



## wwPDB EM Validation Summary Report ⓘ

Nov 14, 2022 – 06:15 PM EST

PDB ID : 7KIP  
EMDB ID : EMD-22889  
Title : A 3.4 Angstrom cryo-EM structure of the human coronavirus spike trimer computationally derived from vitrified NL63 virus particles  
Authors : Zhang, K.; Li, S.; Pintilie, G.; Chmielewski, D.; Schmid, M.; Simmons, G.; Jin, J.; Chiu, W.  
Deposited on : 2020-10-24  
Resolution : 3.39 Å (reported)  
Based on initial model : 5SZS

This is a wwPDB EM Validation Summary 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:

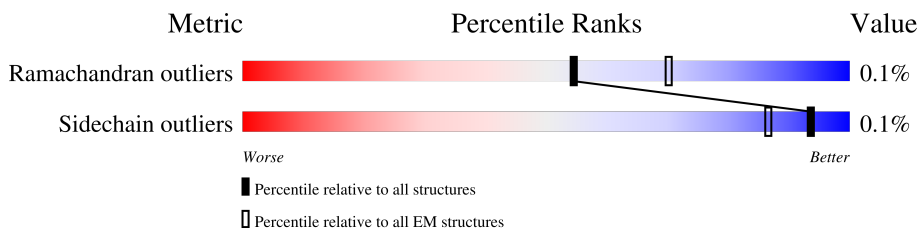
EMDB validation analysis : 0.0.1.dev43  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
MolProbity : 4.02b-467  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.9  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.31.2

# 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 3.39 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)
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 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	1356	<span style="display: inline-block; width: 100%; height: 15px; background: linear-gradient(to right, green 88%, grey 88%);"></span> 88% 12%
1	B	1356	<span style="display: inline-block; width: 100%; height: 15px; background: linear-gradient(to right, green 88%, grey 88%);"></span> 88% 12%
1	C	1356	<span style="display: inline-block; width: 100%; height: 15px; background: linear-gradient(to right, green 88%, grey 88%);"></span> 88% 12%
2	D	6	<span style="display: inline-block; width: 100%; height: 15px; background: linear-gradient(to right, green 17%, yellow 17%, yellow 83%);"></span> 17% 83%
2	Y	6	<span style="display: inline-block; width: 100%; height: 15px; background: linear-gradient(to right, green 17%, yellow 17%, yellow 83%);"></span> 17% 83%
2	t	6	<span style="display: inline-block; width: 100%; height: 15px; background: linear-gradient(to right, green 17%, yellow 17%, yellow 83%);"></span> 17% 83%
3	2	2	<span style="display: inline-block; width: 100%; height: 15px; background: linear-gradient(to right, green 100%);"></span> 100%
3	5	2	<span style="display: inline-block; width: 100%; height: 15px; background: linear-gradient(to right, red 50%, green 50%);"></span> 50% 100%
3	6	2	<span style="display: inline-block; width: 100%; height: 15px; background: linear-gradient(to right, yellow 100%);"></span> 100%

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Mol	Chain	Length	Quality of chain
3	7	2	
3	8	2	
3	9	2	
3	CA	2	
3	E	2	
3	G	2	
3	I	2	
3	J	2	
3	M	2	
3	P	2	
3	Q	2	
3	R	2	
3	S	2	
3	T	2	
3	W	2	
3	Z	2	
3	b	2	
3	d	2	
3	e	2	
3	h	2	
3	k	2	
3	l	2	
3	m	2	
3	n	2	
3	o	2	

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Mol	Chain	Length	Quality of chain
3	r	2	50% 50%
3	u	2	50% 50%
3	w	2	50% 50%
3	y	2	50% 50%
3	z	2	100%
4	AA	4	25% 50% 50%
4	F	4	25% 75%
4	U	4	25% 50% 50%
4	a	4	25% 25% 75%
4	p	4	25% 50% 50%
4	v	4	25% 75%
5	H	4	100%
5	c	4	100%
5	x	4	100%
6	0	8	25% 75%
6	K	8	25% 75%
6	f	8	25% 75%
7	1	2	50% 50%
7	L	2	50% 50%
7	g	2	50% 50%
8	3	5	40% 40% 60%
8	BA	5	100%
8	N	5	40% 40% 60%
8	V	5	100%
8	i	5	40% 40% 60%

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Mol	Chain	Length	Quality of chain
8	q	5	 100%
9	4	3	 33% 67%
9	DA	3	 33% 67%
9	O	3	 33% 67%
9	X	3	 33% 67%
9	j	3	 33% 67%
9	s	3	 33% 67%

## 2 Entry composition i

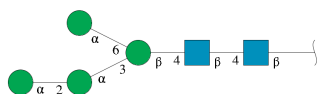
There are 10 unique types of molecules in this entry. The entry contains 30612 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

- Molecule 1 is a protein called Spike glycoprotein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	1192	9243	5882	1549	1769	43	0	0
1	B	1192	9243	5882	1549	1769	43	0	0
1	C	1192	9243	5882	1549	1769	43	0	0

- Molecule 2 is an oligosaccharide called alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-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
			Total	C	N	O		
2	D	6	72	40	2	30	0	0
2	Y	6	72	40	2	30	0	0
2	t	6	72	40	2	30	0	0

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



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

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Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
3	G	2	Total 28	C 16	N 2	O 10	0	0
3	I	2	Total 28	C 16	N 2	O 10	0	0
3	J	2	Total 28	C 16	N 2	O 10	0	0
3	M	2	Total 28	C 16	N 2	O 10	0	0
3	P	2	Total 28	C 16	N 2	O 10	0	0
3	Q	2	Total 28	C 16	N 2	O 10	0	0
3	R	2	Total 28	C 16	N 2	O 10	0	0
3	S	2	Total 28	C 16	N 2	O 10	0	0
3	T	2	Total 28	C 16	N 2	O 10	0	0
3	W	2	Total 28	C 16	N 2	O 10	0	0
3	Z	2	Total 28	C 16	N 2	O 10	0	0
3	b	2	Total 28	C 16	N 2	O 10	0	0
3	d	2	Total 28	C 16	N 2	O 10	0	0
3	e	2	Total 28	C 16	N 2	O 10	0	0
3	h	2	Total 28	C 16	N 2	O 10	0	0
3	k	2	Total 28	C 16	N 2	O 10	0	0
3	l	2	Total 28	C 16	N 2	O 10	0	0
3	m	2	Total 28	C 16	N 2	O 10	0	0
3	n	2	Total 28	C 16	N 2	O 10	0	0
3	o	2	Total 28	C 16	N 2	O 10	0	0
3	r	2	Total 28	C 16	N 2	O 10	0	0

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Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
3	u	2	Total 28	C 16	N 2	O 10	0	0
3	w	2	Total 28	C 16	N 2	O 10	0	0
3	y	2	Total 28	C 16	N 2	O 10	0	0
3	z	2	Total 28	C 16	N 2	O 10	0	0
3	2	2	Total 28	C 16	N 2	O 10	0	0
3	5	2	Total 28	C 16	N 2	O 10	0	0
3	6	2	Total 28	C 16	N 2	O 10	0	0
3	7	2	Total 28	C 16	N 2	O 10	0	0
3	8	2	Total 28	C 16	N 2	O 10	0	0
3	9	2	Total 28	C 16	N 2	O 10	0	0
3	CA	2	Total 28	C 16	N 2	O 10	0	0

- Molecule 4 is an oligosaccharide called alpha-D-mannopyranose-(1-3)-beta-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
			Total	C	N	O		
4	F	4	Total 50	C 28	N 2	O 20	0	0
4	U	4	Total 50	C 28	N 2	O 20	0	0
4	a	4	Total 50	C 28	N 2	O 20	0	0
4	p	4	Total 50	C 28	N 2	O 20	0	0
4	v	4	Total 50	C 28	N 2	O 20	0	0

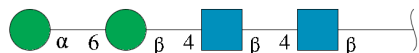
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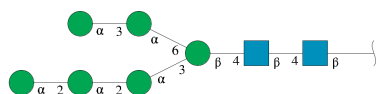
Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
4	AA	4	50	28	2	20	0	0

- Molecule 5 is an oligosaccharide called alpha-D-mannopyranose-(1-6)-beta-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
			Total	C	N	O		
5	H	4	50	28	2	20	0	0
5	c	4	50	28	2	20	0	0
5	x	4	50	28	2	20	0	0

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



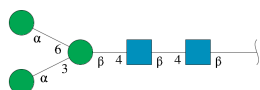
Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
6	K	8	94	52	2	40	0	0
6	f	8	94	52	2	40	0	0
6	0	8	94	52	2	40	0	0

- Molecule 7 is an oligosaccharide called beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



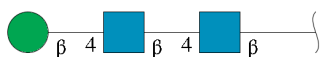
Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
7	L	2	25	14	1	10	0	0
7	g	2	25	14	1	10	0	0
7	1	2	25	14	1	10	0	0

- Molecule 8 is an oligosaccharide called alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



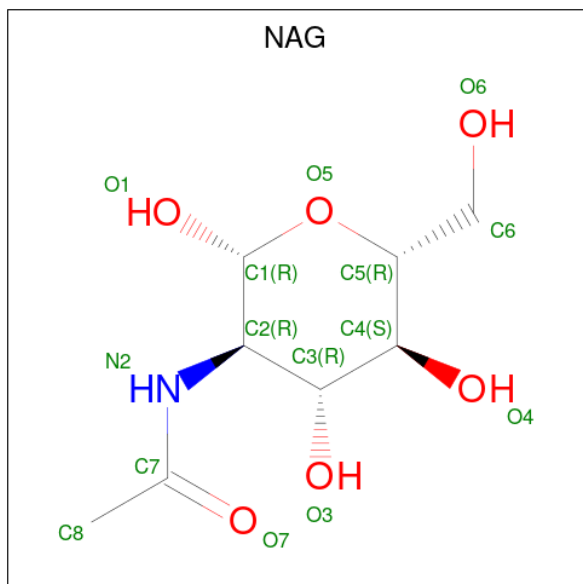
Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
8	N	5	61	34	2	25	0	0
8	V	5	61	34	2	25	0	0
8	i	5	61	34	2	25	0	0
8	q	5	61	34	2	25	0	0
8	3	5	61	34	2	25	0	0
8	BA	5	61	34	2	25	0	0

- Molecule 9 is an oligosaccharide called beta-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
9	O	3	Total	C	N	O	0	0
			39	22	2	15		
9	X	3	Total	C	N	O	0	0
			39	22	2	15		
9	j	3	Total	C	N	O	0	0
			39	22	2	15		
9	s	3	Total	C	N	O	0	0
			39	22	2	15		
9	4	3	Total	C	N	O	0	0
			39	22	2	15		
9	DA	3	Total	C	N	O	0	0
			39	22	2	15		

- Molecule 10 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
10	A	1	Total	C	N	O	0
			112	64	8	40	
10	A	1	Total	C	N	O	0
			112	64	8	40	
10	A	1	Total	C	N	O	0
			112	64	8	40	
10	A	1	Total	C	N	O	0
			112	64	8	40	
10	A	1	Total	C	N	O	0
			112	64	8	40	

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Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
10	A	1	Total 112	C 64	N 8	O 40	0
10	A	1	Total 112	C 64	N 8	O 40	0
10	A	1	Total 112	C 64	N 8	O 40	0
10	B	1	Total 112	C 64	N 8	O 40	0
10	B	1	Total 112	C 64	N 8	O 40	0
10	B	1	Total 112	C 64	N 8	O 40	0
10	B	1	Total 112	C 64	N 8	O 40	0
10	B	1	Total 112	C 64	N 8	O 40	0
10	B	1	Total 112	C 64	N 8	O 40	0
10	B	1	Total 112	C 64	N 8	O 40	0
10	B	1	Total 112	C 64	N 8	O 40	0
10	B	1	Total 112	C 64	N 8	O 40	0
10	B	1	Total 112	C 64	N 8	O 40	0
10	C	1	Total 112	C 64	N 8	O 40	0
10	C	1	Total 112	C 64	N 8	O 40	0
10	C	1	Total 112	C 64	N 8	O 40	0
10	C	1	Total 112	C 64	N 8	O 40	0
10	C	1	Total 112	C 64	N 8	O 40	0
10	C	1	Total 112	C 64	N 8	O 40	0
10	C	1	Total 112	C 64	N 8	O 40	0
10	C	1	Total 112	C 64	N 8	O 40	0



TYR VAL  
 LYS PRO  
 ASN PHE  
 ASP LEU  
 THR THR  
 PHE PHE  
 ASN ASN  
 LEU LEU  
 THR THR  
 TYR TYR  
 LEU LEU  
 ASN ASN  
 SER SER  
 LEU LEU  
 GLU GLU  
 LYS LYS  
 GLN GLN  
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 GLU GLU  
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 SER SER  
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 PHE PHE  
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 CYS CYS  
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 THR THR  
 GLY GLY  
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 CYS CYS  
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 THR THR  
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 ILE ILE  
 MET MET  
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 CYS CYS  
 CYS CYS  
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 THR THR  
 TYR TYR  
 VAL VAL  
 ASP ASP  
 SER SER  
 THR THR  
 LYS LYS  
 LEU LEU  
 LEU LEU  
 LEU LEU  
 ASN ASN  
 ARG ARG  
 PHE PHE  
 GLU GLU

GLU  
 LYS  
 VAL  
 HIS  
 VAL  
 GLN

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

Chain D:  17% 83%

MAG1  
 MAG2  
 BMA3  
 MAN4  
 MAN5  
 MAN6

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

Chain Y:  17% 83%

MAG1  
 MAG2  
 BMA3  
 MAN4  
 MAN5  
 MAN6

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

Chain t:  17% 83%

MAG1  
 MAG2  
 BMA3  
 MAN4  
 MAN5  
 MAN6

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

Chain E:  50% 50%

MAG1  
 MAG2

- 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



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



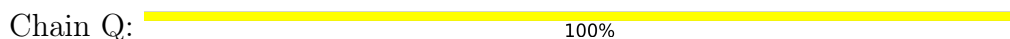
- Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



- 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

Chain e:  100%

  
MAG1  
MAG2

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

Chain h:  100%

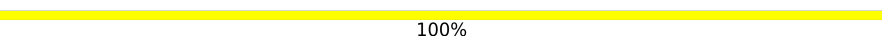
  
MAG1  
MAG2

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

Chain k:  50%  
 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:  50%  
 50%

  
MAG1  
MAG2

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

Chain n:  50%  
 100%

  
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

Chain 2:  100%

 NAG1  
NAG2

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

Chain 5:  50%  
 100%

 NAG1  
NAG2

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

Chain 6:  100%

 NAG1  
NAG2

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

Chain 7:  50%  
 50%

 NAG1  
NAG2

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

Chain 8:  50%  
 100%

 NAG1  
NAG2

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

Chain 9:  50%  
 100%

 NAG1  
NAG2

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

Chain CA:  50% 50%

MAG1  
MAG2

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

Chain F:  25% 75%

MAG1  
MAG2  
BMA3  
MAN4

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

Chain U:  25% 50% 50%

MAG1  
MAG2  
BMA3  
MAN4

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

Chain a:  25% 25% 75%

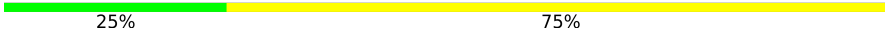
MAG1  
MAG2  
BMA3  
MAN4

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

Chain p:  25% 50% 50%

MAG1  
MAG2  
BMA3  
MAN4

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

Chain v:  25% 75%

MAG1  
MAG2  
BMA3  
MAN4

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



- Molecule 5: alpha-D-mannopyranose-(1-6)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



- Molecule 5: alpha-D-mannopyranose-(1-6)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



- Molecule 5: alpha-D-mannopyranose-(1-6)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



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



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



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

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

Chain 0:  25% 75%



- Molecule 7: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain L:  50% 50%



- Molecule 7: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain g:  50% 50%



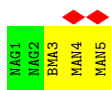
- Molecule 7: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain 1:  50% 50%



- Molecule 8: alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain N:  40% 40% 60%

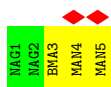


- Molecule 8: alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

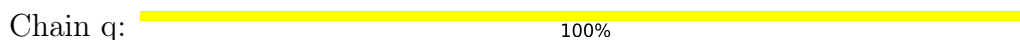
Chain V:  100%



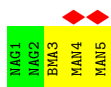
- Molecule 8: alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



- Molecule 8: alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



- Molecule 8: alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



- Molecule 8: alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



- Molecule 9: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



- Molecule 9: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



- Molecule 9: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain j: 



- Molecule 9: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain s: 




- Molecule 9: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain 4: 



- Molecule 9: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain DA: 





## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C3	Depositor
Number of particles used	82030	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 ( $e^-/\text{\AA}^2$ )	48	Depositor
Minimum defocus (nm)	400	Depositor
Maximum defocus (nm)	3600	Depositor
Magnification	64000	Depositor
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	4.420	Depositor
Minimum map value	-1.848	Depositor
Average map value	0.005	Depositor
Map value standard deviation	0.142	Depositor
Recommended contour level	0.528	Depositor
Map size ( $\text{\AA}$ )	358.4, 358.4, 358.4	wwPDB
Map dimensions	256, 256, 256	wwPDB
Map angles ( $^\circ$ )	90.0, 90.0, 90.0	wwPDB
Pixel spacing ( $\text{\AA}$ )	1.4, 1.4, 1.4	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, MAN, BMA

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	0.43	0/9449	0.56	0/12894
1	B	0.43	0/9449	0.56	0/12894
1	C	0.43	0/9449	0.56	0/12894
All	All	0.43	0/28347	0.56	0/38682

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	3
1	B	0	3
1	C	0	3
All	All	0	9

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

5 of 9 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	1194	ASN	Peptide
1	A	188	ALA	Peptide
1	A	943	THR	Peptide
1	B	188	ALA	Peptide
1	B	943	THR	Peptide

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

Due to software issues we are unable to calculate clashes - this section is therefore empty.

## 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	1188/1356 (88%)	1093 (92%)	94 (8%)	1 (0%)	51	82
1	B	1188/1356 (88%)	1094 (92%)	93 (8%)	1 (0%)	51	82
1	C	1188/1356 (88%)	1094 (92%)	93 (8%)	1 (0%)	51	82
All	All	3564/4068 (88%)	3281 (92%)	280 (8%)	3 (0%)	54	82

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	1193	TYR
1	B	1193	TYR
1	C	1193	TYR

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

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	1043/1197 (87%)	1042 (100%)	1 (0%)	93	98
1	B	1043/1197 (87%)	1042 (100%)	1 (0%)	93	98
1	C	1043/1197 (87%)	1042 (100%)	1 (0%)	93	98
All	All	3129/3591 (87%)	3126 (100%)	3 (0%)	93	98

All (3) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	155	ASN
1	B	155	ASN
1	C	155	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 6 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	1019	ASN
1	C	482	HIS
1	C	1019	ASN
1	A	1019	ASN
1	A	482	HIS

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

## 5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

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

## 5.5 Carbohydrates [i](#)

198 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	$\# Z  > 2$
6	NAG	0	1	6,1	14,14,15	0.54	0	17,19,21	0.66	0
6	NAG	0	2	6	14,14,15	0.24	0	17,19,21	0.68	0
6	BMA	0	3	6	11,11,12	1.26	2 (18%)	15,15,17	1.57	3 (20%)
6	MAN	0	4	6	11,11,12	0.94	1 (9%)	15,15,17	1.49	3 (20%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
6	MAN	0	5	6	11,11,12	0.79	0	15,15,17	1.31	2 (13%)
6	MAN	0	6	6	11,11,12	0.83	0	15,15,17	1.07	2 (13%)
6	MAN	0	7	6	11,11,12	1.40	2 (18%)	15,15,17	2.15	2 (13%)
6	MAN	0	8	6	11,11,12	0.68	0	15,15,17	1.20	2 (13%)
7	NAG	1	1	7	14,14,15	0.22	0	17,19,21	0.65	1 (5%)
7	BMA	1	2	7	11,11,12	0.80	0	15,15,17	0.86	0
3	NAG	2	1	3,1	14,14,15	0.22	0	17,19,21	0.50	0
3	NAG	2	2	3	14,14,15	0.24	0	17,19,21	0.52	0
8	NAG	3	1	8,1	14,14,15	0.40	0	17,19,21	0.54	0
8	NAG	3	2	8	14,14,15	0.28	0	17,19,21	0.55	0
8	BMA	3	3	8	11,11,12	1.19	1 (9%)	15,15,17	1.29	1 (6%)
8	MAN	3	4	8	11,11,12	0.81	0	15,15,17	1.06	2 (13%)
8	MAN	3	5	8	11,11,12	0.93	1 (9%)	15,15,17	1.22	2 (13%)
9	NAG	4	1	1,9	14,14,15	0.37	0	17,19,21	0.47	0
9	NAG	4	2	9	14,14,15	0.26	0	17,19,21	0.67	1 (5%)
9	BMA	4	3	9	11,11,12	0.82	0	15,15,17	0.78	0
3	NAG	5	1	3,1	14,14,15	0.27	0	17,19,21	0.52	0
3	NAG	5	2	3	14,14,15	0.42	0	17,19,21	0.54	0
3	NAG	6	1	3,1	14,14,15	0.41	0	17,19,21	1.24	3 (17%)
3	NAG	6	2	3	14,14,15	1.21	2 (14%)	17,19,21	0.51	0
3	NAG	7	1	3,1	14,14,15	0.38	0	17,19,21	1.13	2 (11%)
3	NAG	7	2	3	14,14,15	0.46	0	17,19,21	0.46	0
3	NAG	8	1	3,1	14,14,15	0.14	0	17,19,21	0.59	0
3	NAG	8	2	3	14,14,15	0.34	0	17,19,21	0.54	0
3	NAG	9	1	3,1	14,14,15	0.31	0	17,19,21	0.58	0
3	NAG	9	2	3	14,14,15	0.38	0	17,19,21	0.55	0
4	NAG	AA	1	4,1	14,14,15	0.32	0	17,19,21	0.51	0
4	NAG	AA	2	4	14,14,15	0.21	0	17,19,21	0.43	0
4	BMA	AA	3	4	11,11,12	0.66	0	15,15,17	0.86	1 (6%)
4	MAN	AA	4	4	11,11,12	0.84	0	15,15,17	1.11	2 (13%)
8	NAG	BA	1	8,1	14,14,15	0.41	0	17,19,21	1.04	1 (5%)
8	NAG	BA	2	8	14,14,15	0.50	0	17,19,21	0.98	1 (5%)
8	BMA	BA	3	8	11,11,12	0.83	0	15,15,17	1.23	1 (6%)
8	MAN	BA	4	8	11,11,12	0.71	0	15,15,17	1.07	2 (13%)
8	MAN	BA	5	8	11,11,12	0.77	0	15,15,17	1.08	2 (13%)
3	NAG	CA	1	3,1	14,14,15	0.35	0	17,19,21	1.05	2 (11%)
3	NAG	CA	2	3	14,14,15	0.32	0	17,19,21	0.57	0
2	NAG	D	1	1,2	14,14,15	0.29	0	17,19,21	0.72	1 (5%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	NAG	D	2	2	14,14,15	0.31	0	17,19,21	0.66	0
2	BMA	D	3	2	11,11,12	1.29	1 (9%)	15,15,17	1.55	3 (20%)
2	MAN	D	4	2	11,11,12	0.81	1 (9%)	15,15,17	1.34	2 (13%)
2	MAN	D	5	2	11,11,12	0.61	0	15,15,17	1.09	2 (13%)
2	MAN	D	6	2	11,11,12	1.07	1 (9%)	15,15,17	1.04	1 (6%)
9	NAG	DA	1	1,9	14,14,15	0.24	0	17,19,21	0.55	0
9	NAG	DA	2	9	14,14,15	0.35	0	17,19,21	0.85	1 (5%)
9	BMA	DA	3	9	11,11,12	0.82	0	15,15,17	0.88	1 (6%)
3	NAG	E	1	3,1	14,14,15	0.39	0	17,19,21	0.59	0
3	NAG	E	2	3	14,14,15	0.66	1 (7%)	17,19,21	0.47	0
4	NAG	F	1	4,1	14,14,15	0.41	0	17,19,21	0.57	0
4	NAG	F	2	4	14,14,15	0.25	0	17,19,21	1.11	1 (5%)
4	BMA	F	3	4	11,11,12	0.78	1 (9%)	15,15,17	1.25	1 (6%)
4	MAN	F	4	4	11,11,12	0.74	0	15,15,17	1.08	2 (13%)
3	NAG	G	1	3,1	14,14,15	0.48	0	17,19,21	0.92	1 (5%)
3	NAG	G	2	3	14,14,15	0.32	0	17,19,21	0.57	1 (5%)
5	NAG	H	1	1,5	14,14,15	0.55	0	17,19,21	0.68	1 (5%)
5	NAG	H	2	5	14,14,15	0.25	0	17,19,21	0.73	1 (5%)
5	BMA	H	3	5	11,11,12	1.13	1 (9%)	15,15,17	1.05	2 (13%)
5	MAN	H	4	5	11,11,12	0.81	0	15,15,17	1.07	2 (13%)
3	NAG	I	1	3,1	14,14,15	0.33	0	17,19,21	0.75	1 (5%)
3	NAG	I	2	3	14,14,15	0.46	0	17,19,21	0.51	0
3	NAG	J	1	3,1	14,14,15	0.23	0	17,19,21	0.55	0
3	NAG	J	2	3	14,14,15	0.34	0	17,19,21	0.46	0
6	NAG	K	1	6,1	14,14,15	0.55	0	17,19,21	0.66	0
6	NAG	K	2	6	14,14,15	0.24	0	17,19,21	0.68	0
6	BMA	K	3	6	11,11,12	1.26	1 (9%)	15,15,17	1.57	3 (20%)
6	MAN	K	4	6	11,11,12	0.95	1 (9%)	15,15,17	1.50	3 (20%)
6	MAN	K	5	6	11,11,12	0.80	0	15,15,17	1.31	2 (13%)
6	MAN	K	6	6	11,11,12	0.82	0	15,15,17	1.07	2 (13%)
6	MAN	K	7	6	11,11,12	1.40	2 (18%)	15,15,17	2.15	2 (13%)
6	MAN	K	8	6	11,11,12	0.68	0	15,15,17	1.20	2 (13%)
7	NAG	L	1	7	14,14,15	0.21	0	17,19,21	0.65	1 (5%)
7	BMA	L	2	7	11,11,12	0.79	0	15,15,17	0.86	0
3	NAG	M	1	3,1	14,14,15	0.22	0	17,19,21	0.51	0
3	NAG	M	2	3	14,14,15	0.25	0	17,19,21	0.53	0
8	NAG	N	1	8,1	14,14,15	0.42	0	17,19,21	0.54	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
8	NAG	N	2	8	14,14,15	0.27	0	17,19,21	0.54	0
8	BMA	N	3	8	11,11,12	1.19	1 (9%)	15,15,17	1.29	1 (6%)
8	MAN	N	4	8	11,11,12	0.83	0	15,15,17	1.06	2 (13%)
8	MAN	N	5	8	11,11,12	0.94	1 (9%)	15,15,17	1.21	2 (13%)
9	NAG	O	1	1,9	14,14,15	0.37	0	17,19,21	0.47	0
9	NAG	O	2	9	14,14,15	0.27	0	17,19,21	0.67	1 (5%)
9	BMA	O	3	9	11,11,12	0.82	0	15,15,17	0.78	0
3	NAG	P	1	3,1	14,14,15	0.26	0	17,19,21	0.54	0
3	NAG	P	2	3	14,14,15	0.42	0	17,19,21	0.54	0
3	NAG	Q	1	3,1	14,14,15	0.41	0	17,19,21	1.24	3 (17%)
3	NAG	Q	2	3	14,14,15	1.22	2 (14%)	17,19,21	0.51	0
3	NAG	R	1	3,1	14,14,15	0.38	0	17,19,21	1.13	2 (11%)
3	NAG	R	2	3	14,14,15	0.47	0	17,19,21	0.48	0
3	NAG	S	1	3,1	14,14,15	0.14	0	17,19,21	0.59	0
3	NAG	S	2	3	14,14,15	0.33	0	17,19,21	0.54	0
3	NAG	T	1	3,1	14,14,15	0.31	0	17,19,21	0.57	0
3	NAG	T	2	3	14,14,15	0.36	0	17,19,21	0.56	0
4	NAG	U	1	4,1	14,14,15	0.31	0	17,19,21	0.51	0
4	NAG	U	2	4	14,14,15	0.22	0	17,19,21	0.44	0
4	BMA	U	3	4	11,11,12	0.67	0	15,15,17	0.86	1 (6%)
4	MAN	U	4	4	11,11,12	0.84	0	15,15,17	1.11	2 (13%)
8	NAG	V	1	8,1	14,14,15	0.42	0	17,19,21	1.04	1 (5%)
8	NAG	V	2	8	14,14,15	0.50	0	17,19,21	0.97	1 (5%)
8	BMA	V	3	8	11,11,12	0.83	0	15,15,17	1.24	1 (6%)
8	MAN	V	4	8	11,11,12	0.72	0	15,15,17	1.08	2 (13%)
8	MAN	V	5	8	11,11,12	0.77	0	15,15,17	1.08	2 (13%)
3	NAG	W	1	3,1	14,14,15	0.35	0	17,19,21	1.05	2 (11%)
3	NAG	W	2	3	14,14,15	0.31	0	17,19,21	0.57	0
9	NAG	X	1	1,9	14,14,15	0.26	0	17,19,21	0.54	0
9	NAG	X	2	9	14,14,15	0.34	0	17,19,21	0.85	1 (5%)
9	BMA	X	3	9	11,11,12	0.81	0	15,15,17	0.89	1 (6%)
2	NAG	Y	1	1,2	14,14,15	0.29	0	17,19,21	0.71	1 (5%)
2	NAG	Y	2	2	14,14,15	0.31	0	17,19,21	0.65	0
2	BMA	Y	3	2	11,11,12	1.28	1 (9%)	15,15,17	1.54	3 (20%)
2	MAN	Y	4	2	11,11,12	0.80	1 (9%)	15,15,17	1.35	2 (13%)
2	MAN	Y	5	2	11,11,12	0.61	0	15,15,17	1.09	2 (13%)
2	MAN	Y	6	2	11,11,12	1.07	1 (9%)	15,15,17	1.04	1 (6%)
3	NAG	Z	1	3,1	14,14,15	0.37	0	17,19,21	0.60	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
3	NAG	Z	2	3	14,14,15	0.65	1 (7%)	17,19,21	0.47	0
4	NAG	a	1	4,1	14,14,15	0.43	0	17,19,21	0.57	0
4	NAG	a	2	4	14,14,15	0.25	0	17,19,21	1.11	1 (5%)
4	BMA	a	3	4	11,11,12	0.78	1 (9%)	15,15,17	1.24	1 (6%)
4	MAN	a	4	4	11,11,12	0.73	0	15,15,17	1.08	2 (13%)
3	NAG	b	1	3,1	14,14,15	0.48	0	17,19,21	0.92	1 (5%)
3	NAG	b	2	3	14,14,15	0.33	0	17,19,21	0.58	0
5	NAG	c	1	1,5	14,14,15	0.54	0	17,19,21	0.67	1 (5%)
5	NAG	c	2	5	14,14,15	0.25	0	17,19,21	0.73	1 (5%)
5	BMA	c	3	5	11,11,12	1.13	1 (9%)	15,15,17	1.05	2 (13%)
5	MAN	c	4	5	11,11,12	0.82	0	15,15,17	1.06	2 (13%)
3	NAG	d	1	3,1	14,14,15	0.32	0	17,19,21	0.74	1 (5%)
3	NAG	d	2	3	14,14,15	0.47	0	17,19,21	0.52	0
3	NAG	e	1	3,1	14,14,15	0.22	0	17,19,21	0.55	0
3	NAG	e	2	3	14,14,15	0.33	0	17,19,21	0.46	0
6	NAG	f	1	6,1	14,14,15	0.55	0	17,19,21	0.66	0
6	NAG	f	2	6	14,14,15	0.25	0	17,19,21	0.68	0
6	BMA	f	3	6	11,11,12	1.26	1 (9%)	15,15,17	1.58	3 (20%)
6	MAN	f	4	6	11,11,12	0.94	1 (9%)	15,15,17	1.50	3 (20%)
6	MAN	f	5	6	11,11,12	0.79	0	15,15,17	1.30	2 (13%)
6	MAN	f	6	6	11,11,12	0.82	0	15,15,17	1.07	2 (13%)
6	MAN	f	7	6	11,11,12	1.40	2 (18%)	15,15,17	2.16	2 (13%)
6	MAN	f	8	6	11,11,12	0.67	0	15,15,17	1.21	2 (13%)
7	NAG	g	1	7	14,14,15	0.21	0	17,19,21	0.65	1 (5%)
7	BMA	g	2	7	11,11,12	0.80	0	15,15,17	0.85	0
3	NAG	h	1	3,1	14,14,15	0.22	0	17,19,21	0.50	0
3	NAG	h	2	3	14,14,15	0.23	0	17,19,21	0.53	0
8	NAG	i	1	8,1	14,14,15	0.41	0	17,19,21	0.54	0
8	NAG	i	2	8	14,14,15	0.28	0	17,19,21	0.54	0
8	BMA	i	3	8	11,11,12	1.19	1 (9%)	15,15,17	1.29	2 (13%)
8	MAN	i	4	8	11,11,12	0.83	0	15,15,17	1.07	2 (13%)
8	MAN	i	5	8	11,11,12	0.93	1 (9%)	15,15,17	1.22	2 (13%)
9	NAG	j	1	1,9	14,14,15	0.35	0	17,19,21	0.47	0
9	NAG	j	2	9	14,14,15	0.26	0	17,19,21	0.66	1 (5%)
9	BMA	j	3	9	11,11,12	0.81	0	15,15,17	0.79	0
3	NAG	k	1	3,1	14,14,15	0.26	0	17,19,21	0.53	0
3	NAG	k	2	3	14,14,15	0.41	0	17,19,21	0.53	0
3	NAG	l	1	3,1	14,14,15	0.40	0	17,19,21	1.24	3 (17%)



Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
3	NAG	l	2	3	14,14,15	1.20	2 (14%)	17,19,21	0.51	0
3	NAG	m	1	3,1	14,14,15	0.38	0	17,19,21	1.13	2 (11%)
3	NAG	m	2	3	14,14,15	0.46	0	17,19,21	0.48	0
3	NAG	n	1	3,1	14,14,15	0.15	0	17,19,21	0.60	0
3	NAG	n	2	3	14,14,15	0.33	0	17,19,21	0.55	0
3	NAG	o	1	3,1	14,14,15	0.32	0	17,19,21	0.58	0
3	NAG	o	2	3	14,14,15	0.37	0	17,19,21	0.56	0
4	NAG	p	1	4,1	14,14,15	0.31	0	17,19,21	0.50	0
4	NAG	p	2	4	14,14,15	0.22	0	17,19,21	0.44	0
4	BMA	p	3	4	11,11,12	0.67	0	15,15,17	0.86	1 (6%)
4	MAN	p	4	4	11,11,12	0.85	0	15,15,17	1.11	2 (13%)
8	NAG	q	1	8,1	14,14,15	0.41	0	17,19,21	1.04	1 (5%)
8	NAG	q	2	8	14,14,15	0.50	0	17,19,21	0.98	1 (5%)
8	BMA	q	3	8	11,11,12	0.84	0	15,15,17	1.24	1 (6%)
8	MAN	q	4	8	11,11,12	0.71	0	15,15,17	1.07	2 (13%)
8	MAN	q	5	8	11,11,12	0.77	0	15,15,17	1.08	2 (13%)
3	NAG	r	1	3,1	14,14,15	0.35	0	17,19,21	1.06	2 (11%)
3	NAG	r	2	3	14,14,15	0.31	0	17,19,21	0.57	0
9	NAG	s	1	1,9	14,14,15	0.25	0	17,19,21	0.55	0
9	NAG	s	2	9	14,14,15	0.36	0	17,19,21	0.84	1 (5%)
9	BMA	s	3	9	11,11,12	0.83	0	15,15,17	0.89	1 (6%)
2	NAG	t	1	1,2	14,14,15	0.31	0	17,19,21	0.72	1 (5%)
2	NAG	t	2	2	14,14,15	0.31	0	17,19,21	0.65	0
2	BMA	t	3	2	11,11,12	1.27	1 (9%)	15,15,17	1.54	3 (20%)
2	MAN	t	4	2	11,11,12	0.81	1 (9%)	15,15,17	1.34	2 (13%)
2	MAN	t	5	2	11,11,12	0.61	0	15,15,17	1.10	2 (13%)
2	MAN	t	6	2	11,11,12	1.07	1 (9%)	15,15,17	1.04	2 (13%)
3	NAG	u	1	3,1	14,14,15	0.38	0	17,19,21	0.60	0
3	NAG	u	2	3	14,14,15	0.65	1 (7%)	17,19,21	0.47	0
4	NAG	v	1	4,1	14,14,15	0.44	0	17,19,21	0.57	0
4	NAG	v	2	4	14,14,15	0.25	0	17,19,21	1.10	1 (5%)
4	BMA	v	3	4	11,11,12	0.79	1 (9%)	15,15,17	1.24	1 (6%)
4	MAN	v	4	4	11,11,12	0.74	0	15,15,17	1.07	2 (13%)
3	NAG	w	1	3,1	14,14,15	0.48	0	17,19,21	0.92	1 (5%)
3	NAG	w	2	3	14,14,15	0.32	0	17,19,21	0.57	0
5	NAG	x	1	1,5	14,14,15	0.53	0	17,19,21	0.67	1 (5%)
5	NAG	x	2	5	14,14,15	0.25	0	17,19,21	0.73	1 (5%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
5	BMA	x	3	5	11,11,12	1.13	1 (9%)	15,15,17	1.05	2 (13%)
5	MAN	x	4	5	11,11,12	0.80	0	15,15,17	1.07	2 (13%)
3	NAG	y	1	3,1	14,14,15	0.32	0	17,19,21	0.74	1 (5%)
3	NAG	y	2	3	14,14,15	0.46	0	17,19,21	0.51	0
3	NAG	z	1	3,1	14,14,15	0.22	0	17,19,21	0.55	0
3	NAG	z	2	3	14,14,15	0.35	0	17,19,21	0.46	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
6	NAG	0	1	6,1	-	1/6/23/26	0/1/1/1
6	NAG	0	2	6	-	2/6/23/26	0/1/1/1
6	BMA	0	3	6	-	2/2/19/22	0/1/1/1
6	MAN	0	4	6	-	2/2/19/22	0/1/1/1
6	MAN	0	5	6	-	2/2/19/22	0/1/1/1
6	MAN	0	6	6	-	0/2/19/22	0/1/1/1
6	MAN	0	7	6	-	2/2/19/22	0/1/1/1
6	MAN	0	8	6	-	0/2/19/22	0/1/1/1
7	NAG	1	1	7	-	2/6/23/26	0/1/1/1
7	BMA	1	2	7	-	1/2/19/22	0/1/1/1
3	NAG	2	1	3,1	-	1/6/23/26	0/1/1/1
3	NAG	2	2	3	-	2/6/23/26	0/1/1/1
8	NAG	3	1	8,1	-	1/6/23/26	0/1/1/1
8	NAG	3	2	8	-	0/6/23/26	0/1/1/1
8	BMA	3	3	8	-	2/2/19/22	0/1/1/1
8	MAN	3	4	8	-	0/2/19/22	0/1/1/1
8	MAN	3	5	8	-	1/2/19/22	0/1/1/1
9	NAG	4	1	1,9	-	2/6/23/26	0/1/1/1
9	NAG	4	2	9	-	2/6/23/26	0/1/1/1
9	BMA	4	3	9	-	0/2/19/22	0/1/1/1
3	NAG	5	1	3,1	-	2/6/23/26	0/1/1/1
3	NAG	5	2	3	-	2/6/23/26	0/1/1/1
3	NAG	6	1	3,1	-	3/6/23/26	0/1/1/1
3	NAG	6	2	3	-	2/6/23/26	0/1/1/1
3	NAG	7	1	3,1	-	3/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NAG	7	2	3	-	2/6/23/26	0/1/1/1
3	NAG	8	1	3,1	-	0/6/23/26	0/1/1/1
3	NAG	8	2	3	-	2/6/23/26	0/1/1/1
3	NAG	9	1	3,1	-	2/6/23/26	0/1/1/1
3	NAG	9	2	3	-	2/6/23/26	0/1/1/1
4	NAG	AA	1	4,1	-	2/6/23/26	0/1/1/1
4	NAG	AA	2	4	-	2/6/23/26	0/1/1/1
4	BMA	AA	3	4	-	2/2/19/22	0/1/1/1
4	MAN	AA	4	4	-	2/2/19/22	0/1/1/1
8	NAG	BA	1	8,1	-	3/6/23/26	0/1/1/1
8	NAG	BA	2	8	-	0/6/23/26	0/1/1/1
8	BMA	BA	3	8	-	2/2/19/22	0/1/1/1
8	MAN	BA	4	8	-	0/2/19/22	0/1/1/1
8	MAN	BA	5	8	-	0/2/19/22	0/1/1/1
3	NAG	CA	1	3,1	-	1/6/23/26	0/1/1/1
3	NAG	CA	2	3	-	2/6/23/26	0/1/1/1
2	NAG	D	1	1,2	-	1/6/23/26	0/1/1/1
2	NAG	D	2	2	-	2/6/23/26	0/1/1/1
2	BMA	D	3	2	-	2/2/19/22	0/1/1/1
2	MAN	D	4	2	-	0/2/19/22	0/1/1/1
2	MAN	D	5	2	-	1/2/19/22	0/1/1/1
2	MAN	D	6	2	-	2/2/19/22	0/1/1/1
9	NAG	DA	1	1,9	-	2/6/23/26	0/1/1/1
9	NAG	DA	2	9	-	2/6/23/26	0/1/1/1
9	BMA	DA	3	9	-	1/2/19/22	0/1/1/1
3	NAG	E	1	3,1	-	0/6/23/26	0/1/1/1
3	NAG	E	2	3	-	2/6/23/26	0/1/1/1
4	NAG	F	1	4,1	-	1/6/23/26	0/1/1/1
4	NAG	F	2	4	-	1/6/23/26	0/1/1/1
4	BMA	F	3	4	-	2/2/19/22	0/1/1/1
4	MAN	F	4	4	-	0/2/19/22	0/1/1/1
3	NAG	G	1	3,1	-	3/6/23/26	0/1/1/1
3	NAG	G	2	3	-	2/6/23/26	0/1/1/1
5	NAG	H	1	1,5	-	1/6/23/26	0/1/1/1
5	NAG	H	2	5	-	0/6/23/26	0/1/1/1
5	BMA	H	3	5	-	2/2/19/22	0/1/1/1
5	MAN	H	4	5	-	2/2/19/22	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NAG	I	1	3,1	-	4/6/23/26	0/1/1/1
3	NAG	I	2	3	-	2/6/23/26	0/1/1/1
3	NAG	J	1	3,1	-	0/6/23/26	0/1/1/1
3	NAG	J	2	3	-	2/6/23/26	0/1/1/1
6	NAG	K	1	6,1	-	1/6/23/26	0/1/1/1
6	NAG	K	2	6	-	2/6/23/26	0/1/1/1
6	BMA	K	3	6	-	2/2/19/22	0/1/1/1
6	MAN	K	4	6	-	1/2/19/22	0/1/1/1
6	MAN	K	5	6	-	2/2/19/22	0/1/1/1
6	MAN	K	6	6	-	0/2/19/22	0/1/1/1
6	MAN	K	7	6	-	2/2/19/22	0/1/1/1
6	MAN	K	8	6	-	0/2/19/22	0/1/1/1
7	NAG	L	1	7	-	2/6/23/26	0/1/1/1
7	BMA	L	2	7	-	1/2/19/22	0/1/1/1
3	NAG	M	1	3,1	-	1/6/23/26	0/1/1/1
3	NAG	M	2	3	-	2/6/23/26	0/1/1/1
8	NAG	N	1	8,1	-	1/6/23/26	0/1/1/1
8	NAG	N	2	8	-	0/6/23/26	0/1/1/1
8	BMA	N	3	8	-	2/2/19/22	0/1/1/1
8	MAN	N	4	8	-	0/2/19/22	0/1/1/1
8	MAN	N	5	8	-	1/2/19/22	0/1/1/1
9	NAG	O	1	1,9	-	2/6/23/26	0/1/1/1
9	NAG	O	2	9	-	2/6/23/26	0/1/1/1
9	BMA	O	3	9	-	0/2/19/22	0/1/1/1
3	NAG	P	1	3,1	-	2/6/23/26	0/1/1/1
3	NAG	P	2	3	-	2/6/23/26	0/1/1/1
3	NAG	Q	1	3,1	-	3/6/23/26	0/1/1/1
3	NAG	Q	2	3	-	2/6/23/26	0/1/1/1
3	NAG	R	1	3,1	-	3/6/23/26	0/1/1/1
3	NAG	R	2	3	-	2/6/23/26	0/1/1/1
3	NAG	S	1	3,1	-	0/6/23/26	0/1/1/1
3	NAG	S	2	3	-	2/6/23/26	0/1/1/1
3	NAG	T	1	3,1	-	2/6/23/26	0/1/1/1
3	NAG	T	2	3	-	2/6/23/26	0/1/1/1
4	NAG	U	1	4,1	-	2/6/23/26	0/1/1/1
4	NAG	U	2	4	-	2/6/23/26	0/1/1/1
4	BMA	U	3	4	-	2/2/19/22	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	MAN	U	4	4	-	2/2/19/22	0/1/1/1
8	NAG	V	1	8,1	-	3/6/23/26	0/1/1/1
8	NAG	V	2	8	-	0/6/23/26	0/1/1/1
8	BMA	V	3	8	-	2/2/19/22	0/1/1/1
8	MAN	V	4	8	-	0/2/19/22	0/1/1/1
8	MAN	V	5	8	-	0/2/19/22	0/1/1/1
3	NAG	W	1	3,1	-	1/6/23/26	0/1/1/1
3	NAG	W	2	3	-	2/6/23/26	0/1/1/1
9	NAG	X	1	1,9	-	2/6/23/26	0/1/1/1
9	NAG	X	2	9	-	2/6/23/26	0/1/1/1
9	BMA	X	3	9	-	1/2/19/22	0/1/1/1
2	NAG	Y	1	1,2	-	1/6/23/26	0/1/1/1
2	NAG	Y	2	2	-	2/6/23/26	0/1/1/1
2	BMA	Y	3	2	-	2/2/19/22	0/1/1/1
2	MAN	Y	4	2	-	0/2/19/22	0/1/1/1
2	MAN	Y	5	2	-	1/2/19/22	0/1/1/1
2	MAN	Y	6	2	-	2/2/19/22	0/1/1/1
3	NAG	Z	1	3,1	-	0/6/23/26	0/1/1/1
3	NAG	Z	2	3	-	2/6/23/26	0/1/1/1
4	NAG	a	1	4,1	-	1/6/23/26	0/1/1/1
4	NAG	a	2	4	-	1/6/23/26	0/1/1/1
4	BMA	a	3	4	-	2/2/19/22	0/1/1/1
4	MAN	a	4	4	-	0/2/19/22	0/1/1/1
3	NAG	b	1	3,1	-	3/6/23/26	0/1/1/1
3	NAG	b	2	3	-	2/6/23/26	0/1/1/1
5	NAG	c	1	1,5	-	1/6/23/26	0/1/1/1
5	NAG	c	2	5	-	0/6/23/26	0/1/1/1
5	BMA	c	3	5	-	2/2/19/22	0/1/1/1
5	MAN	c	4	5	-	2/2/19/22	0/1/1/1
3	NAG	d	1	3,1	-	4/6/23/26	0/1/1/1
3	NAG	d	2	3	-	2/6/23/26	0/1/1/1
3	NAG	e	1	3,1	-	0/6/23/26	0/1/1/1
3	NAG	e	2	3	-	2/6/23/26	0/1/1/1
6	NAG	f	1	6,1	-	1/6/23/26	0/1/1/1
6	NAG	f	2	6	-	2/6/23/26	0/1/1/1
6	BMA	f	3	6	-	2/2/19/22	0/1/1/1
6	MAN	f	4	6	-	2/2/19/22	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	MAN	f	5	6	-	2/2/19/22	0/1/1/1
6	MAN	f	6	6	-	0/2/19/22	0/1/1/1
6	MAN	f	7	6	-	2/2/19/22	0/1/1/1
6	MAN	f	8	6	-	0/2/19/22	0/1/1/1
7	NAG	g	1	7	-	2/6/23/26	0/1/1/1
7	BMA	g	2	7	-	1/2/19/22	0/1/1/1
3	NAG	h	1	3,1	-	1/6/23/26	0/1/1/1
3	NAG	h	2	3	-	2/6/23/26	0/1/1/1
8	NAG	i	1	8,1	-	1/6/23/26	0/1/1/1
8	NAG	i	2	8	-	0/6/23/26	0/1/1/1
8	BMA	i	3	8	-	2/2/19/22	0/1/1/1
8	MAN	i	4	8	-	0/2/19/22	0/1/1/1
8	MAN	i	5	8	-	1/2/19/22	0/1/1/1
9	NAG	j	1	1,9	-	2/6/23/26	0/1/1/1
9	NAG	j	2	9	-	2/6/23/26	0/1/1/1
9	BMA	j	3	9	-	0/2/19/22	0/1/1/1
3	NAG	k	1	3,1	-	2/6/23/26	0/1/1/1
3	NAG	k	2	3	-	2/6/23/26	0/1/1/1
3	NAG	l	1	3,1	-	3/6/23/26	0/1/1/1
3	NAG	l	2	3	-	2/6/23/26	0/1/1/1
3	NAG	m	1	3,1	-	3/6/23/26	0/1/1/1
3	NAG	m	2	3	-	2/6/23/26	0/1/1/1
3	NAG	n	1	3,1	-	0/6/23/26	0/1/1/1
3	NAG	n	2	3	-	2/6/23/26	0/1/1/1
3	NAG	o	1	3,1	-	2/6/23/26	0/1/1/1
3	NAG	o	2	3	-	2/6/23/26	0/1/1/1
4	NAG	p	1	4,1	-	2/6/23/26	0/1/1/1
4	NAG	p	2	4	-	2/6/23/26	0/1/1/1
4	BMA	p	3	4	-	2/2/19/22	0/1/1/1
4	MAN	p	4	4	-	2/2/19/22	0/1/1/1
8	NAG	q	1	8,1	-	3/6/23/26	0/1/1/1
8	NAG	q	2	8	-	0/6/23/26	0/1/1/1
8	BMA	q	3	8	-	2/2/19/22	0/1/1/1
8	MAN	q	4	8	-	0/2/19/22	0/1/1/1
8	MAN	q	5	8	-	0/2/19/22	0/1/1/1
3	NAG	r	1	3,1	-	1/6/23/26	0/1/1/1
3	NAG	r	2	3	-	2/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
9	NAG	s	1	1,9	-	2/6/23/26	0/1/1/1
9	NAG	s	2	9	-	2/6/23/26	0/1/1/1
9	BMA	s	3	9	-	1/2/19/22	0/1/1/1
2	NAG	t	1	1,2	-	1/6/23/26	0/1/1/1
2	NAG	t	2	2	-	2/6/23/26	0/1/1/1
2	BMA	t	3	2	-	2/2/19/22	0/1/1/1
2	MAN	t	4	2	-	0/2/19/22	0/1/1/1
2	MAN	t	5	2	-	1/2/19/22	0/1/1/1
2	MAN	t	6	2	-	2/2/19/22	0/1/1/1
3	NAG	u	1	3,1	-	0/6/23/26	0/1/1/1
3	NAG	u	2	3	-	2/6/23/26	0/1/1/1
4	NAG	v	1	4,1	-	1/6/23/26	0/1/1/1
4	NAG	v	2	4	-	1/6/23/26	0/1/1/1
4	BMA	v	3	4	-	2/2/19/22	0/1/1/1
4	MAN	v	4	4	-	0/2/19/22	0/1/1/1
3	NAG	w	1	3,1	-	3/6/23/26	0/1/1/1
3	NAG	w	2	3	-	2/6/23/26	0/1/1/1
5	NAG	x	1	1,5	-	1/6/23/26	0/1/1/1
5	NAG	x	2	5	-	0/6/23/26	0/1/1/1
5	BMA	x	3	5	-	2/2/19/22	0/1/1/1
5	MAN	x	4	5	-	2/2/19/22	0/1/1/1
3	NAG	y	1	3,1	-	4/6/23/26	0/1/1/1
3	NAG	y	2	3	-	2/6/23/26	0/1/1/1
3	NAG	z	1	3,1	-	0/6/23/26	0/1/1/1
3	NAG	z	2	3	-	2/6/23/26	0/1/1/1

The worst 5 of 43 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	6	2	NAG	O5-C1	3.99	1.50	1.43
3	Q	2	NAG	O5-C1	3.99	1.50	1.43
3	l	2	NAG	O5-C1	3.93	1.50	1.43
2	D	3	BMA	C1-C2	3.28	1.59	1.52
2	t	3	BMA	C1-C2	3.25	1.59	1.52

The worst 5 of 186 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	f	7	MAN	C1-O5-C5	7.24	122.00	112.19

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	K	7	MAN	C1-O5-C5	7.22	121.98	112.19
6	0	7	MAN	C1-O5-C5	7.22	121.98	112.19
6	f	3	BMA	O3-C3-C2	4.11	117.87	109.99
6	0	3	BMA	O3-C3-C2	4.10	117.84	109.99

There are no chirality outliers.

