



Full wwPDB X-ray Structure Validation Report ⓘ

Apr 26, 2026 – 03:09 PM EDT

PDB ID : 8IQE / pdb_00008iqe
Title : Crystal structure of tetrameric K2-2 TSP
Authors : Ye, T.J.; Huang, K.F.; Tu, I.F.; Lee, I.M.; Chang, Y.P.; Wu, S.H.
Deposited on : 2023-03-16
Resolution : 2.17 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

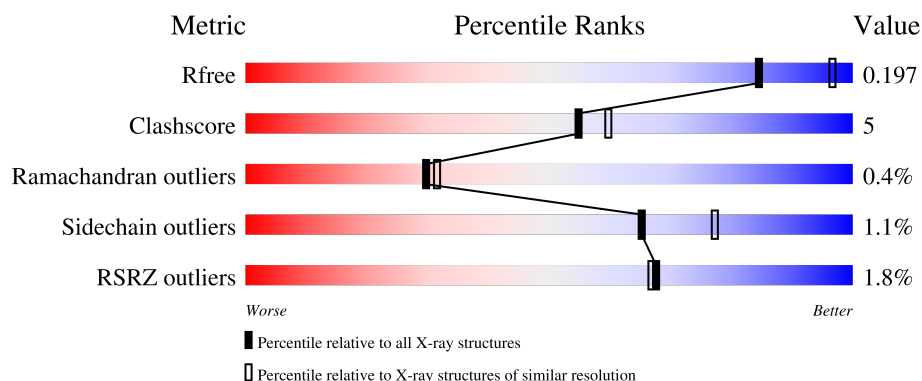
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.17 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	8975 (2.20-2.16)
Clashscore	190562	9786 (2.20-2.16)
Ramachandran outliers	187476	9664 (2.20-2.16)
Sidechain outliers	187428	9664 (2.20-2.16)
RSRZ outliers	180081	8979 (2.20-2.16)

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	586	2% 87% 9% .
1	B	586	% 81% 11% 8%
1	C	586	2% 83% 14% .
1	D	586	2% 82% 11% 7%

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
2	GOL	D	602	-	-	X	-

2 Entry composition [i](#)

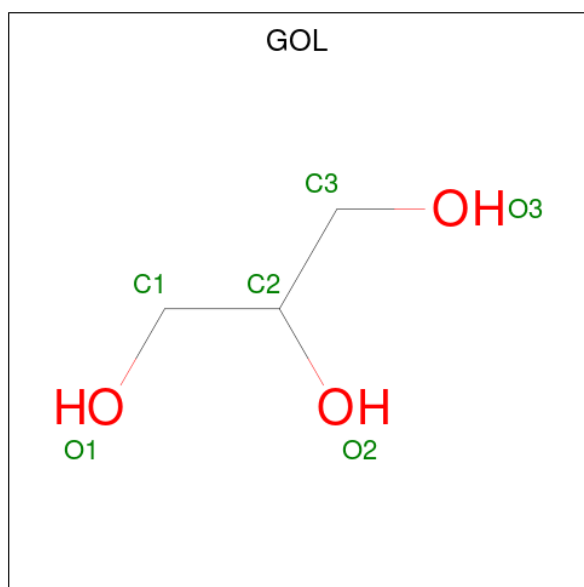
There are 3 unique types of molecules in this entry. The entry contains 18702 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 K2-VCL6 TSP.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	568	Total	C	N	O	S	0	0	0
			4218	2659	718	821	20			
1	B	540	Total	C	N	O	S	0	1	0
			4001	2524	688	769	20			
1	C	568	Total	C	N	O	S	0	1	0
			4219	2659	718	821	21			
1	D	546	Total	C	N	O	S	0	2	0
			4051	2553	693	785	20			

- 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	1
			12	6	6		
2	A	1	Total	C	O	0	0
			6	3	3		

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total C O 6 3 3	0	0
2	A	1	Total C O 6 3 3	0	0
2	A	1	Total C O 6 3 3	0	0
2	A	1	Total C O 6 3 3	0	0
2	A	1	Total C O 6 3 3	0	0
2	A	1	Total C O 6 3 3	0	0
2	B	1	Total C O 6 3 3	0	0
2	B	1	Total C O 6 3 3	0	0
2	B	1	Total C O 6 3 3	0	0
2	C	1	Total C O 6 3 3	0	0
2	C	1	Total C O 6 3 3	0	0
2	C	1	Total C O 6 3 3	0	0
2	C	1	Total C O 6 3 3	0	0
2	D	1	Total C O 12 6 6	0	1
2	D	1	Total C O 6 3 3	0	0
2	D	1	Total C O 6 3 3	0	0
2	D	1	Total C O 6 3 3	0	0
2	D	1	Total C O 6 3 3	0	0

- Molecule 3 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	593	Total O 594 594	0	1

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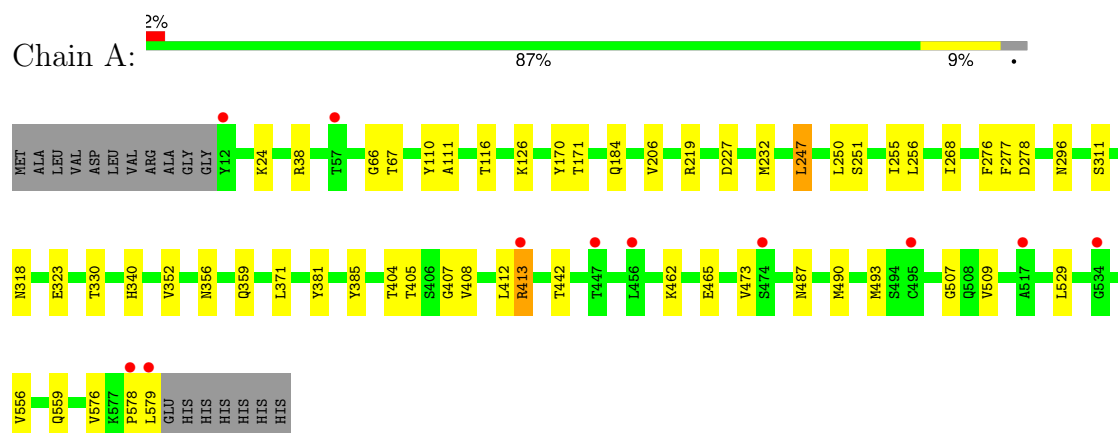
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	B	435	Total 439	O 439	0	4
3	C	457	Total 459	O 459	0	2
3	D	585	Total 589	O 589	0	4

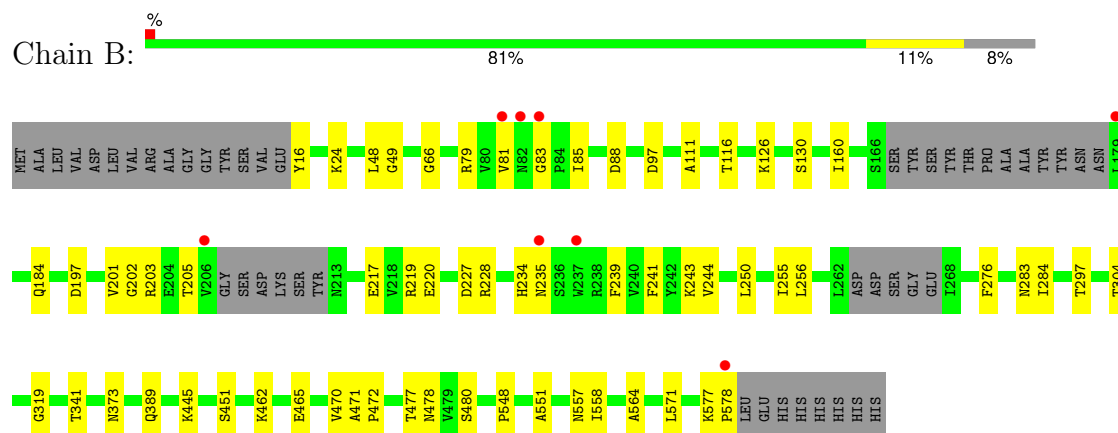
3 Residue-property plots

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.

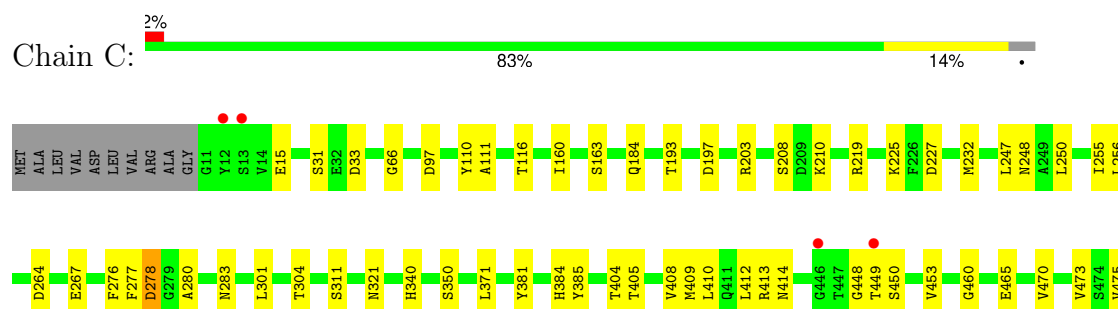
• Molecule 1: K2-VCL6 TSP

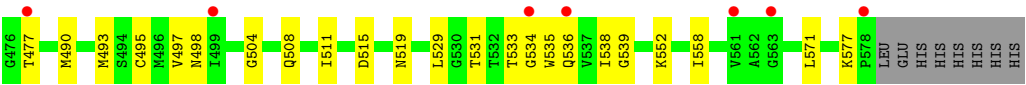


• Molecule 1: K2-VCL6 TSP

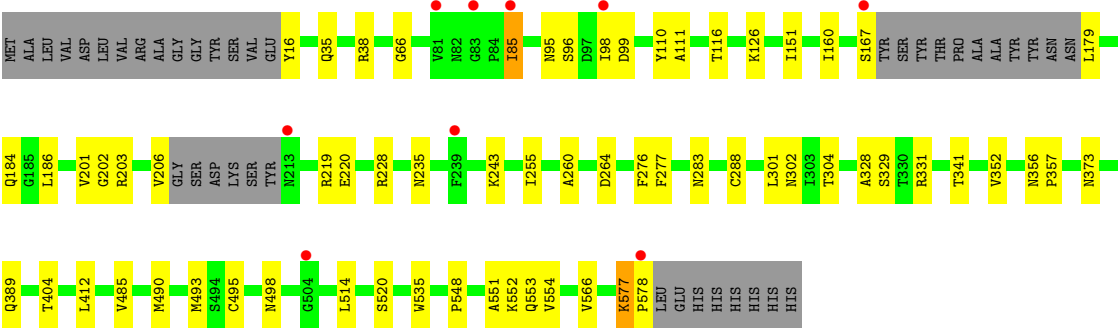
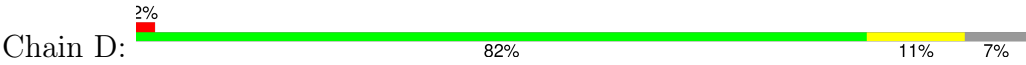


• Molecule 1: K2-VCL6 TSP





● Molecule 1: K2-VCL6 TSP



4 Data and refinement statistics

Property	Value	Source
Space group	P 63	Depositor
Cell constants a, b, c, α , β , γ	232.88Å 232.88Å 102.27Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	29.56 – 2.17 29.56 – 2.17	Depositor EDS
% Data completeness (in resolution range)	95.4 (29.56-2.17) 95.4 (29.56-2.17)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	0.05	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.09 (at 2.18Å)	Xtriage
Refinement program	PHENIX 1.19.2_4158	Depositor
R, R_{free}	0.168 , 0.198 0.169 , 0.197	Depositor DCC
R_{free} test set	7985 reflections (4.79%)	wwPDB-VP
Wilson B-factor (Å ²)	29.9	Xtriage
Anisotropy	0.007	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 54.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	0.018 for h,-h-k,-l	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	18702	wwPDB-VP
Average B, all atoms (Å ²)	39.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 1.69% 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: 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	0.12	0/4311	0.39	0/5871
1	B	0.10	0/4087	0.33	0/5560
1	C	0.16	0/4315	0.43	4/5875 (0.1%)
1	D	0.12	0/4142	0.38	0/5636
All	All	0.13	0/16855	0.39	4/22942 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	C	0	1

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	552	LYS	CB-CG-CD	9.51	133.17	111.30
1	C	552	LYS	CA-CB-CG	5.48	125.05	114.10
1	C	449	THR	CA-C-N	5.22	131.82	122.38
1	C	449	THR	C-N-CA	5.22	131.82	122.38

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	C	448	GLY	Peptide

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	4218	0	4097	33	0
1	B	4001	0	3917	35	0
1	C	4219	0	4098	50	0
1	D	4051	0	3952	40	0
2	A	54	0	72	2	0
2	B	18	0	24	0	0
2	C	24	0	32	3	0
2	D	36	0	48	9	0
3	A	594	0	0	5	0
3	B	439	0	0	2	0
3	C	459	0	0	7	0
3	D	589	0	0	3	0
All	All	18702	0	16240	157	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 (157) 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:495:CYS:N	1:C:538:ILE:O	2.17	0.77
1:C:536:GLN:NE2	3:C:704:HOH:O	2.19	0.76
1:C:577:LYS:O	3:C:701:HOH:O	2.04	0.75
1:B:470:VAL:HG12	1:B:472:PRO:HD3	1.69	0.74
1:D:96:SER:OG	1:D:98:ILE:HG22	1.89	0.72
1:A:407:GLY:HA2	1:A:579:LEU:H	1.57	0.69
1:B:445:LYS:HA	1:B:477:THR:HG23	1.75	0.69
1:C:321:ASN:ND2	1:C:350:SER:OG	2.26	0.68
1:D:412:LEU:HD11	1:D:490:MET:HG2	1.76	0.66
1:C:15:GLU:OE1	1:D:38:ARG:NH2	2.30	0.64
1:C:371:LEU:HD11	1:C:404:THR:HG23	1.79	0.64
1:D:389:GLN:NE2	3:D:706:HOH:O	2.31	0.64
1:D:220:GLU:HG2	1:D:243:LYS:HE2	1.81	0.63
1:C:405:THR:HG23	1:C:408:VAL:HB	1.82	0.62
1:D:167:SER:OG	1:D:203:ARG:NH1	2.32	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:381:TYR:HB3	1:C:414:ASN:HD22	1.65	0.61
1:C:267:GLU:HB2	2:D:601[B]:GOL:H31	1.83	0.60
1:A:296:ASN:HD21	1:A:318:ASN:HD22	1.50	0.60
1:D:202:GLY:HA2	1:D:235:ASN:HD22	1.66	0.60
1:A:407:GLY:HA2	1:A:578:PRO:HA	1.83	0.60
1:D:514:LEU:HB2	1:D:553:GLN:HG3	1.84	0.59
1:A:371:LEU:HD11	1:A:404:THR:HG23	1.84	0.59
1:C:31:SER:O	3:C:702:HOH:O	2.16	0.59
1:B:49:GLY:O	1:B:79:ARG:NH2	2.28	0.58
1:D:485:VAL:HG11	1:D:554:VAL:HB	1.86	0.58
1:C:203:ARG:NH1	3:C:708:HOH:O	2.38	0.57
2:C:602:GOL:H32	2:D:604:GOL:H32	1.85	0.57
1:C:493:MET:HE3	1:C:511:ILE:HD11	1.87	0.56
1:B:160:ILE:HG22	1:B:197:ASP:HB2	1.88	0.56
1:B:202:GLY:HA2	1:B:235:ASN:HD22	1.70	0.55
1:C:381:TYR:HA	1:C:385:TYR:CE2	2.42	0.55
1:B:220:GLU:HG2	1:B:243:LYS:HE2	1.88	0.55
1:A:509:VAL:HG23	1:A:529:LEU:HD21	1.89	0.55
1:D:331:ARG:HB2	2:D:602:GOL:H31	1.88	0.54
1:D:16:TYR:N	3:D:708:HOH:O	2.40	0.54
1:C:97:ASP:OD2	3:C:703:HOH:O	2.19	0.53
1:A:251:SER:HB2	2:A:607:GOL:H12	1.89	0.53
1:A:126:LYS:NZ	3:A:710:HOH:O	2.41	0.53
1:C:450:SER:OG	1:C:473:VAL:HG21	2.09	0.53
1:D:98:ILE:HD12	1:D:99:ASP:H	1.73	0.53
1:A:462:LYS:NZ	3:A:708:HOH:O	2.40	0.53
1:B:373[A]:ASN:OD1	3:B:701:HOH:O	2.19	0.52
1:D:329:SER:CB	2:D:602:GOL:H11	2.40	0.52
1:B:203:ARG:HG2	1:B:234:HIS:O	2.10	0.52
1:C:33:ASP:N	3:C:702:HOH:O	2.43	0.51
1:B:462:LYS:HB2	1:B:465:GLU:OE2	2.11	0.51
1:C:453:VAL:HG21	1:C:477:THR:HG21	1.92	0.51
1:D:493:MET:HE2	1:D:495:CYS:SG	2.51	0.51
1:C:384:HIS:H	1:C:384:HIS:CD2	2.28	0.51
1:D:203:ARG:HH21	1:D:206:VAL:C	2.19	0.50
1:A:356:ASN:HD21	1:A:359:GLN:HE21	1.58	0.50
1:B:16:TYR:N	3:B:709:HOH:O	2.43	0.50
1:C:255:ILE:HG21	1:C:276:PHE:HB3	1.93	0.50
1:A:296:ASN:ND2	1:A:318:ASN:HD22	2.09	0.50
2:A:603:GOL:H32	3:A:888:HOH:O	2.11	0.49
1:D:85:ILE:HD12	1:D:110:TYR:HD2	1.78	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:184:GLN:HA	1:A:219:ARG:O	2.13	0.49
1:C:210:LYS:HD2	1:C:264:ASP:CG	2.38	0.49
1:D:260:ALA:HA	1:D:288:CYS:HA	1.95	0.48
1:C:184:GLN:HA	1:C:219:ARG:O	2.12	0.48
1:C:232[A]:MET:HE3	1:C:256:LEU:HD11	1.95	0.48
1:D:277:PHE:HA	1:D:301:LEU:O	2.14	0.48
1:A:413:ARG:HA	1:A:413:ARG:HE	1.79	0.48
1:D:352:VAL:HG11	2:D:601[A]:GOL:H32	1.95	0.48
1:A:67:THR:HG21	1:A:110:TYR:CE2	2.49	0.48
1:B:577:LYS:HE3	1:B:577:LYS:HB2	1.43	0.47
1:B:97:ASP:HA	1:B:126:LYS:HE3	1.95	0.47
1:B:184:GLN:HA	1:B:219:ARG:O	2.14	0.47
1:B:48:LEU:HD12	1:B:88:ASP:OD2	2.14	0.47
1:B:558:ILE:HD11	1:B:571:LEU:HD13	1.97	0.47
1:C:277:PHE:CD1	1:C:278:ASP:N	2.83	0.47
1:C:515:ASP:OD1	1:C:519:ASN:HB2	2.15	0.47
1:D:35:GLN:NE2	3:D:709:HOH:O	2.43	0.47
1:A:405:THR:HG21	1:A:576:VAL:HG12	1.96	0.47
1:C:160:ILE:HG22	1:C:197:ASP:HB2	1.97	0.47
1:C:453:VAL:HG22	1:C:470:VAL:HG13	1.97	0.47
1:D:184:GLN:HA	1:D:219:ARG:O	2.15	0.47
1:A:405:THR:HG23	1:A:408:VAL:HB	1.97	0.47
1:A:412:LEU:HG	1:A:490:MET:HE3	1.97	0.47
1:A:38:ARG:NH1	3:A:716:HOH:O	2.46	0.46
1:D:228:ARG:HH22	2:D:603:GOL:H11	1.80	0.46
1:B:227:ASP:HA	1:B:250:LEU:HB3	1.96	0.46
1:B:577:LYS:HB2	1:B:578:PRO:HD2	1.98	0.46
1:C:111:ALA:HB1	1:C:116:THR:O	2.15	0.45
1:A:170:TYR:CD2	1:A:171:THR:HG23	2.52	0.45
1:A:232:MET:HE3	1:A:256:LEU:HD11	1.99	0.45
1:D:329:SER:HB3	2:D:602:GOL:H11	1.98	0.45
1:C:412:LEU:HG	1:C:490:MET:HE3	1.99	0.45
1:A:255:ILE:HG21	1:A:276:PHE:HB3	1.99	0.45
1:C:110:TYR:HB2	2:C:603:GOL:H11	2.00	0.44
1:C:247:LEU:HA	1:C:277:PHE:O	2.17	0.44
1:C:311:SER:HA	1:C:340:HIS:O	2.18	0.44
1:D:255:ILE:HG21	1:D:276:PHE:HB3	1.99	0.44
1:D:283:ASN:HB3	1:D:304:THR:O	2.18	0.44
1:D:548:PRO:HG2	1:D:551:ALA:HB2	1.99	0.44
1:B:255:ILE:HG21	1:B:276:PHE:HB3	1.99	0.44
1:C:534:GLY:O	1:C:536:GLN:NE2	2.50	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:373:ASN:OD1	1:D:404:THR:OG1	2.30	0.44
1:A:442:THR:HG23	3:A:714:HOH:O	2.17	0.44
1:C:460:GLY:HA3	1:C:465:GLU:HG2	2.00	0.44
1:B:297:THR:HA	1:B:319:GLY:O	2.18	0.43
1:A:493:MET:HE1	1:A:556:VAL:HG21	2.00	0.43
1:B:241:PHE:HD2	1:B:244:VAL:HG21	1.83	0.43
1:C:473:VAL:O	1:C:475:VAL:N	2.47	0.43
1:B:478:ASN:HB3	1:B:557:ASN:HD21	1.84	0.43
1:D:202:GLY:HA2	1:D:235:ASN:ND2	2.31	0.43
1:C:558:ILE:HD11	1:C:571:LEU:HD13	2.00	0.43
1:B:201:VAL:HG13	1:B:239:PHE:CZ	2.54	0.43
1:A:507:GLY:C	1:A:529:LEU:HG	2.44	0.43
1:B:480:SER:HB3	1:B:557:ASN:HD22	1.83	0.43
1:C:498:ASN:HB2	1:C:535:TRP:CD2	2.53	0.43
1:C:409:MET:HE3	1:C:409:MET:HB3	1.79	0.43
1:D:111:ALA:HB1	1:D:116:THR:O	2.19	0.43
1:B:81:VAL:HG12	1:B:83:GLY:H	1.84	0.43
1:B:217:GLU:HG2	1:B:219:ARG:CG	2.49	0.43
1:B:451:SER:HB3	1:B:472:PRO:HA	1.99	0.42
1:D:577:LYS:HB2	1:D:578:PRO:HD2	2.01	0.42
1:C:160:ILE:CD1	1:C:163:SER:HB3	2.50	0.42
1:C:405:THR:HG22	3:C:701:HOH:O	2.19	0.42
1:A:111:ALA:HB1	1:A:116:THR:O	2.18	0.42
1:B:24:LYS:HB3	1:B:24:LYS:HE3	1.84	0.42
1:B:111:ALA:HB1	1:B:116:THR:O	2.19	0.42
1:C:504:GLY:O	1:C:531:THR:HG22	2.19	0.42
1:D:328:ALA:O	1:D:356:ASN:HB3	2.19	0.42
1:D:514:LEU:HD23	1:D:520:SER:HA	2.01	0.42
1:D:552:LYS:HA	1:D:552:LYS:HD3	1.78	0.42
1:B:203:ARG:HG3	1:B:205:THR:O	2.19	0.42
1:B:389:GLN:OE1	1:D:329:SER:HA	2.18	0.42
1:B:283:ASN:HB3	1:B:304:THR:O	2.20	0.42
1:C:110:TYR:HA	2:C:603:GOL:H32	2.01	0.42
1:C:283:ASN:HB3	1:C:304:THR:O	2.19	0.42
1:A:381:TYR:HA	1:A:385:TYR:CE2	2.55	0.42
1:C:225:LYS:HA	1:C:248:ASN:O	2.19	0.42
1:D:356:ASN:HB2	1:D:357:PRO:HD2	2.01	0.42
1:C:277:PHE:HA	1:C:301:LEU:O	2.20	0.41
1:A:227:ASP:HA	1:A:250:LEU:HB3	2.01	0.41
1:A:206:VAL:O	1:D:95:ASN:HB3	2.20	0.41
1:C:410:LEU:H	1:C:490:MET:HE1	1.84	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:538:ILE:HA	1:C:539:GLY:HA2	1.84	0.41
1:A:323:GLU:HG3	1:A:352:VAL:HB	2.02	0.41
1:A:330:THR:HA	1:A:359:GLN:HE22	1.86	0.41
1:A:465:GLU:OE1	1:A:465:GLU:N	2.49	0.41
1:B:85:ILE:HD13	1:B:111:ALA:HA	2.02	0.41
1:D:498:ASN:HB2	1:D:535:TRP:CD2	2.55	0.41
1:C:497:VAL:HG11	1:C:529:LEU:HD22	2.02	0.41
1:A:311:SER:HA	1:A:340:HIS:O	2.20	0.41
1:C:278:ASP:CG	1:C:280:ALA:H	2.29	0.41
1:B:471:ALA:HA	1:B:564:ALA:O	2.20	0.41
1:D:302:ASN:O	2:D:602:GOL:H2	2.21	0.41
1:D:331:ARG:NH1	2:D:602:GOL:O2	2.54	0.41
1:B:548:PRO:HG2	1:B:551:ALA:HB2	2.02	0.41
1:C:227:ASP:HA	1:C:250:LEU:HB3	2.03	0.40
1:D:151:ILE:HD11	1:D:186:LEU:HD22	2.03	0.40
1:A:247:LEU:HA	1:A:277:PHE:O	2.22	0.40
1:A:507:GLY:HA3	1:A:559:GLN:O	2.22	0.40
1:B:256:LEU:HB3	1:B:284:ILE:HG12	2.03	0.40
1:C:413:ARG:HD2	1:C:413:ARG:HA	1.69	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	566/586 (97%)	549 (97%)	14 (2%)	3 (0%)	24	25
1	B	533/586 (91%)	518 (97%)	14 (3%)	1 (0%)	43	49
1	C	567/586 (97%)	550 (97%)	15 (3%)	2 (0%)	30	31
1	D	542/586 (92%)	526 (97%)	14 (3%)	2 (0%)	30	31
All	All	2208/2344 (94%)	2143 (97%)	57 (3%)	8 (0%)	30	31

