



## wwPDB EM Validation Summary Report ⓘ

Jan 25, 2023 – 06:19 PM EST

PDB ID : 7SWX  
EMDB ID : EMD-25488  
Title : SARS-CoV-2 Spike in complex with neutralizing Fab SARS2-57 (three down conformation)  
Authors : Adams, L.J.; Fremont, D.H.; Center for Structural Genomics of Infectious Diseases (CSGID); Center for Structural Biology of Infectious Diseases (CSBID)  
Deposited on : 2021-11-21  
Resolution : 3.13 Å(reported)

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>.

---

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

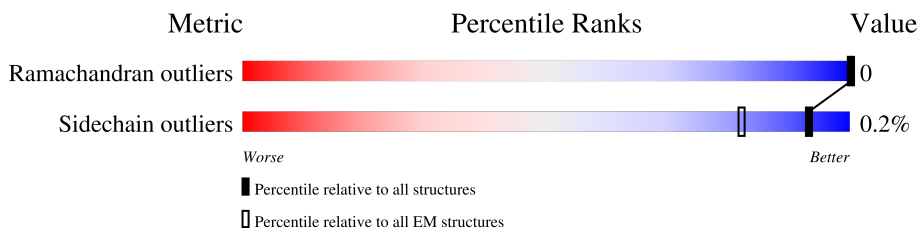
EMDB validation analysis : 0.0.1.dev43  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
MolProbity : 4.02b-467  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.9  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson 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 3.13 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.



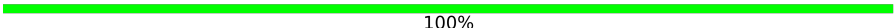



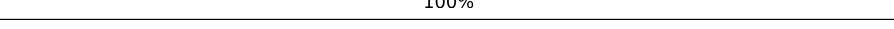
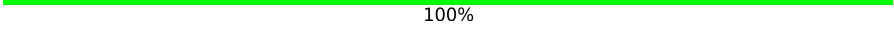

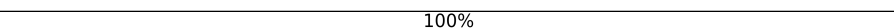

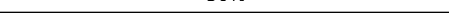

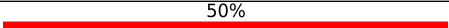

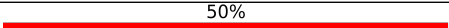

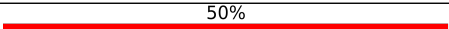

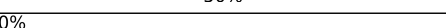

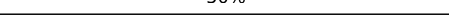

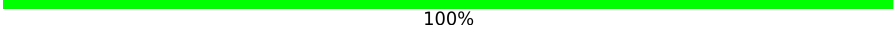

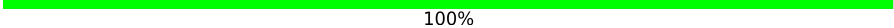




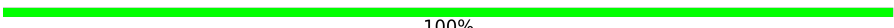

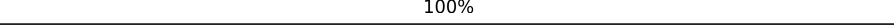



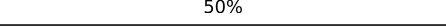

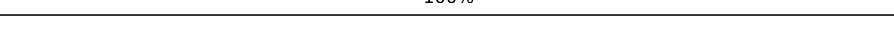
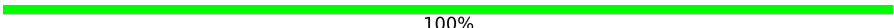
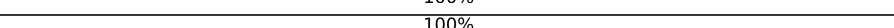

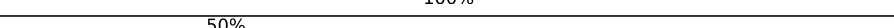
Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

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	1133	97%
1	B	1133	97%
1	C	1133	97%
2	H	117	32% 100%
3	L	112	47% 100%
4	D	2	50% 100%
4	E	2	50% 100%
4	F	2	100%
4	G	2	50% 50%

*Continued on next page...*

Continued from previous page...

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

## 2 Entry composition i

There are 5 unique types of molecules in this entry. The entry contains 28669 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	1095	8557	5457	1431	1630	39	0	0
1	B	1099	8595	5483	1436	1636	40	0	0
1	C	1099	8595	5483	1436	1636	40	0	0

There are 18 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	817	PRO	PHE	engineered mutation	UNP P0DTC2
A	892	PRO	ALA	engineered mutation	UNP P0DTC2
A	899	PRO	ALA	engineered mutation	UNP P0DTC2
A	942	PRO	ALA	engineered mutation	UNP P0DTC2
A	986	PRO	LYS	engineered mutation	UNP P0DTC2
A	987	PRO	VAL	engineered mutation	UNP P0DTC2
B	817	PRO	PHE	engineered mutation	UNP P0DTC2
B	892	PRO	ALA	engineered mutation	UNP P0DTC2
B	899	PRO	ALA	engineered mutation	UNP P0DTC2
B	942	PRO	ALA	engineered mutation	UNP P0DTC2
B	986	PRO	LYS	engineered mutation	UNP P0DTC2
B	987	PRO	VAL	engineered mutation	UNP P0DTC2
C	817	PRO	PHE	engineered mutation	UNP P0DTC2
C	892	PRO	ALA	engineered mutation	UNP P0DTC2
C	899	PRO	ALA	engineered mutation	UNP P0DTC2
C	942	PRO	ALA	engineered mutation	UNP P0DTC2
C	986	PRO	LYS	engineered mutation	UNP P0DTC2
C	987	PRO	VAL	engineered mutation	UNP P0DTC2

- Molecule 2 is a protein called SARS2-57 Fv heavy chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	H	117	916	583	151	180	2	0	0

- Molecule 3 is a protein called SARS2-57 Fv light chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	L	112	872	554	139	175	4	0	0

- Molecule 4 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		
4	D	2	28	16	2	10	0	0
4	E	2	28	16	2	10	0	0
4	F	2	28	16	2	10	0	0
4	G	2	28	16	2	10	0	0
4	I	2	28	16	2	10	0	0
4	J	2	28	16	2	10	0	0
4	K	2	28	16	2	10	0	0
4	M	2	28	16	2	10	0	0
4	N	2	28	16	2	10	0	0
4	O	2	28	16	2	10	0	0
4	P	2	28	16	2	10	0	0
4	Q	2	28	16	2	10	0	0
4	R	2	28	16	2	10	0	0

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
4	S	2	Total 28	C 16	N 2	O 10	0	0
4	T	2	Total 28	C 16	N 2	O 10	0	0
4	U	2	Total 28	C 16	N 2	O 10	0	0
4	V	2	Total 28	C 16	N 2	O 10	0	0
4	W	2	Total 28	C 16	N 2	O 10	0	0
4	X	2	Total 28	C 16	N 2	O 10	0	0
4	Y	2	Total 28	C 16	N 2	O 10	0	0
4	Z	2	Total 28	C 16	N 2	O 10	0	0
4	a	2	Total 28	C 16	N 2	O 10	0	0
4	b	2	Total 28	C 16	N 2	O 10	0	0
4	c	2	Total 28	C 16	N 2	O 10	0	0
4	d	2	Total 28	C 16	N 2	O 10	0	0
4	e	2	Total 28	C 16	N 2	O 10	0	0
4	f	2	Total 28	C 16	N 2	O 10	0	0
4	g	2	Total 28	C 16	N 2	O 10	0	0

- Molecule 5 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula:  $C_8H_{15}NO_6$ ).



Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
5	A	1	98	56	7	35	0
5	A	1	98	56	7	35	0
5	A	1	98	56	7	35	0
5	A	1	98	56	7	35	0
5	A	1	98	56	7	35	0
5	A	1	98	56	7	35	0
5	A	1	98	56	7	35	0
5	A	1	98	56	7	35	0
5	B	1	126	72	9	45	0
5	B	1	126	72	9	45	0
5	B	1	126	72	9	45	0
5	B	1	126	72	9	45	0
5	B	1	126	72	9	45	0
5	B	1	126	72	9	45	0
5	B	1	126	72	9	45	0

*Continued on next page...*

*Continued from previous page...*

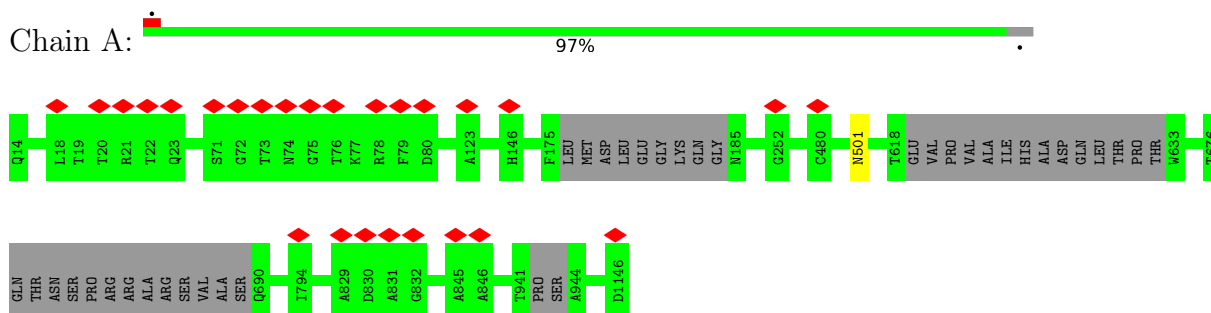
Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
5	B	1	Total 126	C 72	N 9	O 45	0
5	B	1	Total 126	C 72	N 9	O 45	0
5	C	1	Total 126	C 72	N 9	O 45	0
5	C	1	Total 126	C 72	N 9	O 45	0
5	C	1	Total 126	C 72	N 9	O 45	0
5	C	1	Total 126	C 72	N 9	O 45	0
5	C	1	Total 126	C 72	N 9	O 45	0
5	C	1	Total 126	C 72	N 9	O 45	0
5	C	1	Total 126	C 72	N 9	O 45	0
5	C	1	Total 126	C 72	N 9	O 45	0
5	C	1	Total 126	C 72	N 9	O 45	0



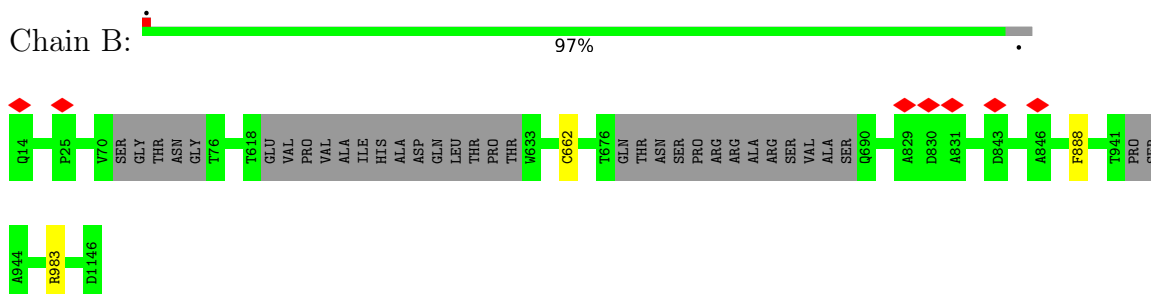
### 3 Residue-property plots

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

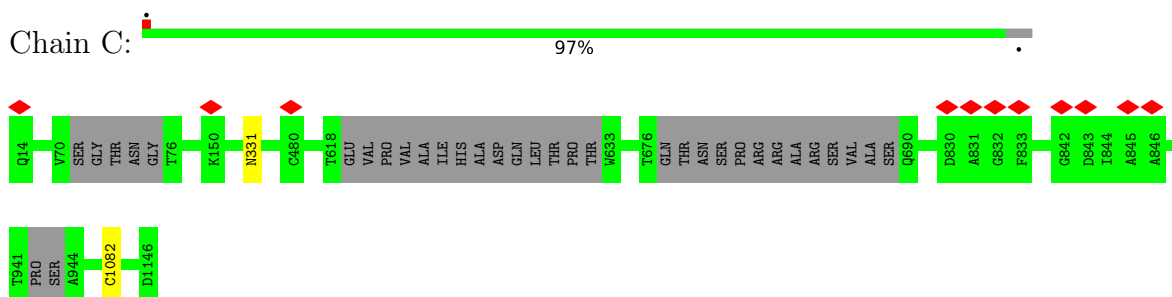
- Molecule 1: Spike glycoprotein



- Molecule 1: Spike glycoprotein

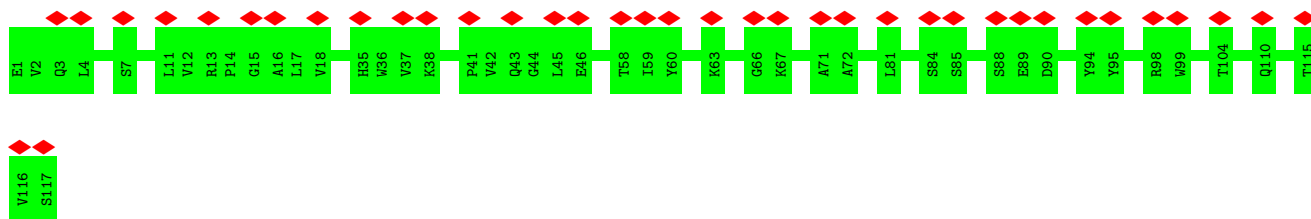


- Molecule 1: Spike glycoprotein

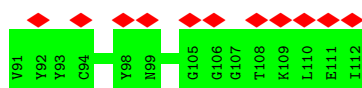
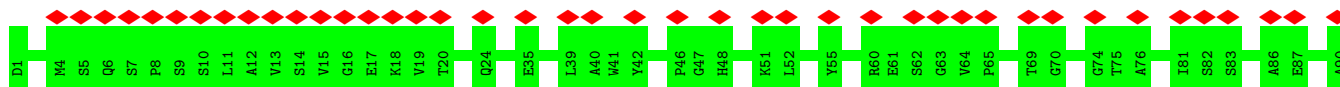


- Molecule 2: SARS2-57 Fv heavy chain





- Molecule 3: SARS2-57 Fv light chain



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



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



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



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





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

Chain I:  100%



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

Chain J:  100%  
 100%



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

Chain K:  100%



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

Chain M:  50%  
 100%



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

Chain N:  100%



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

Chain O:  50%  
 100%



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



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



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



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



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



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





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

Chain V:  100%



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

Chain W:  50%  
100%



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

Chain X:  50%  
100%



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

Chain Y:  100%  
100%



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

Chain Z:  100%



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

Chain a:  50%  
100%



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

Chain b:  100%



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

Chain c:  100%  
50% 50%



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

Chain d:  100%



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

Chain e:  100%



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

Chain f:  100%  
100%



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

Chain g:  50%  
100%



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	241481	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 ( $e^-/\text{\AA}^2$ )	66.9	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	2.216	Depositor
Minimum map value	-0.022	Depositor
Average map value	0.002	Depositor
Map value standard deviation	0.032	Depositor
Recommended contour level	0.04	Depositor
Map size ( $\text{\AA}$ )	330.0, 330.0, 330.0	wwPDB
Map dimensions	300, 300, 300	wwPDB
Map angles ( $^\circ$ )	90.0, 90.0, 90.0	wwPDB
Pixel spacing ( $\text{\AA}$ )	1.1, 1.1, 1.1	Depositor



## 5 Model quality [i](#)

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

Bond lengths and bond angles in the following residue types are not validated in this section: NAG

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 5$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
1	A	0.28	0/8759	0.50	0/11926
1	B	0.28	0/8797	0.51	0/11975
1	C	0.28	0/8797	0.50	0/11975
2	H	0.27	0/940	0.53	0/1279
3	L	0.28	0/894	0.58	0/1213
All	All	0.28	0/28187	0.51	0/38368

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](#)

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	1085/1133 (96%)	1058 (98%)	27 (2%)	0	100	100
1	B	1089/1133 (96%)	1055 (97%)	34 (3%)	0	100	100
1	C	1089/1133 (96%)	1054 (97%)	35 (3%)	0	100	100
2	H	115/117 (98%)	113 (98%)	2 (2%)	0	100	100
3	L	110/112 (98%)	109 (99%)	1 (1%)	0	100	100
All	All	3488/3628 (96%)	3389 (97%)	99 (3%)	0	100	100

There are no Ramachandran outliers to report.

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

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	955/987 (97%)	954 (100%)	1 (0%)	93	98
1	B	959/987 (97%)	956 (100%)	3 (0%)	92	97
1	C	959/987 (97%)	957 (100%)	2 (0%)	93	97
2	H	97/97 (100%)	97 (100%)	0	100	100
3	L	97/97 (100%)	97 (100%)	0	100	100
All	All	3067/3155 (97%)	3061 (100%)	6 (0%)	93	97

5 of 6 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	983	ARG
1	C	331	ASN
1	C	1082	CYS
1	B	662	CYS
1	A	501	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 8 such sidechains are listed below:

Mol	Chain	Res	Type
3	L	95	GLN
1	C	422	ASN
1	B	804	GLN
1	B	613	GLN
1	B	935	GLN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

### 5.5 Carbohydrates [i](#)

56 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	$\# Z  > 2$
4	NAG	D	1	1,4	14,14,15	0.20	0	17,19,21	0.46	0
4	NAG	D	2	4	14,14,15	0.55	0	17,19,21	0.49	0
4	NAG	E	1	1,4	14,14,15	0.29	0	17,19,21	0.41	0
4	NAG	E	2	4	14,14,15	0.22	0	17,19,21	0.51	0
4	NAG	F	1	1,4	14,14,15	0.35	0	17,19,21	0.55	0
4	NAG	F	2	4	14,14,15	0.62	0	17,19,21	0.69	0
4	NAG	G	1	1,4	14,14,15	0.27	0	17,19,21	0.47	0
4	NAG	G	2	4	14,14,15	0.28	0	17,19,21	0.96	1 (5%)
4	NAG	I	1	1,4	14,14,15	0.24	0	17,19,21	0.42	0
4	NAG	I	2	4	14,14,15	0.26	0	17,19,21	0.44	0
4	NAG	J	1	1,4	14,14,15	0.41	0	17,19,21	0.51	0
4	NAG	J	2	4	14,14,15	0.40	0	17,19,21	0.46	0
4	NAG	K	1	1,4	14,14,15	0.20	0	17,19,21	0.46	0
4	NAG	K	2	4	14,14,15	0.34	0	17,19,21	0.46	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
4	NAG	M	1	1,4	14,14,15	0.21	0	17,19,21	0.38	0
4	NAG	M	2	4	14,14,15	0.24	0	17,19,21	0.45	0
4	NAG	N	1	1,4	14,14,15	0.26	0	17,19,21	0.37	0
4	NAG	N	2	4	14,14,15	0.19	0	17,19,21	0.43	0
4	NAG	O	1	1,4	14,14,15	0.27	0	17,19,21	0.41	0
4	NAG	O	2	4	14,14,15	0.31	0	17,19,21	0.66	0
4	NAG	P	1	1,4	14,14,15	0.27	0	17,19,21	0.43	0
4	NAG	P	2	4	14,14,15	0.34	0	17,19,21	0.93	1 (5%)
4	NAG	Q	1	1,4	14,14,15	0.28	0	17,19,21	0.43	0
4	NAG	Q	2	4	14,14,15	0.26	0	17,19,21	0.44	0
4	NAG	R	1	1,4	14,14,15	0.18	0	17,19,21	0.48	0
4	NAG	R	2	4	14,14,15	0.22	0	17,19,21	0.46	0
4	NAG	S	1	1,4	14,14,15	0.24	0	17,19,21	0.39	0
4	NAG	S	2	4	14,14,15	0.23	0	17,19,21	0.41	0
4	NAG	T	1	1,4	14,14,15	0.23	0	17,19,21	0.47	0
4	NAG	T	2	4	14,14,15	0.76	1 (7%)	17,19,21	0.45	0
4	NAG	U	1	1,4	14,14,15	0.28	0	17,19,21	0.43	0
4	NAG	U	2	4	14,14,15	0.27	0	17,19,21	0.95	1 (5%)
4	NAG	V	1	1,4	14,14,15	0.20	0	17,19,21	0.43	0
4	NAG	V	2	4	14,14,15	0.29	0	17,19,21	0.46	0
4	NAG	W	1	1,4	14,14,15	0.18	0	17,19,21	0.41	0
4	NAG	W	2	4	14,14,15	0.21	0	17,19,21	0.44	0
4	NAG	X	1	1,4	14,14,15	0.22	0	17,19,21	0.45	0
4	NAG	X	2	4	14,14,15	0.21	0	17,19,21	0.40	0
4	NAG	Y	1	1,4	14,14,15	0.28	0	17,19,21	0.52	0
4	NAG	Y	2	4	14,14,15	0.33	0	17,19,21	0.68	0
4	NAG	Z	1	1,4	14,14,15	0.27	0	17,19,21	0.42	0
4	NAG	Z	2	4	14,14,15	0.26	0	17,19,21	0.51	0
4	NAG	a	1	1,4	14,14,15	0.22	0	17,19,21	0.45	0
4	NAG	a	2	4	14,14,15	0.23	0	17,19,21	0.40	0
4	NAG	b	1	1,4	14,14,15	0.20	0	17,19,21	0.40	0
4	NAG	b	2	4	14,14,15	0.24	0	17,19,21	0.53	0
4	NAG	c	1	1,4	14,14,15	0.65	1 (7%)	17,19,21	0.75	1 (5%)
4	NAG	c	2	4	14,14,15	0.27	0	17,19,21	0.44	0
4	NAG	d	1	1,4	14,14,15	0.20	0	17,19,21	0.47	0
4	NAG	d	2	4	14,14,15	0.24	0	17,19,21	0.41	0
4	NAG	e	1	1,4	14,14,15	0.26	0	17,19,21	0.42	0
4	NAG	e	2	4	14,14,15	0.26	0	17,19,21	0.50	0
4	NAG	f	1	1,4	14,14,15	0.47	0	17,19,21	0.61	0
4	NAG	f	2	4	14,14,15	0.32	0	17,19,21	0.50	0
4	NAG	g	1	1,4	14,14,15	0.17	0	17,19,21	0.39	0
4	NAG	g	2	4	14,14,15	0.22	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
4	NAG	D	1	1,4	-	4/6/23/26	0/1/1/1
4	NAG	D	2	4	-	2/6/23/26	0/1/1/1
4	NAG	E	1	1,4	-	0/6/23/26	0/1/1/1
4	NAG	E	2	4	-	1/6/23/26	0/1/1/1
4	NAG	F	1	1,4	-	2/6/23/26	0/1/1/1
4	NAG	F	2	4	-	1/6/23/26	0/1/1/1
4	NAG	G	1	1,4	-	0/6/23/26	0/1/1/1
4	NAG	G	2	4	-	3/6/23/26	0/1/1/1
4	NAG	I	1	1,4	-	2/6/23/26	0/1/1/1
4	NAG	I	2	4	-	2/6/23/26	0/1/1/1
4	NAG	J	1	1,4	-	3/6/23/26	0/1/1/1
4	NAG	J	2	4	-	3/6/23/26	0/1/1/1
4	NAG	K	1	1,4	-	2/6/23/26	0/1/1/1
4	NAG	K	2	4	-	0/6/23/26	0/1/1/1
4	NAG	M	1	1,4	-	2/6/23/26	0/1/1/1
4	NAG	M	2	4	-	0/6/23/26	0/1/1/1
4	NAG	N	1	1,4	-	2/6/23/26	0/1/1/1
4	NAG	N	2	4	-	1/6/23/26	0/1/1/1
4	NAG	O	1	1,4	-	1/6/23/26	0/1/1/1
4	NAG	O	2	4	-	3/6/23/26	0/1/1/1
4	NAG	P	1	1,4	-	0/6/23/26	0/1/1/1
4	NAG	P	2	4	-	3/6/23/26	0/1/1/1
4	NAG	Q	1	1,4	-	2/6/23/26	0/1/1/1
4	NAG	Q	2	4	-	2/6/23/26	0/1/1/1
4	NAG	R	1	1,4	-	0/6/23/26	0/1/1/1
4	NAG	R	2	4	-	0/6/23/26	0/1/1/1
4	NAG	S	1	1,4	-	1/6/23/26	0/1/1/1
4	NAG	S	2	4	-	2/6/23/26	0/1/1/1
4	NAG	T	1	1,4	-	2/6/23/26	0/1/1/1
4	NAG	T	2	4	-	0/6/23/26	0/1/1/1
4	NAG	U	1	1,4	-	0/6/23/26	0/1/1/1
4	NAG	U	2	4	-	4/6/23/26	0/1/1/1
4	NAG	V	1	1,4	-	2/6/23/26	0/1/1/1
4	NAG	V	2	4	-	2/6/23/26	0/1/1/1

