



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 10:47 AM UTC

PDB ID : 6NNZ / pdb_00006nnz
Title : Crystal structure of Mycobacterium tuberculosis dethiobiotin synthetase in complex with fragment analogue 4
Authors : Thompson, A.P.; Polyak, S.W.; Wegener, K.L.; Bruning, J.B.
Deposited on : 2019-01-15
Resolution : 2.30 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

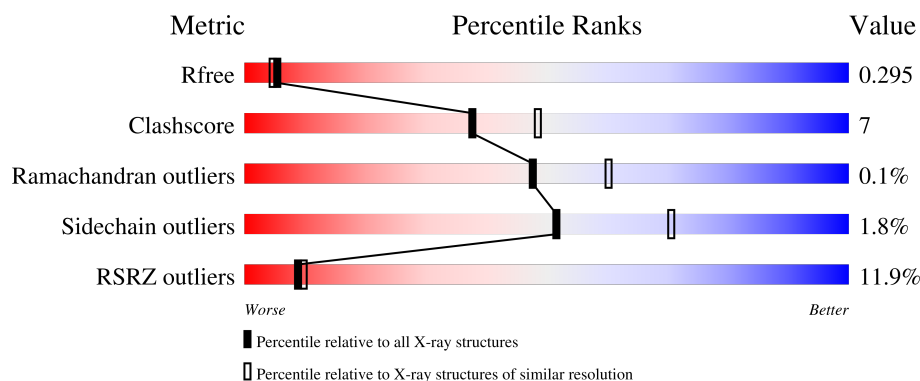
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.30 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	6319 (2.30-2.30)
Clashscore	190562	6919 (2.30-2.30)
Ramachandran outliers	187476	6854 (2.30-2.30)
Sidechain outliers	187428	6854 (2.30-2.30)
RSRZ outliers	180081	6325 (2.30-2.30)

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	233	
1	B	233	
1	C	233	
1	D	233	

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	KUD	D	301[A]	-	X	-	-
3	KUG	D	302[B]	-	X	-	-
4	SO4	A	304	-	-	X	-
4	SO4	B	303	-	-	X	-
4	SO4	C	304	-	-	X	-
4	SO4	D	303	-	-	X	-

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 6759 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 ATP-dependent dethiobiotin synthetase BioD.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	227	Total	C	N	O	S	0	1	0
			1577	984	286	300	7			
1	B	226	Total	C	N	O	S	0	3	0
			1589	990	287	304	8			
1	C	227	Total	C	N	O	S	0	1	0
			1575	983	285	300	7			
1	D	227	Total	C	N	O	S	0	1	0
			1576	984	283	302	7			

There are 32 discrepancies between the modelled and reference sequences:

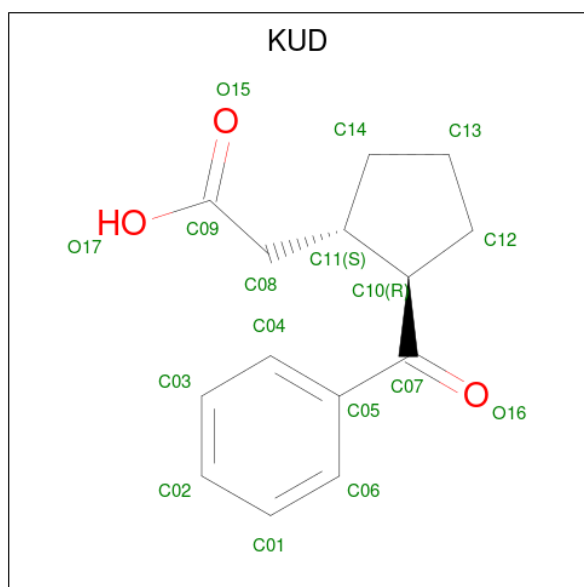
Chain	Residue	Modelled	Actual	Comment	Reference
A	-6	HIS	-	expression tag	UNP P9WPQ5
A	-5	HIS	-	expression tag	UNP P9WPQ5
A	-4	HIS	-	expression tag	UNP P9WPQ5
A	-3	HIS	-	expression tag	UNP P9WPQ5
A	-2	HIS	-	expression tag	UNP P9WPQ5
A	-1	HIS	-	expression tag	UNP P9WPQ5
A	0	GLY	-	expression tag	UNP P9WPQ5
A	1	GLY	-	expression tag	UNP P9WPQ5
B	-6	HIS	-	expression tag	UNP P9WPQ5
B	-5	HIS	-	expression tag	UNP P9WPQ5
B	-4	HIS	-	expression tag	UNP P9WPQ5
B	-3	HIS	-	expression tag	UNP P9WPQ5
B	-2	HIS	-	expression tag	UNP P9WPQ5
B	-1	HIS	-	expression tag	UNP P9WPQ5
B	0	GLY	-	expression tag	UNP P9WPQ5
B	1	GLY	-	expression tag	UNP P9WPQ5
C	-6	HIS	-	expression tag	UNP P9WPQ5
C	-5	HIS	-	expression tag	UNP P9WPQ5
C	-4	HIS	-	expression tag	UNP P9WPQ5
C	-3	HIS	-	expression tag	UNP P9WPQ5
C	-2	HIS	-	expression tag	UNP P9WPQ5

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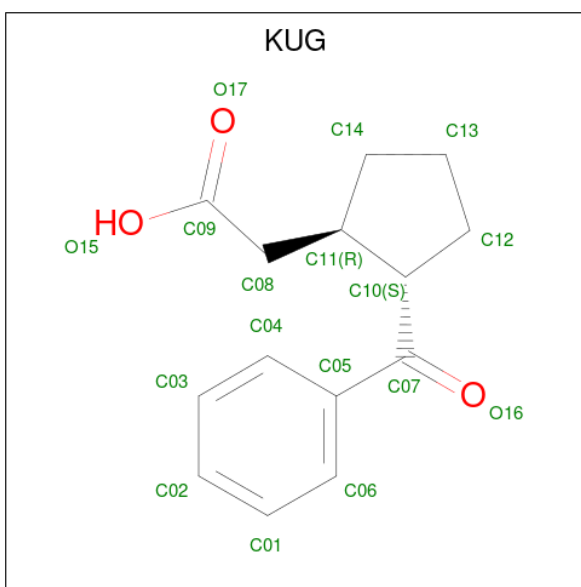
Chain	Residue	Modelled	Actual	Comment	Reference
C	-1	HIS	-	expression tag	UNP P9WPQ5
C	0	GLY	-	expression tag	UNP P9WPQ5
C	1	GLY	-	expression tag	UNP P9WPQ5
D	-6	HIS	-	expression tag	UNP P9WPQ5
D	-5	HIS	-	expression tag	UNP P9WPQ5
D	-4	HIS	-	expression tag	UNP P9WPQ5
D	-3	HIS	-	expression tag	UNP P9WPQ5
D	-2	HIS	-	expression tag	UNP P9WPQ5
D	-1	HIS	-	expression tag	UNP P9WPQ5
D	0	GLY	-	expression tag	UNP P9WPQ5
D	1	GLY	-	expression tag	UNP P9WPQ5

- Molecule 2 is [(1S,2R)-2-(benzenecarbonyl)cyclopentyl]acetic acid (CCD ID: KUD) (formula: C₁₄H₁₆O₃) (labeled as "Ligand of Interest" by depositor).



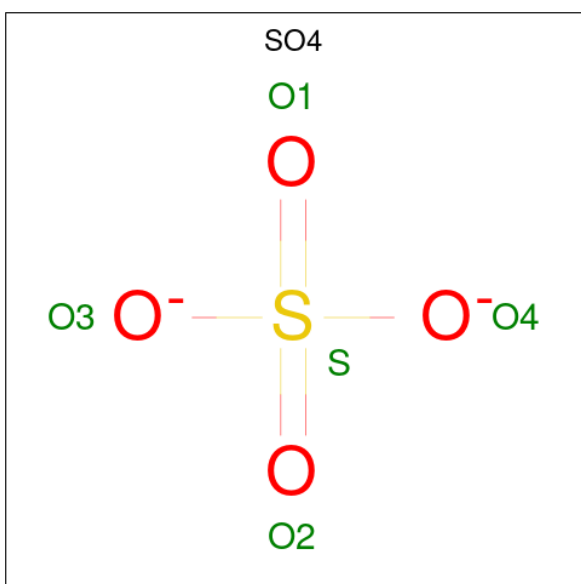
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	O	0	1
			17	14	3		
2	B	1	Total	C	O	0	1
			17	14	3		
2	C	1	Total	C	O	0	1
			17	14	3		
2	D	1	Total	C	O	0	1
			17	14	3		

- Molecule 3 is [(1R,2S)-2-(benzenecarbonyl)cyclopentyl]acetic acid (CCD ID: KUG) (formula: C₁₄H₁₆O₃) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	1
			17	14	3		
3	B	1	Total	C	O	0	1
			17	14	3		
3	C	1	Total	C	O	0	1
			17	14	3		
3	D	1	Total	C	O	0	1
			17	14	3		

- Molecule 4 is SULFATE ION (CCD ID: SO4) (formula: O₄S) (labeled as "Ligand of Interest" by depositor).



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

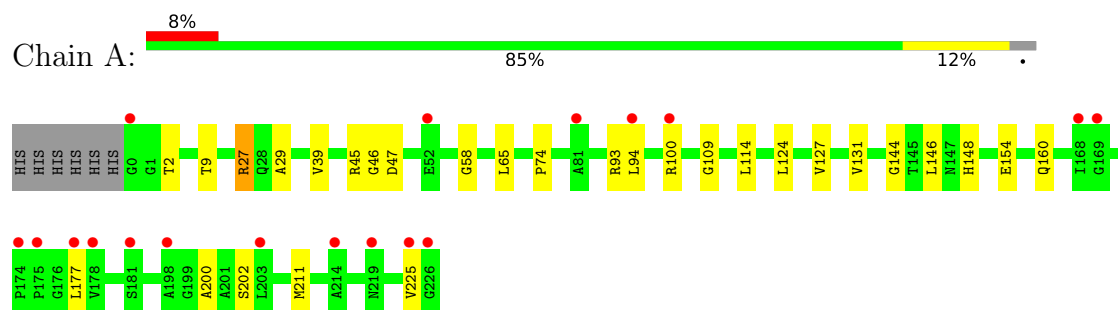
- Molecule 5 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	65	Total O 65 65	0	0
5	B	84	Total O 84 84	0	0
5	C	61	Total O 61 61	0	0
5	D	56	Total O 56 56	0	0

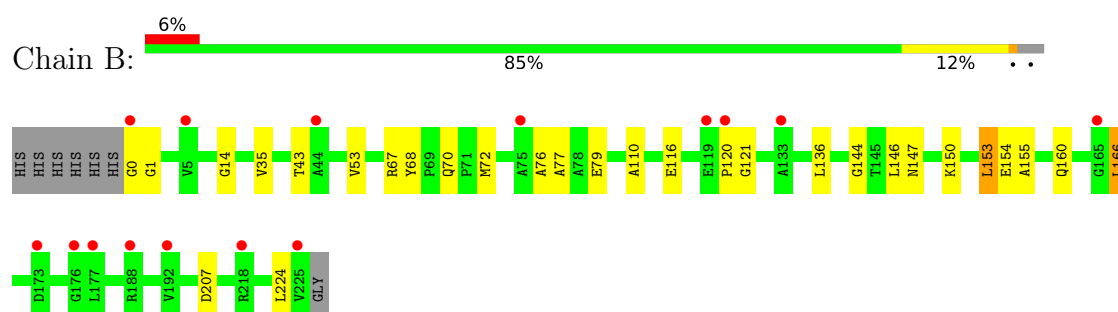
3 Residue-property plots [i](#)

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

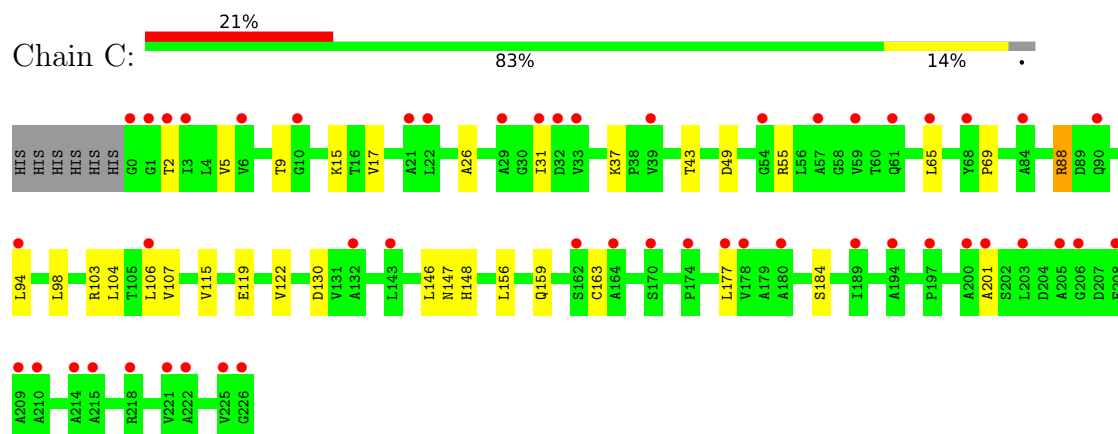
- Molecule 1: ATP-dependent dethiobiotin synthetase BioD



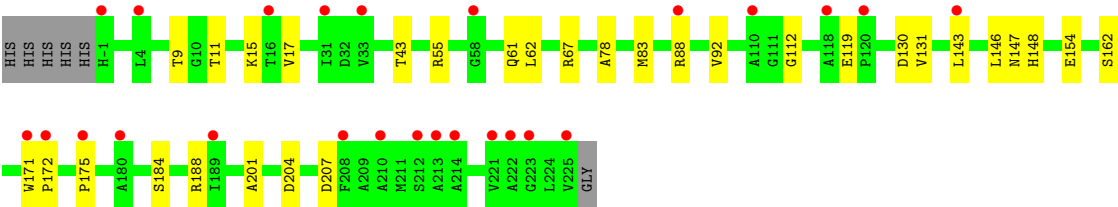
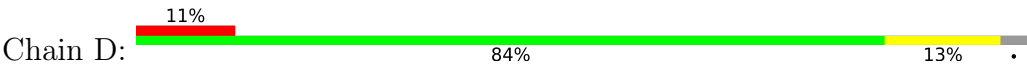
- Molecule 1: ATP-dependent dethiobiotin synthetase BioD



- Molecule 1: ATP-dependent dethiobiotin synthetase BioD



- Molecule 1: ATP-dependent dethiobiotin synthetase BioD



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	55.61Å 108.35Å 153.75Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	41.60 – 2.30 41.60 – 2.30	Depositor EDS
% Data completeness (in resolution range)	90.5 (41.60-2.30) 90.4 (41.60-2.30)	Depositor EDS
R_{merge}	0.20	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.50 (at 2.29Å)	Xtriage
Refinement program	PHENIX (1.11.1_2575)	Depositor
R, R_{free}	0.256 , 0.293 0.257 , 0.295	Depositor DCC
R_{free} test set	1918 reflections (4.55%)	wwPDB-VP
Wilson B-factor (Å ²)	39.5	Xtriage
Anisotropy	0.725	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 38.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.53$, $\langle L^2 \rangle = 0.38$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.91	EDS
Total number of atoms	6759	wwPDB-VP
Average B, all atoms (Å ²)	47.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.53% 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: KUD, SO4, KUG

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	0.45	0/1596	0.84	2/2183 (0.1%)
1	B	0.47	0/1608	0.83	1/2199 (0.0%)
1	C	0.45	0/1594	0.83	0/2180
1	D	0.48	0/1595	0.85	0/2183
All	All	0.46	0/6393	0.84	3/8745 (0.0%)

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	27	ARG	CG-CD-NE	-6.75	97.15	112.00
1	A	27	ARG	CA-CB-CG	-6.43	101.25	114.10
1	B	79	GLU	CA-CB-CG	5.19	124.48	114.10

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1577	0	1624	21	1
1	B	1589	0	1633	23	0
1	C	1575	0	1623	26	0
1	D	1576	0	1616	22	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	A	17	0	0	0	0
2	B	17	0	0	0	0
2	C	17	0	0	1	0
2	D	17	0	0	2	0
3	A	17	0	0	0	0
3	B	17	0	0	1	0
3	C	17	0	0	0	0
3	D	17	0	0	2	0
4	A	10	0	0	4	0
4	B	10	0	0	3	0
4	C	10	0	0	3	0
4	D	10	0	0	4	0
5	A	65	0	0	4	0
5	B	84	0	0	6	0
5	C	61	0	0	13	0
5	D	56	0	0	8	0
All	All	6759	0	6496	91	1

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 7.

