



## Full wwPDB EM Validation Report ⓘ

Jul 15, 2025 – 08:58 PM JST

PDB ID : 8ZY4 / pdb\_00008zy4  
EMDB ID : EMD-60555  
Title : Sarbecovirus YN2013 Spike Trimer in a Locked Conformation  
Authors : Wang, J.; Xiong, X.  
Deposited on : 2024-06-16  
Resolution : 2.53 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](mailto: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>.

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The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

EMDB validation analysis : **FAILED**  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
MolProbity : 4-5-2 with Phenix2.0rc1  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
MapQ : **FAILED**  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.44

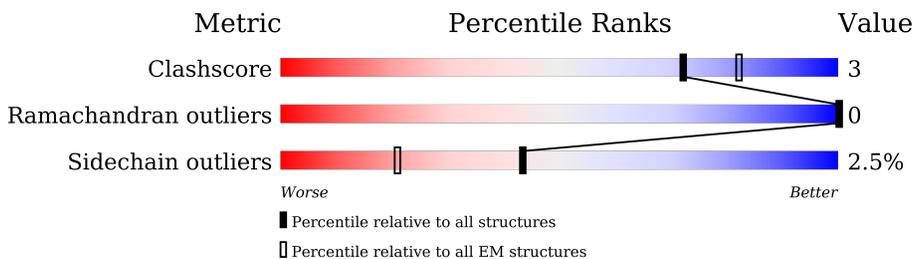
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 2.53 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)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

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  $\geq 3$ , 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  $\leq 5\%$ .

Mol	Chain	Length	Quality of chain
1	A	1247	
1	B	1247	
1	C	1247	
2	D	2	
2	E	2	
2	F	2	
2	G	2	
2	H	2	
2	I	2	

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Mol	Chain	Length	Quality of chain
2	J	2	 50% 50%
2	K	2	 100%
2	L	2	 50% 50%
2	M	2	 50% 50%
2	N	2	 50% 50%
2	O	2	 100%
2	P	2	 100%
2	Q	2	 50% 50%
2	R	2	 50% 50%

## 2 Entry composition i

There are 4 unique types of molecules in this entry. The entry contains 26181 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
			Total	C	N	O	S		
1	A	1073	8344	5313	1395	1596	40	0	0
1	B	1073	8350	5316	1398	1596	40	0	0
1	C	1073	8350	5316	1398	1596	40	0	0

There are 243 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	946	PRO	LYS	engineered mutation	UNP A0A0U1WJY8
A	947	PRO	VAL	engineered mutation	UNP A0A0U1WJY8
A	1169	GLY	-	expression tag	UNP A0A0U1WJY8
A	1170	SER	-	expression tag	UNP A0A0U1WJY8
A	1171	GLY	-	expression tag	UNP A0A0U1WJY8
A	1172	TYR	-	expression tag	UNP A0A0U1WJY8
A	1173	ILE	-	expression tag	UNP A0A0U1WJY8
A	1174	PRO	-	expression tag	UNP A0A0U1WJY8
A	1175	GLU	-	expression tag	UNP A0A0U1WJY8
A	1176	ALA	-	expression tag	UNP A0A0U1WJY8
A	1177	PRO	-	expression tag	UNP A0A0U1WJY8
A	1178	ARG	-	expression tag	UNP A0A0U1WJY8
A	1179	ASP	-	expression tag	UNP A0A0U1WJY8
A	1180	GLY	-	expression tag	UNP A0A0U1WJY8
A	1181	GLN	-	expression tag	UNP A0A0U1WJY8
A	1182	ALA	-	expression tag	UNP A0A0U1WJY8
A	1183	TYR	-	expression tag	UNP A0A0U1WJY8
A	1184	VAL	-	expression tag	UNP A0A0U1WJY8
A	1185	ARG	-	expression tag	UNP A0A0U1WJY8
A	1186	LYS	-	expression tag	UNP A0A0U1WJY8
A	1187	ASP	-	expression tag	UNP A0A0U1WJY8
A	1188	GLY	-	expression tag	UNP A0A0U1WJY8
A	1189	GLU	-	expression tag	UNP A0A0U1WJY8
A	1190	TRP	-	expression tag	UNP A0A0U1WJY8

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Chain	Residue	Modelled	Actual	Comment	Reference
A	1191	VAL	-	expression tag	UNP A0A0U1WJY8
A	1192	LEU	-	expression tag	UNP A0A0U1WJY8
A	1193	LEU	-	expression tag	UNP A0A0U1WJY8
A	1194	SER	-	expression tag	UNP A0A0U1WJY8
A	1195	THR	-	expression tag	UNP A0A0U1WJY8
A	1196	PHE	-	expression tag	UNP A0A0U1WJY8
A	1197	LEU	-	expression tag	UNP A0A0U1WJY8
A	1198	LEU	-	expression tag	UNP A0A0U1WJY8
A	1199	GLU	-	expression tag	UNP A0A0U1WJY8
A	1200	VAL	-	expression tag	UNP A0A0U1WJY8
A	1201	LEU	-	expression tag	UNP A0A0U1WJY8
A	1202	PHE	-	expression tag	UNP A0A0U1WJY8
A	1203	GLN	-	expression tag	UNP A0A0U1WJY8
A	1204	GLY	-	expression tag	UNP A0A0U1WJY8
A	1205	PRO	-	expression tag	UNP A0A0U1WJY8
A	1206	GLY	-	expression tag	UNP A0A0U1WJY8
A	1207	HIS	-	expression tag	UNP A0A0U1WJY8
A	1208	HIS	-	expression tag	UNP A0A0U1WJY8
A	1209	HIS	-	expression tag	UNP A0A0U1WJY8
A	1210	HIS	-	expression tag	UNP A0A0U1WJY8
A	1211	HIS	-	expression tag	UNP A0A0U1WJY8
A	1212	HIS	-	expression tag	UNP A0A0U1WJY8
A	1213	HIS	-	expression tag	UNP A0A0U1WJY8
A	1214	HIS	-	expression tag	UNP A0A0U1WJY8
A	1215	SER	-	expression tag	UNP A0A0U1WJY8
A	1216	ALA	-	expression tag	UNP A0A0U1WJY8
A	1217	TRP	-	expression tag	UNP A0A0U1WJY8
A	1218	SER	-	expression tag	UNP A0A0U1WJY8
A	1219	HIS	-	expression tag	UNP A0A0U1WJY8
A	1220	PRO	-	expression tag	UNP A0A0U1WJY8
A	1221	GLN	-	expression tag	UNP A0A0U1WJY8
A	1222	PHE	-	expression tag	UNP A0A0U1WJY8
A	1223	GLU	-	expression tag	UNP A0A0U1WJY8
A	1224	LYS	-	expression tag	UNP A0A0U1WJY8
A	1225	GLY	-	expression tag	UNP A0A0U1WJY8
A	1226	GLY	-	expression tag	UNP A0A0U1WJY8
A	1227	GLY	-	expression tag	UNP A0A0U1WJY8
A	1228	SER	-	expression tag	UNP A0A0U1WJY8
A	1229	GLY	-	expression tag	UNP A0A0U1WJY8
A	1230	GLY	-	expression tag	UNP A0A0U1WJY8
A	1231	GLY	-	expression tag	UNP A0A0U1WJY8
A	1232	GLY	-	expression tag	UNP A0A0U1WJY8

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Chain	Residue	Modelled	Actual	Comment	Reference
A	1233	SER	-	expression tag	UNP A0A0U1WJY8
A	1234	GLY	-	expression tag	UNP A0A0U1WJY8
A	1235	GLY	-	expression tag	UNP A0A0U1WJY8
A	1236	SER	-	expression tag	UNP A0A0U1WJY8
A	1237	ALA	-	expression tag	UNP A0A0U1WJY8
A	1238	TRP	-	expression tag	UNP A0A0U1WJY8
A	1239	SER	-	expression tag	UNP A0A0U1WJY8
A	1240	HIS	-	expression tag	UNP A0A0U1WJY8
A	1241	PRO	-	expression tag	UNP A0A0U1WJY8
A	1242	GLN	-	expression tag	UNP A0A0U1WJY8
A	1243	PHE	-	expression tag	UNP A0A0U1WJY8
A	1244	GLU	-	expression tag	UNP A0A0U1WJY8
A	1245	LYS	-	expression tag	UNP A0A0U1WJY8
A	1246	SER	-	expression tag	UNP A0A0U1WJY8
A	1247	ALA	-	expression tag	UNP A0A0U1WJY8
B	946	PRO	LYS	engineered mutation	UNP A0A0U1WJY8
B	947	PRO	VAL	engineered mutation	UNP A0A0U1WJY8
B	1169	GLY	-	expression tag	UNP A0A0U1WJY8
B	1170	SER	-	expression tag	UNP A0A0U1WJY8
B	1171	GLY	-	expression tag	UNP A0A0U1WJY8
B	1172	TYR	-	expression tag	UNP A0A0U1WJY8
B	1173	ILE	-	expression tag	UNP A0A0U1WJY8
B	1174	PRO	-	expression tag	UNP A0A0U1WJY8
B	1175	GLU	-	expression tag	UNP A0A0U1WJY8
B	1176	ALA	-	expression tag	UNP A0A0U1WJY8
B	1177	PRO	-	expression tag	UNP A0A0U1WJY8
B	1178	ARG	-	expression tag	UNP A0A0U1WJY8
B	1179	ASP	-	expression tag	UNP A0A0U1WJY8
B	1180	GLY	-	expression tag	UNP A0A0U1WJY8
B	1181	GLN	-	expression tag	UNP A0A0U1WJY8
B	1182	ALA	-	expression tag	UNP A0A0U1WJY8
B	1183	TYR	-	expression tag	UNP A0A0U1WJY8
B	1184	VAL	-	expression tag	UNP A0A0U1WJY8
B	1185	ARG	-	expression tag	UNP A0A0U1WJY8
B	1186	LYS	-	expression tag	UNP A0A0U1WJY8
B	1187	ASP	-	expression tag	UNP A0A0U1WJY8
B	1188	GLY	-	expression tag	UNP A0A0U1WJY8
B	1189	GLU	-	expression tag	UNP A0A0U1WJY8
B	1190	TRP	-	expression tag	UNP A0A0U1WJY8
B	1191	VAL	-	expression tag	UNP A0A0U1WJY8
B	1192	LEU	-	expression tag	UNP A0A0U1WJY8
B	1193	LEU	-	expression tag	UNP A0A0U1WJY8

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Chain	Residue	Modelled	Actual	Comment	Reference
B	1194	SER	-	expression tag	UNP A0A0U1WJY8
B	1195	THR	-	expression tag	UNP A0A0U1WJY8
B	1196	PHE	-	expression tag	UNP A0A0U1WJY8
B	1197	LEU	-	expression tag	UNP A0A0U1WJY8
B	1198	LEU	-	expression tag	UNP A0A0U1WJY8
B	1199	GLU	-	expression tag	UNP A0A0U1WJY8
B	1200	VAL	-	expression tag	UNP A0A0U1WJY8
B	1201	LEU	-	expression tag	UNP A0A0U1WJY8
B	1202	PHE	-	expression tag	UNP A0A0U1WJY8
B	1203	GLN	-	expression tag	UNP A0A0U1WJY8
B	1204	GLY	-	expression tag	UNP A0A0U1WJY8
B	1205	PRO	-	expression tag	UNP A0A0U1WJY8
B	1206	GLY	-	expression tag	UNP A0A0U1WJY8
B	1207	HIS	-	expression tag	UNP A0A0U1WJY8
B	1208	HIS	-	expression tag	UNP A0A0U1WJY8
B	1209	HIS	-	expression tag	UNP A0A0U1WJY8
B	1210	HIS	-	expression tag	UNP A0A0U1WJY8
B	1211	HIS	-	expression tag	UNP A0A0U1WJY8
B	1212	HIS	-	expression tag	UNP A0A0U1WJY8
B	1213	HIS	-	expression tag	UNP A0A0U1WJY8
B	1214	HIS	-	expression tag	UNP A0A0U1WJY8
B	1215	SER	-	expression tag	UNP A0A0U1WJY8
B	1216	ALA	-	expression tag	UNP A0A0U1WJY8
B	1217	TRP	-	expression tag	UNP A0A0U1WJY8
B	1218	SER	-	expression tag	UNP A0A0U1WJY8
B	1219	HIS	-	expression tag	UNP A0A0U1WJY8
B	1220	PRO	-	expression tag	UNP A0A0U1WJY8
B	1221	GLN	-	expression tag	UNP A0A0U1WJY8
B	1222	PHE	-	expression tag	UNP A0A0U1WJY8
B	1223	GLU	-	expression tag	UNP A0A0U1WJY8
B	1224	LYS	-	expression tag	UNP A0A0U1WJY8
B	1225	GLY	-	expression tag	UNP A0A0U1WJY8
B	1226	GLY	-	expression tag	UNP A0A0U1WJY8
B	1227	GLY	-	expression tag	UNP A0A0U1WJY8
B	1228	SER	-	expression tag	UNP A0A0U1WJY8
B	1229	GLY	-	expression tag	UNP A0A0U1WJY8
B	1230	GLY	-	expression tag	UNP A0A0U1WJY8
B	1231	GLY	-	expression tag	UNP A0A0U1WJY8
B	1232	GLY	-	expression tag	UNP A0A0U1WJY8
B	1233	SER	-	expression tag	UNP A0A0U1WJY8
B	1234	GLY	-	expression tag	UNP A0A0U1WJY8
B	1235	GLY	-	expression tag	UNP A0A0U1WJY8

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Chain	Residue	Modelled	Actual	Comment	Reference
B	1236	SER	-	expression tag	UNP A0A0U1WJY8
B	1237	ALA	-	expression tag	UNP A0A0U1WJY8
B	1238	TRP	-	expression tag	UNP A0A0U1WJY8
B	1239	SER	-	expression tag	UNP A0A0U1WJY8
B	1240	HIS	-	expression tag	UNP A0A0U1WJY8
B	1241	PRO	-	expression tag	UNP A0A0U1WJY8
B	1242	GLN	-	expression tag	UNP A0A0U1WJY8
B	1243	PHE	-	expression tag	UNP A0A0U1WJY8
B	1244	GLU	-	expression tag	UNP A0A0U1WJY8
B	1245	LYS	-	expression tag	UNP A0A0U1WJY8
B	1246	SER	-	expression tag	UNP A0A0U1WJY8
B	1247	ALA	-	expression tag	UNP A0A0U1WJY8
C	946	PRO	LYS	engineered mutation	UNP A0A0U1WJY8
C	947	PRO	VAL	engineered mutation	UNP A0A0U1WJY8
C	1169	GLY	-	expression tag	UNP A0A0U1WJY8
C	1170	SER	-	expression tag	UNP A0A0U1WJY8
C	1171	GLY	-	expression tag	UNP A0A0U1WJY8
C	1172	TYR	-	expression tag	UNP A0A0U1WJY8
C	1173	ILE	-	expression tag	UNP A0A0U1WJY8
C	1174	PRO	-	expression tag	UNP A0A0U1WJY8
C	1175	GLU	-	expression tag	UNP A0A0U1WJY8
C	1176	ALA	-	expression tag	UNP A0A0U1WJY8
C	1177	PRO	-	expression tag	UNP A0A0U1WJY8
C	1178	ARG	-	expression tag	UNP A0A0U1WJY8
C	1179	ASP	-	expression tag	UNP A0A0U1WJY8
C	1180	GLY	-	expression tag	UNP A0A0U1WJY8
C	1181	GLN	-	expression tag	UNP A0A0U1WJY8
C	1182	ALA	-	expression tag	UNP A0A0U1WJY8
C	1183	TYR	-	expression tag	UNP A0A0U1WJY8
C	1184	VAL	-	expression tag	UNP A0A0U1WJY8
C	1185	ARG	-	expression tag	UNP A0A0U1WJY8
C	1186	LYS	-	expression tag	UNP A0A0U1WJY8
C	1187	ASP	-	expression tag	UNP A0A0U1WJY8
C	1188	GLY	-	expression tag	UNP A0A0U1WJY8
C	1189	GLU	-	expression tag	UNP A0A0U1WJY8
C	1190	TRP	-	expression tag	UNP A0A0U1WJY8
C	1191	VAL	-	expression tag	UNP A0A0U1WJY8
C	1192	LEU	-	expression tag	UNP A0A0U1WJY8
C	1193	LEU	-	expression tag	UNP A0A0U1WJY8
C	1194	SER	-	expression tag	UNP A0A0U1WJY8
C	1195	THR	-	expression tag	UNP A0A0U1WJY8
C	1196	PHE	-	expression tag	UNP A0A0U1WJY8

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Chain	Residue	Modelled	Actual	Comment	Reference
C	1197	LEU	-	expression tag	UNP A0A0U1WJY8
C	1198	LEU	-	expression tag	UNP A0A0U1WJY8
C	1199	GLU	-	expression tag	UNP A0A0U1WJY8
C	1200	VAL	-	expression tag	UNP A0A0U1WJY8
C	1201	LEU	-	expression tag	UNP A0A0U1WJY8
C	1202	PHE	-	expression tag	UNP A0A0U1WJY8
C	1203	GLN	-	expression tag	UNP A0A0U1WJY8
C	1204	GLY	-	expression tag	UNP A0A0U1WJY8
C	1205	PRO	-	expression tag	UNP A0A0U1WJY8
C	1206	GLY	-	expression tag	UNP A0A0U1WJY8
C	1207	HIS	-	expression tag	UNP A0A0U1WJY8
C	1208	HIS	-	expression tag	UNP A0A0U1WJY8
C	1209	HIS	-	expression tag	UNP A0A0U1WJY8
C	1210	HIS	-	expression tag	UNP A0A0U1WJY8
C	1211	HIS	-	expression tag	UNP A0A0U1WJY8
C	1212	HIS	-	expression tag	UNP A0A0U1WJY8
C	1213	HIS	-	expression tag	UNP A0A0U1WJY8
C	1214	HIS	-	expression tag	UNP A0A0U1WJY8
C	1215	SER	-	expression tag	UNP A0A0U1WJY8
C	1216	ALA	-	expression tag	UNP A0A0U1WJY8
C	1217	TRP	-	expression tag	UNP A0A0U1WJY8
C	1218	SER	-	expression tag	UNP A0A0U1WJY8
C	1219	HIS	-	expression tag	UNP A0A0U1WJY8
C	1220	PRO	-	expression tag	UNP A0A0U1WJY8
C	1221	GLN	-	expression tag	UNP A0A0U1WJY8
C	1222	PHE	-	expression tag	UNP A0A0U1WJY8
C	1223	GLU	-	expression tag	UNP A0A0U1WJY8
C	1224	LYS	-	expression tag	UNP A0A0U1WJY8
C	1225	GLY	-	expression tag	UNP A0A0U1WJY8
C	1226	GLY	-	expression tag	UNP A0A0U1WJY8
C	1227	GLY	-	expression tag	UNP A0A0U1WJY8
C	1228	SER	-	expression tag	UNP A0A0U1WJY8
C	1229	GLY	-	expression tag	UNP A0A0U1WJY8
C	1230	GLY	-	expression tag	UNP A0A0U1WJY8
C	1231	GLY	-	expression tag	UNP A0A0U1WJY8
C	1232	GLY	-	expression tag	UNP A0A0U1WJY8
C	1233	SER	-	expression tag	UNP A0A0U1WJY8
C	1234	GLY	-	expression tag	UNP A0A0U1WJY8
C	1235	GLY	-	expression tag	UNP A0A0U1WJY8
C	1236	SER	-	expression tag	UNP A0A0U1WJY8
C	1237	ALA	-	expression tag	UNP A0A0U1WJY8
C	1238	TRP	-	expression tag	UNP A0A0U1WJY8

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Chain	Residue	Modelled	Actual	Comment	Reference
C	1239	SER	-	expression tag	UNP A0A0U1WJY8
C	1240	HIS	-	expression tag	UNP A0A0U1WJY8
C	1241	PRO	-	expression tag	UNP A0A0U1WJY8
C	1242	GLN	-	expression tag	UNP A0A0U1WJY8
C	1243	PHE	-	expression tag	UNP A0A0U1WJY8
C	1244	GLU	-	expression tag	UNP A0A0U1WJY8
C	1245	LYS	-	expression tag	UNP A0A0U1WJY8
C	1246	SER	-	expression tag	UNP A0A0U1WJY8
C	1247	ALA	-	expression tag	UNP A0A0U1WJY8

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



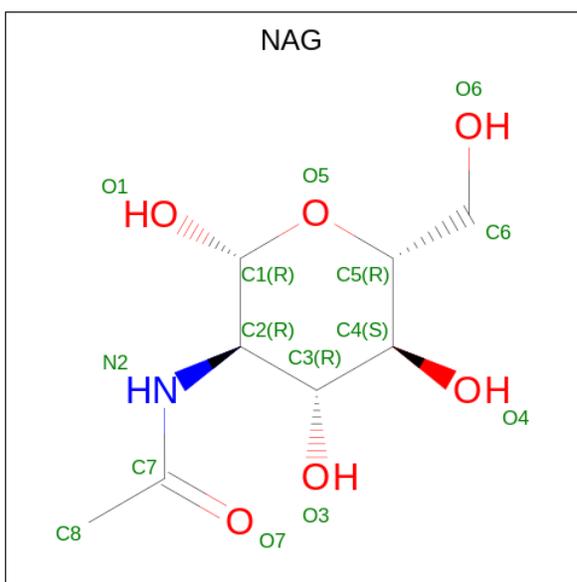
Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
2	D	2	Total 28	C 16	N 2	O 10	0	0
2	E	2	Total 28	C 16	N 2	O 10	0	0
2	F	2	Total 28	C 16	N 2	O 10	0	0
2	G	2	Total 28	C 16	N 2	O 10	0	0
2	H	2	Total 28	C 16	N 2	O 10	0	0
2	I	2	Total 28	C 16	N 2	O 10	0	0
2	J	2	Total 28	C 16	N 2	O 10	0	0
2	K	2	Total 28	C 16	N 2	O 10	0	0
2	L	2	Total 28	C 16	N 2	O 10	0	0
2	M	2	Total 28	C 16	N 2	O 10	0	0
2	N	2	Total 28	C 16	N 2	O 10	0	0
2	O	2	Total 28	C 16	N 2	O 10	0	0

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Mol	Chain	Residues	Atoms				AltConf	Trace
2	P	2	Total	C	N	O	0	0
			28	16	2	10		
2	Q	2	Total	C	N	O	0	0
			28	16	2	10		
2	R	2	Total	C	N	O	0	0
			28	16	2	10		

- Molecule 3 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
3	A	1	Total	C	N	O	0
			14	8	1	5	
3	A	1	Total	C	N	O	0
			14	8	1	5	
3	A	1	Total	C	N	O	0
			14	8	1	5	
3	A	1	Total	C	N	O	0
			14	8	1	5	
3	A	1	Total	C	N	O	0
			14	8	1	5	
3	A	1	Total	C	N	O	0
			14	8	1	5	
3	A	1	Total	C	N	O	0
			14	8	1	5	

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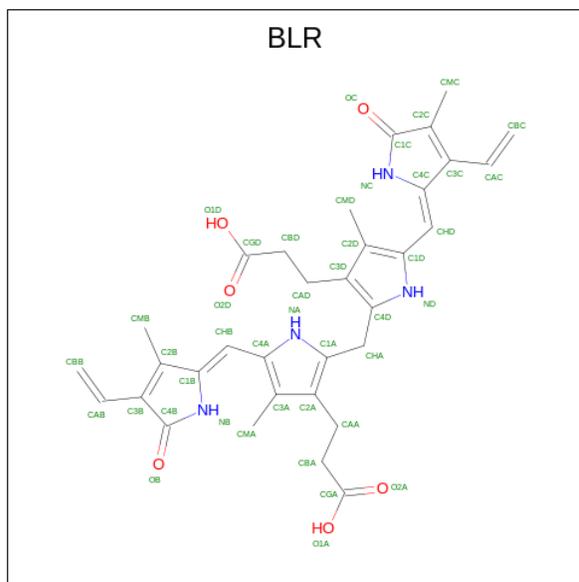
Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
3	A	1	Total 14	C 8	N 1	O 5	0
3	A	1	Total 14	C 8	N 1	O 5	0
3	A	1	Total 14	C 8	N 1	O 5	0
3	A	1	Total 14	C 8	N 1	O 5	0
3	A	1	Total 14	C 8	N 1	O 5	0
3	A	1	Total 14	C 8	N 1	O 5	0
3	B	1	Total 14	C 8	N 1	O 5	0
3	B	1	Total 14	C 8	N 1	O 5	0
3	B	1	Total 14	C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

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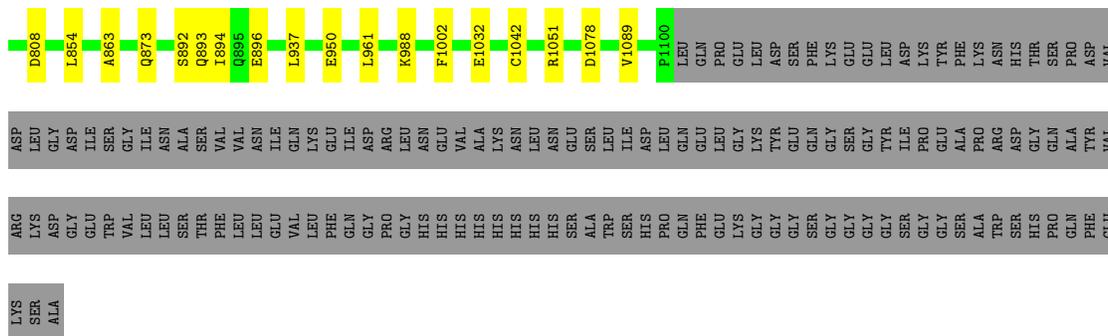
Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
3	C	1	Total 14	C 8	N 1	O 5	0
3	C	1	Total 14	C 8	N 1	O 5	0
3	C	1	Total 14	C 8	N 1	O 5	0
3	C	1	Total 14	C 8	N 1	O 5	0
3	C	1	Total 14	C 8	N 1	O 5	0
3	C	1	Total 14	C 8	N 1	O 5	0
3	C	1	Total 14	C 8	N 1	O 5	0
3	C	1	Total 14	C 8	N 1	O 5	0
3	C	1	Total 14	C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

- Molecule 4 is 3-[5-[(Z)-(4-ethenyl-3-methyl-5-oxidanylidene-pyrrol-2-ylidene)methyl]-2-[[5-[(Z)-(3-ethenyl-4-methyl-5-oxidanylidene-pyrrol-2-ylidene)methyl]-3-(3-hydroxy-3-oxopropyl)-4-methyl-1H-pyrrol-2-yl]methyl]-4-methyl-1H-pyrrol-3-yl]propanoic acid (CCD ID: BLR) (formula: C<sub>33</sub>H<sub>36</sub>N<sub>4</sub>O<sub>6</sub>) (labeled as "Ligand of Interest" by depositor).

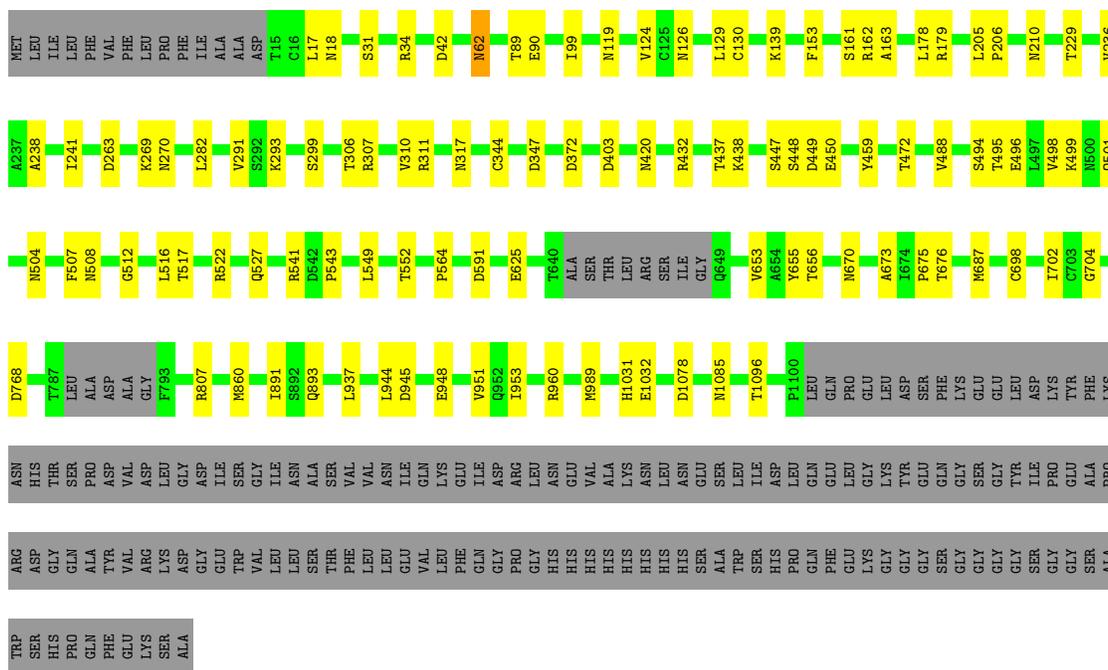
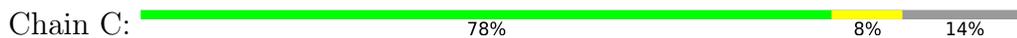


Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
4	A	1	43	33	4	6	0
4	B	1	43	33	4	6	0
4	C	1	43	33	4	6	0





• Molecule 1: Spike glycoprotein



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



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



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

Chain F:  100%



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

Chain G:  50% 50%



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

Chain H:  50% 50%



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

Chain I:  50% 50%



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

Chain J:  50% 50%



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

Chain K:  100%



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

Chain L:  50% 50%



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

Chain M:



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

Chain N:



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

Chain O:



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

Chain P:



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

Chain Q:



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

Chain R:



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	452110	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TALOS ARCTICA	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	50	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	2200	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor

## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: BLR, 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	0.14	0/8529	0.36	0/11607
1	B	0.15	0/8535	0.38	0/11614
1	C	0.14	0/8535	0.38	0/11614
All	All	0.14	0/25599	0.37	0/34835

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

### 5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	8344	0	8128	59	0
1	B	8350	0	8139	55	0
1	C	8350	0	8139	53	0
2	D	28	0	25	0	0
2	E	28	0	25	0	0
2	F	28	0	25	0	0
2	G	28	0	25	0	0
2	H	28	0	25	0	0
2	I	28	0	25	0	0
2	J	28	0	25	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	K	28	0	25	0	0
2	L	28	0	25	0	0
2	M	28	0	25	0	0
2	N	28	0	25	0	0
2	O	28	0	25	0	0
2	P	28	0	25	0	0
2	Q	28	0	25	0	0
2	R	28	0	25	0	0
3	A	196	0	182	0	0
3	B	196	0	182	0	0
3	C	196	0	182	0	0
4	A	43	0	34	2	0
4	B	43	0	34	2	0
4	C	43	0	34	1	0
All	All	26181	0	25429	166	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 3.

