



Full wwPDB X-ray Structure Validation Report ⓘ

Oct 15, 2023 – 12:03 AM EDT

PDB ID : 8DK9
Title : Sliding-clamp-DinX peptide
Authors : Kapur, M.K.; Gray, O.J.; Honzatko, R.H.; Nelson, S.N.
Deposited on : 2022-07-05
Resolution : 2.50 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 : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.36
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36

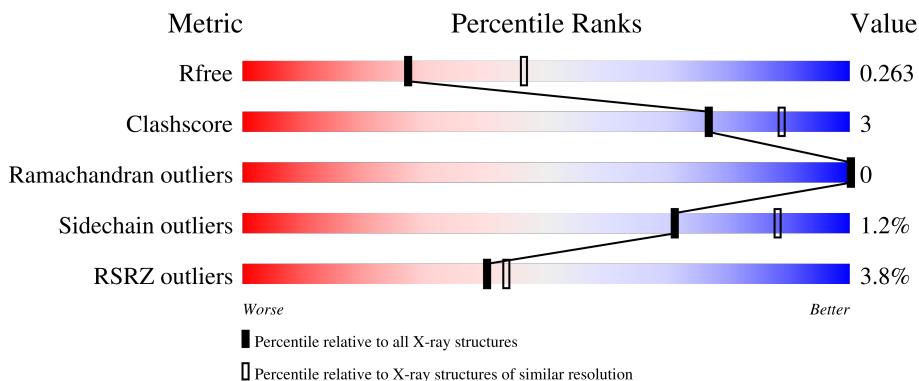
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.50 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.






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

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

Mol	Chain	Length	Quality of chain
1	A	397	<div style="display: flex; align-items: center;"> <div style="width: 2%; height: 10px; background-color: red; margin-right: 2px;"></div> <div style="width: 91%; height: 10px; background-color: green; margin-right: 2px;"></div> <div style="width: 7%; height: 10px; background-color: yellow; margin-right: 2px;"></div> <div style="width: 0%; height: 10px; background-color: grey; margin-right: 2px;"></div> </div> <p style="margin-left: 20px;">2% 91% 7% .</p>
1	B	397	<div style="display: flex; align-items: center;"> <div style="width: 0%; height: 10px; background-color: red; margin-right: 2px;"></div> <div style="width: 91%; height: 10px; background-color: green; margin-right: 2px;"></div> <div style="width: 6%; height: 10px; background-color: yellow; margin-right: 2px;"></div> <div style="width: 3%; height: 10px; background-color: grey; margin-right: 2px;"></div> </div> <p style="margin-left: 20px;">% 91% 6% .</p>
1	C	397	<div style="display: flex; align-items: center;"> <div style="width: 8%; height: 10px; background-color: red; margin-right: 2px;"></div> <div style="width: 89%; height: 10px; background-color: green; margin-right: 2px;"></div> <div style="width: 9%; height: 10px; background-color: yellow; margin-right: 2px;"></div> <div style="width: 4%; height: 10px; background-color: grey; margin-right: 2px;"></div> </div> <p style="margin-left: 20px;">8% 89% 9% .</p>
1	D	397	<div style="display: flex; align-items: center;"> <div style="width: 4%; height: 10px; background-color: red; margin-right: 2px;"></div> <div style="width: 91%; height: 10px; background-color: green; margin-right: 2px;"></div> <div style="width: 6%; height: 10px; background-color: yellow; margin-right: 2px;"></div> <div style="width: 0%; height: 10px; background-color: grey; margin-right: 2px;"></div> </div> <p style="margin-left: 20px;">4% 91% 6% .</p>
2	E	6	<div style="display: flex; align-items: center;"> <div style="width: 17%; height: 10px; background-color: red; margin-right: 2px;"></div> <div style="width: 100%; height: 10px; background-color: green; margin-right: 2px;"></div> </div> <p style="margin-left: 20px;">17% 100%</p>

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Mol	Chain	Length	Quality of chain
2	F	6	 83% 17%
2	G	6	 17% 83% 17%
2	H	6	 17% 83% 17%

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	SO4	B	402	-	-	-	X
6	NH2	E	102	-	-	-	X
6	NH2	G	102	-	-	-	X

2 Entry composition [i](#)

There are 7 unique types of molecules in this entry. The entry contains 24227 atoms, of which 11854 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 sliding clamp.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace	
			Total	C	H	N	O				S
1	A	388	5789	1815	2910	493	564	7	0	1	0
1	B	388	5824	1828	2928	496	565	7	0	4	0
1	C	388	5816	1824	2923	496	566	7	0	3	0
1	D	388	5788	1815	2909	493	564	7	0	1	0

- Molecule 2 is a protein called DNA polymerase IV 1 peptide.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	H	N	O			
2	E	6	92	31	44	7	10	0	0	0
2	F	6	92	31	44	7	10	0	0	0
2	G	6	92	31	44	7	10	0	0	0
2	H	6	92	31	44	7	10	0	0	0

- Molecule 3 is SULFATE ION (three-letter code: SO4) (formula: O₄S) (labeled as "Ligand of Interest" by depositor).

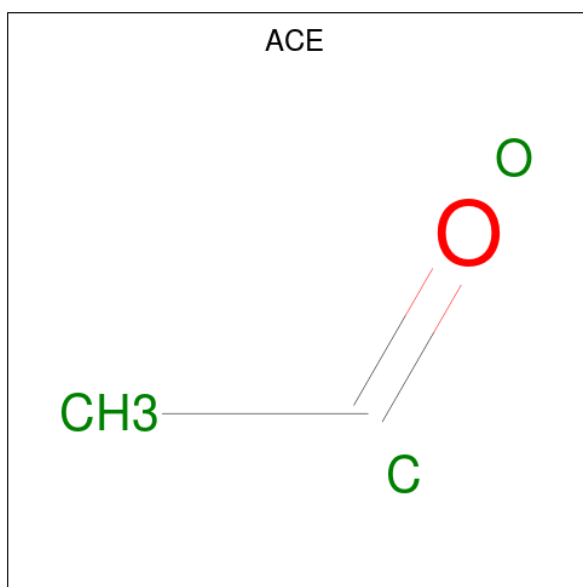


Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total O S 5 4 1	0	0
3	B	1	Total O S 5 4 1	0	0
3	B	1	Total O S 5 4 1	0	0
3	D	1	Total O S 5 4 1	0	0

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

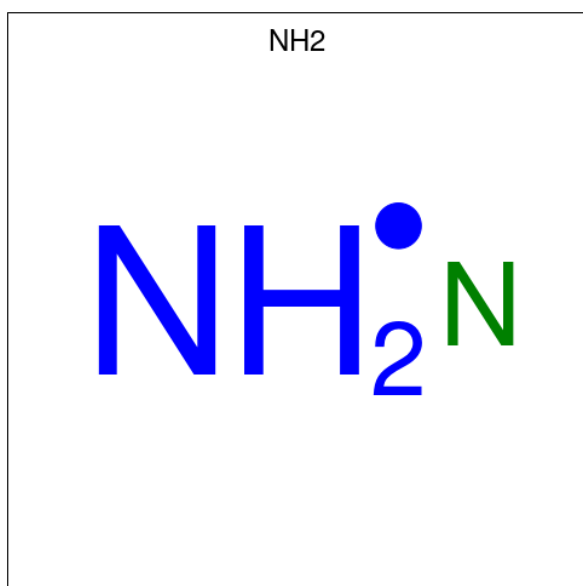
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	B	1	Total Cl 1 1	0	0

- Molecule 5 is ACETYL GROUP (three-letter code: ACE) (formula: C₂H₄O) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	E	1	Total	C	O	0	0
			3	2	1		
5	F	1	Total	C	O	0	0
			3	2	1		
5	G	1	Total	C	O	0	0
			3	2	1		
5	H	1	Total	C	O	0	0
			3	2	1		

- Molecule 6 is AMINO GROUP (three-letter code: NH2) (formula: H₂N) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	E	1	Total	H	N	0	0
			3	2	1		
6	F	1	Total	H	N	0	0
			3	2	1		
6	G	1	Total	H	N	0	0
			3	2	1		
6	H	1	Total	H	N	0	0
			3	2	1		

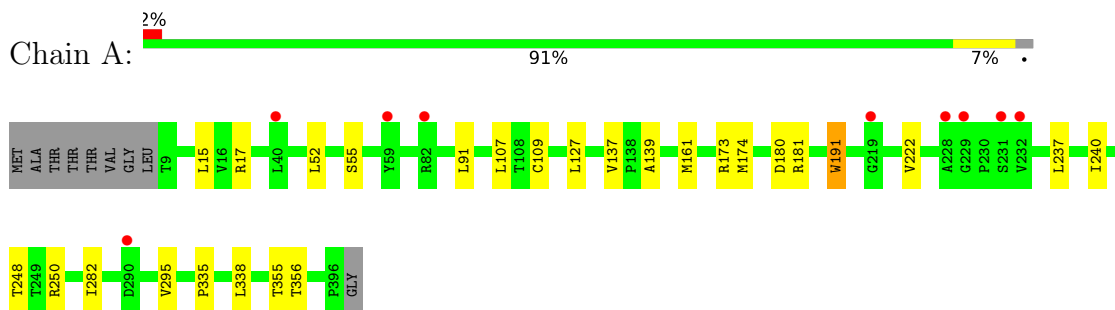
- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	152	Total	O	0	0
			152	152		
7	B	189	Total	O	0	0
			189	189		
7	E	3	Total	O	0	0
			3	3		
7	F	5	Total	O	0	0
			5	5		
7	C	113	Total	O	0	0
			113	113		
7	D	126	Total	O	0	0
			126	126		
7	G	4	Total	O	0	0
			4	4		
7	H	5	Total	O	0	0
			5	5		

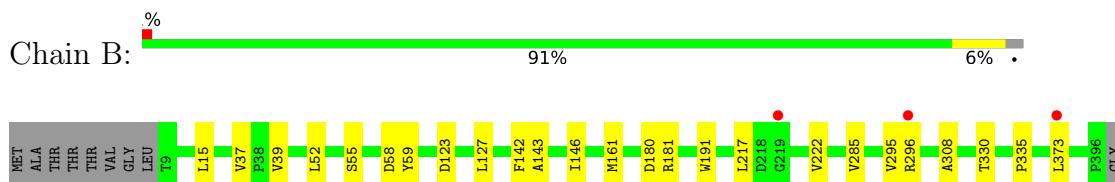
3 Residue-property plots

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

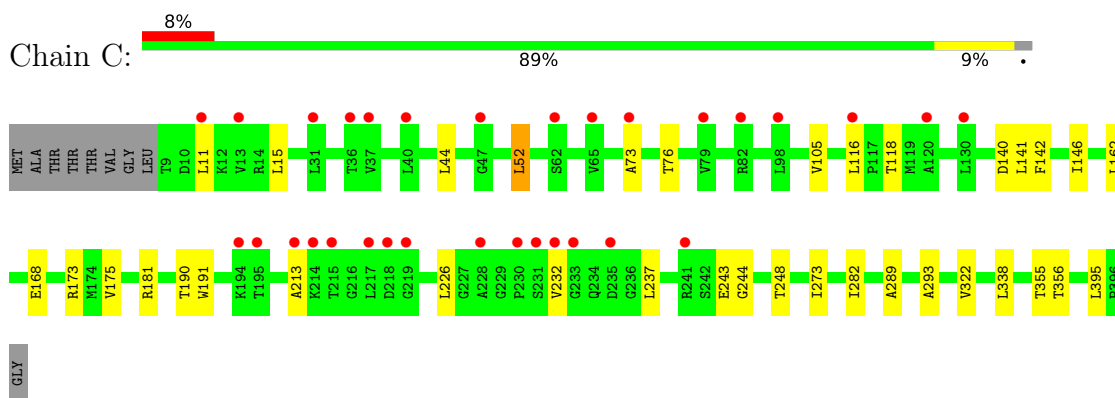
- Molecule 1: Beta sliding clamp



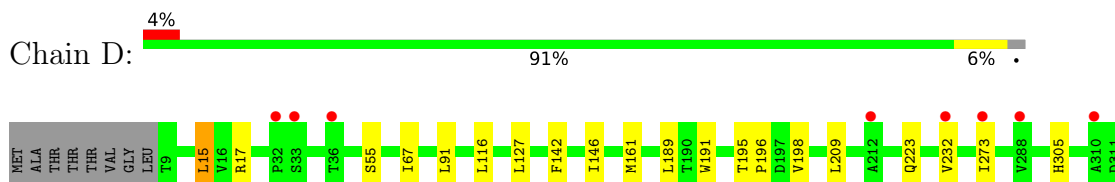
- Molecule 1: Beta sliding clamp

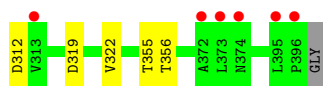


- Molecule 1: Beta sliding clamp



- Molecule 1: Beta sliding clamp

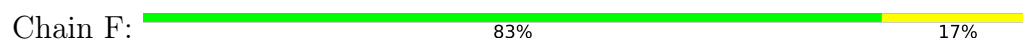




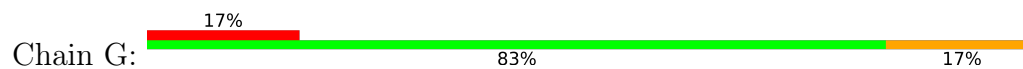
- Molecule 2: DNA polymerase IV 1 peptide