All (91) 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:B:147:ASN:N	4:B:303:SO4:O3	1.96	0.97
1:C:147:ASN:N	4:C:304:SO4:O4	2.06	0.89
1:D:15:LYS:NZ	4:D:304:SO4:O4	2.05	0.89
1:A:146:LEU:N	4:A:304:SO4:O1	2.04	0.88
1:D:146:LEU:N	4:D:303:SO4:O2	2.10	0.84
1:D:62:LEU:O	5:D:401:HOH:O	1.97	0.83
1:C:2:THR:O	5:C:401:HOH:O	1.98	0.80
1:C:159:GLN:NE2	5:C:406:HOH:O	2.18	0.76
1:C:55:ARG:NH1	5:C:405:HOH:O	2.17	0.76
1:C:184:SER:OG	5:C:402:HOH:O	2.06	0.73
1:B:116:GLU:HG3	1:B:121:GLY:HA2	1.72	0.72
2:D:301[A]:KUD:O15	5:D:402:HOH:O	2.07	0.71
4:C:304:SO4:O2	5:C:403:HOH:O	2.08	0.71
1:A:146:LEU:HB2	4:A:304:SO4:O3	1.94	0.67
1:A:46:GLY:O	5:A:401:HOH:O	2.14	0.66
1:D:154[A]:GLU:OE2	5:D:403:HOH:O	2.14	0.65
1:A:65:LEU:HB2	1:A:94:LEU:HD22	1.79	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:115:VAL:O	5:C:404:HOH:O	2.14	0.64
1:D:55:ARG:NH1	5:D:406:HOH:O	2.30	0.64
1:B:70:GLN:HB3	1:B:72:MET:HE3	1.79	0.63
1:C:104:LEU:HD12	5:C:401:HOH:O	2.00	0.61
1:C:104:LEU:HA	5:C:401:HOH:O	2.00	0.60
3:D:302[B]:KUG:O17	5:D:402:HOH:O	2.16	0.60
1:B:116:GLU:HG2	5:B:420:HOH:O	2.02	0.60
1:B:207:ASP:OD2	5:B:401:HOH:O	2.15	0.59
1:D:78:ALA:HB1	1:D:83:MET:O	2.02	0.59
1:C:17:VAL:HG11	1:C:201:ALA:HB2	1.86	0.57
1:A:177:LEU:HD12	5:A:432:HOH:O	2.06	0.55
1:C:9:THR:HB	1:C:148:HIS:HB3	1.89	0.55
1:A:177:LEU:HG	1:B:72:MET:HE1	1.88	0.54
1:C:106:LEU:O	5:C:407:HOH:O	2.18	0.54
1:A:2:THR:OG1	1:A:225:VAL:HG12	2.07	0.54
1:B:144:GLY:HA2	4:B:303:SO4:O1	2.08	0.53
1:A:127:VAL:O	1:A:131:VAL:HG22	2.09	0.53
1:C:65:LEU:HB2	1:C:94:LEU:HD22	1.90	0.52
1:A:146:LEU:HB2	4:A:304:SO4:S	2.49	0.51
1:B:43:THR:HG21	1:B:67:ARG:HB3	1.91	0.51
1:D:61:GLN:NE2	5:D:409:HOH:O	2.39	0.51
1:D:43:THR:HG21	1:D:67:ARG:HB3	1.93	0.50
1:A:211:MET:HG2	5:A:412:HOH:O	2.11	0.50
1:C:146:LEU:HB2	4:C:304:SO4:S	2.52	0.50
1:C:43:THR:OG1	1:C:69:PRO:HA	2.12	0.50
1:C:15:LYS:NZ	2:C:301[A]:KUD:O15	2.42	0.49
1:D:88:ARG:NH2	1:D:130:ASP:OD2	2.45	0.49
1:A:9:THR:HB	1:A:148:HIS:HB3	1.95	0.48
1:D:146:LEU:HB2	4:D:303:SO4:O4	2.13	0.48
1:D:17:VAL:HG11	1:D:201:ALA:HB2	1.94	0.48
1:A:200:ALA:HB1	1:A:211:MET:HE2	1.96	0.48
1:A:39:VAL:HG11	1:A:74:PRO:HB3	1.95	0.48
1:D:88:ARG:HH21	1:D:130:ASP:CG	2.22	0.47
1:C:119:GLU:HG3	5:C:460:HOH:O	2.14	0.47
1:D:92:VAL:HG13	1:D:131:VAL:CG1	2.46	0.46
1:C:37:LYS:NZ	1:C:49:ASP:OD2	2.49	0.46
1:A:27:ARG:HH12	1:A:58:GLY:C	2.23	0.45
1:B:14:GLY:HA2	5:B:462:HOH:O	2.16	0.45
1:C:98:LEU:O	1:C:103:ARG:HD2	2.17	0.44
1:A:45:ARG:NH1	1:A:47:ASP:OD2	2.49	0.44
2:D:301[A]:KUD:C09	2:D:301[A]:KUD:O16	2.66	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:163:CYS:O	5:C:408:HOH:O	2.21	0.44
1:D:172:PRO:HG2	1:D:175:PRO:HA	2.00	0.44
1:B:1:GLY:O	5:B:402:HOH:O	2.21	0.44
1:C:107:VAL:HG22	5:C:407:HOH:O	2.17	0.44
1:B:68:TYR:HB3	1:B:77:ALA:HB1	2.00	0.43
1:B:72:MET:HB3	1:B:76:ALA:HB3	2.00	0.43
1:A:109:GLY:HA3	1:A:124:LEU:HD22	2.01	0.43
1:B:110:ALA:HB1	3:B:302[B]:KUG:O16	2.19	0.43
1:D:171:TRP:CE3	1:D:172:PRO:HD2	2.53	0.43
1:C:88:ARG:HG3	1:C:122:VAL:HG11	1.99	0.43
1:C:177:LEU:HG	5:C:412:HOH:O	2.18	0.43
1:C:88:ARG:NH2	1:C:130:ASP:OD2	2.51	0.43
1:B:154[B]:GLU:HG3	5:B:423:HOH:O	2.19	0.42
1:B:35:VAL:HG21	1:B:53:VAL:HG11	2.02	0.42
1:D:15:LYS:HD2	5:D:424:HOH:O	2.18	0.42
1:B:153:LEU:HD11	1:B:166:LEU:HD21	2.02	0.42
1:D:147:ASN:N	4:D:303:SO4:O2	2.44	0.42
1:C:156:LEU:HA	1:C:156:LEU:HD23	1.83	0.42
1:B:224:LEU:HD23	1:B:224:LEU:HA	1.65	0.42
1:D:11:THR:OG1	3:D:302[B]:KUG:O16	2.31	0.42
1:A:114:LEU:HB3	1:B:150:LYS:HE2	2.02	0.41
1:A:177:LEU:HG	1:B:72:MET:CE	2.50	0.41
1:C:147:ASN:ND2	1:D:112:GLY:HA3	2.35	0.41
1:B:0:GLY:N	5:B:417:HOH:O	2.49	0.41
1:D:204:ASP:OD1	1:D:207:ASP:HB2	2.20	0.41
1:A:154[A]:GLU:OE1	1:B:155:ALA:HA	2.21	0.41
1:B:146:LEU:N	4:B:303:SO4:O3	2.54	0.41
1:C:26:ALA:HB1	1:C:31:ILE:HB	2.02	0.41
1:D:9:THR:HB	1:D:148:HIS:HB3	2.02	0.41
1:A:160:GLN:HG2	5:A:461:HOH:O	2.21	0.40
1:B:136:LEU:HD12	1:B:136:LEU:HA	1.87	0.40
1:A:144:GLY:C	4:A:304:SO4:O1	2.64	0.40
1:D:188:ARG:NH2	5:D:417:HOH:O	2.54	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:29:ALA:O	1:A:93:ARG:NH1[4_575]	1.86	0.34

5.3 Torsion angles

5.3.1 Protein backbone

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	226/233 (97%)	223 (99%)	3 (1%)	0	100	100
1	B	227/233 (97%)	223 (98%)	3 (1%)	1 (0%)	30	38
1	C	226/233 (97%)	222 (98%)	4 (2%)	0	100	100
1	D	226/233 (97%)	223 (99%)	3 (1%)	0	100	100
All	All	905/932 (97%)	891 (98%)	13 (1%)	1 (0%)	48	60

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	120	PRO

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	151/157 (96%)	149 (99%)	2 (1%)	61	77
1	B	154/157 (98%)	151 (98%)	3 (2%)	50	69
1	C	151/157 (96%)	149 (99%)	2 (1%)	61	77
1	D	151/157 (96%)	147 (97%)	4 (3%)	40	59
All	All	607/628 (97%)	596 (98%)	11 (2%)	51	70

All (11) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	100	ARG
1	A	202	SER
1	B	153	LEU
1	B	160	GLN
1	B	166	LEU
1	C	5	VAL
1	C	88	ARG
1	D	119	GLU
1	D	143	LEU
1	D	162	SER
1	D	184	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	148	HIS
1	B	61	GLN
1	C	148	HIS
1	D	61	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

16 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
3	KUG	B	302[B]	-	18,18,18	5.52	12 (66%)	22,24,24	1.90	9 (40%)
2	KUD	B	301[A]	-	18,18,18	5.43	12 (66%)	22,24,24	1.71	7 (31%)
3	KUG	D	302[B]	-	18,18,18	5.65	13 (72%)	22,24,24	2.20	6 (27%)
4	SO4	A	304	-	4,4,4	0.25	0	6,6,6	1.56	1 (16%)
4	SO4	B	303	-	4,4,4	0.46	0	6,6,6	1.06	1 (16%)
4	SO4	C	303	-	4,4,4	0.28	0	6,6,6	0.31	0
4	SO4	C	304	-	4,4,4	0.31	0	6,6,6	0.67	0
2	KUD	C	301[A]	-	18,18,18	5.48	11 (61%)	22,24,24	2.13	9 (40%)
4	SO4	B	304	-	4,4,4	0.24	0	6,6,6	0.18	0
3	KUG	C	302[B]	-	18,18,18	5.73	13 (72%)	22,24,24	1.61	5 (22%)
2	KUD	A	301[A]	-	18,18,18	5.43	12 (66%)	22,24,24	1.57	6 (27%)
4	SO4	D	303	-	4,4,4	0.30	0	6,6,6	0.94	0
4	SO4	A	303	-	4,4,4	0.31	0	6,6,6	0.41	0
4	SO4	D	304	-	4,4,4	0.37	0	6,6,6	0.51	0
3	KUG	A	302[B]	-	18,18,18	5.54	13 (72%)	22,24,24	1.58	3 (13%)
2	KUD	D	301[A]	-	18,18,18	5.62	12 (66%)	22,24,24	3.10	7 (31%)

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
3	KUG	B	302[B]	-	-	4/12/22/22	0/2/2/2
2	KUD	B	301[A]	-	-	2/12/22/22	0/2/2/2
3	KUG	D	302[B]	-	-	9/12/22/22	0/2/2/2
2	KUD	C	301[A]	-	-	1/12/22/22	0/2/2/2
3	KUG	C	302[B]	-	-	3/12/22/22	0/2/2/2
2	KUD	A	301[A]	-	-	2/12/22/22	0/2/2/2
3	KUG	A	302[B]	-	-	4/12/22/22	0/2/2/2
2	KUD	D	301[A]	-	-	9/12/22/22	0/2/2/2

All (98) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	301[A]	KUD	C10-C11	-9.66	1.31	1.54
2	C	301[A]	KUD	C10-C11	-9.63	1.32	1.54
3	C	302[B]	KUG	C10-C11	-9.41	1.32	1.54
3	A	302[B]	KUG	C10-C11	-9.37	1.32	1.54
3	C	302[B]	KUG	C04-C05	9.34	1.53	1.39
3	B	302[B]	KUG	C10-C11	-9.30	1.32	1.54
2	D	301[A]	KUD	C10-C11	-9.16	1.33	1.54
3	D	302[B]	KUG	C10-C11	-9.15	1.33	1.54
2	B	301[A]	KUD	C10-C11	-9.12	1.33	1.54
2	C	301[A]	KUD	C04-C05	9.08	1.53	1.39
3	D	302[B]	KUG	C04-C05	8.88	1.52	1.39
3	C	302[B]	KUG	C06-C05	8.80	1.52	1.39
2	B	301[A]	KUD	C04-C05	8.63	1.52	1.39
3	D	302[B]	KUG	C06-C05	8.63	1.52	1.39
3	A	302[B]	KUG	C04-C05	8.54	1.52	1.39
2	D	301[A]	KUD	C04-C05	8.54	1.52	1.39
2	D	301[A]	KUD	C06-C05	8.53	1.52	1.39
3	B	302[B]	KUG	C04-C05	8.48	1.52	1.39
2	A	301[A]	KUD	C04-C05	8.46	1.52	1.39
3	B	302[B]	KUG	C06-C05	8.27	1.51	1.39
3	A	302[B]	KUG	C06-C05	8.22	1.51	1.39
3	C	302[B]	KUG	C03-C04	8.21	1.52	1.38
3	D	302[B]	KUG	C03-C04	8.19	1.52	1.38
2	C	301[A]	KUD	C06-C05	8.11	1.51	1.39
3	A	302[B]	KUG	C03-C04	8.07	1.52	1.38
2	B	301[A]	KUD	C06-C05	8.03	1.51	1.39
2	A	301[A]	KUD	C06-C05	7.98	1.51	1.39
3	B	302[B]	KUG	C03-C04	7.98	1.52	1.38
2	D	301[A]	KUD	C03-C04	7.93	1.52	1.38
3	D	302[B]	KUG	C01-C06	7.91	1.52	1.38
2	B	301[A]	KUD	C03-C04	7.80	1.52	1.38
2	A	301[A]	KUD	C03-C04	7.74	1.52	1.38
3	C	302[B]	KUG	C01-C06	7.71	1.52	1.38
2	C	301[A]	KUD	C03-C04	7.70	1.52	1.38
2	D	301[A]	KUD	C01-C06	7.69	1.52	1.38
2	B	301[A]	KUD	C01-C06	7.63	1.51	1.38
3	B	302[B]	KUG	C01-C06	7.53	1.51	1.38
2	C	301[A]	KUD	C01-C06	7.21	1.51	1.38
2	A	301[A]	KUD	C01-C06	7.18	1.51	1.38
3	A	302[B]	KUG	C14-C11	7.16	1.71	1.53
3	A	302[B]	KUG	C01-C06	7.11	1.51	1.38
2	D	301[A]	KUD	C14-C11	7.08	1.71	1.53
3	B	302[B]	KUG	C14-C11	7.06	1.71	1.53

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	302[B]	KUG	C14-C11	7.04	1.71	1.53
3	D	302[B]	KUG	C14-C11	6.93	1.71	1.53
2	A	301[A]	KUD	C14-C11	6.91	1.71	1.53
2	B	301[A]	KUD	C14-C11	6.87	1.71	1.53
2	C	301[A]	KUD	C14-C11	6.85	1.71	1.53
2	D	301[A]	KUD	C02-C01	6.70	1.53	1.38
3	D	302[B]	KUG	C02-C01	6.68	1.52	1.38
3	C	302[B]	KUG	C02-C01	6.58	1.52	1.38
3	D	302[B]	KUG	C03-C02	6.44	1.52	1.38
2	D	301[A]	KUD	C03-C02	6.37	1.52	1.38
2	C	301[A]	KUD	C02-C01	6.34	1.52	1.38
3	C	302[B]	KUG	C03-C02	6.31	1.52	1.38
2	C	301[A]	KUD	C03-C02	6.30	1.52	1.38
3	A	302[B]	KUG	C03-C02	6.29	1.52	1.38
3	B	302[B]	KUG	C03-C02	6.16	1.51	1.38
3	B	302[B]	KUG	C02-C01	6.14	1.51	1.38
2	A	301[A]	KUD	C03-C02	6.13	1.51	1.38
2	A	301[A]	KUD	C02-C01	6.12	1.51	1.38
3	A	302[B]	KUG	C02-C01	6.09	1.51	1.38
2	B	301[A]	KUD	C02-C01	6.05	1.51	1.38
2	B	301[A]	KUD	C03-C02	5.96	1.51	1.38
3	A	302[B]	KUG	C12-C10	5.36	1.65	1.54
2	B	301[A]	KUD	C12-C10	5.25	1.64	1.54
2	A	301[A]	KUD	C12-C10	5.17	1.64	1.54
2	D	301[A]	KUD	C12-C10	5.06	1.64	1.54
3	B	302[B]	KUG	C12-C10	5.03	1.64	1.54
2	C	301[A]	KUD	C12-C10	4.98	1.64	1.54
3	C	302[B]	KUG	C12-C10	4.89	1.64	1.54
3	D	302[B]	KUG	C12-C10	4.85	1.64	1.54
2	D	301[A]	KUD	C10-C07	4.69	1.58	1.52
2	C	301[A]	KUD	C13-C14	-4.02	1.35	1.51
3	D	302[B]	KUG	C13-C14	-4.00	1.35	1.51
2	A	301[A]	KUD	C13-C14	-3.90	1.36	1.51
3	A	302[B]	KUG	C10-C07	3.89	1.57	1.52
2	B	301[A]	KUD	C13-C14	-3.86	1.36	1.51
2	D	301[A]	KUD	C13-C14	-3.83	1.36	1.51
3	A	302[B]	KUG	C13-C14	-3.81	1.36	1.51
3	C	302[B]	KUG	C13-C14	-3.80	1.36	1.51
3	B	302[B]	KUG	C13-C14	-3.74	1.36	1.51
3	C	302[B]	KUG	C10-C07	3.69	1.57	1.52
3	B	302[B]	KUG	C10-C07	3.63	1.57	1.52
3	C	302[B]	KUG	C05-C07	3.58	1.54	1.49

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	D	302[B]	KUG	C10-C07	3.25	1.56	1.52
3	D	302[B]	KUG	O16-C07	-3.23	1.18	1.22
2	B	301[A]	KUD	C10-C07	3.13	1.56	1.52
3	B	302[B]	KUG	O16-C07	-2.89	1.18	1.22
2	D	301[A]	KUD	O16-C07	-2.81	1.18	1.22
2	A	301[A]	KUD	O16-C07	-2.62	1.18	1.22
2	A	301[A]	KUD	C10-C07	2.58	1.55	1.52
3	A	302[B]	KUG	C05-C07	2.45	1.52	1.49
3	A	302[B]	KUG	O16-C07	-2.44	1.19	1.22
2	B	301[A]	KUD	O16-C07	-2.37	1.19	1.22
3	C	302[B]	KUG	O16-C07	-2.37	1.19	1.22
2	C	301[A]	KUD	C10-C07	2.26	1.55	1.52
3	D	302[B]	KUG	C05-C07	2.02	1.52	1.49

All (54) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	301[A]	KUD	C05-C07-C10	8.70	129.03	119.53
2	D	301[A]	KUD	O16-C07-C05	-8.64	109.97	120.70
3	D	302[B]	KUG	C05-C07-C10	6.29	126.39	119.53
3	B	302[B]	KUG	C05-C07-C10	4.89	124.86	119.53
3	D	302[B]	KUG	O16-C07-C05	-4.50	115.11	120.70
3	A	302[B]	KUG	C05-C07-C10	4.32	124.24	119.53
2	C	301[A]	KUD	C01-C06-C05	-4.04	116.39	120.36
2	B	301[A]	KUD	C01-C06-C05	-3.95	116.48	120.36
2	C	301[A]	KUD	C05-C07-C10	-3.93	115.25	119.53
2	C	301[A]	KUD	C12-C10-C07	-3.89	104.29	111.18
2	D	301[A]	KUD	C01-C06-C05	-3.68	116.75	120.36
2	A	301[A]	KUD	C05-C07-C10	-3.60	115.60	119.53
2	C	301[A]	KUD	C02-C03-C04	-3.57	115.84	120.24
3	D	302[B]	KUG	C01-C06-C05	-3.46	116.96	120.36
2	B	301[A]	KUD	C05-C07-C10	-3.29	115.94	119.53
3	C	302[B]	KUG	C05-C07-C10	3.12	122.94	119.53
2	D	301[A]	KUD	C14-C11-C10	-3.11	98.98	103.36
3	A	302[B]	KUG	O16-C07-C05	-2.93	117.05	120.70
2	C	301[A]	KUD	C06-C05-C04	2.93	122.29	118.57
4	A	304	SO4	O4-S-O1	-2.88	94.51	109.56
2	D	301[A]	KUD	C06-C05-C04	2.85	122.19	118.57
3	C	302[B]	KUG	C14-C11-C08	-2.71	108.36	113.41
2	B	301[A]	KUD	C06-C05-C04	2.67	121.96	118.57
3	B	302[B]	KUG	O16-C07-C05	-2.65	117.41	120.70
3	C	302[B]	KUG	C02-C03-C04	-2.63	117.00	120.24