All (166) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:483:ASN:HD21	1:A:530:GLY:H	1.46	0.64
1:A:126:ASN:HB2	1:A:153:PHE:HB2	1.82	0.60
1:C:702:ILE:O	1:C:960:ARG:NH1	2.37	0.58
1:C:447:SER:OG	1:C:450:GLU:OE1	2.22	0.57
1:A:293:LYS:HG3	1:A:564:PRO:HA	1.87	0.57
1:A:307:ARG:HB2	1:A:503:VAL:HG12	1.86	0.57
1:C:311:ARG:NH1	1:C:495:THR:O	2.39	0.56
1:C:99:ILE:HD13	1:C:129:LEU:HD11	1.88	0.55
1:A:347:ASP:OD1	1:A:347:ASP:N	2.38	0.55
1:A:1051:ARG:NH1	1:A:1078:ASP:O	2.39	0.55
1:C:347:ASP:N	1:C:347:ASP:OD1	2.39	0.55
1:B:1051:ARG:NH1	1:B:1078:ASP:O	2.39	0.55
1:A:336:TRP:O	1:A:444:ARG:NH1	2.40	0.54
1:A:31:SER:HA	1:A:62:ASN:HA	1.90	0.54
1:B:347:ASP:OD1	1:B:347:ASP:N	2.39	0.53
1:C:31:SER:HA	1:C:62:ASN:HA	1.90	0.53
1:A:311:ARG:NH1	1:A:495:THR:O	2.41	0.53
1:A:702:ILE:O	1:A:960:ARG:NH1	2.42	0.53
1:C:293:LYS:HG3	1:C:564:PRO:HA	1.91	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:34:ARG:NH2	1:B:270:ASN:OD1	2.42	0.53
1:A:382:THR:HG22	1:A:475:VAL:HG22	1.91	0.52
1:A:712:LEU:HD11	1:A:950:GLU:HG2	1.89	0.52
1:C:768:ASP:OD1	1:C:768:ASP:N	2.42	0.52
1:C:139:LYS:HG3	1:C:236:VAL:HA	1.90	0.52
1:B:538:ASP:OD1	1:B:538:ASP:N	2.42	0.52
1:A:460:ASP:OD1	1:A:460:ASP:N	2.42	0.52
1:A:141:ASN:OD1	1:A:141:ASN:N	2.41	0.52
1:B:712:LEU:HD11	1:B:950:GLU:HG2	1.92	0.52
1:B:511:LYS:NZ	1:C:704:GLY:O	2.40	0.52
1:B:591:ASP:OD1	1:B:591:ASP:N	2.42	0.52
1:C:263:ASP:HB3	1:C:269:LYS:HG3	1.92	0.52
1:B:538:ASP:HA	1:B:551:ILE:HB	1.92	0.52
1:C:344:CYS:HB2	1:C:488:VAL:HG22	1.90	0.51
1:B:336:TRP:O	1:B:444:ARG:NH1	2.43	0.51
1:C:591:ASP:OD1	1:C:591:ASP:N	2.41	0.51
1:C:126:ASN:HB2	1:C:153:PHE:HB2	1.93	0.51
1:A:527:GLN:O	1:A:541:ARG:NH2	2.44	0.51
1:B:307:ARG:HH12	1:B:498:VAL:HB	1.74	0.51
1:A:768:ASP:OD2	1:A:768:ASP:N	2.44	0.50
1:C:205:LEU:HD12	1:C:206:PRO:HD2	1.93	0.50
1:A:119:ASN:ND2	1:A:161:SER:O	2.44	0.50
1:A:540:VAL:HB	1:A:551:ILE:HD11	1.93	0.50
1:C:937:LEU:HD11	1:C:953:ILE:HG12	1.93	0.50
1:B:504:ASN:HA	1:B:512:GLY:HA2	1.94	0.50
1:B:531:ARG:NH2	1:B:532:ASP:O	2.44	0.50
1:B:532:ASP:HA	1:C:807:ARG:HH12	1.77	0.50
1:A:137:VAL:HG11	1:A:168:ILE:HG21	1.94	0.49
1:B:293:LYS:HG3	1:B:564:PRO:HA	1.94	0.49
1:A:591:ASP:OD1	1:A:591:ASP:N	2.42	0.49
1:B:235:ARG:NH1	1:B:239:GLY:O	2.45	0.49
1:B:795:LYS:NZ	1:B:808:ASP:OD2	2.41	0.49
1:A:376:THR:OG1	1:A:480:GLU:O	2.31	0.49
1:A:944:LEU:HD13	1:A:948:GLU:HG3	1.93	0.49
1:B:311:ARG:NH1	1:B:495:THR:O	2.43	0.49
1:C:90:GLU:OE2	1:C:179:ARG:NH1	2.45	0.49
1:A:1071:SER:O	1:A:1071:SER:OG	2.27	0.49
1:B:31:SER:HA	1:B:62:ASN:HA	1.94	0.49
1:B:210:ASN:N	1:B:210:ASN:OD1	2.46	0.49
4:C:1315:BLR:H28	4:C:1315:BLR:H3	1.61	0.49
1:A:542:ASP:OD1	1:A:544:GLN:NE2	2.47	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:504:ASN:HA	1:C:512:GLY:HA2	1.95	0.48
1:A:199:ILE:HD12	1:A:201:ILE:HG12	1.94	0.48
4:A:1314:BLR:H28	4:A:1314:BLR:H3	1.62	0.48
4:B:1315:BLR:H28	4:B:1315:BLR:H3	1.63	0.47
1:C:507:PHE:HD1	1:C:543:PRO:HD3	1.79	0.47
1:A:785:LYS:NZ	1:A:901:THR:O	2.41	0.47
1:C:62:ASN:OD1	1:C:62:ASN:N	2.44	0.47
1:C:437:THR:OG1	1:C:438:LYS:N	2.47	0.47
1:C:944:LEU:HD13	1:C:948:GLU:HG3	1.96	0.47
1:A:34:ARG:NH2	1:A:270:ASN:OD1	2.47	0.47
1:A:210:ASN:N	1:A:210:ASN:OD1	2.46	0.46
1:A:172:SER:OG	1:A:174:ASN:O	2.34	0.46
1:C:210:ASN:OD1	1:C:210:ASN:N	2.47	0.46
1:B:684:THR:HG23	1:B:894:ILE:HD11	1.98	0.46
1:A:62:ASN:OD1	1:A:62:ASN:N	2.44	0.46
1:B:540:VAL:HB	1:B:551:ILE:HD11	1.97	0.46
1:B:205:LEU:HD12	1:B:206:PRO:HD2	1.98	0.46
1:B:746:LYS:HD3	1:B:746:LYS:HA	1.71	0.46
1:C:34:ARG:NH2	1:C:270:ASN:OD1	2.49	0.46
1:A:162:ARG:NH1	1:A:163:ALA:O	2.48	0.45
1:A:863:ALA:HB1	1:A:873:GLN:HB2	1.98	0.45
1:B:162:ARG:NH1	1:B:163:ALA:O	2.49	0.45
1:A:75:ASN:N	1:A:75:ASN:OD1	2.50	0.45
1:B:803:ASP:OD1	1:B:803:ASP:N	2.47	0.45
1:C:499:LYS:HE3	1:C:549:LEU:HD22	1.98	0.45
1:B:90:GLU:OE2	1:B:179:ARG:NH1	2.50	0.45
1:C:236:VAL:HG23	1:C:238:ALA:H	1.81	0.45
1:B:282:LEU:HD21	1:B:291:VAL:HG11	1.99	0.45
1:A:771:LYS:HA	1:A:771:LYS:HD3	1.83	0.45
1:B:215:LEU:HG	1:B:216:LEU:HD13	1.99	0.45
1:A:538:ASP:HA	1:A:551:ILE:HD12	2.00	0.44
1:B:745:VAL:HG22	1:B:747:GLN:H	1.81	0.44
1:B:893:GLN:HA	1:B:896:GLU:HG3	1.99	0.44
1:A:403:ASP:HB2	1:A:438:LYS:HB2	1.99	0.44
1:B:988:LYS:NZ	1:B:1002:PHE:O	2.50	0.44
1:C:989:MET:HE2	1:C:989:MET:HB2	1.88	0.44
1:C:307:ARG:HH12	1:C:498:VAL:HB	1.82	0.44
1:B:536:PHE:HZ	1:B:553:PRO:HD3	1.83	0.44
1:C:945:ASP:N	1:C:945:ASP:OD1	2.47	0.44
1:C:317:ASN:OD1	1:C:317:ASN:N	2.48	0.43
1:C:420:ASN:HA	1:C:472:THR:HG22	1.99	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:236:VAL:HG23	1:A:238:ALA:H	1.83	0.43
1:B:377:SER:O	1:B:377:SER:OG	2.32	0.43
1:B:168:ILE:O	1:B:234:TYR:OH	2.28	0.43
1:B:522:ARG:H	1:B:522:ARG:HG3	1.66	0.43
1:C:403:ASP:HB2	1:C:438:LYS:HG2	2.00	0.43
1:A:96:ARG:HH12	1:A:144:GLN:HE22	1.66	0.43
1:B:640:THR:OG1	1:B:650:LYS:NZ	2.49	0.43
1:C:675:PRO:HA	1:C:1032:GLU:HA	2.01	0.43
1:C:432:ARG:NH2	1:C:447:SER:O	2.48	0.43
1:A:709:CYS:O	1:A:713:LEU:N	2.51	0.43
1:B:937:LEU:HD12	1:B:937:LEU:HA	1.91	0.43
1:C:499:LYS:NZ	1:C:517:THR:OG1	2.52	0.43
1:C:625:GLU:O	1:C:655:TYR:OH	2.33	0.43
1:A:499:LYS:HG2	1:A:515:VAL:HG12	2.00	0.42
1:A:854:LEU:HB3	1:C:673:ALA:HB3	2.01	0.42
1:C:676:THR:N	1:C:1031:HIS:O	2.44	0.42
1:C:891:ILE:HD13	1:C:891:ILE:HA	1.92	0.42
1:C:282:LEU:HD21	1:C:291:VAL:HG11	2.00	0.42
1:B:687:MET:HE2	1:B:687:MET:HB3	1.80	0.42
1:A:546:LEU:HD12	1:A:546:LEU:HA	1.89	0.42
1:A:220:PHE:HB3	1:A:222:LEU:HD12	2.01	0.42
1:A:673:ALA:HB3	1:B:854:LEU:HB3	2.01	0.42
1:B:675:PRO:HA	1:B:1032:GLU:HA	2.02	0.42
1:C:162:ARG:NH1	1:C:163:ALA:O	2.53	0.42
1:A:21:ASN:O	1:A:71:THR:OG1	2.37	0.42
1:A:1087:ASP:OD1	1:A:1087:ASP:N	2.53	0.42
1:B:144:GLN:OE1	1:B:144:GLN:N	2.39	0.42
1:B:361:LYS:HB2	1:B:361:LYS:HE2	1.73	0.42
1:B:892:SER:OG	1:B:893:GLN:N	2.52	0.42
1:B:145:LEU:HD23	1:B:145:LEU:HA	1.87	0.41
1:B:318:ARG:HA	1:B:318:ARG:HD2	1.94	0.41
1:C:119:ASN:ND2	1:C:161:SER:O	2.49	0.41
1:C:307:ARG:HH21	1:C:501:GLN:HG3	1.85	0.41
1:B:497:LEU:HD13	1:B:549:LEU:HD11	2.02	0.41
1:B:961:LEU:HD12	1:B:961:LEU:HA	1.94	0.41
1:C:18:ASN:OD1	1:C:18:ASN:N	2.52	0.41
1:A:750:LYS:HE3	1:A:750:LYS:HB3	1.87	0.41
1:A:774:LYS:HE2	1:A:774:LYS:HB2	1.87	0.41
1:A:892:SER:OG	1:A:893:GLN:N	2.53	0.41
1:C:670:ASN:OD1	1:C:670:ASN:N	2.53	0.41
1:B:727:LEU:HD23	1:B:727:LEU:HA	1.92	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:321:PHE:HB3	1:B:351:LEU:HD21	2.02	0.41
1:B:718:SER:O	1:B:722:GLN:HB2	2.21	0.41
1:A:216:LEU:HD22	1:A:218:ILE:HD11	2.03	0.41
1:A:746:LYS:HD3	1:A:746:LYS:HA	1.88	0.41
1:A:865:ARG:NH1	1:A:1009:LEU:O	2.50	0.41
1:B:93:ASN:HB3	4:B:1315:BLR:H26	2.02	0.41
1:B:311:ARG:NH2	1:B:542:ASP:OD2	2.48	0.41
1:C:311:ARG:HH11	1:C:494:SER:HB3	1.86	0.41
1:C:496:GLU:HG3	1:C:498:VAL:HG23	2.02	0.41
1:A:937:LEU:HD12	1:A:937:LEU:HA	1.94	0.41
1:A:626:CYS:HB2	1:A:657:MET:HE3	2.03	0.40
1:A:687:MET:HE2	1:A:687:MET:HB3	1.86	0.40
1:B:771:LYS:HA	1:B:771:LYS:HD3	1.92	0.40
1:C:89:THR:HG22	1:C:178:LEU:HD13	2.03	0.40
1:B:863:ALA:HB1	1:B:873:GLN:HB2	2.03	0.40
1:C:687:MET:HE2	1:C:687:MET:HB3	1.90	0.40
1:B:42:ASP:OD1	1:B:42:ASP:N	2.54	0.40
1:C:527:GLN:O	1:C:541:ARG:NH2	2.53	0.40
1:A:93:ASN:HB3	4:A:1314:BLR:H26	2.04	0.40
1:A:99:ILE:HG13	1:A:112:ILE:HG22	2.02	0.40
1:A:151:ASP:OD2	1:A:152:SER:N	2.55	0.40
1:A:937:LEU:HD11	1:A:953:ILE:HG12	2.02	0.40
1:C:42:ASP:OD2	1:C:42:ASP:N	2.55	0.40
1:C:448:SER:OG	1:C:449:ASP:N	2.53	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all 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	1067/1247 (86%)	1027 (96%)	40 (4%)	0	<a href="#">100</a> <a href="#">100</a>

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	B	1067/1247 (86%)	1020 (96%)	47 (4%)	0	100	100
1	C	1067/1247 (86%)	1023 (96%)	44 (4%)	0	100	100
All	All	3201/3741 (86%)	3070 (96%)	131 (4%)	0	100	100

There are no Ramachandran outliers to report.

### 5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all 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	929/1072 (87%)	904 (97%)	25 (3%)	40	65
1	B	930/1072 (87%)	910 (98%)	20 (2%)	47	71
1	C	930/1072 (87%)	906 (97%)	24 (3%)	41	66
All	All	2789/3216 (87%)	2720 (98%)	69 (2%)	43	67

All (69) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	31	SER
1	A	42	ASP
1	A	52	VAL
1	A	62	ASN
1	A	124	VAL
1	A	141	ASN
1	A	303	VAL
1	A	306	THR
1	A	310	VAL
1	A	372	ASP
1	A	459	TYR
1	A	465	VAL
1	A	478	SER
1	A	508	ASN
1	A	545	THR
1	A	698	CYS

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	A	703	CYS
1	A	725	ARG
1	A	804	ILE
1	A	809	LEU
1	A	860	MET
1	A	954	ASP
1	A	1010	MET
1	A	1042	CYS
1	A	1096	THR
1	B	42	ASP
1	B	62	ASN
1	B	99	ILE
1	B	120	LEU
1	B	124	VAL
1	B	229	THR
1	B	241	ILE
1	B	264	LEU
1	B	306	THR
1	B	459	TYR
1	B	465	VAL
1	B	497	LEU
1	B	522	ARG
1	B	552	THR
1	B	656	THR
1	B	698	CYS
1	B	725	ARG
1	B	801	LEU
1	B	1042	CYS
1	B	1089	VAL
1	C	17	LEU
1	C	62	ASN
1	C	124	VAL
1	C	130	CYS
1	C	229	THR
1	C	241	ILE
1	C	299	SER
1	C	306	THR
1	C	310	VAL
1	C	372	ASP
1	C	459	TYR
1	C	508	ASN
1	C	516	LEU

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Mol	Chain	Res	Type
1	C	522	ARG
1	C	552	THR
1	C	653	VAL
1	C	656	THR
1	C	698	CYS
1	C	860	MET
1	C	893	GLN
1	C	951	VAL
1	C	1078	ASP
1	C	1085	ASN
1	C	1096	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (32) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	21	ASN
1	A	191	HIS
1	A	423	ASN
1	A	500	ASN
1	A	608	GLN
1	A	619	HIS
1	A	796	GLN
1	B	21	ASN
1	B	72	ASN
1	B	119	ASN
1	B	191	HIS
1	B	300	ASN
1	B	470	GLN
1	B	504	ASN
1	B	608	GLN
1	B	764	GLN
1	B	816	ASN
1	B	861	GLN
1	B	873	GLN
1	B	917	GLN
1	B	971	GLN
1	C	174	ASN
1	C	191	HIS
1	C	300	ASN
1	C	420	ASN
1	C	500	ASN
1	C	504	ASN

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Mol	Chain	Res	Type
1	C	639	HIS
1	C	764	GLN
1	C	796	GLN
1	C	816	ASN
1	C	861	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](#)

30 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	1,2	14,14,15	0.67	0	17,19,21	1.68	3 (17%)
2	NAG	D	2	2	14,14,15	0.70	0	17,19,21	0.95	1 (5%)
2	NAG	E	1	1,2	14,14,15	0.72	0	17,19,21	0.96	0
2	NAG	E	2	2	14,14,15	0.71	0	17,19,21	0.90	0
2	NAG	F	1	1,2	14,14,15	0.75	0	17,19,21	1.02	0
2	NAG	F	2	2	14,14,15	0.71	0	17,19,21	0.88	0
2	NAG	G	1	1,2	14,14,15	0.74	0	17,19,21	1.17	1 (5%)
2	NAG	G	2	2	14,14,15	0.71	0	17,19,21	0.86	0
2	NAG	H	1	1,2	14,14,15	0.72	0	17,19,21	1.00	1 (5%)
2	NAG	H	2	2	14,14,15	0.71	0	17,19,21	0.87	0
2	NAG	I	1	1,2	14,14,15	0.75	0	17,19,21	1.07	1 (5%)
2	NAG	I	2	2	14,14,15	0.71	0	17,19,21	0.91	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	NAG	J	1	1,2	14,14,15	0.68	0	17,19,21	1.50	2 (11%)
2	NAG	J	2	2	14,14,15	0.72	0	17,19,21	0.94	0
2	NAG	K	1	1,2	14,14,15	0.75	0	17,19,21	1.01	0
2	NAG	K	2	2	14,14,15	0.73	0	17,19,21	0.86	0
2	NAG	L	1	1,2	14,14,15	0.73	0	17,19,21	1.22	3 (17%)
2	NAG	L	2	2	14,14,15	0.70	0	17,19,21	0.85	0
2	NAG	M	1	1,2	14,14,15	0.72	0	17,19,21	1.03	1 (5%)
2	NAG	M	2	2	14,14,15	0.71	0	17,19,21	0.89	0
2	NAG	N	1	1,2	14,14,15	0.75	0	17,19,21	1.09	0
2	NAG	N	2	2	14,14,15	0.70	0	17,19,21	1.50	1 (5%)
2	NAG	O	1	1,2	14,14,15	0.70	0	17,19,21	0.93	0
2	NAG	O	2	2	14,14,15	0.72	0	17,19,21	0.91	0
2	NAG	P	1	1,2	14,14,15	0.70	0	17,19,21	0.91	0
2	NAG	P	2	2	14,14,15	0.70	0	17,19,21	0.88	0
2	NAG	Q	1	1,2	14,14,15	0.73	0	17,19,21	1.12	1 (5%)
2	NAG	Q	2	2	14,14,15	0.71	0	17,19,21	0.88	0
2	NAG	R	1	1,2	14,14,15	0.73	0	17,19,21	1.00	1 (5%)
2	NAG	R	2	2	14,14,15	0.72	0	17,19,21	0.88	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	1,2	-	1/6/23/26	0/1/1/1
2	NAG	D	2	2	-	1/6/23/26	0/1/1/1
2	NAG	E	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	E	2	2	-	0/6/23/26	0/1/1/1
2	NAG	F	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	F	2	2	-	0/6/23/26	0/1/1/1
2	NAG	G	1	1,2	-	2/6/23/26	0/1/1/1
2	NAG	G	2	2	-	0/6/23/26	0/1/1/1
2	NAG	H	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	H	2	2	-	1/6/23/26	0/1/1/1
2	NAG	I	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	I	2	2	-	1/6/23/26	0/1/1/1
2	NAG	J	1	1,2	-	1/6/23/26	0/1/1/1
2	NAG	J	2	2	-	0/6/23/26	0/1/1/1
2	NAG	K	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	K	2	2	-	0/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	NAG	L	1	1,2	-	3/6/23/26	0/1/1/1
2	NAG	L	2	2	-	0/6/23/26	0/1/1/1
2	NAG	M	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	M	2	2	-	0/6/23/26	0/1/1/1
2	NAG	N	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	N	2	2	-	2/6/23/26	0/1/1/1
2	NAG	O	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	O	2	2	-	0/6/23/26	0/1/1/1
2	NAG	P	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	P	2	2	-	0/6/23/26	0/1/1/1
2	NAG	Q	1	1,2	-	2/6/23/26	0/1/1/1
2	NAG	Q	2	2	-	0/6/23/26	0/1/1/1
2	NAG	R	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	R	2	2	-	1/6/23/26	0/1/1/1

There are no bond length outliers.

All (16) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	1	NAG	C2-N2-C7	4.40	129.18	122.90
2	N	2	NAG	C2-N2-C7	4.27	128.99	122.90
2	J	1	NAG	C2-N2-C7	4.27	128.98	122.90
2	D	1	NAG	C1-O5-C5	2.94	116.18	112.19
2	G	1	NAG	C2-N2-C7	2.73	126.79	122.90
2	Q	1	NAG	C2-N2-C7	2.59	126.59	122.90
2	L	1	NAG	C2-N2-C7	2.55	126.53	122.90
2	M	1	NAG	C1-O5-C5	2.49	115.56	112.19
2	D	2	NAG	C1-O5-C5	2.43	115.48	112.19
2	H	1	NAG	C1-O5-C5	2.41	115.45	112.19
2	R	1	NAG	C1-O5-C5	2.31	115.32	112.19
2	L	1	NAG	O5-C1-C2	-2.18	107.84	111.29
2	D	1	NAG	O5-C1-C2	-2.17	107.86	111.29
2	I	1	NAG	C1-O5-C5	2.15	115.11	112.19
2	J	1	NAG	O5-C1-C2	-2.02	108.10	111.29
2	L	1	NAG	O4-C4-C3	-2.00	105.72	110.35

There are no chirality outliers.

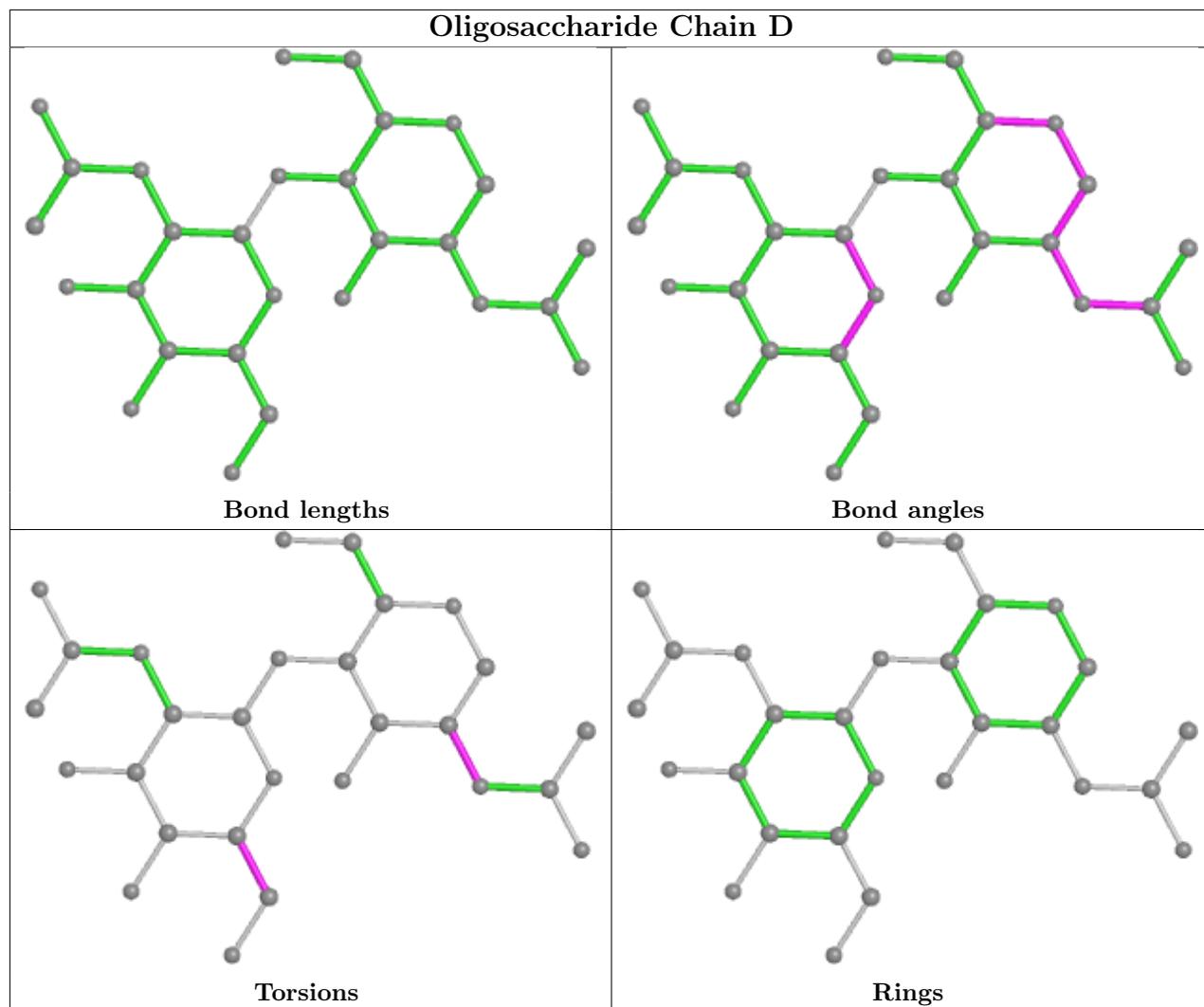
All (15) torsion outliers are listed below:

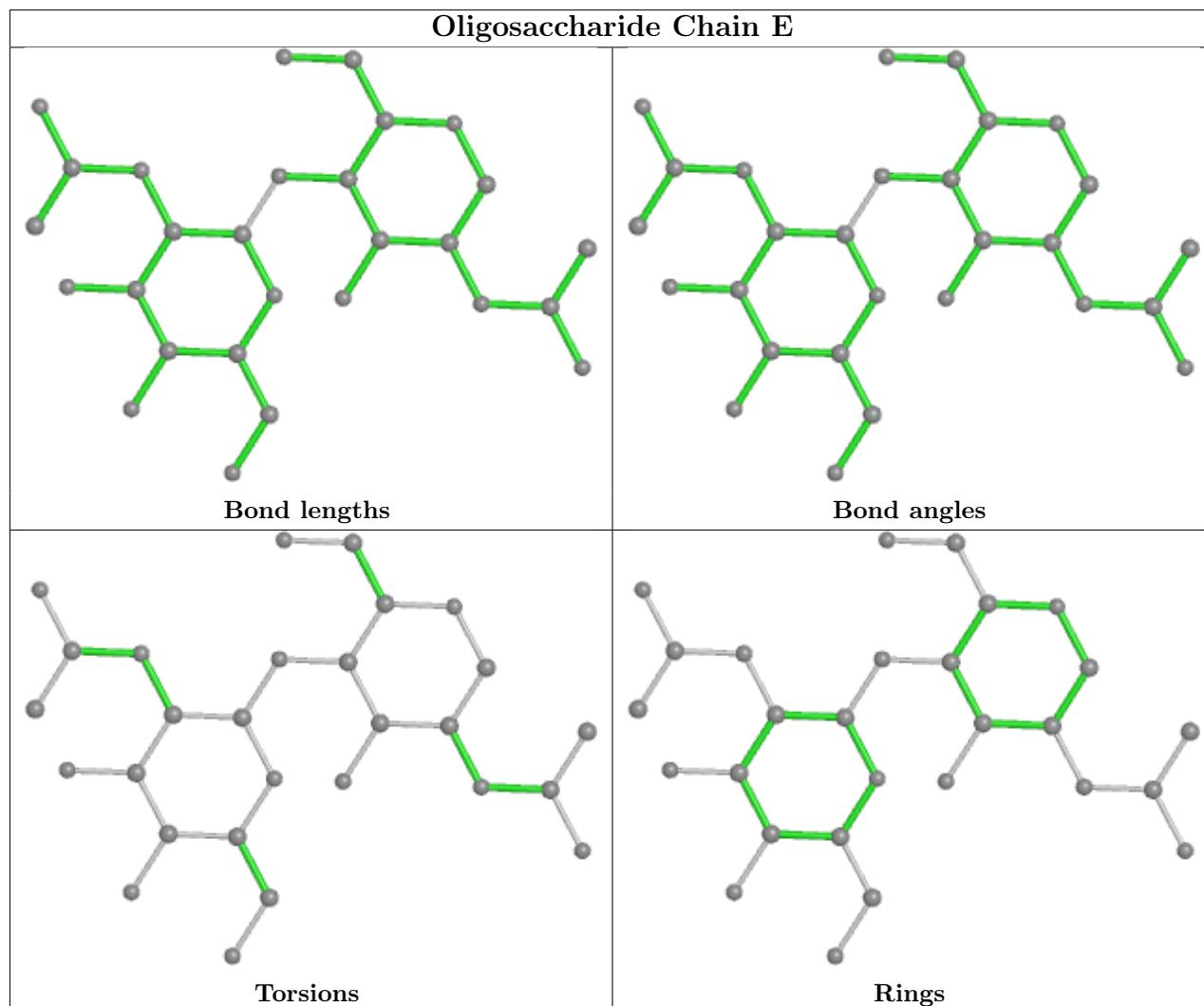
Mol	Chain	Res	Type	Atoms
2	G	1	NAG	C8-C7-N2-C2
2	G	1	NAG	O7-C7-N2-C2
2	L	1	NAG	C8-C7-N2-C2
2	L	1	NAG	O7-C7-N2-C2
2	Q	1	NAG	C8-C7-N2-C2
2	Q	1	NAG	O7-C7-N2-C2
2	D	2	NAG	O5-C5-C6-O6
2	N	2	NAG	O5-C5-C6-O6
2	I	2	NAG	O5-C5-C6-O6
2	R	2	NAG	O5-C5-C6-O6
2	H	2	NAG	O5-C5-C6-O6
2	L	1	NAG	O5-C5-C6-O6
2	D	1	NAG	C3-C2-N2-C7
2	N	2	NAG	C3-C2-N2-C7
2	J	1	NAG	C3-C2-N2-C7

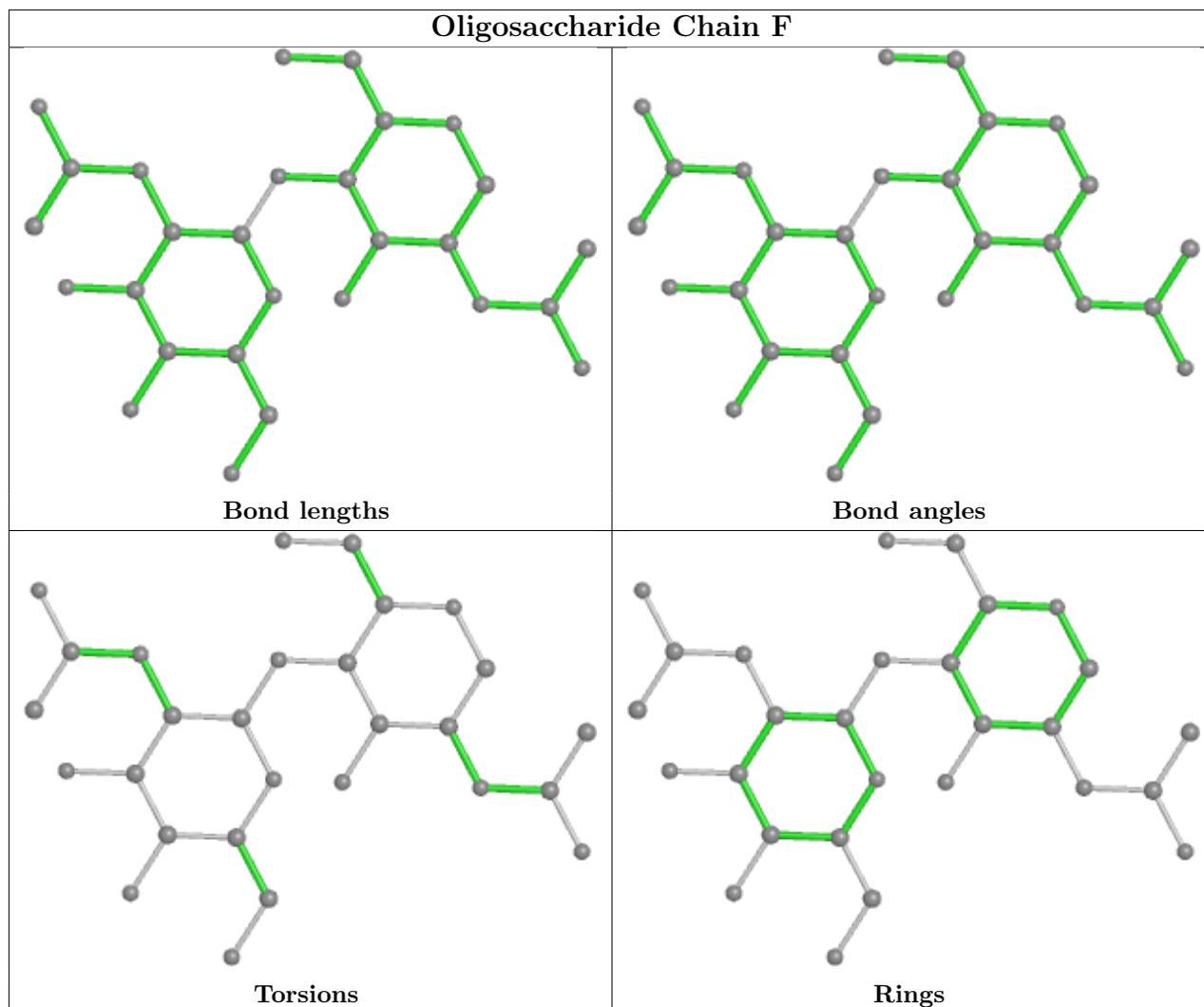
There are no ring outliers.

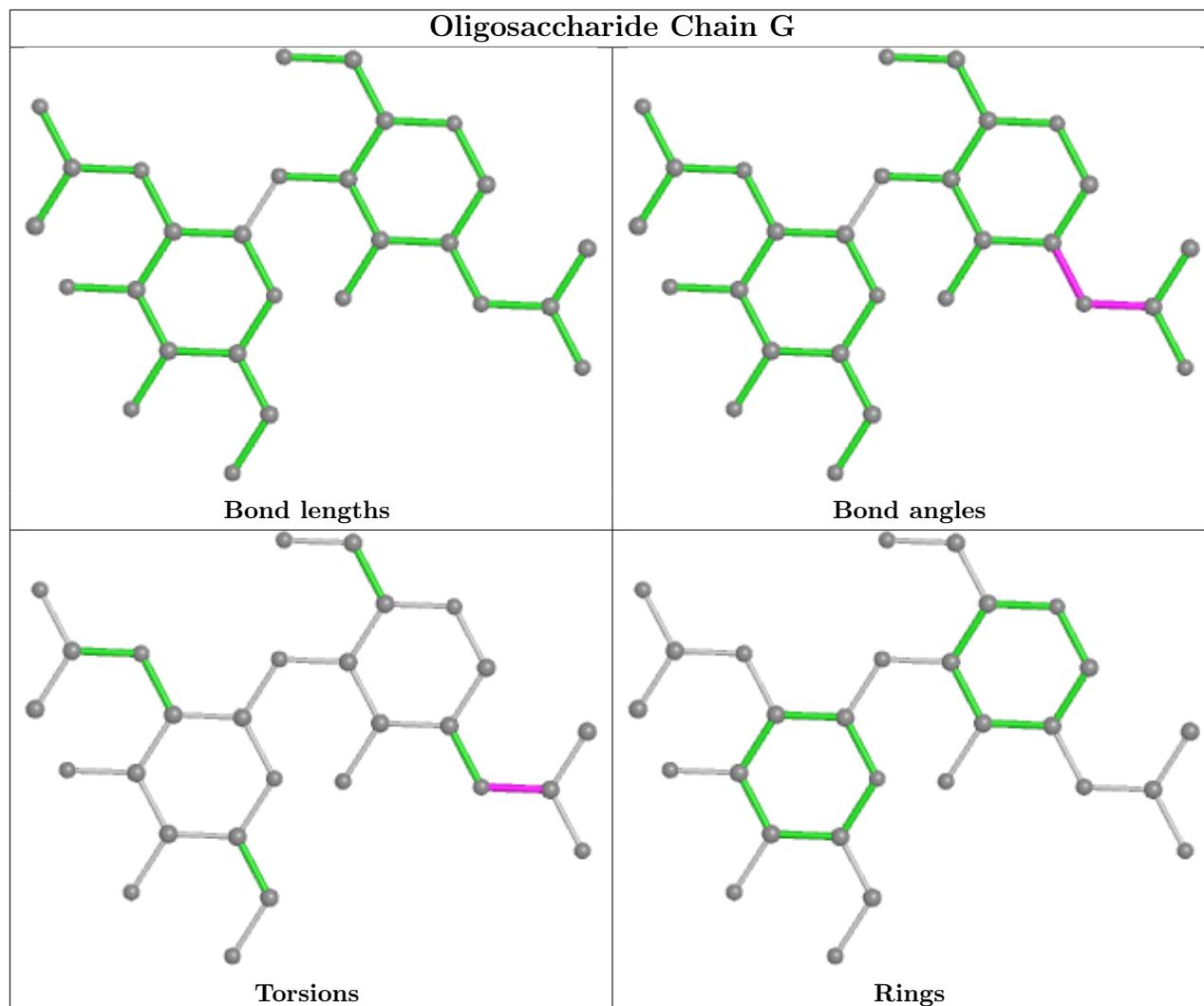
No monomer is involved in short contacts.