5 of 293 torsion outliers are listed below:

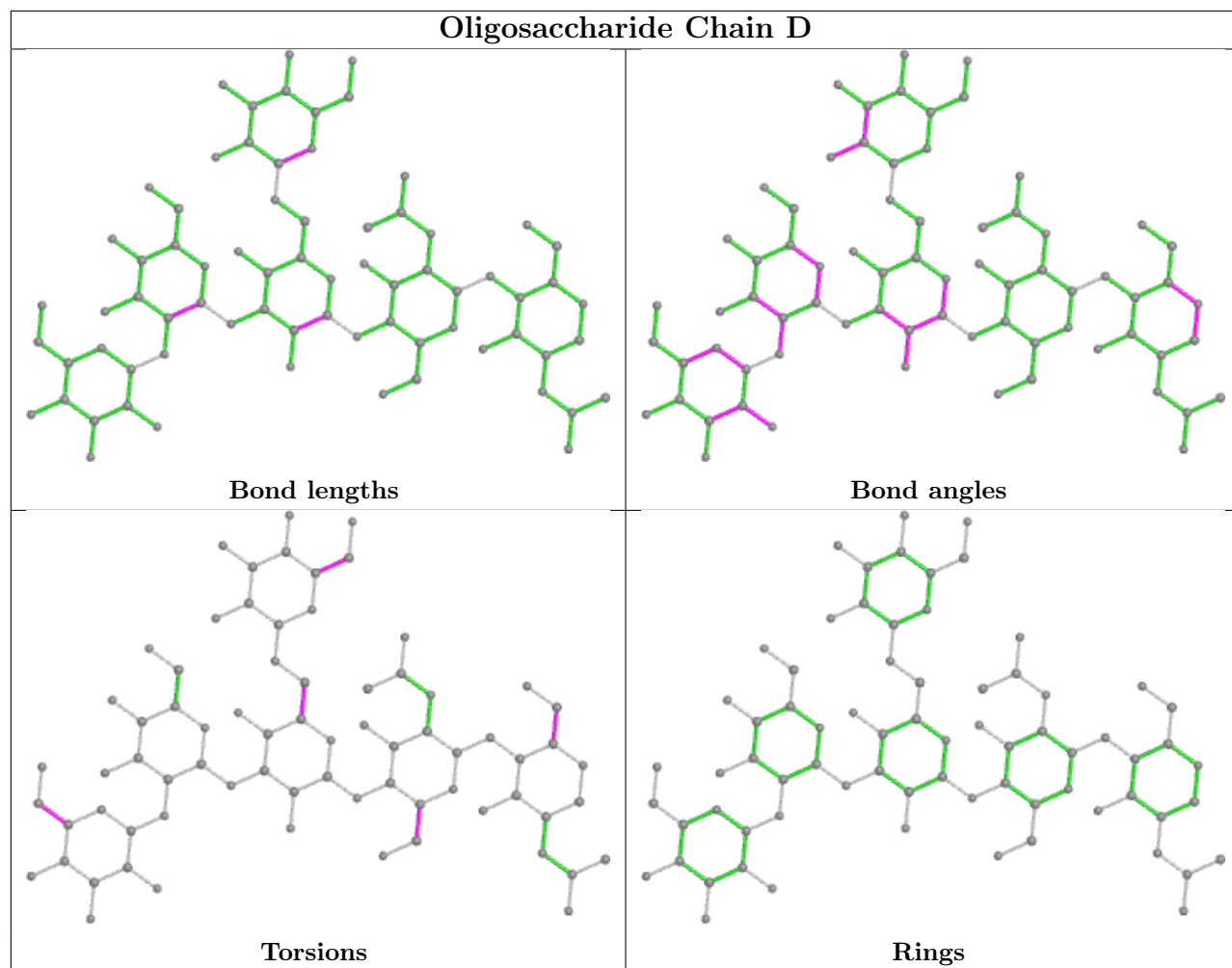
Mol	Chain	Res	Type	Atoms
3	Q	2	NAG	C4-C5-C6-O6
3	1	2	NAG	C4-C5-C6-O6
3	6	2	NAG	C4-C5-C6-O6
3	Q	1	NAG	O5-C5-C6-O6
3	1	1	NAG	O5-C5-C6-O6

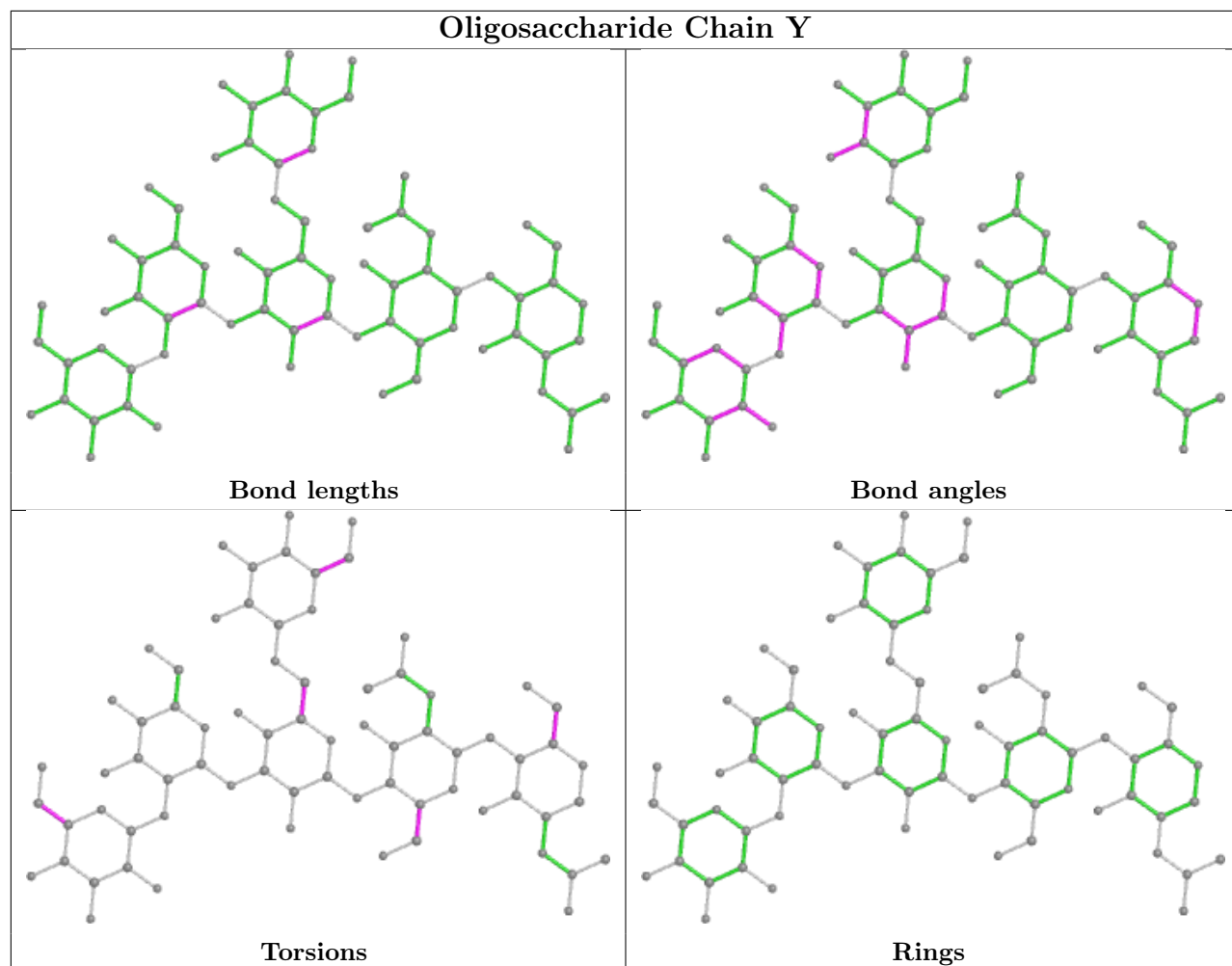
There are no ring outliers.

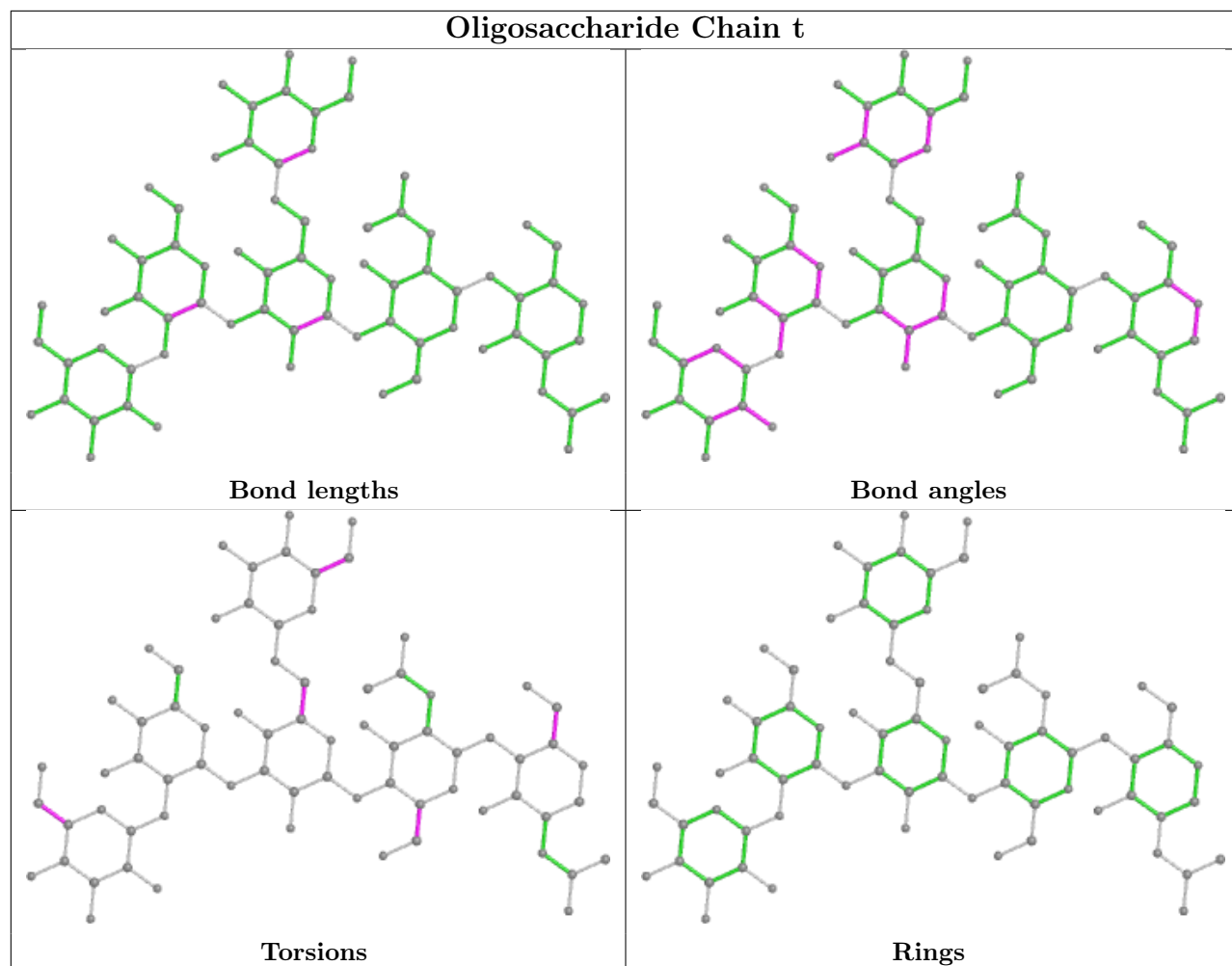
No monomer is involved in short contacts.

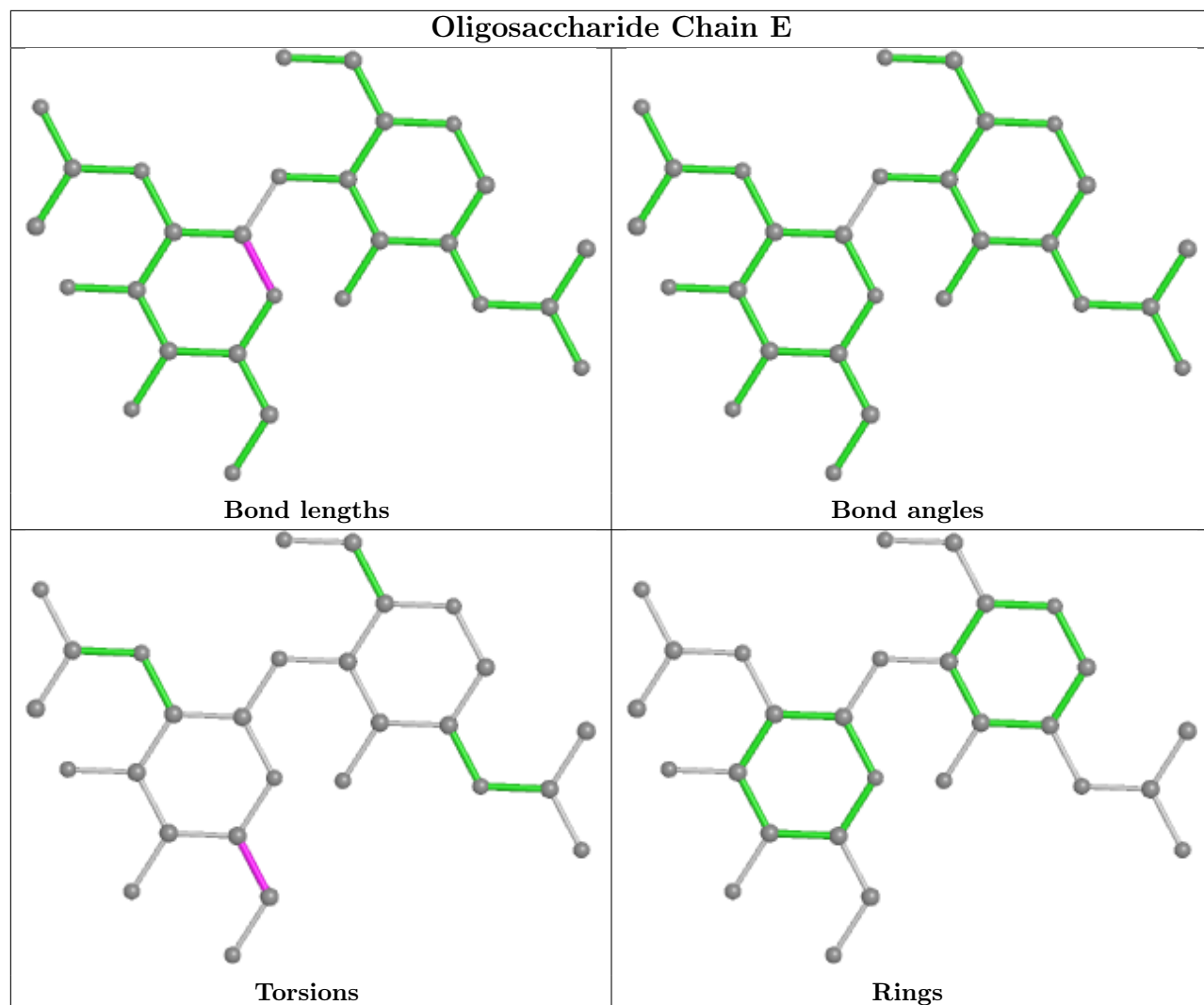
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

