



wwPDB EM Validation Summary Report ⓘ

Mar 5, 2026 – 03:18 AM UTC

PDB ID : 7KJ4 / pdb_00007kj4
EMDB ID : EMD-22893
Title : SARS-CoV-2 Spike Glycoprotein with three ACE2 Bound
Authors : Zhang, J.; Xiao, T.S.; Cai, Y.F.; Chen, B.
Deposited on : 2020-10-25
Resolution : 3.40 Å(reported)
Based on initial models : 6VYB, 6M17

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:

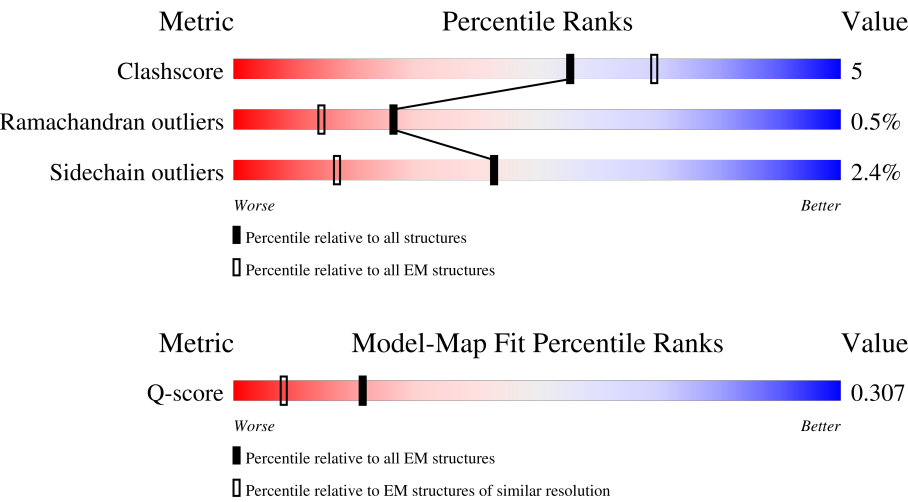
EMDB validation analysis : 0.0.1.dev132
Mogul : 2022.3.0, CSD as543be (2022)
MolProbity : 4-5-2 with Phenix2.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data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

1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:
ELECTRON MICROSCOPY

The reported resolution of this entry is 3.40 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	14717 (2.90 - 3.90)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion $< 40\%$). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	1234	
1	B	1234	
1	C	1234	
2	D	615	

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Mol	Chain	Length	Quality of chain
2	E	615	
2	F	615	
3	G	2	
3	H	2	
3	I	2	
3	J	2	
3	K	2	
3	L	2	
3	M	2	
3	N	2	
3	O	2	
3	P	2	
3	Q	2	
3	R	2	
3	S	2	
3	T	2	
3	U	2	
3	V	2	
3	W	2	
3	X	2	
3	Y	2	
3	Z	2	
3	a	2	
3	b	2	
3	c	2	

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Mol	Chain	Length	Quality of chain
3	d	2	100% 50% 50%

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 38776 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called Spike glycoprotein.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	981	Total	C	N	O	S	0	0
			7658	4890	1269	1464	35		
1	B	981	Total	C	N	O	S	0	0
			7665	4893	1271	1466	35		
1	C	981	Total	C	N	O	S	0	0
			7661	4891	1271	1464	35		

There are 135 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	682	GLY	ARG	conflict	UNP P0DTC2
A	683	GLY	ARG	conflict	UNP P0DTC2
A	684	SER	ALA	conflict	UNP P0DTC2
A	685	GLY	ARG	conflict	UNP P0DTC2
A	986	PRO	LYS	engineered mutation	UNP P0DTC2
A	987	PRO	VAL	engineered mutation	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	GLY	-	expression tag	UNP P0DTC2
A	1213	TYR	-	expression tag	UNP P0DTC2
A	1214	ILE	-	expression tag	UNP P0DTC2
A	1215	PRO	-	expression tag	UNP P0DTC2
A	1216	GLU	-	expression tag	UNP P0DTC2
A	1217	ALA	-	expression tag	UNP P0DTC2
A	1218	PRO	-	expression tag	UNP P0DTC2
A	1219	ARG	-	expression tag	UNP P0DTC2
A	1220	ASP	-	expression tag	UNP P0DTC2
A	1221	GLY	-	expression tag	UNP P0DTC2
A	1222	GLN	-	expression tag	UNP P0DTC2
A	1223	ALA	-	expression tag	UNP P0DTC2
A	1224	TYR	-	expression tag	UNP P0DTC2
A	1225	VAL	-	expression tag	UNP P0DTC2
A	1226	ARG	-	expression tag	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
A	1227	LYS	-	expression tag	UNP P0DTC2
A	1228	ASP	-	expression tag	UNP P0DTC2
A	1229	GLY	-	expression tag	UNP P0DTC2
A	1230	GLU	-	expression tag	UNP P0DTC2
A	1231	TRP	-	expression tag	UNP P0DTC2
A	1232	VAL	-	expression tag	UNP P0DTC2
A	1233	LEU	-	expression tag	UNP P0DTC2
A	1234	LEU	-	expression tag	UNP P0DTC2
A	1235	SER	-	expression tag	UNP P0DTC2
A	1236	THR	-	expression tag	UNP P0DTC2
A	1237	PHE	-	expression tag	UNP P0DTC2
A	1238	LEU	-	expression tag	UNP P0DTC2
A	1239	GLY	-	expression tag	UNP P0DTC2
A	1240	GLY	-	expression tag	UNP P0DTC2
A	1241	SER	-	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	682	GLY	ARG	conflict	UNP P0DTC2
B	683	GLY	ARG	conflict	UNP P0DTC2
B	684	SER	ALA	conflict	UNP P0DTC2
B	685	GLY	ARG	conflict	UNP P0DTC2
B	986	PRO	LYS	engineered mutation	UNP P0DTC2
B	987	PRO	VAL	engineered mutation	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	GLY	-	expression tag	UNP P0DTC2
B	1213	TYR	-	expression tag	UNP P0DTC2
B	1214	ILE	-	expression tag	UNP P0DTC2
B	1215	PRO	-	expression tag	UNP P0DTC2
B	1216	GLU	-	expression tag	UNP P0DTC2
B	1217	ALA	-	expression tag	UNP P0DTC2
B	1218	PRO	-	expression tag	UNP P0DTC2
B	1219	ARG	-	expression tag	UNP P0DTC2
B	1220	ASP	-	expression tag	UNP P0DTC2
B	1221	GLY	-	expression tag	UNP P0DTC2
B	1222	GLN	-	expression tag	UNP P0DTC2
B	1223	ALA	-	expression tag	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
B	1224	TYR	-	expression tag	UNP P0DTC2
B	1225	VAL	-	expression tag	UNP P0DTC2
B	1226	ARG	-	expression tag	UNP P0DTC2
B	1227	LYS	-	expression tag	UNP P0DTC2
B	1228	ASP	-	expression tag	UNP P0DTC2
B	1229	GLY	-	expression tag	UNP P0DTC2
B	1230	GLU	-	expression tag	UNP P0DTC2
B	1231	TRP	-	expression tag	UNP P0DTC2
B	1232	VAL	-	expression tag	UNP P0DTC2
B	1233	LEU	-	expression tag	UNP P0DTC2
B	1234	LEU	-	expression tag	UNP P0DTC2
B	1235	SER	-	expression tag	UNP P0DTC2
B	1236	THR	-	expression tag	UNP P0DTC2
B	1237	PHE	-	expression tag	UNP P0DTC2
B	1238	LEU	-	expression tag	UNP P0DTC2
B	1239	GLY	-	expression tag	UNP P0DTC2
B	1240	GLY	-	expression tag	UNP P0DTC2
B	1241	SER	-	expression tag	UNP P0DTC2
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	682	GLY	ARG	conflict	UNP P0DTC2
C	683	GLY	ARG	conflict	UNP P0DTC2
C	684	SER	ALA	conflict	UNP P0DTC2
C	685	GLY	ARG	conflict	UNP P0DTC2
C	986	PRO	LYS	engineered mutation	UNP P0DTC2
C	987	PRO	VAL	engineered mutation	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	GLY	-	expression tag	UNP P0DTC2
C	1213	TYR	-	expression tag	UNP P0DTC2
C	1214	ILE	-	expression tag	UNP P0DTC2
C	1215	PRO	-	expression tag	UNP P0DTC2
C	1216	GLU	-	expression tag	UNP P0DTC2
C	1217	ALA	-	expression tag	UNP P0DTC2
C	1218	PRO	-	expression tag	UNP P0DTC2
C	1219	ARG	-	expression tag	UNP P0DTC2
C	1220	ASP	-	expression tag	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
C	1221	GLY	-	expression tag	UNP P0DTC2
C	1222	GLN	-	expression tag	UNP P0DTC2
C	1223	ALA	-	expression tag	UNP P0DTC2
C	1224	TYR	-	expression tag	UNP P0DTC2
C	1225	VAL	-	expression tag	UNP P0DTC2
C	1226	ARG	-	expression tag	UNP P0DTC2
C	1227	LYS	-	expression tag	UNP P0DTC2
C	1228	ASP	-	expression tag	UNP P0DTC2
C	1229	GLY	-	expression tag	UNP P0DTC2
C	1230	GLU	-	expression tag	UNP P0DTC2
C	1231	TRP	-	expression tag	UNP P0DTC2
C	1232	VAL	-	expression tag	UNP P0DTC2
C	1233	LEU	-	expression tag	UNP P0DTC2
C	1234	LEU	-	expression tag	UNP P0DTC2
C	1235	SER	-	expression tag	UNP P0DTC2
C	1236	THR	-	expression tag	UNP P0DTC2
C	1237	PHE	-	expression tag	UNP P0DTC2
C	1238	LEU	-	expression tag	UNP P0DTC2
C	1239	GLY	-	expression tag	UNP P0DTC2
C	1240	GLY	-	expression tag	UNP P0DTC2
C	1241	SER	-	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
2	D	593	Total	C	N	O	S	0	0
			4844	3101	802	912	29		
2	E	593	Total	C	N	O	S	0	0
			4844	3101	802	912	29		
2	F	593	Total	C	N	O	S	0	0
			4844	3101	802	912	29		

There are 30 discrepancies between the modelled and reference sequences:

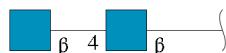
Chain	Residue	Modelled	Actual	Comment	Reference
D	616	SER	-	expression tag	UNP Q9BYF1

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Chain	Residue	Modelled	Actual	Comment	Reference
D	617	GLY	-	expression tag	UNP Q9BYF1
D	618	GLY	-	expression tag	UNP Q9BYF1
D	619	SER	-	expression tag	UNP Q9BYF1
D	620	HIS	-	expression tag	UNP Q9BYF1
D	621	HIS	-	expression tag	UNP Q9BYF1
D	622	HIS	-	expression tag	UNP Q9BYF1
D	623	HIS	-	expression tag	UNP Q9BYF1
D	624	HIS	-	expression tag	UNP Q9BYF1
D	625	HIS	-	expression tag	UNP Q9BYF1
E	616	SER	-	expression tag	UNP Q9BYF1
E	617	GLY	-	expression tag	UNP Q9BYF1
E	618	GLY	-	expression tag	UNP Q9BYF1
E	619	SER	-	expression tag	UNP Q9BYF1
E	620	HIS	-	expression tag	UNP Q9BYF1
E	621	HIS	-	expression tag	UNP Q9BYF1
E	622	HIS	-	expression tag	UNP Q9BYF1
E	623	HIS	-	expression tag	UNP Q9BYF1
E	624	HIS	-	expression tag	UNP Q9BYF1
E	625	HIS	-	expression tag	UNP Q9BYF1
F	616	SER	-	expression tag	UNP Q9BYF1
F	617	GLY	-	expression tag	UNP Q9BYF1
F	618	GLY	-	expression tag	UNP Q9BYF1
F	619	SER	-	expression tag	UNP Q9BYF1
F	620	HIS	-	expression tag	UNP Q9BYF1
F	621	HIS	-	expression tag	UNP Q9BYF1
F	622	HIS	-	expression tag	UNP Q9BYF1
F	623	HIS	-	expression tag	UNP Q9BYF1
F	624	HIS	-	expression tag	UNP Q9BYF1
F	625	HIS	-	expression tag	UNP Q9BYF1

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



Mol	Chain	Residues	Atoms				AltConf	Trace
3	G	2	Total	C	N	O	0	0
			28	16	2	10		
3	H	2	Total	C	N	O	0	0
			28	16	2	10		

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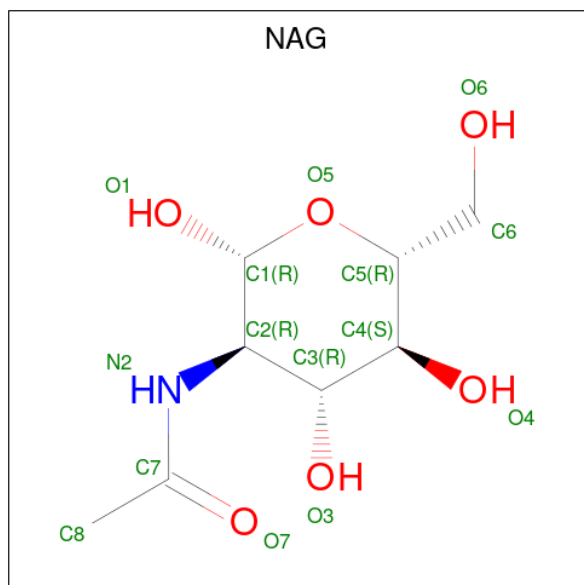
Mol	Chain	Residues	Atoms				AltConf	Trace
3	I	2	Total	C	N	O	0	0
			28	16	2	10		
3	J	2	Total	C	N	O	0	0
			28	16	2	10		
3	K	2	Total	C	N	O	0	0
			28	16	2	10		
3	L	2	Total	C	N	O	0	0
			28	16	2	10		
3	M	2	Total	C	N	O	0	0
			28	16	2	10		
3	N	2	Total	C	N	O	0	0
			28	16	2	10		
3	O	2	Total	C	N	O	0	0
			28	16	2	10		
3	P	2	Total	C	N	O	0	0
			28	16	2	10		
3	Q	2	Total	C	N	O	0	0
			28	16	2	10		
3	R	2	Total	C	N	O	0	0
			28	16	2	10		
3	S	2	Total	C	N	O	0	0
			28	16	2	10		
3	T	2	Total	C	N	O	0	0
			28	16	2	10		
3	U	2	Total	C	N	O	0	0
			28	16	2	10		
3	V	2	Total	C	N	O	0	0
			28	16	2	10		
3	W	2	Total	C	N	O	0	0
			28	16	2	10		
3	X	2	Total	C	N	O	0	0
			28	16	2	10		
3	Y	2	Total	C	N	O	0	0
			28	16	2	10		
3	Z	2	Total	C	N	O	0	0
			28	16	2	10		
3	a	2	Total	C	N	O	0	0
			28	16	2	10		
3	b	2	Total	C	N	O	0	0
			28	16	2	10		
3	c	2	Total	C	N	O	0	0
			28	16	2	10		

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Mol	Chain	Residues	Atoms				AltConf	Trace
3	d	2	Total	C	N	O	0	0
			28	16	2	10		

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



Mol	Chain	Residues	Atoms				AltConf
4	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	

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

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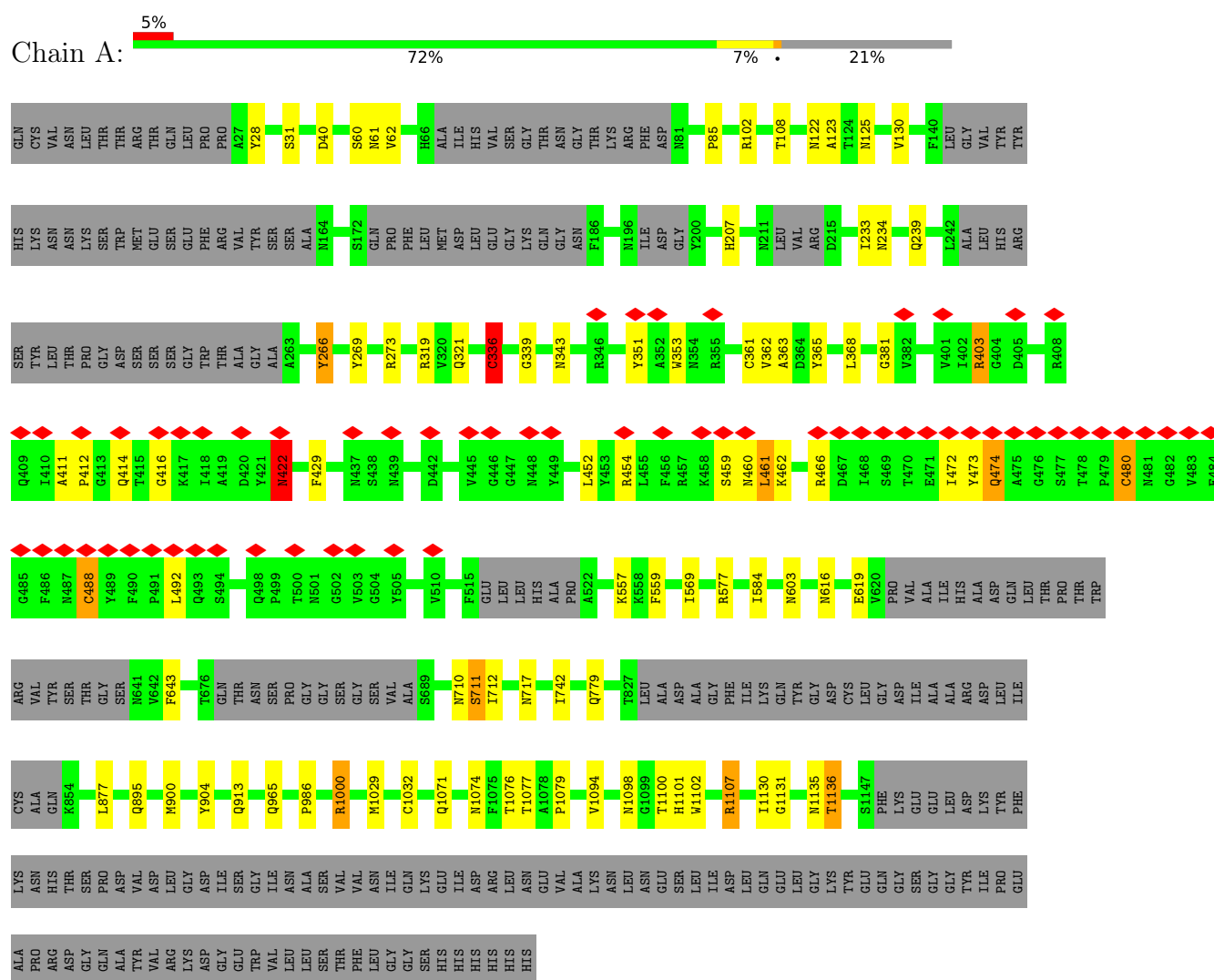
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Mol	Chain	Residues	Atoms				AltConf
4	C	1	Total	C	N	O	0
			14	8	1	5	
4	C	1	Total	C	N	O	0
			14	8	1	5	
4	C	1	Total	C	N	O	0
			14	8	1	5	
4	C	1	Total	C	N	O	0
			14	8	1	5	
4	C	1	Total	C	N	O	0
			14	8	1	5	
4	C	1	Total	C	N	O	0
			14	8	1	5	
4	C	1	Total	C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

3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

• Molecule 1: Spike glycoprotein



• Molecule 1: Spike glycoprotein



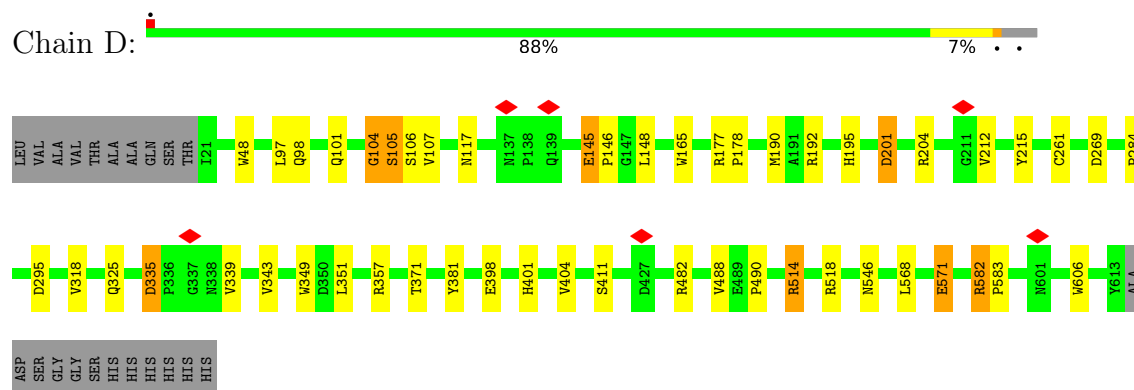


ILE	K921	T676	P479	SER	TTR	GLN
SER	Q965	GLU	C480	TYR	HIS	CYS
ILE		THR	V483	THR	LYS	VAL
ASN	P866	ASN	V483	THR	ASN	ASN
ALA	R995	SER	C488	PRO	LYS	LEU
SER		PRO	C488	GLY	THR	THR
VAL	S1037	GLY	R509	ASP	SER	THR
ASN		GLY		SER	ARG	THR
ILE	H1048	SER	F515	SER	GLN	GLN
GLN		GLY		GLY	SER	LEU
LYS	H1058	SER		TRP	GLU	PRO
ILE		VAL		THR	PHE	
GLU		LEU		THR	ARG	
ILE	H1064	HIS		GLY	VAL	
ASP		ALA		GLY	ARG	
ARG	H1074	PRO	A522	ALA	TTR	T29
LEU		ASP			TYR	N30
ASN	C1082	N1717	A522	A263	SER	S31
GLU	H1083	I794	C538	Y266	ALA	F43
VAL	D1084	K795	L546	R273	N165	V62
ALA		D796			C166	
LYS	E1092	T827	F559	N282		H66
ASN	E1093	LEU			GLN	ALA
LEU	V1094	ALA	R577	C336	PRO	ILE
ASN		ASP			ILE	HIS
GLU	R1107	ALA	T581	N343	PHE	VAL
SER		GLY	L582		LEU	SER
LEU	G1131	PHE	S583	F347	MET	GLY
ILE		ILE	T584		ASP	THR
ASP	N1134	LYS		V350	LEU	ASN
LEU		GLN	M603		GLY	GLY
GLN	Y1138	TYR			LYS	THR
GLU	D1139	GLY	E619	R357	ASN	ARG
LEU	P1140	ASP	V620	A363	GLY	PHE
GLY		CYS			ASN	ASP
LYS	P1143	LEU	VAL	I402	F186	N81
GLU		GLY	ALA			
THR		ASP	ILE	A411	N196	D88
GLN	S1147	ILE	HIS	P412	ILE	
GLY		ALA	ALA		ASP	T114
SER		ALA	ASP	K417	GLY	Q115
GLU		ARG	GLN		LYS	
GLU		ASP	LEU	D428	GLY	V120
ASP		LEU	THR			N121
ILE		ILE	THR	PRO	N211	N122
PRO		CYS	THR	THR	LEU	A123
GLU		ALA	TRP	TRP	VAL	N125
ALA		GLN	ARG	Y453	ARG	V126
PRO		K854	VAL		D215	E132
ARG		ASN	THR	K456		
PRO		HIS	SER	S459	N234	F140
ASP		THR	THR		T235	LEU
GLY		R895	THR	N460		GLY
GLN		R897	GLY		T236	VAL
ALA		ASP	SER	T470		THR
TYR		VAL	M900	E471	L242	
VAL		ASP	Q901	V642	ALA	LEU
ARG		LEU		I472	GLY	THR
LYS		GLY	Y904	Q474	HIS	VAL
ASP		ASP			ASP	

GLY
GLU
TRP
VAL
LEU
LEU
SER
PHE
LEU
GLY
GLY
SER
HIS
HIS
HIS
HIS
HIS

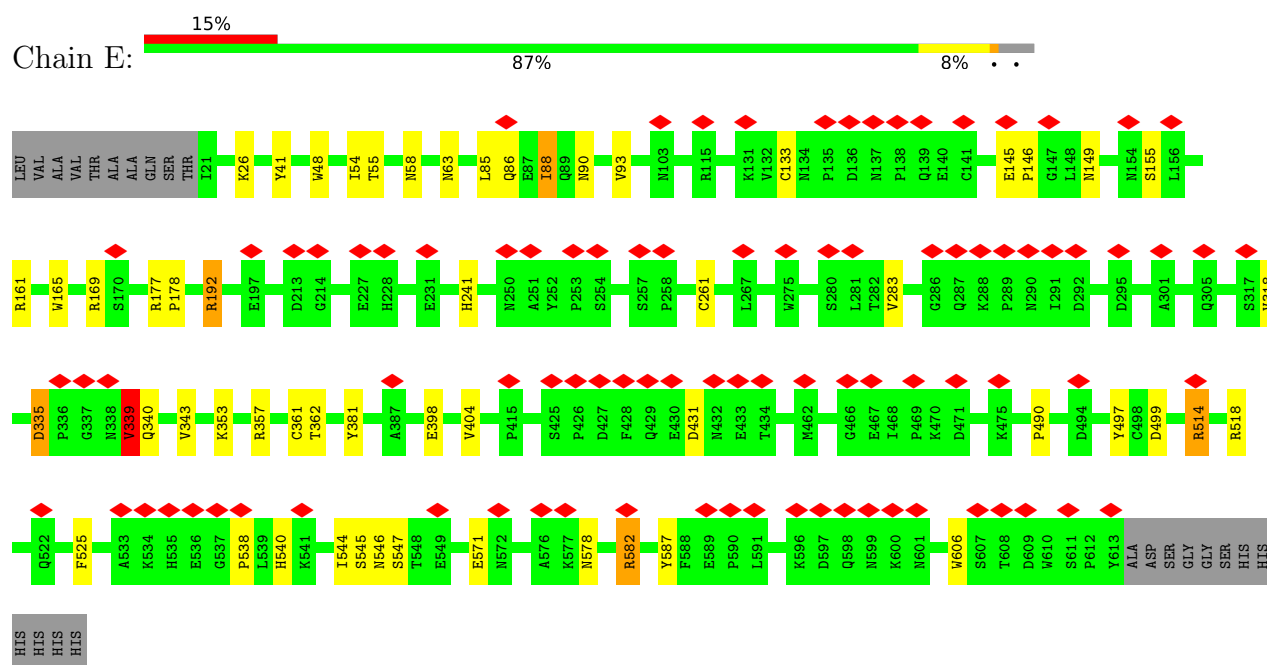
• Molecule 2: Angiotensin-converting enzyme 2

Chain D:



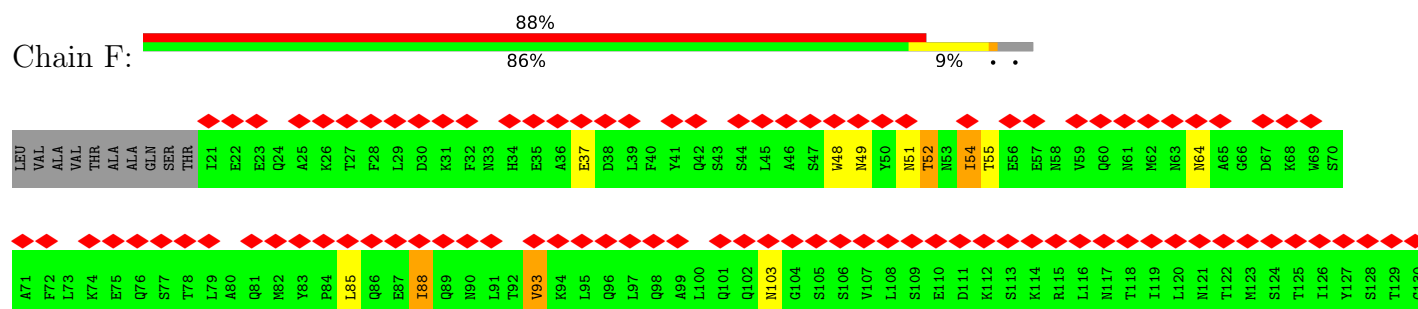
• Molecule 2: Angiotensin-converting enzyme 2

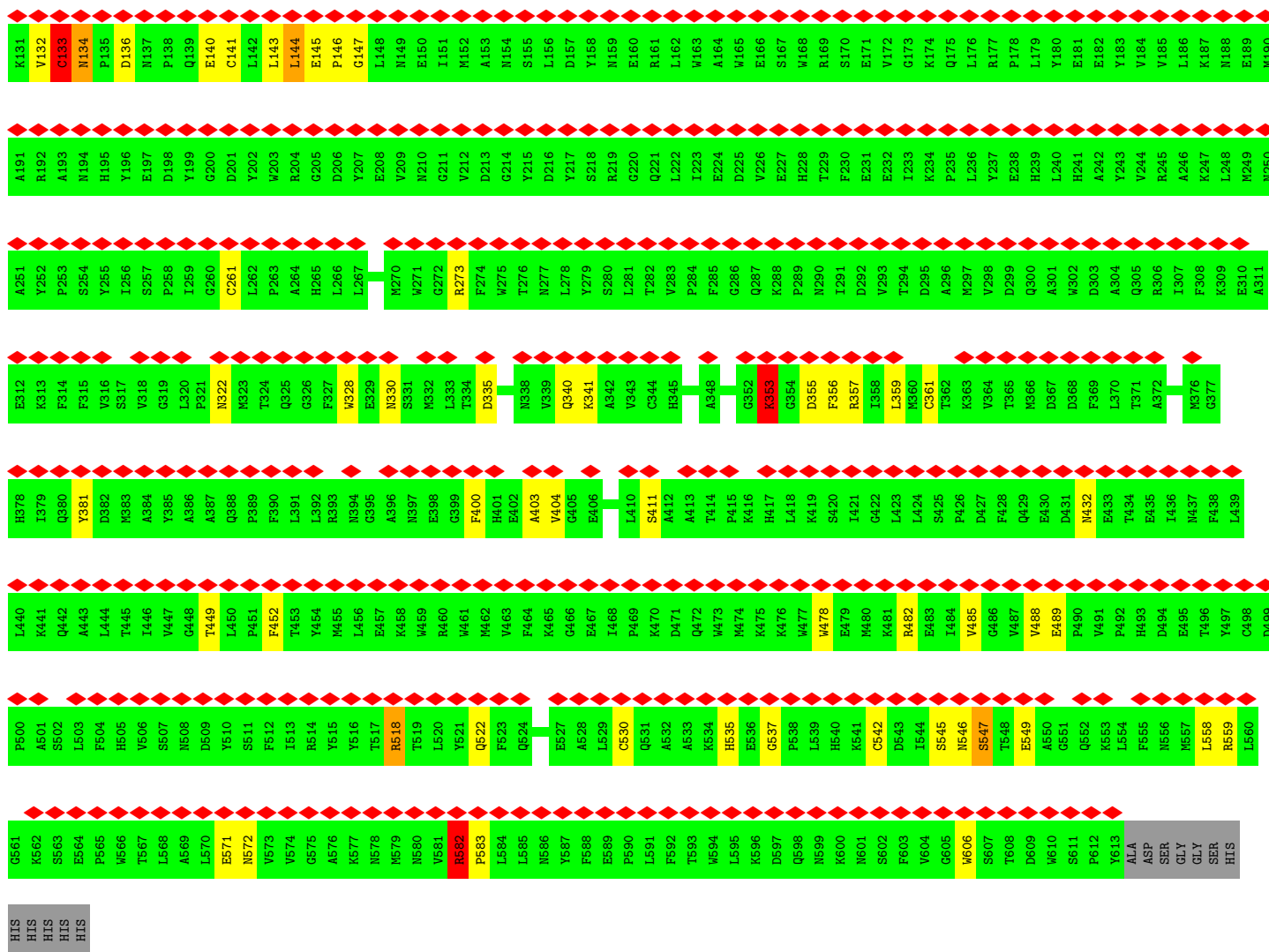
Chain E:



• Molecule 2: Angiotensin-converting enzyme 2

Chain F:





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

Chain G: 100%

MAG1
MAG2

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

Chain H: 50% 50%

MAG1
MAG2

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

Chain I:  100%

MAG1
MAG2

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

Chain J:  100%

MAG1
MAG2

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

Chain K:  100%

MAG1
MAG2

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

Chain L:  100%

MAG1
MAG2

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

Chain M:  100%

MAG1
MAG2

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

Chain N:  100%

MAG1
MAG2

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

Chain O:  50% 50%

MAG1
MAG2

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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	26298	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	50.05	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.084	Depositor
Minimum map value	-0.047	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.002	Depositor
Recommended contour level	0.004	Depositor
Map size (Å)	396.0, 396.0, 396.0	wwPDB
Map dimensions	480, 480, 480	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.825, 0.825, 0.825	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	0.74	2/7827 (0.0%)	1.29	20/10645 (0.2%)
1	B	0.72	0/7834	1.29	14/10654 (0.1%)
1	C	0.75	2/7830 (0.0%)	1.29	15/10649 (0.1%)
2	D	0.78	0/4981	1.34	8/6767 (0.1%)
2	E	0.81	0/4981	1.36	10/6767 (0.1%)
2	F	0.81	0/4981	1.36	13/6767 (0.2%)
All	All	0.76	4/38434 (0.0%)	1.31	80/52249 (0.2%)

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	717	ASN	CG-ND2	-5.95	1.20	1.33
1	A	122	ASN	CG-ND2	5.69	1.45	1.33
1	A	480	CYS	CA-C	5.42	1.58	1.52
1	C	488	CYS	N-CA	5.17	1.52	1.46

The worst 5 of 80 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	1107	ARG	N-CA-C	8.97	122.03	111.71
2	F	547	SER	N-CA-C	8.41	123.32	112.89
1	A	1107	ARG	N-CA-C	7.49	121.68	112.54
1	A	60	SER	N-CA-C	7.45	120.68	109.95
1	C	1107	ARG	N-CA-C	7.40	121.22	111.75

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts ⓘ

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	7658	0	7451	104	0
1	B	7665	0	7464	72	0
1	C	7661	0	7460	76	0
2	D	4844	0	4613	40	0
2	E	4844	0	4617	50	0
2	F	4844	0	4619	53	0
3	G	28	0	25	0	0
3	H	28	0	25	6	0
3	I	28	0	25	0	0
3	J	28	0	25	0	0
3	K	28	0	25	0	0
3	L	28	0	25	0	0
3	M	28	0	25	0	0
3	N	28	0	25	0	0
3	O	28	0	25	4	0
3	P	28	0	25	0	0
3	Q	28	0	25	0	0
3	R	28	0	25	5	0
3	S	28	0	25	0	0
3	T	28	0	25	3	0
3	U	28	0	25	2	0
3	V	28	0	25	3	0
3	W	28	0	25	0	0
3	X	28	0	25	0	0
3	Y	28	0	25	0	0
3	Z	28	0	25	2	0
3	a	28	0	25	0	0
3	b	28	0	25	3	0
3	c	28	0	25	3	0
3	d	28	0	25	0	0
4	A	182	0	169	30	0
4	B	182	0	169	25	0
4	C	182	0	169	22	0
4	D	14	0	13	0	0
4	E	14	0	13	0	0
4	F	14	0	13	2	0
All	All	38776	0	37370	374	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 5.

