



Full wwPDB EM Validation Report ⓘ

Mar 9, 2026 – 11:08 PM UTC

PDB ID : 8Y1C / pdb_00008y1c
EMDB ID : EMD-38831
Title : 2up-1 conformation of HKU1-B S protein after incubation of the receptor
Authors : Xia, L.Y.; Zhang, Y.Y.; Zhou, Q.
Deposited on : 2024-01-24
Resolution : 2.80 Å(reported)

This is a Full wwPDB EM 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/EMValidationReportHelp>

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:

EMDB validation analysis : 0.0.1.dev132
Mogul : 2022.3.0, CSD as543be (2022)
MolProbity : 4-5-2 with Phenix2.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

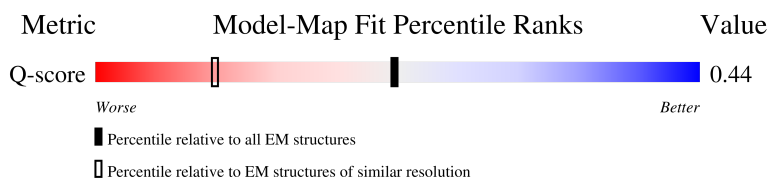
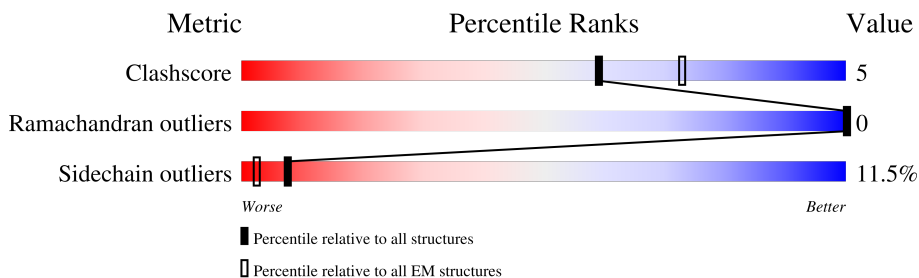
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 2.80 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)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	11806 (2.30 - 3.30)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the 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 EM map (all-atom inclusion $< 40\%$). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	1290	8% 74% 18% • 6%
1	B	1290	10% 75% 17% • 6%
1	C	1290	75% 16% • 6%
2	D	6	17% 67% 83%

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Mol	Chain	Length	Quality of chain
2	I	6	 33% 67%
2	N	6	 33% 67%
3	E	2	 50% 50%
3	F	2	 100%
3	G	2	 50% 50%
3	H	2	 50% 50%
3	J	2	 100%
3	K	2	 50% 50%
3	L	2	 50% 50%
3	M	2	 100%
3	O	2	 100%
3	P	2	 50% 100%
3	Q	2	 50% 50%
3	R	2	 100%

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 29541 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, 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.

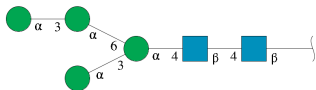
- Molecule 1 is a protein called Spike glycoprotein.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	B	1208	Total	C	N	O	S	0	0
			9425	6003	1551	1814	57		
1	C	1208	Total	C	N	O	S	0	0
			9425	6003	1551	1814	57		
1	A	1208	Total	C	N	O	S	0	0
			9425	6003	1551	1814	57		

There are 18 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	752	GLY	ARG	conflict	UNP Q14EB0
B	753	SER	ARG	conflict	UNP Q14EB0
B	754	ALA	LYS	conflict	UNP Q14EB0
B	755	SER	ARG	conflict	UNP Q14EB0
B	1067	PRO	ASN	conflict	UNP Q14EB0
B	1068	PRO	LEU	conflict	UNP Q14EB0
C	752	GLY	ARG	conflict	UNP Q14EB0
C	753	SER	ARG	conflict	UNP Q14EB0
C	754	ALA	LYS	conflict	UNP Q14EB0
C	755	SER	ARG	conflict	UNP Q14EB0
C	1067	PRO	ASN	conflict	UNP Q14EB0
C	1068	PRO	LEU	conflict	UNP Q14EB0
A	752	GLY	ARG	conflict	UNP Q14EB0
A	753	SER	ARG	conflict	UNP Q14EB0
A	754	ALA	LYS	conflict	UNP Q14EB0
A	755	SER	ARG	conflict	UNP Q14EB0
A	1067	PRO	ASN	conflict	UNP Q14EB0
A	1068	PRO	LEU	conflict	UNP Q14EB0

- Molecule 2 is an oligosaccharide called alpha-D-mannopyranose-(1-3)-alpha-D-mannopyranose-(1-6)-[alpha-D-mannopyranose-(1-3)]alpha-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



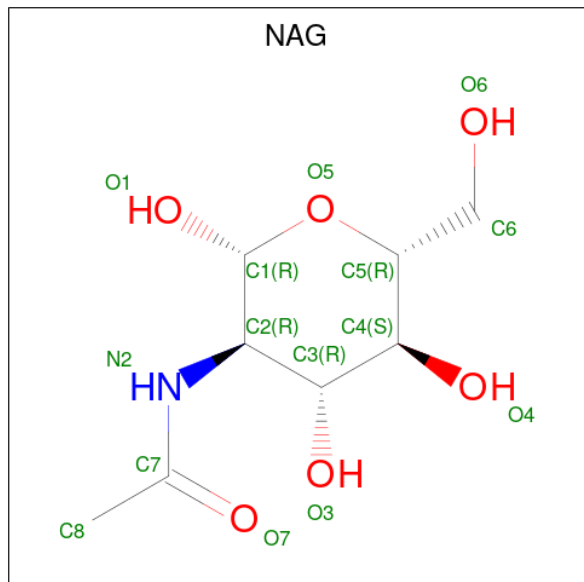
Mol	Chain	Residues	Atoms				AltConf	Trace
2	D	6	Total	C	N	O	0	0
			72	40	2	30		
2	I	6	Total	C	N	O	0	0
			72	40	2	30		
2	N	6	Total	C	N	O	0	0
			72	40	2	30		

- Molecule 3 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



Mol	Chain	Residues	Atoms				AltConf	Trace
3	E	2	Total	C	N	O	0	0
			28	16	2	10		
3	F	2	Total	C	N	O	0	0
			28	16	2	10		
3	G	2	Total	C	N	O	0	0
			28	16	2	10		
3	H	2	Total	C	N	O	0	0
			28	16	2	10		
3	J	2	Total	C	N	O	0	0
			28	16	2	10		
3	K	2	Total	C	N	O	0	0
			28	16	2	10		
3	L	2	Total	C	N	O	0	0
			28	16	2	10		
3	M	2	Total	C	N	O	0	0
			28	16	2	10		
3	O	2	Total	C	N	O	0	0
			28	16	2	10		
3	P	2	Total	C	N	O	0	0
			28	16	2	10		
3	Q	2	Total	C	N	O	0	0
			28	16	2	10		
3	R	2	Total	C	N	O	0	0
			28	16	2	10		

- Molecule 4 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				AltConf
4	B	1	Total	C	N	O	0
			14	8	1	5	
4	B	1	Total	C	N	O	0
			14	8	1	5	
4	B	1	Total	C	N	O	0
			14	8	1	5	
4	B	1	Total	C	N	O	0
			14	8	1	5	
4	B	1	Total	C	N	O	0
			14	8	1	5	
4	B	1	Total	C	N	O	0
			14	8	1	5	
4	B	1	Total	C	N	O	0
			14	8	1	5	
4	B	1	Total	C	N	O	0
			14	8	1	5	
4	B	1	Total	C	N	O	0
			14	8	1	5	

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Mol	Chain	Residues	Atoms				AltConf
4	B	1	Total	C	N	O	0
			14	8	1	5	
4	B	1	Total	C	N	O	0
			14	8	1	5	
4	B	1	Total	C	N	O	0
			14	8	1	5	
4	B	1	Total	C	N	O	0
			14	8	1	5	
4	B	1	Total	C	N	O	0
			14	8	1	5	
4	C	1	Total	C	N	O	0
			14	8	1	5	
4	C	1	Total	C	N	O	0
			14	8	1	5	
4	C	1	Total	C	N	O	0
			14	8	1	5	
4	C	1	Total	C	N	O	0
			14	8	1	5	
4	C	1	Total	C	N	O	0
			14	8	1	5	
4	C	1	Total	C	N	O	0
			14	8	1	5	
4	C	1	Total	C	N	O	0
			14	8	1	5	
4	C	1	Total	C	N	O	0
			14	8	1	5	
4	C	1	Total	C	N	O	0
			14	8	1	5	
4	C	1	Total	C	N	O	0
			14	8	1	5	
4	C	1	Total	C	N	O	0
			14	8	1	5	
4	C	1	Total	C	N	O	0
			14	8	1	5	
4	C	1	Total	C	N	O	0
			14	8	1	5	
4	C	1	Total	C	N	O	0
			14	8	1	5	

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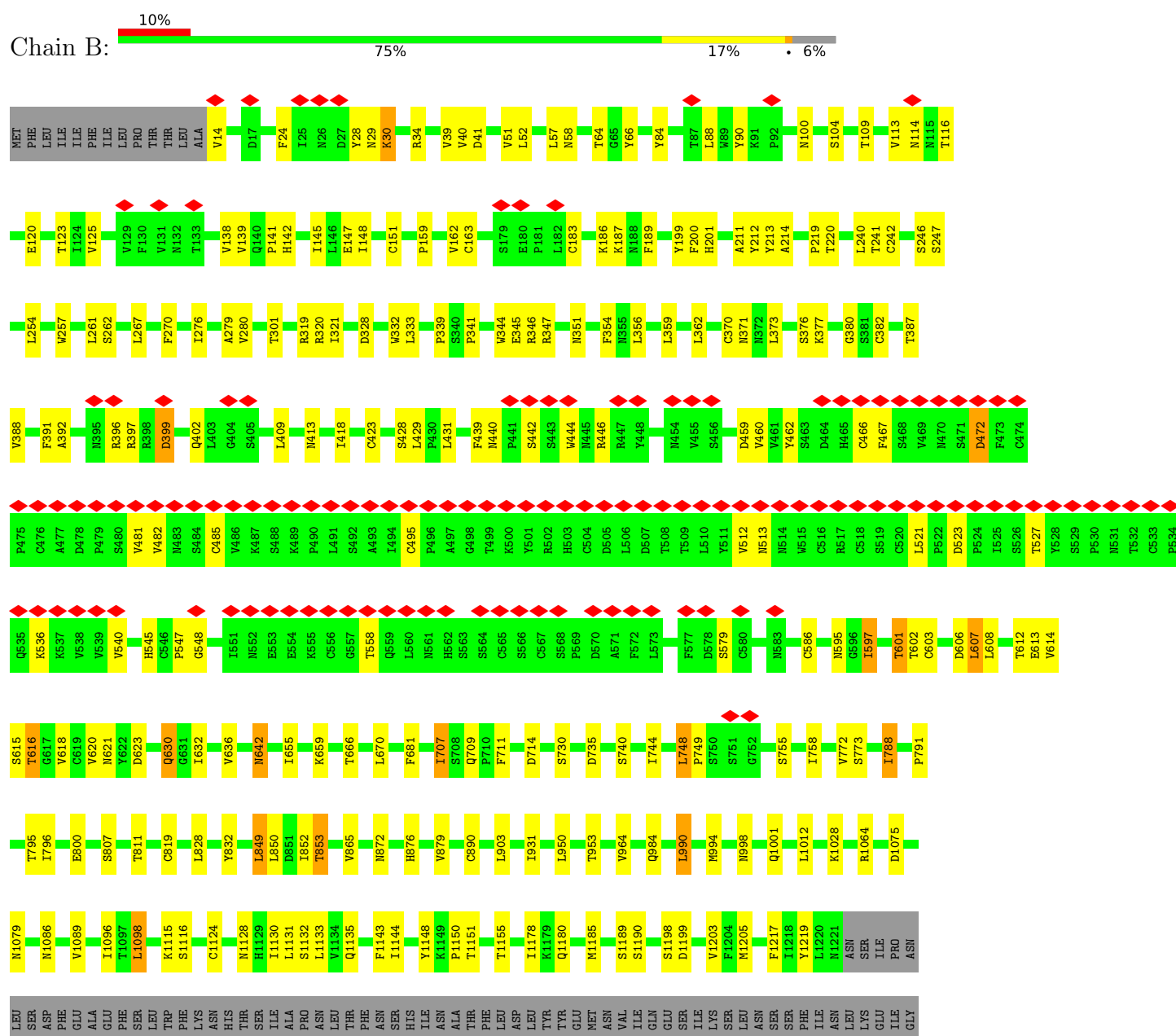
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Mol	Chain	Residues	Atoms				AltConf
4	C	1	Total	C	N	O	0
			14	8	1	5	
4	A	1	Total	C	N	O	0
			14	8	1	5	
4	A	1	Total	C	N	O	0
			14	8	1	5	
4	A	1	Total	C	N	O	0
			14	8	1	5	
4	A	1	Total	C	N	O	0
			14	8	1	5	
4	A	1	Total	C	N	O	0
			14	8	1	5	
4	A	1	Total	C	N	O	0
			14	8	1	5	
4	A	1	Total	C	N	O	0
			14	8	1	5	
4	A	1	Total	C	N	O	0
			14	8	1	5	
4	A	1	Total	C	N	O	0
			14	8	1	5	
4	A	1	Total	C	N	O	0
			14	8	1	5	
4	A	1	Total	C	N	O	0
			14	8	1	5	
4	A	1	Total	C	N	O	0
			14	8	1	5	
4	A	1	Total	C	N	O	0
			14	8	1	5	
4	A	1	Total	C	N	O	0
			14	8	1	5	

3 Residue-property plots

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map 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 diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). 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: Spike glycoprotein



Chain N:  33% 67%



- Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain E:  50% 50%



- Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain F:  100%



- Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain G:  50% 50%

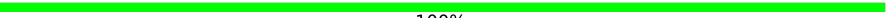


- Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain H:  50% 50%



- Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain J:  100%



- Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain K:  50% 50%



- Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain L:  50% 50%

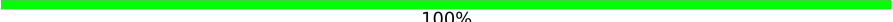


- Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain M:  100%



- Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain O:  100%



- Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain P:  50% 100%

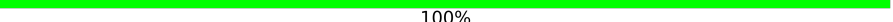


- Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain Q:  50% 50%



- Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain R:  100%



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	212902	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	50	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	2200	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	5.350	Depositor
Minimum map value	-3.380	Depositor
Average map value	-0.003	Depositor
Map value standard deviation	0.093	Depositor
Recommended contour level	0.19	Depositor
Map size ($\text{\AA}$)	434.80002, 434.80002, 434.80002	wwPDB
Map dimensions	400, 400, 400	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing ($\text{\AA}$)	1.087, 1.087, 1.087	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: MAN, NAG

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	0.28	0/9653	0.52	1/13146 (0.0%)
1	B	0.27	0/9653	0.52	0/13146
1	C	0.28	0/9653	0.52	1/13146 (0.0%)
All	All	0.27	0/28959	0.52	2/39438 (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	A	0	2
1	B	0	1
1	C	0	1
All	All	0	4

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	969	PRO	N-CA-C	6.28	118.36	110.70
1	A	969	PRO	N-CA-C	5.85	117.83	110.70

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	968	PHE	Peptide
1	A	969	PRO	Peptide

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Mol	Chain	Res	Type	Group
1	B	819	CYS	Peptide
1	C	967	MET	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	9425	0	9078	99	0
1	B	9425	0	9076	95	0
1	C	9425	0	9076	83	0
2	D	72	0	61	0	0
2	I	72	0	61	0	0
2	N	72	0	61	0	0
3	E	28	0	25	1	0
3	F	28	0	25	0	0
3	G	28	0	25	0	0
3	H	28	0	25	0	0
3	J	28	0	25	0	0
3	K	28	0	25	0	0
3	L	28	0	25	0	0
3	M	28	0	25	0	0
3	O	28	0	25	0	0
3	P	28	0	25	0	0
3	Q	28	0	25	1	0
3	R	28	0	25	0	0
4	A	238	0	221	0	0
4	B	238	0	221	0	0
4	C	238	0	221	0	0
All	All	29541	0	28376	267	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 (267) 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:201:HIS:HB2	1:B:212:TYR:HB2	1.72	0.70
1:B:199:TYR:O	1:B:213:TYR:HA	1.92	0.68
1:C:123:THR:HG22	1:C:141:PRO:HD2	1.75	0.68
1:A:58:ASN:HA	1:A:270:PHE:O	1.94	0.68
1:C:201:HIS:HB2	1:C:212:TYR:HB2	1.77	0.66
1:B:201:HIS:O	1:B:211:ALA:HA	1.97	0.65
1:B:1132:SER:HA	1:B:1144:ILE:O	1.96	0.65
1:B:200:PHE:HA	1:B:212:TYR:O	1.98	0.64
1:A:1128:ASN:HB3	1:A:1148:TYR:HB3	1.80	0.63
1:B:123:THR:HG22	1:B:141:PRO:HD2	1.80	0.62
1:C:214:ALA:HB2	1:C:220:THR:HA	1.81	0.61
1:A:994:MET:O	1:A:998:ASN:ND2	2.33	0.61
1:A:332:TRP:O	1:A:390:LYS:NZ	2.34	0.61
1:A:986:ARG:HD2	1:A:1117:GLN:HG2	1.84	0.60
1:B:440:ASN:HD21	1:B:442:SER:HB3	1.67	0.59
1:A:201:HIS:HB2	1:A:212:TYR:HB2	1.83	0.59
1:B:151:CYS:HA	1:B:183:CYS:HA	1.83	0.59
1:C:507:ASP:O	1:C:514:ASN:HA	2.02	0.59
1:A:654:ASN:OD1	1:A:654:ASN:N	2.37	0.58
1:C:88:LEU:HA	1:C:91:LYS:HD3	1.85	0.57
1:C:846:VAL:HG13	1:C:1096:ILE:HG13	1.86	0.57
1:B:214:ALA:HB2	1:B:220:THR:HA	1.88	0.56
1:A:319:ARG:HH22	1:A:612:THR:HA	1.69	0.56
1:B:219:PRO:HG2	1:B:276:ILE:HB	1.87	0.56
1:A:358:THR:HA	1:A:361:ARG:HG2	1.86	0.56
1:C:1149:LYS:NZ	1:C:1150:PRO:O	2.38	0.56
1:B:319:ARG:HH21	1:B:321:ILE:HA	1.71	0.56
1:C:505:ASP:N	1:C:505:ASP:OD1	2.38	0.56
1:C:330:ASP:OD1	1:C:330:ASP:N	2.39	0.56
1:A:334:ASN:HA	1:A:429:LEU:HD21	1.88	0.55
1:C:17:ASP:N	1:C:17:ASP:OD1	2.38	0.55
1:C:363:VAL:HG23	1:C:365:VAL:HG22	1.88	0.55
1:B:339:PRO:HG2	1:B:391:PHE:HA	1.89	0.55
1:A:168:SER:OG	1:A:169:ILE:N	2.38	0.55
1:B:145:ILE:HA	1:B:189:PHE:O	2.07	0.55
1:A:502:ARG:NH1	1:A:553:GLU:O	2.40	0.54
1:B:444:TRP:HE1	1:B:548:GLY:HA3	1.72	0.54
1:C:160:HIS:NE2	1:C:171:ASN:O	2.36	0.54
1:B:370:CYS:HA	1:B:423:CYS:HA	1.89	0.54
1:A:214:ALA:HB2	1:A:220:THR:HA	1.90	0.54
1:B:186:LYS:HE3	3:E:1:NAG:H83	1.90	0.54
1:C:952:GLU:HG3	1:C:1136:ASN:HD21	1.73	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:400:ASP:O	1:A:410:GLN:NE2	2.41	0.54
1:A:872:ASN:H	1:A:876:HIS:HD2	1.56	0.54
1:C:319:ARG:NH1	1:C:612:THR:O	2.40	0.54
1:B:707:ILE:HD12	1:B:709:GLN:HE21	1.73	0.54
1:A:329:ILE:HG21	1:A:388:VAL:HG21	1.89	0.54
1:A:477:ALA:HA	1:A:502:ARG:HB3	1.90	0.54
1:B:990:LEU:O	1:B:1190:SER:OG	2.27	0.53
1:C:1173:LYS:HG3	1:C:1203:VAL:HG12	1.91	0.53
1:A:321:ILE:HG12	1:A:625:TYR:HD1	1.73	0.53
1:B:66:TYR:HA	1:B:262:SER:O	2.09	0.53
1:B:472:ASP:OD1	1:B:472:ASP:N	2.41	0.53
1:B:994:MET:O	1:B:998:ASN:ND2	2.37	0.53
1:B:1098:LEU:HD13	1:C:1097:THR:HG23	1.91	0.53
1:A:38:ASP:O	1:A:73:ASN:ND2	2.38	0.53
1:C:1196:PRO:O	1:C:1201:ASN:ND2	2.43	0.52
1:A:370:CYS:HA	1:A:423:CYS:HA	1.91	0.52
1:C:147:GLU:OE2	1:C:186:LYS:NZ	2.43	0.52
1:C:910:LYS:HD2	1:C:1026:LEU:HD11	1.90	0.52
1:C:447:ARG:HD2	1:A:131:VAL:HG11	1.92	0.52
1:B:409:LEU:HA	1:B:413:ASN:HD22	1.75	0.51
1:B:984:GLN:OE1	1:B:1001:GLN:NE2	2.43	0.51
1:C:412:SER:OG	1:C:466:CYS:SG	2.68	0.51
1:C:124:ILE:HG22	1:C:139:VAL:HB	1.93	0.51
1:C:90:TYR:OH	1:C:159:PRO:O	2.28	0.51
1:B:849:LEU:O	1:B:853:THR:OG1	2.29	0.51
1:A:384:ASN:HB2	1:A:596:GLY:HA3	1.92	0.51
1:B:104:SER:HA	1:B:257:TRP:O	2.11	0.51
1:A:527:THR:OG1	1:A:528:TYR:N	2.41	0.51
1:A:103:PHE:HB2	1:A:261:LEU:HD21	1.92	0.51
1:A:846:VAL:HG13	1:A:1096:ILE:HG13	1.91	0.51
1:C:809:LYS:NZ	1:C:851:ASP:OD1	2.40	0.50
1:A:367:SER:HB3	1:A:426:TYR:HD2	1.76	0.50
1:A:107:LYS:NZ	1:A:253:THR:O	2.40	0.50
1:A:872:ASN:H	1:A:876:HIS:CD2	2.29	0.50
1:A:204:GLN:HE22	1:A:232:LEU:H	1.58	0.50
1:A:109:THR:HG21	1:A:254:LEU:HD23	1.93	0.50
1:B:30:LYS:HB3	1:B:88:LEU:HD22	1.94	0.50
1:B:459:ASP:HA	1:B:579:SER:HA	1.94	0.50
1:B:642:ASN:N	1:B:642:ASN:OD1	2.44	0.50
1:C:316:THR:HG22	1:C:621:ASN:HB2	1.93	0.50
1:A:556:CYS:HA	1:A:567:CYS:HA	1.94	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:994:MET:HG2	1:A:1205:MET:HG2	1.93	0.49
1:C:345:GLU:O	1:C:389:ASP:HA	2.12	0.49
1:C:430:PRO:HA	1:C:585:ARG:HG2	1.93	0.49
1:C:358:THR:HA	1:C:361:ARG:HG2	1.94	0.49
1:B:735:ASP:OD1	1:B:735:ASP:N	2.37	0.49
1:A:366:ASP:N	1:A:366:ASP:OD1	2.43	0.49
1:B:621:ASN:HA	1:B:630:GLN:HG3	1.94	0.49
1:C:730:SER:OG	1:C:731:VAL:N	2.46	0.49
1:A:317:VAL:HG11	1:A:633:PHE:HE2	1.77	0.49
1:B:431:LEU:HD21	1:B:586:CYS:HB2	1.95	0.49
1:C:92:PRO:HA	1:C:95:LEU:HB3	1.93	0.49
1:A:395:ASN:ND2	1:A:579:SER:O	2.46	0.49
1:B:399:ASP:N	1:B:399:ASP:OD1	2.46	0.49
1:B:872:ASN:H	1:B:876:HIS:HD2	1.59	0.49
1:A:149:THR:HG22	1:A:186:LYS:HG3	1.94	0.49
1:B:109:THR:OG1	1:B:120:GLU:O	2.29	0.49
1:C:113:VAL:O	1:C:116:THR:OG1	2.30	0.49
1:B:795:THR:OG1	1:B:796:ILE:N	2.45	0.49
1:C:959:THR:O	1:C:963:THR:OG1	2.30	0.49
1:A:244:ALA:HA	1:A:249:THR:HG21	1.93	0.49
1:B:24:PHE:HB3	1:B:84:TYR:HA	1.95	0.48
1:C:779:VAL:HG11	1:A:871:LEU:HD23	1.95	0.48
1:B:301:THR:HA	1:B:681:PHE:O	2.13	0.48
1:B:373:LEU:HD21	1:B:597:ILE:HD12	1.94	0.48
1:B:832:TYR:OH	1:B:1079:ASN:ND2	2.45	0.48
1:A:68:PRO:O	1:A:266:TYR:OH	2.31	0.48
1:C:1162:LEU:HD23	1:C:1213:THR:HB	1.95	0.48
1:A:64:THR:HA	1:A:265:GLN:HA	1.95	0.48
1:B:100:ASN:ND2	1:B:261:LEU:O	2.46	0.48
1:C:204:GLN:HE22	1:C:231:ILE:HA	1.78	0.48
1:A:110:LYS:HD3	1:A:117:LEU:HD11	1.96	0.48
1:A:907:LEU:HD11	1:A:1142:LEU:HD22	1.96	0.48
1:C:447:ARG:NH2	1:C:448:TYR:OH	2.47	0.48
1:B:788:ILE:O	1:B:1155:THR:HA	2.14	0.47
1:A:26:ASN:HB2	1:A:84:TYR:HD2	1.79	0.47
1:A:161:THR:HA	1:A:172:GLU:HG3	1.95	0.47
1:B:267:LEU:O	1:B:279:ALA:HA	2.14	0.47
1:C:782:VAL:N	1:C:785:LEU:O	2.46	0.47
1:B:396:ARG:HG3	1:B:397:ARG:HG2	1.96	0.47
1:C:850:LEU:HD13	1:C:1096:ILE:HD11	1.97	0.47
1:B:163:CYS:HB3	1:B:240:LEU:HD11	1.97	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:558:THR:OG1	1:C:561:ASN:O	2.32	0.47
1:C:151:CYS:HA	1:C:183:CYS:HA	1.95	0.47
1:C:394:PRO:HB3	1:C:578:ASP:HB3	1.96	0.47
1:B:439:PHE:HE2	1:B:446:ARG:HH11	1.63	0.47
1:B:632:ILE:HB	1:B:670:LEU:HB2	1.95	0.47
1:B:332:TRP:HB2	1:B:347:ARG:HH11	1.79	0.47
1:C:510:LEU:O	1:A:583:ASN:ND2	2.48	0.47
1:C:1132:SER:HA	1:C:1144:ILE:O	2.15	0.47
1:C:142:HIS:N	1:C:145:ILE:O	2.48	0.47
1:C:340:SER:OG	1:C:343:ASN:OD1	2.33	0.47
1:A:17:ASP:N	1:A:17:ASP:OD1	2.47	0.47
1:A:374:ASP:HB2	1:A:377:LYS:HG2	1.97	0.46
1:B:392:ALA:HB3	1:B:460:VAL:HG11	1.97	0.46
1:A:246:SER:OG	1:A:247:SER:N	2.48	0.46
1:C:118:TYR:HA	1:C:143:ASN:HD21	1.80	0.46
1:C:789:GLN:HA	1:C:1154:LYS:O	2.16	0.46
1:A:809:LYS:HG2	1:A:850:LEU:HD23	1.97	0.46
1:B:148:ILE:O	1:B:186:LYS:HA	2.16	0.46
1:B:523:ASP:OD1	1:B:523:ASP:N	2.48	0.46
1:B:466:CYS:HB3	1:B:547:PRO:HD2	1.97	0.46
1:A:873:THR:HG1	1:A:891:LEU:H	1.60	0.46
1:C:114:ASN:OD1	1:C:114:ASN:N	2.49	0.46
1:C:478:ASP:OD2	1:C:480:SER:OG	2.34	0.46
1:C:1148:TYR:OH	1:C:1190:SER:O	2.26	0.46
1:C:995:ASP:OD1	1:C:995:ASP:N	2.45	0.46
1:A:467:PHE:HA	1:A:536:LYS:O	2.16	0.46
1:B:246:SER:OG	1:B:247:SER:N	2.48	0.46
1:A:505:ASP:HB2	1:A:517:ARG:HG3	1.98	0.46
1:B:142:HIS:N	1:B:145:ILE:O	2.48	0.45
1:A:60:THR:HA	1:A:268:LEU:O	2.16	0.45
1:A:873:THR:OG1	1:A:891:LEU:N	2.44	0.45
1:A:996:VAL:O	1:A:1000:ASN:N	2.49	0.45
1:B:147:GLU:HA	1:B:187:LYS:O	2.15	0.45
1:B:791:PRO:HB3	1:B:1150:PRO:HB3	1.98	0.45
1:A:791:PRO:HB3	1:A:1150:PRO:HB3	1.96	0.45
1:B:614:VAL:HG12	1:B:616:THR:HG22	1.98	0.45
1:C:791:PRO:HB3	1:C:1150:PRO:HB3	1.99	0.45
1:C:842:ILE:HG21	1:C:1089:VAL:HG13	1.98	0.45
1:A:422:SER:HB3	1:A:593:ILE:HG23	1.99	0.45
1:B:1205:MET:HE3	1:C:998:ASN:HD21	1.82	0.45
1:A:902:LEU:HA	1:A:905:ASP:HB2	1.98	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:326:ASP:OD2	3:Q:1:NAG:O6	2.34	0.45
1:A:407:GLY:O	1:A:411:SER:OG	2.33	0.45
1:A:460:VAL:O	1:A:577:PHE:HA	2.16	0.45
1:B:1128:ASN:HB3	1:B:1148:TYR:HB3	1.99	0.45
1:C:1100:LYS:HE2	1:C:1100:LYS:HB3	1.86	0.45
1:A:27:ASP:OD1	1:A:27:ASP:N	2.36	0.45
1:B:114:ASN:N	1:B:114:ASN:OD1	2.49	0.45
1:B:998:ASN:HD21	1:A:1205:MET:HE3	1.82	0.45
1:C:399:ASP:OD1	1:C:399:ASP:N	2.50	0.45
1:C:885:LYS:HB2	1:C:885:LYS:HE3	1.79	0.44
1:C:74:PHE:HB2	1:C:257:TRP:HB3	2.00	0.44
1:C:142:HIS:NE2	1:C:147:GLU:OE1	2.37	0.44
1:C:828:LEU:HD12	1:C:1078:ILE:HD12	1.98	0.44
1:A:995:ASP:OD1	1:A:995:ASP:N	2.46	0.44
1:B:58:ASN:HA	1:B:270:PHE:O	2.17	0.44
1:A:1023:ASN:HD22	1:A:1024:SER:H	1.66	0.44
1:B:240:LEU:HG	1:B:242:CYS:HB2	1.99	0.44
1:B:90:TYR:OH	1:B:159:PRO:O	2.35	0.44
1:A:1162:LEU:HD12	1:A:1170:ILE:HD11	2.00	0.44
1:A:312:LYS:HD3	1:A:312:LYS:HA	1.81	0.44
1:C:73:ASN:HD22	1:C:74:PHE:H	1.65	0.44
1:C:772:VAL:HG21	1:A:867:LEU:HD12	2.00	0.44
1:A:680:ALA:HB1	1:A:736:LEU:HD13	2.00	0.44
1:A:969:PRO:HA	1:A:971:TRP:CE2	2.53	0.44
1:B:467:PHE:HA	1:B:536:LYS:O	2.18	0.43
1:B:615:SER:HB2	1:B:620:VAL:HG11	2.00	0.43
1:A:650:ASP:OD1	1:A:650:ASP:N	2.51	0.43
1:A:162:VAL:HB	1:A:172:GLU:HB2	2.00	0.43
1:C:917:GLY:HA2	1:C:920:GLU:HG2	2.00	0.43
1:A:881:ASN:HD22	1:A:1002:LYS:HE3	1.83	0.43
1:B:104:SER:HB2	1:B:200:PHE:HB2	2.01	0.43
1:B:382:CYS:HA	1:B:603:CYS:HA	2.01	0.43
1:B:380:GLY:HA2	1:B:607:LEU:HD22	2.01	0.43
1:A:38:ASP:HB3	1:A:74:PHE:HB2	1.99	0.43
1:A:401:LEU:O	1:A:426:TYR:OH	2.30	0.43
1:A:1196:PRO:O	1:A:1201:ASN:ND2	2.51	0.43
1:B:1133:LEU:O	1:B:1143:PHE:HA	2.19	0.43
1:A:910:LYS:HD2	1:A:1026:LEU:HD11	2.01	0.43
1:B:513:ASN:OD1	1:B:513:ASN:N	2.51	0.43
1:A:382:CYS:HA	1:A:603:CYS:HA	2.01	0.43
1:B:371:ASN:HD21	1:B:418:ILE:HG22	1.84	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:376:SER:OG	1:B:377:LYS:NZ	2.51	0.42
1:C:213:TYR:HB3	1:C:223:LEU:HD13	2.01	0.42
1:C:464:ASP:OD1	1:C:464:ASP:N	2.53	0.42
1:A:445:ASN:OD1	1:A:549:LEU:N	2.50	0.42
1:B:113:VAL:O	1:B:116:THR:OG1	2.34	0.42
1:C:687:SER:OG	1:C:722:ASN:ND2	2.52	0.42
1:C:1212:PHE:HD1	1:C:1212:PHE:HA	1.72	0.42
1:A:472:ASP:OD1	1:A:472:ASP:N	2.50	0.42
1:B:341:PRO:HB2	1:B:462:TYR:HB3	2.02	0.42
1:B:344:TRP:NE1	1:B:413:ASN:O	2.53	0.42
1:B:328:ASP:OD1	1:B:328:ASP:N	2.41	0.42
1:A:107:LYS:HB3	1:A:255:GLU:HB2	2.02	0.42
1:A:338:VAL:HG21	1:A:434:VAL:HG13	2.02	0.42
1:A:1086:ASN:HD22	1:A:1086:ASN:HA	1.70	0.42
1:B:351:ASN:HA	1:B:601:THR:HB	2.01	0.41
1:B:748:LEU:HA	1:B:749:PRO:HD3	1.92	0.41
1:A:509:THR:OG1	1:A:512:VAL:O	2.33	0.41
1:A:843:LEU:HD23	1:A:843:LEU:HA	1.92	0.41
1:B:339:PRO:HB3	1:B:345:GLU:HG3	2.02	0.41
1:C:523:ASP:HB2	1:C:526:SER:H	1.85	0.41
1:B:1130:ILE:HG22	1:B:1131:LEU:HD23	2.02	0.41
1:A:58:ASN:CA	1:A:270:PHE:O	2.65	0.41
1:B:139:VAL:HG13	1:B:148:ILE:HG12	2.02	0.41
1:B:1198:SER:OG	1:B:1199:ASP:N	2.54	0.41
1:C:510:LEU:HB3	1:A:583:ASN:HB2	2.02	0.41
1:B:354:PHE:HE2	1:B:356:LEU:HD13	1.85	0.41
1:C:331:ASN:OD1	1:C:331:ASN:N	2.53	0.41
1:A:65:GLY:O	1:A:263:ARG:HA	2.20	0.41
1:B:320:ARG:NH1	1:B:623:ASP:OD1	2.47	0.41
1:B:521:LEU:O	1:B:527:THR:OG1	2.34	0.41
1:C:269:ASN:ND2	1:C:277:THR:OG1	2.45	0.41
1:A:98:PHE:HE1	1:A:204:GLN:HG2	1.85	0.41
1:A:129:VAL:HB	1:A:131:VAL:HG22	2.01	0.41
1:A:436:ILE:HG21	1:A:460:VAL:HG22	2.02	0.41
1:A:868:SER:HB3	1:A:871:LEU:HB2	2.03	0.41
1:A:969:PRO:HA	1:A:971:TRP:CD2	2.56	0.41
1:B:267:LEU:HB3	1:B:280:VAL:HB	2.03	0.41
1:B:362:LEU:HD23	1:B:362:LEU:HA	1.93	0.41
1:C:332:TRP:O	1:C:390:LYS:NZ	2.54	0.41
1:A:938:GLN:HG3	1:A:1044:LEU:HD22	2.03	0.41
1:B:254:LEU:HD22	1:B:254:LEU:HA	1.91	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:775:VAL:O	1:A:869:SER:N	2.54	0.41
1:B:125:VAL:HG23	1:B:138:VAL:HG22	2.03	0.40
1:B:162:VAL:HG22	1:B:241:THR:HB	2.03	0.40
1:C:205:GLU:OE2	1:C:206:ARG:NH1	2.44	0.40
1:A:888:LEU:HD11	1:A:967:MET:HE1	2.02	0.40
1:C:223:LEU:HD12	1:C:223:LEU:HA	1.92	0.40
1:C:392:ALA:HB3	1:C:460:VAL:HG11	2.04	0.40
1:C:625:TYR:OH	1:C:660:ASP:OD1	2.33	0.40
1:C:978:PRO:HB2	1:C:981:LEU:HD13	2.03	0.40
1:A:333:LEU:HD11	1:A:592:PHE:HZ	1.86	0.40
1:B:333:LEU:HD12	1:B:359:LEU:HD11	2.04	0.40
1:B:346:ARG:HA	1:B:388:VAL:O	2.21	0.40
1:C:66:TYR:OH	1:C:205:GLU:OE1	2.31	0.40
1:C:78:ALA:HB1	1:C:254:LEU:HD12	2.02	0.40
1:A:376:SER:OG	1:A:377:LYS:NZ	2.55	0.40
1:C:161:THR:OG1	1:C:239:PRO:O	2.38	0.40
1:C:518:CYS:HB2	1:C:521:LEU:HD21	2.03	0.40
1:C:887:LEU:HA	1:C:1135:GLN:HE22	1.87	0.40
1:B:373:LEU:HD23	1:B:373:LEU:HA	1.94	0.40
1:A:373:LEU:HD23	1:A:373:LEU:HA	1.87	0.40

There are no symmetry-related clashes.

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 PDB entries followed by that with respect to all EM entries.

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	1206/1290 (94%)	1116 (92%)	90 (8%)	0	100	100
1	B	1206/1290 (94%)	1131 (94%)	75 (6%)	0	100	100
1	C	1206/1290 (94%)	1122 (93%)	84 (7%)	0	100	100
All	All	3618/3870 (94%)	3369 (93%)	249 (7%)	0	100	100

There are no Ramachandran outliers to report.

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 PDB entries followed by that with respect to all EM entries.

