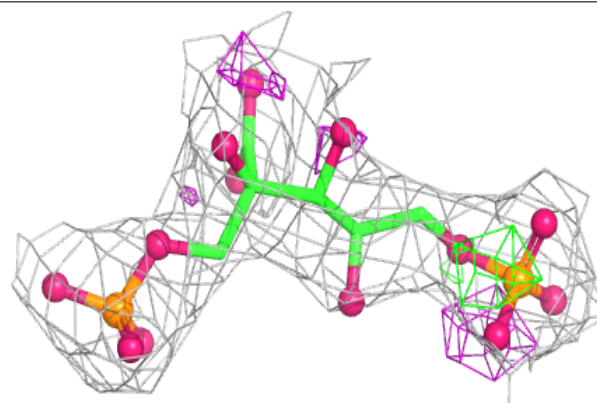


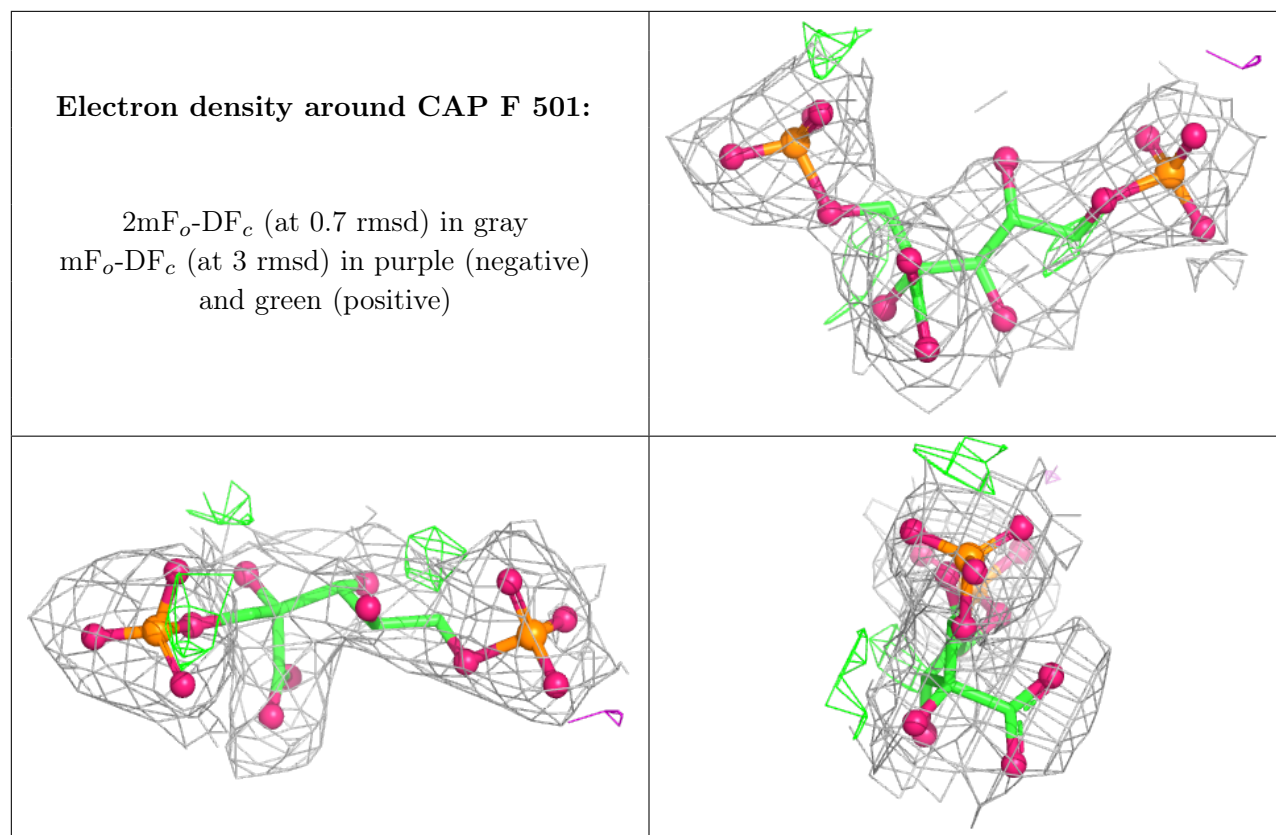
Electron density around CAP C 501:

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

**Electron density around CAP G 501:**

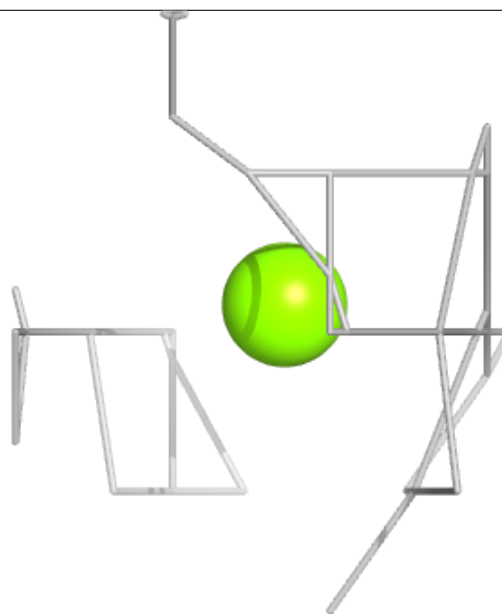
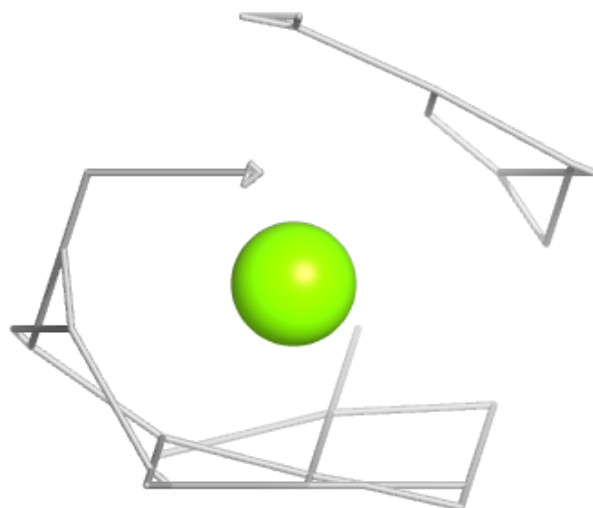
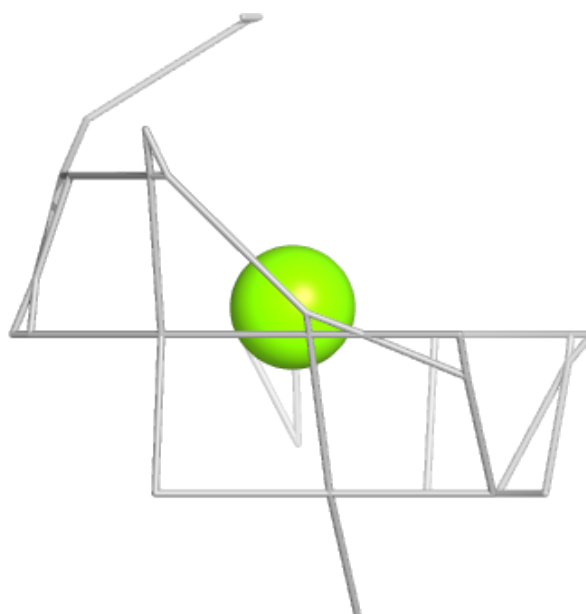
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)





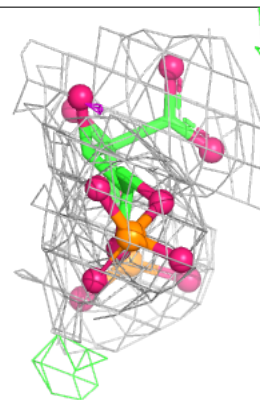
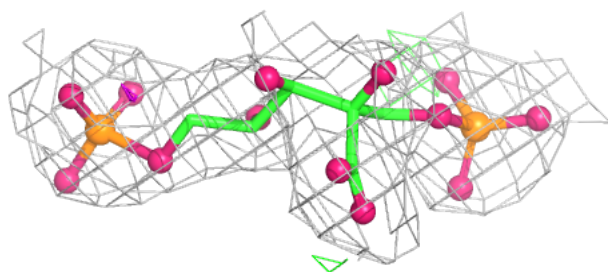
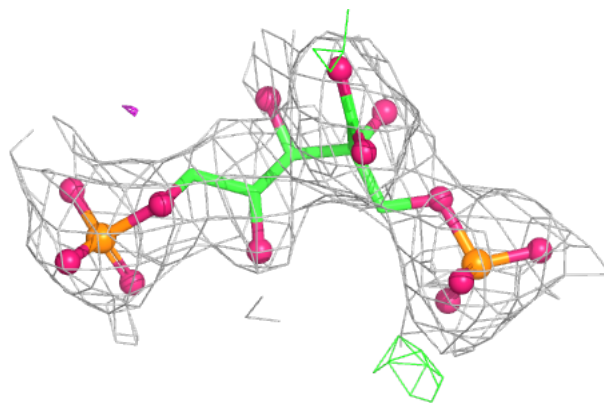
Electron density around MG B 502:

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

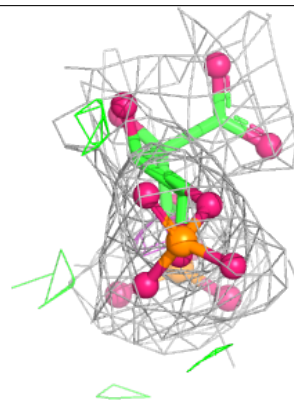
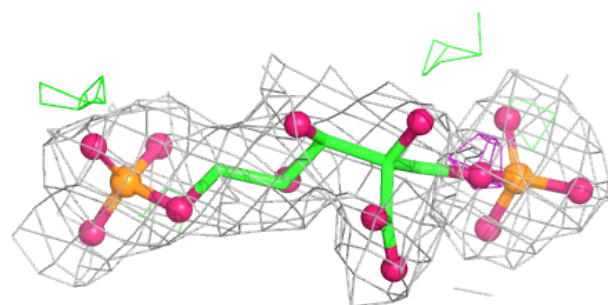
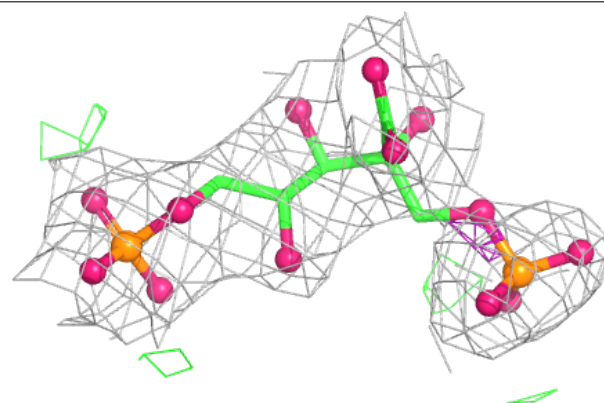


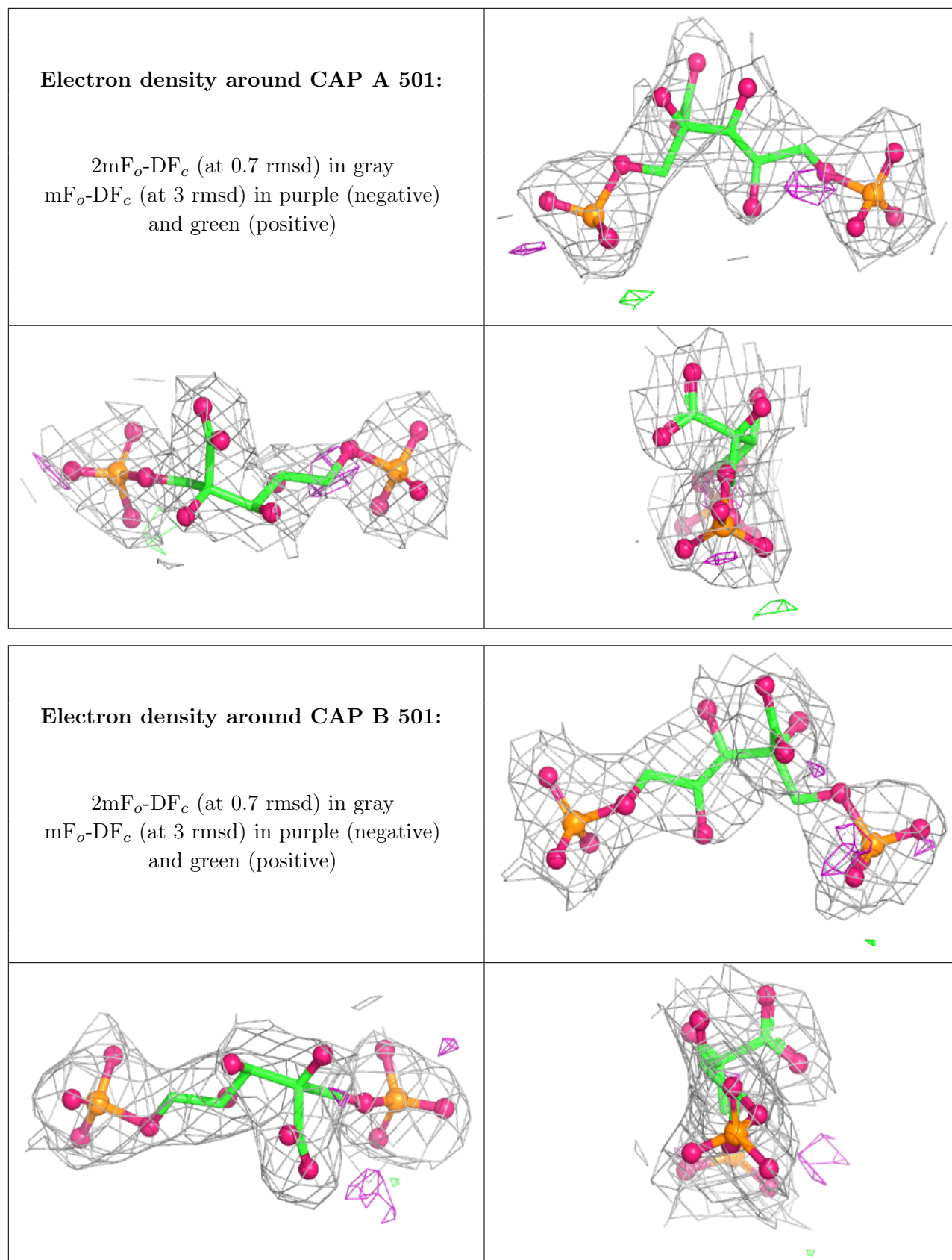
Electron density around CAP E 501:

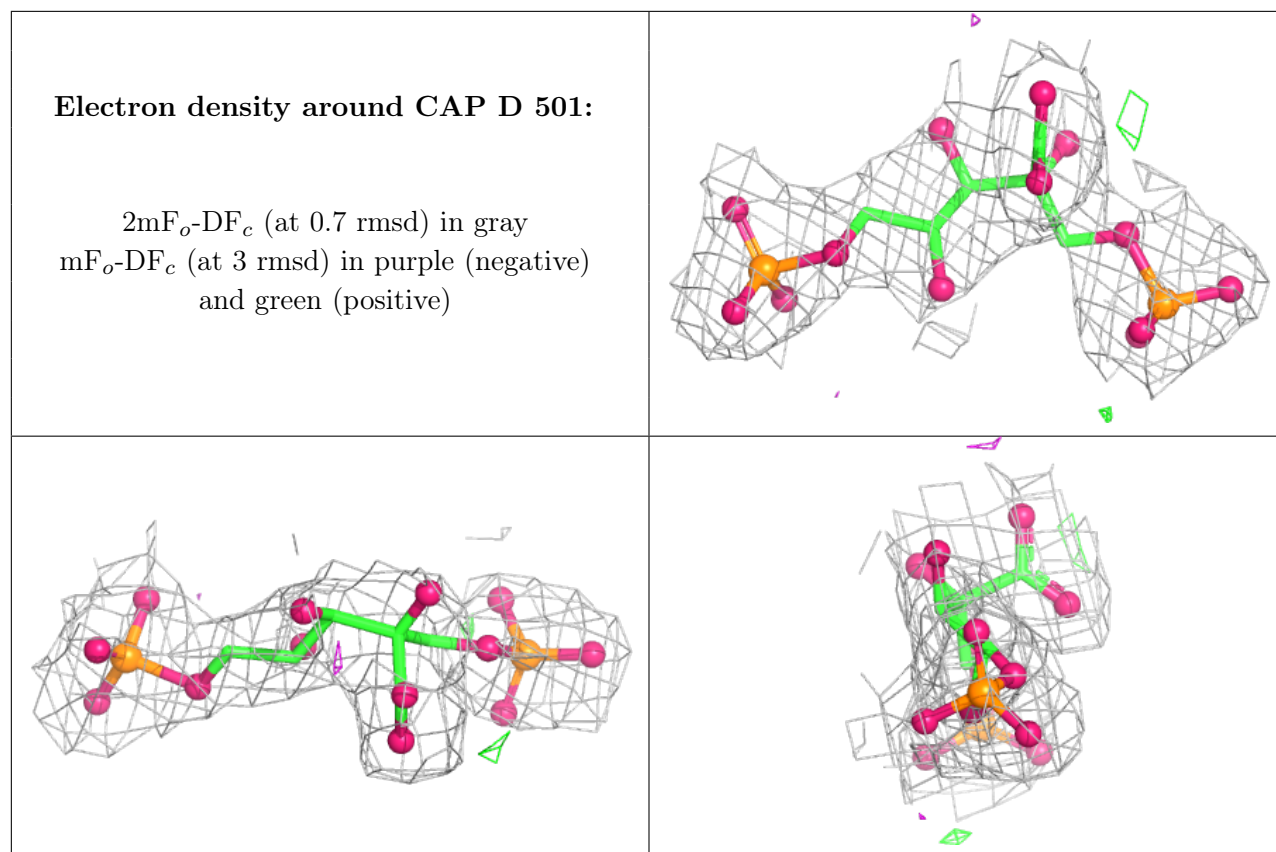
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