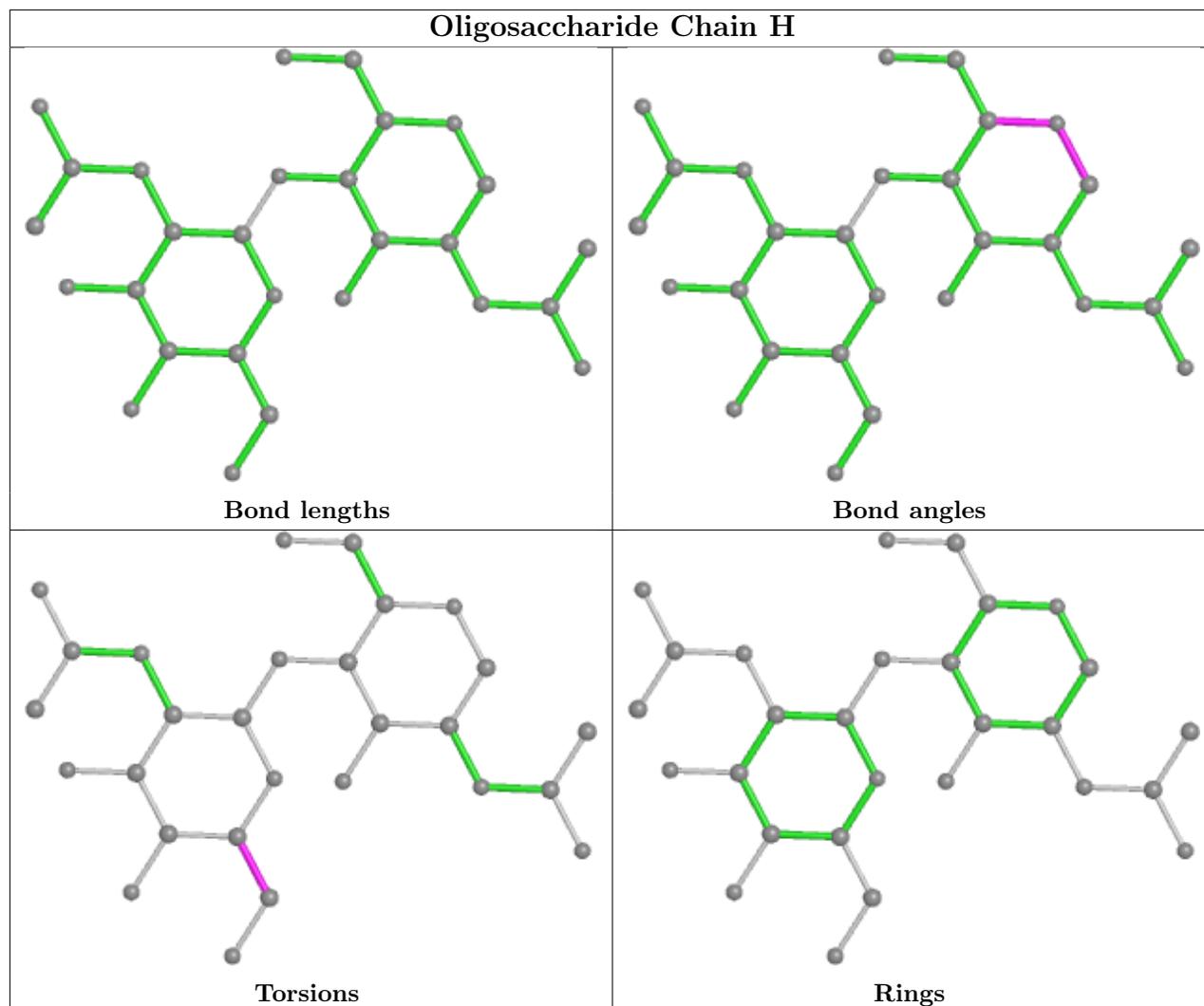
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

