



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 05:45 AM UTC

PDB ID : 6PCA / pdb_00006pca
Title : Crystal structure of beta-ketoadipyl-CoA thiolase
Authors : Sukritee, B.; Panjekar, S.
Deposited on : 2019-06-17
Resolution : 1.81 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 : 2022.3.0, CSD as543be (2022)
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

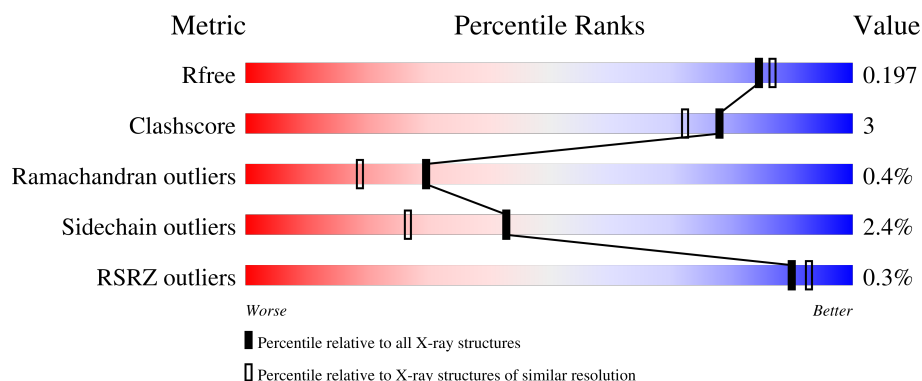
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.81 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	1112 (1.82-1.82)
Clashscore	190562	1148 (1.82-1.82)
Ramachandran outliers	187476	1140 (1.82-1.82)
Sidechain outliers	187428	1140 (1.82-1.82)
RSRZ outliers	180081	1112 (1.82-1.82)

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	422	85% 9% 6%
1	B	422	88% 7% 5%
1	C	422	87% 8% 5%
1	D	422	87% 7% 6%

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
3	ACT	C	503	-	-	X	-

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 12855 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 Beta-ketoadipyl-CoA thiolase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	397	Total	C	N	O	S	3	3	0
			2932	1830	527	556	19			
1	B	403	Total	C	N	O	S	4	0	0
			2956	1842	537	559	18			
1	C	403	Total	C	N	O	S	0	2	0
			2973	1852	539	563	19			
1	D	396	Total	C	N	O	S	0	5	0
			2934	1832	528	555	19			

There are 88 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-21	MET	-	initiating methionine	UNP Q88N39
A	-20	HIS	-	expression tag	UNP Q88N39
A	-19	HIS	-	expression tag	UNP Q88N39
A	-18	HIS	-	expression tag	UNP Q88N39
A	-17	HIS	-	expression tag	UNP Q88N39
A	-16	HIS	-	expression tag	UNP Q88N39
A	-15	HIS	-	expression tag	UNP Q88N39
A	-14	SER	-	expression tag	UNP Q88N39
A	-13	SER	-	expression tag	UNP Q88N39
A	-12	GLY	-	expression tag	UNP Q88N39
A	-11	VAL	-	expression tag	UNP Q88N39
A	-10	ASP	-	expression tag	UNP Q88N39
A	-9	LEU	-	expression tag	UNP Q88N39
A	-8	GLY	-	expression tag	UNP Q88N39
A	-7	THR	-	expression tag	UNP Q88N39
A	-6	GLU	-	expression tag	UNP Q88N39
A	-5	ASN	-	expression tag	UNP Q88N39
A	-4	LEU	-	expression tag	UNP Q88N39
A	-3	TYR	-	expression tag	UNP Q88N39
A	-2	HIS	-	expression tag	UNP Q88N39
A	-1	GLN	-	expression tag	UNP Q88N39

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Chain	Residue	Modelled	Actual	Comment	Reference
A	0	SER	-	expression tag	UNP Q88N39
B	-21	MET	-	initiating methionine	UNP Q88N39
B	-20	HIS	-	expression tag	UNP Q88N39
B	-19	HIS	-	expression tag	UNP Q88N39
B	-18	HIS	-	expression tag	UNP Q88N39
B	-17	HIS	-	expression tag	UNP Q88N39
B	-16	HIS	-	expression tag	UNP Q88N39
B	-15	HIS	-	expression tag	UNP Q88N39
B	-14	SER	-	expression tag	UNP Q88N39
B	-13	SER	-	expression tag	UNP Q88N39
B	-12	GLY	-	expression tag	UNP Q88N39
B	-11	VAL	-	expression tag	UNP Q88N39
B	-10	ASP	-	expression tag	UNP Q88N39
B	-9	LEU	-	expression tag	UNP Q88N39
B	-8	GLY	-	expression tag	UNP Q88N39
B	-7	THR	-	expression tag	UNP Q88N39
B	-6	GLU	-	expression tag	UNP Q88N39
B	-5	ASN	-	expression tag	UNP Q88N39
B	-4	LEU	-	expression tag	UNP Q88N39
B	-3	TYR	-	expression tag	UNP Q88N39
B	-2	HIS	-	expression tag	UNP Q88N39
B	-1	GLN	-	expression tag	UNP Q88N39
B	0	SER	-	expression tag	UNP Q88N39
C	-21	MET	-	initiating methionine	UNP Q88N39
C	-20	HIS	-	expression tag	UNP Q88N39
C	-19	HIS	-	expression tag	UNP Q88N39
C	-18	HIS	-	expression tag	UNP Q88N39
C	-17	HIS	-	expression tag	UNP Q88N39
C	-16	HIS	-	expression tag	UNP Q88N39
C	-15	HIS	-	expression tag	UNP Q88N39
C	-14	SER	-	expression tag	UNP Q88N39
C	-13	SER	-	expression tag	UNP Q88N39
C	-12	GLY	-	expression tag	UNP Q88N39
C	-11	VAL	-	expression tag	UNP Q88N39
C	-10	ASP	-	expression tag	UNP Q88N39
C	-9	LEU	-	expression tag	UNP Q88N39
C	-8	GLY	-	expression tag	UNP Q88N39
C	-7	THR	-	expression tag	UNP Q88N39
C	-6	GLU	-	expression tag	UNP Q88N39
C	-5	ASN	-	expression tag	UNP Q88N39
C	-4	LEU	-	expression tag	UNP Q88N39
C	-3	TYR	-	expression tag	UNP Q88N39

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Chain	Residue	Modelled	Actual	Comment	Reference
C	-2	HIS	-	expression tag	UNP Q88N39
C	-1	GLN	-	expression tag	UNP Q88N39
C	0	SER	-	expression tag	UNP Q88N39
D	-21	MET	-	initiating methionine	UNP Q88N39
D	-20	HIS	-	expression tag	UNP Q88N39
D	-19	HIS	-	expression tag	UNP Q88N39
D	-18	HIS	-	expression tag	UNP Q88N39
D	-17	HIS	-	expression tag	UNP Q88N39
D	-16	HIS	-	expression tag	UNP Q88N39
D	-15	HIS	-	expression tag	UNP Q88N39
D	-14	SER	-	expression tag	UNP Q88N39
D	-13	SER	-	expression tag	UNP Q88N39
D	-12	GLY	-	expression tag	UNP Q88N39
D	-11	VAL	-	expression tag	UNP Q88N39
D	-10	ASP	-	expression tag	UNP Q88N39
D	-9	LEU	-	expression tag	UNP Q88N39
D	-8	GLY	-	expression tag	UNP Q88N39
D	-7	THR	-	expression tag	UNP Q88N39
D	-6	GLU	-	expression tag	UNP Q88N39
D	-5	ASN	-	expression tag	UNP Q88N39
D	-4	LEU	-	expression tag	UNP Q88N39
D	-3	TYR	-	expression tag	UNP Q88N39
D	-2	HIS	-	expression tag	UNP Q88N39
D	-1	GLN	-	expression tag	UNP Q88N39
D	0	SER	-	expression tag	UNP Q88N39

- Molecule 2 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$) (labeled as "Ligand of Interest" by depositor).



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

- Molecule 3 is ACETATE ION (CCD ID: ACT) (formula: $C_2H_3O_2$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C O 4 2 2	0	0
3	C	1	Total C O 4 2 2	0	0
3	D	1	Total C O 4 2 2	0	0

- Molecule 4 is CHLORIDE ION (CCD ID: CL) (formula: Cl) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	2	Total Cl 2 2	0	0
4	B	3	Total Cl 3 3	0	0

- Molecule 5 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	256	Total O 256 256	0	0
5	B	252	Total O 252 252	0	0
5	C	247	Total O 247 247	0	0
5	D	240	Total O 240 240	0	0

- Molecule 1: Beta-ketoadipyl-CoA thiolase





4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	110.08Å 113.84Å 127.42Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	20.00 – 1.81 20.00 – 1.81	Depositor EDS
% Data completeness (in resolution range)	99.4 (20.00-1.81) 99.4 (20.00-1.81)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.08 (at 1.81Å)	Xtriage
Refinement program	REFMAC 5.8.0238	Depositor
R, R_{free}	0.156 , 0.196 0.159 , 0.197	Depositor DCC
R_{free} test set	1045 reflections (0.71%)	wwPDB-VP
Wilson B-factor (Å ²)	19.2	Xtriage
Anisotropy	0.136	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.40 , 46.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.34$	Xtriage
Estimated twinning fraction	0.000 for k,h,-l	Xtriage
F_o, F_c correlation	0.97	EDS
Total number of atoms	12855	wwPDB-VP
Average B, all atoms (Å ²)	21.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.71% 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: ACT, CL, GOL

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	0.77	3/2974 (0.1%)	1.09	5/4027 (0.1%)
1	B	0.98	2/3000 (0.1%)	1.04	3/4061 (0.1%)
1	C	0.66	0/3017	1.02	1/4083 (0.0%)
1	D	0.65	0/2975	0.98	2/4029 (0.0%)
All	All	0.78	5/11966 (0.0%)	1.03	11/16200 (0.1%)

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	16	ARG	CD-NE	-38.66	0.92	1.46
1	A	221	ARG	CZ-NH2	-14.04	1.15	1.33
1	A	221	ARG	CD-NE	-11.90	1.29	1.46
1	A	356	HIS	CE1-NE2	5.62	1.38	1.32
1	B	356	HIS	CE1-NE2	5.40	1.38	1.32

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	221	ARG	NE-CZ-NH2	20.03	137.23	119.20
1	B	16	ARG	CG-CD-NE	11.64	137.62	112.00
1	A	221	ARG	NH1-CZ-NH2	-11.21	104.72	119.30
1	B	16	ARG	CD-NE-CZ	9.25	137.34	124.40
1	B	346	ASN	O-C-N	-5.60	118.95	121.53
1	A	7	CYS	CA-C-O	5.58	121.17	117.94
1	A	346	ASN	O-C-N	-5.56	118.97	121.53
1	C	243	PRO	N-CA-C	5.52	121.81	113.81
1	D	287	GLY	CA-C-N	-5.35	118.49	122.18
1	D	287	GLY	C-N-CA	-5.35	118.49	122.18
1	A	357	PRO	CB-CA-C	-5.29	107.42	111.87

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

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	2932	0	2964	18	0
1	B	2956	0	2992	16	0
1	C	2973	0	3005	20	0
1	D	2934	0	2970	19	0
2	A	12	0	16	1	0
2	B	12	0	16	1	0
2	C	12	0	16	1	0
2	D	12	0	16	1	0
3	A	4	0	3	1	0
3	C	4	0	3	2	0
3	D	4	0	3	1	0
4	A	2	0	0	2	0
4	B	3	0	0	2	0
5	A	256	0	0	0	0
5	B	252	0	0	3	0
5	C	247	0	0	0	0
5	D	240	0	0	0	0
All	All	12855	0	12004	67	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 3.