*Continued on next page...*

Continued from previous page...

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	NAG	W	1	1,4	-	2/6/23/26	0/1/1/1
4	NAG	W	2	4	-	0/6/23/26	0/1/1/1
4	NAG	X	1	1,4	-	2/6/23/26	0/1/1/1
4	NAG	X	2	4	-	2/6/23/26	0/1/1/1
4	NAG	Y	1	1,4	-	0/6/23/26	0/1/1/1
4	NAG	Y	2	4	-	5/6/23/26	0/1/1/1
4	NAG	Z	1	1,4	-	2/6/23/26	0/1/1/1
4	NAG	Z	2	4	-	3/6/23/26	0/1/1/1
4	NAG	a	1	1,4	-	2/6/23/26	0/1/1/1
4	NAG	a	2	4	-	0/6/23/26	0/1/1/1
4	NAG	b	1	1,4	-	2/6/23/26	0/1/1/1
4	NAG	b	2	4	-	3/6/23/26	0/1/1/1
4	NAG	c	1	1,4	-	2/6/23/26	0/1/1/1
4	NAG	c	2	4	-	2/6/23/26	0/1/1/1
4	NAG	d	1	1,4	-	2/6/23/26	0/1/1/1
4	NAG	d	2	4	-	2/6/23/26	0/1/1/1
4	NAG	e	1	1,4	-	2/6/23/26	0/1/1/1
4	NAG	e	2	4	-	3/6/23/26	0/1/1/1
4	NAG	f	1	1,4	-	4/6/23/26	0/1/1/1
4	NAG	f	2	4	-	2/6/23/26	0/1/1/1
4	NAG	g	1	1,4	-	2/6/23/26	0/1/1/1
4	NAG	g	2	4	-	0/6/23/26	0/1/1/1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	T	2	NAG	O5-C1	2.34	1.47	1.43
4	c	1	NAG	C1-C2	2.01	1.55	1.52

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	G	2	NAG	O5-C1-C2	-2.87	106.75	111.29
4	U	2	NAG	O5-C1-C2	-2.76	106.93	111.29
4	c	1	NAG	C1-O5-C5	2.64	115.76	112.19
4	P	2	NAG	O5-C1-C2	-2.20	107.82	111.29

There are no chirality outliers.

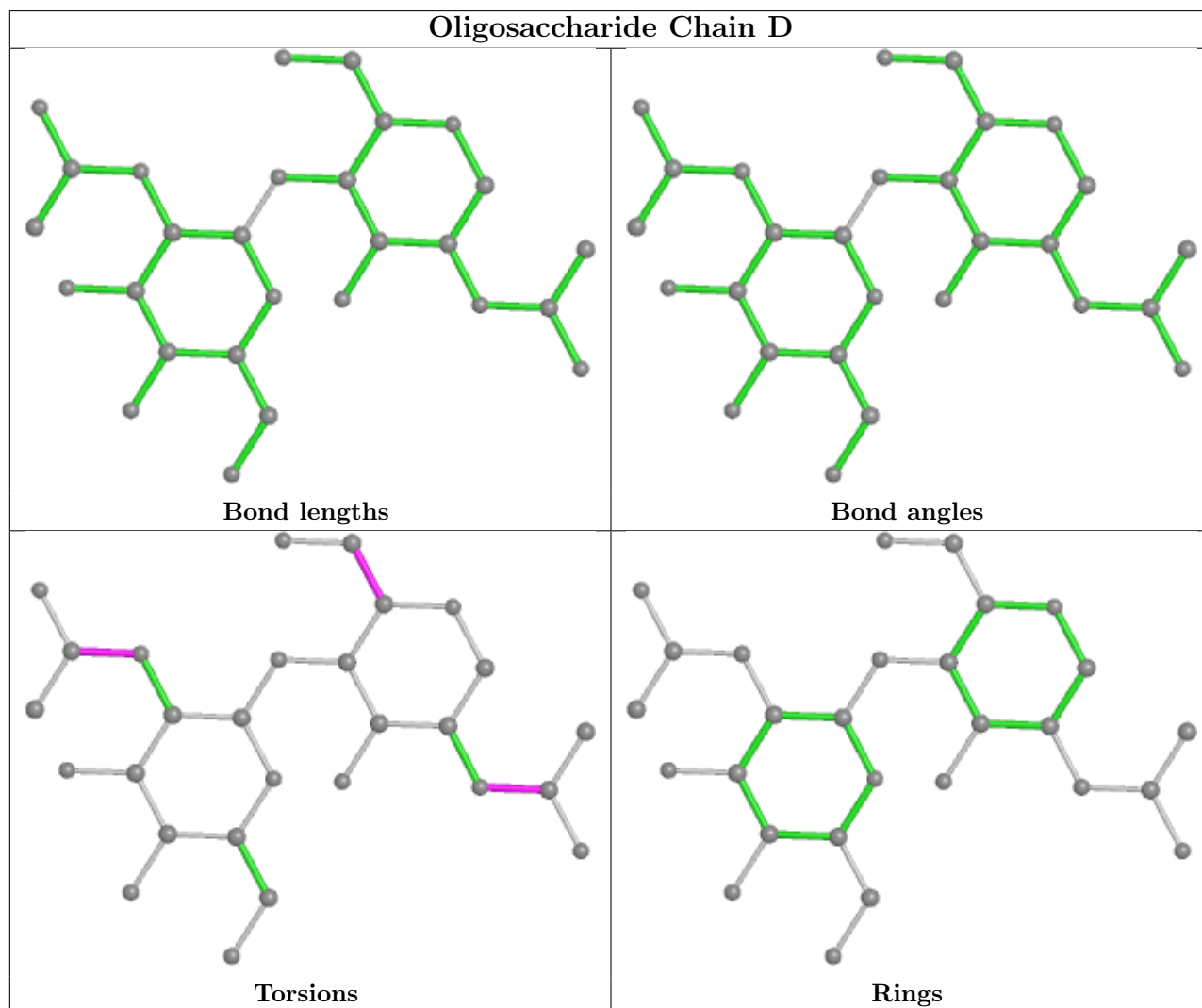
5 of 98 torsion outliers are listed below:

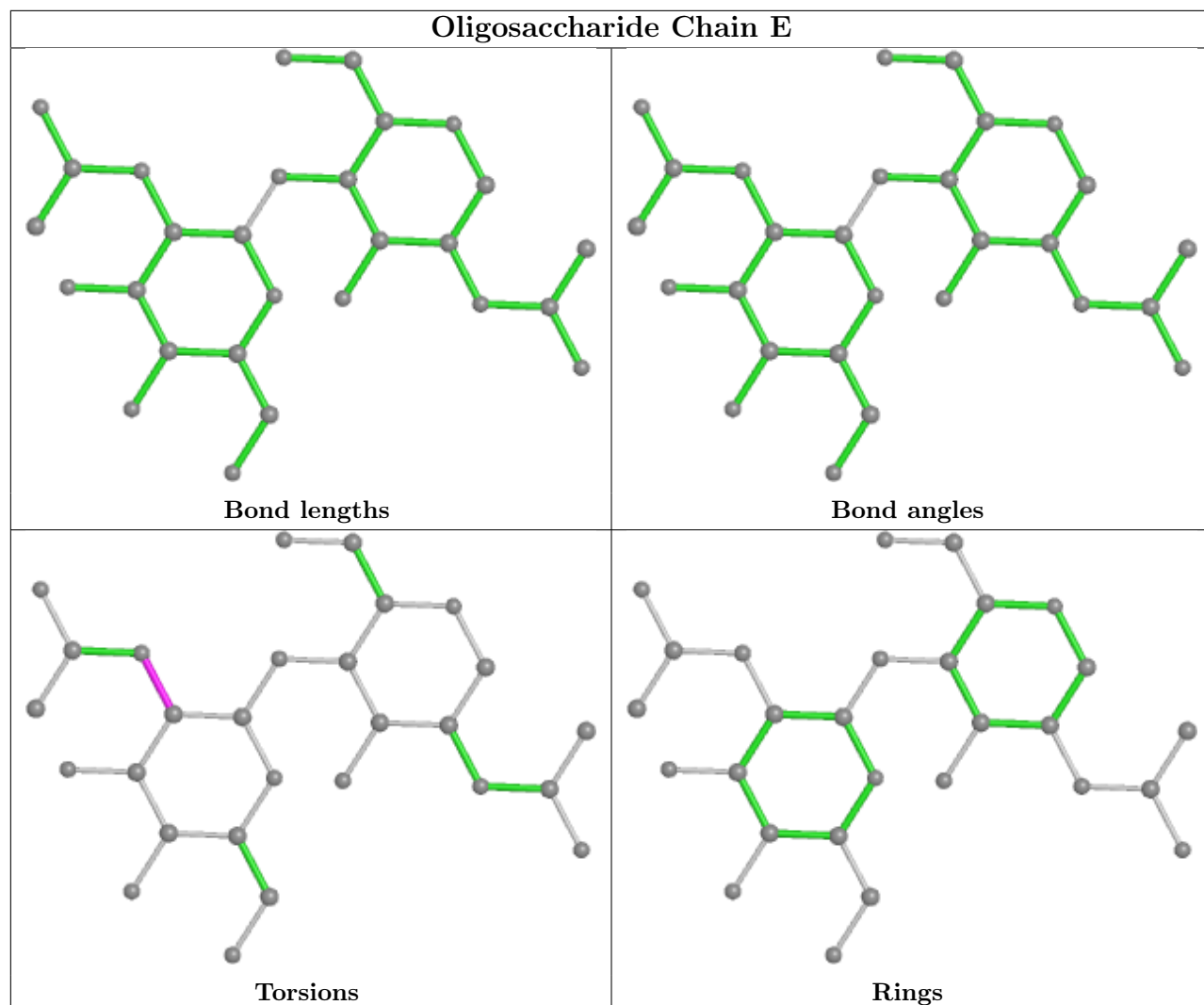
Mol	Chain	Res	Type	Atoms
4	G	2	NAG	C1-C2-N2-C7
4	G	2	NAG	C8-C7-N2-C2
4	G	2	NAG	O7-C7-N2-C2
4	O	2	NAG	C3-C2-N2-C7
4	O	2	NAG	C8-C7-N2-C2

There are no ring outliers.

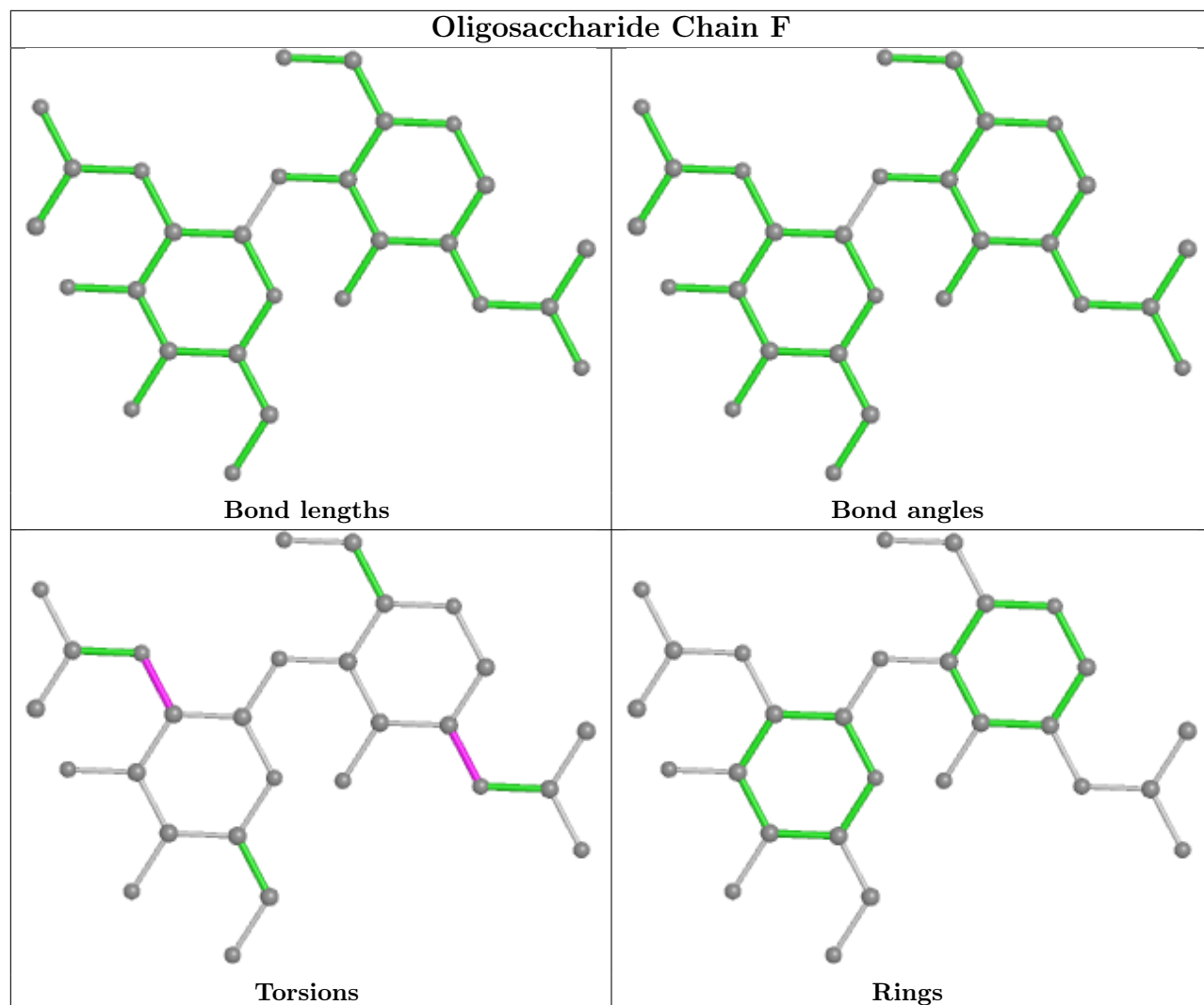
No monomer is involved in short contacts.

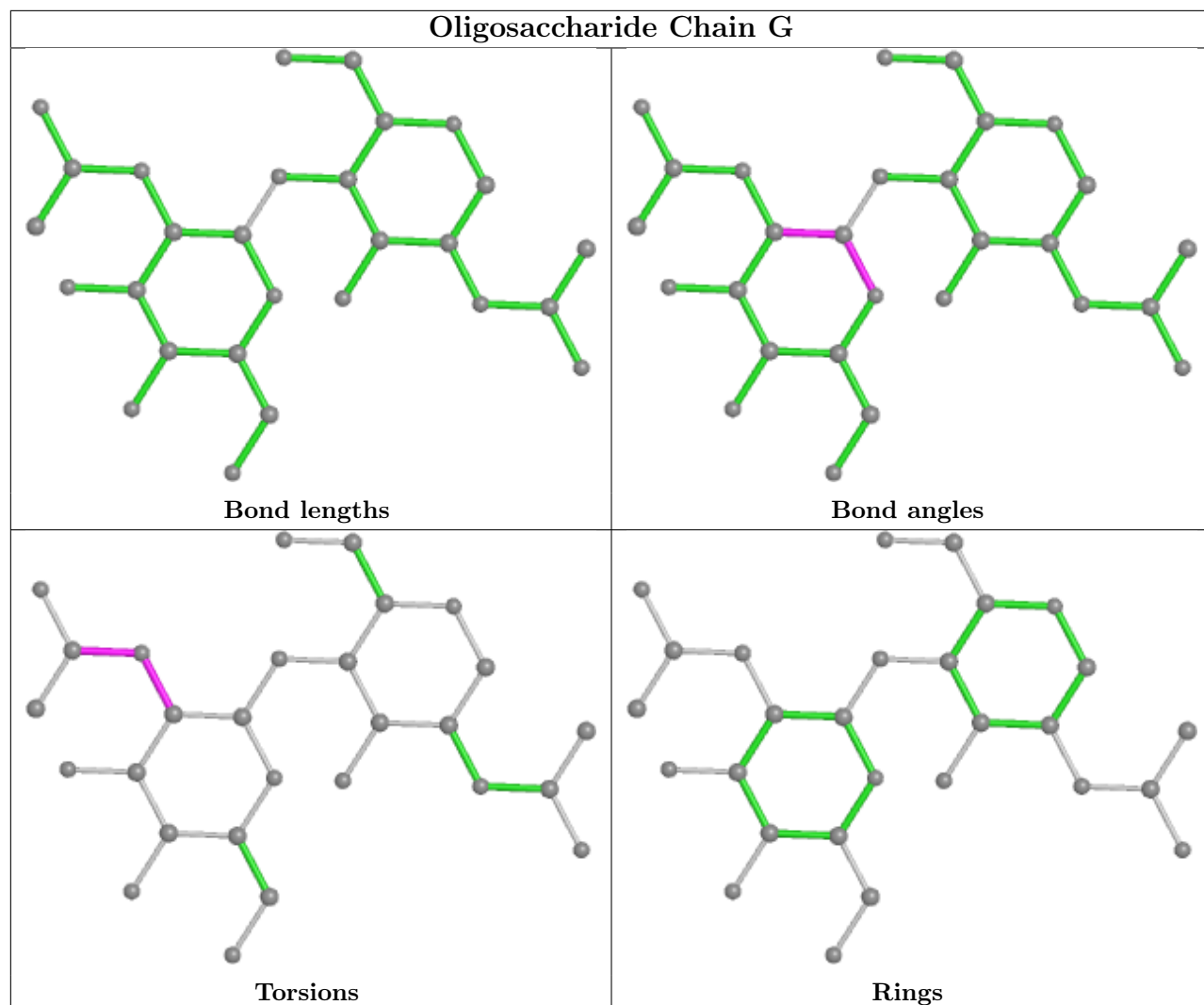
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

