



wwPDB EM Validation Summary Report ⓘ

Apr 14, 2024 – 12:11 AM JST

PDB ID : 8WGV
EMDB ID : EMD-37516
Title : BA.2(S375) Spike (S6P)/hACE2 complex
Authors : Wei, X.; Zhang, Z.
Deposited on : 2023-09-22
Resolution : 2.92 Å (reported)
Based on initial model : 7XO8

This is a wwPDB EM Validation Summary 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 : **FAILED**
Mogul : 1.8.5 (274361), CSD as541be (2020)
MolProbity : 4.02b-467
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : **FAILED**
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36

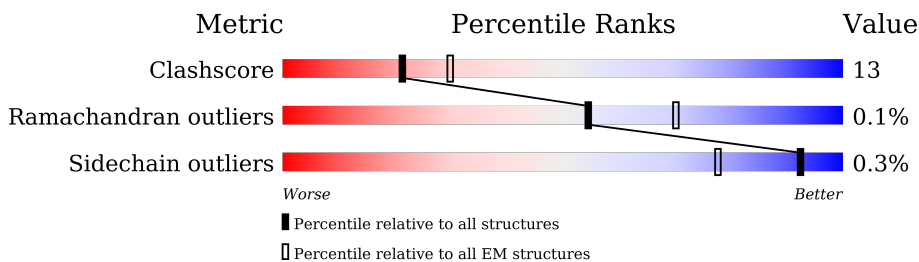
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 2.92 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	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

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 $\leq 5\%$

Mol	Chain	Length	Quality of chain
1	A	1244	
1	B	1244	
1	C	1244	
2	D	614	
2	E	614	
2	F	614	
3	G	2	
3	H	2	
3	I	2	

2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 38688 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	993	7773	4971	1293	1475	34	1	0
1	B	992	7770	4969	1293	1473	35	1	0
1	C	991	7761	4964	1292	1470	35	1	0

There are 234 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	22	ILE	THR	variant	UNP P0DTC2
A	?	-	LEU	deletion	UNP P0DTC2
A	?	-	PRO	deletion	UNP P0DTC2
A	?	-	PRO	deletion	UNP P0DTC2
A	27	SER	ALA	variant	UNP P0DTC2
A	142	ASP	GLY	variant	UNP P0DTC2
A	213	GLY	VAL	variant	UNP P0DTC2
A	339	ASP	GLY	variant	UNP P0DTC2
A	371	PHE	SER	variant	UNP P0DTC2
A	373	PRO	SER	variant	UNP P0DTC2
A	376	ALA	THR	variant	UNP P0DTC2
A	405	ASN	ASP	variant	UNP P0DTC2
A	408	SER	ARG	variant	UNP P0DTC2
A	417	ASN	LYS	variant	UNP P0DTC2
A	440	LYS	ASN	variant	UNP P0DTC2
A	477	ASN	SER	variant	UNP P0DTC2
A	478	LYS	THR	variant	UNP P0DTC2
A	484	ALA	GLU	variant	UNP P0DTC2
A	493	ARG	GLN	variant	UNP P0DTC2
A	498	ARG	GLN	variant	UNP P0DTC2
A	501	TYR	ASN	variant	UNP P0DTC2
A	505	HIS	TYR	variant	UNP P0DTC2
A	614	GLY	ASP	variant	UNP P0DTC2
A	655	TYR	HIS	variant	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
A	679	LYS	ASN	variant	UNP P0DTC2
A	681	HIS	PRO	variant	UNP P0DTC2
A	682	GLY	ARG	conflict	UNP P0DTC2
A	683	SER	ARG	conflict	UNP P0DTC2
A	685	SER	ARG	conflict	UNP P0DTC2
A	764	LYS	ASN	variant	UNP P0DTC2
A	796	TYR	ASP	variant	UNP P0DTC2
A	817	PRO	PHE	conflict	UNP P0DTC2
A	892	PRO	ALA	conflict	UNP P0DTC2
A	899	PRO	ALA	conflict	UNP P0DTC2
A	942	PRO	ALA	conflict	UNP P0DTC2
A	954	HIS	GLN	variant	UNP P0DTC2
A	969	LYS	ASN	variant	UNP P0DTC2
A	986	PRO	LYS	variant	UNP P0DTC2
A	987	PRO	VAL	variant	UNP P0DTC2
A	1209	GLY	-	expression tag	UNP P0DTC2
A	1210	SER	-	expression tag	UNP P0DTC2
A	1211	GLY	-	expression tag	UNP P0DTC2
A	1212	TYR	-	expression tag	UNP P0DTC2
A	1213	ILE	-	expression tag	UNP P0DTC2
A	1214	PRO	-	expression tag	UNP P0DTC2
A	1215	GLU	-	expression tag	UNP P0DTC2
A	1216	ALA	-	expression tag	UNP P0DTC2
A	1217	PRO	-	expression tag	UNP P0DTC2
A	1218	ARG	-	expression tag	UNP P0DTC2
A	1219	ASP	-	expression tag	UNP P0DTC2
A	1220	GLY	-	expression tag	UNP P0DTC2
A	1221	GLN	-	expression tag	UNP P0DTC2
A	1222	ALA	-	expression tag	UNP P0DTC2
A	1223	TYR	-	expression tag	UNP P0DTC2
A	1224	VAL	-	expression tag	UNP P0DTC2
A	1225	ARG	-	expression tag	UNP P0DTC2
A	1226	LYS	-	expression tag	UNP P0DTC2
A	1227	ASP	-	expression tag	UNP P0DTC2
A	1228	GLY	-	expression tag	UNP P0DTC2
A	1229	GLU	-	expression tag	UNP P0DTC2
A	1230	TRP	-	expression tag	UNP P0DTC2
A	1231	VAL	-	expression tag	UNP P0DTC2
A	1232	LEU	-	expression tag	UNP P0DTC2
A	1233	LEU	-	expression tag	UNP P0DTC2
A	1234	SER	-	expression tag	UNP P0DTC2
A	1235	THR	-	expression tag	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
A	1236	PHE	-	expression tag	UNP P0DTC2
A	1237	LEU	-	expression tag	UNP P0DTC2
A	1238	GLY	-	expression tag	UNP P0DTC2
A	1239	GLY	-	expression tag	UNP P0DTC2
A	1240	HIS	-	expression tag	UNP P0DTC2
A	1241	HIS	-	expression tag	UNP P0DTC2
A	1242	HIS	-	expression tag	UNP P0DTC2
A	1243	HIS	-	expression tag	UNP P0DTC2
A	1244	HIS	-	expression tag	UNP P0DTC2
A	1245	HIS	-	expression tag	UNP P0DTC2
A	1246	HIS	-	expression tag	UNP P0DTC2
A	1247	HIS	-	expression tag	UNP P0DTC2
B	22	ILE	THR	variant	UNP P0DTC2
B	?	-	LEU	deletion	UNP P0DTC2
B	?	-	PRO	deletion	UNP P0DTC2
B	?	-	PRO	deletion	UNP P0DTC2
B	27	SER	ALA	variant	UNP P0DTC2
B	142	ASP	GLY	variant	UNP P0DTC2
B	213	GLY	VAL	variant	UNP P0DTC2
B	339	ASP	GLY	variant	UNP P0DTC2
B	371	PHE	SER	variant	UNP P0DTC2
B	373	PRO	SER	variant	UNP P0DTC2
B	376	ALA	THR	variant	UNP P0DTC2
B	405	ASN	ASP	variant	UNP P0DTC2
B	408	SER	ARG	variant	UNP P0DTC2
B	417	ASN	LYS	variant	UNP P0DTC2
B	440	LYS	ASN	variant	UNP P0DTC2
B	477	ASN	SER	variant	UNP P0DTC2
B	478	LYS	THR	variant	UNP P0DTC2
B	484	ALA	GLU	variant	UNP P0DTC2
B	493	ARG	GLN	variant	UNP P0DTC2
B	498	ARG	GLN	variant	UNP P0DTC2
B	501	TYR	ASN	variant	UNP P0DTC2
B	505	HIS	TYR	variant	UNP P0DTC2
B	614	GLY	ASP	variant	UNP P0DTC2
B	655	TYR	HIS	variant	UNP P0DTC2
B	679	LYS	ASN	variant	UNP P0DTC2
B	681	HIS	PRO	variant	UNP P0DTC2
B	682	GLY	ARG	conflict	UNP P0DTC2
B	683	SER	ARG	conflict	UNP P0DTC2
B	685	SER	ARG	conflict	UNP P0DTC2
B	764	LYS	ASN	variant	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
B	796	TYR	ASP	variant	UNP P0DTC2
B	817	PRO	PHE	conflict	UNP P0DTC2
B	892	PRO	ALA	conflict	UNP P0DTC2
B	899	PRO	ALA	conflict	UNP P0DTC2
B	942	PRO	ALA	conflict	UNP P0DTC2
B	954	HIS	GLN	variant	UNP P0DTC2
B	969	LYS	ASN	variant	UNP P0DTC2
B	986	PRO	LYS	variant	UNP P0DTC2
B	987	PRO	VAL	variant	UNP P0DTC2
B	1209	GLY	-	expression tag	UNP P0DTC2
B	1210	SER	-	expression tag	UNP P0DTC2
B	1211	GLY	-	expression tag	UNP P0DTC2
B	1212	TYR	-	expression tag	UNP P0DTC2
B	1213	ILE	-	expression tag	UNP P0DTC2
B	1214	PRO	-	expression tag	UNP P0DTC2
B	1215	GLU	-	expression tag	UNP P0DTC2
B	1216	ALA	-	expression tag	UNP P0DTC2
B	1217	PRO	-	expression tag	UNP P0DTC2
B	1218	ARG	-	expression tag	UNP P0DTC2
B	1219	ASP	-	expression tag	UNP P0DTC2
B	1220	GLY	-	expression tag	UNP P0DTC2
B	1221	GLN	-	expression tag	UNP P0DTC2
B	1222	ALA	-	expression tag	UNP P0DTC2
B	1223	TYR	-	expression tag	UNP P0DTC2
B	1224	VAL	-	expression tag	UNP P0DTC2
B	1225	ARG	-	expression tag	UNP P0DTC2
B	1226	LYS	-	expression tag	UNP P0DTC2
B	1227	ASP	-	expression tag	UNP P0DTC2
B	1228	GLY	-	expression tag	UNP P0DTC2
B	1229	GLU	-	expression tag	UNP P0DTC2
B	1230	TRP	-	expression tag	UNP P0DTC2
B	1231	VAL	-	expression tag	UNP P0DTC2
B	1232	LEU	-	expression tag	UNP P0DTC2
B	1233	LEU	-	expression tag	UNP P0DTC2
B	1234	SER	-	expression tag	UNP P0DTC2
B	1235	THR	-	expression tag	UNP P0DTC2
B	1236	PHE	-	expression tag	UNP P0DTC2
B	1237	LEU	-	expression tag	UNP P0DTC2
B	1238	GLY	-	expression tag	UNP P0DTC2
B	1239	GLY	-	expression tag	UNP P0DTC2
B	1240	HIS	-	expression tag	UNP P0DTC2
B	1241	HIS	-	expression tag	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
B	1242	HIS	-	expression tag	UNP P0DTC2
B	1243	HIS	-	expression tag	UNP P0DTC2
B	1244	HIS	-	expression tag	UNP P0DTC2
B	1245	HIS	-	expression tag	UNP P0DTC2
B	1246	HIS	-	expression tag	UNP P0DTC2
B	1247	HIS	-	expression tag	UNP P0DTC2
C	22	ILE	THR	variant	UNP P0DTC2
C	?	-	LEU	deletion	UNP P0DTC2
C	?	-	PRO	deletion	UNP P0DTC2
C	?	-	PRO	deletion	UNP P0DTC2
C	27	SER	ALA	variant	UNP P0DTC2
C	142	ASP	GLY	variant	UNP P0DTC2
C	213	GLY	VAL	variant	UNP P0DTC2
C	339	ASP	GLY	variant	UNP P0DTC2
C	371	PHE	SER	variant	UNP P0DTC2
C	373	PRO	SER	variant	UNP P0DTC2
C	376	ALA	THR	variant	UNP P0DTC2
C	405	ASN	ASP	variant	UNP P0DTC2
C	408	SER	ARG	variant	UNP P0DTC2
C	417	ASN	LYS	variant	UNP P0DTC2
C	440	LYS	ASN	variant	UNP P0DTC2
C	477	ASN	SER	variant	UNP P0DTC2
C	478	LYS	THR	variant	UNP P0DTC2
C	484	ALA	GLU	variant	UNP P0DTC2
C	493	ARG	GLN	variant	UNP P0DTC2
C	498	ARG	GLN	variant	UNP P0DTC2
C	501	TYR	ASN	variant	UNP P0DTC2
C	505	HIS	TYR	variant	UNP P0DTC2
C	614	GLY	ASP	variant	UNP P0DTC2
C	655	TYR	HIS	variant	UNP P0DTC2
C	679	LYS	ASN	variant	UNP P0DTC2
C	681	HIS	PRO	variant	UNP P0DTC2
C	682	GLY	ARG	conflict	UNP P0DTC2
C	683	SER	ARG	conflict	UNP P0DTC2
C	685	SER	ARG	conflict	UNP P0DTC2
C	764	LYS	ASN	variant	UNP P0DTC2
C	796	TYR	ASP	variant	UNP P0DTC2
C	817	PRO	PHE	conflict	UNP P0DTC2
C	892	PRO	ALA	conflict	UNP P0DTC2
C	899	PRO	ALA	conflict	UNP P0DTC2
C	942	PRO	ALA	conflict	UNP P0DTC2
C	954	HIS	GLN	variant	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
C	969	LYS	ASN	variant	UNP P0DTC2
C	986	PRO	LYS	variant	UNP P0DTC2
C	987	PRO	VAL	variant	UNP P0DTC2
C	1209	GLY	-	expression tag	UNP P0DTC2
C	1210	SER	-	expression tag	UNP P0DTC2
C	1211	GLY	-	expression tag	UNP P0DTC2
C	1212	TYR	-	expression tag	UNP P0DTC2
C	1213	ILE	-	expression tag	UNP P0DTC2
C	1214	PRO	-	expression tag	UNP P0DTC2
C	1215	GLU	-	expression tag	UNP P0DTC2
C	1216	ALA	-	expression tag	UNP P0DTC2
C	1217	PRO	-	expression tag	UNP P0DTC2
C	1218	ARG	-	expression tag	UNP P0DTC2
C	1219	ASP	-	expression tag	UNP P0DTC2
C	1220	GLY	-	expression tag	UNP P0DTC2
C	1221	GLN	-	expression tag	UNP P0DTC2
C	1222	ALA	-	expression tag	UNP P0DTC2
C	1223	TYR	-	expression tag	UNP P0DTC2
C	1224	VAL	-	expression tag	UNP P0DTC2
C	1225	ARG	-	expression tag	UNP P0DTC2
C	1226	LYS	-	expression tag	UNP P0DTC2
C	1227	ASP	-	expression tag	UNP P0DTC2
C	1228	GLY	-	expression tag	UNP P0DTC2
C	1229	GLU	-	expression tag	UNP P0DTC2
C	1230	TRP	-	expression tag	UNP P0DTC2
C	1231	VAL	-	expression tag	UNP P0DTC2
C	1232	LEU	-	expression tag	UNP P0DTC2
C	1233	LEU	-	expression tag	UNP P0DTC2
C	1234	SER	-	expression tag	UNP P0DTC2
C	1235	THR	-	expression tag	UNP P0DTC2
C	1236	PHE	-	expression tag	UNP P0DTC2
C	1237	LEU	-	expression tag	UNP P0DTC2
C	1238	GLY	-	expression tag	UNP P0DTC2
C	1239	GLY	-	expression tag	UNP P0DTC2
C	1240	HIS	-	expression tag	UNP P0DTC2
C	1241	HIS	-	expression tag	UNP P0DTC2
C	1242	HIS	-	expression tag	UNP P0DTC2
C	1243	HIS	-	expression tag	UNP P0DTC2
C	1244	HIS	-	expression tag	UNP P0DTC2
C	1245	HIS	-	expression tag	UNP P0DTC2
C	1246	HIS	-	expression tag	UNP P0DTC2
C	1247	HIS	-	expression tag	UNP P0DTC2

- Molecule 2 is a protein called Angiotensin-converting enzyme 2.

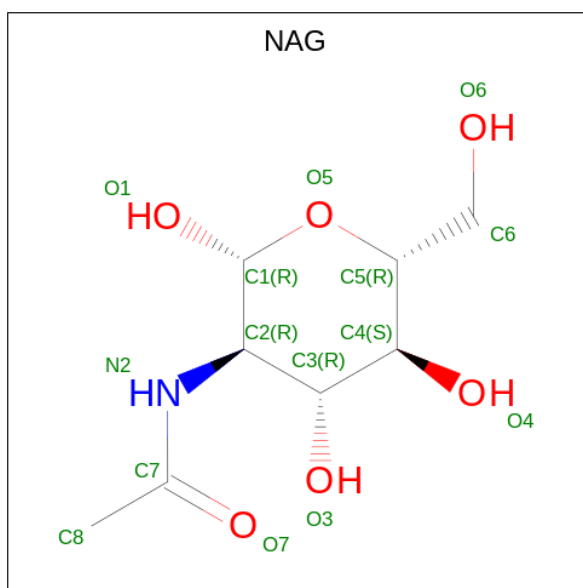
Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	D	596	Total 4862	C 3111	N 805	O 917	S 29	0	0
2	E	596	Total 4862	C 3111	N 805	O 917	S 29	0	0
2	F	596	Total 4862	C 3111	N 805	O 917	S 29	0	0

- 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
			Total	C	N	O		
3	G	2	Total 28	C 16	N 2	O 10	0	0
3	H	2	Total 28	C 16	N 2	O 10	0	0
3	I	2	Total 28	C 16	N 2	O 10	0	0

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



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

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

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

N196	N197	D198	G199	F200	F201	K202	I203	Y204	K206	I210	N211	LEU	GLY	ARG	D215	I216	P217	F220	F220	L223	L229	P230	I231	N234	I235	I235	T236	R237	T240	L241	L242	ALA	LEU	HIS	ARG	ARG	TYR	LEU	THR	PRO	GLY	ASP	ASP	ASP	ASP	ASP	GLY	TRP	THR	THR	ALA	ALA	ALA	A263	A264	Y265																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
N280	G283	T284	L285	K310	T323	E324	Q409	I410	R328	F329	I332	T333	N334	L335	C336	P337	F338	D339	E340	A344	T345	R346	F347	A348	S349	V350	Y351	A352	W353	R357	I358	C361	Y365	S366	F374	F377	K378	C379	Y380	K386	L387	N388	D389	L390	C391	F392	T393	N394																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
V395	S399	F400	V401	I402	R403	E406	Q409	I410	I418	Y421	N422	P426	C432	V433	I434	A435	W436	D442	N448	Y449	N450	Y451	L452	Y453	L455	F456	R457	R458	S459	N460	P463	S469	Y473	Q474	A475	M481	N487	F490	L492	R493	L495																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
G496	F497	Y501	H505	G506	F507	Y508	R509	V510	V511	L513	S514	F515	E516	L517	C525	G526	P527	S530	L533	F543	L546	V551	N556	L557	K558	F565	D568	D574	D578	T588	S596	W597	L598	Y612	Q613	N616	C617	V620	S621	I622	I623	I624	I625	I626	I627	I628	I629	I630	I631	I632	I633	I634	I635	I636	I637	I638	I639	I640	I641	I642	I643	I644	I645	I646	I647	I648	I649	I650	I651	I652	I653	I654	I655	I656	I657	I658	I659	I660	I661	I662	I663	I664	I665	I666	I667	I668	I669	I670	I671	I672	I673	I674	I675	I676	I677	I678	I679	I680	I681	I682	I683	I684	I685	I686	I687	I688	I689	I690	I691	I692	I693	I694	I695	I696	I697	I698	I699	I700	I701	I702	I703	I704	I705	I706	I707	I708	I709	I710	I711	I712	I713	I714	I715	I716	I717	I718	I719	I720	I721	I722	I723	I724	I725	I726	I727	I728	I729	I730	I731	I732	I733	I734	I735	I736	I737	I738	I739	I740	I741	I742	I743	I744	I745	I746	I747	I748	I749	I750	I751	I752	I753	I754	I755	I756	I757	I758	I759	I760	I761	I762	I763	I764	I765	I766	I767	I768	I769	I770	I771	I772	I773	I774	I775	I776	I777	I778	I779	I780	I781	I782	I783	I784	I785	I786	I787	I788	I789	I790	I791	I792	I793	I794	I795	I796	I797	I798	I799	I800	I801	I802	I803	I804	I805	I806	I807	I808	I809	I810	I811	I812	I813	I814	I815	I816	I817	I818	I819	I820	I821	I822	I823	I824	I825	I826	I827	I828	I829	I830	I831	I832	I833	I834	I835	I836	I837	I838	I839	I840	I841	I842	I843	I844	I845	I846	I847	I848	I849	I850	I851	I852	I853	I854	I855	I856	I857	I858	I859	I860	I861	I862	I863	I864	I865	I866	I867	I868	I869	I870	I871	I872	I873	I874	I875	I876	I877	I878	I879	I880	I881	I882	I883	I884	I885	I886	I887	I888	I889	I890	I891	I892	I893	I894	I895	I896	I897	I898	I899	I900	I901	I902	I903	I904	I905	I906	I907	I908	I909	I910	I911	I912	I913	I914	I915	I916	I917	I918	I919	I920	I921	I922	I923	I924	I925	I926	I927	I928	I929	I930	I931	I932	I933	I934	I935	I936	I937	I938	I939	I940	I941	I942	I943	I944	I945	I946	I947	I948	I949	I950	I951	I952	I953	I954	I955	I956	I957	I958	I959	I960	I961	I962	I963	I964	I965	I966	I967	I968	I969	I970	I971	I972	I973	I974	I975	I976	I977	I978	I979	I980	I981	I982	I983	I984	I985	I986	I987	I988	I989	I990	I991	I992	I993	I994	I995	I996	I997	I998	I999	I1000	I1001	I1002	I1003	I1004	I1005	I1006	I1007	I1008	I1009	I1010	I1011	I1012	I1013	I1014	I1015	I1016	I1017	I1018	I1019	I1020	I1021	I1022	I1023	I1024	I1025	I1026	I1027	I1028	I1029	I1030	I1031	I1032	I1033	I1034	I1035	I1036	I1037	I1038	I1039	I1040	I1041	I1042	I1043	I1044	I1045	I1046	I1047	I1048	I1049	I1050	I1051	I1052	I1053	I1054	I1055	I1056	I1057	I1058	I1059	I1060	I1061	I1062	I1063	I1064	I1065	I1066	I1067	I1068	I1069	I1070	I1071	I1072	I1073	I1074	I1075	I1076	I1077	I1078	I1079	I1080	I1081	I1082	I1083	I1084	I1085	I1086	I1087	I1088	I1089	I1090	I1091	I1092	I1093	I1094	I1095	I1096	I1097	I1098	I1099	I1100	I1101	I1102	I1103	I1104	I1105	I1106	I1107	I1108	I1109	I1110	I1111	I1112	I1113	I1114	I1115	I1116	I1117	I1118	I1119	I1120	I1121	I1122	I1123	I1124	I1125	I1126	I1127	I1128	I1129	I1130	I1131	I1132	I1133	I1134	I1135	I1136	I1137	I1138	I1139	I1140	I1141	I1142	I1143	I1144	I1145	I1146	I1147	I1148	I1149	I1150	I1151	I1152	I1153	I1154	I1155	I1156	I1157	I1158	I1159	I1160	I1161	I1162	I1163	I1164	I1165	I1166	I1167	I1168	I1169	I1170	I1171	I1172	I1173	I1174	I1175	I1176	I1177	I1178	I1179	I1180	I1181	I1182	I1183	I1184	I1185	I1186	I1187	I1188	I1189	I1190	I1191	I1192	I1193	I1194	I1195	I1196	I1197	I1198	I1199	I1200	I1201	I1202	I1203	I1204	I1205	I1206	I1207	I1208	I1209	I1210	I1211	I1212	I1213	I1214	I1215	I1216	I1217	I1218	I1219	I1220	I1221	I1222	I1223	I1224	I1225	I1226	I1227	I1228	I1229	I1230	I1231	I1232	I1233	I1234	I1235	I1236	I1237	I1238	I1239	I1240	I1241	I1242	I1243	I1244	I1245	I1246	I1247	I1248	I1249	I1250	I1251	I1252	I1253	I1254	I1255	I1256	I1257	I1258	I1259	I1260	I1261	I1262	I1263	I1264	I1265	I1266	I1267	I1268	I1269	I1270	I1271	I1272	I1273	I1274	I1275	I1276	I1277	I1278	I1279	I1280	I1281	I1282	I1283	I1284	I1285	I1286	I1287	I1288	I1289	I1290	I1291	I1292	I1293	I1294	I1295	I1296	I1297	I1298	I1299	I1300	I1301	I1302	I1303	I1304	I1305	I1306	I1307	I1308	I1309	I1310	I1311	I1312	I1313	I1314	I1315	I1316	I1317	I1318	I1319	I1320	I1321	I1322	I1323	I1324	I1325	I1326	I1327	I1328	I1329	I1330	I1331	I1332	I1333	I1334	I1335	I1336	I1337	I1338	I1339	I1340	I1341	I1342	I1343	I1344	I1345	I1346	I1347	I1348	I1349	I1350	I1351	I1352	I1353	I1354	I1355	I1356	I1357	I1358	I1359	I1360	I1361	I1362	I1363	I1364	I1365	I1366	I1367	I1368	I1369	I1370	I1371	I1372	I1373	I1374	I1375	I1376	I1377	I1378	I1379	I1380	I1381	I1382	I1383	I1384	I1385	I1386	I1387	I1388	I1389	I1390	I1391	I1392	I1393	I1394	I1395	I1396	I1397	I1398	I1399	I1400	I1401	I1402	I1403	I1404	I1405	I1406	I1407	I1408	I1409	I1410	I1411	I1412	I1413	I1414	I1415	I1416	I1417	I1418	I1419	I1420	I1421	I1422	I1423	I1424	I1425	I1426	I1427	I1428	I1429	I1430	I1431	I1432	I1433	I1434	I1435	I1436	I1437	I1438	I1439	I1440	I1441	I1442	I1443	I1444	I1445	I1446	I1447	I1448	I1449	I1450	I1451	I1452	I1453	I1454	I1455	I1456	I1457	I1458	I1459	I1460	I1461	I1462	I1463	I1464	I1465	I1466	I1467	I1468	I1469	I1470	I1471	I1472	I1473	I1474	I1475	I1476	I1477	I1478	I1479	I1480	I1481	I1482	I1483	I1484	I1485	I1486	I1487	I1488	I1489	I1490	I1491	I1492	I1493	I1494	I1495	I1496	I1497	I1498	I1499	I1500	I1501	I1502	I1503	I1504	I1505	I1506	I1507	I1508	I1509	I1510	I1511	I1512	I1513	I1514	I1515	I1516	I1517	I1518	I1519	I1520	I1521	I1522	I1523	I1524	I1525	I1526	I1527	I1528	I1529	I1530	I1531	I1532	I1533	I1534	I1535	I1536	I1537	I1538	I1539	I1540	I1541	I1542	I1543	I1544	I1545	I1546	I1547	I1548	I1549	I1550	I1551	I1552	I1553	I1554	I1555	I1556	I1557	I1558	I1559	I1560	I1561	I1562	I1563	I1564	I1565	I1566	I1567	I1568	I1569	I1570	I1571	I1572	I1573	I1574	I1575	I1576	I1577	I1578	I1579	I1580	I1581	I1582	I1583	I1584	I1585	I1586	I1587	I1588	I1589	I1590	I1591	I1592	I1593	I1594	I1595	I1596	I1597	I1598	I1599	I1600	I1601	I1602	I1603	I1604	I1605	I1606	I1607	I1608	I1609	I1610	I1611	I1612	I1613	I1614	I1615	I1616	I1617	I1618	I1619	I1620	I1621	I1622	I1623	I1624	I1625	I1626	I1627	I1628	I1629	I1630	I1631	I1632	I1633	I1634	I1635	I1636	I1637	I1638	I1639	I1640	I1641	I1642	I1643	I1644	I1645	I1646	I1647	I1648	I1649	I1650	I1651	I1652	I1653	I1654	I1655	I1656	I1657	I1658	I1659	I1660	I1661	I1662	I1663	I1664	I1665	I1666	I1667	I1668	I1669	I1670	I1671	I1672	I1673	I1674	I1675	I1676	I1677	I1678	I1679	I1680	I1681	I1682	I1683	I1684	I1685	I1686	I1687	I1688	I1689	I1690	I1691	I1692	I1693	I1694	I1695	I1696	I1697	I1698	I1699	I1700	I1701	I1702	I1703	I1704	I1705	I1706	I1707	I1708	I1709	I1710	I1711	I1712	I1713	I1714	I1715	I1716	I1717	I1718	I1719	I1720	I1721	I1722	I1723	I1724	I1725	I1726	I1727	I1728	I1729	I1730	I1731	I1732	I1733	I1734	I1735	I1736	I1737	I1738	I1739	I1740	I1741	I1742	I1743	I1744	I1745	I1746	I1747	I1748	I1749	I1750	I1751	I1752	I1753	I1754	I1755	I1756	I1757	I1758	I1759	I1760	I1761	I1762	I1763	I1764	I1765	I1766	I1767	I1768	I1769	I1770	I1771	I1772	I1773	I1774	I1775	I1776	I1777	I1778	I1779	I1780	I1781	I1782	I1783	I1784	I1785	I1786	I1787	I1788	I1789	I1790	I1791	I1792	I1793	I1794	I1795	I1796	I1797	I1798	I1799	I1800	I1801	I1802	I1803	I1804	I1805	I1806	I1807	I1808	I1809	I1810	I1811	I1812	I1813	I1814	I1815	I1816	I1817	I1818	I1819	I1820	I1821	I1822	I1823	I1824	I1825	I1826	I1827	I1828	I1829	I1830	I1831	I1832	I1833	I1834	I1835	I1836	I1837	I1838	I1839	I1840	I1841	I1842	I1843	I1844	I1845	I1846	I1847	I1848	I1849	I1850	I1851	I1852	I1853	I1854	I1855



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

Chain G:  100%

MAG1
MAG2

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

Chain H:  100%

MAG1
MAG2

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

Chain I:  50%

MAG1
MAG2

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	74518	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 ($e^-/\text{\AA}^2$)	60	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	Not provided	
Image detector	FEI FALCON IV (4k 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: 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	0/7952	0.50	0/10818
1	B	0.28	0/7950	0.49	0/10817
1	C	0.28	0/7941	0.50	1/10805 (0.0%)
2	D	0.24	0/4999	0.46	0/6792
2	E	0.25	0/4999	0.47	0/6792
2	F	0.30	1/4999 (0.0%)	0.51	3/6792 (0.0%)
All	All	0.28	1/38840 (0.0%)	0.49	4/52816 (0.0%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	F	321	PRO	CG-CD	-11.73	1.11	1.50

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	F	321	PRO	N-CD-CG	-14.40	81.59	103.20
2	F	321	PRO	CA-N-CD	-7.80	100.58	111.50
2	F	321	PRO	CA-CB-CG	-7.35	90.04	104.00
1	C	492	LEU	CA-CB-CG	6.67	130.65	115.30

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	7773	0	7598	162	0
1	B	7770	0	7596	158	0
1	C	7761	0	7586	173	0
2	D	4862	0	4639	169	0
2	E	4862	0	4639	193	0
2	F	4862	0	4639	166	0
3	G	28	0	25	0	0
3	H	28	0	25	0	0
3	I	28	0	25	1	0
4	A	154	0	143	2	0
4	B	154	0	143	0	0
4	C	196	0	182	5	0
4	D	70	0	65	1	0
4	E	70	0	65	3	0
4	F	70	0	65	3	0
All	All	38688	0	37435	997	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 13.