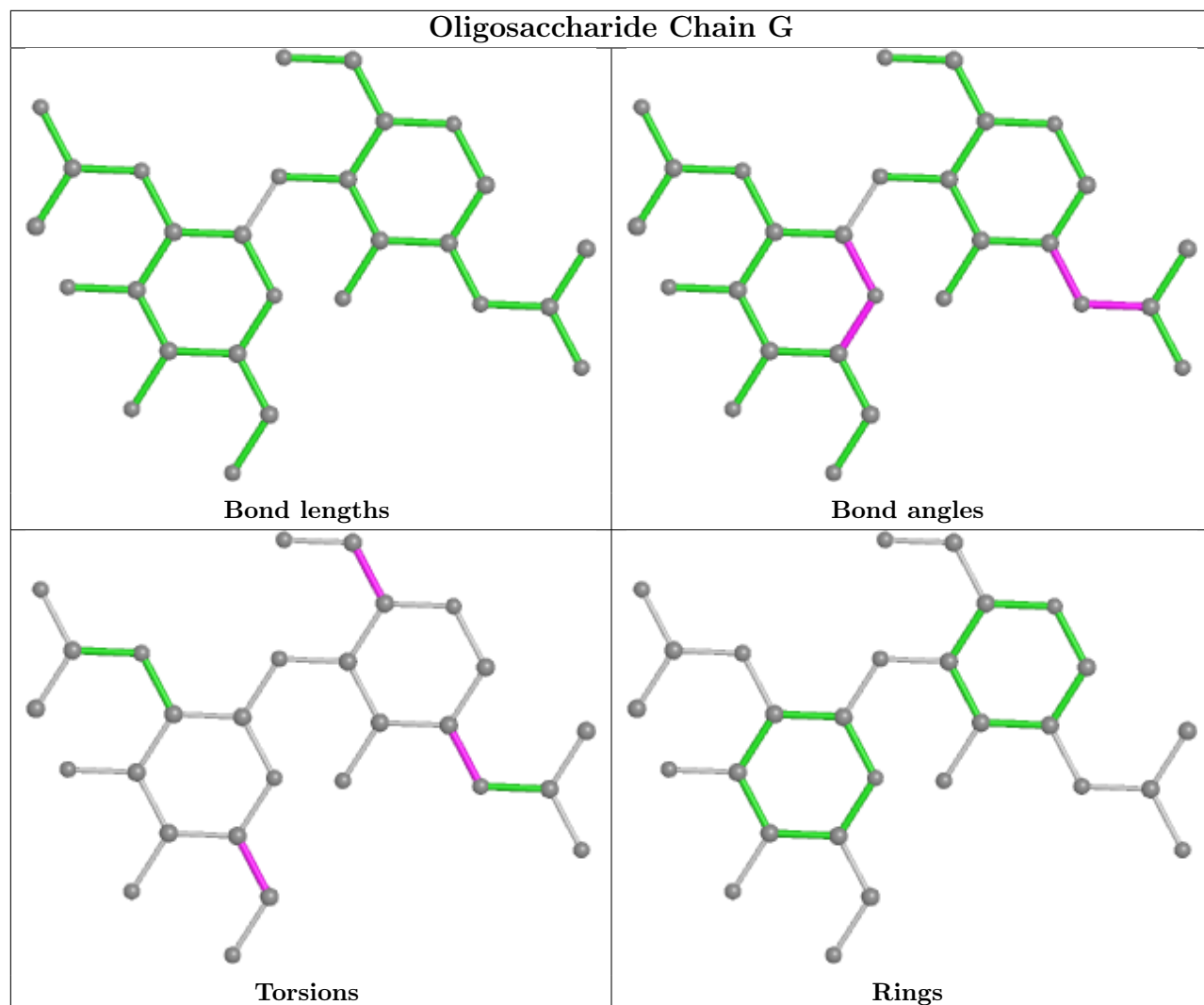


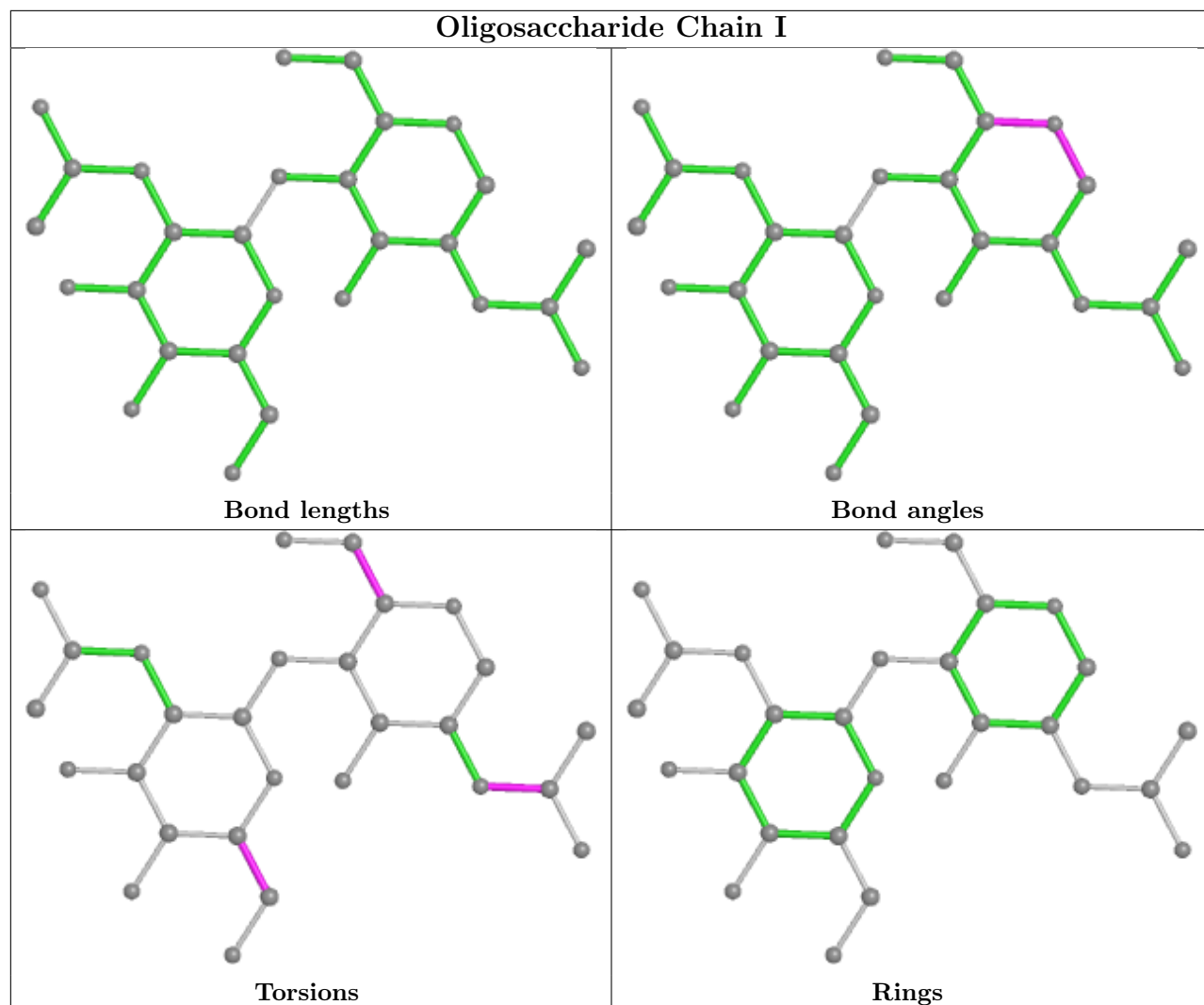


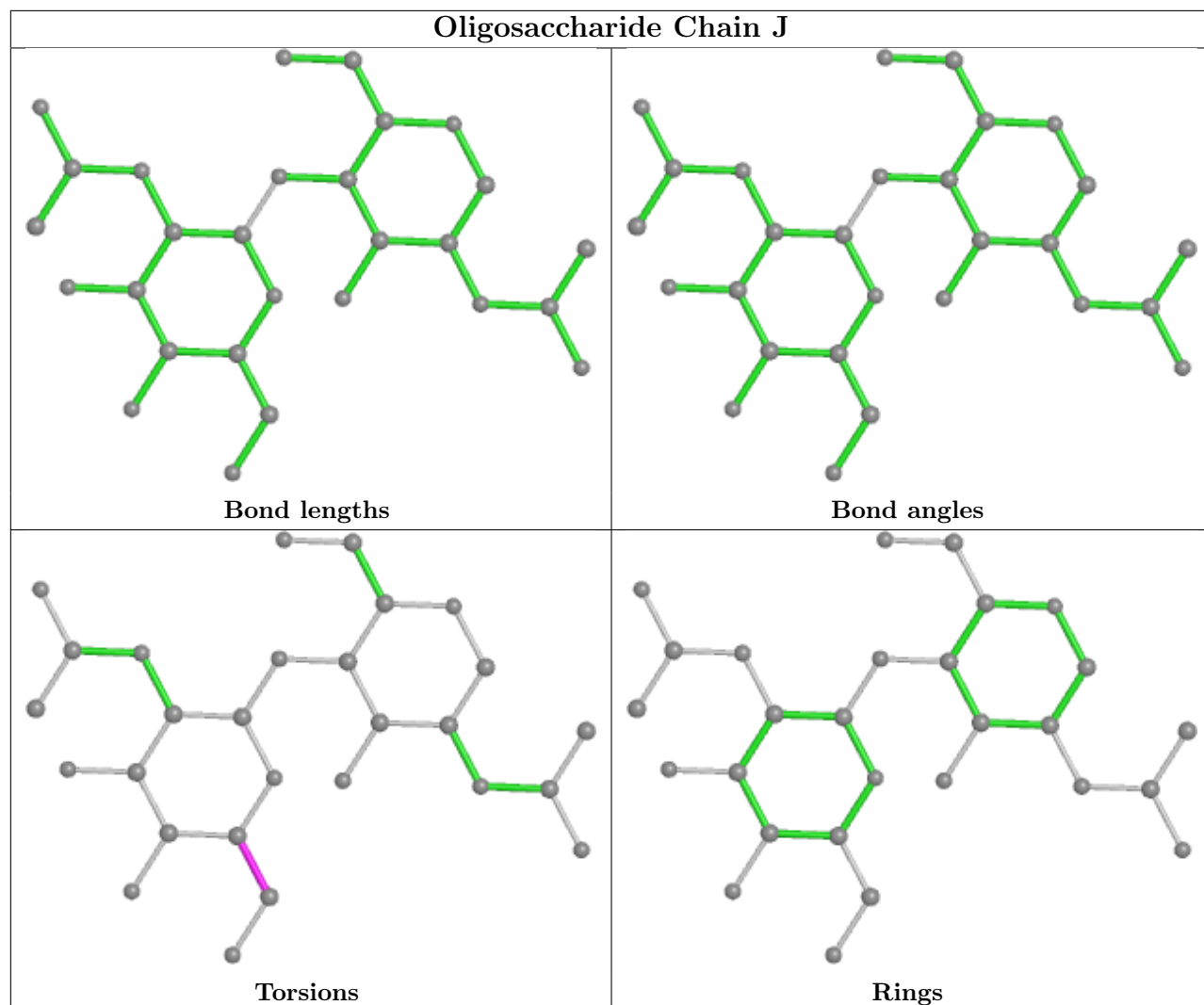


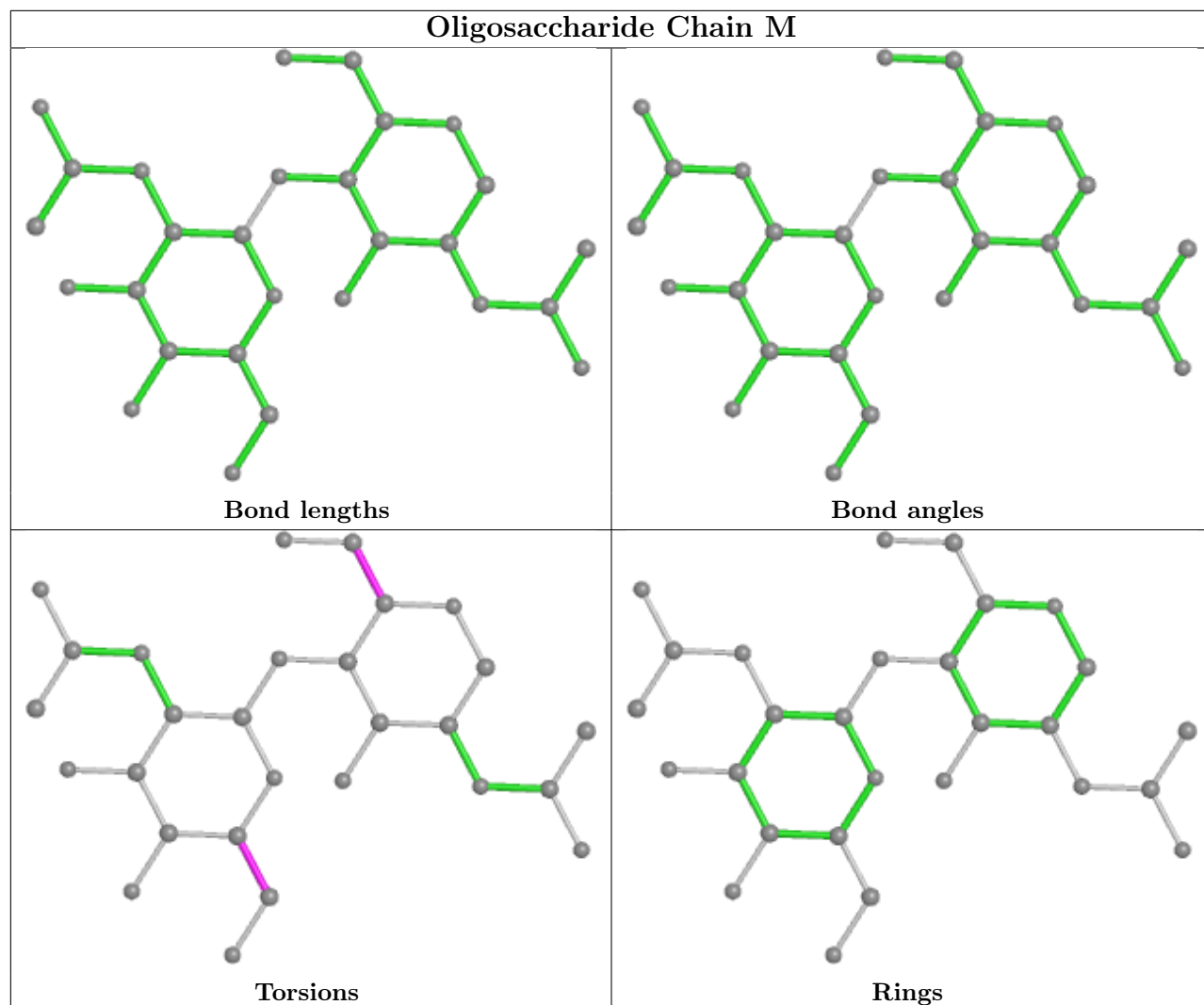




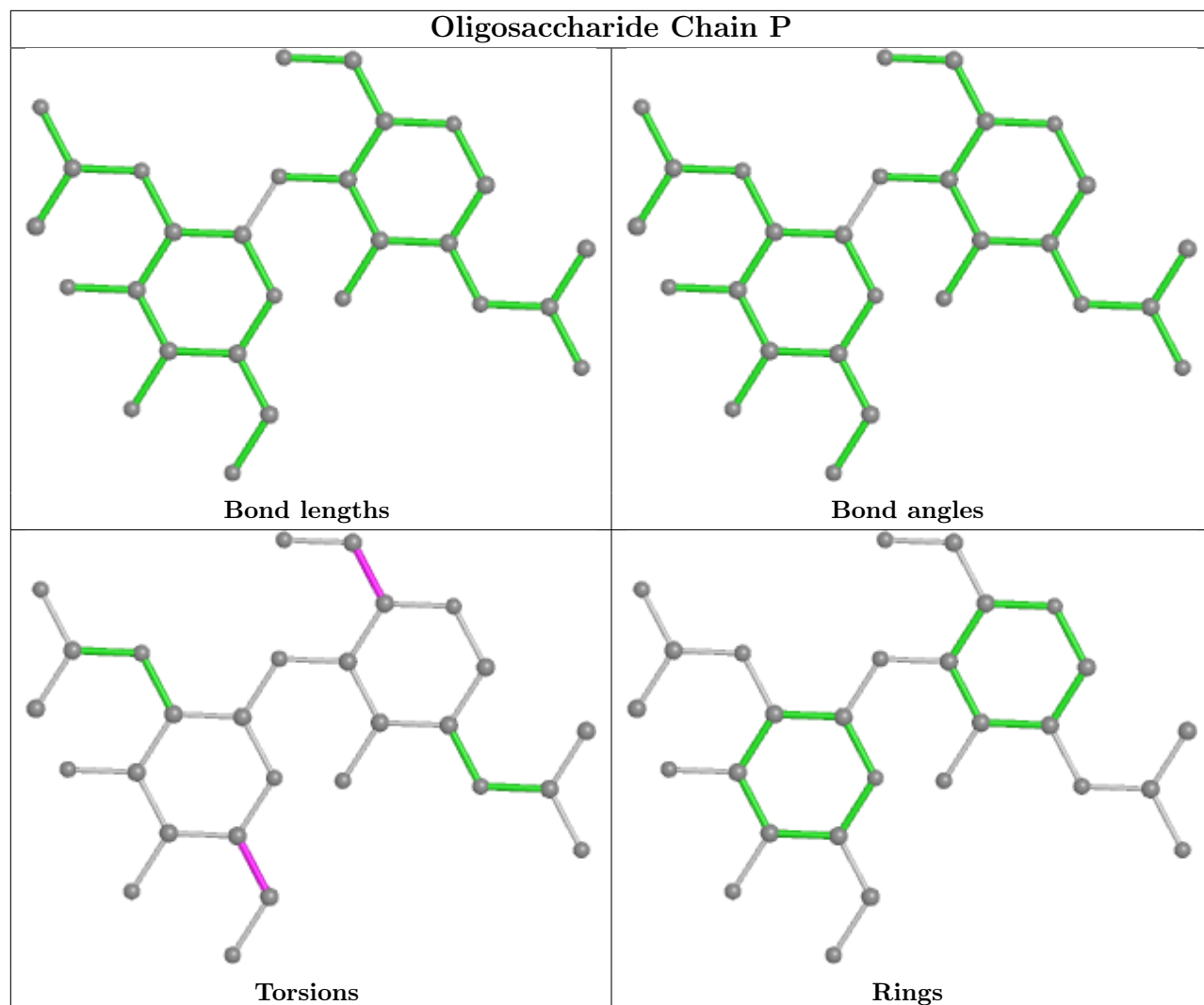


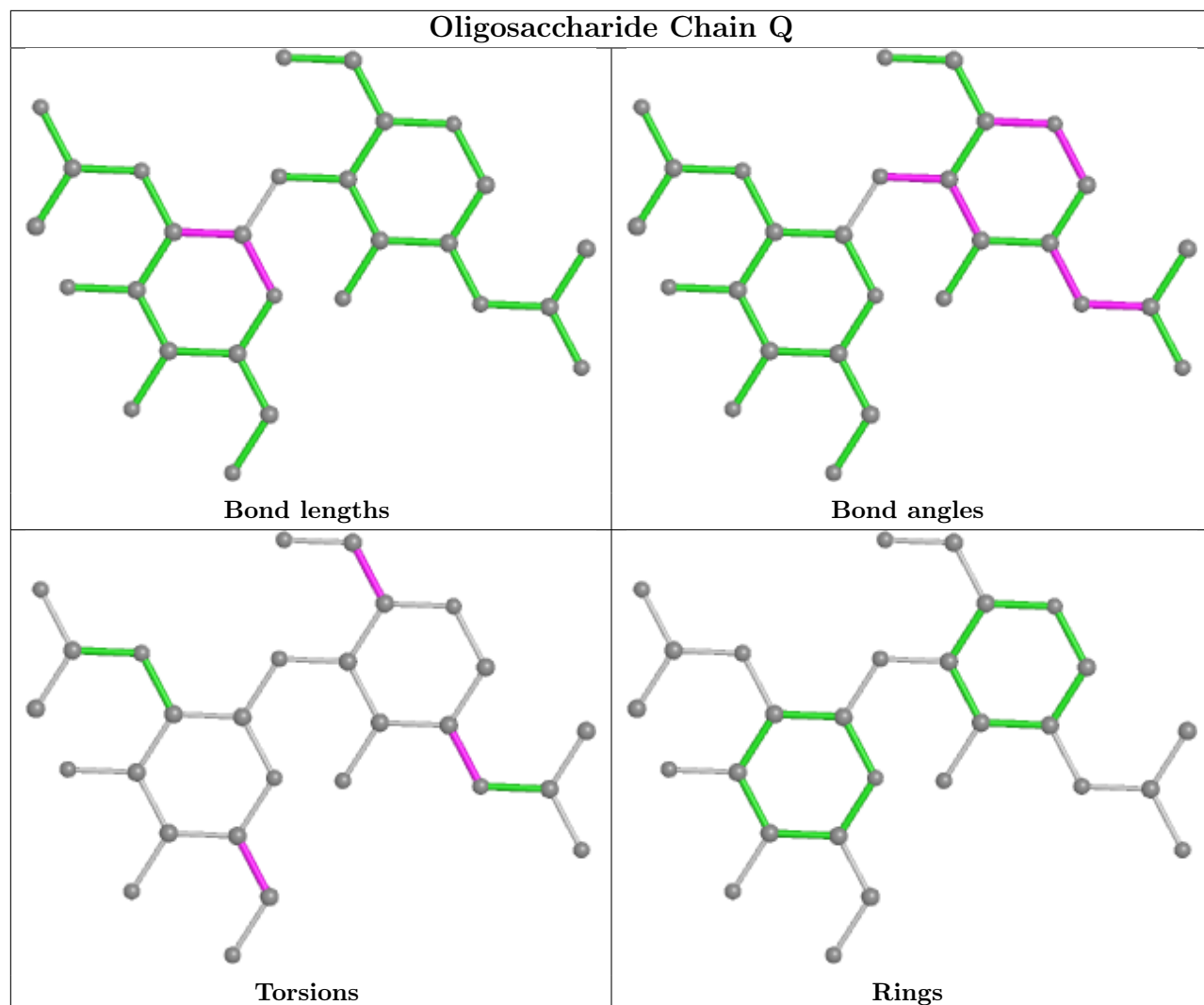


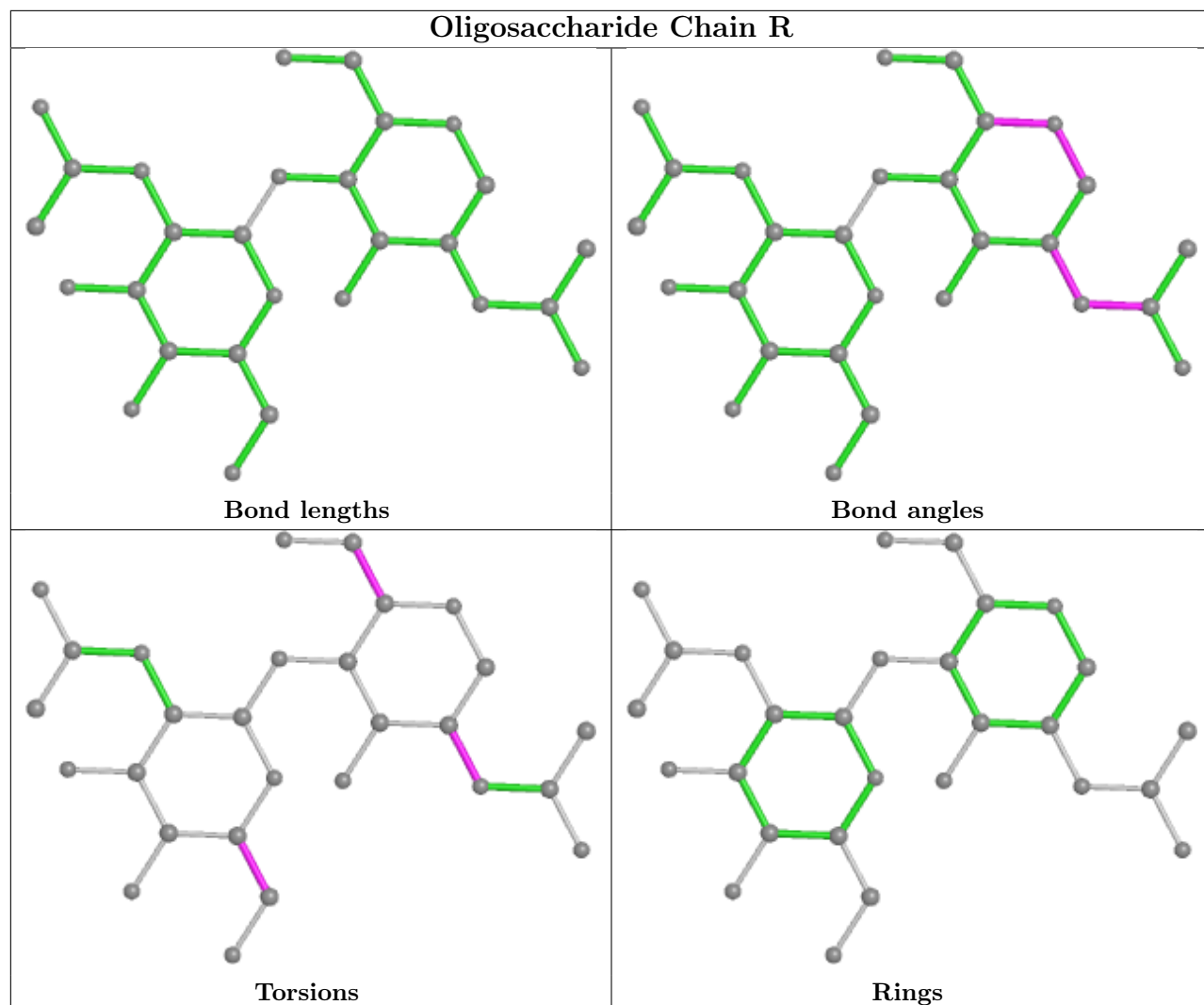


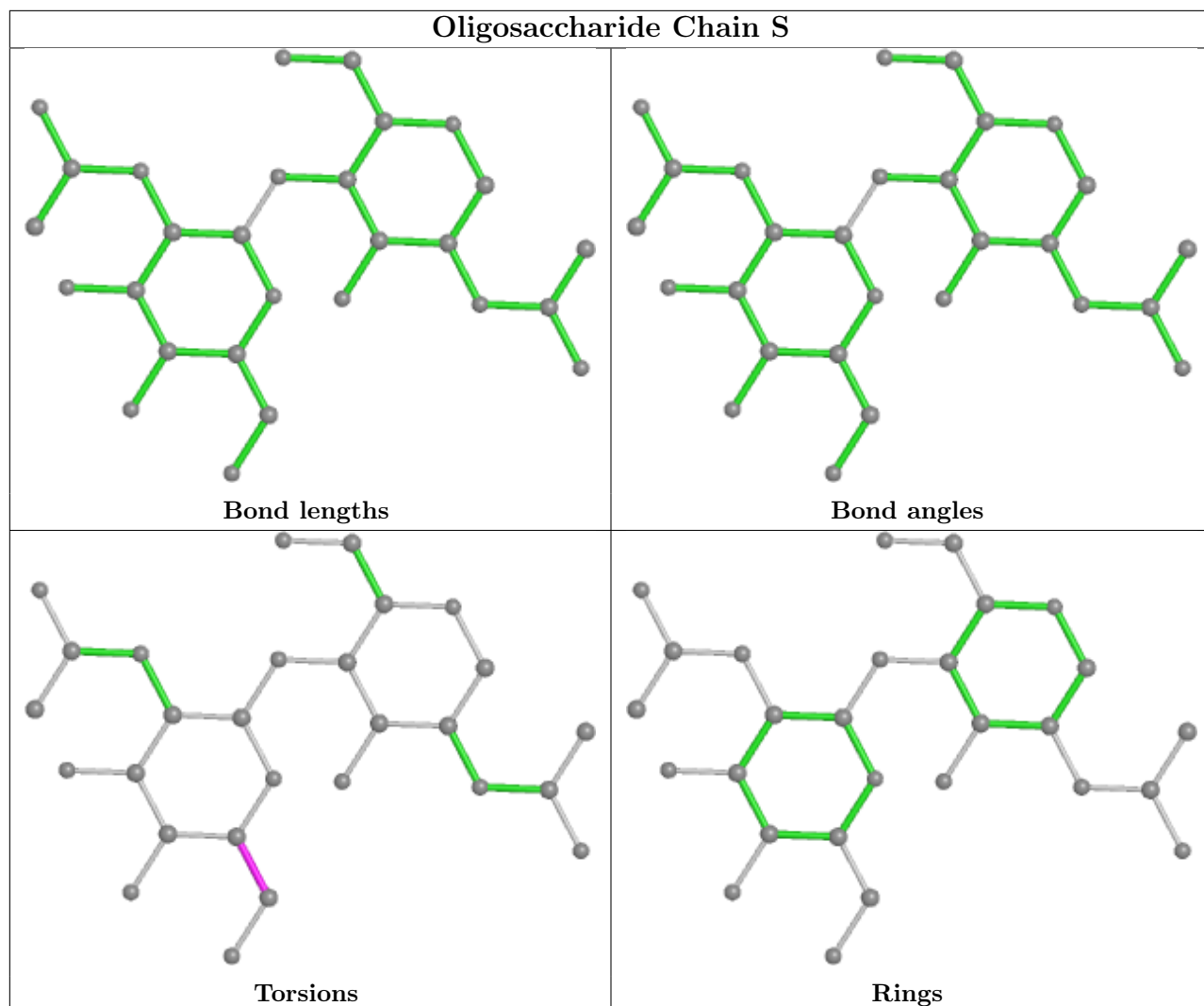


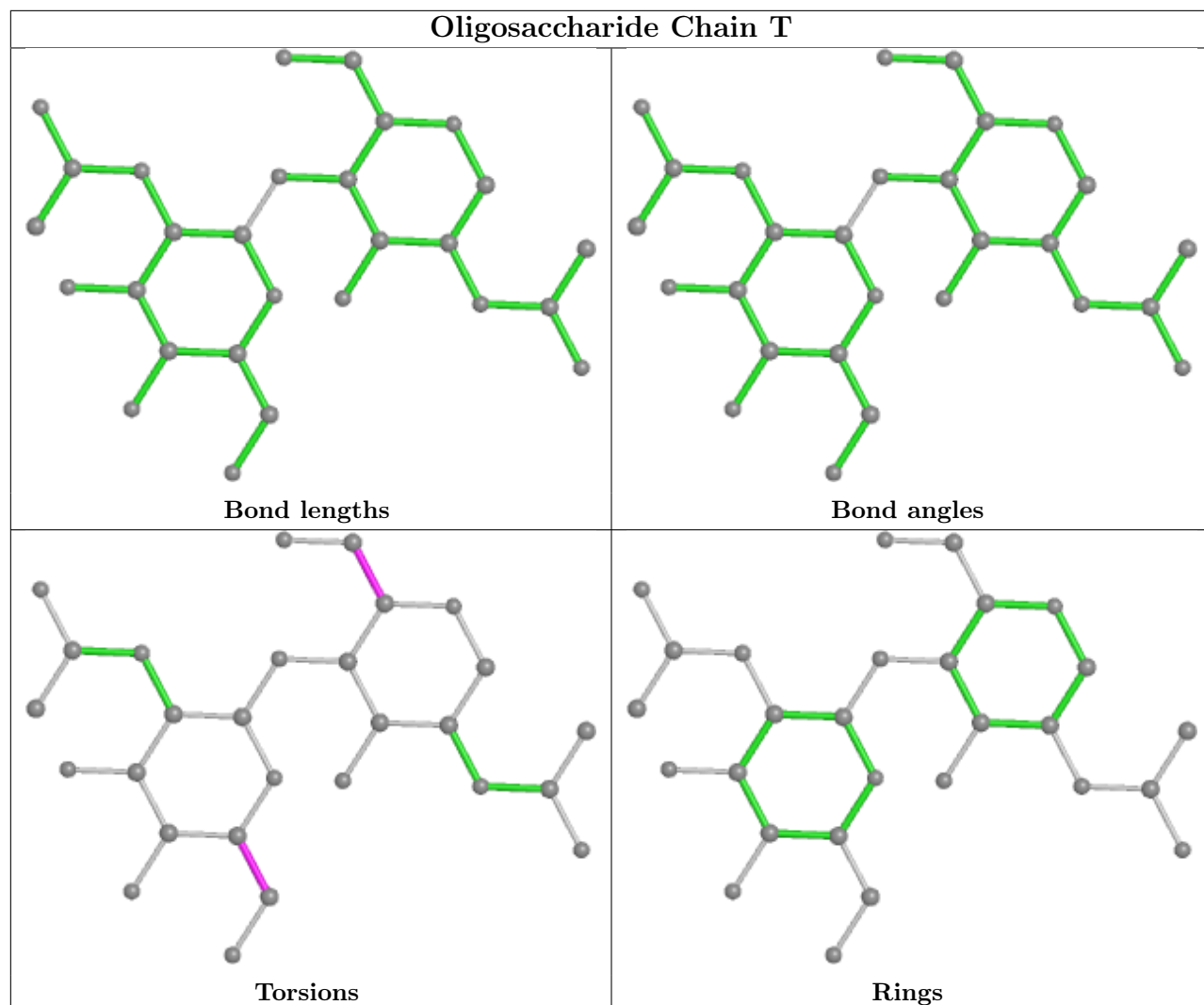


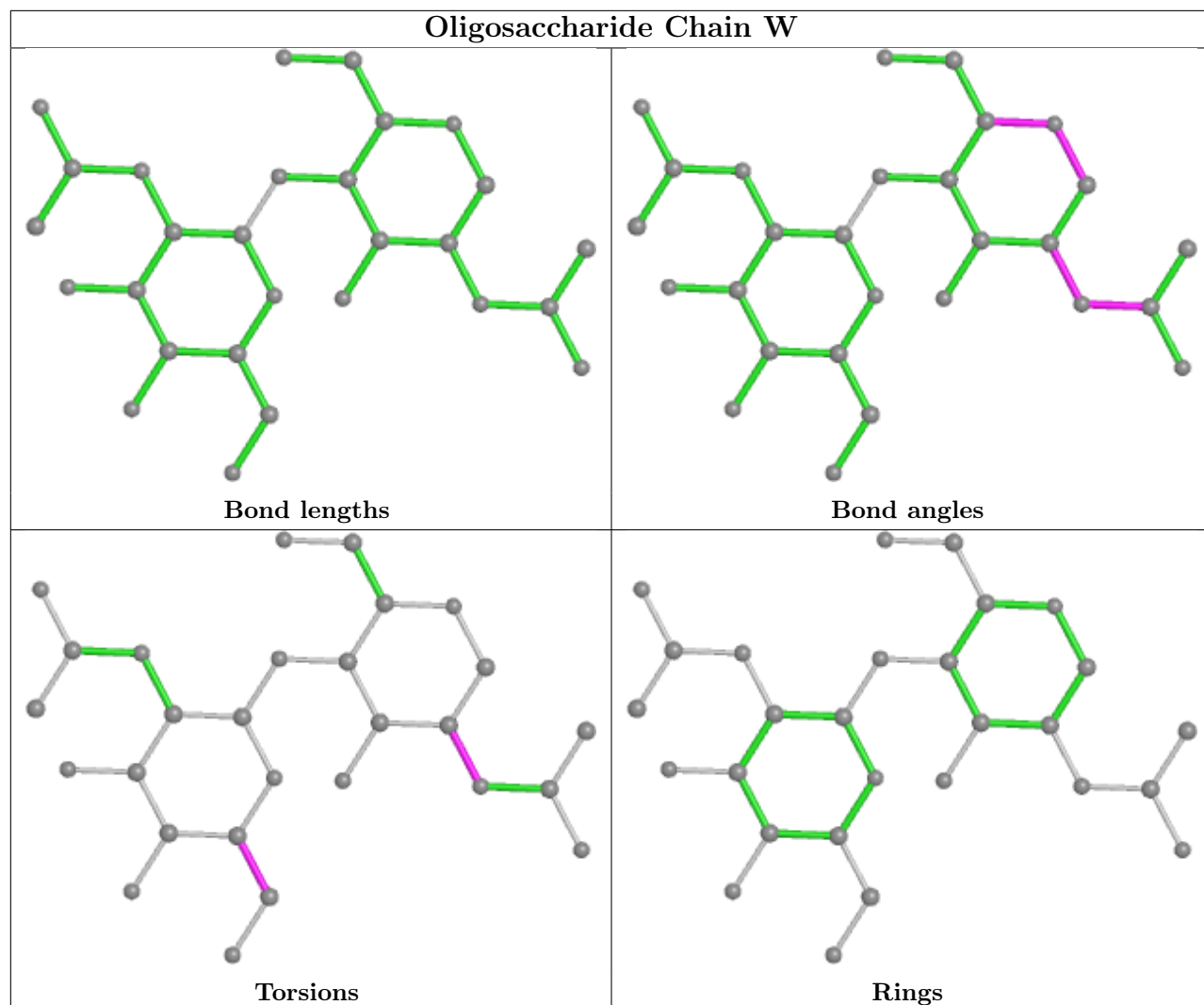


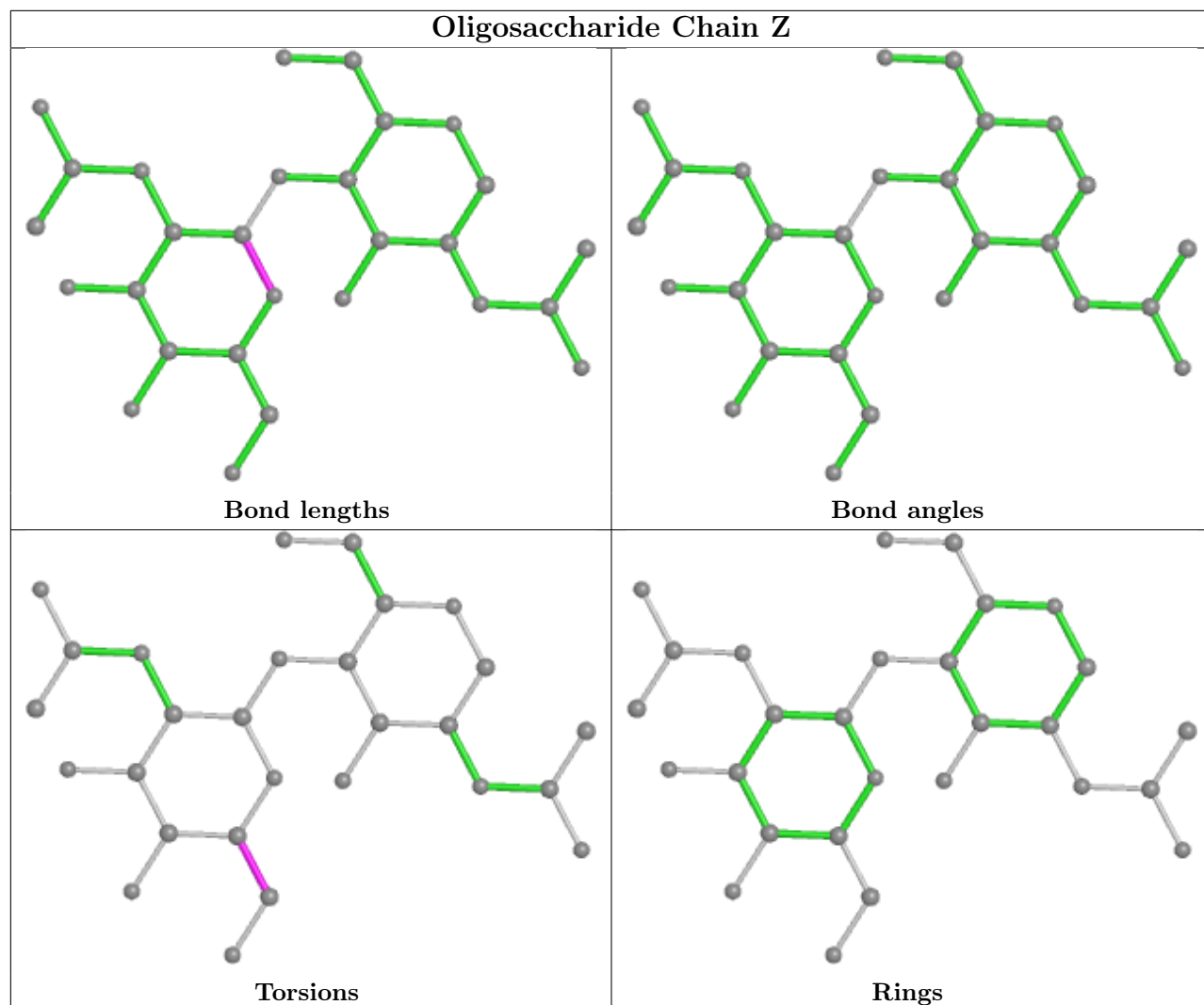


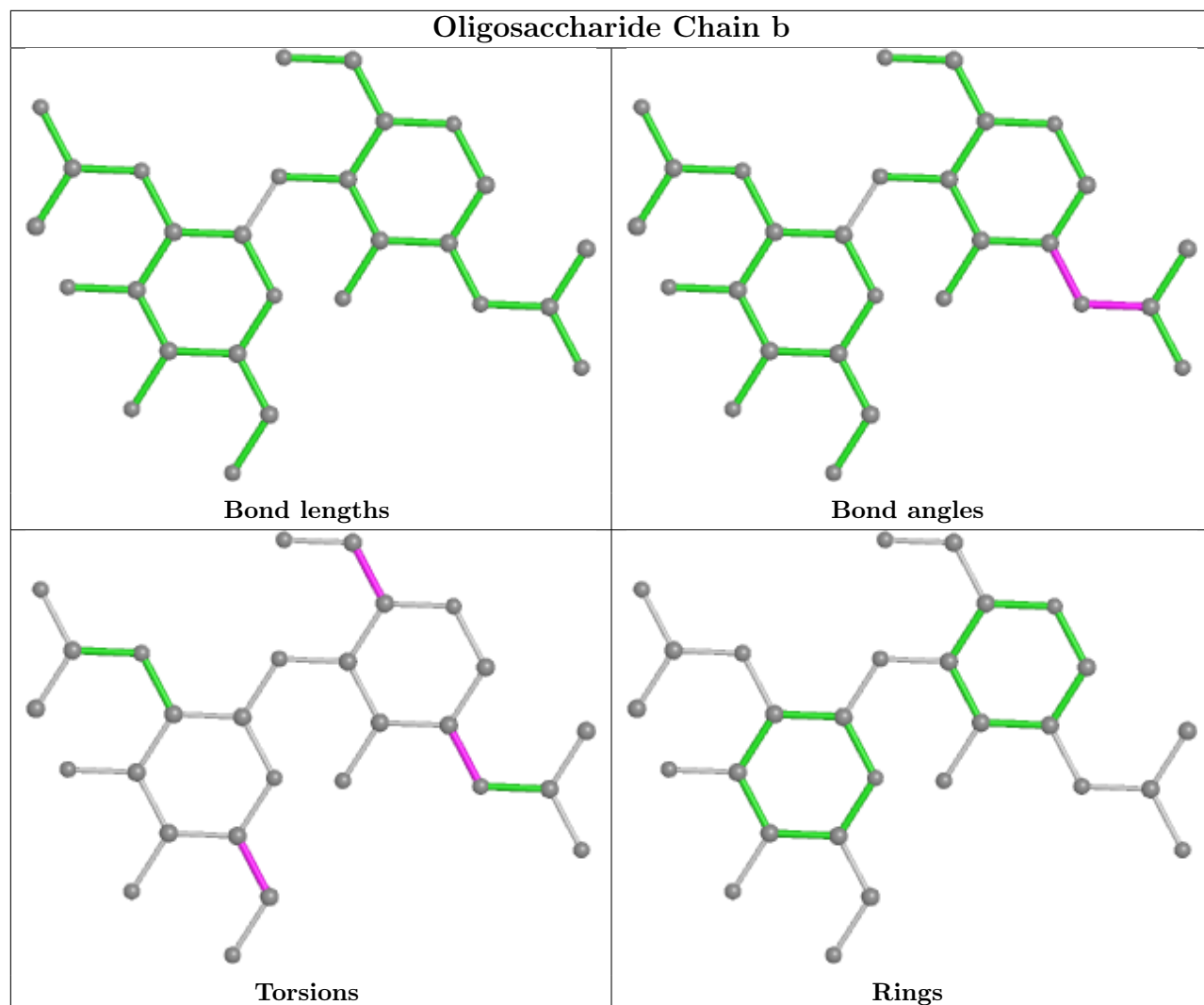




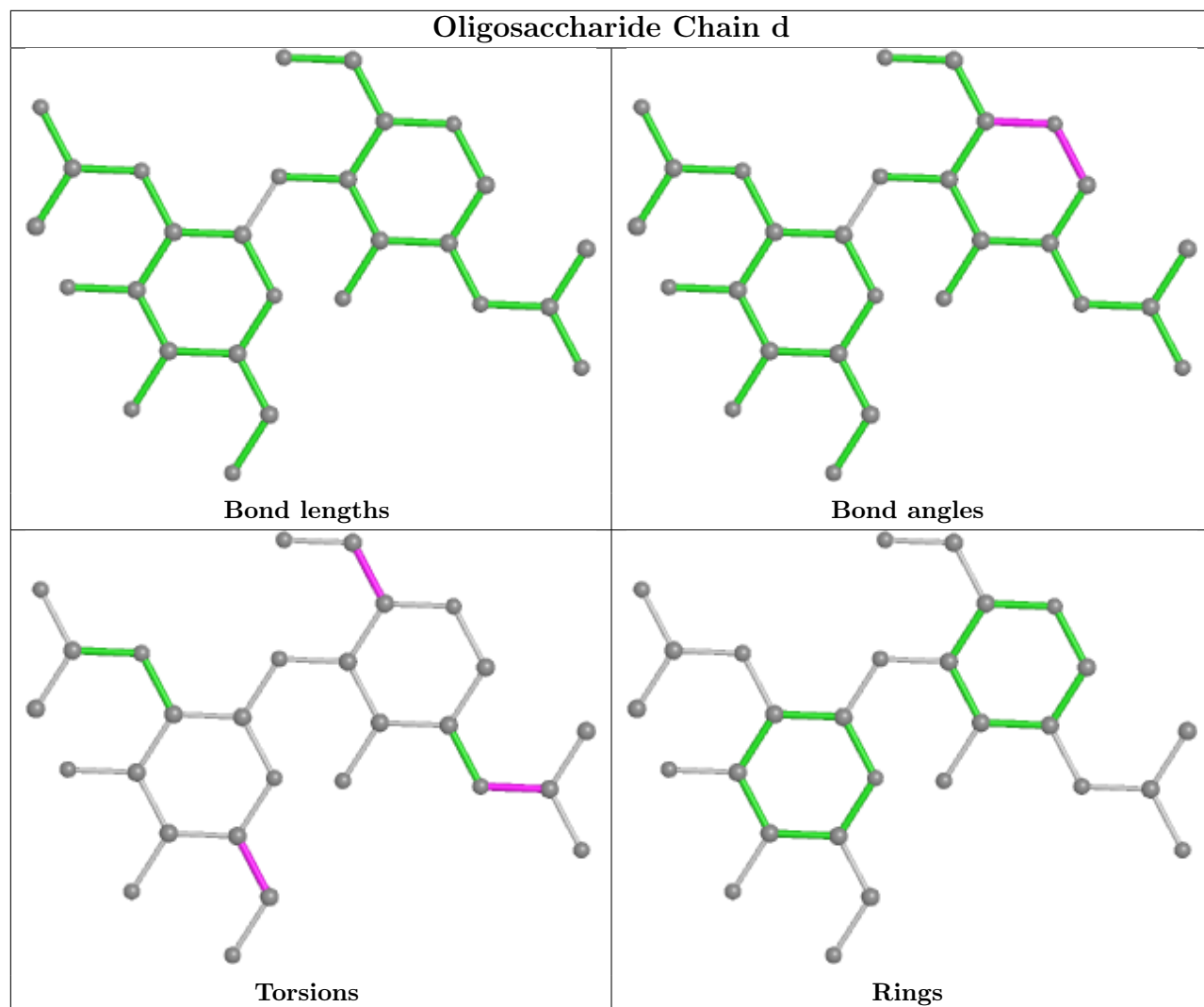


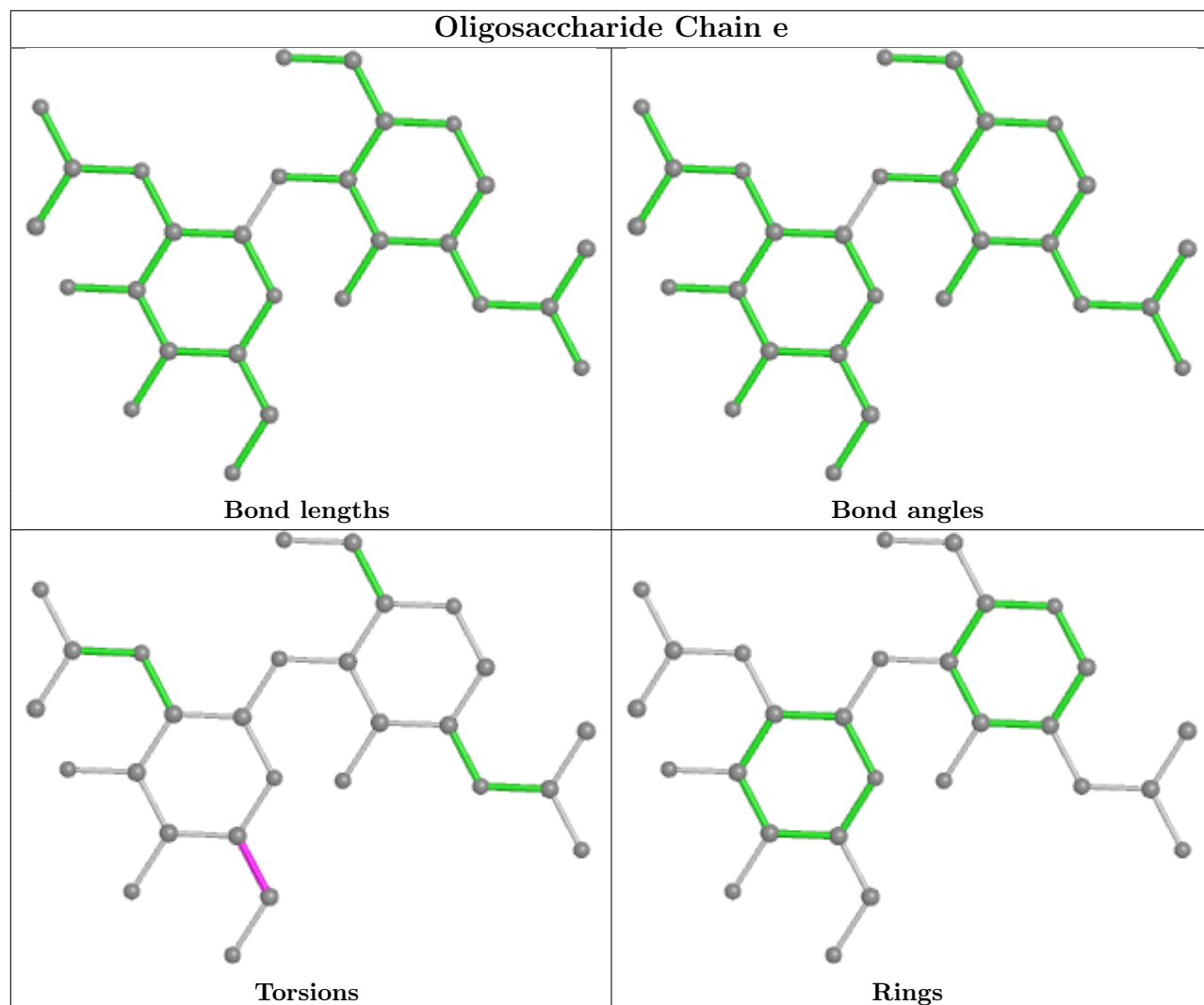


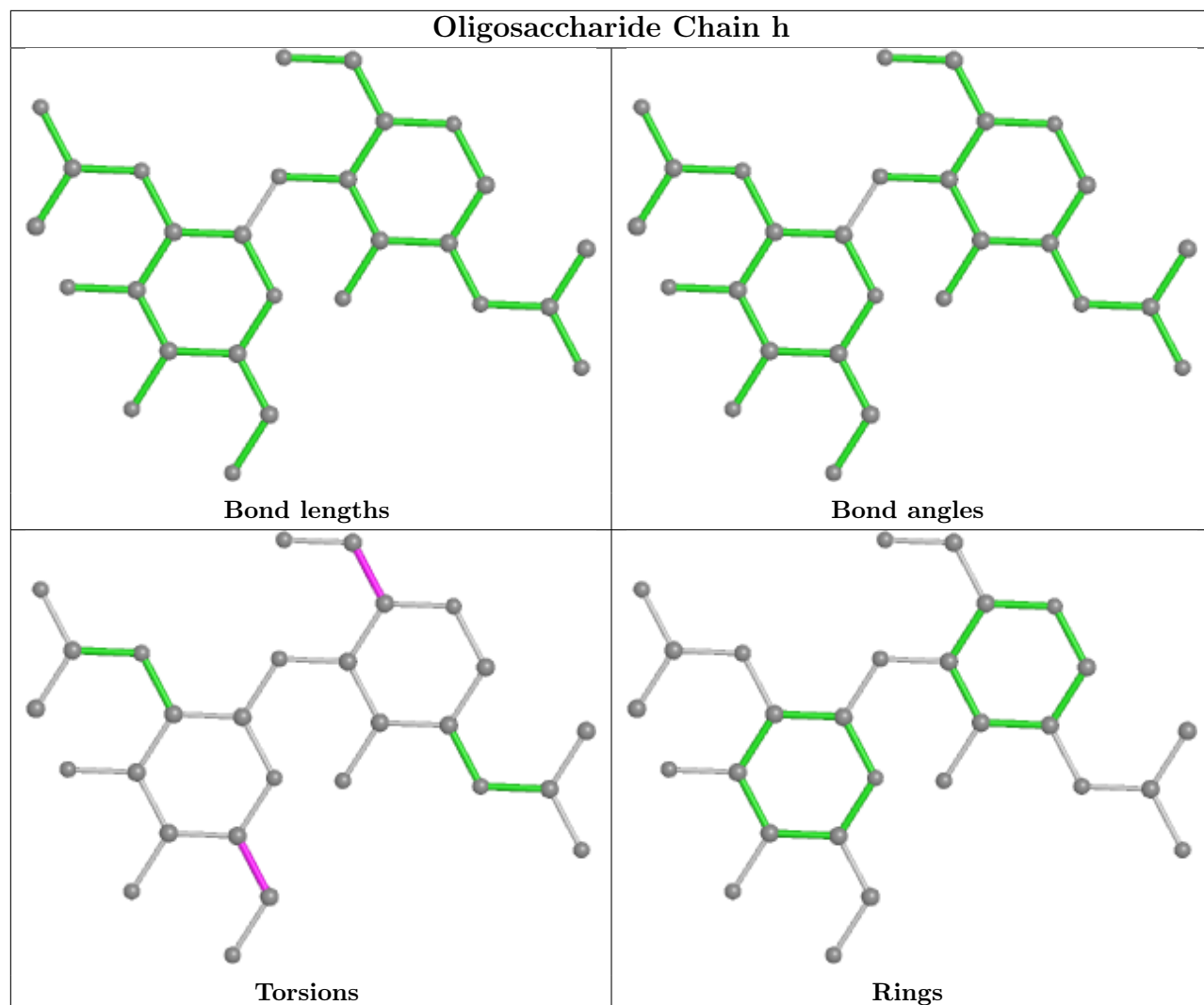


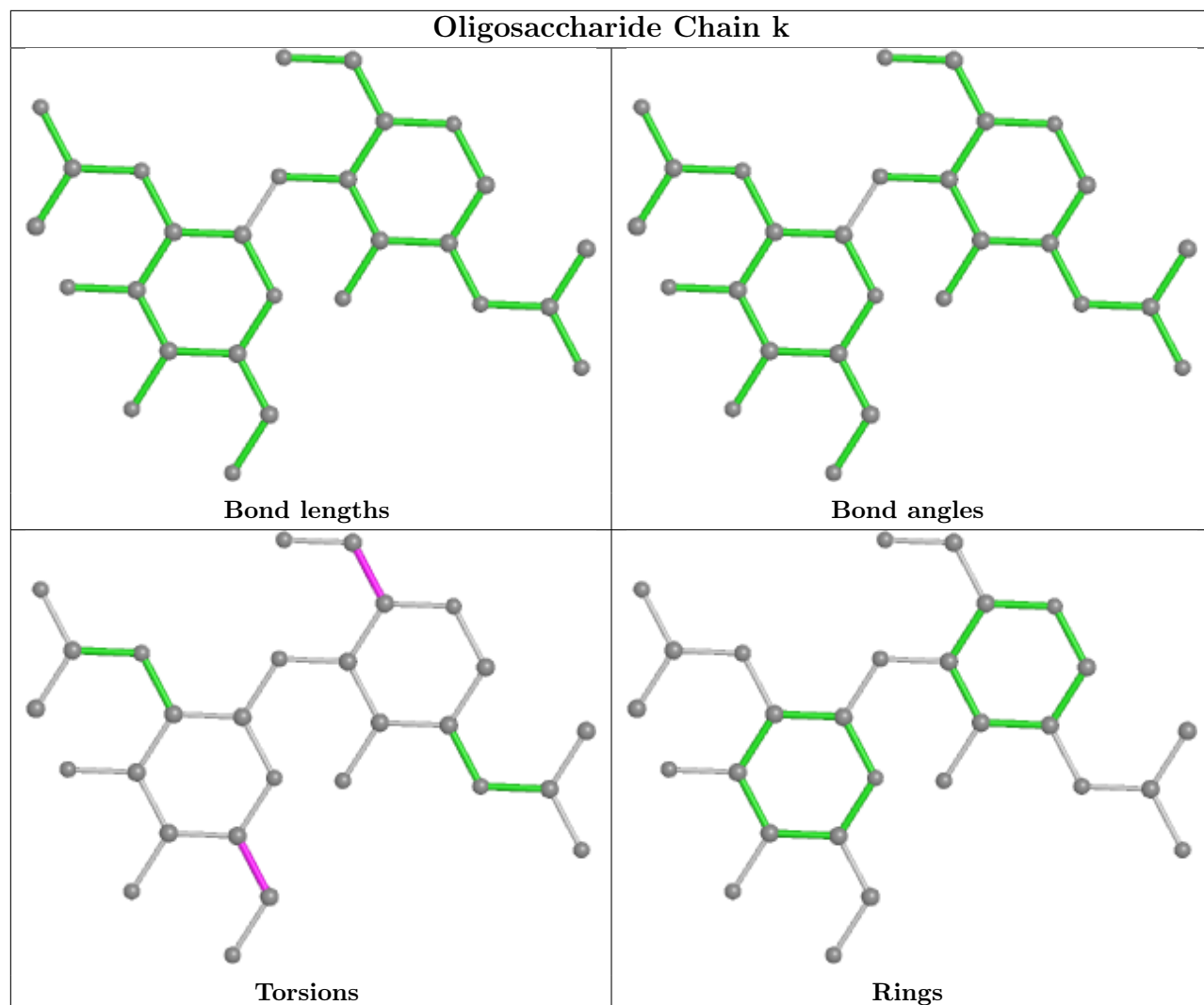


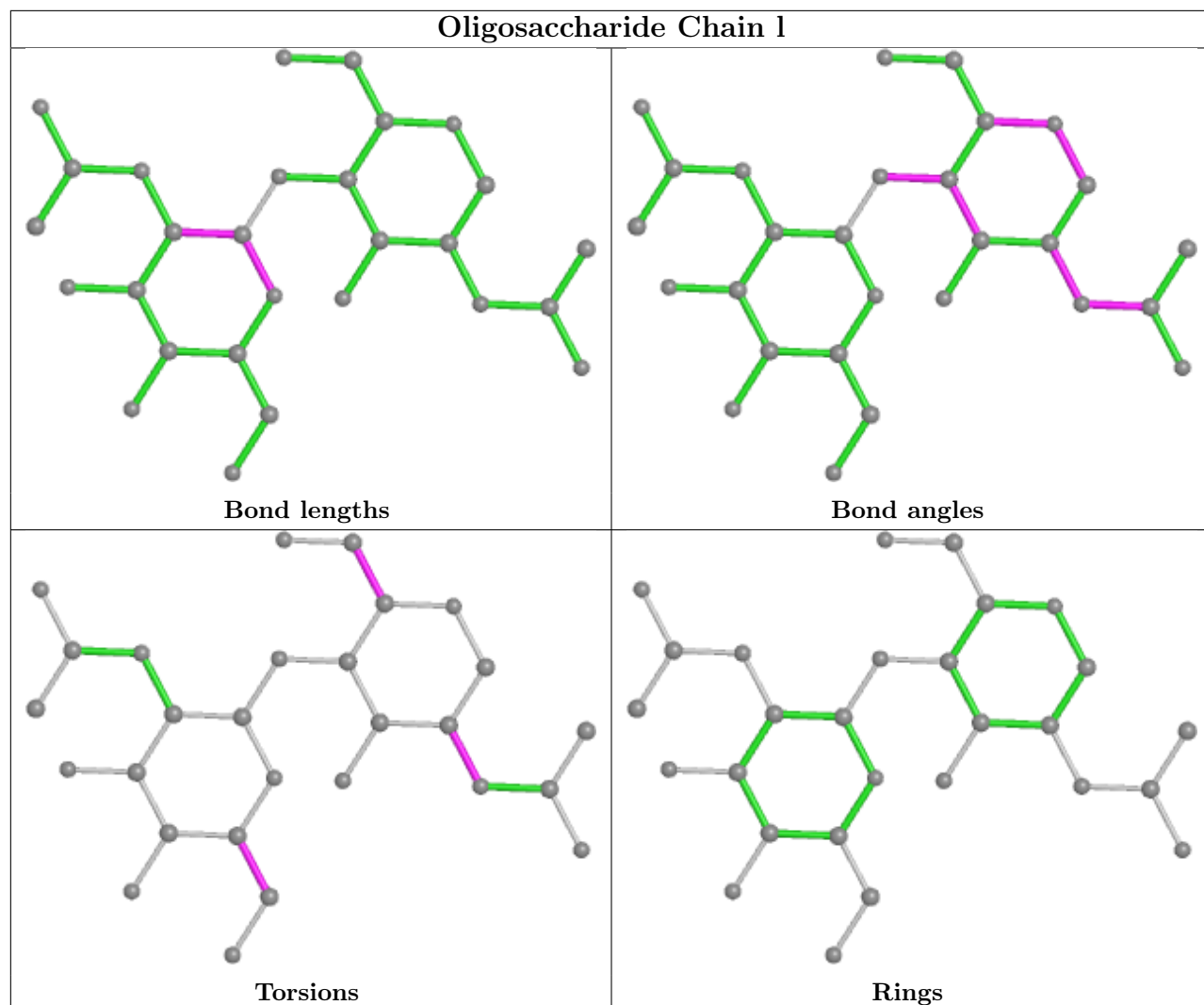


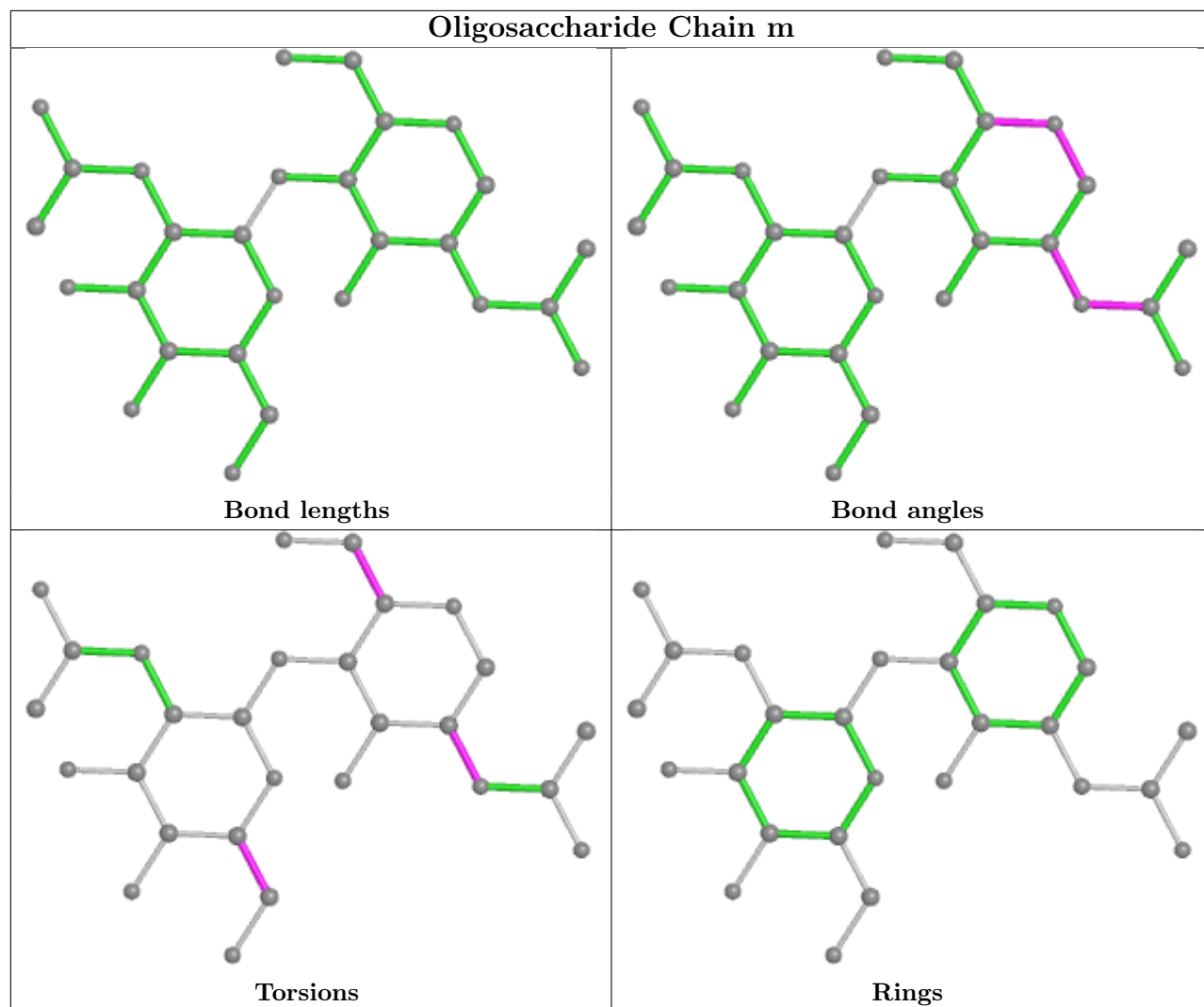