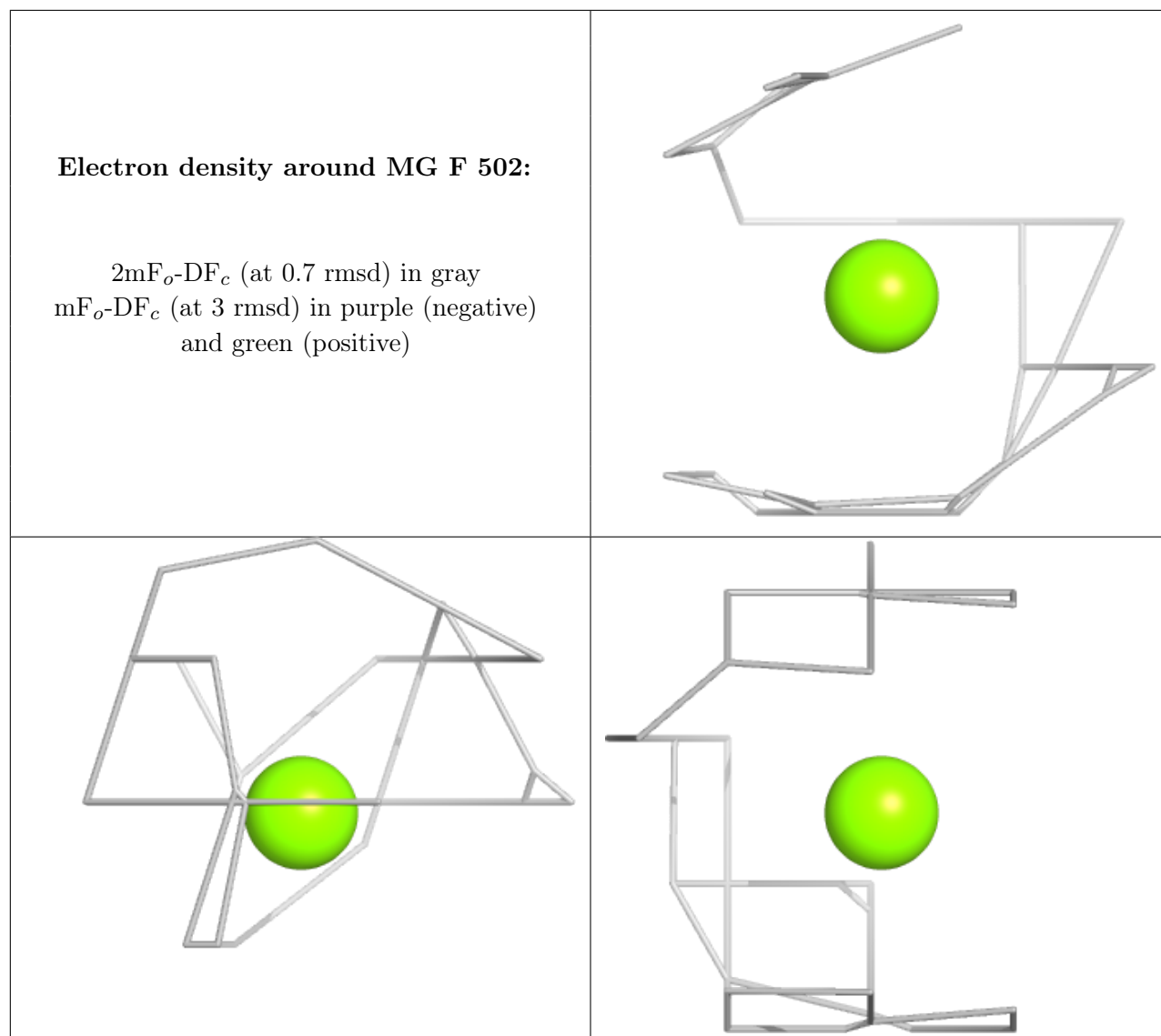
**Electron density around CAP H 501:**

$2mF_o-DF_c$ (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.