All (67) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:502:GOL:O1	4:A:505:CL:CL	2.29	0.87
4:A:504:CL:CL	2:D:502:GOL:O1	2.41	0.74
1:B:137:ASN:HB2	5:B:803:HOH:O	1.88	0.73
2:B:502:GOL:O3	4:B:503:CL:CL	2.42	0.73
1:A:1:MET:HA	1:D:1:MET:HE1	1.71	0.71
1:A:14:ILE:HD11	1:A:360[B]:MET:HE1	1.75	0.69

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:14:ILE:HD11	1:C:360[B]:MET:HE1	1.79	0.64
1:C:125:PHE:HB3	1:C:140:LEU:HD22	1.78	0.64
1:A:126[A]:VAL:HG12	1:D:126[A]:VAL:HG12	1.82	0.61
3:A:503:ACT:H1	1:D:62:GLU:OE2	2.01	0.59
1:B:212:HIS:HE1	5:B:811:HOH:O	1.84	0.59
4:B:504:CL:CL	2:C:502:GOL:O3	2.53	0.58
1:B:62:GLU:OE2	3:C:503:ACT:H1	2.05	0.57
1:A:65:ARG:HA	1:D:89:LEU:HD21	1.87	0.56
1:C:100:ALA:HB1	1:C:112:VAL:HG21	1.88	0.56
1:A:77:LEU:HB3	1:A:81:ILE:HD12	1.90	0.54
1:B:100:ALA:HB1	1:B:112:VAL:HG21	1.89	0.54
1:B:65:ARG:HA	1:C:89:LEU:HD21	1.89	0.54
1:D:38:ILE:HA	1:D:46:TRP:CZ2	2.44	0.53
1:C:125:PHE:CE1	1:D:138[B]:MET:HG3	2.44	0.52
1:C:306:THR:HB	1:C:311:ILE:O	2.11	0.51
1:A:14:ILE:CD1	1:A:360[B]:MET:HE1	2.41	0.50
1:A:306:THR:HB	1:A:311:ILE:O	2.11	0.50
1:B:89:LEU:HD21	1:C:65:ARG:HA	1.94	0.49
1:A:38:ILE:HA	1:A:46:TRP:CZ2	2.47	0.49
1:B:77:LEU:HB3	1:B:81:ILE:HD12	1.93	0.49
1:B:367:LEU:C	1:B:367:LEU:HD12	2.38	0.49
1:A:279:ALA:HB2	1:A:370:LEU:HD13	1.95	0.48
1:B:279:ALA:HB2	1:B:370:LEU:HD13	1.96	0.48
1:A:125:PHE:HB3	1:A:140:LEU:HD22	1.95	0.48
1:D:306:THR:HB	1:D:311:ILE:O	2.13	0.48
1:C:78:PRO:HD2	1:C:81:ILE:CD1	2.44	0.47
1:B:126:VAL:HG12	1:C:126:VAL:HG12	1.95	0.47
1:D:100:ALA:HB1	1:D:112:VAL:HG21	1.97	0.47
1:C:218:ILE:HD12	1:C:220:GLU:CG	2.44	0.47
1:A:89:LEU:HD21	1:D:65:ARG:HG2	1.98	0.46
1:A:100:ALA:HB1	1:A:112:VAL:HG21	1.97	0.46
1:A:1:MET:HG2	1:D:1:MET:CE	2.46	0.46
1:C:218:ILE:HD12	1:C:220:GLU:HG3	1.98	0.46
1:C:360[B]:MET:HE3	1:C:364:ARG:HB2	1.99	0.45
1:C:77:LEU:HB3	1:C:81:ILE:HD12	1.98	0.45
1:D:129:LYS:O	3:D:503:ACT:H3	2.16	0.45
1:B:306:THR:HB	1:B:311:ILE:O	2.17	0.44
1:B:26:ALA:HB2	5:B:668:HOH:O	2.17	0.44
1:C:322:ASN:HB2	1:C:365:LEU:HD11	1.99	0.43
1:B:122:ARG:HB3	3:C:503:ACT:H3	2.00	0.43
1:C:212:HIS:HB3	1:C:215:GLY:O	2.18	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:387:VAL:HB	1:D:391:GLN:HB2	2.00	0.43
1:B:-1:GLN:O	1:B:-1:GLN:HG3	2.17	0.43
1:B:38:ILE:HA	1:B:46:TRP:CZ2	2.54	0.43
1:A:89:LEU:HD23	1:A:89:LEU:HA	1.90	0.43
1:D:279:ALA:HB2	1:D:370:LEU:HD13	2.01	0.43
1:A:17:PHE:HB2	1:A:255:VAL:HG23	2.01	0.42
1:C:1:MET:HE2	1:C:1:MET:HB2	1.82	0.42
1:D:104:ILE:HD11	1:D:112:VAL:HG22	2.01	0.42
1:D:127:MET:SD	1:D:138[B]:MET:HE2	2.59	0.42
1:C:78:PRO:HD2	1:C:81:ILE:HD11	2.02	0.41
1:C:125:PHE:CZ	1:D:138[B]:MET:HG3	2.56	0.41
1:A:367:LEU:C	1:A:367:LEU:HD12	2.44	0.41
1:C:17:PHE:HB2	1:C:255:VAL:HG23	2.03	0.41
1:A:387:VAL:HB	1:A:391:GLN:HB2	2.03	0.41
1:B:17:PHE:HB2	1:B:255:VAL:HG23	2.02	0.41
1:A:98:GLY:HA3	1:A:284:MET:SD	2.60	0.41
1:C:38:ILE:HA	1:C:46:TRP:CZ2	2.56	0.41
1:D:138[B]:MET:HE2	1:D:138[B]:MET:HB3	1.95	0.41
1:D:209:ARG:CZ	1:D:209:ARG:HB3	2.49	0.41
1:D:98:GLY:HA3	1:D:284:MET:SD	2.61	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	396/422 (94%)	381 (96%)	14 (4%)	1 (0%)	36	26
1	B	401/422 (95%)	387 (96%)	12 (3%)	2 (0%)	24	14
1	C	403/422 (96%)	391 (97%)	10 (2%)	2 (0%)	24	14
1	D	397/422 (94%)	381 (96%)	14 (4%)	2 (0%)	24	14
All	All	1597/1688 (95%)	1540 (96%)	50 (3%)	7 (0%)	30	19

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	66	ASN
1	A	389	VAL
1	B	389	VAL
1	C	389	VAL
1	D	389	VAL
1	B	66	ASN
1	C	66	ASN

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	298/317 (94%)	291 (98%)	7 (2%)	44	28
1	B	300/317 (95%)	294 (98%)	6 (2%)	48	35
1	C	302/317 (95%)	291 (96%)	11 (4%)	31	13
1	D	298/317 (94%)	292 (98%)	6 (2%)	48	35
All	All	1198/1268 (94%)	1168 (98%)	30 (2%)	43	25

All (30) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	45	GLN
1	A	209	ARG
1	A	272	LYS
1	A	280	ARG
1	A	328	GLN
1	A	367	LEU
1	A	368	THR
1	B	-1	GLN
1	B	153	LEU
1	B	238	LYS
1	B	328	GLN
1	B	360	MET
1	B	367	LEU

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Continued from previous page...

Mol	Chain	Res	Type
1	C	1	MET
1	C	108	GLU
1	C	139	LYS
1	C	140	LEU
1	C	209	ARG
1	C	240	VAL
1	C	244	ASP
1	C	245	LYS
1	C	328	GLN
1	C	360[A]	MET
1	C	360[B]	MET
1	D	1	MET
1	D	108	GLU
1	D	145	ILE
1	D	328	GLN
1	D	360	MET
1	D	379	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (10) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	48	GLN
1	A	348	ASN
1	B	-1	GLN
1	B	48	GLN
1	B	212	HIS
1	B	322	ASN
1	C	-1	GLN
1	C	66	ASN
1	C	196	GLN
1	D	2	HIS

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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 16 ligands modelled in this entry, 5 are monoatomic - leaving 11 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	GOL	C	501	-	5,5,5	0.19	0	5,5,5	0.35	0
3	ACT	A	503	-	3,3,3	1.15	0	3,3,3	0.99	0
2	GOL	A	501	-	5,5,5	0.14	0	5,5,5	0.30	0
2	GOL	A	502	-	5,5,5	0.30	0	5,5,5	0.66	0
2	GOL	B	501	-	5,5,5	0.10	0	5,5,5	0.23	0
2	GOL	D	501	-	5,5,5	0.10	0	5,5,5	0.47	0
2	GOL	D	502	-	5,5,5	0.31	0	5,5,5	0.67	0
2	GOL	B	502	-	5,5,5	0.18	0	5,5,5	0.75	0
3	ACT	D	503	-	3,3,3	1.41	0	3,3,3	0.58	0
2	GOL	C	502	-	5,5,5	0.23	0	5,5,5	0.61	0
3	ACT	C	503	-	3,3,3	0.83	0	3,3,3	1.07	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	GOL	C	501	-	-	0/4/4/4	-
2	GOL	A	501	-	-	0/4/4/4	-
2	GOL	A	502	-	-	2/4/4/4	-
2	GOL	B	501	-	-	0/4/4/4	-
2	GOL	D	501	-	-	0/4/4/4	-
2	GOL	D	502	-	-	2/4/4/4	-
2	GOL	B	502	-	-	2/4/4/4	-
2	GOL	C	502	-	-	2/4/4/4	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (8) torsion outliers are listed below:

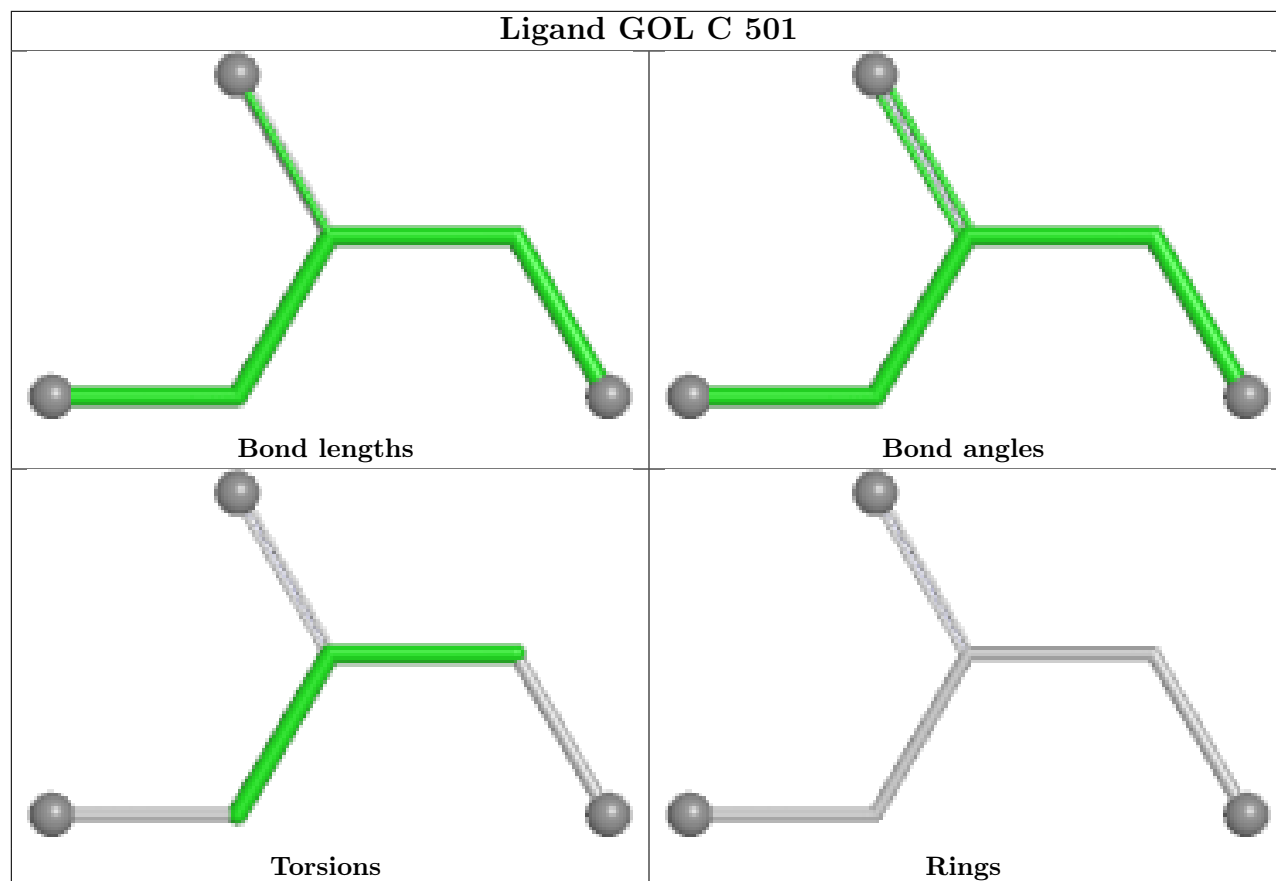
Mol	Chain	Res	Type	Atoms
2	A	502	GOL	O1-C1-C2-C3
2	B	502	GOL	C1-C2-C3-O3
2	C	502	GOL	C1-C2-C3-O3
2	D	502	GOL	O1-C1-C2-O2
2	D	502	GOL	O1-C1-C2-C3
2	A	502	GOL	O1-C1-C2-O2
2	B	502	GOL	O2-C2-C3-O3
2	C	502	GOL	O2-C2-C3-O3