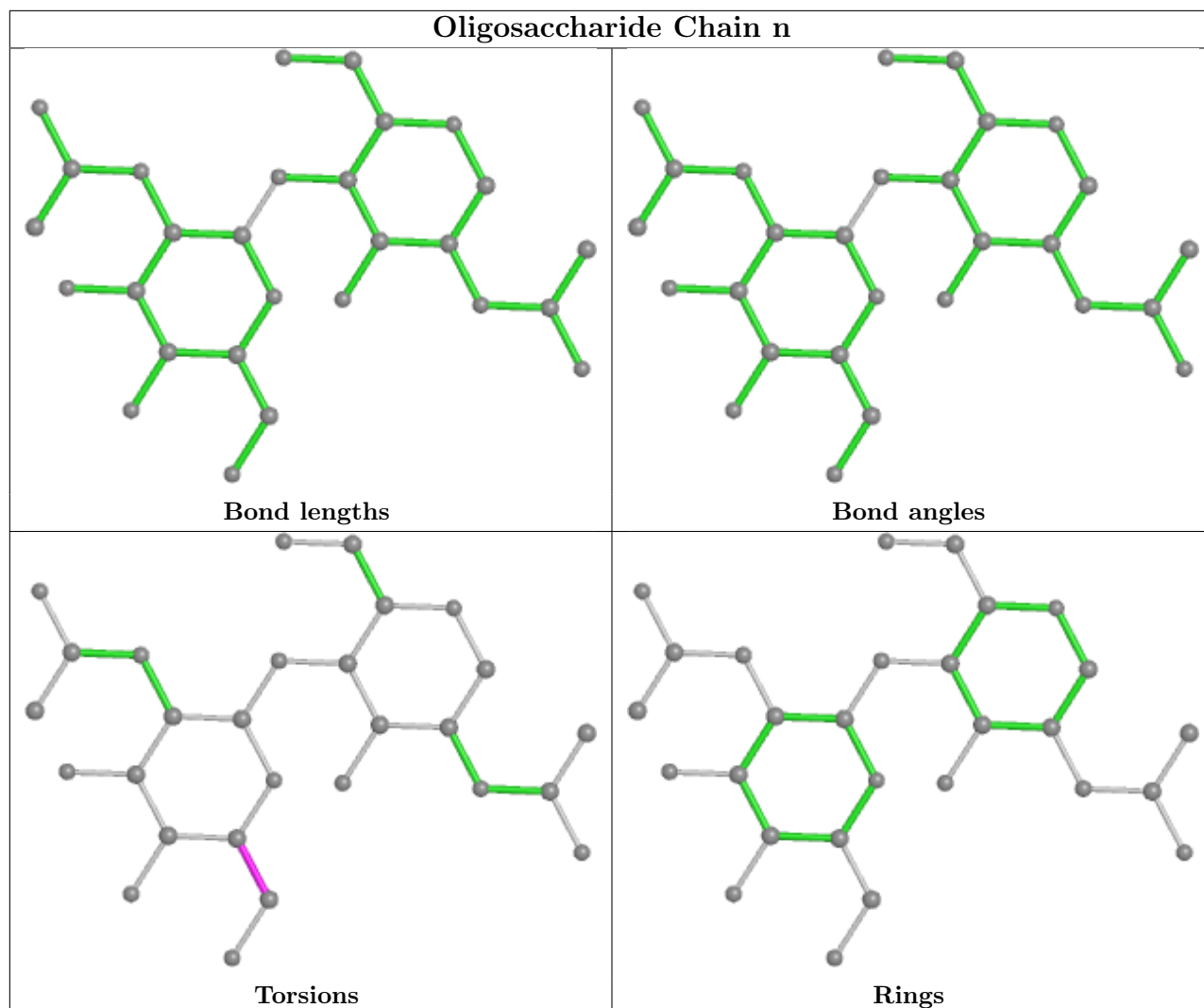


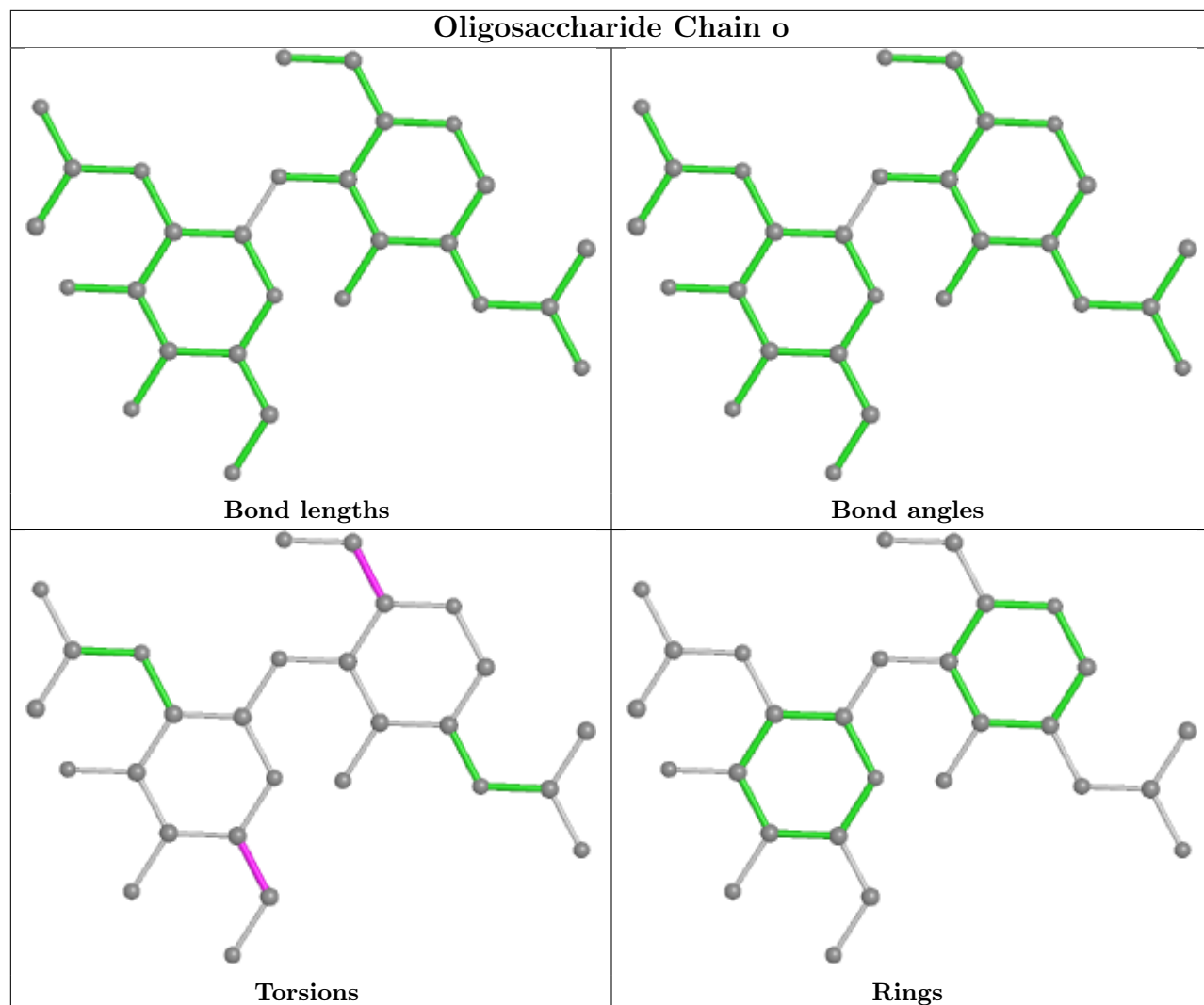




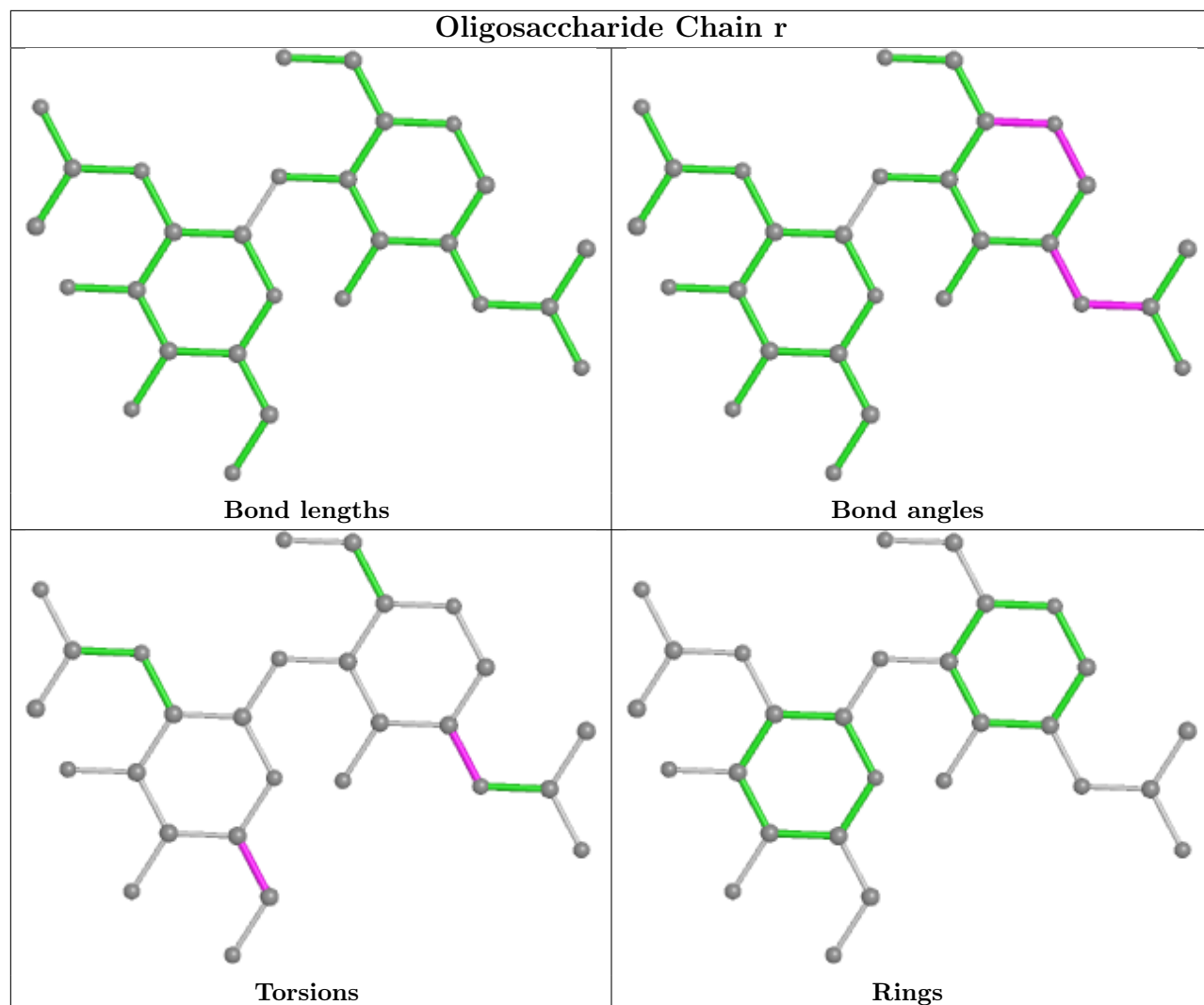


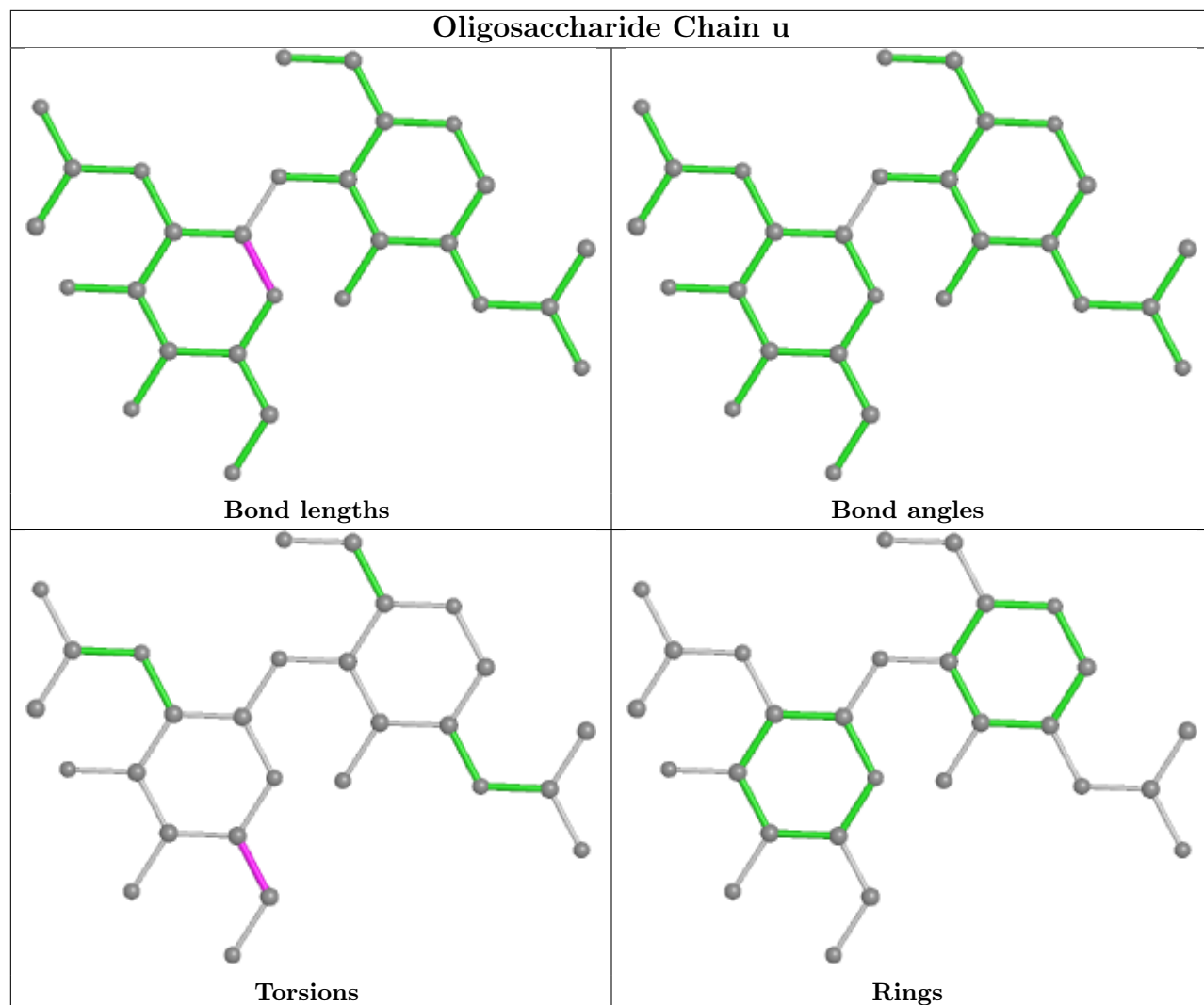


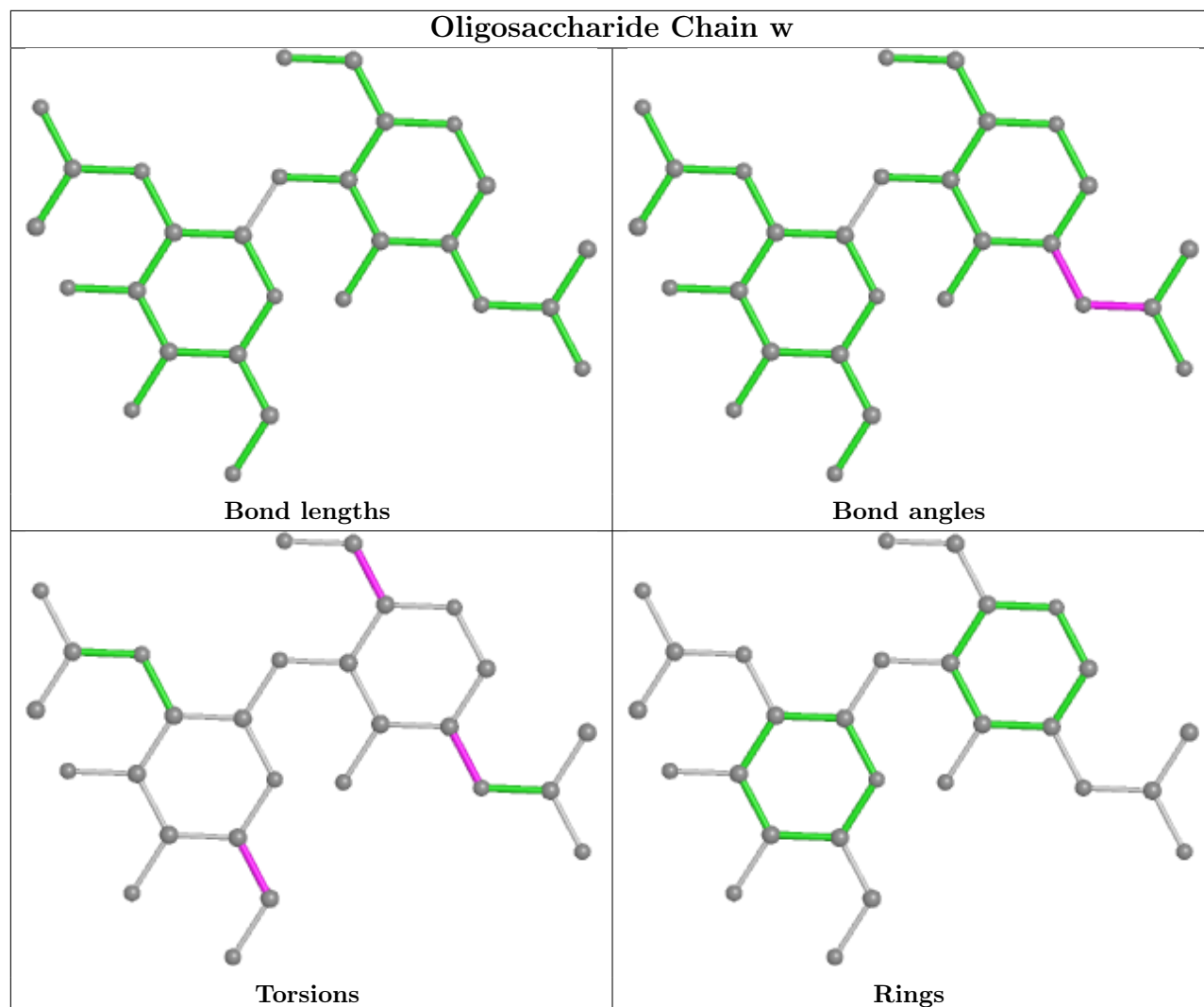


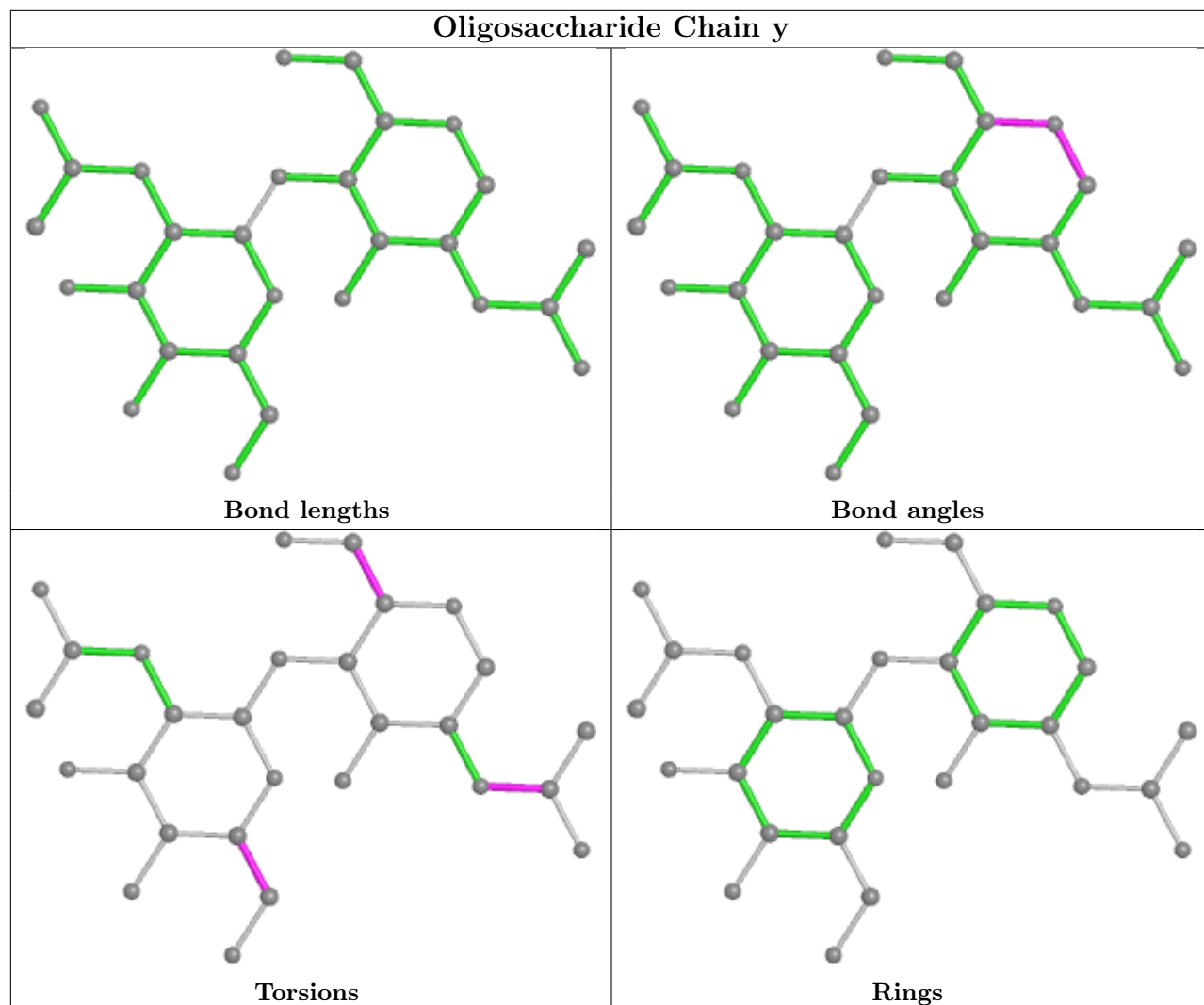


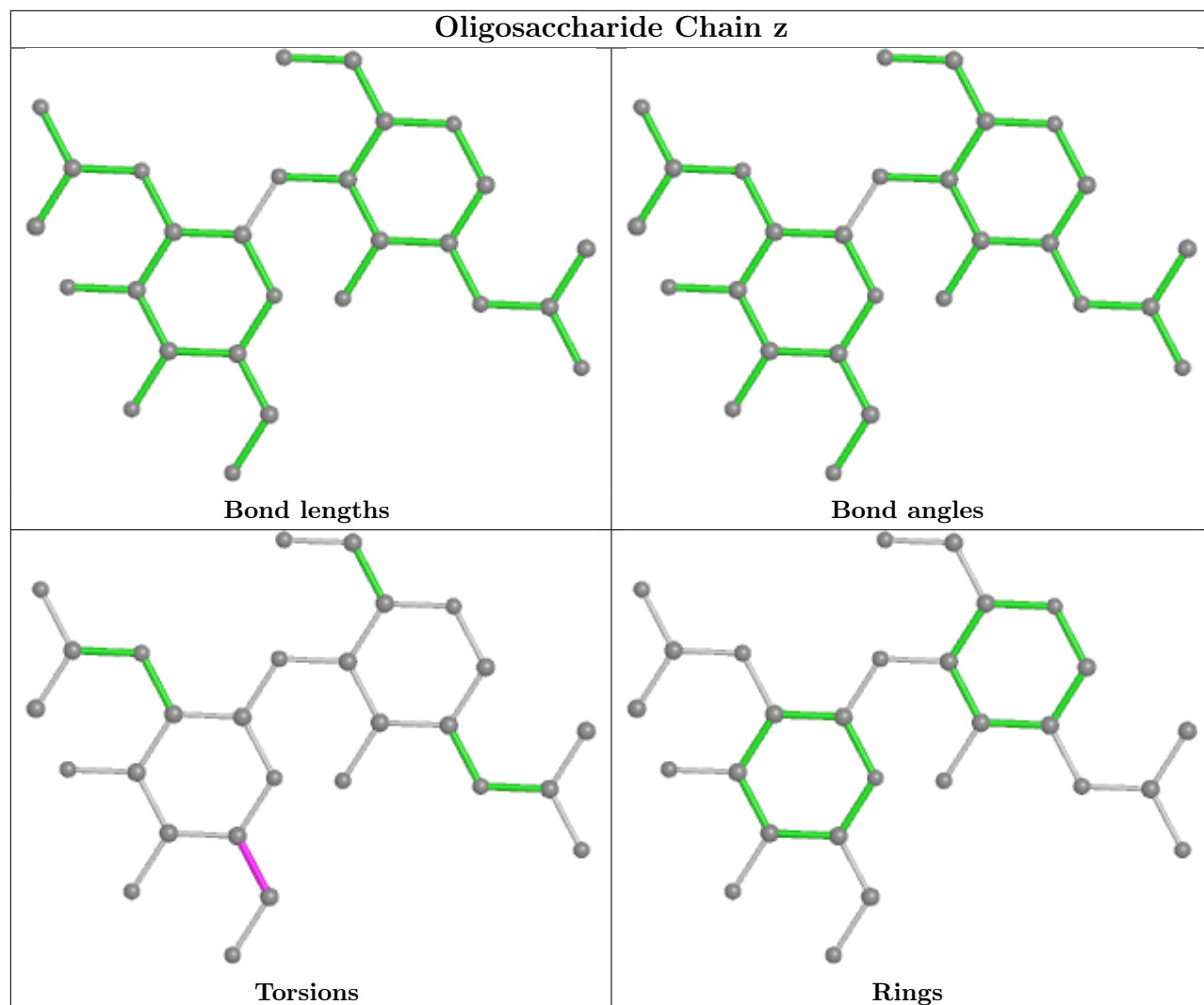


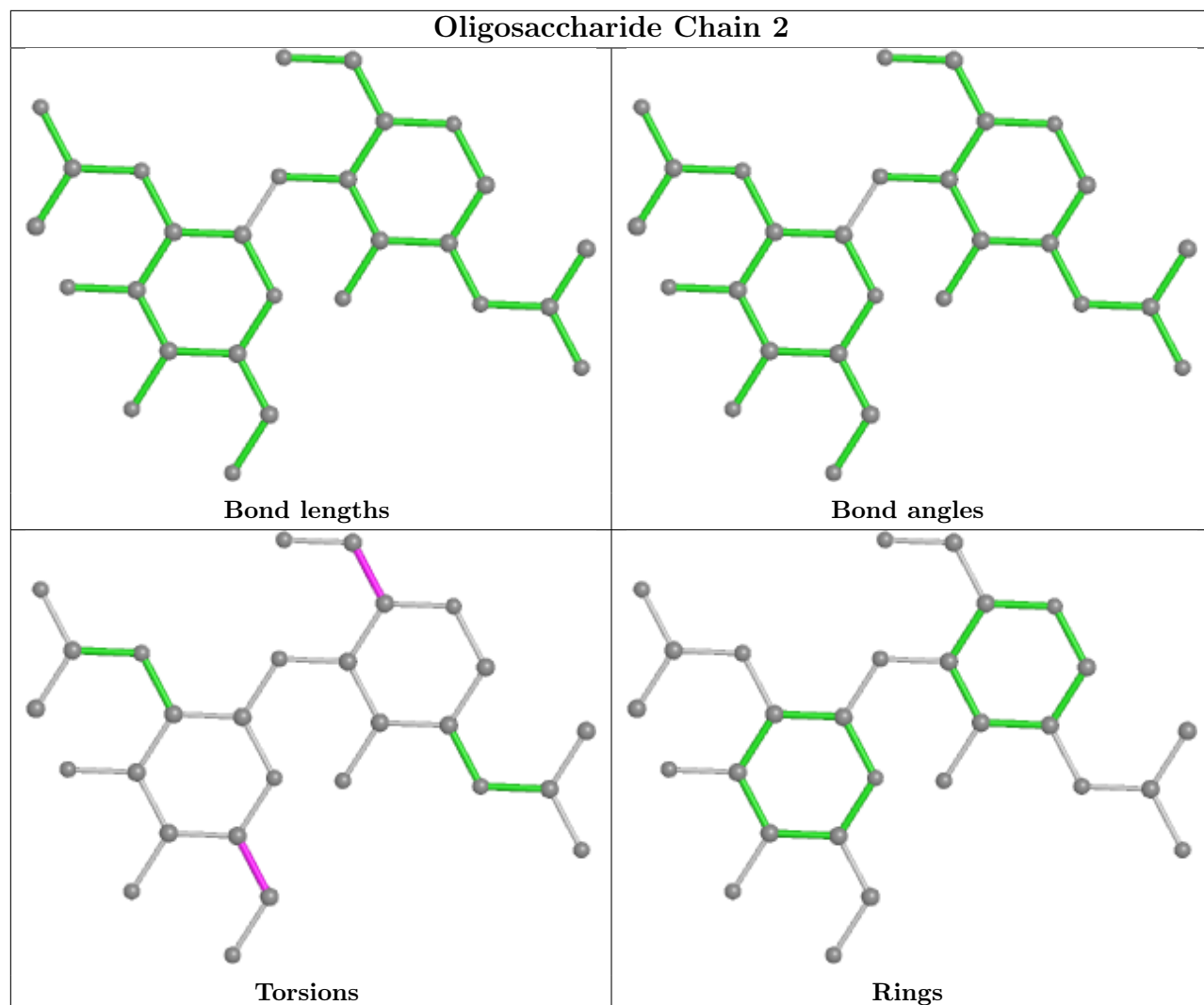


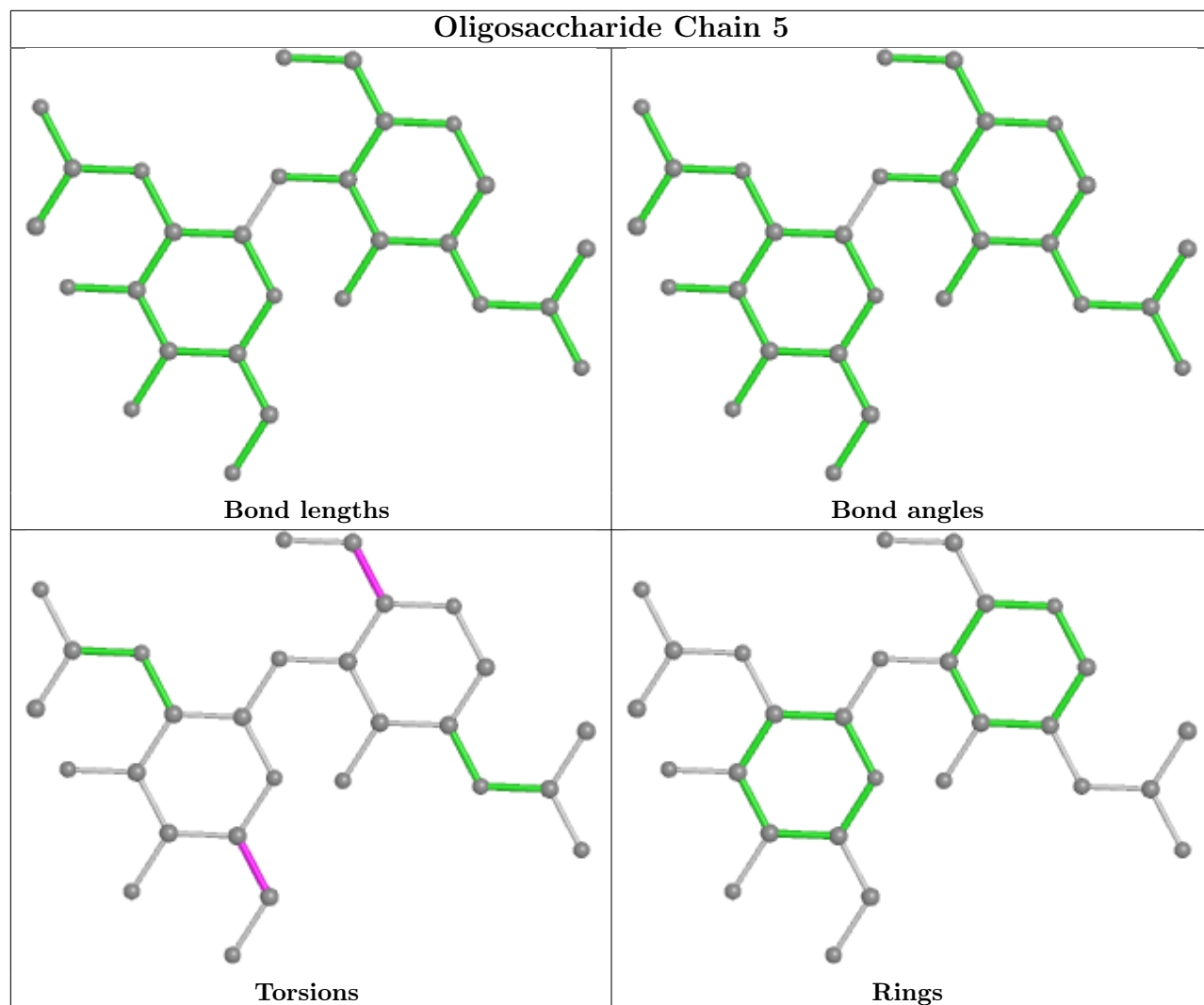


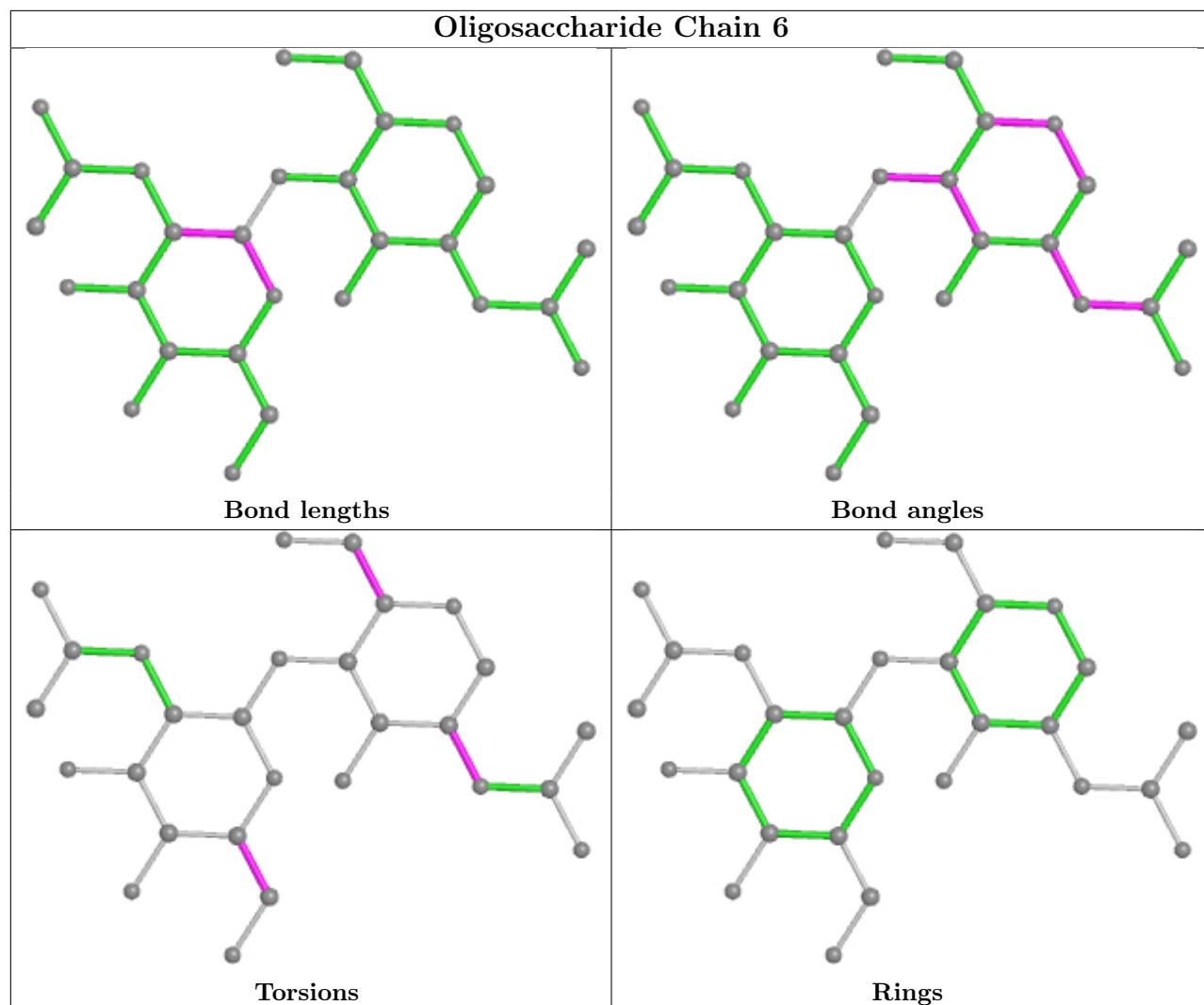




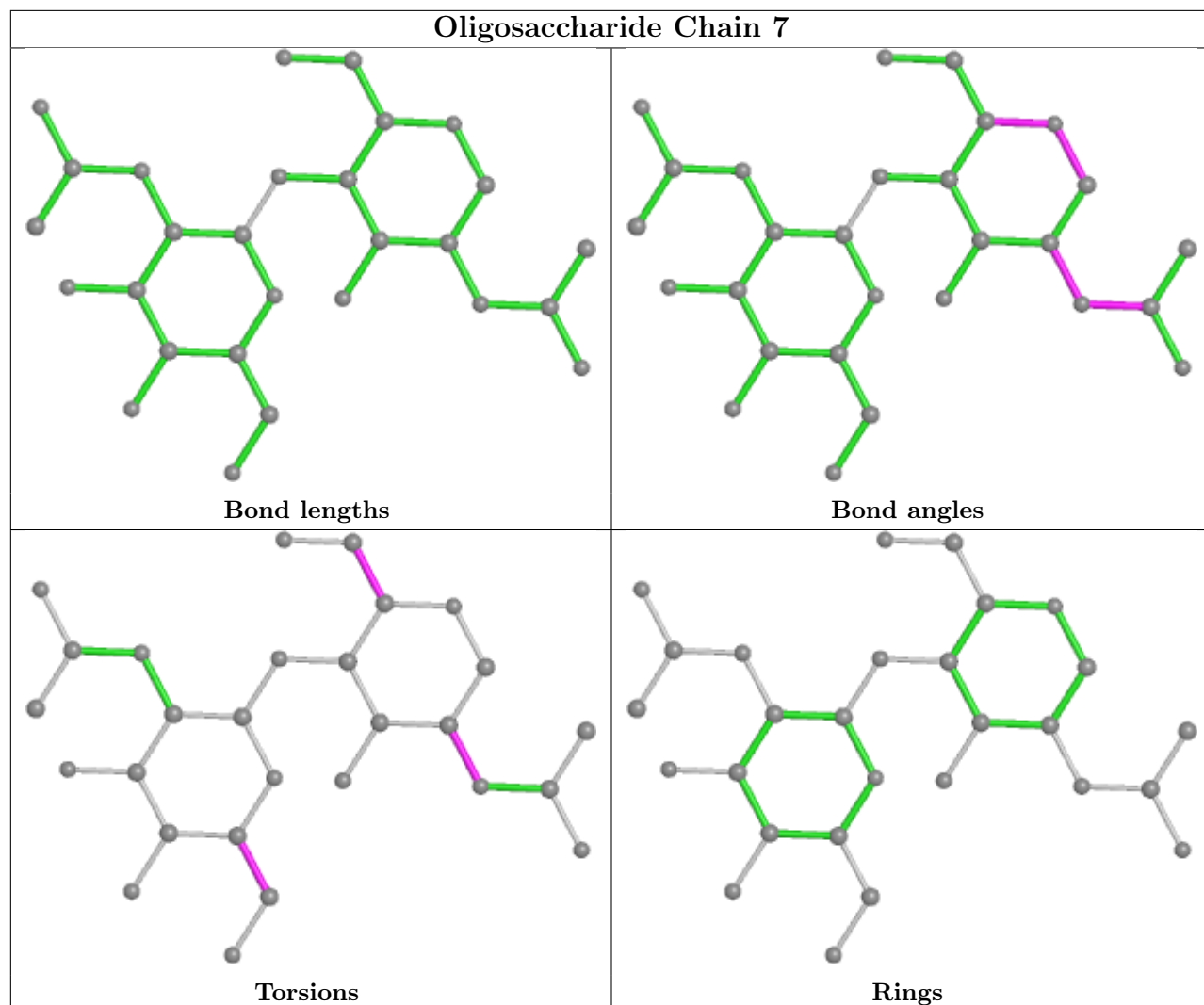


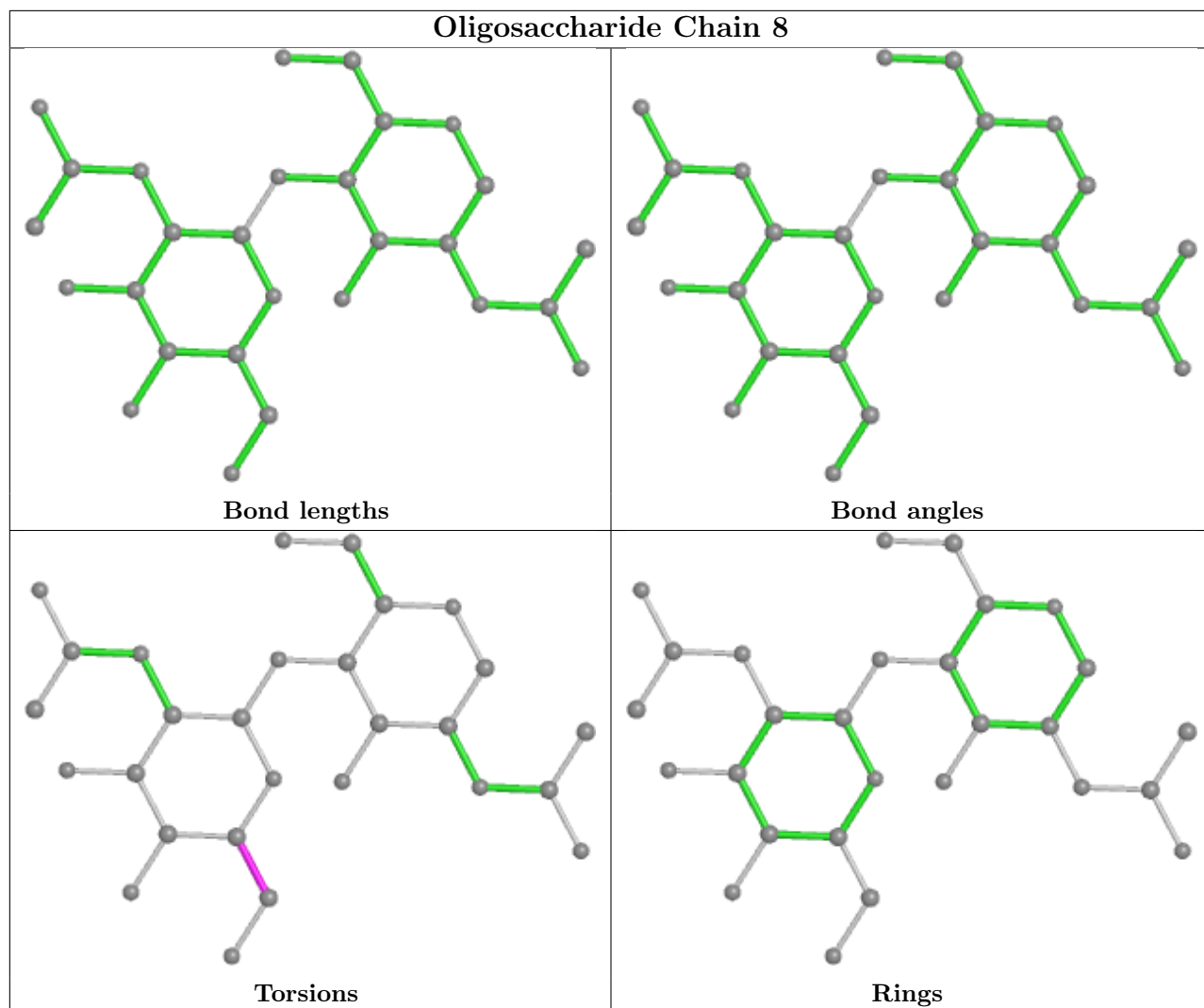


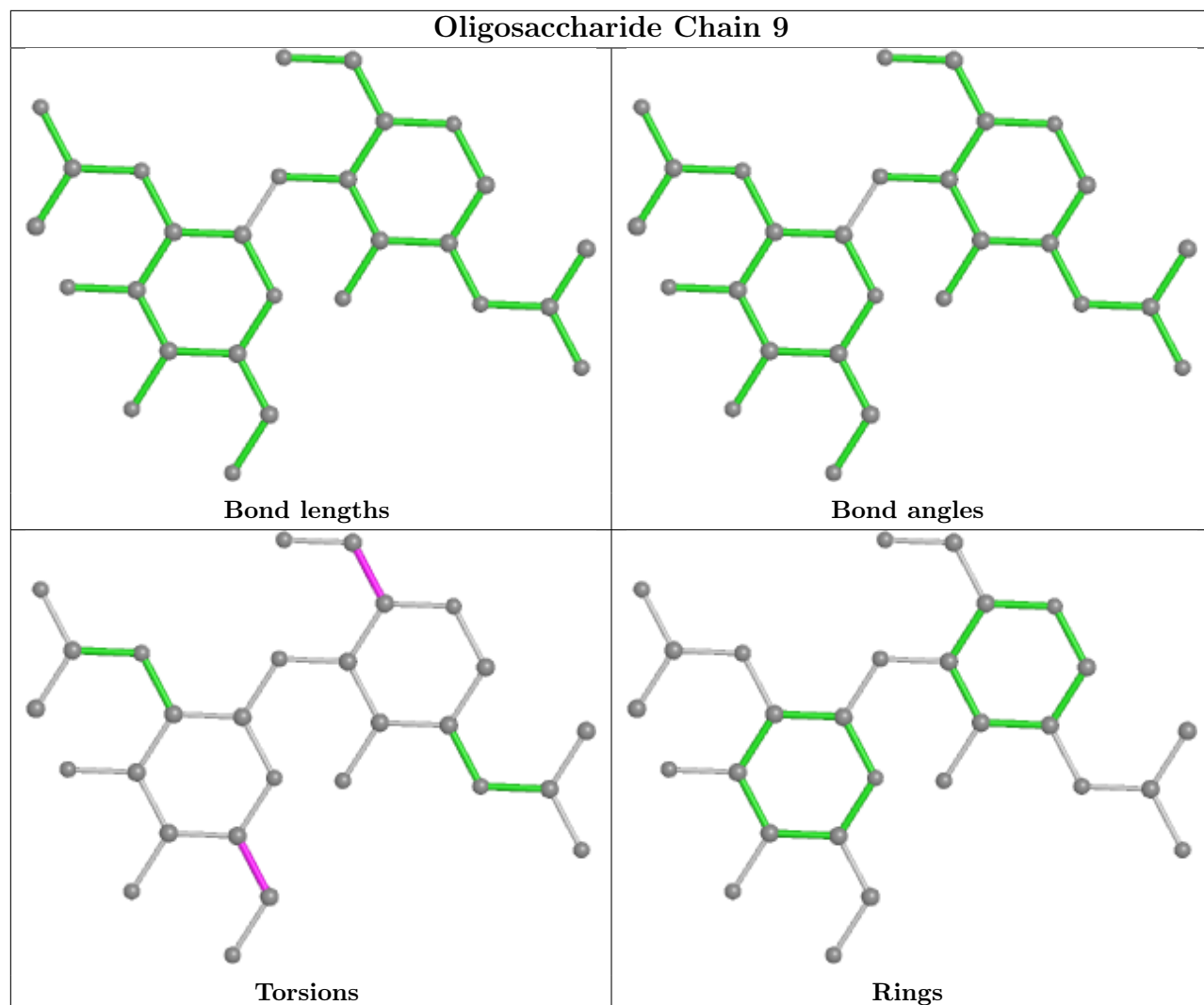


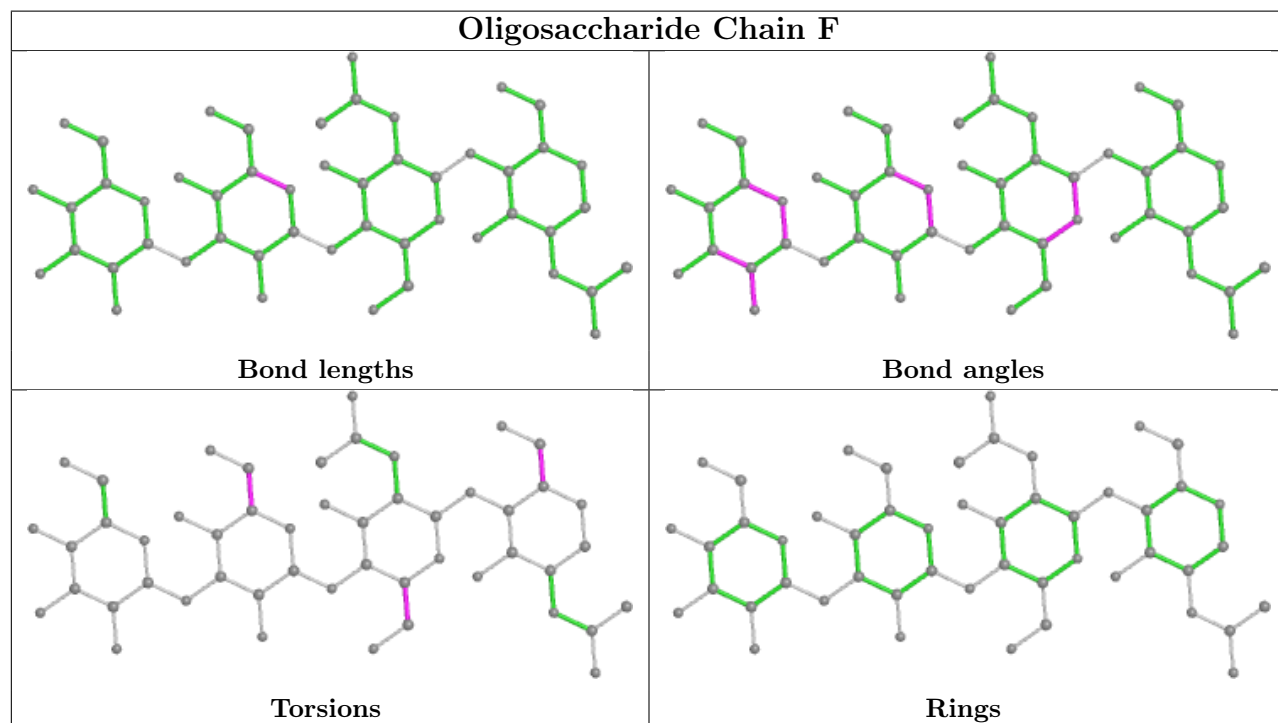
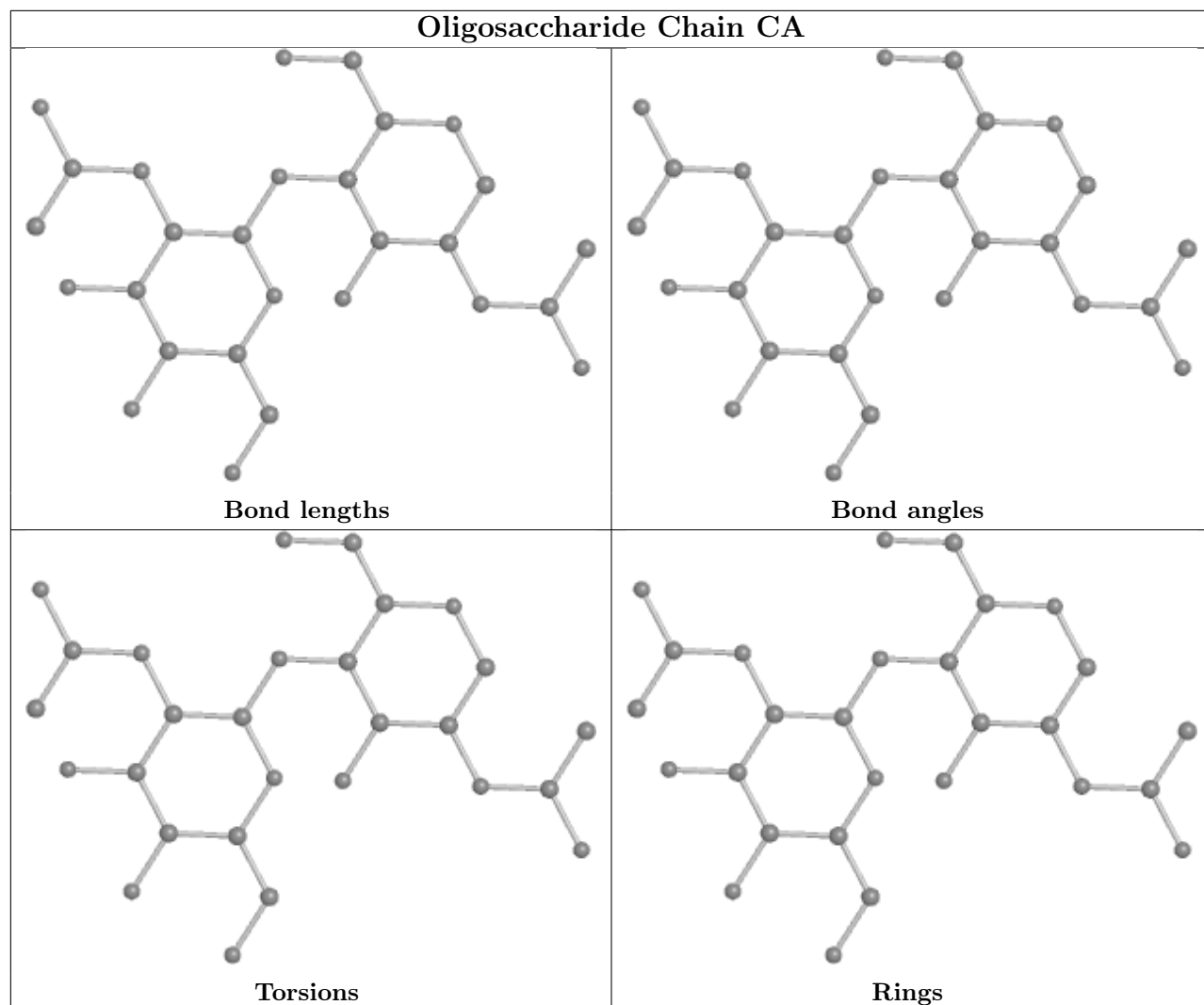


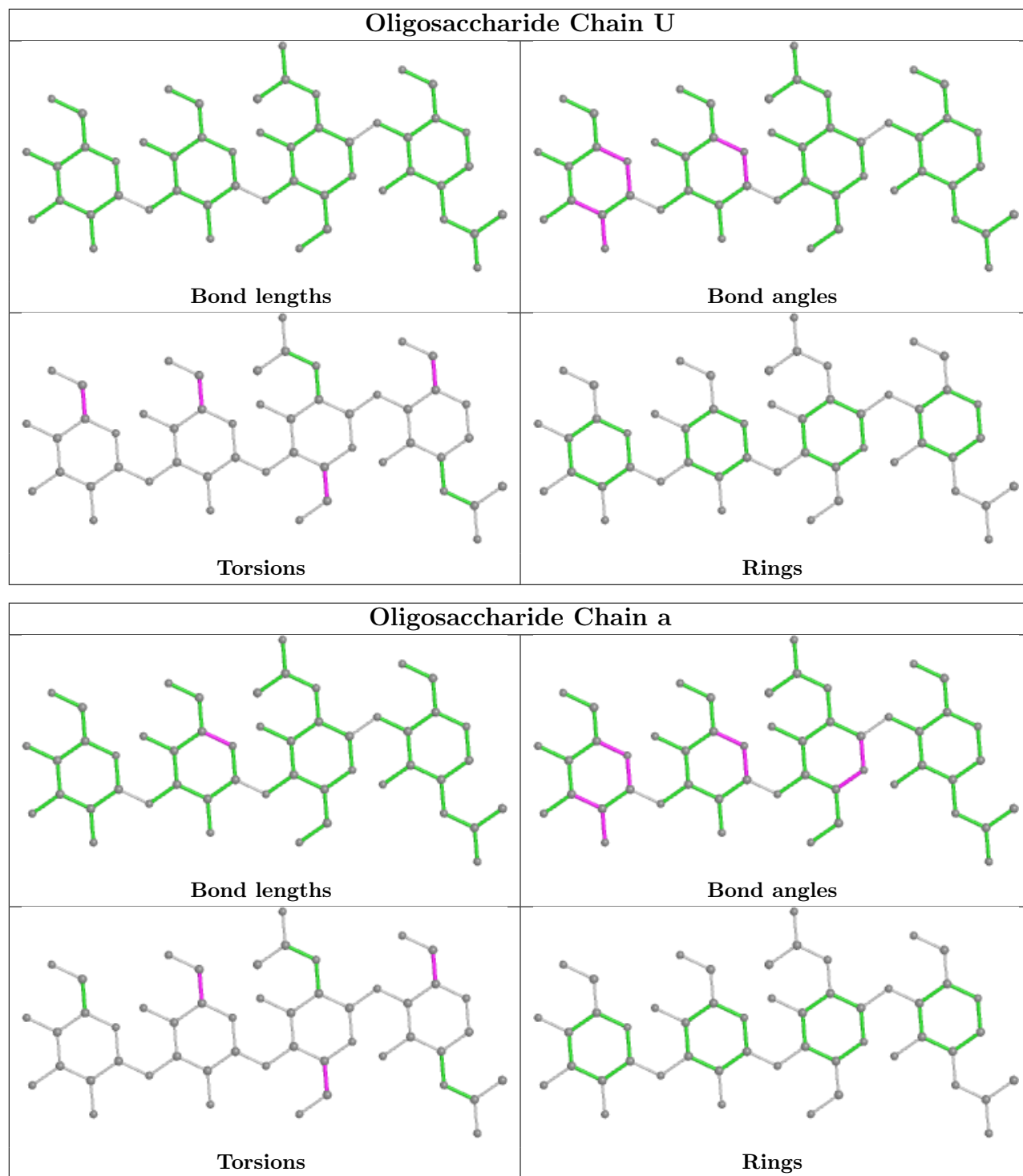


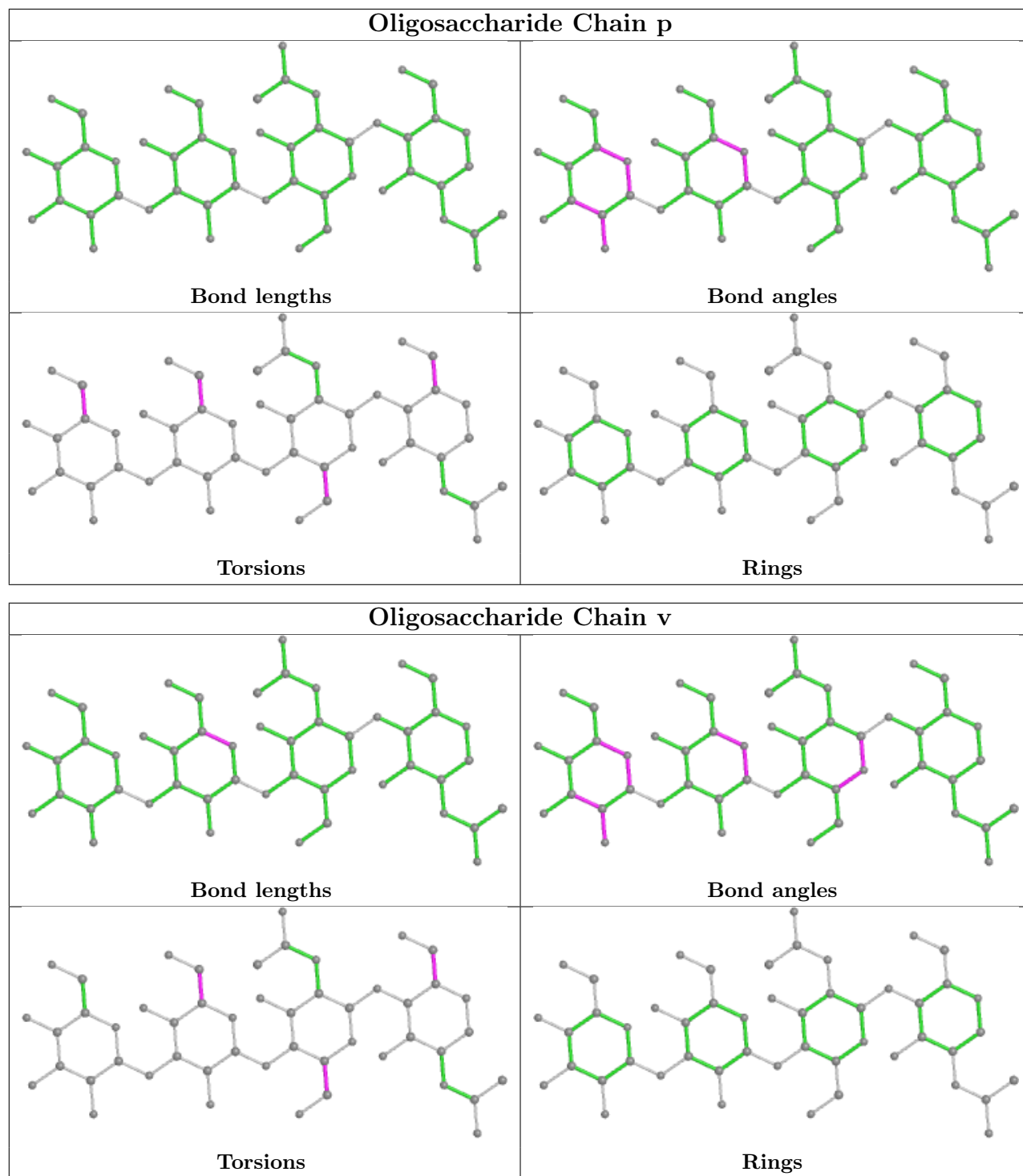


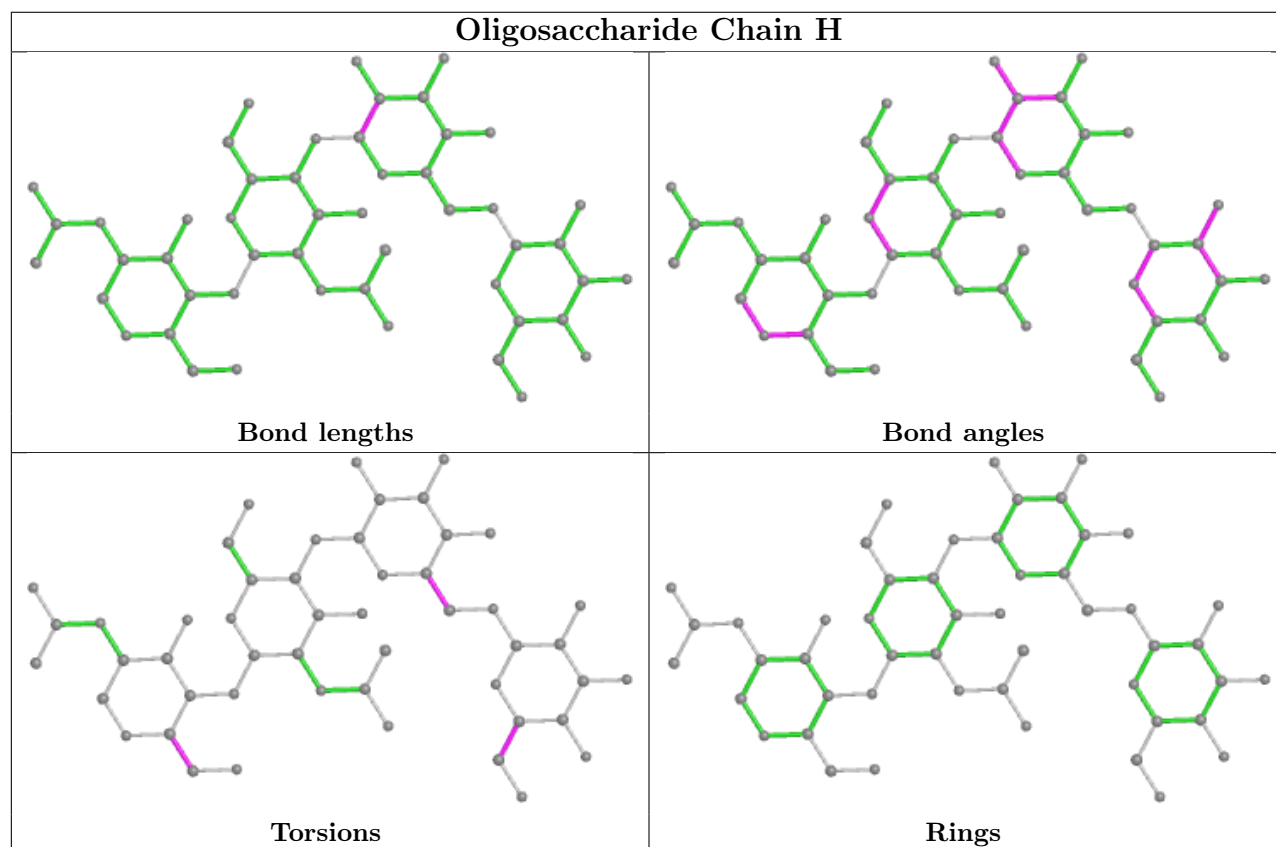
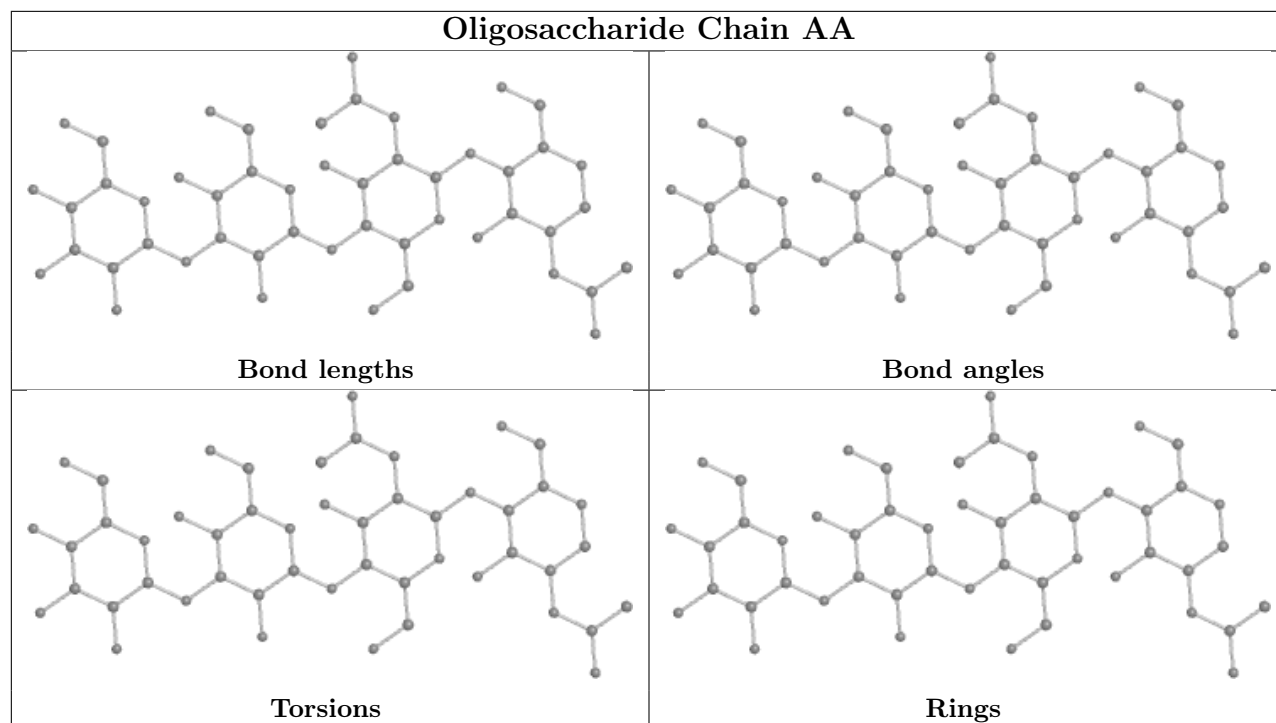


