



## Full wwPDB EM Validation Report ⓘ

Oct 20, 2024 – 03:25 PM EDT

PDB ID : 7N1V  
EMDB ID : EMD-24124  
Title : Structural basis for enhanced infectivity and immune evasion of SARS-CoV-2 variants  
Authors : Zhang, J.; Cai, Y.F.; Xiao, T.S.; Rawson, S.; Peng, H.Q.; Sterling, S.M.; Walsh Jr, R.M.; Volloch, S.R.; Chen, B.  
Deposited on : 2021-05-28  
Resolution : 3.21 Å (reported)  
Based on initial model : 7KRR

This is a Full wwPDB EM Validation Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

EMDB validation analysis : 0.0.1.dev113  
Mogul : 2022.3.0, CSD as543be (2022)  
MolProbity : 4.02b-467  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
MapQ : 1.9.13  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.39

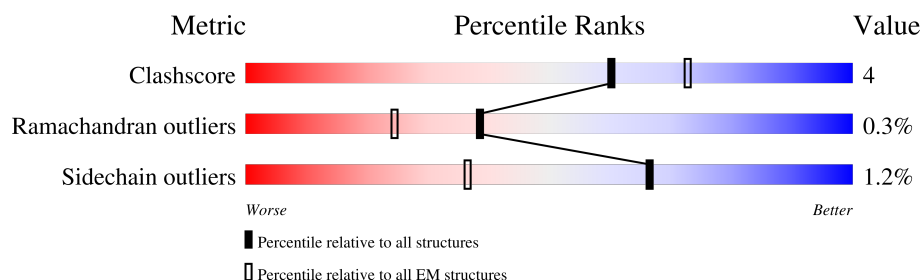
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 3.21 Å.

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




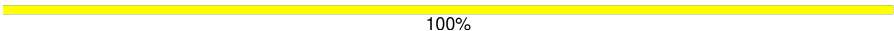

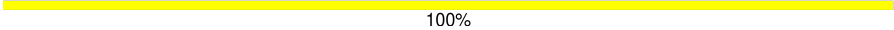
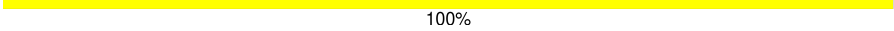
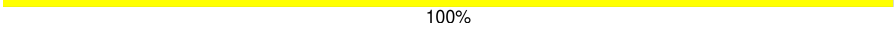
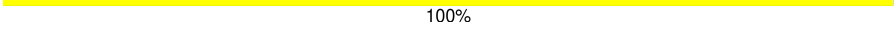
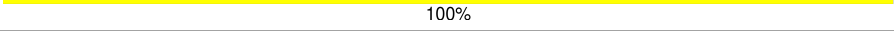
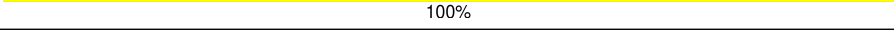
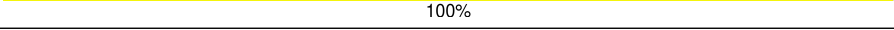
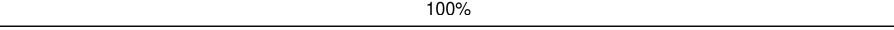
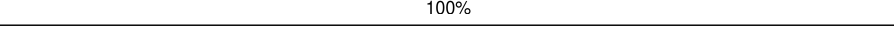

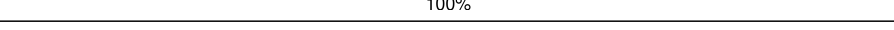
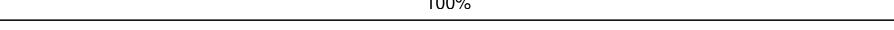
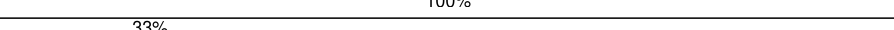
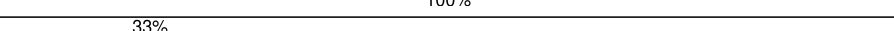
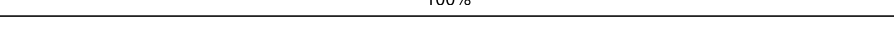
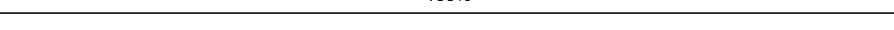


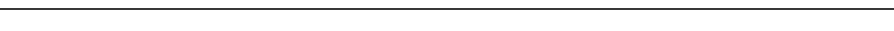


Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . 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	1305	
1	B	1305	
1	C	1305	
2	D	2	
2	E	2	
2	F	2	
2	G	2	
2	H	2	

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Mol	Chain	Length	Quality of chain
2	L	2	 50% 50%
2	M	2	 100%
2	N	2	 50% 50%
2	O	2	 100%
2	P	2	 100%
2	Q	2	 100%
2	R	2	 100%
2	V	2	 100%
2	W	2	 100%
2	X	2	 100%
2	Y	2	 100%
2	Z	2	 100%
2	a	2	 50% 50%
2	b	2	 100%
2	c	2	 100%
3	I	3	 100%
3	S	3	 33% 100%
3	d	3	 33% 100%
4	J	3	 100%
4	K	3	 100%
4	T	3	 100%
4	U	3	 100%
4	e	3	 100%
4	f	3	 100%

## 2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 26947 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	1089	Total	C	N	O	S	0	0
			8530	5451	1420	1620	39		
1	B	1091	Total	C	N	O	S	0	0
			8545	5459	1424	1623	39		
1	C	1094	Total	C	N	O	S	0	0
			8572	5474	1430	1630	38		

There are 135 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	?	-	HIS	deletion	UNP P0DTC2
A	?	-	VAL	deletion	UNP P0DTC2
A	?	-	TYR	deletion	UNP P0DTC2
A	501	TYR	ASN	conflict	UNP P0DTC2
A	570	ASP	ALA	conflict	UNP P0DTC2
A	614	GLY	ASP	conflict	UNP P0DTC2
A	681	HIS	PRO	conflict	UNP P0DTC2
A	716	ILE	THR	conflict	UNP P0DTC2
A	982	ALA	SER	conflict	UNP P0DTC2
A	1118	HIS	ASP	conflict	UNP P0DTC2
A	1274	SER	-	expression tag	UNP P0DTC2
A	1275	GLY	-	expression tag	UNP P0DTC2
A	1276	GLY	-	expression tag	UNP P0DTC2
A	1277	GLY	-	expression tag	UNP P0DTC2
A	1278	SER	-	expression tag	UNP P0DTC2
A	1279	ALA	-	expression tag	UNP P0DTC2
A	1280	TRP	-	expression tag	UNP P0DTC2
A	1281	SER	-	expression tag	UNP P0DTC2
A	1282	HIS	-	expression tag	UNP P0DTC2
A	1283	PRO	-	expression tag	UNP P0DTC2
A	1284	GLN	-	expression tag	UNP P0DTC2
A	1285	PHE	-	expression tag	UNP P0DTC2
A	1286	GLU	-	expression tag	UNP P0DTC2
A	1287	LYS	-	expression tag	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
A	1288	GLY	-	expression tag	UNP P0DTC2
A	1289	GLY	-	expression tag	UNP P0DTC2
A	1290	GLY	-	expression tag	UNP P0DTC2
A	1291	SER	-	expression tag	UNP P0DTC2
A	1292	GLY	-	expression tag	UNP P0DTC2
A	1293	GLY	-	expression tag	UNP P0DTC2
A	1294	GLY	-	expression tag	UNP P0DTC2
A	1295	SER	-	expression tag	UNP P0DTC2
A	1296	GLY	-	expression tag	UNP P0DTC2
A	1297	GLY	-	expression tag	UNP P0DTC2
A	1298	SER	-	expression tag	UNP P0DTC2
A	1299	SER	-	expression tag	UNP P0DTC2
A	1300	ALA	-	expression tag	UNP P0DTC2
A	1301	TRP	-	expression tag	UNP P0DTC2
A	1302	SER	-	expression tag	UNP P0DTC2
A	1303	HIS	-	expression tag	UNP P0DTC2
A	1304	PRO	-	expression tag	UNP P0DTC2
A	1305	GLN	-	expression tag	UNP P0DTC2
A	1306	PHE	-	expression tag	UNP P0DTC2
A	1307	GLU	-	expression tag	UNP P0DTC2
A	1308	LYS	-	expression tag	UNP P0DTC2
B	?	-	HIS	deletion	UNP P0DTC2
B	?	-	VAL	deletion	UNP P0DTC2
B	?	-	TYR	deletion	UNP P0DTC2
B	501	TYR	ASN	conflict	UNP P0DTC2
B	570	ASP	ALA	conflict	UNP P0DTC2
B	614	GLY	ASP	conflict	UNP P0DTC2
B	681	HIS	PRO	conflict	UNP P0DTC2
B	716	ILE	THR	conflict	UNP P0DTC2
B	982	ALA	SER	conflict	UNP P0DTC2
B	1118	HIS	ASP	conflict	UNP P0DTC2
B	1274	SER	-	expression tag	UNP P0DTC2
B	1275	GLY	-	expression tag	UNP P0DTC2
B	1276	GLY	-	expression tag	UNP P0DTC2
B	1277	GLY	-	expression tag	UNP P0DTC2
B	1278	SER	-	expression tag	UNP P0DTC2
B	1279	ALA	-	expression tag	UNP P0DTC2
B	1280	TRP	-	expression tag	UNP P0DTC2
B	1281	SER	-	expression tag	UNP P0DTC2
B	1282	HIS	-	expression tag	UNP P0DTC2
B	1283	PRO	-	expression tag	UNP P0DTC2
B	1284	GLN	-	expression tag	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
B	1285	PHE	-	expression tag	UNP P0DTC2
B	1286	GLU	-	expression tag	UNP P0DTC2
B	1287	LYS	-	expression tag	UNP P0DTC2
B	1288	GLY	-	expression tag	UNP P0DTC2
B	1289	GLY	-	expression tag	UNP P0DTC2
B	1290	GLY	-	expression tag	UNP P0DTC2
B	1291	SER	-	expression tag	UNP P0DTC2
B	1292	GLY	-	expression tag	UNP P0DTC2
B	1293	GLY	-	expression tag	UNP P0DTC2
B	1294	GLY	-	expression tag	UNP P0DTC2
B	1295	SER	-	expression tag	UNP P0DTC2
B	1296	GLY	-	expression tag	UNP P0DTC2
B	1297	GLY	-	expression tag	UNP P0DTC2
B	1298	SER	-	expression tag	UNP P0DTC2
B	1299	SER	-	expression tag	UNP P0DTC2
B	1300	ALA	-	expression tag	UNP P0DTC2
B	1301	TRP	-	expression tag	UNP P0DTC2
B	1302	SER	-	expression tag	UNP P0DTC2
B	1303	HIS	-	expression tag	UNP P0DTC2
B	1304	PRO	-	expression tag	UNP P0DTC2
B	1305	GLN	-	expression tag	UNP P0DTC2
B	1306	PHE	-	expression tag	UNP P0DTC2
B	1307	GLU	-	expression tag	UNP P0DTC2
B	1308	LYS	-	expression tag	UNP P0DTC2
C	?	-	HIS	deletion	UNP P0DTC2
C	?	-	VAL	deletion	UNP P0DTC2
C	?	-	TYR	deletion	UNP P0DTC2
C	501	TYR	ASN	conflict	UNP P0DTC2
C	570	ASP	ALA	conflict	UNP P0DTC2
C	614	GLY	ASP	conflict	UNP P0DTC2
C	681	HIS	PRO	conflict	UNP P0DTC2
C	716	ILE	THR	conflict	UNP P0DTC2
C	982	ALA	SER	conflict	UNP P0DTC2
C	1118	HIS	ASP	conflict	UNP P0DTC2
C	1274	SER	-	expression tag	UNP P0DTC2
C	1275	GLY	-	expression tag	UNP P0DTC2
C	1276	GLY	-	expression tag	UNP P0DTC2
C	1277	GLY	-	expression tag	UNP P0DTC2
C	1278	SER	-	expression tag	UNP P0DTC2
C	1279	ALA	-	expression tag	UNP P0DTC2
C	1280	TRP	-	expression tag	UNP P0DTC2
C	1281	SER	-	expression tag	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
C	1282	HIS	-	expression tag	UNP P0DTC2
C	1283	PRO	-	expression tag	UNP P0DTC2
C	1284	GLN	-	expression tag	UNP P0DTC2
C	1285	PHE	-	expression tag	UNP P0DTC2
C	1286	GLU	-	expression tag	UNP P0DTC2
C	1287	LYS	-	expression tag	UNP P0DTC2
C	1288	GLY	-	expression tag	UNP P0DTC2
C	1289	GLY	-	expression tag	UNP P0DTC2
C	1290	GLY	-	expression tag	UNP P0DTC2
C	1291	SER	-	expression tag	UNP P0DTC2
C	1292	GLY	-	expression tag	UNP P0DTC2
C	1293	GLY	-	expression tag	UNP P0DTC2
C	1294	GLY	-	expression tag	UNP P0DTC2
C	1295	SER	-	expression tag	UNP P0DTC2
C	1296	GLY	-	expression tag	UNP P0DTC2
C	1297	GLY	-	expression tag	UNP P0DTC2
C	1298	SER	-	expression tag	UNP P0DTC2
C	1299	SER	-	expression tag	UNP P0DTC2
C	1300	ALA	-	expression tag	UNP P0DTC2
C	1301	TRP	-	expression tag	UNP P0DTC2
C	1302	SER	-	expression tag	UNP P0DTC2
C	1303	HIS	-	expression tag	UNP P0DTC2
C	1304	PRO	-	expression tag	UNP P0DTC2
C	1305	GLN	-	expression tag	UNP P0DTC2
C	1306	PHE	-	expression tag	UNP P0DTC2
C	1307	GLU	-	expression tag	UNP P0DTC2
C	1308	LYS	-	expression tag	UNP P0DTC2

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



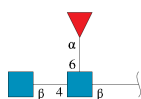
Mol	Chain	Residues	Atoms				AltConf	Trace
2	D	2	Total	C	N	O	0	0
			28	16	2	10		
2	E	2	Total	C	N	O	0	0
			28	16	2	10		
2	F	2	Total	C	N	O	0	0
			28	16	2	10		

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Mol	Chain	Residues	Atoms				AltConf	Trace
2	G	2	Total	C	N	O	0	0
			28	16	2	10		
2	H	2	Total	C	N	O	0	0
			28	16	2	10		
2	L	2	Total	C	N	O	0	0
			28	16	2	10		
2	M	2	Total	C	N	O	0	0
			28	16	2	10		
2	N	2	Total	C	N	O	0	0
			28	16	2	10		
2	O	2	Total	C	N	O	0	0
			28	16	2	10		
2	P	2	Total	C	N	O	0	0
			28	16	2	10		
2	Q	2	Total	C	N	O	0	0
			28	16	2	10		
2	R	2	Total	C	N	O	0	0
			28	16	2	10		
2	V	2	Total	C	N	O	0	0
			28	16	2	10		
2	W	2	Total	C	N	O	0	0
			28	16	2	10		
2	X	2	Total	C	N	O	0	0
			28	16	2	10		
2	Y	2	Total	C	N	O	0	0
			28	16	2	10		
2	Z	2	Total	C	N	O	0	0
			28	16	2	10		
2	a	2	Total	C	N	O	0	0
			28	16	2	10		
2	b	2	Total	C	N	O	0	0
			28	16	2	10		
2	c	2	Total	C	N	O	0	0
			28	16	2	10		

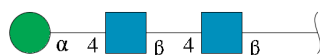
- Molecule 3 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose.





Mol	Chain	Residues	Atoms				AltConf	Trace
3	I	3	Total	C	N	O	0	0
			38	22	2	14		
3	S	3	Total	C	N	O	0	0
			38	22	2	14		
3	d	3	Total	C	N	O	0	0
			38	22	2	14		

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



Mol	Chain	Residues	Atoms				AltConf	Trace
4	J	3	Total	C	N	O	0	0
			39	22	2	15		
4	K	3	Total	C	N	O	0	0
			39	22	2	15		
4	T	3	Total	C	N	O	0	0
			39	22	2	15		
4	U	3	Total	C	N	O	0	0
			39	22	2	15		
4	e	3	Total	C	N	O	0	0
			39	22	2	15		
4	f	3	Total	C	N	O	0	0
			39	22	2	15		

- Molecule 5 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: C<sub>8</sub>H<sub>15</sub>NO<sub>6</sub>) (labeled as "Ligand of Interest" by depositor).



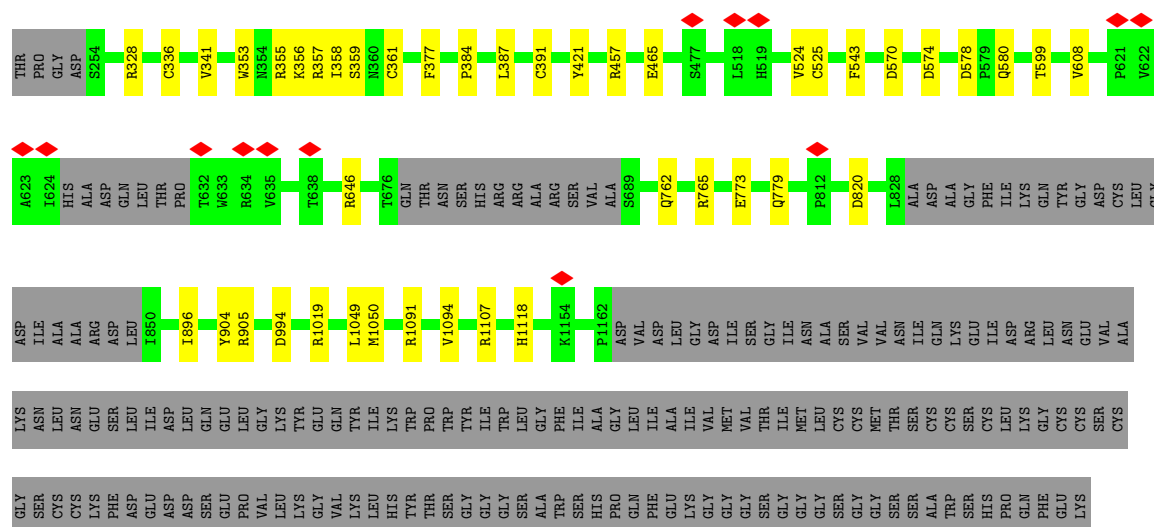
Mol	Chain	Residues	Atoms				AltConf
5	A	1	Total	C	N	O	0
			14	8	1	5	
5	A	1	Total	C	N	O	0
			14	8	1	5	
5	A	1	Total	C	N	O	0
			14	8	1	5	
5	A	1	Total	C	N	O	0
			14	8	1	5	
5	A	1	Total	C	N	O	0
			14	8	1	5	
5	A	1	Total	C	N	O	0
			14	8	1	5	
5	A	1	Total	C	N	O	0
			14	8	1	5	
5	A	1	Total	C	N	O	0
			14	8	1	5	
5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

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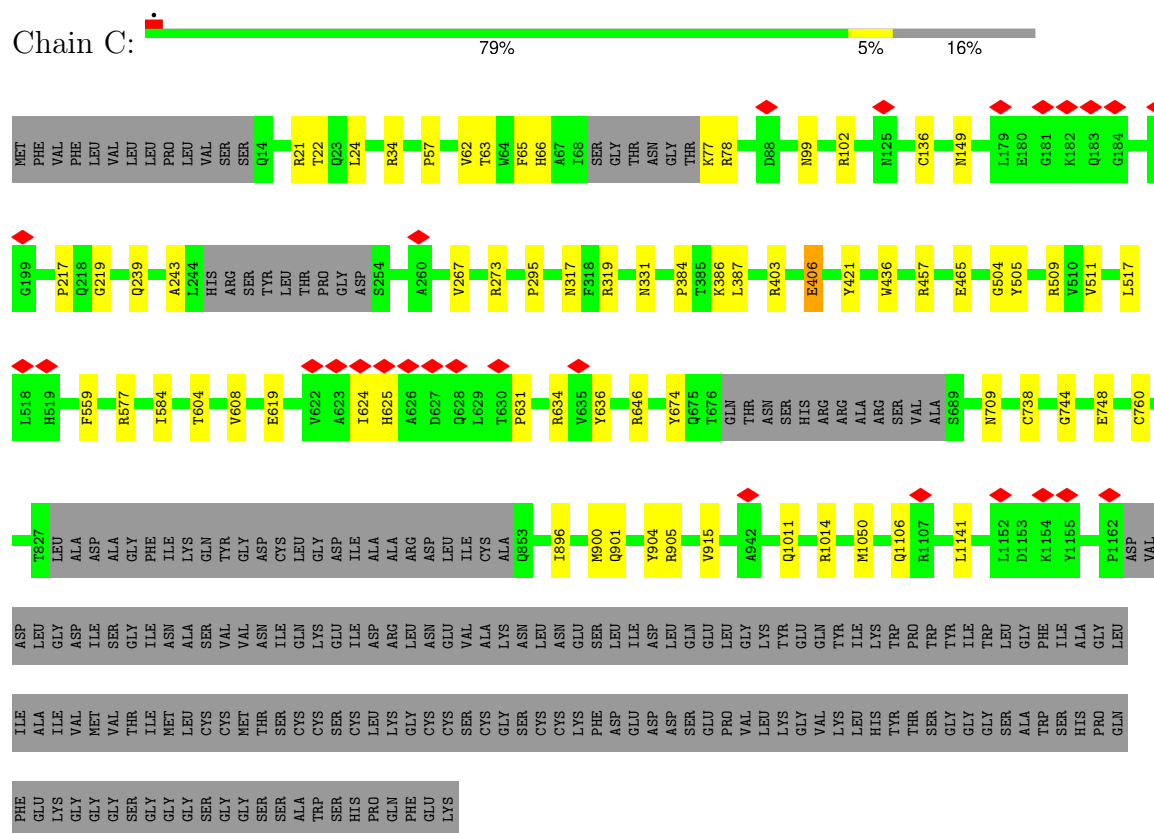
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Mol	Chain	Residues	Atoms				AltConf
5	B	1	Total	C	N	O	0
			14	8	1	5	
5	B	1	Total	C	N	O	0
			14	8	1	5	
5	B	1	Total	C	N	O	0
			14	8	1	5	
5	B	1	Total	C	N	O	0
			14	8	1	5	
5	B	1	Total	C	N	O	0
			14	8	1	5	
5	B	1	Total	C	N	O	0
			14	8	1	5	
5	C	1	Total	C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





- Molecule 1: Spike glycoprotein



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



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

Chain E:  100%

MAG1  
MAG2

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

Chain F:  100%

MAG1  
MAG2

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

Chain G:  100%

MAG1  
MAG2

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

Chain H:  100%

MAG1  
MAG2

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

Chain L:  50% 50%

MAG1  
MAG2

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

Chain M:  100%

MAG1  
MAG2

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

Chain N:  50% 50%



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

Chain O:  100%




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

Chain P:  100%




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

Chain Q:  100%




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

Chain R:  100%




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

Chain V:  100%



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

Chain W:  100%



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

Chain X:  100%

MAG1  
MAG2

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

Chain Y:  100%

MAG1  
MAG2

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

Chain Z:  100%

MAG1  
MAG2

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

Chain a:  50% 50%

MAG1  
MAG2

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

Chain b:  100%

MAG1  
MAG2

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

Chain c:  100%

MAG1  
MAG2

- Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose

Chain I:  100%



MAG1  
MAG2  
FUC3

- Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose

Chain S:  33% 100%

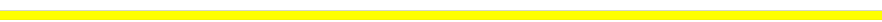
MAG1  
MAG2  
FUC3

- Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose

Chain d:  33% 100%

MAG1  
MAG2  
FUC3

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

Chain J:  100%

MAG1  
MAG2  
MAN3

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

Chain K:  100%

MAG1  
MAG2  
MAN3

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

Chain T:  100%

MAG1  
MAG2  
MAN3

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

Chain U:  100%

MAG1  
MAG2  
MAN3

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

Chain e:

100%

MAG1  
MAG2  
MAN3

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

Chain f:

100%

MAG1  
MAG2  
MAN3

## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	119338	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 ( $e^-/\text{\AA}^2$ )	53.4	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	2.266	Depositor
Minimum map value	-0.001	Depositor
Average map value	0.003	Depositor
Map value standard deviation	0.044	Depositor
Recommended contour level	0.25	Depositor
Map size (Å)	396.03217, 396.03217, 396.03217	wwPDB
Map dimensions	480, 480, 480	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.825067, 0.825067, 0.825067	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: MAN, FUC, 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	0.63	0/8727	0.90	0/11868
1	B	0.62	0/8743	0.90	0/11893
1	C	0.62	0/8773	0.90	0/11937
All	All	0.62	0/26243	0.90	0/35698

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

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

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	8530	0	8317	94	0
1	B	8545	0	8331	56	0
1	C	8572	0	8348	85	0
2	D	28	0	25	0	0
2	E	28	0	25	0	0
2	F	28	0	25	2	0
2	G	28	0	25	0	0
2	H	28	0	25	0	0
2	L	28	0	25	2	0
2	M	28	0	25	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	N	28	0	25	0	0
2	O	28	0	25	0	0
2	P	28	0	25	0	0
2	Q	28	0	25	0	0
2	R	28	0	25	0	0
2	V	28	0	25	0	0
2	W	28	0	25	0	0
2	X	28	0	25	0	0
2	Y	28	0	25	0	0
2	Z	28	0	25	0	0
2	a	28	0	25	0	0
2	b	28	0	25	0	0
2	c	28	0	25	0	0
3	I	38	0	34	0	0
3	S	38	0	34	0	0
3	d	38	0	34	0	0
4	J	39	0	34	0	0
4	K	39	0	34	6	0
4	T	39	0	34	0	0
4	U	39	0	34	0	0
4	e	39	0	34	0	0
4	f	39	0	34	0	0
5	A	154	0	143	7	0
5	B	126	0	117	2	0
5	C	112	0	104	9	0
All	All	26947	0	26166	223	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 4.

All (223) 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:C:709:ASN:HD21	5:C:1407:NAG:C1	1.08	1.58
1:A:234:ASN:ND2	5:A:1405:NAG:C1	1.68	1.55
1:A:1134:ASN:HD21	4:K:1:NAG:C1	0.97	1.54
1:C:331:ASN:ND2	5:C:1403:NAG:C1	1.69	1.51
1:C:709:ASN:ND2	5:C:1407:NAG:C1	1.75	1.48
1:A:1134:ASN:ND2	4:K:1:NAG:C1	1.75	1.40
1:A:124:THR:O	1:A:175:PHE:CE1	1.78	1.37
1:B:149:ASN:HD21	5:B:1402:NAG:C1	1.37	1.35

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:124:THR:O	1:A:175:PHE:CD1	1.78	1.32
1:C:149:ASN:ND2	5:C:1402:NAG:C1	1.92	1.32
1:A:122:ASN:ND2	5:A:1402:NAG:C1	1.99	1.25
1:B:149:ASN:ND2	5:B:1402:NAG:C1	2.15	1.09
1:C:905:ARG:NH1	1:C:1050:MET:HB3	1.68	1.08
1:A:122:ASN:HD21	5:A:1402:NAG:C1	1.63	1.08
1:C:149:ASN:HD21	5:C:1402:NAG:C1	1.61	1.07
1:C:509:ARG:HH21	1:C:511:VAL:HG22	1.21	1.03
1:A:206:LYS:HD2	1:A:222:ALA:O	1.60	1.02
1:C:57:PRO:HB3	1:C:273:ARG:NH2	1.74	1.02
1:A:740:MET:CE	1:C:319:ARG:HH11	1.73	1.00
1:C:900:MET:O	1:C:904:TYR:HD1	1.46	0.99
1:C:149:ASN:HD22	5:C:1402:NAG:C1	1.73	0.98
1:C:421:TYR:CD2	1:C:457:ARG:HB3	2.01	0.95
1:A:1134:ASN:HD21	4:K:1:NAG:C2	1.78	0.94
1:B:328:ARG:HG2	1:B:543:PHE:CE1	2.02	0.94
1:B:905:ARG:NH1	1:B:1050:MET:HB3	1.84	0.92
1:C:509:ARG:HH21	1:C:511:VAL:CG2	1.80	0.92
1:B:361:CYS:SG	1:B:524:VAL:HG23	2.10	0.92
1:A:472:ILE:CG2	1:A:488:CYS:O	2.19	0.91
1:A:153:MET:HG3	5:A:1403:NAG:H62	1.54	0.89
1:A:140:PHE:CZ	1:A:158:ARG:HD2	2.09	0.88
1:B:21:ARG:NH1	1:B:79:PHE:O	2.06	0.87
1:C:403:ARG:HG2	1:C:504:GLY:O	1.74	0.87
1:C:905:ARG:HH12	1:C:1050:MET:CB	1.89	0.86
1:C:900:MET:O	1:C:904:TYR:CD1	2.28	0.86
1:C:905:ARG:HH12	1:C:1050:MET:HB3	1.37	0.85
1:C:509:ARG:NH2	1:C:511:VAL:CG2	2.39	0.85
1:B:341:VAL:HG13	1:B:356:LYS:NZ	1.90	0.84
1:A:472:ILE:HG21	1:A:488:CYS:O	1.78	0.84
1:B:328:ARG:HB2	1:B:543:PHE:CD1	2.13	0.83
1:B:328:ARG:CG	1:B:543:PHE:CE1	2.61	0.83
1:C:295:PRO:HG2	1:C:636:TYR:CE1	2.14	0.83
1:A:234:ASN:HD22	5:A:1405:NAG:C1	1.91	0.82
1:A:191:GLU:CD	1:A:223:LEU:CD2	2.48	0.82
1:B:1091:ARG:NH1	1:B:1118:HIS:O	2.11	0.81
1:A:740:MET:HE1	1:C:319:ARG:HH11	1.43	0.81
1:C:709:ASN:HD21	5:C:1407:NAG:C2	1.93	0.80
1:A:475:ALA:HB3	1:A:489:TYR:HD2	1.46	0.80
1:C:421:TYR:HD2	1:C:457:ARG:HB3	1.43	0.79
1:A:740:MET:CE	1:C:319:ARG:NH1	2.45	0.79

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:1094:VAL:HB	1:C:904:TYR:OH	1.82	0.79
1:C:63:THR:HG21	1:C:65:PHE:CZ	2.18	0.78
1:C:403:ARG:NH2	1:C:406:GLU:OE1	2.16	0.78
1:B:773:GLU:OE2	1:B:1019:ARG:NH1	2.15	0.78
1:B:140:PHE:CZ	1:B:158:ARG:HD2	2.18	0.78
1:C:331:ASN:ND2	5:C:1403:NAG:C2	2.47	0.77
1:B:391:CYS:HA	1:B:525:CYS:HB3	1.67	0.76
1:C:509:ARG:NH2	1:C:511:VAL:HG22	2.00	0.75
1:A:122:ASN:HD22	5:A:1402:NAG:C1	1.94	0.74
1:C:905:ARG:NH1	1:C:1050:MET:CB	2.47	0.74
1:B:328:ARG:CG	1:B:543:PHE:CD1	2.71	0.74
1:A:140:PHE:CE1	1:A:158:ARG:HD2	2.22	0.73
1:A:475:ALA:HB3	1:A:489:TYR:CD2	2.23	0.73
1:B:328:ARG:NH2	1:B:580:GLN:HB2	2.04	0.73
1:A:1134:ASN:CG	4:K:1:NAG:C1	2.57	0.73
1:A:191:GLU:HG3	1:A:223:LEU:HD22	1.71	0.72
1:C:63:THR:CG2	1:C:65:PHE:CZ	2.74	0.71
1:B:341:VAL:HG13	1:B:356:LYS:HZ3	1.53	0.71
1:B:21:ARG:HD3	1:B:79:PHE:HB3	1.73	0.71
1:C:57:PRO:HB3	1:C:273:ARG:CZ	2.22	0.70
1:A:191:GLU:CD	1:A:223:LEU:HD21	2.12	0.70
1:B:16:VAL:HG21	1:B:158:ARG:NH1	2.07	0.70
1:A:472:ILE:HG22	1:A:488:CYS:O	1.90	0.69
1:C:421:TYR:HD2	1:C:457:ARG:CB	2.06	0.69
1:C:577:ARG:CZ	1:C:584:ILE:HD11	2.22	0.69
1:B:905:ARG:NH1	1:B:1050:MET:CB	2.55	0.69
1:B:341:VAL:CG1	1:B:356:LYS:NZ	2.57	0.67
1:C:63:THR:HB	1:C:267:VAL:HG12	1.76	0.67
1:B:896:ILE:CD1	1:B:904:TYR:CE2	2.77	0.66
1:A:16:VAL:HG12	1:A:158:ARG:HD3	1.75	0.66
1:A:740:MET:HE1	1:C:319:ARG:NH1	2.10	0.66
1:C:102:ARG:HE	1:C:243:ALA:HB2	1.60	0.66
1:B:328:ARG:CB	1:B:543:PHE:CD1	2.79	0.65
1:A:140:PHE:CZ	1:A:158:ARG:NH1	2.66	0.64
1:B:905:ARG:HH12	1:B:1050:MET:CB	2.11	0.64
1:C:896:ILE:HD11	1:C:904:TYR:CE1	2.32	0.64
1:B:328:ARG:HG2	1:B:543:PHE:CD1	2.33	0.63
1:A:124:THR:O	1:A:175:PHE:CG	2.50	0.63
1:A:983:ARG:CZ	1:C:517:LEU:HD13	2.28	0.63
1:C:608:VAL:HG23	1:C:636:TYR:OH	1.99	0.63
1:B:361:CYS:SG	1:B:524:VAL:CG2	2.84	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:487:ASN:HA	1:A:489:TYR:CE2	2.33	0.63
1:C:436:TRP:CZ3	1:C:509:ARG:HG3	2.34	0.62
1:C:1011:GLN:OE1	1:C:1014:ARG:NH1	2.32	0.62
1:A:984:LEU:O	1:C:386:LYS:HE3	1.98	0.62
1:B:1107:ARG:HH11	1:C:904:TYR:HD2	1.46	0.62
1:B:341:VAL:HG11	1:B:356:LYS:HE2	1.81	0.62
2:L:1:NAG:O4	2:L:2:NAG:O7	2.18	0.62
2:L:1:NAG:H62	2:L:2:NAG:C7	2.30	0.61
1:C:421:TYR:HD2	1:C:457:ARG:CG	2.13	0.61
1:A:206:LYS:CD	1:A:222:ALA:O	2.42	0.61
1:B:353:TRP:CZ3	1:B:355:ARG:NH2	2.69	0.61
1:B:353:TRP:CH2	1:B:355:ARG:NH2	2.69	0.61
1:A:740:MET:HE2	1:C:319:ARG:NH1	2.15	0.60
1:A:971:GLY:HA3	1:A:995:ARG:HH21	1.66	0.60
1:B:896:ILE:HD11	1:B:904:TYR:CE2	2.36	0.60
1:A:475:ALA:CB	1:A:489:TYR:HD2	2.12	0.60
1:A:1093:GLY:HA2	1:A:1107:ARG:HG3	1.84	0.60
1:C:295:PRO:HG2	1:C:636:TYR:HE1	1.67	0.59
1:A:124:THR:O	1:A:175:PHE:CZ	2.50	0.59
1:A:124:THR:C	1:A:175:PHE:CE1	2.71	0.59
1:B:896:ILE:CD1	1:B:904:TYR:HE2	2.14	0.59
1:A:191:GLU:OE1	1:A:206:LYS:HB3	2.03	0.58
1:A:421:TYR:CD1	1:A:457:ARG:HB3	2.38	0.58
1:C:403:ARG:CG	1:C:504:GLY:O	2.51	0.58
1:C:436:TRP:CZ2	1:C:509:ARG:HG2	2.39	0.58
1:A:153:MET:HG3	5:A:1403:NAG:C6	2.31	0.58
1:A:567:ARG:HH11	1:B:42:VAL:HG21	1.68	0.58
1:A:567:ARG:NH1	1:B:42:VAL:HG21	2.17	0.58
1:B:353:TRP:HZ3	1:B:355:ARG:NE	2.02	0.57
1:A:475:ALA:CB	1:A:489:TYR:CD2	2.86	0.57
1:A:125:ASN:HA	1:A:175:PHE:CZ	2.39	0.57
1:B:328:ARG:HH21	1:B:580:GLN:HB2	1.69	0.57
1:B:328:ARG:HG3	1:B:543:PHE:CE1	2.40	0.57
1:B:341:VAL:CG1	1:B:356:LYS:HE2	2.35	0.56
1:C:634:ARG:HG2	1:C:634:ARG:O	2.05	0.56
1:A:125:ASN:HB3	1:A:174:PRO:HA	1.88	0.56
1:A:206:LYS:NZ	1:A:221:SER:HB2	2.21	0.56
1:B:341:VAL:CG1	1:B:356:LYS:CE	2.84	0.55
1:C:421:TYR:CD2	1:C:457:ARG:CB	2.81	0.55
1:B:328:ARG:NE	1:B:578:ASP:OD1	2.40	0.54
1:C:624:ILE:HD12	1:C:634:ARG:NH2	2.21	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:472:ILE:HG22	1:A:489:TYR:O	2.07	0.54
1:A:644:GLN:HG2	2:F:1:NAG:H82	1.90	0.53
1:C:57:PRO:CB	1:C:273:ARG:NH2	2.62	0.53
1:C:63:THR:HB	1:C:267:VAL:CG1	2.39	0.53
1:C:295:PRO:CG	1:C:636:TYR:HE1	2.22	0.53
1:C:465:GLU:HA	1:C:465:GLU:OE1	2.09	0.53
1:A:991:VAL:O	1:A:995:ARG:HG3	2.09	0.53
1:A:403:ARG:HE	1:A:505:TYR:HA	1.73	0.53
1:B:905:ARG:HD2	1:B:1049:LEU:O	2.09	0.53
1:C:295:PRO:CG	1:C:636:TYR:CE1	2.91	0.53
1:C:915:VAL:CG2	1:C:1106:GLN:HE22	2.22	0.53
1:A:191:GLU:OE1	1:A:223:LEU:HD23	2.09	0.52
1:C:62:VAL:HG23	1:C:62:VAL:O	2.09	0.52
1:B:328:ARG:HG2	1:B:543:PHE:HE1	1.71	0.52
1:A:156:GLU:CD	1:A:158:ARG:HH12	2.12	0.52
1:A:971:GLY:HA3	1:A:995:ARG:NH2	2.25	0.52
1:C:102:ARG:NE	1:C:243:ALA:HB2	2.23	0.51
1:A:454:ARG:CZ	1:A:457:ARG:HD2	2.41	0.51
1:A:21:ARG:HG2	1:A:21:ARG:HH11	1.76	0.50
1:B:341:VAL:HG13	1:B:356:LYS:HZ1	1.72	0.50
1:A:191:GLU:CG	1:A:223:LEU:HD22	2.40	0.50
1:C:1014:ARG:NH1	1:C:1014:ARG:HB2	2.27	0.50
1:A:850:ILE:HG13	1:C:646:ARG:HD3	1.93	0.49
1:B:762:GLN:HA	1:B:765:ARG:NH1	2.26	0.49
1:B:353:TRP:CZ3	1:B:355:ARG:CZ	2.95	0.49
1:C:436:TRP:CH2	1:C:509:ARG:HG2	2.48	0.49
1:C:436:TRP:CH2	1:C:509:ARG:CG	2.96	0.49
1:A:1014:ARG:HB2	1:A:1014:ARG:NH1	2.28	0.49
1:A:125:ASN:HB2	1:A:172:SER:OG	2.13	0.49
1:A:21:ARG:HD2	1:A:21:ARG:O	2.13	0.48
1:A:191:GLU:CG	1:A:223:LEU:CD2	2.90	0.48
1:B:16:VAL:HG21	1:B:158:ARG:CZ	2.43	0.48
1:A:205:SER:OG	1:A:226:LEU:HB2	2.13	0.48
1:A:983:ARG:CZ	1:C:517:LEU:CD1	2.91	0.48
1:C:149:ASN:ND2	5:C:1402:NAG:O5	2.44	0.48
1:C:63:THR:HG22	1:C:65:PHE:CZ	2.47	0.48
1:B:773:GLU:CD	1:B:1019:ARG:HH11	2.16	0.48
1:A:1141:LEU:HD13	1:C:1141:LEU:HD11	1.96	0.47
1:C:384:PRO:HA	1:C:387:LEU:HD23	1.96	0.47
1:A:99:ASN:OD1	1:A:190:ARG:NH1	2.47	0.47
1:C:559:PHE:HB3	1:C:577:ARG:HH21	1.80	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:206:LYS:HZ3	1:A:221:SER:HB2	1.78	0.47
1:A:646:ARG:HB2	1:A:668:ALA:HB1	1.96	0.47
1:A:905:ARG:NH1	1:A:1049:LEU:O	2.42	0.47
1:A:191:GLU:OE1	1:A:223:LEU:CD2	2.62	0.46
1:A:296:LEU:HD21	1:A:300:LYS:HE3	1.97	0.46
1:A:140:PHE:HZ	1:A:158:ARG:NH1	2.09	0.46
1:C:608:VAL:CG2	1:C:636:TYR:OH	2.63	0.46
1:A:451:TYR:O	1:A:495:TYR:N	2.44	0.46
1:A:534:VAL:HG11	1:A:539:VAL:HG11	1.98	0.46
1:C:403:ARG:HD2	1:C:505:TYR:HA	1.98	0.46
1:C:901:GLN:O	1:C:905:ARG:HG2	2.16	0.45
1:A:646:ARG:HB2	1:A:668:ALA:CB	2.45	0.45
1:B:524:VAL:O	1:B:524:VAL:HG13	2.17	0.45
1:A:1134:ASN:ND2	4:K:1:NAG:C2	2.56	0.45
1:A:837:TYR:CZ	1:A:959:LEU:CB	3.00	0.45
1:B:599:THR:HG22	1:B:608:VAL:HG12	1.99	0.44
1:A:192:PHE:CD2	1:A:205:SER:HB3	2.53	0.44
1:C:34:ARG:HH21	1:C:219:GLY:N	2.16	0.44
1:B:328:ARG:NH2	1:B:580:GLN:CB	2.77	0.43
1:A:191:GLU:HG2	1:A:206:LYS:O	2.18	0.43
1:A:1014:ARG:HB2	1:A:1014:ARG:CZ	2.48	0.43
1:A:644:GLN:CG	2:F:1:NAG:H82	2.47	0.43
1:B:384:PRO:HA	1:B:387:LEU:HD23	1.99	0.43
1:C:21:ARG:NH2	1:C:77:LYS:N	2.66	0.43
1:A:485:GLY:O	1:A:488:CYS:HB2	2.19	0.43
1:A:34:ARG:NH2	1:A:189:LEU:CD2	2.83	0.42
1:C:1014:ARG:HB2	1:C:1014:ARG:CZ	2.50	0.42
1:C:66:HIS:NE2	1:C:78:ARG:NH1	2.68	0.42
1:B:328:ARG:NH2	1:B:580:GLN:CG	2.83	0.42
1:B:83:VAL:HG11	1:B:237:ARG:HD2	2.02	0.42
1:B:83:VAL:CG1	1:B:237:ARG:HD2	2.49	0.41
1:C:625:HIS:HB2	1:C:634:ARG:NE	2.35	0.41
1:A:457:ARG:HG2	1:A:459:SER:O	2.19	0.41
1:C:21:ARG:HH21	1:C:77:LYS:HA	1.85	0.41
1:C:915:VAL:HG21	1:C:1106:GLN:HE22	1.84	0.41
1:A:837:TYR:CZ	1:A:959:LEU:HB2	2.55	0.41
1:A:16:VAL:CG1	1:A:158:ARG:HD3	2.48	0.41
1:A:837:TYR:CZ	1:A:959:LEU:HB3	2.55	0.41
1:A:191:GLU:OE2	1:A:223:LEU:HD21	2.20	0.41
1:A:403:ARG:NH2	1:A:505:TYR:CD1	2.89	0.41
1:B:357:ARG:NH1	1:B:359:SER:OG	2.54	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:66:HIS:CE1	1:C:78:ARG:NH1	2.89	0.41
1:A:970:PHE:O	1:A:995:ARG:NH2	2.52	0.41
1:A:1134:ASN:OD1	4:K:1:NAG:C1	2.69	0.41
1:C:22:THR:HG22	1:C:24:LEU:CD2	2.51	0.41
1:C:34:ARG:NH2	1:C:217:PRO:O	2.54	0.41
1:B:356:LYS:HE3	1:B:358:ILE:HG13	2.03	0.41
1:C:436:TRP:CH2	1:C:509:ARG:HG3	2.56	0.41
1:C:604:THR:HG22	1:C:674:TYR:CE2	2.56	0.41
1:A:374:PHE:CG	1:A:434:ILE:HD11	2.56	0.40
1:C:625:HIS:HB2	1:C:634:ARG:HE	1.85	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