All (8) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	278	ASP
1	A	66	GLY
1	C	66	GLY
1	B	66	GLY
1	C	278	ASP
1	D	577	LYS
1	D	66	GLY
1	A	268	ILE

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	455/469 (97%)	450 (99%)	5 (1%)	65	77
1	B	432/469 (92%)	429 (99%)	3 (1%)	76	86
1	C	455/469 (97%)	451 (99%)	4 (1%)	70	81
1	D	438/469 (93%)	430 (98%)	8 (2%)	51	65
All	All	1780/1876 (95%)	1760 (99%)	20 (1%)	65	77

All (20) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	24	LYS
1	A	247	LEU
1	A	413	ARG
1	A	473	VAL
1	A	487	ASN
1	B	130	SER
1	B	228	ARG
1	B	341	THR
1	C	193	THR
1	C	208	SER
1	C	508	GLN
1	C	533	THR

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Mol	Chain	Res	Type
1	D	85	ILE
1	D	126	LYS
1	D	160	ILE
1	D	179	LEU
1	D	201	VAL
1	D	264	ASP
1	D	341	THR
1	D	566	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (27) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	35	GLN
1	A	146	GLN
1	A	235	ASN
1	A	245	ASN
1	A	296	ASN
1	A	321	ASN
1	A	359	GLN
1	A	553	GLN
1	B	213	ASN
1	B	458	ASN
1	B	478	ASN
1	B	508	GLN
1	B	553	GLN
1	B	557	ASN
1	C	146	GLN
1	C	275	GLN
1	C	318	ASN
1	C	321	ASN
1	C	384	HIS
1	C	411	GLN
1	C	508	GLN
1	C	536	GLN
1	D	35	GLN
1	D	165	ASN
1	D	213	ASN
1	D	318	ASN
1	D	389	GLN

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 ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

22 ligands 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	$\# Z > 2$
2	GOL	A	604	-	5,5,5	0.96	0	5,5,5	1.07	0
2	GOL	D	603	-	5,5,5	0.94	0	5,5,5	1.01	0
2	GOL	A	608	-	5,5,5	0.95	0	5,5,5	0.97	0
2	GOL	C	604	-	5,5,5	0.91	0	5,5,5	1.08	0
2	GOL	A	603	-	5,5,5	0.89	0	5,5,5	1.12	0
2	GOL	D	602	-	5,5,5	0.97	0	5,5,5	1.14	0
2	GOL	B	603	-	5,5,5	0.92	0	5,5,5	1.06	0
2	GOL	D	601[A]	-	5,5,5	0.90	0	5,5,5	1.10	0
2	GOL	B	601	-	5,5,5	0.97	0	5,5,5	0.99	0
2	GOL	D	601[B]	-	5,5,5	0.93	0	5,5,5	1.09	0
2	GOL	C	601	-	5,5,5	0.95	0	5,5,5	1.09	0
2	GOL	A	601[A]	-	5,5,5	0.94	0	5,5,5	1.08	0
2	GOL	A	606	-	5,5,5	0.90	0	5,5,5	1.06	0
2	GOL	A	607	-	5,5,5	0.97	0	5,5,5	1.06	0
2	GOL	A	602	-	5,5,5	0.92	0	5,5,5	1.05	0
2	GOL	A	601[B]	-	5,5,5	0.91	0	5,5,5	1.08	0
2	GOL	C	602	-	5,5,5	0.91	0	5,5,5	1.10	0
2	GOL	B	602	-	5,5,5	0.93	0	5,5,5	1.07	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	GOL	C	603	-	5,5,5	0.93	0	5,5,5	1.07	0
2	GOL	D	605	-	5,5,5	0.91	0	5,5,5	1.11	0
2	GOL	D	604	-	5,5,5	0.92	0	5,5,5	1.10	0
2	GOL	A	605	-	5,5,5	0.94	0	5,5,5	1.08	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	A	604	-	-	2/4/4/4	-
2	GOL	D	603	-	-	2/4/4/4	-
2	GOL	A	608	-	-	3/4/4/4	-
2	GOL	C	604	-	-	0/4/4/4	-
2	GOL	A	603	-	-	3/4/4/4	-
2	GOL	D	602	-	-	0/4/4/4	-
2	GOL	B	603	-	-	1/4/4/4	-
2	GOL	D	601[A]	-	-	2/4/4/4	-
2	GOL	B	601	-	-	2/4/4/4	-
2	GOL	D	601[B]	-	-	4/4/4/4	-
2	GOL	C	601	-	-	0/4/4/4	-
2	GOL	A	601[A]	-	-	0/4/4/4	-
2	GOL	A	606	-	-	0/4/4/4	-
2	GOL	A	607	-	-	2/4/4/4	-
2	GOL	A	602	-	-	2/4/4/4	-
2	GOL	A	601[B]	-	-	0/4/4/4	-
2	GOL	C	602	-	-	0/4/4/4	-
2	GOL	B	602	-	-	0/4/4/4	-
2	GOL	C	603	-	-	2/4/4/4	-
2	GOL	D	605	-	-	0/4/4/4	-
2	GOL	D	604	-	-	0/4/4/4	-
2	GOL	A	605	-	-	0/4/4/4	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (25) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	603	GOL	C1-C2-C3-O3
2	A	603	GOL	O2-C2-C3-O3
2	A	607	GOL	O1-C1-C2-C3
2	A	608	GOL	O1-C1-C2-C3
2	D	601[B]	GOL	O1-C1-C2-C3
2	A	608	GOL	O1-C1-C2-O2
2	C	603	GOL	O1-C1-C2-O2
2	A	602	GOL	C1-C2-C3-O3
2	A	604	GOL	O1-C1-C2-C3
2	B	601	GOL	O1-C1-C2-C3
2	B	603	GOL	O1-C1-C2-C3
2	C	603	GOL	O1-C1-C2-C3
2	D	601[A]	GOL	C1-C2-C3-O3
2	D	601[B]	GOL	C1-C2-C3-O3
2	D	603	GOL	O1-C1-C2-C3
2	A	602	GOL	O2-C2-C3-O3
2	A	604	GOL	O1-C1-C2-O2
2	D	601[B]	GOL	O1-C1-C2-O2
2	A	607	GOL	O1-C1-C2-O2
2	A	603	GOL	O1-C1-C2-C3
2	D	601[B]	GOL	O2-C2-C3-O3
2	A	608	GOL	O2-C2-C3-O3
2	D	603	GOL	O1-C1-C2-O2
2	B	601	GOL	O1-C1-C2-O2
2	D	601[A]	GOL	O2-C2-C3-O3

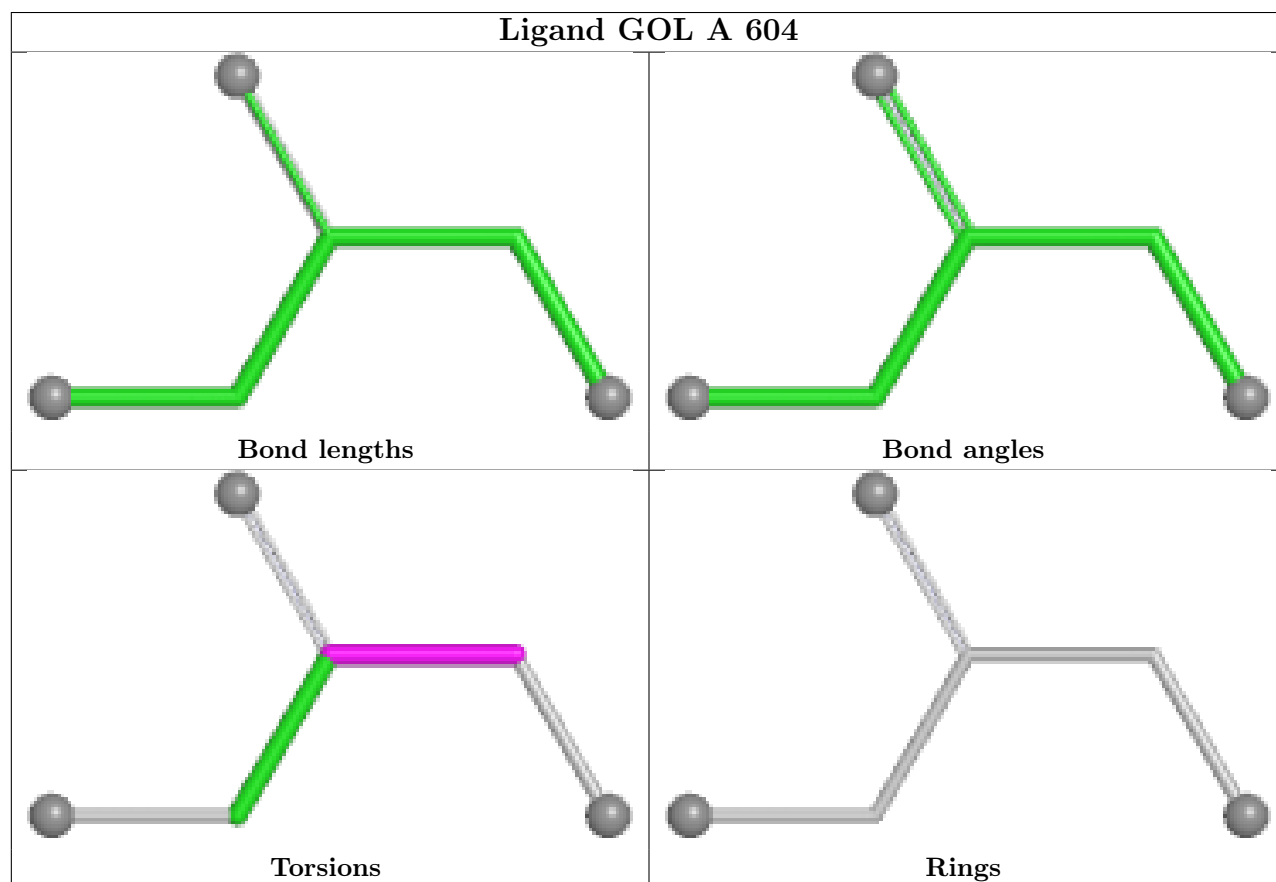
There are no ring outliers.

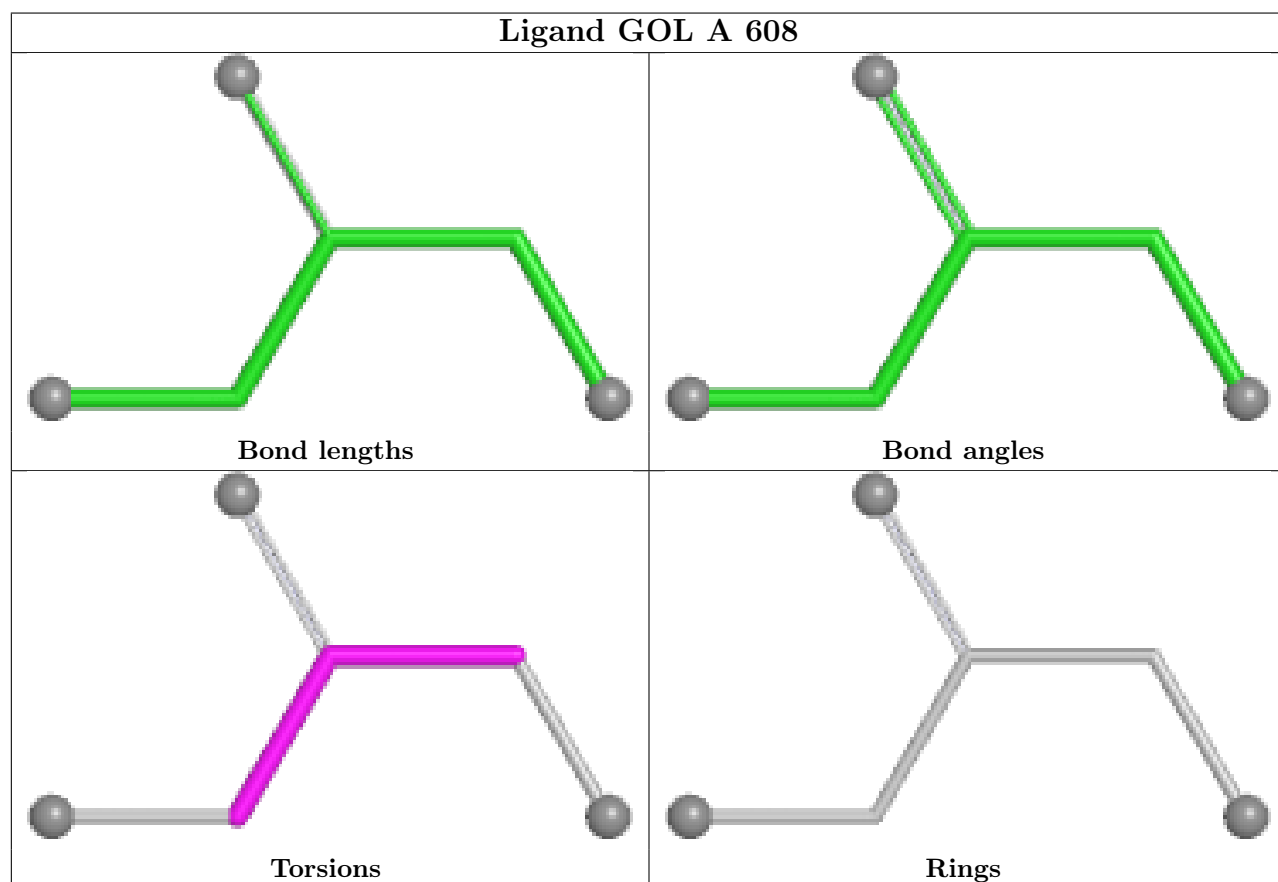
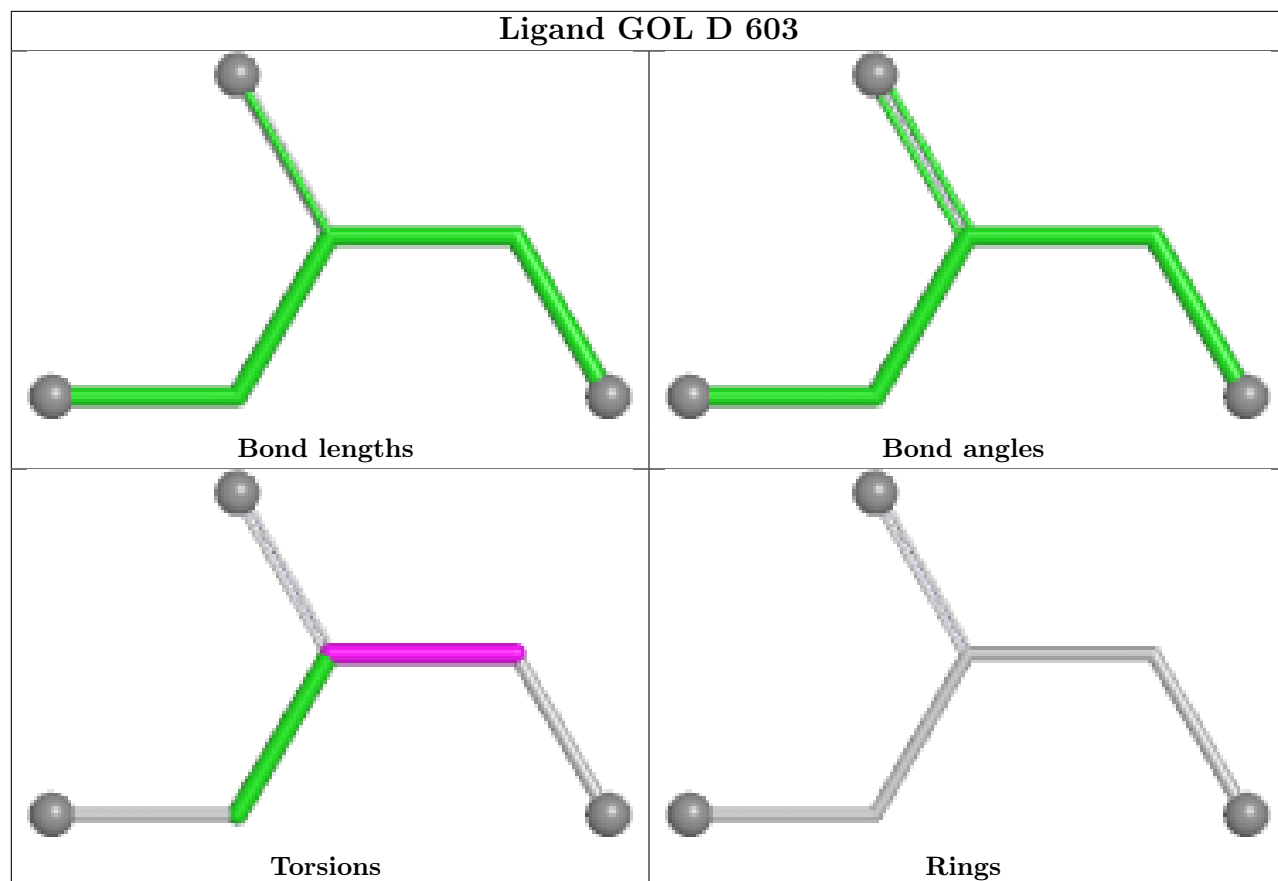
9 monomers are involved in 13 short contacts:

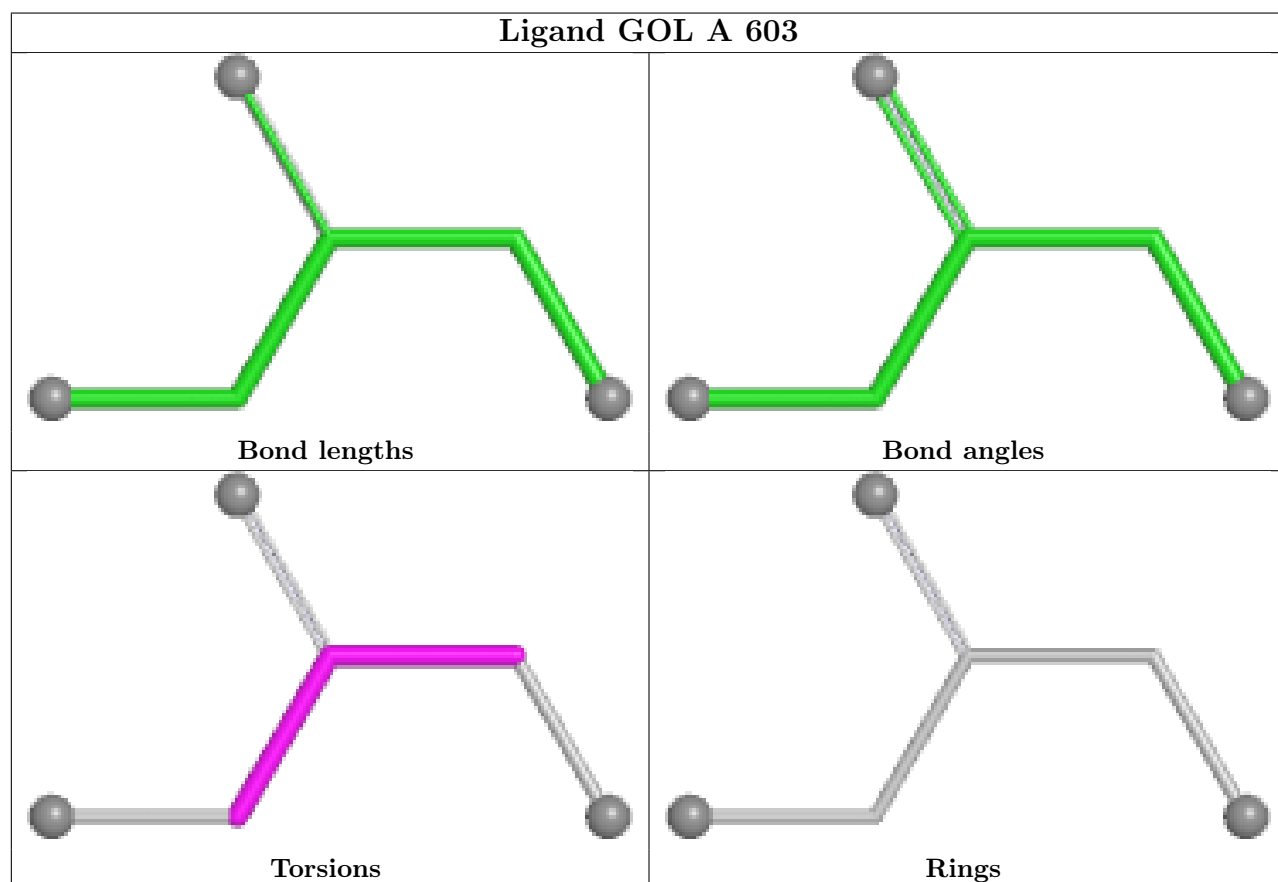
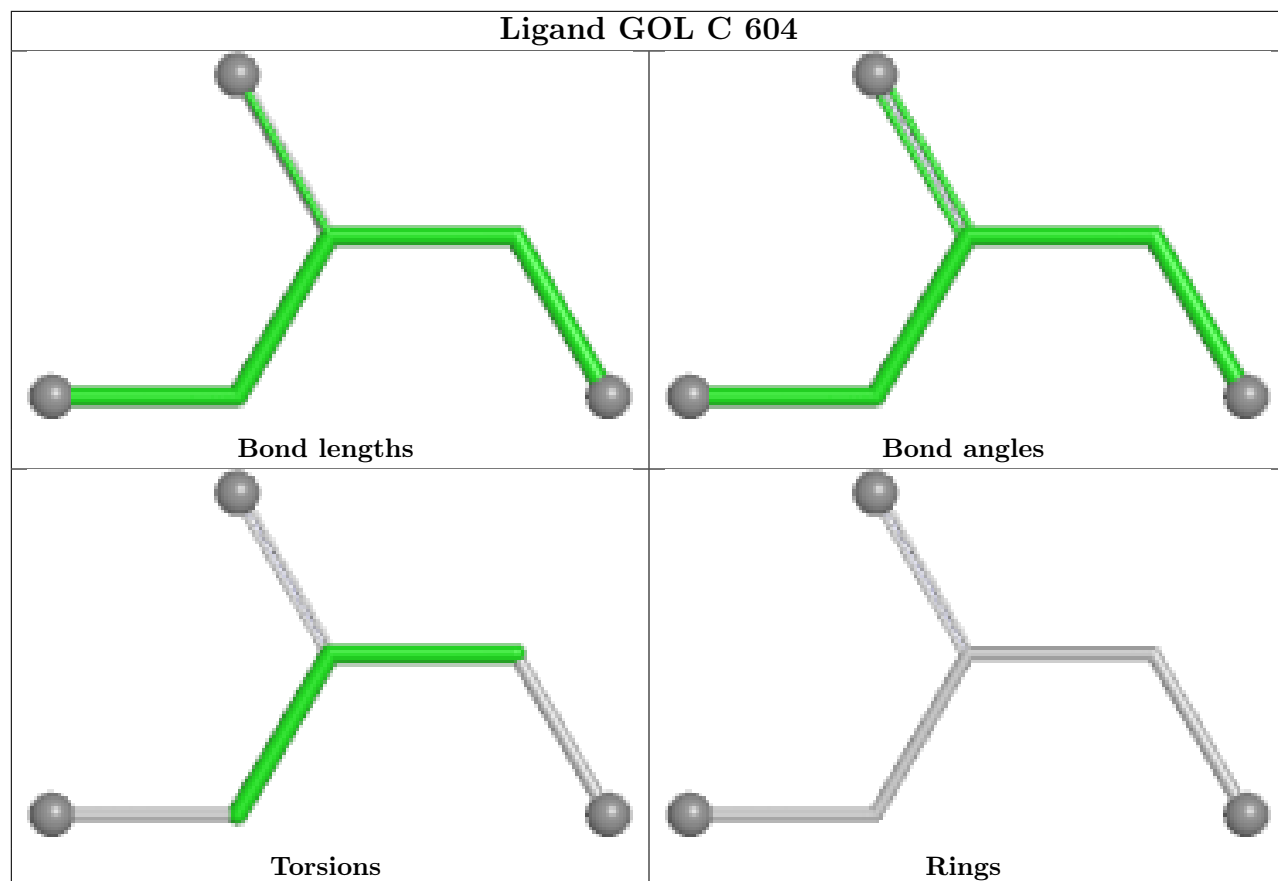
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	D	603	GOL	1	0
2	A	603	GOL	1	0
2	D	602	GOL	5	0
2	D	601[A]	GOL	1	0
2	D	601[B]	GOL	1	0
2	A	607	GOL	1	0
2	C	602	GOL	1	0
2	C	603	GOL	2	0
2	D	604	GOL	1	0

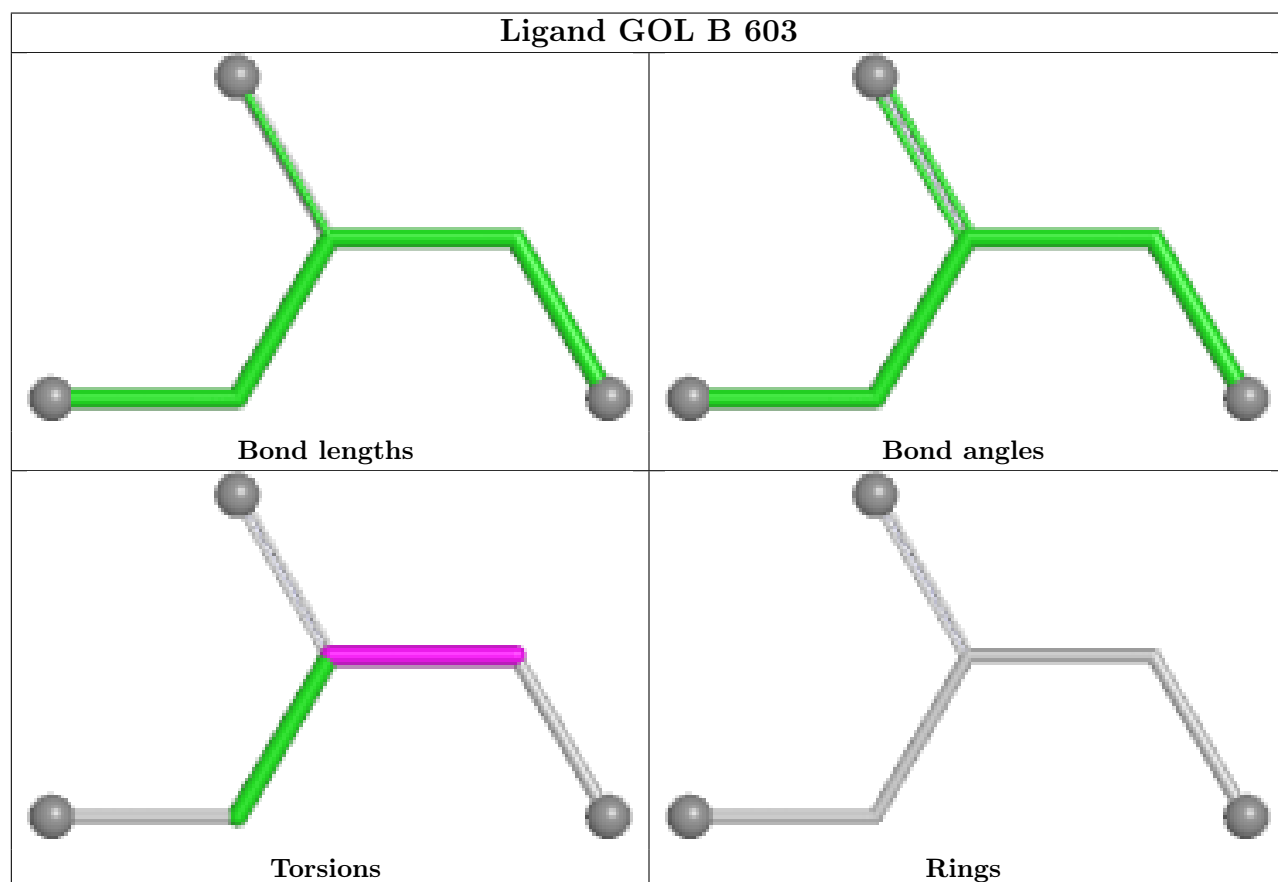
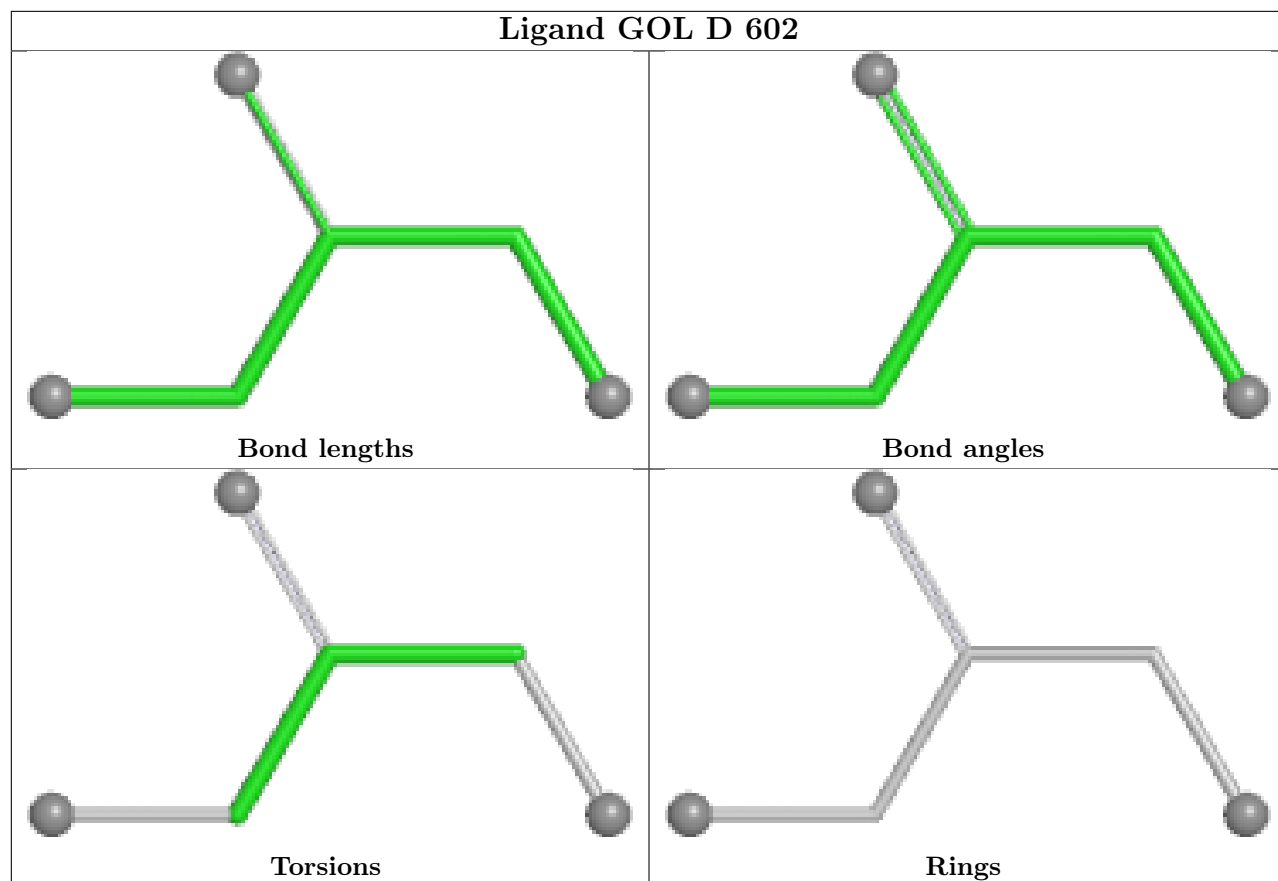
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will

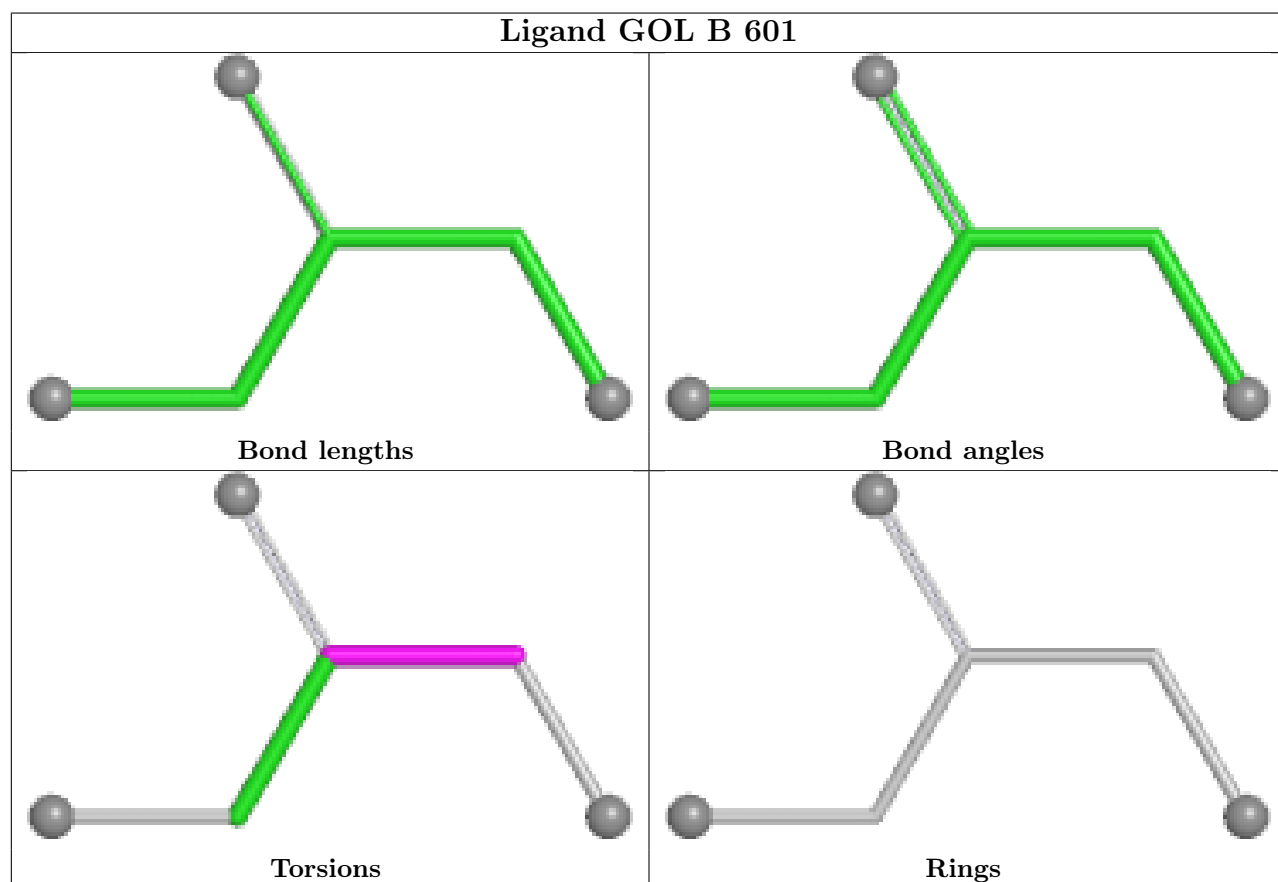
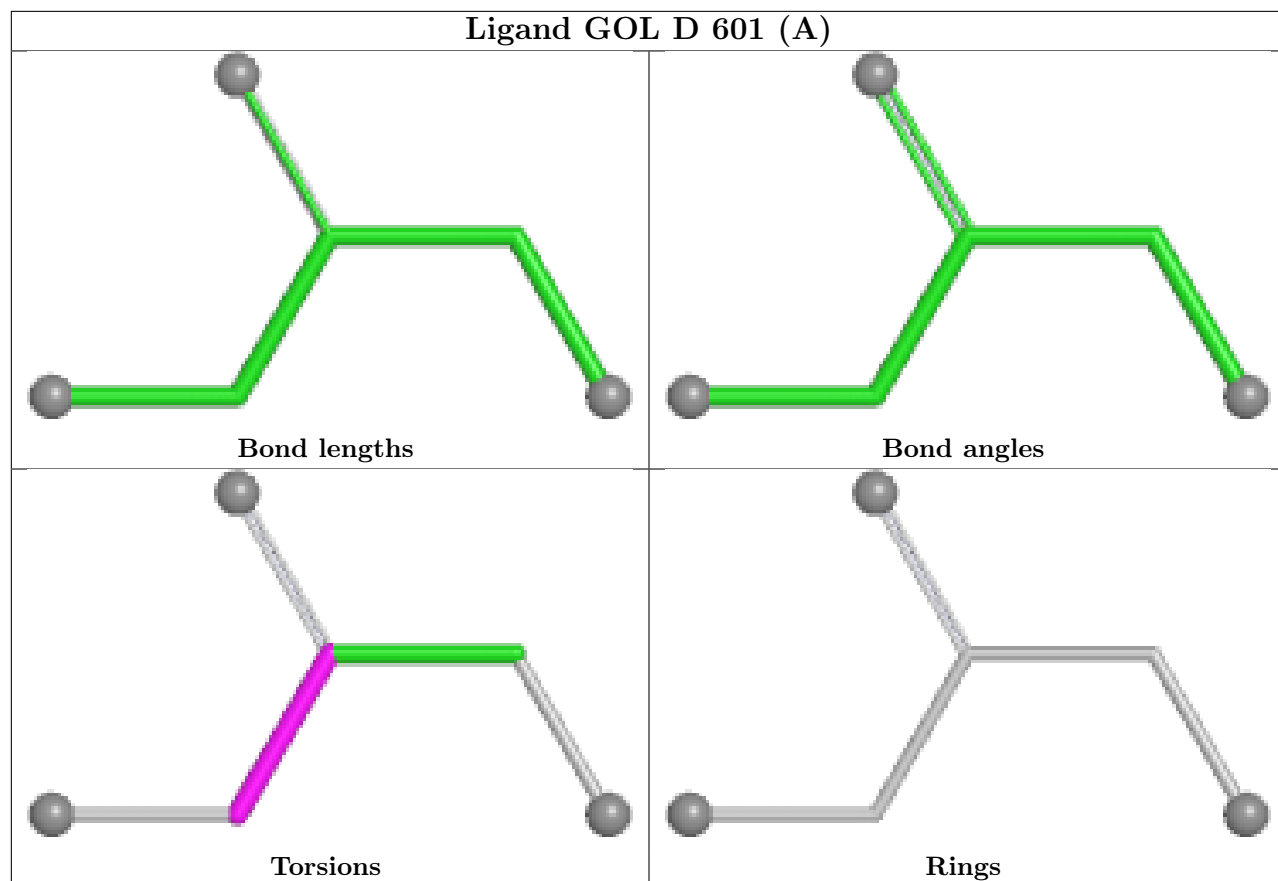
also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted 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.