The worst 5 of 997 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:215:ASP:N	1:B:266:TYR:HH	1.66	0.93
1:A:400:PHE:O	1:A:510:VAL:HB	1.75	0.86
1:A:330:PRO:HD3	1:A:544:ASN:HD21	1.37	0.86
1:B:190:ARG:HD2	1:B:207:HIS:HD2	1.41	0.85
1:A:1093:GLY:HA3	1:A:1105:THR:O	1.77	0.83

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	974/1244 (78%)	883 (91%)	90 (9%)	1 (0%)	51	81
1	B	975/1244 (78%)	890 (91%)	84 (9%)	1 (0%)	51	81
1	C	974/1244 (78%)	897 (92%)	75 (8%)	2 (0%)	47	77
2	D	594/614 (97%)	540 (91%)	52 (9%)	2 (0%)	41	70
2	E	594/614 (97%)	550 (93%)	43 (7%)	1 (0%)	47	77
2	F	594/614 (97%)	547 (92%)	47 (8%)	0	100	100
All	All	4705/5574 (84%)	4307 (92%)	391 (8%)	7 (0%)	54	81

5 of 7 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	675	GLN
1	C	332	ILE
2	D	364	VAL
1	C	481	ASN
2	D	365	THR

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	871/1083 (80%)	869 (100%)	2 (0%)	93	98
1	B	871/1083 (80%)	868 (100%)	3 (0%)	92	98
1	C	870/1083 (80%)	867 (100%)	3 (0%)	92	98
2	D	526/541 (97%)	524 (100%)	2 (0%)	91	97
2	E	526/541 (97%)	522 (99%)	4 (1%)	81	93
2	F	526/541 (97%)	523 (99%)	3 (1%)	86	95
All	All	4190/4872 (86%)	4173 (100%)	17 (0%)	92	97

5 of 17 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	F	518	ARG
2	F	553	LYS
1	C	964	LYS
2	D	174	LYS
2	D	559	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 21 such sidechains are listed below:

Mol	Chain	Res	Type
2	E	60	GLN
2	E	522	GLN
2	F	64	ASN
2	E	598	GLN
2	E	472	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](#)

6 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	$\# Z > 2$
3	NAG	G	1	3,2	14,14,15	0.43	0	17,19,21	0.36	0
3	NAG	G	2	3	14,14,15	0.41	0	17,19,21	0.34	0
3	NAG	H	1	3,2	14,14,15	0.49	0	17,19,21	0.38	0
3	NAG	H	2	3	14,14,15	0.37	0	17,19,21	0.37	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	NAG	I	1	3,2	14,14,15	0.43	0	17,19,21	0.36	0
3	NAG	I	2	3	14,14,15	0.38	0	17,19,21	0.35	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
3	NAG	G	1	3,2	-	3/6/23/26	0/1/1/1
3	NAG	G	2	3	-	2/6/23/26	0/1/1/1
3	NAG	H	1	3,2	-	4/6/23/26	0/1/1/1
3	NAG	H	2	3	-	2/6/23/26	0/1/1/1
3	NAG	I	1	3,2	-	2/6/23/26	0/1/1/1
3	NAG	I	2	3	-	1/6/23/26	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

5 of 14 torsion outliers are listed below:

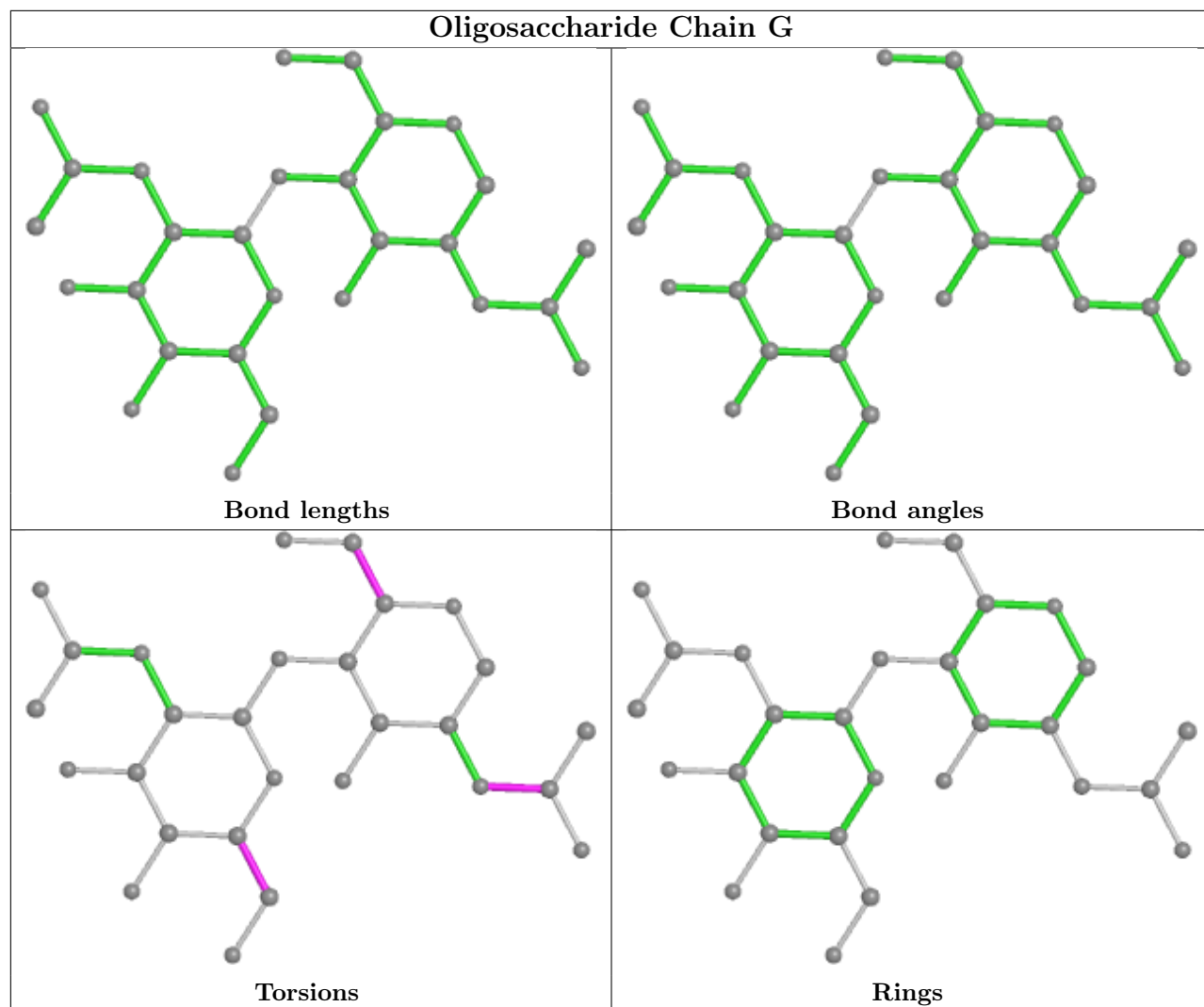
Mol	Chain	Res	Type	Atoms
3	G	2	NAG	O5-C5-C6-O6
3	H	1	NAG	O5-C5-C6-O6
3	H	1	NAG	C4-C5-C6-O6
3	H	2	NAG	O5-C5-C6-O6
3	G	2	NAG	C4-C5-C6-O6

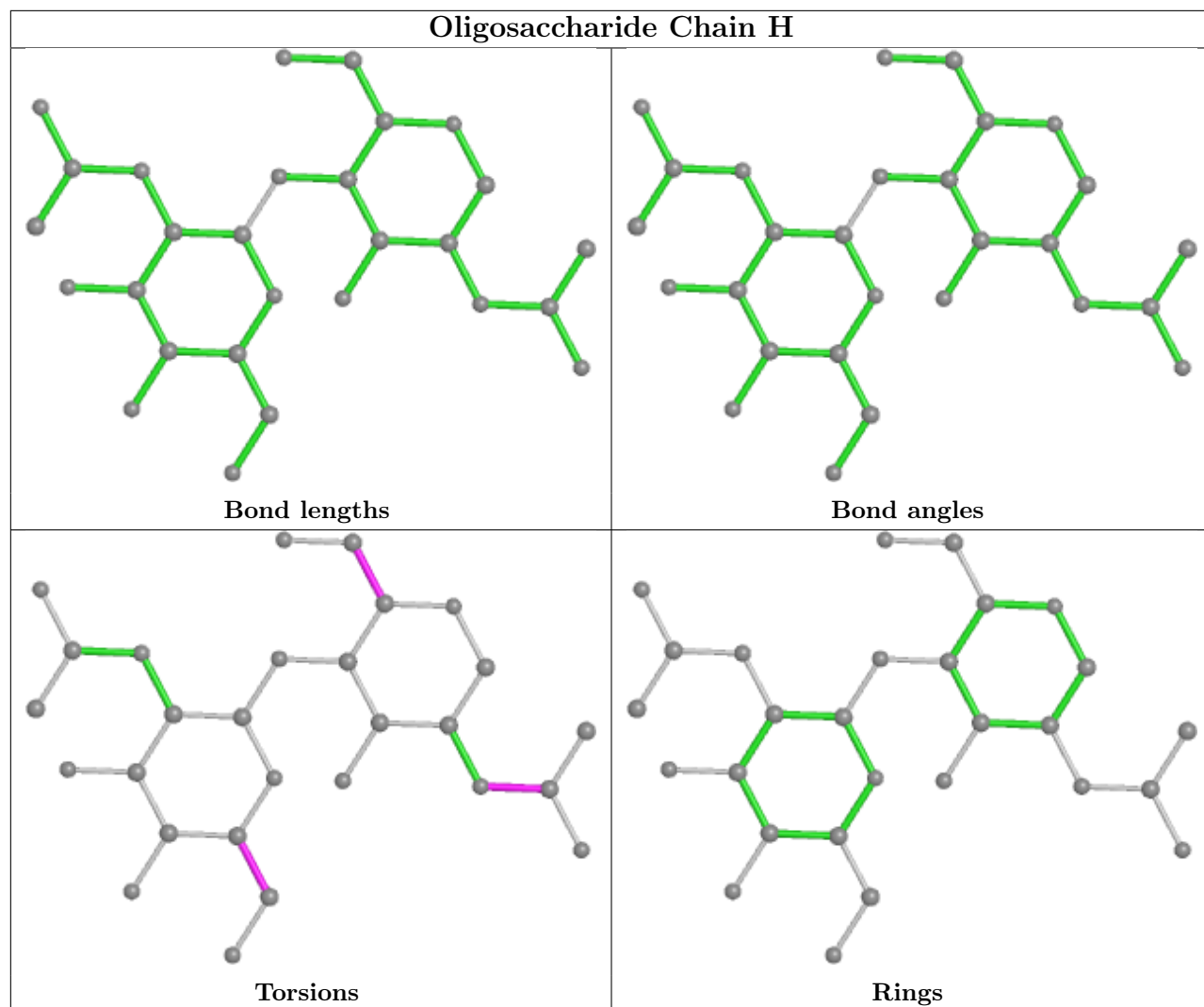
There are no ring outliers.

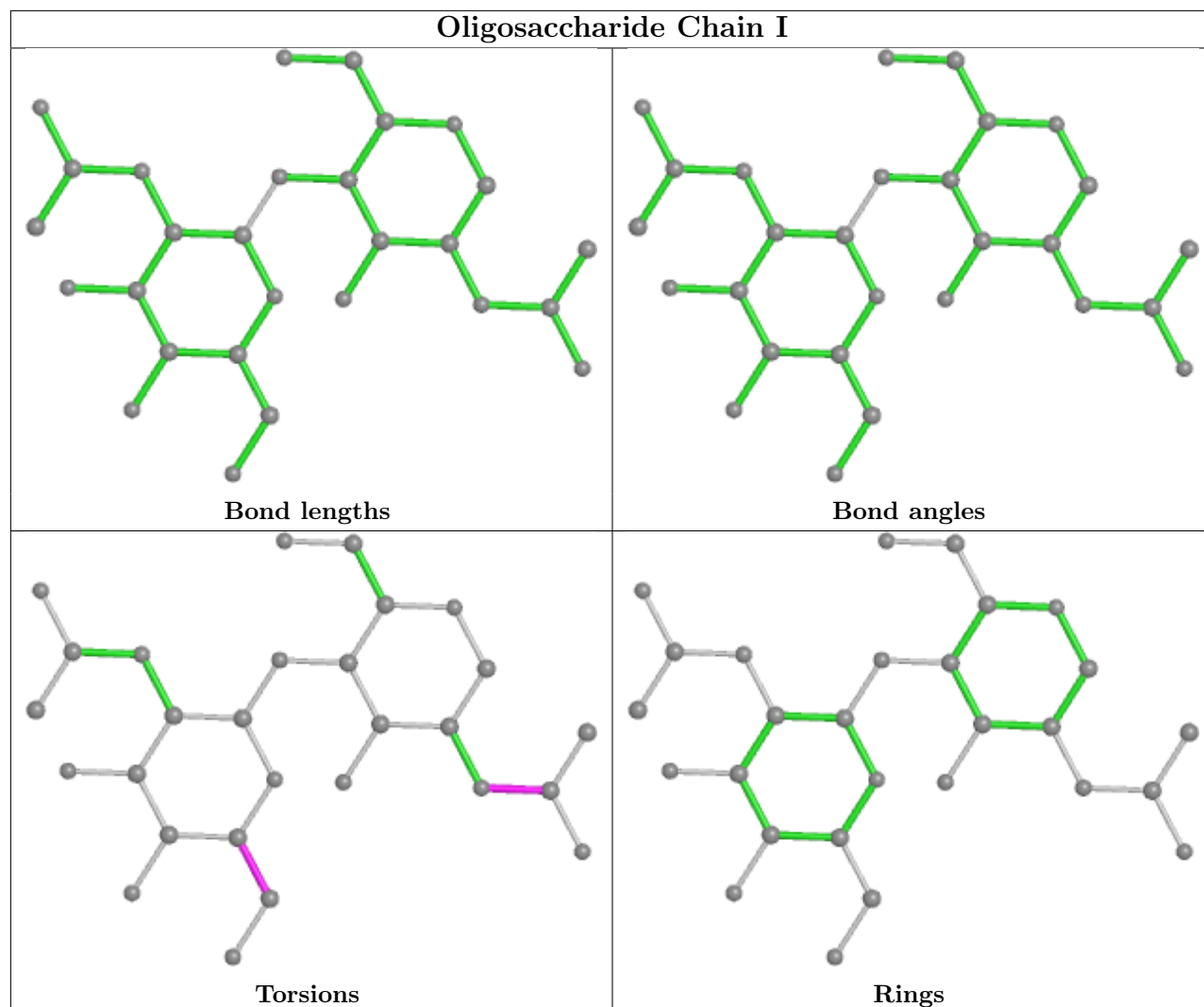
1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	I	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	E	702	2	14,14,15	0.33	0	17,19,21	0.34	0
4	NAG	C	1304	1	14,14,15	0.42	0	17,19,21	0.37	0
4	NAG	B	1310	1	14,14,15	0.23	0	17,19,21	0.49	0
4	NAG	B	1309	1	14,14,15	0.20	0	17,19,21	0.47	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
4	NAG	B	1306	1	14,14,15	0.23	0	17,19,21	0.48	0
4	NAG	A	1307	1	14,14,15	0.20	0	17,19,21	0.45	0
4	NAG	D	701	2	14,14,15	0.50	0	17,19,21	0.41	0
4	NAG	F	704	2	14,14,15	0.31	0	17,19,21	0.38	0
4	NAG	F	705	2	14,14,15	0.37	0	17,19,21	0.35	0
4	NAG	C	1310	1	14,14,15	0.25	0	17,19,21	0.42	0
4	NAG	E	704	2	14,14,15	0.26	0	17,19,21	0.53	0
4	NAG	E	705	2	14,14,15	0.40	0	17,19,21	0.34	0
4	NAG	F	701	2	14,14,15	0.45	0	17,19,21	0.39	0
4	NAG	B	1311	1	14,14,15	0.23	0	17,19,21	0.34	0
4	NAG	A	1301	1	14,14,15	0.78	1 (7%)	17,19,21	0.97	1 (5%)
4	NAG	D	702	2	14,14,15	0.85	1 (7%)	17,19,21	0.90	1 (5%)
4	NAG	A	1309	1	14,14,15	0.31	0	17,19,21	0.58	0
4	NAG	D	705	2	14,14,15	0.89	2 (14%)	17,19,21	0.91	1 (5%)
4	NAG	F	702	2	14,14,15	0.40	0	17,19,21	0.36	0
4	NAG	B	1302	1	14,14,15	0.22	0	17,19,21	0.52	0
4	NAG	C	1314	1	14,14,15	0.30	0	17,19,21	0.40	0
4	NAG	B	1308	1	14,14,15	0.52	0	17,19,21	0.42	0
4	NAG	B	1305	1	14,14,15	0.32	0	17,19,21	0.46	0
4	NAG	A	1303	1	14,14,15	0.36	0	17,19,21	0.36	0
4	NAG	A	1302	1	14,14,15	0.39	0	17,19,21	0.35	0
4	NAG	C	1303	1	14,14,15	0.83	1 (7%)	17,19,21	0.98	1 (5%)
4	NAG	C	1306	1	14,14,15	0.40	0	17,19,21	1.27	1 (5%)
4	NAG	B	1303	1	14,14,15	0.92	1 (7%)	17,19,21	1.21	1 (5%)
4	NAG	A	1308	1	14,14,15	0.27	0	17,19,21	0.46	0
4	NAG	C	1307	1	14,14,15	0.38	0	17,19,21	0.39	0
4	NAG	A	1305	1	14,14,15	0.44	0	17,19,21	0.38	0
4	NAG	A	1311	1	14,14,15	0.85	1 (7%)	17,19,21	1.34	1 (5%)
4	NAG	C	1302	1	14,14,15	0.26	0	17,19,21	0.54	0
4	NAG	D	703	2	14,14,15	0.47	0	17,19,21	1.25	2 (11%)
4	NAG	C	1313	1	14,14,15	0.30	0	17,19,21	1.37	2 (11%)
4	NAG	F	703	2	14,14,15	0.29	0	17,19,21	0.61	0
4	NAG	B	1301	1	14,14,15	0.38	0	17,19,21	0.45	0
4	NAG	A	1304	1	14,14,15	0.20	0	17,19,21	0.44	0
4	NAG	C	1308	1	14,14,15	0.25	0	17,19,21	0.43	0
4	NAG	B	1304	1	14,14,15	0.33	0	17,19,21	0.62	0
4	NAG	E	701	2	14,14,15	0.39	0	17,19,21	0.38	0
4	NAG	C	1301	1	14,14,15	0.26	0	17,19,21	0.34	0
4	NAG	C	1311	1	14,14,15	0.23	0	17,19,21	0.52	0
4	NAG	A	1306	1	14,14,15	0.41	0	17,19,21	0.35	0
4	NAG	B	1307	1	14,14,15	0.19	0	17,19,21	0.48	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
4	NAG	C	1305	1	14,14,15	0.30	0	17,19,21	0.36	0
4	NAG	E	703	2	14,14,15	0.47	0	17,19,21	1.26	1 (5%)
4	NAG	A	1310	1	14,14,15	0.23	0	17,19,21	0.36	0
4	NAG	D	704	2	14,14,15	0.20	0	17,19,21	0.51	0
4	NAG	C	1312	1	14,14,15	0.84	1 (7%)	17,19,21	1.30	1 (5%)
4	NAG	C	1309	1	14,14,15	0.35	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
4	NAG	E	702	2	-	2/6/23/26	0/1/1/1
4	NAG	C	1304	1	-	0/6/23/26	0/1/1/1
4	NAG	B	1310	1	-	3/6/23/26	0/1/1/1
4	NAG	B	1309	1	-	0/6/23/26	0/1/1/1
4	NAG	B	1306	1	-	0/6/23/26	0/1/1/1
4	NAG	A	1307	1	-	1/6/23/26	0/1/1/1
4	NAG	D	701	2	-	2/6/23/26	0/1/1/1
4	NAG	F	704	2	-	0/6/23/26	0/1/1/1
4	NAG	F	705	2	-	2/6/23/26	0/1/1/1
4	NAG	C	1310	1	-	0/6/23/26	0/1/1/1
4	NAG	E	704	2	-	3/6/23/26	0/1/1/1
4	NAG	E	705	2	-	2/6/23/26	0/1/1/1
4	NAG	F	701	2	-	4/6/23/26	0/1/1/1
4	NAG	B	1311	1	-	2/6/23/26	0/1/1/1
4	NAG	A	1301	1	-	4/6/23/26	0/1/1/1
4	NAG	D	702	2	-	2/6/23/26	0/1/1/1
4	NAG	A	1309	1	-	4/6/23/26	0/1/1/1
4	NAG	D	705	2	-	2/6/23/26	0/1/1/1
4	NAG	F	702	2	-	0/6/23/26	0/1/1/1
4	NAG	B	1302	1	-	3/6/23/26	0/1/1/1
4	NAG	C	1314	1	-	4/6/23/26	0/1/1/1
4	NAG	B	1308	1	-	2/6/23/26	0/1/1/1
4	NAG	B	1305	1	-	3/6/23/26	0/1/1/1
4	NAG	A	1303	1	-	4/6/23/26	0/1/1/1
4	NAG	A	1302	1	-	4/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	NAG	C	1303	1	-	2/6/23/26	0/1/1/1
4	NAG	C	1306	1	-	5/6/23/26	0/1/1/1
4	NAG	B	1303	1	-	3/6/23/26	0/1/1/1
4	NAG	A	1308	1	-	3/6/23/26	0/1/1/1
4	NAG	C	1307	1	-	3/6/23/26	0/1/1/1
4	NAG	A	1305	1	-	4/6/23/26	0/1/1/1
4	NAG	A	1311	1	-	4/6/23/26	0/1/1/1
4	NAG	C	1302	1	-	2/6/23/26	0/1/1/1
4	NAG	D	703	2	-	3/6/23/26	0/1/1/1
4	NAG	C	1313	1	-	0/6/23/26	0/1/1/1
4	NAG	F	703	2	-	1/6/23/26	0/1/1/1
4	NAG	B	1301	1	-	4/6/23/26	0/1/1/1
4	NAG	A	1304	1	-	2/6/23/26	0/1/1/1
4	NAG	C	1308	1	-	2/6/23/26	0/1/1/1
4	NAG	B	1304	1	-	3/6/23/26	0/1/1/1
4	NAG	E	701	2	-	1/6/23/26	0/1/1/1
4	NAG	C	1301	1	-	2/6/23/26	0/1/1/1
4	NAG	C	1311	1	-	2/6/23/26	0/1/1/1
4	NAG	A	1306	1	-	1/6/23/26	0/1/1/1
4	NAG	B	1307	1	-	0/6/23/26	0/1/1/1
4	NAG	C	1305	1	-	2/6/23/26	0/1/1/1
4	NAG	E	703	2	-	4/6/23/26	0/1/1/1
4	NAG	A	1310	1	-	0/6/23/26	0/1/1/1
4	NAG	D	704	2	-	2/6/23/26	0/1/1/1
4	NAG	C	1312	1	-	2/6/23/26	0/1/1/1
4	NAG	C	1309	1	-	3/6/23/26	0/1/1/1

The worst 5 of 8 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	B	1303	NAG	O5-C1	3.17	1.48	1.43
4	A	1311	NAG	O5-C1	3.10	1.48	1.43
4	C	1312	NAG	O5-C1	3.04	1.48	1.43
4	C	1303	NAG	O5-C1	2.64	1.47	1.43
4	D	702	NAG	O5-C1	2.50	1.47	1.43

The worst 5 of 13 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	1311	NAG	C1-O5-C5	5.26	119.32	112.19
4	C	1312	NAG	C1-O5-C5	5.14	119.16	112.19
4	C	1313	NAG	C1-O5-C5	4.95	118.90	112.19
4	B	1303	NAG	C1-O5-C5	4.58	118.40	112.19
4	C	1306	NAG	C2-N2-C7	4.32	129.05	122.90

There are no chirality outliers.

5 of 113 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	B	1303	NAG	C4-C5-C6-O6
4	A	1309	NAG	C4-C5-C6-O6
4	E	702	NAG	C4-C5-C6-O6
4	E	704	NAG	O5-C5-C6-O6
4	A	1304	NAG	C4-C5-C6-O6

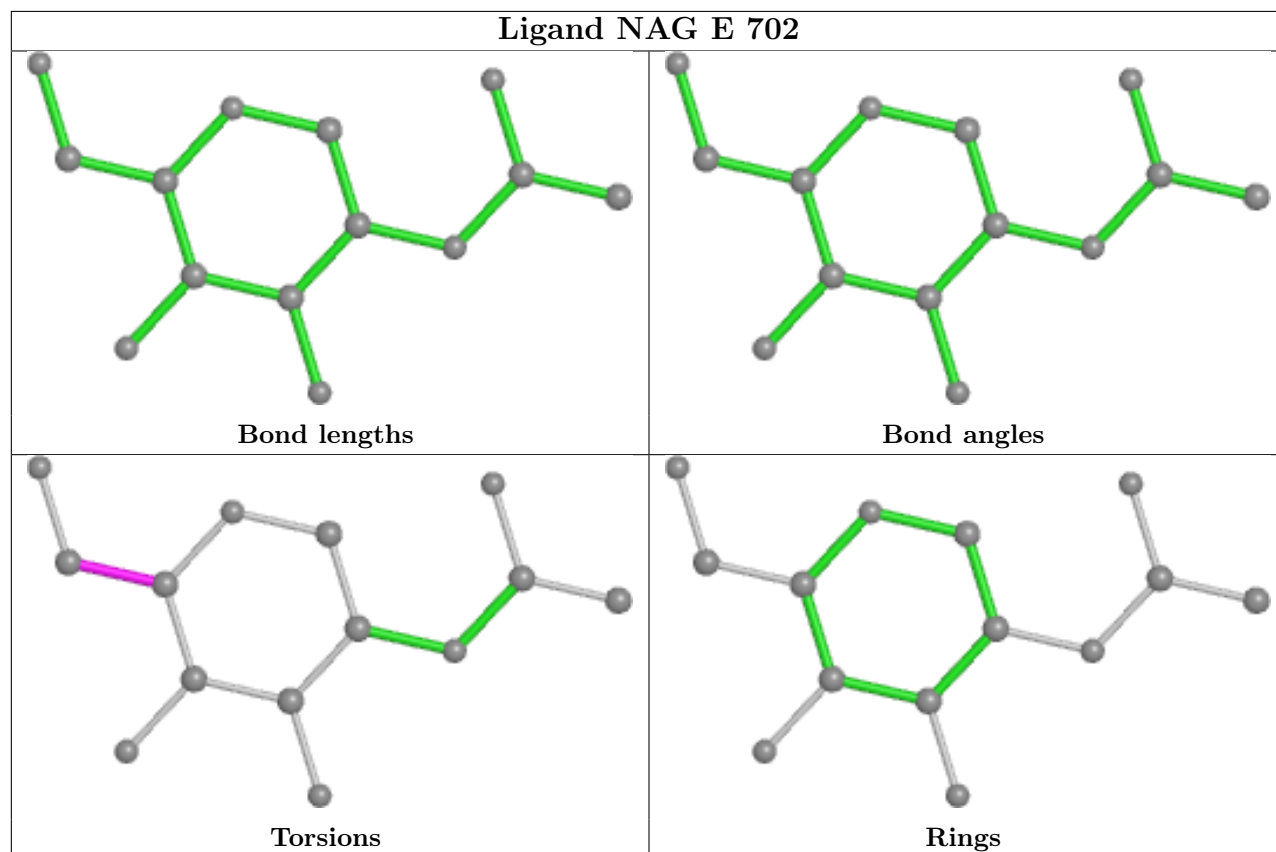
There are no ring outliers.

