



# wwPDB X-ray Structure Validation Summary Report ⓘ

Oct 5, 2023 – 09:22 AM EDT

PDB ID : 6UTK  
Title : Crystal structure of 438-B11 Fab in complex with an uncleaved prefusion optimized (UFO) soluble BG505 trimer and Fab 35O22 at 3.80 Angstrom  
Authors : Kumar, S.; Wilson, I.A.  
Deposited on : 2019-10-29  
Resolution : 3.80 Å (reported)

This is a wwPDB X-ray Structure 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/XrayValidationReportHelp>

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:

MolProbity : **FAILED**  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtrriage (Phenix) : 1.13  
EDS : **FAILED**  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.35.1

## 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.80 Å.

There are no overall percentile quality scores available for this entry.

MolProbity and EDS failed to run properly - the sequence quality summary graphics cannot be shown.

## 2 Entry composition [i](#)

There are 16 unique types of molecules in this entry. The entry contains 12419 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, 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 35O22 Fab Heavy Chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	D	240	1813	1150	303	352	8	0	0	0

- Molecule 2 is a protein called 35O22 Fab Light Chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	E	213	1615	1012	267	328	8	0	0	0

- Molecule 3 is a protein called B11 Fab Light Chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
3	L	213	1634	1022	281	327	4	0	0	0

- Molecule 4 is a protein called Envelope glycoprotein gp120.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
4	G	453	3563	2234	630	671	28	0	0	0

There are 14 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
G	62	ASP	GLU	conflict	UNP Q2N0S6
G	332	ASN	THR	conflict	UNP Q2N0S6
G	501	CYS	ALA	conflict	UNP Q2N0S6
G	507	GLY	-	expression tag	UNP Q2N0S6
G	508	GLY	-	expression tag	UNP Q2N0S6
G	509	GLY	-	expression tag	UNP Q2N0S6
G	510	GLY	-	expression tag	UNP Q2N0S6
G	511	GLY	-	expression tag	UNP Q2N0S6

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Chain	Residue	Modelled	Actual	Comment	Reference
G	512	SER	-	expression tag	UNP Q2N0S6
G	513	GLY	-	expression tag	UNP Q2N0S6
G	514	GLY	-	expression tag	UNP Q2N0S6
G	515	GLY	-	expression tag	UNP Q2N0S6
G	516	GLY	-	expression tag	UNP Q2N0S6
G	517	SER	-	expression tag	UNP Q2N0S6

- Molecule 5 is a protein called Envelope glycoprotein gp41.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
5	T	134	1069	677	182	203	7	0	0	0

There are 9 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
T	547A	ASN	-	linker	UNP Q2N0S9
T	547B	PRO	-	linker	UNP Q2N0S9
T	547C	ASP	-	linker	UNP Q2N0S9
T	547D	TRP	-	linker	UNP Q2N0S9
T	547E	LEU	-	linker	UNP Q2N0S9
T	547F	PRO	-	linker	UNP Q2N0S9
T	547G	ASP	-	linker	UNP Q2N0S9
T	547H	MET	-	linker	UNP Q2N0S9
T	605	CYS	THR	conflict	UNP Q2N0S9

- Molecule 6 is a protein called B11 Fab Heavy chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
6	H	231	1747	1109	296	333	9	0	0	0

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

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
7	A	3	39	22	2	15	0	0	0
7	I	3	39	22	2	15	0	0	0
7	P	3	39	22	2	15	0	0	0

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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
7	Q	3	Total	C	N	O	0	0	0
			39	22	2	15			
7	U	3	Total	C	N	O	0	0	0
			39	22	2	15			

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

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
8	B	10	Total	C	N	O	0	0	0
			116	64	2	50			

- Molecule 9 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.

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

- Molecule 10 is an oligosaccharide called alpha-D-mannopyranose-(1-3)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
10	J	4	Total	C	N	O	0	0	0
			50	28	2	20			
10	M	4	Total	C	N	O	0	0	0
			50	28	2	20			

- Molecule 11 is an oligosaccharide called alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-6)]alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
11	K	11	127	70	2	55	0	0	0

- Molecule 12 is an oligosaccharide called alpha-D-mannopyranose-(1-3)-alpha-D-mannopyranose-(1-6)-[alpha-D-mannopyranose-(1-3)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
12	N	6	72	40	2	30	0	0	0

- Molecule 13 is an oligosaccharide called alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]alpha-D-mannopyranose-(1-6)-[alpha-D-mannopyranose-(1-3)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
13	R	7	83	46	2	35	0	0	0

- Molecule 14 is an oligosaccharide called alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
14	S	5	61	34	2	25	0	0	0

- Molecule 15 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-3)-2-acetamido-2-deoxy-beta-D-glucopyranose.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
15	V	2	28	16	2	10	0	0	0

- Molecule 16 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: C<sub>8</sub>H<sub>15</sub>NO<sub>6</sub>) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
16	G	1	Total 14	C 8	N 1	O 5	0	0
16	G	1	Total 14	C 8	N 1	O 5	0	0
16	G	1	Total 14	C 8	N 1	O 5	0	0
16	G	1	Total 14	C 8	N 1	O 5	0	0
16	G	1	Total 14	C 8	N 1	O 5	0	0
16	T	1	Total 14	C 8	N 1	O 5	0	0
16	T	1	Total 14	C 8	N 1	O 5	0	0
16	T	1	Total 14	C 8	N 1	O 5	0	0

MolProbity and EDS failed to run properly - this section is therefore empty.

### 3 Data and refinement statistics

EDS failed to run properly - this section is therefore incomplete.

Property	Value	Source
Space group	H 3 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	247.31Å 247.31Å 257.61Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	49.44 – 3.80	Depositor
% Data completeness (in resolution range)	99.6 (49.44-3.80)	Depositor
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.17	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.46 (at 3.77Å)	Xtrriage
Refinement program	PHENIX 1.16_3549	Depositor
R, $R_{free}$	0.299 , 0.317	Depositor
Wilson B-factor (Å <sup>2</sup> )	131.8	Xtrriage
Anisotropy	0.430	Xtrriage
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.45$ , $\langle L^2 \rangle = 0.27$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
Total number of atoms	12419	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	166.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.35% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup> Intensities estimated from amplitudes.

<sup>2</sup> Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.



## 4 Model quality [i](#)

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

MolProbity failed to run properly - this section is therefore empty.

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

MolProbity failed to run properly - this section is therefore empty.

### 4.3 Torsion angles [i](#)

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

MolProbity failed to run properly - this section is therefore empty.

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

MolProbity failed to run properly - this section is therefore empty.

#### 4.3.3 RNA [i](#)

MolProbity failed to run properly - this section is therefore empty.

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

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

### 4.5 Carbohydrates [i](#)

70 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
7	NAG	A	1	3,7	14,14,15	0.29	0	17,19,21	0.62	0
7	NAG	A	2	7	14,14,15	0.29	0	17,19,21	0.69	0
7	BMA	A	3	7	11,11,12	0.59	0	15,15,17	0.73	0
8	NAG	B	1	8,4	14,14,15	0.44	0	17,19,21	1.06	0
8	MAN	B	10	8	11,11,12	0.28	0	15,15,17	0.88	0
8	NAG	B	2	8	14,14,15	0.42	0	17,19,21	2.09	2 (11%)
8	BMA	B	3	8	11,11,12	1.17	1 (9%)	15,15,17	1.11	1 (6%)
8	MAN	B	4	8	11,11,12	0.65	0	15,15,17	1.72	2 (13%)
8	MAN	B	5	8	11,11,12	0.37	0	15,15,17	1.01	1 (6%)
8	MAN	B	6	8	11,11,12	0.27	0	15,15,17	0.86	0
8	MAN	B	7	8	11,11,12	0.44	0	15,15,17	1.09	2 (13%)
8	MAN	B	8	8	11,11,12	0.29	0	15,15,17	0.80	1 (6%)
8	MAN	B	9	8	11,11,12	1.04	1 (9%)	15,15,17	1.93	5 (33%)
9	NAG	C	1	9,4	14,14,15	0.43	0	17,19,21	1.26	2 (11%)
9	NAG	C	2	9	14,14,15	0.28	0	17,19,21	0.71	0
9	NAG	F	1	9,4	14,14,15	0.27	0	17,19,21	1.08	0
9	NAG	F	2	9	14,14,15	0.42	0	17,19,21	0.72	0
7	NAG	I	1	7,4	14,14,15	0.29	0	17,19,21	0.83	0
7	NAG	I	2	7	14,14,15	0.27	0	17,19,21	0.85	0
7	BMA	I	3	7	11,11,12	0.62	0	15,15,17	0.73	0
10	NAG	J	1	10,4	14,14,15	0.34	0	17,19,21	0.64	0
10	NAG	J	2	10	14,14,15	0.31	0	17,19,21	0.68	0
10	BMA	J	3	10	11,11,12	0.68	0	15,15,17	0.68	0
10	MAN	J	4	10	11,11,12	0.27	0	15,15,17	0.79	1 (6%)
11	NAG	K	1	11,4	14,14,15	0.26	0	17,19,21	0.65	0
11	MAN	K	10	11	11,11,12	0.30	0	15,15,17	1.11	1 (6%)
11	MAN	K	11	11	11,11,12	0.29	0	15,15,17	0.91	1 (6%)
11	NAG	K	2	11	14,14,15	0.32	0	17,19,21	0.83	0
11	BMA	K	3	11	11,11,12	0.55	0	15,15,17	0.87	0
11	MAN	K	4	11	11,11,12	0.25	0	15,15,17	0.98	1 (6%)
11	MAN	K	5	11	11,11,12	0.37	0	15,15,17	1.07	1 (6%)
11	MAN	K	6	11	11,11,12	0.23	0	15,15,17	0.71	0
11	MAN	K	7	11	11,11,12	0.27	0	15,15,17	0.89	0
11	MAN	K	8	11	11,11,12	0.35	0	15,15,17	1.15	2 (13%)
11	MAN	K	9	11	11,11,12	0.33	0	15,15,17	0.94	1 (6%)
10	NAG	M	1	10,4	14,14,15	0.27	0	17,19,21	0.84	0
10	NAG	M	2	10	14,14,15	0.30	0	17,19,21	0.91	1 (5%)
10	BMA	M	3	10	11,11,12	0.70	0	15,15,17	0.74	0
10	MAN	M	4	10	11,11,12	0.27	0	15,15,17	0.81	1 (6%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
12	NAG	N	1	4,12	14,14,15	0.32	0	17,19,21	1.47	3 (17%)
12	NAG	N	2	12	14,14,15	0.31	0	17,19,21	0.92	1 (5%)
12	BMA	N	3	12	11,11,12	0.86	0	15,15,17	0.90	1 (6%)
12	MAN	N	4	12	11,11,12	0.60	0	15,15,17	1.15	1 (6%)
12	MAN	N	5	12	11,11,12	0.31	0	15,15,17	0.86	1 (6%)
12	MAN	N	6	12	11,11,12	0.32	0	15,15,17	0.93	1 (6%)
9	NAG	O	1	9,4	14,14,15	0.30	0	17,19,21	0.65	0
9	NAG	O	2	9	14,14,15	0.28	0	17,19,21	0.74	0
7	NAG	P	1	7,4	14,14,15	0.29	0	17,19,21	0.92	0
7	NAG	P	2	7	14,14,15	0.31	0	17,19,21	0.73	0
7	BMA	P	3	7	11,11,12	0.63	0	15,15,17	0.85	0
7	NAG	Q	1	7,4	14,14,15	0.32	0	17,19,21	0.91	1 (5%)
7	NAG	Q	2	7	14,14,15	0.33	0	17,19,21	0.91	0
7	BMA	Q	3	7	11,11,12	0.61	0	15,15,17	0.82	0
13	NAG	R	1	13,4	14,14,15	0.30	0	17,19,21	0.60	0
13	NAG	R	2	13	14,14,15	0.34	0	17,19,21	1.92	3 (17%)
13	BMA	R	3	13	11,11,12	0.94	0	15,15,17	1.23	1 (6%)
13	MAN	R	4	13	11,11,12	0.69	0	15,15,17	2.00	4 (26%)
13	MAN	R	5	13	11,11,12	0.66	0	15,15,17	1.66	3 (20%)
13	MAN	R	6	13	11,11,12	0.36	0	15,15,17	0.99	1 (6%)
13	MAN	R	7	13	11,11,12	0.27	0	15,15,17	0.82	1 (6%)
14	NAG	S	1	14,4	14,14,15	0.30	0	17,19,21	1.07	2 (11%)
14	NAG	S	2	14	14,14,15	0.38	0	17,19,21	2.04	4 (23%)
14	BMA	S	3	14	11,11,12	0.62	0	15,15,17	0.78	0
14	MAN	S	4	14	11,11,12	0.24	0	15,15,17	0.81	0
14	MAN	S	5	14	11,11,12	0.25	0	15,15,17	0.83	0
7	NAG	U	1	7	14,14,15	0.27	0	17,19,21	0.62	0
7	NAG	U	2	7	14,14,15	0.31	0	17,19,21	1.23	2 (11%)
7	BMA	U	3	7	11,11,12	1.08	1 (9%)	15,15,17	1.27	3 (20%)
15	NAG	V	1	5,15	14,14,15	0.31	0	17,19,21	0.75	0
15	NAG	V	2	15	14,14,15	0.28	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
7	NAG	A	1	3,7	-	2/6/23/26	0/1/1/1
7	NAG	A	2	7	-	0/6/23/26	0/1/1/1
7	BMA	A	3	7	-	0/2/19/22	0/1/1/1
8	NAG	B	1	8,4	-	1/6/23/26	0/1/1/1
8	MAN	B	10	8	-	1/2/19/22	0/1/1/1
8	NAG	B	2	8	-	4/6/23/26	0/1/1/1
8	BMA	B	3	8	-	2/2/19/22	0/1/1/1
8	MAN	B	4	8	-	2/2/19/22	0/1/1/1
8	MAN	B	5	8	-	0/2/19/22	0/1/1/1
8	MAN	B	6	8	-	0/2/19/22	0/1/1/1
8	MAN	B	7	8	-	1/2/19/22	0/1/1/1
8	MAN	B	8	8	-	1/2/19/22	0/1/1/1
8	MAN	B	9	8	-	0/2/19/22	0/1/1/1
9	NAG	C	1	9,4	-	1/6/23/26	0/1/1/1
9	NAG	C	2	9	-	2/6/23/26	0/1/1/1
9	NAG	F	1	9,4	-	3/6/23/26	0/1/1/1
9	NAG	F	2	9	-	0/6/23/26	0/1/1/1
7	NAG	I	1	7,4	-	2/6/23/26	0/1/1/1
7	NAG	I	2	7	-	4/6/23/26	0/1/1/1
7	BMA	I	3	7	-	1/2/19/22	0/1/1/1
10	NAG	J	1	10,4	-	0/6/23/26	0/1/1/1
10	NAG	J	2	10	-	1/6/23/26	0/1/1/1
10	BMA	J	3	10	-	0/2/19/22	0/1/1/1
10	MAN	J	4	10	-	2/2/19/22	0/1/1/1
11	NAG	K	1	11,4	-	2/6/23/26	0/1/1/1
11	MAN	K	10	11	-	0/2/19/22	0/1/1/1
11	MAN	K	11	11	-	1/2/19/22	0/1/1/1
11	NAG	K	2	11	-	2/6/23/26	0/1/1/1
11	BMA	K	3	11	-	2/2/19/22	0/1/1/1
11	MAN	K	4	11	-	0/2/19/22	0/1/1/1
11	MAN	K	5	11	-	2/2/19/22	0/1/1/1
11	MAN	K	6	11	-	0/2/19/22	0/1/1/1
11	MAN	K	7	11	-	2/2/19/22	0/1/1/1
11	MAN	K	8	11	-	1/2/19/22	0/1/1/1
11	MAN	K	9	11	-	2/2/19/22	0/1/1/1
10	NAG	M	1	10,4	-	1/6/23/26	0/1/1/1
10	NAG	M	2	10	-	3/6/23/26	0/1/1/1
10	BMA	M	3	10	-	0/2/19/22	0/1/1/1
10	MAN	M	4	10	-	2/2/19/22	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
12	NAG	N	1	4,12	-	3/6/23/26	0/1/1/1
12	NAG	N	2	12	-	0/6/23/26	0/1/1/1
12	BMA	N	3	12	-	0/2/19/22	0/1/1/1
12	MAN	N	4	12	-	2/2/19/22	0/1/1/1
12	MAN	N	5	12	-	1/2/19/22	0/1/1/1
12	MAN	N	6	12	-	2/2/19/22	0/1/1/1
9	NAG	O	1	9,4	-	2/6/23/26	0/1/1/1
9	NAG	O	2	9	-	0/6/23/26	0/1/1/1
7	NAG	P	1	7,4	-	4/6/23/26	0/1/1/1
7	NAG	P	2	7	-	0/6/23/26	0/1/1/1
7	BMA	P	3	7	-	0/2/19/22	0/1/1/1
7	NAG	Q	1	7,4	-	0/6/23/26	0/1/1/1
7	NAG	Q	2	7	-	2/6/23/26	0/1/1/1
7	BMA	Q	3	7	-	0/2/19/22	0/1/1/1
13	NAG	R	1	13,4	-	2/6/23/26	0/1/1/1
13	NAG	R	2	13	-	4/6/23/26	0/1/1/1
13	BMA	R	3	13	-	2/2/19/22	0/1/1/1
13	MAN	R	4	13	-	2/2/19/22	0/1/1/1
13	MAN	R	5	13	-	1/2/19/22	0/1/1/1
13	MAN	R	6	13	-	1/2/19/22	0/1/1/1
13	MAN	R	7	13	-	1/2/19/22	0/1/1/1
14	NAG	S	1	14,4	-	4/6/23/26	0/1/1/1
14	NAG	S	2	14	-	3/6/23/26	0/1/1/1
14	BMA	S	3	14	-	0/2/19/22	0/1/1/1
14	MAN	S	4	14	-	1/2/19/22	0/1/1/1
14	MAN	S	5	14	-	0/2/19/22	0/1/1/1
7	NAG	U	1	7	-	1/6/23/26	0/1/1/1
7	NAG	U	2	7	-	4/6/23/26	0/1/1/1
7	BMA	U	3	7	-	2/2/19/22	0/1/1/1
15	NAG	V	1	5,15	-	0/6/23/26	0/1/1/1
15	NAG	V	2	15	-	1/6/23/26	0/1/1/1