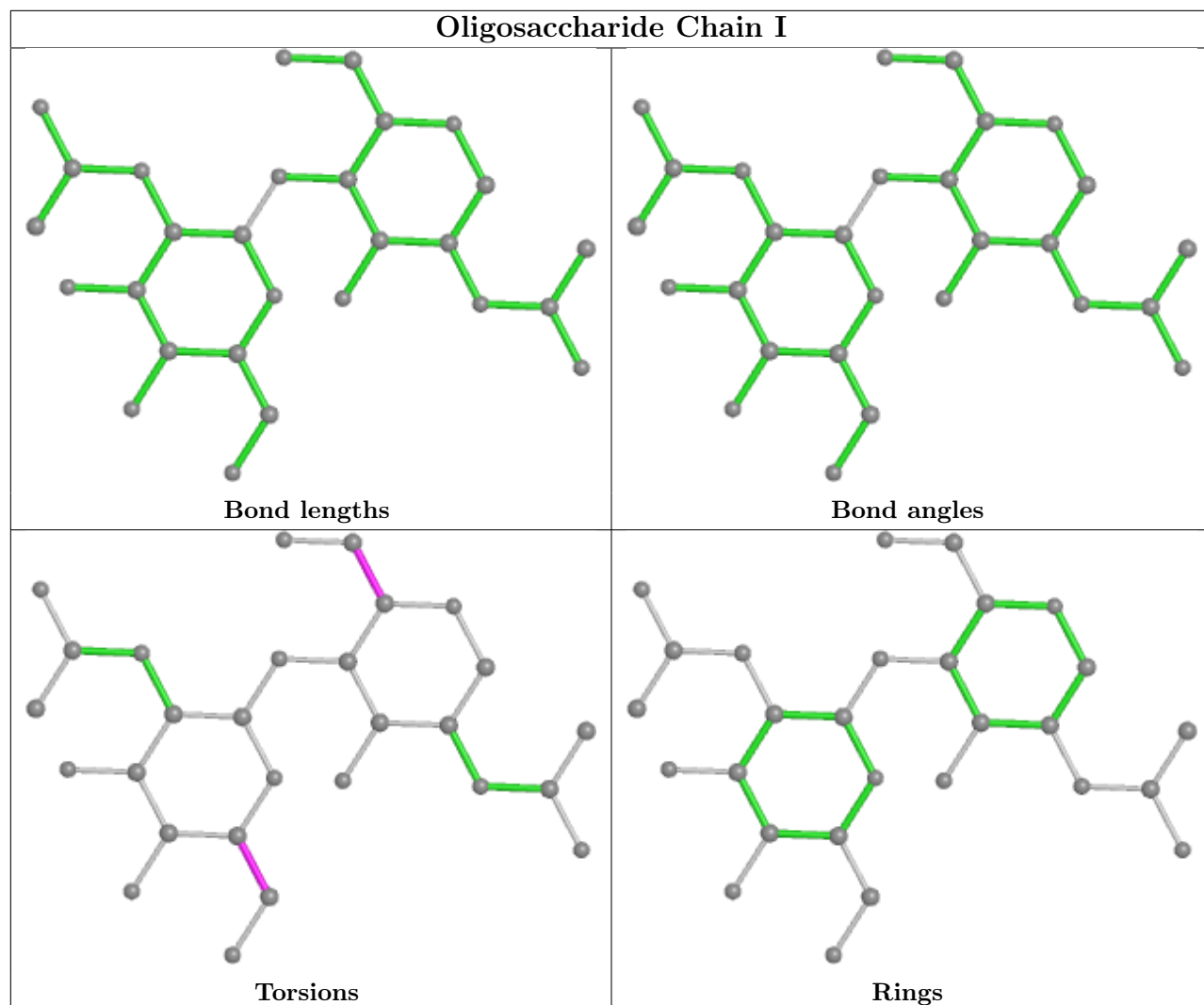


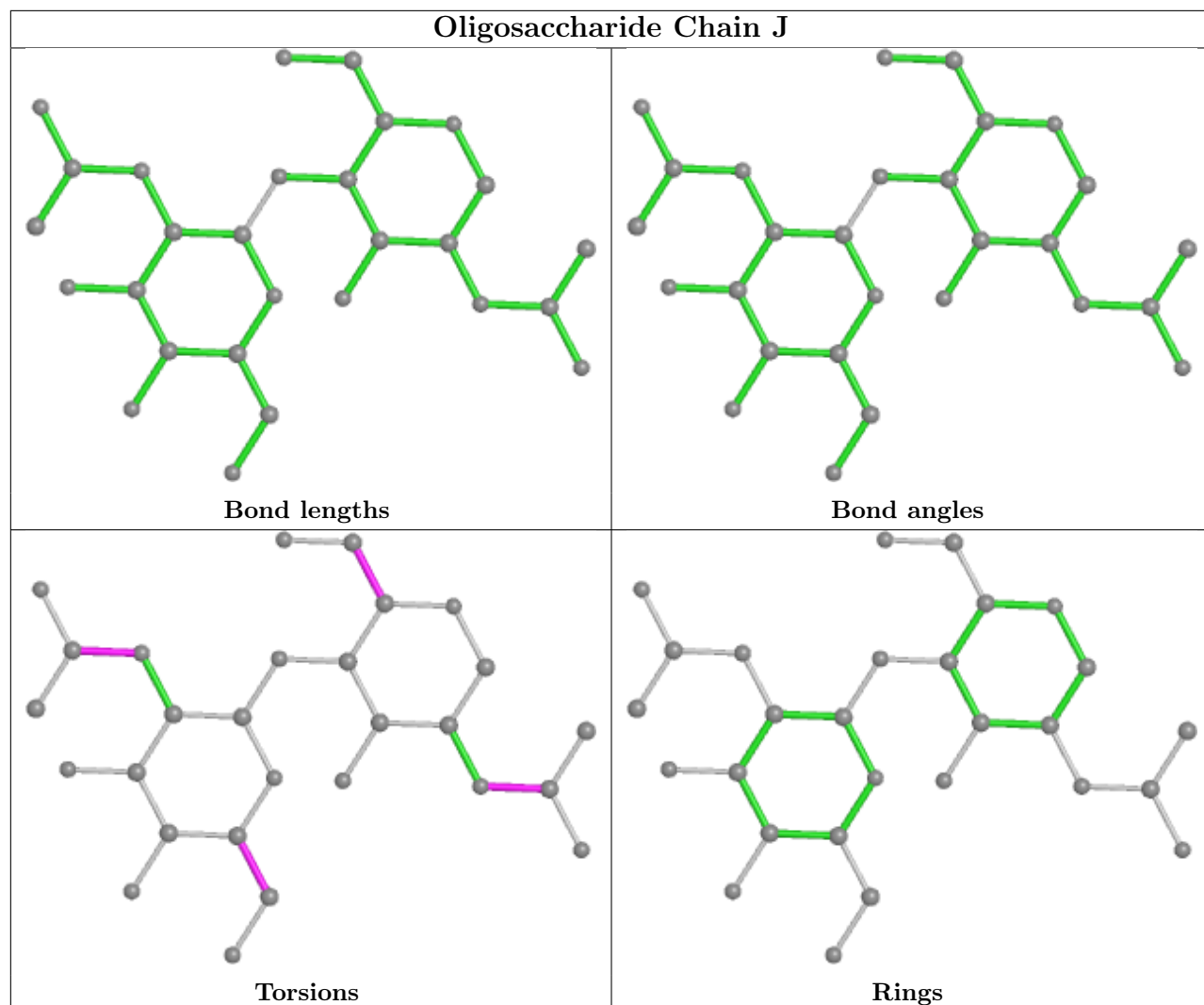


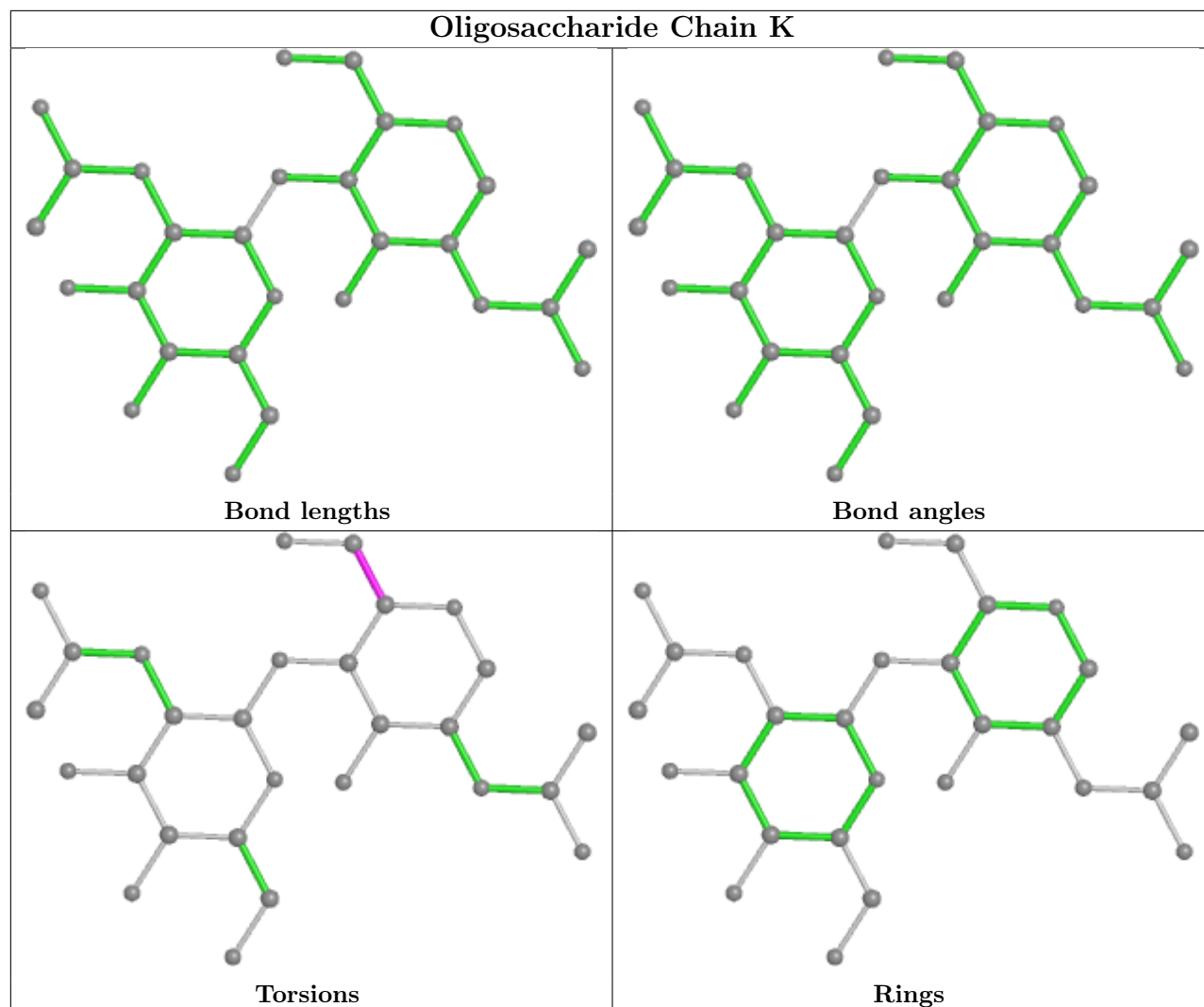


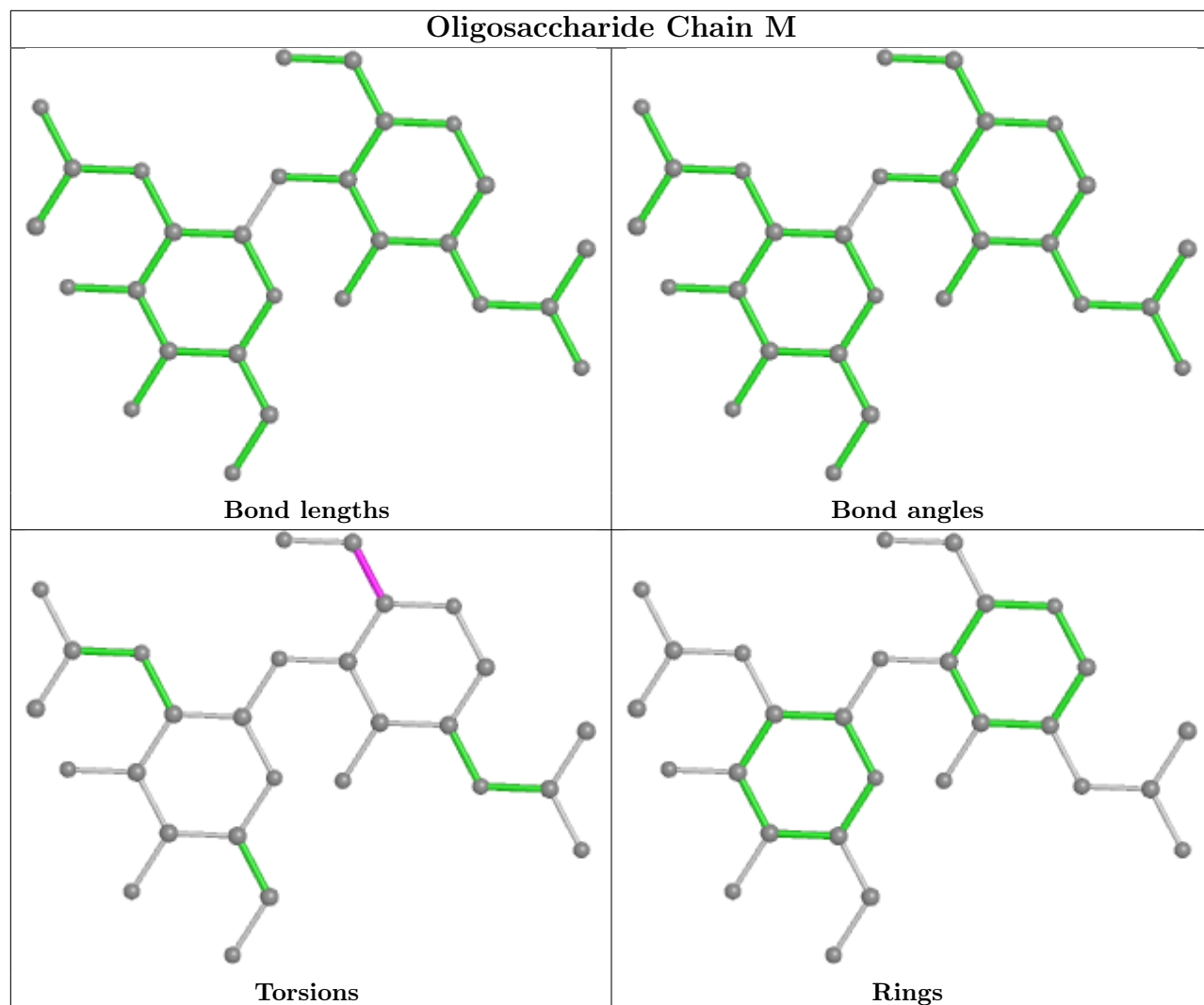


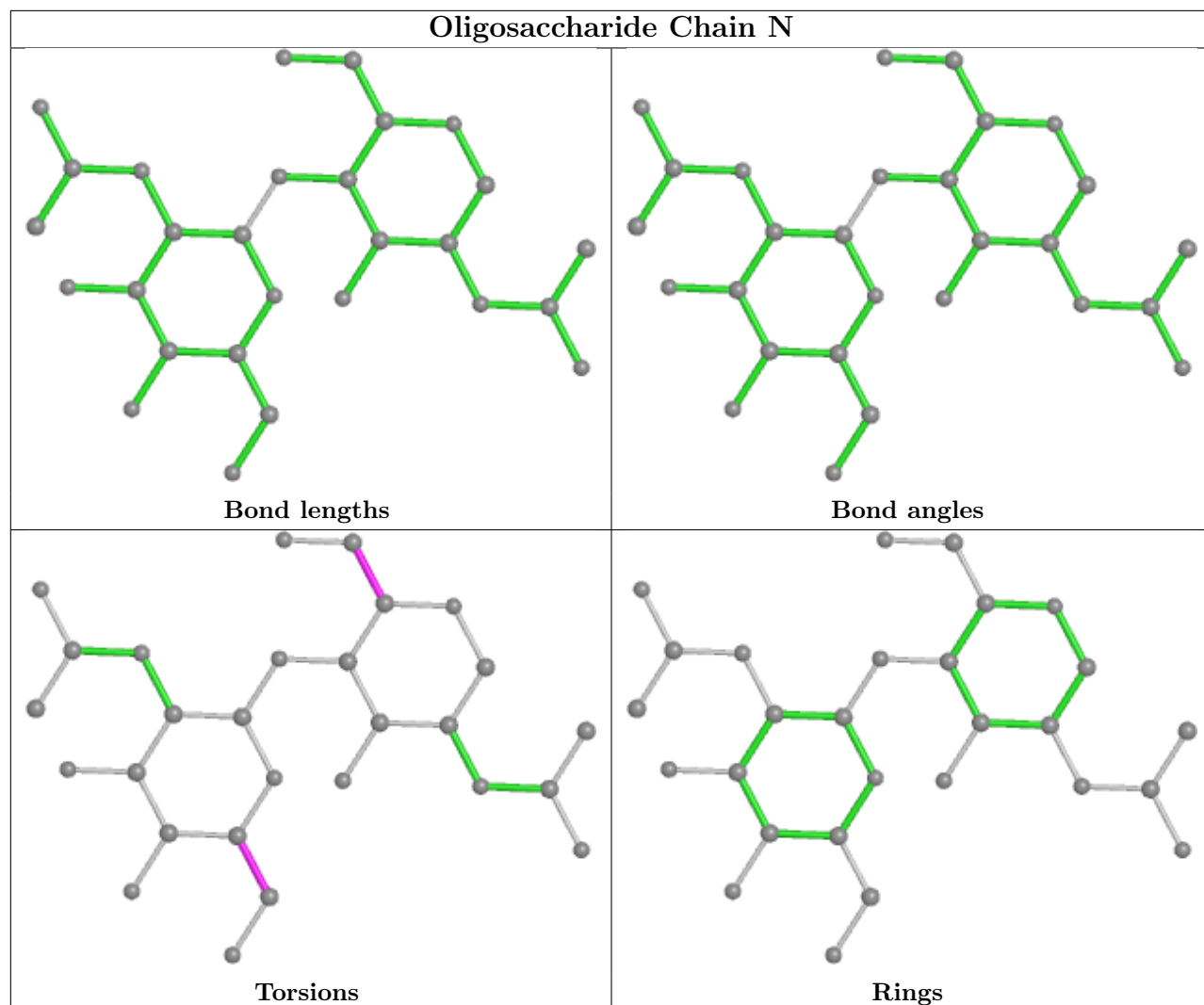


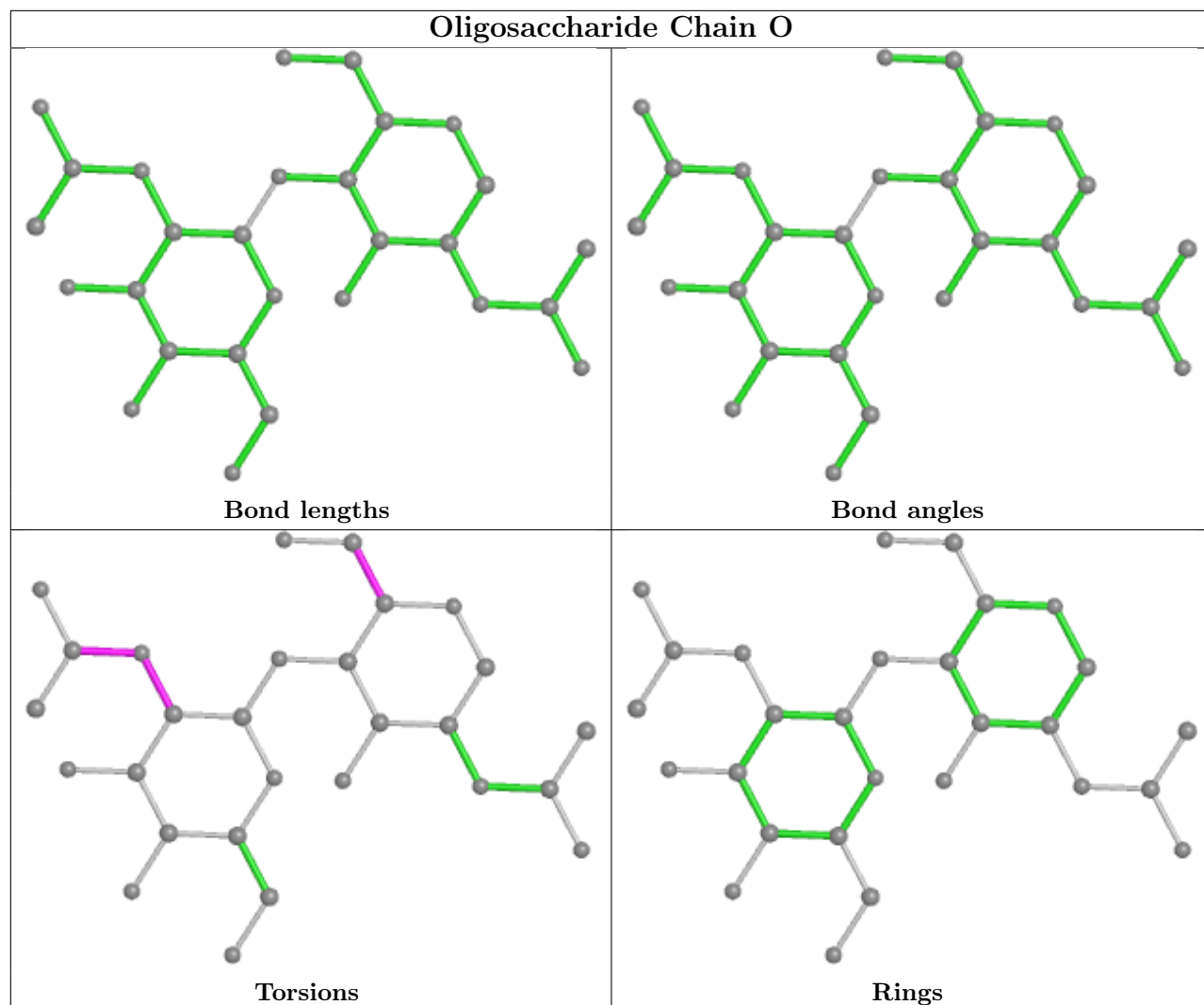




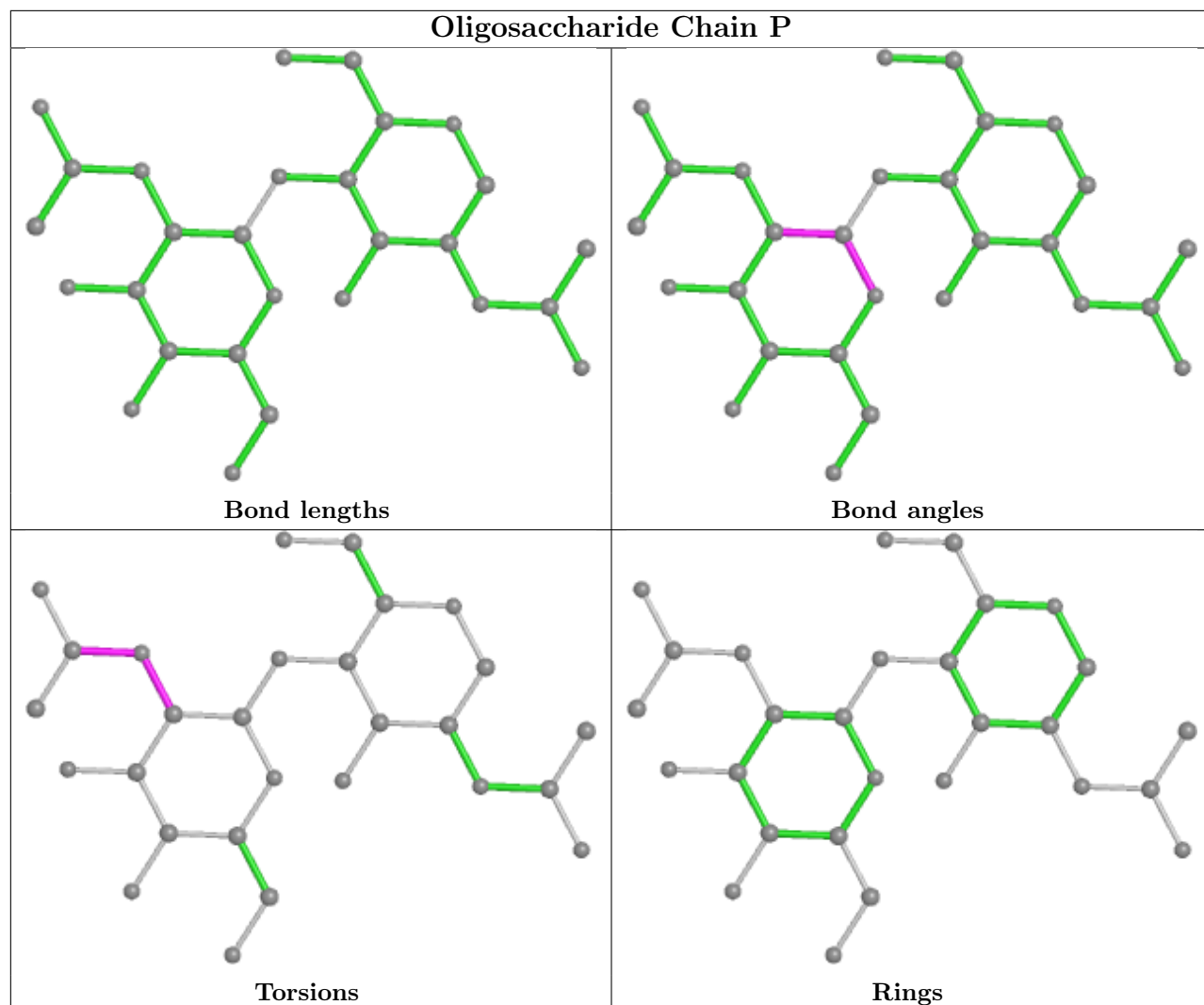


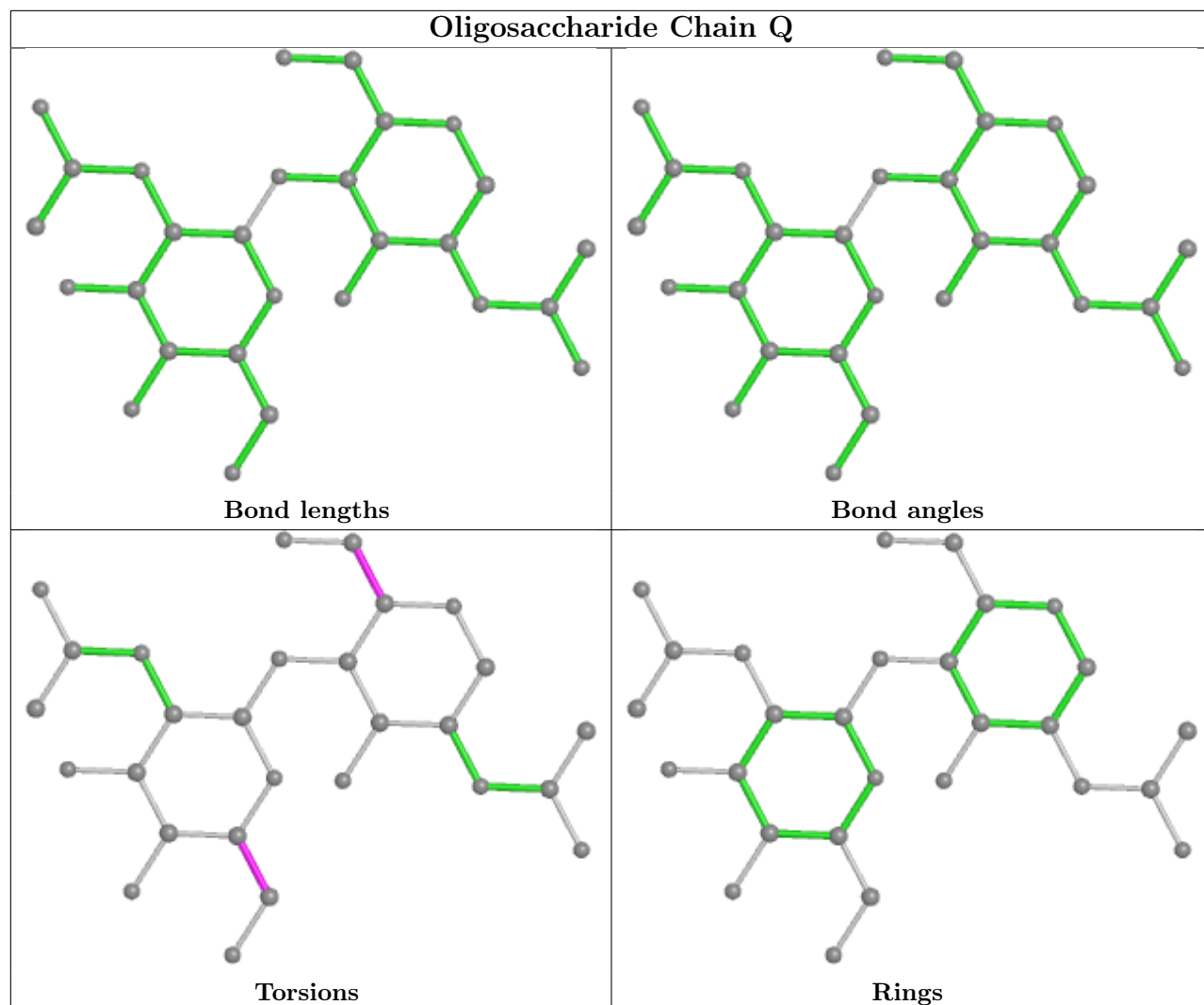


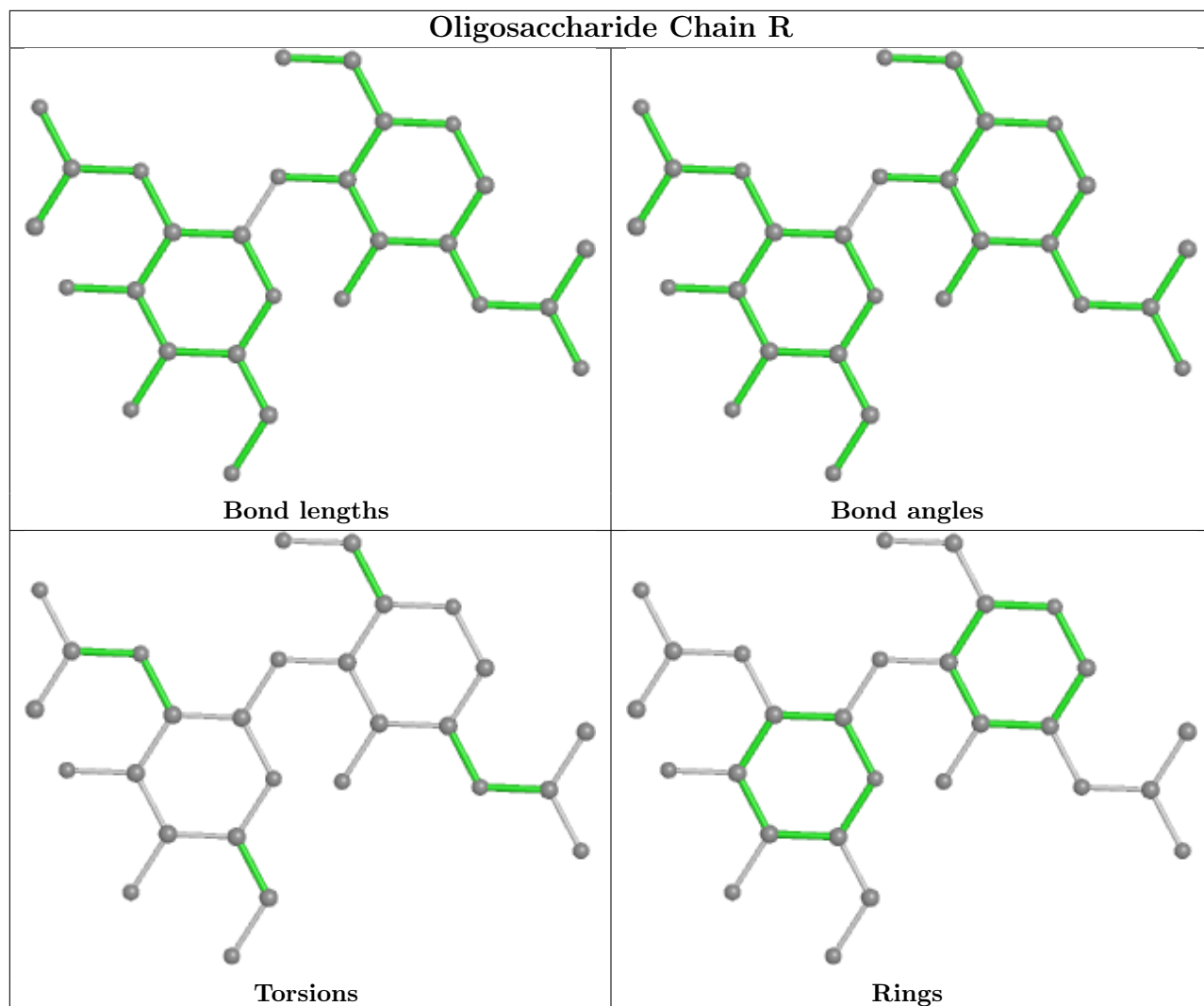


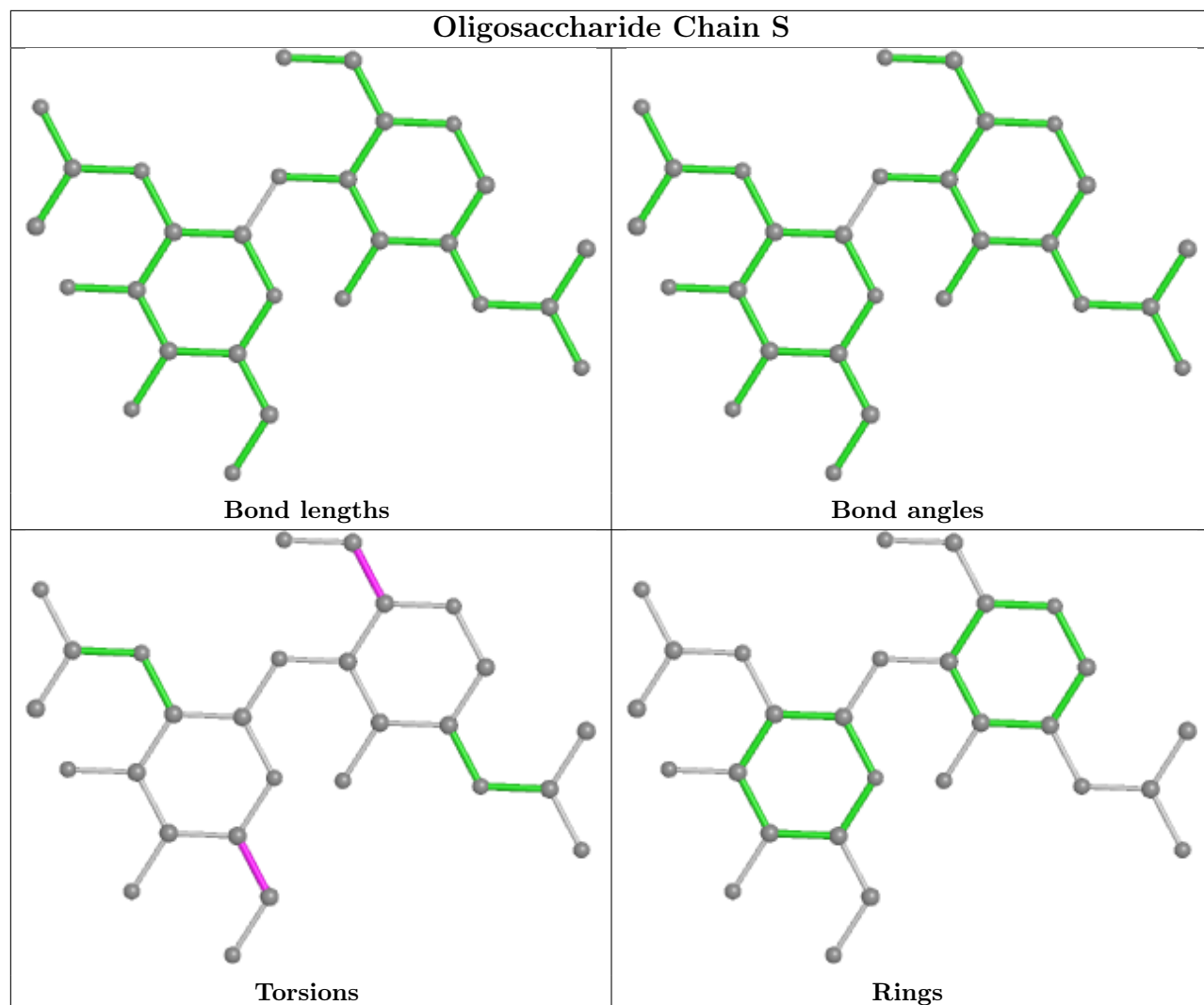


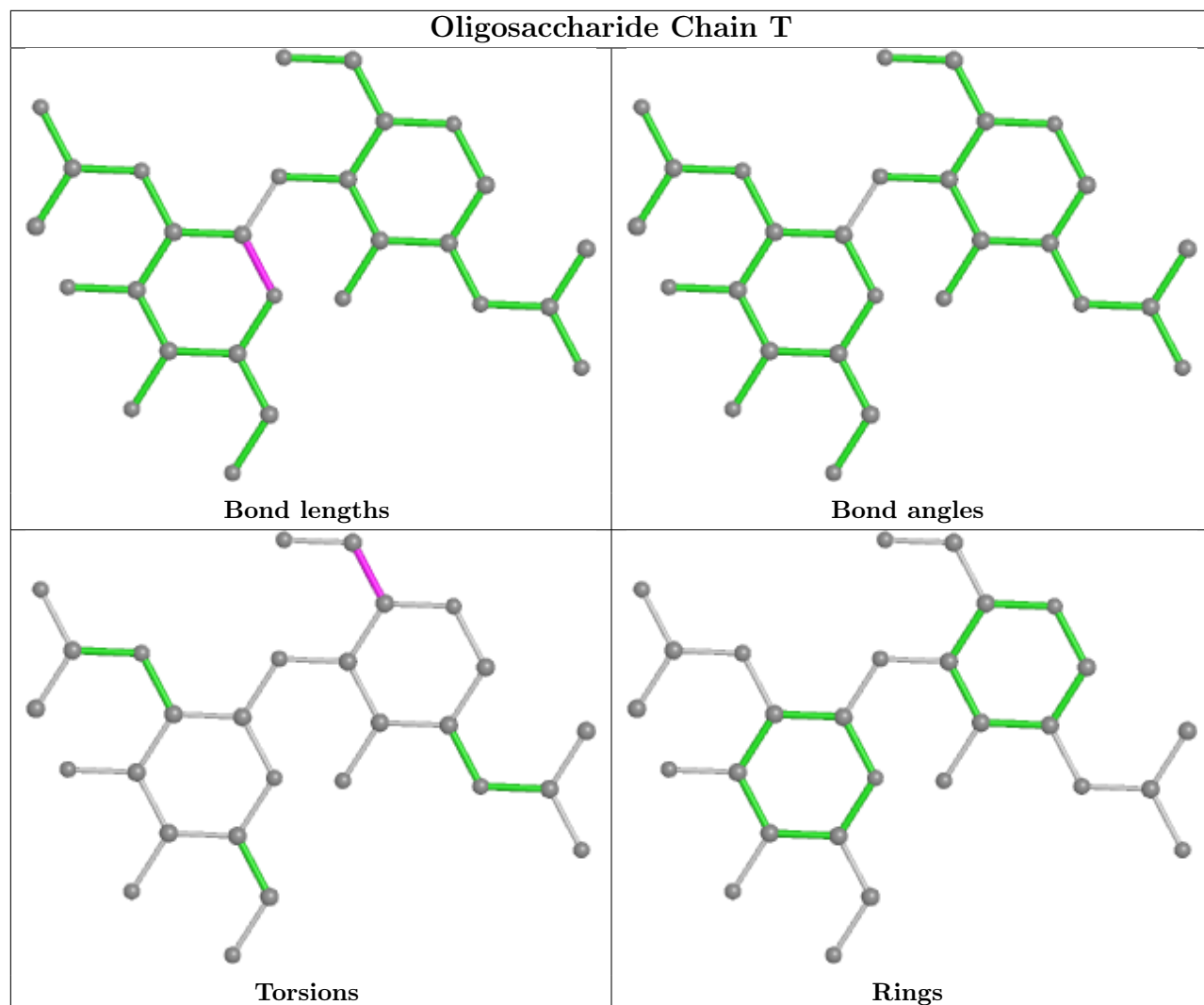


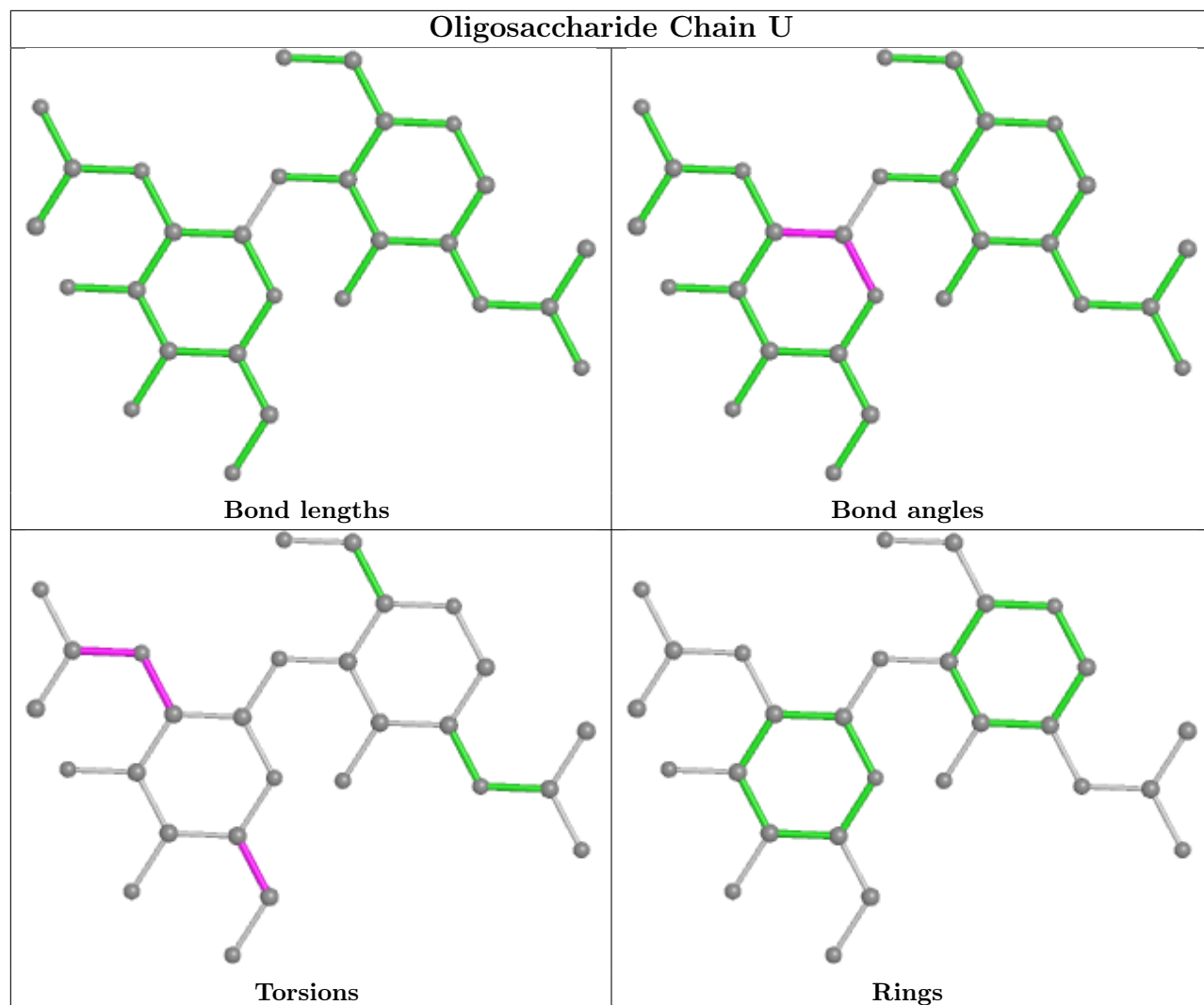


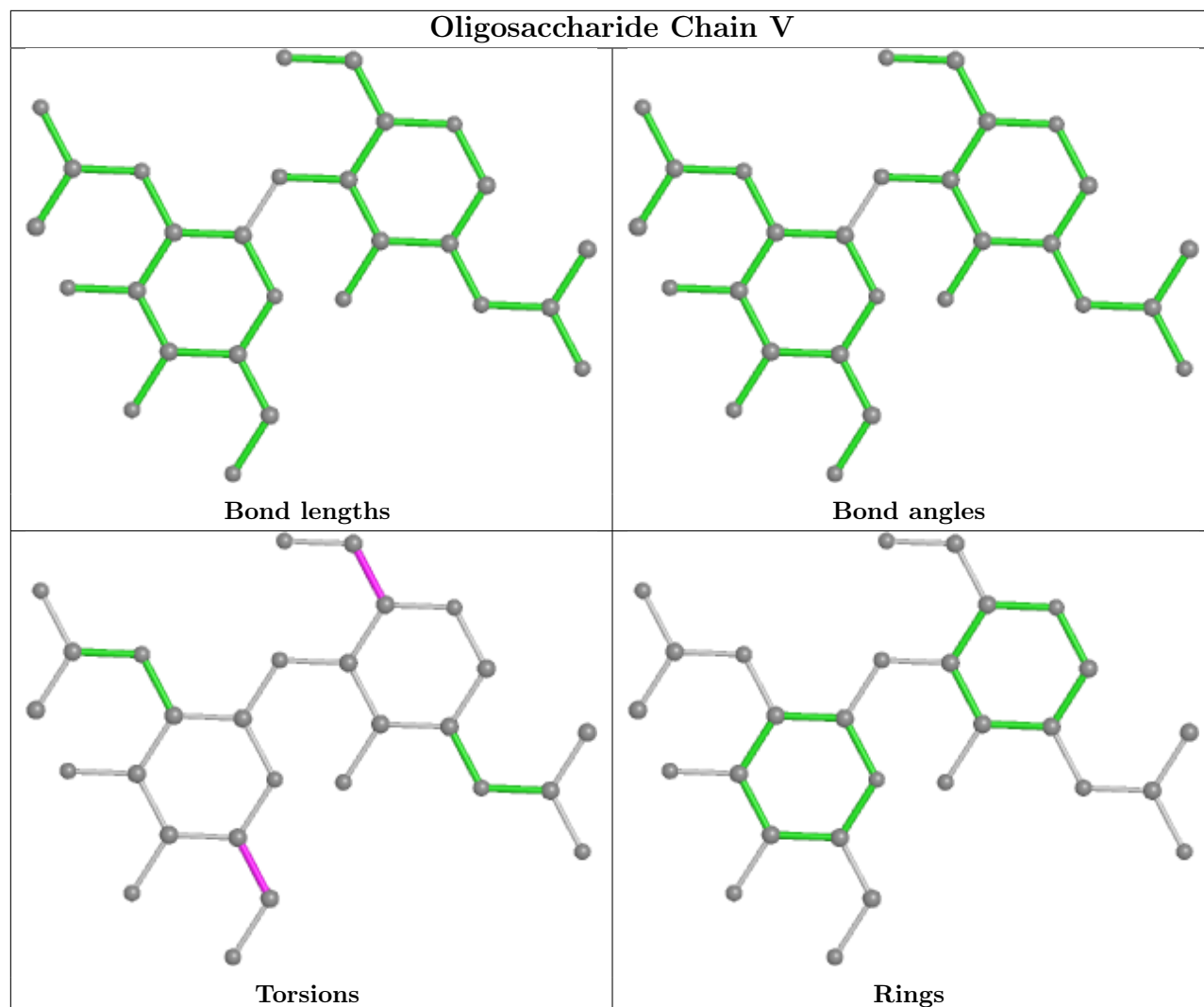


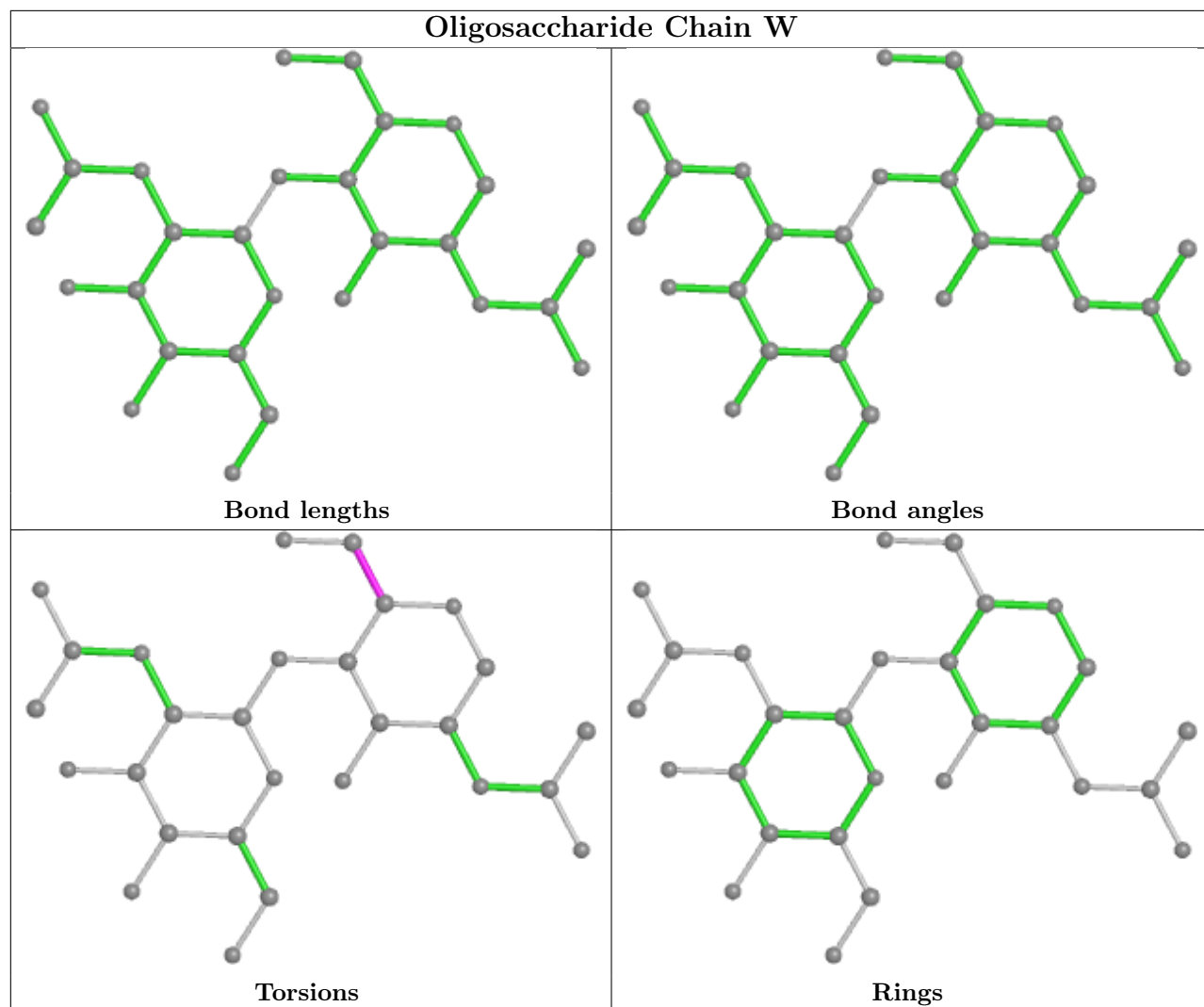




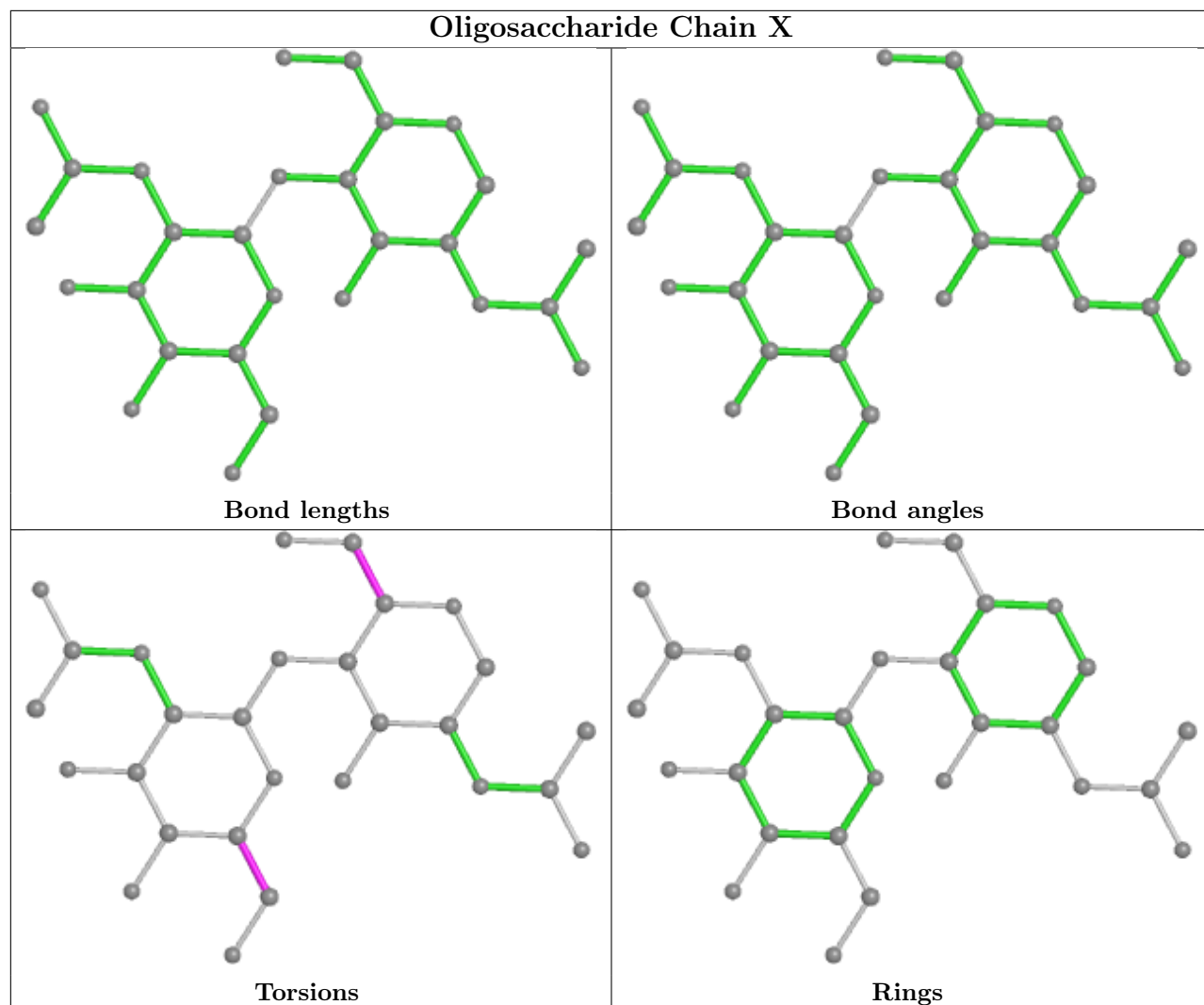


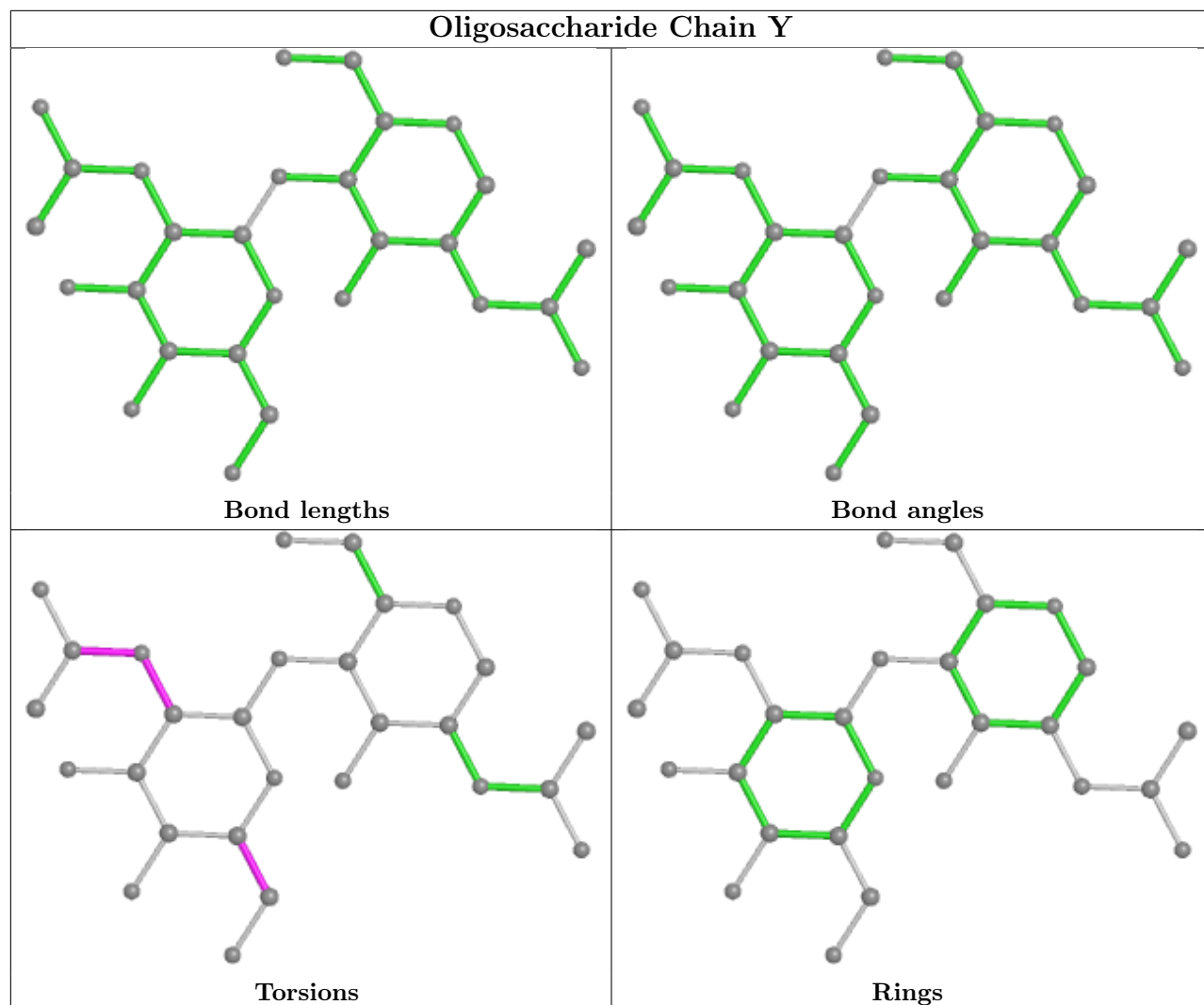


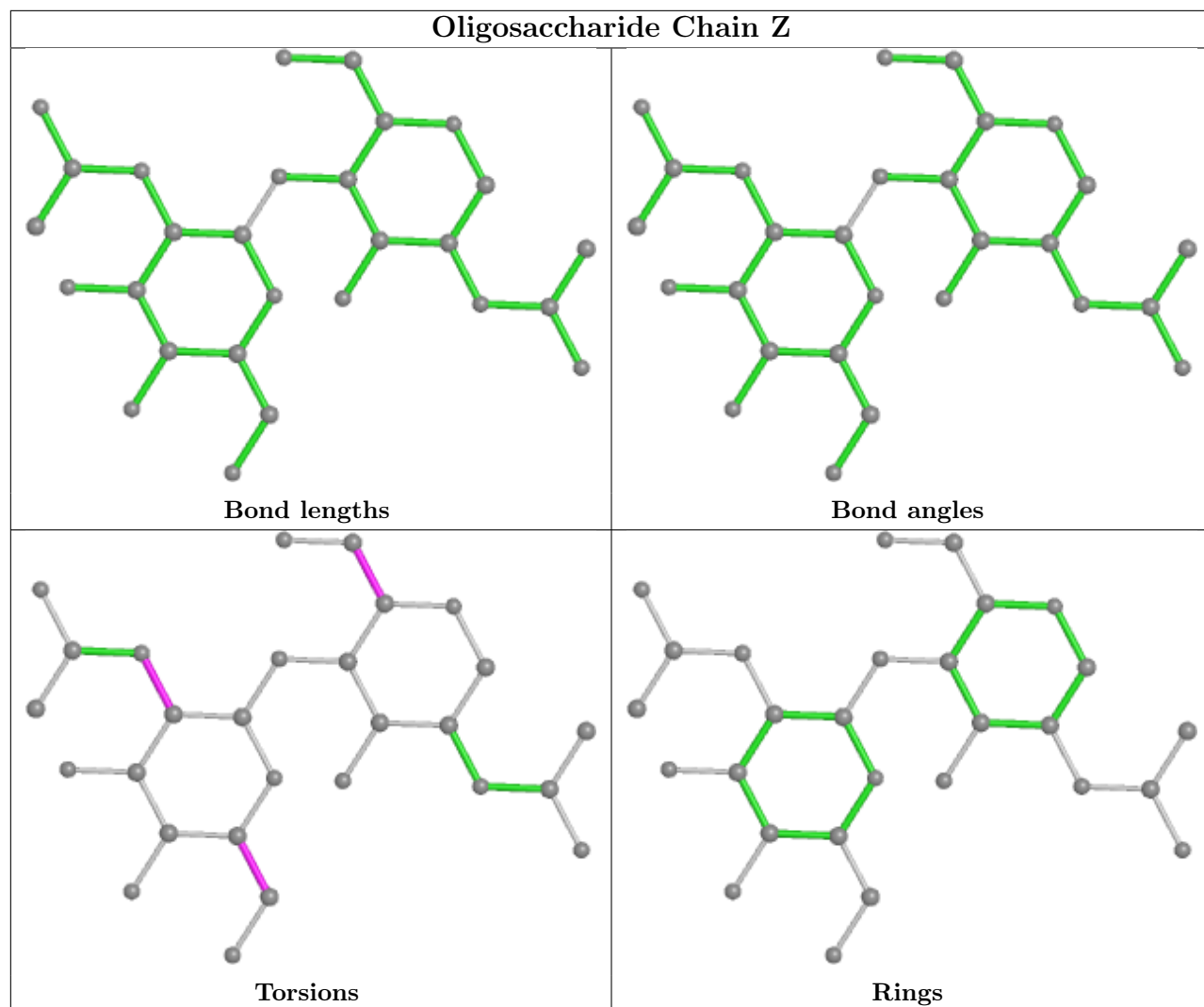


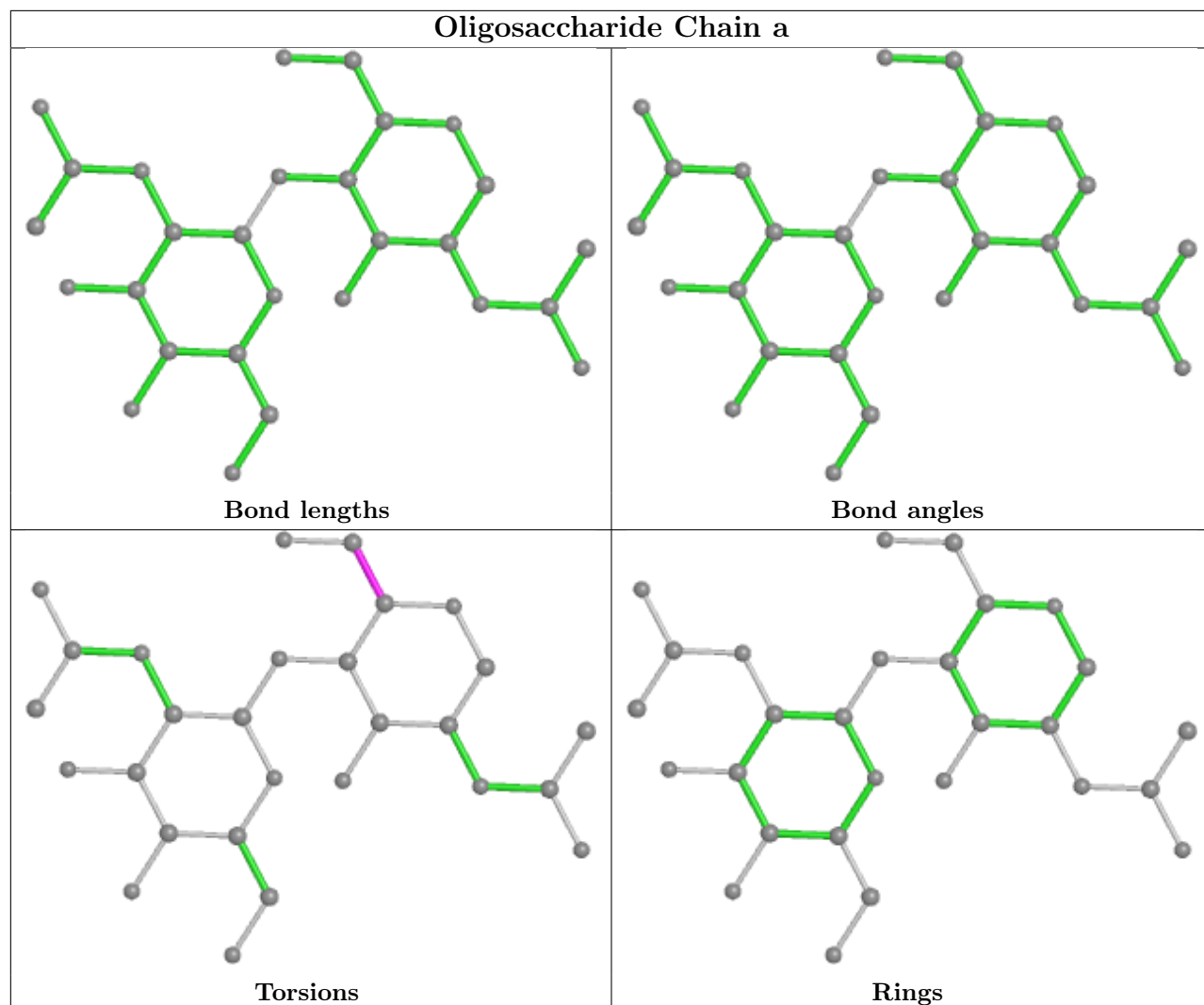


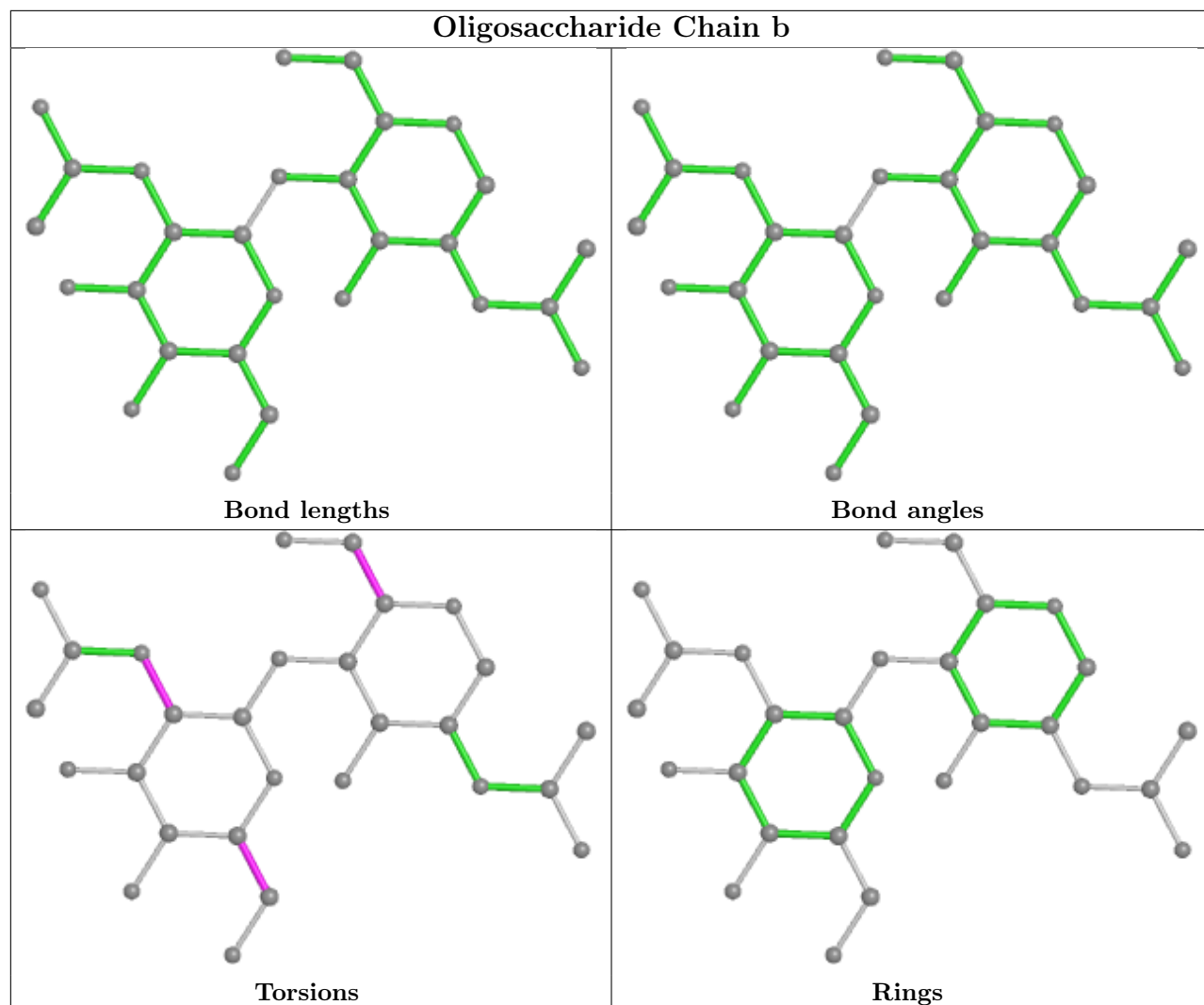


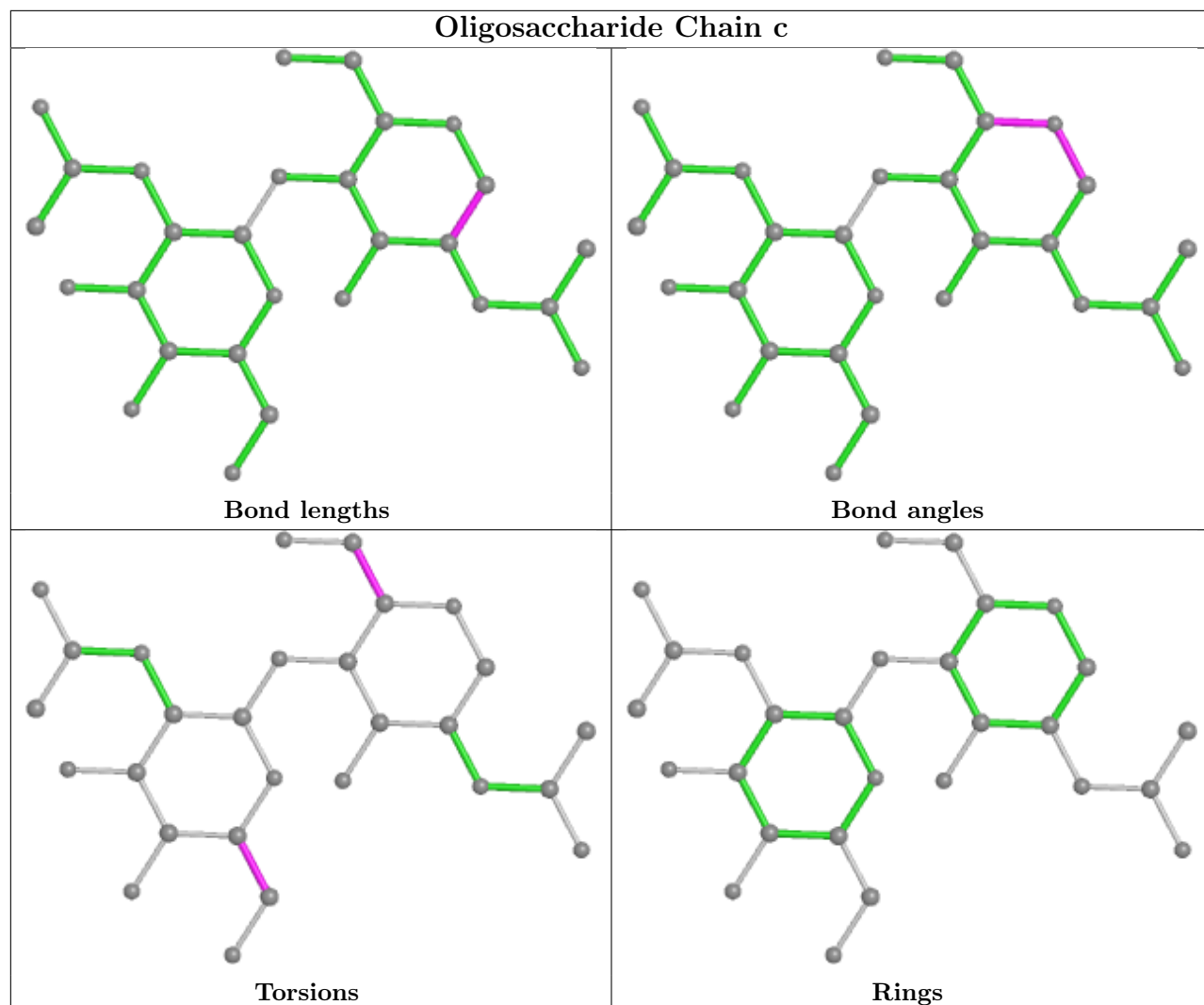


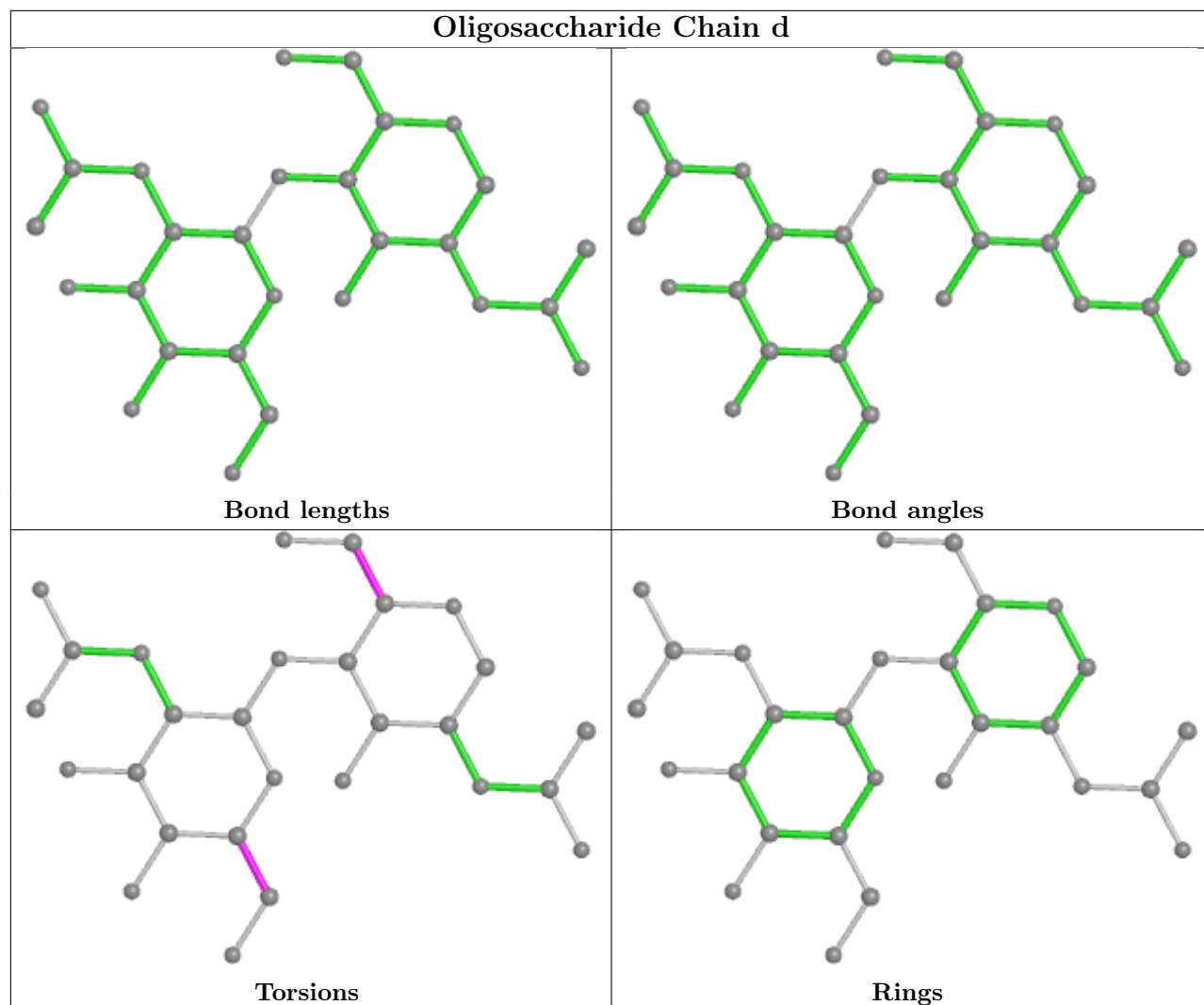


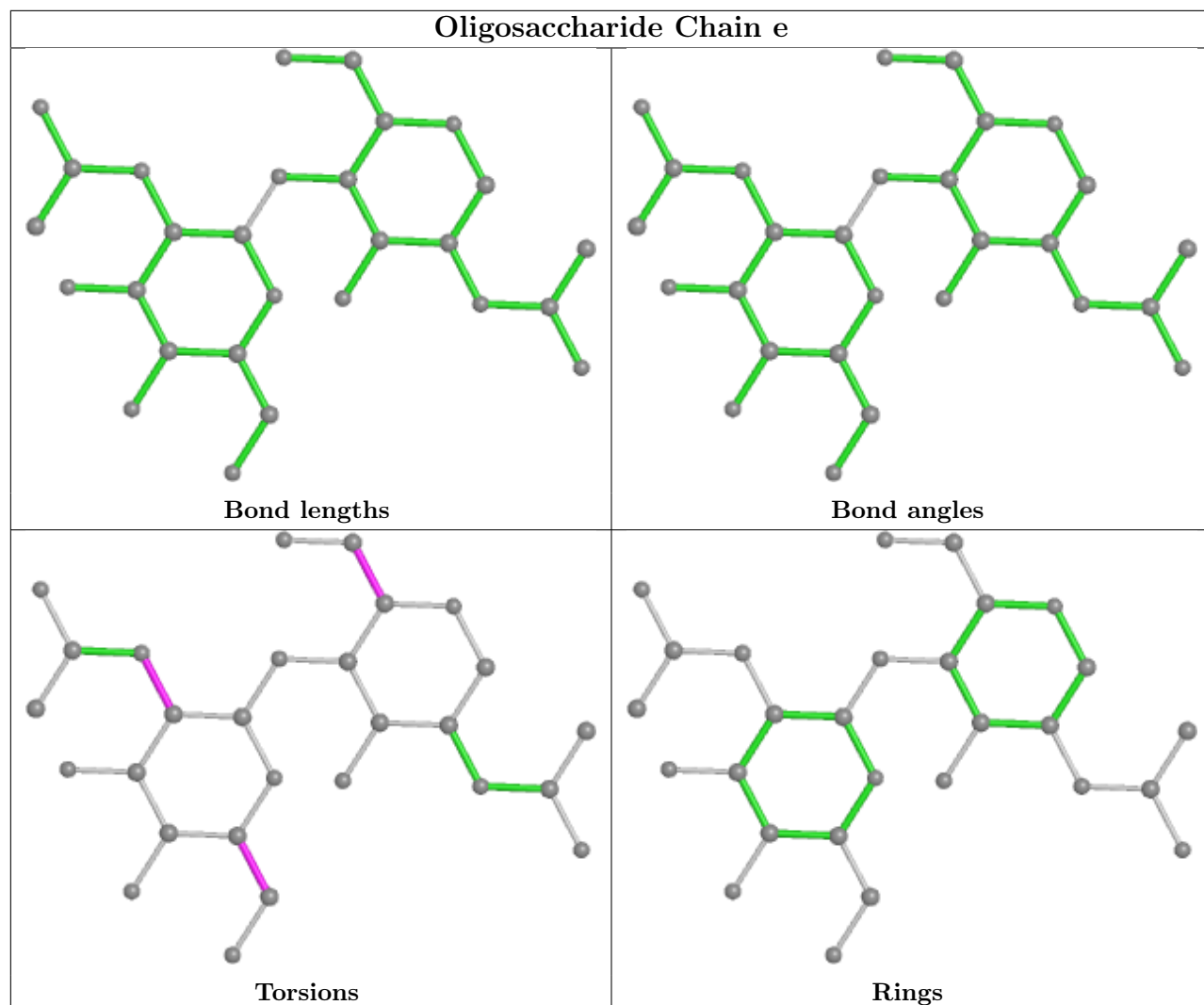




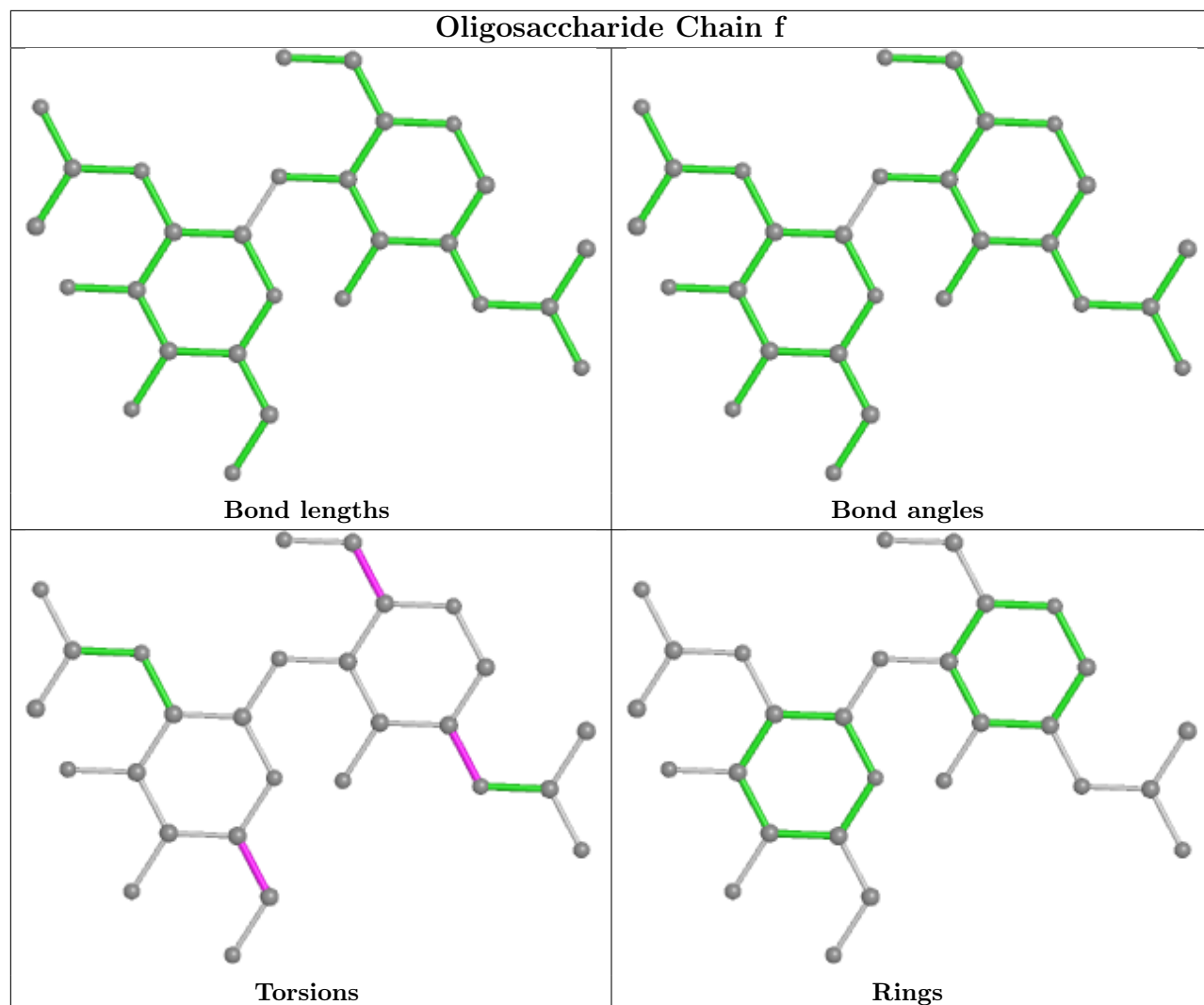