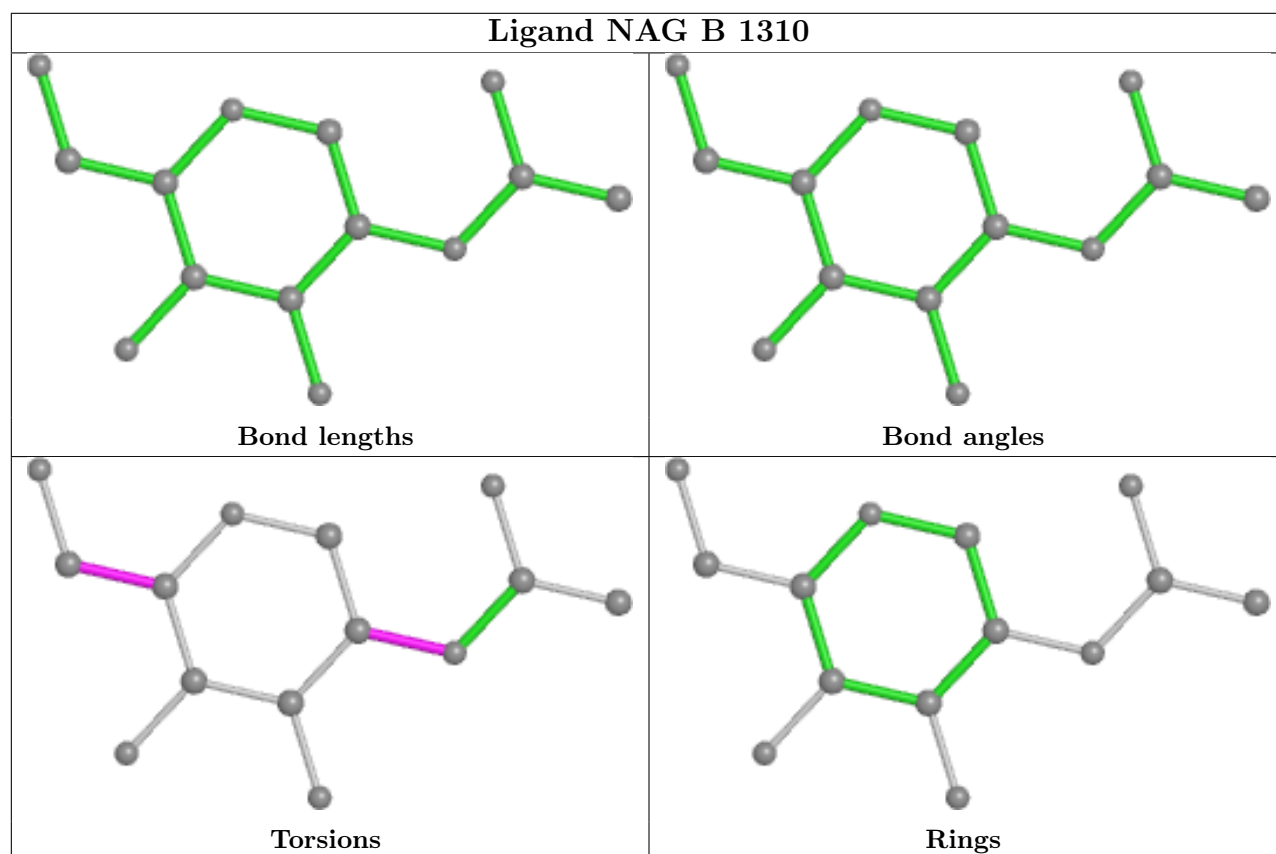
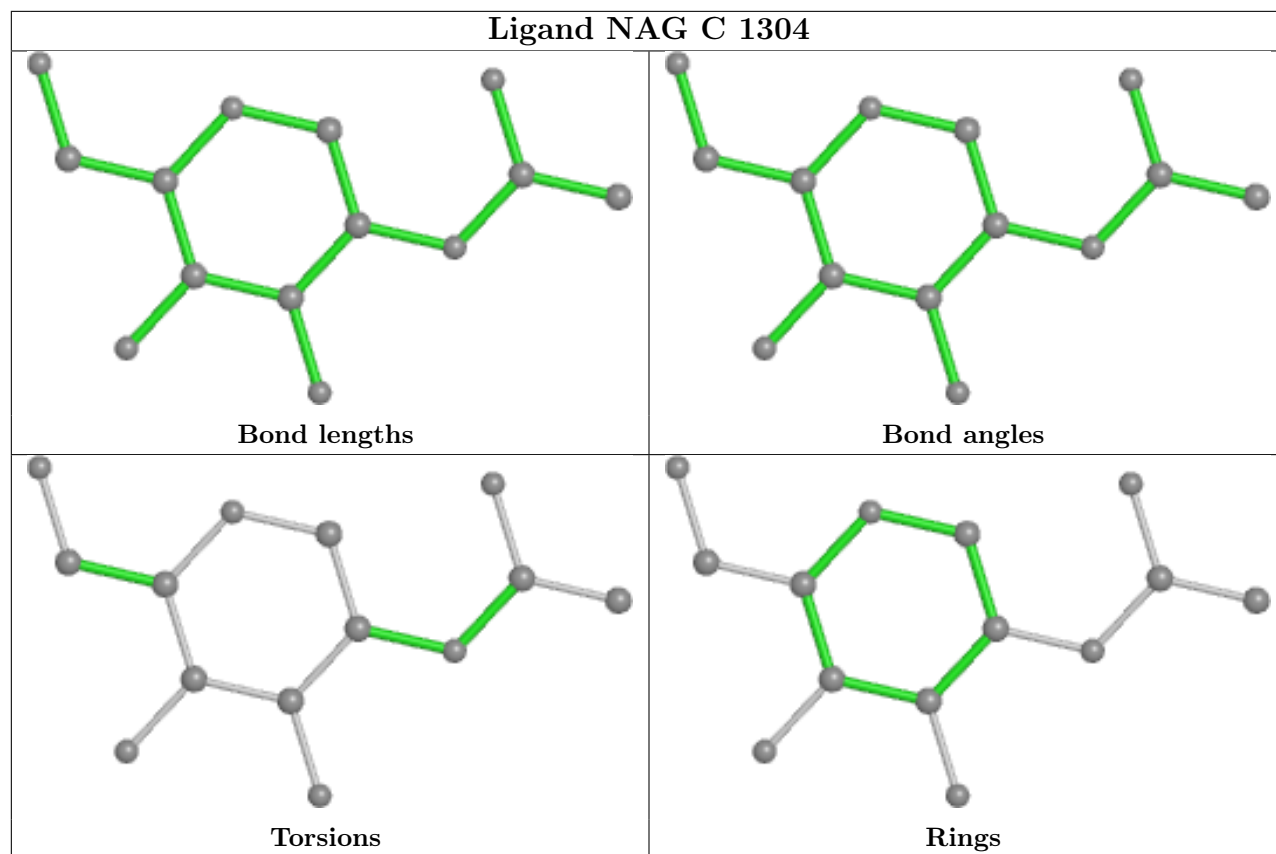
13 monomers are involved in 14 short contacts:

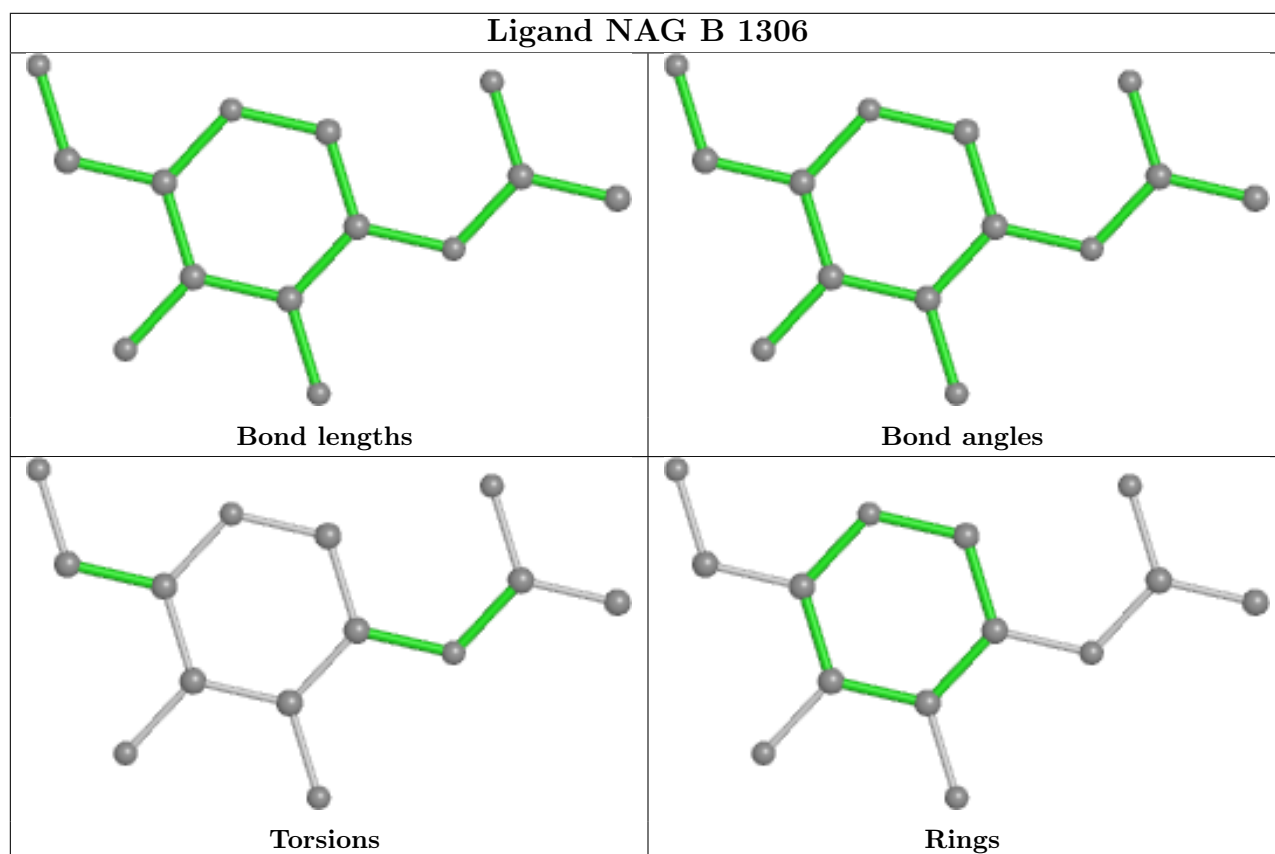
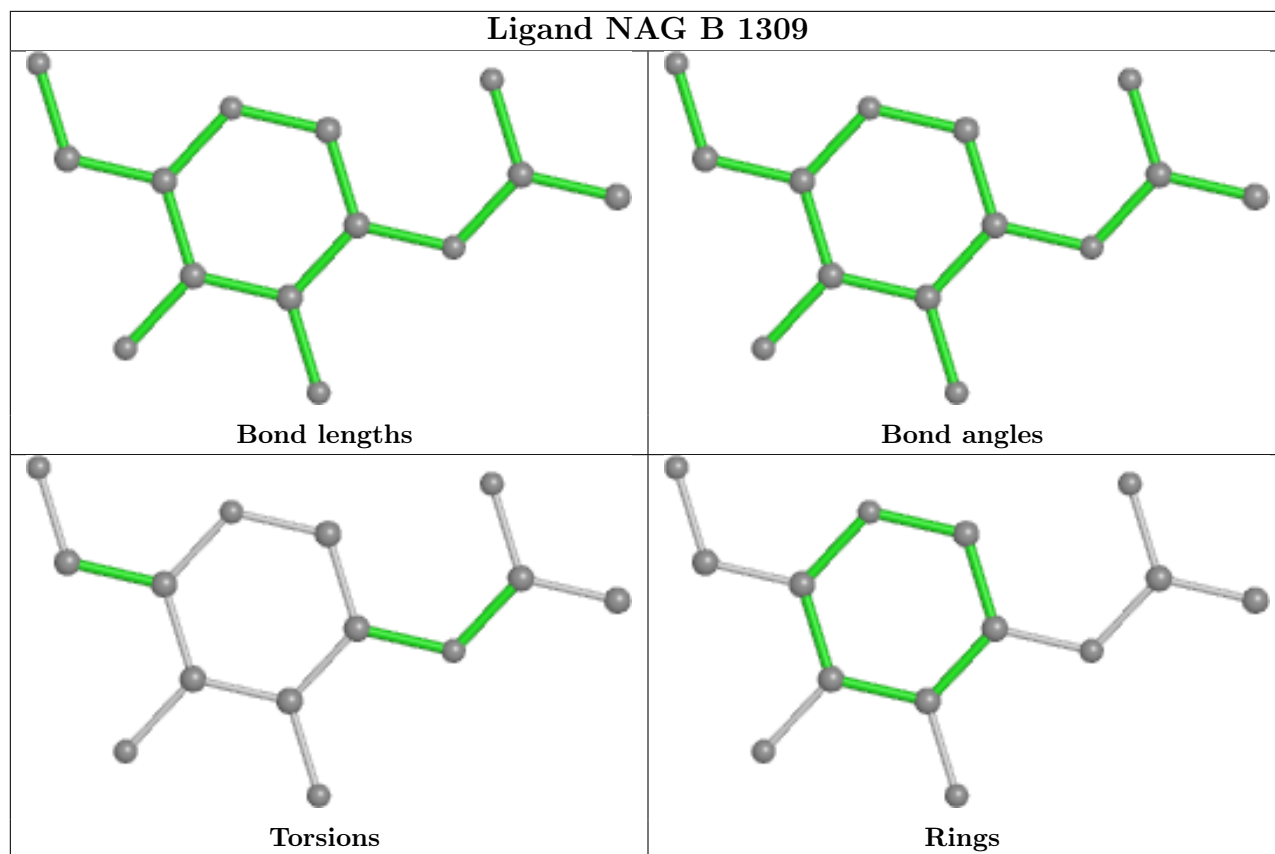
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	E	702	NAG	2	0
4	C	1304	NAG	1	0
4	F	704	NAG	1	0
4	F	701	NAG	1	0
4	C	1314	NAG	1	0
4	A	1303	NAG	1	0
4	C	1303	NAG	1	0
4	C	1306	NAG	1	0
4	C	1302	NAG	1	0
4	D	703	NAG	1	0
4	F	703	NAG	1	0
4	A	1306	NAG	1	0
4	E	703	NAG	1	0

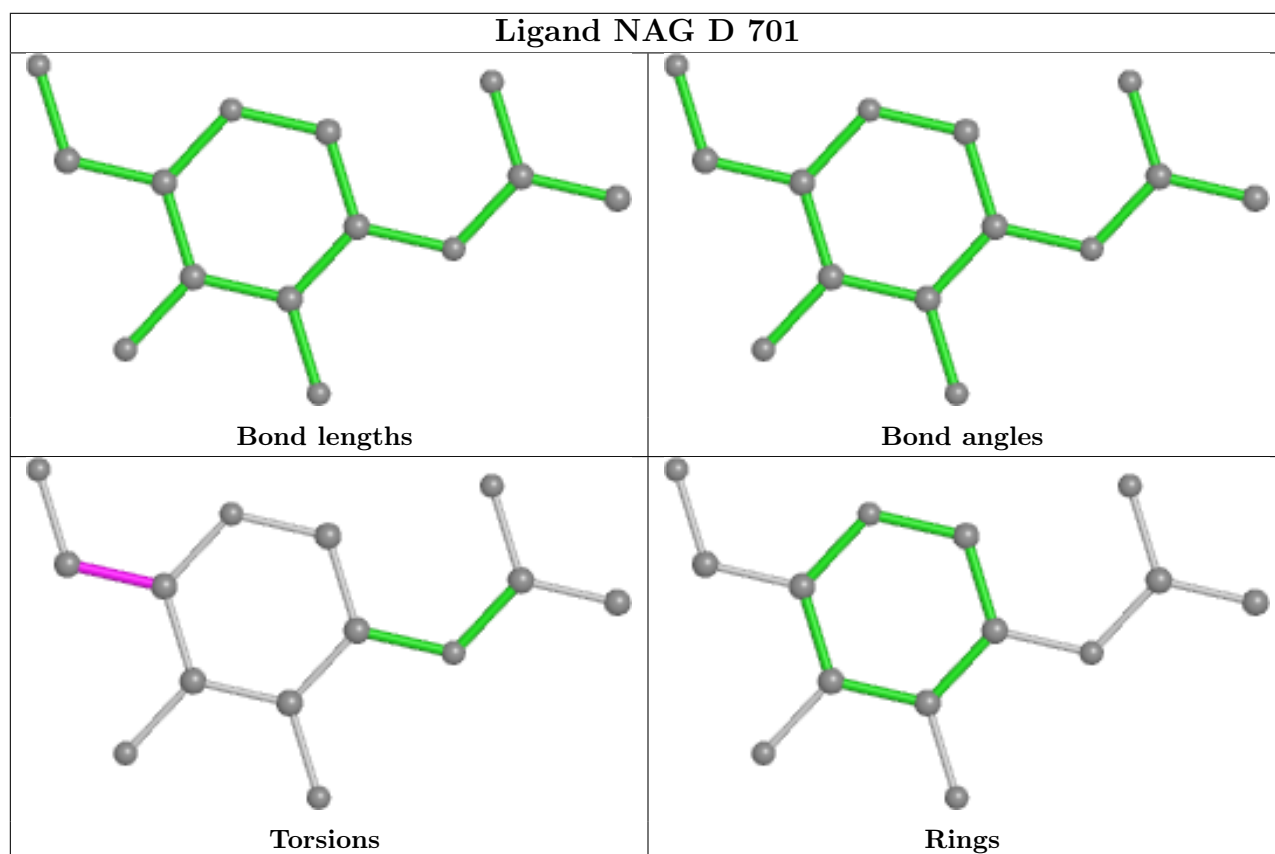
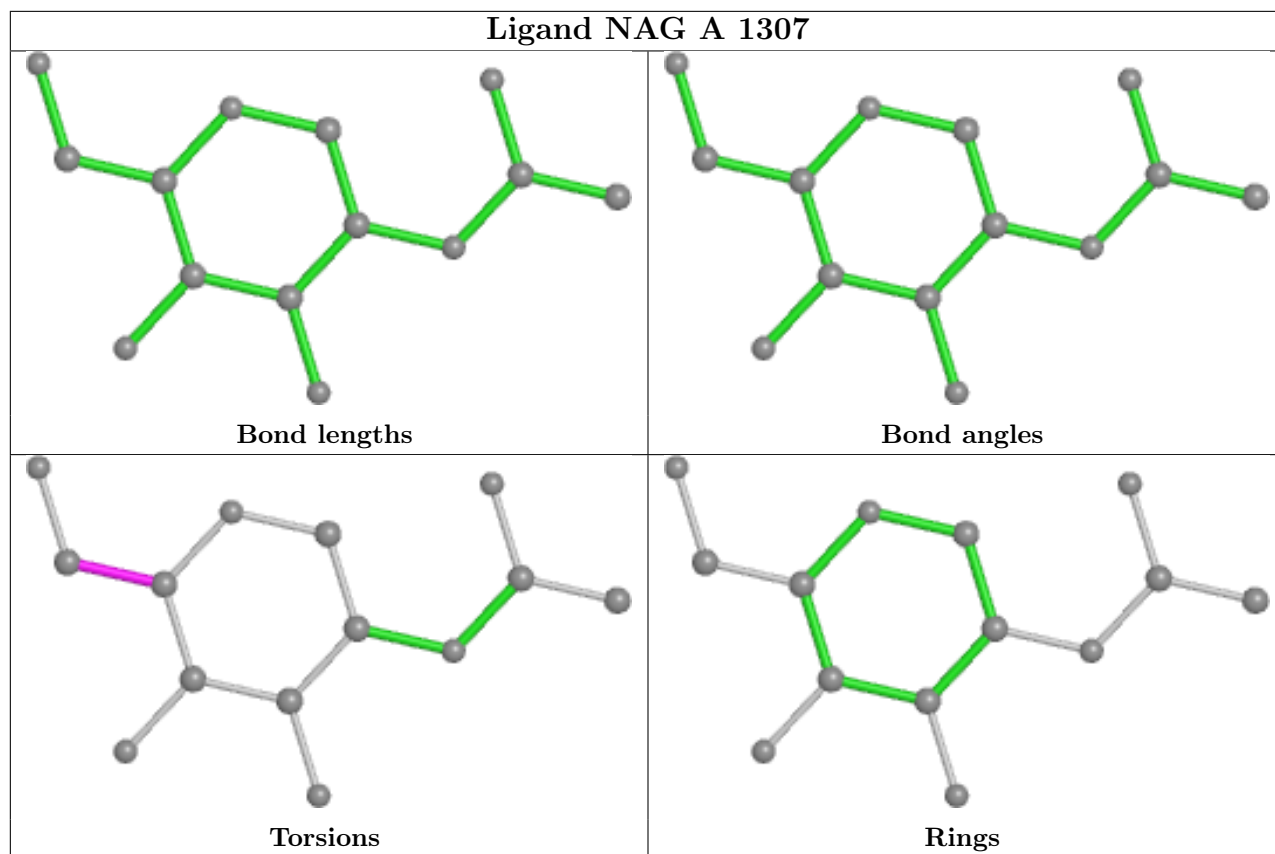
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and

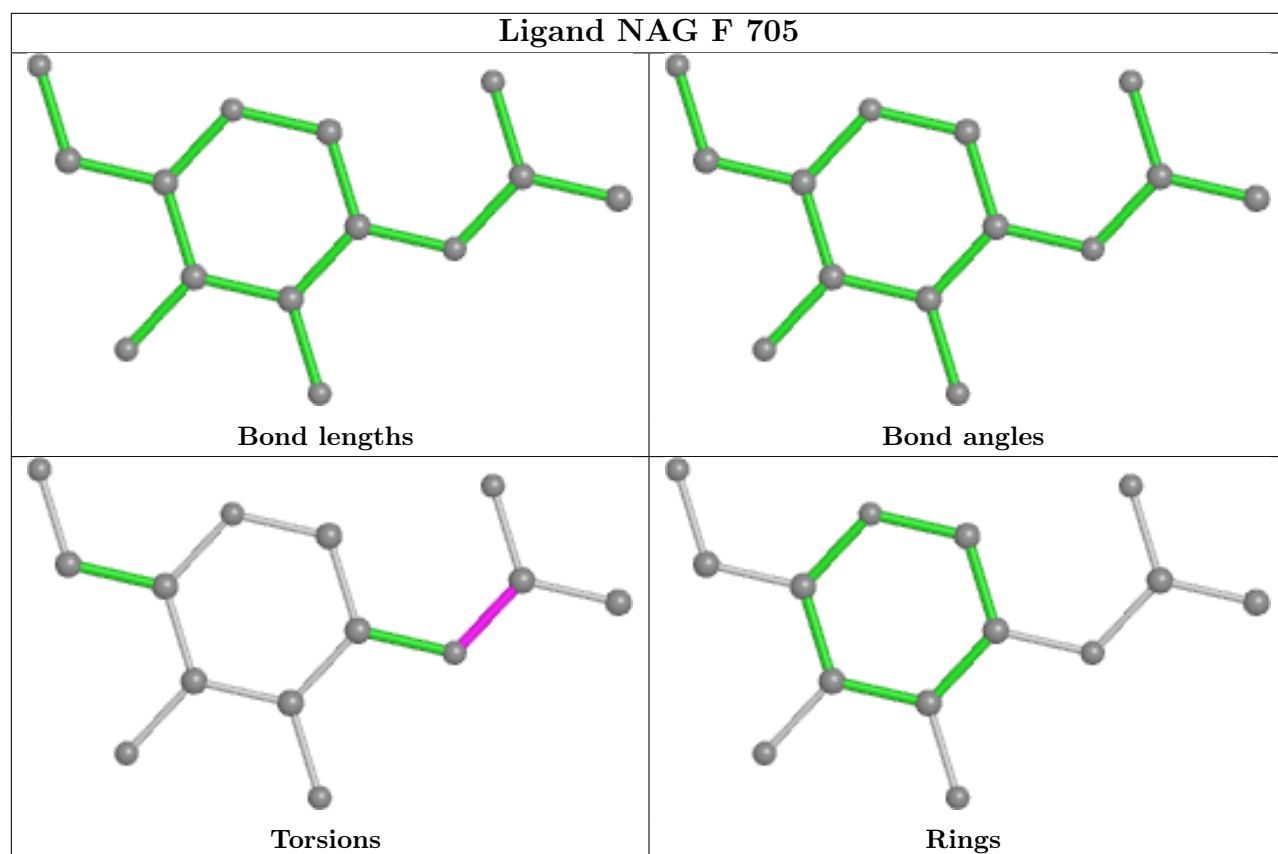
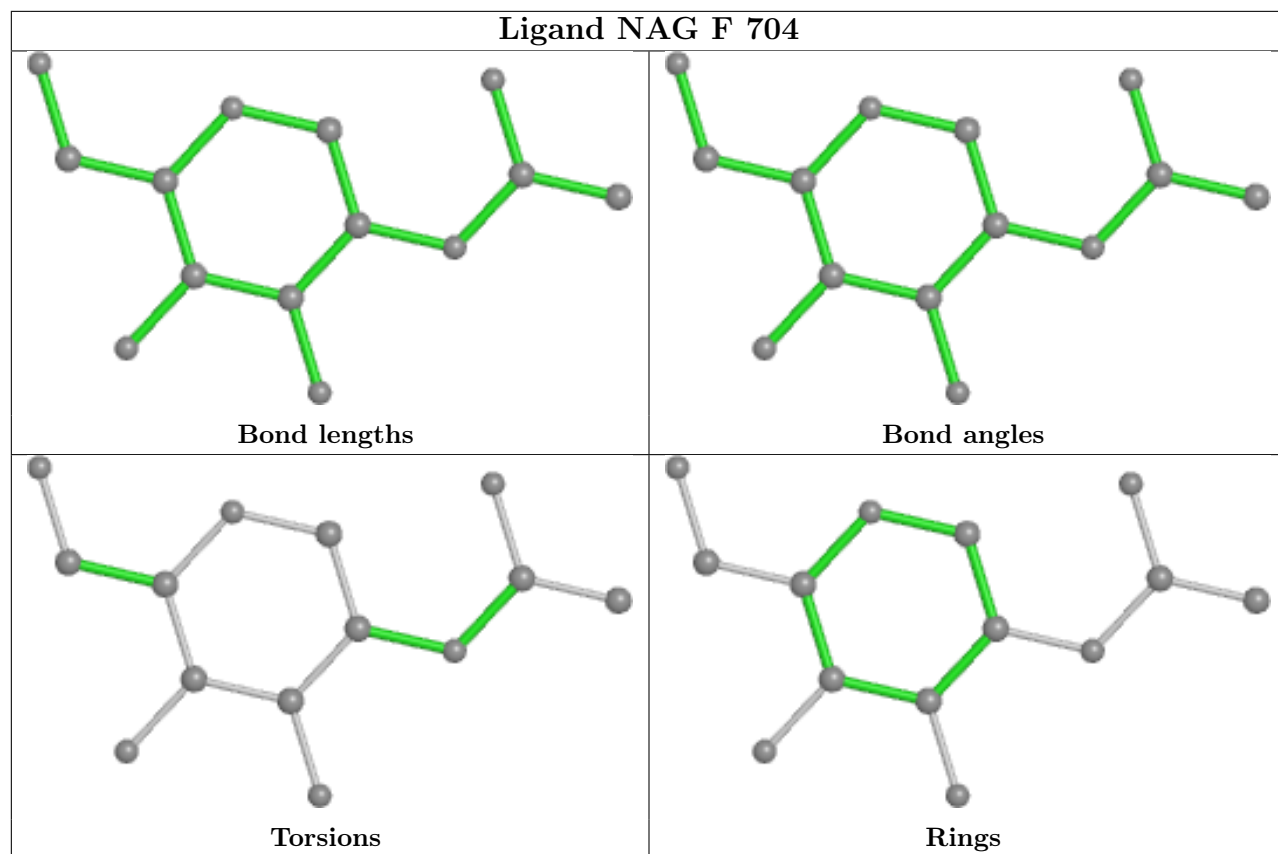
any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