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

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	1077/1305 (82%)	1004 (93%)	68 (6%)	5 (0%)	25	59
1	B	1079/1305 (83%)	1008 (93%)	68 (6%)	3 (0%)	37	68
1	C	1084/1305 (83%)	1008 (93%)	73 (7%)	3 (0%)	37	68
All	All	3240/3915 (83%)	3020 (93%)	209 (6%)	11 (0%)	38	68

All (11) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	164	ASN
1	C	744	GLY
1	A	159	VAL
1	A	316	SER
1	C	99	ASN
1	A	184	GLY
1	B	32	PHE

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Mol	Chain	Res	Type
1	C	631	PRO
1	A	147	LYS
1	A	464	PHE
1	B	198	ASP

### 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	951/1130 (84%)	937 (98%)	14 (2%)	60	79
1	B	954/1130 (84%)	942 (99%)	12 (1%)	65	81
1	C	957/1130 (85%)	949 (99%)	8 (1%)	79	89
All	All	2862/3390 (84%)	2828 (99%)	34 (1%)	66	83

All (34) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	21	ARG
1	A	40	ASP
1	A	53	ASP
1	A	159	VAL
1	A	281	GLU
1	A	294	ASP
1	A	392	PHE
1	A	422	ASN
1	A	427	ASP
1	A	574	ASP
1	A	859	THR
1	A	1072	GLU
1	A	1082	CYS
1	A	1155	TYR
1	B	212	LEU
1	B	336	CYS
1	B	377	PHE
1	B	421	TYR

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Mol	Chain	Res	Type
1	B	457	ARG
1	B	465	GLU
1	B	570	ASP
1	B	574	ASP
1	B	646	ARG
1	B	779	GLN
1	B	820	ASP
1	B	994	ASP
1	C	136	CYS
1	C	239	GLN
1	C	317	ASN
1	C	406	GLU
1	C	619	GLU
1	C	738	CYS
1	C	748	GLU
1	C	760	CYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (7) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	957	GLN
1	A	1134	ASN
1	B	149	ASN
1	C	81	ASN
1	C	149	ASN
1	C	709	ASN
1	C	1108	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 ⓘ

67 monosaccharides are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z  > 2$	Counts	RMSZ	$\# Z  > 2$
2	NAG	D	1	1,2	14,14,15	1.25	2 (14%)	17,19,21	0.83	1 (5%)
2	NAG	D	2	2	14,14,15	1.22	1 (7%)	17,19,21	0.86	1 (5%)
2	NAG	E	1	1,2	14,14,15	1.16	1 (7%)	17,19,21	0.90	0
2	NAG	E	2	2	14,14,15	1.15	1 (7%)	17,19,21	0.77	1 (5%)
2	NAG	F	1	1,2	14,14,15	0.22	0	17,19,21	0.43	0
2	NAG	F	2	2	14,14,15	1.18	1 (7%)	17,19,21	0.91	1 (5%)
2	NAG	G	1	1,2	14,14,15	1.17	1 (7%)	17,19,21	0.63	0
2	NAG	G	2	2	14,14,15	1.25	1 (7%)	17,19,21	0.84	0
2	NAG	H	1	1,2	14,14,15	1.13	1 (7%)	17,19,21	0.79	0
2	NAG	H	2	2	14,14,15	1.25	1 (7%)	17,19,21	0.90	1 (5%)
3	NAG	I	1	1,3	14,14,15	1.27	2 (14%)	17,19,21	1.34	2 (11%)
3	NAG	I	2	3	14,14,15	1.24	2 (14%)	17,19,21	0.80	0
3	FUC	I	3	3	10,10,11	1.64	2 (20%)	14,14,16	1.14	0
4	NAG	J	1	1,4	14,14,15	1.21	1 (7%)	17,19,21	1.20	2 (11%)
4	NAG	J	2	4	14,14,15	1.18	2 (14%)	17,19,21	0.66	1 (5%)
4	MAN	J	3	4	11,11,12	1.55	2 (18%)	15,15,17	0.93	1 (6%)
4	NAG	K	1	4	14,14,15	0.22	0	17,19,21	0.50	0
4	NAG	K	2	4	14,14,15	1.30	2 (14%)	17,19,21	1.21	1 (5%)
4	MAN	K	3	4	11,11,12	1.50	2 (18%)	15,15,17	0.96	1 (6%)
2	NAG	L	1	2	14,14,15	0.22	0	17,19,21	0.42	0
2	NAG	L	2	2	14,14,15	1.06	1 (7%)	17,19,21	0.84	0
2	NAG	M	1	1,2	14,14,15	1.35	2 (14%)	17,19,21	0.87	1 (5%)
2	NAG	M	2	2	14,14,15	1.24	2 (14%)	17,19,21	1.14	2 (11%)
2	NAG	N	1	2	14,14,15	0.19	0	17,19,21	0.45	0
2	NAG	N	2	2	14,14,15	1.07	1 (7%)	17,19,21	0.74	0
2	NAG	O	1	1,2	14,14,15	1.26	2 (14%)	17,19,21	0.69	0
2	NAG	O	2	2	14,14,15	1.32	2 (14%)	17,19,21	0.85	0
2	NAG	P	1	1,2	14,14,15	1.24	1 (7%)	17,19,21	0.97	1 (5%)
2	NAG	P	2	2	14,14,15	1.19	1 (7%)	17,19,21	0.99	1 (5%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	NAG	Q	1	1,2	14,14,15	1.18	2 (14%)	17,19,21	0.77	0
2	NAG	Q	2	2	14,14,15	1.24	2 (14%)	17,19,21	0.64	0
2	NAG	R	1	1,2	14,14,15	1.11	1 (7%)	17,19,21	0.83	0
2	NAG	R	2	2	14,14,15	1.24	1 (7%)	17,19,21	0.67	0
3	NAG	S	1	1,3	14,14,15	1.24	2 (14%)	17,19,21	0.96	2 (11%)
3	NAG	S	2	3	14,14,15	1.23	1 (7%)	17,19,21	0.83	1 (5%)
3	FUC	S	3	3	10,10,11	1.57	2 (20%)	14,14,16	1.03	0
4	NAG	T	1	1,4	14,14,15	1.25	1 (7%)	17,19,21	0.97	1 (5%)
4	NAG	T	2	4	14,14,15	1.32	2 (14%)	17,19,21	0.67	0
4	MAN	T	3	4	11,11,12	1.45	2 (18%)	15,15,17	0.48	0
4	NAG	U	1	1,4	14,14,15	1.33	2 (14%)	17,19,21	0.83	0
4	NAG	U	2	4	14,14,15	1.38	2 (14%)	17,19,21	1.00	2 (11%)
4	MAN	U	3	4	11,11,12	1.54	2 (18%)	15,15,17	1.12	1 (6%)
2	NAG	V	1	1,2	14,14,15	1.25	1 (7%)	17,19,21	0.80	1 (5%)
2	NAG	V	2	2	14,14,15	1.34	2 (14%)	17,19,21	0.98	1 (5%)
2	NAG	W	1	1,2	14,14,15	1.24	2 (14%)	17,19,21	0.78	0
2	NAG	W	2	2	14,14,15	1.21	1 (7%)	17,19,21	1.10	1 (5%)
2	NAG	X	1	1,2	14,14,15	1.36	2 (14%)	17,19,21	1.04	1 (5%)
2	NAG	X	2	2	14,14,15	1.30	1 (7%)	17,19,21	0.82	0
2	NAG	Y	1	1,2	14,14,15	1.30	1 (7%)	17,19,21	0.95	0
2	NAG	Y	2	2	14,14,15	1.27	1 (7%)	17,19,21	1.53	4 (23%)
2	NAG	Z	1	1,2	14,14,15	1.29	1 (7%)	17,19,21	1.41	2 (11%)
2	NAG	Z	2	2	14,14,15	1.29	2 (14%)	17,19,21	0.79	1 (5%)
2	NAG	a	1	2	14,14,15	0.29	0	17,19,21	0.41	0
2	NAG	a	2	2	14,14,15	1.10	1 (7%)	17,19,21	0.78	0
2	NAG	b	1	1,2	14,14,15	1.18	1 (7%)	17,19,21	0.63	0
2	NAG	b	2	2	14,14,15	1.16	1 (7%)	17,19,21	0.80	0
2	NAG	c	1	1,2	14,14,15	1.13	1 (7%)	17,19,21	0.75	0
2	NAG	c	2	2	14,14,15	1.23	1 (7%)	17,19,21	0.84	0
3	NAG	d	1	1,3	14,14,15	1.45	3 (21%)	17,19,21	0.86	1 (5%)
3	NAG	d	2	3	14,14,15	1.18	1 (7%)	17,19,21	0.88	0
3	FUC	d	3	3	10,10,11	1.63	2 (20%)	14,14,16	1.16	2 (14%)
4	NAG	e	1	1,4	14,14,15	1.14	1 (7%)	17,19,21	0.96	0
4	NAG	e	2	4	14,14,15	1.30	2 (14%)	17,19,21	0.67	0
4	MAN	e	3	4	11,11,12	1.57	2 (18%)	15,15,17	0.51	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
4	NAG	f	1	1,4	14,14,15	1.14	1 (7%)	17,19,21	0.70	0
4	NAG	f	2	4	14,14,15	1.33	2 (14%)	17,19,21	0.89	1 (5%)
4	MAN	f	3	4	11,11,12	1.55	2 (18%)	15,15,17	0.82	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

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

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	NAG	R	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	R	2	2	-	0/6/23/26	0/1/1/1
3	NAG	S	1	1,3	-	2/6/23/26	0/1/1/1
3	NAG	S	2	3	-	0/6/23/26	0/1/1/1
3	FUC	S	3	3	-	-	0/1/1/1
4	NAG	T	1	1,4	-	0/6/23/26	0/1/1/1
4	NAG	T	2	4	-	0/6/23/26	0/1/1/1
4	MAN	T	3	4	-	2/2/19/22	0/1/1/1
4	NAG	U	1	1,4	-	0/6/23/26	0/1/1/1
4	NAG	U	2	4	-	0/6/23/26	0/1/1/1
4	MAN	U	3	4	-	0/2/19/22	1/1/1/1
2	NAG	V	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	V	2	2	-	0/6/23/26	0/1/1/1
2	NAG	W	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	W	2	2	-	0/6/23/26	0/1/1/1
2	NAG	X	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	X	2	2	-	0/6/23/26	0/1/1/1
2	NAG	Y	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	Y	2	2	-	1/6/23/26	0/1/1/1
2	NAG	Z	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	Z	2	2	-	1/6/23/26	0/1/1/1
2	NAG	a	1	2	-	2/6/23/26	0/1/1/1
2	NAG	a	2	2	-	0/6/23/26	0/1/1/1
2	NAG	b	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	b	2	2	-	0/6/23/26	0/1/1/1
2	NAG	c	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	c	2	2	-	0/6/23/26	0/1/1/1
3	NAG	d	1	1,3	-	2/6/23/26	0/1/1/1
3	NAG	d	2	3	-	0/6/23/26	0/1/1/1
3	FUC	d	3	3	-	-	0/1/1/1
4	NAG	e	1	1,4	-	1/6/23/26	0/1/1/1
4	NAG	e	2	4	-	0/6/23/26	0/1/1/1
4	MAN	e	3	4	-	1/2/19/22	1/1/1/1
4	NAG	f	1	1,4	-	0/6/23/26	0/1/1/1
4	NAG	f	2	4	-	0/6/23/26	0/1/1/1
4	MAN	f	3	4	-	0/2/19/22	1/1/1/1

All (94) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	F	2	NAG	O5-C5	3.37	1.50	1.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	e	3	MAN	O5-C5	3.31	1.49	1.43
4	U	3	MAN	O5-C5	3.24	1.49	1.43
4	J	3	MAN	O5-C5	3.18	1.49	1.43
4	T	3	MAN	O5-C5	3.14	1.49	1.43
2	Z	1	NAG	O5-C5	3.12	1.49	1.43
2	V	2	NAG	O5-C5	3.11	1.49	1.43
4	U	2	NAG	O5-C5	3.08	1.49	1.43
2	Y	2	NAG	O5-C5	3.05	1.49	1.43
4	f	3	MAN	O5-C5	3.02	1.49	1.43
2	M	1	NAG	O5-C5	3.01	1.49	1.43
3	I	3	FUC	O5-C5	3.00	1.49	1.43
4	K	3	MAN	O5-C5	2.99	1.49	1.43
2	Y	1	NAG	O5-C5	2.98	1.49	1.43
2	H	2	NAG	O5-C5	2.97	1.49	1.43
2	a	2	NAG	O5-C5	2.96	1.49	1.43
4	K	2	NAG	O5-C5	2.94	1.49	1.43
2	O	2	NAG	O5-C5	2.94	1.49	1.43
2	G	2	NAG	O5-C5	2.94	1.49	1.43
3	I	2	NAG	O5-C5	2.92	1.49	1.43
2	Z	2	NAG	O5-C5	2.89	1.49	1.43
4	f	2	NAG	O5-C5	2.88	1.49	1.43
2	R	2	NAG	O5-C5	2.87	1.49	1.43
4	T	2	NAG	O5-C5	2.87	1.49	1.43
2	X	1	NAG	O5-C5	2.84	1.49	1.43
2	c	2	NAG	O5-C5	2.83	1.48	1.43
2	N	2	NAG	O5-C5	2.82	1.48	1.43
2	Q	2	NAG	O5-C5	2.81	1.48	1.43
3	S	2	NAG	O5-C5	2.80	1.48	1.43
4	T	1	NAG	O5-C5	2.80	1.48	1.43
2	W	1	NAG	O5-C5	2.79	1.48	1.43
3	d	3	FUC	O5-C1	2.79	1.48	1.43
2	L	2	NAG	O5-C5	2.77	1.48	1.43
2	X	2	NAG	O5-C5	2.77	1.48	1.43
3	d	3	FUC	O5-C5	2.76	1.49	1.43
4	U	1	NAG	O5-C5	2.71	1.48	1.43
2	M	2	NAG	O5-C5	2.70	1.48	1.43
3	I	3	FUC	O5-C1	2.69	1.48	1.43
3	S	3	FUC	O5-C5	2.68	1.48	1.43
4	e	2	NAG	O5-C5	2.66	1.48	1.43
4	J	1	NAG	O5-C5	2.63	1.48	1.43
4	J	2	NAG	O5-C5	2.63	1.48	1.43
2	P	1	NAG	O5-C5	2.63	1.48	1.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	I	1	NAG	O5-C5	2.63	1.48	1.43
2	D	2	NAG	O5-C5	2.62	1.48	1.43
2	W	2	NAG	O5-C5	2.61	1.48	1.43
3	d	1	NAG	C1-C2	2.61	1.55	1.52
3	d	1	NAG	O5-C5	2.59	1.48	1.43
2	V	1	NAG	O5-C5	2.59	1.48	1.43
4	K	3	MAN	O5-C1	2.55	1.48	1.43
2	P	2	NAG	O5-C5	2.55	1.48	1.43
2	O	1	NAG	O5-C5	2.53	1.48	1.43
2	E	1	NAG	O5-C5	2.52	1.48	1.43
4	K	2	NAG	O4-C4	2.50	1.49	1.43
4	e	3	MAN	O5-C1	2.49	1.47	1.43
4	J	3	MAN	O5-C1	2.49	1.47	1.43
4	f	3	MAN	O5-C1	2.48	1.47	1.43
2	D	1	NAG	O5-C5	2.47	1.48	1.43
4	e	1	NAG	O5-C5	2.47	1.48	1.43
2	b	2	NAG	O5-C5	2.45	1.48	1.43
2	Q	1	NAG	O5-C5	2.42	1.48	1.43
3	d	2	NAG	O5-C5	2.41	1.48	1.43
2	b	1	NAG	O5-C5	2.40	1.48	1.43
2	E	2	NAG	O5-C5	2.40	1.48	1.43
3	S	3	FUC	O5-C1	2.39	1.47	1.43
4	U	3	MAN	O5-C1	2.38	1.47	1.43
3	S	1	NAG	O5-C5	2.37	1.48	1.43
2	H	1	NAG	O5-C5	2.34	1.48	1.43
2	c	1	NAG	O5-C5	2.34	1.48	1.43
2	G	1	NAG	O5-C5	2.34	1.48	1.43
4	f	1	NAG	O5-C5	2.32	1.47	1.43
2	R	1	NAG	O5-C5	2.24	1.47	1.43
4	U	2	NAG	O4-C4	2.23	1.48	1.43
4	e	2	NAG	O4-C4	2.21	1.48	1.43
2	V	2	NAG	O5-C1	2.18	1.47	1.43
3	S	1	NAG	C1-C2	2.18	1.55	1.52
2	M	1	NAG	O4-C4	2.17	1.48	1.43
4	f	2	NAG	O4-C4	2.17	1.48	1.43
2	M	2	NAG	O5-C1	2.15	1.47	1.43
2	O	2	NAG	O5-C1	2.14	1.47	1.43
2	W	1	NAG	O4-C4	2.13	1.48	1.43
3	I	1	NAG	C1-C2	2.13	1.55	1.52
4	T	3	MAN	O5-C1	2.12	1.47	1.43
4	T	2	NAG	O4-C4	2.12	1.48	1.43
2	X	1	NAG	O4-C4	2.11	1.48	1.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	Q	2	NAG	O5-C1	2.10	1.47	1.43
4	J	2	NAG	O4-C4	2.08	1.48	1.43
2	Q	1	NAG	C1-C2	2.08	1.55	1.52
3	d	1	NAG	O4-C4	2.06	1.48	1.43
2	Z	2	NAG	O5-C1	2.06	1.47	1.43
3	I	2	NAG	O5-C1	2.05	1.47	1.43
2	O	1	NAG	O4-C4	2.05	1.48	1.43
4	U	1	NAG	O4-C4	2.05	1.48	1.43
2	D	1	NAG	O4-C4	2.02	1.47	1.43

All (40) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	K	2	NAG	C1-O5-C5	4.19	117.80	112.19
3	I	1	NAG	C1-O5-C5	4.07	117.65	112.19
2	W	2	NAG	C1-O5-C5	3.39	116.73	112.19
2	M	2	NAG	C1-O5-C5	3.37	116.70	112.19
2	Y	2	NAG	C1-O5-C5	3.33	116.65	112.19
2	X	1	NAG	C1-O5-C5	3.29	116.60	112.19
2	Y	2	NAG	C3-C4-C5	3.21	116.06	110.23
2	Z	1	NAG	C3-C4-C5	3.17	115.98	110.23
4	J	1	NAG	C3-C4-C5	3.11	115.87	110.23
4	U	3	MAN	C1-O5-C5	3.07	116.30	112.19
2	V	2	NAG	C1-O5-C5	3.06	116.29	112.19
4	f	2	NAG	C1-O5-C5	2.92	116.09	112.19
2	P	2	NAG	C1-O5-C5	2.87	116.04	112.19
4	J	3	MAN	C1-O5-C5	2.78	115.92	112.19
2	H	2	NAG	C1-O5-C5	2.74	115.86	112.19
2	Y	2	NAG	O5-C1-C2	-2.67	107.16	111.29
2	E	2	NAG	C1-O5-C5	2.53	115.58	112.19
3	I	1	NAG	C4-C3-C2	-2.52	107.32	111.02
3	S	2	NAG	C1-O5-C5	2.51	115.55	112.19
4	U	2	NAG	O5-C1-C2	-2.44	107.52	111.29
3	d	1	NAG	C1-O5-C5	2.44	115.45	112.19
2	P	1	NAG	C1-O5-C5	2.40	115.40	112.19
3	d	3	FUC	C1-O5-C5	2.39	118.61	112.97
2	Z	2	NAG	C1-O5-C5	2.36	115.35	112.19
4	K	3	MAN	C1-O5-C5	2.32	115.29	112.19
2	F	2	NAG	C1-O5-C5	2.32	115.29	112.19
2	Y	2	NAG	O4-C4-C3	-2.30	104.95	110.38
3	S	1	NAG	O5-C5-C6	2.23	112.00	107.66
4	T	1	NAG	O4-C4-C3	-2.20	105.19	110.38

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	2	NAG	C1-O5-C5	2.16	115.08	112.19
3	d	3	FUC	C1-C2-C3	2.16	112.79	109.64
2	V	1	NAG	C1-O5-C5	2.14	115.05	112.19
2	M	1	NAG	O5-C1-C2	-2.08	108.08	111.29
2	D	1	NAG	C3-C4-C5	2.06	113.97	110.23
2	M	2	NAG	O5-C1-C2	-2.05	108.12	111.29
4	J	1	NAG	O4-C4-C3	-2.05	105.55	110.38
4	J	2	NAG	O5-C1-C2	-2.03	108.15	111.29
3	S	1	NAG	C1-O5-C5	2.02	114.90	112.19
4	U	2	NAG	C1-O5-C5	2.02	114.89	112.19
2	Z	1	NAG	O5-C1-C2	-2.01	108.19	111.29

There are no chirality outliers.

All (22) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	S	1	NAG	O5-C5-C6-O6
3	d	1	NAG	O5-C5-C6-O6
4	J	3	MAN	O5-C5-C6-O6
3	S	1	NAG	C4-C5-C6-O6
3	d	1	NAG	C4-C5-C6-O6
2	a	1	NAG	C4-C5-C6-O6
4	K	1	NAG	O5-C5-C6-O6
4	T	3	MAN	O5-C5-C6-O6
2	a	1	NAG	O5-C5-C6-O6
4	K	1	NAG	C4-C5-C6-O6
3	I	1	NAG	O5-C5-C6-O6
4	e	3	MAN	O5-C5-C6-O6
2	Y	2	NAG	O5-C5-C6-O6
4	J	3	MAN	C4-C5-C6-O6
3	I	1	NAG	C4-C5-C6-O6
2	N	1	NAG	C4-C5-C6-O6
2	F	1	NAG	O5-C5-C6-O6
2	L	2	NAG	C1-C2-N2-C7
2	Z	2	NAG	C1-C2-N2-C7
4	e	1	NAG	C1-C2-N2-C7
2	N	1	NAG	O5-C5-C6-O6
4	T	3	MAN	C4-C5-C6-O6

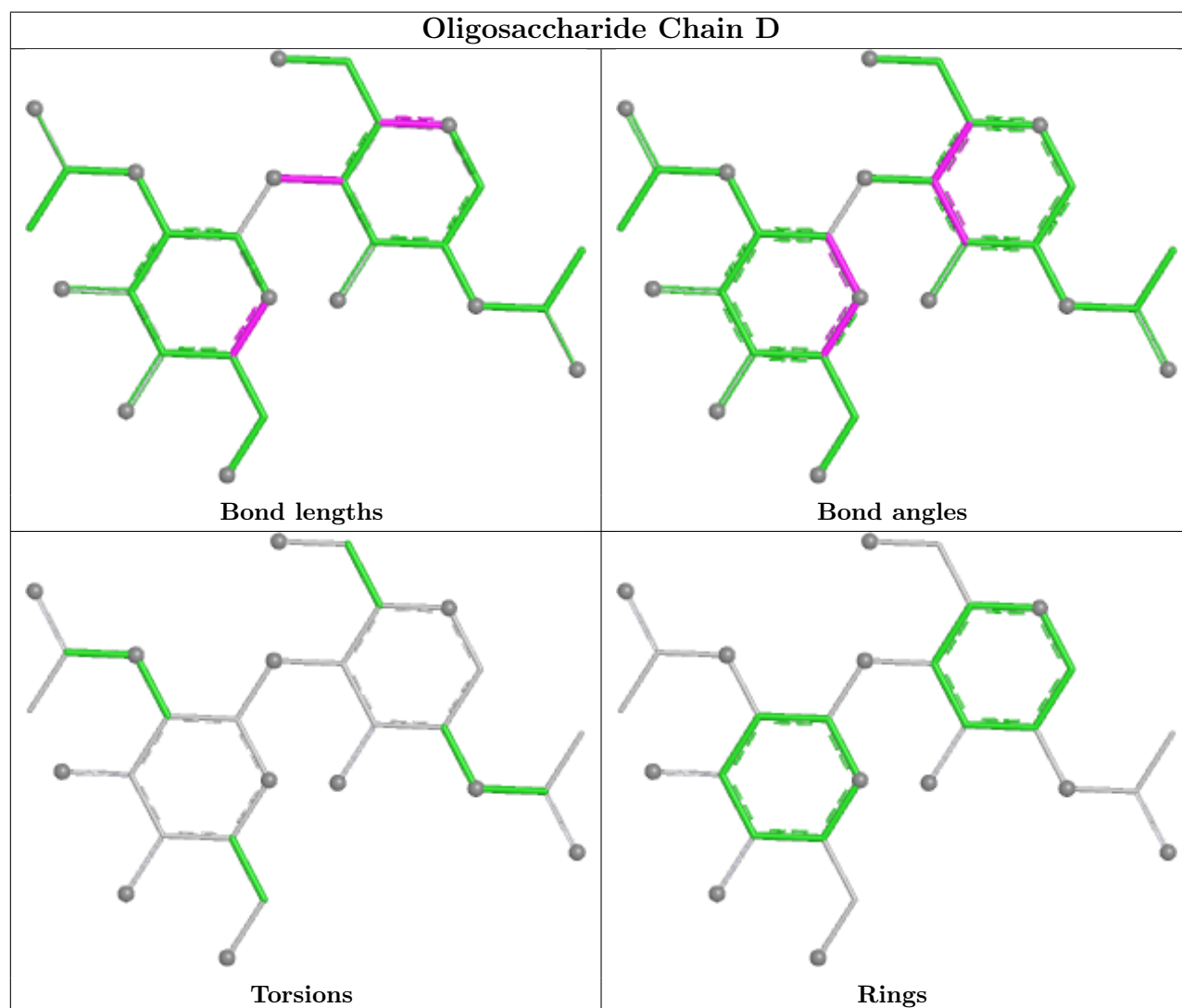
All (5) ring outliers are listed below:

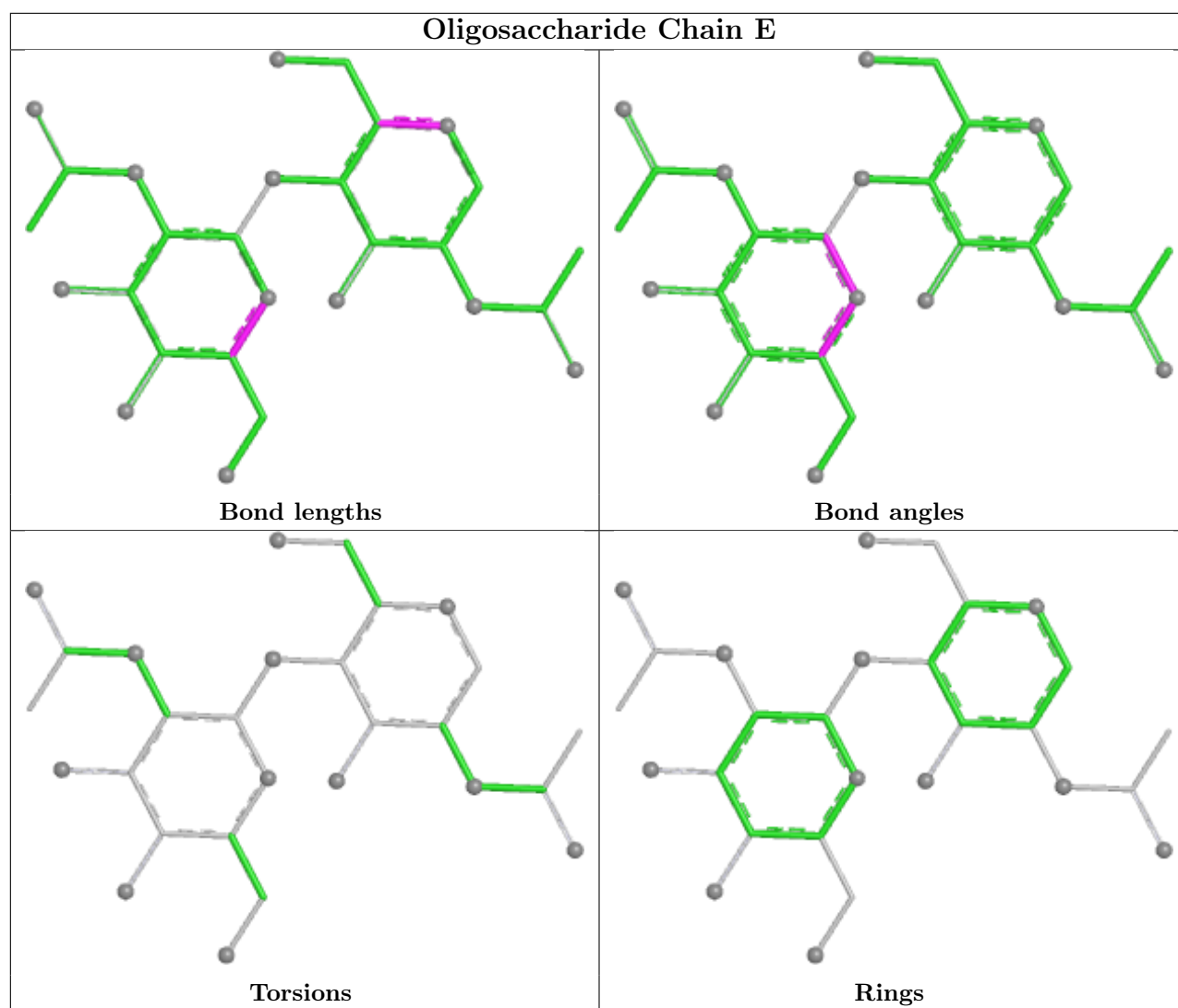
Mol	Chain	Res	Type	Atoms
4	f	3	MAN	C1-C2-C3-C4-C5-O5
4	K	3	MAN	C1-C2-C3-C4-C5-O5
4	J	3	MAN	C1-C2-C3-C4-C5-O5
4	e	3	MAN	C1-C2-C3-C4-C5-O5
4	U	3	MAN	C1-C2-C3-C4-C5-O5

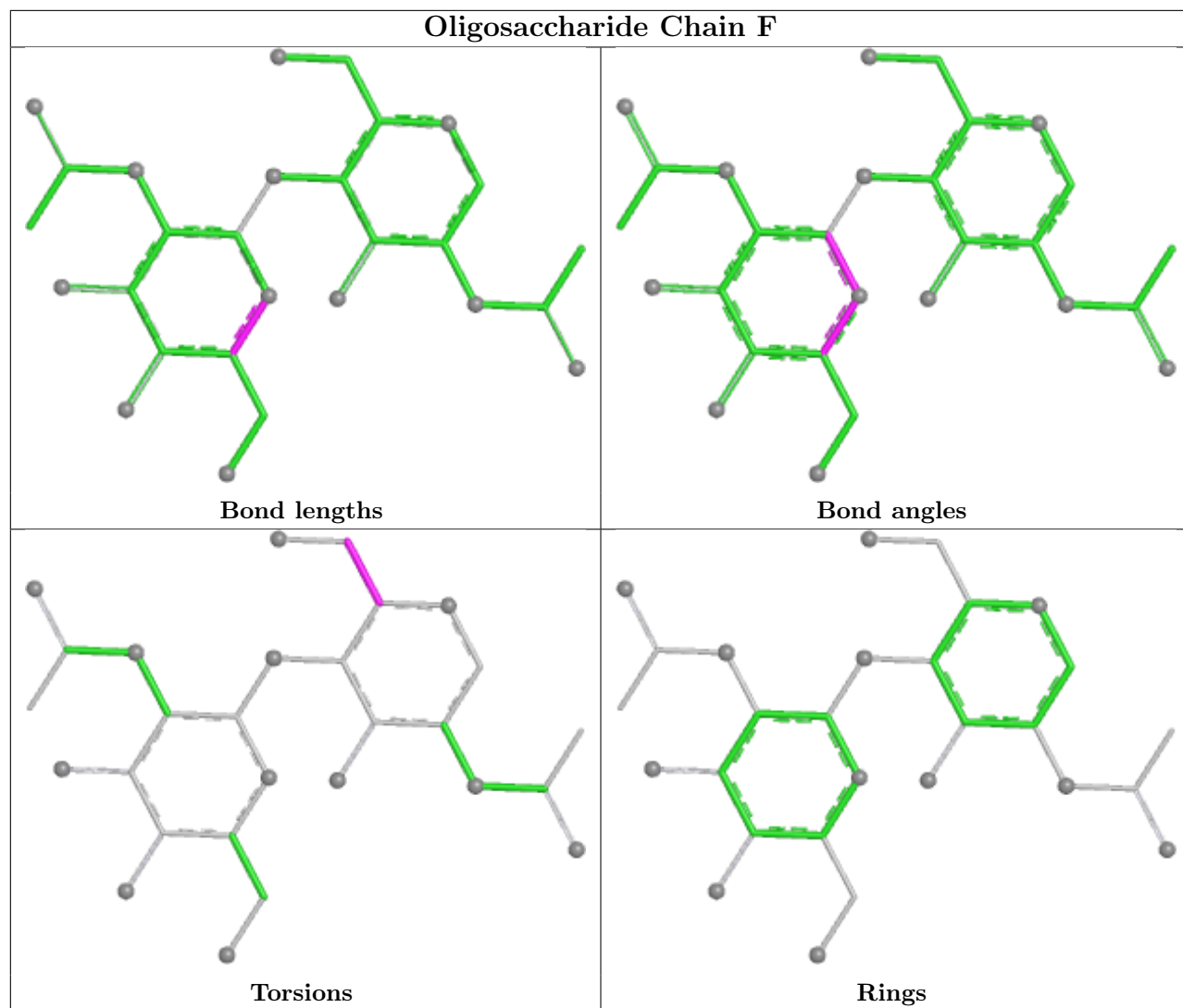
4 monomers are involved in 10 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	L	1	NAG	2	0
4	K	1	NAG	6	0
2	F	1	NAG	2	0
2	L	2	NAG	2	0