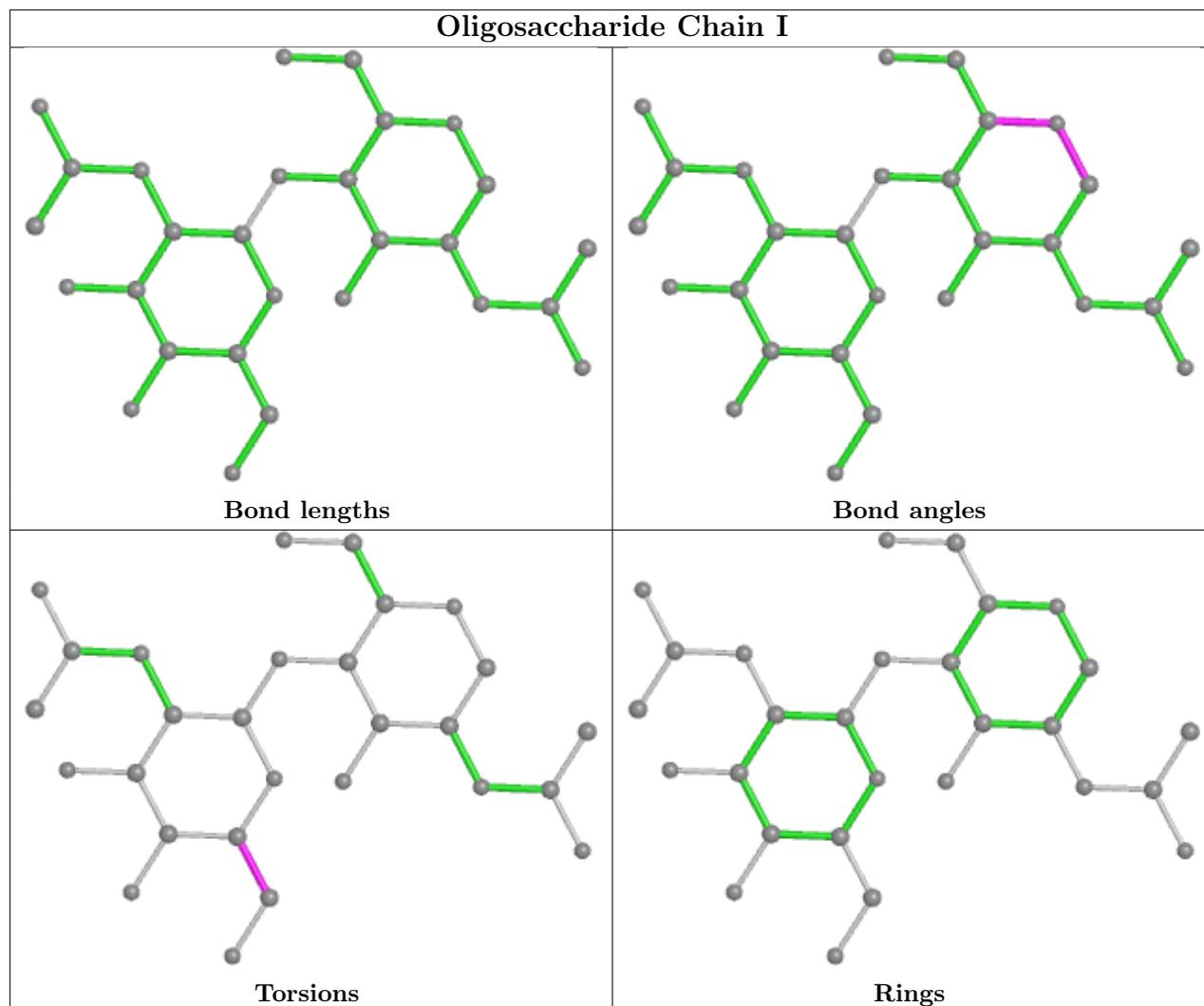


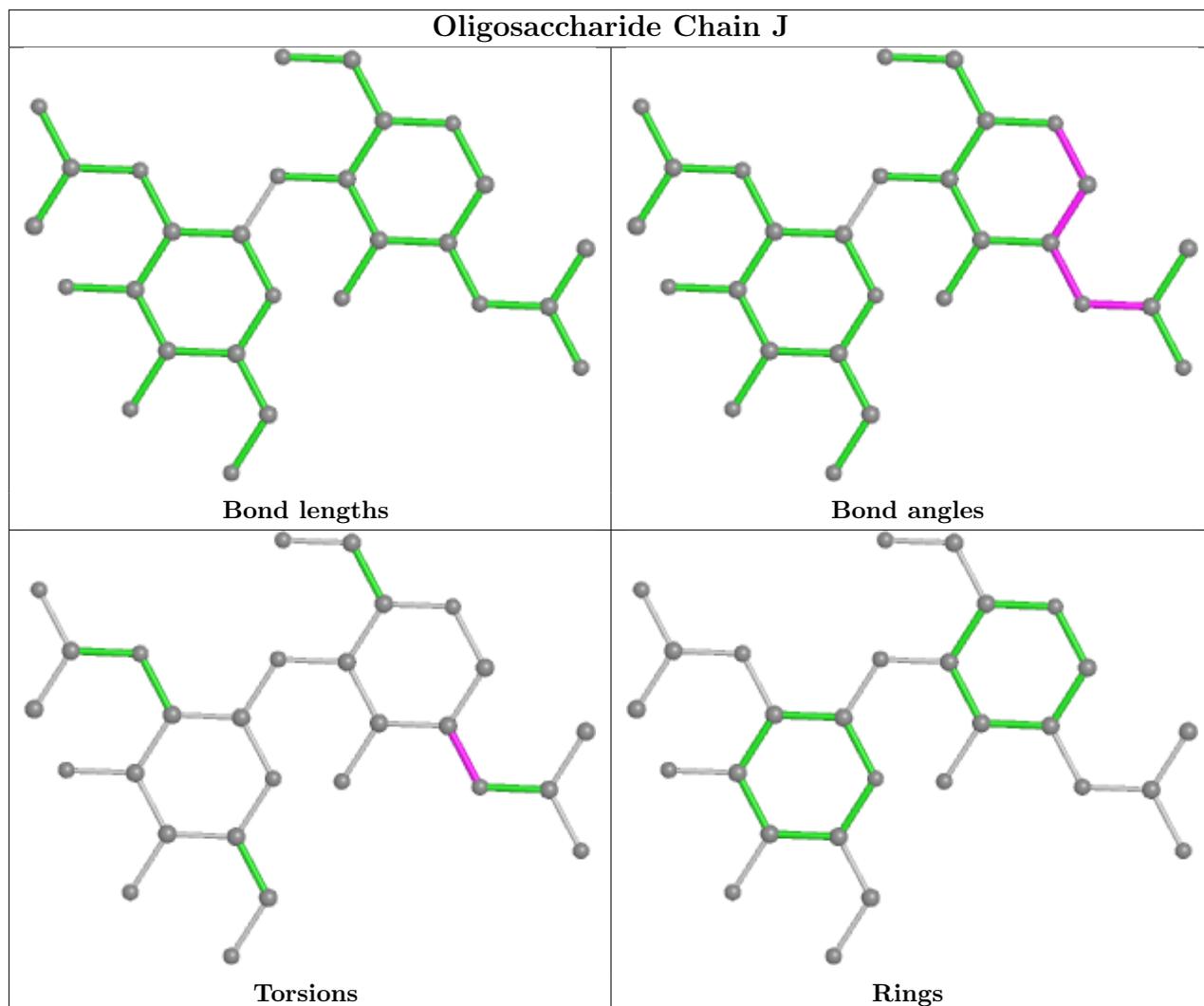


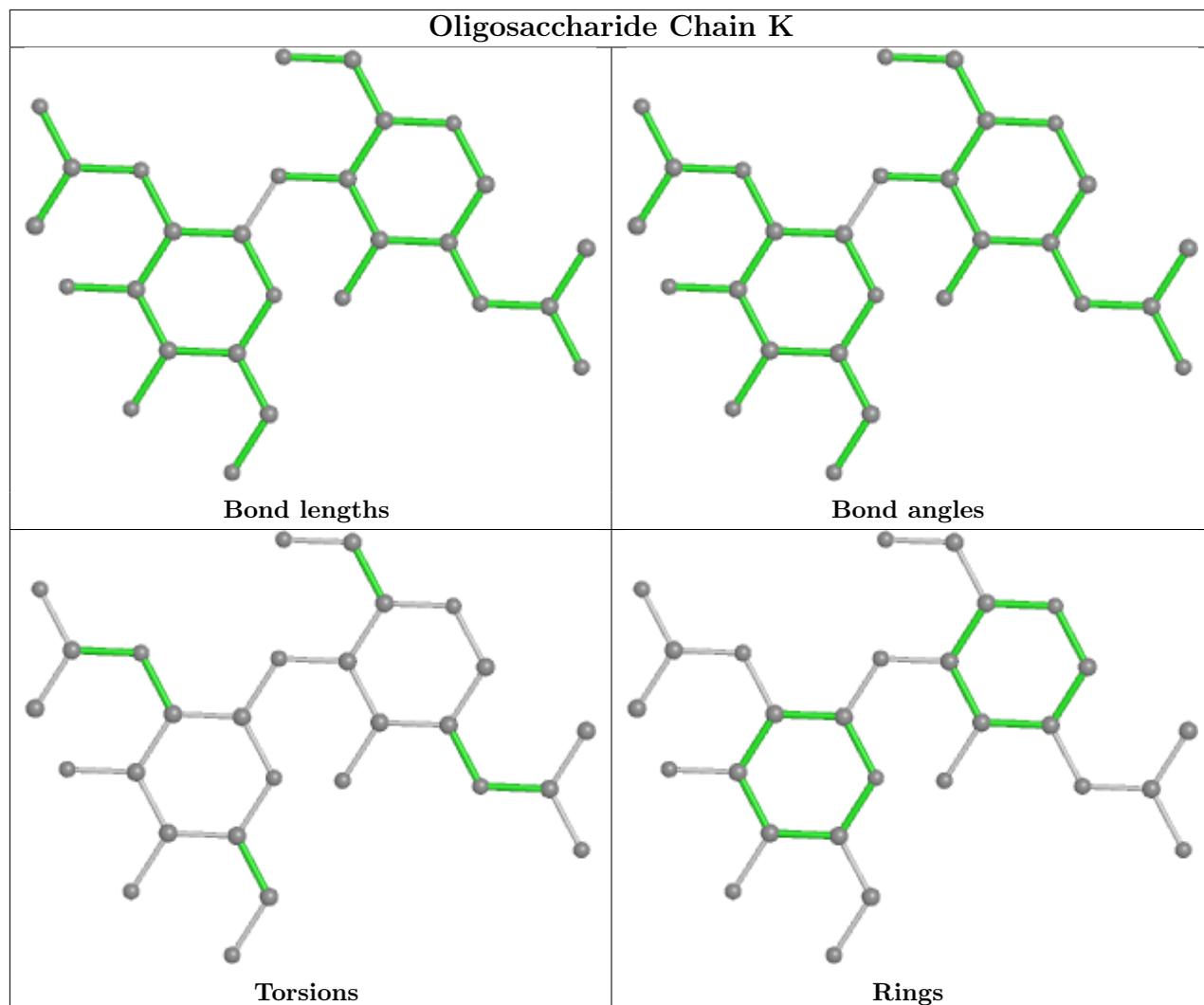


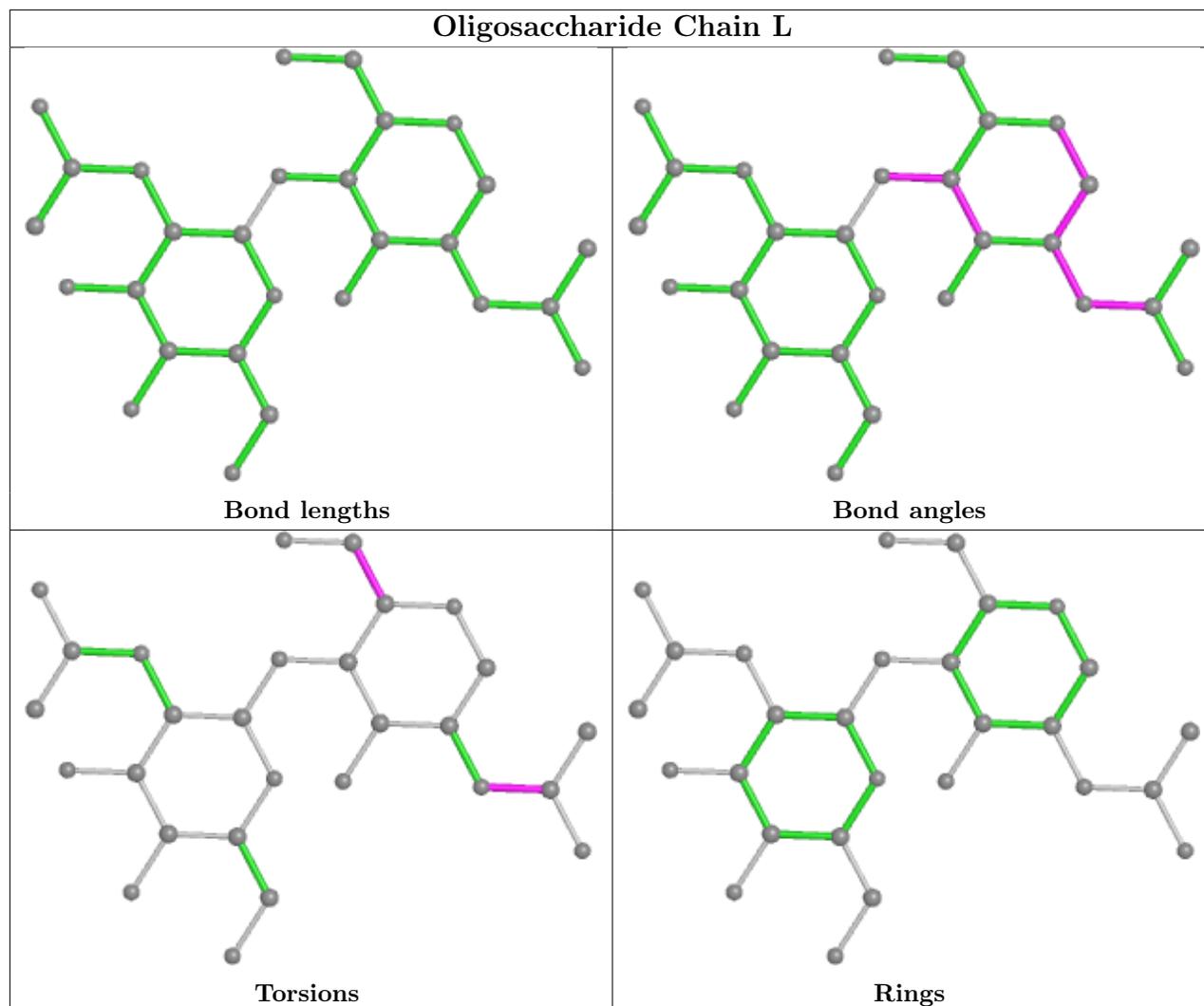


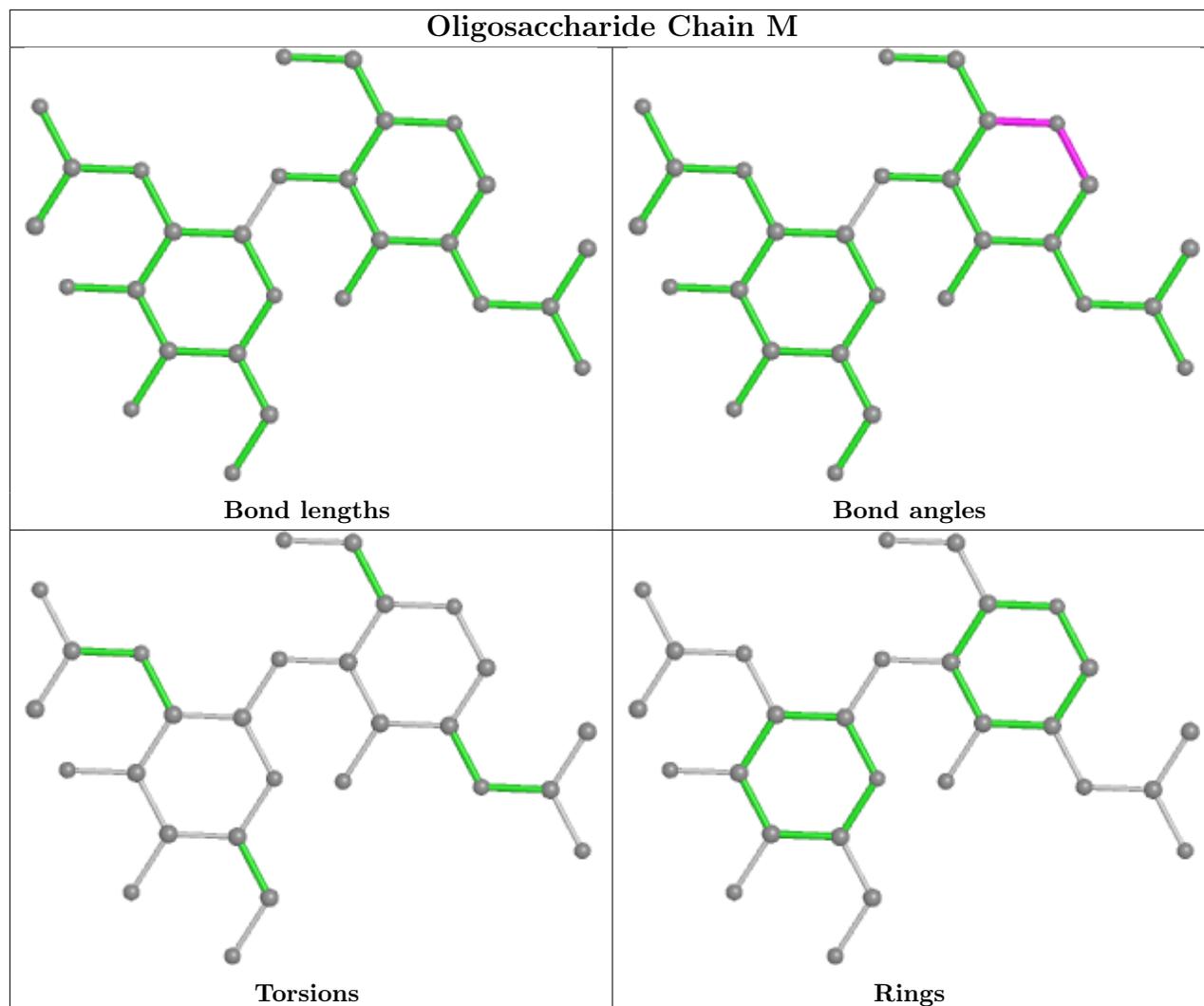


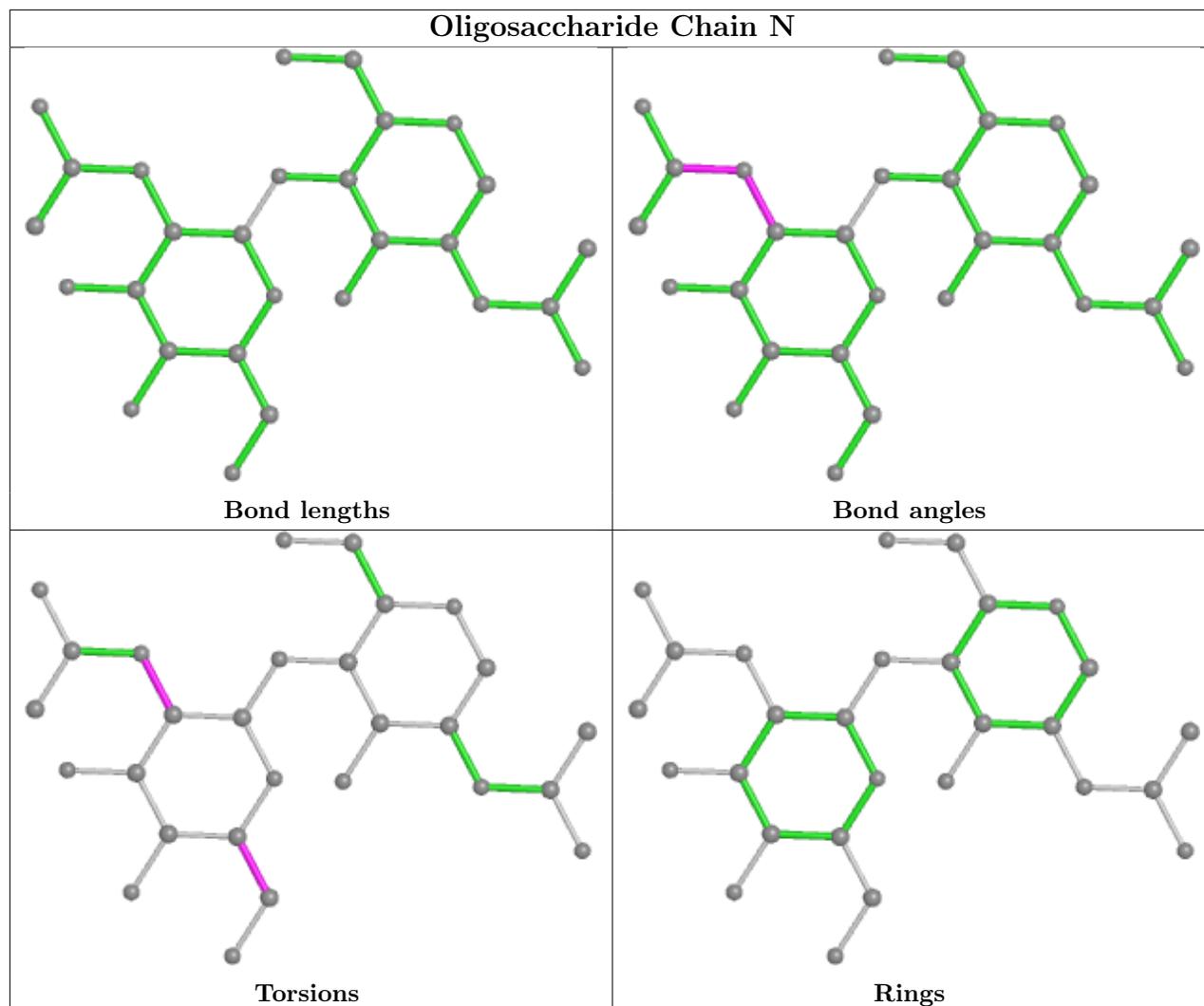


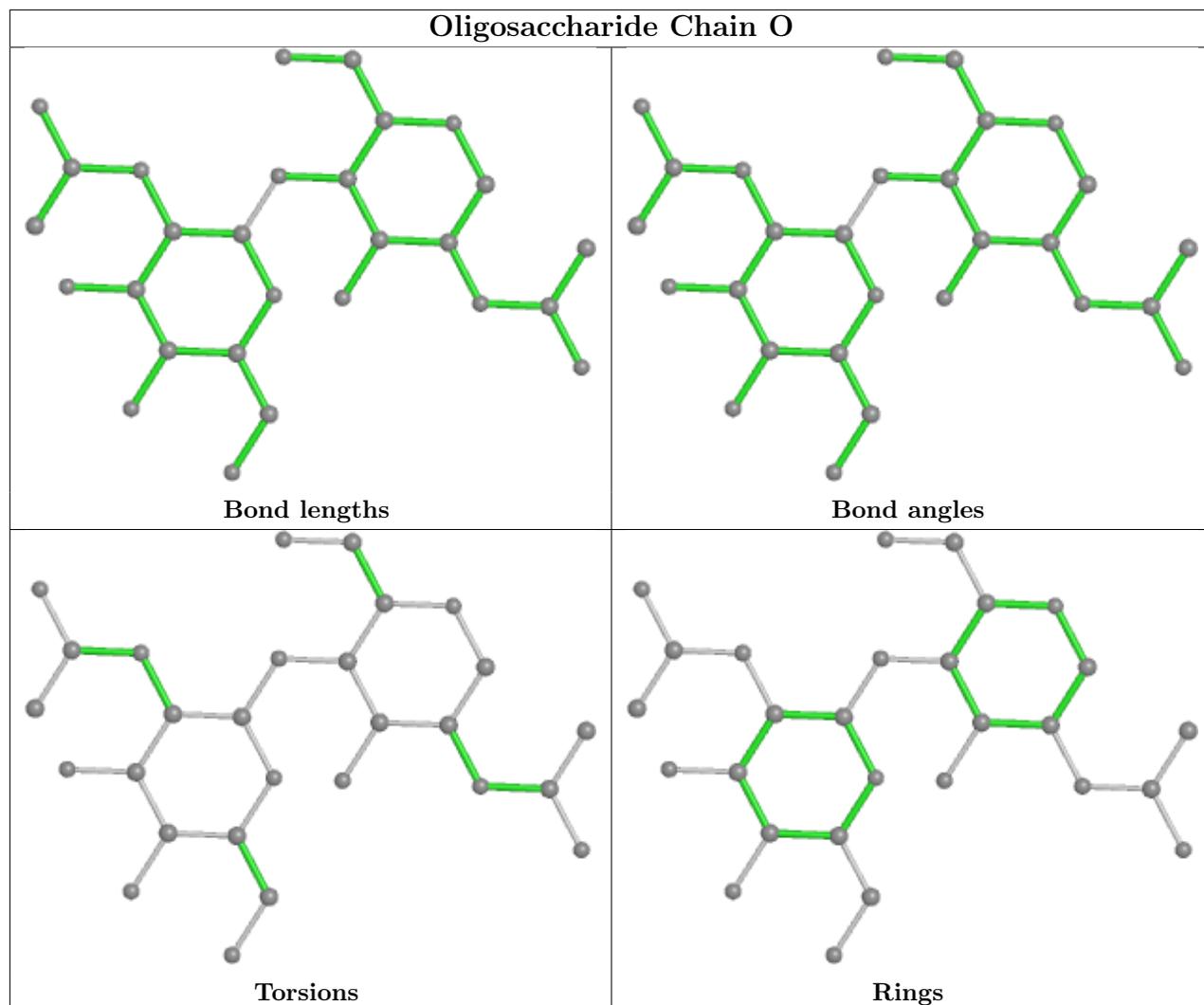


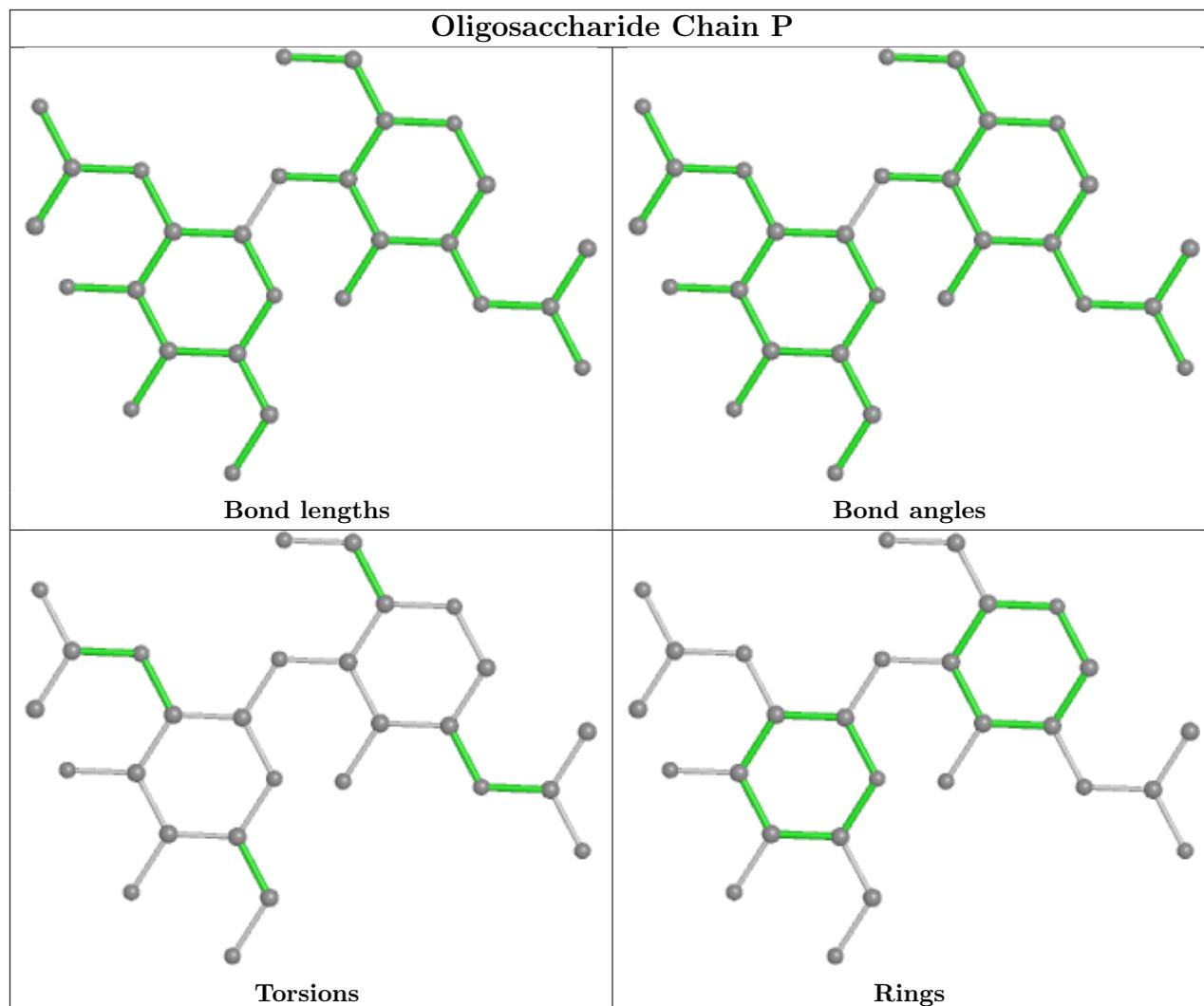


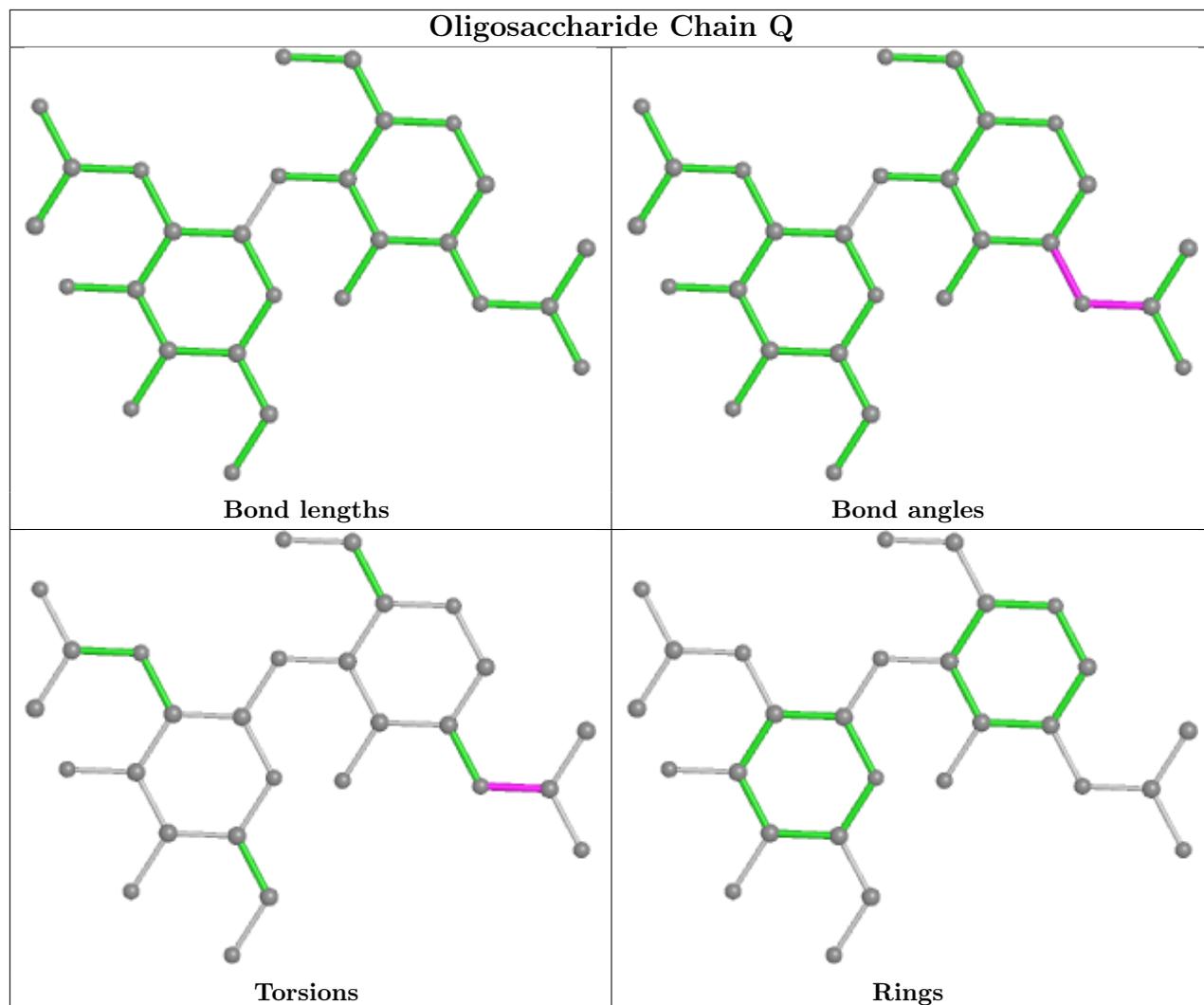


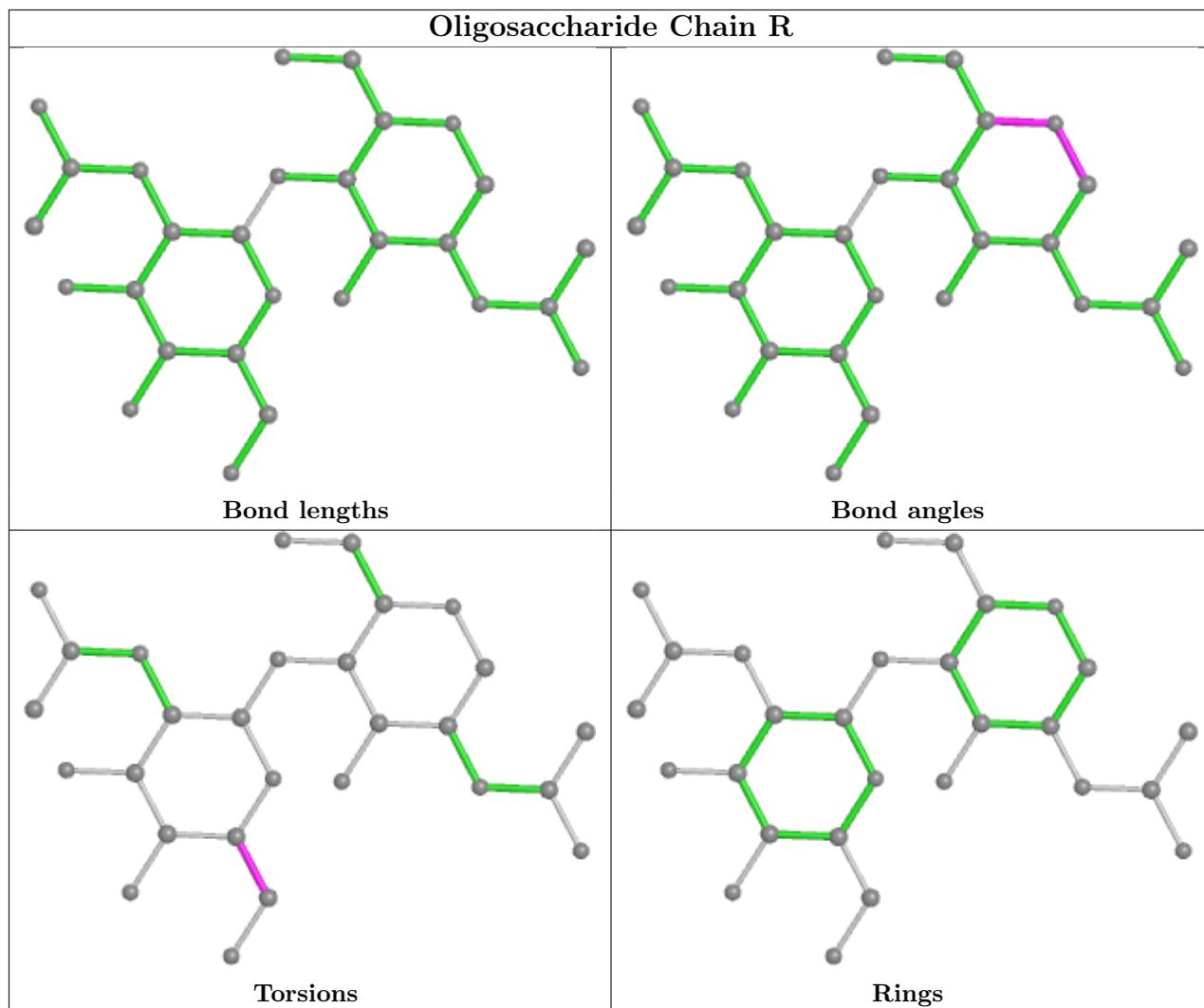












## 5.6 Ligand geometry [i](#)

45 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	NAG	A	1308	1	14,14,15	0.70	0	17,19,21	1.00	1 (5%)
3	NAG	A	1306	1	14,14,15	0.71	0	17,19,21	0.78	0
3	NAG	B	1301	1	14,14,15	0.73	0	17,19,21	0.92	1 (5%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
3	NAG	C	1302	1	14,14,15	0.69	0	17,19,21	1.05	1 (5%)
3	NAG	C	1312	1	14,14,15	0.70	0	17,19,21	0.85	0
3	NAG	C	1310	1	14,14,15	0.75	0	17,19,21	0.82	0
3	NAG	B	1311	1	14,14,15	0.73	0	17,19,21	1.47	2 (11%)
4	BLR	C	1315	-	40,46,46	3.61	3 (7%)	44,67,67	1.03	3 (6%)
3	NAG	C	1306	1	14,14,15	0.73	0	17,19,21	0.95	1 (5%)
3	NAG	A	1311	1	14,14,15	0.71	0	17,19,21	0.87	0
4	BLR	A	1314	-	40,46,46	3.61	3 (7%)	44,67,67	0.99	3 (6%)
3	NAG	A	1315	1	14,14,15	0.70	0	17,19,21	1.46	2 (11%)
3	NAG	B	1305	1	14,14,15	0.69	0	17,19,21	1.07	2 (11%)
3	NAG	B	1303	1	14,14,15	0.73	0	17,19,21	1.00	1 (5%)
3	NAG	B	1314	1	14,14,15	0.70	0	17,19,21	0.90	0
3	NAG	C	1301	1	14,14,15	0.70	0	17,19,21	0.94	1 (5%)
3	NAG	B	1308	1	14,14,15	0.71	0	17,19,21	1.00	1 (5%)
3	NAG	B	1309	1	14,14,15	0.71	0	17,19,21	1.45	1 (5%)
3	NAG	A	1307	1	14,14,15	0.74	0	17,19,21	1.60	2 (11%)
3	NAG	A	1312	1	14,14,15	0.70	0	17,19,21	0.82	0
3	NAG	C	1307	1	14,14,15	0.73	0	17,19,21	1.55	2 (11%)
3	NAG	C	1313	1	14,14,15	0.71	0	17,19,21	0.86	0
3	NAG	A	1310	1	14,14,15	0.70	0	17,19,21	1.46	2 (11%)
3	NAG	A	1309	1	14,14,15	0.76	0	17,19,21	0.82	0
3	NAG	B	1310	1	14,14,15	0.68	0	17,19,21	1.17	1 (5%)
3	NAG	C	1304	1	14,14,15	0.69	0	17,19,21	1.02	1 (5%)
3	NAG	C	1314	1	14,14,15	0.71	0	17,19,21	0.90	1 (5%)
3	NAG	A	1304	1	14,14,15	0.71	0	17,19,21	1.02	1 (5%)
3	NAG	B	1302	1	14,14,15	0.69	0	17,19,21	0.87	0
3	NAG	C	1308	1	14,14,15	0.70	0	17,19,21	0.96	1 (5%)
3	NAG	B	1313	1	14,14,15	0.71	0	17,19,21	0.84	0
3	NAG	C	1309	1	14,14,15	0.43	0	17,19,21	0.81	1 (5%)
3	NAG	B	1307	1	14,14,15	0.74	0	17,19,21	1.04	1 (5%)
3	NAG	C	1305	1	14,14,15	0.69	0	17,19,21	1.10	2 (11%)
3	NAG	A	1302	1	14,14,15	0.70	0	17,19,21	0.88	0
3	NAG	A	1303	1	14,14,15	0.73	0	17,19,21	0.97	1 (5%)
3	NAG	A	1301	1	14,14,15	0.71	0	17,19,21	0.92	1 (5%)
4	BLR	B	1315	-	40,46,46	3.65	3 (7%)	44,67,67	0.99	2 (4%)
3	NAG	B	1312	1	14,14,15	0.70	0	17,19,21	0.87	0
3	NAG	A	1313	1	14,14,15	0.71	0	17,19,21	0.89	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
3	NAG	C	1311	1	14,14,15	0.70	0	17,19,21	1.45	2 (11%)
3	NAG	B	1304	1	14,14,15	0.66	0	17,19,21	2.53	4 (23%)
3	NAG	B	1306	1	14,14,15	0.72	0	17,19,21	0.90	1 (5%)
3	NAG	C	1303	1	14,14,15	0.72	0	17,19,21	1.07	1 (5%)
3	NAG	A	1305	1	14,14,15	0.67	0	17,19,21	1.03	1 (5%)

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	NAG	A	1308	1	-	0/6/23/26	0/1/1/1
3	NAG	A	1306	1	-	0/6/23/26	0/1/1/1
3	NAG	B	1301	1	-	0/6/23/26	0/1/1/1
3	NAG	C	1302	1	-	2/6/23/26	0/1/1/1
3	NAG	C	1312	1	-	0/6/23/26	0/1/1/1
3	NAG	C	1310	1	-	1/6/23/26	0/1/1/1
3	NAG	B	1311	1	-	3/6/23/26	0/1/1/1
4	BLR	C	1315	-	-	10/24/58/58	0/4/4/4
3	NAG	C	1306	1	-	0/6/23/26	0/1/1/1
3	NAG	A	1311	1	-	1/6/23/26	0/1/1/1
4	BLR	A	1314	-	-	11/24/58/58	0/4/4/4
3	NAG	A	1315	1	-	1/6/23/26	0/1/1/1
3	NAG	B	1305	1	-	3/6/23/26	0/1/1/1
3	NAG	B	1303	1	-	1/6/23/26	0/1/1/1
3	NAG	B	1314	1	-	0/6/23/26	0/1/1/1
3	NAG	C	1301	1	-	1/6/23/26	0/1/1/1
3	NAG	B	1308	1	-	1/6/23/26	0/1/1/1
3	NAG	B	1309	1	-	1/6/23/26	0/1/1/1
3	NAG	A	1307	1	-	2/6/23/26	0/1/1/1
3	NAG	A	1312	1	-	0/6/23/26	0/1/1/1
3	NAG	C	1307	1	-	2/6/23/26	0/1/1/1
3	NAG	C	1313	1	-	0/6/23/26	0/1/1/1
3	NAG	A	1310	1	-	2/6/23/26	0/1/1/1
3	NAG	A	1309	1	-	0/6/23/26	0/1/1/1
3	NAG	B	1310	1	-	0/6/23/26	0/1/1/1
3	NAG	C	1304	1	-	2/6/23/26	0/1/1/1
3	NAG	C	1314	1	-	1/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NAG	A	1304	1	-	2/6/23/26	0/1/1/1
3	NAG	B	1302	1	-	0/6/23/26	0/1/1/1
3	NAG	C	1308	1	-	1/6/23/26	0/1/1/1
3	NAG	B	1313	1	-	1/6/23/26	0/1/1/1
3	NAG	C	1309	1	-	0/6/23/26	0/1/1/1
3	NAG	B	1307	1	-	2/6/23/26	0/1/1/1
3	NAG	C	1305	1	-	2/6/23/26	0/1/1/1
3	NAG	A	1302	1	-	1/6/23/26	0/1/1/1
3	NAG	A	1303	1	-	1/6/23/26	0/1/1/1
3	NAG	A	1301	1	-	0/6/23/26	0/1/1/1
4	BLR	B	1315	-	-	10/24/58/58	0/4/4/4
3	NAG	B	1312	1	-	0/6/23/26	0/1/1/1
3	NAG	A	1313	1	-	0/6/23/26	0/1/1/1
3	NAG	C	1311	1	-	1/6/23/26	0/1/1/1
3	NAG	B	1304	1	-	2/6/23/26	0/1/1/1
3	NAG	B	1306	1	-	0/6/23/26	0/1/1/1
3	NAG	C	1303	1	-	0/6/23/26	0/1/1/1
3	NAG	A	1305	1	-	2/6/23/26	0/1/1/1

All (9) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	B	1315	BLR	CHA-C4D	-18.04	1.37	1.51
4	C	1315	BLR	CHA-C4D	-17.83	1.38	1.51
4	A	1314	BLR	CHA-C4D	-17.77	1.38	1.51
4	B	1315	BLR	CHA-C1A	-12.35	1.42	1.51
4	A	1314	BLR	CHA-C1A	-12.24	1.42	1.51
4	C	1315	BLR	CHA-C1A	-12.24	1.42	1.51
4	A	1314	BLR	C3D-C4D	4.38	1.45	1.39
4	C	1315	BLR	C3D-C4D	4.31	1.45	1.39
4	B	1315	BLR	C3D-C4D	4.27	1.45	1.39

All (48) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	1304	NAG	C1-O5-C5	8.76	124.06	112.19
3	A	1310	NAG	C2-N2-C7	4.28	129.00	122.90
3	C	1311	NAG	C2-N2-C7	4.26	128.97	122.90
3	A	1315	NAG	C2-N2-C7	4.25	128.96	122.90
3	A	1307	NAG	C2-N2-C7	4.25	128.96	122.90
3	B	1311	NAG	C2-N2-C7	4.23	128.93	122.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	1309	NAG	C2-N2-C7	4.22	128.92	122.90
3	C	1307	NAG	C2-N2-C7	4.18	128.85	122.90
3	B	1310	NAG	O5-C1-C2	-3.83	105.25	111.29
4	C	1315	BLR	CAD-C3D-C4D	-3.39	124.92	127.30
3	B	1304	NAG	O5-C1-C2	3.31	116.51	111.29
4	B	1315	BLR	CAD-C3D-C4D	-3.00	125.19	127.30
3	C	1303	NAG	C1-O5-C5	2.98	116.23	112.19
4	A	1314	BLR	CAD-C3D-C4D	-2.95	125.23	127.30
3	C	1309	NAG	O5-C1-C2	2.80	115.71	111.29
3	C	1304	NAG	C2-N2-C7	2.72	126.77	122.90
3	B	1307	NAG	C2-N2-C7	2.71	126.77	122.90
3	B	1308	NAG	C1-O5-C5	2.66	115.80	112.19
3	A	1308	NAG	C1-O5-C5	2.65	115.79	112.19
3	A	1307	NAG	O5-C1-C2	-2.63	107.13	111.29
3	B	1304	NAG	C2-N2-C7	2.63	126.65	122.90
3	C	1305	NAG	C2-N2-C7	2.63	126.65	122.90
3	B	1305	NAG	C2-N2-C7	2.63	126.65	122.90
3	A	1304	NAG	C2-N2-C7	2.62	126.63	122.90
3	C	1302	NAG	C2-N2-C7	2.53	126.51	122.90
3	B	1303	NAG	C1-O5-C5	2.46	115.53	112.19
3	C	1308	NAG	C1-O5-C5	2.44	115.50	112.19
3	A	1305	NAG	C2-N2-C7	2.42	126.35	122.90
3	C	1301	NAG	C1-O5-C5	2.39	115.43	112.19
3	C	1306	NAG	C1-O5-C5	2.37	115.41	112.19
4	C	1315	BLR	O2D-CGD-CBD	-2.34	115.55	123.08
4	B	1315	BLR	O2D-CGD-CBD	-2.32	115.63	123.08
4	A	1314	BLR	O2D-CGD-CBD	-2.31	115.65	123.08
3	A	1303	NAG	C1-O5-C5	2.28	115.29	112.19
3	C	1307	NAG	O5-C1-C2	-2.28	107.69	111.29
3	B	1304	NAG	C3-C4-C5	-2.22	106.29	110.24
4	C	1315	BLR	CMD-C2D-C3D	2.19	129.08	124.94
3	C	1305	NAG	C1-O5-C5	2.16	115.12	112.19
3	B	1301	NAG	C1-O5-C5	2.16	115.11	112.19
3	A	1301	NAG	C1-O5-C5	2.14	115.09	112.19
4	A	1314	BLR	CMD-C2D-C3D	2.11	128.92	124.94
3	B	1306	NAG	C1-O5-C5	2.10	115.03	112.19
3	B	1305	NAG	C1-O5-C5	2.09	115.02	112.19
3	C	1314	NAG	C1-O5-C5	2.05	114.97	112.19
3	B	1311	NAG	O7-C7-N2	2.03	125.68	121.95
3	C	1311	NAG	O7-C7-N2	2.02	125.66	121.95
3	A	1310	NAG	O7-C7-N2	2.02	125.66	121.95
3	A	1315	NAG	O7-C7-N2	2.01	125.65	121.95

There are no chirality outliers.

All (70) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	1314	BLR	C2A-C1A-CHA-C4D
4	A	1314	BLR	C3D-C4D-CHA-C1A
4	A	1314	BLR	ND-C1D-CHD-C4C
4	A	1314	BLR	C2D-C1D-CHD-C4C
4	B	1315	BLR	C2A-C1A-CHA-C4D
4	B	1315	BLR	C3D-C4D-CHA-C1A
4	B	1315	BLR	C2C-C3C-CAC-CBC
4	B	1315	BLR	ND-C1D-CHD-C4C
4	B	1315	BLR	C2D-C1D-CHD-C4C
4	C	1315	BLR	C2A-C1A-CHA-C4D
4	C	1315	BLR	C3D-C4D-CHA-C1A
4	C	1315	BLR	NA-C4A-CHB-C1B
4	C	1315	BLR	C3A-C4A-CHB-C1B
4	C	1315	BLR	C2C-C3C-CAC-CBC
4	C	1315	BLR	ND-C1D-CHD-C4C
4	C	1315	BLR	C2D-C1D-CHD-C4C
3	A	1304	NAG	C8-C7-N2-C2
3	A	1304	NAG	O7-C7-N2-C2
3	A	1305	NAG	C8-C7-N2-C2
3	A	1305	NAG	O7-C7-N2-C2
3	B	1304	NAG	C8-C7-N2-C2
3	B	1304	NAG	O7-C7-N2-C2
3	B	1305	NAG	C8-C7-N2-C2
3	B	1305	NAG	O7-C7-N2-C2
3	B	1307	NAG	C8-C7-N2-C2
3	B	1307	NAG	O7-C7-N2-C2
3	C	1302	NAG	C8-C7-N2-C2
3	C	1302	NAG	O7-C7-N2-C2
3	C	1304	NAG	C8-C7-N2-C2
3	C	1304	NAG	O7-C7-N2-C2
3	C	1305	NAG	C8-C7-N2-C2
3	C	1305	NAG	O7-C7-N2-C2
3	B	1311	NAG	O5-C5-C6-O6
4	A	1314	BLR	C2C-C3C-CAC-CBC
3	C	1307	NAG	O5-C5-C6-O6
4	A	1314	BLR	C4C-C3C-CAC-CBC
4	B	1315	BLR	C4C-C3C-CAC-CBC
4	C	1315	BLR	C4C-C3C-CAC-CBC
3	A	1307	NAG	O5-C5-C6-O6
3	C	1308	NAG	O5-C5-C6-O6

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Mol	Chain	Res	Type	Atoms
3	C	1301	NAG	O5-C5-C6-O6
3	C	1314	NAG	O5-C5-C6-O6
3	A	1310	NAG	O5-C5-C6-O6
3	B	1308	NAG	O5-C5-C6-O6
3	B	1305	NAG	O5-C5-C6-O6
3	A	1311	NAG	O5-C5-C6-O6
3	A	1302	NAG	O5-C5-C6-O6
3	B	1313	NAG	O5-C5-C6-O6
3	B	1303	NAG	O5-C5-C6-O6
3	C	1310	NAG	O5-C5-C6-O6
3	A	1303	NAG	O5-C5-C6-O6
3	B	1311	NAG	C4-C5-C6-O6
3	A	1307	NAG	C3-C2-N2-C7
4	B	1315	BLR	CAA-CBA-CGA-O2A
4	A	1314	BLR	CAA-CBA-CGA-O2A
4	A	1314	BLR	CAA-CBA-CGA-O1A
4	B	1315	BLR	CAA-CBA-CGA-O1A
4	C	1315	BLR	CAD-CBD-CGD-O1D
4	C	1315	BLR	CAD-CBD-CGD-O2D
4	A	1314	BLR	CAD-CBD-CGD-O1D
4	A	1314	BLR	CAD-CBD-CGD-O2D
4	B	1315	BLR	CAD-CBD-CGD-O1D
4	A	1314	BLR	C2A-CAA-CBA-CGA
3	A	1310	NAG	C3-C2-N2-C7
3	A	1315	NAG	C3-C2-N2-C7
3	B	1309	NAG	C3-C2-N2-C7
3	B	1311	NAG	C3-C2-N2-C7
3	C	1307	NAG	C3-C2-N2-C7
3	C	1311	NAG	C3-C2-N2-C7
4	B	1315	BLR	CAD-CBD-CGD-O2D

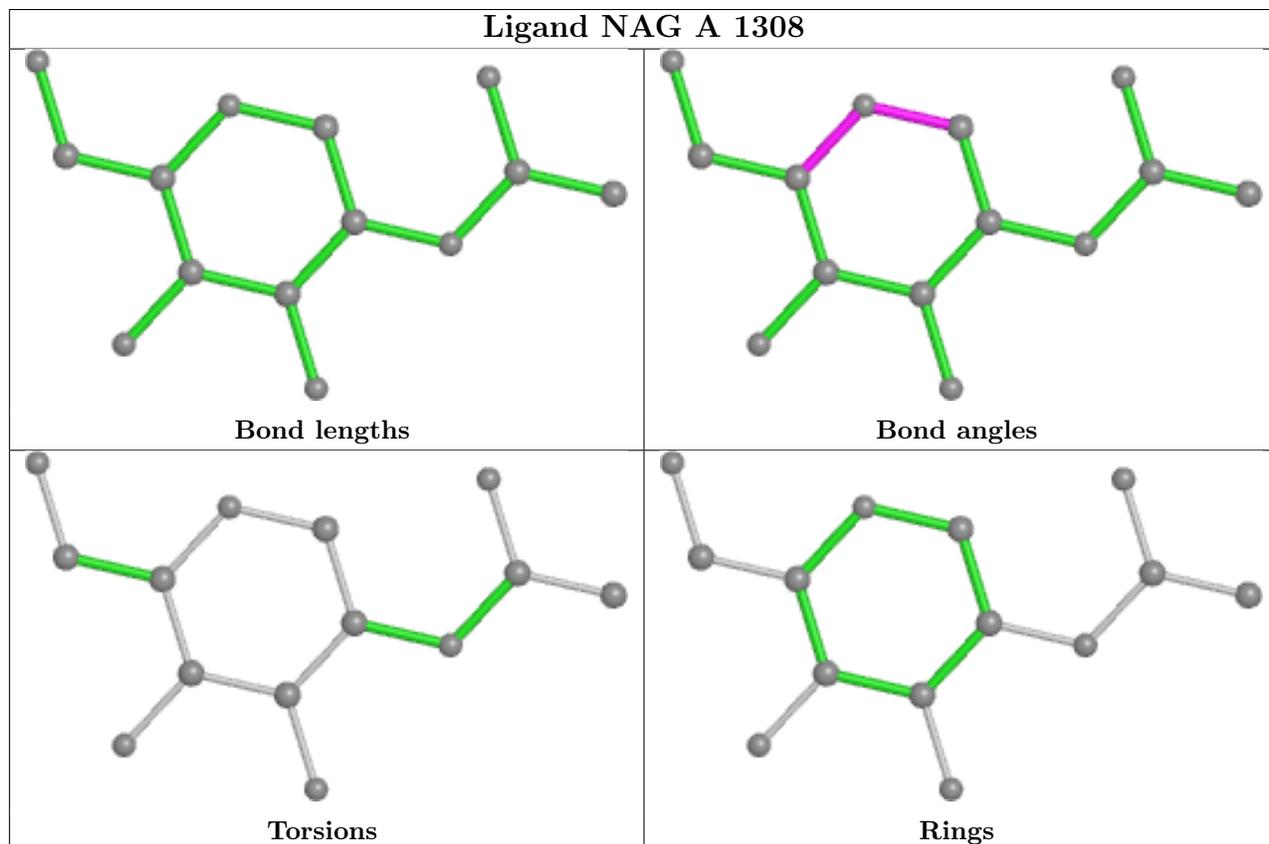
There are no ring outliers.

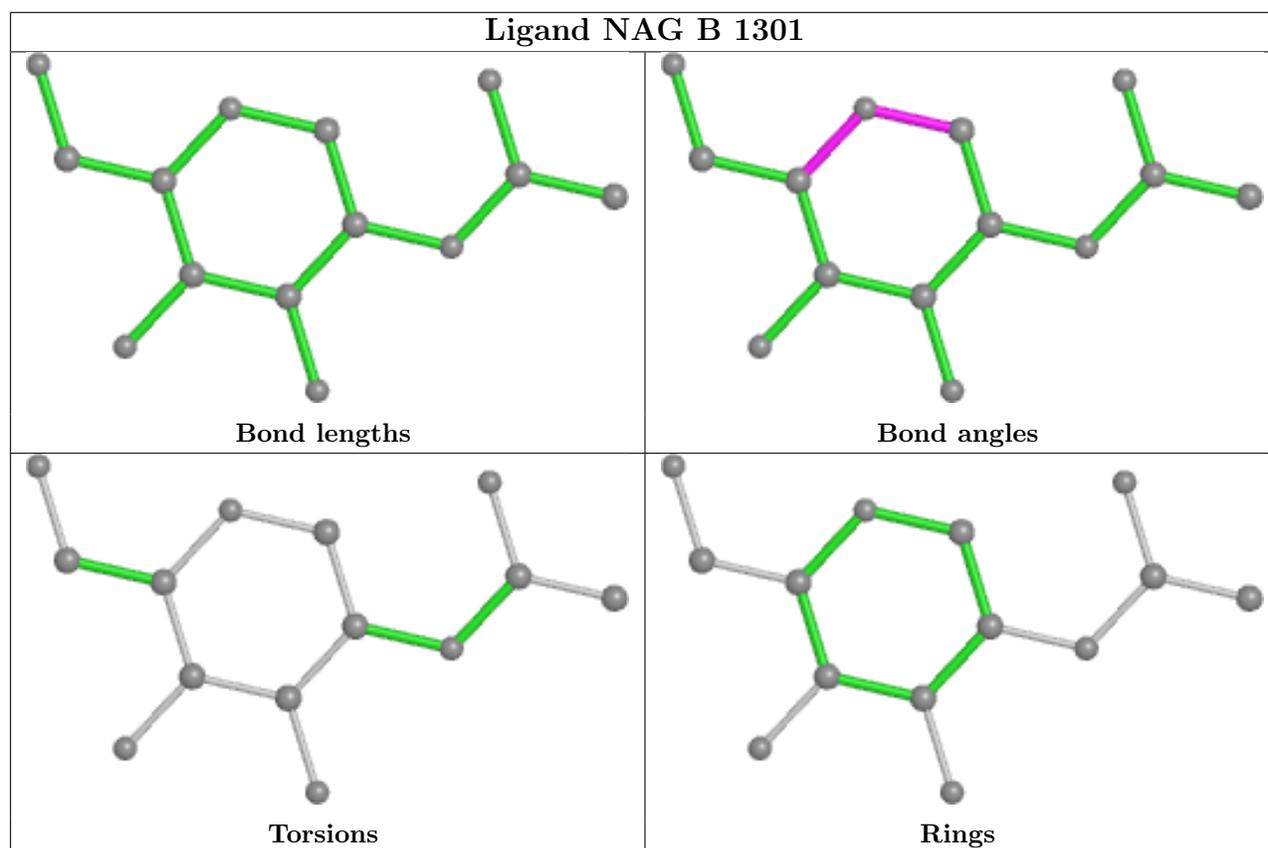
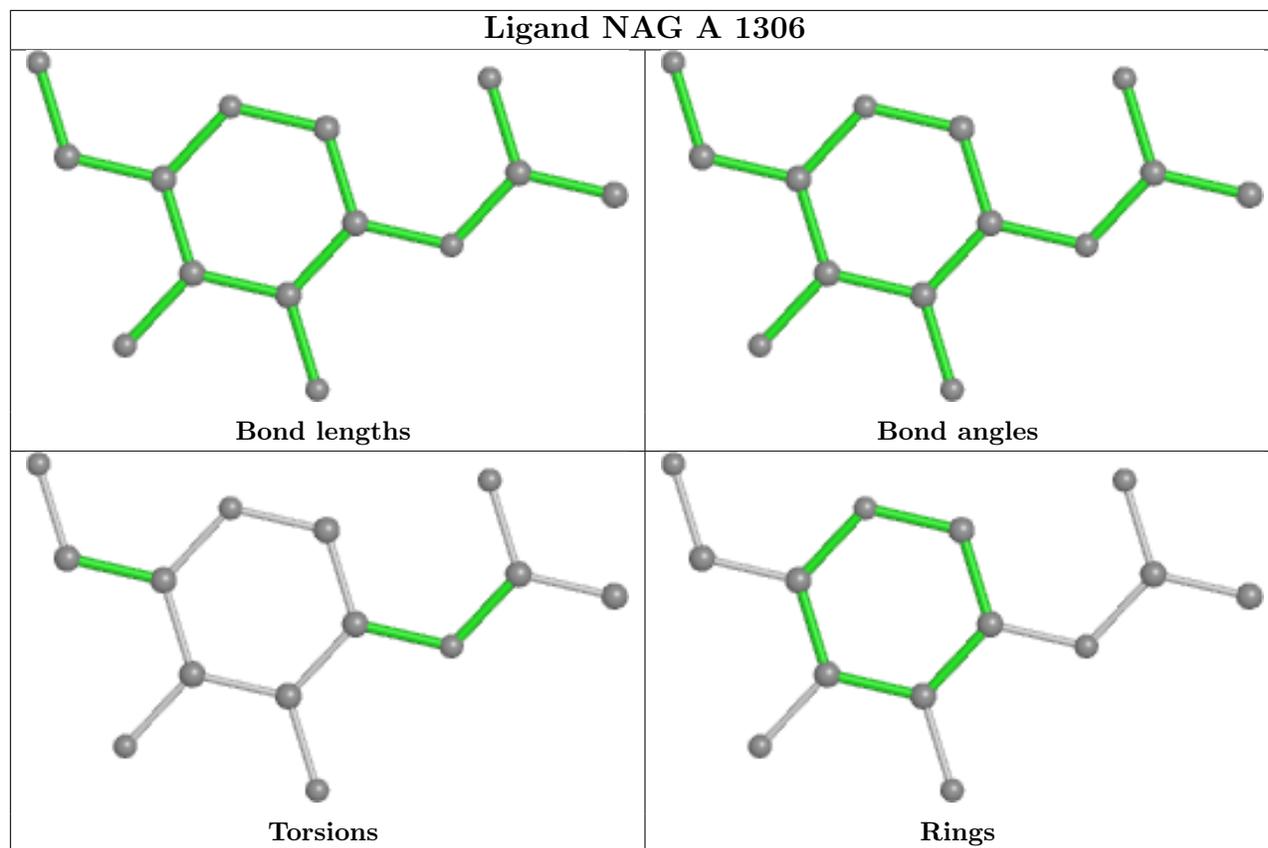
3 monomers are involved in 5 short contacts:

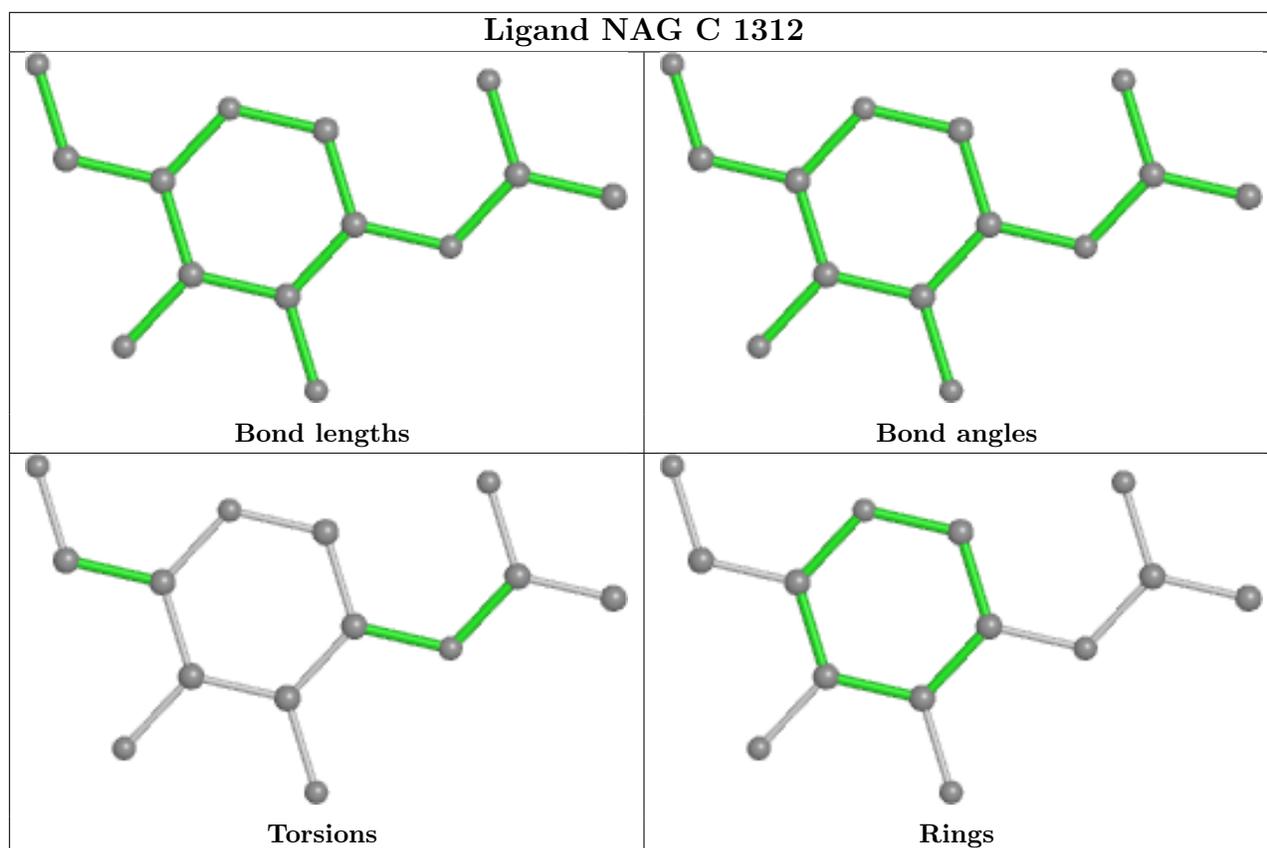
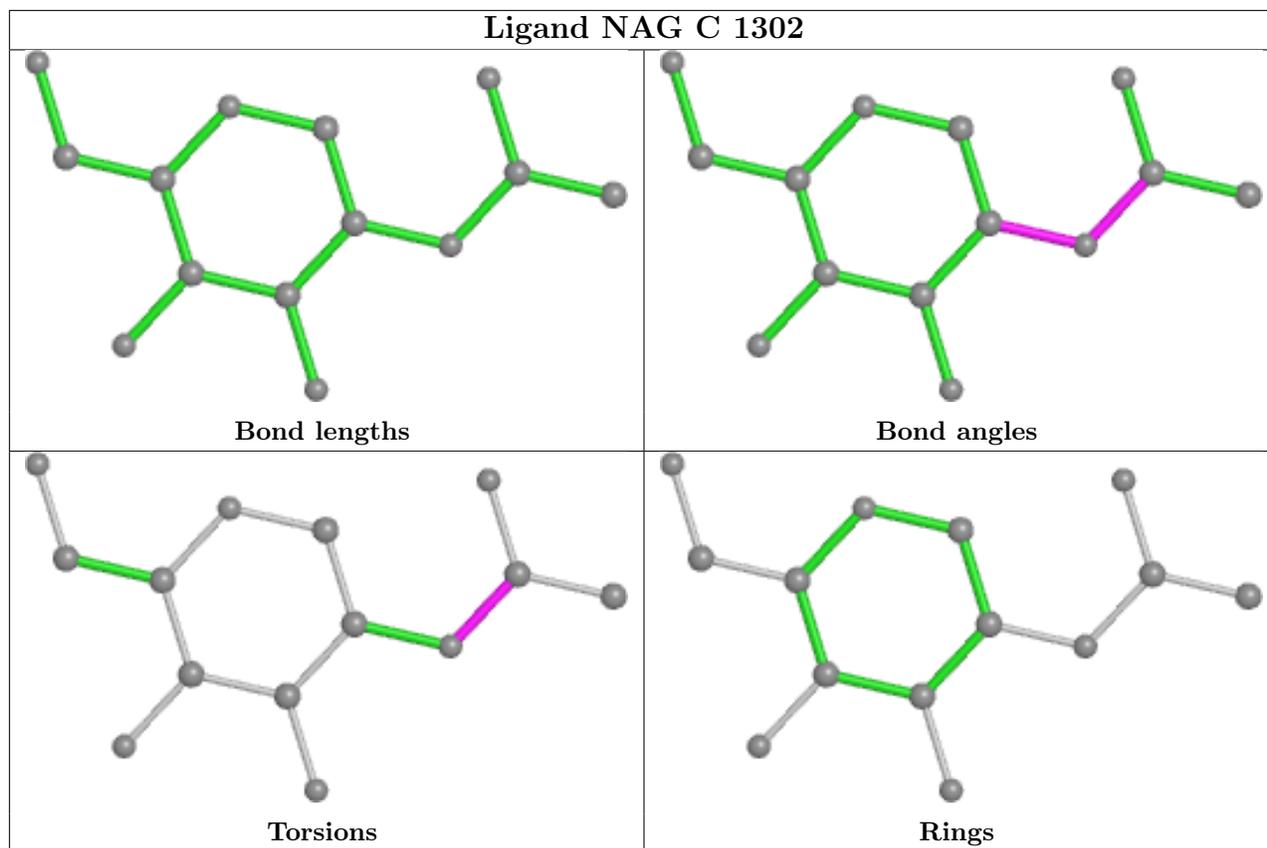
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	C	1315	BLR	1	0
4	A	1314	BLR	2	0
4	B	1315	BLR	2	0