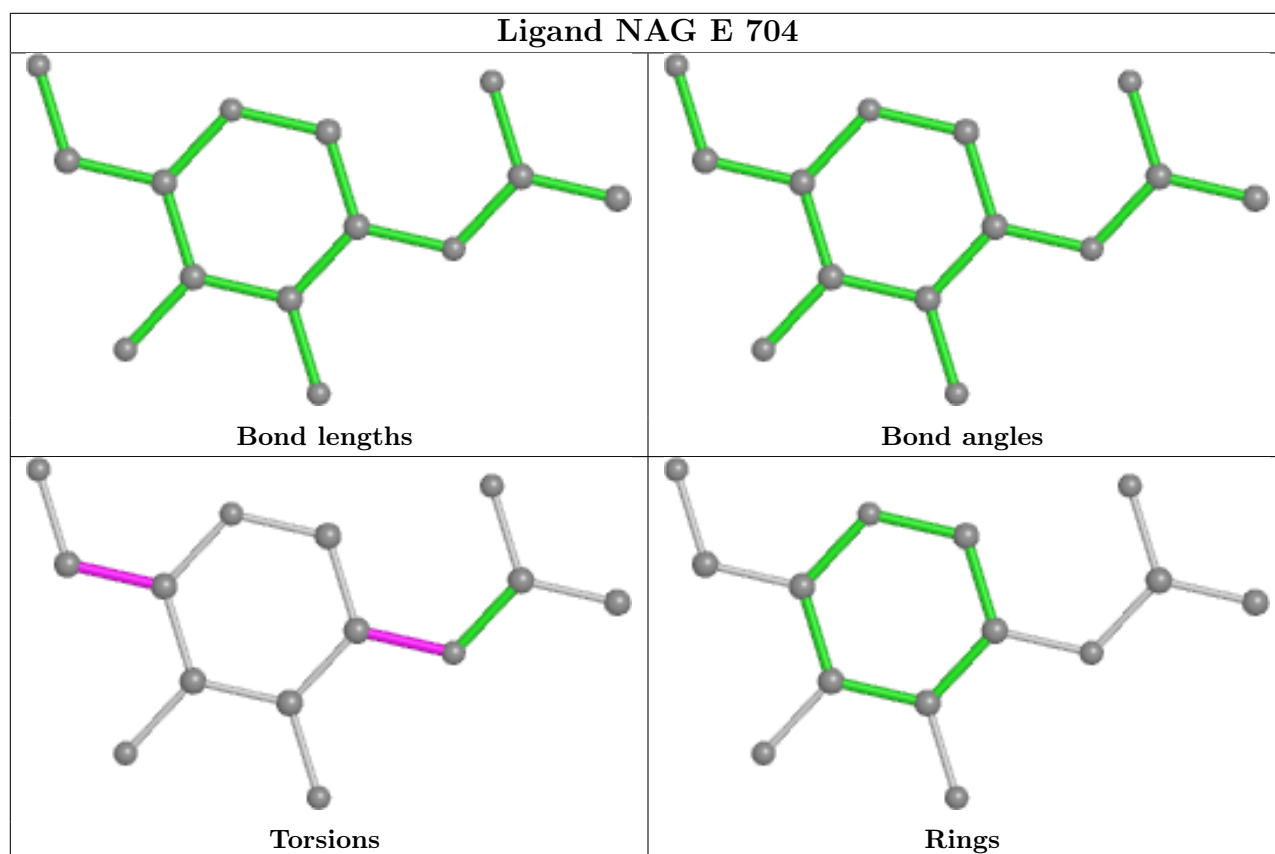
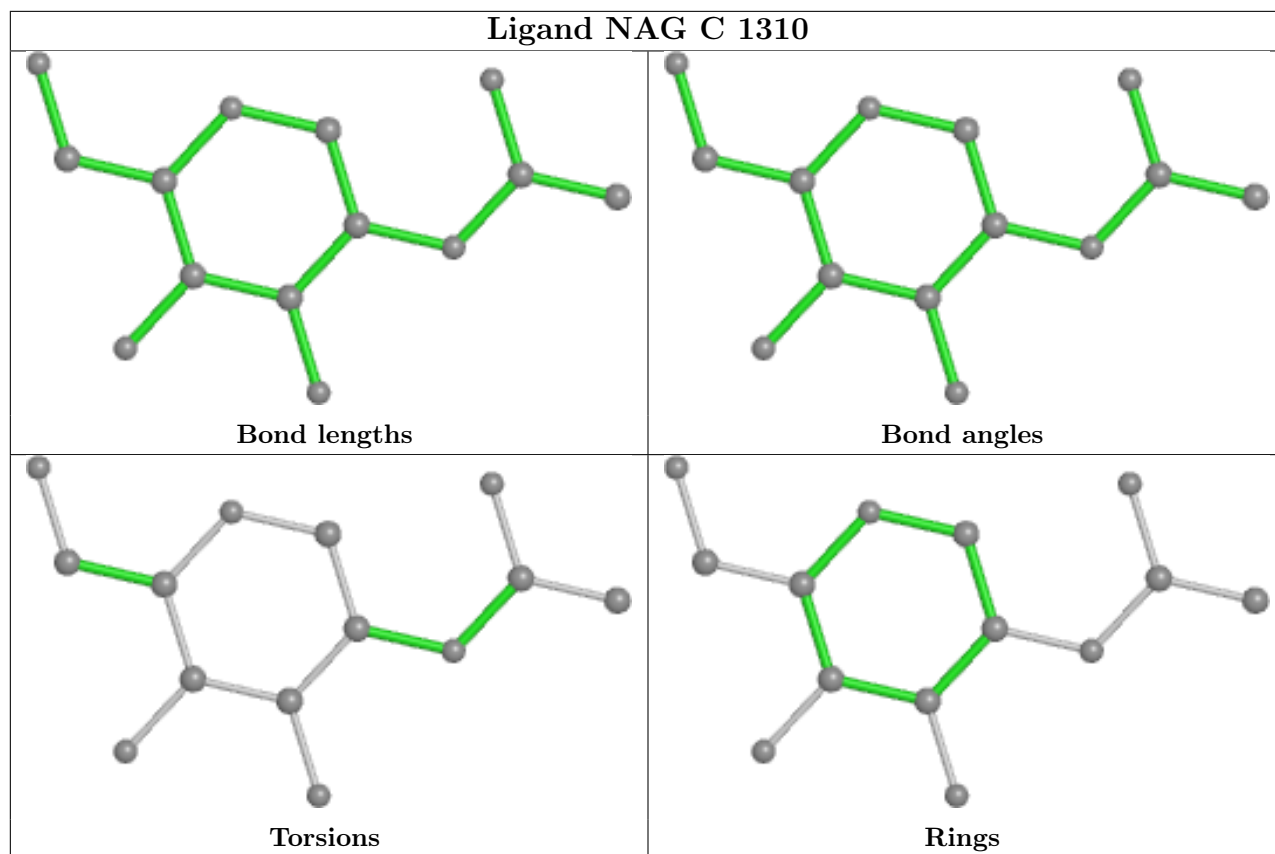


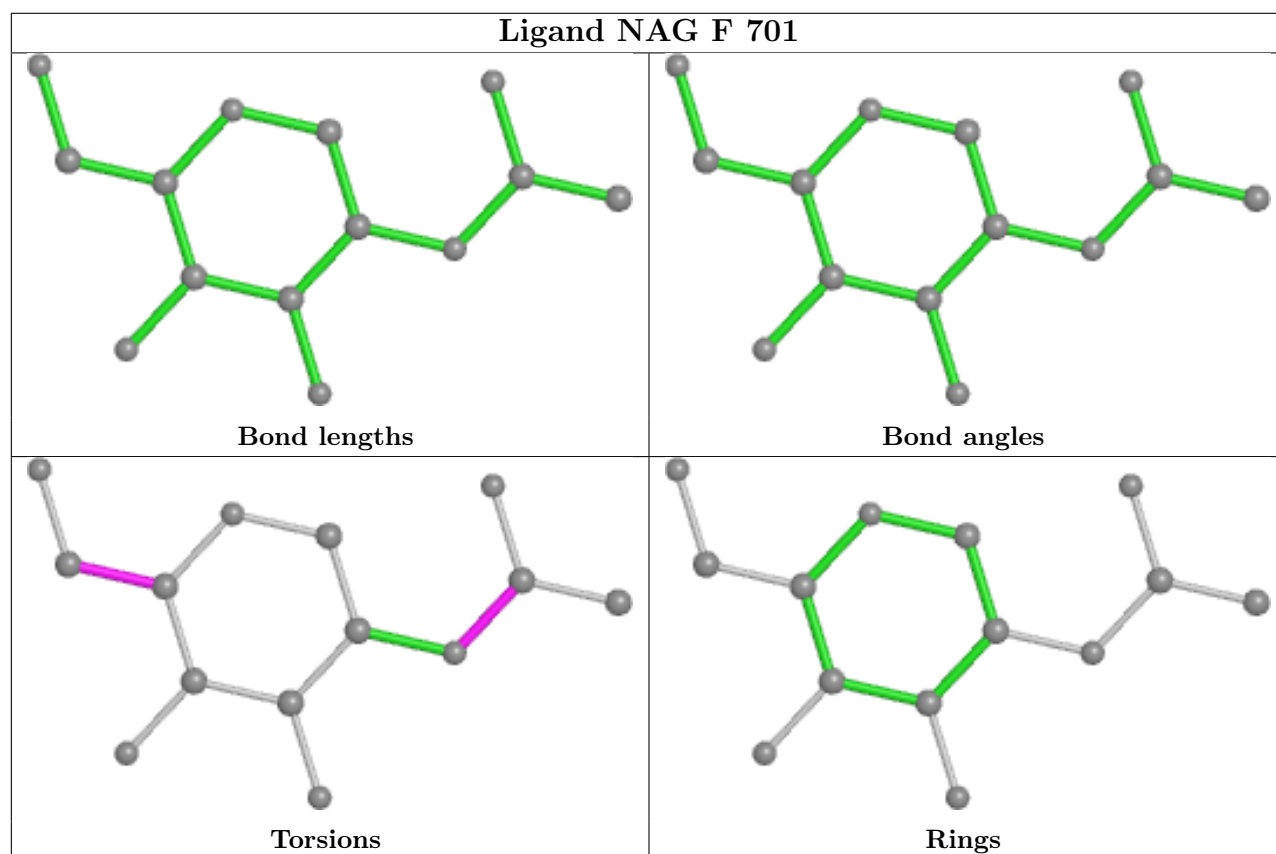
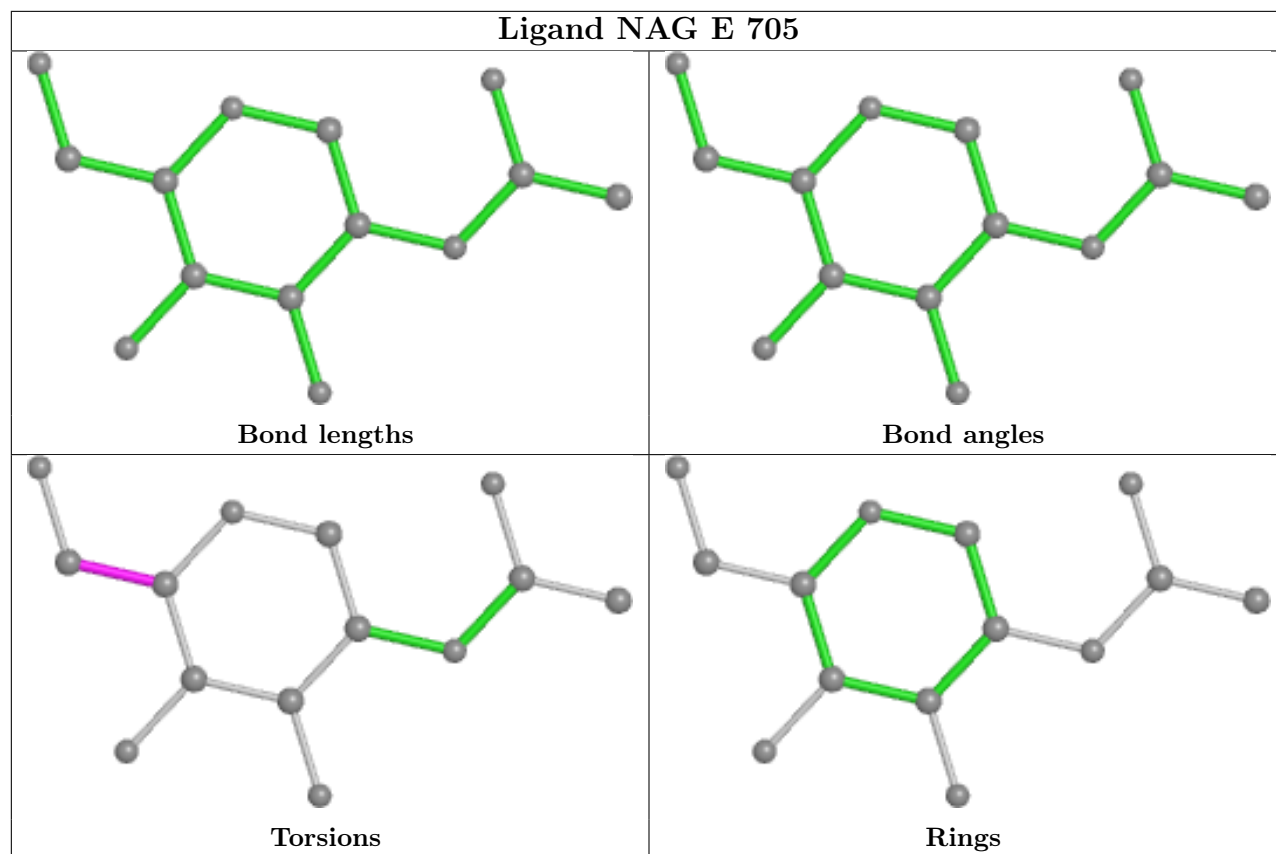


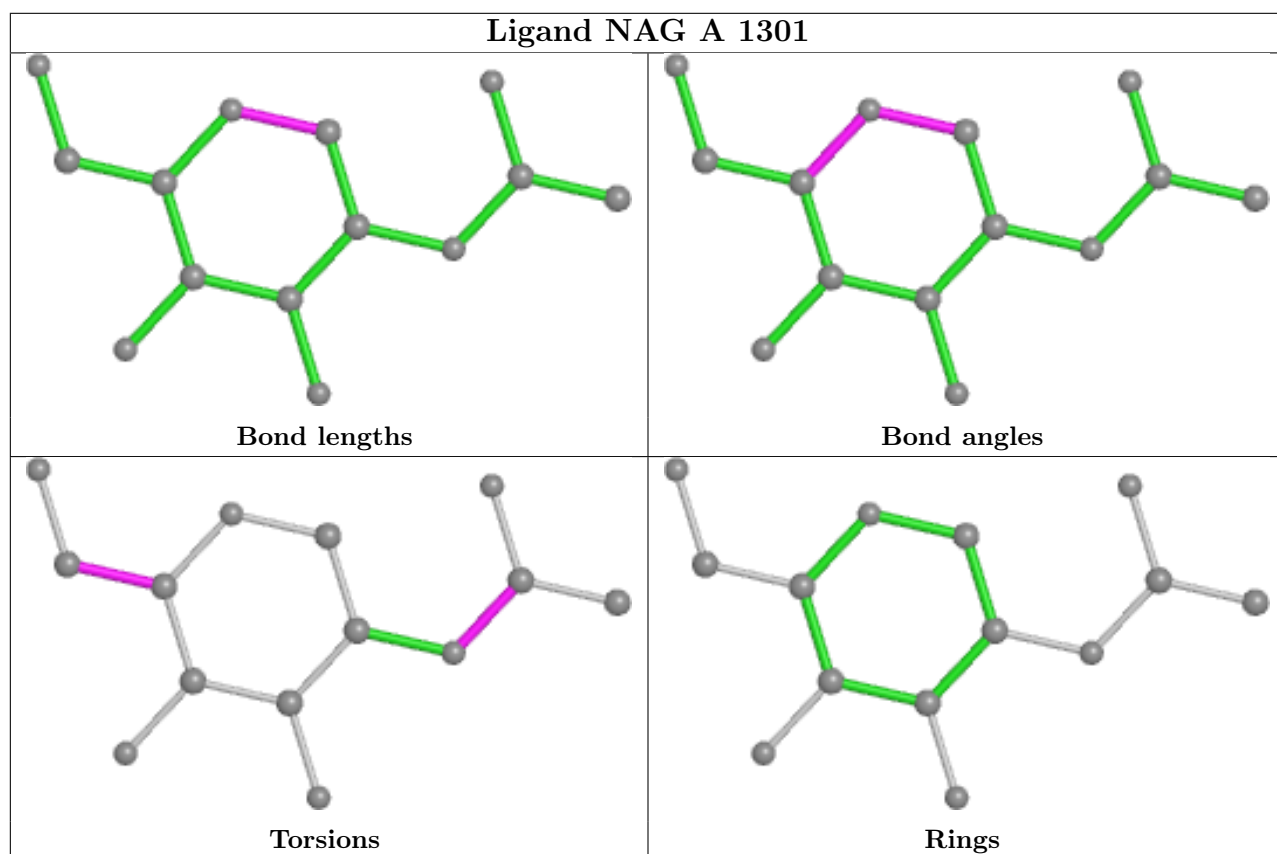
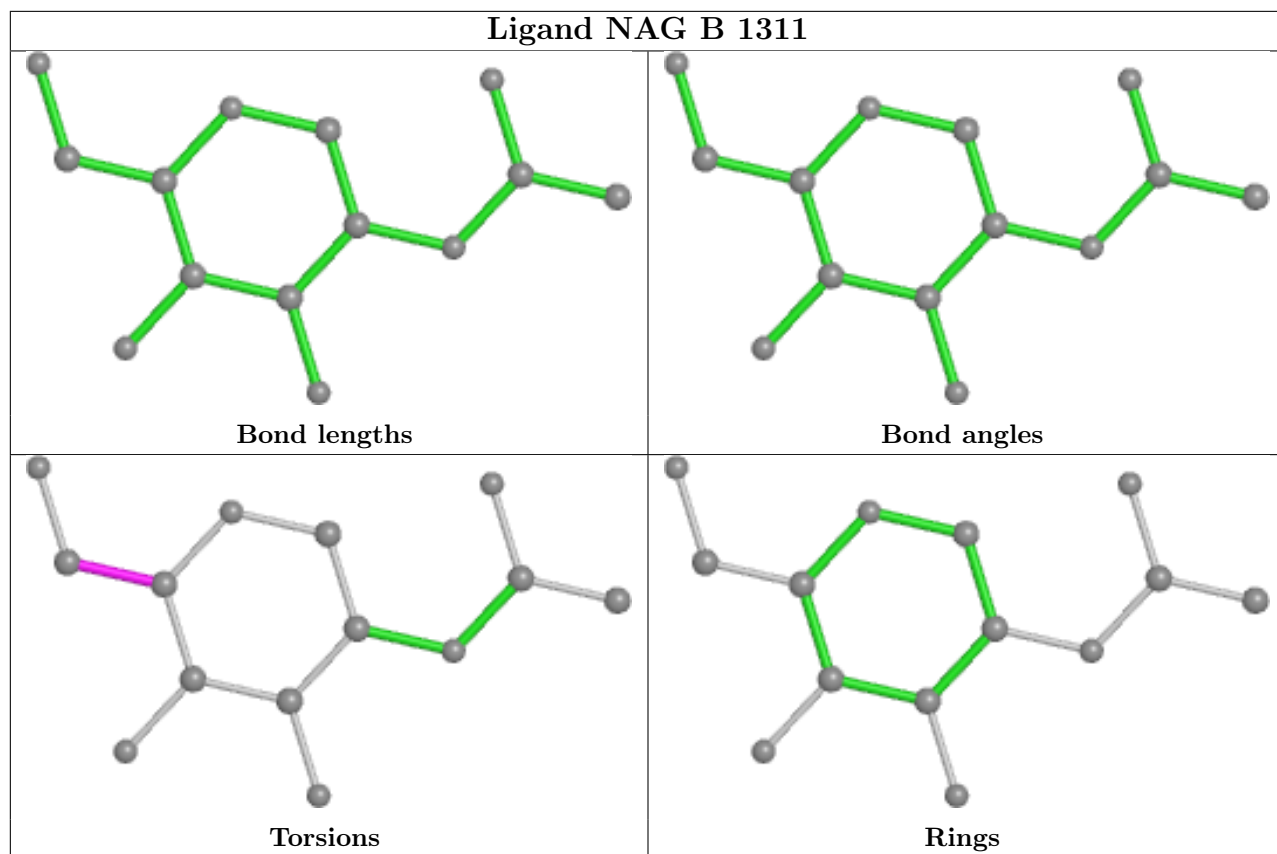


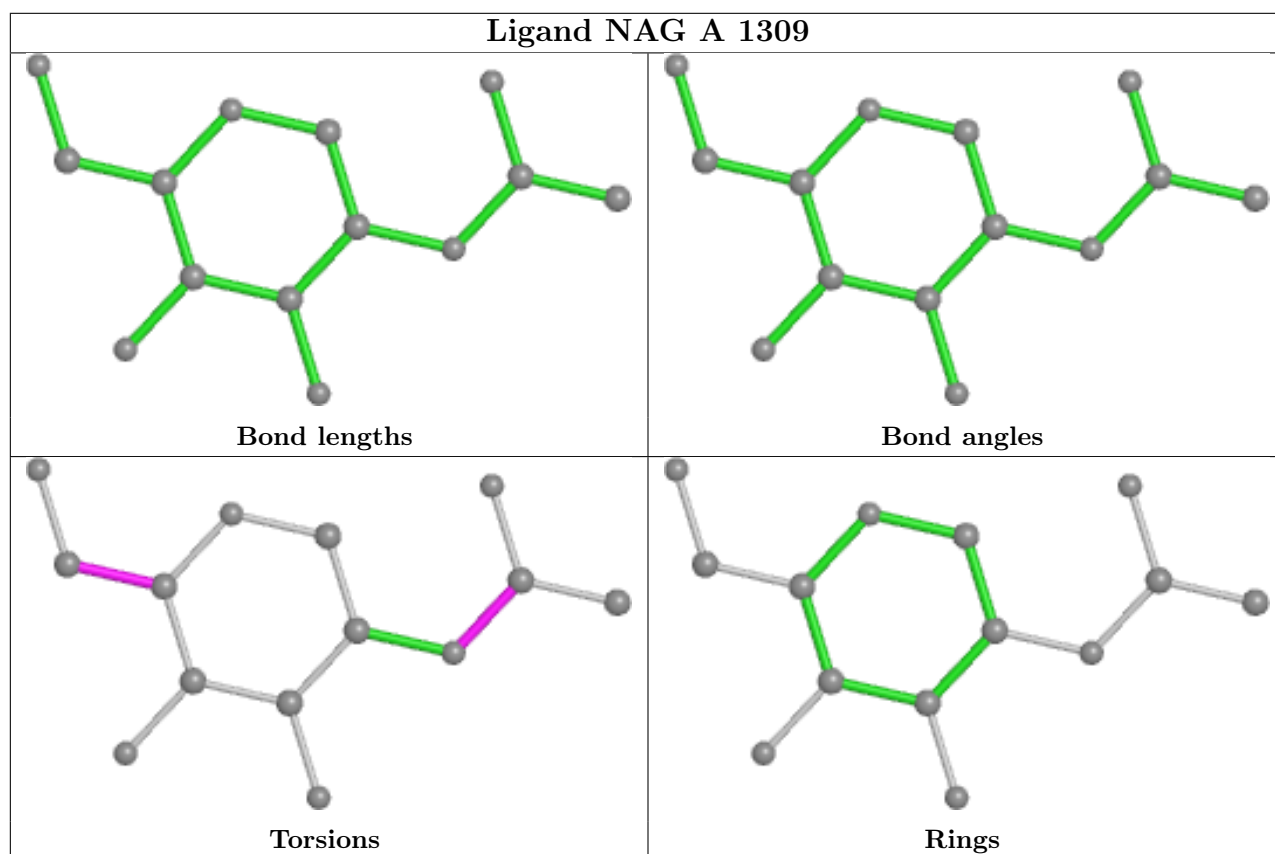
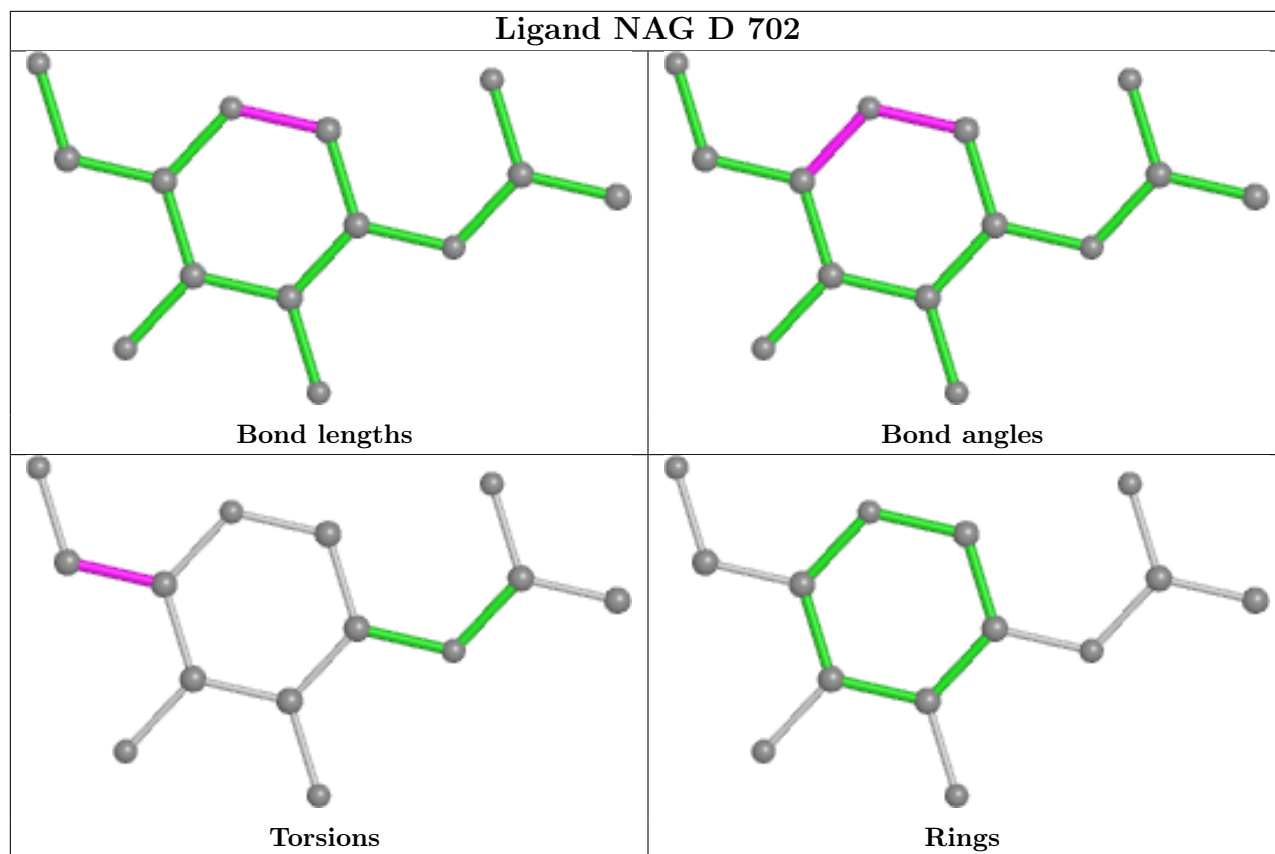