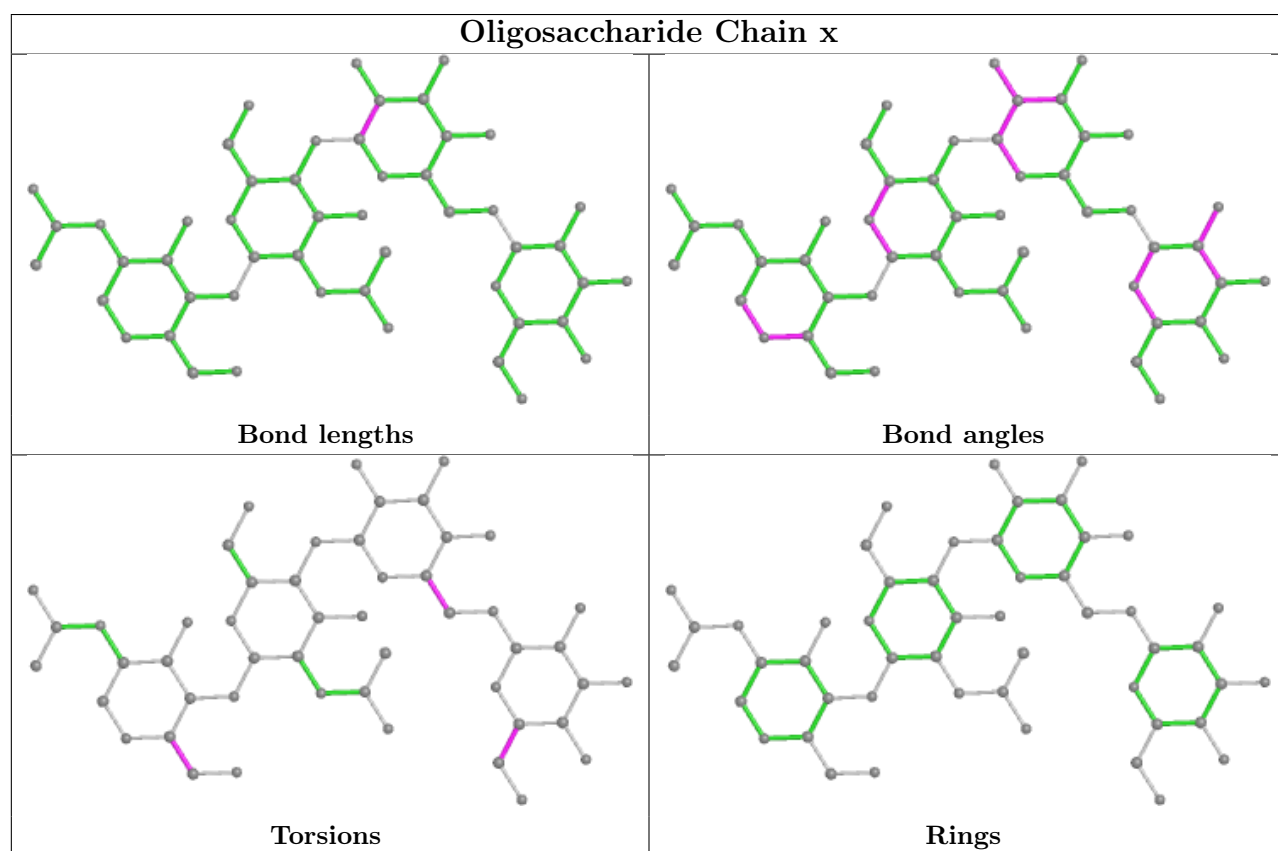
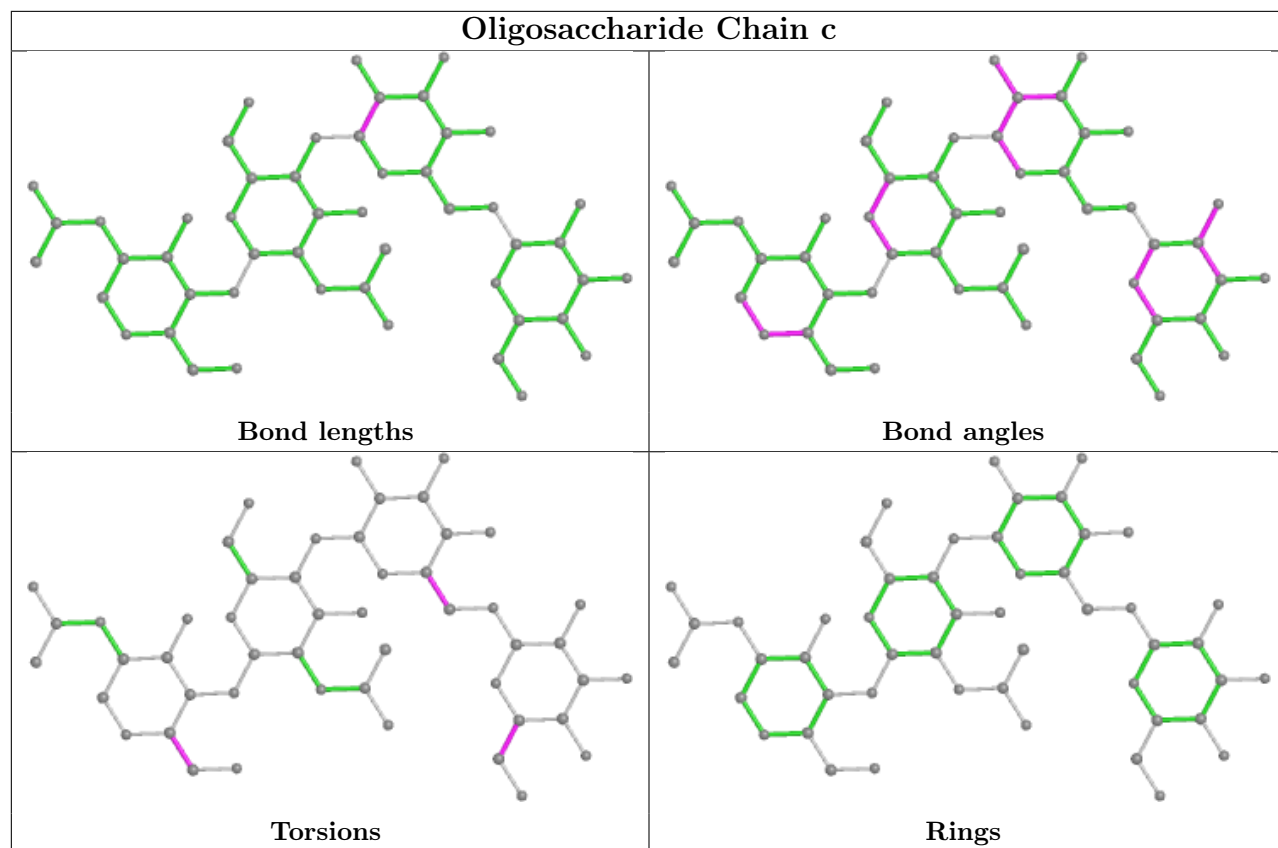




