



## Full wwPDB EM Validation Report ⓘ

Nov 23, 2022 – 04:19 PM JST

PDB ID : 7V89  
EMDB ID : EMD-31794  
Title : Cryo-EM structure of SARS-CoV-2 S-Delta variant (B.1.617.2) in complex with Angiotensin-converting enzyme 2 (ACE2) ectodomain, three ACE2-bound form conformation 1  
Authors : Yang, T.J.; Yu, P.Y.; Chang, Y.C.; Hsu, S.T.D.  
Deposited on : 2021-08-22  
Resolution : 2.80 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

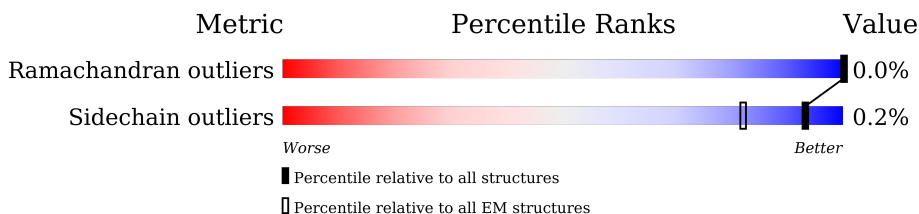
EMDB validation analysis : 0.0.1.dev43  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
MolProbity : 4.02b-467  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.9  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.31.3

# 1 Overall quality at a glance

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

The reported resolution of this entry is 2.80 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.




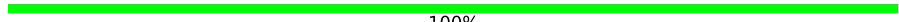
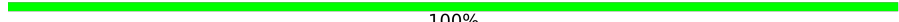





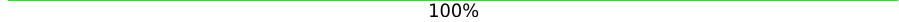
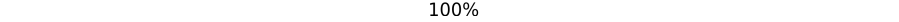

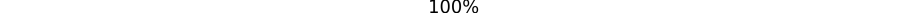
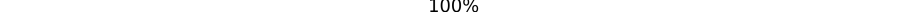
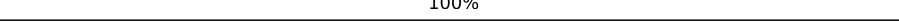
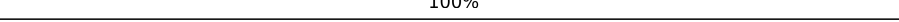
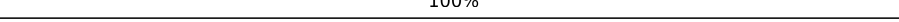

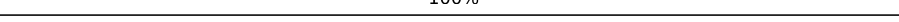
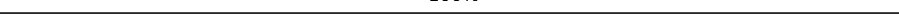






Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

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	1281	
1	B	1281	
1	C	1281	
2	F	861	
2	G	861	
2	H	861	
3	D	2	
3	E	2	
3	I	2	

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

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Mol	Chain	Length	Quality of chain
3	i	2	 100%
3	j	2	 100%
3	k	2	 100%
3	l	2	 100%
3	m	2	 50%
3	n	2	 100%
3	o	2	 100%
3	p	2	 50%
3	q	2	 50%
3	r	2	 100%
3	s	2	 100%
3	t	2	 50%
3	u	2	 100%
3	v	2	 100%
3	w	2	 50%

## 2 Entry composition i

There are 4 unique types of molecules in this entry. The entry contains 40034 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	1027	8016	5113	1340	1527	36	0	0
1	B	1027	8016	5113	1340	1527	36	0	0
1	C	1027	8016	5113	1340	1527	36	0	0

There are 270 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	19	ARG	THR	variant	UNP P0DTC2
A	142	ASP	GLY	variant	UNP P0DTC2
A	156	GLY	GLU	variant	UNP P0DTC2
A	?	-	PHE	deletion	UNP P0DTC2
A	?	-	ARG	deletion	UNP P0DTC2
A	450	ARG	LEU	variant	UNP P0DTC2
A	476	LYS	THR	variant	UNP P0DTC2
A	612	GLY	ASP	variant	UNP P0DTC2
A	679	ARG	PRO	engineered mutation	UNP P0DTC2
A	680	GLY	ARG	engineered mutation	UNP P0DTC2
A	681	SER	ARG	engineered mutation	UNP P0DTC2
A	683	SER	ARG	engineered mutation	UNP P0DTC2
A	948	ASN	ASP	variant	UNP P0DTC2
A	984	PRO	LYS	engineered mutation	UNP P0DTC2
A	985	PRO	VAL	engineered mutation	UNP P0DTC2
A	1207	GLU	-	expression tag	UNP P0DTC2
A	1208	PHE	-	expression tag	UNP P0DTC2
A	1209	GLY	-	expression tag	UNP P0DTC2
A	1210	SER	-	expression tag	UNP P0DTC2
A	1211	GLY	-	expression tag	UNP P0DTC2
A	1212	GLY	-	expression tag	UNP P0DTC2
A	1213	TYR	-	expression tag	UNP P0DTC2
A	1214	ILE	-	expression tag	UNP P0DTC2
A	1215	PRO	-	expression tag	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
A	1216	GLU	-	expression tag	UNP P0DTC2
A	1217	ALA	-	expression tag	UNP P0DTC2
A	1218	PRO	-	expression tag	UNP P0DTC2
A	1219	ARG	-	expression tag	UNP P0DTC2
A	1220	ASP	-	expression tag	UNP P0DTC2
A	1221	GLY	-	expression tag	UNP P0DTC2
A	1222	GLN	-	expression tag	UNP P0DTC2
A	1223	ALA	-	expression tag	UNP P0DTC2
A	1224	TYR	-	expression tag	UNP P0DTC2
A	1225	VAL	-	expression tag	UNP P0DTC2
A	1226	ARG	-	expression tag	UNP P0DTC2
A	1227	LYS	-	expression tag	UNP P0DTC2
A	1228	ASP	-	expression tag	UNP P0DTC2
A	1229	GLY	-	expression tag	UNP P0DTC2
A	1230	GLU	-	expression tag	UNP P0DTC2
A	1231	TRP	-	expression tag	UNP P0DTC2
A	1232	VAL	-	expression tag	UNP P0DTC2
A	1233	LEU	-	expression tag	UNP P0DTC2
A	1234	LEU	-	expression tag	UNP P0DTC2
A	1235	SER	-	expression tag	UNP P0DTC2
A	1236	THR	-	expression tag	UNP P0DTC2
A	1237	PHE	-	expression tag	UNP P0DTC2
A	1238	LEU	-	expression tag	UNP P0DTC2
A	1239	LYS	-	expression tag	UNP P0DTC2
A	1240	GLY	-	expression tag	UNP P0DTC2
A	1241	GLN	-	expression tag	UNP P0DTC2
A	1242	ASP	-	expression tag	UNP P0DTC2
A	1243	ASN	-	expression tag	UNP P0DTC2
A	1244	SER	-	expression tag	UNP P0DTC2
A	1245	ALA	-	expression tag	UNP P0DTC2
A	1246	ASP	-	expression tag	UNP P0DTC2
A	1247	ILE	-	expression tag	UNP P0DTC2
A	1248	GLN	-	expression tag	UNP P0DTC2
A	1249	HIS	-	expression tag	UNP P0DTC2
A	1250	SER	-	expression tag	UNP P0DTC2
A	1251	GLY	-	expression tag	UNP P0DTC2
A	1252	ARG	-	expression tag	UNP P0DTC2
A	1253	PRO	-	expression tag	UNP P0DTC2
A	1254	LEU	-	expression tag	UNP P0DTC2
A	1255	GLU	-	expression tag	UNP P0DTC2
A	1256	SER	-	expression tag	UNP P0DTC2
A	1257	ARG	-	expression tag	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
A	1258	GLY	-	expression tag	UNP P0DTC2
A	1259	PRO	-	expression tag	UNP P0DTC2
A	1260	PHE	-	expression tag	UNP P0DTC2
A	1261	GLU	-	expression tag	UNP P0DTC2
A	1262	GLN	-	expression tag	UNP P0DTC2
A	1263	LYS	-	expression tag	UNP P0DTC2
A	1264	LEU	-	expression tag	UNP P0DTC2
A	1265	ILE	-	expression tag	UNP P0DTC2
A	1266	SER	-	expression tag	UNP P0DTC2
A	1267	GLU	-	expression tag	UNP P0DTC2
A	1268	GLU	-	expression tag	UNP P0DTC2
A	1269	ASP	-	expression tag	UNP P0DTC2
A	1270	LEU	-	expression tag	UNP P0DTC2
A	1271	ASN	-	expression tag	UNP P0DTC2
A	1272	MET	-	expression tag	UNP P0DTC2
A	1273	HIS	-	expression tag	UNP P0DTC2
A	1274	THR	-	expression tag	UNP P0DTC2
A	1275	GLY	-	expression tag	UNP P0DTC2
A	1276	HIS	-	expression tag	UNP P0DTC2
A	1277	HIS	-	expression tag	UNP P0DTC2
A	1278	HIS	-	expression tag	UNP P0DTC2
A	1279	HIS	-	expression tag	UNP P0DTC2
A	1280	HIS	-	expression tag	UNP P0DTC2
A	1281	HIS	-	expression tag	UNP P0DTC2
B	19	ARG	THR	variant	UNP P0DTC2
B	142	ASP	GLY	variant	UNP P0DTC2
B	156	GLY	GLU	variant	UNP P0DTC2
B	?	-	PHE	deletion	UNP P0DTC2
B	?	-	ARG	deletion	UNP P0DTC2
B	450	ARG	LEU	variant	UNP P0DTC2
B	476	LYS	THR	variant	UNP P0DTC2
B	612	GLY	ASP	variant	UNP P0DTC2
B	679	ARG	PRO	engineered mutation	UNP P0DTC2
B	680	GLY	ARG	engineered mutation	UNP P0DTC2
B	681	SER	ARG	engineered mutation	UNP P0DTC2
B	683	SER	ARG	engineered mutation	UNP P0DTC2
B	948	ASN	ASP	variant	UNP P0DTC2
B	984	PRO	LYS	engineered mutation	UNP P0DTC2
B	985	PRO	VAL	engineered mutation	UNP P0DTC2
B	1207	GLU	-	expression tag	UNP P0DTC2
B	1208	PHE	-	expression tag	UNP P0DTC2
B	1209	GLY	-	expression tag	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
B	1210	SER	-	expression tag	UNP P0DTC2
B	1211	GLY	-	expression tag	UNP P0DTC2
B	1212	GLY	-	expression tag	UNP P0DTC2
B	1213	TYR	-	expression tag	UNP P0DTC2
B	1214	ILE	-	expression tag	UNP P0DTC2
B	1215	PRO	-	expression tag	UNP P0DTC2
B	1216	GLU	-	expression tag	UNP P0DTC2
B	1217	ALA	-	expression tag	UNP P0DTC2
B	1218	PRO	-	expression tag	UNP P0DTC2
B	1219	ARG	-	expression tag	UNP P0DTC2
B	1220	ASP	-	expression tag	UNP P0DTC2
B	1221	GLY	-	expression tag	UNP P0DTC2
B	1222	GLN	-	expression tag	UNP P0DTC2
B	1223	ALA	-	expression tag	UNP P0DTC2
B	1224	TYR	-	expression tag	UNP P0DTC2
B	1225	VAL	-	expression tag	UNP P0DTC2
B	1226	ARG	-	expression tag	UNP P0DTC2
B	1227	LYS	-	expression tag	UNP P0DTC2
B	1228	ASP	-	expression tag	UNP P0DTC2
B	1229	GLY	-	expression tag	UNP P0DTC2
B	1230	GLU	-	expression tag	UNP P0DTC2
B	1231	TRP	-	expression tag	UNP P0DTC2
B	1232	VAL	-	expression tag	UNP P0DTC2
B	1233	LEU	-	expression tag	UNP P0DTC2
B	1234	LEU	-	expression tag	UNP P0DTC2
B	1235	SER	-	expression tag	UNP P0DTC2
B	1236	THR	-	expression tag	UNP P0DTC2
B	1237	PHE	-	expression tag	UNP P0DTC2
B	1238	LEU	-	expression tag	UNP P0DTC2
B	1239	LYS	-	expression tag	UNP P0DTC2
B	1240	GLY	-	expression tag	UNP P0DTC2
B	1241	GLN	-	expression tag	UNP P0DTC2
B	1242	ASP	-	expression tag	UNP P0DTC2
B	1243	ASN	-	expression tag	UNP P0DTC2
B	1244	SER	-	expression tag	UNP P0DTC2
B	1245	ALA	-	expression tag	UNP P0DTC2
B	1246	ASP	-	expression tag	UNP P0DTC2
B	1247	ILE	-	expression tag	UNP P0DTC2
B	1248	GLN	-	expression tag	UNP P0DTC2
B	1249	HIS	-	expression tag	UNP P0DTC2
B	1250	SER	-	expression tag	UNP P0DTC2
B	1251	GLY	-	expression tag	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
B	1252	ARG	-	expression tag	UNP P0DTC2
B	1253	PRO	-	expression tag	UNP P0DTC2
B	1254	LEU	-	expression tag	UNP P0DTC2
B	1255	GLU	-	expression tag	UNP P0DTC2
B	1256	SER	-	expression tag	UNP P0DTC2
B	1257	ARG	-	expression tag	UNP P0DTC2
B	1258	GLY	-	expression tag	UNP P0DTC2
B	1259	PRO	-	expression tag	UNP P0DTC2
B	1260	PHE	-	expression tag	UNP P0DTC2
B	1261	GLU	-	expression tag	UNP P0DTC2
B	1262	GLN	-	expression tag	UNP P0DTC2
B	1263	LYS	-	expression tag	UNP P0DTC2
B	1264	LEU	-	expression tag	UNP P0DTC2
B	1265	ILE	-	expression tag	UNP P0DTC2
B	1266	SER	-	expression tag	UNP P0DTC2
B	1267	GLU	-	expression tag	UNP P0DTC2
B	1268	GLU	-	expression tag	UNP P0DTC2
B	1269	ASP	-	expression tag	UNP P0DTC2
B	1270	LEU	-	expression tag	UNP P0DTC2
B	1271	ASN	-	expression tag	UNP P0DTC2
B	1272	MET	-	expression tag	UNP P0DTC2
B	1273	HIS	-	expression tag	UNP P0DTC2
B	1274	THR	-	expression tag	UNP P0DTC2
B	1275	GLY	-	expression tag	UNP P0DTC2
B	1276	HIS	-	expression tag	UNP P0DTC2
B	1277	HIS	-	expression tag	UNP P0DTC2
B	1278	HIS	-	expression tag	UNP P0DTC2
B	1279	HIS	-	expression tag	UNP P0DTC2
B	1280	HIS	-	expression tag	UNP P0DTC2
B	1281	HIS	-	expression tag	UNP P0DTC2
C	19	ARG	THR	variant	UNP P0DTC2
C	142	ASP	GLY	variant	UNP P0DTC2
C	156	GLY	GLU	variant	UNP P0DTC2
C	?	-	PHE	deletion	UNP P0DTC2
C	?	-	ARG	deletion	UNP P0DTC2
C	450	ARG	LEU	variant	UNP P0DTC2
C	476	LYS	THR	variant	UNP P0DTC2
C	612	GLY	ASP	variant	UNP P0DTC2
C	679	ARG	PRO	engineered mutation	UNP P0DTC2
C	680	GLY	ARG	engineered mutation	UNP P0DTC2
C	681	SER	ARG	engineered mutation	UNP P0DTC2
C	683	SER	ARG	engineered mutation	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
C	948	ASN	ASP	variant	UNP P0DTC2
C	984	PRO	LYS	engineered mutation	UNP P0DTC2
C	985	PRO	VAL	engineered mutation	UNP P0DTC2
C	1207	GLU	-	expression tag	UNP P0DTC2
C	1208	PHE	-	expression tag	UNP P0DTC2
C	1209	GLY	-	expression tag	UNP P0DTC2
C	1210	SER	-	expression tag	UNP P0DTC2
C	1211	GLY	-	expression tag	UNP P0DTC2
C	1212	GLY	-	expression tag	UNP P0DTC2
C	1213	TYR	-	expression tag	UNP P0DTC2
C	1214	ILE	-	expression tag	UNP P0DTC2
C	1215	PRO	-	expression tag	UNP P0DTC2
C	1216	GLU	-	expression tag	UNP P0DTC2
C	1217	ALA	-	expression tag	UNP P0DTC2
C	1218	PRO	-	expression tag	UNP P0DTC2
C	1219	ARG	-	expression tag	UNP P0DTC2
C	1220	ASP	-	expression tag	UNP P0DTC2
C	1221	GLY	-	expression tag	UNP P0DTC2
C	1222	GLN	-	expression tag	UNP P0DTC2
C	1223	ALA	-	expression tag	UNP P0DTC2
C	1224	TYR	-	expression tag	UNP P0DTC2
C	1225	VAL	-	expression tag	UNP P0DTC2
C	1226	ARG	-	expression tag	UNP P0DTC2
C	1227	LYS	-	expression tag	UNP P0DTC2
C	1228	ASP	-	expression tag	UNP P0DTC2
C	1229	GLY	-	expression tag	UNP P0DTC2
C	1230	GLU	-	expression tag	UNP P0DTC2
C	1231	TRP	-	expression tag	UNP P0DTC2
C	1232	VAL	-	expression tag	UNP P0DTC2
C	1233	LEU	-	expression tag	UNP P0DTC2
C	1234	LEU	-	expression tag	UNP P0DTC2
C	1235	SER	-	expression tag	UNP P0DTC2
C	1236	THR	-	expression tag	UNP P0DTC2
C	1237	PHE	-	expression tag	UNP P0DTC2
C	1238	LEU	-	expression tag	UNP P0DTC2
C	1239	LYS	-	expression tag	UNP P0DTC2
C	1240	GLY	-	expression tag	UNP P0DTC2
C	1241	GLN	-	expression tag	UNP P0DTC2
C	1242	ASP	-	expression tag	UNP P0DTC2
C	1243	ASN	-	expression tag	UNP P0DTC2
C	1244	SER	-	expression tag	UNP P0DTC2
C	1245	ALA	-	expression tag	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
C	1246	ASP	-	expression tag	UNP P0DTC2
C	1247	ILE	-	expression tag	UNP P0DTC2
C	1248	GLN	-	expression tag	UNP P0DTC2
C	1249	HIS	-	expression tag	UNP P0DTC2
C	1250	SER	-	expression tag	UNP P0DTC2
C	1251	GLY	-	expression tag	UNP P0DTC2
C	1252	ARG	-	expression tag	UNP P0DTC2
C	1253	PRO	-	expression tag	UNP P0DTC2
C	1254	LEU	-	expression tag	UNP P0DTC2
C	1255	GLU	-	expression tag	UNP P0DTC2
C	1256	SER	-	expression tag	UNP P0DTC2
C	1257	ARG	-	expression tag	UNP P0DTC2
C	1258	GLY	-	expression tag	UNP P0DTC2
C	1259	PRO	-	expression tag	UNP P0DTC2
C	1260	PHE	-	expression tag	UNP P0DTC2
C	1261	GLU	-	expression tag	UNP P0DTC2
C	1262	GLN	-	expression tag	UNP P0DTC2
C	1263	LYS	-	expression tag	UNP P0DTC2
C	1264	LEU	-	expression tag	UNP P0DTC2
C	1265	ILE	-	expression tag	UNP P0DTC2
C	1266	SER	-	expression tag	UNP P0DTC2
C	1267	GLU	-	expression tag	UNP P0DTC2
C	1268	GLU	-	expression tag	UNP P0DTC2
C	1269	ASP	-	expression tag	UNP P0DTC2
C	1270	LEU	-	expression tag	UNP P0DTC2
C	1271	ASN	-	expression tag	UNP P0DTC2
C	1272	MET	-	expression tag	UNP P0DTC2
C	1273	HIS	-	expression tag	UNP P0DTC2
C	1274	THR	-	expression tag	UNP P0DTC2
C	1275	GLY	-	expression tag	UNP P0DTC2
C	1276	HIS	-	expression tag	UNP P0DTC2
C	1277	HIS	-	expression tag	UNP P0DTC2
C	1278	HIS	-	expression tag	UNP P0DTC2
C	1279	HIS	-	expression tag	UNP P0DTC2
C	1280	HIS	-	expression tag	UNP P0DTC2
C	1281	HIS	-	expression tag	UNP P0DTC2

- Molecule 2 is a protein called Angiotensin-converting enzyme 2, Angiotensin-converting enzyme 2 (ACE2) ectodomain.

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

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Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	G	596	Total	C	N	O	S	0	0
			4862	3111	805	917	29		
2	H	596	Total	C	N	O	S	0	0
			4862	3111	805	917	29		

- 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	D	2	Total	C	N	O	0	0
			28	16	2	10		
3	E	2	Total	C	N	O	0	0
			28	16	2	10		
3	I	2	Total	C	N	O	0	0
			28	16	2	10		
3	J	2	Total	C	N	O	0	0
			28	16	2	10		
3	K	2	Total	C	N	O	0	0
			28	16	2	10		
3	L	2	Total	C	N	O	0	0
			28	16	2	10		
3	M	2	Total	C	N	O	0	0
			28	16	2	10		
3	N	2	Total	C	N	O	0	0
			28	16	2	10		
3	O	2	Total	C	N	O	0	0
			28	16	2	10		
3	P	2	Total	C	N	O	0	0
			28	16	2	10		
3	Q	2	Total	C	N	O	0	0
			28	16	2	10		
3	R	2	Total	C	N	O	0	0
			28	16	2	10		
3	S	2	Total	C	N	O	0	0
			28	16	2	10		
3	T	2	Total	C	N	O	0	0
			28	16	2	10		
3	U	2	Total	C	N	O	0	0
			28	16	2	10		

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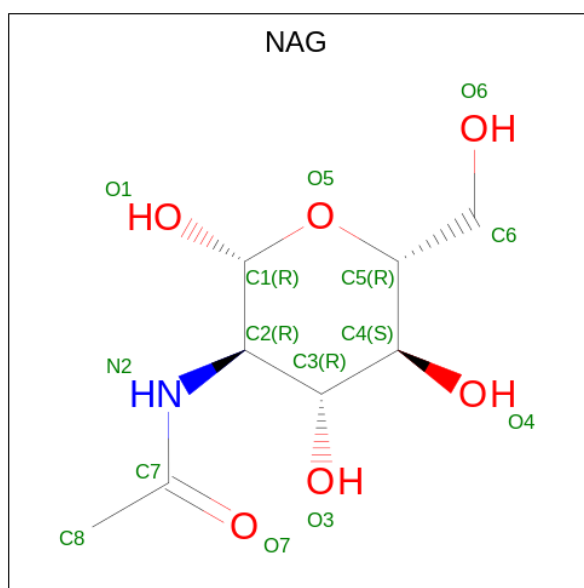
Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
3	V	2	28	16	2	10	0	0
3	W	2	28	16	2	10	0	0
3	X	2	28	16	2	10	0	0
3	Y	2	28	16	2	10	0	0
3	Z	2	28	16	2	10	0	0
3	a	2	28	16	2	10	0	0
3	b	2	28	16	2	10	0	0
3	c	2	28	16	2	10	0	0
3	d	2	28	16	2	10	0	0
3	e	2	28	16	2	10	0	0
3	f	2	28	16	2	10	0	0
3	g	2	28	16	2	10	0	0
3	h	2	28	16	2	10	0	0
3	i	2	28	16	2	10	0	0
3	j	2	28	16	2	10	0	0
3	k	2	28	16	2	10	0	0
3	l	2	28	16	2	10	0	0
3	m	2	28	16	2	10	0	0
3	n	2	28	16	2	10	0	0
3	o	2	28	16	2	10	0	0
3	p	2	28	16	2	10	0	0

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

- Molecule 4 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula:  $C_8H_{15}NO_6$ ).



Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
4	A	1	Total 42	C 24	N 3	O 15	0
4	A	1	Total 42	C 24	N 3	O 15	0
4	A	1	Total 42	C 24	N 3	O 15	0
4	B	1	Total 56	C 32	N 4	O 20	0

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Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
4	B	1	Total 56	C 32	N 4	O 20	0
4	B	1	Total 56	C 32	N 4	O 20	0
4	B	1	Total 56	C 32	N 4	O 20	0
4	C	1	Total 42	C 24	N 3	O 15	0
4	C	1	Total 42	C 24	N 3	O 15	0
4	C	1	Total 42	C 24	N 3	O 15	0
4	F	1	Total 28	C 16	N 2	O 10	0
4	F	1	Total 28	C 16	N 2	O 10	0
4	H	1	Total 28	C 16	N 2	O 10	0
4	H	1	Total 28	C 16	N 2	O 10	0





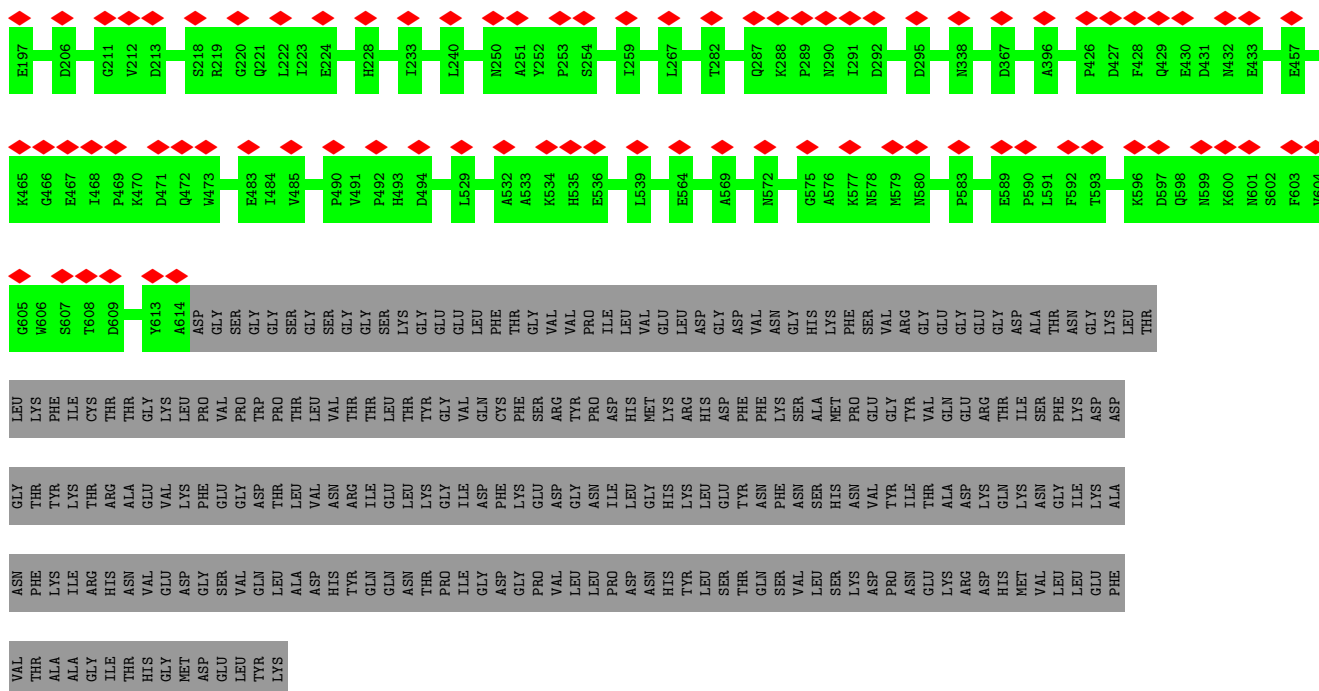


T92	M152	V212	G272	Q340	E433	H493	L554	ASP
V93	A153	D213	R273	H345	T434	D494	F565	GLY
K94	M154	G214	F274	P346	E435	E495	M566	SER
L95	S155	Y215	W275	T347	I436	T496	M567	GLY
Q96	L156	D216	T276	M347	M437	Y497	L568	SER
L97	D157	Y217	N277	C361	F438	C498	R569	GLY
Q98	Y158	S218	L278	T362	L439	A501	K562	GLY
A99	M159	R219	Y279	K363	L440	S502	S563	GLY
L100	E160	G220	S280	T364	K441	L503	E564	SER
Q101	R161	Q221	L281	V365	Q442	F504	P565	THR
Q102	R162	L222	T282	M366	A443	H505	M566	GLY
N103	V163	I223	V283	D367	L444	V506	T567	THR
G104	A164	E224	P284	D368	T445	S507	L568	GLY
S105	V165	D225	F285	F369	I446	M508	A569	THR
S106	E166	V226	G286	A372	V447	D509	L570	GLY
V107	S167	E227	Q287	E375	G448	Y510	E571	VAL
L108	V168	H228	K288	A386	T449	S511	M572	VAL
S109	R169	T229	P289	A387	L450	F512	N573	PRO
E110	S170	F230	N290	Q388	P451	L513	W574	ASN
D111	E171	E231	I291	F390	F452	R514	W574	VAL
K112	V172	E232	D292	F390	T453	Y515	G576	GLY
S113	G173	I233	V293	P389	Y454	Y516	A576	ASP
K114	K174	K234	T294	F390	M455	T517	M577	GLY
R115	Q175	P235	T295	L391	L456	R518	N578	ASP
L116	L176	L236	A296	G395	E457	T519	M579	ASP
N117	R177	Y237	M297	A396	K458	L520	N580	ASN
T118	P178	E238	V298	N397	W459	Y521	W581	GLY
I119	L179	H239	D299	F400	R460	Q522	R582	SER
L120	Y180	Q300	Q300	H401	W461	F523	P583	ALA
M121	E181	H241	A301	I407	M462	Q524	L584	SER
T122	Y182	A242	W302	M408	V463	F525	L586	VAL
M123	Y183	Y243	D303	S409	F464	Q526	Y587	ARG
S124	V184	V244	A304	M408	K465	E527	F588	GLY
I126	V185	R245	K309	L410	G466	A528	E589	GLY
Y127	K187	A246	E312	S411	E467	L529	P590	ASP
S128	N188	K247	K313	A412	I468	C530	L591	ALA
T129	E189	L248	F314	A413	P469	Q531	F592	THR
G130	M190	M249	F315	T414	K470	A532	T593	ASN
K131	A191	N250	V316	Q472	D471	A533	W594	GLY
V132	R192	A251	S317	K416	Q473	K534	L595	LEU
C133	A193	Y252	V318	H417	W473	E535	K596	THR
M134	N194	S254	G319	L418	M474	E536	D597	THR
P135	H195	Y255	L320	L419	K475	G537	L599	LEU
D136	Y196	I256	P321	S420	K476	P538	Q600	THR
M137	E197	S257	N322	I421	W478	L539	M601	THR
P138	D198	P258	M323	G422	E479	H540	S602	THR
Q139	Y199	I259	T324	L423	M480	K541	F603	ALA
E140	G200	G260	Q325	L424	K481	C542	W604	THR
C141	D201	L262	G326	S425	R482	D543	V604	THR
L142	Y202	L262	F327	P426	E483	S545	G606	THR
L143	W203	P263	W328	F428	I484	N546	S607	THR
L144	R204	A264	E329	F428	V485	T547	T608	THR
E145	G205	H265	N330	Q429	G486	E548	D609	THR
P146	D206	L266	D335	E430	V487	E549	M610	THR
G147	Y207	L267	N338	D431	V488	A550	S611	THR
L148	E208	G268	V339	M432	E489	Q551	P612	THR
N149	V209	D269			P490	Q552	W613	THR
E150	N210	M270			V491	K553	A614	THR
I151	G211	W271			P492			THR