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	301[A]	KUD	C12-C10-C07	-2.59	106.58	111.18
3	C	302[B]	KUG	O16-C07-C10	-2.56	117.21	120.38
2	D	301[A]	KUD	C14-C11-C08	-2.54	108.69	113.41
2	D	301[A]	KUD	C12-C10-C07	2.53	115.67	111.18
2	C	301[A]	KUD	O17-C09-C08	2.52	121.84	114.00
2	B	301[A]	KUD	C12-C10-C07	-2.44	106.85	111.18
3	C	302[B]	KUG	O15-C09-C08	2.41	121.49	114.00
3	B	302[B]	KUG	C14-C11-C10	-2.35	100.05	103.36
3	B	302[B]	KUG	O15-C09-C08	2.35	121.31	114.00
3	B	302[B]	KUG	O15-C09-O17	-2.35	117.30	123.33
2	A	301[A]	KUD	C14-C11-C08	-2.34	109.05	113.41
4	B	303	SO4	O3-S-O1	-2.32	97.45	109.56
3	B	302[B]	KUG	C06-C05-C04	2.30	121.50	118.57
3	B	302[B]	KUG	C13-C12-C10	-2.27	100.29	104.92
2	A	301[A]	KUD	C06-C05-C04	2.27	121.45	118.57
3	D	302[B]	KUG	C14-C11-C08	-2.26	109.21	113.41
3	D	302[B]	KUG	C06-C05-C04	2.25	121.42	118.57
2	C	301[A]	KUD	O17-C09-O15	-2.23	117.59	123.33
2	B	301[A]	KUD	O17-C09-C08	2.22	120.90	114.00
2	A	301[A]	KUD	C01-C06-C05	-2.21	118.20	120.36
2	A	301[A]	KUD	O16-C07-C05	2.20	123.43	120.70
3	A	302[B]	KUG	O15-C09-C08	2.19	120.82	114.00
3	B	302[B]	KUG	C01-C06-C05	-2.18	118.22	120.36
3	D	302[B]	KUG	C12-C10-C07	-2.18	107.32	111.18
3	B	302[B]	KUG	O16-C07-C10	-2.14	117.73	120.38
2	C	301[A]	KUD	C03-C02-C01	2.10	122.75	119.87
2	B	301[A]	KUD	O17-C09-O15	-2.09	117.95	123.33
2	C	301[A]	KUD	C14-C11-C08	-2.05	109.59	113.41
2	B	301[A]	KUD	C02-C03-C04	-2.04	117.73	120.24

There are no chirality outliers.

All (34) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	D	301[A]	KUD	O16-C07-C10-C12
2	D	301[A]	KUD	C05-C07-C10-C12
2	D	301[A]	KUD	C04-C05-C07-O16
2	D	301[A]	KUD	C04-C05-C07-C10
2	D	301[A]	KUD	C06-C05-C07-C10
3	A	302[B]	KUG	O16-C07-C10-C12
3	B	302[B]	KUG	O16-C07-C10-C12
3	D	302[B]	KUG	C04-C05-C07-C10

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Mol	Chain	Res	Type	Atoms
3	D	302[B]	KUG	C06-C05-C07-C10
3	D	302[B]	KUG	C05-C07-C10-C12
2	D	301[A]	KUD	C06-C05-C07-O16
3	D	302[B]	KUG	C06-C05-C07-O16
3	D	302[B]	KUG	C04-C05-C07-O16
3	C	302[B]	KUG	C05-C07-C10-C12
3	A	302[B]	KUG	C05-C07-C10-C11
3	B	302[B]	KUG	C05-C07-C10-C11
3	A	302[B]	KUG	C05-C07-C10-C12
3	B	302[B]	KUG	C05-C07-C10-C12
2	A	301[A]	KUD	C11-C08-C09-O15
2	A	301[A]	KUD	C11-C08-C09-O17
3	D	302[B]	KUG	C11-C08-C09-O15
2	D	301[A]	KUD	C11-C08-C09-O17
3	D	302[B]	KUG	C11-C08-C09-O17
3	C	302[B]	KUG	O16-C07-C10-C12
3	D	302[B]	KUG	O16-C07-C10-C12
2	B	301[A]	KUD	C11-C08-C09-O17
2	D	301[A]	KUD	C11-C08-C09-O15
2	C	301[A]	KUD	C09-C08-C11-C10
2	D	301[A]	KUD	C09-C08-C11-C10
3	C	302[B]	KUG	C09-C08-C11-C10
3	D	302[B]	KUG	C09-C08-C11-C10
2	B	301[A]	KUD	C11-C08-C09-O15
3	A	302[B]	KUG	O16-C07-C10-C11
3	B	302[B]	KUG	O16-C07-C10-C11

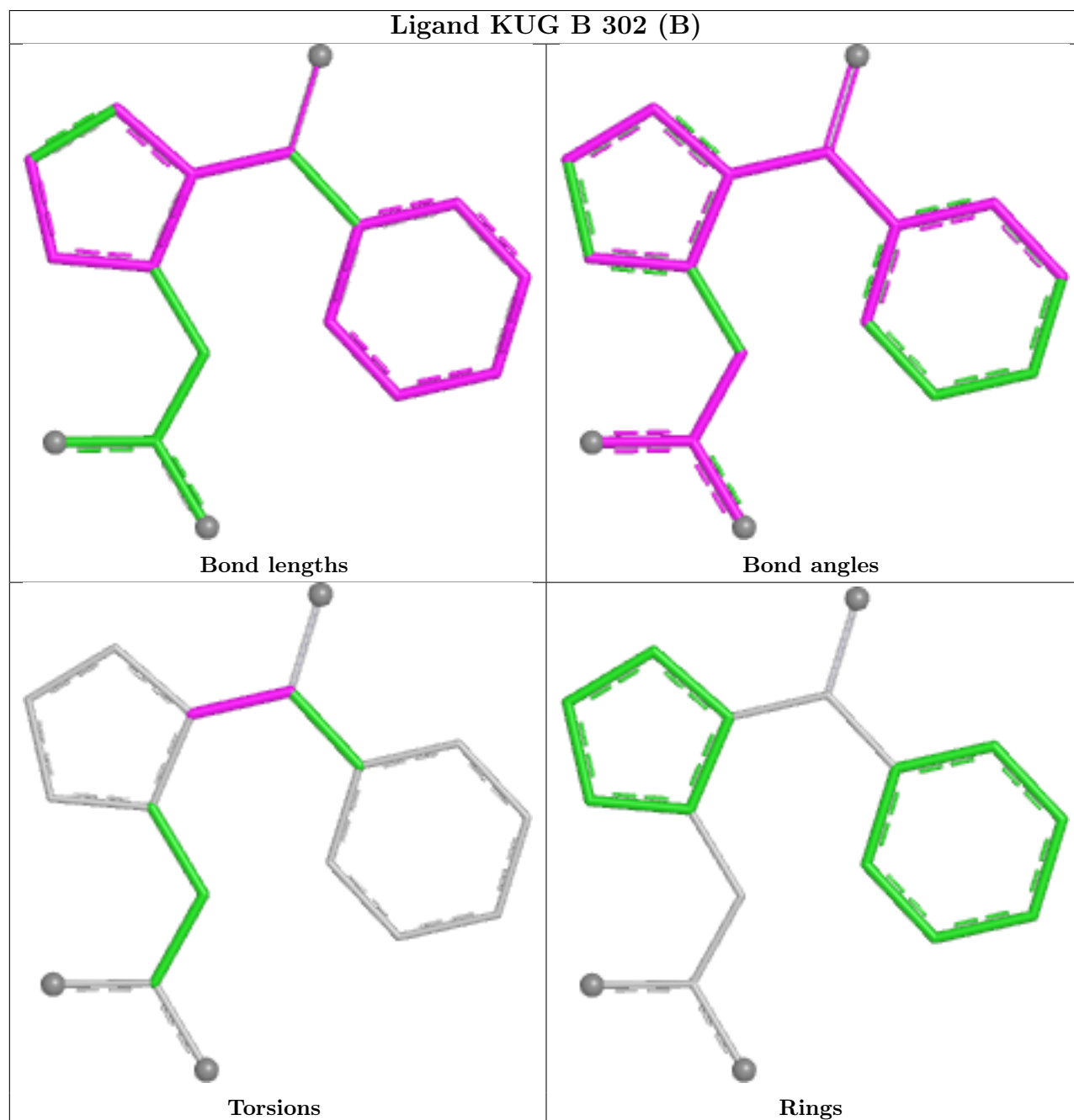
There are no ring outliers.

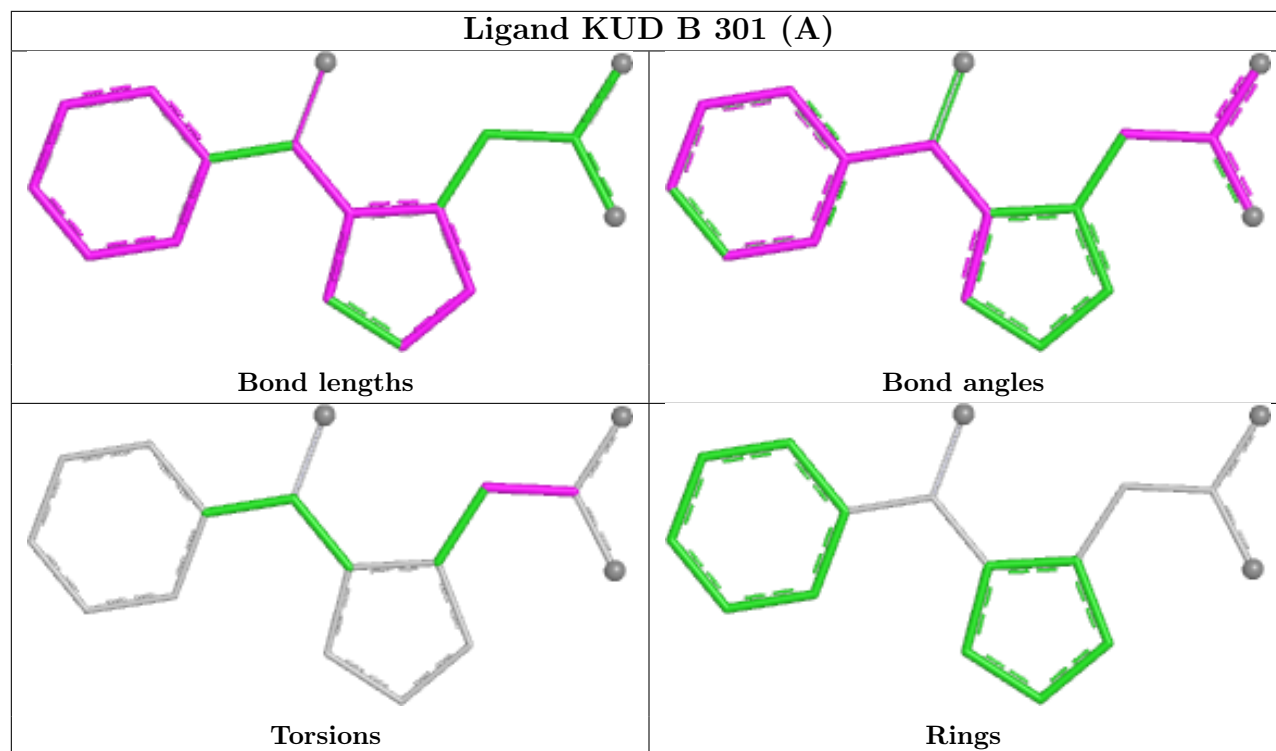
9 monomers are involved in 20 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	302[B]	KUG	1	0
3	D	302[B]	KUG	2	0
4	A	304	SO4	4	0
4	B	303	SO4	3	0
4	C	304	SO4	3	0
2	C	301[A]	KUD	1	0
4	D	303	SO4	3	0
4	D	304	SO4	1	0
2	D	301[A]	KUD	2	0

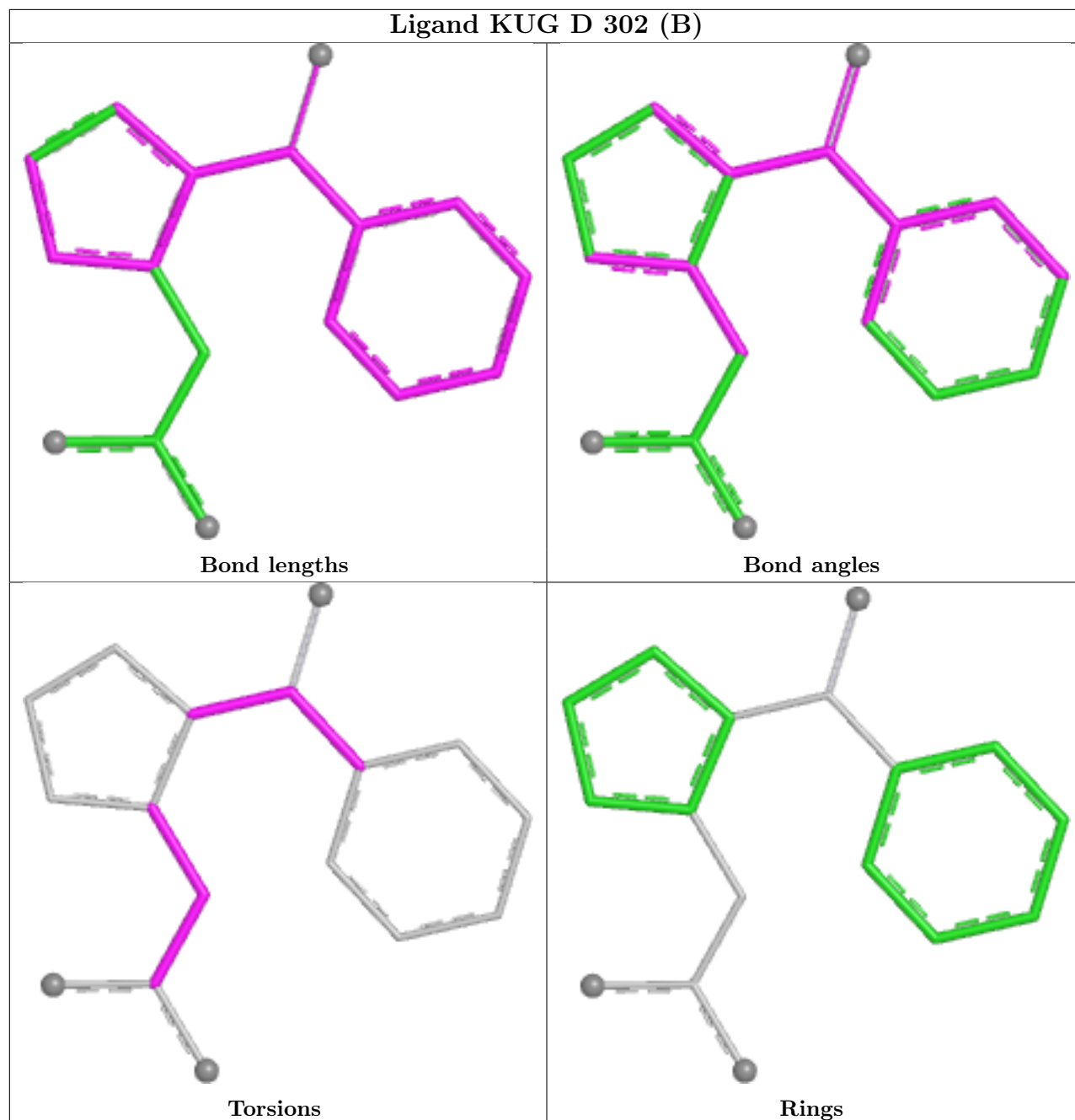
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths,

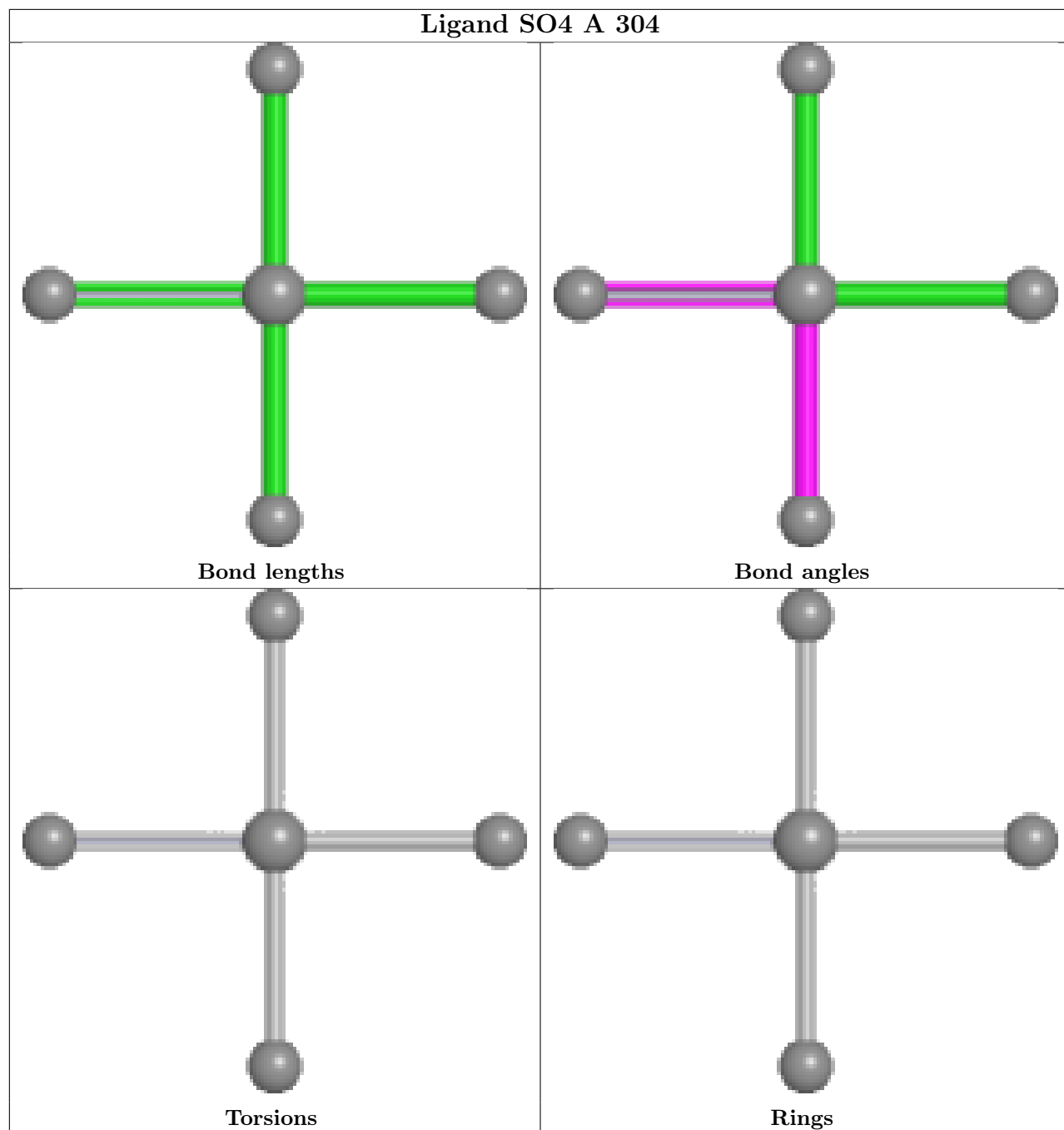
bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within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