The worst 5 of 374 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)
2:F:432:ASN:HD21	3:c:1:NAG:C1	1.03	1.64
1:B:165:ASN:HD21	4:B:1313:NAG:C1	0.97	1.61
1:B:122:ASN:HD21	4:B:1302:NAG:C1	1.13	1.58
1:B:1074:ASN:HD21	4:B:1312:NAG:C1	1.02	1.57
1:A:234:ASN:HD21	4:A:1303:NAG:C1	0.98	1.55

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	959/1234 (78%)	887 (92%)	68 (7%)	4 (0%)	30	59
1	B	959/1234 (78%)	894 (93%)	61 (6%)	4 (0%)	30	59
1	C	959/1234 (78%)	882 (92%)	73 (8%)	4 (0%)	30	59
2	D	591/615 (96%)	565 (96%)	21 (4%)	5 (1%)	16	44
2	E	591/615 (96%)	560 (95%)	29 (5%)	2 (0%)	36	65
2	F	591/615 (96%)	555 (94%)	31 (5%)	5 (1%)	16	44
All	All	4650/5547 (84%)	4343 (93%)	283 (6%)	24 (0%)	26	54

5 of 24 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	569	ILE
1	C	417	LYS
2	D	106	SER

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Mol	Chain	Res	Type
2	F	144	LEU
1	C	582	LEU

5.3.2 Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	858/1069 (80%)	841 (98%)	17 (2%)	48	65
1	B	860/1069 (80%)	838 (97%)	22 (3%)	40	61
1	C	859/1069 (80%)	841 (98%)	18 (2%)	47	64
2	D	524/540 (97%)	512 (98%)	12 (2%)	44	63
2	E	524/540 (97%)	513 (98%)	11 (2%)	47	64
2	F	524/540 (97%)	506 (97%)	18 (3%)	32	57
All	All	4149/4827 (86%)	4051 (98%)	98 (2%)	43	62

5 of 98 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	D	97	LEU
2	E	149	ASN
2	D	148	LEU
2	D	401	HIS
2	E	362	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 98 such sidechains are listed below:

Mol	Chain	Res	Type
1	C	1002	GLN
2	E	96	GLN
1	C	1074	ASN
2	D	154	ASN
2	E	154	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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

5.5 Carbohydrates ⓘ

48 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	1,3	14,14,15	1.25	2 (14%)	17,19,21	0.65	0
3	NAG	G	2	3	14,14,15	1.11	1 (7%)	17,19,21	0.99	2 (11%)
3	NAG	H	1	3	14,14,15	1.52	2 (14%)	17,19,21	0.78	0
3	NAG	H	2	3	14,14,15	1.40	2 (14%)	17,19,21	0.92	1 (5%)
3	NAG	I	1	1,3	14,14,15	1.53	2 (14%)	17,19,21	0.69	0
3	NAG	I	2	3	14,14,15	1.52	2 (14%)	17,19,21	0.63	0
3	NAG	J	1	1,3	14,14,15	1.21	2 (14%)	17,19,21	0.92	1 (5%)
3	NAG	J	2	3	14,14,15	1.20	1 (7%)	17,19,21	0.64	0
3	NAG	K	1	1,3	14,14,15	1.35	2 (14%)	17,19,21	0.82	1 (5%)
3	NAG	K	2	3	14,14,15	1.36	2 (14%)	17,19,21	0.72	0
3	NAG	L	1	1,3	14,14,15	1.51	2 (14%)	17,19,21	0.71	0
3	NAG	L	2	3	14,14,15	1.48	2 (14%)	17,19,21	0.73	0
3	NAG	M	1	1,3	14,14,15	1.18	2 (14%)	17,19,21	0.79	0
3	NAG	M	2	3	14,14,15	1.13	1 (7%)	17,19,21	0.76	0
3	NAG	N	1	1,3	14,14,15	1.33	3 (21%)	17,19,21	0.96	0
3	NAG	N	2	3	14,14,15	1.37	2 (14%)	17,19,21	0.90	1 (5%)
3	NAG	O	1	3	14,14,15	1.52	2 (14%)	17,19,21	0.70	0
3	NAG	O	2	3	14,14,15	1.35	2 (14%)	17,19,21	1.02	2 (11%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	NAG	P	1	2,3	14,14,15	0.29	0	17,19,21	0.55	0
3	NAG	P	2	3	14,14,15	0.29	0	17,19,21	0.53	0
3	NAG	Q	1	2,3	14,14,15	0.39	0	17,19,21	0.66	0
3	NAG	Q	2	3	14,14,15	0.99	1 (7%)	17,19,21	1.00	1 (5%)
3	NAG	R	1	2,3	14,14,15	0.29	0	17,19,21	0.58	0
3	NAG	R	2	3	14,14,15	0.30	0	17,19,21	0.56	0
3	NAG	S	1	2,3	14,14,15	0.31	0	17,19,21	0.53	0
3	NAG	S	2	3	14,14,15	1.19	1 (7%)	17,19,21	0.89	0
3	NAG	T	1	3	14,14,15	0.24	0	17,19,21	0.63	0
3	NAG	T	2	3	14,14,15	0.37	0	17,19,21	0.61	1 (5%)
3	NAG	U	1	2,3	14,14,15	0.58	0	17,19,21	0.74	0
3	NAG	U	2	3	14,14,15	0.57	0	17,19,21	0.38	0
3	NAG	V	1	2,3	14,14,15	0.40	0	17,19,21	0.66	0
3	NAG	V	2	3	14,14,15	0.27	0	17,19,21	0.70	1 (5%)
3	NAG	W	1	2,3	14,14,15	1.45	4 (28%)	17,19,21	1.38	2 (11%)
3	NAG	W	2	3	14,14,15	1.17	1 (7%)	17,19,21	0.88	0
3	NAG	X	1	2,3	14,14,15	1.51	4 (28%)	17,19,21	1.10	2 (11%)
3	NAG	X	2	3	14,14,15	1.28	1 (7%)	17,19,21	0.79	0
3	NAG	Y	1	2,3	14,14,15	0.23	0	17,19,21	0.63	0
3	NAG	Y	2	3	14,14,15	0.39	0	17,19,21	0.61	1 (5%)
3	NAG	Z	1	2,3	14,14,15	0.58	1 (7%)	17,19,21	0.74	0
3	NAG	Z	2	3	14,14,15	0.55	0	17,19,21	0.38	0
3	NAG	a	1	2,3	14,14,15	0.42	0	17,19,21	0.67	0
3	NAG	a	2	3	14,14,15	0.29	0	17,19,21	0.71	1 (5%)
3	NAG	b	1	3	14,14,15	0.19	0	17,19,21	0.71	1 (5%)
3	NAG	b	2	3	14,14,15	1.30	2 (14%)	17,19,21	2.08	4 (23%)
3	NAG	c	1	3	14,14,15	0.39	0	17,19,21	0.52	0
3	NAG	c	2	3	14,14,15	1.11	1 (7%)	17,19,21	1.23	1 (5%)
3	NAG	d	1	2,3	14,14,15	0.23	0	17,19,21	0.63	0
3	NAG	d	2	3	14,14,15	0.39	0	17,19,21	0.61	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	G	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	G	2	3	-	0/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NAG	H	1	3	-	0/6/23/26	0/1/1/1
3	NAG	H	2	3	-	0/6/23/26	0/1/1/1
3	NAG	I	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	I	2	3	-	0/6/23/26	0/1/1/1
3	NAG	J	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	J	2	3	-	0/6/23/26	0/1/1/1
3	NAG	K	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	K	2	3	-	1/6/23/26	0/1/1/1
3	NAG	L	1	1,3	-	1/6/23/26	0/1/1/1
3	NAG	L	2	3	-	0/6/23/26	0/1/1/1
3	NAG	M	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	M	2	3	-	0/6/23/26	0/1/1/1
3	NAG	N	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	N	2	3	-	0/6/23/26	0/1/1/1
3	NAG	O	1	3	-	1/6/23/26	0/1/1/1
3	NAG	O	2	3	-	0/6/23/26	0/1/1/1
3	NAG	P	1	2,3	-	2/6/23/26	0/1/1/1
3	NAG	P	2	3	-	2/6/23/26	0/1/1/1
3	NAG	Q	1	2,3	-	2/6/23/26	0/1/1/1
3	NAG	Q	2	3	-	0/6/23/26	0/1/1/1
3	NAG	R	1	2,3	-	2/6/23/26	0/1/1/1
3	NAG	R	2	3	-	3/6/23/26	0/1/1/1
3	NAG	S	1	2,3	-	0/6/23/26	0/1/1/1
3	NAG	S	2	3	-	0/6/23/26	0/1/1/1
3	NAG	T	1	3	-	0/6/23/26	0/1/1/1
3	NAG	T	2	3	-	2/6/23/26	0/1/1/1
3	NAG	U	1	2,3	-	2/6/23/26	0/1/1/1
3	NAG	U	2	3	-	2/6/23/26	0/1/1/1
3	NAG	V	1	2,3	-	2/6/23/26	0/1/1/1
3	NAG	V	2	3	-	2/6/23/26	0/1/1/1
3	NAG	W	1	2,3	-	0/6/23/26	0/1/1/1
3	NAG	W	2	3	-	0/6/23/26	0/1/1/1
3	NAG	X	1	2,3	-	0/6/23/26	0/1/1/1
3	NAG	X	2	3	-	0/6/23/26	0/1/1/1
3	NAG	Y	1	2,3	-	0/6/23/26	0/1/1/1
3	NAG	Y	2	3	-	2/6/23/26	0/1/1/1
3	NAG	Z	1	2,3	-	2/6/23/26	0/1/1/1
3	NAG	Z	2	3	-	2/6/23/26	0/1/1/1
3	NAG	a	1	2,3	-	2/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NAG	a	2	3	-	2/6/23/26	0/1/1/1
3	NAG	b	1	3	-	2/6/23/26	0/1/1/1
3	NAG	b	2	3	-	4/6/23/26	0/1/1/1
3	NAG	c	1	3	-	0/6/23/26	0/1/1/1
3	NAG	c	2	3	-	2/6/23/26	0/1/1/1
3	NAG	d	1	2,3	-	0/6/23/26	0/1/1/1
3	NAG	d	2	3	-	2/6/23/26	0/1/1/1

The worst 5 of 50 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	H	1	NAG	C1-C2	4.11	1.57	1.52
3	I	2	NAG	C1-C2	4.06	1.57	1.52
3	O	1	NAG	C1-C2	4.03	1.57	1.52
3	L	1	NAG	C1-C2	4.03	1.57	1.52
3	I	1	NAG	C1-C2	4.01	1.57	1.52

The worst 5 of 24 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	b	2	NAG	C2-N2-C7	5.69	130.52	122.90
3	c	2	NAG	C1-O5-C5	4.33	117.99	112.19
3	b	2	NAG	C8-C7-N2	4.08	122.88	116.12
3	Q	2	NAG	C1-O5-C5	3.72	117.17	112.19
3	W	1	NAG	C1-O5-C5	3.59	117.00	112.19

There are no chirality outliers.

5 of 44 torsion outliers are listed below:

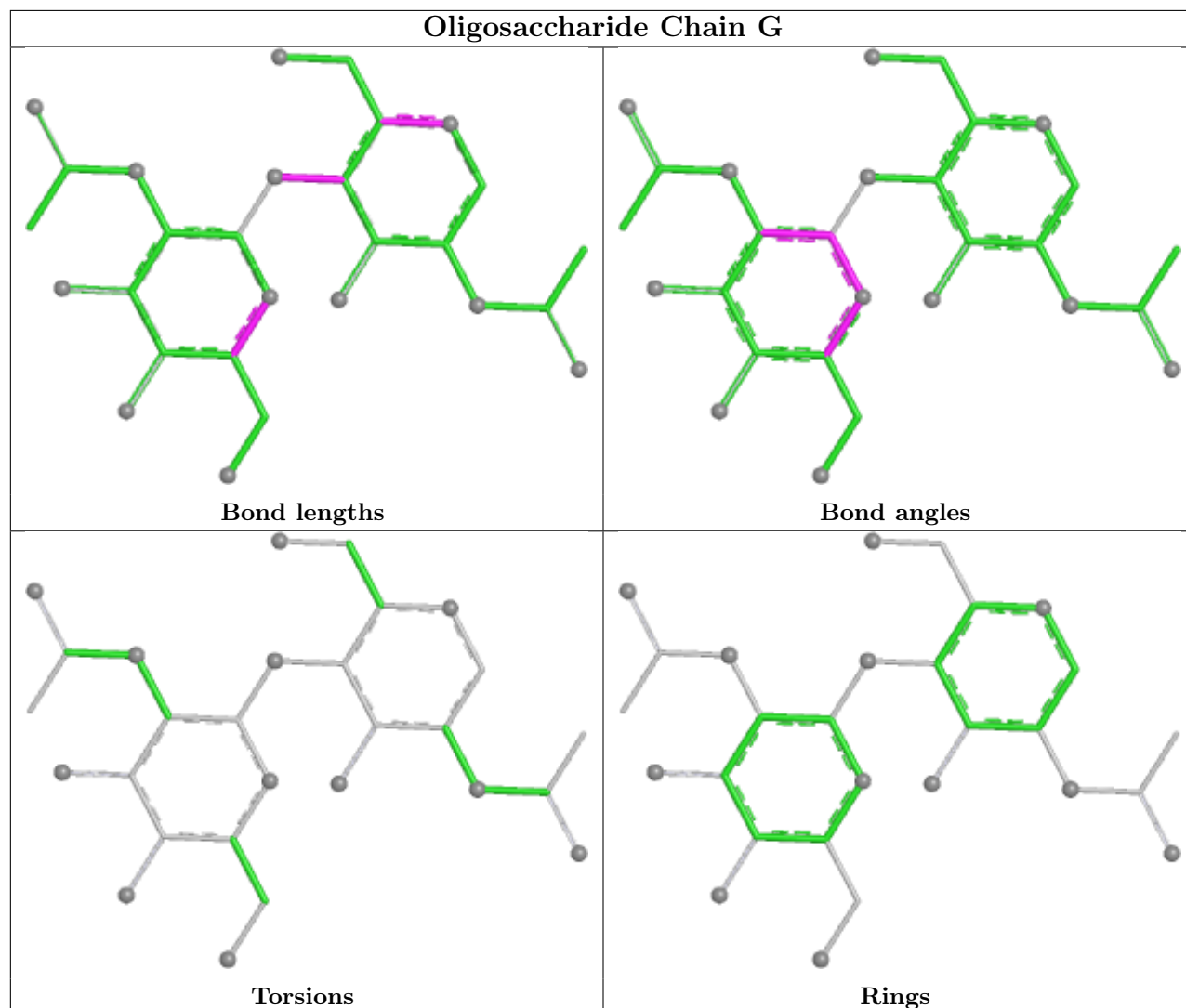
Mol	Chain	Res	Type	Atoms
3	R	1	NAG	O7-C7-N2-C2
3	R	2	NAG	C3-C2-N2-C7
3	R	2	NAG	C8-C7-N2-C2
3	R	2	NAG	O7-C7-N2-C2
3	R	1	NAG	C8-C7-N2-C2

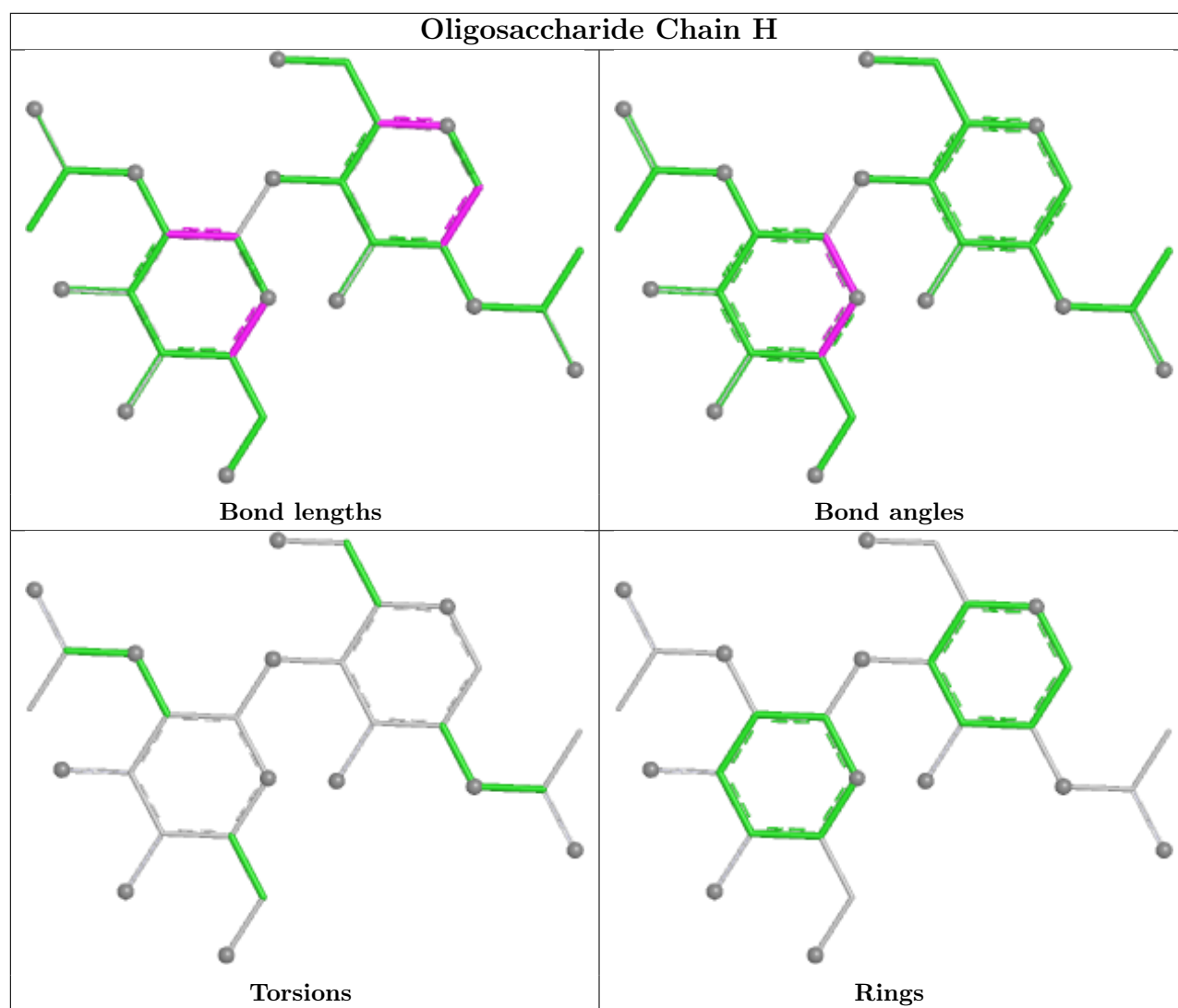
There are no ring outliers.

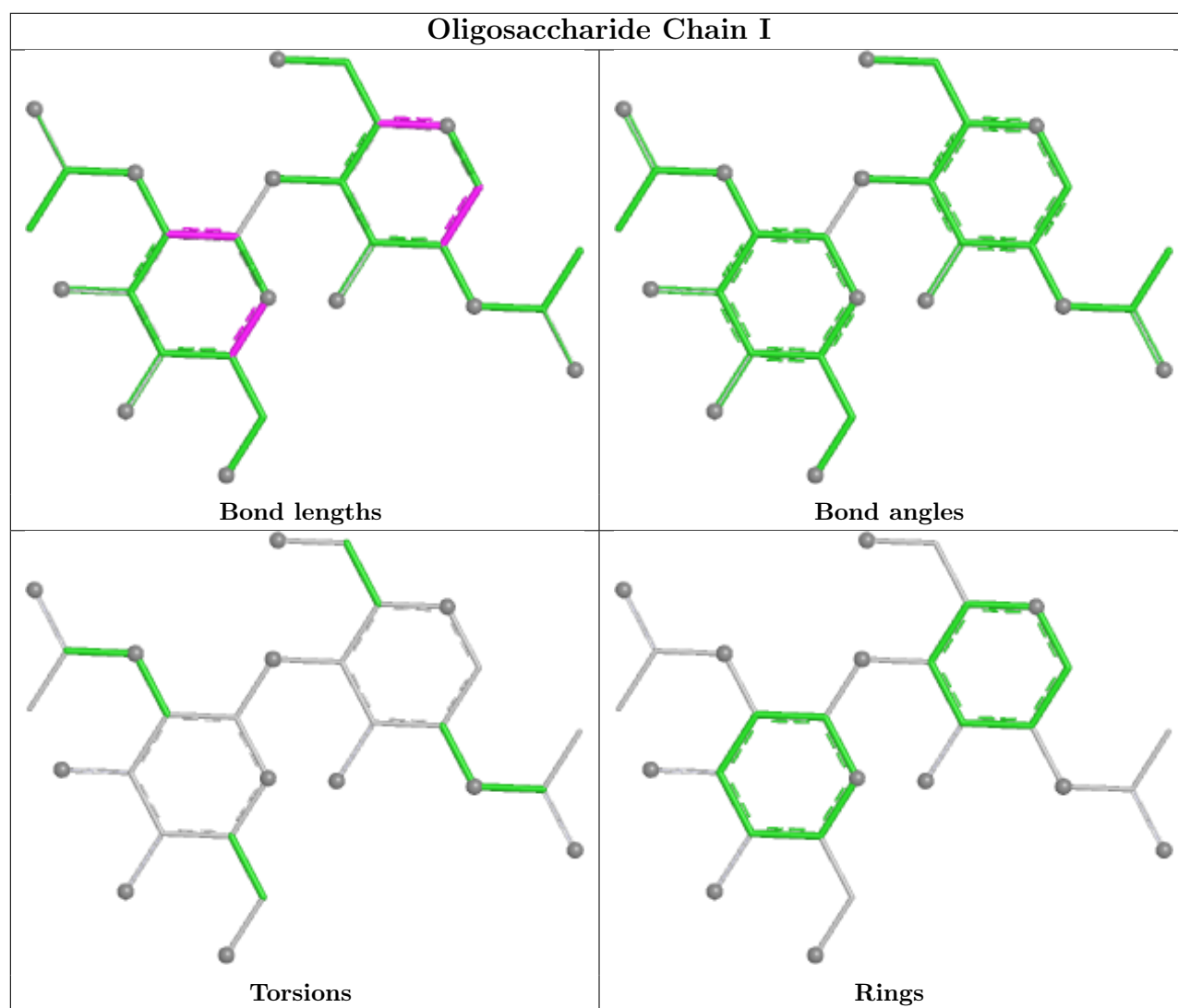
12 monomers are involved in 31 short contacts:

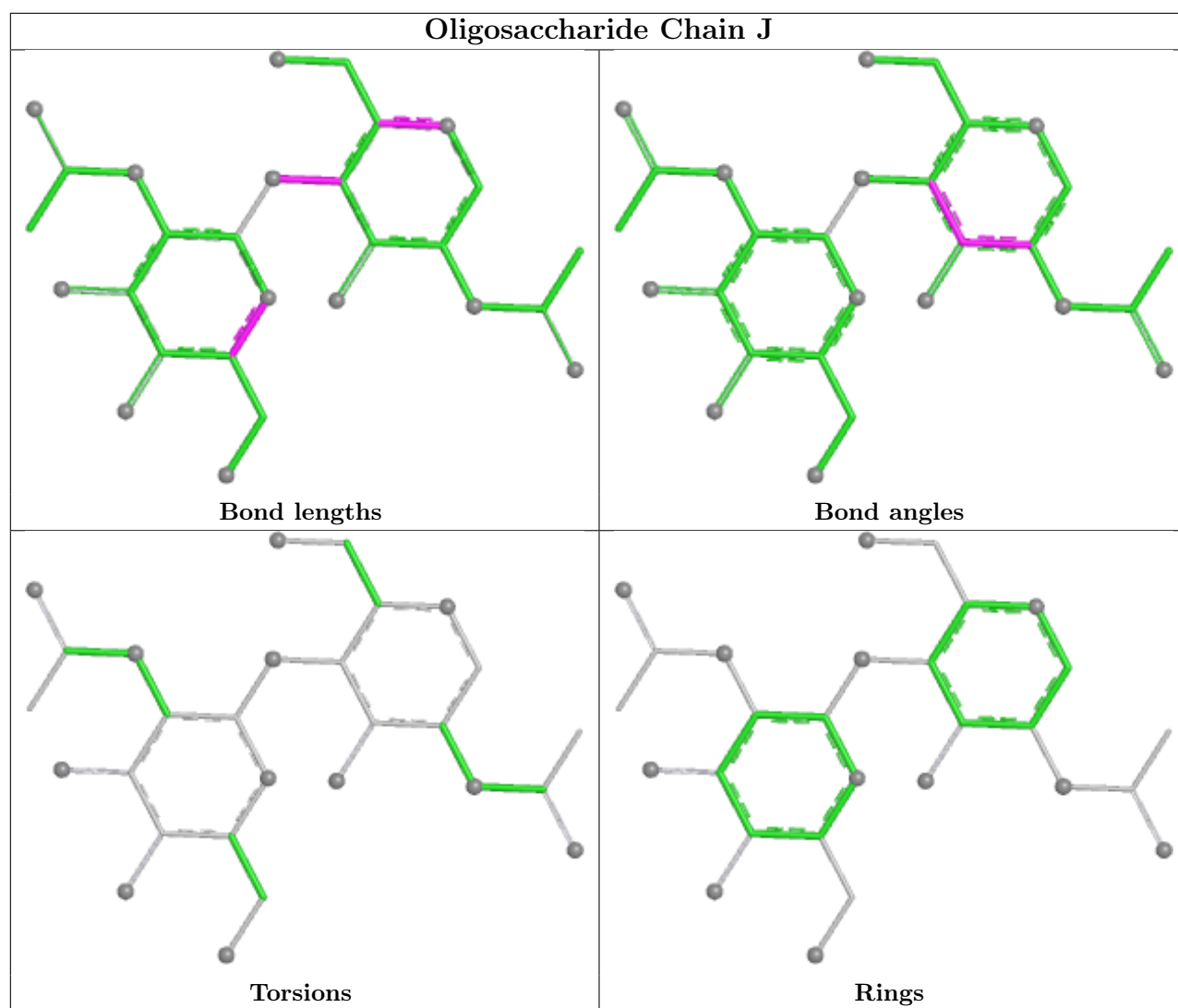
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	H	1	NAG	6	0
3	U	1	NAG	2	0
3	V	1	NAG	3	0
3	c	1	NAG	3	0
3	T	1	NAG	3	0
3	O	1	NAG	4	0
3	b	1	NAG	3	0
3	R	1	NAG	3	0
3	Z	1	NAG	2	0
3	R	2	NAG	5	0
3	c	2	NAG	1	0
3	b	2	NAG	1	0

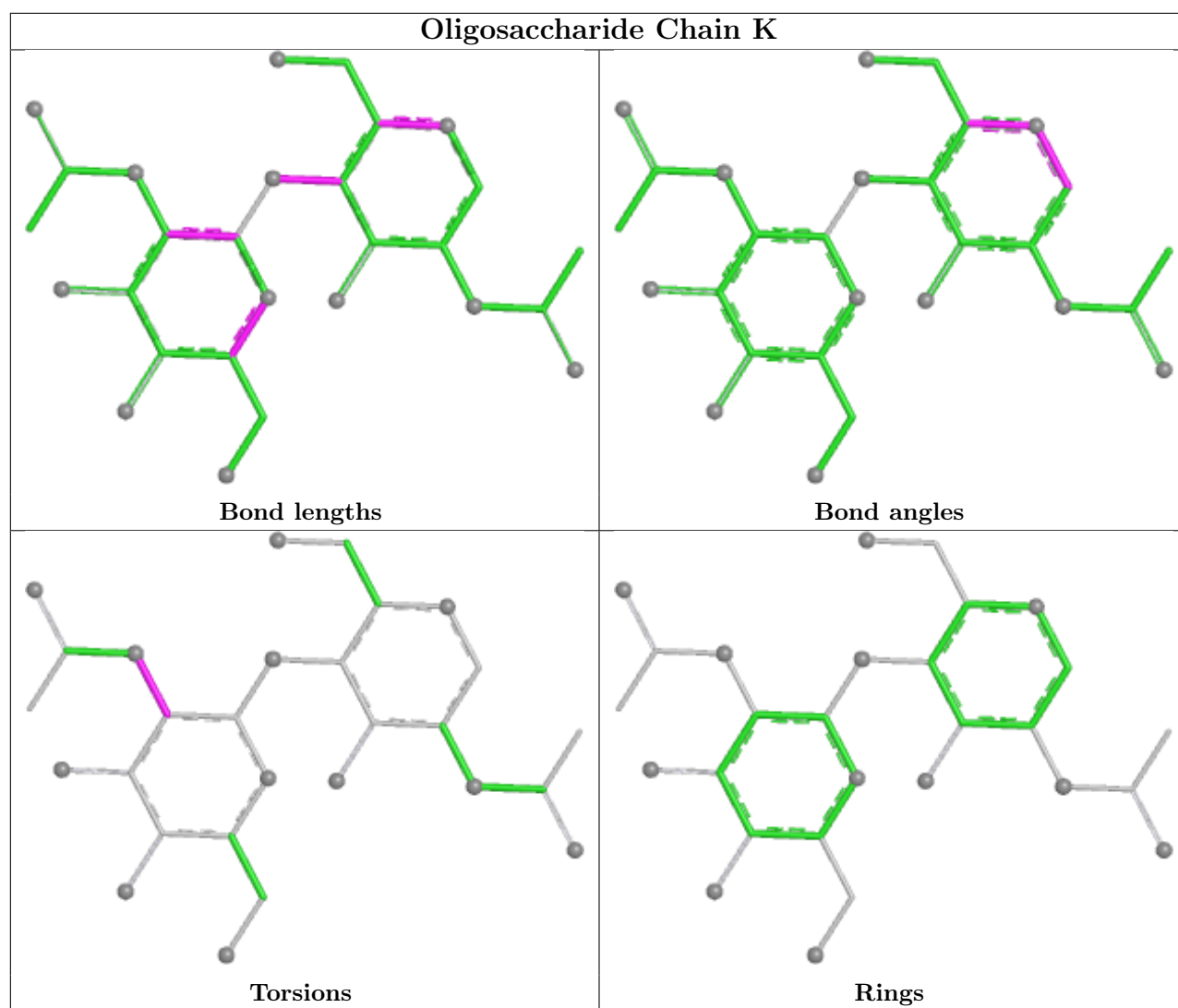
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