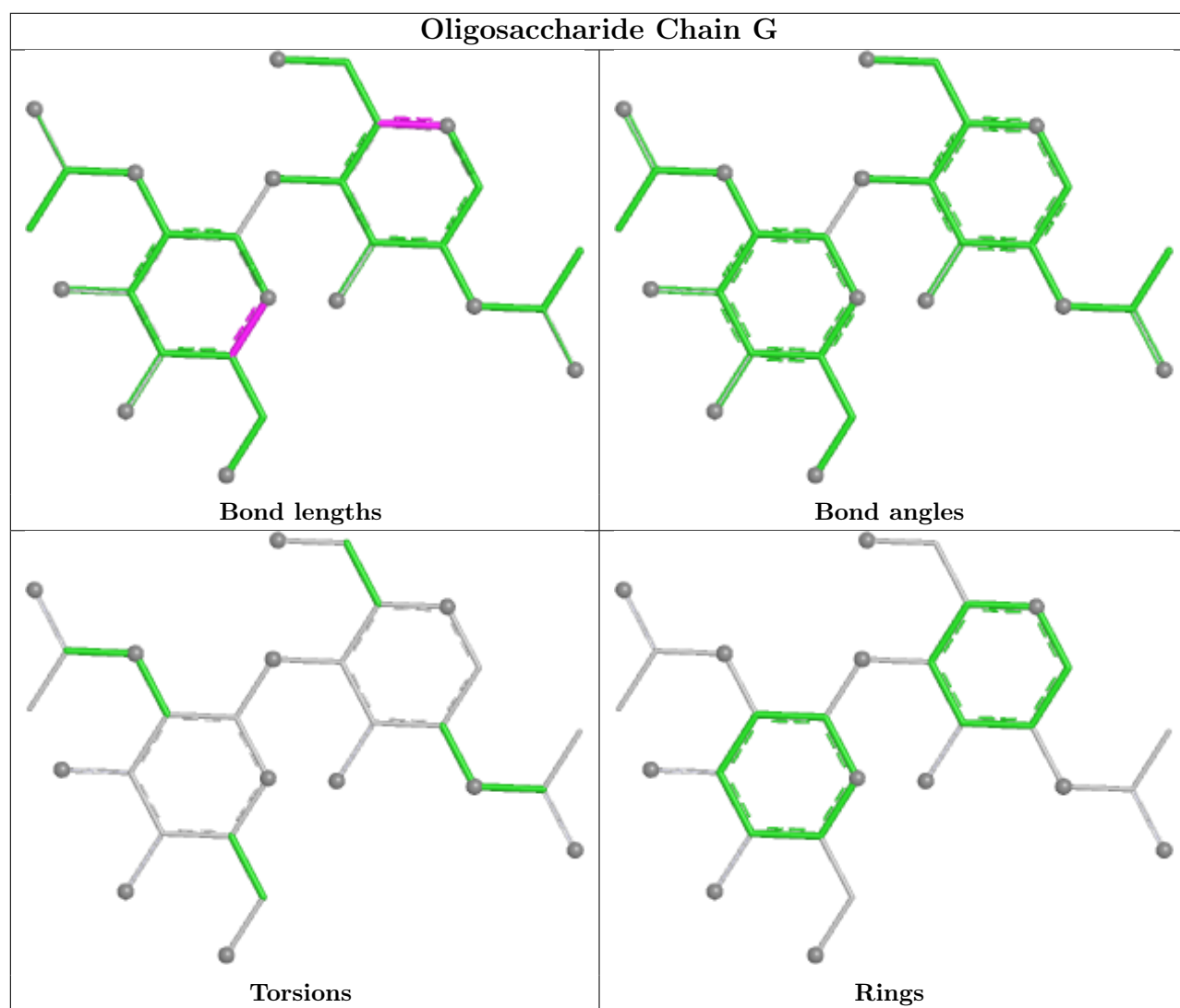
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