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	1082/1159 (93%)	959 (89%)	123 (11%)	5	19
1	B	798/1159 (69%)	706 (88%)	92 (12%)	5	18
1	C	1082/1159 (93%)	957 (88%)	125 (12%)	5	18
All	All	2962/3477 (85%)	2622 (88%)	340 (12%)	8	18

All (340) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	14	VAL
1	B	28	TYR
1	B	29	ASN
1	B	30	LYS
1	B	34	ARG
1	B	39	VAL
1	B	40	VAL
1	B	41	ASP
1	B	51	VAL
1	B	52	LEU
1	B	57	LEU
1	B	64	THR
1	B	387	THR
1	B	399	ASP
1	B	402	GLN
1	B	428	SER
1	B	429	LEU
1	B	472	ASP
1	B	481	VAL
1	B	482	VAL
1	B	485	CYS
1	B	495	CYS
1	B	512	VAL

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Mol	Chain	Res	Type
1	B	540	VAL
1	B	545	HIS
1	B	558	THR
1	B	595	ASN
1	B	597	ILE
1	B	601	THR
1	B	602	THR
1	B	606	ASP
1	B	607	LEU
1	B	608	LEU
1	B	612	THR
1	B	613	GLU
1	B	616	THR
1	B	618	VAL
1	B	630	GLN
1	B	636	VAL
1	B	642	ASN
1	B	655	ILE
1	B	659	LYS
1	B	666	THR
1	B	707	ILE
1	B	711	PHE
1	B	714	ASP
1	B	730	SER
1	B	740	SER
1	B	744	ILE
1	B	748	LEU
1	B	755	SER
1	B	758	ILE
1	B	772	VAL
1	B	773	SER
1	B	788	ILE
1	B	800	GLU
1	B	807	SER
1	B	811	THR
1	B	828	LEU
1	B	849	LEU
1	B	850	LEU
1	B	852	ILE
1	B	853	THR
1	B	865	VAL
1	B	879	VAL

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Mol	Chain	Res	Type
1	B	890	CYS
1	B	903	LEU
1	B	931	ILE
1	B	950	LEU
1	B	953	THR
1	B	964	VAL
1	B	990	LEU
1	B	1012	LEU
1	B	1028	LYS
1	B	1064	ARG
1	B	1075	ASP
1	B	1086	ASN
1	B	1089	VAL
1	B	1096	ILE
1	B	1098	LEU
1	B	1115	LYS
1	B	1116	SER
1	B	1124	CYS
1	B	1135	GLN
1	B	1151	THR
1	B	1178	ILE
1	B	1180	GLN
1	B	1185	MET
1	B	1189	SER
1	B	1203	VAL
1	B	1217	PHE
1	B	1219	TYR
1	C	17	ASP
1	C	29	ASN
1	C	34	ARG
1	C	38	ASP
1	C	48	THR
1	C	51	VAL
1	C	55	VAL
1	C	58	ASN
1	C	73	ASN
1	C	74	PHE
1	C	85	LEU
1	C	99	ASN
1	C	100	ASN
1	C	111	LEU
1	C	114	ASN

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Mol	Chain	Res	Type
1	C	116	THR
1	C	120	GLU
1	C	124	ILE
1	C	125	VAL
1	C	129	VAL
1	C	134	SER
1	C	136	THR
1	C	137	ILE
1	C	143	ASN
1	C	149	THR
1	C	184	LEU
1	C	187	LYS
1	C	213	TYR
1	C	216	VAL
1	C	228	LEU
1	C	241	THR
1	C	243	LYS
1	C	254	LEU
1	C	258	VAL
1	C	259	THR
1	C	268	LEU
1	C	272	GLU
1	C	283	SER
1	C	294	THR
1	C	310	THR
1	C	311	VAL
1	C	324	LEU
1	C	330	ASP
1	C	342	LEU
1	C	356	LEU
1	C	365	VAL
1	C	373	LEU
1	C	374	ASP
1	C	378	ILE
1	C	403	LEU
1	C	418	ILE
1	C	425	LEU
1	C	434	VAL
1	C	460	VAL
1	C	464	ASP
1	C	482	VAL
1	C	500	LYS

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Mol	Chain	Res	Type
1	C	505	ASP
1	C	511	TYR
1	C	512	VAL
1	C	527	THR
1	C	535	GLN
1	C	558	THR
1	C	573	LEU
1	C	604	SER
1	C	618	VAL
1	C	628	THR
1	C	636	VAL
1	C	644	TRP
1	C	655	ILE
1	C	659	LYS
1	C	706	PHE
1	C	714	ASP
1	C	731	VAL
1	C	732	SER
1	C	735	ASP
1	C	743	CYS
1	C	748	LEU
1	C	756	ARG
1	C	768	GLU
1	C	787	GLU
1	C	788	ILE
1	C	789	GLN
1	C	800	GLU
1	C	820	SER
1	C	828	LEU
1	C	845	GLU
1	C	849	LEU
1	C	850	LEU
1	C	865	VAL
1	C	866	THR
1	C	879	VAL
1	C	886	SER
1	C	891	LEU
1	C	894	GLN
1	C	914	SER
1	C	930	GLU
1	C	932	ARG
1	C	934	LEU

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Mol	Chain	Res	Type
1	C	950	LEU
1	C	952	GLU
1	C	964	VAL
1	C	972	SER
1	C	983	VAL
1	C	995	ASP
1	C	1002	LYS
1	C	1012	LEU
1	C	1026	LEU
1	C	1086	ASN
1	C	1089	VAL
1	C	1096	ILE
1	C	1098	LEU
1	C	1115	LYS
1	C	1118	SER
1	C	1124	CYS
1	C	1147	SER
1	C	1156	VAL
1	C	1179	LYS
1	C	1185	MET
1	C	1203	VAL
1	C	1207	SER
1	C	1212	PHE
1	C	1213	THR
1	C	1219	TYR
1	C	1220	LEU
1	A	14	VAL
1	A	27	ASP
1	A	34	ARG
1	A	35	ILE
1	A	40	VAL
1	A	51	VAL
1	A	52	LEU
1	A	58	ASN
1	A	64	THR
1	A	75	ARG
1	A	96	SER
1	A	116	THR
1	A	125	VAL
1	A	129	VAL
1	A	136	THR
1	A	143	ASN

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Mol	Chain	Res	Type
1	A	187	LYS
1	A	206	ARG
1	A	213	TYR
1	A	221	THR
1	A	243	LYS
1	A	245	ILE
1	A	248	ASN
1	A	253	THR
1	A	258	VAL
1	A	268	LEU
1	A	272	GLU
1	A	288	SER
1	A	296	SER
1	A	305	ASP
1	A	310	THR
1	A	311	VAL
1	A	312	LYS
1	A	314	VAL
1	A	317	VAL
1	A	324	LEU
1	A	329	ILE
1	A	330	ASP
1	A	356	LEU
1	A	364	HIS
1	A	366	ASP
1	A	378	ILE
1	A	389	ASP
1	A	418	ILE
1	A	447	ARG
1	A	455	VAL
1	A	484	SER
1	A	511	TYR
1	A	515	TRP
1	A	527	THR
1	A	539	VAL
1	A	560	LEU
1	A	570	ASP
1	A	573	LEU
1	A	587	ASN
1	A	593	ILE
1	A	595	ASN
1	A	602	THR

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Mol	Chain	Res	Type
1	A	654	ASN
1	A	655	ILE
1	A	661	PHE
1	A	662	LEU
1	A	674	SER
1	A	706	PHE
1	A	707	ILE
1	A	720	VAL
1	A	731	VAL
1	A	737	ARG
1	A	743	CYS
1	A	748	LEU
1	A	772	VAL
1	A	779	VAL
1	A	781	THR
1	A	789	GLN
1	A	796	ILE
1	A	811	THR
1	A	828	LEU
1	A	835	PHE
1	A	845	GLU
1	A	848	ASP
1	A	850	LEU
1	A	865	VAL
1	A	871	LEU
1	A	873	THR
1	A	879	VAL
1	A	895	CYS
1	A	902	LEU
1	A	930	GLU
1	A	931	ILE
1	A	934	LEU
1	A	950	LEU
1	A	951	SER
1	A	953	THR
1	A	964	VAL
1	A	972	SER
1	A	977	VAL
1	A	986	ARG
1	A	993	THR
1	A	994	MET
1	A	995	ASP

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Mol	Chain	Res	Type
1	A	1002	LYS
1	A	1012	LEU
1	A	1023	ASN
1	A	1024	SER
1	A	1026	LEU
1	A	1028	LYS
1	A	1066	ASP
1	A	1079	ASN
1	A	1086	ASN
1	A	1089	VAL
1	A	1091	GLN
1	A	1096	ILE
1	A	1098	LEU
1	A	1115	LYS
1	A	1124	CYS
1	A	1132	SER
1	A	1152	SER
1	A	1156	VAL
1	A	1187	THR
1	A	1203	VAL
1	A	1217	PHE
1	A	1219	TYR
1	A	1220	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (60) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	402	GLN
1	B	445	ASN
1	B	595	ASN
1	B	605	ASN
1	B	621	ASN
1	B	630	GLN
1	B	694	ASN
1	B	709	GLN
1	B	799	HIS
1	B	821	ASN
1	B	863	GLN
1	B	870	ASN
1	B	876	HIS
1	B	984	GLN
1	B	1001	GLN

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Mol	Chain	Res	Type
1	B	1016	GLN
1	B	1046	GLN
1	B	1079	ASN
1	B	1086	ASN
1	B	1091	GLN
1	B	1122	ASN
1	B	1180	GLN
1	C	73	ASN
1	C	140	GLN
1	C	152	GLN
1	C	204	GLN
1	C	410	GLN
1	C	424	GLN
1	C	503	HIS
1	C	552	ASN
1	C	561	ASN
1	C	605	ASN
1	C	652	ASN
1	C	722	ASN
1	C	872	ASN
1	C	876	HIS
1	C	894	GLN
1	C	1009	ASN
1	C	1016	GLN
1	C	1059	GLN
1	C	1073	GLN
1	C	1086	ASN
1	C	1091	GLN
1	C	1136	ASN
1	A	204	GLN
1	A	265	GLN
1	A	351	ASN
1	A	552	ASN
1	A	561	ASN
1	A	630	GLN
1	A	874	ASN
1	A	876	HIS
1	A	894	GLN
1	A	1001	GLN
1	A	1023	ASN
1	A	1073	GLN
1	A	1086	ASN

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Mol	Chain	Res	Type
1	A	1091	GLN
1	A	1122	ASN
1	A	1180	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 ⓘ

42 monosaccharides 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	NAG	D	1	2,1	14,14,15	0.58	0	17,19,21	0.61	1 (5%)
2	NAG	D	2	2	14,14,15	0.31	0	17,19,21	0.55	0
2	MAN	D	3	2	11,11,12	1.61	2 (18%)	15,15,17	1.46	2 (13%)
2	MAN	D	4	2	11,11,12	0.91	0	15,15,17	1.00	2 (13%)
2	MAN	D	5	2	11,11,12	0.92	0	15,15,17	1.00	2 (13%)
2	MAN	D	6	2	11,11,12	0.87	1 (9%)	15,15,17	1.18	1 (6%)
3	NAG	E	1	3,1	14,14,15	0.23	0	17,19,21	0.52	0
3	NAG	E	2	3	14,14,15	0.34	0	17,19,21	0.50	0
3	NAG	F	1	3,1	14,14,15	0.34	0	17,19,21	0.54	0
3	NAG	F	2	3	14,14,15	0.32	0	17,19,21	0.49	0
3	NAG	G	1	3,1	14,14,15	0.55	0	17,19,21	0.54	0
3	NAG	G	2	3	14,14,15	0.50	0	17,19,21	0.62	1 (5%)
3	NAG	H	1	3,1	14,14,15	0.23	0	17,19,21	0.56	0
3	NAG	H	2	3	14,14,15	0.37	0	17,19,21	0.61	1 (5%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	NAG	I	1	2,1	14,14,15	0.33	0	17,19,21	0.57	0
2	NAG	I	2	2	14,14,15	0.28	0	17,19,21	0.54	0
2	MAN	I	3	2	11,11,12	1.49	3 (27%)	15,15,17	1.69	1 (6%)
2	MAN	I	4	2	11,11,12	0.85	0	15,15,17	1.12	2 (13%)
2	MAN	I	5	2	11,11,12	0.79	0	15,15,17	1.09	2 (13%)
2	MAN	I	6	2	11,11,12	0.81	0	15,15,17	1.03	1 (6%)
3	NAG	J	1	3,1	14,14,15	0.37	0	17,19,21	0.55	0
3	NAG	J	2	3	14,14,15	0.27	0	17,19,21	0.55	0
3	NAG	K	1	3,1	14,14,15	0.31	0	17,19,21	0.52	0
3	NAG	K	2	3	14,14,15	0.44	0	17,19,21	0.65	1 (5%)
3	NAG	L	1	3,1	14,14,15	0.41	0	17,19,21	0.79	1 (5%)
3	NAG	L	2	3	14,14,15	0.45	0	17,19,21	0.43	0
3	NAG	M	1	3,1	14,14,15	0.28	0	17,19,21	0.56	0
3	NAG	M	2	3	14,14,15	0.37	0	17,19,21	0.50	0
2	NAG	N	1	2,1	14,14,15	0.28	0	17,19,21	0.47	0
2	NAG	N	2	2	14,14,15	0.28	0	17,19,21	0.57	0
2	MAN	N	3	2	11,11,12	1.46	2 (18%)	15,15,17	1.75	3 (20%)
2	MAN	N	4	2	11,11,12	1.24	2 (18%)	15,15,17	1.27	3 (20%)
2	MAN	N	5	2	11,11,12	0.78	0	15,15,17	1.22	1 (6%)
2	MAN	N	6	2	11,11,12	0.82	0	15,15,17	1.01	2 (13%)
3	NAG	O	1	3,1	14,14,15	0.33	0	17,19,21	0.58	0
3	NAG	O	2	3	14,14,15	0.42	0	17,19,21	0.54	0
3	NAG	P	1	3,1	14,14,15	0.31	0	17,19,21	0.48	0
3	NAG	P	2	3	14,14,15	0.48	0	17,19,21	0.60	0
3	NAG	Q	1	3,1	14,14,15	0.53	0	17,19,21	0.84	1 (5%)
3	NAG	Q	2	3	14,14,15	0.50	0	17,19,21	0.49	0
3	NAG	R	1	3,1	14,14,15	0.19	0	17,19,21	0.56	0
3	NAG	R	2	3	14,14,15	0.40	0	17,19,21	0.57	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	NAG	D	1	2,1	-	2/6/23/26	0/1/1/1
2	NAG	D	2	2	-	2/6/23/26	0/1/1/1
2	MAN	D	3	2	-	1/2/19/22	0/1/1/1
2	MAN	D	4	2	-	2/2/19/22	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	MAN	D	5	2	-	2/2/19/22	0/1/1/1
2	MAN	D	6	2	-	0/2/19/22	0/1/1/1
3	NAG	E	1	3,1	-	2/6/23/26	0/1/1/1
3	NAG	E	2	3	-	0/6/23/26	0/1/1/1
3	NAG	F	1	3,1	-	2/6/23/26	0/1/1/1
3	NAG	F	2	3	-	2/6/23/26	0/1/1/1
3	NAG	G	1	3,1	-	2/6/23/26	0/1/1/1
3	NAG	G	2	3	-	0/6/23/26	0/1/1/1
3	NAG	H	1	3,1	-	0/6/23/26	0/1/1/1
3	NAG	H	2	3	-	0/6/23/26	0/1/1/1
2	NAG	I	1	2,1	-	1/6/23/26	0/1/1/1
2	NAG	I	2	2	-	2/6/23/26	0/1/1/1
2	MAN	I	3	2	-	0/2/19/22	1/1/1/1
2	MAN	I	4	2	-	2/2/19/22	0/1/1/1
2	MAN	I	5	2	-	0/2/19/22	0/1/1/1
2	MAN	I	6	2	-	0/2/19/22	0/1/1/1
3	NAG	J	1	3,1	-	0/6/23/26	0/1/1/1
3	NAG	J	2	3	-	2/6/23/26	0/1/1/1
3	NAG	K	1	3,1	-	0/6/23/26	0/1/1/1
3	NAG	K	2	3	-	0/6/23/26	0/1/1/1
3	NAG	L	1	3,1	-	1/6/23/26	0/1/1/1
3	NAG	L	2	3	-	2/6/23/26	0/1/1/1
3	NAG	M	1	3,1	-	1/6/23/26	0/1/1/1
3	NAG	M	2	3	-	0/6/23/26	0/1/1/1
2	NAG	N	1	2,1	-	0/6/23/26	0/1/1/1
2	NAG	N	2	2	-	2/6/23/26	0/1/1/1
2	MAN	N	3	2	-	0/2/19/22	0/1/1/1
2	MAN	N	4	2	-	1/2/19/22	0/1/1/1
2	MAN	N	5	2	-	0/2/19/22	0/1/1/1
2	MAN	N	6	2	-	0/2/19/22	0/1/1/1
3	NAG	O	1	3,1	-	2/6/23/26	0/1/1/1
3	NAG	O	2	3	-	0/6/23/26	0/1/1/1
3	NAG	P	1	3,1	-	2/6/23/26	0/1/1/1
3	NAG	P	2	3	-	2/6/23/26	0/1/1/1
3	NAG	Q	1	3,1	-	2/6/23/26	0/1/1/1
3	NAG	Q	2	3	-	0/6/23/26	0/1/1/1
3	NAG	R	1	3,1	-	2/6/23/26	0/1/1/1
3	NAG	R	2	3	-	1/6/23/26	0/1/1/1

All (10) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	3	MAN	O5-C5	3.35	1.50	1.43
2	N	3	MAN	O5-C5	2.82	1.48	1.43
2	N	4	MAN	C1-C2	2.80	1.58	1.52
2	D	3	MAN	C2-C3	2.76	1.56	1.52
2	I	3	MAN	C1-C2	2.45	1.58	1.52
2	I	3	MAN	C4-C3	2.42	1.58	1.52
2	D	6	MAN	C1-C2	2.22	1.57	1.52
2	N	4	MAN	C2-C3	2.17	1.55	1.52
2	N	3	MAN	C1-C2	2.10	1.57	1.52
2	I	3	MAN	O5-C5	2.04	1.47	1.43

All (28) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	N	3	MAN	C1-O5-C5	5.59	119.68	112.19
2	I	3	MAN	C1-O5-C5	5.54	119.61	112.19
2	D	3	MAN	C1-O5-C5	4.21	117.83	112.19
2	N	5	MAN	C1-O5-C5	3.96	117.49	112.19
2	D	6	MAN	C1-O5-C5	3.34	116.66	112.19
2	I	5	MAN	C1-O5-C5	3.14	116.40	112.19
2	I	4	MAN	C1-O5-C5	3.12	116.36	112.19
2	I	6	MAN	C1-O5-C5	3.03	116.24	112.19
2	N	4	MAN	C1-C2-C3	2.63	113.47	109.64
2	D	4	MAN	C1-O5-C5	2.62	115.69	112.19
2	N	4	MAN	C1-O5-C5	2.59	115.66	112.19
2	N	6	MAN	C1-O5-C5	2.55	115.61	112.19
2	D	5	MAN	C1-O5-C5	2.53	115.57	112.19
3	Q	1	NAG	C1-O5-C5	2.50	115.53	112.19
2	N	4	MAN	O2-C2-C3	-2.40	105.18	110.15
3	L	1	NAG	C1-O5-C5	2.32	115.30	112.19
3	K	2	NAG	C1-O5-C5	2.23	115.18	112.19
2	D	5	MAN	O2-C2-C3	-2.17	105.66	110.15
2	D	3	MAN	C1-C2-C3	2.13	112.75	109.64
2	N	3	MAN	O2-C2-C3	-2.12	105.77	110.15
2	I	5	MAN	O2-C2-C3	-2.11	105.79	110.15
2	N	3	MAN	C2-C3-C4	2.10	114.55	110.86
2	D	1	NAG	C1-O5-C5	2.10	114.99	112.19
3	G	2	NAG	C1-O5-C5	2.09	114.99	112.19
2	D	4	MAN	O2-C2-C3	-2.05	105.90	110.15
3	H	2	NAG	C1-O5-C5	2.05	114.94	112.19
2	N	6	MAN	O2-C2-C3	-2.03	105.94	110.15
2	I	4	MAN	O2-C2-C3	-2.02	105.97	110.15

There are no chirality outliers.

All (42) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	I	2	NAG	O5-C5-C6-O6
3	Q	1	NAG	O5-C5-C6-O6
3	J	2	NAG	C4-C5-C6-O6
3	L	2	NAG	O5-C5-C6-O6
3	E	1	NAG	O5-C5-C6-O6
3	F	2	NAG	O5-C5-C6-O6
3	G	1	NAG	O5-C5-C6-O6
3	Q	1	NAG	C4-C5-C6-O6
2	I	4	MAN	O5-C5-C6-O6
2	I	2	NAG	C4-C5-C6-O6
3	L	2	NAG	C4-C5-C6-O6
3	J	2	NAG	O5-C5-C6-O6
2	D	4	MAN	O5-C5-C6-O6
2	D	2	NAG	O5-C5-C6-O6
3	G	1	NAG	C4-C5-C6-O6
3	P	2	NAG	O5-C5-C6-O6
3	P	2	NAG	C4-C5-C6-O6
2	D	2	NAG	C4-C5-C6-O6
3	E	1	NAG	C4-C5-C6-O6
3	F	1	NAG	O5-C5-C6-O6
3	F	2	NAG	C4-C5-C6-O6
3	F	1	NAG	C4-C5-C6-O6
2	D	4	MAN	C4-C5-C6-O6
3	P	1	NAG	O5-C5-C6-O6
2	N	2	NAG	O5-C5-C6-O6
2	I	4	MAN	C4-C5-C6-O6
2	D	1	NAG	C4-C5-C6-O6
3	R	1	NAG	C4-C5-C6-O6
2	D	5	MAN	O5-C5-C6-O6
2	D	1	NAG	O5-C5-C6-O6
2	D	3	MAN	O5-C5-C6-O6
3	M	1	NAG	O5-C5-C6-O6
2	I	1	NAG	O5-C5-C6-O6
2	N	4	MAN	O5-C5-C6-O6
3	R	1	NAG	O5-C5-C6-O6
3	R	2	NAG	O5-C5-C6-O6
3	L	1	NAG	O5-C5-C6-O6
3	P	1	NAG	C4-C5-C6-O6
3	O	1	NAG	C4-C5-C6-O6
2	N	2	NAG	C4-C5-C6-O6

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Mol	Chain	Res	Type	Atoms
3	O	1	NAG	O5-C5-C6-O6
2	D	5	MAN	C4-C5-C6-O6

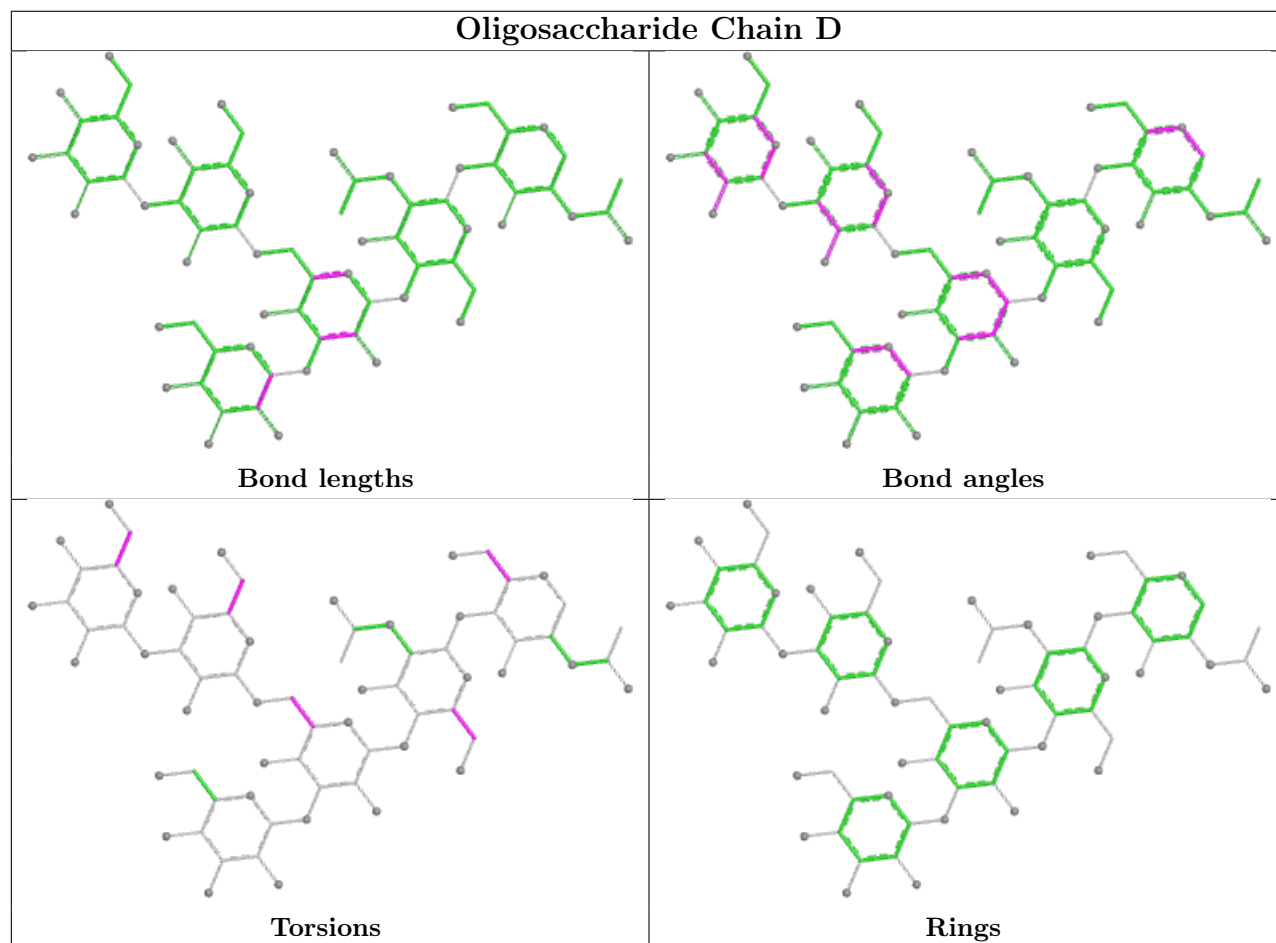
All (1) ring outliers are listed below:

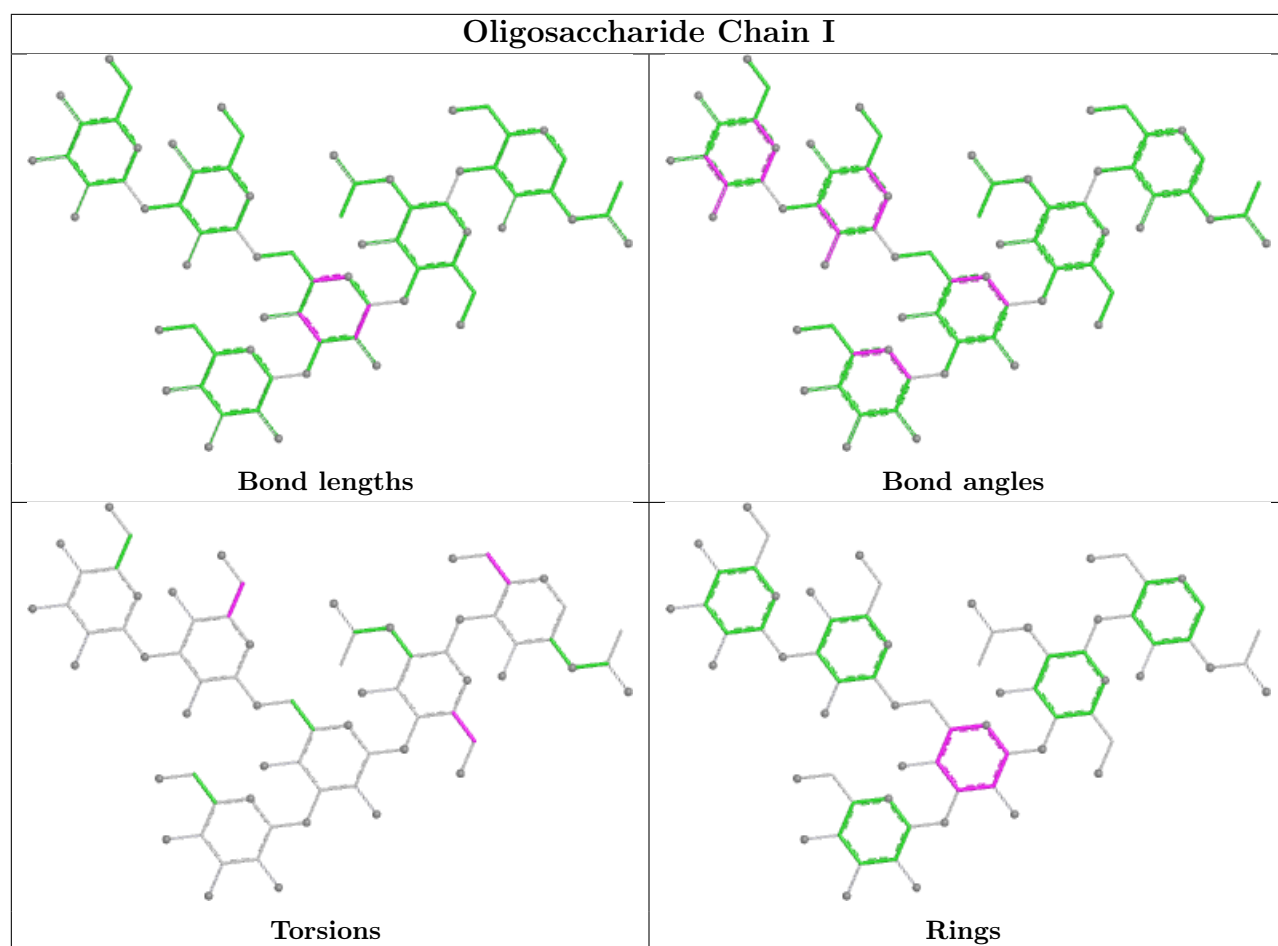
Mol	Chain	Res	Type	Atoms
2	I	3	MAN	C1-C2-C3-C4-C5-O5

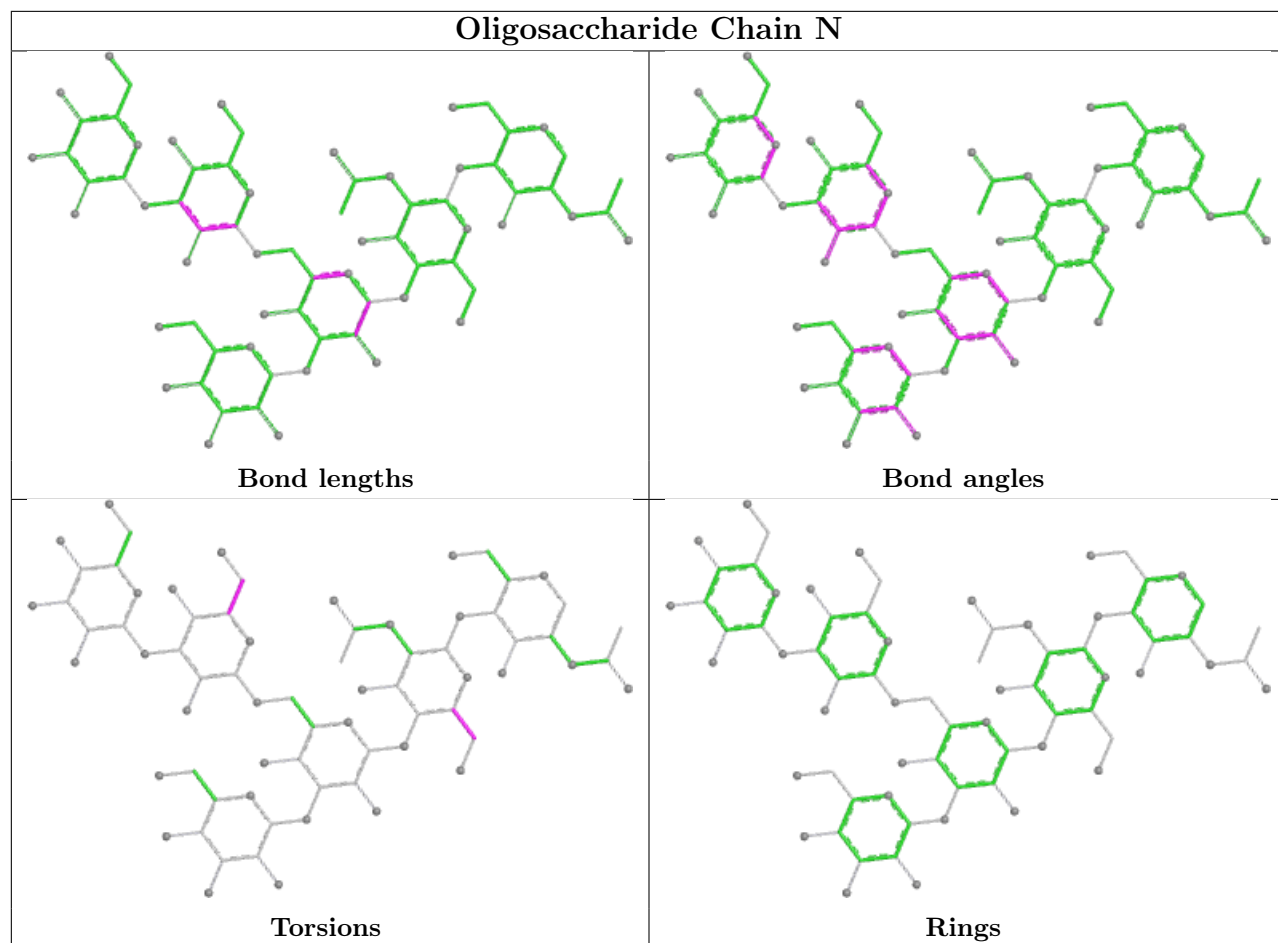
2 monomers are involved in 2 short contacts:

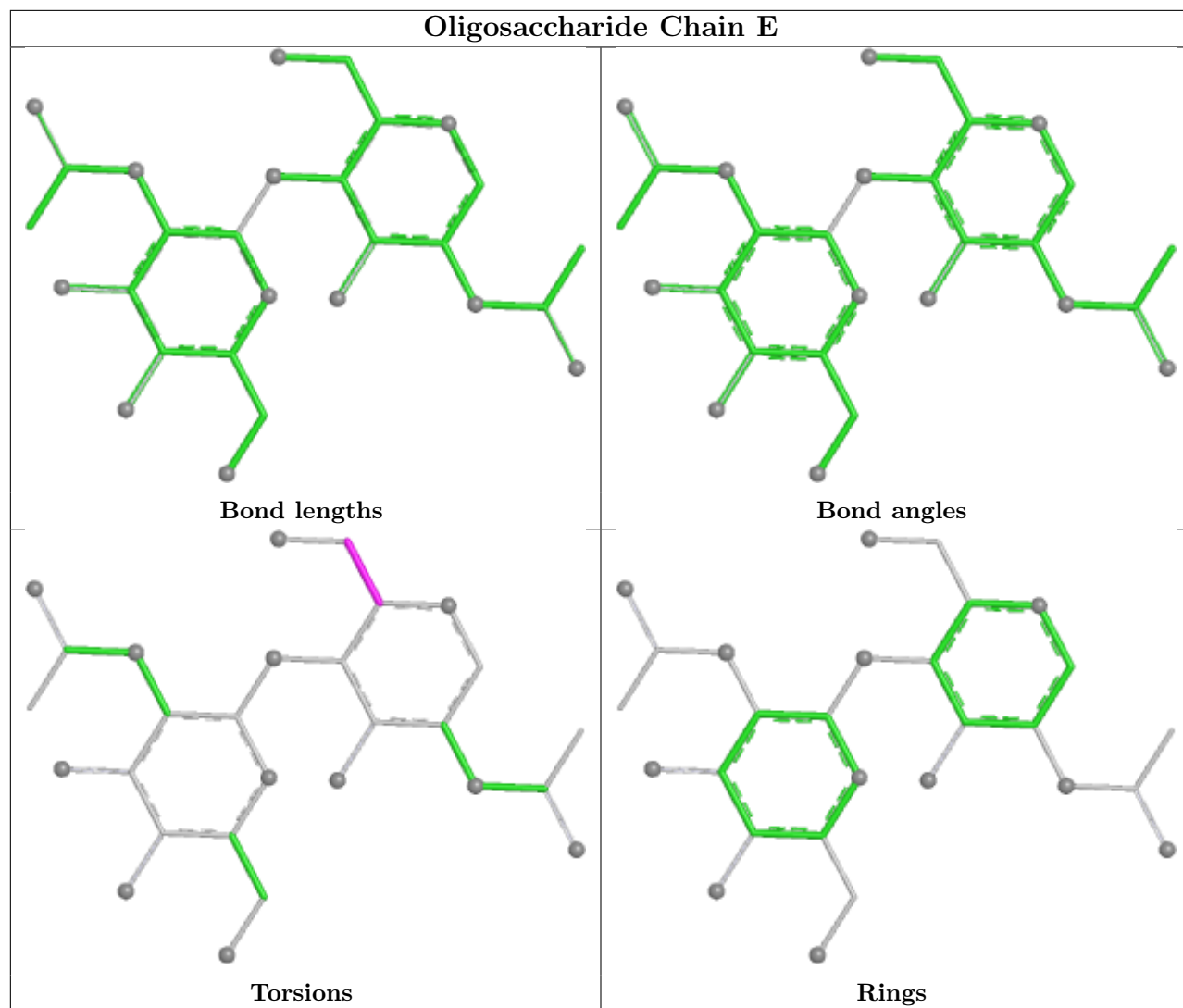
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	Q	1	NAG	1	0
3	E	1	NAG	1	0

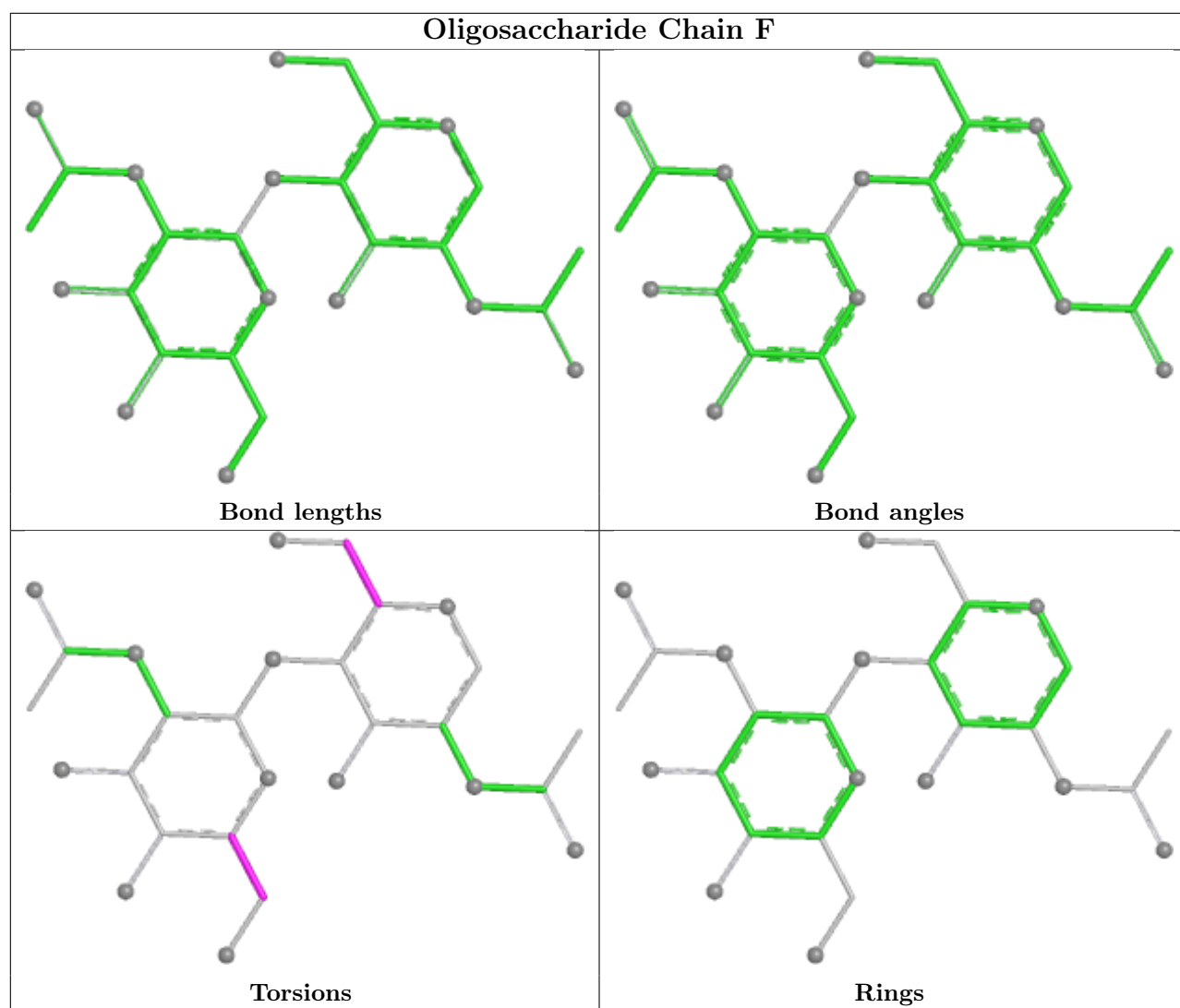
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