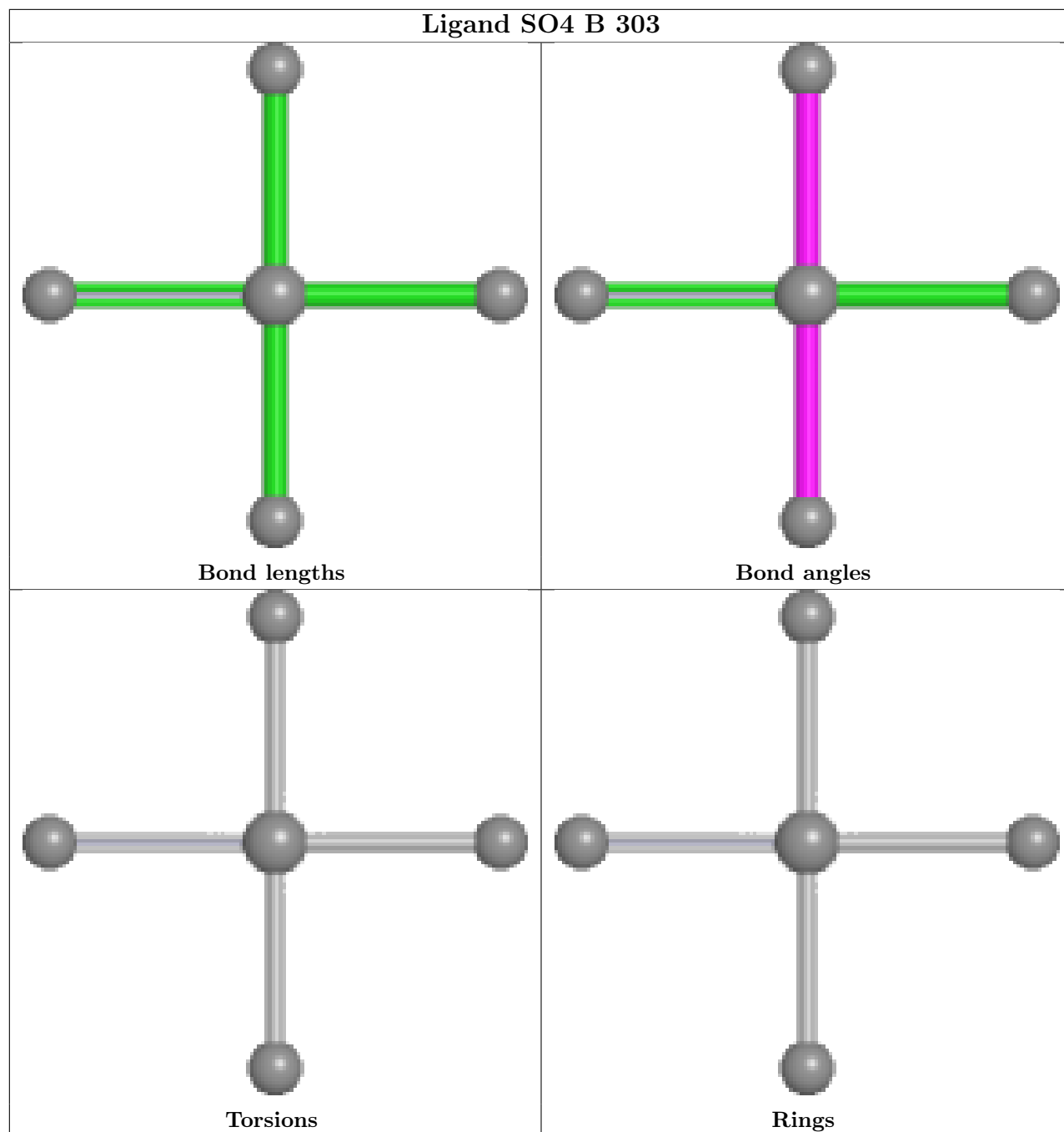


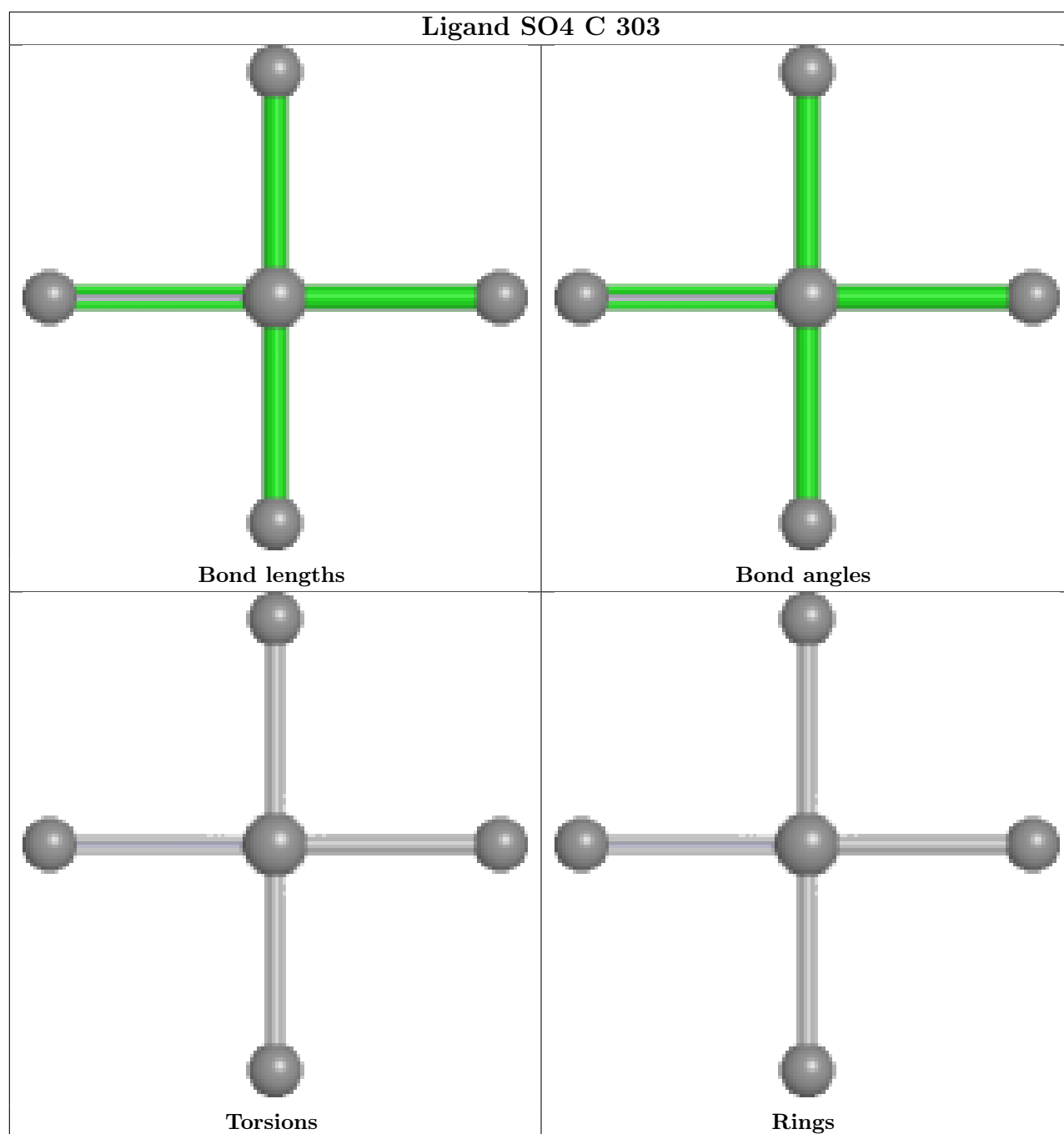


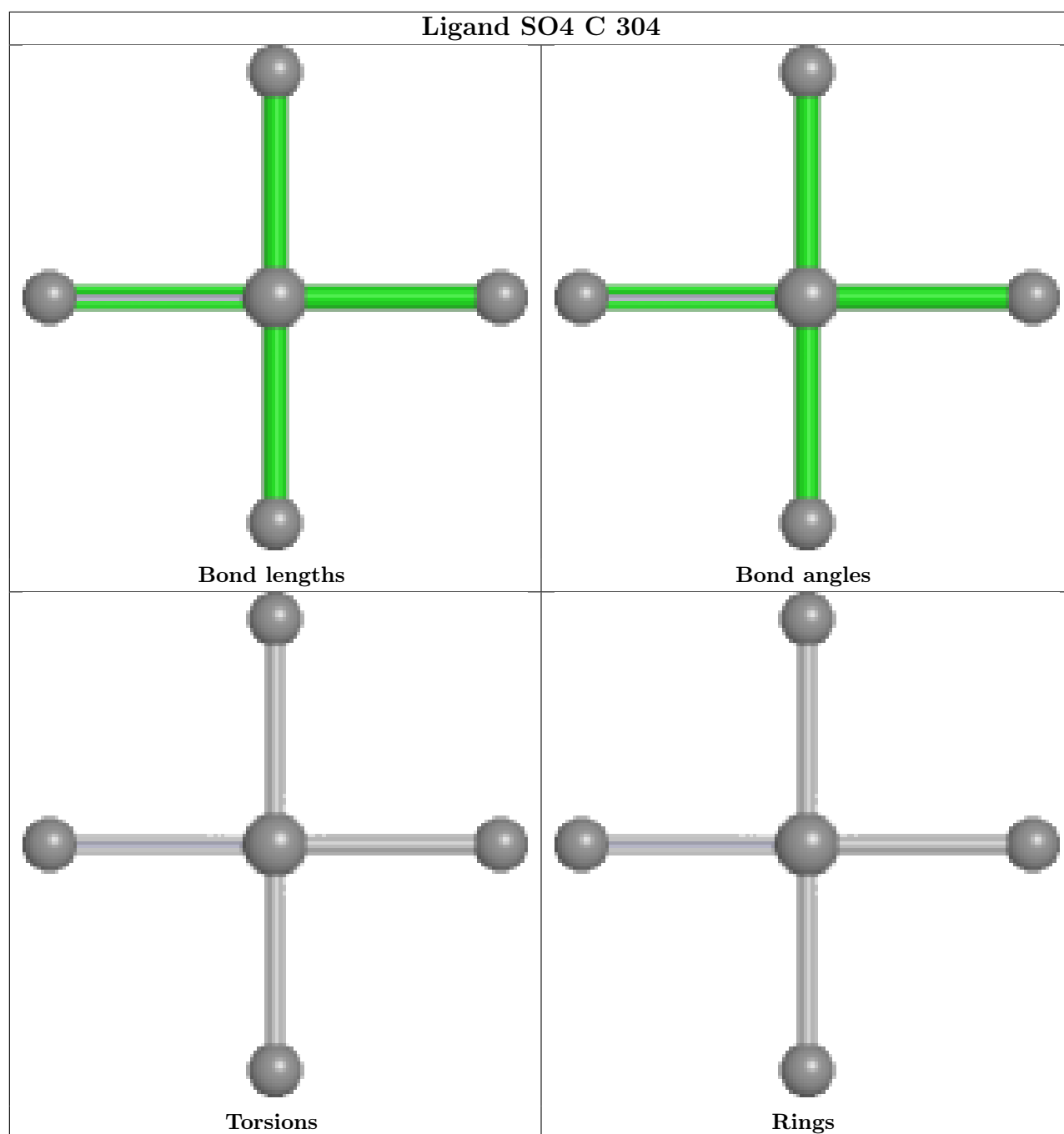
Ligand KUG D 302 (B)