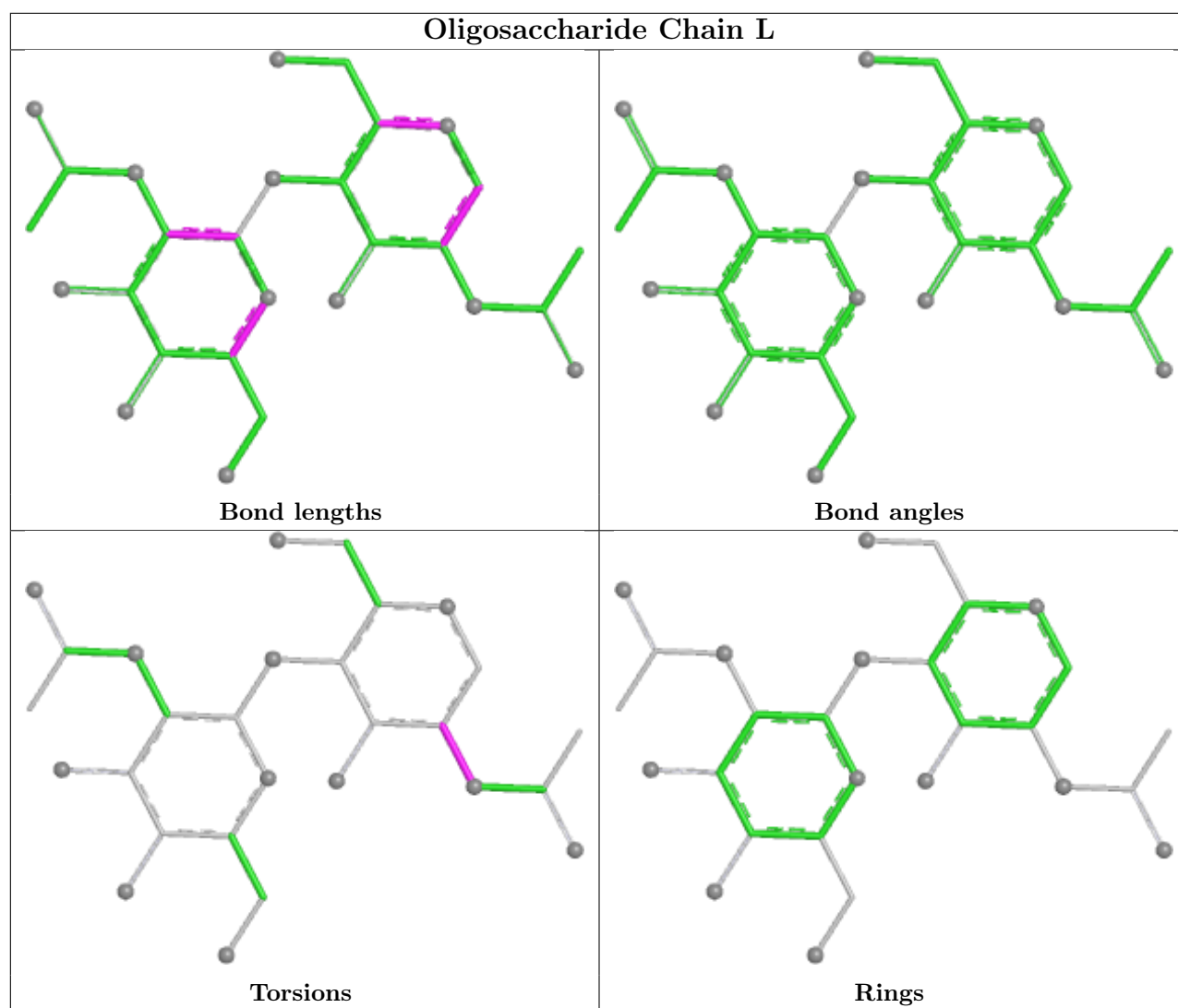


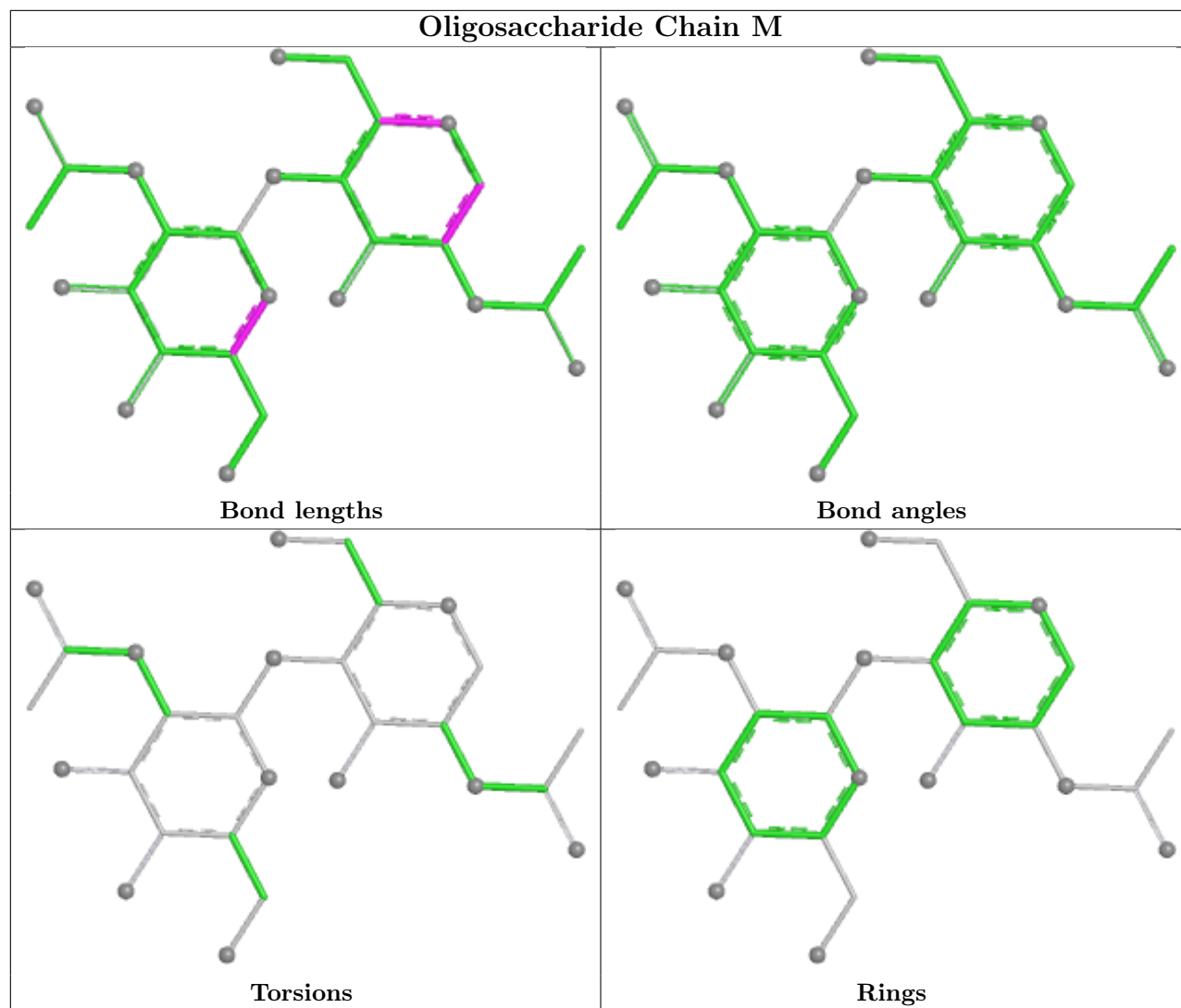


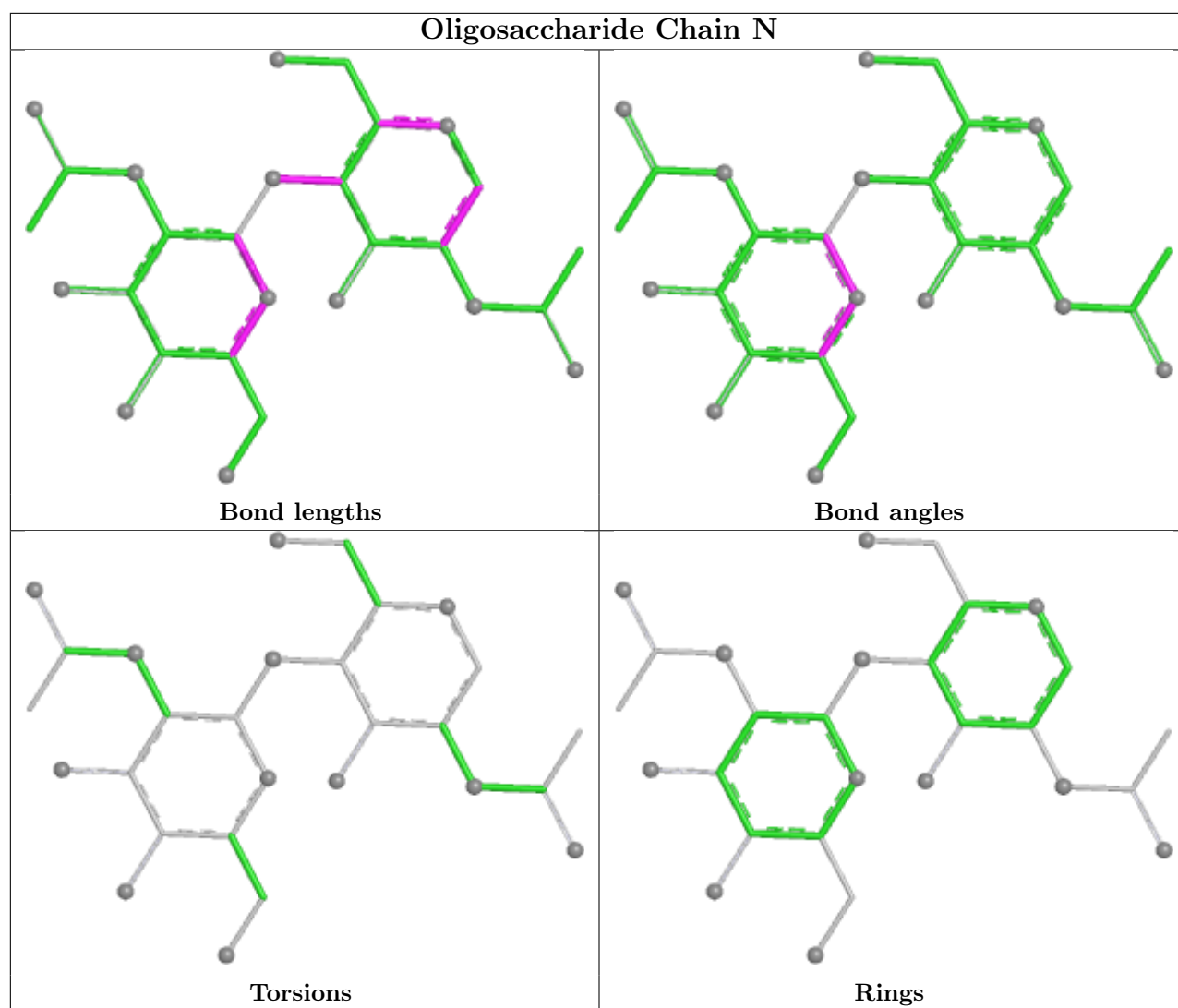


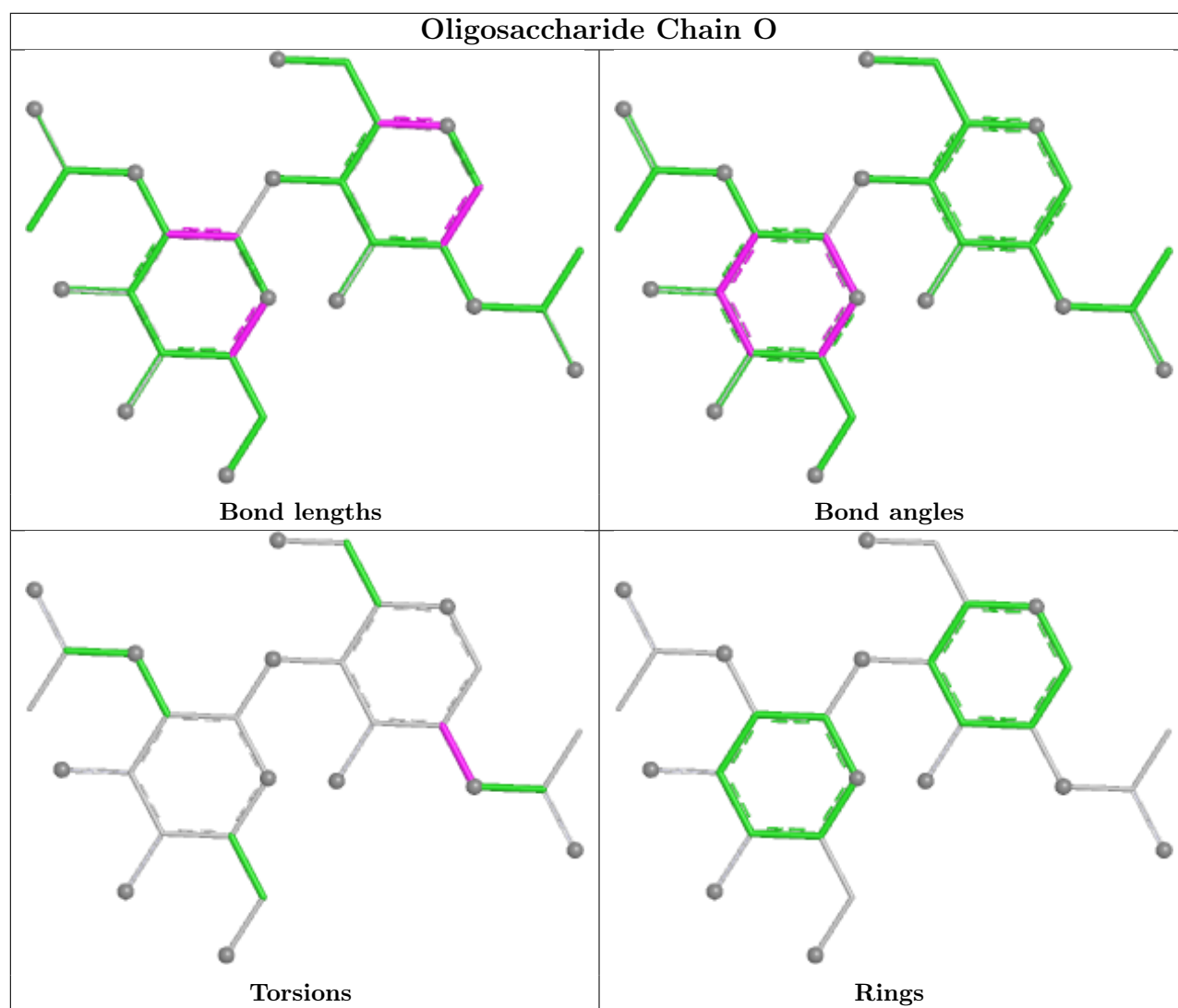


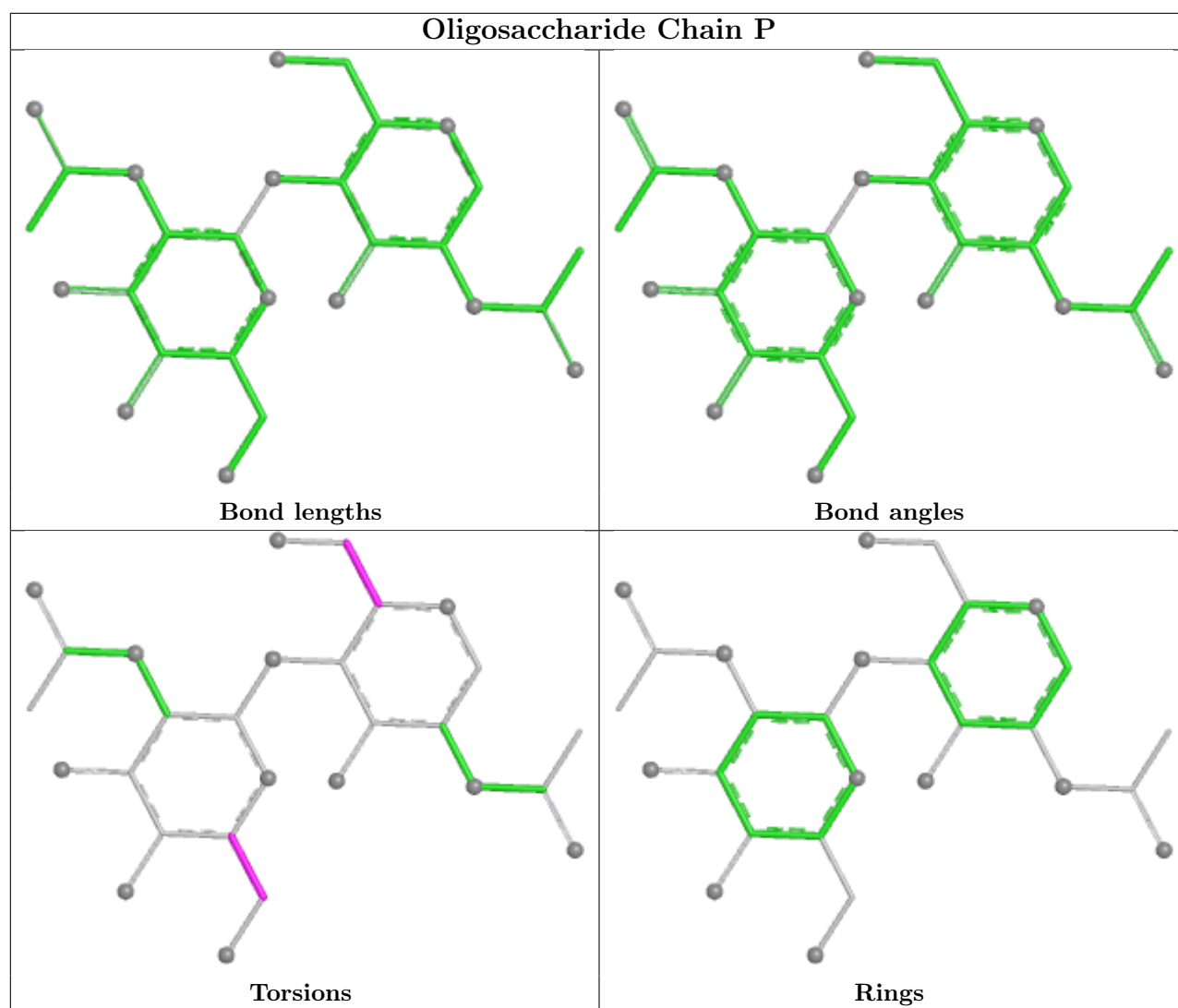


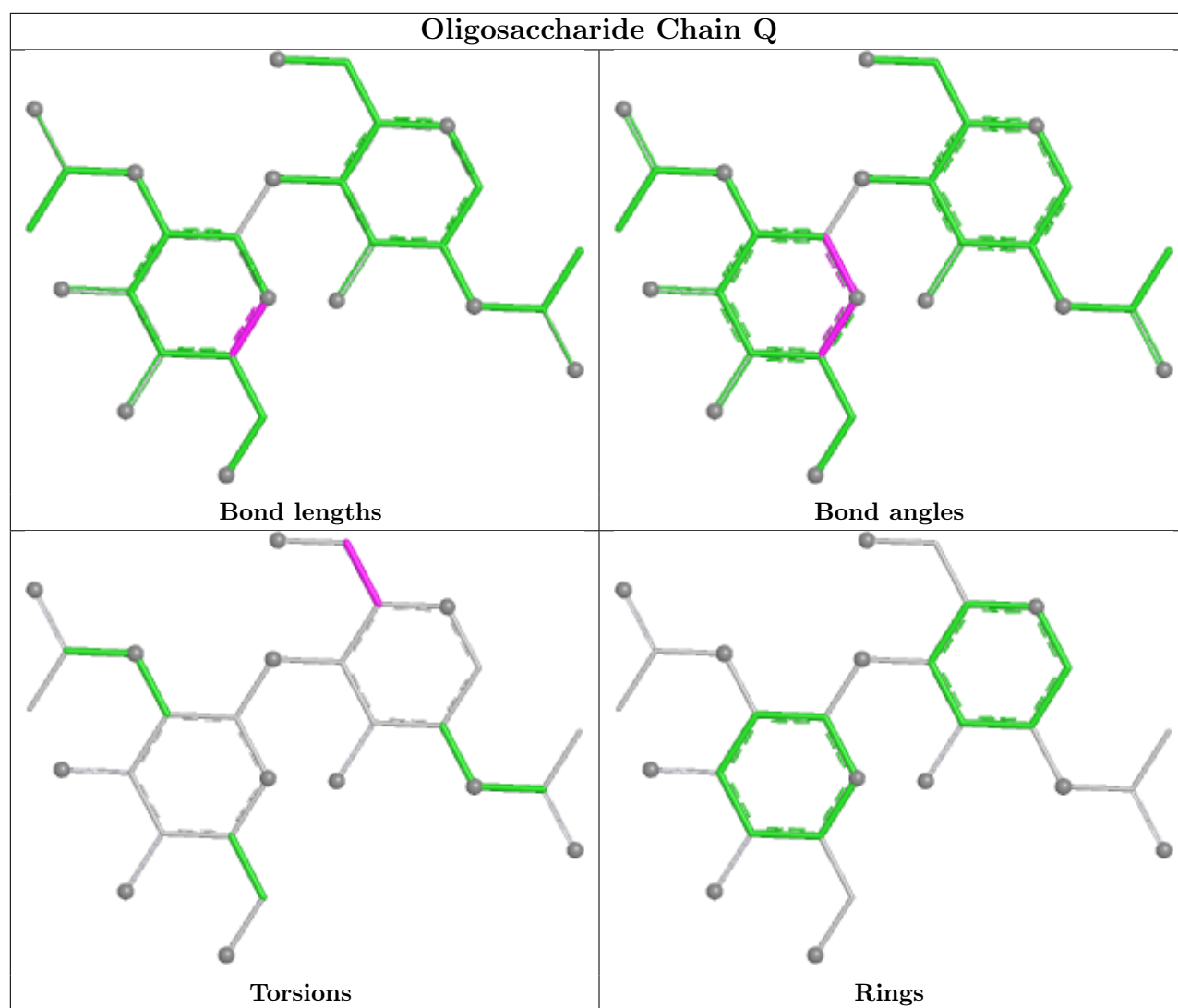


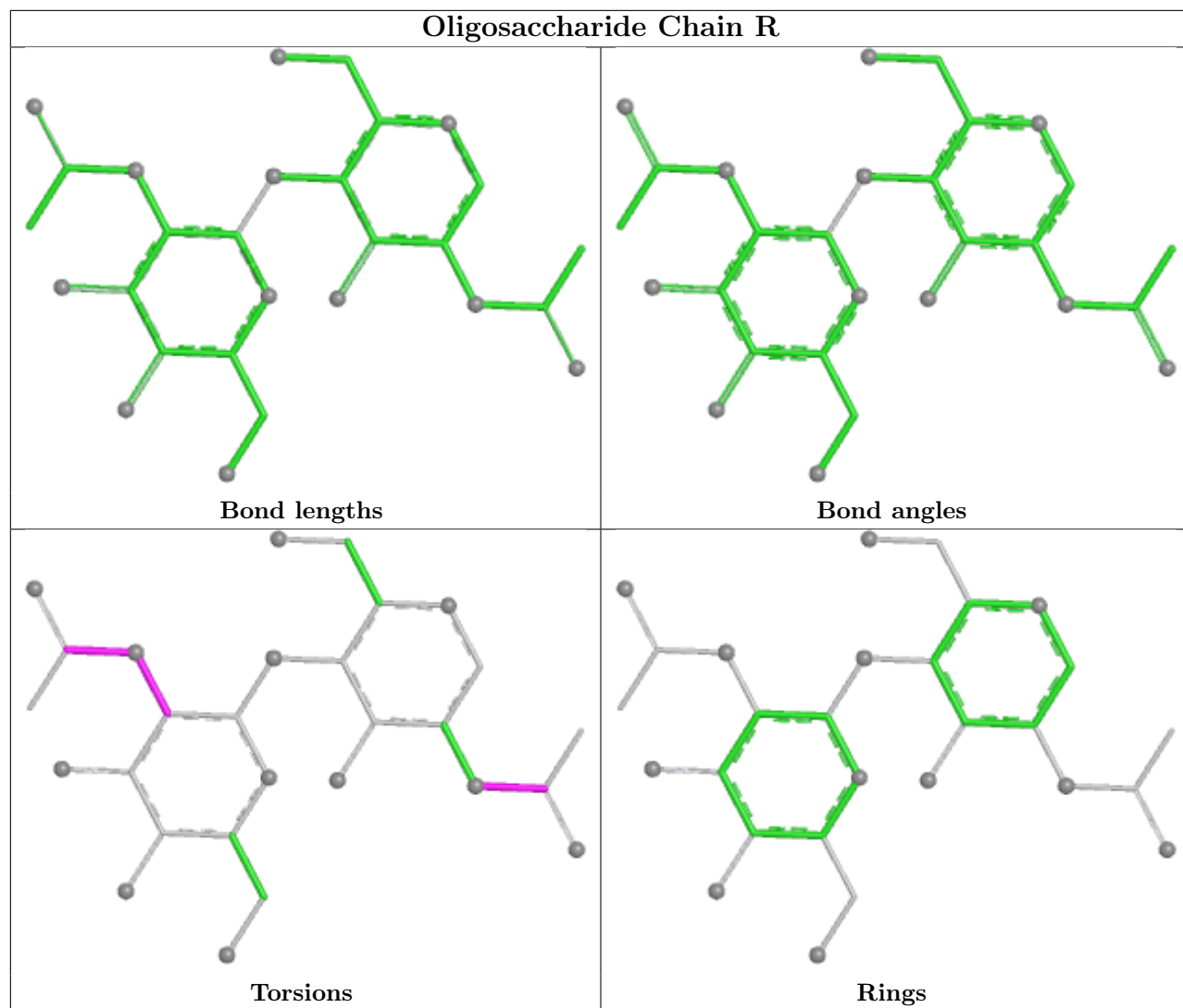


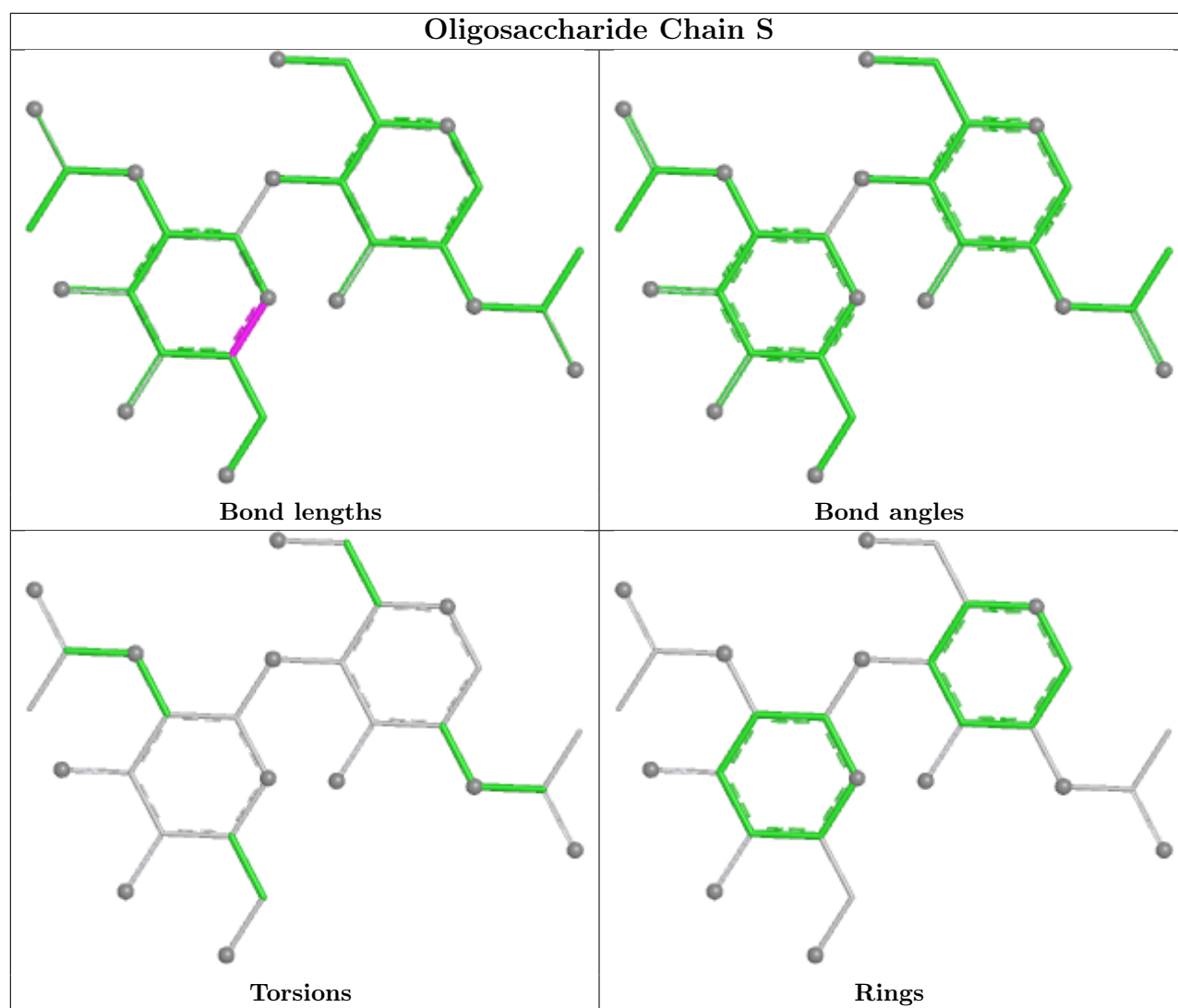


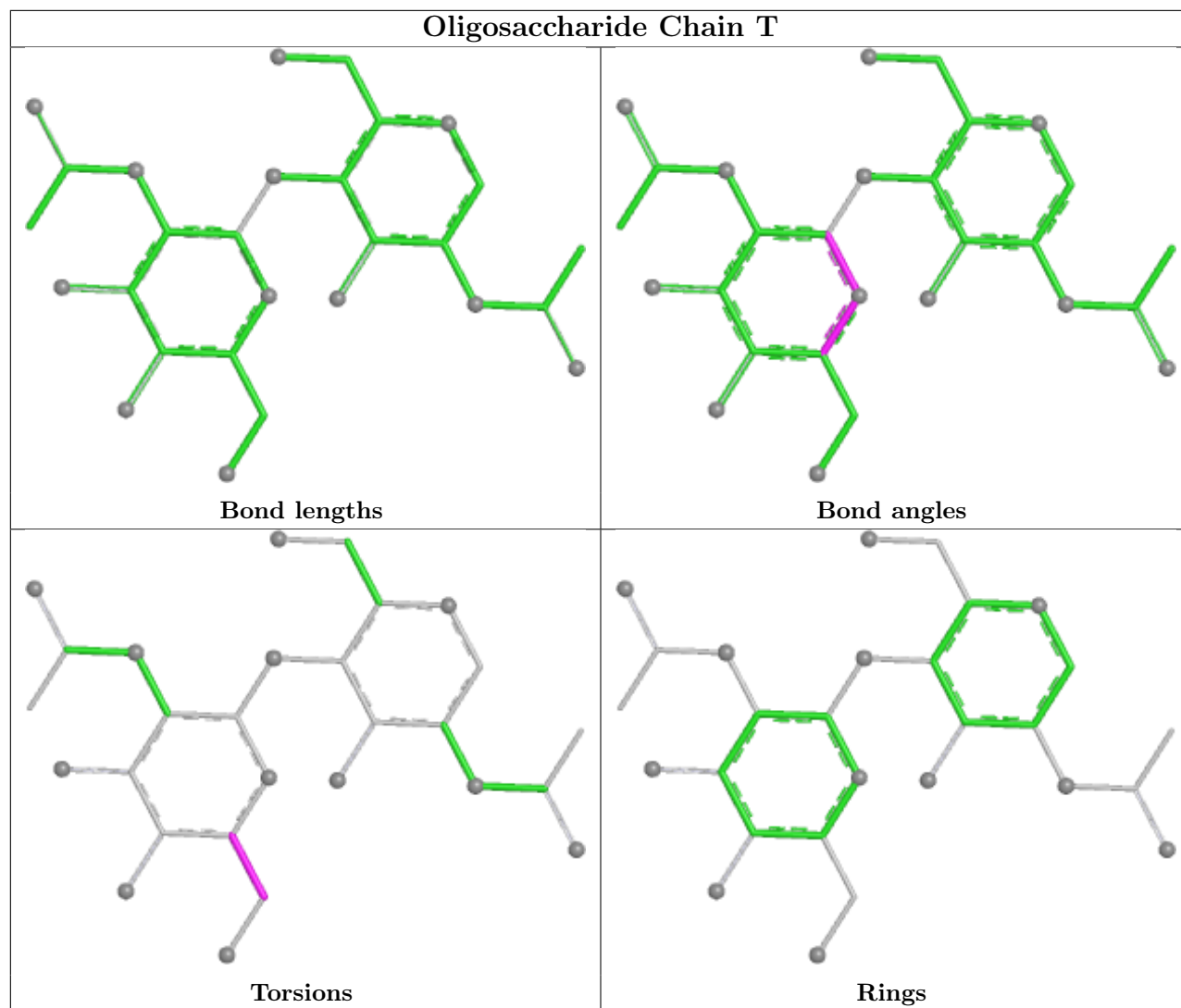


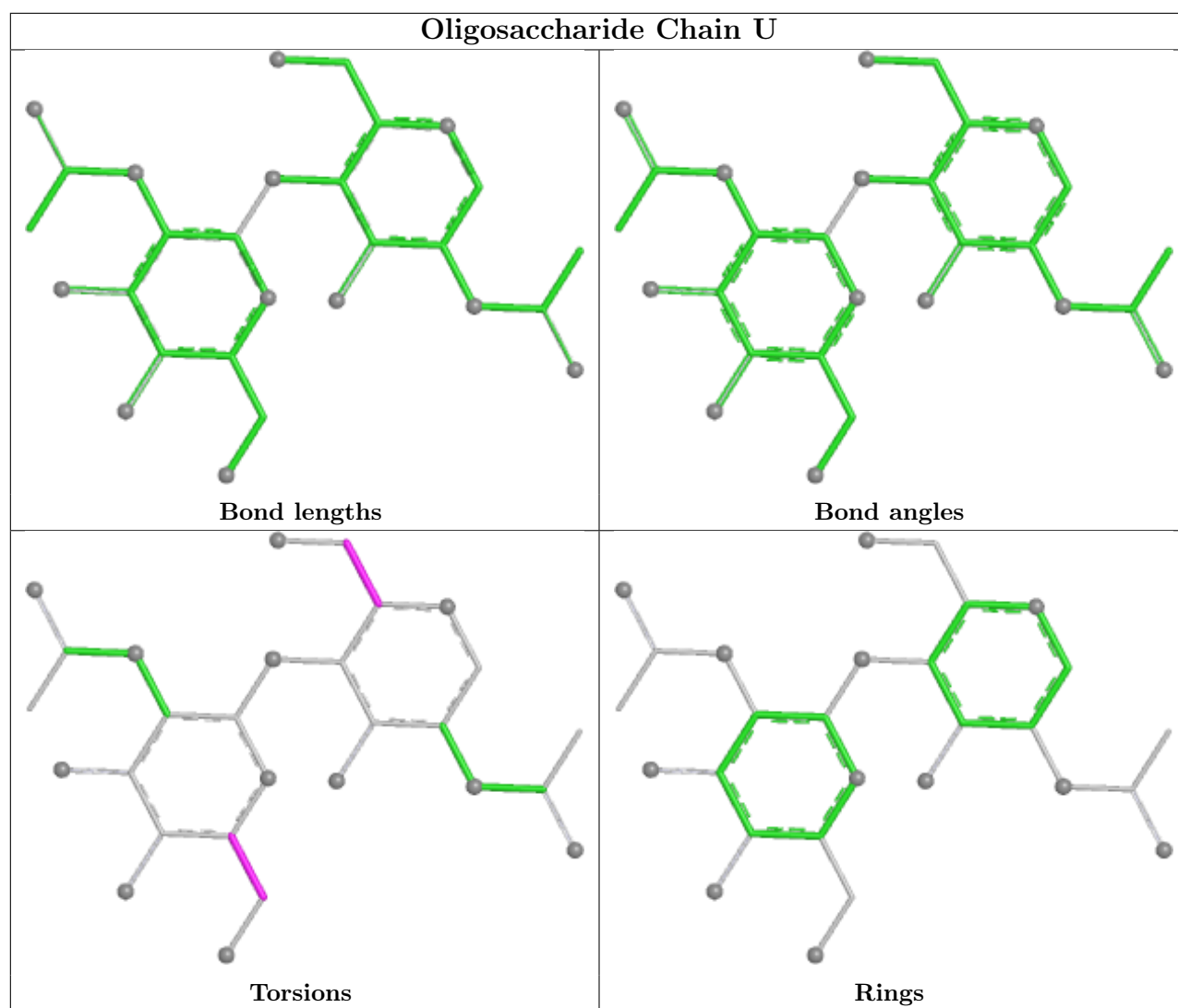


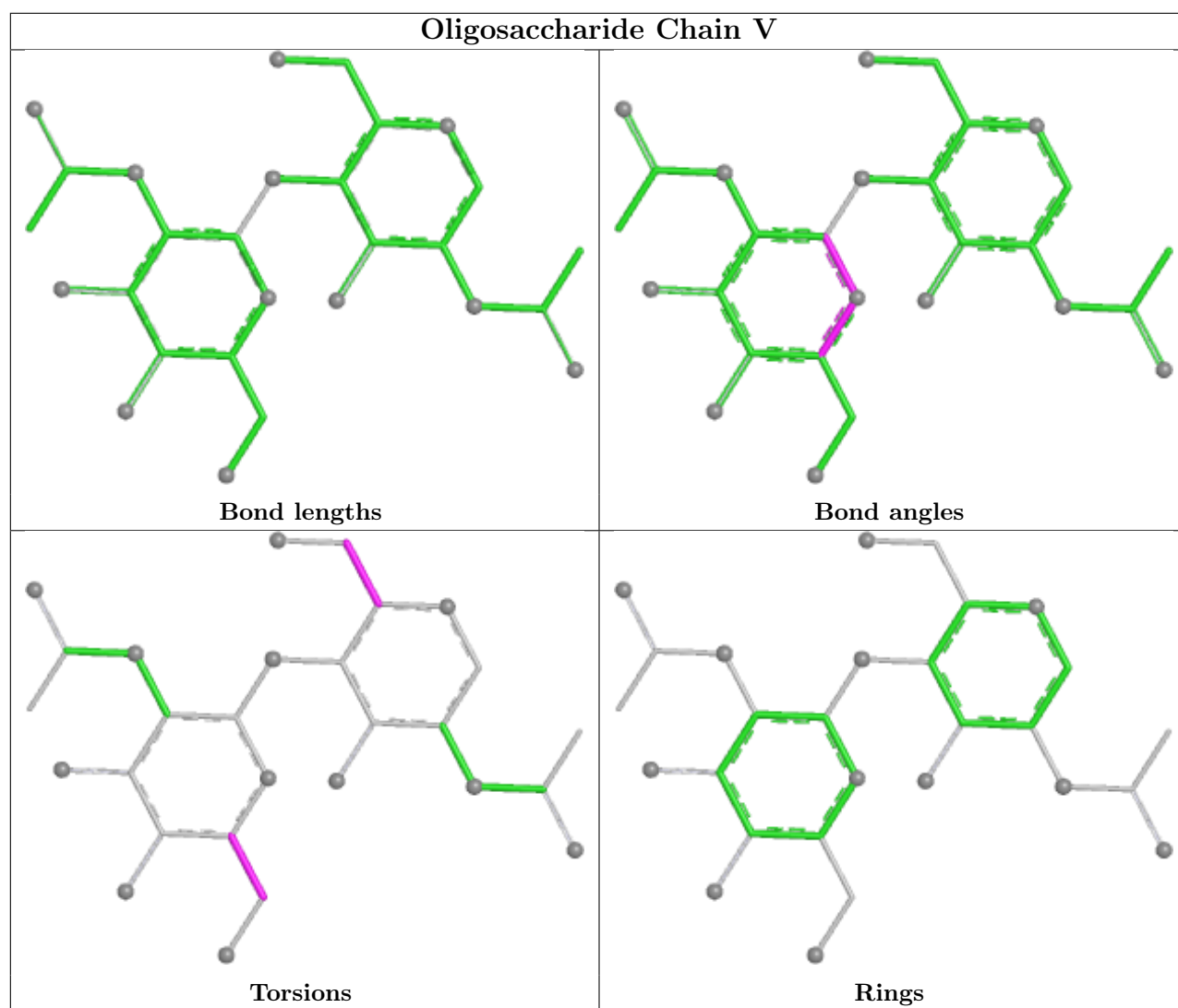


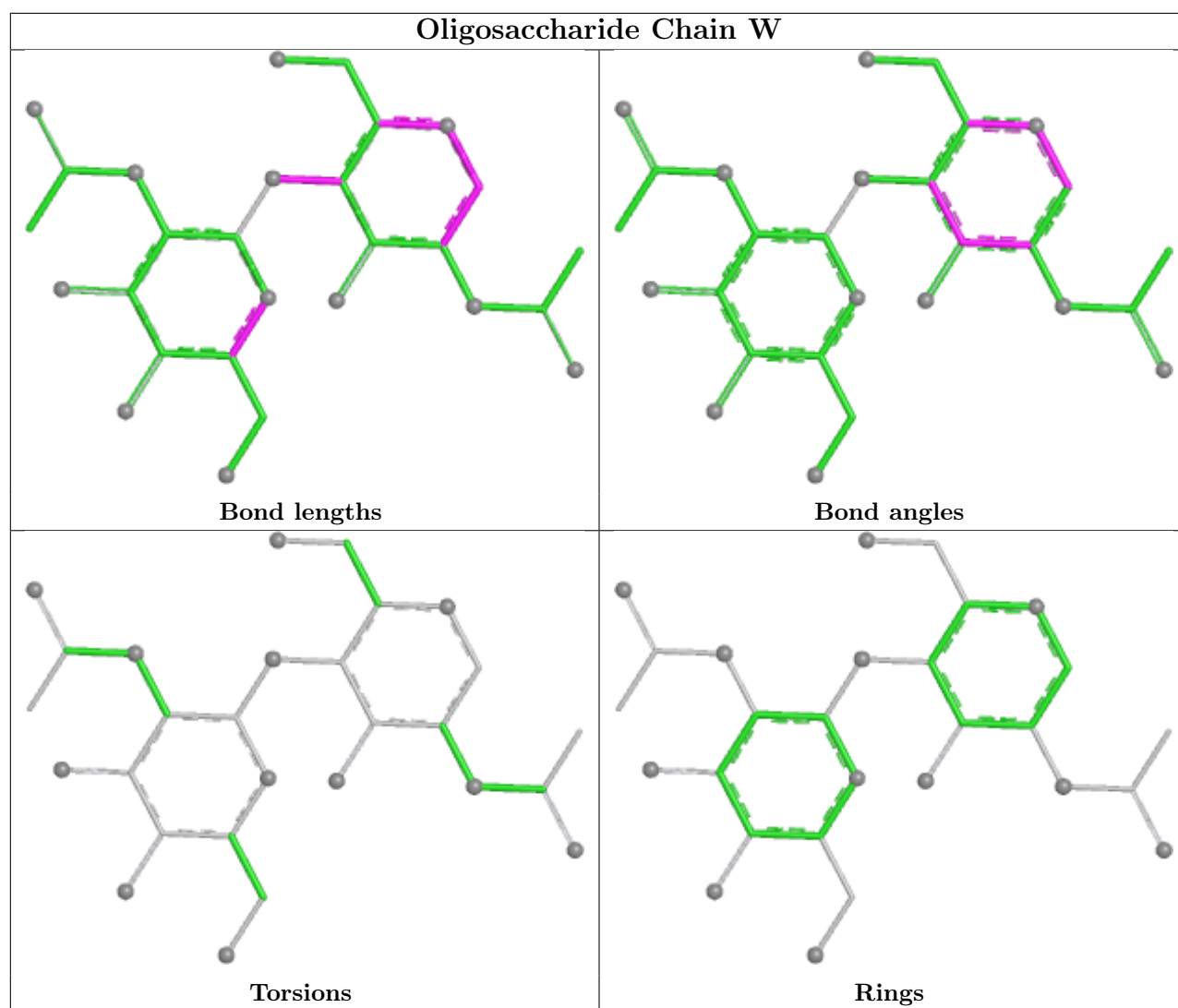


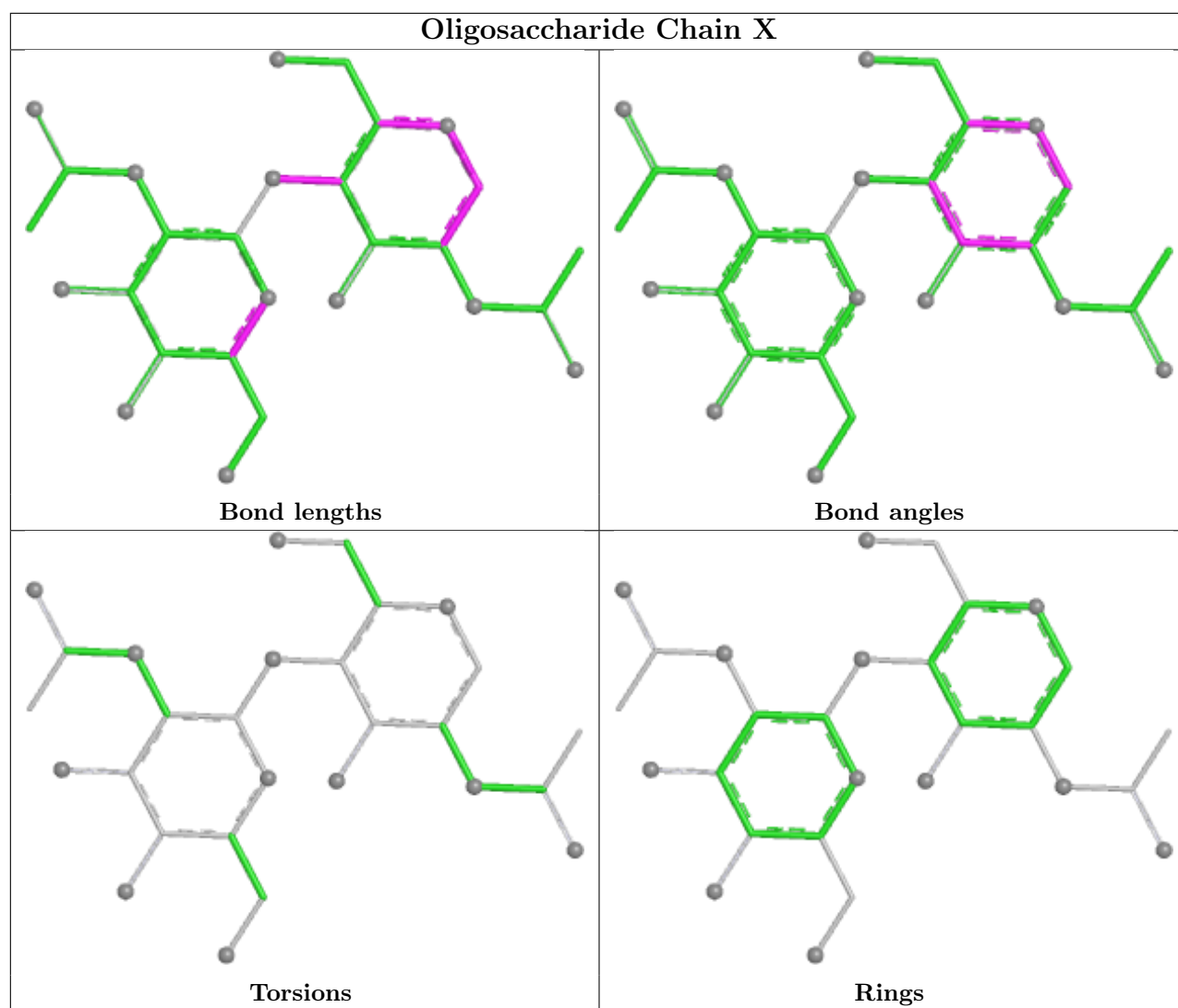


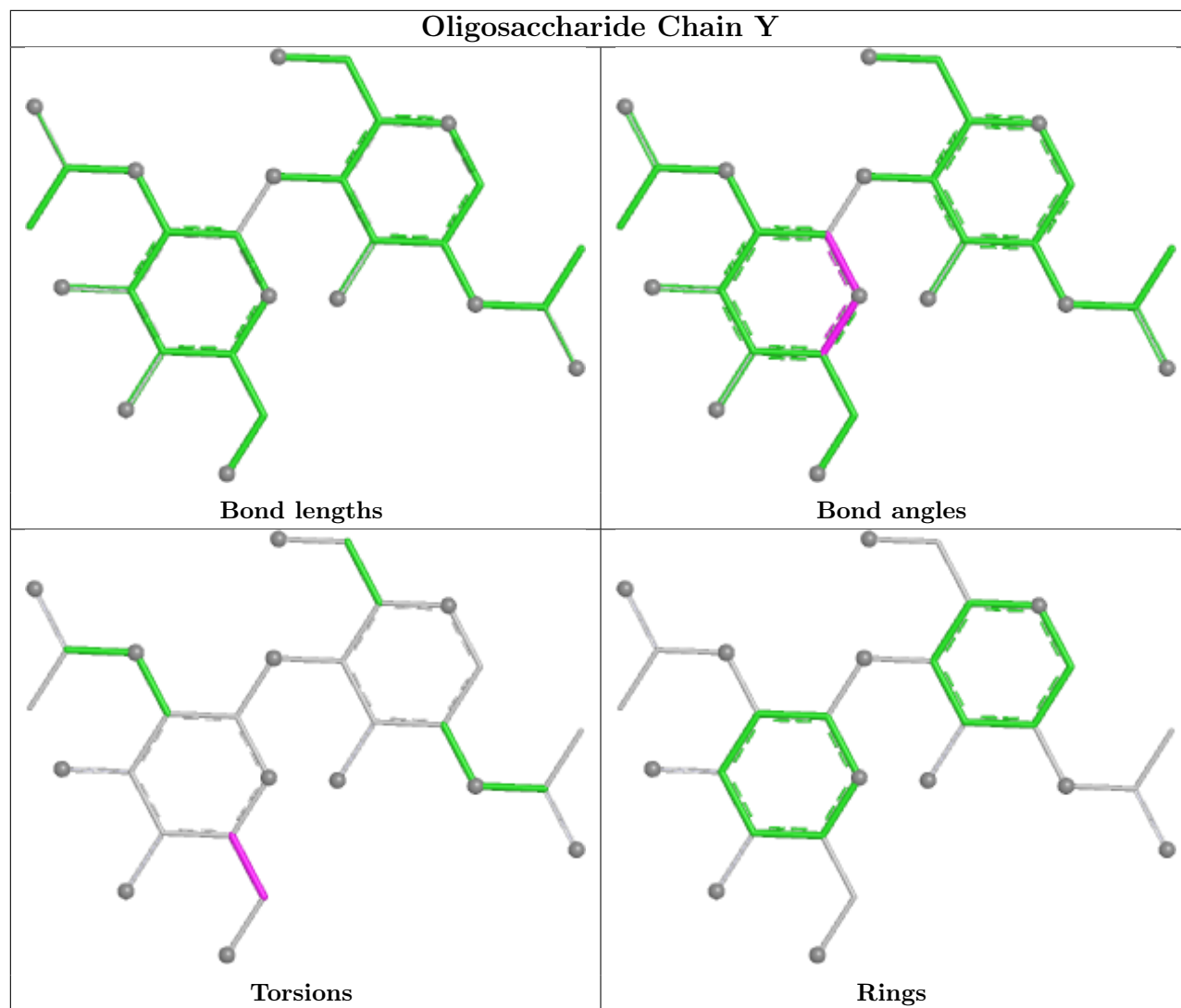


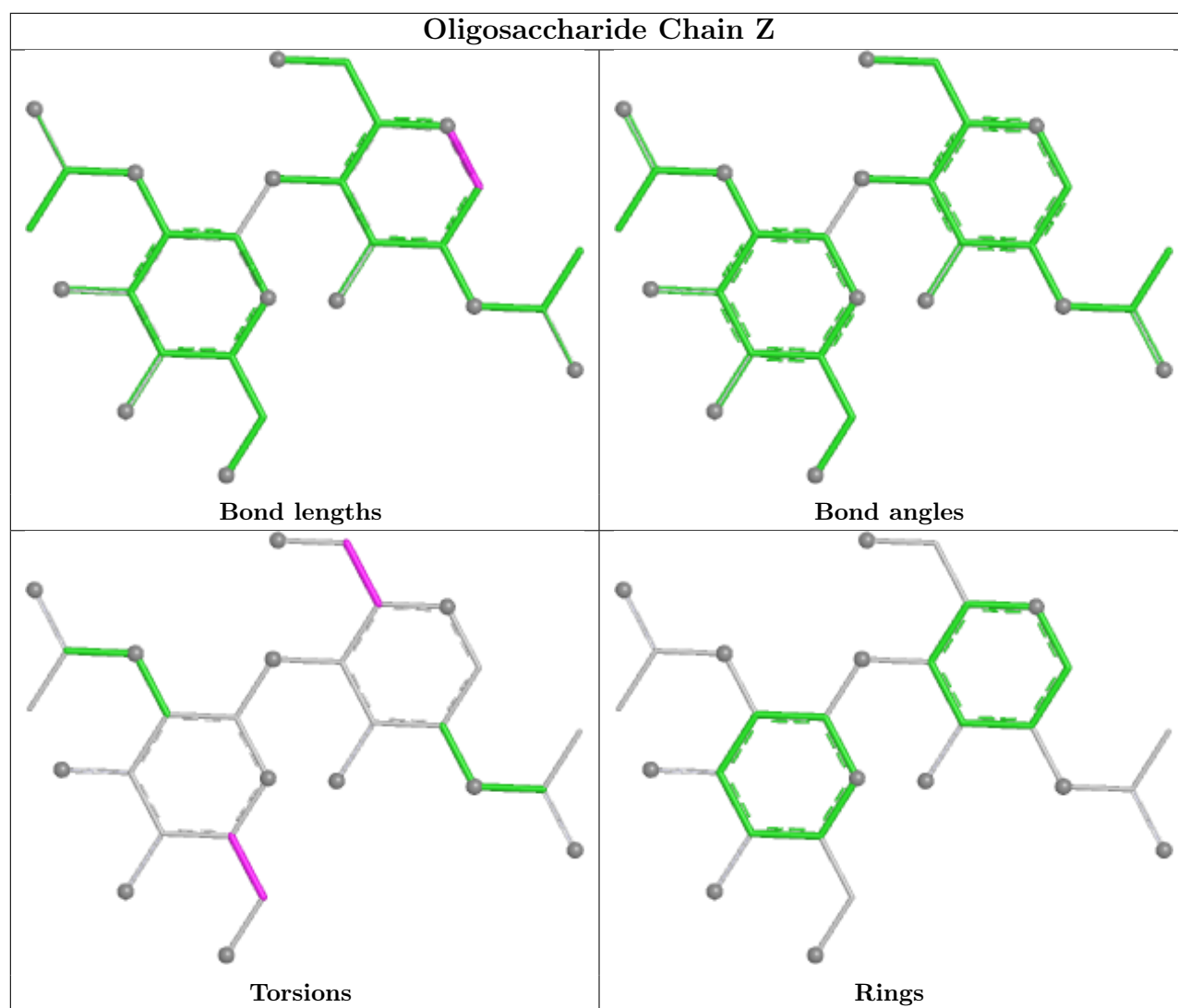


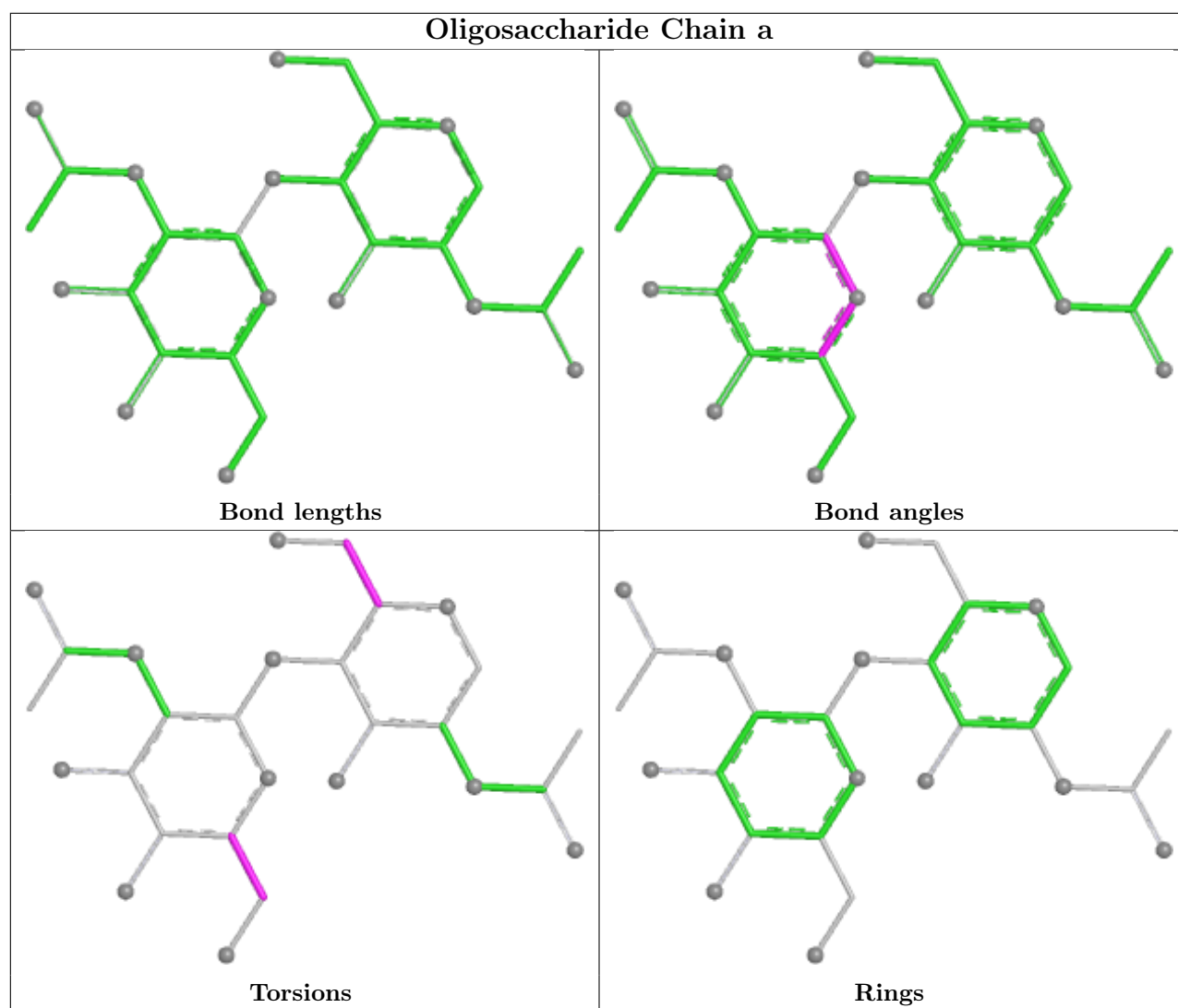


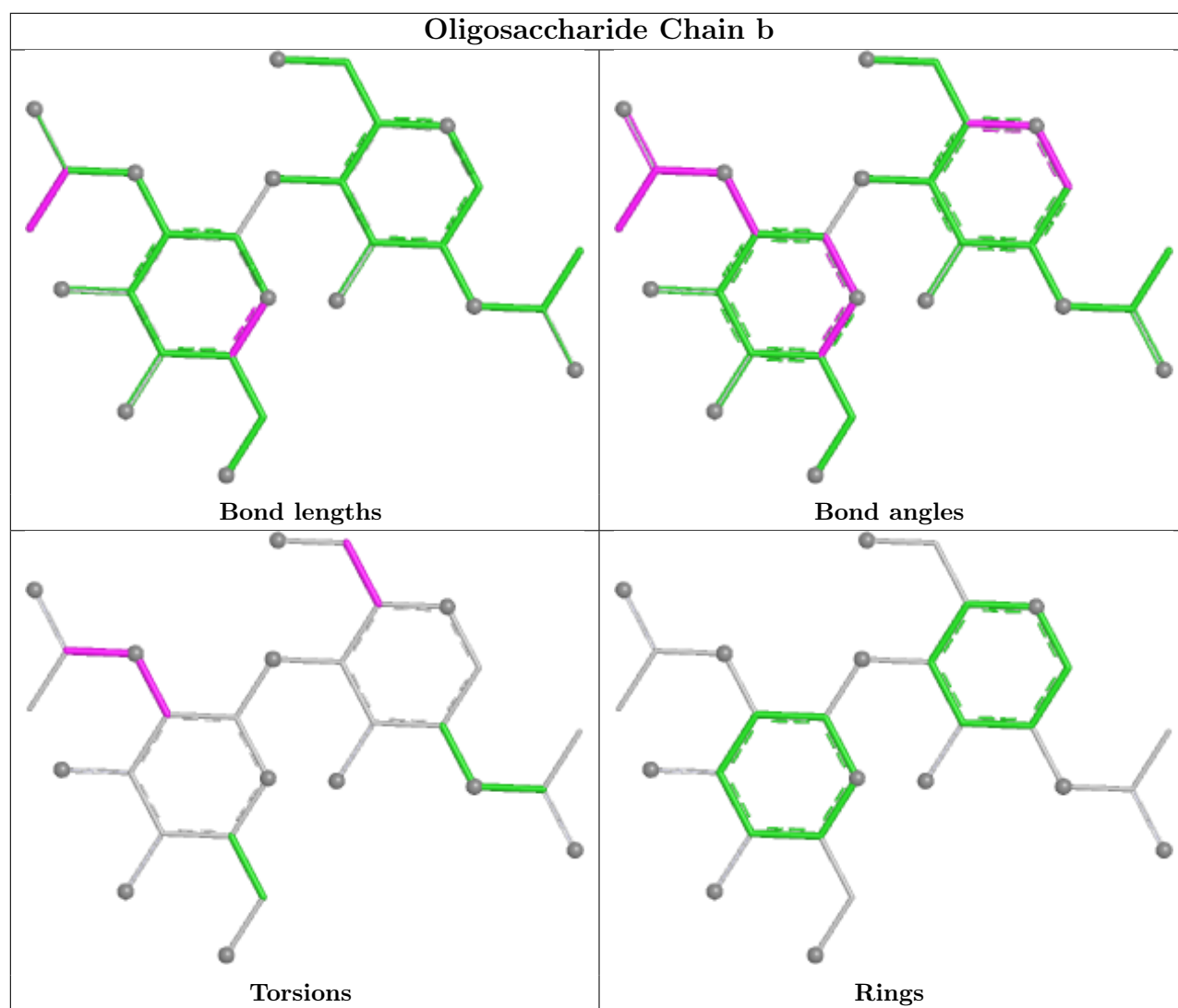


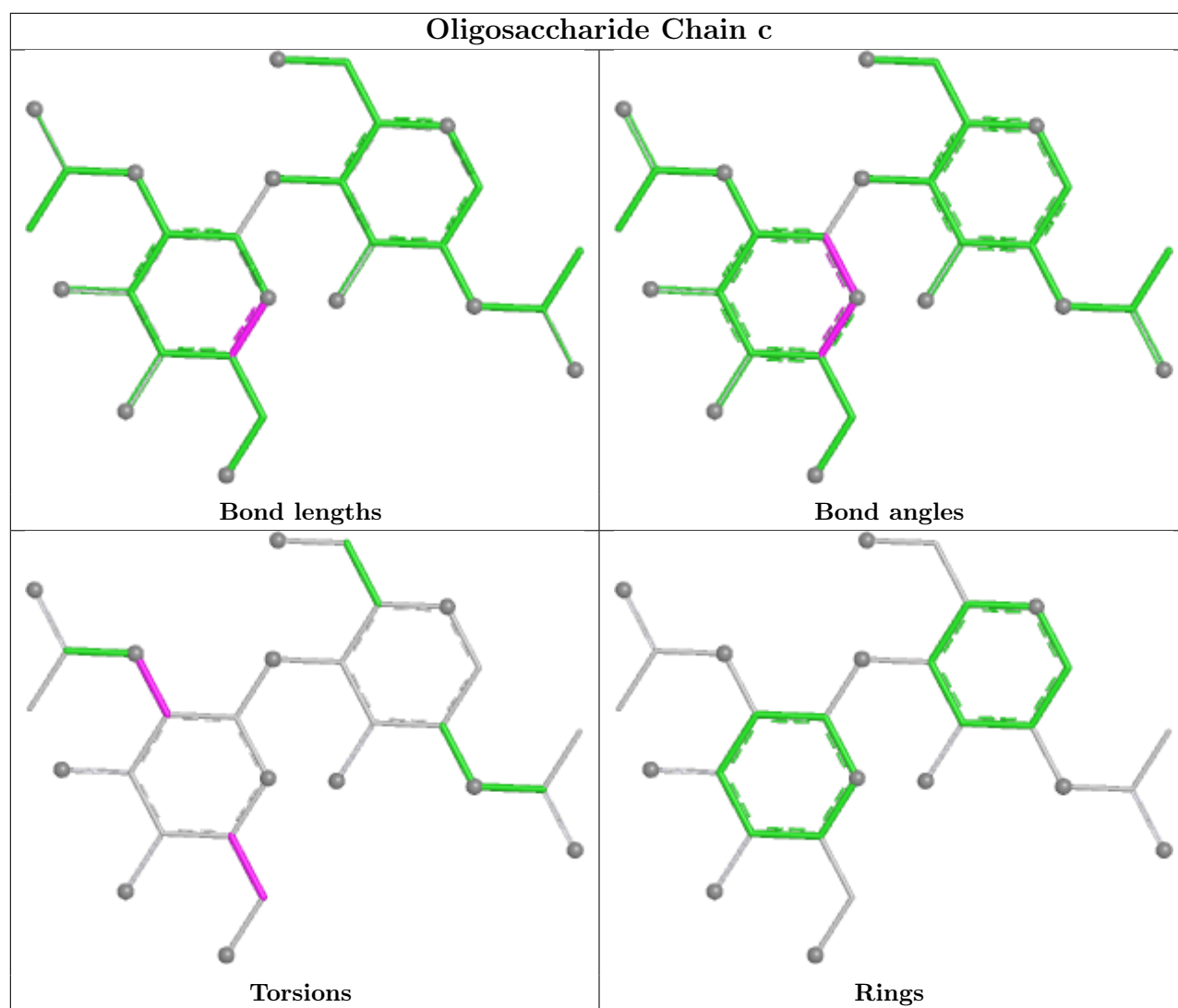


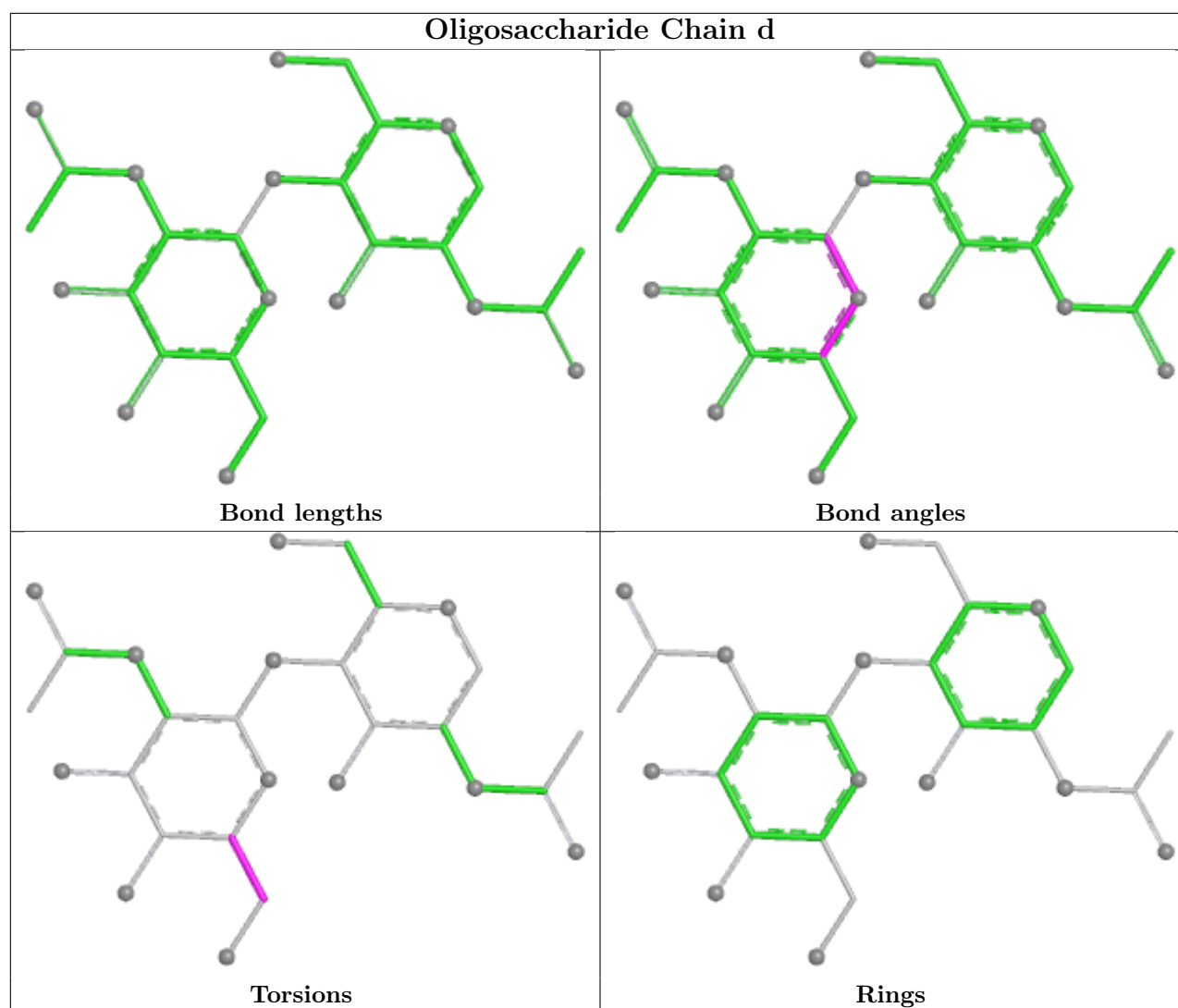












5.6 Ligand geometry [i](#)

42 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	F	701	-	14,14,15	0.17	0	17,19,21	0.48	0
4	NAG	A	1301	-	14,14,15	1.62	2 (14%)	17,19,21	0.65	0
4	NAG	C	1308	1	14,14,15	1.30	2 (14%)	17,19,21	0.91	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
4	NAG	C	1311	-	14,14,15	1.17	2 (14%)	17,19,21	1.20	1 (5%)
4	NAG	C	1301	-	14,14,15	1.61	2 (14%)	17,19,21	0.67	0
4	NAG	C	1313	-	14,14,15	1.63	2 (14%)	17,19,21	1.01	1 (5%)
4	NAG	A	1309	1	14,14,15	1.69	2 (14%)	17,19,21	0.71	0
4	NAG	C	1305	1	14,14,15	1.65	2 (14%)	17,19,21	0.72	0
4	NAG	B	1310	1	14,14,15	1.22	2 (14%)	17,19,21	0.83	1 (5%)
4	NAG	A	1313	1	14,14,15	1.28	2 (14%)	17,19,21	0.98	1 (5%)
4	NAG	B	1304	-	14,14,15	1.60	2 (14%)	17,19,21	0.71	0
4	NAG	A	1310	1	14,14,15	1.58	2 (14%)	17,19,21	0.71	0
4	NAG	C	1306	-	14,14,15	1.73	3 (21%)	17,19,21	0.91	1 (5%)
4	NAG	C	1310	1	14,14,15	1.53	3 (21%)	17,19,21	0.65	0
4	NAG	A	1308	-	14,14,15	1.59	2 (14%)	17,19,21	0.72	0
4	NAG	A	1311	1	14,14,15	1.47	2 (14%)	17,19,21	0.77	0
4	NAG	C	1304	1	14,14,15	1.41	3 (21%)	17,19,21	1.26	1 (5%)
4	NAG	A	1303	-	14,14,15	1.64	2 (14%)	17,19,21	0.68	0
4	NAG	B	1307	-	14,14,15	1.60	2 (14%)	17,19,21	0.66	0
4	NAG	D	701	2	14,14,15	1.40	3 (21%)	17,19,21	1.06	1 (5%)
4	NAG	A	1302	-	14,14,15	1.95	3 (21%)	17,19,21	0.91	1 (5%)
4	NAG	B	1305	1	14,14,15	1.19	2 (14%)	17,19,21	0.77	0
4	NAG	A	1305	1	14,14,15	1.44	3 (21%)	17,19,21	0.74	0
4	NAG	A	1306	-	14,14,15	1.70	2 (14%)	17,19,21	0.90	1 (5%)
4	NAG	A	1307	-	14,14,15	1.64	2 (14%)	17,19,21	0.68	0
4	NAG	B	1306	-	14,14,15	1.70	2 (14%)	17,19,21	0.91	1 (5%)
4	NAG	C	1302	-	14,14,15	1.64	2 (14%)	17,19,21	0.73	0
4	NAG	A	1304	1	14,14,15	1.64	2 (14%)	17,19,21	0.69	0
4	NAG	B	1308	1	14,14,15	1.62	2 (14%)	17,19,21	0.63	0
4	NAG	B	1312	-	14,14,15	1.57	2 (14%)	17,19,21	0.70	0
4	NAG	B	1311	1	14,14,15	1.23	2 (14%)	17,19,21	0.60	0
4	NAG	B	1309	1	14,14,15	1.39	3 (21%)	17,19,21	0.87	1 (5%)
4	NAG	B	1313	-	14,14,15	1.67	3 (21%)	17,19,21	0.73	0
4	NAG	C	1307	-	14,14,15	1.60	2 (14%)	17,19,21	0.66	0
4	NAG	B	1303	-	14,14,15	1.68	2 (14%)	17,19,21	0.67	0
4	NAG	B	1302	-	14,14,15	1.91	3 (21%)	17,19,21	0.91	0
4	NAG	A	1312	-	14,14,15	1.59	2 (14%)	17,19,21	0.70	0
4	NAG	E	701	2	14,14,15	1.27	2 (14%)	17,19,21	0.90	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
4	NAG	C	1312	-	14,14,15	1.76	2 (14%)	17,19,21	1.26	1 (5%)
4	NAG	C	1309	-	14,14,15	1.69	2 (14%)	17,19,21	0.72	0