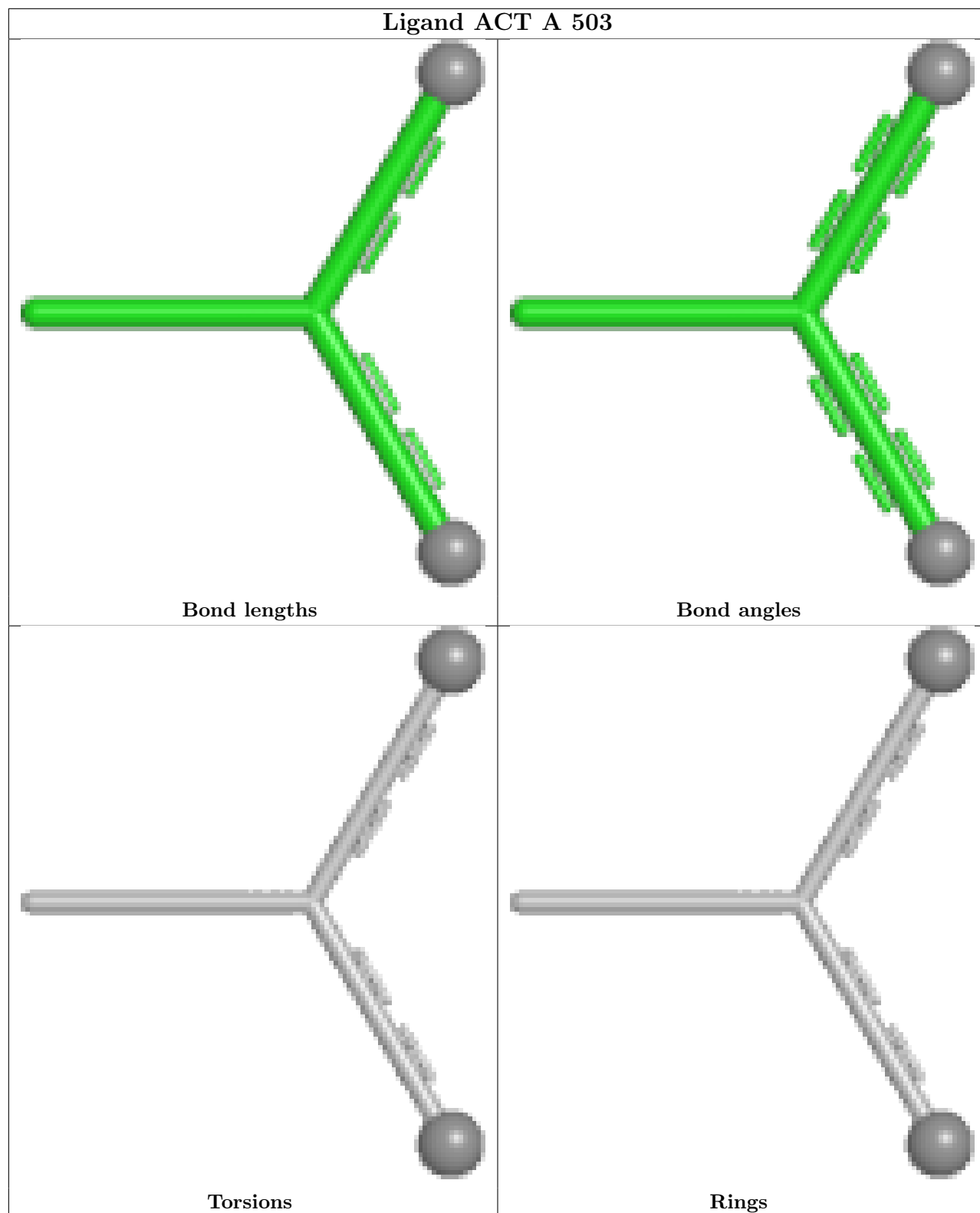
There are no ring outliers.

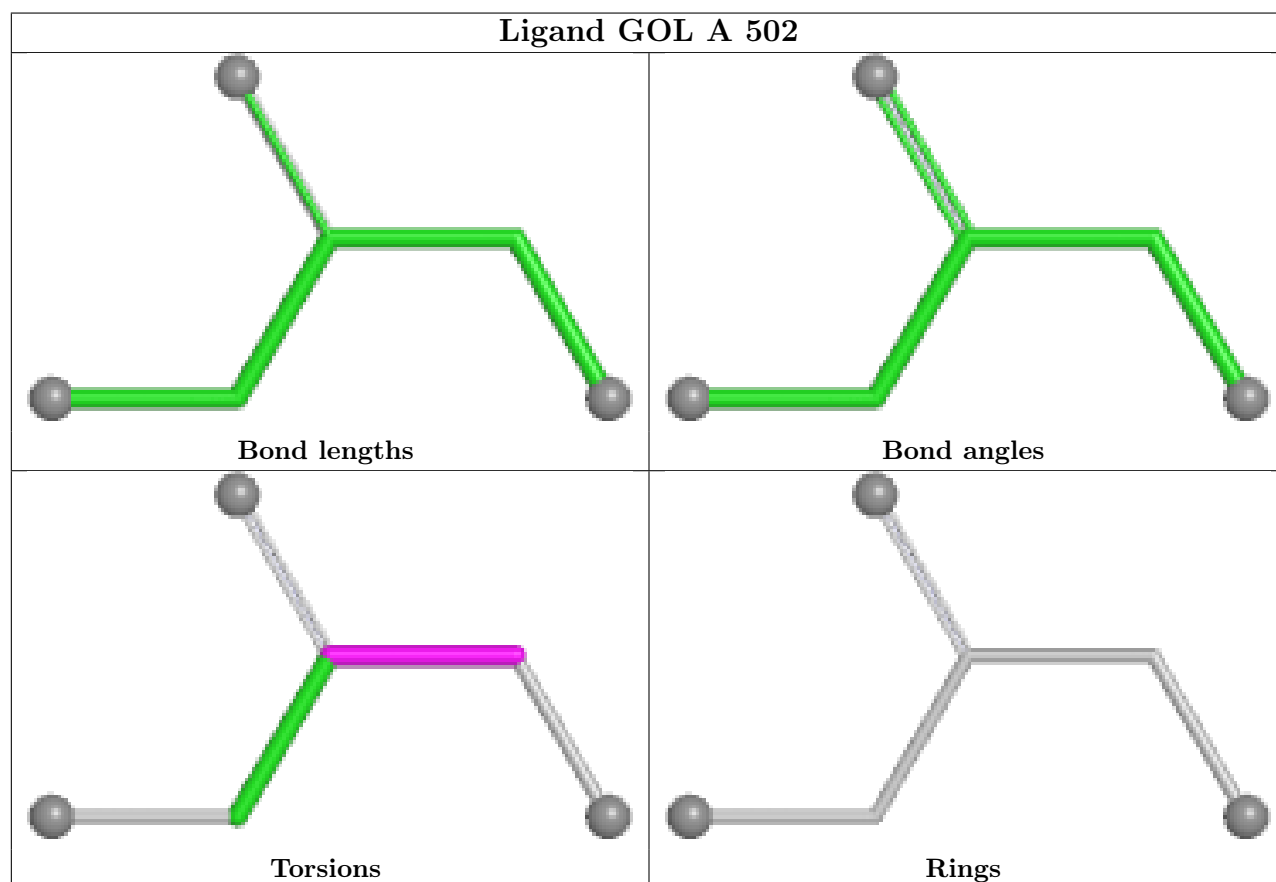
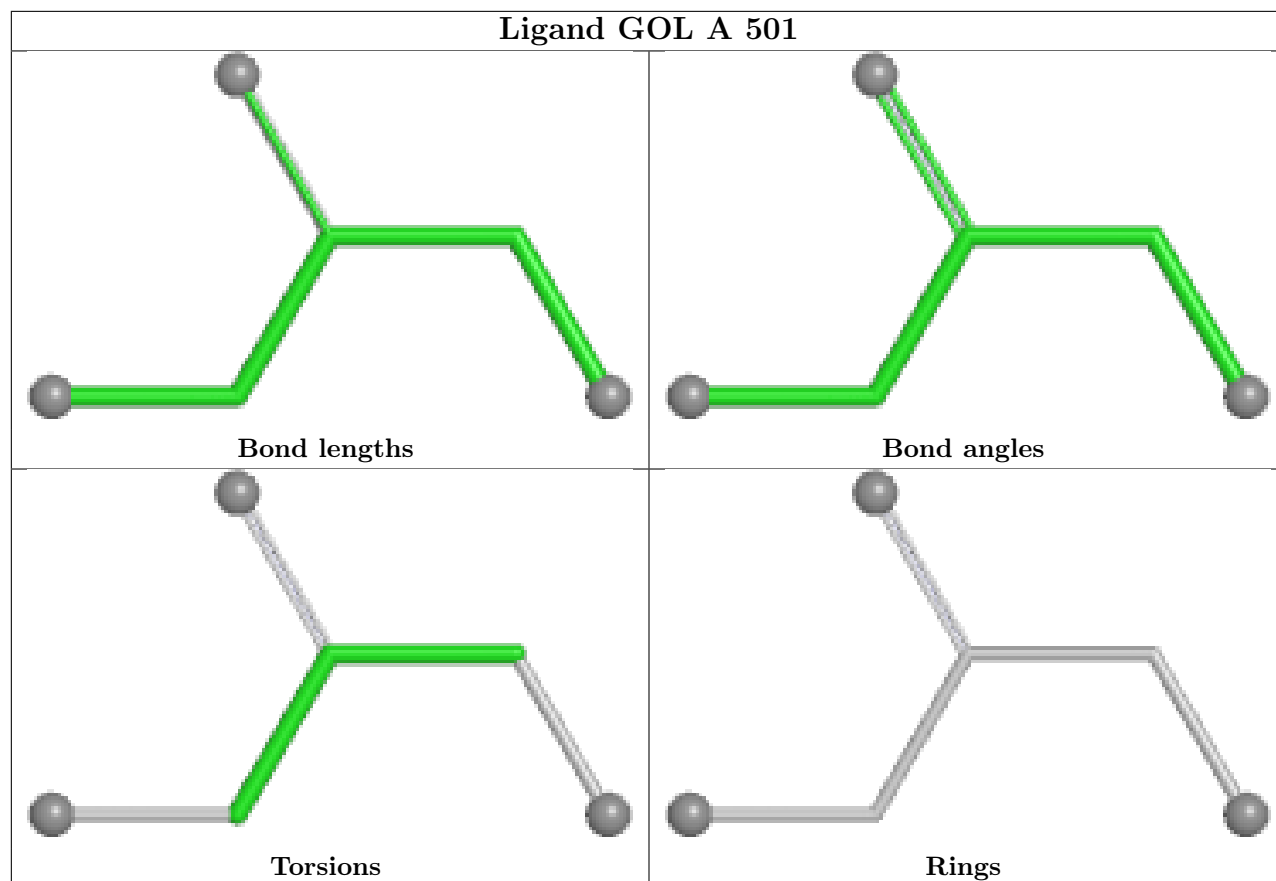
7 monomers are involved in 8 short contacts:

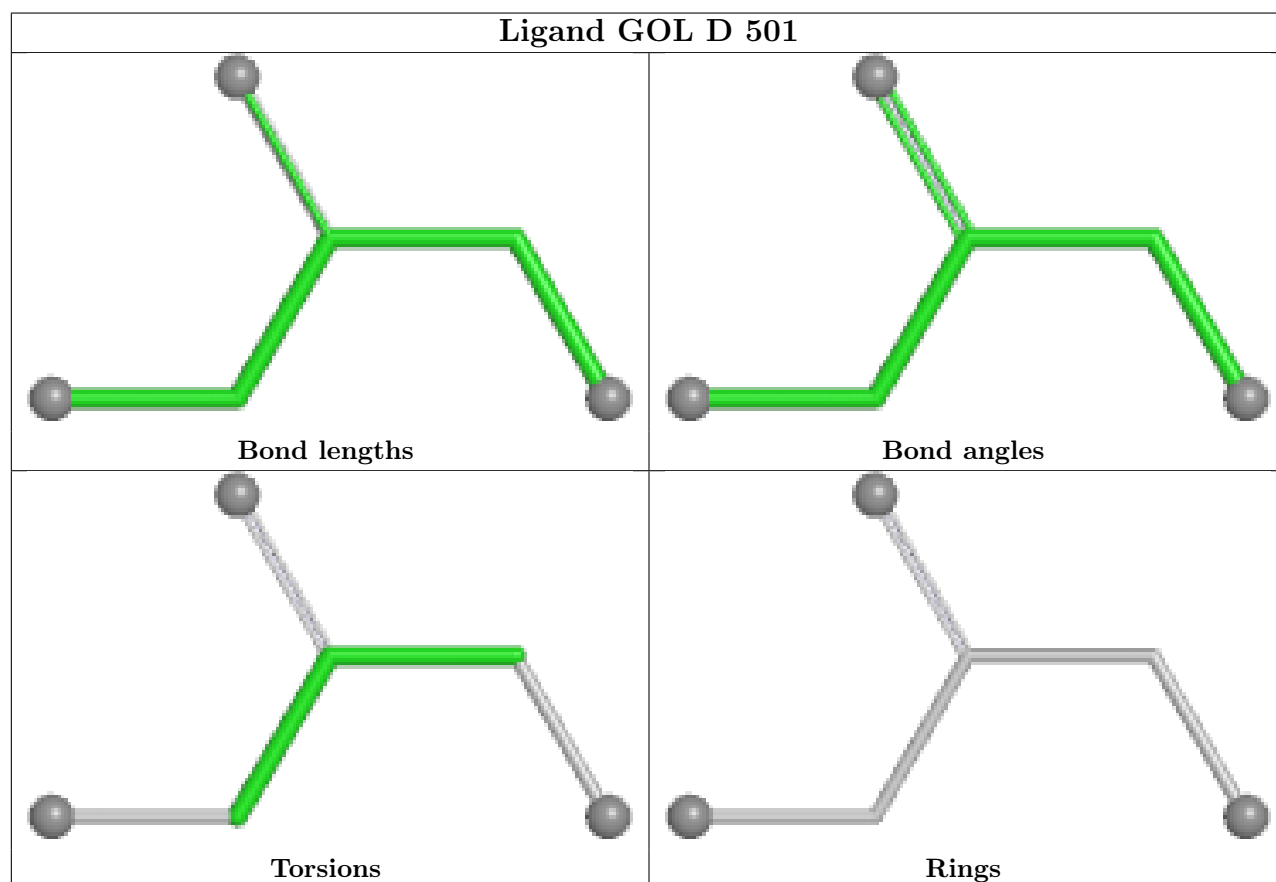
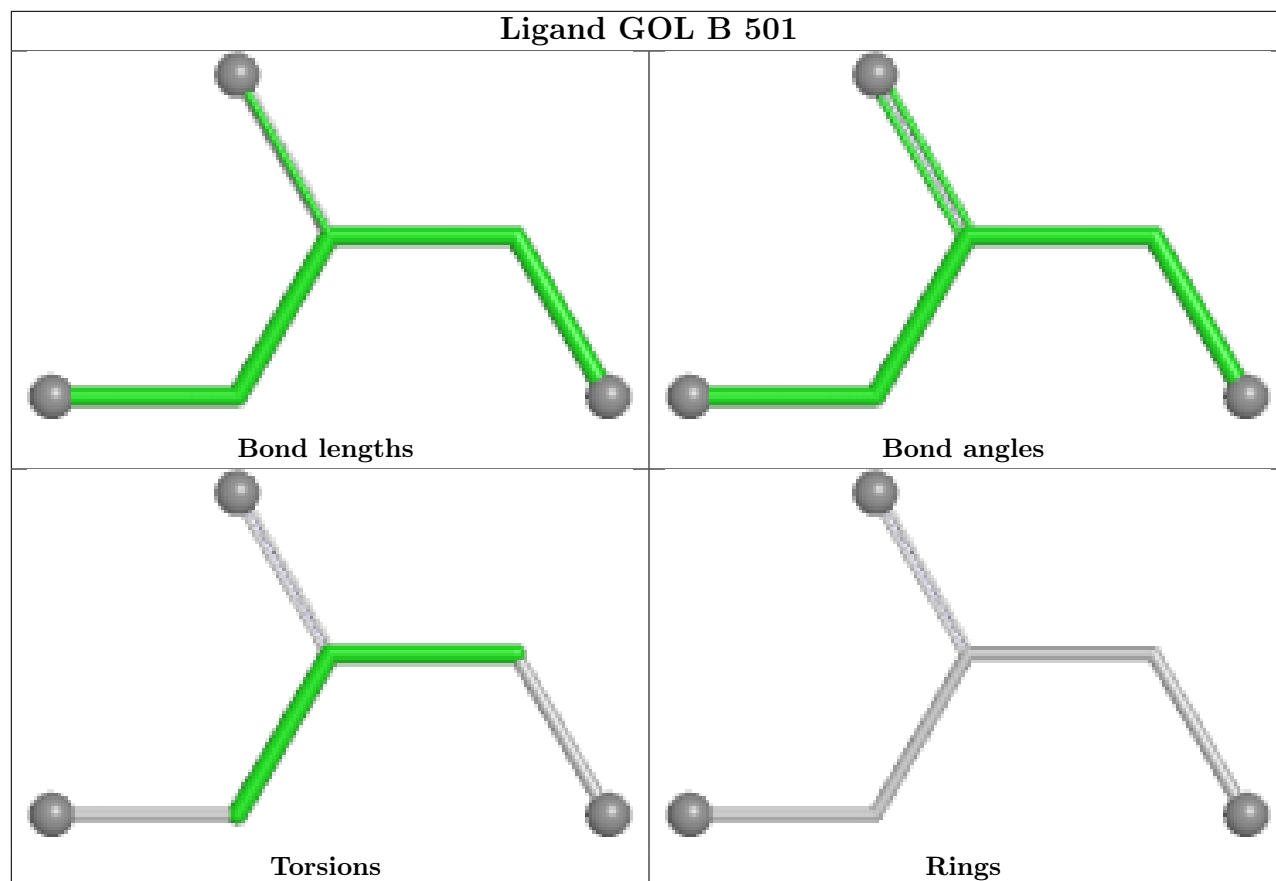
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	503	ACT	1	0
2	A	502	GOL	1	0
2	D	502	GOL	1	0
2	B	502	GOL	1	0
3	D	503	ACT	1	0
2	C	502	GOL	1	0
3	C	503	ACT	2	0

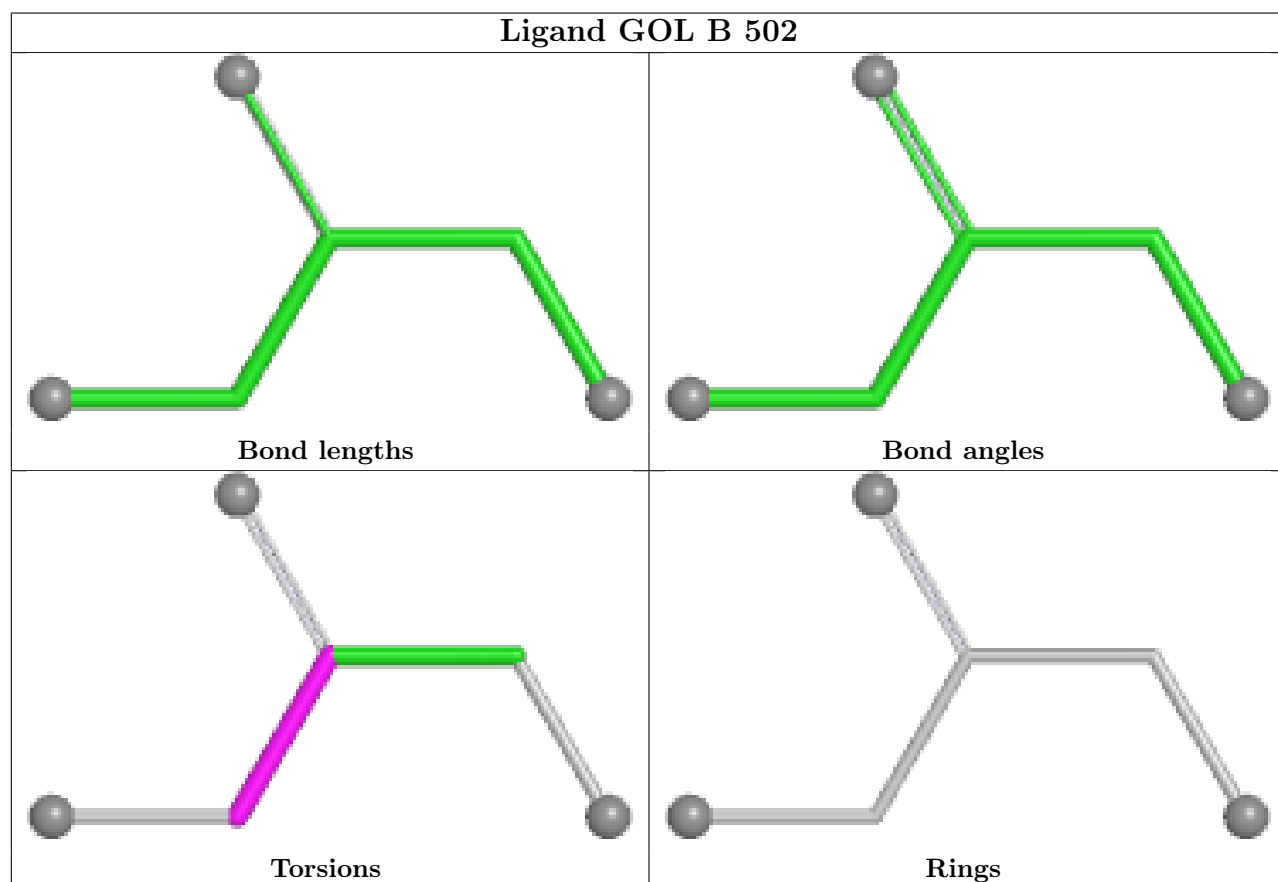
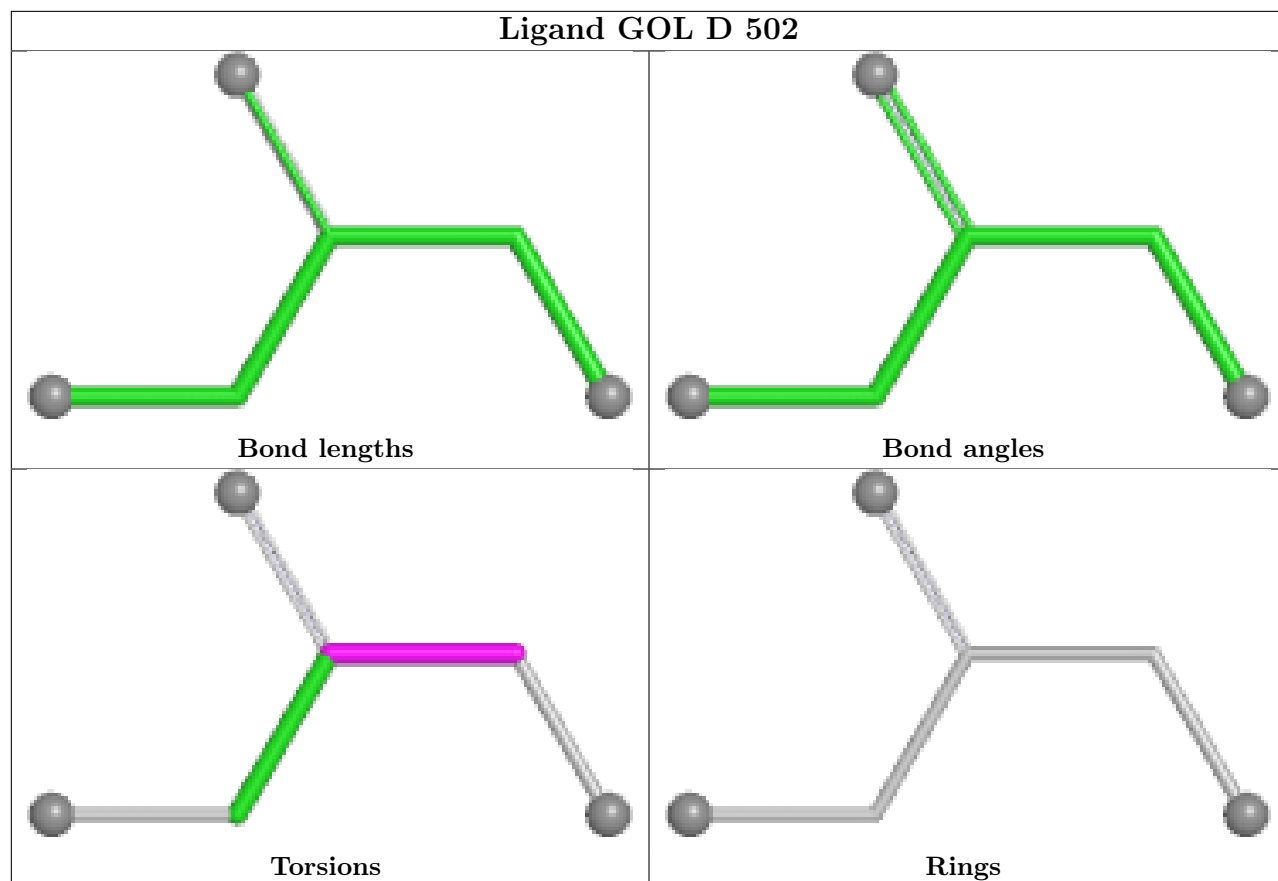
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