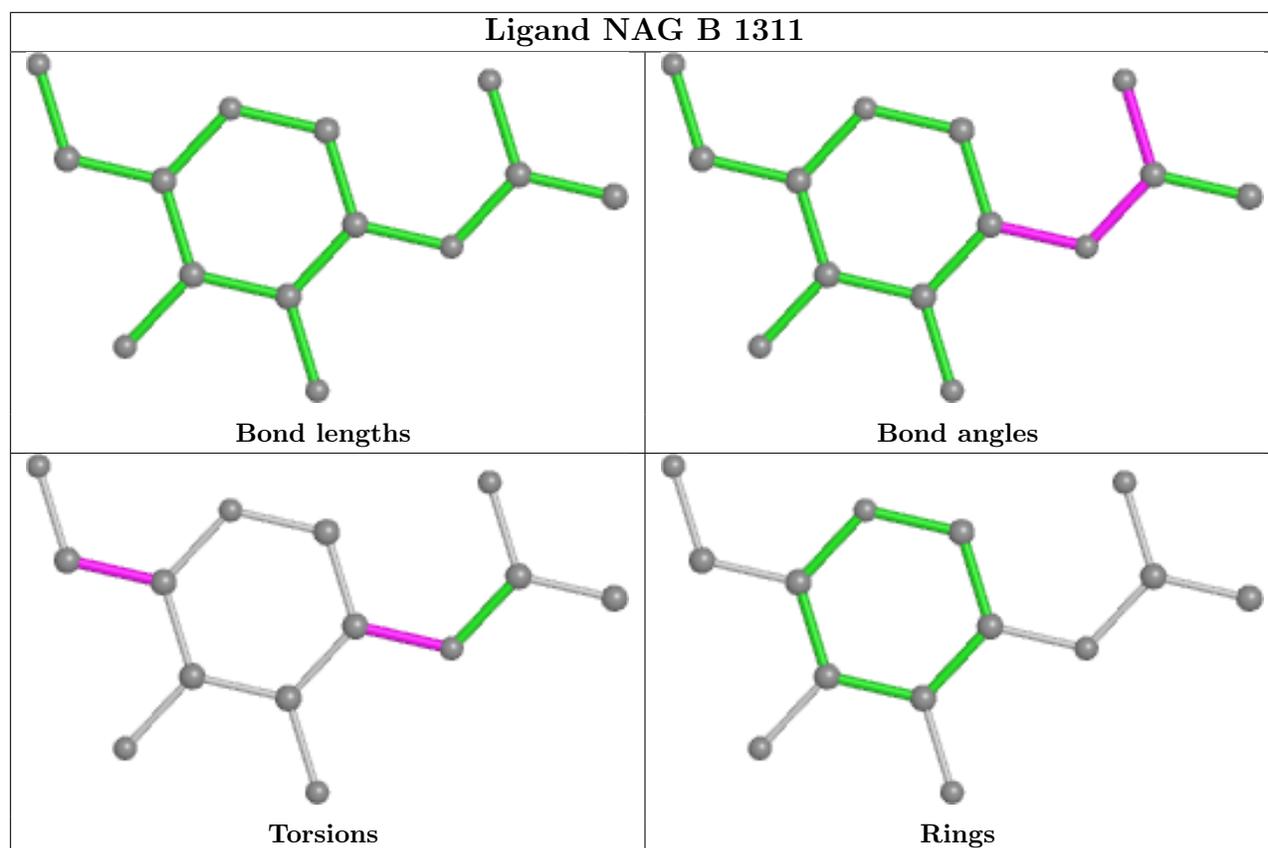
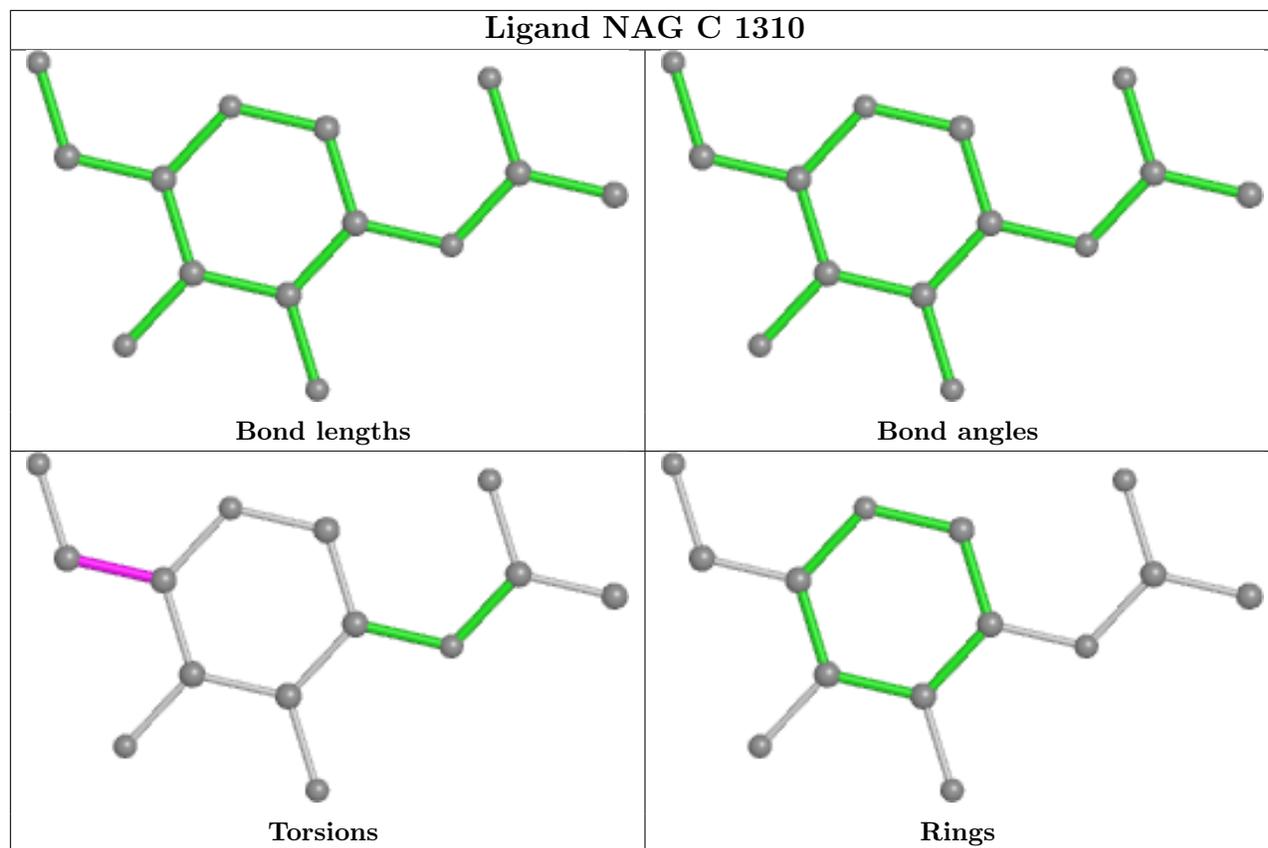
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will

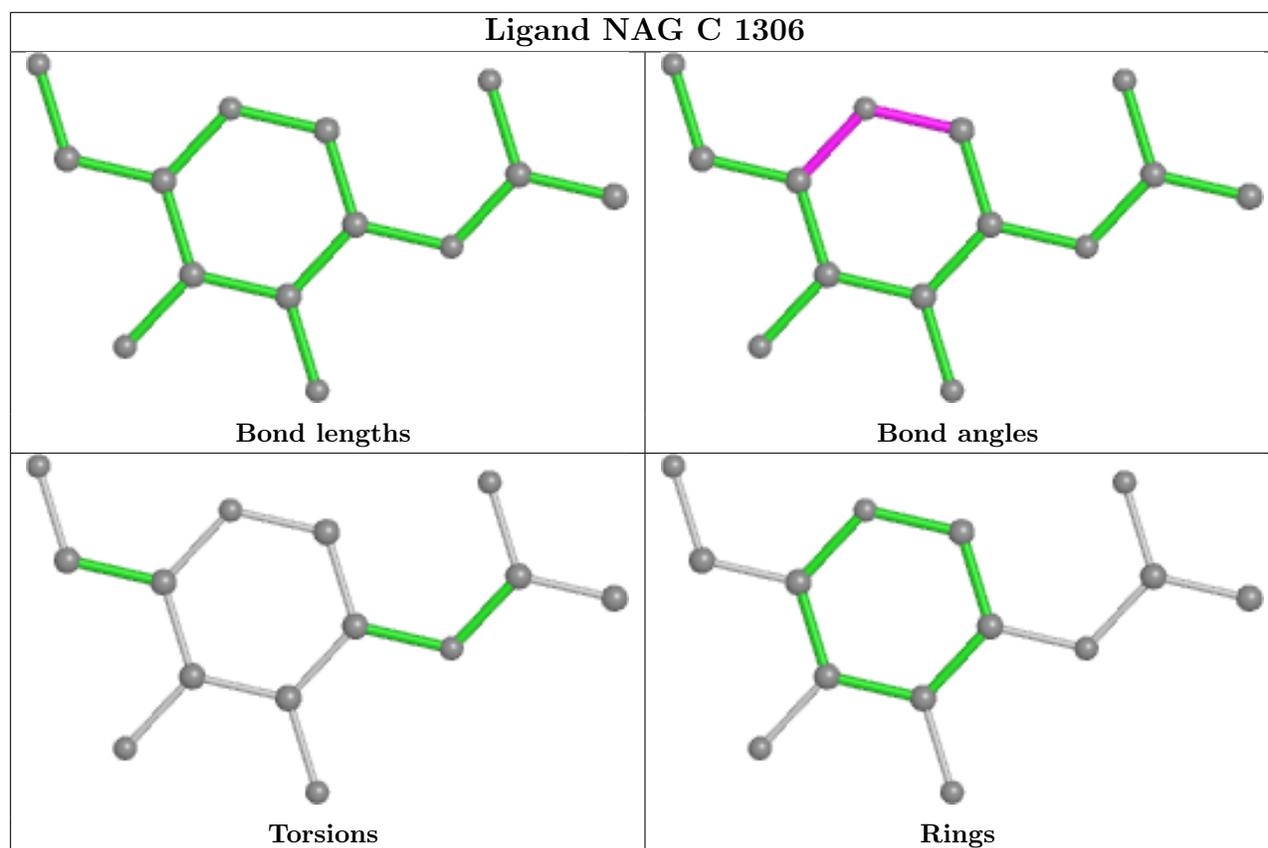
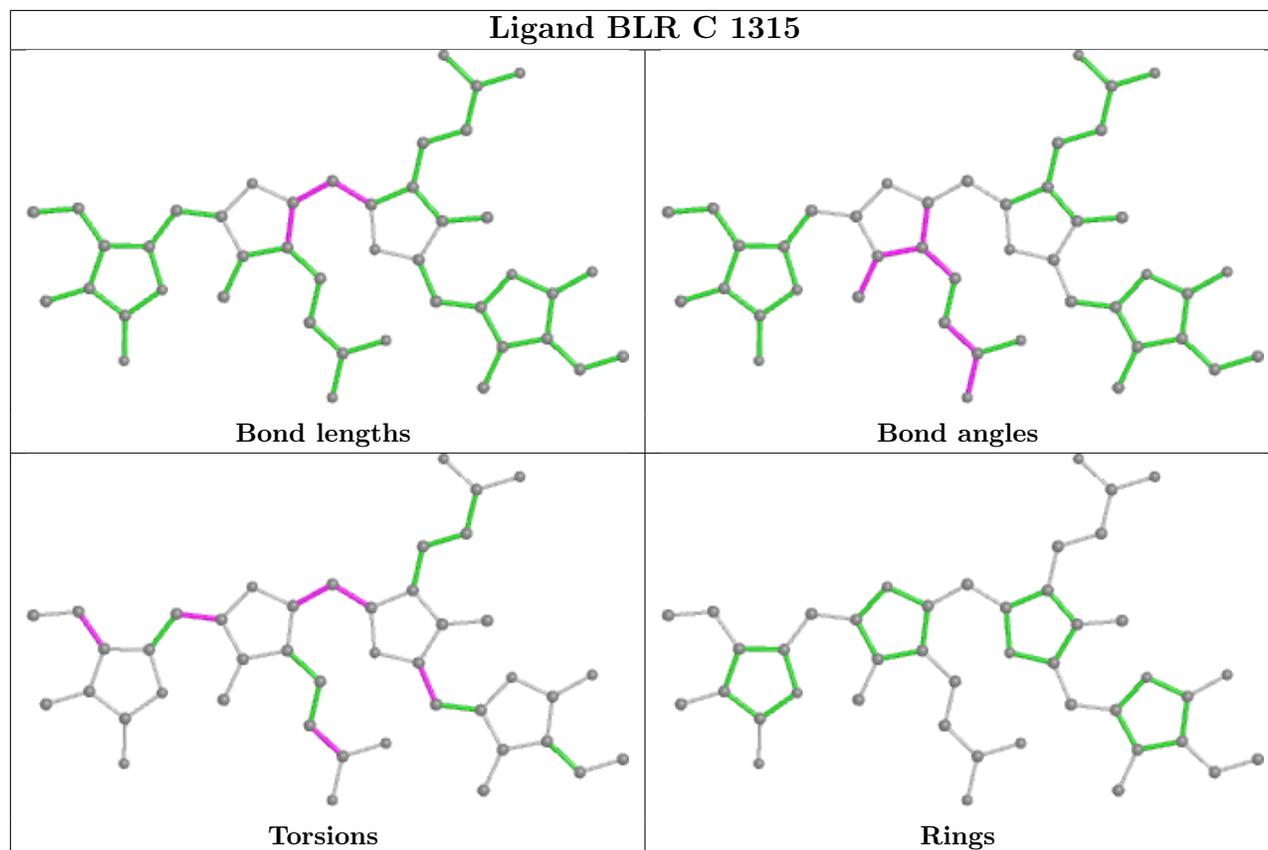
also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted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

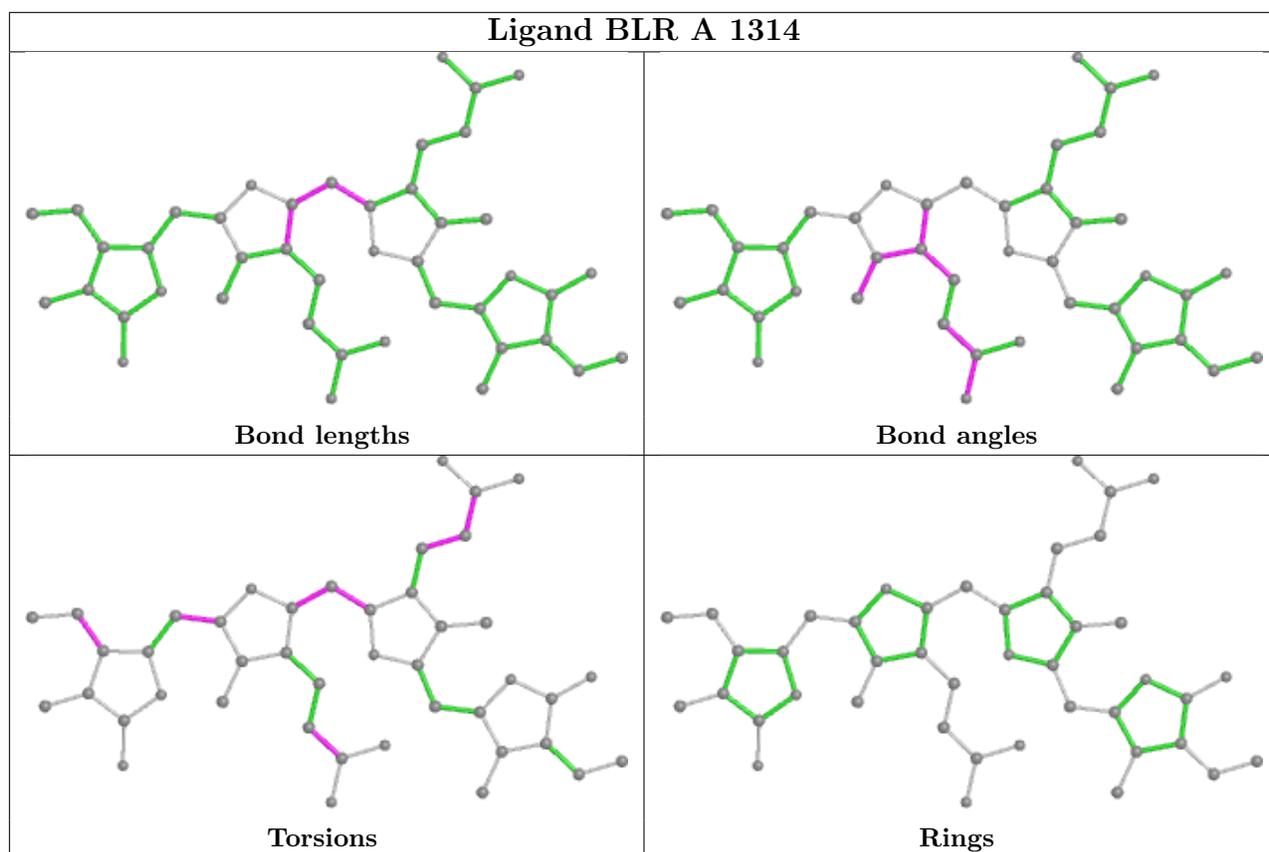
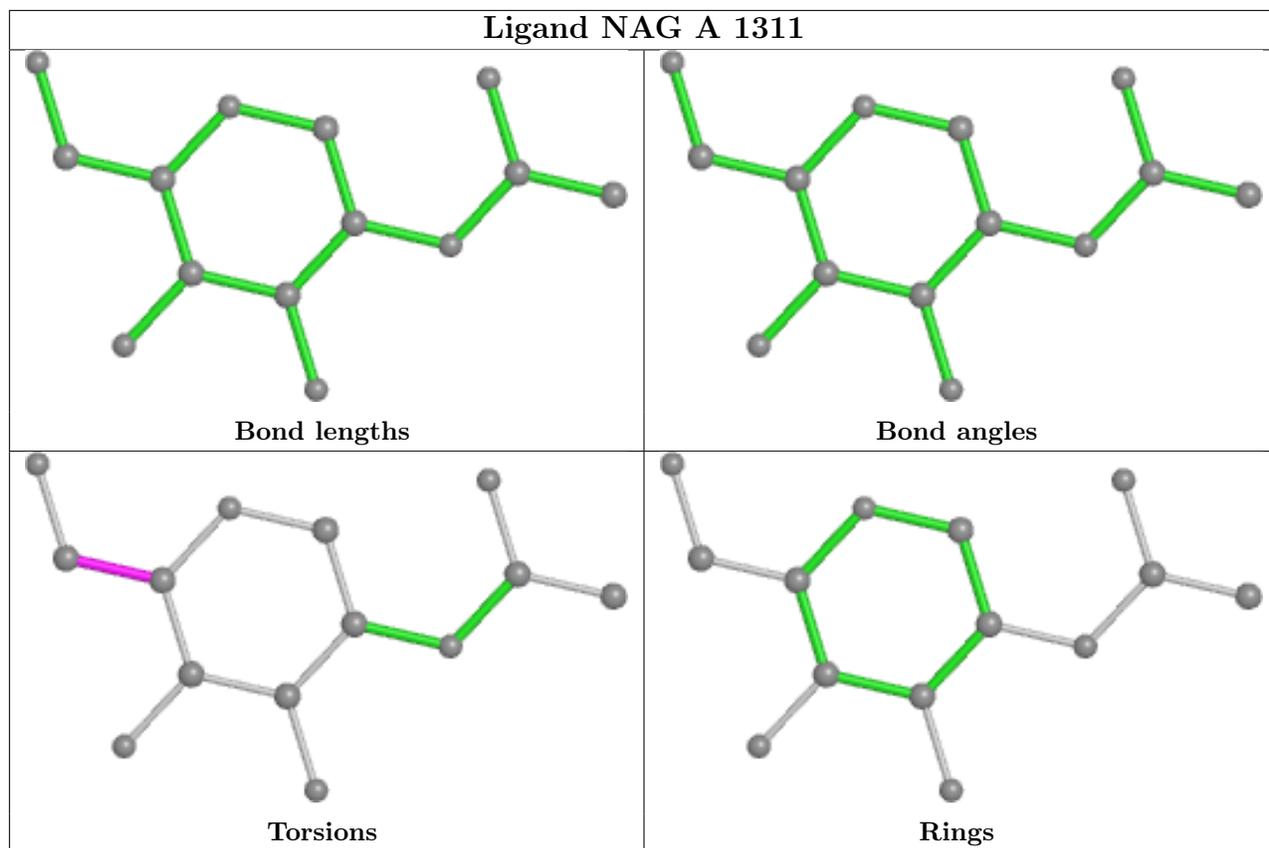


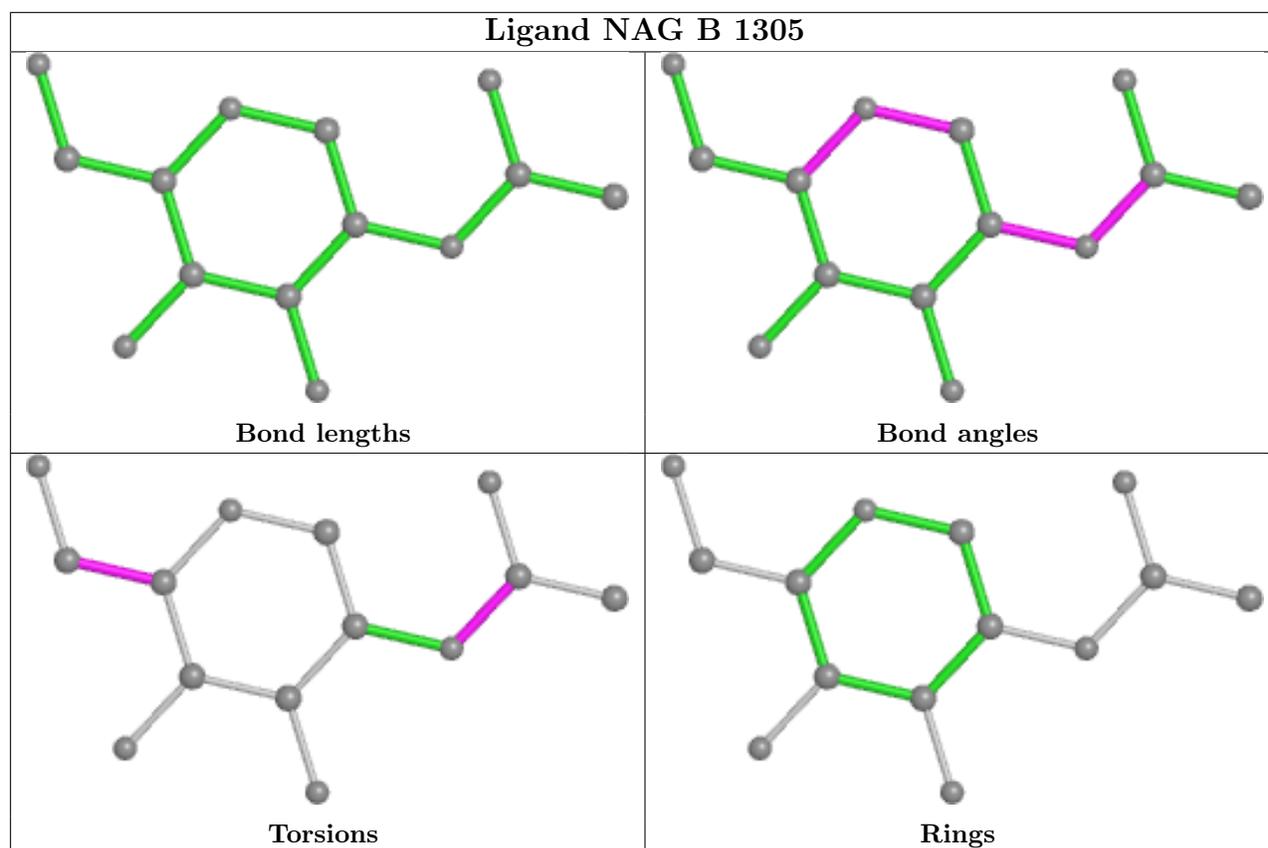
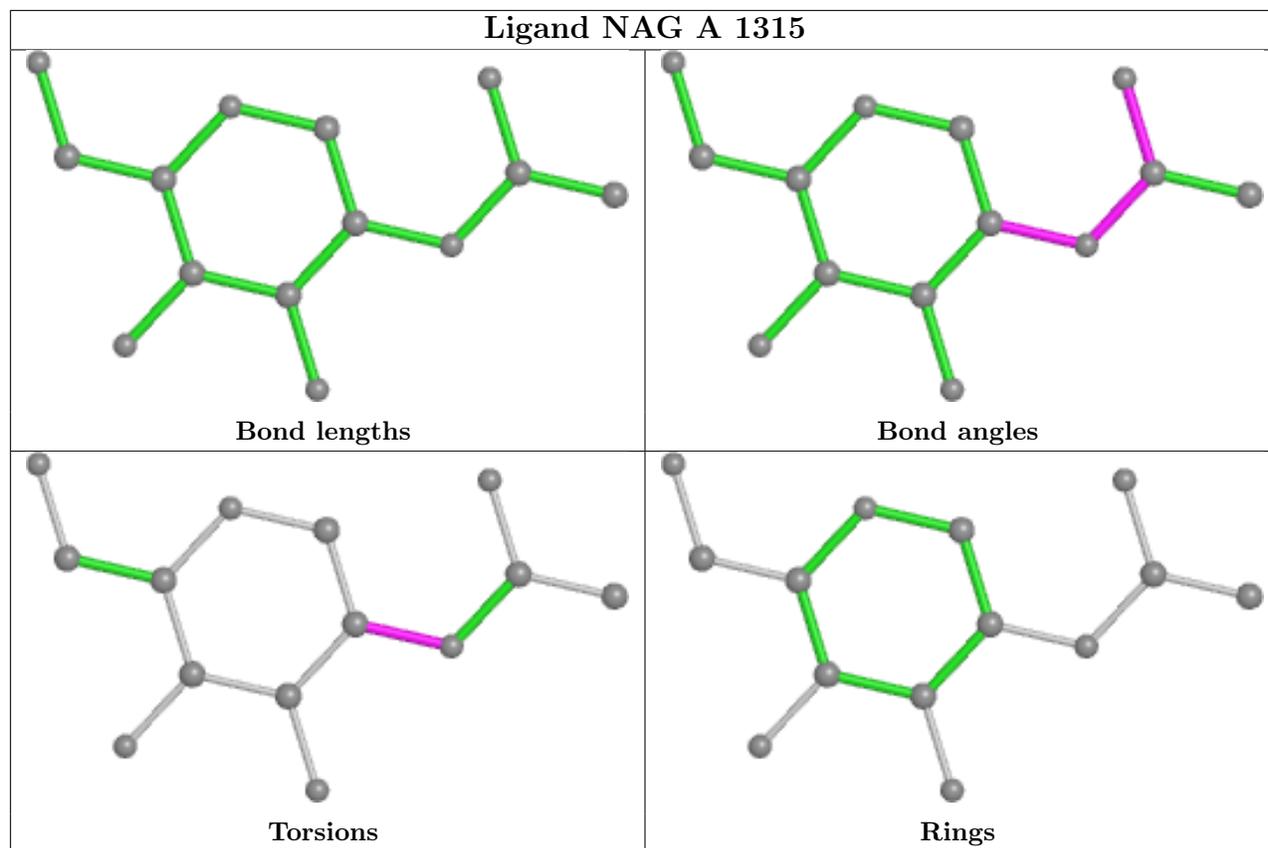


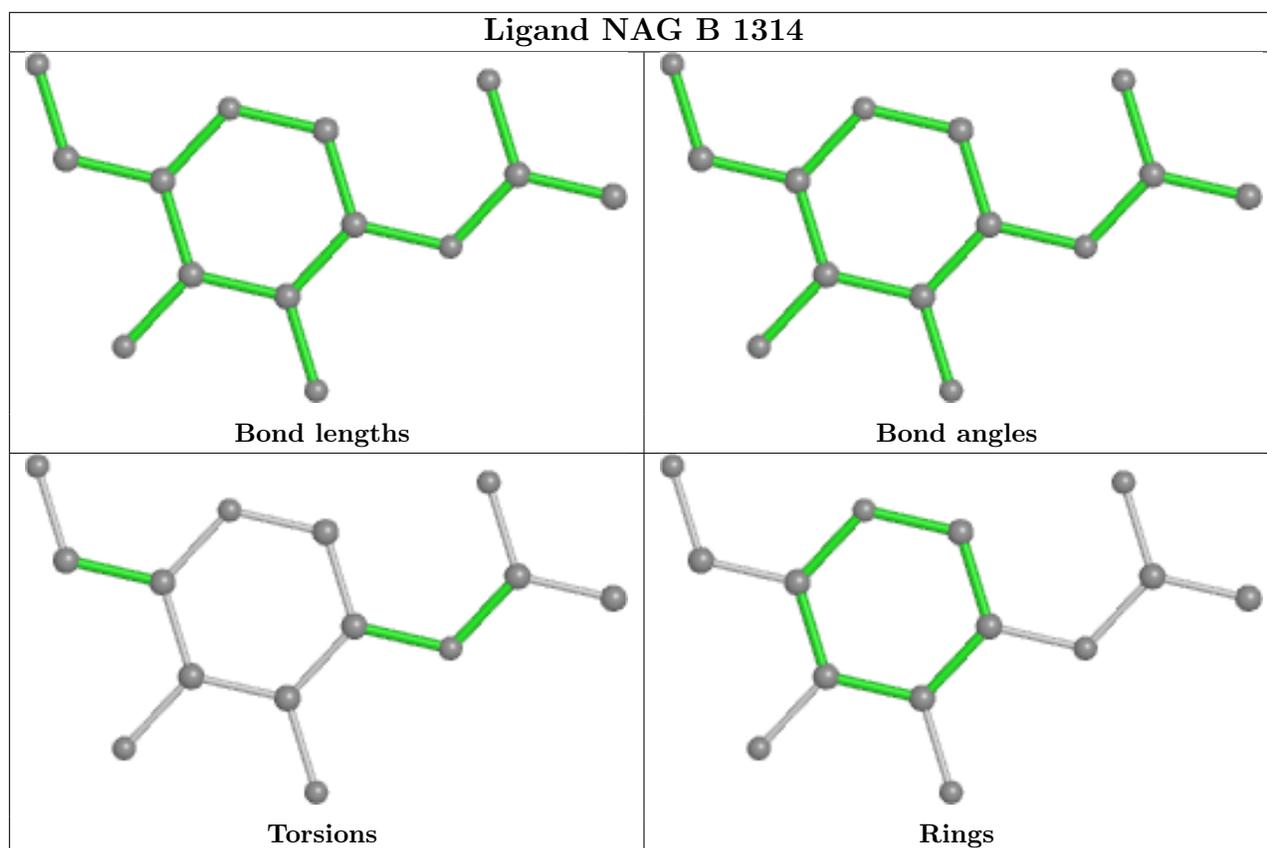
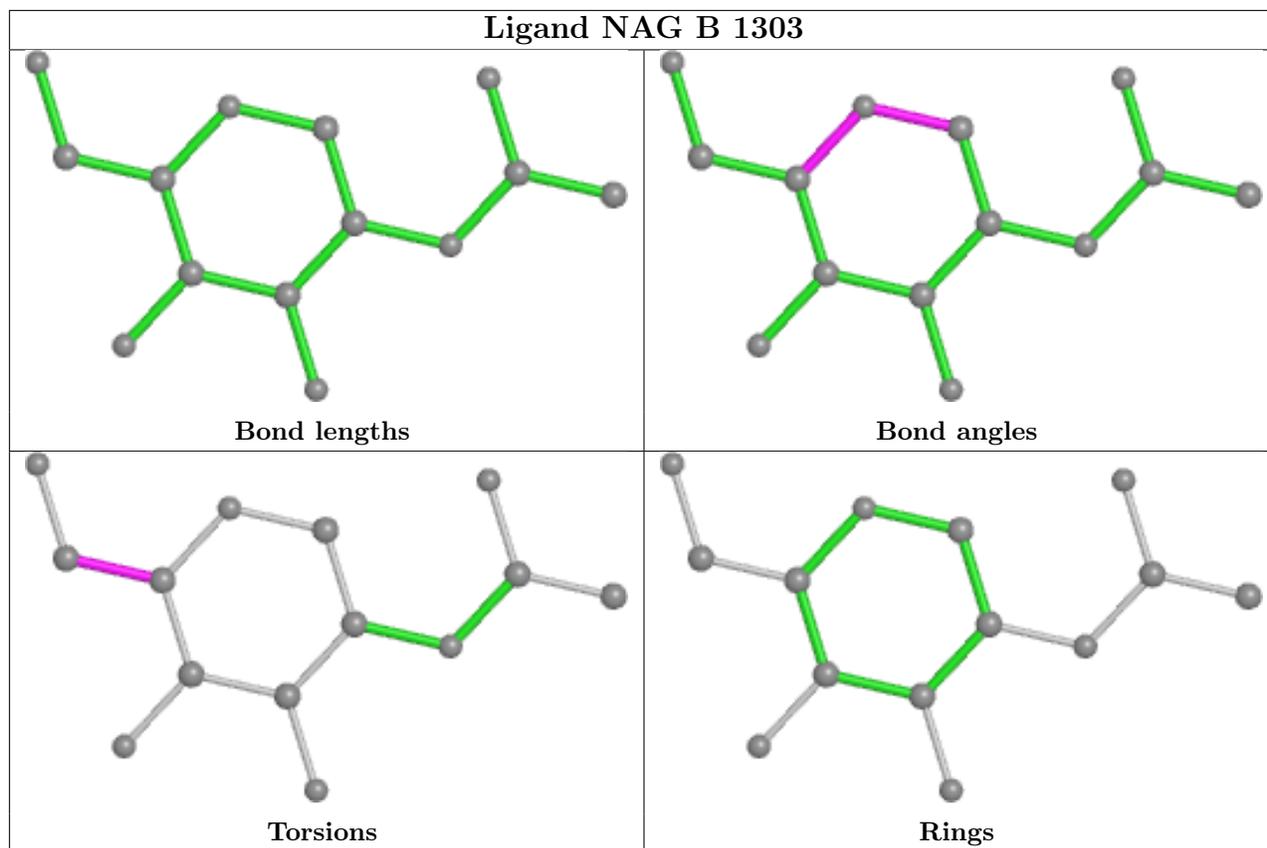