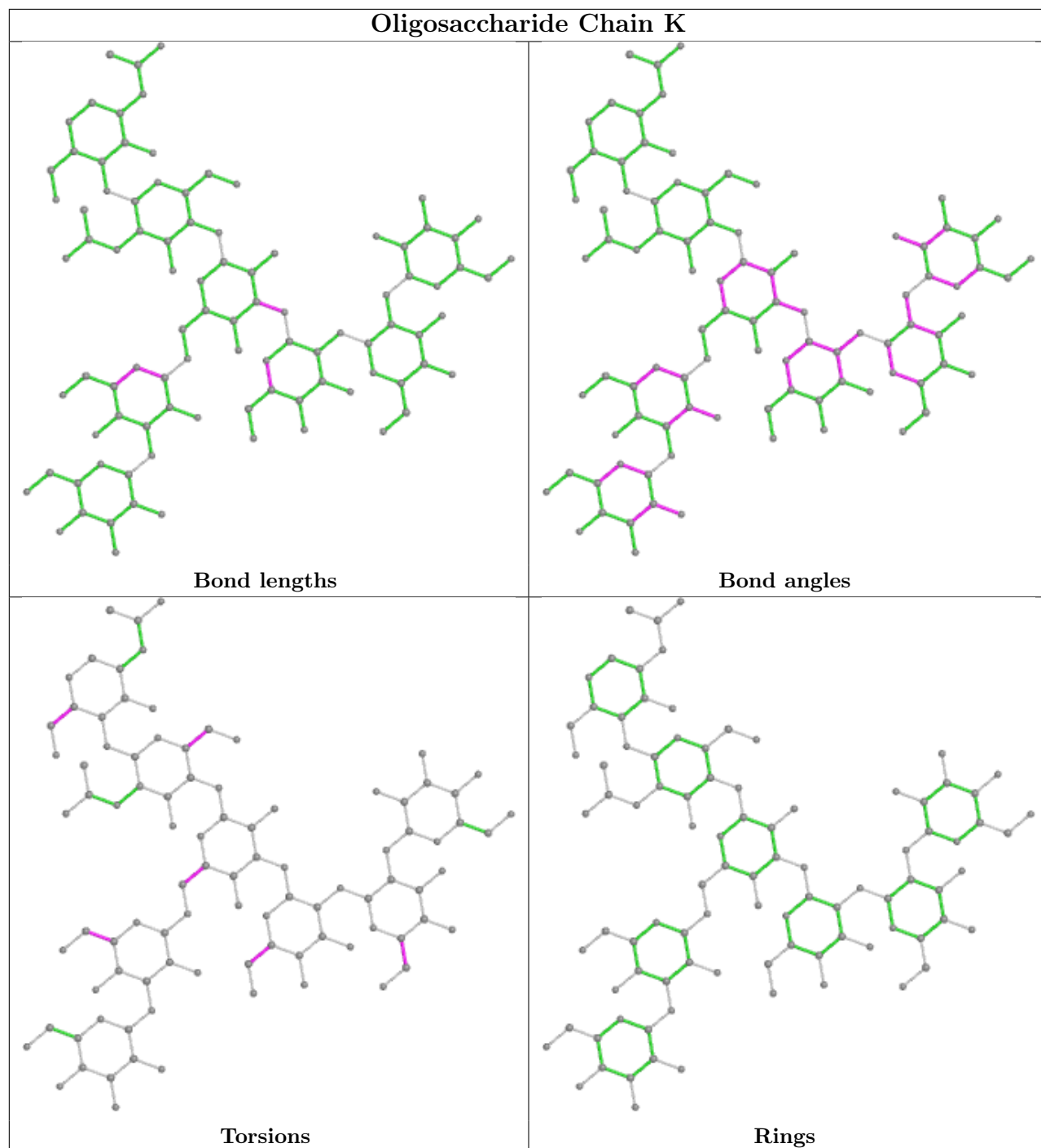


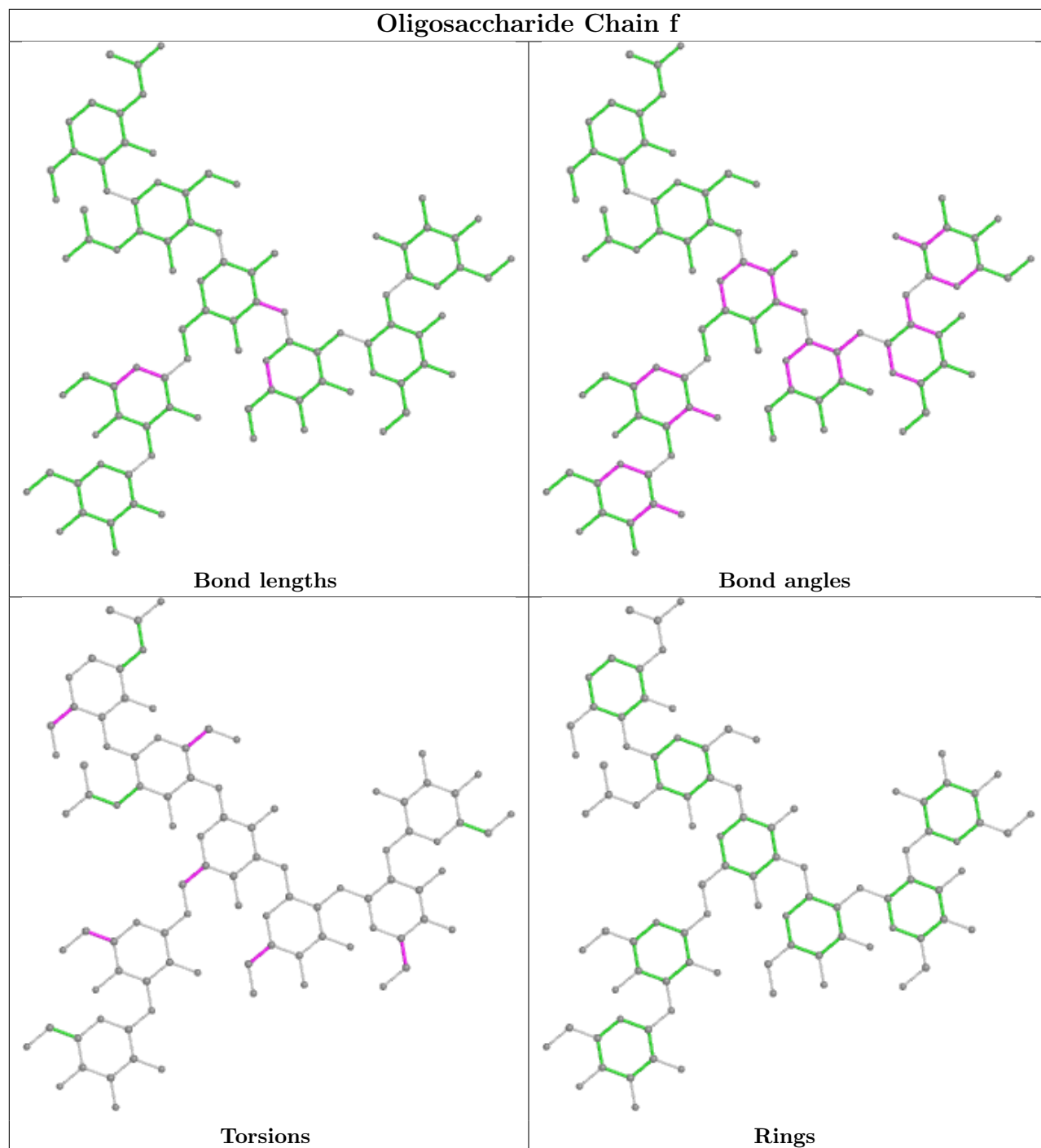


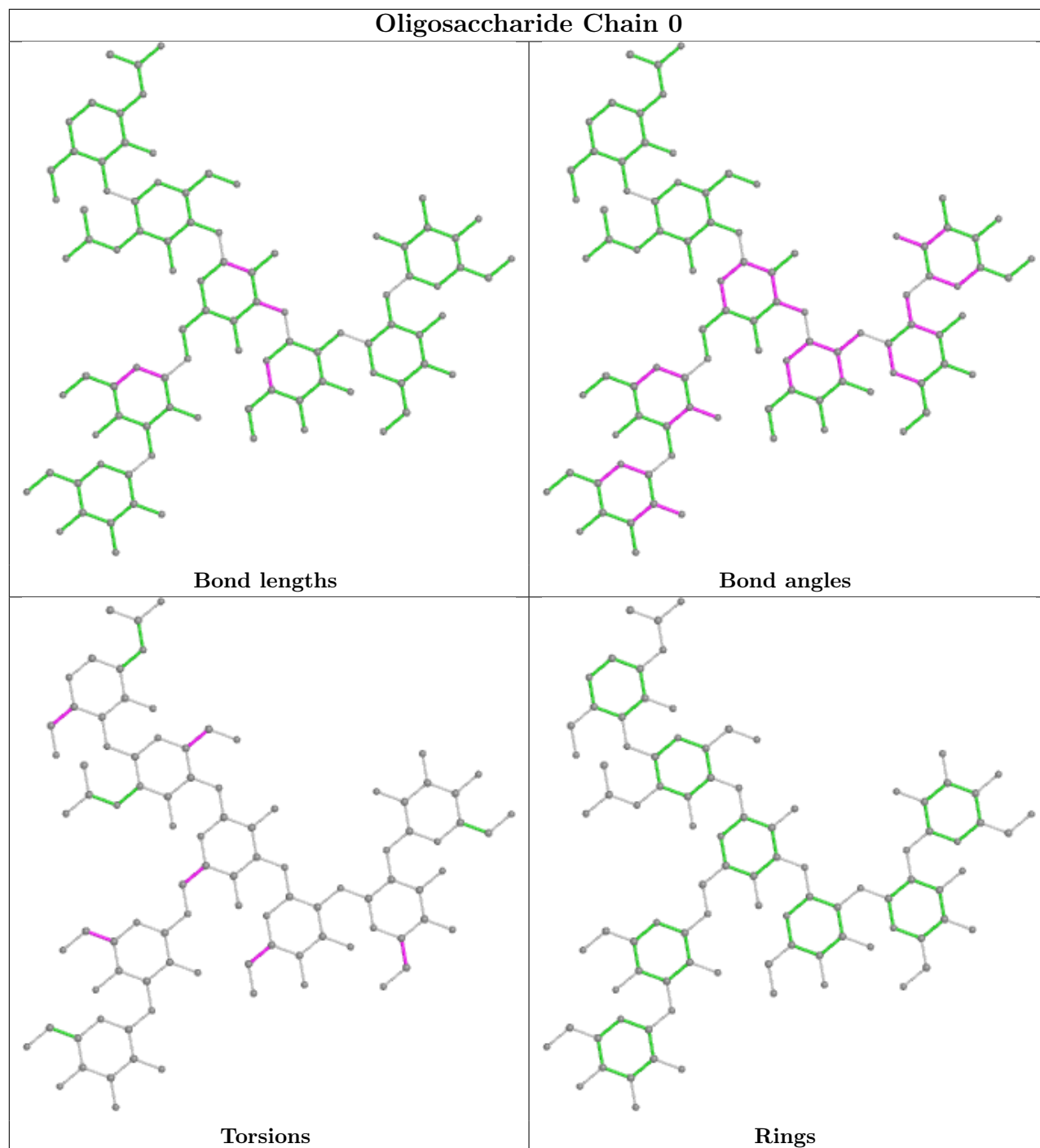


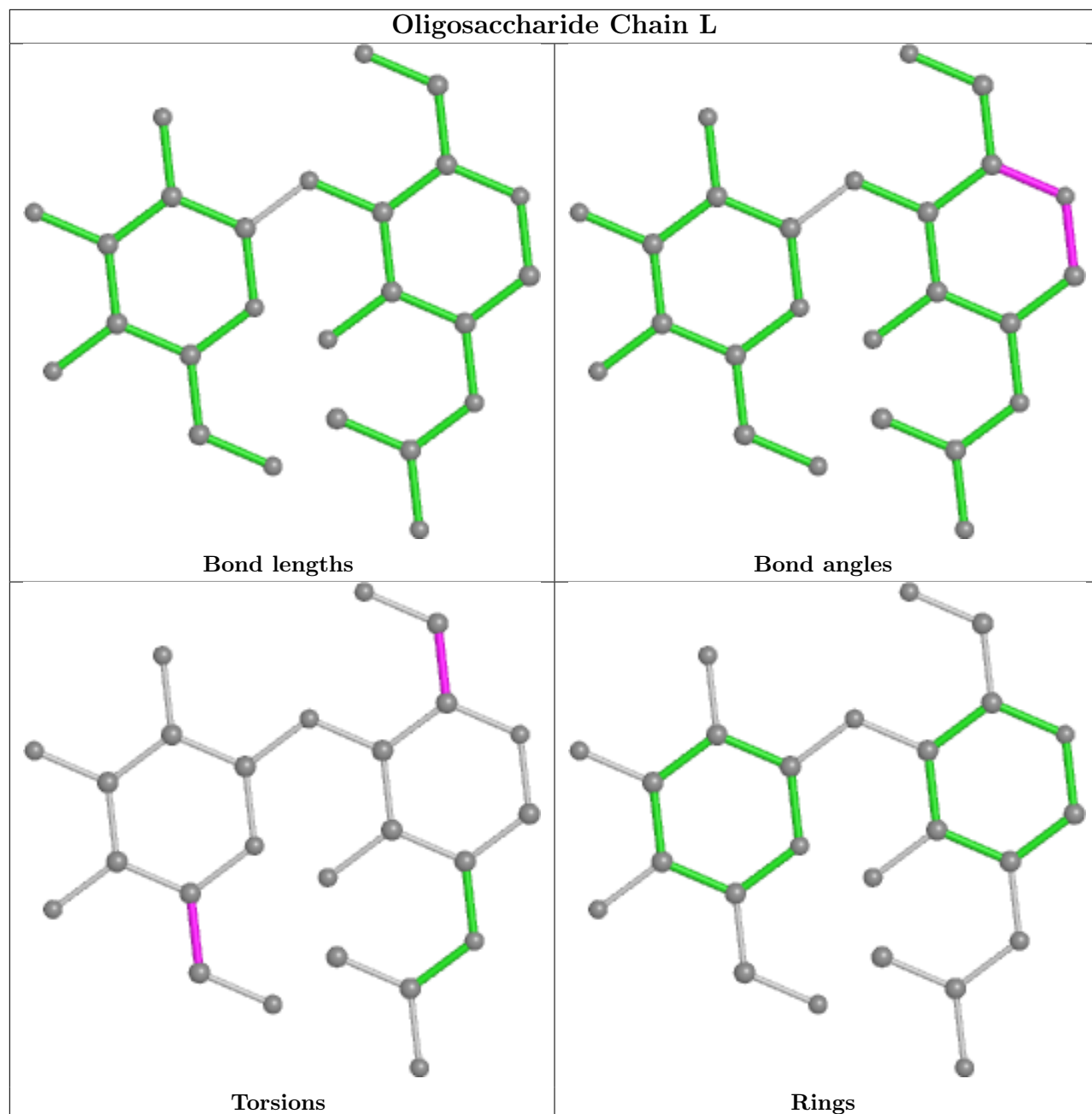


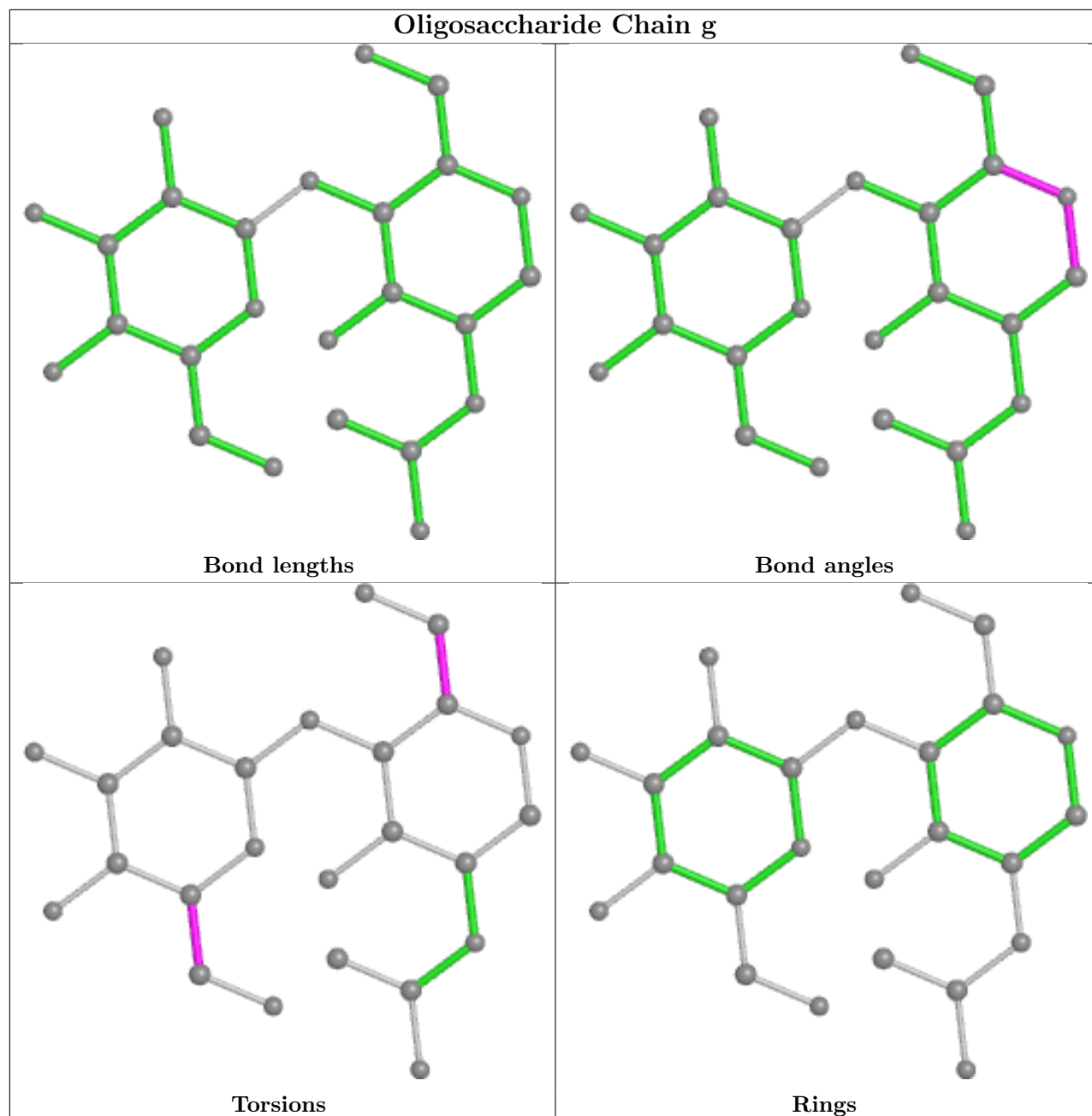


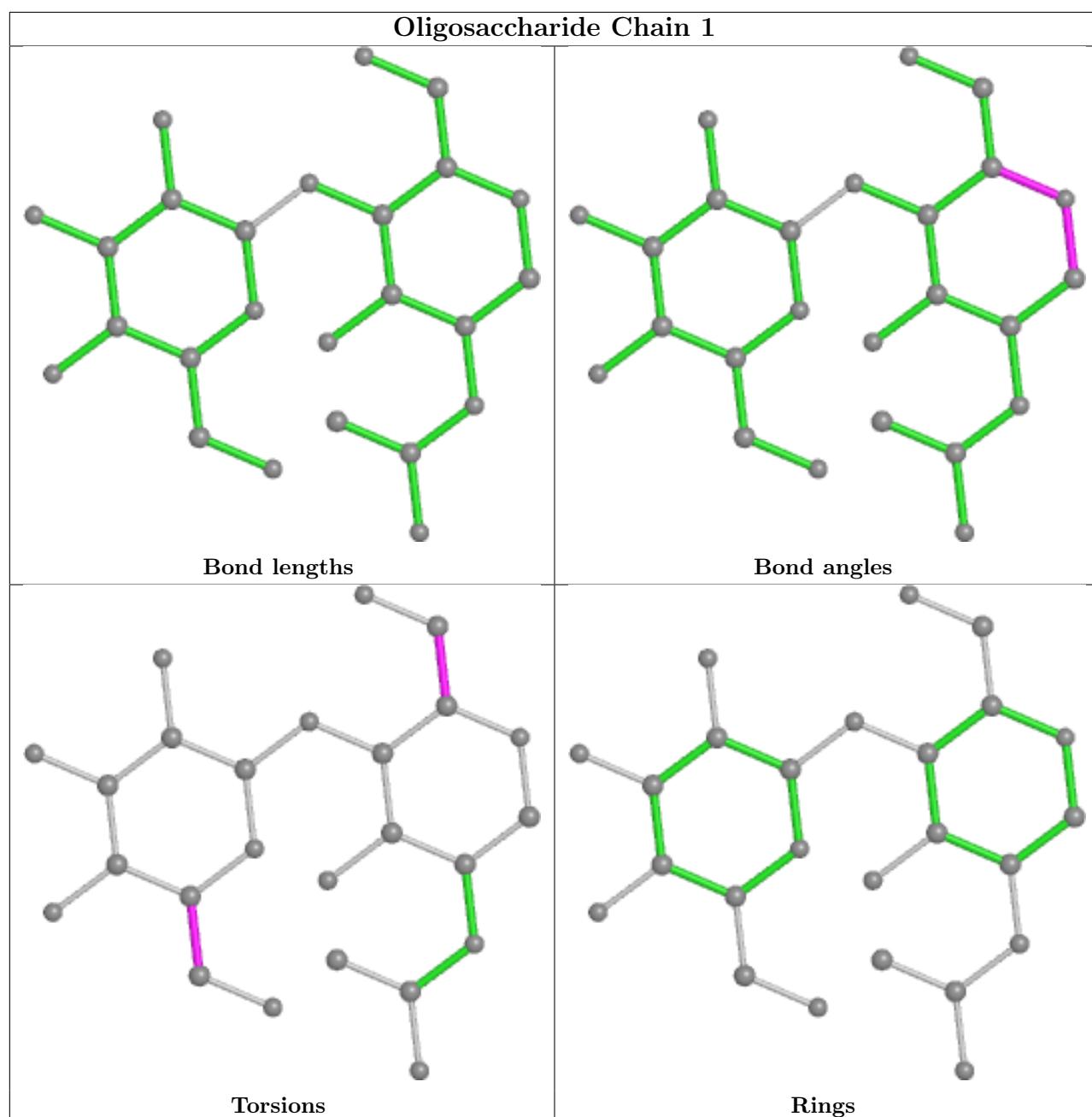


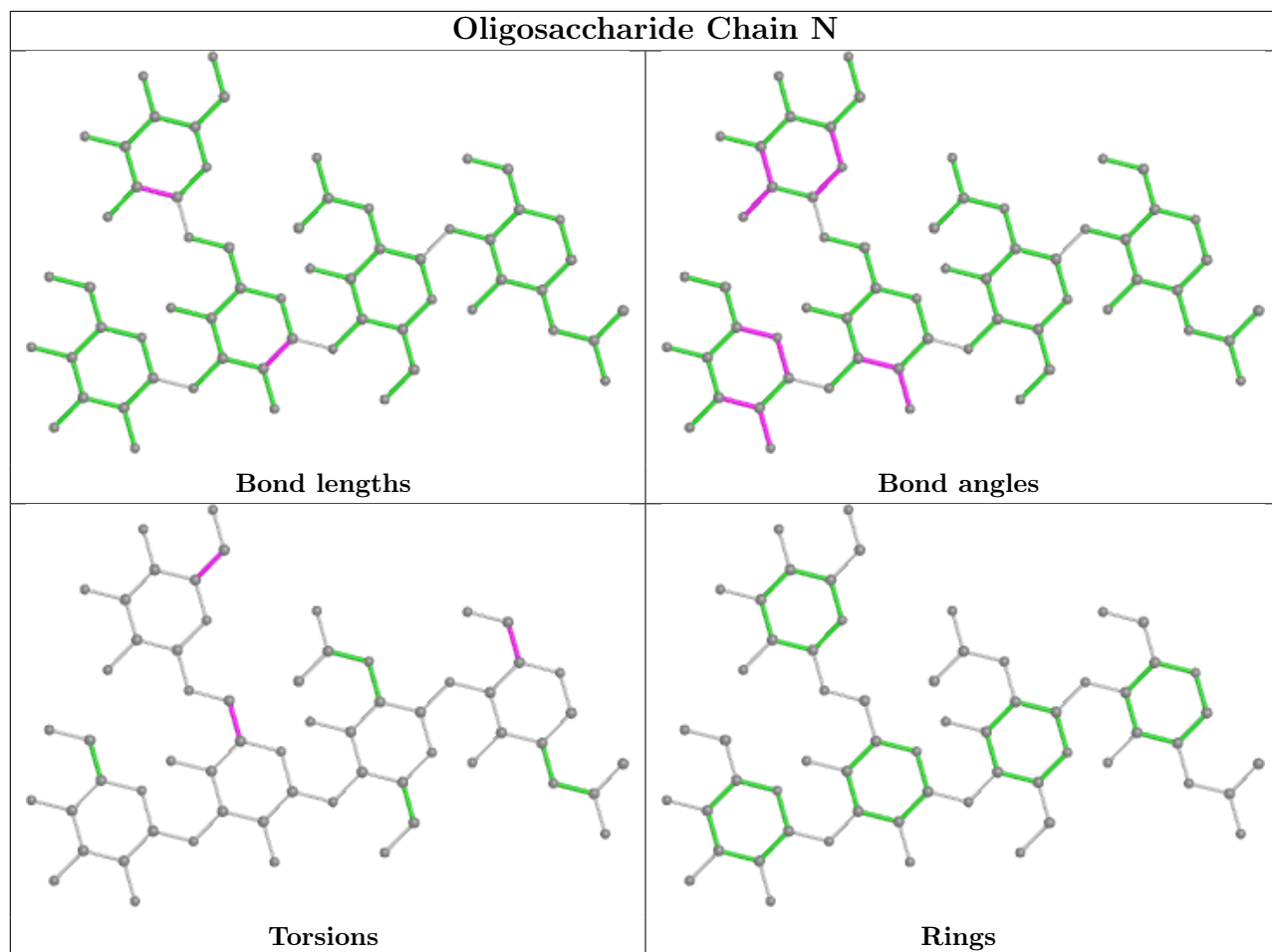


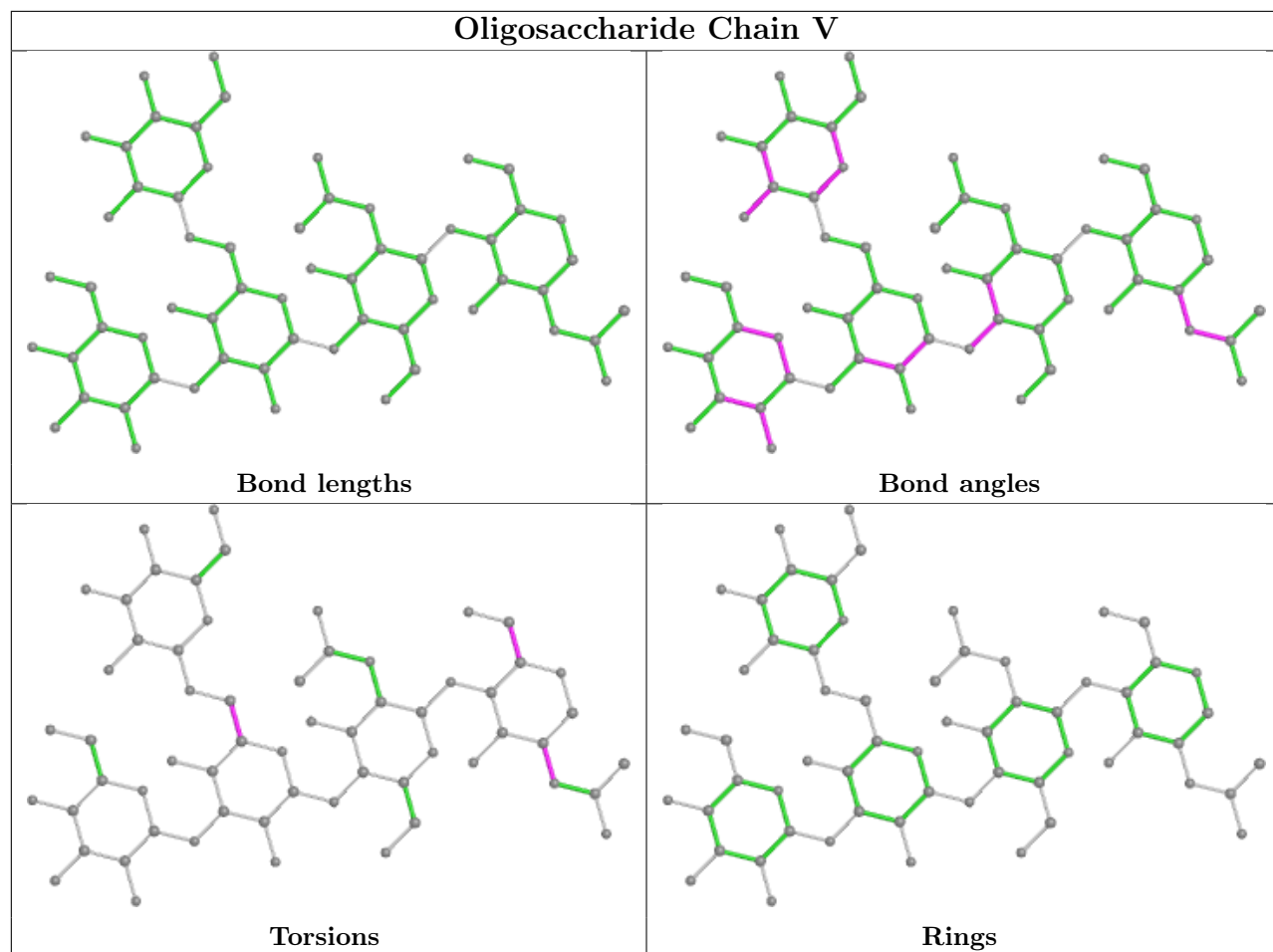




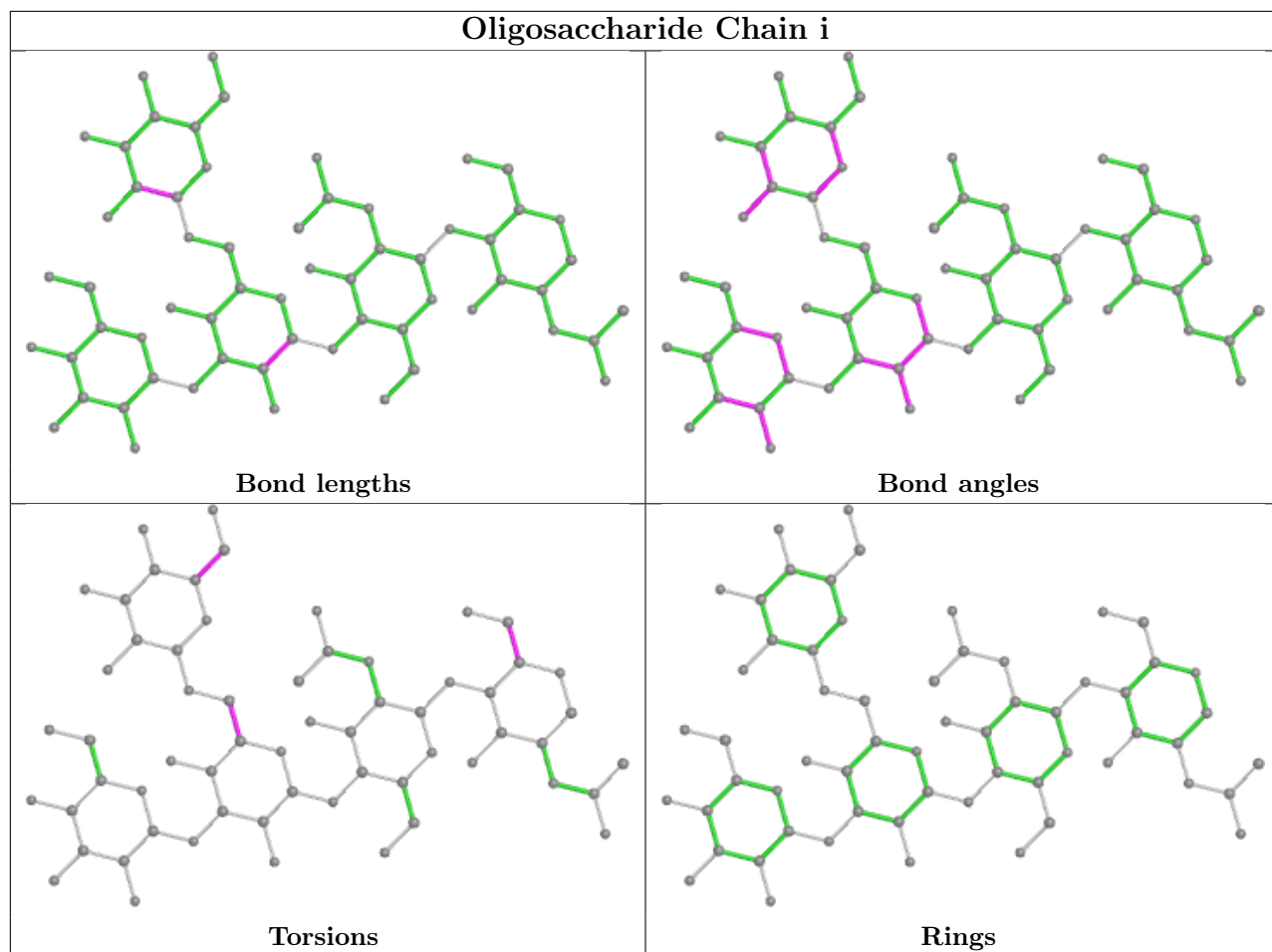


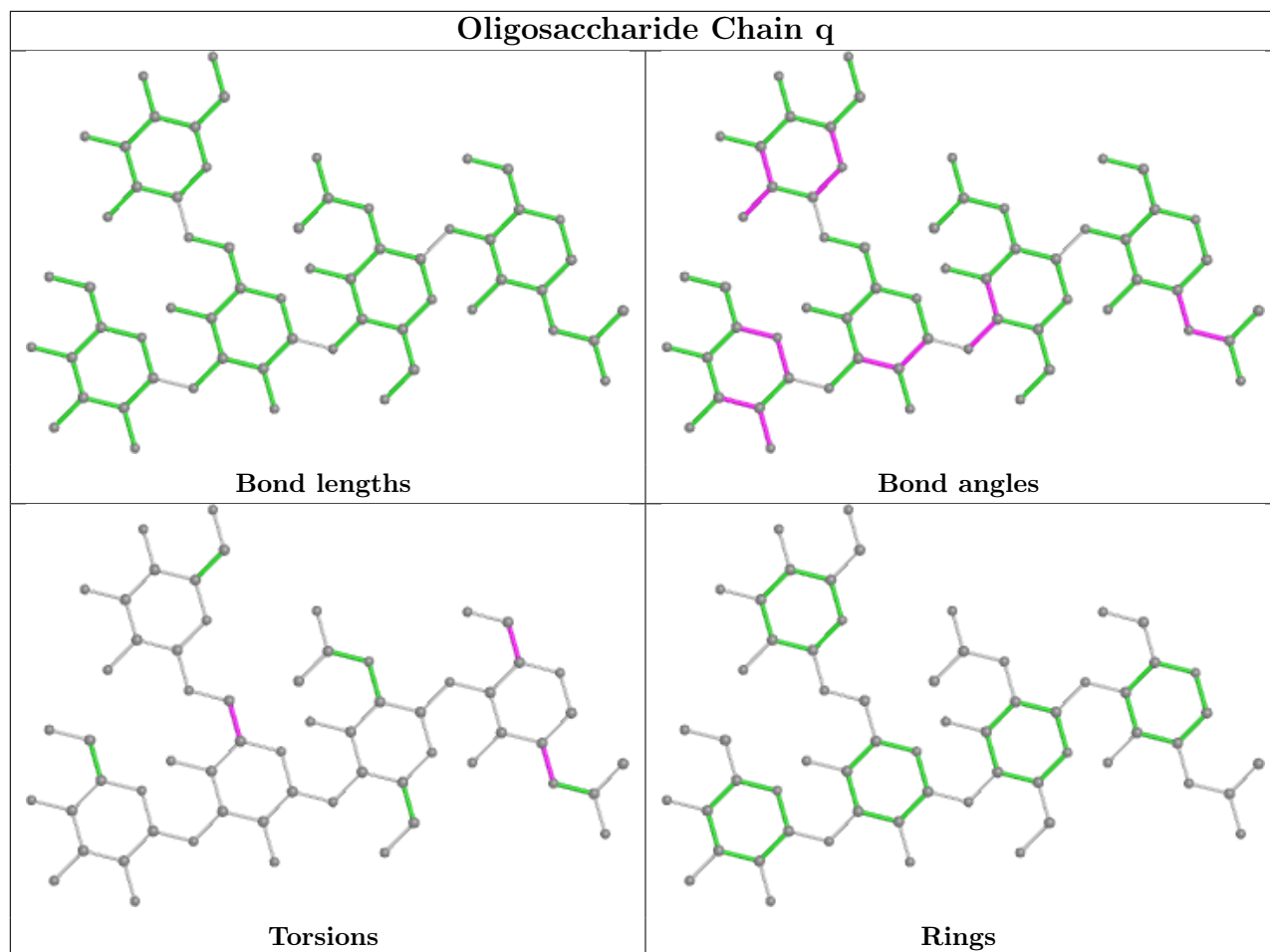


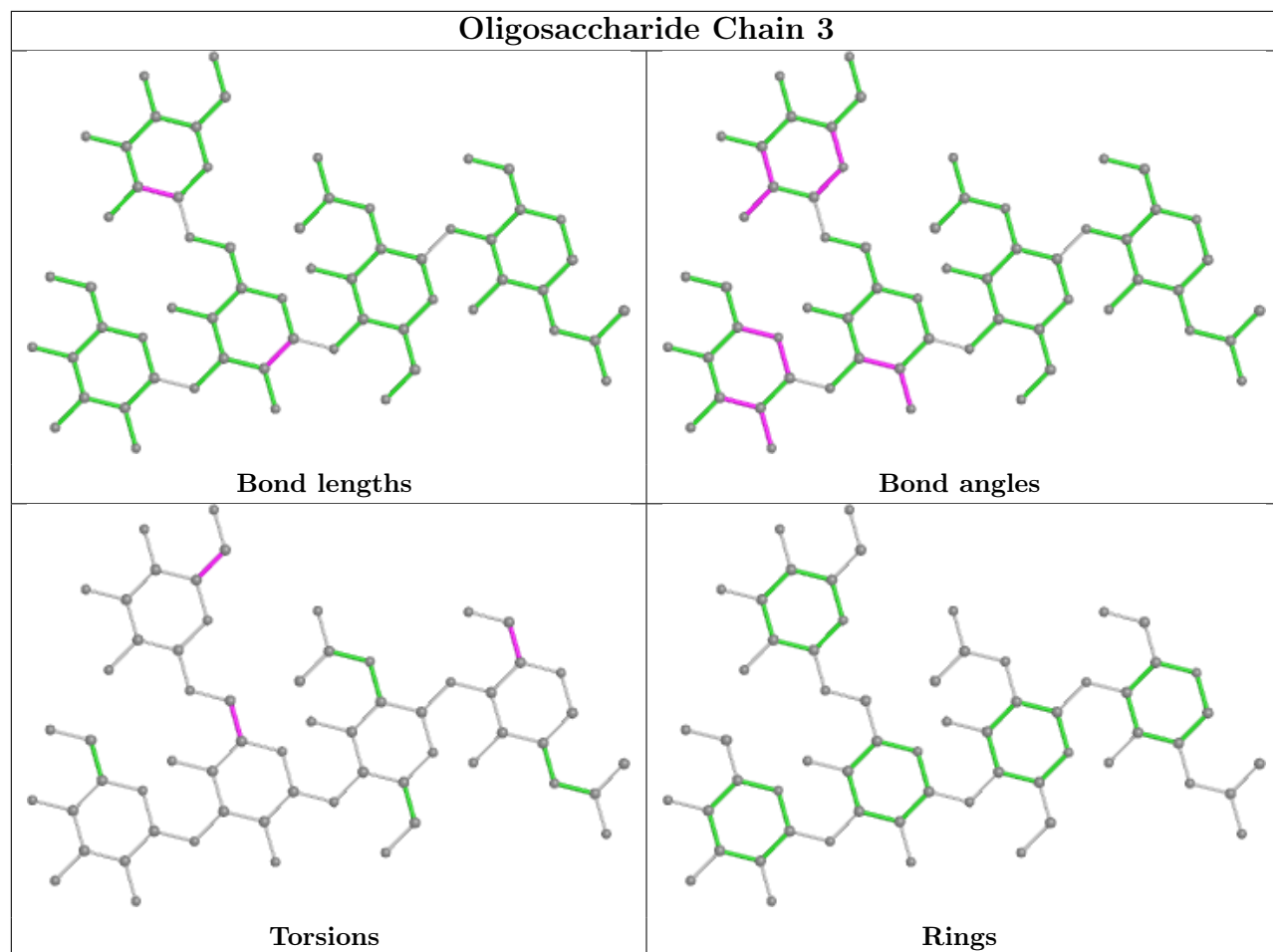


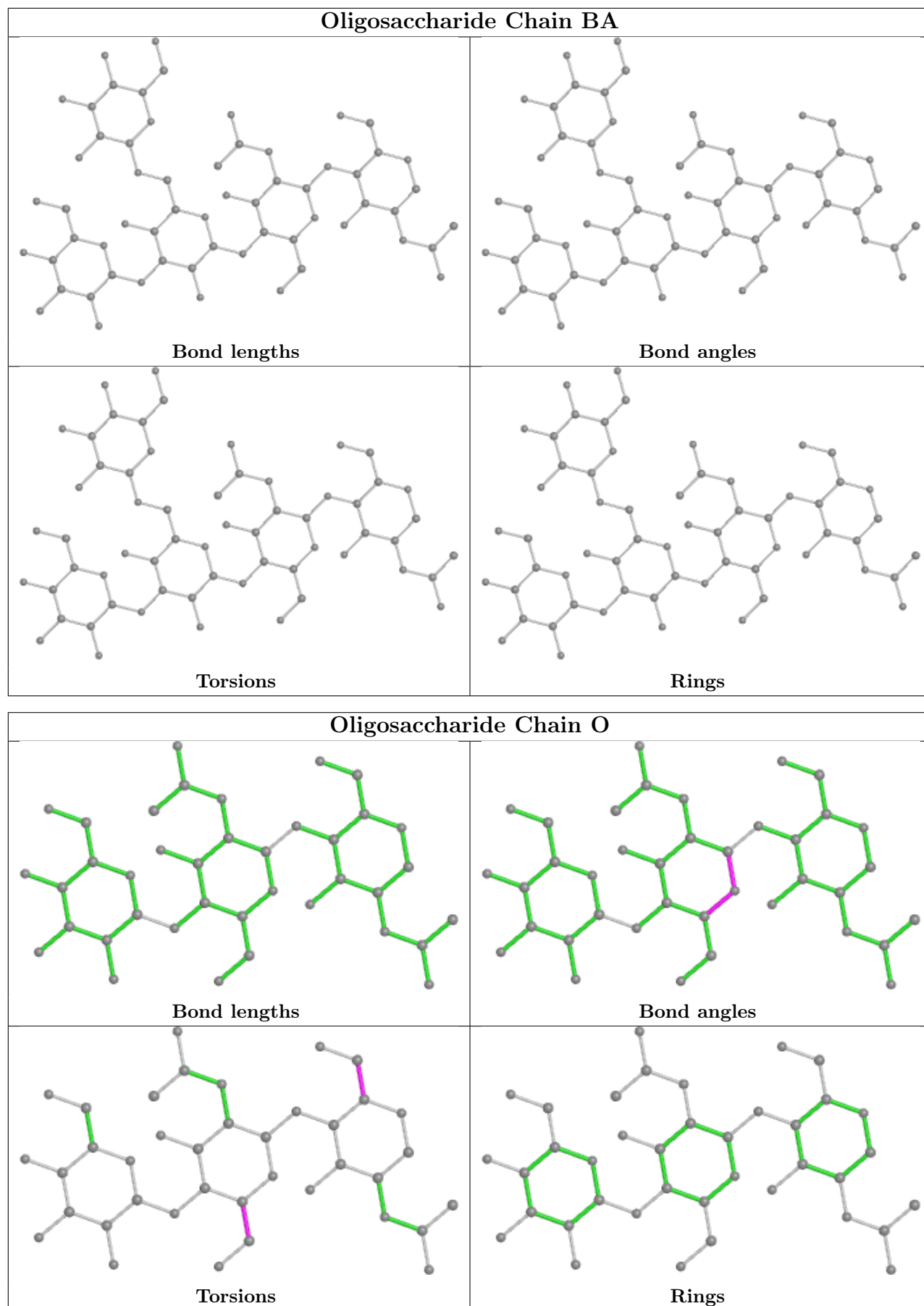


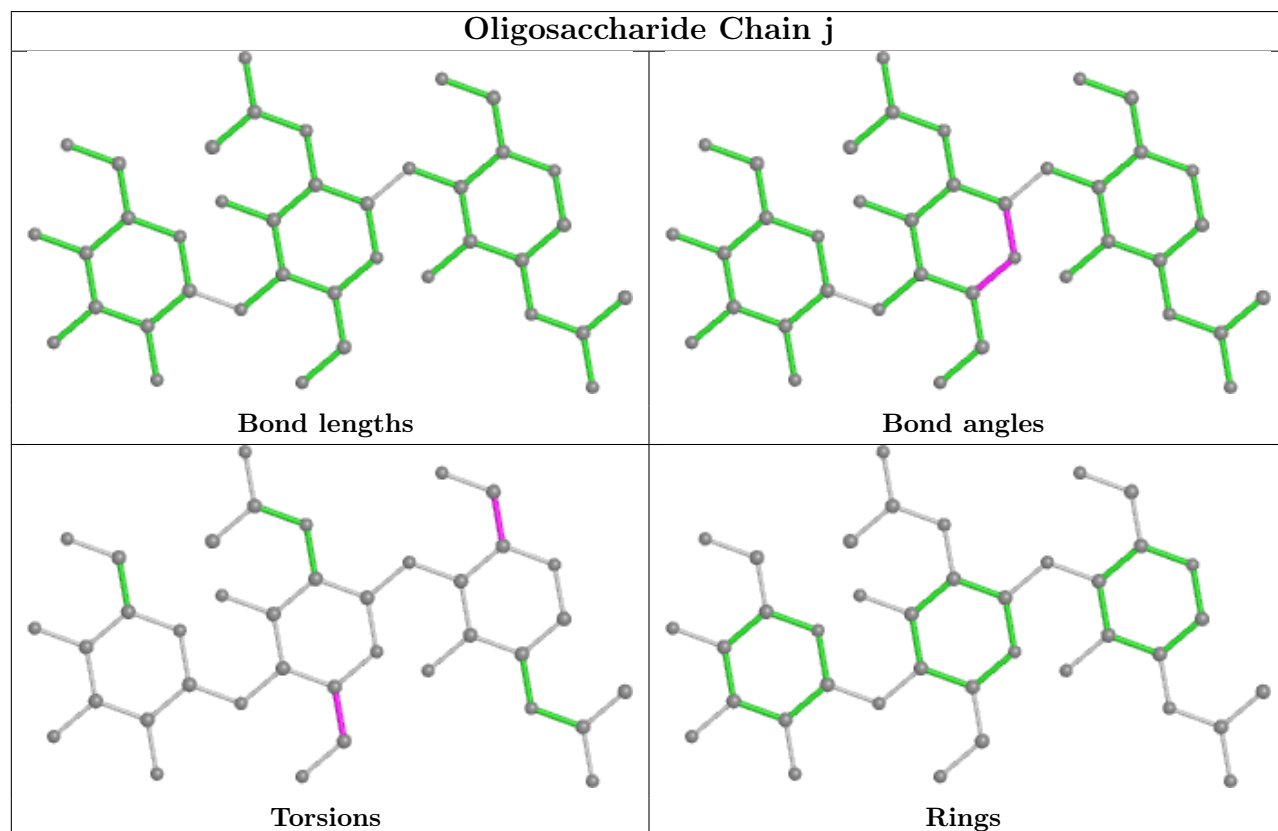
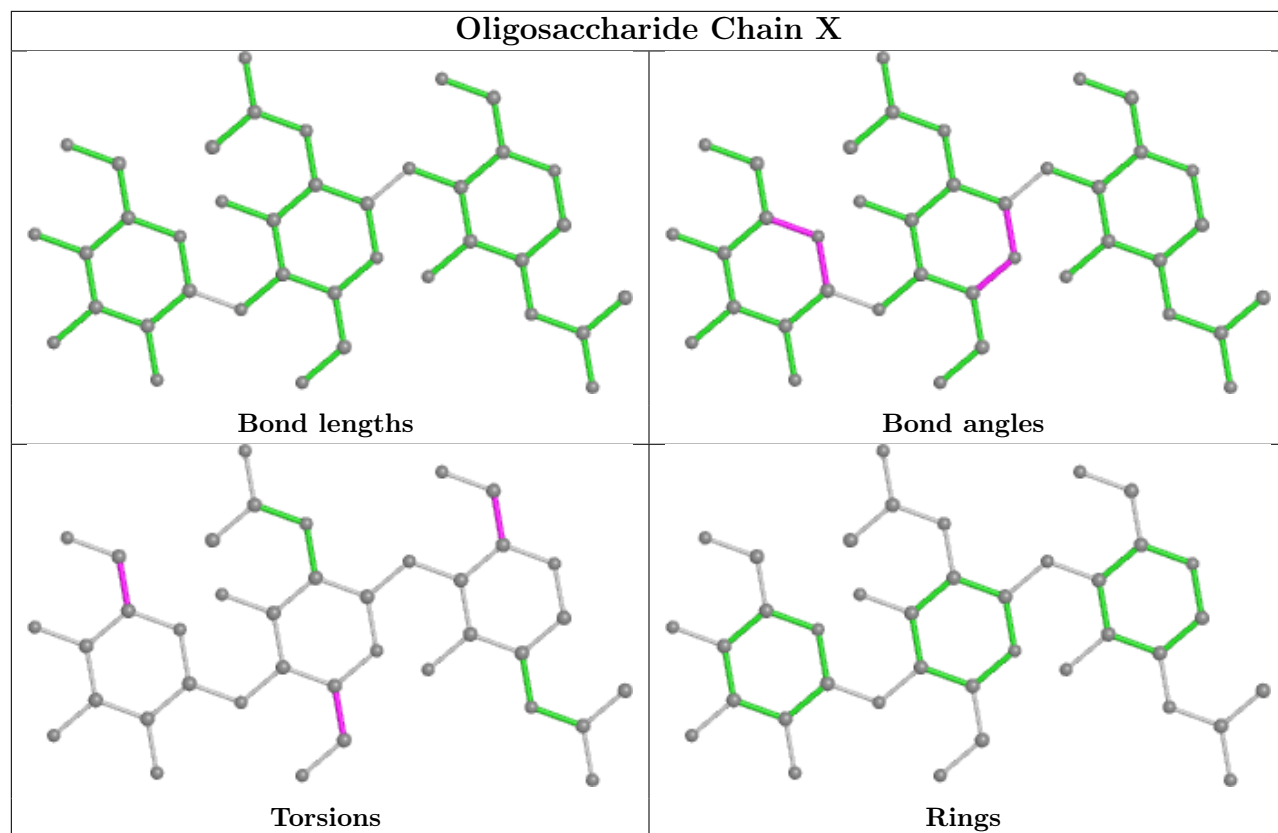


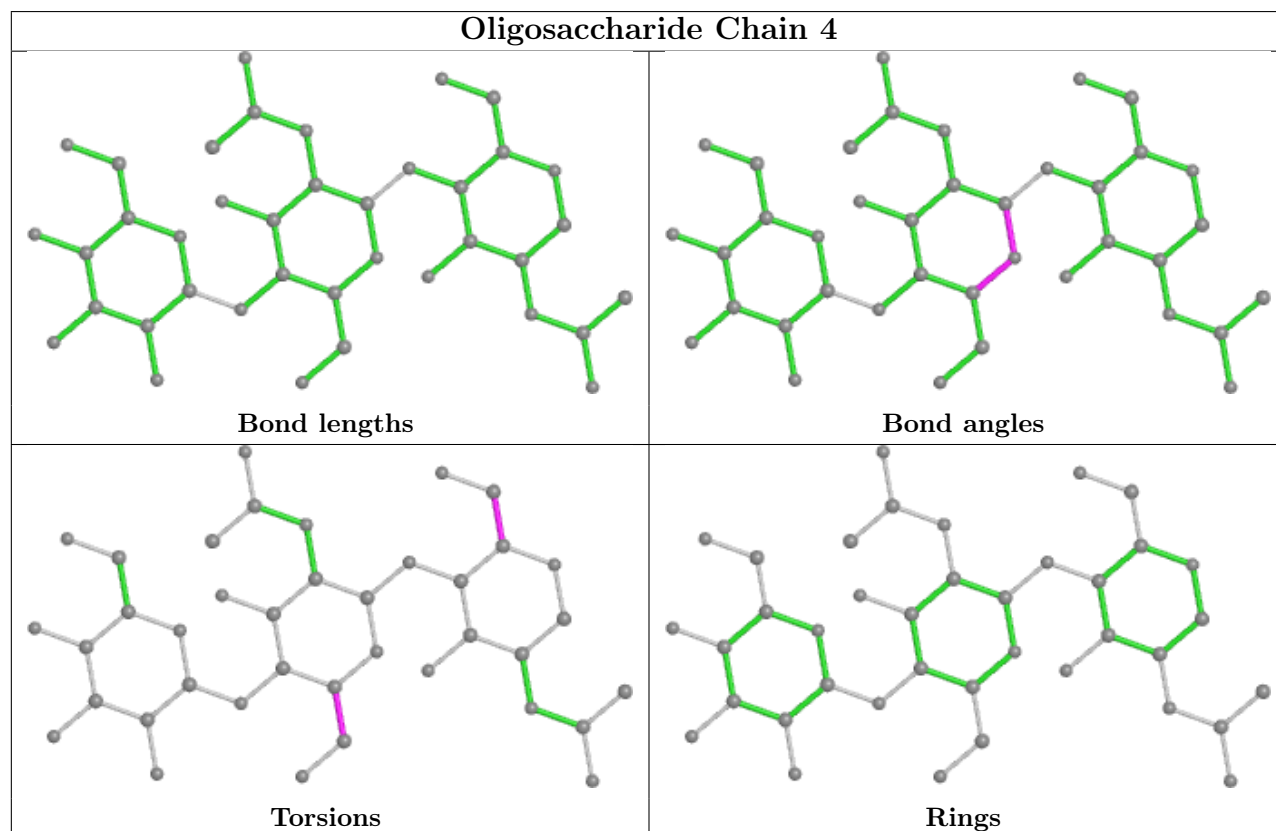
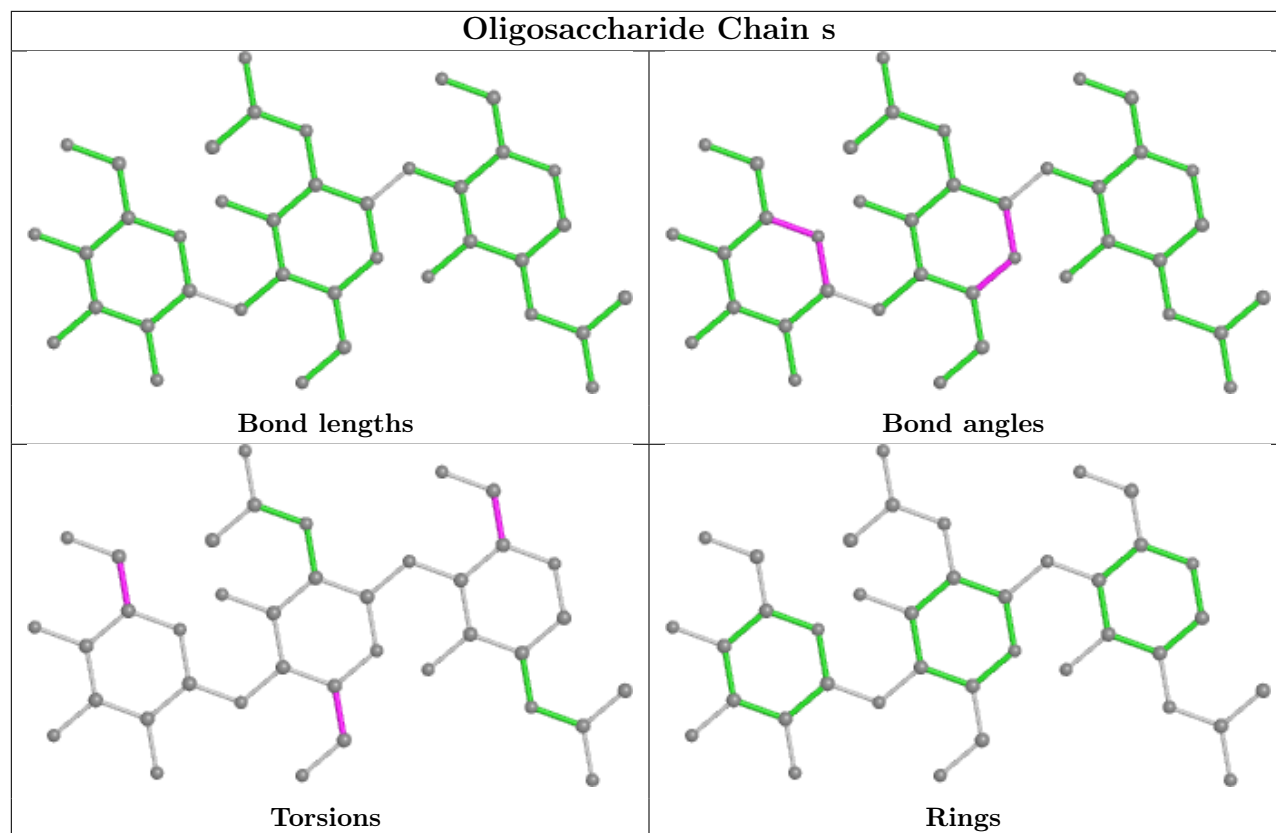


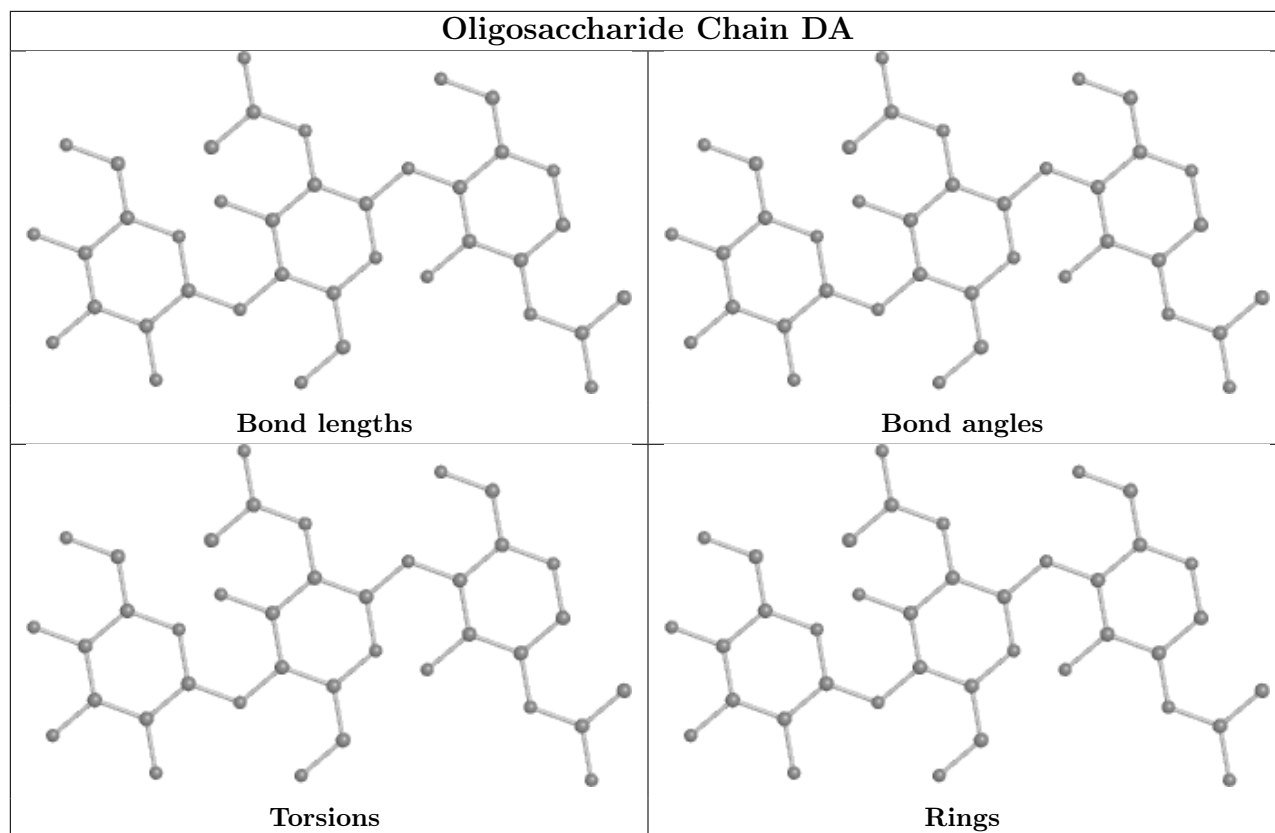












## 5.6 Ligand geometry [i](#)

24 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	$\# Z  > 2$
10	NAG	B	1403	1	14,14,15	0.32	0	17,19,21	0.63	1 (5%)
10	NAG	B	1407	1	14,14,15	0.70	1 (7%)	17,19,21	0.93	1 (5%)
10	NAG	C	1401	1	14,14,15	0.53	0	17,19,21	0.69	1 (5%)
10	NAG	A	1407	1	14,14,15	0.71	1 (7%)	17,19,21	0.92	1 (5%)
10	NAG	A	1406	1	14,14,15	0.33	0	17,19,21	0.89	1 (5%)
10	NAG	A	1401	1	14,14,15	0.52	0	17,19,21	0.68	1 (5%)
10	NAG	B	1408	1	14,14,15	0.36	0	17,19,21	0.68	1 (5%)
10	NAG	B	1406	1	14,14,15	0.36	0	17,19,21	0.89	1 (5%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
10	NAG	C	1404	1	14,14,15	0.73	1 (7%)	17,19,21	0.70	1 (5%)
10	NAG	A	1405	1	14,14,15	0.22	0	17,19,21	0.47	0
10	NAG	A	1404	1	14,14,15	0.72	1 (7%)	17,19,21	0.69	1 (5%)
10	NAG	C	1405	1	14,14,15	0.22	0	17,19,21	0.47	0
10	NAG	C	1403	1	14,14,15	0.31	0	17,19,21	0.63	1 (5%)
10	NAG	A	1402	1	14,14,15	0.28	0	17,19,21	0.69	1 (5%)
10	NAG	A	1403	1	14,14,15	0.31	0	17,19,21	0.63	1 (5%)
10	NAG	B	1404	1	14,14,15	0.73	1 (7%)	17,19,21	0.69	1 (5%)
10	NAG	B	1405	1	14,14,15	0.22	0	17,19,21	0.47	0
10	NAG	B	1401	1	14,14,15	0.52	0	17,19,21	0.69	1 (5%)
10	NAG	C	1402	1	14,14,15	0.29	0	17,19,21	0.69	1 (5%)
10	NAG	C	1407	1	14,14,15	0.70	1 (7%)	17,19,21	0.93	1 (5%)
10	NAG	C	1408	1	14,14,15	0.36	0	17,19,21	0.68	1 (5%)
10	NAG	A	1408	1	14,14,15	0.37	0	17,19,21	0.68	1 (5%)
10	NAG	B	1402	1	14,14,15	0.29	0	17,19,21	0.69	1 (5%)
10	NAG	C	1406	1	14,14,15	0.35	0	17,19,21	0.89	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
10	NAG	B	1403	1	-	2/6/23/26	0/1/1/1
10	NAG	B	1407	1	-	2/6/23/26	0/1/1/1
10	NAG	C	1401	1	-	1/6/23/26	0/1/1/1
10	NAG	A	1407	1	-	2/6/23/26	0/1/1/1
10	NAG	A	1406	1	-	3/6/23/26	0/1/1/1
10	NAG	A	1401	1	-	1/6/23/26	0/1/1/1
10	NAG	B	1408	1	-	2/6/23/26	0/1/1/1
10	NAG	B	1406	1	-	3/6/23/26	0/1/1/1
10	NAG	C	1404	1	-	2/6/23/26	0/1/1/1
10	NAG	A	1405	1	-	0/6/23/26	0/1/1/1
10	NAG	A	1404	1	-	2/6/23/26	0/1/1/1
10	NAG	C	1405	1	-	0/6/23/26	0/1/1/1
10	NAG	C	1403	1	-	2/6/23/26	0/1/1/1
10	NAG	A	1402	1	-	2/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
10	NAG	A	1403	1	-	2/6/23/26	0/1/1/1
10	NAG	B	1404	1	-	2/6/23/26	0/1/1/1
10	NAG	B	1405	1	-	0/6/23/26	0/1/1/1
10	NAG	B	1401	1	-	1/6/23/26	0/1/1/1
10	NAG	C	1402	1	-	2/6/23/26	0/1/1/1
10	NAG	C	1407	1	-	2/6/23/26	0/1/1/1
10	NAG	C	1408	1	-	2/6/23/26	0/1/1/1
10	NAG	A	1408	1	-	2/6/23/26	0/1/1/1
10	NAG	B	1402	1	-	2/6/23/26	0/1/1/1
10	NAG	C	1406	1	-	3/6/23/26	0/1/1/1

The worst 5 of 6 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
10	C	1404	NAG	C1-C2	2.54	1.56	1.52
10	B	1404	NAG	C1-C2	2.54	1.56	1.52
10	A	1404	NAG	C1-C2	2.49	1.56	1.52
10	A	1407	NAG	O5-C1	2.20	1.47	1.43
10	B	1407	NAG	O5-C1	2.14	1.47	1.43

The worst 5 of 21 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
10	B	1407	NAG	C2-N2-C7	3.08	127.28	122.90
10	C	1407	NAG	C2-N2-C7	3.08	127.28	122.90
10	A	1407	NAG	C2-N2-C7	3.06	127.26	122.90
10	C	1406	NAG	C2-N2-C7	3.03	127.22	122.90
10	A	1406	NAG	C2-N2-C7	3.02	127.20	122.90

There are no chirality outliers.

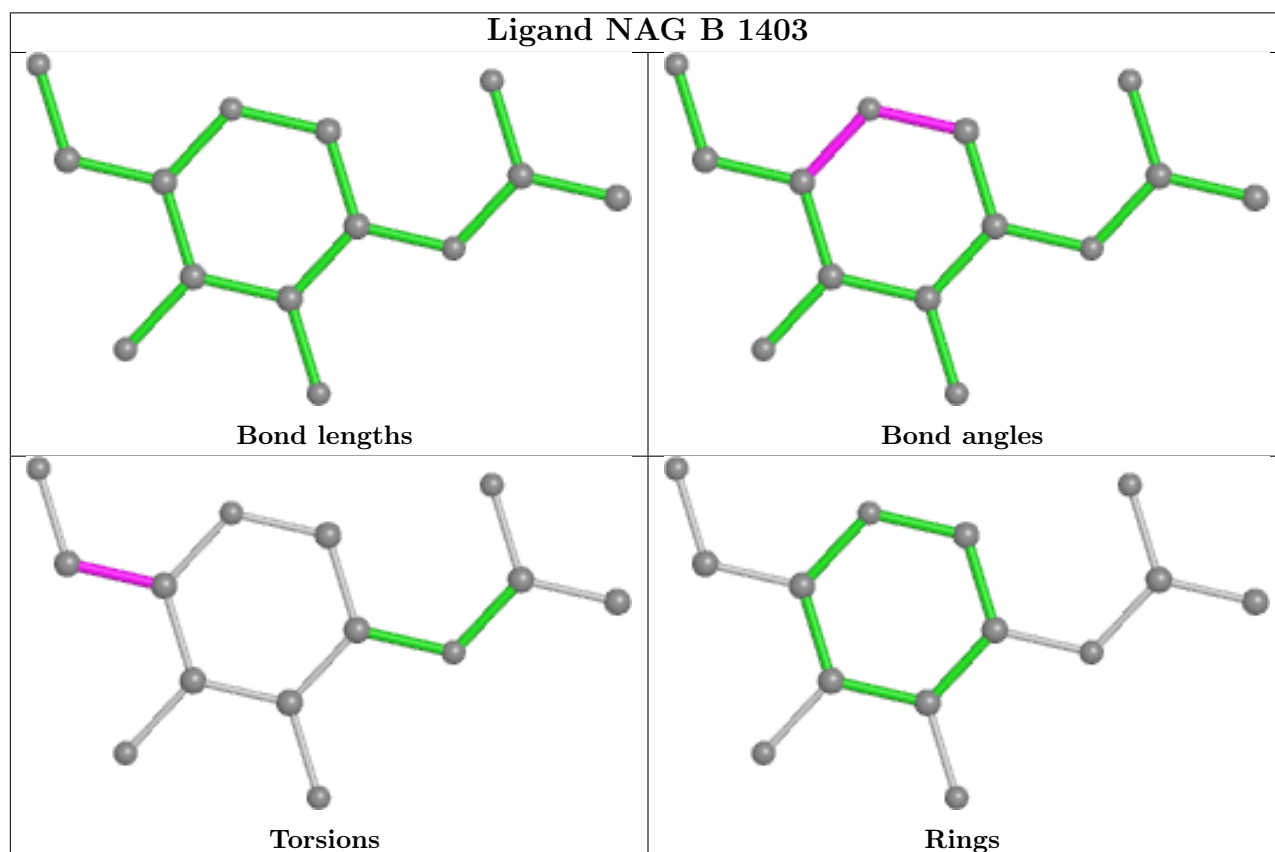
5 of 42 torsion outliers are listed below:

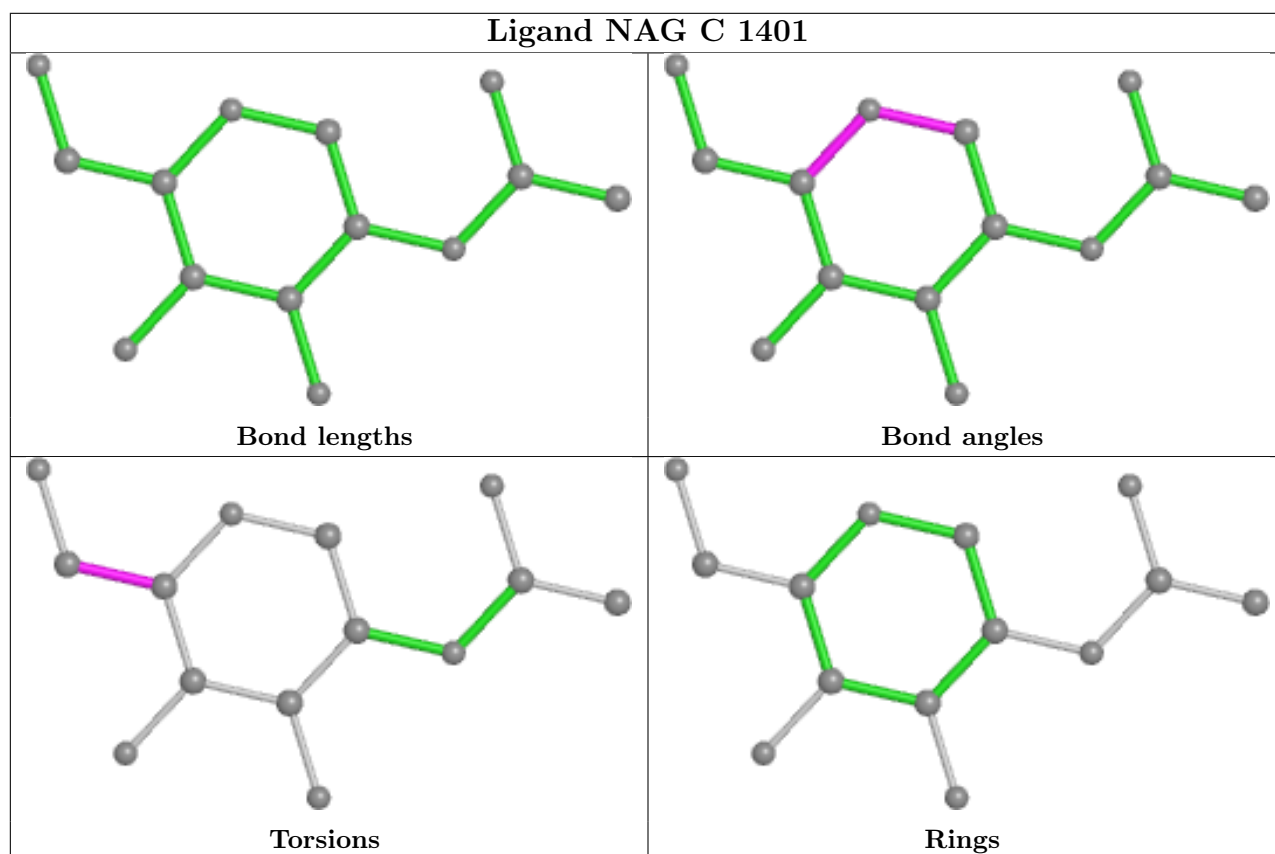
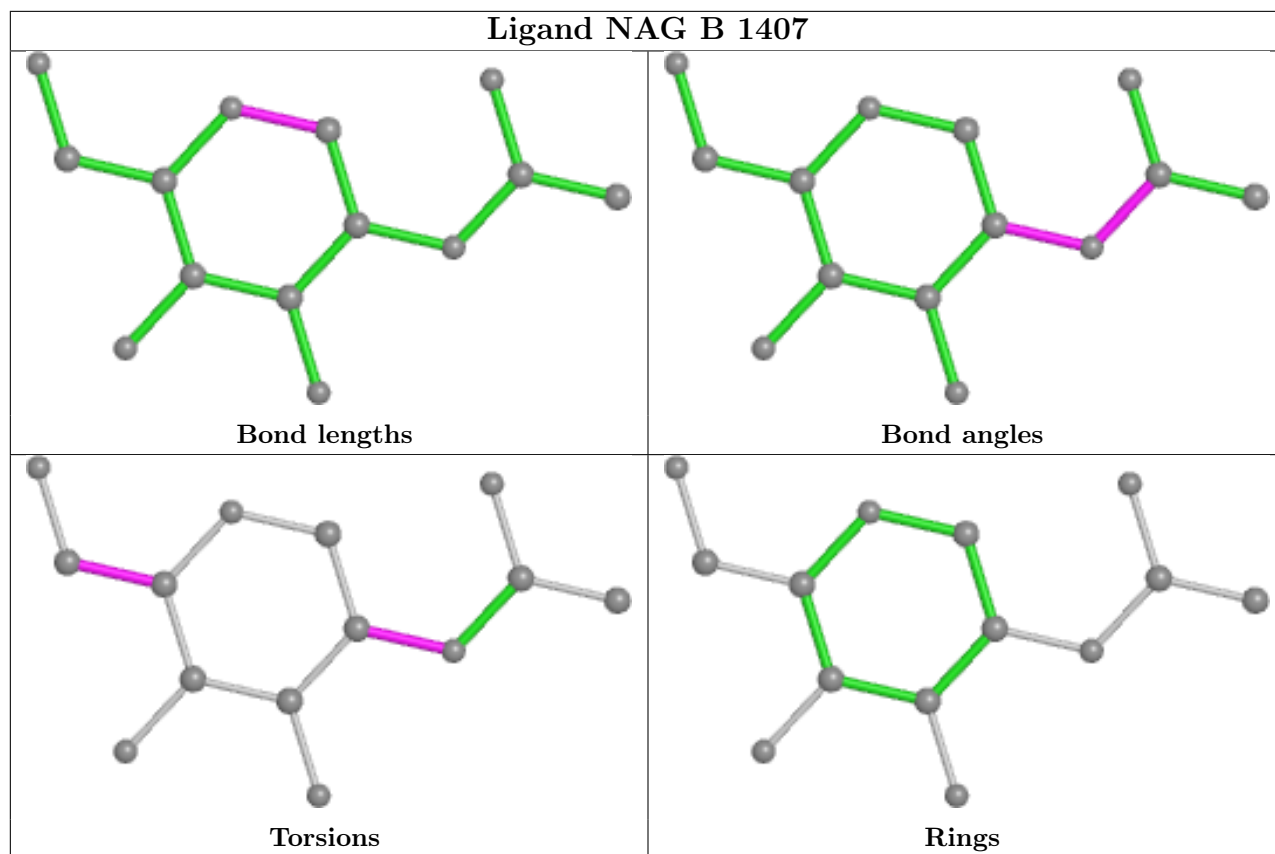
Mol	Chain	Res	Type	Atoms
10	A	1408	NAG	O5-C5-C6-O6
10	B	1408	NAG	O5-C5-C6-O6
10	C	1408	NAG	O5-C5-C6-O6
10	A	1403	NAG	C4-C5-C6-O6
10	B	1403	NAG	C4-C5-C6-O6

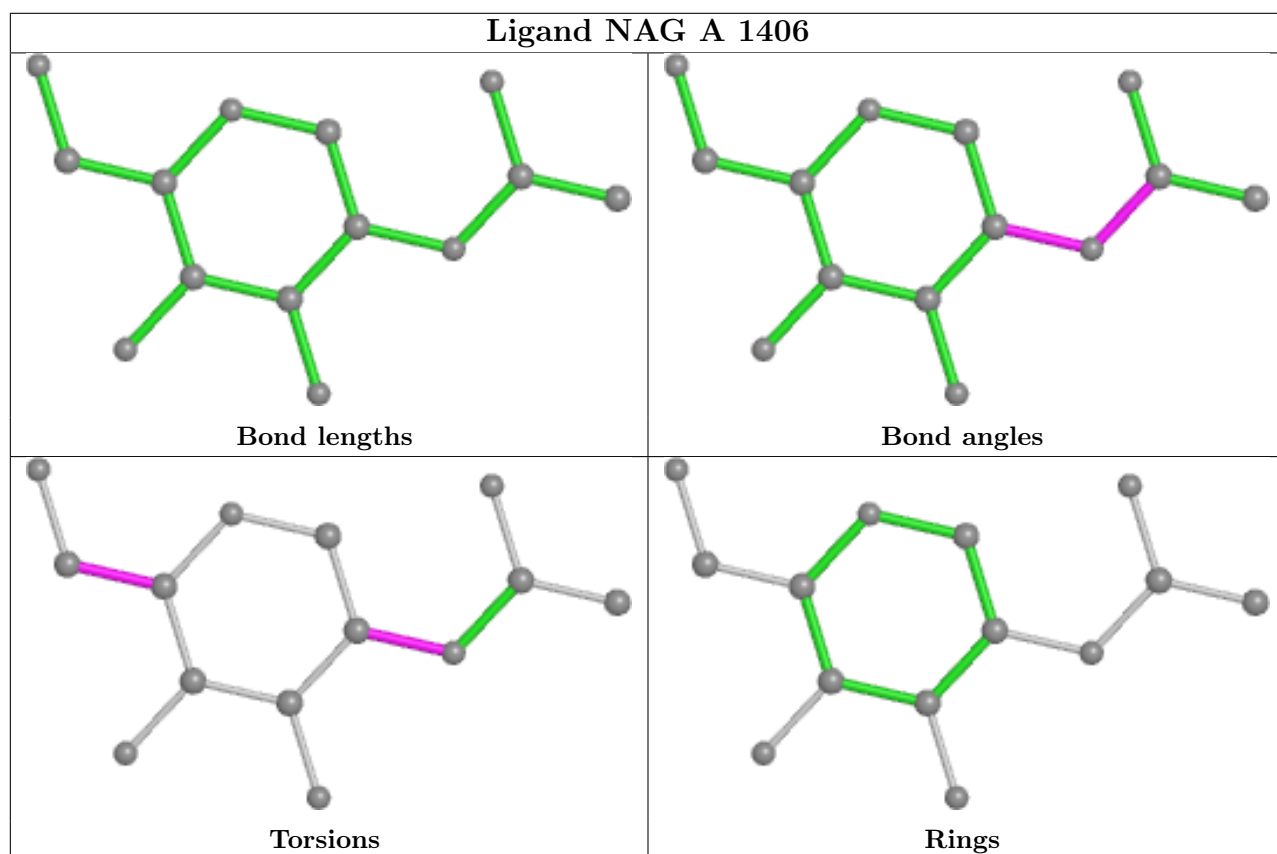
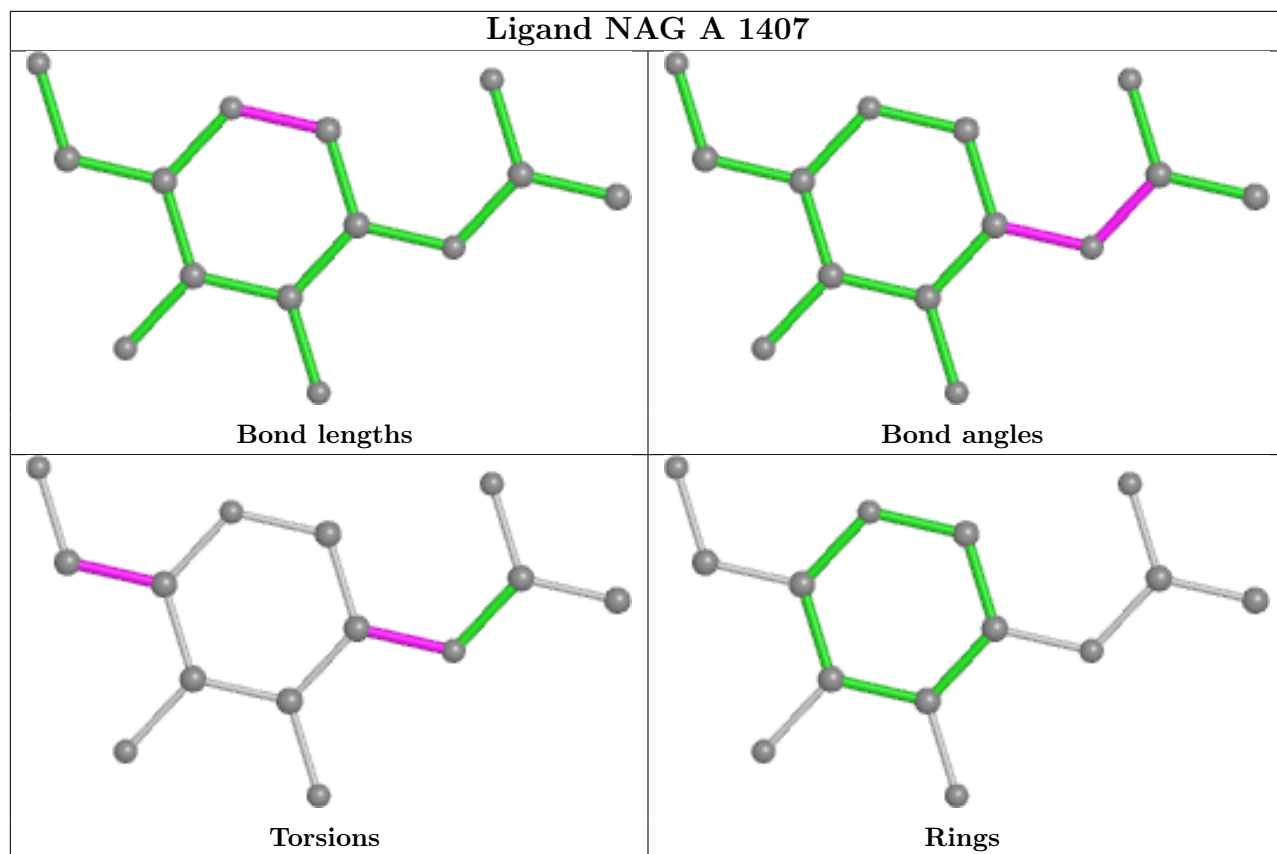
There are no ring outliers.

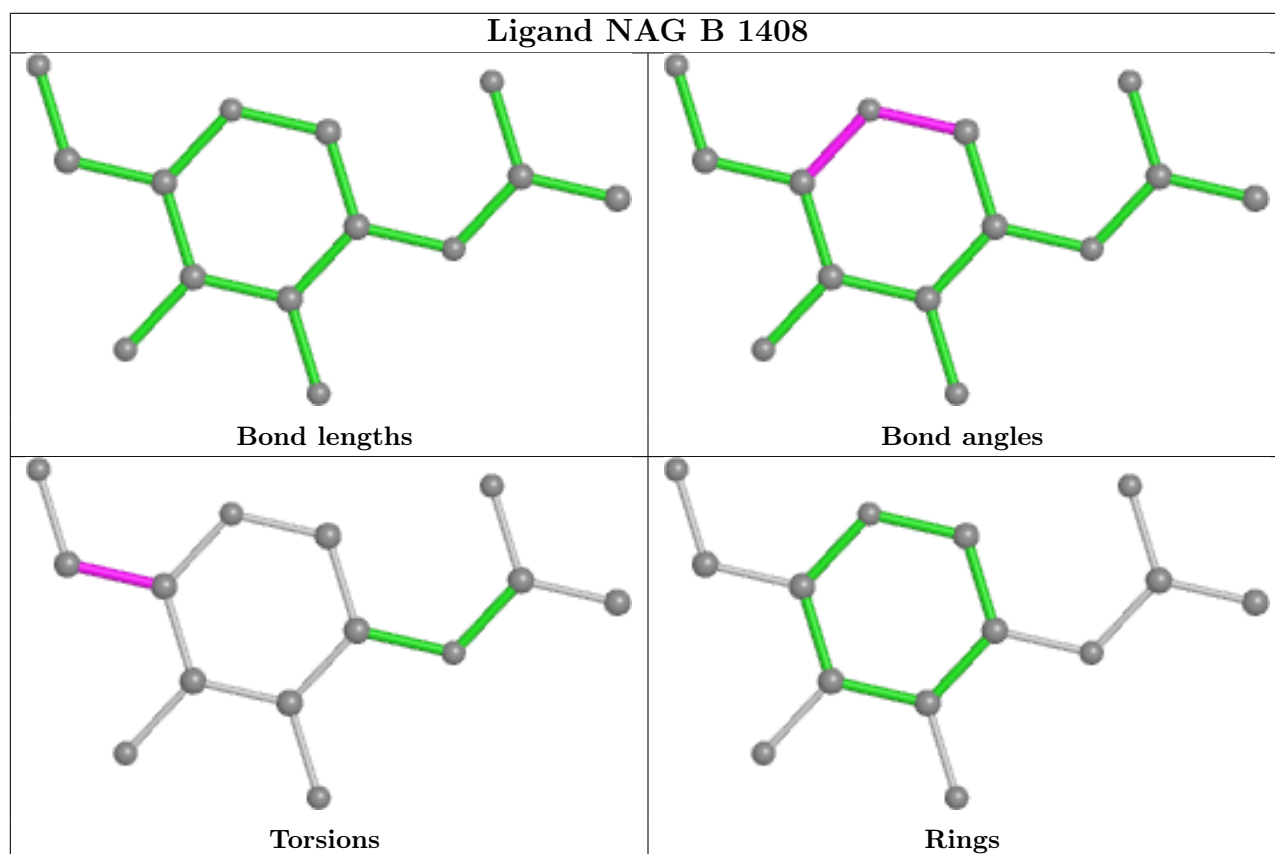
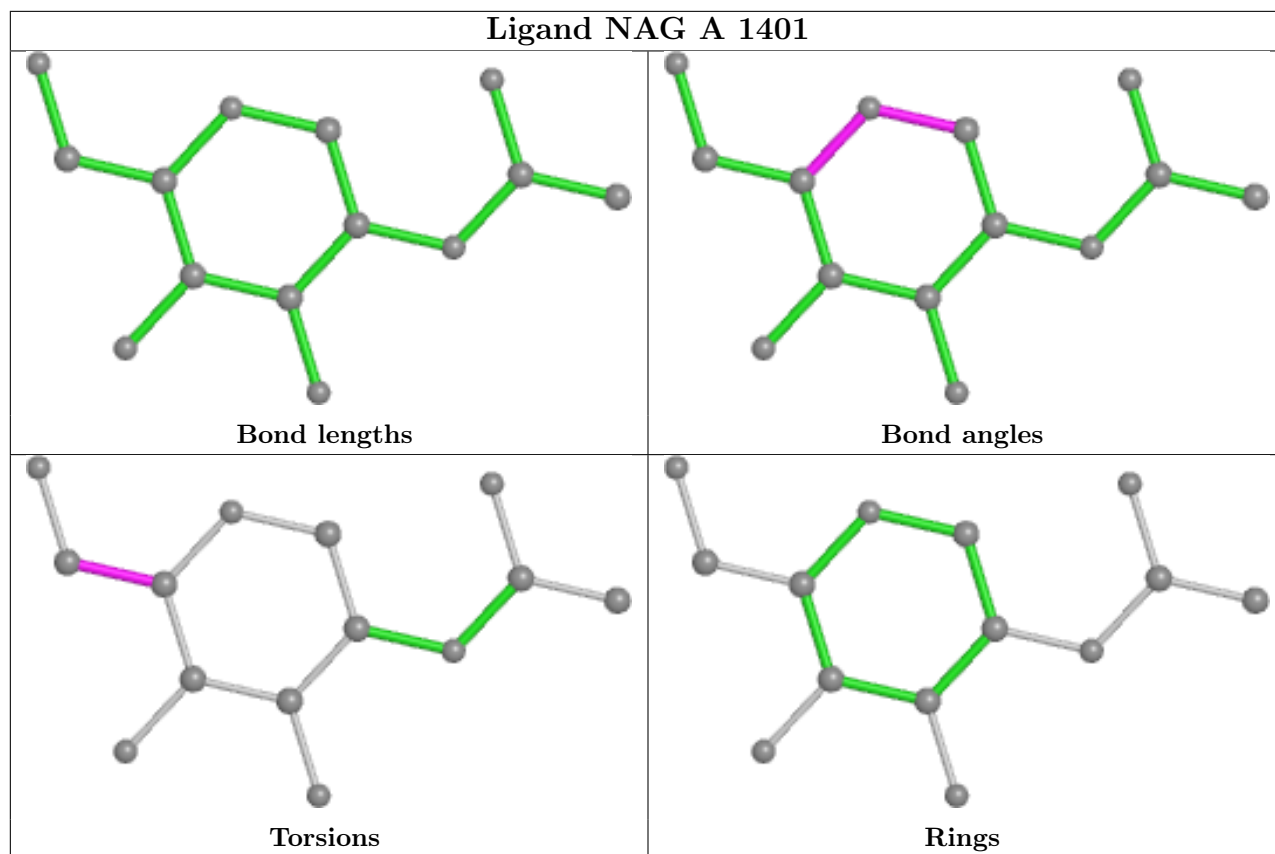
No monomer is involved in short contacts.