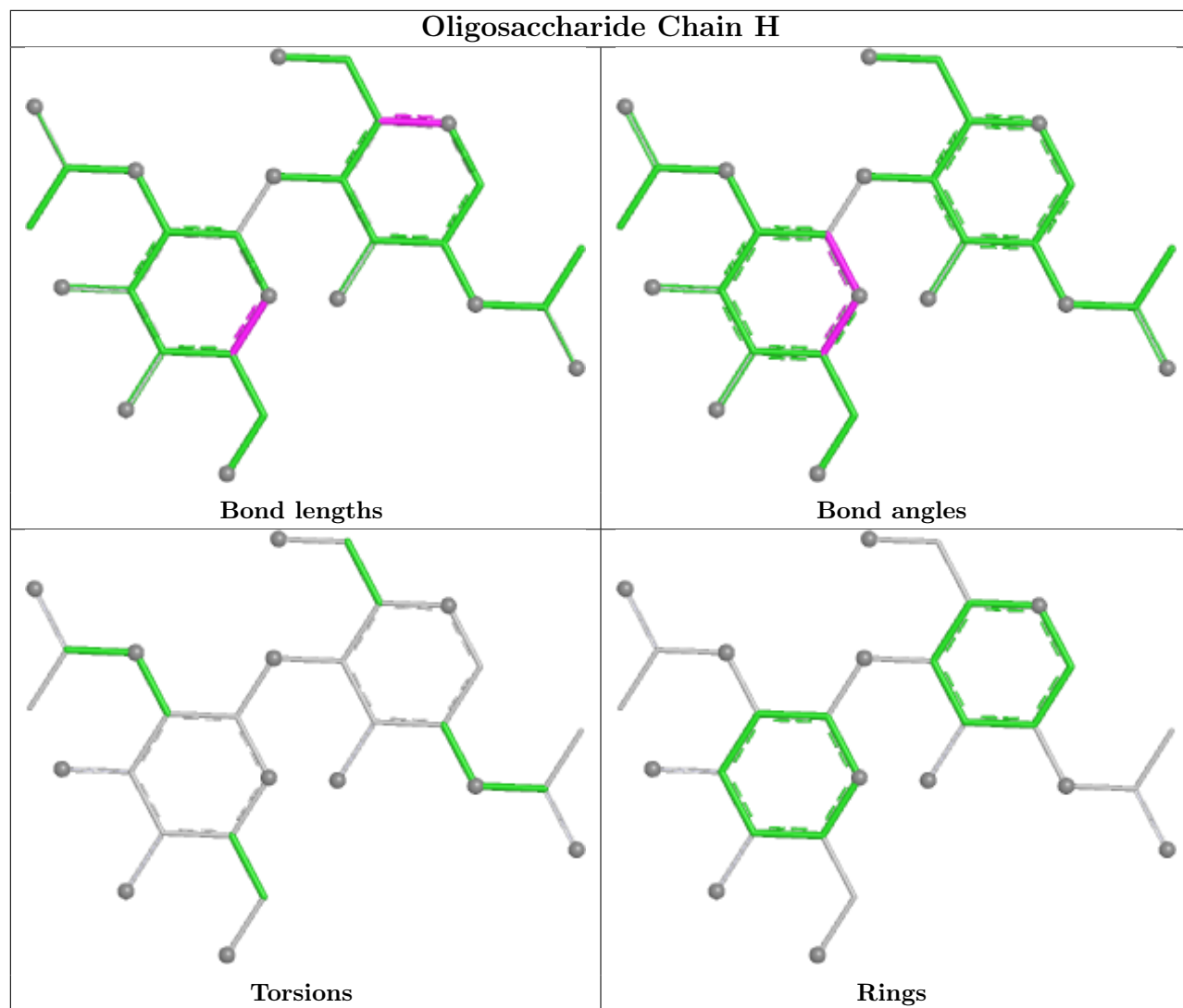


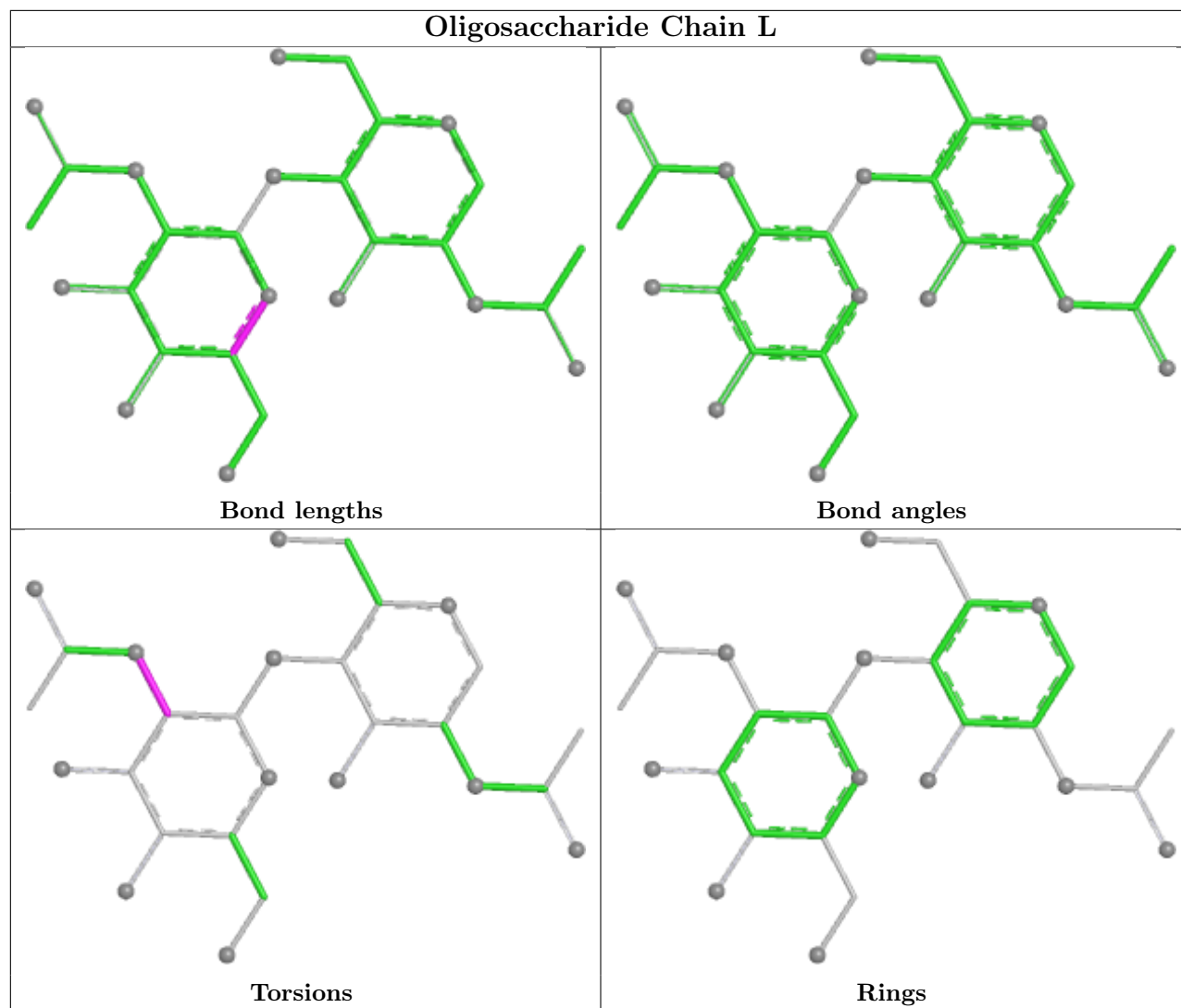


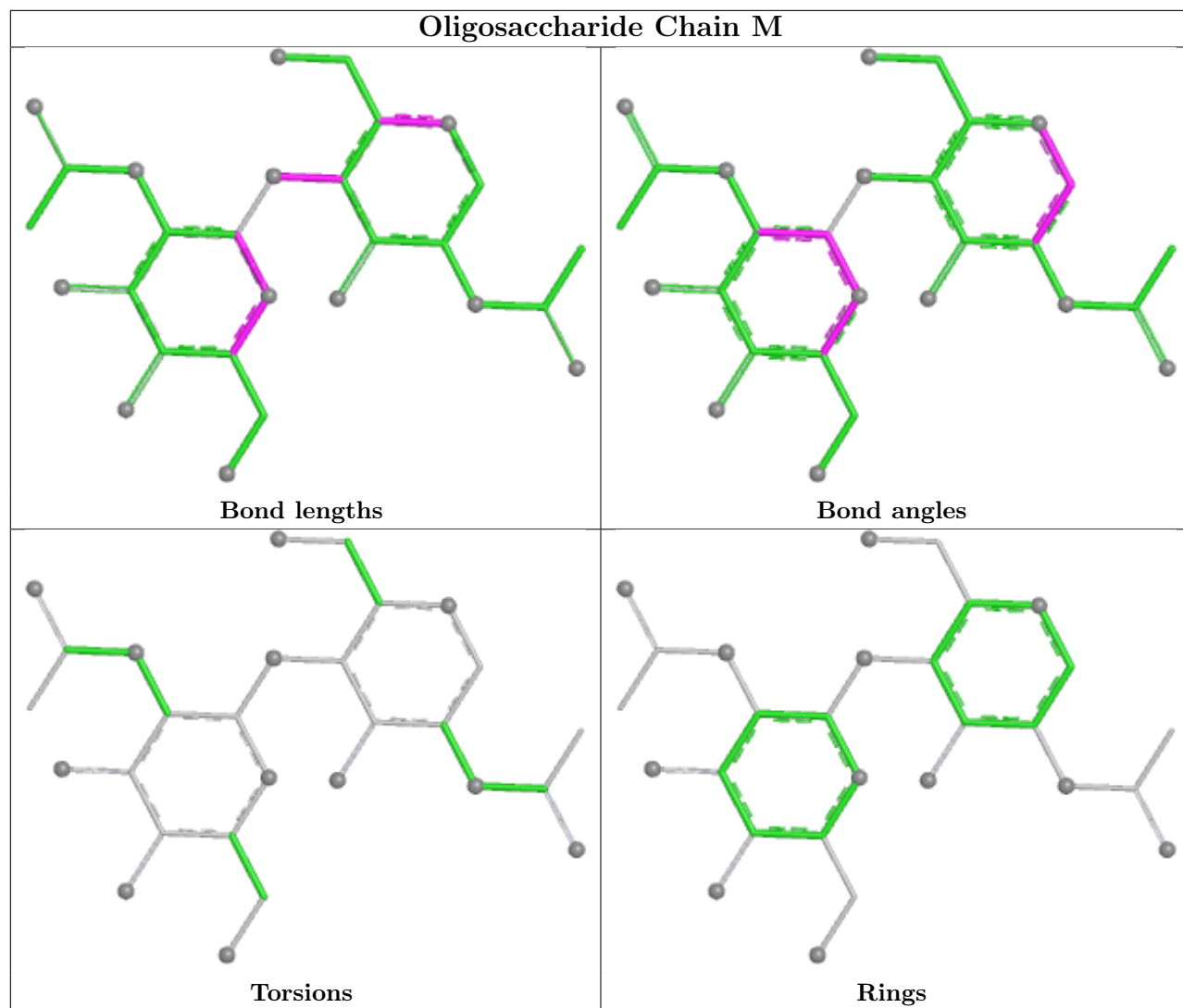


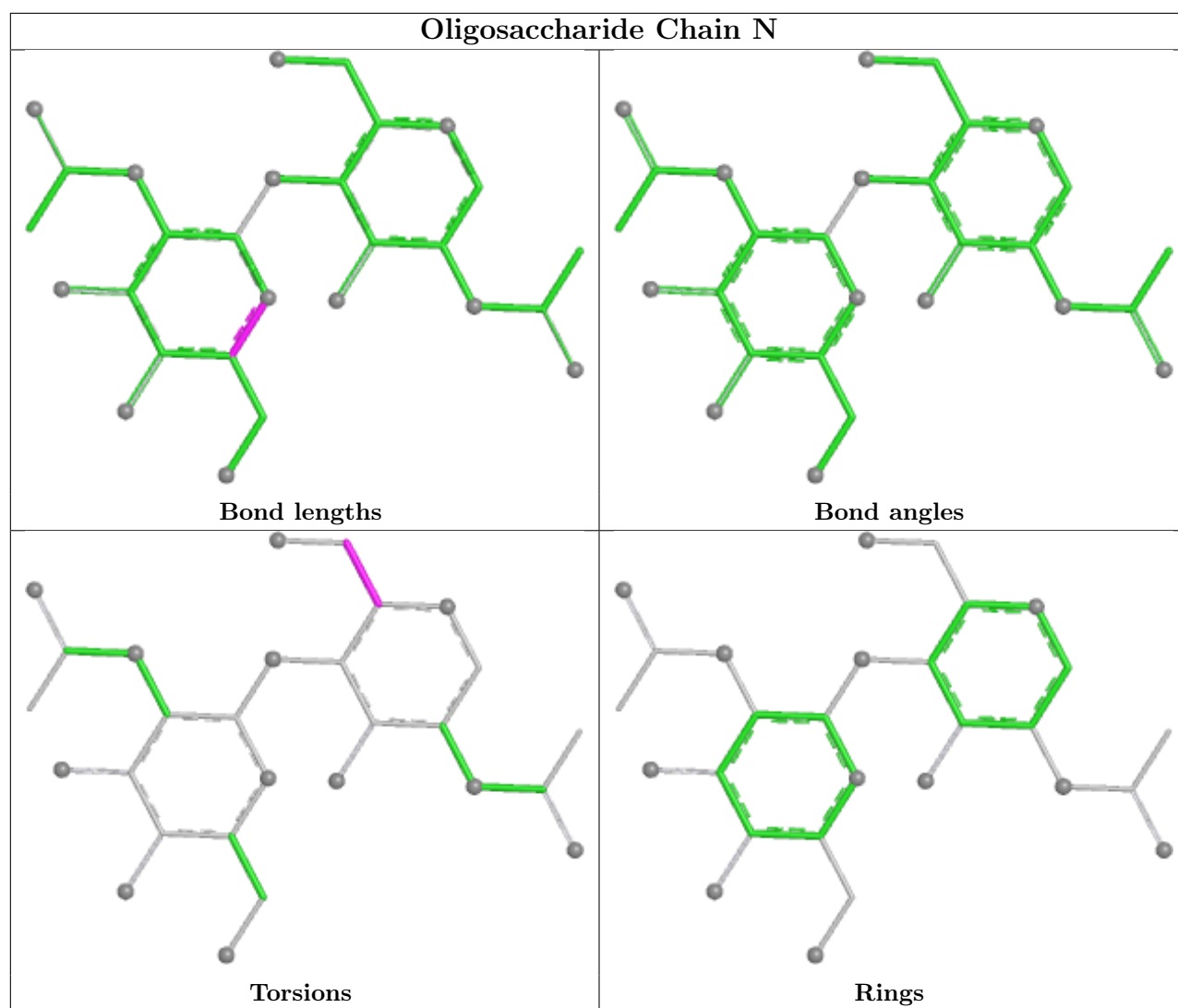


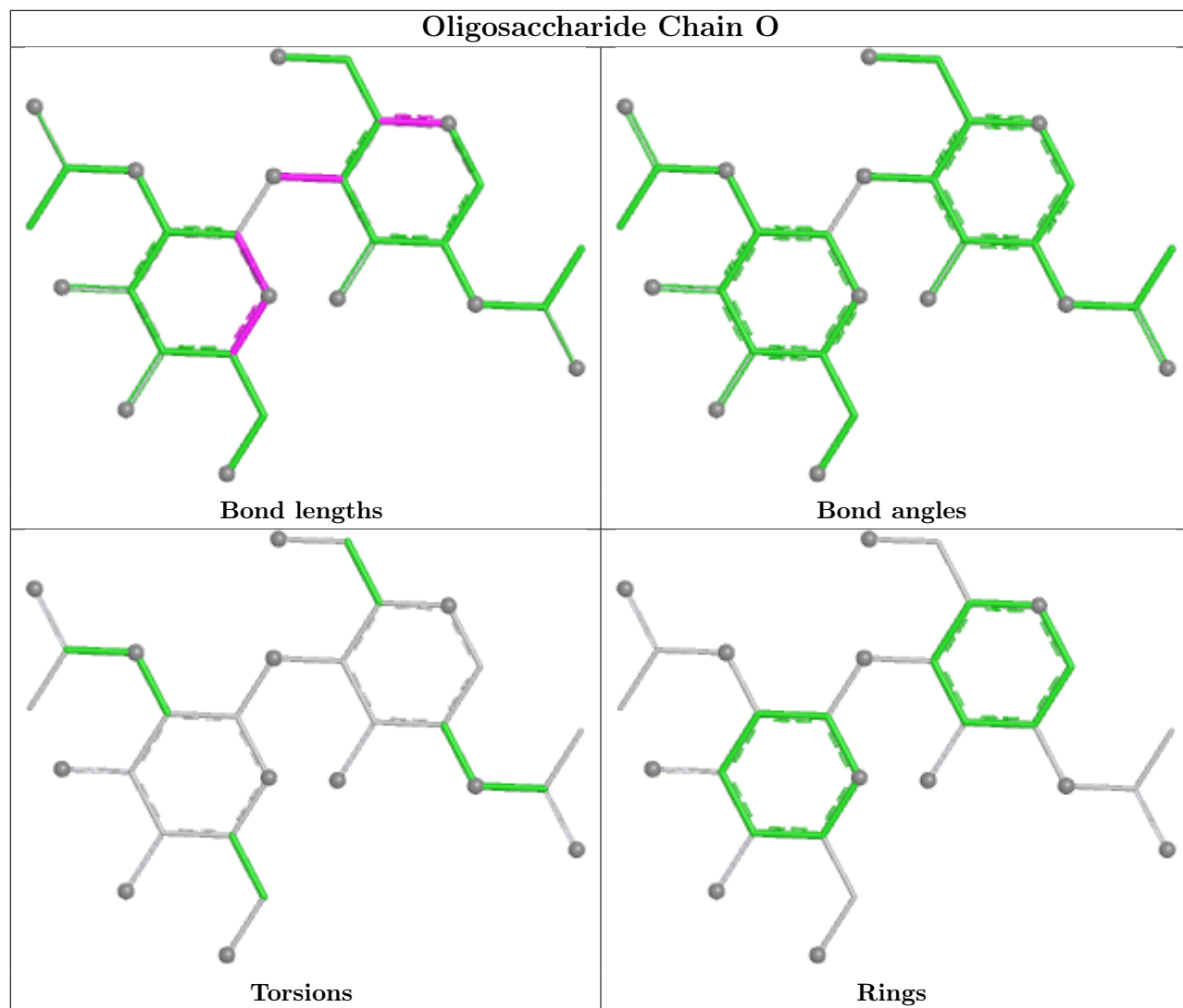


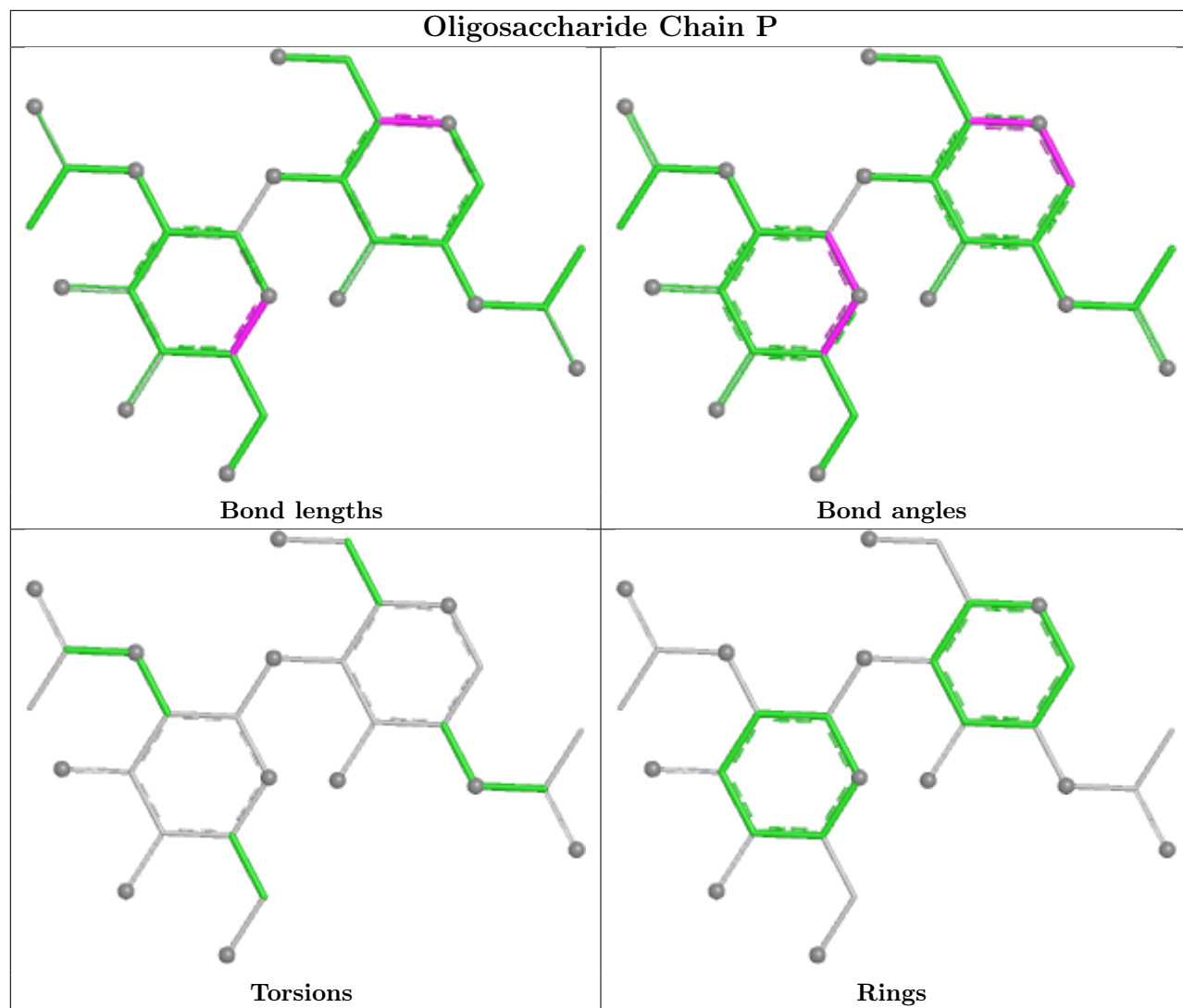


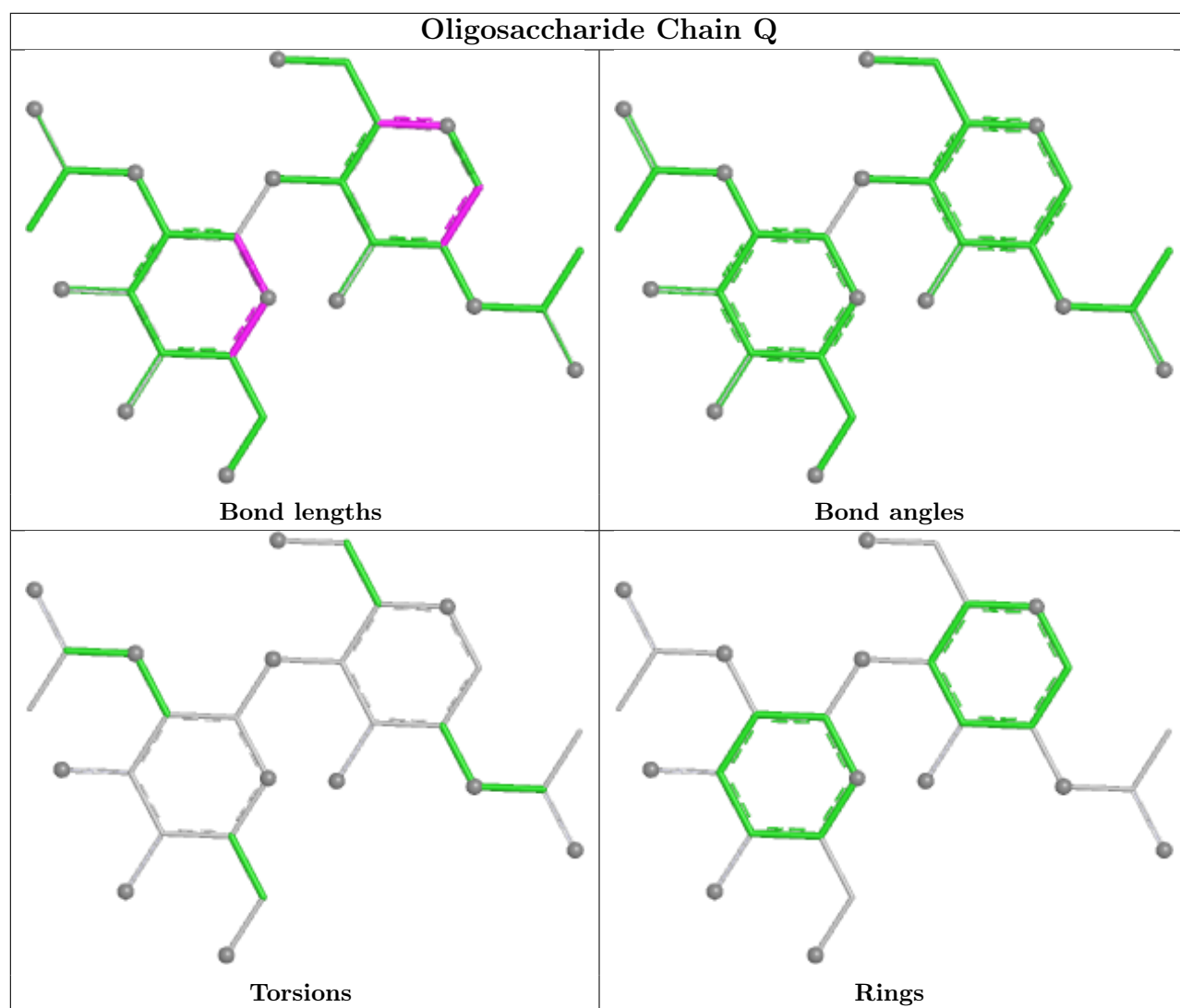




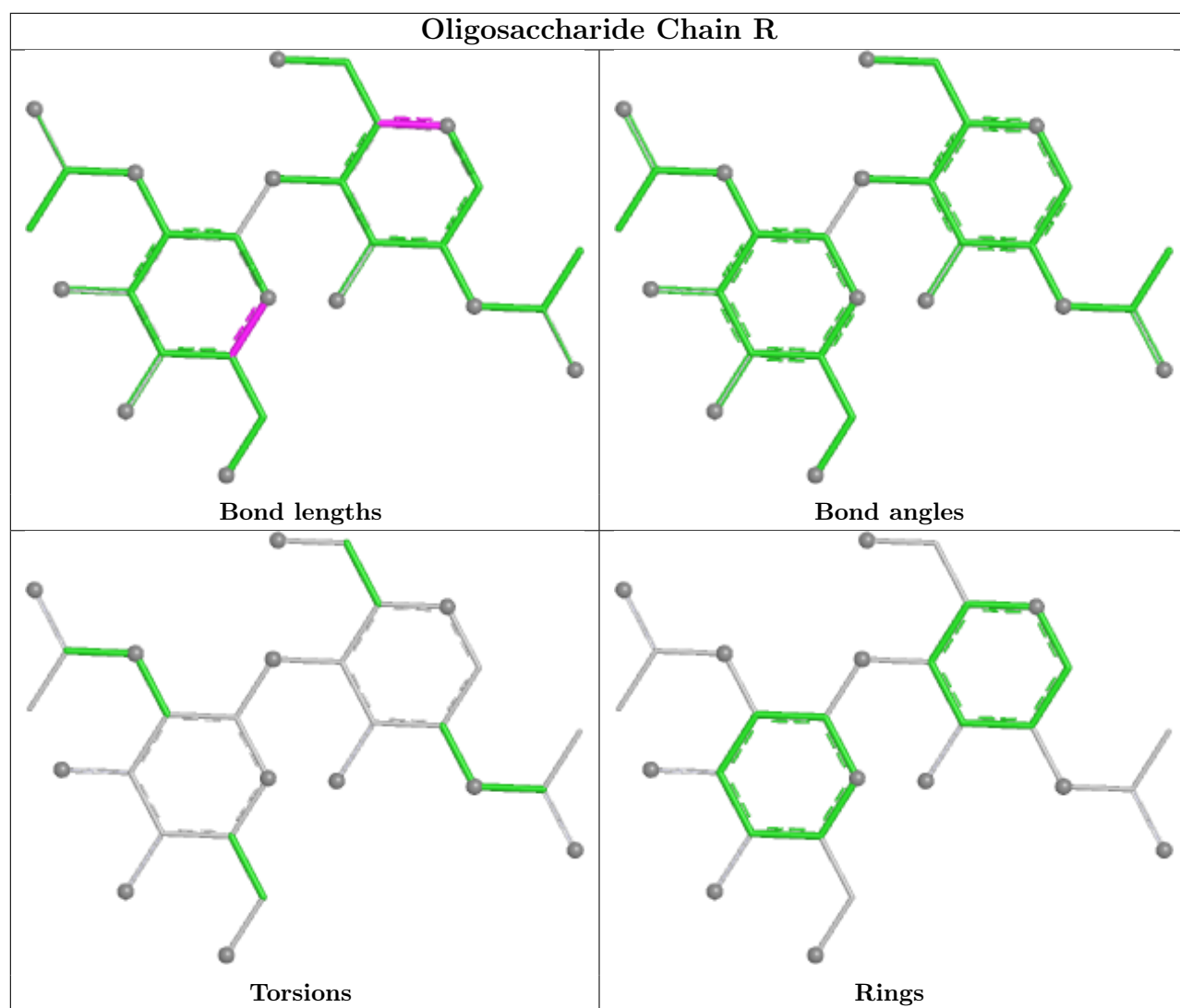


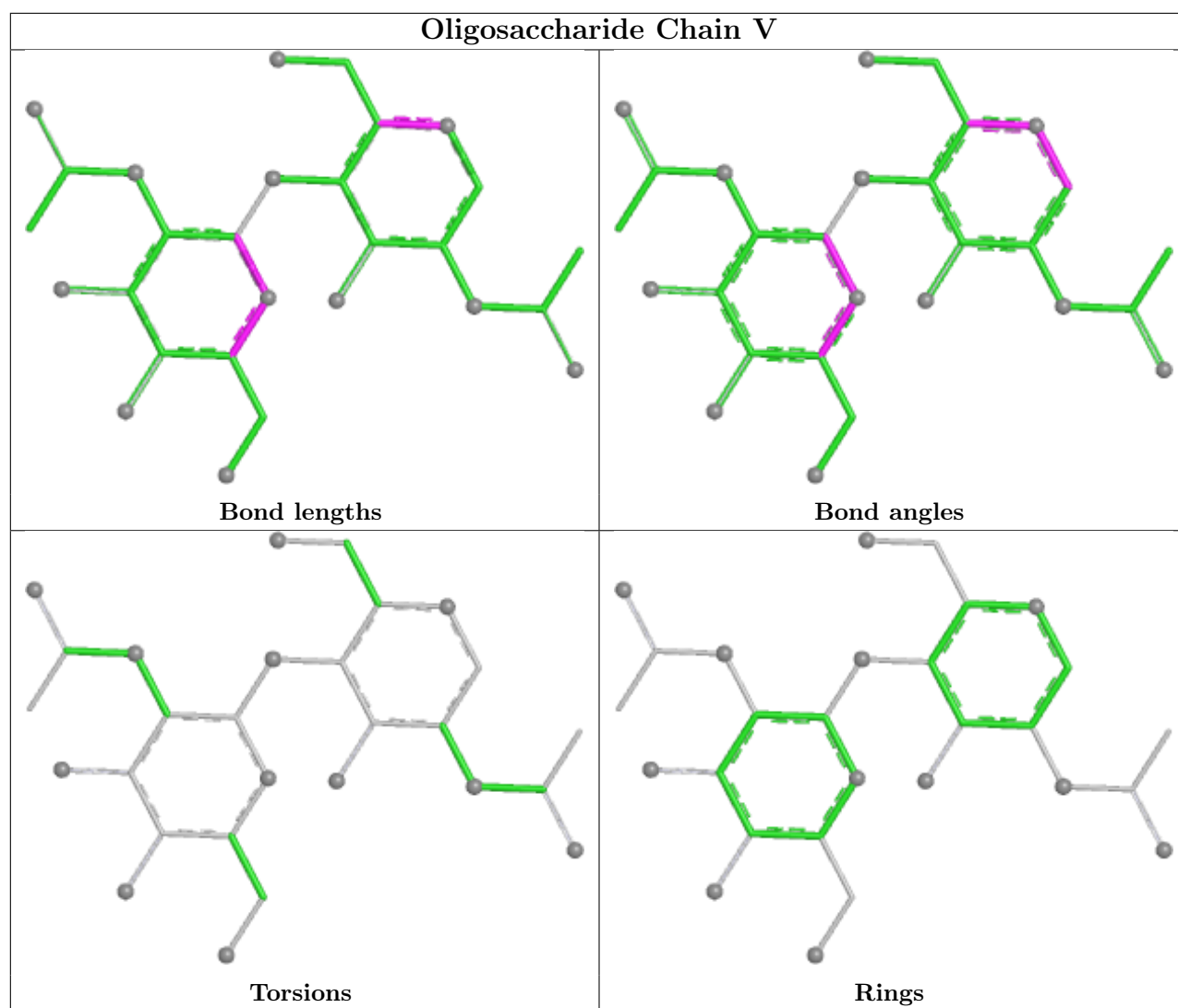


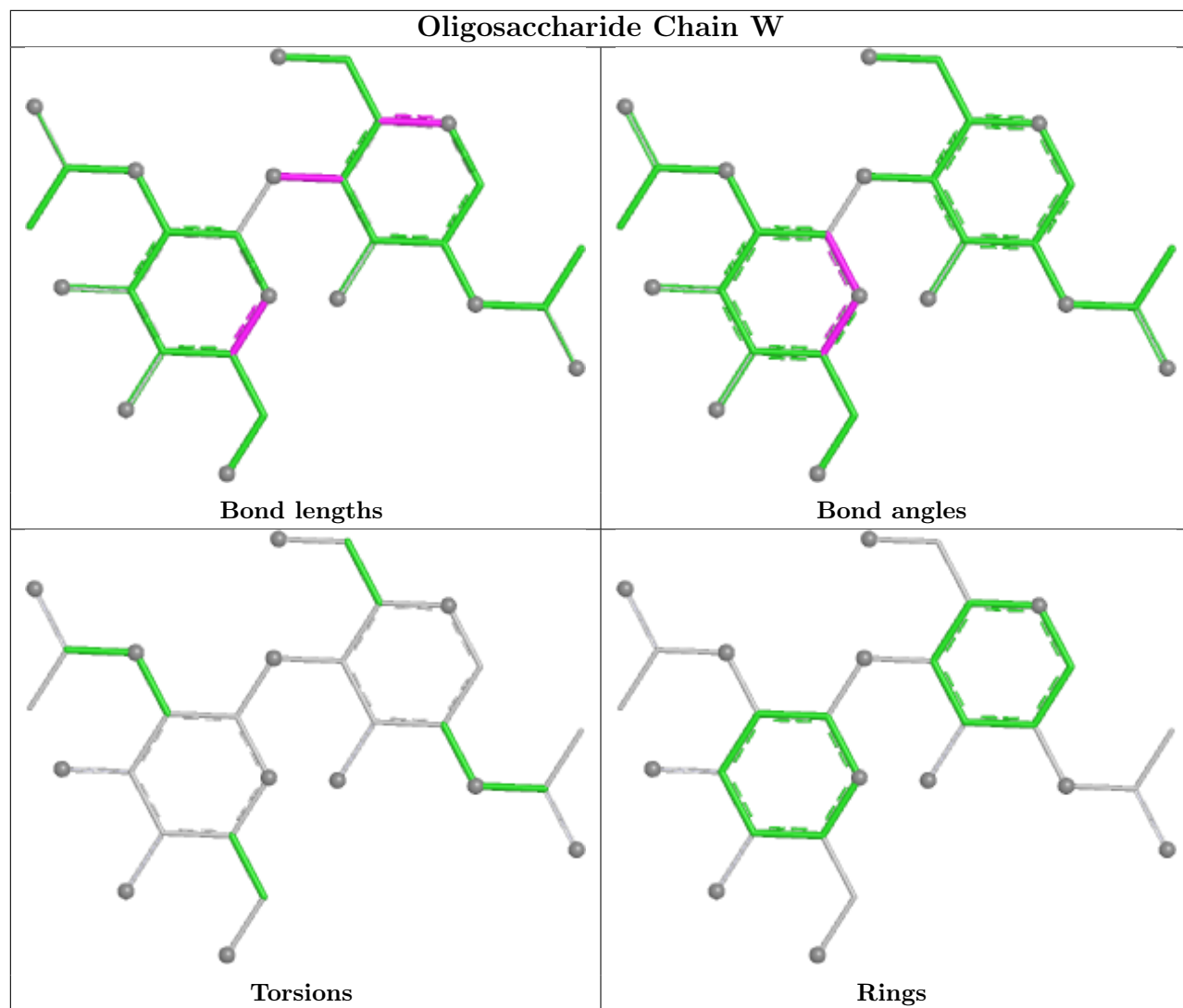


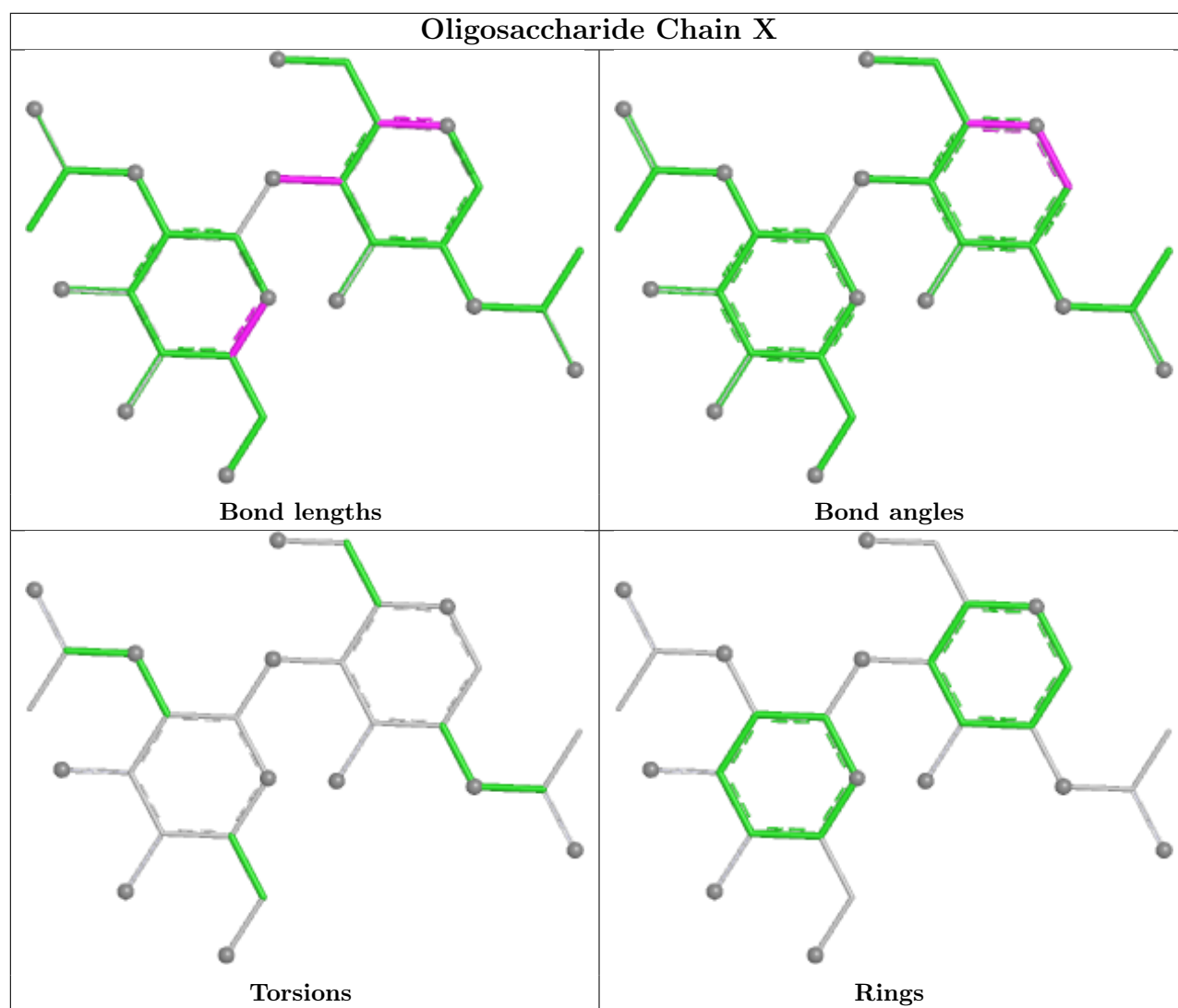


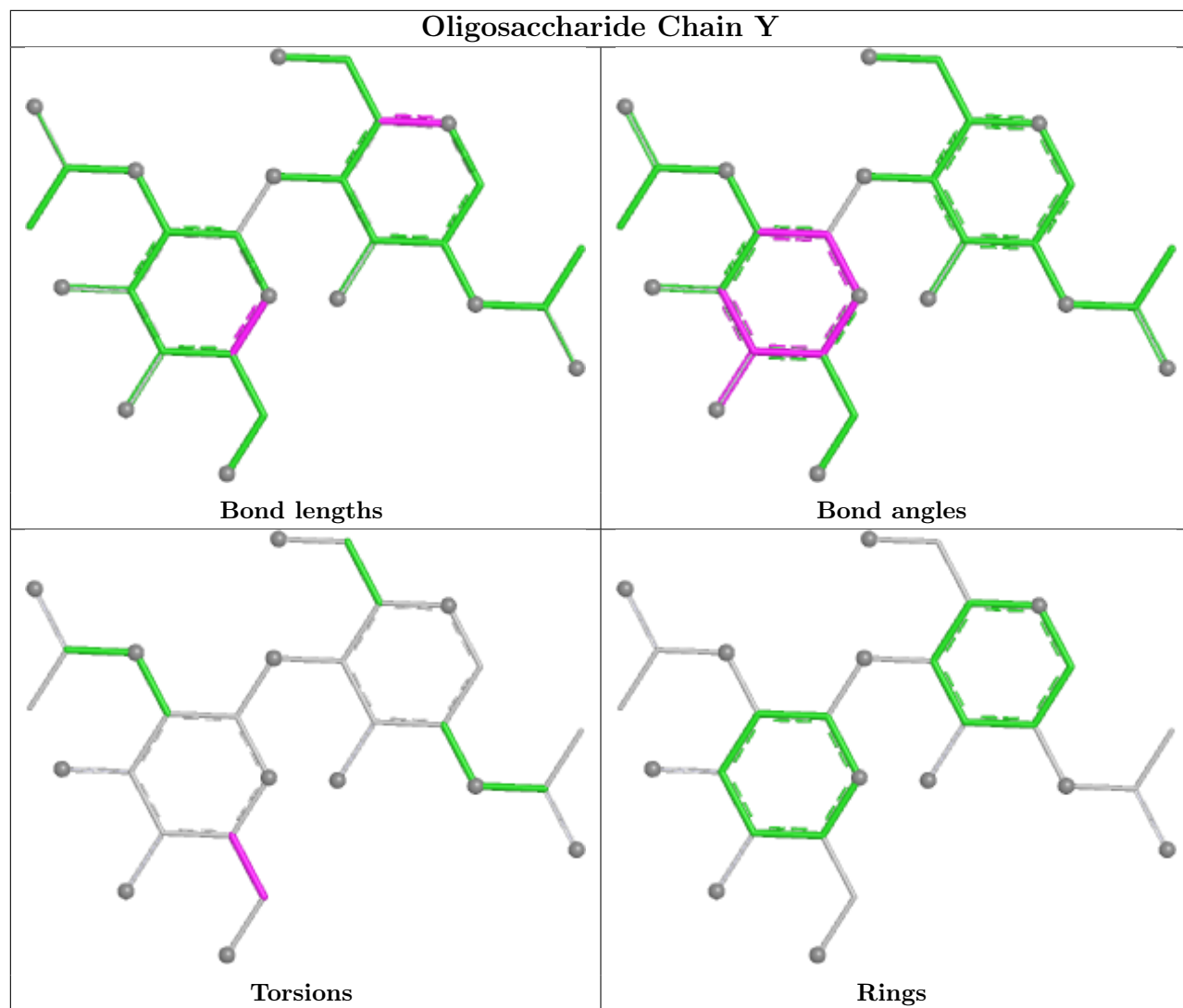


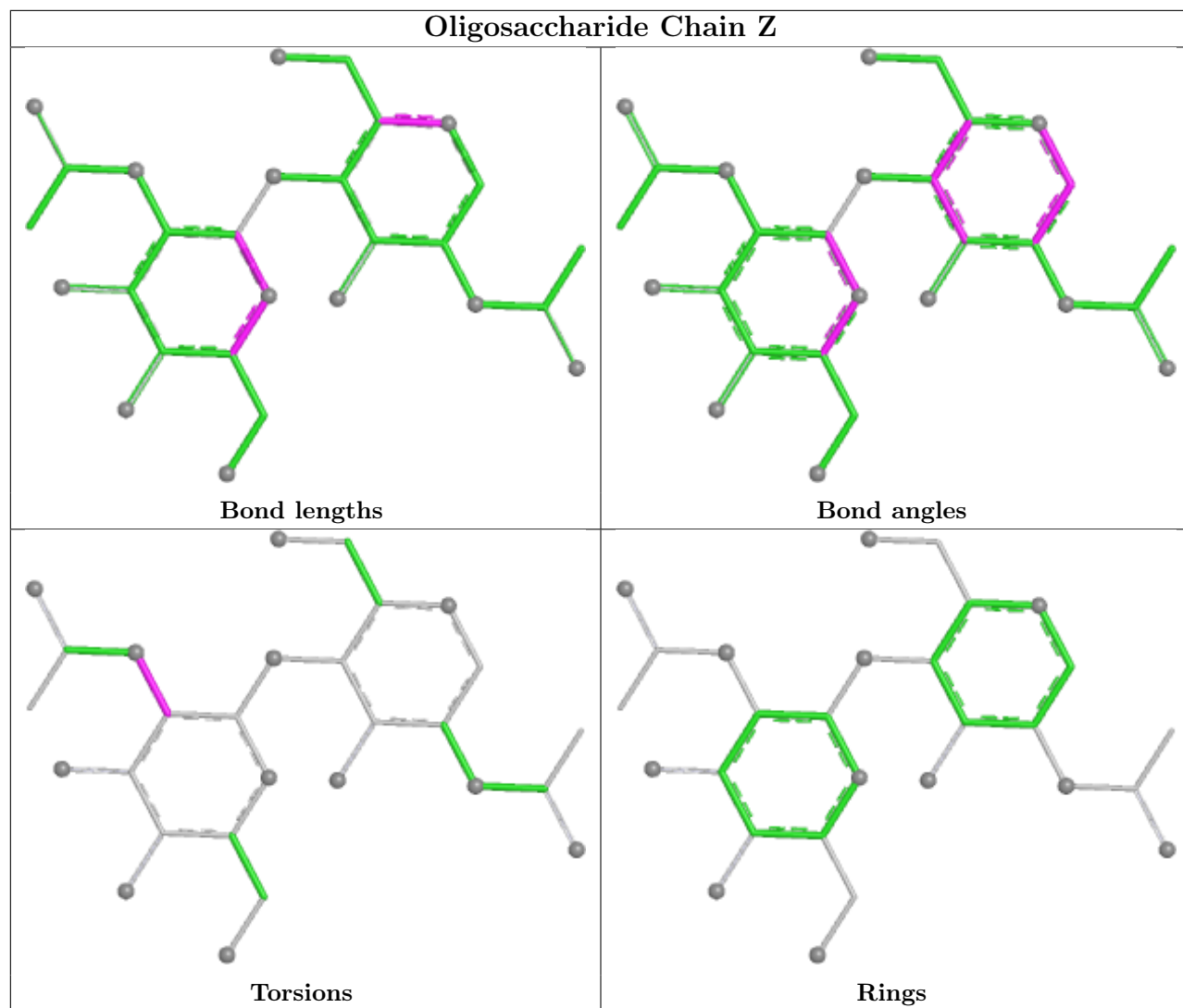


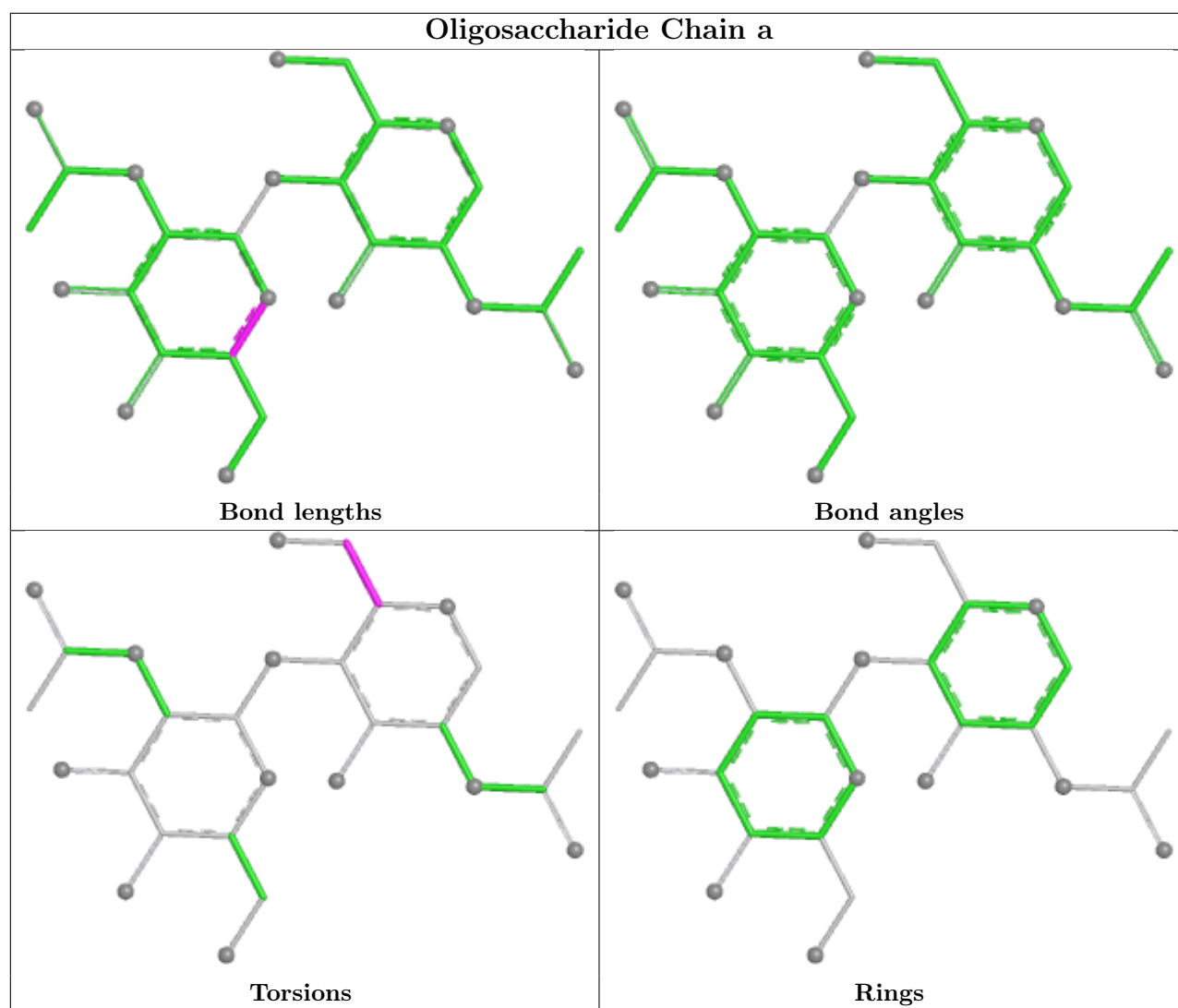


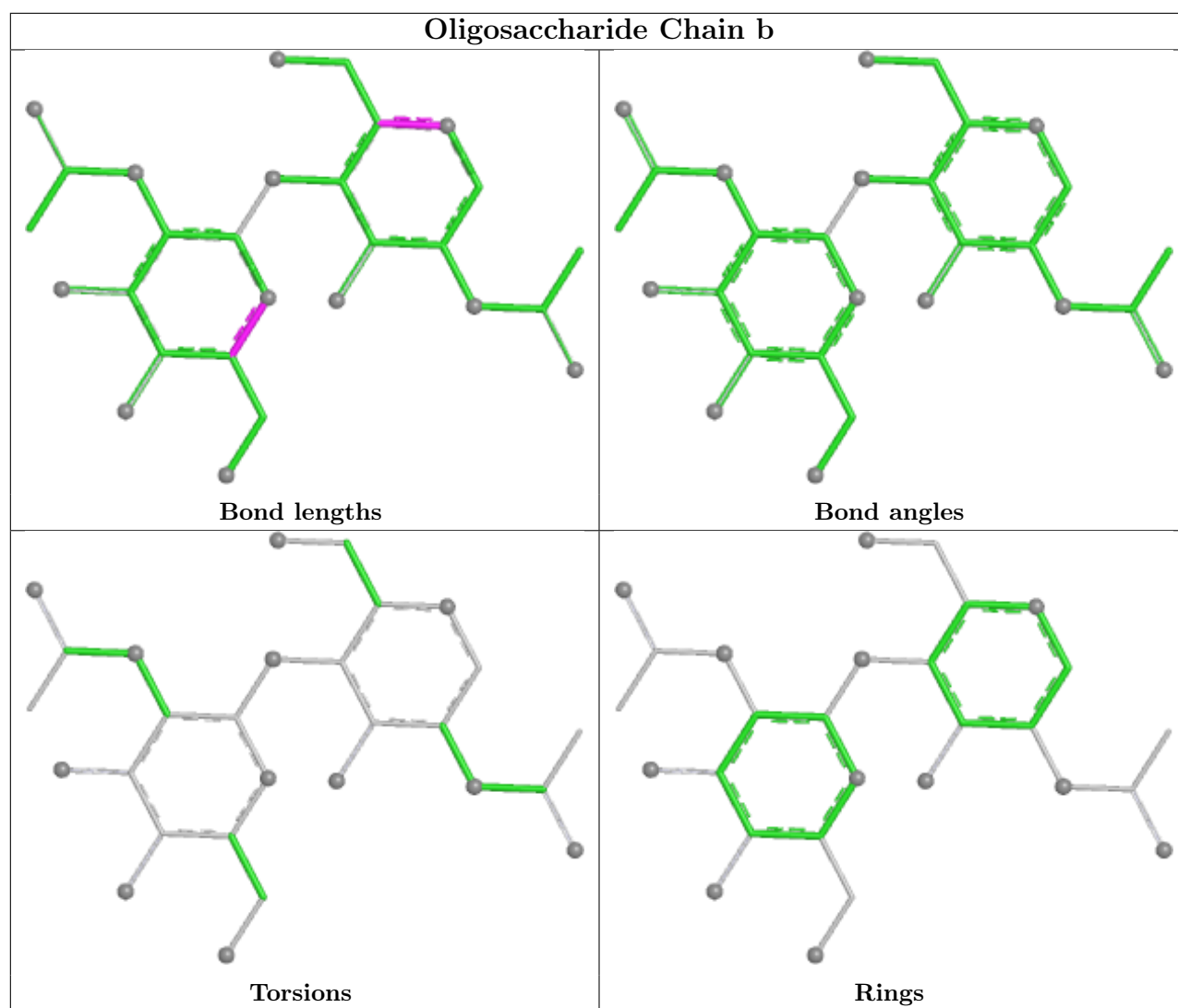




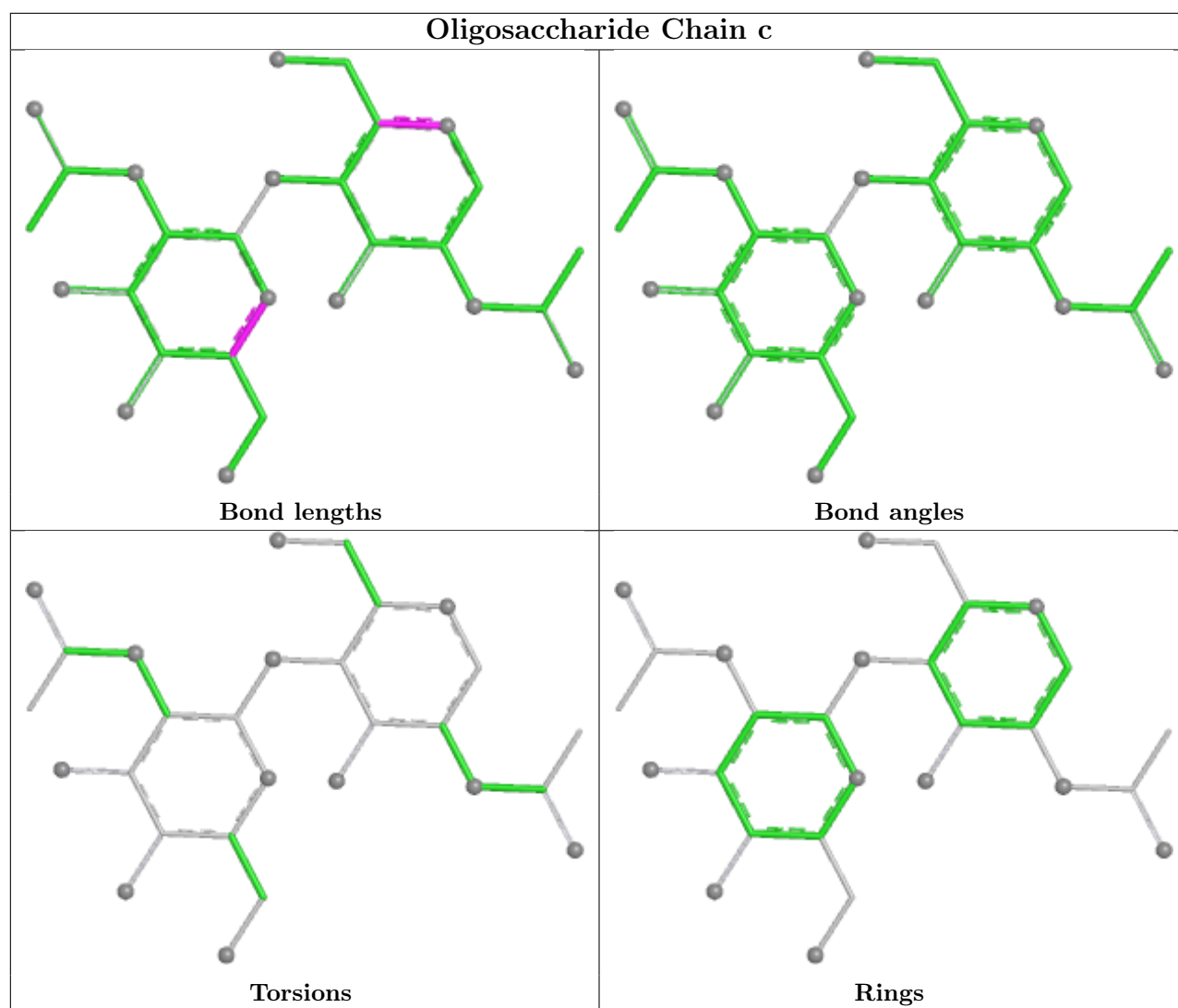


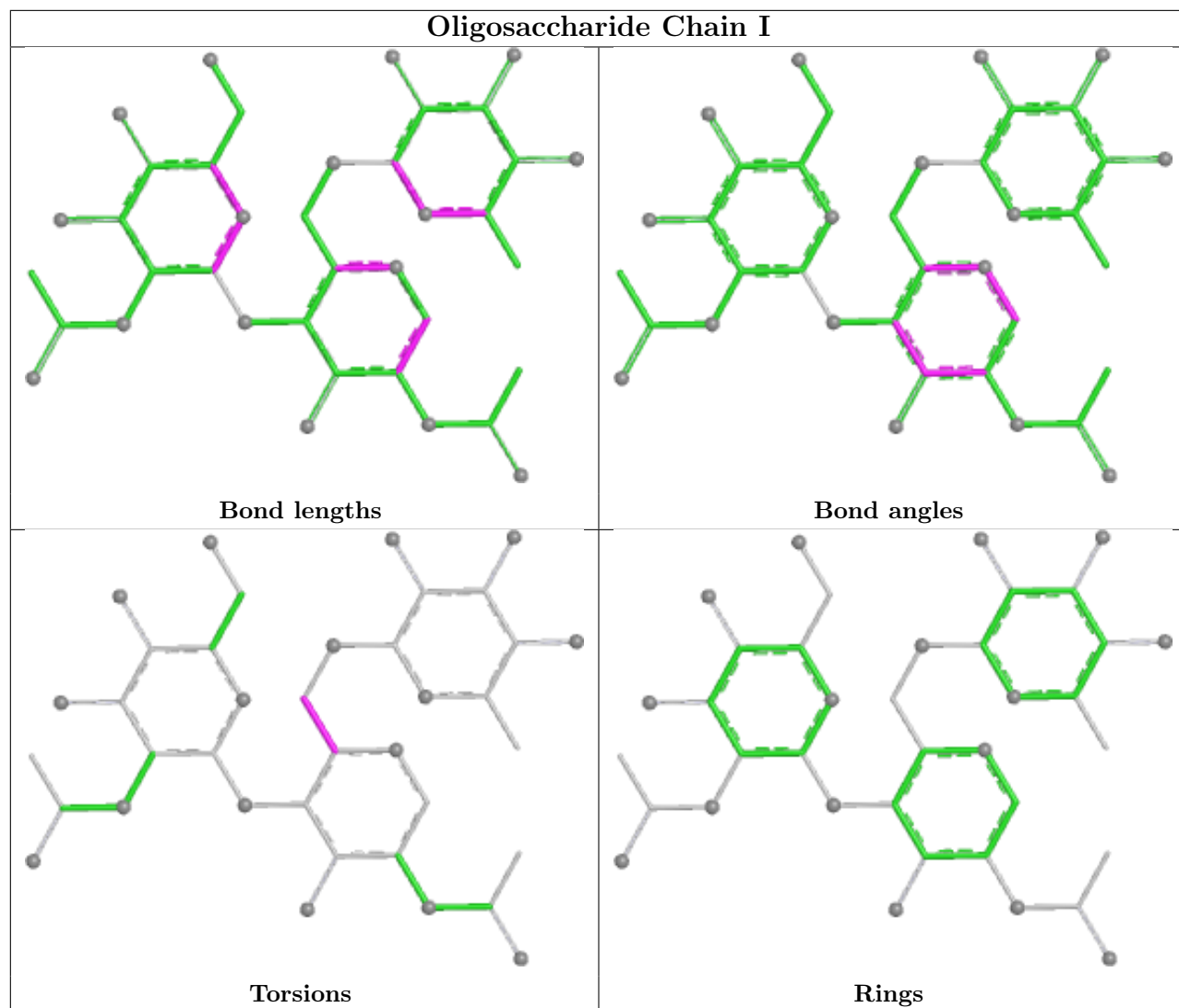


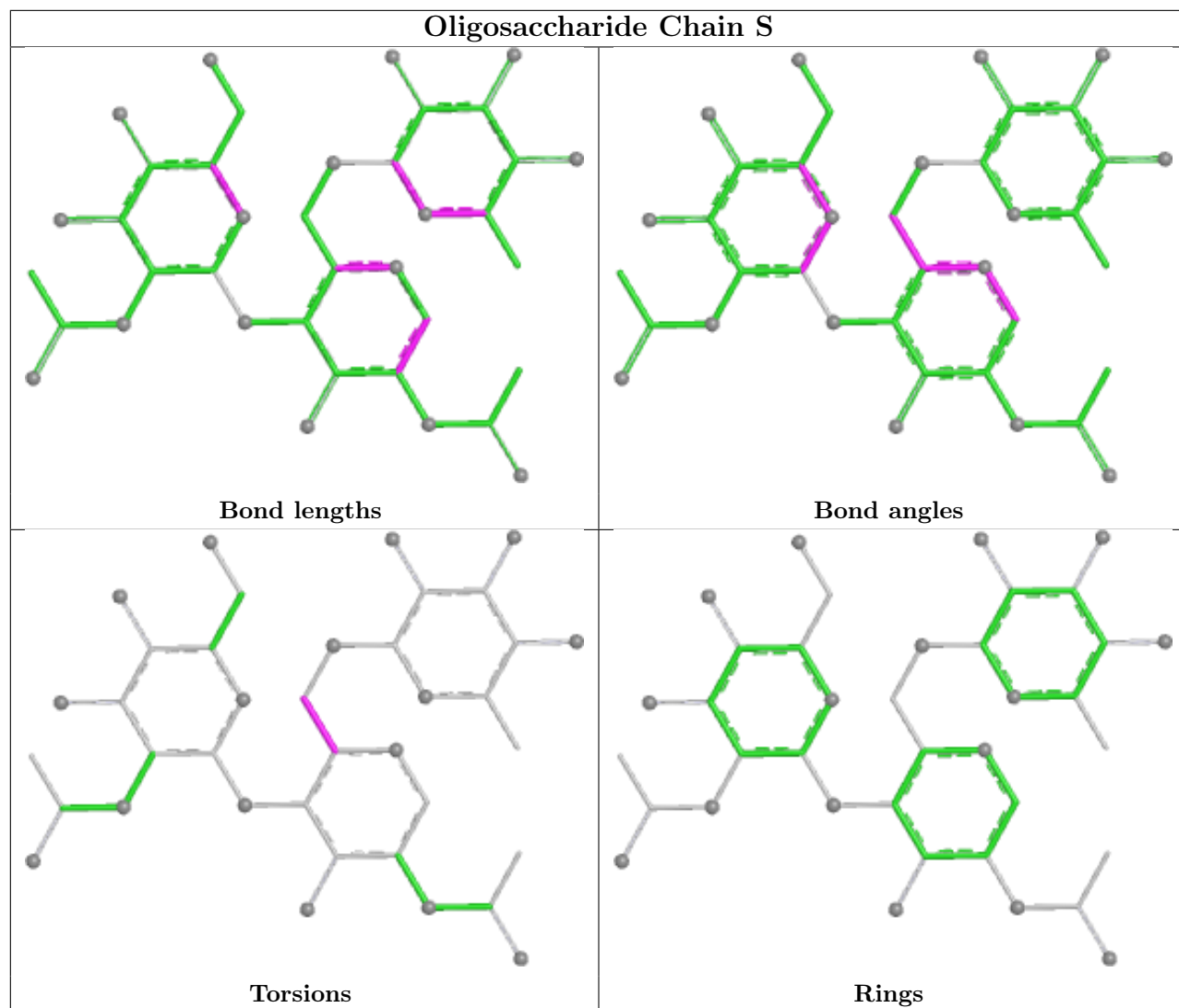


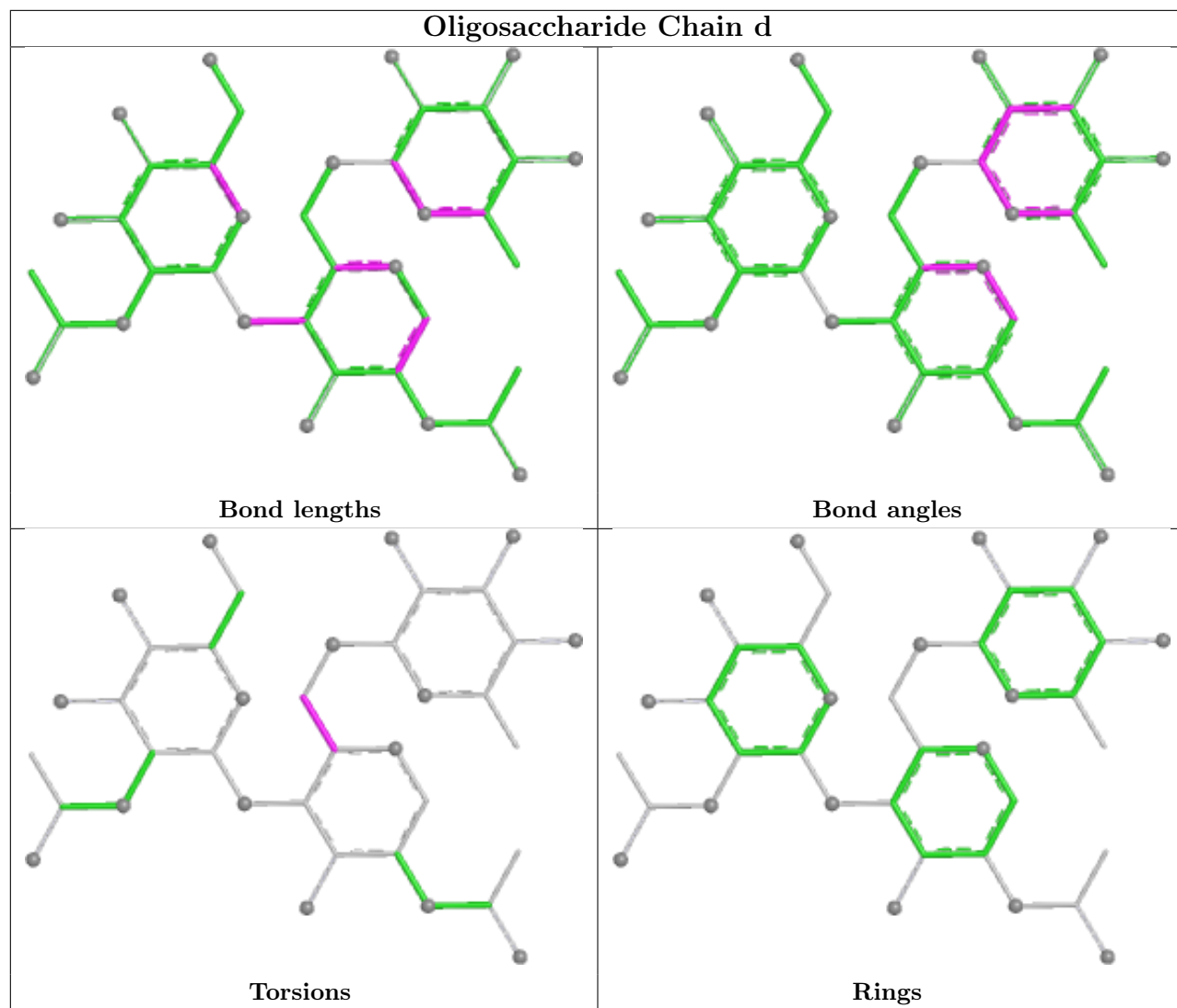


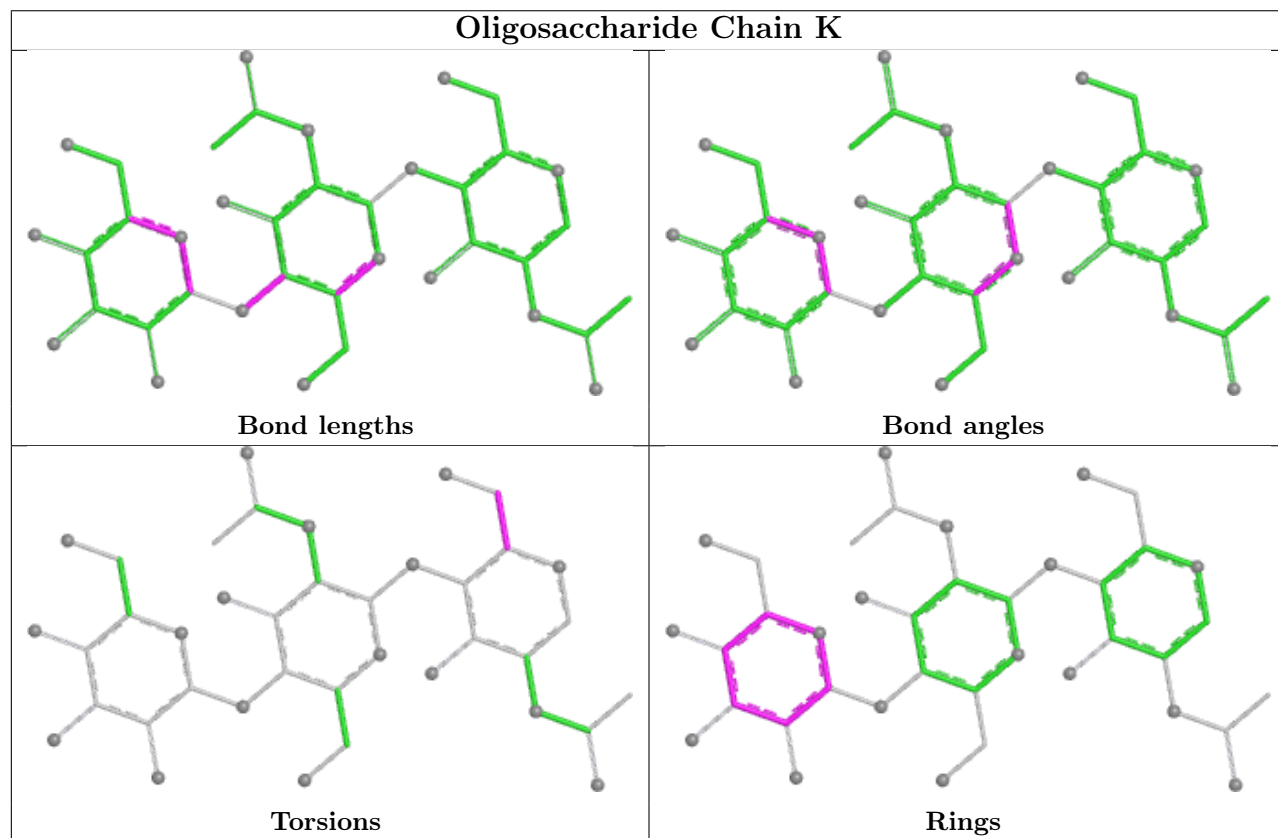
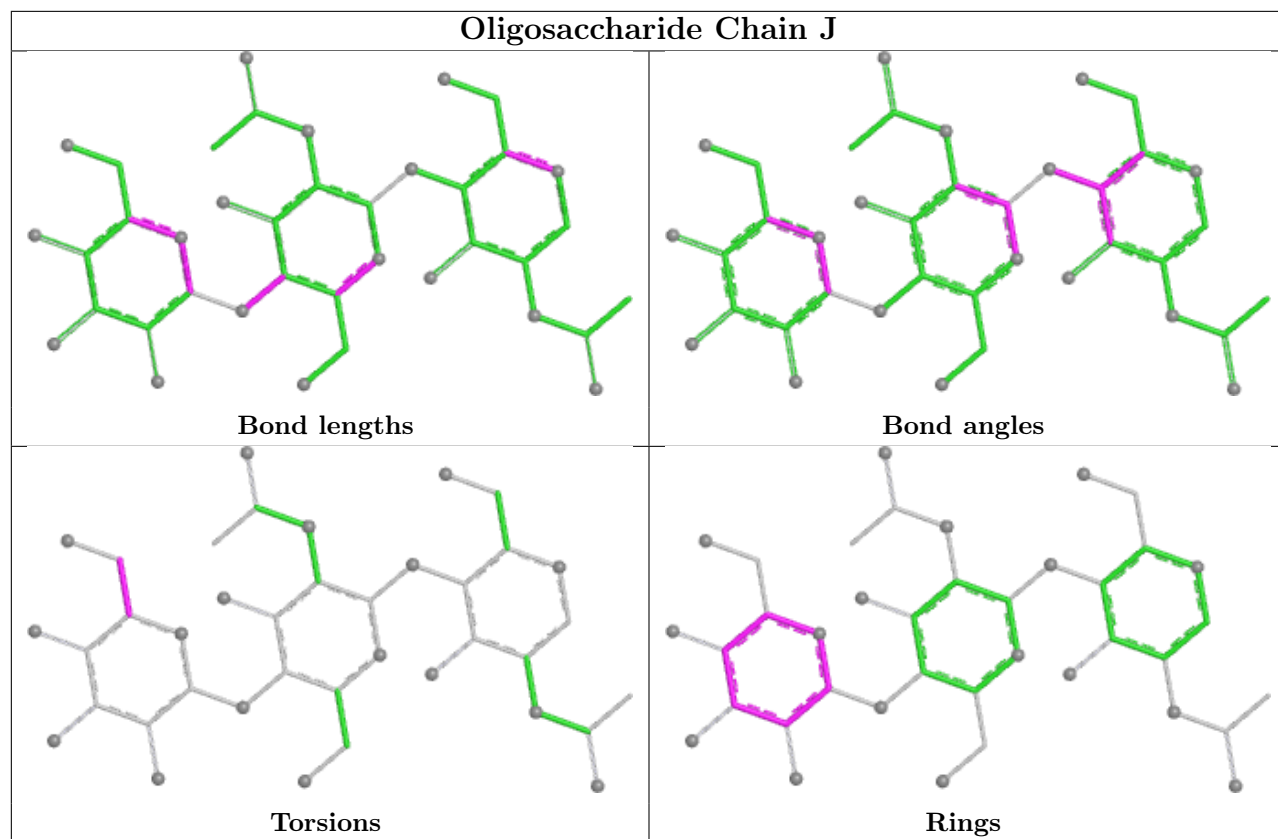


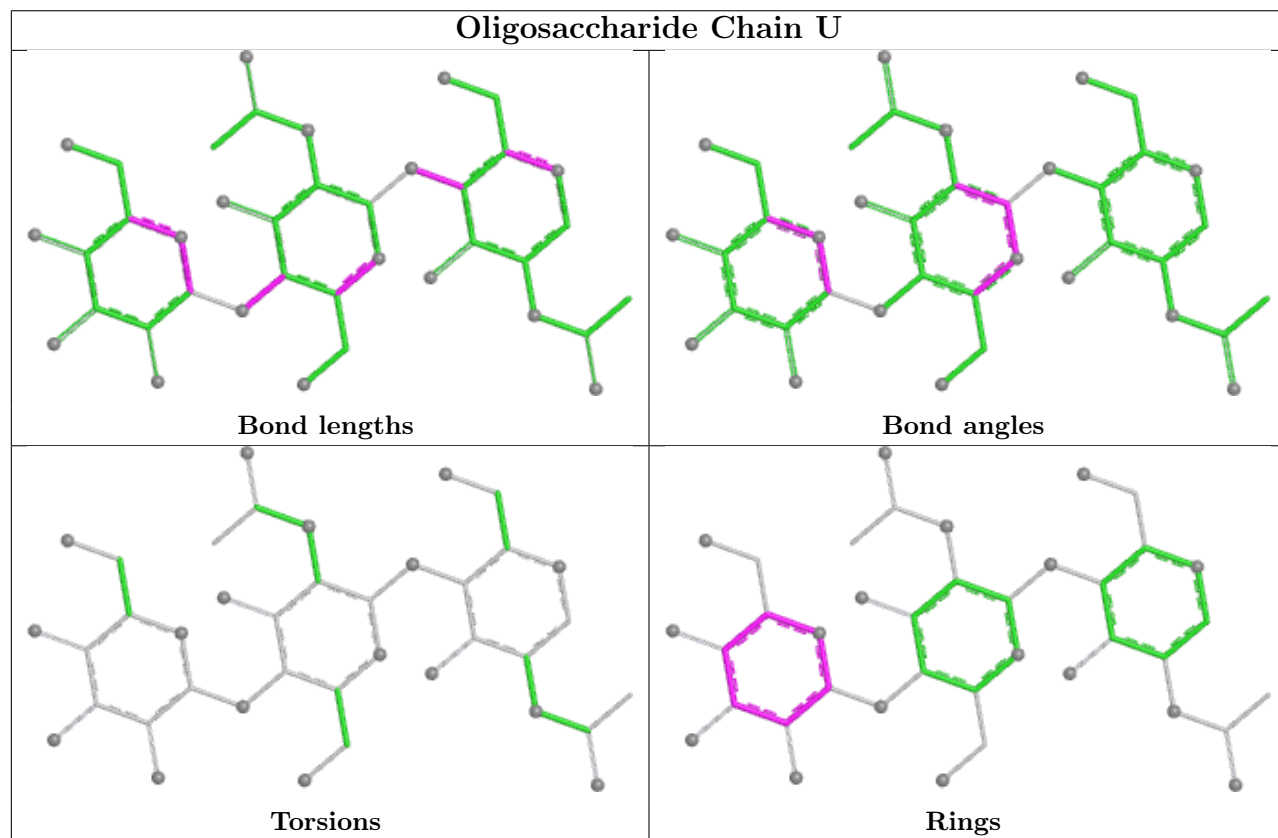
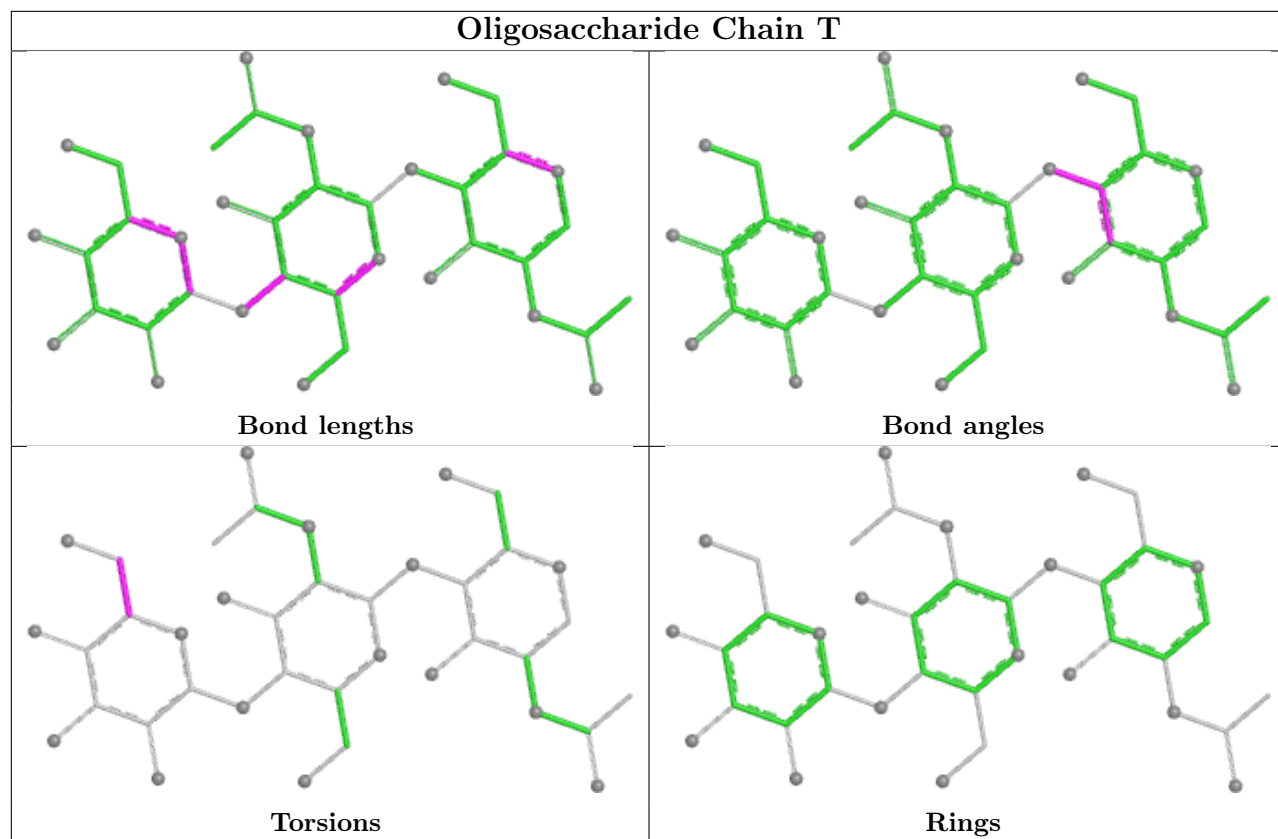


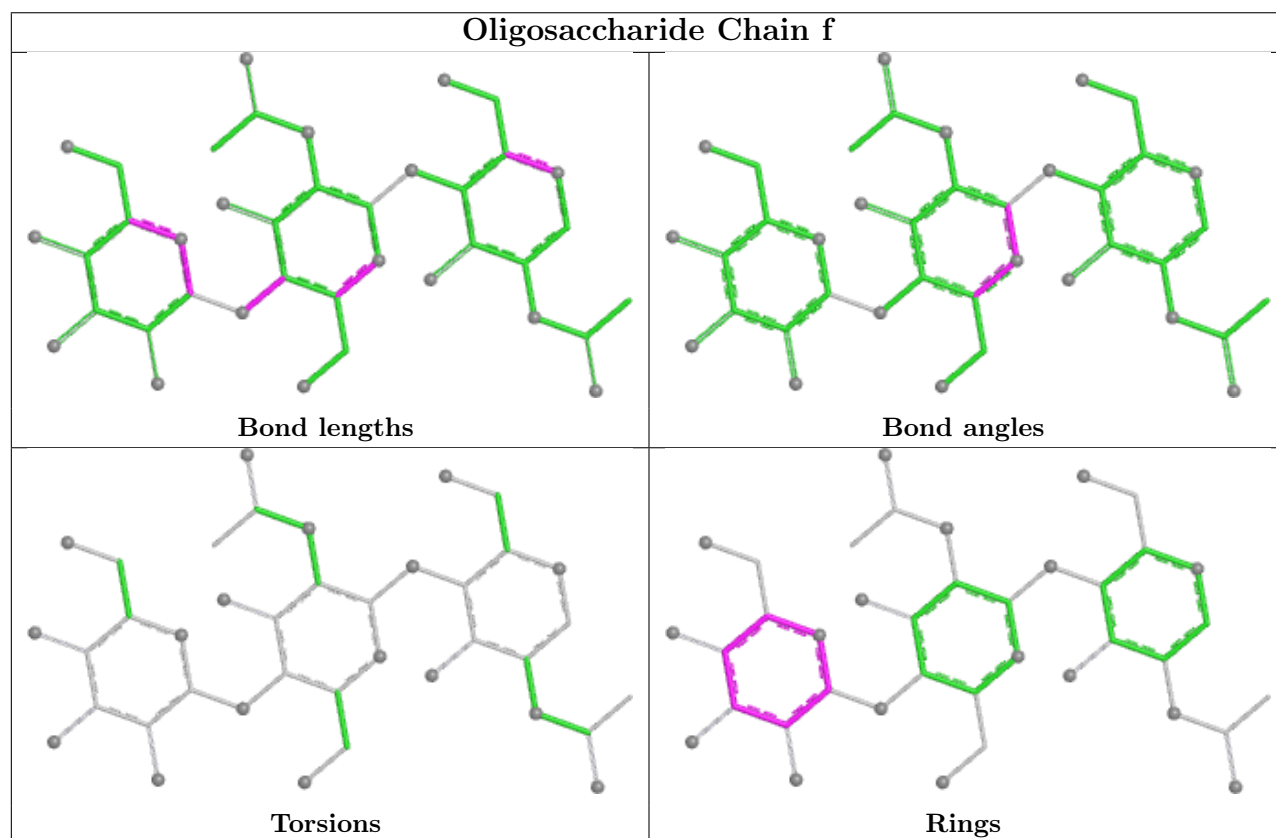
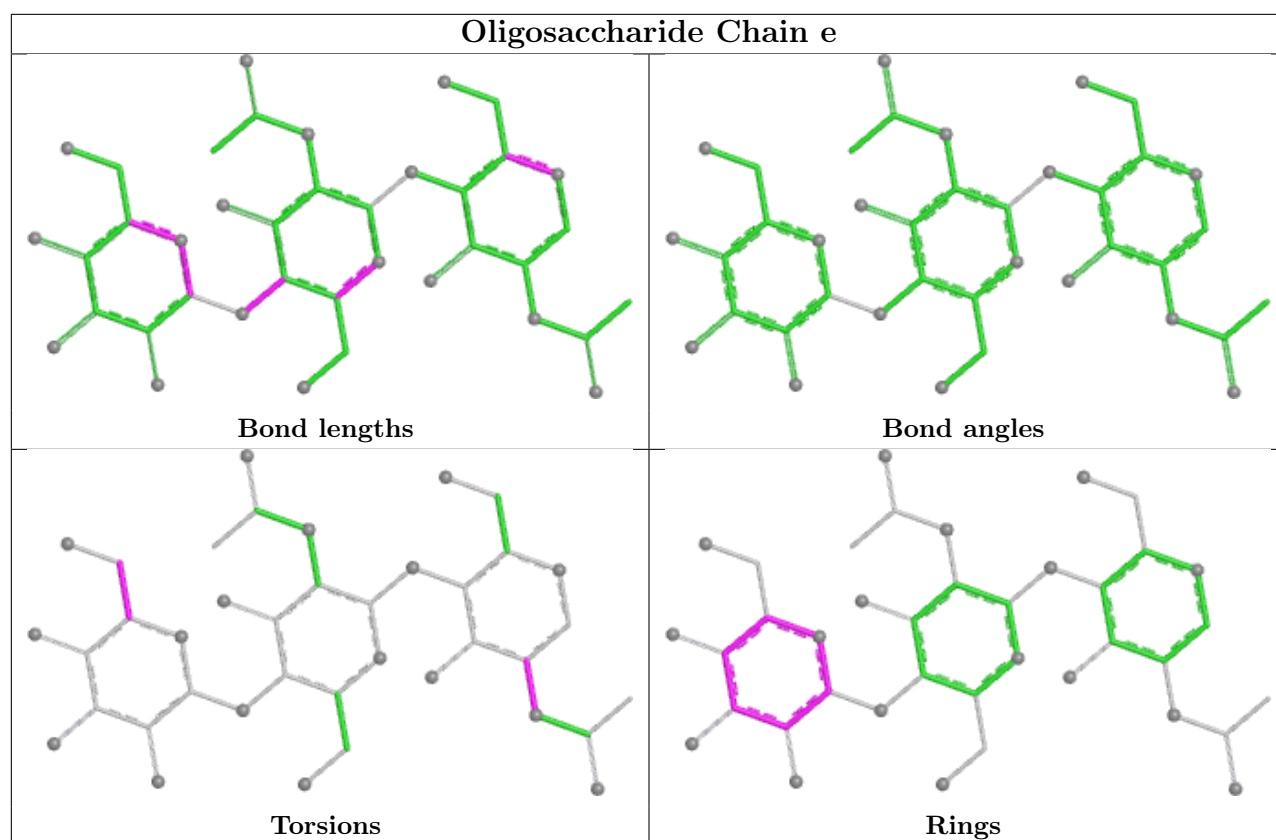












## 5.6 Ligand geometry

28 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
5	NAG	C	1407	-	14,14,15	0.21	0	17,19,21	0.43	0
5	NAG	C	1408	1	14,14,15	1.39	3 (21%)	17,19,21	0.92	0
5	NAG	A	1406	1	14,14,15	1.08	1 (7%)	17,19,21	0.71	0
5	NAG	B	1408	1	14,14,15	0.22	0	17,19,21	0.43	0
5	NAG	A	1402	-	14,14,15	0.20	0	17,19,21	0.44	0
5	NAG	A	1403	1	14,14,15	1.33	3 (21%)	17,19,21	0.65	0
5	NAG	C	1402	-	14,14,15	0.22	0	17,19,21	0.43	0
5	NAG	C	1406	1	14,14,15	1.31	2 (14%)	17,19,21	0.68	0
5	NAG	B	1404	1	14,14,15	1.23	2 (14%)	17,19,21	0.86	1 (5%)
5	NAG	A	1407	1	14,14,15	1.20	1 (7%)	17,19,21	1.18	1 (5%)
5	NAG	A	1409	1	14,14,15	1.27	1 (7%)	17,19,21	0.75	0
5	NAG	C	1403	-	14,14,15	0.18	0	17,19,21	0.45	0
5	NAG	C	1405	-	14,14,15	1.37	2 (14%)	17,19,21	0.94	1 (5%)
5	NAG	B	1407	1	14,14,15	1.34	2 (14%)	17,19,21	0.88	1 (5%)
5	NAG	B	1406	1	14,14,15	1.33	2 (14%)	17,19,21	0.77	0
5	NAG	B	1402	-	14,14,15	0.21	0	17,19,21	0.43	0
5	NAG	A	1408	1	14,14,15	1.49	3 (21%)	17,19,21	1.59	1 (5%)
5	NAG	B	1405	1	14,14,15	1.31	3 (21%)	17,19,21	0.96	1 (5%)
5	NAG	B	1403	1	14,14,15	0.23	0	17,19,21	0.42	0
5	NAG	A	1401	1	14,14,15	1.19	1 (7%)	17,19,21	0.81	0
5	NAG	B	1409	1	14,14,15	1.30	2 (14%)	17,19,21	0.80	0
5	NAG	B	1401	1	14,14,15	0.20	0	17,19,21	0.44	0
5	NAG	C	1401	-	14,14,15	1.16	1 (7%)	17,19,21	0.74	0
5	NAG	A	1404	1	14,14,15	1.17	1 (7%)	17,19,21	1.12	1 (5%)
5	NAG	A	1411	1	14,14,15	1.36	3 (21%)	17,19,21	0.91	1 (5%)
5	NAG	C	1404	1	14,14,15	1.23	1 (7%)	17,19,21	1.21	1 (5%)
5	NAG	A	1410	1	14,14,15	1.28	1 (7%)	17,19,21	0.81	1 (5%)
5	NAG	A	1405	-	14,14,15	0.20	0	17,19,21	0.44	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
5	NAG	C	1407	-	-	2/6/23/26	0/1/1/1
5	NAG	C	1408	1	-	0/6/23/26	0/1/1/1
5	NAG	A	1406	1	-	0/6/23/26	0/1/1/1
5	NAG	B	1408	1	-	1/6/23/26	0/1/1/1
5	NAG	A	1402	-	-	2/6/23/26	0/1/1/1
5	NAG	A	1403	1	-	1/6/23/26	0/1/1/1
5	NAG	C	1402	-	-	0/6/23/26	0/1/1/1
5	NAG	C	1406	1	-	1/6/23/26	0/1/1/1
5	NAG	B	1404	1	-	0/6/23/26	0/1/1/1
5	NAG	A	1407	1	-	0/6/23/26	0/1/1/1
5	NAG	A	1409	1	-	0/6/23/26	0/1/1/1
5	NAG	C	1403	-	-	0/6/23/26	0/1/1/1
5	NAG	C	1405	-	-	0/6/23/26	0/1/1/1
5	NAG	B	1407	1	-	0/6/23/26	0/1/1/1
5	NAG	B	1406	1	-	0/6/23/26	0/1/1/1