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	U	3	BMA	C1-C2	2.60	1.58	1.52
8	B	9	MAN	C1-C2	2.28	1.57	1.52
8	B	3	BMA	O3-C3	2.03	1.47	1.43

The worst 5 of 59 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	B	2	NAG	C2-N2-C7	6.76	132.53	122.90
14	S	2	NAG	C2-N2-C7	6.15	131.67	122.90
13	R	2	NAG	C2-N2-C7	6.00	131.45	122.90
8	B	9	MAN	C1-C2-C3	4.47	115.16	109.67
13	R	5	MAN	C1-C2-C3	4.43	115.11	109.67

There are no chirality outliers.

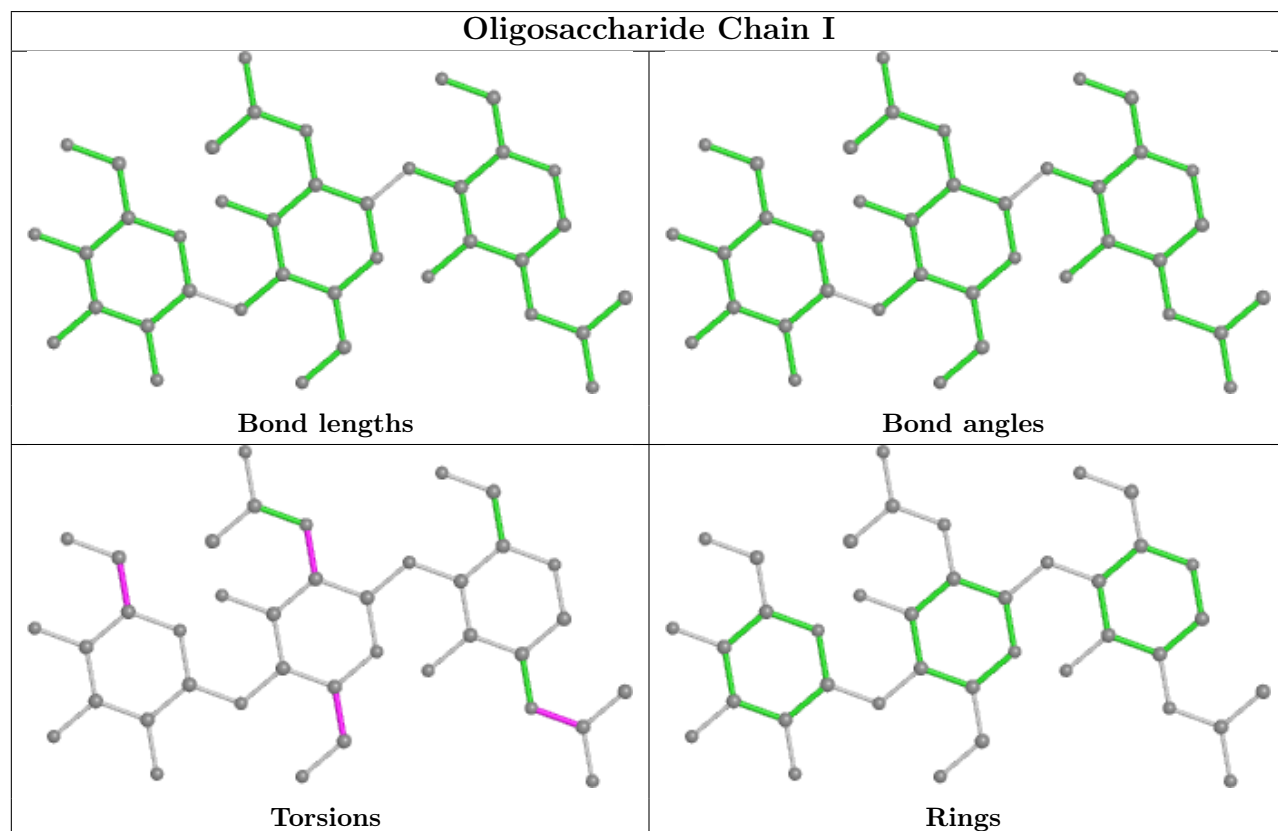
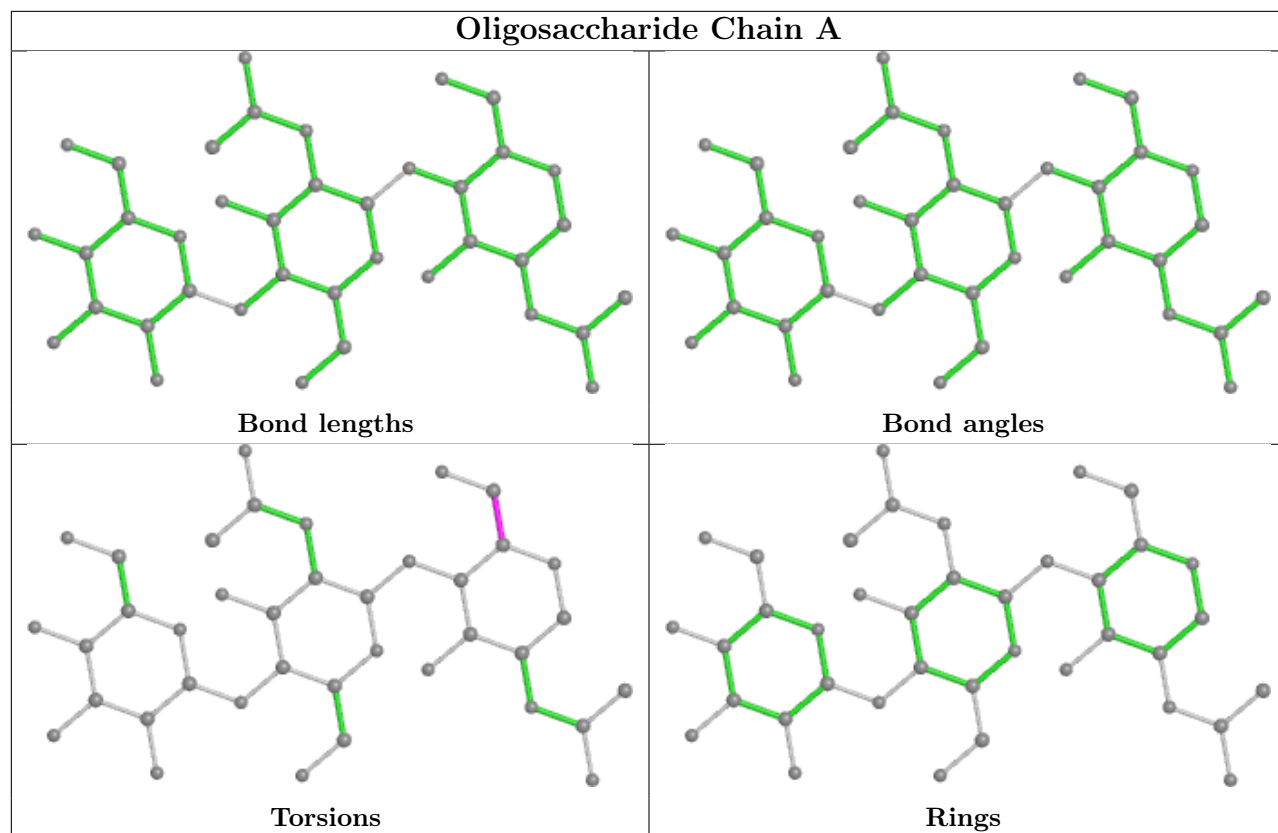
5 of 95 torsion outliers are listed below:

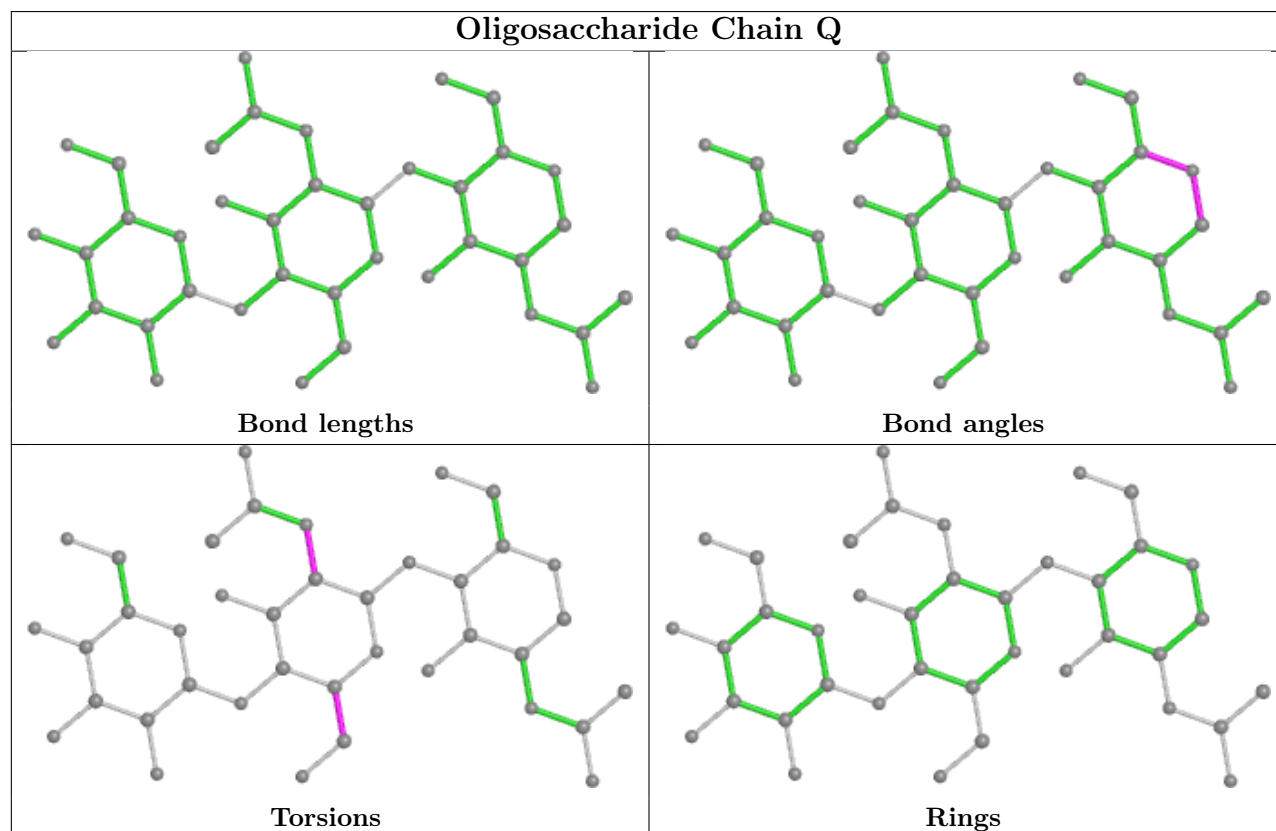
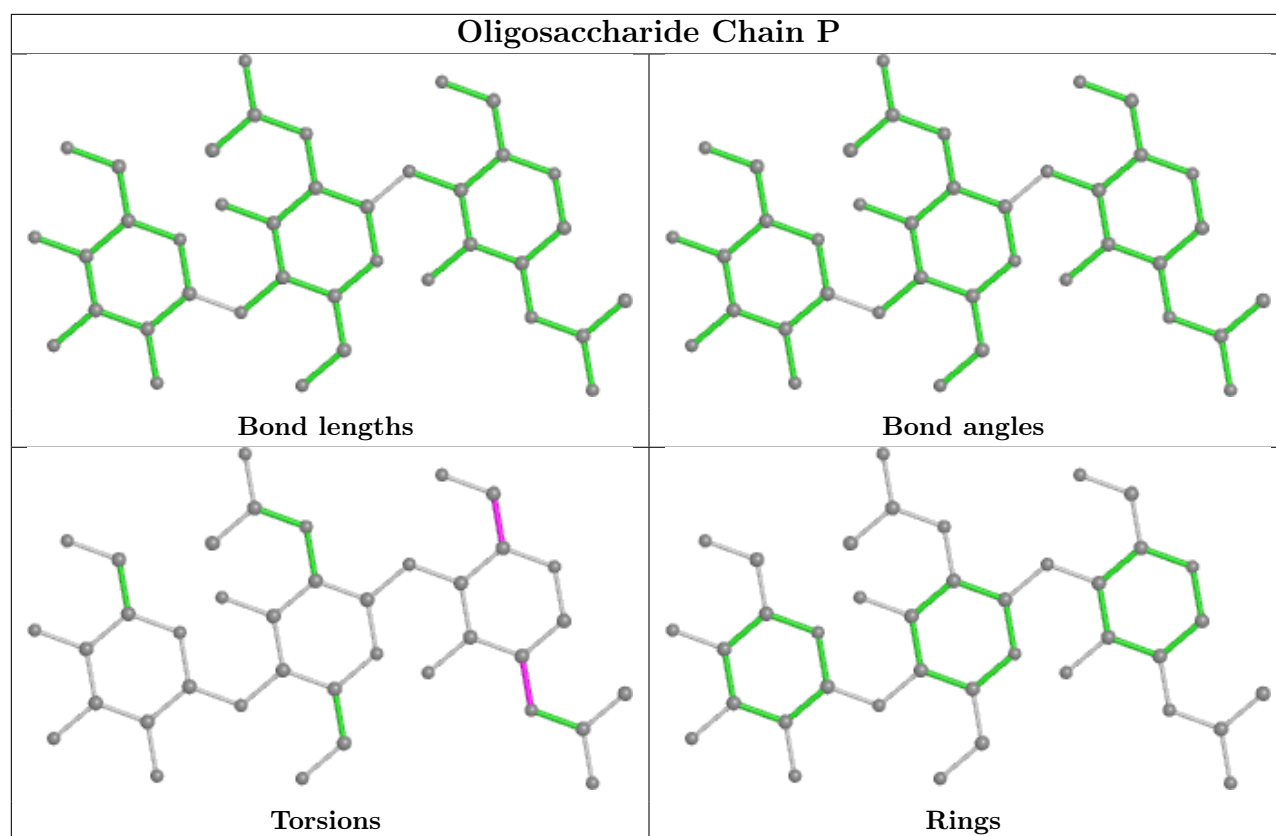
Mol	Chain	Res	Type	Atoms
13	R	2	NAG	C8-C7-N2-C2
13	R	2	NAG	O7-C7-N2-C2
14	S	2	NAG	C8-C7-N2-C2
14	S	2	NAG	O7-C7-N2-C2
12	N	6	MAN	O5-C5-C6-O6

There are no ring outliers.

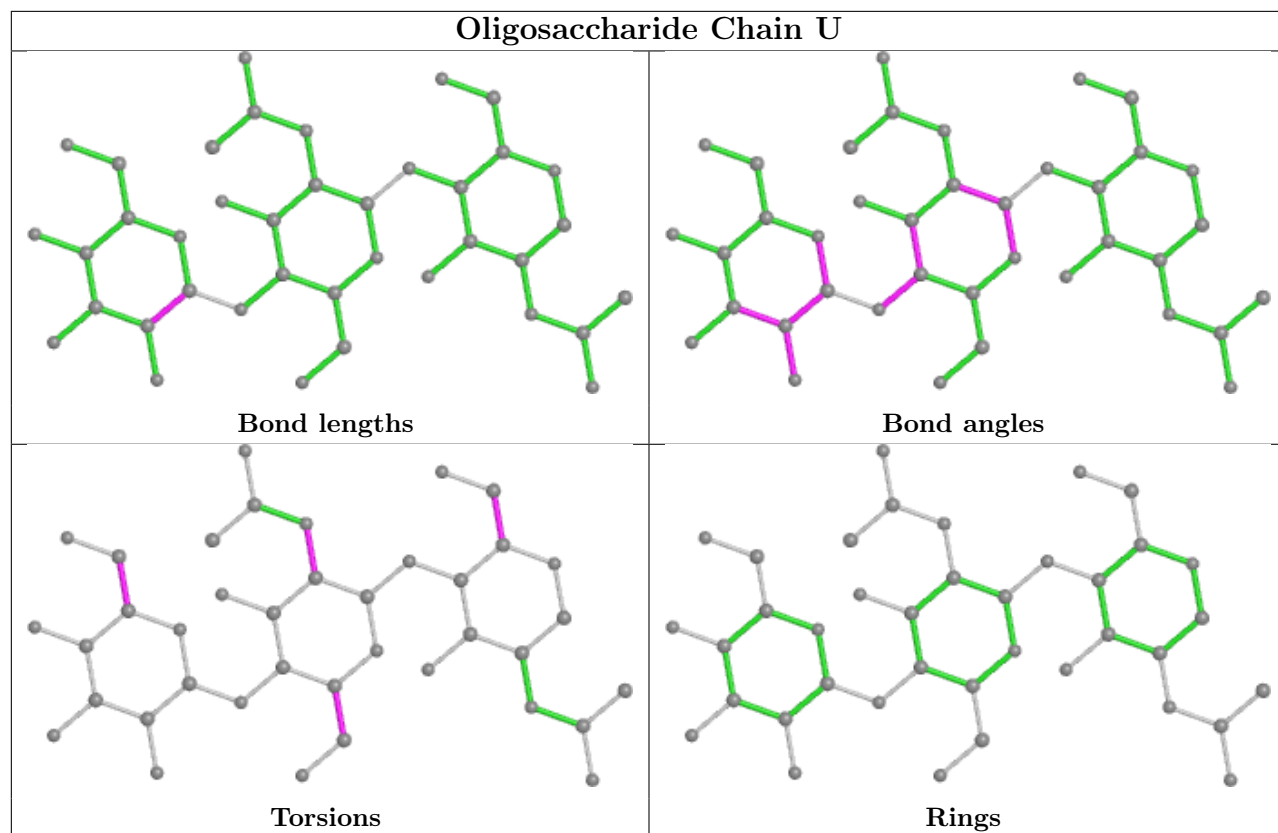
No monomer is involved in short contacts.

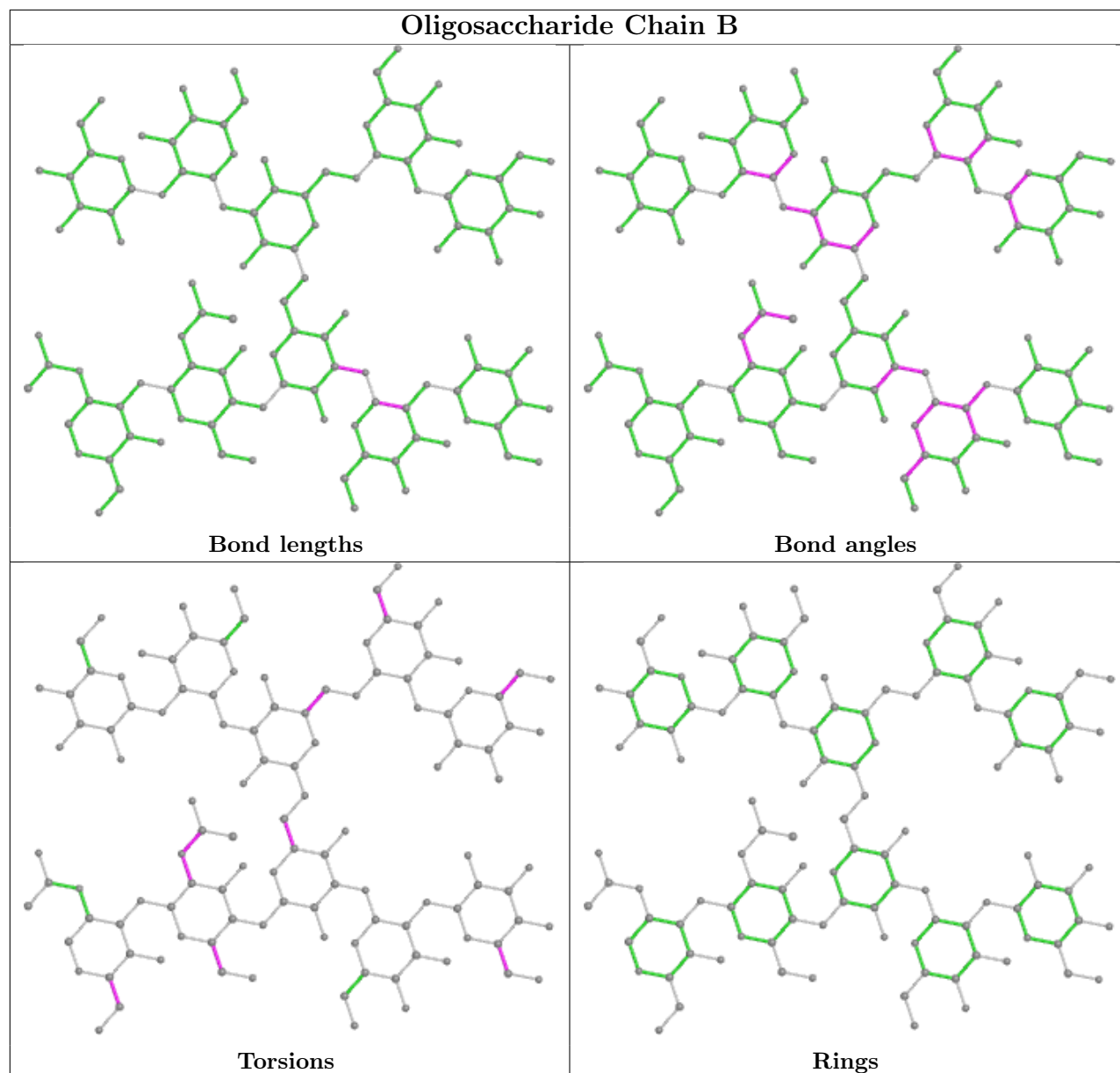
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