• Molecule 2: Angiotensin-converting enzyme 2, Angiotensin-converting enzyme 2 (ACE2) ectodomain



MET	E110	Q131	E145	L156	M159	P178	E181
SER	Q86	V132	P146			L179	
SER	E87	C133	G147			Y180	
SER	I88	N134					
SER	Q89	P135					
TRP		D136					
LEU		N137					
LEU		P138					
LEU		Q139					
LEU		E140					
LEU		G141					
ALA							
ALA							
GLN							



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

Chain D: 100%

MAG1  
MAG2

- 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 I: 50%  
100%

MAG1  
MAG2

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

Chain J: 100%

MAG1  
MAG2

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

Chain K:  100%MAG1  
MAG2

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

Chain L:  100%MAG1  
MAG2

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

Chain M:  100%MAG1  
MAG2

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

Chain N:  50%MAG1  
MAG2

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

Chain O:  100%MAG1  
MAG2

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

Chain P:  100%MAG1  
MAG2

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

Chain Q:  50% 50%

MAG1  
MAG2

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

Chain R:  100%

MAG1  
MAG2

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

Chain S:  100%

MAG1  
MAG2

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

Chain T:  50% 50%

MAG1  
MAG2

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

Chain U:  100%

MAG1  
MAG2

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

Chain V:  50% 100%

MAG1  
MAG2

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

Chain W:  100%

MAG1  
MAG2

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

Chain X:  100%

MAG1  
MAG2

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

Chain Y:  100%

MAG1  
MAG2

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

Chain Z:  50% 50%

MAG1  
MAG2

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

Chain a:  100%

MAG1  
MAG2

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

Chain b:  100%

MAG1  
MAG2

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

Chain c:  50% 50%

MAG1  
MAG2

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

Chain d:  100%

MAG1  
MAG2

- 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 f:  100%

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

Chain h:  50%  
100%

MAG1  
MAG2

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

Chain i:  100%

MAG1  
MAG2

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

Chain j:  100%

NAG1  
NAG2

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

Chain k:  100%

NAG1  
NAG2

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

Chain l:  100%

NAG1  
NAG2

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

Chain m:  50% 50%

NAG1  
NAG2

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

Chain n:  100%

NAG1  
NAG2

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

Chain o:  100%

NAG1  
NAG2

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

Chain p:  50% 50%

NAG1  
NAG2



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

Chain q:  50% 50%



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

Chain r:  100%



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

Chain s:  100%



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

Chain t:  50% 50% 50%



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

Chain u:  100%



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

Chain v:  100%



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



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	481781	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 ( $e^-/\text{\AA}^2$ )	1.0	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	3.203	Depositor
Minimum map value	-1.733	Depositor
Average map value	-0.001	Depositor
Map value standard deviation	0.060	Depositor
Recommended contour level	0.23	Depositor
Map size ( $\text{\AA}$ )	422.40002, 422.40002, 422.40002	wwPDB
Map dimensions	384, 384, 384	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	0.25	0/8197	0.48	0/11155
1	B	0.25	0/8197	0.48	0/11155
1	C	0.25	0/8197	0.48	0/11155
2	F	0.24	0/4999	0.45	1/6792 (0.0%)
2	G	0.24	0/4999	0.43	1/6792 (0.0%)
2	H	0.24	0/4999	0.43	0/6792
All	All	0.25	0/39588	0.46	2/53841 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	G	253	PRO	CA-N-CD	-7.25	101.36	111.50
2	F	123	MET	CA-CB-CG	5.44	122.55	113.30

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	1011/1281 (79%)	970 (96%)	41 (4%)	0	100	100
1	B	1011/1281 (79%)	965 (96%)	45 (4%)	1 (0%)	51	81
1	C	1011/1281 (79%)	970 (96%)	40 (4%)	1 (0%)	51	81
2	F	594/861 (69%)	559 (94%)	35 (6%)	0	100	100
2	G	594/861 (69%)	561 (94%)	33 (6%)	0	100	100
2	H	594/861 (69%)	557 (94%)	37 (6%)	0	100	100
All	All	4815/6426 (75%)	4582 (95%)	231 (5%)	2 (0%)	100	100

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	527	LYS
1	B	25	PRO

### 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	898/1113 (81%)	895 (100%)	3 (0%)	92	98
1	B	898/1113 (81%)	894 (100%)	4 (0%)	91	97
1	C	898/1113 (81%)	896 (100%)	2 (0%)	93	98
2	F	526/752 (70%)	526 (100%)	0	100	100
2	G	526/752 (70%)	526 (100%)	0	100	100
2	H	526/752 (70%)	526 (100%)	0	100	100
All	All	4272/5595 (76%)	4263 (100%)	9 (0%)	93	98

All (9) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	212	ARG
1	A	344	ARG
1	A	476	LYS
1	B	19	ARG
1	B	21	ARG
1	B	212	ARG
1	B	344	ARG
1	C	212	ARG
1	C	344	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (9) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	448	ASN
2	F	442	GLN
2	F	531	GLN
2	F	552	GLN
2	F	556	ASN
2	G	188	ASN
2	G	531	GLN
2	H	531	GLN
2	H	552	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](#)

86 monosaccharides are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the

expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z  > 2$	Counts	RMSZ	$\# Z  > 2$
3	NAG	D	1	1,3	14,14,15	0.33	0	17,19,21	0.57	0
3	NAG	D	2	3	14,14,15	0.22	0	17,19,21	0.38	0
3	NAG	E	1	1,3	14,14,15	0.35	0	17,19,21	0.32	0
3	NAG	E	2	3	14,14,15	0.21	0	17,19,21	0.42	0
3	NAG	I	1	1,3	14,14,15	0.23	0	17,19,21	0.45	0
3	NAG	I	2	3	14,14,15	0.24	0	17,19,21	0.45	0
3	NAG	J	1	1,3	14,14,15	0.23	0	17,19,21	0.52	0
3	NAG	J	2	3	14,14,15	0.21	0	17,19,21	0.42	0
3	NAG	K	1	1,3	14,14,15	0.18	0	17,19,21	0.41	0
3	NAG	K	2	3	14,14,15	0.21	0	17,19,21	0.44	0
3	NAG	L	1	1,3	14,14,15	0.24	0	17,19,21	0.40	0
3	NAG	L	2	3	14,14,15	0.22	0	17,19,21	0.41	0
3	NAG	M	1	1,3	14,14,15	0.26	0	17,19,21	0.48	0
3	NAG	M	2	3	14,14,15	0.22	0	17,19,21	0.41	0
3	NAG	N	1	1,3	14,14,15	0.37	0	17,19,21	1.28	2 (11%)
3	NAG	N	2	3	14,14,15	0.21	0	17,19,21	0.47	0
3	NAG	O	1	1,3	14,14,15	0.23	0	17,19,21	0.45	0
3	NAG	O	2	3	14,14,15	0.23	0	17,19,21	0.39	0
3	NAG	P	1	1,3	14,14,15	0.18	0	17,19,21	0.44	0
3	NAG	P	2	3	14,14,15	0.22	0	17,19,21	0.40	0
3	NAG	Q	1	1,3	14,14,15	0.60	0	17,19,21	0.92	1 (5%)
3	NAG	Q	2	3	14,14,15	0.17	0	17,19,21	0.55	0
3	NAG	R	1	1,3	14,14,15	0.21	0	17,19,21	0.43	0
3	NAG	R	2	3	14,14,15	0.22	0	17,19,21	0.40	0
3	NAG	S	1	1,3	14,14,15	0.21	0	17,19,21	0.44	0
3	NAG	S	2	3	14,14,15	0.23	0	17,19,21	0.42	0
3	NAG	T	1	1,3	14,14,15	0.50	0	17,19,21	0.71	1 (5%)
3	NAG	T	2	3	14,14,15	0.21	0	17,19,21	0.45	0
3	NAG	U	1	1,3	14,14,15	0.23	0	17,19,21	0.51	0
3	NAG	U	2	3	14,14,15	0.25	0	17,19,21	0.40	0
3	NAG	V	1	1,3	14,14,15	0.21	0	17,19,21	0.49	0
3	NAG	V	2	3	14,14,15	0.23	0	17,19,21	0.45	0
3	NAG	W	1	1,3	14,14,15	0.24	0	17,19,21	0.53	0
3	NAG	W	2	3	14,14,15	0.22	0	17,19,21	0.41	0
3	NAG	X	1	1,3	14,14,15	0.19	0	17,19,21	0.41	0
3	NAG	X	2	3	14,14,15	0.21	0	17,19,21	0.43	0
3	NAG	Y	1	1,3	14,14,15	0.29	0	17,19,21	0.50	0
3	NAG	Y	2	3	14,14,15	0.23	0	17,19,21	0.40	0
3	NAG	Z	1	1,3	14,14,15	0.39	0	17,19,21	1.27	2 (11%)

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	0.22	0	17,19,21	0.45	0
3	NAG	a	1	1,3	14,14,15	0.24	0	17,19,21	0.48	0
3	NAG	a	2	3	14,14,15	0.25	0	17,19,21	0.39	0
3	NAG	b	1	1,3	14,14,15	0.21	0	17,19,21	0.46	0
3	NAG	b	2	3	14,14,15	0.22	0	17,19,21	0.40	0
3	NAG	c	1	1,3	14,14,15	0.59	0	17,19,21	0.94	1 (5%)
3	NAG	c	2	3	14,14,15	0.20	0	17,19,21	0.52	0
3	NAG	d	1	1,3	14,14,15	0.21	0	17,19,21	0.42	0
3	NAG	d	2	3	14,14,15	0.23	0	17,19,21	0.40	0
3	NAG	e	1	1,3	14,14,15	0.23	0	17,19,21	0.45	0
3	NAG	e	2	3	14,14,15	0.23	0	17,19,21	0.41	0
3	NAG	f	1	1,3	14,14,15	0.41	0	17,19,21	0.61	0
3	NAG	f	2	3	14,14,15	0.24	0	17,19,21	0.39	0
3	NAG	g	1	1,3	14,14,15	0.21	0	17,19,21	0.39	0
3	NAG	g	2	3	14,14,15	0.26	0	17,19,21	0.40	0
3	NAG	h	1	1,3	14,14,15	0.20	0	17,19,21	0.47	0
3	NAG	h	2	3	14,14,15	0.25	0	17,19,21	0.45	0
3	NAG	i	1	1,3	14,14,15	0.23	0	17,19,21	0.49	0
3	NAG	i	2	3	14,14,15	0.23	0	17,19,21	0.42	0
3	NAG	j	1	1,3	14,14,15	0.20	0	17,19,21	0.40	0
3	NAG	j	2	3	14,14,15	0.21	0	17,19,21	0.43	0
3	NAG	k	1	1,3	14,14,15	0.27	0	17,19,21	0.55	0
3	NAG	k	2	3	14,14,15	0.25	0	17,19,21	0.57	0
3	NAG	l	1	1,3	14,14,15	0.28	0	17,19,21	0.52	0
3	NAG	l	2	3	14,14,15	0.23	0	17,19,21	0.41	0
3	NAG	m	1	1,3	14,14,15	0.38	0	17,19,21	1.28	2 (11%)
3	NAG	m	2	3	14,14,15	0.23	0	17,19,21	0.48	0
3	NAG	n	1	1,3	14,14,15	0.25	0	17,19,21	0.49	0
3	NAG	n	2	3	14,14,15	0.22	0	17,19,21	0.39	0
3	NAG	o	1	1,3	14,14,15	0.24	0	17,19,21	0.48	0
3	NAG	o	2	3	14,14,15	0.23	0	17,19,21	0.40	0
3	NAG	p	1	1,3	14,14,15	0.62	0	17,19,21	0.92	1 (5%)
3	NAG	p	2	3	14,14,15	0.21	0	17,19,21	0.52	0
3	NAG	q	1	1,3	14,14,15	1.05	1 (7%)	17,19,21	1.04	1 (5%)
3	NAG	q	2	3	14,14,15	0.23	0	17,19,21	0.49	0
3	NAG	r	1	1,3	14,14,15	0.21	0	17,19,21	0.43	0
3	NAG	r	2	3	14,14,15	0.24	0	17,19,21	0.43	0
3	NAG	s	1	2,3	14,14,15	0.19	0	17,19,21	0.39	0
3	NAG	s	2	3	14,14,15	0.26	0	17,19,21	0.53	0
3	NAG	t	1	2,3	14,14,15	0.41	0	17,19,21	1.26	1 (5%)
3	NAG	t	2	3	14,14,15	0.22	0	17,19,21	0.42	0
3	NAG	u	1	2,3	14,14,15	0.21	0	17,19,21	0.47	0



Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
3	NAG	u	2	3	14,14,15	0.24	0	17,19,21	0.45	0
3	NAG	v	1	2,3	14,14,15	0.18	0	17,19,21	0.39	0
3	NAG	v	2	3	14,14,15	0.24	0	17,19,21	0.46	0
3	NAG	w	1	2,3	14,14,15	0.22	0	17,19,21	0.42	0
3	NAG	w	2	3	14,14,15	0.24	0	17,19,21	0.42	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NAG	D	1	1,3	-	2/6/23/26	0/1/1/1
3	NAG	D	2	3	-	2/6/23/26	0/1/1/1
3	NAG	E	1	1,3	-	1/6/23/26	0/1/1/1
3	NAG	E	2	3	-	1/6/23/26	0/1/1/1
3	NAG	I	1	1,3	-	2/6/23/26	0/1/1/1
3	NAG	I	2	3	-	2/6/23/26	0/1/1/1
3	NAG	J	1	1,3	-	1/6/23/26	0/1/1/1
3	NAG	J	2	3	-	4/6/23/26	0/1/1/1
3	NAG	K	1	1,3	-	3/6/23/26	0/1/1/1
3	NAG	K	2	3	-	4/6/23/26	0/1/1/1
3	NAG	L	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	L	2	3	-	0/6/23/26	0/1/1/1
3	NAG	M	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	M	2	3	-	0/6/23/26	0/1/1/1
3	NAG	N	1	1,3	-	5/6/23/26	0/1/1/1
3	NAG	N	2	3	-	2/6/23/26	0/1/1/1
3	NAG	O	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	O	2	3	-	0/6/23/26	0/1/1/1
3	NAG	P	1	1,3	-	2/6/23/26	0/1/1/1
3	NAG	P	2	3	-	0/6/23/26	0/1/1/1
3	NAG	Q	1	1,3	-	1/6/23/26	0/1/1/1
3	NAG	Q	2	3	-	2/6/23/26	0/1/1/1
3	NAG	R	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	R	2	3	-	0/6/23/26	0/1/1/1
3	NAG	S	1	1,3	-	2/6/23/26	0/1/1/1
3	NAG	S	2	3	-	2/6/23/26	0/1/1/1
3	NAG	T	1	1,3	-	2/6/23/26	0/1/1/1

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

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NAG	m	1	1,3	-	5/6/23/26	0/1/1/1
3	NAG	m	2	3	-	2/6/23/26	0/1/1/1
3	NAG	n	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	n	2	3	-	2/6/23/26	0/1/1/1
3	NAG	o	1	1,3	-	2/6/23/26	0/1/1/1
3	NAG	o	2	3	-	0/6/23/26	0/1/1/1
3	NAG	p	1	1,3	-	1/6/23/26	0/1/1/1
3	NAG	p	2	3	-	2/6/23/26	0/1/1/1
3	NAG	q	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	q	2	3	-	0/6/23/26	0/1/1/1
3	NAG	r	1	1,3	-	2/6/23/26	0/1/1/1
3	NAG	r	2	3	-	0/6/23/26	0/1/1/1
3	NAG	s	1	2,3	-	4/6/23/26	0/1/1/1
3	NAG	s	2	3	-	3/6/23/26	0/1/1/1
3	NAG	t	1	2,3	-	5/6/23/26	0/1/1/1
3	NAG	t	2	3	-	4/6/23/26	0/1/1/1
3	NAG	u	1	2,3	-	2/6/23/26	0/1/1/1
3	NAG	u	2	3	-	2/6/23/26	0/1/1/1
3	NAG	v	1	2,3	-	2/6/23/26	0/1/1/1
3	NAG	v	2	3	-	1/6/23/26	0/1/1/1
3	NAG	w	1	2,3	-	1/6/23/26	0/1/1/1
3	NAG	w	2	3	-	2/6/23/26	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	q	1	NAG	O5-C1	-3.66	1.37	1.43

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	N	1	NAG	C2-N2-C7	4.39	129.15	122.90
3	m	1	NAG	C2-N2-C7	4.38	129.14	122.90
3	Z	1	NAG	C2-N2-C7	4.34	129.09	122.90
3	t	1	NAG	C2-N2-C7	4.28	129.00	122.90
3	c	1	NAG	C1-O5-C5	2.87	116.08	112.19
3	p	1	NAG	C1-O5-C5	2.80	115.99	112.19
3	Q	1	NAG	C1-O5-C5	2.75	115.91	112.19
3	q	1	NAG	C3-C4-C5	2.71	115.06	110.24

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	m	1	NAG	C1-C2-N2	2.06	114.00	110.49
3	Z	1	NAG	C1-C2-N2	2.03	113.96	110.49
3	T	1	NAG	C1-O5-C5	2.02	114.93	112.19
3	N	1	NAG	C1-C2-N2	2.02	113.93	110.49

There are no chirality outliers.

All (144) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	D	1	NAG	C4-C5-C6-O6
3	d	2	NAG	C4-C5-C6-O6
3	f	2	NAG	C4-C5-C6-O6
3	D	2	NAG	C4-C5-C6-O6
3	f	1	NAG	C4-C5-C6-O6
3	V	1	NAG	O5-C5-C6-O6
3	j	2	NAG	C4-C5-C6-O6
3	D	1	NAG	O5-C5-C6-O6
3	f	2	NAG	O5-C5-C6-O6
3	Y	2	NAG	C4-C5-C6-O6
3	h	2	NAG	C4-C5-C6-O6
3	d	2	NAG	O5-C5-C6-O6
3	X	2	NAG	C4-C5-C6-O6
3	c	1	NAG	C4-C5-C6-O6
3	K	2	NAG	C4-C5-C6-O6
3	t	2	NAG	C4-C5-C6-O6
3	Q	2	NAG	O5-C5-C6-O6
3	S	1	NAG	O5-C5-C6-O6
3	X	2	NAG	O5-C5-C6-O6
3	p	2	NAG	O5-C5-C6-O6
3	r	1	NAG	O5-C5-C6-O6
3	t	1	NAG	O5-C5-C6-O6
3	V	1	NAG	C4-C5-C6-O6
3	v	1	NAG	C4-C5-C6-O6
3	D	2	NAG	O5-C5-C6-O6
3	I	2	NAG	O5-C5-C6-O6
3	f	1	NAG	O5-C5-C6-O6
3	o	1	NAG	O5-C5-C6-O6
3	U	2	NAG	C4-C5-C6-O6
3	Y	2	NAG	O5-C5-C6-O6
3	c	1	NAG	O5-C5-C6-O6
3	h	2	NAG	O5-C5-C6-O6
3	j	2	NAG	O5-C5-C6-O6

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Mol	Chain	Res	Type	Atoms
3	i	2	NAG	C4-C5-C6-O6
3	K	2	NAG	O5-C5-C6-O6
3	e	1	NAG	O5-C5-C6-O6
3	o	1	NAG	C4-C5-C6-O6
3	I	2	NAG	C4-C5-C6-O6
3	T	1	NAG	O5-C5-C6-O6
3	e	1	NAG	C4-C5-C6-O6
3	l	2	NAG	O5-C5-C6-O6
3	Q	2	NAG	C4-C5-C6-O6
3	J	2	NAG	C8-C7-N2-C2
3	J	2	NAG	O7-C7-N2-C2
3	K	1	NAG	C8-C7-N2-C2
3	K	1	NAG	O7-C7-N2-C2
3	K	2	NAG	C8-C7-N2-C2
3	K	2	NAG	O7-C7-N2-C2
3	N	1	NAG	C8-C7-N2-C2
3	N	1	NAG	O7-C7-N2-C2
3	X	1	NAG	C8-C7-N2-C2
3	X	1	NAG	O7-C7-N2-C2
3	X	2	NAG	C8-C7-N2-C2
3	X	2	NAG	O7-C7-N2-C2
3	Z	1	NAG	C8-C7-N2-C2
3	Z	1	NAG	O7-C7-N2-C2
3	j	1	NAG	C8-C7-N2-C2
3	j	1	NAG	O7-C7-N2-C2
3	j	2	NAG	C8-C7-N2-C2
3	j	2	NAG	O7-C7-N2-C2
3	m	1	NAG	C8-C7-N2-C2
3	m	1	NAG	O7-C7-N2-C2
3	s	1	NAG	C8-C7-N2-C2
3	s	1	NAG	O7-C7-N2-C2
3	t	1	NAG	C8-C7-N2-C2
3	t	1	NAG	O7-C7-N2-C2
3	t	2	NAG	C8-C7-N2-C2
3	t	2	NAG	O7-C7-N2-C2
3	r	1	NAG	C4-C5-C6-O6
3	t	1	NAG	C4-C5-C6-O6
3	N	2	NAG	O5-C5-C6-O6
3	c	2	NAG	O5-C5-C6-O6
3	p	2	NAG	C4-C5-C6-O6
3	l	1	NAG	O5-C5-C6-O6
3	l	2	NAG	C4-C5-C6-O6

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Mol	Chain	Res	Type	Atoms
3	Z	1	NAG	O5-C5-C6-O6
3	N	1	NAG	C4-C5-C6-O6
3	S	1	NAG	C4-C5-C6-O6
3	I	1	NAG	O5-C5-C6-O6
3	t	2	NAG	O5-C5-C6-O6
3	c	2	NAG	C4-C5-C6-O6
3	v	1	NAG	O5-C5-C6-O6
3	h	1	NAG	O5-C5-C6-O6
3	N	2	NAG	C4-C5-C6-O6
3	l	1	NAG	C4-C5-C6-O6
3	P	1	NAG	C4-C5-C6-O6
3	Z	1	NAG	C4-C5-C6-O6
3	u	2	NAG	O5-C5-C6-O6
3	U	2	NAG	O5-C5-C6-O6
3	Z	2	NAG	O5-C5-C6-O6
3	u	2	NAG	C4-C5-C6-O6
3	w	2	NAG	O5-C5-C6-O6
3	Z	2	NAG	C4-C5-C6-O6
3	i	2	NAG	O5-C5-C6-O6
3	j	1	NAG	C4-C5-C6-O6
3	w	2	NAG	C4-C5-C6-O6
3	N	1	NAG	O5-C5-C6-O6
3	P	1	NAG	O5-C5-C6-O6
3	S	2	NAG	C4-C5-C6-O6
3	m	2	NAG	C4-C5-C6-O6
3	S	2	NAG	O5-C5-C6-O6
3	m	2	NAG	O5-C5-C6-O6
3	E	2	NAG	O5-C5-C6-O6
3	v	2	NAG	O5-C5-C6-O6
3	u	1	NAG	C4-C5-C6-O6
3	I	1	NAG	C4-C5-C6-O6
3	j	1	NAG	O5-C5-C6-O6
3	V	2	NAG	C4-C5-C6-O6
3	V	2	NAG	O5-C5-C6-O6
3	J	2	NAG	C4-C5-C6-O6
3	s	1	NAG	C4-C5-C6-O6
3	h	1	NAG	C4-C5-C6-O6
3	s	2	NAG	C4-C5-C6-O6
3	J	2	NAG	O5-C5-C6-O6
3	m	1	NAG	C4-C5-C6-O6
3	e	2	NAG	C4-C5-C6-O6
3	s	1	NAG	O5-C5-C6-O6

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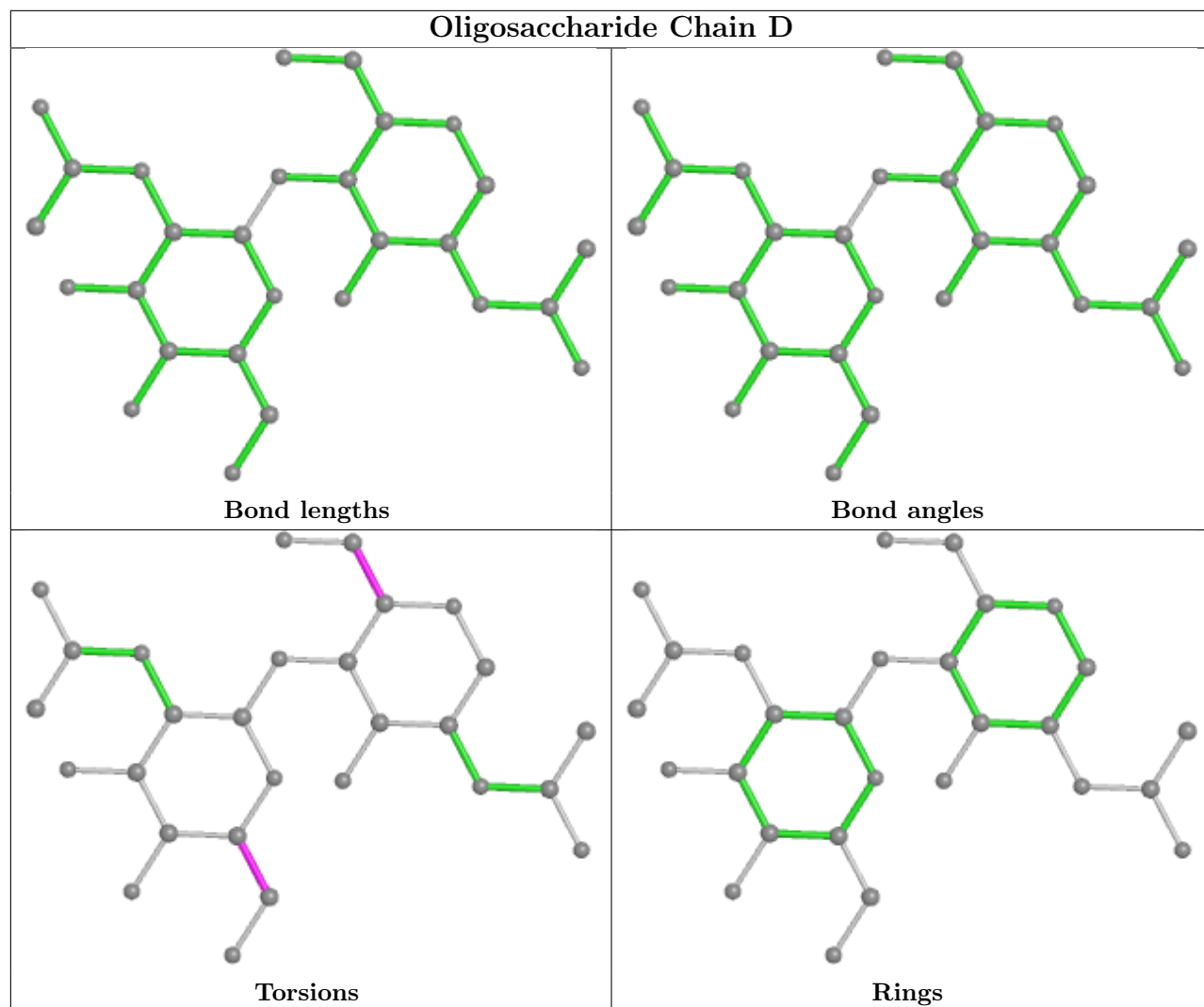
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Mol	Chain	Res	Type	Atoms
3	e	2	NAG	O5-C5-C6-O6
3	m	1	NAG	O5-C5-C6-O6
3	u	1	NAG	O5-C5-C6-O6
3	w	1	NAG	C4-C5-C6-O6
3	n	2	NAG	C4-C5-C6-O6
3	T	2	NAG	C4-C5-C6-O6
3	J	1	NAG	C3-C2-N2-C7
3	Q	1	NAG	C3-C2-N2-C7
3	U	1	NAG	C3-C2-N2-C7
3	W	1	NAG	C3-C2-N2-C7
3	c	1	NAG	C3-C2-N2-C7
3	i	1	NAG	C3-C2-N2-C7
3	k	1	NAG	C3-C2-N2-C7
3	k	2	NAG	C3-C2-N2-C7
3	p	1	NAG	C3-C2-N2-C7
3	s	2	NAG	C3-C2-N2-C7
3	E	1	NAG	C4-C5-C6-O6
3	n	2	NAG	O5-C5-C6-O6
3	s	2	NAG	O5-C5-C6-O6
3	T	1	NAG	C4-C5-C6-O6
3	a	1	NAG	C4-C5-C6-O6
3	N	1	NAG	C3-C2-N2-C7
3	Z	1	NAG	C3-C2-N2-C7
3	m	1	NAG	C3-C2-N2-C7
3	t	1	NAG	C3-C2-N2-C7
3	a	1	NAG	O5-C5-C6-O6
3	K	1	NAG	C4-C5-C6-O6

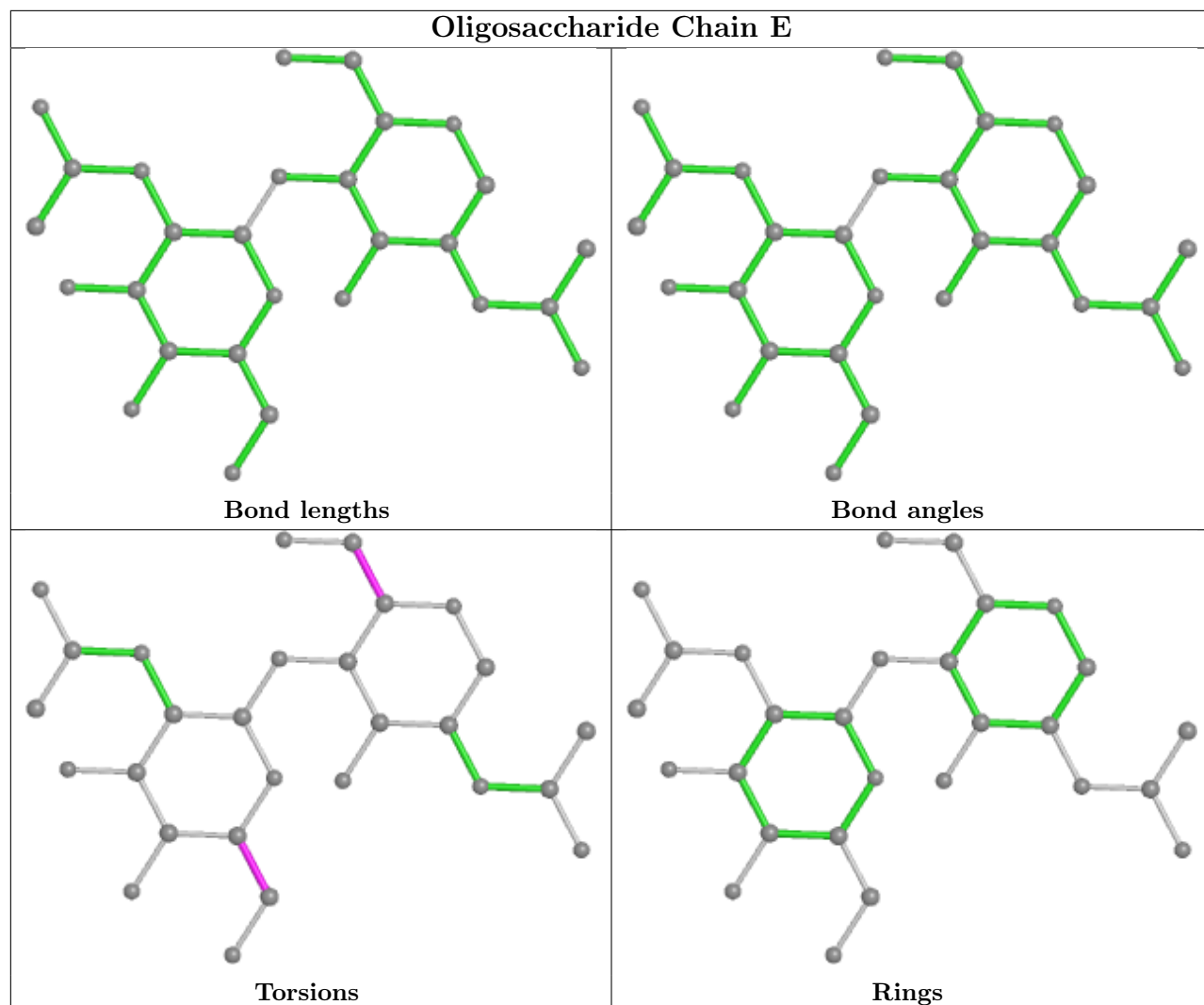
There are no ring outliers.