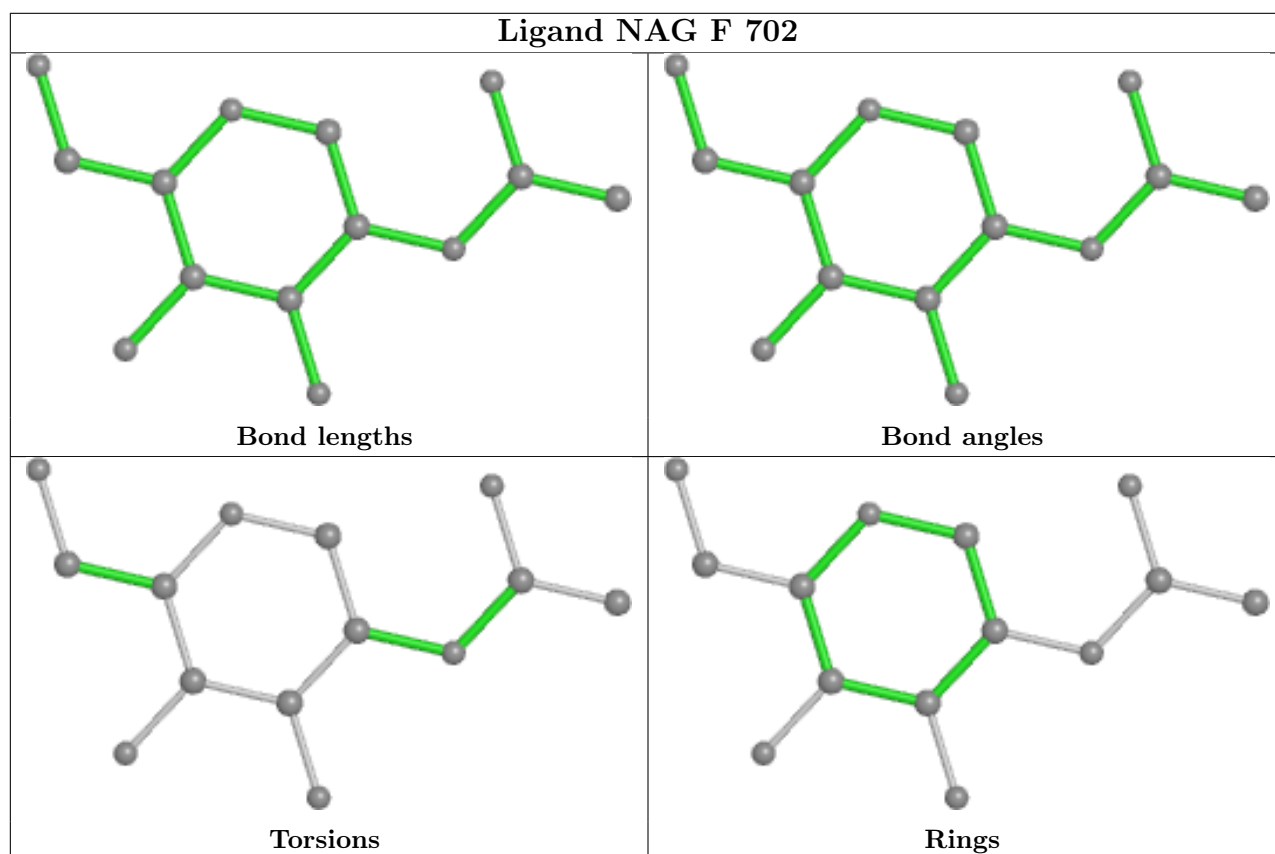
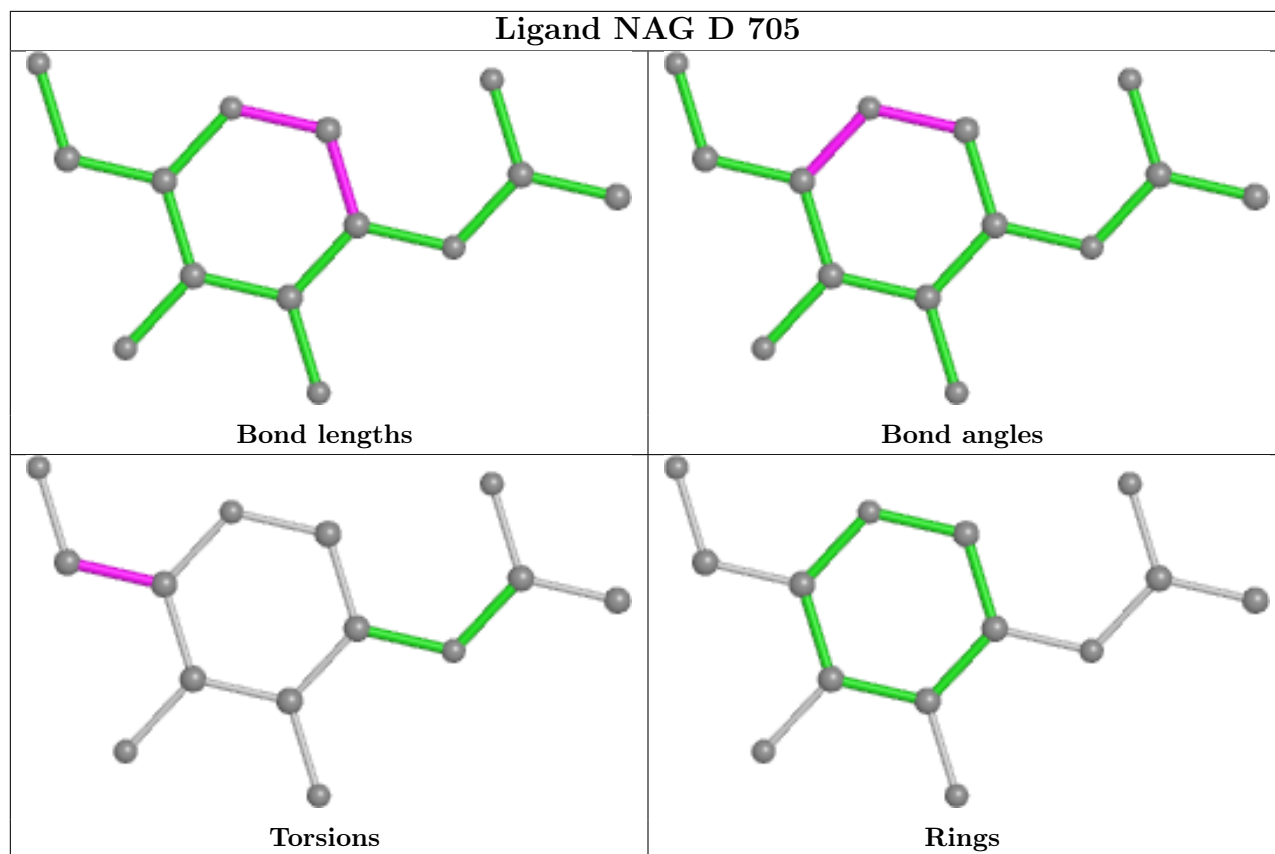


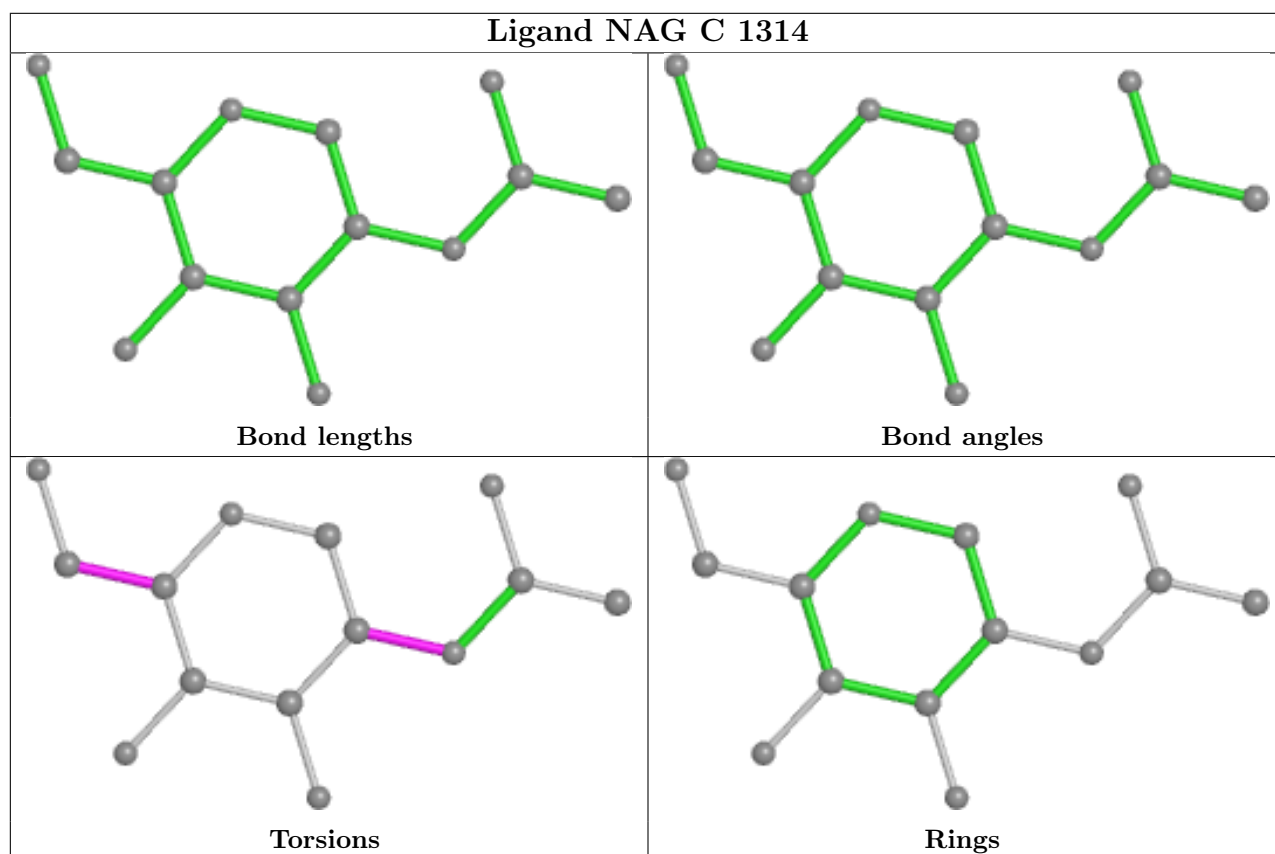
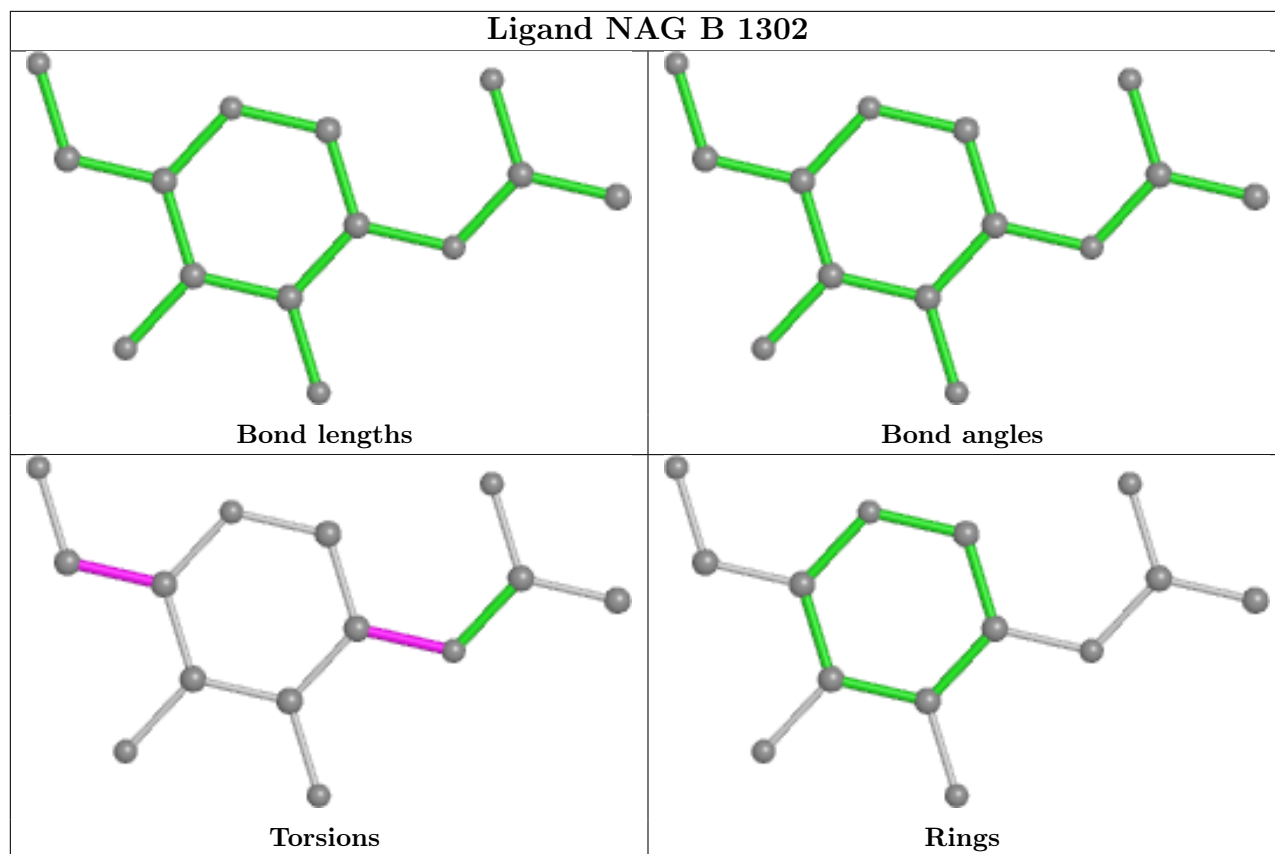


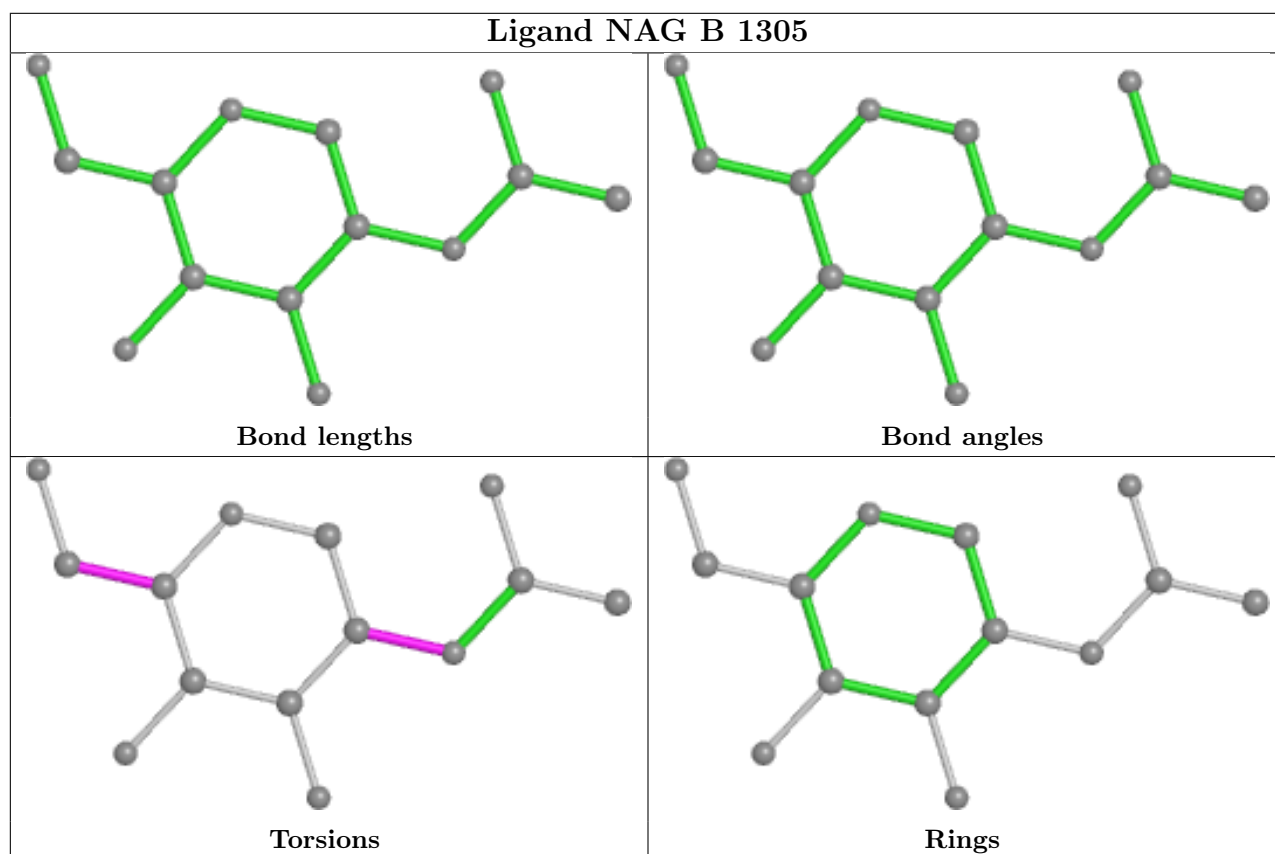
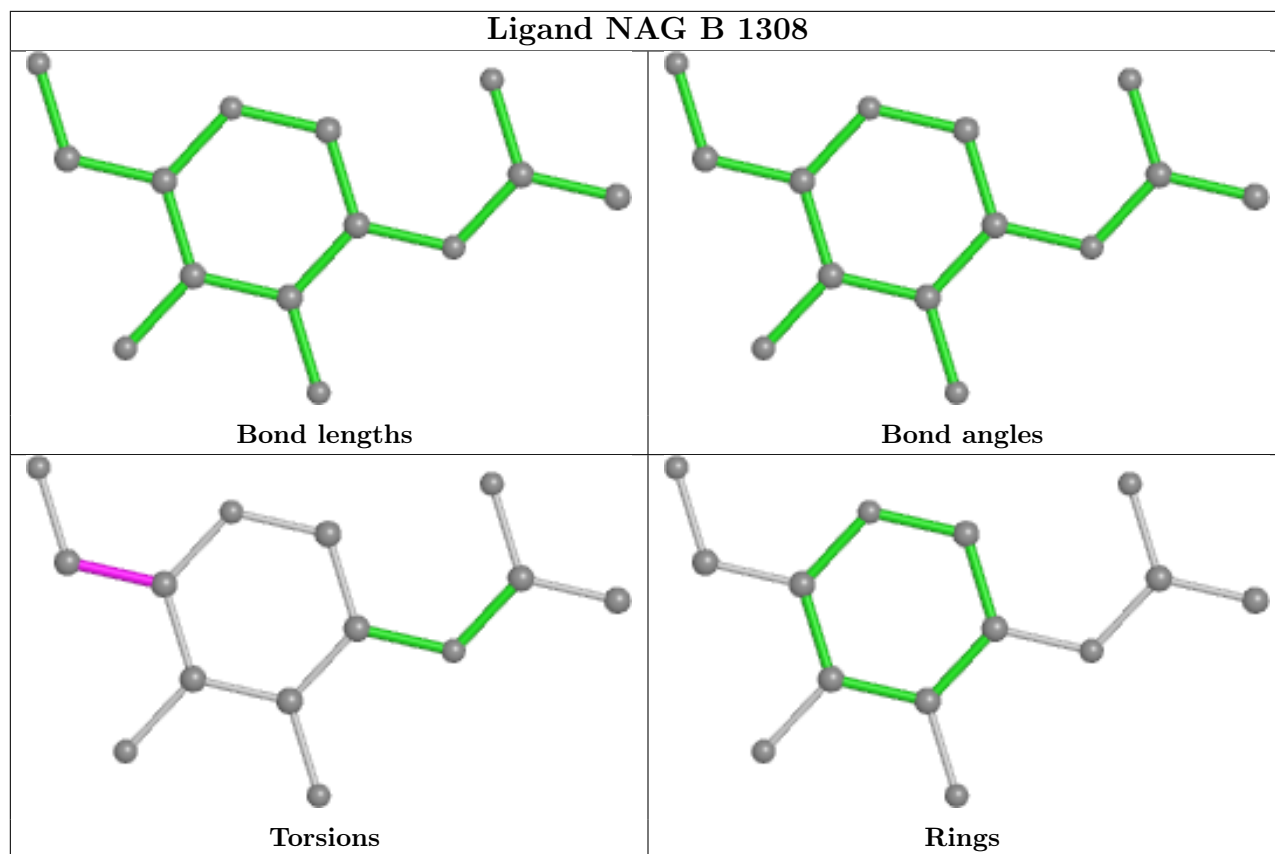


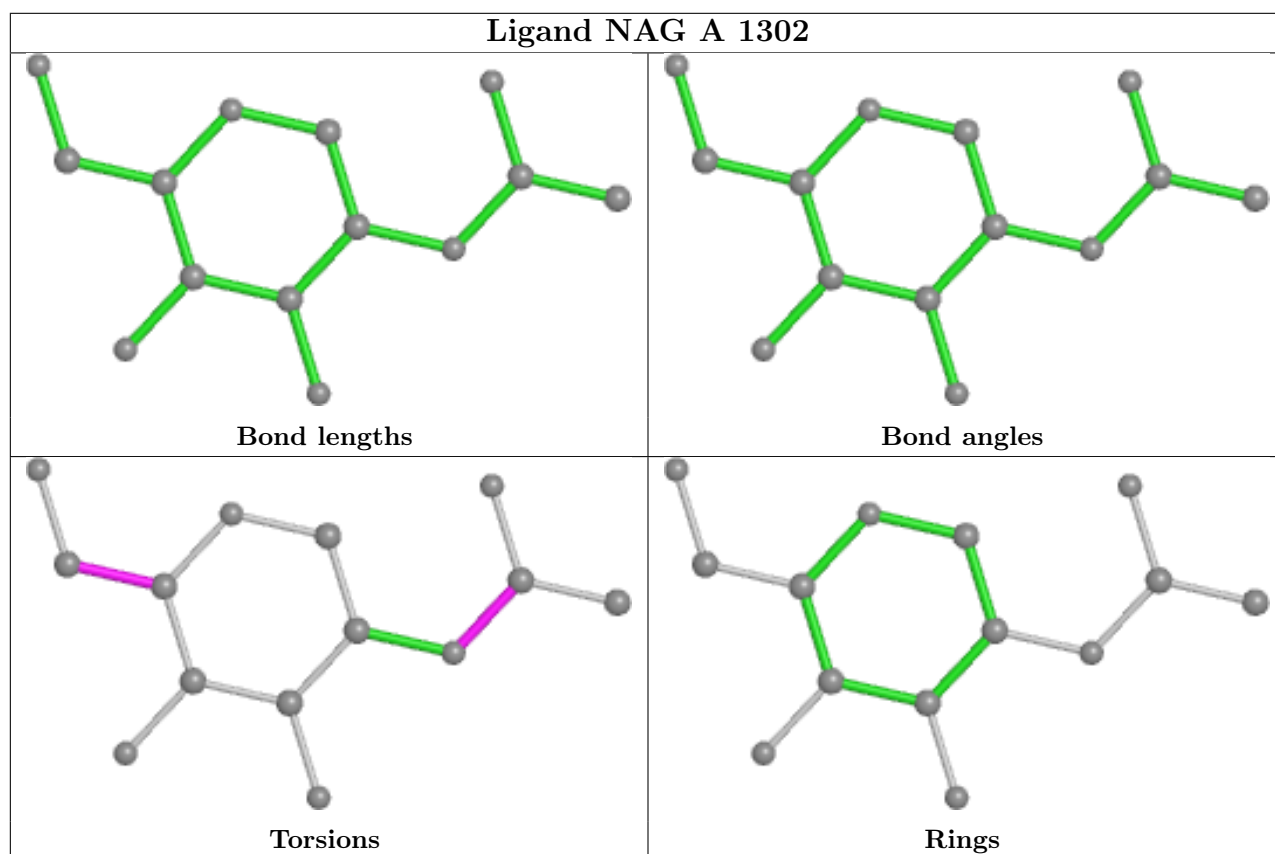
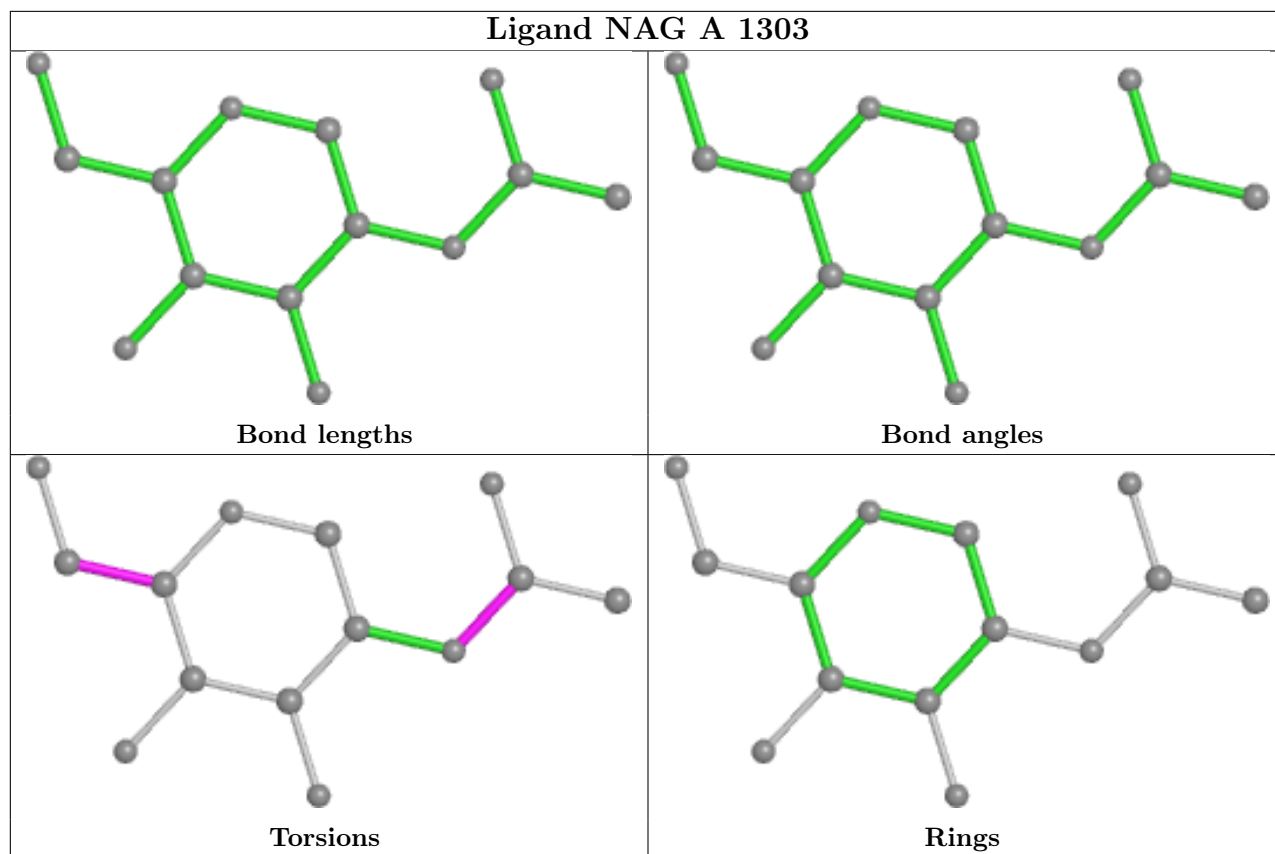