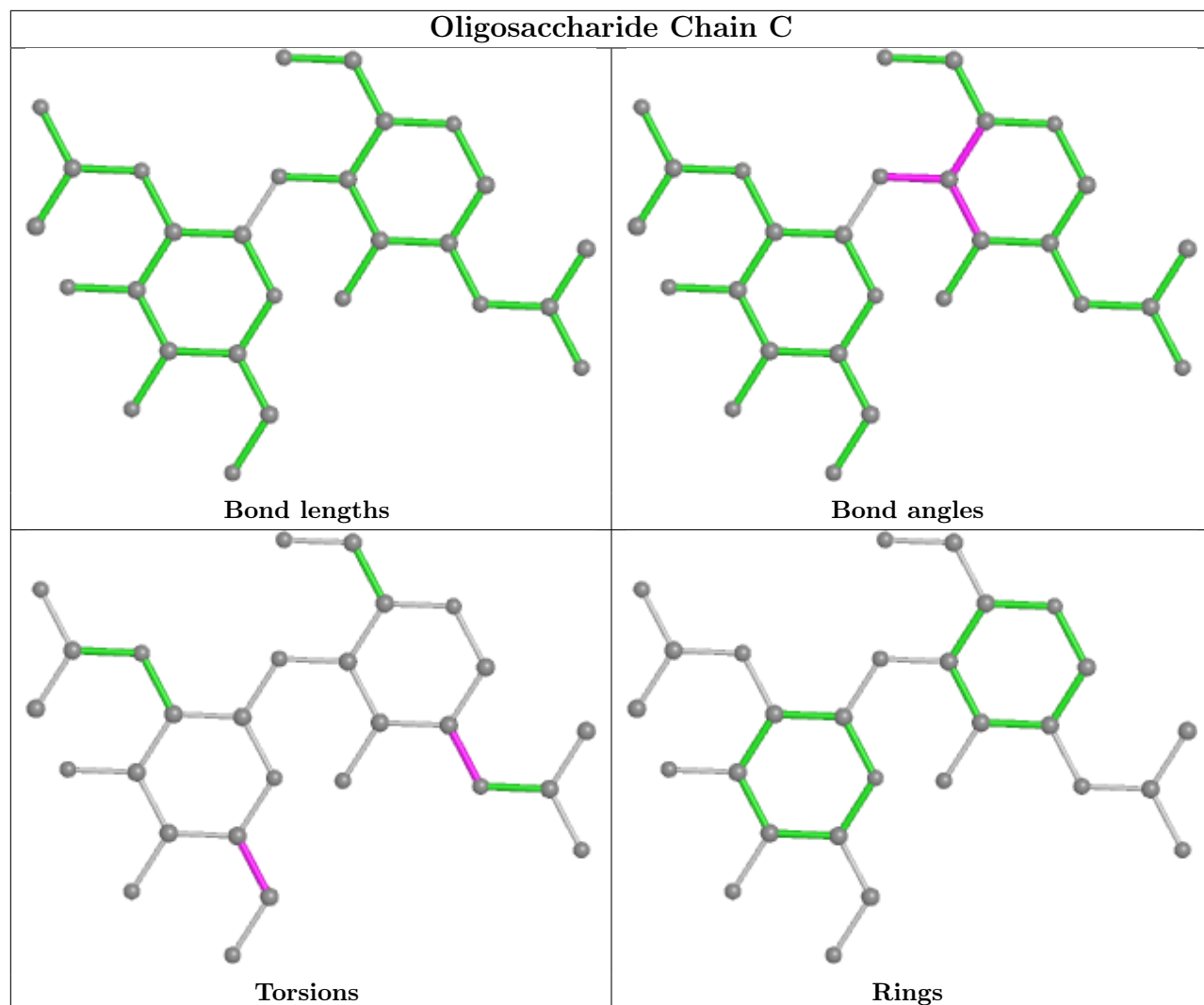


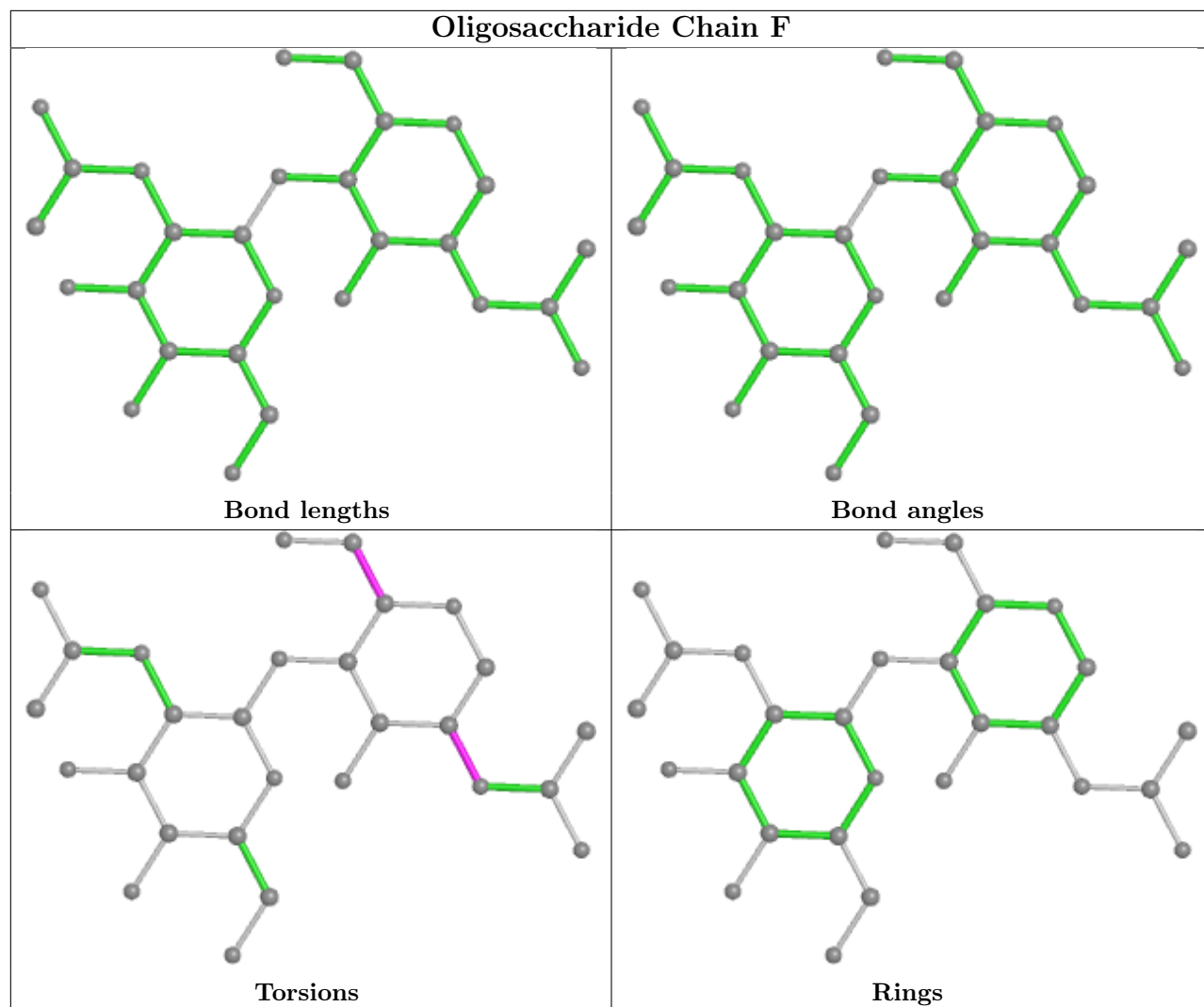


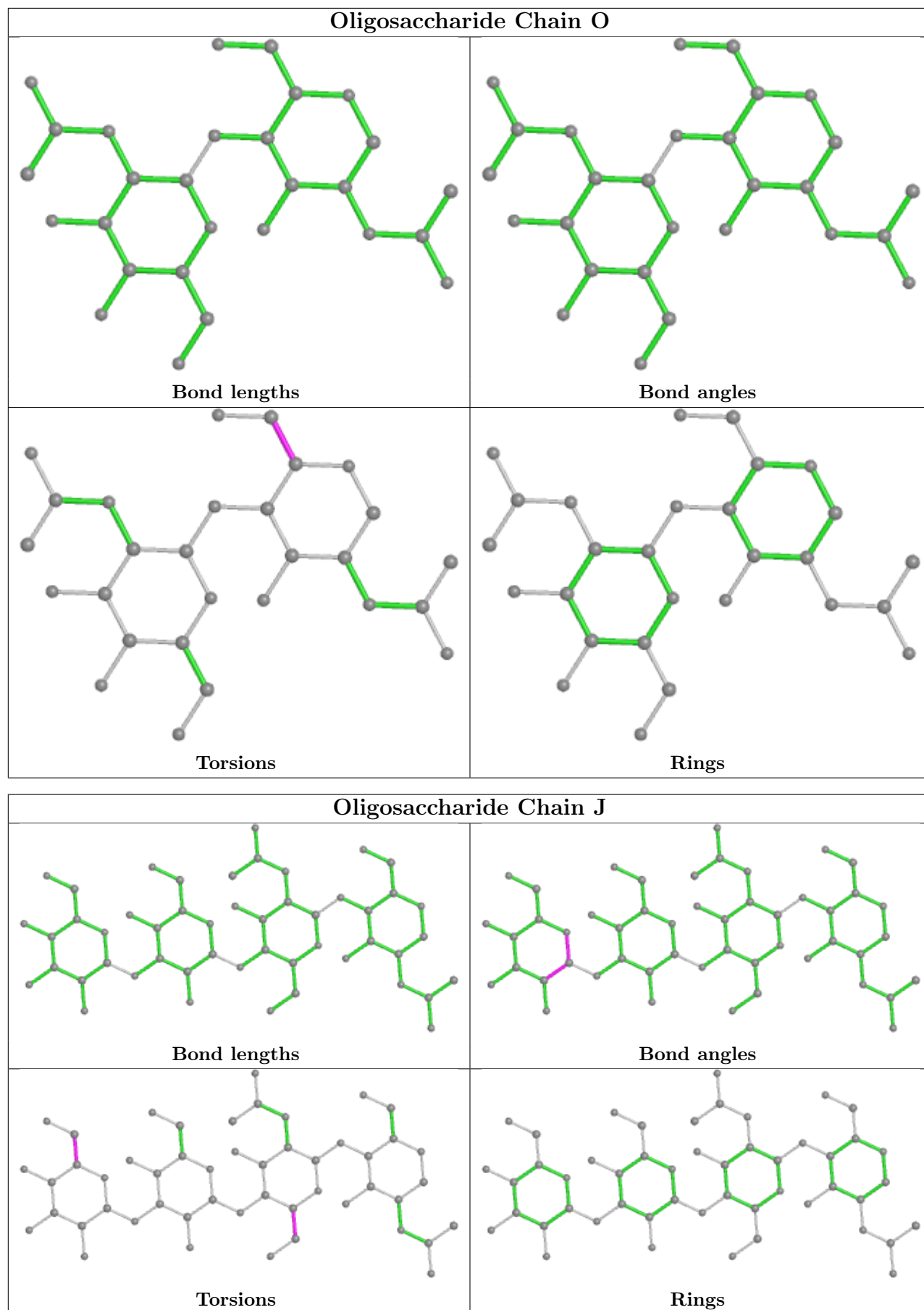


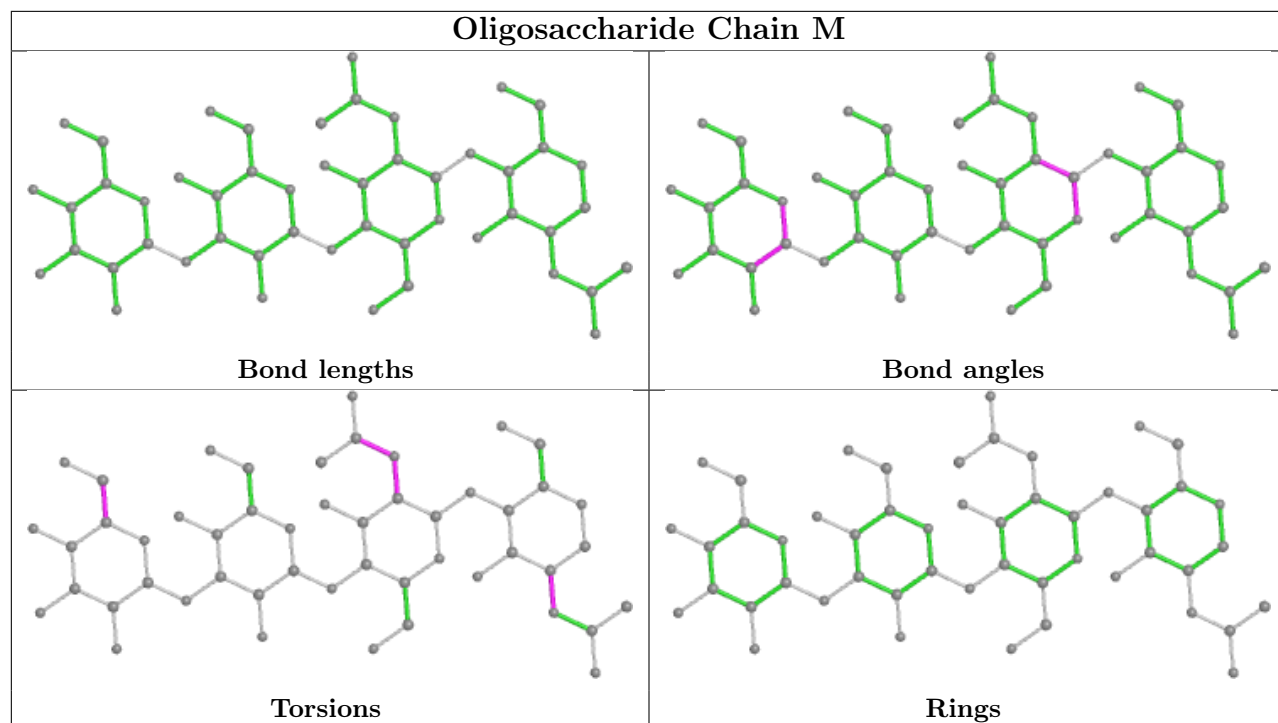


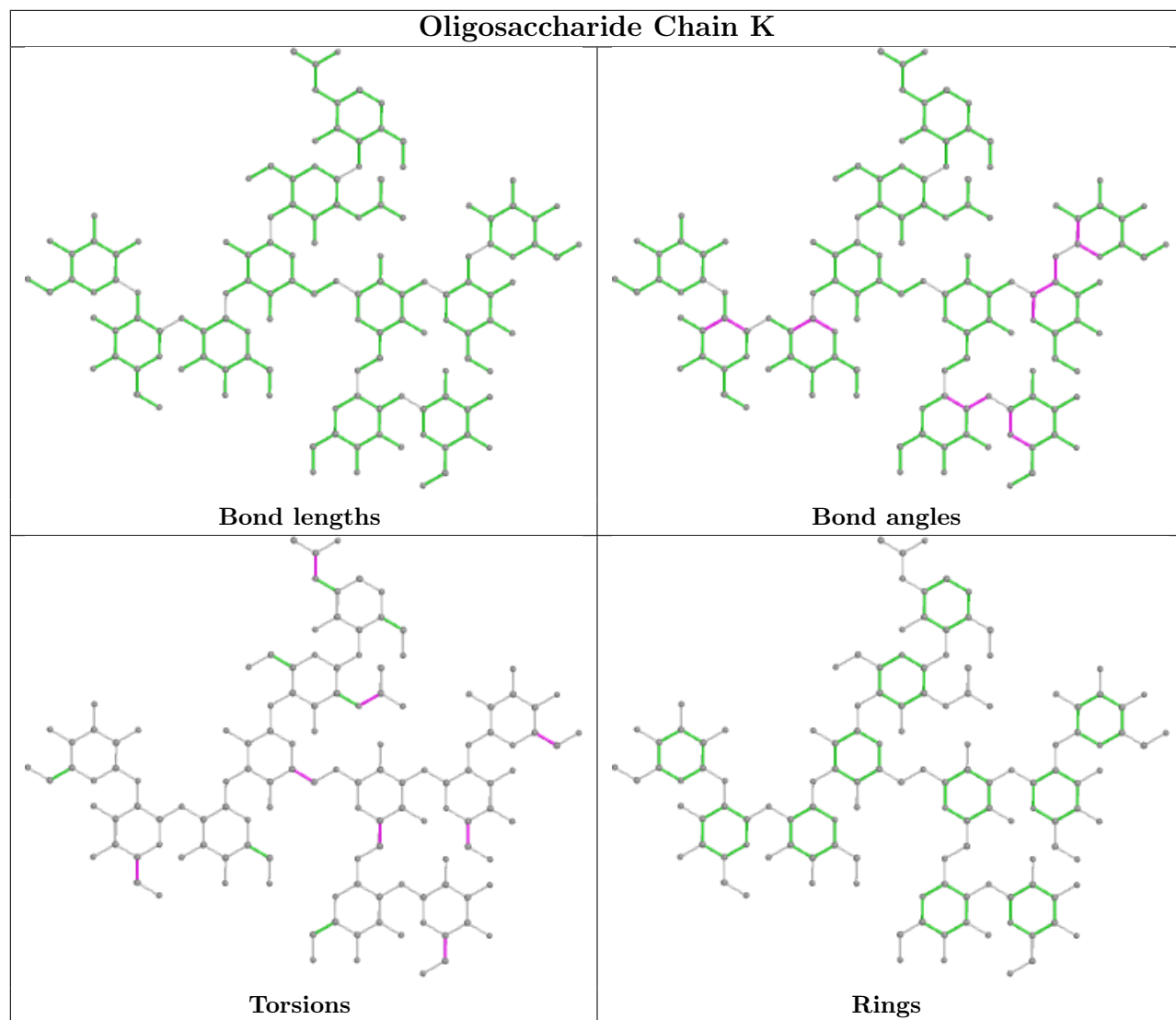


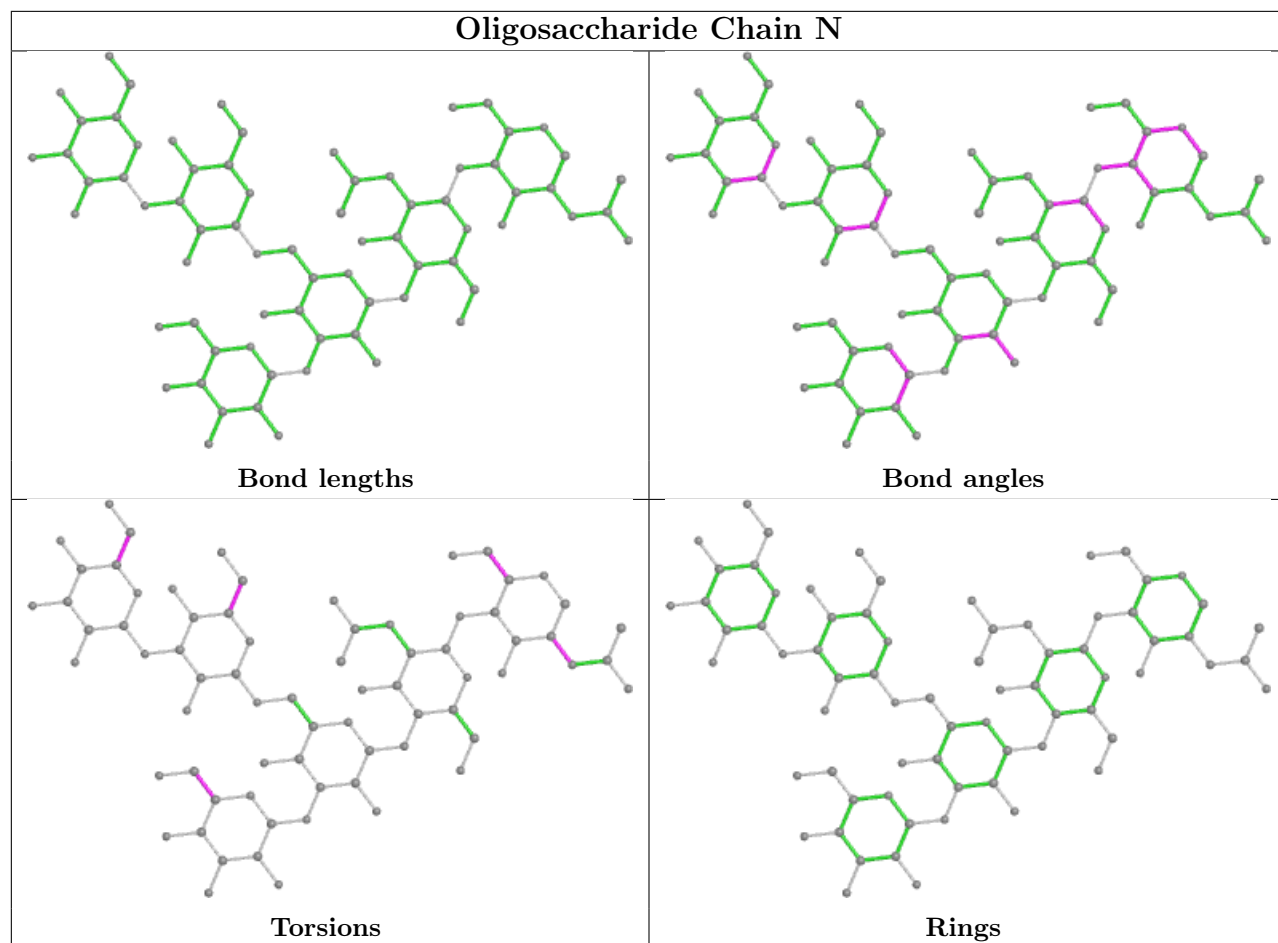




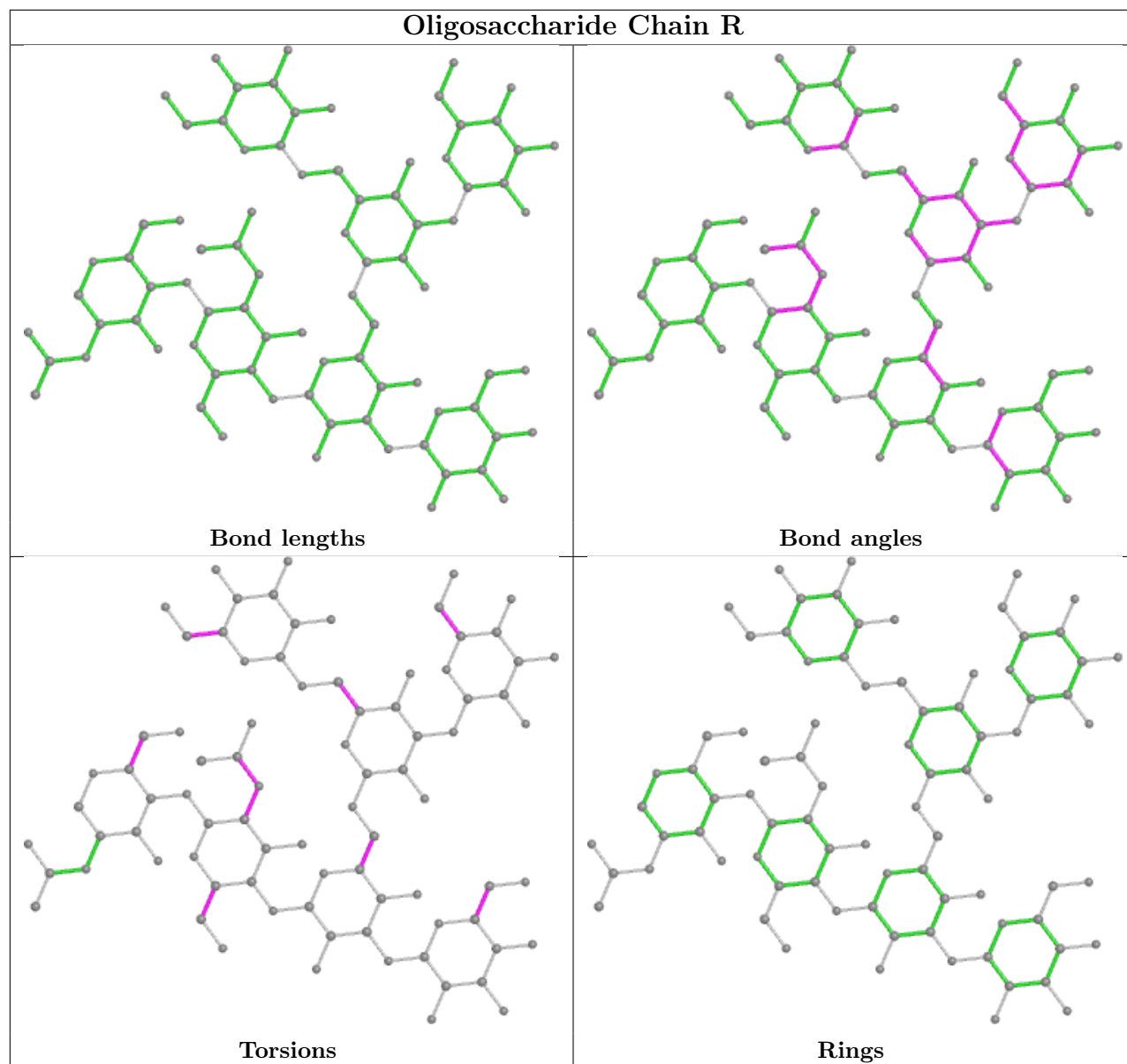


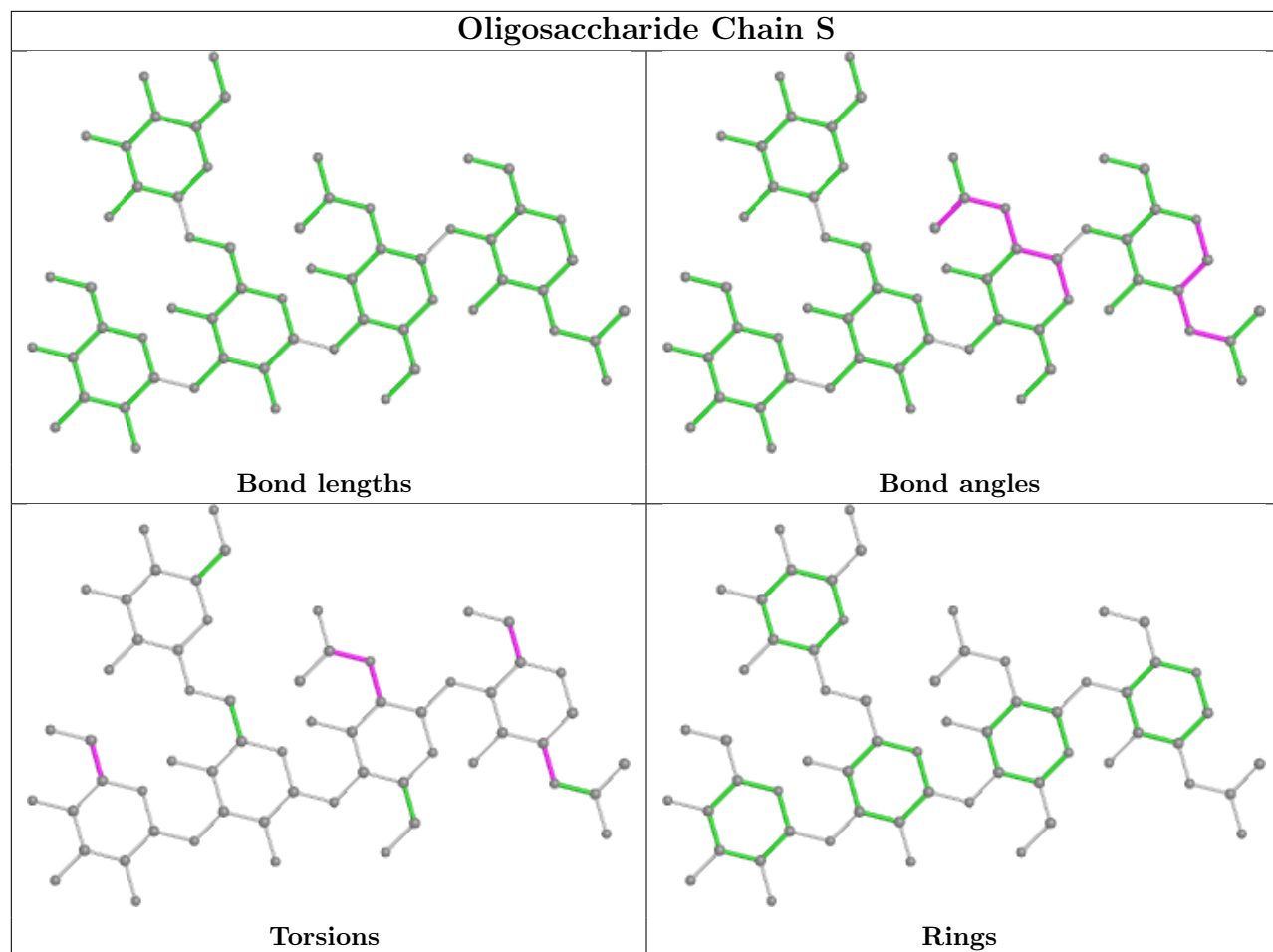


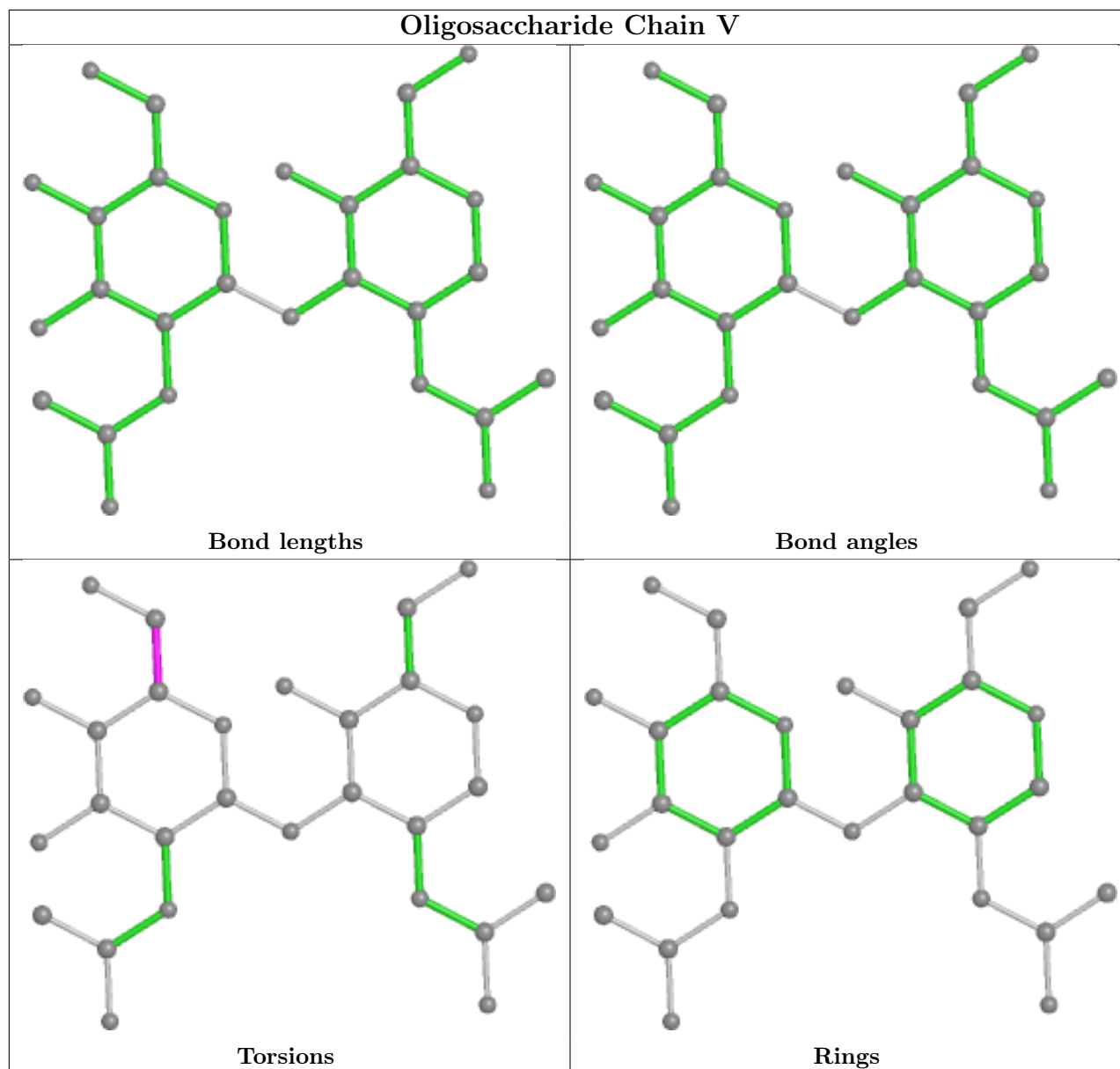












## 4.6 Ligand geometry [i](#)

8 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
16	NAG	G	602	4	14,14,15	0.30	0	17,19,21	0.89	0