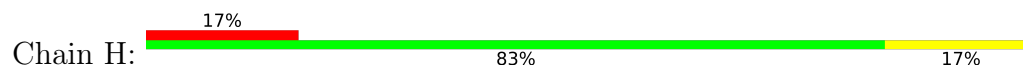
- Molecule 2: DNA polymerase IV 1 peptide



- Molecule 2: DNA polymerase IV 1 peptide



- Molecule 2: DNA polymerase IV 1 peptide



4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	71.07Å 73.94Å 81.34Å 82.77° 77.57° 87.75°	Depositor
Resolution (Å)	47.35 – 2.50 47.35 – 2.50	Depositor EDS
% Data completeness (in resolution range)	95.0 (47.35-2.50) 95.0 (47.35-2.50)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.37 (at 2.51Å)	Xtrriage
Refinement program	PHENIX 1.19.2_4158	Depositor
R, R_{free}	0.211 , 0.264 0.208 , 0.263	Depositor DCC
R_{free} test set	1999 reflections (3.79%)	wwPDB-VP
Wilson B-factor (Å ²)	48.9	Xtrriage
Anisotropy	0.239	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 51.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	24227	wwPDB-VP
Average B, all atoms (Å ²)	61.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.70% 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: NH2, SO4, CL, ACE

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	0/2934	0.51	0/4007
1	B	0.25	0/2961	0.52	0/4044
1	C	0.25	0/2954	0.51	0/4033
1	D	0.25	0/2934	0.52	0/4007
2	E	0.27	0/48	0.41	0/63
2	F	0.27	0/48	0.40	0/63
2	G	0.27	0/48	0.62	0/63
2	H	0.57	0/48	0.60	0/63
All	All	0.25	0/11975	0.51	0/16343

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	2879	2910	2909	18	0
1	B	2896	2928	2933	13	0
1	C	2893	2923	2928	23	0
1	D	2879	2909	2909	15	0
2	E	48	44	43	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	F	48	44	43	0	0
2	G	48	44	43	1	0
2	H	48	44	43	0	0
3	A	5	0	0	0	0
3	B	10	0	0	0	0
3	D	5	0	0	0	0
4	B	1	0	0	0	0
5	E	3	0	3	0	0
5	F	3	0	3	0	0
5	G	3	0	3	0	0
5	H	3	0	3	0	0
6	E	1	2	0	0	0
6	F	1	2	0	0	0
6	G	1	2	0	0	0
6	H	1	2	0	0	0
7	A	152	0	0	0	0
7	B	189	0	0	0	0
7	C	113	0	0	0	0
7	D	126	0	0	0	0
7	E	3	0	0	0	0
7	F	5	0	0	0	0
7	G	4	0	0	0	0
7	H	5	0	0	0	0
All	All	12373	11854	11863	70	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 (70) 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:137:VAL:HG22	1:A:191:TRP:HB2	1.69	0.73
1:B:295:VAL:HG23	1:B:335:PRO:HG3	1.70	0.71
1:B:373:LEU:HD12	1:B:373:LEU:O	1.92	0.69
1:B:142:PHE:CZ	1:B:146:ILE:HD11	2.29	0.68
1:C:237:LEU:HD21	1:C:248:THR:HB	1.79	0.64
1:A:55:SER:HB3	1:A:127:LEU:HD11	1.79	0.64
1:D:198:VAL:HG21	1:D:232:VAL:HG21	1.79	0.64
1:C:44:LEU:HD11	1:C:76:THR:CG2	2.29	0.63
1:C:162:LEU:HD21	1:C:181:ARG:HG3	1.80	0.63
1:B:55:SER:OG	1:B:127:LEU:HD11	2.00	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:11:LEU:HD12	1:C:73:ALA:O	2.01	0.60
1:A:282:ILE:HD13	1:A:338:LEU:HD23	1.83	0.59
1:A:137:VAL:HG22	1:A:191:TRP:CB	2.32	0.58
1:C:142:PHE:CZ	1:C:146:ILE:HD11	2.38	0.58
1:D:273:ILE:HB	1:D:322:VAL:HG23	1.85	0.57
1:C:173:ARG:CD	1:C:190:THR:HG22	2.35	0.56
1:C:168:GLU:HB2	1:C:175:VAL:HG13	1.88	0.56
1:A:295:VAL:HG23	1:A:335:PRO:HG3	1.90	0.54
1:A:91:LEU:HD22	1:A:109:CYS:HB3	1.91	0.52
1:A:15:LEU:HD11	1:A:52:LEU:HD22	1.93	0.51
1:B:37:VAL:HG12	1:B:39:VAL:HG22	1.94	0.50
1:B:180:ASP:O	1:B:181:ARG:HB2	2.12	0.49
1:C:146:ILE:HD12	1:C:213:ALA:CB	2.43	0.49
1:C:173:ARG:HD2	1:C:190:THR:HG22	1.95	0.48
1:D:161:MET:SD	1:D:161:MET:N	2.86	0.48
1:B:15:LEU:HD21	1:B:52:LEU:HD22	1.96	0.48
1:C:142:PHE:CE2	1:C:146:ILE:HD11	2.49	0.47
1:A:139:ALA:HB2	1:A:222:VAL:HG23	1.97	0.47
1:A:180:ASP:O	1:A:181:ARG:HB2	2.14	0.47
1:D:15:LEU:HD22	1:D:67:ILE:HD11	1.94	0.47
1:D:198:VAL:HG21	1:D:232:VAL:CG2	2.43	0.46
1:D:355:THR:HG22	1:D:356:THR:HG23	1.96	0.46
1:C:289:ALA:HB3	1:C:293:ALA:HB2	1.99	0.45
1:A:137:VAL:HG21	1:A:174:MET:CE	2.45	0.45
1:B:217:LEU:HD22	1:B:222:VAL:HG21	1.98	0.45
1:D:198:VAL:HG11	1:D:232:VAL:HG21	1.98	0.45
1:D:142:PHE:CZ	1:D:146:ILE:HD11	2.52	0.45
1:A:107:LEU:C	1:A:107:LEU:HD23	2.36	0.45
1:C:355:THR:HG22	1:C:356:THR:HG23	1.98	0.45
1:A:137:VAL:HG21	1:A:174:MET:HE1	2.00	0.44
2:G:6:PHE:CD1	2:G:6:PHE:N	2.82	0.44
1:A:237:LEU:HD12	1:A:248:THR:HB	2.00	0.44
1:A:355:THR:HG22	1:A:356:THR:HG23	1.99	0.43
1:D:146:ILE:HD13	1:D:209:LEU:HG	2.00	0.43
1:C:44:LEU:HD11	1:C:76:THR:HG23	1.98	0.43
1:B:39:VAL:HG11	1:B:123:ASP:HB2	2.00	0.43
1:C:226:LEU:HB2	1:C:232:VAL:HG13	2.01	0.43
1:C:105:VAL:HG23	1:C:118:THR:HG22	2.00	0.42
1:A:222:VAL:CG1	1:A:240:ILE:HG23	2.48	0.42
1:C:282:ILE:HD13	1:C:338:LEU:HD23	2.02	0.42
1:A:91:LEU:HD11	1:A:107:LEU:HD21	2.00	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:296[A]:ARG:NH2	1:B:330:THR:HG21	2.35	0.42
1:D:17:ARG:NH1	1:D:91:LEU:O	2.52	0.42
1:D:55:SER:HB3	1:D:127:LEU:HD11	2.02	0.42
1:C:243:GLU:HG3	1:C:244:GLY:H	1.85	0.41
1:C:140:ASP:OD1	1:C:141:LEU:N	2.53	0.41
1:C:395:LEU:HD12	1:C:395:LEU:N	2.35	0.41
1:C:273:ILE:HB	1:C:322:VAL:HG23	2.02	0.41
1:D:312:ASP:OD1	1:D:312:ASP:N	2.54	0.41
1:A:15:LEU:HD11	1:A:52:LEU:CD2	2.51	0.41
1:B:58:ASP:O	1:B:59:TYR:HB2	2.21	0.41
1:B:143:ALA:HB2	1:B:217:LEU:HD12	2.01	0.41
1:C:15:LEU:HD11	1:C:52:LEU:HD13	2.03	0.41
1:C:168:GLU:HB2	1:C:175:VAL:CG1	2.50	0.41
1:B:285:VAL:HG12	1:B:308:ALA:HB3	2.03	0.40
1:D:305:HIS:ND1	1:D:319:ASP:OD1	2.54	0.40
1:A:17:ARG:NH1	1:A:91:LEU:O	2.54	0.40
1:C:116:LEU:HD12	1:C:116:LEU:N	2.36	0.40
1:D:116:LEU:N	1:D:116:LEU:HD12	2.37	0.40
1:D:195:THR:HB	1:D:196:PRO:HD2	2.03	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	387/397 (98%)	372 (96%)	15 (4%)	0	100	100
1	B	390/397 (98%)	376 (96%)	14 (4%)	0	100	100
1	C	389/397 (98%)	369 (95%)	20 (5%)	0	100	100
1	D	387/397 (98%)	369 (95%)	18 (5%)	0	100	100
2	E	4/6 (67%)	4 (100%)	0	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	F	4/6 (67%)	4 (100%)	0	0	100	100
2	G	4/6 (67%)	4 (100%)	0	0	100	100
2	H	4/6 (67%)	4 (100%)	0	0	100	100
All	All	1569/1612 (97%)	1502 (96%)	67 (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	306/311 (98%)	302 (99%)	4 (1%)	69	87
1	B	309/311 (99%)	307 (99%)	2 (1%)	86	95
1	C	308/311 (99%)	306 (99%)	2 (1%)	86	95
1	D	306/311 (98%)	302 (99%)	4 (1%)	69	87
2	E	5/5 (100%)	5 (100%)	0	100	100
2	F	5/5 (100%)	4 (80%)	1 (20%)	1	2
2	G	5/5 (100%)	4 (80%)	1 (20%)	1	2
2	H	5/5 (100%)	4 (80%)	1 (20%)	1	2
All	All	1249/1264 (99%)	1234 (99%)	15 (1%)	71	88

All (15) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	161	MET
1	A	173	ARG
1	A	191	TRP
1	A	250	ARG
1	B	161	MET
1	B	191	TRP
2	F	6	PHE
1	C	52	LEU

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Mol	Chain	Res	Type
1	C	191	TRP
1	D	15	LEU
1	D	189	LEU
1	D	191	TRP
1	D	223	GLN
2	G	6	PHE
2	H	6	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](#)

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

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 13 ligands modelled in this entry, 1 is monoatomic and 4 are modelled with single atom - 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	$\# Z > 2$
3	SO4	D	401	-	4,4,4	0.14	0	6,6,6	0.04	0
3	SO4	B	401	-	4,4,4	0.14	0	6,6,6	0.06	0
5	ACE	F	101	2	1,2,2	0.78	0	1,1,1	0.27	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
5	ACE	E	101	2	1,2,2	0.78	0	1,1,1	0.26	0
5	ACE	H	101	2	1,2,2	0.79	0	1,1,1	0.27	0
3	SO4	B	402	-	4,4,4	0.14	0	6,6,6	0.07	0
5	ACE	G	101	2	1,2,2	0.78	0	1,1,1	0.28	0
3	SO4	A	401	-	4,4,4	0.15	0	6,6,6	0.05	0

There are no bond length outliers.