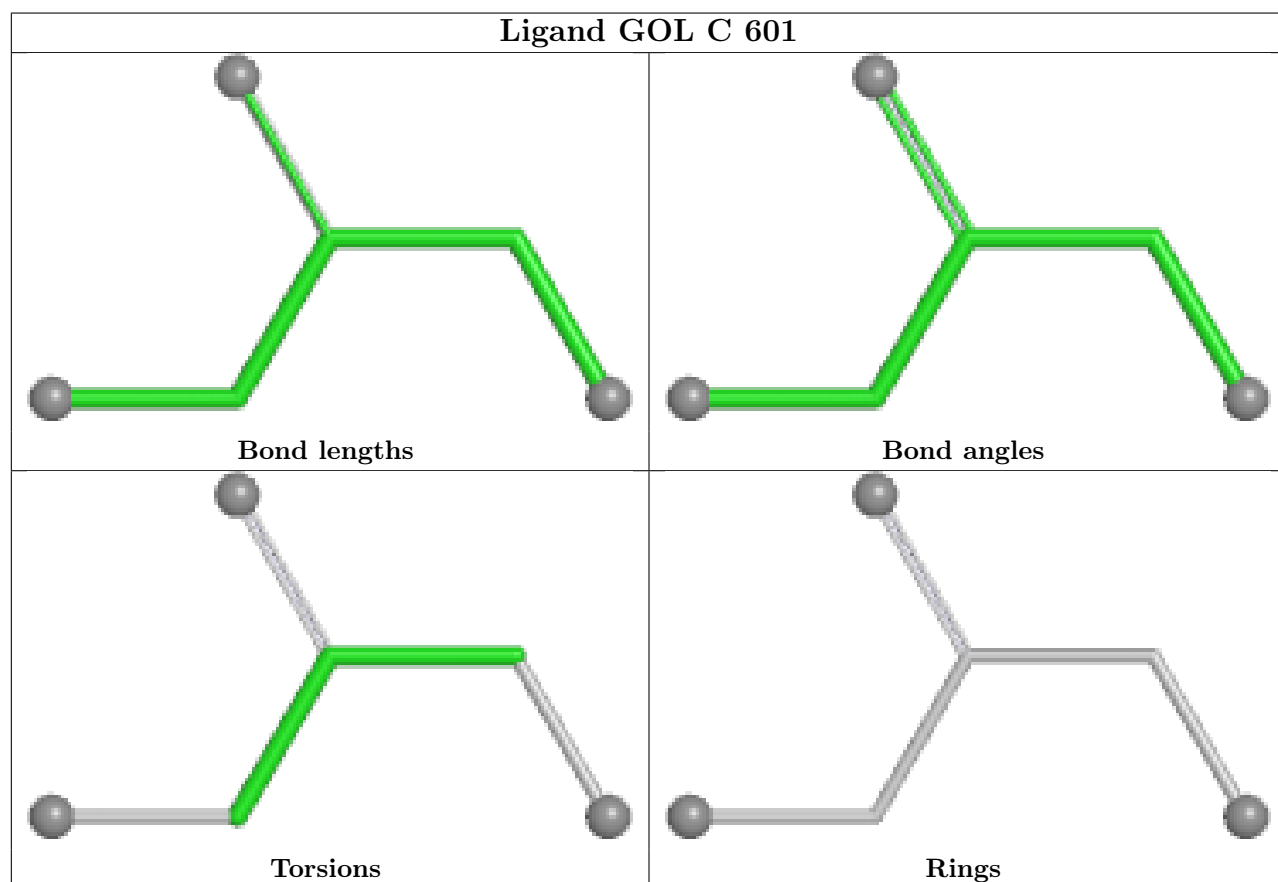
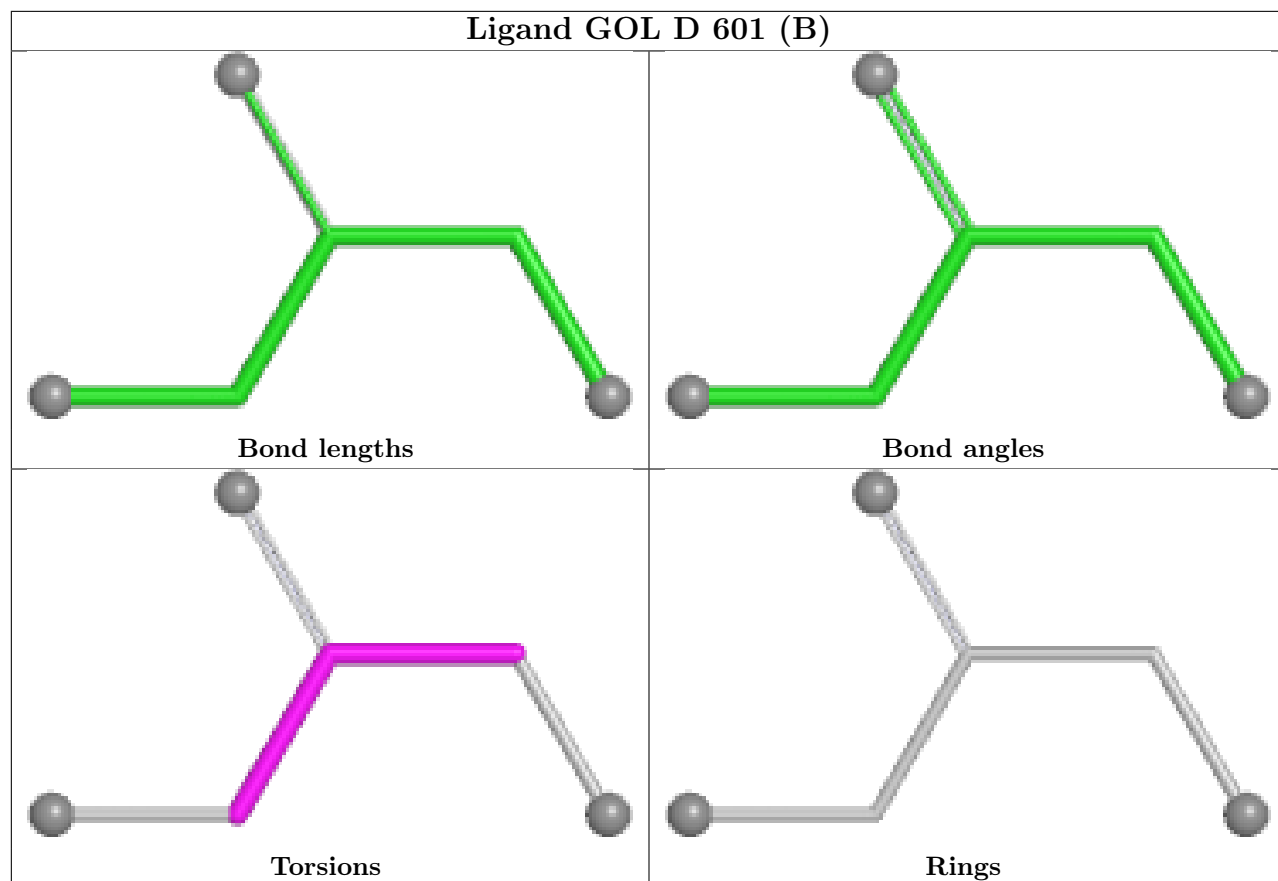




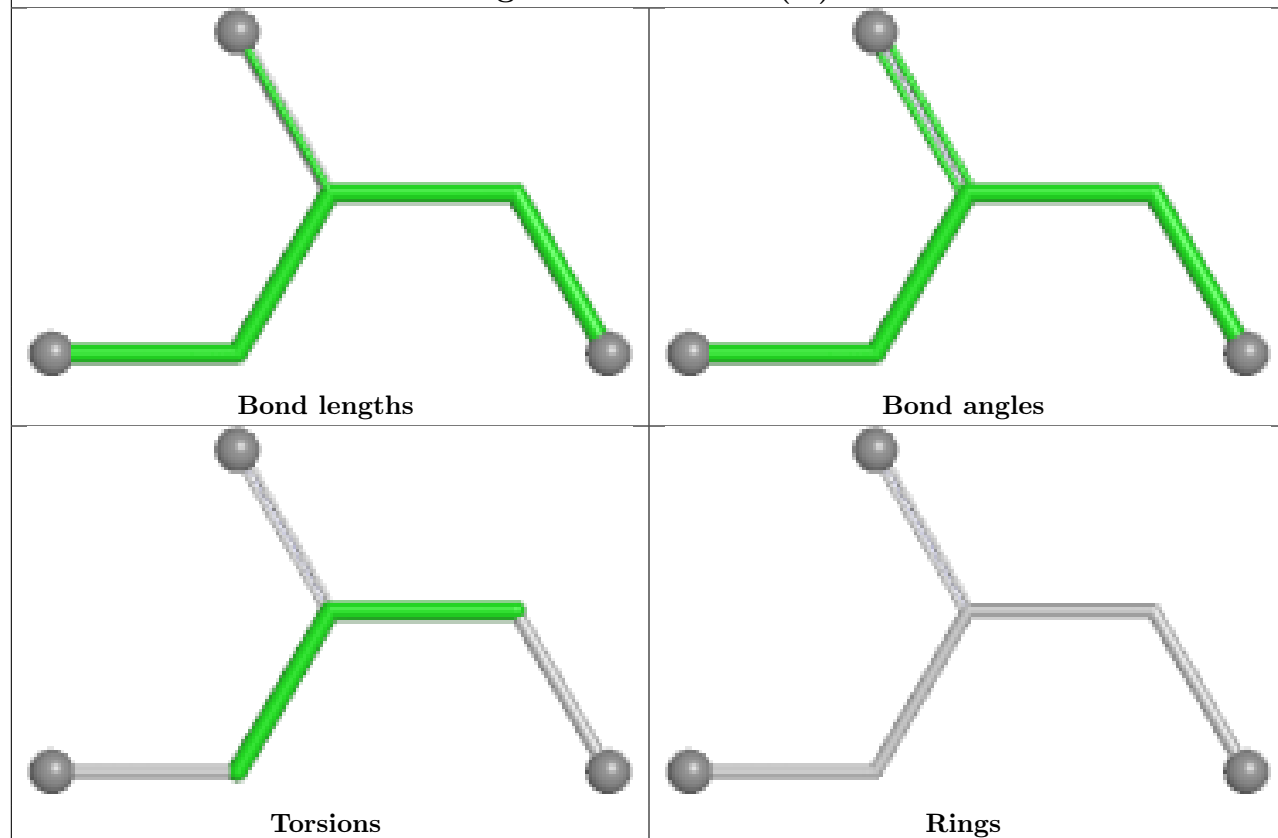




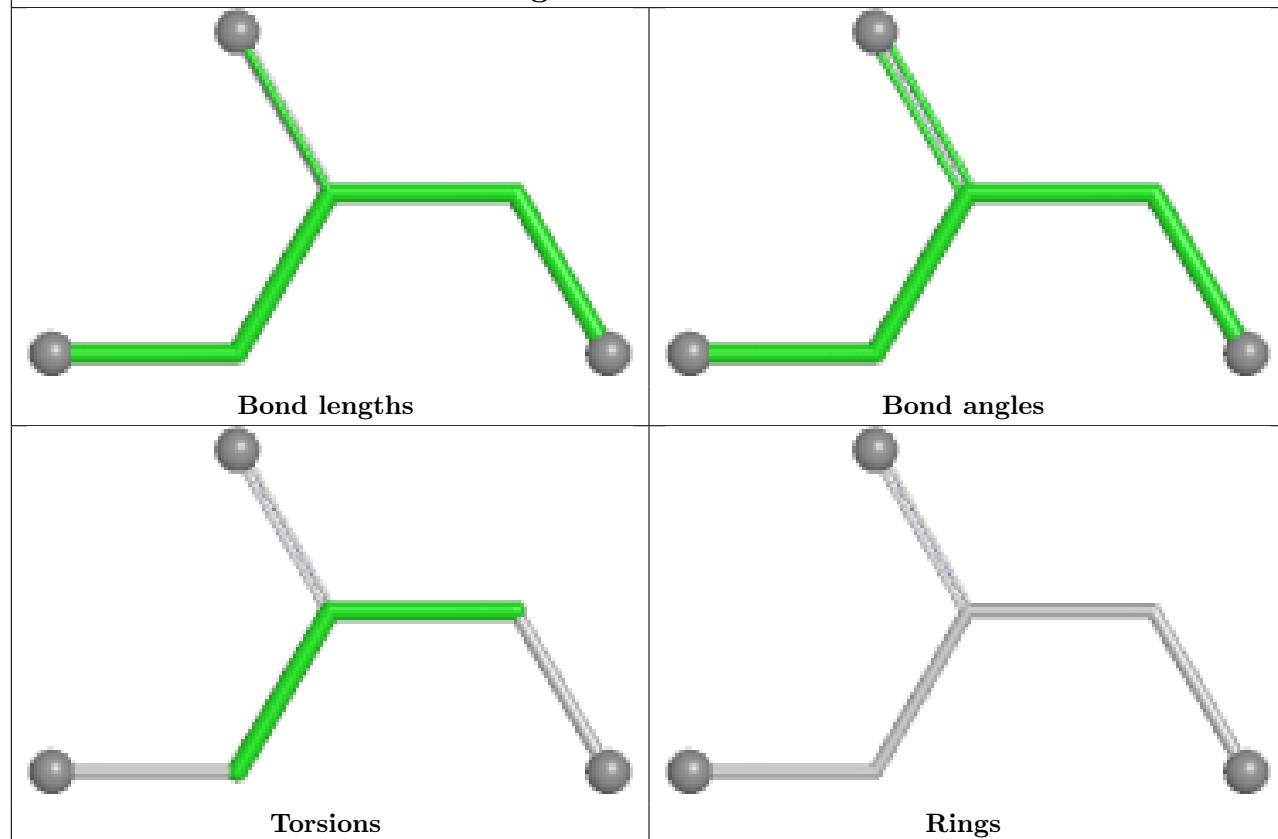


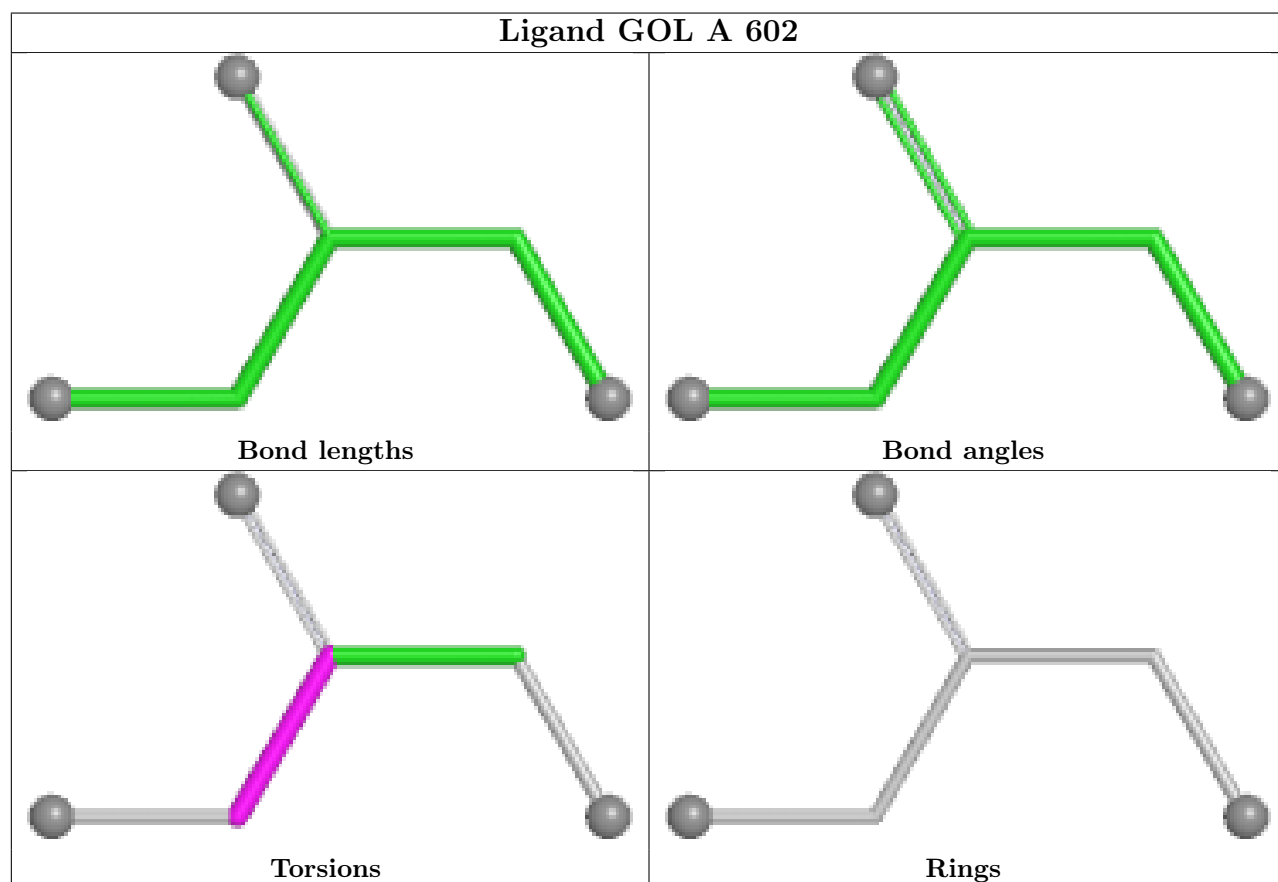
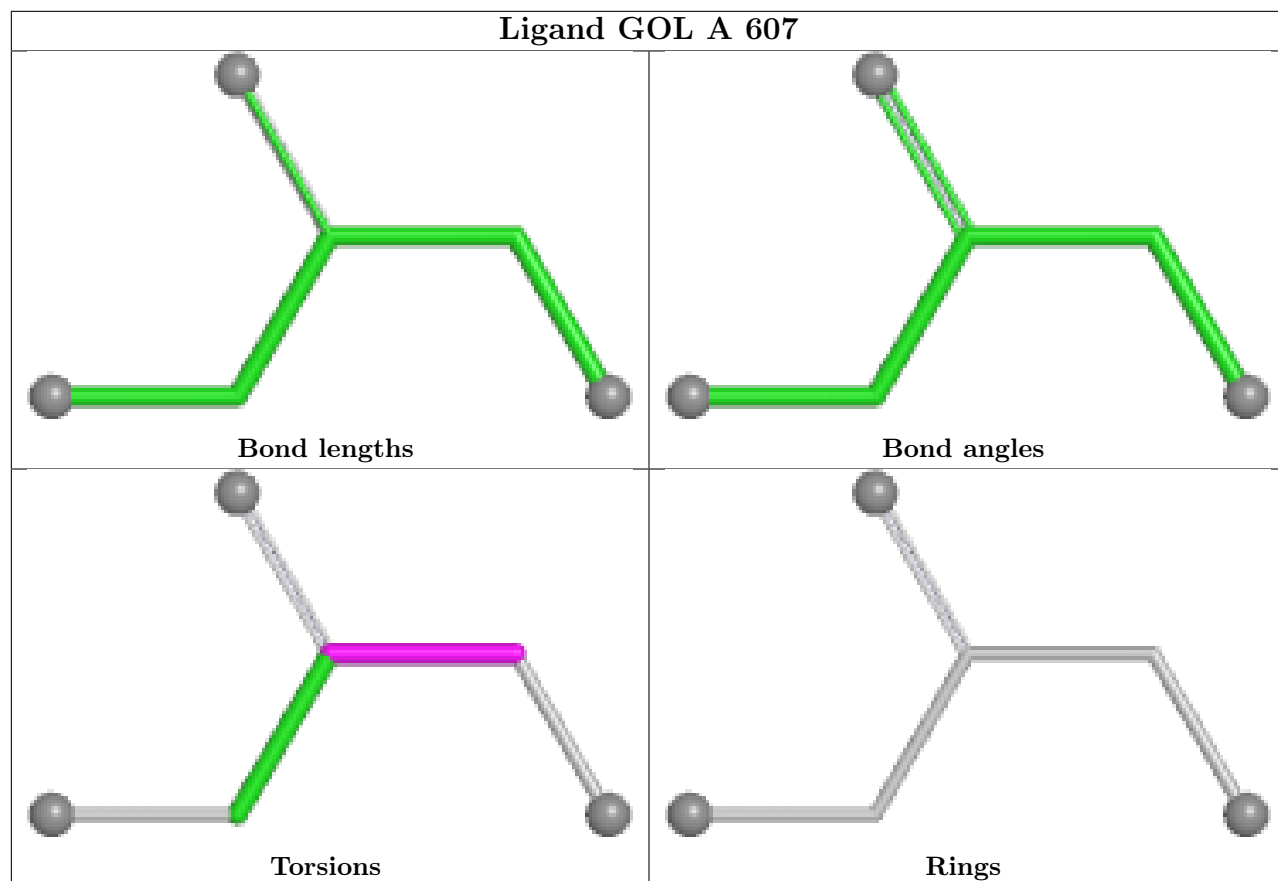


