



Full wwPDB X-ray Structure Validation Report ⓘ

Nov 5, 2023 – 02:16 PM EST

PDB ID : 8EJ0
Title : Crystal structure of Fe-S cluster-dependent dehydratase from *Paralcaligenes ureilyticus* in complex with Mg
Authors : Bayaraa, T.; Lonhienne, T.; Guddat, L.W.
Deposited on : 2022-09-16
Resolution : 2.59 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)
Xtrriage (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

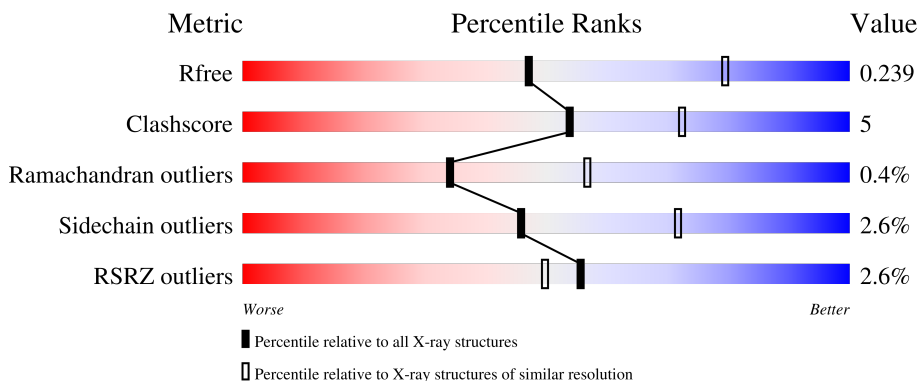
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION


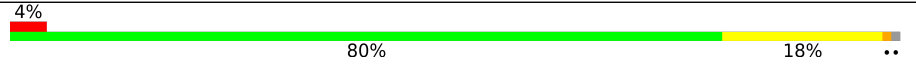
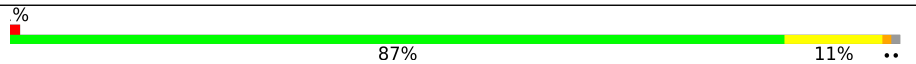

The reported resolution of this entry is 2.59 Å.

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	3163 (2.60-2.60)
Clashscore	141614	3518 (2.60-2.60)
Ramachandran outliers	138981	3455 (2.60-2.60)
Sidechain outliers	138945	3455 (2.60-2.60)
RSRZ outliers	127900	3104 (2.60-2.60)

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	575	 86% 12% ..
1	C	575	 80% 18% ..
1	E	575	 87% 11% ..
1	G	575	 81% 16% ..

2 Entry composition [i](#)

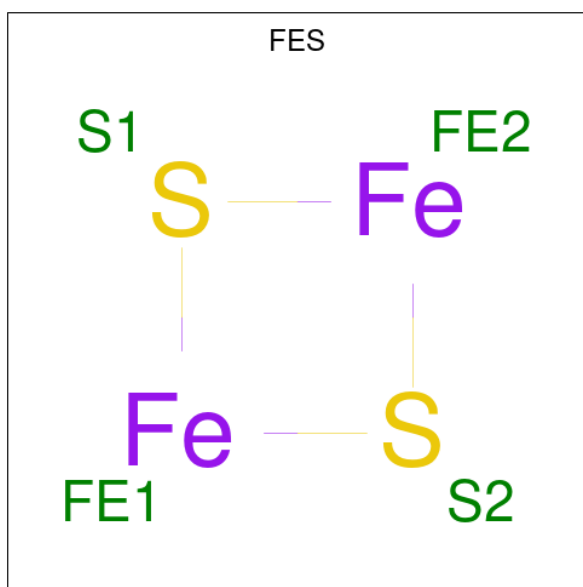
There are 6 unique types of molecules in this entry. The entry contains 17475 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Dihydroxyacid dehydratase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	568	Total 4322	C 2699	N 784	O 801	S 38	0	1	0
1	C	568	Total 4344	C 2711	N 791	O 804	S 38	0	3	0
1	E	568	Total 4337	C 2707	N 788	O 804	S 38	0	2	0
1	G	568	Total 4294	C 2682	N 774	O 800	S 38	0	1	0

- Molecule 2 is FE2/S2 (INORGANIC) CLUSTER (three-letter code: FES) (formula: Fe₂S₂) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	Fe	S		
2	A	1	Total 4	Fe 2	S 2	0	0
2	C	1	Total 4	Fe 2	S 2	0	0

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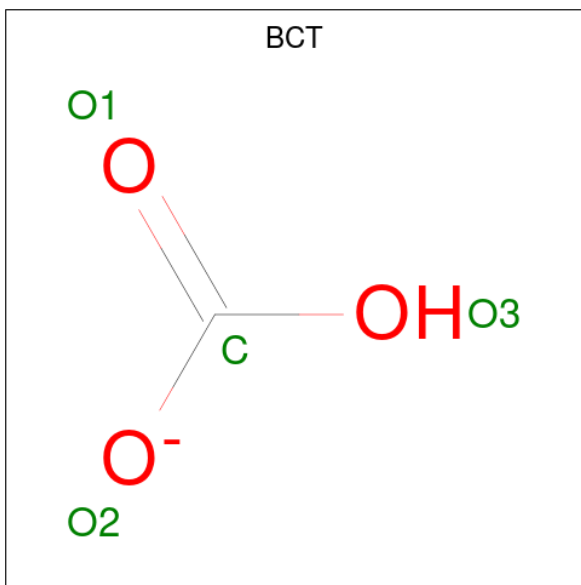
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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	E	1	Total	Fe	S	0	0
			4	2	2		
2	G	1	Total	Fe	S	0	0
			4	2	2		

- 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	C	1	Total	Mg	0	0
			1	1		
3	E	1	Total	Mg	0	0
			1	1		
3	G	1	Total	Mg	0	0
			1	1		

- Molecule 4 is BICARBONATE ION (three-letter code: BCT) (formula: CHO₃) (labeled as "Ligand of Interest" by depositor).



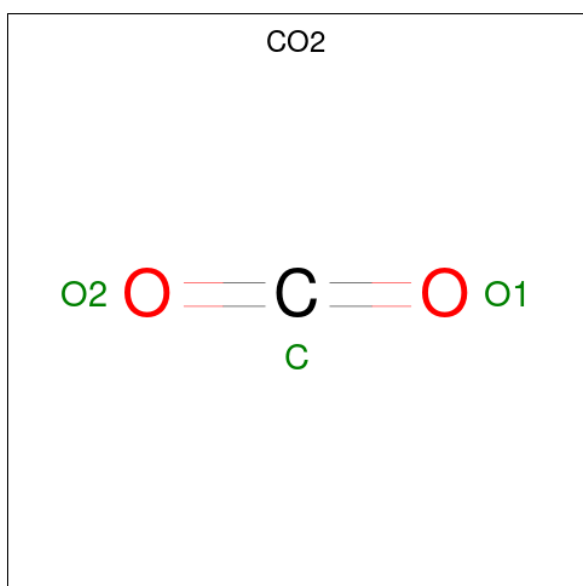
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			4	1	3		
4	A	1	Total	C	O	0	0
			4	1	3		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	C	1	Total	C	O	0	0
			4	1	3		
4	E	1	Total	C	O	0	0
			4	1	3		
4	E	1	Total	C	O	0	0
			4	1	3		
4	E	1	Total	C	O	0	0
			4	1	3		

- Molecule 5 is CARBON DIOXIDE (three-letter code: CO2) (formula: CO₂) (labeled as "Ligand of Interest" by depositor).



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

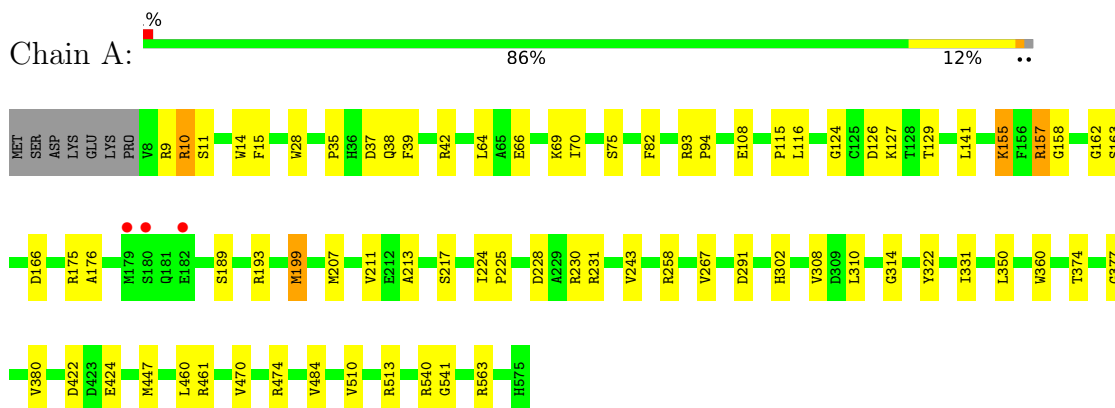
- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	31	Total	O	0	0
			31	31		
6	C	36	Total	O	0	0
			36	36		
6	E	42	Total	O	0	0
			42	42		
6	G	22	Total	O	0	0
			22	22		

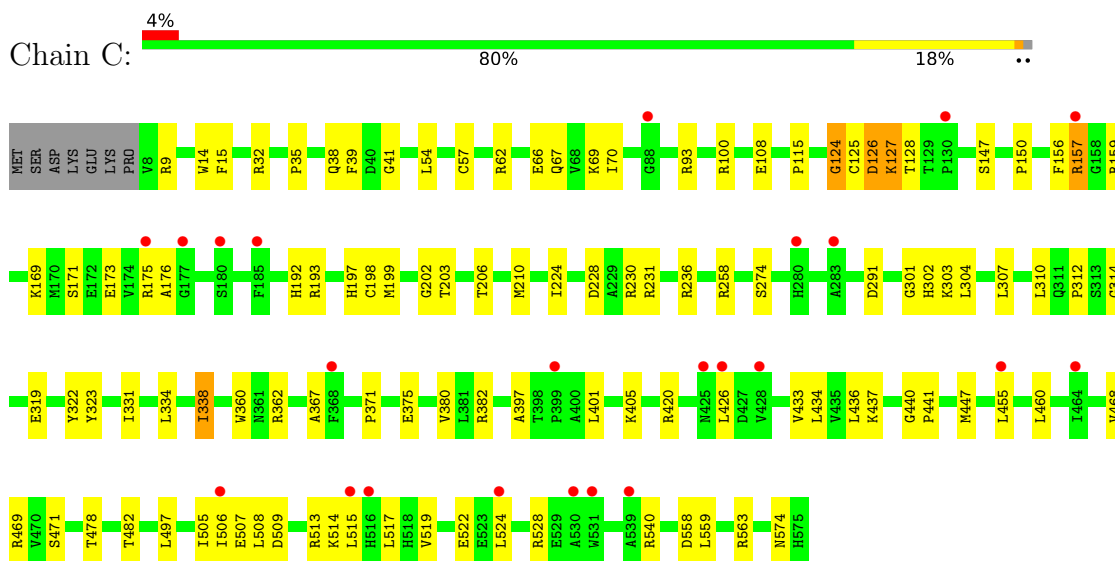
3 Residue-property plots i

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.

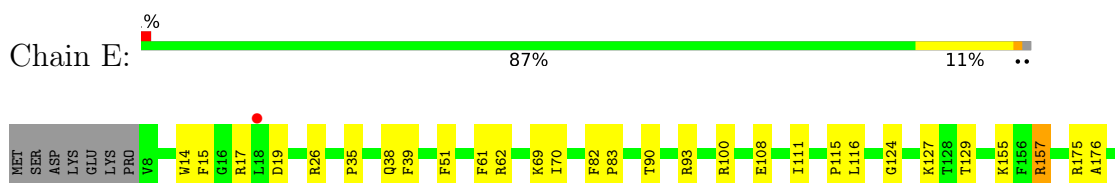
- Molecule 1: Dihydroxyacid dehydratase

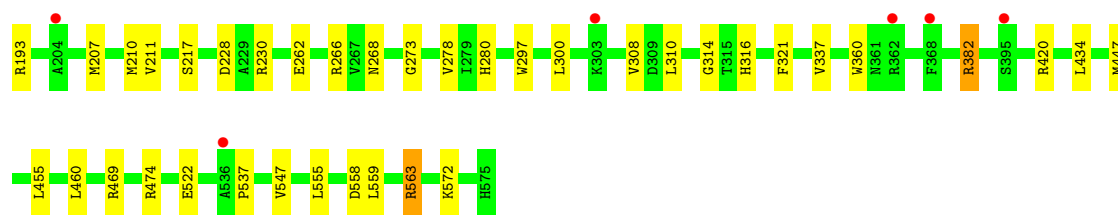


- Molecule 1: Dihydroxyacid dehydratase

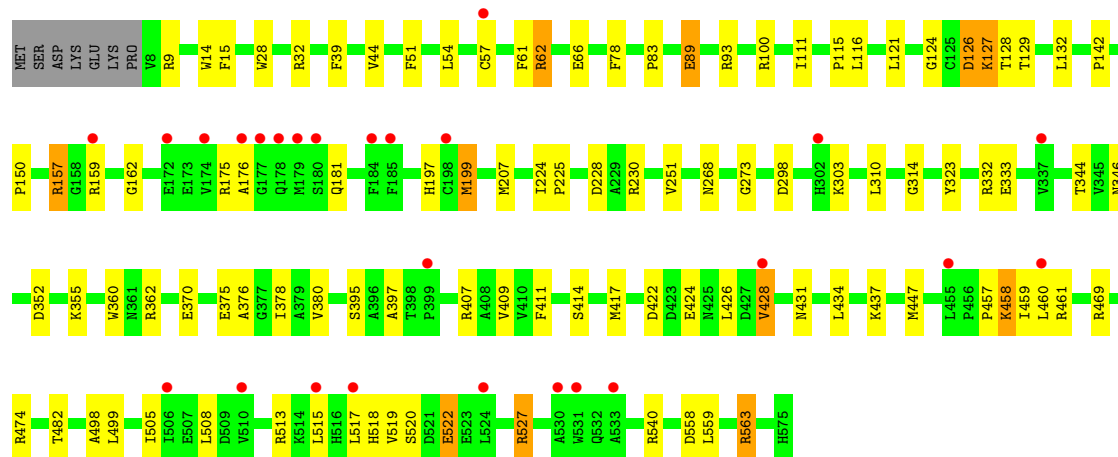
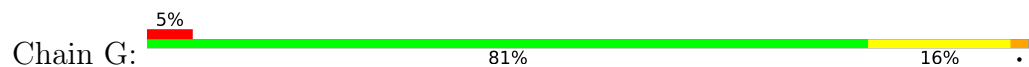


- Molecule 1: Dihydroxyacid dehydratase





● Molecule 1: Dihydroxyacid dehydratase



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	69.91Å 178.07Å 92.86Å 90.00° 101.72° 90.00°	Depositor
Resolution (Å)	44.05 – 2.59 44.05 – 2.59	Depositor EDS
% Data completeness (in resolution range)	99.3 (44.05-2.59) 99.3 (44.05-2.59)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.09 (at 2.58Å)	Xtrriage
Refinement program	PHENIX 1.17.1_3660	Depositor
R, R_{free}	0.194 , 0.239 0.194 , 0.239	Depositor DCC
R_{free} test set	1998 reflections (2.93%)	wwPDB-VP
Wilson B-factor (Å ²)	45.4	Xtrriage
Anisotropy	0.646	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.30 , 31.6	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	17475	wwPDB-VP
Average B, all atoms (Å ²)	51.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.90% 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, CO2, FES, MG, BCT

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	0.36	2/4400 (0.0%)	0.44	0/5957
1	C	0.39	3/4422 (0.1%)	0.45	1/5985 (0.0%)
1	E	0.37	2/4415 (0.0%)	0.43	0/5976
1	G	0.26	0/4369	0.43	0/5922
All	All	0.35	7/17606 (0.0%)	0.44	1/23840 (0.0%)

All (7) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	69	LYS	C-N	-17.01	0.94	1.34
1	E	69	LYS	C-N	-15.35	0.98	1.34
1	C	124	GLY	C-N	13.01	1.64	1.34
1	C	69	LYS	C-N	-10.71	1.09	1.34
1	C	70	ILE	C-N	-10.30	1.14	1.33
1	E	70	ILE	C-N	-10.10	1.14	1.33
1	A	70	ILE	C-N	-5.04	1.24	1.33