There are no bond angle outliers.

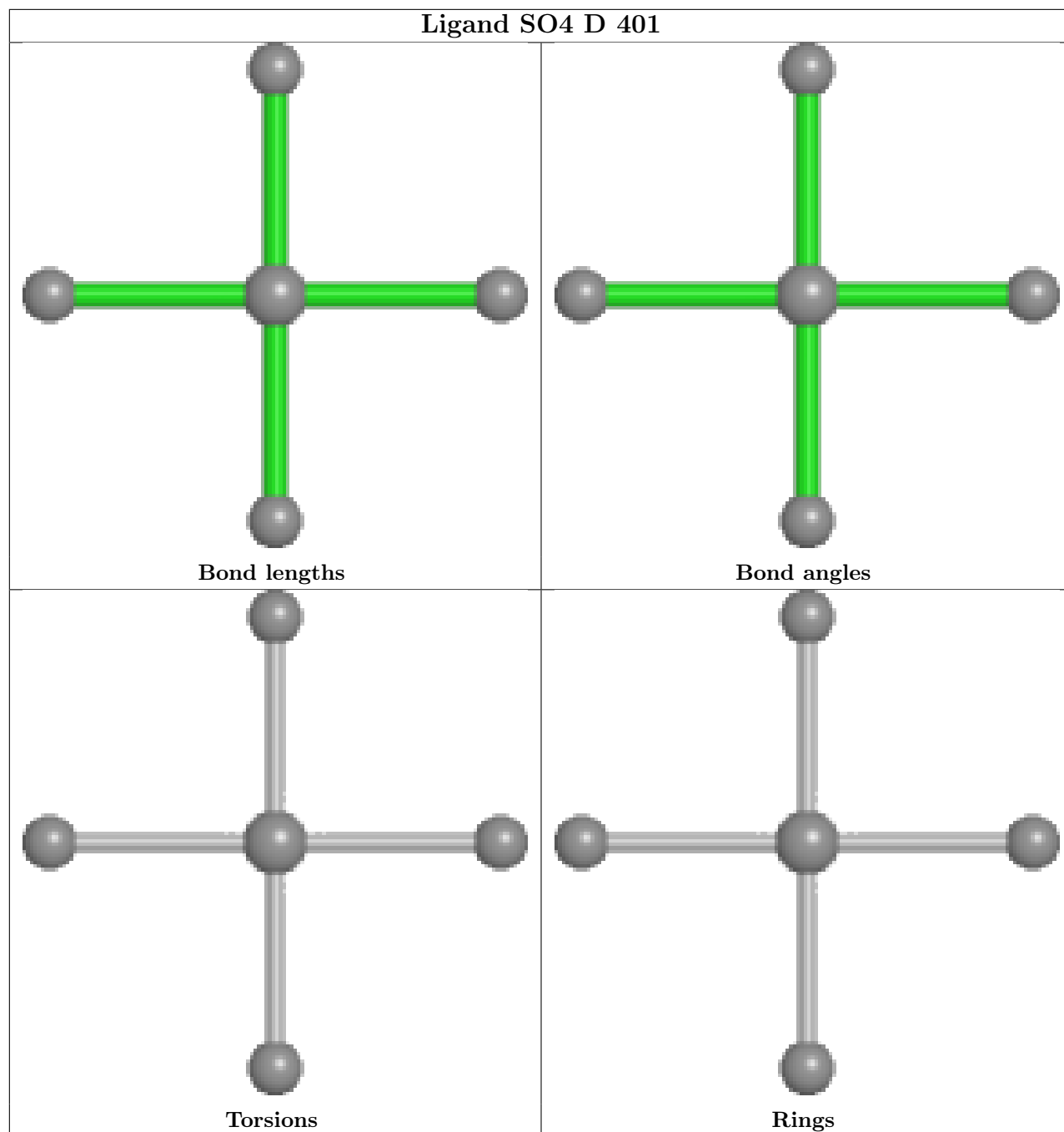
There are no chirality outliers.

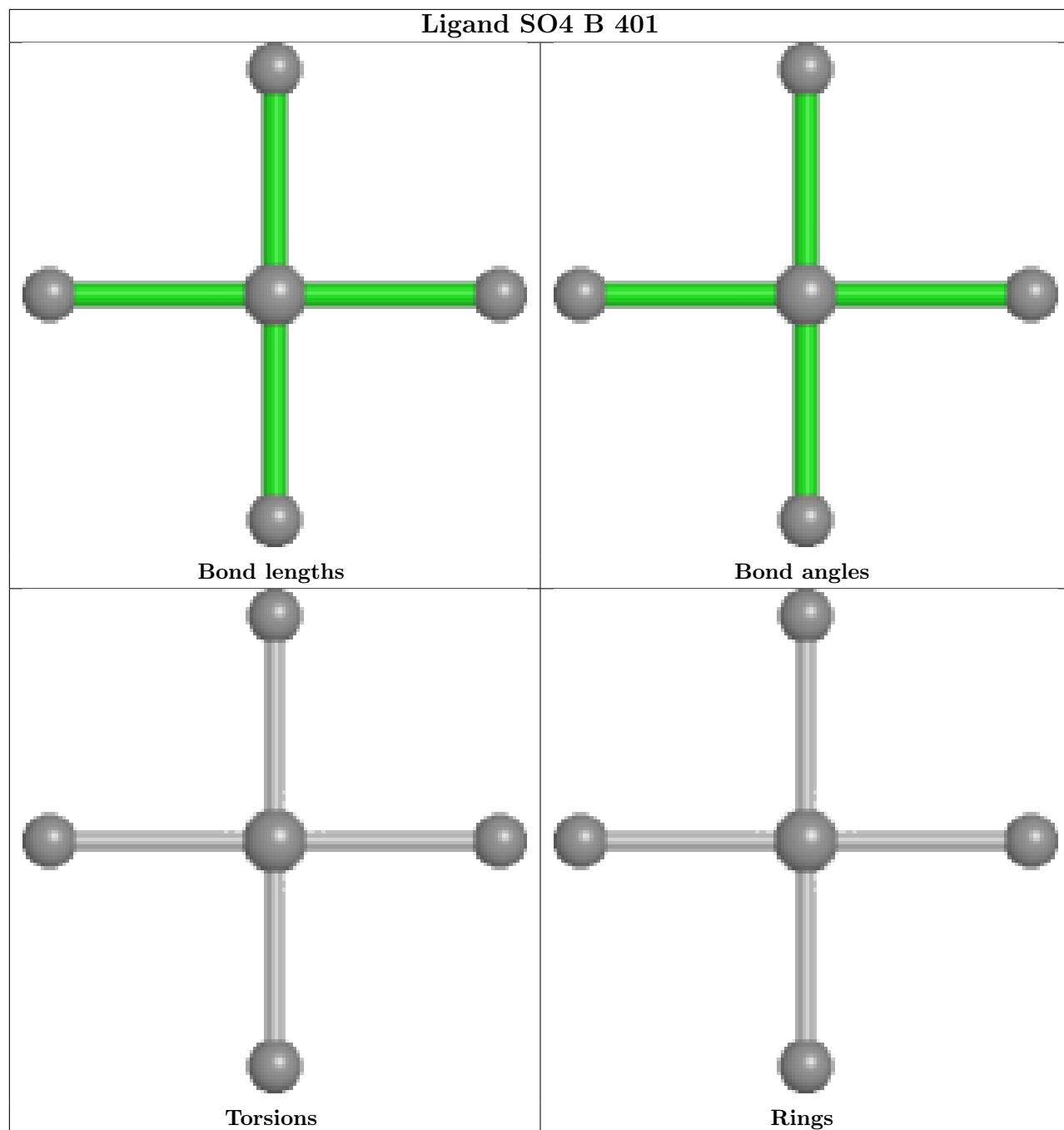
There are no torsion outliers.

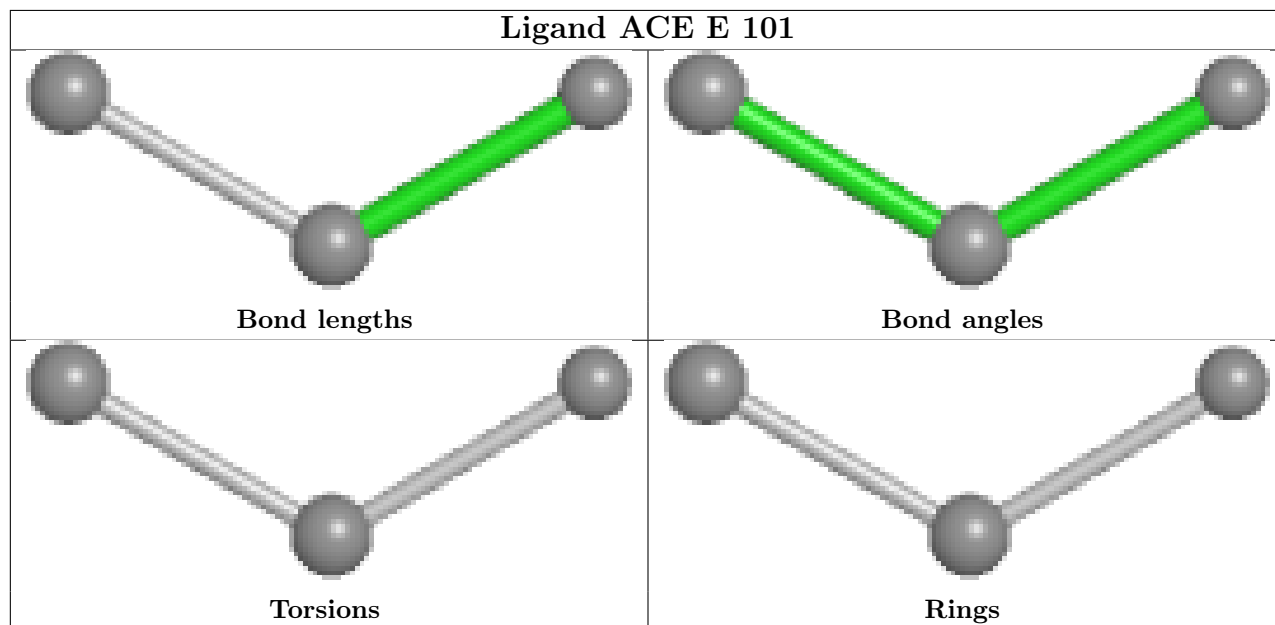
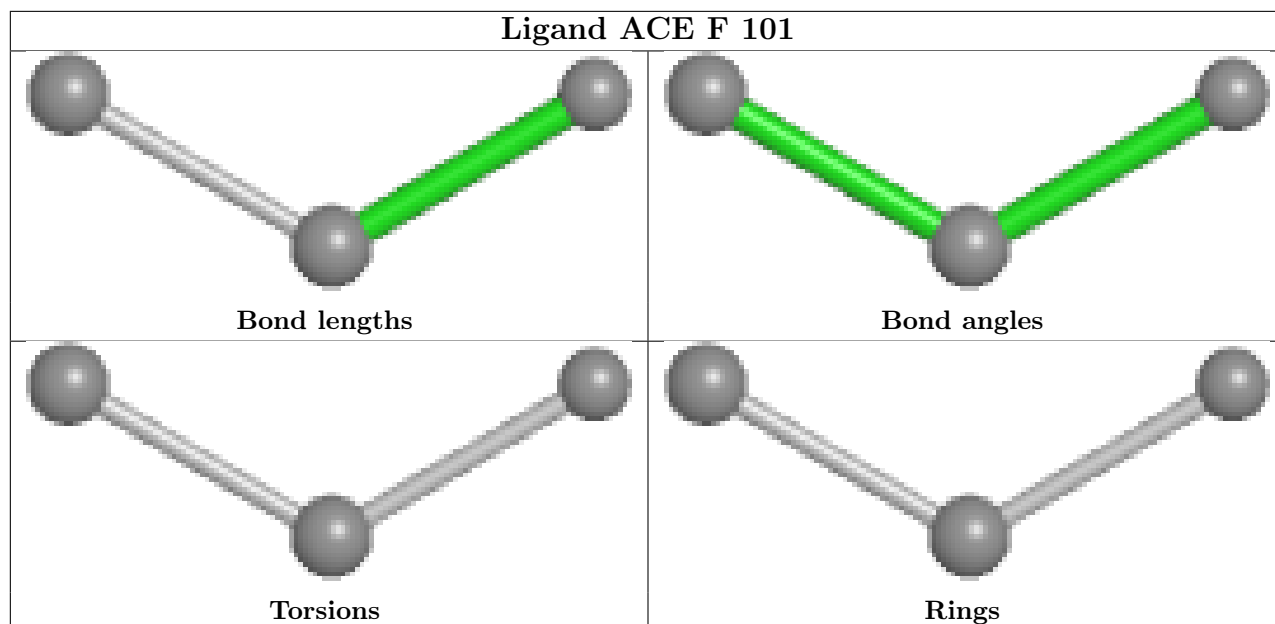
There are no ring outliers.