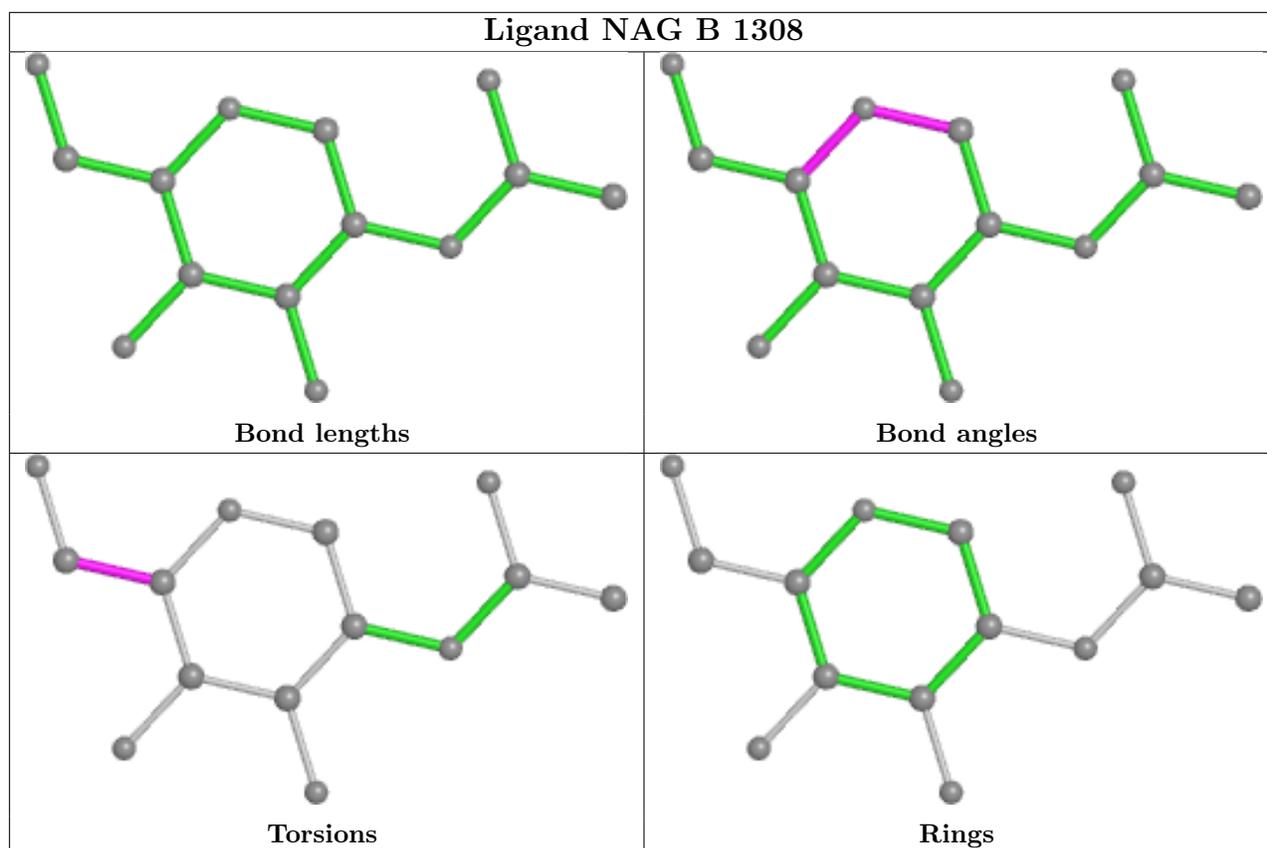
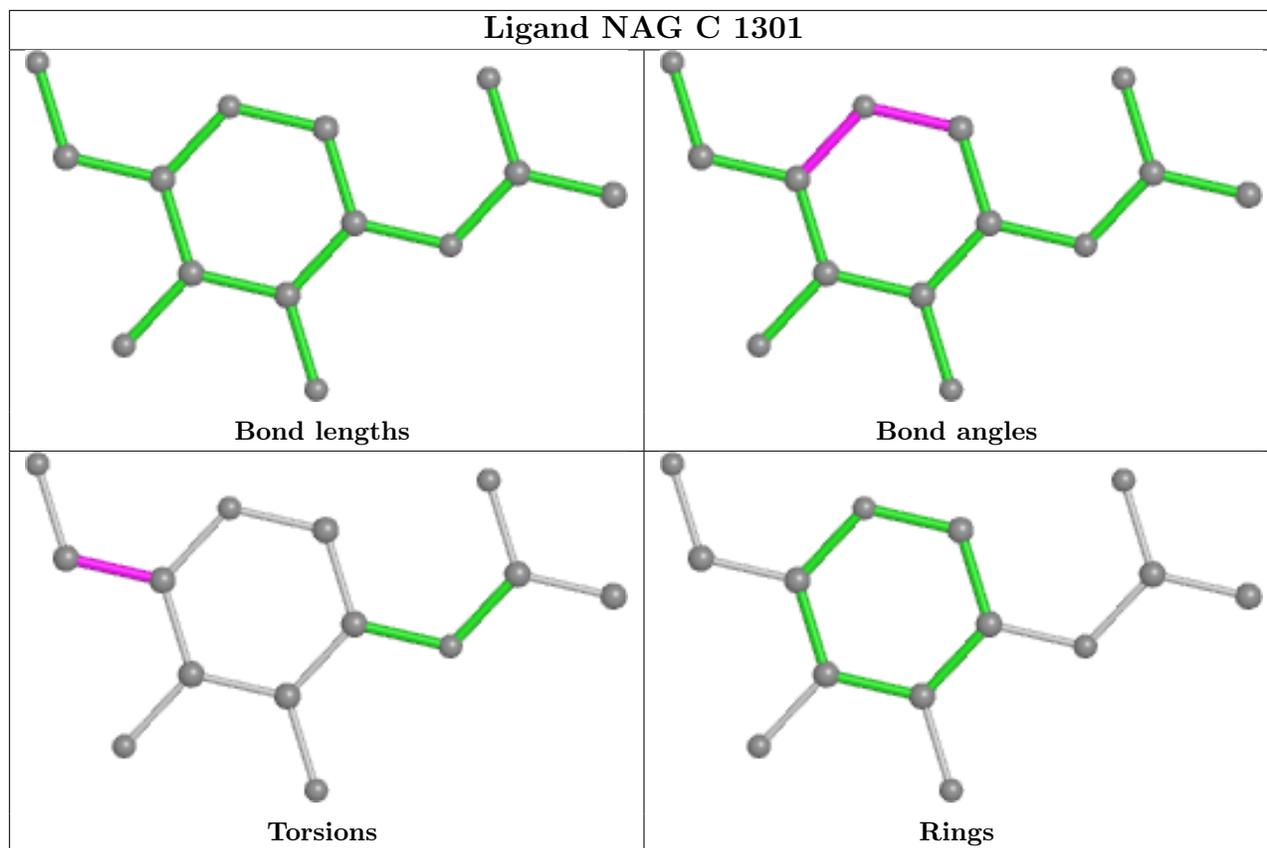


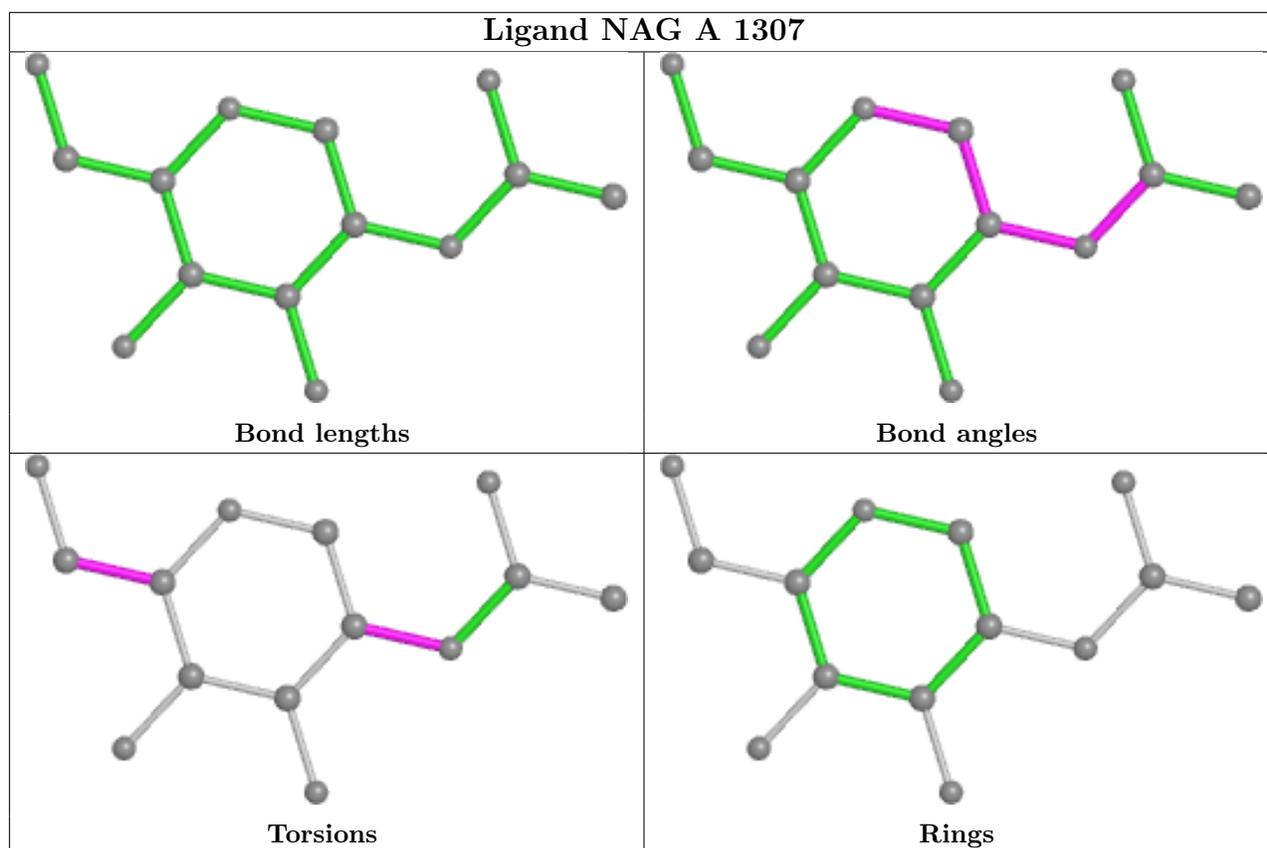
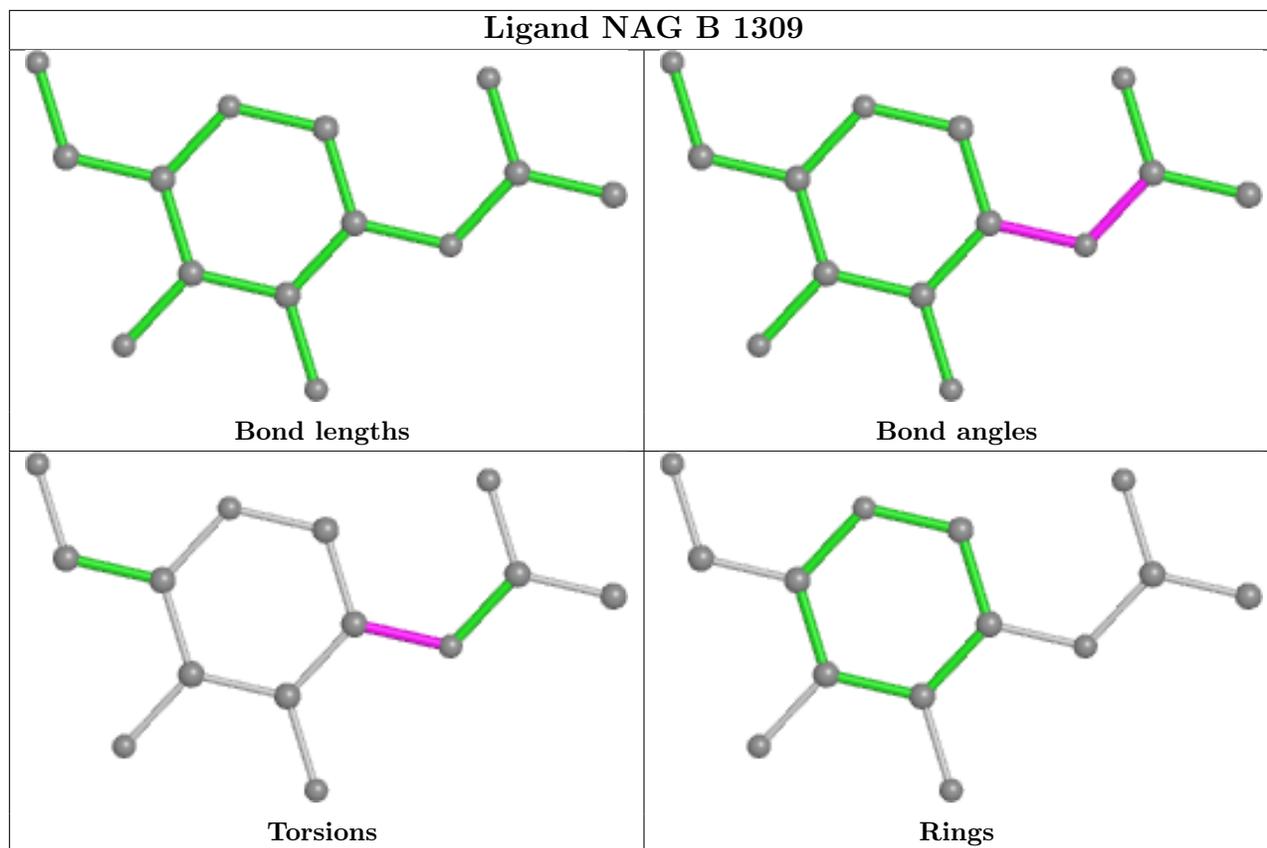


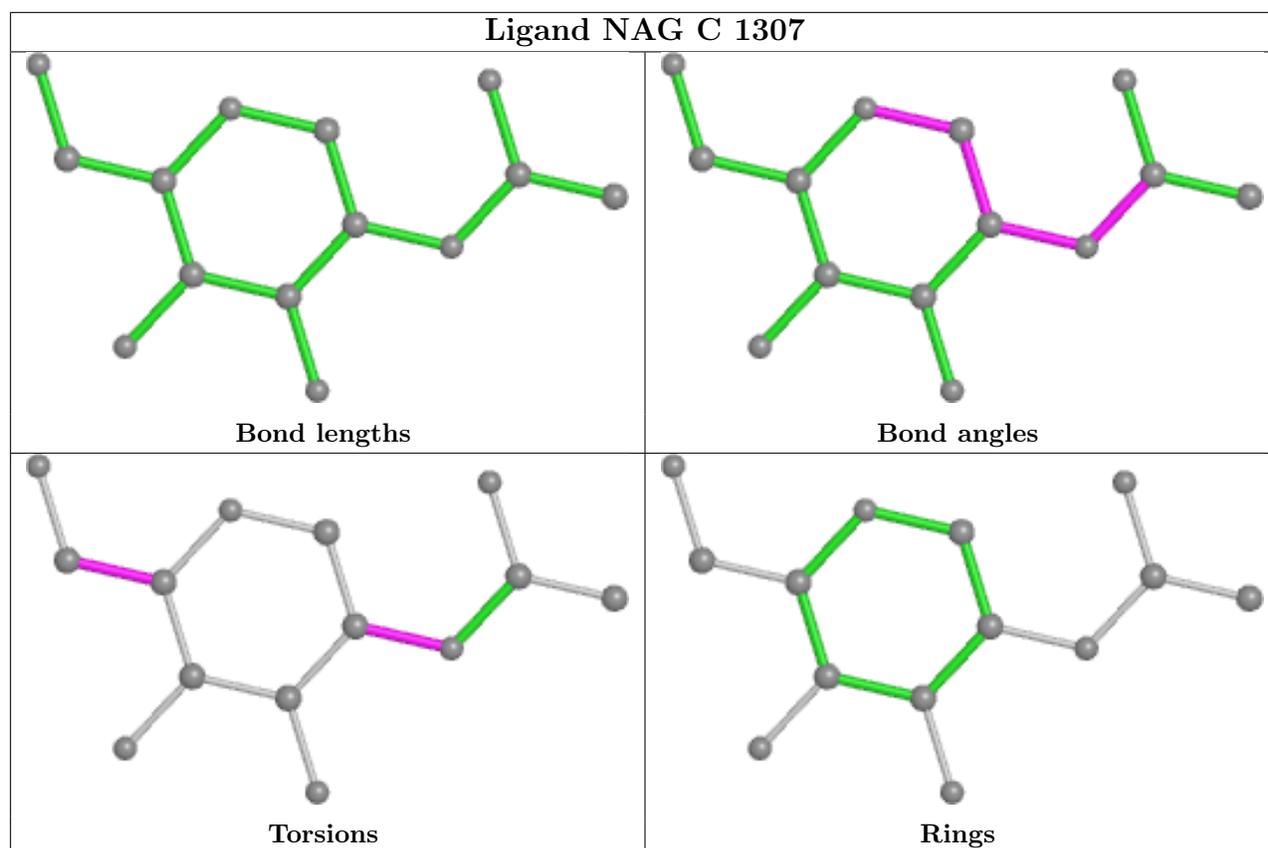
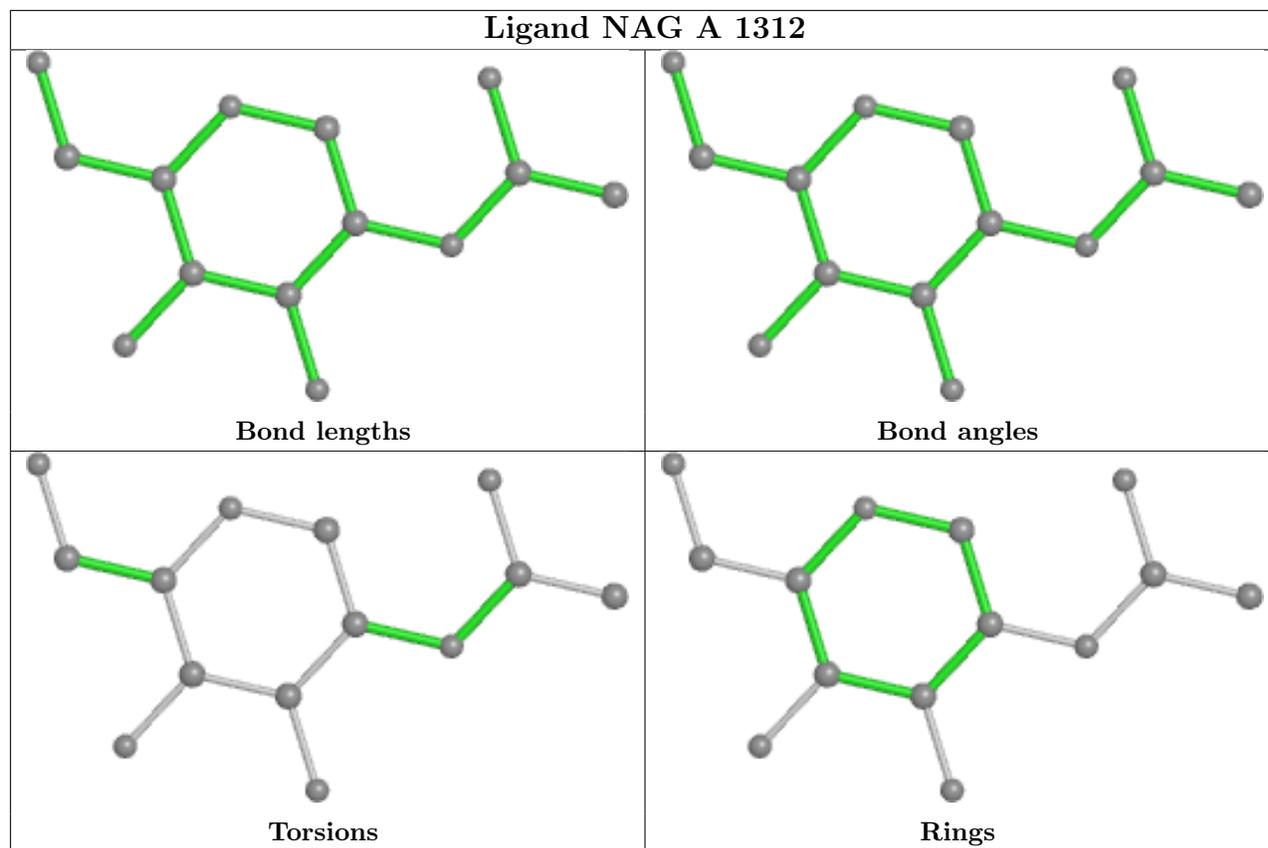


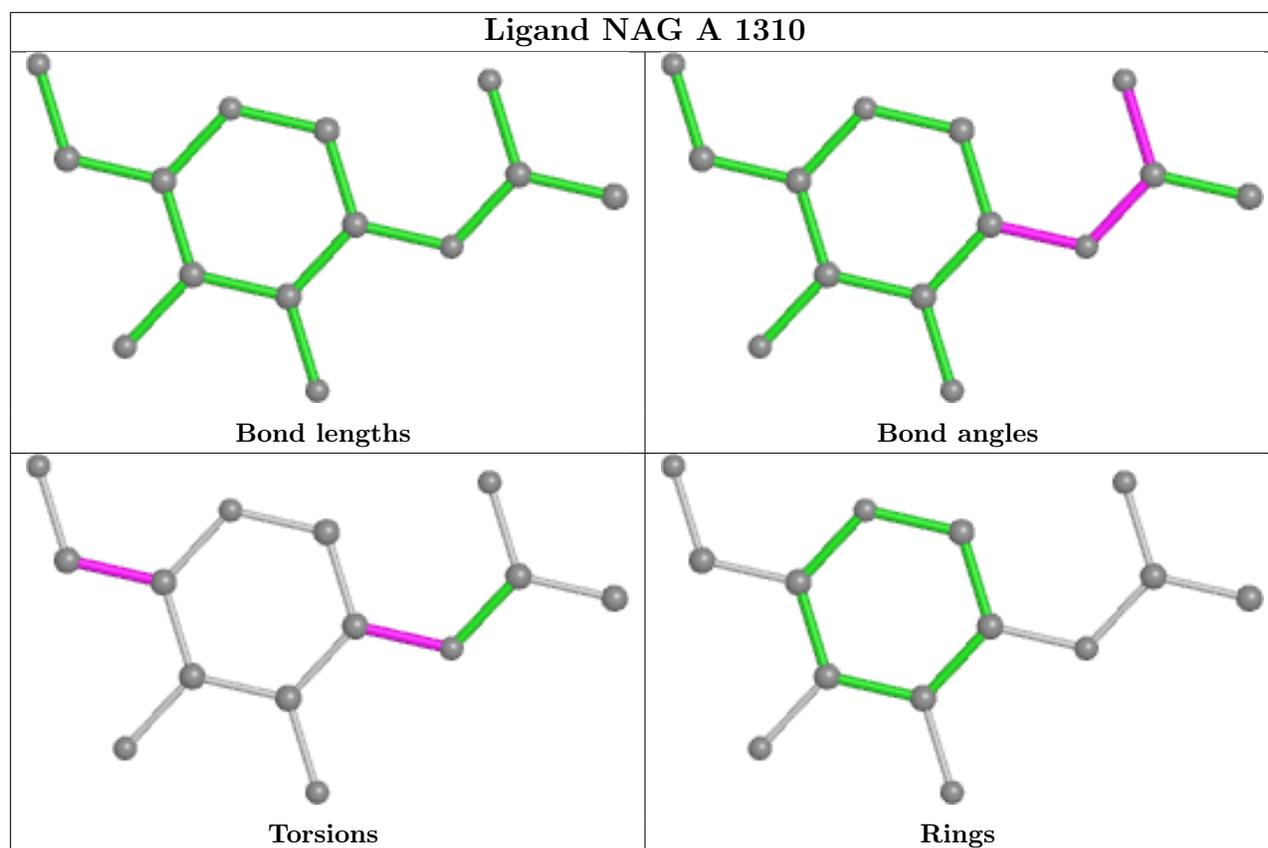
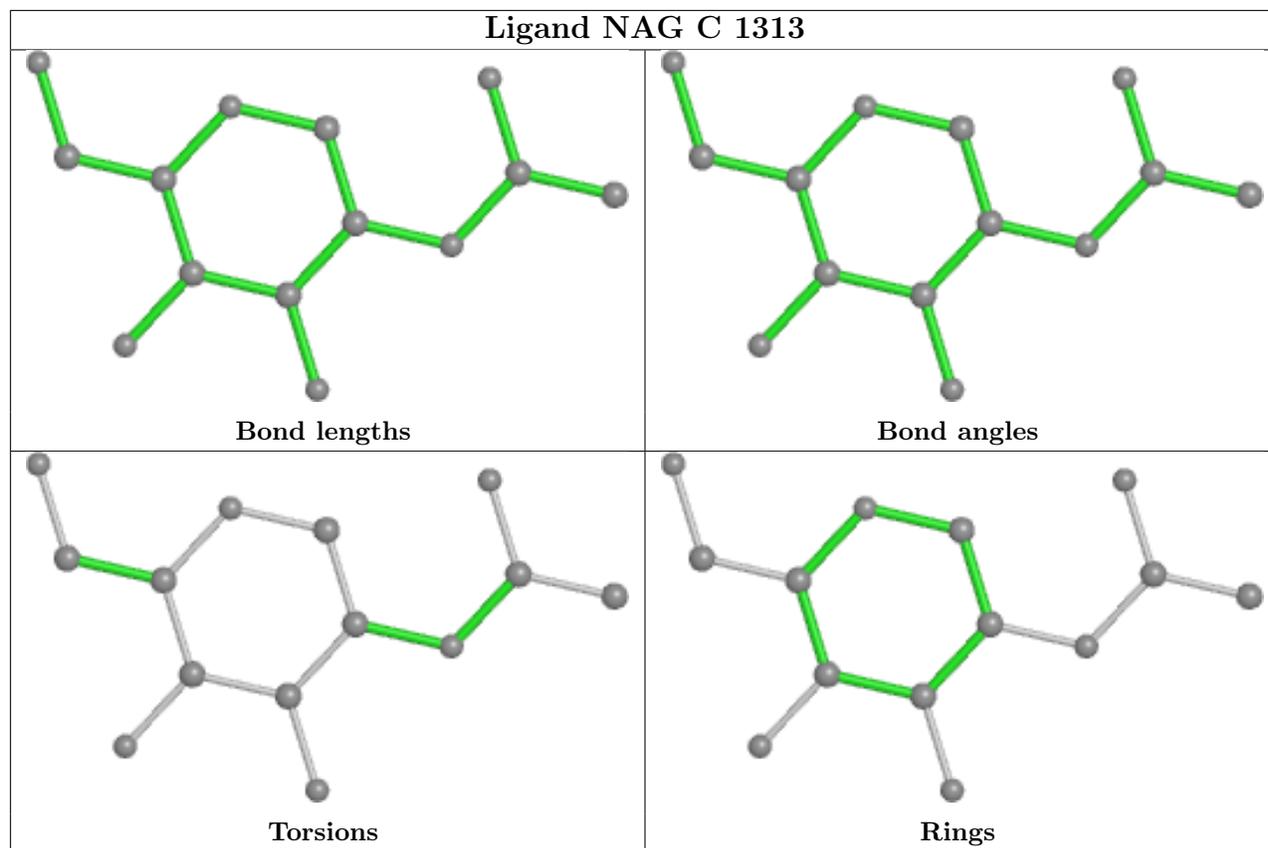


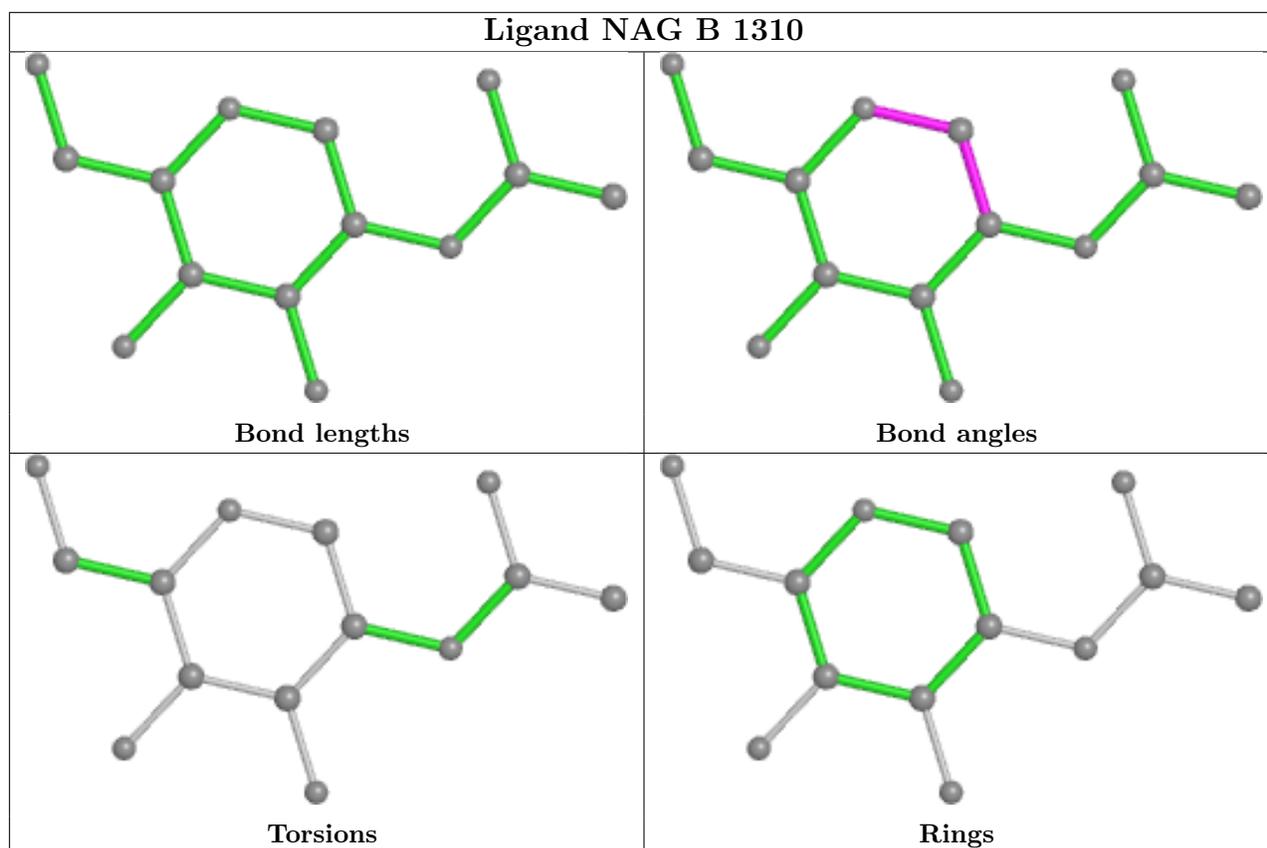
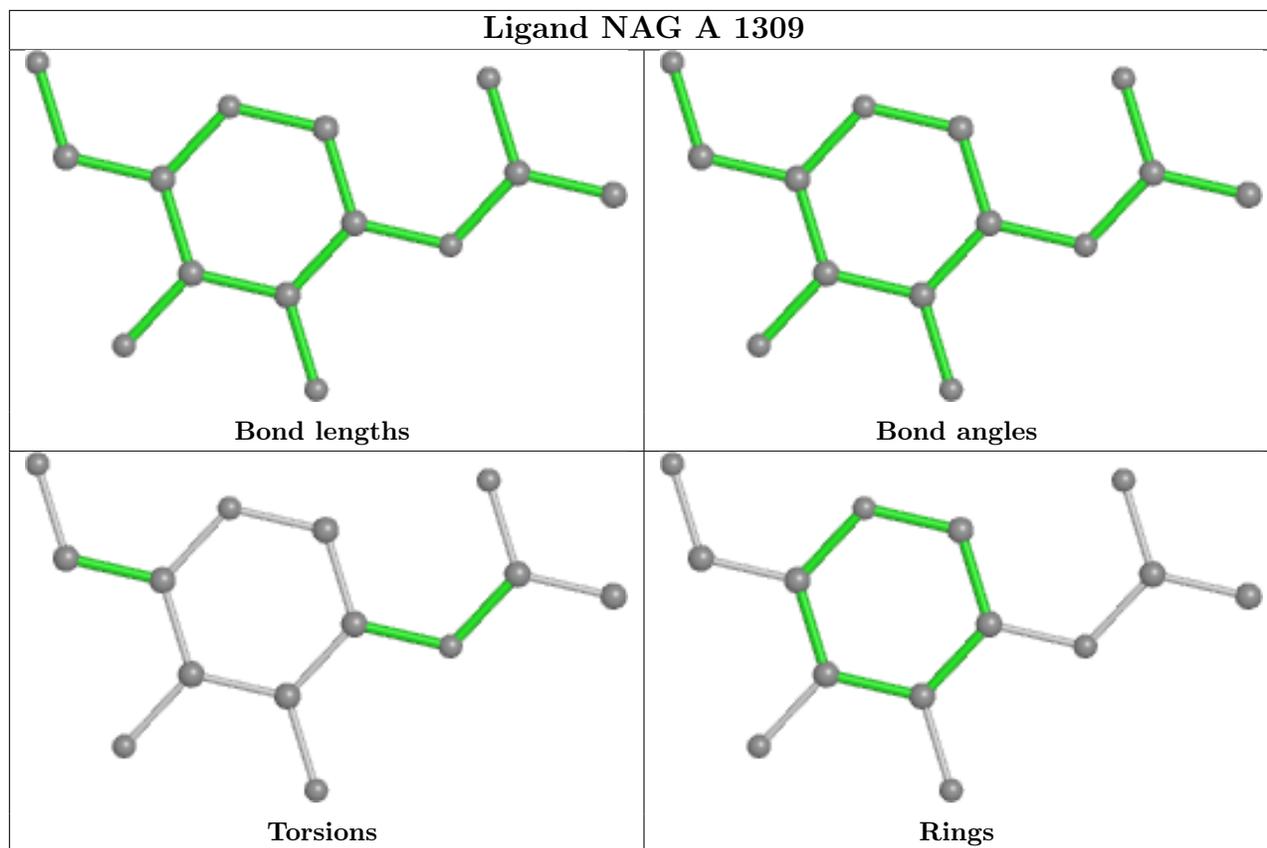