16	NAG	G	601	4	14,14,15	0.31	0	17,19,21	0.64	0
16	NAG	T	703	5	14,14,15	0.28	0	17,19,21	0.61	0
16	NAG	G	605	4	14,14,15	0.29	0	17,19,21	0.68	0
16	NAG	G	604	4	14,14,15	0.33	0	17,19,21	0.90	1 (5%)
16	NAG	T	701	5	14,14,15	0.30	0	17,19,21	0.86	1 (5%)
16	NAG	G	603	4	14,14,15	0.29	0	17,19,21	0.64	0
16	NAG	T	702	5	14,14,15	0.30	0	17,19,21	0.69	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
16	NAG	G	602	4	-	2/6/23/26	0/1/1/1
16	NAG	G	601	4	-	4/6/23/26	0/1/1/1
16	NAG	T	703	5	-	2/6/23/26	0/1/1/1
16	NAG	G	605	4	-	0/6/23/26	0/1/1/1
16	NAG	G	604	4	-	6/6/23/26	0/1/1/1
16	NAG	T	701	5	-	2/6/23/26	0/1/1/1
16	NAG	G	603	4	-	0/6/23/26	0/1/1/1
16	NAG	T	702	5	-	2/6/23/26	0/1/1/1

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
16	T	701	NAG	C1-O5-C5	2.26	115.26	112.19
16	G	604	NAG	C1-O5-C5	2.11	115.05	112.19

There are no chirality outliers.

5 of 18 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
16	G	602	NAG	C4-C5-C6-O6
16	G	604	NAG	C8-C7-N2-C2
16	G	604	NAG	O7-C7-N2-C2
16	T	702	NAG	O5-C5-C6-O6