5	NAG	B	1402	-	-	2/6/23/26	0/1/1/1
5	NAG	A	1408	1	-	1/6/23/26	0/1/1/1
5	NAG	B	1405	1	-	2/6/23/26	0/1/1/1
5	NAG	B	1403	1	-	0/6/23/26	0/1/1/1
5	NAG	A	1401	1	-	0/6/23/26	0/1/1/1
5	NAG	B	1409	1	-	0/6/23/26	0/1/1/1
5	NAG	B	1401	1	-	1/6/23/26	0/1/1/1
5	NAG	C	1401	-	-	1/6/23/26	0/1/1/1
5	NAG	A	1404	1	-	0/6/23/26	0/1/1/1
5	NAG	A	1411	1	-	0/6/23/26	0/1/1/1
5	NAG	C	1404	1	-	0/6/23/26	0/1/1/1
5	NAG	A	1410	1	-	0/6/23/26	0/1/1/1
5	NAG	A	1405	-	-	2/6/23/26	0/1/1/1

All (35) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	1408	NAG	O5-C5	3.14	1.49	1.43
5	C	1408	NAG	O5-C5	3.10	1.49	1.43
5	B	1407	NAG	O5-C5	3.03	1.49	1.43
5	A	1410	NAG	O5-C5	3.01	1.49	1.43
5	C	1404	NAG	O5-C5	3.00	1.49	1.43
5	B	1406	NAG	O5-C5	2.93	1.49	1.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	1408	NAG	O5-C1	2.93	1.48	1.43
5	C	1406	NAG	O5-C5	2.91	1.49	1.43
5	A	1401	NAG	O5-C5	2.90	1.49	1.43
5	B	1409	NAG	O5-C5	2.90	1.49	1.43
5	A	1404	NAG	O5-C5	2.85	1.49	1.43
5	A	1409	NAG	O5-C5	2.83	1.49	1.43
5	C	1405	NAG	O5-C5	2.82	1.48	1.43
5	A	1407	NAG	O5-C5	2.78	1.48	1.43
5	A	1411	NAG	O5-C5	2.77	1.48	1.43
5	B	1405	NAG	O5-C5	2.72	1.48	1.43
5	A	1403	NAG	O5-C5	2.64	1.48	1.43
5	C	1405	NAG	C1-C2	2.60	1.55	1.52
5	B	1404	NAG	O5-C5	2.51	1.48	1.43
5	A	1408	NAG	C1-C2	2.37	1.55	1.52
5	A	1411	NAG	C1-C2	2.34	1.55	1.52
5	C	1401	NAG	O5-C5	2.34	1.48	1.43
5	A	1403	NAG	C1-C2	2.32	1.55	1.52
5	C	1408	NAG	C1-C2	2.32	1.55	1.52
5	A	1411	NAG	O5-C1	2.18	1.47	1.43
5	C	1408	NAG	O5-C1	2.18	1.47	1.43
5	B	1406	NAG	C1-C2	2.15	1.55	1.52
5	B	1405	NAG	O5-C1	2.10	1.47	1.43
5	A	1403	NAG	O5-C1	2.09	1.47	1.43
5	C	1406	NAG	C1-C2	2.08	1.55	1.52
5	B	1404	NAG	C1-C2	2.06	1.55	1.52
5	A	1406	NAG	O5-C5	2.05	1.47	1.43
5	B	1409	NAG	C1-C2	2.04	1.55	1.52
5	B	1405	NAG	C1-C2	2.03	1.55	1.52
5	B	1407	NAG	C1-C2	2.02	1.55	1.52

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	1408	NAG	C1-O5-C5	5.59	119.68	112.19
5	A	1407	NAG	C1-O5-C5	4.15	117.75	112.19
5	A	1404	NAG	C1-O5-C5	3.31	116.62	112.19
5	C	1404	NAG	C1-O5-C5	3.23	116.52	112.19
5	B	1405	NAG	C1-O5-C5	3.11	116.35	112.19
5	A	1410	NAG	C1-O5-C5	2.63	115.71	112.19
5	B	1404	NAG	C1-O5-C5	2.53	115.57	112.19
5	C	1405	NAG	C1-O5-C5	2.46	115.48	112.19
5	A	1411	NAG	O5-C1-C2	-2.04	108.14	111.29

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	B	1407	NAG	C1-O5-C5	2.01	114.88	112.19

There are no chirality outliers.

All (16) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	B	1402	NAG	O5-C5-C6-O6
5	A	1405	NAG	C4-C5-C6-O6
5	B	1402	NAG	C4-C5-C6-O6
5	A	1405	NAG	O5-C5-C6-O6
5	B	1405	NAG	C4-C5-C6-O6
5	A	1402	NAG	O5-C5-C6-O6
5	B	1405	NAG	O5-C5-C6-O6
5	A	1402	NAG	C4-C5-C6-O6
5	C	1407	NAG	O5-C5-C6-O6
5	C	1407	NAG	C4-C5-C6-O6
5	A	1403	NAG	O5-C5-C6-O6
5	B	1401	NAG	O5-C5-C6-O6
5	C	1401	NAG	O5-C5-C6-O6
5	B	1408	NAG	O5-C5-C6-O6
5	A	1408	NAG	O5-C5-C6-O6
5	C	1406	NAG	C1-C2-N2-C7

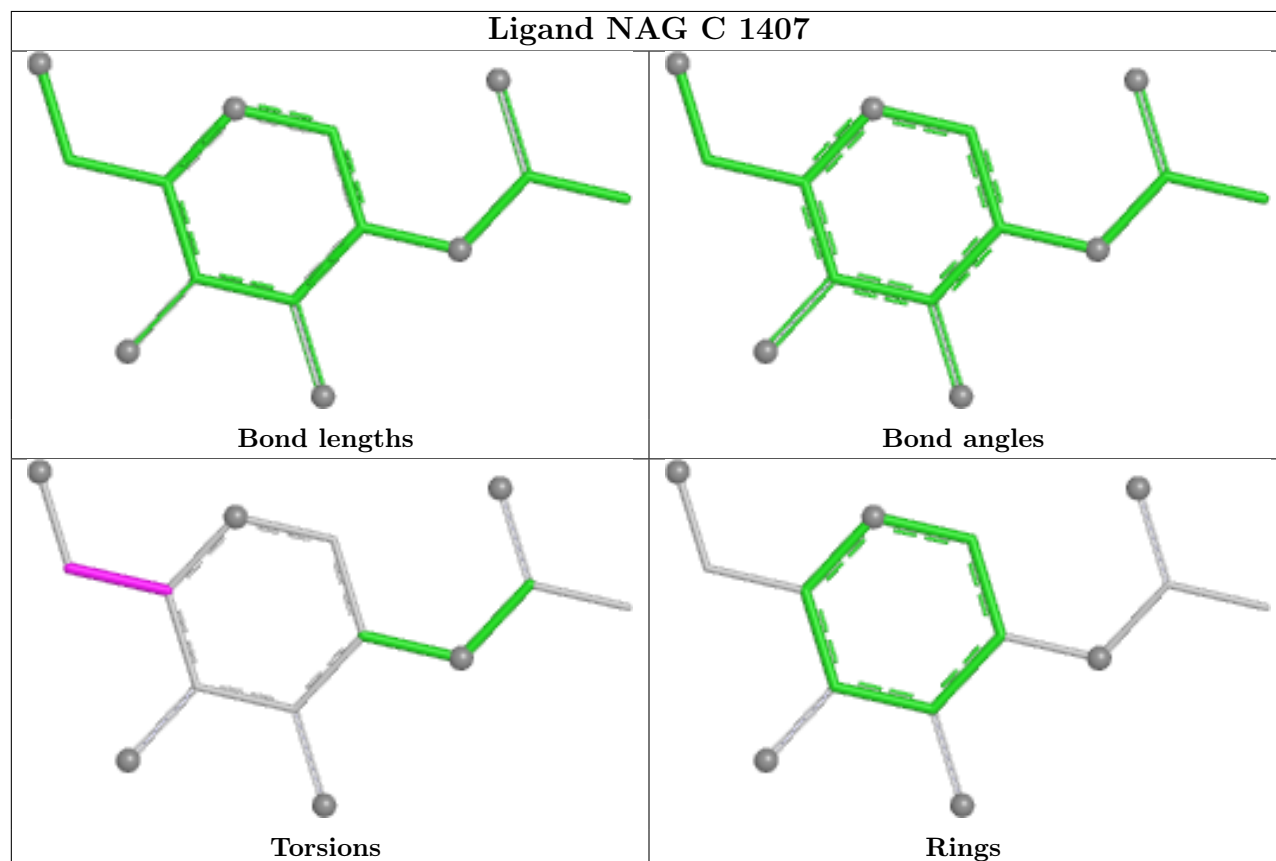
There are no ring outliers.

7 monomers are involved in 18 short contacts:

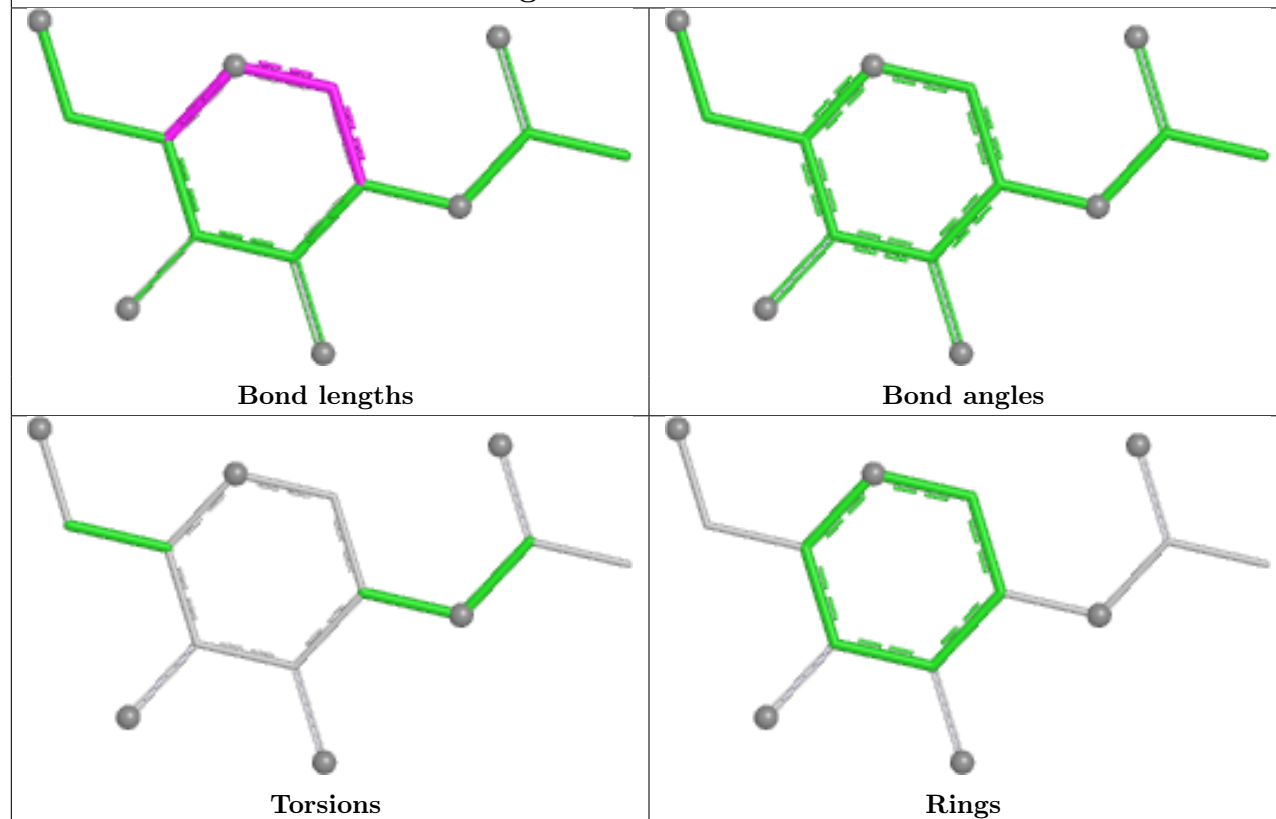
Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	C	1407	NAG	3	0
5	A	1402	NAG	3	0
5	A	1403	NAG	2	0
5	C	1402	NAG	4	0
5	C	1403	NAG	2	0
5	B	1402	NAG	2	0
5	A	1405	NAG	2	0

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

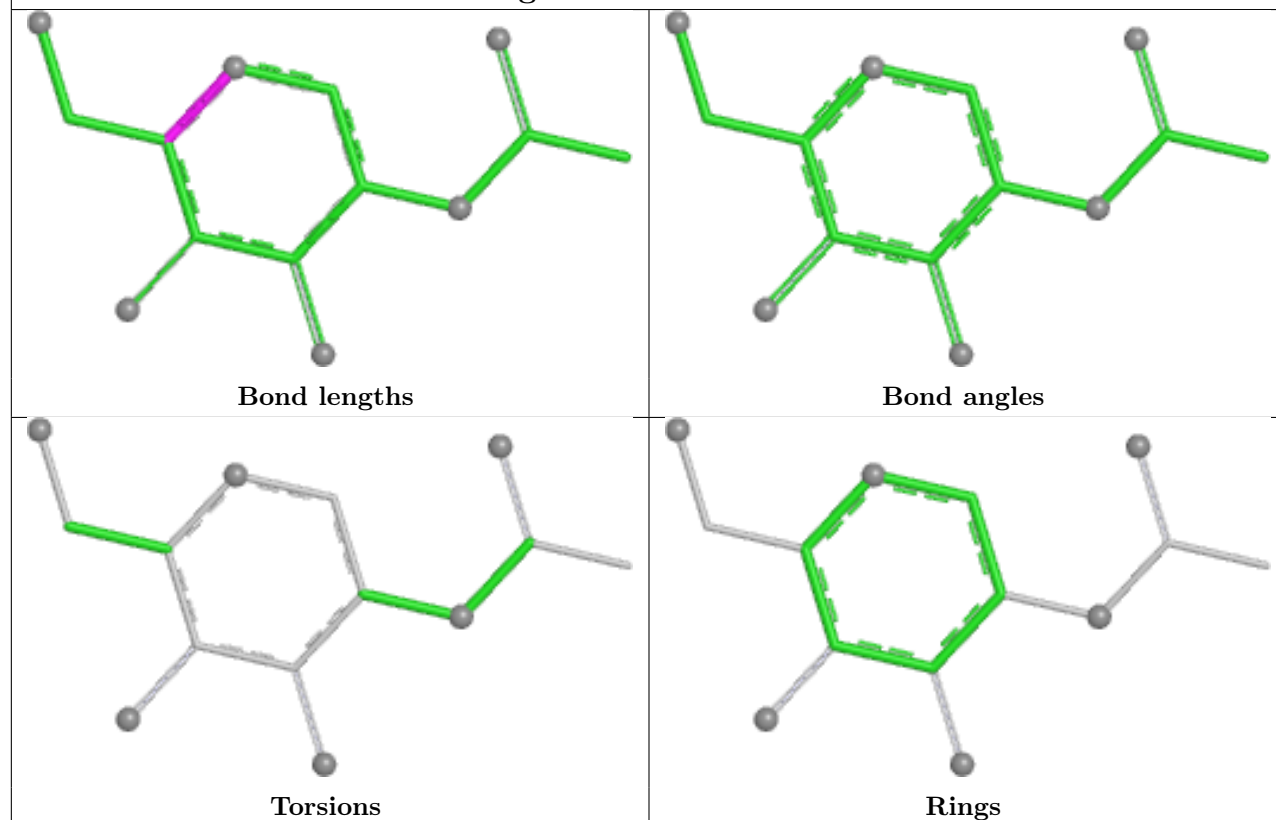
in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