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	124	GLY	C-N-CA	-7.18	103.75	121.70

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	4322	0	4284	45	0
1	C	4344	0	4305	66	0
1	E	4337	0	4299	42	0
1	G	4294	0	4219	58	0
2	A	4	0	0	0	0
2	C	4	0	0	0	0
2	E	4	0	0	0	0
2	G	4	0	0	0	0
3	A	1	0	0	0	0
3	C	1	0	0	0	0
3	E	1	0	0	0	0
3	G	1	0	0	0	0
4	A	8	0	1	0	0
4	C	4	0	0	0	0
4	E	12	0	1	0	0
5	G	3	0	0	0	0
6	A	31	0	0	0	0
6	C	36	0	0	0	0
6	E	42	0	0	0	0
6	G	22	0	0	2	0
All	All	17475	0	17109	184	0

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

All (184) 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:C:397:ALA:HB1	1:C:482:THR:HG22	1.67	0.76
1:C:206:THR:HG21	1:C:274:SER:H	1.52	0.74
1:C:175:ARG:NH2	1:C:455:LEU:O	2.22	0.73
1:A:163:SER:OG	1:A:199:MET:SD	2.47	0.71
1:C:9:ARG:NH2	1:C:41:GLY:O	2.26	0.69
1:E:108:GLU:OE1	1:G:540:ARG:NH2	2.27	0.68
1:E:17:ARG:O	1:E:26:ARG:NH2	2.27	0.67
1:A:37:ASP:O	1:A:42:ARG:NH1	2.29	0.64
1:A:108:GLU:OE1	1:C:540:ARG:NH2	2.31	0.64
1:C:362:ARG:HH21	1:C:367:ALA:HB2	1.63	0.64
1:G:397:ALA:HB1	1:G:482:THR:HG22	1.81	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:225:PRO:HG2	1:A:228:ASP:HB2	1.80	0.63
1:A:447:MET:HG2	1:A:474:ARG:HG3	1.80	0.62
1:G:162:GLY:HA2	1:G:199:MET:HE1	1.81	0.62
1:C:331:ILE:HG23	1:C:338:ILE:HD13	1.81	0.62
1:E:14:TRP:CD2	1:E:115:PRO:HB3	2.34	0.62
1:E:266:ARG:NH1	1:E:337:VAL:O	2.33	0.61
1:G:57:CYS:HB3	1:G:197:HIS:HA	1.82	0.61
1:G:111:ILE:HA	1:G:116:LEU:HD12	1.82	0.61
1:E:310:LEU:HD11	1:E:321:PHE:HB2	1.83	0.60
1:G:225:PRO:HG2	1:G:228:ASP:HB2	1.82	0.60
1:G:32:ARG:NH1	6:G:703:HOH:O	2.34	0.60
1:E:15:PHE:HB3	1:E:39:PHE:HB3	1.82	0.60
1:G:14:TRP:CD2	1:G:115:PRO:HB3	2.36	0.60
1:A:510:VAL:O	1:A:513:ARG:NH1	2.35	0.59
1:E:175:ARG:NH2	1:E:455:LEU:O	2.35	0.59
1:C:258:ARG:NH1	1:C:291:ASP:O	2.36	0.59
1:G:121:LEU:HD22	1:G:132:LEU:HB3	1.84	0.59
1:A:258:ARG:NH2	1:A:291:ASP:O	2.35	0.59
1:A:176:ALA:HB2	1:A:460:LEU:HB3	1.86	0.58
1:C:401:LEU:HB2	1:C:482:THR:HG21	1.86	0.58
1:C:57:CYS:HB3	1:C:197:HIS:HA	1.86	0.57
1:E:572:LYS:NZ	1:G:414:SER:OG	2.27	0.57
1:A:15:PHE:HB3	1:A:39:PHE:HB3	1.86	0.57
1:E:100:ARG:HH11	1:E:280:HIS:HD1	1.53	0.57
1:A:75:SER:HB2	1:A:243:VAL:HG11	1.86	0.56
1:C:405:LYS:HE2	1:C:507:GLU:HG3	1.87	0.56
1:A:82:PHE:HB3	1:C:54:LEU:HD12	1.87	0.56
1:E:129:THR:HG21	1:E:207:MET:HB3	1.87	0.56
1:E:308:VAL:HG12	1:E:310:LEU:HG	1.86	0.56
1:G:517:LEU:O	1:G:519:VAL:N	2.38	0.56
1:C:14:TRP:CG	1:C:115:PRO:HB3	2.41	0.55
1:E:555:LEU:O	1:E:563:ARG:NH2	2.39	0.55
1:C:517:LEU:HG	1:C:519:VAL:HG13	1.88	0.55
1:C:441:PRO:HG3	1:C:447:MET:HE2	1.88	0.55
1:C:14:TRP:CD2	1:C:115:PRO:HB3	2.41	0.55
1:C:67:GLN:HG3	1:C:236:ARG:HB2	1.89	0.54
1:C:126:ASP:OD2	1:C:203:THR:HB	2.07	0.54
1:C:434:LEU:HB2	1:C:469:ARG:HG2	1.90	0.54
1:G:298:ASP:OD1	1:G:513:ARG:NE	2.36	0.54
1:E:310:LEU:O	1:E:314:GLY:N	2.36	0.54
1:C:440:GLY:HA2	1:C:447:MET:HG3	1.90	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:175:ARG:NH2	1:A:422:ASP:OD2	2.40	0.54
1:A:308:VAL:HG12	1:A:310:LEU:HB2	1.89	0.53
1:A:360:TRP:CH2	1:G:157:ARG:HD2	2.43	0.53
1:E:19:ASP:OD2	1:E:19:ASP:N	2.41	0.53
1:C:433:VAL:HG21	1:C:506:ILE:HB	1.90	0.53
1:C:15:PHE:HB3	1:C:39:PHE:HB3	1.91	0.53
1:G:176:ALA:HB2	1:G:460:LEU:HB3	1.92	0.52
1:G:310:LEU:O	1:G:314:GLY:N	2.40	0.52
1:A:14:TRP:CD2	1:A:115:PRO:HB3	2.45	0.52
1:G:563:ARG:NH1	6:G:705:HOH:O	2.39	0.52
1:A:155[B]:LYS:HD2	1:G:323:TYR:HB3	1.91	0.52
1:G:434:LEU:HB2	1:G:469:ARG:HG2	1.90	0.51
1:A:10:ARG:HD3	1:A:116:LEU:O	2.11	0.51
1:A:302:HIS:CD2	1:A:513:ARG:HH22	2.29	0.51
1:A:302:HIS:HA	1:A:377:GLY:HA3	1.92	0.51
1:C:157:ARG:HD2	1:E:360:TRP:CH2	2.46	0.51
1:A:331:ILE:HD13	1:A:350:LEU:HD11	1.93	0.51
1:E:447:MET:HG2	1:E:474:ARG:HG3	1.93	0.51
1:G:14:TRP:CG	1:G:115:PRO:HB3	2.46	0.51
1:G:424:GLU:OE2	1:G:461:ARG:NH2	2.43	0.51
1:A:540:ARG:NH2	1:C:108:GLU:OE1	2.42	0.50
1:E:93:ARG:HD3	1:G:14:TRP:CE2	2.46	0.50
1:G:344:THR:OG1	1:G:346:ASN:OD1	2.29	0.50
1:A:157:ARG:HD2	1:G:360:TRP:CH2	2.47	0.50
1:C:360:TRP:CH2	1:E:157:ARG:HD2	2.47	0.50
1:C:380:VAL:O	1:C:513:ARG:HG3	2.11	0.49
1:G:128:THR:O	1:G:132:LEU:HG	2.11	0.49
1:C:524:LEU:O	1:C:528:ARG:HG3	2.12	0.49
1:C:558:ASP:OD1	1:C:559:LEU:N	2.46	0.48
1:G:409:VAL:HG21	1:G:428:VAL:CG1	2.43	0.48
1:A:14:TRP:CE2	1:C:93:ARG:HD3	2.48	0.48
1:A:93:ARG:HD3	1:C:14:TRP:CE2	2.48	0.48
1:C:100:ARG:HB2	1:C:127:KCX:HG2	1.95	0.48
1:C:35:PRO:HG2	1:C:38:GLN:HG2	1.95	0.48
1:G:508:LEU:HD23	1:G:515:LEU:HD13	1.95	0.48
1:A:162:GLY:N	1:A:166:ASP:OD2	2.47	0.47
1:G:175:ARG:NH2	1:G:422:ASP:OD1	2.46	0.47
1:C:303:LYS:HA	1:C:375:GLU:HG2	1.97	0.47
1:G:376:ALA:HB1	1:G:395:SER:HB3	1.97	0.47
1:G:378:ILE:H	1:G:378:ILE:HD12	1.80	0.47
1:E:262:GLU:HG2	1:E:300:LEU:HD11	1.97	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:155[B]:LYS:HE2	1:A:158:GLY:C	2.35	0.46
1:C:171:SER:O	1:C:175:ARG:HG3	2.15	0.46
1:A:310:LEU:O	1:A:314:GLY:N	2.39	0.46
1:C:169:LYS:HE2	1:C:173:GLU:OE2	2.16	0.46
1:E:211:VAL:HG12	1:E:217:SER:HB3	1.96	0.46
1:G:457:PRO:O	1:G:461:ARG:HG3	2.16	0.46
1:E:90:THR:HG21	1:G:28:TRP:CD2	2.50	0.46
1:E:310:LEU:HD23	1:E:316:HIS:HB2	1.98	0.46
1:C:206:THR:HG21	1:C:274:SER:N	2.25	0.46
1:G:558:ASP:OD1	1:G:559:LEU:N	2.46	0.46
1:A:380:VAL:O	1:A:513:ARG:HD2	2.15	0.46
1:A:470:VAL:HA	1:A:484:VAL:HG22	1.98	0.46
1:E:14:TRP:CE2	1:G:93:ARG:HD3	2.51	0.46
1:G:89:GLU:HG3	1:G:126:ASP:HB2	1.97	0.46
1:C:436:LEU:HB3	1:C:471:SER:HB3	1.98	0.46
1:A:10:ARG:HD2	1:A:141:LEU:HD21	1.98	0.45
1:A:28:TRP:NE1	1:C:198:CYS:SG	2.85	0.45
1:G:303:LYS:HA	1:G:375:GLU:HG2	1.98	0.45
1:A:540:ARG:HH22	1:C:108:GLU:CD	2.19	0.45
1:C:319:GLU:HG2	1:C:323:TYR:CE2	2.52	0.45
1:C:206:THR:O	1:C:210:MET:N	2.43	0.45
1:C:508:LEU:HD23	1:C:515:LEU:HD13	1.99	0.45
1:G:100:ARG:HB2	1:G:127:KCX:HG3	1.99	0.45
1:A:129:THR:HG21	1:A:207:MET:HB3	1.99	0.45
1:C:125:CYS:O	1:C:128:THR:OG1	2.29	0.45
1:C:202:GLY:O	1:C:206:THR:HG23	2.16	0.45
1:C:301:GLY:HA2	1:C:304:LEU:HD12	1.99	0.45
1:G:44:VAL:HG22	1:G:78:PHE:HD2	1.81	0.45
1:E:14:TRP:CG	1:E:115:PRO:HB3	2.51	0.44
1:C:310:LEU:O	1:C:314:GLY:N	2.46	0.44
1:E:522:GLU:OE1	1:E:522:GLU:N	2.48	0.44
1:C:147:SER:O	1:C:231:ARG:NH1	2.50	0.44
1:C:519:VAL:HG22	1:C:524:LEU:HG	1.99	0.44
1:E:82:PHE:HB3	1:G:54:LEU:HD12	2.00	0.44
1:C:176:ALA:HB2	1:C:460:LEU:HB3	1.98	0.44
1:A:193:ARG:NH1	1:G:323:TYR:OH	2.51	0.44
1:G:51:PHE:HB2	1:G:61:PHE:HB2	2.00	0.44
1:C:307:LEU:HD23	1:C:371:PRO:HB3	1.99	0.43
1:E:176:ALA:HB2	1:E:460:LEU:HB3	1.99	0.43
1:E:572:LYS:HZ1	1:G:414:SER:HG	1.58	0.43
1:G:458:LYS:HG2	1:G:459:ILE:HD12	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:509:ASP:HB3	1:C:514:LYS:HB3	2.00	0.43
1:E:35:PRO:HG2	1:E:38:GLN:HG2	2.00	0.43
1:G:437:LYS:HD2	1:G:498:ALA:HA	2.01	0.43
1:G:298:ASP:HB2	1:G:380:VAL:HB	2.00	0.43
1:A:93:ARG:HD3	1:C:14:TRP:NE1	2.34	0.43
1:C:62[B]:ARG:O	1:C:66[B]:GLU:HG2	2.19	0.43
1:C:323:TYR:CE1	1:E:155:LYS:HG3	2.53	0.43
1:C:433:VAL:HA	1:C:468:VAL:HG23	2.01	0.43
1:G:499:LEU:HD22	1:G:527:ARG:HB2	2.00	0.43
1:E:382:ARG:HE	1:E:382:ARG:HB3	1.57	0.43
1:G:15:PHE:HB3	1:G:39:PHE:HB3	2.00	0.43
1:C:228:ASP:OD2	1:E:193:ARG:HD3	2.18	0.43
1:G:268:ASN:OD1	1:G:273:GLY:HA3	2.19	0.43
1:A:14:TRP:CG	1:A:115:PRO:HB3	2.54	0.42
1:A:224:ILE:HG12	1:A:322:TYR:CE1	2.54	0.42
1:G:522:GLU:H	1:G:522:GLU:HG2	1.50	0.42
1:A:64:LEU:HD21	1:A:231:ARG:HG3	2.01	0.42
1:E:558:ASP:OD1	1:E:559:LEU:N	2.51	0.42
1:G:352:ASP:HA	1:G:355:LYS:HE2	2.02	0.42
1:C:420:ARG:HG2	1:C:426:LEU:HD13	2.01	0.42
1:G:51:PHE:CE2	1:G:62:ARG:HD2	2.55	0.42
1:C:312:PRO:HG3	1:C:478:THR:HA	2.01	0.42
1:E:51:PHE:HB2	1:E:61:PHE:HB2	2.01	0.42
1:G:411:PHE:CD1	1:G:417:MET:HA	2.54	0.42
1:A:94:PRO:O	1:C:574:ASN:HA	2.19	0.42
1:E:83:PRO:HB2	1:G:83:PRO:HB2	2.02	0.42
1:A:213:ALA:HB2	1:A:267:VAL:HG21	2.02	0.42
1:C:156:PHE:O	1:C:159:ARG:HG2	2.19	0.41
1:A:211:VAL:HG12	1:A:217:SER:HB3	2.02	0.41
1:A:28:TRP:CD2	1:C:192:HIS:CE1	3.08	0.41
1:E:268:ASN:OD1	1:E:273:GLY:HA3	2.20	0.41
1:E:278:VAL:HA	1:E:297:TRP:CZ2	2.55	0.41
1:C:302:HIS:CD2	1:C:303:LYS:HG2	2.55	0.41
1:C:150:PRO:HD2	1:C:224:ILE:O	2.20	0.41
1:E:537:PRO:HG2	1:E:547:VAL:HG21	2.01	0.41
1:G:150:PRO:HD2	1:G:224:ILE:O	2.20	0.41
1:C:437:LYS:HD3	1:C:497:LEU:O	2.21	0.41
1:G:426:LEU:HG	1:G:428:VAL:HG22	2.01	0.41
1:E:207:MET:HE2	1:E:210:MET:HG3	2.02	0.41
1:A:540:ARG:HG2	1:A:541:GLY:N	2.36	0.41
1:C:224:ILE:HG12	1:C:322:TYR:CE1	2.56	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:333:GLU:OE1	1:G:362:ARG:NH2	2.54	0.41
1:E:111:ILE:HA	1:E:116:LEU:HD12	2.03	0.41
1:E:434:LEU:HB2	1:E:469:ARG:HG2	2.03	0.41
1:G:142:PRO:HD3	1:G:251:VAL:HG12	2.03	0.41
1:A:424:GLU:OE2	1:A:461:ARG:NH2	2.33	0.40
1:G:447:MET:HG2	1:G:474:ARG:HG3	2.02	0.40
1:A:35:PRO:HG2	1:A:38:GLN:HG2	2.04	0.40
1:C:193:ARG:HD2	1:E:228:ASP:OD2	2.22	0.40
1:G:129:THR:HG21	1:G:207:MET:HB3	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	566/575 (98%)	552 (98%)	12 (2%)	2 (0%)	34 57
1	C	568/575 (99%)	552 (97%)	14 (2%)	2 (0%)	34 57
1	E	567/575 (99%)	549 (97%)	17 (3%)	1 (0%)	47 71
1	G	566/575 (98%)	538 (95%)	25 (4%)	3 (0%)	29 52
All	All	2267/2300 (99%)	2191 (97%)	68 (3%)	8 (0%)	34 57