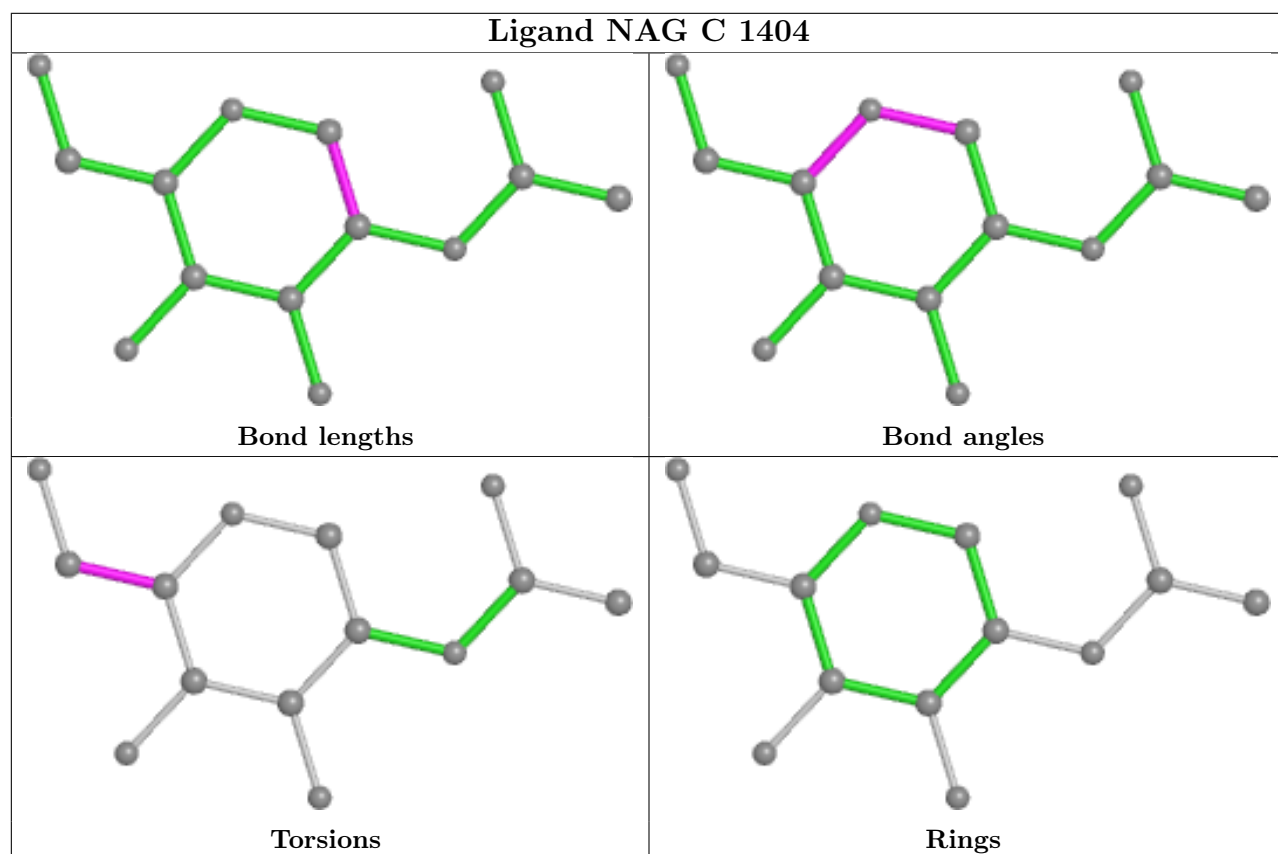
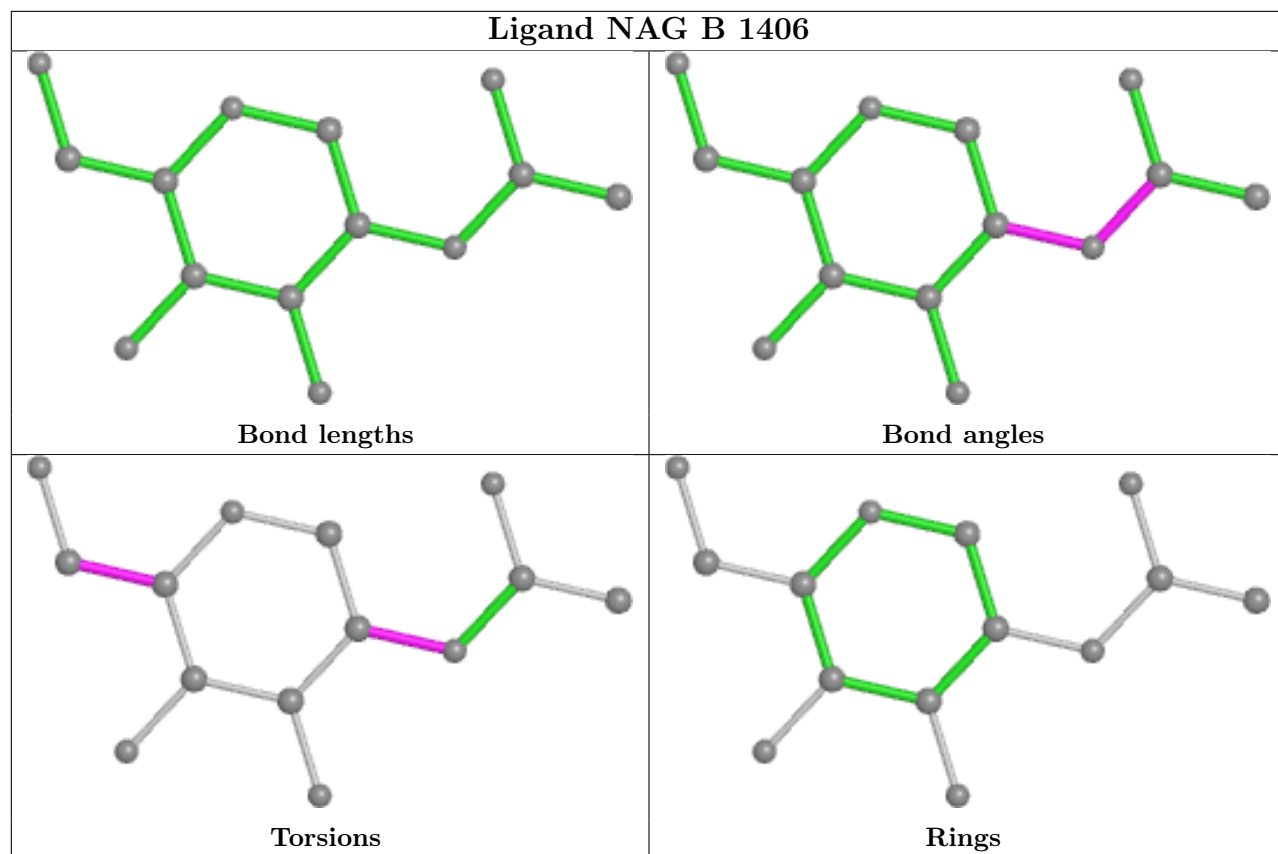
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

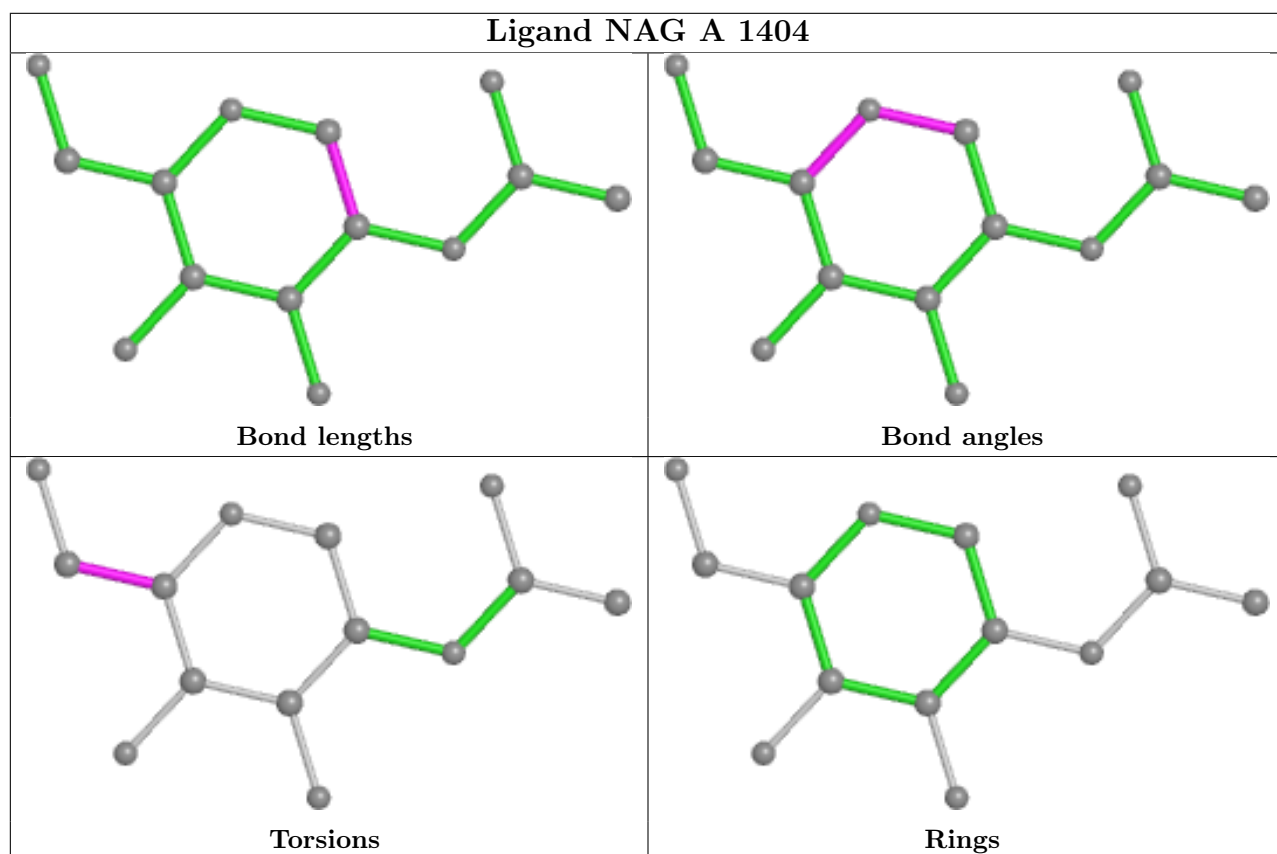
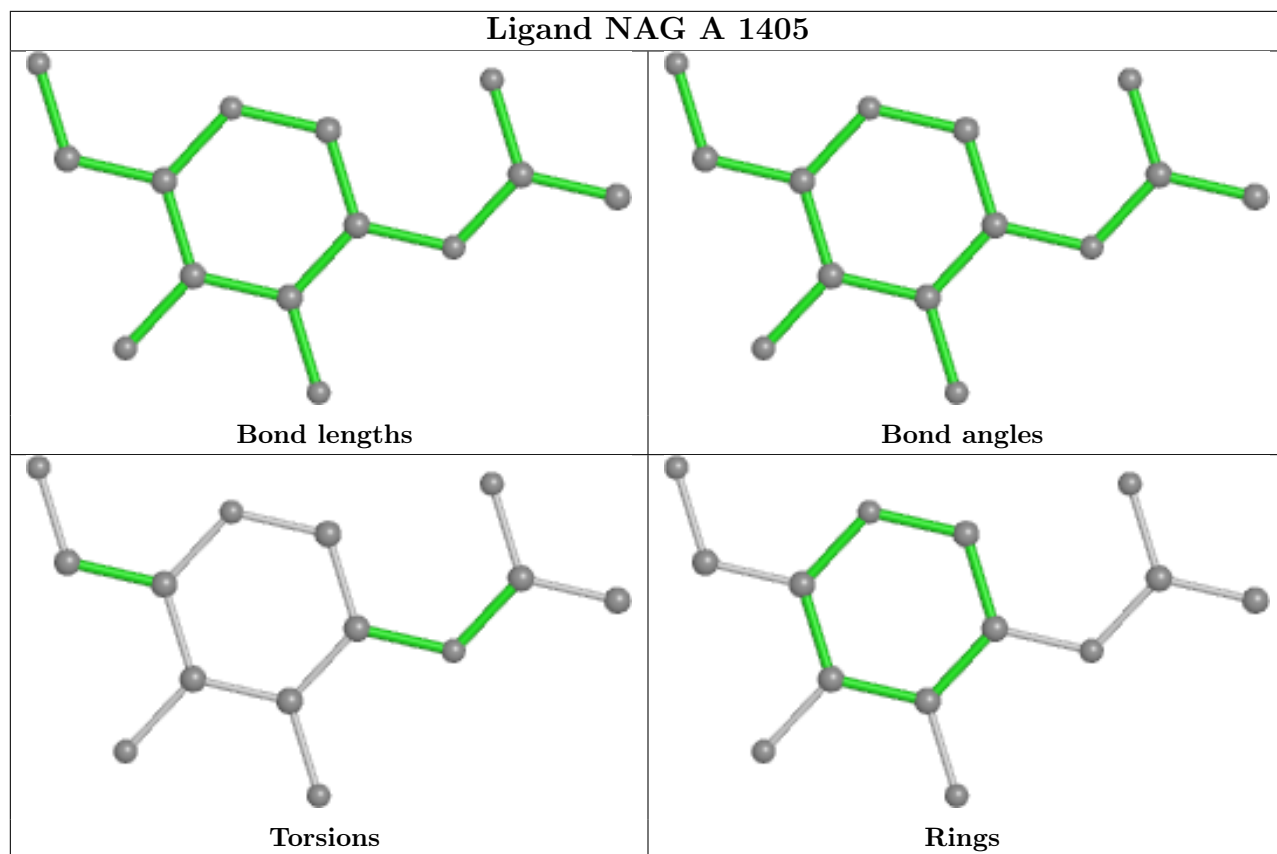


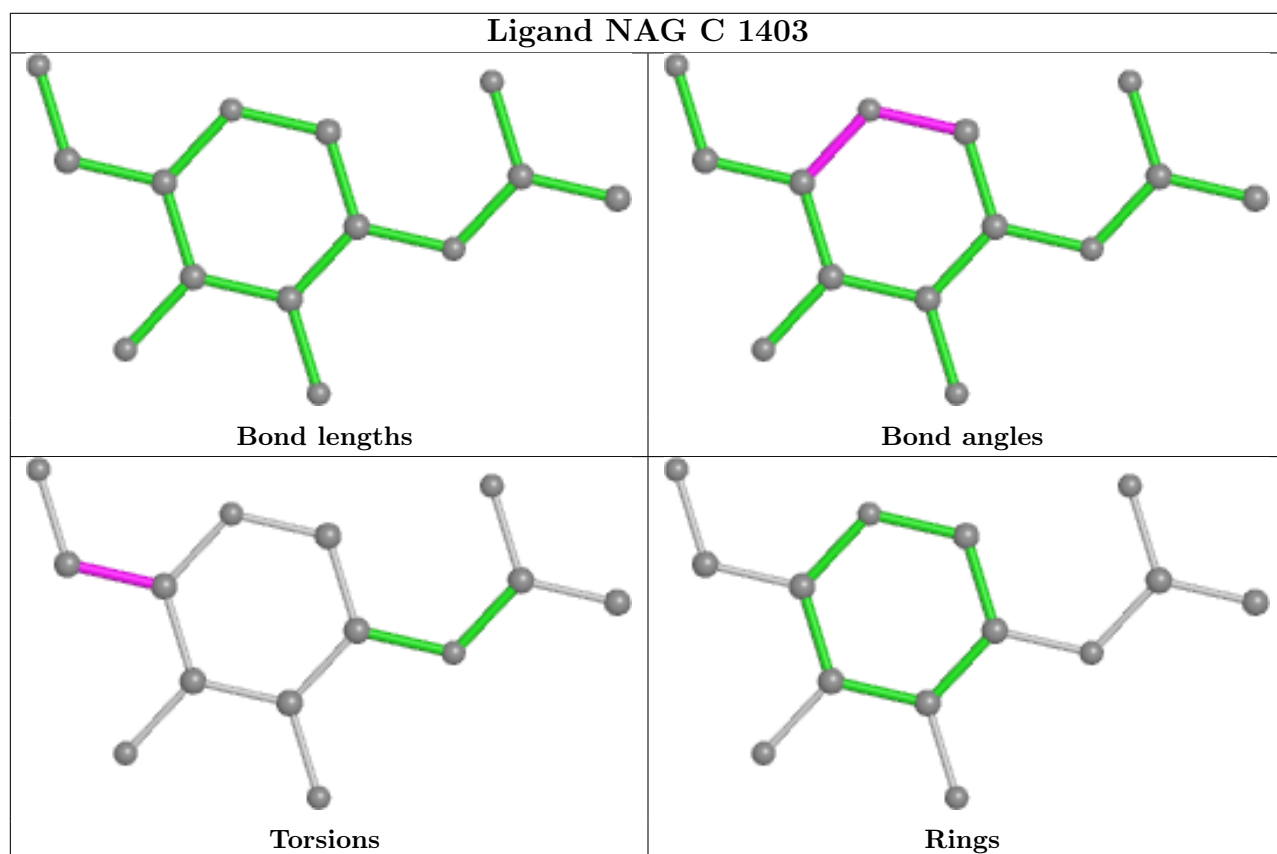
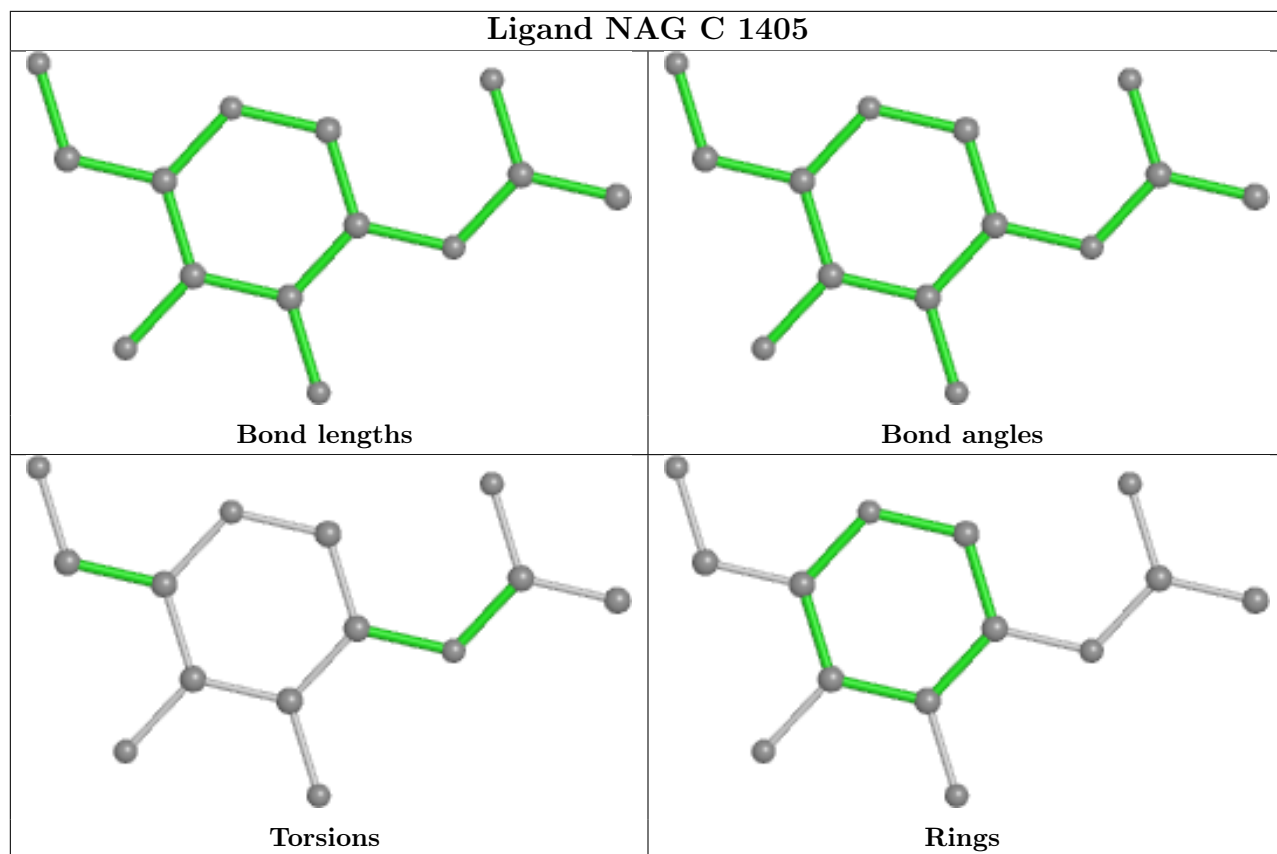




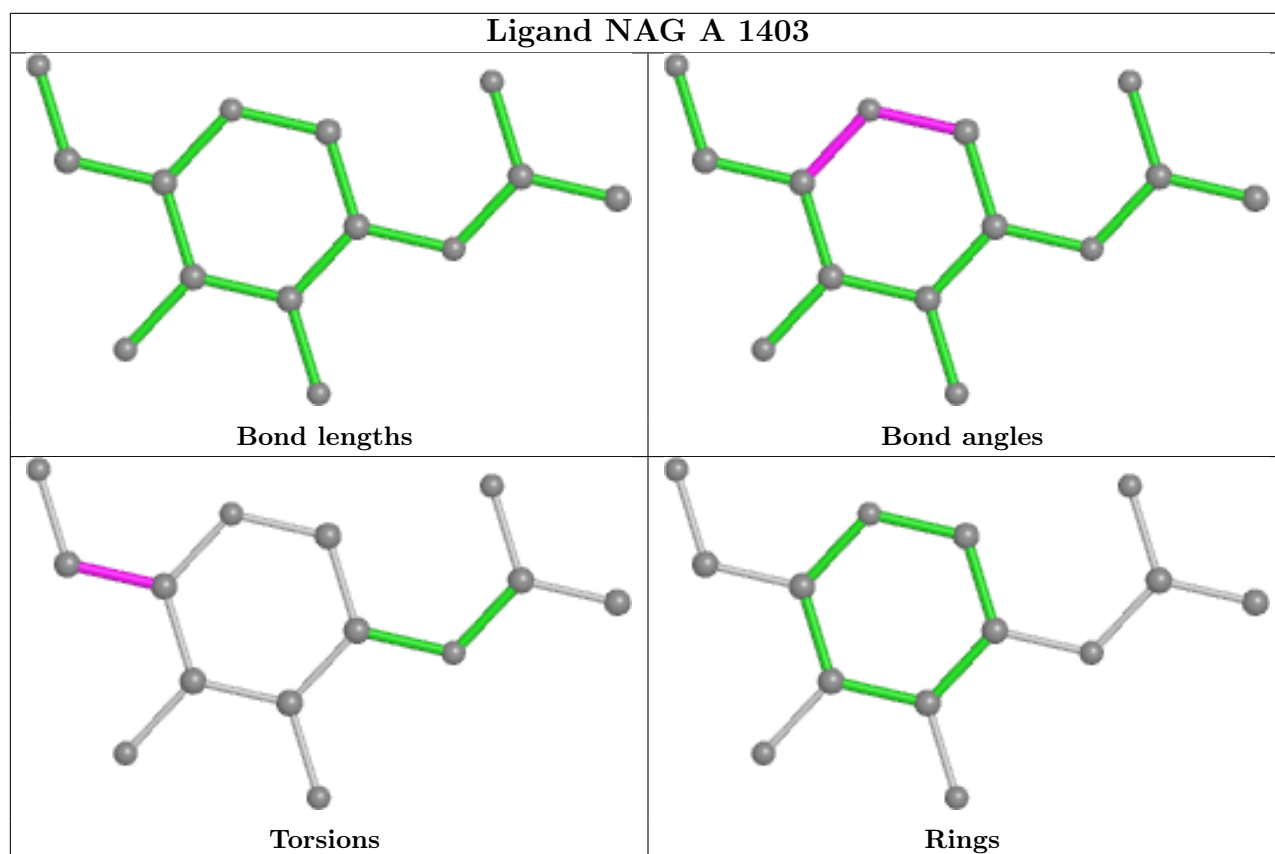
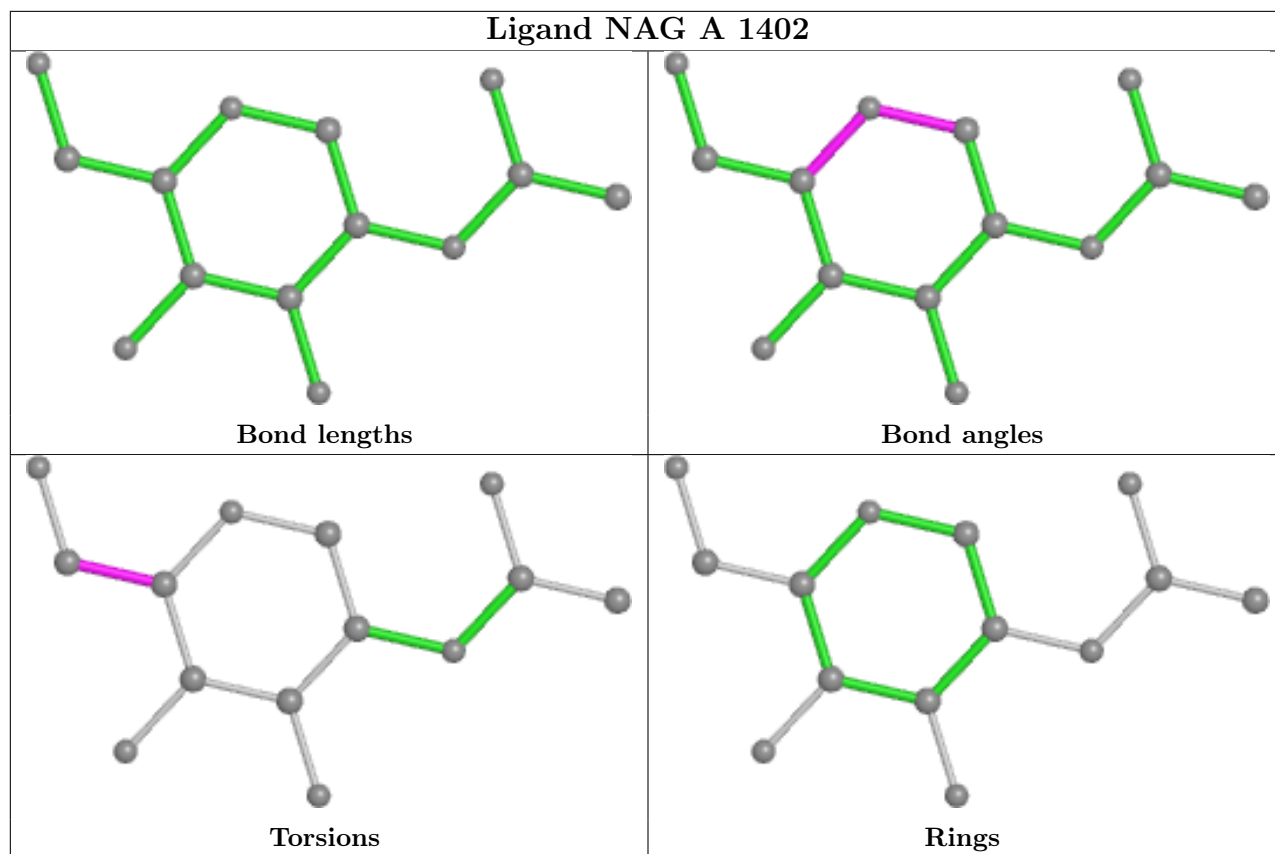


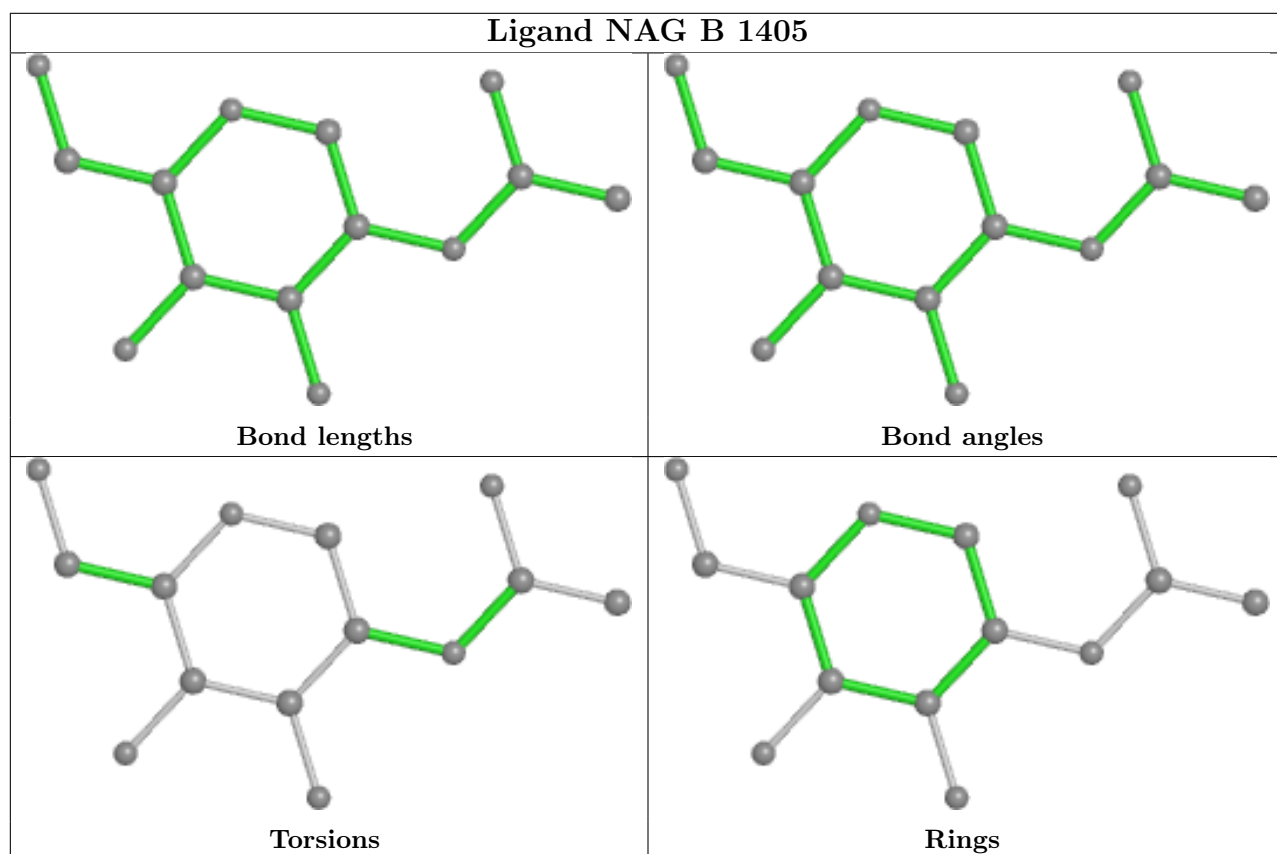
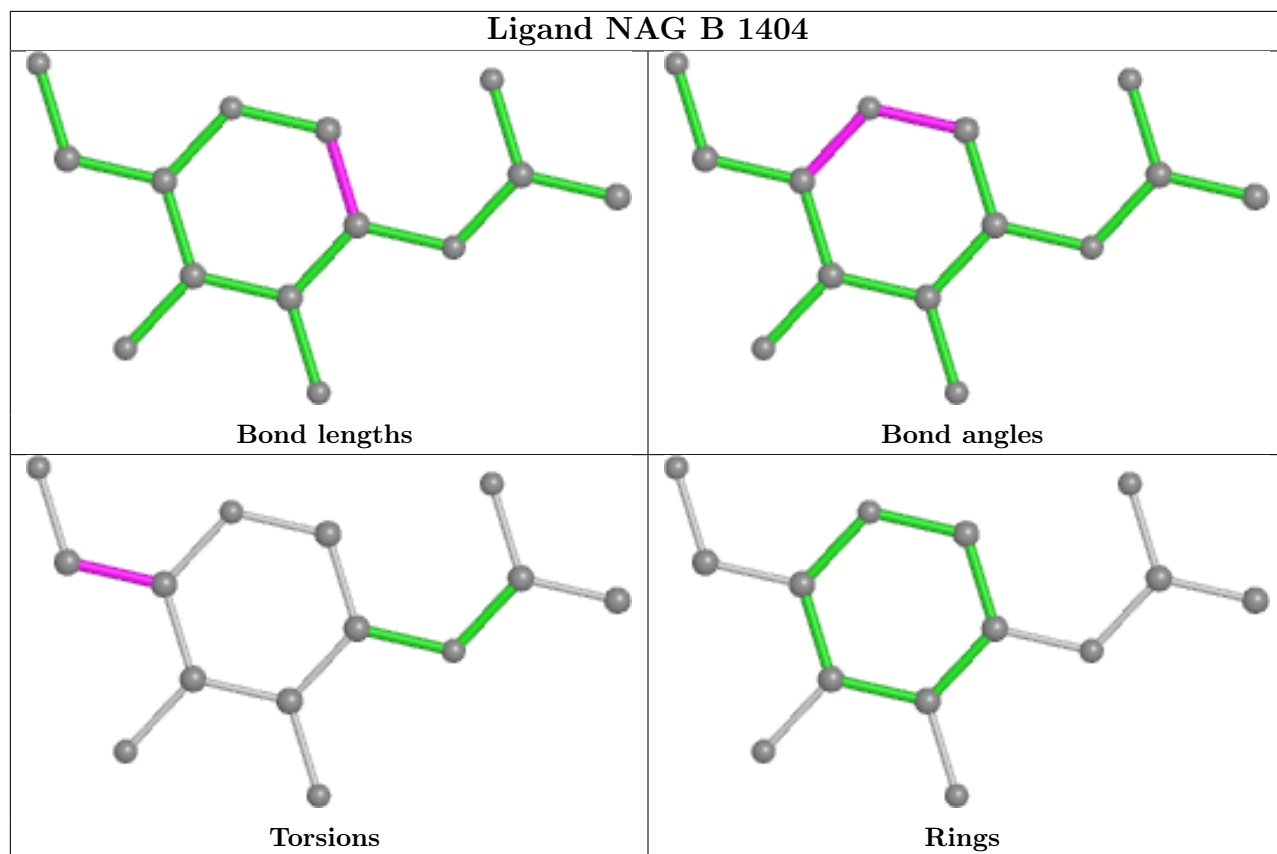


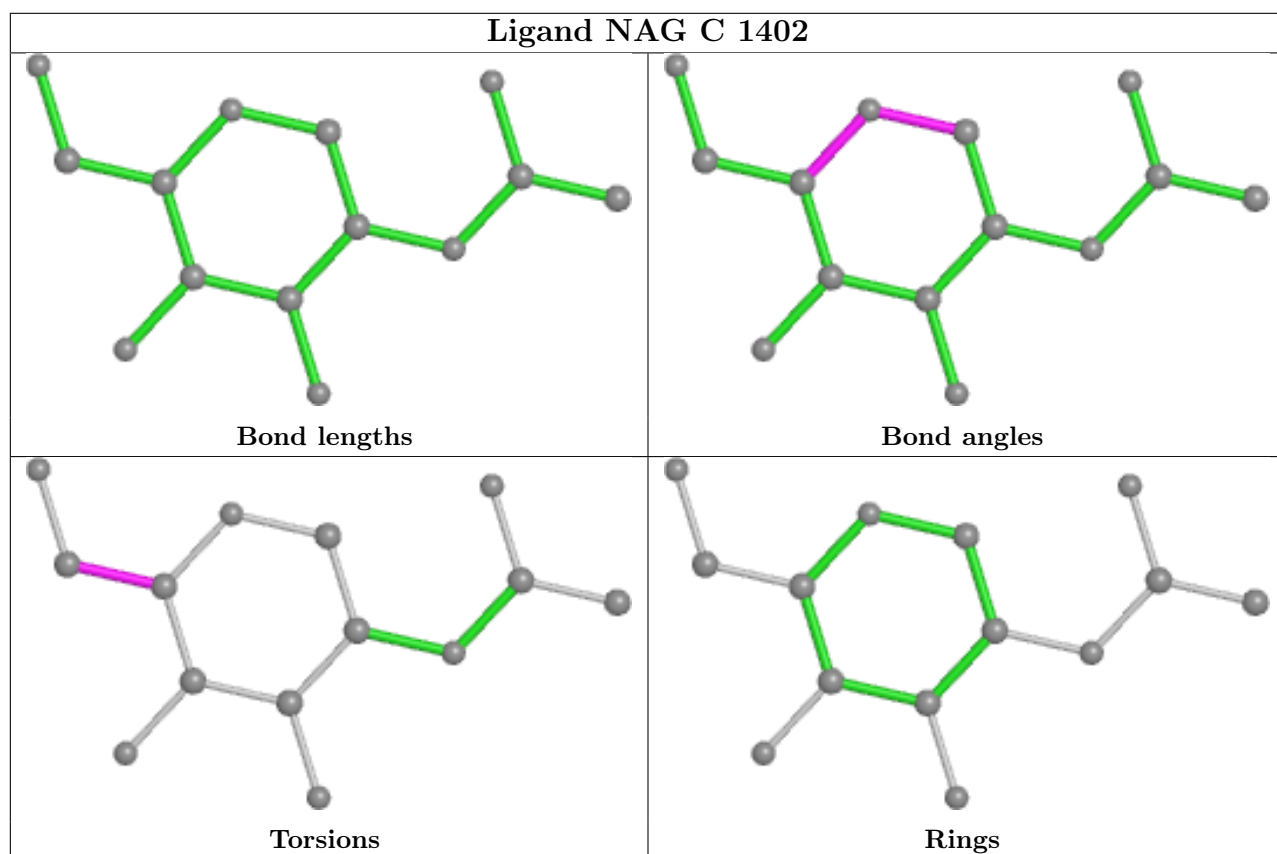
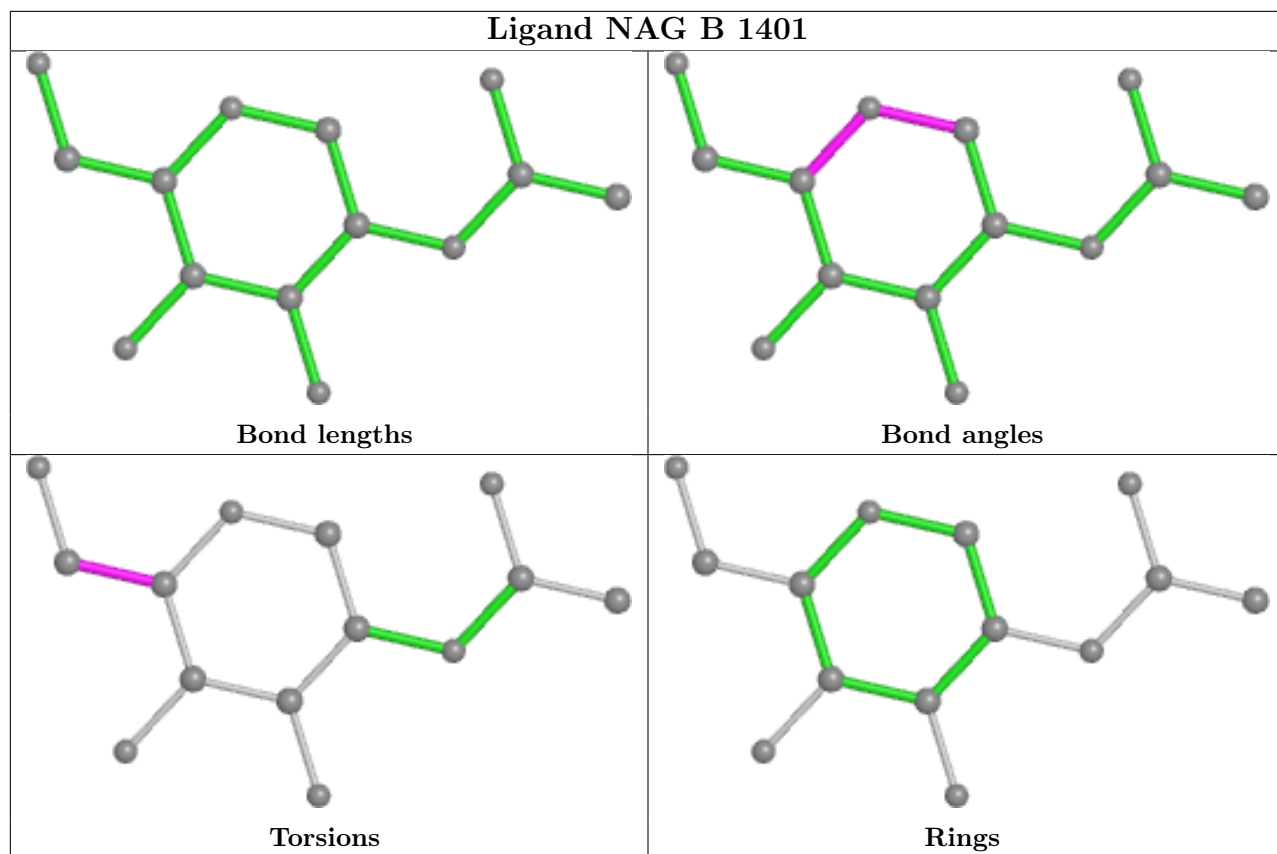


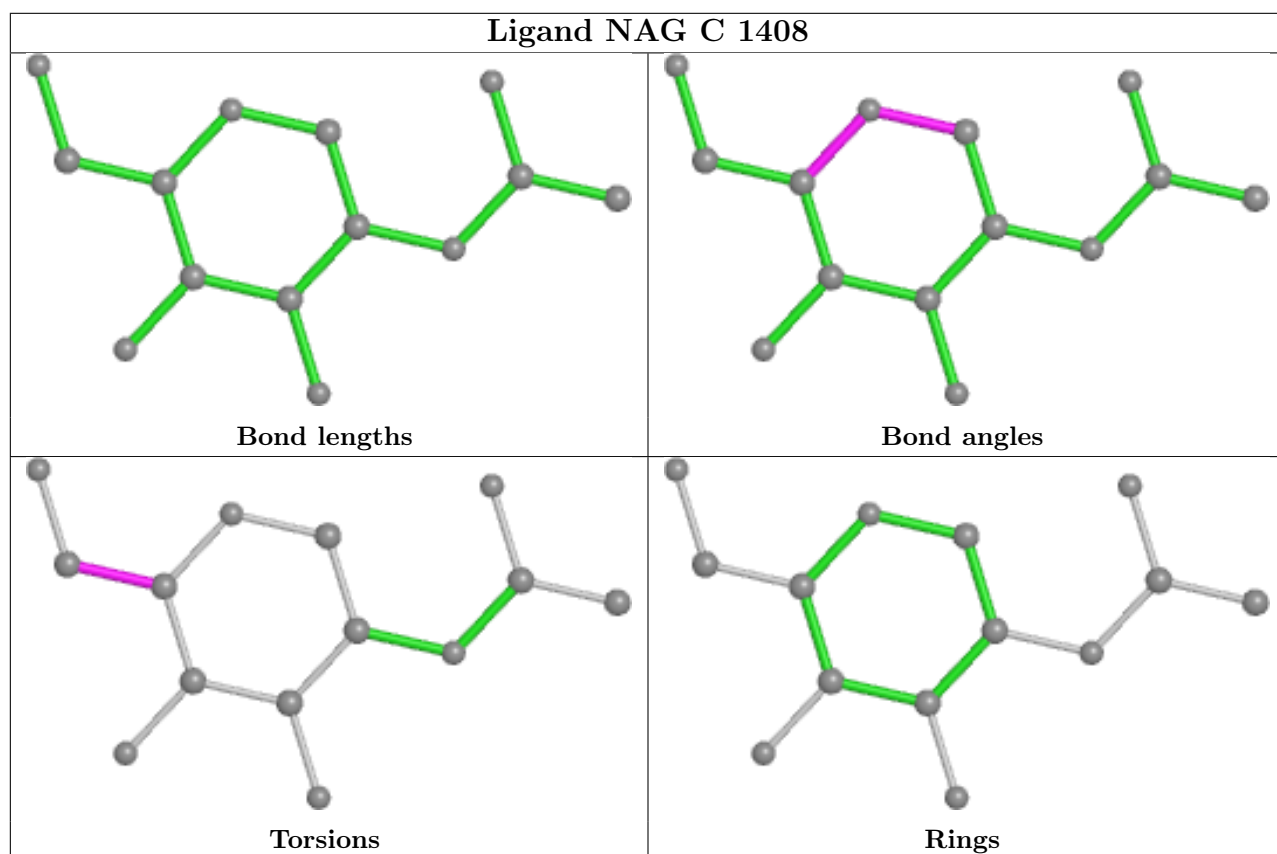
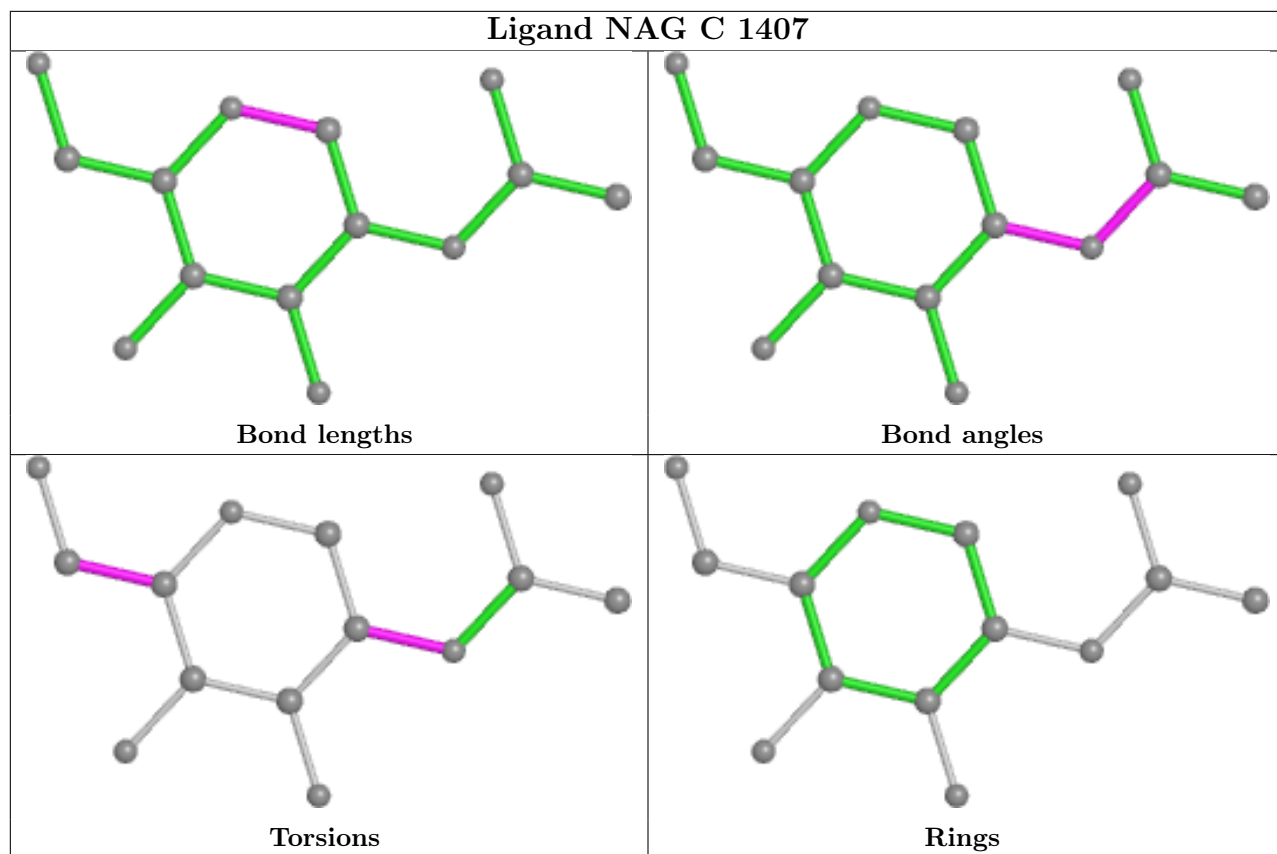