Ligand GOL A 601 (A)

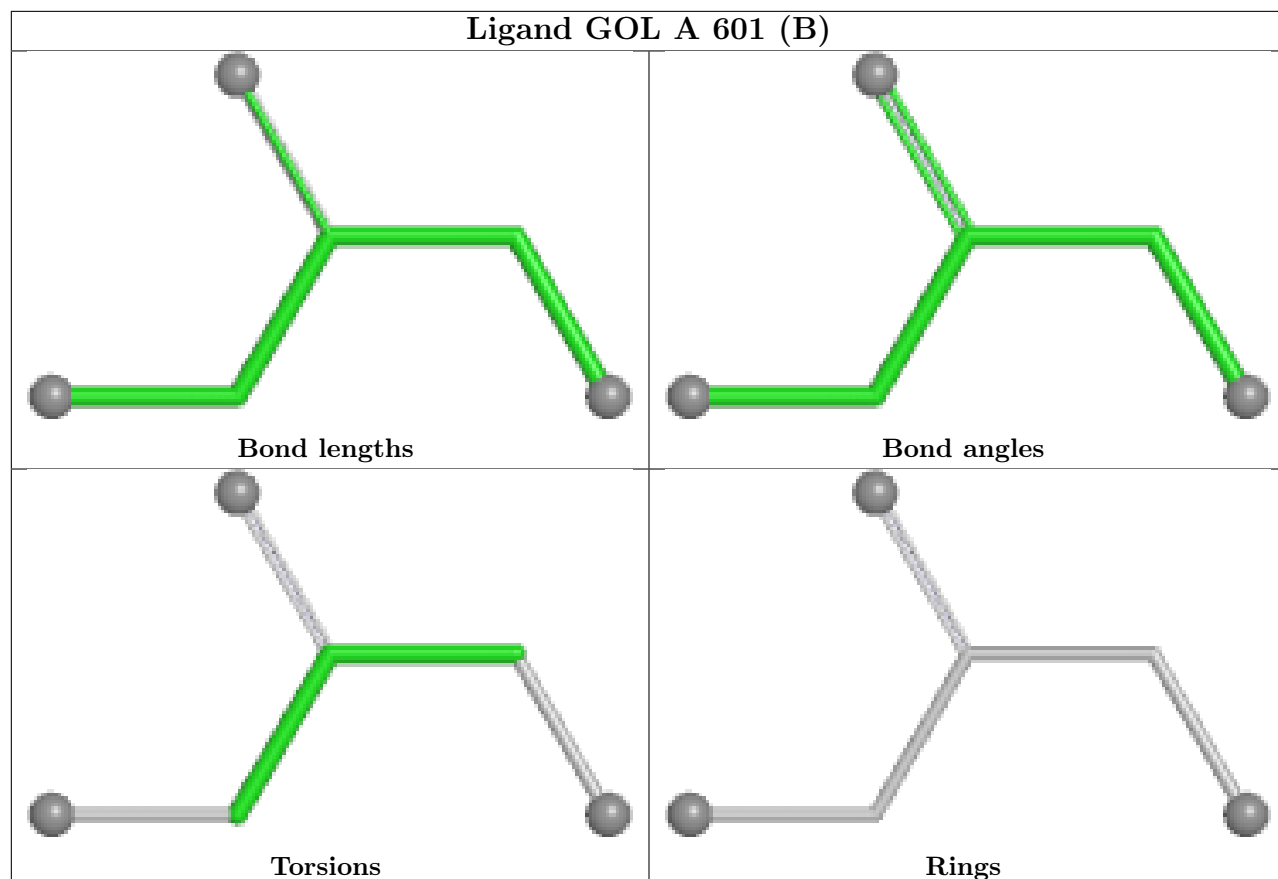


Ligand GOL A 606

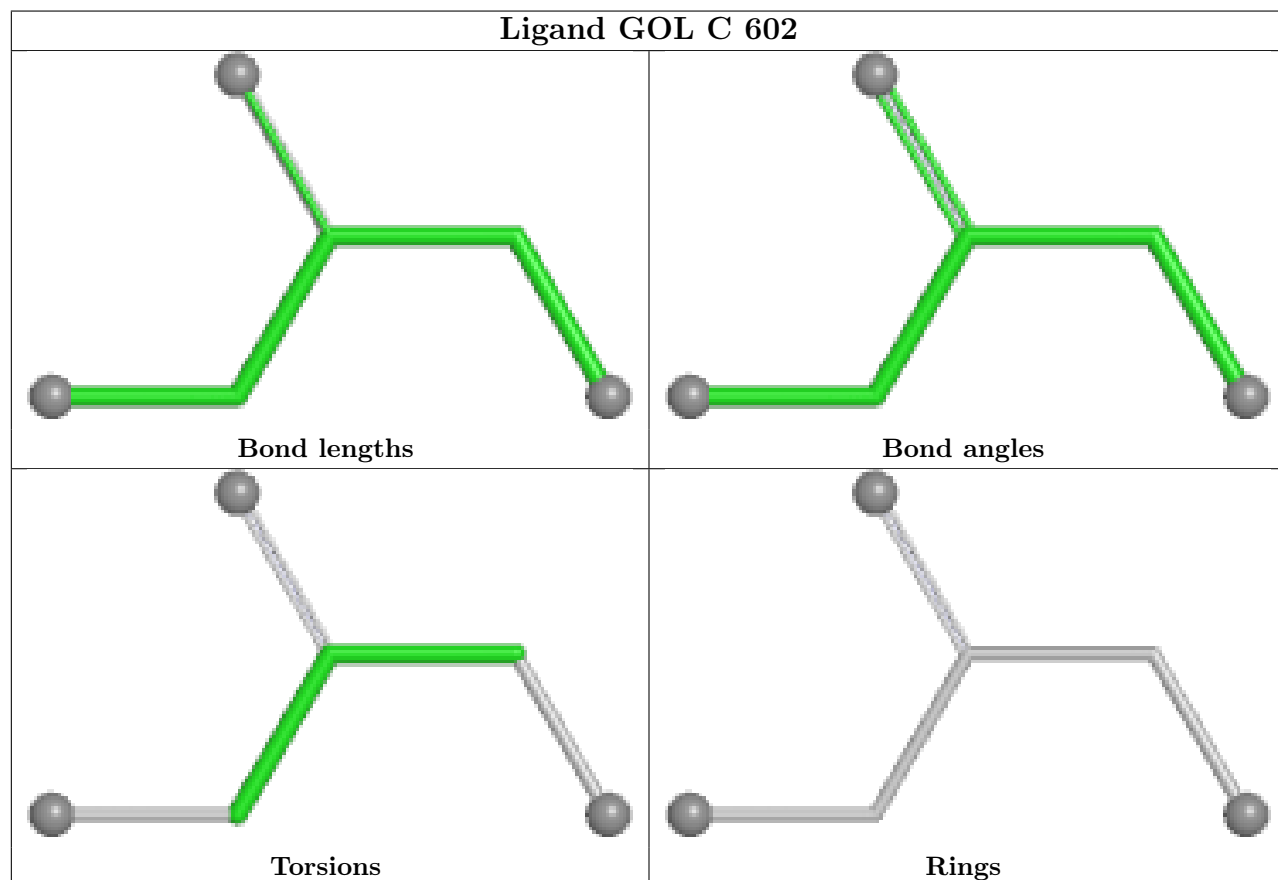


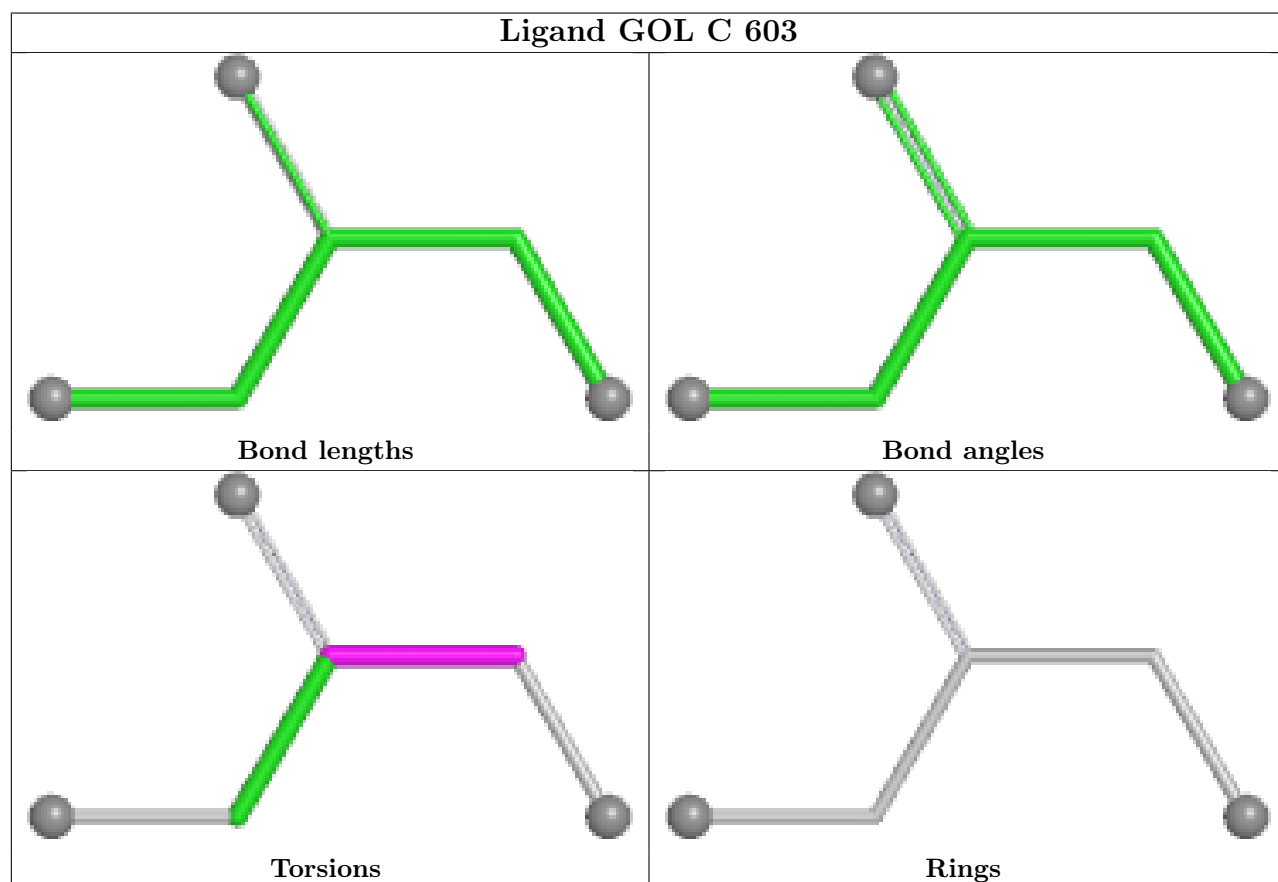
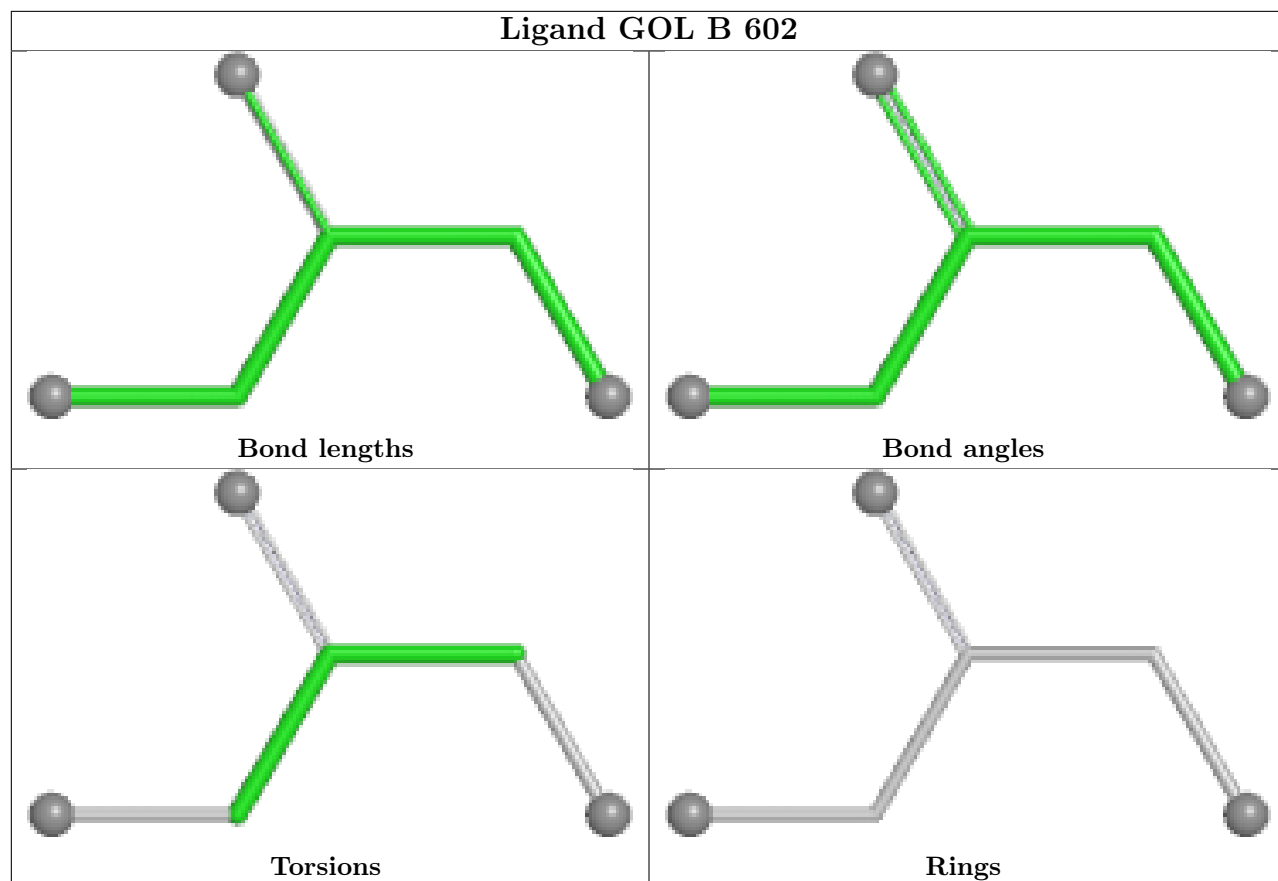


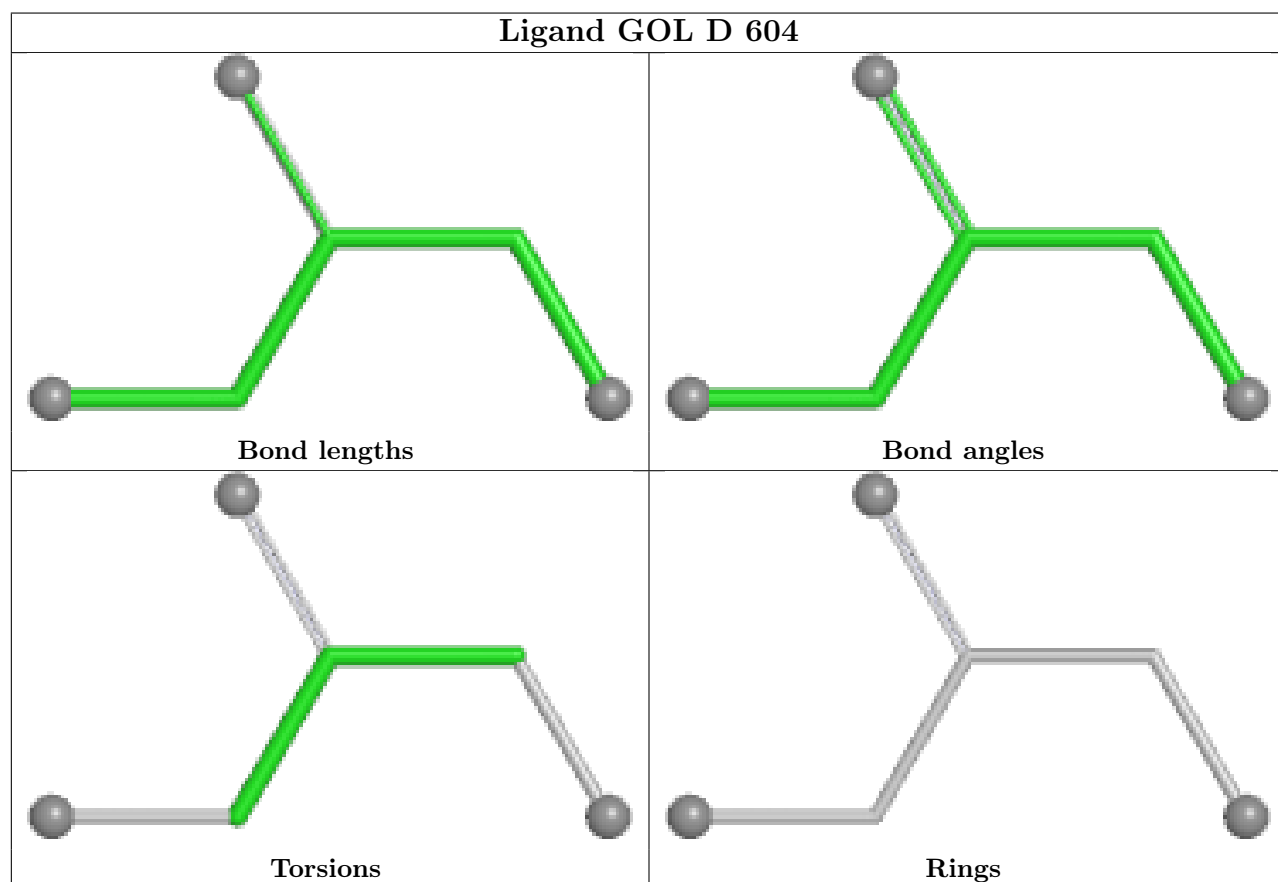
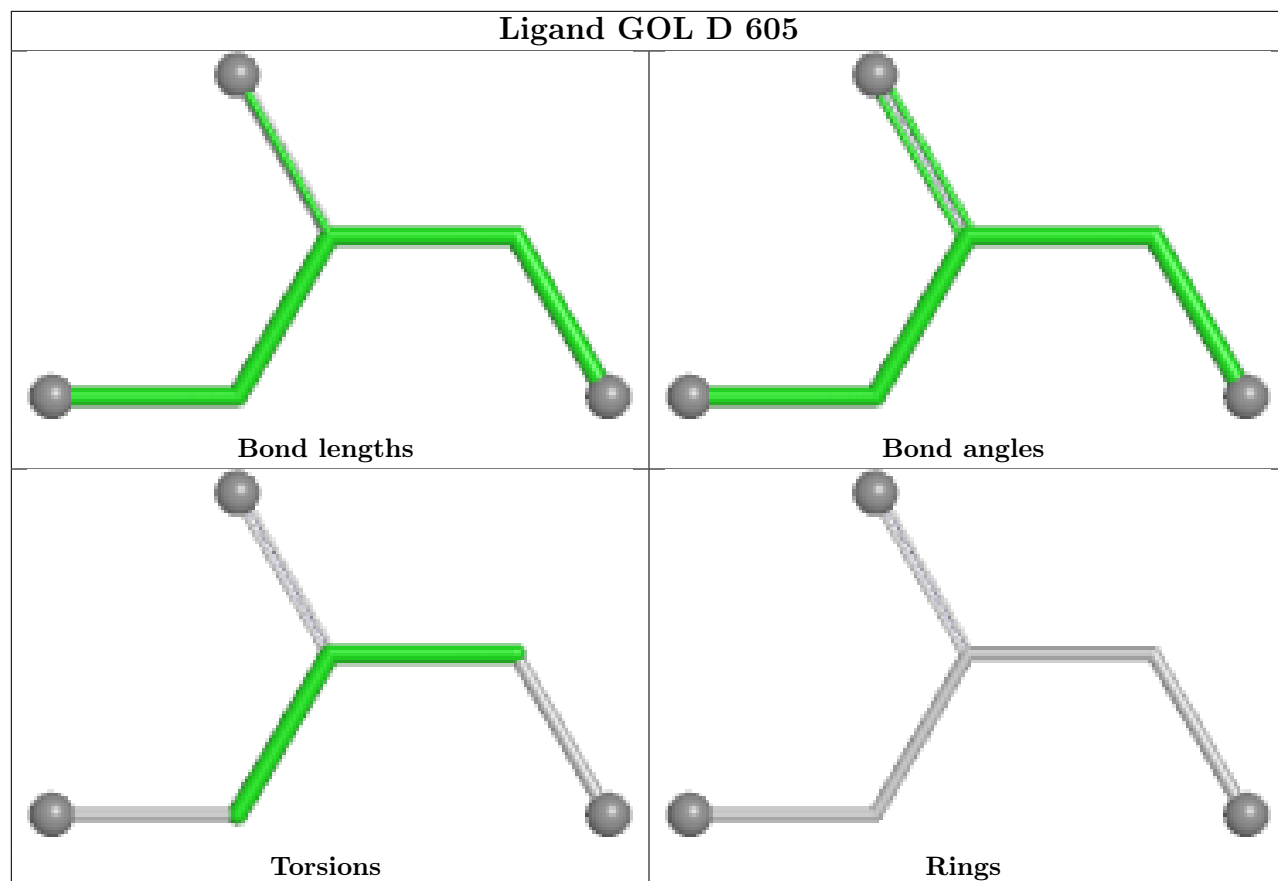
Ligand GOL A 601 (B)