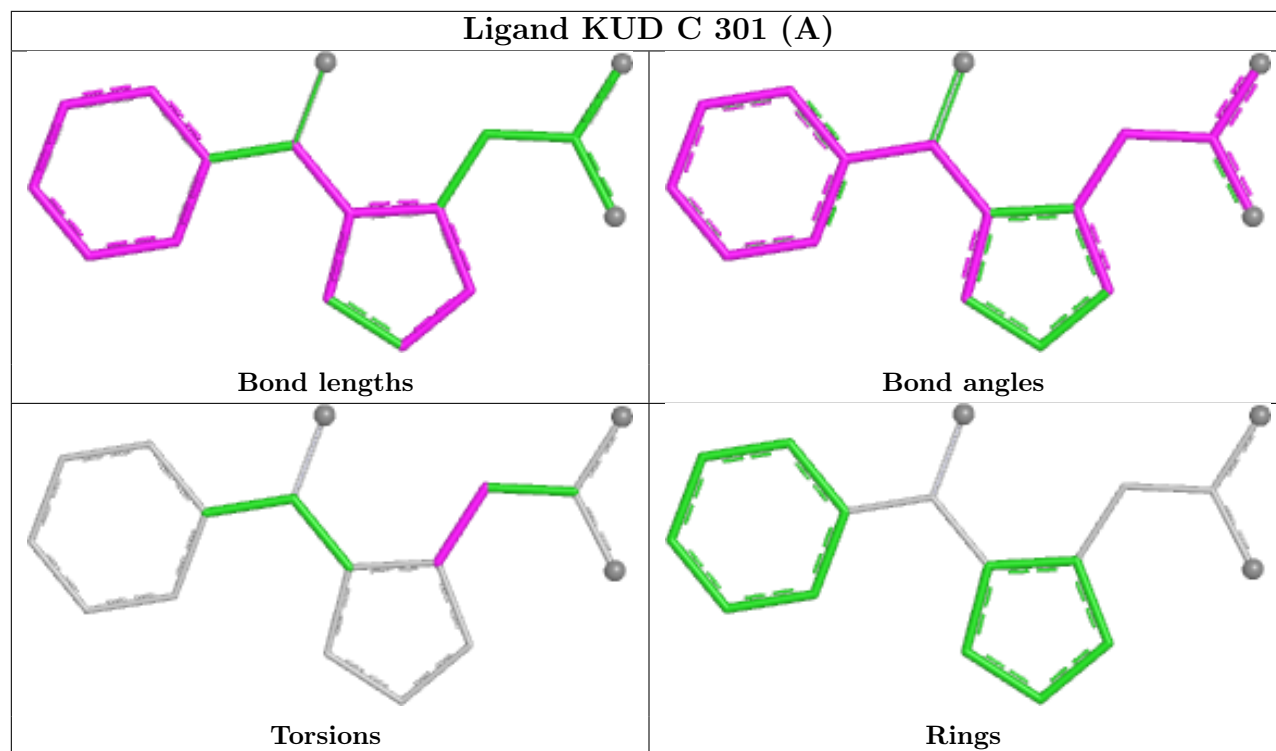


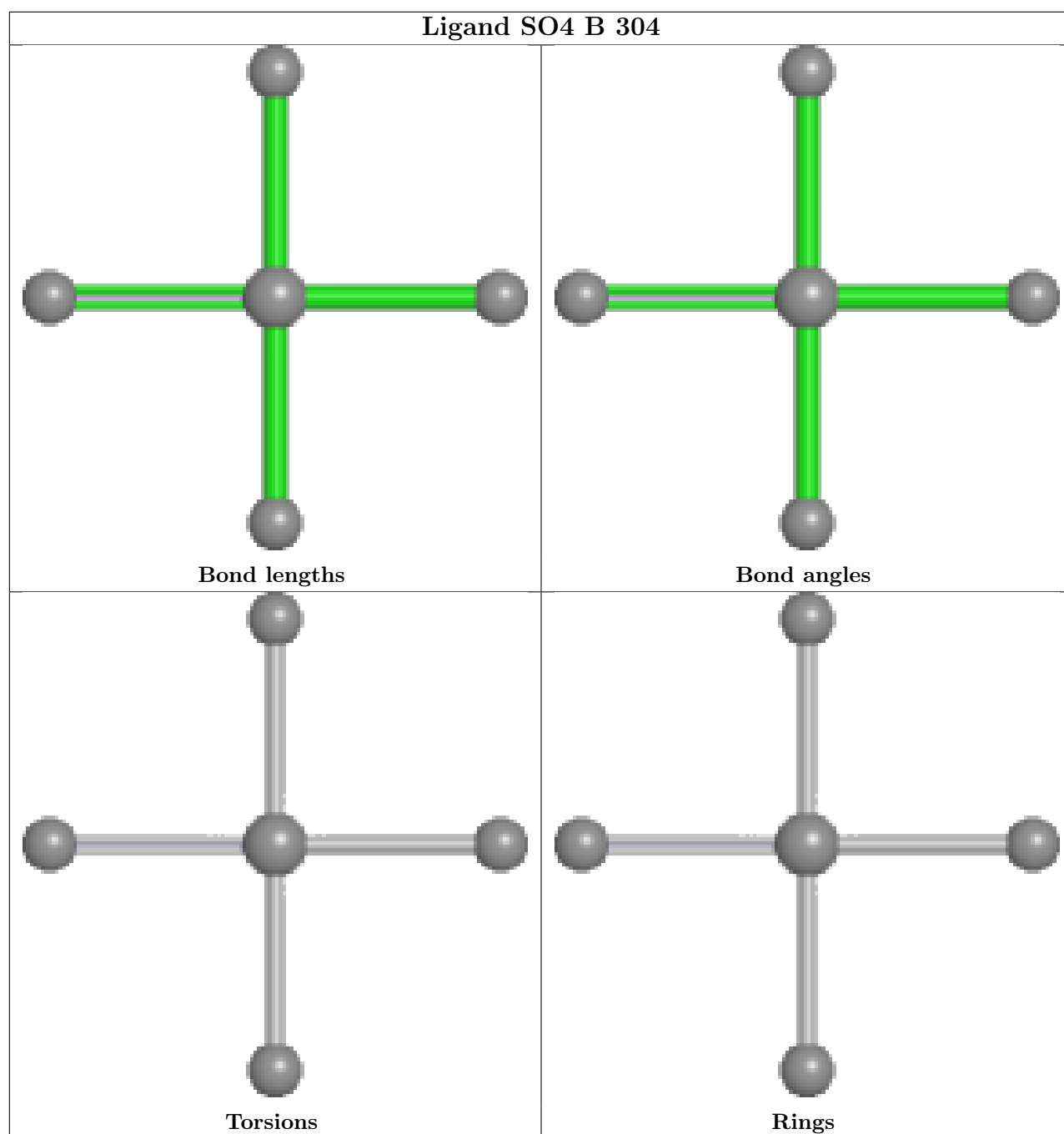




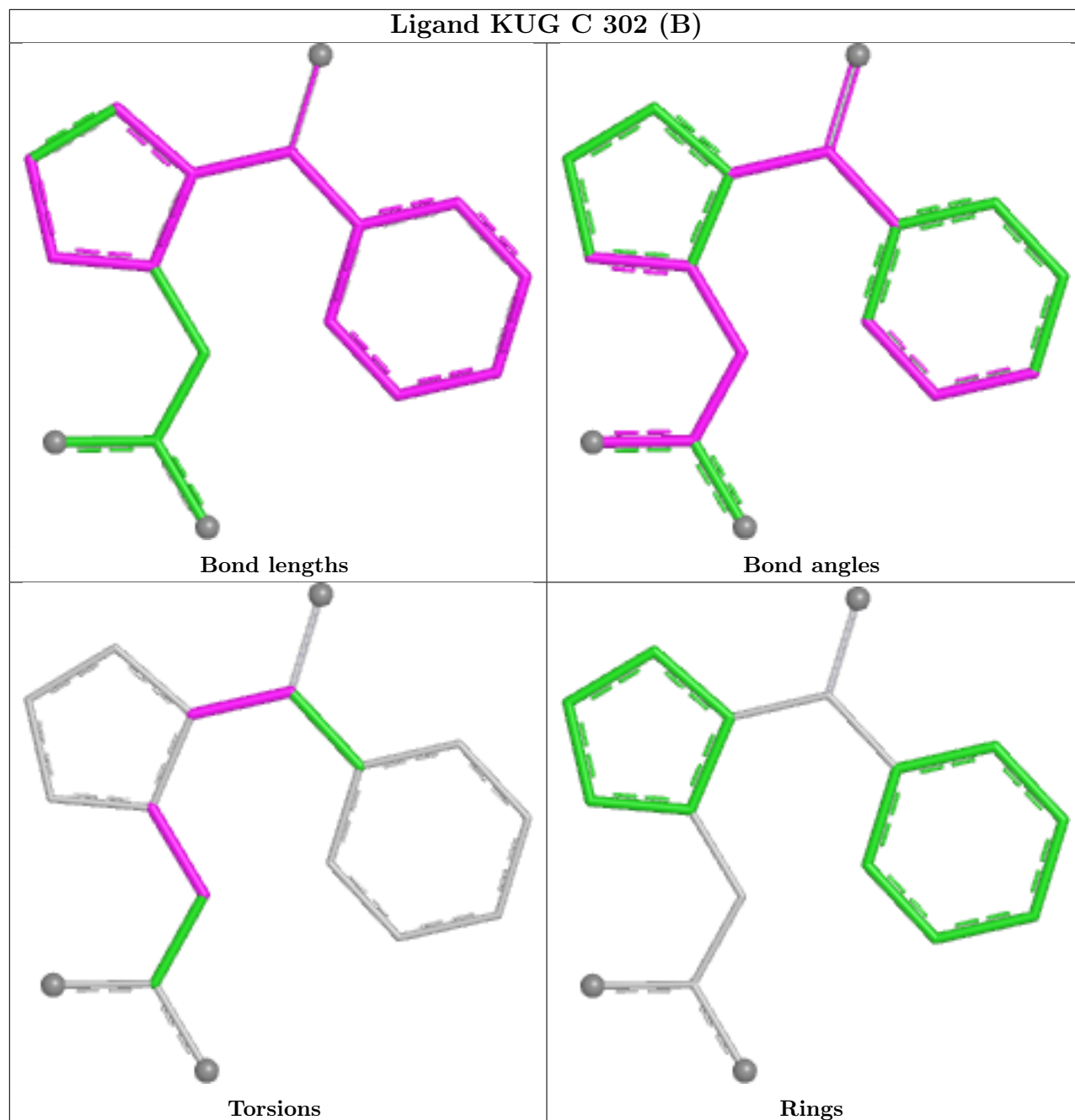


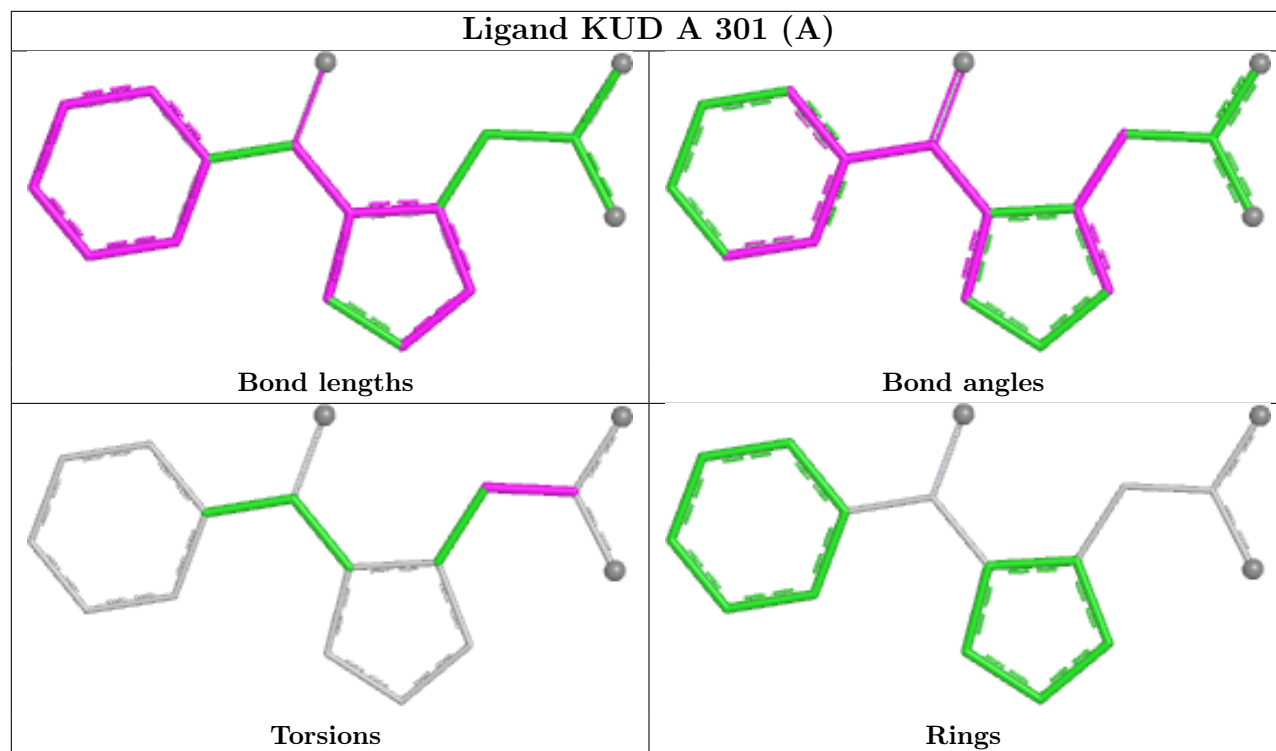


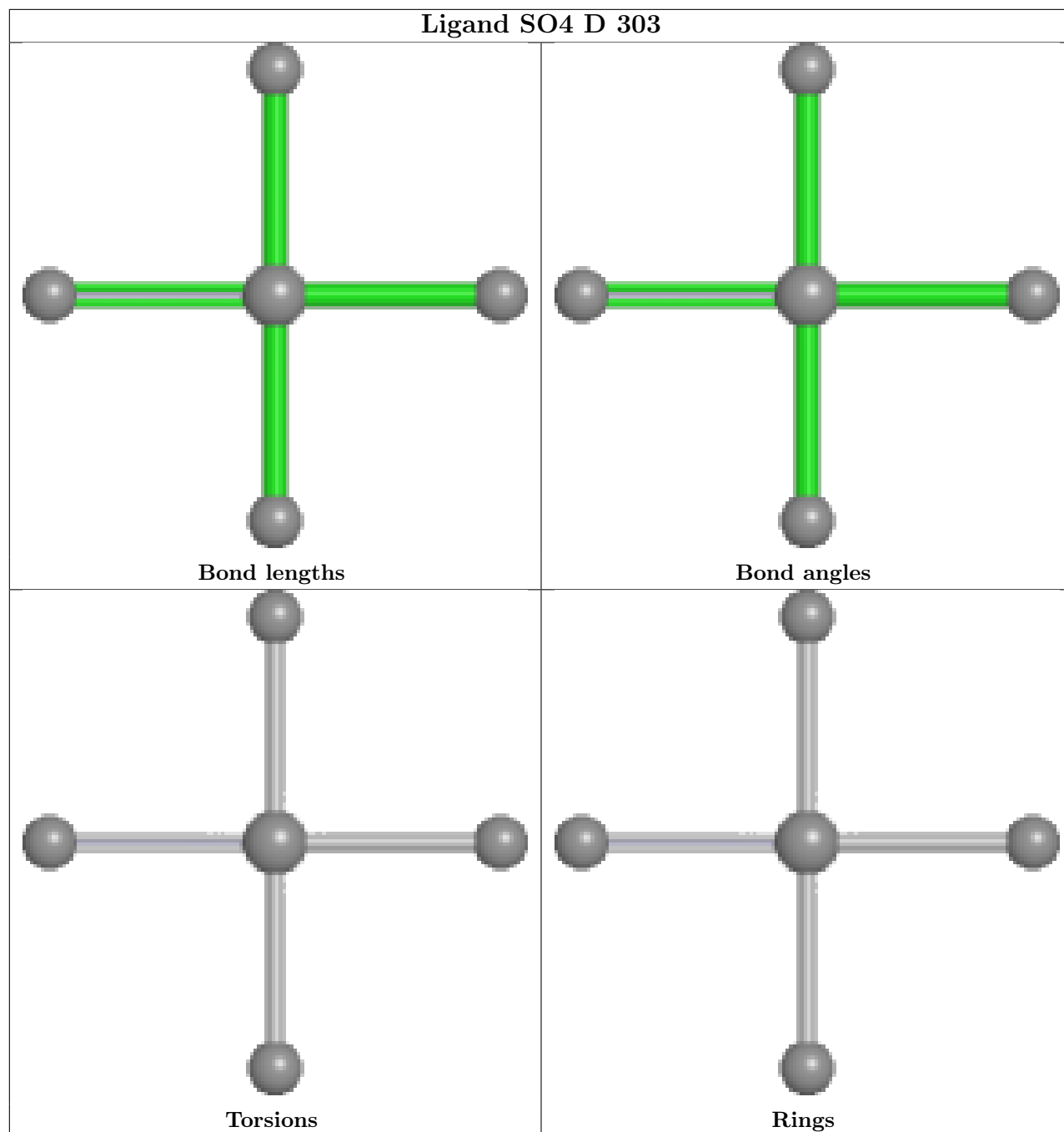


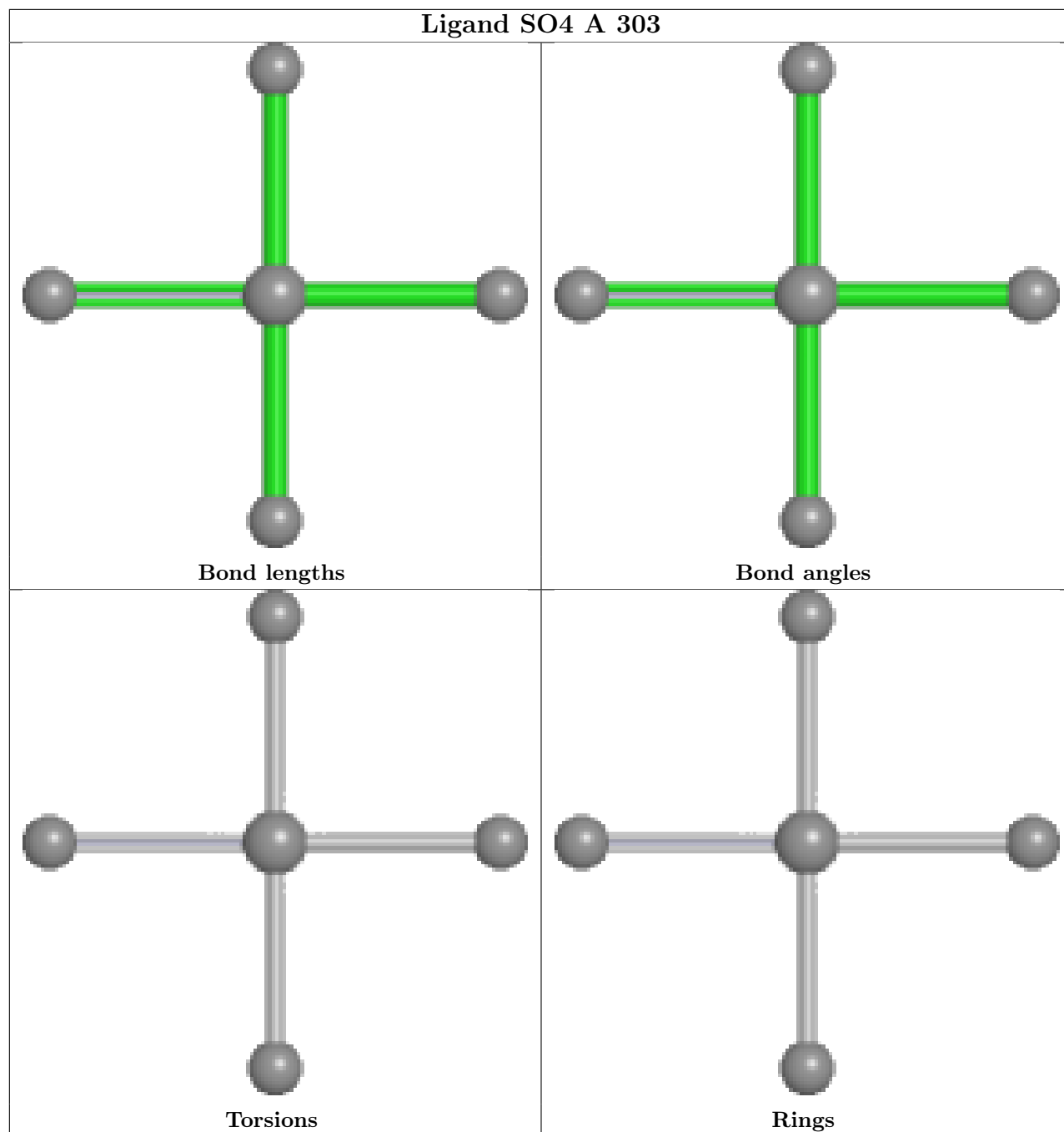


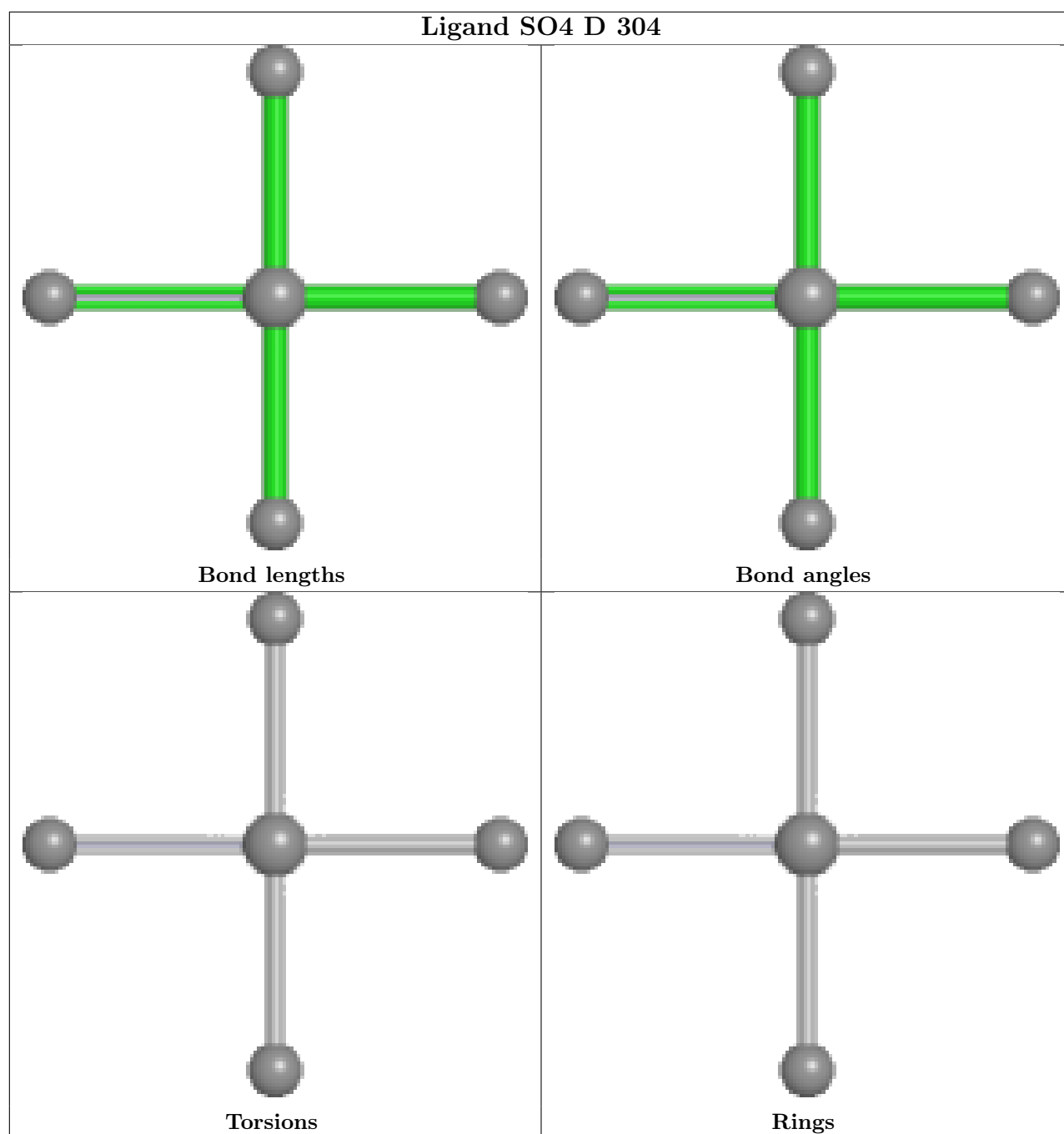
Ligand KUG C 302 (B)