All (8) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	126	ASP
1	G	126	ASP
1	G	518	HIS
1	A	124	GLY
1	E	124	GLY
1	C	124	GLY

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Mol	Chain	Res	Type
1	C	126	ASP
1	G	124	GLY

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	454/461 (98%)	442 (97%)	12 (3%)	46	72
1	C	456/461 (99%)	445 (98%)	11 (2%)	49	74
1	E	456/461 (99%)	449 (98%)	7 (2%)	65	83
1	G	447/461 (97%)	426 (95%)	21 (5%)	26	50
All	All	1813/1844 (98%)	1762 (97%)	51 (3%)	46	69

All (51) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	9	ARG
1	A	10	ARG
1	A	11	SER
1	A	66	GLU
1	A	155[A]	LYS
1	A	155[B]	LYS
1	A	157	ARG
1	A	189	SER
1	A	199	MET
1	A	230	ARG
1	A	374	THR
1	A	563	ARG
1	C	32	ARG
1	C	157	ARG
1	C	199	MET
1	C	230	ARG
1	C	334	LEU
1	C	338	ILE
1	C	382[A]	ARG

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Mol	Chain	Res	Type
1	C	382[B]	ARG
1	C	505	ILE
1	C	522	GLU
1	C	563	ARG
1	E	62	ARG
1	E	157	ARG
1	E	230	ARG
1	E	382	ARG
1	E	420[A]	ARG
1	E	420[B]	ARG
1	E	563	ARG
1	G	9	ARG
1	G	62	ARG
1	G	66[A]	GLU
1	G	66[B]	GLU
1	G	89	GLU
1	G	157	ARG
1	G	159	ARG
1	G	181	GLN
1	G	199	MET
1	G	230	ARG
1	G	332	ARG
1	G	370	GLU
1	G	407	ARG
1	G	428	VAL
1	G	431	ASN
1	G	458	LYS
1	G	505	ILE
1	G	520	SER
1	G	522	GLU
1	G	527	ARG
1	G	563	ARG

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

5.3.3 RNA

There are no RNA molecules in this entry.

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

4 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	E	127	1,3	9,11,12	2.19	2 (22%)	5,12,14	1.43	1 (20%)
1	KCX	A	127	1,3	9,11,12	2.15	2 (22%)	5,12,14	1.57	1 (20%)
1	KCX	C	127	1,3	9,11,12	2.10	2 (22%)	5,12,14	1.58	1 (20%)
1	KCX	G	127	1,3	9,11,12	2.14	2 (22%)	5,12,14	1.79	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	E	127	1,3	-	4/9/10/12	-
1	KCX	A	127	1,3	-	5/9/10/12	-
1	KCX	C	127	1,3	-	6/9/10/12	-
1	KCX	G	127	1,3	-	7/9/10/12	-

All (8) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	E	127	KCX	CX-NZ	5.97	1.45	1.35
1	A	127	KCX	CX-NZ	5.86	1.45	1.35
1	G	127	KCX	CX-NZ	5.85	1.45	1.35
1	C	127	KCX	CX-NZ	5.83	1.45	1.35
1	E	127	KCX	OQ1-CX	2.53	1.26	1.21
1	A	127	KCX	OQ1-CX	2.45	1.26	1.21
1	G	127	KCX	OQ1-CX	2.41	1.26	1.21
1	C	127	KCX	OQ1-CX	2.17	1.25	1.21

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	G	127	KCX	OQ1-CX-NZ	-3.49	119.54	124.96
1	C	127	KCX	OQ1-CX-NZ	-3.24	119.94	124.96
1	A	127	KCX	OQ1-CX-NZ	-3.14	120.09	124.96
1	E	127	KCX	OQ1-CX-NZ	-2.98	120.34	124.96

There are no chirality outliers.

All (22) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	127	KCX	C-CA-CB-CG
1	C	127	KCX	N-CA-CB-CG
1	C	127	KCX	C-CA-CB-CG
1	C	127	KCX	OQ1-CX-NZ-CE
1	E	127	KCX	C-CA-CB-CG
1	G	127	KCX	C-CA-CB-CG
1	E	127	KCX	CG-CD-CE-NZ
1	A	127	KCX	CA-CB-CG-CD
1	C	127	KCX	CA-CB-CG-CD
1	G	127	KCX	CA-CB-CG-CD
1	G	127	KCX	CE-CD-CG-CB
1	C	127	KCX	CE-CD-CG-CB
1	C	127	KCX	OQ2-CX-NZ-CE
1	G	127	KCX	OQ1-CX-NZ-CE
1	G	127	KCX	OQ2-CX-NZ-CE
1	A	127	KCX	N-CA-CB-CG
1	E	127	KCX	N-CA-CB-CG
1	G	127	KCX	N-CA-CB-CG
1	A	127	KCX	CE-CD-CG-CB
1	A	127	KCX	OQ2-CX-NZ-CE
1	G	127	KCX	CG-CD-CE-NZ
1	E	127	KCX	CE-CD-CG-CB

There are no ring outliers.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	C	127	KCX	1	0
1	G	127	KCX	1	0

5.5 Carbohydrates

There are no monosaccharides in this entry.

5.6 Ligand geometry

Of 15 ligands modelled in this entry, 4 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	FES	C	601	1	0,4,4	-	-	-		
4	BCT	E	604	3	2,3,3	0.96	0	2,3,3	0.18	0
5	CO2	G	603	3	2,2,2	1.03	0	1,1,1	0.55	0
2	FES	G	601	1	0,4,4	-	-	-		
2	FES	A	601	1	0,4,4	-	-	-		
4	BCT	E	605	-	2,3,3	0.96	0	2,3,3	0.16	0
4	BCT	A	604	3	2,3,3	0.97	0	2,3,3	0.03	0
4	BCT	A	603	-	2,3,3	0.96	0	2,3,3	0.17	0
4	BCT	E	603	-	2,3,3	0.96	0	2,3,3	0.15	0
4	BCT	C	603	3	2,3,3	0.95	0	2,3,3	0.06	0
2	FES	E	601	1	0,4,4	-	-	-		

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	FES	C	601	1	-	-	0/1/1/1
2	FES	G	601	1	-	-	0/1/1/1
2	FES	A	601	1	-	-	0/1/1/1
2	FES	E	601	1	-	-	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

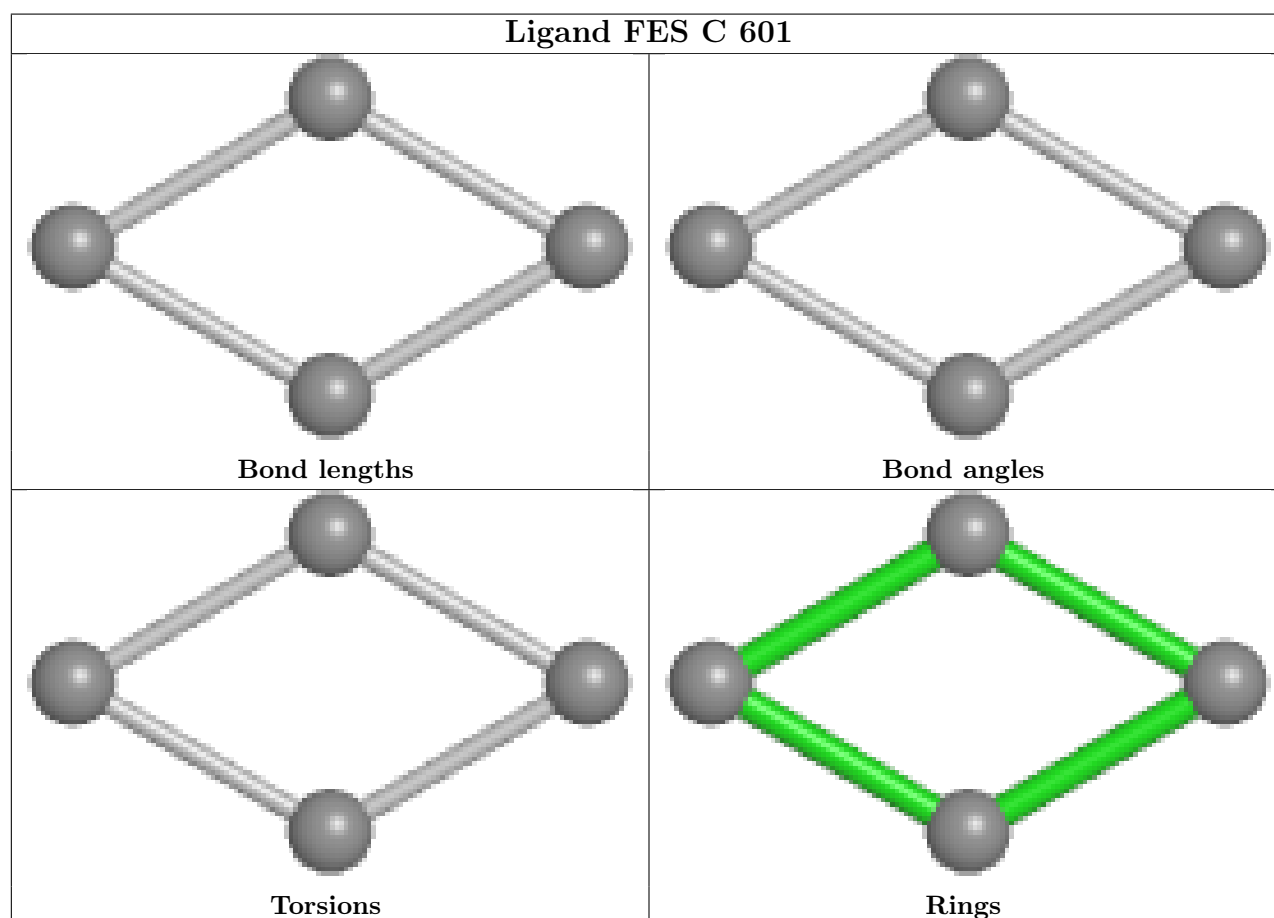
There are no chirality outliers.

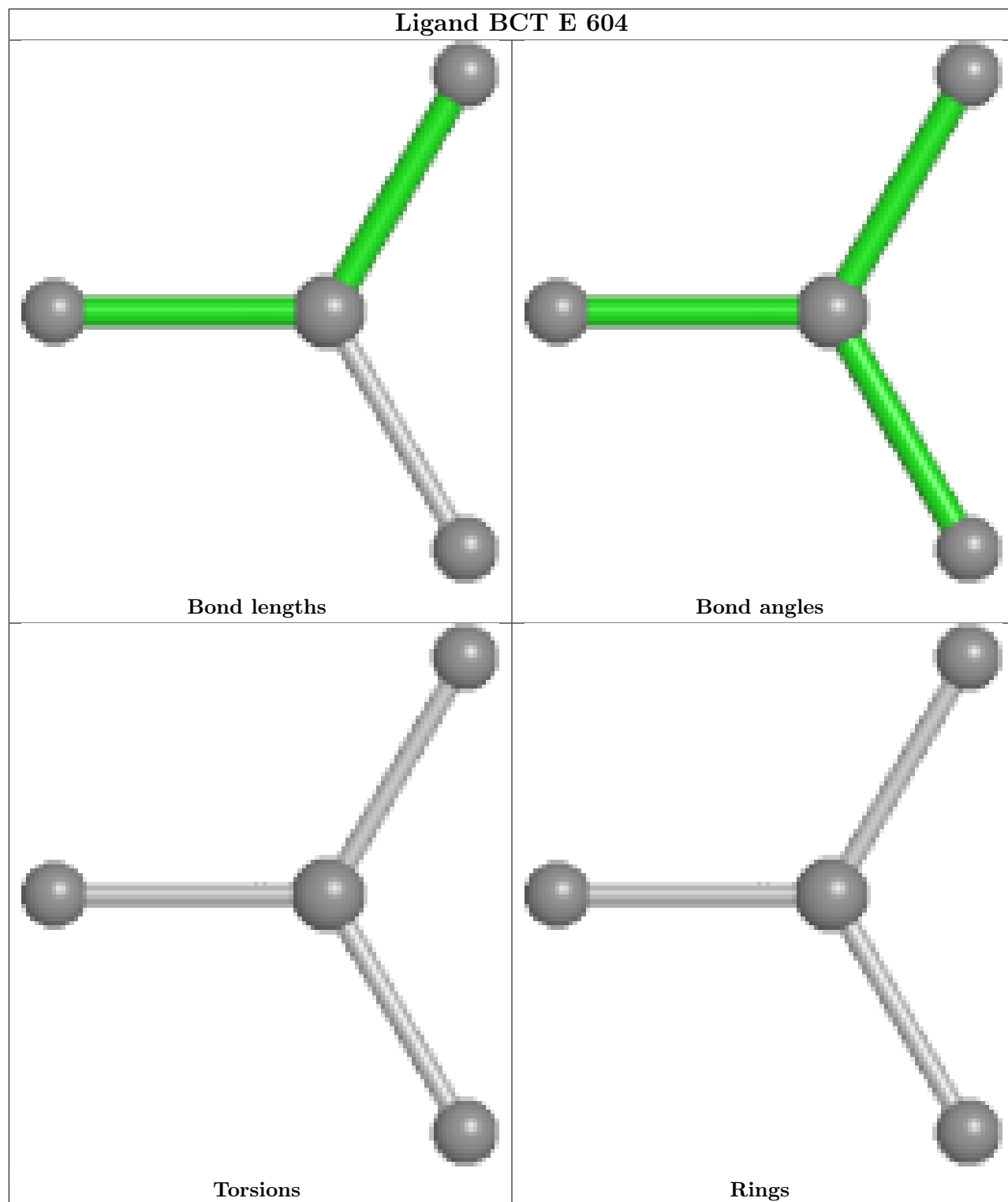
There are no torsion outliers.