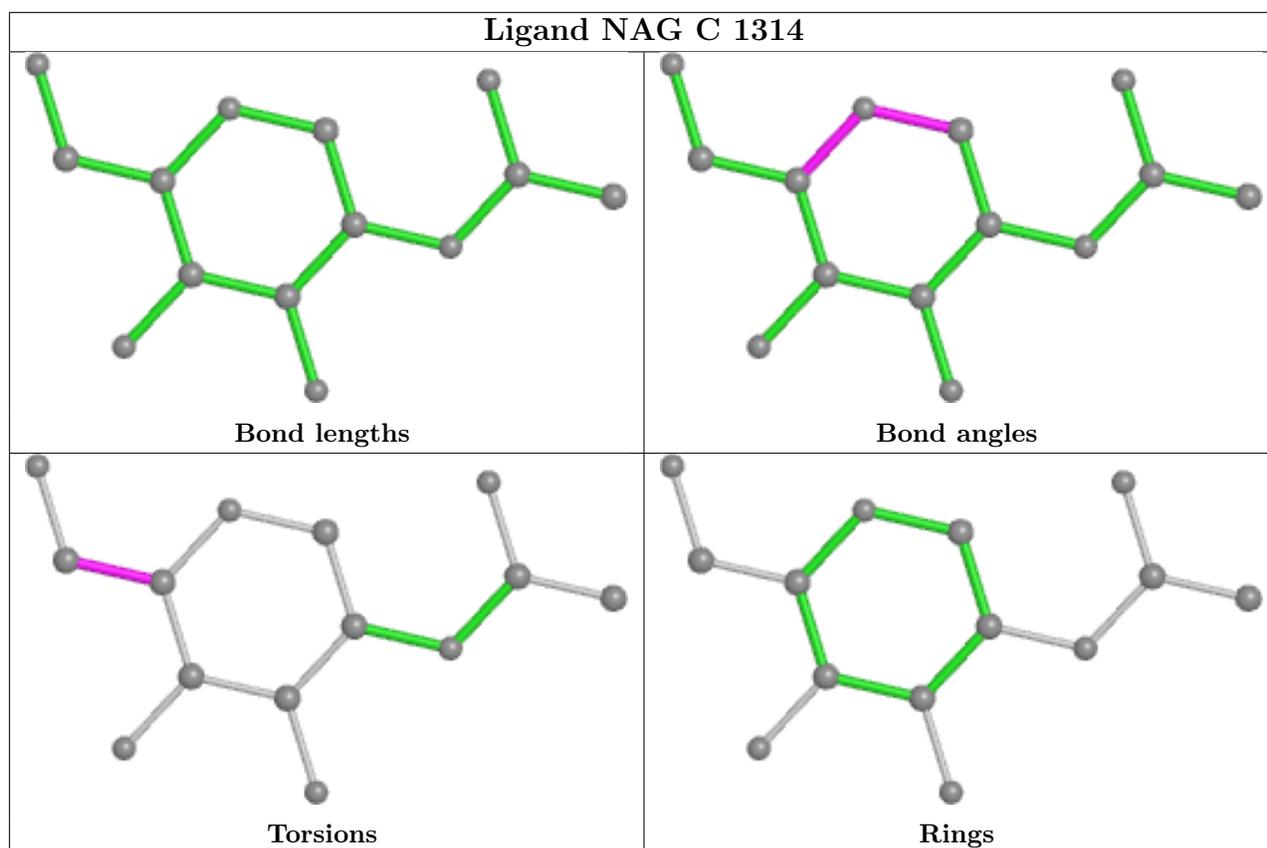
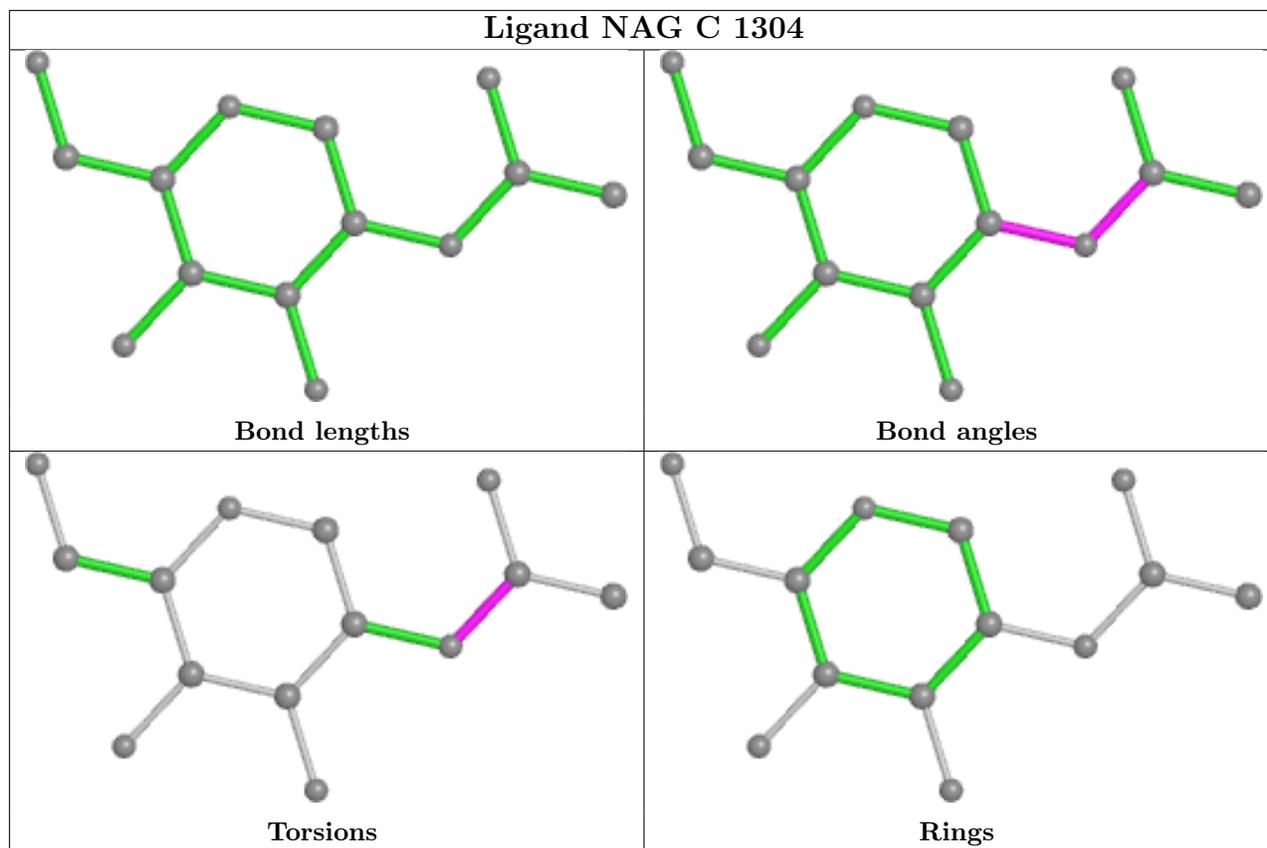


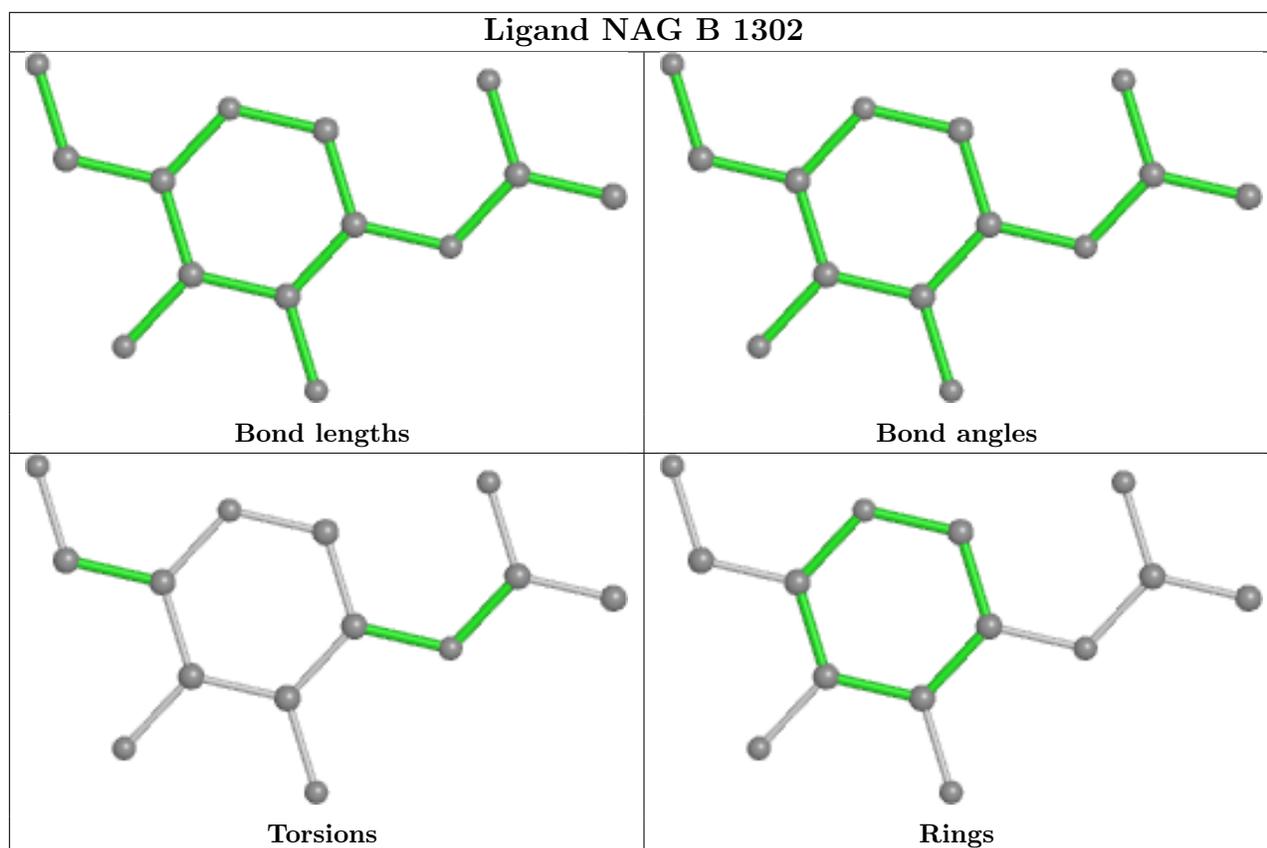
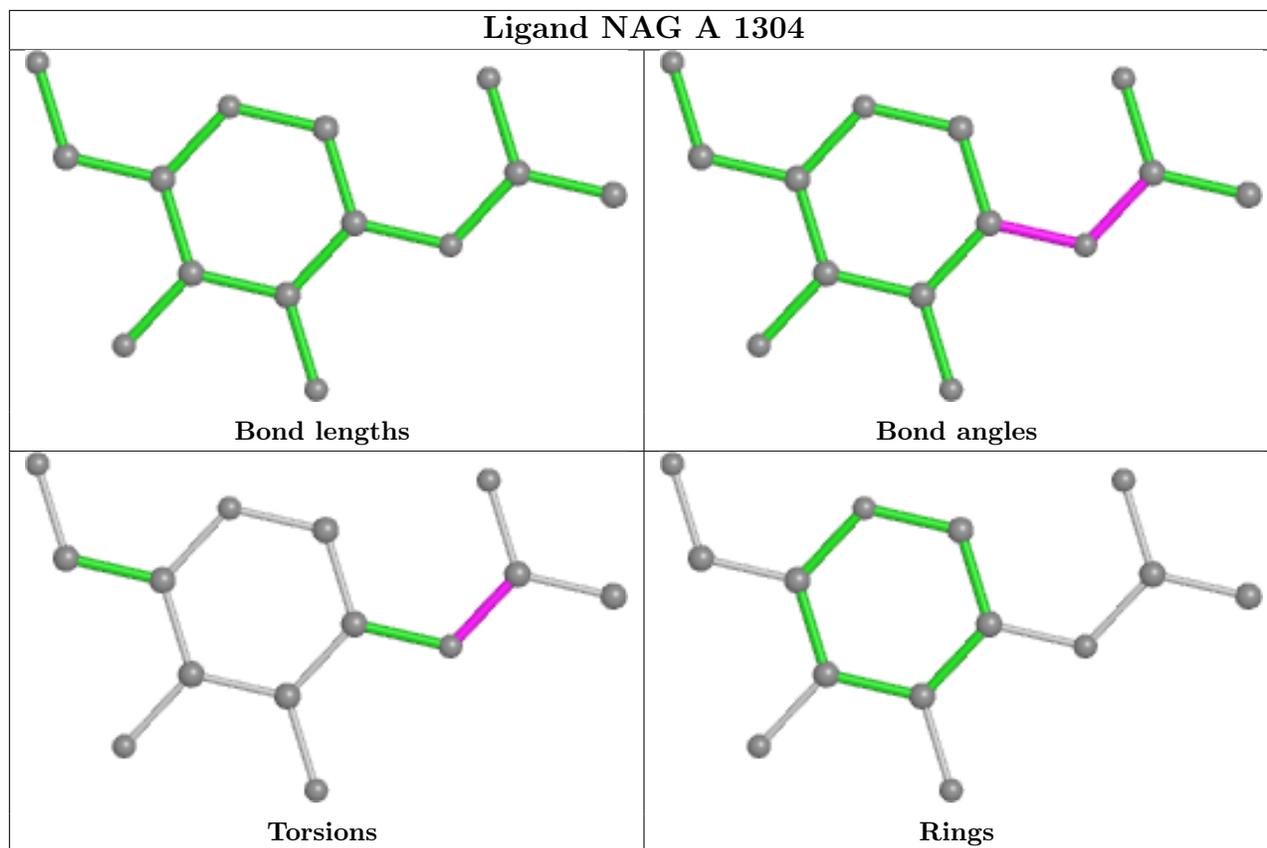


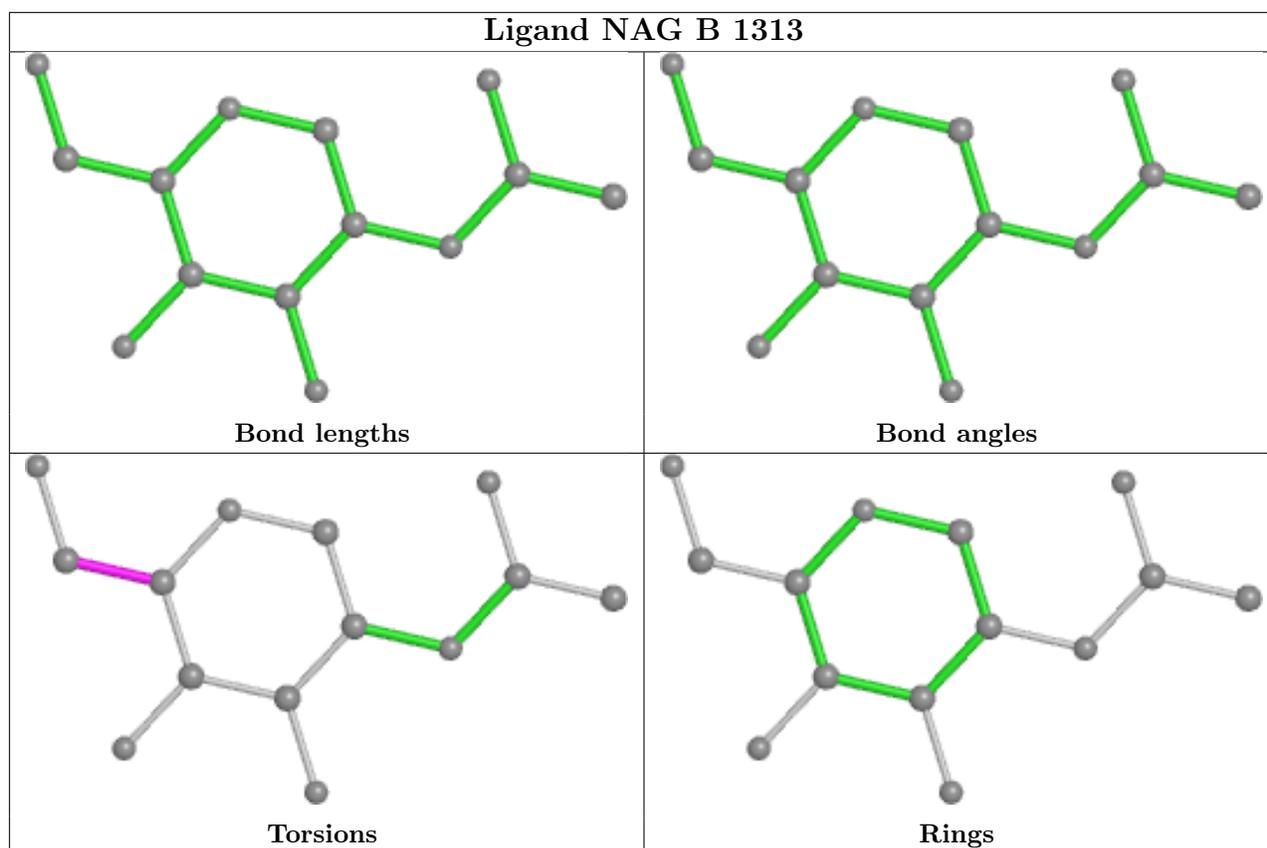
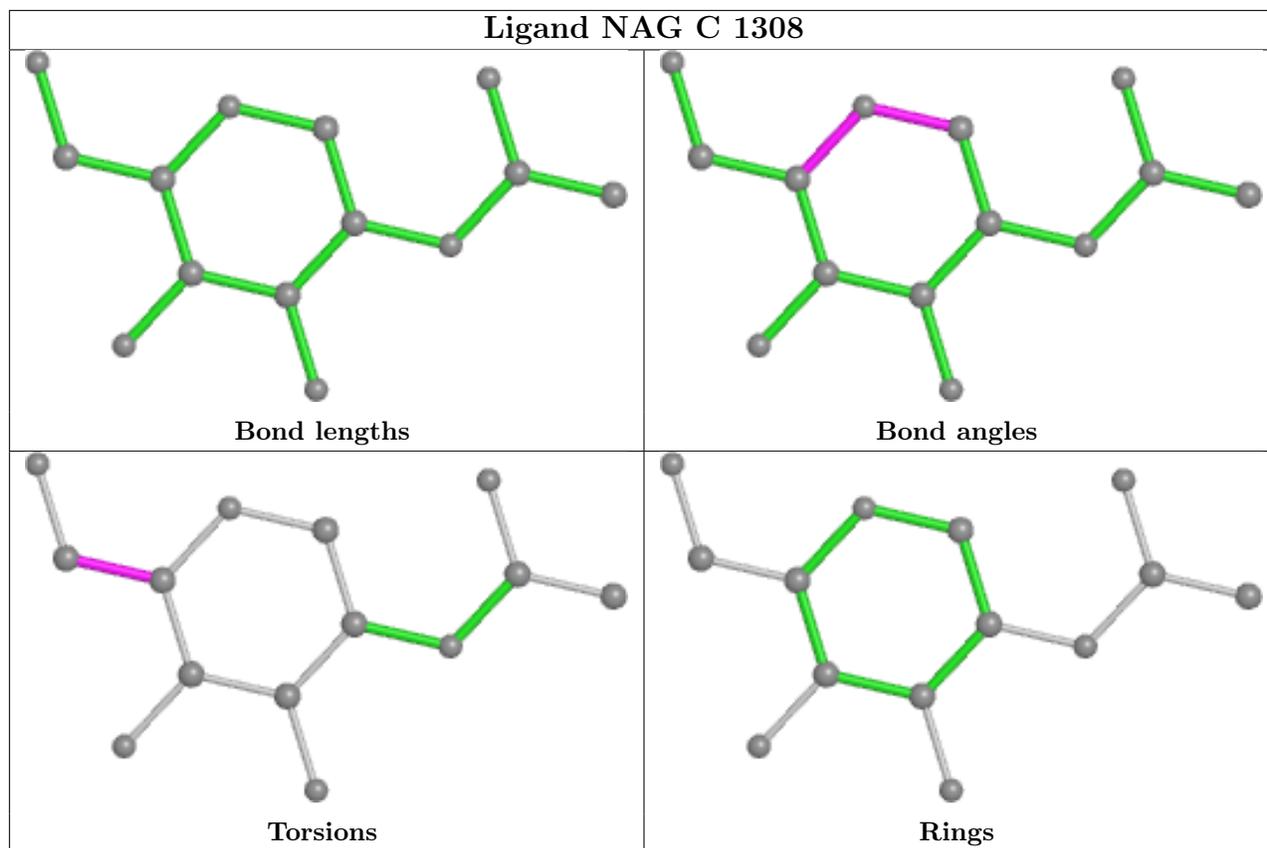


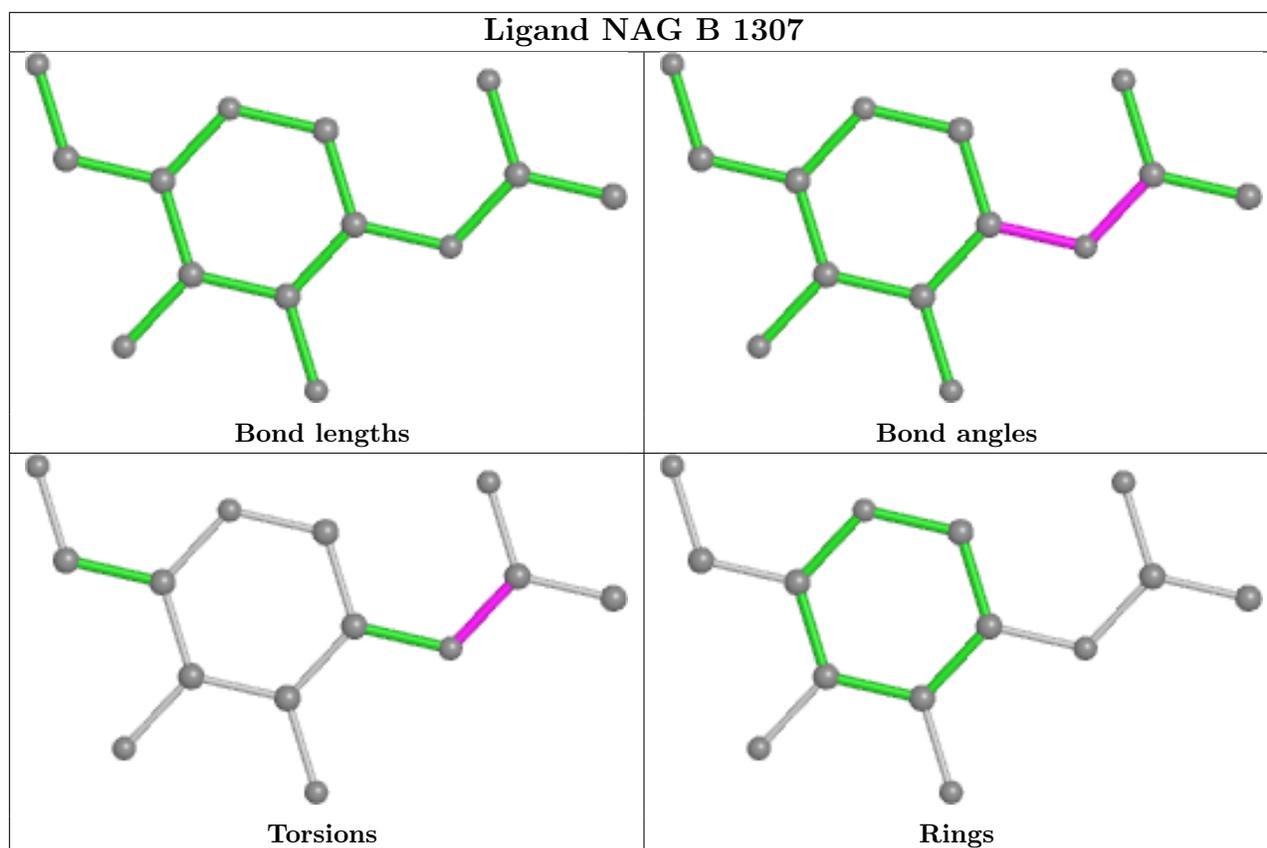
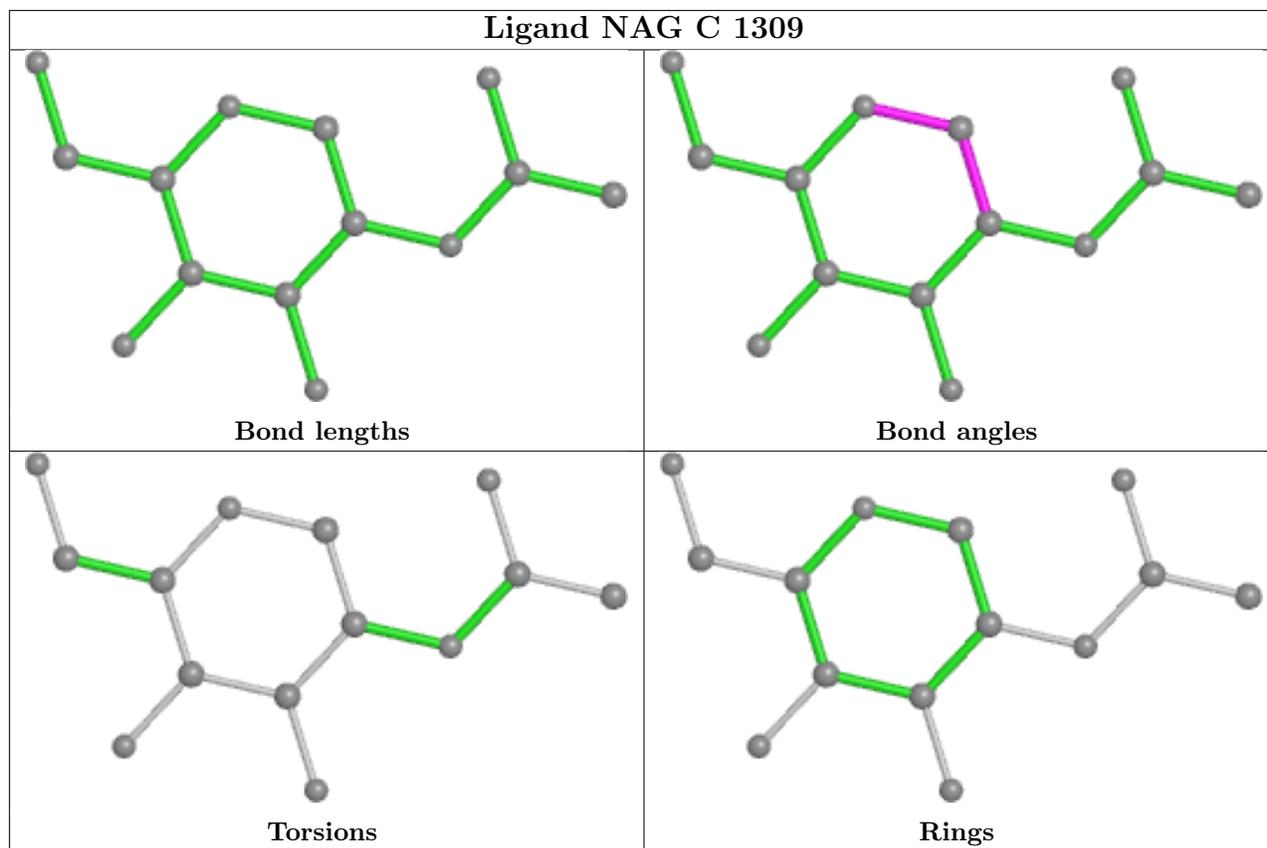


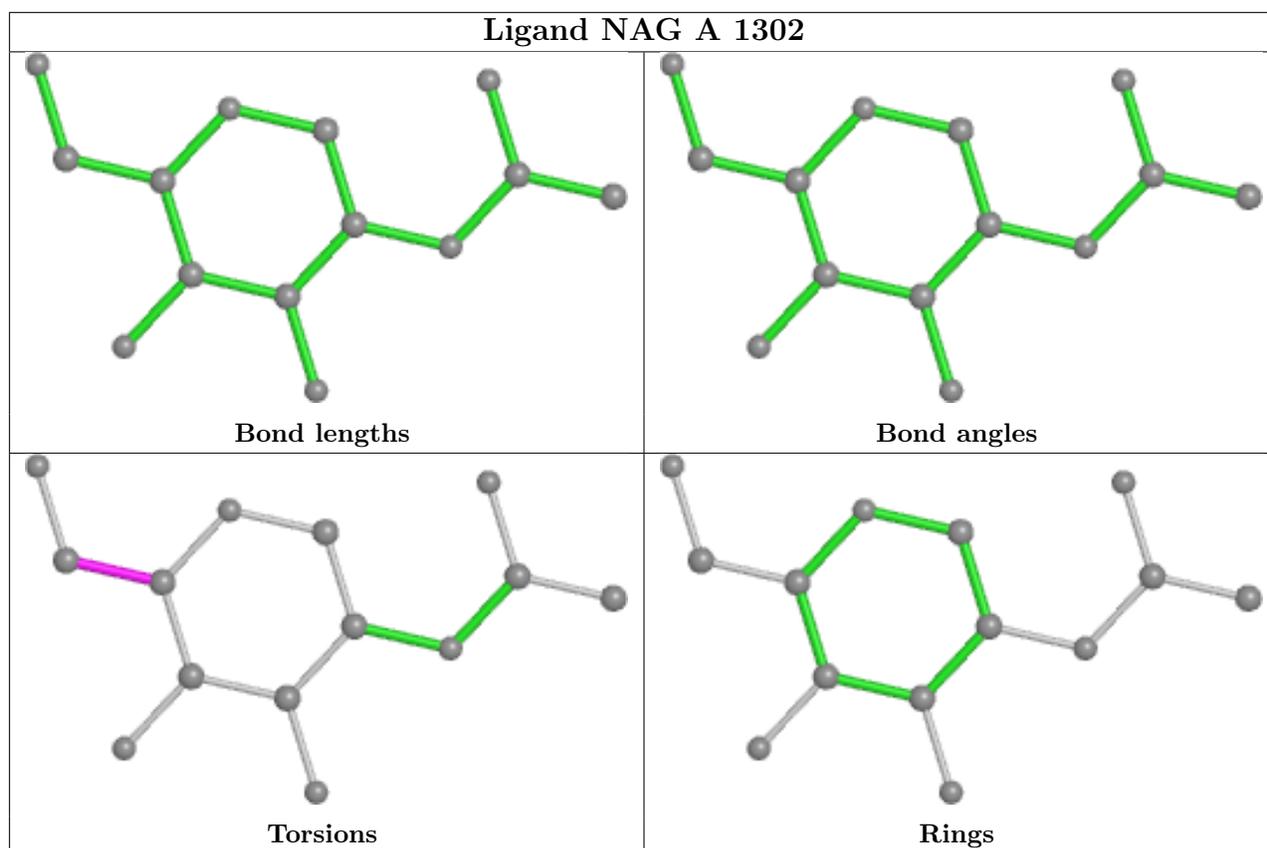
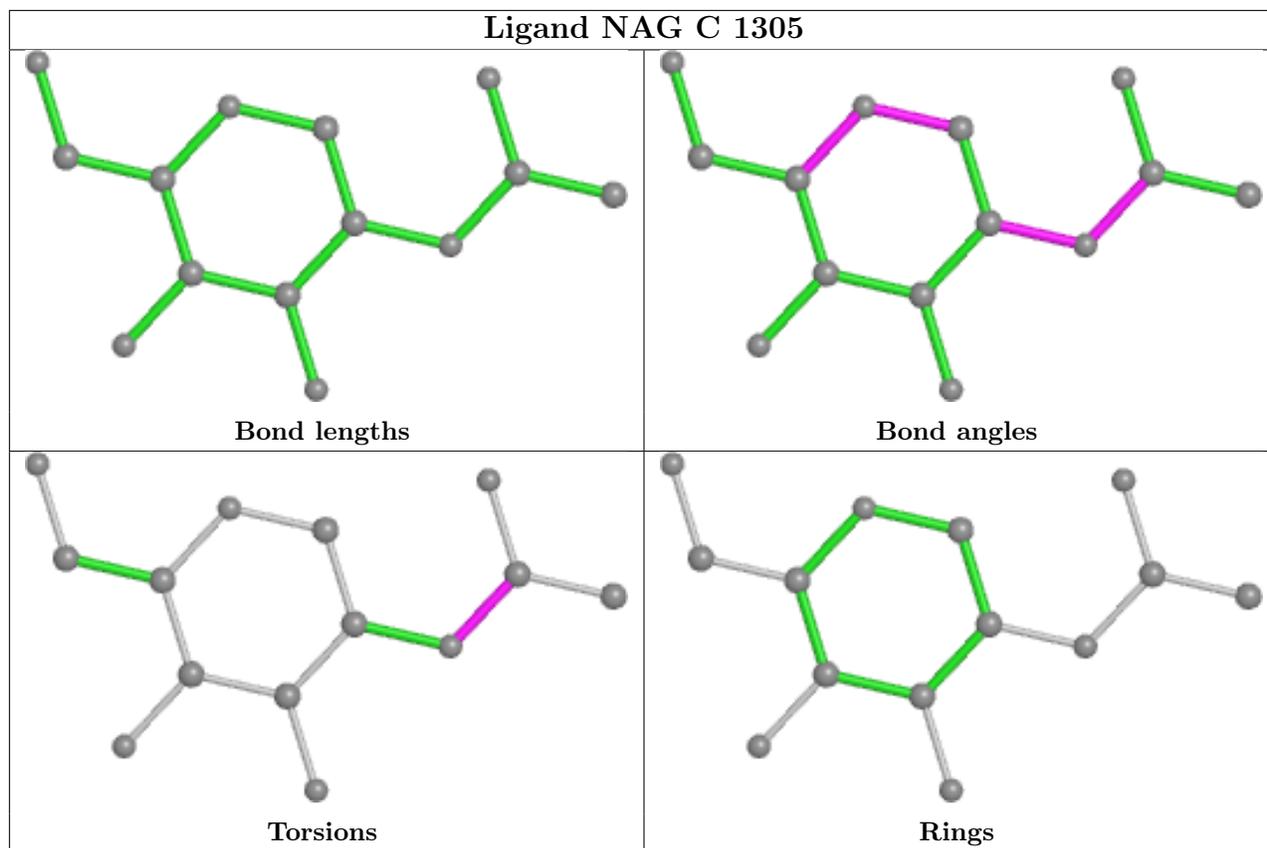