4	NAG	B	1301	-	14,14,15	1.64	2 (14%)	17,19,21	0.67	0
4	NAG	C	1303	-	14,14,15	1.66	2 (14%)	17,19,21	0.68	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	F	701	-	-	0/6/23/26	0/1/1/1
4	NAG	A	1301	-	-	0/6/23/26	0/1/1/1
4	NAG	C	1308	1	-	0/6/23/26	0/1/1/1
4	NAG	C	1311	-	-	1/6/23/26	0/1/1/1
4	NAG	C	1301	-	-	0/6/23/26	0/1/1/1
4	NAG	C	1313	-	-	0/6/23/26	0/1/1/1
4	NAG	A	1309	1	-	0/6/23/26	0/1/1/1
4	NAG	C	1305	1	-	0/6/23/26	0/1/1/1
4	NAG	B	1310	1	-	0/6/23/26	0/1/1/1
4	NAG	A	1313	1	-	0/6/23/26	0/1/1/1
4	NAG	B	1304	-	-	0/6/23/26	0/1/1/1
4	NAG	A	1310	1	-	1/6/23/26	0/1/1/1
4	NAG	C	1306	-	-	2/6/23/26	0/1/1/1
4	NAG	C	1310	1	-	0/6/23/26	0/1/1/1
4	NAG	A	1308	-	-	0/6/23/26	0/1/1/1
4	NAG	A	1311	1	-	0/6/23/26	0/1/1/1
4	NAG	C	1304	1	-	0/6/23/26	0/1/1/1
4	NAG	A	1303	-	-	0/6/23/26	0/1/1/1
4	NAG	B	1307	-	-	0/6/23/26	0/1/1/1
4	NAG	D	701	2	-	0/6/23/26	0/1/1/1
4	NAG	A	1302	-	-	0/6/23/26	0/1/1/1
4	NAG	B	1305	1	-	0/6/23/26	0/1/1/1
4	NAG	A	1305	1	-	0/6/23/26	0/1/1/1
4	NAG	A	1306	-	-	2/6/23/26	0/1/1/1
4	NAG	A	1307	-	-	0/6/23/26	0/1/1/1
4	NAG	B	1306	-	-	2/6/23/26	0/1/1/1
4	NAG	C	1302	-	-	0/6/23/26	0/1/1/1
4	NAG	A	1304	1	-	0/6/23/26	0/1/1/1
4	NAG	B	1308	1	-	0/6/23/26	0/1/1/1
4	NAG	B	1312	-	-	0/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	NAG	B	1311	1	-	0/6/23/26	0/1/1/1
4	NAG	B	1309	1	-	0/6/23/26	0/1/1/1
4	NAG	B	1313	-	-	0/6/23/26	0/1/1/1
4	NAG	C	1307	-	-	0/6/23/26	0/1/1/1
4	NAG	B	1303	-	-	0/6/23/26	0/1/1/1
4	NAG	B	1302	-	-	0/6/23/26	0/1/1/1
4	NAG	A	1312	-	-	0/6/23/26	0/1/1/1
4	NAG	E	701	2	-	0/6/23/26	0/1/1/1
4	NAG	C	1312	-	-	0/6/23/26	0/1/1/1
4	NAG	C	1309	-	-	0/6/23/26	0/1/1/1
4	NAG	B	1301	-	-	0/6/23/26	0/1/1/1
4	NAG	C	1303	-	-	0/6/23/26	0/1/1/1

The worst 5 of 91 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	1302	NAG	C1-C2	5.67	1.60	1.52
4	B	1302	NAG	C1-C2	5.45	1.59	1.52
4	C	1309	NAG	C1-C2	4.86	1.59	1.52
4	A	1309	NAG	C1-C2	4.82	1.58	1.52
4	C	1305	NAG	C1-C2	4.77	1.58	1.52

The worst 5 of 12 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	C	1304	NAG	C1-O5-C5	4.35	118.01	112.19
4	C	1311	NAG	C1-O5-C5	4.26	117.90	112.19
4	C	1312	NAG	C1-O5-C5	4.20	117.81	112.19
4	C	1313	NAG	C1-O5-C5	2.89	116.06	112.19
4	A	1313	NAG	C1-O5-C5	2.77	115.89	112.19

There are no chirality outliers.

5 of 8 torsion outliers are listed below:

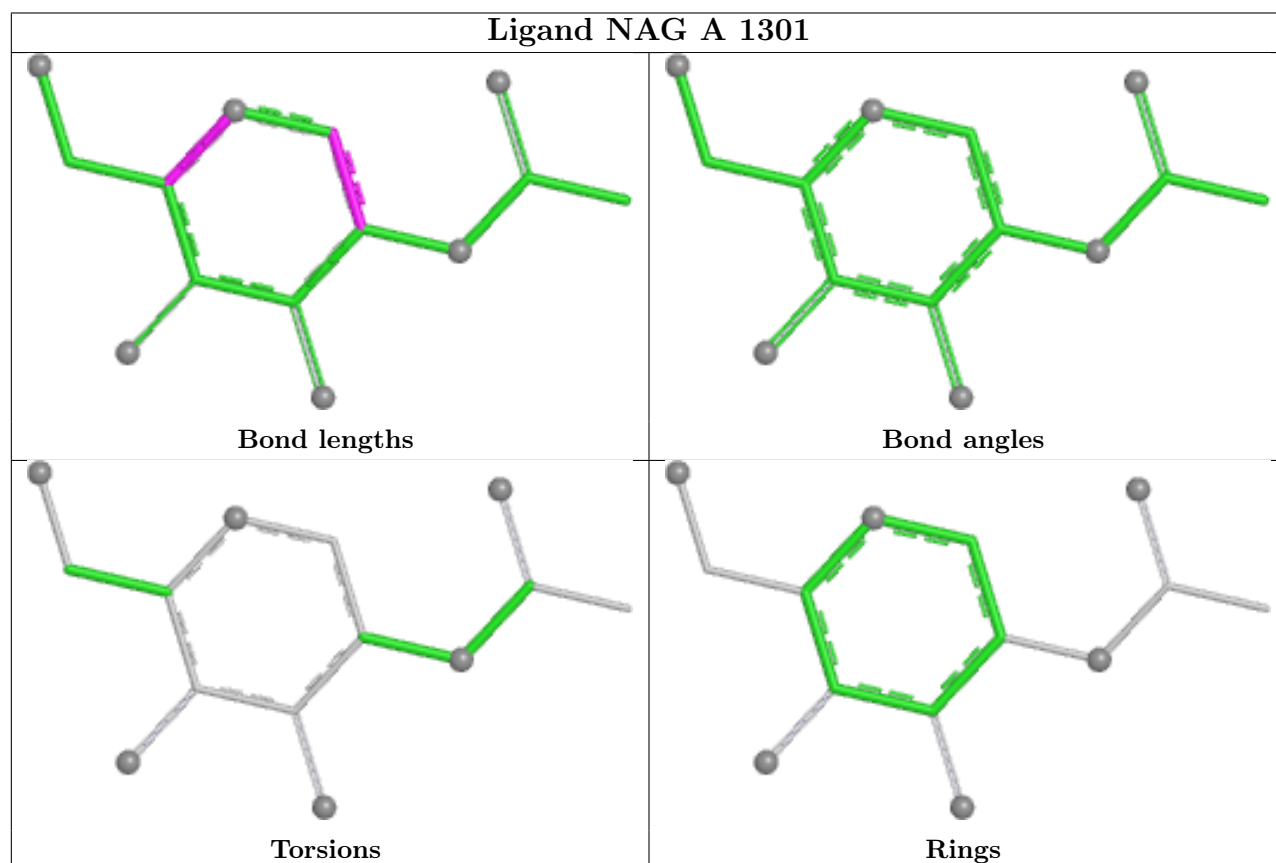
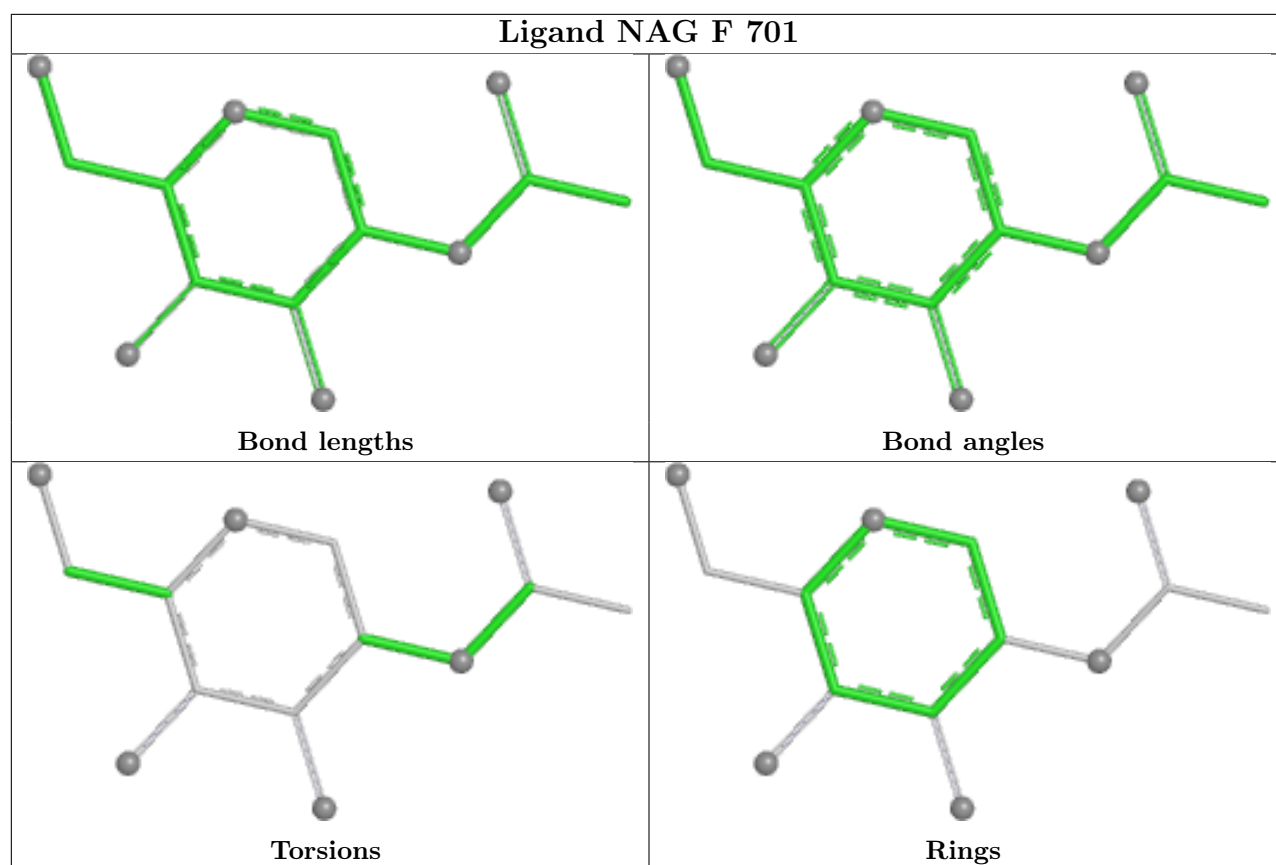
Mol	Chain	Res	Type	Atoms
4	A	1306	NAG	O5-C5-C6-O6
4	B	1306	NAG	O5-C5-C6-O6
4	C	1306	NAG	O5-C5-C6-O6
4	A	1306	NAG	C4-C5-C6-O6
4	B	1306	NAG	C4-C5-C6-O6

There are no ring outliers.

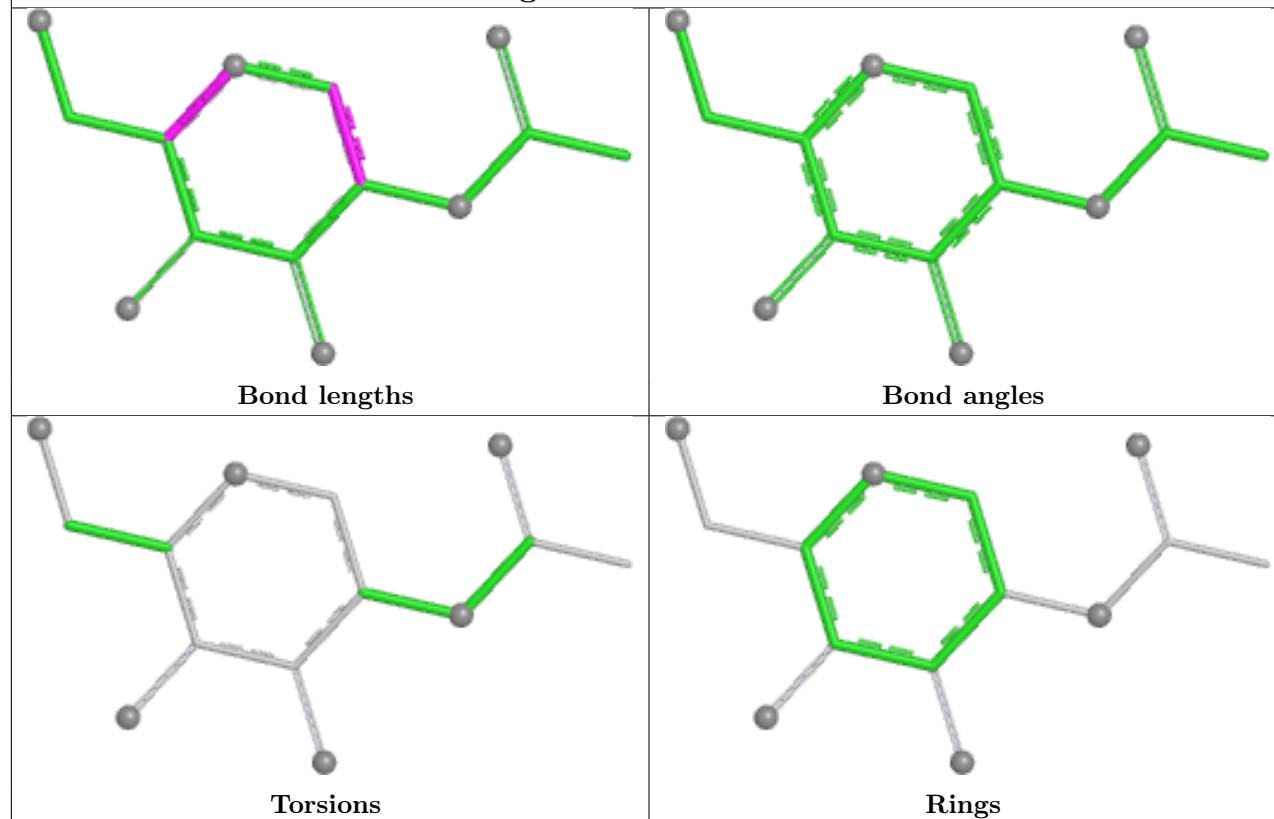
25 monomers are involved in 79 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	F	701	NAG	2	0
4	A	1301	NAG	6	0
4	C	1311	NAG	3	0
4	C	1313	NAG	5	0
4	B	1304	NAG	2	0
4	C	1306	NAG	3	0
4	C	1310	NAG	1	0
4	A	1308	NAG	6	0
4	A	1311	NAG	1	0
4	A	1303	NAG	2	0
4	B	1307	NAG	3	0
4	A	1302	NAG	3	0
4	A	1306	NAG	5	0
4	A	1307	NAG	4	0
4	B	1306	NAG	2	0
4	C	1302	NAG	1	0
4	B	1312	NAG	6	0
4	B	1313	NAG	6	0
4	C	1307	NAG	3	0
4	B	1303	NAG	2	0
4	B	1302	NAG	2	0
4	A	1312	NAG	3	0
4	C	1312	NAG	3	0
4	B	1301	NAG	2	0
4	C	1303	NAG	3	0

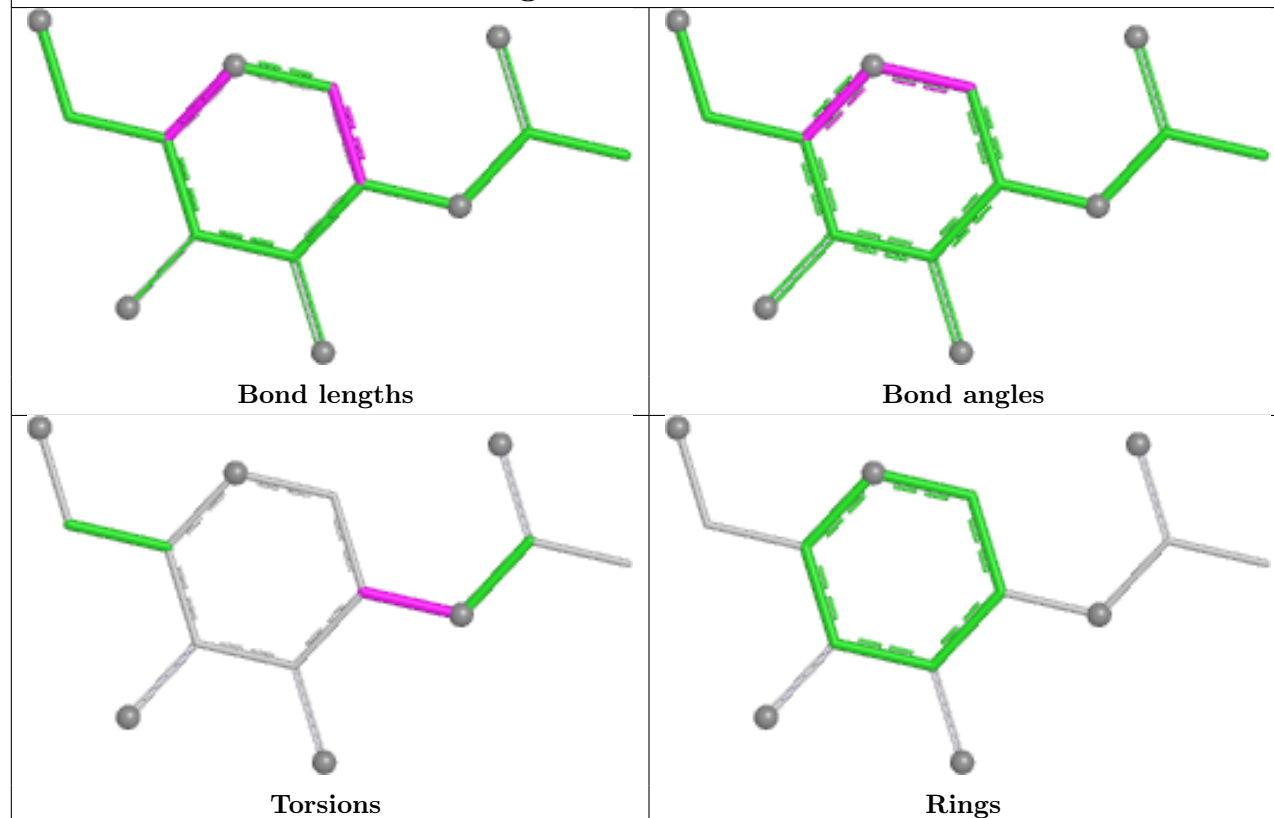
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