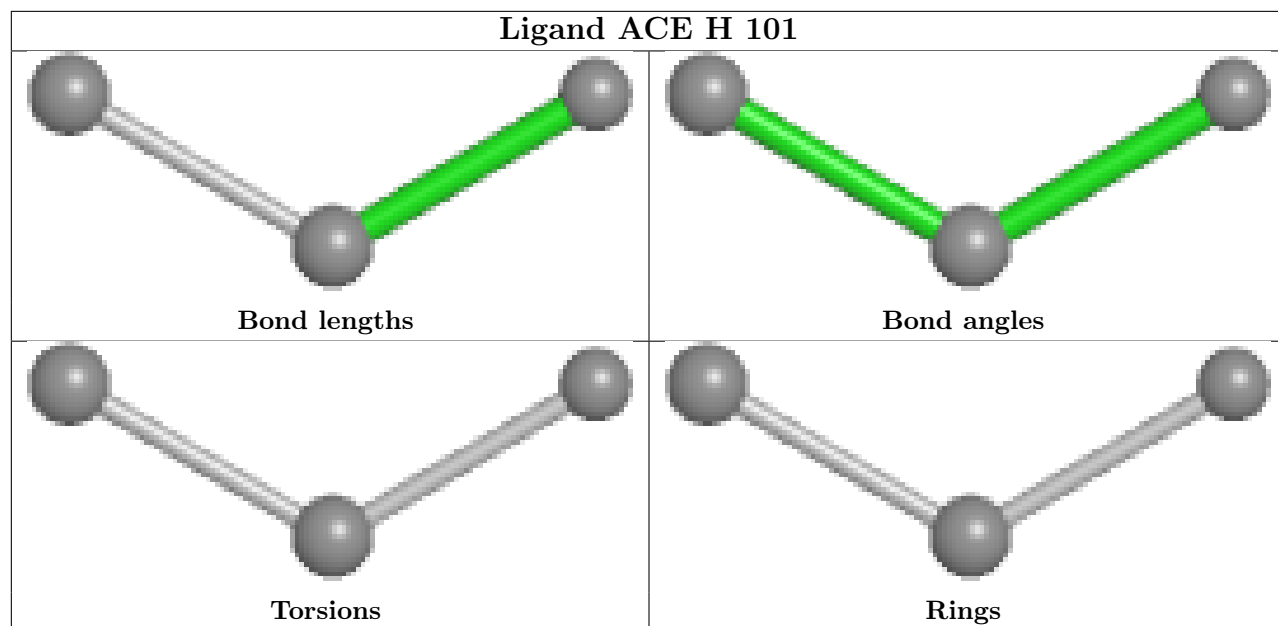
No monomer is involved in short contacts.

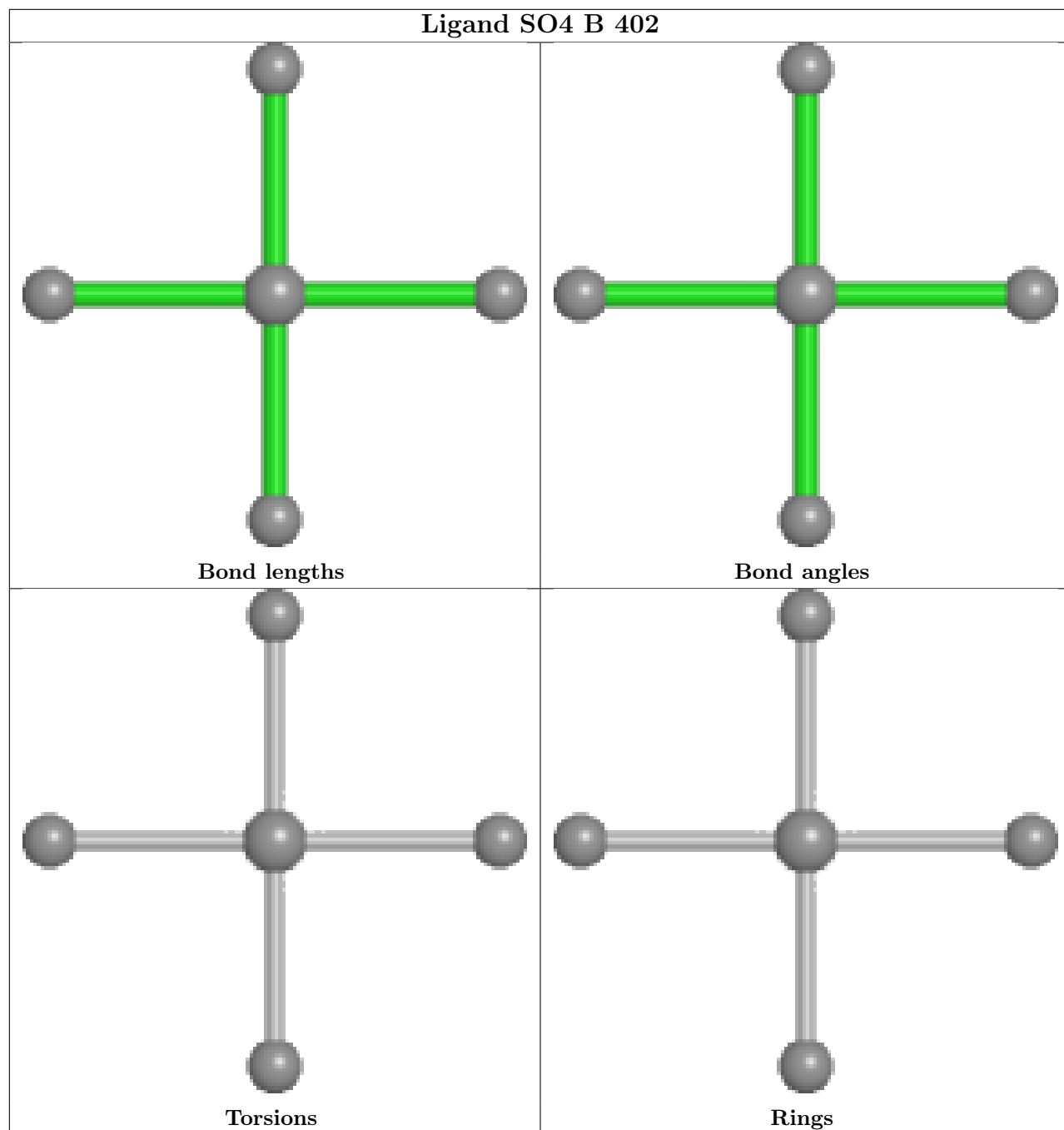
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