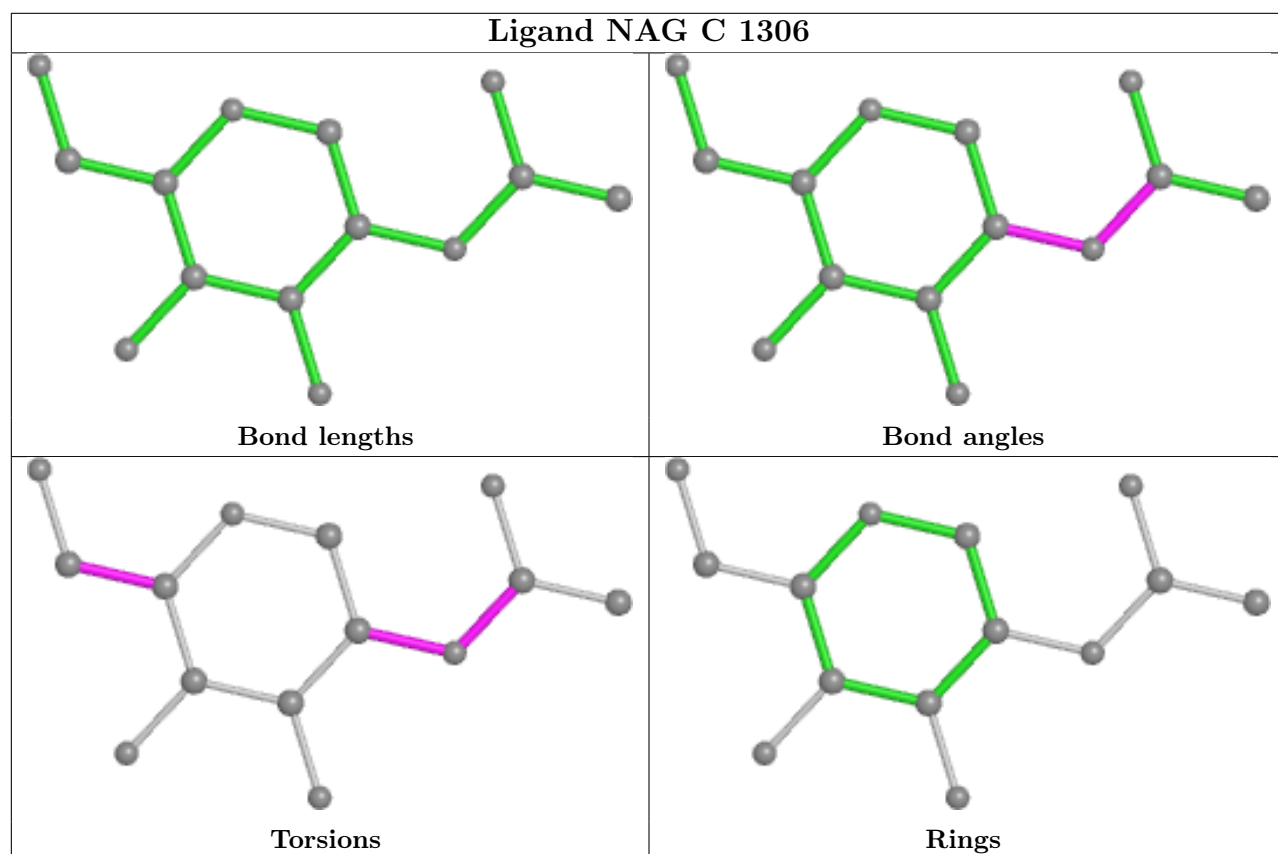
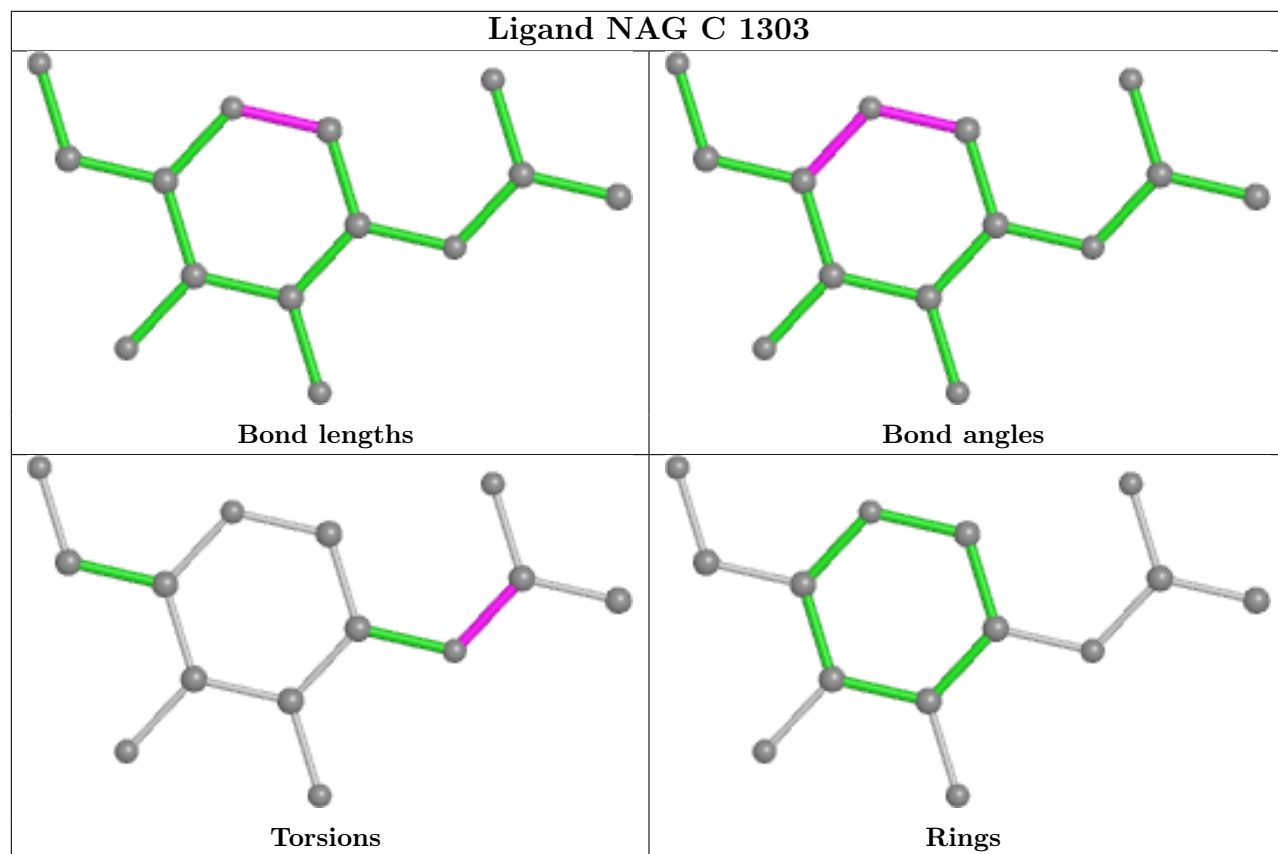


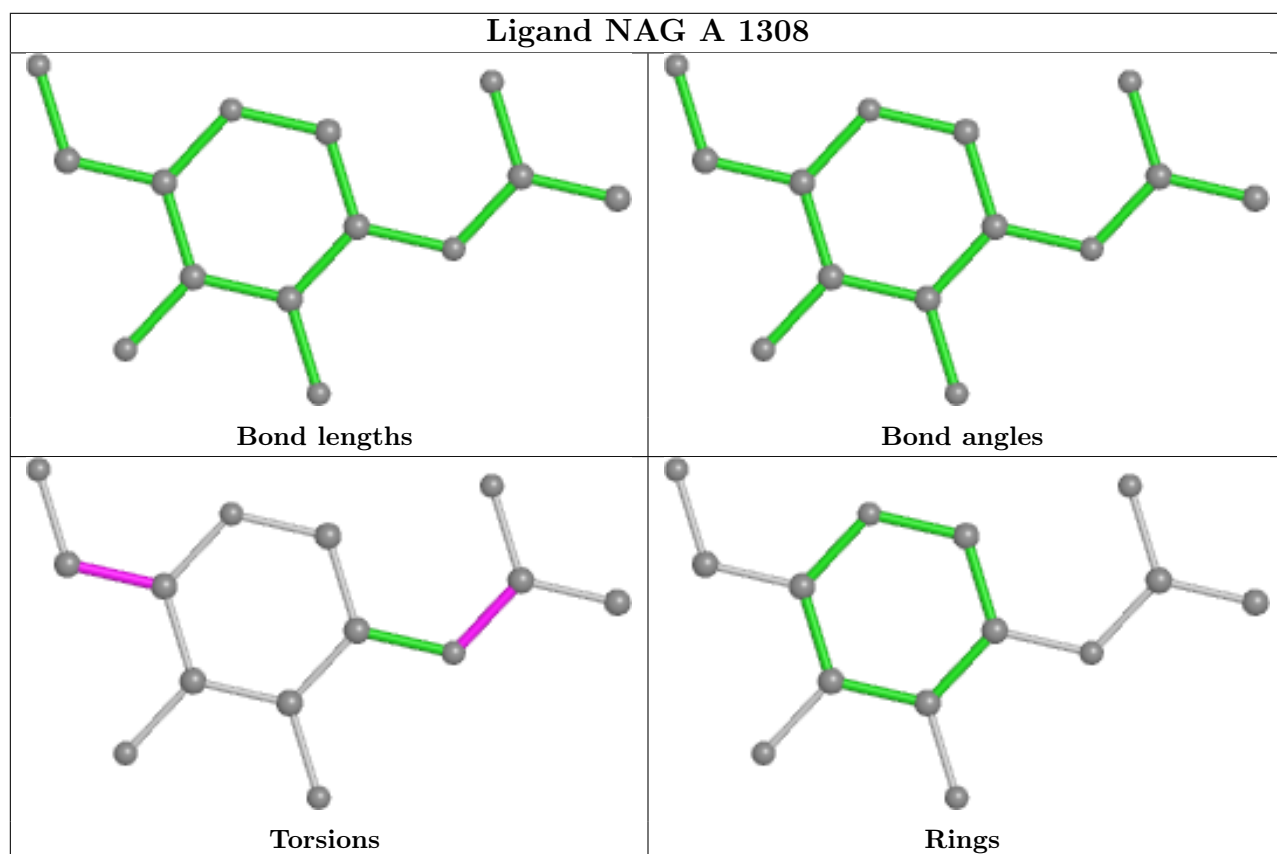
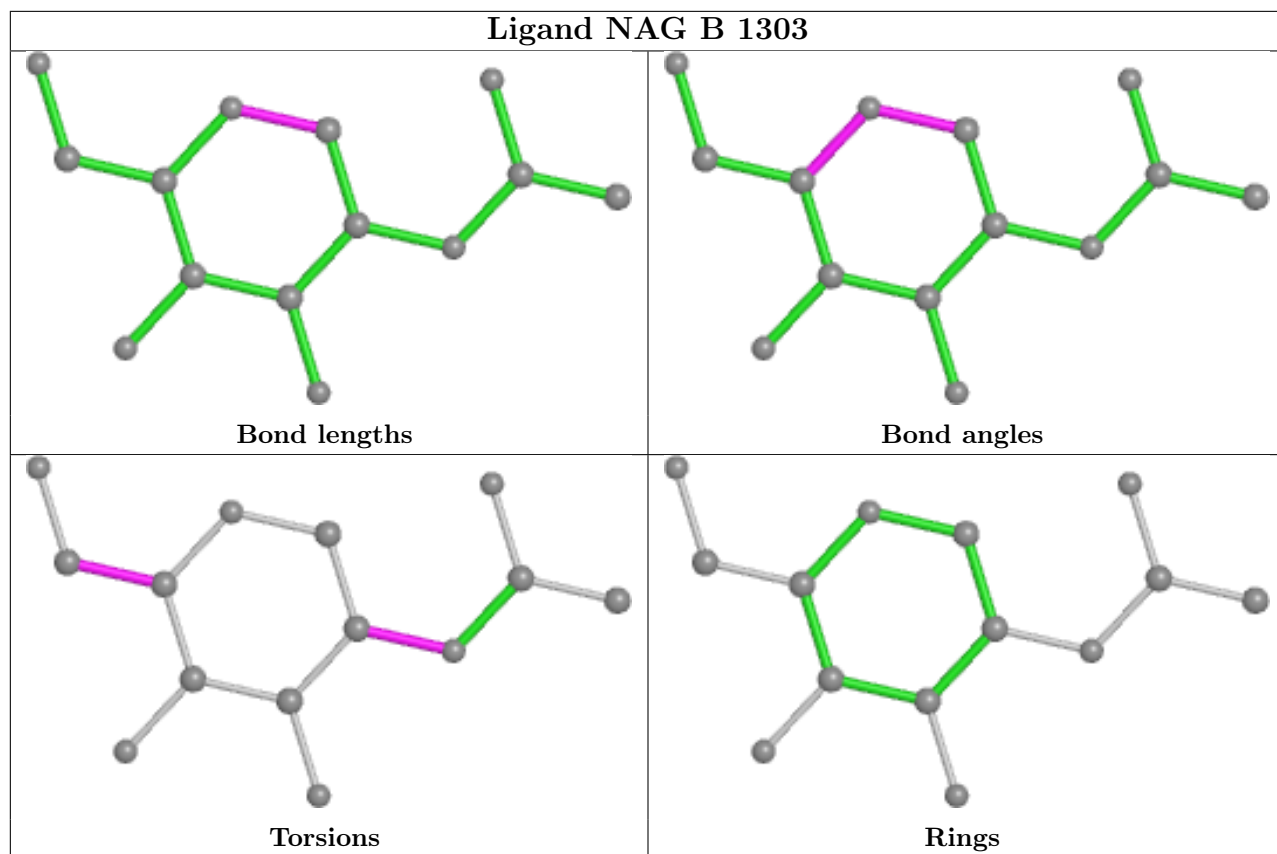


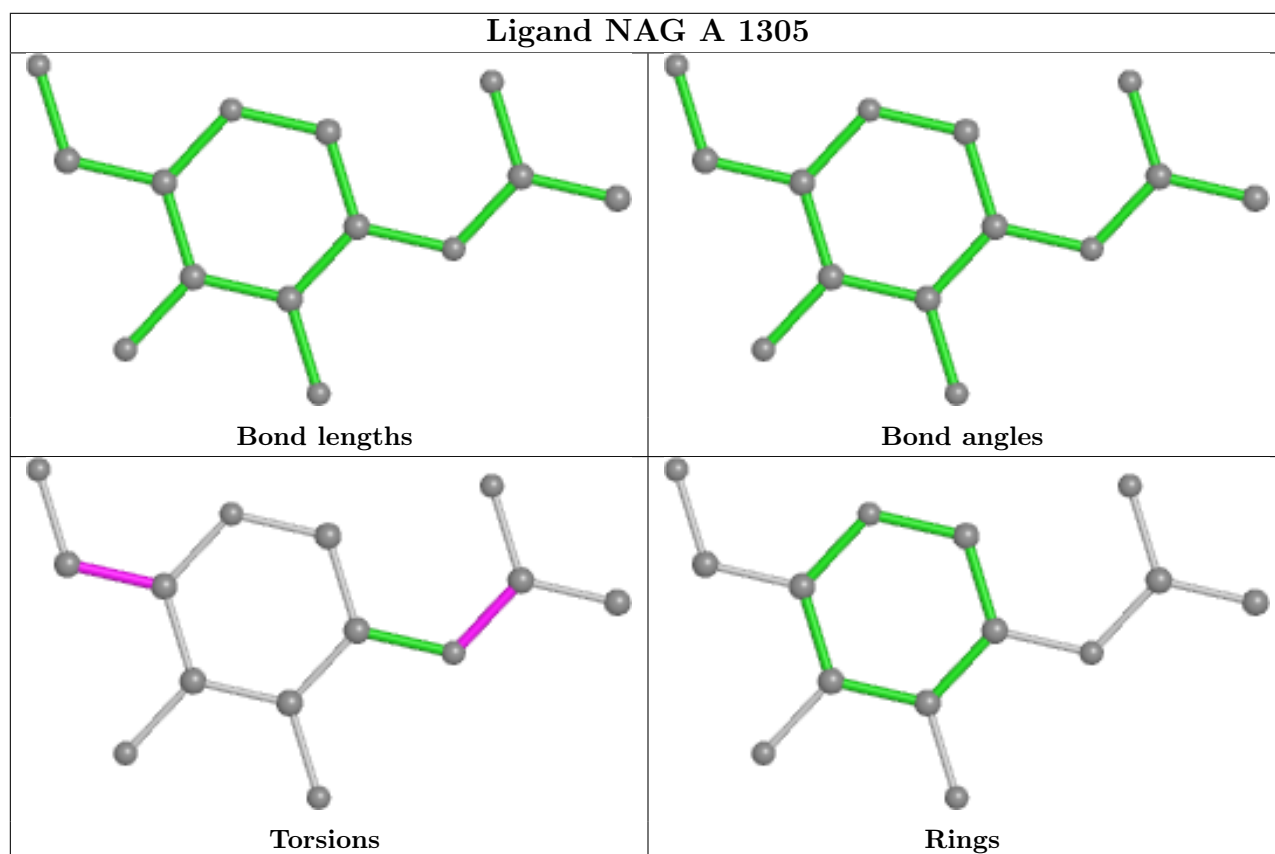
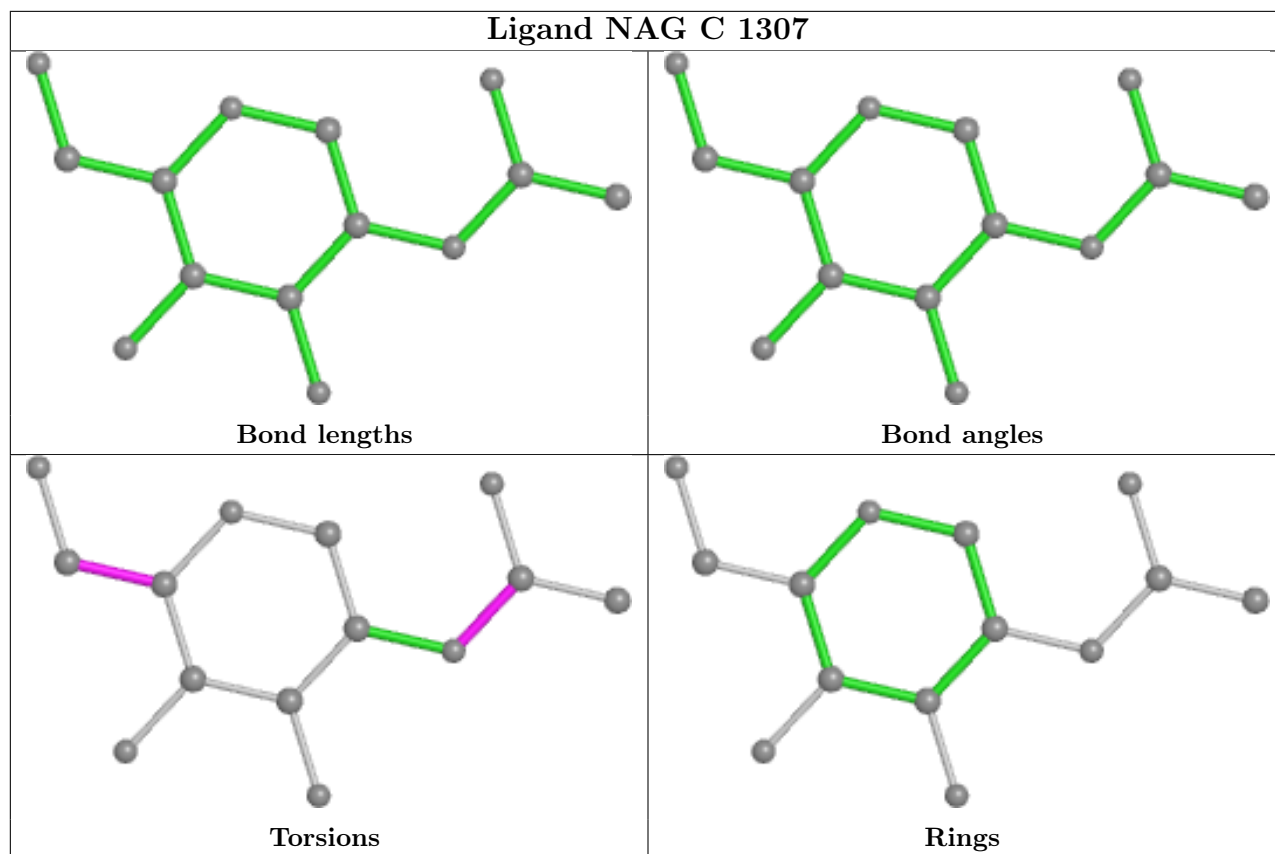


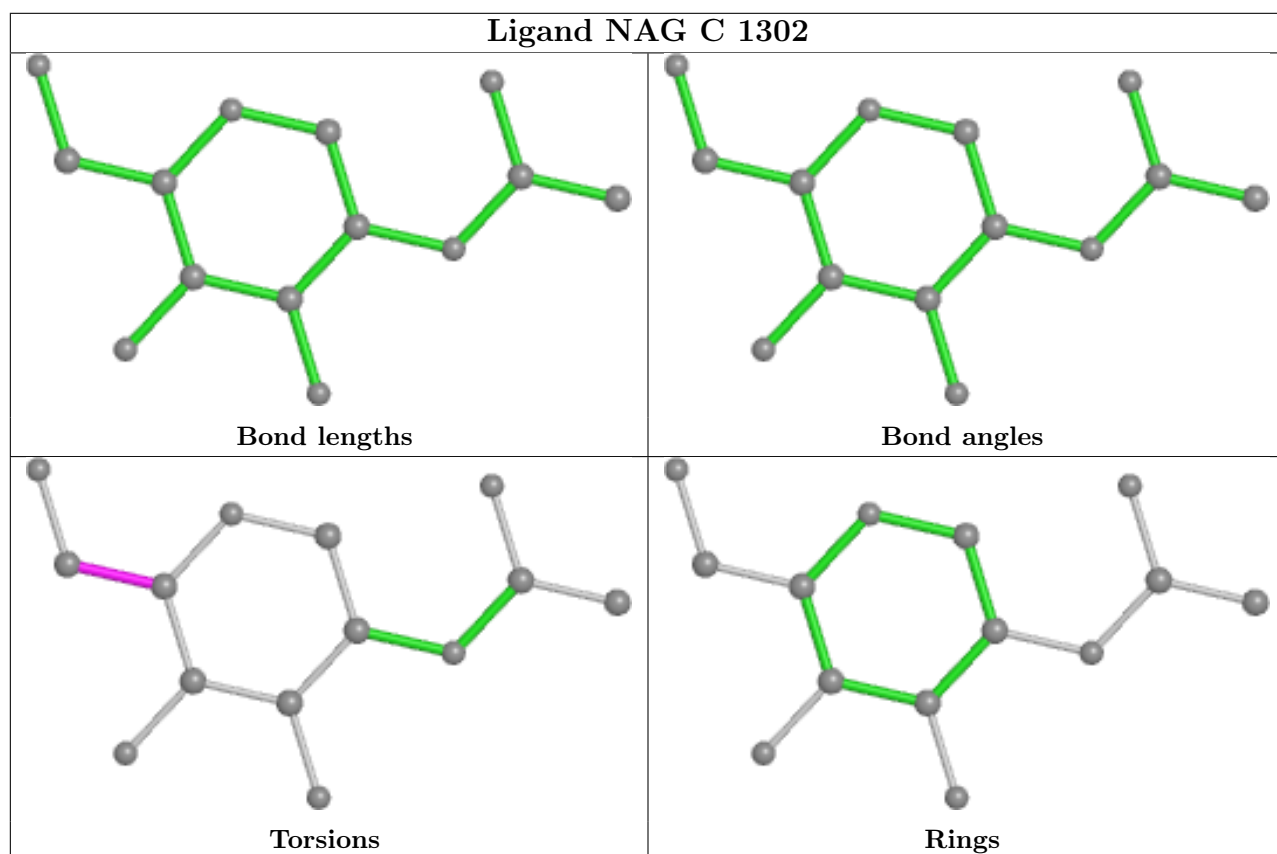
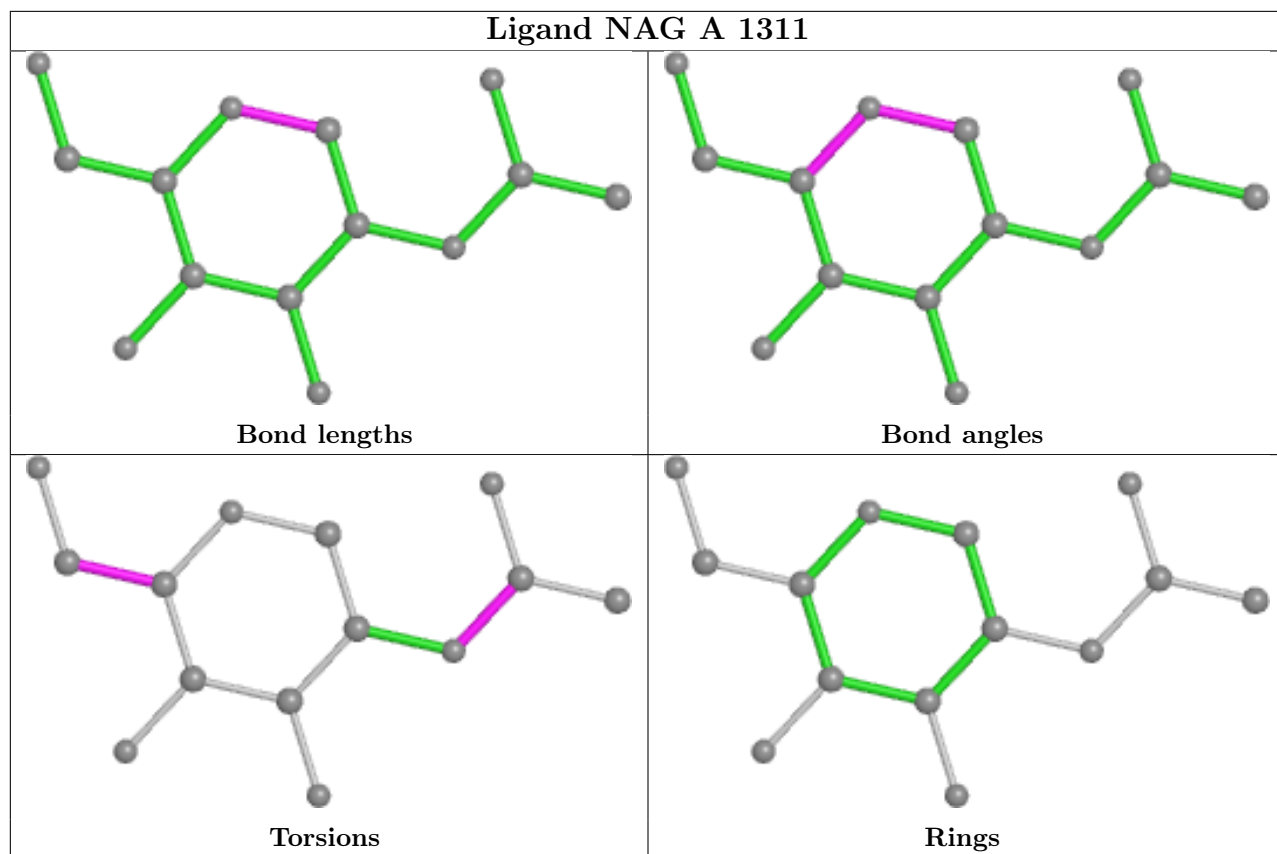


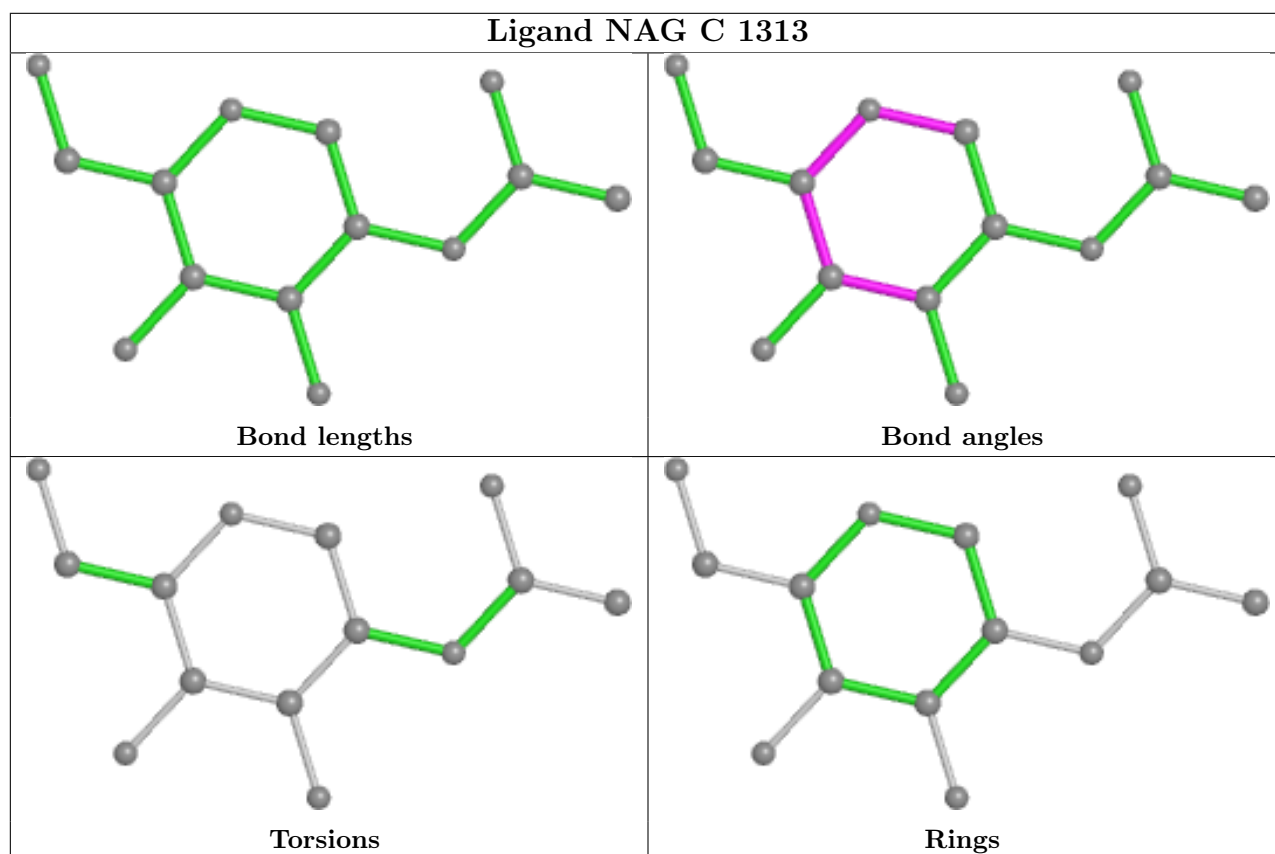
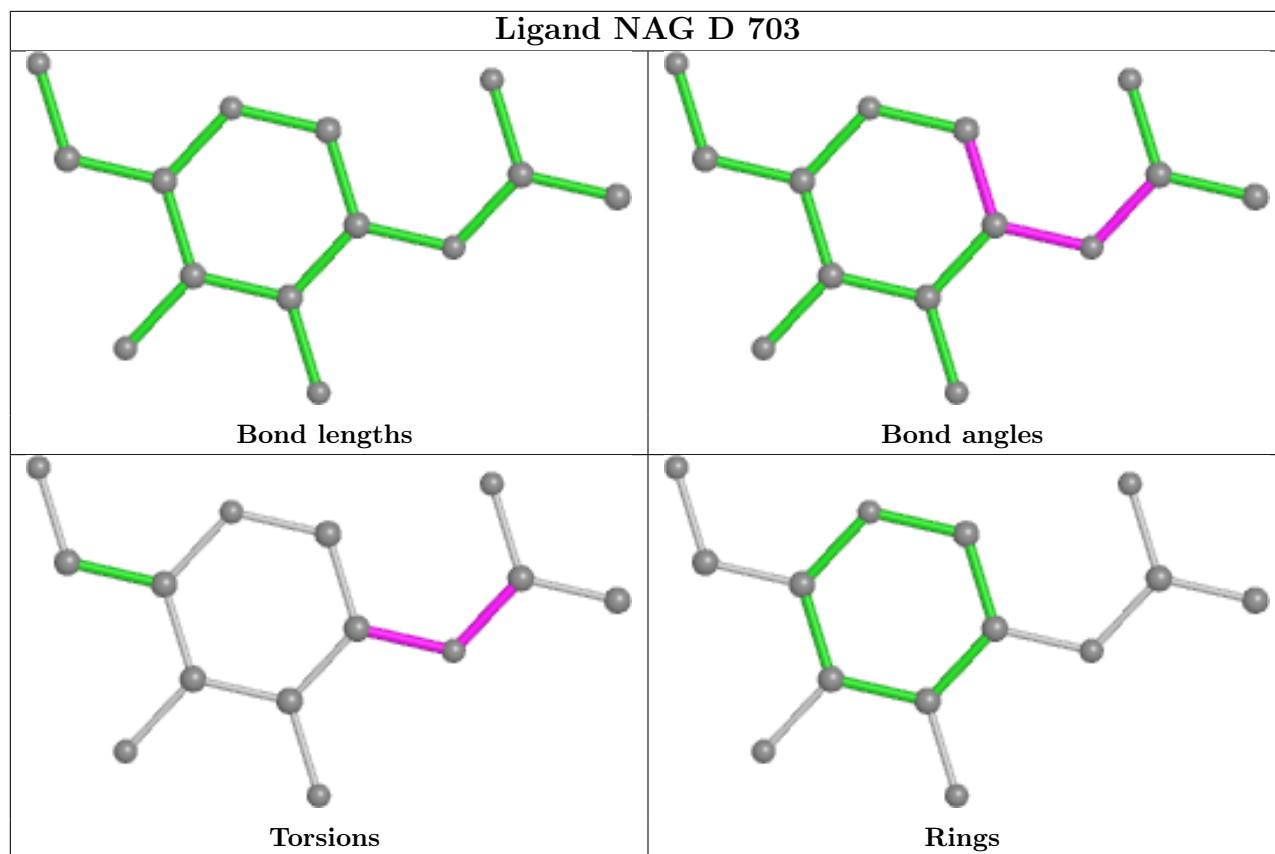