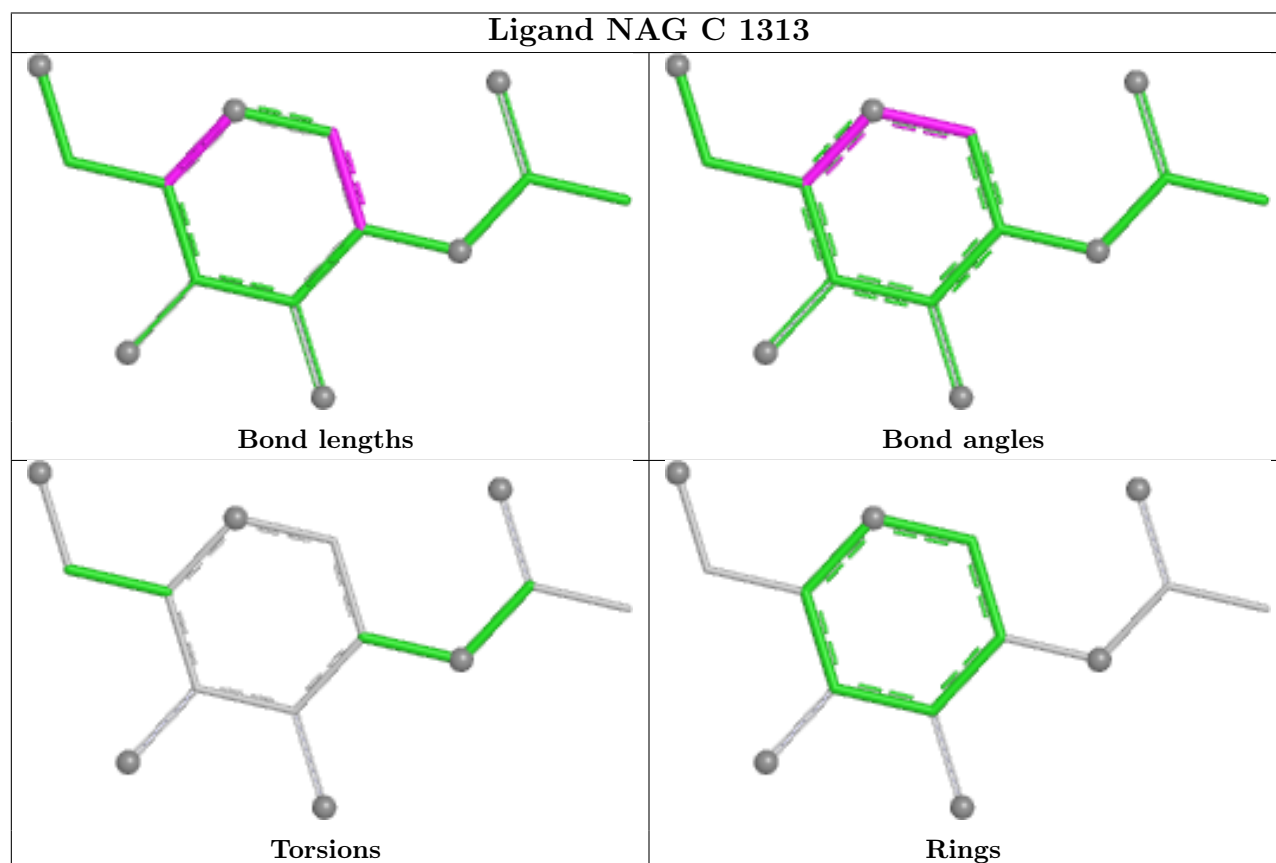
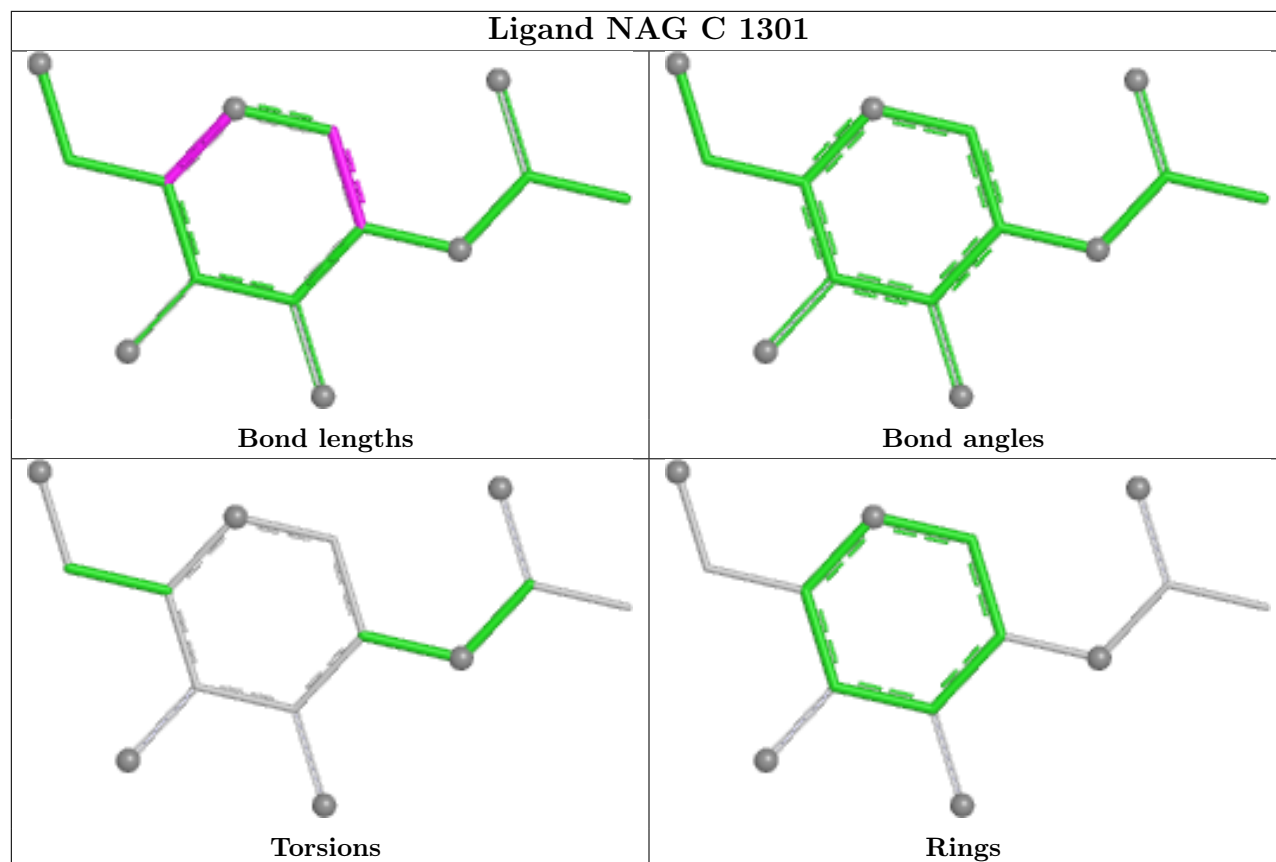