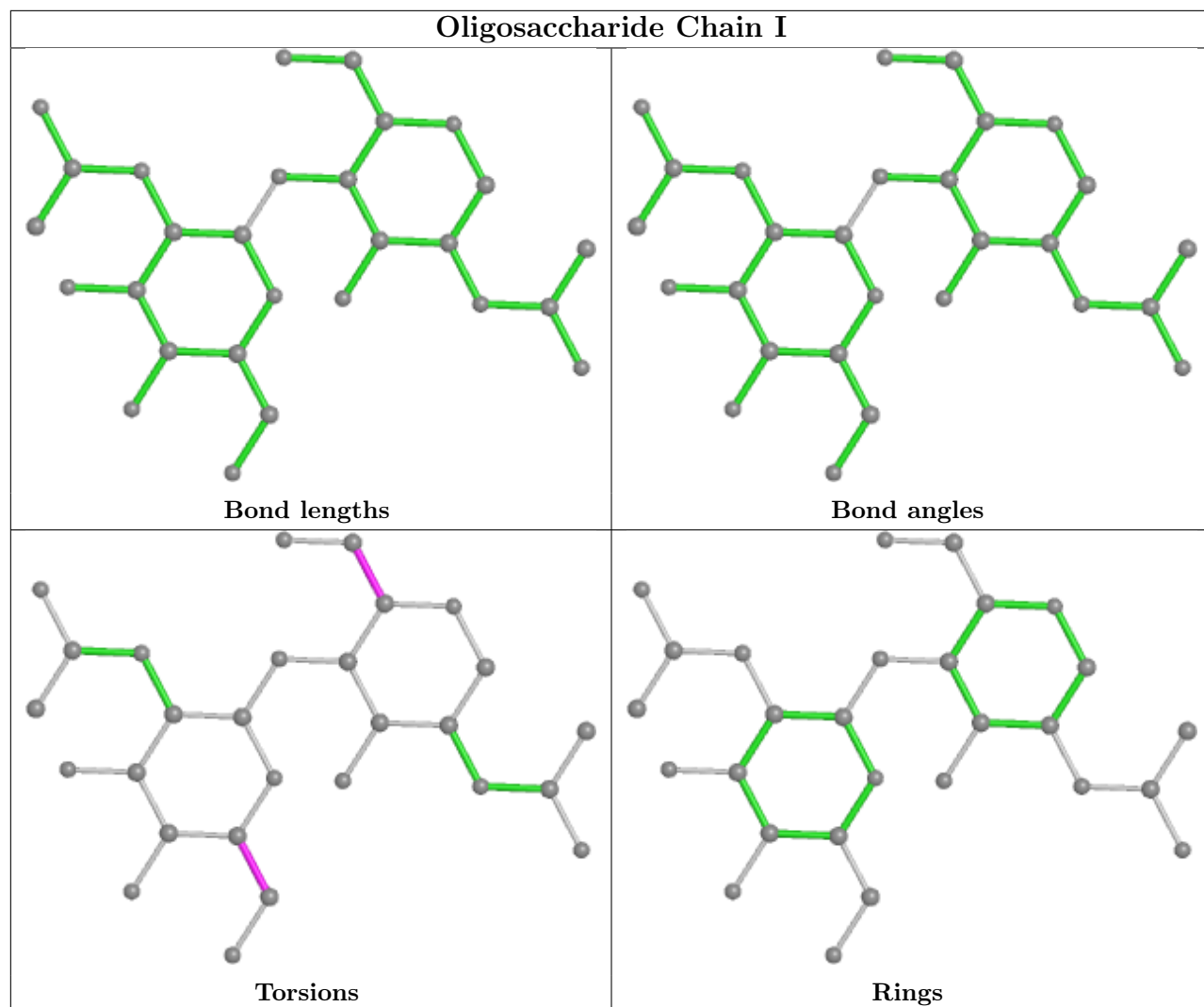
No monomer is involved in short contacts.

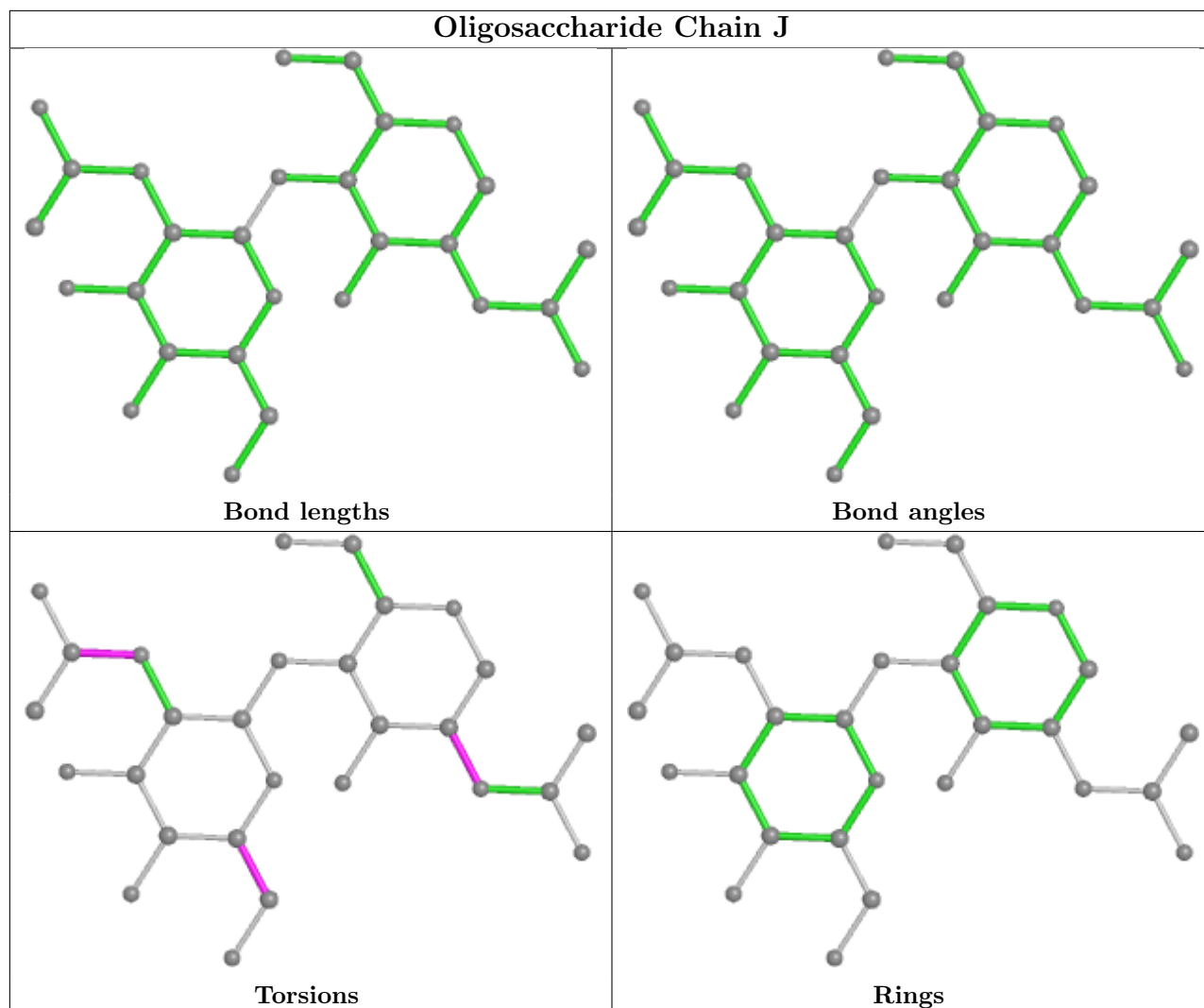
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