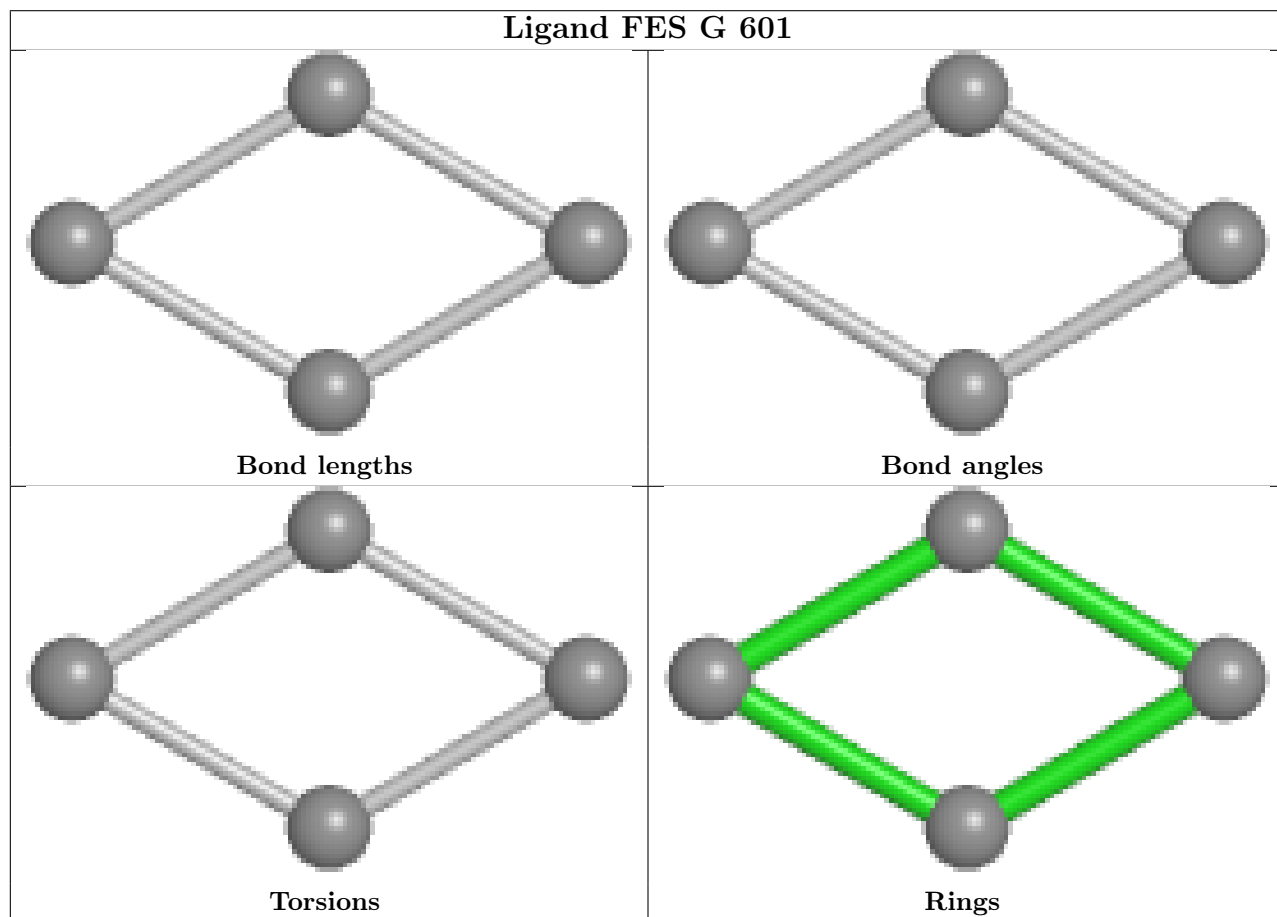
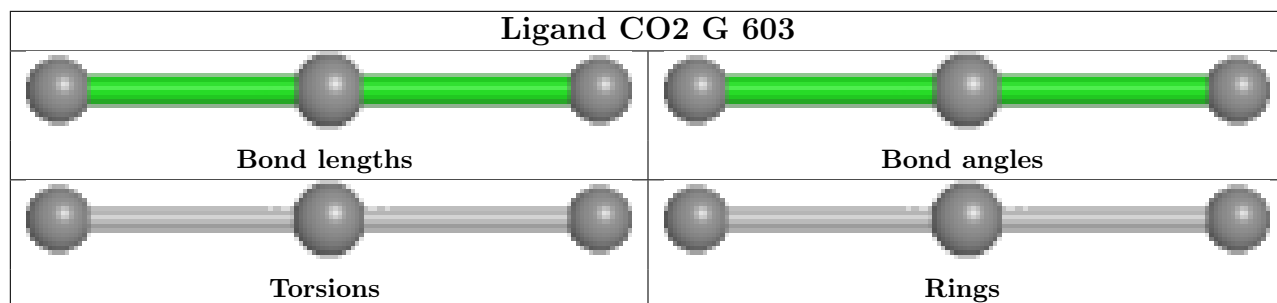
There are no ring outliers.

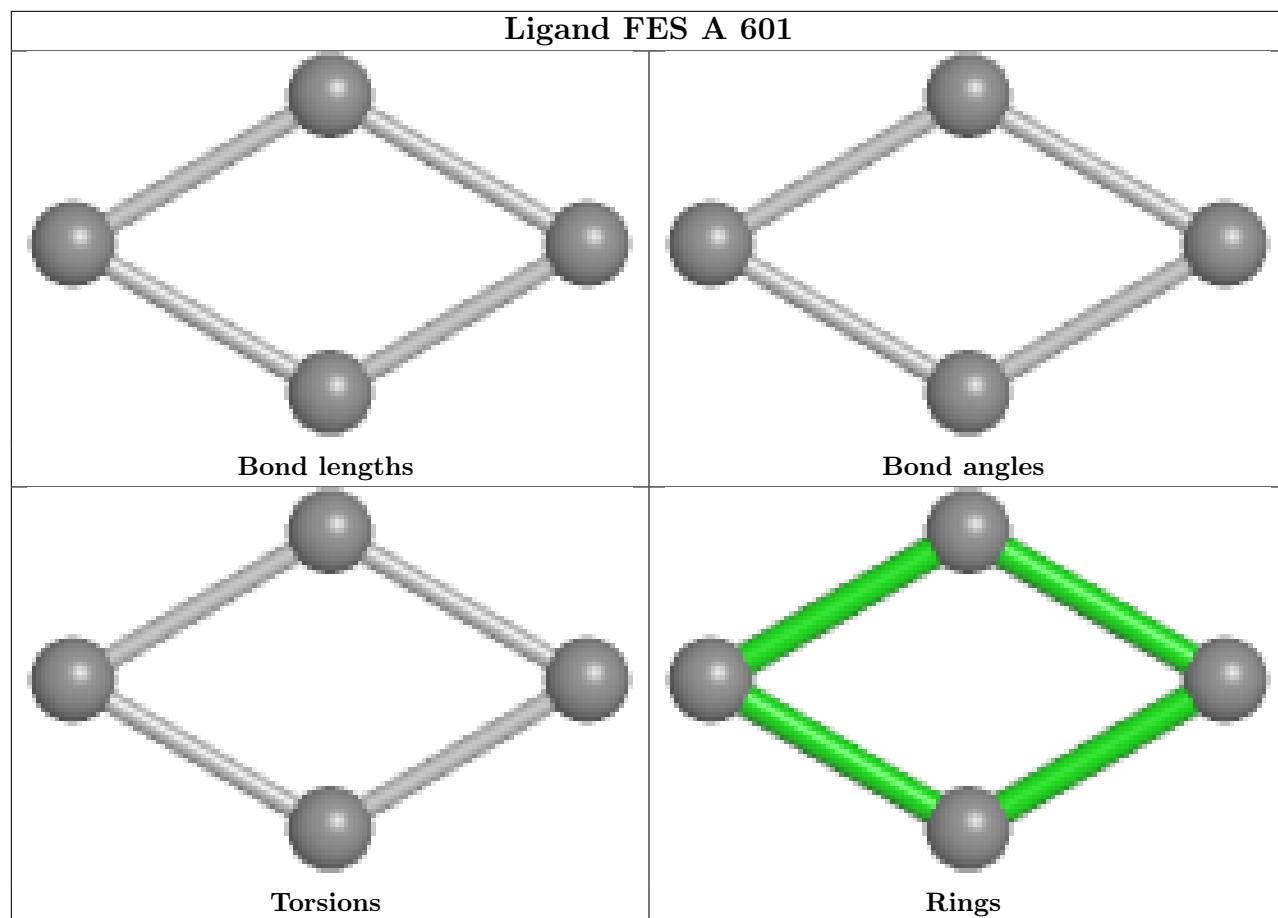
No monomer is involved in short contacts.

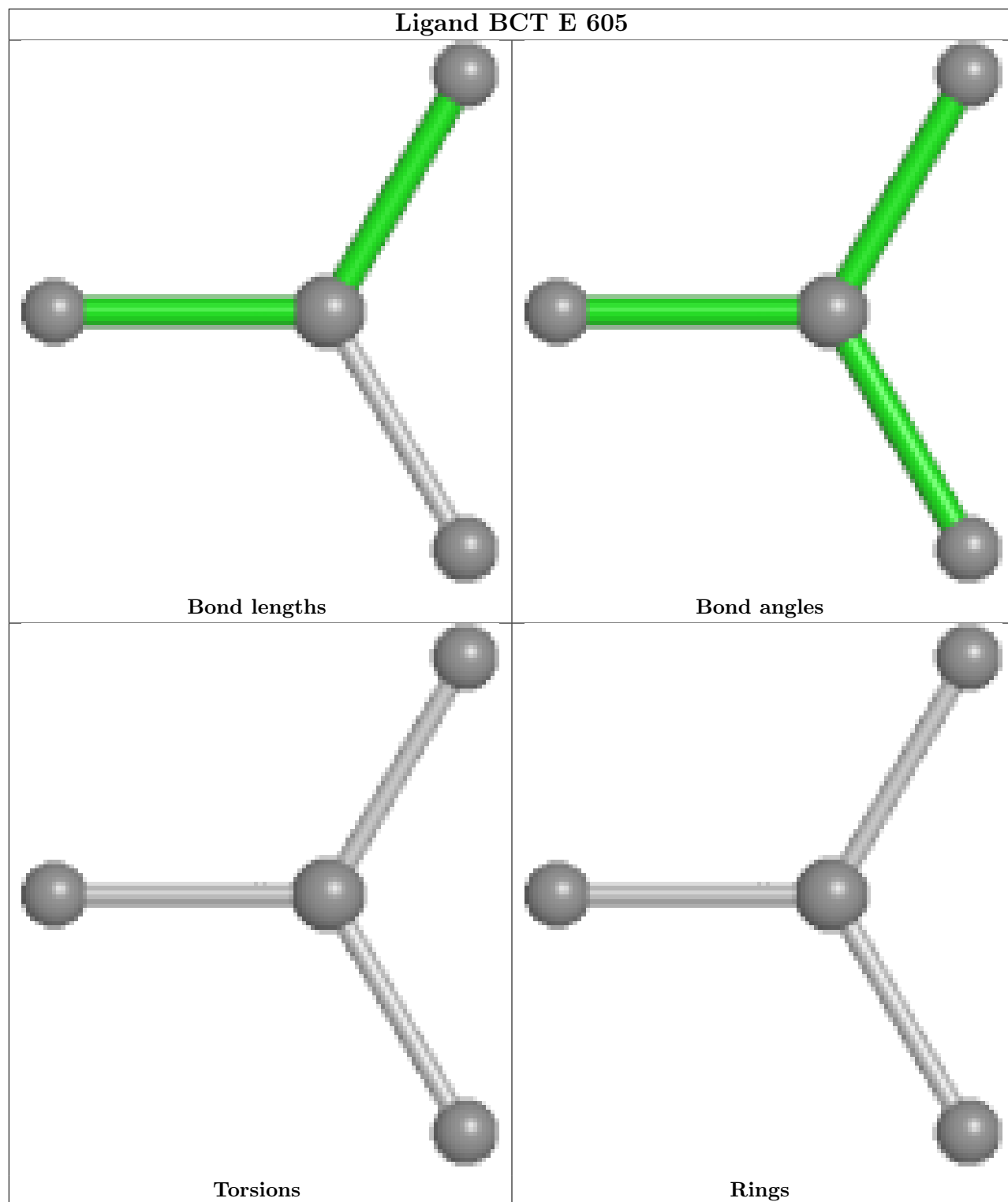
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