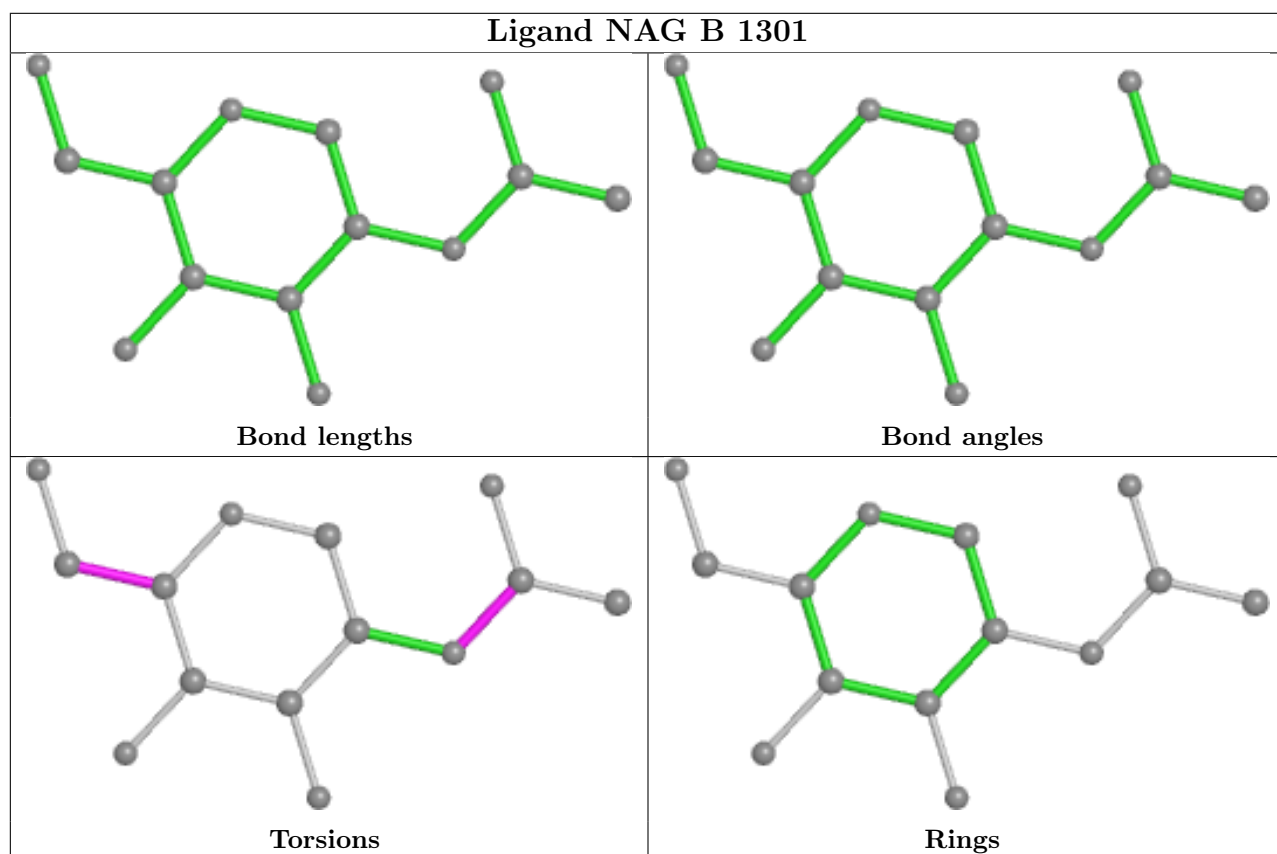
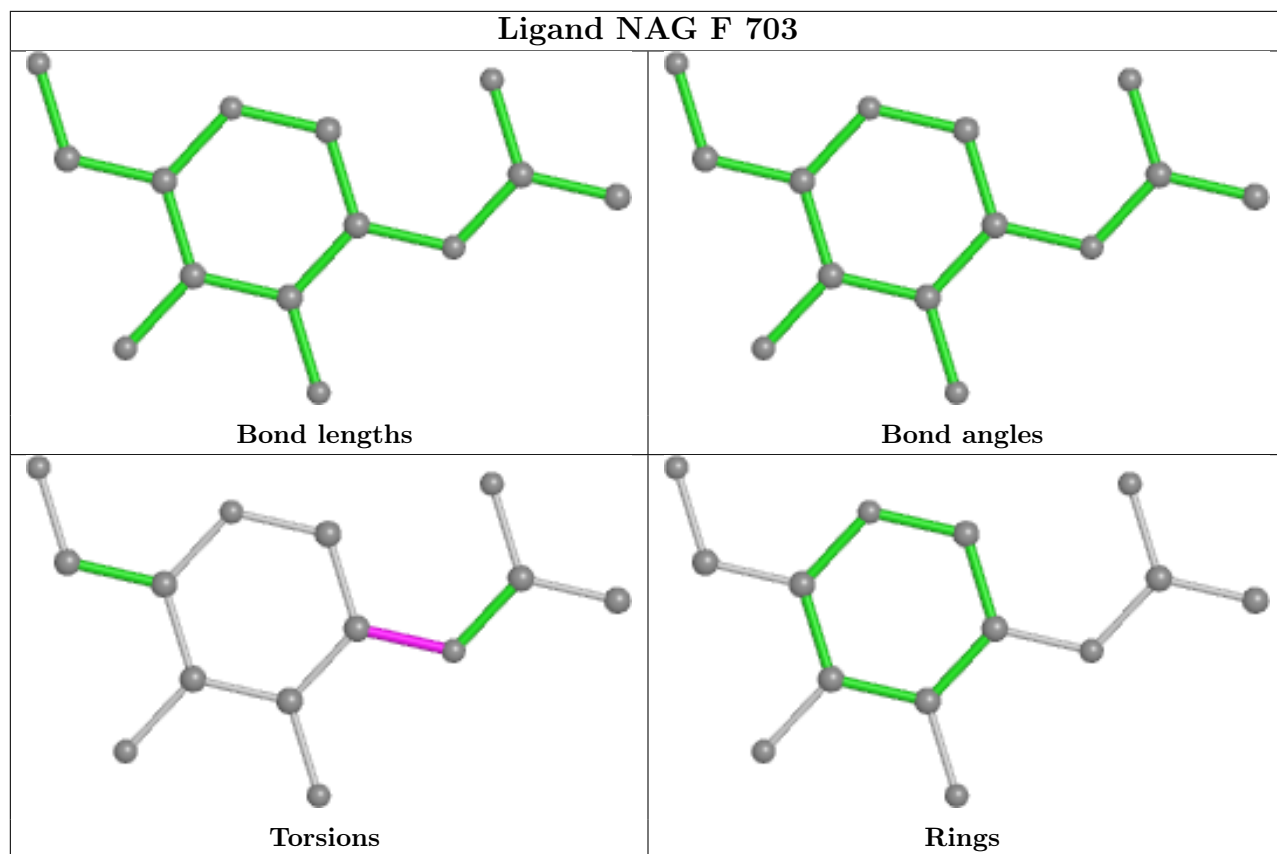


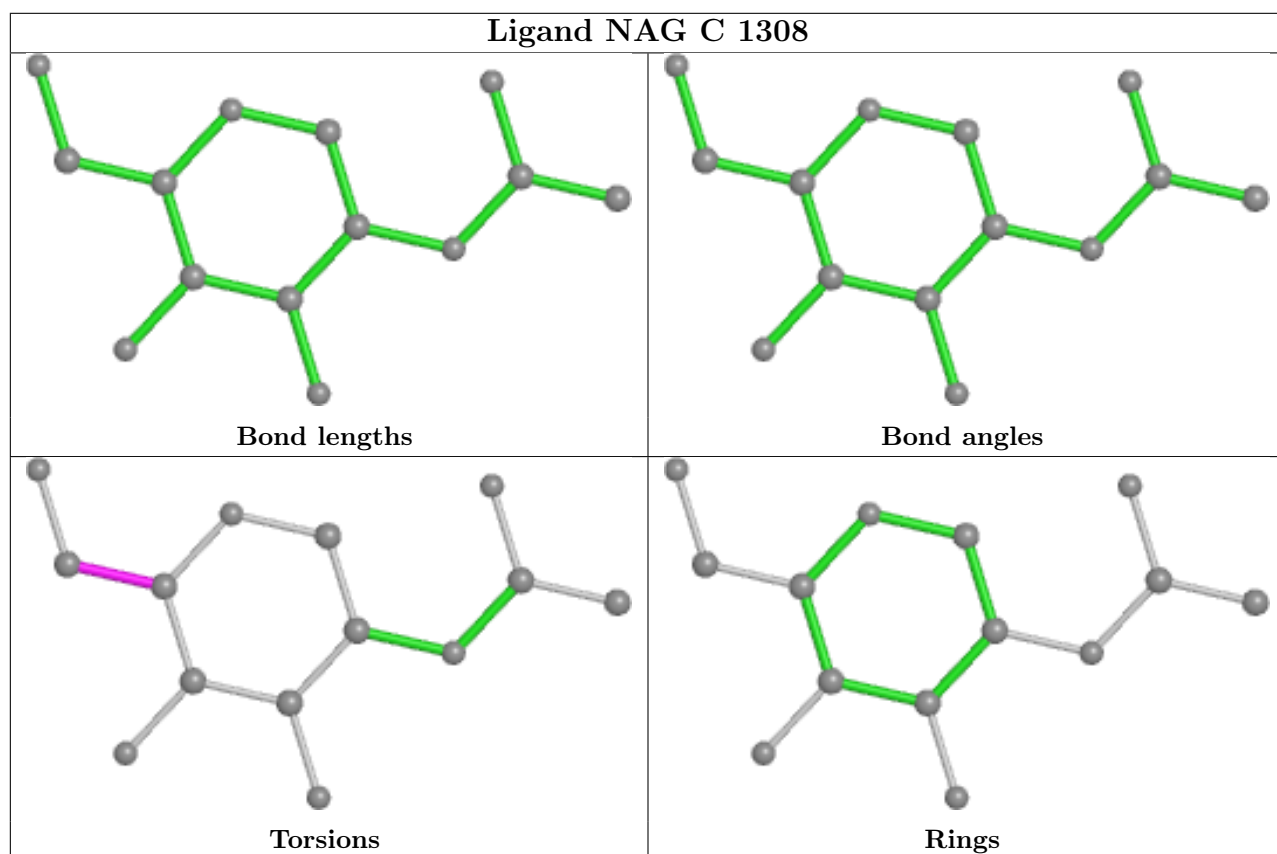
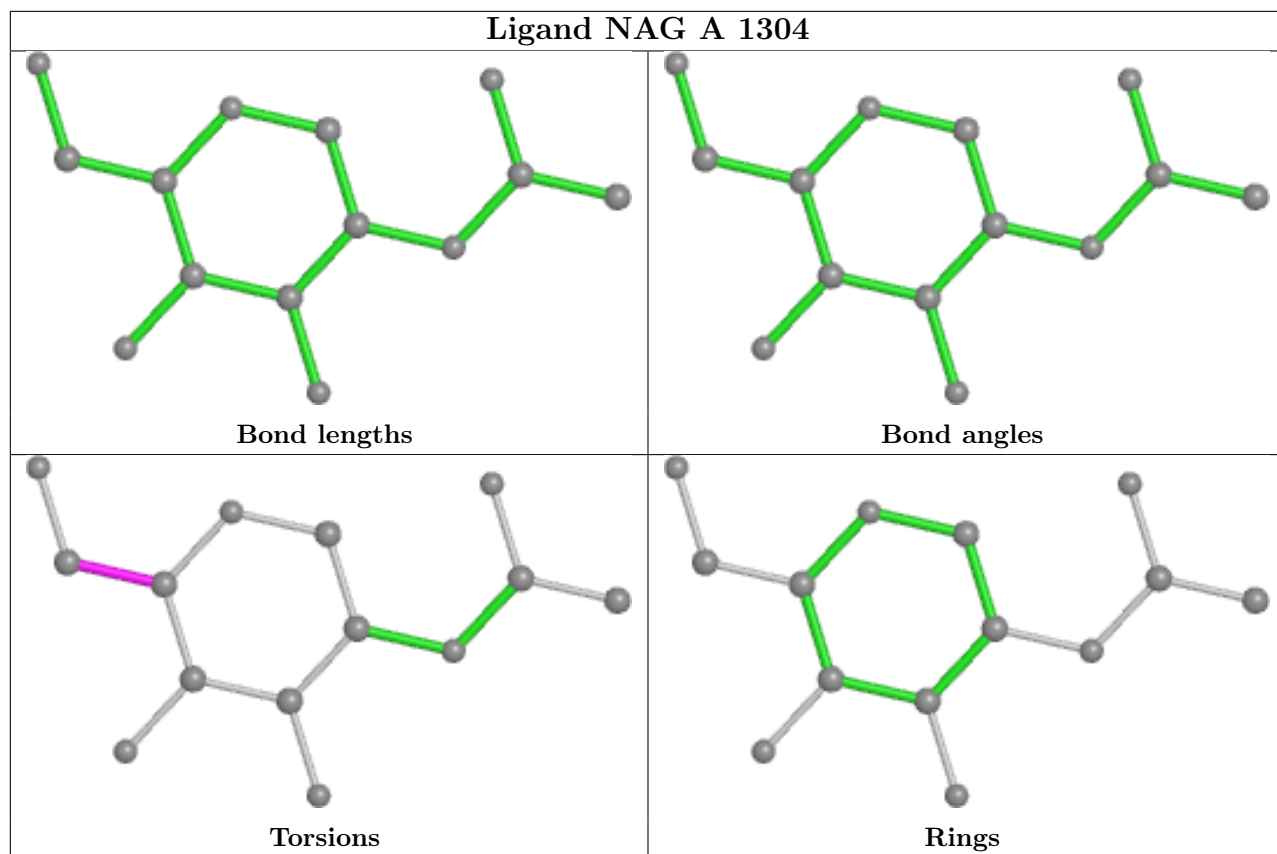


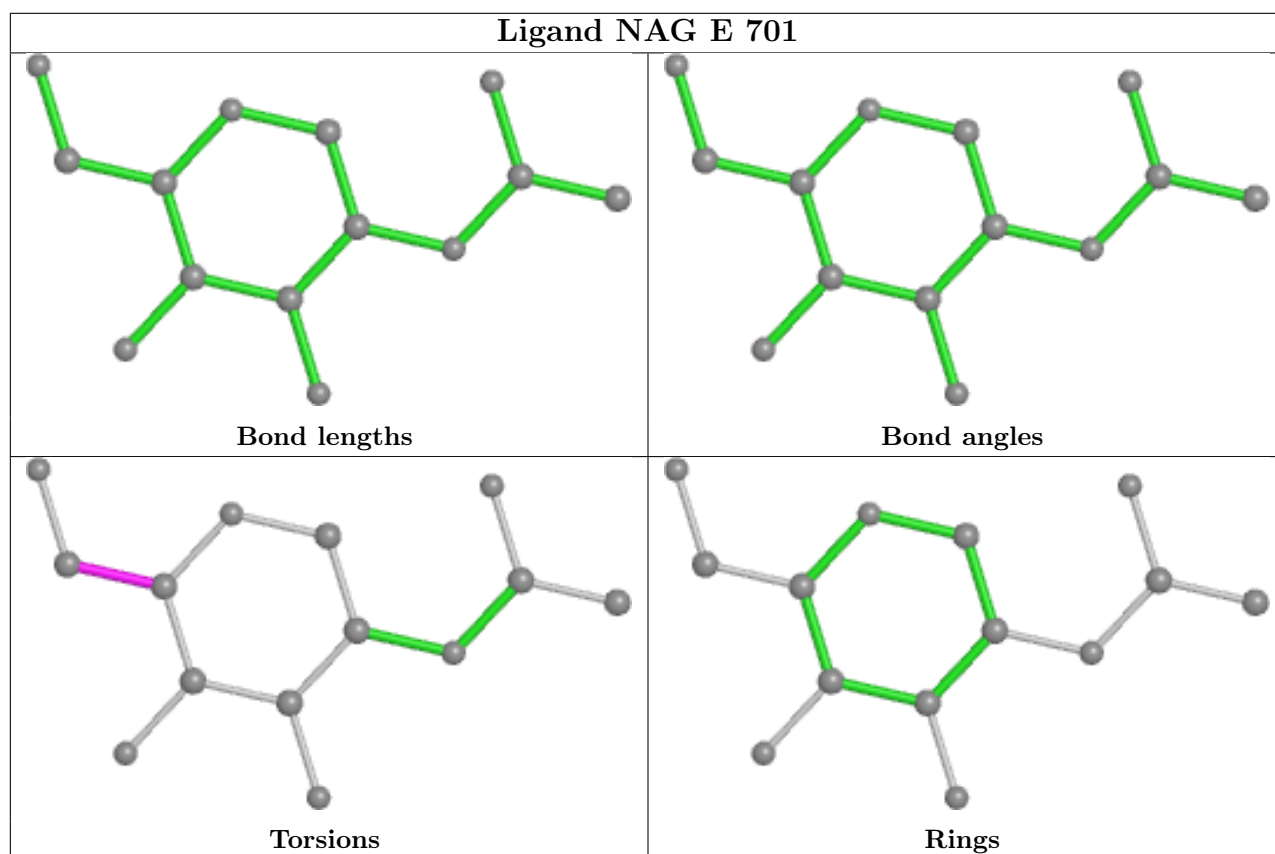
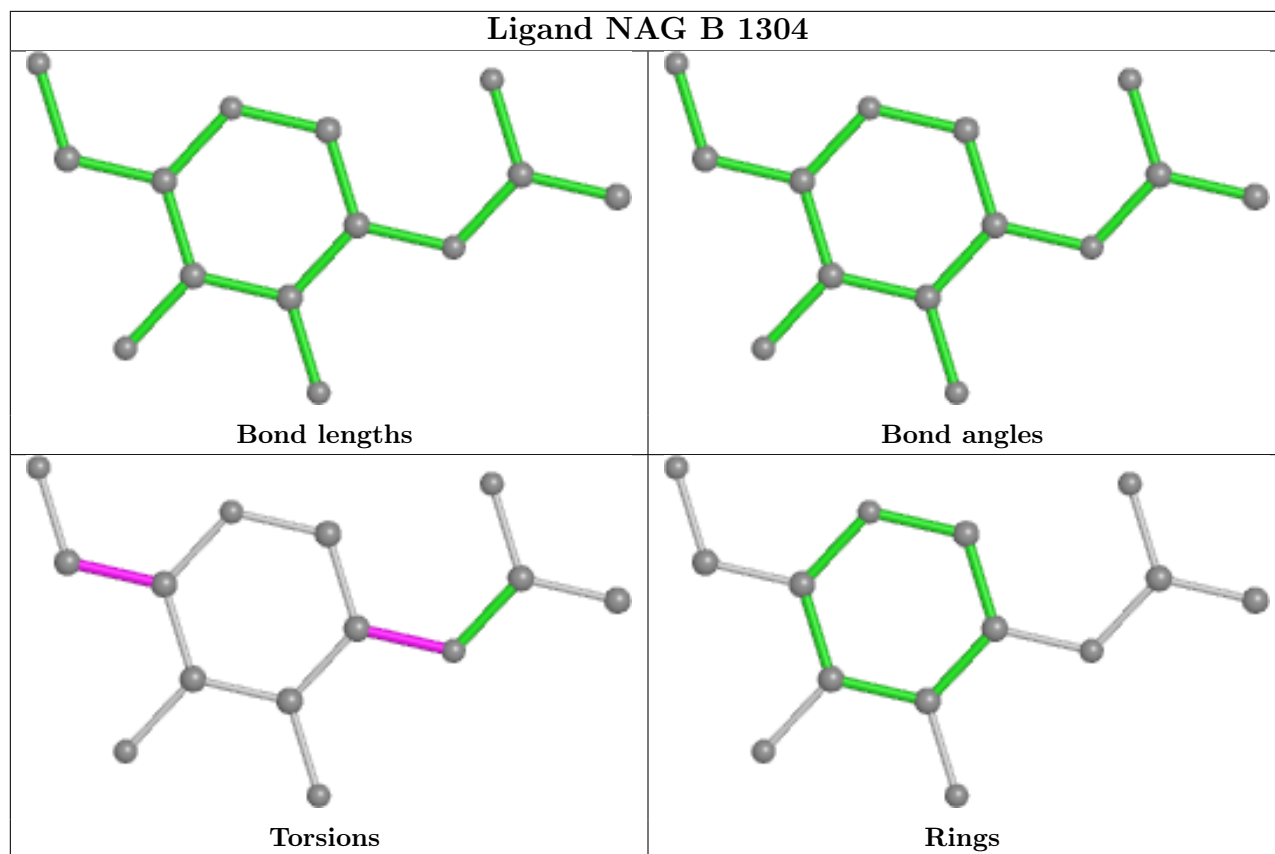


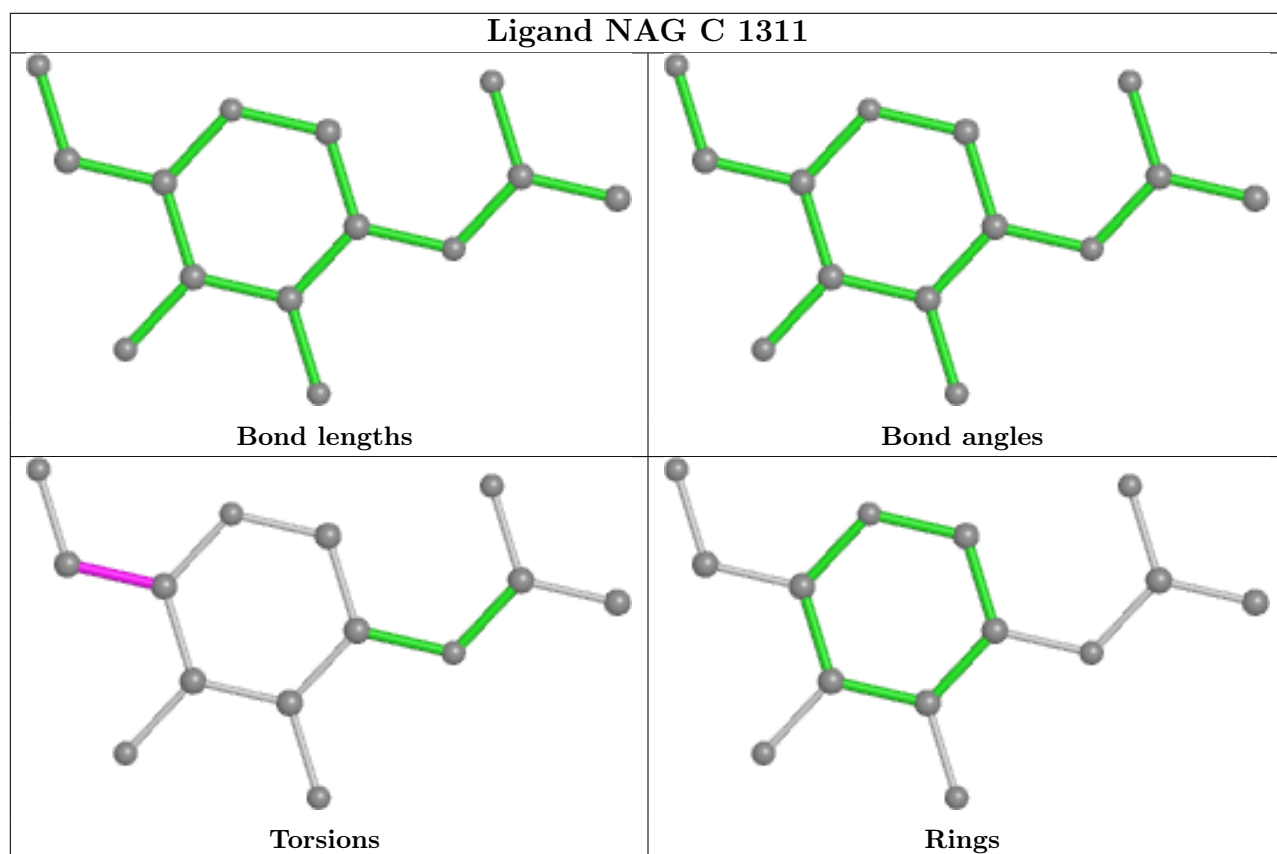
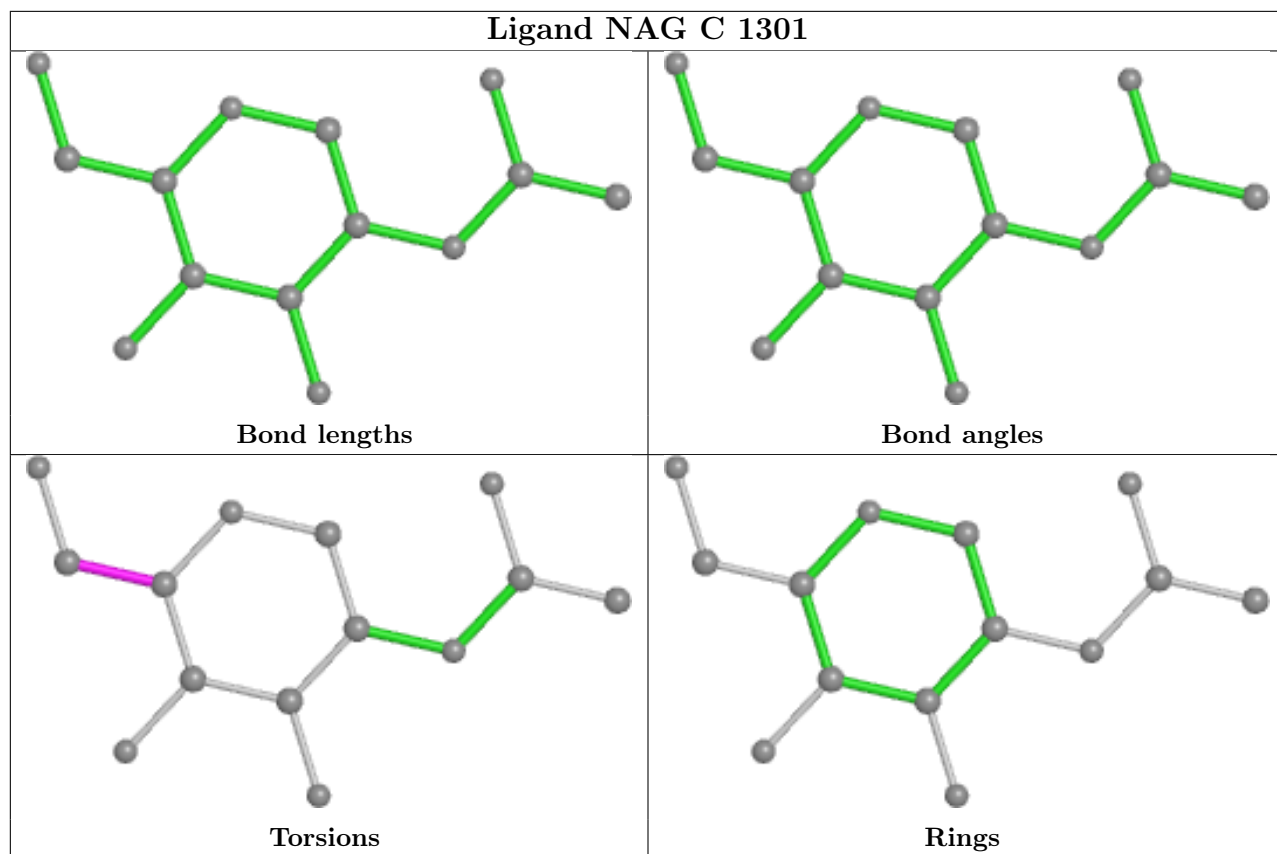