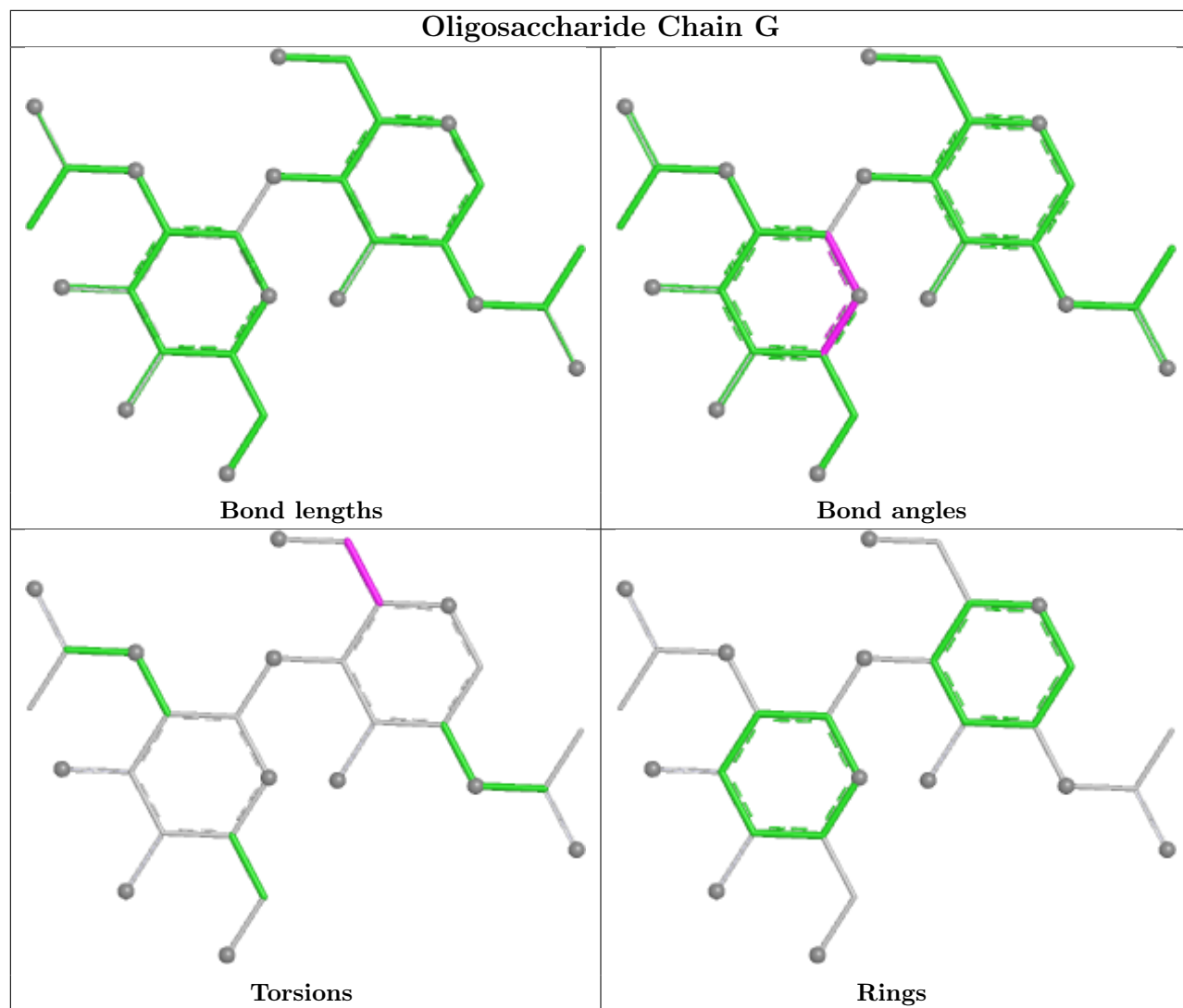


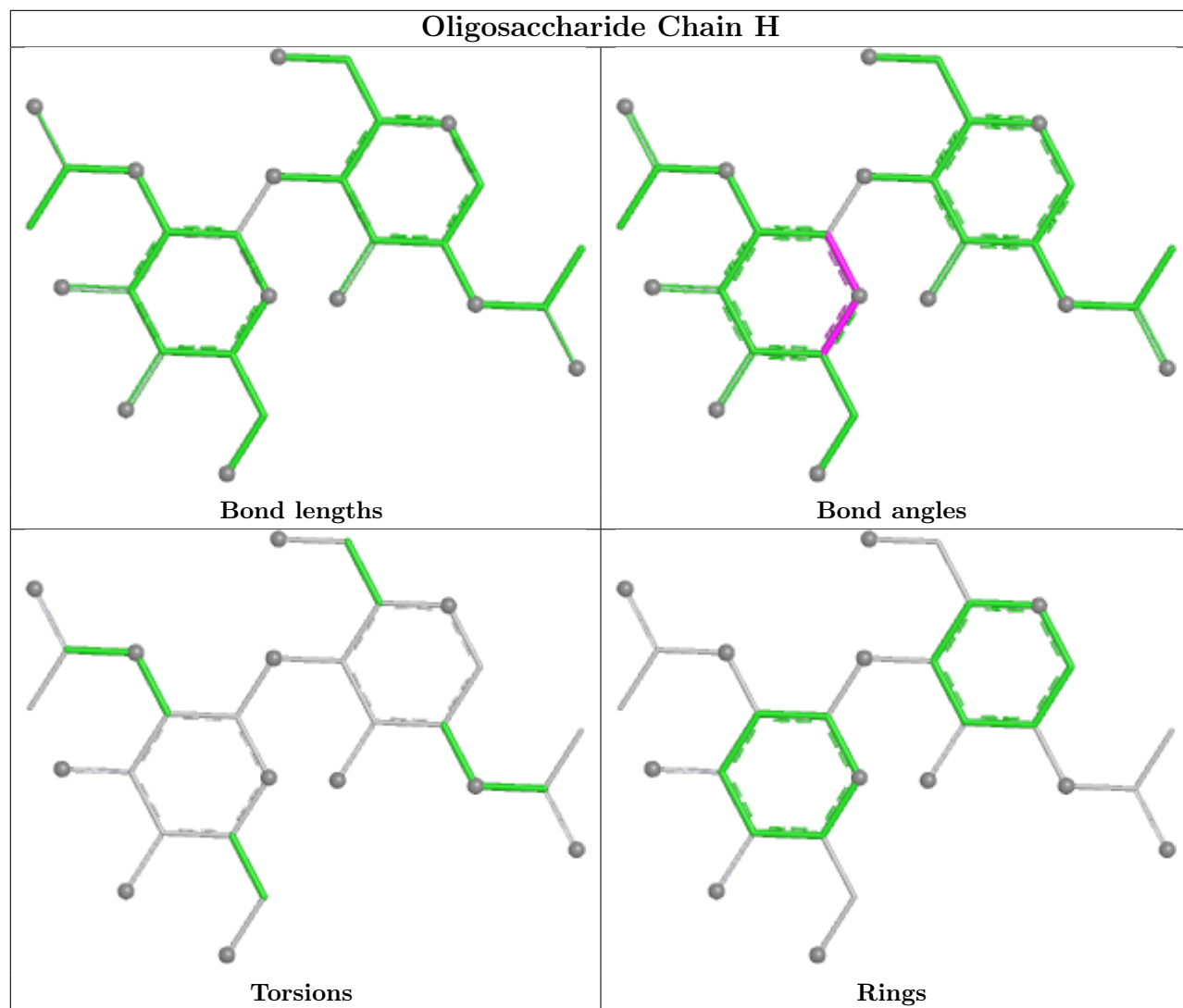


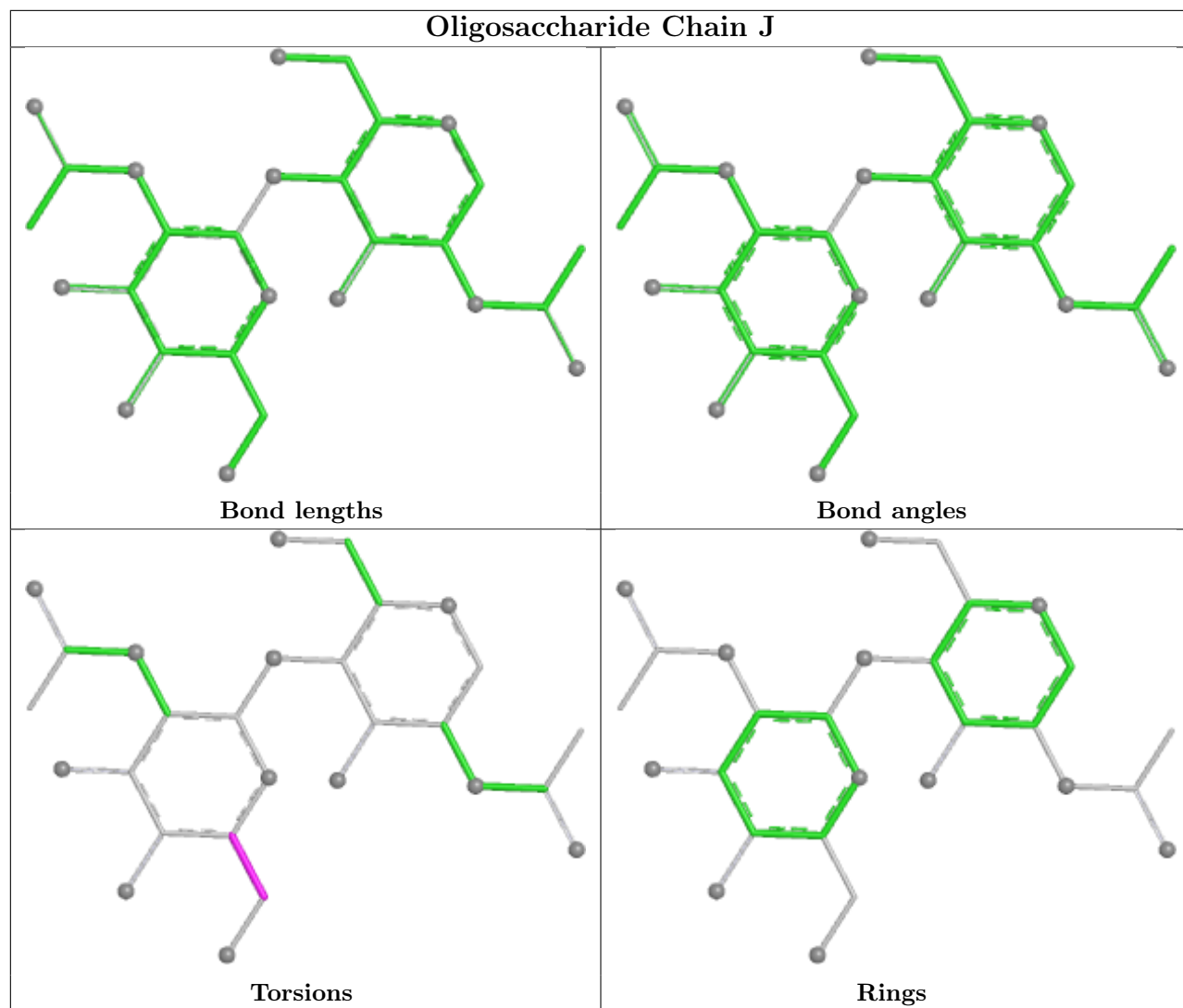


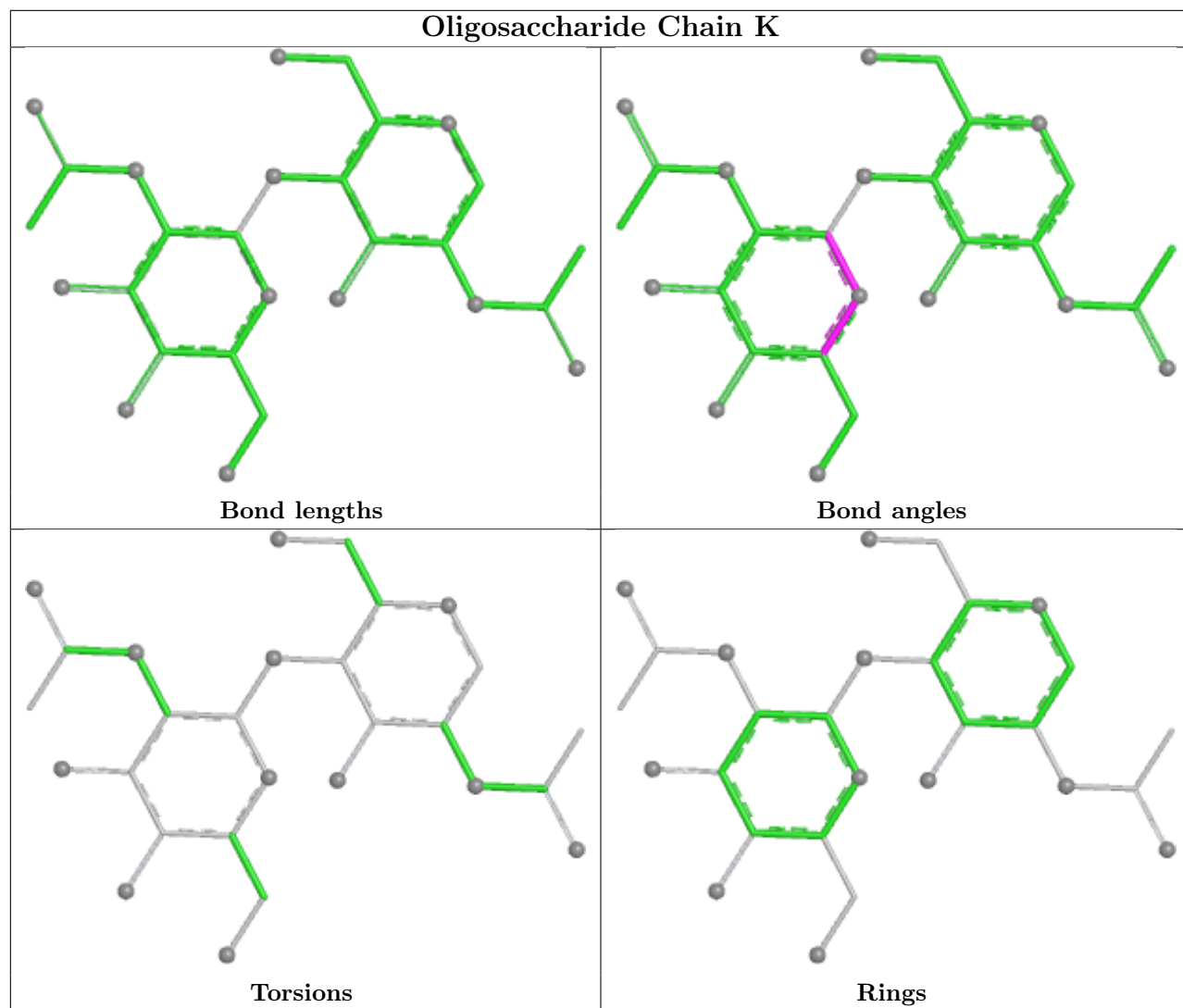


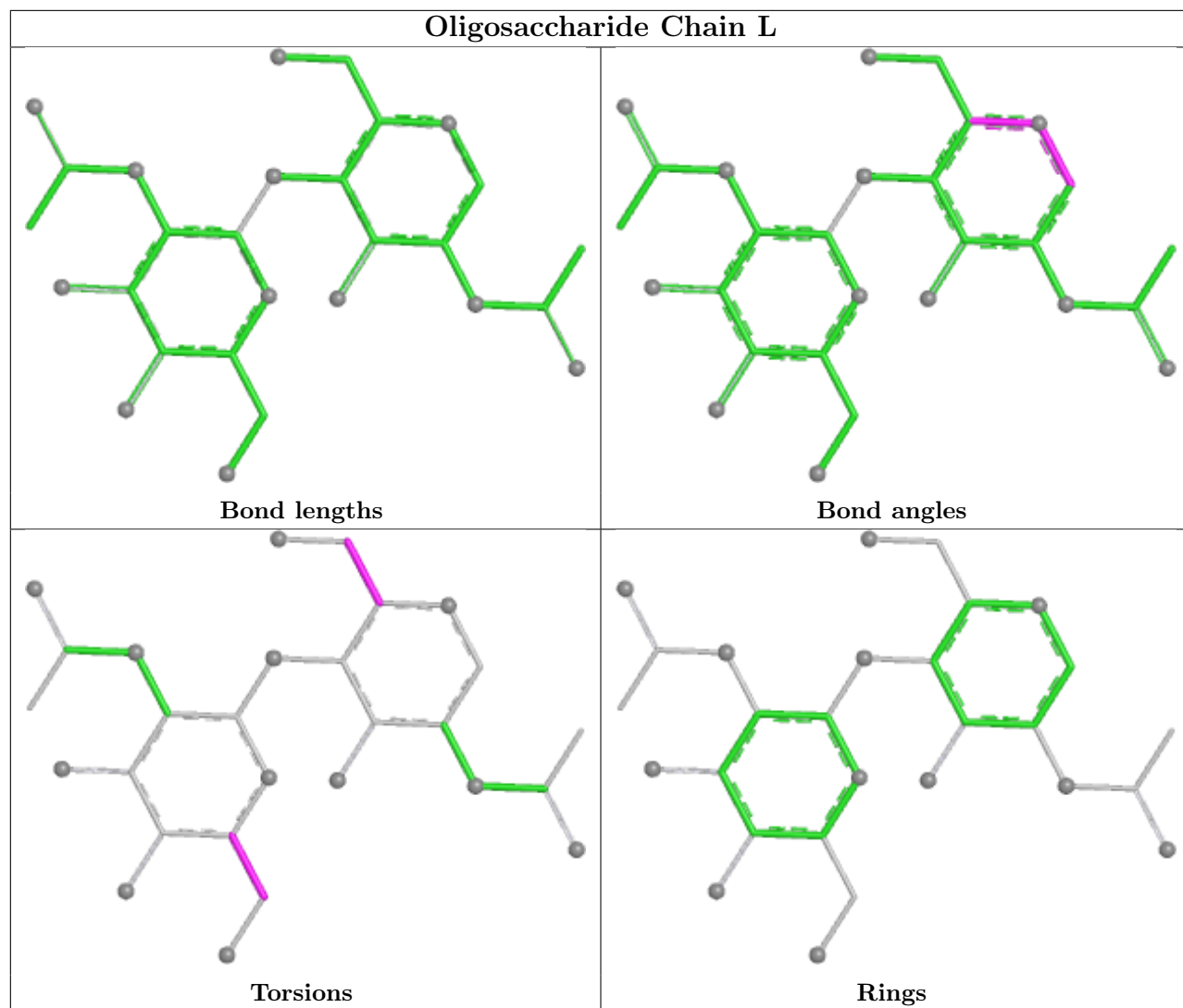


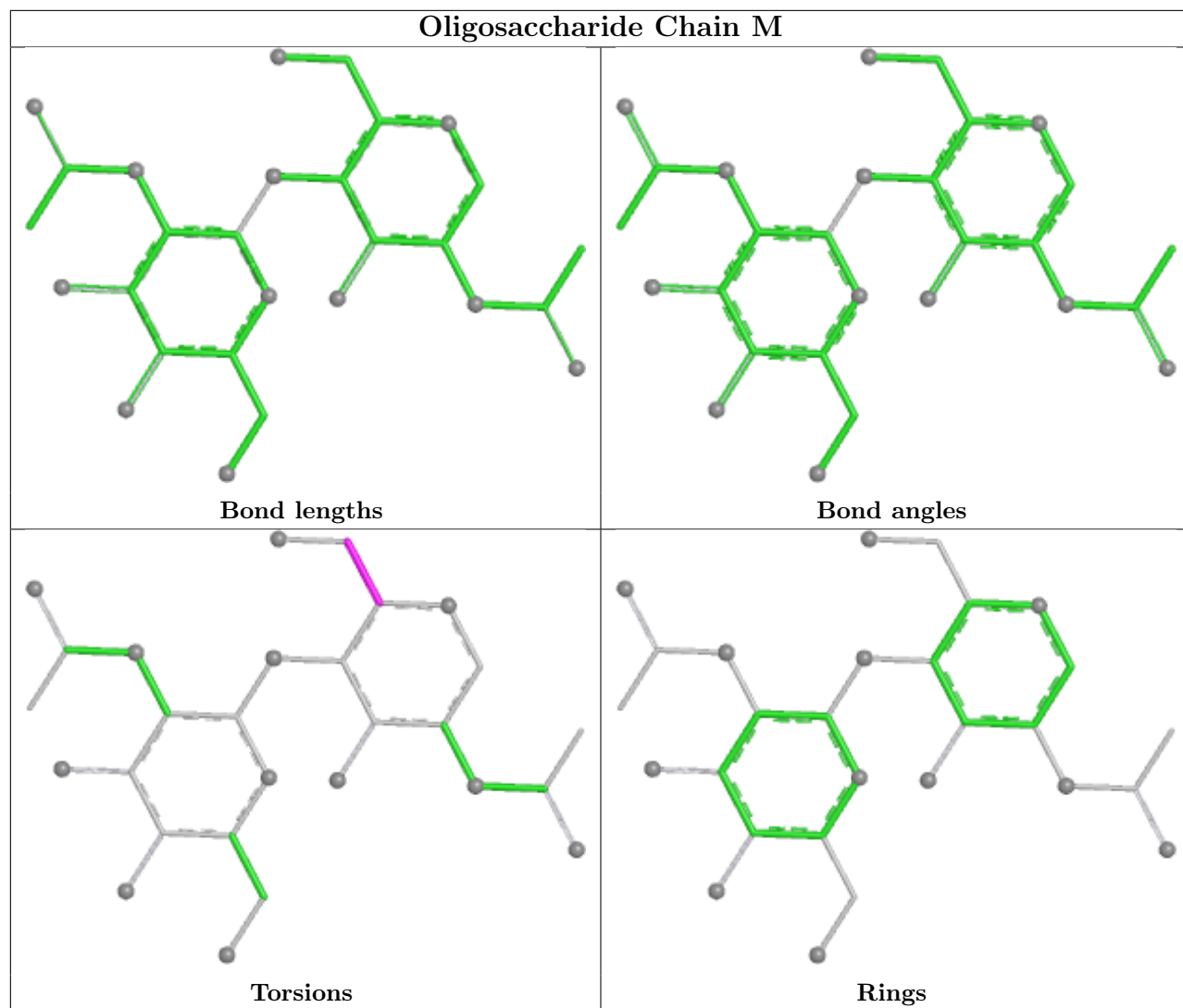


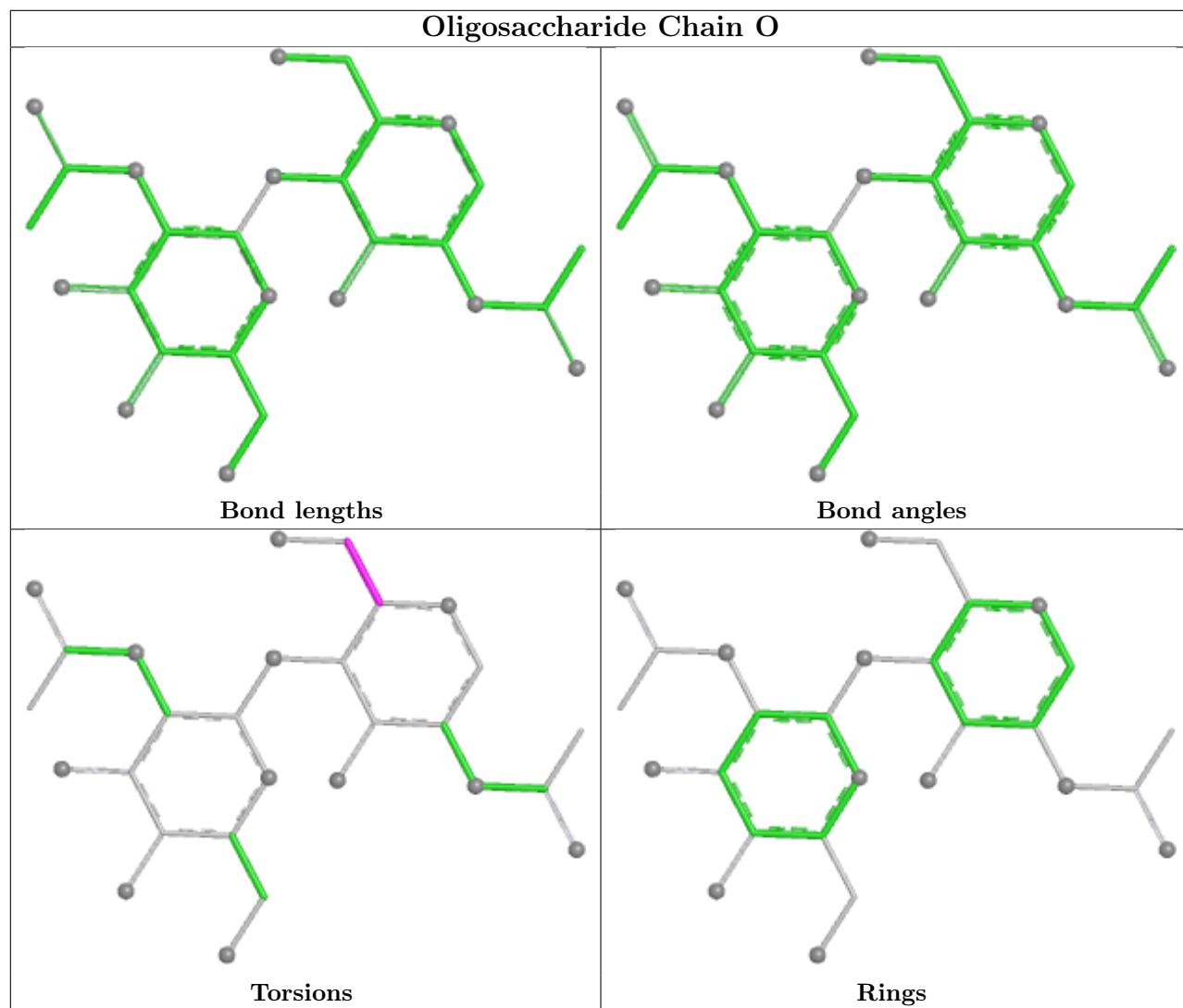


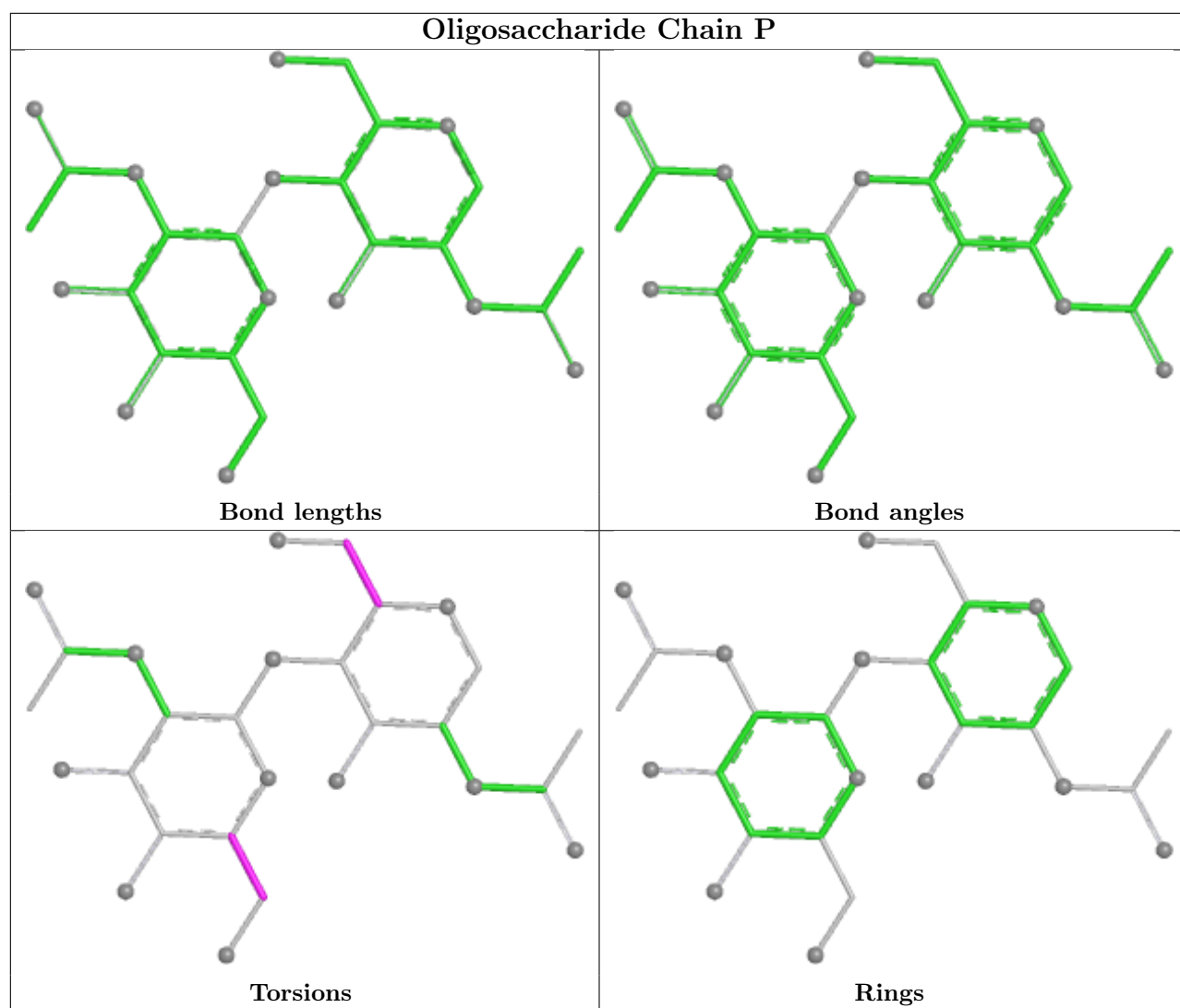


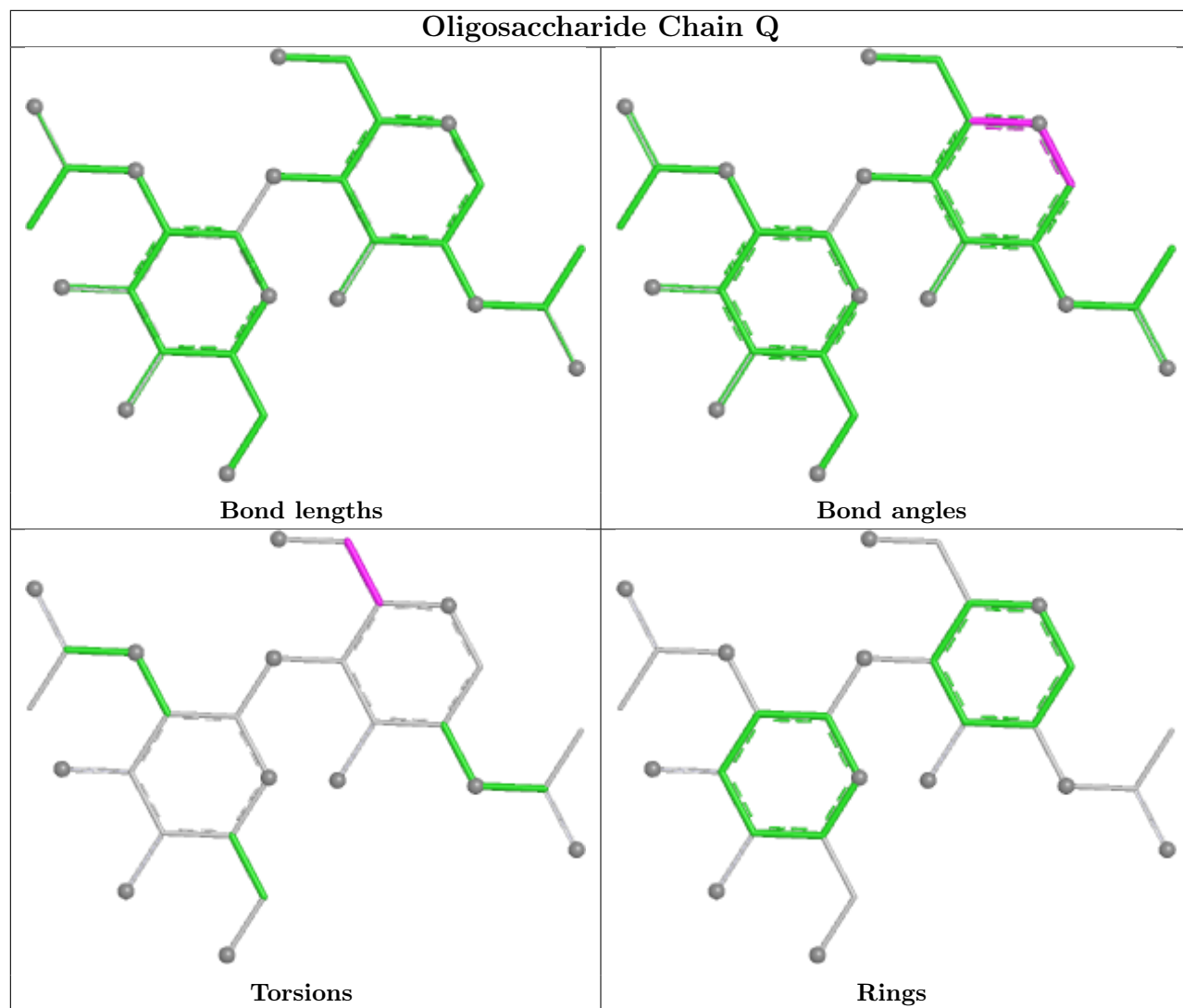


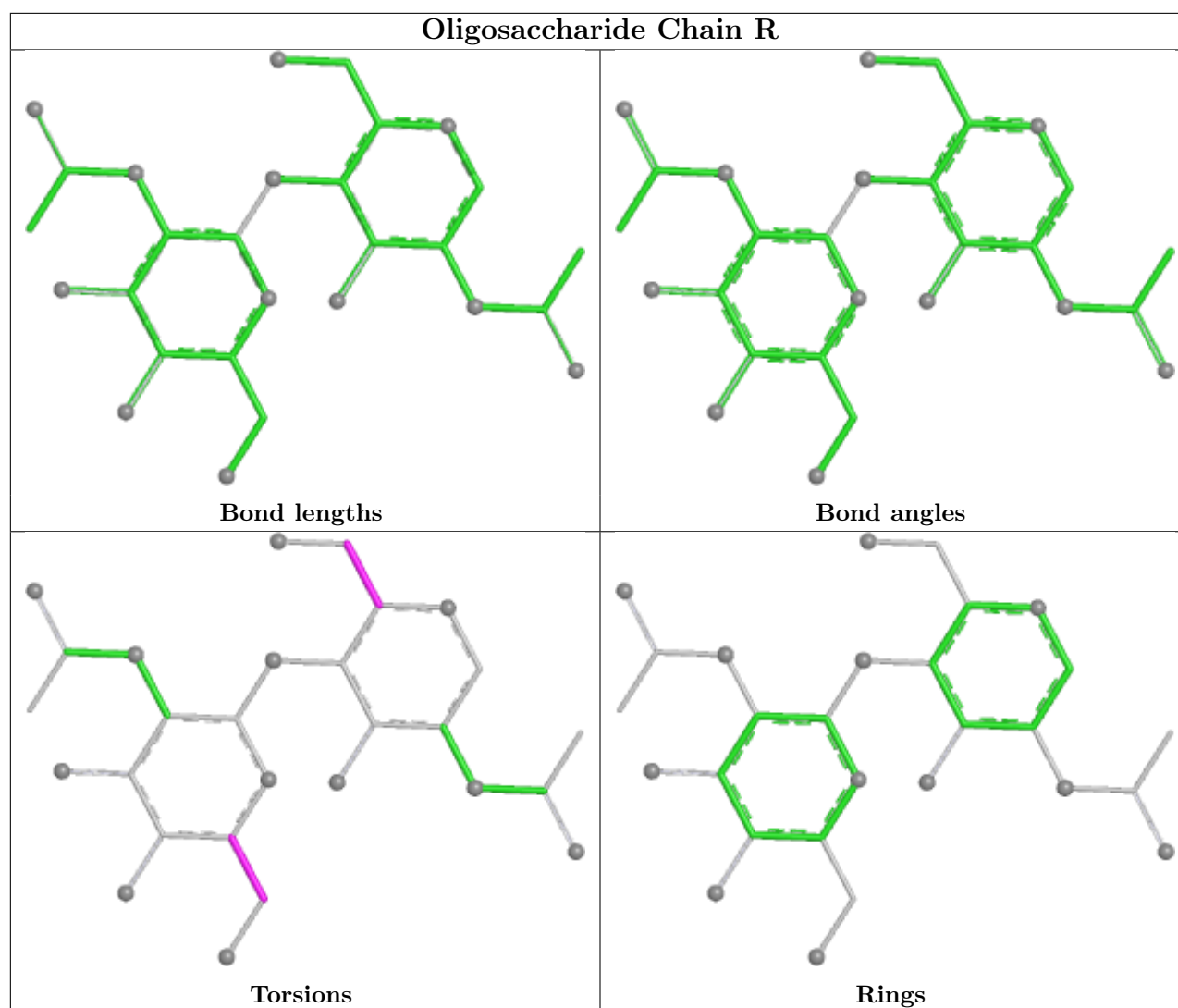












5.6 Ligand geometry [i](#)

51 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	$\# Z > 2$
4	NAG	C	2003	1	14,14,15	0.26	0	17,19,21	0.41	0
4	NAG	C	2017	1	14,14,15	0.30	0	17,19,21	0.36	0
4	NAG	A	2014	1	14,14,15	0.38	0	17,19,21	0.54	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
4	NAG	C	2011	1	14,14,15	0.38	0	17,19,21	0.62	1 (5%)
4	NAG	C	2001	1	14,14,15	0.66	1 (7%)	17,19,21	0.81	1 (5%)
4	NAG	C	2012	1	14,14,15	0.26	0	17,19,21	0.58	0
4	NAG	B	2005	1	14,14,15	0.32	0	17,19,21	0.57	0
4	NAG	A	2010	1	14,14,15	0.56	0	17,19,21	0.45	0
4	NAG	B	2013	1	14,14,15	0.37	0	17,19,21	0.78	1 (5%)
4	NAG	B	2006	1	14,14,15	0.29	0	17,19,21	0.46	0
4	NAG	B	2001	1	14,14,15	0.58	0	17,19,21	0.69	1 (5%)
4	NAG	C	2007	1	14,14,15	0.42	0	17,19,21	0.62	1 (5%)
4	NAG	A	2007	1	14,14,15	0.59	0	17,19,21	0.65	1 (5%)
4	NAG	B	2017	1	14,14,15	0.39	0	17,19,21	0.46	0
4	NAG	A	2013	1	14,14,15	0.38	0	17,19,21	0.56	0
4	NAG	C	2010	1	14,14,15	0.28	0	17,19,21	0.52	0
4	NAG	B	2007	1	14,14,15	0.56	0	17,19,21	0.65	1 (5%)
4	NAG	A	2015	1	14,14,15	0.30	0	17,19,21	0.54	0
4	NAG	C	2005	1	14,14,15	0.29	0	17,19,21	0.47	0
4	NAG	C	2009	1	14,14,15	0.32	0	17,19,21	0.66	1 (5%)
4	NAG	B	2015	1	14,14,15	0.28	0	17,19,21	0.57	0
4	NAG	A	2006	1	14,14,15	0.38	0	17,19,21	0.41	0
4	NAG	A	2002	1	14,14,15	0.51	0	17,19,21	0.59	0
4	NAG	B	2008	1	14,14,15	0.36	0	17,19,21	0.47	0
4	NAG	B	2012	1	14,14,15	0.30	0	17,19,21	0.63	1 (5%)
4	NAG	B	2010	1	14,14,15	0.37	0	17,19,21	0.54	0
4	NAG	B	2014	1	14,14,15	0.38	0	17,19,21	0.54	0
4	NAG	A	2004	1	14,14,15	0.29	0	17,19,21	0.52	0
4	NAG	B	2003	1	14,14,15	0.27	0	17,19,21	0.35	0
4	NAG	C	2006	1	14,14,15	0.56	0	17,19,21	0.68	1 (5%)
4	NAG	C	2016	1	14,14,15	0.36	0	17,19,21	0.63	1 (5%)
4	NAG	B	2011	1	14,14,15	0.30	0	17,19,21	0.48	0
4	NAG	C	2015	1	14,14,15	0.34	0	17,19,21	0.62	1 (5%)
4	NAG	A	2017	1	14,14,15	0.43	0	17,19,21	0.52	0
4	NAG	A	2016	1	14,14,15	0.37	0	17,19,21	0.51	0
4	NAG	C	2002	1	14,14,15	0.41	0	17,19,21	0.60	0
4	NAG	B	2016	1	14,14,15	0.26	0	17,19,21	0.59	0
4	NAG	A	2005	1	14,14,15	0.41	0	17,19,21	0.55	0
4	NAG	A	2003	1	14,14,15	0.39	0	17,19,21	0.36	0
4	NAG	C	2004	1	14,14,15	0.32	0	17,19,21	0.44	0
4	NAG	A	2001	1	14,14,15	0.32	0	17,19,21	0.59	1 (5%)
4	NAG	B	2002	1	14,14,15	0.33	0	17,19,21	0.54	0
4	NAG	A	2009	1	14,14,15	0.27	0	17,19,21	0.50	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
4	NAG	A	2011	1	14,14,15	0.29	0	17,19,21	0.49	0
4	NAG	C	2008	1	14,14,15	0.51	0	17,19,21	0.64	1 (5%)
4	NAG	B	2009	1	14,14,15	0.40	0	17,19,21	0.54	0
4	NAG	C	2013	1	14,14,15	0.38	0	17,19,21	0.39	0
4	NAG	A	2012	1	14,14,15	0.21	0	17,19,21	0.65	1 (5%)
4	NAG	C	2014	1	14,14,15	0.49	0	17,19,21	0.48	0
4	NAG	A	2008	1	14,14,15	0.44	0	17,19,21	0.51	0
4	NAG	B	2004	1	14,14,15	0.38	0	17,19,21	0.55	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
4	NAG	C	2003	1	-	2/6/23/26	0/1/1/1
4	NAG	C	2017	1	-	2/6/23/26	0/1/1/1
4	NAG	A	2014	1	-	2/6/23/26	0/1/1/1
4	NAG	C	2011	1	-	2/6/23/26	0/1/1/1
4	NAG	C	2001	1	-	2/6/23/26	0/1/1/1
4	NAG	C	2012	1	-	2/6/23/26	0/1/1/1
4	NAG	B	2005	1	-	2/6/23/26	0/1/1/1
4	NAG	A	2010	1	-	2/6/23/26	0/1/1/1
4	NAG	B	2013	1	-	2/6/23/26	0/1/1/1
4	NAG	B	2006	1	-	2/6/23/26	0/1/1/1
4	NAG	B	2001	1	-	2/6/23/26	0/1/1/1
4	NAG	C	2007	1	-	3/6/23/26	0/1/1/1
4	NAG	A	2007	1	-	2/6/23/26	0/1/1/1
4	NAG	B	2017	1	-	2/6/23/26	0/1/1/1
4	NAG	A	2013	1	-	2/6/23/26	0/1/1/1
4	NAG	C	2010	1	-	2/6/23/26	0/1/1/1
4	NAG	B	2007	1	-	2/6/23/26	0/1/1/1
4	NAG	A	2015	1	-	2/6/23/26	0/1/1/1
4	NAG	C	2005	1	-	2/6/23/26	0/1/1/1
4	NAG	C	2009	1	-	2/6/23/26	0/1/1/1
4	NAG	B	2015	1	-	2/6/23/26	0/1/1/1
4	NAG	A	2006	1	-	2/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	NAG	A	2002	1	-	2/6/23/26	0/1/1/1
4	NAG	B	2008	1	-	2/6/23/26	0/1/1/1
4	NAG	B	2012	1	-	0/6/23/26	0/1/1/1
4	NAG	B	2010	1	-	2/6/23/26	0/1/1/1
4	NAG	B	2014	1	-	2/6/23/26	0/1/1/1
4	NAG	A	2004	1	-	0/6/23/26	0/1/1/1
4	NAG	B	2003	1	-	1/6/23/26	0/1/1/1
4	NAG	C	2006	1	-	2/6/23/26	0/1/1/1
4	NAG	C	2016	1	-	3/6/23/26	0/1/1/1
4	NAG	B	2011	1	-	2/6/23/26	0/1/1/1
4	NAG	C	2015	1	-	0/6/23/26	0/1/1/1
4	NAG	A	2017	1	-	2/6/23/26	0/1/1/1
4	NAG	A	2016	1	-	0/6/23/26	0/1/1/1
4	NAG	C	2002	1	-	2/6/23/26	0/1/1/1
4	NAG	B	2016	1	-	2/6/23/26	0/1/1/1
4	NAG	A	2005	1	-	2/6/23/26	0/1/1/1
4	NAG	A	2003	1	-	1/6/23/26	0/1/1/1
4	NAG	C	2004	1	-	2/6/23/26	0/1/1/1
4	NAG	A	2001	1	-	0/6/23/26	0/1/1/1
4	NAG	B	2002	1	-	2/6/23/26	0/1/1/1
4	NAG	A	2009	1	-	2/6/23/26	0/1/1/1
4	NAG	A	2011	1	-	0/6/23/26	0/1/1/1
4	NAG	C	2008	1	-	3/6/23/26	0/1/1/1
4	NAG	B	2009	1	-	0/6/23/26	0/1/1/1
4	NAG	C	2013	1	-	1/6/23/26	0/1/1/1
4	NAG	A	2012	1	-	0/6/23/26	0/1/1/1
4	NAG	C	2014	1	-	1/6/23/26	0/1/1/1
4	NAG	A	2008	1	-	2/6/23/26	0/1/1/1
4	NAG	B	2004	1	-	0/6/23/26	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	C	2001	NAG	C1-C2	2.18	1.55	1.52

All (15) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	C	2001	NAG	C1-O5-C5	2.82	115.97	112.19
4	B	2013	NAG	C1-O5-C5	2.81	115.95	112.19
4	B	2001	NAG	C1-O5-C5	2.42	115.43	112.19
4	C	2006	NAG	C1-O5-C5	2.34	115.32	112.19
4	C	2009	NAG	C1-O5-C5	2.27	115.22	112.19
4	A	2012	NAG	C1-O5-C5	2.23	115.17	112.19
4	B	2007	NAG	C1-O5-C5	2.22	115.17	112.19
4	A	2007	NAG	C1-O5-C5	2.19	115.12	112.19
4	C	2008	NAG	C1-O5-C5	2.18	115.11	112.19
4	C	2007	NAG	C1-O5-C5	2.16	115.08	112.19
4	B	2012	NAG	C1-O5-C5	2.13	115.04	112.19
4	C	2016	NAG	C1-O5-C5	2.12	115.03	112.19
4	A	2001	NAG	C1-O5-C5	2.01	114.89	112.19
4	C	2015	NAG	C1-O5-C5	2.01	114.88	112.19
4	C	2011	NAG	C1-O5-C5	2.00	114.87	112.19

There are no chirality outliers.

All (83) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	B	2008	NAG	O5-C5-C6-O6
4	C	2010	NAG	O5-C5-C6-O6
4	B	2013	NAG	C4-C5-C6-O6
4	B	2002	NAG	O5-C5-C6-O6
4	C	2017	NAG	O5-C5-C6-O6
4	B	2006	NAG	O5-C5-C6-O6
4	B	2007	NAG	O5-C5-C6-O6
4	B	2017	NAG	O5-C5-C6-O6
4	C	2002	NAG	O5-C5-C6-O6
4	C	2009	NAG	O5-C5-C6-O6
4	C	2011	NAG	O5-C5-C6-O6
4	C	2012	NAG	O5-C5-C6-O6
4	A	2009	NAG	O5-C5-C6-O6
4	B	2002	NAG	C4-C5-C6-O6
4	A	2017	NAG	O5-C5-C6-O6
4	C	2010	NAG	C4-C5-C6-O6
4	B	2007	NAG	C4-C5-C6-O6
4	A	2005	NAG	C4-C5-C6-O6
4	C	2004	NAG	O5-C5-C6-O6
4	A	2007	NAG	O5-C5-C6-O6
4	B	2008	NAG	C4-C5-C6-O6
4	C	2016	NAG	O5-C5-C6-O6
4	B	2014	NAG	C4-C5-C6-O6

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Mol	Chain	Res	Type	Atoms
4	B	2017	NAG	C4-C5-C6-O6
4	B	2001	NAG	O5-C5-C6-O6
4	A	2005	NAG	O5-C5-C6-O6
4	A	2010	NAG	O5-C5-C6-O6
4	C	2017	NAG	C4-C5-C6-O6
4	A	2015	NAG	O5-C5-C6-O6
4	B	2013	NAG	O5-C5-C6-O6
4	B	2006	NAG	C4-C5-C6-O6
4	A	2017	NAG	C4-C5-C6-O6
4	B	2001	NAG	C4-C5-C6-O6
4	A	2014	NAG	C4-C5-C6-O6
4	A	2015	NAG	C4-C5-C6-O6
4	C	2002	NAG	C4-C5-C6-O6
4	C	2011	NAG	C4-C5-C6-O6
4	A	2009	NAG	C4-C5-C6-O6
4	A	2010	NAG	C4-C5-C6-O6
4	C	2007	NAG	C4-C5-C6-O6
4	C	2016	NAG	C4-C5-C6-O6
4	C	2005	NAG	O5-C5-C6-O6
4	C	2004	NAG	C4-C5-C6-O6
4	C	2009	NAG	C4-C5-C6-O6
4	C	2012	NAG	C4-C5-C6-O6
4	A	2014	NAG	O5-C5-C6-O6
4	A	2002	NAG	O5-C5-C6-O6
4	A	2006	NAG	O5-C5-C6-O6
4	A	2008	NAG	O5-C5-C6-O6
4	C	2013	NAG	O5-C5-C6-O6
4	A	2002	NAG	C4-C5-C6-O6
4	C	2007	NAG	O5-C5-C6-O6
4	B	2014	NAG	O5-C5-C6-O6
4	B	2010	NAG	C4-C5-C6-O6
4	C	2003	NAG	C4-C5-C6-O6
4	C	2003	NAG	O5-C5-C6-O6
4	C	2001	NAG	C4-C5-C6-O6
4	B	2015	NAG	O5-C5-C6-O6
4	B	2005	NAG	O5-C5-C6-O6
4	C	2001	NAG	O5-C5-C6-O6
4	B	2005	NAG	C4-C5-C6-O6
4	B	2015	NAG	C4-C5-C6-O6
4	B	2010	NAG	O5-C5-C6-O6
4	B	2016	NAG	O5-C5-C6-O6
4	B	2016	NAG	C4-C5-C6-O6

Continued on next page...