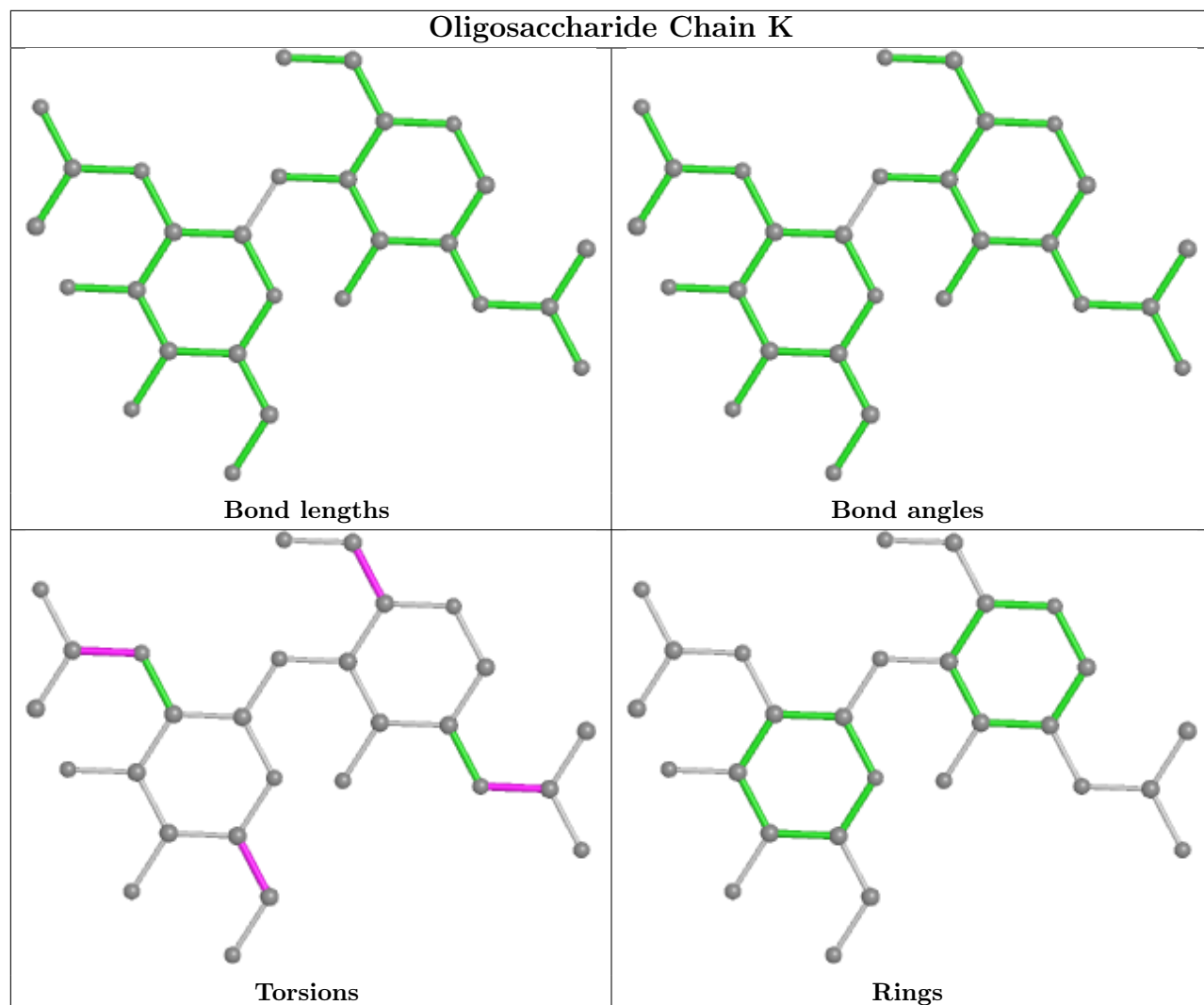


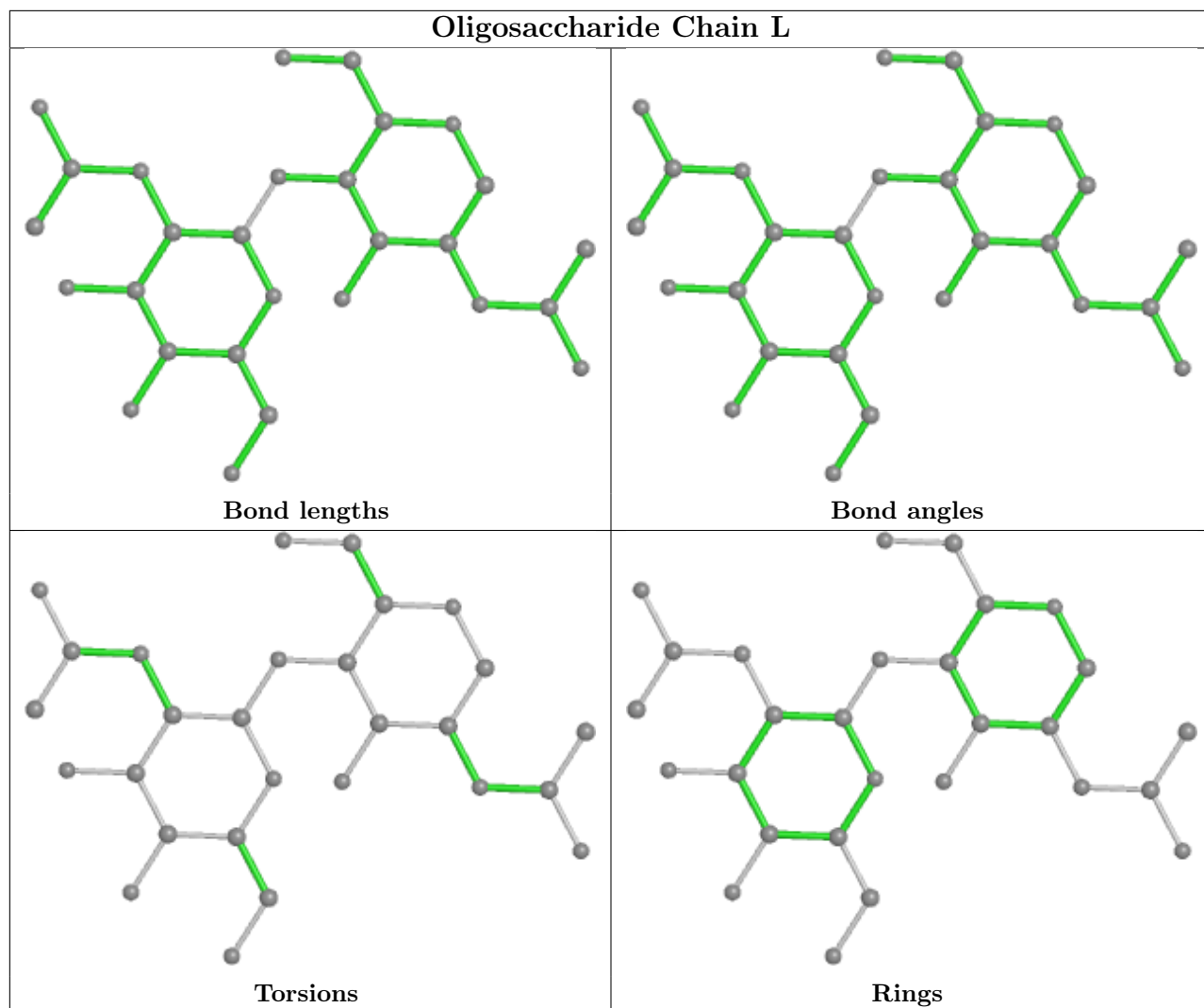


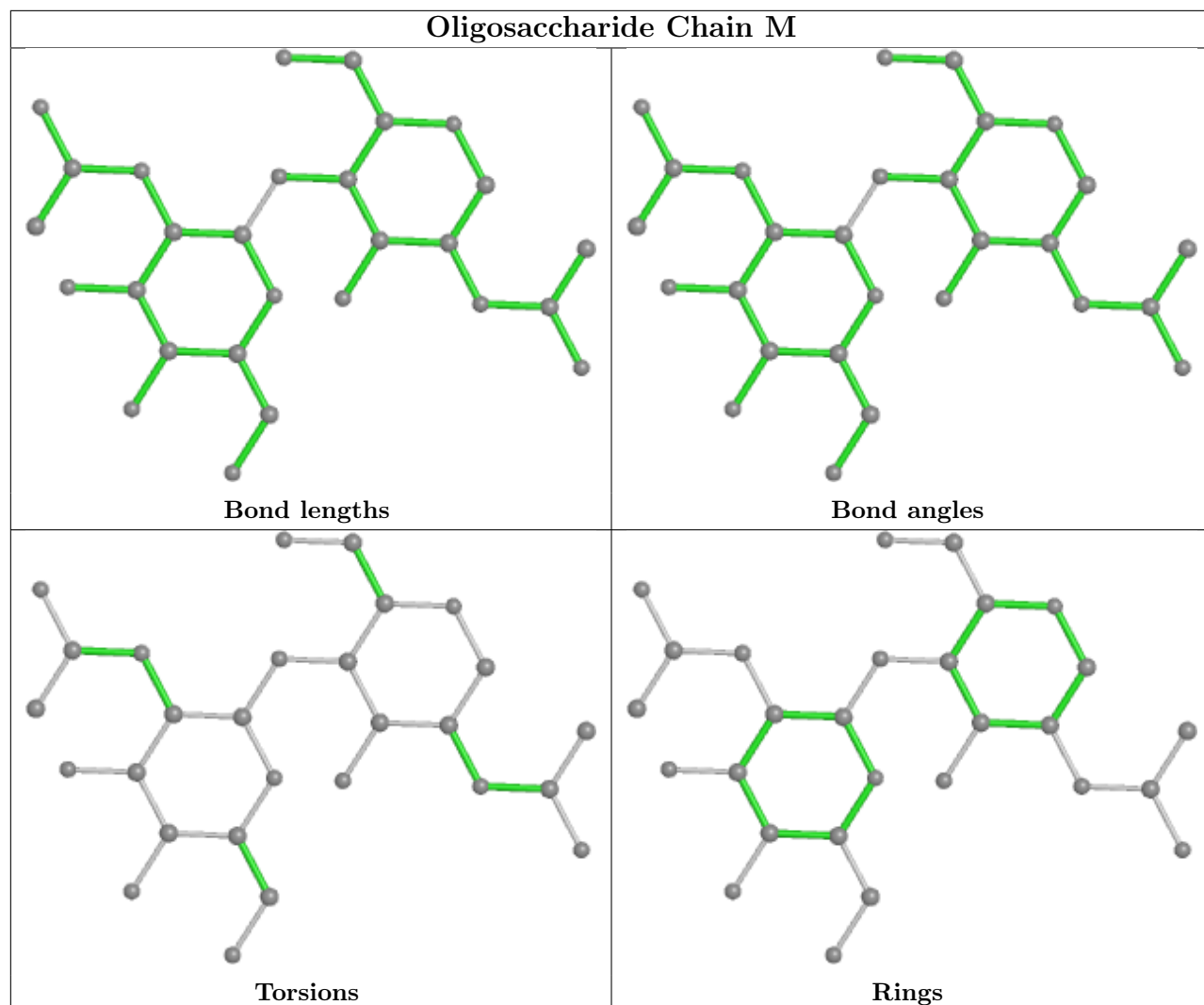


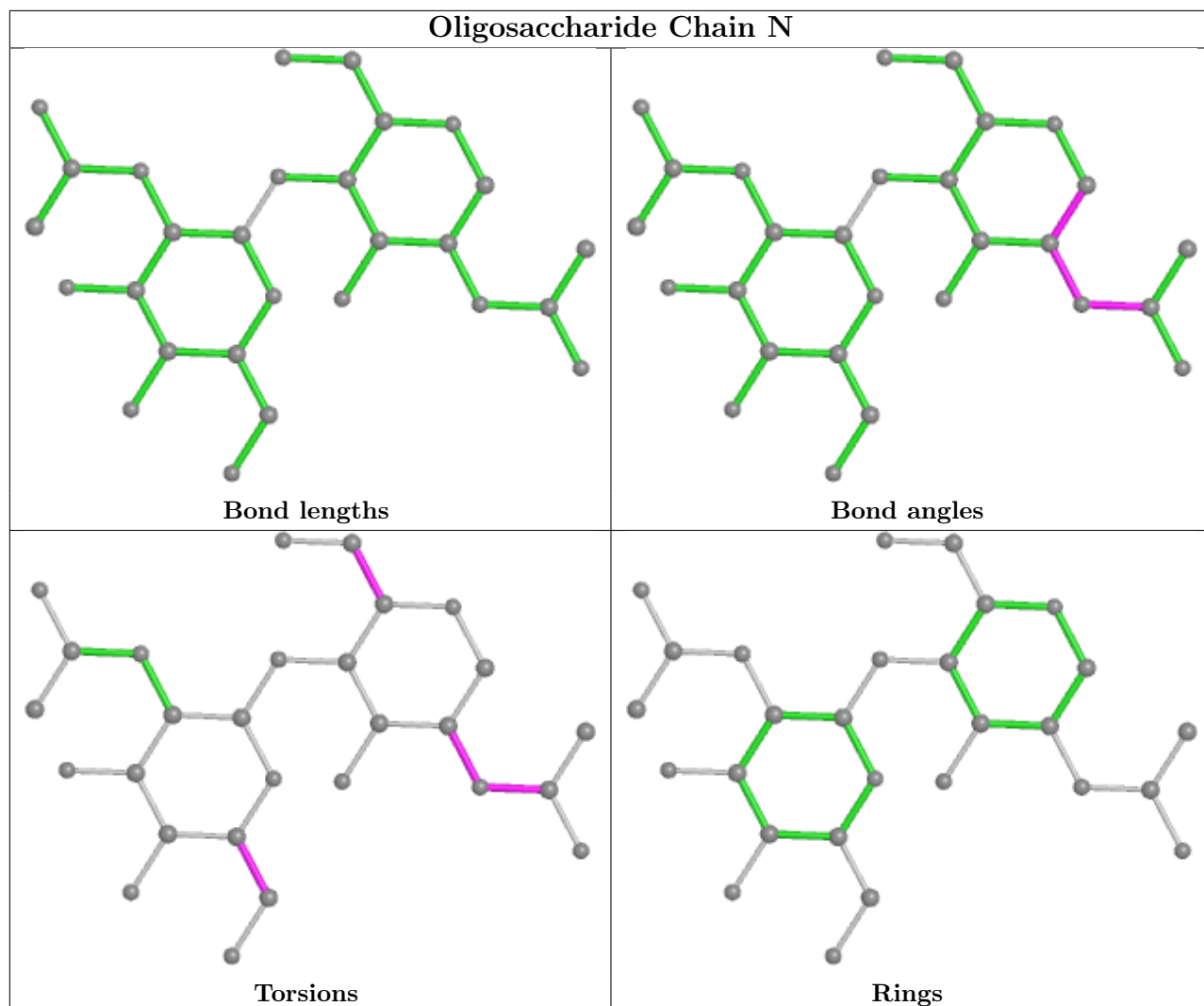


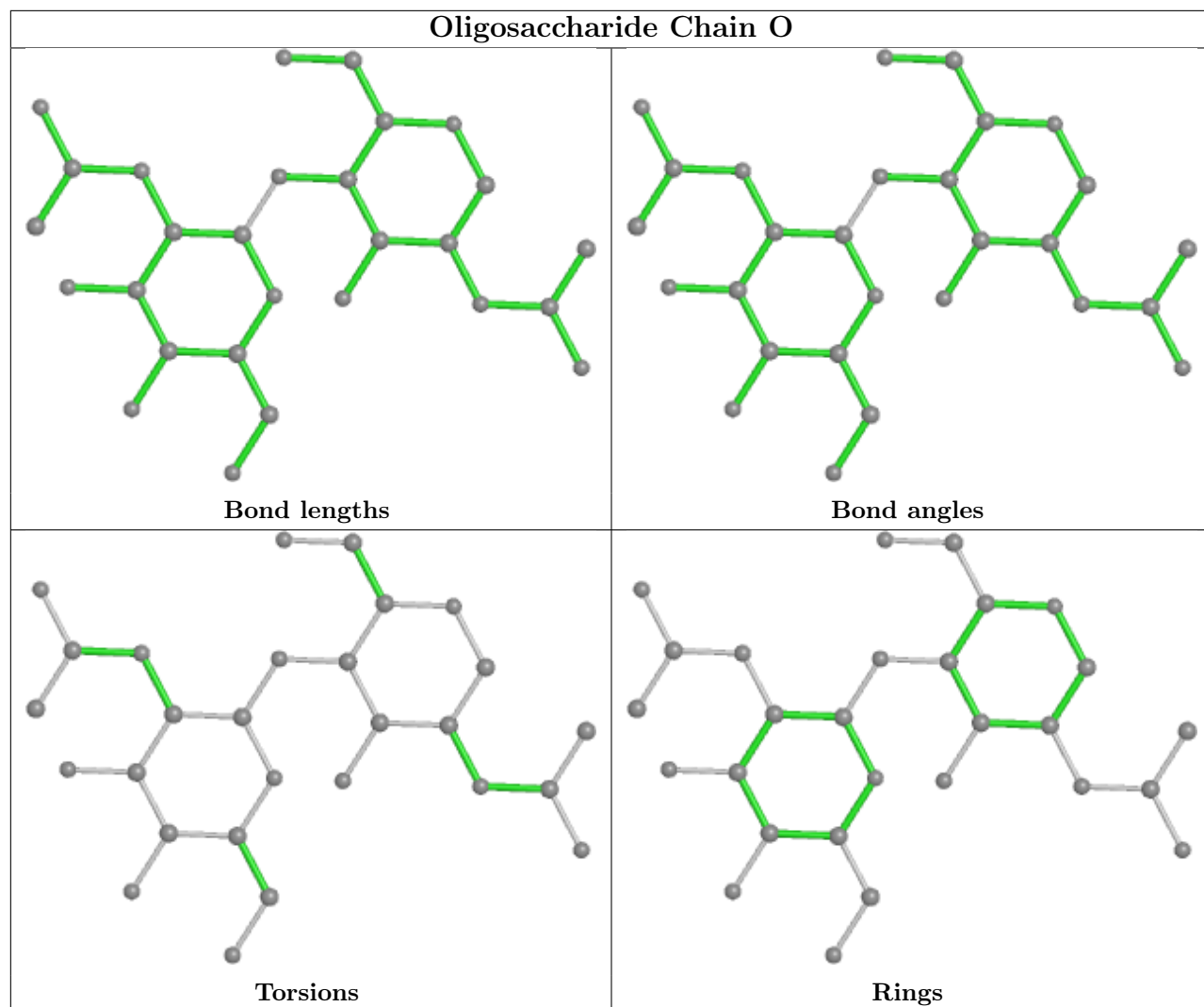




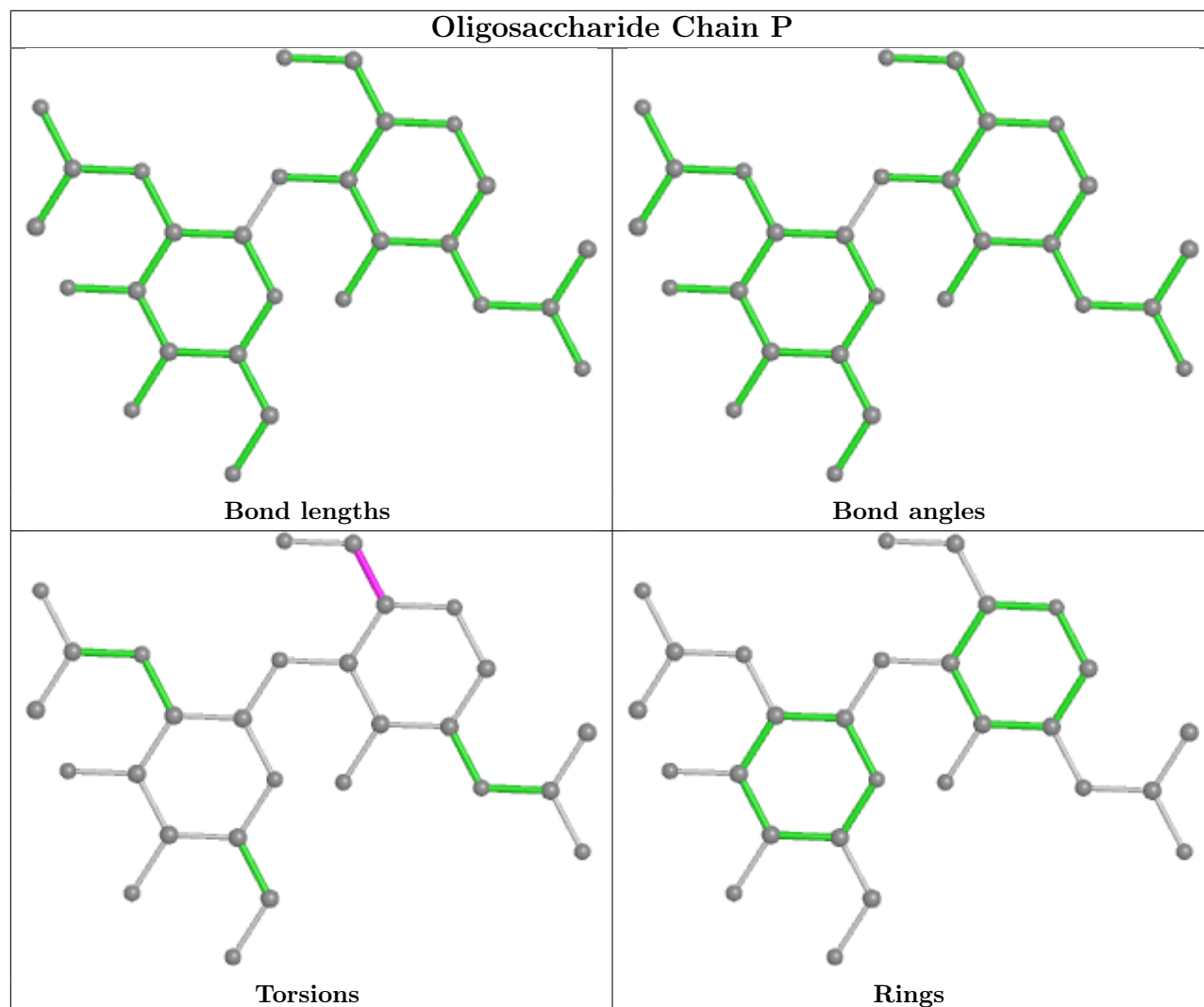


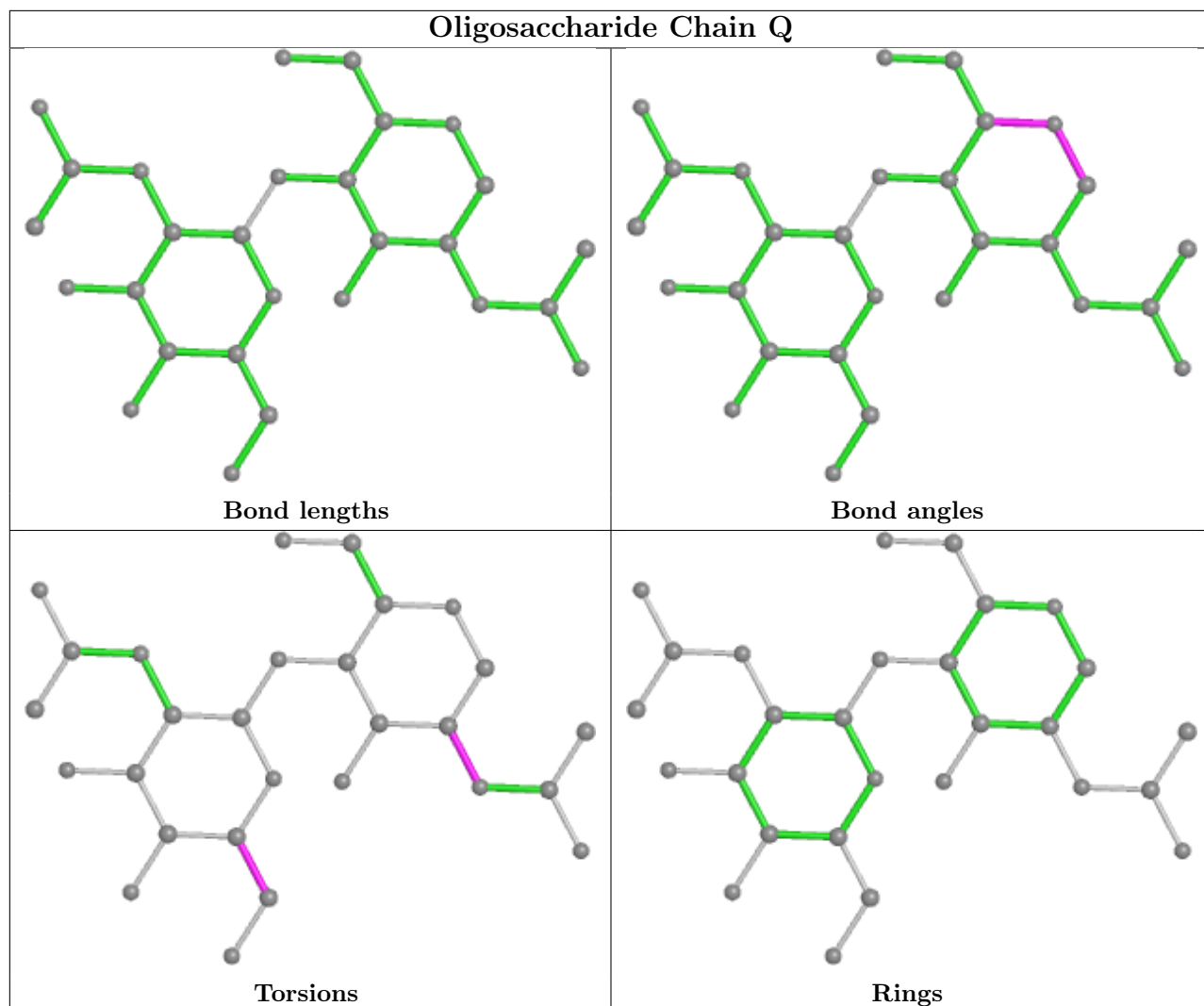


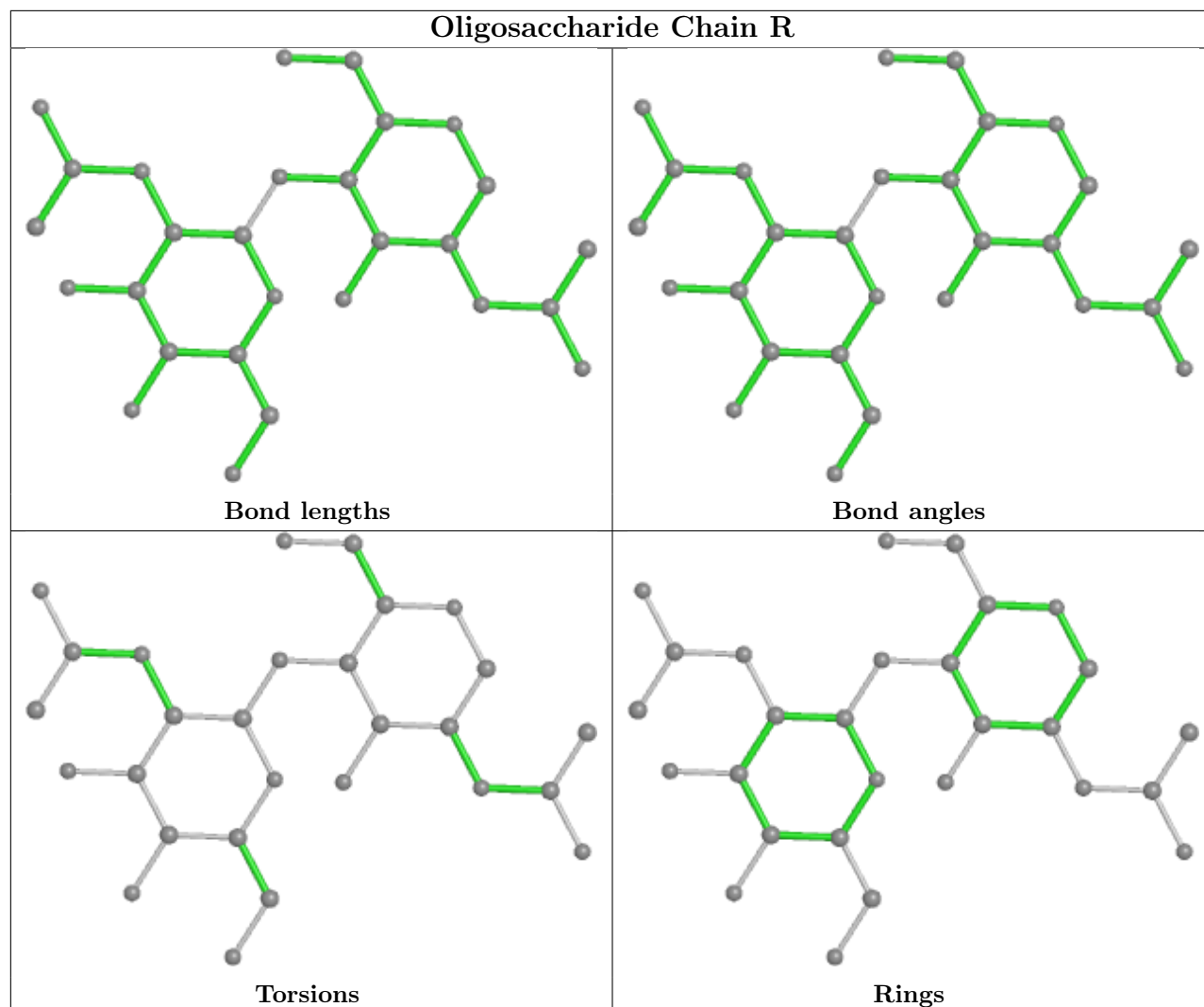


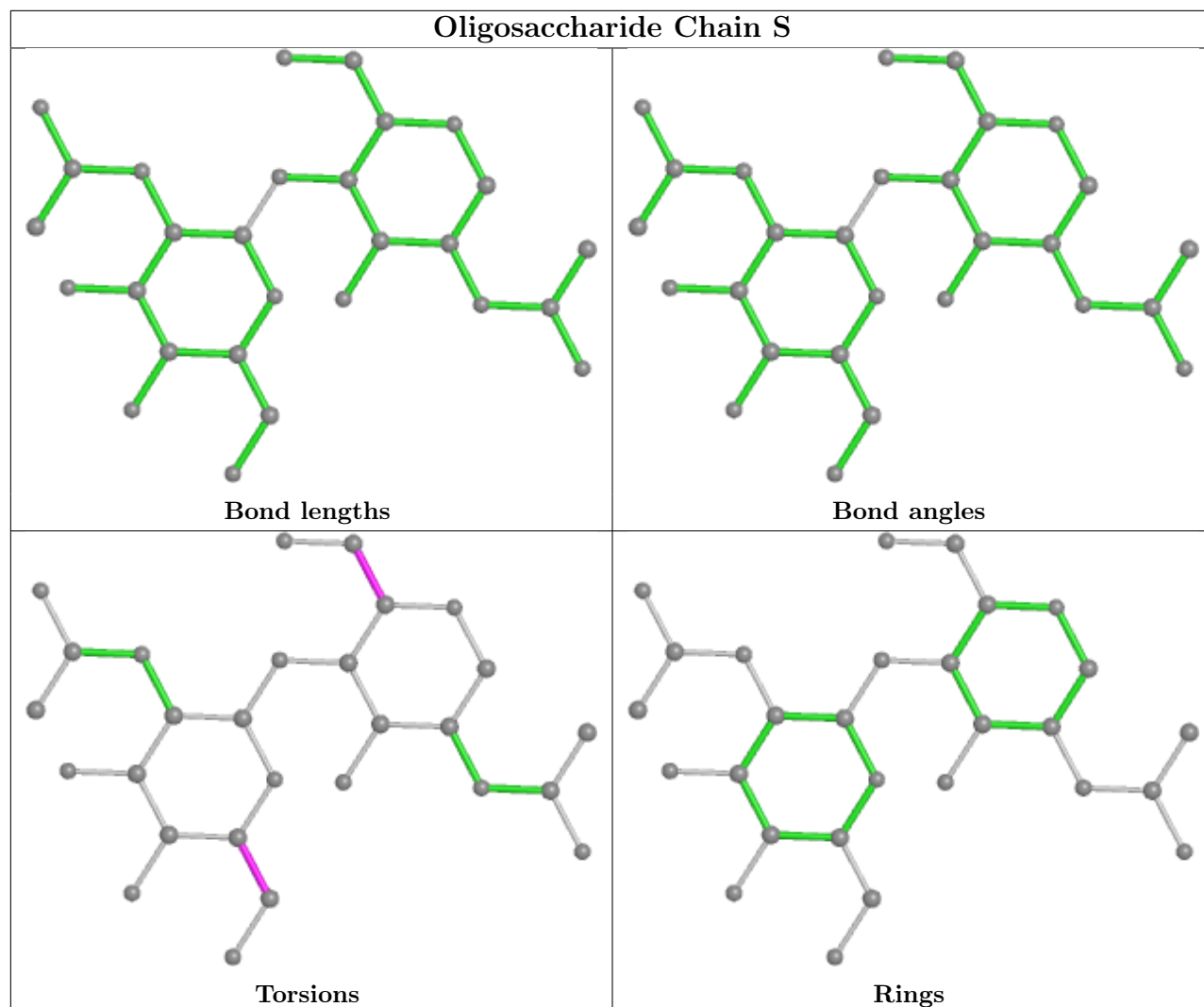


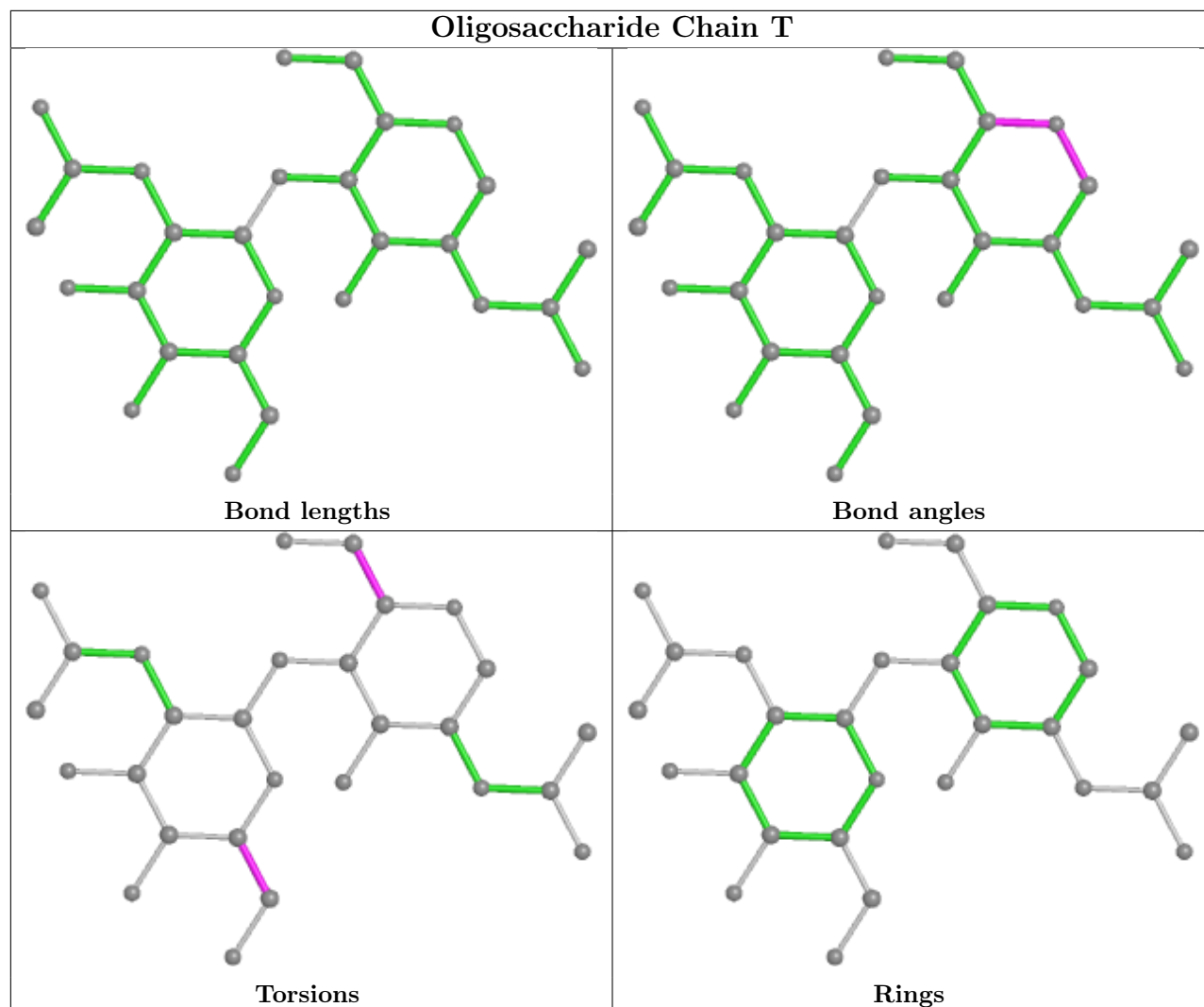


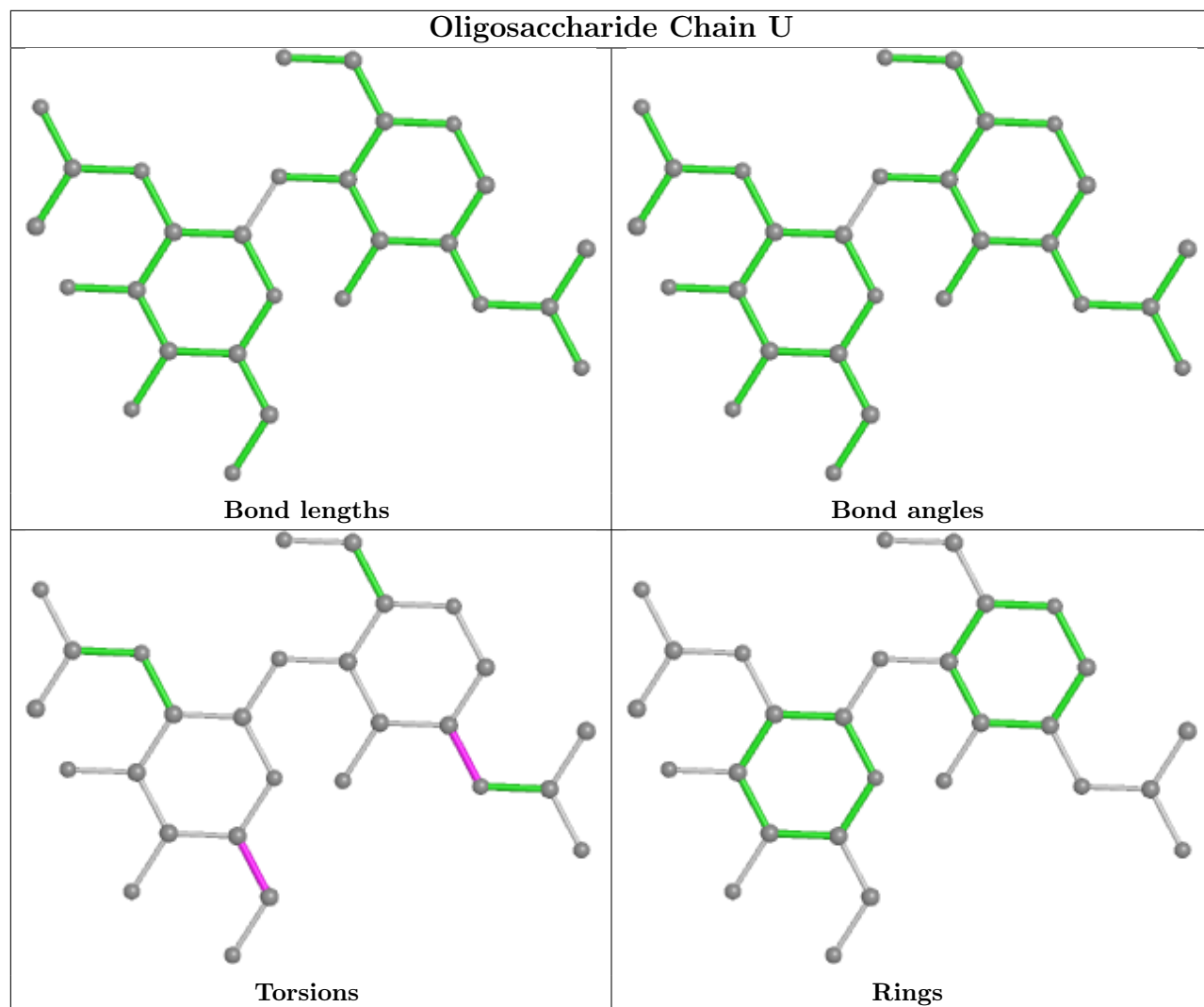


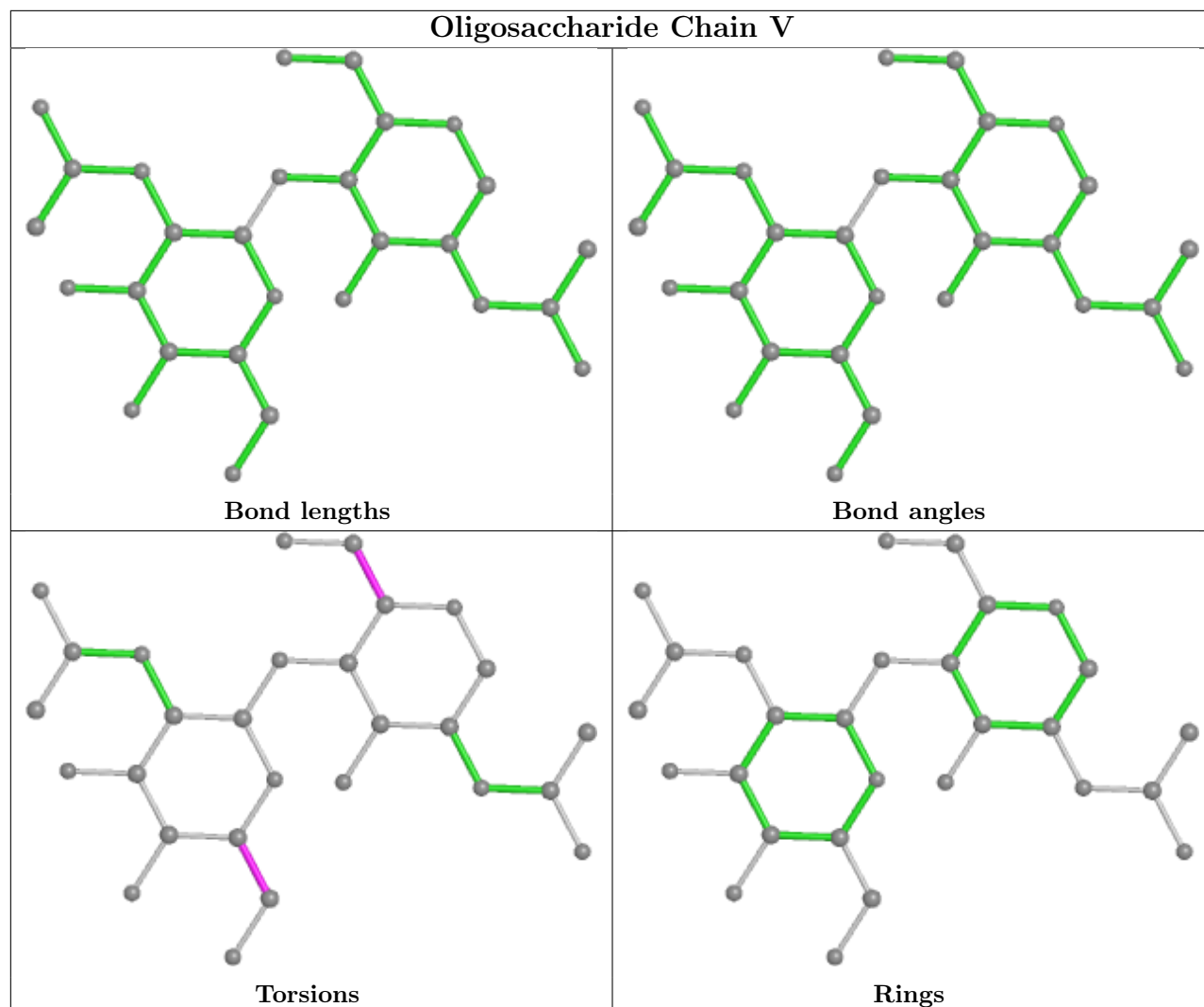


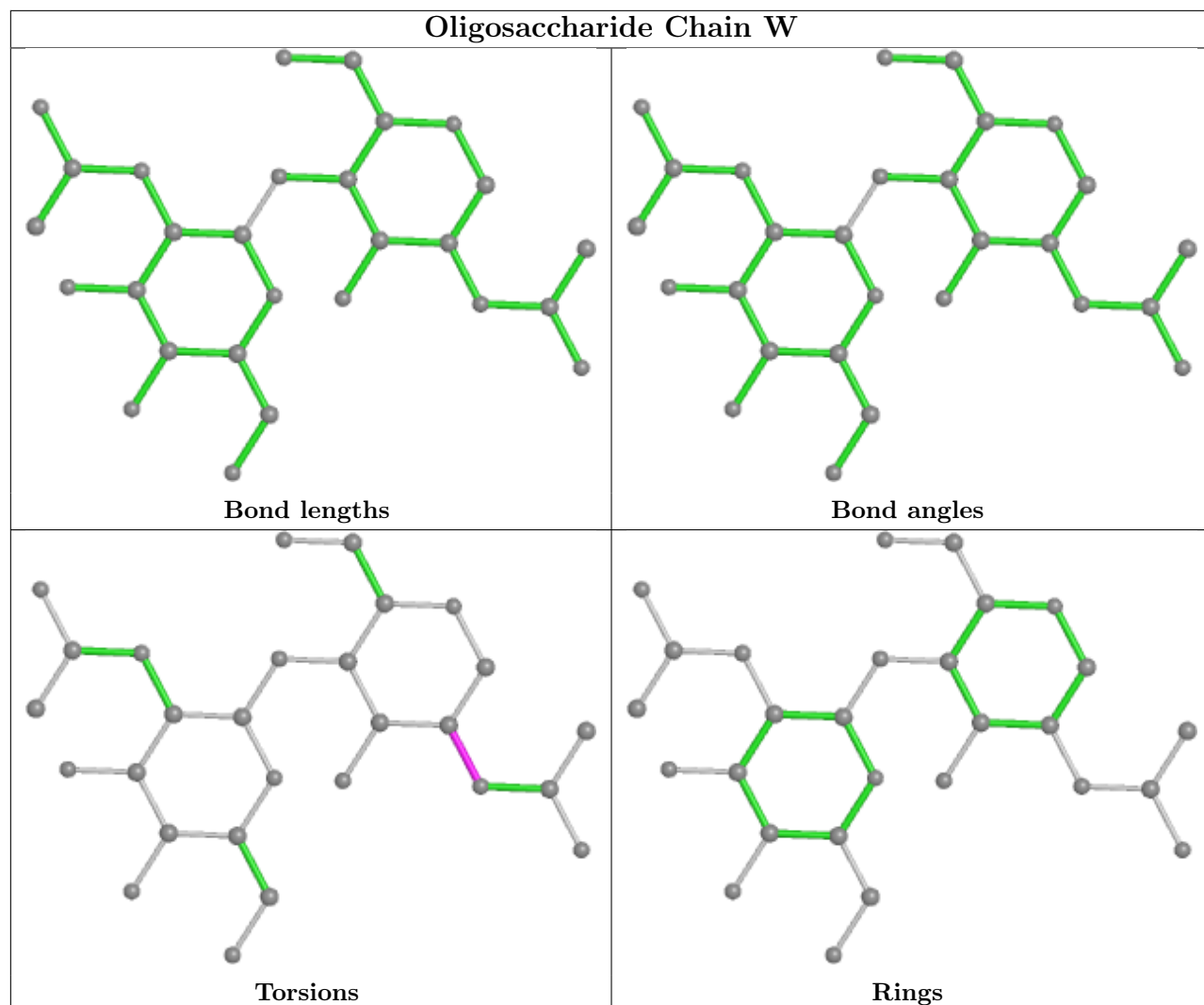




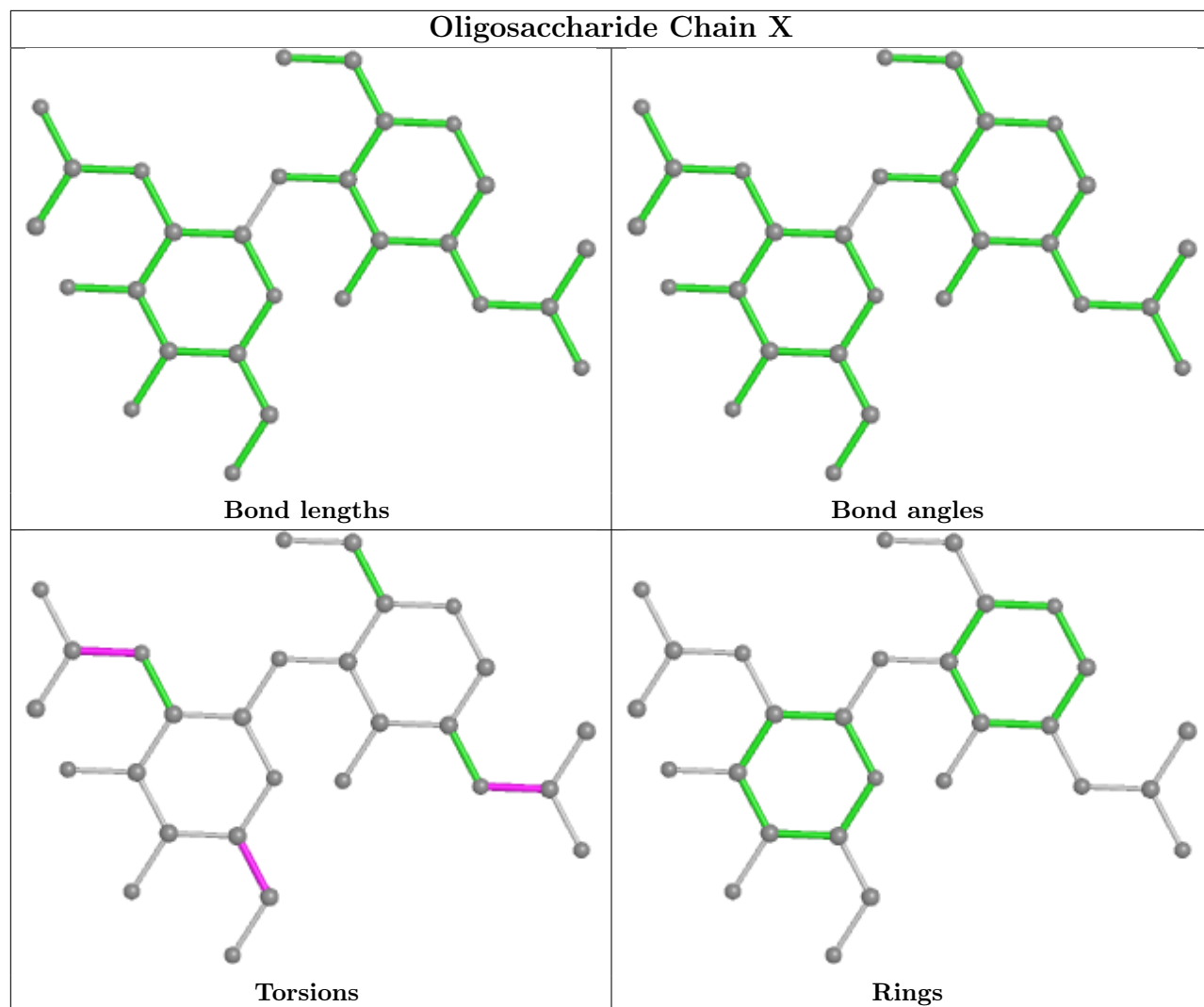


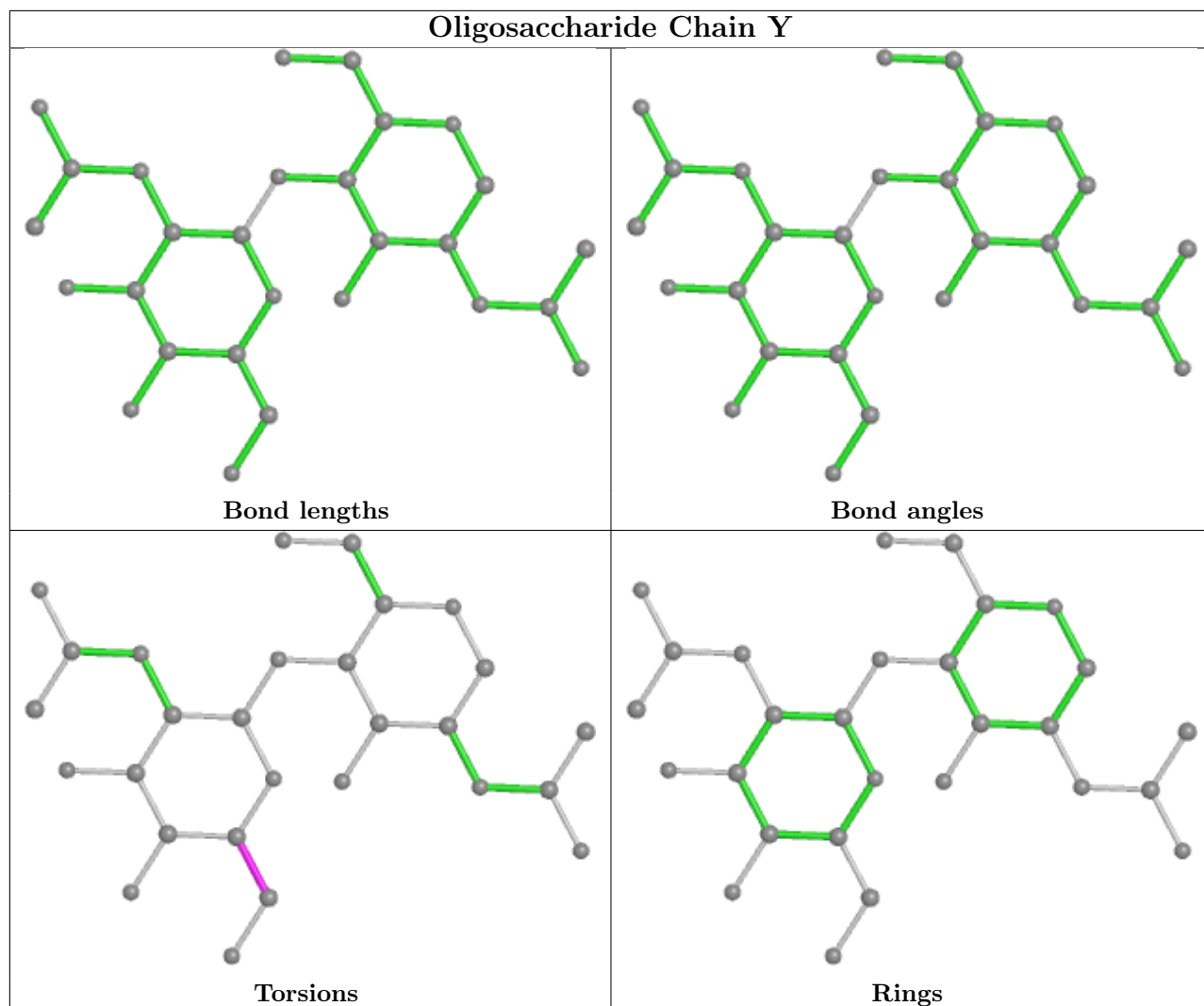


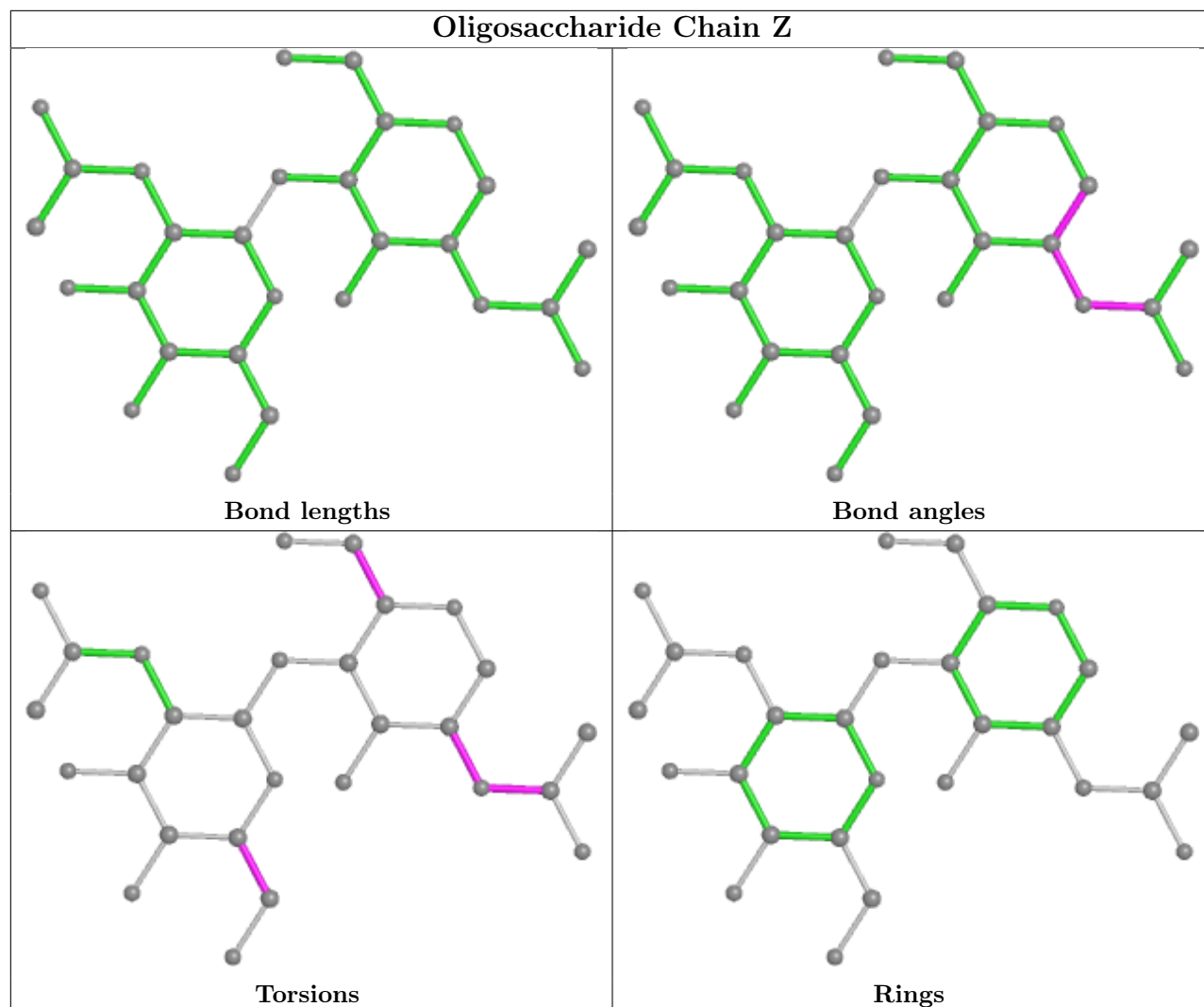


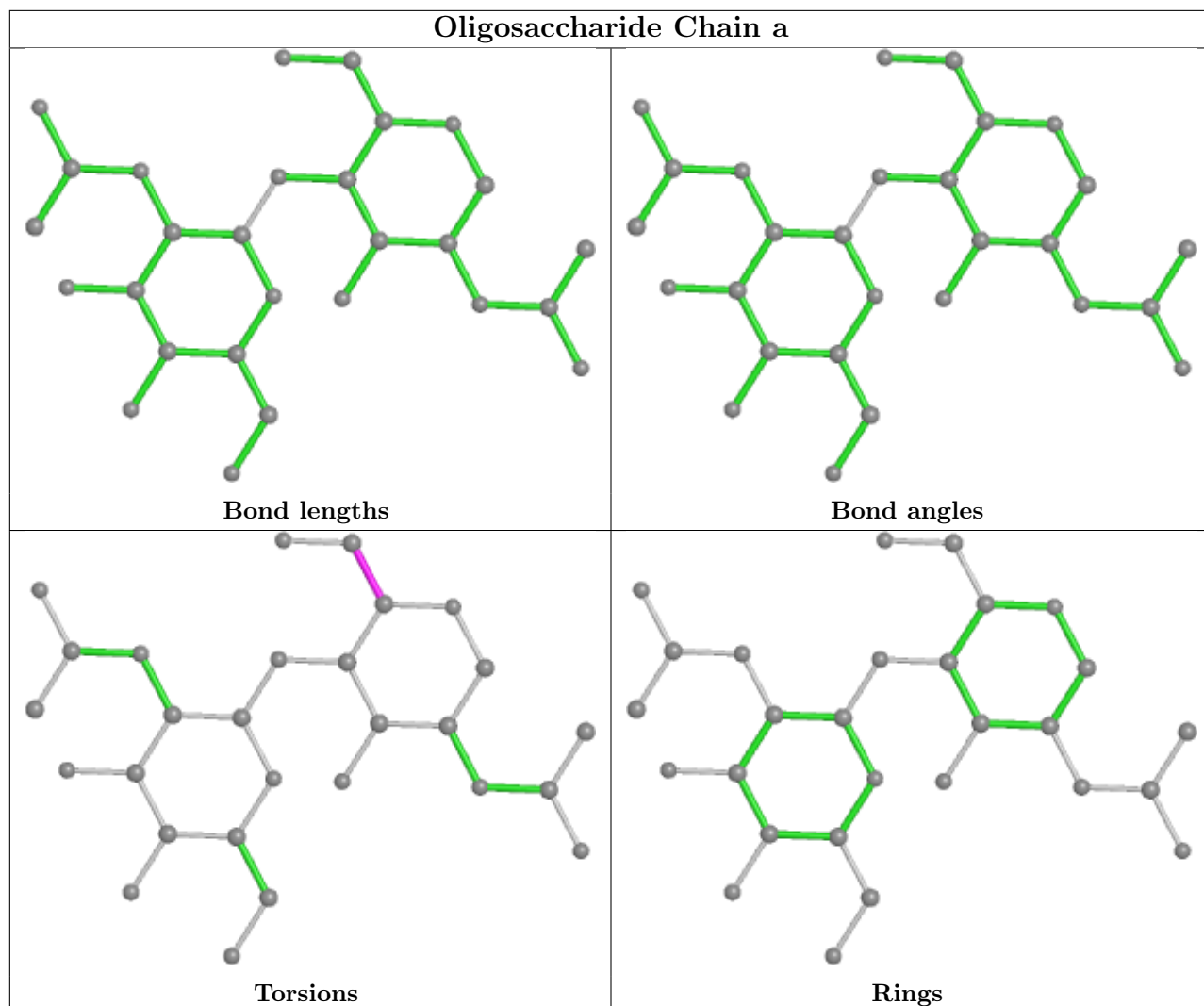


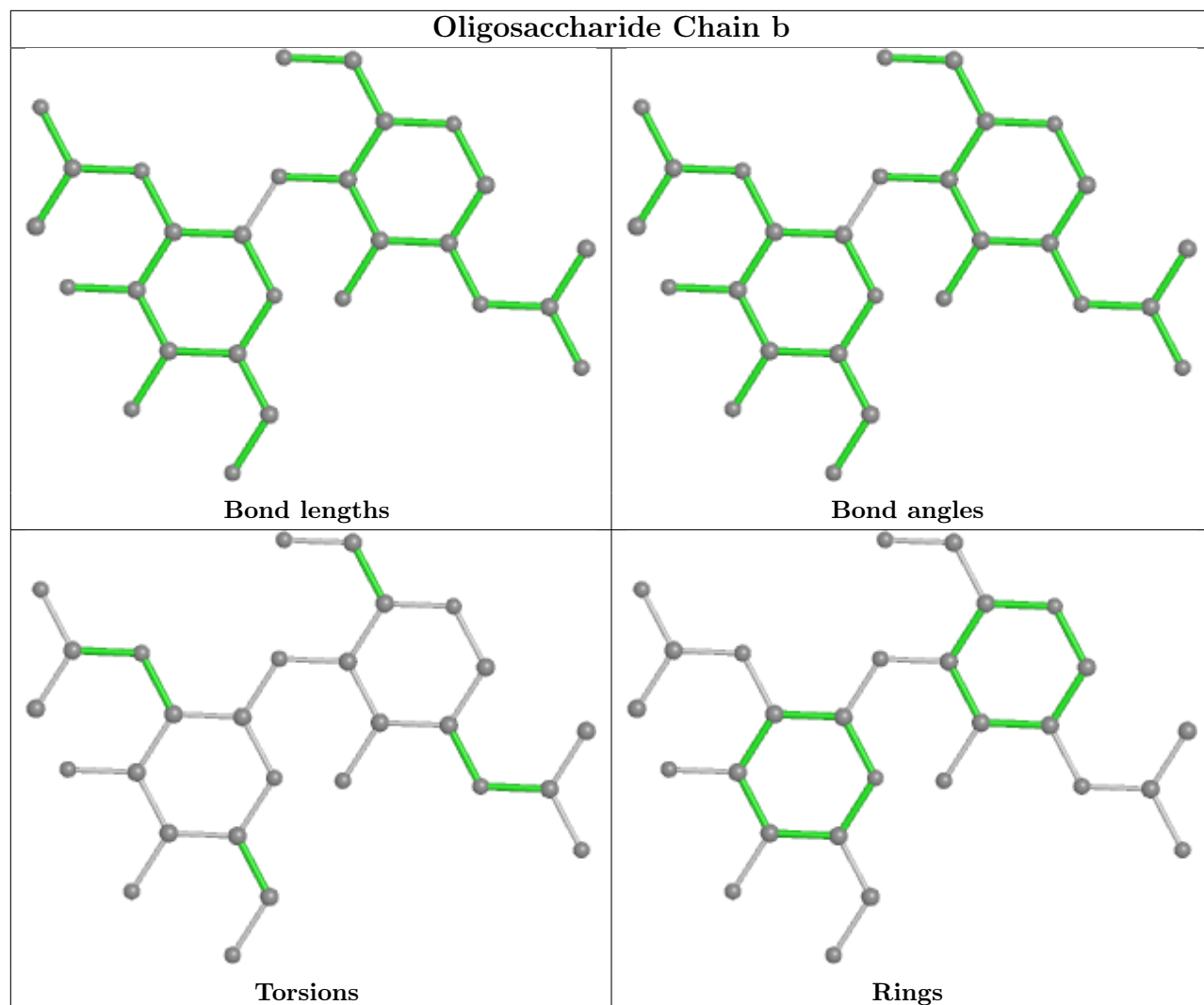


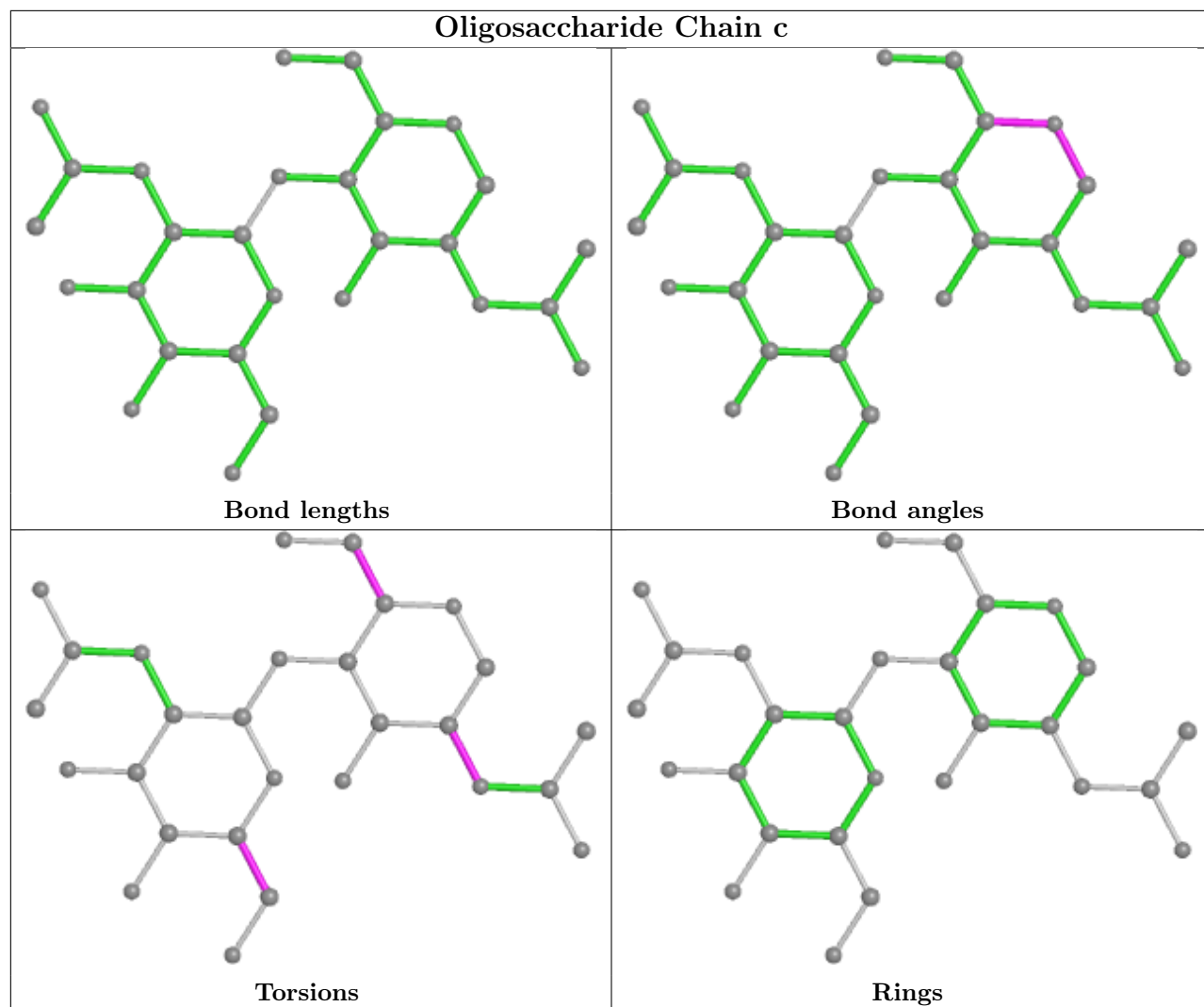


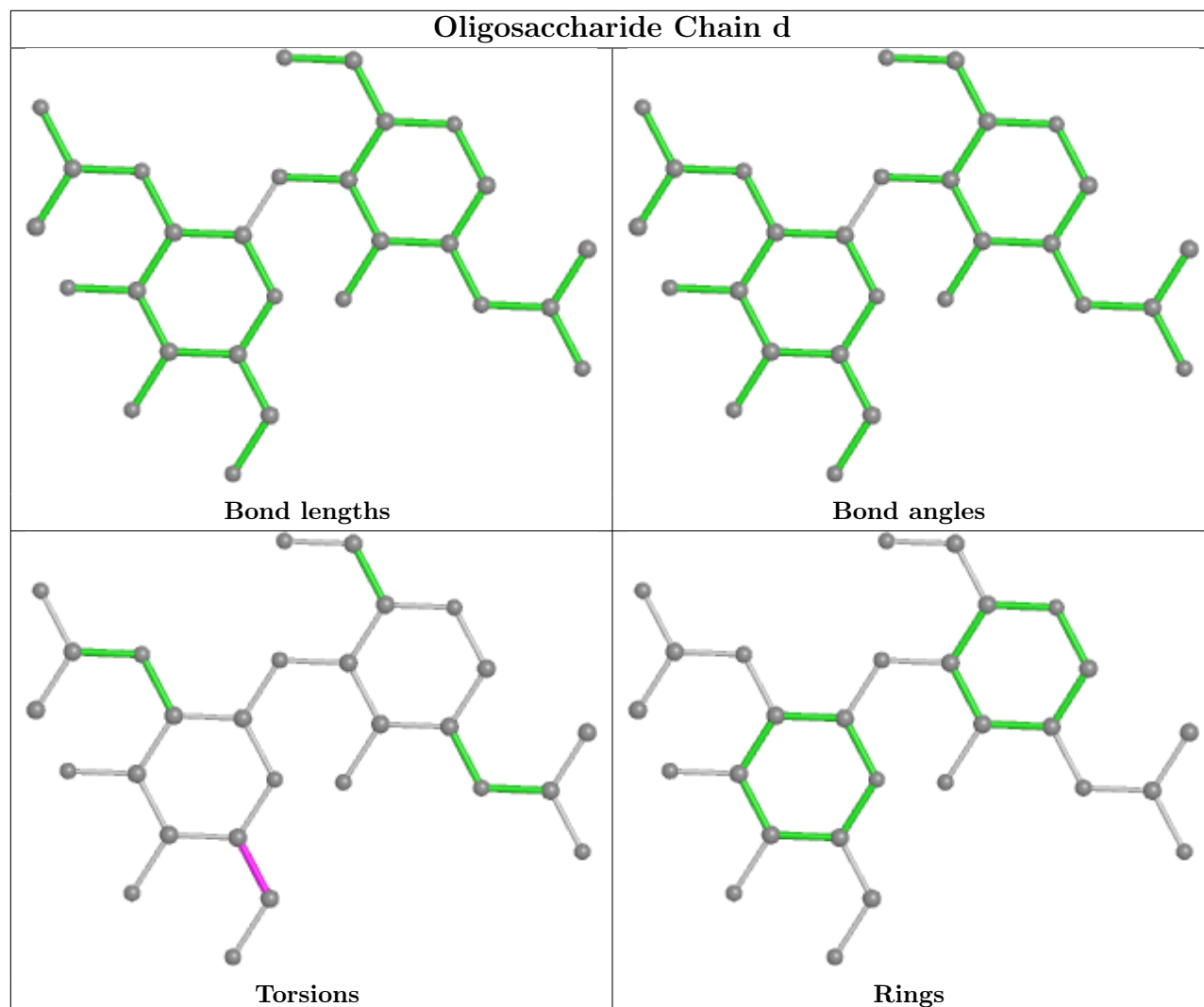


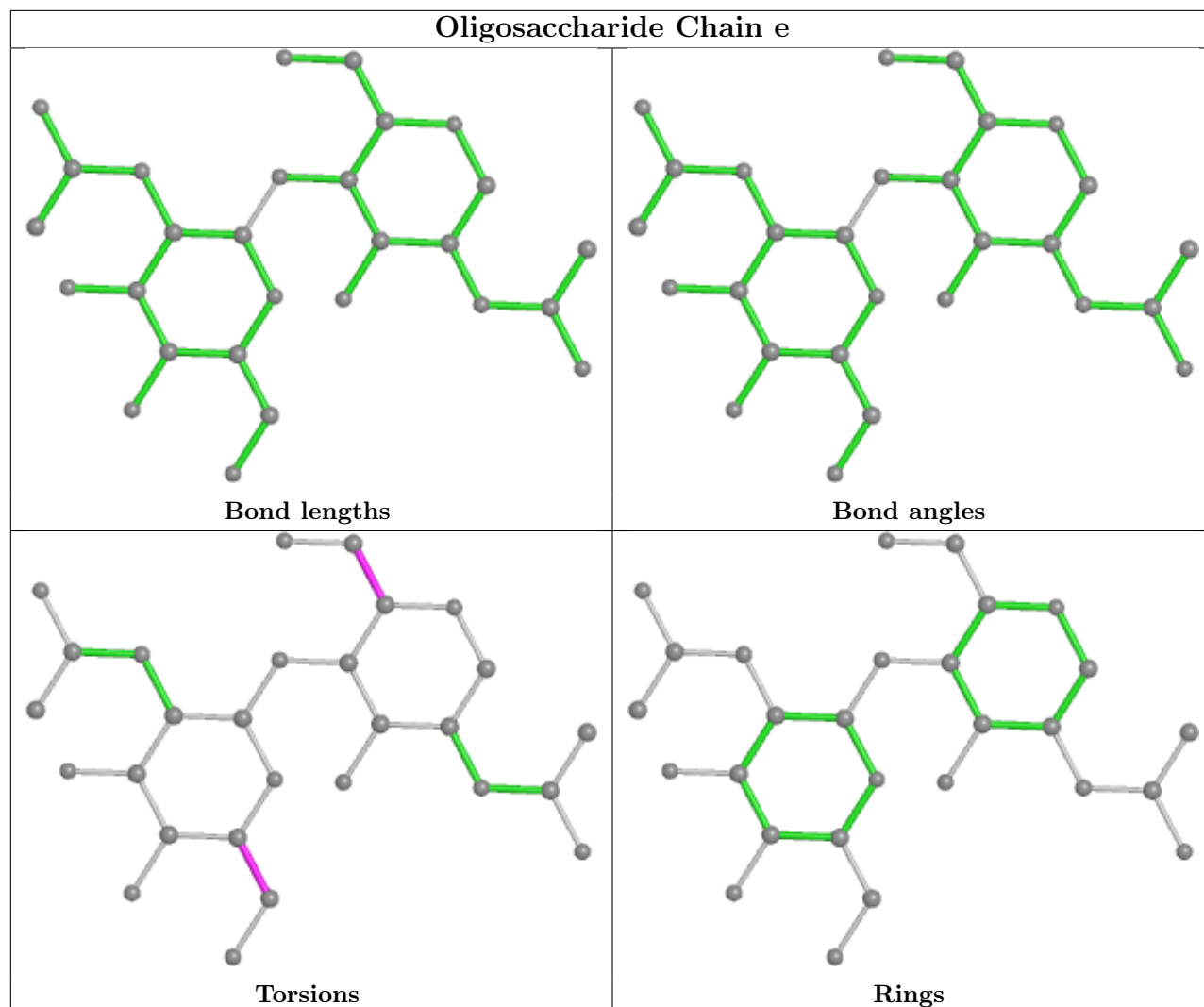




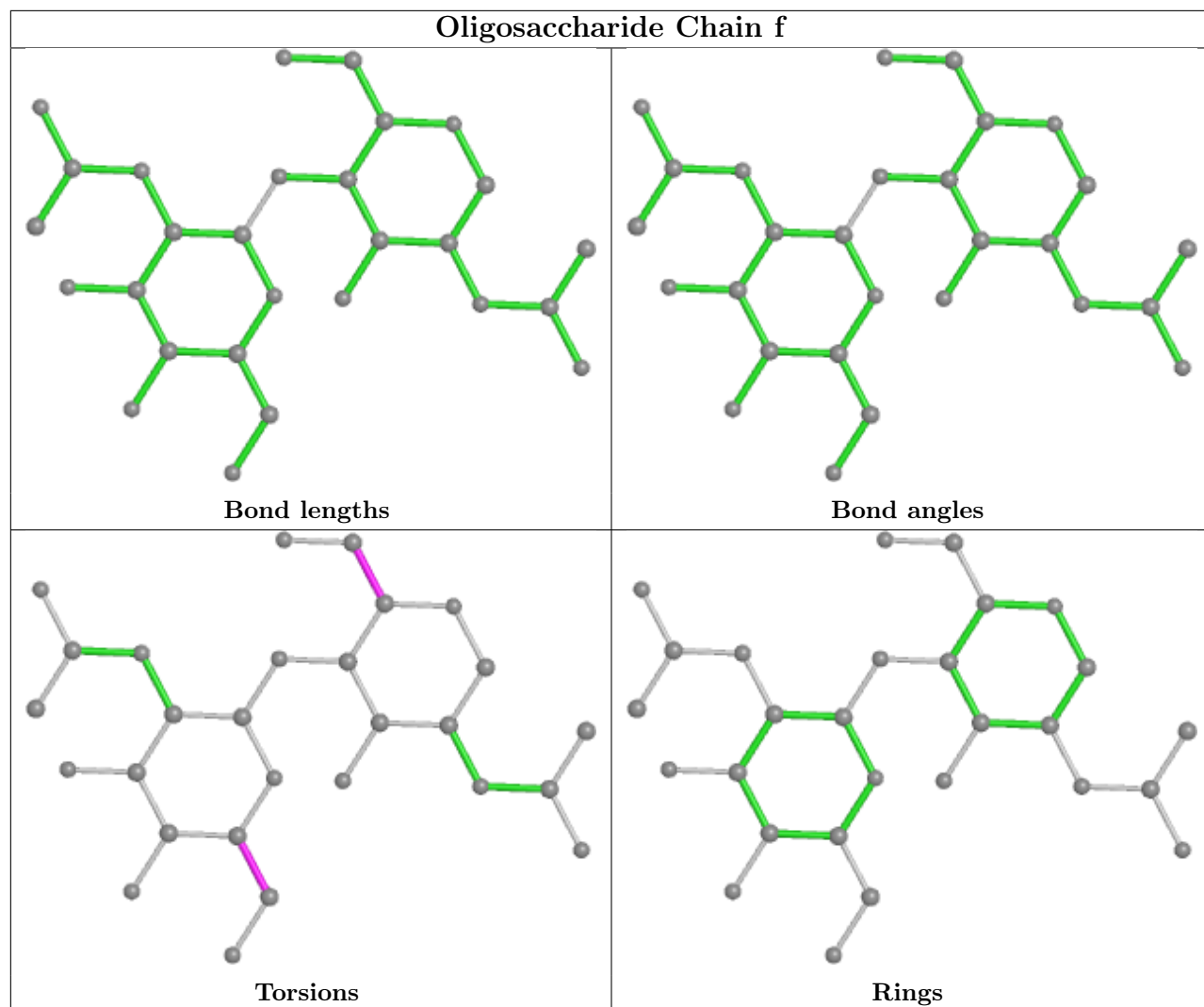


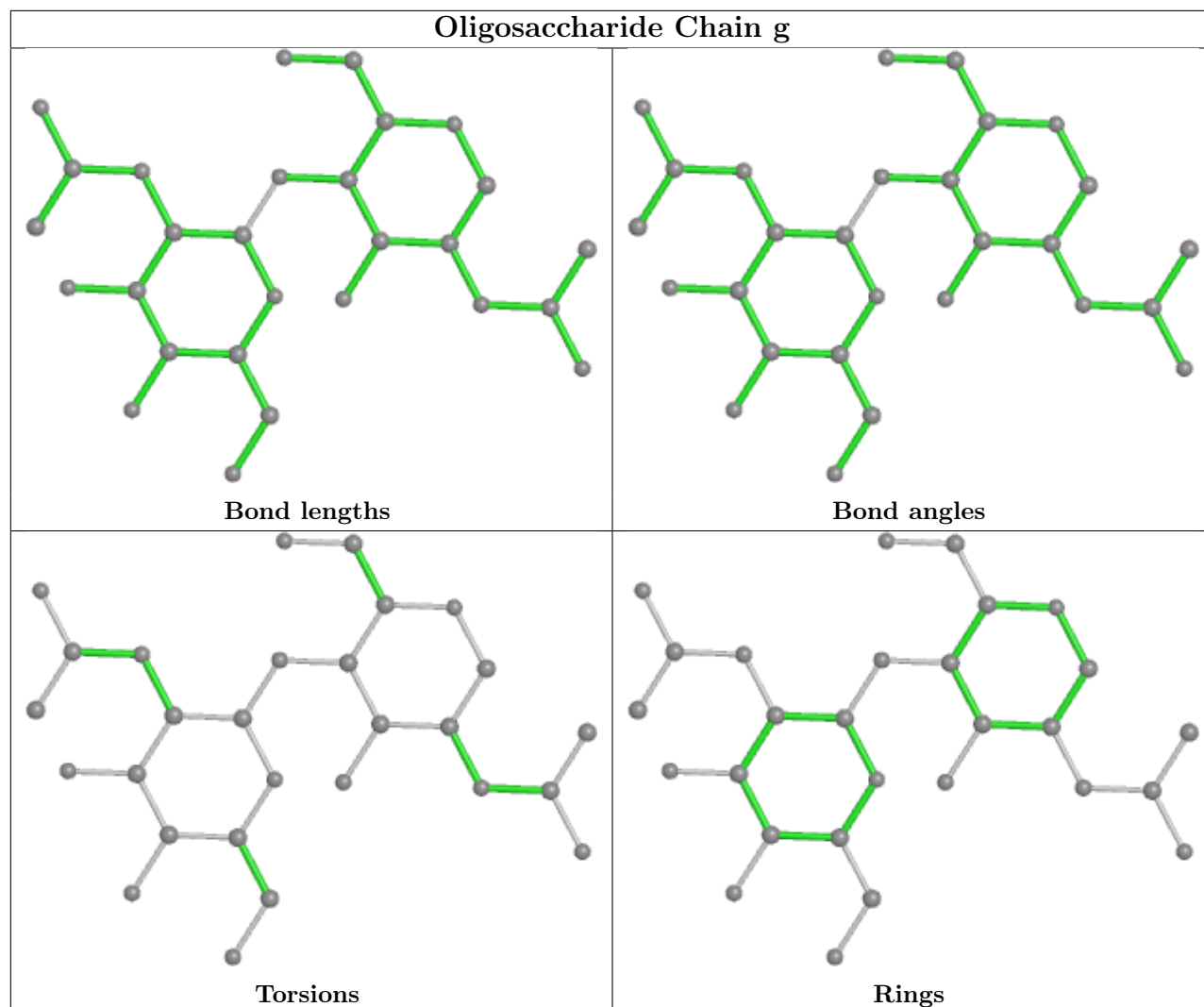