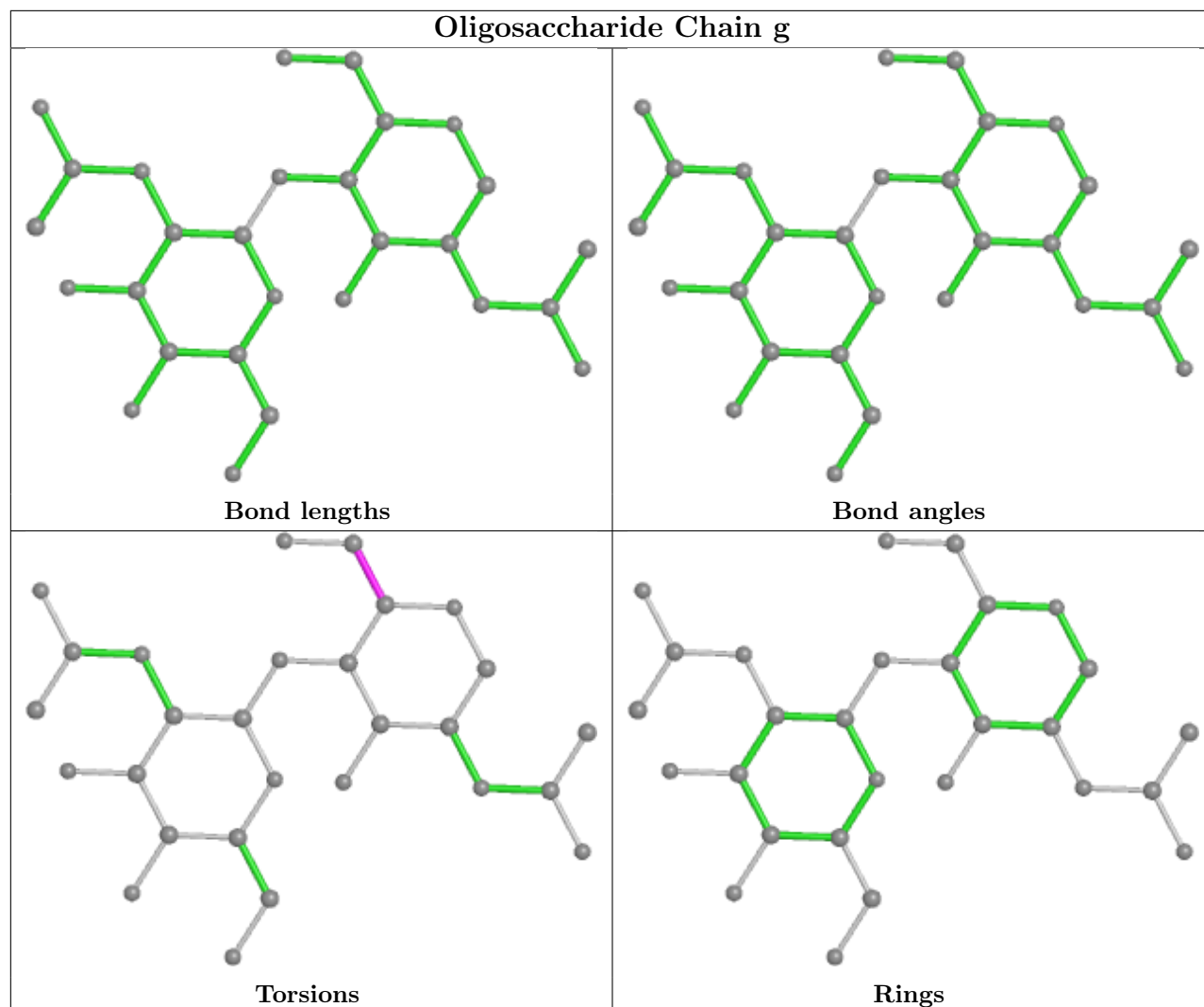












## 5.6 Ligand geometry [i](#)

25 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	B	1203	1	14,14,15	0.20	0	17,19,21	0.32	0
5	NAG	A	1404	1	14,14,15	0.28	0	17,19,21	0.33	0
5	NAG	C	1208	1	14,14,15	0.29	0	17,19,21	0.65	0
5	NAG	C	1205	1	14,14,15	0.21	0	17,19,21	0.45	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
5	NAG	A	1406	1	14,14,15	0.31	0	17,19,21	0.68	0
5	NAG	C	1202	1	14,14,15	0.56	0	17,19,21	0.72	1 (5%)
5	NAG	C	1209	1	14,14,15	0.26	0	17,19,21	0.45	0
5	NAG	B	1208	1	14,14,15	0.31	0	17,19,21	0.61	0
5	NAG	B	1205	1	14,14,15	0.21	0	17,19,21	0.46	0
5	NAG	C	1207	1	14,14,15	0.24	0	17,19,21	0.37	0
5	NAG	A	1401	1	14,14,15	0.35	0	17,19,21	0.43	0
5	NAG	C	1203	1	14,14,15	0.21	0	17,19,21	0.41	0
5	NAG	B	1209	1	14,14,15	0.18	0	17,19,21	0.45	0
5	NAG	A	1407	1	14,14,15	0.30	0	17,19,21	0.45	0
5	NAG	B	1204	1	14,14,15	0.21	0	17,19,21	0.42	0
5	NAG	B	1201	1	14,14,15	0.23	0	17,19,21	0.46	0
5	NAG	B	1207	1	14,14,15	0.34	0	17,19,21	0.33	0