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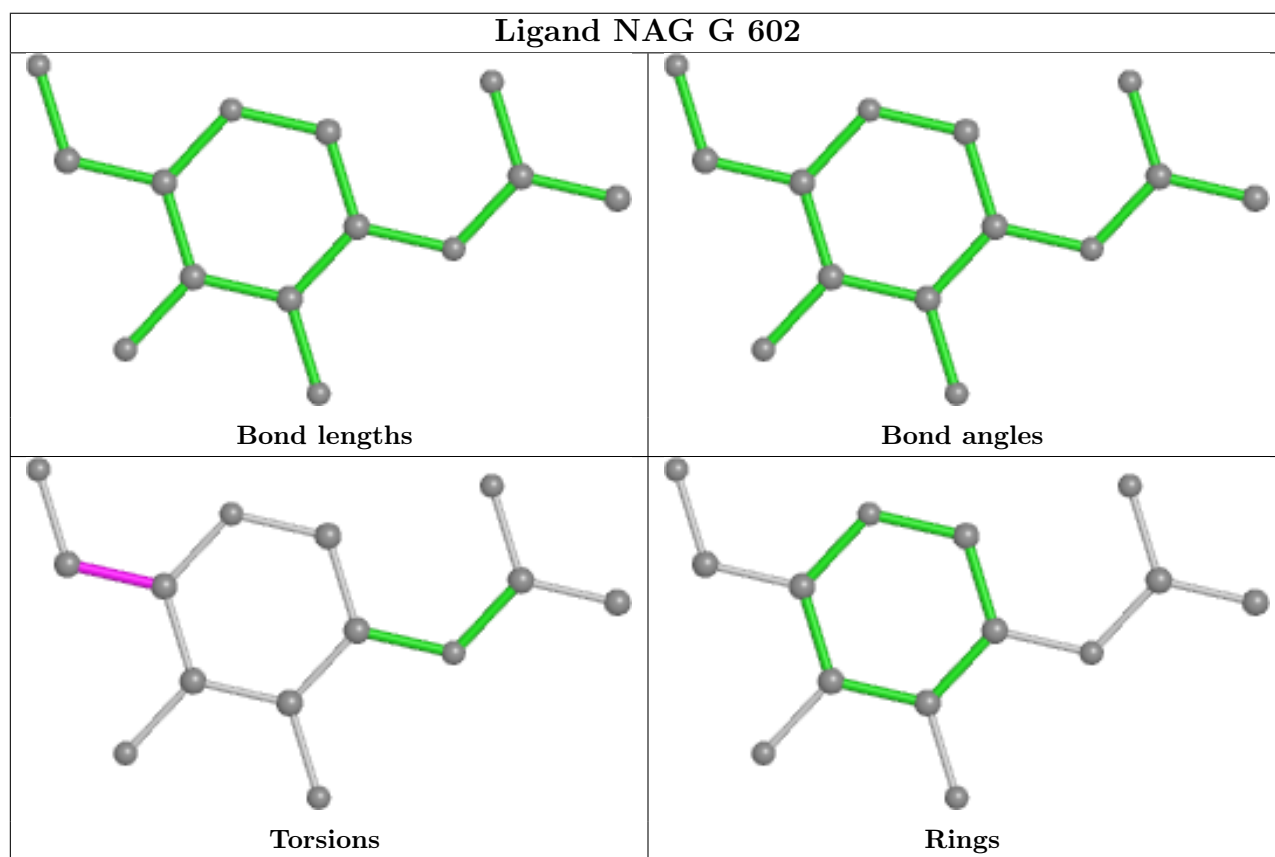
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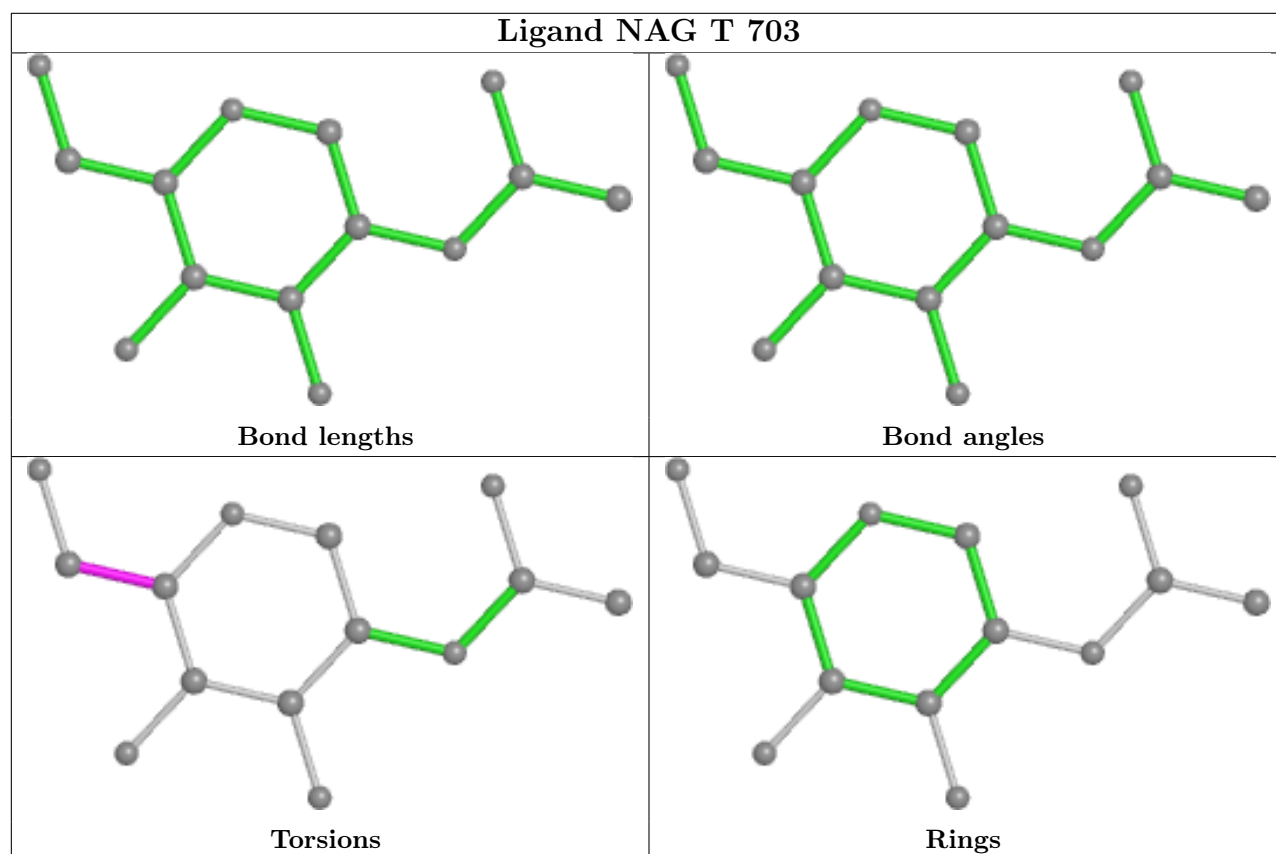
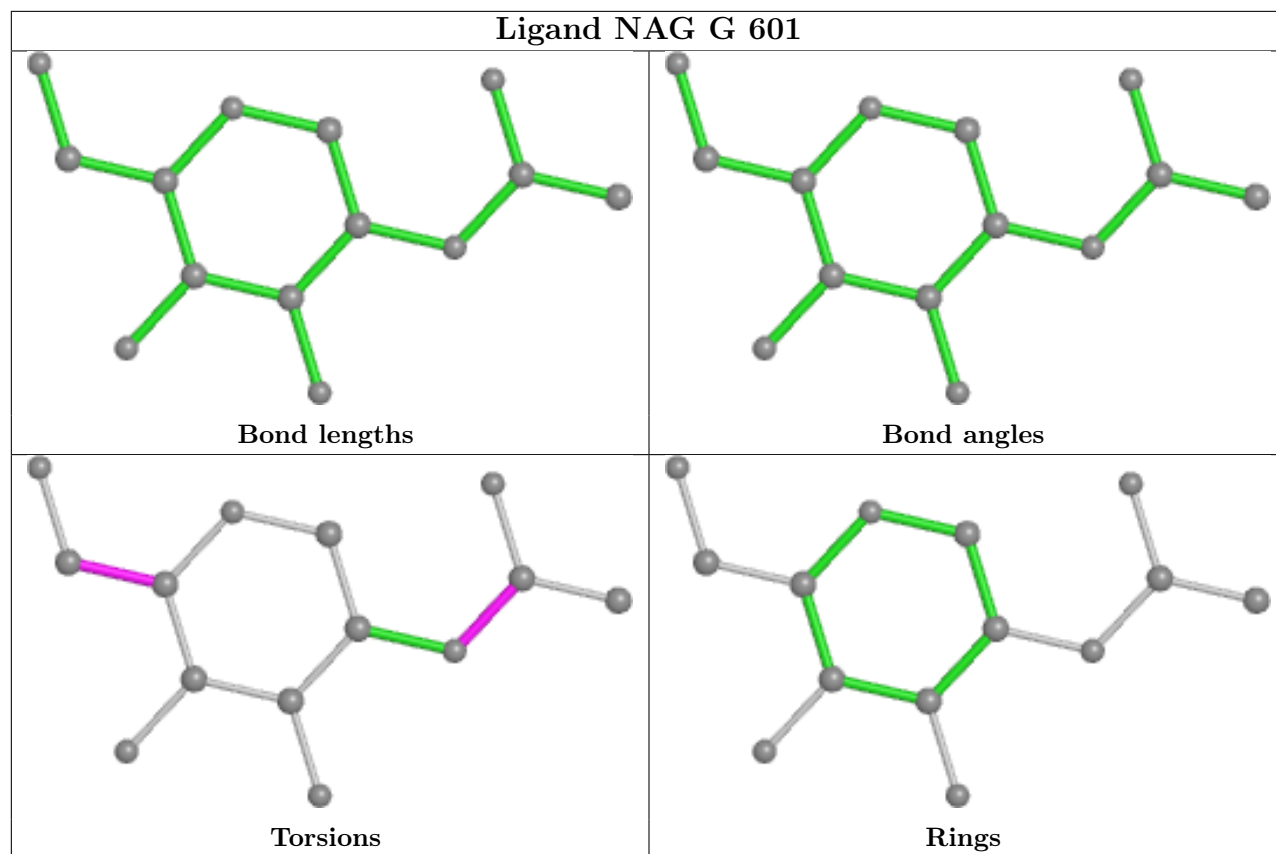
Mol	Chain	Res	Type	Atoms
16	G	601	NAG	C8-C7-N2-C2

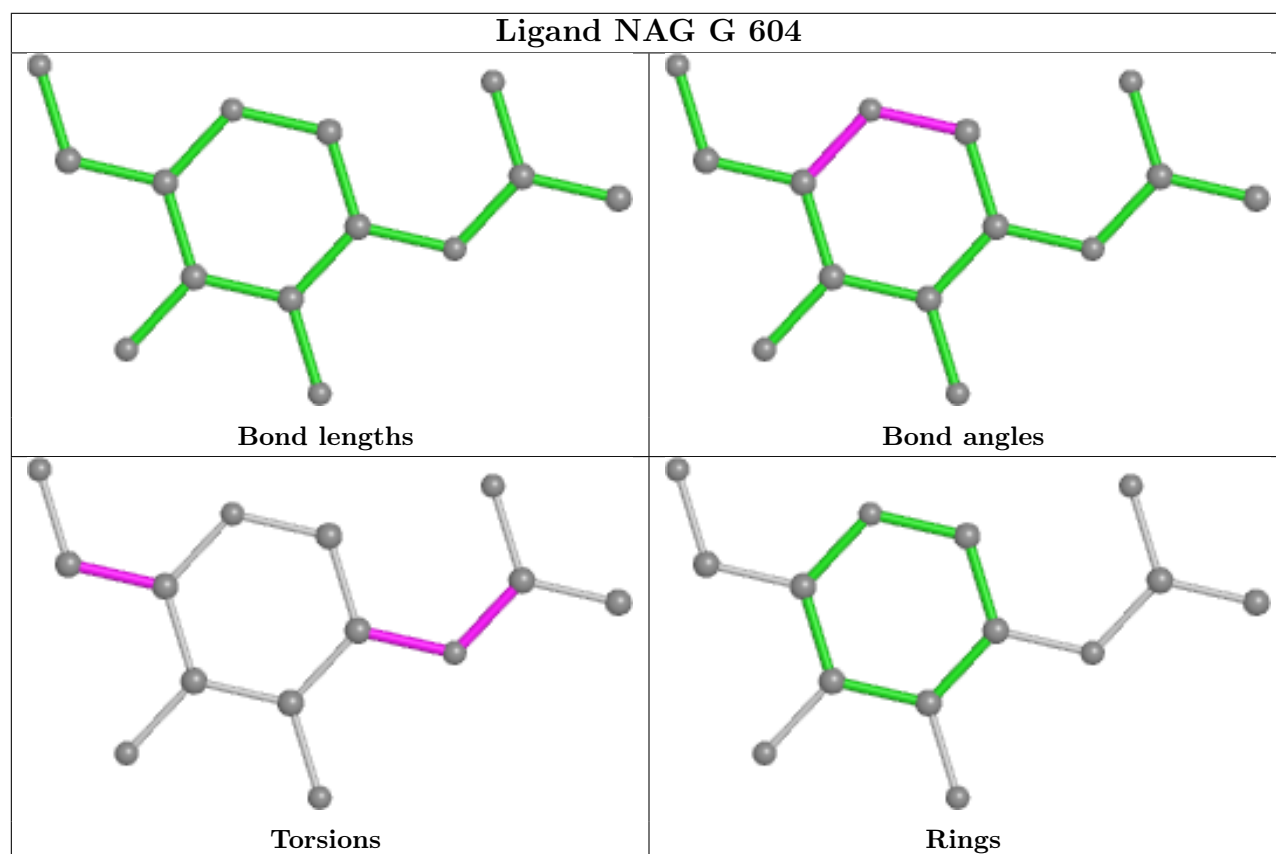
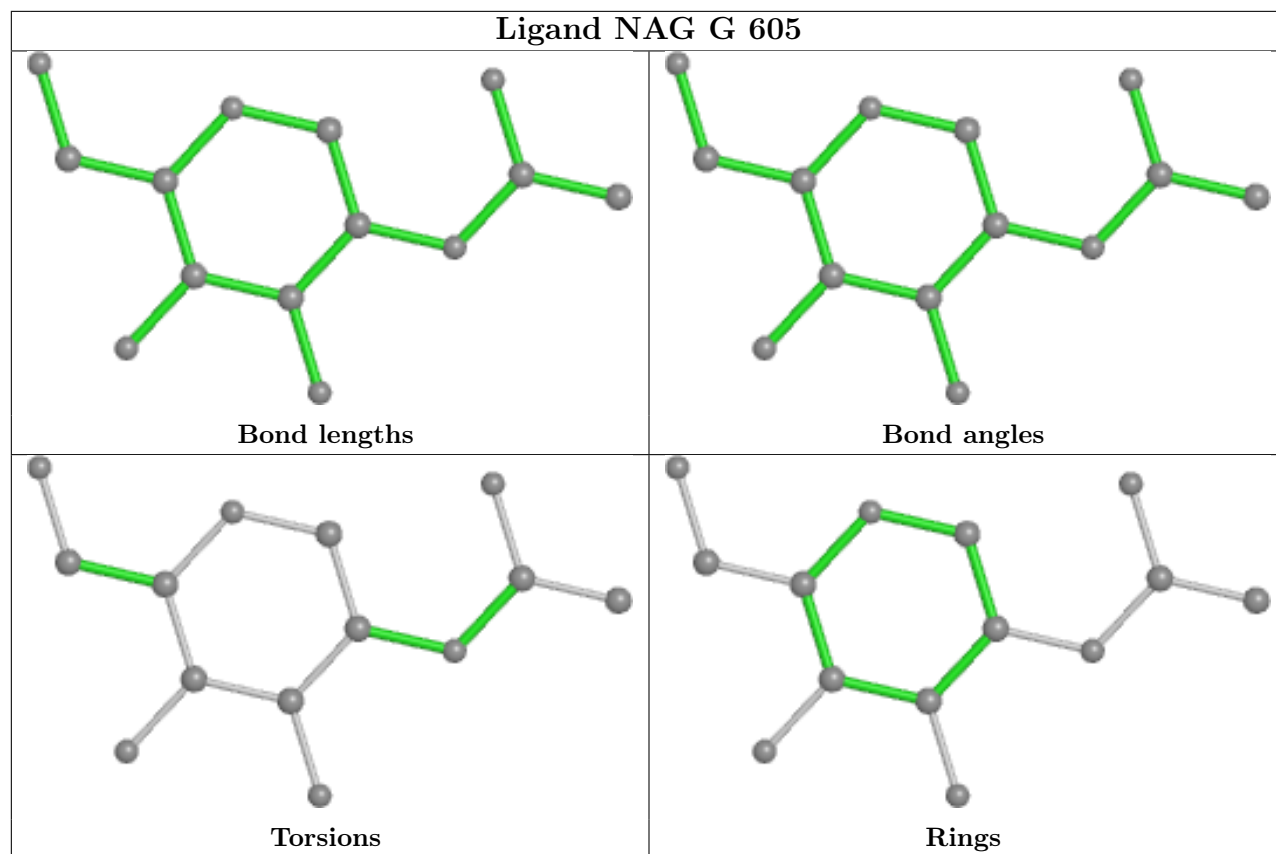
There are no ring outliers.