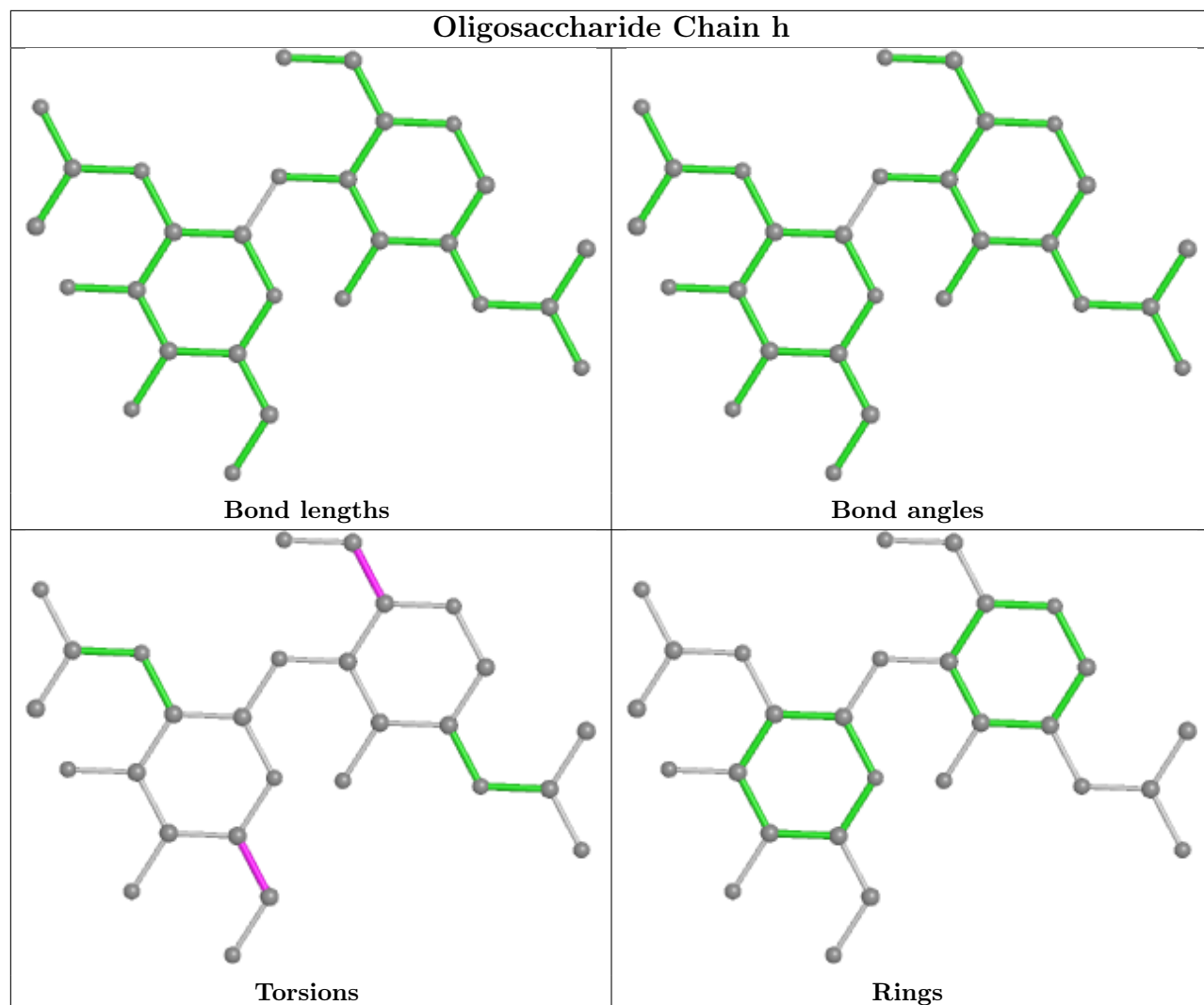


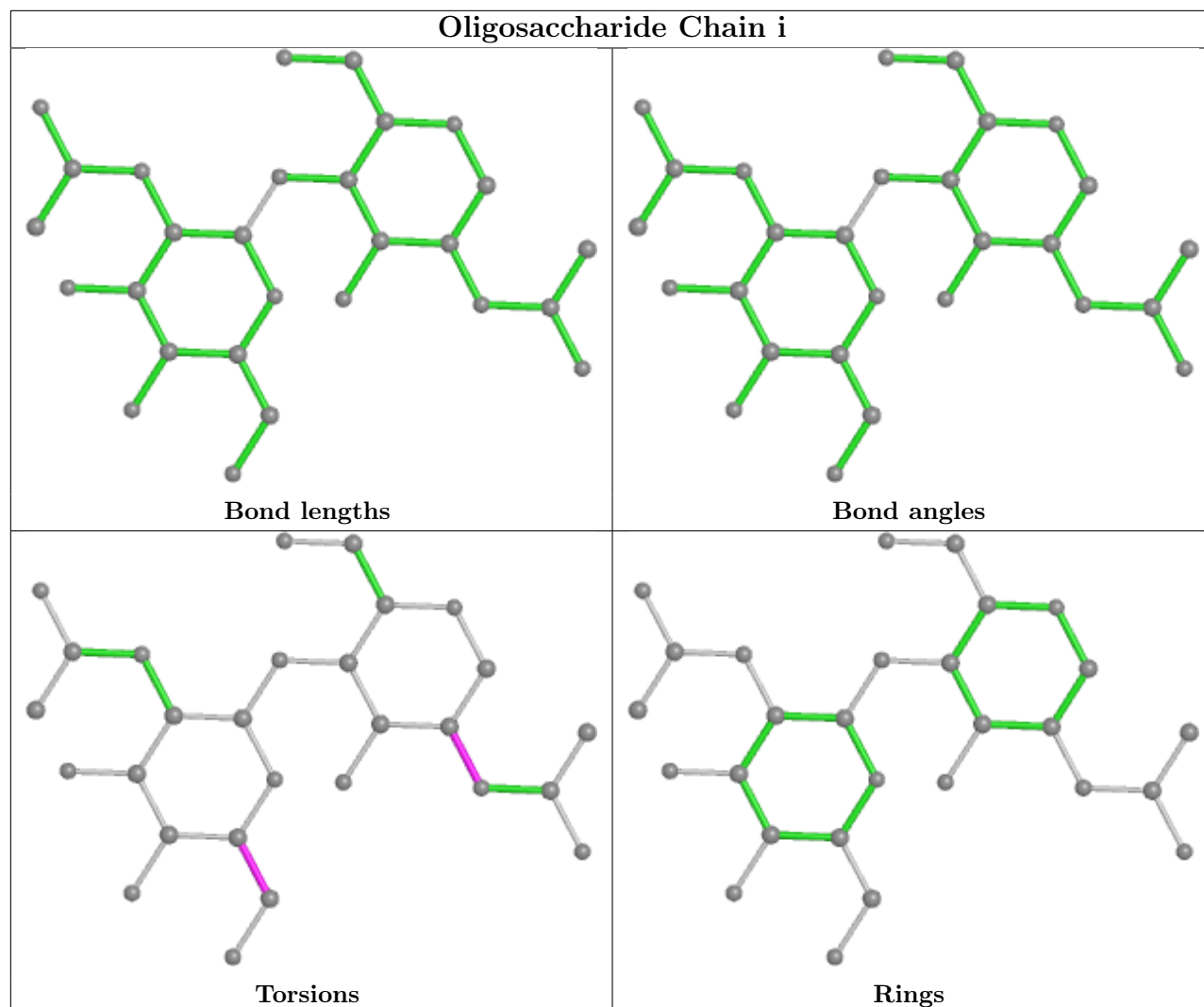


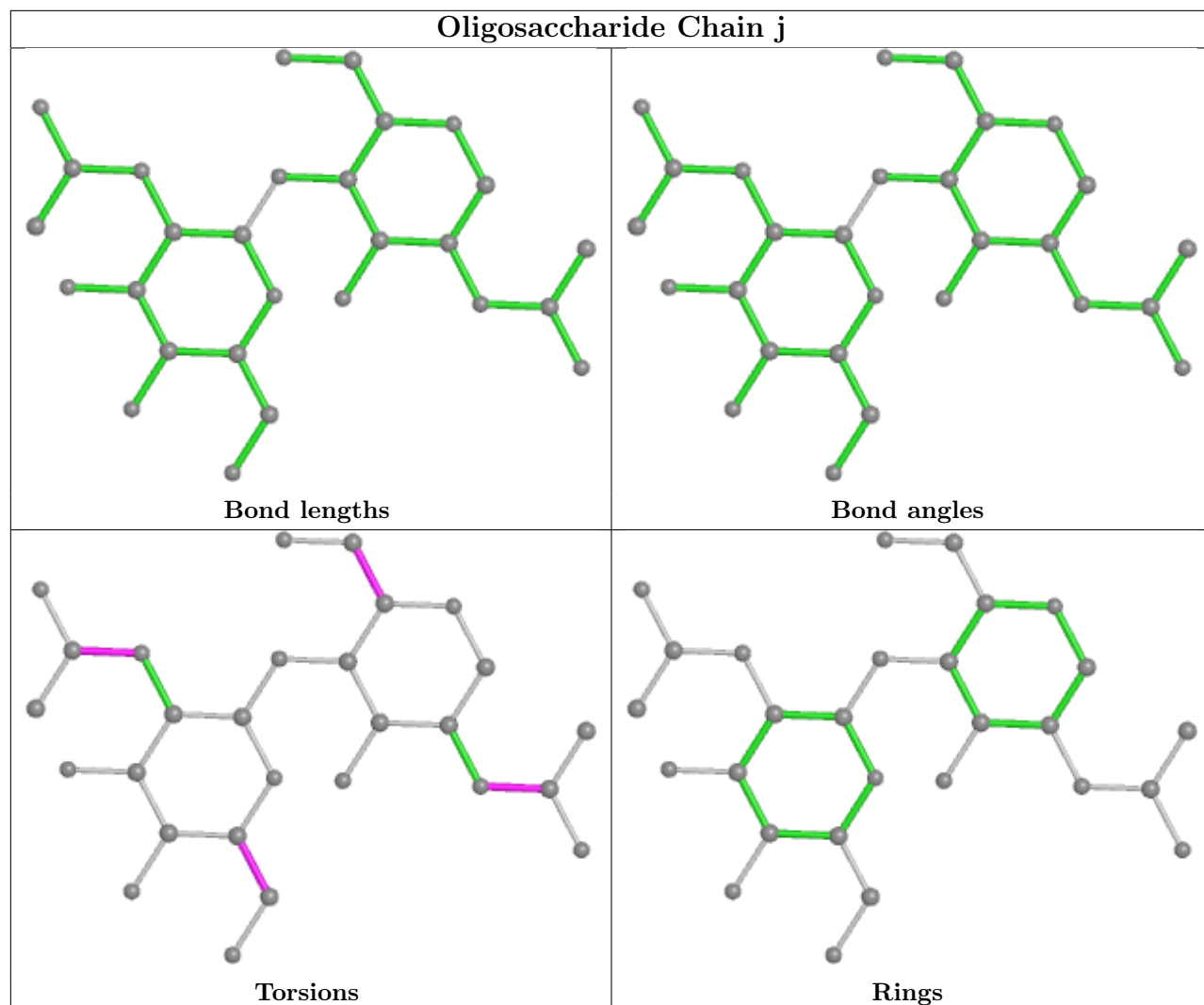


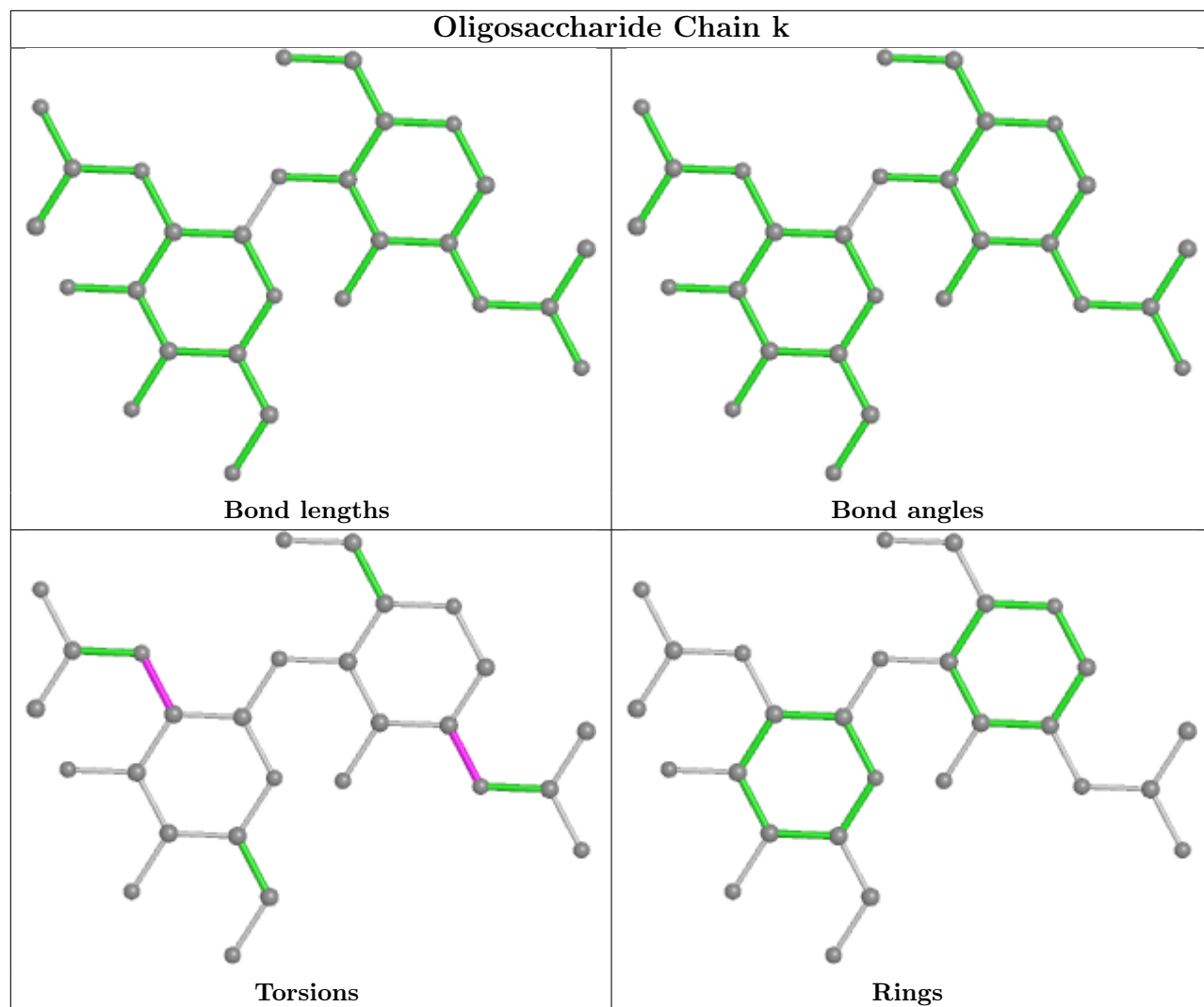


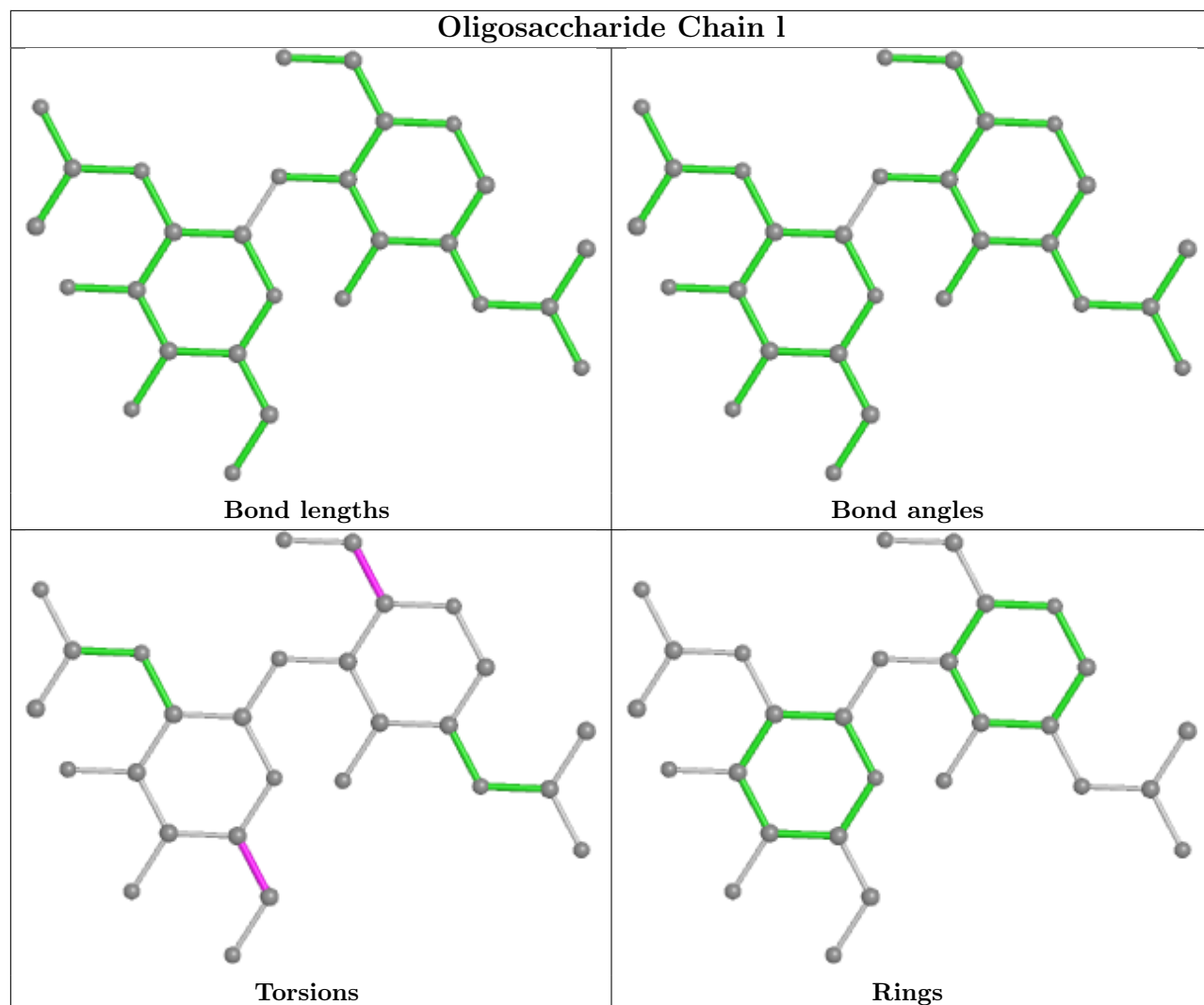


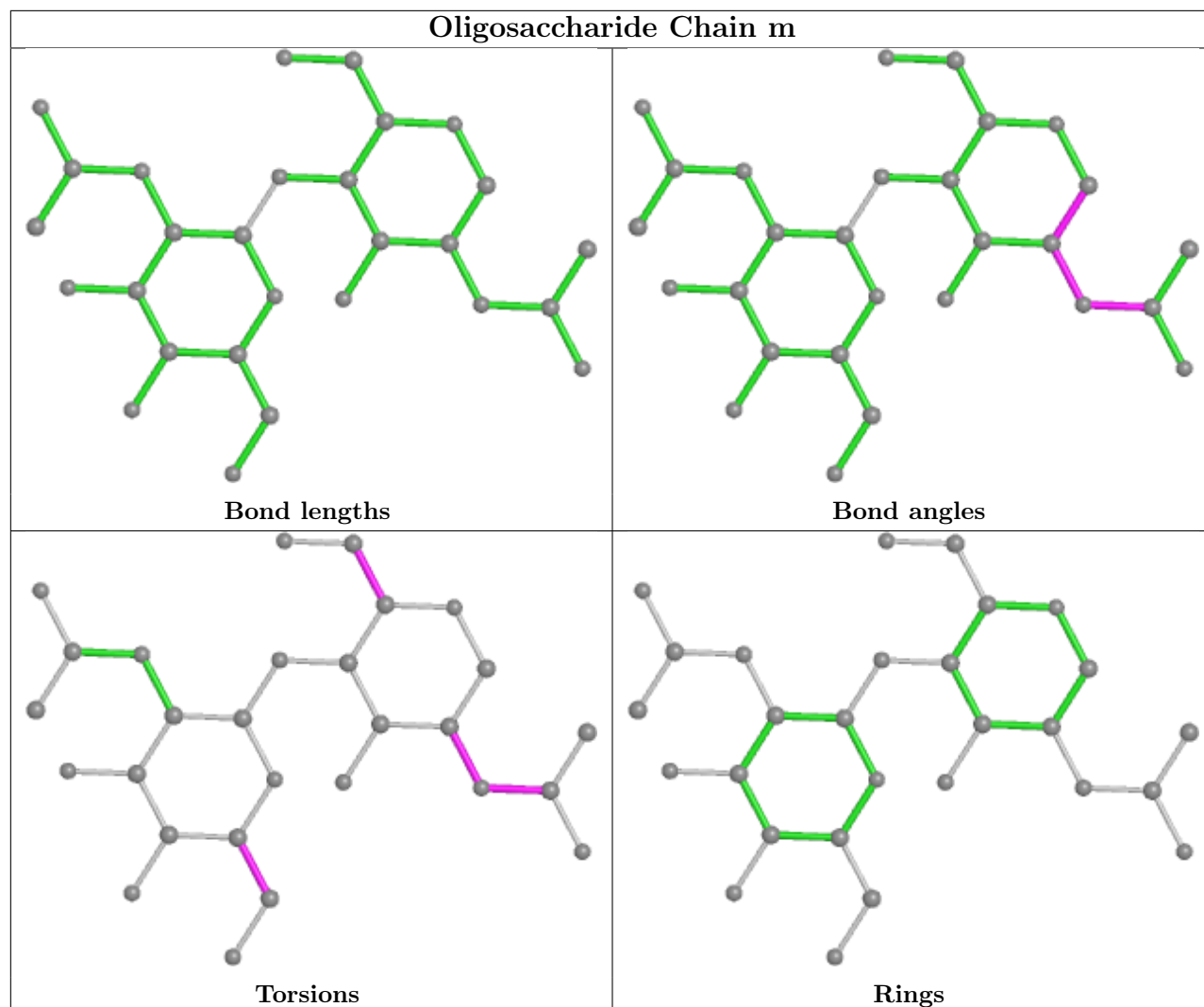




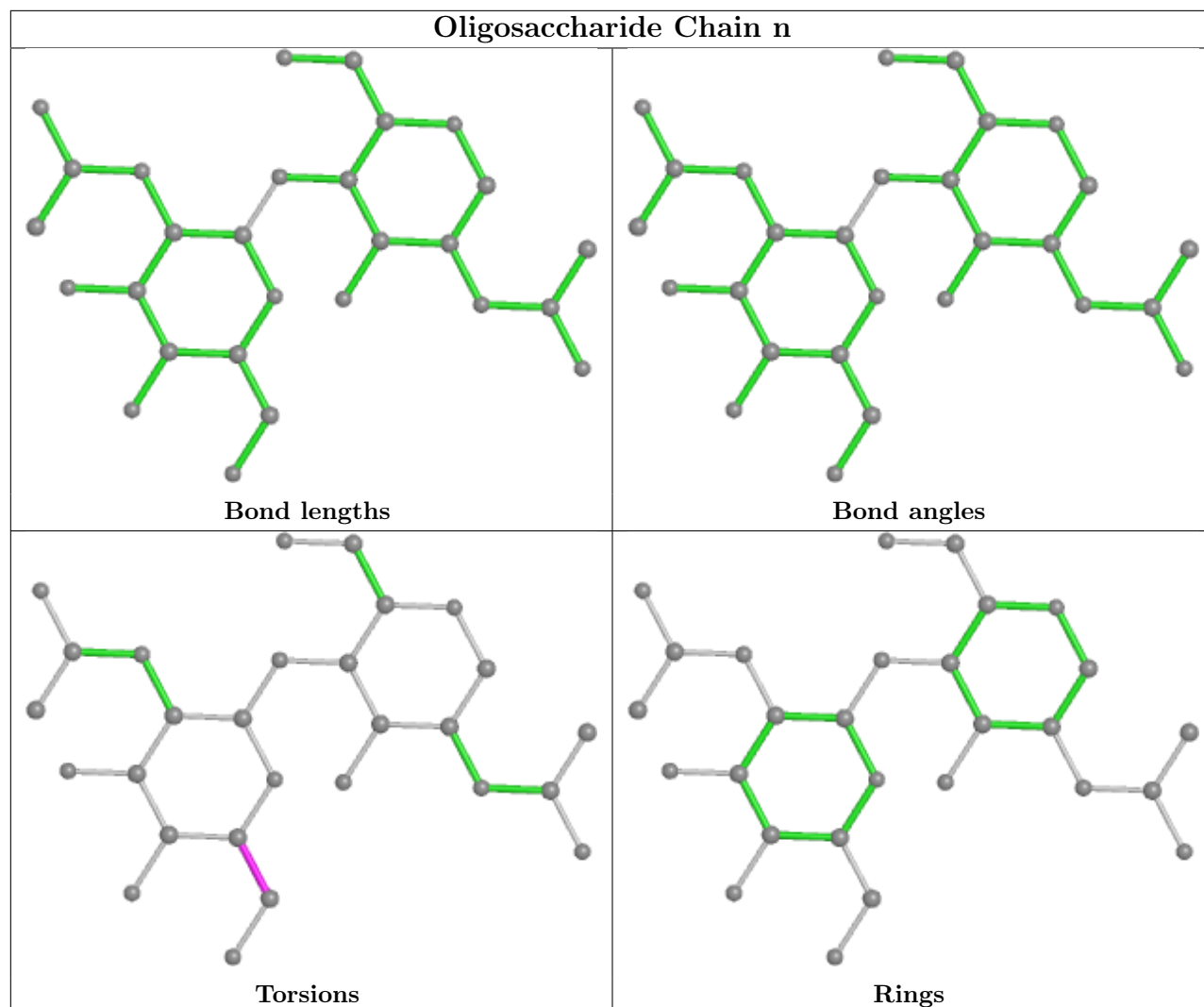


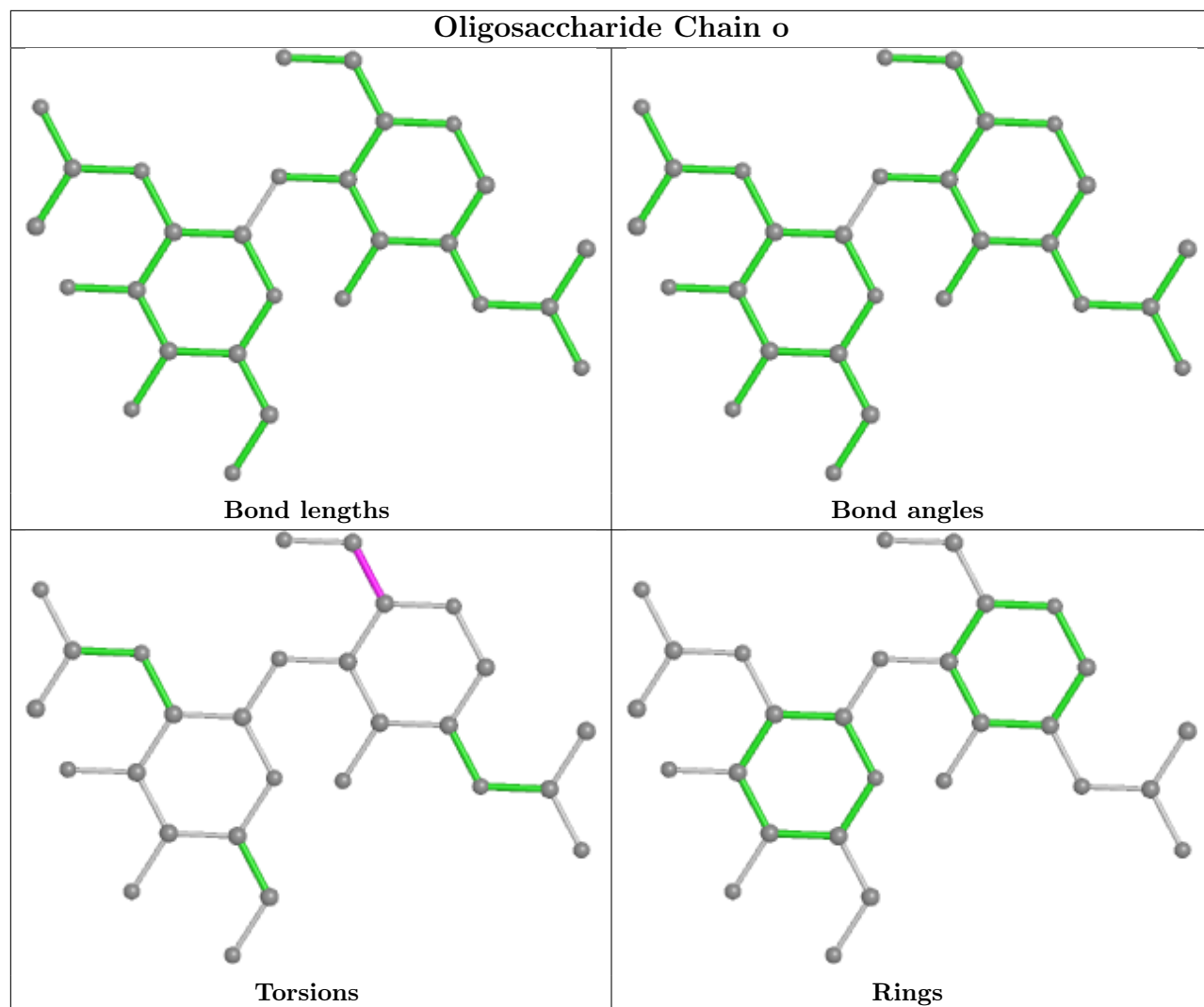


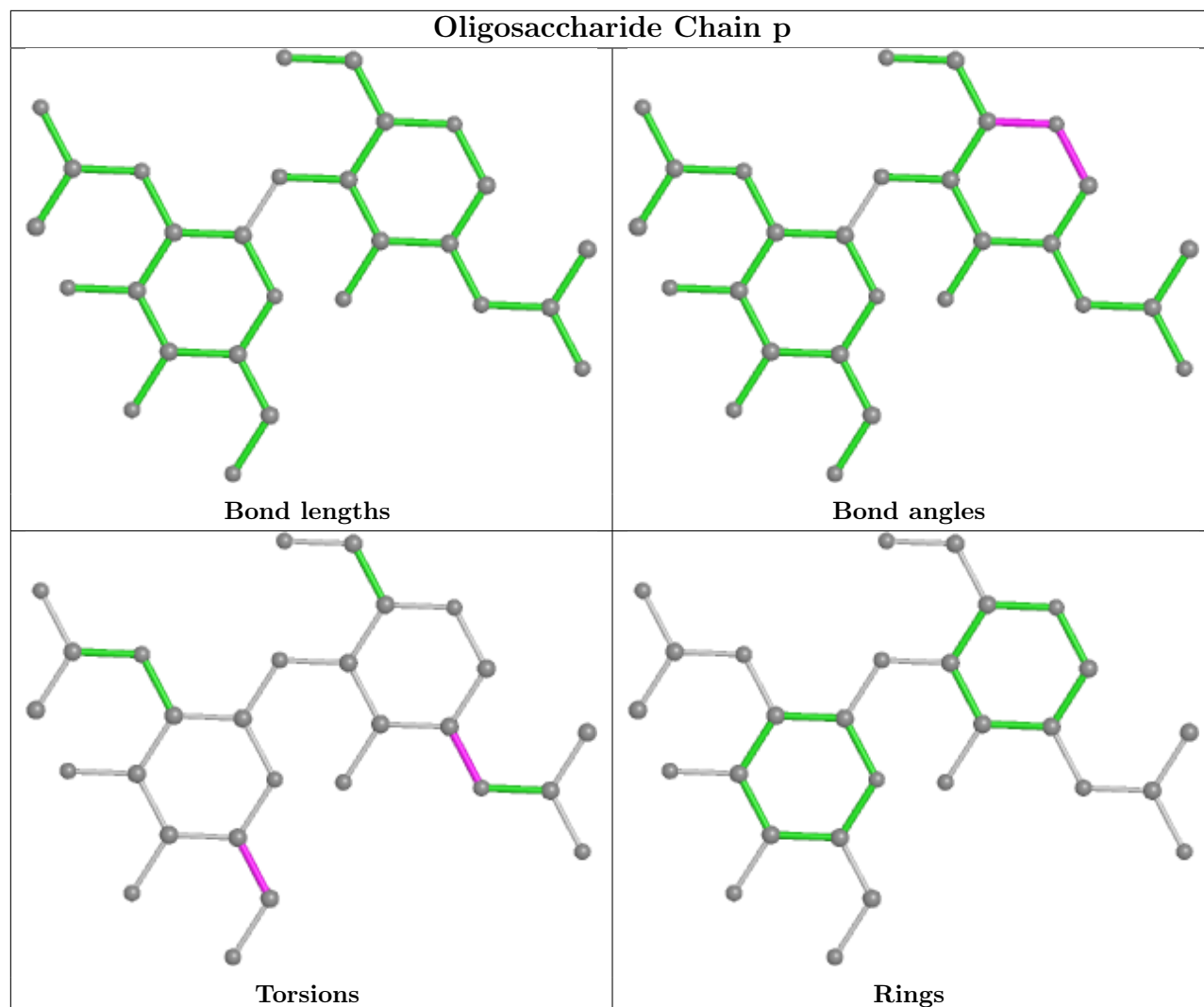


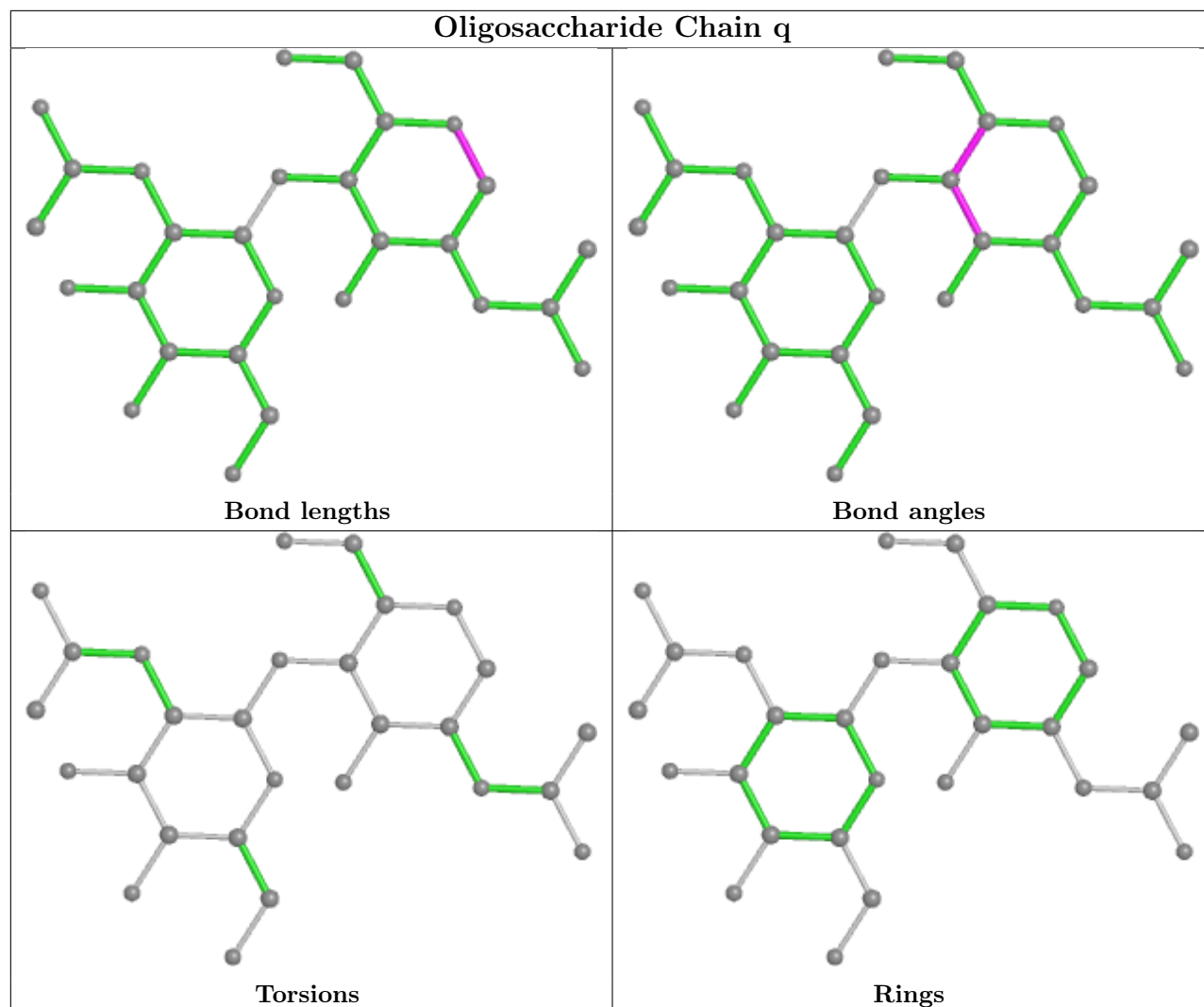


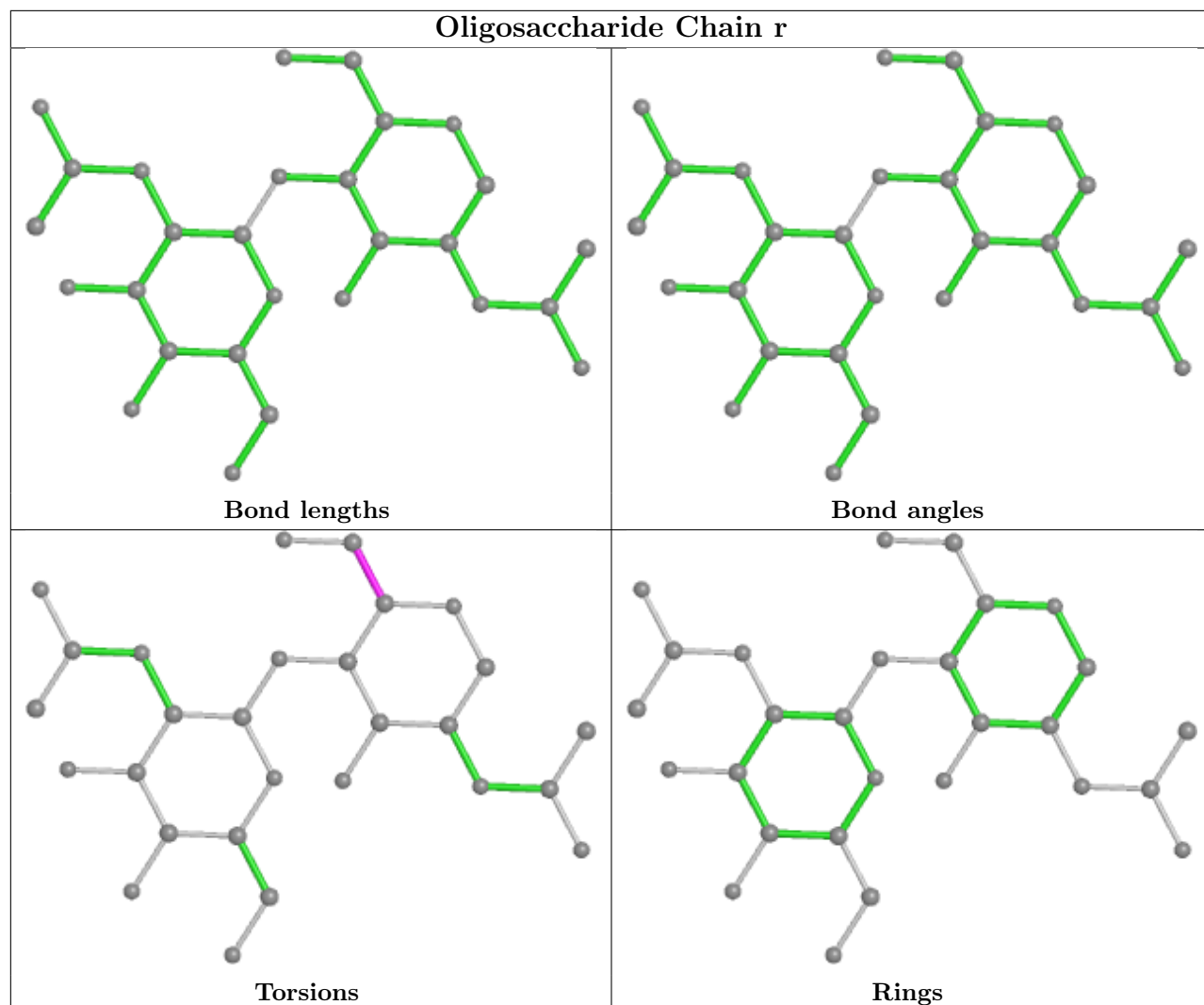


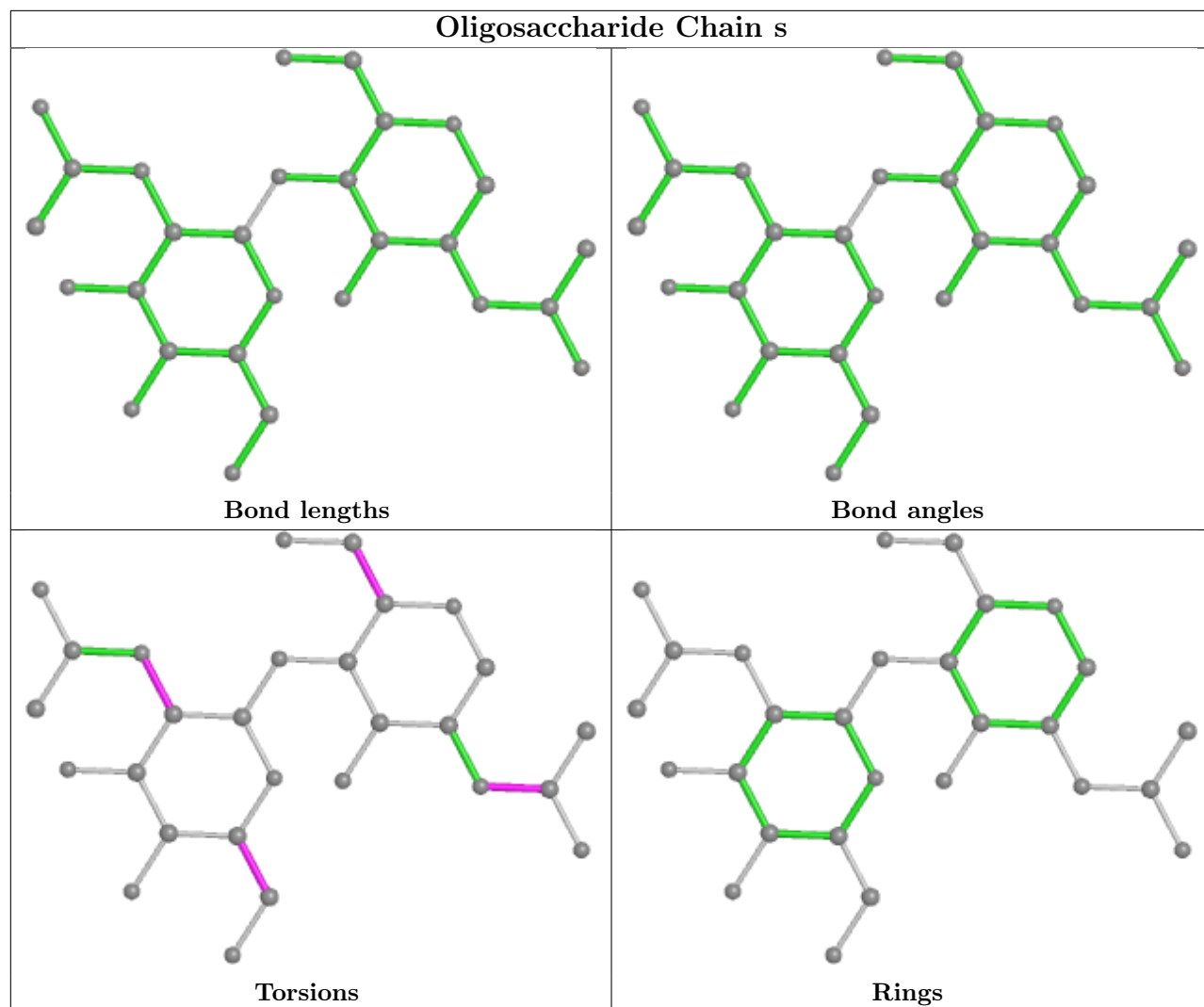


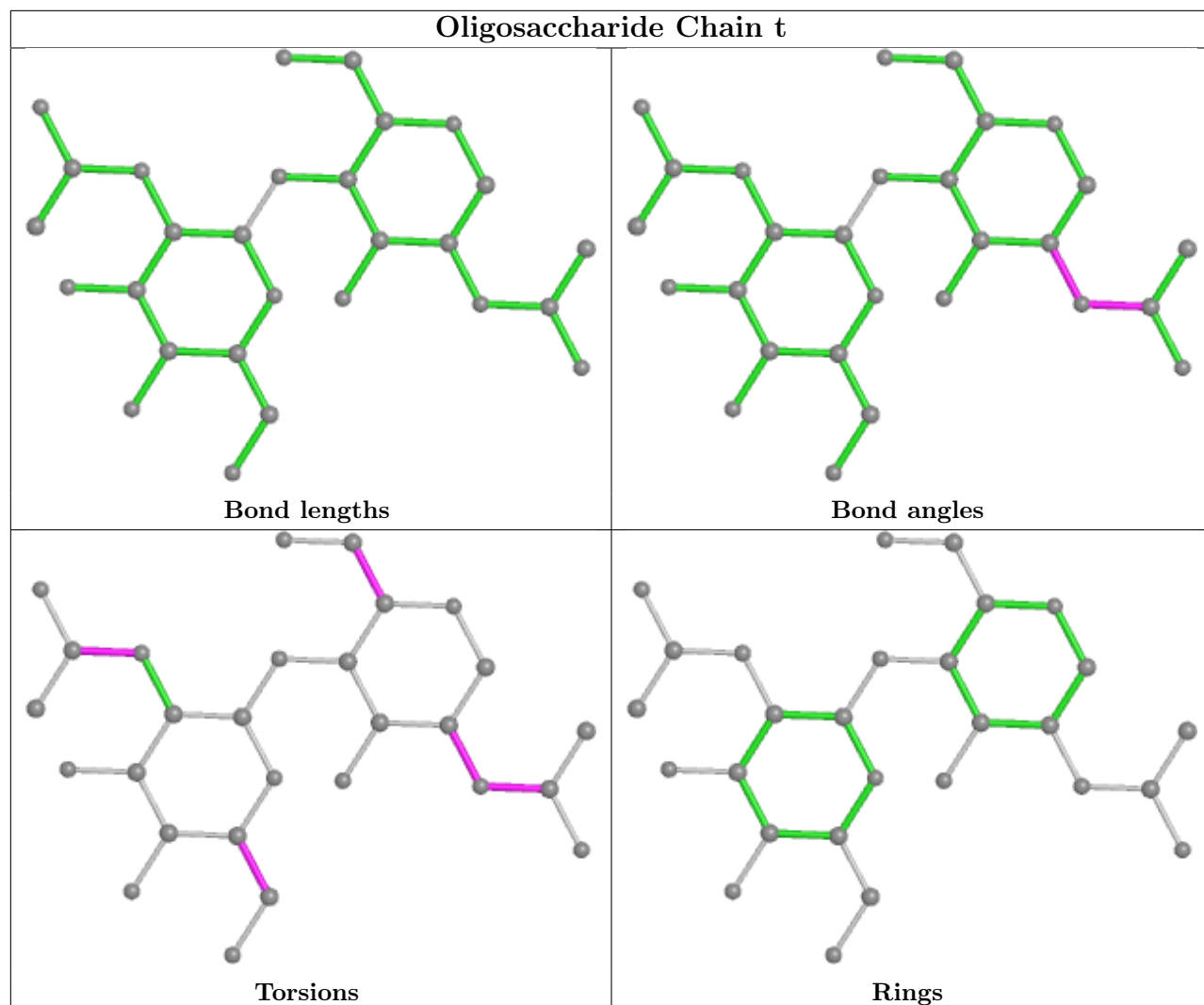


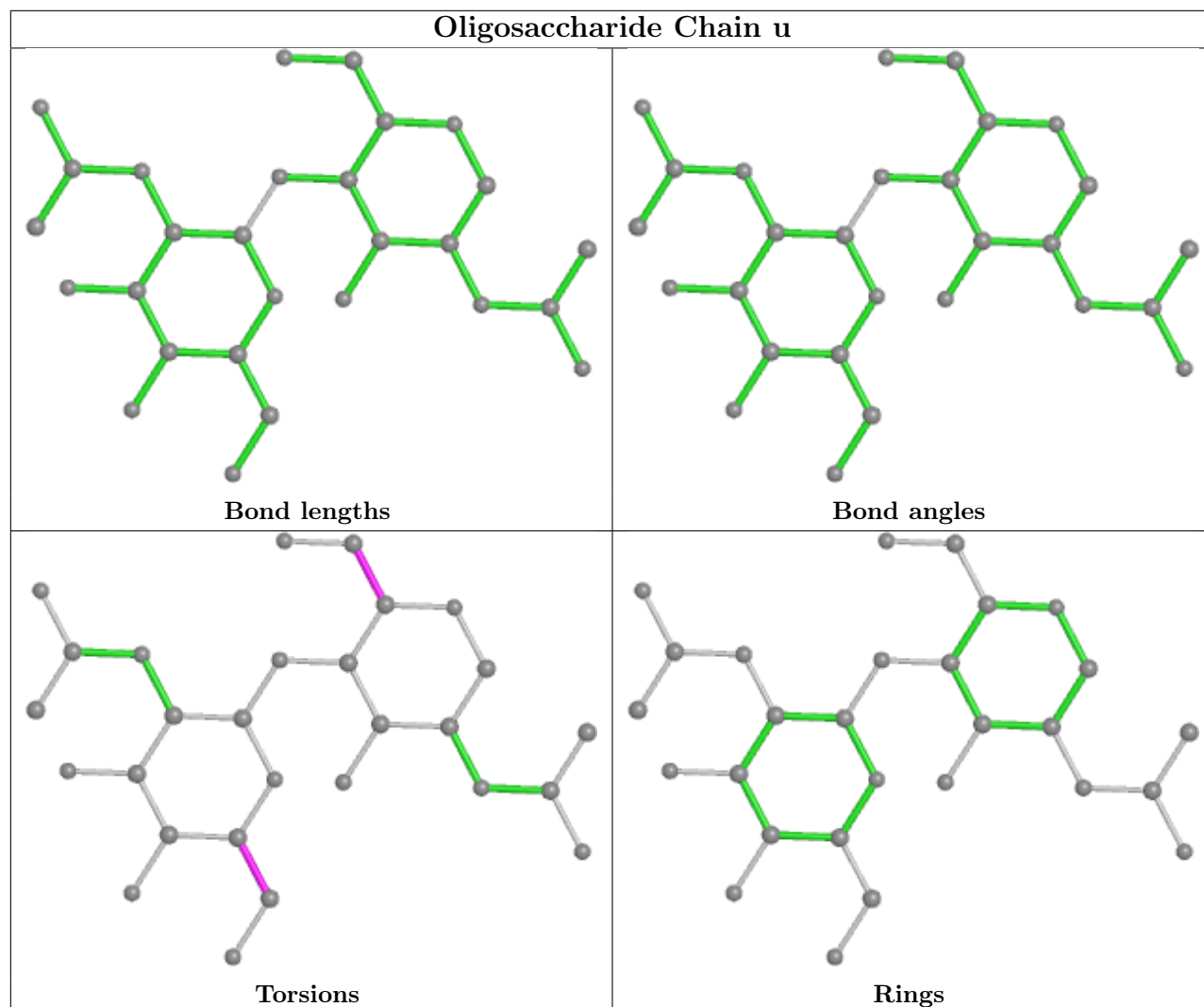




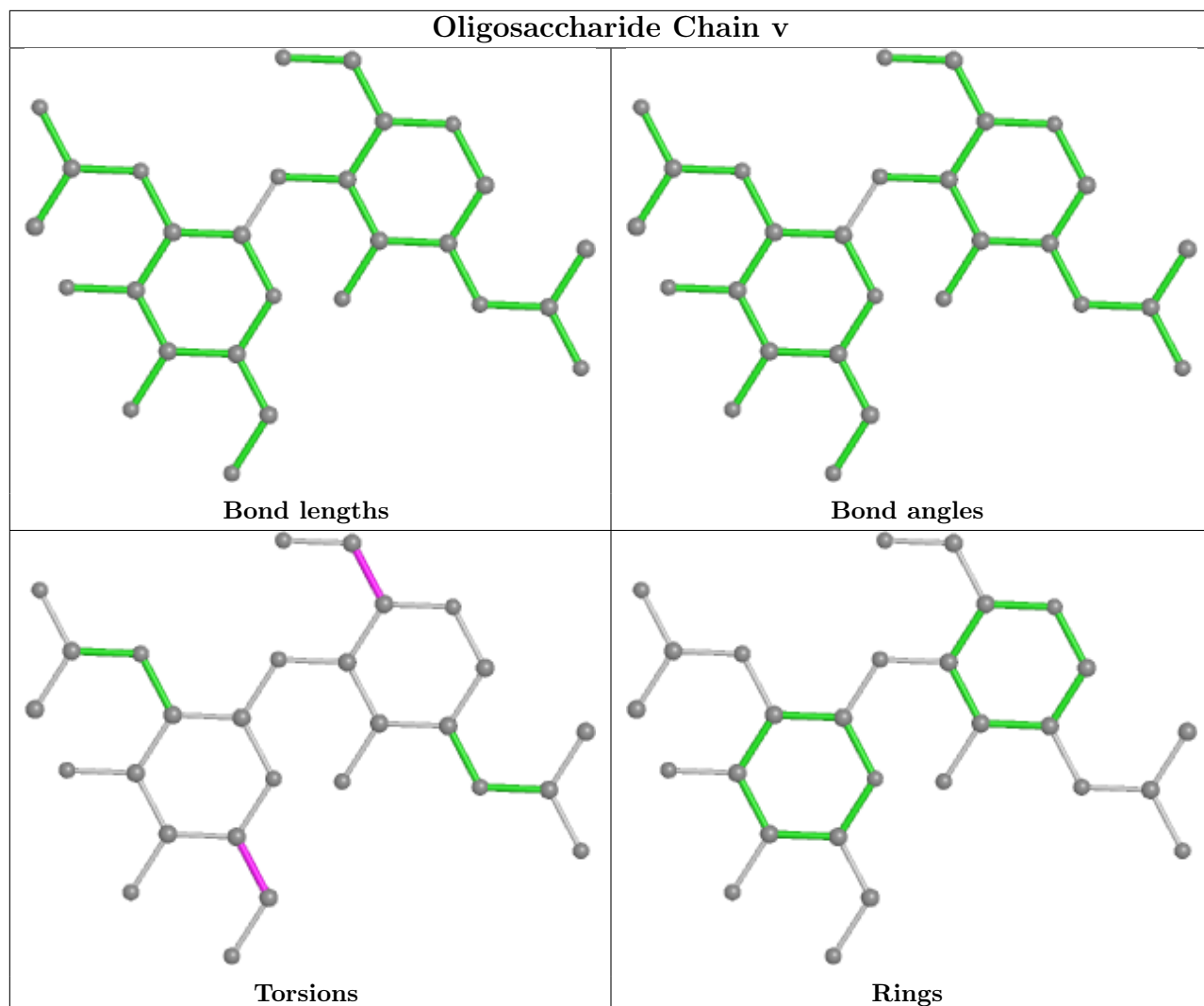


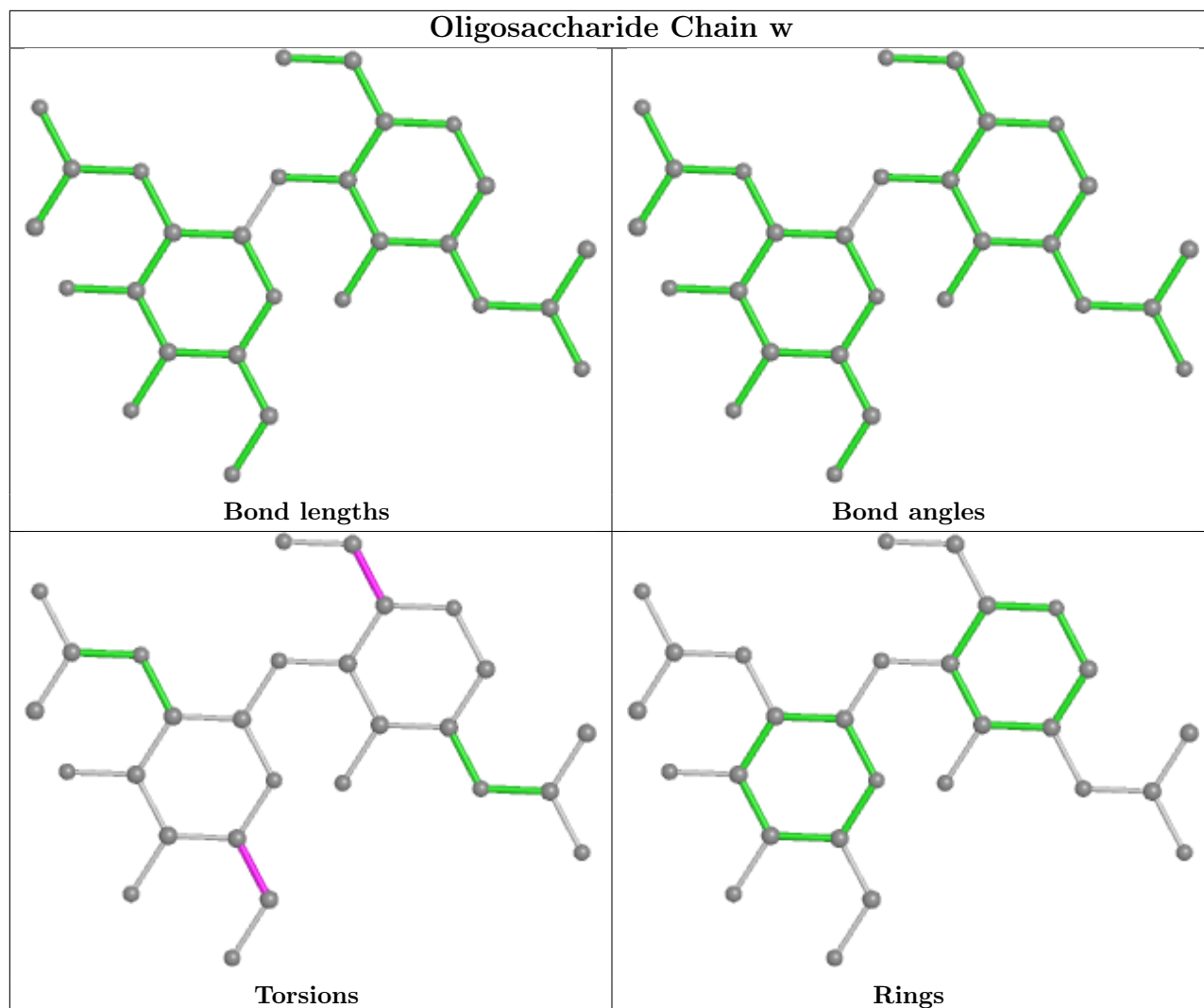












## 5.6 Ligand geometry [i](#)

14 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z  > 2$	Counts	RMSZ	$\# Z  > 2$
4	NAG	B	2001	1	14,14,15	0.26	0	17,19,21	0.48	0
4	NAG	B	2004	1	14,14,15	0.29	0	17,19,21	0.51	0
4	NAG	H	2002	2	14,14,15	0.23	0	17,19,21	0.43	0
4	NAG	A	2003	1	14,14,15	0.30	0	17,19,21	0.51	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