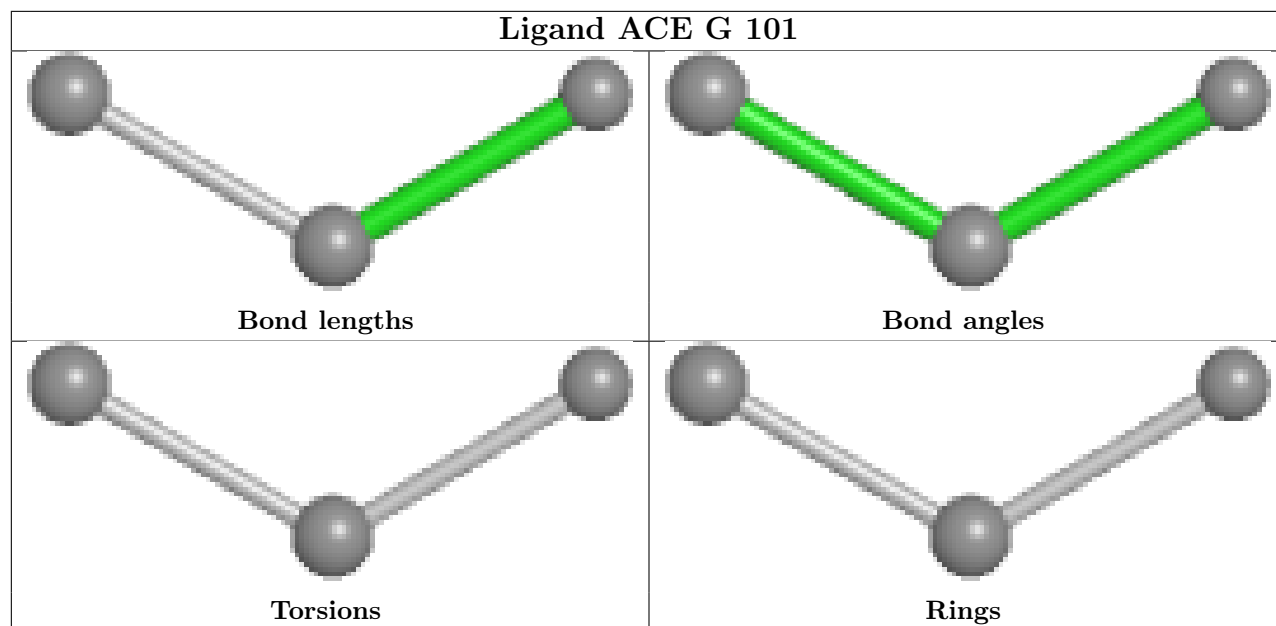


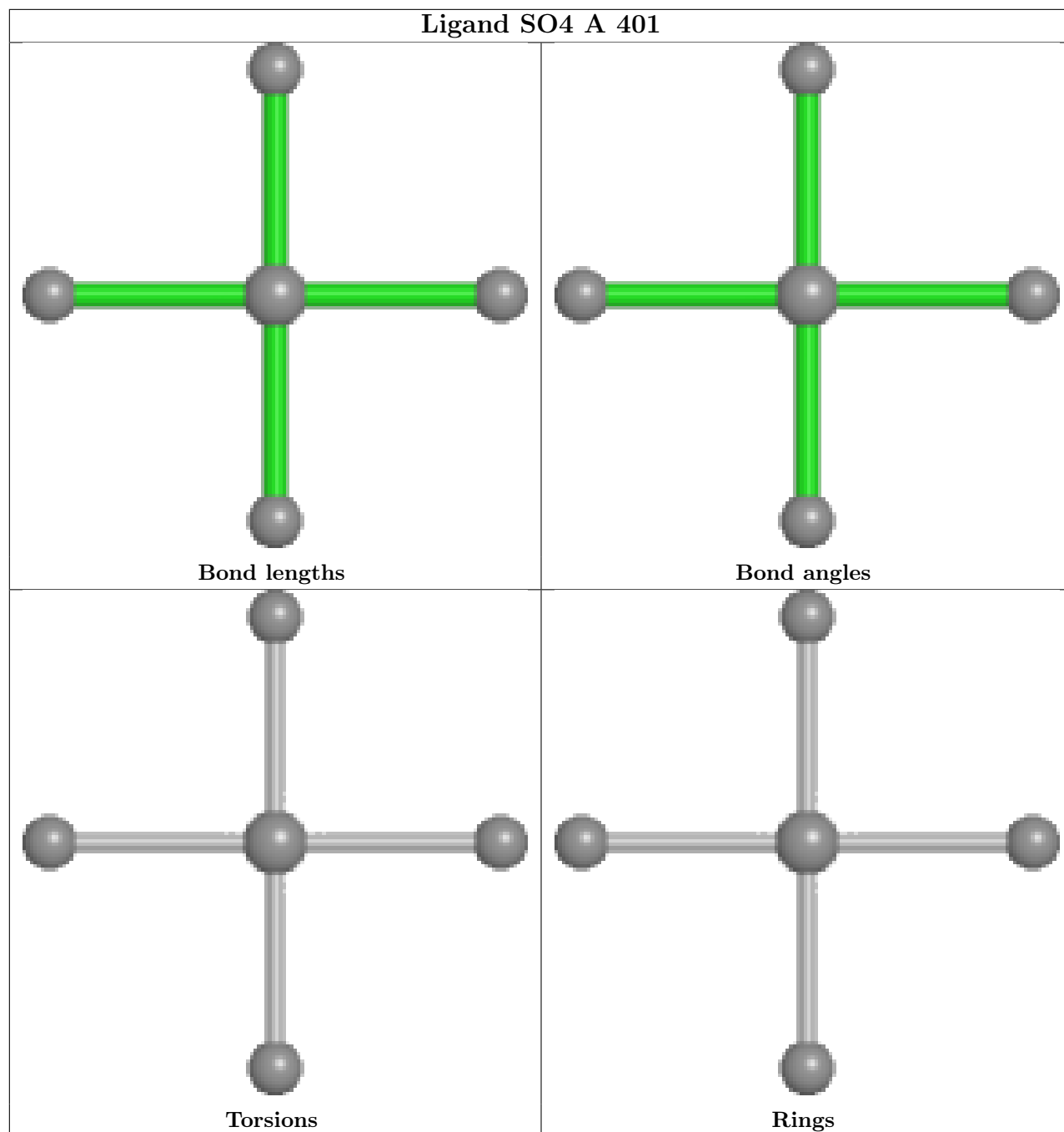












5.7 Other polymers [i](#)

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	388/397 (97%)	0.17	9 (2%) 60 63	34, 52, 78, 101	0
1	B	388/397 (97%)	0.14	3 (0%) 86 87	28, 48, 74, 87	0
1	C	388/397 (97%)	0.50	31 (7%) 12 12	29, 63, 95, 105	0
1	D	388/397 (97%)	0.27	14 (3%) 42 46	32, 55, 84, 97	0
2	E	6/6 (100%)	0.81	1 (16%) 1 1	54, 61, 69, 86	0
2	F	6/6 (100%)	-0.12	0 100 100	45, 45, 52, 54	0
2	G	6/6 (100%)	1.16	1 (16%) 1 1	43, 54, 63, 81	0
2	H	6/6 (100%)	0.85	1 (16%) 1 1	60, 67, 72, 76	0
All	All	1576/1612 (97%)	0.28	60 (3%) 40 43	28, 53, 87, 105	0

All (60) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	373	LEU	6.1
1	D	33	SER	6.0
1	C	218	ASP	5.6
1	C	233	GLY	5.5
2	G	7	ALA	5.0
1	B	373	LEU	4.3
1	C	116	LEU	4.2
1	A	229	GLY	4.1
1	C	37	VAL	3.9
1	D	374	ASN	3.8
1	D	313	VAL	3.7
1	C	214	LYS	3.7
1	C	98	LEU	3.7
1	C	230	PRO	3.7
1	D	395	LEU	3.7
1	C	65	VAL	3.6

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Mol	Chain	Res	Type	RSRZ
1	C	217	LEU	3.6
1	D	396	PRO	3.5
1	D	310	ALA	3.5
1	C	195	THR	3.5
1	C	79	VAL	3.4
1	C	120	ALA	3.4
1	A	290	ASP	3.4
1	C	213	ALA	3.4
1	D	372	ALA	3.4
1	D	36	THR	3.3
2	E	7	ALA	3.1
1	C	215	THR	2.9
1	C	228	ALA	2.9
1	A	228	ALA	2.8
1	A	40	LEU	2.8
1	B	219	GLY	2.6
1	C	235	ASP	2.6
1	C	13	VAL	2.6
1	C	47	GLY	2.6
1	C	62	SER	2.5
1	C	231	SER	2.5
1	A	59	TYR	2.4
1	C	11	LEU	2.4
1	C	241	ARG	2.4
1	A	231	SER	2.3
1	D	232	VAL	2.3
1	A	82	ARG	2.3
1	D	32	PRO	2.3
1	C	40	LEU	2.3
1	C	82[A]	ARG	2.3
2	H	6	PHE	2.3
1	D	212	ALA	2.2
1	C	232	VAL	2.2
1	D	273	ILE	2.2
1	C	31	LEU	2.2
1	C	36	THR	2.1
1	C	194	LYS	2.1
1	B	296[A]	ARG	2.1
1	C	219	GLY	2.1
1	A	219	GLY	2.1
1	A	232	VAL	2.1
1	D	288	VAL	2.1

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Mol	Chain	Res	Type	RSRZ
1	C	73	ALA	2.0
1	C	130	LEU	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](#)

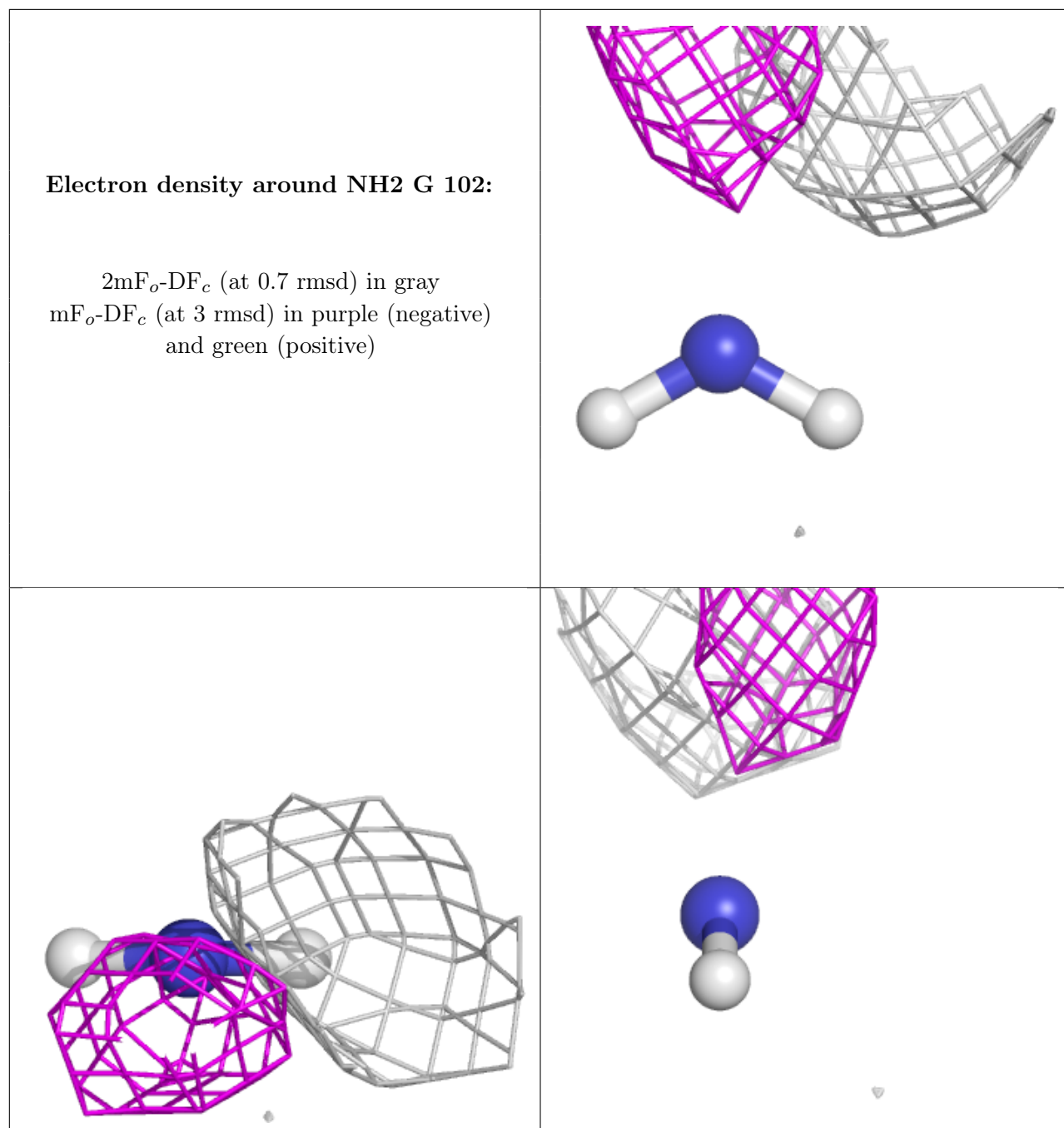
There are no monosaccharides in this entry.

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.

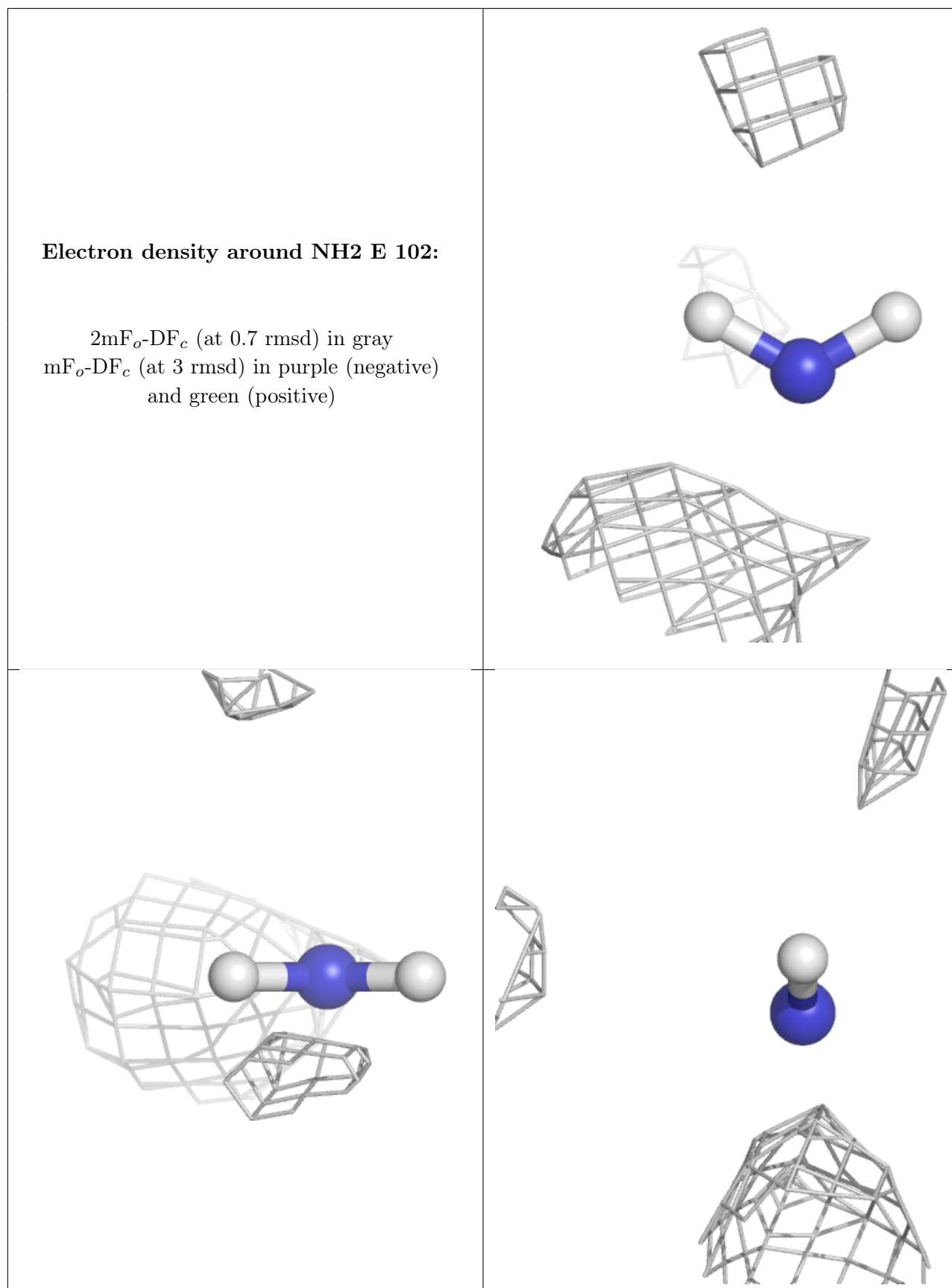
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
6	NH2	G	102	1/1	-0.08	0.50	87,87,105,105	0
6	NH2	E	102	1/1	0.33	0.72	109,109,131,131	0
3	SO4	B	402	5/5	0.77	0.42	38,46,54,61	5
3	SO4	A	401	5/5	0.83	0.28	58,58,61,63	5
3	SO4	D	401	5/5	0.85	0.42	64,65,73,73	5
6	NH2	H	102	1/1	0.85	0.70	83,83,99,99	0
3	SO4	B	401	5/5	0.92	0.44	52,55,56,57	5
5	ACE	H	101	3/3	0.94	0.22	69,69,72,73	0
6	NH2	F	102	1/1	0.95	0.29	68,68,82,82	0
5	ACE	E	101	3/3	0.96	0.21	59,59,61,62	0
5	ACE	G	101	3/3	0.97	0.26	41,41,44,46	0
4	CL	B	403	1/1	0.98	0.09	43,43,43,43	0
5	ACE	F	101	3/3	0.98	0.12	49,49,49,49	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.