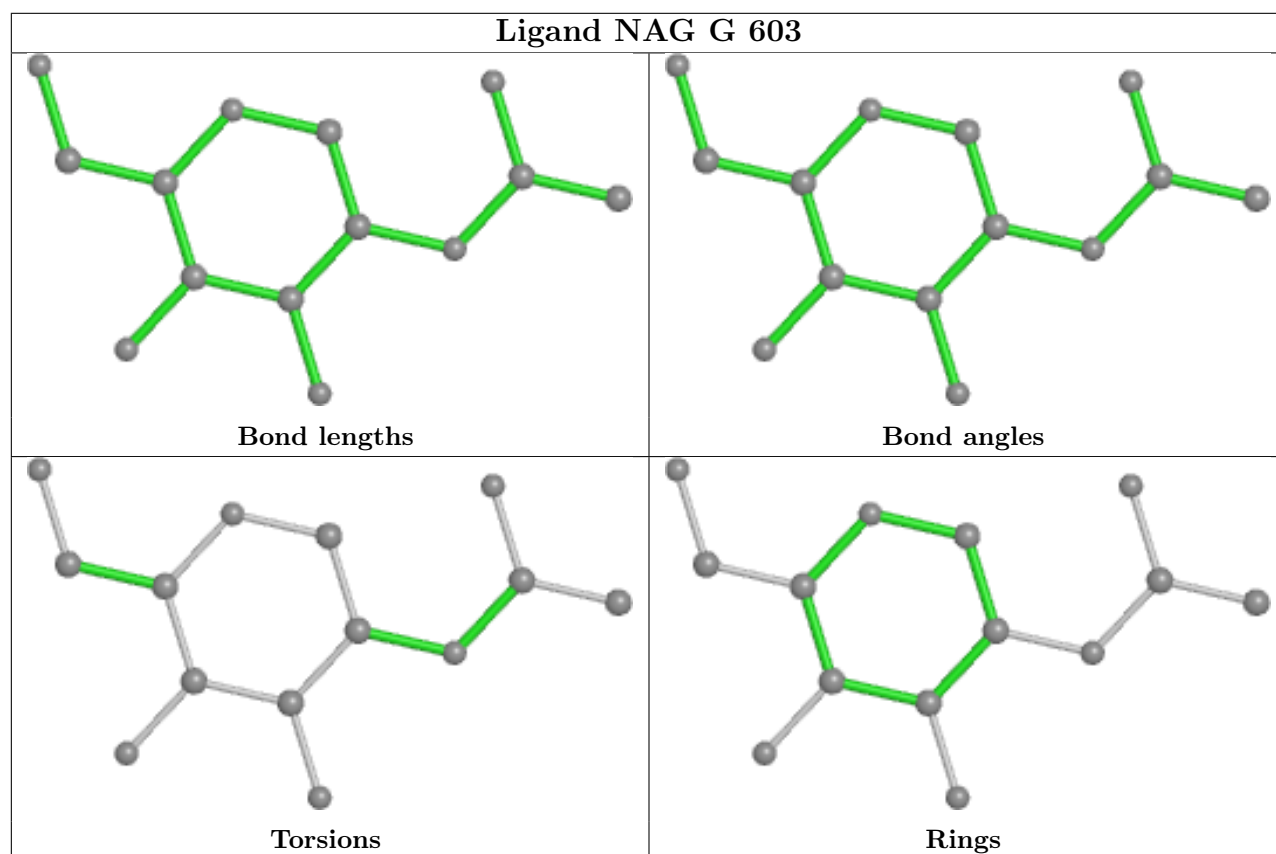
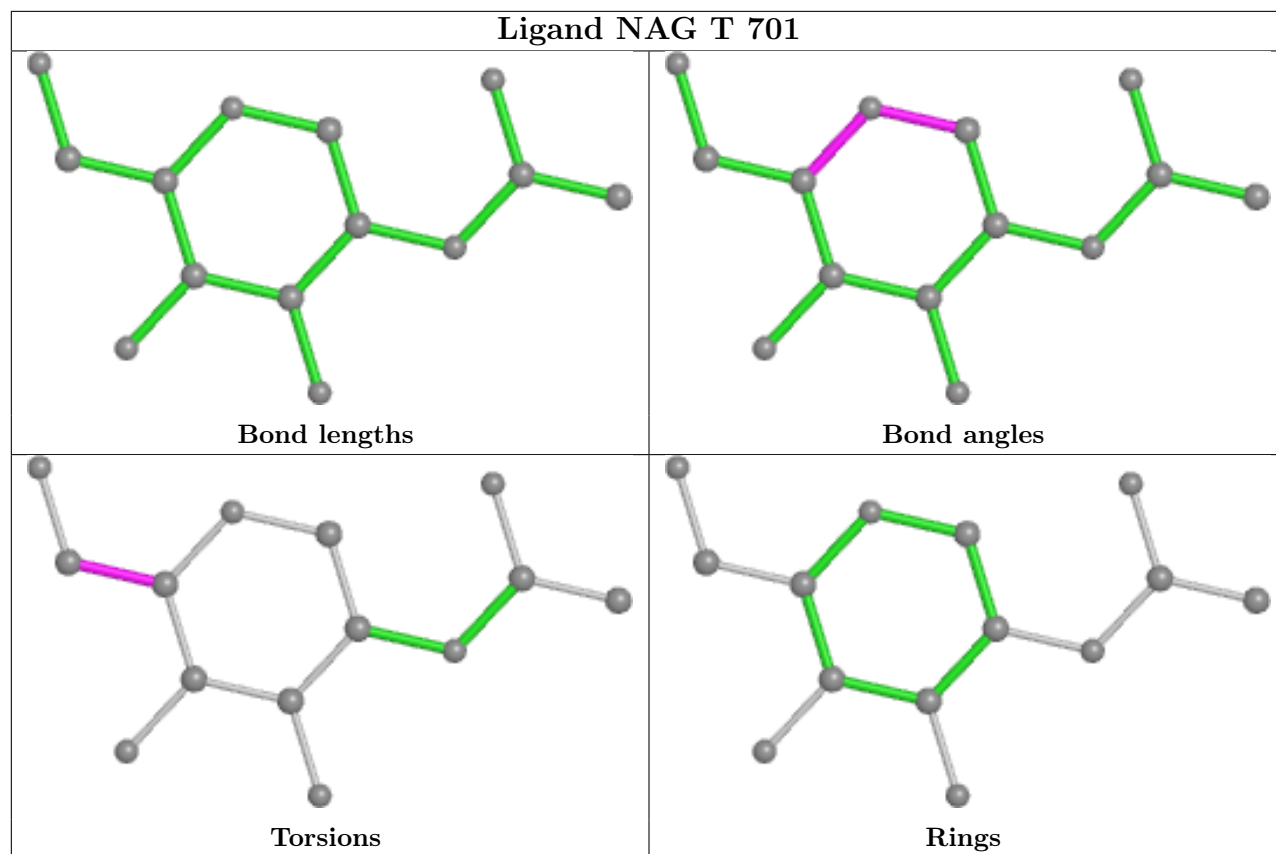
No monomer is involved in short contacts.

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

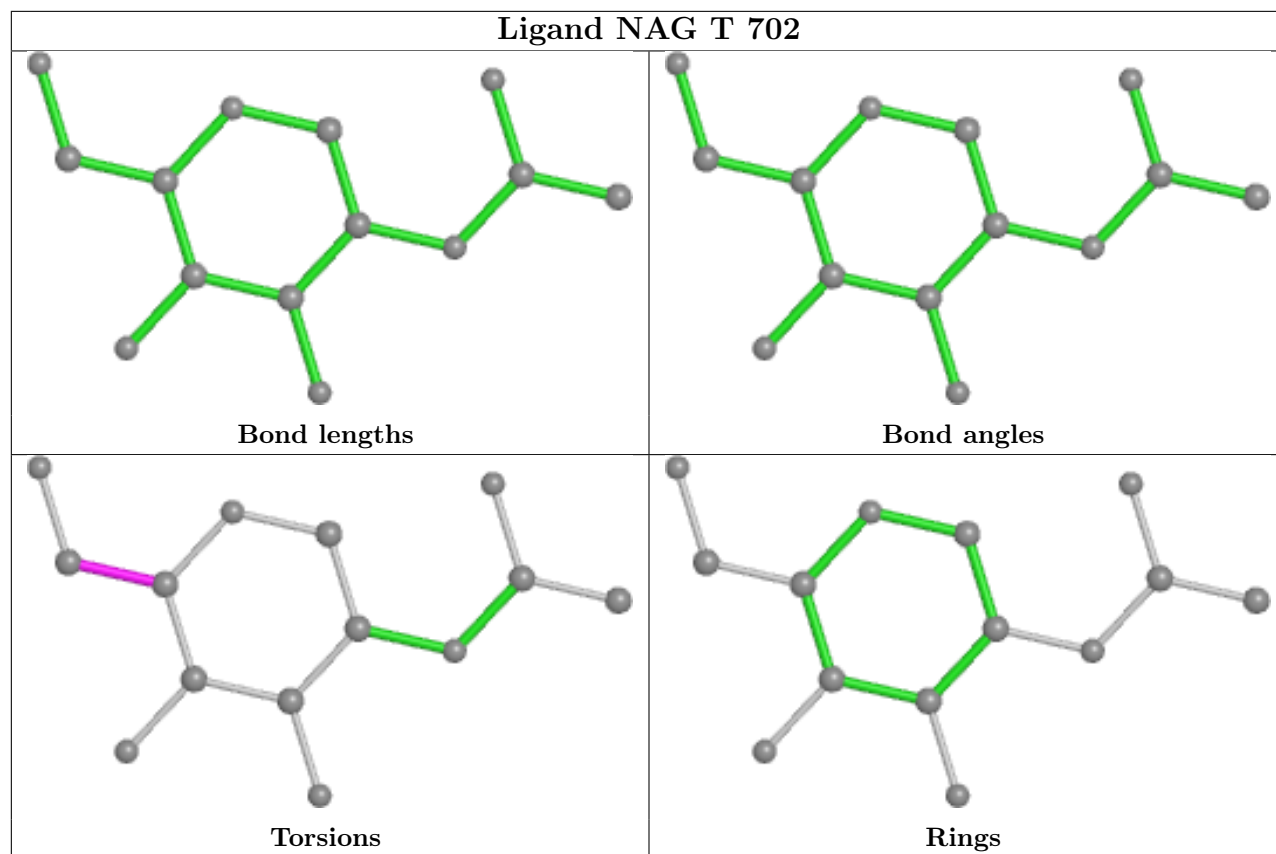












#### 4.7 Other polymers [i](#)

There are no such residues in this entry.

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

There are no chain breaks in this entry.

## 5 Fit of model and data

### 5.1 Protein, DNA and RNA chains

EDS failed to run properly - this section is therefore empty.

### 5.2 Non-standard residues in protein, DNA, RNA chains

EDS failed to run properly - this section is therefore empty.

### 5.3 Carbohydrates

EDS failed to run properly - this section is therefore empty.

### 5.4 Ligands

EDS failed to run properly - this section is therefore empty.

### 5.5 Other polymers

EDS failed to run properly - this section is therefore empty.