Ligand NAG C 1308

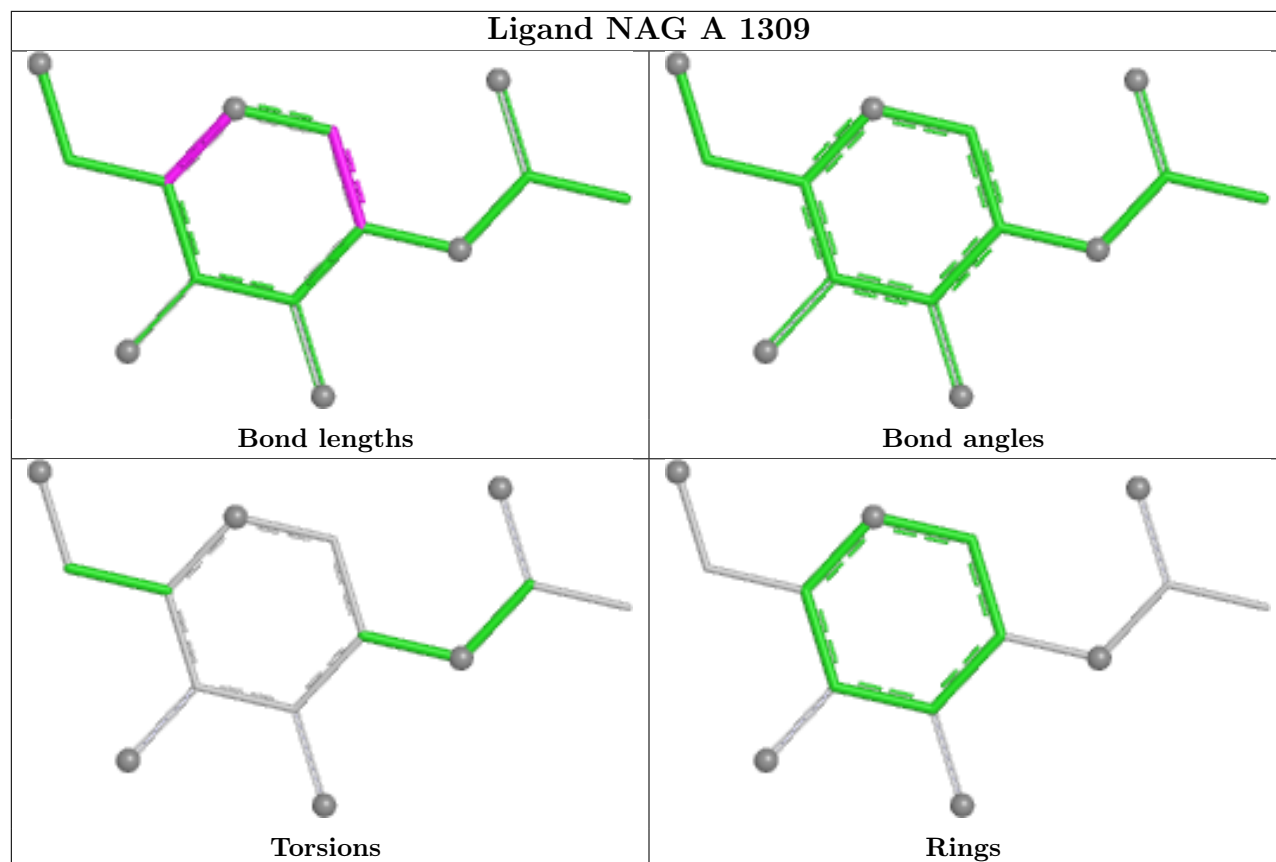


Ligand NAG C 1311

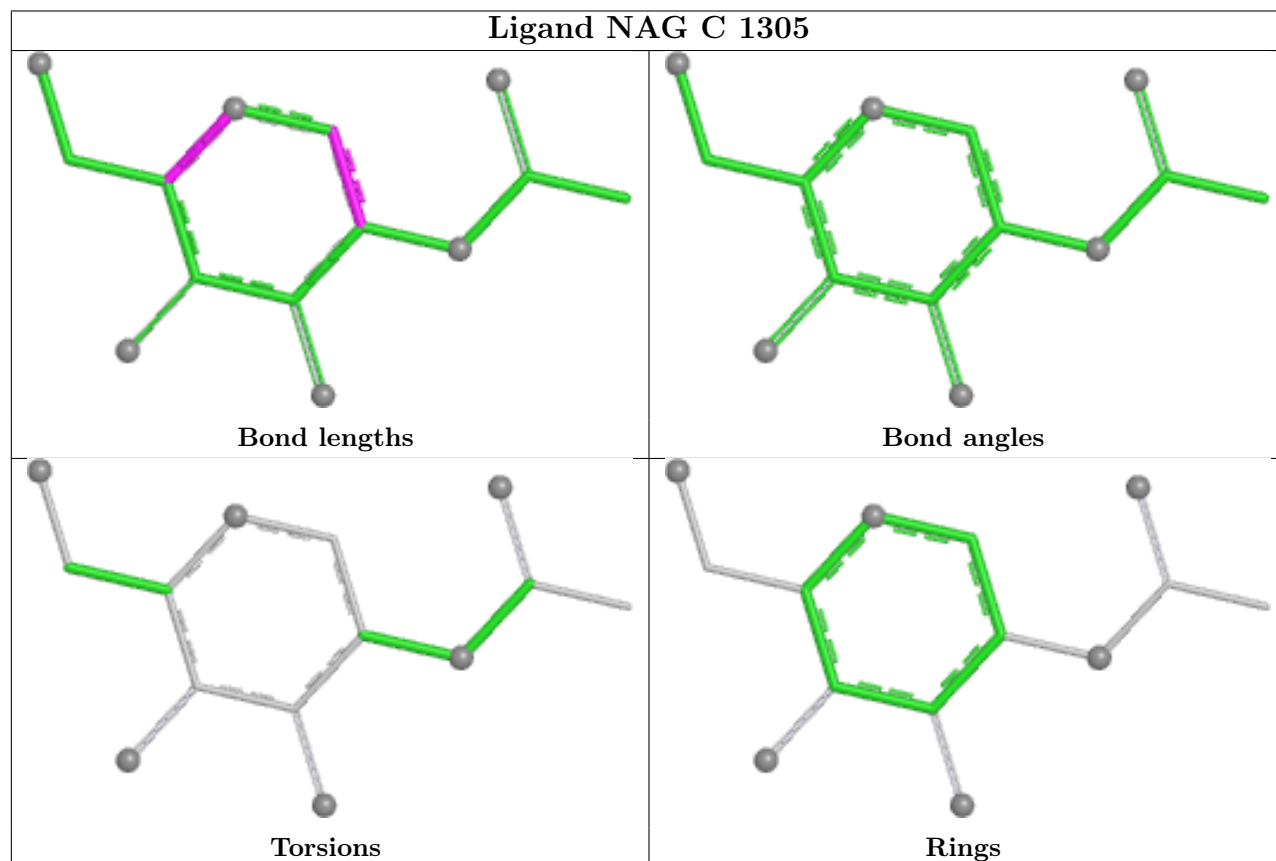




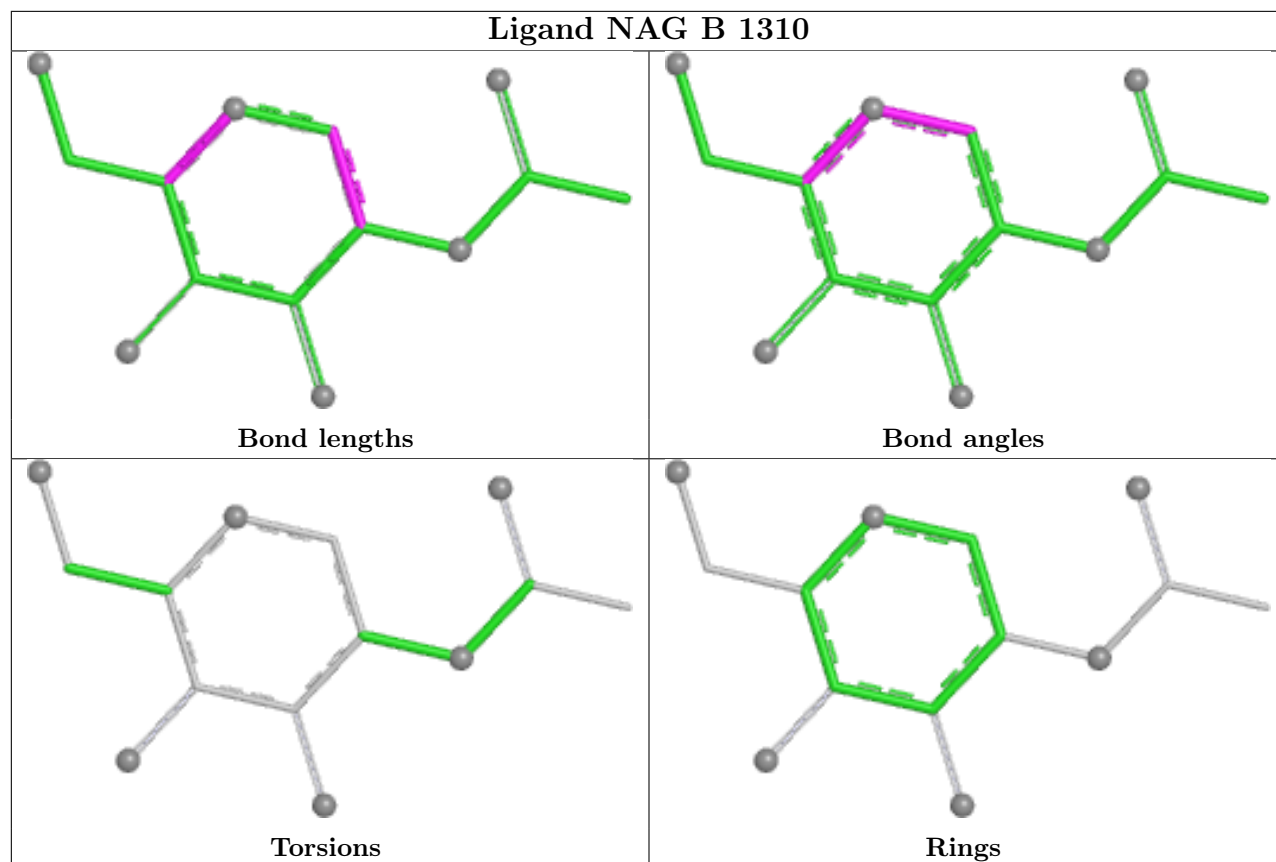
Ligand NAG A 1309



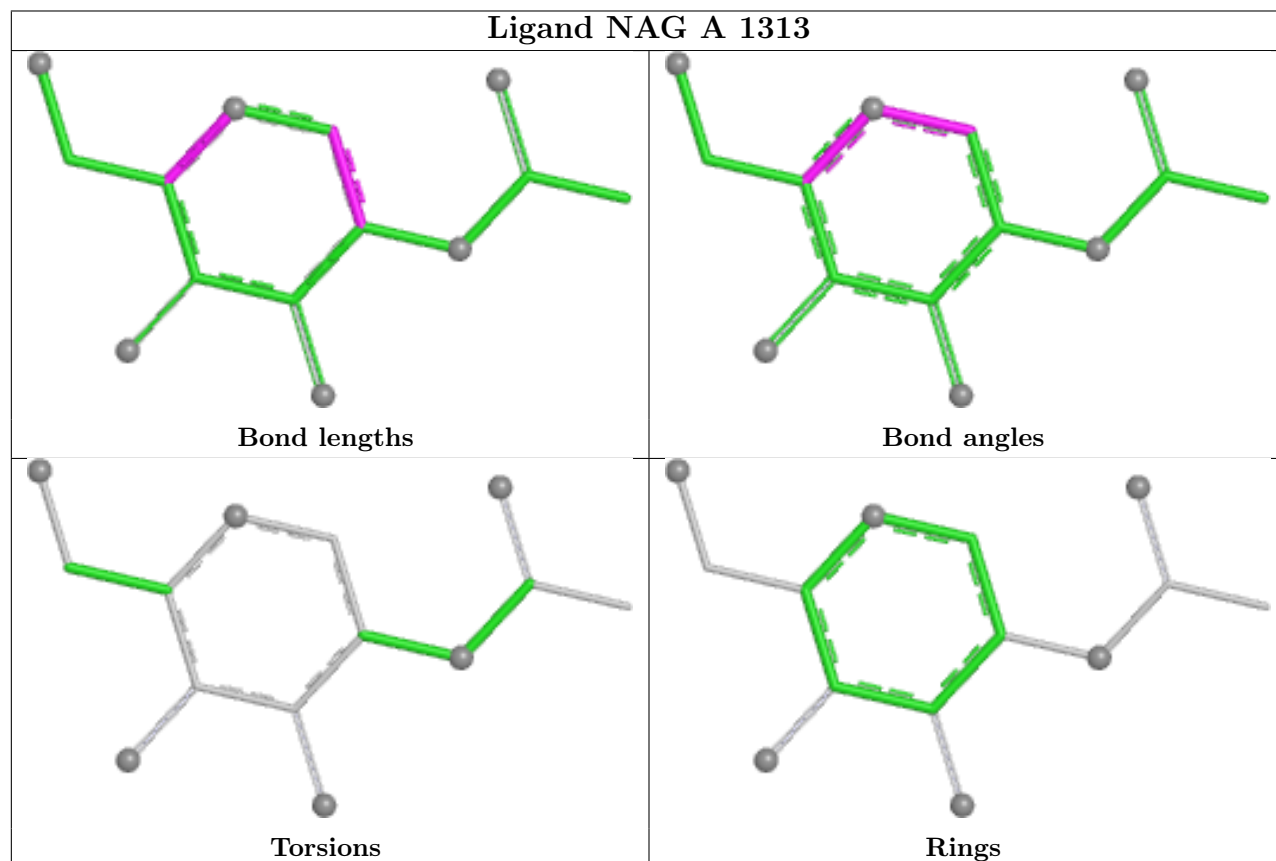
Ligand NAG C 1305



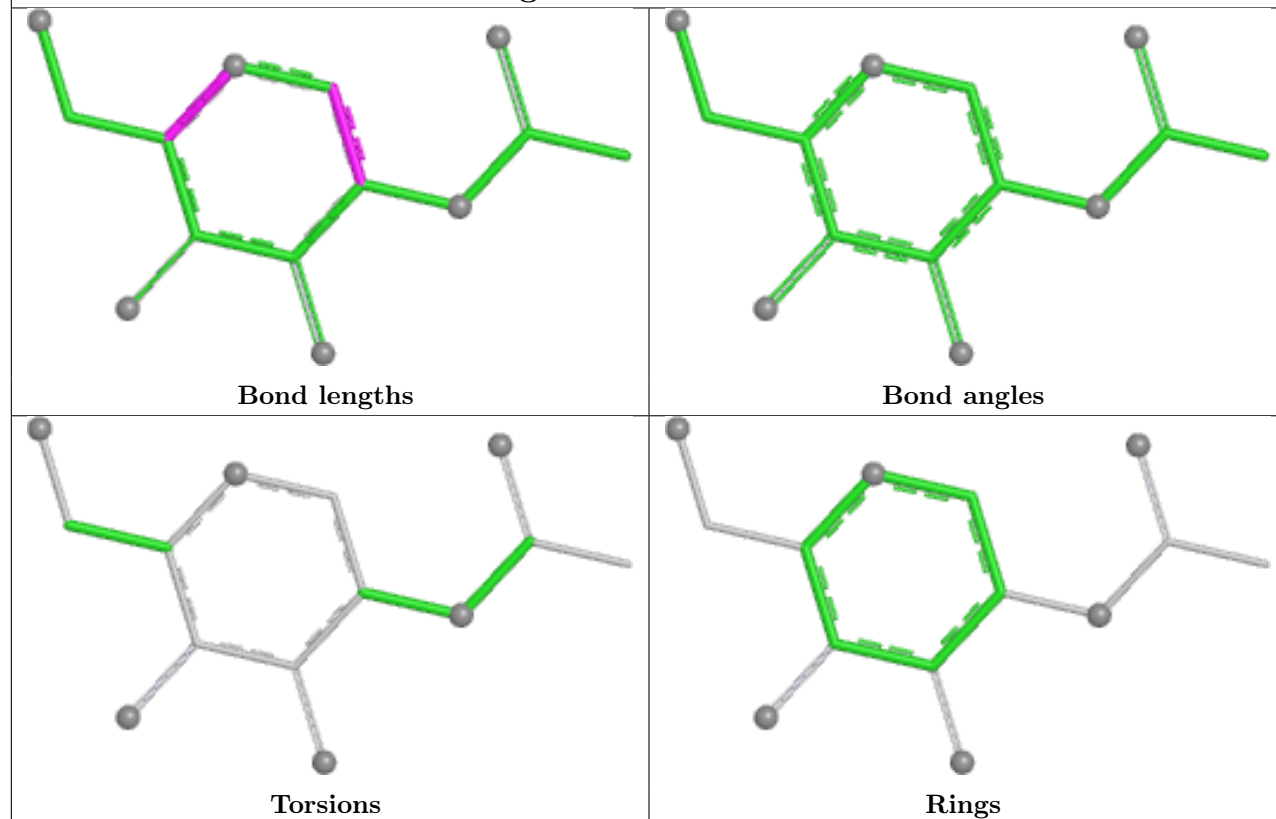
Ligand NAG B 1310



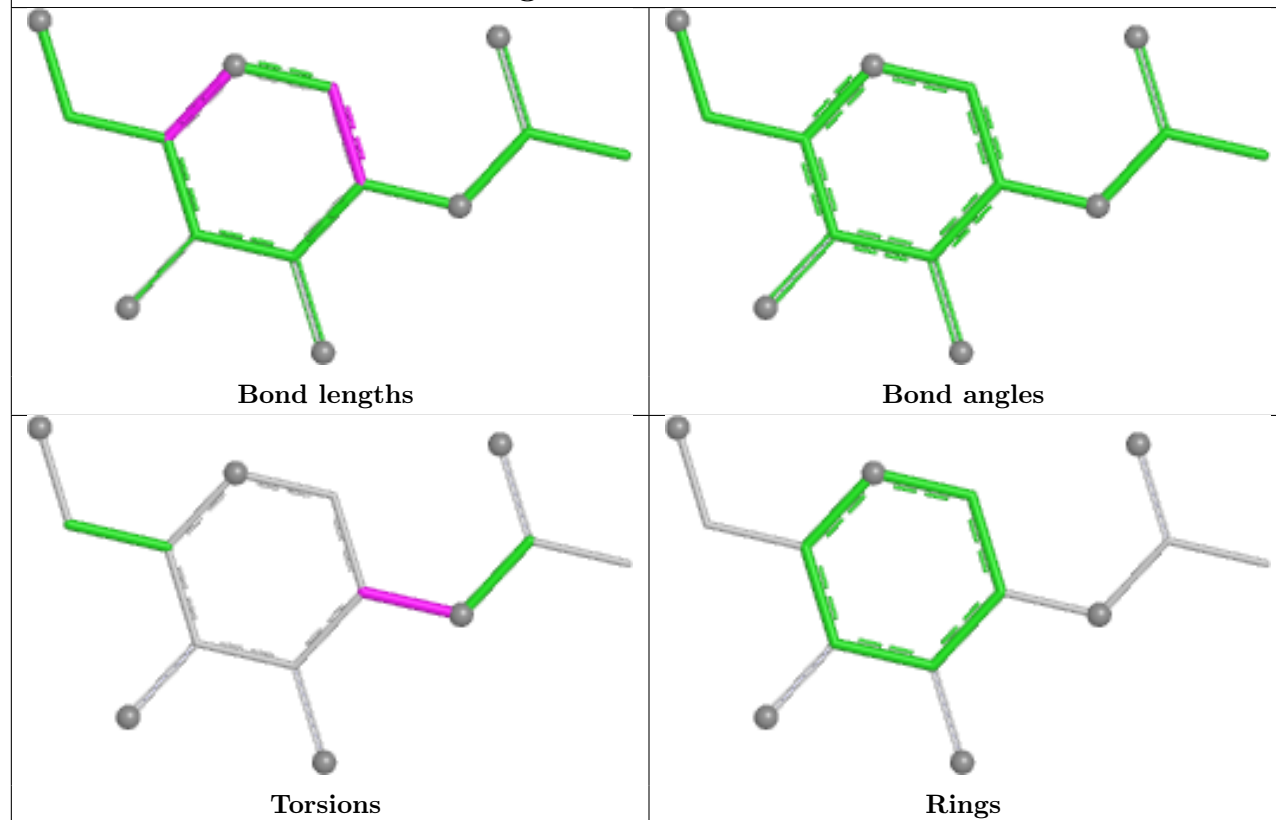
Ligand NAG A 1313



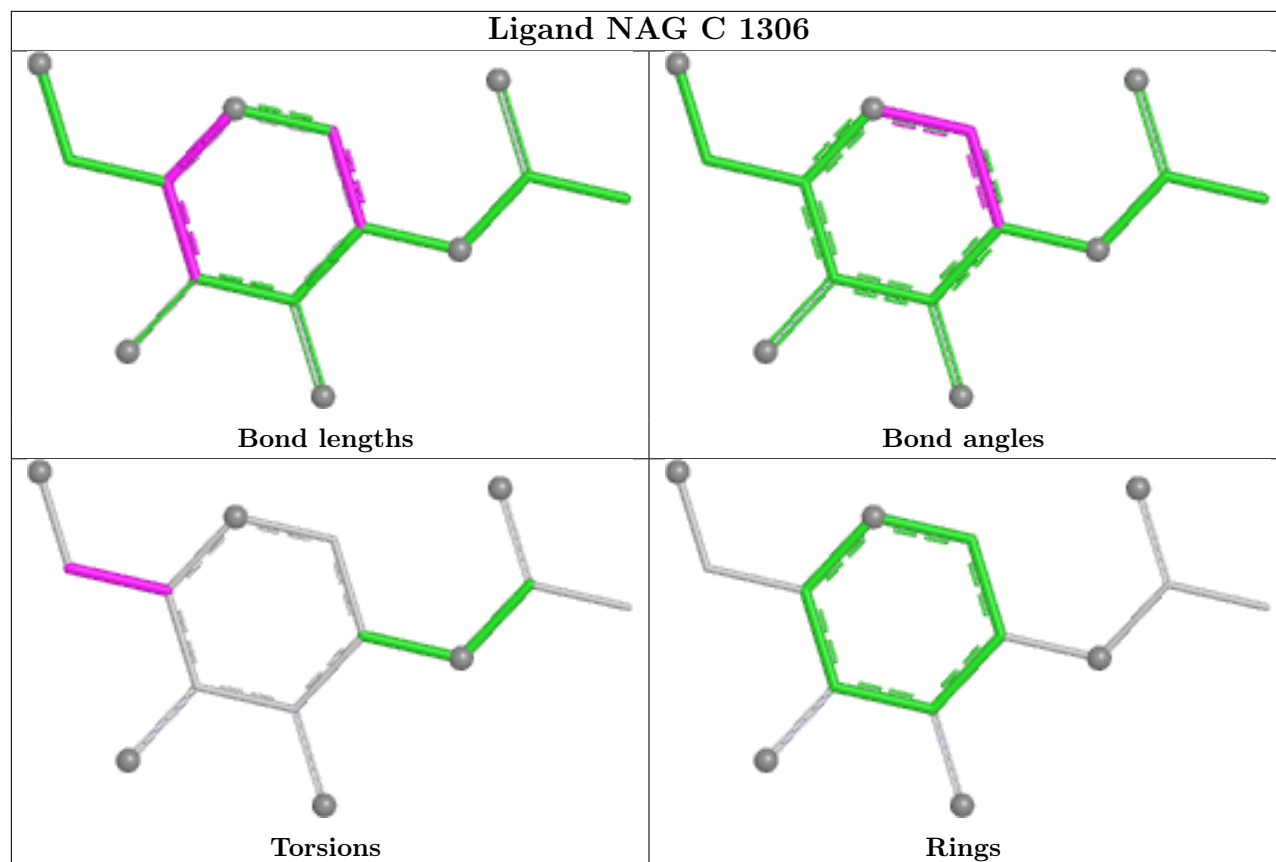
Ligand NAG B 1304



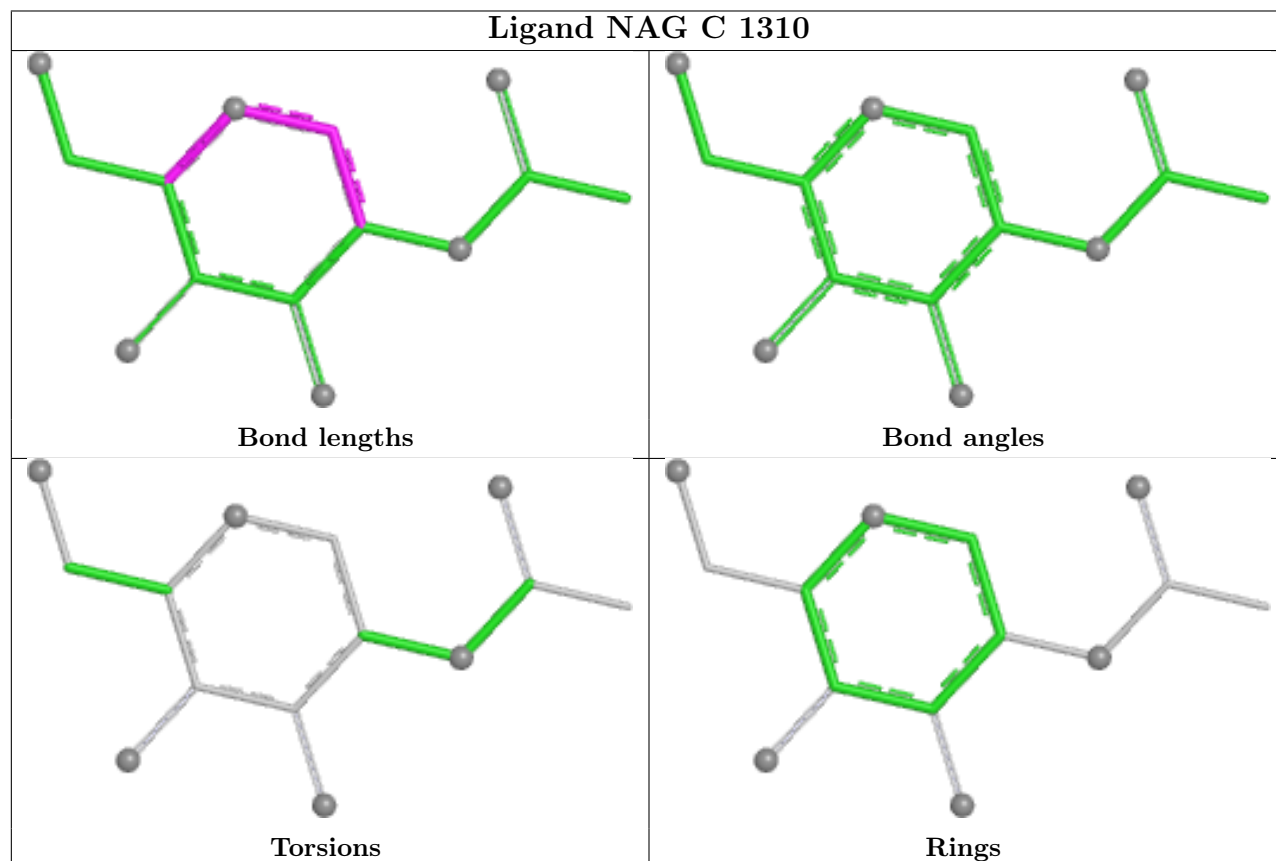
Ligand NAG A 1310



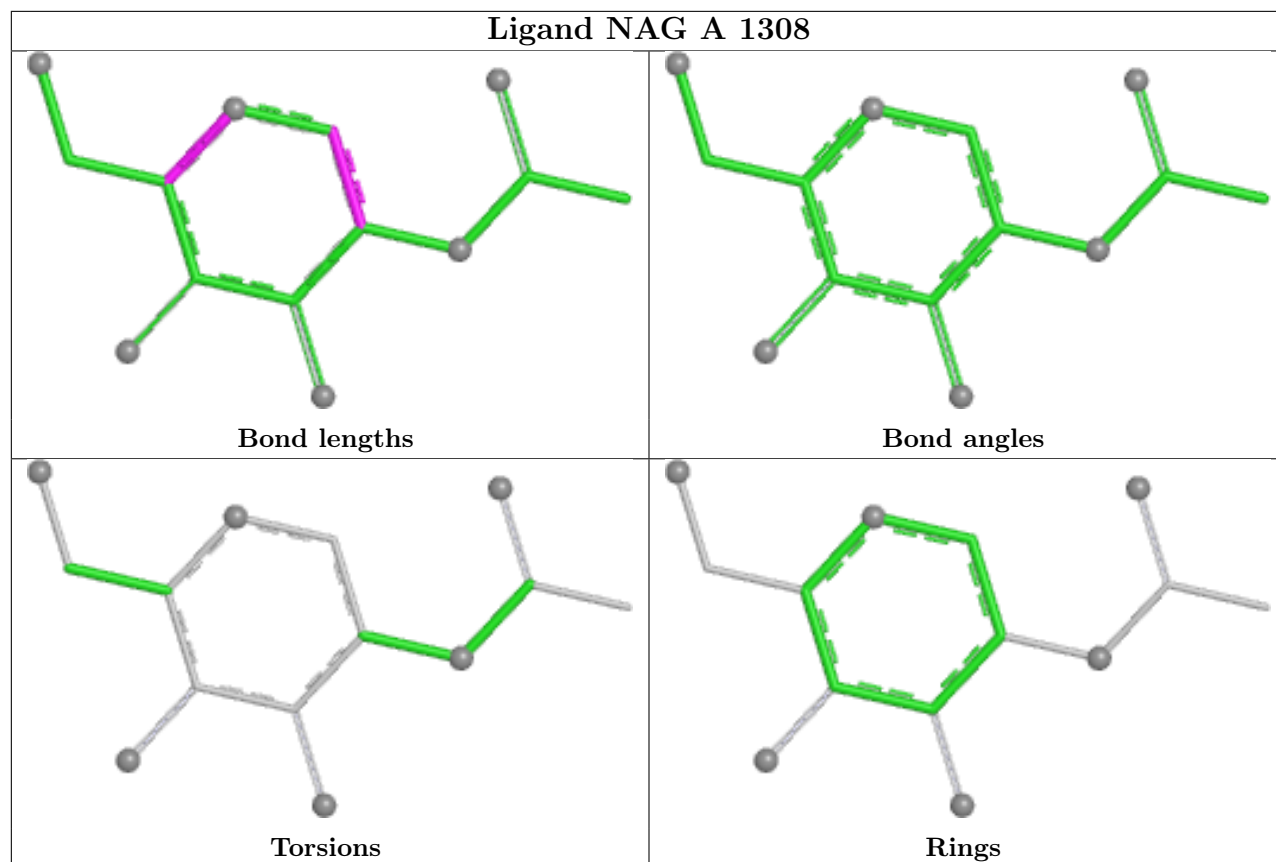
Ligand NAG C 1306



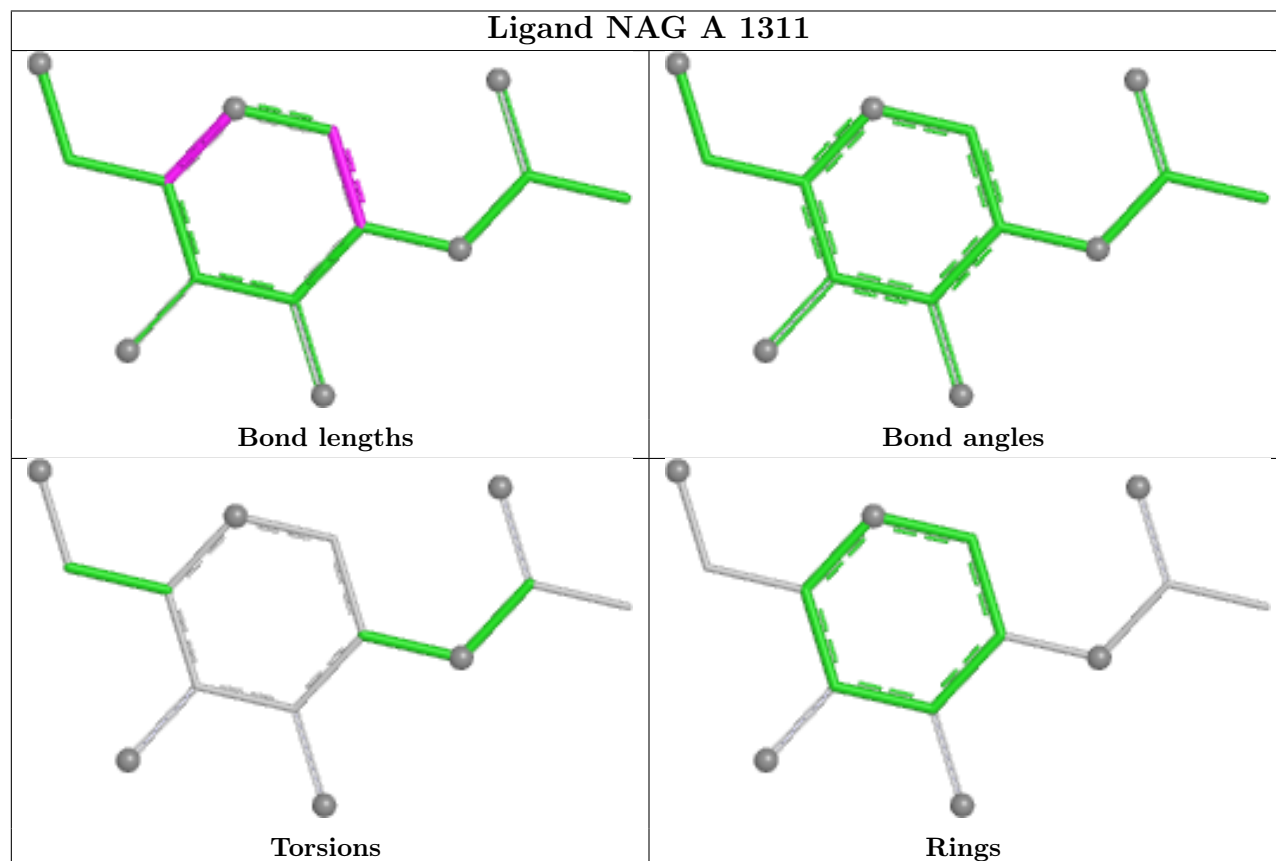
Ligand NAG C 1310



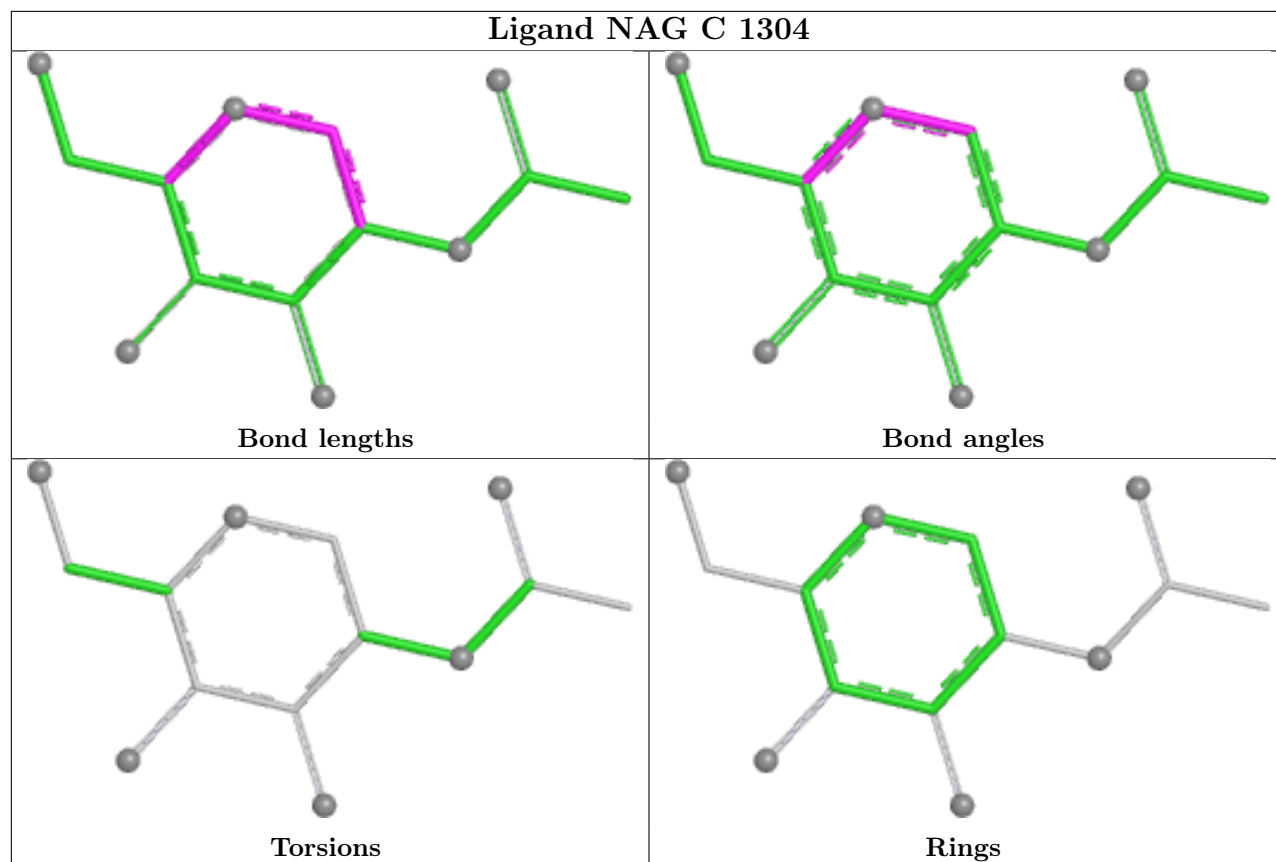
Ligand NAG A 1308



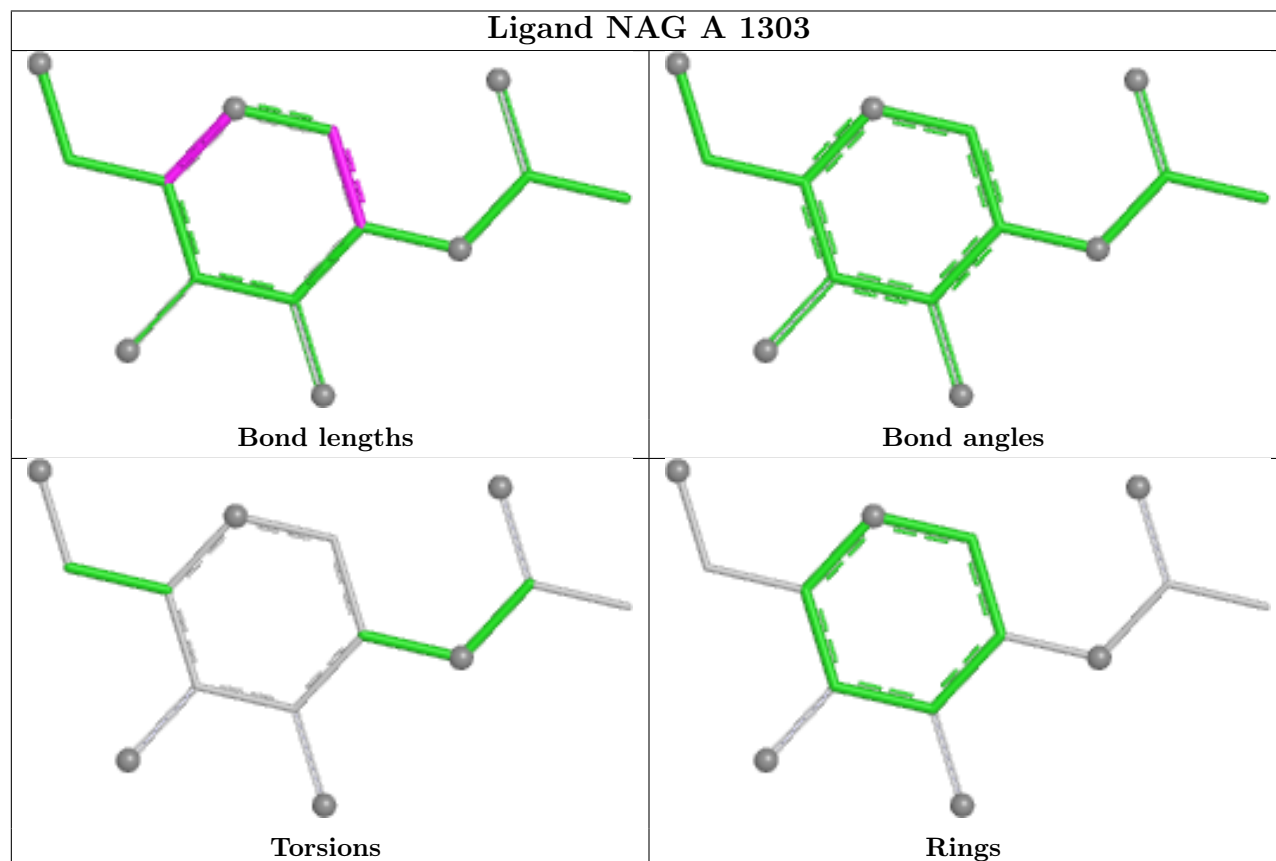
Ligand NAG A 1311



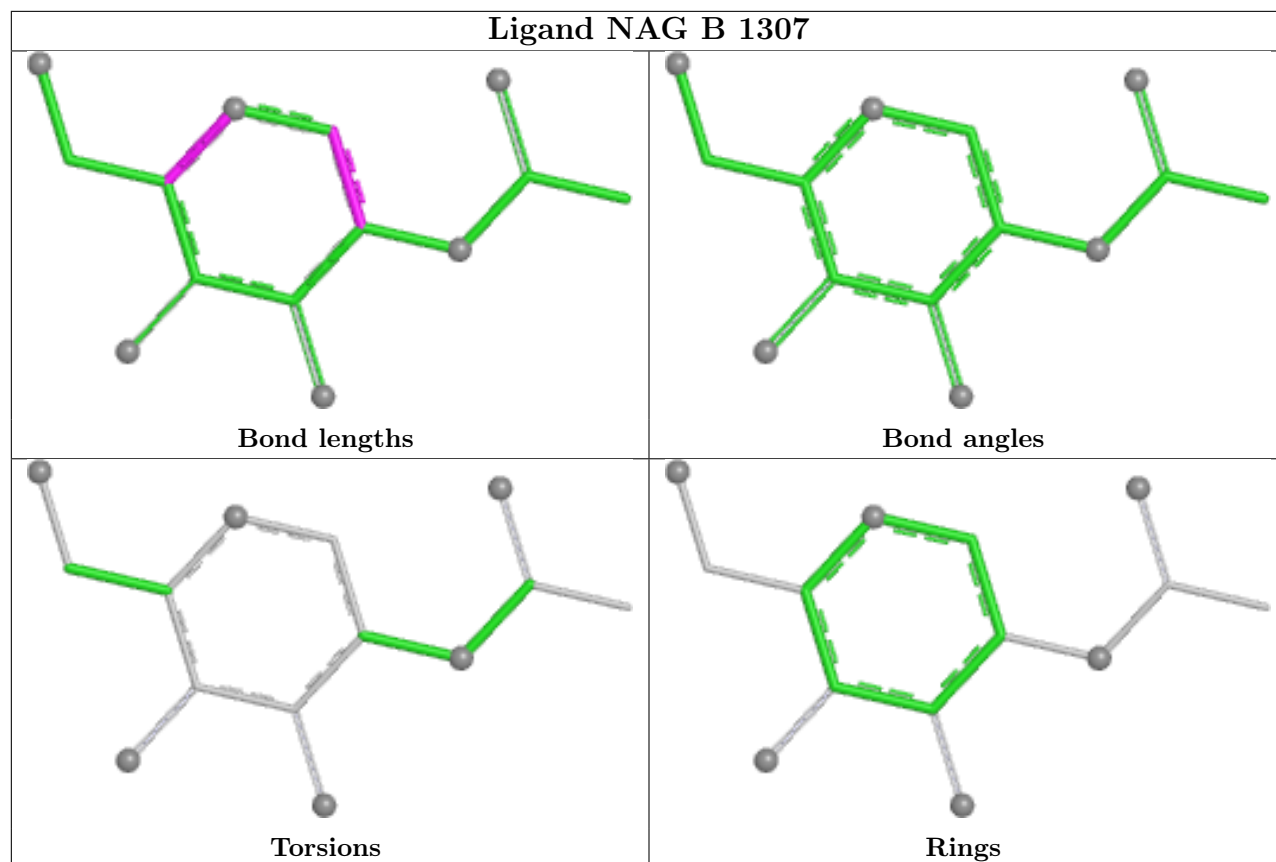
Ligand NAG C 1304



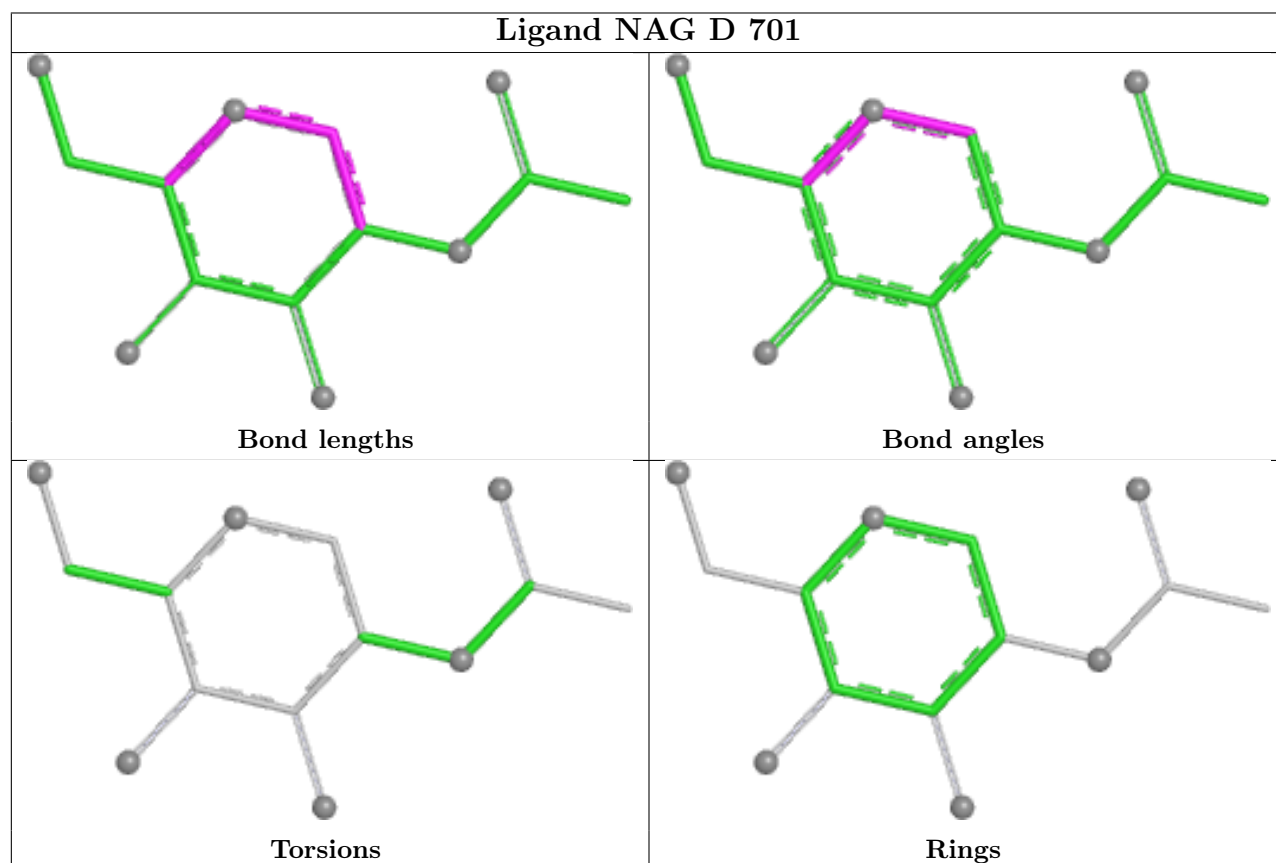
Ligand NAG A 1303



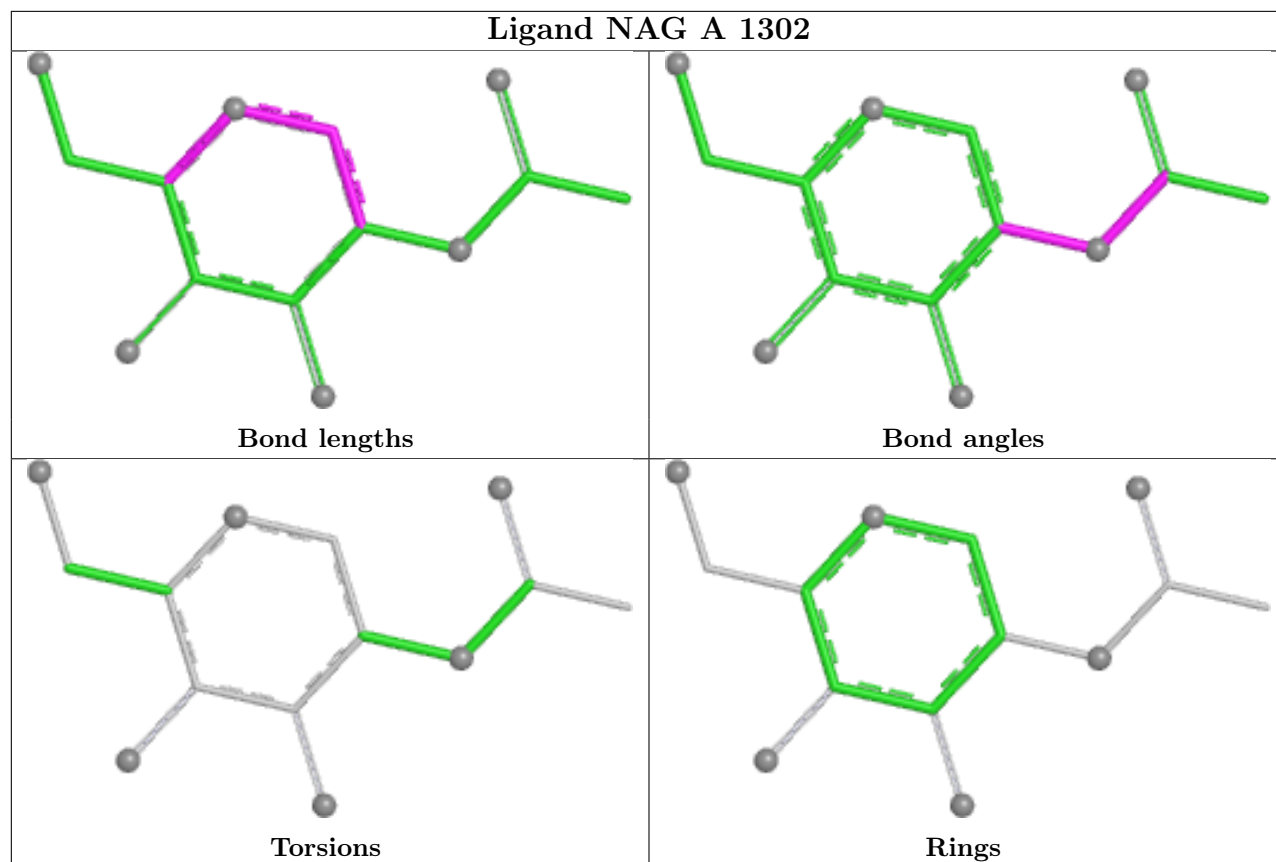