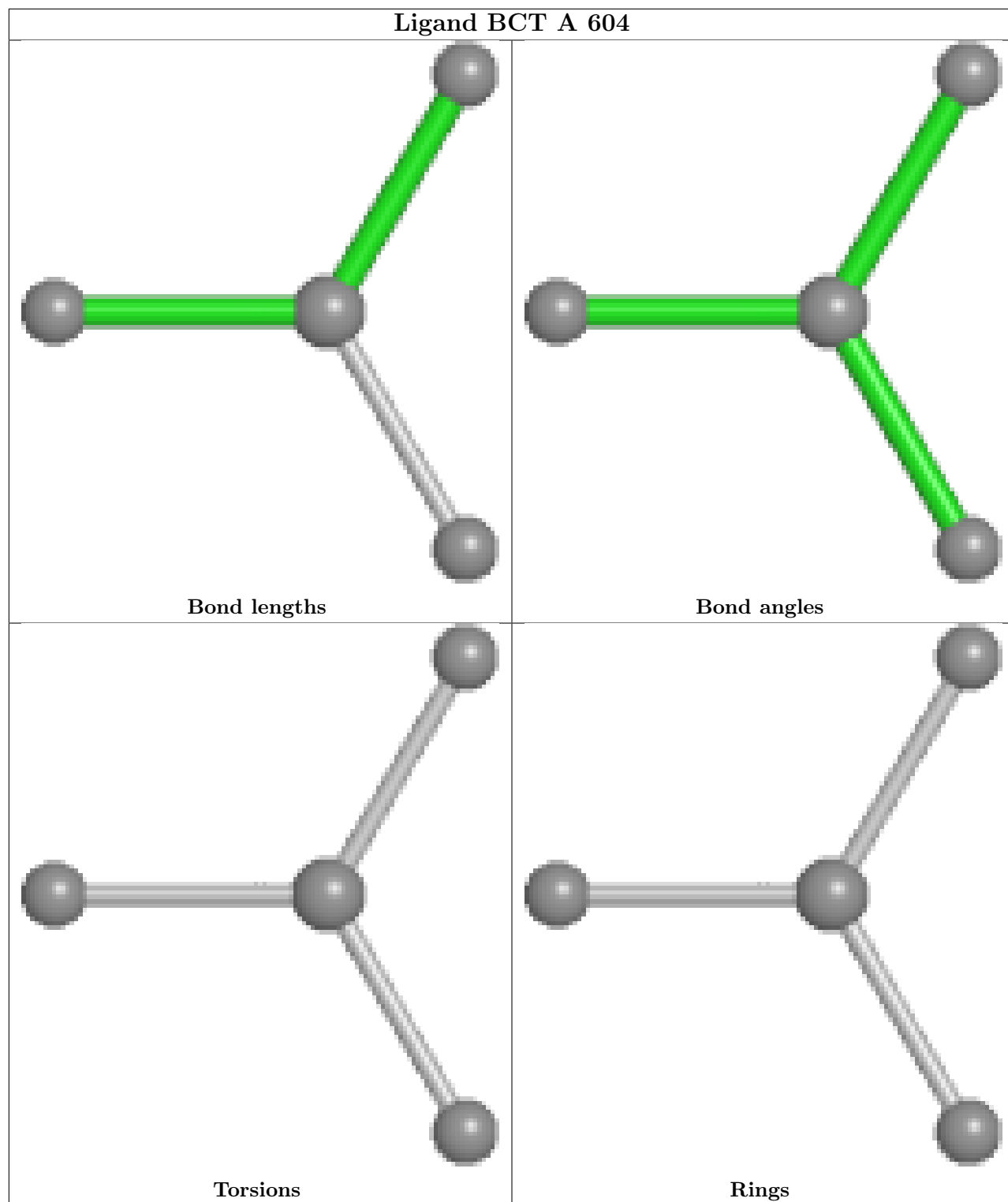


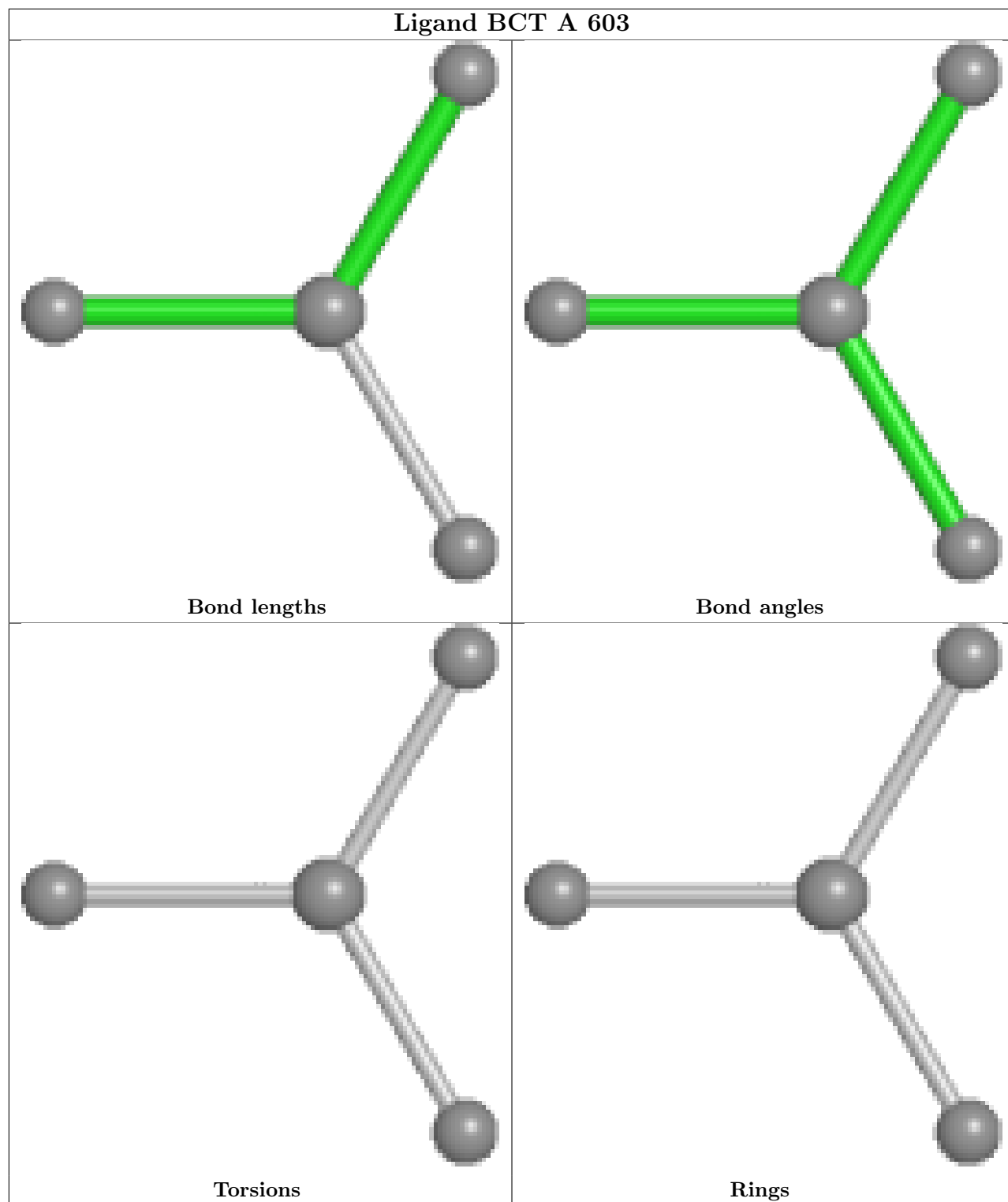


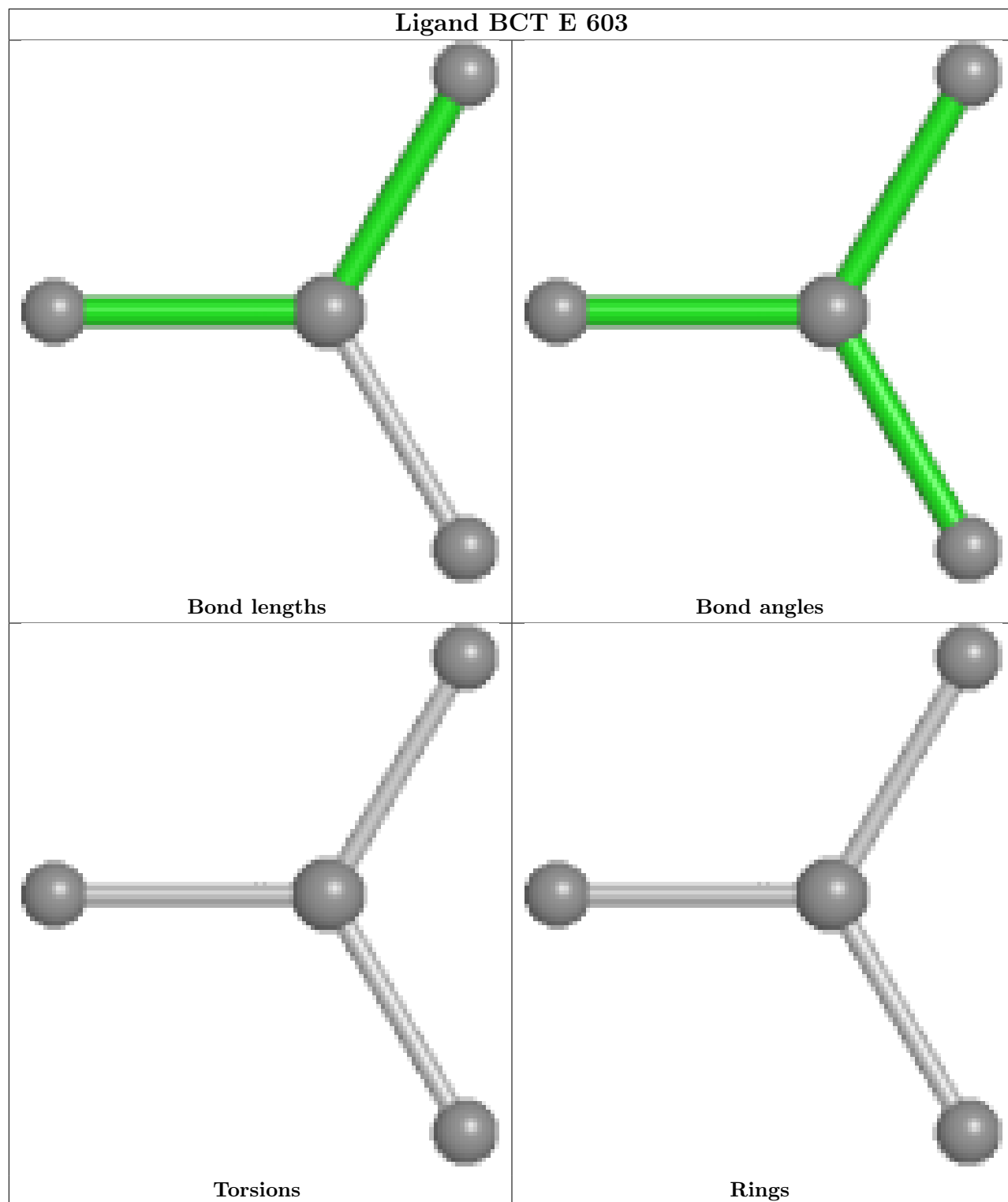


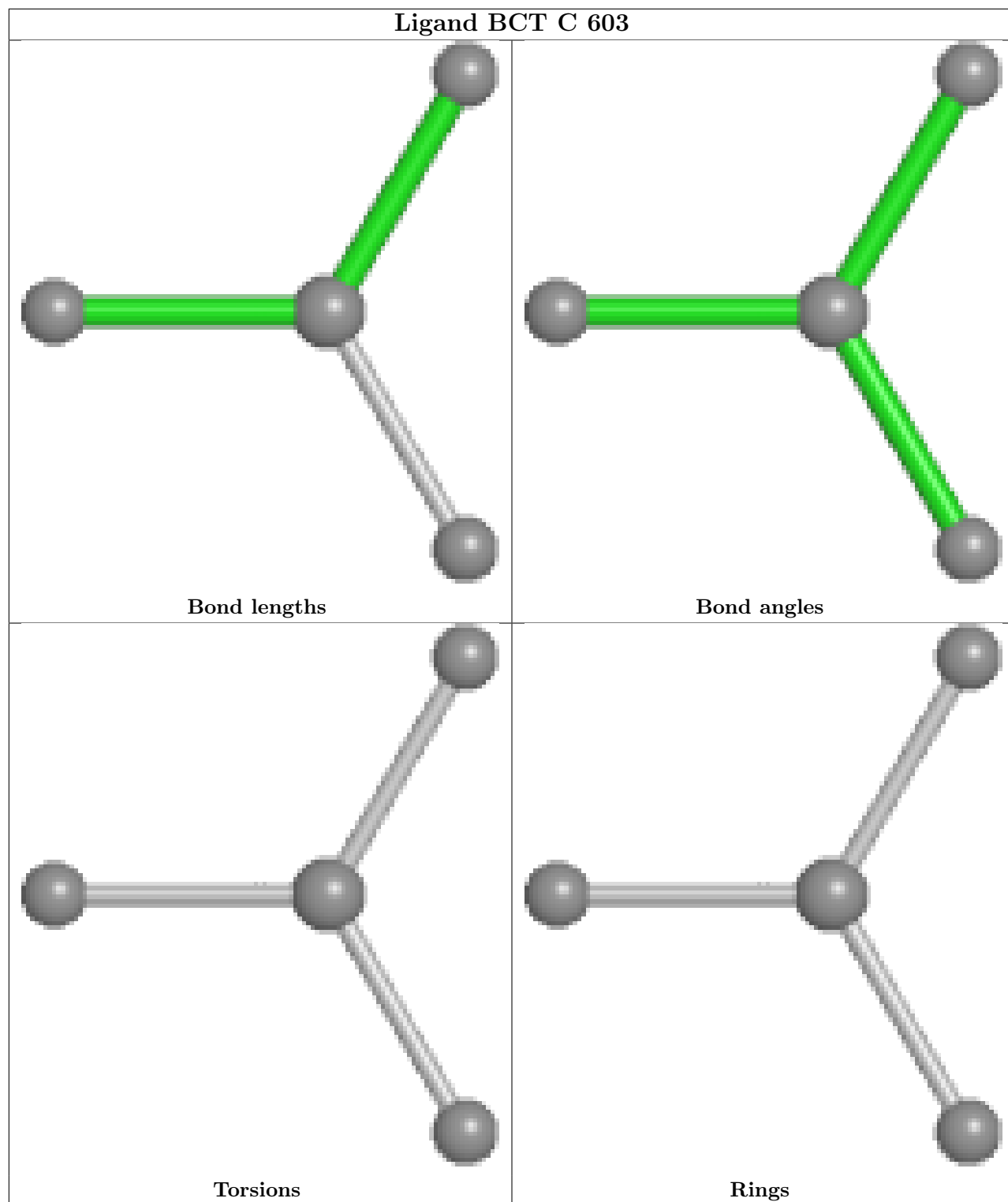


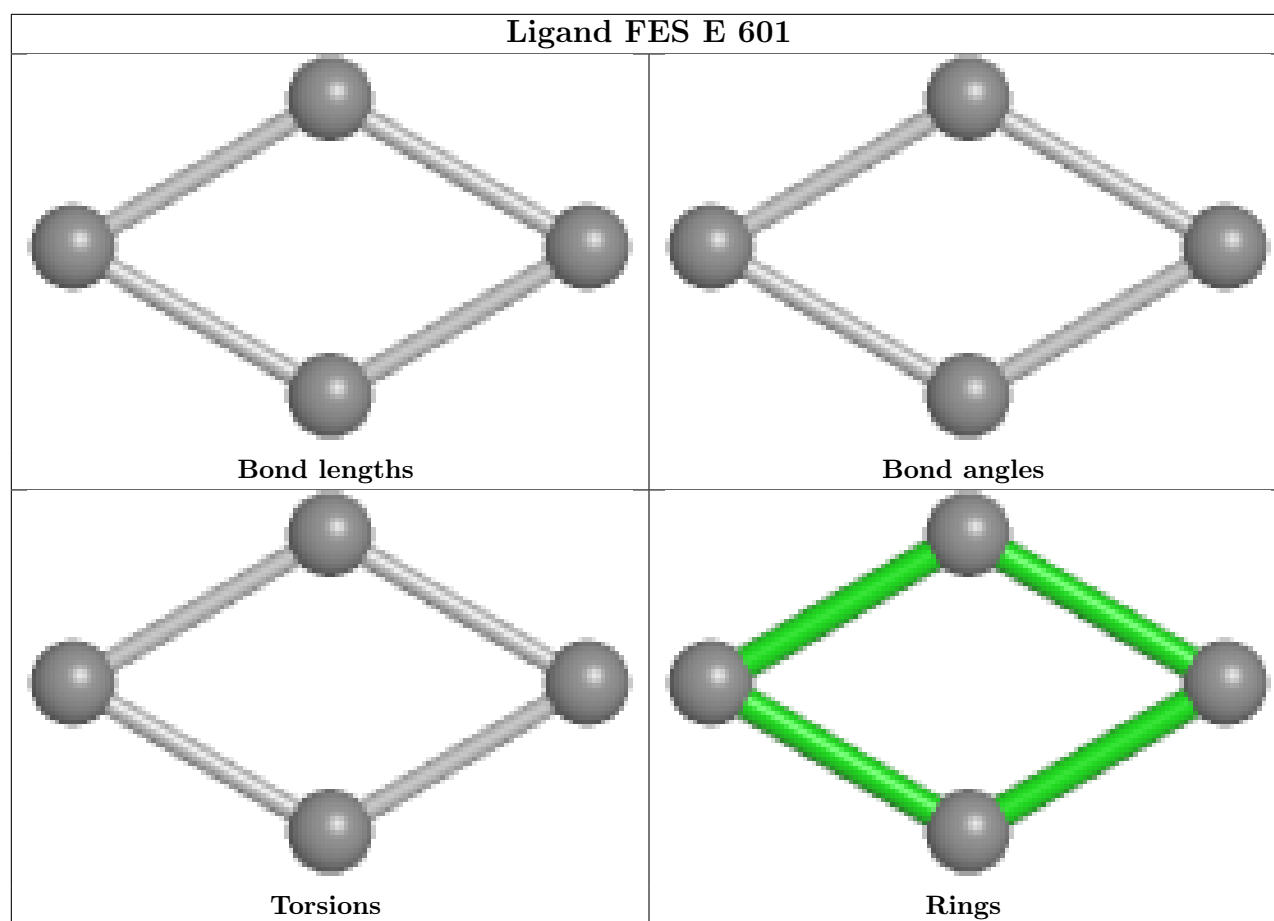












5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
1	C	3
1	E	2
1	A	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	C	124:GLY	C	125:CYS	N	1.64
1	C	70:ILE	C	71:GLY	N	1.14
1	E	70:ILE	C	71:GLY	N	1.14

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Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	C	69:LYS	C	70:ILE	N	1.09
1	E	69:LYS	C	70:ILE	N	0.98
1	A	69:LYS	C	70:ILE	N	0.94

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	567/575 (98%)	-0.15	3 (0%) 91 89	34, 46, 65, 81	0
1	C	567/575 (98%)	0.28	23 (4%) 37 30	33, 51, 74, 86	0
1	E	567/575 (98%)	-0.08	7 (1%) 79 76	34, 45, 66, 79	0
1	G	567/575 (98%)	0.20	26 (4%) 32 26	20, 54, 87, 100	0
All	All	2268/2300 (98%)	0.06	59 (2%) 56 50	20, 49, 76, 100	0

All (59) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	506	ILE	5.9
1	G	531	TRP	4.8
1	G	506	ILE	4.6
1	C	530	ALA	4.4
1	E	18	LEU	4.1
1	G	524	LEU	4.0
1	G	184	PHE	3.8
1	C	524	LEU	3.6
1	C	531	TRP	3.4
1	E	395	SER	3.2
1	G	460	LEU	3.2
1	C	464	ILE	3.1
1	C	426	LEU	3.1
1	G	530	ALA	2.9
1	G	399	PRO	2.8
1	G	510	VAL	2.8
1	G	159	ARG	2.8
1	G	176	ALA	2.8
1	C	180	SER	2.8
1	A	182	GLU	2.7
1	G	533	ALA	2.7

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Mol	Chain	Res	Type	RSRZ
1	G	185	PHE	2.7
1	G	198	CYS	2.7
1	C	455	LEU	2.6
1	C	130	PRO	2.5
1	E	368	PHE	2.5
1	G	515	LEU	2.5
1	C	280	HIS	2.5
1	G	455	LEU	2.5
1	A	179	MET	2.5
1	C	368	PHE	2.4
1	G	57	CYS	2.4
1	E	303	LYS	2.4
1	G	517	LEU	2.4
1	C	177	GLY	2.3
1	C	399	PRO	2.3
1	C	428	VAL	2.3
1	C	157	ARG	2.3
1	C	425	ASN	2.3
1	G	177	GLY	2.3
1	C	515	LEU	2.3
1	G	178	GLN	2.2
1	G	179	MET	2.2
1	E	536	ALA	2.2
1	C	88	GLY	2.2
1	C	175	ARG	2.1
1	G	302	HIS	2.1
1	E	204	ALA	2.1
1	C	185	PHE	2.1
1	C	283	ALA	2.1
1	C	516	HIS	2.1
1	G	337	VAL	2.1
1	G	172	GLU	2.1
1	E	362	ARG	2.0
1	G	180	SER	2.0
1	C	539	ALA	2.0
1	A	180	SER	2.0
1	G	174	VAL	2.0
1	G	428	VAL	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	E	127	12/13	0.95	0.21	36,41,43,46	0
1	KCX	C	127	12/13	0.96	0.26	39,43,49,50	0
1	KCX	A	127	12/13	0.96	0.17	37,42,44,44	0
1	KCX	G	127	12/13	0.96	0.26	42,46,52,53	0