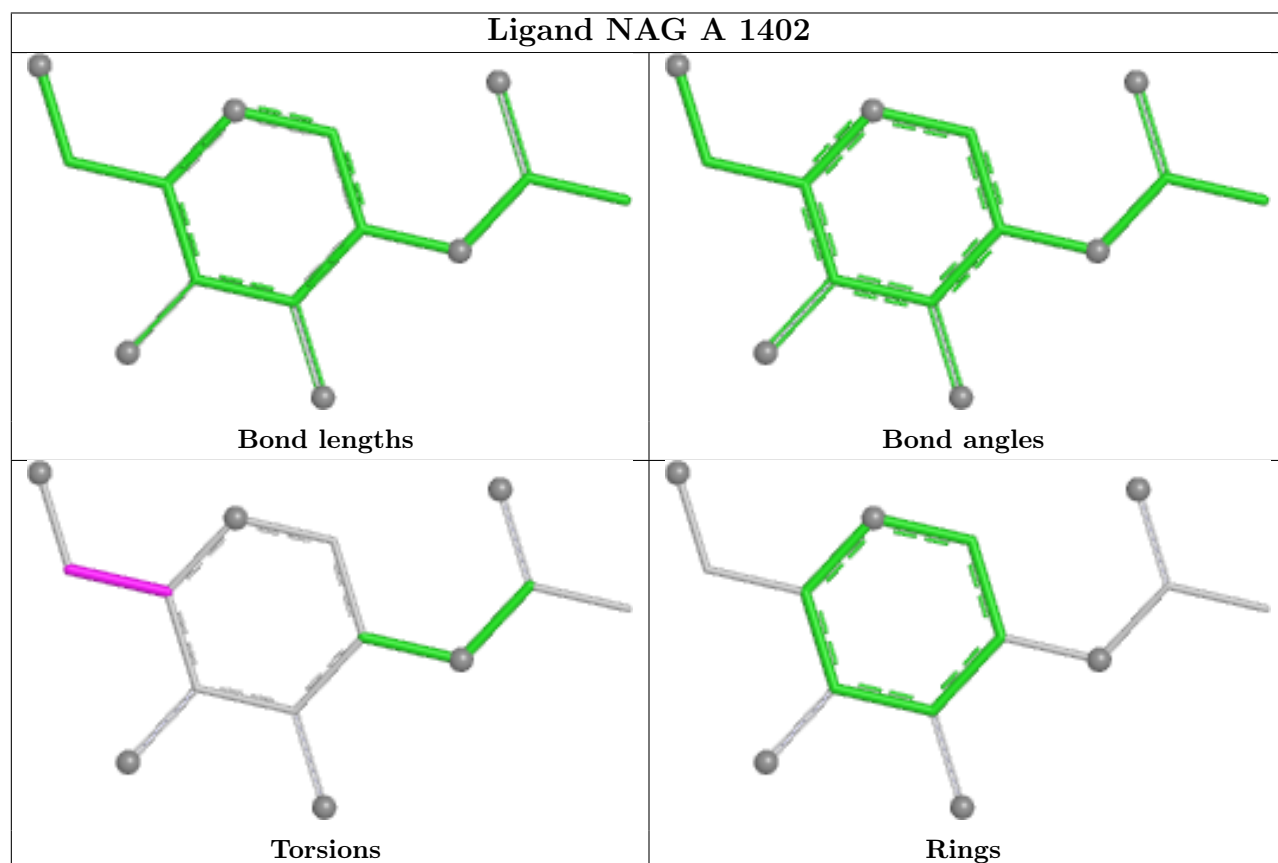
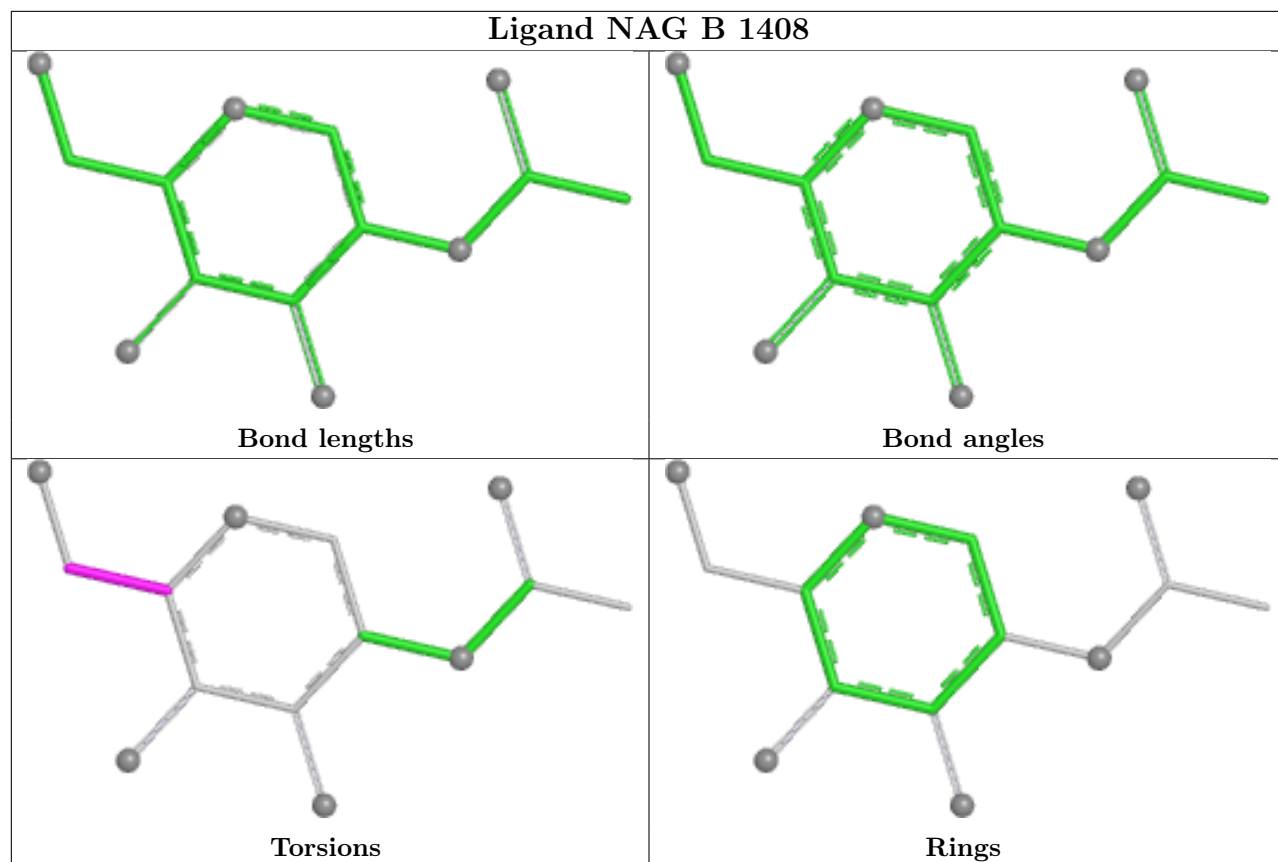


## Ligand NAG C 1408

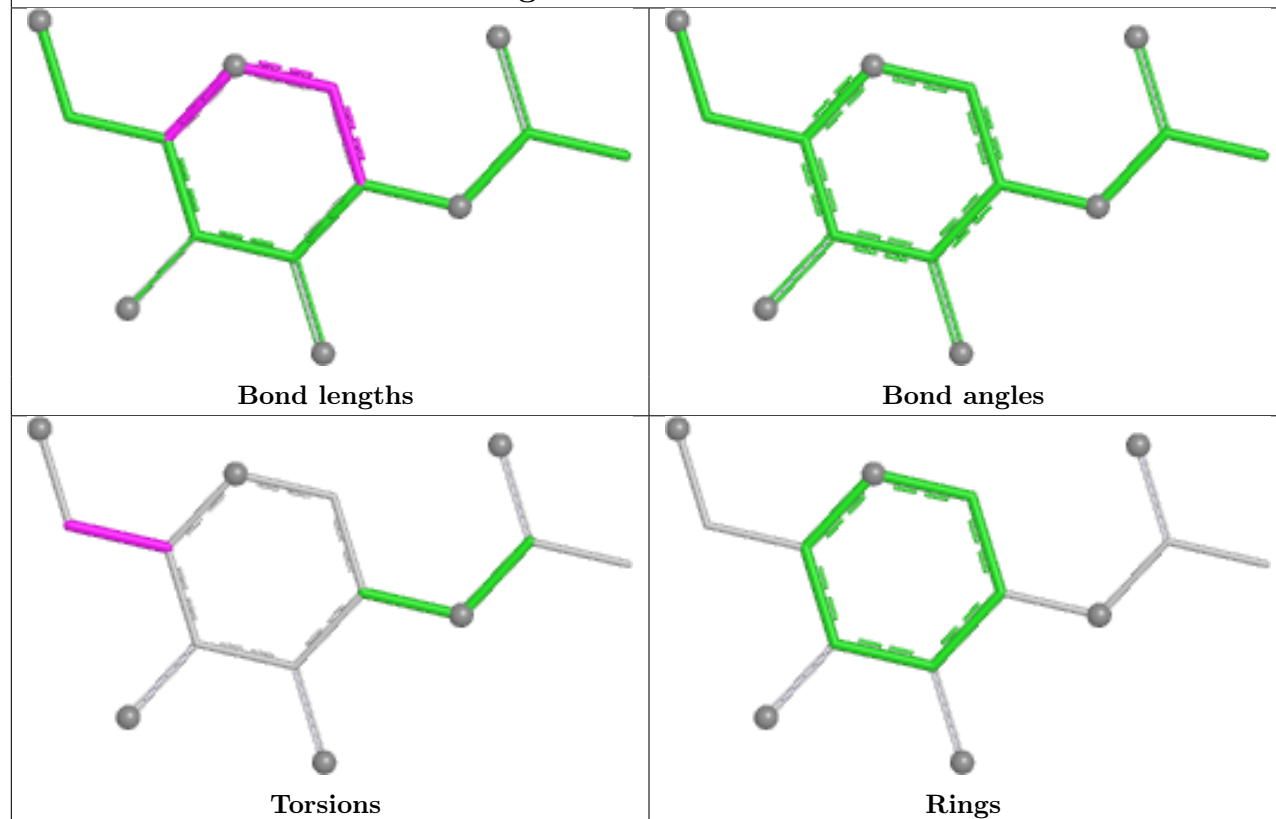


## Ligand NAG A 1406

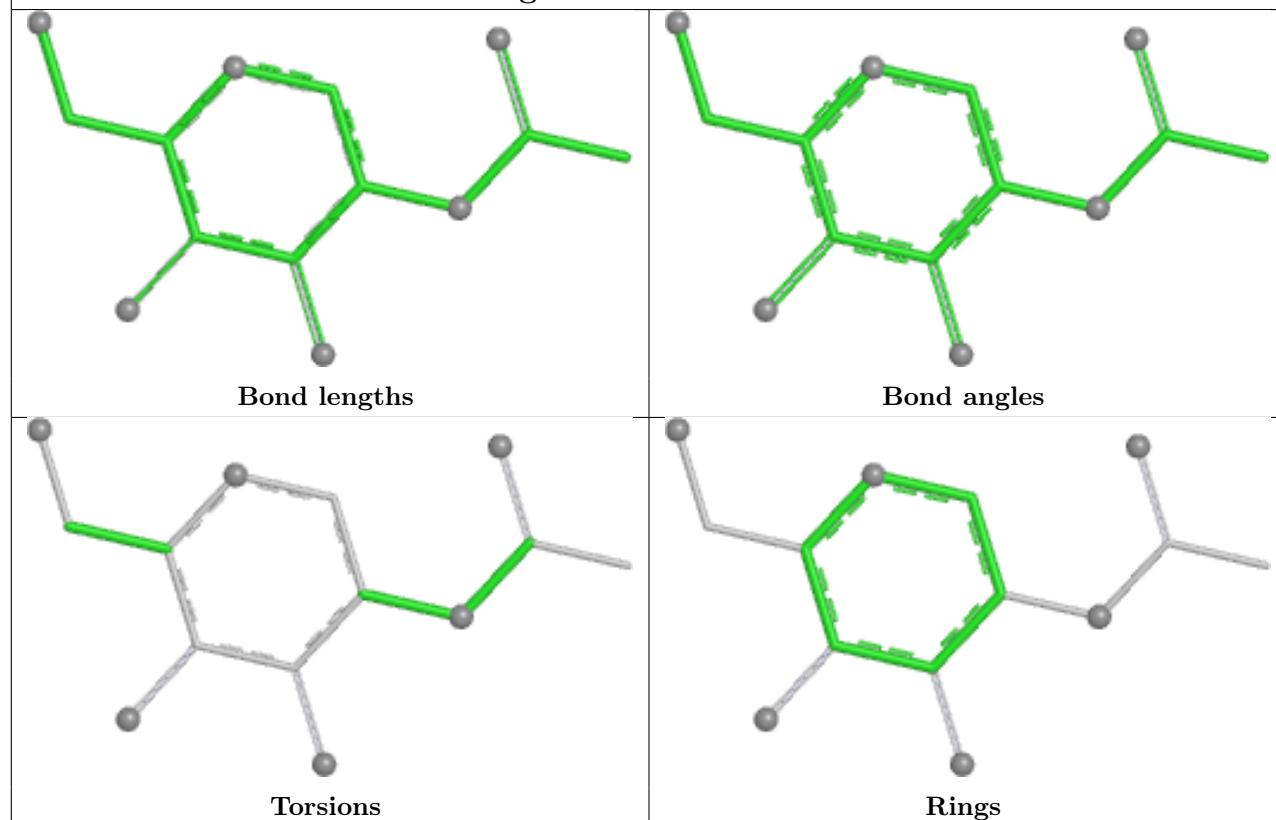




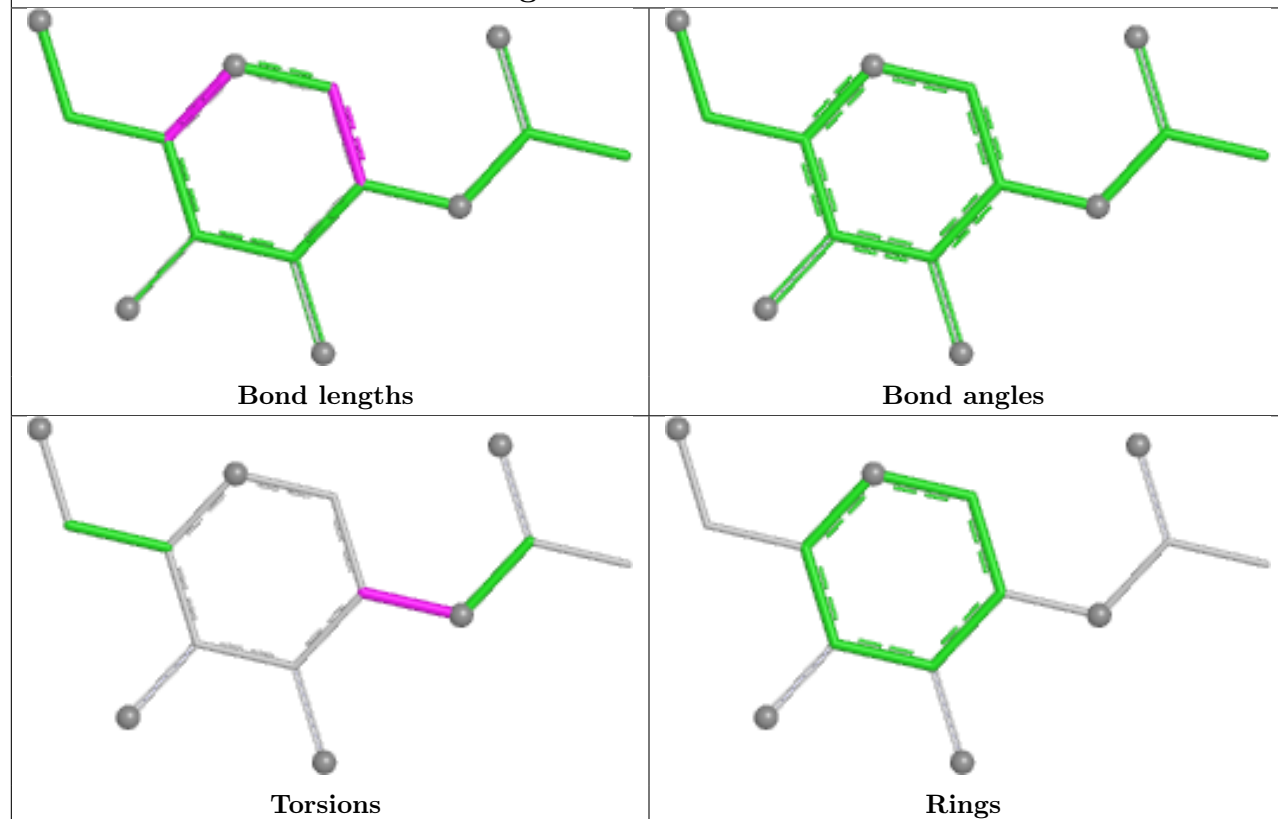
## Ligand NAG A 1403



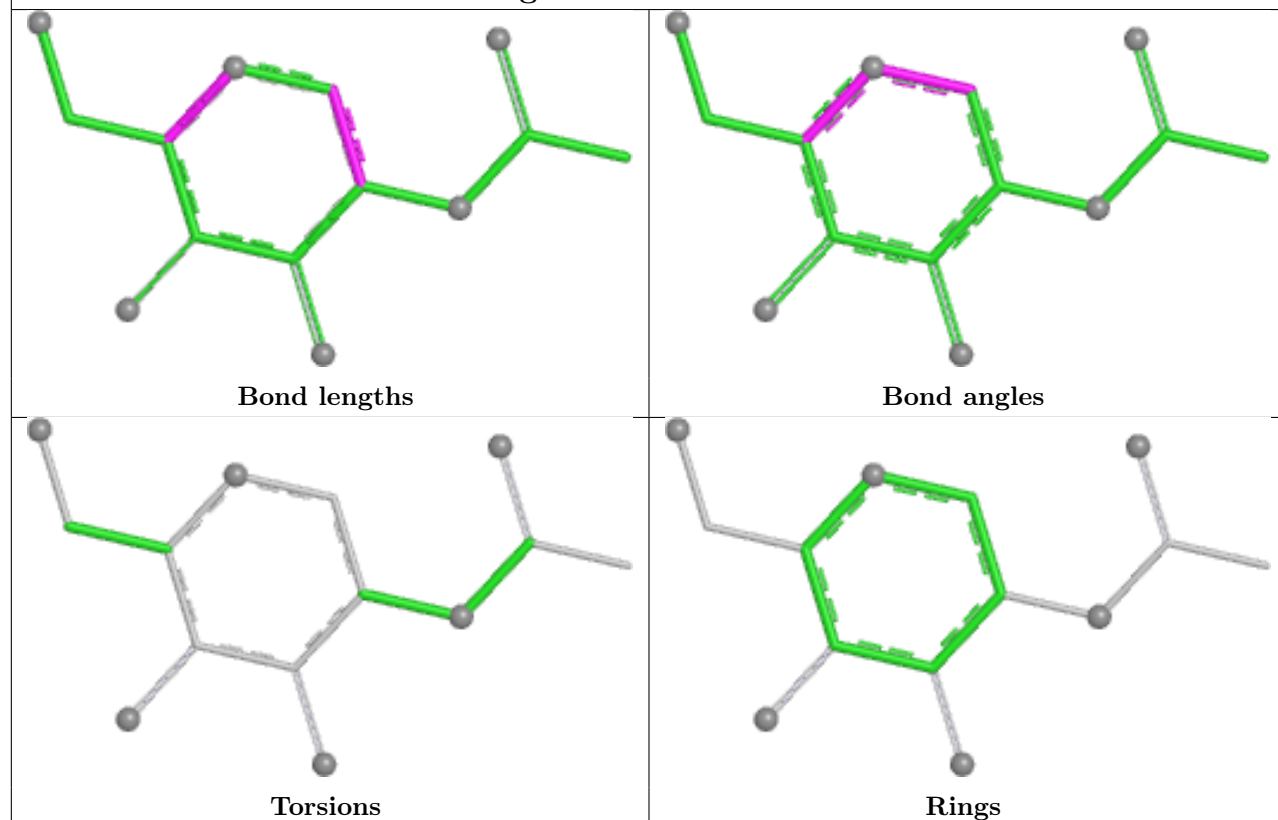
## Ligand NAG C 1402



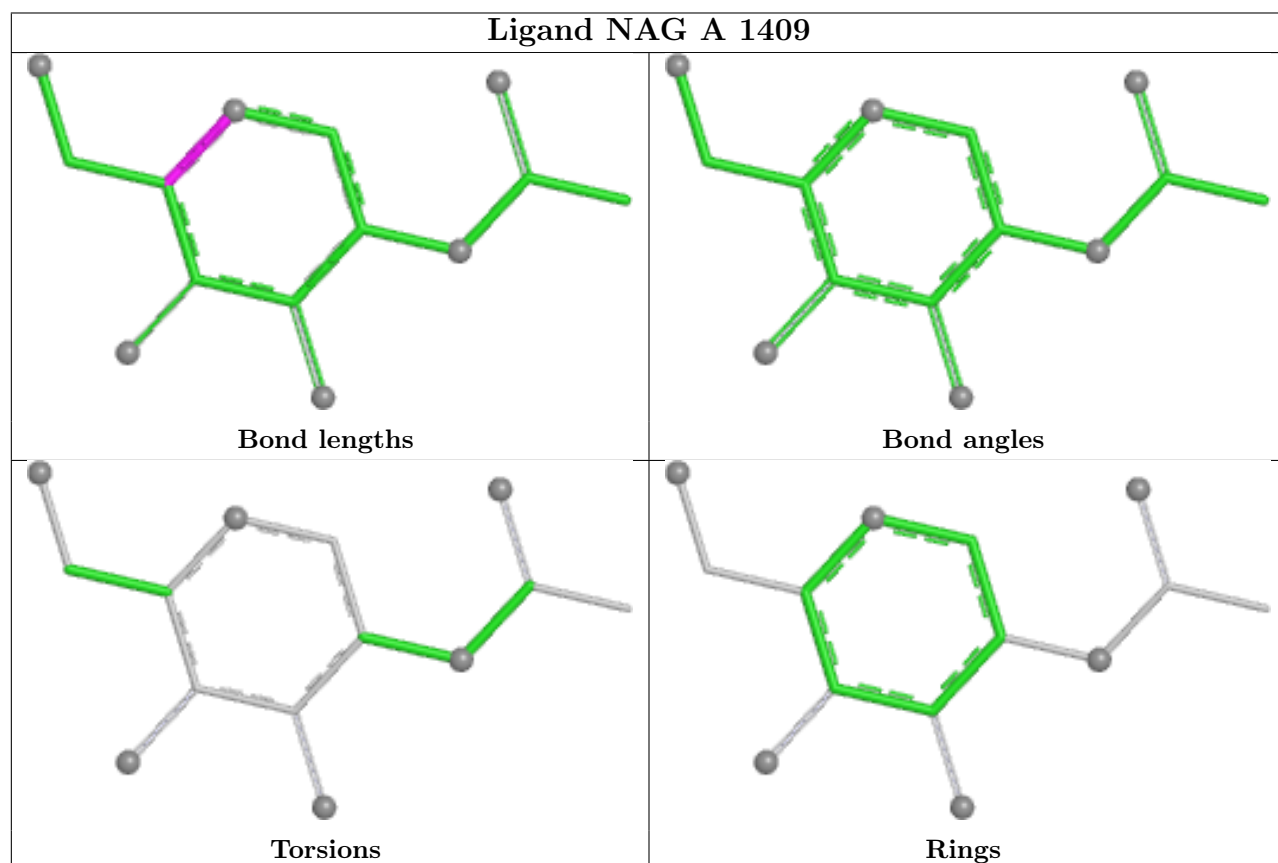
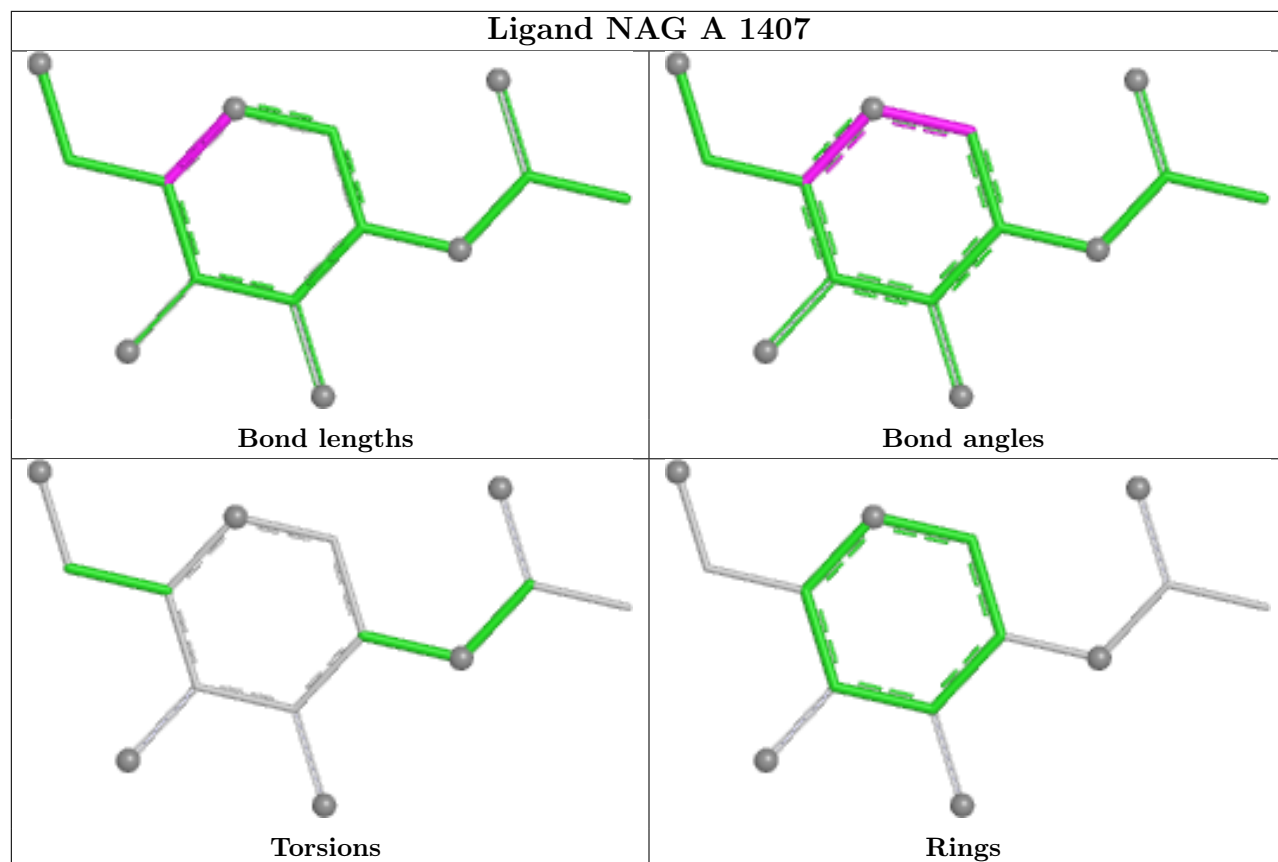
## Ligand NAG C 1406



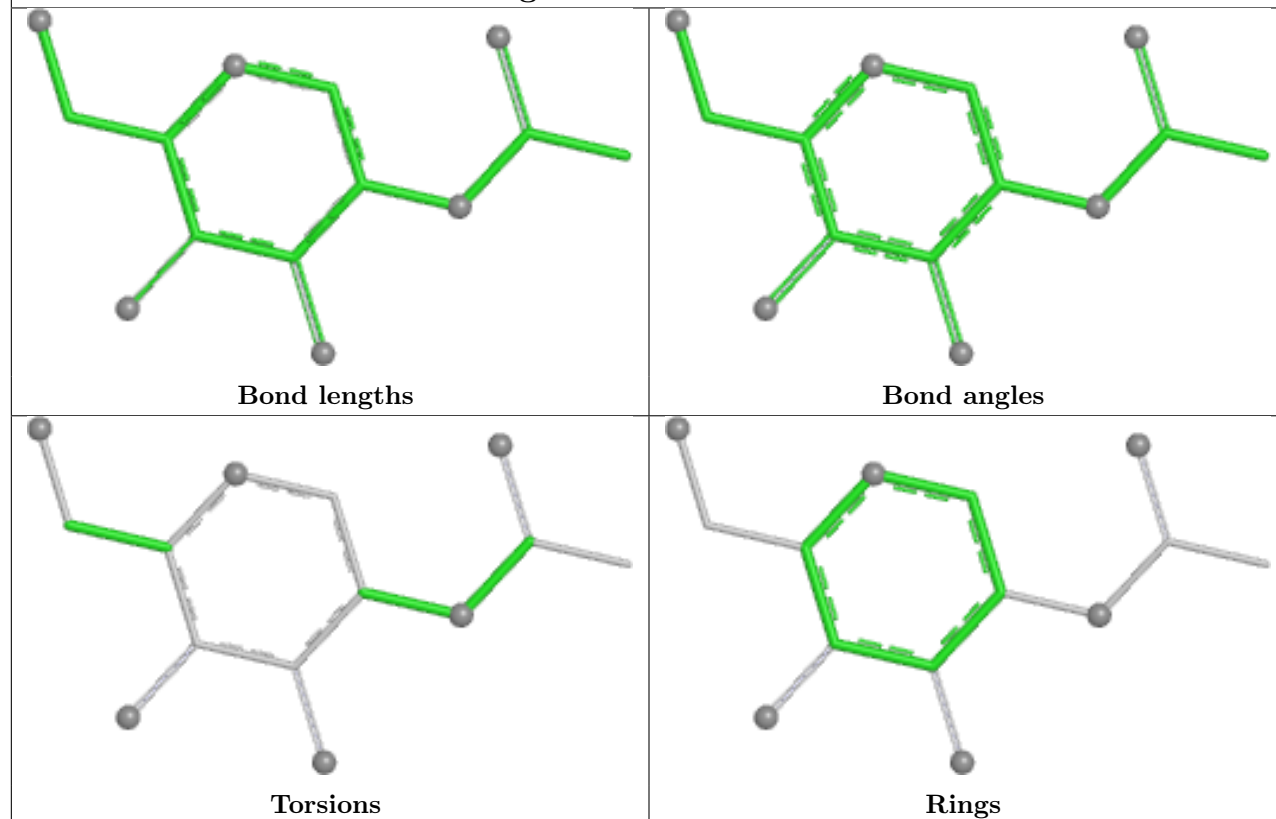
## Ligand NAG B 1404



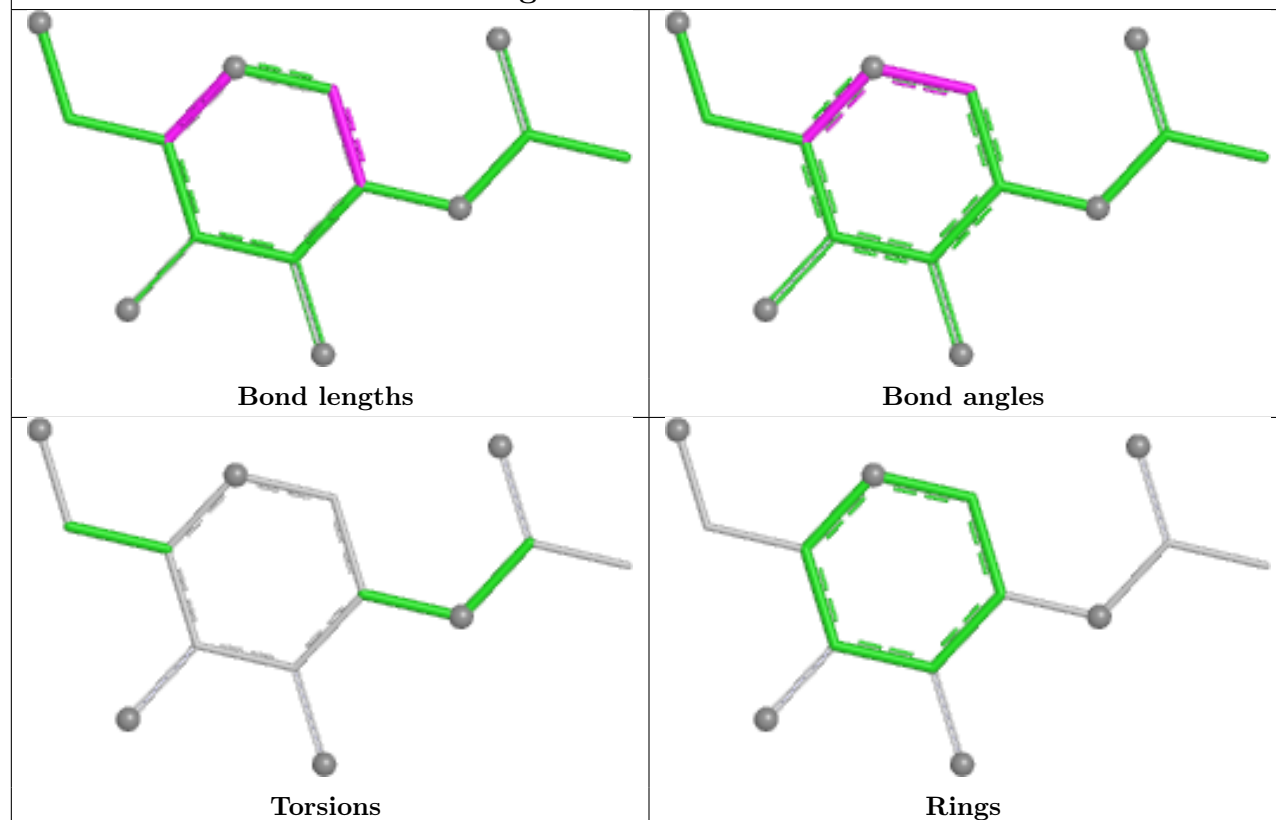


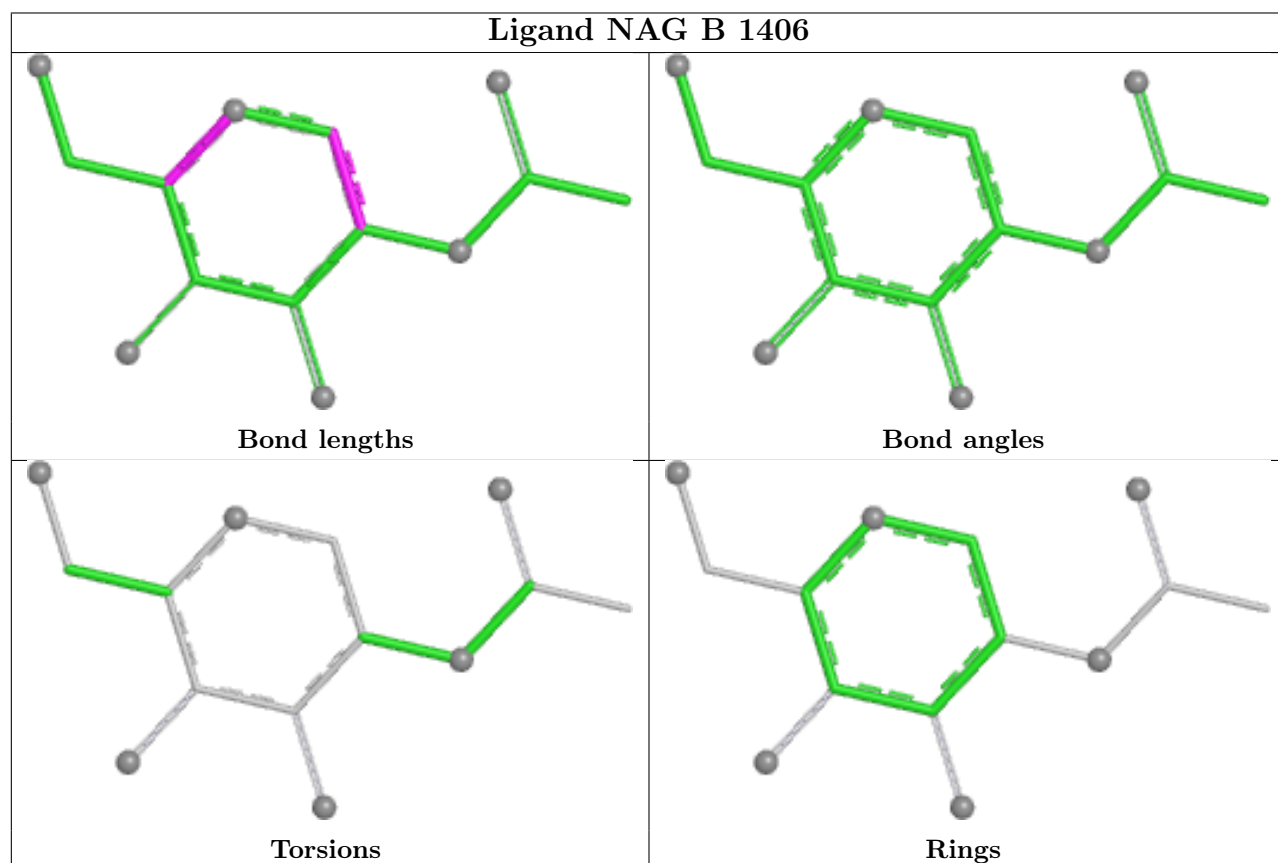
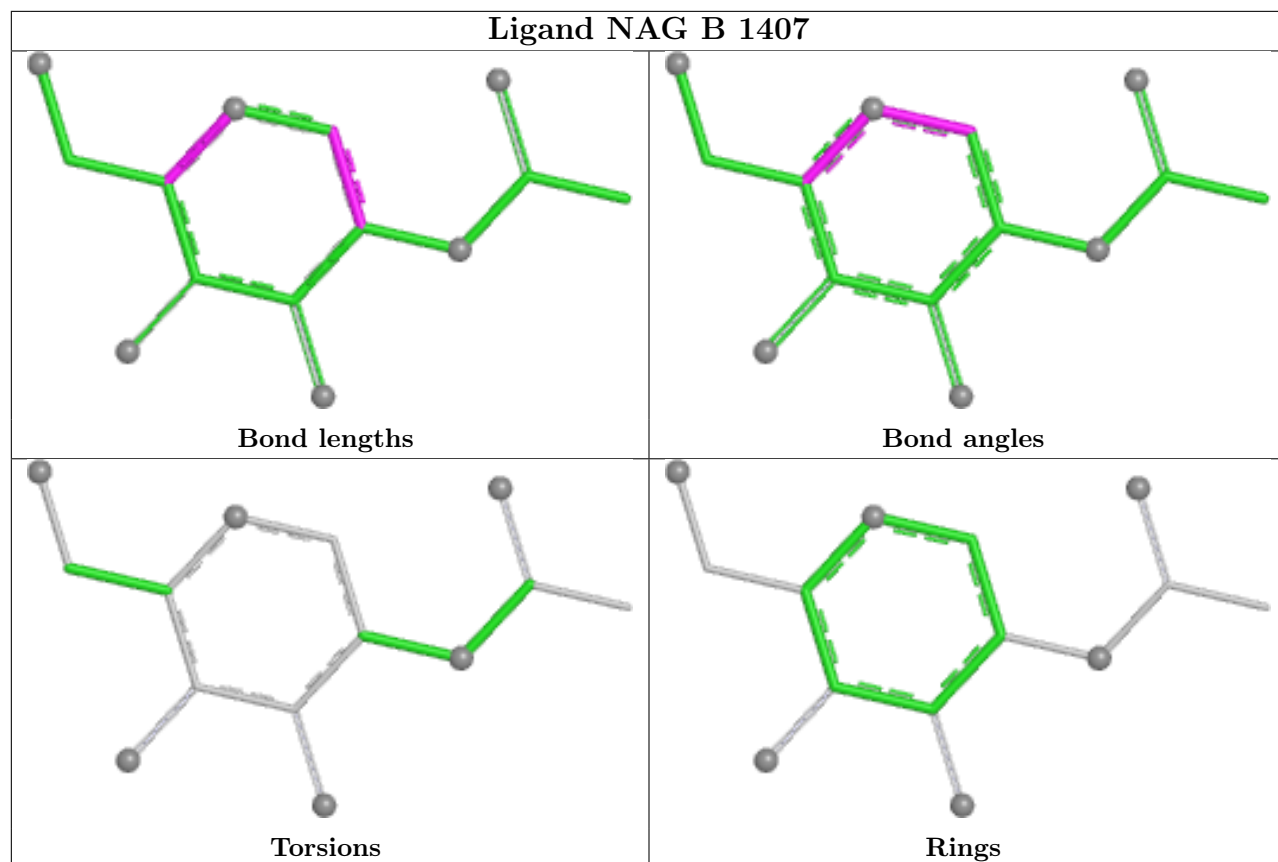