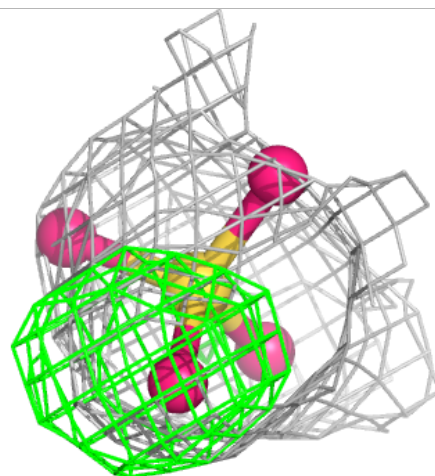
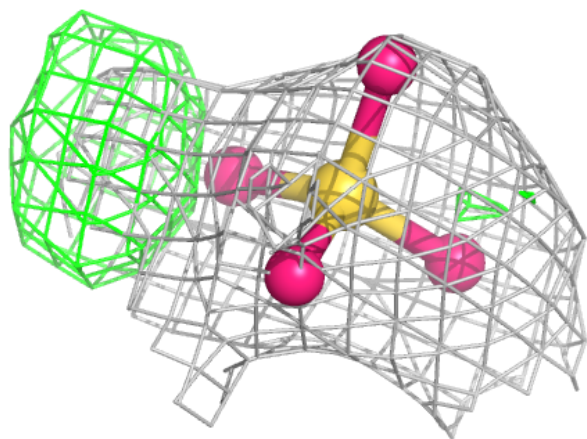
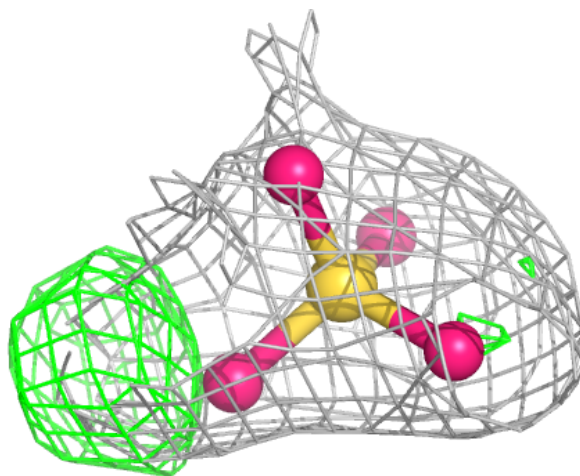
Electron density around NH2 E 102:

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



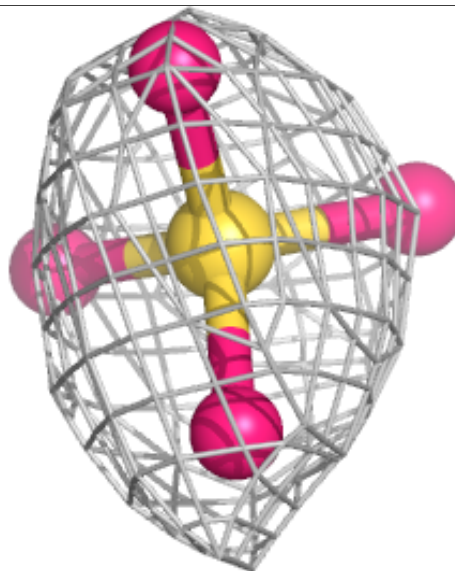
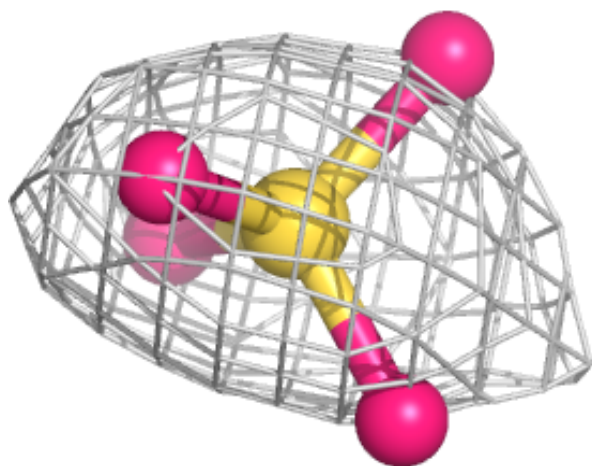
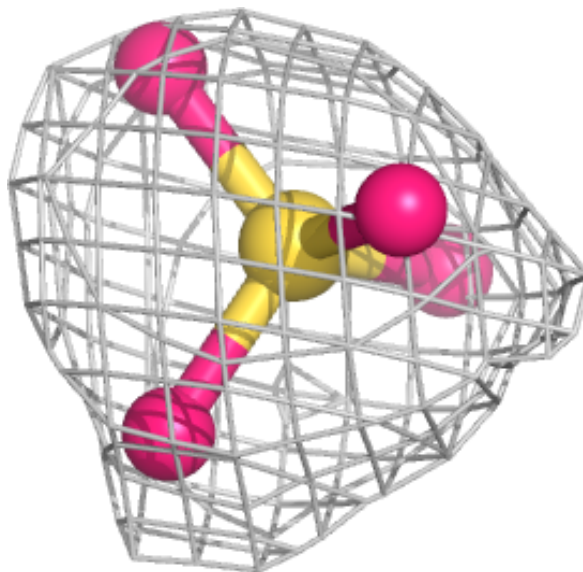
Electron density around SO4 B 402:

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



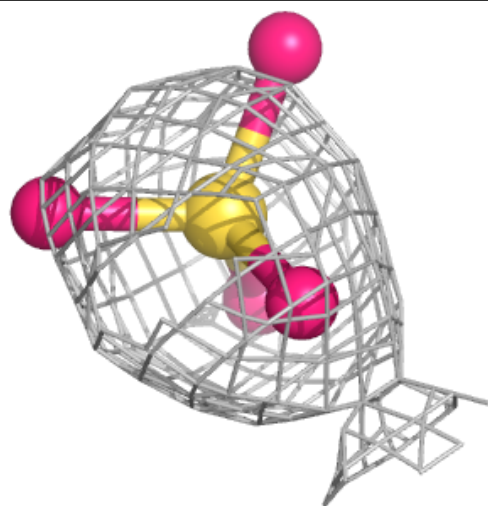
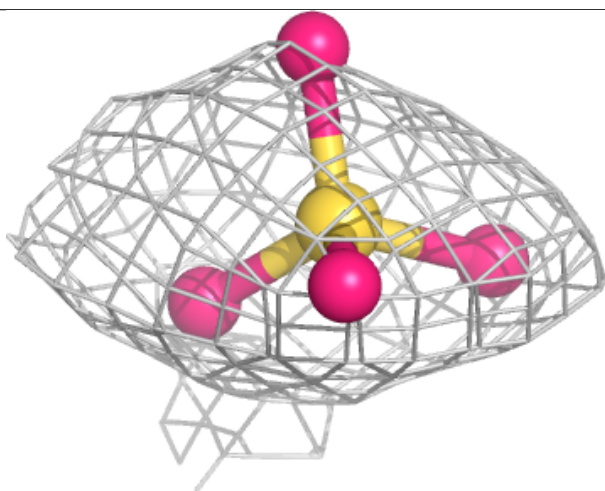
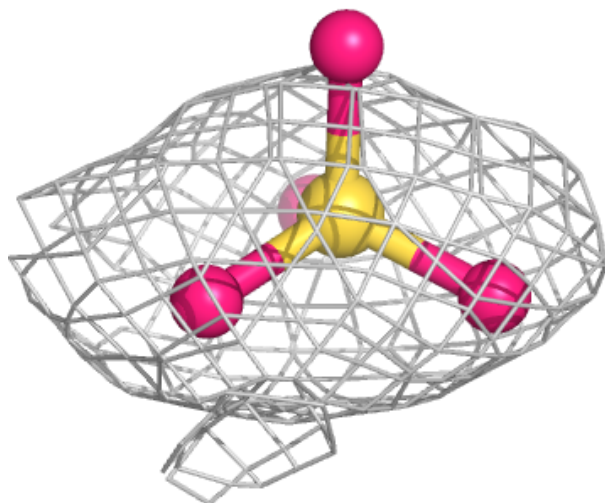
Electron density around SO4 A 401:

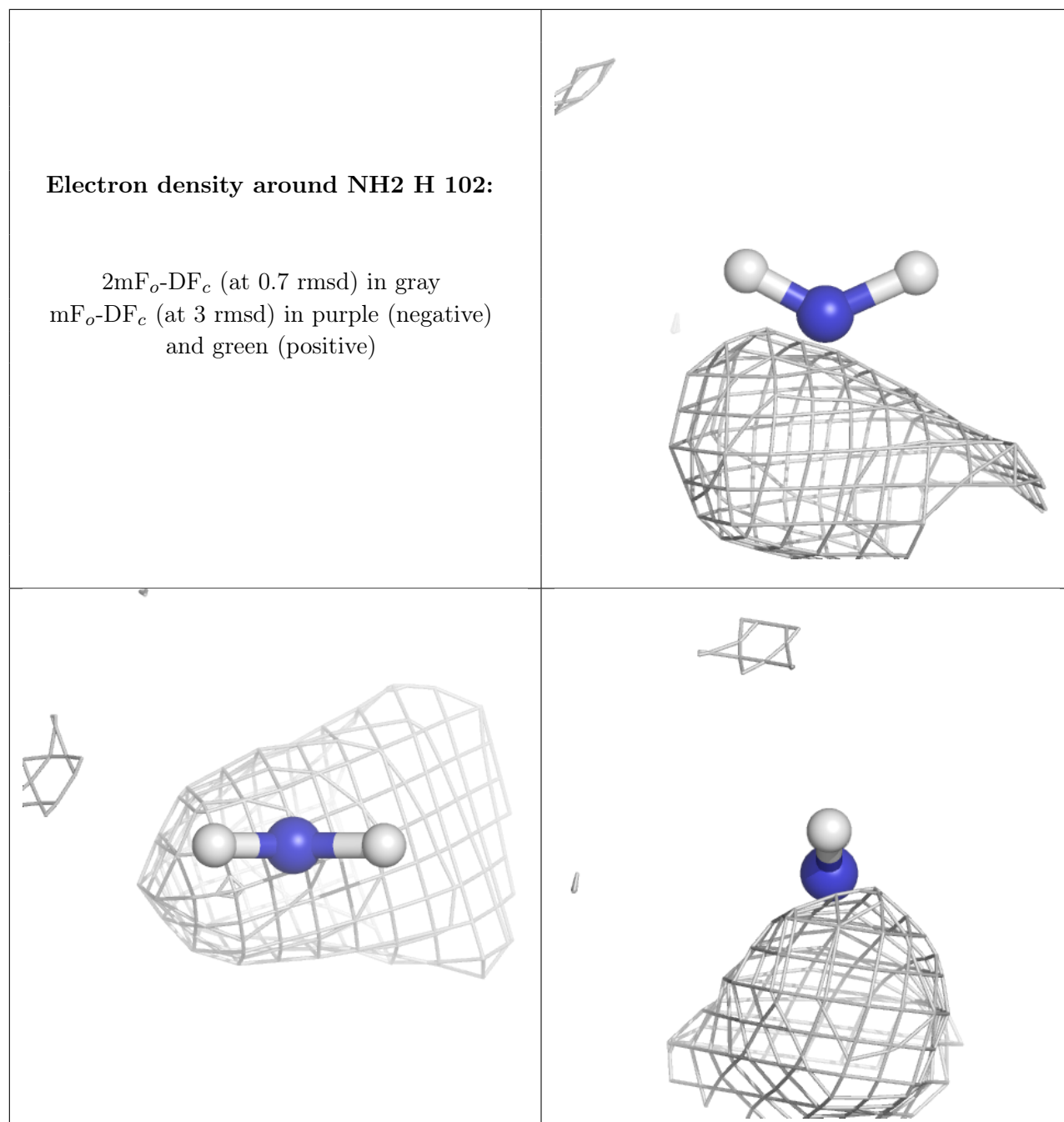
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around SO4 D 401:

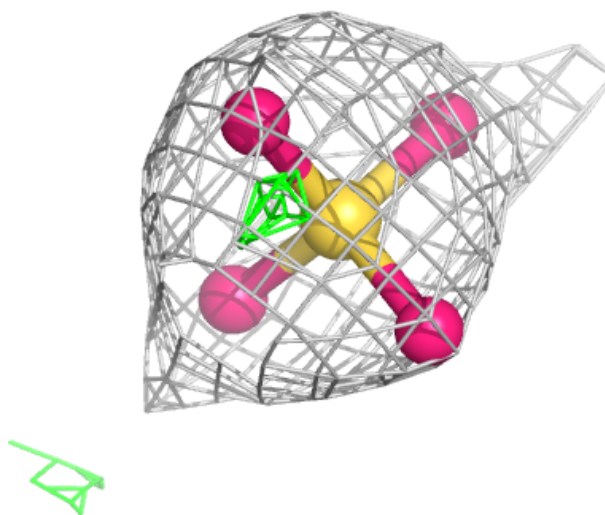
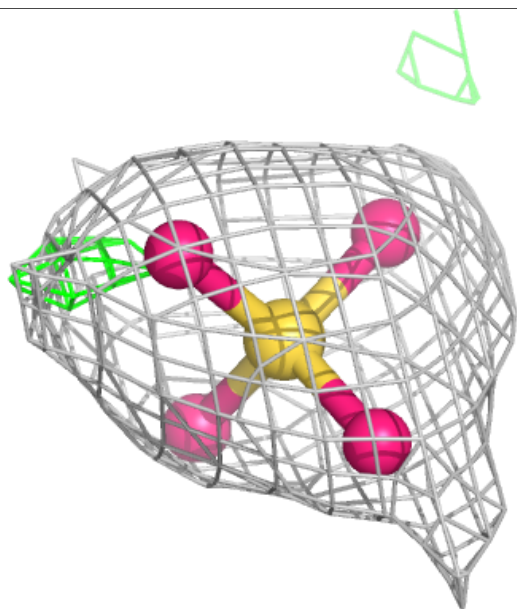
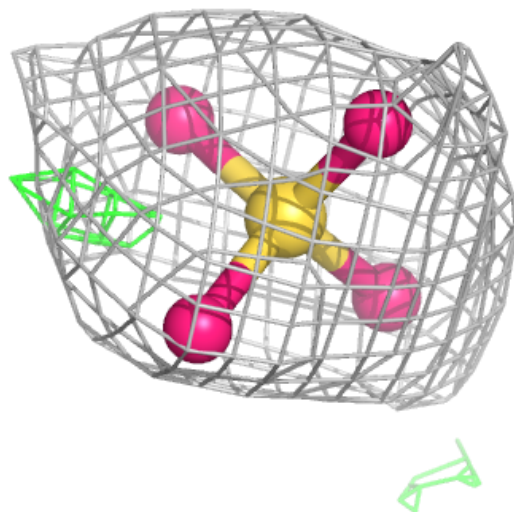
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

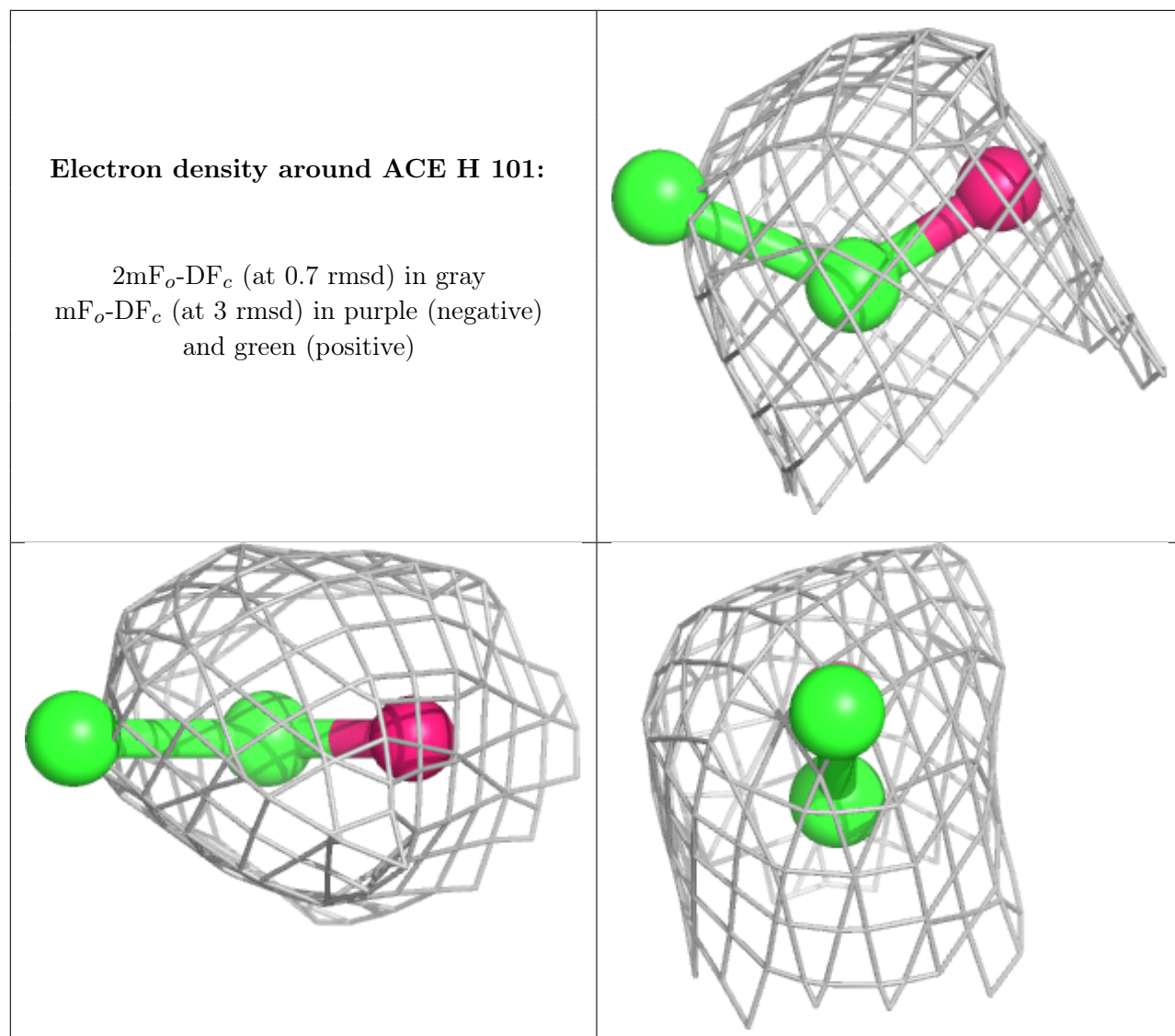




Electron density around SO4 B 401:

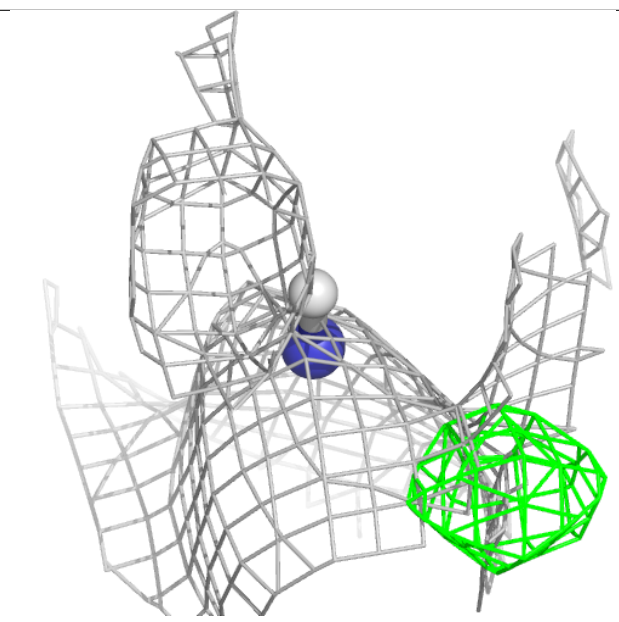
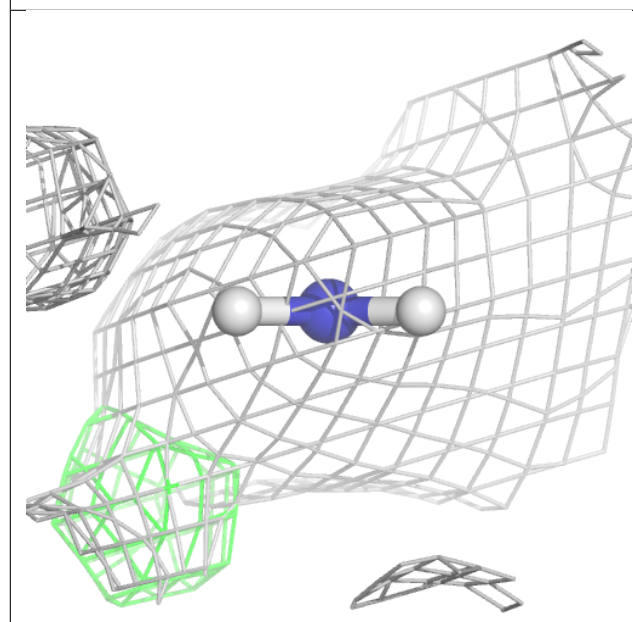
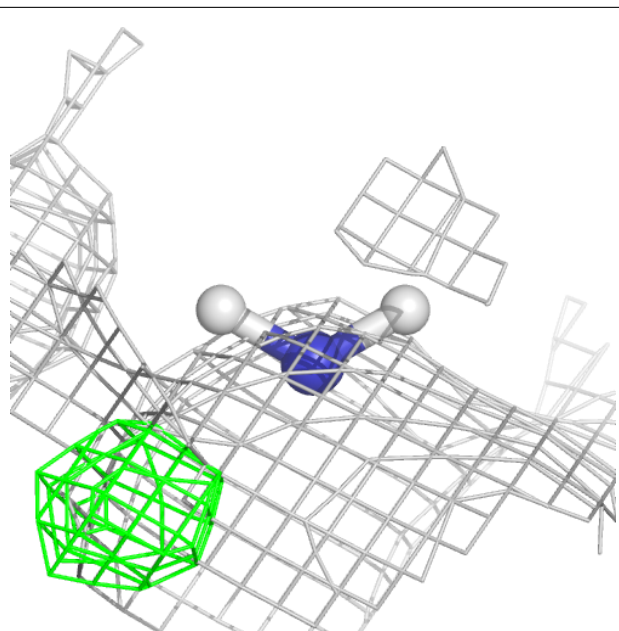
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)