6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

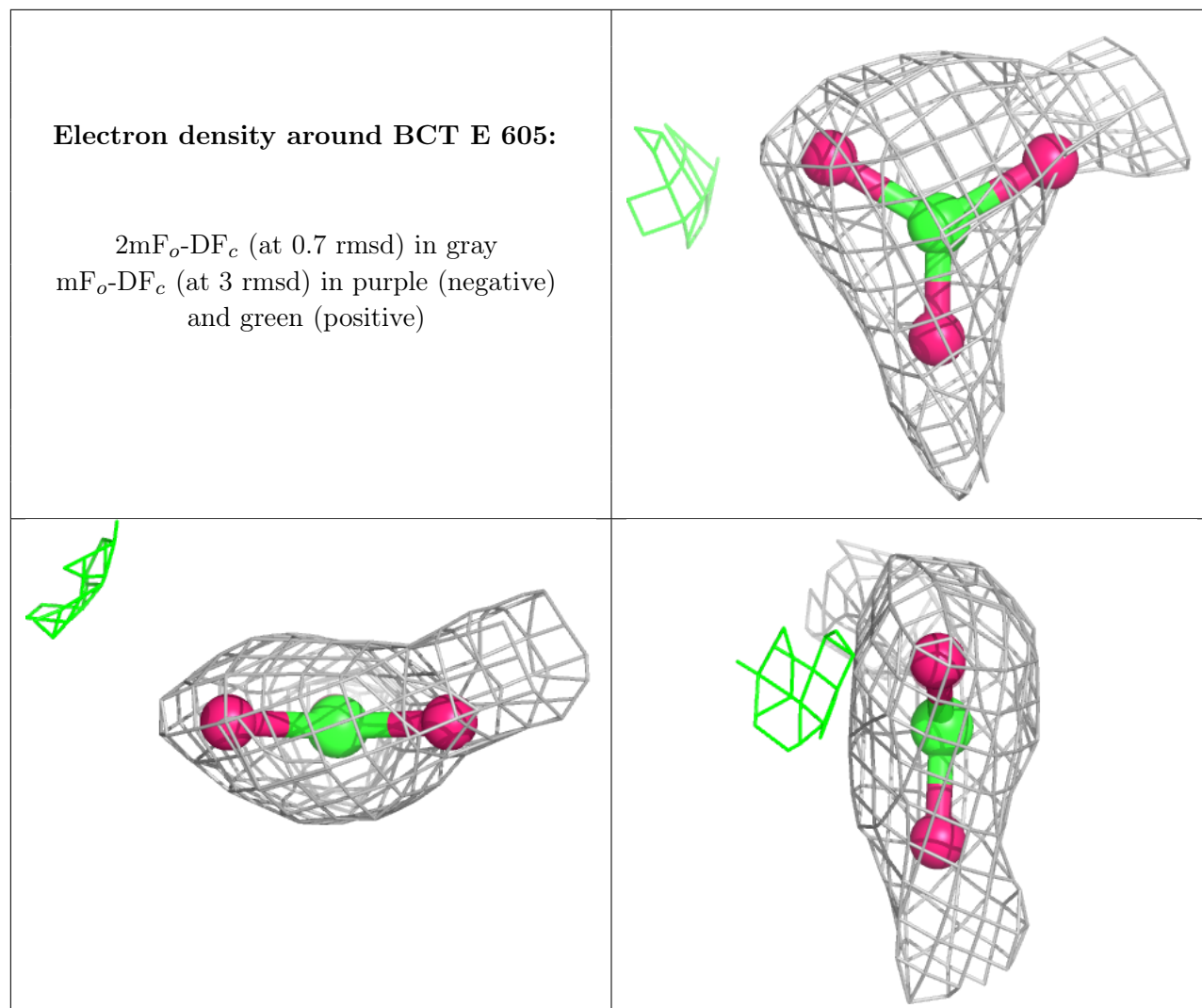
6.4 Ligands [i](#)

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
4	BCT	E	605	4/4	0.76	0.31	61,65,68,73	0
4	BCT	E	603	4/4	0.84	0.15	57,62,66,67	0
4	BCT	C	603	4/4	0.87	0.27	52,53,54,55	0
4	BCT	E	604	4/4	0.89	0.17	51,52,54,57	0
4	BCT	A	604	4/4	0.93	0.14	49,50,54,56	0
4	BCT	A	603	4/4	0.94	0.16	62,63,63,64	0
5	CO2	G	603	3/3	0.94	0.26	57,57,58,60	0
2	FES	C	601	4/4	0.95	0.19	40,44,46,67	4
3	MG	A	602	1/1	0.96	0.23	36,36,36,36	0
3	MG	E	602	1/1	0.96	0.22	31,31,31,31	0
2	FES	G	601	4/4	0.96	0.20	45,46,48,64	4
3	MG	G	602	1/1	0.97	0.21	41,41,41,41	0
3	MG	C	602	1/1	0.97	0.30	46,46,46,46	0
2	FES	A	601	4/4	0.98	0.16	39,42,47,62	4
2	FES	E	601	4/4	0.98	0.14	36,42,45,54	4

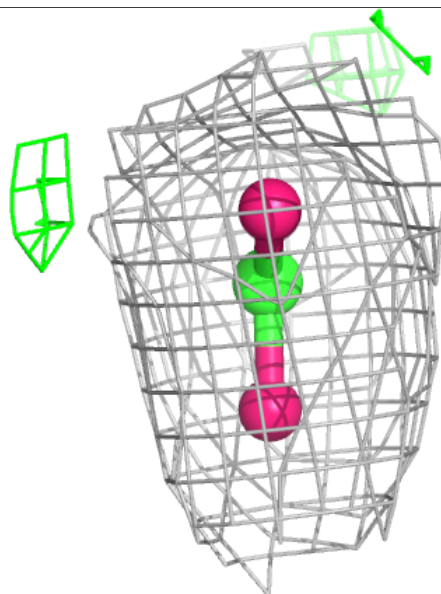
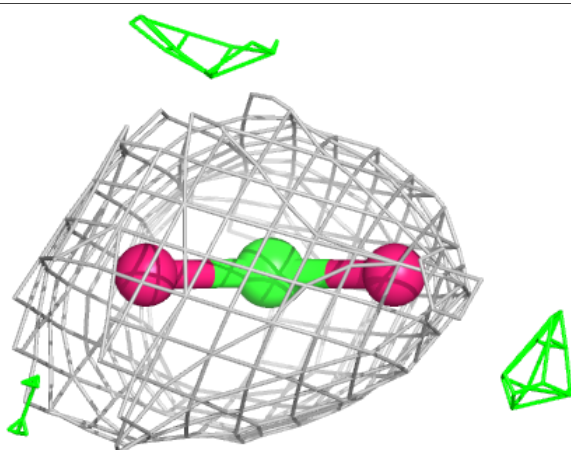
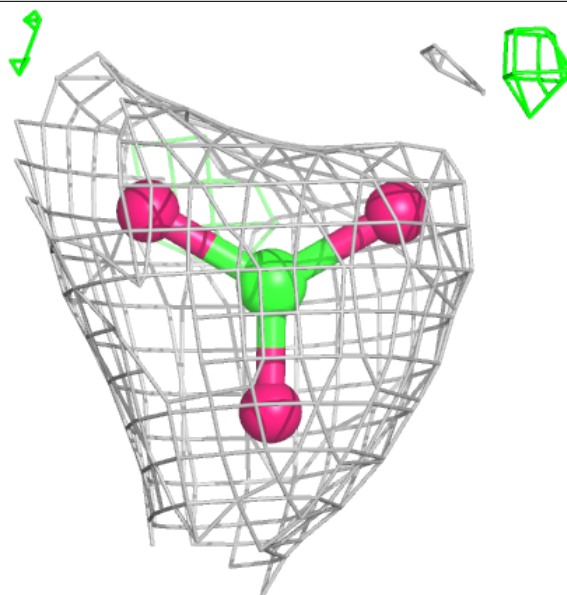
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different

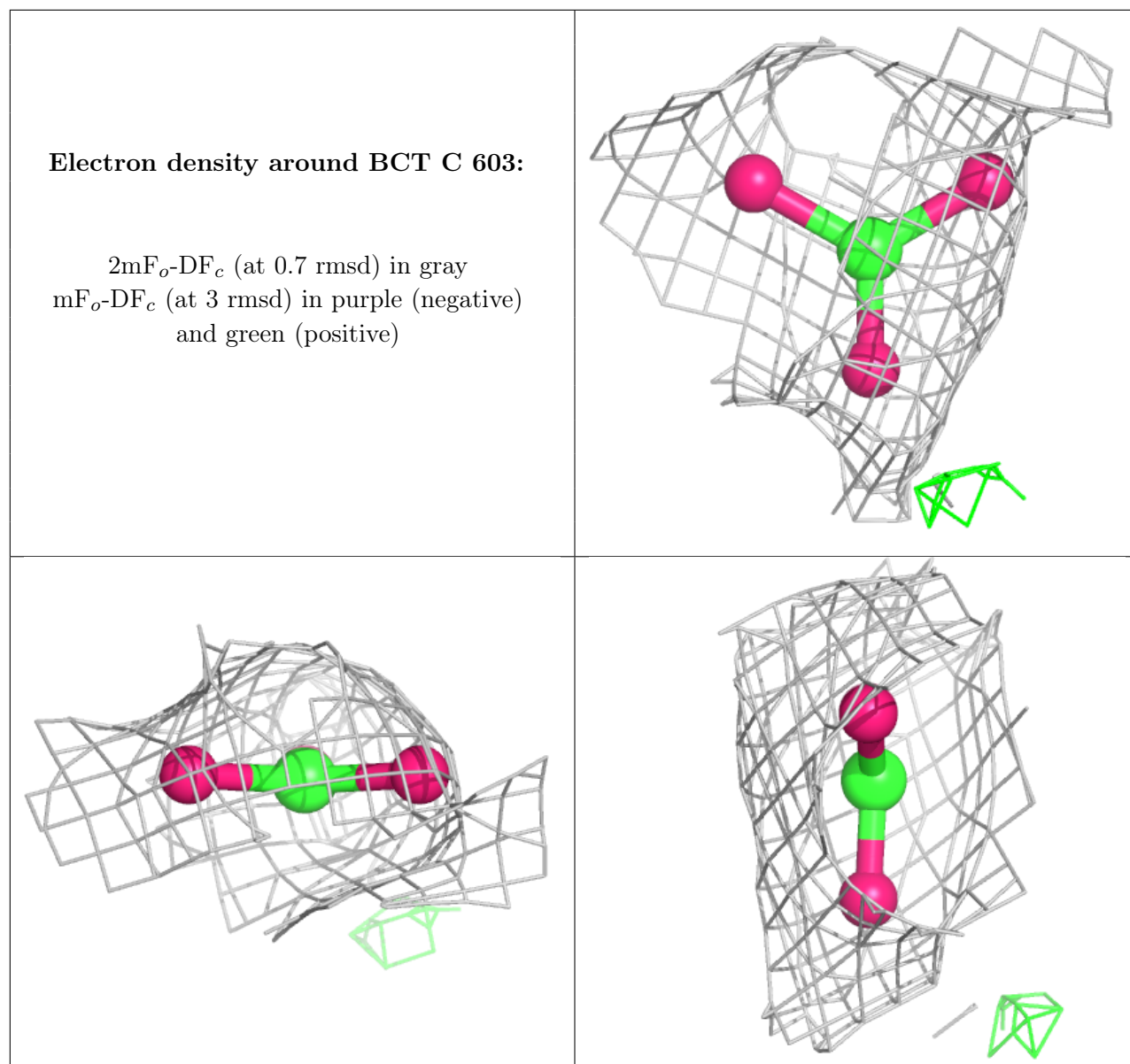
orientation to approximate a three-dimensional view.



Electron density around BCT E 603:

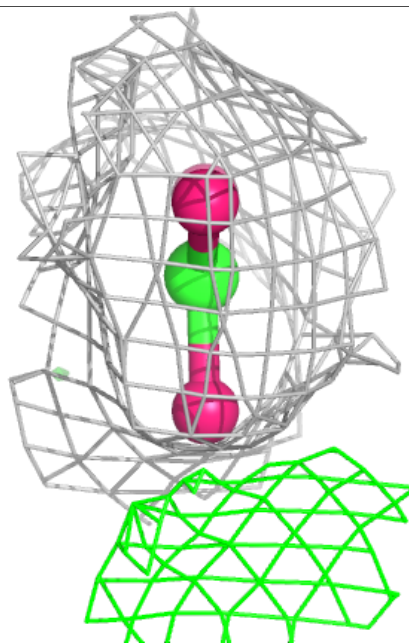
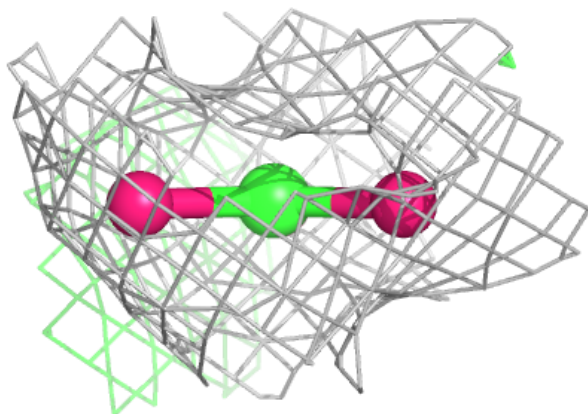
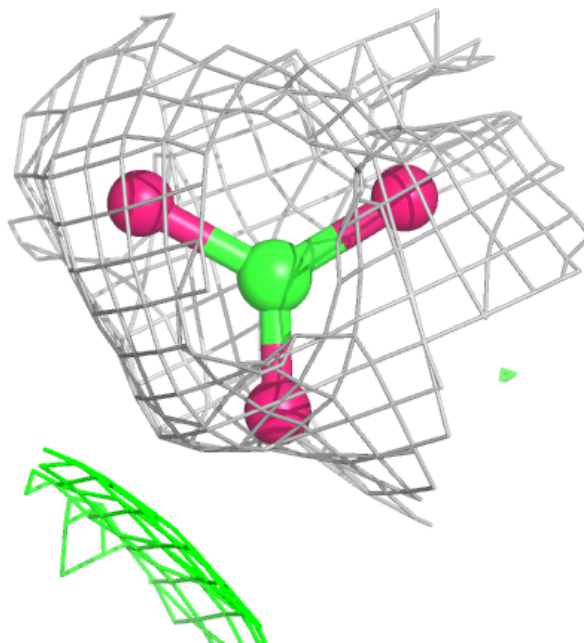
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

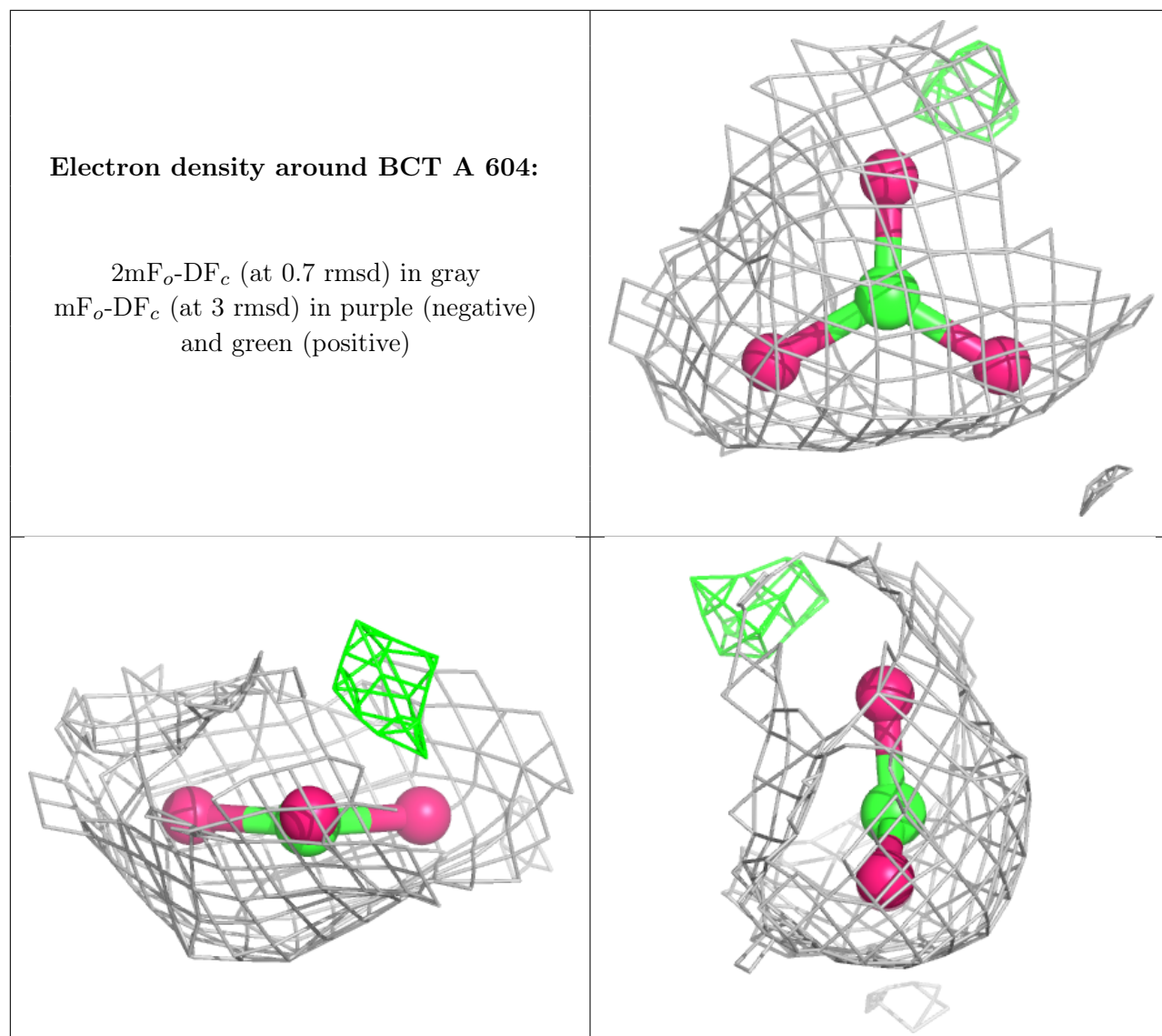




Electron density around BCT E 604:

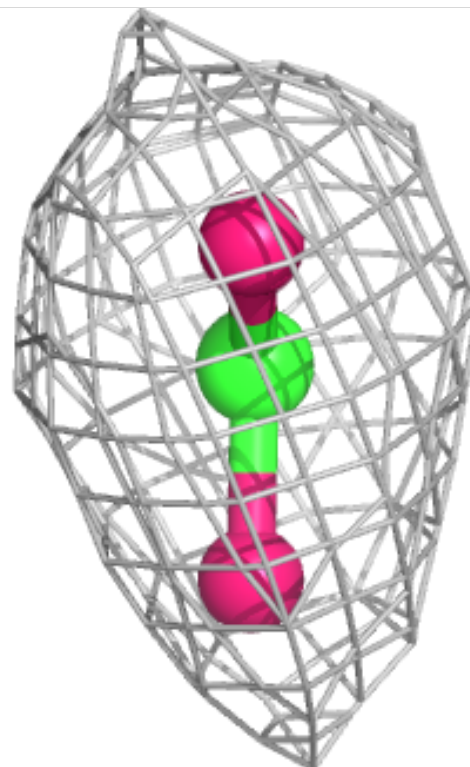
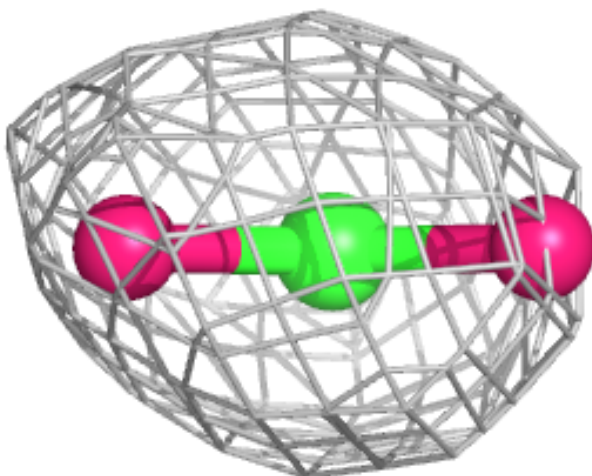
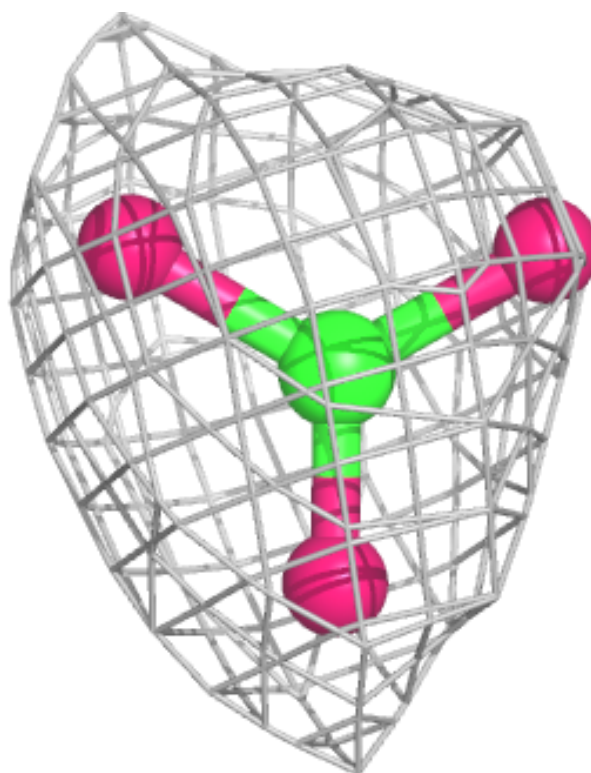
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)





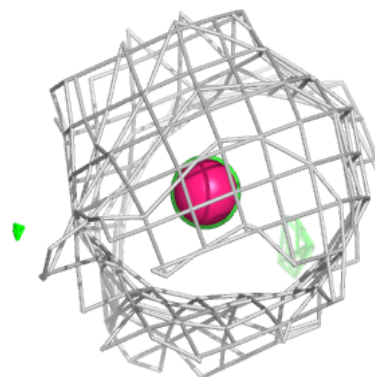
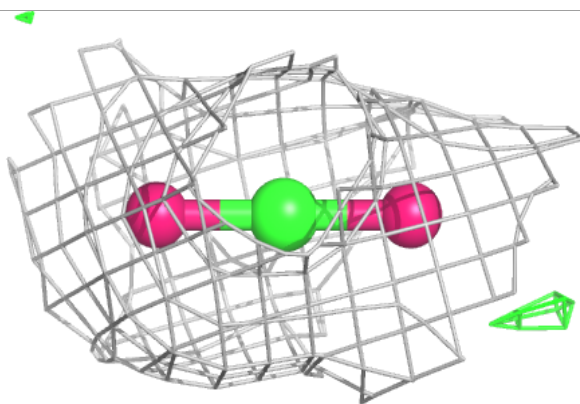
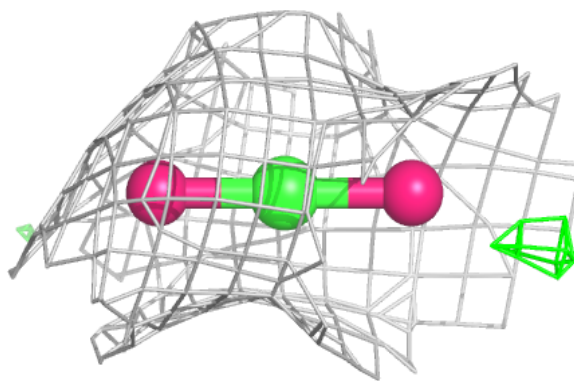
Electron density around BCT A 603:

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



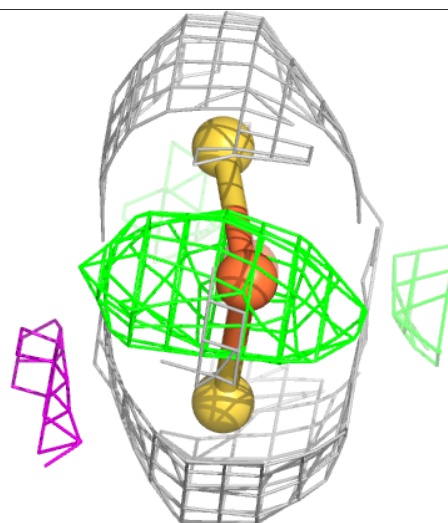
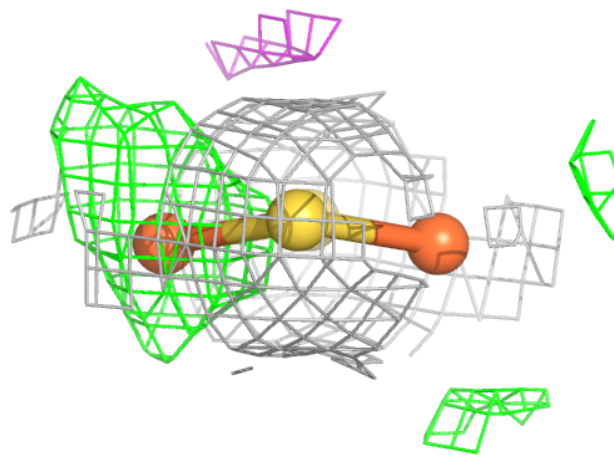
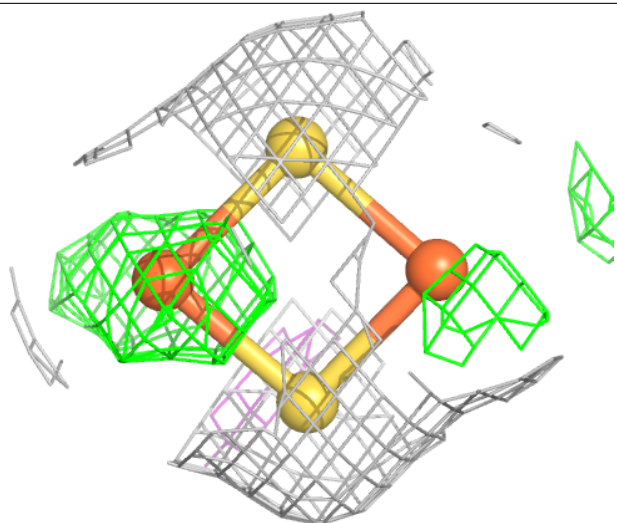
Electron density around CO2 G 603:

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



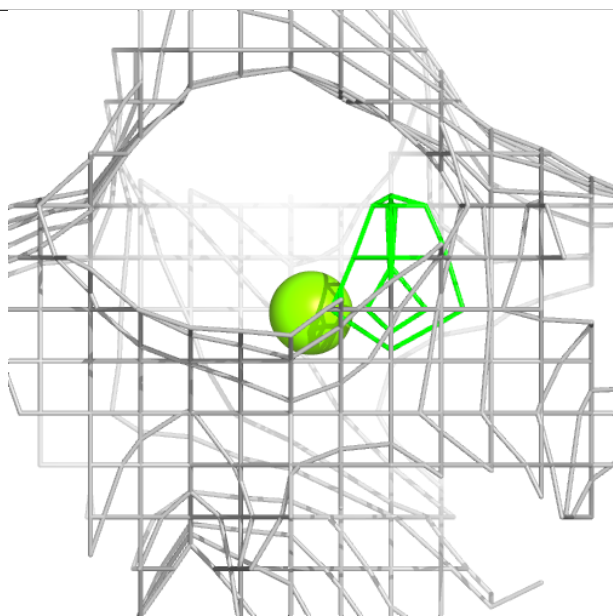
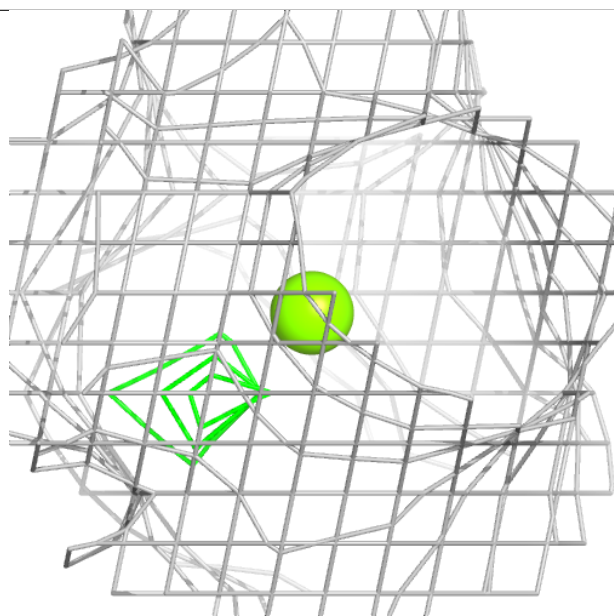
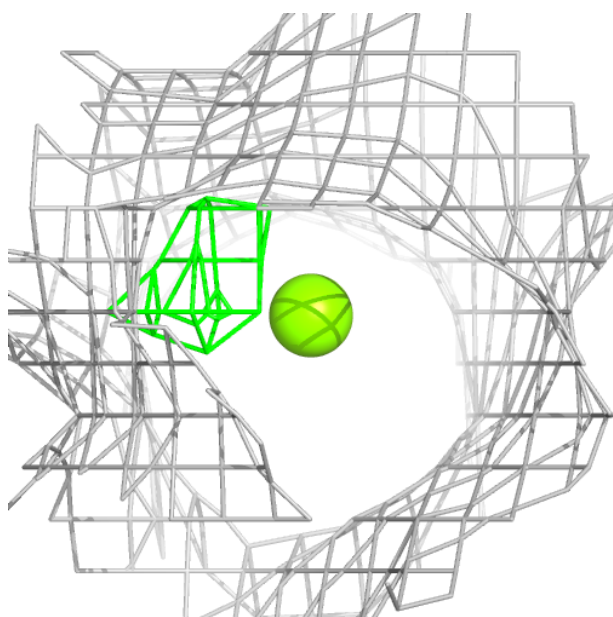
Electron density around FES C 601:

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



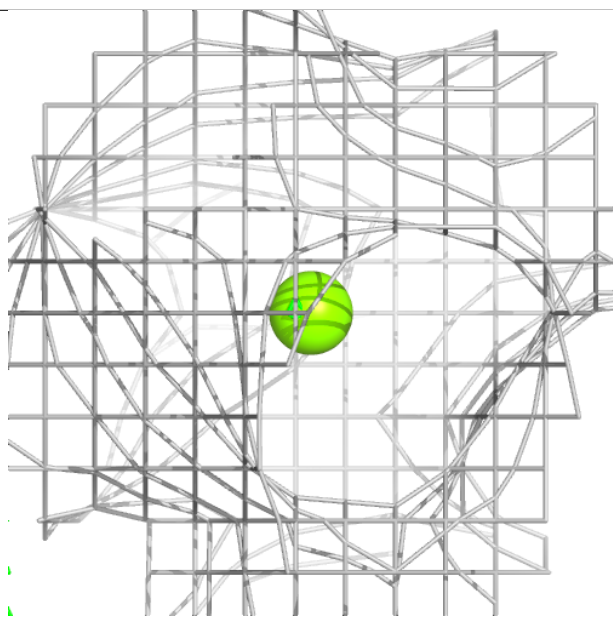
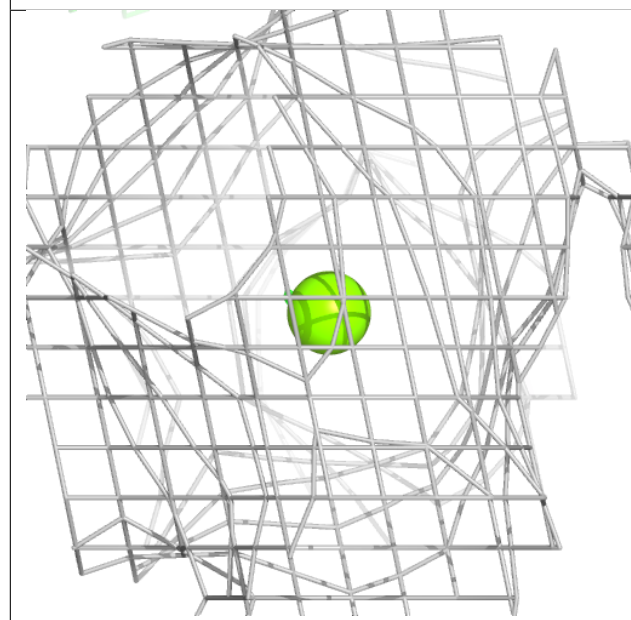
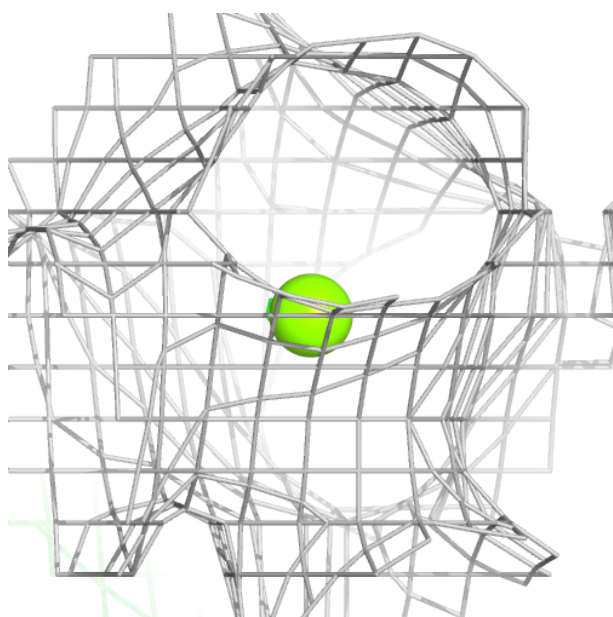
Electron density around MG A 602:

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and green (positive)



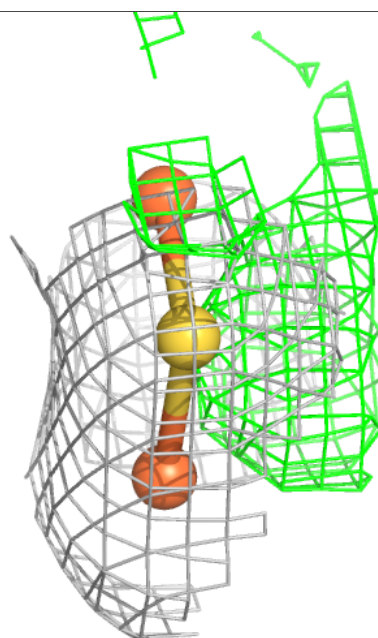
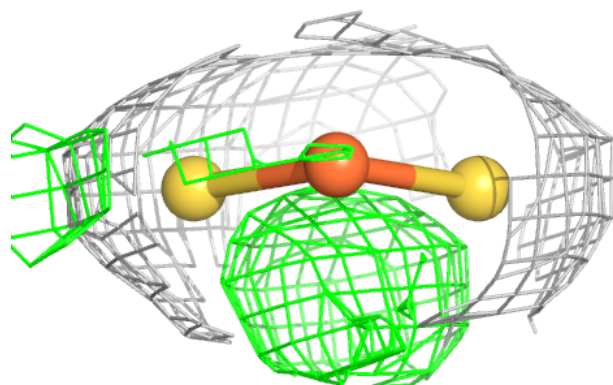
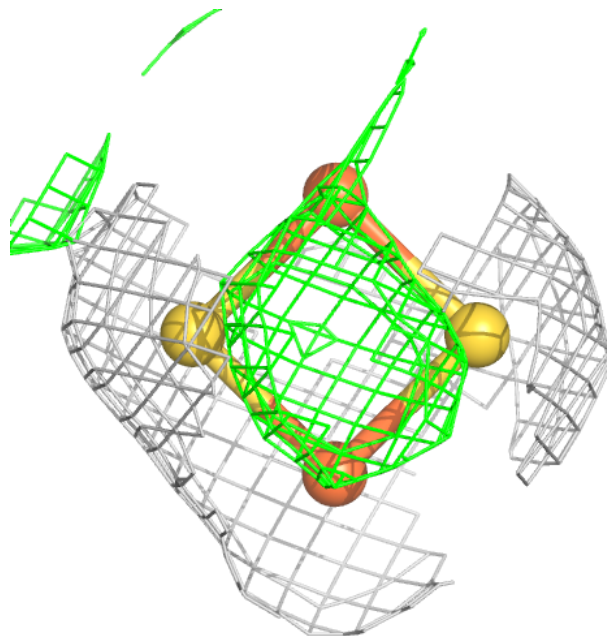
Electron density around MG E 602:

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and green (positive)



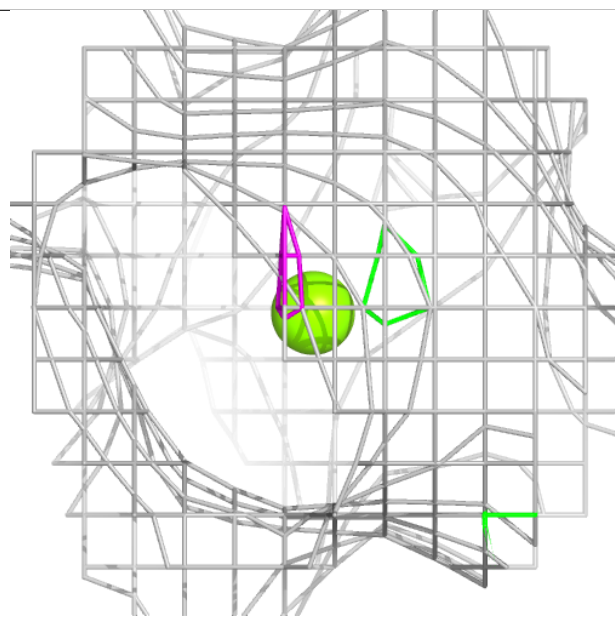
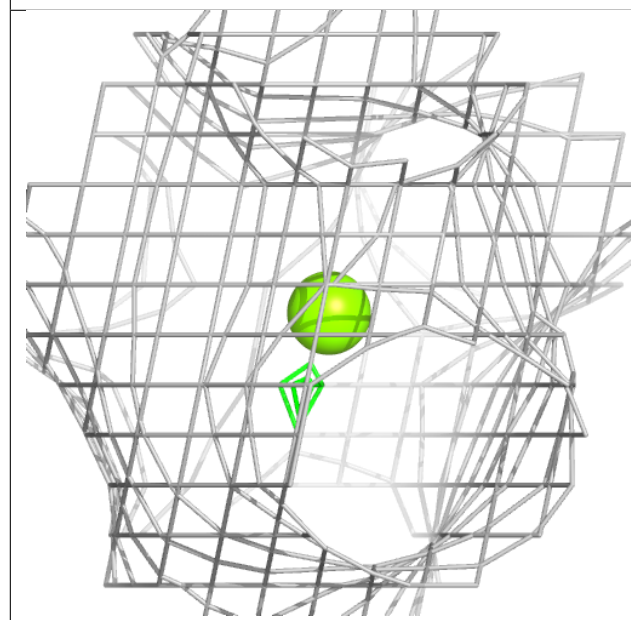
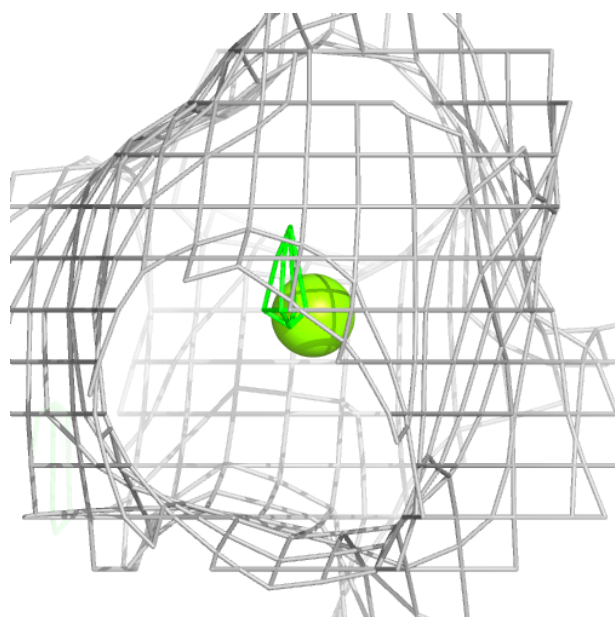
Electron density around FES G 601:

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and green (positive)



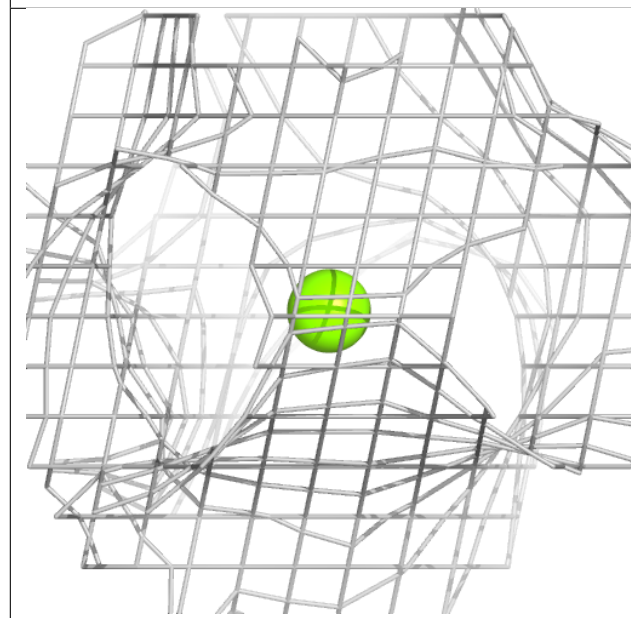
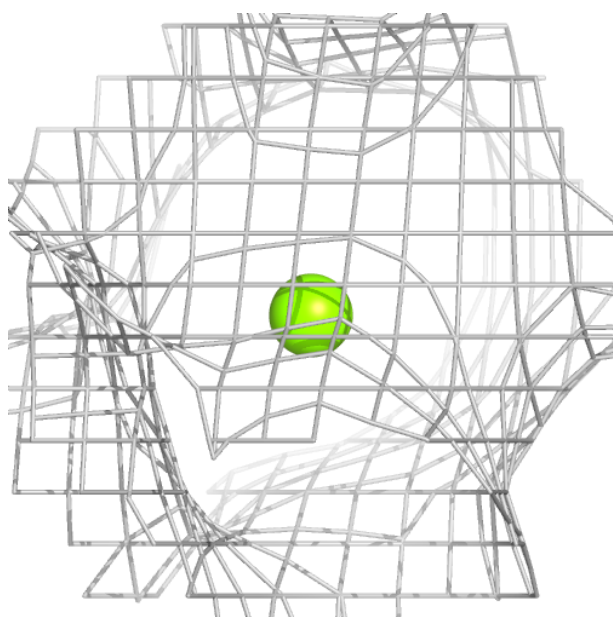
Electron density around MG G 602:

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



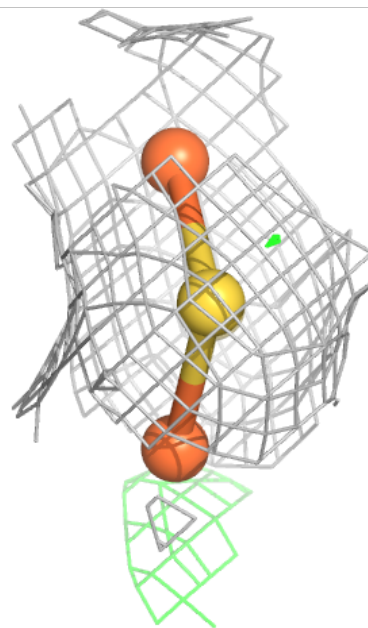
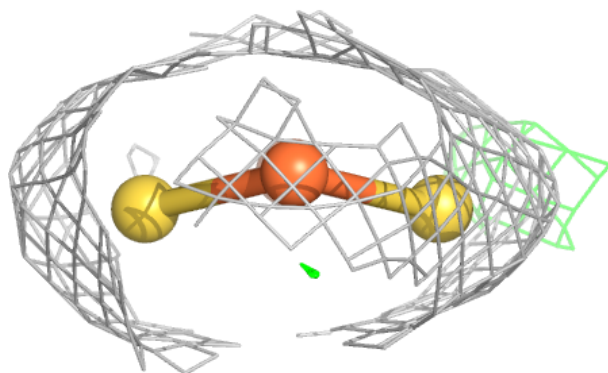
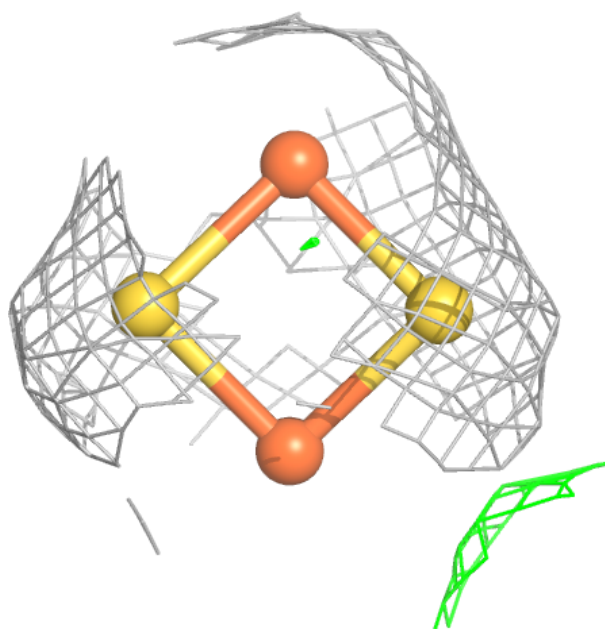
Electron density around MG C 602:

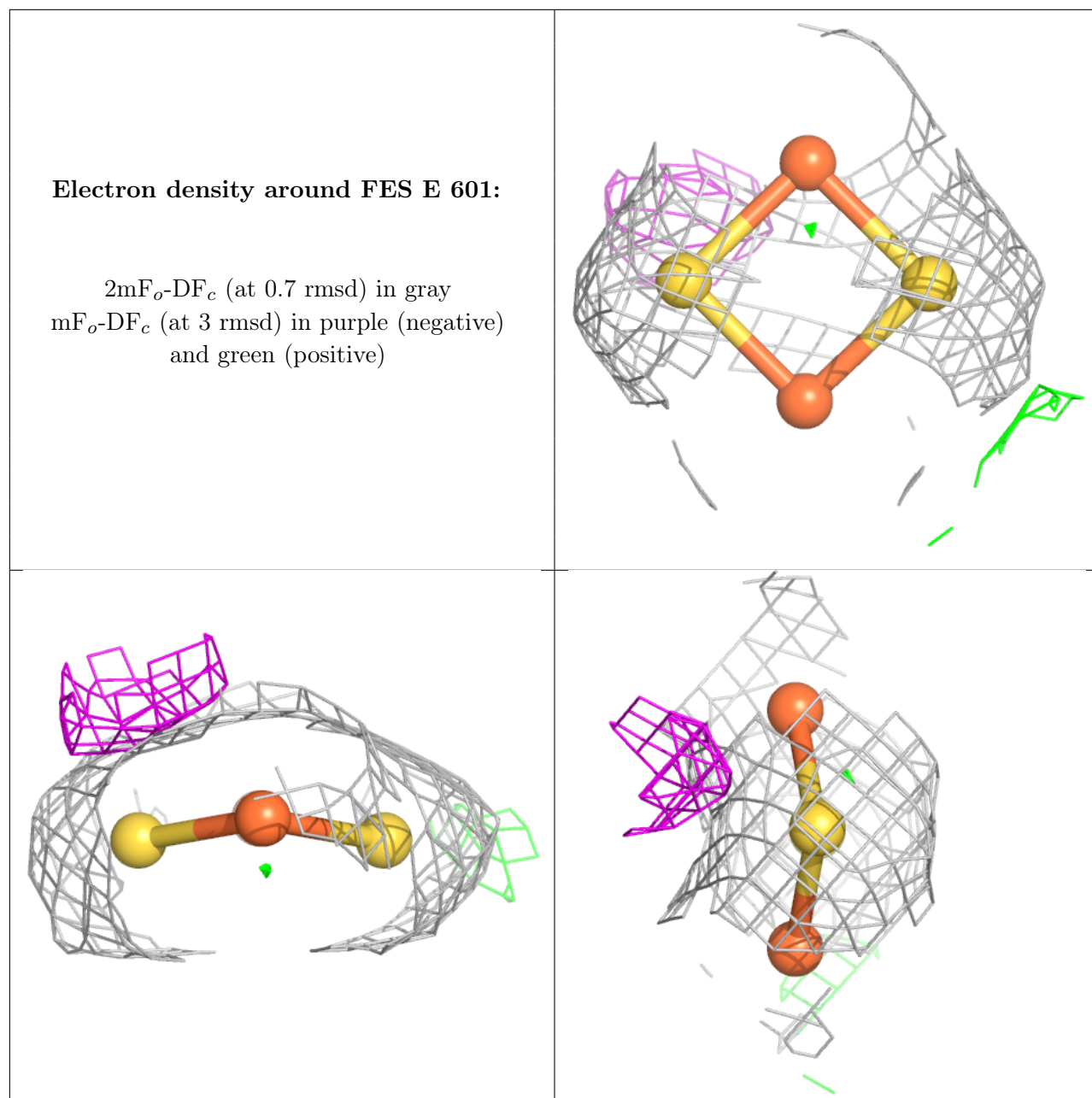
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around FES A 601:

$2mF_o-DF_c$ (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.