## Ligand NAG C 1403

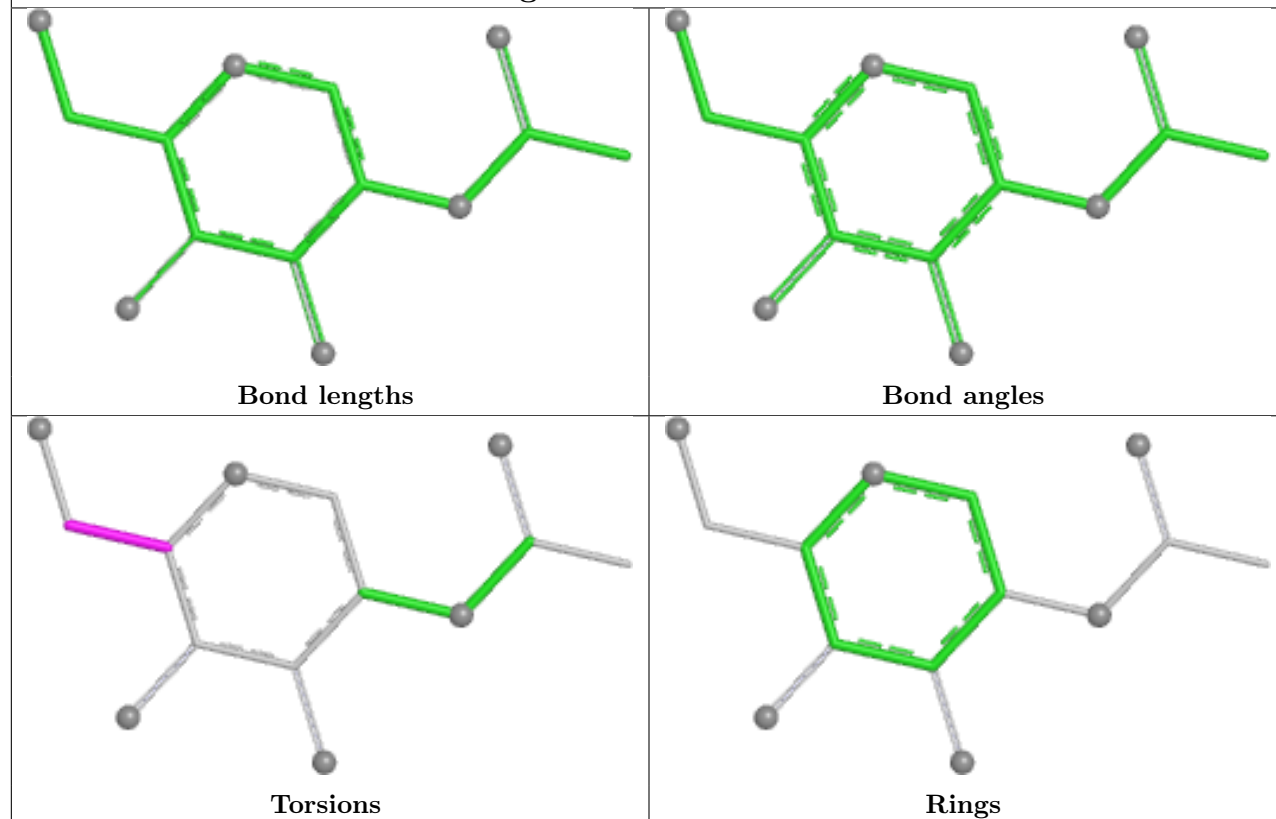


## Ligand NAG C 1405

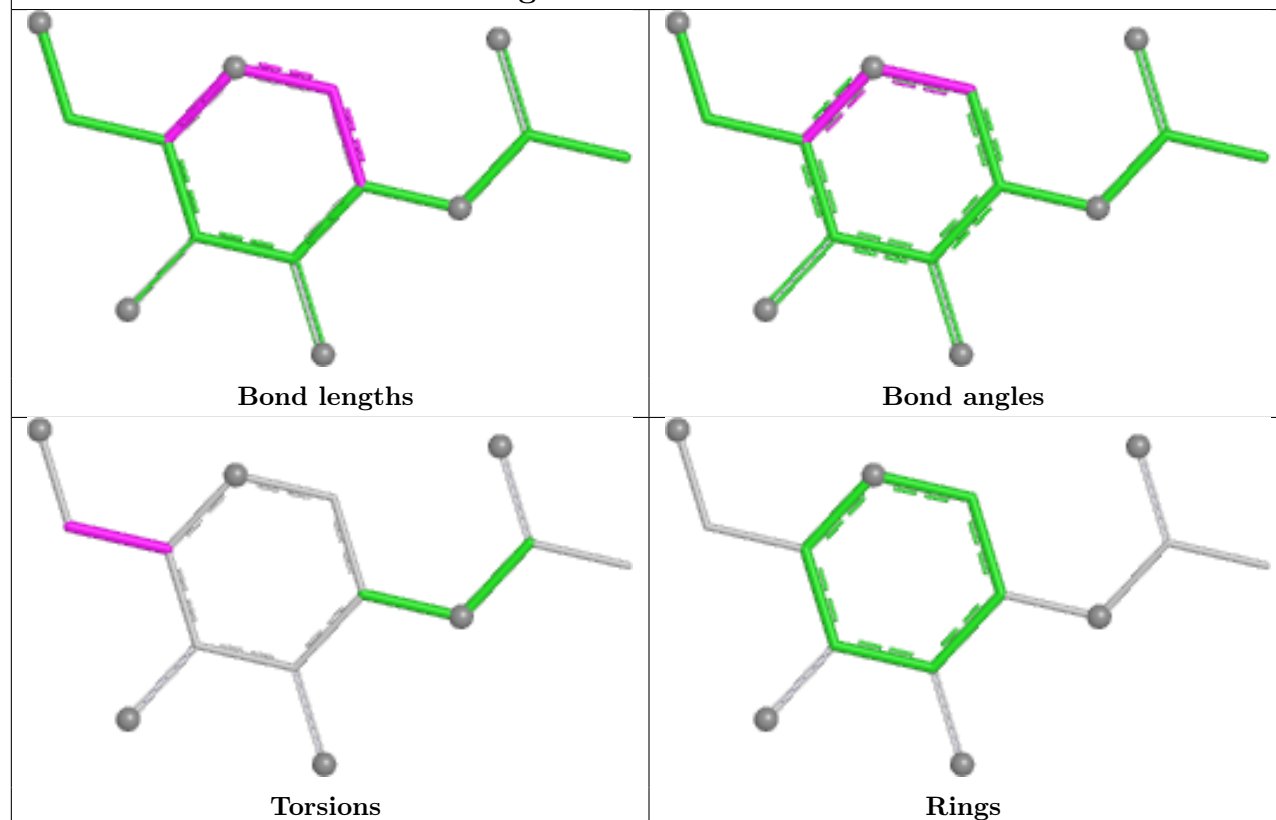




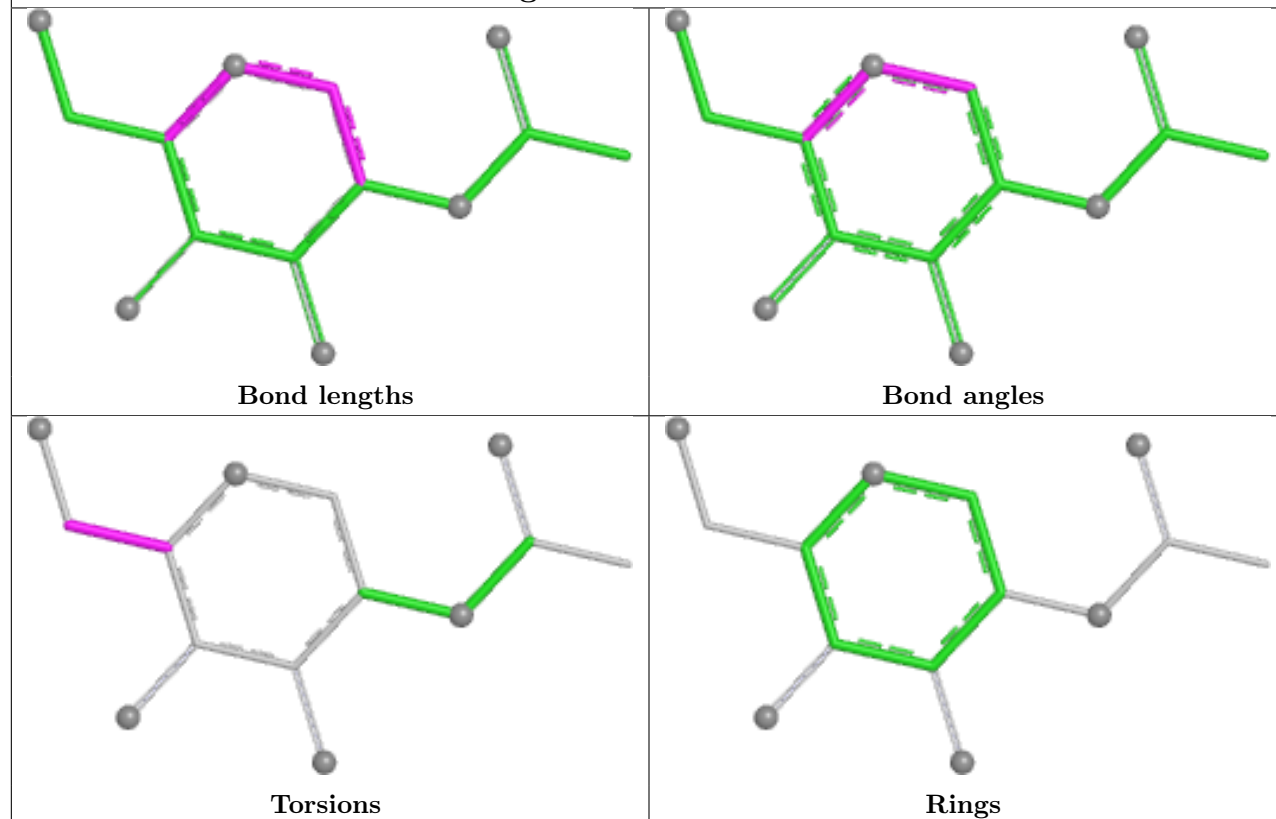
## Ligand NAG B 1402



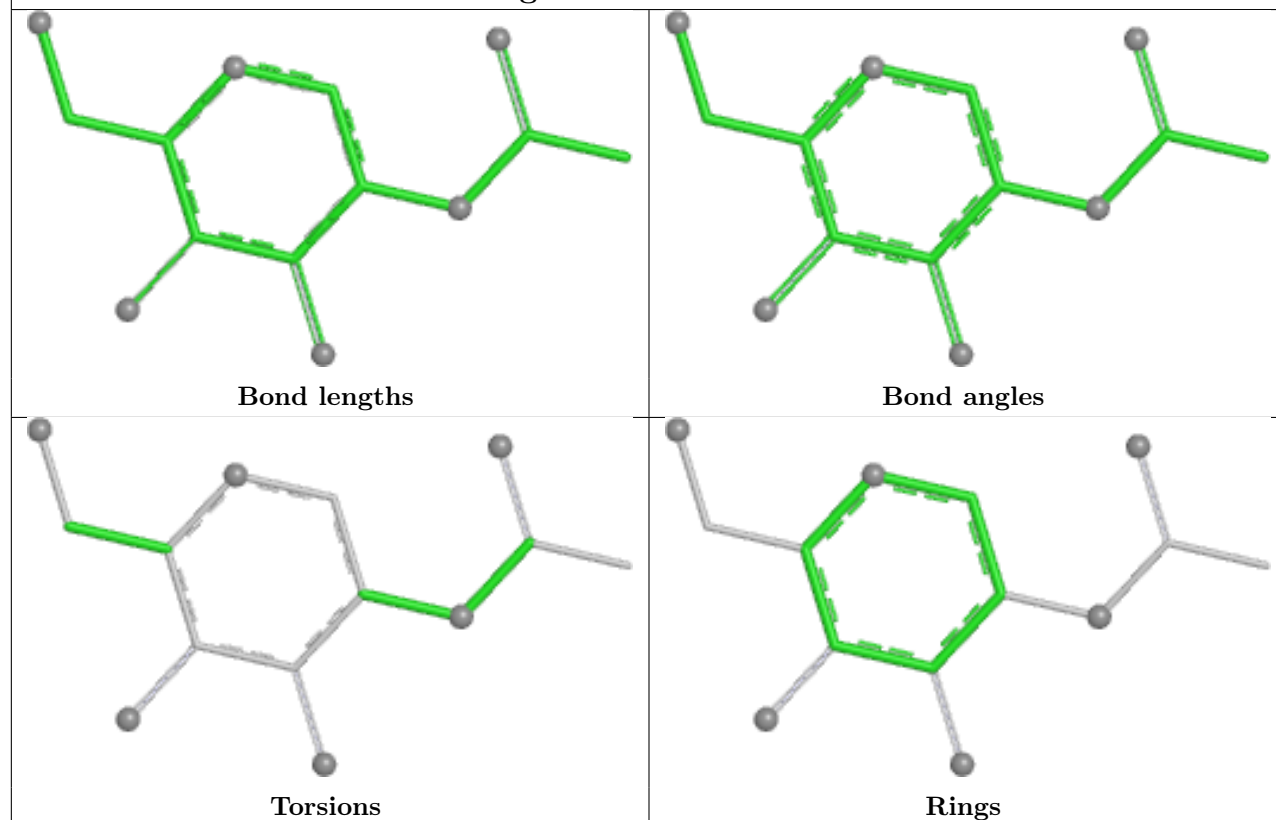
## Ligand NAG A 1408



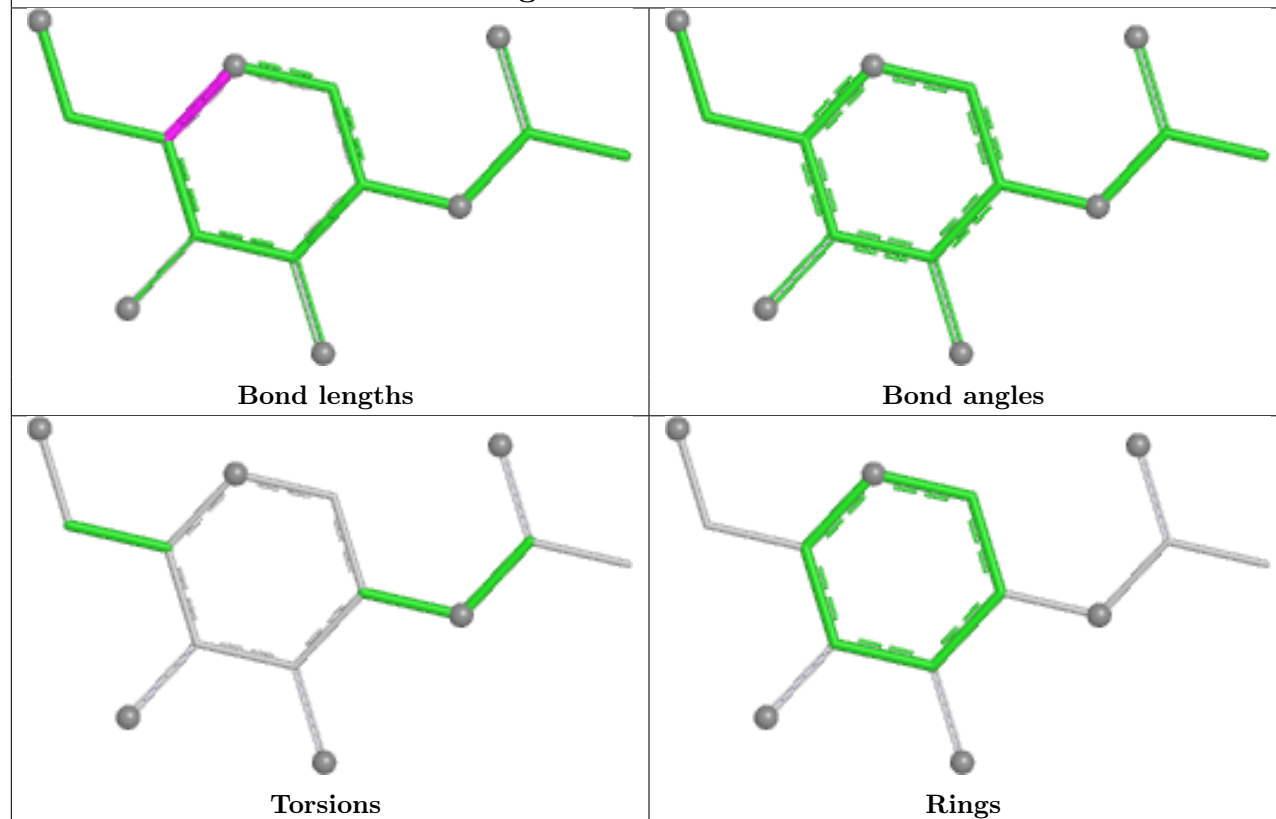
## Ligand NAG B 1405



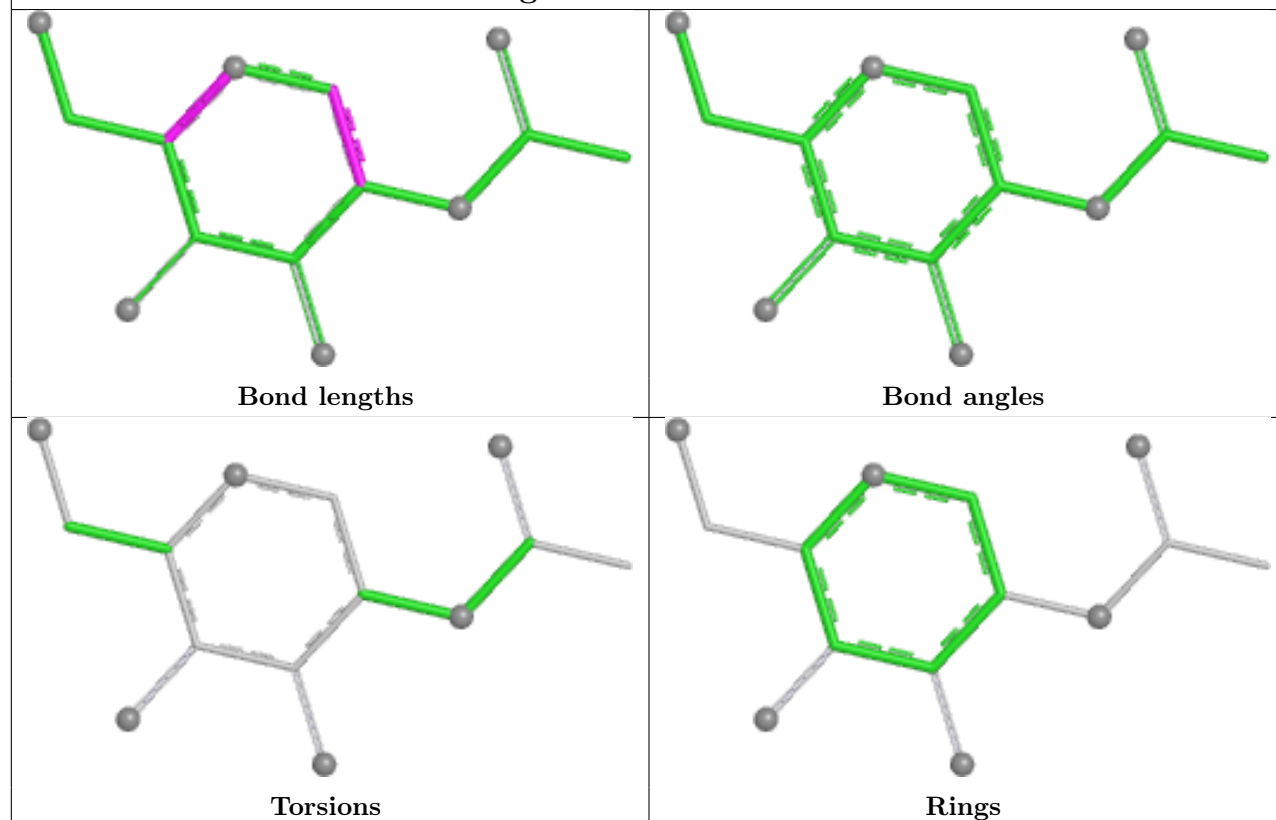
## Ligand NAG B 1403



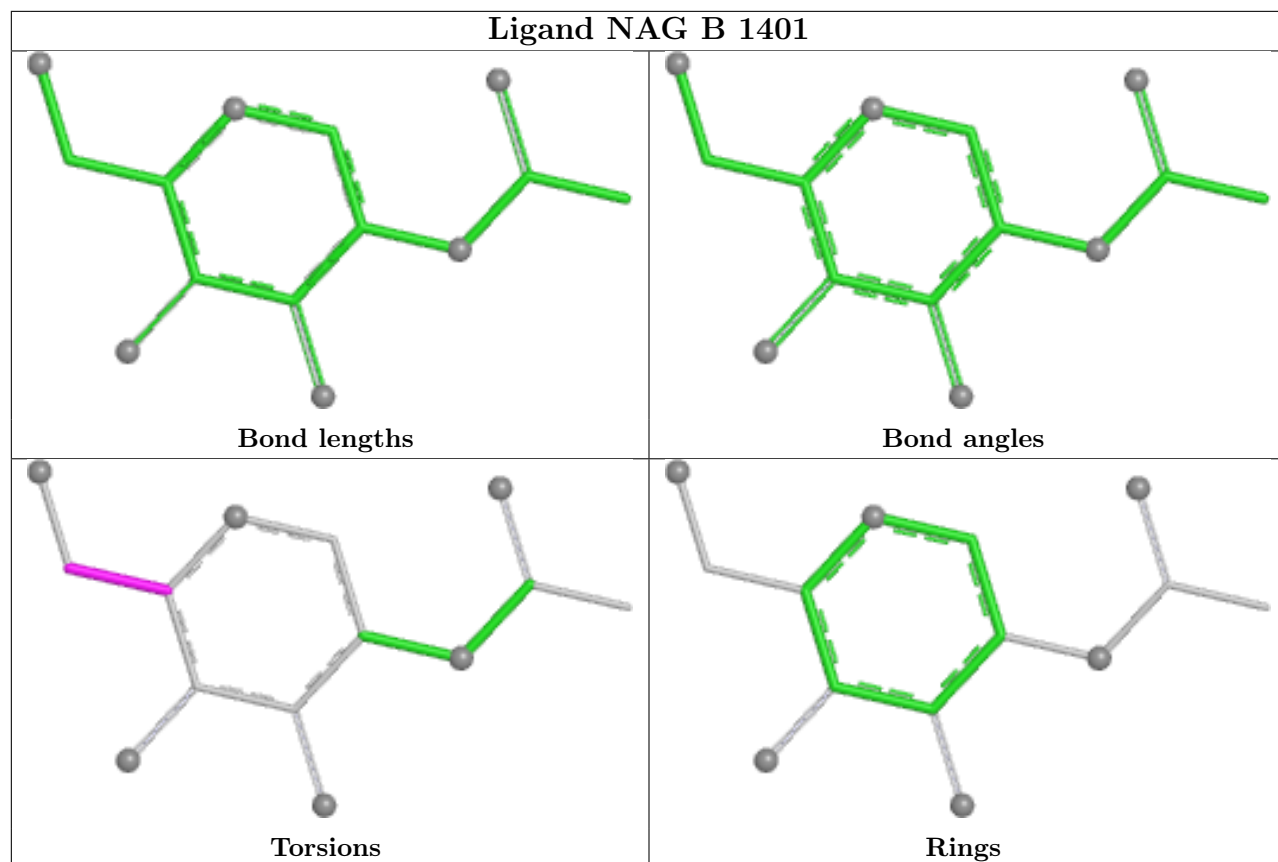
## Ligand NAG A 1401



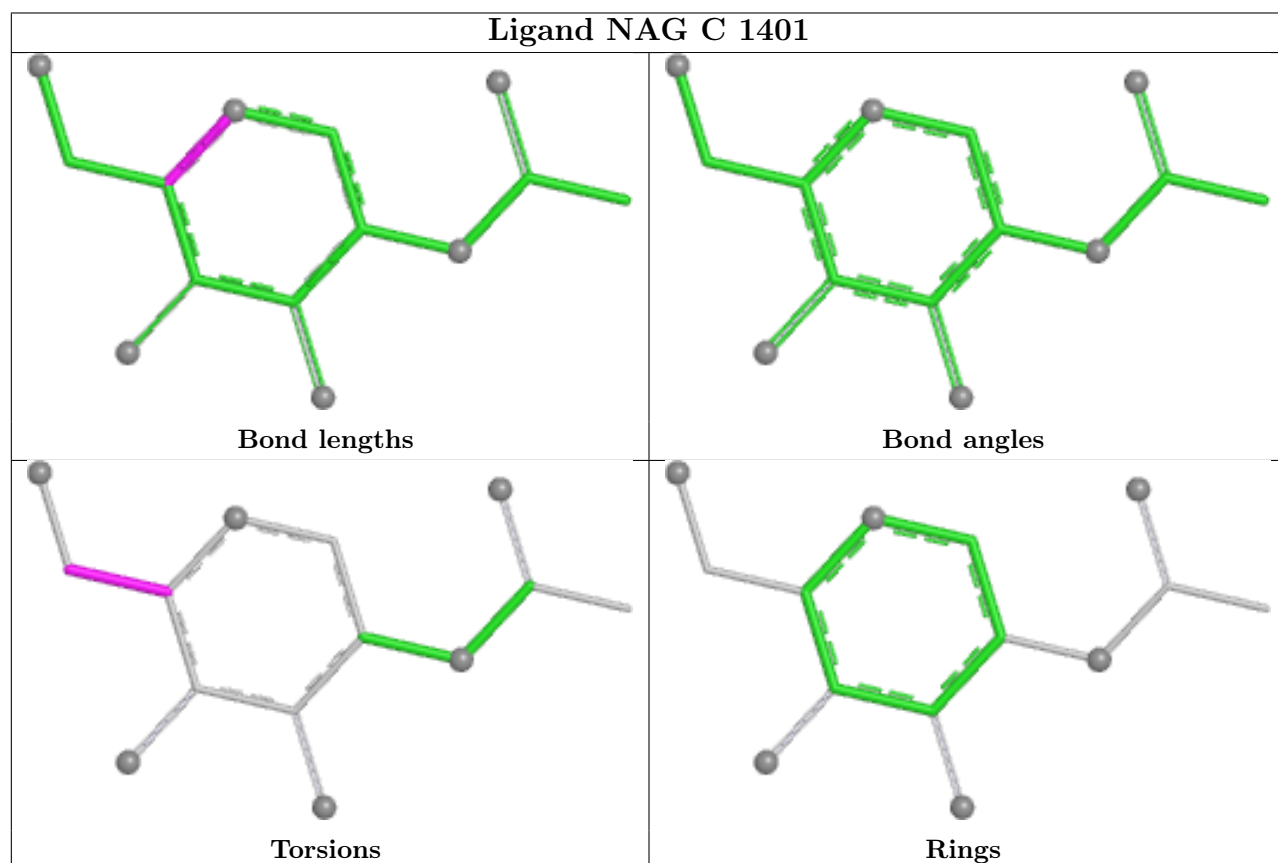
## Ligand NAG B 1409

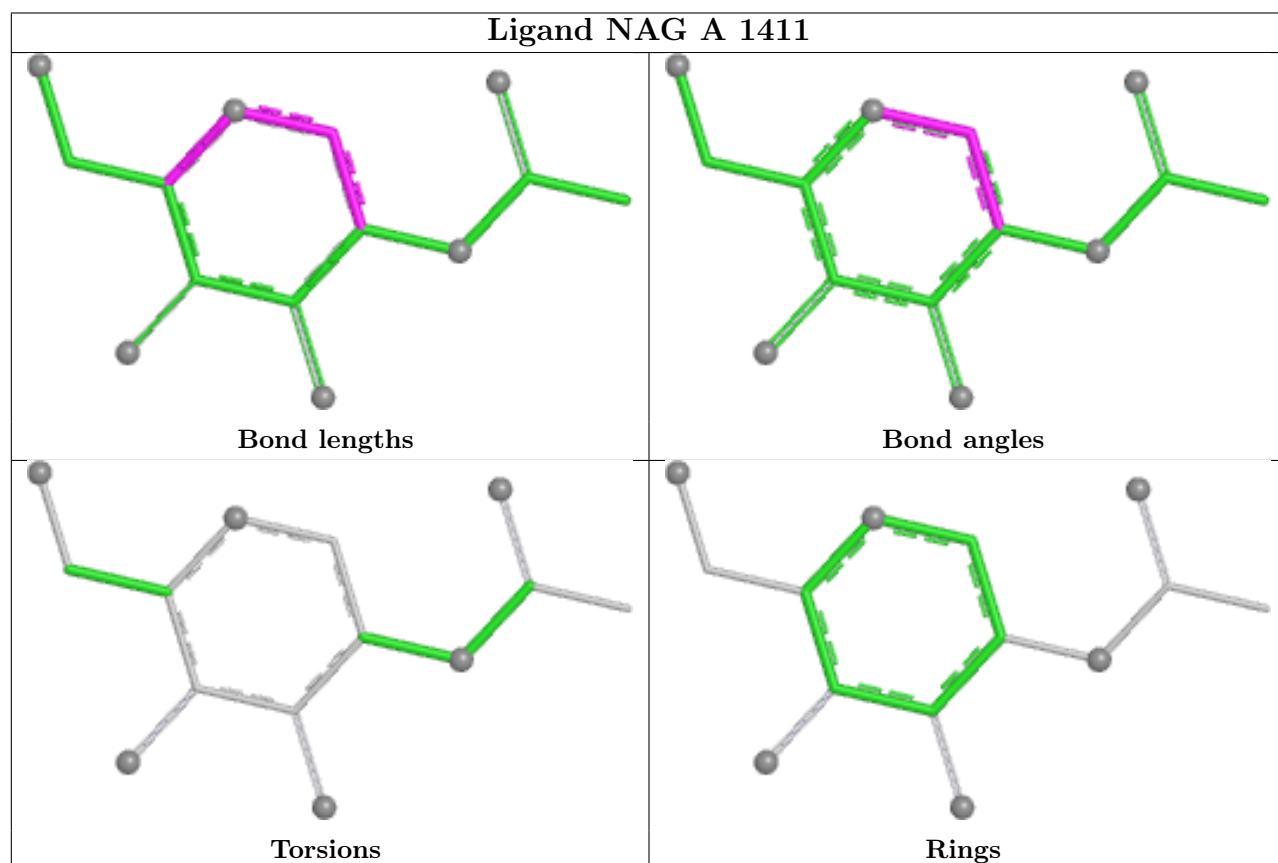
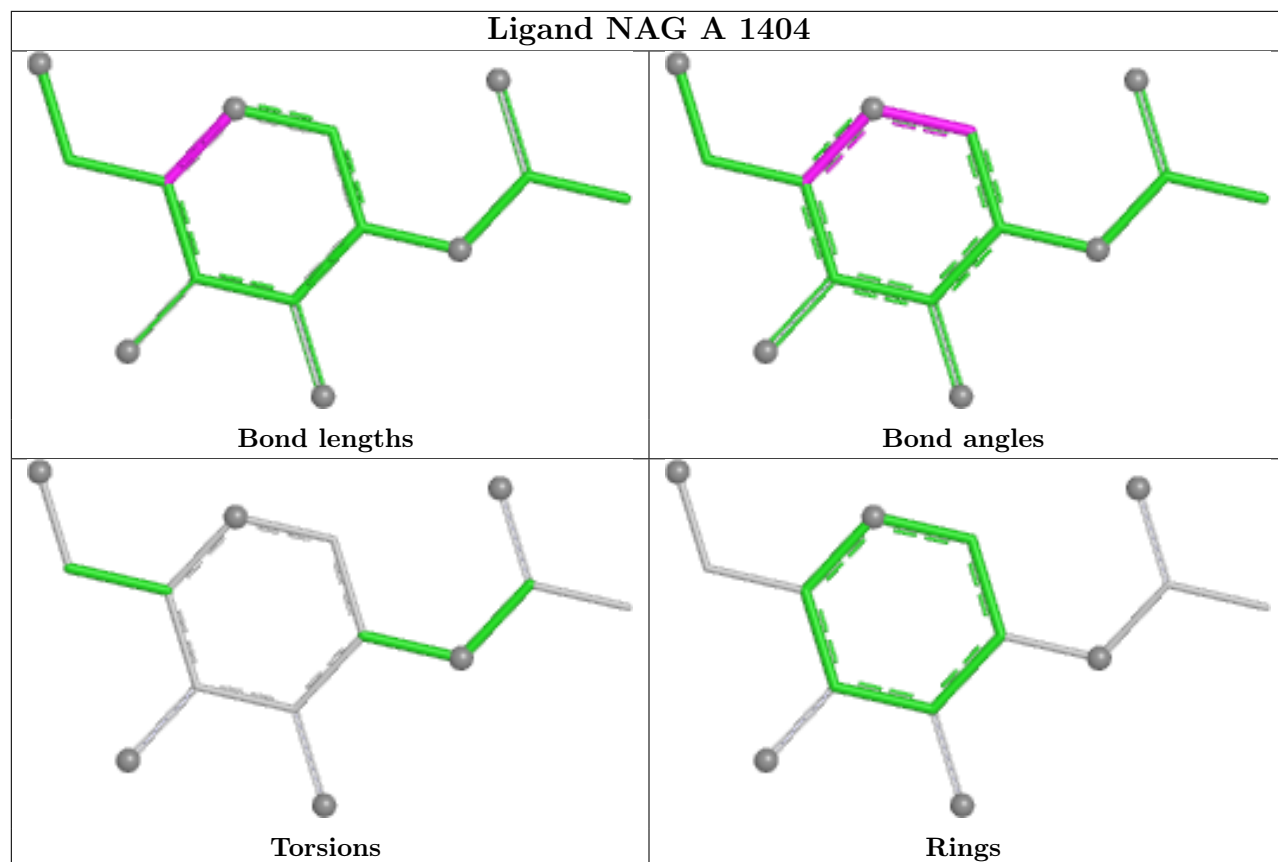