4	NAG	C	2003	1	14,14,15	0.28	0	17,19,21	0.51	0
4	NAG	B	2002	1	14,14,15	0.20	0	17,19,21	0.44	0
4	NAG	H	2001	2	14,14,15	0.23	0	17,19,21	0.42	0
4	NAG	A	2001	1	14,14,15	0.21	0	17,19,21	0.42	0
4	NAG	C	2002	1	14,14,15	0.21	0	17,19,21	0.43	0
4	NAG	F	2001	2	14,14,15	0.22	0	17,19,21	0.43	0
4	NAG	C	2001	1	14,14,15	0.20	0	17,19,21	0.42	0
4	NAG	B	2003	1	14,14,15	0.24	0	17,19,21	0.46	0
4	NAG	A	2002	1	14,14,15	0.22	0	17,19,21	0.44	0
4	NAG	F	2002	2	14,14,15	0.42	0	17,19,21	0.49	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	B	2001	1	-	2/6/23/26	0/1/1/1
4	NAG	B	2004	1	-	3/6/23/26	0/1/1/1
4	NAG	H	2002	2	-	2/6/23/26	0/1/1/1
4	NAG	A	2003	1	-	3/6/23/26	0/1/1/1
4	NAG	C	2003	1	-	3/6/23/26	0/1/1/1
4	NAG	B	2002	1	-	0/6/23/26	0/1/1/1
4	NAG	H	2001	2	-	2/6/23/26	0/1/1/1
4	NAG	A	2001	1	-	2/6/23/26	0/1/1/1
4	NAG	C	2002	1	-	2/6/23/26	0/1/1/1
4	NAG	F	2001	2	-	2/6/23/26	0/1/1/1
4	NAG	C	2001	1	-	2/6/23/26	0/1/1/1
4	NAG	B	2003	1	-	3/6/23/26	0/1/1/1
4	NAG	A	2002	1	-	4/6/23/26	0/1/1/1