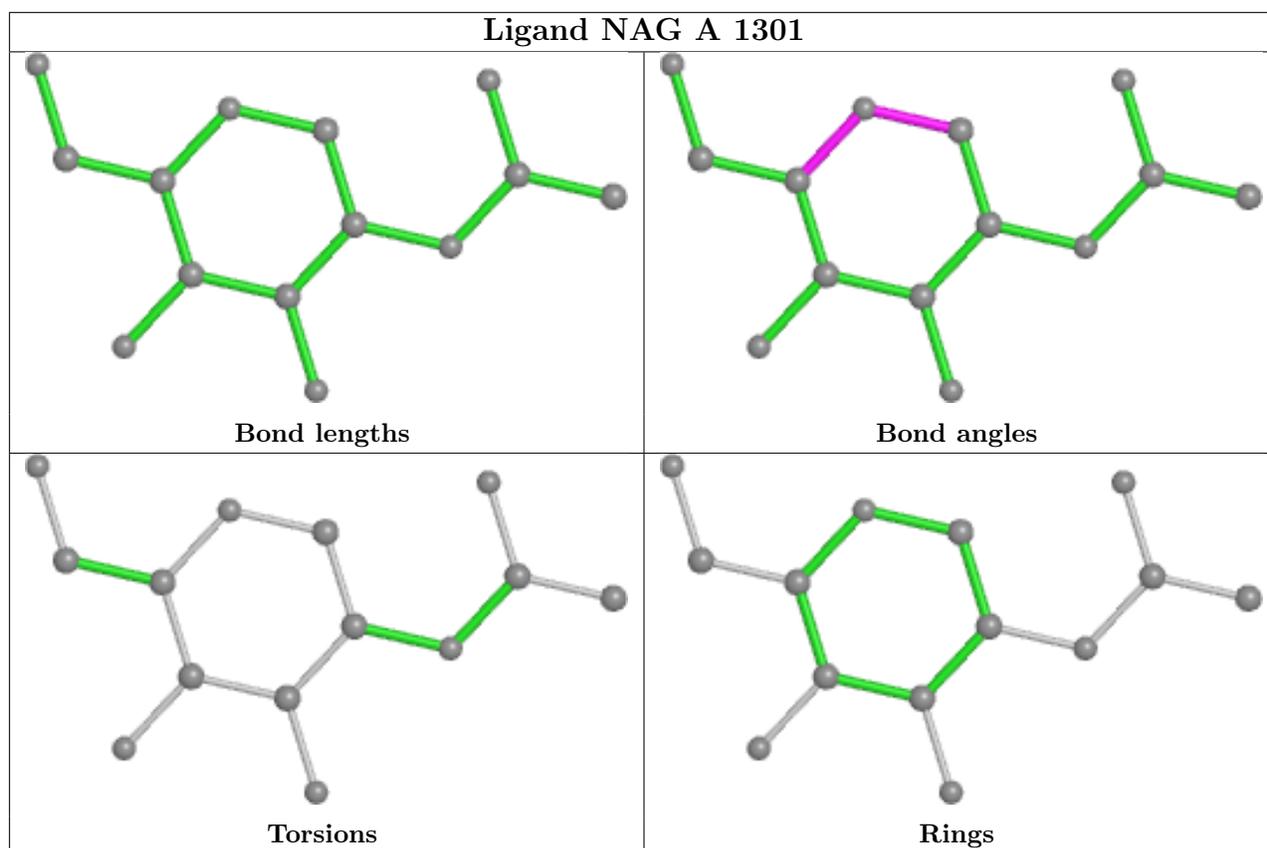
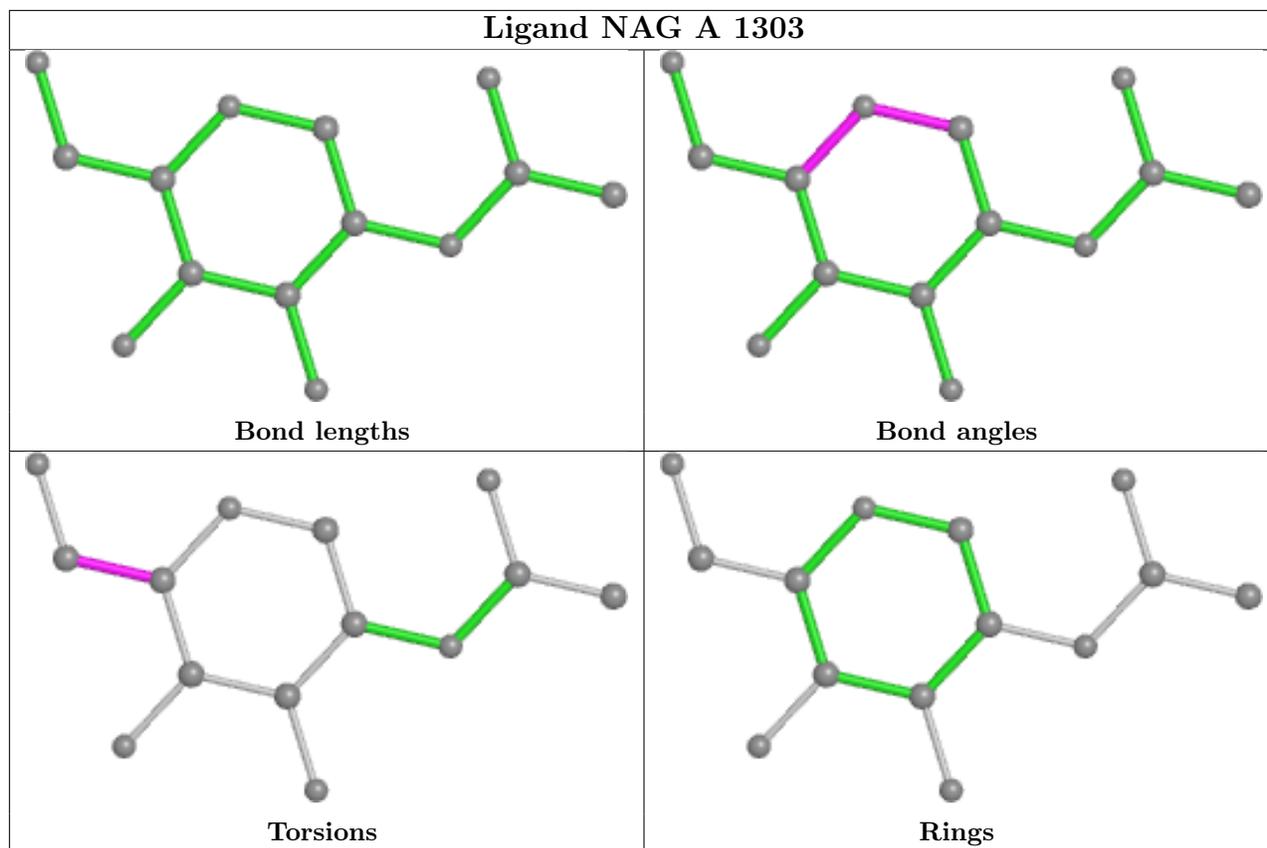


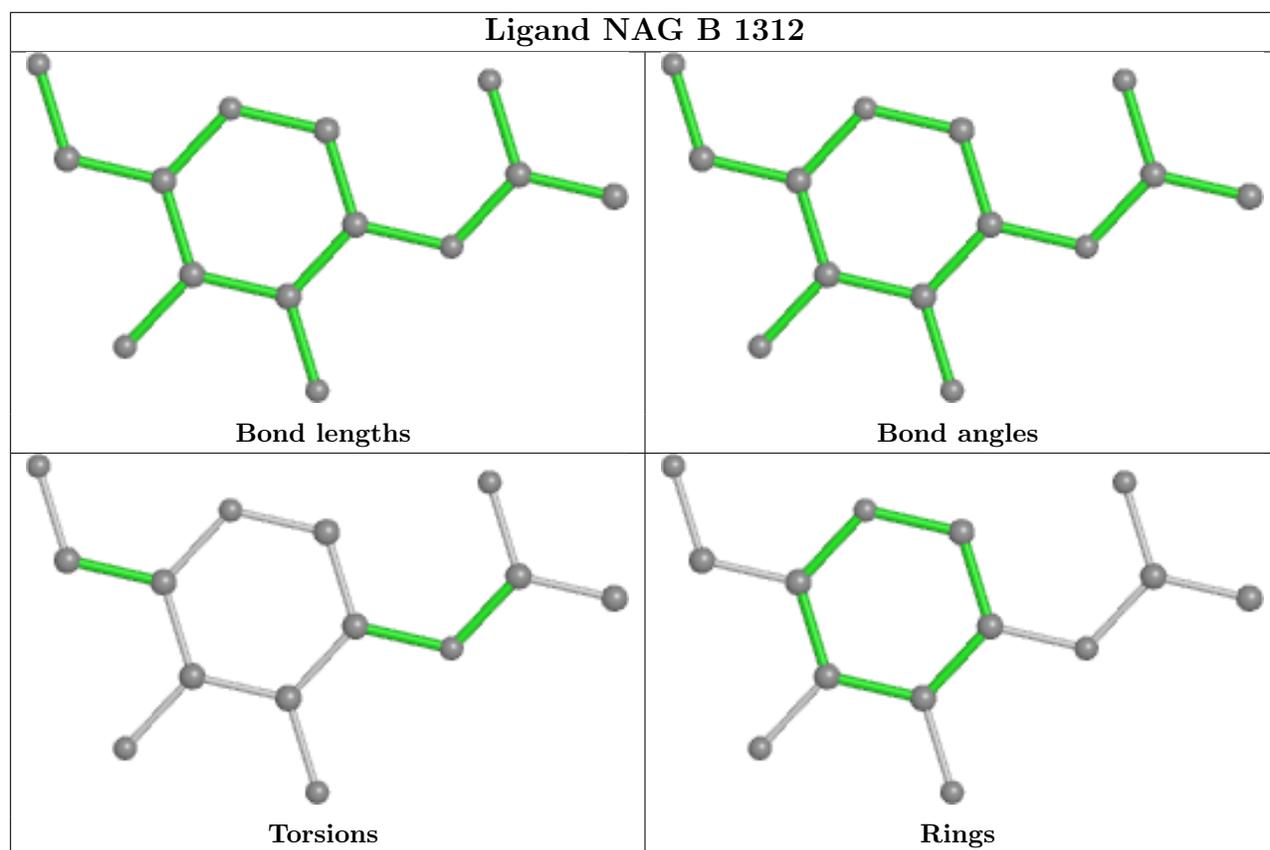
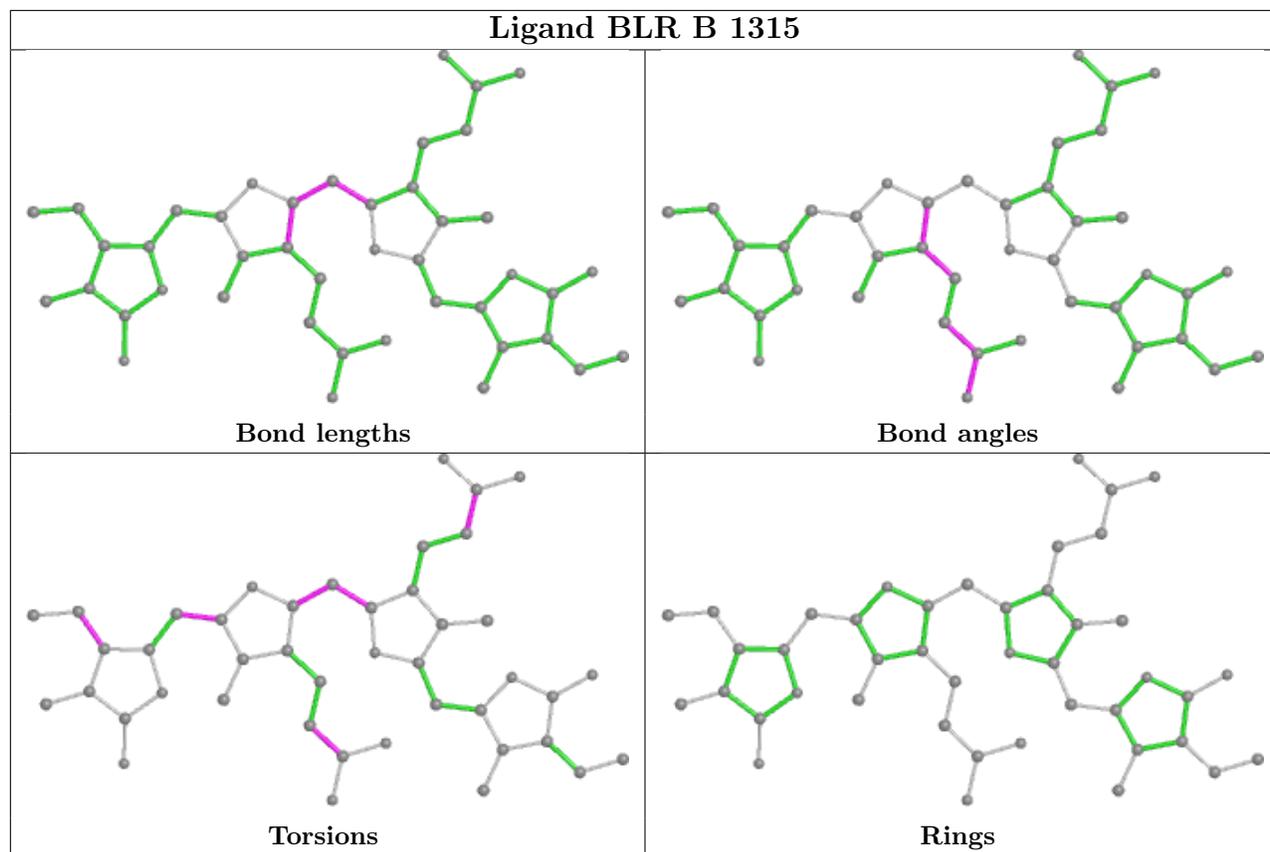


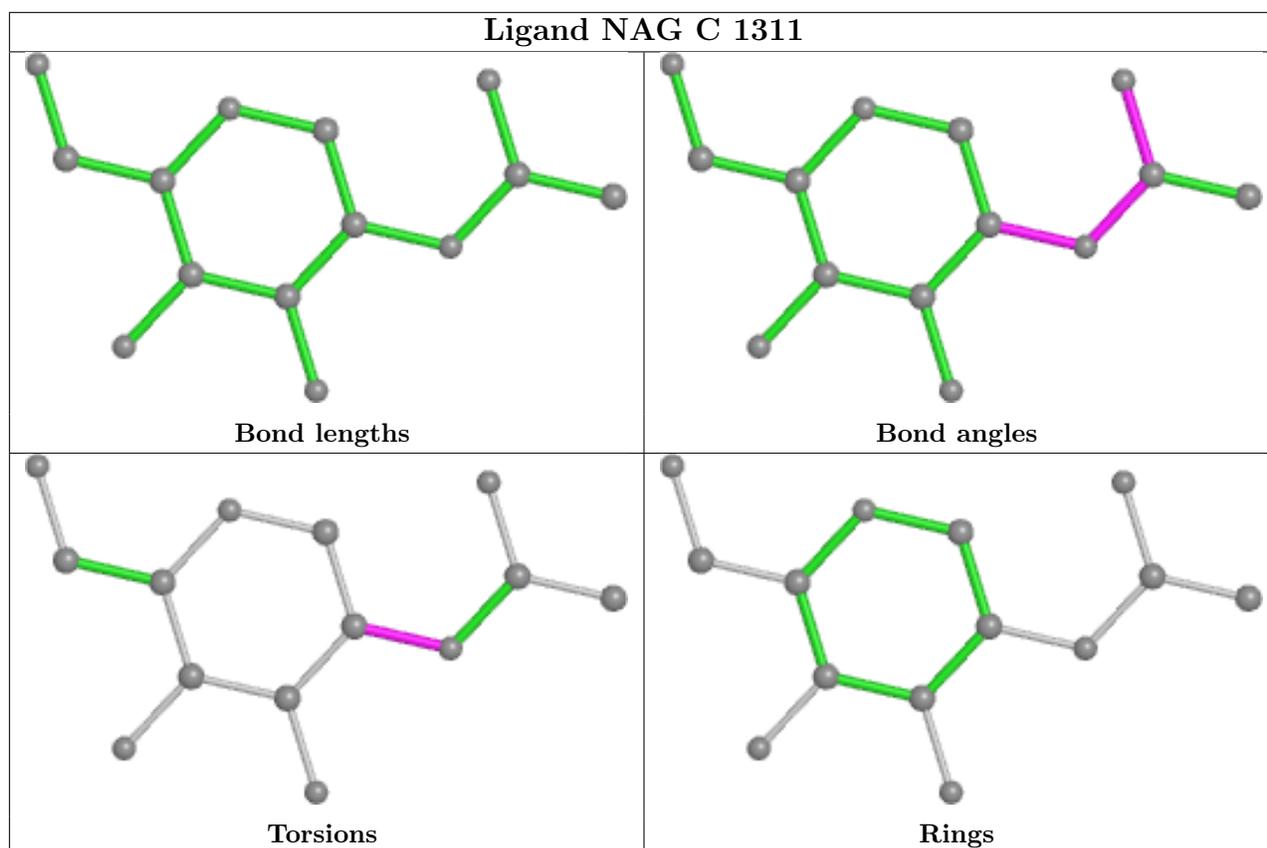
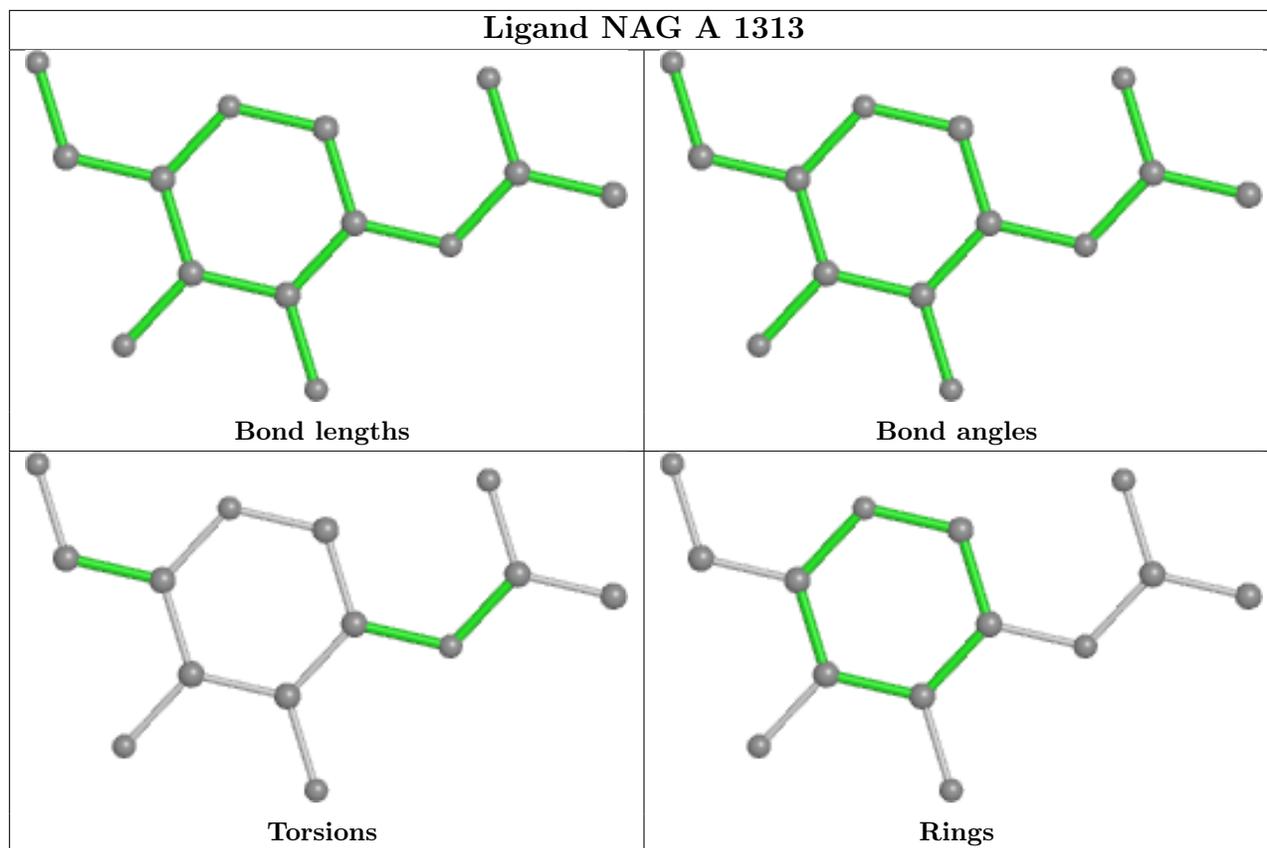


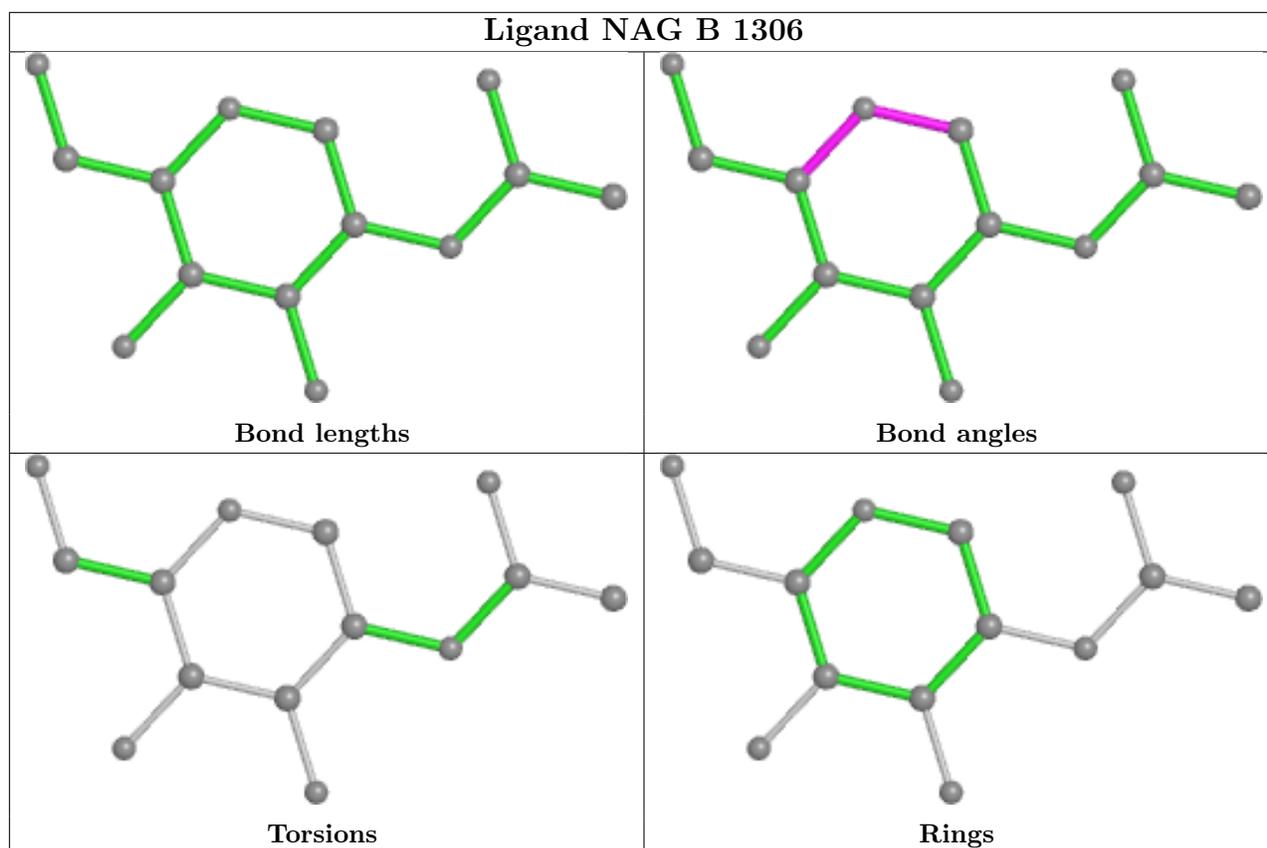
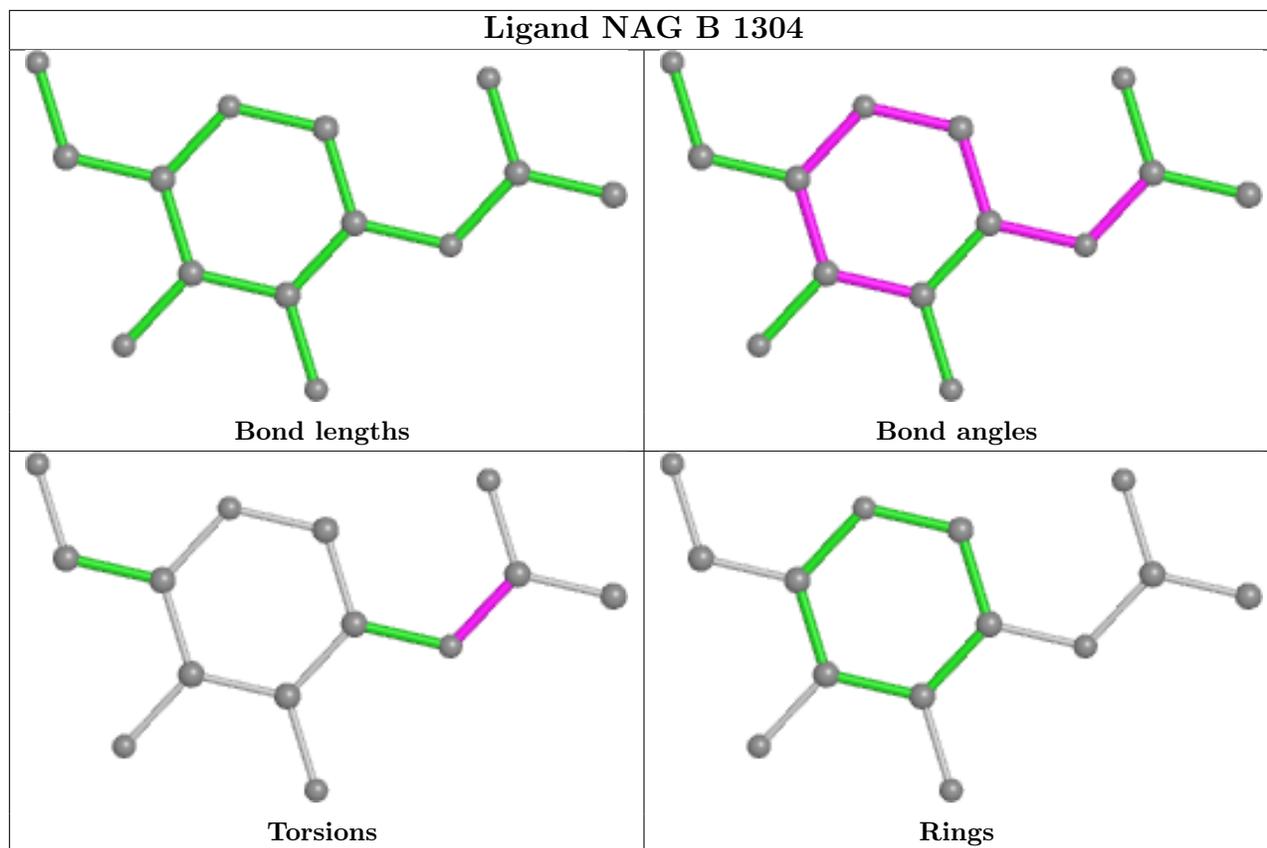


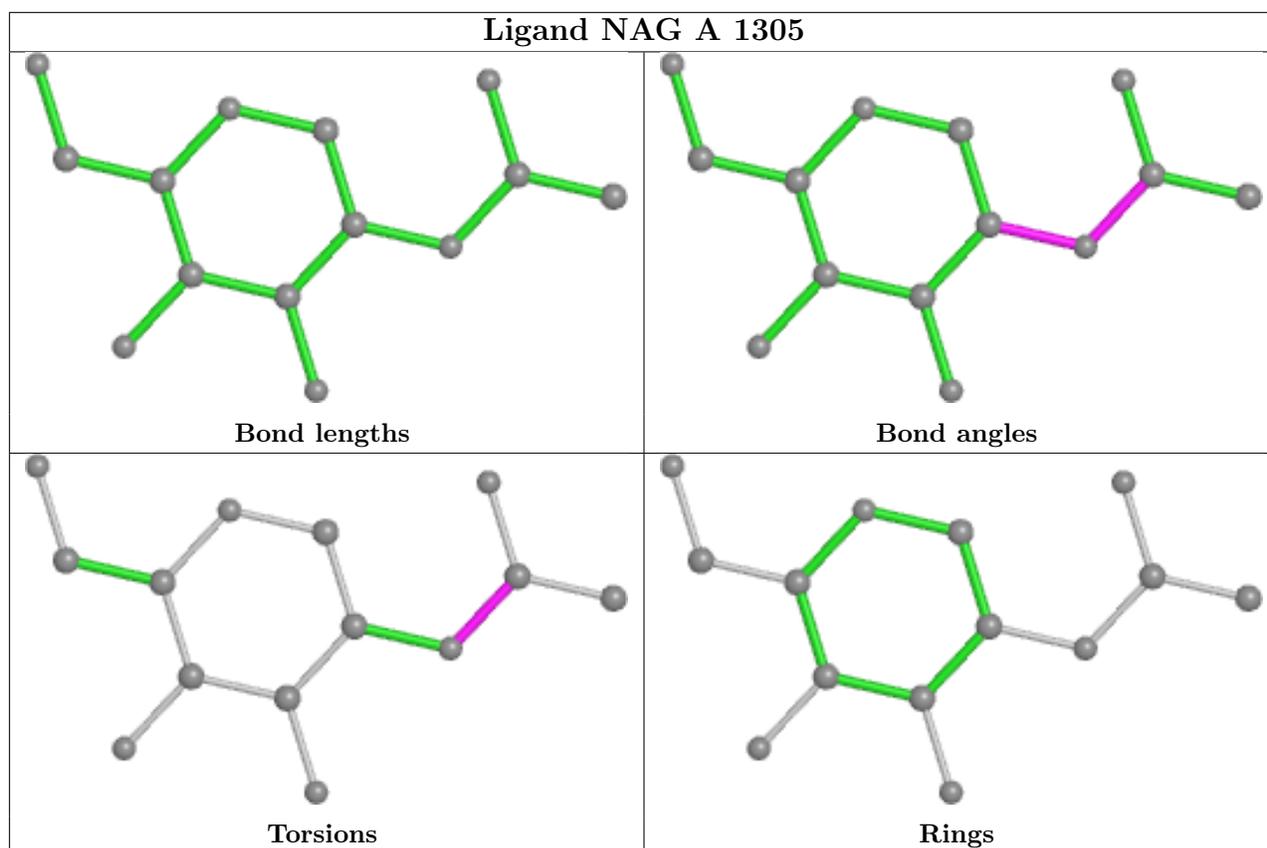
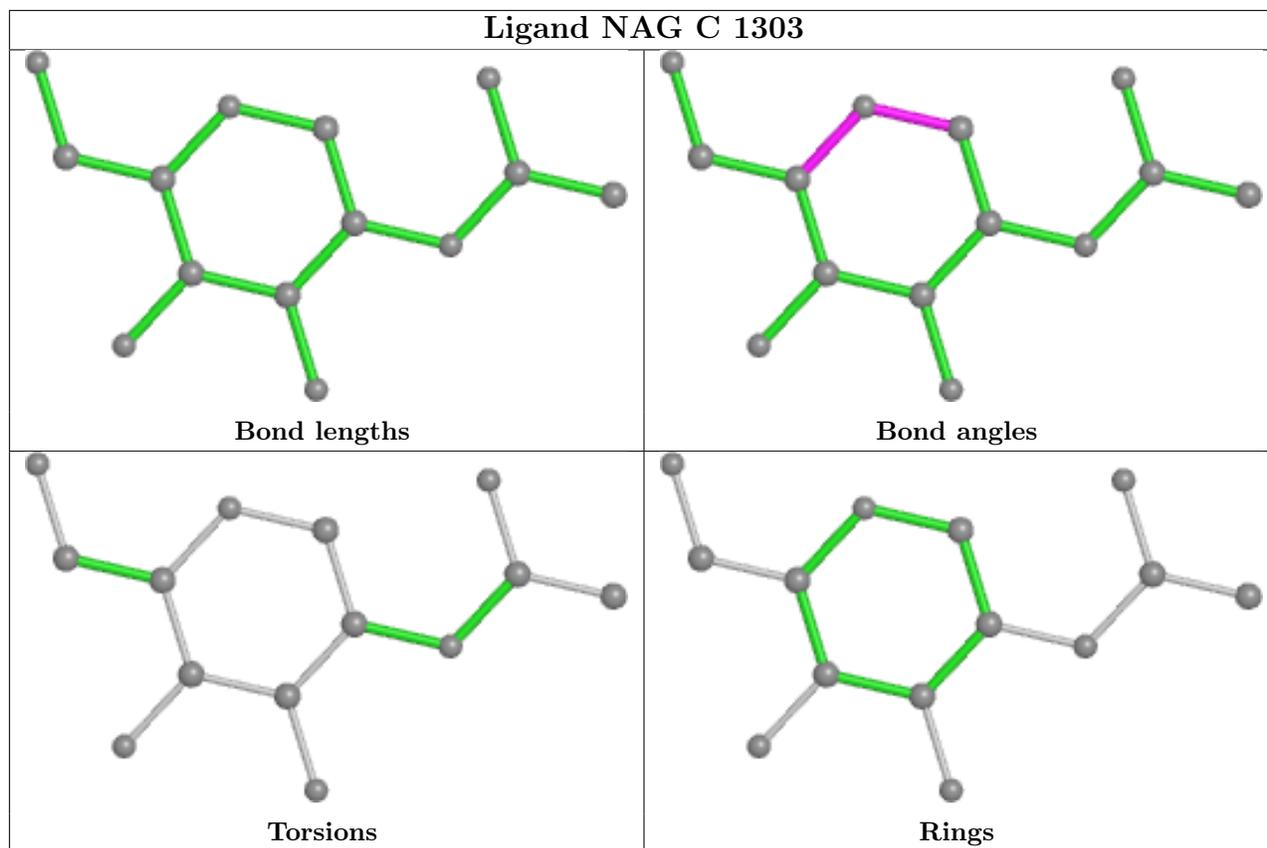












## 5.7 Other polymers

There are no such residues in this entry.

## 5.8 Polymer linkage issues

There are no chain breaks in this entry.