## Ligand NAG B 1401

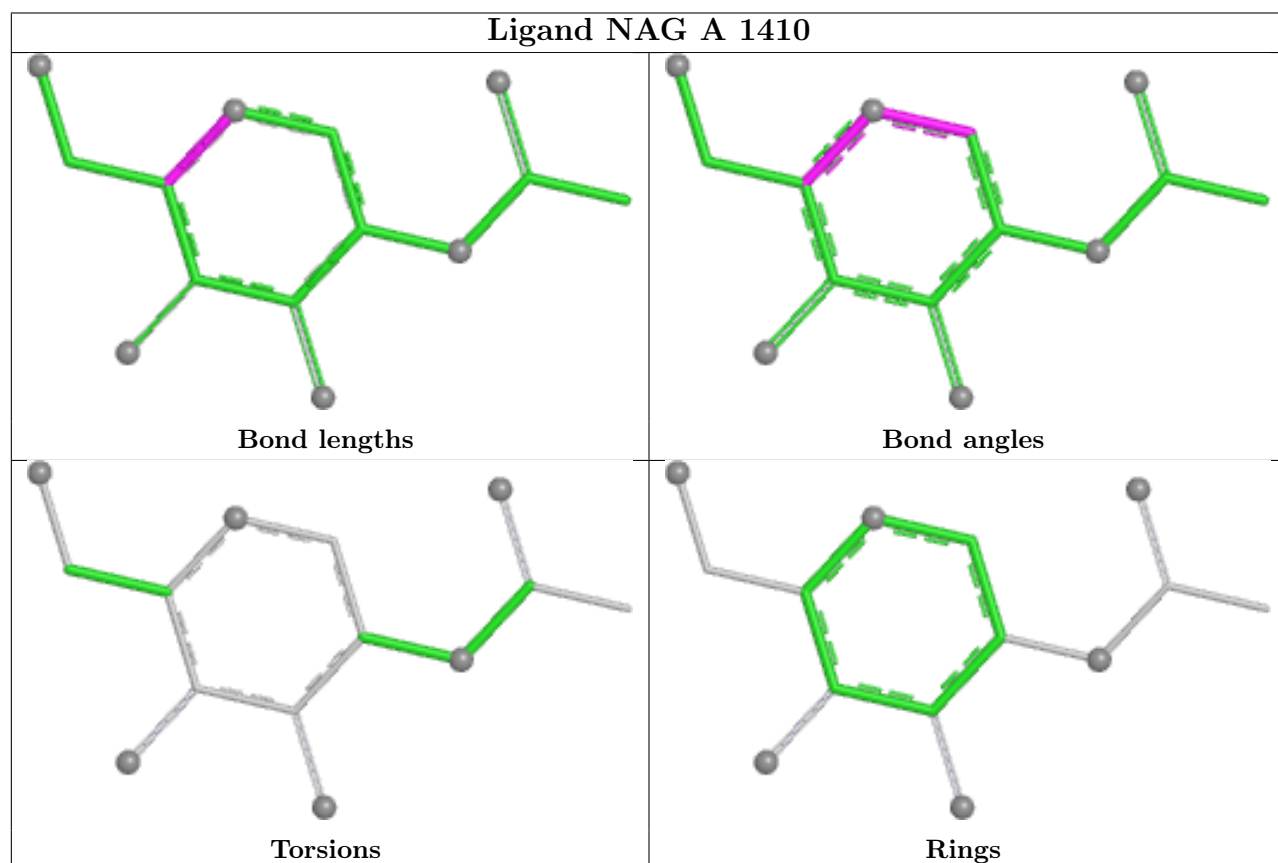
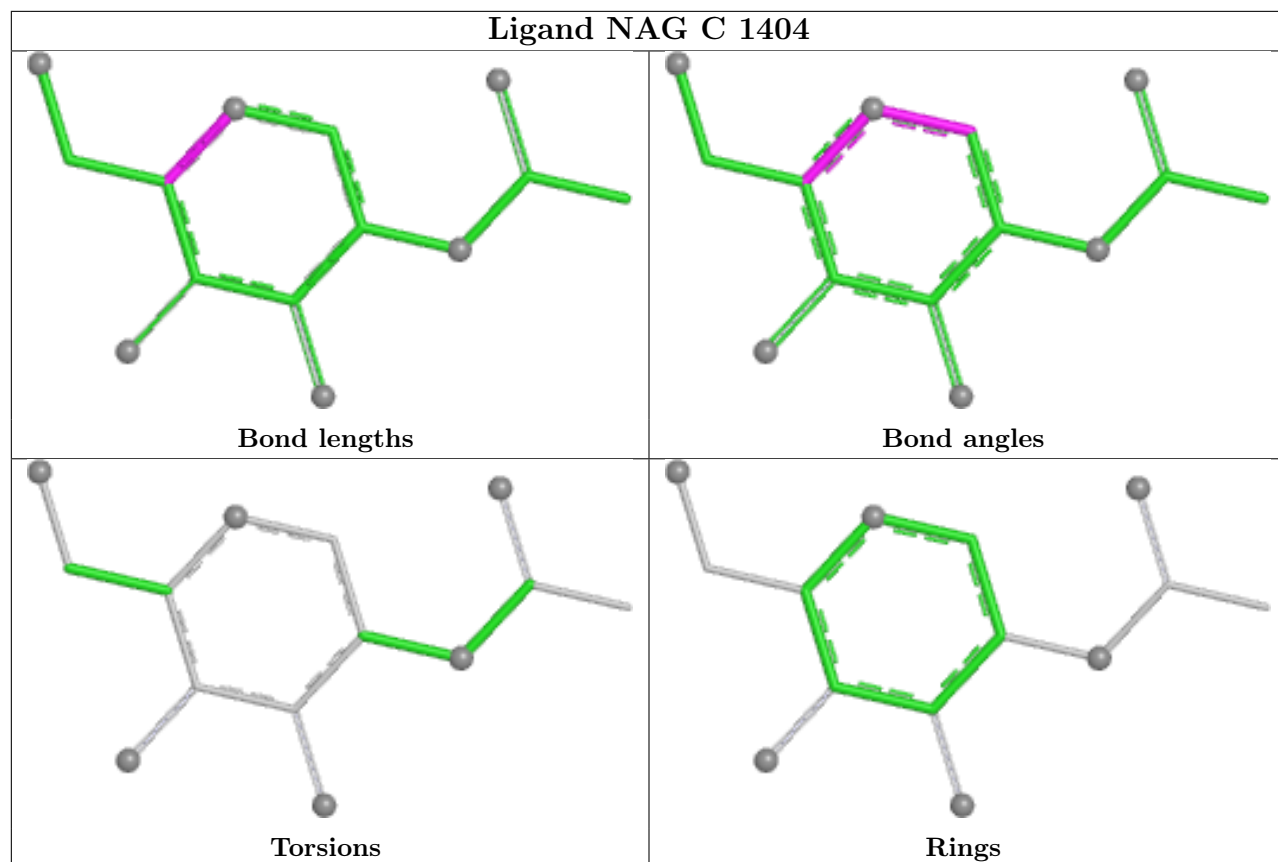


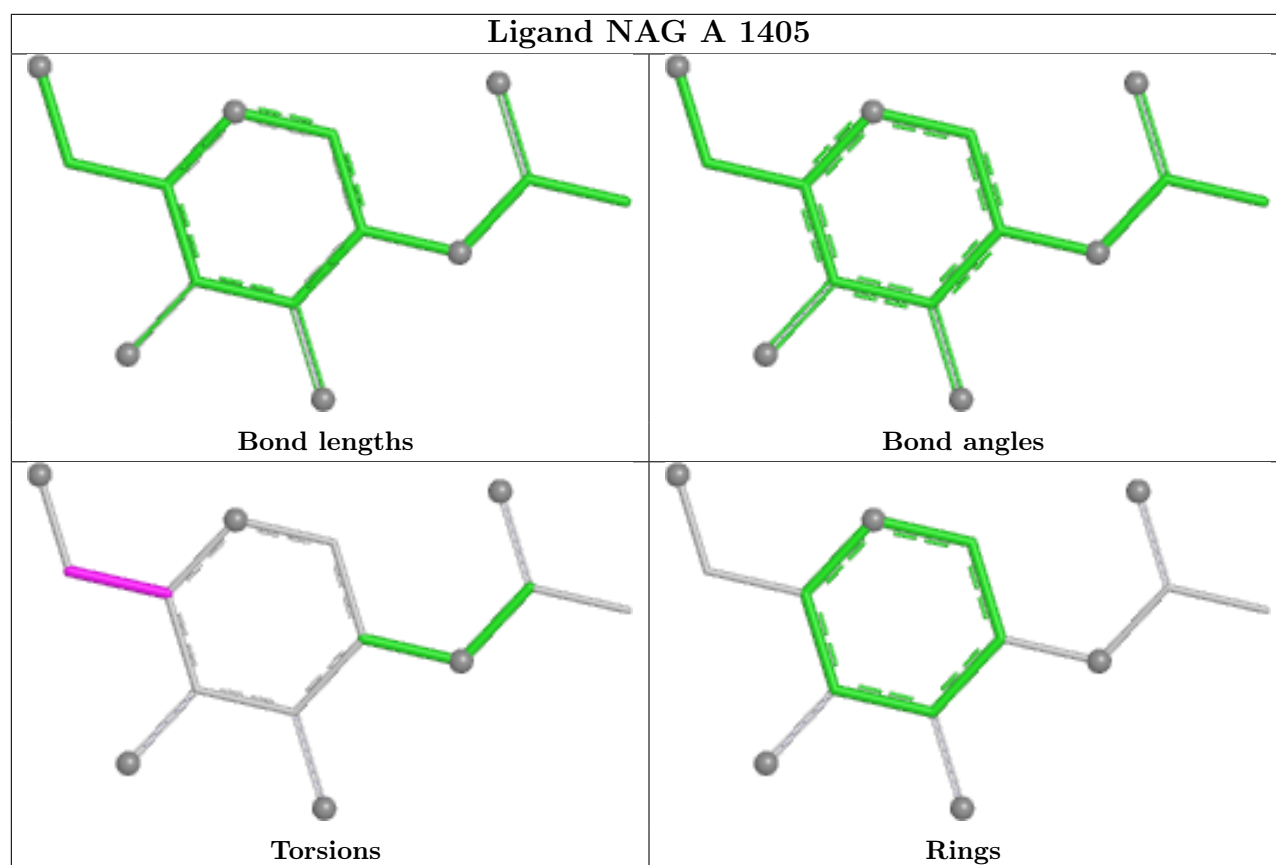
## Ligand NAG C 1401











## 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.

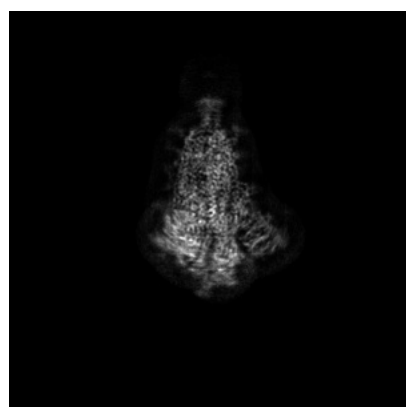
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-24124. These allow visual inspection of the internal detail of the map and identification of artifacts.

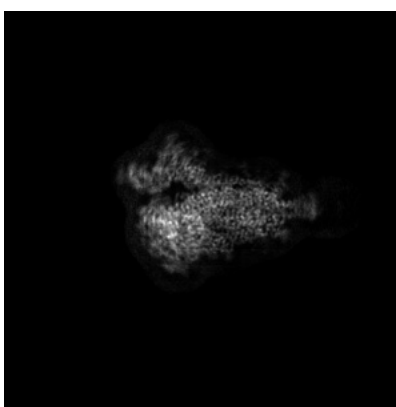
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

### 6.1 Orthogonal projections [i](#)

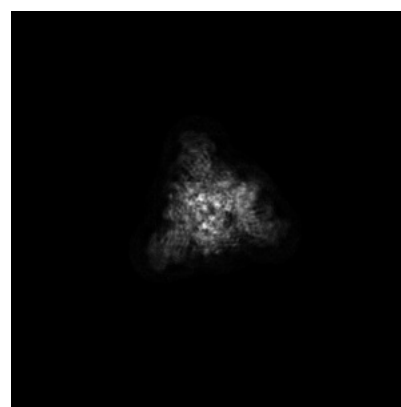
#### 6.1.1 Primary map



X



Y

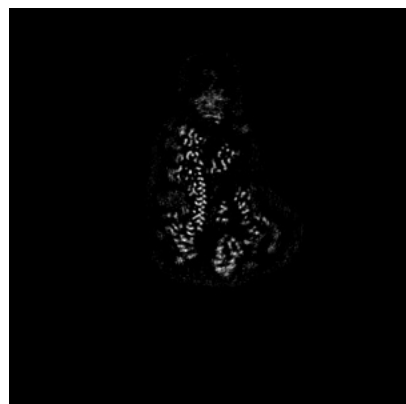


Z

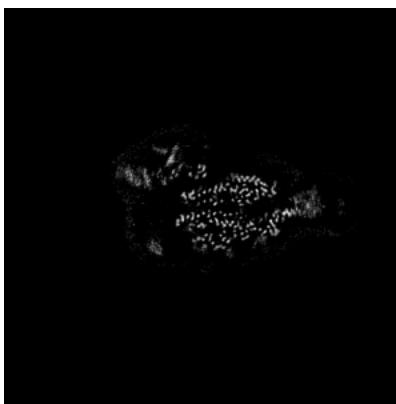
The images above show the map projected in three orthogonal directions.

### 6.2 Central slices [i](#)

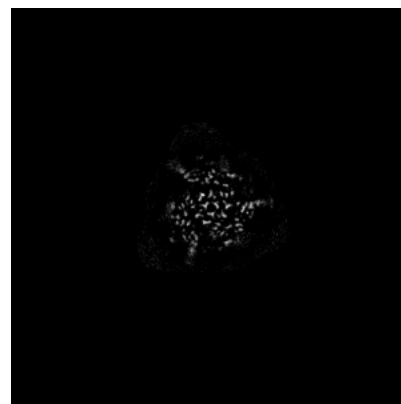
#### 6.2.1 Primary map



X Index: 240



Y Index: 240

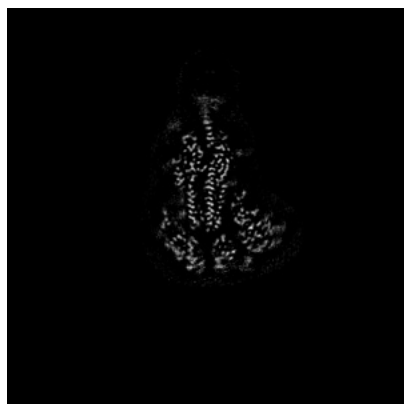


Z Index: 240

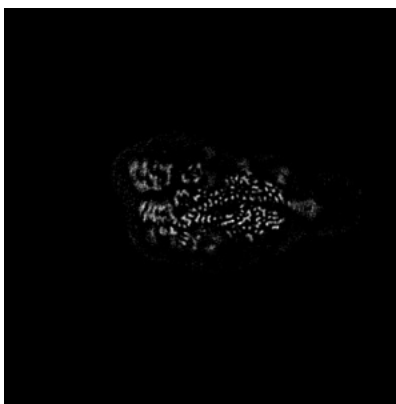
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices [i](#)

### 6.3.1 Primary map



X Index: 231



Y Index: 253

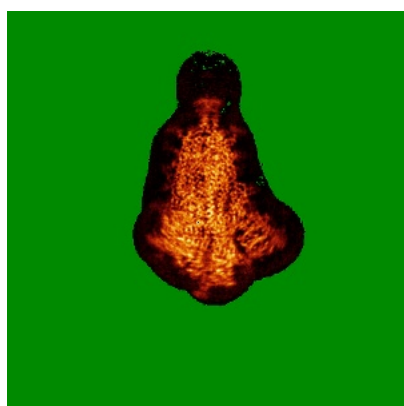


Z Index: 207

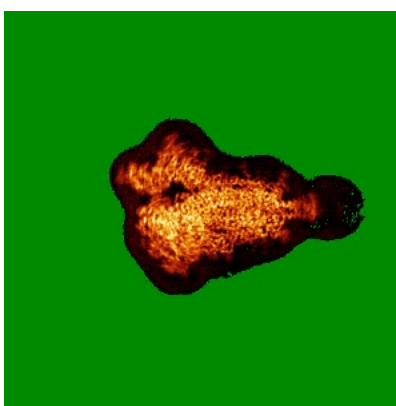
The images above show the largest variance slices of the map in three orthogonal directions.

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

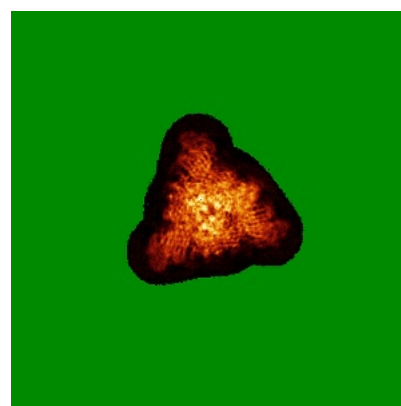
### 6.4.1 Primary map



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 [i](#)

### 6.5.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.25. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

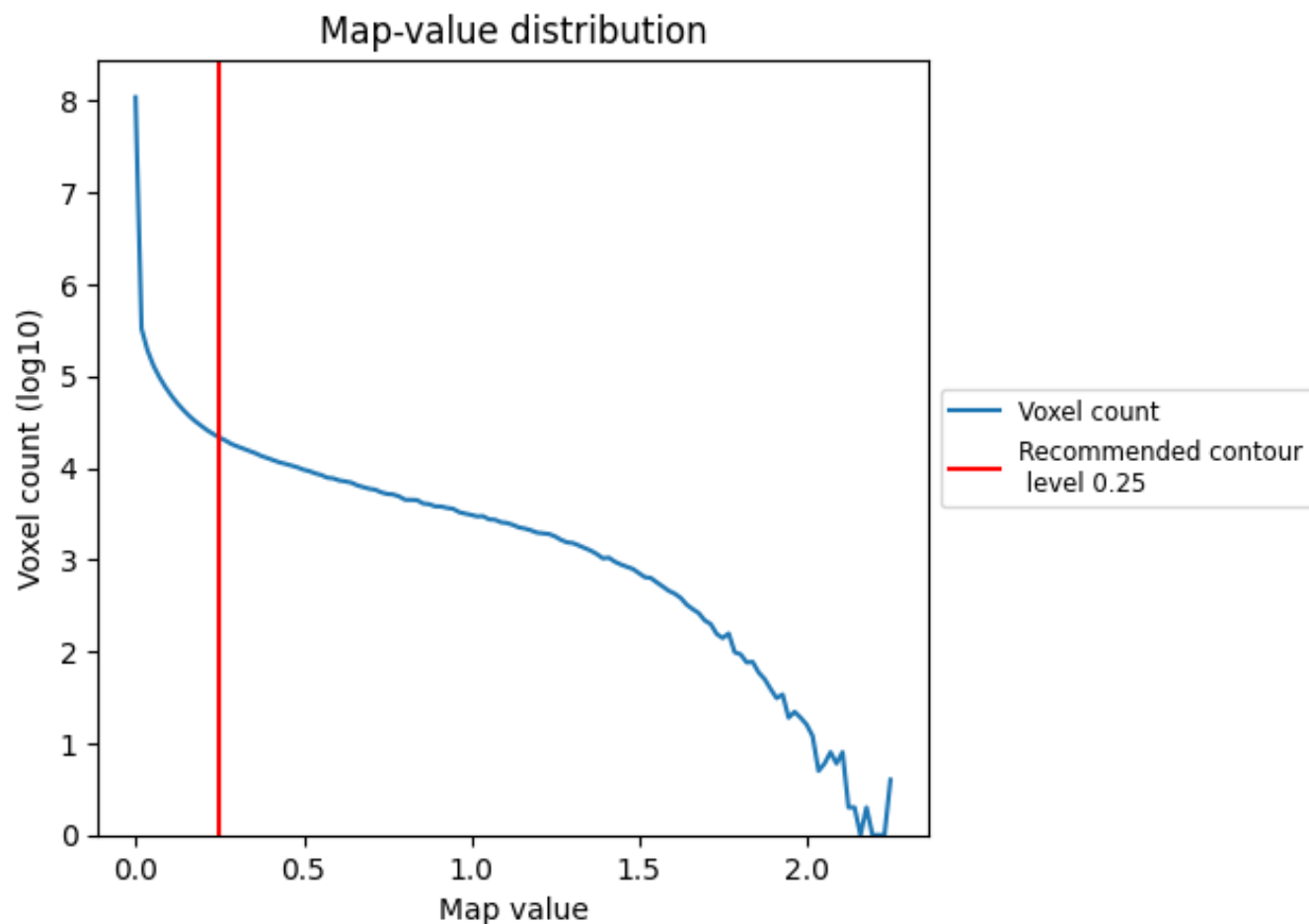
## 6.6 Mask visualisation [i](#)

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

## 7 Map analysis [i](#)

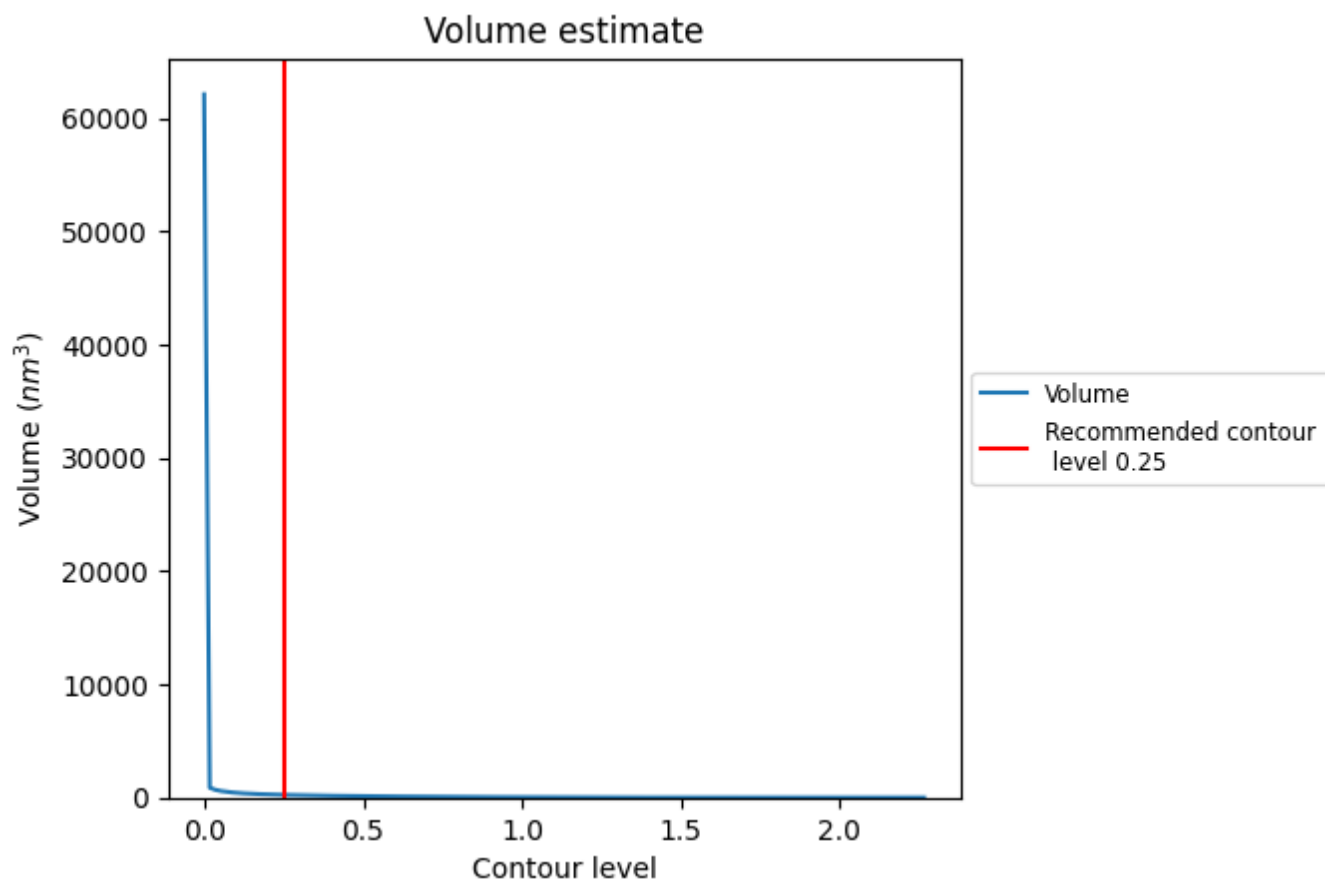
This section contains the results of statistical analysis of the map.

### 7.1 Map-value distribution [i](#)



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

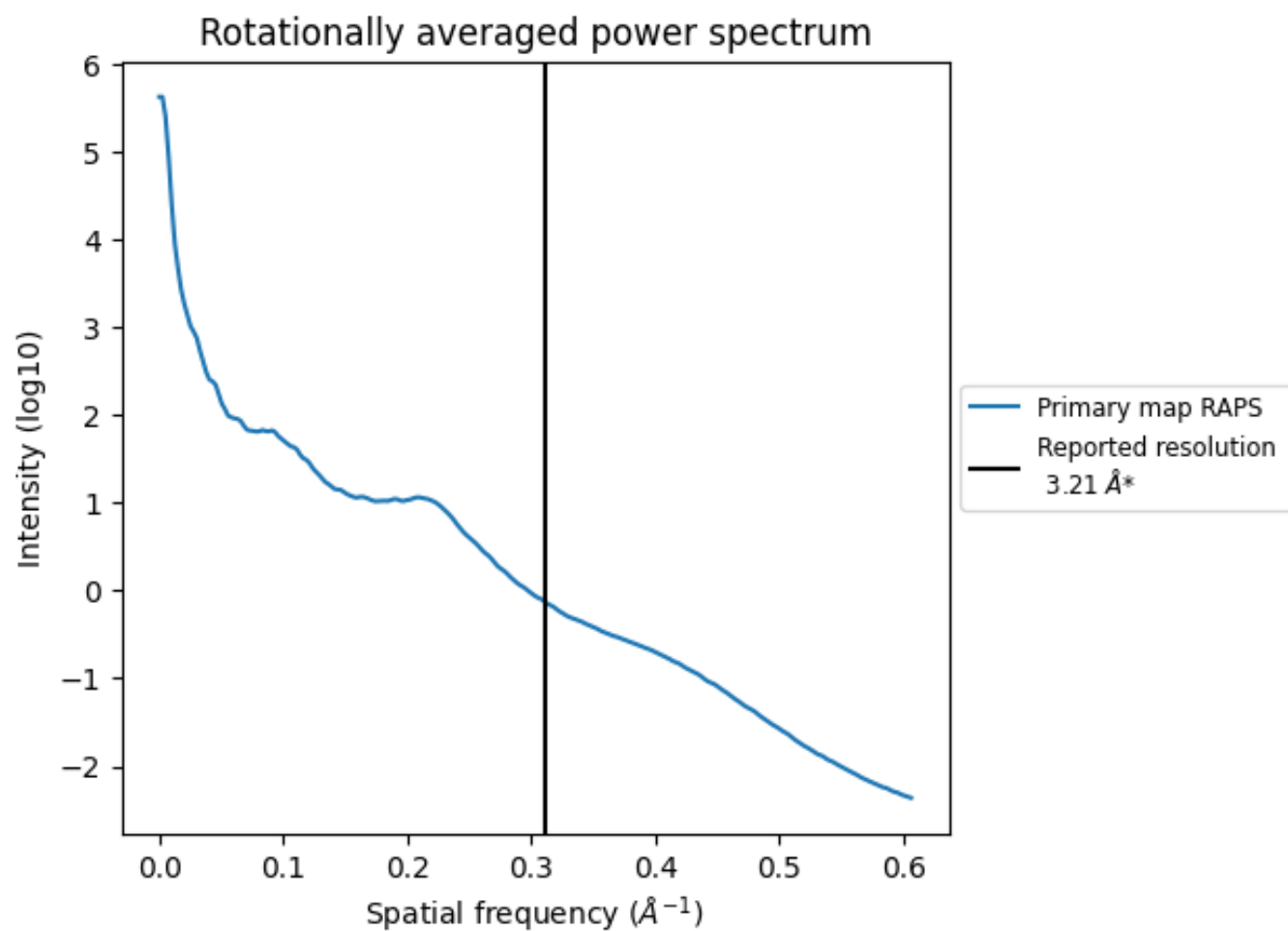
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 237 nm<sup>3</sup>; this corresponds to an approximate mass of 214 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 0.312 Å<sup>-1</sup>



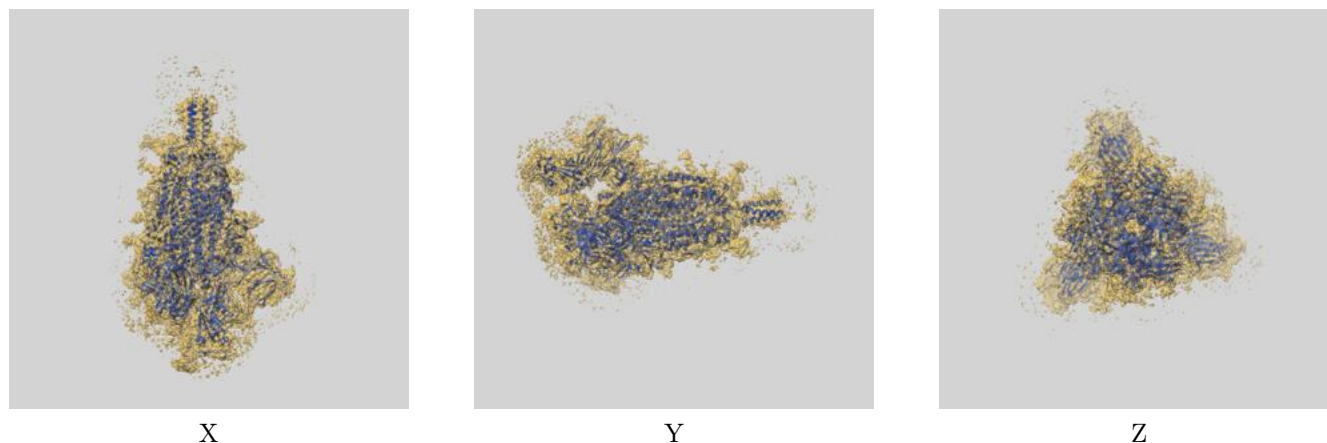
## 8 Fourier-Shell correlation

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

## 9 Map-model fit [i](#)

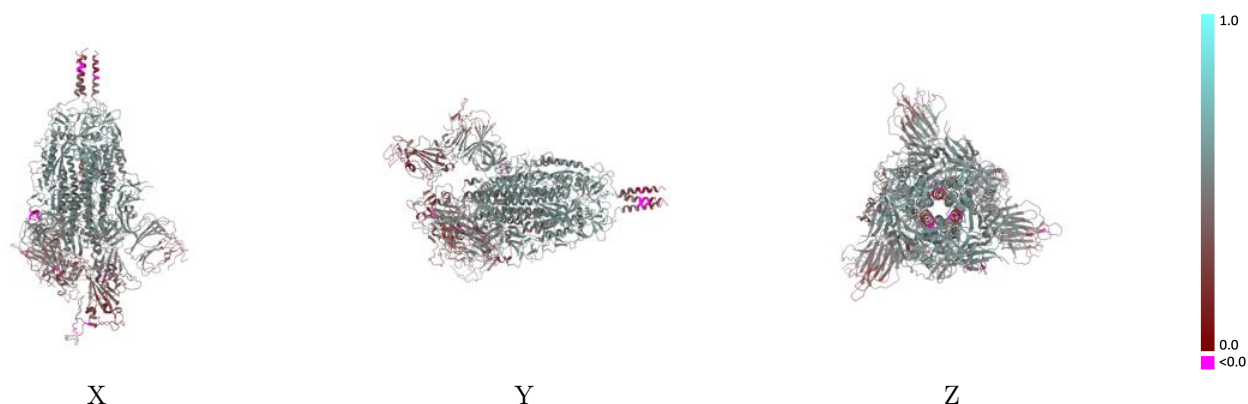
This section contains information regarding the fit between EMDB map EMD-24124 and PDB model 7N1V. Per-residue inclusion information can be found in [section 3](#) on [page 12](#).

### 9.1 Map-model overlay [i](#)



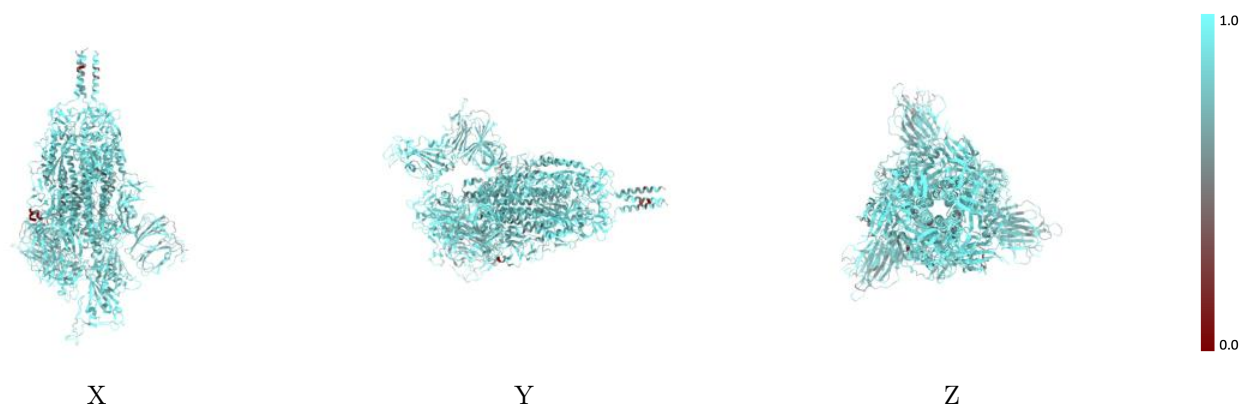
The images above show the 3D surface view of the map at the recommended contour level 0.25 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



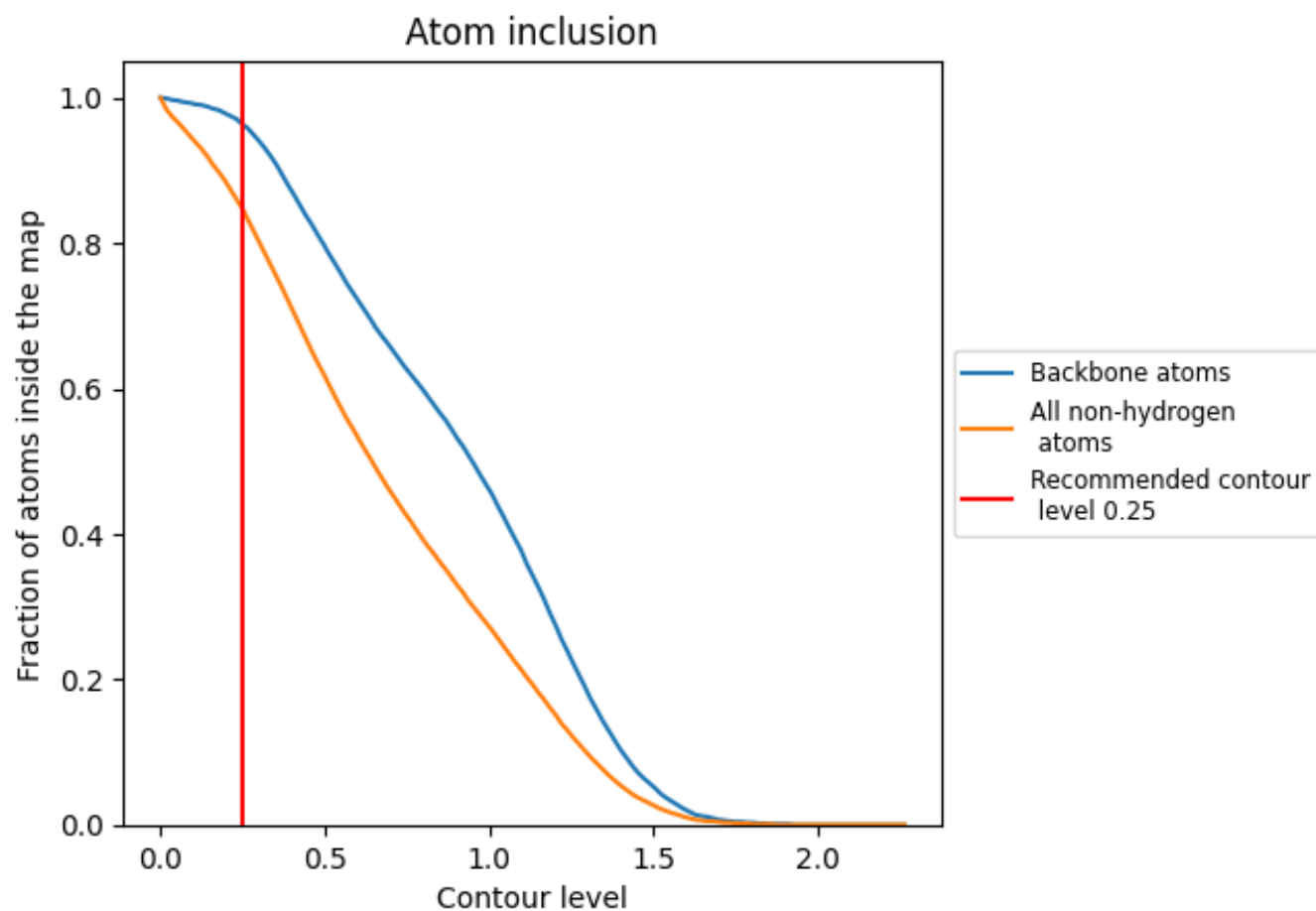
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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

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



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 (0.25).



































































## 9.4 Atom inclusion [i](#)



At the recommended contour level, 96% of all backbone atoms, 85% 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 (0.25) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8460	 0.4450
A	 0.8540	 0.4510
B	 0.8470	 0.4520
C	 0.8450	 0.4400
D	 0.7140	 0.3350
E	 0.8930	 0.4590
F	 0.7500	 0.3000
G	 0.7500	 0.4600
H	 0.7140	 0.4310
I	 0.7110	 0.3610
J	 0.8970	 0.4680
K	 0.8210	 0.2870
L	 0.8570	 0.3170
M	 0.9290	 0.4170
N	 0.7500	 0.2540
O	 0.6790	 0.3000
P	 0.7140	 0.4060
Q	 0.7140	 0.4280
R	 0.8210	 0.4170
S	 0.5530	 0.3580
T	 0.8720	 0.3990
U	 0.8210	 0.3780
V	 0.7860	 0.4550
W	 0.7860	 0.2820
X	 0.8570	 0.2520
Y	 0.7140	 0.3790
Z	 0.7500	 0.3550
a	 0.6070	 0.2750
b	 0.7860	 0.4580
c	 0.8570	 0.5050
d	 0.5000	 0.3030
e	 0.8970	 0.4120
f	 0.8460	 0.3830