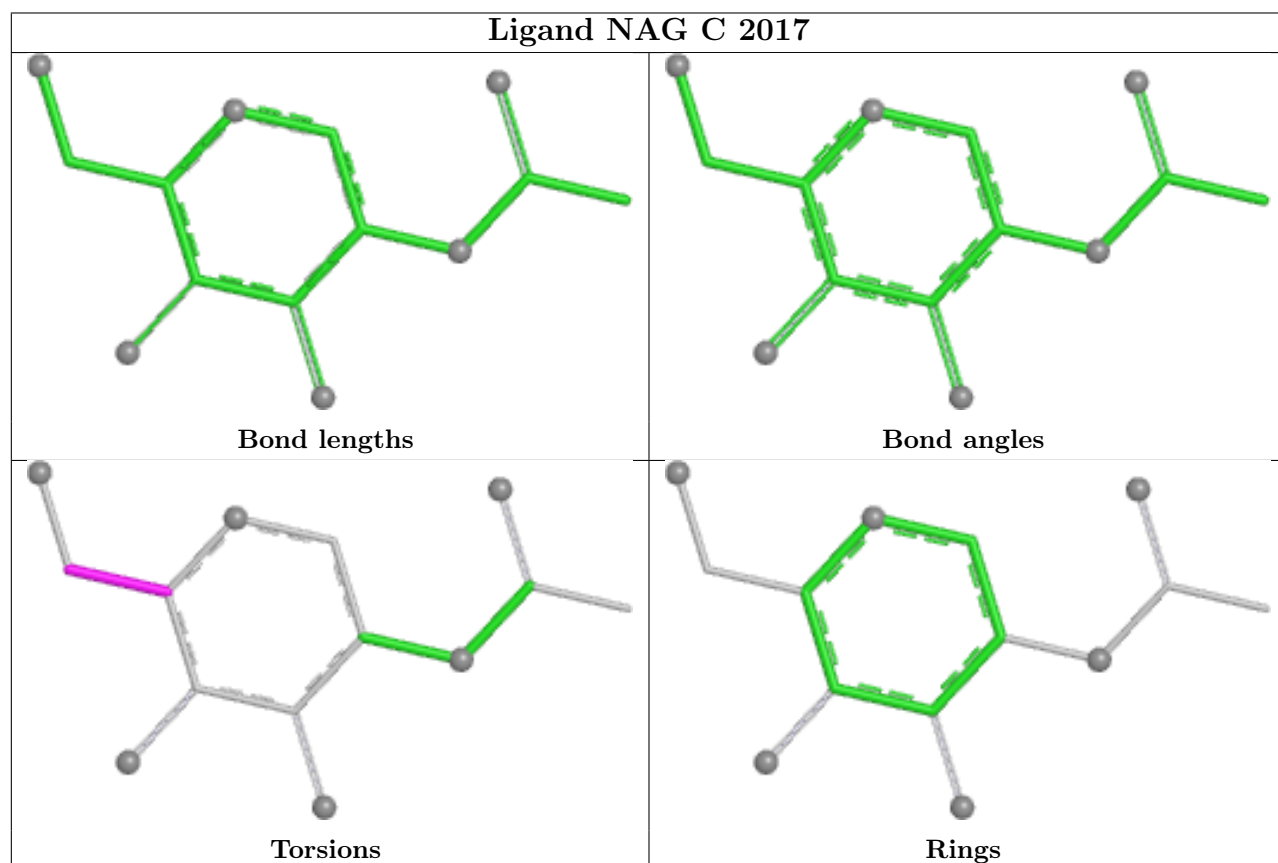
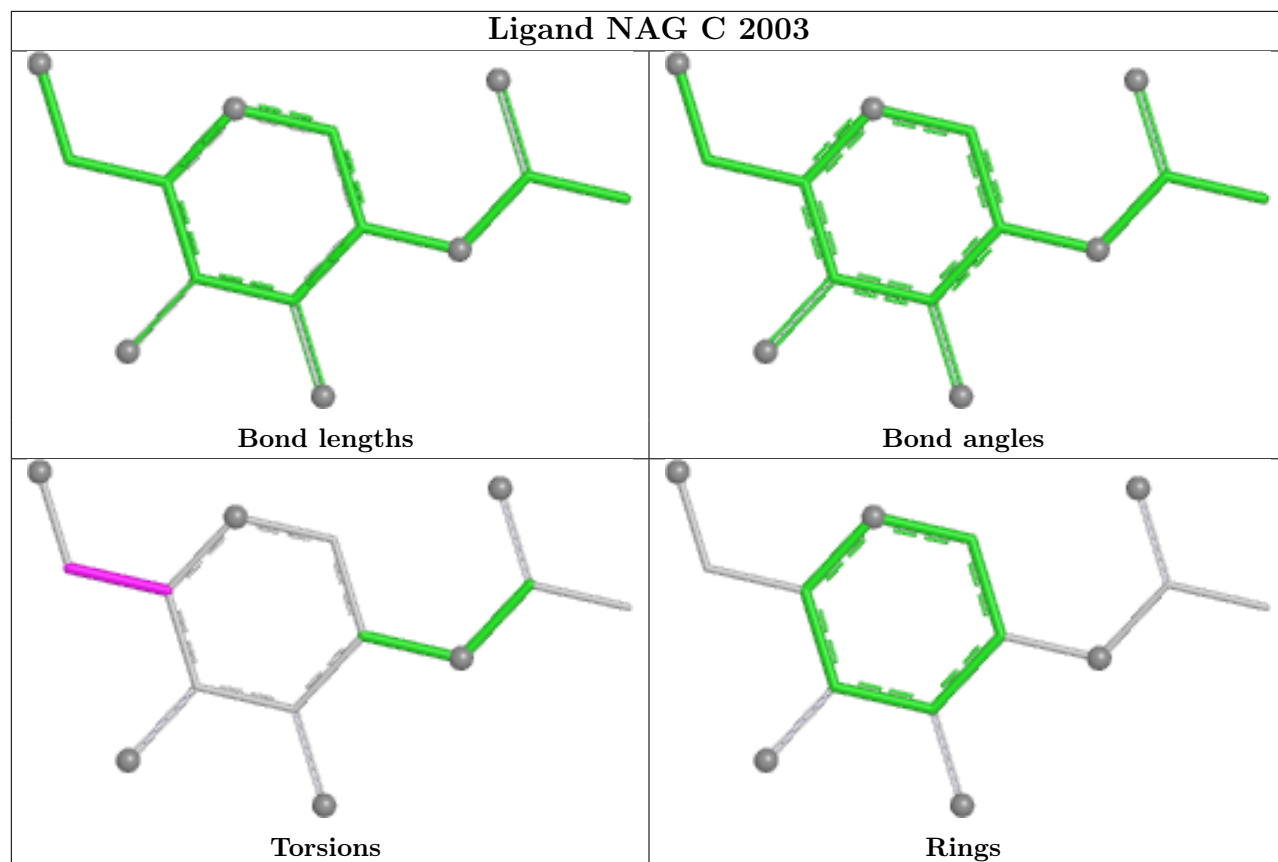
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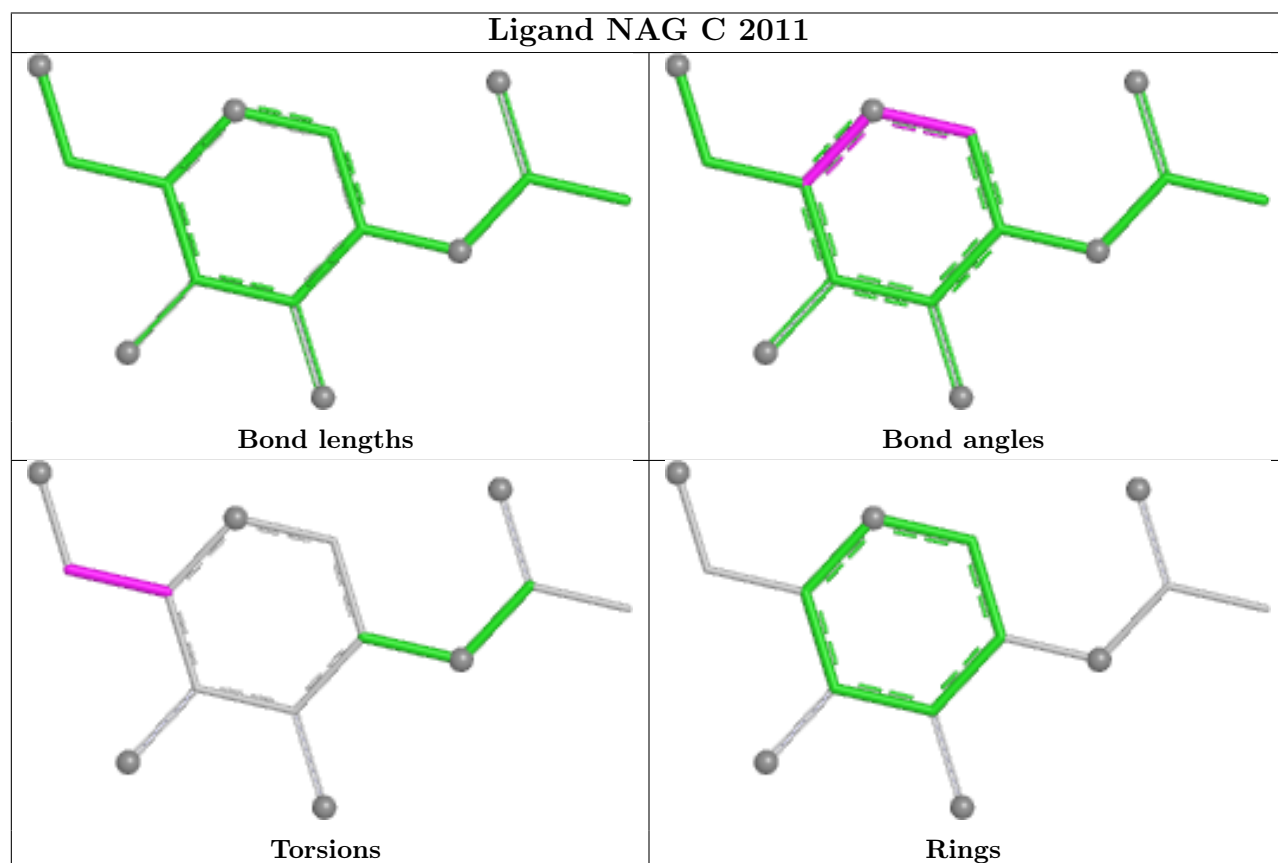
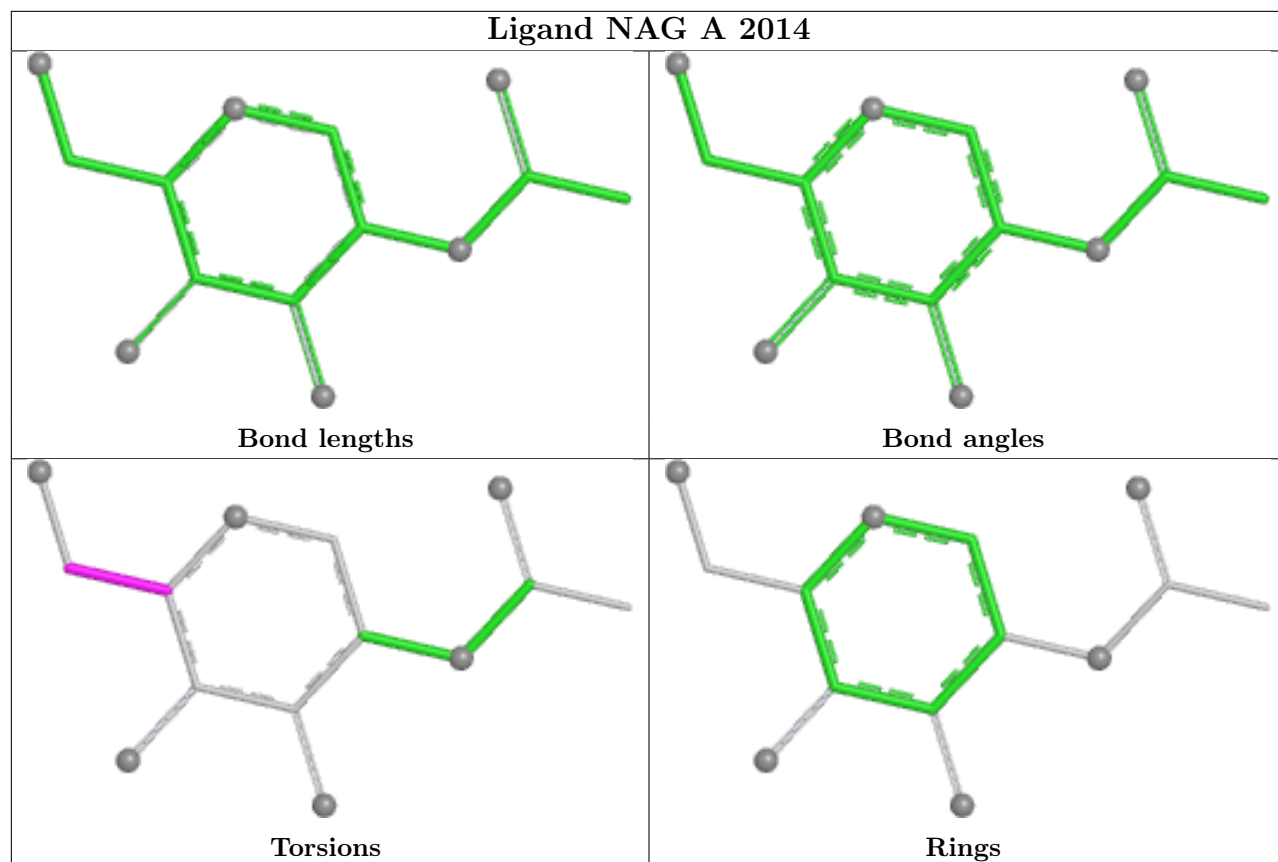
Mol	Chain	Res	Type	Atoms
4	A	2013	NAG	O5-C5-C6-O6
4	C	2005	NAG	C4-C5-C6-O6
4	C	2014	NAG	O5-C5-C6-O6
4	B	2011	NAG	O5-C5-C6-O6
4	A	2003	NAG	O5-C5-C6-O6
4	C	2006	NAG	C4-C5-C6-O6
4	C	2006	NAG	O5-C5-C6-O6
4	A	2007	NAG	C4-C5-C6-O6
4	C	2008	NAG	C4-C5-C6-O6
4	A	2006	NAG	C4-C5-C6-O6
4	A	2008	NAG	C4-C5-C6-O6
4	B	2003	NAG	O5-C5-C6-O6
4	C	2007	NAG	C1-C2-N2-C7
4	C	2008	NAG	C1-C2-N2-C7
4	C	2016	NAG	C1-C2-N2-C7
4	A	2013	NAG	C1-C2-N2-C7
4	C	2008	NAG	O5-C5-C6-O6
4	B	2011	NAG	C4-C5-C6-O6

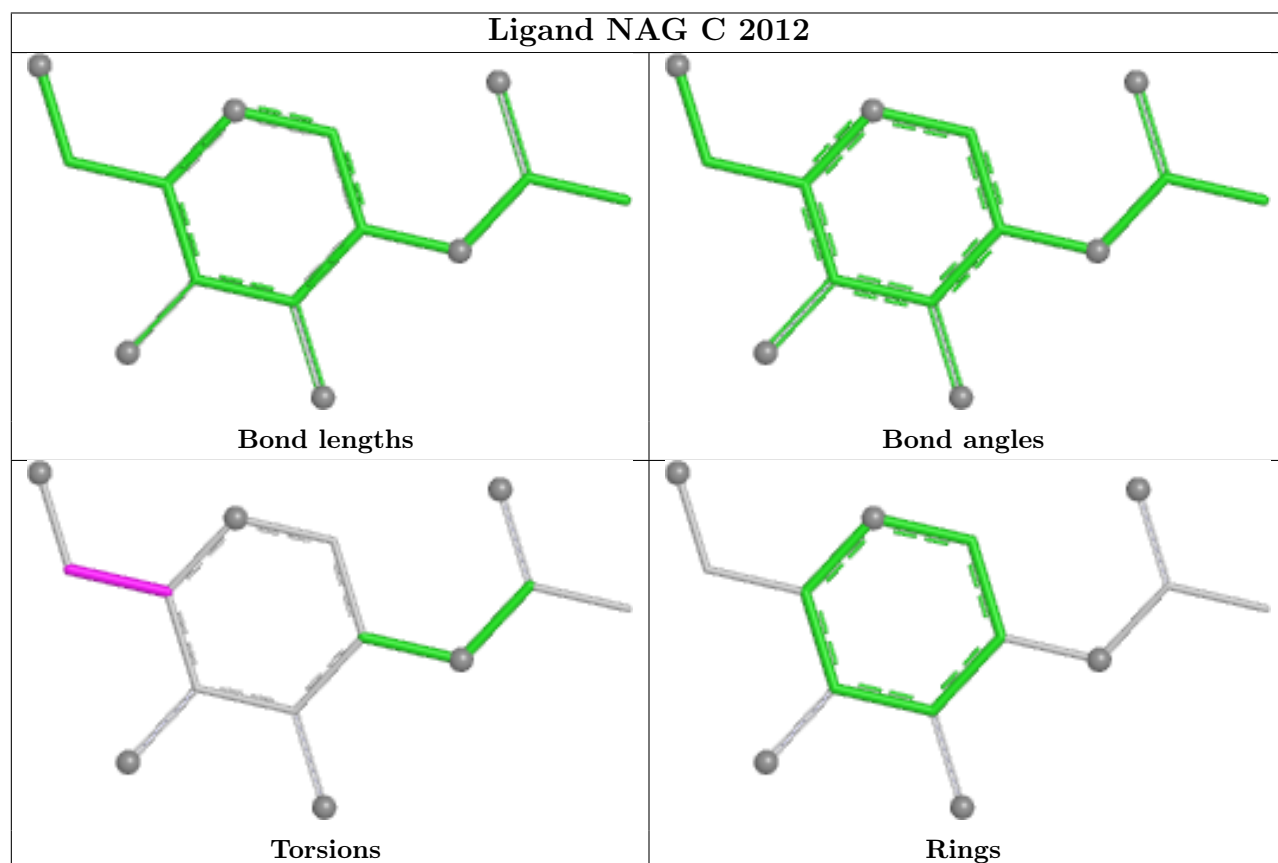
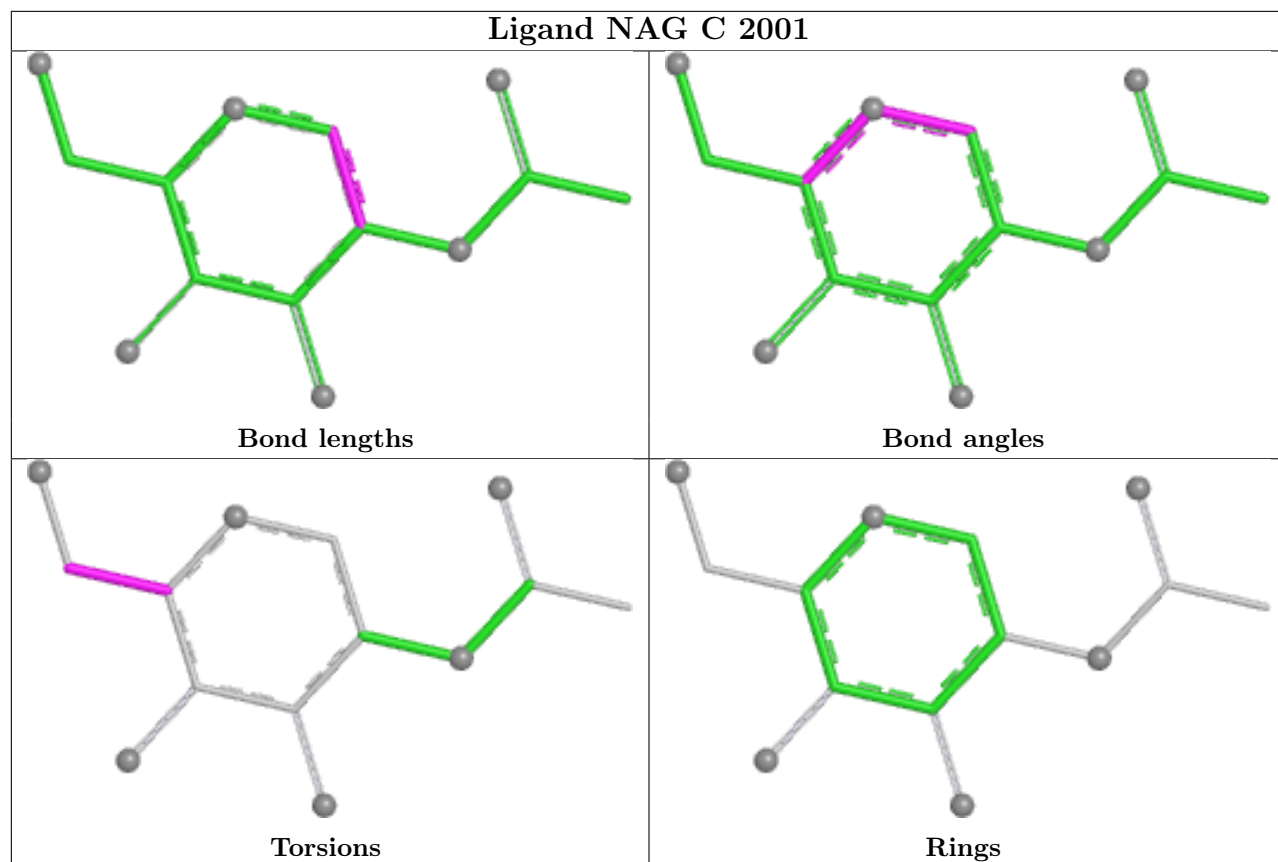
There are no ring outliers.

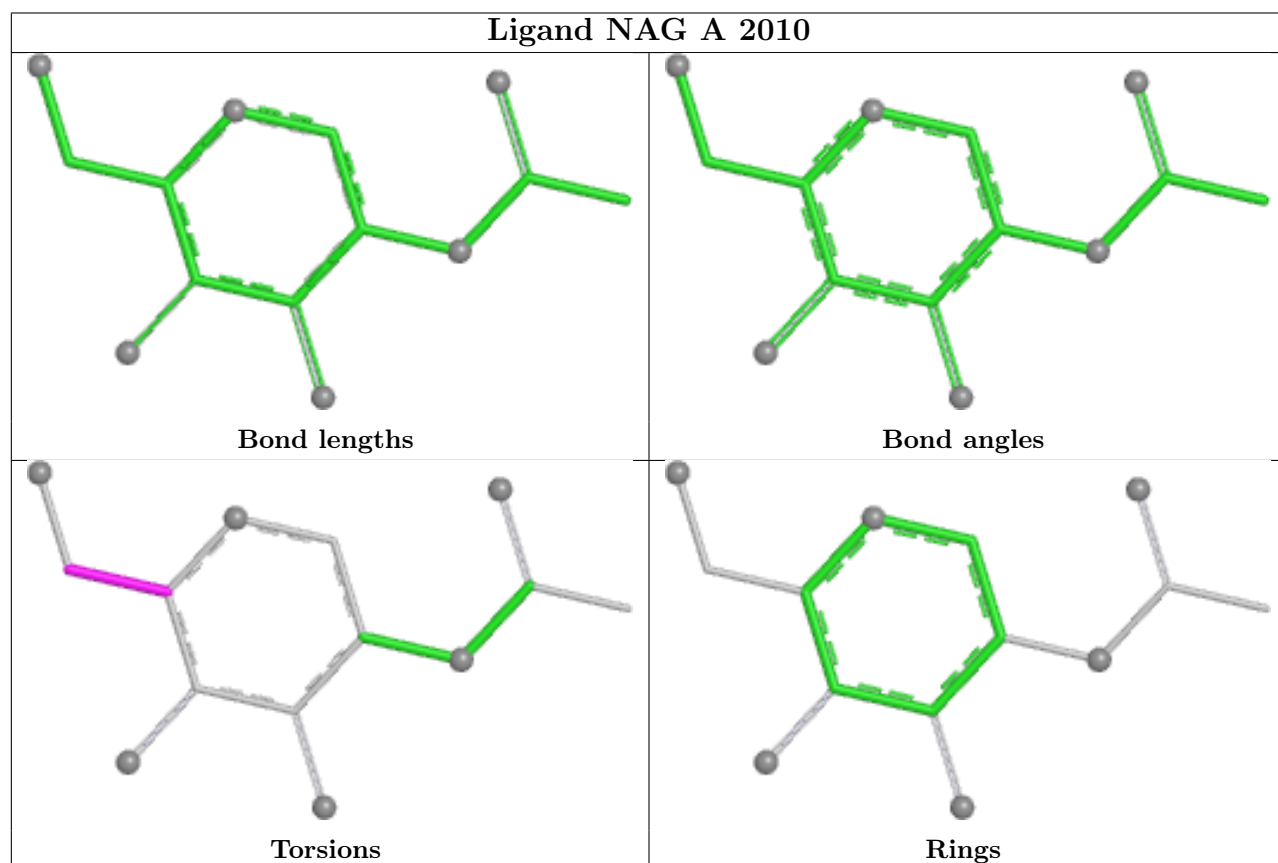
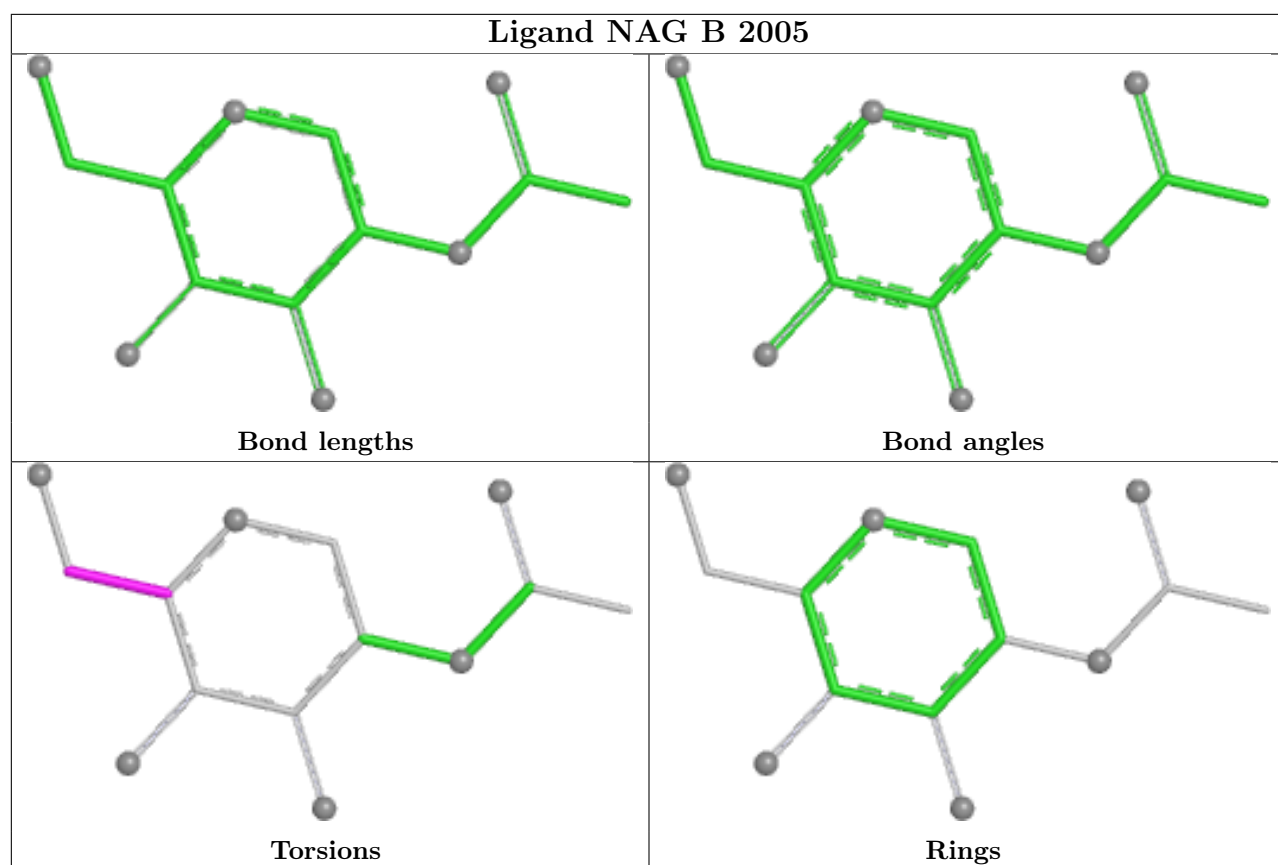
No monomer is involved in short contacts.

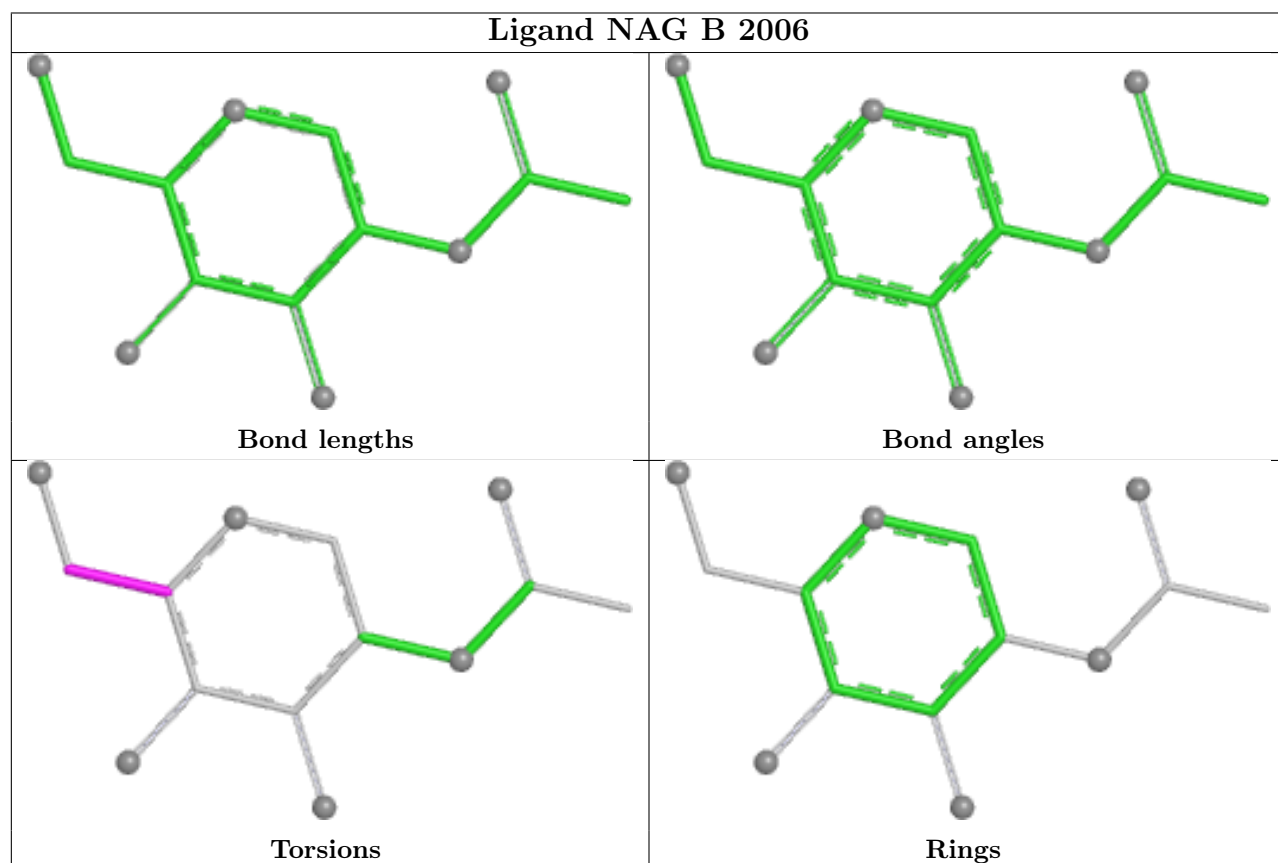
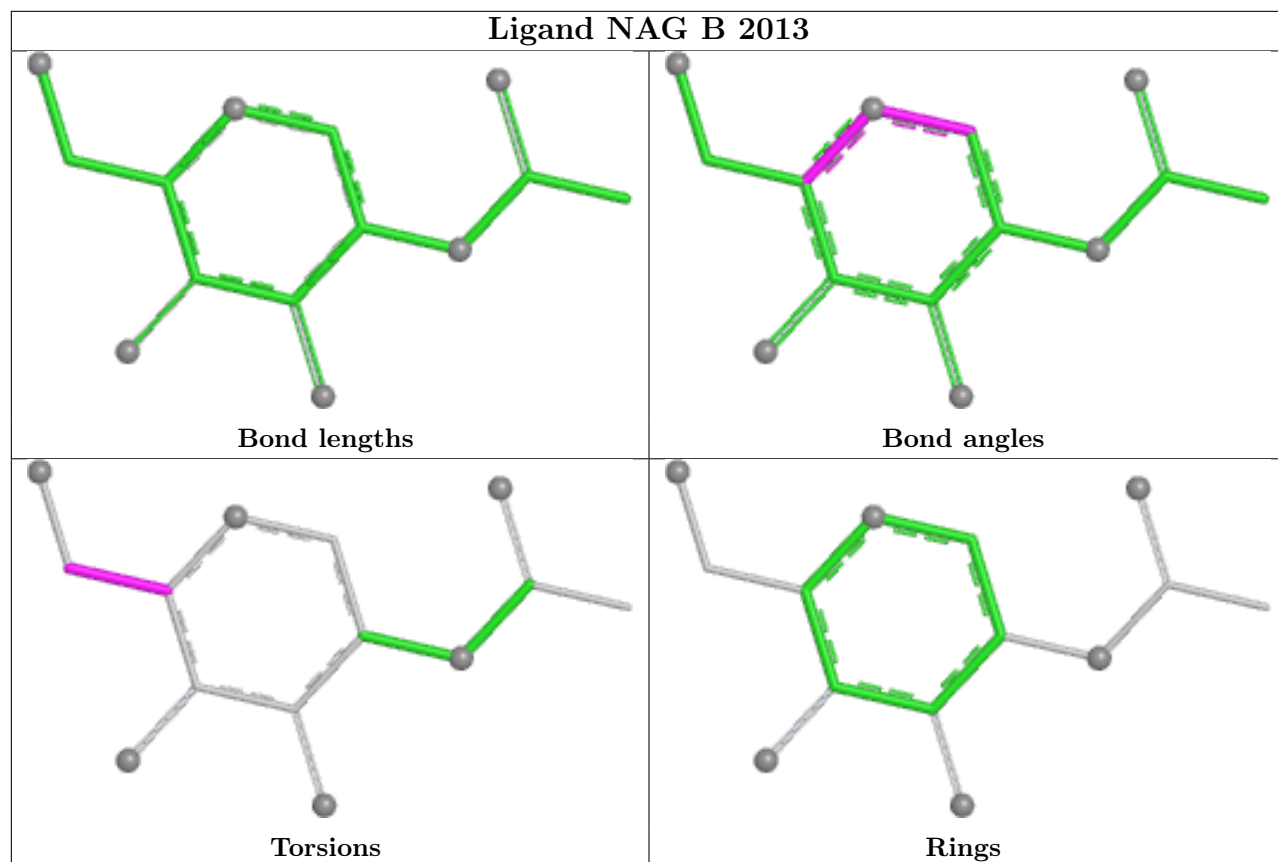
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

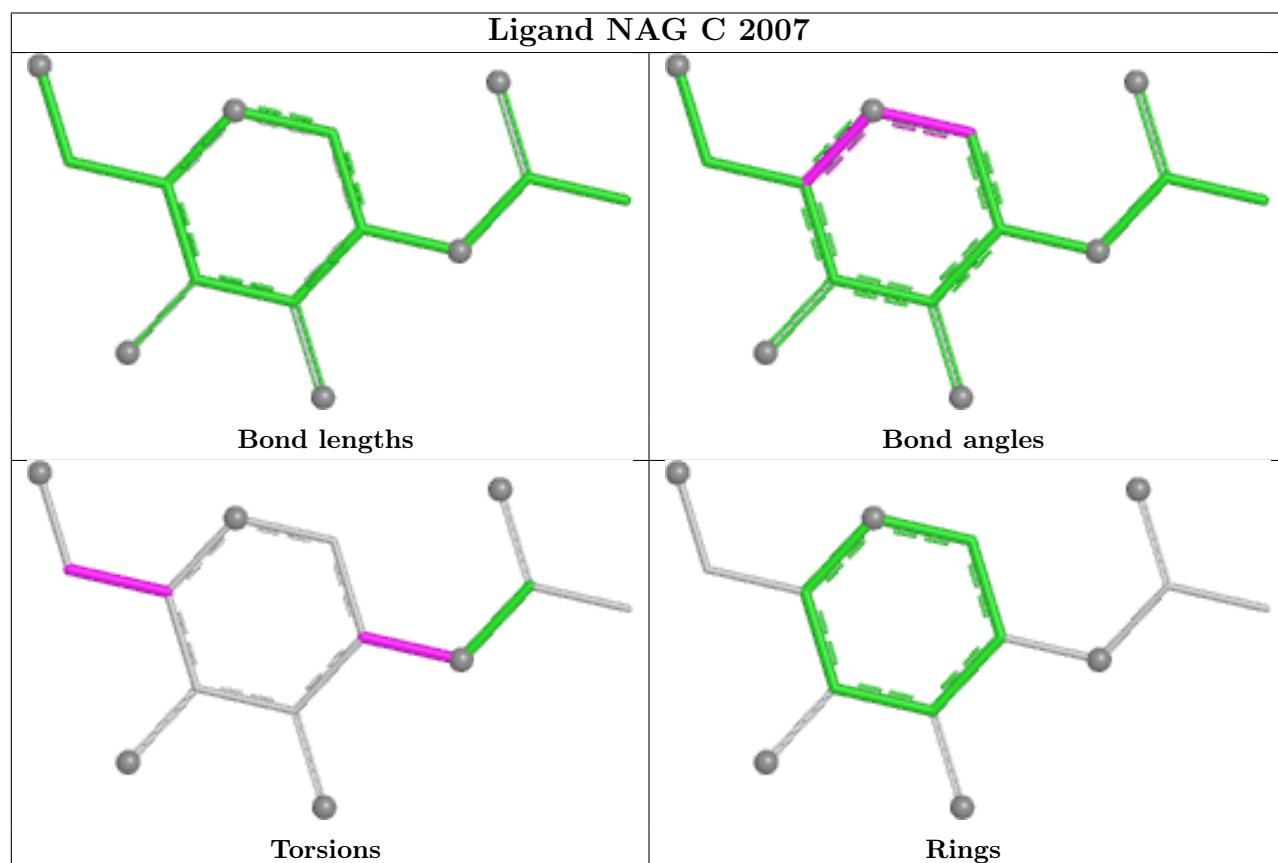
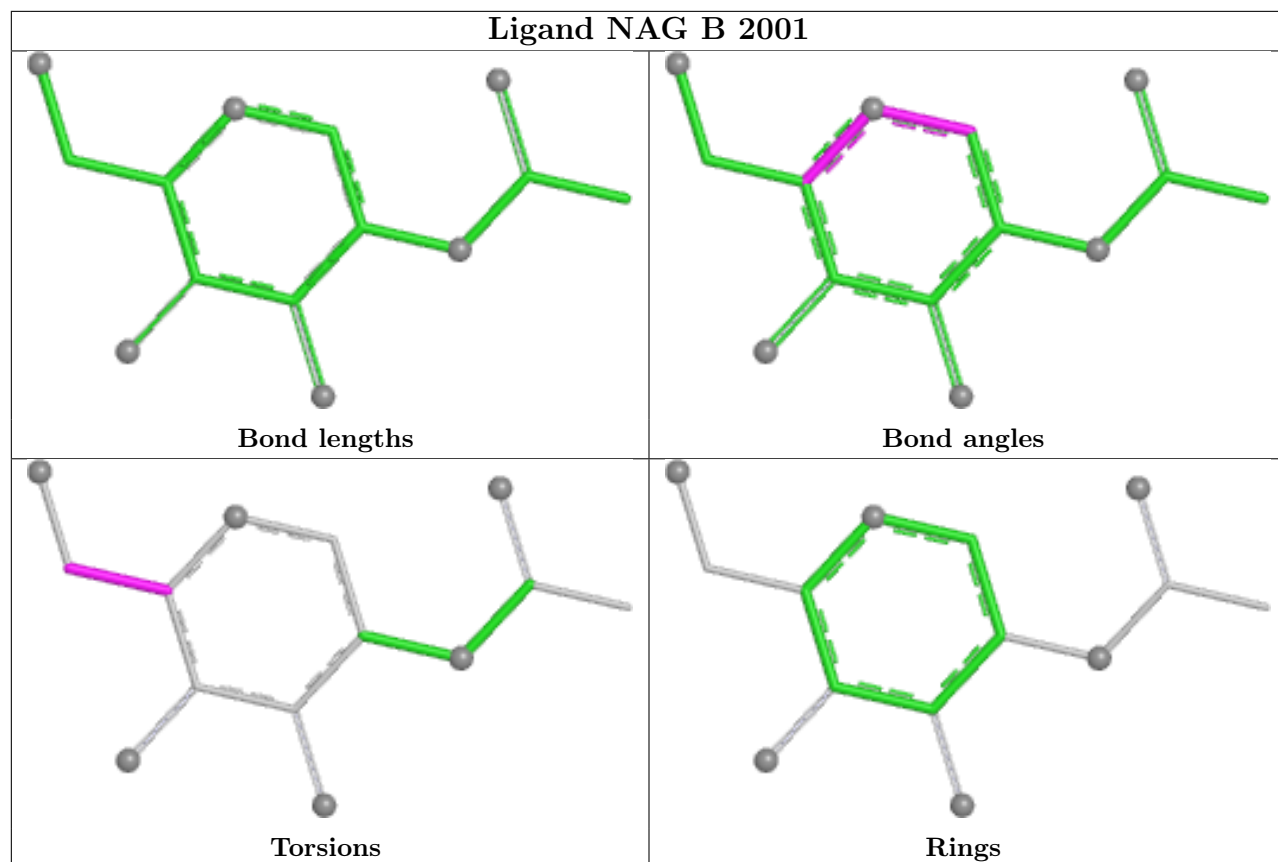