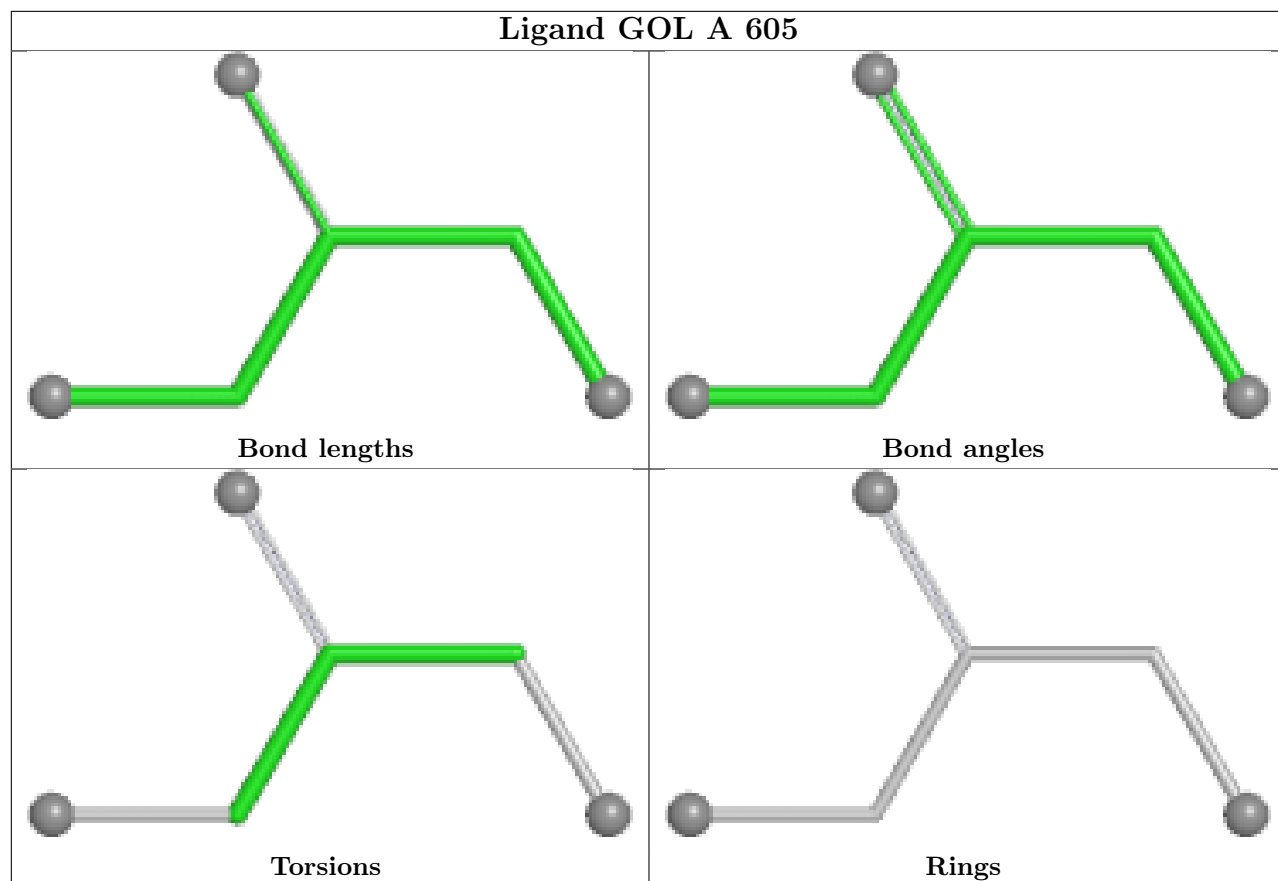


Ligand GOL C 602









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	568/586 (96%)	-0.17	11 (1%) 66 65	17, 33, 59, 106	0
1	B	540/586 (92%)	-0.13	8 (1%) 72 71	20, 39, 61, 115	1 (0%)
1	C	568/586 (96%)	0.05	11 (1%) 66 65	18, 41, 74, 91	1 (0%)
1	D	546/586 (93%)	-0.17	9 (1%) 70 70	17, 33, 57, 96	2 (0%)
All	All	2222/2344 (94%)	-0.10	39 (1%) 67 67	17, 37, 65, 115	4 (0%)

All (39) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	579	LEU	5.9
1	B	179	LEU	4.6
1	D	167	SER	4.3
1	D	578	PRO	4.2
1	D	85	ILE	4.1
1	D	81	VAL	3.9
1	A	578	PRO	3.8
1	B	237	TRP	3.7
1	A	12	TYR	3.7
1	C	578	PRO	3.4
1	B	578	PRO	3.0
1	A	447	THR	3.0
1	D	83	GLY	3.0
1	B	206	VAL	3.0
1	B	82	ASN	2.9
1	C	449	THR	2.8
1	C	13	SER	2.7
1	A	57	THR	2.6
1	C	561	VAL	2.5
1	A	413	ARG	2.5
1	D	213	ASN	2.5

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Mol	Chain	Res	Type	RSRZ
1	D	98	ILE	2.5
1	C	477	THR	2.4
1	C	534	GLY	2.3
1	C	446	GLY	2.3
1	A	456	LEU	2.3
1	C	12	TYR	2.3
1	B	83	GLY	2.2
1	C	536	GLN	2.2
1	D	239	PHE	2.2
1	C	499	ILE	2.2
1	B	81	VAL	2.2
1	B	235	ASN	2.2
1	A	495	CYS	2.2
1	D	504	GLY	2.1
1	A	517	ALA	2.1
1	A	474	SER	2.1
1	C	563	GLY	2.0
1	A	534	GLY	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(Å ²)	Q<0.9
2	GOL	A	605	6/6	0.73	0.19	86,91,96,98	0
2	GOL	A	608	6/6	0.76	0.17	63,71,72,78	0
2	GOL	A	607	6/6	0.77	0.19	70,73,89,93	0
2	GOL	D	605	6/6	0.78	0.17	55,58,69,77	0
2	GOL	D	601[A]	6/6	0.83	0.18	47,49,52,56	6

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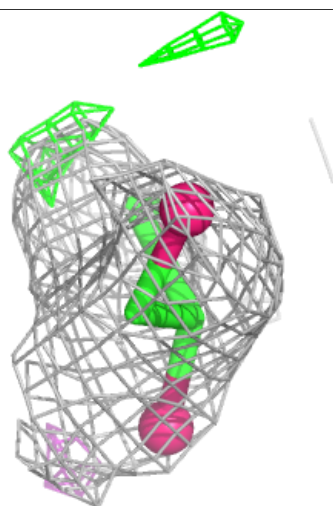
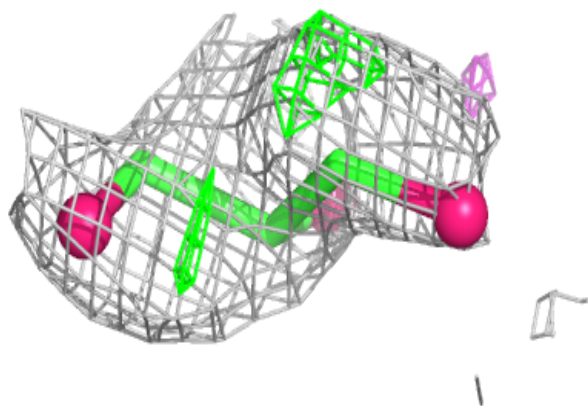
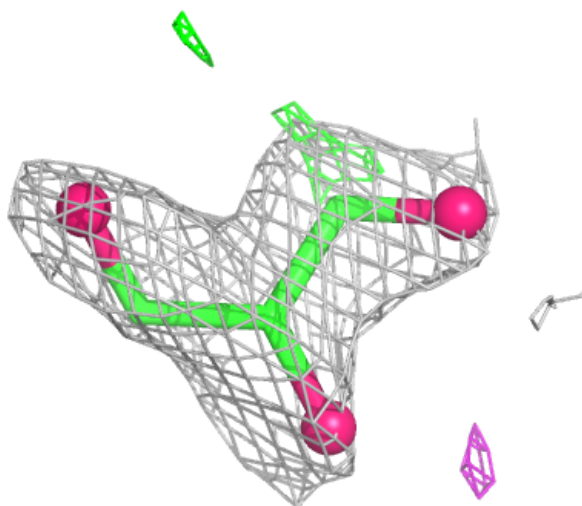
Continued from previous page...

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
2	GOL	D	601[B]	6/6	0.83	0.18	43,49,53,53	6
2	GOL	A	602	6/6	0.83	0.18	52,57,72,73	0
2	GOL	C	603	6/6	0.84	0.15	40,54,57,64	0
2	GOL	D	602	6/6	0.84	0.17	34,37,41,42	0
2	GOL	A	603	6/6	0.84	0.16	37,62,66,69	0
2	GOL	B	602	6/6	0.86	0.11	66,71,73,75	0
2	GOL	D	603	6/6	0.88	0.11	54,61,68,69	0
2	GOL	C	601	6/6	0.88	0.11	50,55,59,60	0
2	GOL	D	604	6/6	0.89	0.17	23,36,49,63	0
2	GOL	A	604	6/6	0.90	0.12	55,56,57,60	0
2	GOL	B	603	6/6	0.91	0.10	38,52,73,78	0
2	GOL	C	602	6/6	0.92	0.11	30,39,44,46	0
2	GOL	A	601[B]	6/6	0.93	0.12	23,28,30,34	6
2	GOL	A	606	6/6	0.93	0.08	27,31,37,47	0
2	GOL	A	601[A]	6/6	0.93	0.12	23,28,31,31	6
2	GOL	B	601	6/6	0.94	0.11	26,36,47,56	0
2	GOL	C	604	6/6	0.94	0.09	34,39,44,62	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.

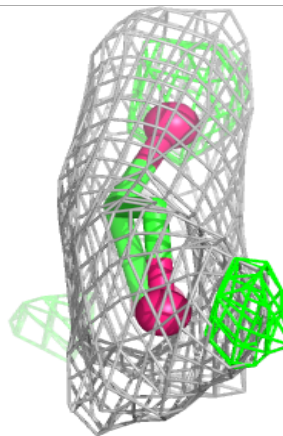
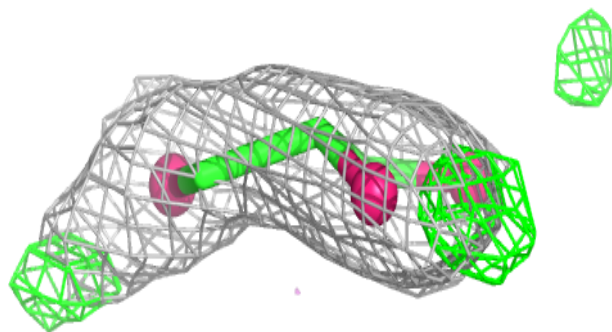
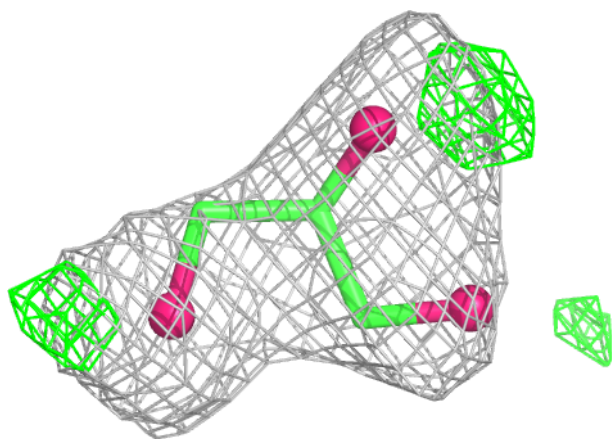
Electron density around GOL A 605:

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



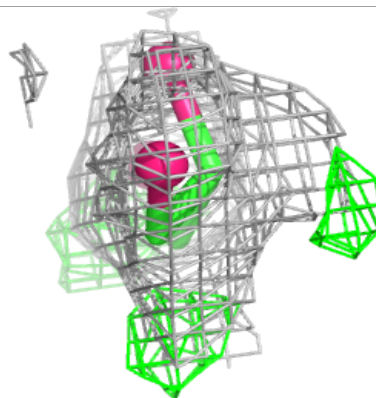
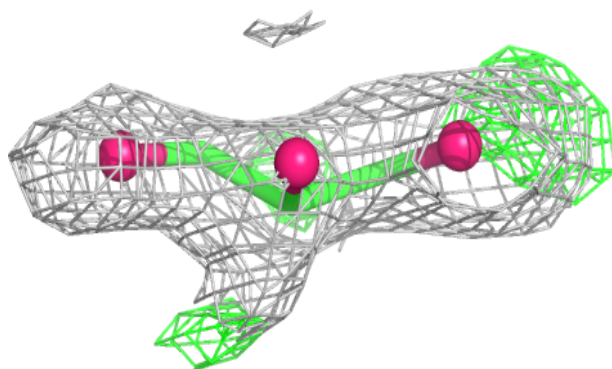
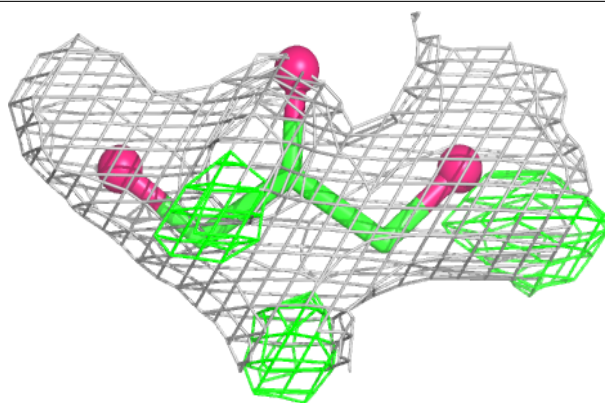
Electron density around GOL A 608:

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and green (positive)



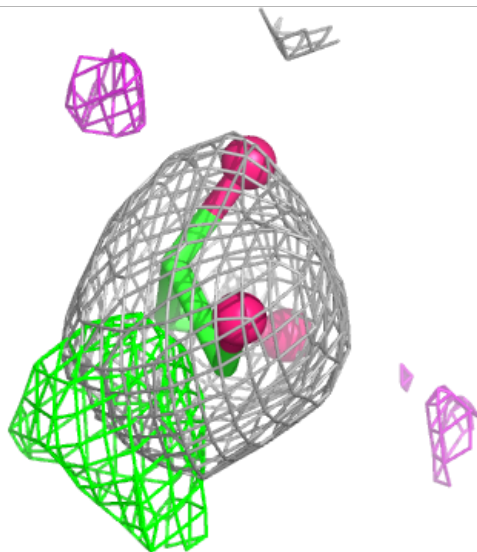
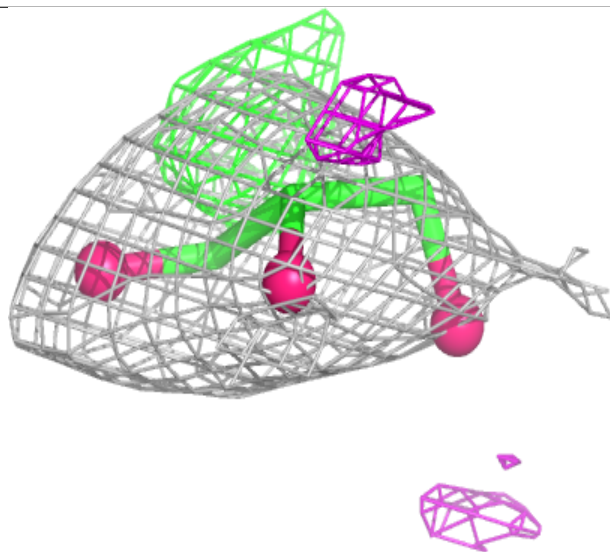
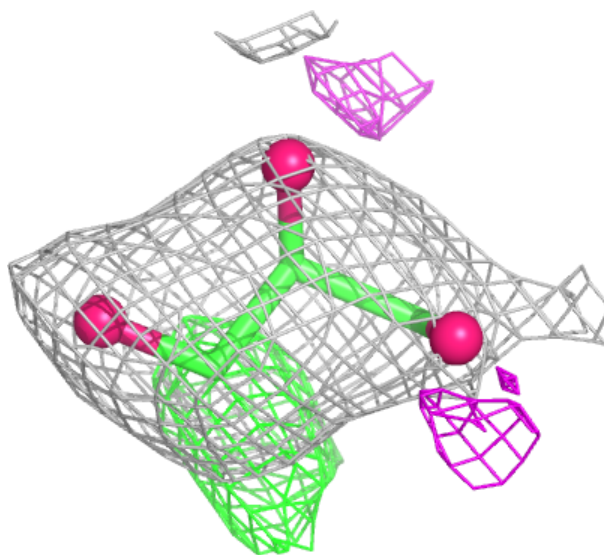
Electron density around GOL A 607:

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and green (positive)



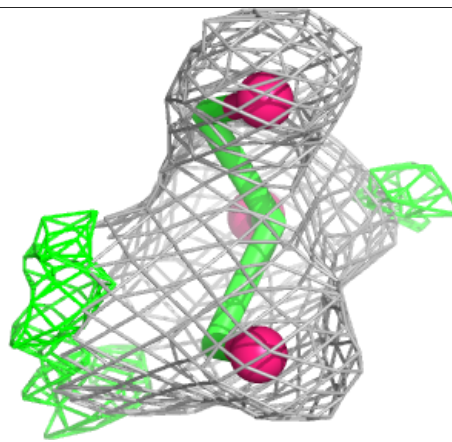
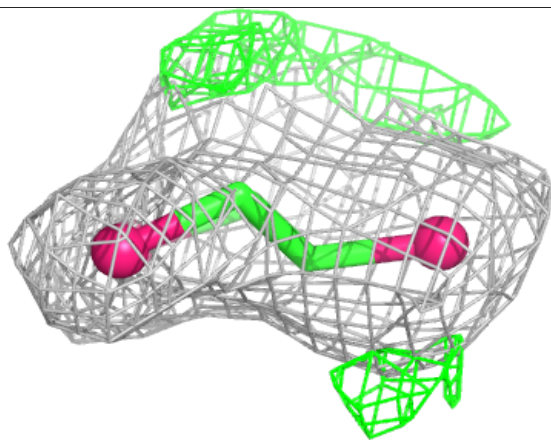
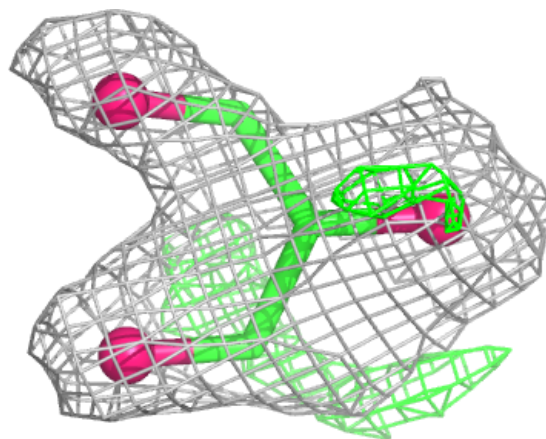
Electron density around GOL D 605:

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and green (positive)



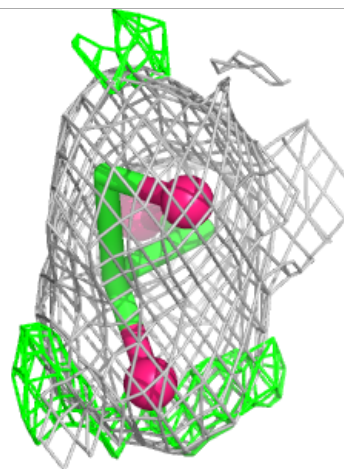
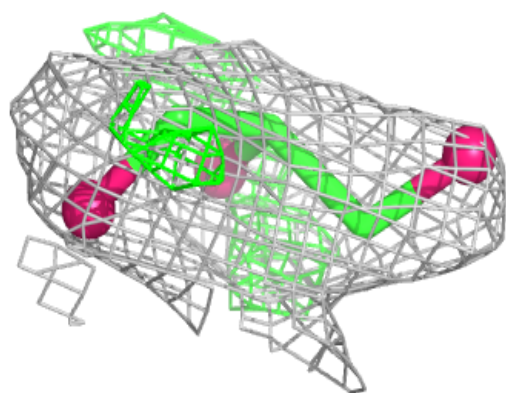
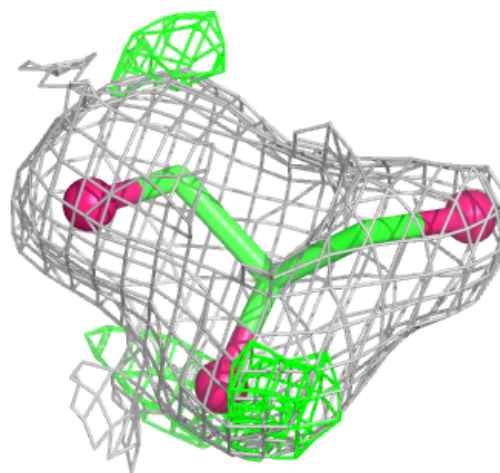
Electron density around GOL D 601 (A):

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and green (positive)



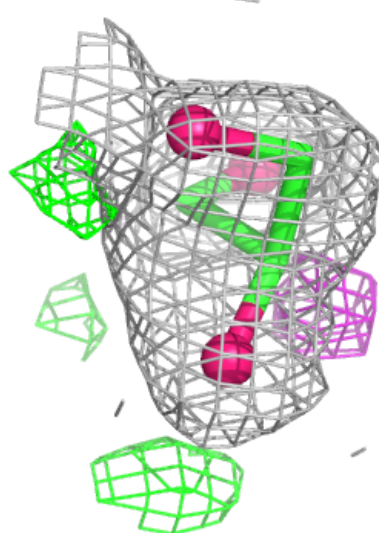
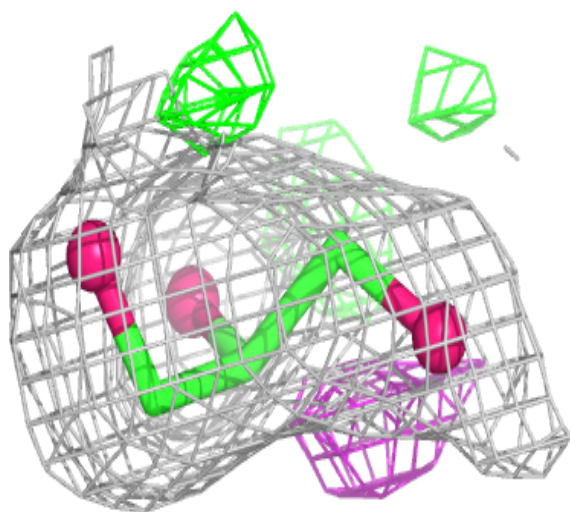
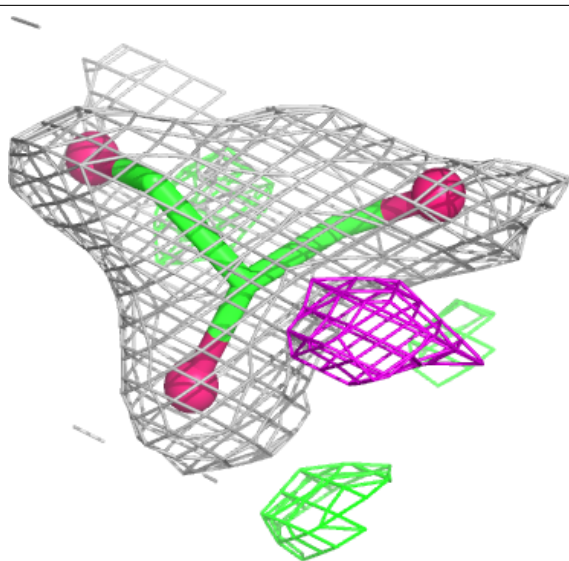
Electron density around GOL D 601 (B):

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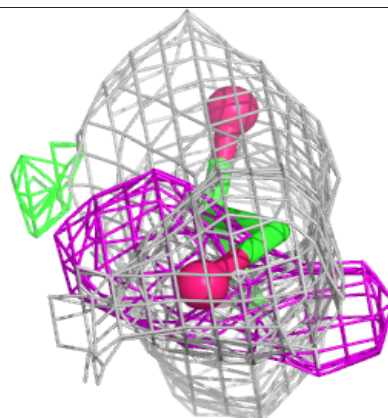
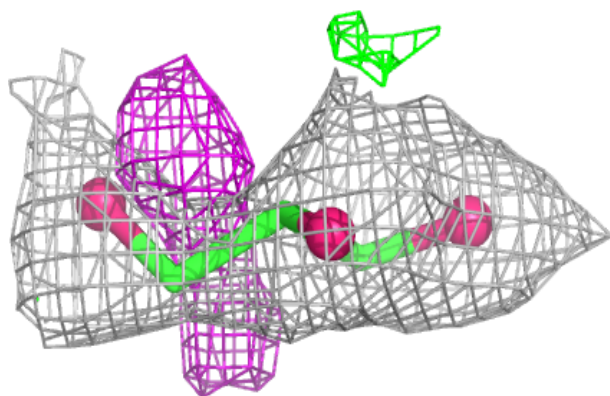
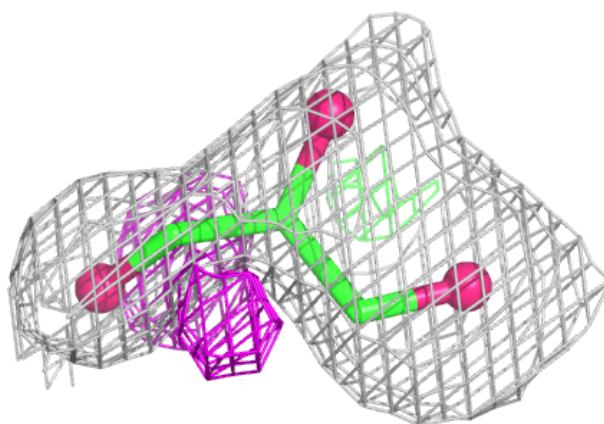
Electron density around GOL A 602:

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and green (positive)



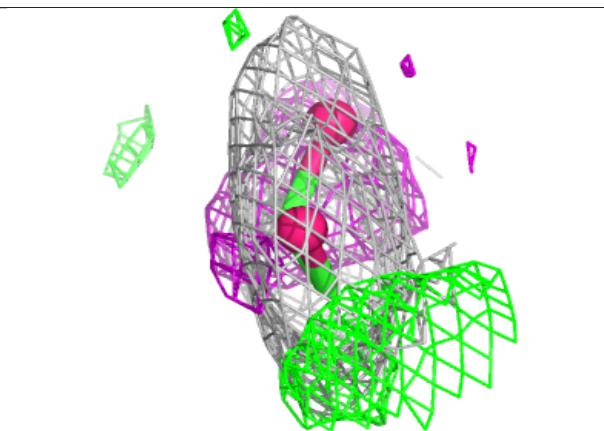
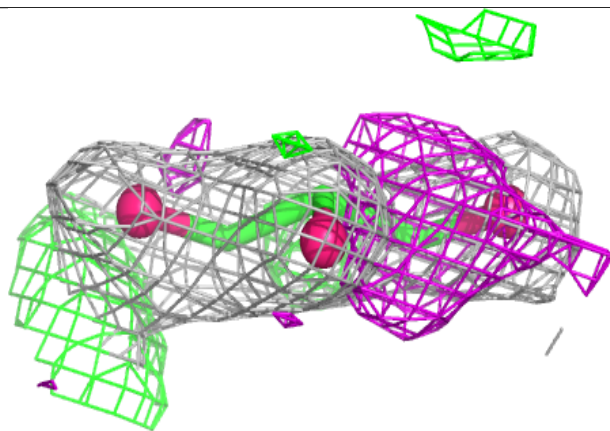
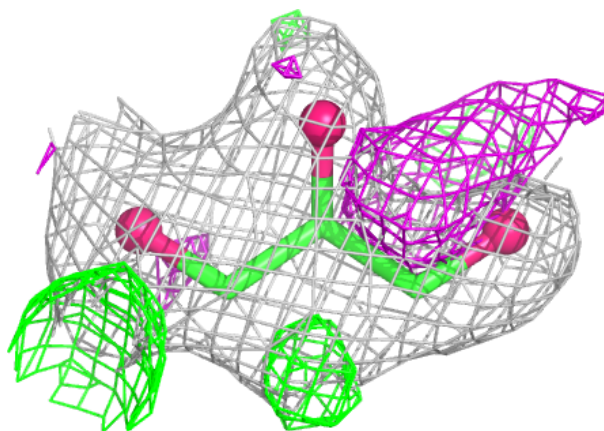
Electron density around GOL C 603:

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and green (positive)



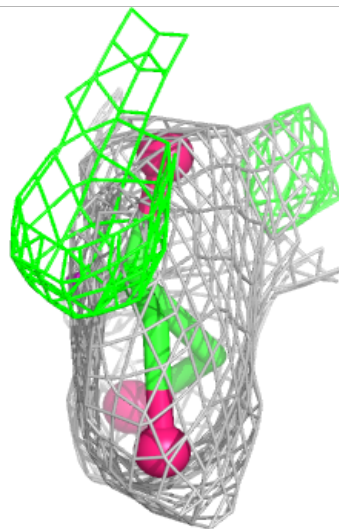
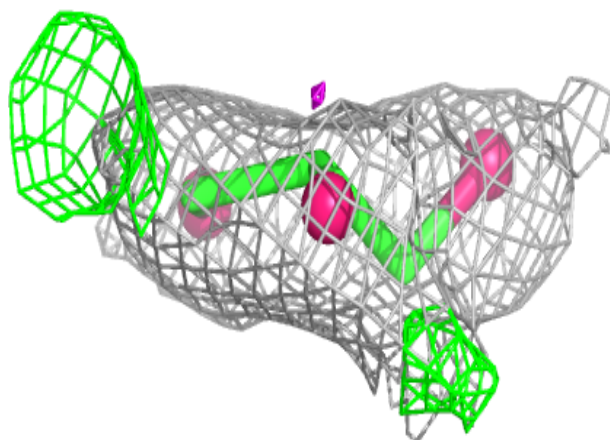
Electron density around GOL D 602:

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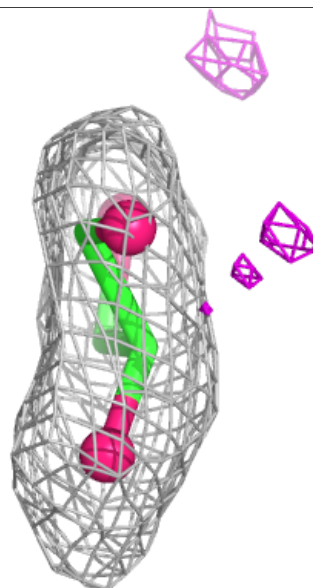
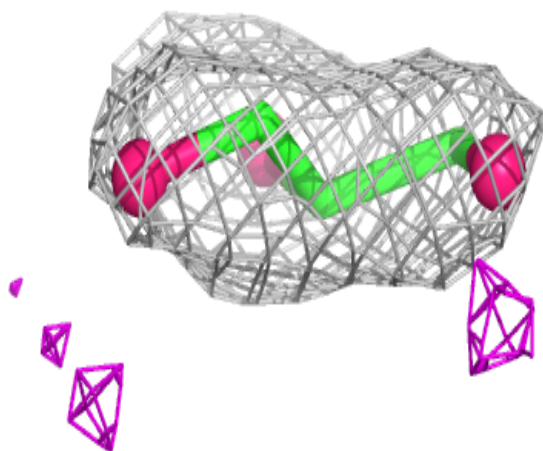
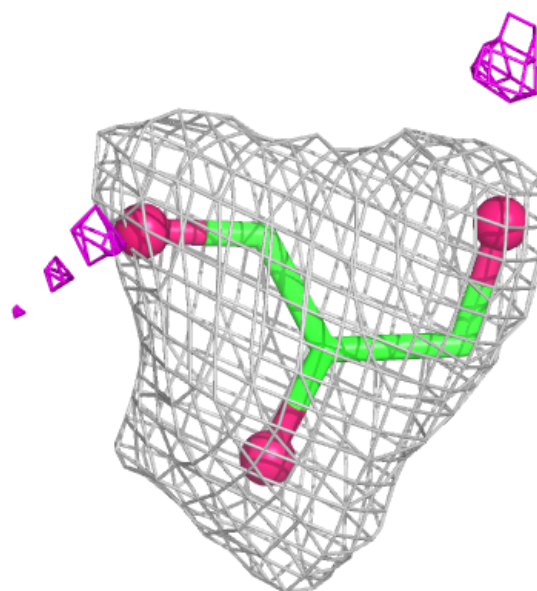
Electron density around GOL A 603:

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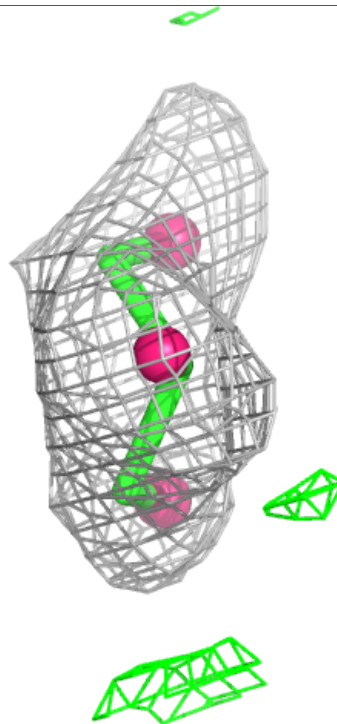
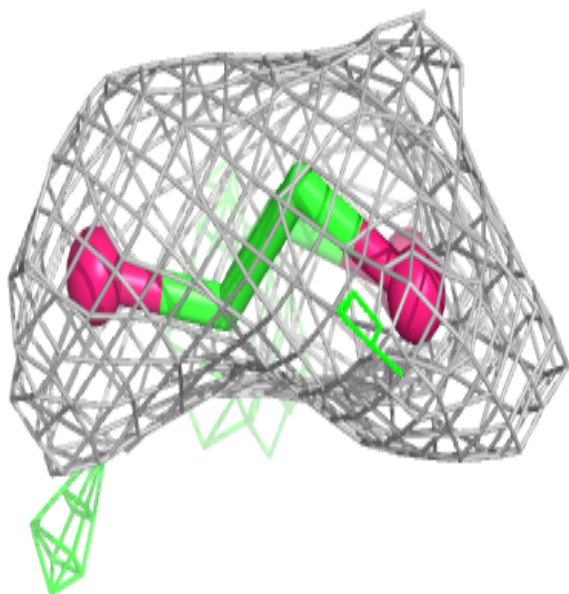
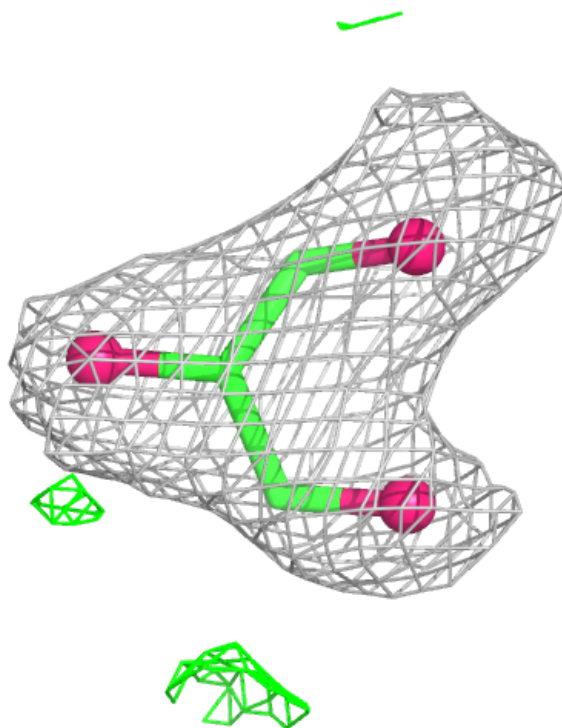
Electron density around GOL B 602:

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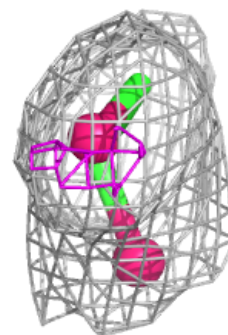
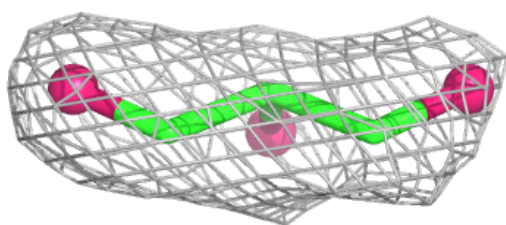
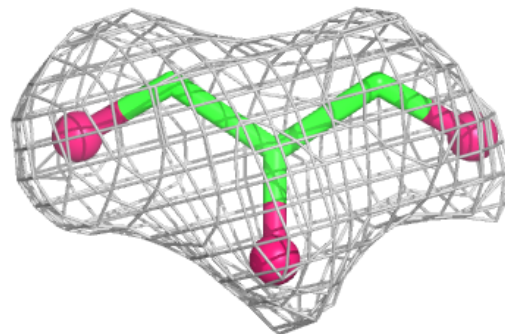
Electron density around GOL D 603:

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



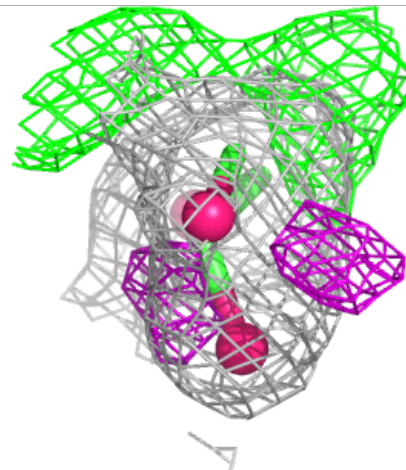
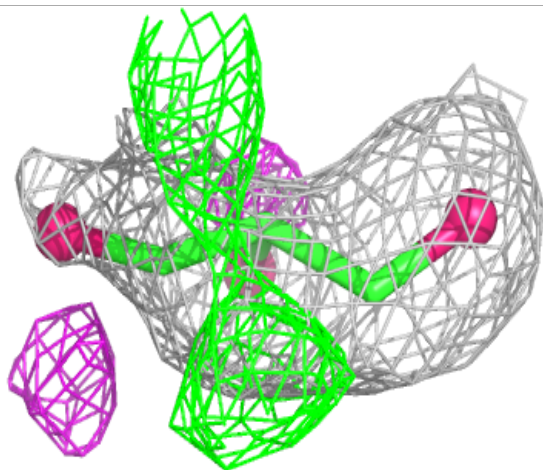
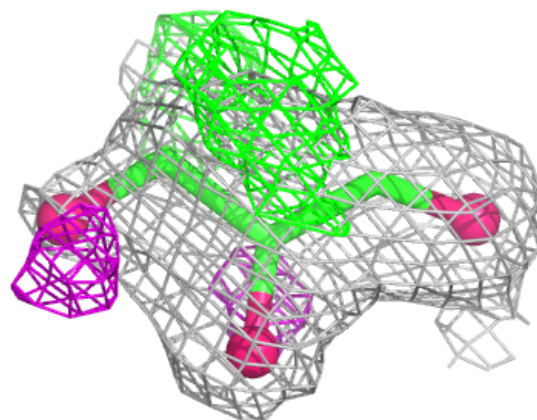
Electron density around GOL C 601:

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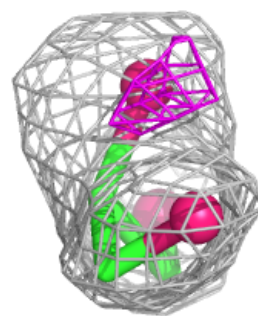
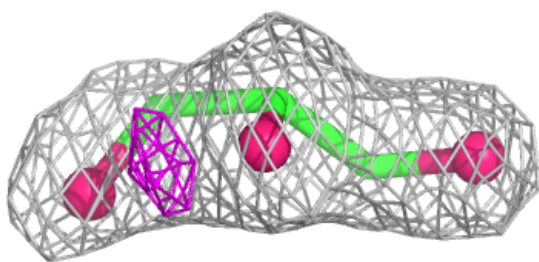
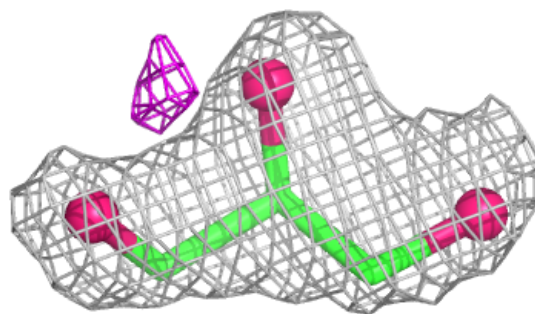
Electron density around GOL D 604:

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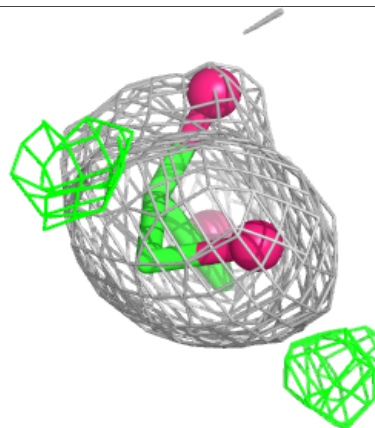
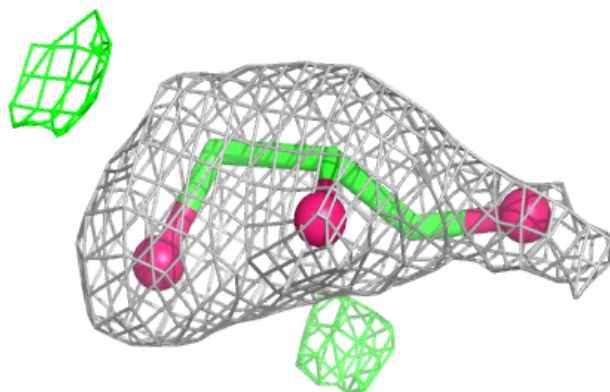
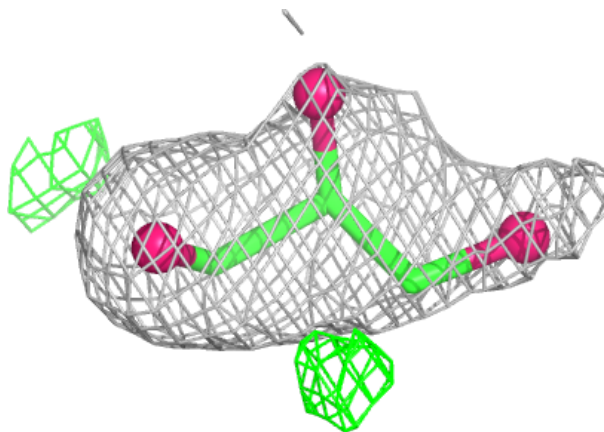


Electron density around GOL A 604:

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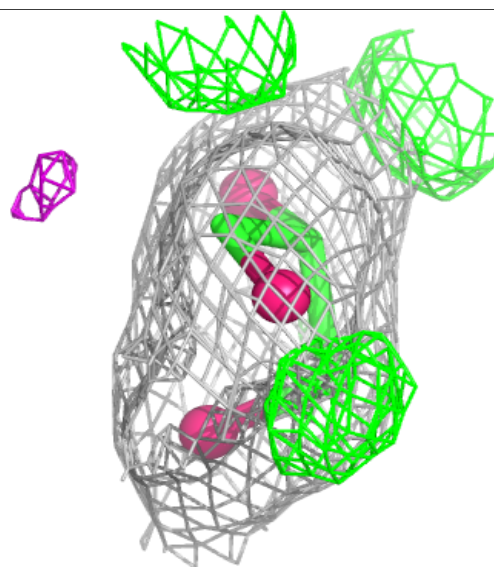
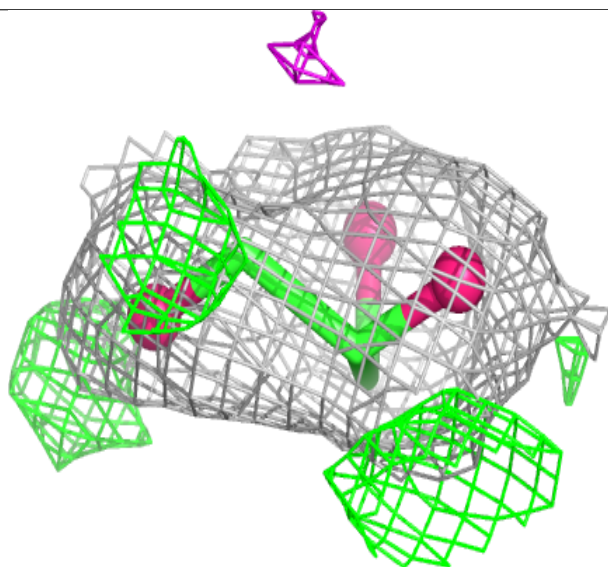
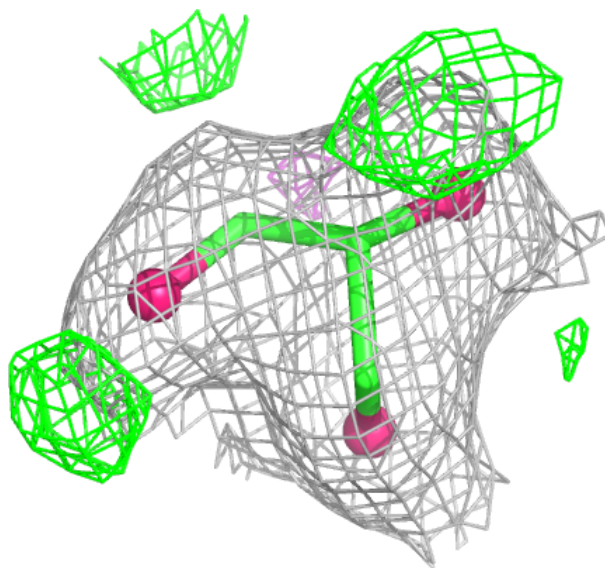
**Electron density around GOL B 603:**

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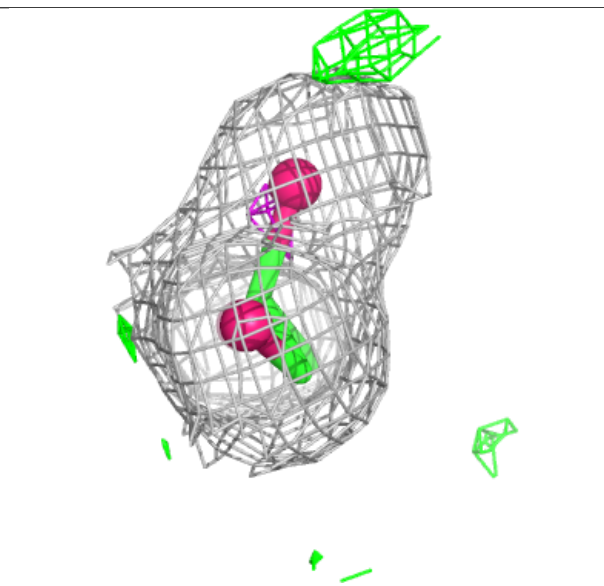
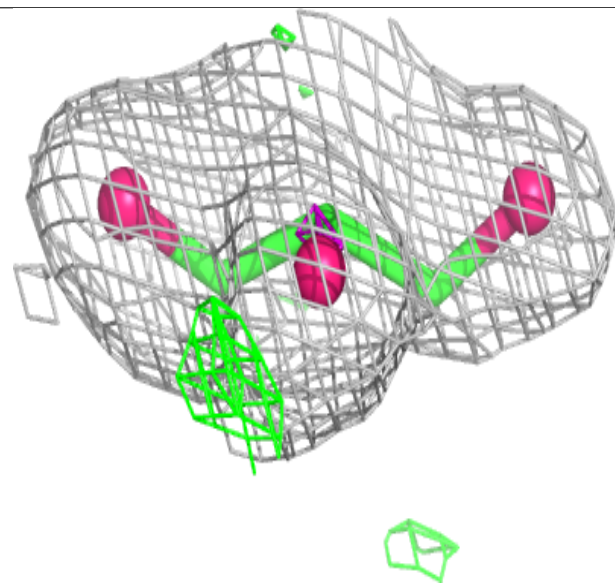
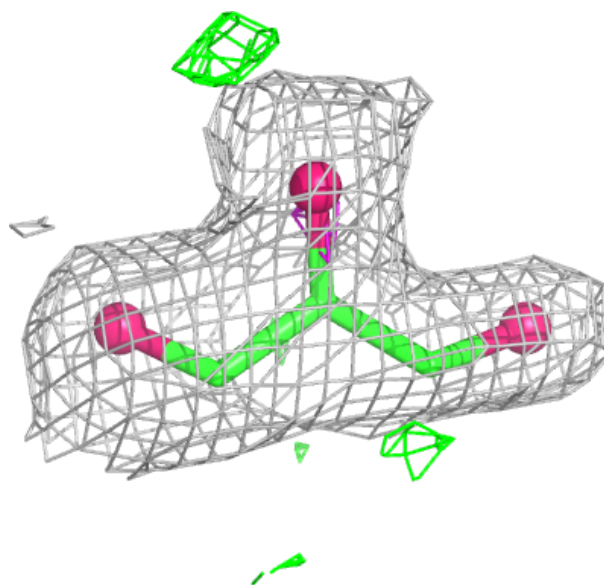
Electron density around GOL C 602:

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and green (positive)



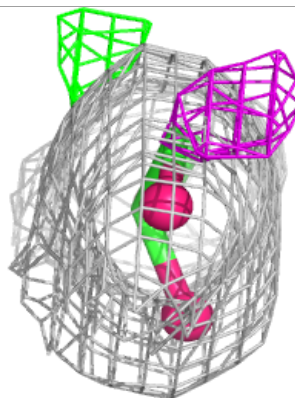
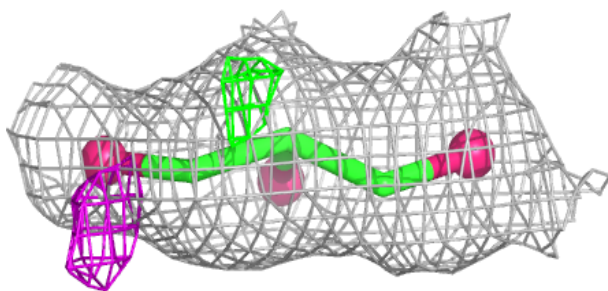
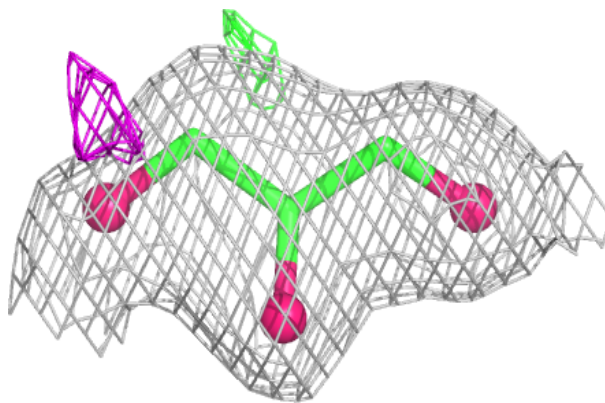
Electron density around GOL A 601 (B):

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and green (positive)



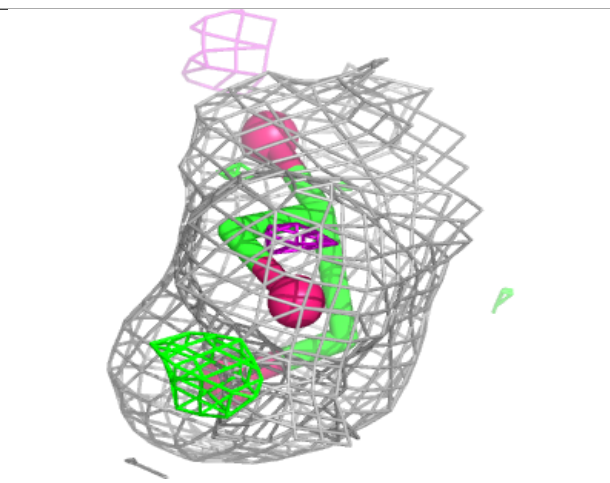
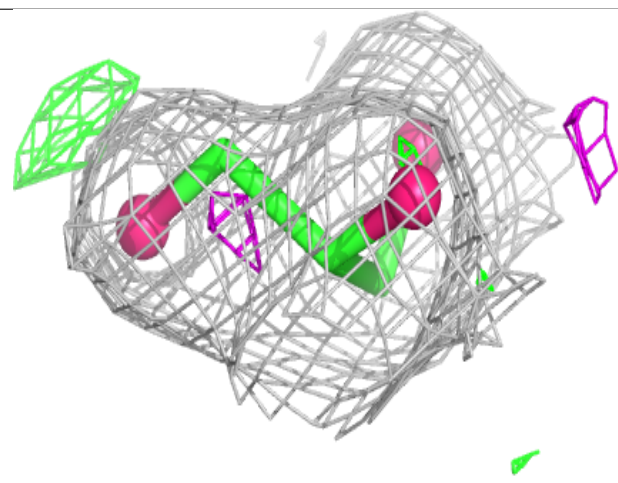
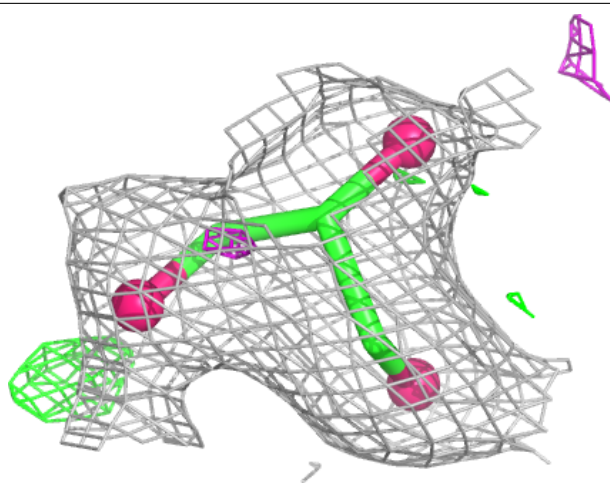
Electron density around GOL A 606:

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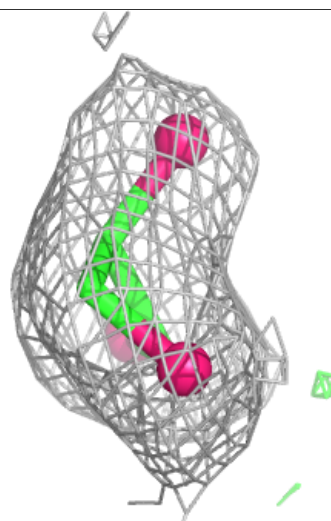
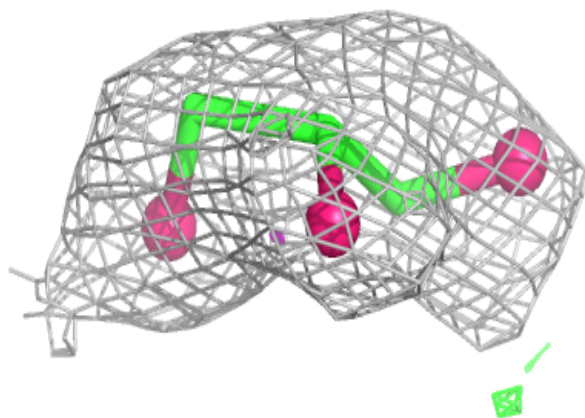
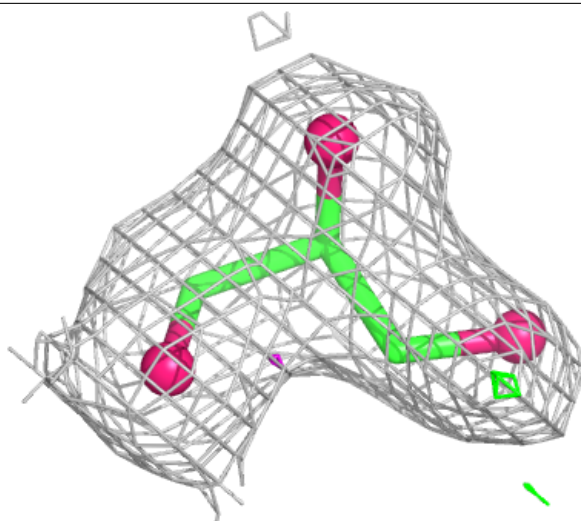
Electron density around GOL A 601 (A):

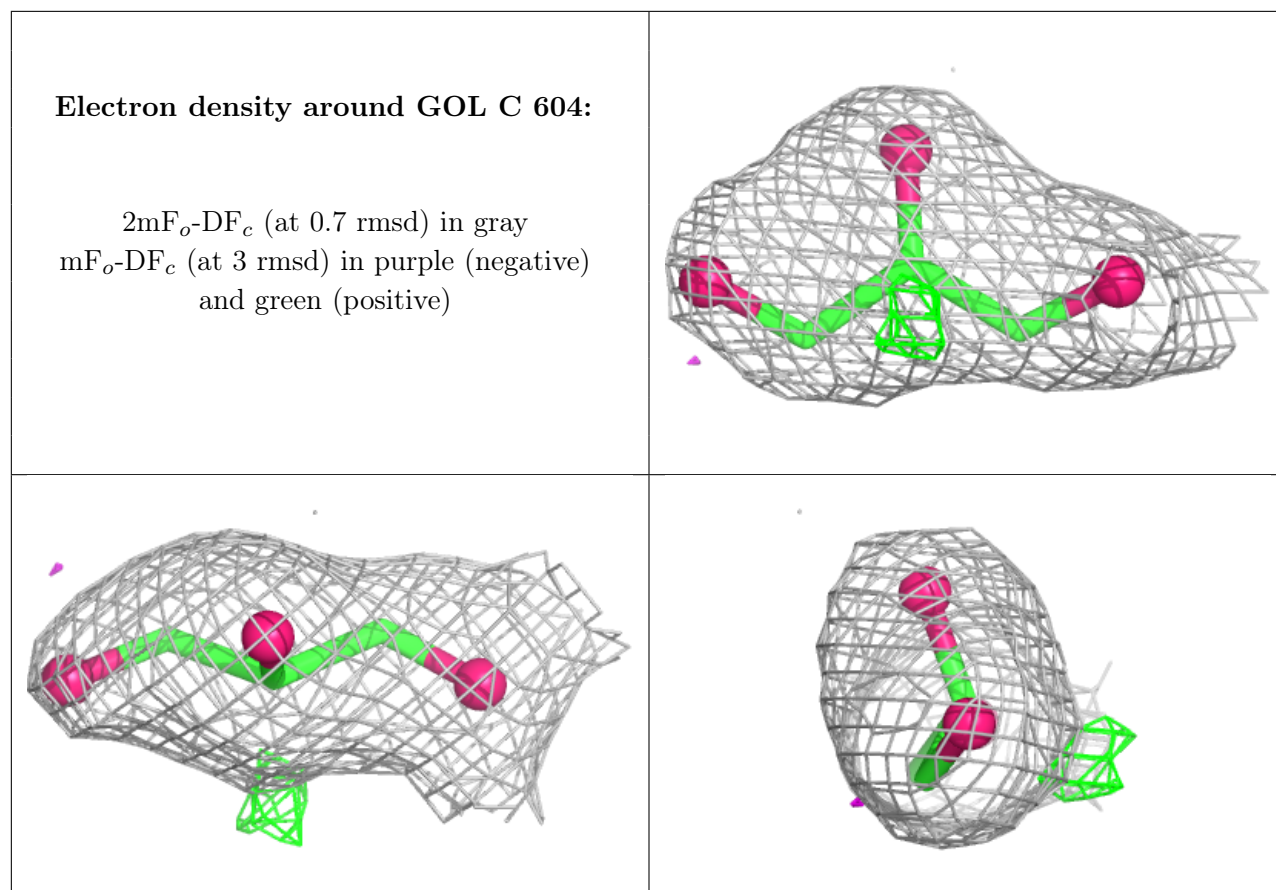
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and green (positive)



Electron density around GOL B 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.