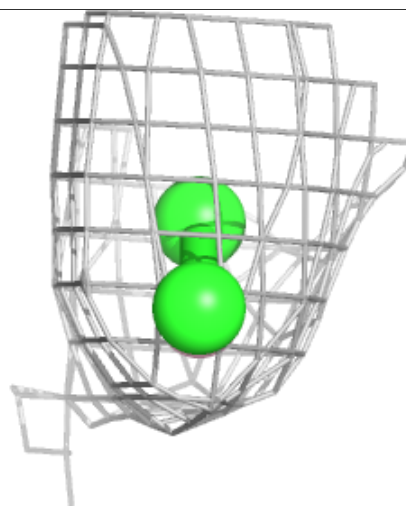
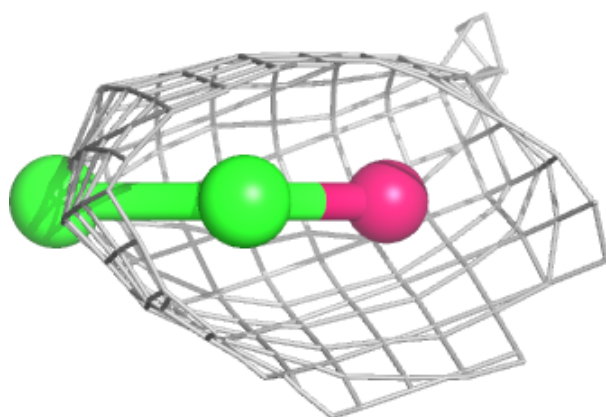
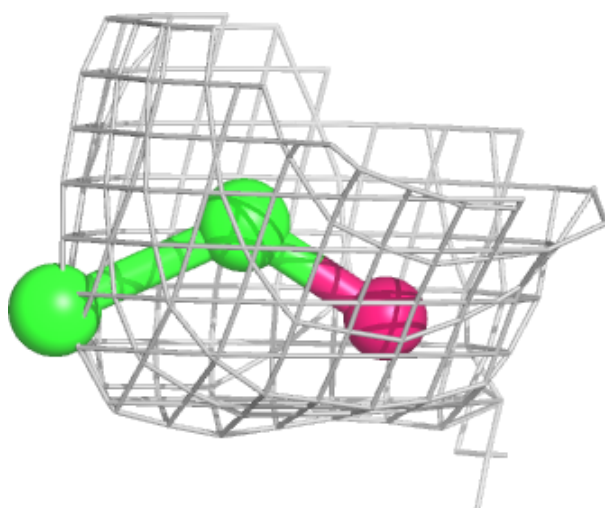
Electron density around NH2 F 102:

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



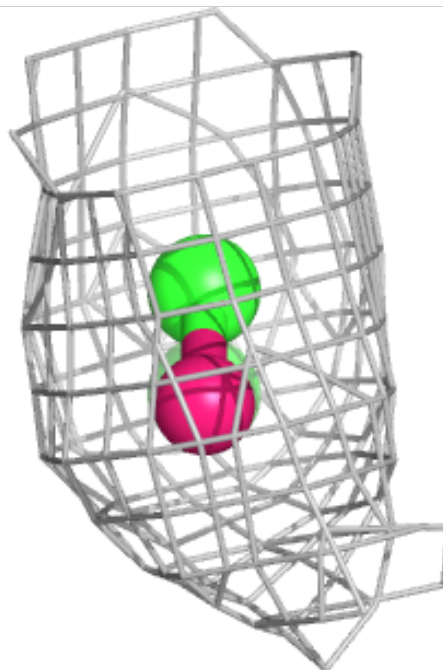
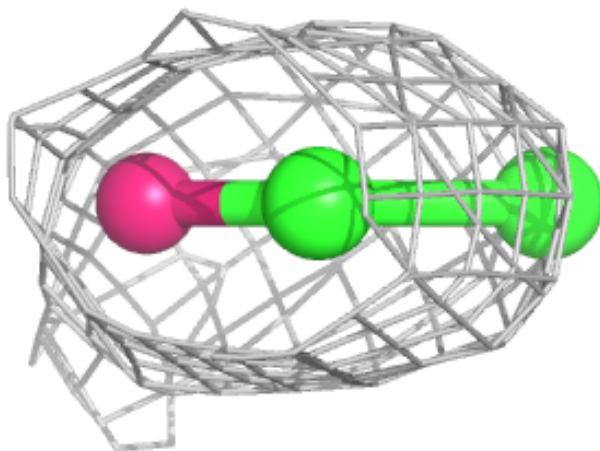
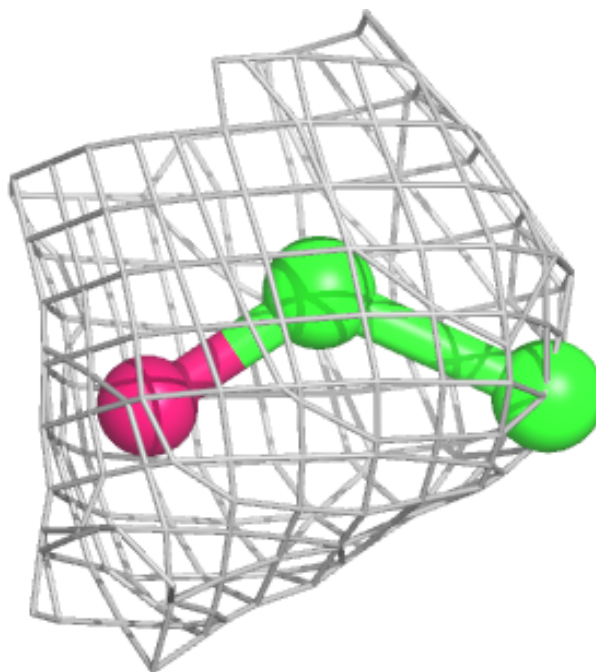
Electron density around ACE E 101:

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



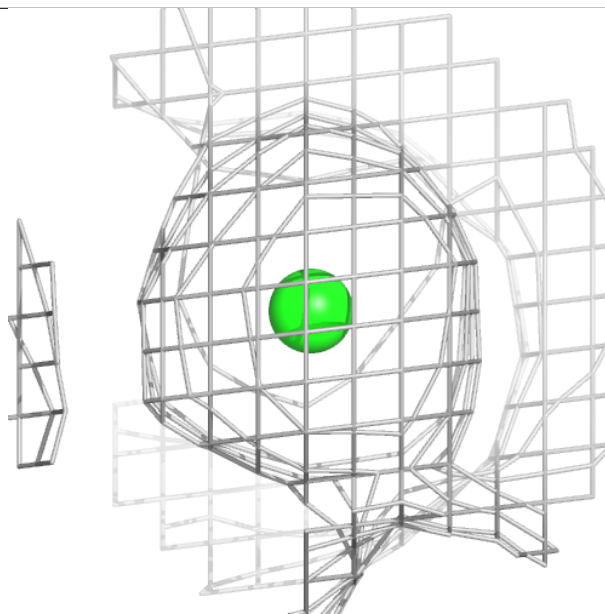
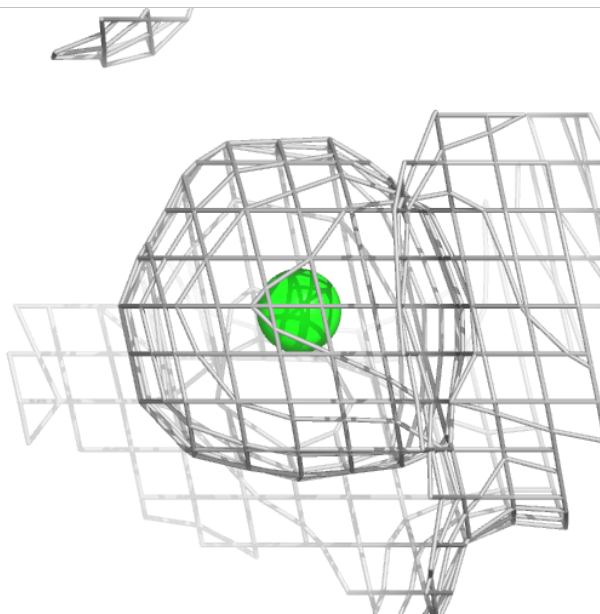
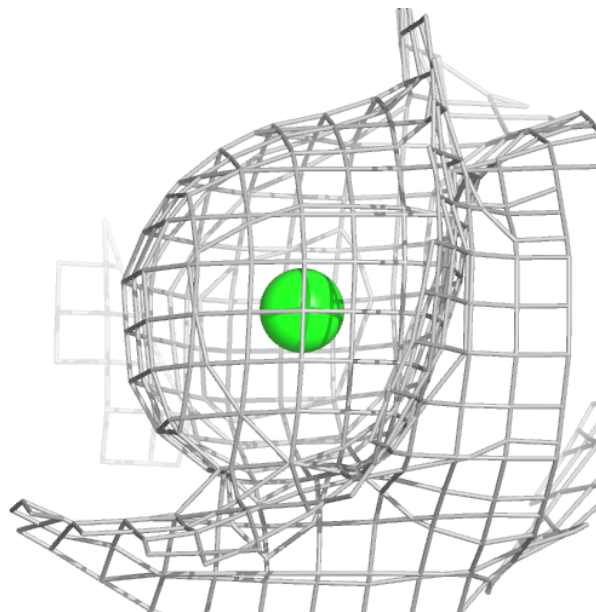
Electron density around ACE G 101:

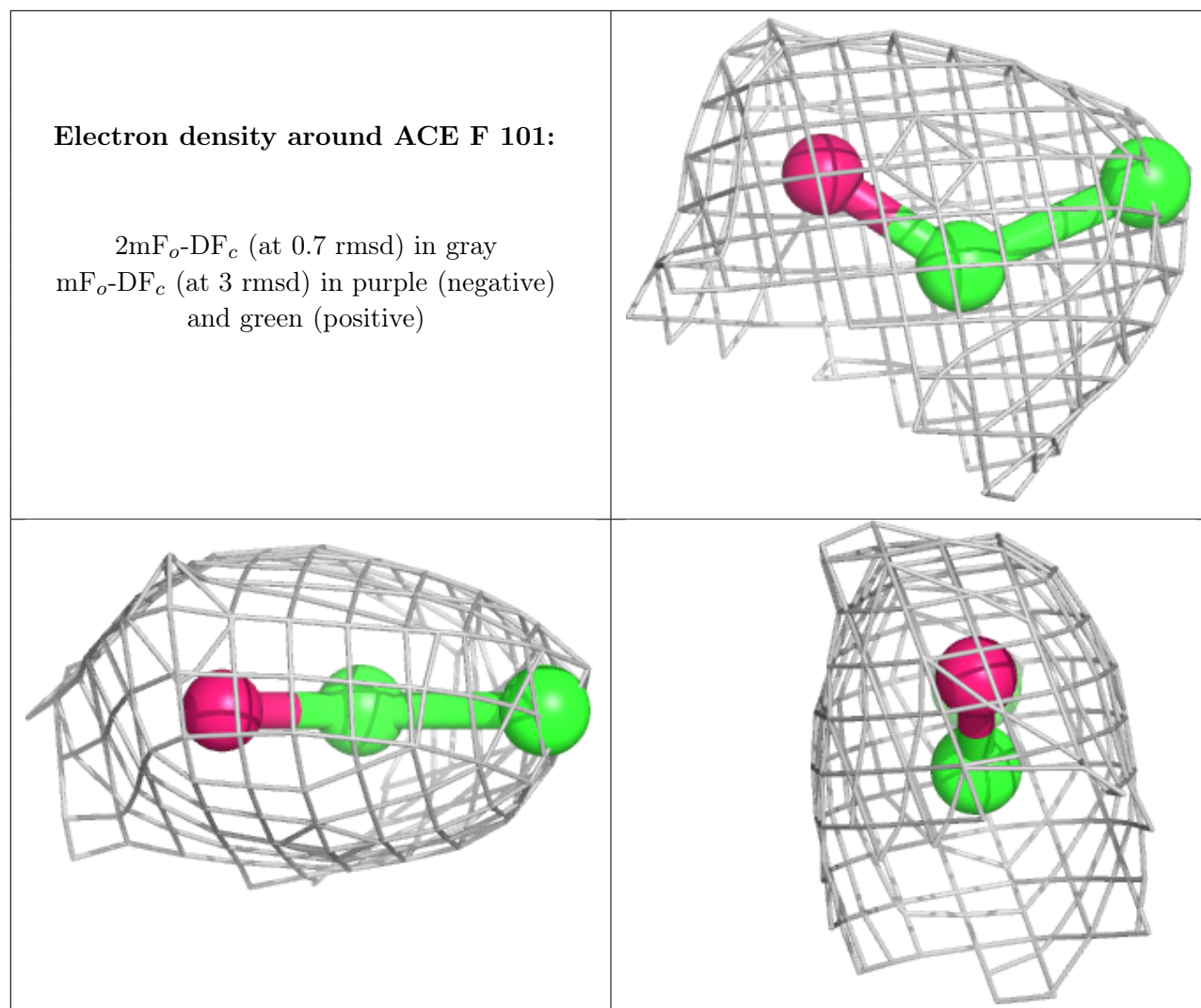
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around CL B 403:

$2mF_o-DF_c$ (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.