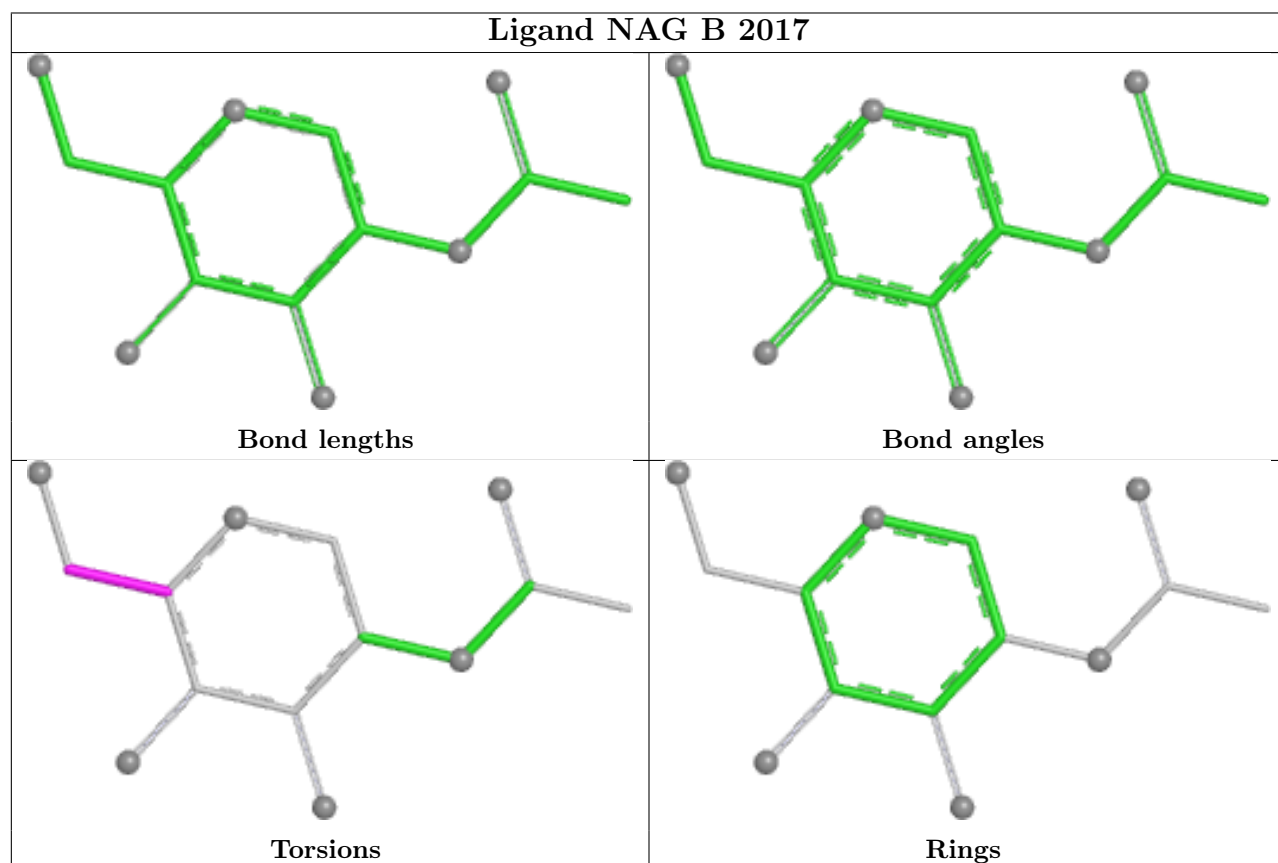
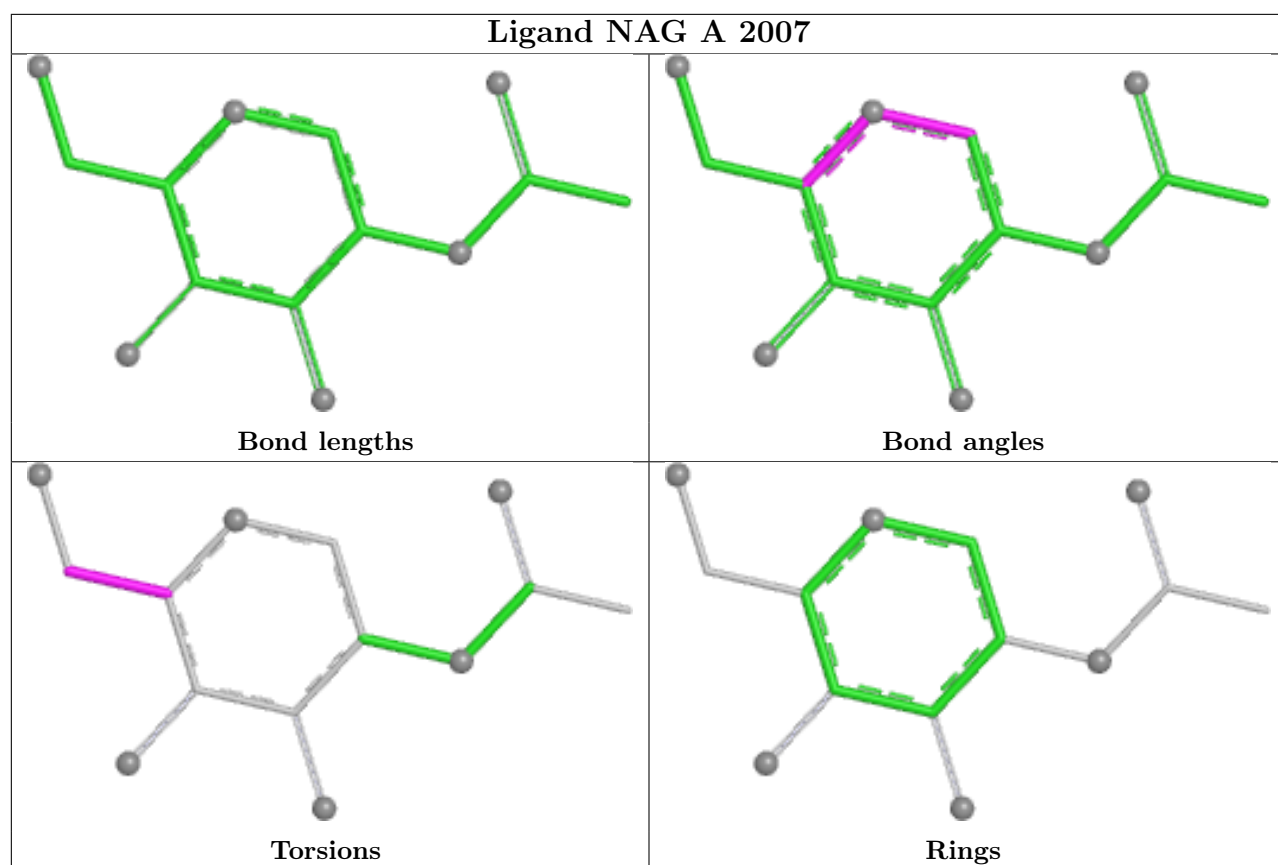




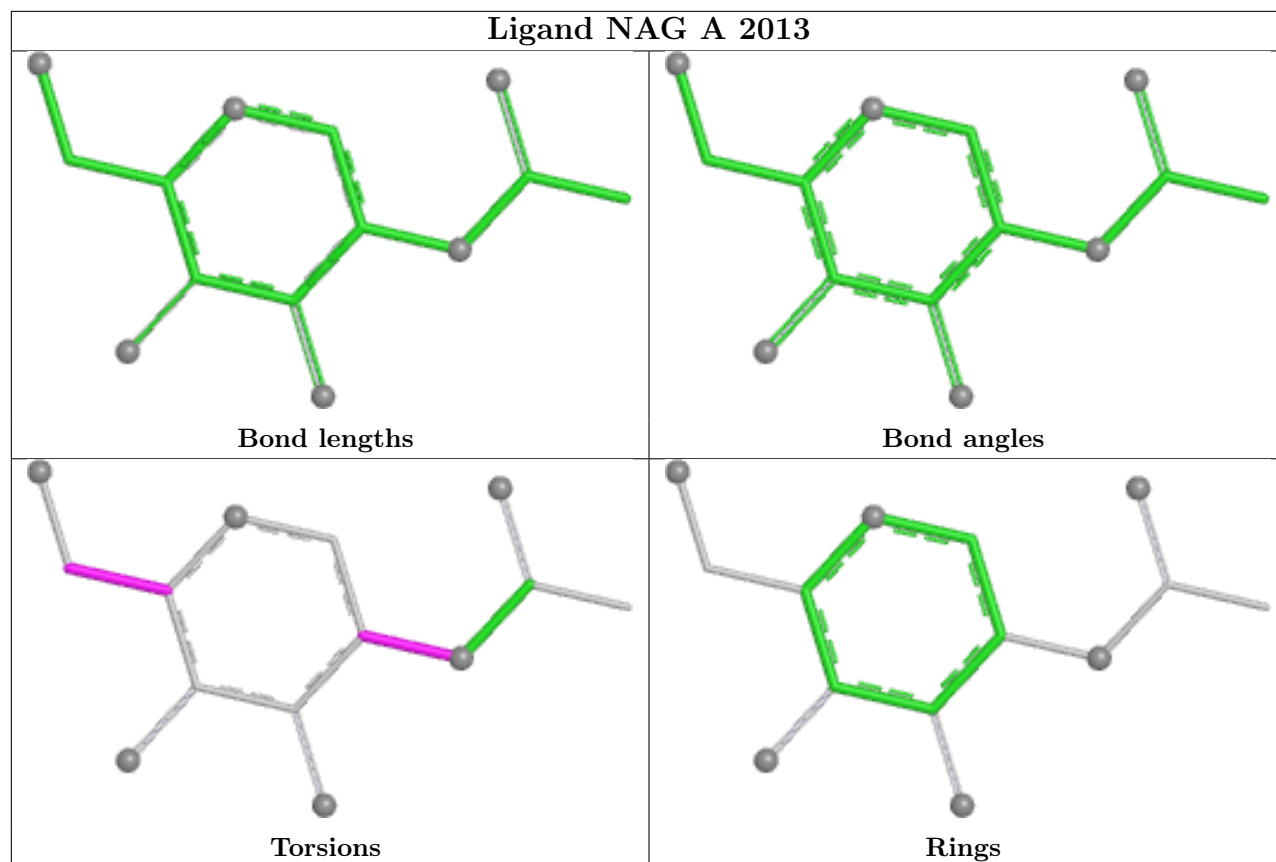




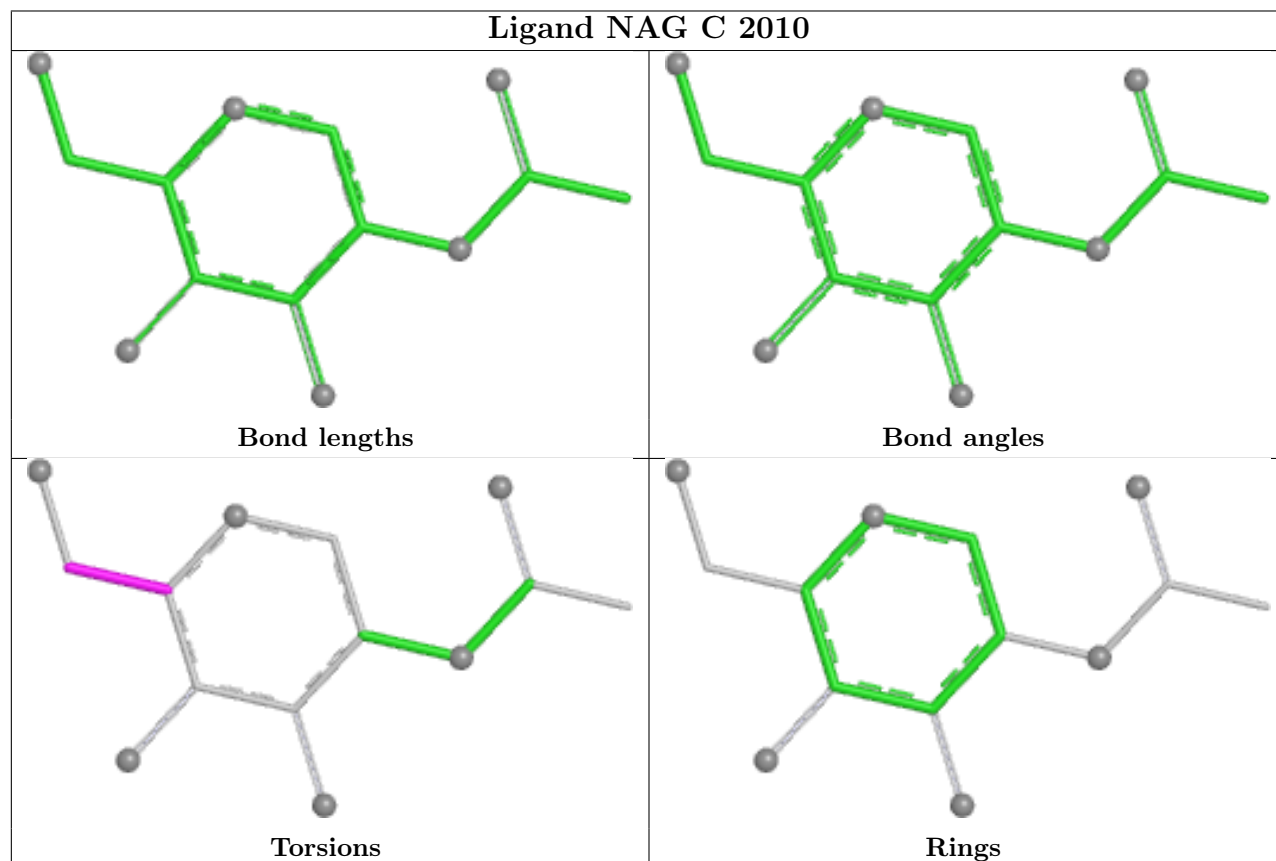


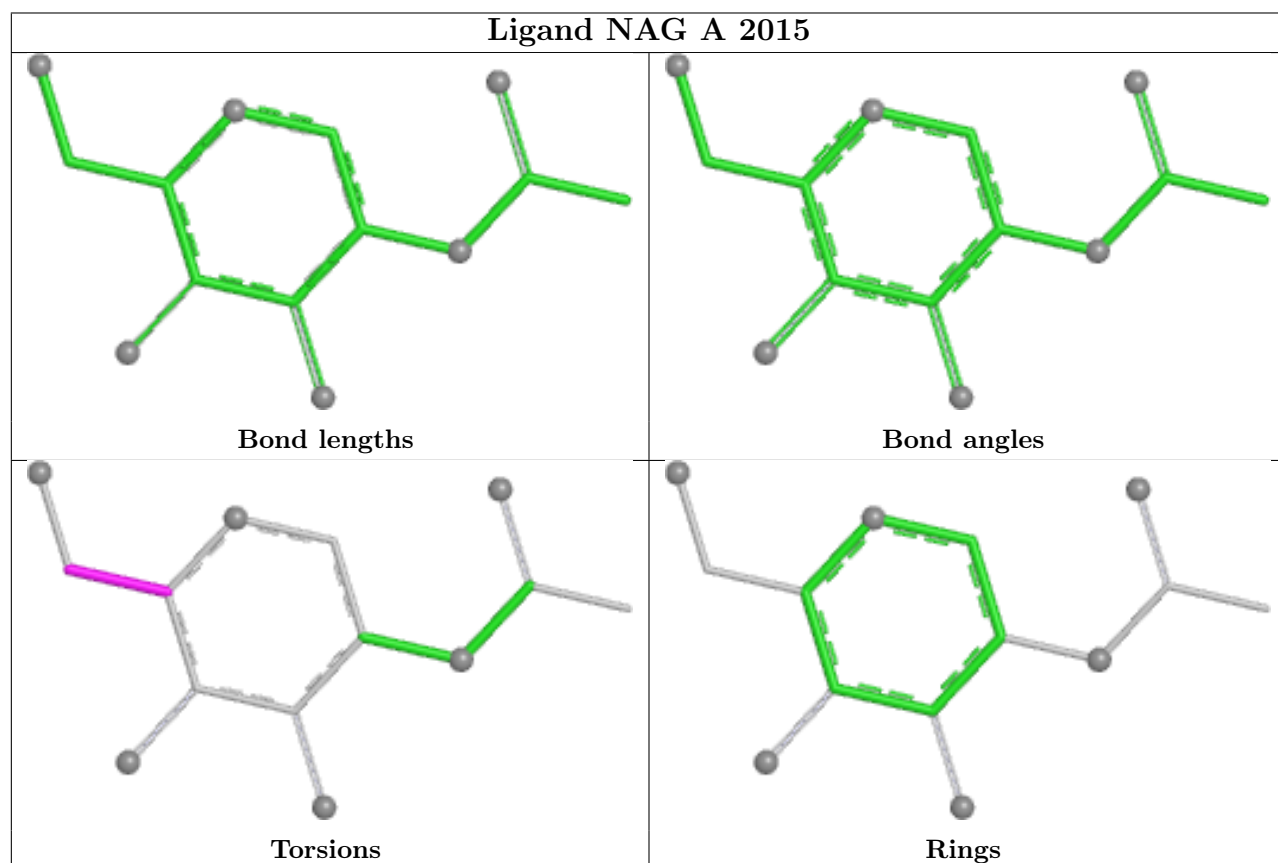
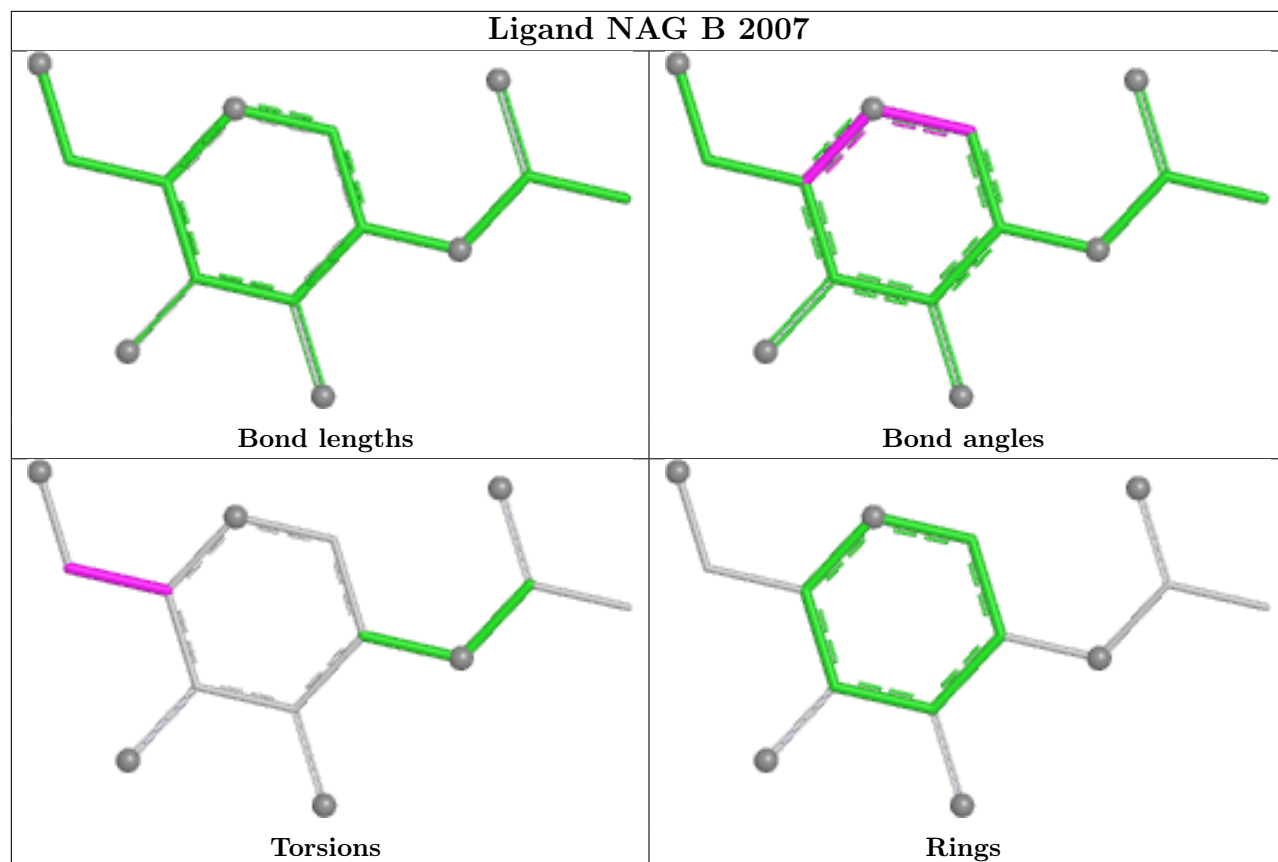


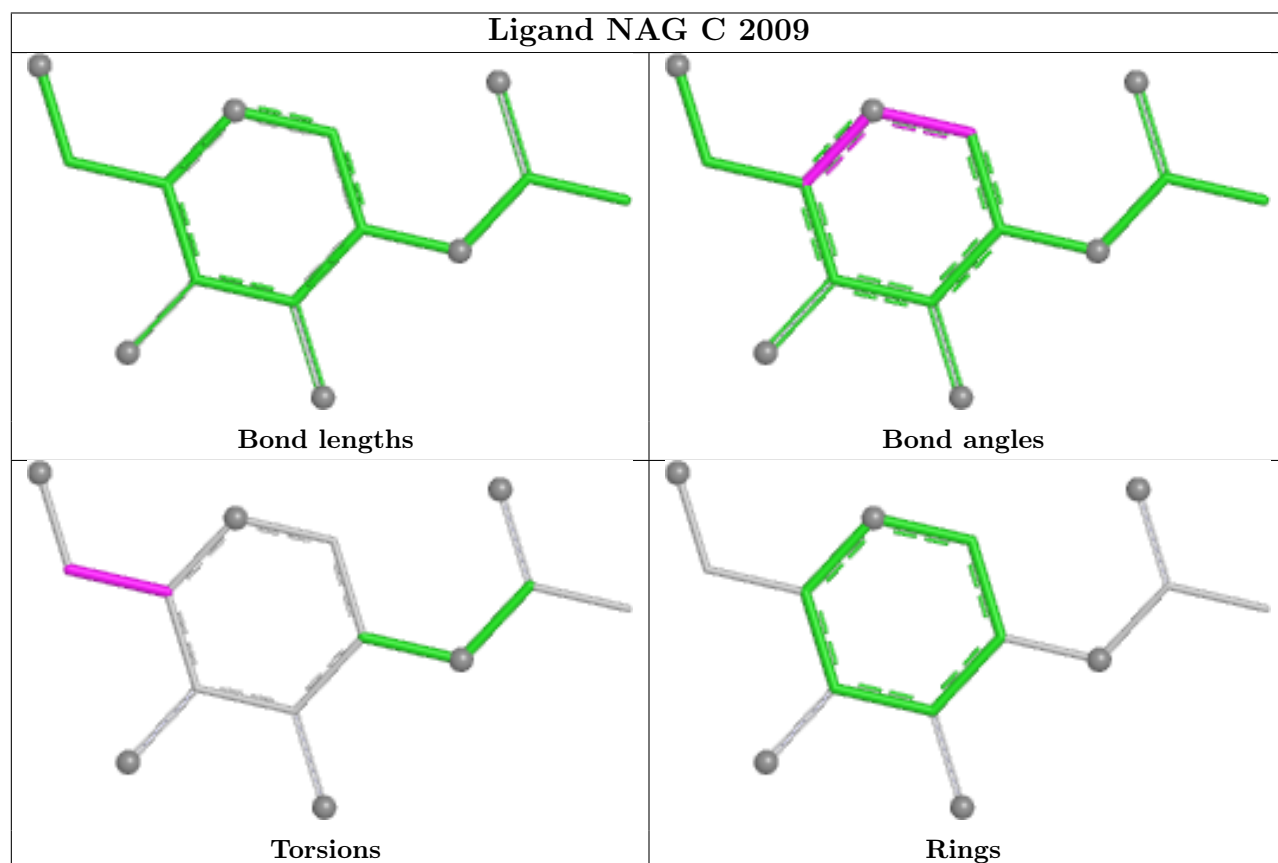
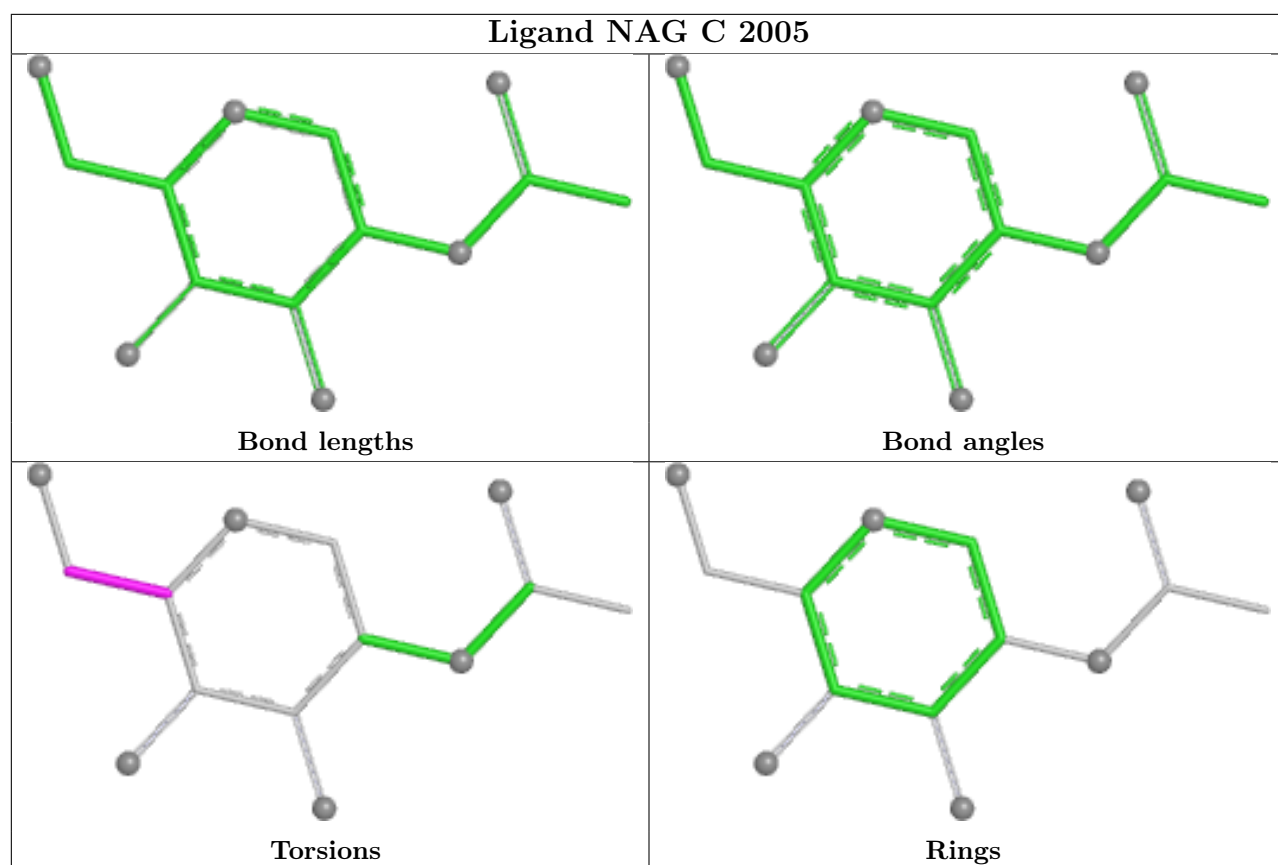
Ligand NAG A 2013

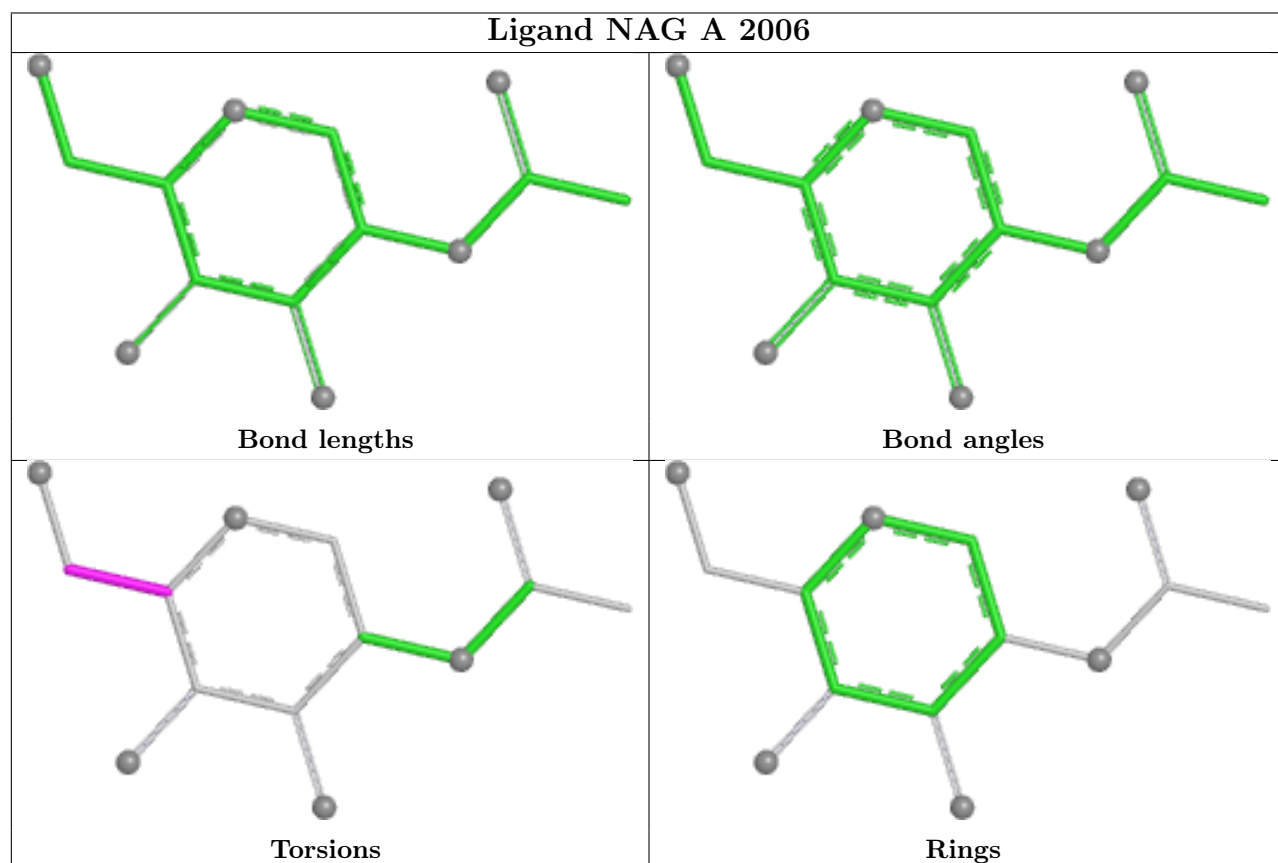
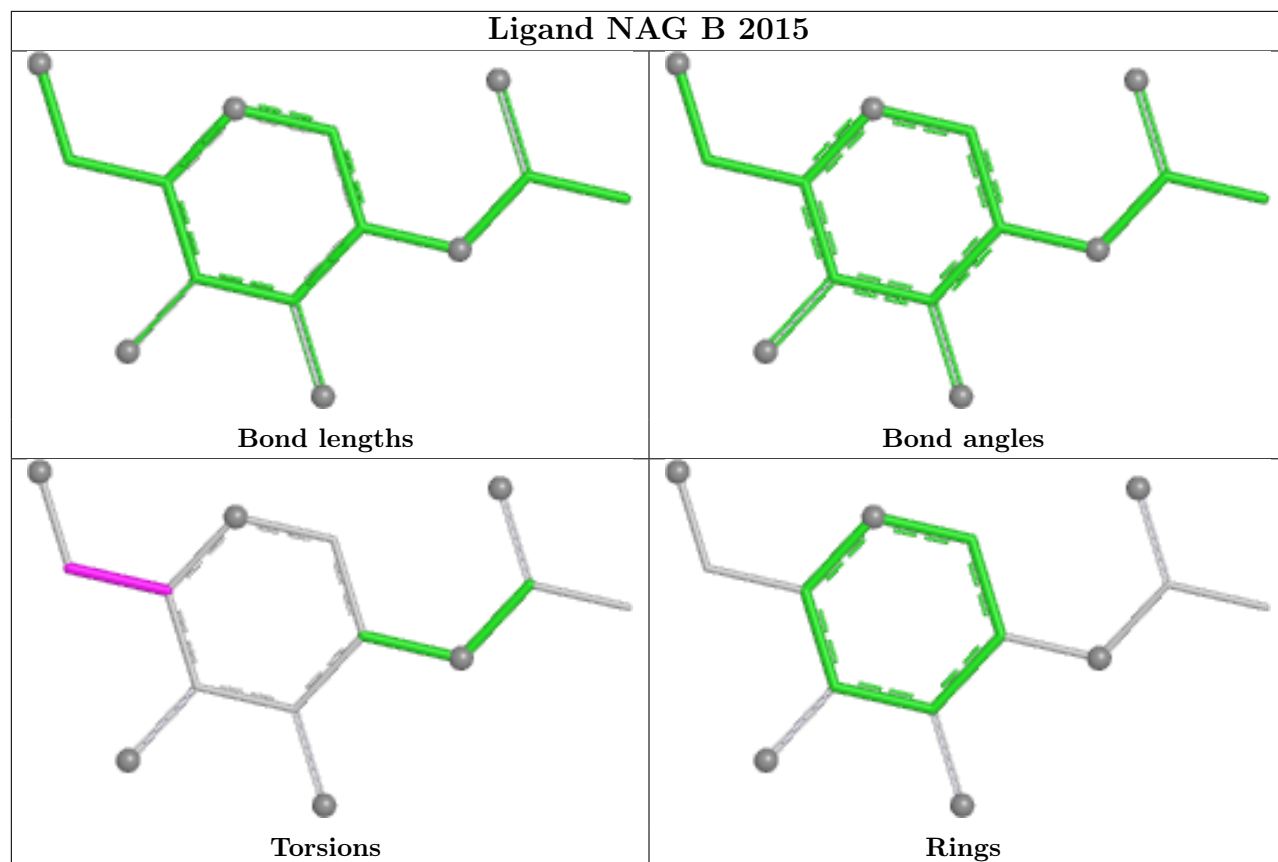


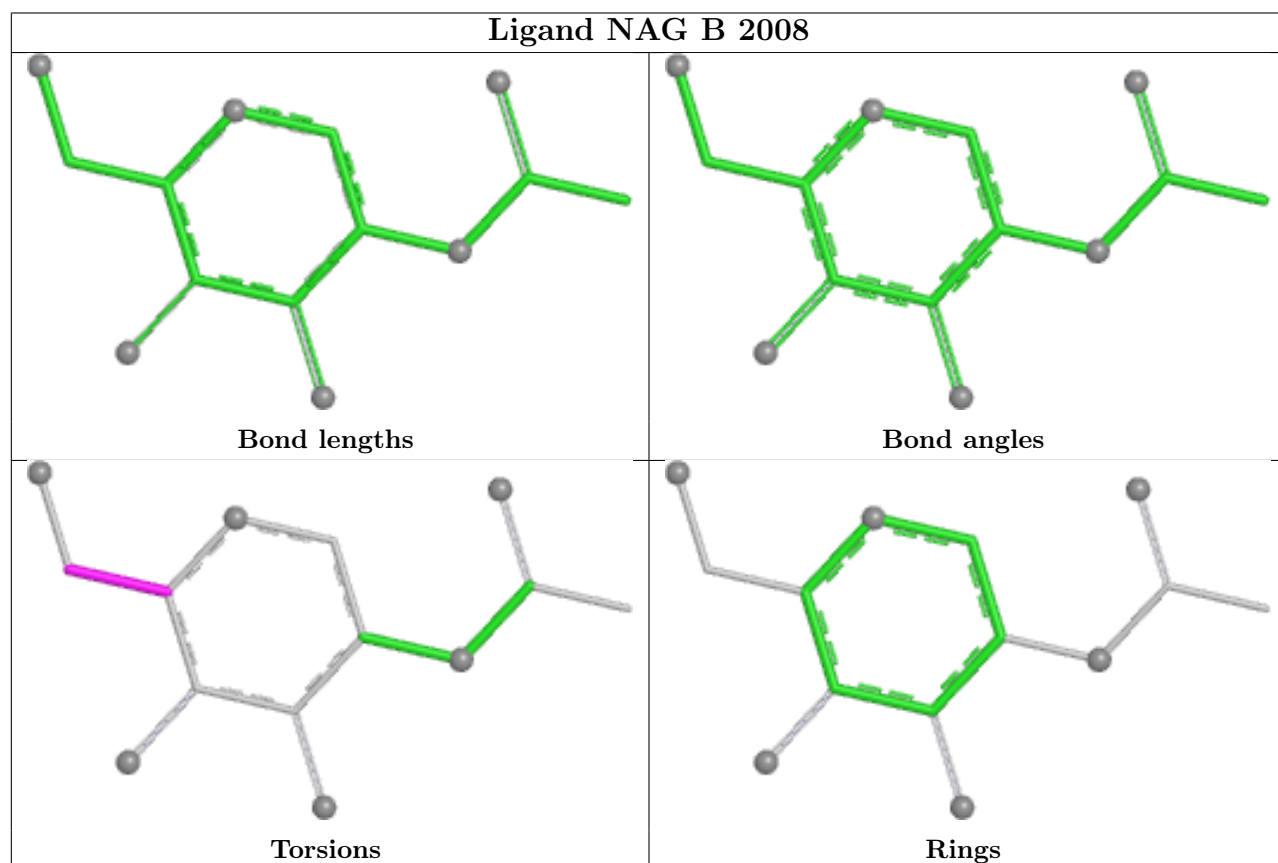
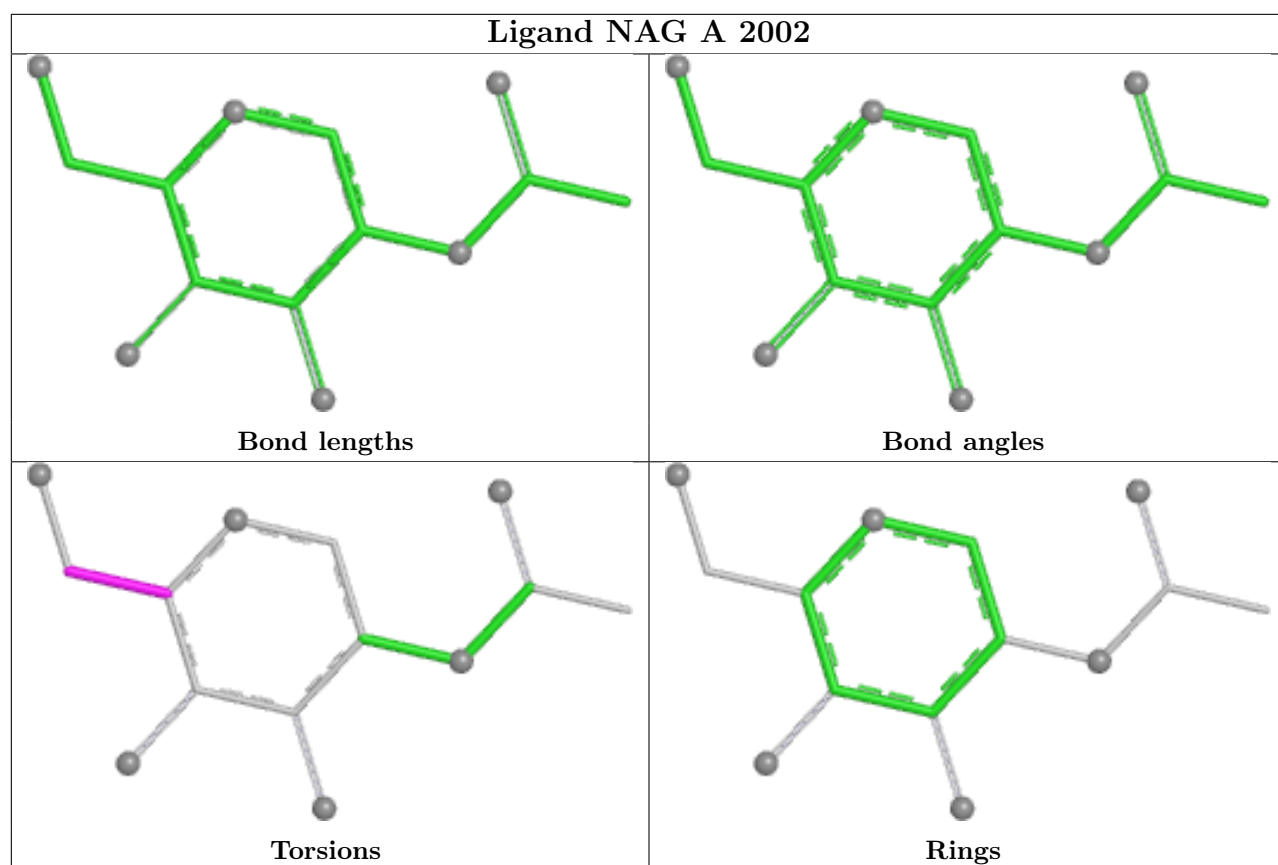
Ligand NAG C 2010