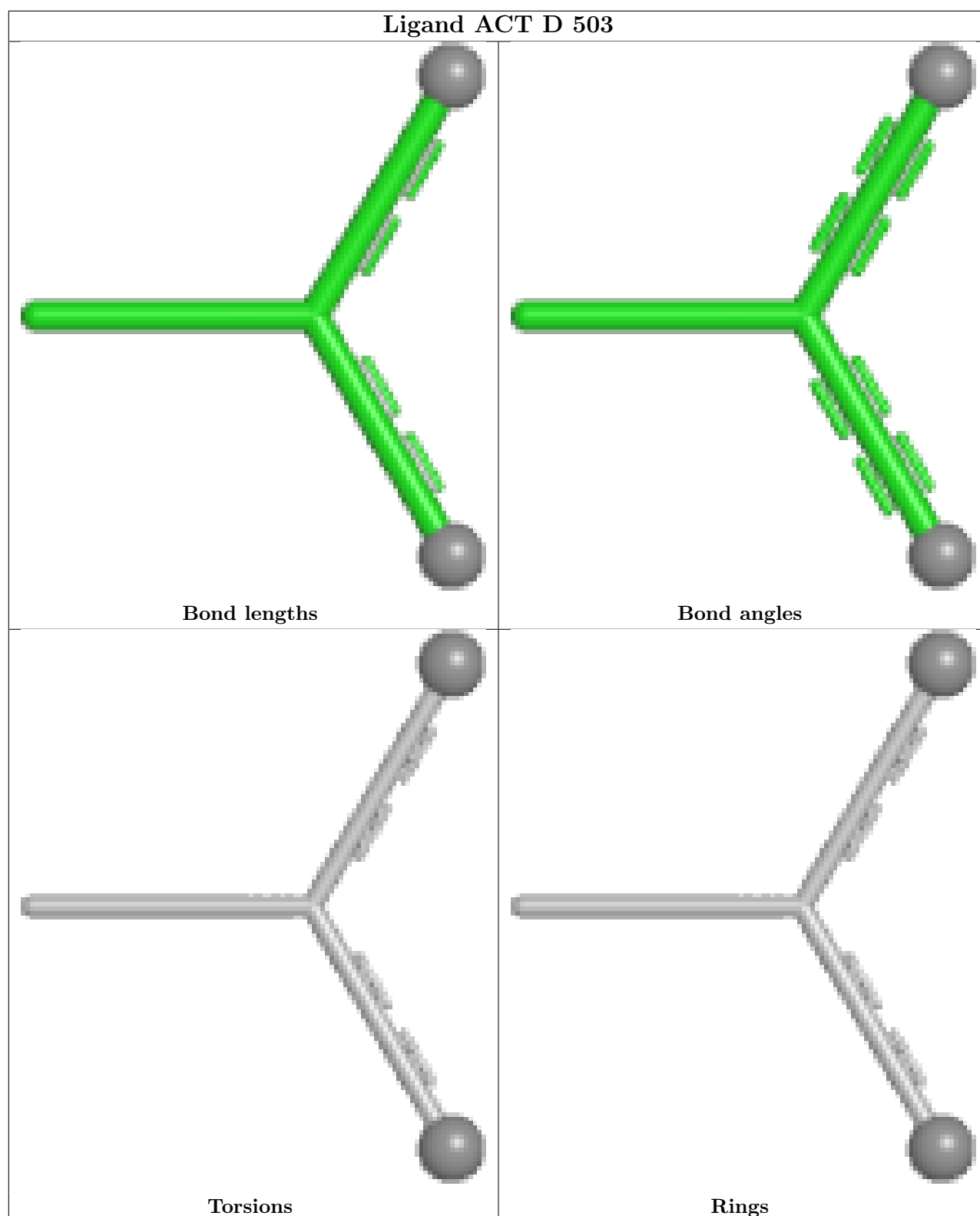


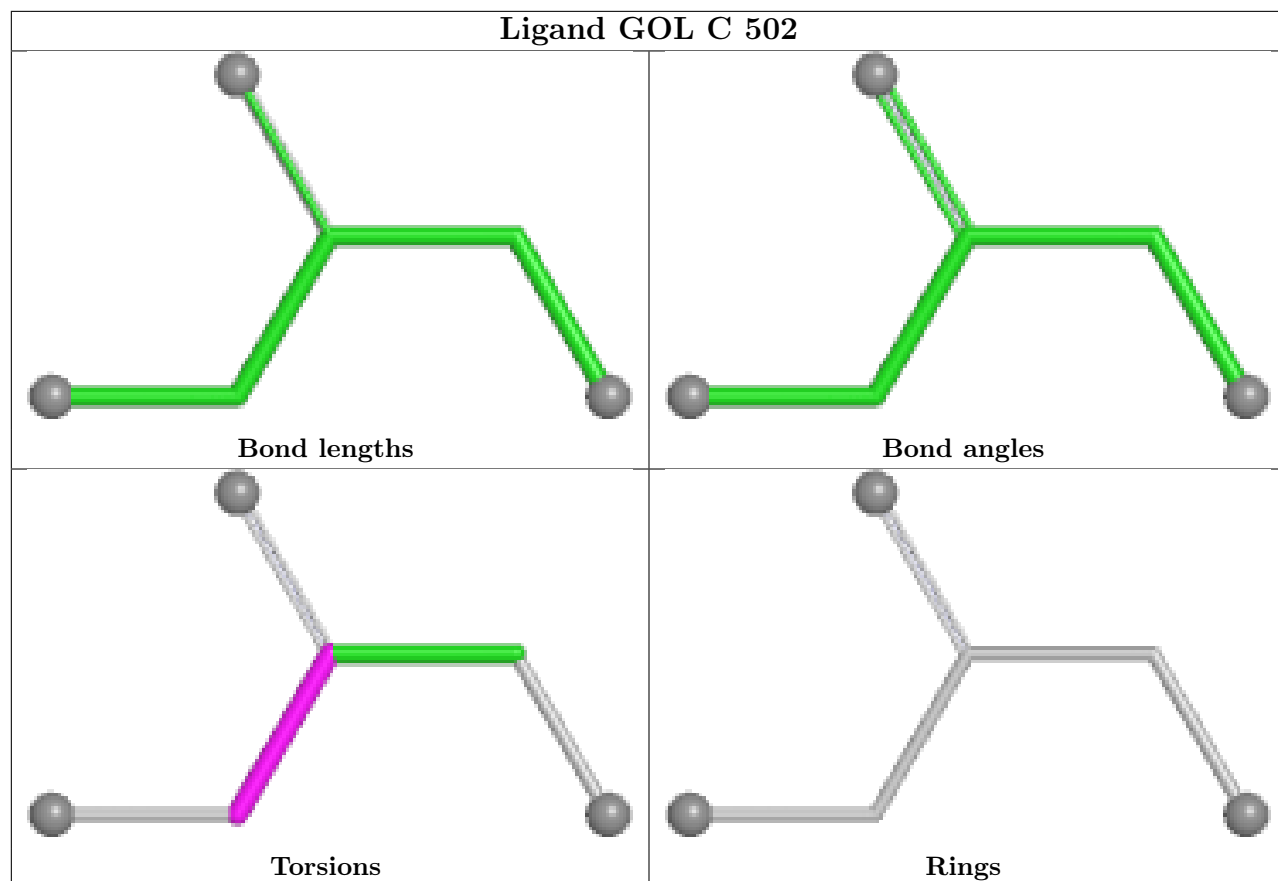


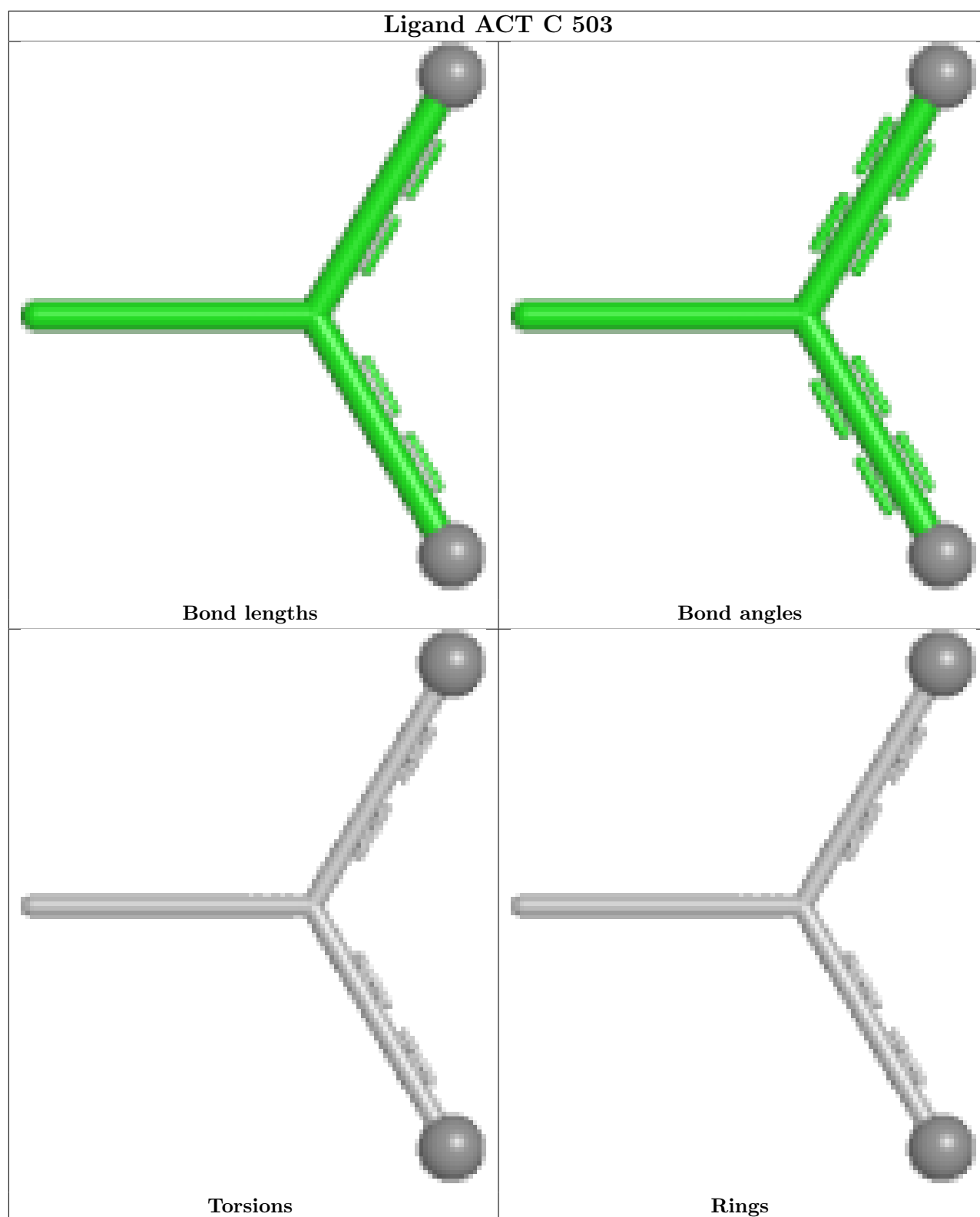












5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues

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	397/422 (94%)	-0.66	2 (0%) 87 90	7, 17, 34, 54	4 (1%)
1	B	403/422 (95%)	-0.65	1 (0%) 91 93	11, 18, 33, 60	1 (0%)
1	C	403/422 (95%)	-0.61	0 100 100	9, 19, 34, 72	2 (0%)
1	D	396/422 (93%)	-0.66	1 (0%) 90 93	6, 18, 34, 51	5 (1%)
All	All	1599/1688 (94%)	-0.65	4 (0%) 90 93	6, 18, 34, 72	12 (0%)

All (4) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	211	ALA	2.9
1	B	243	PRO	2.2
1	D	211	ALA	2.2
1	A	0	SER	2.0

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](#)

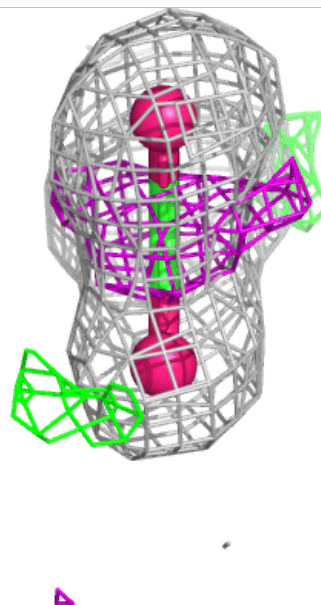
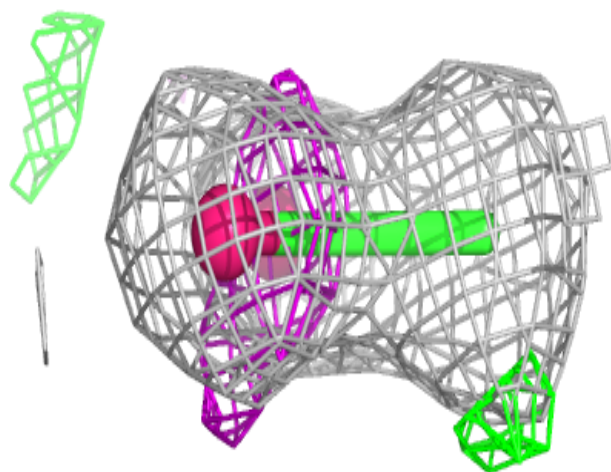
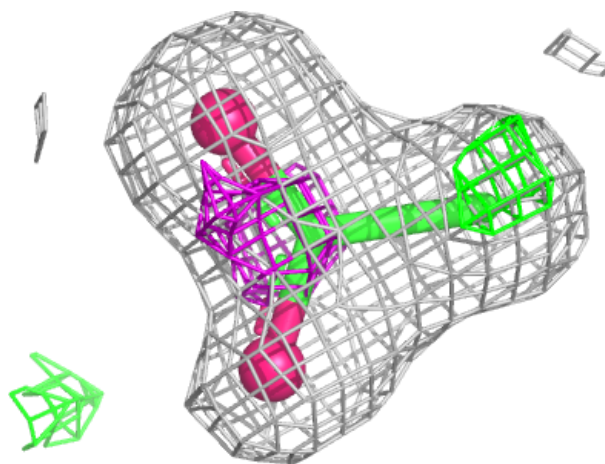
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled ‘Q< 0.9’ lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
3	ACT	D	503	4/4	0.87	0.14	20,25,31,33	0
2	GOL	A	502	6/6	0.90	0.14	25,32,34,39	0
3	ACT	A	503	4/4	0.91	0.10	18,24,28,28	0
2	GOL	C	501	6/6	0.92	0.08	21,23,24,27	0
2	GOL	C	502	6/6	0.93	0.09	25,29,32,32	0
2	GOL	D	502	6/6	0.93	0.10	23,30,33,33	0
3	ACT	C	503	4/4	0.94	0.07	20,25,28,29	0
2	GOL	B	502	6/6	0.95	0.08	22,31,31,32	0
2	GOL	D	501	6/6	0.95	0.07	19,20,21,22	0
2	GOL	A	501	6/6	0.95	0.06	21,22,23,24	0
2	GOL	B	501	6/6	0.96	0.05	22,24,24,24	0
4	CL	B	505	1/1	0.96	0.14	44,44,44,44	0
4	CL	B	504	1/1	0.97	0.08	38,38,38,38	0
4	CL	A	504	1/1	0.97	0.07	38,38,38,38	0
4	CL	A	505	1/1	0.98	0.10	36,36,36,36	0
4	CL	B	503	1/1	0.98	0.06	33,33,33,33	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.