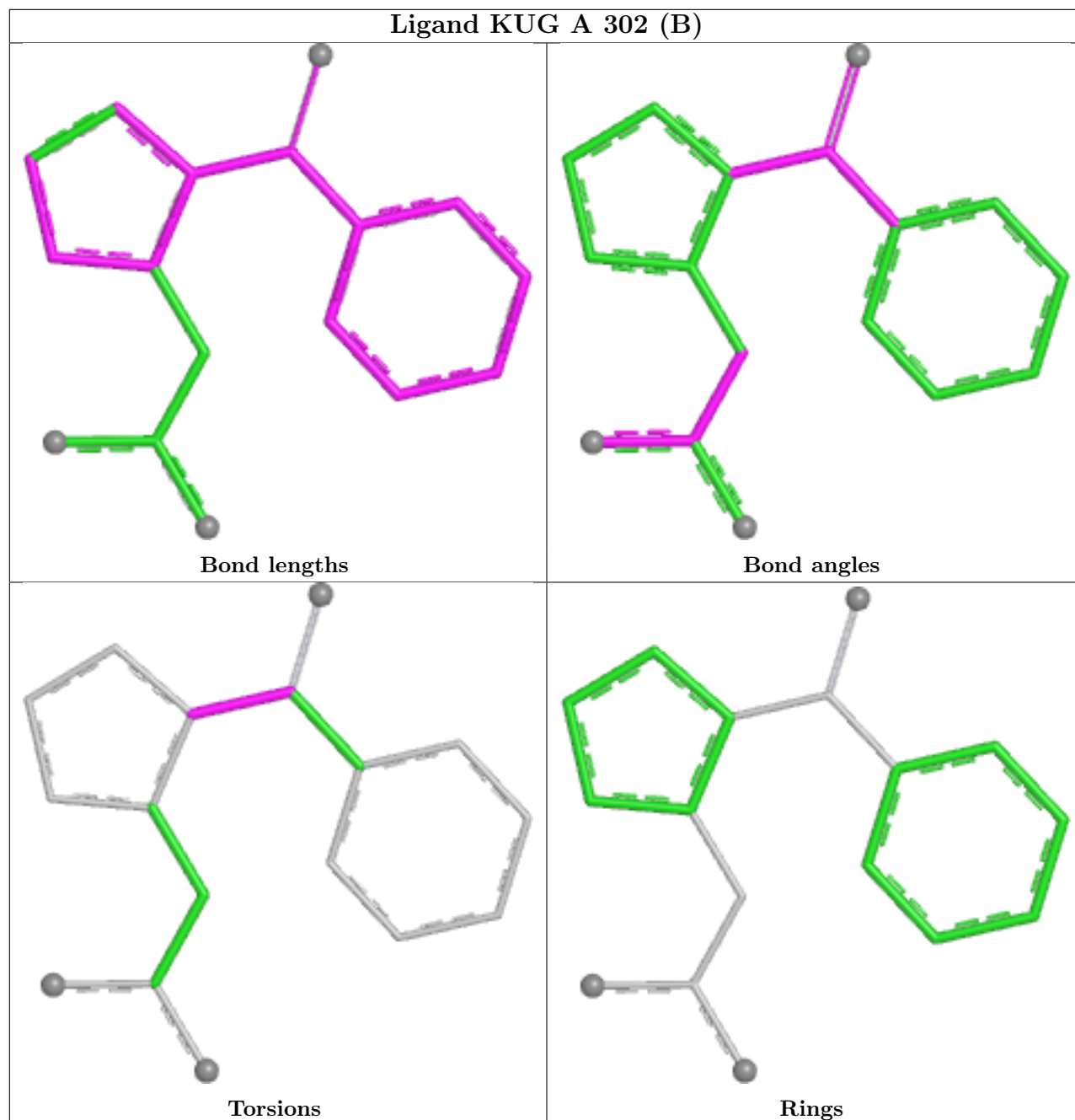


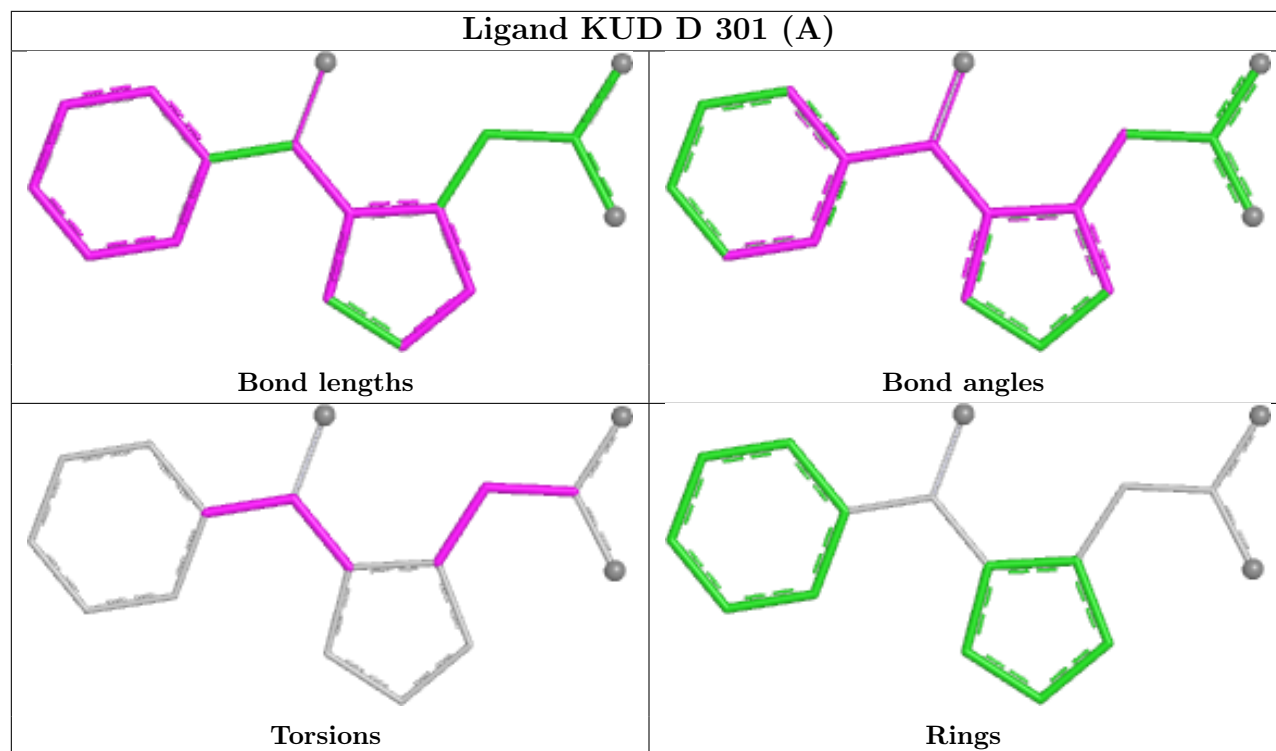






Ligand KUG A 302 (B)





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	227/233 (97%)	0.85	18 (7%)	18 20	17, 41, 63, 76	1 (0%)
1	B	226/233 (96%)	0.90	15 (6%)	24 26	16, 41, 61, 74	3 (1%)
1	C	227/233 (97%)	1.40	50 (22%)	2 2	24, 57, 83, 93	1 (0%)
1	D	227/233 (97%)	1.04	25 (11%)	10 11	17, 46, 71, 84	1 (0%)
All	All	907/932 (97%)	1.05	108 (11%)	9 10	16, 46, 75, 93	6 (0%)

All (108) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	177	LEU	4.8
1	C	226	GLY	4.6
1	D	225	VAL	4.3
1	D	223	GLY	3.9
1	C	0	GLY	3.7
1	A	0	GLY	3.4
1	A	100	ARG	3.4
1	D	120	PRO	3.3
1	C	106	LEU	3.3
1	D	-1	HIS	3.3
1	D	208	PHE	3.2
1	D	118	ALA	3.2
1	C	22	LEU	3.2
1	C	90	GLN	3.2
1	A	226	GLY	3.1
1	D	222	ALA	3.1
1	C	206	GLY	3.0
1	B	44	ALA	3.0
1	D	33	VAL	3.0
1	C	132	ALA	3.0
1	B	177	LEU	3.0

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Mol	Chain	Res	Type	RSRZ
1	C	177	LEU	3.0
1	C	31	ILE	3.0
1	C	222	ALA	2.9
1	C	221	VAL	2.9
1	C	189	ILE	2.8
1	C	178	VAL	2.8
1	D	221	VAL	2.8
1	B	0	GLY	2.8
1	C	164	ALA	2.8
1	C	6	VAL	2.8
1	C	197	PRO	2.7
1	C	21	ALA	2.7
1	C	205	ALA	2.7
1	A	178	VAL	2.7
1	C	143	LEU	2.7
1	C	208	PHE	2.6
1	B	173	ASP	2.6
1	D	143	LEU	2.6
1	C	54	GLY	2.6
1	A	181	SER	2.6
1	B	119	GLU	2.6
1	C	200	ALA	2.6
1	D	171	TRP	2.6
1	A	225	VAL	2.6
1	C	215	ALA	2.5
1	D	210	ALA	2.5
1	C	39	VAL	2.5
1	C	29	ALA	2.5
1	B	176	GLY	2.5
1	C	2	THR	2.5
1	B	75	ALA	2.5
1	D	110	ALA	2.4
1	D	214	ALA	2.4
1	C	1	GLY	2.4
1	D	212	SER	2.4
1	B	192	VAL	2.4
1	A	198	ALA	2.4
1	B	133	ALA	2.4
1	C	214	ALA	2.4
1	A	175	PRO	2.4
1	C	57	ALA	2.4
1	C	210	ALA	2.4

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Mol	Chain	Res	Type	RSRZ
1	C	61	GLN	2.4
1	D	213	ALA	2.3
1	C	33	VAL	2.3
1	C	84	ALA	2.3
1	C	65	LEU	2.3
1	C	94	LEU	2.3
1	C	174	PRO	2.3
1	C	10	GLY	2.3
1	B	188	ARG	2.3
1	B	225	VAL	2.3
1	C	32	ASP	2.2
1	C	194	ALA	2.2
1	D	4	LEU	2.2
1	A	52	GLU	2.2
1	C	162[A]	SER	2.2
1	B	5	VAL	2.2
1	B	120	PRO	2.2
1	D	180	ALA	2.2
1	C	218	ARG	2.2
1	A	174	PRO	2.2
1	D	16	THR	2.2
1	D	31	ILE	2.1
1	C	225	VAL	2.1
1	D	172	PRO	2.1
1	D	58	GLY	2.1
1	B	218	ARG	2.1
1	A	203	LEU	2.1
1	C	59	VAL	2.1
1	C	170	SER	2.1
1	C	180	ALA	2.1
1	C	3	ILE	2.1
1	D	175	PRO	2.1
1	A	169	GLY	2.1
1	B	165	GLY	2.1
1	A	214	ALA	2.1
1	A	94	LEU	2.1
1	C	68	TYR	2.1
1	A	81	ALA	2.0
1	C	201	ALA	2.0
1	C	209	ALA	2.0
1	D	189	ILE	2.0
1	A	219	ASN	2.0

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Mol	Chain	Res	Type	RSRZ
1	C	203	LEU	2.0
1	A	168	ILE	2.0
1	D	88	ARG	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](#)

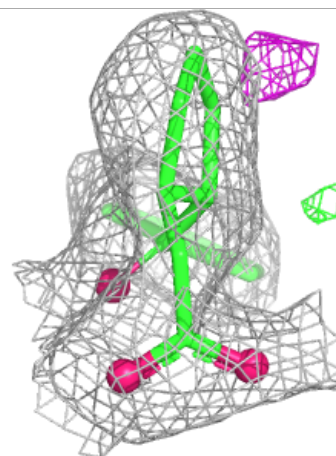
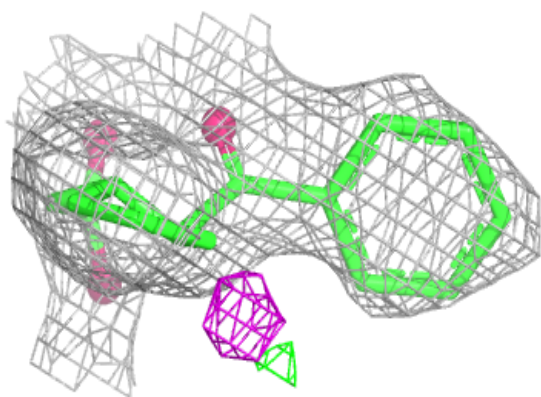
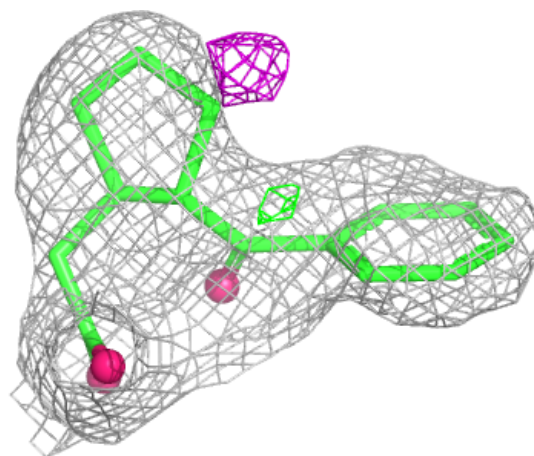
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
3	KUG	D	302[B]	17/17	0.70	0.15	33,39,43,45	17
2	KUD	D	301[A]	17/17	0.80	0.14	33,39,43,46	17
4	SO4	C	304	5/5	0.80	0.22	15,20,23,34	5
2	KUD	C	301[A]	17/17	0.81	0.12	35,38,41,42	17
3	KUG	A	302[B]	17/17	0.82	0.14	30,37,46,47	17
3	KUG	B	302[B]	17/17	0.82	0.12	33,37,40,40	17
2	KUD	A	301[A]	17/17	0.83	0.14	30,37,45,46	17
2	KUD	B	301[A]	17/17	0.84	0.12	33,37,39,40	17
3	KUG	C	302[B]	17/17	0.85	0.11	35,39,41,43	17
4	SO4	A	304	5/5	0.86	0.16	30,34,35,41	5
4	SO4	B	303	5/5	0.88	0.16	22,24,25,32	5
4	SO4	D	303	5/5	0.88	0.17	29,30,37,42	5
4	SO4	C	303	5/5	0.91	0.13	68,69,69,72	0
4	SO4	D	304	5/5	0.93	0.09	28,33,36,42	0
4	SO4	A	303	5/5	0.94	0.08	39,39,51,55	0
4	SO4	B	304	5/5	0.97	0.06	31,33,38,52	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.