5	NAG	A	1402	1	14,14,15	0.17	0	17,19,21	0.40	0
5	NAG	A	1403	1	14,14,15	0.55	0	17,19,21	0.40	0
5	NAG	A	1405	1	14,14,15	0.33	0	17,19,21	0.35	0
5	NAG	C	1206	1	14,14,15	0.49	0	17,19,21	0.54	0
5	NAG	B	1206	1	14,14,15	0.28	0	17,19,21	0.36	0
5	NAG	B	1202	1	14,14,15	0.29	0	17,19,21	0.46	0
5	NAG	C	1204	1	14,14,15	0.23	0	17,19,21	0.38	0
5	NAG	C	1201	1	14,14,15	0.32	0	17,19,21	0.62	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	B	1203	1	-	2/6/23/26	0/1/1/1
5	NAG	A	1404	1	-	2/6/23/26	0/1/1/1
5	NAG	C	1208	1	-	4/6/23/26	0/1/1/1
5	NAG	C	1205	1	-	1/6/23/26	0/1/1/1
5	NAG	A	1406	1	-	4/6/23/26	0/1/1/1
5	NAG	C	1202	1	-	0/6/23/26	0/1/1/1
5	NAG	C	1209	1	-	2/6/23/26	0/1/1/1
5	NAG	B	1208	1	-	3/6/23/26	0/1/1/1
5	NAG	B	1205	1	-	2/6/23/26	0/1/1/1
5	NAG	C	1207	1	-	2/6/23/26	0/1/1/1
5	NAG	A	1401	1	-	4/6/23/26	0/1/1/1
5	NAG	C	1203	1	-	2/6/23/26	0/1/1/1

Continued on next page...

Continued from previous page...

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	NAG	B	1209	1	-	2/6/23/26	0/1/1/1