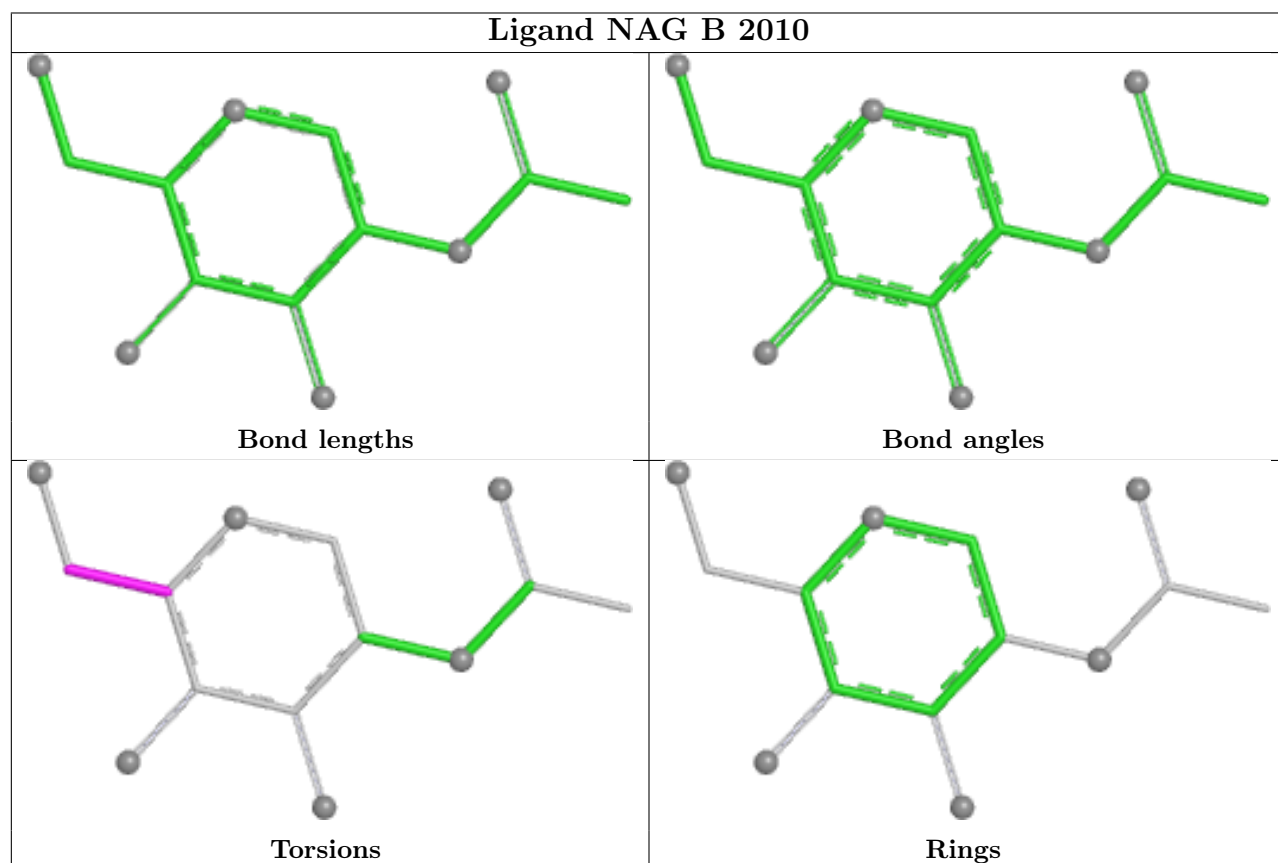
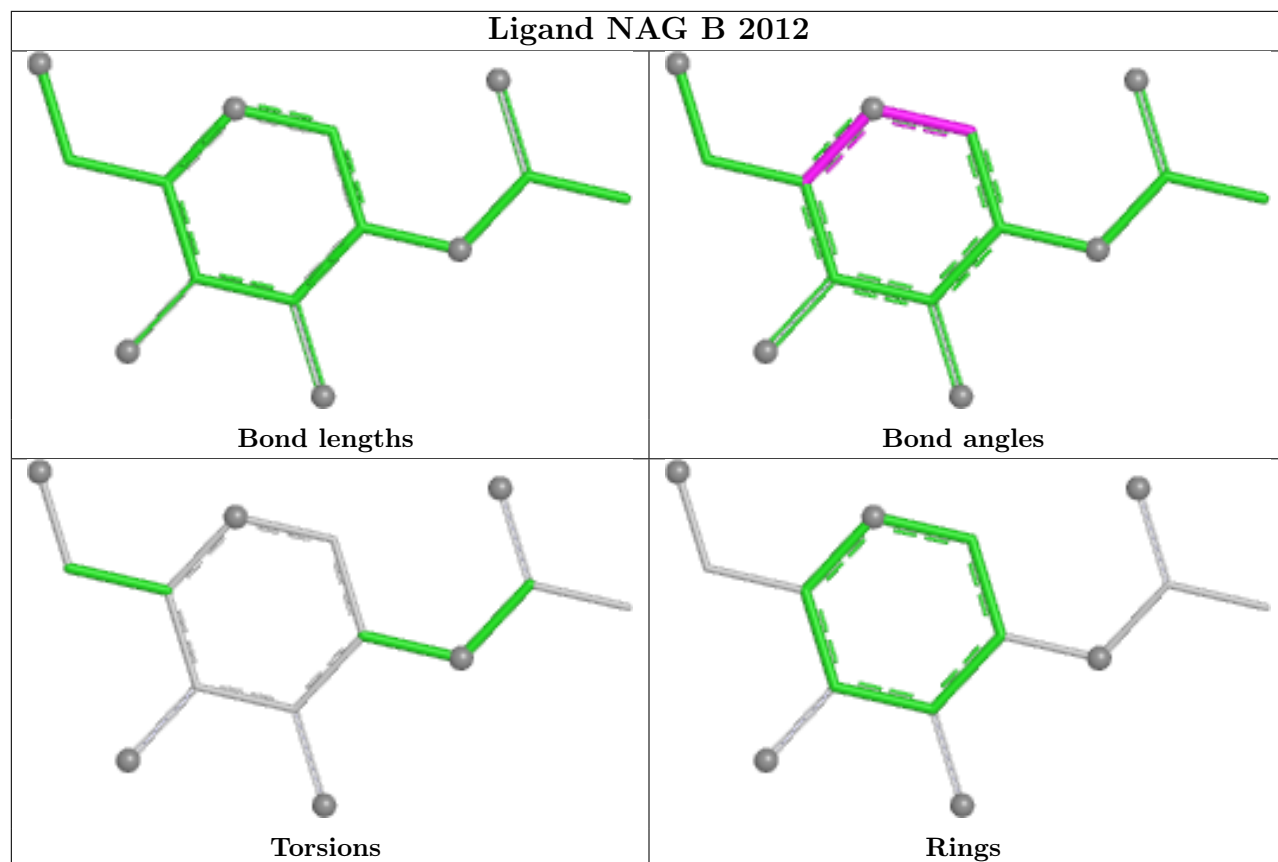




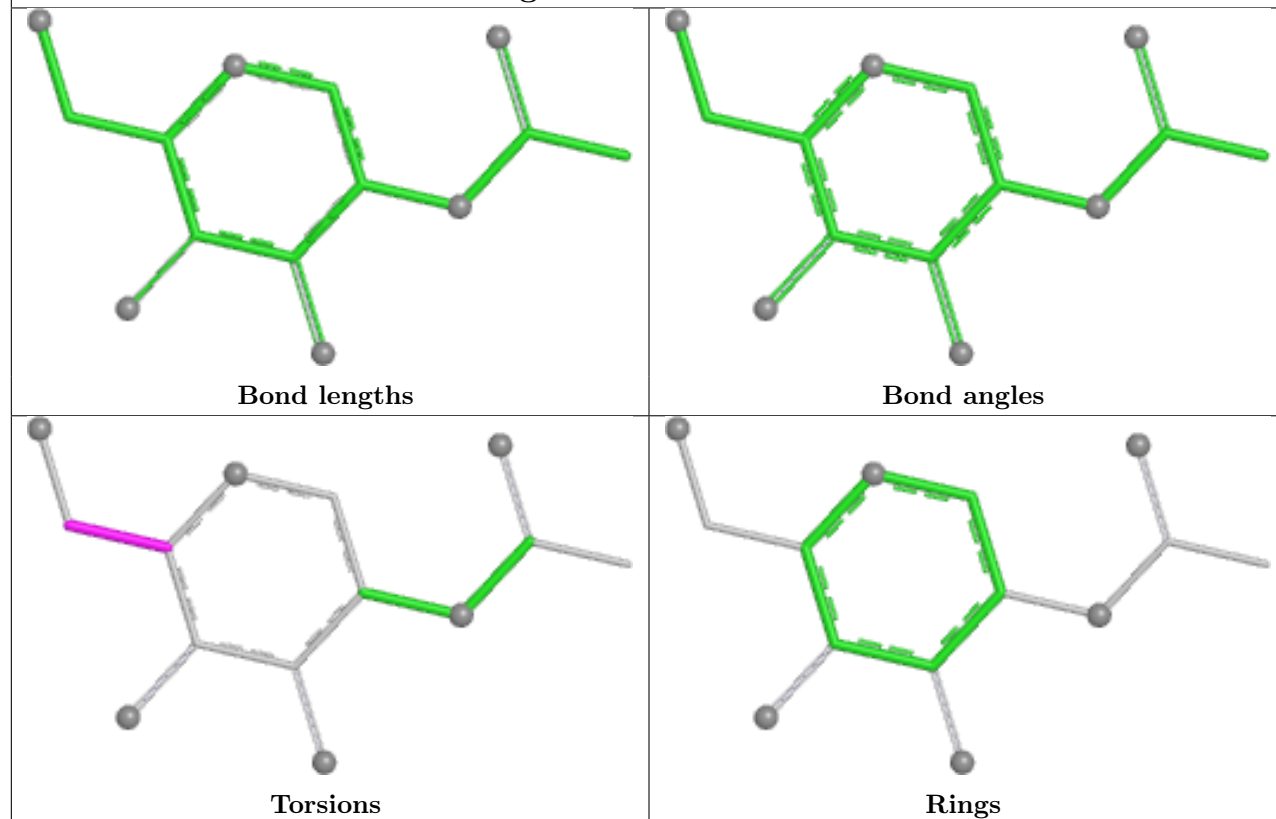




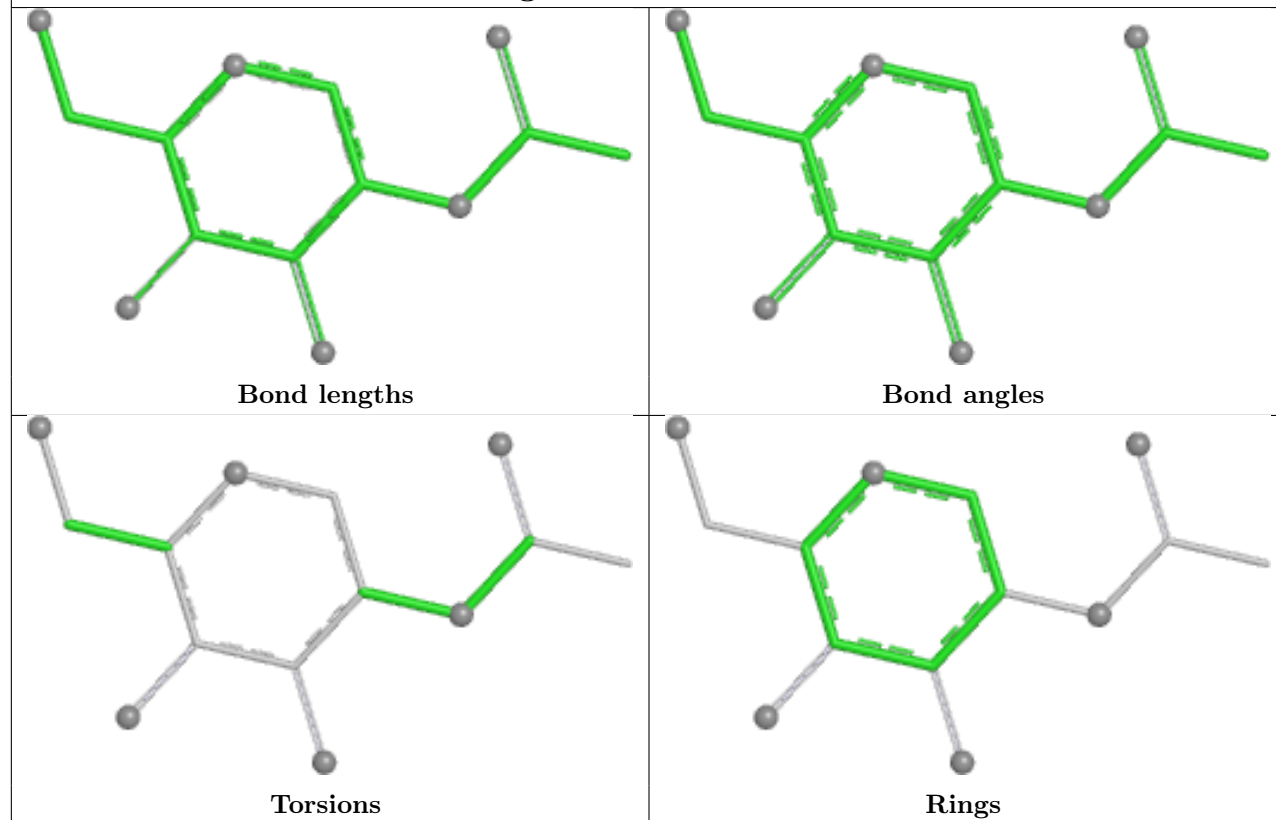




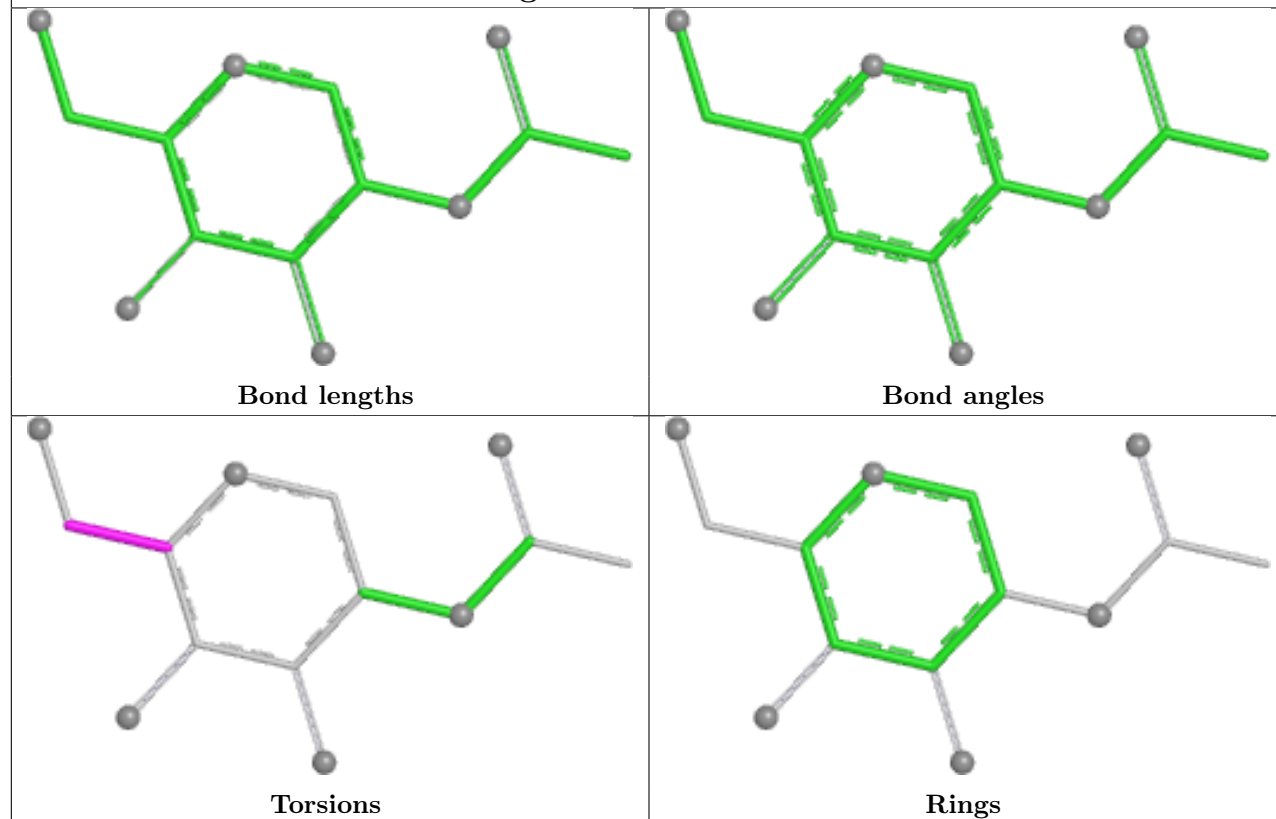
Ligand NAG B 2014



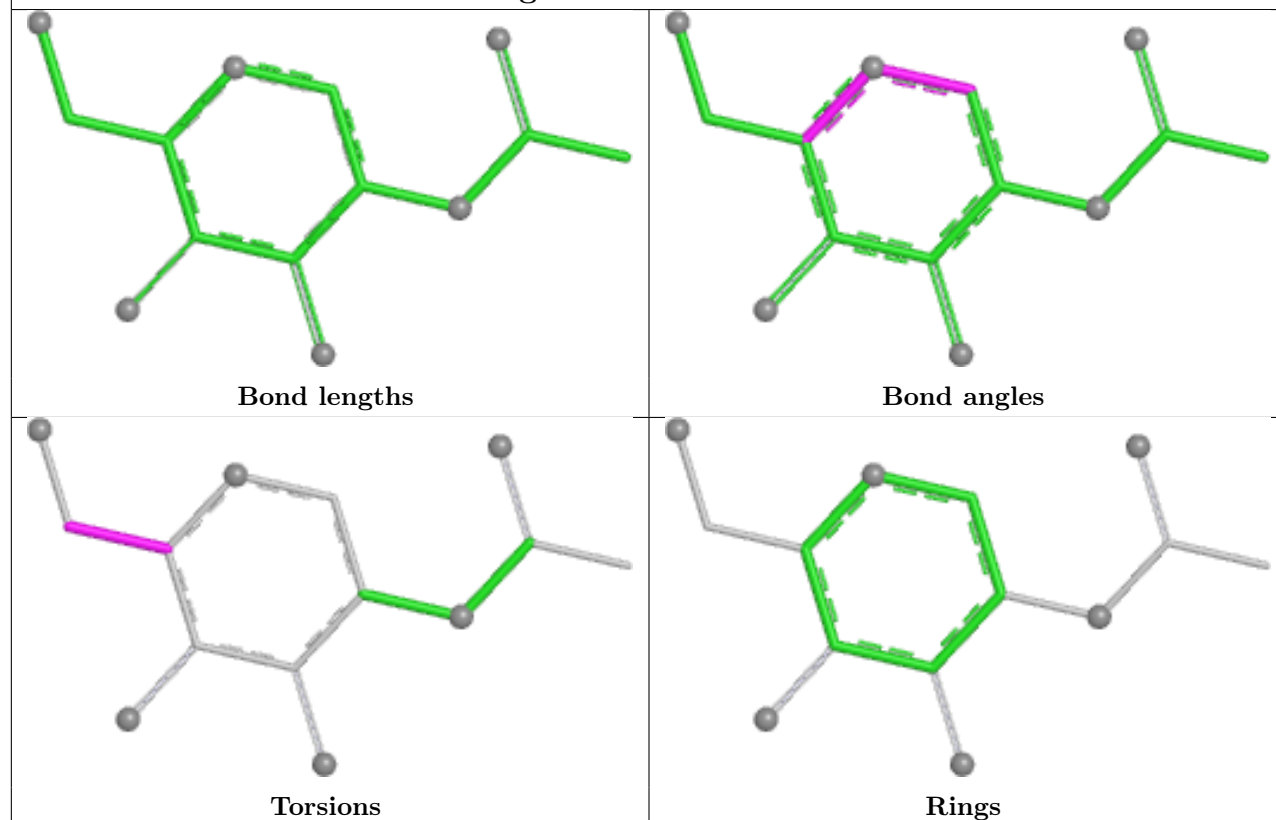
Ligand NAG A 2004



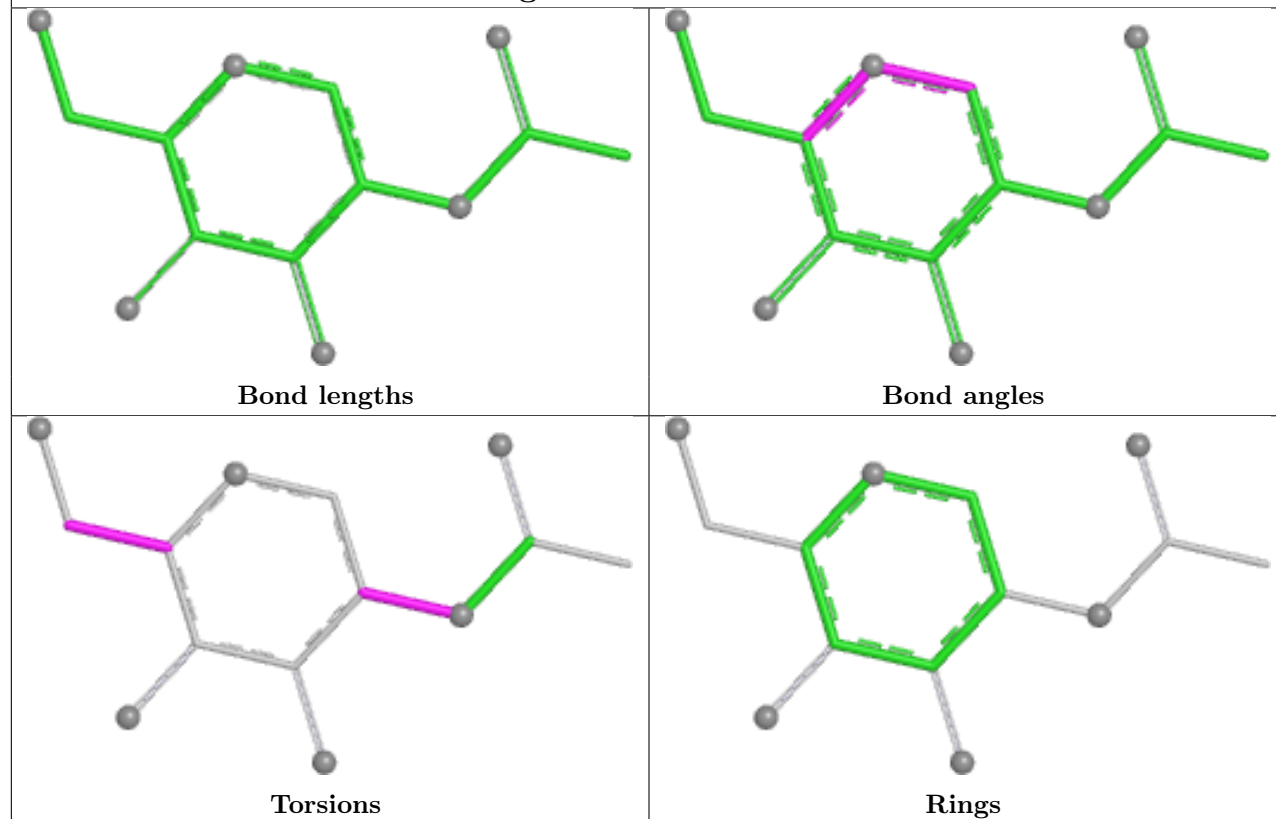
Ligand NAG B 2003



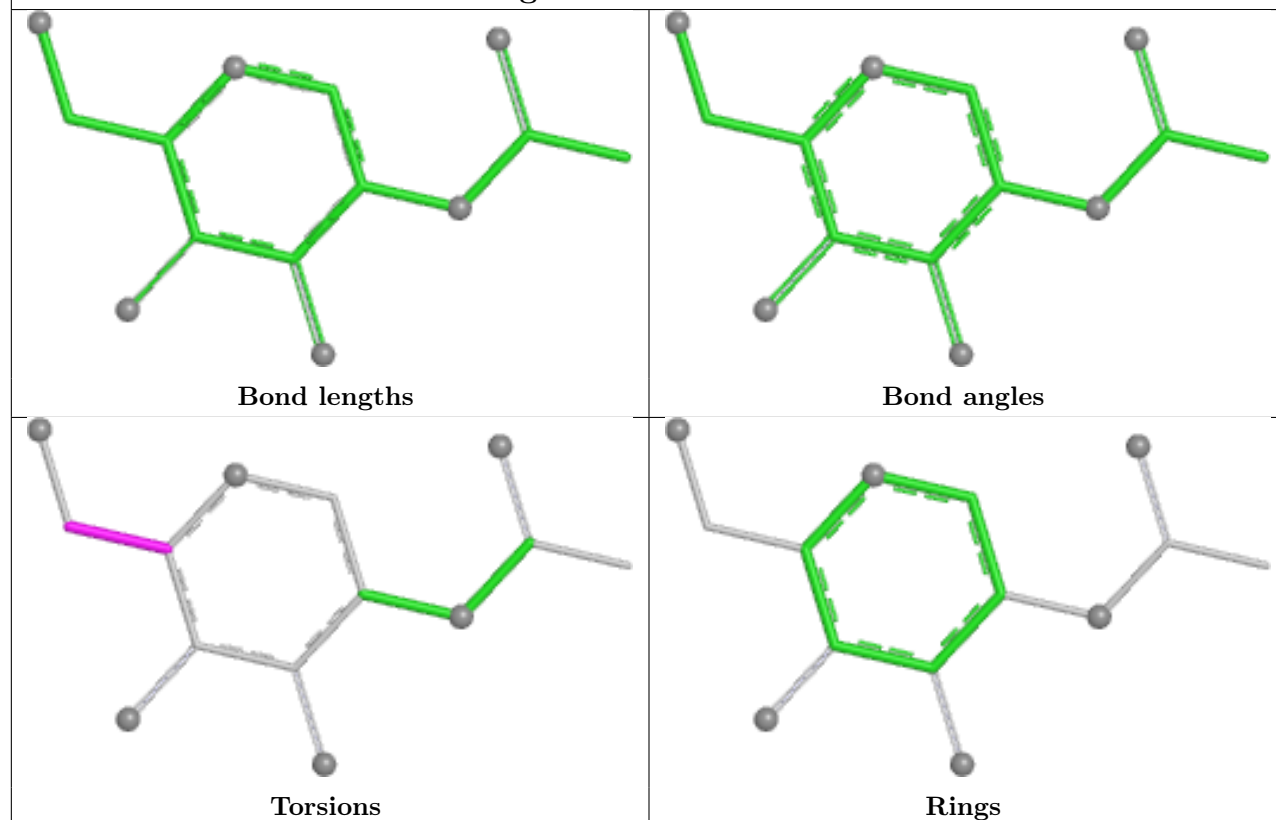
Ligand NAG C 2006

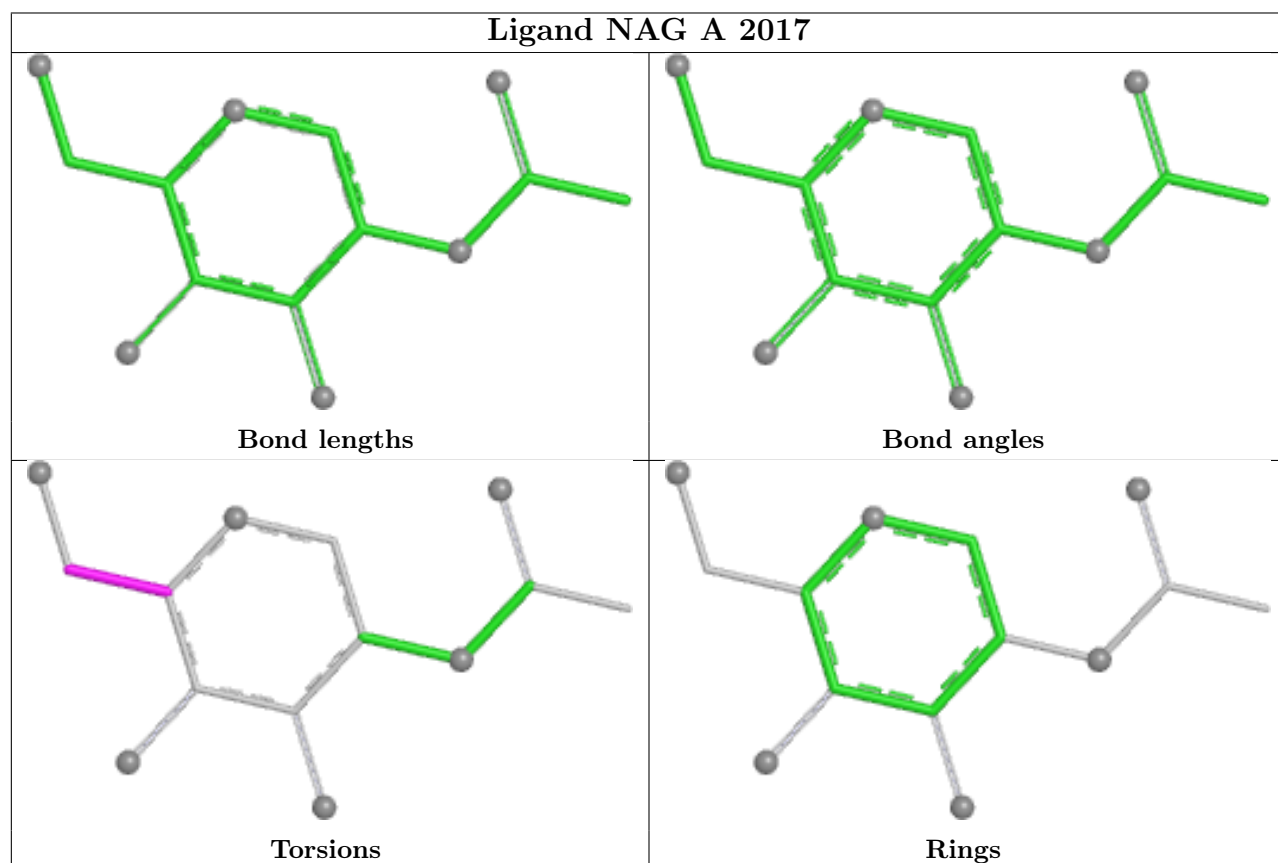
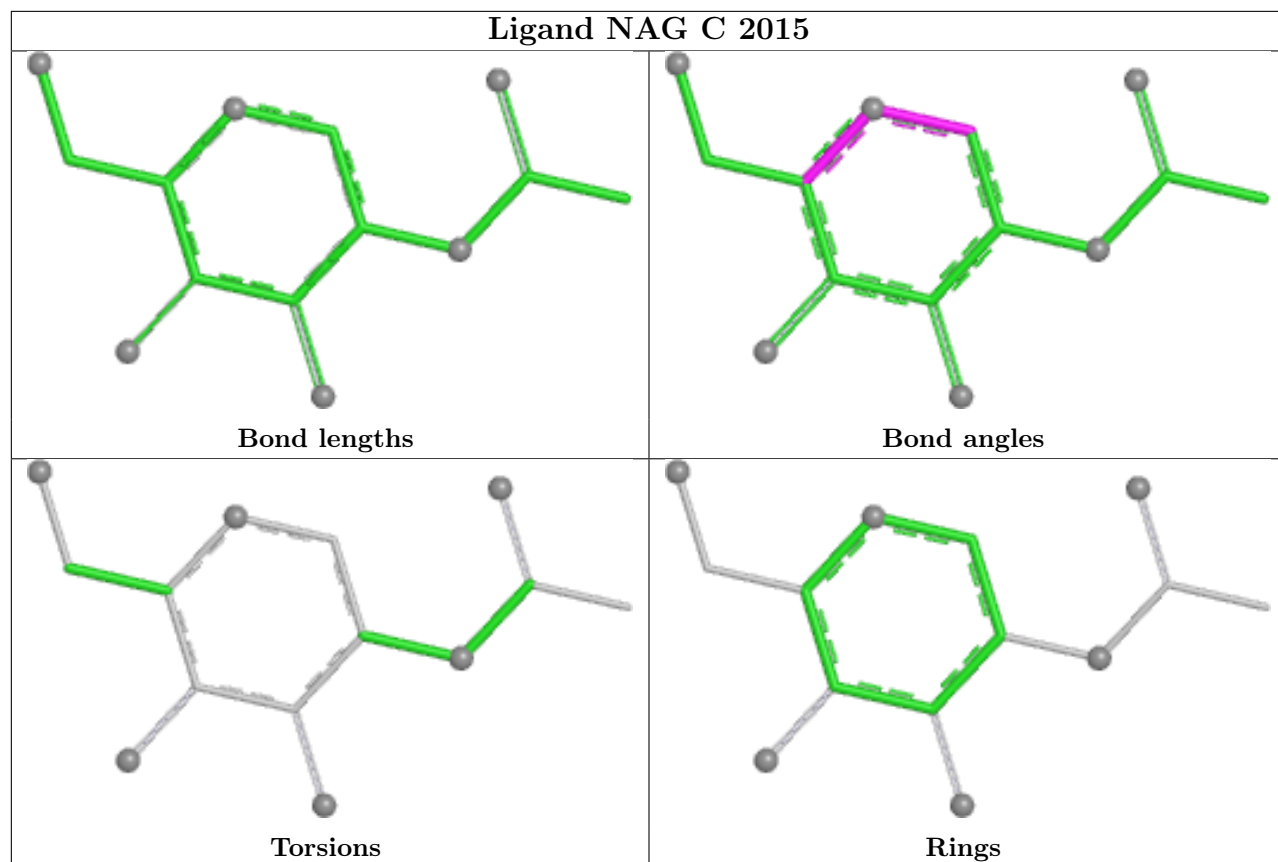


Ligand NAG C 2016

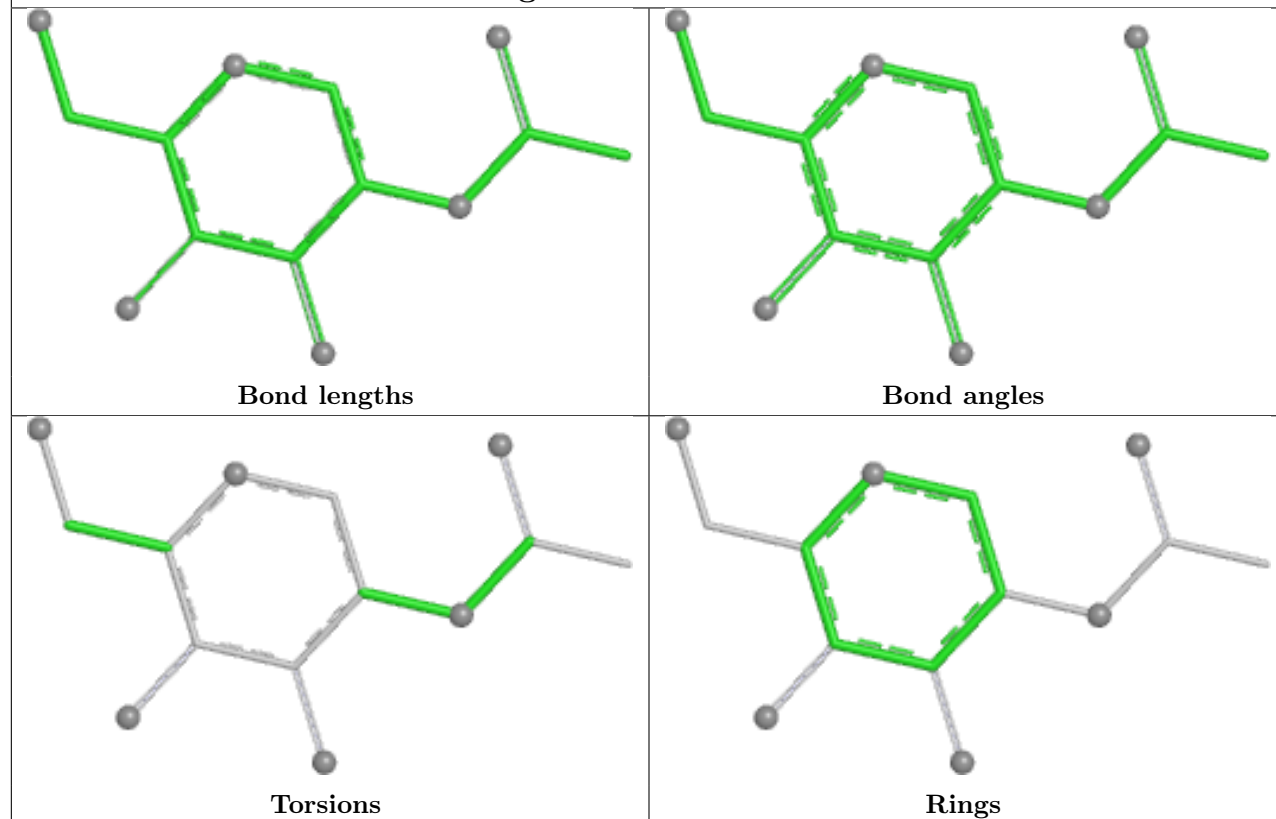


Ligand NAG B 2011

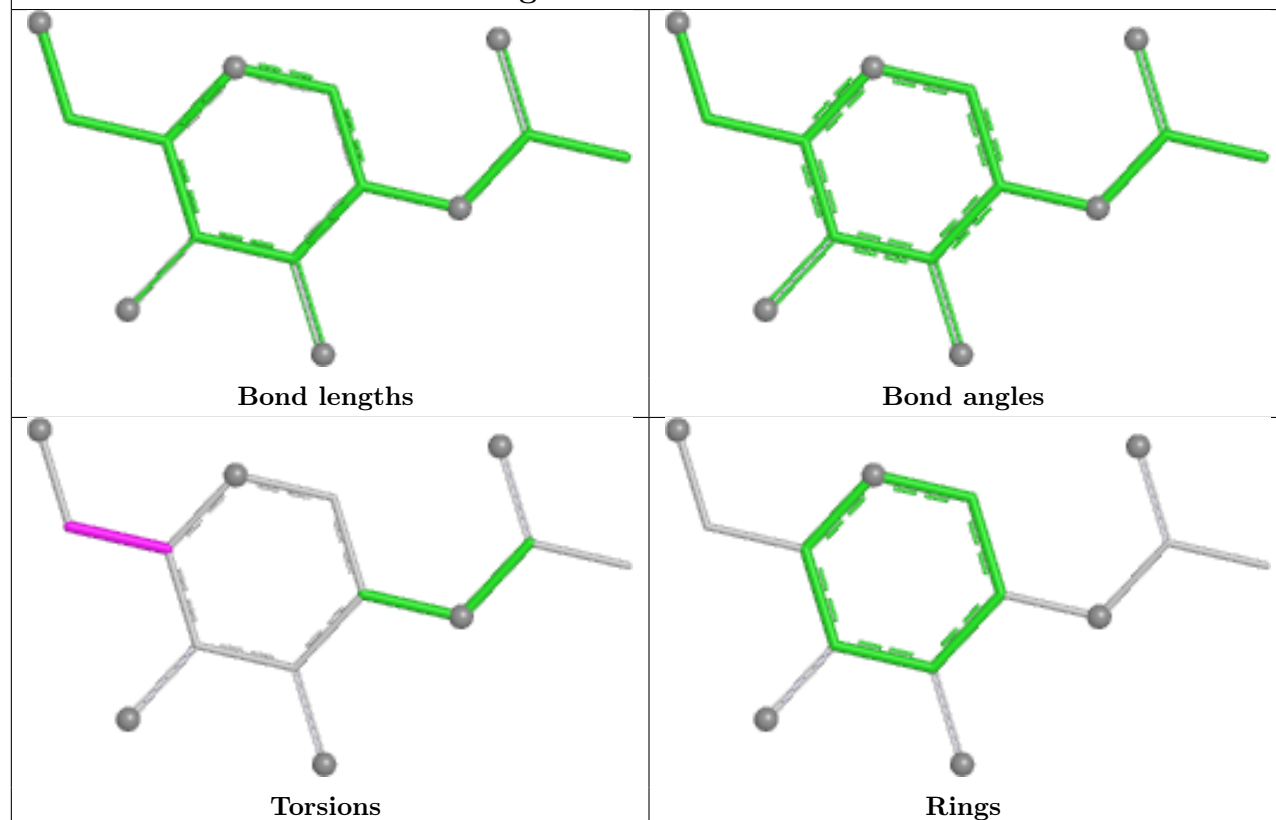


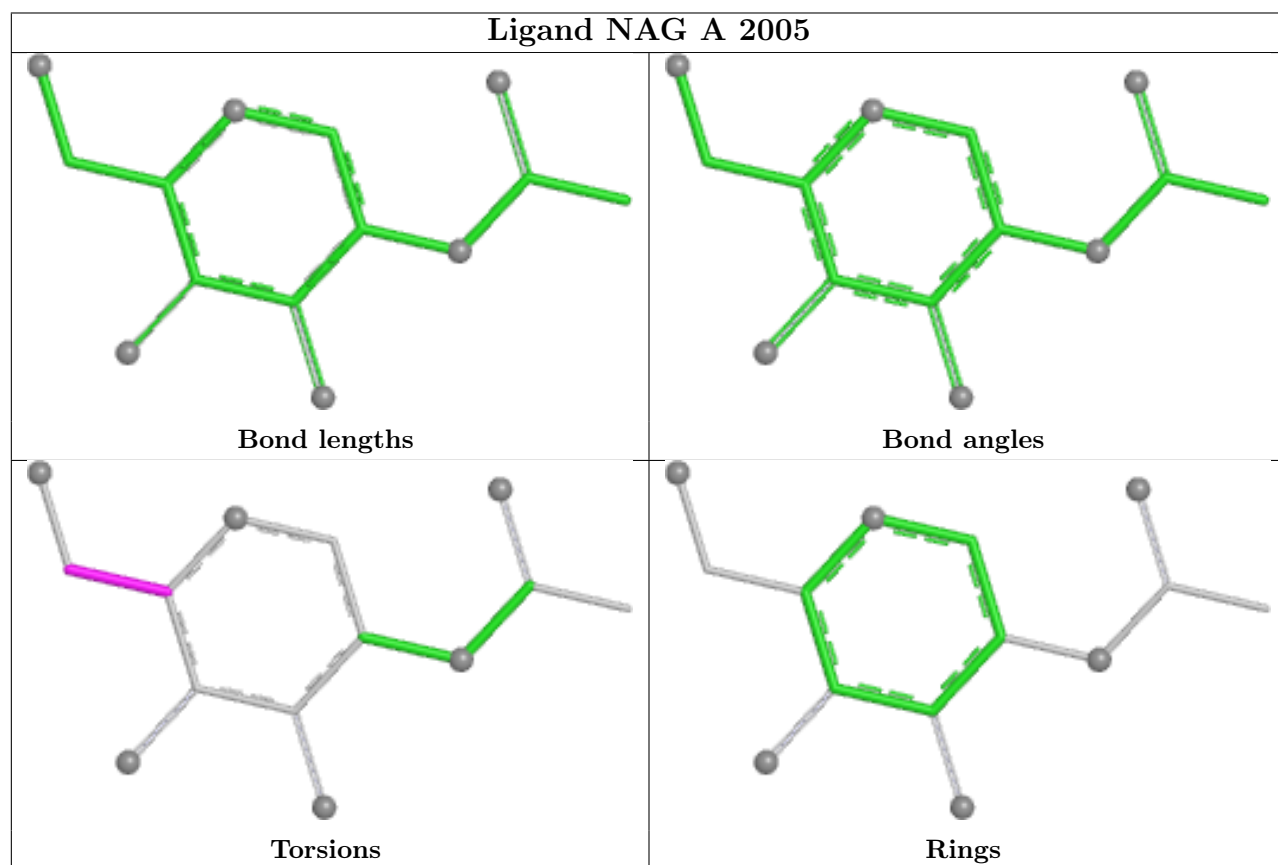
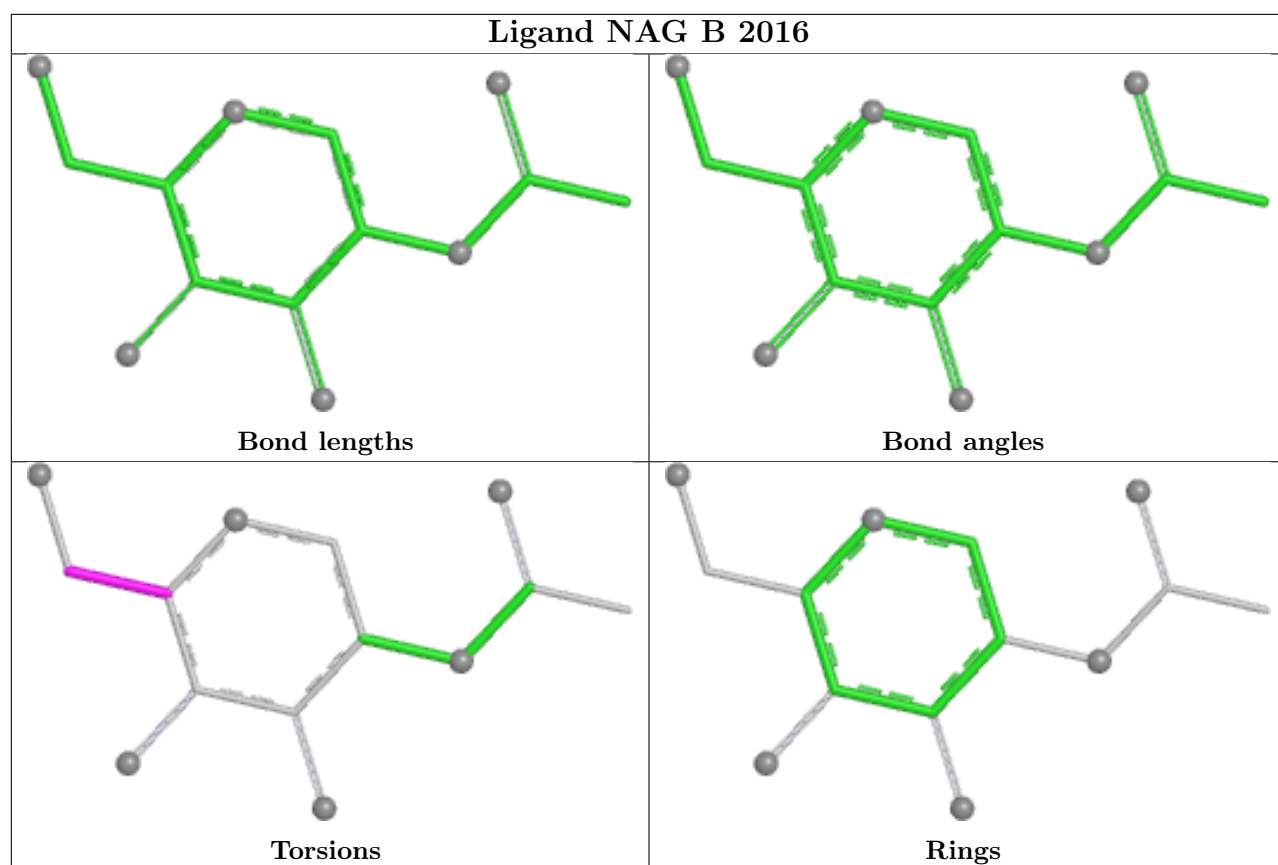