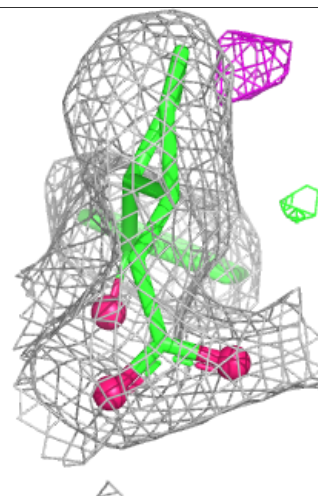
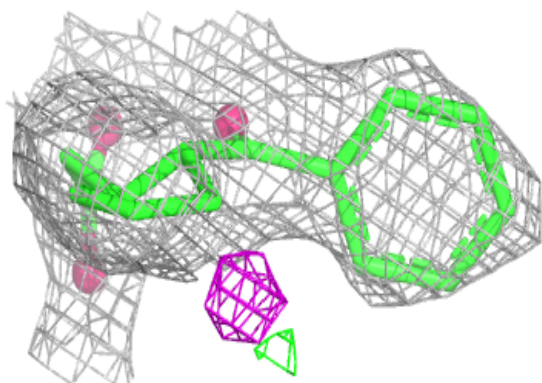
Electron density around KUG D 302 (B):

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



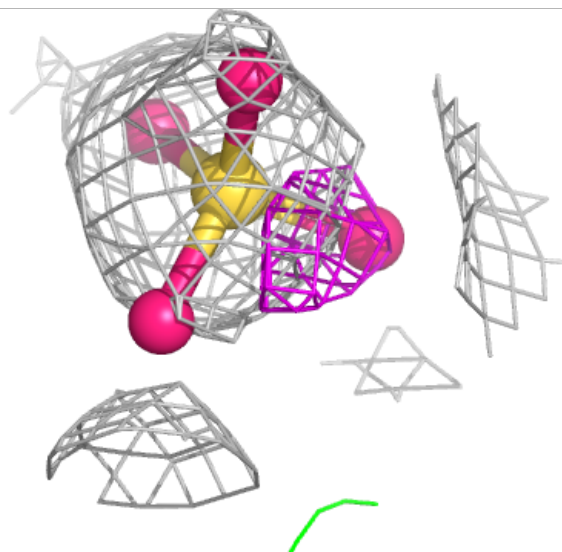
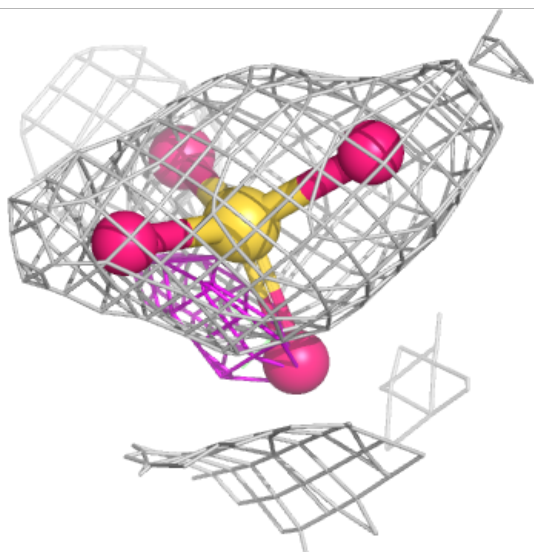
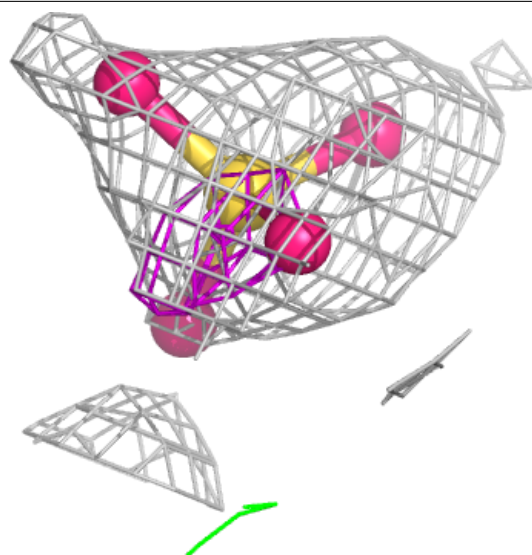
Electron density around KUD D 301 (A):

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



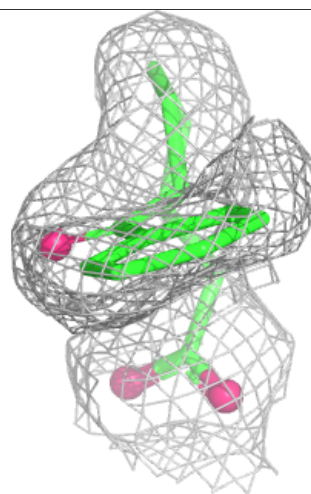
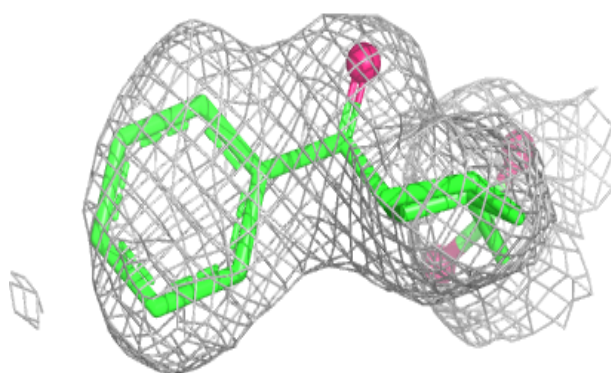
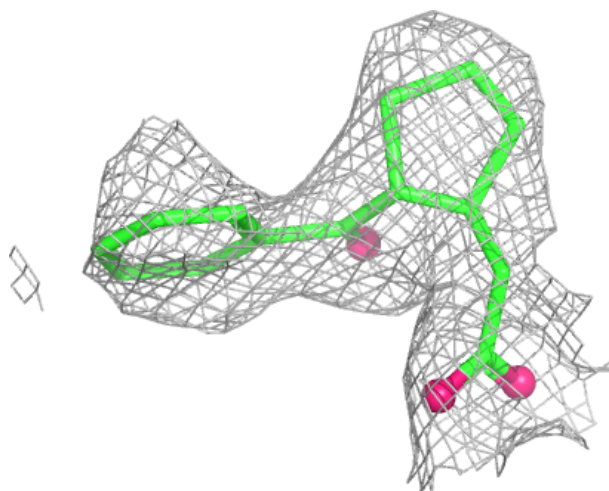
Electron density around SO4 C 304:

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



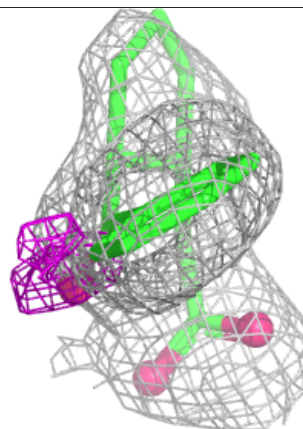
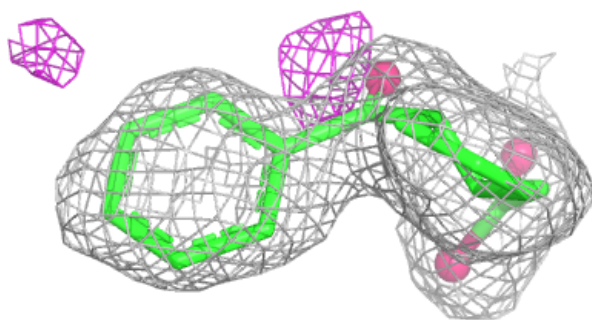
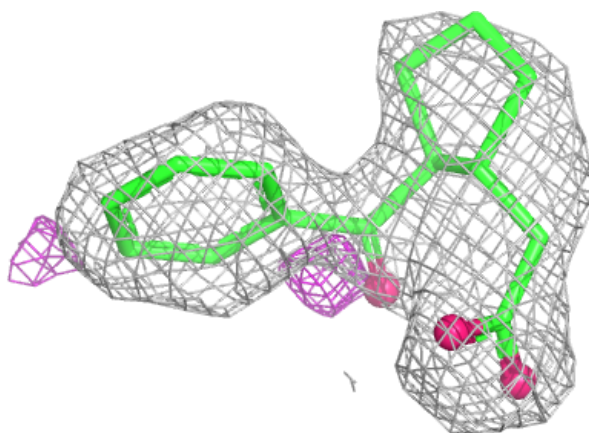
Electron density around KUD C 301 (A):

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



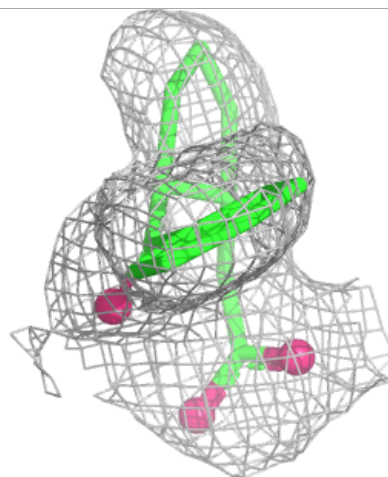
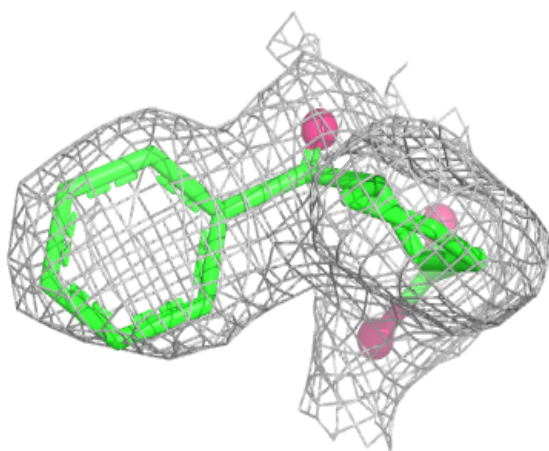
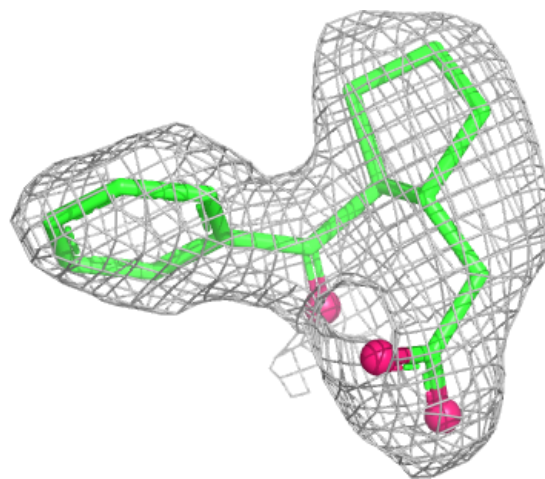
Electron density around KUG A 302 (B):

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



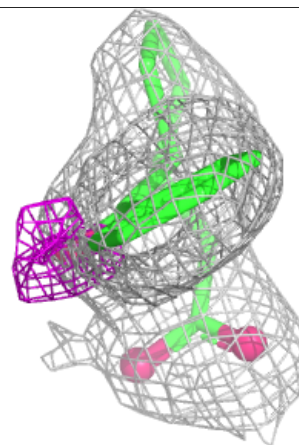
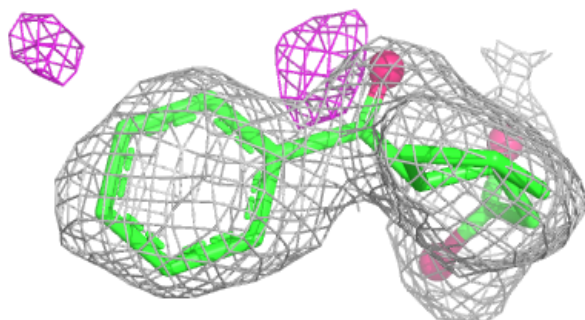
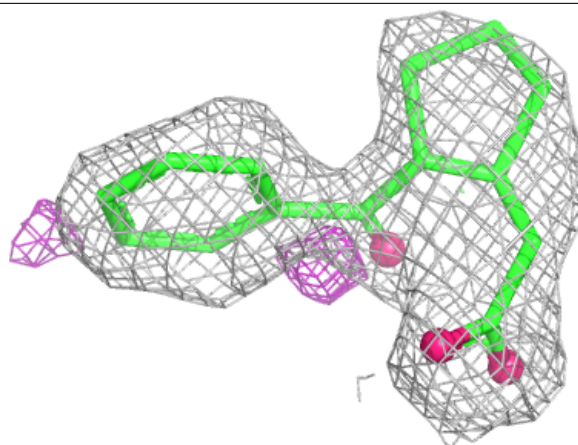
Electron density around KUG B 302 (B):

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



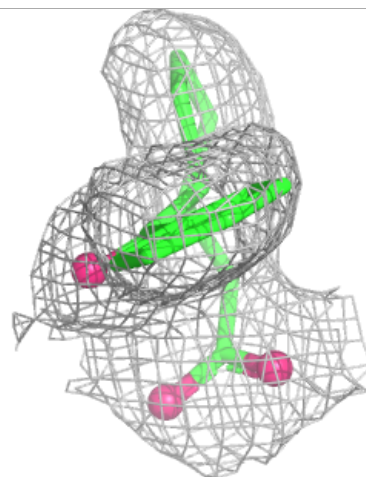
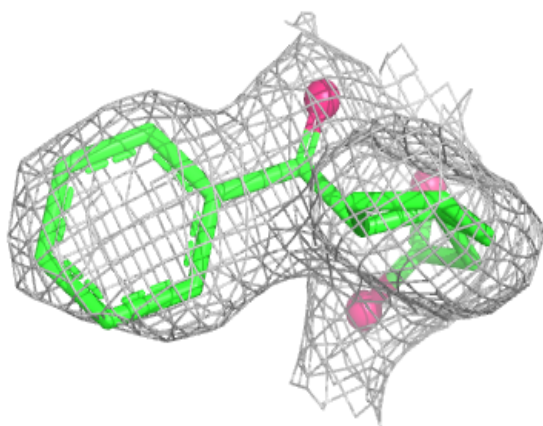
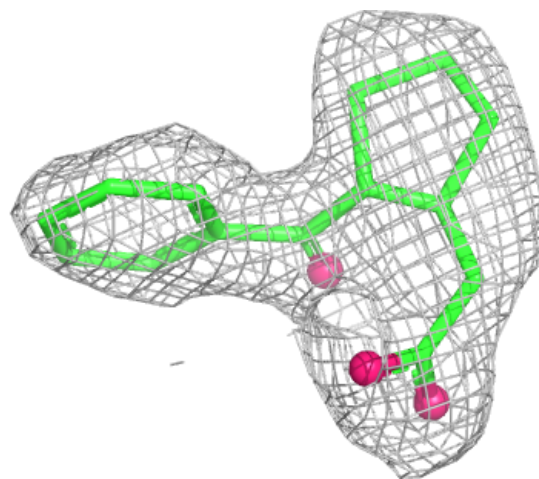
Electron density around KUD A 301 (A):

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



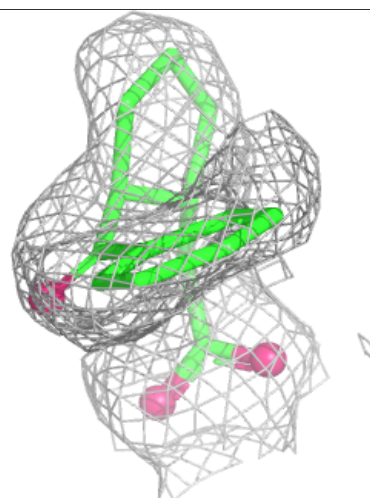
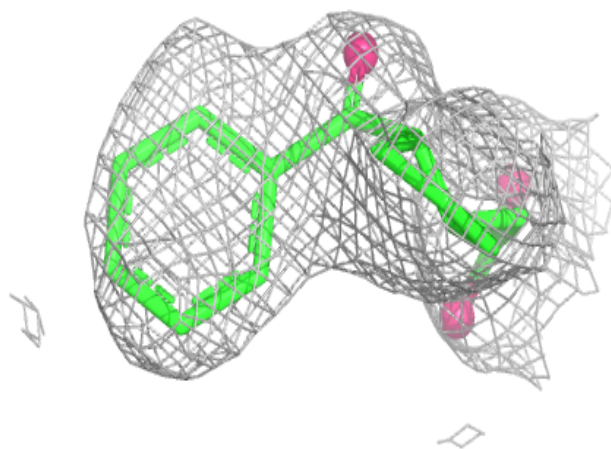
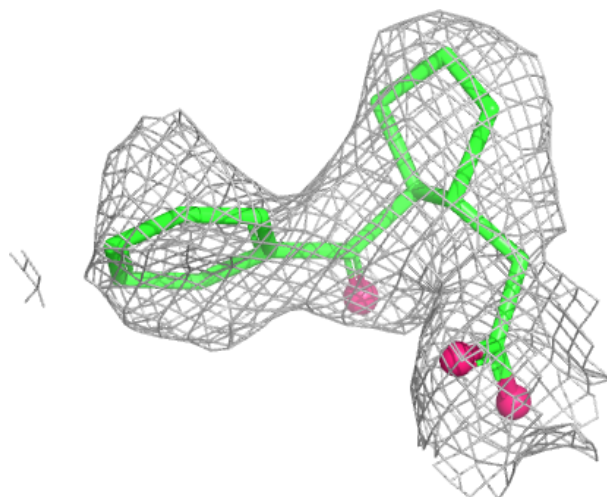
Electron density around KUD B 301 (A):

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



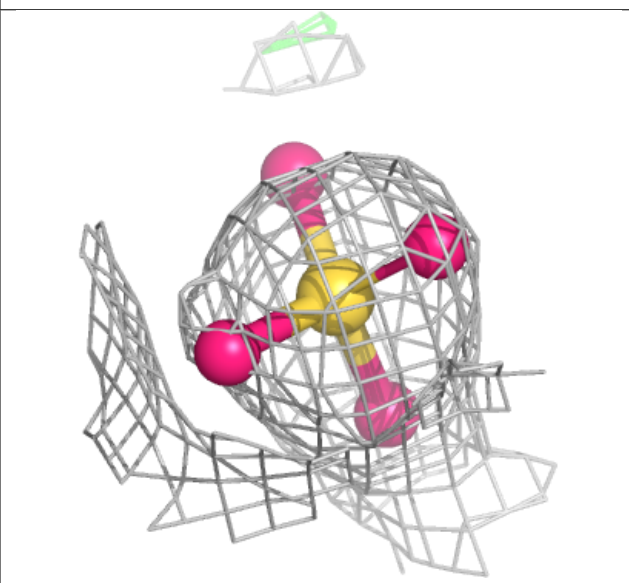
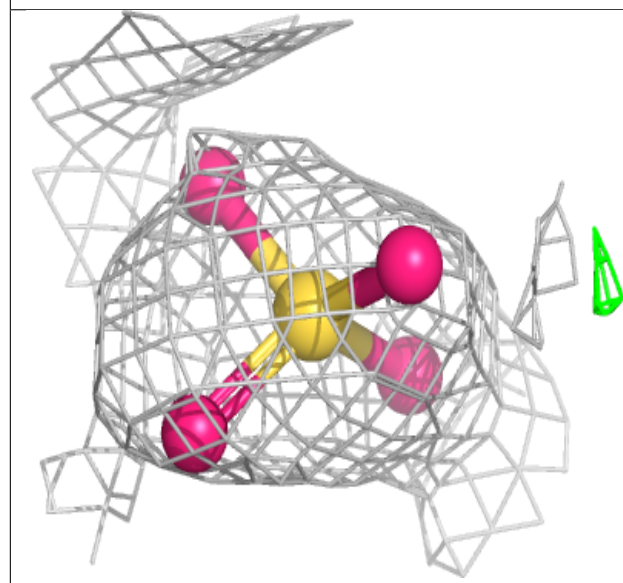
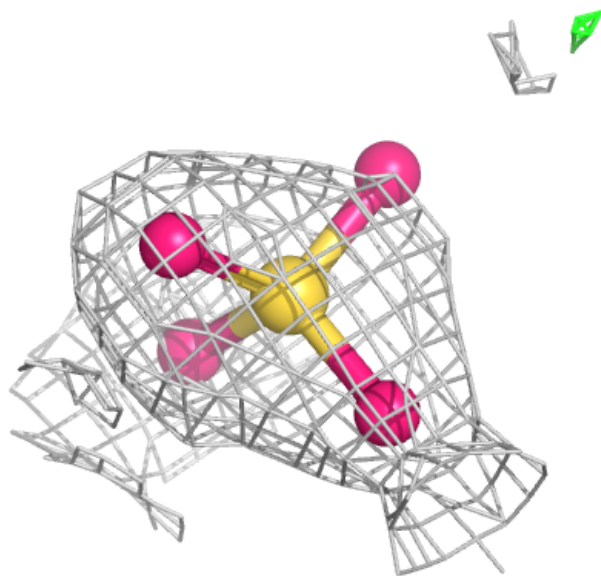
Electron density around KUG C 302 (B):