5	NAG	A	1407	1	-	2/6/23/26	0/1/1/1
5	NAG	B	1204	1	-	2/6/23/26	0/1/1/1
5	NAG	B	1201	1	-	2/6/23/26	0/1/1/1
5	NAG	B	1207	1	-	2/6/23/26	0/1/1/1
5	NAG	A	1402	1	-	2/6/23/26	0/1/1/1
5	NAG	A	1403	1	-	3/6/23/26	0/1/1/1
5	NAG	A	1405	1	-	3/6/23/26	0/1/1/1
5	NAG	C	1206	1	-	4/6/23/26	0/1/1/1
5	NAG	B	1206	1	-	2/6/23/26	0/1/1/1
5	NAG	B	1202	1	-	2/6/23/26	0/1/1/1
5	NAG	C	1204	1	-	2/6/23/26	0/1/1/1
5	NAG	C	1201	1	-	5/6/23/26	0/1/1/1

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	C	1202	NAG	C1-O5-C5	2.49	115.57	112.19

There are no chirality outliers.

5 of 61 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	1406	NAG	C3-C2-N2-C7
5	A	1406	NAG	C8-C7-N2-C2
5	A	1406	NAG	O7-C7-N2-C2
5	B	1208	NAG	C3-C2-N2-C7
5	B	1208	NAG	C8-C7-N2-C2

There are no ring outliers.

No monomer is involved in short contacts.

## 5.7 Other polymers [\(i\)](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues

There are no chain breaks in this entry.

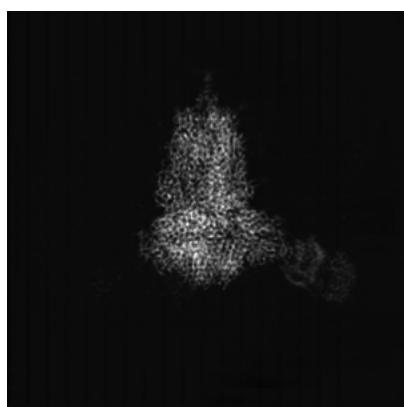