Ligand NAG B 1307



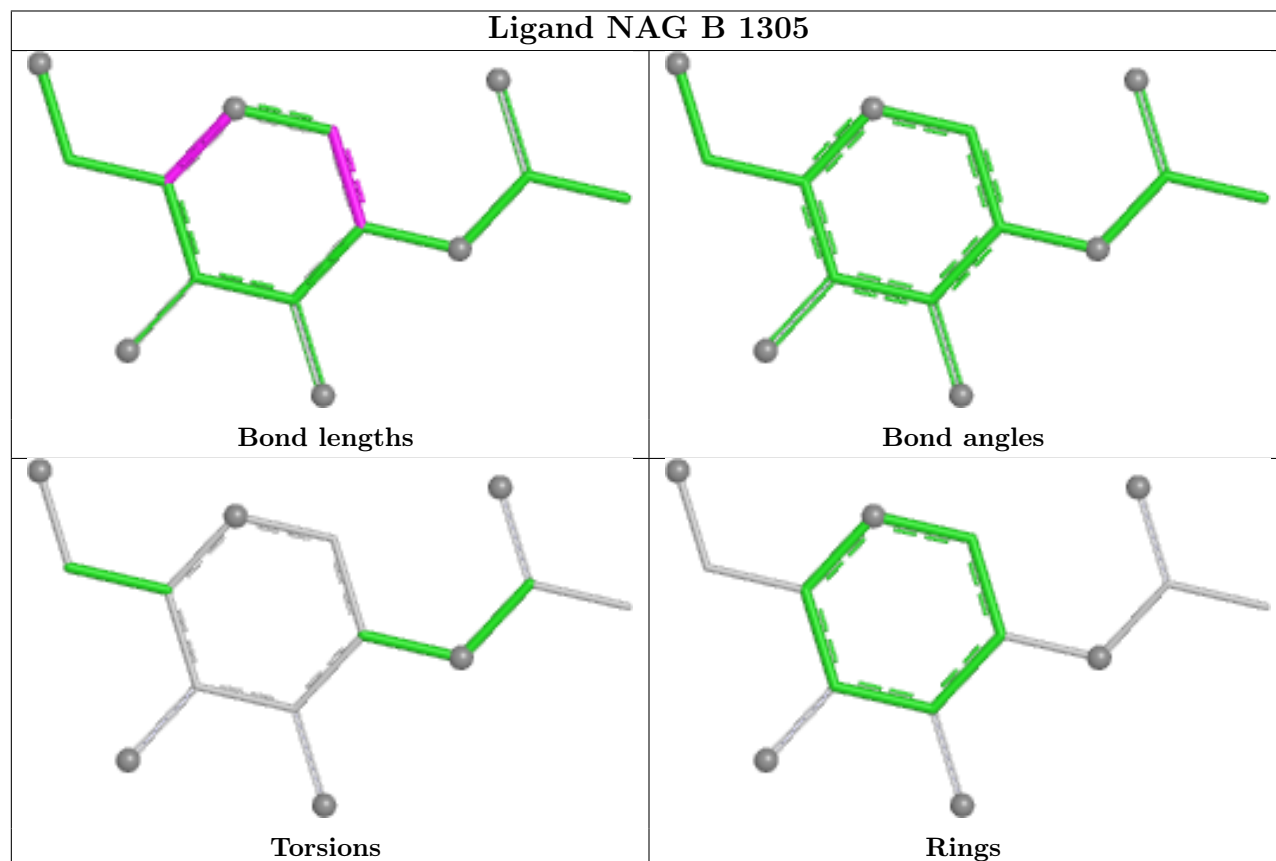
Ligand NAG D 701



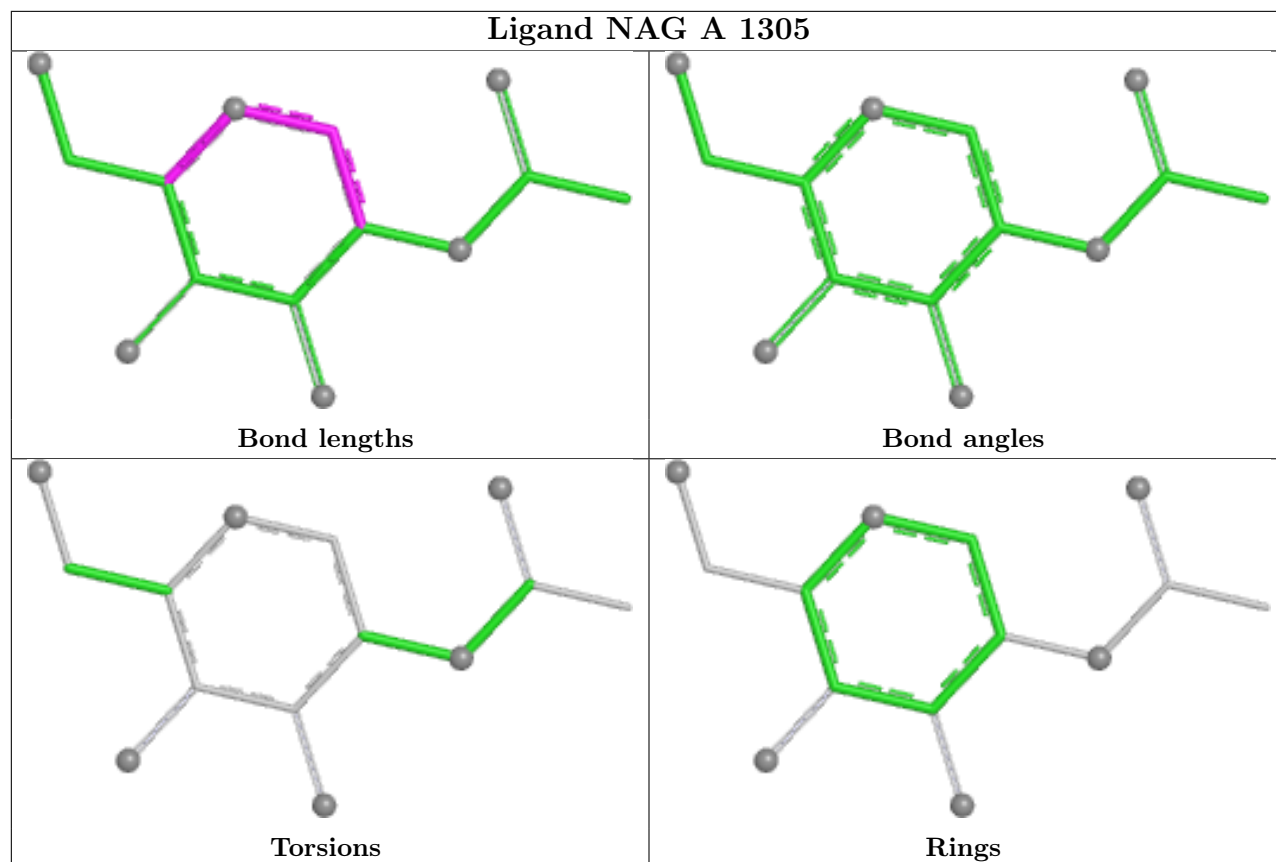
Ligand NAG A 1302



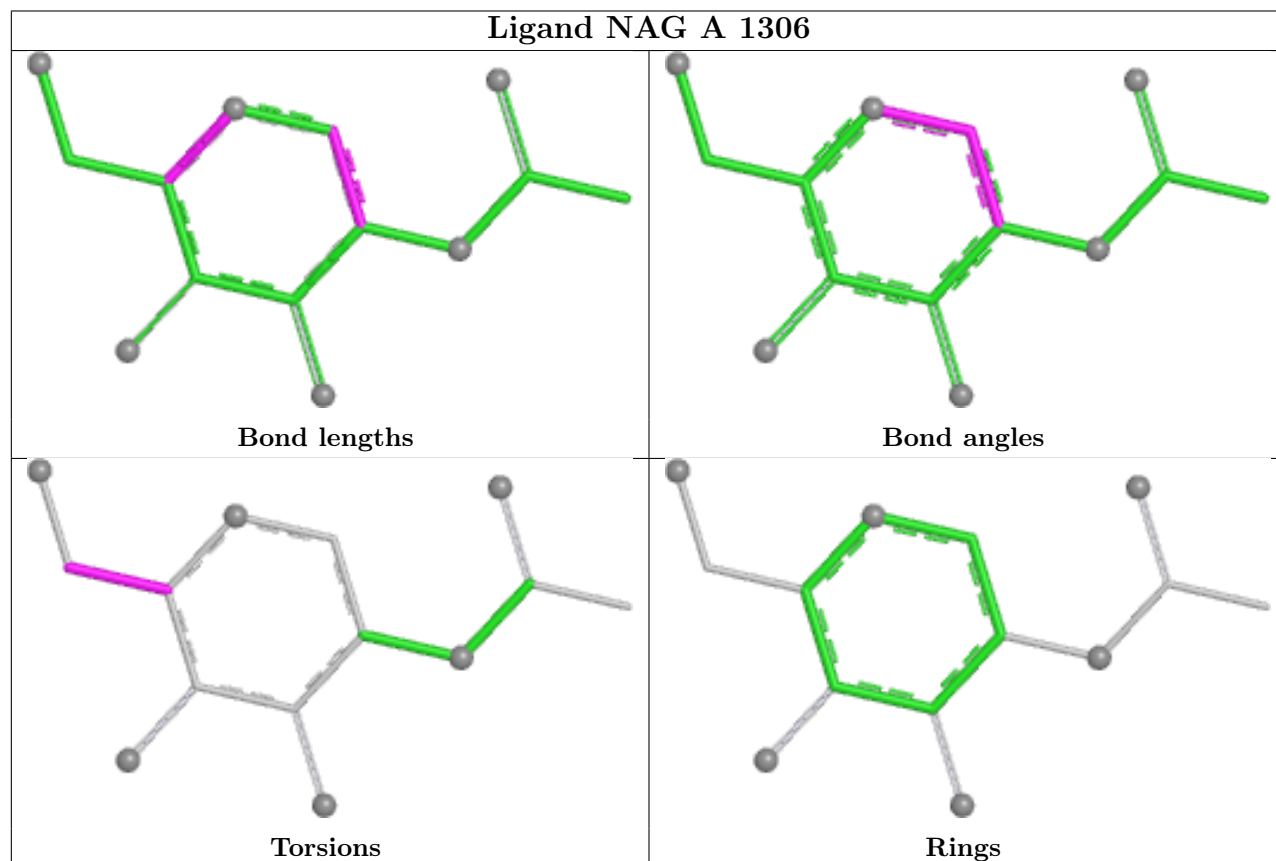
Ligand NAG B 1305



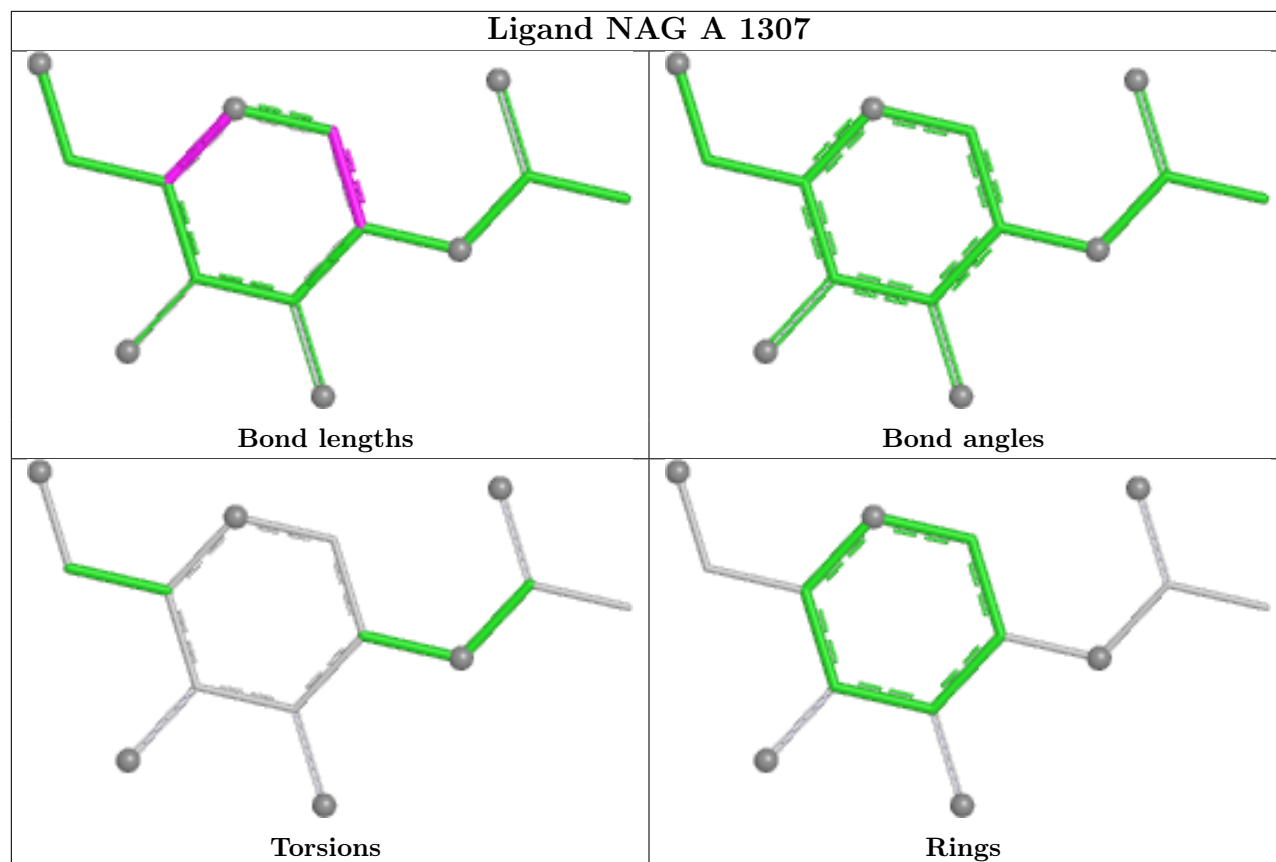
Ligand NAG A 1305



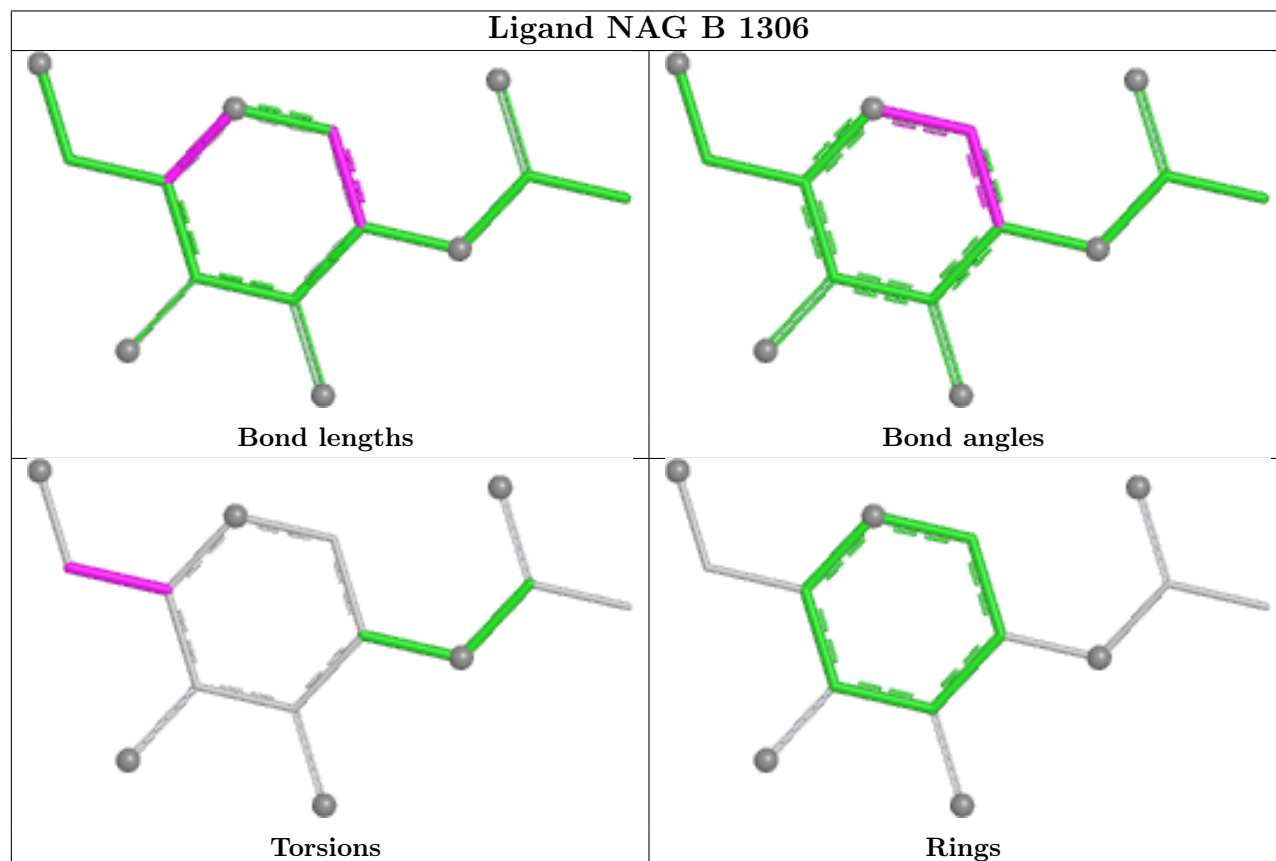
Ligand NAG A 1306



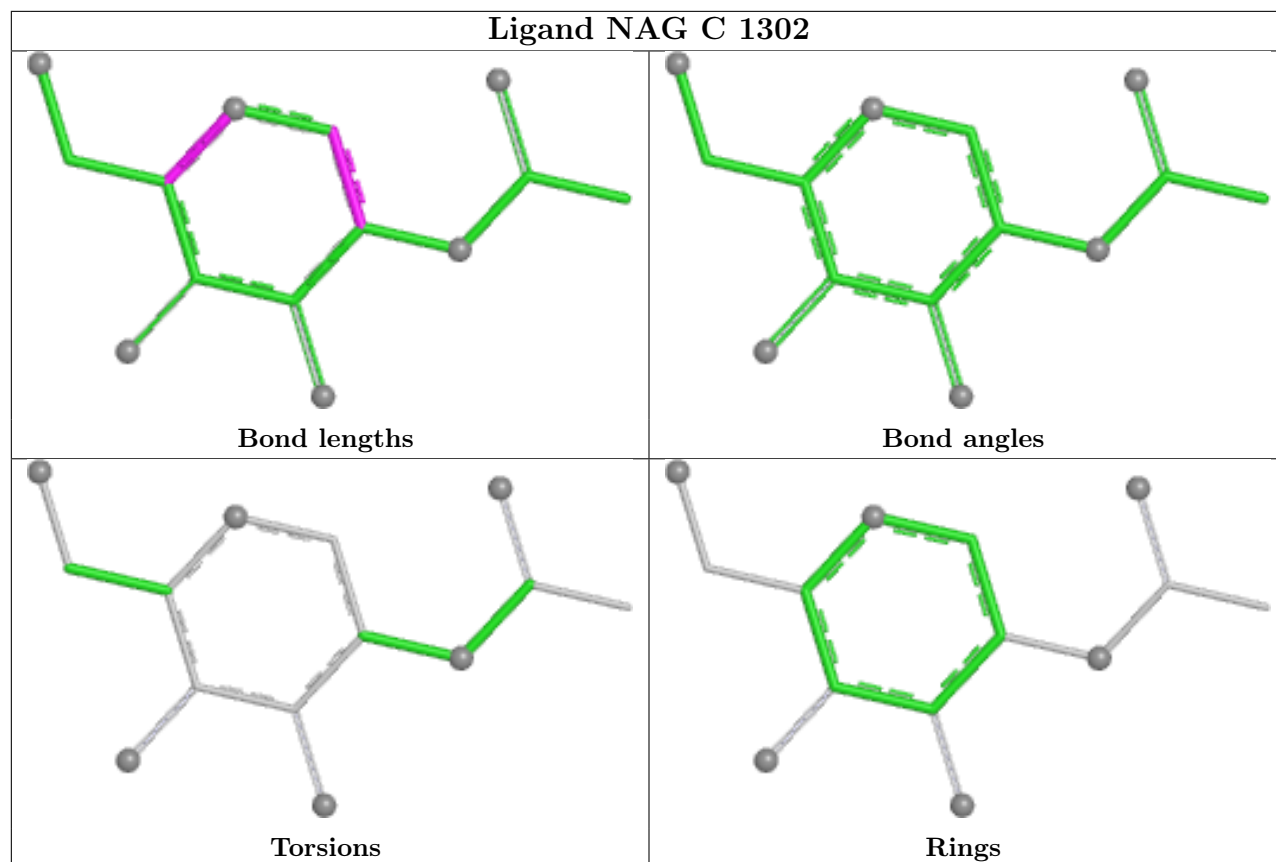
Ligand NAG A 1307



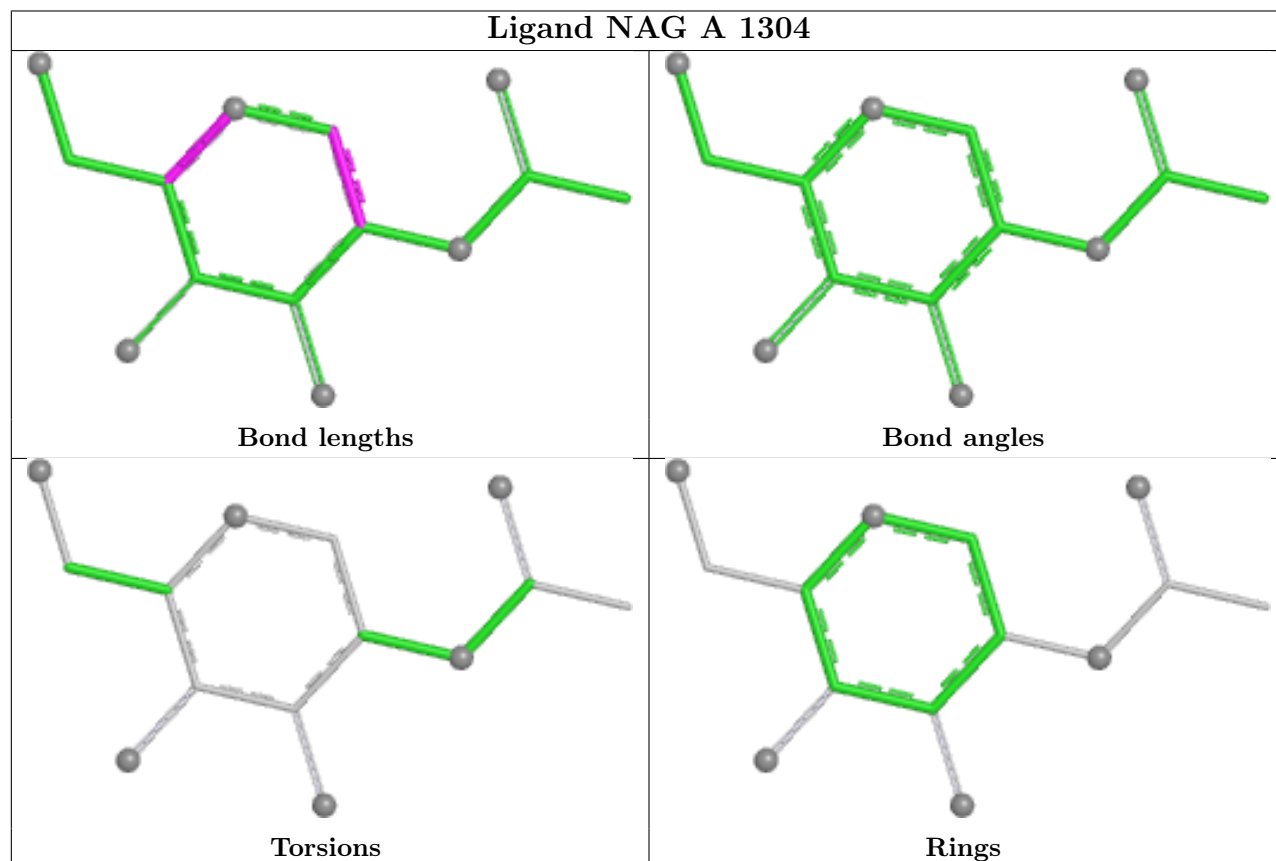
Ligand NAG B 1306



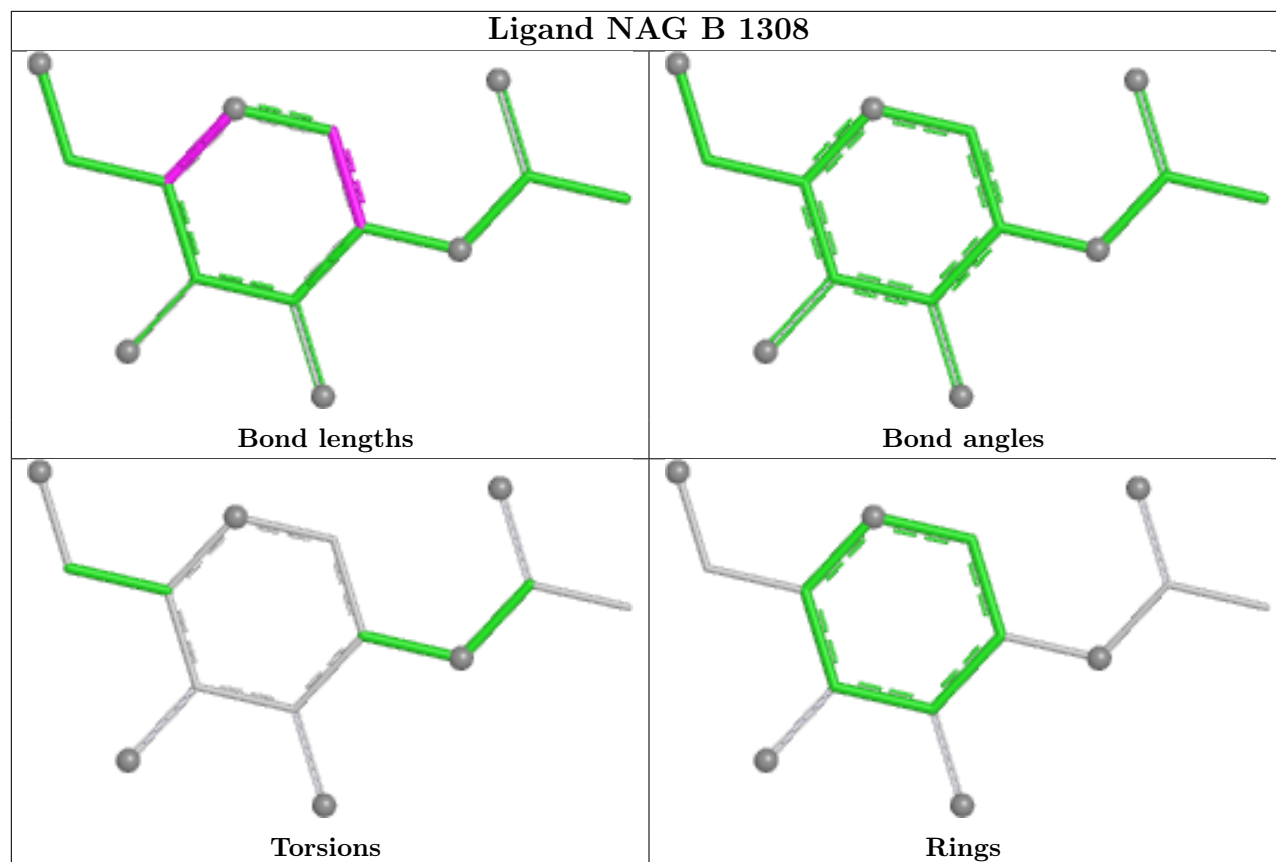
Ligand NAG C 1302



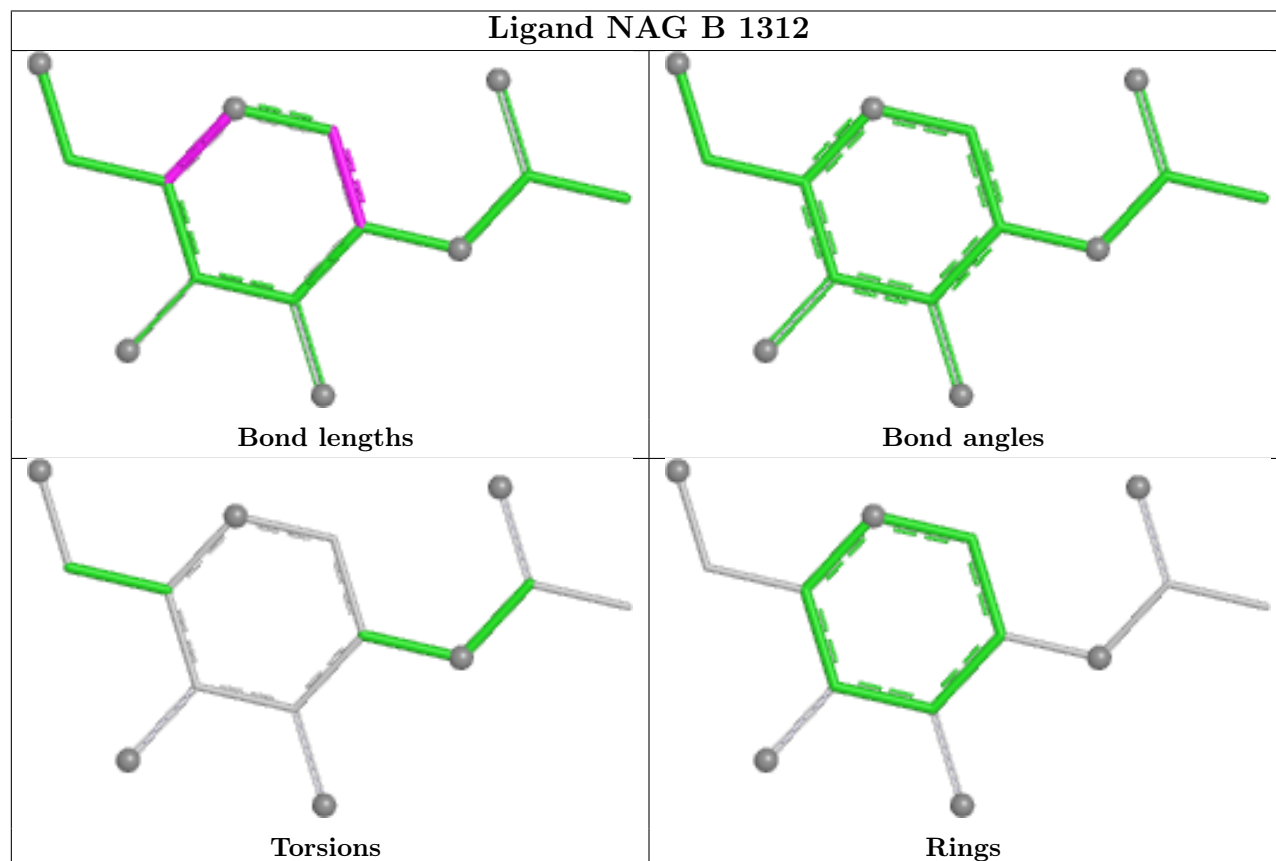
Ligand NAG A 1304



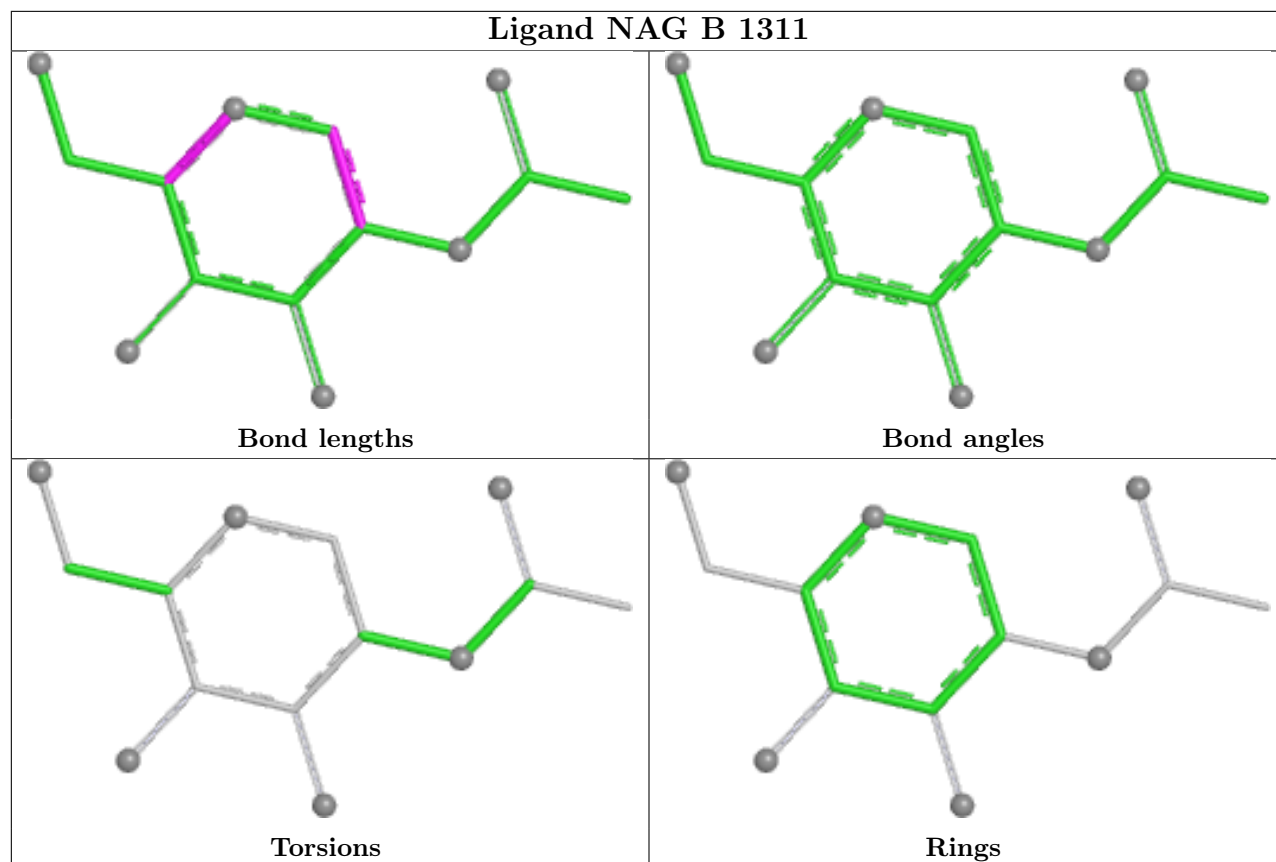
Ligand NAG B 1308



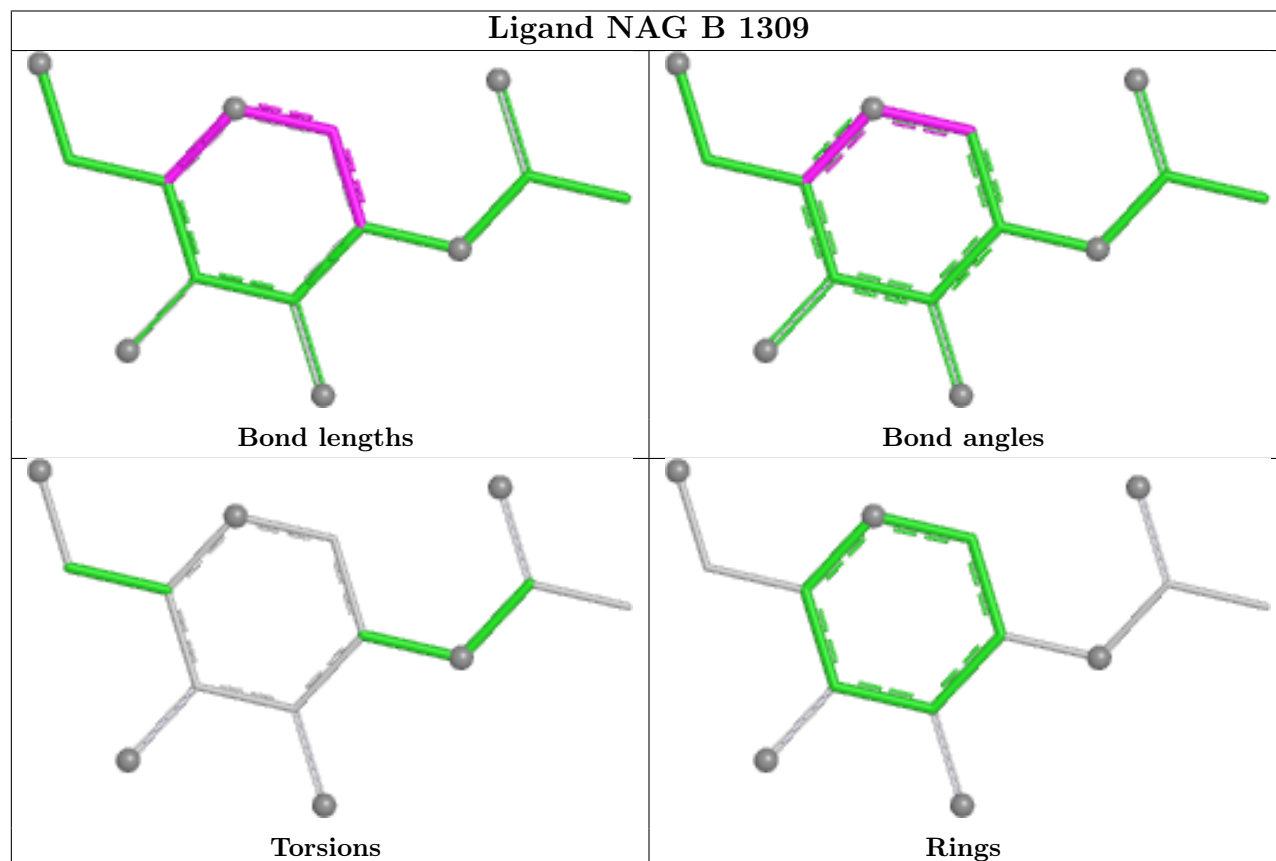
Ligand NAG B 1312



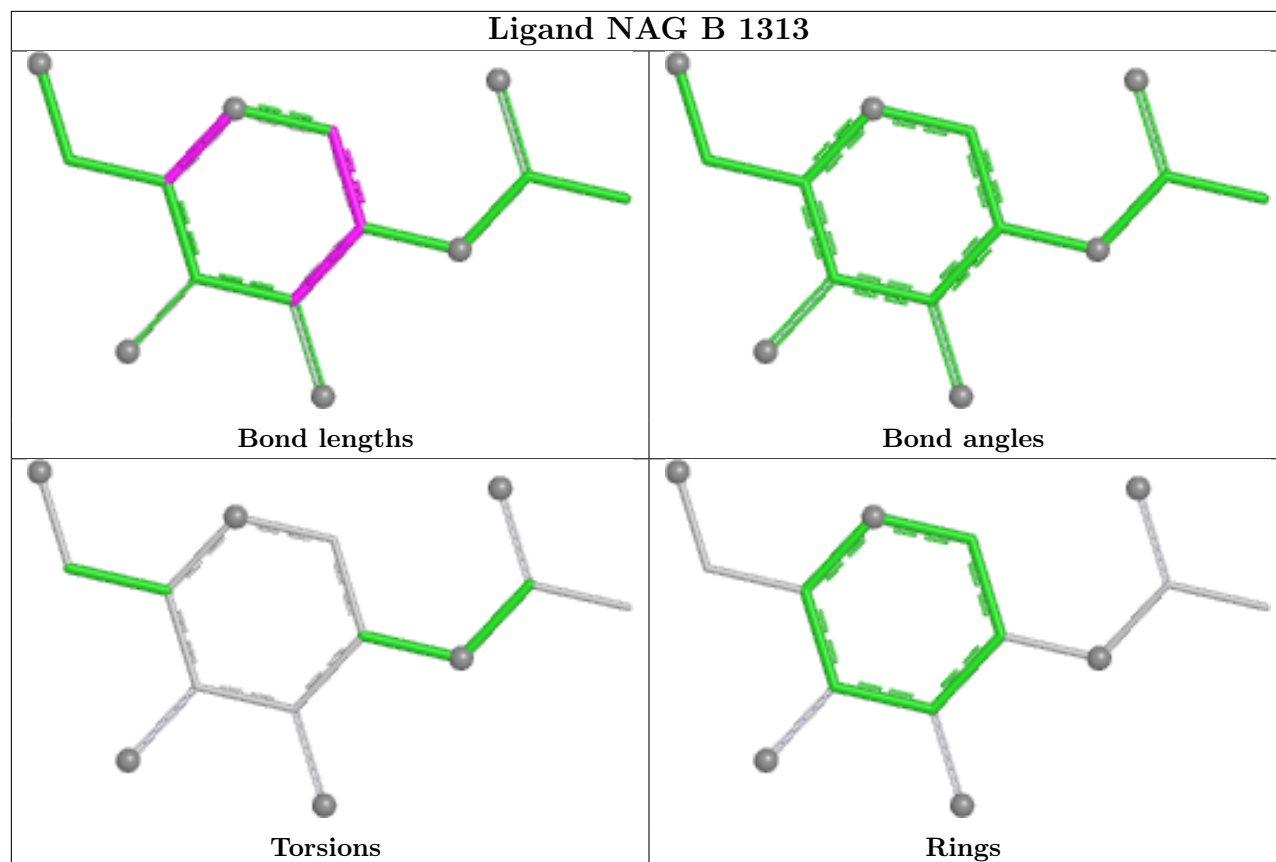
Ligand NAG B 1311



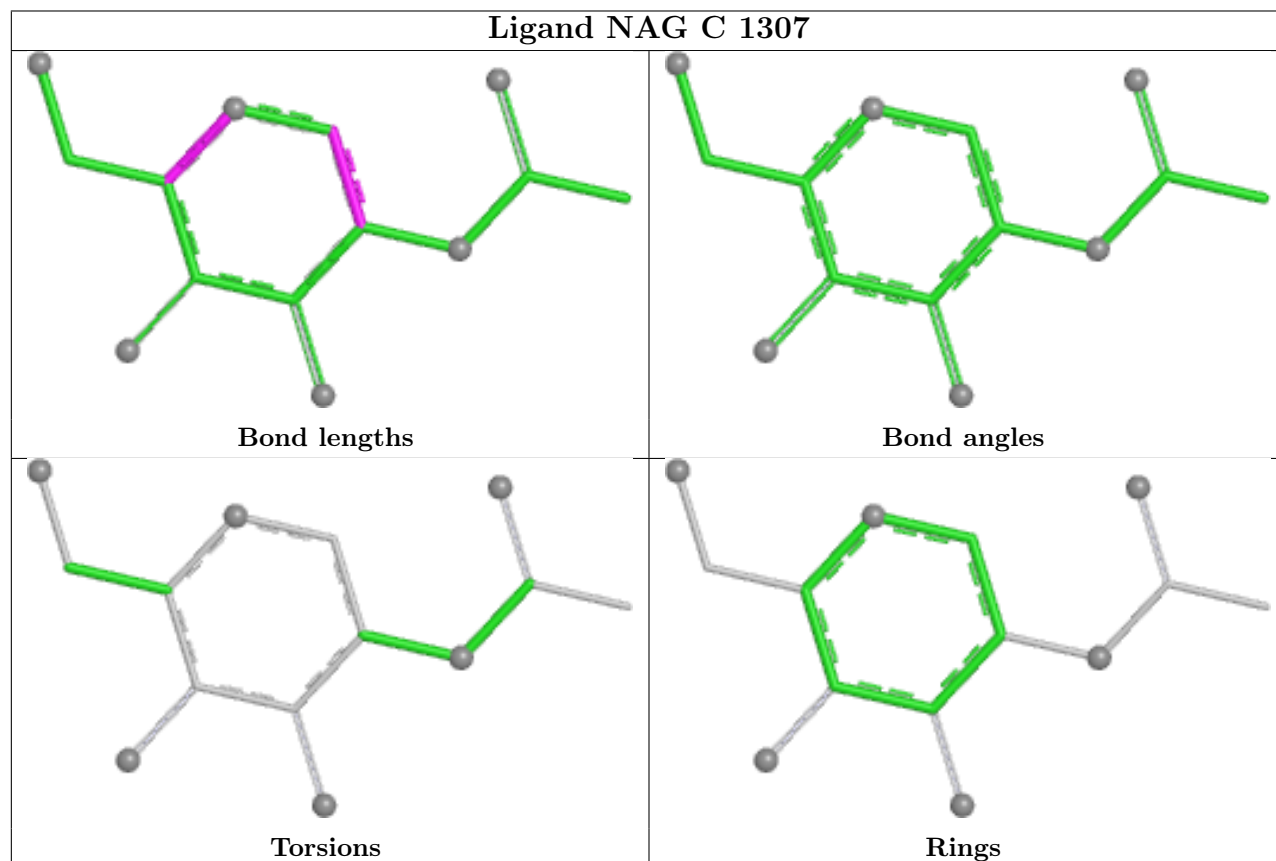
Ligand NAG B 1309

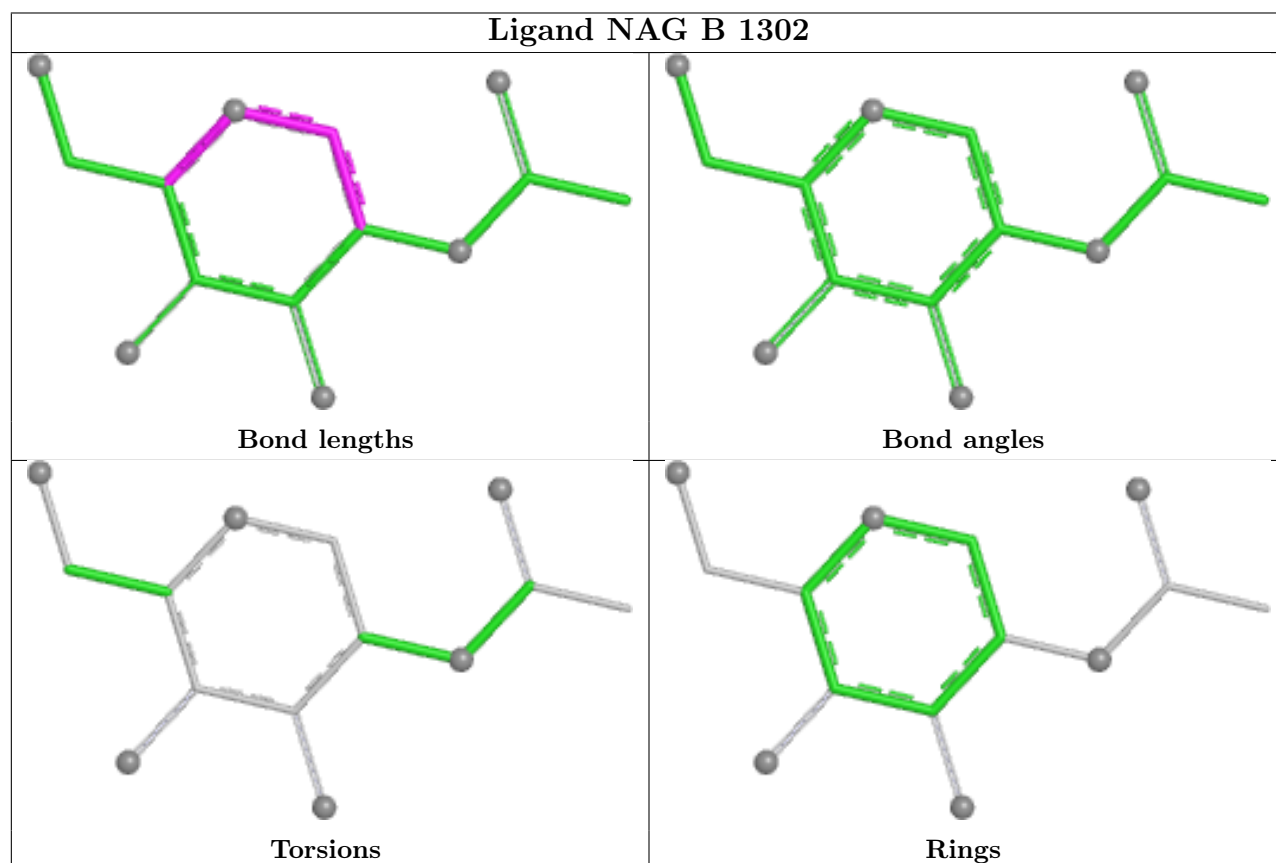
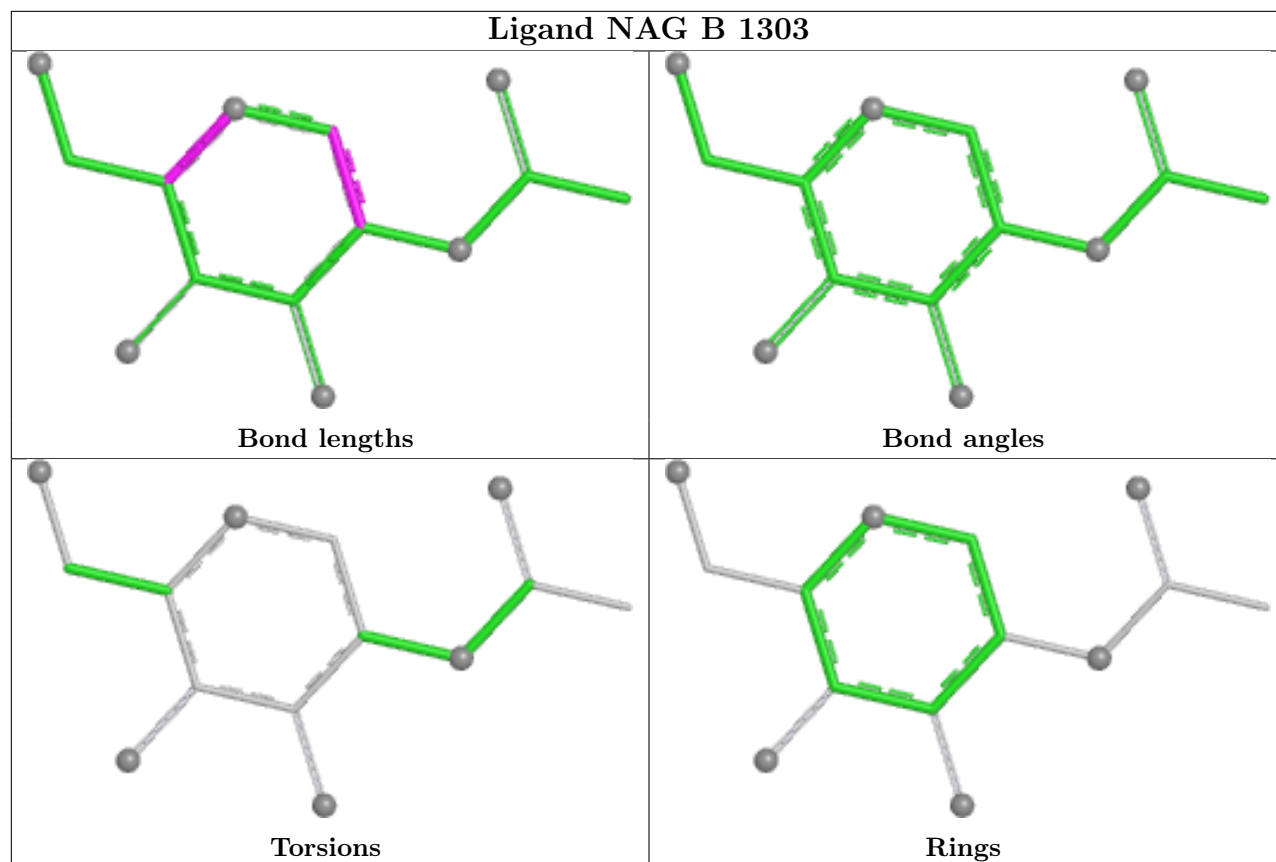