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



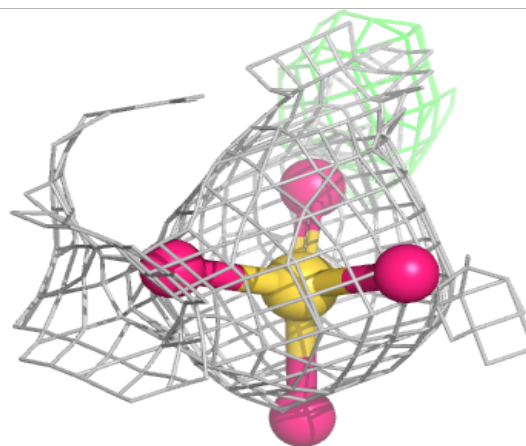
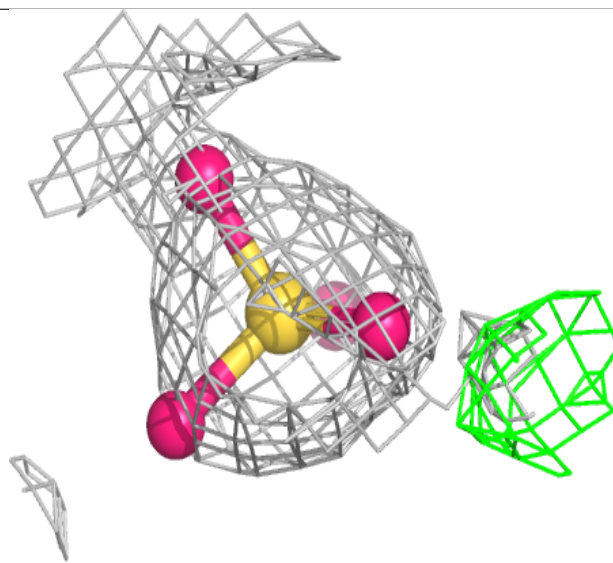
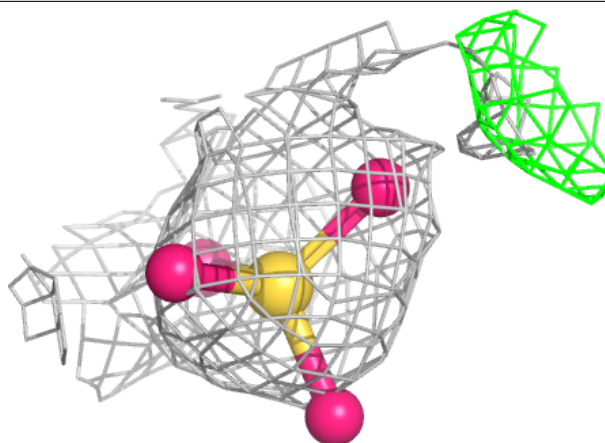
Electron density around SO4 A 304:

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



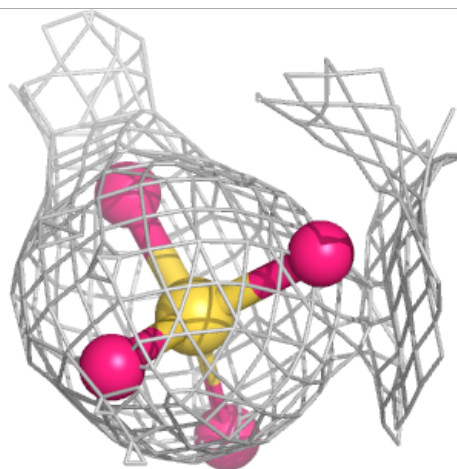
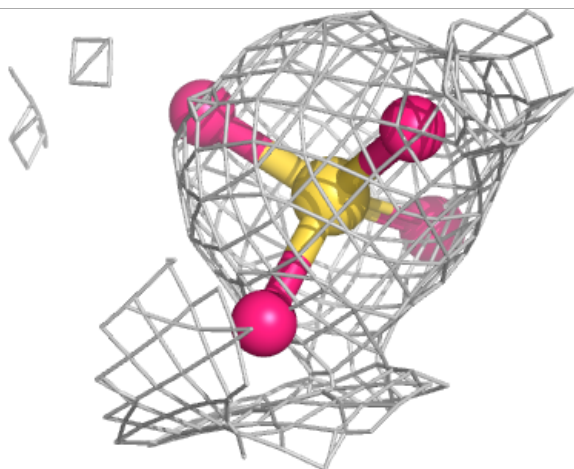
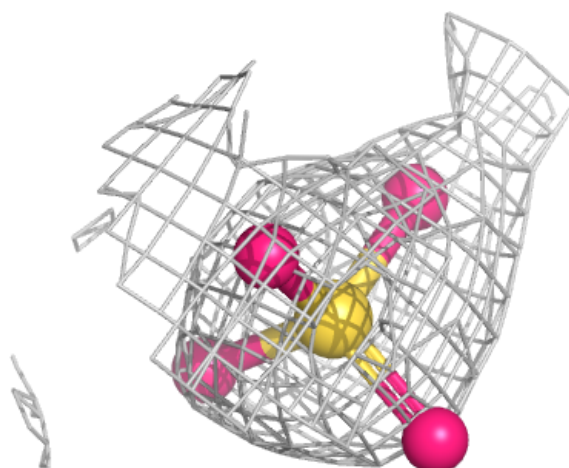
Electron density around SO4 B 303:

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



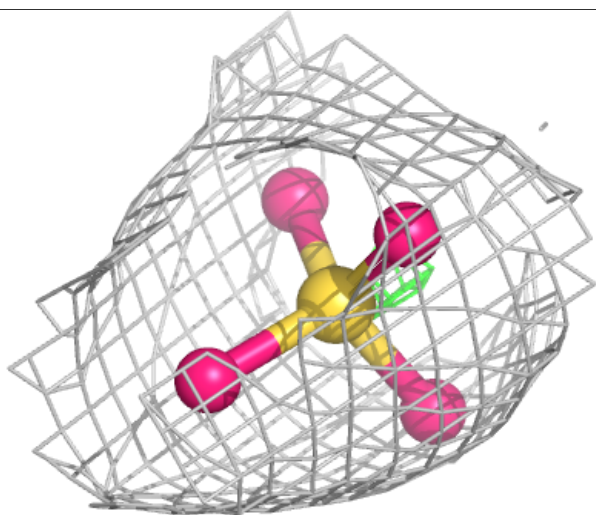
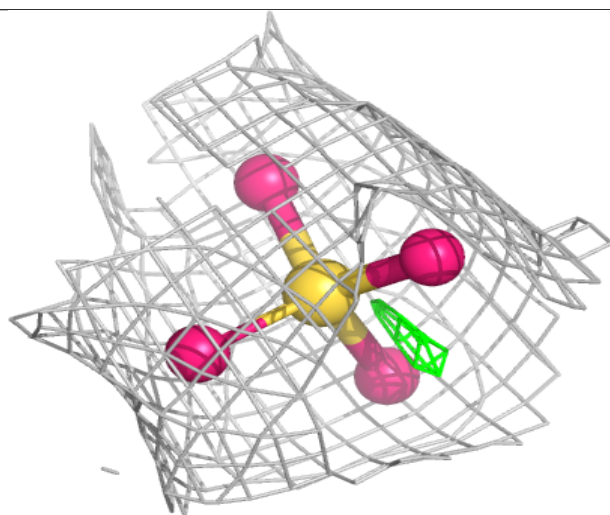
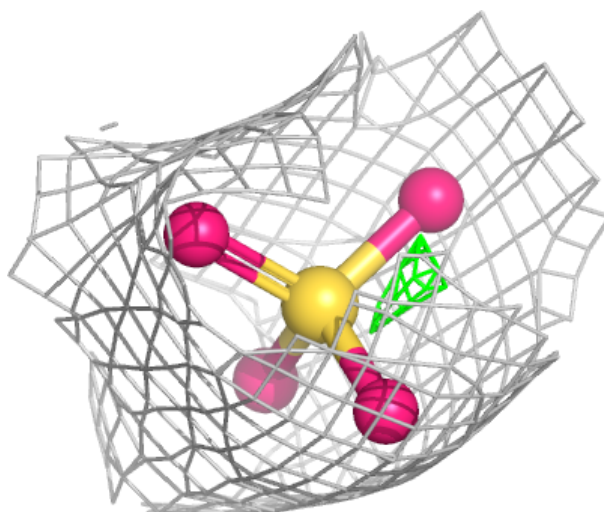
Electron density around SO4 D 303:

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



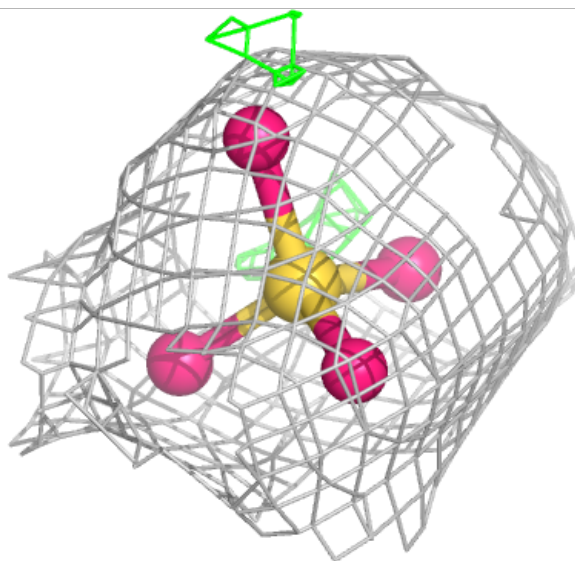
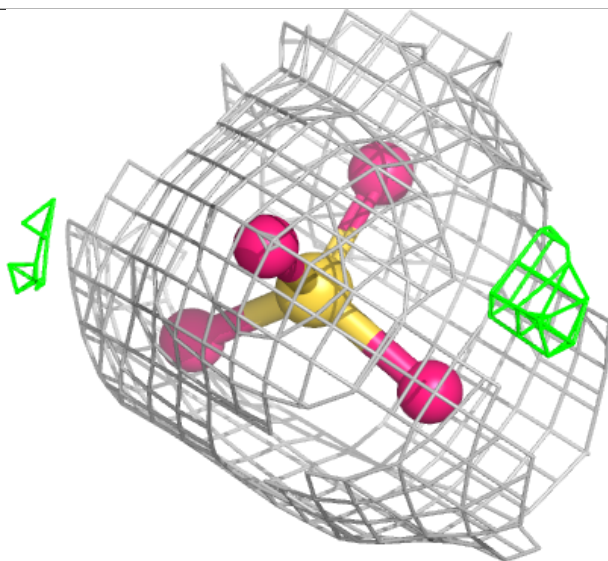
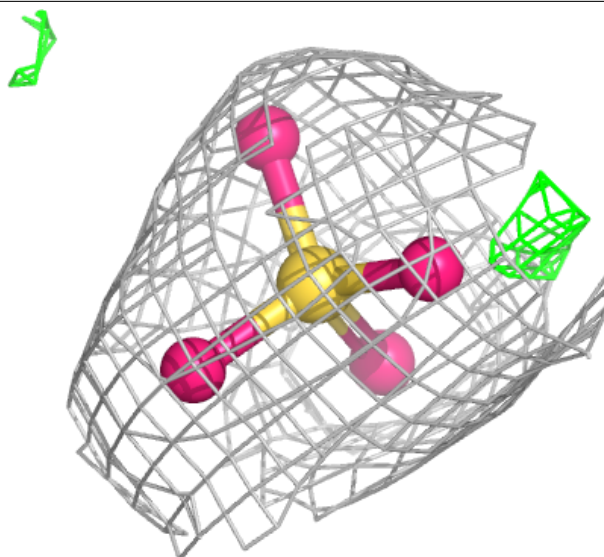
Electron density around SO4 C 303:

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



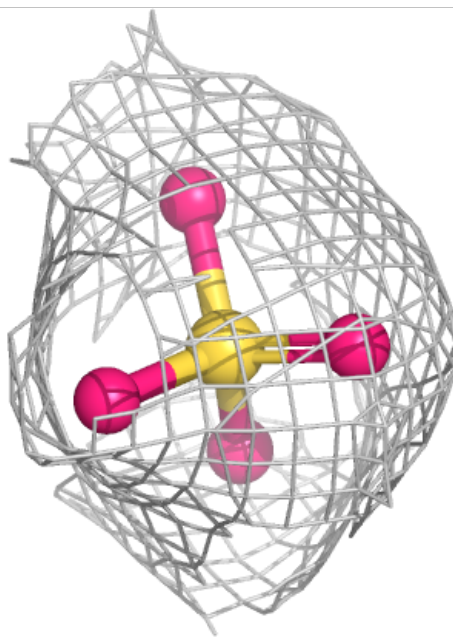
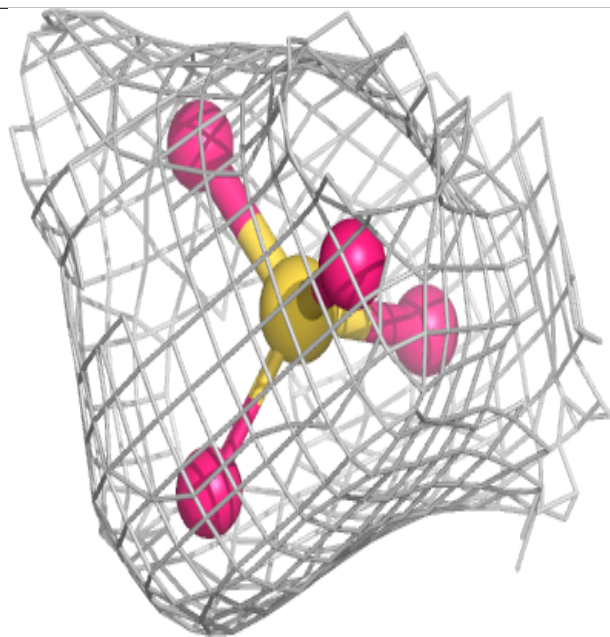
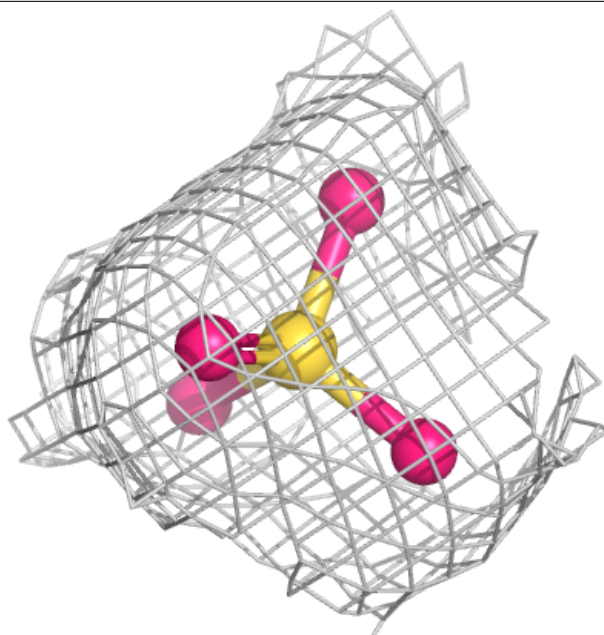
Electron density around SO4 D 304:

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



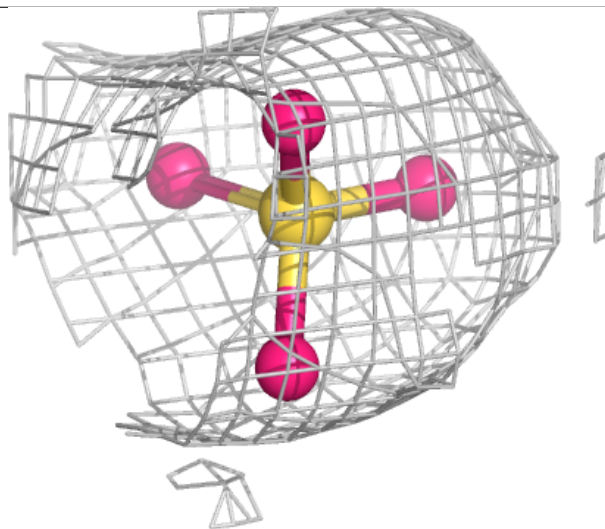
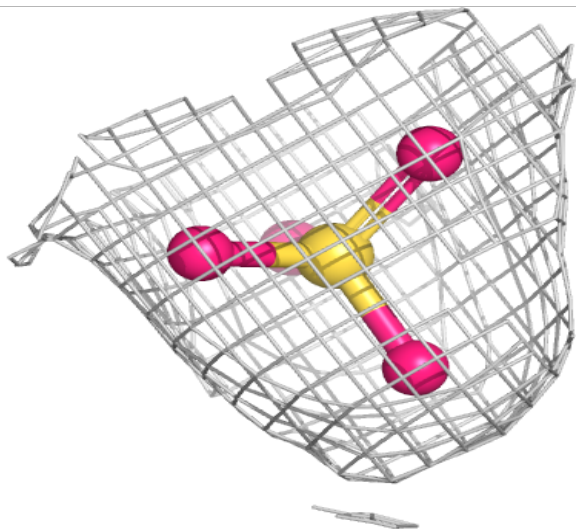
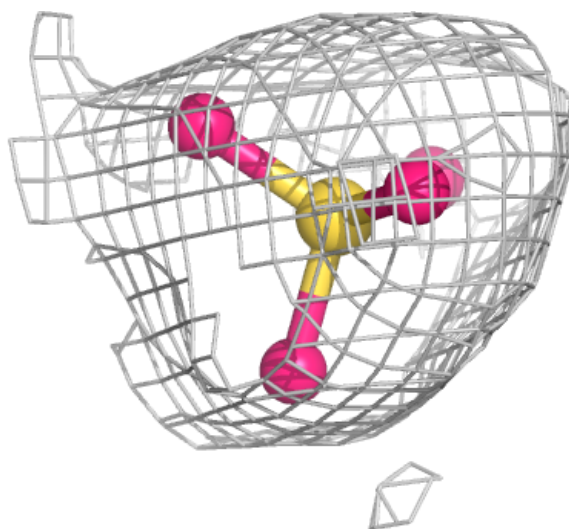
Electron density around SO4 A 303:

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



Electron density around SO4 B 304:

$2mF_o-DF_c$ (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.