4	NAG	F	2002	2	-	3/6/23/26	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (33) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	B	2004	NAG	O5-C5-C6-O6
4	A	2002	NAG	O5-C5-C6-O6
4	A	2003	NAG	O5-C5-C6-O6
4	C	2003	NAG	O5-C5-C6-O6
4	A	2002	NAG	C4-C5-C6-O6
4	F	2001	NAG	O5-C5-C6-O6
4	B	2004	NAG	C4-C5-C6-O6
4	C	2003	NAG	C4-C5-C6-O6
4	A	2003	NAG	C4-C5-C6-O6
4	H	2001	NAG	C4-C5-C6-O6
4	A	2001	NAG	C8-C7-N2-C2
4	A	2001	NAG	O7-C7-N2-C2
4	A	2002	NAG	C8-C7-N2-C2
4	A	2002	NAG	O7-C7-N2-C2
4	B	2001	NAG	C8-C7-N2-C2
4	B	2001	NAG	O7-C7-N2-C2
4	B	2003	NAG	C8-C7-N2-C2
4	B	2003	NAG	O7-C7-N2-C2
4	C	2001	NAG	C8-C7-N2-C2
4	C	2001	NAG	O7-C7-N2-C2
4	C	2002	NAG	C8-C7-N2-C2
4	C	2002	NAG	O7-C7-N2-C2
4	H	2002	NAG	C8-C7-N2-C2
4	H	2002	NAG	O7-C7-N2-C2
4	F	2002	NAG	O5-C5-C6-O6
4	F	2001	NAG	C4-C5-C6-O6
4	H	2001	NAG	O5-C5-C6-O6
4	F	2002	NAG	C4-C5-C6-O6
4	A	2003	NAG	C3-C2-N2-C7
4	B	2004	NAG	C3-C2-N2-C7
4	C	2003	NAG	C3-C2-N2-C7
4	B	2003	NAG	O5-C5-C6-O6
4	F	2002	NAG	C1-C2-N2-C7

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.