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-25488. These allow visual inspection of the internal detail of the map and identification of artifacts.

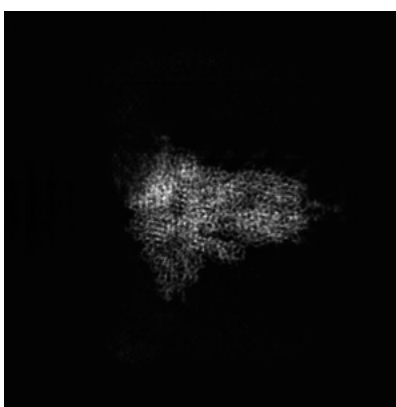
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

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

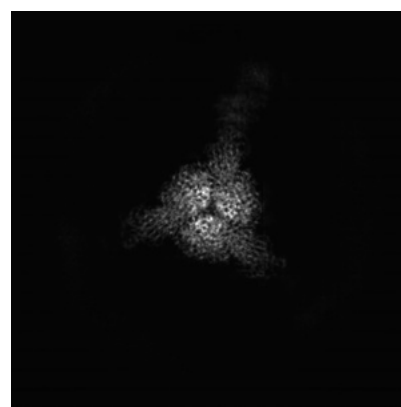
#### 6.1.1 Primary map



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: 150



Y Index: 150



Z Index: 150

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

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

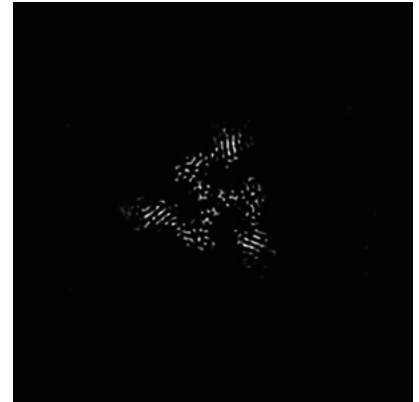
### 6.3.1 Primary map



X Index: 147



Y Index: 161



Z Index: 135

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



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.04. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

## 6.5 Mask visualisation

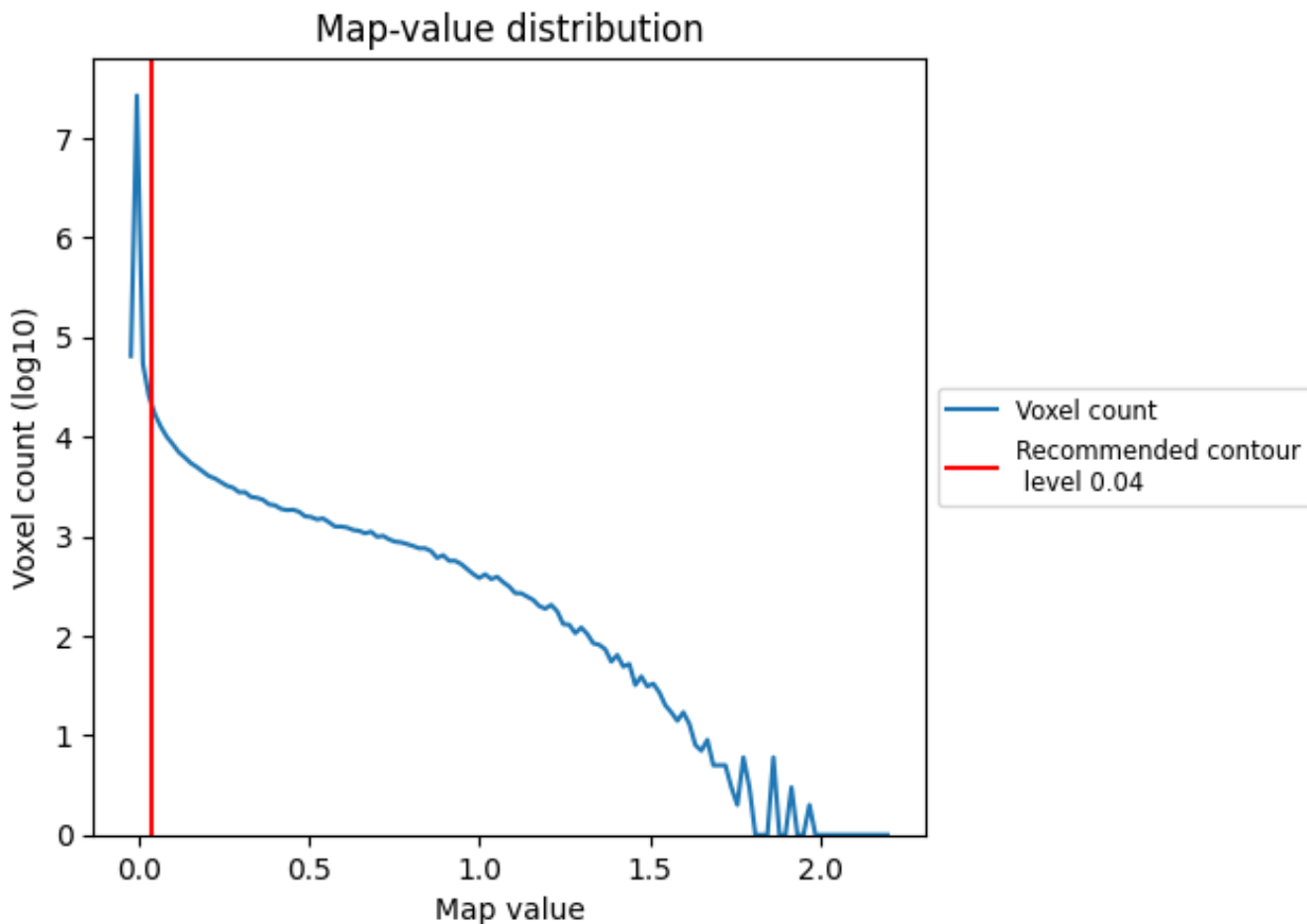
This section was not generated. No masks/segmentation were deposited.