Ligand NAG B 1313

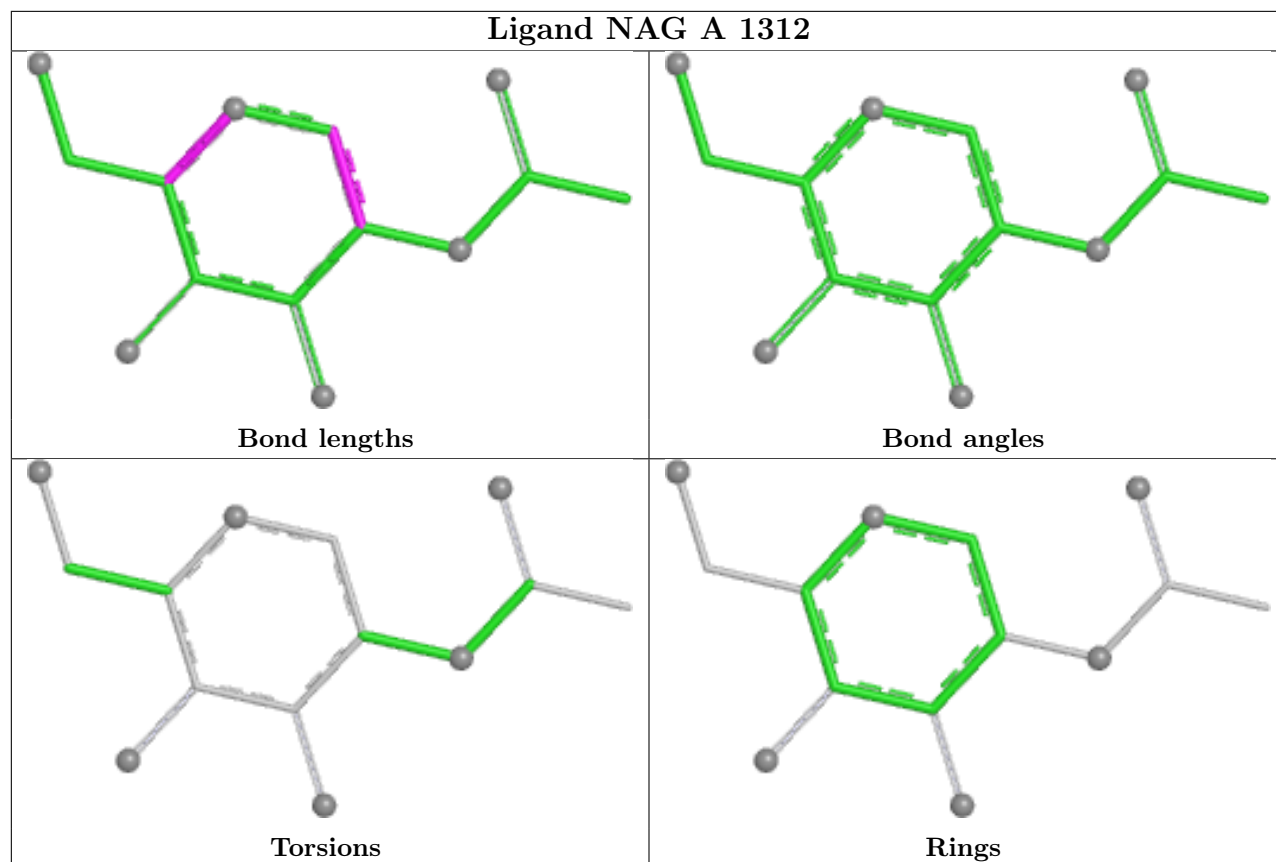


Ligand NAG C 1307

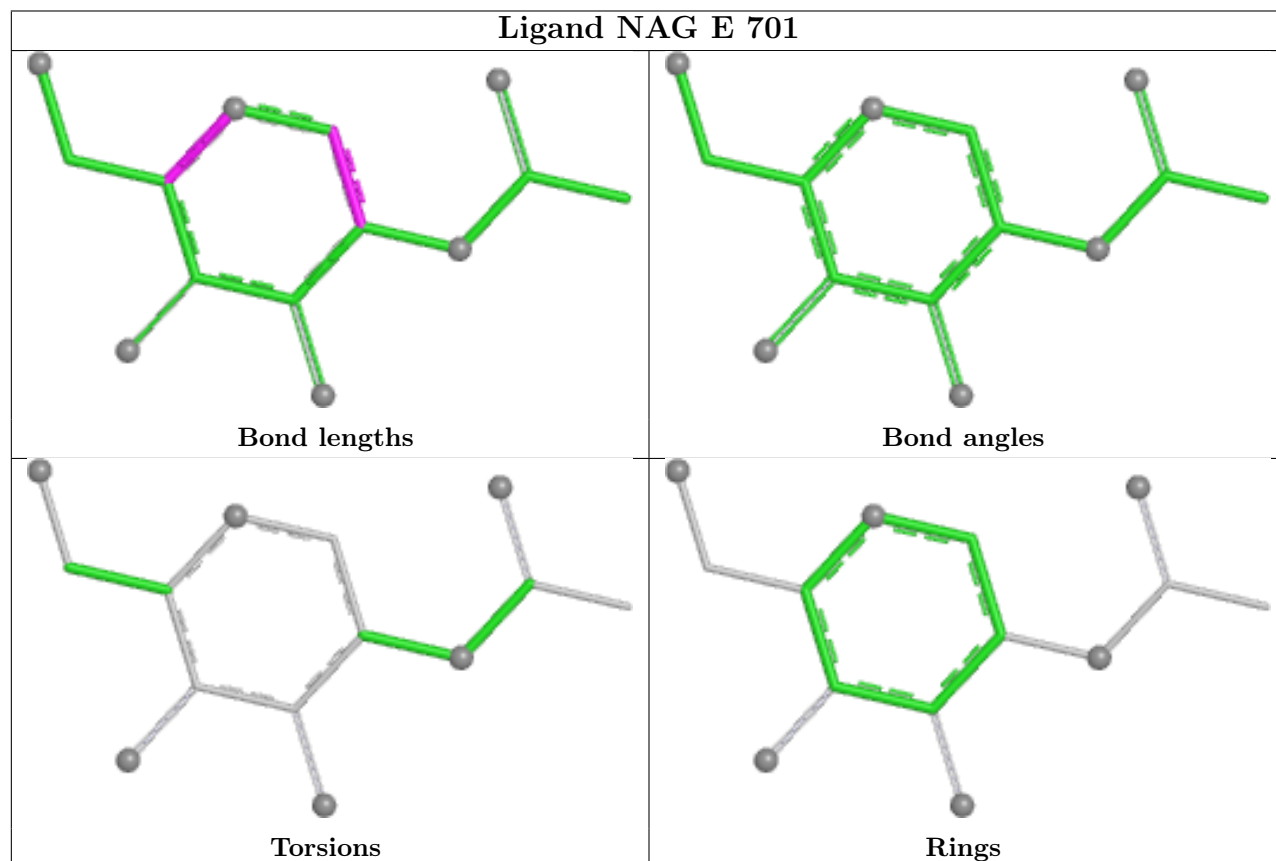




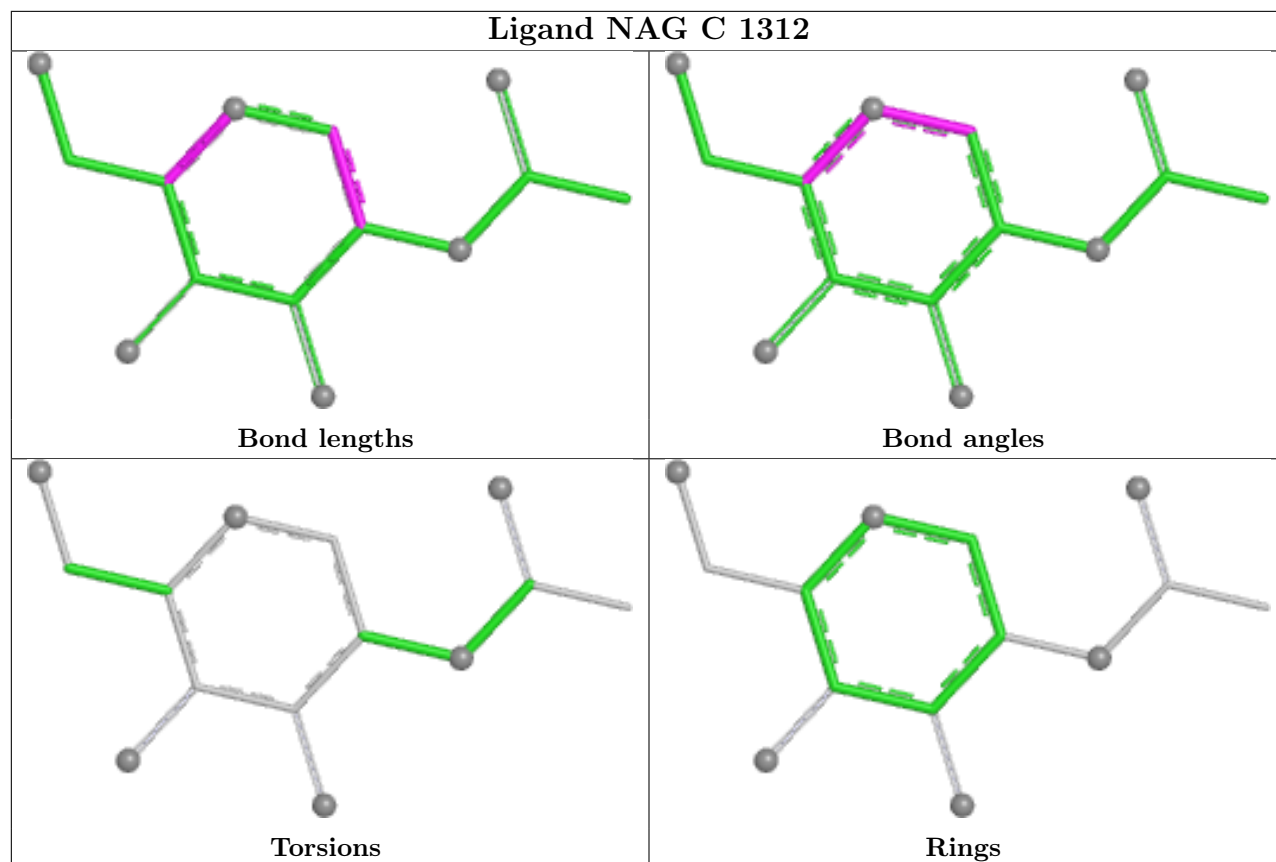
Ligand NAG A 1312



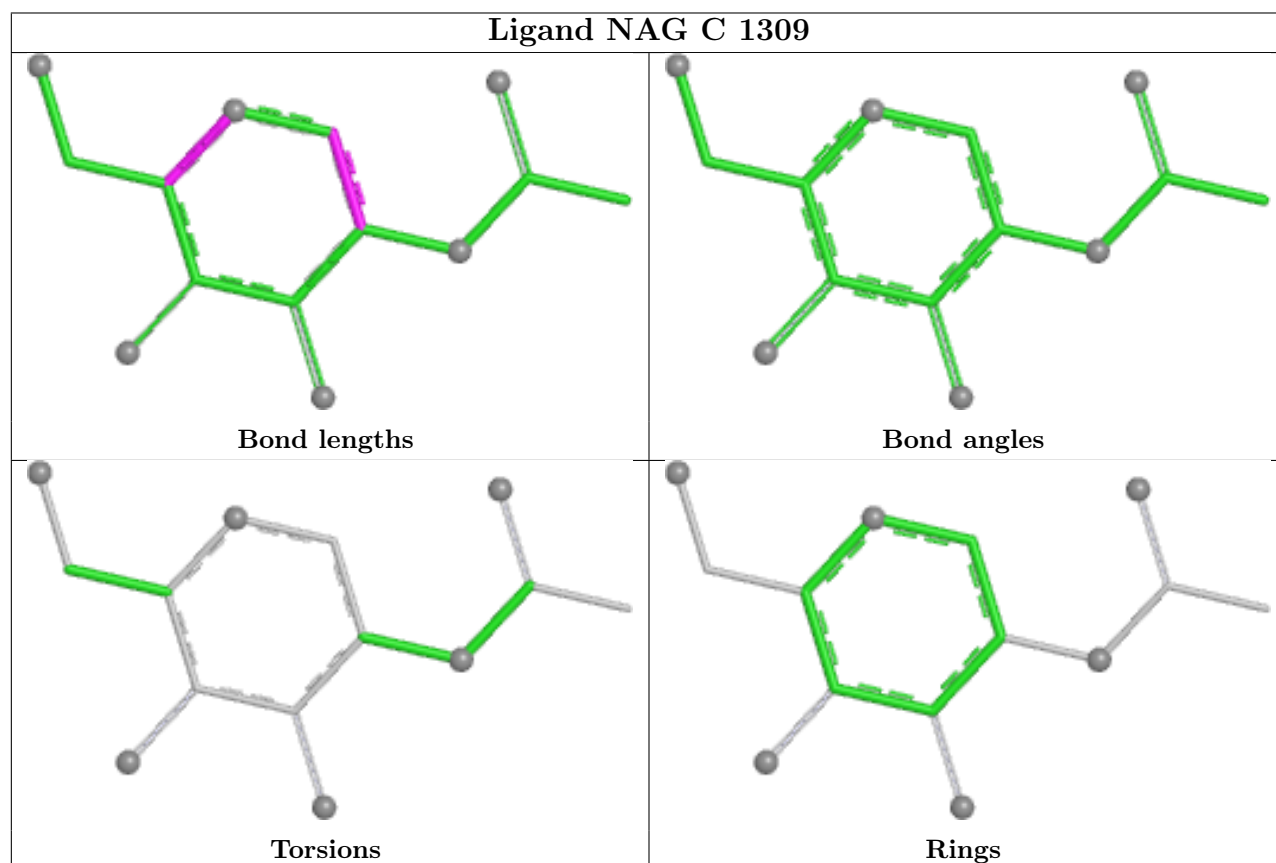
Ligand NAG E 701



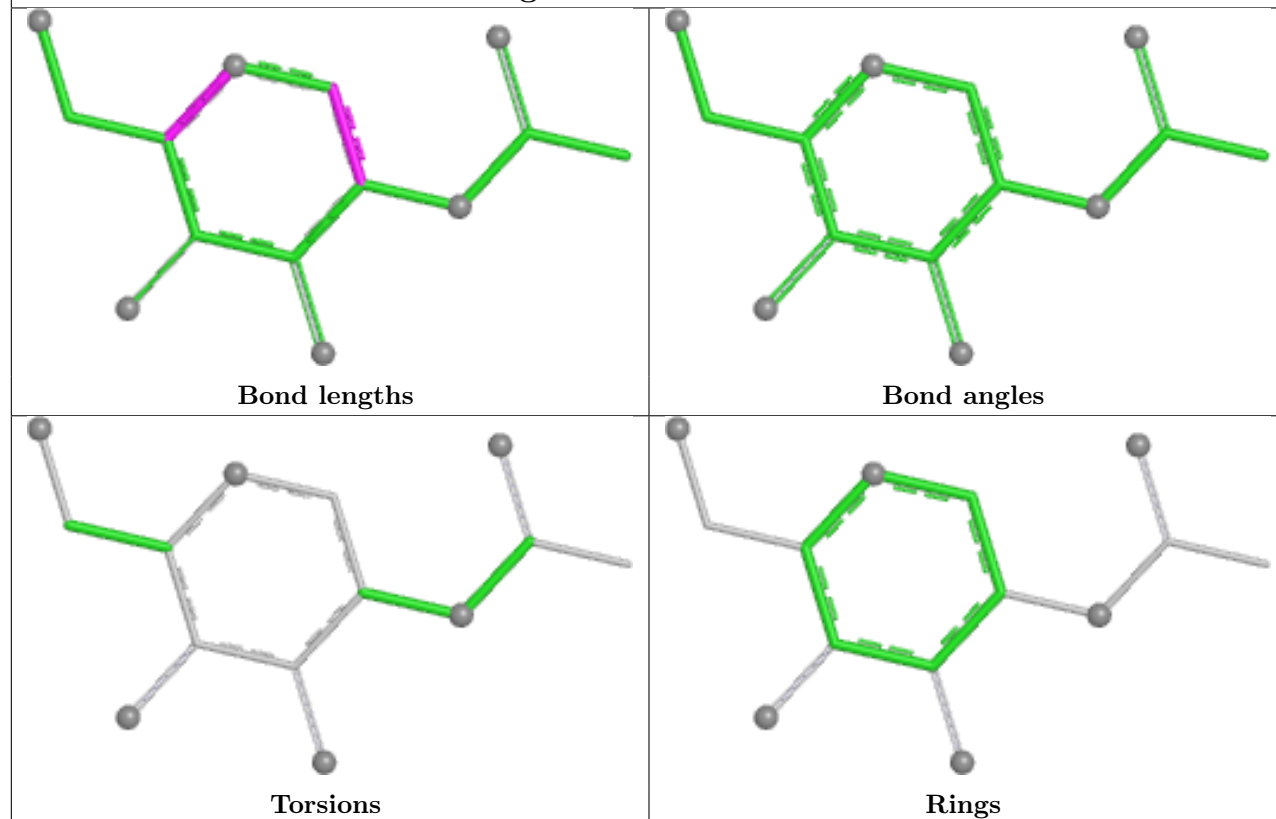
Ligand NAG C 1312



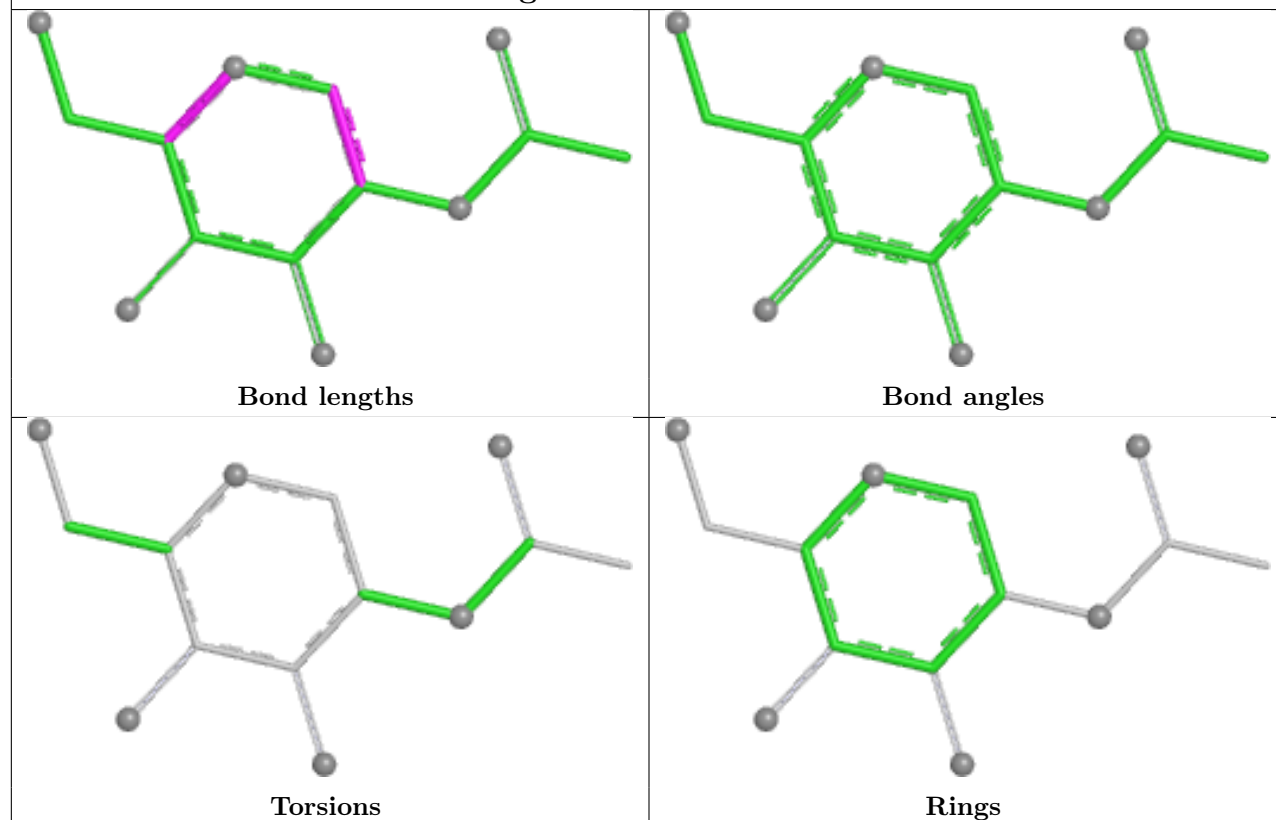
Ligand NAG C 1309



Ligand NAG B 1301



Ligand NAG C 1303



5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

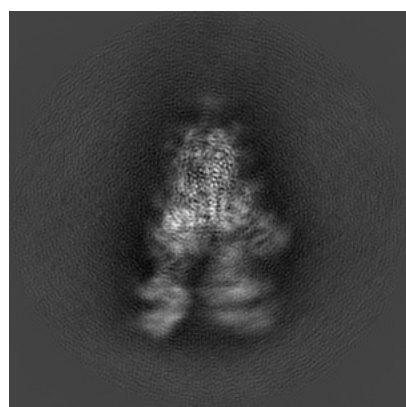
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-22893. These allow visual inspection of the internal detail of the map and identification of artifacts.

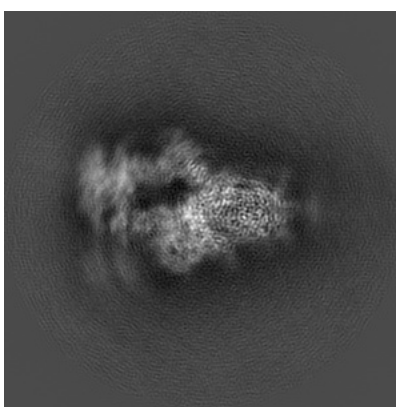
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

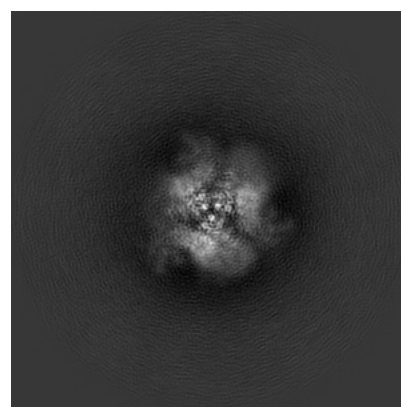
6.1.1 Primary map



X



Y

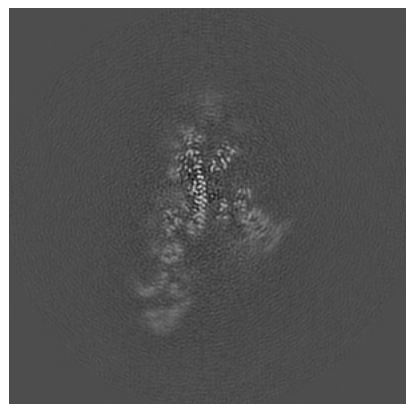


Z

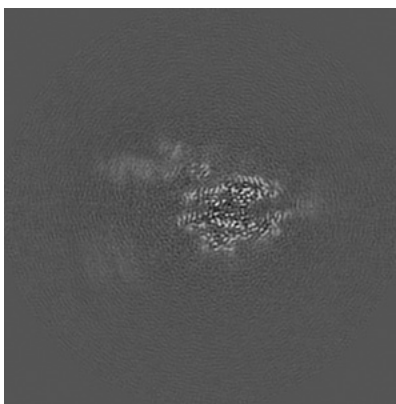
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

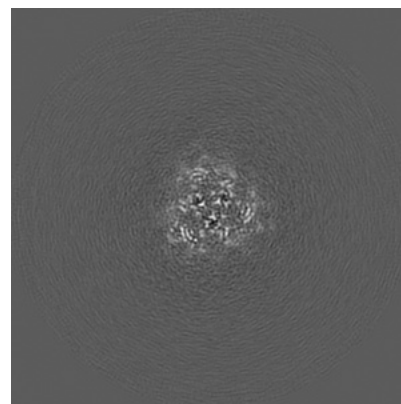
6.2.1 Primary map



X Index: 240



Y Index: 240



Z Index: 240

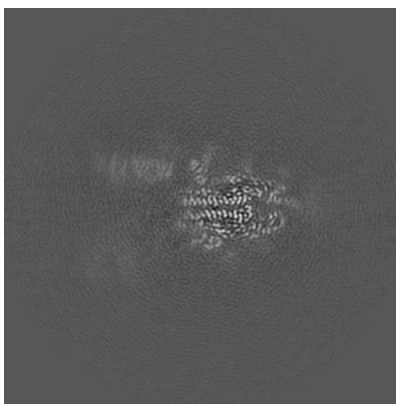
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

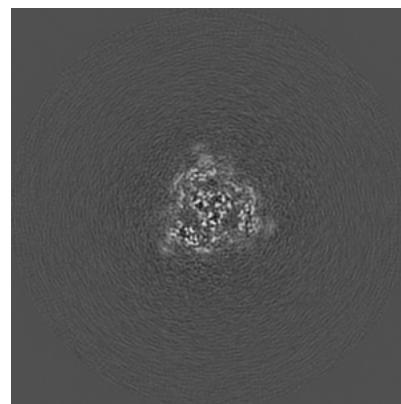
6.3.1 Primary map



X Index: 231



Y Index: 246

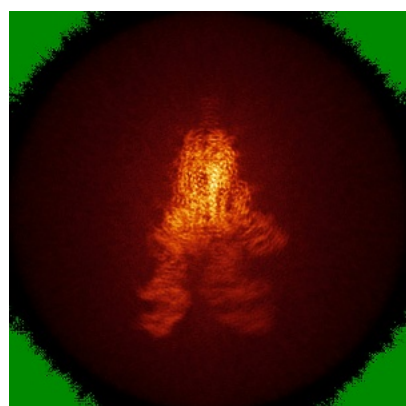


Z Index: 237

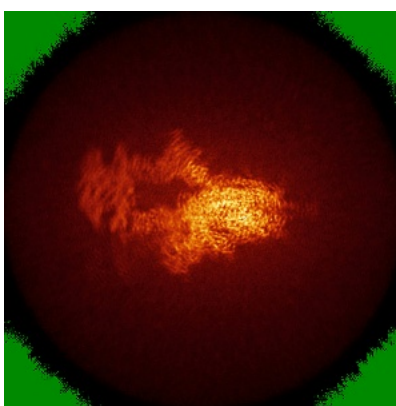
The images above show the largest variance slices of the map in three orthogonal directions.

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

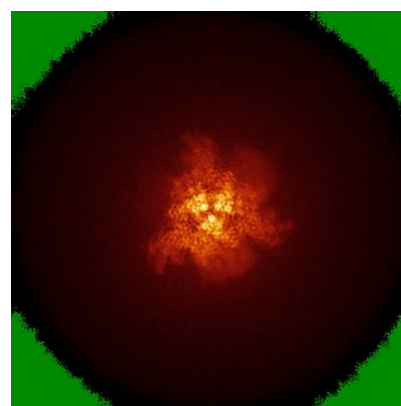
6.4.1 Primary map



X



Y



Z

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

6.5 Orthogonal surface views

This section was not generated.

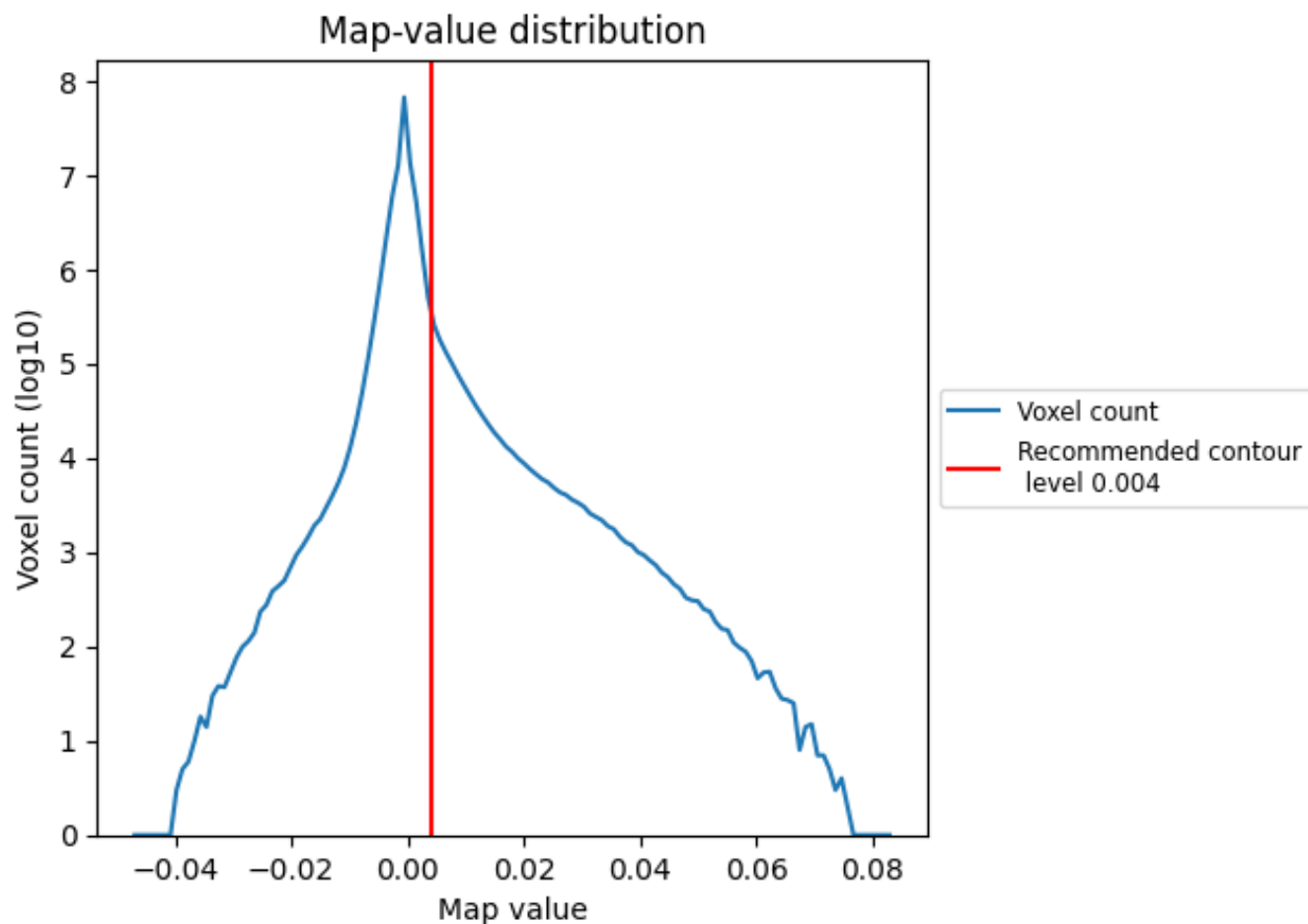
6.6 Mask visualisation

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

7 Map analysis [i](#)

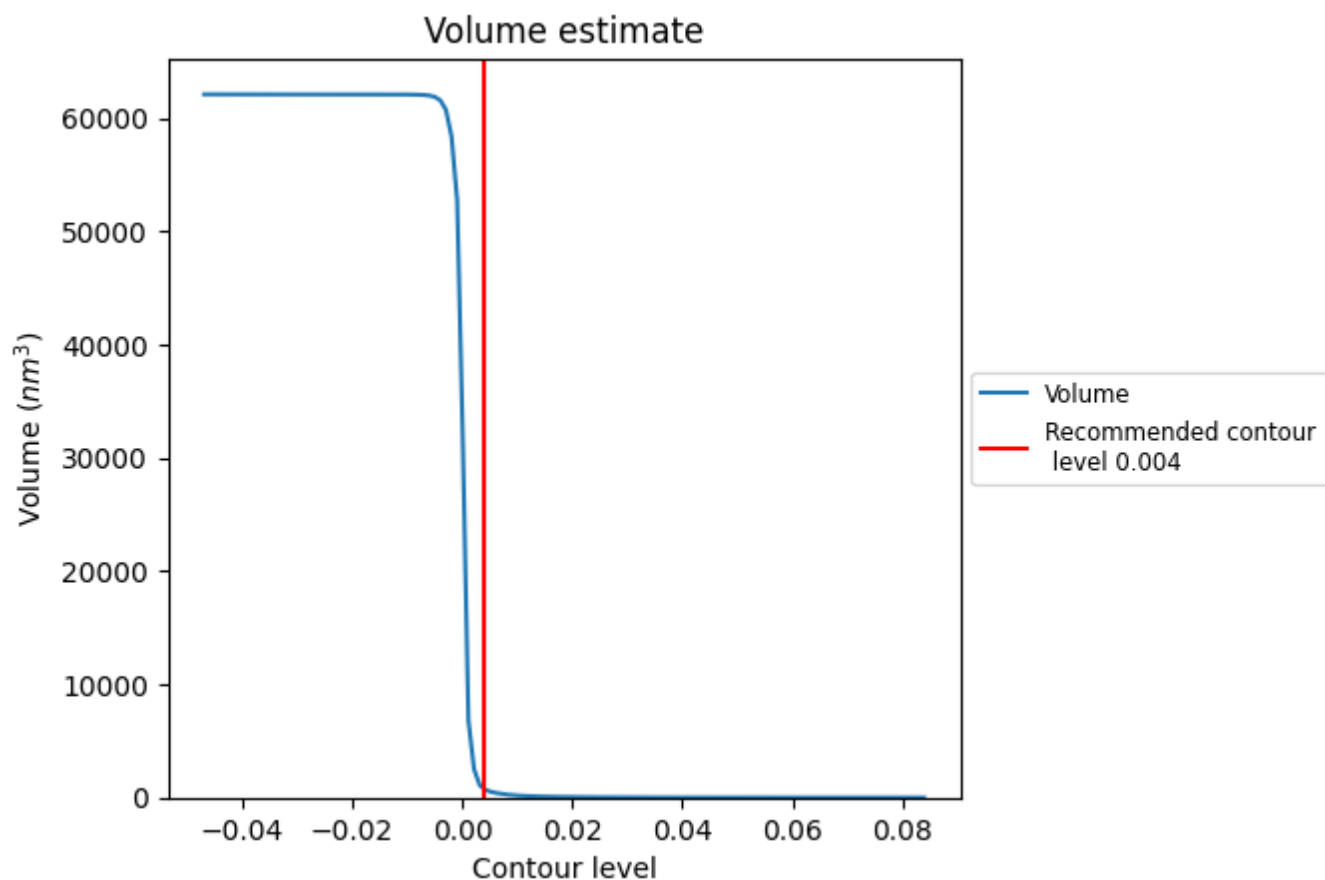
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



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

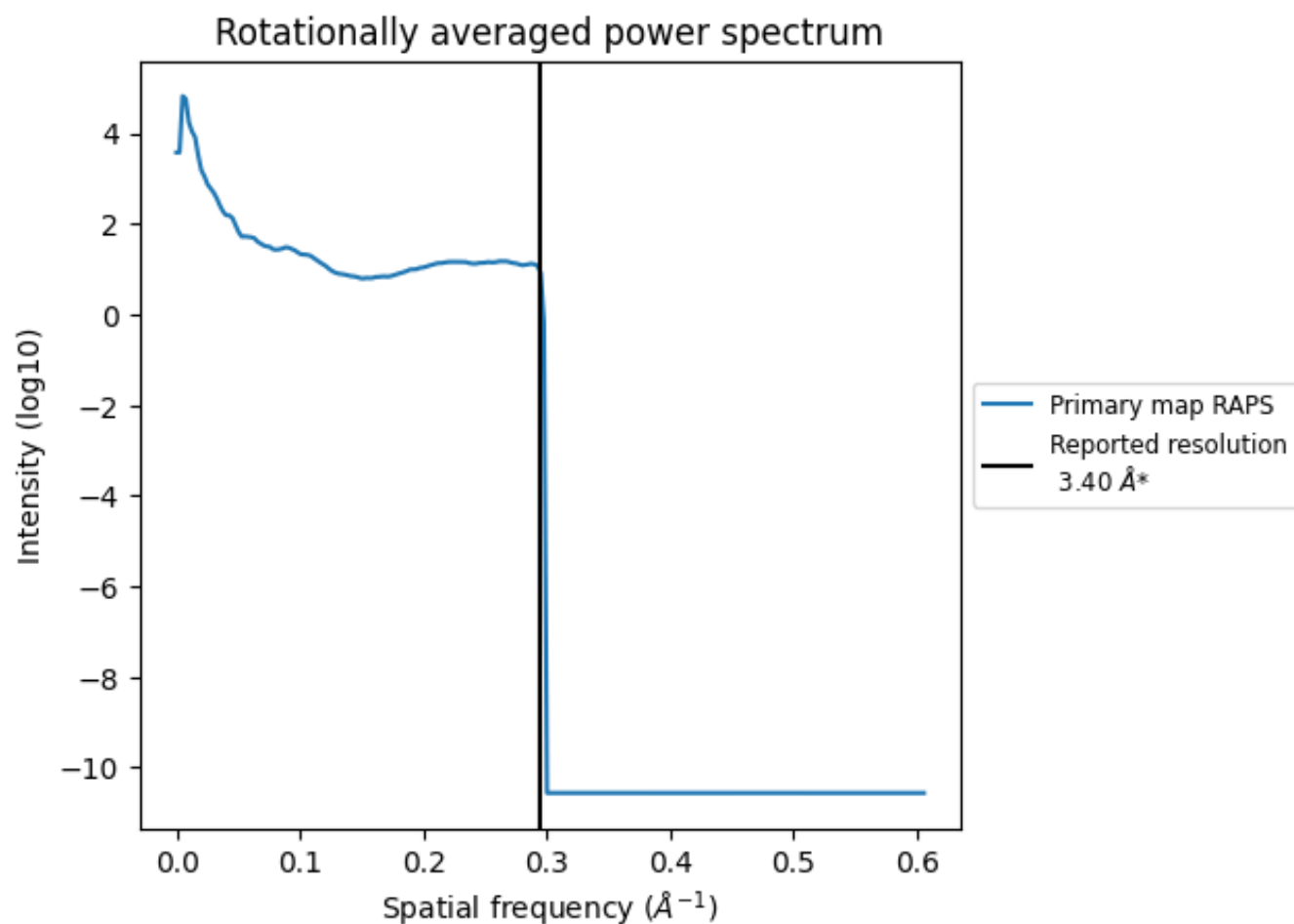
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 752 nm³; this corresponds to an approximate mass of 679 kDa.

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

7.3 Rotationally averaged power spectrum ⓘ



*Reported resolution corresponds to spatial frequency of 0.294 $\text{\AA}^{-1}$

8 Fourier-Shell correlation

This section was not generated. No FSC curve or half-maps provided.

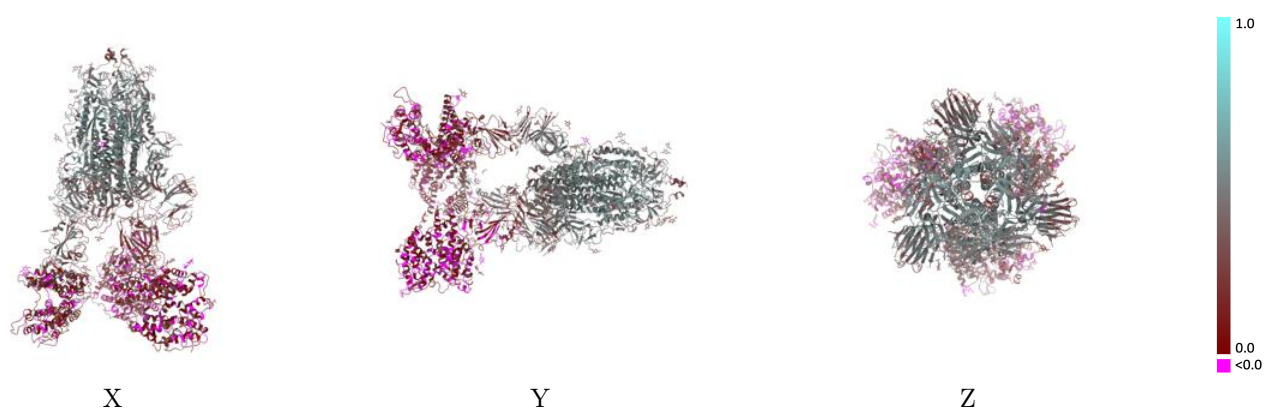
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-22893 and PDB model 7KJ4. Per-residue inclusion information can be found in section 3 on page 14.

9.1 Map-model overlay [i](#)

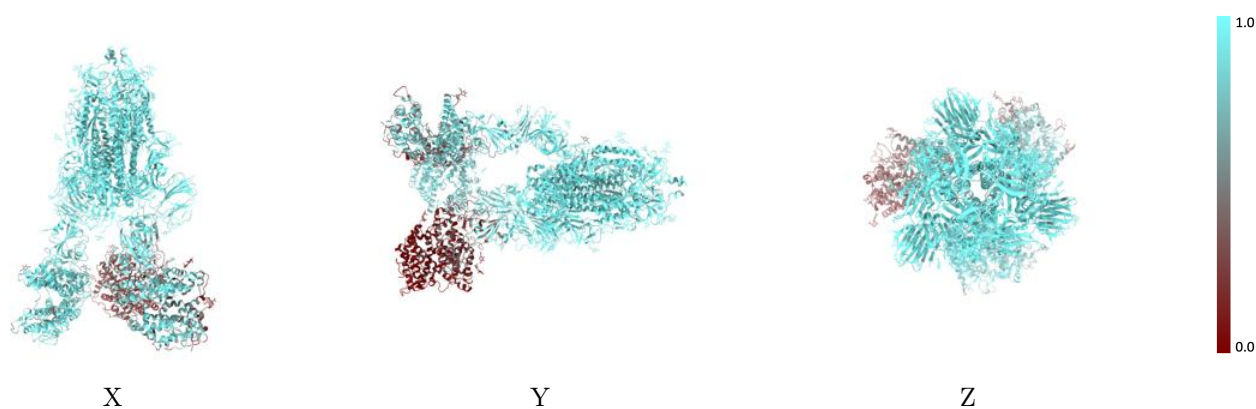
This section was not generated.

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



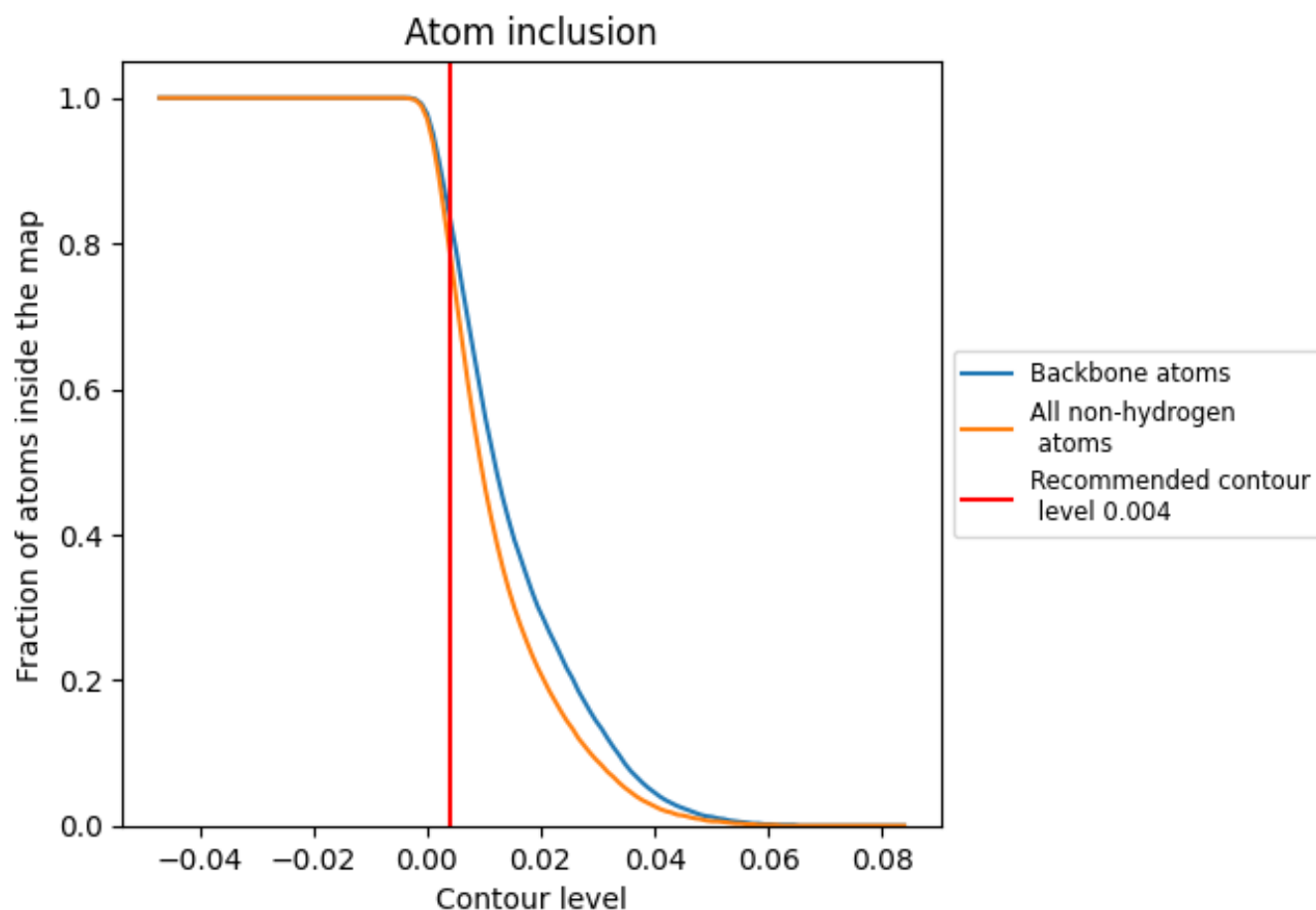
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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

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



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.004).

9.4 Atom inclusion [i](#)



At the recommended contour level, 84% of all backbone atoms, 79% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary ⓘ

The table lists the average atom inclusion at the recommended contour level (0.004) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.7910	 0.3070
A	 0.8910	 0.4130
B	 0.9580	 0.4480
C	 0.9430	 0.4150
D	 0.8850	 0.1760
E	 0.7080	 0.1120
F	 0.1370	 0.0770
G	 1.0000	 0.4500
H	 0.8930	 0.2660
I	 0.8210	 0.2360
J	 0.9640	 0.3730
K	 0.9640	 0.4090
L	 0.9290	 0.3810
M	 1.0000	 0.4550
N	 0.9640	 0.3800
O	 0.9640	 0.3830
P	 0.5360	 -0.0800
Q	 0.6070	 0.1240
R	 0.5710	 0.0040
S	 0.2500	 0.0520
T	 0.7140	 0.0900
U	 0.2500	 0.0090
V	 0.3210	 0.0940
W	 0.5710	 0.2210
X	 0.1070	 0.1370
Y	 0.1070	 -0.0960
Z	 0.2140	 0.1230
a	 0.0360	 0.0940
b	 0.1430	 0.1260
c	 0.0000	 0.0380
d	 0.0710	 0.2940