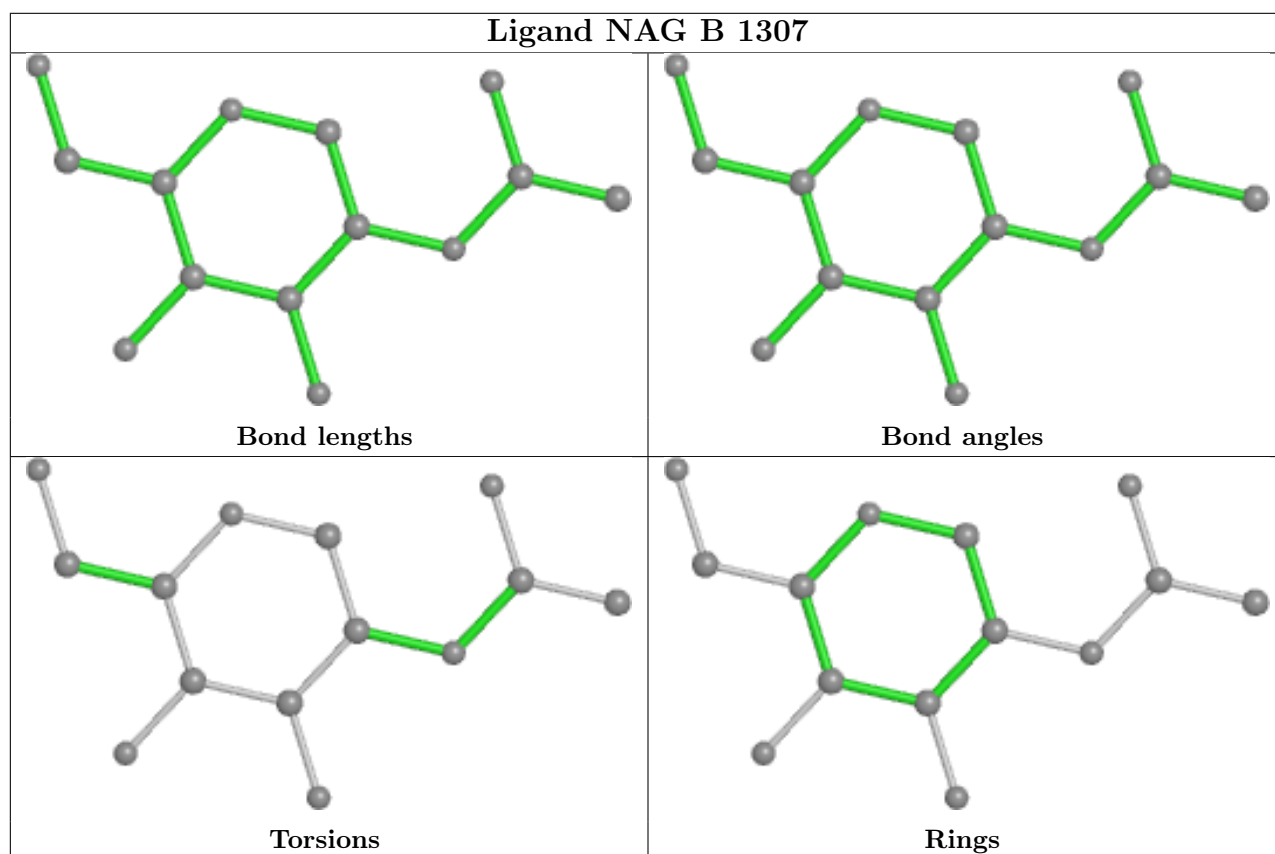
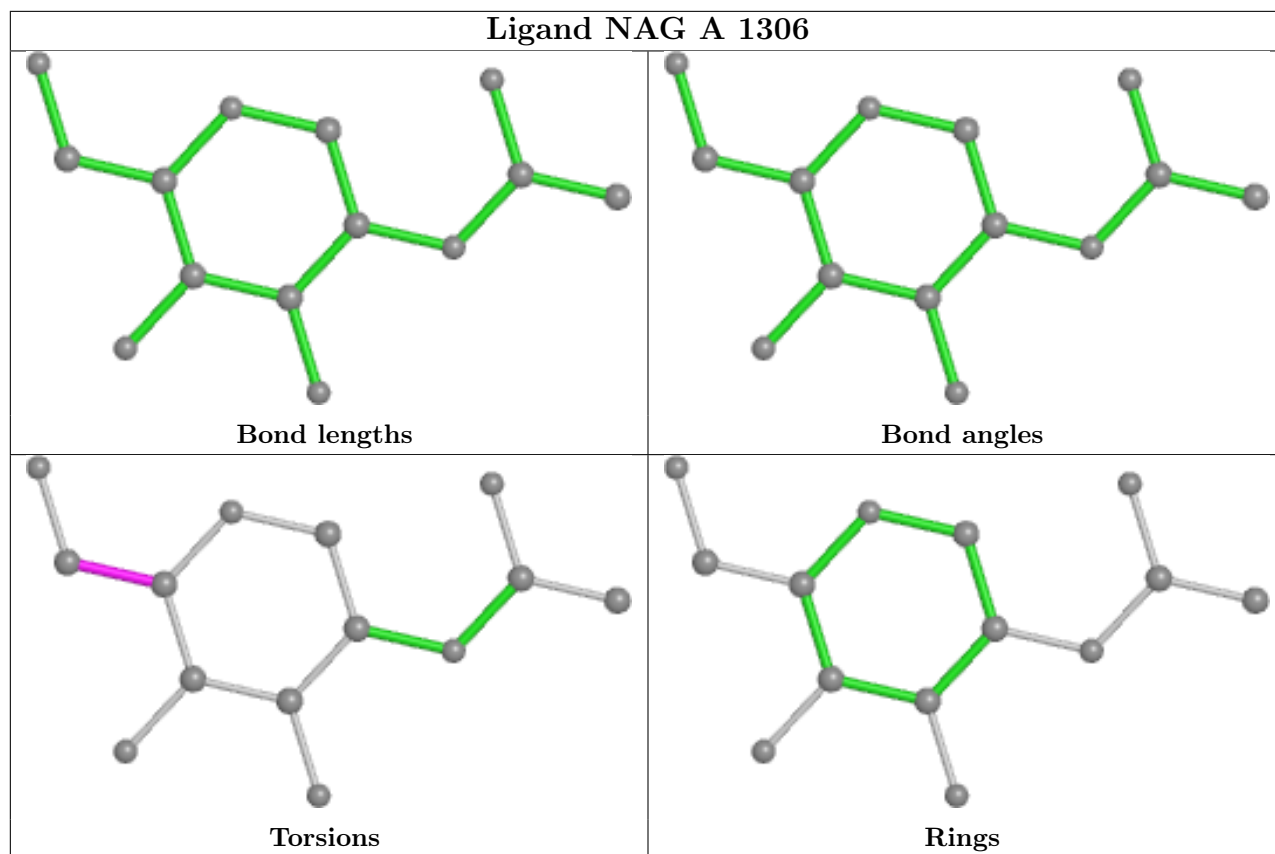


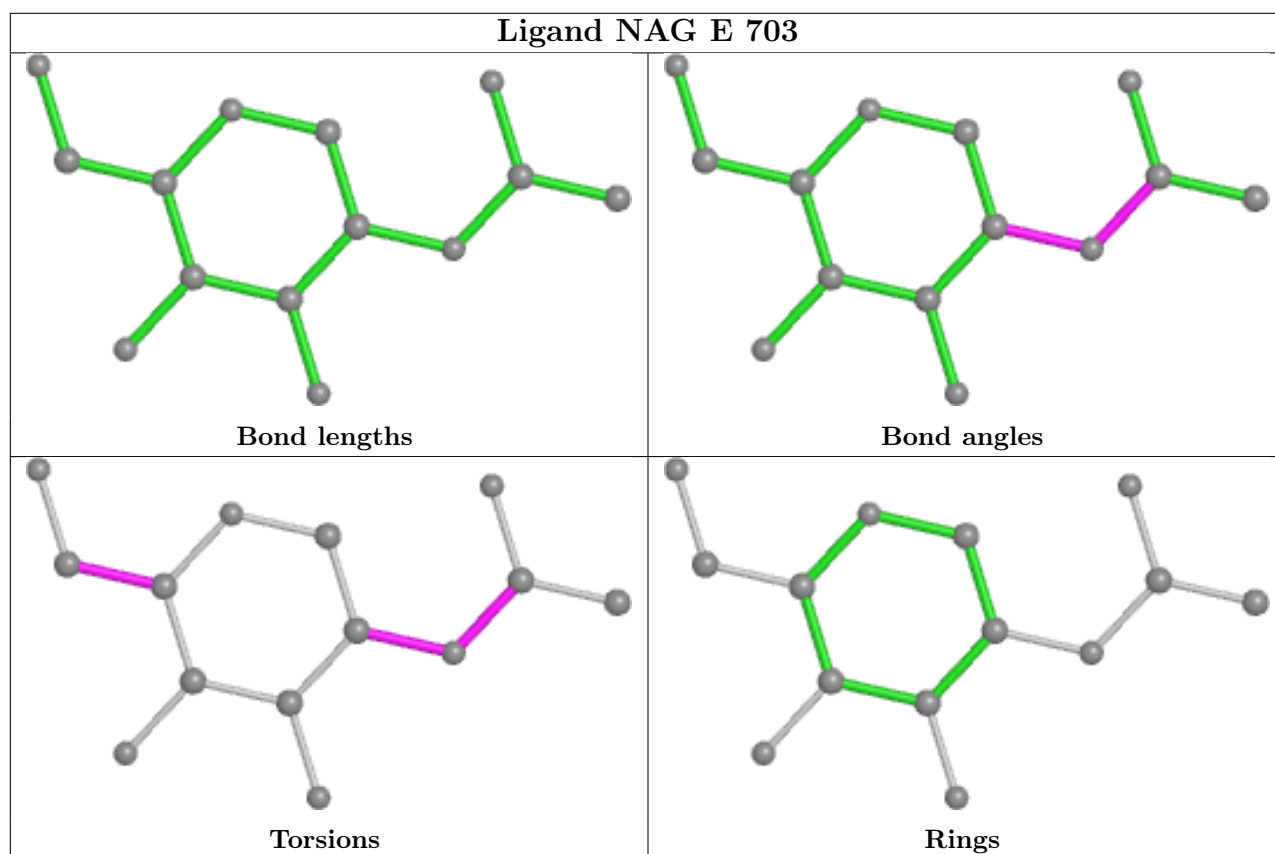
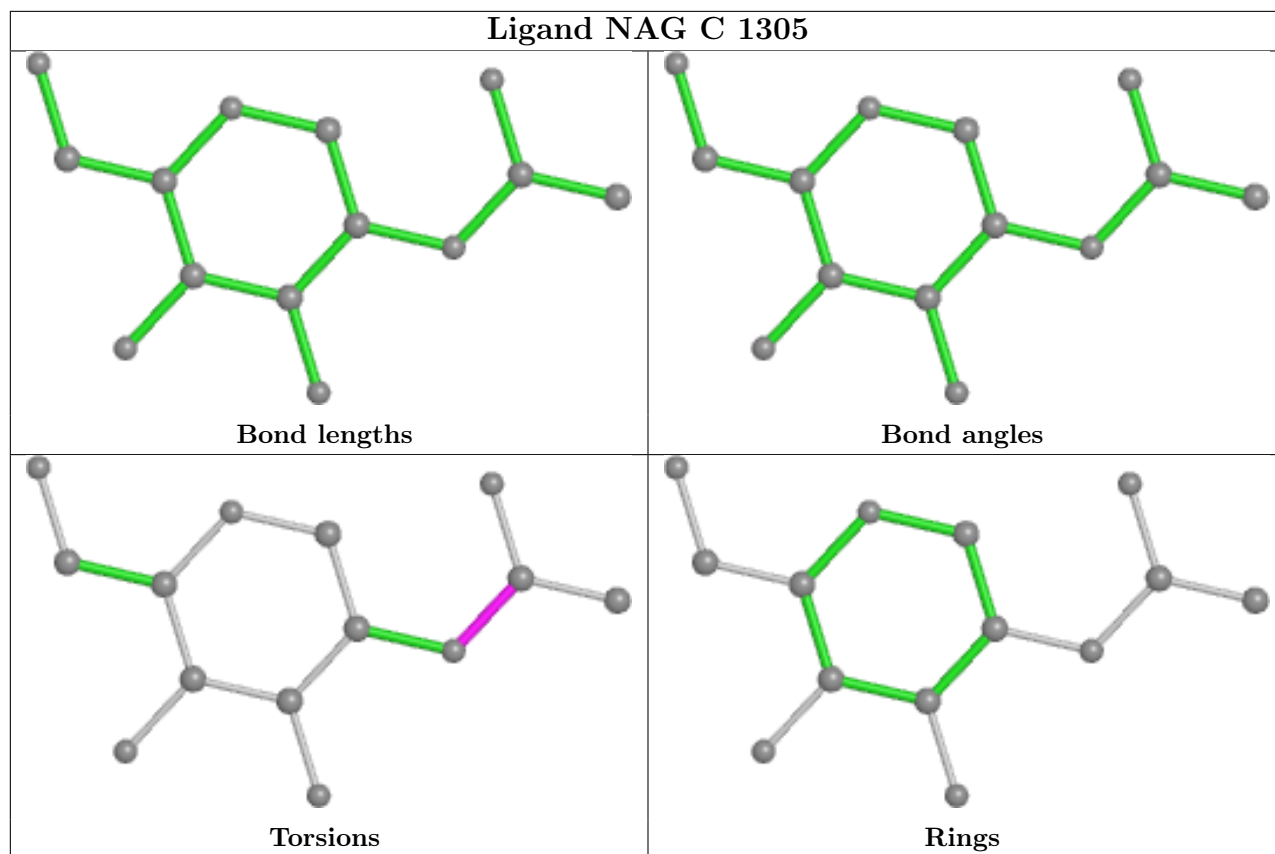


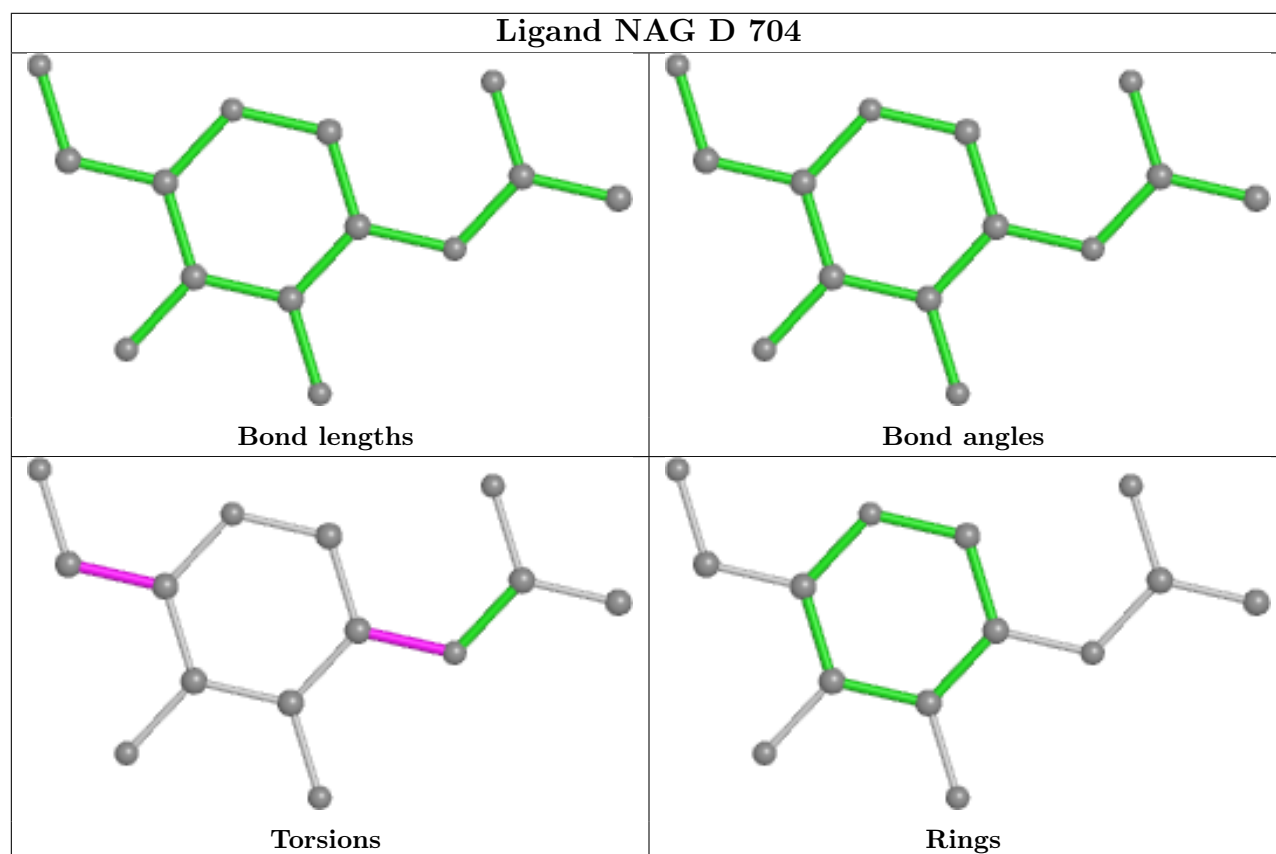
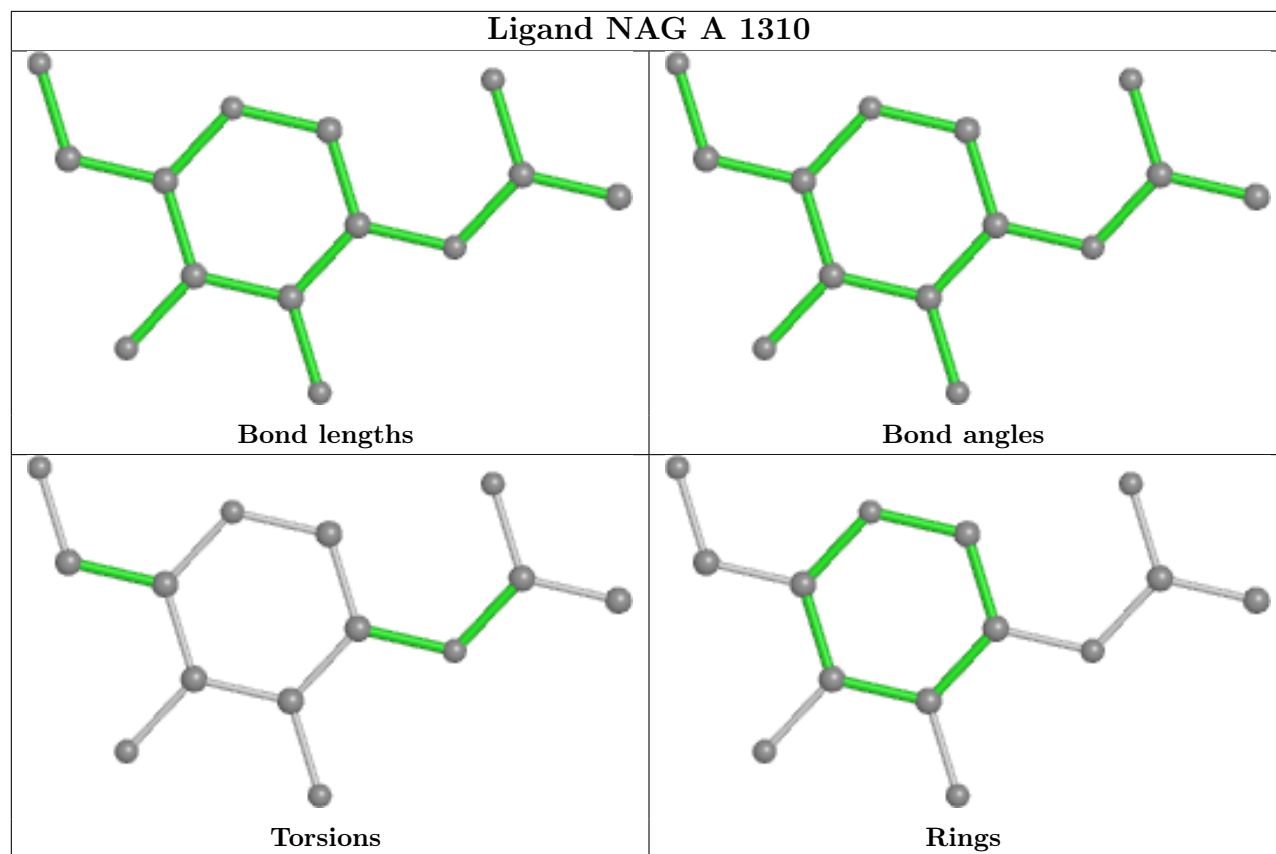


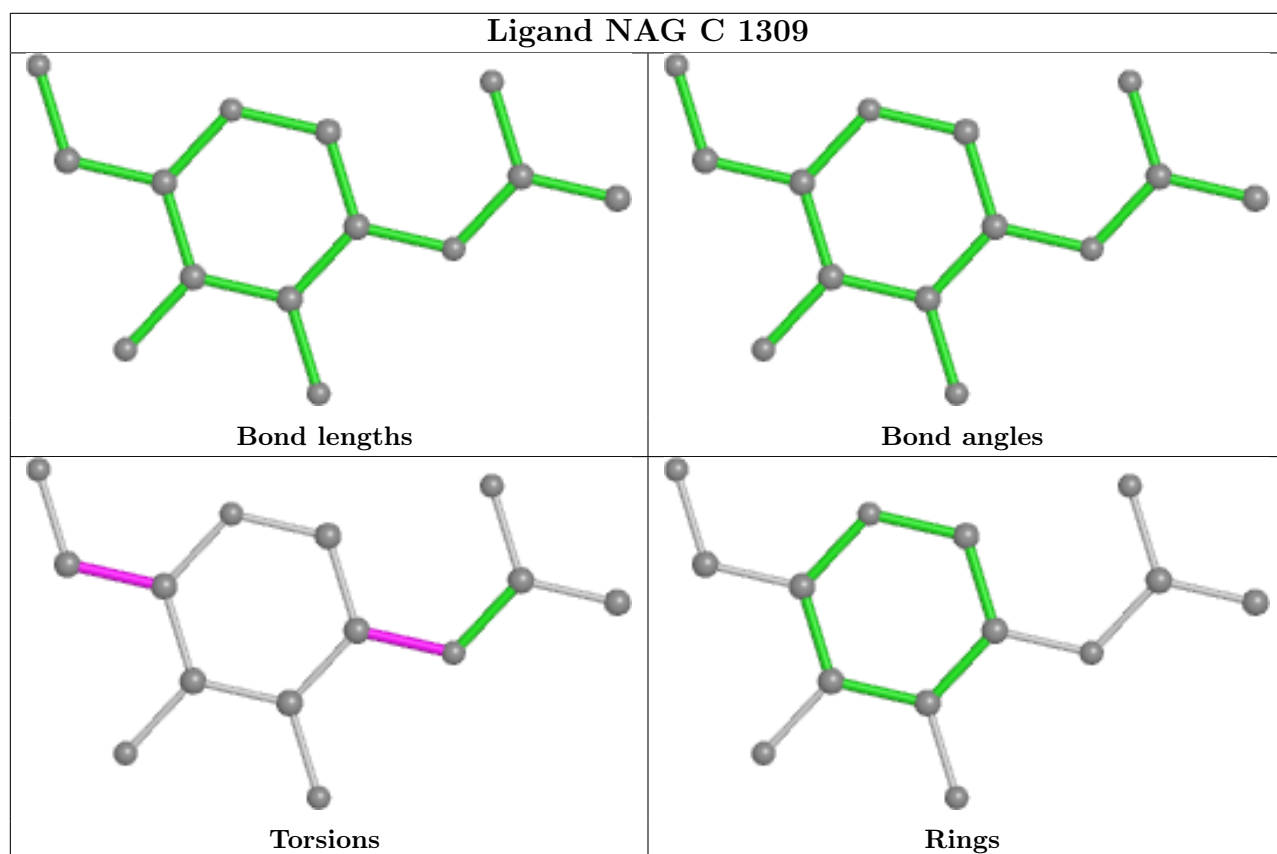
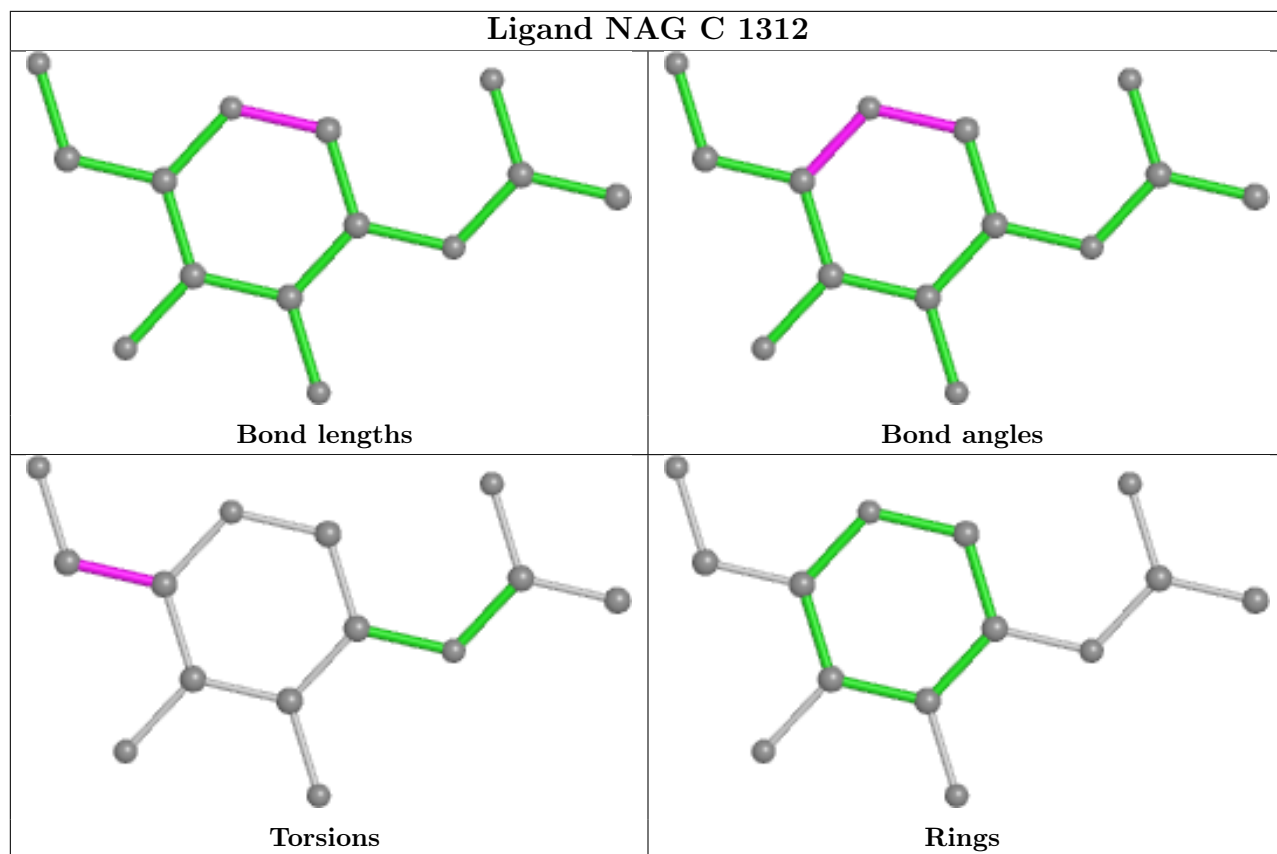












5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.