## 7 Map analysis [i](#)

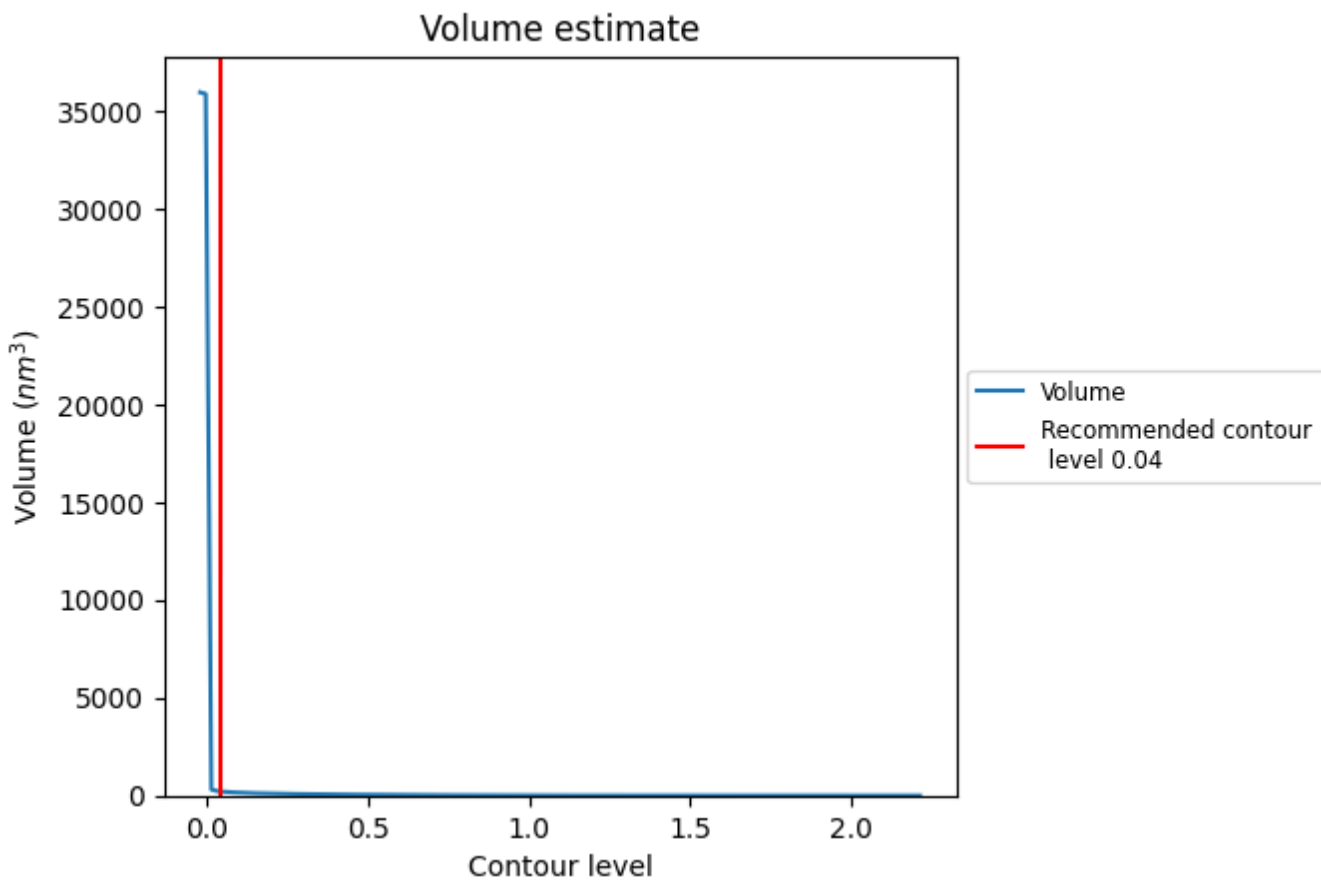
This section contains the results of statistical analysis of the map.

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



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

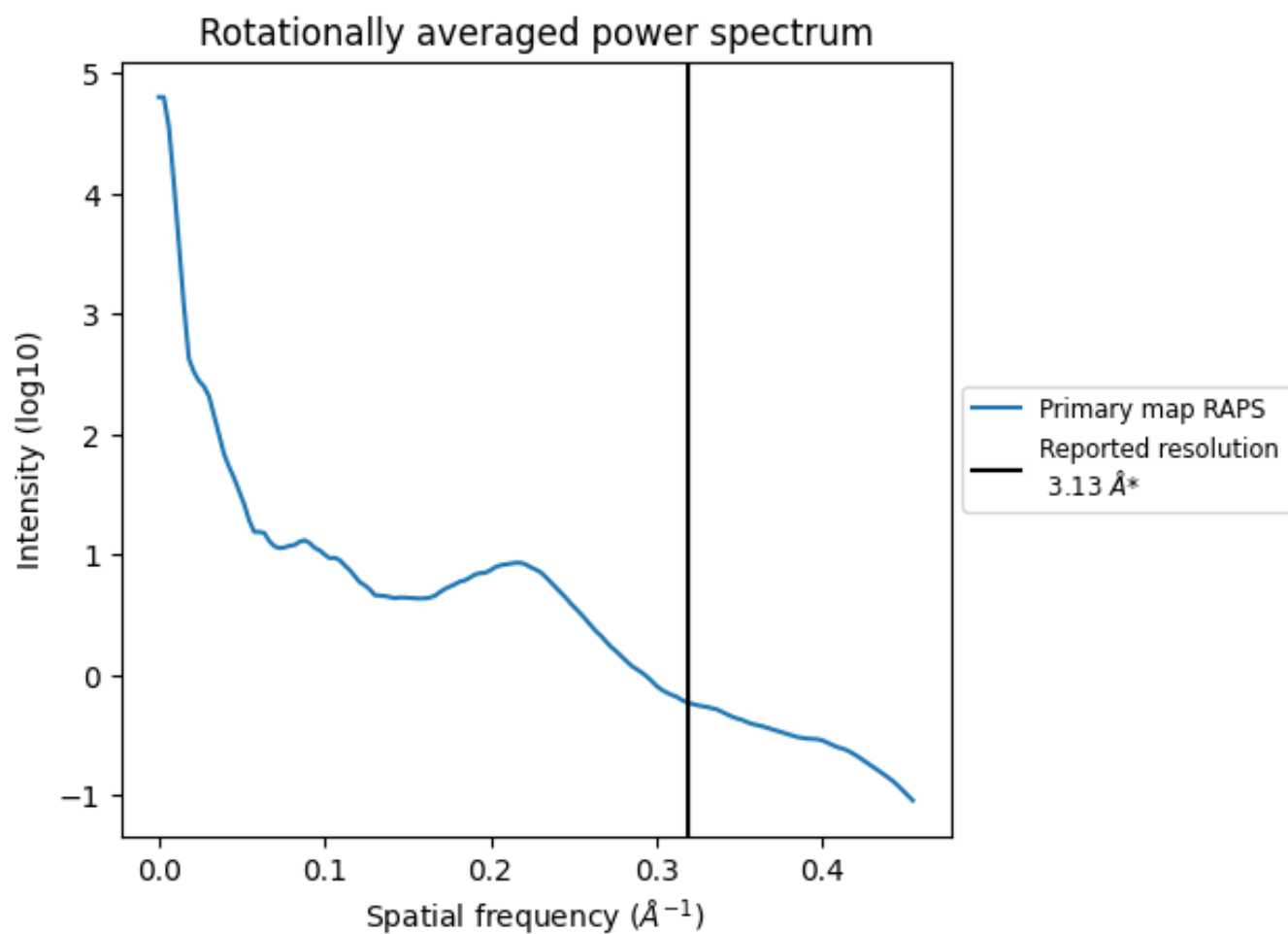
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 216 nm<sup>3</sup>; this corresponds to an approximate mass of 195 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](#)

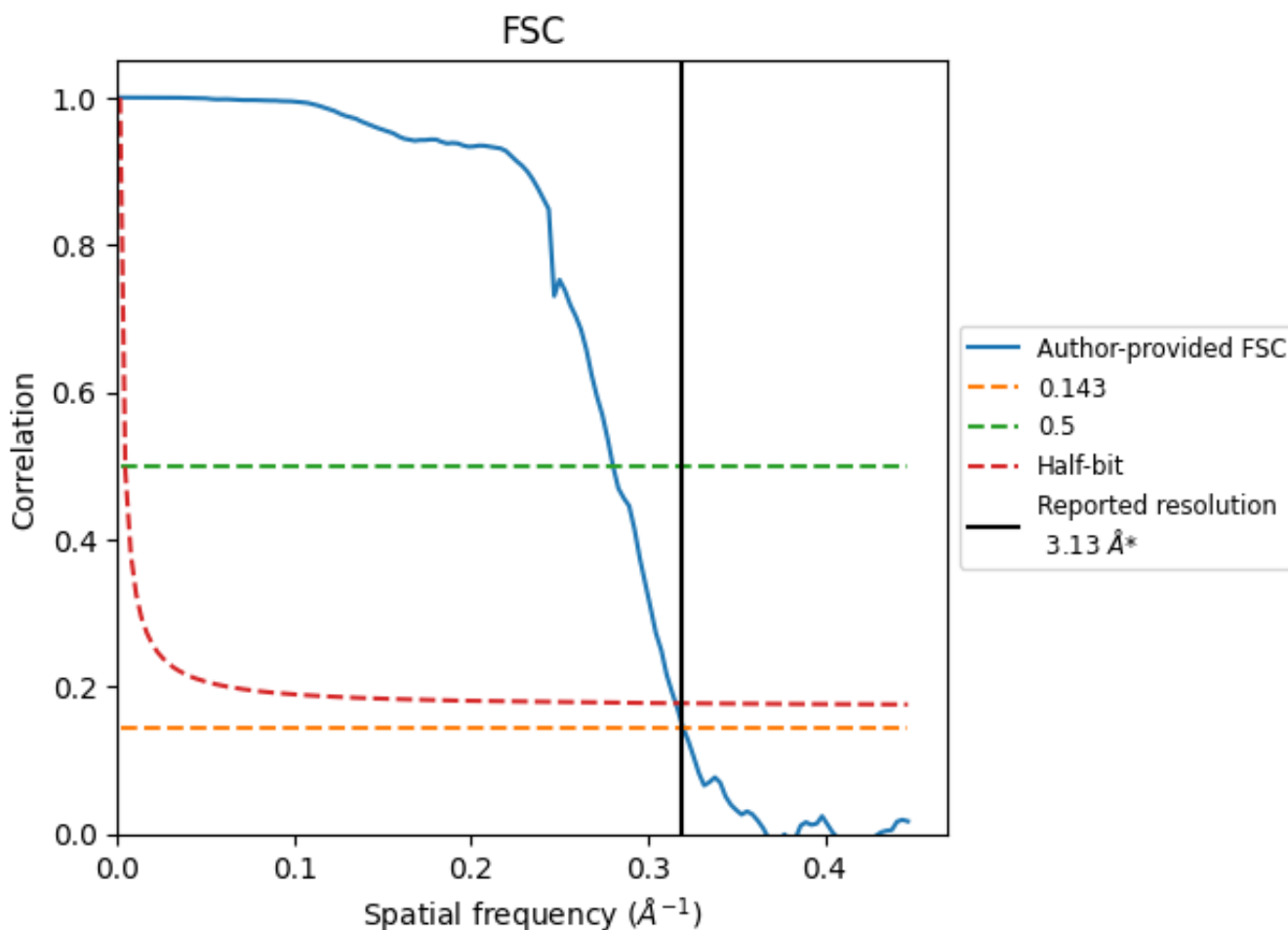


\*Reported resolution corresponds to spatial frequency of 0.319 Å<sup>-1</sup>

## 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 0.319 Å<sup>-1</sup>

## 8.2 Resolution estimates [i](#)

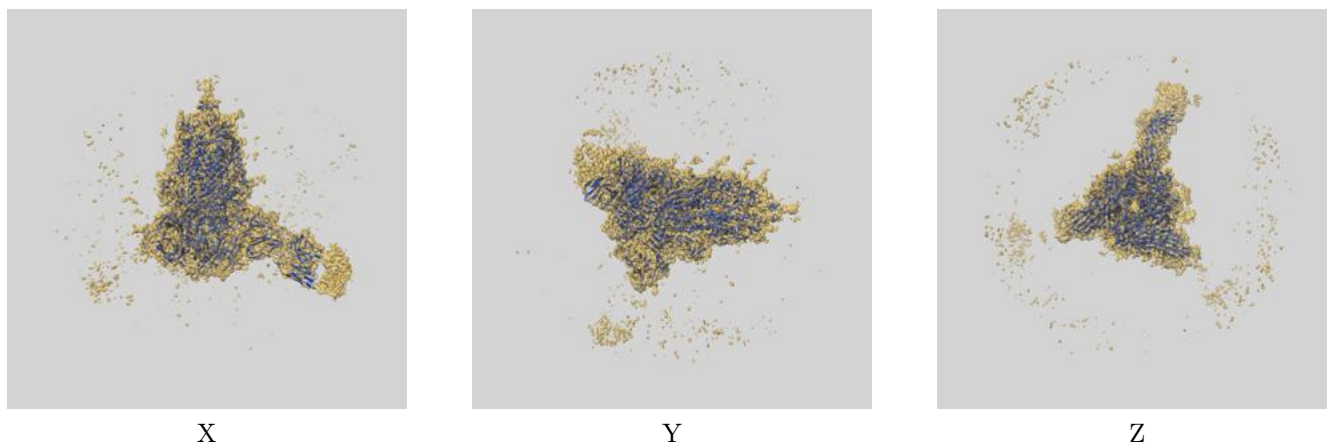
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.13	-	-
Author-provided FSC curve	3.12	3.57	3.17
Unmasked-calculated*	-	-	-

\*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.

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

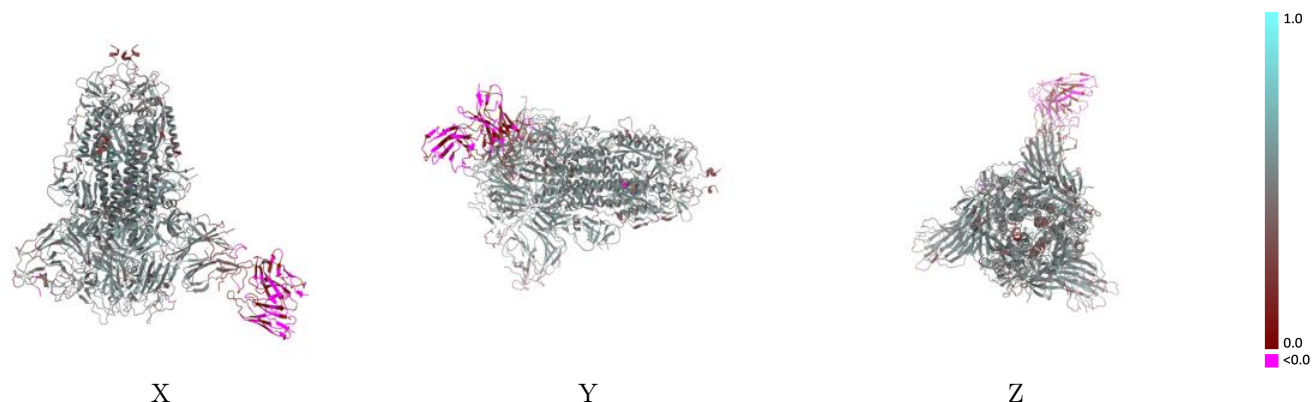
This section contains information regarding the fit between EMDB map EMD-25488 and PDB model 7SWX. Per-residue inclusion information can be found in section [3](#) on page [9](#).

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



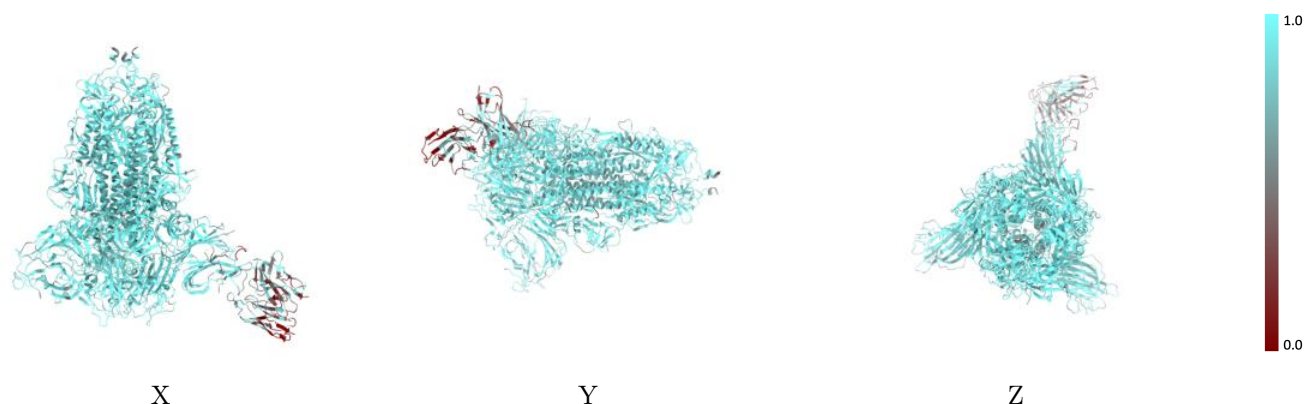
The images above show the 3D surface view of the map at the recommended contour level 0.04 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



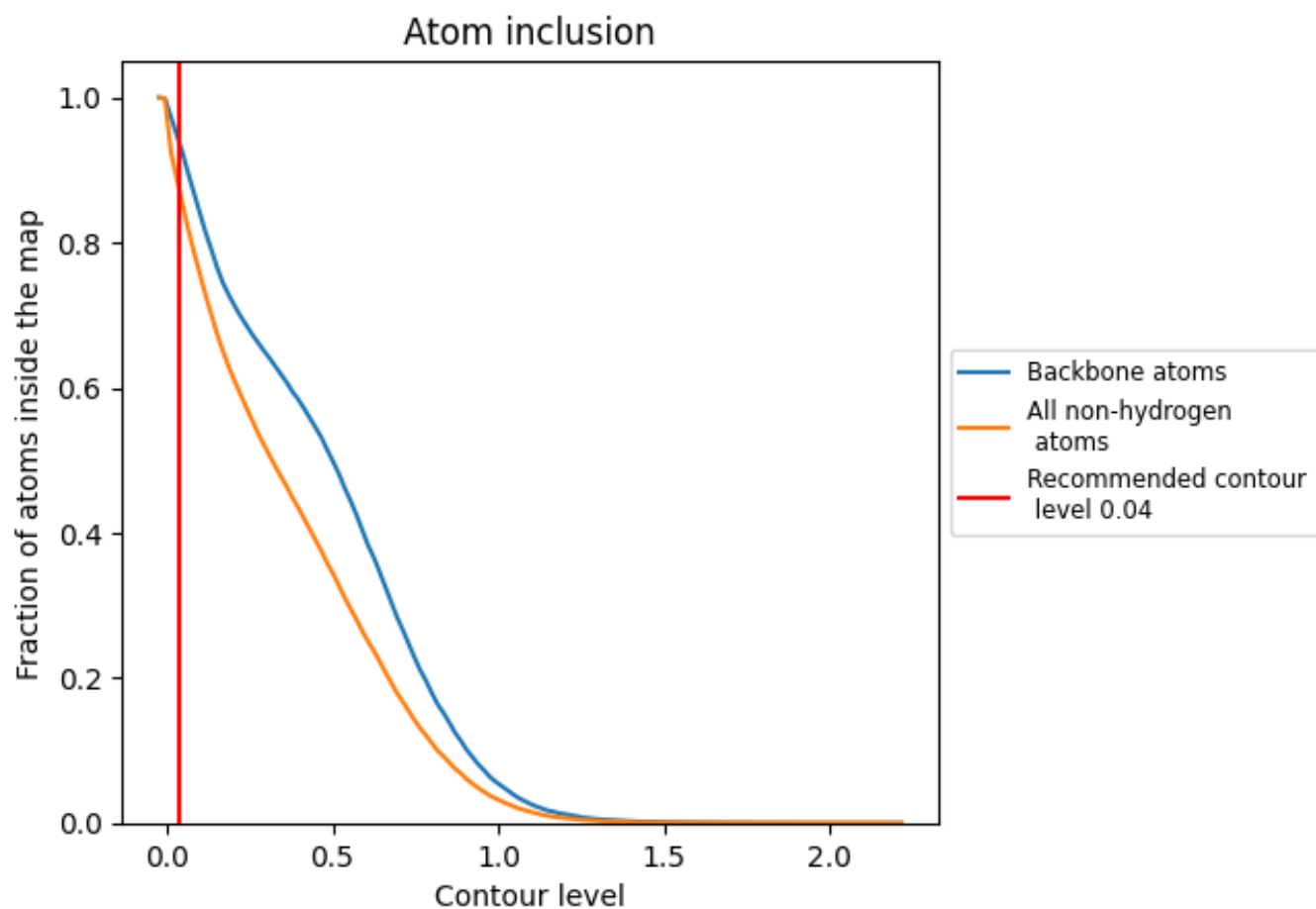
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.04).

## 9.4 Atom inclusion [i](#)







































































At the recommended contour level, 94% of all backbone atoms, 87% 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 (0.04) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8679	 0.4460
A	 0.9027	 0.4700
B	 0.9125	 0.4860
C	 0.9079	 0.4860
D	 0.4286	 0.1210
E	 0.3929	 0.2580
F	 0.0000	 0.1460
G	 0.5714	 0.3150
H	 0.5278	 0.0420
I	 0.7143	 0.3260
J	 0.1786	 0.0960
K	 0.7857	 0.3320
L	 0.4439	 0.0350
M	 0.3571	 0.1660
N	 0.5357	 0.3590
O	 0.3214	 0.1570
P	 0.0000	 0.0650
Q	 0.7143	 0.2990
R	 0.5000	 0.2370
S	 0.4286	 0.2770
T	 0.3571	 0.1850
U	 0.0000	 0.0530
V	 0.5714	 0.2710
W	 0.2500	 0.1400
X	 0.6071	 0.2860
Y	 0.0357	 -0.0400
Z	 0.6786	 0.3050
a	 0.5714	 0.3490
b	 0.6786	 0.3040
c	 0.1786	 0.0300
d	 0.6786	 0.3940
e	 0.7500	 0.3560
f	 0.1429	 0.1620
g	 0.2143	 0.1780