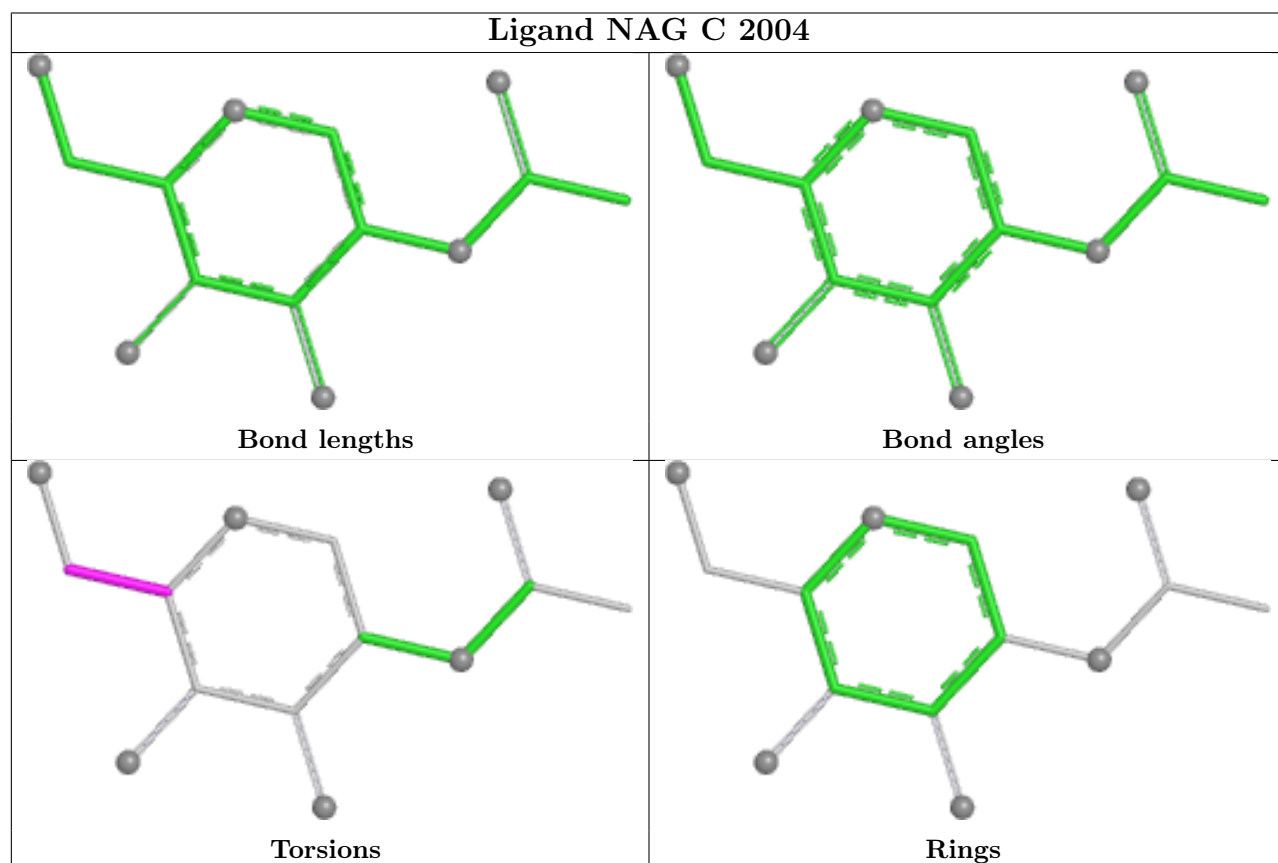
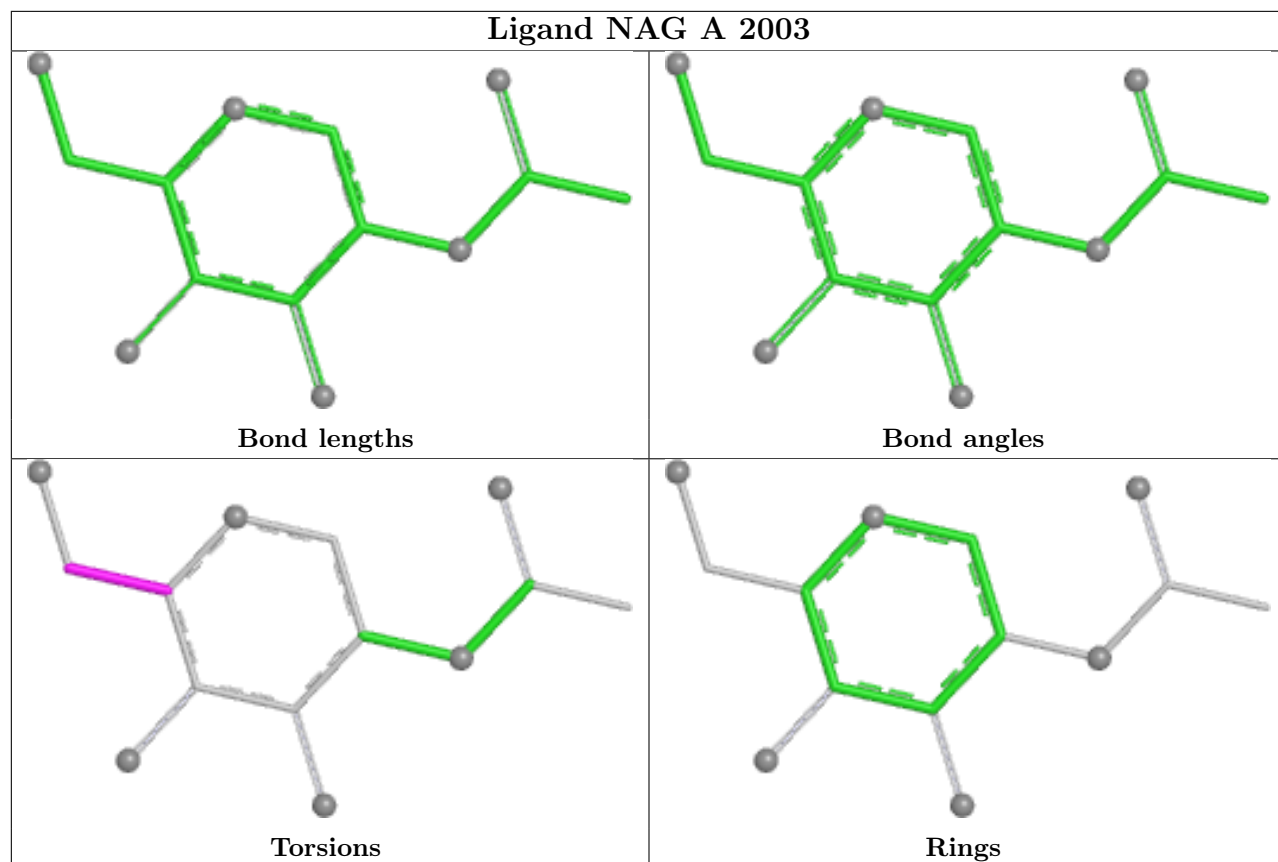
Ligand NAG A 2016

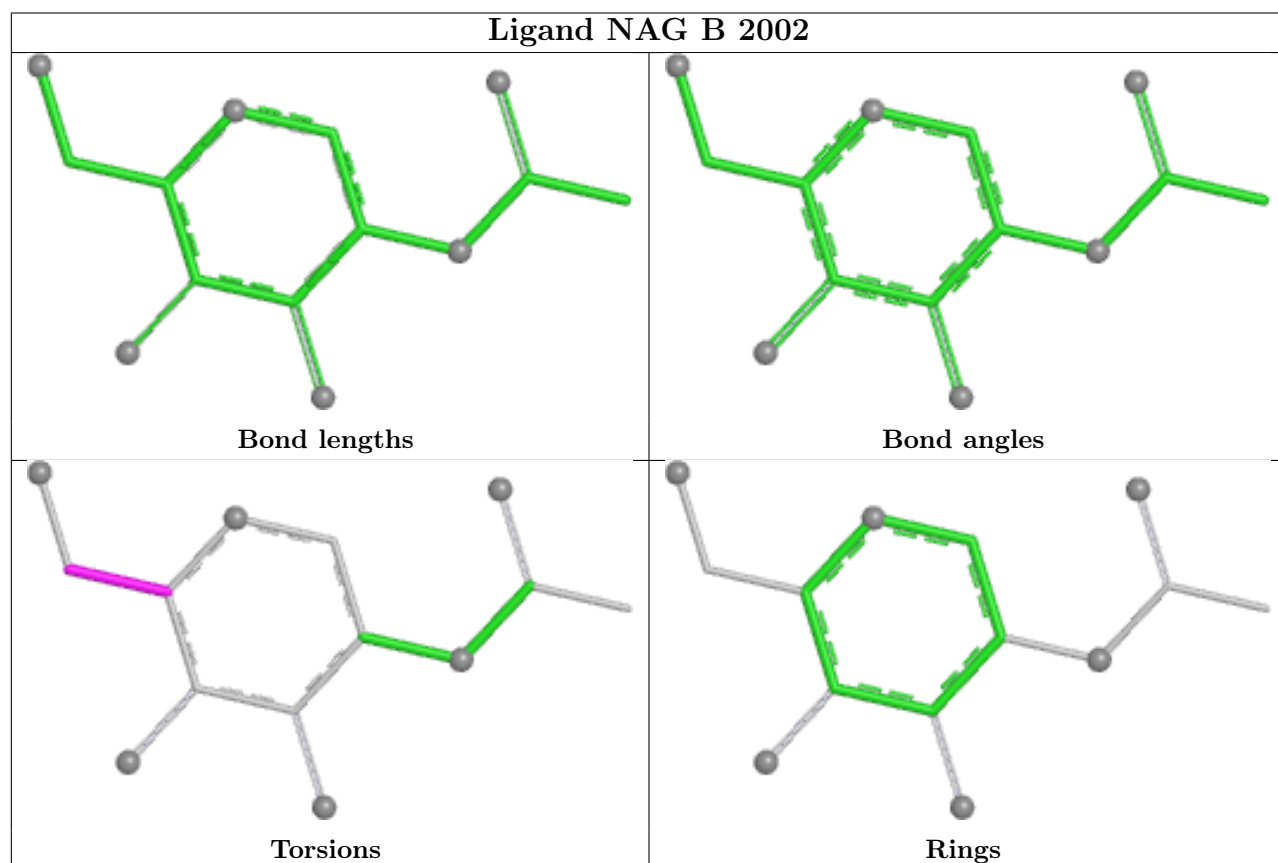
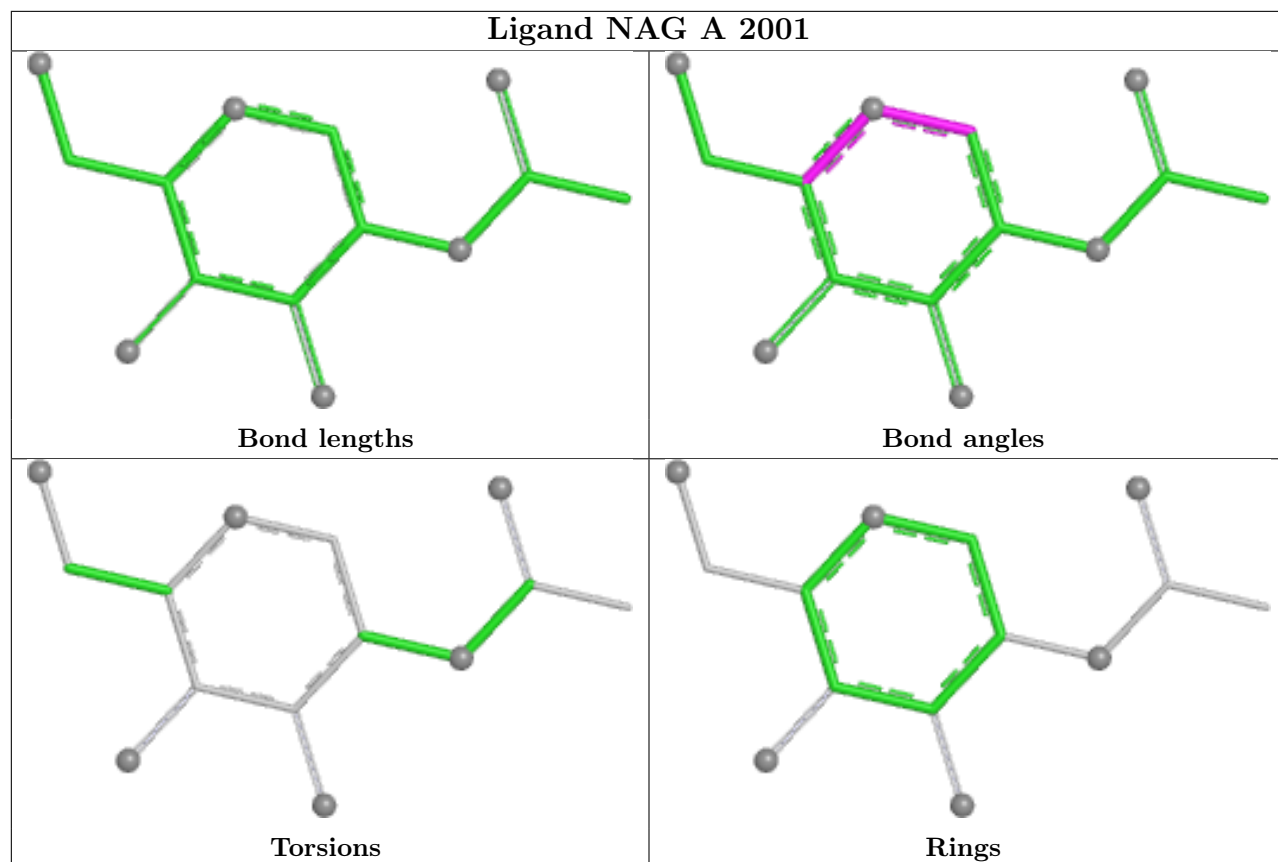


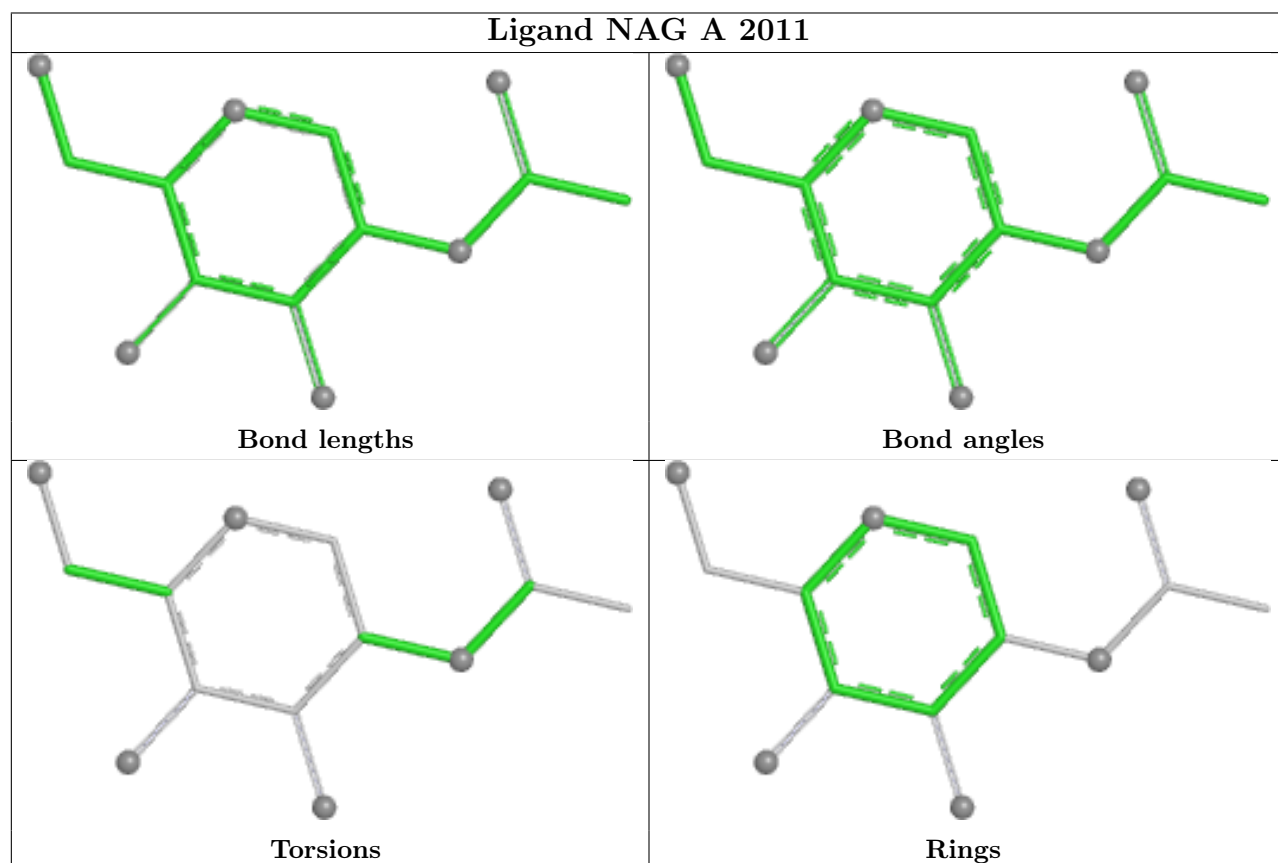
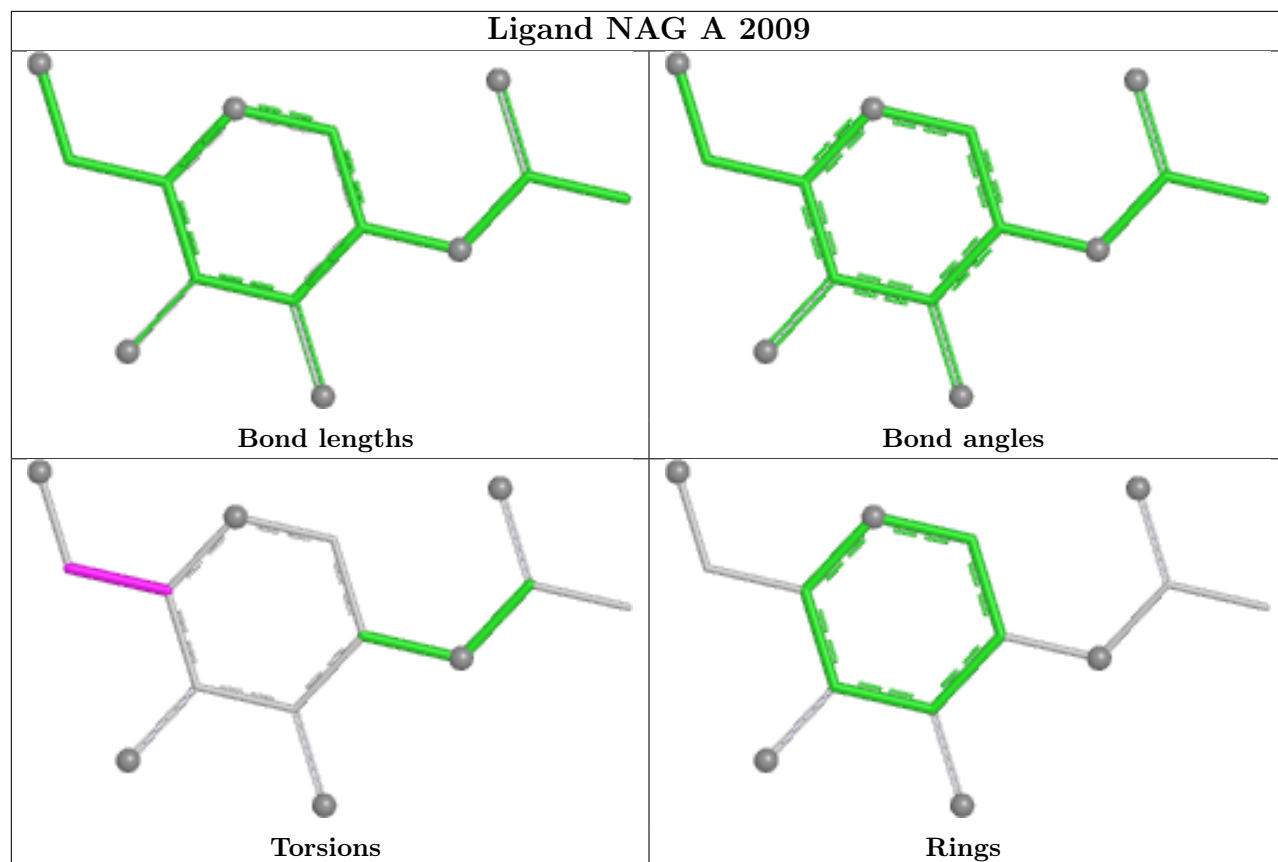
Ligand NAG C 2002

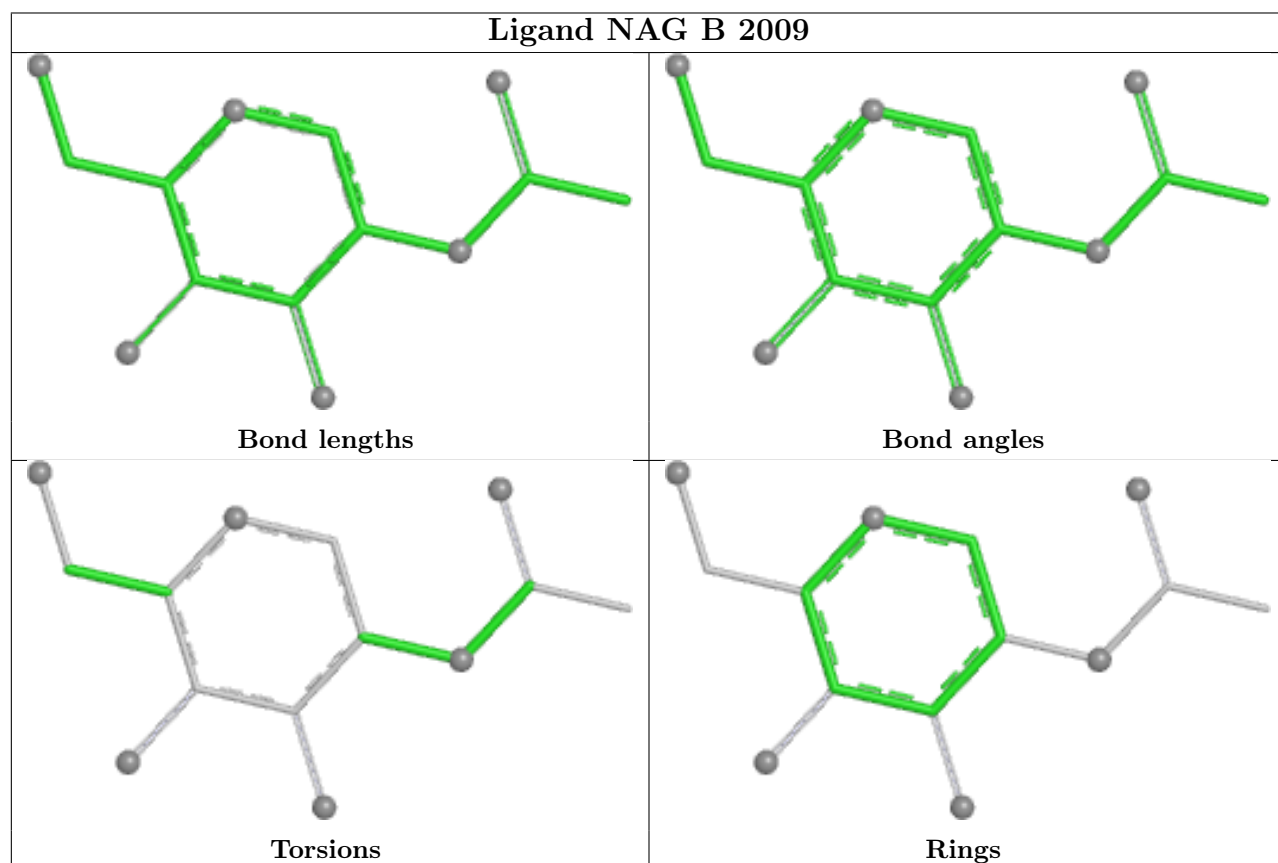
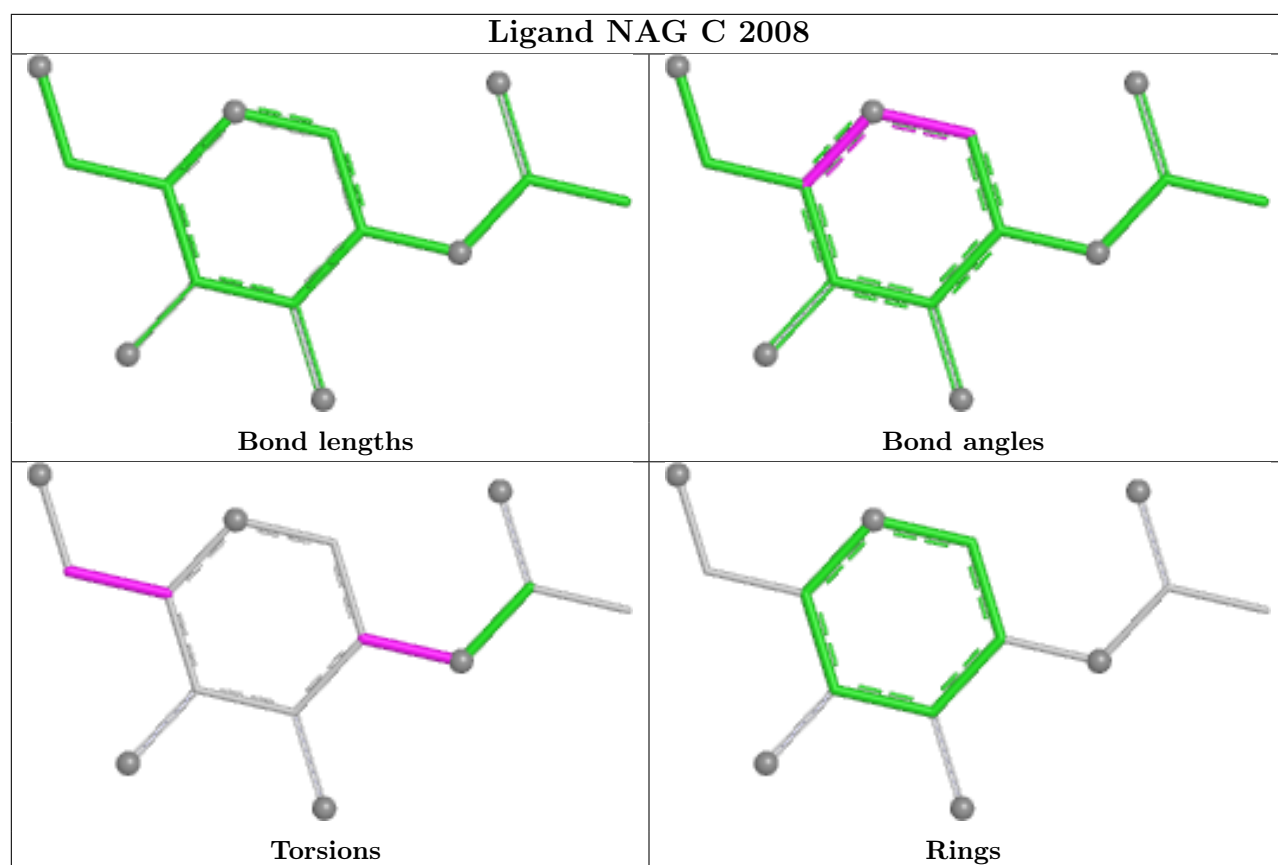




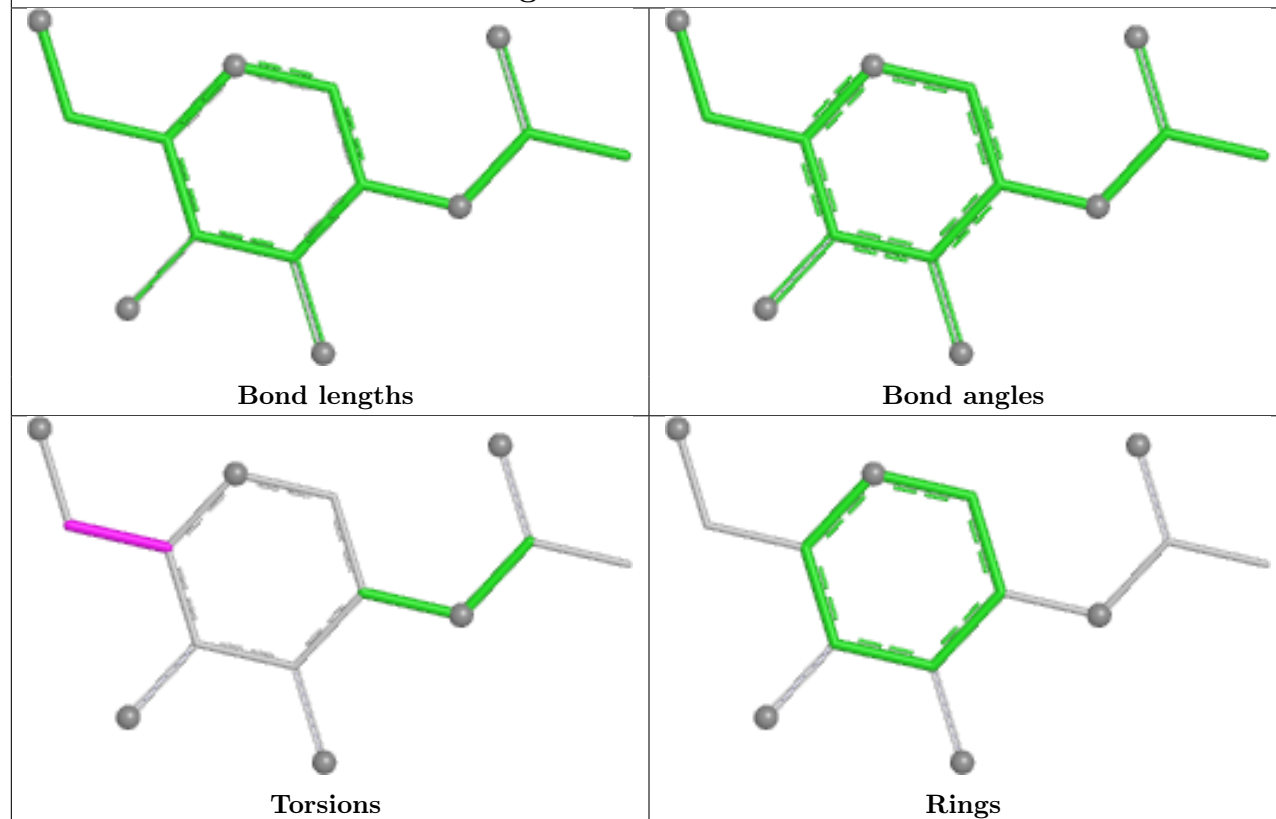




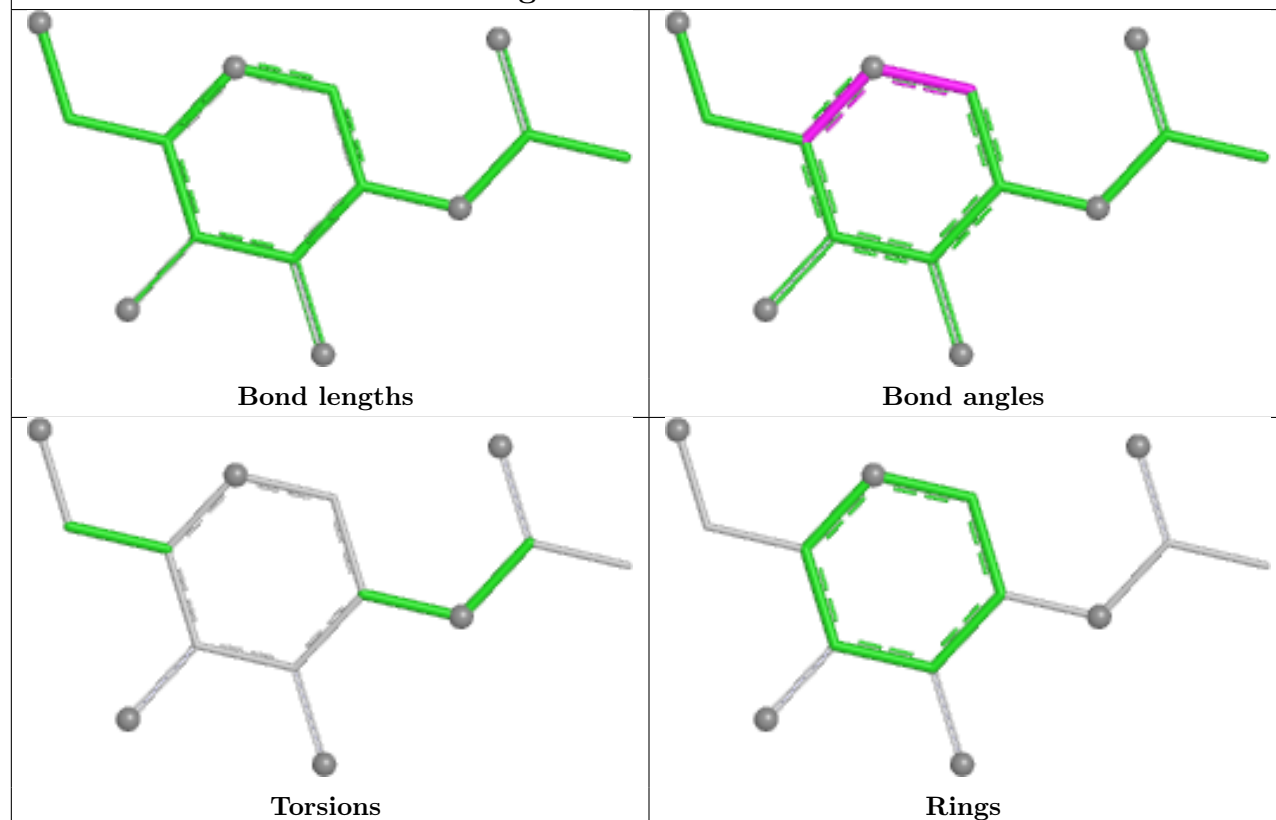


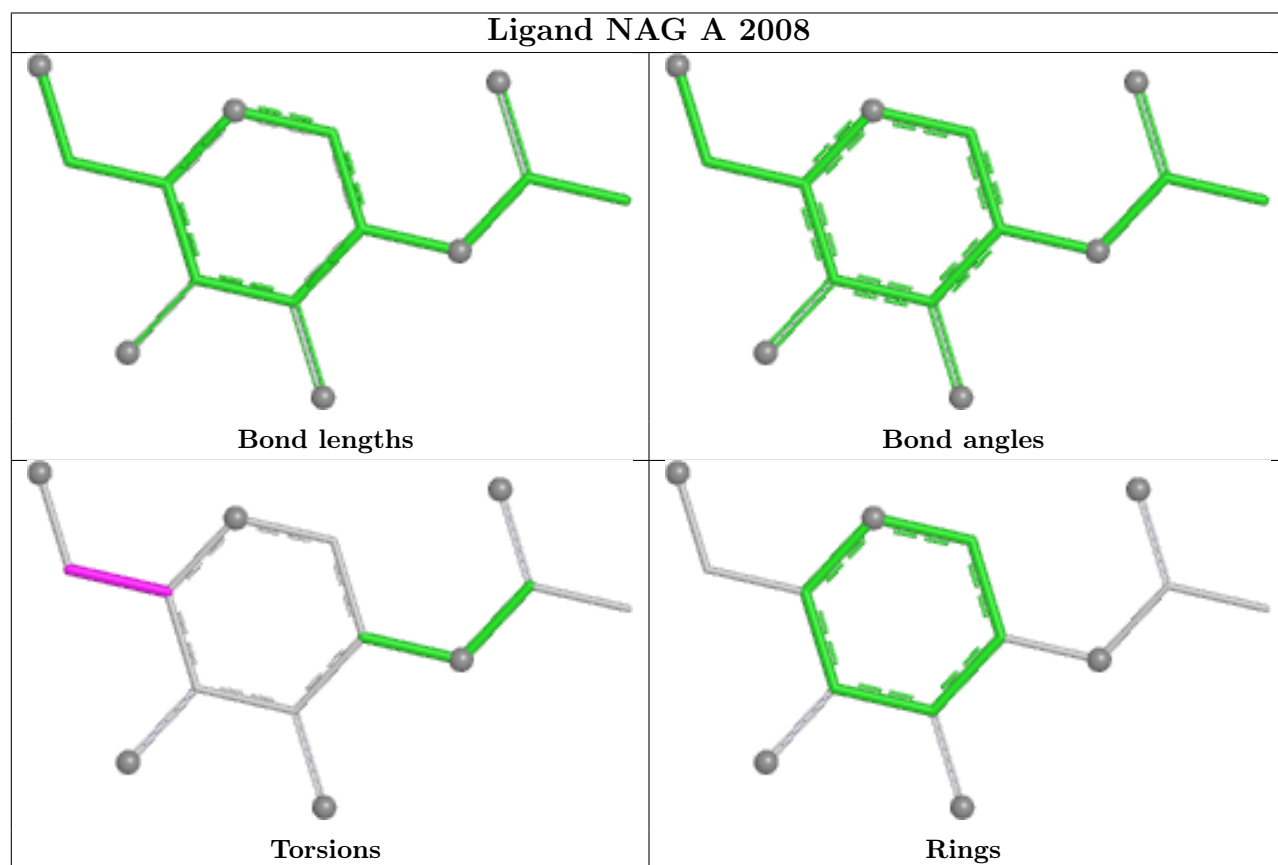
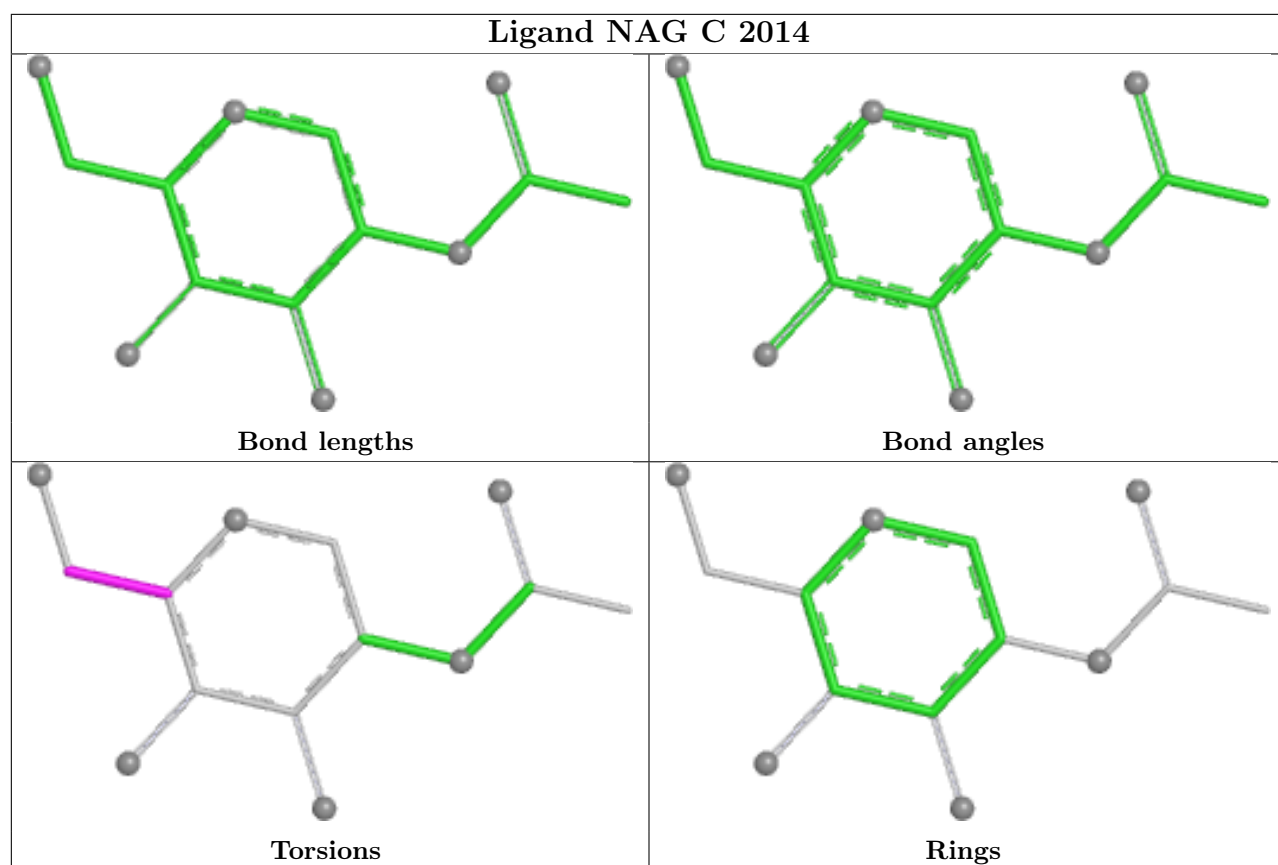


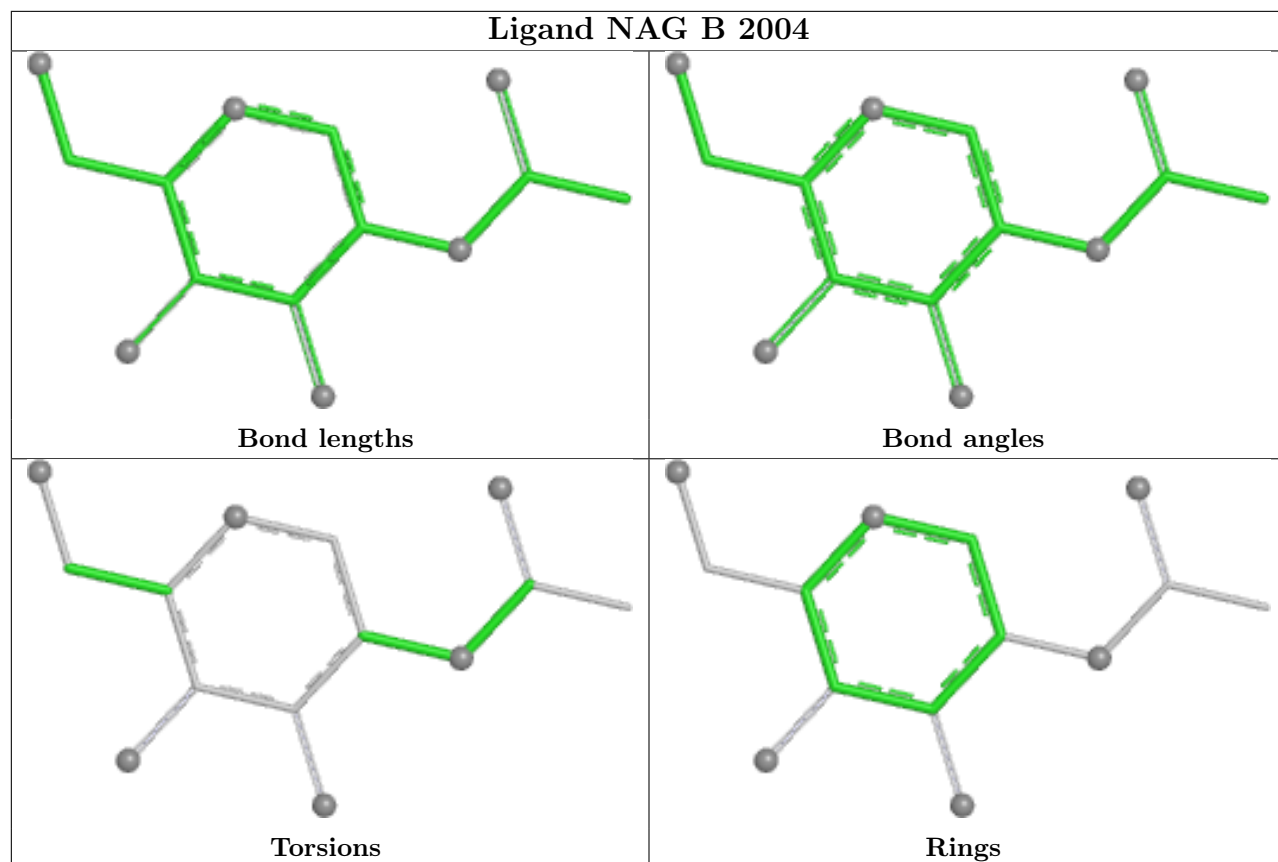
Ligand NAG C 2013



Ligand NAG A 2012







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.