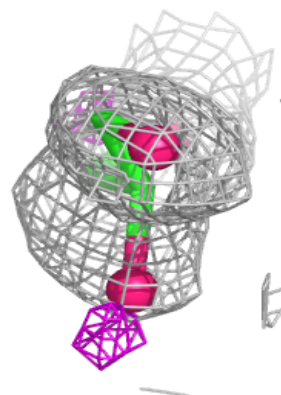
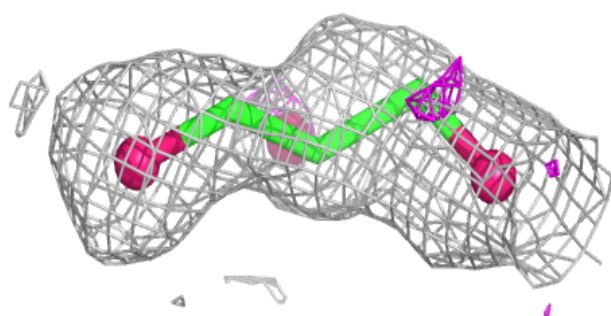
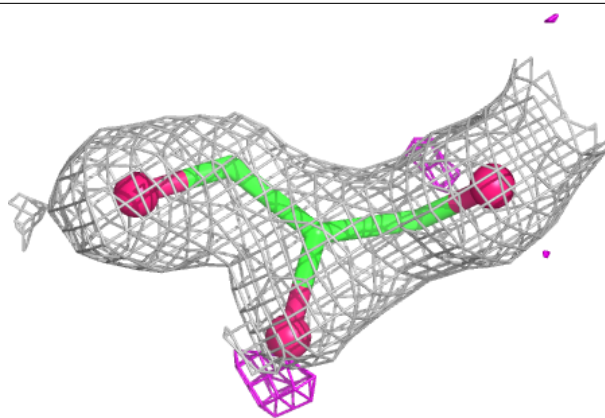
Electron density around ACT D 503:

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



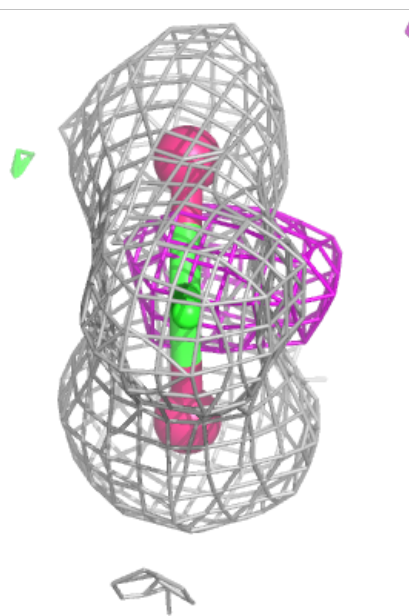
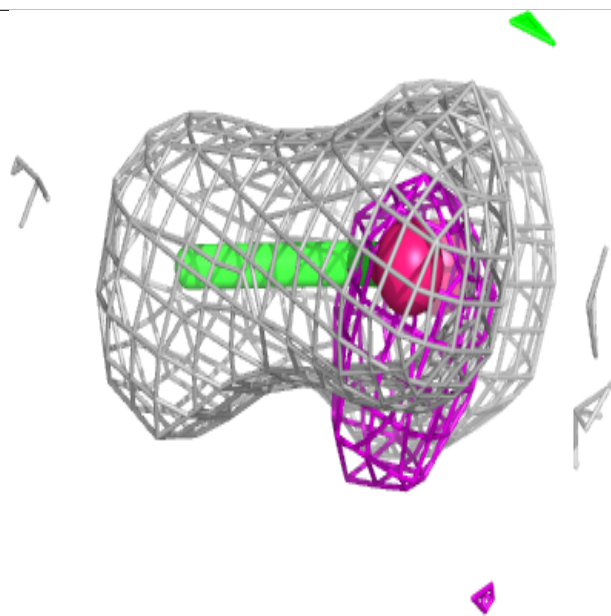
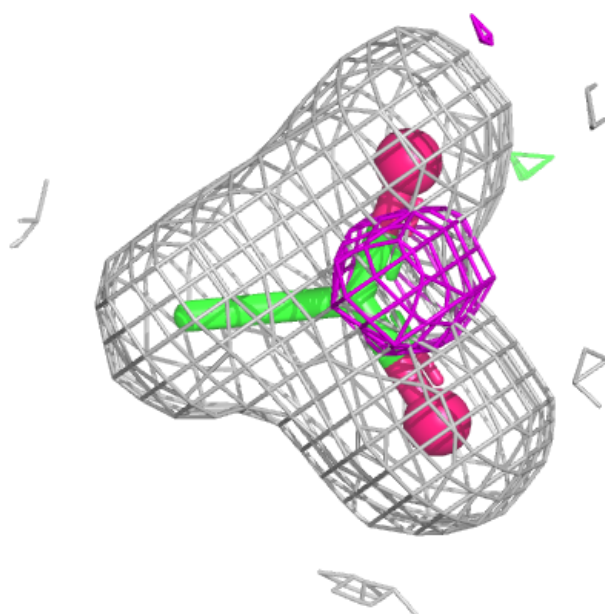
Electron density around GOL A 502:

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



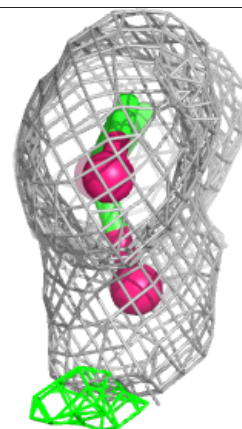
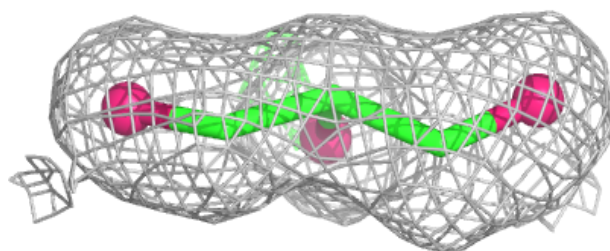
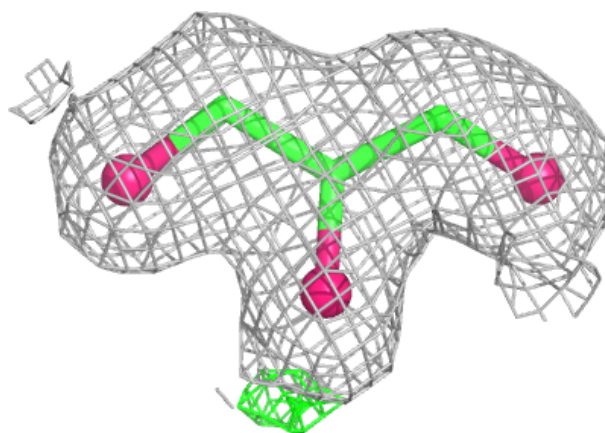
Electron density around ACT A 503:

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

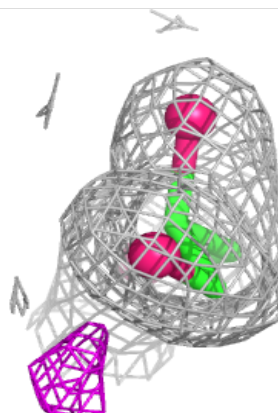
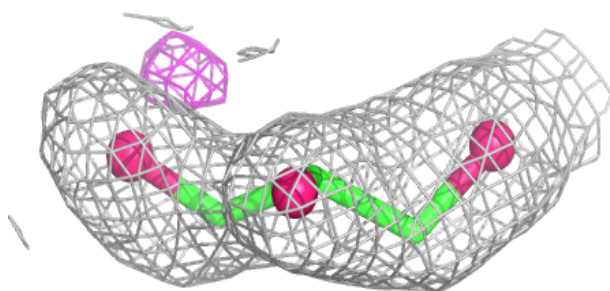
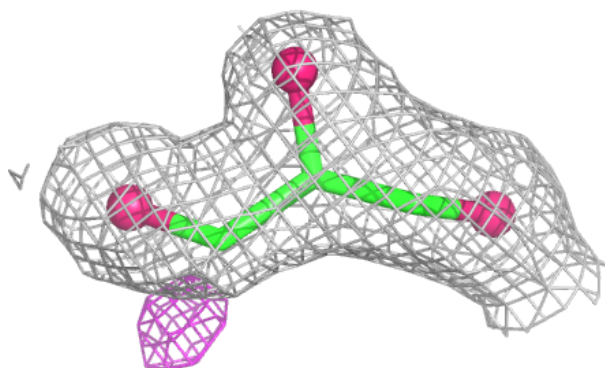


Electron density around GOL C 501:

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

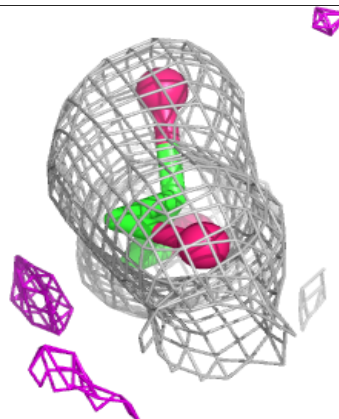
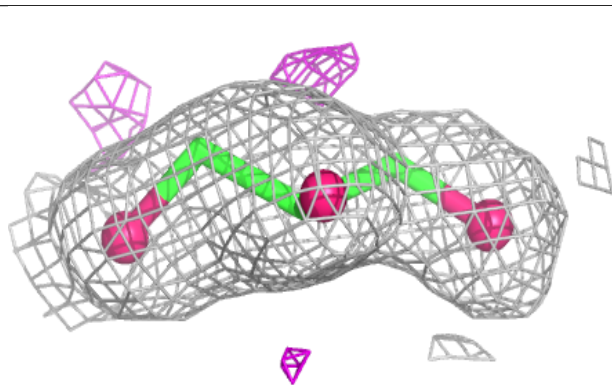
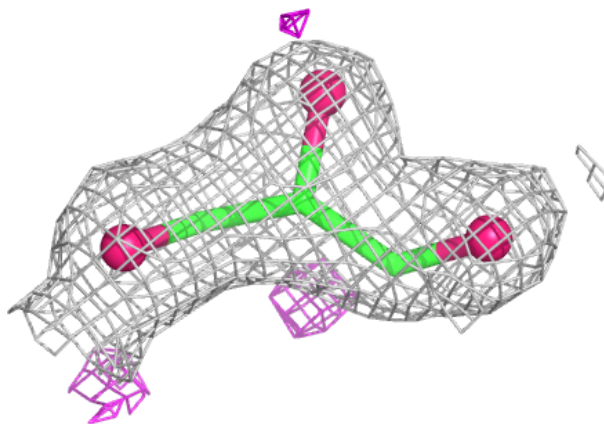
**Electron density around GOL C 502:**

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



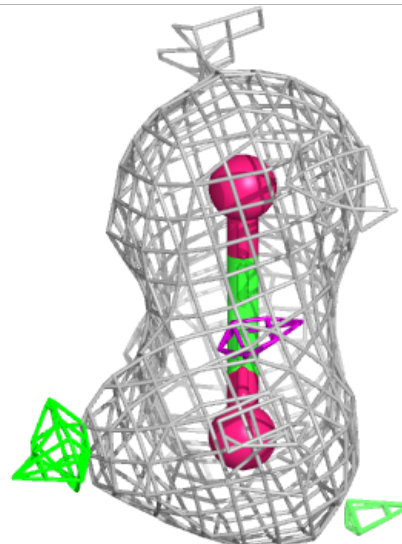
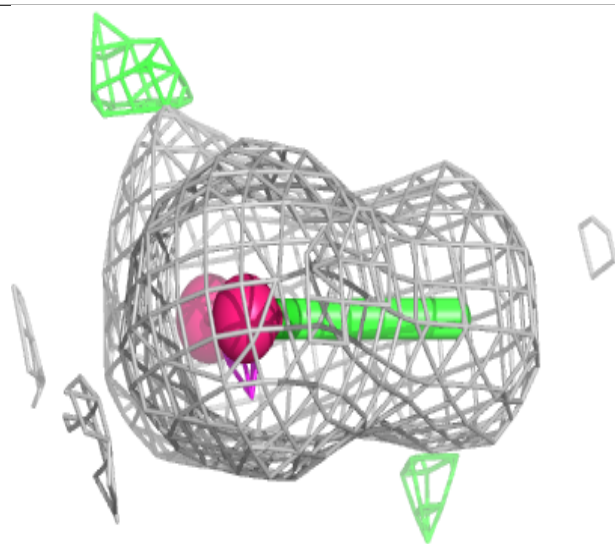
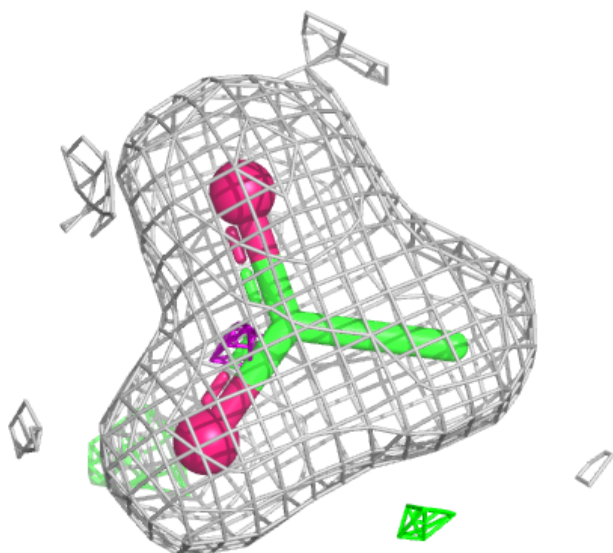
Electron density around GOL D 502:

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



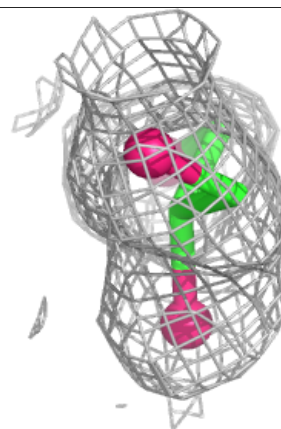
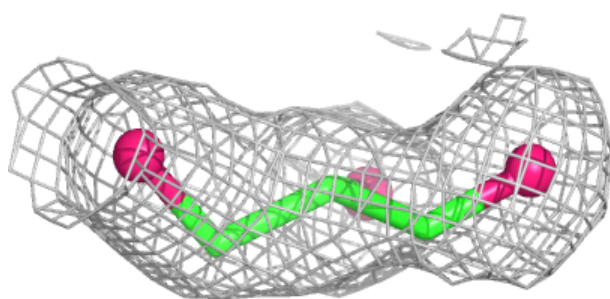
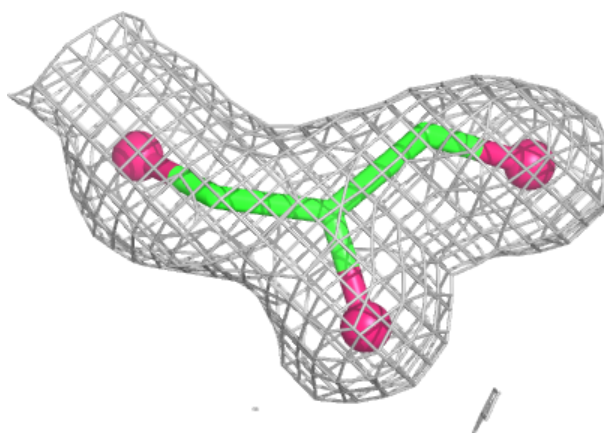
Electron density around ACT C 503:

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

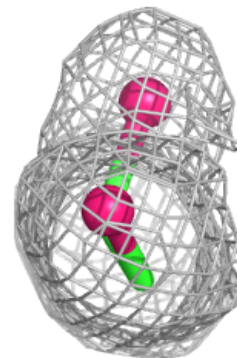
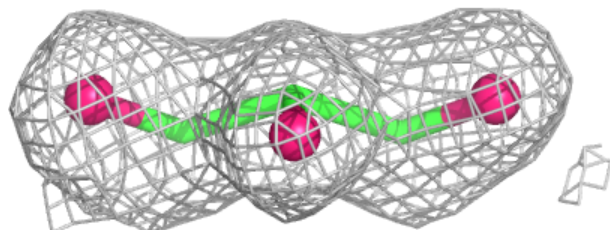
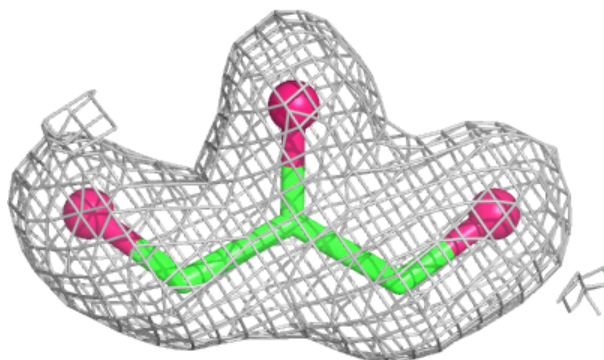


Electron density around GOL B 502:

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and green (positive)

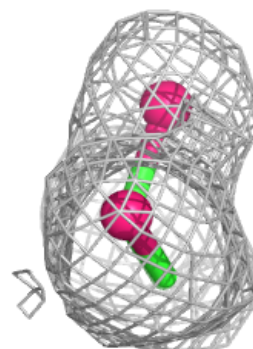
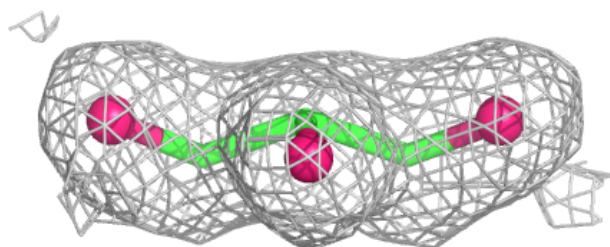
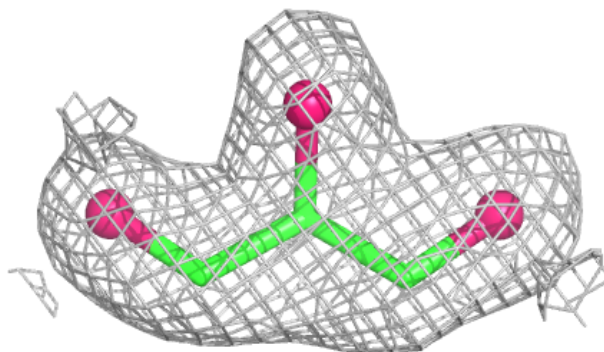
**Electron density around GOL D 501:**

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

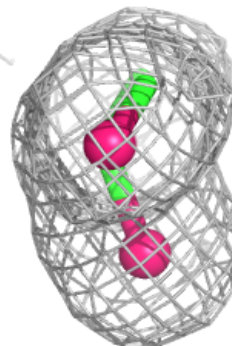
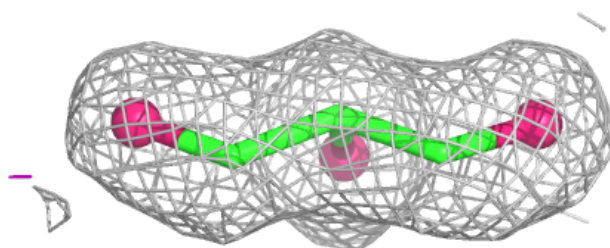
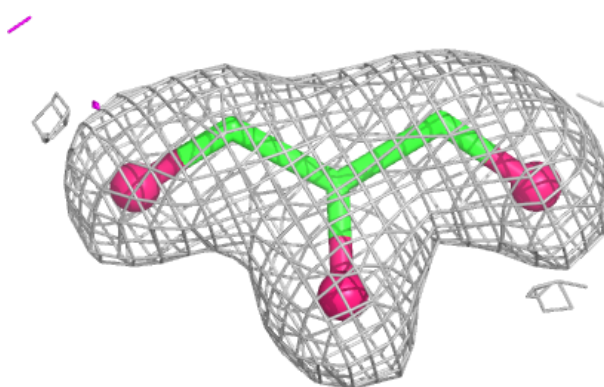


Electron density around GOL A 501:

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

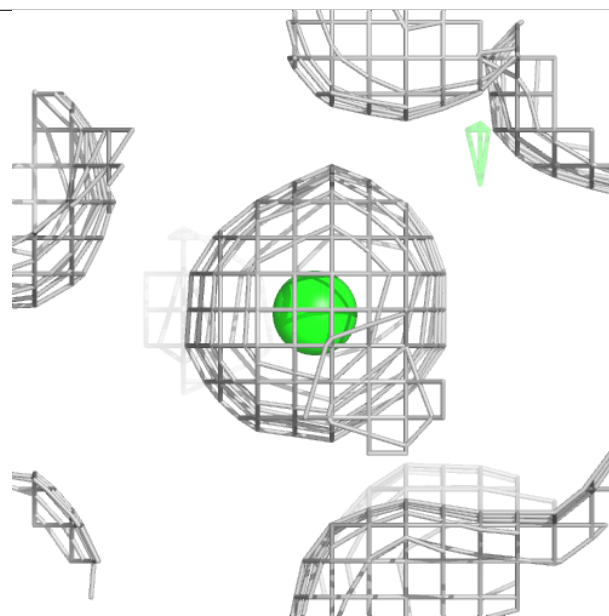
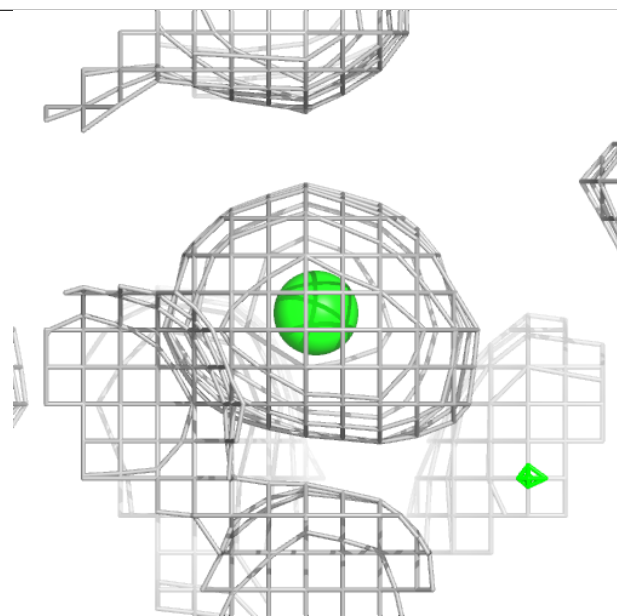
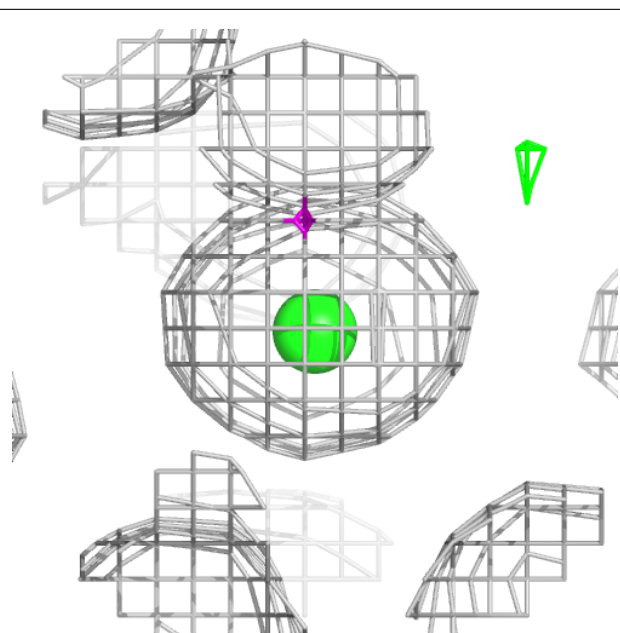
**Electron density around GOL B 501:**

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



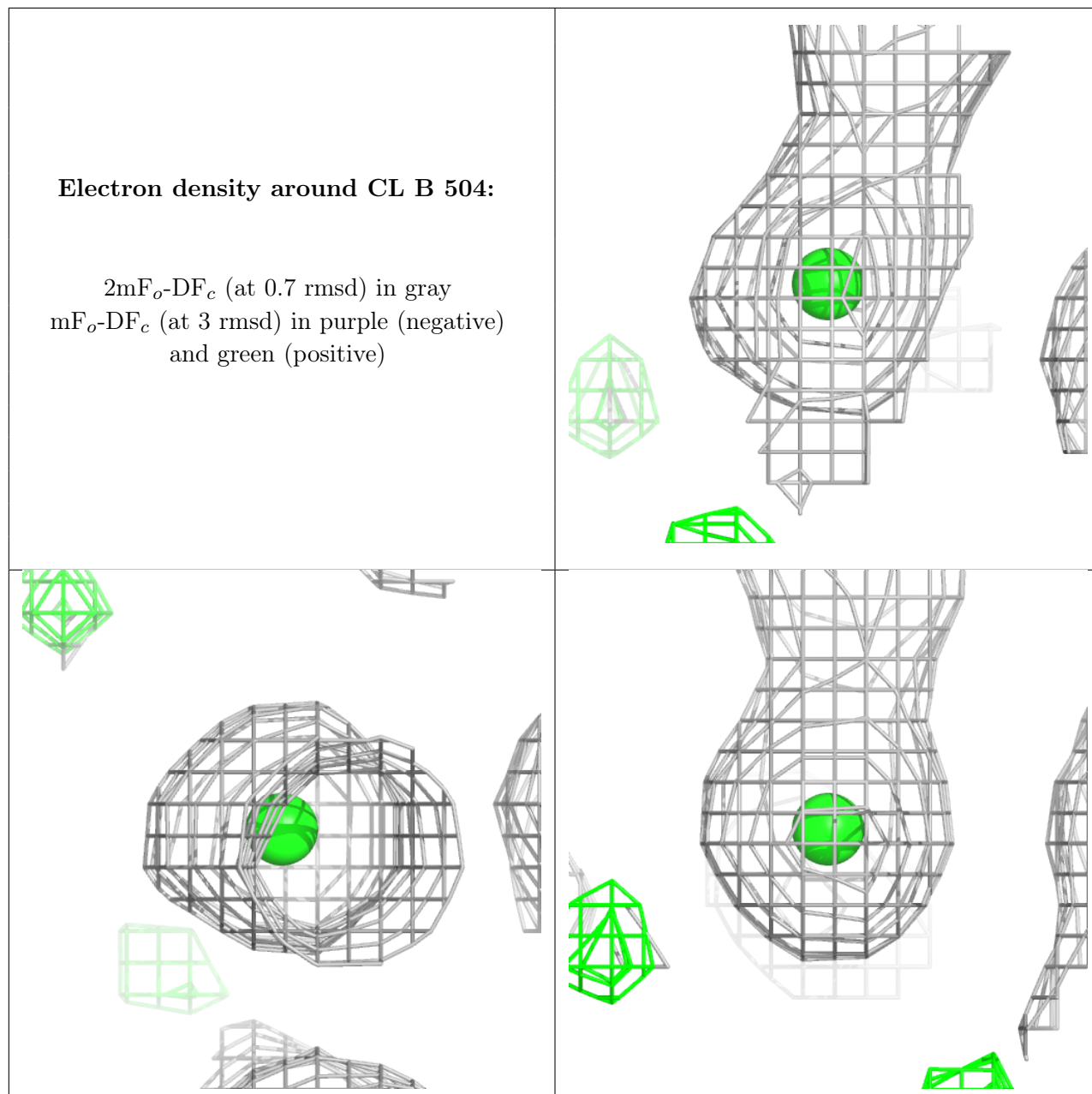
Electron density around CL B 505:

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



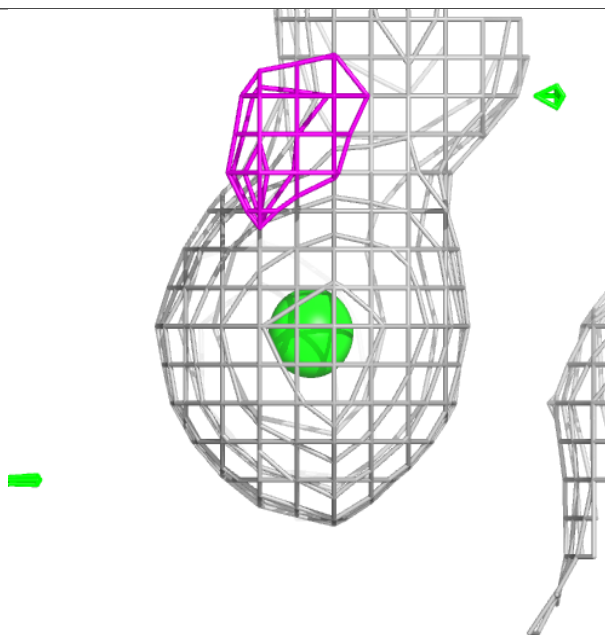
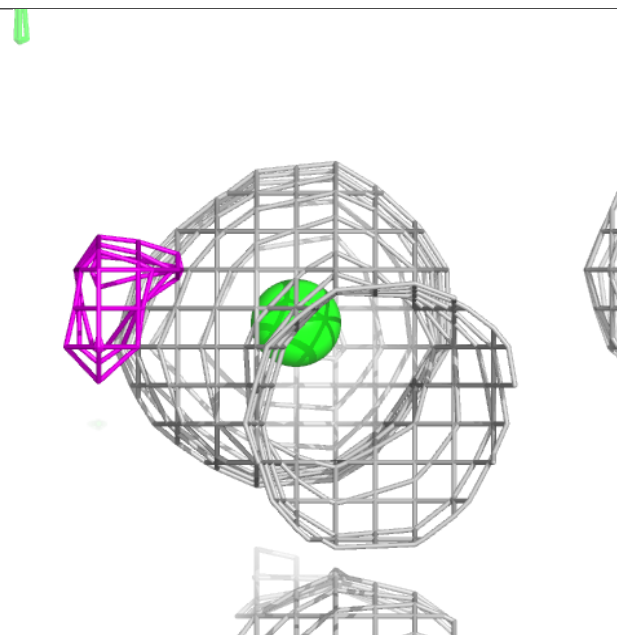
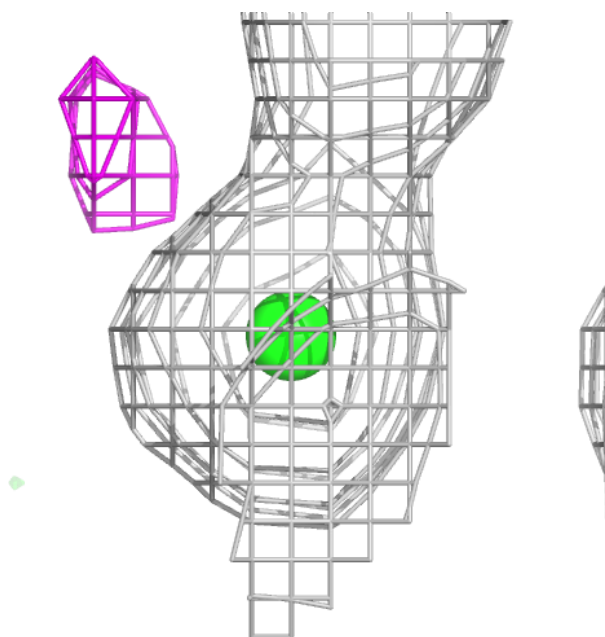
Electron density around CL B 504:

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



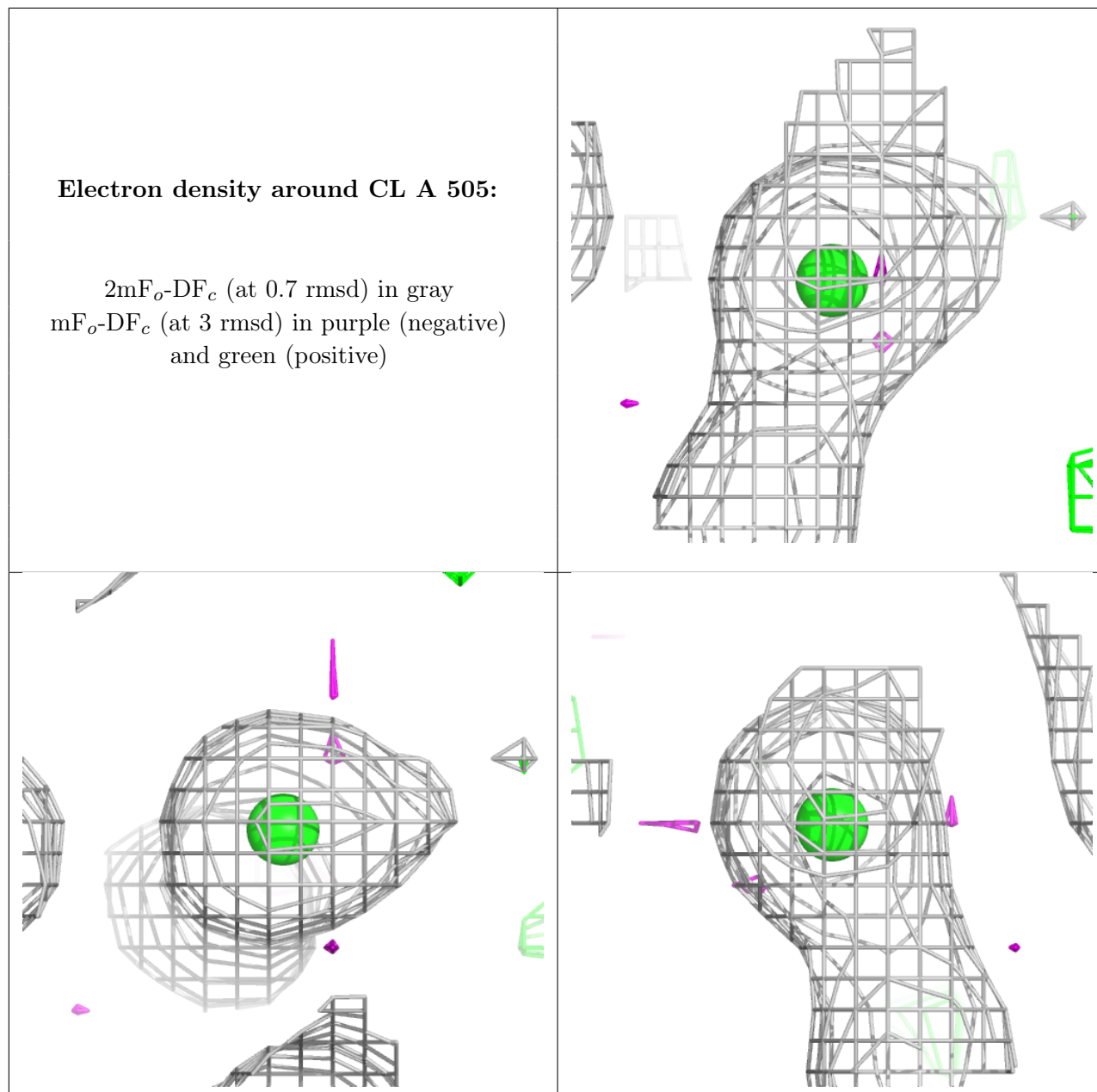
Electron density around CL A 504:

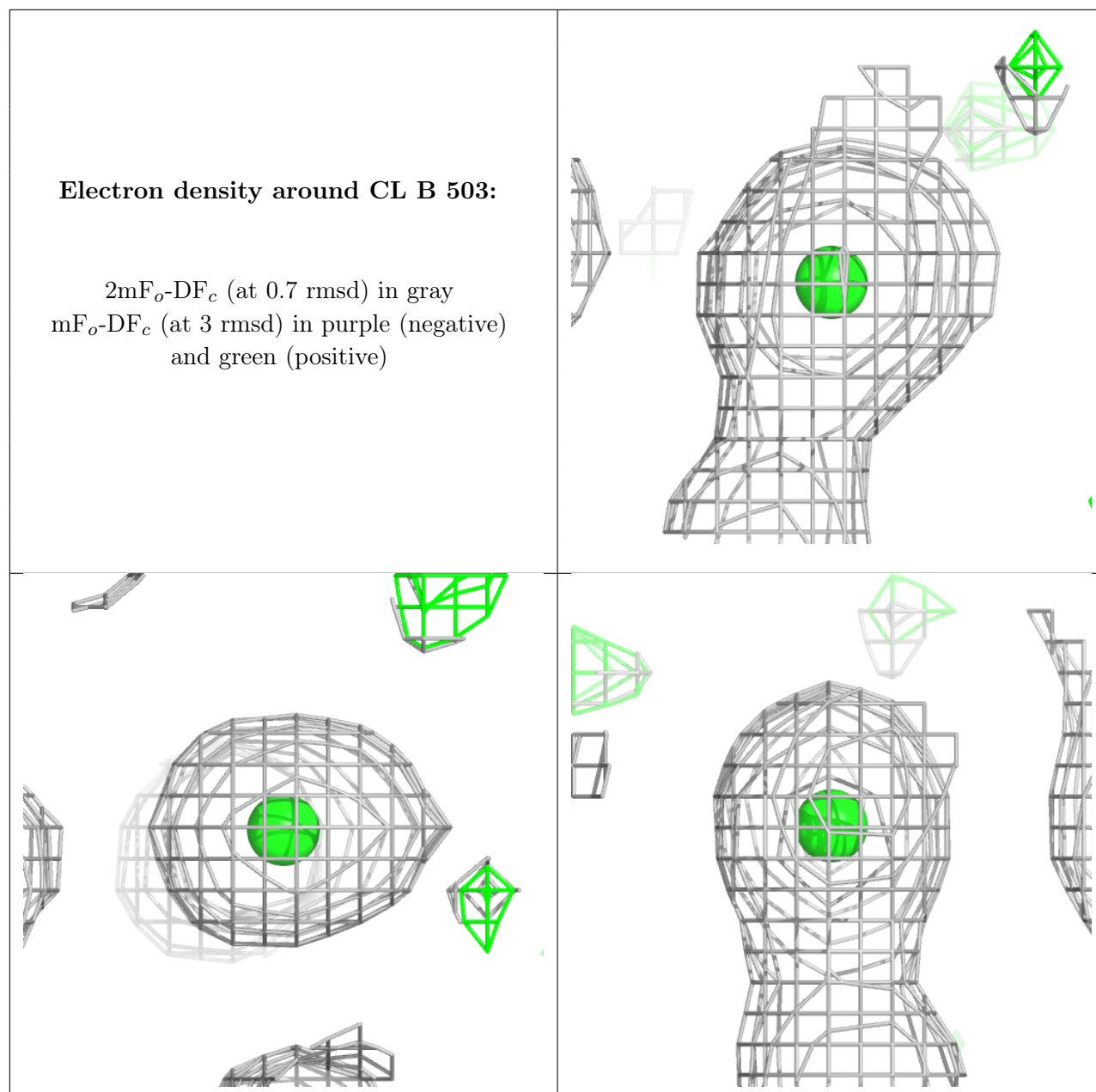
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around CL 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)





6.5 Other polymers ⓘ

There are no such residues in this entry.