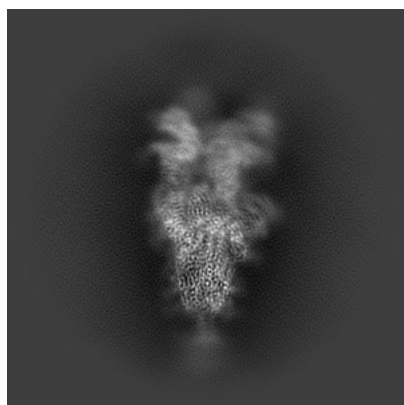
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-31794. These allow visual inspection of the internal detail of the map and identification of artifacts.

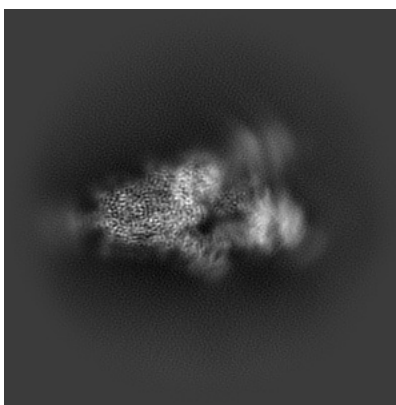
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

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

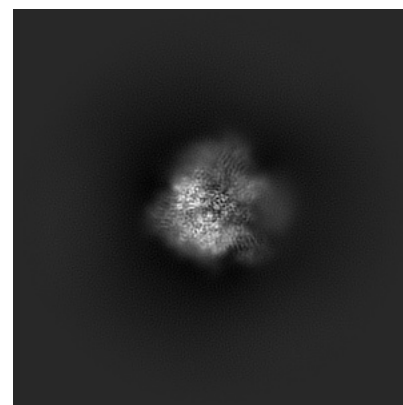
#### 6.1.1 Primary map



X



Y

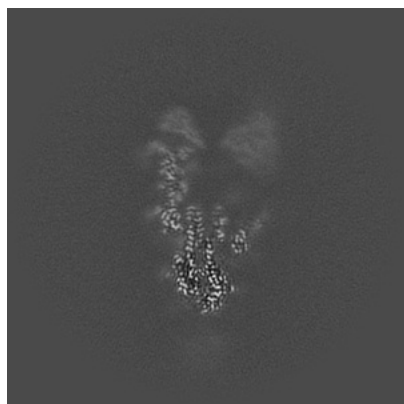


Z

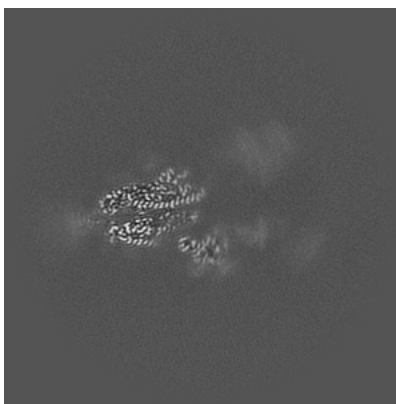
The images above show the map projected in three orthogonal directions.

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

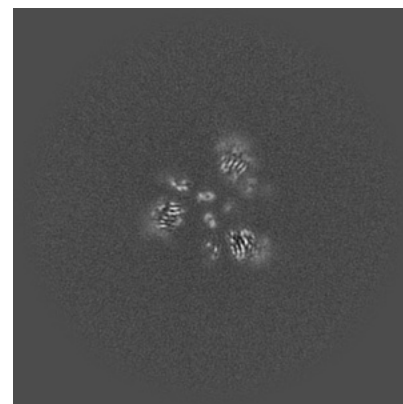
#### 6.2.1 Primary map



X Index: 192



Y Index: 192

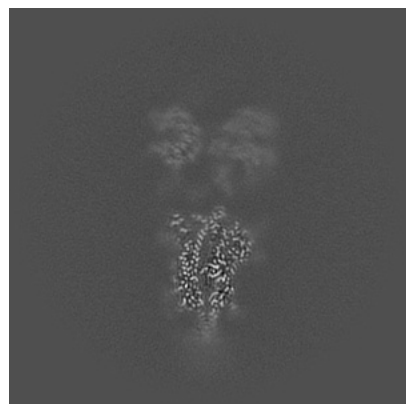


Z Index: 192

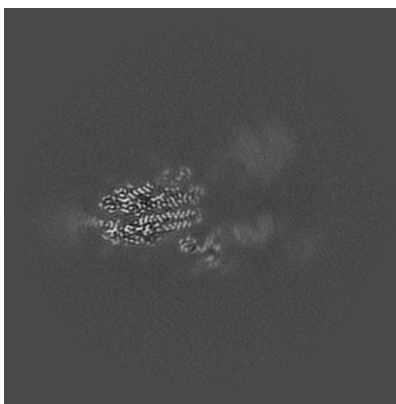
The images above show central slices of the map in three orthogonal directions.

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

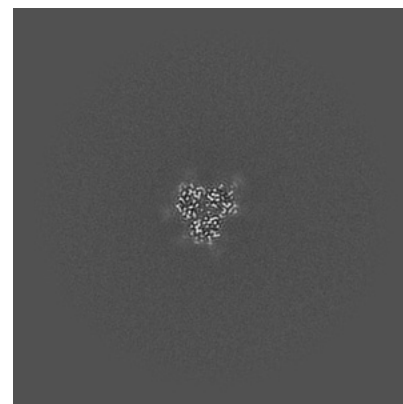
### 6.3.1 Primary map



X Index: 178



Y Index: 196

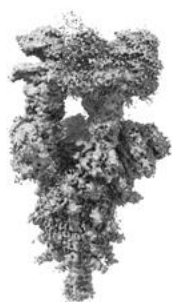


Z Index: 124

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 0.23. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

## 6.5 Mask visualisation

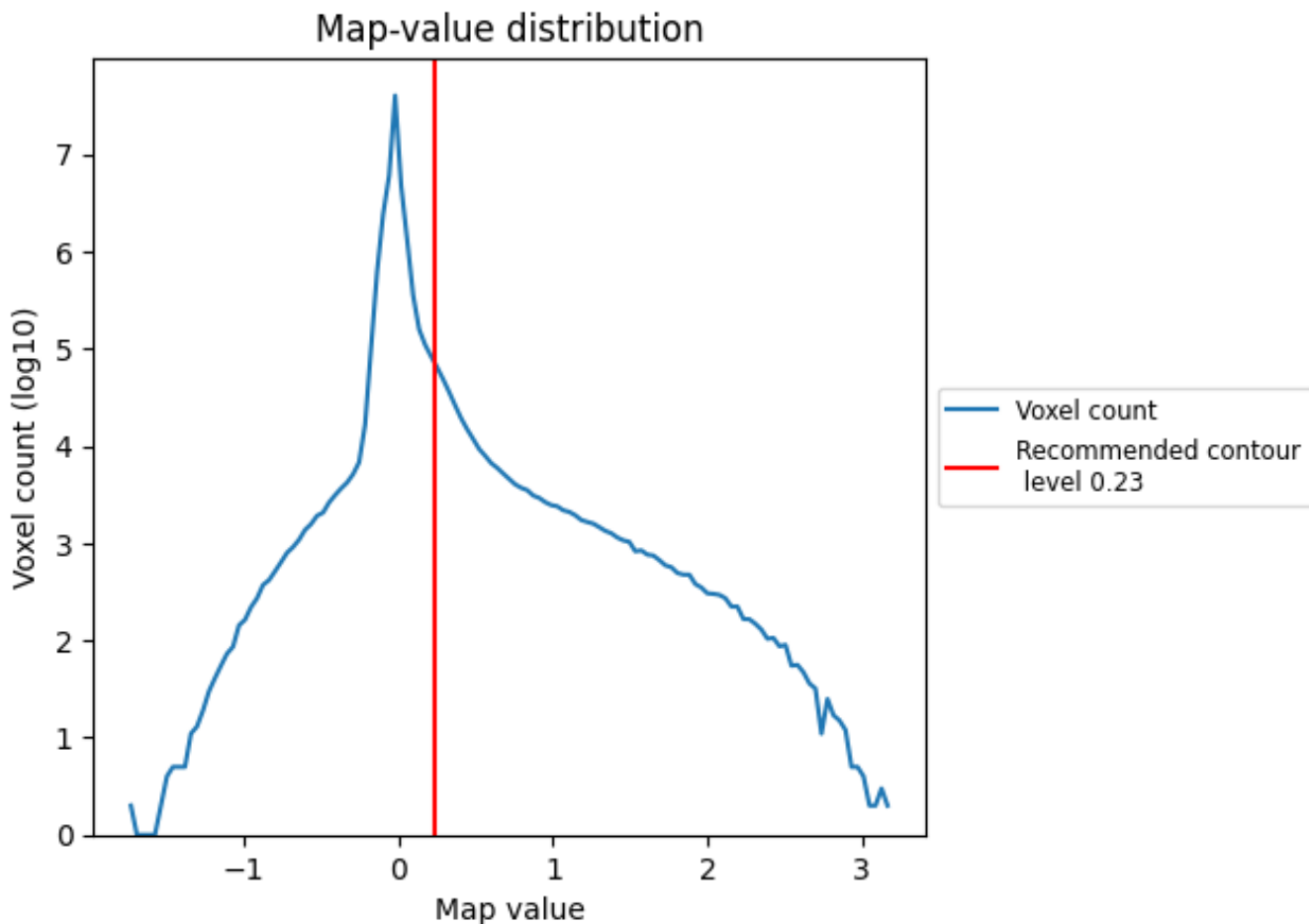
This section was not generated. No masks/segmentation were deposited.



## 7 Map analysis [i](#)

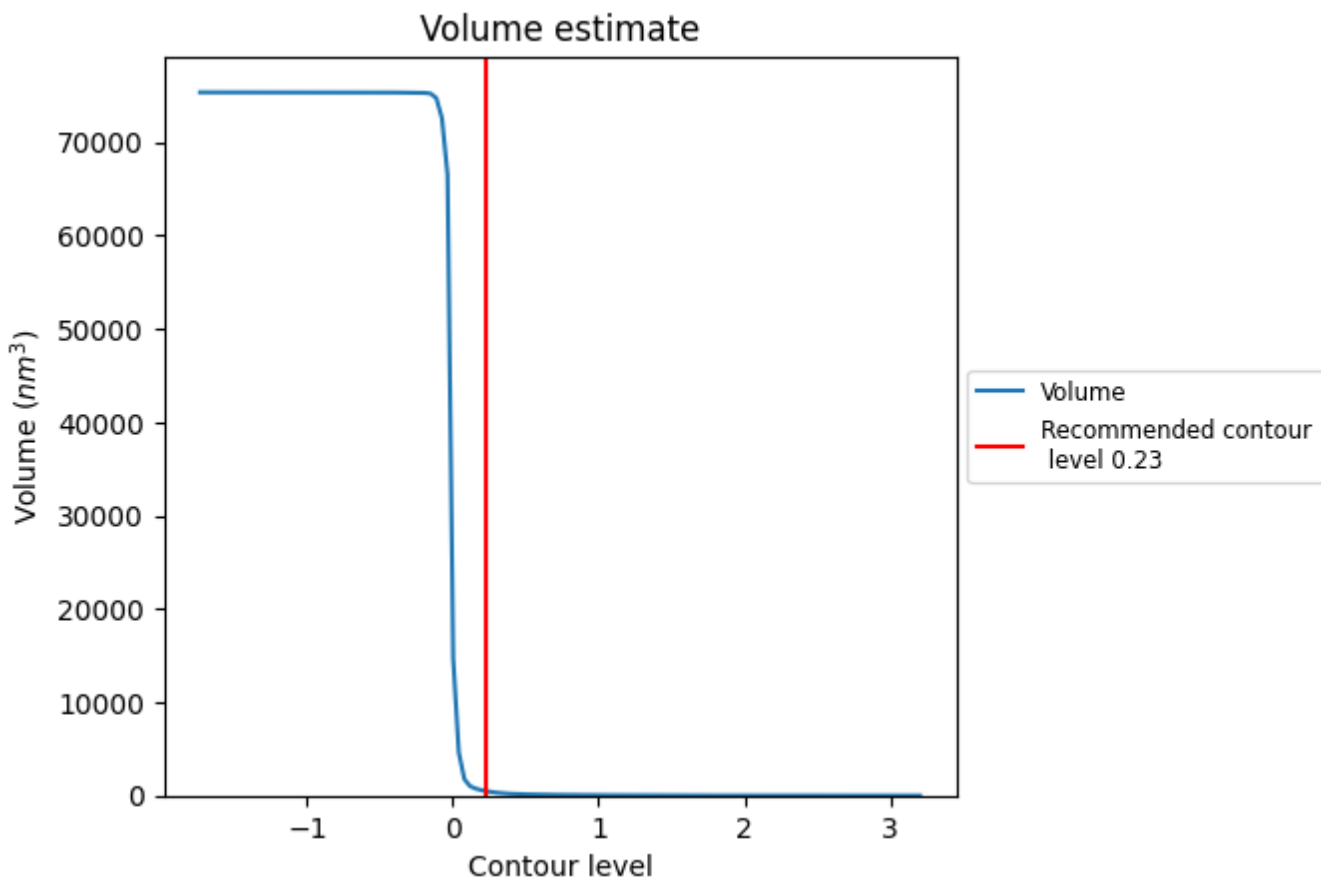
This section contains the results of statistical analysis of the map.

### 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.

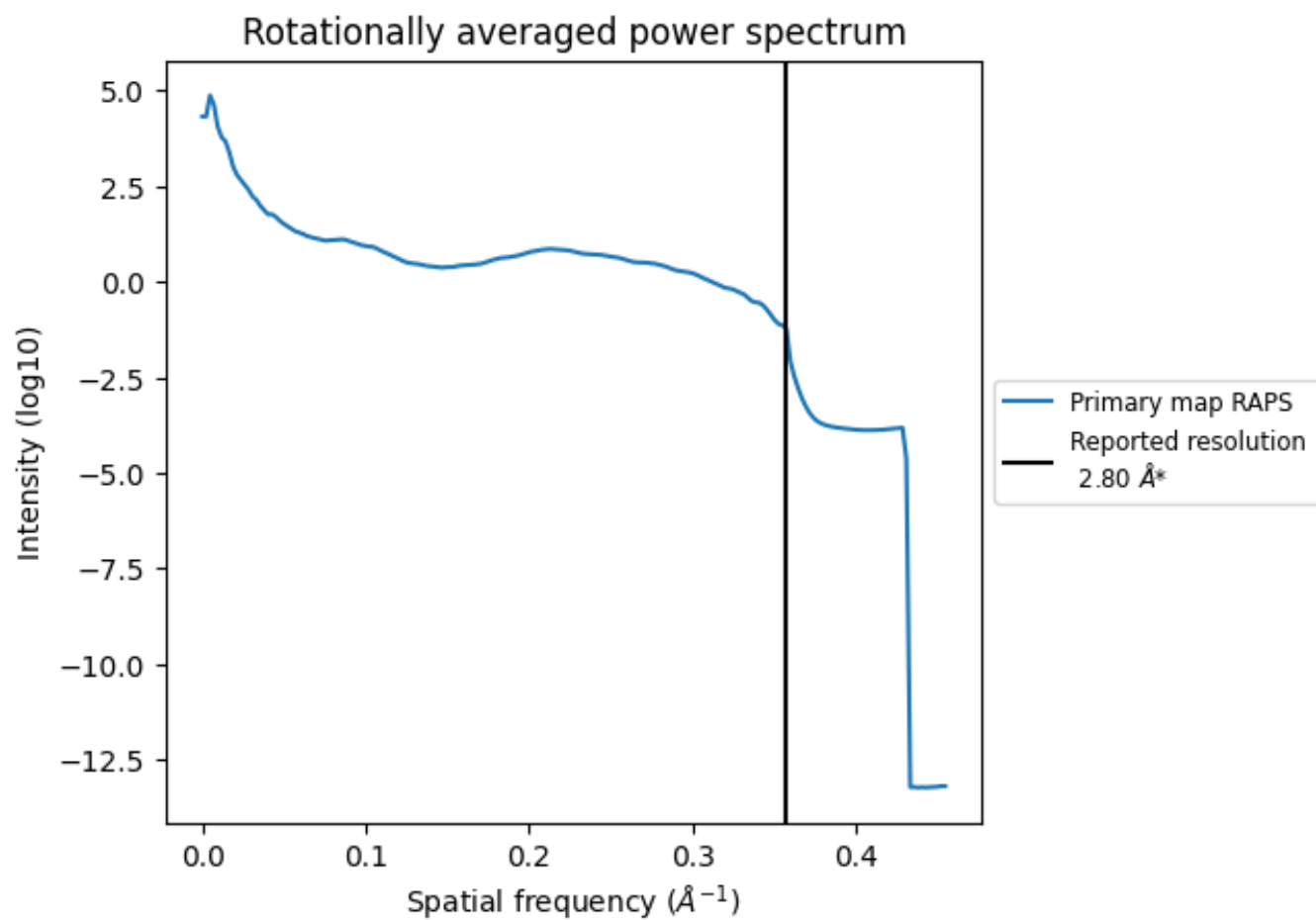
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 471 nm<sup>3</sup>; this corresponds to an approximate mass of 425 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  $0.357 \text{\AA}^{-1}$

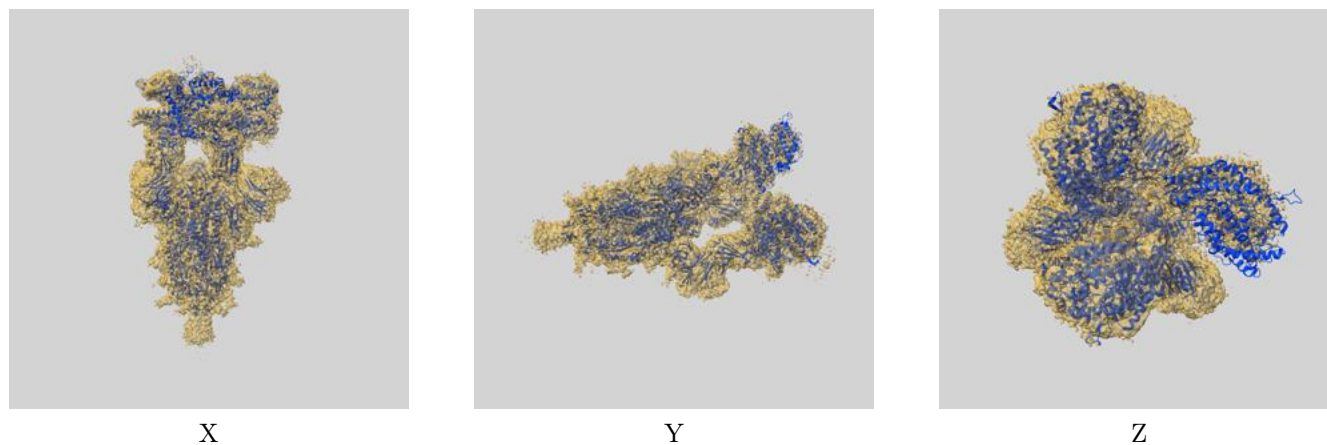
## 8 Fourier-Shell correlation

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

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

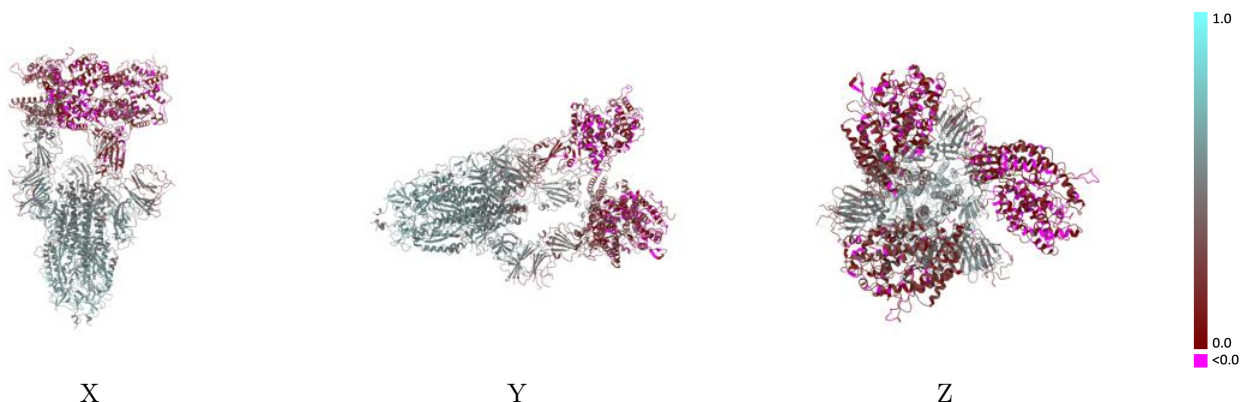
This section contains information regarding the fit between EMDB map EMD-31794 and PDB model 7V89. Per-residue inclusion information can be found in section 3 on page 16.

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



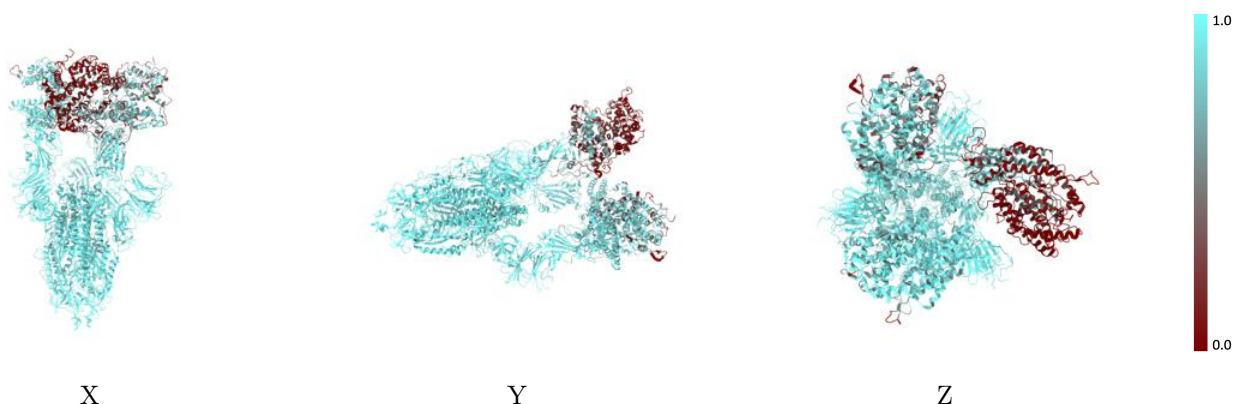
The images above show the 3D surface view of the map at the recommended contour level 0.23 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



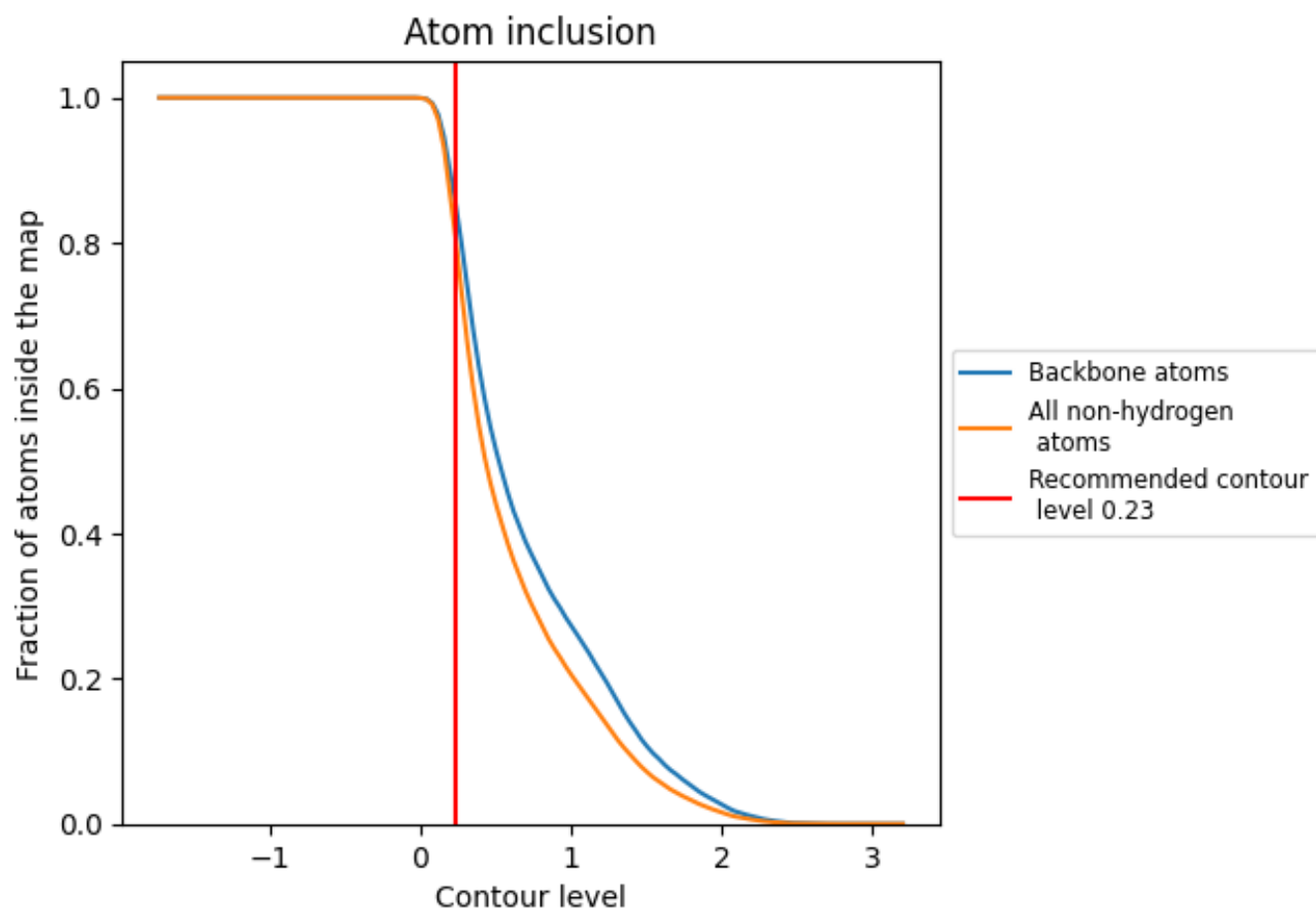
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.23).







































































## 9.4 Atom inclusion [i](#)



At the recommended contour level, 86% of all backbone atoms, 81% 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 (0.23) and Q-score for the entire model and for each chain.































Chain	Atom inclusion	Q-score
All	 0.8140	 0.3570
A	 0.9709	 0.5060
B	 0.9212	 0.4590
C	 0.9568	 0.4790
D	 0.9286	 0.3530
E	 0.7143	 0.3200
F	 0.8639	 0.2260
G	 0.2047	 0.0850
H	 0.6923	 0.1340
I	 0.4286	 0.2410
J	 0.8571	 0.3850
K	 1.0000	 0.5000
L	 0.9643	 0.4870
M	 0.9286	 0.4380
N	 0.8929	 0.3980
O	 1.0000	 0.5220
P	 0.9643	 0.4920
Q	 0.8571	 0.3830
R	 1.0000	 0.5030
S	 1.0000	 0.4650
T	 0.9643	 0.4200
U	 0.6071	 0.3200
V	 0.3929	 0.3220
W	 0.7500	 0.4000
X	 0.9643	 0.4200
Y	 0.8214	 0.3680
Z	 0.7857	 0.3650
a	 1.0000	 0.5170
b	 1.0000	 0.4720
c	 0.8214	 0.3950
d	 1.0000	 0.5390
e	 0.9643	 0.4810
f	 0.7143	 0.2990
g	 0.7857	 0.3420
h	 0.4286	 0.2090



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Chain	Atom inclusion	Q-score
i	 0.7857	 0.3780
j	 0.9286	 0.4140
k	 0.9286	 0.3710
l	 0.8214	 0.3570
m	 0.8571	 0.3920
n	 1.0000	 0.5220
o	 0.9286	 0.4450
p	 0.8214	 0.3330
q	 0.9643	 0.4930
r	 0.9643	 0.5360
s	 0.8571	 0.4050
t	 0.5000	 0.2890
u	 0.7143	 0.3240
v	 0.8214	 0.3310
w	 0.5000	 0.2530