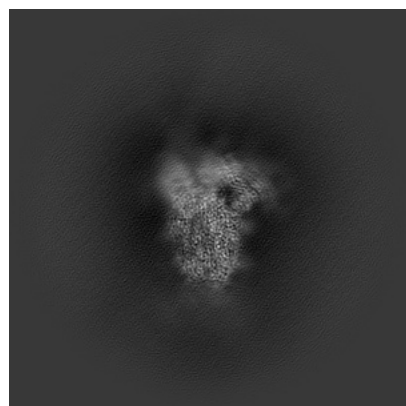
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-38831. These allow visual inspection of the internal detail of the map and identification of artifacts.

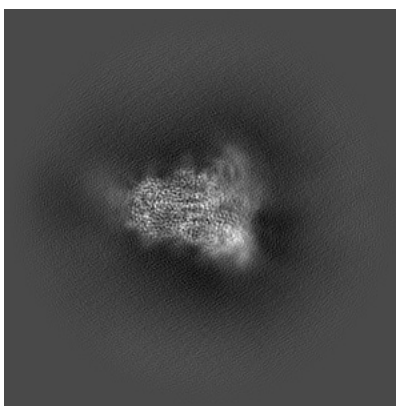
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

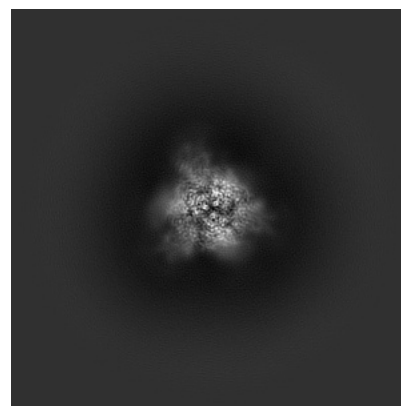
6.1.1 Primary map



X

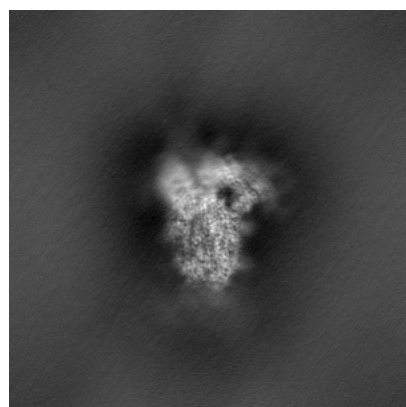


Y

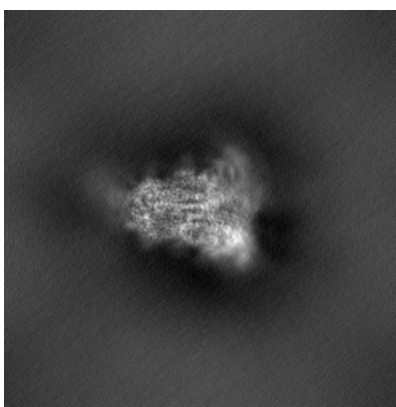


Z

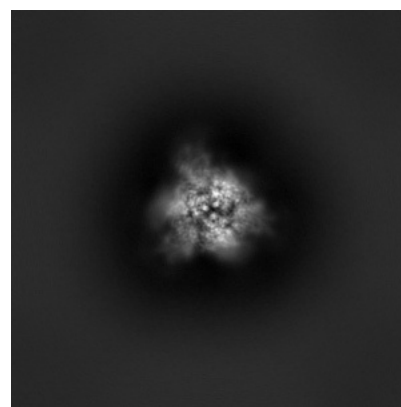
6.1.2 Raw map



X



Y

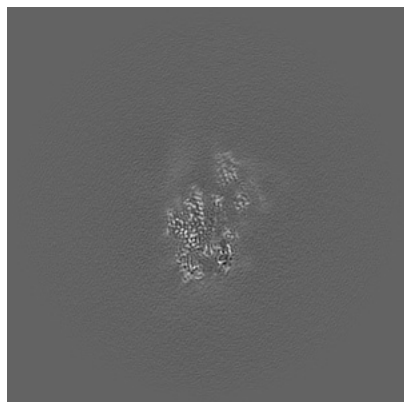


Z

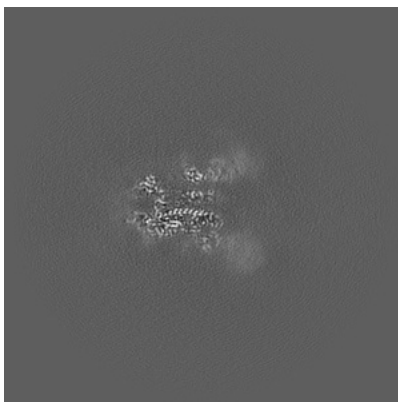
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

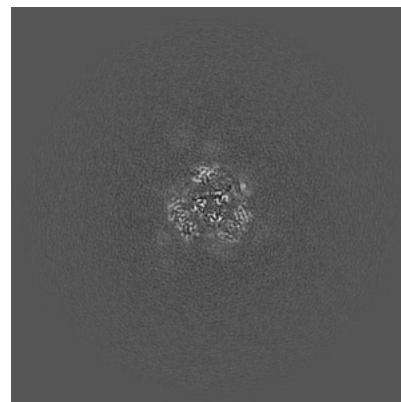
6.2.1 Primary map



X Index: 200

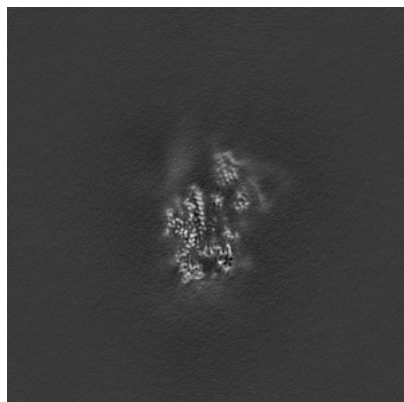


Y Index: 200

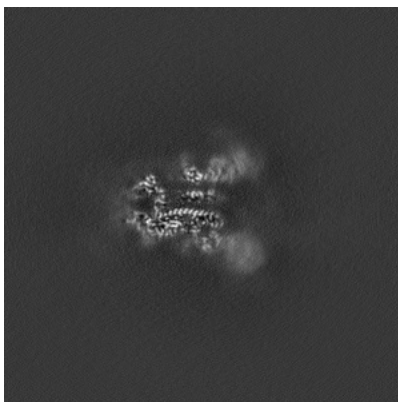


Z Index: 200

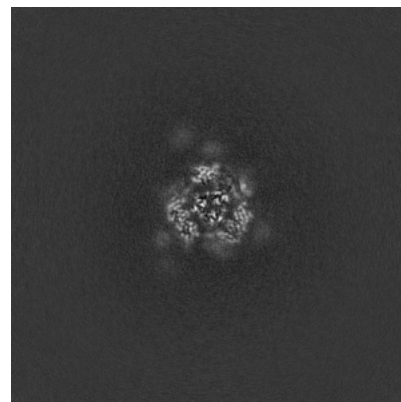
6.2.2 Raw map



X Index: 200



Y Index: 200

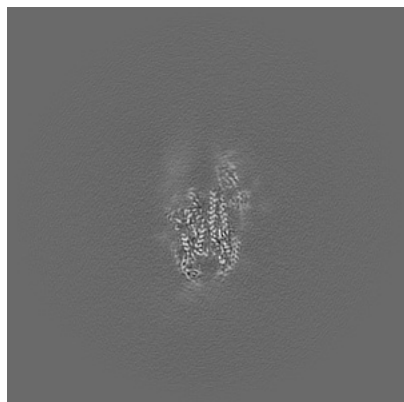


Z Index: 200

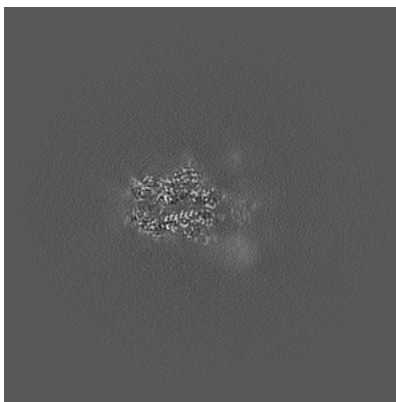
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

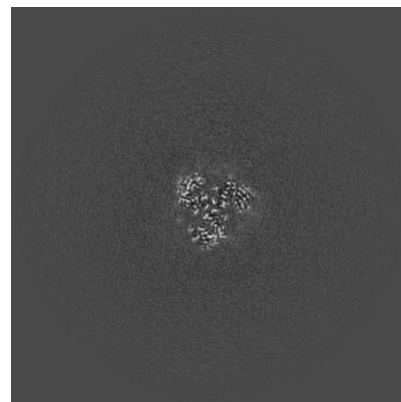
6.3.1 Primary map



X Index: 205

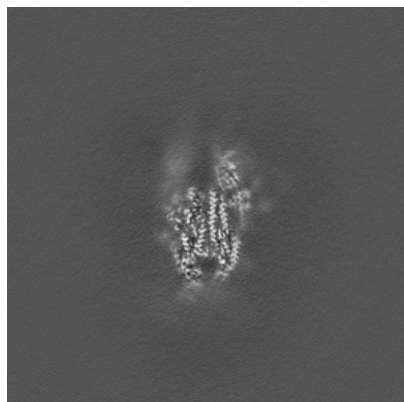


Y Index: 209

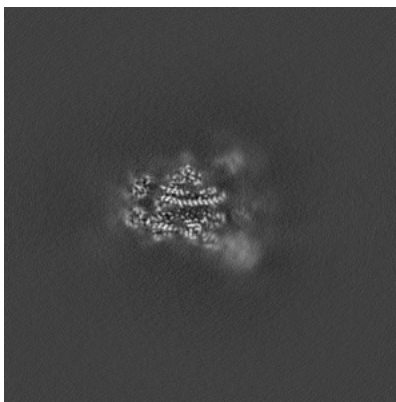


Z Index: 187

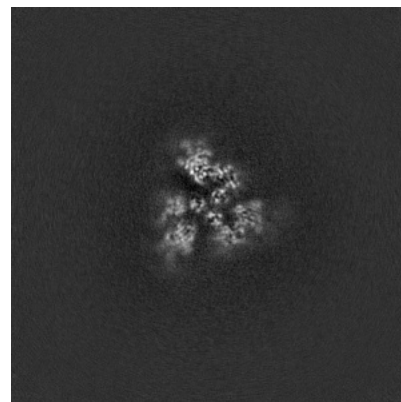
6.3.2 Raw map



X Index: 205



Y Index: 206

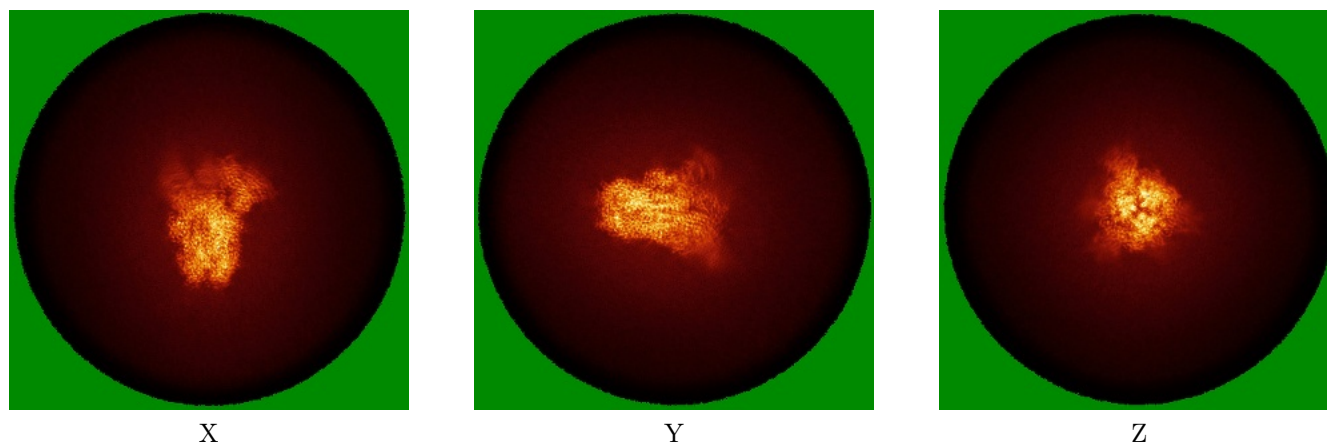


Z Index: 212

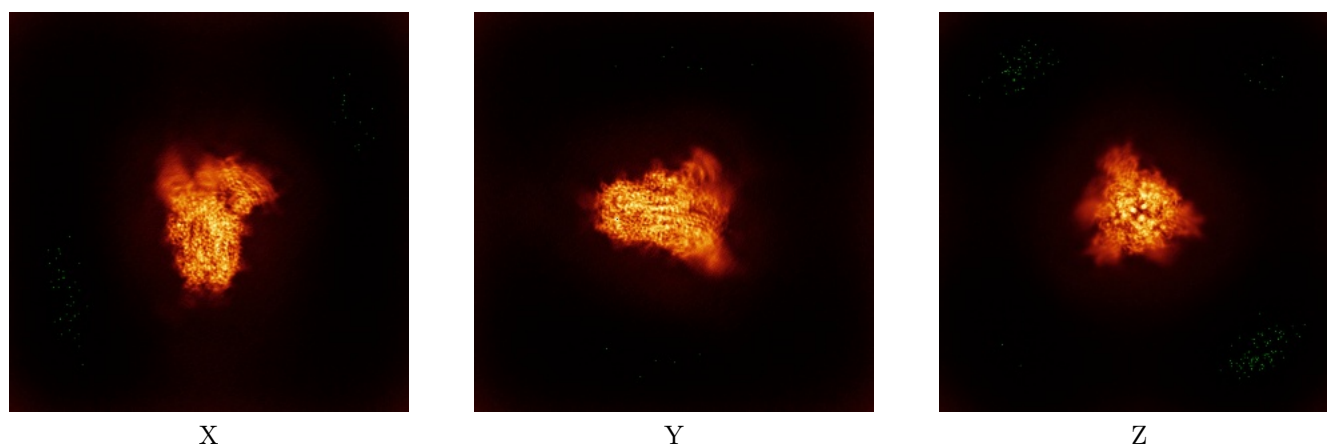
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) [i](#)

6.4.1 Primary map



6.4.2 Raw map



The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5 Orthogonal surface views [i](#)

This section was not generated.

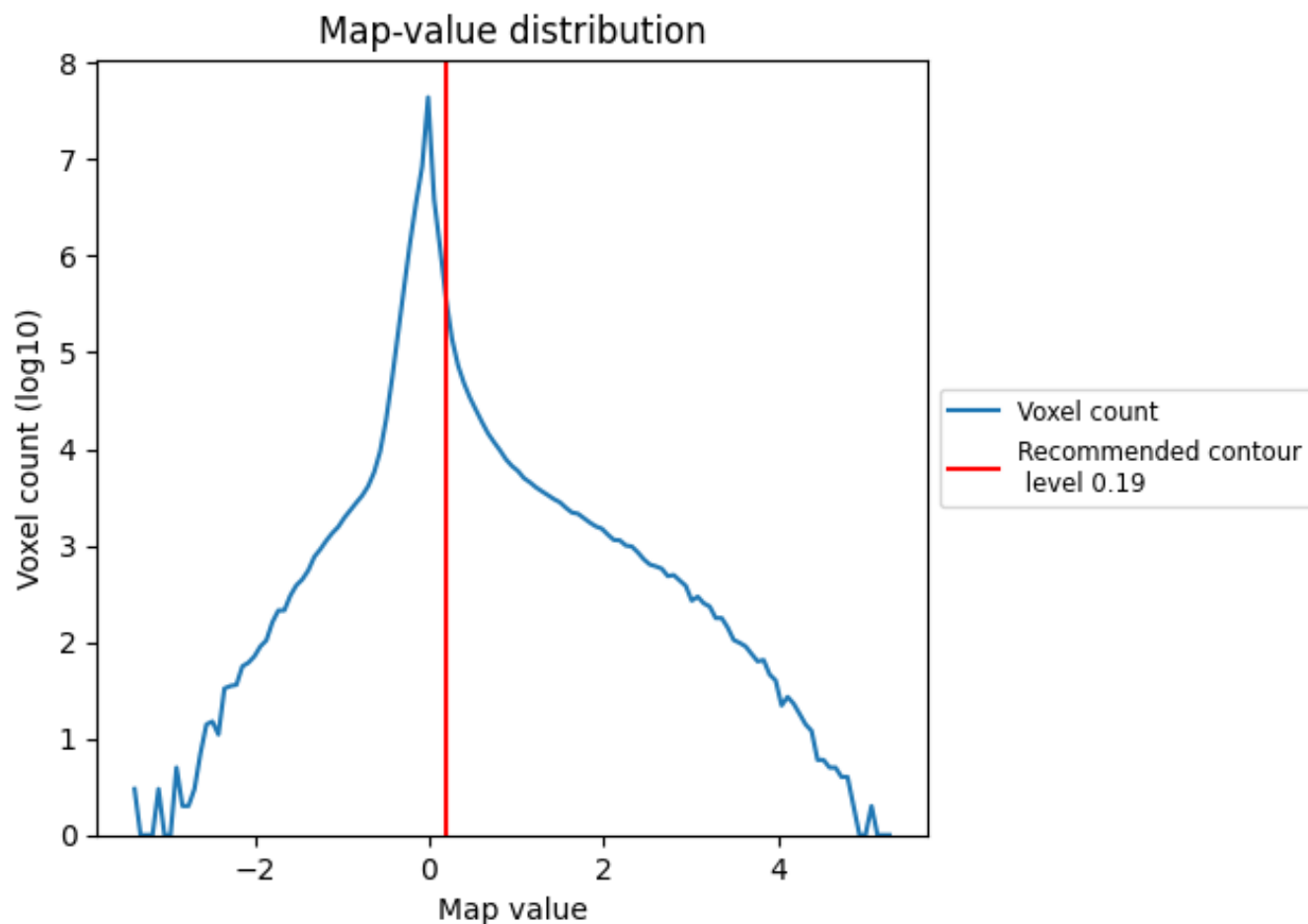
6.6 Mask visualisation [i](#)

This section was not generated. No masks/segmentation were deposited.

7 Map analysis [i](#)

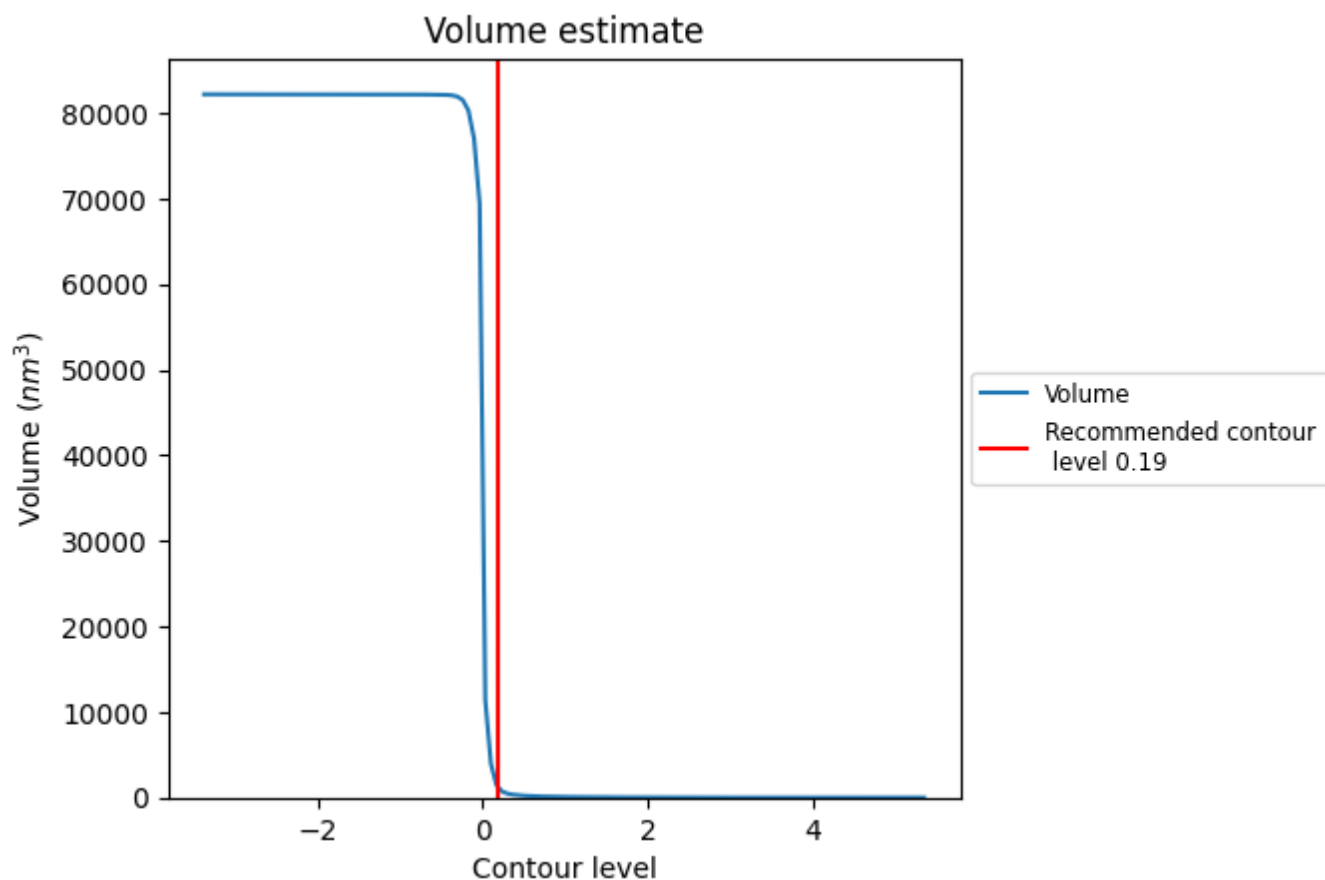
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

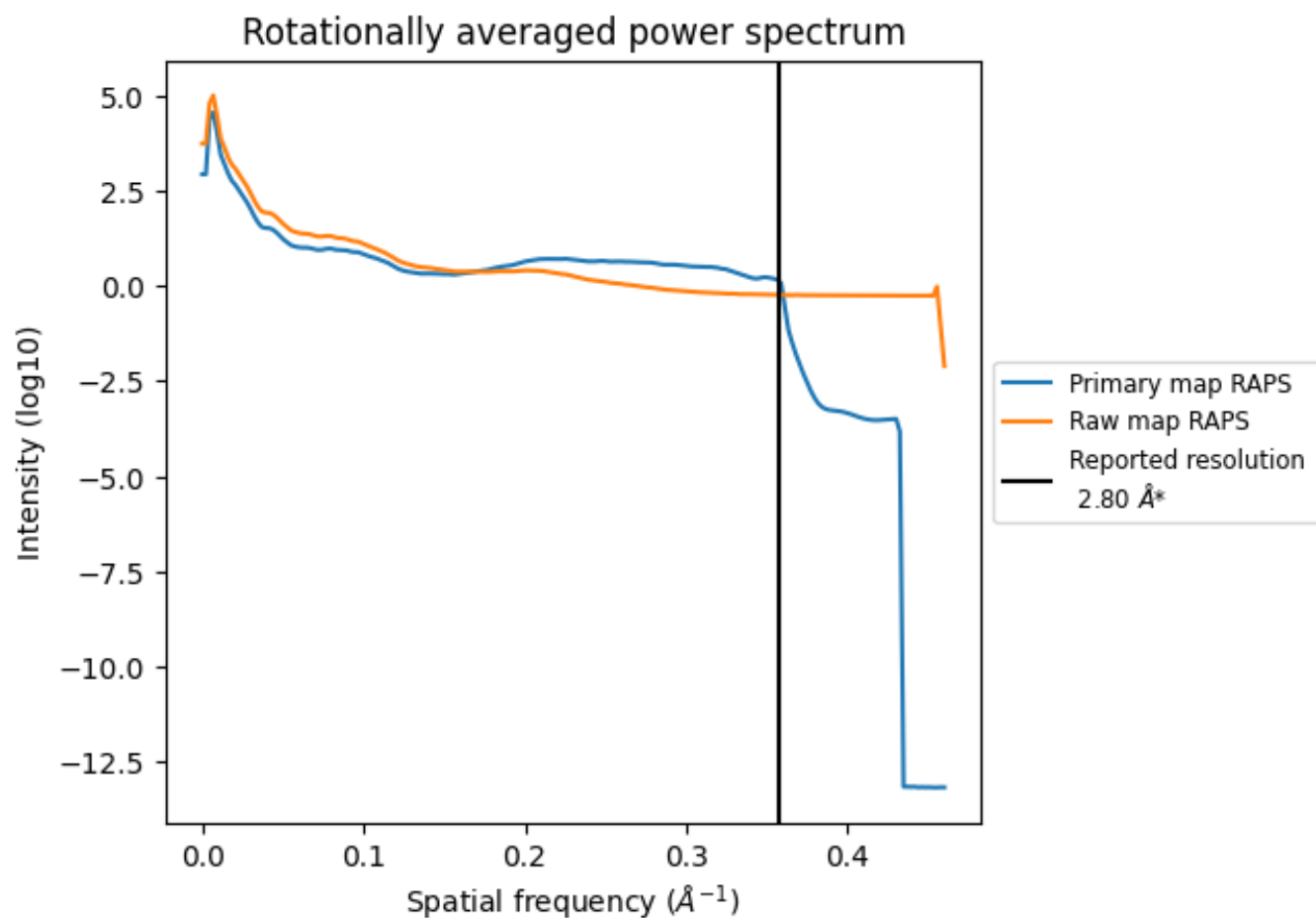
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 1181 nm^3 ; this corresponds to an approximate mass of 1067 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

7.3 Rotationally averaged power spectrum ⓘ

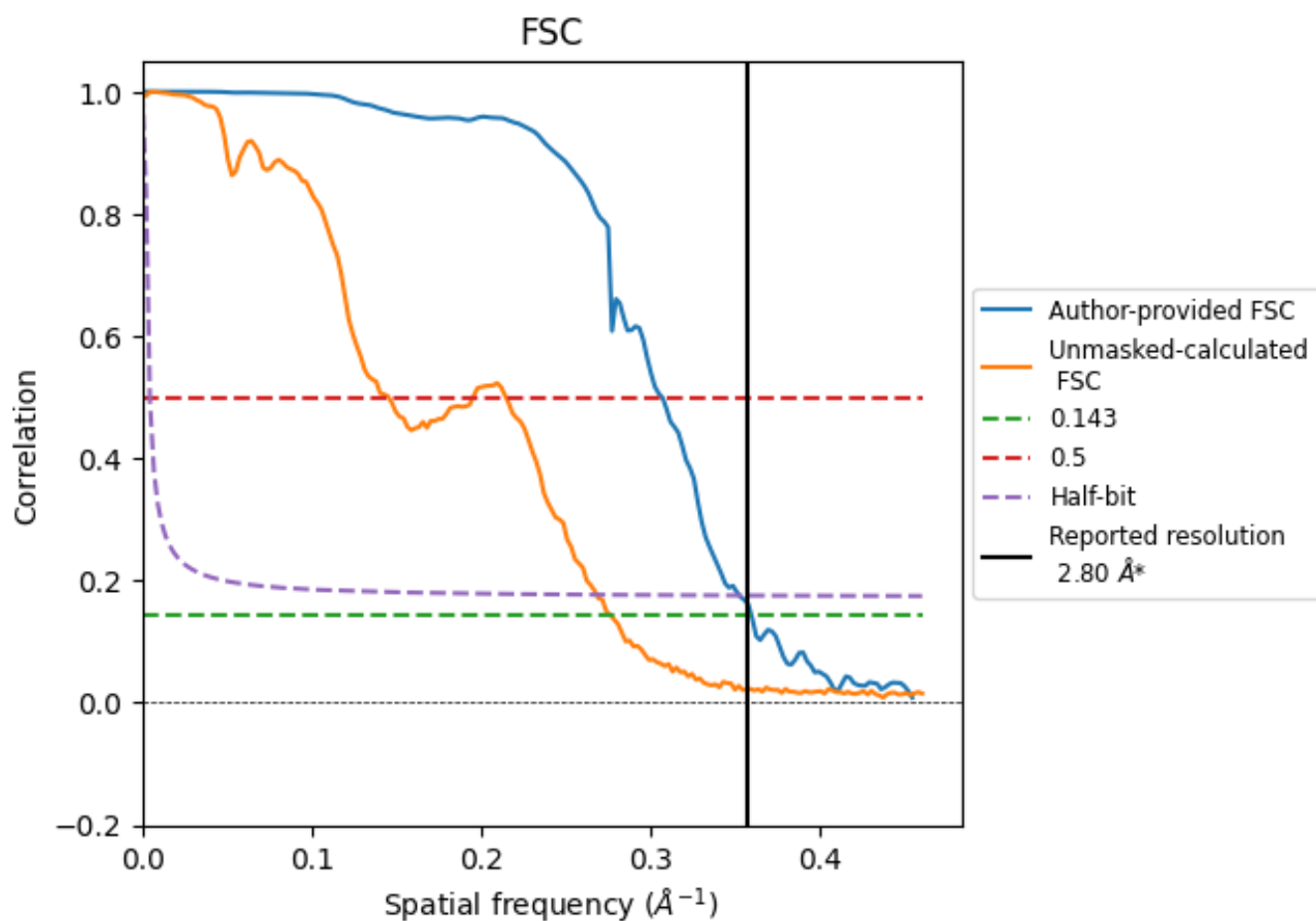


*Reported resolution corresponds to spatial frequency of 0.357 $\text{\AA}^{-1}$

8 Fourier-Shell correlation [i](#)

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of 0.357 $\text{\AA}^{-1}$

8.2 Resolution estimates [i](#)

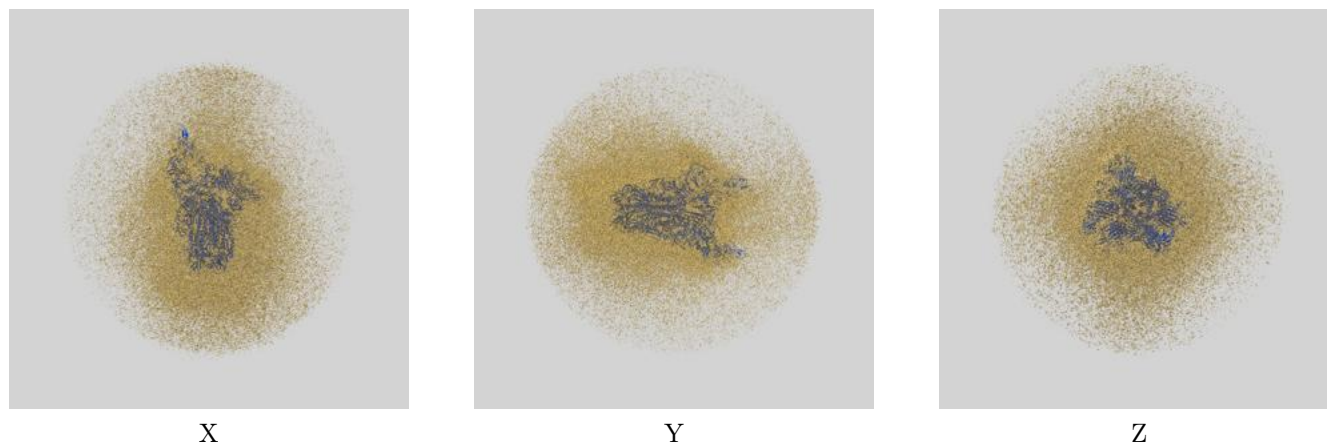
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.80	-	-
Author-provided FSC curve	2.78	3.26	2.84
Unmasked-calculated*	3.62	6.89	3.73

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 3.62 differs from the reported value 2.8 by more than 10 %

9 Map-model fit [i](#)

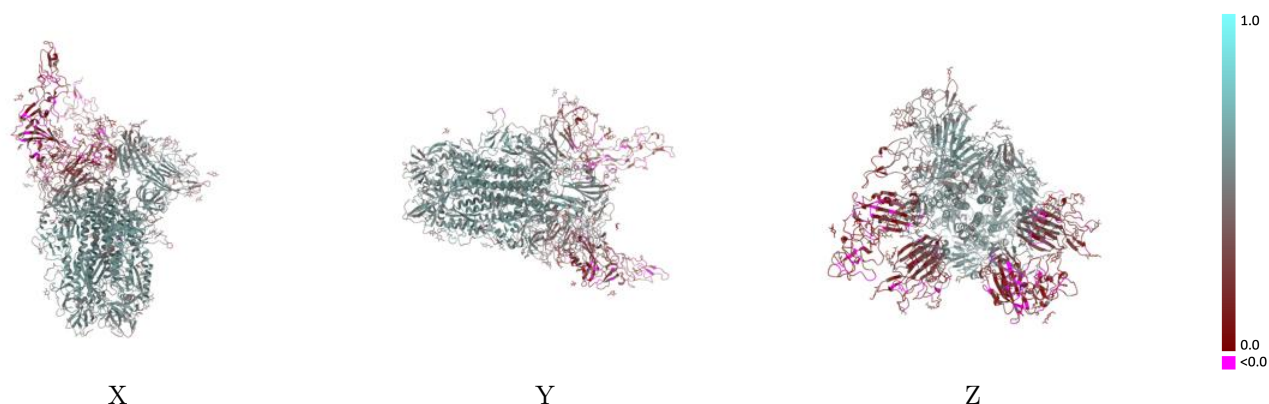
This section contains information regarding the fit between EMDB map EMD-38831 and PDB model 8Y1C. Per-residue inclusion information can be found in section [3](#) on page [9](#).

9.1 Map-model overlay [i](#)



The images above show the 3D surface view of the map at the recommended contour level 0.19 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2 Q-score mapped to coordinate model [i](#)

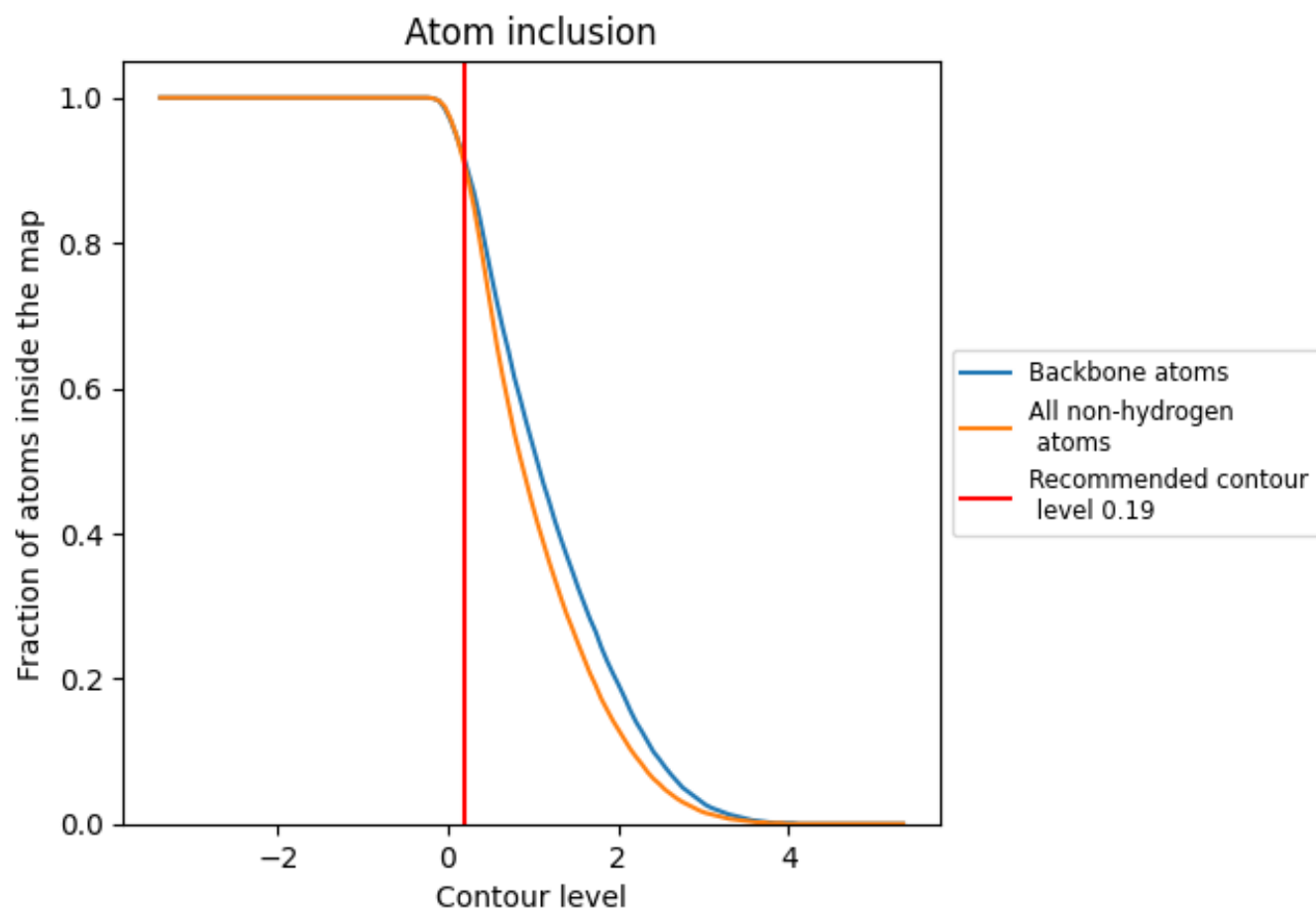


The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

9.3 Atom inclusion mapped to coordinate model [i](#)

This section was not generated.

9.4 Atom inclusion [i](#)



At the recommended contour level, 92% of all backbone atoms, 91% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (0.19) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.9100	 0.4400
A	 0.8970	 0.4500
B	 0.8620	 0.4000
C	 0.9800	 0.4780
D	 0.3890	 0.2260
E	 0.7500	 0.2750
F	 0.6430	 0.2510
G	 0.9640	 0.2690
H	 0.9290	 0.4270
I	 0.5830	 0.1790
J	 0.8570	 0.2100
K	 1.0000	 0.4610
L	 0.7140	 0.2950
M	 0.8930	 0.3840
N	 0.9580	 0.3560
O	 1.0000	 0.4080
P	 0.4640	 0.1970
Q	 0.8210	 0.2550
R	 0.9290	 0.3040