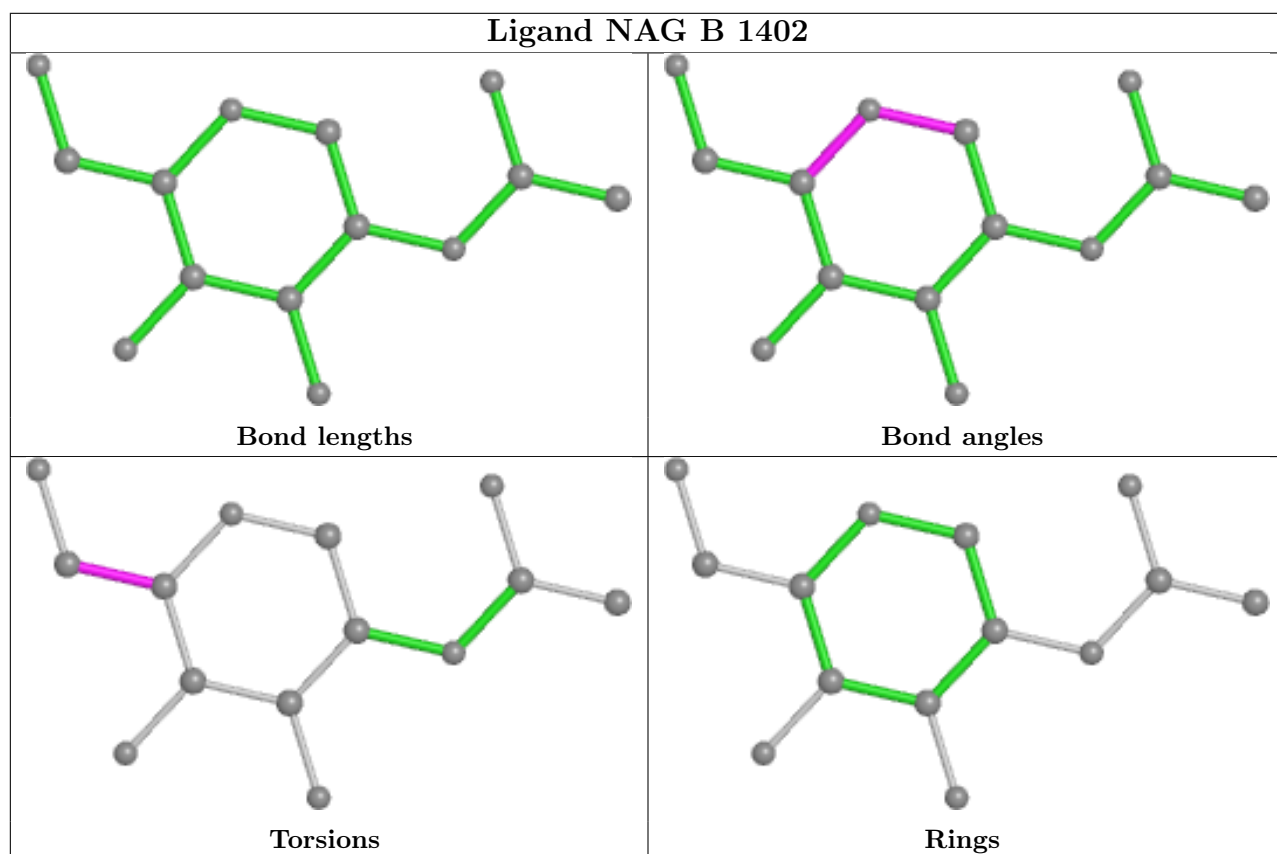
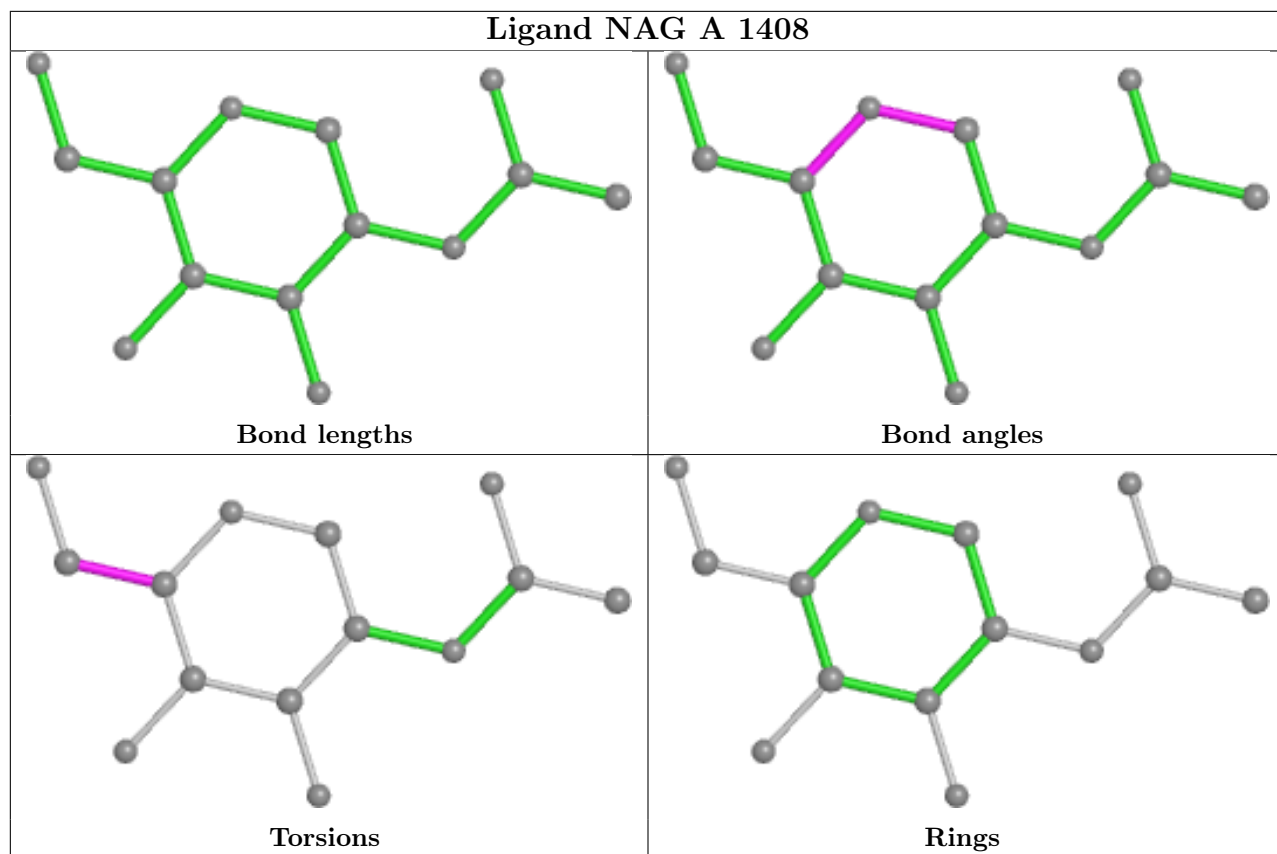


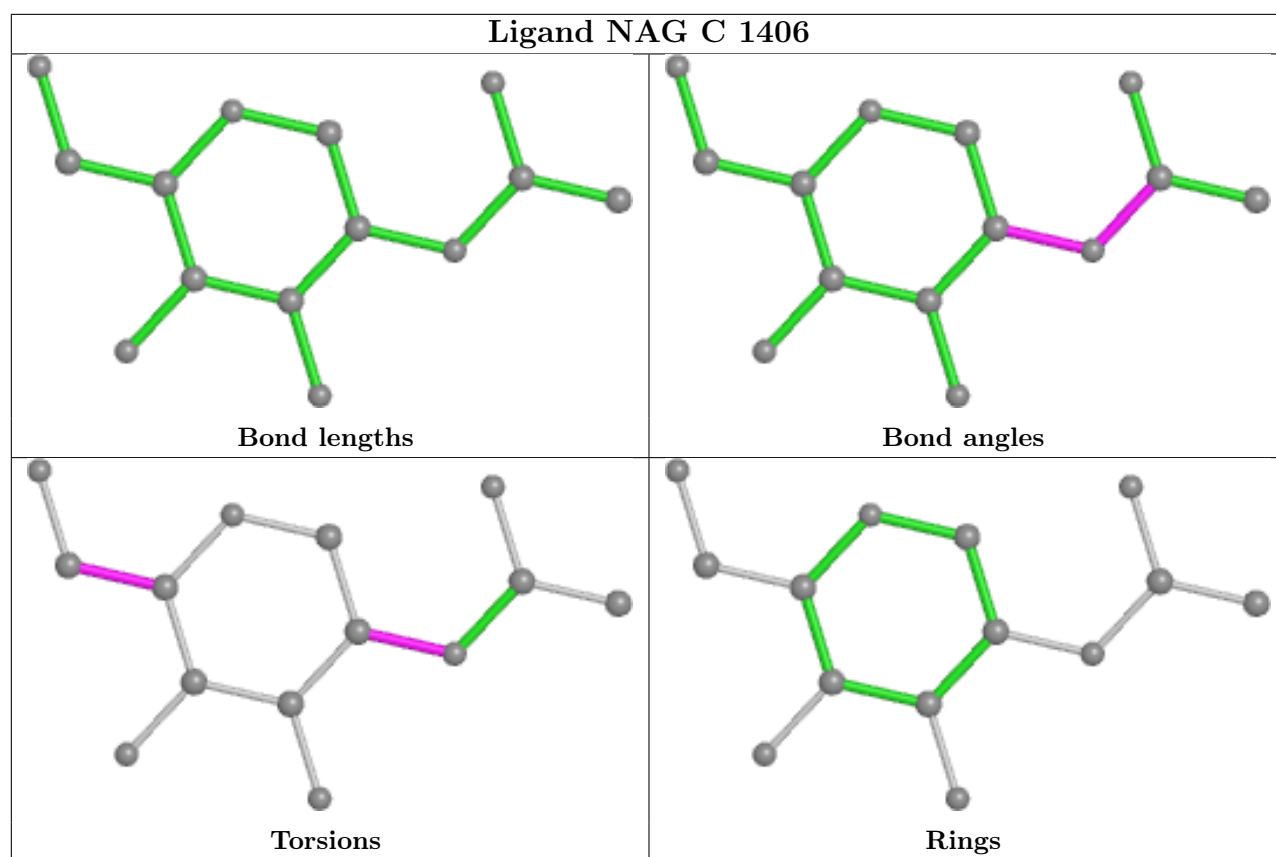












## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

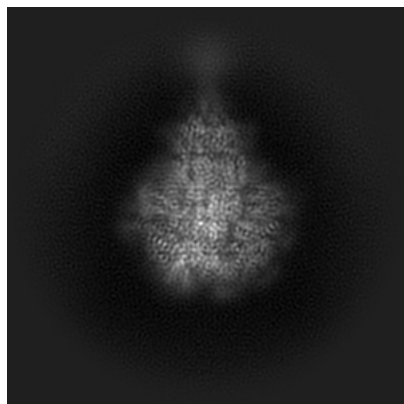
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-22889. These allow visual inspection of the internal detail of the map and identification of artifacts.

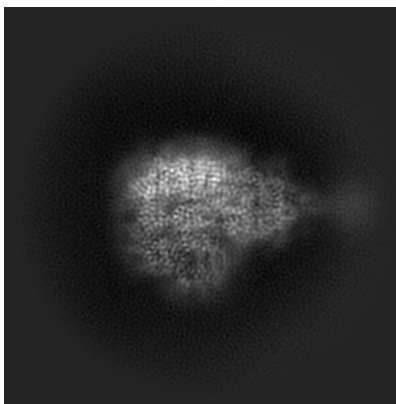
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

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

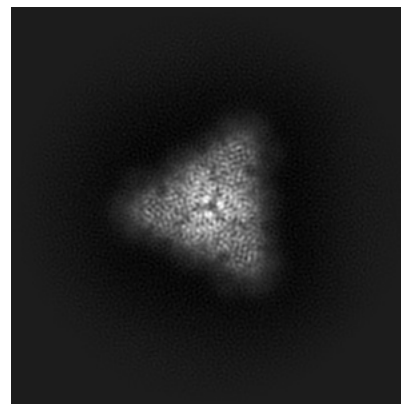
#### 6.1.1 Primary map



X

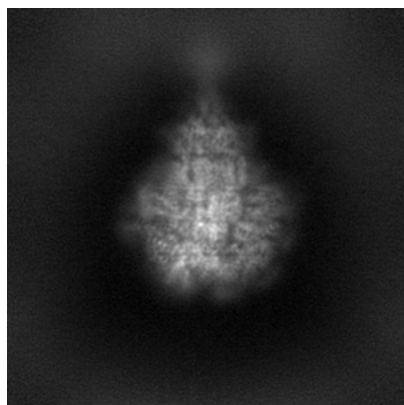


Y

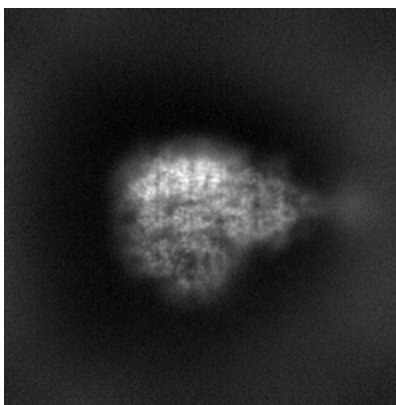


Z

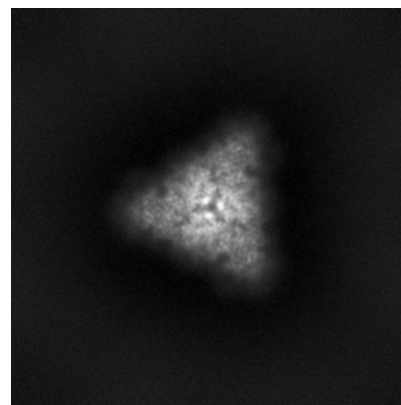
#### 6.1.2 Raw map



X



Y

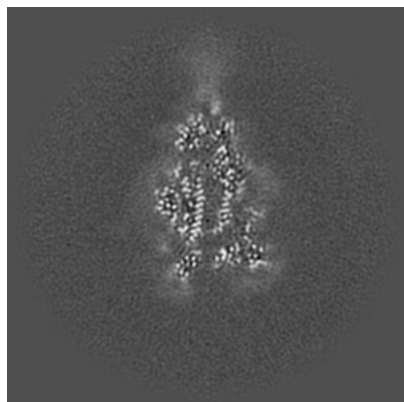


Z

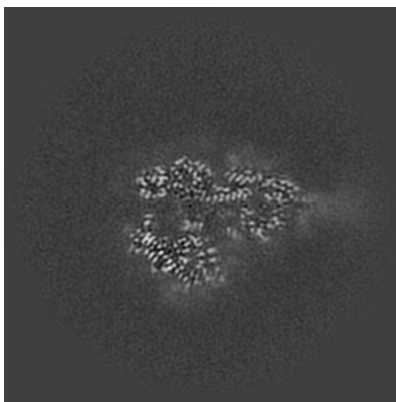
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices [i](#)

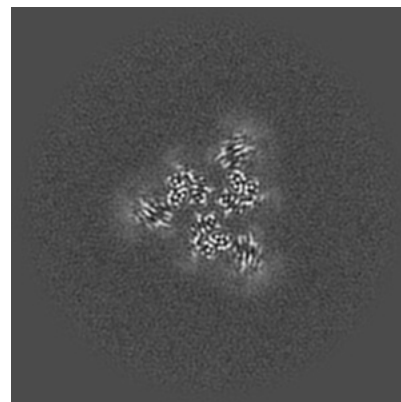
### 6.2.1 Primary map



X Index: 128

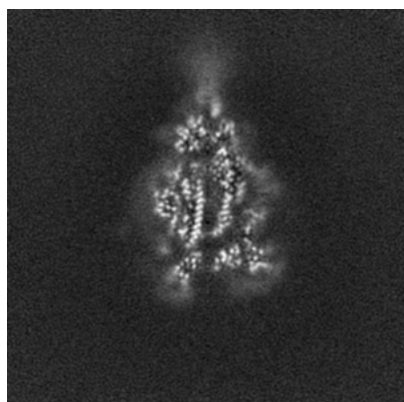


Y Index: 128

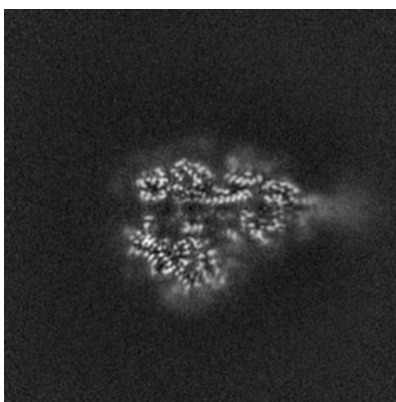


Z Index: 128

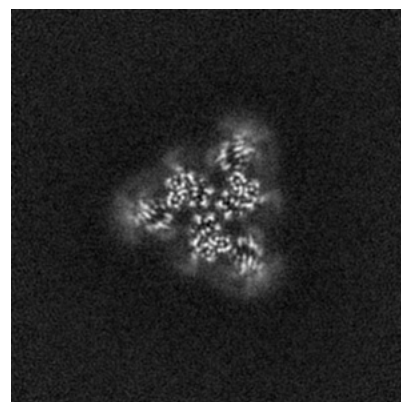
### 6.2.2 Raw map



X Index: 128



Y Index: 128



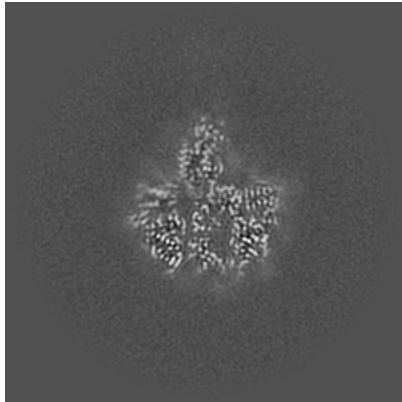
Z Index: 128

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

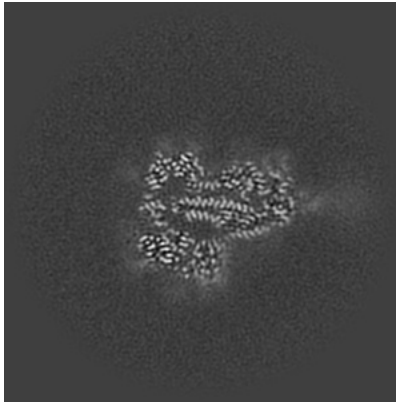


## 6.3 Largest variance slices [i](#)

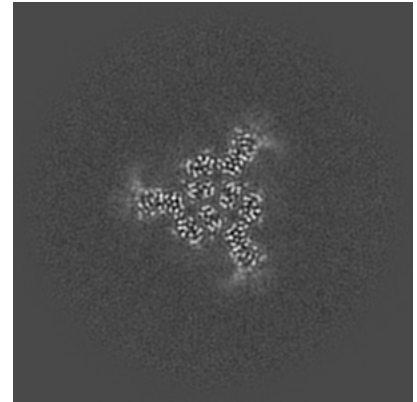
### 6.3.1 Primary map



X Index: 145

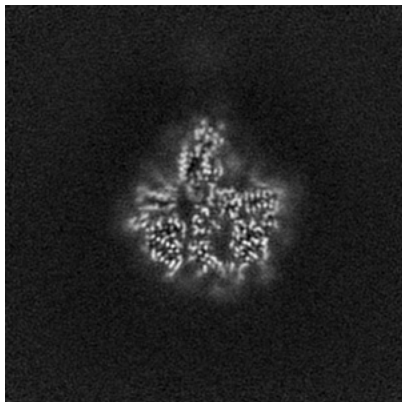


Y Index: 122

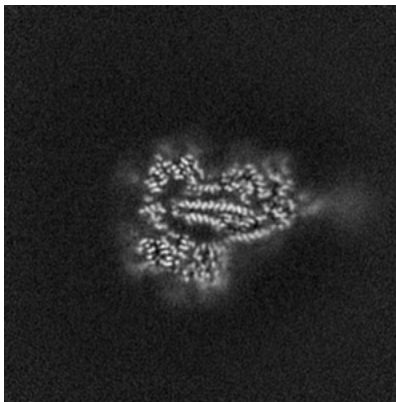


Z Index: 114

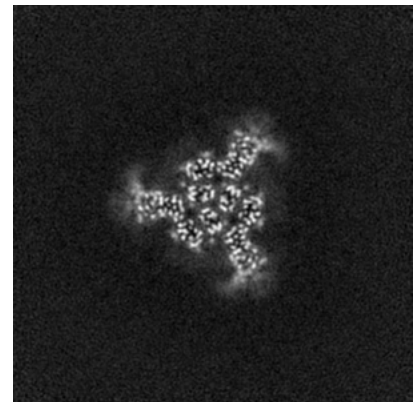
### 6.3.2 Raw map



X Index: 145



Y Index: 122



Z Index: 114

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

## 6.4 Orthogonal surface views [i](#)

### 6.4.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.528. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

### 6.4.2 Raw map



These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

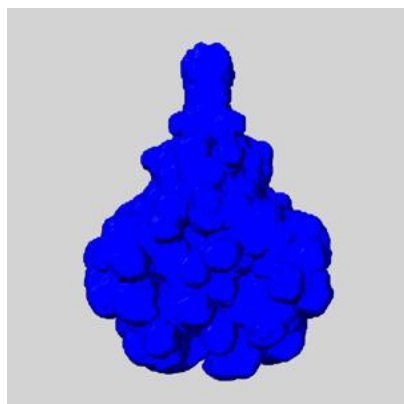
## 6.5 Mask visualisation [i](#)

This section shows the 3D surface view of the primary map at 50% transparency overlaid with the specified mask at 0% transparency

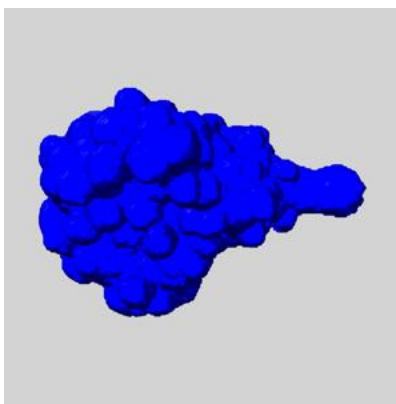
A mask typically either:

- Encompasses the whole structure
- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure

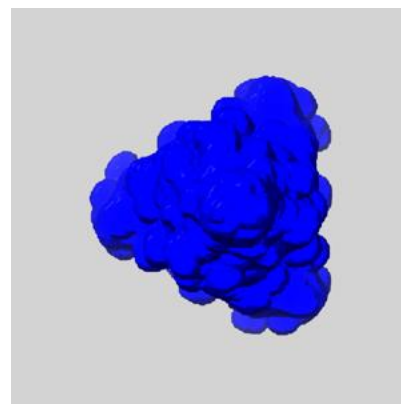
### 6.5.1 emd\_22889\_msk\_1.map [i](#)



X



Y

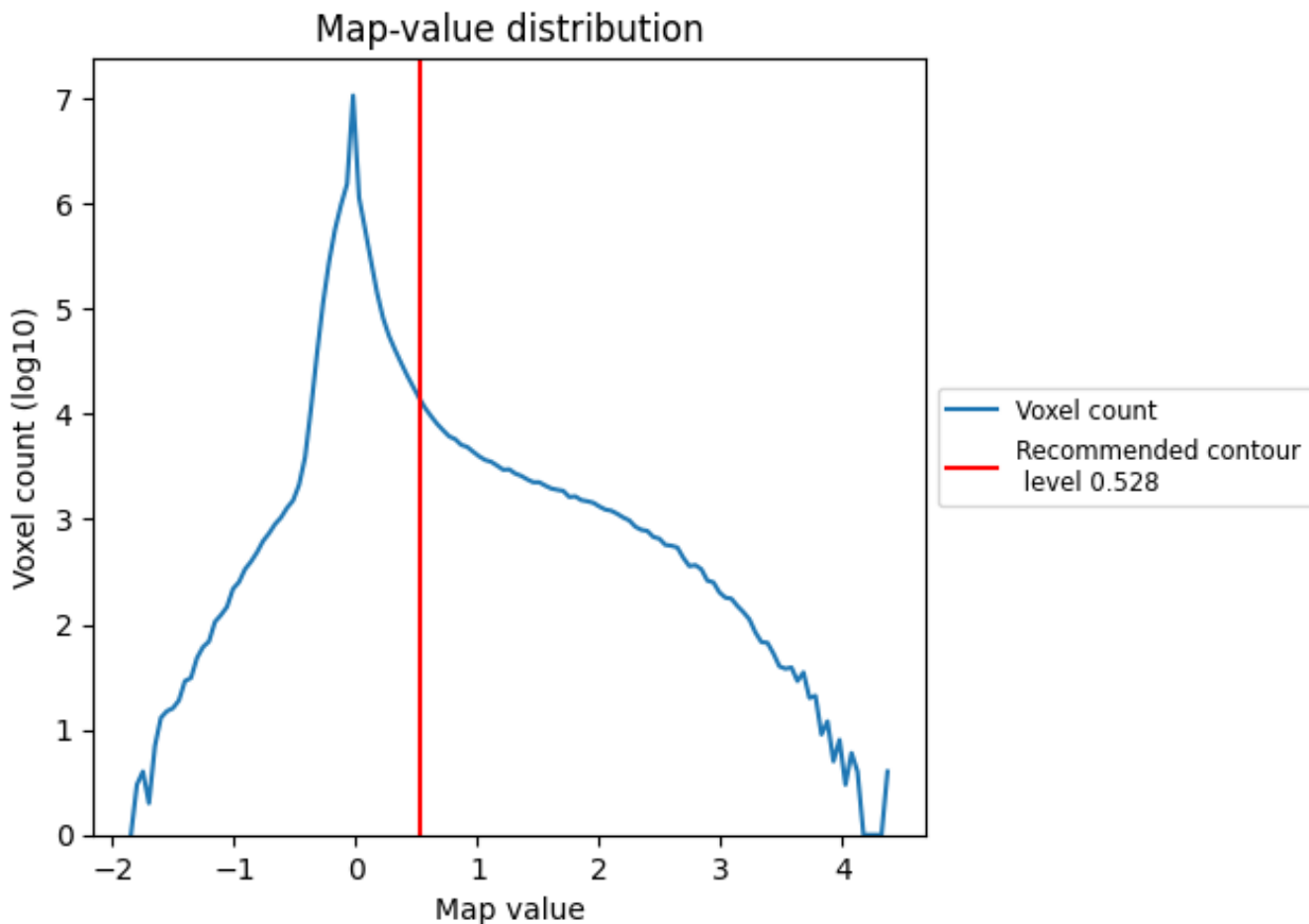


Z

## 7 Map analysis [i](#)

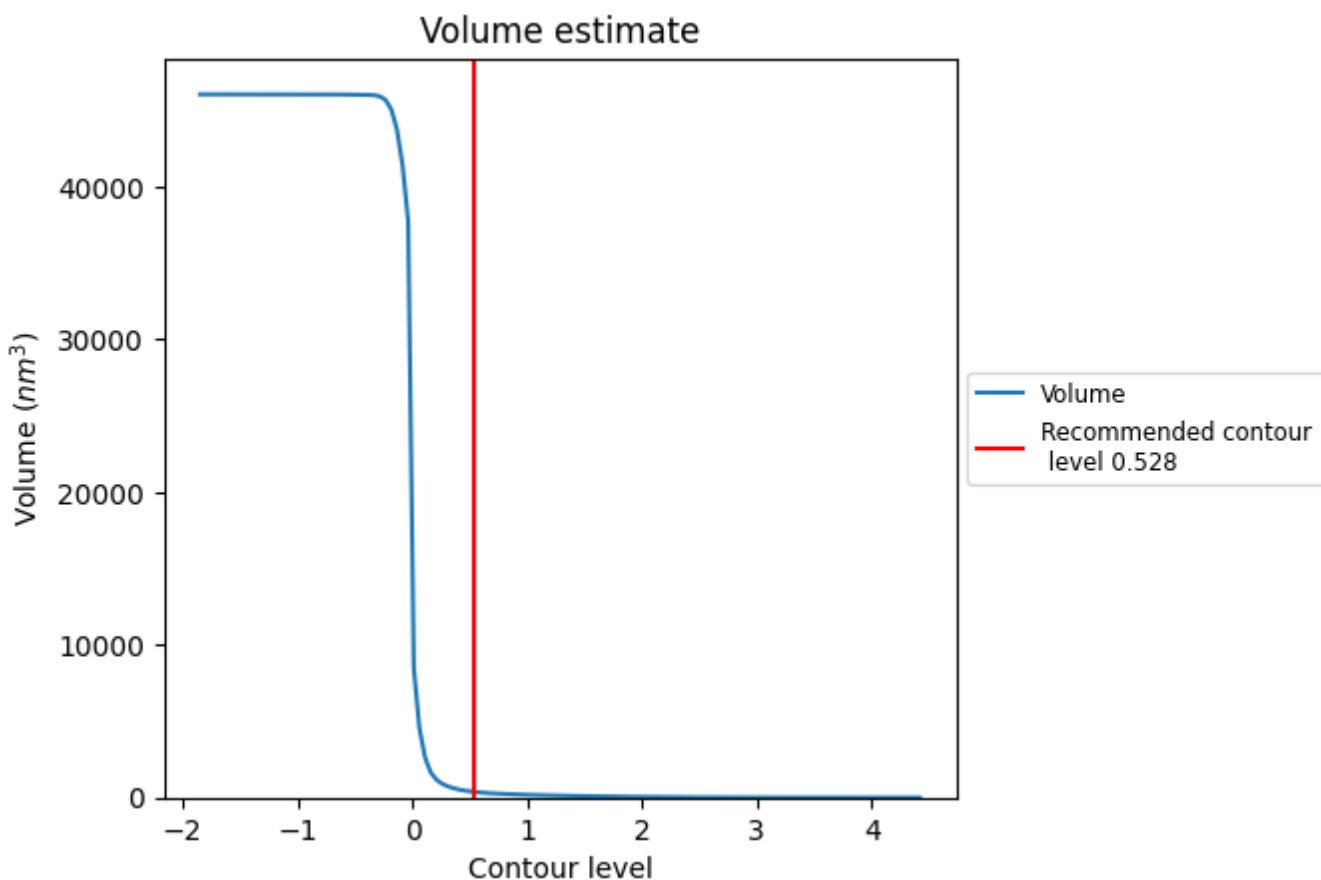
This section contains the results of statistical analysis of the map.

### 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.

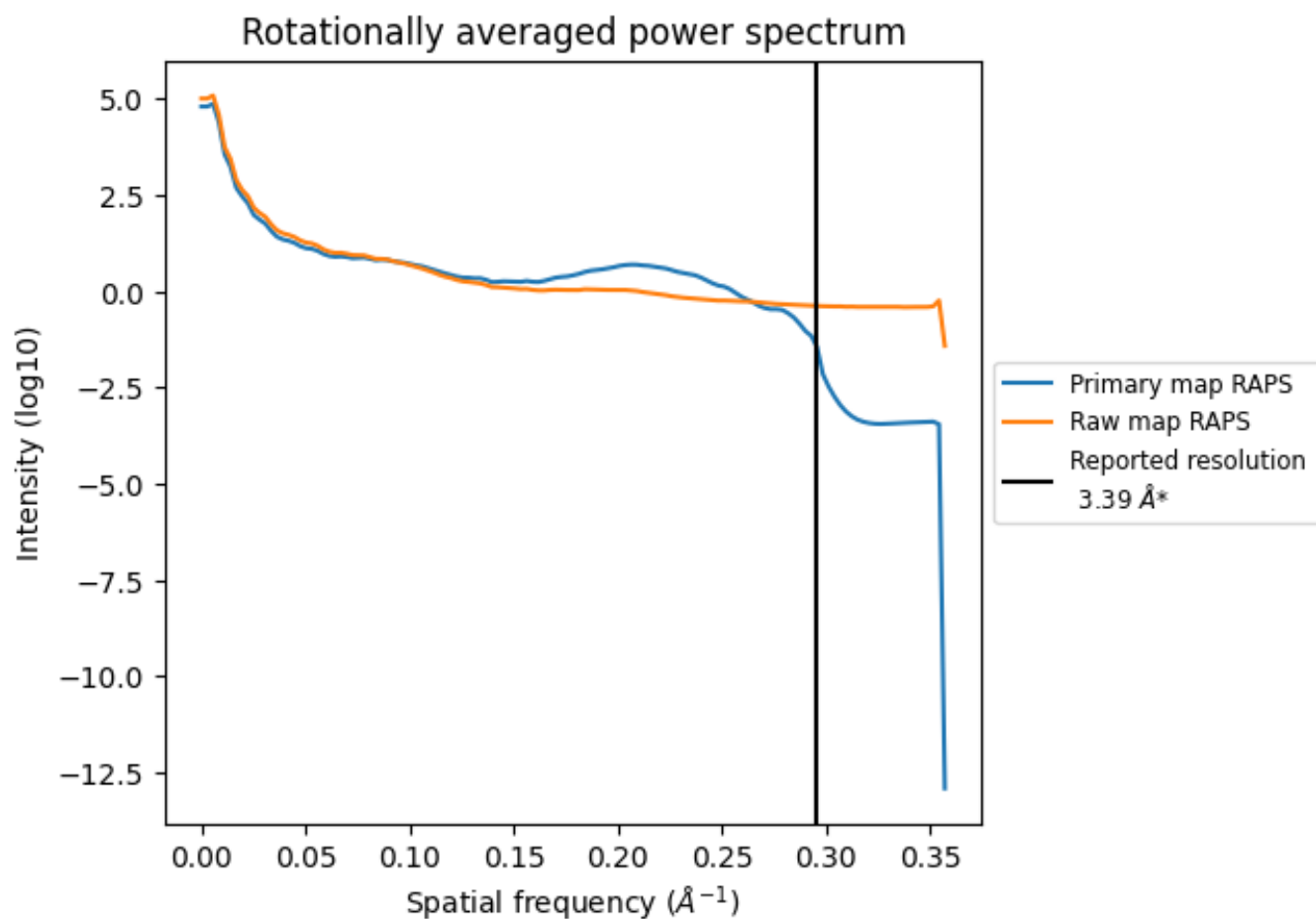
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 380  $\text{nm}^3$ ; this corresponds to an approximate mass of 344 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 [i](#)

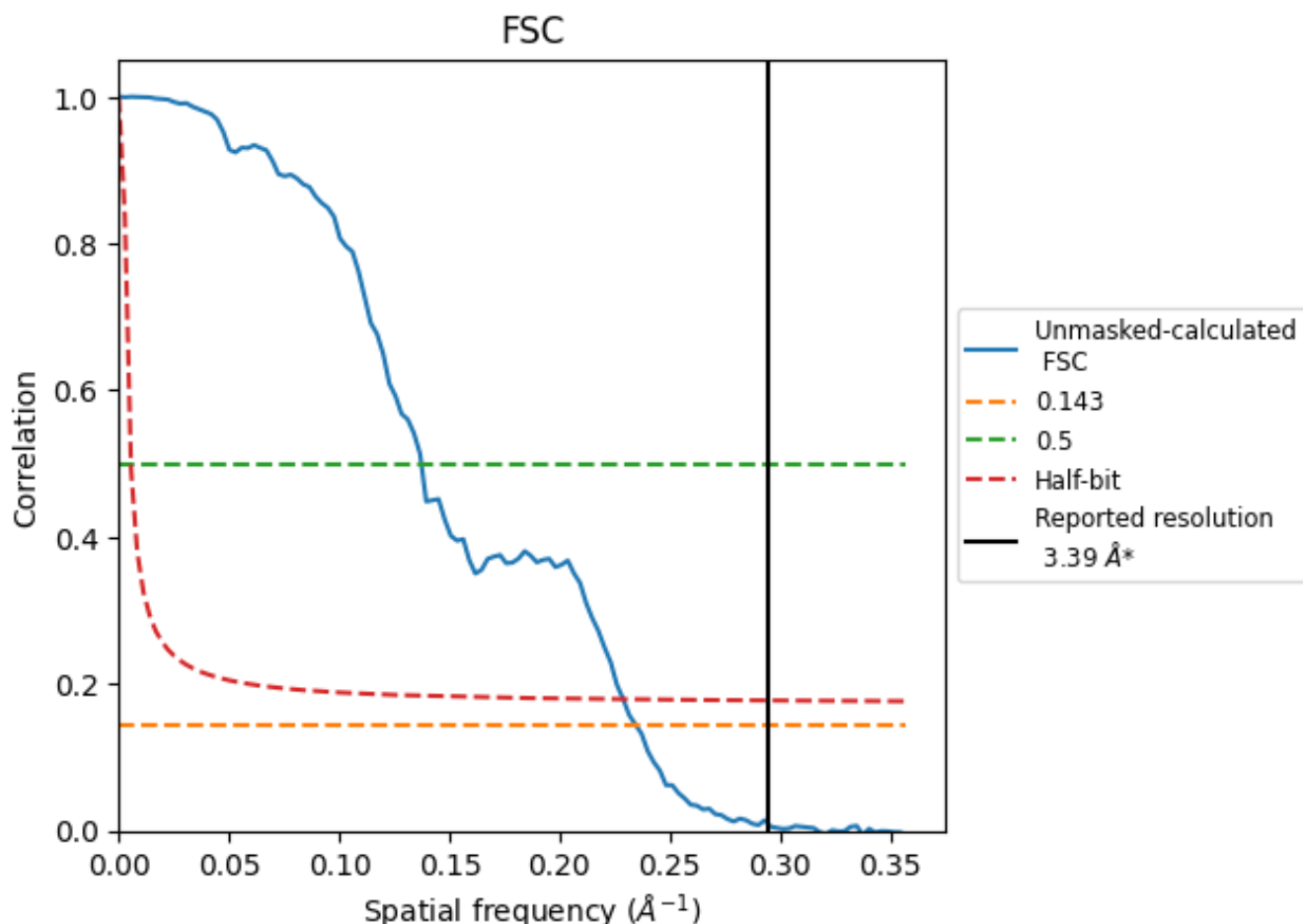


\*Reported resolution corresponds to spatial frequency of  $0.295 \text{ \AA}^{-1}$

## 8 Fourier-Shell correlation [i](#)

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

### 8.1 FSC [i](#)



\*Reported resolution corresponds to spatial frequency of 0.295 Å<sup>-1</sup>

## 8.2 Resolution estimates [i](#)

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.39	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	4.26	7.28	4.37

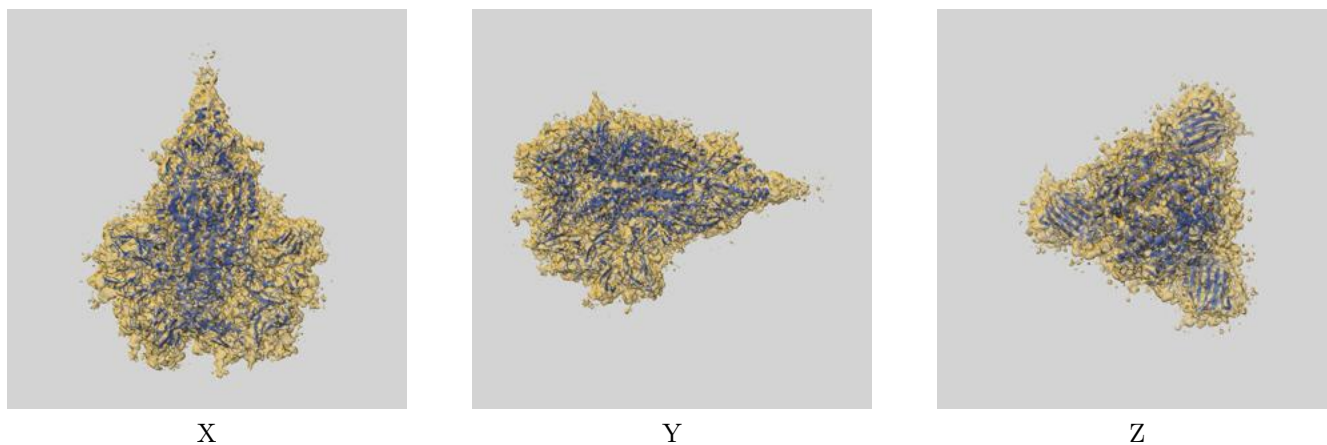
\*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 4.26 differs from the reported value 3.39 by more than 10 %



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

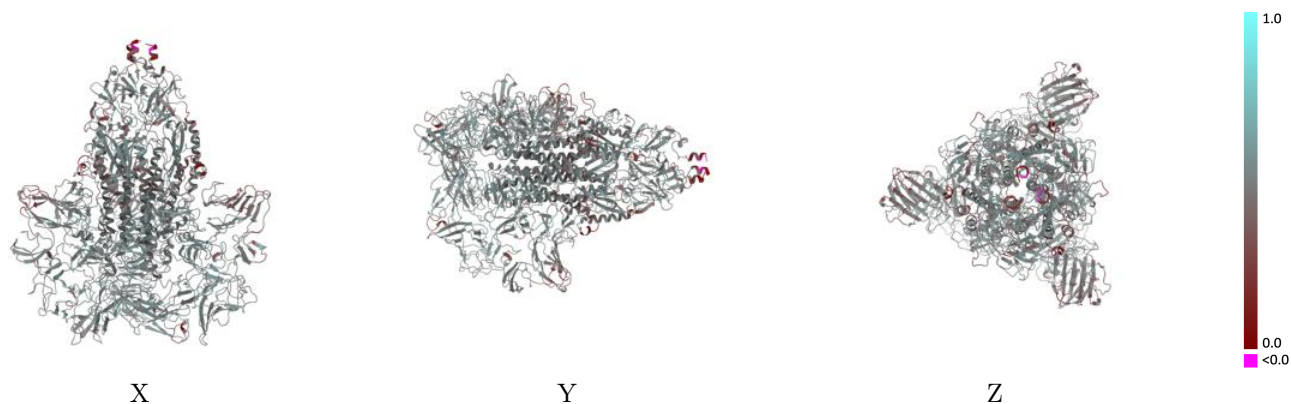
This section contains information regarding the fit between EMDB map EMD-22889 and PDB model 7KIP. Per-residue inclusion information can be found in section 3 on page 13.

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



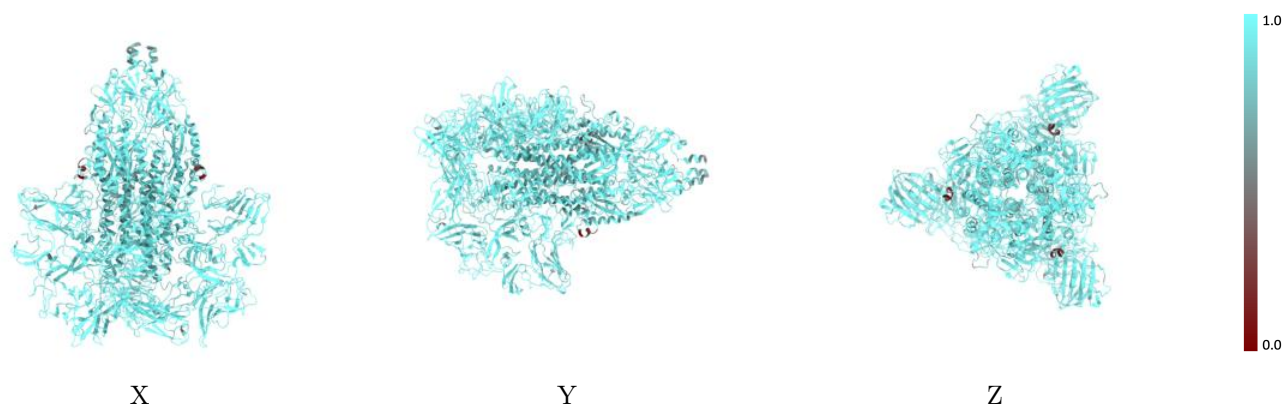
The images above show the 3D surface view of the map at the recommended contour level 0.528 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



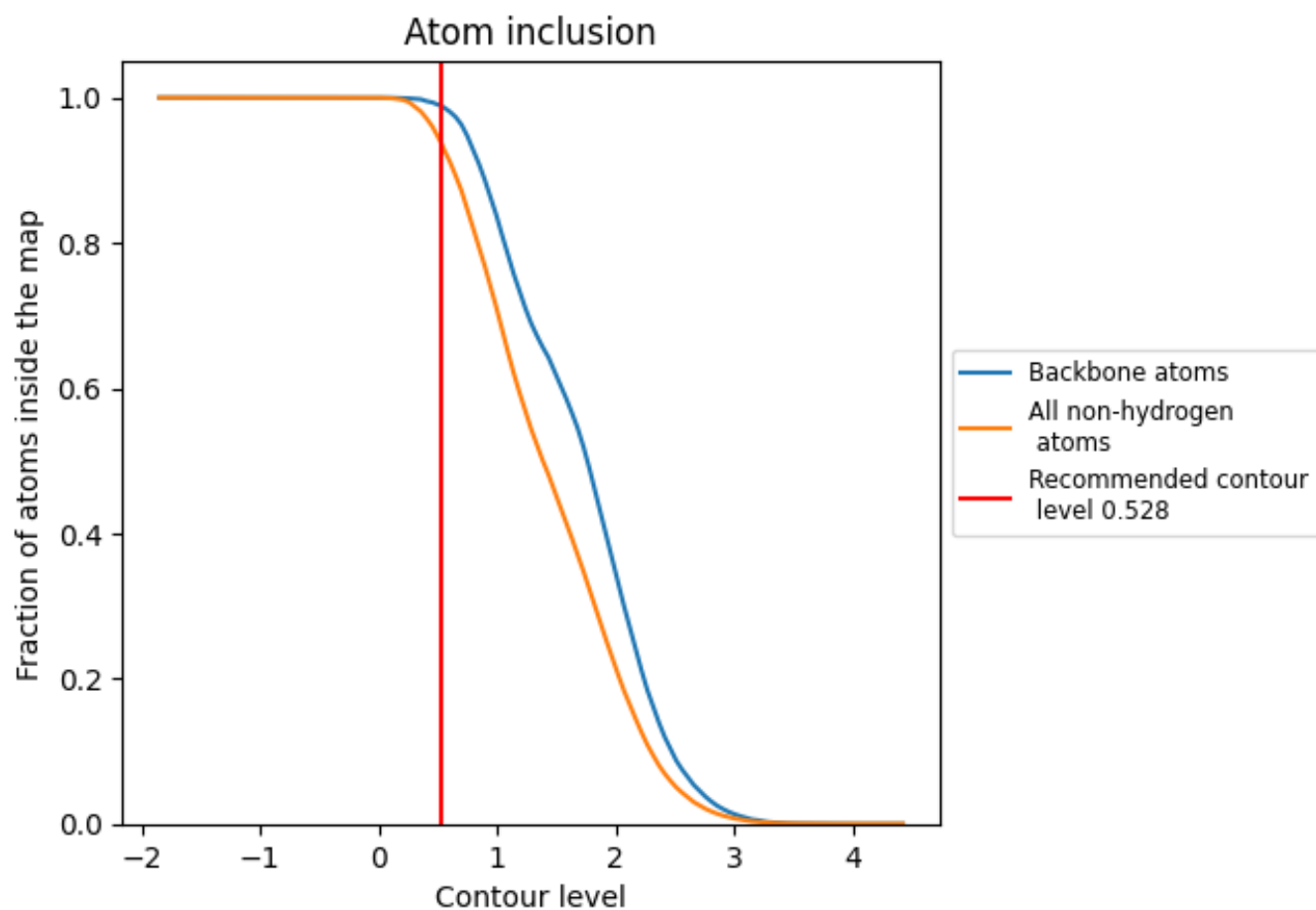
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.528).







































































## 9.4 Atom inclusion [i](#)



At the recommended contour level, 99% of all backbone atoms, 94% 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 (0.528) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.9375	 0.4720
0	 0.8830	 0.4560
1	 0.7600	 0.3590
2	 0.9286	 0.4920
3	 0.5410	 0.2860
4	 0.5128	 0.2980
5	 0.4286	 0.2390
6	 0.8571	 0.3980
7	 0.6429	 0.3870
8	 0.5357	 0.2100
9	 0.6071	 0.2960
A	 0.9539	 0.4830
AA	 0.6000	 0.2330
B	 0.9540	 0.4820
BA	 0.7377	 0.3160
C	 0.9541	 0.4820
CA	 1.0000	 0.4710
D	 0.9861	 0.4490
DA	 0.7692	 0.3840
E	 1.0000	 0.4430
F	 0.7800	 0.3580
G	 0.9286	 0.4460
H	 0.9400	 0.3700
I	 0.3214	 0.1200
J	 0.9286	 0.3830
K	 0.8723	 0.4600
L	 0.7600	 0.3830
M	 0.9643	 0.4850
N	 0.5574	 0.2930
O	 0.5385	 0.2960
P	 0.4286	 0.2650
Q	 0.8929	 0.4110
R	 0.6071	 0.3870
S	 0.5357	 0.2050
T	 0.6071	 0.3020



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Chain	Atom inclusion	Q-score
U	 0.6200	 0.2180
V	 0.7213	 0.3070
W	 1.0000	 0.4630
X	 0.7949	 0.3880
Y	 0.9444	 0.4380
Z	 1.0000	 0.4390
a	 0.7400	 0.3690
b	 0.8929	 0.4420
c	 0.9400	 0.3870
d	 0.3214	 0.1550
e	 0.9286	 0.4010
f	 0.8723	 0.4570
g	 0.7600	 0.3680
h	 0.9286	 0.4650
i	 0.5410	 0.2910
j	 0.5385	 0.3150
k	 0.4286	 0.2560
l	 0.8571	 0.4200
m	 0.6071	 0.3720
n	 0.5357	 0.2110
o	 0.6071	 0.3000
p	 0.6200	 0.2290
q	 0.7213	 0.3060
r	 1.0000	 0.4680
s	 0.7692	 0.3970
t	 0.9722	 0.4450
u	 1.0000	 0.4550
v	 0.7600	 0.3760
w	 0.9286	 0.4470
x	 0.9200	 0.3650
y	 0.3214	 0.1590
z	 0.9286	 0.3930